



## **MVTS II v. 1.2.0**

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*Operator's manual*

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# MVTS II v. 1.2.0

## VoIP traffic management system

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# Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>9</b>
1.1	DOCUMENT PROFILE .....	9
1.2	AUDIENCE.....	9
1.3	NOTATIONAL CONVENTIONS.....	9
1.4	DOCUMENT STRUCTURE .....	9
<b>2</b>	<b>SYSTEM OVERVIEW .....</b>	<b>10</b>
2.1	SYSTEM ARCHITECTURE AND NETWORKING ARRANGEMENTS.....	10
2.1.1	<i>Switching layer</i> .....	10
2.1.1.1	Traffic Switch functions .....	12
2.1.1.2	Specifications and requirements .....	12
2.1.2	<i>Traffic management layer</i> .....	13
2.1.2.1	TMngr capabilities .....	14
2.1.2.2	TMngr specifications .....	14
2.1.2.3	Hardware and software requirements.....	14
<b>3</b>	<b>MVTS II OPERATION SEQUENCE.....</b>	<b>16</b>
3.1	AUTHENTICATION.....	17
3.2	AUTHORIZATION.....	17
3.3	ROUTING.....	18
3.4	CALL SETUP .....	20
3.5	END OF CALL SESSION, PRE-BILLING.....	21
3.6	NUMBER TRANSLATION SEQUENCE .....	21
3.7	DIAL PEERS AND EQUIPMENT .....	22
3.8	STATISTICS .....	23
3.9	SOFTSWITCH PARTITIONING.....	24
3.9.1	<i>Hierarchy classifiers</i> .....	24
3.9.2	<i>Routing groups</i> .....	25
3.10	ROUTING POLICIES OVERVIEW .....	26
3.10.1	<i>Understanding routing policies by examples</i> .....	27
<b>4</b>	<b>WEB-INTERFACE .....</b>	<b>33</b>
4.1	ACCESSING TMNGR THROUGH WEB-SERVER .....	33
4.2	WHAT YOU SEE ON THE SCREEN.....	33
4.3	STANDARD PROCEDURES .....	35
4.3.1	<i>Pop-up menu</i> .....	35
4.3.2	<i>Use of filters</i> .....	36
4.3.3	<i>Sorting table data</i> .....	46
4.3.4	<i>Re-arranging table columns</i> .....	46
4.3.5	<i>Editing multiple table records</i> .....	47
4.3.6	<i>Data export</i> .....	48
<b>5</b>	<b>OPERATING TMNGR.....</b>	<b>50</b>
5.1	CUSTOMERS/VENDORS .....	50
5.1.1	<i>Customers/Vendors</i> .....	51
5.1.2	<i>Customer authentication</i> .....	53
5.1.3	<i>Vendor Parameters</i> .....	58
5.1.4	<i>Notifications</i> .....	60
5.1.5	<i>Subcategory Administration</i> .....	62
5.1.5.1	System users .....	63
5.1.5.2	Web authentication .....	63

---

5.1.5.3	Role assignments .....	65
5.1.5.4	Roles .....	66
5.1.5.5	Roles setup .....	67
5.1.5.6	Detailed role setup .....	72
5.1.5.7	Web realms .....	73
5.1.5.8	Contacts .....	75
5.1.5.9	Customer-Vendor termination restrictions.....	76
5.1.5.10	Customer/Vendor data removal .....	76
5.1.5.11	Wizards .....	77
5.2	CATEGORY EQUIPMENT .....	78
5.2.1	<i>Equipment</i> .....	78
5.2.2	<i>Equipment groups</i> .....	87
5.2.3	<i>Zones</i> .....	89
5.2.4	<i>Zones setup</i> .....	89
5.2.5	<i>Subcategory Codecs</i> .....	90
5.2.5.1	Codecs.....	90
5.2.5.2	Codec groups .....	91
5.2.5.3	Codec group setup .....	92
5.2.6	<i>Subcategory ENUM</i> .....	93
5.2.6.1	ENUM-register .....	93
5.2.6.2	ENUM-enabled routing groups.....	95
5.3	CATEGORY TERMINATION .....	95
5.3.1	<i>Routing groups</i> .....	96
5.3.2	<i>Dial peers</i> .....	97
5.3.2.1	Enabled flag vs blockings .....	102
5.3.3	<i>Active dial peers</i> .....	103
5.3.4	<i>Subcategory Routing policies</i> .....	104
5.3.4.1	Routing policies .....	104
5.3.4.2	Procedures.....	104
5.4	CATEGORY ORIGINATION .....	108
5.4.1	<i>Rate plans</i> .....	108
5.4.1.1	Billing schemes.....	110
5.4.1.2	Disabled prefix inheritance in child rate plans.....	111
5.4.2	<i>Destinations</i> .....	111
5.4.3	<i>Active destinations</i> .....	114
5.4.4	<i>Rate plans for hosted customers, Destinations for hosted customers</i> .....	115
5.5	CATEGORY DEBUGGING .....	115
5.5.1	<i>Call simulation</i> .....	115
5.5.2	<i>Dial peer hunting</i> .....	116
5.5.3	<i>Call debugging</i> .....	117
5.6	CATEGORY CDRS .....	118
5.6.1	<i>Active calls</i> .....	119
5.6.2	<i>Structure of CDRs</i> .....	120
5.6.3	<i>CDR export</i> .....	125
5.6.4	<i>CDR re-rating</i> .....	127
5.6.5	<i>CDR backup</i> .....	129
5.6.6	<i>CDR removal</i> .....	129
5.7	CATEGORY BILLING.....	131

5.7.1	Subcategory Currency.....	131
5.7.1.1	Currency .....	132
5.7.1.2	Exchange rates .....	132
5.7.1.3	Currency loader.....	133
5.7.2	Accounts .....	135
5.7.3	Payments.....	138
5.7.4	Settlement groups / Settlement schemes.....	139
5.7.5	Scheduled account debiting .....	141
5.7.6	Account debiting log.....	143
5.7.7	Subcategory Invoices.....	143
5.7.7.1	Invoice generation/deletion.....	143
5.7.7.2	Invoices.....	145
5.7.7.3	Taxes.....	146
5.7.7.4	Detailed invoices.....	147
5.7.7.5	PDF templates.....	151
5.8	CATEGORY STATISTICS.....	152
5.8.1	Active calls by customers / Active calls by vendors.....	153
5.8.2	ASR by customer/vendor.....	154
5.8.3	ASR by SRC/DST IP .....	157
5.8.4	ASR by SRC/DST equipment.....	159
5.8.5	Statistics by time.....	162
5.8.6	Settlements by customer/vendor .....	165
5.8.7	Profitability reports.....	167
5.8.8	Top areas.....	170
5.8.9	Custom reports .....	172
5.8.10	Reports for rate plan preparation.....	175
5.8.11	Charts .....	177
5.9	CATEGORY GLOBAL SETTINGS.....	179
5.9.1	System global settings.....	180
5.9.2	GUI settings.....	185
5.9.3	Disconnect codes.....	186
5.9.4	Global area names.....	187
5.9.5	ASR notification thresholds .....	188
5.9.6	Global LAR settings.....	188
5.9.7	USA states NPA-NXX.....	189
5.9.8	Calling party category.....	190
5.9.9	Disconnect sound options.....	191
5.9.10	DNS servers.....	192
5.9.11	RADIUS servers.....	193
5.9.12	Mail servers.....	194
5.9.13	Data import .....	195
5.9.14	Web password settings.....	199
5.10	CATEGORY LOGS.....	200
5.10.1	Application log .....	201
5.10.2	Login history.....	202
5.10.3	Web activity log.....	203
5.10.4	Notification log.....	203
5.10.5	Scheduler log.....	204
5.10.6	CPU usage log.....	205
<b>6</b>	<b>APPENDIX A. METACHARACTERS, REGULAR EXPRESSIONS AND NUMBER TRANSLATION .....</b>	<b>207</b>
6.1	USE OF METACHARACTERS IN SEARCH.....	207
6.2	USE OF REGULAR EXPRESSIONS IN SEARCH .....	207

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6.3	NUMBER TRANSLATION .....	208
<b>7</b>	<b>APPENDIX B. MVTS II LOCAL DISCONNECT CODES .....</b>	<b>211</b>
7.1	TS LOCAL DISCONNECT CODES .....	211
7.2	TMNGR LOCAL DISCONNECT CODES .....	212
<b>8</b>	<b>APPENDIX C.MVTS II CODEC SORTING AND PROXYING .....</b>	<b>214</b>

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## Terms and acronyms

AAA	Authentication, Authorization, and Accounting
ACD	Average Call Duration
ASR	Answer Seizure Ratio
BS	Billing scheme
CDR	Call detail record
CPC	Calling party category
CSV	Comma separated values
Customer	Customers are ITSPs or carriers that originate traffic and pay the MVTS II SysO for the delivered service.
DB	Database
DBMS	Database management system
DNS	Domain Name System
DP	Dial Peer
DST	Destination
EMA	Exponential moving average
ENUM	Telephone Number Mapping (from <b>TE</b> lephone <b>N</b> umber <b>M</b> apping.) A suite of protocols to unify the telephone numbering system E.164 with the Internet addressing system DNS
GK	Gatekeeper
GUI	Graphical User Interface
GW	Gateway
HC	Hierarchic classifier
HTTPS	HyperText Transfer Protocol, Secure
ITSP	Internet telephony service provider
MERA SIP HIT	Add-on module for the MVTS session border controller. The SIP-HIT's intent is SIP/H.323 conversion.
MNP	Mobile Number Portability
MVTS	Mera VoIP Transit Softswitch
MVTS II	Next generation VoIP traffic management system described and explained in this document
NIC	Network Interface Card
NPA	Numbering Plan Area. A 3-digit code that designates one of the numbering plan areas in the NANP (North American Numbering Plan) for direct distance dialing.
OCI	Oracle Call Interface
PDD	Post Dial Delay
QoS	Quality of service. The System calculates QoS as a ratio of packets delivered to total packets transferred.

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RG	Routing group
RP	Rate plan. RP is a schedule of prices charged for passing traffic. There are two kinds of RPs in the System Vendor RPs and customer-facing RPs. Vendor RPs comprise destination prices that the SysO pays for delivery of MVTS's egress traffic. Customer-facing RPs are rate plans with prices that the SysO charges customers for traffic delivery.
SBC	Session Border Controller
SysO	SysO is a single acronym used to denote the System operator and owner alike. Plainly speaking, SysO is a person or business entity who/that owns/operates the MVTS II system for wholesale VoIP traffic management. Individuals or businesses that rent a portion of the MVTS II wholesale traffic capability (switch partitioning) are Customers in the perspective of the MVTS II principal owner and System operators from the operational standpoint and are also referred to as SysOs in this document.
System	The word System is used in this document to refer to an MVTS II facility employed by its owner/operator to deliver service
TCD	Total Calls Duration
TMngr	TMngr. TMngr is the MVTS II core element designed for call routing, analysis of data streams passage along the routing paths with allowance made for QoS and profitability and ensuing optimization of traffic distribution among the route alternatives.
TNS	Target namespace
TS	Traffic Switch – is an application functioning as a session border controller that handles calls under the control of TMngr
Vendor	Vendors are ITSPs or carriers that accept the MVTS II egress traffic for termination or further relay and receive payments from the SysO for the service they deliver. Vendors can also be Customers if they reciprocate traffic with the SysO.
VoIP	Voice over Internet Protocol

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# 1 INTRODUCTION

## 1.1 DOCUMENT PROFILE

This document provides an overview of the MVTS II application, a carrier-grade solution for efficient policy routing of VoIP traffic.

## 1.2 AUDIENCE

This document is intended for Internet telephony service providers interested in finding a resolution to complex transit problems and administrators responsible for deployment, operation and maintenance of MVTS II systems.

## 1.3 NOTATIONAL CONVENTIONS

The conventions used in this document are described in Table 1 below.

**Table 1: Conventions**

Example	Convention
<b>Note:</b> <i>text</i>	Important information requiring special attention
[N]	Reference to some other document
void	Examples of source code, program output, logs, configuration files etc.
<b>Ulimit</b>	Names of programs or files

## 1.4 DOCUMENT STRUCTURE

This document comprises the following sections:

**Section 1 Introduction** contains general information about this document, its structure and the conventions used in explanation.

**Section 2 System overview** provides a description of the system functionality, specifications, architecture, hardware and software requirements

**Section 3 MVTS II operation sequence** details basic operating procedures for the system.

**Section 4 Web-interface** provides overview of the TMngr web-interface and details standard operation procedures.

**Section 5 Operating TMngr** leads you through the particulars of Traffic Manager administration.

## 2 SYSTEM OVERVIEW

MVTS II is a system for comprehensive management of IP telephony traffic flowing across the ITSP's network. MVTS II is designed to efficiently handle big amounts of simultaneous call sessions through application of adaptive call authorization and routing policies.

### 2.1 SYSTEM ARCHITECTURE AND NETWORKING ARRANGEMENTS

The MVTS II system includes two functional layers: a switching layer comprised of traffic switches (TSs), and traffic management layer (see Fig. 1.) In what follows the traffic management layer for simplicity is referred to as Traffic Manager (TMngr.)

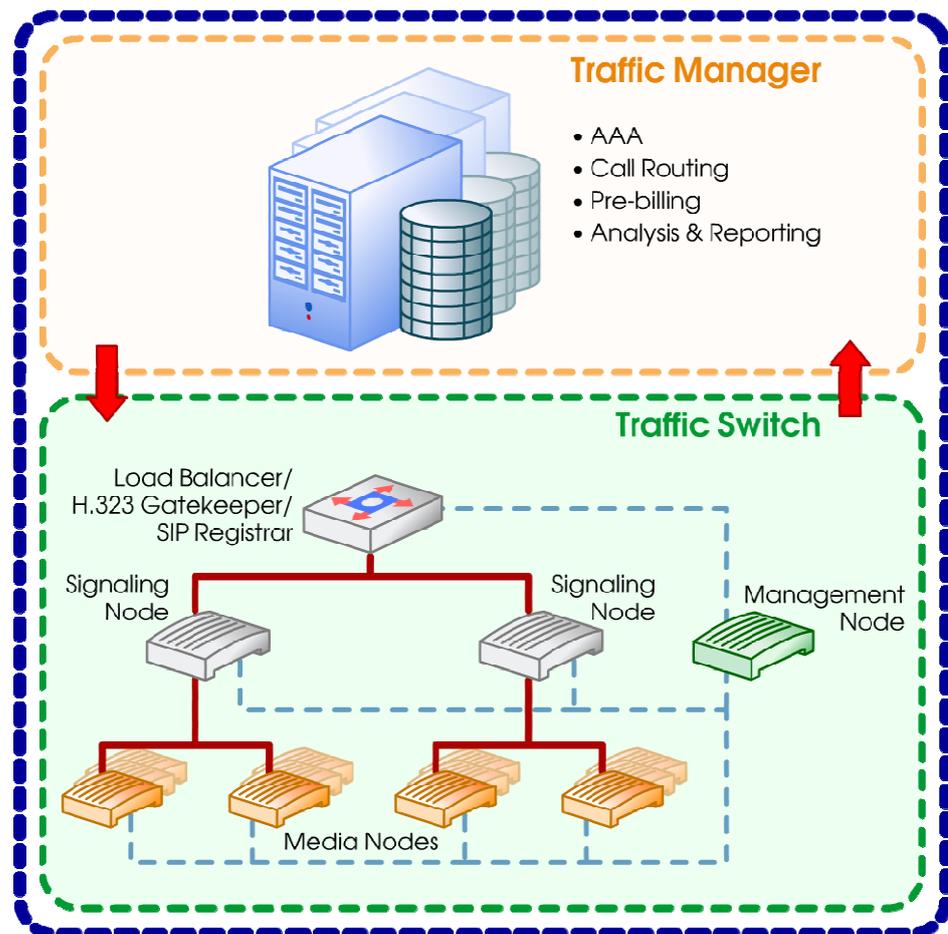


Fig. 1 MVTS II-based solution architecture

The distribution of operational functions among the MVTS II key components is as follows: The job of TMngr is to keep and furnish data about available routing paths as well as provide traffic balancing rules for termination equipment. Traffic switches perform all information processing and call handling.

#### 2.1.1 SWITCHING LAYER

Traffic Switches of the switching layer handle SIP and H.323 calls and perform two-way conversion of signaling protocols and voice codecs when necessary. Each TS is a full-featured session border controller (SBC) that provides a secure connectivity interface with end customers and peering partners, enables interoperability of multi-vendor equipment,

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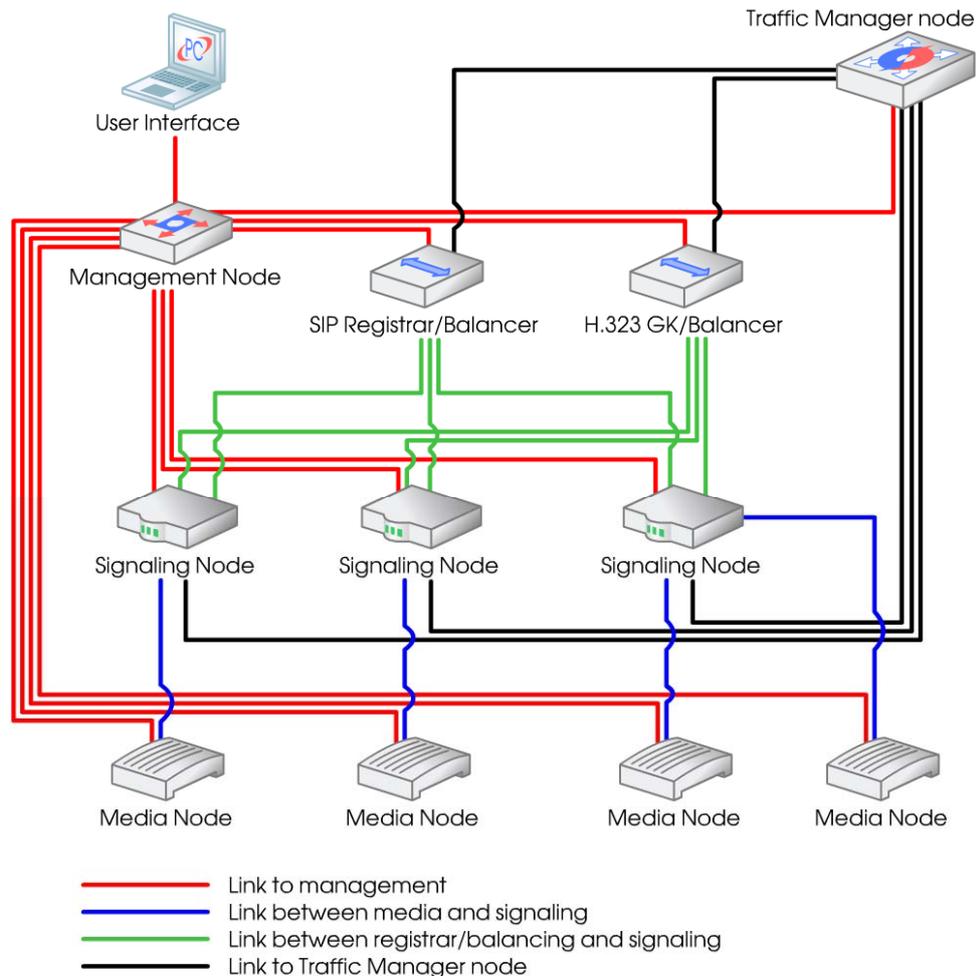
conceals the network topology and assures protection from DoS attacks. Additionally, every TS is the primary source of call statistics that is analyzed and visualized by means of the TMngr.

An individual TS comprises the following functional modules (nodes), each module being an independent software application:

- **Management node** keeps all configuration data, provides centralized control over other functional modules and serves as a collection point for the System statistics
- **SIP registrar/balancer and H.323 gatekeeper/balancer.** These nodes handle registration requests and provide for load balancing between the signaling nodes. When a user (calling device) tries to register to the System, the relevant data is forwarded to the TMngr. Depending on the response received from the TMngr the registration request is either accepted or rejected. Load balancing is based on the current call per second rate of each signaling node.
- **Signaling node** provides two-way conversion of SIP/H.323 signaling protocols and traffic distribution (load balancing) between media nodes based on the current CPU load of the server hosting each signaling node. One signaling node can work with any number of media nodes.
- **Media node** – the job of a media node is to handle media flows, function as an RTP media proxy and perform conversion of voice codecs. The number of media nodes needed in an MVTs II system depends on the anticipated number of concurrent call sessions that involve RTP media proxy operation.
- **Command line node** is a telnet server that allows users to log on to a switching host using any telnet client.
- **Traffic Manager node** ensures interaction between the TS and TMngr by means of DBMS clients. It is also responsible for interaction with external billing systems and ENUM registers, codec sorting and distributing calls between termination devices within equipment groups.
- **Syncro node** ensures synchronization of the System processes and control over the used resources. The synchro node interoperates with the signaling and traffic manager nodes.

Depending on the System capacity requirements TS functional modules can run on dedicated servers or share a single hardware platform. For instance, with the traffic load of several dozens simultaneous call sessions a single-server installation will perfectly do the job. In case of larger traffic loads, you can allocate individual servers for, say, media nodes, the most demanding application in terms of computing power.

Fig. 2 shows the general layout of the switching layer.



**Fig. 2 Switching layer organization**

### 2.1.1.1 Traffic Switch functions

Below is an overview of TS functionalities:

- SIP (RFC3261) and H.323 v2 - v4 call handling, two-way conversion of the signaling protocols;
- Conversion of voice codecs (G.729, G723.1, G.711A/U, GSM FR, Speex, iLBC);
- Support of IP version 6
- RTP media proxy options (full proxy and signaling proxy operation only)
- Fully distributed architecture (assures enhanced dependability and almost unlimited scalability of the System.)
- Command-line interface for system administration.

### 2.1.1.2 Specifications and requirements

#### 2.1.1.2.1 Hardware and software requirements

Traffic Switch is designed to run on Debian GNU/Linux Etch (kernel 2.6).

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Owing to the distributed architecture of the switching layer the hardware requirements for the platform intended to host the system fully depend on the projected system performance and the selected method of redundancy.

#### 2.1.1.2.2 *Capacity*

The System capacity varies with the number of concurrently running signaling and media nodes. The following performance figures are given for deployments where the signaling and media nodes run on separate servers with Dual PIV 3.0 GHz/ 2 GB RAM with 1 Gbps and above networking interfaces.

##### **Signaling node**

- Up to 3500 concurrent call sessions
- Traffic growth rate up to 50 new calls per second
- Post Dial Delay: 30 ms and below

##### **Media node (when installed on a dedicated server)**

- Up to 1000 calls during proxy operation without codec conversion
- From 150 to 500 calls with codec conversion
- Media traffic latency from 10 to 100 ms depending on the operation mode (i.e. with or without codec conversion)
- From 100 to 200 calls with codec conversion

##### **SIP registrar/balancer and H.323 gatekeeper/balancer**

- Up to 1000 simultaneous registrations
- Up to 100 new registrations per second
- Registration handling latency: 500 ms and below

#### 2.1.1.2.3 *Scalability*

The capacity of a TS can be scaled up by adding more nodes. Additional nodes can be installed both on single- and multi-processor platforms.

#### 2.1.1.2.4 *Fault tolerance*

The fault tolerance of the TS is ensured by the possibility to start and run several modules of identical functionality (signaling and media nodes). In addition, TS features a background autorecovery service called “phoenix”, designed to restore the module serviceability in case of a failure.

### **2.1.2 TRAFFIC MANAGEMENT LAYER**

**Traffic Manager (TMngr)** is the core element of MVTs II, and the System’s intellect.

TMngr carries out authentication and authorization of VoIP equipment, does call routing, call analysis, validation and transformation of call numbers, traffic load balancing. In addition, TMngr performs QoS control functions and pre-billing, i.e. generation of information required for external billing systems.

TMngr comprises two constituents:

- **Database** based on the ORACLE™ technology. The DB is a repository of data necessary for call routing and analysis of statistics.
- **Web server (WS)** provides a convenient graphical interface for administration tasks and customer access.

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### 2.1.2.1 TMngr capabilities

TMngr features an advanced call routing mechanism, elaborate network analysis and reporting tools. TMngr has a fully distributed architecture that assures almost unlimited scalability and flexibility in terms of fault-tolerance and redundancy.

The System:

- based on the destination number draws up a list of routing path alternatives with consideration for termination costs and service quality. Search of termination options depends upon recognition of the tariff zone prefix in the destination number.
- performs least cost sorting of routing path alternatives
- allows the operator to implement customized routing policies
- features flexible customer authentication and authorization management. The System allows the operator to impose customer-, destination-, peering partner- and time-based call restrictions
- performs translation of source and destination numbers according to configured number transformation patterns
- carries out call completion data analysis for exclusion of bad paths from routing options
- performs traffic overload assessment for routing paths and assures load balancing
- keeps various statistical parameters (number of calls, ASR, ACD, QoS, etc.) for dial peers and gateways
- allows for creation and modification of customers' rate plans and discounts that the SysO offers to customers
- keeps a record of vendor rate plans and discounts offered by termination partners (vendors)
- provides graphical and tabular representation of operational statistics: peak and current System loads, total number of calls, average call duration, total calls duration, ASR, QoS, etc
- calculates dynamic statistical parameters as EMA (exponential moving average) and allows configuration of the EMA period
- supports mobile number portability, inter/intrastate routing and other specific features.

### 2.1.2.2 TMngr specifications

- Average response latency: 60 ms
- Supported dial peers (traffic termination opportunities): 10 mln and above
- Traffic growth rate (new calls per second): 70
- Number of authentication objects: not limited
- Authentication rate (authentications per second): 300 and above with the total population of ID records amounting to 1'750'000
- Authentication and authorization latency: 60 ms and below with the total number of ID records 2 mln
- Number of users simultaneously accessing the web-server: 1000
- Number of destinations in a customer-facing rate plan: not limited
- Number of identified equipment per one vendor: not limited
- System dependability: 99.99%.

### 2.1.2.3 Hardware and software requirements

The TMngr DB software runs on the following operating systems:

- 
- SUSE Linux Enterprise Server (SLES) 9
  - SUSE Linux Enterprise Server (SLES) 10
  - Red Hat Enterprise AS/ES 5
  - Red Hat Enterprise AS/ES 4
  - Red Hat Enterprise AS/ES 3

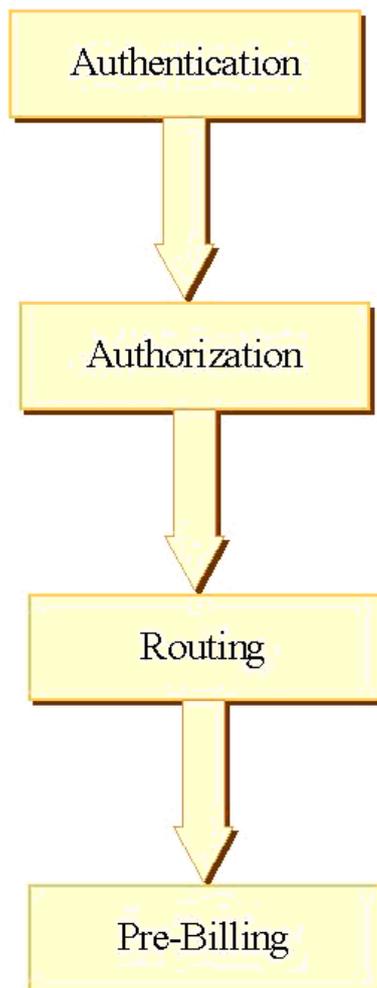
The following server specification is capable of supporting the traffic growth rate of up to 70 calls per second with the number of configured dial peers (DPs) of up to 10'000'000:

- Double AMD Opteron or Double Xeon CPU 3.0GHz
- 8Gb RAM
- RAID 0+1 of 4 15000rpm SCSI disks
- 1Gb Ethernet

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### 3 MVTS II OPERATION SEQUENCE

Responding to a new call, the TS sends TMngr a call authorization and routing query. TMngr checks the query data against the information stored in the database and acts in accordance with the authorization, billing and routing instructions configured for the call originator. The diagram below shows the stages of MVTS II operation sequence.



**Fig. 3 MVTS II operation sequence**

---

## 3.1 AUTHENTICATION

At the authentication stage TMngr proceeds through the following stages.

- On the receipt of a query from the switch, TMngr first initiates authentication of the origination customer. TMngr can authenticate the calling entity by:
  - User agent ID and password
  - IP address and network mask
  - technical prefix
  - source or destination numbers
  - NAT router IP address
  - or any combination of the above criteria

The System performs authentication only by the parameters defined in the authentication record (applying the condition 'AND'). All other parameters that may be present in the authentication query are ignored. To explain this, let us assume the configured authentication parameters are IP address and source number. Now, if the authentication request received from the TS contains, for instance, a technical prefix in addition to the IP address and source number, the system will authenticate the user by the IP address and source number only, ignoring the technical prefix.

There can be several authentication records associated with the same origination device thus making the application of different rate plans or detailed logging dependent of the call parameters received in the authentication request (use of the condition 'OR'.)

- If the calling party is identified and its account is not blocked, TMngr performs translation of the source and destination numbers according to number transformation patterns defined in the equipment and/or authentication account.
- TMngr determines the rate plan applicable to the customer based on the authentication record for the origination equipment.
- The System then determines the routing group the customer belongs to. A routing group is a number of dial peers among which a routing path is searched first of all. If the appropriate route is not found within the routing group, TMngr continues the search among dial peers in the parent routing group, if any (see section 3.9.2).
- Further, TMngr determines the logging level (degree of information details) for debug logs and goes over to the authorization procedure.

## 3.2 AUTHORIZATION

When the authentication process is over, TMngr performs authorization. The progress of the authorization procedure is as follows:

- Based on the obtained authentication data the System searches the customer's rate plan for a record that includes the best match for the call destination number prefix.
- Using the destination number prefix found in the rate plan TMngr determines the price of service for the customer. The System supports inheritance of rate plans and, therefore, there can exist parent rate plans and child rate plans. Search for destination-dependent price data always starts in the customer rate plan and continues in the parent rate plan, if any.
- Based on the ASR value defined in the customer's rate plan, TMngr determines the ASR value for potential routing paths.
- The ASR value of a potential routing path cannot be below the value determined in the corresponding Destination of a rate plan.

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The System also allows the operator to set the profitability flag for low-rate plans (normally, such economy rate plans imply reduced quality of service) where destination rates are close to those charged by termination providers. With the profitability flag set, the System sends calls only to dial peers where rates are lower than the costs of the origination customer. More “expensive” rate plans in some cases allow the System to route calls to termination providers with rates exceeding those specified in the customer-facing rate plan. The profitability of operations under such rate plans is maintained at the sacrifice of the overall profitability of the main bulk of handled calls.

- Next the System determines the billing scheme specified in the rate plan and switches to the routing procedure (for information about billing schemes refer to section 5.4.1).

### 3.3 ROUTING

Below are the steps of the routing procedure.

#### Stage 1. Looping detection

- TMngr first checks the call for looping. Call looping may occur when the call forwarded to the termination provider returns to the switch with a renewed routing request. The returned call may come back directly from the immediate partner-provider or after having passed through a chain of other carriers and with a number of technical prefixes added to the destination number.

The looping prevention function of TMngr serves to preclude such situations. The System determines the number of undertaken routing attempts N and during subsequent routing excludes the first N routing paths from the list of routing options, i.e. the call will be forwarded to some other service provider. The System has the capability to alert the operator to call looping by means of e-mail notifications (configurable).

#### Stage 2. Search of termination alternatives belonging to the same vendor

- The System first finds termination alternatives (dial peers) belonging to the same service provider (provided that there are no customer-vendor restrictions, see section 5.1.5.9). The *main* selection criterion at this stage is the dial peer prefix. Per minute rates and quality aspects, such as ASR or ACD or QoS values are not taken into account. The DP records corresponding to potential routing paths should:
  - be enabled, i.e. the check box **Enabled** should be selected;
  - have an appropriate prefix, for instance, if a vendor has dial peers with prefixes 52, 521, 5212, 52123 and the number dialed is 521288889999, the dial peers with prefixes 52, 521, 5212 will be chosen;
  - have an appropriate validity term, i.e. the dates in the **Valid from/Valid till** fields should not be later/earlier than the current date, respectively;
  - belong to the routing group assigned to the originator or a group of a superior hierarchy level\* (parent routing group);
  - the length of the destination number should not exceed the minimum and maximum configured for the dial peer (optional);
  - the dial peer is of appropriate inter/intrastate type (optional, see section 5.9.7);
  - if the dial peer is configured for scheduled operation, it should be currently active

---

*Note: The search of dial peers in parent routing groups can be disabled (see section 5.1.2)*

---

- From the resulting list of routing path options TMngr selects only one according to the following criteria:
  1. the dial peer has a prefix which is the best match (longest) for the destination number, i.e. out of dial peers selected in the example above the dial peer with prefix 5212 will be chosen, *even if the per minute rate set for this dial peer is higher than that of the others*;
  2. if several dial peers of the same vendor have the same prefix, the dial peer belonging to the routing group with the lowest hierarchy level (the deepest child group) is selected;
  3. of several dial peers within the same routing group the System picks the scheduled one, and of several scheduled dial peers the one with the highest schedule priority;
  4. then of several dial peers the System selects the newest one, i.e. the dial peer with the latest date in the **Valid from** field but not later than the current date;
  5. if still several dial peers belonging to the same vendor meet the above requirements, the System - to provide for equal load sharing - will select the one that has been idle longer.

The result of this process is a list of termination alternatives where *each termination provider is represented by one routing path only*.

### **Stage 3. Analysis of routing paths belonging to different vendors**

- Then the System scans the resulting list and excludes:
  - dial peers with the **Blocked** check box selected;
  - dial peers that do not meet the profitability requirements defined in the table **Destinations**;
  - dial peers statistics do not satisfy the required ASR or ACD or QoS, etc. values defined in the table **Destinations**;
  - dial peers affiliated to the call originator, i.e. to the providers who act both as a customer and a termination partner, if the **Ignore own dial peers** checkbox in the **Customer authentication** dialog box is selected (see section 5.1.2);
  - dial peers affiliated to vendors whose settlement schemes have lower precedence than the settlement scheme of the call originator (optional, see section 5.7.4);

### **Stage 4. Final sorting**

- At this stage Traffic Manager sorts the routing paths in order to place the optimal ones in the beginning of the list. The dial peers are sorted by:
  1. routing group hierarchy - starting from the deepest child group to the top parent group;
  2. dial peer precedence - the higher is the precedence, the closer is the dial peer to the beginning of the list;
  3. TS actions defined in the DP records: Stop hunting (highest priority) > Stop hunting after this DP > Normal (lowest priority);

- 
4. the rest of the dial peers are sorted in accordance with the current routing policy. The default routing policy is LCR (least cost routing). During LCR TMngr arranges dial peers for termination from the lowest to the highest rates. Other types of routing policies are customizable and the SysO can easily switch between them (see section 3.10).
- In case of looping the System excludes from the resulting list of route alternatives the first N routing options that cause looping.
  - Then TMngr truncates the resulting list leaving the first six\* dial peers only and sends it to the trafficmanager node for further processing.

---

*Note: Six is the default number of dial peers on the list, but it can be changed with the help of the parameter “Max routes number”, see section 5.9.1.*

---

### **Stage 5. Route processing on TS**

- After the call authorization simultaneously with execution of the native routing procedure by Traffic Manager the trafficmanager node sends routing requests to the ENUM registers configured in the DB (see section 5.2.6). If the trafficmanager node receives a route from any of the ENUM registers it places the route in the beginning of the list of routing paths.
- Then the trafficmaner node performs such procedures as number translations, codec sorting, etc. and finally sends the list of routes to Traffic Switch.
- The dial peer data is processed in the same order it was received from DB:
  1. In case of a failure to establish the connection through the dial pear with the type "Normal", Traffic Switch will send the call to the next dial peer in the list (provided that an appropriate disconnect code is received, see also section 5.9.6).
  2. If a dial peer with the type “Restricted” is encountered, it will be ignored by the Traffic Switch, as well as the rest of dial peers in the list that follow this dial peer.
  3. If a dial peer with the type “Priviledged” is encountered, it will be tried for termination by the Traffic switch, but all the rest of dial peers in the list will be rejected.

## **3.4 CALL SETUP**

When call setup occurs, TMngr proceeds as follows:

- On a successful call setup TMngr decreases the current capacity value of the equipment involved in the call termination and
- Further, TMngr analyzes the reasons for termination failures.

While handling the call TMngr sends the TS information about termination possibilities selected in compliance with the routing policy (refer to 3.3.) The TS successively tries to terminate the call via every DP on the list.

Now, suppose call termination proved successful with the third DP on the list only. Naturally, the two previous DPs are regarded as failures, and TMngr performs ASR adjustments for the failed routing paths. The termination alternatives that follow the successful DP in the list are disregarded. Information about failed attempts is registered in the table of CDRs

- 
- Finally, TMngr decreases the available capacity of the successful DP and adds an entry to the table of active calls.

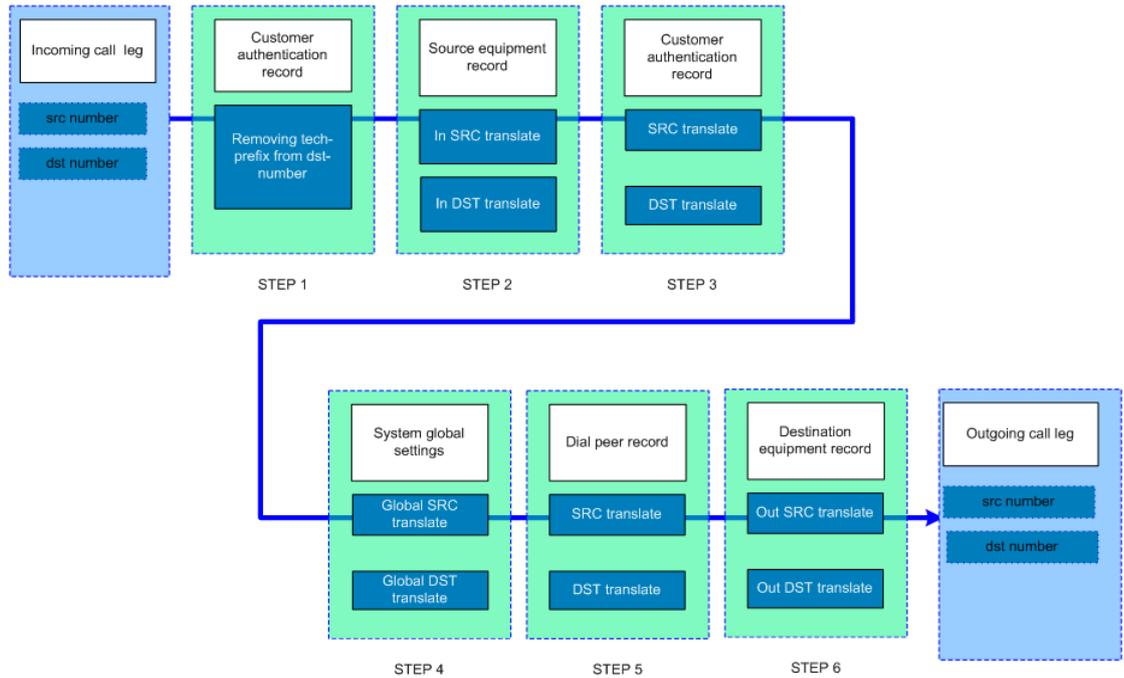
### **3.5 END OF CALL SESSION. PRE-BILLING**

Upon call completion, the TS sends TMngr information about call duration and other session-related data. Following this TMngr:

- removes the record pertaining to the call from the table of ongoing call sessions;
- increases the available capacity of the DP used for call termination and updates other DP statistics;
- calculates the cost of service for the customer (amount receivable) and the SysO (amount payable) based on the applied billing schemes and applicable discounts. After that TMngr debits the calculated amount to the customer's account and credits the due amount to the vendor's account; The results of the calculation can also be exported to an external billing sy
- accounts updated, TMngr checks the customer's account balance. In case the amount has reached the configured notification value, the System sends the customer a low-balance notification.
- checks if the balance has reached the configured minimum amount. In case the minimum is reached, TMngr blocks the customer's access to services and generates an appropriate e-mail notification.
- enters all the call-related data in the table "CDRs".

### **3.6 NUMBER TRANSLATION SEQUENCE**

During call processing source and destination numbers received on the incoming call leg can undergo several transformations in compliance with the respective settings configured in the TMngr DB. The figure below shows the call stages where number translation can take place and the parameters involved.



**Fig. 4 Number translation sequence**

All number transformations for real calls are performed by the trafficmanager node. Number transformation for dial peer hunting and call simulation procedures is done by the DB engine.

### 3.7 DIAL PEERS AND EQUIPMENT

Every DP can be represented by either a single device that handles destination-bound traffic from MVTS II or a number of such devices united in an Equipment Group. An important difference between individual devices and devices united in a group is that:

- a. all devices within an Equipment group must belong to the same vendor, but on the other hand,
- b. there may exist only one DP in the Routing group that belongs to the same vendor and has the same prefix (area code).

Thus, if there is a need to balance traffic among more than one device belonging to the **same vendor**, the only configuration choice is to create a group of such devices and create ONE DP pointing to this group.

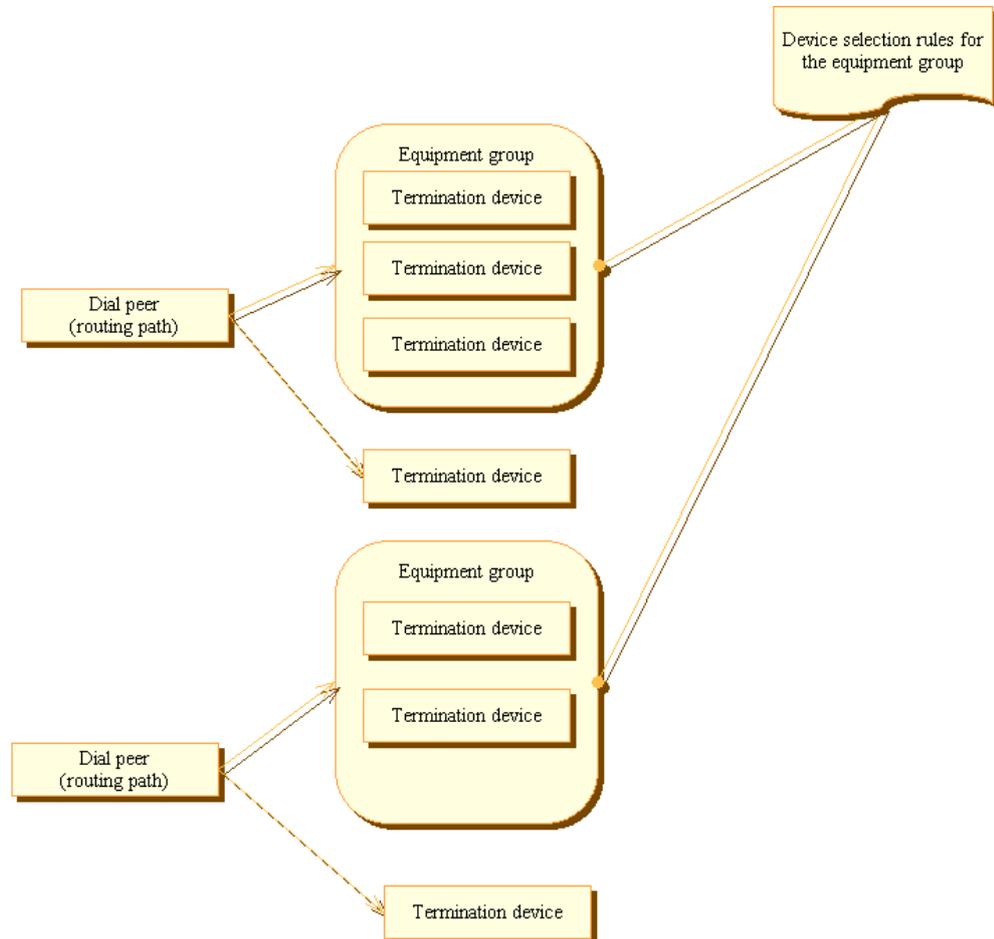
If there is a need to balance traffic among several devices belonging to **different vendors** – one must create as many DPs as there are devices (vendors), Equipment groups will not work in this case.

When a DP points to a group of devices, there must exist a rule how termination alternatives are tried within the group. Each group of equipment may be assigned a rule that governs selection of a device that will handle traffic. A device for termination within the equipment group may be picked in a round robin fashion, randomly or according to the load balancing/priorities principle.

In addition to determining device selection rules, the operator can configure the maximum number of devices that will be tried for termination, after which the System will abandon

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further attempts to complete the call through the current DP and select some other DPs when the selected call-handling devices turn out to be unreachable or respond with one of disconnect codes for which re-routing is enabled.



**Fig. 5 Equipment selection rules**

### **3.8 STATISTICS**

TMngr features a spectrum of tools for the analysis of statistical data that provide information about the System performance and allow real-time monitoring of such parameters as the total number of handled calls, route load, ASR, ACD, QoS, CPS, etc. To enhance the topicality of statistics the majority of key statistical data is calculated as EMA (exponential moving average). Real-time data can be viewed in the following tables:

- Customers/Vendors
- Vendor parameters
- Equipment
- Equipment groups
- Dial peers
- Destinations

Along with real time data there is a possibility to generate a variety of statistical reports and graphs with the help of the objects found of the category **Statistics**.

### 3.9 SOFTSWITCH PARTITIONING

MVTS II allows several service providers to share the System's traffic management capability. The SysO may choose to render hosting services by granting out portions of the System's ample operational capacity on lease. Sharing of the MVTS II operational resources is achieved through partitioning of the System's logical structure. The use of a hosted softswitch allows small ITSP businesses that service individuals and organizations to get access to the operational capacity of an industry-grade session controller without any material investment in the network infrastructure.

ITSPs that buy hosted softswitch services offered by the SysO can create their own rate plans, dial peers and provide traffic delivery service (including hosted softswitch service) as if they operated a switching facility of their own.

The softswitch partitioning is possible thanks to the use of hierarchic classifiers and routing groups.

#### 3.9.1 HIERARCHY CLASSIFIERS

Every System user receives a hierarchy classifier (HC) at the time of creating the user's account. The HC indicates the user's position in the hierarchy of System users and provides an additional tool of managing user access to the information stored in the DB along with user roles and rights.

The hierarchy of TMngr users is a tree-like structure at the top of which is the SysO with HC 01. When the SysO creates new user accounts the newly added users are assigned HCs 01.01, 01.02, 01.03, where the first part of the classifier identifies the parent user while the second figure delimited from the first part of the HC by a period represents the user's number in the hierarchy level. Likewise HCs 01.01.01, 01.01.02, 01.01.03 will be assigned to users added by the parent user with HC 01.01. Therefore, the longer is the HC the lower is the user's level in the hierarchy (see Table 1).

System users have access to information about all child/grandchild/grand-grandchild/etc. users within the bounds of their home partitions (sub-partitions). The amount of partitions and nested sub-partitions is limited by the computing power of the TMngr hardware only.

**Table 1 Hierarchy classifiers**

User 01 (Hierarchy Parent)						Level I
User 01.01 (child)	User 01.02 (child)		User 01.03 (child)			Level II
User 01.01.01 (grandchild)	User 01.02.01 (grandchild)	User 01.02.02 (grandchild)	User 01.03.01 (grandchild)	User 01.03.02 (grandchild)	User 01.03.03 (grandchild)	Level III
01.01.01.01 (grand-grandchild)	01.02.01.01 (grand-grandchild)	01.02.02.01 (grand-grandchild)	01.03.01.01 (grand-grandchild)	01.03.02.01 (grand-grandchild)	01.03.03.01 (grand-grandchild)	Level IV
	Partition 01.02.01	Partition 01.02.02	Partition 01.03.01	Partition 01.03.02	Partition 01.03.03	
Partition 01.01	Partition 01.02		Partition 01.03			

*For the convenience of sorting data in data tables, numbers that constitute HCs include a leading element (a numeric indicator), that shows the quantity of digits in the number minus 1. For example, single-digit numbers from 0 through 9 are presented as 01 through 09, two-digit numbers from 10 through 99 are presented as 110 through 199, three-digit numbers 100 through 999 as 2100 through 2999 and so on. This means user number 50 added by the SysO will be assigned HC 01.150*

---

### 3.9.2

#### ROUTING GROUPS

A routing group (RG) is a collection of DPs grouped by some criterion, for example, high QoS or termination equipment belonging to a specific service provider. Routing groups allow the SysO to create customized DP tables for individual users and user groups.

During authentication TMngr determines to what routing group the traffic originator belongs and further two operation scenarios are possible depending on the TMngr settings:

- TMngr performs route hunting among the DPs that constitute the routing group only;
- TMngr performs route hunting among the DPs of the group and if the necessary termination option is not found continues the search in the group of a superior hierarchy level (parent routing group).

Routing groups are also instrumental in delivering the hosted softswitch service to customers. When creating user accounts for softswitch renters the SysO can configure:

- customer-specific routing groups
- routing groups including the DPs of a certain Vendor only
- routing groups comprised of high-QoS DPs

The above examples of routing groups are not exhaustive. The SysO creates routing groups at his/her discretion with regard to the applied business model, pursued business policy, relationship with customers and other considerations.

Softswitch renters can create their own routing groups and DP tables necessary for routing the traffic of their clientele. All system users have access to their own routing groups and routing groups of inferior hierarchy levels within the confines of the softswitch logical partition they are using. Refer to Fig. 6 for a diagram illustrating the hosted softswitch service structure.

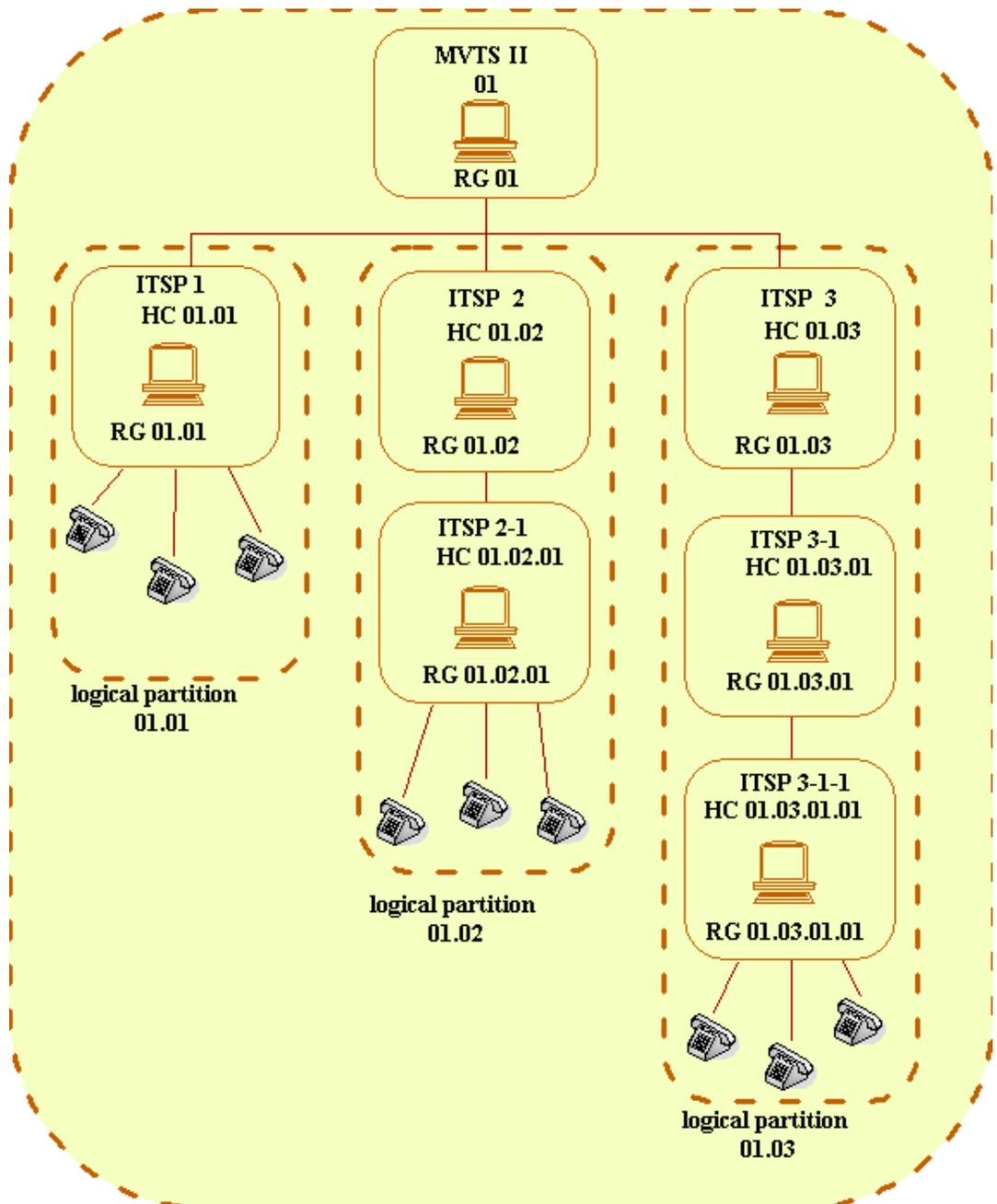


Fig. 6 Rendering hosted softswitch service

### 3.10 ROUTING POLICIES OVERVIEW

This section explains the principles of the MVTs II routing policies.

A number of factors may determine the ‘appeal’ of a dial peer as a potential routing path. Such factors include the cost of termination, ASR, ACD, QoS, PDD, etc. as well as their combinations. For example, a dial peer can demonstrate very good ASR and ACD but very long PDD, which in some cases is unacceptable. However, the above parameters vary in time and a dial peer unworthy at one time may become the best routing option at some other.

Therefore, to provide for more flexible routing in addition to the native least-cost routing, MVTs II features a tool that allows the operator to implement customized routing policies.

### Key terms

There are four key terms required to understand the MVTs II policy-based routing:

- **Routing policy**
- **Procedure**
- **Dial peer appeal value**
- **Additional policy parameters**

**Routing policy** is a rule that enables preference sorting of dial peers during routing. Routing policies are applied to individual destinations that make up customer rate plans.

Preference sorting criteria are determined by PL/SQL **procedures** used in calculation of dial peer **appeal values**. By means of the procedures the operator can manipulate the dial peer attributes to control which dial peer is selected as a routing alternative depending on the current appeal value. A procedure can return up to three values, each of them corresponding to an individual routing policy. There can be up to eight active procedures at a time. Each procedure is applied to an individual group of dial peers (see Example 3 below).

**Appeal values** are presented in the fields Appeal value 1, Appeal value 2 and Appeal value 3 of each dial peer record. During route hunting dial peers are sorted according to the least dial peer appeal value (by analogy with LCR where the less the cost, the more preferable the DP is for termination). On this account the procedures should be designed so as to return *minimum* values.

**Additional policy parameter** is a value that can be configured in every DP to be used as part of formulas in the procedures. Additional policy parameters can represent, for instance, the DP's load sharing values in percentage-based routing procedures.

Table 2 below presents information about GUI objects related to the key terms of routing policies.

**Table 2 Key terms of routing policies and related GUI objects**

Name	Related GUI objects
<b>Routing policy</b>	1. Termination > Routing policies > object Routing policies 2. Origination > Destinations > column/drop-down list box Routing policy
<b>Procedure</b>	Termination > Routing Policies > object Procedures
<b>Dial peer appeal value</b>	Termination > Dial peers > columns/fields Appeal value 1, Appeal value 2, Appeal value 3
<b>Additional policy parameter</b>	Termination > Dial peers > column/field Additional policy parameter

## 3.10.1 UNDERSTANDING ROUTING POLICIES BY EXAMPLES

### Example 1 Appeal-based policies

Suppose, you wish to implement the following routing policies:

- Econom (Routing policy 1). This policy involves sorting dial peers by termination rates, which means regular LCR;

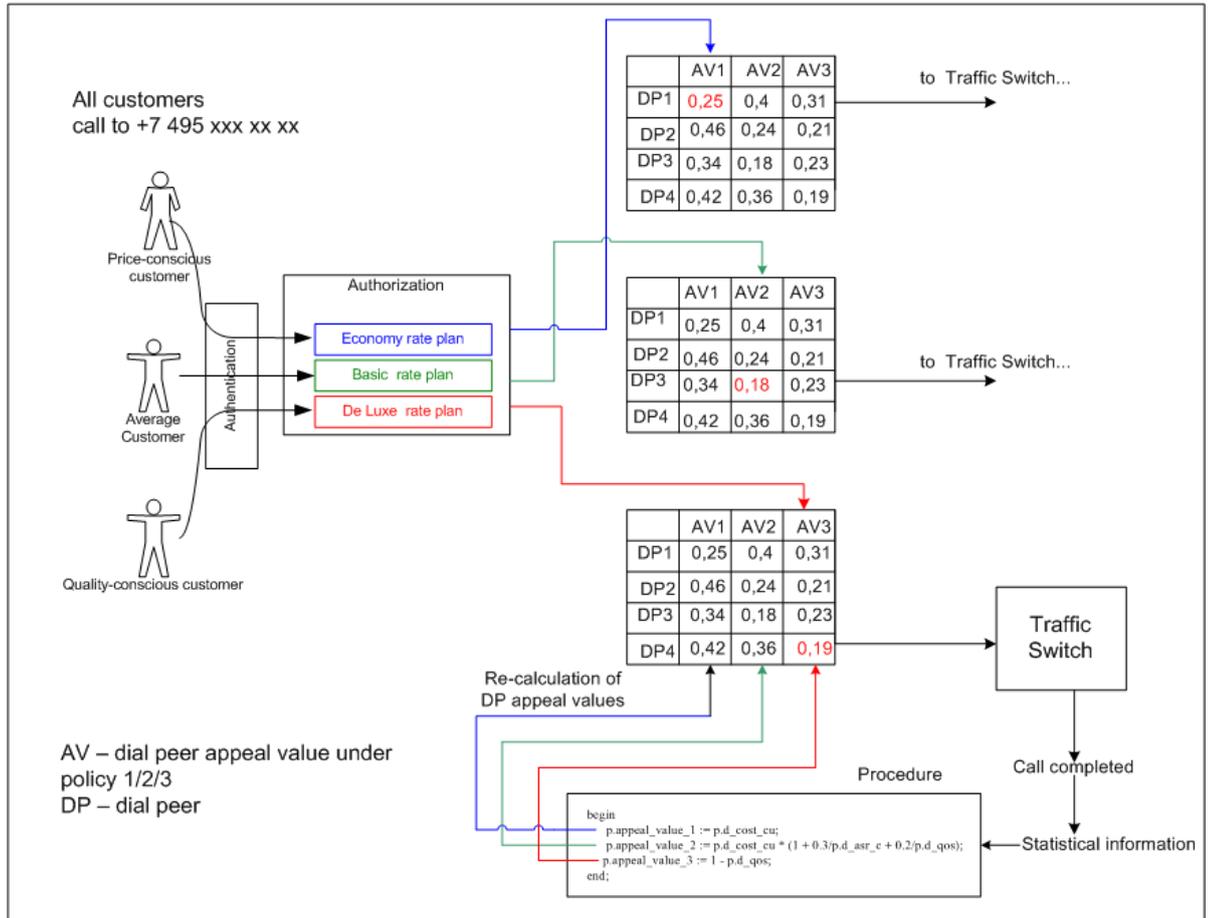
- Basic (Routing policy 2) is a routing policy based on both consideration for quality parameters and termination costs;
- De Luxe (Routing policy 3) is a policy when dial peers are sorted by the service quality regardless of prices.

To implement policy routing involving the above policies, assign the policies to destinations making up customers' rate plans, configure appropriate procedures that calculate preference values and assign them to DPs.

Suppose now that upon arrival of a call route hunting returns several dial peers with the same number prefix and the following "appeal" values:

Dial peer ID	Affiliated to	Prefix	Routing policy 1 (Econom)	Routing policy 2 (Basic)	Routing policy 3 (De Luxe)
1	Vendor A	7495	0.25	0.40	0.31
2	Vendor B	7495	0.46	0.24	0.21
3	Vendor C	7495	0.34	0.18	0.23
4	Vendor D	7495	0.42	0.36	0.19

In such a case the DP with ID 1 will be selected as the routing path under the routing policy "Econom"; the DP with ID 3, will be the best route option under the policy "Basic", and the DP with ID 4 will be the best choice under the routing policy "De Luxe" (see also Fig. 7).



**Fig. 7 Routing policies**

All the three “appeal” values are re-calculated after completion of every call sent through the dial peer.

However, DP appeal values can also be statically defined by the user as described in Example 2 below.

**Example 2 Using routing policies with consideration for differences in billing schemes**

Suppose there are two Vendors, Vendor A and Vendor B providing termination services to the same destinations. Vendor A sells traffic minutes at \$0.1 per minute with a 60 second billing increment, while Vendor B’s rate is \$0.105 with a 1-second billing increment.

Despite the seeming appeal of Vendor A’s dial peers under LCR, the 60-second billing increment applied by the Vendor may in case of large traffic mean higher termination costs for the SysO. To cope up with the situation you can enter a per minute rate adjustment in one of the ‘Routing policy’ fields. The adjustment value is derived by multiplying the actual rate by an adjustment factor. The adjustment factor can be calculated after analysis of the CDR records and estimation of the average per minute rate for the calls terminated to the dial peer.

As the rate offered by Vendor B does not require adjustment substitute 1 for the multiplication factor.

**Example 3 Using routing policies for load balancing**

Assume that the existing “appeal”-based procedure discussed in Example 1 works fine for all dial peers, except DPs for some destination where you want to apply another policy. The reason for this may be that you wish to distribute traffic between several vendors servicing

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the same destination, say UK, in some proportion. With this end in mind you have to make a special procedure and assign it to all dial peers specializing in UK-bound traffic termination.

There are several methods to distribute traffic between dial peers. It is possible to distribute traffic by the amount of calls and by traffic time. To distribute calls evenly between all dial peers, use the following procedure:

```
begin
    p.appeal_value_1 := p.d_total_calls;
end;
where
p.d_total_calls – total number of calls terminated through a dial peer.
```

---

*For complete list of parameters that can be used in procedures refer to section 5.3.4*

---

In the customer rate plan assign the UK destination Routing policy with ID 1. In this case calls will be evenly distributed between dial peers, as the System will always route calls to dial peer with the least total number of currently handled calls.

To configure load balancing by traffic time, write:

```
begin
    p.appeal_value_1 := p.d_total_time;
end;
where
p.d_total_time – total duration of calls terminated to the dial peer.
```

---

*Load balancing is possible only between dial peers with the same prefix. It can turn out that Vendors A, B and C provide termination services to the destinations with prefixes 44 and 44161, while Vendor D only to the destination with prefix 44. In such a case, add an additional dial peer record with the same rate and prefix 44161 for Vendor D (see the table below).*

---

Provider	Rate	Prefix
A	\$0.24	44
A	\$0.35	44161
B	\$0.20	44
B	\$0.22	44161
C	\$0.25	44
C	\$0.30	44161
D	\$0.27	44
D	\$0.27	44161

---

There is also a possibility to proportionally distribute traffic between dial peers by defining the required percentage of traffic to be sent to the dial peer in the field ‘Additional policy parameter’ of dial peer records. In this case write the following procedure:

```
begin
    p.appeal_value_1 := (100 / p.d_policy_param) * p.d_total_calls;
end;
where
p.d_policy_param – value of the “Additional policy parameter” field
p.d_total_calls – total number of calls terminated by a dial peer.
```

The above procedure can be made more reliable, for instance:

```
begin
    if p.d_policy_param <> 0 and p.d_policy_param is not null then
        p.appeal_value_1 := (100 / p.d_policy_param) * p.d_total_calls;
    else
        raise_application_error(-20000, 'The d_policy_param is 0 or NULL');
    end if;
end;
```

Thus, in case the user enters 0 in the field ‘Additional policy parameter’ of the dial peer record or nothing is defined, the procedure will not be applied to the dial peer and its appeal value will not change. At the same time the appropriate message will be added to the application log.

Note that the error code should always be -20000. It is reserved for errors related to routing procedures.

#### **Example 4 Combining load sharing and quality-based policies**

Now, let us consider a more complicated scenario. Assume that you have several customers whose calls should be routed to dial peers with the best quality of service among all available options. Besides you should load share traffic between Vendors A, B and C in the 20/30/50% proportion. To achieve this, assign a special routing policy to the destinations making up a rate plan for the quality-conscious customers (policy 3 in the example below), while calls from rest of the customers will be routed under load sharing policies (policies 1 and 2):

```
begin
    p.appeal_value_1 := (100 / p.d_policy_param) * p.d_total_calls;
    p.appeal_value_2 := (100 / p.d_policy_param) * p.d_total_calls;
    p.appeal_value_3 := p.d_cost_cu * (1 + 0.3/p.d_asr_c + 240/p.d_acd);
;
end;
```

Thus, in case the dial peers with the best quality values are affiliated to Vendor A, the System will route call from the quality-conscious customers to the dial peers of Vendor A whilst retaining the defined load sharing proportion (provided that the total amount of calls from such customers does not exceed those 20 % defined for Vendor A).

#### **Configuring routing policies**

To configure routing policies proceed as follows:

1. Change the default names of the routing policies, if necessary (Termination > Routing policies > object Routing policies);

- 
2. Assign the routing policies to the destinations making up a customer rate plan (Origination > Destinations);
  3. Configure, compile and activate the procedure(-s) (Termination > Routing policies > object Procedures);
  4. Assign the procedure to dial peers.

For more detailed information refer to section 5.3.4.

---

## 4 WEB-INTERFACE

The web server provides a friendly graphical interface for convenient configuration and administration of TMngr.

### 4.1 ACCESSING TMNGR THROUGH WEB-SERVER

To establish a link with the web server, enter the IP address or DNS name of the web server on the address line of the web browser you are using. For example <https://192.168.1.101>. Note that the working protocol must be HTTPS (Hyper Text Transmission Protocol, Secure.) The system will respond with a logon dialog similar to that shown in the figure below.



**Fig. 8 Logon dialog box**

Upon first log onto the web-interface use the “admin” login name and password. You will be displayed with the main window of the web-interface.

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**Note:** *It is advisable to change the first-time logon credentials immediately after you have accessed the newly deployed system (Customers/Vendors > Administration > Web authentication). The login and password check in the system is case-sensitive.*

---

### 4.2 WHAT YOU SEE ON THE SCREEN

The left part of the web-interface shows the tree of object categories. The right pane is a working area which displays the information on the currently selected object in tabular representation. The screenshots below (Fig. 9 and Fig. 10) illustrate the web interface elements and the terms used in this manual to refer to the objects that the TMngr software deals with.

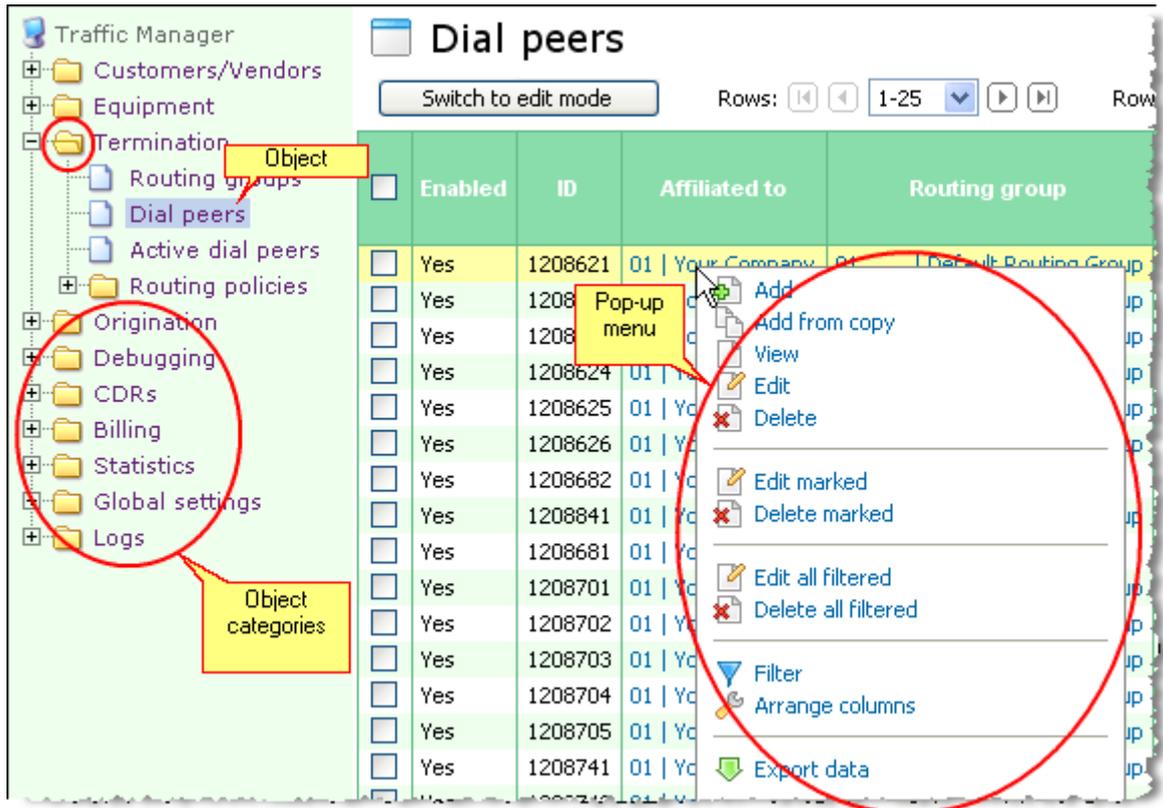


Fig. 9 TMngr objects and GUI elements

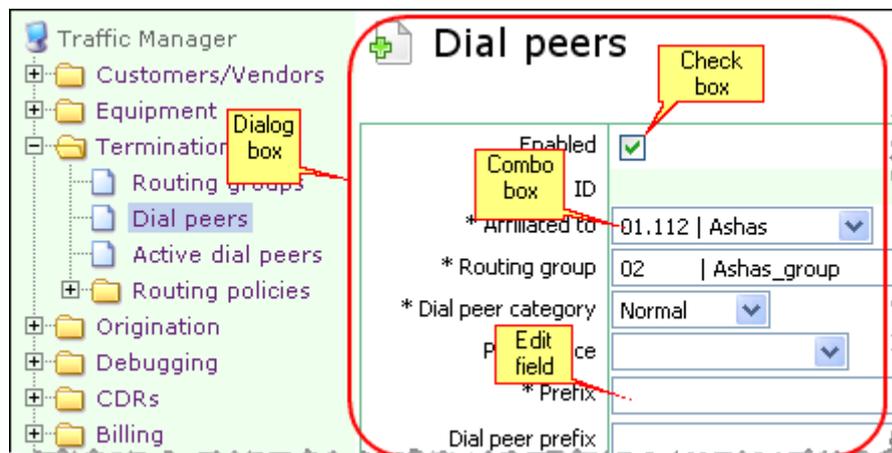


Fig. 10 GUI elements

Use the **Rows on page** combo box located above and below the tables to control the number of rows displayed in them (10, 25, 50 or 100). Use the buttons / to view the next (or previous) portion of data. Use the buttons / to go to the last or first view.

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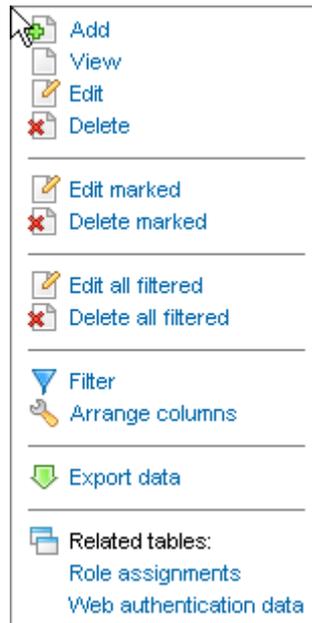
## 4.3

## STANDARD PROCEDURES

This chapter covers standard procedures used when working with the TMngr GUI.

### 4.3.1 POP-UP MENU

Left-click a record of interest in the table you are working with to invoke a pop-up menu that offers record manipulation options. The contents of pop-up menus may differ from table to table and depend on your user permissions. The figure below presents an example of the pop-up menu that you invoke to work with the records of a table.



**Fig. 11 Pop-up menu**

Typically a pop-up menu contains the following commands:

**Add** – this command enables you to add new records to the table;

**View** – opens a record viewing window. To return to the tabular view click the **OK** button;

**Edit** – opens a record editing dialog box. When you are through with editing the record parameters, click **OK** to confirm or **Cancel** to discard the changes;

**Delete** – use this command to delete the record you selected;

**Edit marked** – you can use this command to perform group editing of table records. Mark the records of interest and select **Edit marked**. You will be displayed with a dialog box similar to the one displayed by the **Edit** command but with additional check boxes in front of each parameter record. Select the appropriate check box, enter the required changes and click **OK**. The changes will be applied to all the marked records.

**Delete marked** – this command allows you to delete marked records. To mark the records, select the respective check boxes in the leftmost column of the table. To mark all the records in the list simply select the checkbox in the header of the table.

**Edit all filtered** - you can use this command to edit all the records at a time. In case the table data has been filtered, the changes will be applied only to the records matching the filtering criteria (for more information about filters refer to section 4.3.2). Invoke the popup menu and select **Edit marked**. You will be displayed with a dialog box similar to the one displayed by the **Edit** command but with additional check boxes next to each parameter record. Select the

---

appropriate check box, enter the required changes and click **OK**. The changes will be applied to all the records in the table or to all filtered records.

**Delete all filtered** – this command allows you to delete all the records from the table you are working with. In case the table data has been filtered, only the records matching the filtering criteria will be removed (for more information about filters refer to section 4.3.2).

**Filter** – invokes a filter dialog box (for information how to use filters consult section 4.3.2);

**Arrange columns** – enables you to arrange the table columns according to your preference (see section 4.3.4);

**Export data** – use this command to unload data from the tables into CSV-files (for information about data export refer to section 4.3.6).

**Related tables** – a list of tables associated with the table you are working with. The table opened by this command contains information related only to the item selected in the source table. For example, left-click a record of interest in the **Users** table and select **User rights** on the pop-up menu. The system will display the **User rights** table with information about the rights of the selected user only.

### 4.3.2 USE OF FILTERS

Filters are instrumental in reducing the amount of data displayed onscreen and allow you to view records that match certain criteria only.

TMngr features a powerful filtering tool that allows the creation of complex filters with multiple filtering conditions. Filtering conditions can be combined by means of logical operators:

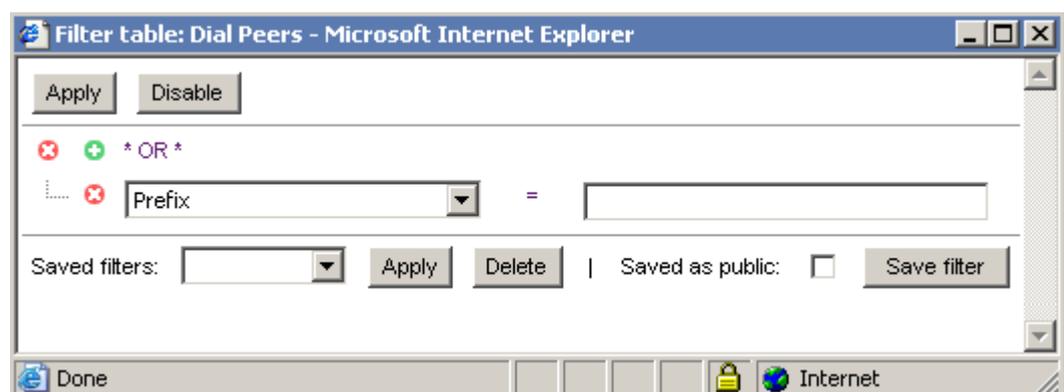
**AND** – shows data that meet all conditions specified in the complex filter;

**OR** – shows data that meet at least one of the specified filter conditions;

**NOT (AND)** – filters with NOT (AND) return data that fail to meet all of the specified conditions;

**NOT (OR)** – complex filters with the NOT (OR) operator return data that fail to meet at least one of the specified conditions.

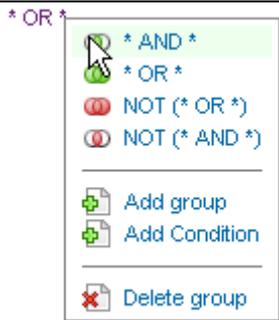
To create a filter, select **Filter** on the pop-up menu. You will be displayed with a dialog box similar to the one shown in the figure below.



**Fig. 12 Filter setting dialog box**

The filter dialog box has the following controls:

**Table 3 Filter controls**

View	Description
	Applies the filter to the table
	Cancel the filter application to the table
	Clears filter conditions/condition groups from the filter builder
	Adds a filtering condition to the filter being created in the builder
	Dynamic control that allows selection of logical operators, addition and removal of filtering conditions/condition groups. The control view varies depending on the selected logical operator.
	Dynamic control that allows selection of comparison operators. The control view varies depending on the selected comparison operator.  The comparison operators “Like” and “Not like” indicates the use of wildcard characters ‘%’ and ‘_’.  The comparison operator “RegExp” indicates the use of regular expressions.  Refer to <a href="#">Appendix A</a> for detailed information about wildcard characters and regular expressions.
	Saves the filter for future use
Save as public: <input checked="" type="checkbox"/>	Saves the filter accessible to other users
Saved filters: 	This combo box allows selection of previously saved filters

To explain how filters work let us assume that you wish to filter a table of dial peers and your intention is to view:

- unblocked or enabled records of "MERA"-affiliated vendor dial peers with prefixes beginning with "7495123" or "7495124" or "7495125"
- all dial peer records associated with the vendor "MERA.RU" and prefixes beginning with "7495".

To make the process of filter building easier let us analyze the task and draw up a structure of the filter. As a result we get the following table:

		The dial peer records you want to see should...	Notes	
OR	AND	...be affiliated to vendor "MERA"		
		OR	...be unblocked	
		...be enabled		
		...have prefixes beginning with "7495123" or "7495124" or "7495125"	Here we will use regular expressions	
	AND	...be affiliated to vendor "MERA.RU"		
	...have prefixes beginning with "7495"	Here we will use wildcard characters		

Thus we need to build a filter that includes:

- two condition groups combined with the help of the logical operator "OR"
- the condition groups will include filtering conditions combined with the help of the logical operator "AND"
- one of the groups (highlighted in yellow) will include a subgroup with filtering conditions combined with the help of the logical operator "OR".

The resulting filter will look as shown in the figure below.

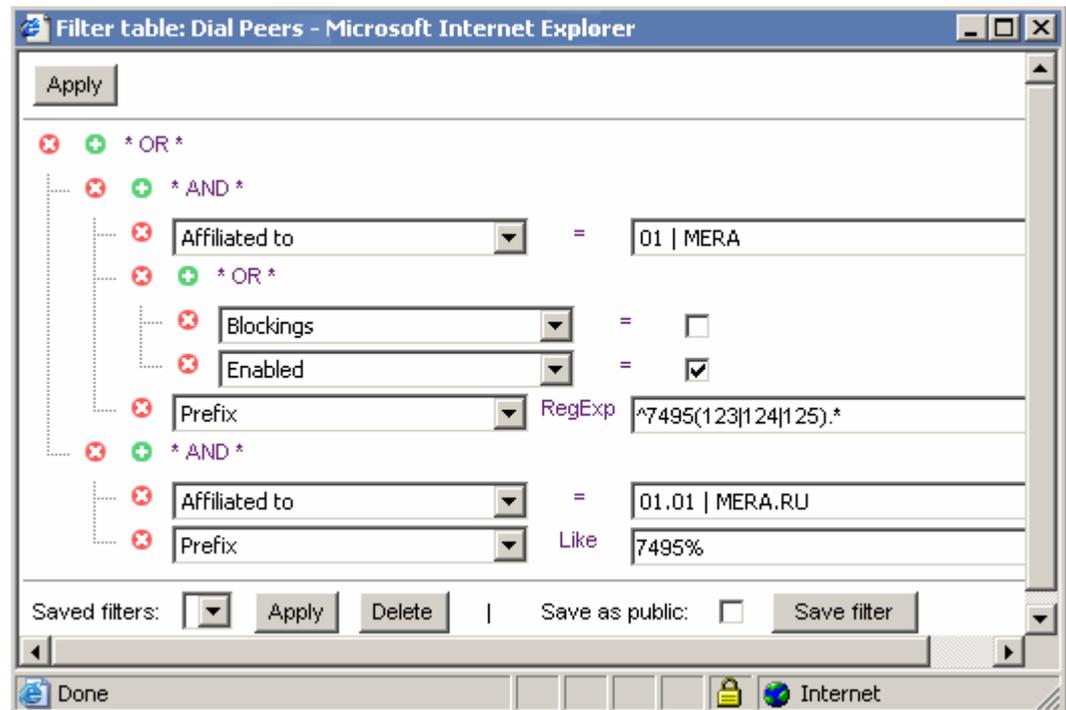


Fig. 13 Configured filter

To build a filter meeting the conditions above, proceed as follows:

1. To add a new condition group to the filter, left-click the \* OR \* control and select the **Add group** option on the appearing menu. Note that newly created condition groups have the logical operator "AND" selected by default .

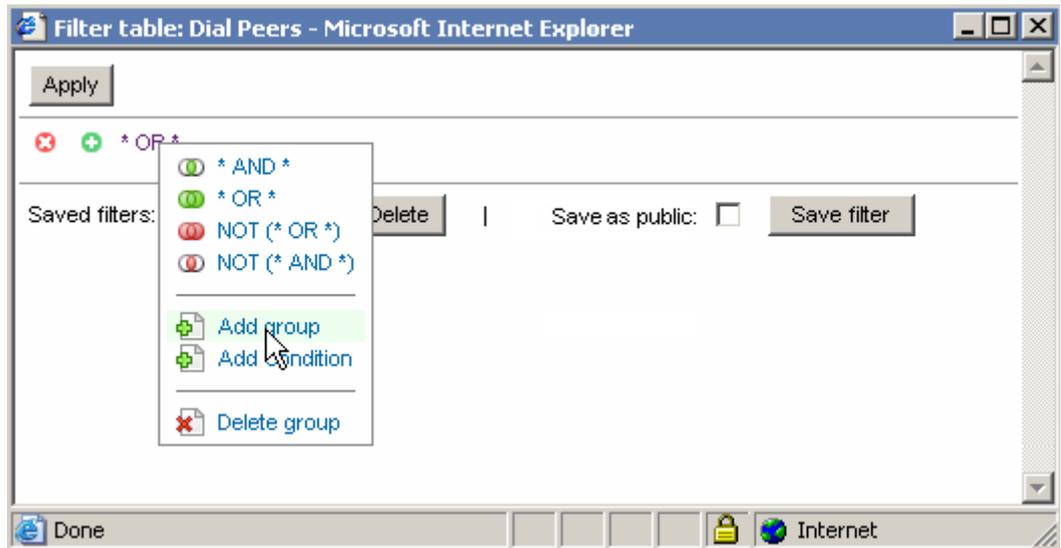


Fig. 14 Building a filter. Step 1

2. To add a condition, click the plus button **+** next to the **\*AND\*** control or click the **\*AND\*** control and select **Add condition** on the displayed menu. Select “Affiliated to” and “01| MERA” after the equal sign in the displayed combo boxes (see Fig. 15).

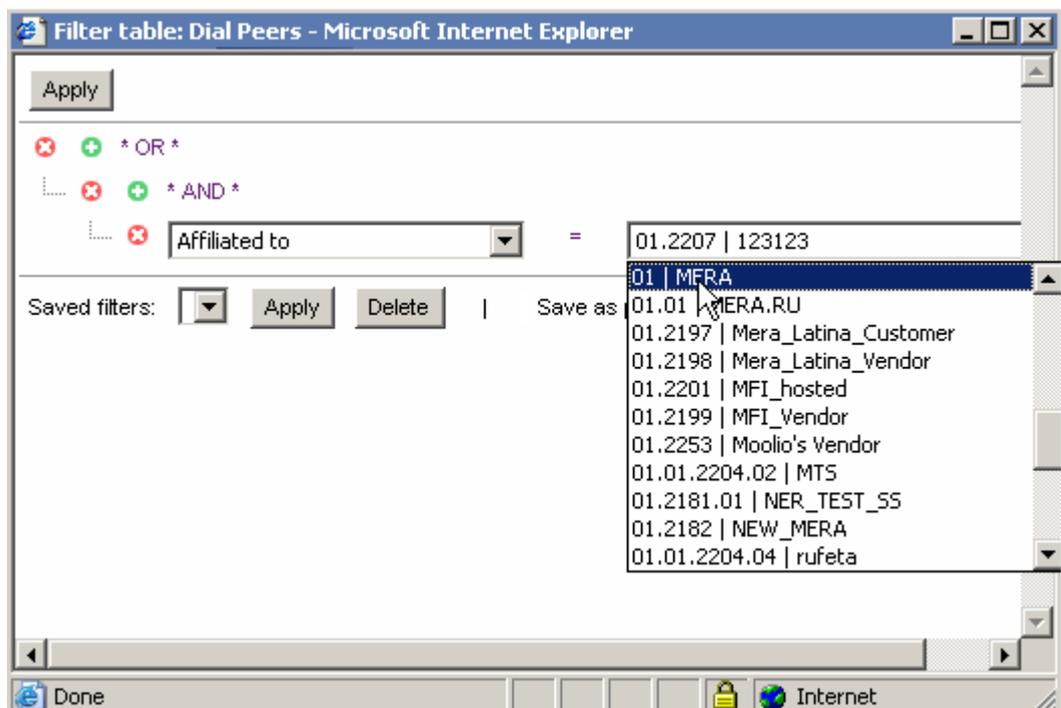


Fig. 15 Building a filter. Step 2

3. To add another condition group, click the **\*AND\*** control and select the **Add group** option in the displayed menu. Select the logical operator “OR” for the newly added condition group (see Fig. 16).

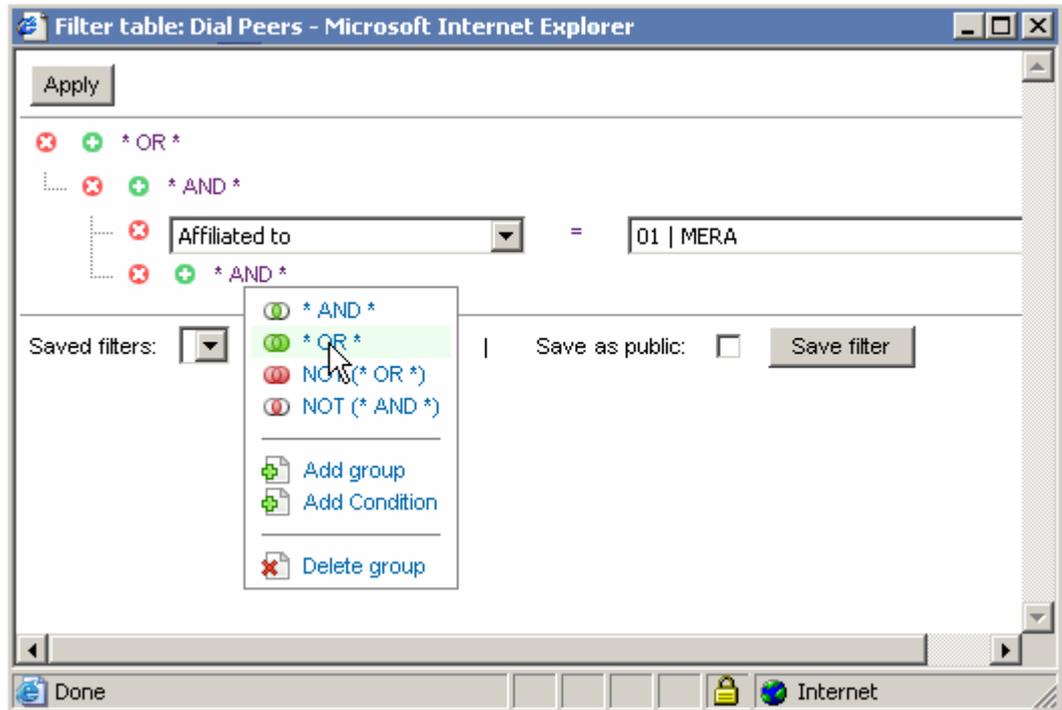


Fig. 16 Building a filter. Step 3

4. To add a new condition, click the \* OR \* control and in the displayed menu select **Add condition** or simply click the + button next to the \* OR \* control.

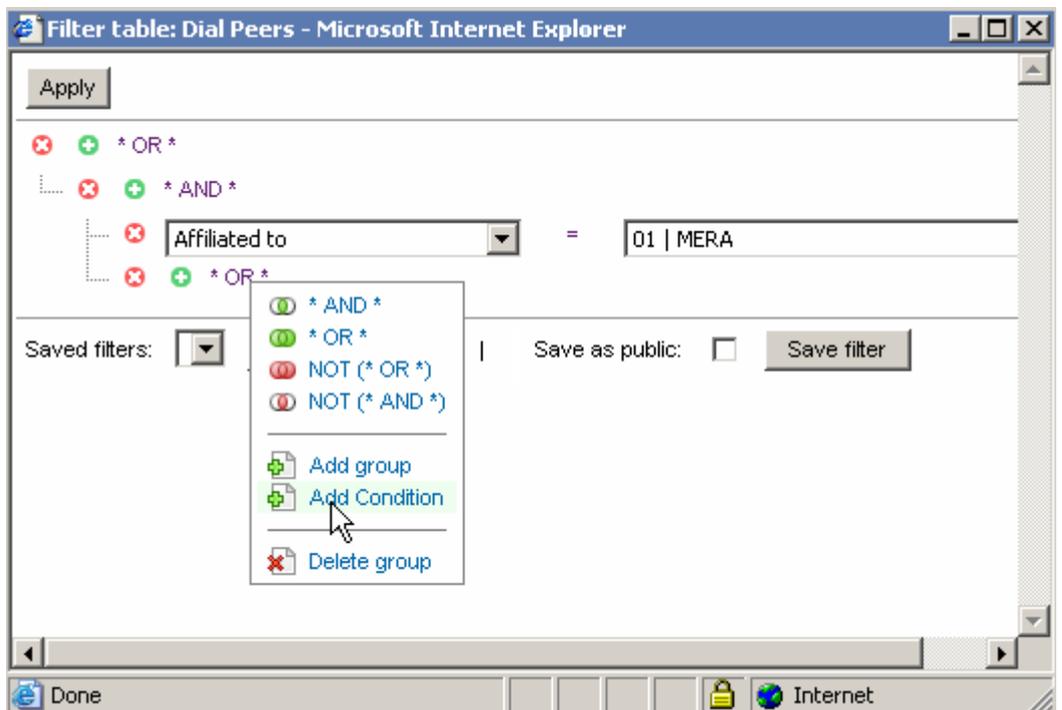


Fig. 17 Building a filter. Step 4

5. Select **Blockings** from the drop-down list of the displayed combo box. Leave the check box to the right of the equal sign unselected as you want to see unblocked records only (see Fig. 18).

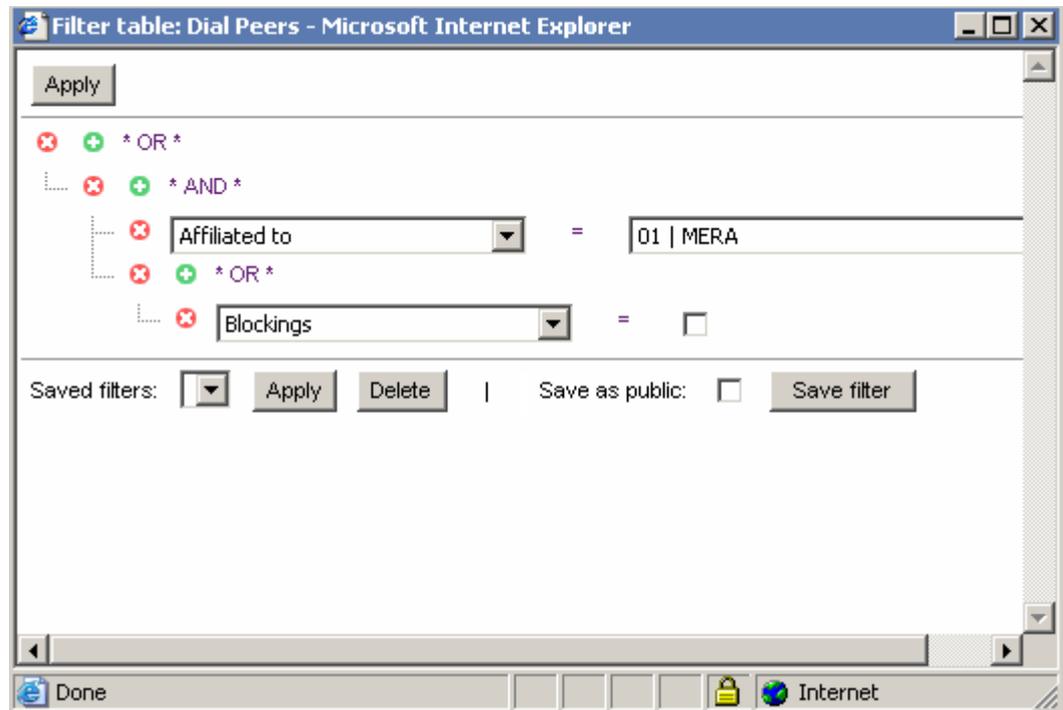


Fig. 18 Building a filter. Step 5

6. Repeat Step 4 to add one more search condition and select **Enabled** from the drop-down list of the displayed combo box. Select the check box to the right of the equal sign to have enabled records displayed only (see Fig. 19).

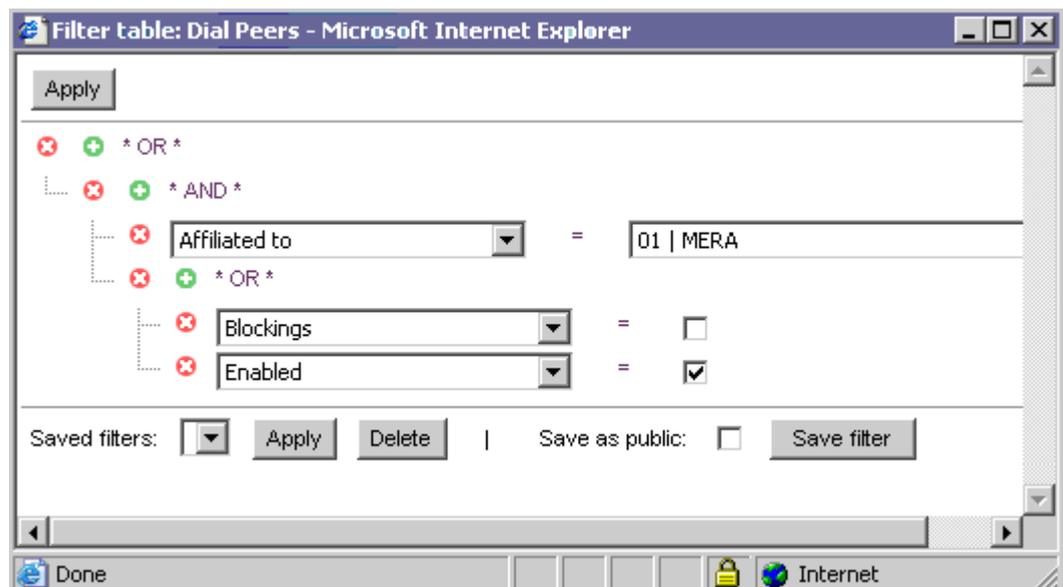
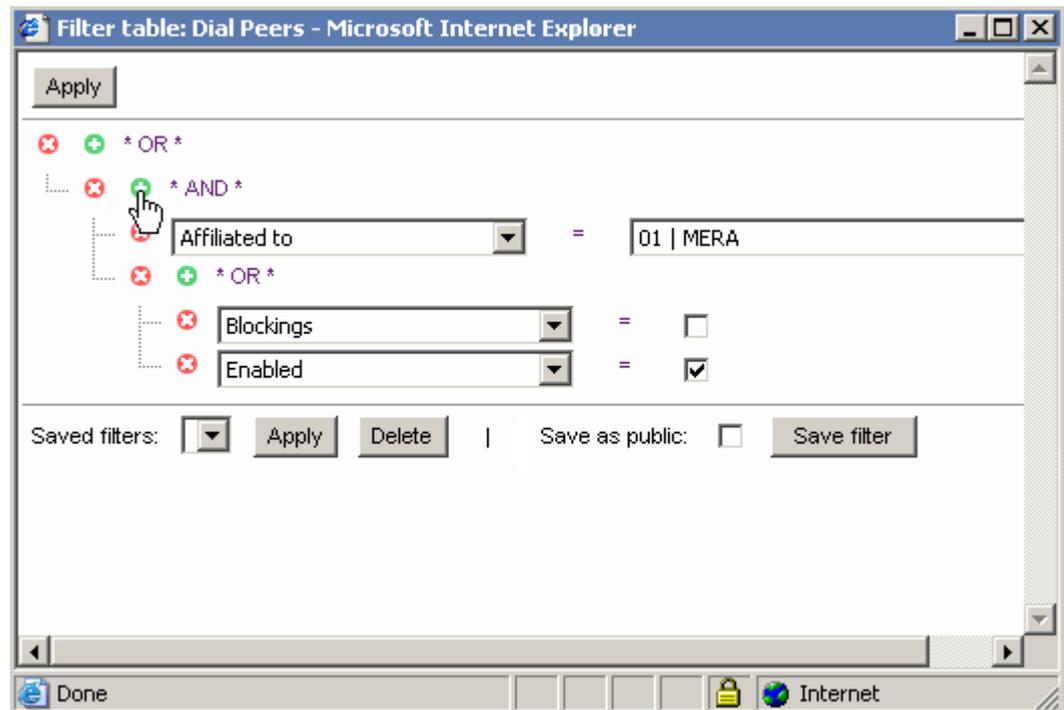


Fig. 19 Building a filter. Step 6

7. To add the next condition, click the **+** button next to the **\*AND\*** control or click **\*AND\*** and select **Add condition** on the pop-up menu (see Fig. 20).



**Fig. 20 Building a filter. Step 7**

8. To enter a regular expression that will have the application select numbers starting with the prefix 7495123 OR 7495124 OR 7495125:
  - select **Prefix** from the drop-down list of the displayed combo box, then
  - click the “=” control next to the combo box and select **RegExp** on the displayed menu as it is easier to use regular expressions to define search conditions and
  - enter the regular expression “`^7495(123|124|125).*`” in the right edit field.

This step completes your filter building procedure for the filter part intended to select unblocked or enabled records of dial peers affiliated to vendor "MERA" with number prefixes beginning with "7495123" or "7495124" or "7495125" (see Fig. 21).

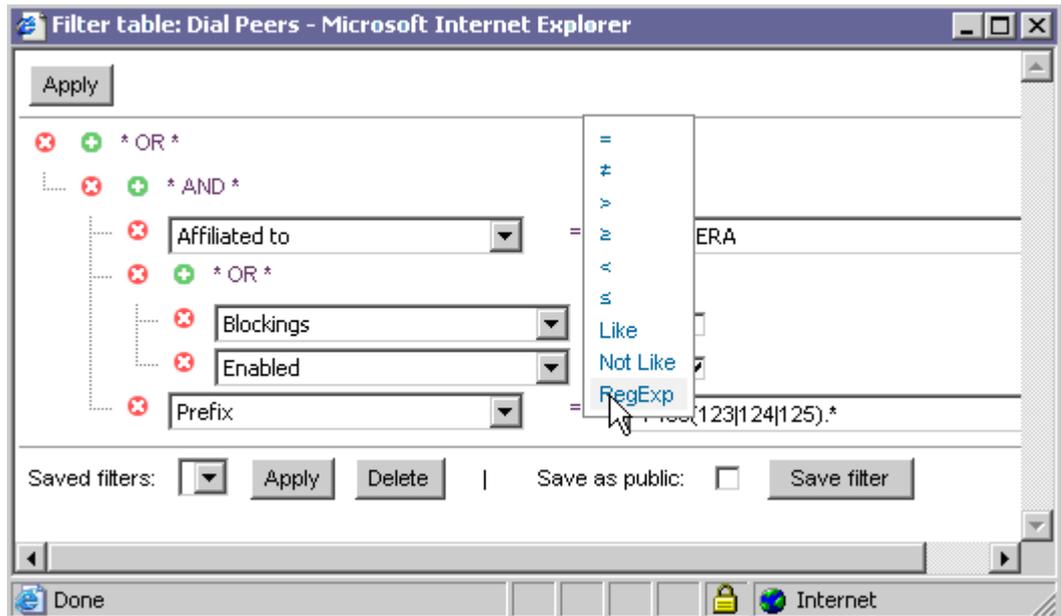


Fig. 21 Building a filter. Step 8

To enhance the filter with the ability to select DPs associated with the vendor “MERA.RU” and number prefixes starting with “7495”, add one more condition group:

- For this, click the \* OR \* control at the root level of the filter builder and select **Add group** on the pop menu (see Fig. 22).

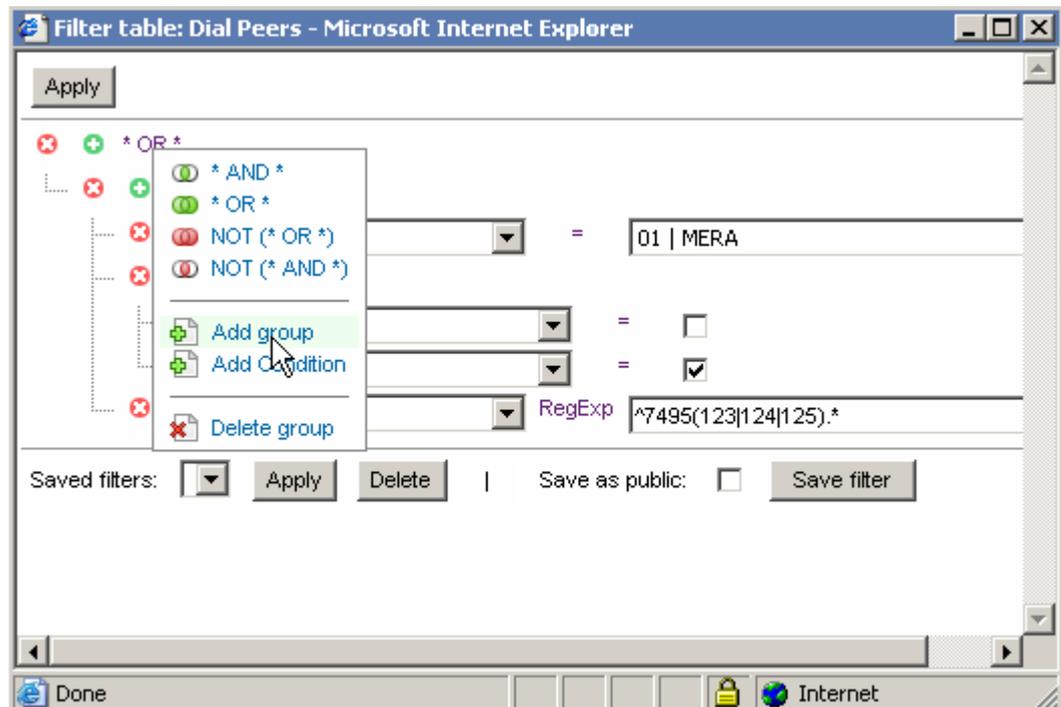


Fig. 22 Building a filter. Step 9

- Click the plus button **+** next to the lowest \*AND\* control or click the \*AND\* control and select **Add condition** on the displayed menu.
- Select “Affiliated to” and “01.01 | MERA” in the displayed combo boxes.

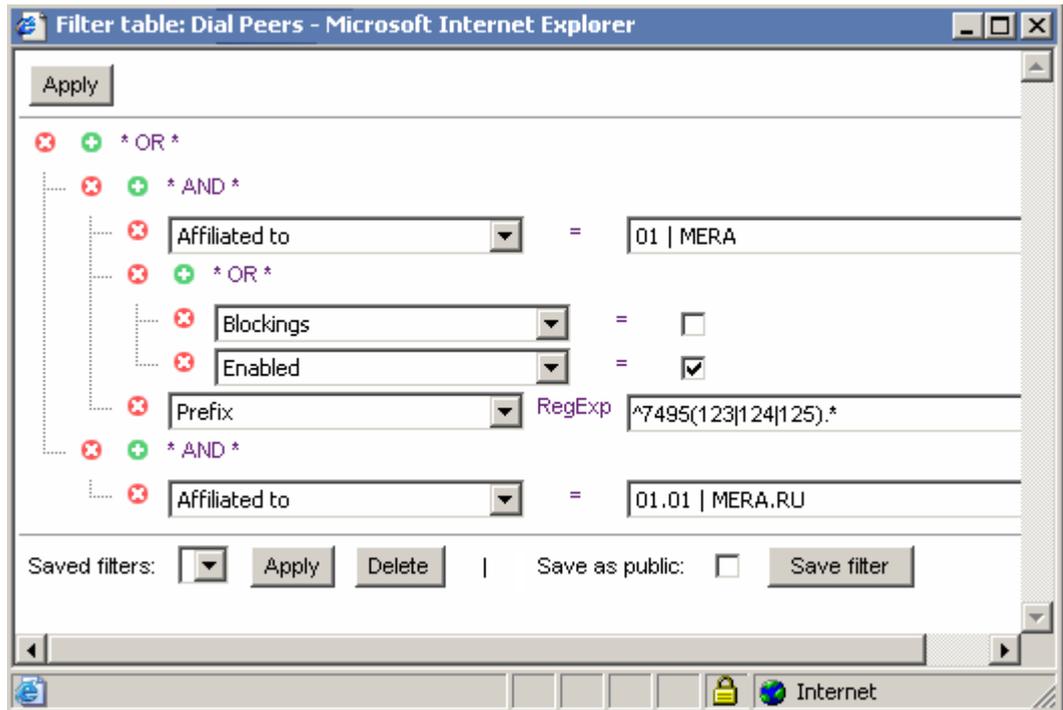


Fig. 23 Building a filter. Step 10

12. Repeat Step 10 to add another condition and select **Prefix** from the drop-down list of the left combo box. Then click the equal sign control “=” next to the combo box and select the comparison operator **Like** on the displayed menu and enter the string “7495%” in the right edit field.

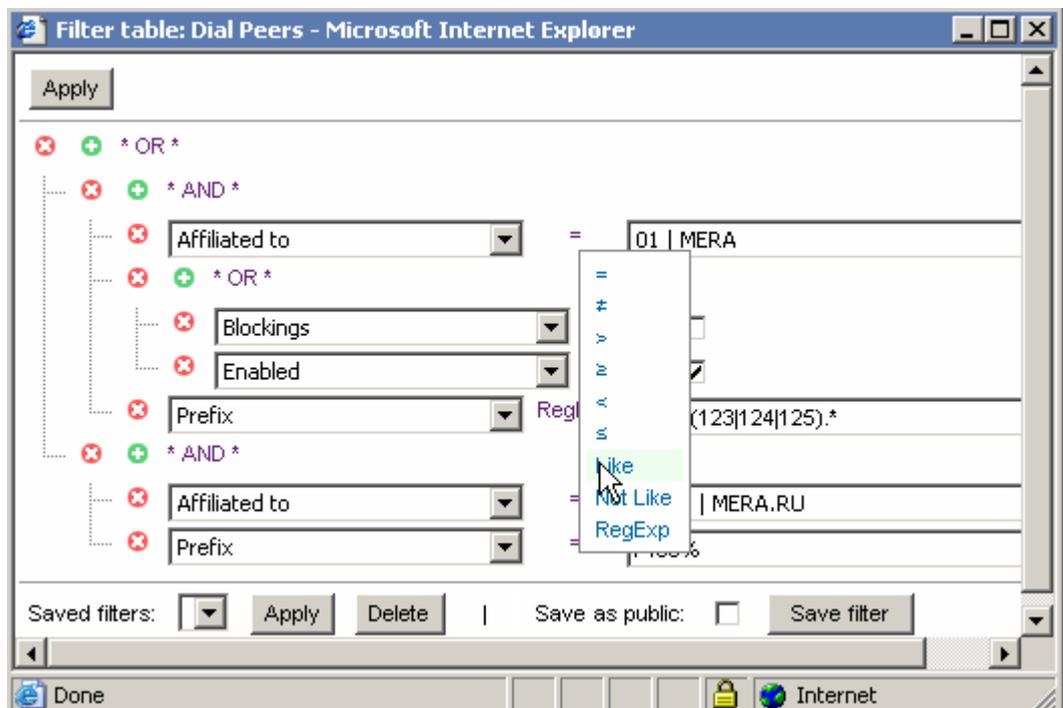


Fig. 24 Building a filter. Step 11

13. This completes the filter building. Click the **Apply** button to apply the filter to the table.

With a filter applied to the table contents, the table data is displayed with the filter-applied icon  next to the table name. The icon indicates that not all of the table records are displayed and allows you to cancel the filter. If you point the cursor to the filter icon, you will be displayed with a pop-up tip showing the filter structure. For your convenience the system remembers the filter you applied last time.

There is also a possibility to save the filters you create and use them again whenever you need. To save the filter after you have applied it to the table, click the **Save filter** button (if you want to make this filter accessible to other users select the **Save as public** checkbox). In the invoked dialog type in a name for the filter you are saving and click **OK**.

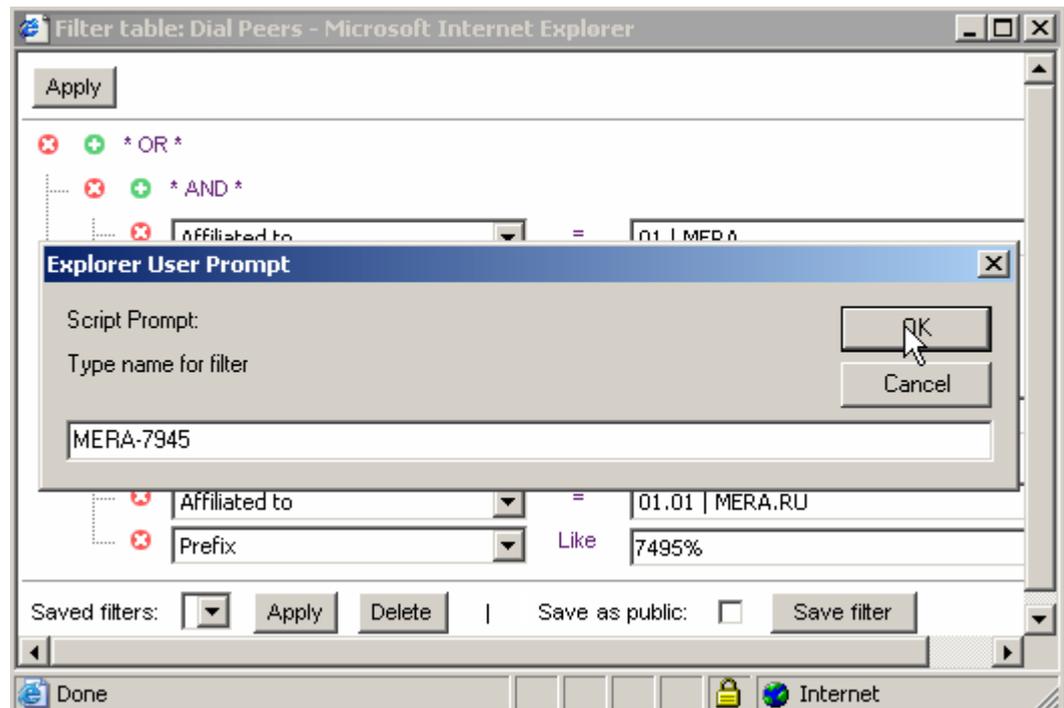


Fig. 25 Saving a filter

To use a previously saved filter, select the filter name from the **Saved filters** combo box and click the **Apply** button next to it. To delete a filter, use the **Delete** button.

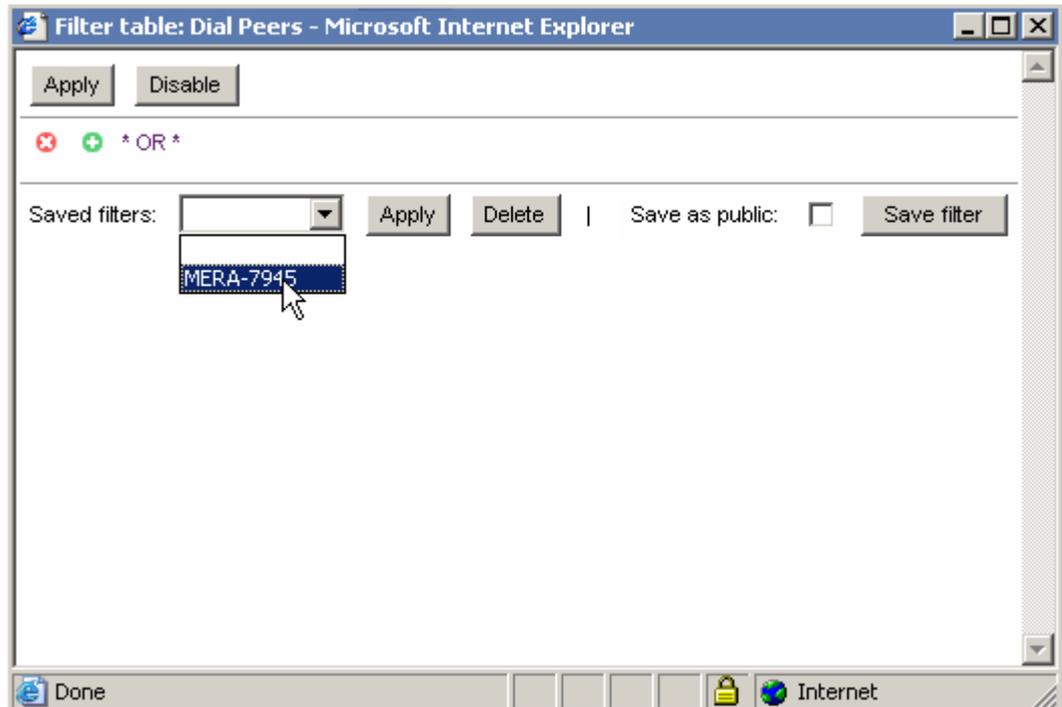


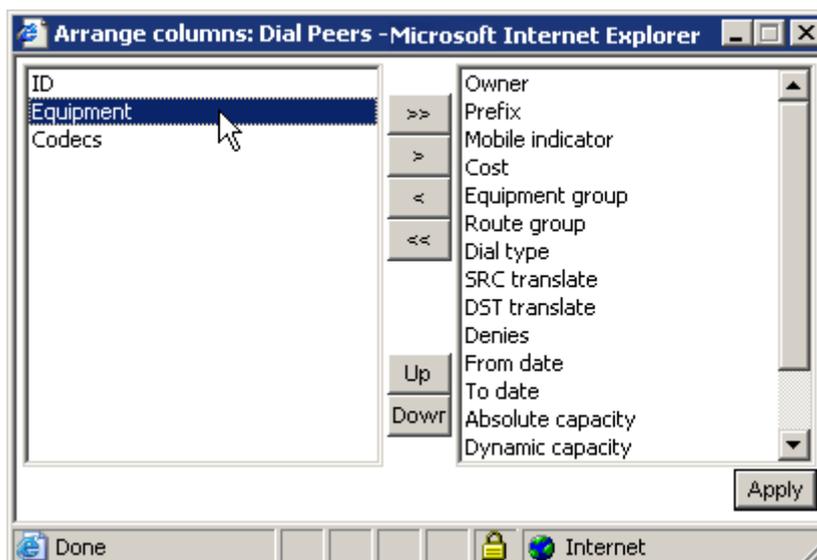
Fig. 26 Selecting a previously saved filter

### 4.3.3 SORTING TABLE DATA

The System allows you to sort the contents of the table columns. To sort data in a column, click the header of the column of interest. The first click causes the system to sort the contents of the column in the ascending order and the sort order is indicated by an up arrow appearing in the column header. To sort the data in the descending order, click the column header once again. The third click will clear the sort from the column contents. The system also allows you to perform more complex types of sort based on the contents of several columns. In this case the last sorting you apply becomes the main sorting criterion. With a sort applied, the  icon appears next to the table name. A click on this icon removes the sort from all columns.

### 4.3.4 RE-ARRANGING TABLE COLUMNS

For the sake of convenience, the system allows you to arrange table columns according to your preference. Click **Arrange columns** on the pop-up menu. The system will display a dialog box similar to the one shown below.



**Fig. 27 Re-arranging table columns**

The right box presents the list of the columns as they appear in the table from left to right. To delete a column, select it and click the  button. To add a column, select it in the left box and click the  button. Holding down the **Shift** or **Ctrl** key you can select multiple records. Use the  and  buttons to move all the column names from the right box to the left and vice versa.

The **Up** and **Down** buttons allows you to move the columns to the left or to the right, respectively. Click the **Apply** button when you are through with configuring the table. The new column layout will be applied to the table. You will also see the  icon next to the table name.

The system will remember the table layout and the next time you log in it will display the table in accordance with the changes you made.

To restore all the table columns in their initial layout, click the  icon.

#### **4.3.5 EDITING MULTIPLE TABLE RECORDS**

The button **Switch to edit mode** located above or below all the tables brings up a dialog box that allows you to edit all the records currently displayed on the screen simultaneously. Fig. 28 presents such multiple-edit dialog box invoked from the table 'Contacts'.

ID	Affiliated to	User	How to contact
283	01.01   MERA.RU	261   John Smith	E-mail
284	01.01   MERA.RU	301   test 1	E-mail
423	01.01   MERA.RU	441   test 2	E-mail
383	01.01   MERA.RU	121   test 3	E-mail
113	01.01   MERA.RU	121   Serge Beluchov	E-mail

**Fig. 28 Editing multiple table records**

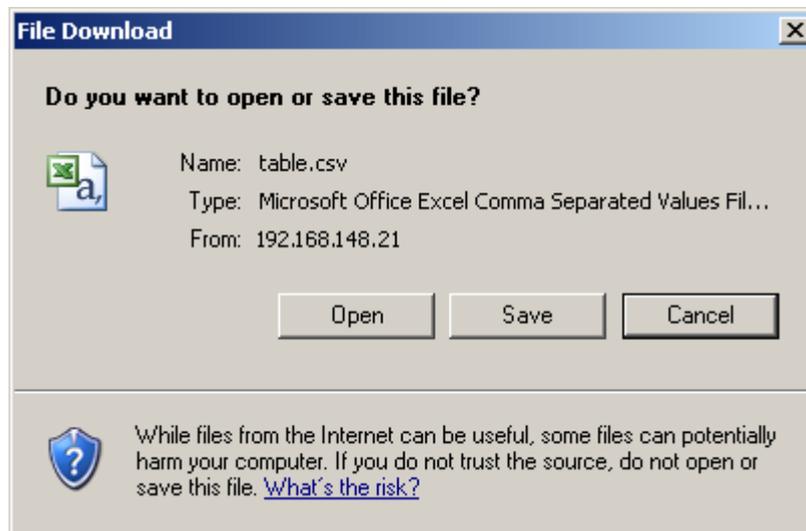
When you are through with editing the records, click **Submit** to confirm or **Cancel** to discard the changes. The System also provides a possibility of group editing of table records (see section 4.3.1)

#### 4.3.6 DATA EXPORT

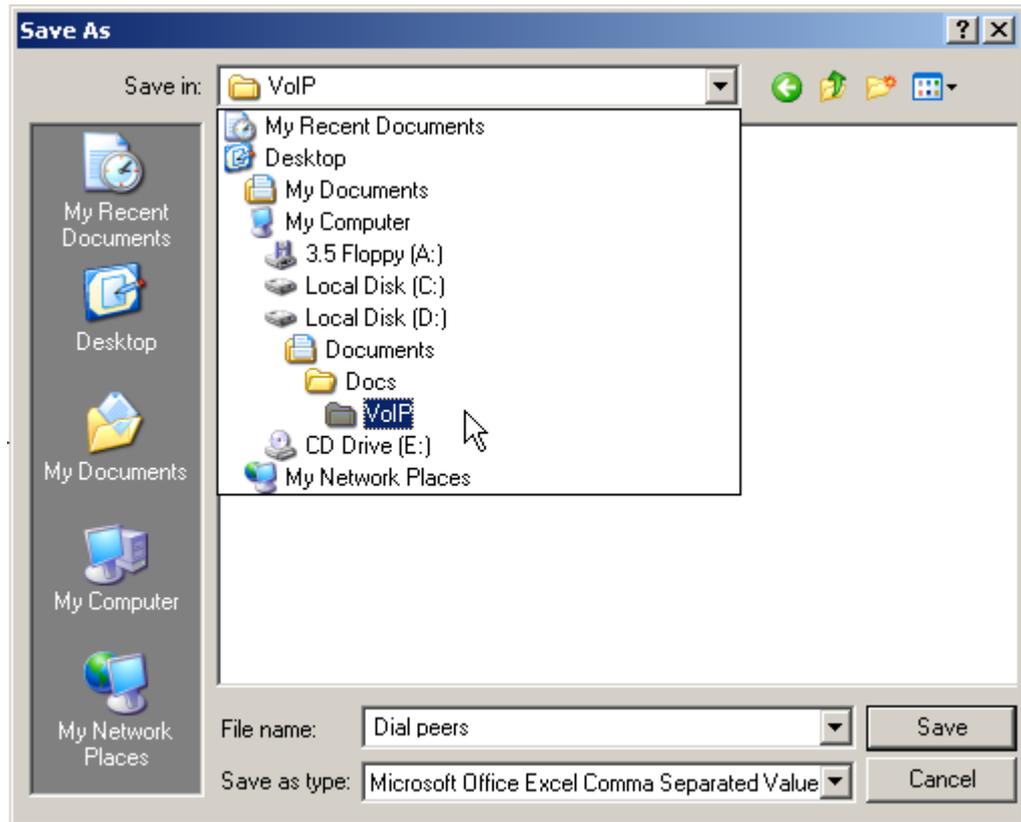
There is a possibility to export the necessary data from view tables to CSV files for use in other applications.

To export data proceed as follows:

- Left-click the table you are working with and select the **Export data** option on the pop-up menu. In the invoked dialog box, click **Save**.



- You will see the **Save as** dialog box. Use the **Save in** combo box to indicate the device and folder where you want to save the file.

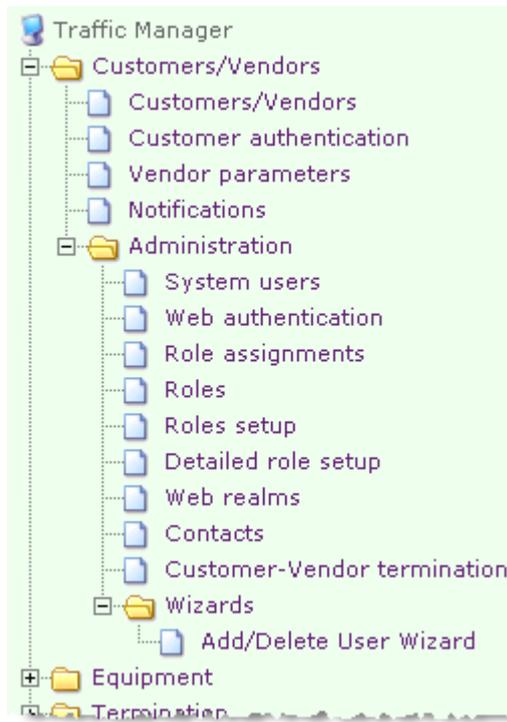


- Enter the file name in the field **File name**.
- In the **Save as type** combo box select *Microsoft Office Excel Comma Separated Values File* and click **Save**.

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## 5 OPERATING TMNGR

### 5.1 CUSTOMERS/VENDORS



All entities, individuals and organizations, directly and indirectly involved in the operation of the MVTs II system can be divided in three categories:

- **System operator and/or owner (SysO).** The SysO is the user or owner of the system who utilizes the MVTs II installation to render commercial traffic handling services or offer a portion of the MVTs II softswitch capacity for rent (delivery of hosted softswitch services).
- **Customers.** In terms of the MVTs II system, providers, carriers or other operating entities that deliver, supply or otherwise originate VoIP traffic and use the service of the MVTs II operator (or owner) to relay, transfer or otherwise effect traffic transit and pay for such service are referred to in this manual as customers. Fees payable by customers are calculated based on SysO's rate plans for customers further referred to in this manual as customer-facing rate plans (see section 5.4.1).
- **Vendors.** Vendors are service providers or carriers that provide traffic termination service, charge fees for such service and receive payment of fees from the MVTs II system operator or owner (SysO). Calculation of fees payable by the SysO is based on vendors' rates set in dial peers. (DPs, see section 5.3.2).

With respect to the SysO one and the same service provider (carrier) may act both as a customer (when the provider originates traffic and buys the service delivered by the SysO) and a vendor (when the provider/carrier receives traffic for termination selling its traffic handling service to the SysO). For this reason data about all parties involved in the system operations are entered in a common table named Customers/Vendors (refer to section 5.1.1).

All users authorized to access the System are distinguished by their organizational affiliation (that is identified as belonging to organizations, i.e. businesses or institutions). Organizational access of users to the System information resources is structured as a hierarchy of rights with the help of hierarchy classifiers (see section 3.9.1).

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Table 4 gives a brief description of objects found in the category **Customers/Vendors**

**Table 4 Objects of category Customers/Vendors**

<b>Object</b>	<b>Description</b>
<b>Customers/Vendors</b>	Table of customers and vendors (service buyers and sellers) that engage in partner relationship with the SysO
<b>Customer authentication</b>	Table of records with authentication data for customer equipment (i.e. traffic originating devices)
<b>Vendor Parameters</b>	Table of vendor records. The records provide information about classifiers, names, routing groups the vendors belong to, applicable billing schemes and some other
<b>Notifications</b>	Table of notification subscriptions. The table is used to subscribe customers to System notifications

The category Customers/Vendors also comprises the subcategory Administration.

### **5.1.1 CUSTOMERS/VENDORS**

This view presents a table with the records of Customers and Vendors the SysO interoperates with.

To add a record, click the left mouse button to invoke the pop-up menu and select the option Add. The add-new record dialog is shown in Fig. 29.

**Fig. 29 Adding a new customer/vendor record**

Fill in the displayed form (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active;

**Parent** – define the company name to whose partition the new Customer/Vendor will belong and will be doing business with (paying/receiving money);

**\*Customer/Vendor** – enter the name of the new Customer/Vendor;

**Description** – fill this text box with pertinent information about the partner service provider;

**Vendor/Customer** – select the customer/vendor check box accordingly. ;

**Max. incoming calls** – specify the maximum number of simultaneous calls the customer is allowed originate;

**Incoming calls** – this field is non-editable, it presents the current number of simultaneous calls originated by the customer.

**Allow proxy for originated calls** – select the checkbox to enable the media-proxy function for calls originated by this customer. If the checkbox is selected, TMngr sends the TS the value of the ‘Proxy’ field set in the table ‘Equipment’. If the checkbox is not selected, TMngr will send the TS the ‘force non-proxy’ value irrespectively of the proxy settings in the table of equipment.

**Customer profitability threshold (%)** – define the customer profitability threshold. Customer profitability is calculated as EMA; the number of calls used in calculation is configurable (see section 5.9.1). In case the profitability of the customer drops below the configured value, the System generates an e-mail notification (for more detailed information about notifications refer to sections 5.1.5.8, 5.1.4).

**Customer settlement scheme** – define the settlement scheme used by the customer (for more detailed information about settlement schemes refer to section 5.7.4).

**Vendor settlement scheme** – define the settlement scheme used by the vendor (for more detailed information about settlement schemes refer to section 5.7.4).

---

**Time zone** – you can use this combo box to define the offset for the customer/vendor local time from Coordinated Universal Time (UTC) that will be taken into account during creation of statistical reports (see section 5.8). In case the time zone is not defined the customer/vendor will be associated with the System time zone.

#### **Hosted user settings:**

**Hosted rate plan** – in case you are adding the record for a user of the hosted softswitch service, select the rate plan it will be using

**Hosted routing group** – in case you are adding the record for a user of the hosted softswitch service, select the routing group it will belong to from the drop down list of this combo box (see information about routing groups in sections 3.9.2, 5.3.1);

**Hosted customer account** – in case the record pertains to a user of the “hosted softswitch service” (hosted user) this non-editable field will represent the name of the account configured for the user in the table **Accounts** (see section 5.7.2);

**Hosted customer is blocked** – non-editable field, which when is set to “Yes” indicates that the balance in the user’s account is low. All the calls from the user’s customers in this case are rejected with LDC MVTM 211 (unique code 65572) “Hosted-user is blocked”.

**Zone** – in case you are adding the record for a user of the hosted softswitch service, select the name of IP zone through which the calls originated by its customers should be routed (for more detailed information zones refer to sections 5.2.3 and 5.2.4).

When through with filling the form, click  to add the record. The System will assign the newly added record an automatically generated hierarchic classifier (refer to section 3.9.1 for information about hierarchic classifiers).

Click  to discard the changes.

You can use the pop-up menu to edit or delete the selected record, view it in an individual window and see linked records in the following related tables:

- **Dial peers**
- **Equipment**
- **Equipment groups**
- **Accounts**
- **Rate plans**

## **5.1.2 CUSTOMER AUTHENTICATION**

The table **Customer authentication** comprises information about authentication parameters of the Customer equipment (traffic origination equipment). Traffic origination equipment can be of two types:

- Static, i.e. equipment the authentication parameters of which (IP address, port, technical prefix, source number) do not change and always remain the same. Static equipment does not need registration.
- Dynamic, i.e. equipment that does not have a fixed IP address and needs to register to the System. To make the equipment registration possible you must create an authentication record for the equipment comprising its login and password.

Further, to be able to send traffic to the registering equipment for termination it is necessary to configure a dial peer in the table **Dial peers** (see 5.3.2.) The field **Prefix** of the dial peer record must contain a full telephone number rather than a prefix only. When such equipment registers to the System it provides its current IP and

port which are automatically substituted into the authentication record for this equipment and further are used for authentication purposes. At the same time the dial peer corresponding to this equipment is enabled and can be used in routing. When the equipment unregisters the IP and port data are cleared from the record and the associated dial peer is disabled.

<input type="checkbox"/>	Enabled	Hierarchical classifier	ID	Description	Blocked by min balance	Login	Password
<input type="checkbox"/>	Yes	2413	1003889		Yes	6034221	asdef342
<input type="checkbox"/>		00.5200114	1305809	For test		11	
<input type="checkbox"/>	Yes	2414	1003969		Yes		
<input type="checkbox"/>		00.5200102	1305631			16	16
<input type="checkbox"/>	Yes	00.5200127	1306469	matteest			

**Fig. 30 Table of customer authentication records**

The System can authenticate Customers by:

- destination number (weight 32)
- IP address
- network mask (weight 16)
- technical prefix (weight 8)
- source number (weight 4)
- port (1)
- NAT router IP address
- or any combination of the above criteria

The calling device will pass authentication only if all the parameters configured in its authentication record coincide with the parameters of authorization query. Additional authentication data not defined in the device's authentication record and present in the authorization request will be ignored.

If there are several records that satisfy the authentication parameters passed over in the authorization query the System sums up the weights of the parameters for each record and selects the record with the highest weight value (see also section 3.1). The min. weight required for authentication is 4.

Failed authentication events are recorded in CDRs.

To add a new authentication record for the device select  **Add** on the pop-up menu.

---

*Prior to adding a new authentication record make sure a record for the equipment exists (see 5.2.1)*

---

The System will display the add-new-record form shown in Fig. 31.

**Fig. 31 Customer authentication dialog box**

Fill out the form specifying the necessary authentication parameters. The fields marked with an asterisk are required fields.

**Enabled** – select the checkbox to make the record active;

**Description** – you can enter any appropriate information about the authentication record in this text box;

**Login** – type in a login name (for registering devices);

**Password** – enter a password (for registering devices);

**IP address** – specify the device IP address (static devices can be authenticated by the IP);

**Subnet mask** – specify the subnet mask;

**Port** – enter a port number if you intend its use as an authentication parameter;

**NAT IP address** – in case the user's device sits behind a NAT router, enter the IP address of the NAT router in this field. Currently the System cannot handle calls destined *to* H.323 devices located behind a NAT router, however it is capable of handling calls *from* such devices;

**Tech. prefix** – type in the technical prefix here if you intend its use as an authentication parameter;

**SRC number** – use this field to enter a phone number when you wish the equipment be identified by the call source number it provides;

**DST number** – use this field to enter a phone number if you wish the equipment be identified by the destination number it provides;

**SRC Translate** – type in a regular expression for transformation of call source numbers. The use of this configuration option should be judicious as numerous number translations affect the System performance.

**DST Translate** – type in a regular expression for translation of call destination numbers. The use of this configuration option should be judicious as numerous number translations affect the System performance while technical prefixes are removed anyway requiring no special configuration effort.

**Zone** – select the name of IP zone through which the calls originated by the customer should be routed (for more detailed information zones refer to sections 5.2.3 and 5.2.4);

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\***Affiliated to** – using the drop-down list select the organization that is the equipment owner/operator;

\***Chargeable account** – unfold the drop-down list of this combo box and select the account that should be debited when the authenticated device delivers ingress traffic;

**Blocked by min balance** – “Yes” in this field indicates that the balance of the customer’s account is below a configured min value and that the account was blocked (see section 5.7.2).

\***Equipment** – select an item from the drop-down list of this combo box (the drop-down list is populated with the equipment names configured in the table Equipment, see 5.2.1).

**Equipment registration required** – select the check box to allow only registered devices to be authenticated through the record. Calls from unregistered devices will be rejected.

**Equipment is registered** – “Yes” in this non-editable field indicates that the device associated with the authentication record is registered with MVTs II. The table below shows the influence of the settings of the parameters **Registration required** and **Is registered** on customer authentication.

<b>Registration required</b>	<b>Is registered</b>	<b>Result</b>
No	No	OK
No	Yes	OK
Yes	Yes	OK
Yes	No	Call rejected

\***Type** – use this combo box to select the equipment type from the drop-down list populated by the following options:

- **Endpoint**
- **GK (gatekeeper)**
- **GW (gateway)**
- **MERA SIP-HIT (SIP/H.323 converter add-on for the MVTs SBC)**
- **SIP registrar**

\***Routing group** – on the drop-down list of this combo box select the routing group that will be used to terminate traffic from the authenticated device;

**Disable parent routing group** – select the checkbox to restrict the search for routing options in the parent routing group for this authenticated device;

\***Rate plan** – select a rate plan that will be applicable to this authenticated device when it originates traffic;

\***Debug logging level** – you can use this field to activate the debug logging function and set the logging level:

- No logging
- Errors – is the minimum logging level when the System writes only errors to the log file
- Warnings – is a more detailed logging level that produces a log file that in addition to critical errors also contains minor errors that do not affect the System serviceability
- Partial debug info – provides a medium quantity of details in a log
- Full debug info – is the maximum logging level that assures most detailed information.

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**Valid till** – use this set of date-time combo boxes to configure the record validity expiration date;

**Max. incoming calls** – define the maximum allowed number of simultaneous calls to be originated from this device;

**Incoming calls** – uneditable field representing a current number of simultaneous calls originated by the authenticated device.

**Advanced settings:**

**Call time adjustment (%)** – you can use this parameter to make call time adjustments for the purposes of settlement with service providers. In certain situations the total length of call sessions according to the Customer and according to the SysO may be different (usually this difference is accounted for by difference in the time of arrival of signaling packets). To offset this difference the SysO is required to calculate the difference average and use the in-call time adjustment parameter to increase or decrease the call session length accordingly (for example by setting the parameter to 0.002 or -0.002 in fractions of 1 respectively) The parameter default value is 0.

**Call time adjustment (sec)** – this parameter is similar to the previous one with the only difference that the adjustment is made in seconds;

**Disable max call time** – select this checkbox to instruct the system to ignore the settings of the “Max. call time” parameter in **Dial peers** when calls are originated from this authenticated device (see also section 5.3.2);

**Ignore own dial peers** – this parameter is intended for configuring authentication records of the providers who act both as a customer and a termination partner. Select the checkbox to instruct the System to exclude the dial peers affiliated to the provider from the list of terminating options when handling calls originated by the provider.

**Enable looping detection** – select the checkbox to enable the looping detection function for the device;

**Settlement scheme precedence** – uneditable field that presents precedence of the settlement group, to which the settlement scheme assigned to the customer belongs. The field is filled automatically in conformity with the value of the field **Customer settlement scheme** in the table **Customer/Vendors** (for more detailed information about settlement schemes refer to section 5.7.4).

**Rate call according to original DST number** – with this check box selected the System charges for calls by the original destination numbers received on the incoming call leg. With the check box cleared the calls are charged by the number resulting from the required transformations (steps 1 through 4 in Fig. 4).

**Replace SRC number** – with this check box selected the System to replaces the user’s source number with the number defined in the **Dummy SRC number** field of the destination record (table **Destinations**) when the call from the user is considered as that of indeterminate jurisdiction during USA interstate/intrastate routing (see also section 5.9.7).

When finished with filling out the configuration form click **OK**. The newly configured record will be added to the table with a unique hierarchy classifier automatically generated by the application. Click **Cancel** to discard the made changes and return to the table view.

This object also allows creation of child records. To create a child record, left-click over the record you intend to use as the parent and select the **Add child** command on the pop-up menu.

The parameter values in the displayed dialog box will be the same as in the parent record except for the login and password. Make the necessary changes and click the **OK** button. The record will be added to the table with the assigned hierarchy identifier displayed in the column **Hierarchical classifier**. Note that child records survive the deletion of parent records.

---

**Warning:** A change of any parameter value in the parent record (except for Login and Password), causes an identical change in child records that had the same initial value.

The pop-up menu invoked from the table **Customer authentication data** also gives you access to pertinent information in the related tables **Equipment** and **Rate plans**.

### 5.1.3 VENDOR PARAMETERS

The table of vendors provides information about termination providers whose services the SysO buys. The table allows the operator to enter a billing scheme applicable to all dial peers of a vendor. That makes the billing scheme effective for all the termination options the vendor offers. For information about dial peers refer to 5.3.2

A vendor's record appears in the table Vendors only if there is a record configured in the table Customers/Vendors (see section 5.1.1). With the help of the object **Vendor parameters** you can define the billing scheme that the vendor uses in metering and billing your egress traffic.

Use the  $x/y/z$  notation to enter the billing scheme, where  $x$  denotes the non-chargeable interval of an established connection (seconds),  $y$  stands for the initial period, i.e. chargeable minimum expressed in seconds, and  $z$  is the billing increment (seconds).

#### Example 1

Assume that the vendor's billing scheme is 0/30/6. In this case:

- If the duration of the call is under 30 seconds you will be charged for 30 seconds (zero non-chargeable time);
- with the call length of, say, 38 seconds the charges will apply to 42 seconds ( $0+30+6+6=42$ ), i.e. 36 seconds of the rate period plus a 2 seconds fraction of the billing increment rounded up to the next higher increment);

#### Example 2

Suppose that your termination business partner offers the billing scheme 10/0/1. In this case:

- you will not be charged for calls of duration under 10 seconds
- calls of duration of 10 seconds and above will be chargeable **starting from the beginning of the call** in 1 second increments

To enter a new or edit the existing billing scheme in a vendor's record left-click the mouse on the vendor's record and select  **Edit** on the displayed pop-up menu. This will bring up the Vendors dialog as shown in Fig. 32 below.

Field	Value
Classifier	01.2181
Vendor	TEST_SS_CONTR
Description	
Hosted routing group	01.125   TEST_SS_RG
Customer	Yes
Billing scheme	1/1/1
Applies to all	<input checked="" type="checkbox"/>
ASR notification threshold	
ACD notification threshold	
PDD notification threshold	

**Fig. 32 Vendor configuration dialog**

Enter (edit) the vendor's billing scheme in the 'Billing scheme' edit box.

Further, if you click the OK button and submit the changes, the configured BS will be extended to all configured DPs of the vendor except those, the billing scheme (BS) formula of which is protected against changing by a selected '[Retain billing scheme](#)' checkbox. Otherwise, if you wish to override the current BS settings in all DP records of the vendor, select the 'Applies to all' checkbox and the change will be extended to all the DPs regardless of the 'Retain billing scheme' checkbox state. See the examples below.

**Example 1**

*Assume that the table 'Dial peers' contains 500 records affiliated to Vendor A. Billing scheme 0/0/1 is set for 490 dial peers, the checkbox 'Retain billing scheme' is not selected. For the rest 10 dial peers the billing scheme is set to 0/30/6, the checkbox 'Retain billing scheme' is selected. Suppose the vendor have changed the billing scheme for the 490 dial peers from 0/0/1 to 0/60/6, while billing scheme 0/30/6 remained unchanged. To quickly and easily make the corresponding changes, in the field 'Billing scheme' of the dialog box 'Vendors' enter 0/60/6; leave the checkbox 'Applies to all' unselected. When done, click the OK button. The new billing scheme will be applied to the 490 dial peers, while no alternations will be made to the dial peers with billing scheme 0/30/6.*

**Example 2**

*Assume that the table 'Dial peers' contains 500 records affiliated to Vendor B. Billing scheme 0/0/1 is set for 490 dial peers, the checkbox 'Retain billing scheme' is not selected. For the rest 10 dial peers the billing scheme is set to 0/30/6, the checkbox 'Retain billing scheme' is selected. Suppose the vendor have set billing scheme 0/60/6 for all dial peers. To quickly and easily make the corresponding changes, in the field 'Billing scheme' of the dialog box 'Vendors' enter 0/60/6 and select the checkbox 'Applies to all'. When done, click the OK button. The new billing scheme will be applied to all the 500 dial peers regardless of the setting of the 'Retain billing scheme' checkbox of individual DP forms.*

You can also use this object to set the ACR, ACD and QoS notification thresholds for the vendor. For this, just enter the required values in the respective fields.

Click the OK button to submit the changes. Alternatively click  to discard the changes and quit the dialog.

Select  if you wish to view a DP record in an individual window.

The related tables viewing options of the pop-up menu invoked from this table include:

- **Dial peers**
- **Equipment**
- **Equipment groups**
- **Accounts**
- **Customers/Vendors**

#### 5.1.4 NOTIFICATIONS

The table of notification records shows what notifications System users are subscribed to.

<input type="checkbox"/>	Notification	Contact	Vendor	Area	from...
<input type="checkbox"/>	Call looping detected	John Smith <john.smith@mera-systems.com>			00:00
<input type="checkbox"/>	Restricted destination	John Smith <john.smith@mera-systems.com>			00:00
<input type="checkbox"/>	Unprofitable destination	John Smith <john.smith@mera-systems.com>			00:00

**Fig. 33 Table of notification settings**

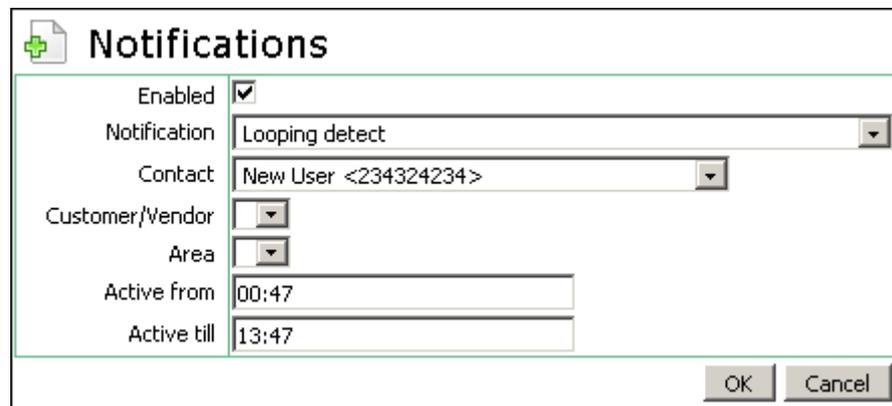
The table below provides information about notifications configured in the System:

**Table 5 System notifications**

Notification	Description
<b>System ACD is below the configured threshold</b>	This type of notification is sent when the System global ACD goes down below a predefined threshold. The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>Vendor ACD is below the configured threshold</b>	This type of notification is sent when the ACD value for the vendor drops below a predefined threshold. The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>System ASR is below the configured threshold</b>	This type of notification is sent when the System global ASR drops below a predefined threshold value. The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>Vendor ASR is below the configured threshold</b>	This type of notification is sent when the ASR of the vendor drops below a predefined threshold value. The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>Vendor ASR for a specific area is below the configured threshold</b>	This type of notification is sent when the vendor ASR for a specific area drops below a predefined threshold value. The threshold is configured in the table of areas (see section 5.9.1)
<b>System PDD exceeds the configured threshold</b>	This type of notification is sent when the System global PDD exceeds a predefined threshold value.

	The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>Vendor PDD exceeds the configured threshold</b>	This type of notification is sent when PDD for the vendor exceeds a predefined threshold value. The threshold is configured in the table of the System global settings (see section 5.9.1)
<b>Unprofitable destination</b>	This type of notification is sent when the destination profitability drops below the threshold. The threshold should be configured in the table of destinations (see section 5.4.2)
<b>Restricted destination</b>	This type of notification is sent when a tentative restriction is applied to the destination owing to its poor profitability. The threshold is configured in the table of destinations (see section 5.4.2)
<b>Call looping detected</b>	This type of notification is sent when a call looping occurs (see section 3.3)
<b>Customer profitability is below the configured threshold</b>	This type of notification is sent when the profitability of the Customer drops below a threshold value. The threshold value should be configured in the table “Customers/Vendors” (see section 5.1.1)
<b>Free disk space is below the configured threshold</b>	This type of notification is sent when the available free disk space of the TMngr server drops below a threshold value. The threshold value is configured in the table of the System global settings (see section 5.9.1)

To subscribe a user to notifications, invoke the pop-up menu and select  **Add** to display the “Notifications” dialog box.



**Fig. 34 Subscribing to a notification**

1. Select the checkbox ‘Enabled’ to make the record active;
2. Select a type of notification from the drop-down list of the ‘Notification’ combo box;
3. Select the name of the user you want to subscribe to the notification from the drop-down list of the ‘Contact’ combo box.
  - For the notifications “Vendor ACD is below the configured threshold”, “Vendor ASR is below the configured threshold”, “Vendor ASR for a specific area is below the configured threshold” and “Vendor PDD exceeds the

configured threshold” select the name of the vendor from the drop-down list of the ‘Client/Vendor’ combo box.

- For the notification “Vendor ASR for a specific area is below the configured threshold” specify the name of the area using the drop-down list of the ‘Area’ combo box.
4. Use the ‘from’ and ‘till’ combo boxes to set the time when you want the user to receive this type of notifications. For example, you can configure the system to send the notifications during working hours (say, from 9.00 a.m. till 18.00 p.m.) to the user’s office e-mail address and to a private e-mail address during nonworking hours. For this, you should create two records for the same type of notification and specify the appropriate contact data and time. When notification time is not set, notifications will be sent to the specified e-mail address on a 24-hour basis.
  5. When done, click  to add the record to the table.

To unsubscribe from a notification, simply delete the appropriate record from the table.

### 5.1.5 SUBCATEGORY ADMINISTRATION

Table 6 gives a brief description of objects found in the subcategory **Administration**.

**Table 6 Objects of subcategory Administration**

Object	Description
<b>System users</b>	Table of records with data about personnel who use direct web access to the System (in a variety of roles)
<b>Web authentication</b>	Table of records with authentication data for System users
<b>Role assignments</b>	Table of role assignments. The table is used to assign roles to System users. The table view allows the administrator to give a System user extra rights in addition to those available to him by virtue of the assigned role.
<b>Roles</b>	Contains a list of roles that can be assigned to System users
<b>Roles setup</b>	Table of records with information about web interface objects and rights that a user acquires when assigned the role
<b>Detailed role setup</b>	Allows the operator to customize existing roles.
<b>Web realms</b>	Table of existing web interface partitions
<b>Contacts</b>	Table of records with contact information of System users
<b>Customer-Vendor termination restrictions</b>	Allows the operator to configure the System so that it will not transfer calls from certain customers to certain vendors
<b>Customer/Vendor data removal</b>	Allows the operator to remove all customer or vendor-related data (except for CDRs) from the DB.

The subcategory Administration also comprises the subcategory **Wizards**.

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### 5.1.5.1 System users

The table of System users presents information about organization personnel who perform system administration tasks. Each staff member may have an individual suite of information access rights. For example, Operator A may be responsible for general System administration (full set of access rights) while the job of Operator B is to tend to accounting and billing issues only (which means that all other information will be inaccessible to Operator B).

To add a new user select the item Add on the pop-up menu (left-click the mouse on the table area to invoke the pop-up menu).

ID
* Customer/Vendor
* Name
* Language

**Fig. 35 Add-user dialog box**

Enter the following data in the displayed dialog (see Fig. 35) The fields marked with an asterisk are required fields:

**\*Customer/Vendor** – use this combo box to select the organization to which the user belongs;

**\*Name** – type in the user’s name;

**\*Language** – use this combo box to select the language that the user will use when working with the web interface.

When through with entering data click  to submit the newly made record. When adding the new record to the table of system users, the System assigns it an automatically generated ID.

In addition to the user data described above, the table presents the following information:

**Last login IP;**

**Last login date;**

**Last activity date.**

To edit, delete or view a record in an individual window select the appropriate item in the pop-up menu (invoked by left clicking the mouse on the record of interest).

You can also use the pop-up menu to view the information you need in the related tables (“User roles” and “Web authentication”).

Your next step in configuring the user’s account in the System is assigning the user a role (see 5.1.5.3) and entering the user’s authentication data that enables web access to the System (see 5.1.5.2 below).

### 5.1.5.2 Web authentication

This table presents users’ authentication data that ensures web access to the System.

<input type="checkbox"/>	ID	Enabled	Customer/Vendor	User	Web realm	Log
<input type="checkbox"/>	1	Yes	01   Your Company	1   Admin	users   Default web realm	admin
<input type="checkbox"/>	272076	Yes	01.01   Ashas	16   qwer	users   Default web realm	qwer
<input type="checkbox"/>	272236	Yes	01   Your Company	176   asd	users   Default web realm	asd
<input type="checkbox"/>	272277	Yes	01.01   Ashas	218   newashas	users   Default web realm	newas
<input type="checkbox"/>	2	Yes	01   Your Company	2   superashas	users   Default web realm	supera
<input type="checkbox"/>	272217	Yes	01.01   Ashas	157   test	users   Default web realm	newas

**Fig. 36 Table of user authentication records**

TMngr can perform user authentication by:

- Login name;
- Login name and password;
- Login name and IP address;
- Login name, password and IP address

There can be one or several authentication records configured for one user.

During authentication the System applies the AND condition to the authentication parameters configured in the user record and the OR condition to multiple authentication records.

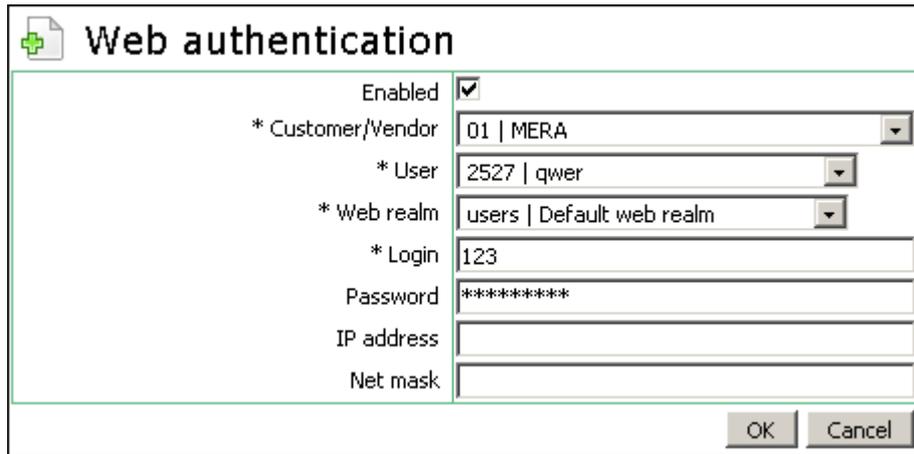
Let us explain how the System authentication process is organized using the following example.

Assume a user wants flexible access to the System information and wishes to be able to view traffic statistics both from the office tabletop computer with a trusted IP and any other IP (laptop) when on the move.

To ensure this, the user must have two authentication records – one configured for IP address authentication and another with just a login name and password. When accessing the system from the office computer the user will be granted access to the System even without having to enter the login name and password or with the login or password mistyped. (login/password verification will fail, but IP authentication will prove successful).

Wishing to access the System from any other place the user will have to provide correct logon credentials (login name and password) as IP verification will fail.

To configure logon credentials for a new user, select ‘Add’ in the pop-up menu (invoked by left clicking the mouse over the table).



The dialog box titled "Web authentication" contains the following fields:

- Enabled:
- \* Customer/Vendor: 01 | MERA
- \* User: 2527 | qwer
- \* Web realm: users | Default web realm
- \* Login: 123
- Password: \*\*\*\*\*
- IP address: (empty)
- Net mask: (empty)

Buttons: OK, Cancel

**Fig. 37 Web authentication dialog box**

Enter the user's logon credentials filling out the fields of the brought up Web authentication dialog box. The fields marked with an asterisk are required fields.

**Enabled** – select the checkbox, to make the record active;

**\*Customer/Vendor** – use the drop-down list of this combo box to select the organization the user is a member of;

**\*User** – use the drop-down list to select the user whose logon credentials you are configuring;

**\*Web realm** – use the combo box to select the required web realm (for detailed information about web realms refer to section 5.1.5.7);

**\*Login** – enter the user's login name here. Note that all user logins configured in the DB must be unique;

**Password, IP address, Net mask** – use these fields to enter respective user authentication attributes;

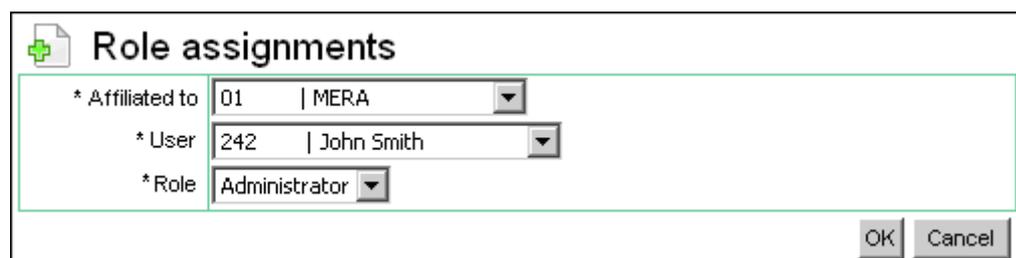
**Block** – select this checkbox when necessary to block the user's access by means of this authentication record.

To submit the configured authentication records click . Click  to discard the changes or abort the procedure.

### 5.1.5.3 Role assignments

This object is intended for assigning roles to the System users. As was mentioned above, you can assign multiple roles to a single user. In this case the user will have access to all the GUI objects envisaged by the assigned roles.

To assign the user a role, left-click to invoke the pop-up menu and select the 'Add' item.



The dialog box titled "Role assignments" contains the following fields:

- \* Affiliated to: 01 | MERA
- \* User: 242 | John Smith
- \* Role: Administrator

Buttons: OK, Cancel

**Fig. 38 Role assignment dialog**

Fill out the Role assignment form (the fields marked with an asterisk are required fields):

\***Affiliated to** is a combo box where you can select the organization the user is a member of;

\***User** is another combo box that provides a list of user names to select from;

\***Role** is the combo box where you select the role you intend to assign.

When finished with filling the form fields click  to submit the assignment. Click  to discard the changes or abort the procedure and return to the table of role assignments.

#### 5.1.5.4 Roles

The table 'Roles' presents a list of configured roles that System users may be assigned.

A role is a set of access rights that the administrator custom tailors to suit the operational needs of the user (see 5.1.5.5, 5.1.5.6). Actually, a role is a collection of GUI objects (forms, tables, columns etc.) made visible and accessible to the user.

<input type="checkbox"/>	ID	Role	
<input type="checkbox"/>	51	Super administrator	The user assigned the Super Administrator role has unres
<input type="checkbox"/>	52	Super administrator (view only)	The user assigned the Super administrator (view only) rol
<input type="checkbox"/>	53	Administrator	This role is assigned to the System administrators affiliated
<input type="checkbox"/>	54	Administrator (view only)	The users with this role have the same access privileges
<input type="checkbox"/>	55	Equipment manager	The users assigned this role have access only to the obje
<input type="checkbox"/>	56	DP and RP manager	The users with this role are supposed to be responsible fo
<input type="checkbox"/>	57	Accounting manager	This role is assigned to the users with accountant respons
<input type="checkbox"/>	58	Reporter	The user assigned the Reporter role can view CDR record

Switch to edit mode      Rows:       Rows on page:

Fig. 39 Table of roles

The System comes with the following pre-configured roles:

- **Super administrator.** The user assigned the Super Administrator role has unrestricted access to all objects of the System and absolute freedom of action. This role can be assigned to users with the first-level hierarchy classifier only.
- **Super Administrator (view only).** The user who is assigned the Super Administrator (view only) role has unrestricted access to all objects of the System but is not allowed to add, edit or delete any data.
- **Administrator.** This role is assigned to the System administrators affiliated to hosted vendors. Users with this role have access almost to all the GUI objects, except for the objects intended for global system configuration.
- **Administrator (view only).** The users with this role have the same access privileges as the users assigned the Administrator role, but cannot add, edit or delete data.
- **Equipment manager.** The users assigned this role have access only to the objects intended for equipment configuration.
- **DP and RP manager.** Users with this role are responsible for pricing policies and have access to the tables of dial peers, rate plans, etc.

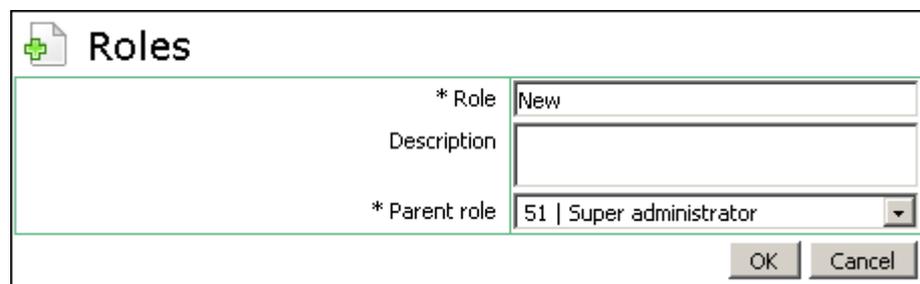
- 
- **Accounting manager.** This role is assigned to users with accounting responsibilities, such as invoice generation, entering data about payments received from customers, etc.
  - **Reporter.** The user assigned the Reporter role can view CDRs available in the DB and generate all types of statistical reports based on CDRs.

It should be mentioned that you can assign multiple roles to a single user. In this case the user will have access to all the GUI objects allowed for the roles he is assigned.

In addition to the “off-the-shelf” roles the SysO can create new roles with custom make-ups.

To create a role, invoke the pop-up menu (left click the mouse over the table) and select ‘Add’.

Enter a name for the role you are creating in the Role edit box of the form (see Fig. 40) and click .



**Fig. 40 Adding a role**

Your next step is to fill the role with content, i.e. make a list of objects that the user who is assigned the role can view and manage (see 5.1.5.4, 5.1.5.6 below).

### 5.1.5.5 Roles setup

This object serves for granting rights and permissions to custom roles.

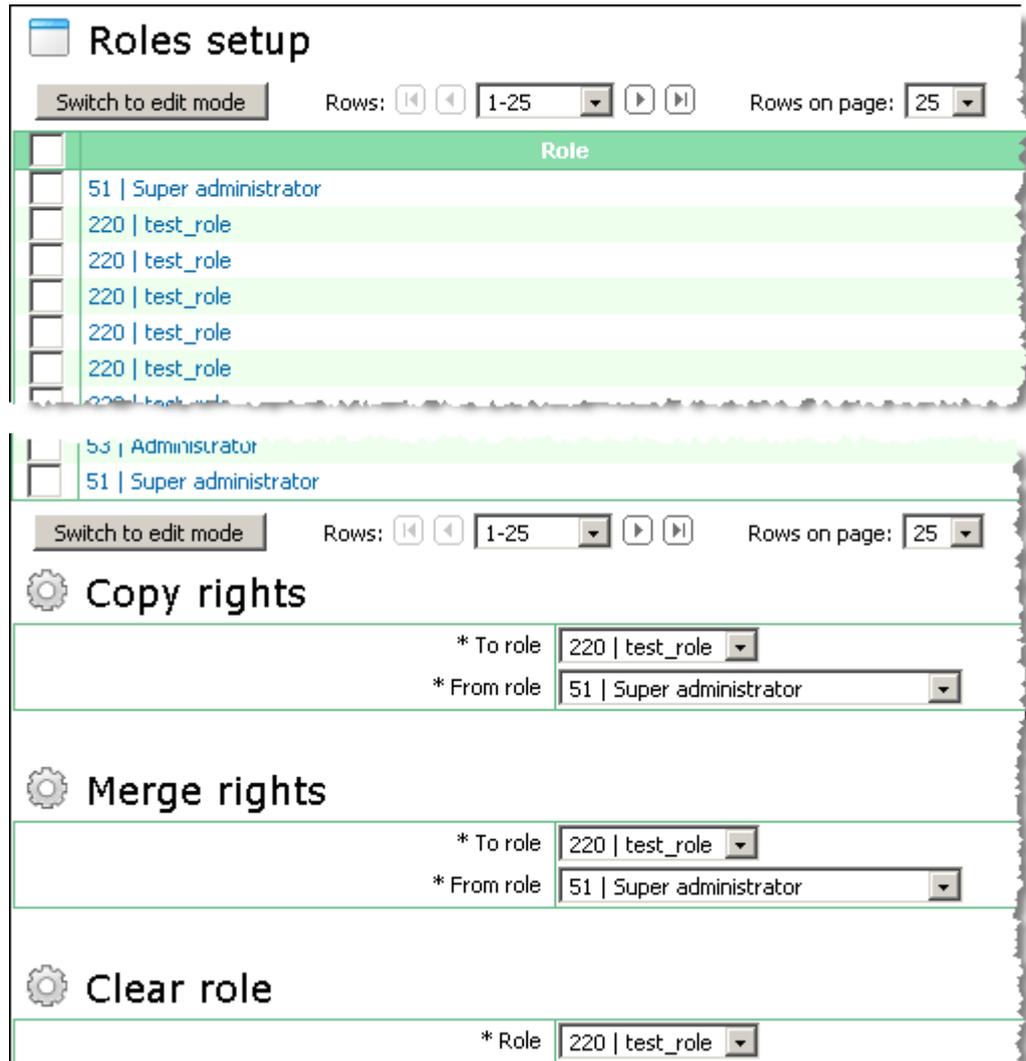


Fig. 41 View of the object “Role setup”

Open the object **Role setup** and in the table **Sub-roles assigned to the roles** find the name of the role of interest. The columns of the table present the names of sub-roles that can make-up a role. Each sub-role is a set of rights and permissions for one or several GUI objects closely related functionally. The names of the sub-roles are intuitive or self-explanatory, for example, the sub-role “Customers/Vendors administration” means that it allows viewing, adding, editing and deletion of data presented in the table **Customers/Vendors**, while the sub-role “Customers/Vendors view” provides only the right to access that is view data in the table. Switch to the edit mode, select the required sub-roles and accept the changes. The new role is ready.

There are two additional role creation possibilities:

- the tool **Copy rights** (the object **Role make-up**) allows copying of rights from one role to another. The recipient role acquires all the rights of the donator role. As a result you wind up with two roles with identical sets of rights but different names.
- the tool **Merge rights** (the object **Role make-up**) allows the operator to copy rights from one role to another preserving the existing rights of the recipient role.
- use the tool **Clear role** (the object **Role make-up**) to eliminate all rights in the role.

The table below shows the list of sub-roles and objects they embrace.

**Table 7 Sub-roles**

Sub-role	Accessible GUI objects
View log (only the users with the first-level hierarchy classifiers have access to the System logs)	object category Logs: <ul style="list-style-type: none"> <li>▪ Application log</li> <li>▪ Web activity log</li> <li>▪ Notification log</li> <li>▪ Login history</li> <li>▪ CPU usage log</li> </ul>
Roles administration	Customers/Vendors > Administration: <ul style="list-style-type: none"> <li>▪ Roles</li> <li>▪ Role setup</li> <li>▪ Detailed role setup</li> </ul>
System user administration	object category Customers/Vendors and subcategory Administration: <ul style="list-style-type: none"> <li>▪ System users</li> <li>▪ Web authentication</li> <li>▪ Web realms</li> <li>▪ Role assignments</li> <li>▪ Contacts</li> <li>▪ Notifications</li> </ul>
Customer/Vendors administration	object category Customers/Vendors: <ul style="list-style-type: none"> <li>▪ Customers/Vendors</li> </ul>
Customer/Vendors view	object category Customers/Vendors: <ul style="list-style-type: none"> <li>▪ Customers/Vendors</li> </ul>
Customer authentication administration	object category Customers/Vendors: <ul style="list-style-type: none"> <li>▪ Customer authentication</li> </ul>
Customer authentication view	object category Customers/Vendors: <ul style="list-style-type: none"> <li>▪ Customer authentication</li> </ul>
Vendors settings	object category Customers/Vendors: <ul style="list-style-type: none"> <li>▪ Vendor parameters</li> </ul>
Areas and NPA administration	object category Global settings: <ul style="list-style-type: none"> <li>▪ Global area names</li> <li>▪ ASR notification settings</li> <li>▪ USA states NPA-NXX</li> </ul>
Areas and NPA view	object category Global settings: <ul style="list-style-type: none"> <li>▪ Global area names</li> </ul>

	<ul style="list-style-type: none"> <li>▪ ASR notification settings</li> <li>▪ USA states NPA-NXX</li> </ul>
Routing administration	<p>object category Termination:</p> <ul style="list-style-type: none"> <li>▪ Routing groups</li> <li>▪ Dial peers</li> <li>▪ Active dial peers</li> <li>▪ Routing policies -&gt; Routing policies</li> <li>▪ Routing policies -&gt; Procedures</li> </ul>
Routing view	<p>object category Termination:</p> <ul style="list-style-type: none"> <li>▪ Routing groups</li> <li>▪ Dial peers</li> <li>▪ Active dial peers</li> <li>▪ Routing policies -&gt; Routing policies</li> <li>▪ Routing policies -&gt; Procedures</li> </ul>
Call debugging	<p>object category Debugging:</p> <ul style="list-style-type: none"> <li>▪ Call simulation</li> <li>▪ Dial peer hunting</li> <li>▪ Call debugging</li> </ul>
Equipment administration	<p>all the objects of the category Equipment and enclosed subcategories, except for Zones and Zones setup</p>
Change zone	<p>object category Equipment:</p> <ul style="list-style-type: none"> <li>▪ Zones</li> <li>▪ Zones setup</li> </ul>
Rate plans administration	<p>object category Origination:</p> <ul style="list-style-type: none"> <li>▪ Rate plans</li> <li>▪ Destinations</li> </ul>
View rate plans	<p>object category Origination:</p> <ul style="list-style-type: none"> <li>▪ Origination -&gt; Rate plans for hosted customers</li> <li>▪ Origination -&gt; Destinations for hosted customers</li> </ul>
View CDRs	<p>object category CDRs:</p> <ul style="list-style-type: none"> <li>▪ Active calls</li> <li>▪ Today</li> <li>▪ Last 7 days</li> <li>▪ Last 30 days</li> <li>▪ All</li> </ul>
CDR export	<p>object category CDRs:</p>

	<ul style="list-style-type: none"> <li>▪ CDR export</li> </ul>
CDR backup	object category CDRs: <ul style="list-style-type: none"> <li>▪ CDR backup</li> </ul>
CDR re-rating	object category CDRs: <ul style="list-style-type: none"> <li>▪ CDR re-rating</li> </ul>
Currency administration	object category Billing: <ul style="list-style-type: none"> <li>▪ Currency</li> <li>▪ Exchange rates</li> </ul>
Currency view	object category Billing: <ul style="list-style-type: none"> <li>▪ Currency</li> <li>▪ Exchange rates</li> </ul>
Add Payments	object category Billing: <ul style="list-style-type: none"> <li>▪ Payments</li> </ul>
View Payments	object category Billing: <ul style="list-style-type: none"> <li>▪ Payments</li> </ul>
Account manager	object category Billing: <ul style="list-style-type: none"> <li>▪ Accounts</li> </ul>
Generate invoices	object category Billing >Invoices: <ul style="list-style-type: none"> <li>▪ Invoice generation/deletion</li> <li>▪ Invoices</li> <li>▪ Detailed invoices</li> <li>▪ PDF templates</li> </ul>
Settlement schemes	object category Billing: <ul style="list-style-type: none"> <li>▪ Settlement groups</li> <li>▪ Settlement schemes</li> </ul>
Fixed customer payments	object category Billing: <ul style="list-style-type: none"> <li>▪ Scheduled account debiting</li> <li>▪ Account debiting log</li> </ul>
Import data	object category Global settings: <ul style="list-style-type: none"> <li>▪ Data import</li> </ul>
System global settings	object category Global settings: <ul style="list-style-type: none"> <li>▪ System global settings</li> </ul>
Edit disconnect codes	object category Global settings: <ul style="list-style-type: none"> <li>▪ Disconnect codes</li> </ul>
Disconnect sound options	object category Global settings: <ul style="list-style-type: none"> <li>▪ Disconnect sound options</li> </ul>
LAR Settings	object category Global settings: <ul style="list-style-type: none"> <li>▪ Global LAR settings</li> </ul>

Create report for ASR	object category Statistics: <ul style="list-style-type: none"> <li>ASR by customer/vendor</li> <li>ASR by SRC/DST IP</li> <li>ASR by SRC/DST equipment</li> <li>Statistics by time</li> </ul>
Create settlements report	object category Statistics: <ul style="list-style-type: none"> <li>Settlements by customer/vendor</li> </ul>
Profitability reports	object category Statistics: <ul style="list-style-type: none"> <li>Profitability reports</li> </ul>
Top area reports	object category Statistics: <ul style="list-style-type: none"> <li>Top areas</li> </ul>
Create custom report	object category Statistics: <ul style="list-style-type: none"> <li>Custom reports</li> </ul>
Create Statistics for active calls	object category Statistics: <ul style="list-style-type: none"> <li>Active calls by customers</li> <li>Active calls by vendors</li> </ul>
Create charts	object category Statistics: <ul style="list-style-type: none"> <li>Charts</li> </ul>

### 5.1.5.6 Detailed role setup

In case you need to “fine-tune” the role, for example, to limit access to a single or several columns, open the object **Detailed role setup**.

	Role	Menu item	Object type	Object
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Menu	00.01.01.01   Customers/Vend
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Table	00.2101.01   Customers/Vendo
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Column	00.2101.01.01   Enabled
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Column	00.2101.01.02   Classifier
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Column	00.2101.01.03   Parent
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Column	00.2101.01.04   Customer/Ven
<input type="checkbox"/>	51   Super administrator	-----Customers/Vendors	Column	00.2101.01.05   Description

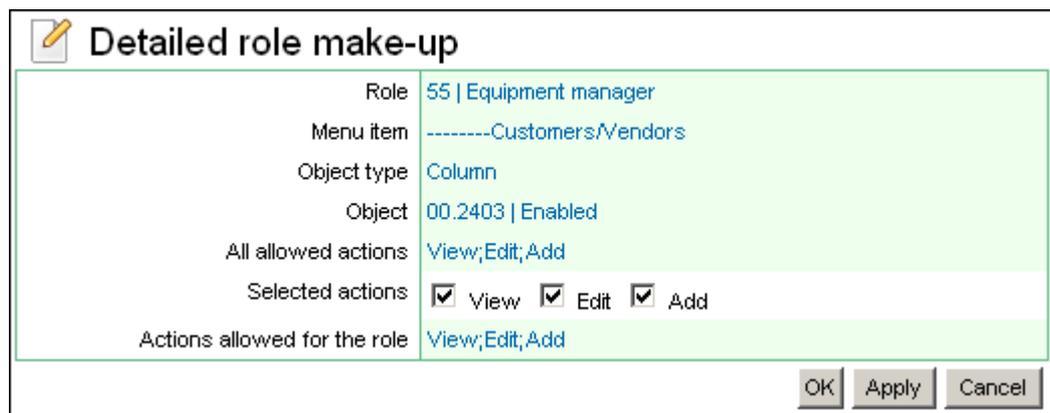
**Fig. 42 View of the object “Detailed role setup”**

The table **Detailed role setup** comprises information about all GUI items and access rights for them provided by the roles configured in the DB. To find the required item use the filter and sorting tool. The easiest way to do it is to filter the data in the table by the column **Role** and then sort by the entries in the column **Menu item**.

The table also comprises the following columns:

- **Object type** – presents information about the GUI object type (table, column, etc.);
- **Object** – shows the name of the GUI item;
- **All allowed actions** – shows the set of rights that can be assigned regarding the item;
- **Selected actions** – shows the set of rights selected by the user. The rights that contradict the column **All allowed actions** are highlighted in red.
- **Actions allowed for the role** – shows the currently effective rights;

Switch to the edit mode, select/deselect the required rights and accept the changes (see Fig. 43 below).



	Role
Role	55   Equipment manager
Menu item	-----Customers/Vendors
Object type	Column
Object	00.2403   Enabled
All allowed actions	View;Edit;Add
Selected actions	<input checked="" type="checkbox"/> View <input checked="" type="checkbox"/> Edit <input checked="" type="checkbox"/> Add
Actions allowed for the role	View;Edit;Add

OK Apply Cancel

Fig. 43 Role editing

### 5.1.5.7 Web realms

Web realms help you logically divide the web-interface into several protected areas, each with its own set of the users' web-authentication records.

For instance, to ensure additional security of the system you can use two web realms, a public realm accessible to all users and a private one accessible to the System administrators only. Association with a realm is a mandatory parameter of the users' web-authentication records. The administrator decides to what realm the authentication records will belong, thus precluding the threat of password-guessing attacks, i.e. malicious users will not be able to guess administrators' logins and passwords because they do not have access to the private realm.

Users with roles other than "Administrator" have no access to this object. In addition they cannot edit the field "Web realm" when creating or editing users' web-authentication records, as it is set to "Default web realm" automatically.

Initially, TMngr has a single public realm called the "Default web realm" and assigned the unique ID "users"\*.

---

*The unique ID of a web realm is one of the configuration parameters of the PHP-application (see below).*

---

To create the private realm, invoke the pop-up menu and select the 'Add' item.

**Fig. 44 Creating a private web realm**

Fill out the fields of the ‘Web realms’ dialog box (the fields marked with an asterisk are required fields):

**\*ID** – enter the unique ID of the realm, which can any word of your choice, for example, “admin”;

**\*Name** – enter the name of the realm;

**Description** – you can enter any appropriate information in this text box.

When finished with filling out the configuration form click . The newly configured record will be added to the table.

Now you can create a copy of the web-server that will be accessible to the System administrators only. For example, you can do it as follows:

1. Create a subdirectory in the directory `/opt/apache2/htdocs`, the directory of the web-server files.
2. Copy all the files of the directory `/opt/apache2/htdocs` to the newly created subdirectory.
3. In the newly created directory, edit the configuration file `Config.php`, by defining the unique ID of the private realm.

```

$cfg = array
(
    ...

    // Application settings

    "app" => array
    (
        // Web realm id

        "realm_id"                => "admins"

        ...
    )
);

```

Now in case the public web realm is accessible for the users via `www.<providername>.com`, to log onto the private web realm the address `www.<providername>.com/<directoryname>` will be used, where `<directoryname>` is the name of the subdirectory comprising the copies of the web-server files, known only to the System administrators.

As an alternative of copying web-server files, you can deploy the web-server to be used by the System administrators on another server with a different domain name or IP address.

It should also be mentioned, that the use of several web realms is not limited by security considerations and can find other applications. For example, you may wish to allocate individual web realms to the users of the hosted softswitch service, i.e. hosted vendors.

### 5.1.5.8 Contacts

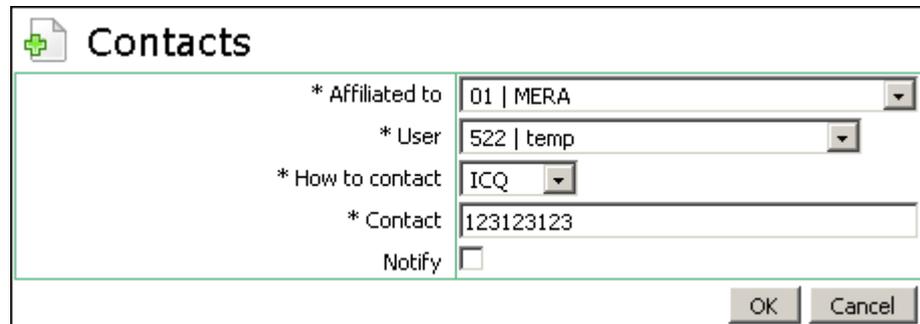
The table Contacts presents contact information records currently configured in the System (see Fig. 45). The contact data contained in the table is used for sending e-mail alerts and notifications.



ID	Affiliation	User
283	01   Telecom	2   Sergey Spatar
284	01   Telecom	3   Anton Kovalenko
383	01.01   MERA.RU	101   Иван Иванов
323	01   Telecom	121   Yuri Akimov
343	01.01   MERA.RU	182   Artem Andreev
403	01   Telecom	241   Sergey Ivanov
303	01   Telecom	1   Andrey Vinogradov

Fig. 45 Table of contact information records

To add a record with contact information, invoke the pop-up menu and select  Add .



**Contacts**

\* Affiliated to: 01 | MERA

\* User: 522 | temp

\* How to contact: ICQ

\* Contact: 123123123

Notify:

OK Cancel

Fig. 46 Contact information dialog

Fill out the form entering data in the following form fields (the fields marked with an asterisk are required fields):

**ID** – unique register identifier, generated automatically;

\***Affiliated to** – from the drop-down list of configured organizations select the one to which the user belongs;

\***User** – enter the contact name selecting it from the drop-down list of the combo box;

\***How to contact** – select E-mail from the drop-down list (other contacting means can be used for reference);

\***Contact** – use this text box to enter the contact’s email address, phone/fax number, or ICQ UIN depending on the setting of the parameter **How to contact**;

**Notify** – select this check box to instruct the System to send alerts and notifications to the user.

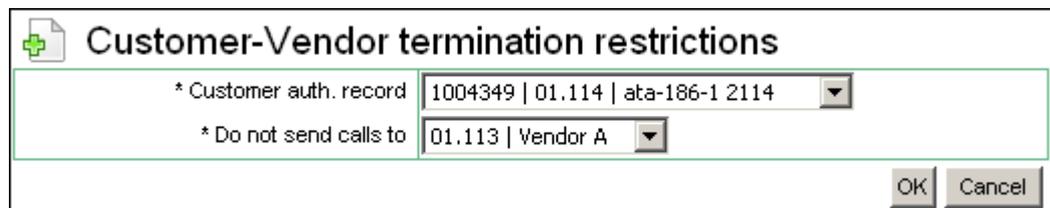
When finished with entering data, click **OK** to add the record to the table. Alternatively, click **Cancel** to discard the changes and return to the table view.

To edit or delete a record, invoke the pop-up menu and select the necessary option.

### 5.1.5.9 Customer-Vendor termination restrictions

This object allows the operator to configure the System so that it will not transfer calls from certain customers to certain vendors. It can be used in cases when you have termination problems caused by incompatibility of the customer and vendor equipment or for any other consideration.

To configure an undesirable customer-vendor pair, left-click the mouse on the table area to invoke the pop-up menu and select **Add**.



**Fig. 47 Customer-Vendor termination restrictions dialog box**

In the displayed dialog box, select the required authentication record, the name of the unwanted vendor and click **OK** to submit the newly made record. If necessary, repeat the procedure to add another restricted vendor for the customer. The number of such pairs is not limited.

The pop-up menu invoked from this table allows you to view the related table **Dial Peers** that will present information about dial peers affiliated to the vendor of the selected pair.

### 5.1.5.10 Customer/Vendor data removal

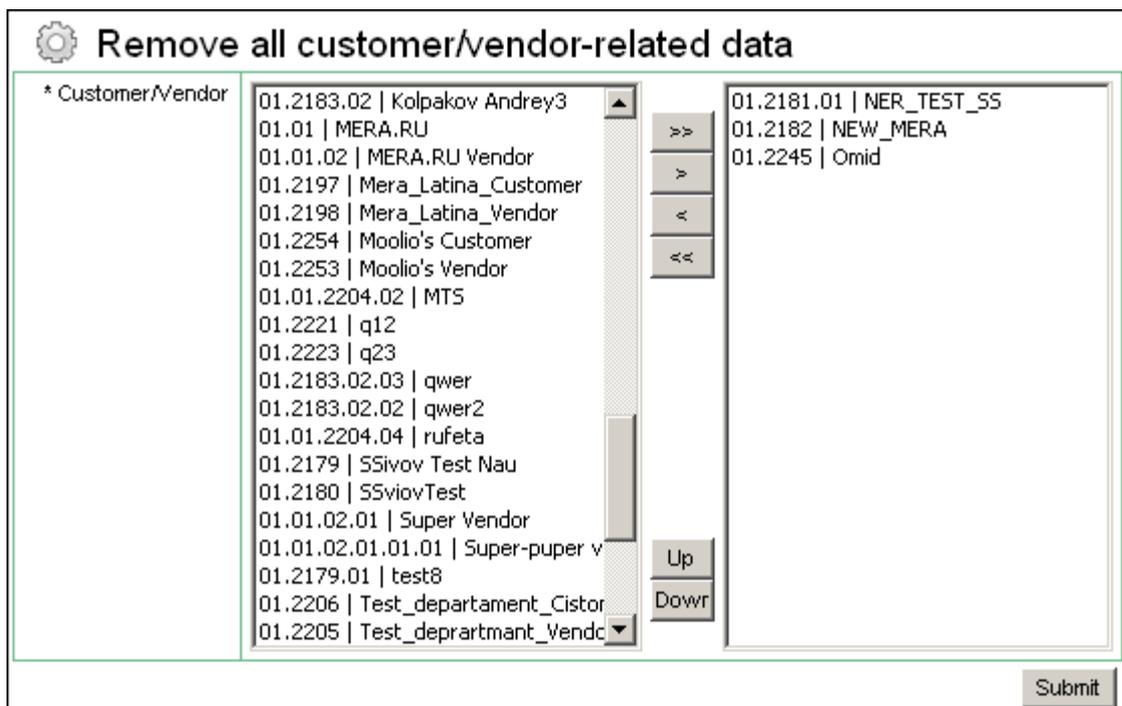
This object allows the operator to remove all customer or vendor-related data (except for CDRs) from the DB. The displayed list of removable customers/vendors varies with the operator's hierarchy classifier, i.e. the data that belong to users superior in the user hierarchy cannot be deleted. Data removal causes related data clearing from the following tables:

- Customers/Vendors
- System users
- Web authentication
- Role assignments
- Contacts
- Notifications
- Customer authentication
- Vendors
- Routing groups
- Dial peers
- Equipment
- Equipment groups
- Codec groups
- Codec group setupConfigure codec groups
- Enum-register
- Enum-enabled routing groups
- DNS-server
- Radius server

- Rate plans
- Destinations
- Calling party category
- Accounts
- Invoices
- Payments
- Scheduled account debiting

To remove the unnecessary data select the name of the customer/vendor in the left box and click the **>** button. Use the **<<** and **>>** buttons to move all the names from the right box to the left and vice versa. When done, click the **Submit** button.

**Warning!** Removed data cannot be restored.



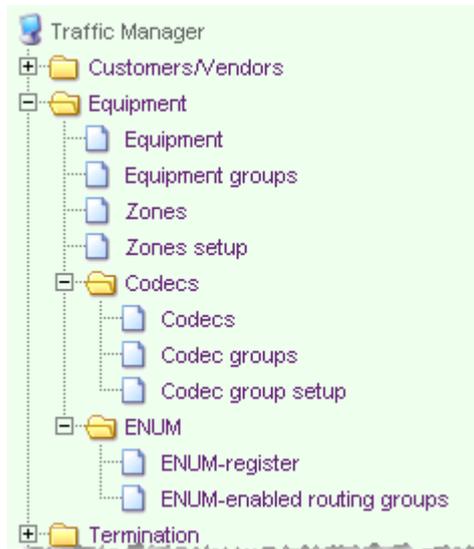
**Fig. 48 Customer/Vendor data removal**

### 5.1.5.11 Wizards

The only object in the subcategory **Wizards** is **Add/Delete User Wizard**. Following the wizard instructions the operator can quickly create new user accounts, assign roles to them, configure user authentication and contact data. The wizard is also instrumental in the removal of user accounts and user-related data from the DB.

## 5.2

## CATEGORY EQUIPMENT



The category Equipment comprises objects related to equipment the System interoperates with. Table 8 gives a brief overview of the objects that constitute the category Equipment.

**Table 8 Objects of category Equipment**

Object	Description
<b>Equipment</b>	List of devices the System interacts with. Also contains the equipment functioning statistics.
<b>Equipment groups</b>	List of existing equipment groupings
<b>Zones</b>	Contains information about “IP zones” used by the TS in call routing.
<b>Zones setup</b>	Provides information on thenetworks forming the configured IP zones.

The category Equipment also comprises the subcategories CODECS and ENUM.

### 5.2.1

### EQUIPMENT

The table Equipment provides information on devices that interoperate with the System and operational statistics for these devices.

<input type="checkbox"/>	Enabled	ID	Name	Description	Customer/Vendor
<input type="checkbox"/>	Yes	2840	dlink-80sip 2111	MyEq	01   Your Company
<input type="checkbox"/>	Yes	2841	dlink-120s 2110	MyEq	01   Your Company
<input type="checkbox"/>	Yes	2842	dlink-80h323 2112	MyEq	01   Your Company
<input type="checkbox"/>	Yes	2843	ata-186-1 2114	MyEq	01   Your Company
<input type="checkbox"/>	Yes	2844	ata-186-2 2115	MyEq	01   Your Company
<input type="checkbox"/>	Yes	2845	linksys901 2113	MyEq	01   Your Company

**Fig. 49 Table of equipment**

You can view, edit, delete records and add new records to the table. To add a new record, bring up the pop-up menu and select  **Add**.

**Equipment**

OK Cancel

Enabled

\* Name New equipment

Description

\* Customer/Vendor 01 | MERA

\* Type (for information only) EndPoint

Domain name

IP address

\* Zone intranet

\* Protocol h.323

Port H.323

**Fig. 50 Adding a new equipment record**

Use the combo and text boxes of the invoked dialog box to define the attributes of the equipment item you are configuring.

**Enabled** – select the checkbox to make the record active;

**\*Name** – is the word or phrase by which the equipment item is referred to;

**Description** – in this field you can enter any descriptive information;

**\*Customer/Vendor** – use this combo box to select the organization or individual running the equipment from the drop-down list;

**\*Type** – select the equipment type using the drop-down list the available options being:

- Endpoint

- 
- GK (gatekeeper)
  - GW (gateway)
  - [MERA SIP HIT](#)
  - SIP registrar

**Domain name** – enter the domain name of the device if it is used for termination. To resolve the domain name Traffic Manager inquires the DNS server configured in the table of the system global settings (see section 5.9.1). When resolved the IP address of the device and the address expiration date are added to the database. Traffic Manager uses this data until the validity of the address expires and later inquires the DNS server again.

**IP address** – enter the IP address of the termination device in case there is no Domain name defined. This field, as well as the Domain name field can both be blank for the Originating device, as originating equipment authentication is performed using data from the Customer Authenticatyon table;

**\*Zone** – use the combo box to select the preferred network for delivery of traffic to the termination device being configured (for information about zones refer to 5.2.3 and 5.2.4);

**\*Protocol** – select the necessary signaling protocol (SIP or H.323) for situations when the equipment operates as the termination device. Option “the same” means that traffic will be sent for termination using the protocol of originating equipment;

**Port H.323** – enter the TCP port for outgoing H.323 calls (if blank, the standard 1720 will be used);

**Port SIP** – enter the UDP port for outgoing SIP calls (if blank, the standard 5060 will be used);

**\*Proxy mode** – select the type of the proxy function (see also [Appendix C](#)):

- Force Proxy
- Non-proxy-recommended
- Force non-proxy

**Equipment group** – use the combo box to select the group the device being configured belongs to;

**Load share/Priority** – use this parameter to specify the device’s load share as a percent/weight of total traffic handled by the equipment group or to define the priority of the device for selection of the termination option within a group. The higher is the value the higher is the priority. If you select the equipment selection rule “Try routes according to load sharing rules” (see section 5.2.2) the settings of the this parameter will be treated as percentage/weight of total traffic, and if the rule “Try routes strictly ordered by priority values” is selected the settings will be treated as priority;

**Codec group** – use the combo box to select the group of codecs you would like to assign to the device (for information about codec groups refer to 5.2.5);

**\*Codec sorting (Terminators)** – you can use this parameter to avoid codec conversion in case the lists of codecs supported by origination and termination devices include identical codecs. Define the codec sorting rule applied to the list of codecs in the terminator’s codec group before sending this list to the TS. The sorting will depend on the list of codecs received from the call originator:

- No sort – do not sort codecs and send the list of codecs from the termination device codec group without changes;
- Used first – place the codecs identical to the codecs of the call originator to the beginning of the list (in the same order), move the rest of codecs to the end of the list;

- 
- Discard unused – include in the list only codecs identical to the codecs of the call originator, exclude the rest of codecs;
  - Use first only – use the first supported codec found in the originator list of codecs;
  - Discard unused with failsafe – apply the “Discard unused” rule and in case the resulting list is empty send the list of codecs from the termination device codec group without changes.

It should be mentioned that codec sorting may result in exclusion of certain termination devices and dial peers from the routing options. For example, if you select the “Discard unused” rule, then in case there are no identical codecs in the codec lists of origination and termination devices, TMngr will remove all codecs from the list of the termination device, thus excluding it from the routing process and if it is the only device associated with the dial peer, the dial peer will also be neglected (see also [Appendix C](#)).

**Always apply "Discard unused" rule (Originators)** – this parameter is intended for configuration of origination equipment. Select the checkbox to restrict codec conversion for the device. When a call arrives from the device, the System sets the codec sorting rule for all termination devices to “Discard unused” (see above) irrespective of their codec sorting settings.

One of the applications of the **Always apply "Discard unused" rule** is to make sure that the newly-added customer will not flood the operator’s MVTs II with too many calls requiring codec conversion, thus dramatically decreasing performance and call quality. If after some initial tests it is clear that only an acceptable part of calls will require conversion, the **Always apply "Discard unused" rule** may be disabled.

**Valid till** – use this set of date-time combo boxes to configure the record validity expiration date.

### Number translation rules

**In SRC translate** requires a regular expression that determines source number modification rules for the cases when the equipment is the call originator (for detailed information about number translation rules refer to [Appendix A](#)).

**In DST translate** contains a regular expression that determines destination number modification rules for the cases when the equipment is the call originator (for detailed information about number translation rules refer to [Appendix A](#)).

**Out SRC translate** is for a regular expression that determines source number modification rules for the cases when the equipment is the call terminator (for detailed information about number translation rules refer to [Appendix A](#)).

**Out DST translate** requires a regular expression that determines destination number modification rules for the cases when the equipment is the call terminator (for detailed information about number translation rules refer to [Appendix A](#)).

**Max. incoming calls** – enter the maximum number of concurrent incoming calls that can be accepted from the device.

**Max. outgoing calls** – enter the maximum number of concurrent outgoing calls that can be terminated to the device.

**Block origination** – this check box allows you to block ingress traffic from this equipment.

**Block termination** – this check box you to block egress traffic directed at this device.

### LAR (re-routing) disconnect codes

**LAR allow (MVTs), LAR allow (H.323), LAR allow (SIP) / LAR deny (MVTs), LAR deny (H.323), LAR deny (SIP)** – with the help of these parameters you can customize the LAR (Look Ahead Routing or re-routing) function depending on the call disconnect code received from each device in the list of termination options. Upon receipt of an allowed disconnect code Traffic Switch tries to establish a call via the next device, otherwise the call

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is rejected. Enter the code numbers either only in the fields of allowed codes or only in the fields of restricted codes. At that, all the codes not specified in the fields of allowed codes are considered restricted, while the codes not specified in the fields of restricted codes are considered allowed. You can enter individual code numbers, as well as ranges of code numbers delimiting them with semicolons (for instance, 200-300;304;305;400-500). Reference information about call disconnect codes is presented in the table “Disconnect codes” (see section 5.9.3). In addition to these parameters used for individual customization of the LAR function, there is a possibility to configure global LAR settings (see section 5.9.6). Individual LAR settings override the global ones.

### Advanced settings

**Enable RBT** – select the checkbox to enable the RBT (ring-back tone) emulation function when proxying media-traffic;

**RBT Timeout (sec)** – define the wait period (in seconds) before the Systems starts RBT emulation in case of the absence of RBT from the call terminator;

**RBT file** – enter the name of the audio file (.wav file) to be used for RBT emulation. The path to the audio file is configured in the settings of the media-node;

**RTP Timeout (sec)** – define wait period for RTP traffic in seconds. If the specified time expires and there is no RTP traffic, the system aborts the call;

**Alerting timeout (sec)** – set a time interval, after which the system sends a fake Alerting message to the origination device;

**Clear calls by alerting timeout** - when this checkbox is selected if a connection cannot be established with the termination device within the time specified in the field **Alerting timeout**, the System will clear the call with LDC 70 “Cleared by alerting timeout”, that can be mapped to any SIP or H.323 code to return to the originator (H.323 code 34 and SIP code 408 by default, see section 5.9.3);

**\*Flags** – you can use this parameter to configure some specific options of the device behavior. The options are defined by hexadecimal bit masks:

- 0x0001 – always use the “180” SIP response; the device does not support the “183” response
- 0x0002 – send DTMF as INFO, and not according to RFC2833
- 0x0004 – the device supports fax transmission over G.711
- 0x0008 – an H.323 device that requires emulation of CISCO
- 0x0010 – forced disabling of RPT emulation upon receipt of repetitive Alerting

**\*Report original destination** – this combo box includes the following options:

- No
- Yes – in case the INVITE message on the incoming leg did not include the “Diversion” field (or in case of a H.323 to SIP call) the TS adds this field with the unchanged URI/destination number to the INVITE message sent to the call terminator.
- The same as on the incoming leg:
  1. In case the INVITE message on the incoming leg featured the “Diversion” field, it is included unchanged in the INVITE message sent to the call terminator.
  2. In case of an H.323 to H.323 call the confID received on the incoming leg is sent unchanged to the call terminator.
  3. In case of an H.323 to SIP call the TS adds the “Cisco-Guid” field to the INVITE message sent to the call terminator. The field comprises the same confID as on the incoming leg (in the format used by the Cisco IOS).  
If in case of an SIP H.323 to H.323 call, the INVITE message on the incoming leg comprised the "Cisco-Guid" field, the confID sent to the call terminator is the same as in this field.

**Untrusted device** – with this check box selected the device being configured is not allowed authentication by the source number. Untrusted devices can be authenticated by destination number, technical prefix and source IP address.

**Disconnect sound group** – when the device being configured is an end point you can use this combo box to define the group of disconnect sounds played to the caller depending on the call disconnect code (see also section 5.9.9).

**Name for external billing** – enter the name of the device to be sent to the RADIUS server in the ‘User-Name’ field. If nothing is specified, the System will send the RADIUS server the device’s IP address;

**RADIUS server name** – select the name of the RADIUS server form the drop-down list of this combo box. When the gateway is involved in processing a call, information about the call will be sent exactly to the RADIUS server selected in the combo box of the gateway configuration form. When no RADIUS server is configured for the gateway neither AccountingStart nor AccountingStop message will be sent to the RADIUS.

**Registration required** – in case this checkbox is selected the device should be registered to be able to receive calls from MVTS II;

**Currently registered** – “Yes” in this non-editable field indicates that the device is registered with MVTS II.

**\*Registration keep alive time** – this field serves to define the time interval for registration updates of dynamically registering devices. Default value: 180 seconds.

**\*Domain name resolving option** – select on of the resolving option in case the device being configured is defined by a domain name:

- Resolve name using A and AAAA records
- Do not resolve

The table below describes the System behavior varying with combinations of device settings.

**Table 9 Domain name resolution options**

Resolution option	IP address	Domain name	SIP	H.323
Resolve name using A and AAAA records	Defined	Defined	Until the device domain name date is not expired the CallAck message sent to TS will include the IP address of the device, without having the DNS server resolve the domain name (see <b>Note</b> under the table)	
Do not resolve			The CallAck message sent to TS includes the IP address of the device; the VoipCallAck.destinationAlias message includes the field URI in the format <phone number>@<domain name>	The CallAck message sent to TS includes the IP address of the device

Resolve name using A and AAA records	Defined	Not defined	The parameter is ignored
Do not resolve			
Resolve name using A and AAA records	Not defined	Defined	The domain name is resolved
Do not resolve			The call is rejected
Resolve name using A and AAA records	Not defined	Not defined	The call is rejected
Do not resolve			

**Note:** Upon arrival of the first call to the device identified by a domain name, the System has the DNS server resolve the name and gets from the DNS server information about the domain name expiration date. The System continues to use the IP address until the domain name validity time expires, then the DNS server is used to resolve the domain name again.

**Domain address expiration time** – non-editable field presenting the date and time the correspondence of the device domain name and IP address expires (see the description of the “Domain name” field above).

### H.323 settings

**Faststart** – select this checkbox if the equipment is FastStart capable.

**Tunneling** – select this checkbox if the equipment is supportive of Tunneling (H.245 encapsulation).

**Validation GAP (msec)** – set the packet forwarding delay in milliseconds, during which call setup packets exchange with the origination device is suspended. During call setup the packets arriving from the termination device are stored in the TS buffer, whose content will be forwarded further to the call originator only when the delay time specified in this field is over. Such organization of the call setup and look-ahead routing procedure is needed for devices that can handle one CallProceeding message only. Hence, if a CallProceeding message is occasionally followed by a Release\_Complete message, further work (call setup and call rerouting) with such a device intolerable to repeated CallProceeding messages may become impossible.

**Can Update Media Channel** – select the checkbox if the device being configured is capable of receiving repeated FastStart messages.

**\*(SRC/DST) Type of number** – specify the type of number to be sent to the device when it acts as a call terminator:

- Unknown
- International number
- National number
- Network specific number
- Subscriber number
- Abbreviated number
- Reserved for extension
- The same
- 

**Note:** *The parameters SRC Type of number and DST Type of number can also be used for*

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removal of the “+” symbol from telephone numbers both for SIP and H.323 signaling calls. According to the SIP standard “+” is the attribute of international numbers, while in H.323 international numbers are identified by the “Type of number” field.

Upon arrival of a call with “+” TS unconditionally removes it, replaces the plus with the “international number” token and sends it to the TMngr. TMngr checks the received data against the settings of the SRC Type of number and DST Type of number parameters of the termination device and if they are set to:

- International number – the System will set the type of number of the SRC/DST numbers to “International number” in case of H.323 on the outgoing call leg or pre-pend a plus to the number for SIP calls;
- The same – the System will use the same type of number on the outgoing call leg as was on the incoming leg.

---

**\*(SRC/DST) Numbering plan** – define the numbering plan to be sent to the device when it acts as a call terminator:

- Unknown
- ISDN telephony numbering plan (Recommendation E.164 [19])
- Data numbering plan (Recommendation X.121 [21])
- Telex numbering (Recommendation F.69 [22])
- National standard numbering plan
- Private numbering plan
- Reserved for extension

**Start H.245 after** – use this combo box to define the message, upon receipt of which the H.245 control channel is opened:

- **Call proceeding**
- **Alerting/Progress**
- **Connect**

**Response FastStart in Call Proceeding, Response FastStart in Alerting/Progress, Response FastStart in Connect** – define the message to include the FastStart packet. These parameters are intended for configuration of origination equipment.

**H.323-ID handling options/H.323** – use these two parameters to configure how the System will handle H.323 attributes received from call originators. MVTS II processes H.323 attributes in the following way:

- The first received alias of the ‘DisplayName’ type is written to CDRs
- All the received aliases of the ‘DisplayName’ to the call terminator
- All the received aliases of the ‘H323-ID’ type are processed in accordance with the settings of the parameters **H.323 handling options** and **H.323 alias** defined for the call terminator in the table **Equipment**. The following options are available:
  - Remove – unconditionally removes all aliases of the ‘H323-ID’ type;
  - Preserve – preserves all the received aliases;
  - Use as display name – all the aliases of the ‘H323-ID’ type are changed to ‘DisplayName’ and sent to the call terminator;
  - Replace – replaces all the aliases of the ‘H323-ID’ type with the value defined in the field **H.323 alias**. If the field **H.323 alias** is empty, the ‘Remove’ rule is applied;
  - Use as H.323-ID and DisplayName – each of the received aliases is used both as ‘H323-ID’ and ‘DisplayName’.

**Use indicators** – when this check box is cleared the parameters **Presentation indicator** and **Screening indicator** are automatically set to 'Octet 3a not present' and 'Not screened'

---

respectively. With the checkbox selected you can set any combination of the above parameters:

**Presentation indicator:**

- Presentation allowed
- Presentation restricted
- Number not available due to interworking
- Reserved

**Screening indicator:**

- User-provided, not screened
- User-provided, verified and passed
- User-provided, verified and failed
- Network provided

## SIP settings

**Allow forwarding to** – enter masks of networks where call forwarding is allowed when the equipment operates as a termination device. On receipt of a call forwarding request the System checks if the IP where the call is forwarded belongs to the network allowed for call forwarding and if not the call is rejected. When making a list, delimit the masks you are entering with semicolons without spaces.

**Poll, Poll interval** – these parameters are intended for the configuration of the network entities supportive of the SIP protocol and allow the System to monitor the serviceability of such entities by sending them at a specified interval the OPTIONS request as long as they are handling calls. Select the ‘Poll’ checkbox and enter the polling interval (in seconds) in the respective edit box.

**\*SIP privacy method** – use this combo box to select the privacy method to be used when the SIP protocol is involved:

- Cisco RemotePartyID (for more information about this method refer to [http://www.cisco.com/en/US/products/sw/iosswrel/ps1839/products\\_feature\\_guide09186a0080110bfb.html#wp1050768](http://www.cisco.com/en/US/products/sw/iosswrel/ps1839/products_feature_guide09186a0080110bfb.html#wp1050768))
- RFC 3325 PassertedID (for more information about this method refer to <http://www.ietf.org/rfc/rfc3325.txt>)

**\*NAT keep alive time** - – this field serves to define a time interval (in seconds) for repeated connection checks with devices sitting behind a NAT router. Default value: 0 (do not poll the device).

## Redial settings

**Max. redial attempts** – define the maximum number of redial attempts.

**Redial interval** – define the interval between redial attempts in second.

**Redial cause code (MVTs) / Redial cause code (H323) / Redial cause code (SIP)** – specify the disconnect codes the receipt of which will cause the redialing procedure. Similarly to the ‘LAR allow’ fields you can enter individual code numbers, as well as ranges of code numbers delimiting them with semicolons.

## Gatekeeper (GK) settings

---

The following five parameters serve for configuring the System interoperation with remote gatekeepers:

**Use LRQ** – select the checkbox to instruct the System to send LRQ to the gatekeeper.

**GK ID** – use this field to specify the gatekeeper identifier (arbitrary character string).

**GK IP address** – serves to specify the IP address and port of the remote gatekeeper. Note that the port number should be 1719.

**Use GK IP address** – select the checkbox to instruct the System to write the gatekeeper IP address or IP address of the termination gateway received from the gatekeeper in CDRs.

**Use GK alias IP address** – select the checkbox to instruct the System to use the H.323 aliases received from the gatekeeper.

When through with filling out the add-equipment form click  to submit the record. Alternatively click  to discard the changes.

To edit, delete or view the record in an individual window select the appropriate item in the pop-up menu. The related tables that can be accessed from the pop-up menu include:

- **Customer authentication data**
- **Dial peers**
- **Settlement accounts**
- **Origination** (a table of CDRs for traffic delivered by the equipment)
- **Termination** (a table of CDRs for traffic delivered to the equipment)

When in the table or view mode, you can also view the following statistical data:

- Number of ingress calls currently handled by the equipment
- Number of egress calls currently handled by the equipment
- Number of new ingress calls per second
- Number of new egress calls per second
- ASR for the device when it functions as a call terminator
- ASR (SRC) for the device when it functions as a call originator
- ACD
- Current QoS
- Total time of calls processed by the device
- Successful calls total and failed calls total

The pop-up menu invoked from the table **Equipment** comprises two additional commands intended for resetting equipment statistics in the fields **Total calls**, **Successful calls**:

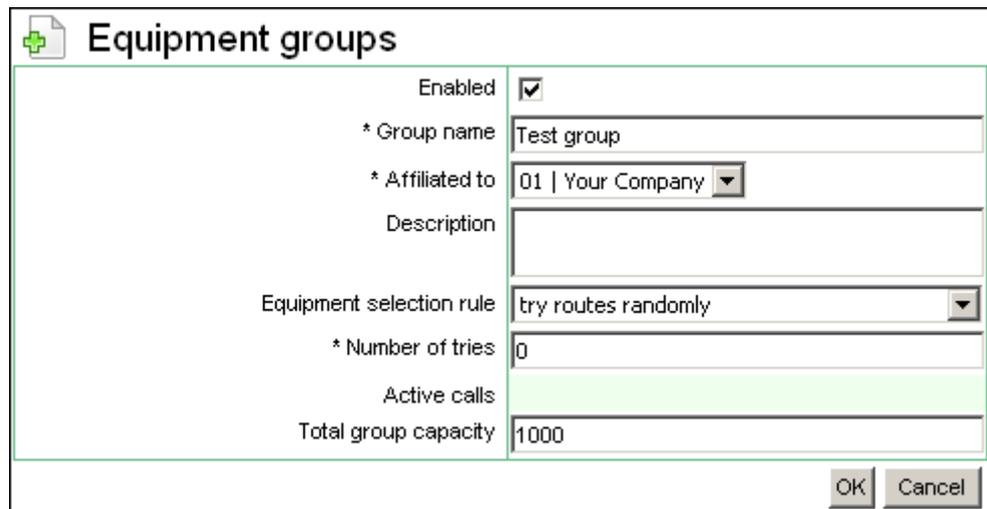
- **Reset statistics (selected or marked)** – resets statistics for the selected record or several marked records;
- **Reset statistics (all filtered)** – resets statistics for all filtered records

## 5.2.2 EQUIPMENT GROUPS

The table Equipment groups presents a list of equipment groups currently existing in the System (see Fig. 51).

A DP may be represented by a single termination device or several devices. When there are several devices belonging to the same DP they form a group of equipment. When a DP incorporates a group of devices, there must exist a rule on how the available termination alternatives are picked within the group (see also section 3.7).

To create a group click  **Add** in the pop-up menu and fill out the displayed equipment group dialog.



The image shows a dialog box titled "Equipment groups" with a plus icon in the top left corner. The dialog contains several fields and controls:

- Enabled:** A checkbox that is checked.
- \* Group name:** A text input field containing "Test group".
- \* Affiliated to:** A dropdown menu showing "01 | Your Company".
- Description:** An empty text input field.
- Equipment selection rule:** A dropdown menu showing "try routes randomly".
- \* Number of tries:** A text input field containing "0".
- Active calls:** A green-shaded text input field.
- Total group capacity:** A text input field containing "1000".

At the bottom right of the dialog are two buttons: "OK" and "Cancel".

**Fig. 51 Adding a new equipment group**

Specify the following parameters of the group being created (the fields marked with an asterisk are required):

**Enabled** – select the checkbox to make the record active;

**\*Group name** – enter the name of the group;

**\*Affiliated to** – specify the equipment owner/operator using the drop-down list of this combo box;

**Description** – you can enter any information about the group in this text box;

**Equipment selection rule** – set an equipment selection rule choosing one from the drop-down list of possible options:

- **Try routes sequentially** – one-by-one picking going through all termination opportunities within the group
- **Try routes randomly** – means that the group termination devices will be tried randomly
- **Try routes according to load sharing rules** – means that the System will balance traffic between devices that make up the equipment group according to the predefined load sharing values (see section 5.2.1).
- **Try routes strictly ordered by priority values** – means that the System will always try the device with the highest priority first, then the device with the second highest priority, etc. according to the predefined priority values (see section 5.2.1).

**Number of tries** - allows the operator to enter a number of termination attempts through the devices that make up the equipment group. Valid values: 0 (unlimited number of attempts) through 99.

**Active calls** – this field is non-editable, it presents the current number of simultaneous calls currently handled by the equipment group;

**Total group capacity** – specify the maximum allowed number of simultaneous calls that can be handled by the equipment group.

Click  to submit the record when through with filling out the form. The newly added record is assigned an automatically generated ID.

---

Alternatively click  to discard the changes.

To edit, delete or view a record in an individual window, select the appropriate item in the pop-up menu. The related tables that can be accessed from the pop-up menu include:

- Equipment
- Dial peers

### 5.2.3 ZONES

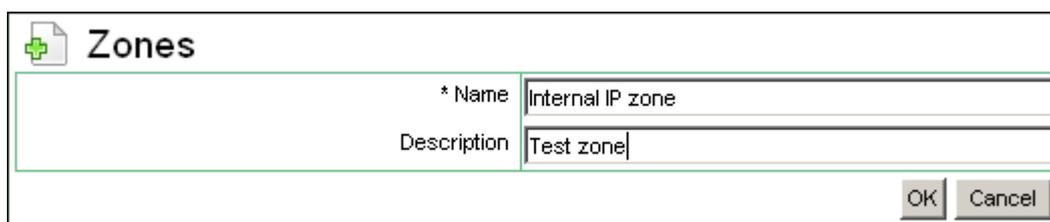
An IP zone is a set of connected networks characterized by configured routing between the IP addresses of the comprising networks and the absence of connectivity restricting devices (for example, firewalls, NAT routers etc.) within the zone. Actually, IP zones are configured on the Traffic Switch. Information about IP zones in the DB is necessary to make it possible assign IP zones when configuring equipment records. For more detailed information about IP zones refer to *MVTS II Installation guide*.

---

*It is mandatory that the description of IP zones in the DB is identical to their description in the configuration file of the Traffic Switch.*

---

To add a new zone record, invoke the pop-up menu and select  Add .



 <b>Zones</b>	
* Name	Internal IP zone
Description	Test zone
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

**Fig. 52 Add zone dialog**

Enter the following data in the displayed dialog:

**\*Name** – type in the zone’s name;

**Description** – you can use this text box to enter whatever explanatory information you find appropriate.

Click  to add the record to the table. The record ID is generated and assigned at the time of adding the record to the table. You next step is to specify what networks the zone comprises (see 5.2.4).

### 5.2.4 ZONES SETUP

The table “Zones setup” provides information about what networks form the IP zones. This information is for your reference purposes only and does not influence the System behaviour.

Zones setup			
<input type="checkbox"/>	ID	Zone	Network mask
<input type="checkbox"/>	1	104   Internal IP zone	192.168.111.0/24
<input type="checkbox"/>	2	105   External IP zone	22.33.44.0/24
<input type="checkbox"/>	3	185   External IP zone 2	11.99.44.8/29

Switch to edit mode      Rows: 1-3      Rows on page: 25

**Fig. 53 Table of zone records**

To add a record, select  **Add** in the pop-up menu.

Zones setup	
* Zone	104   Internal IP zone
* Network mask	192.168.111.0/24
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

**Fig. 54 Adding a zone record**

In the displayed dialog:

- Select the zone name from the drop-down list of the combo box **Zone**
- Enter the IP address (mask) of the network which will belong to the zone (see Fig. 54)

This done, click  to add the record to the table.

## 5.2.5 SUBCATEGORY CODECS

This subcategory allows you to configure parameters pertaining to codecs supported by termination equipment. Table 10 gives a brief overview of the objects that constitute the subcategory Codecs.

**Table 10 Objects of subcategory Codecs**

Object	Description
<b>Codecs</b>	Contains the list of the basic codecs used in IP-telephony
<b>Codec groups</b>	Presents information about existing codec groups
<b>Codec group setup</b>	Allows you to group codecs supported by the termination equipment

### 5.2.5.1 Codecs

The table Codecs contains a list of codecs used in IP-telephony.

**Codecs**

Rows: ⏪ ⏩ 1-11 ⏪ ⏩ Rows on page: 25

Name	Codec type
g723	audio
g729	audio
g729a	audio
gsm	audio
iLBC13k3	audio
iLBC15k2	audio
pcma	audio
pcmu	audio
rfc2833	dtmf
speex	audio
t38	fax

Rows: ⏪ ⏩ 1-11 ⏪ ⏩ Rows on page: 25

**Fig. 55 Table of codecs**

The table of codecs comes pre-configured and cannot be changed.

### 5.2.5.2 Codec groups

The table Codec groups presents information about configured codec groups (see 5.2.1).

**Codec groups**

ID	Affiliated to
141	01   Your Company
161	01   Your Company

Switch to edit mode Rows: ⏪ ⏩ 1-2 ⏪ ⏩ Rows on page: 25

**Fig. 56 Table of configured codec groups**

To be able to group codecs in a set, you must first create a group and then add codecs to it.

To add a new codec group left-click on the table to invoke the pop-up menu and select



You will be displayed with an add-codec-group dialog similar to that shown in Fig. 57.

**Codec groups**

\* Affiliated to: 01 | MERA

\* Name: 01

OK Cancel

**Fig. 57 Adding codec group**

---

Select a name of the organization with which the group of codecs is associated in the combo box **\*Affiliated to**. Finally, type in the group name in the edit field **\*Name**. The configuration parameters marked with the asterisk are required.

When done, click . The newly added record is assigned an automatically generated ID. To edit or delete a record, invoke the pop-up menu and select the necessary option.

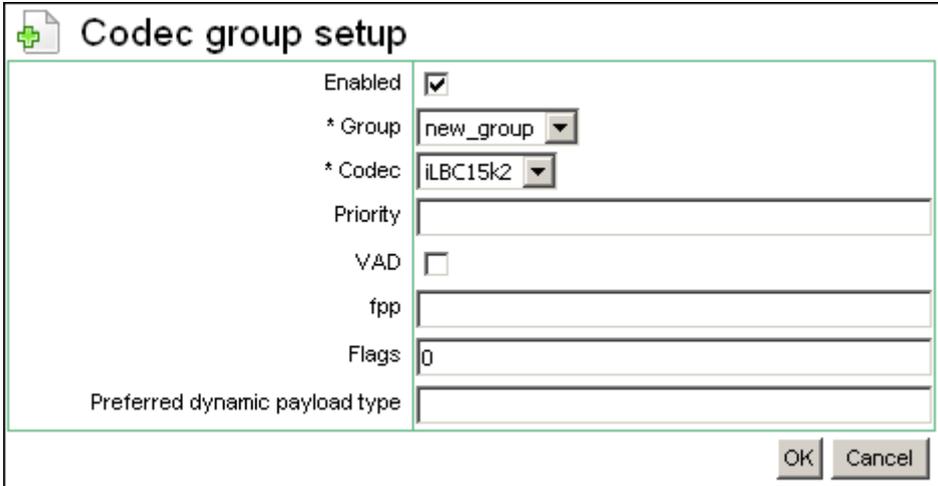
Your next step is to configure codecs that make up the group (see 5.2.5.3).

### 5.2.5.3 Codec group setup

The table Codec group setup presents a general view of available codec groups and their make up.

Use this table to change codec groups make up and configure other codecs' essential parameters.

To add a codec to the group, left-click the group record and select  **Add** in the pop-up menu.



**Fig. 58 Codec group setup**

Enter the following data in the displayed dialog (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active;

**\*Group** – specify the group the codec will be related to using the drop-down list of this combo box (the drop-down list is populated with the names of groups from the table Codec groups, see 5.2.5.2);

**\*Codec** – specify the codec using the drop-down list of this combo box (the drop-down list is populated with codec names available in the table Codecs, see 5.2.5.1).

---

**Note:** *Since there is no standard way to define the G.729a codec in SIP it is recommended to define both G.729 and G.729a codecs when configuring codec groups pertaining to SIP devices.*

---

**Priority** – you can use this field to define the priority of the codec being configured within the group. Valid values: 0-99. The lower is the value the higher is the priority. Note that this parameter is valid only in case the codec sorting rules are not set for the devices involved in a call (see section 5.2.1)

**VAD** – select this check box in case the codec provides built-in voice activity detection (VAD);

---

**fpp** – specify the number of frames per packet transmitted when the codec is in use;

**Flags** – you can use this parameter to configure some specific options of handling the Speex codec. The options are defined by hexadecimal bit masks:

Modes

```
scmMode_1 = 0x0001,  
scmMode_2 = 0x0002,  
scmMode_3 = 0x0003,  
scmMode_4 = 0x0004,  
scmMode_5 = 0x0005,  
scmMode_6 = 0x0006,  
scmMode_any = 0x0007,
```

Penh.

```
scmPenh_0 = 0x0000,  
scmPenh_1 = 0x0008, // bin 00001000 Cng.  
scmCng_off = 0x0000,  
scmCng_on = 0x0010, // bin 00010000 Vbr.  
scmVbr_off = 0x0000, // bin 00000000  
scmVbr_on = 0x0020, // bin 00100000
```

**Preferred dynamic payload type** – define the preferred dynamic payload type in the range 96 through 127.

This done, click  to add the record to the table.

To edit or delete a record, invoke the pop-up menu and select the necessary option.

## 5.2.6

### SUBCATEGORY ENUM

The subcategory ENUM encompasses objects related to telephone number mapping. ENUM registers use the DDDS (Dynamic Delegation Discovery System) algorithm that maps E.164 phone numbers to uniform resource identifiers (URI) by means of the Domain Name System. For more detailed information about ENUM application refer to RFC 3761.

When a call arrives, TMngr performs a standard routing procedure, as described in section 3.3. It then searches for available routing options by means of ENUM registers accessible to the user. The routing path search is based on the number transformed in accordance with the translation patterns defined in the user's authentication record. In case the URI received from the ENUM register needs further resolution into an IP address (for example, "sip.sales@mera-systems.com"), TMngr polls DNS servers associated with the ENUM register. When the route search is complete, TMngr makes up a list of termination options to be sent to the TS. For termination options from the DB, TMngr uses the data configured in the table of dial peers. For the options received from the ENUM registers TMngr uses the parameters configured in the register records. Table 11 below provides a brief overview of objects included in this subcategory.

**Table 11 Objects of subcategory ENUM**

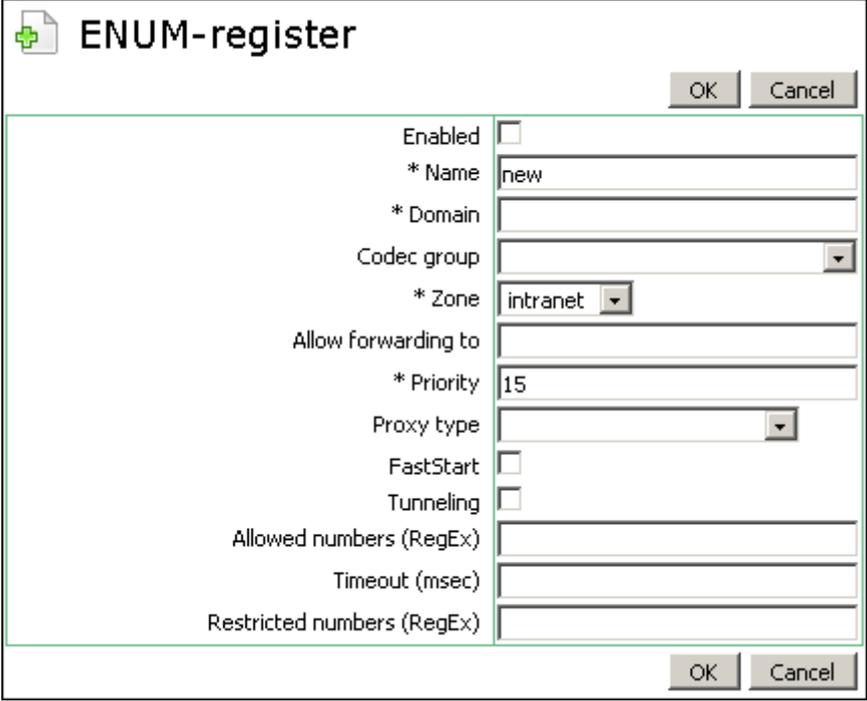
Object	Description
<b>ENUM-register</b>	Table of the ENUM registers the System interoperates with.
<b>ENUM-enabled routing groups</b>	Information about routing groups that have access to ENUM services

#### 5.2.6.1

#### ENUM-register

This object is intended for configuration of ENUM registers. The System can interoperate with multiple registers.

To add a record to the table, select  **Add** in the pop-up menu.



The image shows a dialog box titled "ENUM-register" with a green border and a plus icon in the top-left corner. It contains several fields for configuring a record. At the top right are "OK" and "Cancel" buttons. The fields are: "Enabled" (checkbox, unchecked), "\* Name" (text box with "new"), "\* Domain" (text box), "Codec group" (dropdown menu), "\* Zone" (dropdown menu with "intranet"), "Allow forwarding to" (text box), "\* Priority" (text box with "15"), "Proxy type" (dropdown menu), "FastStart" (checkbox, unchecked), "Tunneling" (checkbox, unchecked), "Allowed numbers (RegEx)" (text box), "Timeout (msec)" (text box), and "Restricted numbers (RegEx)" (text box). At the bottom right are "OK" and "Cancel" buttons.

**Fig. 59 Adding a ENUM register record**

Enter the following data in the displayed dialog (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active;

**\*Name** – enter the register name;

**\*Domain** – enter the register domain;

**Codec group** – select the codec group to be used when handling calls to the equipment whose IP address is provided by the ENUM register (for detailed information about codec groups refer to section 5.2.5.2);

**\*Zone** – select the zone to be used when handling calls to the equipment whose IP address is provided by the ENUM register (for detailed information about zones refer to section 5.2.3);

**Allow forwarding to** – enter a regular expression to define the mask of the network allowed for call forwarding (for detailed information about regular expressions refer to [Appendix A](#));

**\*Priority** – use this parameter to define the priority of the routing options received from different ENUM registers (the lower the value, the higher is the priority). Valid values range from 1 through 100.

**Proxy type** – use this combo box to define the proxy type:

- Forced proxy
- Non-proxy-recommended
- Forced non-proxy

**Faststart** – select the checkbox to enable FastStart;

**Tunneling** – select the checkbox to enable Tunneling;

**Allowed numbers (RegEx)** – enter a regular expression to define a range of numbers allowed for this ENUM-register;

**Timeout (msec)** – define the maximum wait time for response from the ENUM register being configured;

**Restricted numbers (RegEx)** – enter a regular expression to define a range of numbers disallowed for this ENUM-register;

When done, click the OK button. Your next step is to define routing groups with allowed access to the register (see section 5.2.6.2).

### 5.2.6.2 ENUM-enabled routing groups

The table “ENUM-enabled routing groups” presents information on routing groups with access to ENUM services.

**Fig. 60 ENUM-enabled routing groups**

To add a record to the table, select  **Add** in the pop-up menu.

In the displayed form use the respective combo boxes to select the routing group and the ENUM register the group accesses. Click OK to add the record.

To edit or delete a record, invoke the pop-up menu and select the necessary option.

## 5.3 CATEGORY TERMINATION



The category Termination comprises objects involved in and related to call routing. Table 12 below provides a brief overview of the objects included in this category.

**Table 12 Objects of category Providers**

Object	Description
<b>Routing groups</b>	Provides information on routing groups available in the System
<b>Dial peers</b>	Table of configured dial peers. Provides information about configured DPs, traffic termination prices, employed equipment and statistics
<b>Active dial peers</b>	Presents records of the currently active dial peers

The category Termination also comprises the subcategory **Routing Policies**.

### 5.3.1 ROUTING GROUPS

The table of routing groups presents information about RGs currently configured in the System (refer to section 3.9.2 for general information about routing groups).

Group classifier	Affiliated to	Name
01.122	01   MERA	SSivovTEST
01.123	01   MERA	TestGW
01.123.01	01   MERA	AV
01	01   MERA	Default Routing Group

**Fig. 61 Table of routing groups**

Creation of a routing group precedes adding dial peers to the table of DPs. Actually, you first create a group and then add member elements to it.

Initially there is only one main routing group with the name Default Routing Group and classifier 01 in the System. There is also a possibility to create child routing groups. For example, the child groups of the group with classifier “02” will be assigned classifiers “02.01”, “02.02”, “02.03”, etc. Classifiers of routing groups have no relation to classifiers of users who created them nor to the position of the user in the hierarchy.

*For the sake of convenience of sorting data in data tables, numbers that constitute classifiers include a leading element (a numeric indicator), that shows the quantity of digits in the number minus 1. For example, single-digit numbers from 0 through 9 are presented as 01 through 09, two-digit numbers from 10 through 99 are presented as 110 through 199, three-digit numbers 100 through 999 as 2100 through 2999 and so on.*

To add a group, left click the mouse and select Add on the pop-up menu.

**Fig. 62 Adding a routing group**

Fill out the displayed routing group form (see Fig. 62). The fields marked with an asterisk are required fields.

**Parent group** – use the drop-down list of groups linked to this combo box to select a parent group for the group you are creating.

**\*Affiliated to** – select an organization the group is affiliated to (use the drop-down list to make your selection).

**\*Name** – enter the group’s name.

**Description** – use this text box to enter whatever explanatory notes you deem appropriate.

When through with filling out the form, click  to add the record to the table of routing groups.

Use the pop-up menu to view or edit a selected record. The only related table accessible from the pop-up menu is “Dial peers”.

### 5.3.2 DIAL PEERS

In terms of MVTs II a dial peer is a complex notion denoting a termination option characterized by an integration of attributes, the most essential of which are:

- destination prefix
- per minute rate and
- a termination device or a group of termination devices

In fact the table of Dial Peers is the SysO’s calling plan that presents all available termination options provided by the SysO’s peering partners and termination fees they charge.

<input type="checkbox"/>	Enabled	ID	Affiliated to	Routing group	Dial peer category
<input type="checkbox"/>	Yes	1234873	01.02.2114.04   Vendor A-95	01.02.2198   Premium RtGr Demo 95	Normal
<input type="checkbox"/>	Yes	1233947	01.02.163.04   Vendor A-44	01.02.192   Premium RtGr Demo 44	Normal
<input type="checkbox"/>	Yes	1234573	01.02.194.04   Vendor A-75	01.02.2159   Premium RtGr Demo 75	Normal
<input type="checkbox"/>	Yes	1234282	01.02.172.04   Vendor A-53	01.02.2115   Premium RtGr Demo 53	Normal
<input type="checkbox"/>	Yes	1234843	01.02.2112.04   Vendor A-93	01.02.2193   Premium RtGr Demo 93	Normal
<input type="checkbox"/>	Yes	1234842	01.02.2112.04   Vendor A-93	01.02.2190   Standard RtGr Demo 93	Normal

Fig. 63 Dial peers

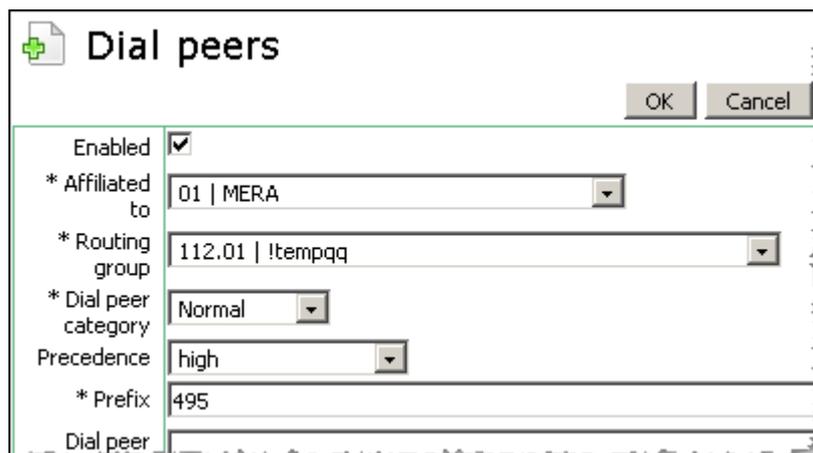
To add a record to the DP table, invoke the pop-up menu by a left mouse click on the table and select Add .

Fill out the displayed DP configuration form (see Fig. 64) entering the following DP attributes (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active (see also section 5.3.2.1);

**\*Affiliated to** – use this combo box to select the vendor the DP is associated with. The drop-down list of vendors is populated by the records from the table of vendors, see 5.1.3.

**\*Routing group** – specify the routing group this DP will be a member of (for more details about routing groups refer to sections 3.9.2 and 5.3.1);



**Fig. 64 Adding a record to the table of dial peers**

**\*Dial peer category** – this parameter determines how the System treats the DP during routing. There are three routing categories of DPs:

- **Normal** – DPs of the category Normal are regular DPs that have neither restrictions nor preferences.
- **Privileged** – a DP of the category Privileged takes priority over other DPs during routing. For example, if in the list of 6 dial peers the privileged dial peer stands on the third place the System will ignore the other three dial peers in the list. Thus, if such a dial peer comes first in the list then it will be considered as the only termination alternative.
- **Restricted** – the dial peer of this type found in the list of termination options sent to TS causes call rejects. For example, if in the list of 6 dial peers the restricted dial peer stands on the third place the System will try to establish connection through the first two routing options and if they fail the call will be rejected. If such a dial peer comes first in the list the call will be immediately rejected.

**Precedence** – set a degree of selection preference for the DP. Choose one of the options from the drop-down list of this combo box or choose “Manual input” and enter a number in the range from 0 to 5000 (numerical values corresponding to the preferability degrees are enclosed in brackets):

- **Manual input**
- **Very low** (1000)
- **Low** (2000)
- **Medium** (3000)
- **High** (4000)
- **Very high** (5000)

The default value for this parameter is “null”.

---

*Remember that the use of this parameter can affect the TMngr’s policy-based routing capability (least cost routing, for example), therefore it should be judicious. Least cost routing and other policies will only work among dial peers with the same precedence.*

---

**\*Prefix** – use this field to enter an area prefix;

**Dial peer prefix description** – you can use this edit field to enter any explanatory information about the prefix entered in the edit field **\*Prefix**;

---

**\*Rate (vendor's currency)** – enter traffic pricing unit expressed in the vendor's currency;

**Billing scheme** – enter a billing scheme that will apply to this DP. Use the  $x/y/z$  notation to configure the DP's billing scheme, where  $x$  denotes the non-chargeable interval of an established connection (seconds),  $y$  stands for the initial period, i.e. chargeable minimum expressed in seconds, and  $z$  is the billing increment (seconds.) See the [Example](#) explaining the BS formula above. The default billing scheme is 0/0/1.

**Retain billing scheme** – select this checkbox when you wish to make the BS specified in the edit box 'Billing scheme' protected against the global change of the BS that occurs every time when the BS is modified in the Vendor dialog (see Fig. 32).

**Equipment** – use the drop-down list of this combo box to select the equipment that represents the DP you are configuring;

**Equipment group** – select the equipment group associated with the DP using the drop-down list;

**\*Payables account** – using the drop-down list select the name of the account to which termination charges will be credited. This combo box shows only vendor accounts of the Vendor affiliated with this DP.

**Payables account is blocked** – “Yes” in this field indicates that the vendor's account was blocked due to operation of the parameter **Max. balance** in the table of settlement accounts (see section 5.7.2).

**Blocked** – selecting this check box will exclude this DP from the routing process (see also section 5.3.2.1);

**\*Valid from/till** – set the beginning and end of the DP validity term;

**SRC/DST translate** – these number translation fields are utilized to enter regular expressions that set translation rules for the source and destination number respectively. See more details about number transformation rules in [Appendix A](#).

**Capacity** – specify the maximum number of simultaneous calls that can be transferred to this DP.

### Advanced settings

**Min./Max. number length** – enter the minimum and maximum number of digits in the destination numbers. In case the length of the destination number is longer than the allowed number specified in the field **Max. number length** or shorter than the number specified in the field **Min. number length** the dial peer is excluded from routing.

**Max. call time (sec)** – use this parameter to specify the maximum allowable call duration for this dial peer, which when exceeded results in call disconnection. Choose one of the options from the drop-down list of this combo box or choose “Manual input” and enter the required value in seconds.

**\*Dial peer Inter/Intrastate type** – this parameter is intended for North America where service providers (vendors) set different rates for intrastate (originating and terminating in the same state) and interstate (originating and terminating in different states) traffic. To handle such situations, the SysO can create several dial peer records (with the same prefix and affiliation but with different rates) and define the type of calls to be routed to the dial peer:

- **Usual routing** – all calls
- **Interstate** – interstate calls within North America
- **Intrastate** – intrastate calls within North America
- **Indeterminate jurisdiction** – this type of routing policy is applied in case when TMngr can not determine the origin state of the call by the NPA code of the source number. Some carriers in United States charge for such calls differently as for Indeterminate jurisdiction calls. A call from, say, Paris to New York might be

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considered by such carriers as an Indeterminate jurisdiction call (for more information about NPA routing refer to section 5.9.7).

**Routing procedure name** – select the name of the procedure to be used to calculate the DP’s routing appeal;

**Additional routing policy parameter** – in this field you can enter additional parameters that will be used as part of formulas in the routing procedures. Additional policy parameters can represent, for instance, the DP’s load sharing values in %-based routing procedures;

**Appeal value 1/2/3** – these fields represent dial peer appeal values under routing policies with IDs 1, 2 and 3, respectively. Optionally the appeal values can be statically defined by the user (for information about routing policies refer to sections 3.10 and 5.3.4.1).

**Ignore ported-out numbers** – this flag relates to the mobile number portability function which is not included in the standard TMngr installation packet. For more information about this option please contact your sales manager.

### Schedule

The following group of parameters serves for configuring the scheduled routing functionality that allows call routing with regard to the time of day, day of week, day of month or day of year. This feature may be instrumental, for example, in cases when dial peers are available only during specific time intervals or when vendor call termination rates vary in time.

**\*Schedule type** – a combo box that serves for defining the type of the DP operation schedule. The combo box includes the following options:

- **no schedule**
- **Time of day**
- **Mon-Fri**
- **Weekend**
- **Day of week**
- **Day of month**
- **Day of year**

**Schedule priority** – this field serves to define the priority of the dial peer operation schedule (see the examples below). Valid values: null (minimum priority), 0 through 9 (maximum priority). Default value: null.

**Time of day On/Off; Day of Week On/Off; Day of Month On/Off; Day of Year On/Off** – these controls serve for setting the date and time of the dial peer activation/deactivation.

#### Examples

The below examples are not exhaustive and just serve as guidelines to the use of the scheduled routing functionality.

1. A dial peer has a limited capacity and it is reasonable to route calls to it only, say, from 20:00 p.m. till 08:00 when traffic is slack. In such a case only one DP record is required.

	<b>DP X</b>
<b>Affiliated to</b>	Vendor A
<b>Prefix</b>	919
<b>Rate</b>	0.002
<b>Schedule type</b>	Time of day
<b>Schedule priority</b>	Null
<b>Time of day – On</b>	20:00
<b>Time of day - Off</b>	08:00

2. Vendor B provides call termination services to the USA at \$0.05 per minute from 08:00 till 20:00 on weekdays and at \$0.025 on weekdays from 20:00 till 08:00 and during the weekend. In such a case you should create two related DP records with parameter settings as in the table below.

	DP1	DP2
<b>Affiliated to</b>	Vendor B	Vendor B
<b>Prefix</b>	1	1
<b>Rate</b>	0.025	0.05
<b>Schedule type</b>		Mon-Fri
<b>Schedule priority</b>		
<b>Time of day - On</b>		08:00
<b>Time of day - Off</b>		20:00

3. Suppose that Vendor B from the previous example decides to terminate calls to the US at \$0.02 on national holidays, say, July 4<sup>th</sup> and Christmas holidays from December 22<sup>th</sup> till January 2<sup>nd</sup>. In such a case you should add two more related DP records (see the table below).

	DP1	DP2	DP3	DP4
<b>Affiliated to</b>	Vendor B	Vendor B	Vendor B	Vendor B
<b>Prefix</b>	1	1	1	1
<b>Rate</b>	0.025	0.05	0.02	0.02
<b>Schedule type</b>		Mon-Fri	Day of year	Day of year
<b>Schedule priority</b>			1	1
<b>Time of day - On</b>		08:00		
<b>Time of day - Off</b>		20:00		
<b>Day of Month - On</b>				
<b>Day of Month - Off</b>				
<b>Day of Year - On</b>			July-4 00:00	December-22 00:00
<b>Day of Year - Off</b>			July-4 23:59	January-2 23:59

Note that the schedule priority value is set to 1 in the records of DP3 and DP4 to make them override the settings of the DP2 record.

If by mistake the operator creates two or more related dial peer records with different schedule types but the same schedule priority and overlapping activity periods the System will sort the dial peers by the schedule type in the following order:

Day of year (highest priority) > Day of Month > Day of Week > Weekend/Mon-Fri > Time of Day (lowest priority).

In case the table of dial peers contains two or more related dial peer records with the same schedule type, schedule priority and overlapping activity periods the System will select the record with the latest DP activation time and date (Time of day - On, Day of month - On, etc.).

To submit the newly configured record to the System click . The record will be added to the table of dial peers.

## Statistics

In addition to the configurable parameters you can view the following statistical data for the dial peer:

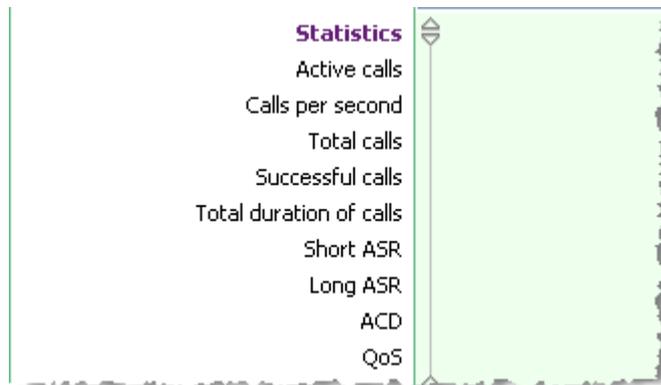


Fig. 65 DP statistics lines

**Active calls** – shows the number of connections currently in progress through the DP.

**Calls per second** – traffic growth rate calculated as EMA;

**Total calls** – is the counter of total calls routed through the DP;

**Successful calls** - shows the total number of successful calls through the DP;

**Total duration of calls** - shows the total time duration for all sessions that occurred through the DP;

**Last call time** – time when the latest call terminated to this dial peer started

**Short ASR / Long ASR** - represent ASR values calculated for a small and a bigger number of successful calls (the calculation base is configurable, see section 5.9.1);

**ACD** – displays average call duration in seconds;

**QoS** – shows the current QoS value for the DP (QoS represents a ratio of packets lost to total packets);

**PDD** – shows the average post dial delay value.

**Average call interval** – shows the average interval between calls. The number of calls for calculation of the average call interval (EMA) is defined by the respective in the table **System global settings** (see section 5.9.1).

### 5.3.2.1 Enabled flag vs blockings

The impact of the flag **Enabled** and of the flags **Blockings** and **Payables account is blocked** on the routing process varies. To explain the difference, assume that a customer is calling the number "12345" and the following DP records are configured in the DB:

Vendor	DP prefix	Blockings/ Payables account is blocked	Enabled
Vendor 1	1234	No	No
Vendor 1	123	Yes	Yes
Vendor 1	12	No	Yes
Vendor 2	12345	No	Yes
Vendor 2	123	No	Yes

Vendor 2	12	No	Yes
----------	----	----	-----

A route search will advance as follows:

1. During a route search the System selects one dial peer with the best matching prefix for each vendor. Disabled records unlike blocked records are ignored during this process.

Vendor	DP prefix	Blockings/ Payables account is blocked	Enabled
Vendor 1	1234	No	No
Vendor 1	123	Yes	Yes
Vendor 1	12	No	Yes
Vendor 2	12345	No	Yes
Vendor 2	123	No	Yes
Vendor 2	12	No	Yes

2. From the resulting list the System excludes blocked dial peers. Therefore, none of the dial peers belonging to Vendor 1 will be selected, notwithstanding that it has an enabled dial peer record with the prefix "12".

Vendor	DP prefix	Blockings/ Payables account is blocked	Enabled
Vendor 1	1234	No	No
Vendor 1	123	Yes	Yes
Vendor 1	12	No	Yes
Vendor 2	12345	No	Yes
Vendor 2	123	No	Yes
Vendor 2	12	No	Yes

### 5.3.3 ACTIVE DIAL PEERS

The table 'Active dial peers' presents records of the currently active dial peers. An active dial peer is a currently valid dial peer with the latest record activation date among other dial peers that have the same prefix and are affiliated to the same vendor. Only active dial peers are involved in routing process. Assume that the table of dial peers comprises the following records:

ID	Affiliated to	Prefix	Rate	Active from	Active till
3053766	MERA	501	1	2006-Nov-16 14:43:53	2020-Jan-01 00:00:00
3053865	MERA	501	.22	2006-Dec-26 00:00:00	2020-Dec-31 00:00:00
3053866	MERA	501	.11	2007-Jan-01 00:00:00	2020-Dec-31 00:00:00

Thus, if the current date is, say, April 01, 2008, only the destination with ID "3053866" is considered active and is engaged in routing.

The table of active dial peers is non-editable and serves for reference only. The information presented in the table is similar to the information discussed above in section 5.3.2.

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## 5.3.4 SUBCATEGORY ROUTING POLICIES

The subcategory Routing policies allows the operator to create a variety of routing policies in addition to the TMngr default least-cost routing policy (for detailed information about routing policies refer to section 3.10). Table 13 below provides a brief overview of the objects included in this category.

**Table 13 Objects of category Providers**

Object	Description
Routing policies	Presents the names of routing policies that can be configured to increase the efficiency of a rate plan
Procedures	A set of PL/SQL <b>procedures</b> that contain formulas used to calculate the dial peer <b>appeal values</b> .

### 5.3.4.1 Routing policies

Up to three additional routing policies can be in effect at the same time. You can not add new records to the table. It is only possible to change the default names of routing policies.

To configure routing policies perform the following steps:

1. Change the default names of the routing policies, if necessary. For this, open the table of routing policies, left-click the record of interest to invoke the pop-up menu, select **Edit** and rename the procedure in the displayed dialog box. When done, click the **OK** button.
2. Assign the routing policies to destinations making up a customer rate plan (see section 5.4.2).
3. Configure, compile and activate the procedure(-s) (see below).
4. Assign the procedure(-s) to appropriate dial peers (see section 5.3.2).

### 5.3.4.2 Procedures

To make a procedure, left-click the table of procedures to invoke the pop-up menu and select Add.

The screenshot shows a configuration dialog box with the following sections:

- Procedures:** Contains fields for Name (test), Version (1), Description (Test), and Text (empty). It has OK and Cancel buttons.
- Compile procedure:** Contains fields for \* Name (DAS test) and \* Version (1). It has an OK button.
- Procedure activation:** Contains fields for \* Name (DAS test) and \* Version (1). It has an OK button.

**Fig. 66 Configuring a routing policy procedure**

Specify the following data in the displayed dialog box:

**Name** – enter the name of the Procedure;

**Version** – enter the procedure version number. The number of procedure versions is not limited but only one procedure version can be active at a time. In case the procedure is renamed all its versions are also renamed automatically.

**Activated** is a non-editable field showing the procedure status (active/inactive);

**Description** – you can enter any descriptive information in this field;

**Text** – enter the procedure code following the PL/SQL language syntax;

**Example**

```
begin
p.appeal_value_1 := p.d_cost_cu * (1 + 0.3/p.d_asr_c + 240/p.d_acd);
if p.d_cps > 30 then
p.appeal_value_2 := 99999;
else
p.appeal_value_2 := p.d_cost_cu * (1 + 0.3/p.d_asr_c + 240/p.d_acd);
end if;

if p.d_policy_param <> 0 and p.d_policy_param is not null then
p.appeal_value_3 := (100 / p.d_policy_param) * p.d_total_time;
else
raise_application_error(-20000, 'The d_policy_param is 0 or NULL');
end if;

end;
```

The code comprises a set of three functions used for calculation of values characterizing the routing path in the perspective of ASR, ACD, CPS and other business-critical factors. The calculated values appear in the fields Routing policy 1, Routing policy 2, Routing policy 3 of the table Dial Peers.

In the example above the first Appeal value `p.appeal_value_1` is calculated using a combination of Cost, ASR, and ACD of the DP. As one can see, the quality parameters can influence the outcome of the formula: the worse the ASR and ACD – the higher will be the value in parenthesis  $(1 + 0.3/p.d\_asr\_c + 240/p.d\_acd)$ , increasing the Appeal value, thus moving the DP lower and lower in the list of possible termination options.

The second Appeal value `p.appeal_value_2` is calculated using the same formula as `p.appeal_value_1`, but in case the current CPS of the DP is more than 30, the DP is sent to the very bottom of the list, as Appeal value = 99999 will definitely be the highest value among all the DPs chosen for termination. Thus, if there exist other options to terminate the call, the DP with CPS exceeding the limit will not be used.

The third Appeal value `p.appeal_value_3` serves to implement a percentage-based balancing policy depending on the Additional routing policy parameters `p.d_policy_param` set in DPs. In this very case, the Additional policy parameters will represent the percentage of traffic every DP should receive.

You can devise and enter various functions depending on parameter combinations that you think best describe the policy you are creating. Table 14 below presents the parameters that can be taken into account in devising a routing policy. These parameters include some of dial peer attributes and statistics as well as information about the last call terminated through the dial peer taken from CDRs. When writing procedures add the leading element “p.” in parameter names. For instance, the parameter that represents answer seizure ratio (ASR) for a dial peer and appears in Table 14 as `d_asr_s` when inserted in the formula acquires the prefix ‘p.’ and is entered as `p.d_asr_s`.

---

*For detailed information about writing PL/SQL functions, refer to the Oracle documentation.*

---

When done with writing functions, click the **OK** button. Your next step is to compile the procedure.

In the dialog box **Compile procedure**, select the name and version of the procedure you created and click the **Submit** button. In case of errors you will be displayed with appropriate information at the bottom of the table.

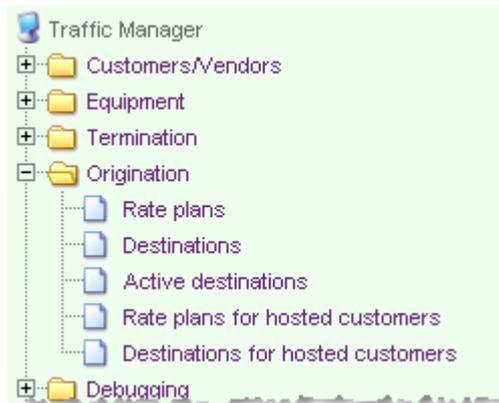
Once the procedure is compiled, you can make it active. For this, select the name and version of the procedure in the dialog box **Procedure activation** and click the **Submit** button. To deactivate a procedure, activate another version of the procedure. Active procedures can not be deleted.

**Table 14 Parameters usable in devising routing policies**

Parameter name	GUI name
<b>Dial peer attributes and statistics</b>	
<code>d_acd</code>	ACD
<code>d_asr_c</code>	Long ASR
<code>d_asr_s</code>	Short ASR
<code>d_avg_call_interval</code>	Average interval between calls
<code>d_cost_cu</code>	Rate (Vendor’s cost)
<code>d_cps</code>	Calls per second
<code>d_last_call</code>	The time when the latest call terminated to the dial peer started

d_normal_calls	Number of Successful calls terminated through this DP
d_npa_type	NPA (Interstate/Intrastate) type
d_pdd	PDD
d_policy_param	Additional policy parameter
d_appeal_value1	Appeal value 1
d_appeal_value2	Appeal value 2
d_appeal_value3	Appeal value 3
d_prfx	Prefix
d_proc_id	Procedure name
d_qos	QoS
d_total_calls	Number of Total calls terminated through this DP
d_total_time	Total duration of calls terminated through this DP
d_used	Current Active calls
<b>Information about last call taken from CDRs</b>	
c_alerting_time	Alerting time
c_connect_time	Connect time
c_disconnect_code	Disconnect code
c_disconnect_time	Disconnect time
c_dp_bill_scheme	Vendor's billing scheme
c_dst_bill_cost_fr	Vendor's receivables (vendor's currency)
c_dst_bill_time	Vendor's bill time
c_dst_max_jitter_size	DST max jitter buffer (packets)
c_dst_min_jitter_size	DST min jitter buffer (packets)
c_elapsed_time	In-call time (sec)
c_pdd	PDD
c_qos	QoS
c_rp_bill_scheme	Customer's billing scheme
c_rp_rate	Destination's rate (Customer's price)
c_setup_time	Setup time
c_src_add_time	Call time adjustment (%)
c_src_bill_cost	Customer's payables (domestic currency)
c_src_bill_time	Customer bill time
c_src_max_jitter_size	SRC max jitter buffer (packets)
c_src_min_jitter_size	SRC min jitter buffer (packets)

## 5.4 CATEGORY ORIGATION



The category **Origination** encompasses tools for adding and editing customer rate plans.

Table 15 gives a brief overview of the System objects that fall under the category Billing.

**Table 15 Objects of the category Billing**

Object	Description
<b>Rate plans</b>	Presents information about available rate plans
<b>Destinations</b>	Each rate plan consists of a set of Destinations, determining the relations between each area prefix, the price charged for termination to this prefix, billing schemes, and other parameters.
<b>Active destinations</b>	Presents the records of the currently active destinations
<b>Rate plans for hosted customers, Destinations for hosted customers</b>	These tables are intended for the providers using the “hosted softswitch” service

### 5.4.1 RATE PLANS

The table of rate plans provides a list of rate plans currently configured in the System.

Classifier	Affiliated to	Rate plan	Description	Pa
2192	01.01   MERA.RU	Rate plan A	In effect since 01.07.06	
2191	01.01   MERA.RU	Rate plane B	In effect since 01.04.06	
2190	01.01   MERA.RU	Rate plan C	In effect since 01.02.06	
2189	01.01   MERA.RU	Rate plan D	In effect since 01.01.06	
2158-01	01.01.01   Customer 01.01.01	test	test	2158-01

**Fig. 67 Table of rate plans**

TMngr allows you to build a hierarchy of rate plans. A new rate plan can be created as a child of an existing plan. The child inherits all the principal attributes of the parent plan and has some individual features. This inheritance capability may save you much work when you need a general rate plan for the overwhelming majority of customers and a number of

customer-specific rate plans or several ad hoc rate plans with deviations from the common plan in the price of delivering traffic to certain destinations.

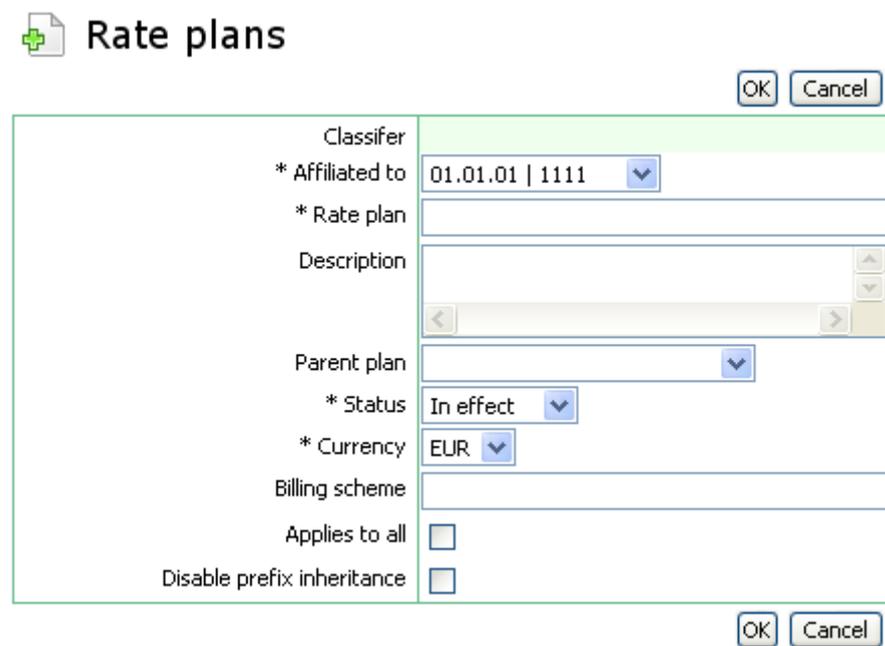
The hierarchy of rate plans involves the use of hierarchic classifiers. In other words, it is the classifier that tells you about the rate plan's position in the hierarchy. When the rate plan is a root RP (that is when the RP is parentless) its classifier is nothing more but the plan's running number in the database. Conversely, when a rate plan is a child plan, that is inherits to some parent plan, its classifier includes the parent's classifier that precedes the child's classifier and is separated from it by a dot. For example, classifier 02.01 indicates that the rate plan is the first child RP that stems from the parent RP with classifier 02. Classifiers of rate plans have no relation to the classifiers of the users who created them and the users' position in the hierarchy.

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*For the sake of convenience of sorting data in data tables, numbers that constitute HCs include a leading element (a numeric indicator), that shows the quantity of digits in the number minus 1. For example, single digit numbers from 0 through 9 are presented as 01 through 09, two-digit numbers from 10 through 99 are presented as 110 through 199, three-digit numbers 100 through 999 as 2100 through 2999 and so on.*

---

To add a new rate plan record to the table, invoke the pop-up menu and select  **Add** . This will bring up a rate plan form as shown in Fig. 68.



**Fig. 68 Adding a rate plan**

Fill out the displayed RP configuration form (the fields marked with an asterisk are required fields):

**\*Affiliated to** – select the name of the provider the rate plan refers to

**\*Rate plan** – enter a name for the newly created RP. Note that this field is editable only upon creation of a new record.

**Description** – in this field you can enter any explanatory text

**Parent plan** – if you are creating a child rate plan, select the name of the parent rate plan from the drop-down list of this combo box

**\*Status** – define the status of the RP selecting one of the three items:

- **In effect** means an effective RP that can be applied to customers.
- **Outdated** denotes an obsolete rate plan generally inapplicable to customers but still in use with some clients (out of tradition or for some other reasons).
- **Out of use.** An out-of-use RP is a banned rate plan kept mostly for the purposes of reference and history.

\***Currency** – define the currency of the rate plan selecting it from the drop-down list of ISO 4217 international currency codes.

**Billing scheme and Applies to all** – see subsection 5.4.1.1 below;

**Disable prefix inheritance** – see subsection 5.4.1.2 below;

**Verify calling party category** – select the checkbox to instruct the System to check the calling party category (CPC) for this customer (for more detailed information about CPC refer to section 5.9.8).

When through with entering data click . The System assigns the newly created rate plan a unique classifier and adds the record to the table.

Your next step is to configure destinations for the rate plan (see section 5.4.2).

### 5.4.1.1 Billing schemes

You can also use the dialog box “Rate plans” to extend the applicability of the billing scheme to all destinations covered by the rate plan.

The billing scheme represents the rule on how per minute call fees charged by the SysO or hosted vendor are applied depending on particular duration of every call.

Use the  $x/y/z$  notation to configure the billing scheme, where  $x$  denotes the non-chargeable interval of an established connection (seconds),  $y$  stands for the initial period, i.e. chargeable minimum expressed in seconds, and  $z$  is the billing increment (seconds).

#### Example 1

*Assume that your billing scheme is 0/30/6. In this case:*

- *If the duration of the call is under 30 seconds your customer will be charged for 30 seconds (zero non-chargeable time);*
- *with the call length, say, 38 seconds the charges will amount to 42 seconds time ( $0+30+6+6=42$ , i.e. 36 seconds of the rate period plus a 2 seconds fraction of the billing increment rounded up to the next higher increment);*

#### Example 2

*Suppose that you offer the billing scheme 10/0/1. In this case:*

- *your customers will not be charged for calls of duration under 10 seconds*
- *calls of duration 10 seconds and above will be chargeable **starting from the beginning of the call** in 1 second increments*

To set a billing scheme that applies to all destinations in the rate plan, left-click the mouse on the rate plan record and select  on the displayed pop-up menu. In the “Rate plans” dialog box, enter the new billing scheme in the ‘Billing scheme’ edit box. Further, if you click the  button and submit the changes, the configured BS will be extended to all destinations of the rate plan available in the System except those, where the BS formula is protected against changing by a selected ‘Retain billing scheme’ checkbox. Otherwise, if you

wish to override the current BS settings in all destination records of the rate plan, select the 'Applies to all' checkbox and the change will be extended to all the destinations regardless of the 'Retain billing scheme' checkbox state.

To edit or delete a record, invoke the pop-up menu and select the necessary option. The only related table accessible from the pop-up menu is "Destinations".

### 5.4.1.2 Disabled prefix inheritance in child rate plans

To explain how the check box **Disable prefix inheritance** works, consider the following example.

Suppose you have a parent rate plan with the following destination records for Russia:

Prefix	Destination prefix description	Rate
7	Russia Proper	\$0.02
7903	Russia Mobile	\$0.2
7905	Russia Mobile	\$0.2
7906	Russia Mobile	\$0.2

Suppose you wish to create a child rate plan for a customer that you want to give a special rate of \$0.01 for Russia Proper, but not for Russia Mobile. In such a case you must create a destination with prefix 7 and rate \$0.01 and select the checkbox **Disable prefix inheritance** on the child rate plan form. This will spare you the necessity of duplicating destination records with prefixes belonging to mobile operators in the child rate plan. As a result when a call with prefix 7495 (Russia, Moscow) arrives it will be billed according to the special rate defined in the child destination record, while calls to destination numbers with prefixes 7903, 7905, 7906 will be billed according to the rates in the parent rate plan.

**Note:** The functionality is enabled with the help of the constant `PKG_COMPILE.cn_disable_prefix_inheritance`:

- true - enable functionality
- false - disable functionality (default)

### 5.4.2 DESTINATIONS

Each rate plans consists of a set of Destinations, determining the relations between each area prefix, the price charged to customers for termination to this prefix, billing schemes, and other parameters.

<input type="checkbox"/>	Enabled	ID	Rate plan	Prefix	Destination prefix description
<input type="checkbox"/>	Yes	3053681	01   Your Company RP	2114	MyEq
<input type="checkbox"/>	Yes	3053682	01   Your Company RP	2115	MyEq
<input type="checkbox"/>	Yes	3053683	01   Your Company RP	2111	MyEq

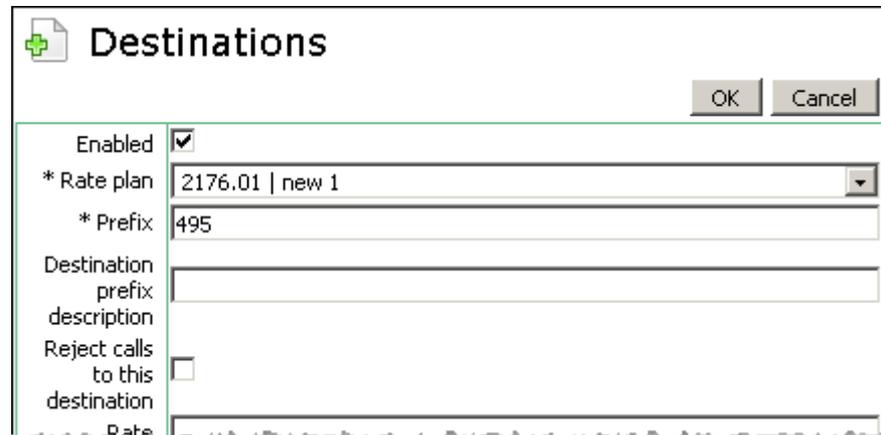
Fig. 69 Table of destination rates

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There can be thousands of records pertaining to an individual RP, the number depending on how many destinations the rate plan covers.

To add a new record invoke the pop-up menu and select  Add .

This is expected to bring up a destinations dialog similar to the one shown in Fig. 70.



**Fig. 70** Specifying destinations the rate plan applies to

Fill out the dialog entering the following data:

**Enabled** - select this checkbox to make the record active

**\*Rate plan** - select the name of the rate plan to which the destination being configured will belong

**\*Prefix** - define the destination prefix

**Rate** - define the per minute rate for this destination

**Billing scheme** - define the billing scheme formula in the  $x/y/z$  notation, where  $x$  denotes the non-chargeable interval of an established connection (seconds),  $y$  stands for the initial period, i.e. chargeable minimum expressed in seconds, and  $z$  is the billing increment (seconds). If you leave the text box blank, the default billing scheme 0/0/1 will be applied, i.e. billing in one-second increments starting from the first second of the connection.

**Retain billing scheme** - select this checkbox if you wish to keep this BS for the destination when a common BS is established for all other destinations covered by the rate plan.

**Capacity** – you can use this field to define the maximum number of concurrent calls allowed for the destination.

**Active calls** – presents the number of concurrent calls. In case the capacity limit of the destination is defined, the System checks the number of active calls currently sent to the destination. If the limit is reached, all new calls are rejected with LDC 403 “Destination is full”.

**Min ASR** - enter a minimum acceptable value for the destination (a decimal fraction from 0 through 1, for example, value 0.1 means 10% ASR and value 0.25 means 25% ASR etc.)

**Min QoS** - enter a minimum acceptable value for the destination (a decimal fraction from 0 through 1)

**\*Active from** – set the date and time the rate plan comes in effect

**\*Active till** – set the date and time when the rate plan validity expires

---

**Use only profitable dial peers** – select this check box to instruct the System to send calls to this destination only through the dial peers that provide the profitability level defined in the field **Profitability restriction threshold** (see below).

**Profitability notification threshold** – serves to define the expected minimum profitability value for the destination. When the destination profitability drops below the configured value the System sends an e-mail alert to users subscribed to this type of notification. Profitability is calculated as:

$$\text{Profitability} = (\text{EMA Customer charges} - \text{EMA Termination costs}) / \text{EMA Termination costs}$$

**Profitability restriction threshold** – serves to set the profitability value that causes exclusion of dial peers that do not ensure the minimum profitability defined in this field. You can enter both positive and negative values.

**Average profitability** – presents the destination productivity value calculated as EMA. The number of calls used in calculating EMA profitability is configured with the help of the global parameter “Number of calls for profitability” (**Configuration** > **System global settings**).

## Rate markups

**Per minute markup/Percentage markup/Rate (markup applied)** – when working with destination records pertaining to child rate plans (child destinations), i.e. rate plans created on the basis of other plans, the operator can use these fields to define a markup for the basic rates defined in the destination records pertaining to parent rate plans (parent destinations). A markup can be specified as a percent (**Percentage markup**), as an absolute monetary value (**Markup per minute**), or both. In case both markups are defined, the System first applies the percentage markup to the basic rate and then adds the per minute markup. The non-editable field **Rate with markup** shows the actual per minute rate for the destination with the applied markups taken into account.

Empty fields in child destination records are automatically assigned the values entered in the respective fields of the parent destination records. Updates of the parameters **Prefix**, **Rate** and **NPA type** in the parent destination record cause updates of the respective child destination record(-s). No parent destination can be deleted from the DB if at least one child record exists.

---

### *Note:*

*Destination A is considered to be the parent of destination B when:*

- 1. the destinations has the same prefix*
- 2. destination A has a rate defined in the respective field*
- 3. destination B has one or both rate markups defined in the respective fields*
- 4. their rate plans belong to neighboring levels of the RP hierarchy (for example, 01 and 01.01, but not 01 and 01.01.01)*
- 5. have the same NPA type*

*Specifying a rate in a child destination record breaks the parent-child relation between destination records and makes the child destination record independent, i.e. the changes made to the parent destination record do not affect child records any more. Deleting the made rate alteration does not restore the parent-child relation of the DB records.*

---

## Advanced settings

**\*Destination Inter/Intrastate type** – this parameter is intended for carriers selling termination services to North America and allows them to set different rates for intrastate (originating and terminating in the same state) and interstate (originating and terminating in different states) traffic within North America. To distinguish between the intrastate and interstate calls, the operator should create at least two records for the same destination with different per minute rates and inter/intrastate types (for more information refer to section 5.9.7).

**\*Routing policy** – use the combo box to select the routing policy adopted to route traffic to the destination (for information about routing policies refer to sections 3.10 and 5.3.4).

**Dummy SRC number** – a number entered in this field replaces the original source number in case a call is considered of indeterminate jurisdiction. Note that this feature is operable only in case the checkbox **Replace original SRC number** in the customer authentication record is selected (see section 5.1.2). The parameter **\*Destination Inter/Intrastate type** should be set to “indeterminate jurisdiction”.

When done with filling out the form, click  to add the record to the table of destinations. The System will generate and assign the record a unique ID.

In addition to the above mentioned parameters the table presents the following information:

**Active calls** – presents the number of concurrent calls. In case the capacity limit of the destination is defined, the System checks the number of active calls currently sent to the destination. If the limit is reached, all new calls are rejected with LDC 403 “Destination is full”.

**Average profitability** – presents the destination productivity value calculated as EMA. The number of calls used in calculating EMA profitability is configured with the help of the global parameter “Number of calls for profitability” (**Configuration > System global settings**).

### Schedule

This group of parameters allows the application of different rates to destinations with regard to time of day, day of week, day of month or day of year. The use of the parameters is the same as the use of similar parameters in the object **Dial peers** (see section 5.3.2).

### 5.4.3 ACTIVE DESTINATIONS

This table presents the records of the currently active destinations. An active destination is a currently valid destination with the latest record activation date among the destinations with identical prefix and associated with the same rate plan. Only active destinations take part in routing process. Assume that the table of destinations comprises the following records:

ID	Rate plan	Prefix	Rate	Active from	Active till
3053766	MERA RP	501	1	2006-Nov-16 14:43:53	2020-Jan-01 00:00:00
3053865	MERA RP	501	.22	2006-Dec-26 00:00:00	2020-Dec-31 00:00:00
3053866	MERA RP	501	.11	2007-Jan-01 00:00:00	2020-Dec-31 00:00:00

Thus, if the current date is, say, April 01, 2007, only the destination with ID “3053866” is considered active and is engaged in routing.

The table of active destinations is non-editable and serves for reference only. Information presented in the table is similar to the information discussed above in section 5.4.2.

#### 5.4.4 RATE PLANS FOR HOSTED CUSTOMERS, DESTINATIONS FOR HOSTED CUSTOMERS

These tables are intended for the providers using the “hosted softswitch” service. In case such a provider buys termination services from the SysO, these tables will provide with the information about the rate plans assigned to the provider and destinations covered by them. The tables are non-editable and serve for reference purposes only. Information presented in the tables is similar to the information discussed above in sections 5.4.1 and 5.4.2.

### 5.5 CATEGORY DEBUGGING

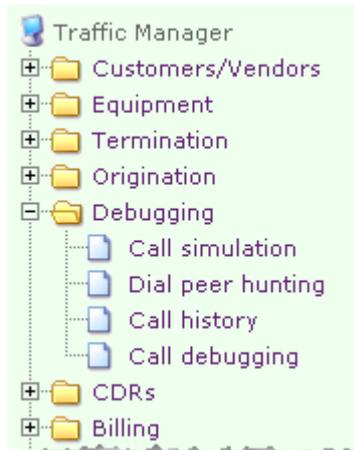


Table 16 Objects of category Debugging

Object	Description
Call simulation	The call simulation dialog is intended for making feigned calls aimed at checking the System for correctness of configuration and functioning
Dial peer hunting	Allows visual presentation of DPs suitable and unsuitable for routing by simulation of the routing procedure
Call debugging	Allows the operator to analyze the reasons why this or that dial peer was not selected as a termination option for the actual completed call

#### 5.5.1 CALL SIMULATION

The call simulation feature allows the SysO to test the System settings. The feature is also useful in situations of the System malfunctioning and troubles reported by business partners.

To simulate a call define the following parameters:

**Affiliated to** - select the owner of the origination device;

**\*IP address** – select the IP address of the origination device;

**\*Src-Number-In** – enter the calling party number;

**\*Dst-Number-In** – enter the called party number;

**Short variant** – select this check box to view a short version of simulation result

**Zone** – select the name of the IP zone through which the call should be routed from the drop-down list of this combo box.

---

**SRC NAT address** – if the device being tested sits behind a NAT router enter the router IP address in this field;

When done, click the **Submit** button. The minimum information needed to simulate a call is the IP address of the customer’s device, however, depending on the settings in the table **Customer authentication**, other parameters might be needed to authenticate a call attempt.

When processing the simulated call the System must authenticate the origination party using authentication data from the table ‘Customer authentication’ (click **Customers/Vendors** → **Customer authentication**), and perform transformation of numbers according to the regular expression patterns specified in the record of the origination equipment (click **Equipment** → **Equipment**.) Further, the System determines the rate plan that applies to the originator (using the equipment authentication record) and searches the table ‘Rate plan structure’ (click **Origination** → **Rate plan**) for a record with the prefix matching the prefix of the called number. The billing data search is followed by determination of call termination alternatives (possible DPs), information about which is presented in the XML-formated sections “dial\_peer” in the Call Simulation output window. The Dial peers in the outcome window are sorted in the order they will be tried for termination.

When the appropriate DPs are found the calling and the called numbers are translated according to the number translation rules for the DPs and termination equipment.

Affiliated to	01.01.01   Customer 01.01.01
IP address	
Src Number In	123
Dst Number In	124
Short variant	<input type="checkbox"/>
Zone	
SRC NAT address	

OK

**Fig. 71 Call simulation**

## **5.5.2 DIAL PEER HUNTING**

This object allows visual presentation of DPs suitable and unsuitable for routing by simulation of the routing procedure.

To simulate the procedure enter the following data in the Dial peer hunting dialog box (the fields marked with an asterisk are required fields):

**Affiliated to** - select the owner of the origination device;

**\*IP address** – select the IP address of the origination device;

**\*Src-Number-In** – enter the calling party number;

**\*Dst-Number-In** – enter the called party number;

**Zone** – select the name of the IP zone through which the call should be routed from the drop-down list of this combo box.

**SRC NAT address** – if the device being tested sits behind a NAT router enter the router IP address in this field;

When done, click the **Submit** button.

The results of simulated DP hunting are displayed as two tables:

**Dial peers unfit for routing** – the table with dial peers that do not qualify for routing. The columns in the tables represent the parameters that affect routing. The parameter that makes a DP unfit for routing is highlighted in red.

**Dial peers fit for routing** – the table with dial peers suitable for routing path selection. DP records in the table of suitable DPs appear in the order they will be selected during call routing.

⚙️

### Dial peer hunting

Affiliated to
01 | Your Company ▼

IP address
192.168.131.150 ▼

Src Number In
123456789

Dst Number In
987654321

Zone
104 | test ▼

SRC NAT address

📄

### Dial peers unfit for routing

ID	Affiliated to	Routing group	Precedence	Dial peer category	Prefix	Routing procedure name	Appeal value	Additional routing policy parameter
<i>No data</i>								

📄

### Dial peers fit for routing

ID	Affiliated to	Routing group	Precedence	Dial peer category	Prefix	Routing procedure name	Appeal value	Additional routing policy parameter
<i>No data</i>								

Fig. 72 Dial peer hunting

### 5.5.3 CALL DEBUGGING

This object allows the operator to analyze the reasons why this or that dial peer was not selected as a termination option for the actual completed call.

⚙️

### Call debugging

CDR ID
12345

Conference ID

Date (Y-M-D h:m:s)
2007-June-12 00:00:00

Fig. 73 Call debugging

---

To simulate the routing procedure as of the moment of required call enter the following data in the Call debugging dialog box:

**CDR ID/Conference ID** – enter the CDR ID or conference ID of the required call;

**Date** – enter the date starting from which all valid and matching dial peer records available in the DB should be taken into consideration during debugging.

When done, click the **Submit** button.

The system will search the DB for CDRs with matching dial peers starting from the specified date. Then it will sort out the latest record for each dial peer and display two tables:

**Available options** – the table with the records of matching dial peers that potentially could be but were not selected as a routing option. The parameters that made these dial peers less preferable for call termination will be highlighted in red;

**Selected dial peer** – the table with the record of the dial peer selected for call routing.

---

*There is a possibility that some of the DP or customer authentication parameters (for example, the parameter Valid till...) can change since the moment of the last call. In such cases some inaccuracies are possible in the procedure output.*

---

## 5.6 CATEGORY CDRs



The category CDRs presents call details records (CDRs) used in metering and billing. Apart from metering and billing data CDRs can provide a variety of statistical data about traffic.

Table 17 gives an overview of the category “CDRs”.

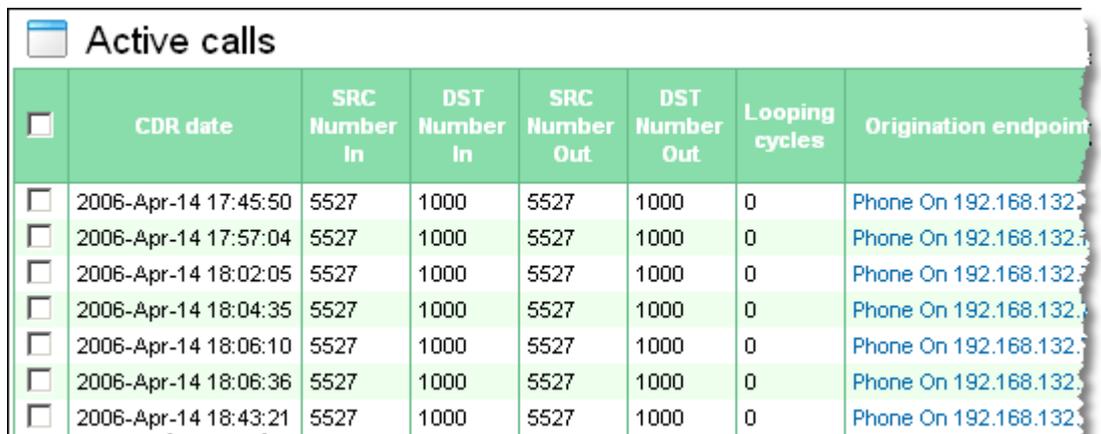
**Table 17 Overview of objects in the category CDRs**

Object	Description
Active calls	Provides information about the calls currently in progress
Today	Presents information about calls handled during the day

<b>Last 7 days</b>	Displays all CDRs generated for the last 7 days, the current day including
<b>Last 30 days</b>	Displays all CDRs generated within the last 30 days, the current day including.
<b>All</b>	Presents information about all handled calls
<b>CDR export</b>	Allows export of CDRs into CSV files
<b>CDR re-rating</b>	Allows the operator to re-rate the existing CDRs
<b>CDR backup</b>	Allows the operator to backup CDRs from the DB to CSV files
<b>CDR removal</b>	Allows the operator to delete obsolete CDRs

### 5.6.1 ACTIVE CALLS

The table Active calls provides information about the calls currently in progress (see Fig. 74).



The screenshot shows a table titled "Active calls" with a blue header bar. The table has 8 columns: a checkbox, "CDR date", "SRC Number In", "DST Number In", "SRC Number Out", "DST Number Out", "Looping cycles", and "Origination endpoint". There are 7 rows of data, all showing calls from 2006-Apr-14 with SRC and DST numbers 5527 and 1000, 0 looping cycles, and an origination endpoint of "Phone On 192.168.132.5".

<input type="checkbox"/>	CDR date	SRC Number In	DST Number In	SRC Number Out	DST Number Out	Looping cycles	Origination endpoint
<input type="checkbox"/>	2006-Apr-14 17:45:50	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 17:57:04	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 18:02:05	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 18:04:35	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 18:06:10	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 18:06:36	5527	1000	5527	1000	0	Phone On 192.168.132.5
<input type="checkbox"/>	2006-Apr-14 18:43:21	5527	1000	5527	1000	0	Phone On 192.168.132.5

**Fig. 74 Table of call sessions in progress**

The content of the active calls view is identical to that of the CDR view explained below with the exception that the viewed call is not complete and the call data change.

Active calls	
CDR date	2006-Mar-10 15:52:54
SRC Number In	5526
DST Number In	5526
SRC Number Out	5526
DST Number Out	5526
Loops	1
Originator	Jk Traffic generator
Terminator	Jk Traffic generator
Dial Peer ID	251274
DP Prefix	5526
DP rate	.1
Rate plan	Rate Plan A
RP structure ID	1167
RP Prefix	5
RP rate	.1
Minimum ASR	
RP Profit Flag	
RP Unprofit Flag	
Call ID	001027000c000010800000a9401a06a4@jk
Elapsed Time	74753
Setup Time	
Connect Time	

Fig. 75 Viewing a call under way

The two additional commands on the pop-up menu invoked from the table of active calls **Close call** (selected or marked) and **Close calls (all filtered)** allow the operator to forcefully tear down all calls, both active and dangling.

The tool **Close hung calls** located below the table of active calls allows removal of hung call records from the table with a user-defined disconnect code. The System automatically detects hung calls, i.e. the calls completed on TS but considered active on TMngr. The operator simply needs to define the disconnect code and click the **Submit** button (see Fig. 76). For the sake of convenience, the drop-down list of the **Disconnect code** combo box includes pink and green colored items. The green color means that the disconnect code is marked as “successful” in the table **Disconnect codes** (the category of objects **Global settings**, see section 5.9.3).

**Close hung calls**

Disconnect code	65541   MVT5   5   Couldn't connect sig..
	262630   SIP   486   Busy Here
	262631   SIP   487   Request Terminated
	262632   SIP   488   Not Acceptable Here
	262635   SIP   491   Request Pending
	262637   SIP   493   Undecipherable
	262644   SIP   500   Server Internal Error
	262645   SIP   501   Not Implemented
	262646   SIP   502   Bad Gateway
	262647   SIP   503   Service Unavailable
	262648   SIP   504   Server Time-out
	262649   SIP   505   Version Not Supported

Fig. 76 Defining disconnect code for hung calls

***Note:** The call abortion functionality requires installation of the ‘mvts3g-sqlclient’ utility supplied in the TMngr installation packet.*

## 5.6.2 STRUCTURE OF CDRs

CDRs are generated for all termination attempts including failed attempts. Select [View](#) from the pop-up menu to conveniently view the required CDR.

All	
ID	5973140
CDR date	2008-April-07 15:08:08
In-call time (sec)	2
Disconnect code	ts   10   BYE received
Disconnect initiator	destination
Routing retries	1
SRC Number In	2828
DST Number In	2929
SRC Number Out	2828
DST Number Out	2929
Tech. prefix	
SRC min jitter buffer (packets)	0
SRC max jitter buffer (packets)	0
DST min jitter buffer (packets)	0
DST max jitter buffer (packets)	0

**Fig. 77 CDR view**

Each CDR provides the following information:

**ID** – CDR’s unique ID number

**CDR date** – date of the record creation

**In-call time (sec)** – duration of the call session in seconds

**Disconnect code** – call disconnect code

**Disconnect initiator** – call disconnect initiator;

**Routing retries** – the number of attempts to terminate the call through the available routing path alternatives (actually the number is the running index of the DP in the list of possible paths delivered to Traffic Switch);

**SRC number in** – calling number as received from the call source

**DST number in** – destination number as received from the call source

**SRC number out** – calling number after transformations according to the configured number translation rules (see [Appendix A](#));

**DST number out** – destination number after transformations according to the configured number translation rules (see [Appendix A](#));

**Tech. prefix** – the prefix preceding the number dialed that was stripped off at authentication

**Customer** – owner/operator of origination equipment

**Vendor** – owner/operator of termination equipment

**SRC IP address** – IP address of the origination equipment

**SRC NAT address** – IP address of the NAT router

**DST IP address** – IP address of the termination equipment

---

**Origination endpoint** – equipment of the call originator

**Termination endpoint** – equipment of the call termination party

**Call ID** – unique identifier the System assigns to every call

**Conference ID** – ID used by TS to identify incoming and outgoing call legs

**Setup time** – time the Setup message was received from the call originator

**Alerting time** – time the Alerting message was received from the call terminator

**Connect time** – time the Connect message was received from the call terminator

**Disconnect time** – time the ReleaseComplete message was received

**Call time adjustment (%)** – call duration adjustment (see section 5.1.2)

**Customer bill time** – call time the Customer will be charged for

**Vendor's bill time** – call time the Vendor is supposed to charge for according to the information configured in the System.

**PDD** – Post Dial Delay value

**Auth. record ID** – unique identifier of the source equipment authentication record (see the table "Customer authentication")

**Looping cycles** – number of repeated routing queries for the same call. Looping occurs when a call delivered by TMngr to the termination provider returns with a routing query (the call may return either directly from the termination provider it was sent to or after a number of intermediate hops) mostly because of inadequate configuration of the termination provider's equipment. When looping is detected the System tries to complete the call via other routing paths. All the parameter values in excess of 1 are the evidence of call looping.

**Routing group** – routing group the DP belongs to

**SRC number used for routing** – calling party number after the "IN SRC translate" modification but before the "OUT SRC translate" modification (see section 5.2.1);

**DST number used for routing** - called party number after the "IN DST translate" modification but before the "OUT DST translate" modification (see section 5.2.1), i.e. the destination number as it was used by TMngr for call routing;

**Dial peer ID** – unique identifier of the DP (see section 5.3.2)

**Dial peer prefix** – termination DP's prefix

**Dial peer prefix description** – information about the DP prefix (area name)

**Vendor's rate (domestic currency)** – per-minute rate used by the Vendor to charge the SysO (in the SysO's domestic currency)

**Vendor's currency exchange rate** – exchange rate for the vendor's homeland currency

**Vendor's rate (vendor's currency)** – cost of a connection minute to the SysO (expressed in the payee's currency)

**Vendor's billing scheme** – billing scheme offered by the vendor (see section 5.3.2)

**Vendor's account ID** – unique identifier of the settlement account to which amounts due to the Vendor are credited (see section 5.7.2)

**Vendor's receivables (domestic currency)** – amount due to the Vendor in the SysO's domestic currency

**Vendor's receivables (vendor's currency)** – amount due to the Vendor in connection with the call

**Min ASR** – acceptable ASR minimum set in the Destination chosen for this call

**Routing policy** – routing policy applied to the call

---

**Procedure name** – name of the procedure used for calculation of DP appeal values

**Appeal value 1** – dial peer appeal value under routing policy 1 at the moment of the call arrival

**Appeal value 2** – dial peer appeal value under routing policy 2 at the moment of the call arrival

**Appeal value 3** – dial peer appeal value under routing policy 3 at the moment of the call arrival

**Additional policy parameter** – additional parameter used for calculation of DP appeal values

**Rate plan** – rate plan applied by the SysO to charge the Customer for traffic

**Rate plan currency** – international currency code as configured in the applicable rate plan

**Rate plan currency exchange rate** – exchange rate for the RP currency from the SysO's domestic currency

**Customer's currency exchange rate** – exchange rate for the customer's homeland currency

**Destination ID** – unique ID of the destination record (table Destinations) that is used in charges calculation

**Destination prefix** – destination prefix chosen in the Customer's rate plan

**Destination prefix description** – information about the Destination prefix (area name)

**Destination rate** – per-minute rate applied to Customer's calls according to the RP

**Rate plan billing scheme** – billing scheme applied to Customer's calls and specified in the table Destinations

**Verify calling party category** – "yes" indicates that the verification of the originator CPC was required

**Calling party category** – CPC of the call originator

**Calling party category markup** – CPC markup added to the total call cost

**Customer's account ID** – unique identifier of the settlement account to which amounts due from the Customer's are debited (see 5.7.2);

**Customer's payables (domestic currency)** – amount due from the Customer in the SysO's domestic currency

**Customer's account currency** – ISO 4217 international currency code for the Customer's account

**Customer's payables (customer's currency)** – amount due from the Customer in connection with the call

**Invoice ID** – this field represents the number of the invoice that includes a bill for this call and remains empty until the invoice is generated

**Use only profitable dial peers** – indicates that the profitability indicator in the chosen Destination is set to 'yes'

**Unprofitable termination** – indicator set to 'yes' when the cost of terminating the call is higher than the price charged for the call

**Profitability restriction threshold** – restriction threshold set in the Destination chosen (in fractions of 1)

**Signaling node** – name of the signaling node that handled the call

**SRC protocol** – protocol used by the call originator

**DST protocol** – protocol used by the call terminator

---

**SRC Faststart present** – “yes” indicates that the origination device used Faststart

**DST Faststart present** – “yes” indicates that the termination device used Faststart

**SRC Tunneling present** – “yes” indicates that the origination device used Tunneling

**DST Tunneling present** – “yes” indicates that the origination device used Tunneling

**Call processing state** – list of procedures executed for establishing the connection

**Invalidate timestamp** – in case of TS failure during the call, this field will include the failure date and time

**SRC URL** – URL address of the call originator

**SRC e-mail** – e-mail address of the call originator

**SRC Name** – name of the call originator

**Proxy mode** – “Yes” indicates that the call’s media was proxied

**Codecs of the first leg** – codec(s) used on the first leg of the call

**Codecs of the second leg** – codec(s) used on the second leg of the call

**Media node IP (Incoming leg)** – IP address of the TS media node on the incoming call leg

**Media node IP (Outgoing leg)** – IP address of the TS media node on the outgoing call leg

**QoS** – quality of service during the call session

**SRC media IP** – IP address and port of the media node of the origination device

**DST media IP** – IP address and port of the media node of the termination device

**SRC media bytes in** – number of ingress bytes received from the call originator

**SRC media bytes out** – number of egress bytes sent to the call originator

**DST media bytes in** – number of ingress bytes received from the call termination party

**DST media bytes out** – number of egress bytes sent to the call termination party

**SRC media packets** – quantity of packets sent to and received from the call originator

**DST media packets** – quantity of packets sent to and received from the call termination party

**SRC media packets late** – number of late packets received from the call originator

**DST media packets late** – number of late packets received from the call termination party

**SRC media packets lost** – amount of packets not received from the call originator

**SRC media packets lost internally** – number of packets received from the call originator but not processed due to the System internal problems

**SRC media packets lost externally** – number of packets expected from the call originator but lost due to some external problems

**DST media packets lost** – amount of packets not received from the call termination party

**DST media packets lost internally** – number of packets received from the call terminator but not processed due to the System internal problems

**DST media packets lost externally** – number of packets expected from the call terminator but lost due to some external problems

**SRC min. jitter buffer (packets)** – minimum jitter buffer size when receiving packets from the call originator

**SRC max. jitter buffer (packets)** – maximum jitter buffer size when receiving packets from the call originator

**DST min. jitter buffer (packets)** – minimum jitter buffer size when receiving packets from the call termination party

---

**DST max. jitter buffer (packets)** – maximum jitter buffer size when receiving packets from the call termination party

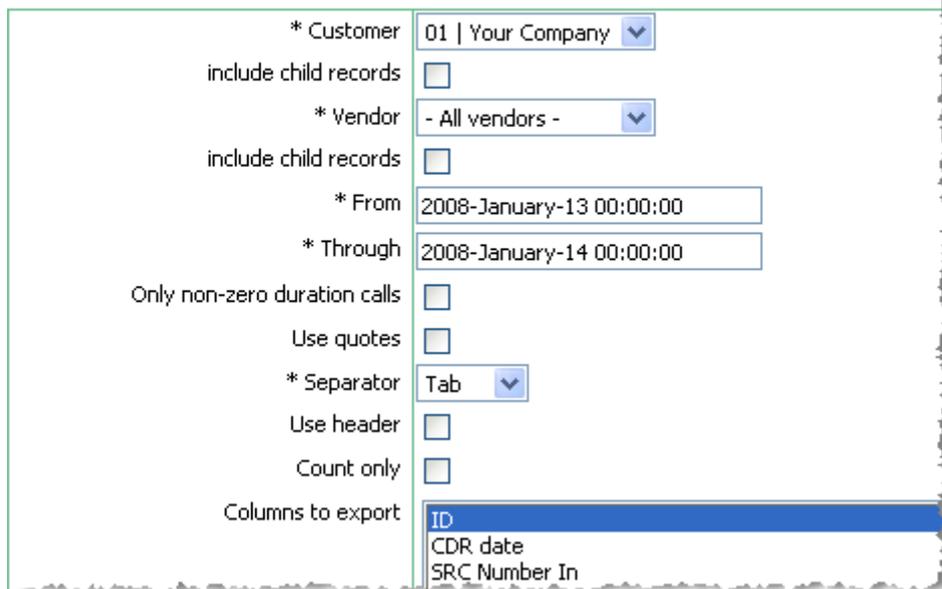
The related tables accessible to you from the pop-up menu invoked when in the CDRs view include:

- Invoices
- Dial peers
- Destinations
- Origination equipment
- Termination equipment
- Customer’s account
- Vendor’s account
- Application log

### 5.6.3 CDR EXPORT

This object allows you to export call detail records saving them to CSV files.

#### CDR export



* Customer	01   Your Company
include child records	<input type="checkbox"/>
* Vendor	- All vendors -
include child records	<input type="checkbox"/>
* From	2008-January-13 00:00:00
* Through	2008-January-14 00:00:00
Only non-zero duration calls	<input type="checkbox"/>
Use quotes	<input type="checkbox"/>
* Separator	Tab
Use header	<input type="checkbox"/>
Count only	<input type="checkbox"/>
Columns to export	ID CDR date SRC Number In

**Fig. 78 CDR export**

To export CDRs, specify the following parameters in the ‘CDR export’ dialog box (the fields marked with an asterisk are required fields):

**\*Customer** – select the name of the customer from the drop down list of the combo box (see also the example below);

**include child records** – select this check box in case you want the exported data to include CDRs pertaining to users affiliated with this customer (see section 3.9.1);

**\*Vendor** – select the name of the vendor from the drop down list of this combo box (see also the example below);

**include child records** – select this check box if you want the exported data to include CDRs pertaining to the users affiliated with this vendor (see section 3.9.1);

---

**\*From / Through** – use these controls to specify the period for which you want to export data;

**Example:**

1. *To export CDRs for all calls originated by the customer during the specified period, select the name of the customer using the 'Customer' combo box; next in the 'Vendor' combo box select 'All vendors' and select the 'include child records' checkbox located below the combo box.*
2. *To export CDRs for all calls terminated by the vendor for the specified period, select 'All customer' in the 'Customer' combo box and select the 'include child records' check box located below the combo box; then specify the name of the vendor using the 'Vendor' combo box.*
3. *To export all CDRs about all calls handled by the System for the specified period, select 'All customers' and 'All vendors' in the combo boxes 'Customer' and 'Vendor' and select both check boxes 'include child records'.*

**Only non-zero duration calls** – select this checkbox to exclude from the exported data CDRs pertaining to zero duration calls;

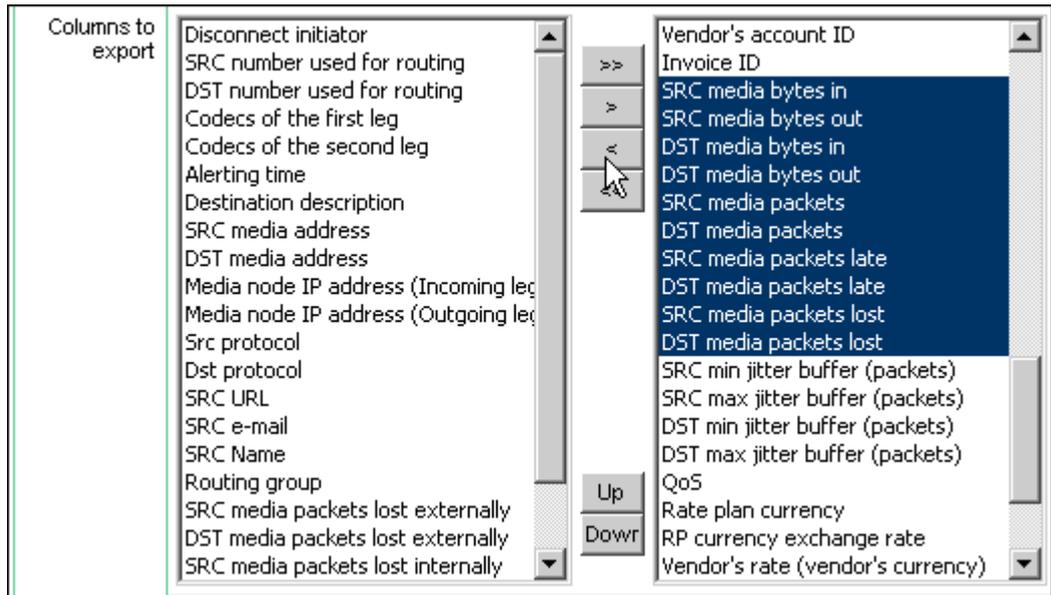
**Use quotes** – select this checkbox if you want the values in the CSV file to be enclosed in quotes;

**\*Separator** – select the separator to be used between the values;

**Use header** – select this checkbox if you want the column headers to be included in the CSV file;

**Count only** – if you select the checkbox **Count only** and click the button 'Submit', the System only counts the number of CDRs meeting the specified requirements and displays the result.

**Columns to export** – use this control to make a list of data fields subject to export. The left box presents a list of data fields available arranged in the same way as they appear in the CDR table. To add a field to the list of data for export, select the field name in the left window and click the  button. The name of the field will be added to the export list in the right box. To remove a field from the list of exported fields, select the field name and click the  button. To select multiple records, hold down the Shift or Ctrl key while clicking the selected item.



**Fig. 79 Making a list of CDR data fields for export**

Use the **>>** and **<<** buttons to move all the field names from the left box to the right box and vice versa.

Use the **Up** and **Down** buttons to re-arrange the order of CDR fields in the resulting CSV file.

When done, click the 'Submit' button. Two more fields will appear in the bottom part of the dialog box:

**Number of CDRs** – number of exported records;

**File** – hyperlink representing the file path and name of the file.

By default all CSV files are saved to the directory `/opt/apache2/htdocs/export/`. The names of export data files have the following format:

```
cdr.<customer name>.<vendor name>.<start date_time>-<end date_time>.<generation date_time>.csv
```

**Example:**

```
cdr.MERA(+).MERA.RU.20060101_000000-20060401_000000.20060831_161136.csv
```

---

*The plus sign enclosed in brackets next to the customer or vendor name indicates that the file includes CDRs pertaining to users affiliated to (children of) the respective customer or vendor.*

---

Click the hyperlink to download the generated file.

## 5.6.4 CDR RE-RATING

The need to recalculate prices and costs, applying different rates than those in effect at the time of the CDR generation, may arise owing to a variety of reasons.

You can use the object CDR re-rating to correct billing and accounting data in the existing CDRs whenever such a necessity occurs (for example, in case a mistake was made when setting rates in a customer rate plan).

**Fig. 80 CDR re-rating**

To re-rate CDRs, make the required changes in dial-peer or destination records (depending on the category of recalculated CDRs) and fill the fields of the “CDR re-rating” dialog box (the fields marked with an asterisk are required fields):

**\*From / Through** – define the start and end date of the period for which you want CDRs to be re-rated

**Customer** – use this combo box to select the customer

**Vendor** – use this combo box to select the vendor

**Origination equipment** – select the name of the origination device

**Origination equipment (ip:port)** – enter the IP address and port of the origination device

**Termination equipment** – select the name of the termination device

**Termination equipment (ip:port)** – enter the IP address and port of the termination device

**\*Re-rating type** – select one of the two re-rating types:

- Simple re-rating – this type of re-rating means plain recalculation of billing and accounting data applying new rates. For example, one of the vendors reduced termination rates and respective changes were not made timely in the DB. To rectify the issue, enter the correct rate in the dial-peer records and switch over to the “CDR re-rating” dialog box. Define the period and the vendor and perform recalculation.
- Complex re-rating – complex re-rating with allowance for rate alterations within the recalculation period.

You resort to this complex re-rating, when plain and straightforward recalculation does not solve the problem. For example, you need rate changes in CDRs starting from December 1 through February 1 with consideration for the discount that your vendor provided from December 20 to January 10. For some reason or other the corresponding changes were not made in the DB in due time. To handle the situation, duplicate dial peer records pertaining to the vendor and set the discount rates for the period from December 20 to January 10 in the newly made dial peer copies. Switch over to the “CDR re-rating” dialog box, set the re-rating period from December 1 to February 1, specify the vendor and choose the “complex re-rating” option in the ‘re-rating type’ combo box. This will result in comprehensive recalculation with allowance for the discount period.

**With regard to Enabled flag** – select this checkbox to instruct the System to disregard disabled dial peer records during the re-rating process.

**With regard to DP category** – select this checkbox to instruct the System to disregard during recalculation dial peer records with DP category value Restricted.

---

When done, click 'Submit'. You will be displayed with the ID of the re-rating process at the bottom of the dialog box.

The table "Re-rating progress" under the dialog box shows the current state of the recalculation process showing progress in 5,000 processed CDRs lots. The re-rating process can take a very long time, during which you can continue working with other GUI objects. When the process is complete, the progress table is cleared.

Re-rating is a very demanding process in terms of computing power. Therefore, it is NOT ADVISABLE to launch several re-rating processes simultaneously.

### 5.6.5 CDR BACKUP

The object allows the operator to backup CDRs from the DB to CSV files. For this, the operator should define the start and end dates of the period, for which CDRs should be backed up, select the interval (day or week) by which the CDRs will be grouped and click the **Submit** button.

The files with backup CDRs are saved to the directory /opt/apache2/htdocs/export/. CDRs for every period (day or week) are saved to individual files. The names of backup files have the following format:

```
«BackUp_CDR.<YYYYMMDD- YYYYMMDD>. <YYYYMMDDHHMMSS>.csv
```

where,

YYYYMMDD- YYYYMMDD is the backup period for CDRs;

YYYYMMDDHHMMSS - date and time the backup procedure started.

#### **Example:**

```
BackUp_CDR.20070531-20070601.20070601122015.csv
```

The backup procedure may be lengthy.

---

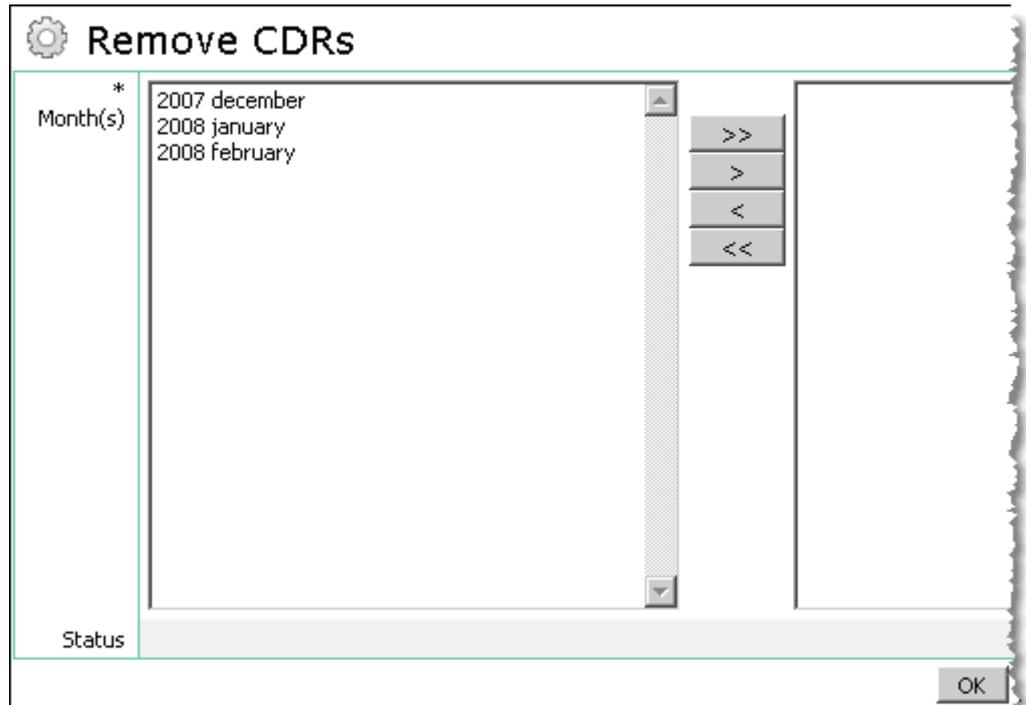
*Since there is also a possibility of automatic CDRs backup and removal (see section 5.6.5), make sure that the back up procedure started by the operator does not interfere with the scheduled automatic backup procedure.*

---

When file export is complete the user with the record ID set in the configuration parameter **ID of user responsible for CDRs backup** (see section 5.9.1) is sent a notification, i.e. the number of notifications received by the user should correspond to the number of intervals (days or weeks) in the backup period. Note that the user's e-mail should be configured in the table of contacts ([Customers/Vendors](#) > [Administration](#) > **Contacts**).

### 5.6.6 CDR REMOVAL

This object allows the operator to delete obsolete CDRs. It is a typical add/remove tool with a list of months in the left column. These are the months for which CDRs are available in the DB, except for the current and previous months.



**Fig. 81 CDR removal**

To delete outdated CDRs for the whole month, select a month of your choice and move it to the right column by clicking the  button, then click OK. To remove a month from the list of months to be deleted, select the name of the month and click the  button. Holding down the Shift or Ctrl key you can select multiple records.

Use the  and  buttons to move all the records from the left column to the right one and vice versa.

This object is accessible to users with the Super Administrator role only.

## 5.7

## CATEGORY BILLING

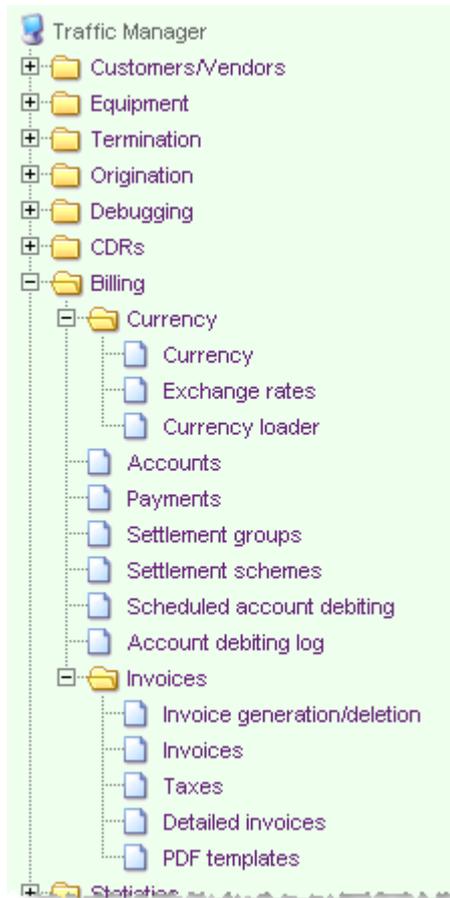


Table 18 gives an overview of the category “Billing”.

**Table 18 Objects of the category Billing**

Object	Description
<b>Accounts</b>	The table allows you to keep record of balances in Customers' and Vendors' accounts
<b>Payments</b>	This table serves to keep record of Customer payments
<b>Settlement groups / Settlement schemes</b>	Allows the operator to configure the System for settlement-dependent traffic distribution
<b>Scheduled account debiting</b>	Allows the operator to configure the System for automated debits to customer accounts
<b>Account debiting log</b>	Allows the operator to configure the System to keep track of account debiting

The category Billing also comprises the subcategories **Currency** and **Invoices**.

### 5.7.1

### SUBCATEGORY CURRENCY

This subcategory comprises the objects that allow the operator to configure currency exchange rates to be used in billing and other currency related features.

### 5.7.1.1 Currency

The table **Currency** presents a list of ISO 4217 international currency codes.

You may wish to find further ISO 4217 currency reference at the site of [International Organization for Standardization](#).



ID	Currency
784	AED
971	AFN
8	ALL
51	AMD
532	ANG
973	AOA
32	ARS
36	AUD
533	AWG
31	AZM
977	BAM

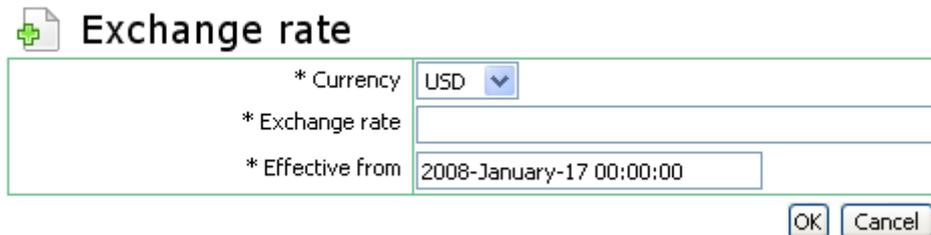
**Fig. 82 Table of numeric and alphabetic currency codes**

### 5.7.1.2 Exchange rates

The table **Exchange rates** presents information about currency rates that the SysO configured in the system.

It is worth mentioning that since the rates used in generation of customer invoices fluctuate, it is necessary to keep the records of exchange rates for some time to be able to maintain an adequate accuracy in settlements. The time of keeping the exchange rates records is established pursuant to the organization documentation management policy.

To add a new exchange rate record select  **Add** on the pop-up menu.



**Exchange rate**

\* Currency: USD

\* Exchange rate: [ ]

\* Effective from: 2008-January-17 00:00:00

OK Cancel

**Fig. 83 Configuring exchange rates**

Fill out the form onscreen:

- selecting the name of the configured Customer currency from the drop-down list of the combo box **\*Currency**
- entering the exchange rate value in the edit field **\*Exchange rate**
- setting the date/time when the rate comes in effect with the help of the **\*Effective from** control

Click  to add the rate record to the table of exchange rates.

---

While generating invoices the System uses exchange rates effective at the date of the invoiced service.

### 5.7.1.3 Currency loader

The object **Currency loader** allows uploading currency exchange rates to the DB from external servers. With the help of this object the operator can also configure the System for scheduled exchange rates uploading.

The object consists of four elements.

1. **Currency server settings** – the table intended for configuring a connection to a remote server. The connection configurable parameters include:

**IP address/Domain name** – field for entering the IP address or DNS name of the server;

**Data type** - currently “xml” is the only possible value in this field

**Login/Password** – enter the login name and password if the server requires authorization

**Proxy server settings** - this group of parameters is used to configure the proxy server settings

**Date-related options** – you can use this group of parameters to define the date of the requested currency exchange rate and date format. This type of data may be requisite for some servers.

**XML parser settings** – use these parameters to specify names of currencies and rate tags in the XML code, for the System to be able to parse data received from the server. The figures below show an example of code and an example of a properly configured server.

```
<symbol>UGX</symbol>
  <name>Uganda Shillings</name>
  <rate>1710.500000000</rate>
</currency>
Node name --> <currency>
Currency tag --> <symbol>USD</symbol>
  <name>United States Dollars</name>
Rate tag --> <rate>1.000000000</rate>
</currency>
- <currency>
  <symbol>UYU</symbol>
  <name>Uruguay Pesos</name>
  <rate>25.737999161</rate>
</currency>
```

Fig. 84 Example of an XML code

**Currency server settings**

\* IP address/Domain name:

\* Data type:

Login:

Password:

**Proxy server settings**

Proxy server IP address/domain name:

Proxy login:

Proxy password:

**Date-related options**

Date value name:

Date format:

**XML parser settings**

Node name:

Currency tag:

Rate tag:

OK Cancel

Fig. 85 Currency server settings

2. **Test currency server** - a tool that allows the operator to test settings of the configured currency server. Data received from the server can be viewed both parsed and raw. To view raw data, select the check box **Unparsed**.

**Test currency server**

\* Server:

Unparsed:

Result:

```

AED = 3.6725000000
AFN = 48.1400000000
ALL = 76.7200000000
AMD = 309.1300048828
ANG = 1.7450000000
AOA = 74.8050000000
ARS = 3.1739959674
AUD = 1.0711000000
AWG = 1.7900000000
AZN = 0.8350000000
BAM = 1.2528532179
BBD = 1.9850000000
BDT = 68.6000000000
BGN = 1.2525000000
BHD = 0.3769500000
BIF = 1153.9000000000
BMD = 1.0000000000

```

Fig. 86 Result of a currency server test (parsed)

3. **Upload exchange rates into DB** – a tool that serves for uploading currency exchange rates to the DB.

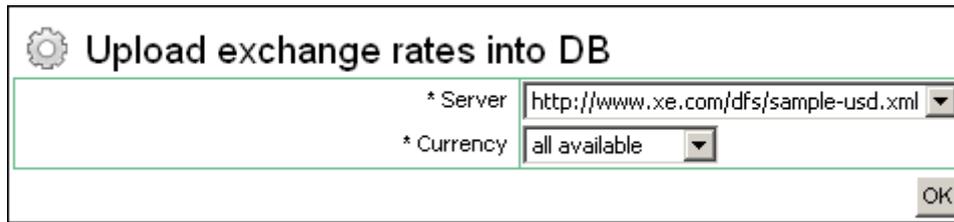


Fig. 87 Uploading exchange rates into the DB

4. **Scheduled uploading** – a table that allows the operator to configure the System for automatic uploading of exchange rates. All uploading events are registered in the table **Scheduler log** found in the category of objects **Logs**. An example of configuration is shown in the figure below.

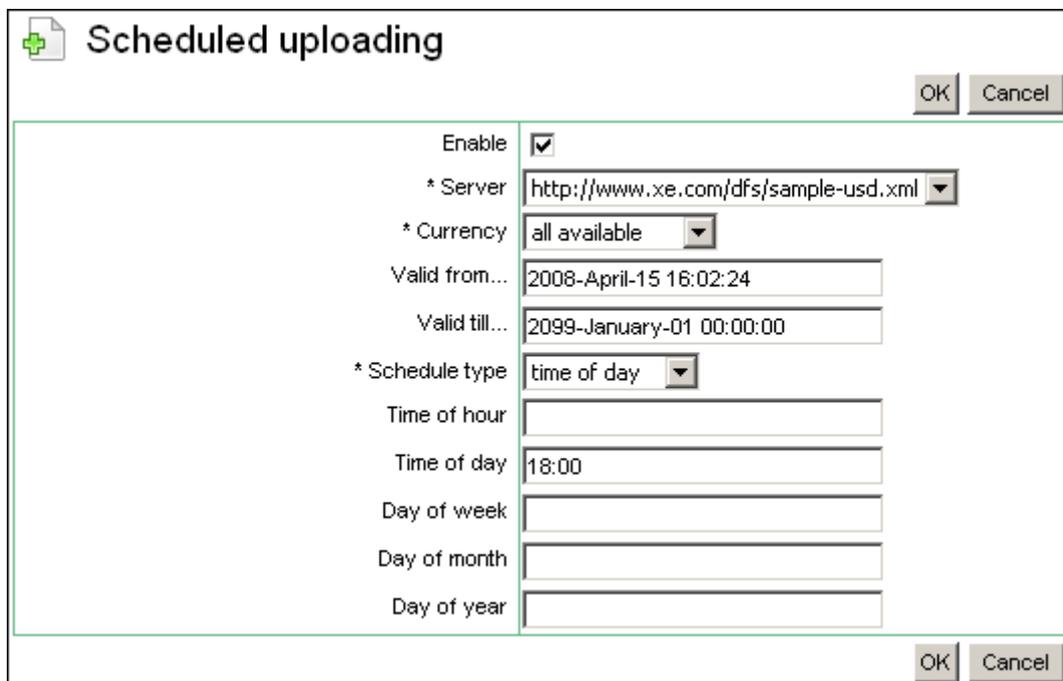


Fig. 88 Configuring scheduled uploading of exchange rates

## 5.7.2 ACCOUNTS

The table **Accounts** serves to keep an account of the amounts in payables and receivables, i.e. Vendor and Customer accounts. When an ITSP or carrier acts both as a supplier of ingress traffic (Customer) and a termination partner (Vendor) the SysO should create two accounts – one for payables (Vendor's account) and another for receivables (Customer's account).

ID	Account name	Customer/Vendor
941	Mera Customer Account	01   MERA
942	Mera Vendor Account	01   MERA
943	Provider A Customer Account	01.02
944	Provider A Vendor Account	01.03
945	Provider B Customer Account	01.03
946	Provider B Vendor Account	01.04

**Fig. 89 Table of settlement accounts**

To add an account, invoke the pop-up menu and select  Add .

The appearing add-account dialog will look similar to the one shown in Fig. 90.

 Accounts
OK Cancel

* Account name	Test account
* Customer/Vendor	01   Your Company
Description	
* Account type	vendor account
* Currency	USD
* Active till	2099-January-01 00:00:00
Min balance	0
Min balance notification	
Max balance	
Max balance notification	
Send notifications	<input type="checkbox"/>
Tax group	
Invoice schedule	

OK Cancel

**Fig. 90 Adding an account**

Fill out the dialog paying special attention to entering data in the fields marked by the asterisk symbol (the required fields):

\***Account name** – enter a name for the account;

\***Customer/Vendor** – select the account owner from the drop-down list of Customers and Vendors;

**Description** – you can use this edit field to enter any appropriate information about the account being configured;

\***Account type** – use this combo box to define the account type:

- 
- Vendor account is the type assigned to vendors' settlement account records. These accounts show the amounts payable by the SysO to vendors. Each dial peer is associated with a single vendor account. The account blocking threshold is set with the help of the parameter **Max. balance**. Once the account blocking occurs, the System also blocks all the dial peers affiliated to the vendor.
  - Customer account is the account type assigned to customers' settlement account records. Accounts of this type show amounts payable by customers to the SysO. Each customer authentication record is associated with one customer account. The account blocking threshold is configured with the help of the parameter **Min. balance**. If the account blocking happens, the System also blocks all authentication records associated with the account.
  - Hosted user account - this type of account is assigned to users of the hosted softswitch service and indicates amounts due from the user to the SysO (or to the provider the user rents the MVTS II softswitch capability from). The account blocking threshold is configured with the help of the parameter **Min. balance**. Along with the account blocking, the System also blocks the user's record in the table **Customers/Vendors**.

**Balance** is a non-editable parameter as it represents the amount currently available in the account of the Customer/Vendor. The account balance changes as the result of credit entries to the account done in the field **Amount** of the dialog **Payments** (see 5.7.3);

**Reserved amount** – non-editable field representing the aggregate amount reserved to provide for currently active calls initiated by the customer. When a call arrives, TMngr calculates the cost of the call for a period called 'Reservation period', that can be configured in Global settings (see section 5.9.1).

TMngr reserves the resulting amount in the customer's account and informs TS about the established reservation period. Once the period is over, TS sends TMngr a query on how long the call can continue for. If the balance in the customer's account is sufficient to continue the call, TMngr again sends the TS the value equal to the reservation period. When the balance is insufficient to provide for the next reservation period, TMngr informs the TS about the accurate time the call can still continue for. All new calls arriving from the customer at that moment are rejected. When the call is over, TMngr calculates the cost of service for the customer based on the applied billing scheme and applicable discount and registers a debit to the customer's account.

To eliminate excessive queries from TS to TMngr the fund reservation function does not work when:

- the minimum balance limit is not defined
- the account balance exceeds the minimum balance notification threshold.

The function is operational when:

- the minimum balance limit is defined and the minimum balance notification threshold is not defined
- the minimum balance limit is defined and the account balance is below the minimum balance notification threshold.

\***Currency** – use the combo box to select the account currency;

\***Active till** – set an expiration date and time for the account;

**Min balance** – this parameter of the customer account records. Enter a balance amount of the account that when reached causes denial of service. The access to the service is restored after the payment is received and entered in the DB or after the minimum balance amount is reduced. Minimum balance amounts can be both positive and negative, for example 500 or -500.

**Min balance notification** – specify the amount expected to cause sending an appropriate notification to the email address configured in the respective record of ‘Contacts’ in the category ‘Users’ (see 5.1.5.8);

**Max balance** – this parameter is intended for configuration of the vendor account records. In case the SysO and a vendor partnership is organized on a pre-paid basis, when the balance amount defined in this field is reached the System blocks all the dial peers associated with the vendor settlement account to exclude them from the routing process. When the balance amount drops below the specified value, the System unblocks the dial peers.

**Max balance notification** – specify the amount expected to cause sending an appropriate notification to the email address specified in the respective record of ‘Contacts’ in the category ‘Users’ (see 5.1.5.8);

**Blocked by min/max balance** – non-editable field, which when is set to “Yes” indicates that the account is blocked;

**Send notifications** – select this checkbox to make the System generate and send an email notification when the account balance reaches the notification amount specified in the fields ‘Min. balance notification’ or ‘Max. balance notification’.

**Tax group** – with the help of this combo box you can assign the tax group that will be applicable to the account being configured. Taxes are later included into the .pdf invoices sent to customers (see also section 5.7.7.3).

**Invoice schedule** – with the help of this combo box you can tie invoice generation schedules to customer settlement accounts (see also section 5.7.7.1).

When through with filling the dialog click , and the record will be added to the table of similar records with a unique identifier the System assigns it.

You can also use the respective pop-up menu options to view, edit and delete records of the table **Accounts**.

### 5.7.3 PAYMENTS

The table Payments allows you to keep an account of reimbursements received from Customers.



ID	Customer	Account	Amount	Currency	Exchange rate
121	01.01   MERA.RU	Mera chargeable account	10	EUR	1
83	01.01   MERA.RU	Mera chargeable account	10		.8393
84	01.01   MERA.RU	Mera chargeable account	10		1.1915
85	01.01   MERA.RU	Mera chargeable account	-10		1.1915
86	01.01   MERA.RU	Mera chargeable account	-2.39		1.1915
81	01.01   MERA.RU	Mera chargeable account	10		.04

**Fig. 91 Table of payment records**

To make a payment entry select  **Add** on the pop-up menu. The form appearing onscreen will look similar to that shown in Fig. 92

Payments	
ID	
* Customer	01.01   MERA,RU
* Account	Mera chargeable account
* Amount	1000
* Currency	USD
Exchange rate	
Amount in domestic currency	
* Payment date	2006 - Mar - 01 00 : 00 : 00
* Document	#125158451515
Entered by	
Entry date	
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

**Fig. 92 Payment entry**

Fill out the displayed form performing the following (the fields marked with an asterisk are required fields):

\***Customer** - select the payer's name from the drop-down list of this combo box

\***Account** - select the Customer's account name

\***Amount** - enter the payment amount in the edit field

\***Currency** - use the drop-down list of this combo box to select the payment currency. Payments may be effected in any currency as TMngr automatically converts the payment amount into the Customer's account currency applying the exchange rate effective at the payment date, provided the exchange rate is configured in the table of rates. See 5.7.1.2

\***Payment date** - set the payment date

\***Document** - type the name and number of the payment document in this edit field

When the form filling is completed, click  to add the record to the table 'Payments' with a unique ID assigned by the System. In addition to the configurable parameters above, each record provides information about the exchange rate for the payer's and payee's currencies (field 'Exchange rate'), the payment amount in the domestic currency of the SysO (field 'Amount in domestic currency'), the date when the record was entered (field 'Entry date') and the person who made the entry (field 'Entered by').

## 5.7.4 SETTLEMENT GROUPS / SETTLEMENT SCHEMES

These sections describe how to configure the System to take into account customers' and vendors' settlement schemes when choosing traffic termination options. Settlement schemes determine payment terms between customers and the SysO, as well as between the SysO and vendors, for example:

- 7/7 – invoicing each 7 days, payments are effected within 7 days after the end of invoiced period;
- 30/15 –invoicing each 30 days, payments are effected within 15 days after the end of invoiced period;
- 30/30 – invoicing each 30 days, payments are effected within 30 days after the end of invoiced period;

---

Traffic routing without due regard to possible differences in employed settlement schemes may result in unintentional and unwilling funds lending. For example, if calls originated by Customers that employ the 30/30 settlement scheme are directed to dial peers operated by a Vendor with the 7/7 settlement method the SysO will factually extend a 6 weeks long loan to the Customer, paying the Vendor for traffic out of its own funds.

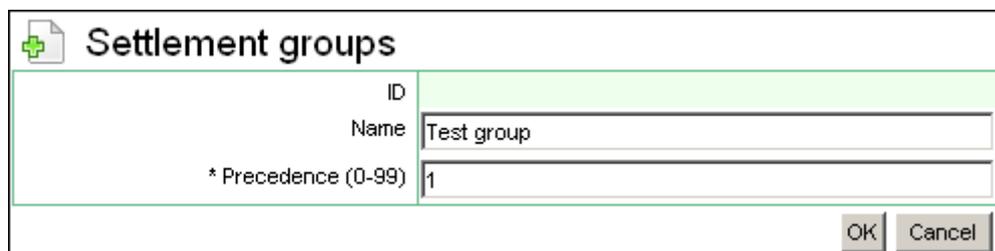
It is possible to configure the System to disallow termination of traffic originated by Customers with longer settlement periods to Vendors with shorter settlement time.

The following GUI objects are involved in configuring the settlement-dependent traffic distribution functionality:

- **Settlement groups (Billing > Settlement groups)** – serves for making up groups of settlement schemes and setting their precedence. The group precedence is taken into account during call routing: calls originated by Customers can be terminated to dial peers with the same or lower precedence than that in the customer authentication record (see below). The higher is the parameter value the lower is precedence. Valid values: from 0 through 99. Default value: 0. Suppose that the settlement scheme 7/7 belongs to a settlement group with precedence 1; the scheme 30/15 to a group with precedence 2; and the scheme 30/30 to a group with precedence 3. In such a case traffic originated by a 7/7 Customer will be terminated by 7/7, 30/15 and 30/30 Vendors, traffic originated by a 30/15 Customer will be terminated by 30/15 and 30/30 Vendors, while traffic originated by a 30/30 Customer will be directed to 30/30 Vendors only.
- **Settlement schemes (Billing > Settlement schemes)** – serves to configure settlement schemes and settlement groups the schemes belong to;
- column/drop-down list box **Customer settlement scheme (Customers/Vendors > Customers/Vendors)** – serves to specify the settlement scheme assigned to the customer;
- column/drop-down list box **Vendor settlement scheme (Customers/Vendors > Customers/Vendors)** - serves to specify the settlement scheme employed by the vendor;
- column/uneditable field **Settlement scheme precedence (Termination > Dial peers)** – shows precedence of the settlement group, to which the settlement scheme employed by the vendor belongs. The field is filled automatically in conformity with the value of the field **Vendor settlement scheme** in the table **Customer/Vendors**;
- column/uneditable field **Settlement scheme precedence (Customers/Vendors > Customer authentication)** – presents precedence of the settlement group, to which the settlement scheme applied to the customer belongs. The field is filled automatically in conformity with the value of the field **Customer settlement scheme** in the table **Customers/Vendors**.

#### Configuring the functionality

1. Create a new settlement group. For this, open the table of settlement groups, left-click to invoke the pop-up menu and select **Add**. In the displayed dialog box enter the name of the group and its precedence in the range of 0 to 99. When done, click the **OK** button.



ID	Name	* Precedence (0-99)
	Test group	1

Fig. 93 Creating a settlement group

- Switch over to the table of settlement schemes. Left-click to invoke the pop-up menu and select **Add**. In the displayed dialog box enter the settlement scheme in any format you wish (for example, you can enter “7/7” or “Weekly”) and define the settlement group it will belong to. When done, click the **OK** button.

Settlement schemes	
ID	
* Scheme	7/7
Settlement group	Test group   1

OK Cancel

**Fig. 94 Creating a settlement scheme record**

- Repeat steps 1 and 2 to create other settlement group and/or scheme records, if necessary.

Assign the appropriate settlement schemes to the customers and vendors (see section 5.1.1).

## 5.7.5 SCHEDULED ACCOUNT DEBITING

This object allows the operator to configure the System for automated debits to customer accounts. Once a day the System (currently it is configured for 4 a.m.) analyzes the data in the table **Scheduled account debiting** and makes debits of amounts due from customers to customer accounts.

To schedule debiting, left-click over the table and select **Add** on the pop-up menu.

Scheduled account debiting	
ID	
* Account ID	01   deneg.net
* Frequency	DAILY
* Active from	
* Active till	
Enable	<input type="checkbox"/>
* Billing options	Flat Rate Billing
* Rate	
Currency	
Min. minutes	
Max. minutes	
* Postpaid / prepaid indicator	Postpaid
Description	

OK Cancel

**Fig. 95 Scheduled account debiting**

In the displayed dialog box enter the following information (the fields marked with an asterisk are mandatory fields):

---

\***Account ID** – select a Customer account from the drop-down list of the combo box;

\***Frequency** – use the drop-down list of this combo box to define the frequency of automated account debiting:

- Daily – the account is debited every day (currently configured for 4 a.m.)
- Weekly - the account is debited each Monday (currently configured for 4 a.m.)
- Bi-weekly - the account is debited on the 1<sup>st</sup> and 16<sup>th</sup> day of each month
- Monthly – the account is debited on the 1<sup>st</sup> of each month

In case **Min. minutes/Max. minutes** are configured (see below) the traffic is counted for the previous period (day, week, month, etc.).

\***Active from/\*Active till** – define the start and end date of the debiting schedule being configured;

**Enable** – select the checkbox to make the record active;

\***Billing options** – use the drop-down list of this combo box to define how hosted users will be billed:

- Flat rate billing – the users are billed by flat rate irrespective of their traffic volumes;
- Rate per mins – the users are billed by flat rate for the minutes they use during the billing period. For example, in case the rate is 0.001 and the user with a monthly billing period consumes 1,000,000 minutes, on the 1<sup>st</sup> day of the month the System will debit the user’s account for  $0.001 * 1,000,000 = \$1000$ .
- There is also a possibility to configure more flexible billing options with traffic-dependent rates (see below).

\***Rate** – define the rate at which the customer will be billed;

**Currency** – non-editable field, representing the currency of the account taken from the table **Accounts**;

**Min. minutes/Max. minutes** – these fields are intended for configuring billing options with traffic-dependent rates. For example, the user can be billed \$X per minute for minutes from 0 to 1000, \$Y per minute for traffic from 1000 to 10,000,000 minutes and \$Z per minute for minutes from 10,000,000 and above.

To implement this scheme, you will need to create several records with different rates and traffic values as shown in the table below.

ID	Rate	Min. value	Max. value
1	0.05	0	1000
2	0.03	1000	10,000,000
3	0.01	10,000,000	0*

\* “0” or null in the field **Max. minutes** means that there is no limit

\*\* All the other parameters in these records should be identical.

Please note that currently the features supports calculation of only total minutes sent by a customer, with no regard for the area codes (prefixes).

\***Postpaid/prepaid indicator** – select “postpaid” or “prepaid” from the drop-down list of this combo box depending on the type of payment. This parameter serves only for your information and has no effect on the functional behavior.

**Description** – you can enter any descriptive information in this field.

When done, click the **OK** button.

---

*Note: With this functionality the SysO can charge not only its ordinary customers but also the users of the “hosted softswitch” service (hosted users).*

---

## 5.7.6 ACCOUNT DEBITING LOG

Account debiting log			
Schedule record ID	Chargeable account	Payment date (Y-M-D)	Amount
2	01.01.2204 Artem's ART-TELECOM 1 hosted account	2007-September-17	5

**Fig. 96 Account debiting log**

Information about debiting is written to the table **Account debiting log**, which provides the following information:

**Schedule record ID** – unique identifier of the schedule record;  
**Chargeable account** – name of the debited account;  
**Payment date** – the date the account was debited;  
**Amount** – debited amount.

## 5.7.7 SUBCATEGORY INVOICES

Table 19 gives an overview of the subcategory **Invoices**.

**Table 19 Objects of the subcategory Invoices**

Object	Description
<b>Invoice generation/deletion</b>	Serves for generation/deletion of invoices
<b>Invoices</b>	Presents generated invoices, allows the operator to recalculate taxes
<b>Taxes</b>	Serves to configure tax calculation equations or sets of equations
<b>Detailed invoices</b>	Allows the operator to create detailed invoices by applying different filtering and sorting criteria to CDRs included in the invoices
<b>PDF templates</b>	Serves for configuring templates that can be used for creating invoices in the PDF format

### 5.7.7.1 Invoice generation/deletion

You can use this object to generate or undo previously generated invoices as well as to configure the System for scheduled invoice generation. During invoice generation the System draws on data contained in CDRs.

#### **Invoice generation**

To generate invoices proceed as follows:

- set the start and end date of the invoicing period

**Warning!** To avoid the possibility of unbilled calls the field **From date...** requires the operator to pay special attention to time settings during invoice creation. If you want to be sure that the System will bill all the calls that occurred since the latest invoice generation, delete the start date from the field.

- select the name of the customer and the name of the account in the appropriate combo boxes.
- you can also set the required time offset from coordinated Universal Time (UTC). The time specified in the fields **From date...** and **Through date...** will be the time of the selected time zone. In case the time zone is not defined the created invoices will be based on the System time, set with the help of the configuration parameter **Time zone** in the table **System global settings** (category of objects **Global settings**).
- you can use the combo box **Options** if you want the System to generate detailed and/or pdf invoices (see also sections 5.7.7.4 and 5.7.7.5). The combo box comprises the following items:
  - create detailed invoice – after invoice generation the System will generate a detailed invoice(-s)
  - create .pdf document - after invoice generation the System will generate a detailed invoice(-s) and a .pdf invoice(-s).

Besides, in the **PDF template** combo box, you should define the template that will be used for creation of detailed and pdf invoices. Automatically generated .pdf invoices are saved to the directory /home/oracle/unload.

When done, click the **Submit** button (in case nothing is selected the System will generate invoices for all customers and accounts). You will be displayed with the ID of the generation process and the number of involved CDRs at the bottom of the dialog box.

**Fig. 97 Invoice generation**

The table “Status” under the ‘Generate invoice’ dialog box displays the current state of the generation process showing progress in 100 processed records lots. The invoice generation process can take some time, during which you can continue working with other GUI objects. When the process is complete, the table is cleared. All the generated invoices will be presented in the table ‘Invoices’ (see section 0).

### Invoice deletion

You can also undo previously generated invoices, re-rate the CDRs that were included into them and generate new invoices with consideration for the updated data. To undo an invoice, enter its ID (refer to the table **Invoices**) in the edit field of the **Delete invoice** tool and click the **Submit** button. The table **Status** will display the current state of the process. When the process is complete, the table is cleared. While the process is in progress the corresponding invoice record in the table **Invoices** will be highlighted in red.

**Fig. 98 Deleting an invoice**

### Scheduled invoice generation

Scheduled invoice generation is configured with the help of the table **Invoice generation schedule**. If scheduled, the invoice generation procedure starts after 02:00 a.m. when traffic is slack and only after all other scheduled procedures, such as CDR backup, are complete. Automatically generated .pdf invoices are saved to the directory /home/oracle/unload.

To configure a schedule define the following parameters:

**Schedule name** – enter the schedule name. Note that the schedule should be assigned to customer settlement accounts (see section 5.7.2);

**Frequency** – define the interval with which invoices will be generated. Select the “monthly” option, or select “Manual input” and enter the required number of days (1 through 30);

**From date** – specify the starting date. The ending date is calculated automatically. Calls handled on the ending day are not included in the invoice(-s). For example, if the starting date is set to April 1 and the System is configured to generate invoices on a monthly basis, the ending date will be May 1 and the invoices will include traffic processed from April, 1 through April, 30. The invoice generation procedure will start after 02:00 a.m. on May 1.

**Time zone** – if necessary, specify the time zone with regard to which invoices should be generated;

**Options** – specify if generation of detailed and .pdf invoices is desired

**PDF template** – select a template for .pdf documents

**Responsible user** – specify the user whose privileges and language settings will be used by the procedure.

**Fig. 99 Scheduled invoice generation**

### 5.7.7.2 Invoices

The object Invoices consist of two elements:

- the table **Invoices** and
- the tool **Recalculate taxes**

Generation ID	ID	Invoice date	Account ID	Currency	Billing period (from:)
223	11925	2007-Feb-09 17:57:35	MERA.RU   841	EUR	2006-Nov-28 1
223	11926	2007-Feb-09 17:57:35	MERA.RU   901	EUR	2006-Nov-28 1

**Fig. 100 Table of invoices**

This table **Invoices** presents generated invoices. Each invoice record includes the following data items:

**Generation ID** – unique identifier of the generation process;

**ID** – unique invoice identifier;

**Invoice date** – date of invoice generation;

**Account ID** – Customer’s name and Customer’s account identifier;

**Currency** – name of the invoice currency;

**Billing period (from)** – start date of the invoice period;

**Billing period (through)** – end date of the invoice period;

**Time zone** – time zone used during invoice generation;

**Amount** – amount due from the Customer;

**Tax calculation successful** – “Yes” in this field indicates that the taxes for this invoice were calculated correctly.

You can use the pop-up menu to invoke the related table of CDRs and see the calls the prices of which were included in the invoice amount.

With the help of the tool **Recalculate taxes** located below the table the operator can recalculate taxes for the selected invoice in case the tax calculation formula has changed or as need be (see also section 5.7.7.3).

**Fig. 101 Tax recalculation**

### 5.7.7.3 Taxes

There is a possibility to include taxes into the .pdf invoices sent to customers. The object **Taxes** serves to configure tax calculation equations or sets of equations.

The object comprises the following fields:

**Tax group ID** – use this field to enter the tax group identifier. Even if there is only one tax applicable to the total invoice amount, it still must belong to a separate group. Valid values: 1 through 9999. These groups are assigned to the customer settlement accounts (see section 5.7.2).

**Precedence** – in this field you define the order in which the tax should be calculated and added to the total invoice amount.

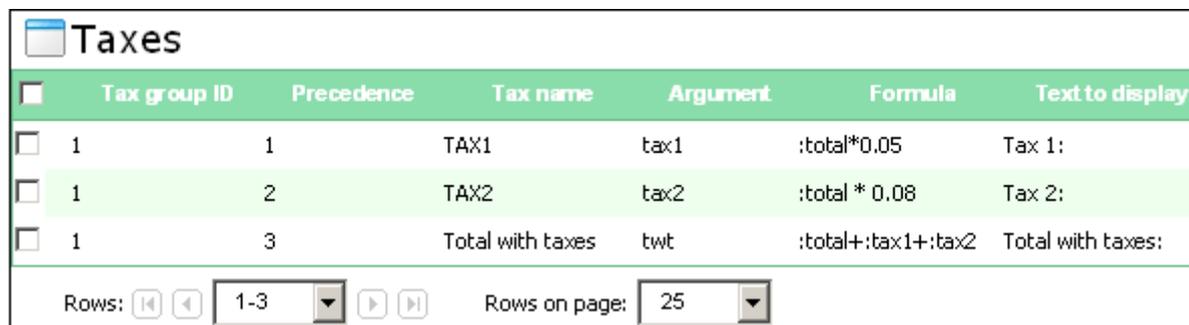
**Tax name** – this field serves for entering the tax name.

**Argument** – enter a name for the tax equation that will be used as an argument in other equations.

**Formula** – this field serves for writing tax calculation formulas. When writing calculus formulas precede argument names with a colon. For the total invoice amount use the argument “:total” (see Fig. 102). This field does not allow arguments with precedence values higher than that of the current record. The argument “:total” can be used in all formulas.

**Text to display** – in this field you can enter the text that will be included in the PDF invoices next to the resulting tax amounts, for example, “Total with taxes”.

The figure below shows an example of a configured tax formula group.



<input type="checkbox"/>	Tax group ID	Precedence	Tax name	Argument	Formula	Text to display
<input type="checkbox"/>	1	1	TAX1	tax1	:total*0.05	Tax 1:
<input type="checkbox"/>	1	2	TAX2	tax2	:total * 0.08	Tax 2:
<input type="checkbox"/>	1	3	Total with taxes	twt	:total+;tax1+;tax2	Total with taxes:

Rows:   1-3   Rows on page: 25

**Fig. 102 Table “Taxes”**

This configuration example is construed to mean the following:

- Calculate a 5% tax for the total invoice amount.
- Calculate a 8% tax for the total invoice amount.
- Add the resulting tax amounts to the total invoice amount.

**Warning!** Remember that although there is a possibility to quote taxes in invoices, tax amounts are not debited to customer settlement accounts.

#### 5.7.7.4 Detailed invoices

This object allows the operator to detail generated invoices by applying various filtering and sorting criteria to the CDRs included into invoices.

**Fig. 103 Creating a detailed invoice**

To generate a detailed invoice specify the following information in the **Generate detailed invoice** dialog box (the fields marked with an asterisk are required fields):

**Invoice ID** – enter the unique ID of the invoice you want to detail;

**\*Customer** – select the name of the customer from the drop down list of this combo box;

**\*Vendor** – select the name of the vendor from the drop down list of this combo box;

**Customer account** – select the customer account from the drop down list of this combo box;

**Vendor account** – select the vendor account from the drop down list of this combo box;

**Area** – select the area name from the drop down list of this combo box;

**Rate plan** – select the rate plan from the drop down list of this combo box;

**Include child records** – select this check box when you want the invoice to include the CDRs of calls billed under the rate plans, for which the selected rate plan is a parent plan.

**Routing group** – select the routing group in this combo box;

**include child records** – select this check box when the invoice is expected to include the CDRs of calls directed to the dial peers, for which the selected routing group is the parent group.

**\*Group order** – use this control to define the fields to be used as sorting criteria for the detailed invoice, which are as follows:

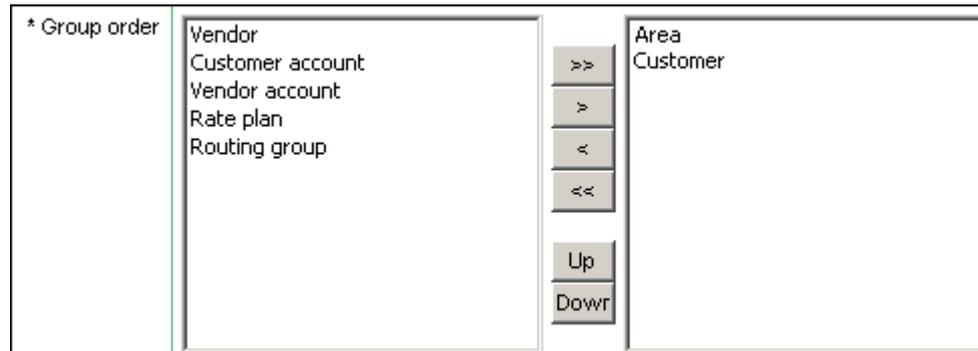
- **Customer**
- **Vendor**
- **Customer account**
- **Vendor account**
- **Area**
- **Rate plan**
- **Routing group**

To add a field to the list of sorting criteria, select the name of the field with the mouse and click the  button. The name of the field will be moved to the right box. To remove a field from the list of sorting criteria, select the name of the field and click the  button. Holding down the Shift or Ctrl key you can select multiple records.

Use the **Up** and **Down** buttons to define the sorting order of CDR fields in the resulting invoice.

Use the  and  buttons to move all the field names from the left box to the right box and vice versa.

If nothing is defined, the data will be sorted by the field **Customer**.



**Fig. 104 Defining sorting criteria for a detailed invoice**

**Group areas by prefixes** – with this box selected, the System will sort data about calls to the same geographic areas by prefixes before including it in the resulting invoice, for example:

- 55483 - Brazil Florianopolis
- 55613 - Brazil Brasilia
- 55622 - Brazil Goiania
- 55623 - Brazil Goiania, etc.

**\*Time zone** – you can use this combo box to set the required time offset from coordinated Universal Time (UTC). Note that in case you select the “customer TZ” option from the drop-down list of the combo box **Time zone** during invoice creation, the System will use the time zone settings currently configured for the customer in the table **Customers/Vendors**. Should these settings change since the time of the invoice creation and you need to create a detailed invoice, select the “invoice TZ” option for the System to use the old customer time zone settings during generation of a detailed report.

**Create PDF document** – select this checkbox if you want to obtain a PDF version of the invoice;

**\*PDF template** – define the template to be used for creation of the PDF version of the invoice (it should be already configured, see section 5.7.7.5).

When through with filling out the form, click the Submit button.

Below the dialog box you will see the detailed invoice and the table of previously generated invoices. In case the ‘Create PDF document’ checkbox has been selected, you will also be offered to download the resulting PDF file to your computer.

---

*Generation of detailed invoices can take some time. Remember that the more CDRs are involved and the more sorting criteria you apply, the longer it will take to generate the invoice (especially when filtering or sorting by geographic areas is required).*

---

 **Detailed invoice**  

ID	Area	Customer	Profitability (%)	Min
1726	ANTARCTICA DAVIS	01.157   Customer 01.157	4	.5195
1726	ANTARCTICA DAVIS	01.195   Customer 01.195	3	.516
1726	ANTARCTICA DAVIS	01.2126   Customer 01.2126	7	.5337
1726	ANTARCTICA DAVIS	01.2173   Customer 01.2173	7	1.205
1726	ANTARCTICA MAQUARIE STATION	01.08   Customer 01.08	3	.515
1726	ANTARCTICA MAQUARIE STATION	01.191   Customer 01.191	10	1.389
1726	ANTARCTICA MAQUARIE STATION	01.2105   Customer 01.2105	10	1.389
1726	ANTARCTICA MAQUARIE STATION	01.2142   Customer 01.2142	2	.5085
1726	ANTARCTICA MAQUARIE STATION	01.2143   Customer 01.2143	2	.511
1726	ANTARCTICA MAQUARIE STATION	01.2171   Customer 01.2171	4	.5195
1726	ANTARCTICA MAWSON	01.128   Customer 01.128	5	.524
1726	ANTARCTICA MAWSON	01.171   Customer 01.171	10	1.389
1726	ANTARCTICA MAWSON	01.196   Customer 01.196	10	1.389
1726	ANTARCTICA MAWSON	01.2146   Customer 01.2146	4	.519

**Fig. 105 An excerpt from a detailed invoice**

In addition to the selected sorting criteria, the invoice will include the following data:

**Profitability (%)** – profit percentage;

**Minimum rate (destination)/Maximum rate (destination)** – minimum and maximum call termination rates for the customer(s) used during the billing period. The rates are determined based on the data specified in the field ‘Rate’ of the table of destinations.

**Minimum rate (dial peer)/Maximum rate (dial peer)** – minimum and maximum call termination rates the SysO was charged during the billing period. The rates are determined based on the data specified in the field ‘Rate’ of the table of dial peers.

**Total calls** – total number of calls;

**Successful calls** – number of successful calls;

**Total duration** – total duration of calls in seconds;

**Customer chargeable duration** – chargeable call duration for the customer(s). Chargeable duration can differ from the value displayed the ‘Total duration’ field since different billing schemes can apply to the calls.

**SysO chargeable duration** – chargeable call duration for the SysO. Chargeable duration can differ from the value displayed the ‘Total duration’ field since the billing schemes applied to calls can differ.

**ASR** – ASR value;

**Average duration** – average duration of call sessions;

**Average PDD** – average PDD value;

**Customer payables** – amount due from the customer(s) in the SysO’s domestic currency;

**Vendor receivables** – amount due to the vendor(s) in the SysO’s domestic currency;

**First call** – date and time of the first call that occurred during the reporting period;

**Last call** – date and time of the last call in the reporting period.

To exclude excessive fields from the invoice, use the ‘Arrange columns’ tool (see section 4.3.4).

**Table “All detailed invoices”**

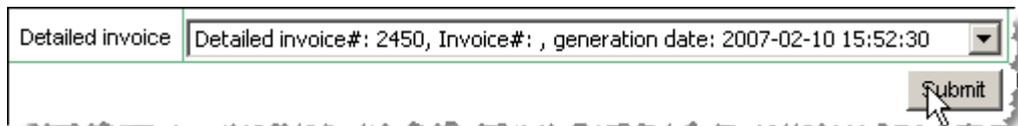


<input type="checkbox"/>	ID	Invoice ID	Description
<input type="checkbox"/>	2449	11925	Detailed invoice#: 2449, Invoice#: 11925, generation date: 2007-02-10 15:51:30
<input type="checkbox"/>	2450		Detailed invoice#: 2450, Invoice#: , generation date: 2007-02-10 15:52:30

**Fig. 106 Table of the detailed invoices**

This table presents information about previously generated invoices, such as invoice description, start and end date of the billing period, sorting criteria.

The operator can view previously generated invoices. For this, select the invoice of interest from the drop-down list of the “Detailed invoice” combo box (the dialog box “Generate detailed invoice”) and click the ‘Submit’ button (see Fig. 107). The drop-down list of this combo box is similar to the contents of the table “All detailed invoices”.



**Fig. 107 Opening a previously generated invoice**

In a similar fashion you can create PDF versions of the previously generated invoices. Just select the ‘Create PDF document’ check box, define the PDF template, select the invoice of interest and click the ‘Submit’ button.

Unused and obsolete invoices can be removed from the table. To do it, point the mouse to the record you wish to remove, invoke the pop-up menu and select **Delete**.

### 5.7.7.5 PDF templates

This object serves for configuring templates that can be used for creating invoices in the PDF format. Templates contain general information such as company logo, payment terms and bank details and also define what data should be included in the invoice.

To create a new template, left-click over the table to invoke the pop-up menu and select **Add**. Fill in the displayed form (the fields marked with an asterisk are required fields):

**\*Name** – enter the name of the template;

**\*Company logo** – enter the path to the image file (.jpg or .png) with the company logo;

**\*Columns to export** – select the columns that will be included into the invoice in addition to the columns defined in the **Group order** field of the object ‘Generate detailed invoice’ (see section 5.7.7.4);

**\*Payment terms** – enter information about payment terms in this field;

**\*Bank details** – enter information about bank details;

**Auto-invoicing settings** - these parameters (**Group order** and **Group areas by prefixes**) are used during automatic creation of detailed and .pdf invoices. The intent of the parameters is the same as of the similar parameters in the object **Detailed invoices**.

When done, click the **OK** button. The record will be added to the table.

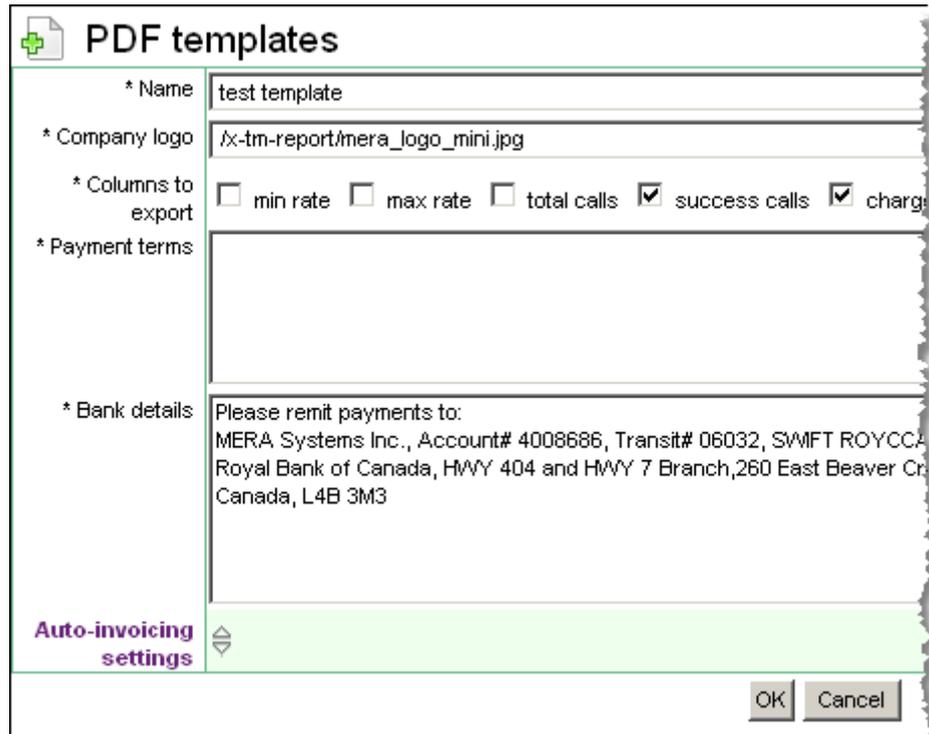
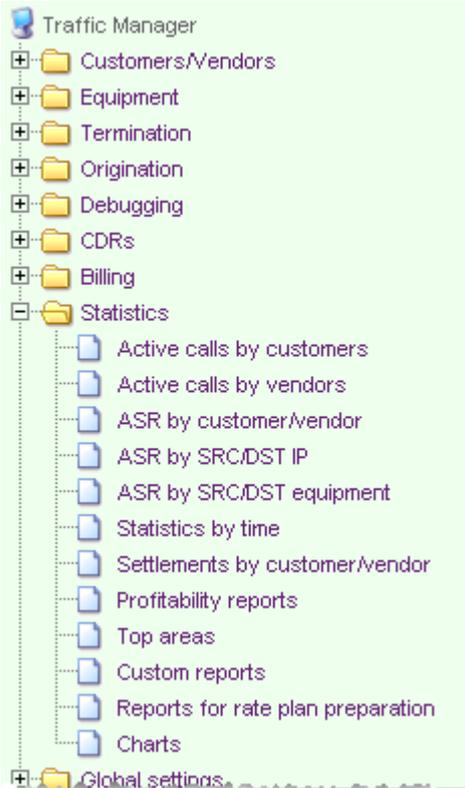


Fig. 108 Configuring a PDF template

## 5.8 CATEGORY STATISTICS



This object category allows the operator to generate a variety of reports and charts visualizing system statistics. Table 20 provides an overview of the category “Statistics”.

**Table 20 Objects of category Statistics**

<b>Object</b>	<b>Description</b>
<b>Active calls by customers / Active calls by vendors</b>	These two objects provides real time graphical representation of calls originated by customers and handled by vendors
<b>ASR by customer/vendor</b>	Allows the operator to generate reports on ASR statistics sorted by customers and vendors
<b>ASR by SRC/DST IP</b>	Allows the operator to generate reports on ASR statistics sorted by source and destination IP addresses
<b>ASR by SRC/DST equipment</b>	Allows the operator to generate reports on ASR statistics sorted by the names of origination and termination equipment.
<b>Statistics by time</b>	Allows the operator to generate reports on ASR statistics with data grouped by predefined time intervals and sorted by customers and vendors
<b>Settlements by customer/vendor</b>	Allows the operator to generate reports on settlements between the SysO and its customers and vendors
<b>Profitability reports</b>	Allows the operator to generate a variety of profitability reports
<b>Top areas</b>	Allows the operator to generate a variety of reports on the System statistics for different geographic areas
<b>Custom reports</b>	Allows the operator to create customized invoices by applying different filtering and sorting criteria to the CDRs available in the DB.
<b>Reports for rate plan preparation</b>	Allows the operator to view termination rates charged by vendors for different destinations together with statistics for the dial peers. Based on these data the operator can decide on the pricing policy with respect to customers.
<b>Charts</b>	Allows the operator to create charts visualizing system statistics

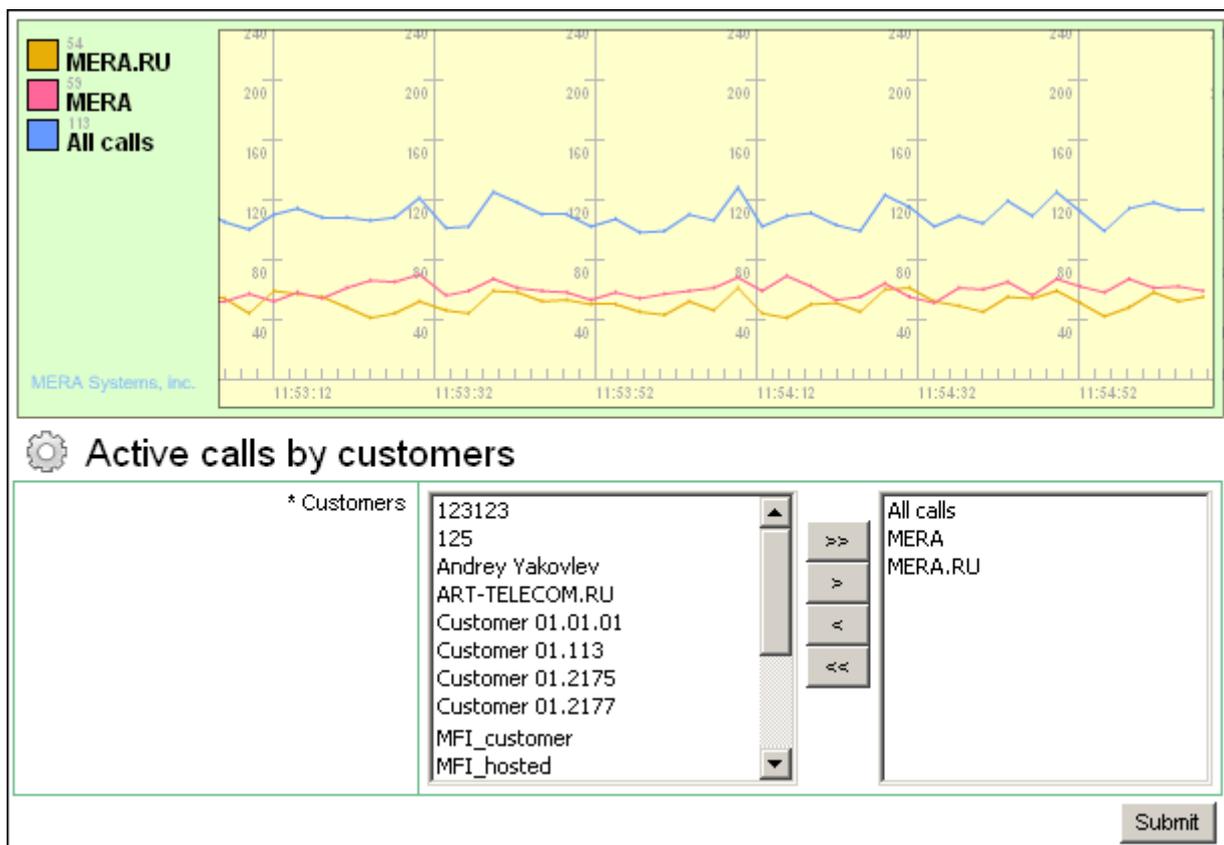
### **5.8.1 ACTIVE CALLS BY CUSTOMERS / ACTIVE CALLS BY VENDORS**

These two objects provide real time graphical representation of calls originated by customers and handled by vendors.

Both objects allow monitoring of *all* calls currently handled by the System, as well monitoring individual calls for selected customers/vendors (up to 7 at a time).

To add a customer/vendor to the list of monitored objects select the customer/vendor name in the left box and click the  button. Click the  button to remove a customer/vendor from the list.

Use the **>>** and **<<** buttons to move all the records from the left box to the right and vice versa.



**Fig. 109 Graphical representation of active calls**

The time displayed in the graphs is server time.

*Note: To be able to view graphs of calls you should have the Adobe® Flash Player plug-in installed on your computer. To download the player visit <http://www.adobe.com/go/getflashplayer>.*

## 5.8.2 ASR BY CUSTOMER/VENDOR

This object allows the operator to generate reports on ASR statistics sorted by customers and vendors.

**Fig. 110 Creating “ASR by customer/vendor” report**

To generate a report specify the following information in the ‘Create report’ dialog box (the fields marked with an asterisk are required fields):

**\*Report type** – select the type of the report using the drop-down list of the combo box

**\*From... / \*Through...** – specify the start and end date of the reporting period

**filter by Customer** – select the name of the customer from the drop down list of the combo box

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this customer (see section 3.9.1)

**filter by Vendor** – select the name of the vendor from the drop down list of this combo box

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this vendor (see section 3.9.1)

**Area** – select the name of the geographic area

**Origination equipment/Termination equipment** – enter the IP address and port of the origination/termination equipment. Using the metacharacter “%”, whose function is similar to the function of the comparison operator “Like”, you can enter patterns of IP addresses in these fields. For example, in case you enter the pattern “192.168.32%” in the field ‘Termination equipment’ and leave the field ‘Origination equipment’ empty, the report will include information only about calls involving termination equipment with IP addresses beginning with “192.168.32”.

**Time zone** – this combo box allows selection of the time zone for the created report. The time specified in the fields **from...** and **through...** will be the time of the selected time zone. The time displayed in the columns **First call** and **Last call** of the report will be recalculated for the defined time zone. In case the time zone is not defined the report is created in the System local time configured with the help of the configuration parameter **Time zone** (see

section 5.9.1). The time zone a customer/vendor is associated with is configured with the help of the same-name parameter in the object **Customers/Vendors** (see section 5.1.1).

This done, click the 'Submit' button.

Below the dialog box you will see the report and the table 'All reports'. Information about the data presented in the report and the table is given below.

### Report "ASR by Customers/Vendors"

ID	Customer/Vendor	Total calls	Failed calls	Total duration	ASR	Average duration	First call
803	01   MERA	53	29	645	.45	27	2006-Jul-10 19:40
803	01.162   Customer 01.162	2	0	152	1	76	2006-Jul-10 12:16
803	01.01   MERA.RU	219	149	1246	.32	18	2006-Jul-12 12:47
803	01.2146   Customer 01.2146	4	1	28	.75	9	2006-Jul-10 12:16

Fig. 111 Report "ASR by customer/vendor"

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Customer/Vendor** – hierarchical classifier and the name of the customer or the vendor depending on the type of the report selected;

**Total calls** – total number of calls originated/terminated by the customer/vendor during the reporting period;

**Failed calls** – number of failed calls;

**Total duration (min)** – total duration of calls in seconds;

**ASR** – ASR value;

**Average PDD** – average PDD value

**Average duration (min)** – average duration of a call;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

### Table "All reports"

ID	Description
701	Rep.#: 701, ASR by Vendor, 2006-07-01 00:00:00 - 2006-08-01 00:00:00, last generate: 2006-08-01 12:16:16
642	Rep.#: 642, ASR by Vendor, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, only orig. equip. 2006-01-01 12:16:16
661	Rep.#: 661, ASR by Customer, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, last generate: 2006-08-01 12:16:16

Fig. 112 Table of "ASR by Customer/Vendor" reports

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

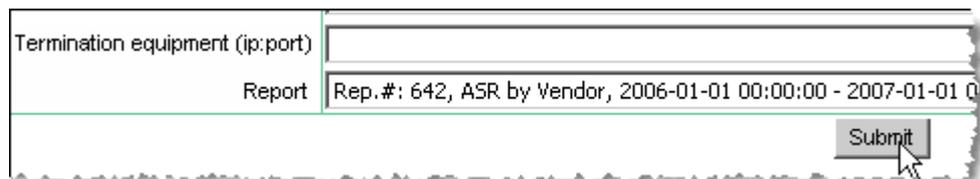
**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**From... / Through...** – start and end date of the reporting period;

**Origination equipment/Termination equipment** – IP addresses of the origination/termination devices

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the 'Report' combo box (the dialog box 'Create report') and click the 'Submit' button (see Fig. 113). The population of the drop-down list of this combo box is similar to the population of the table 'All reports'.

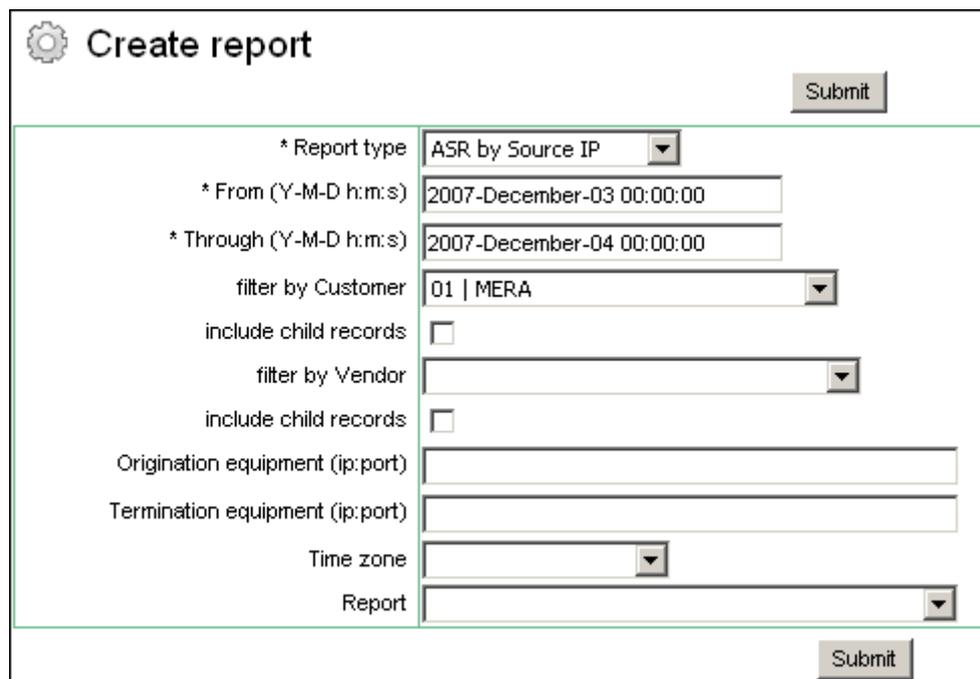


**Fig. 113 Opening previously generated report**

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.3 ASR BY SRC/DST IP

This object allows the operator to generate reports on ASR statistics sorted by IP addresses of origination and termination equipment.



**Fig. 114 Creating "ASR by source/destination IP" report**

To generate a report specify the following information in the 'Create report' dialog box (the fields marked with an asterisk are required fields):

**\*Report type** – select the type of the report using the dropdown list of the combo box;

**\*From... / \*Through...** – specify the start and end date of the reporting period;

**filter by Customer** – select the name of the customer from the drop down list of the combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this customer (see section 3.9.1);

**filter by Vendor** – select the name of the vendor from the drop down list of this combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to users affiliated with this vendor (see section 3.9.1);

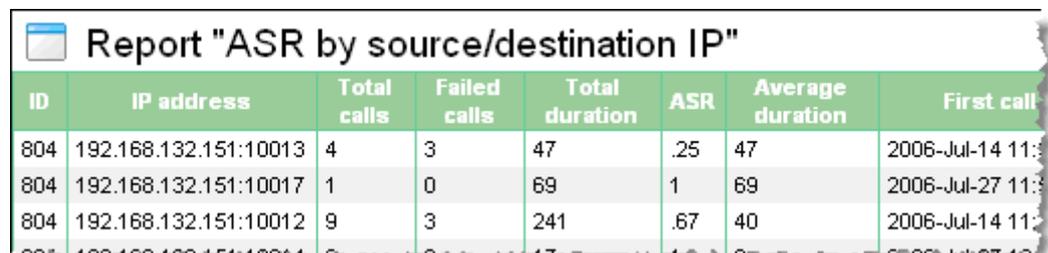
**Origination equipment/Termination equipment** – enter the IP address and port of the origination/termination equipment. Using the metacharacter “%”, whose function is similar to the function of the comparison operator “Like”, you can enter patterns of IP addresses in these fields. For example, in case you enter the pattern “192.168.32%” in the field ‘Termination equipment’ and leave the field ‘Origination equipment’ empty, the report will include information only about calls involving termination equipment with IP addresses beginning with “192.168.32”.

**Time zone** – this combo box allows selection of the time zone for the created report. The time specified in the fields **from...** and **through...** will be the time of the selected time zone. The time displayed in the columns **First call** and **Last call** of the report will be recalculated for the defined time zone. In case the time zone is not defined the report is created in the System local time configured with the help of the configuration parameter **Time zone** (see section 5.9.1). The time zone a customer/vendor is associated with is configured with the help of the same-name parameter in the object **Customers/Vendors** (see section 5.1.1).

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table ‘All reports’. Information about the data presented in the report and the table is given below.

#### Report “ASR by Source/Destination IP”



ID	IP address	Total calls	Failed calls	Total duration	ASR	Average duration	First call
804	192.168.132.151:10013	4	3	47	.25	47	2006-Jul-14 11:11
804	192.168.132.151:10017	1	0	69	1	69	2006-Jul-27 11:11
804	192.168.132.151:10012	9	3	241	.67	40	2006-Jul-14 11:11
804	192.168.132.151:10014	5	2	17	1	0	2006-Jul-27 11:11

Fig. 115 Report “ASR by source/destination IP”

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**IP address** – IP address of the origination or termination device depending on the type of the report selected;

**Total calls** – total number of calls originated/terminated by the customer/vendor during the reporting period;

**Failed calls** – number of failed calls;

**Total duration** – total duration of calls in seconds;

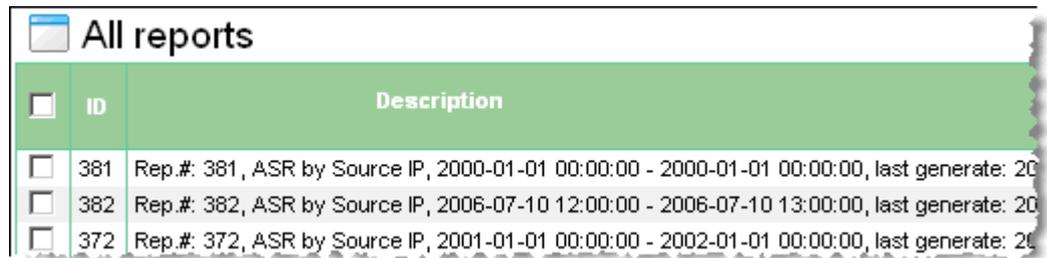
**ASR** – ASR value;

**Average duration** – average duration of a call;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

**Table “All reports”**



<input type="checkbox"/>	ID	Description
<input type="checkbox"/>	381	Rep.#: 381, ASR by Source IP, 2000-01-01 00:00:00 - 2000-01-01 00:00:00, last generate: 20
<input type="checkbox"/>	382	Rep.#: 382, ASR by Source IP, 2006-07-10 12:00:00 - 2006-07-10 13:00:00, last generate: 20
<input type="checkbox"/>	372	Rep.#: 372, ASR by Source IP, 2001-01-01 00:00:00 - 2002-01-01 00:00:00, last generate: 20

**Fig. 116 Table of the “ASR by source/destination IP” reports**

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

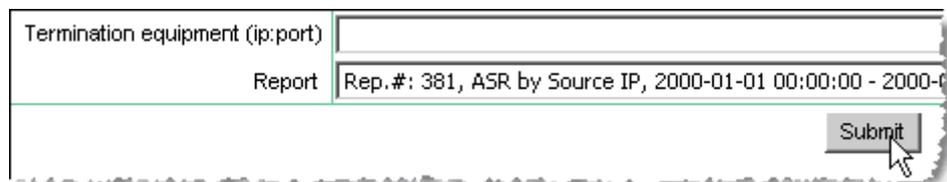
**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**from.../through...**– start and end date of the reporting period;

**Origination equipment/Termination equipment** – IP addresses of the origination/termination devices.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the ‘Report’ combo box, the dialog box ‘Create report’ and click the ‘Submit’ button (see Fig. 117). The population of the drop-down list of this combo box is similar to the population of the table ‘All reports’.



Termination equipment (ip:port)

Report

**Fig. 117 Opening previously generated report**

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

#### **5.8.4 ASR BY SRC/DST EQUIPMENT**

This object allows the operator to generate reports on ASR statistics sorted by the names of origination and termination equipment.

The screenshot shows a 'Create report' dialog box with the following fields and values:

- \* Report type:** ASR by Source Equipment (dropdown)
- \* From (Y-M-D h:m:s):** 2007-December-03 00:00:00
- \* Through (Y-M-D h:m:s):** 2007-December-04 00:00:00
- filter by Customer:** 01 | MERA (dropdown)
- include child records:**
- filter by Vendor:** (empty dropdown)
- include child records:**
- Origination equipment (ip:port):** (empty text box)
- Termination equipment (ip:port):** (empty text box)
- Time zone:** (empty dropdown)
- Report:** (empty dropdown)

**Fig. 118 Creating an “ASR by source/destination equipment” report**

To generate a report specify the following information in the ‘Create report’ dialog box (the fields marked with an asterisk are required fields):

**\*Report type** – select the type of the report using the dropdown list of the combo box;

**\*from.../\*through...** – specify the start and end date of the reporting period;

**filter by Customer** – select the name of the customer from the drop down list of the combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this customer (see section 3.9.1);

**filter by Vendor** – select the name of the vendor from the drop down list of this combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this vendor (see section 3.9.1);

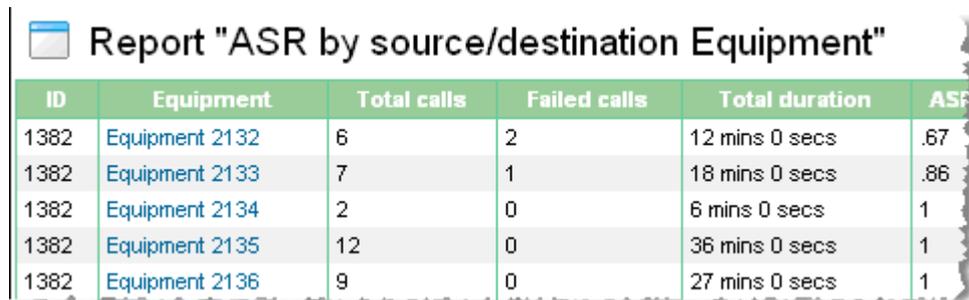
**Origination equipment/Termination equipment** – enter the IP address and port of the origination/termination equipment. Using the metacharacter “%”, whose function is similar to the function of the comparison operator “Like”, you can enter patterns of IP addresses in these fields. For example, in case you enter the pattern “192.168.32%” in the field ‘Termination equipment’ and leave the field ‘Origination equipment’ empty, the report will include information only about calls involving termination equipment with IP addresses beginning with “192.168.32”.

**Time zone** – this combo box allows selection of the time zone for the created report. The time specified in the fields **from...** and **through...** will be the time of the selected time zone. The time displayed in the columns **First call** and **Last call** of the report will be recalculated for the defined time zone. In case the time zone is not defined the report is created in the System local time configured with the help of the configuration parameter **Time zone** (see section 5.9.1). The time zone a customer/vendor is associated with is configured with the help of the same-name parameter in the object **Customers/Vendors** (see section 5.1.1).

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table 'All reports'. Information about the data presented in the report and the table is given below.

**Report "ASR by Source/Destination equipment"**



ID	Equipment	Total calls	Failed calls	Total duration	ASR
1382	Equipment 2132	6	2	12 mins 0 secs	.67
1382	Equipment 2133	7	1	18 mins 0 secs	.86
1382	Equipment 2134	2	0	6 mins 0 secs	1
1382	Equipment 2135	12	0	36 mins 0 secs	1
1382	Equipment 2136	9	0	27 mins 0 secs	1

**Fig. 119 Report "ASR by source/destination equipment"**

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Equipment** – name of the origination or termination device depending on the type of the report selected;

**Total calls** – total number of calls originated/terminated by the customer/vendor during the reporting period;

**Failed calls** – number of failed calls;

**Total duration** – total duration of calls in seconds;

**ASR** – ASR value;

**Average duration** – average duration of a call;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

**Table "All reports"**



ID	Description
1159	Rep.#: 1159, ASR by Source Equipment, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, la
1250	Rep.#: 1250, ASR by Source Equipment, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, la
1382	Rep.#: 1382, ASR by Source Equipment, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, o
1160	Rep.#: 1160, ASR by Destination Equipment, 2006-01-01 00:00:00 - 2007-01-01 00:00:0

**Fig. 120 Table of the "ASR by source/destination equipment" reports**

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

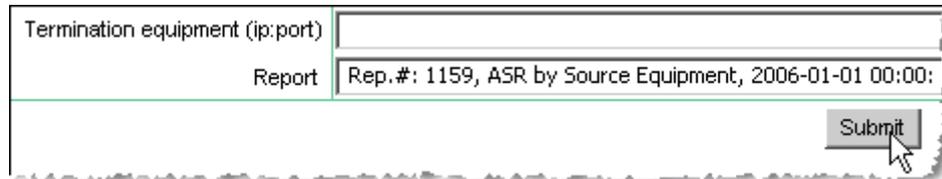
**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**from.../through...** – start and end date of the reporting period;

**Origination equipment/Termination equipment** – IP addresses of the origination/termination devices.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the ‘Report’ combo box, the dialog box ‘Create report’ and click the ‘Submit’ button (see Fig. 121). The population of the drop-down list of this combo box is similar to the population of the table ‘All reports’.

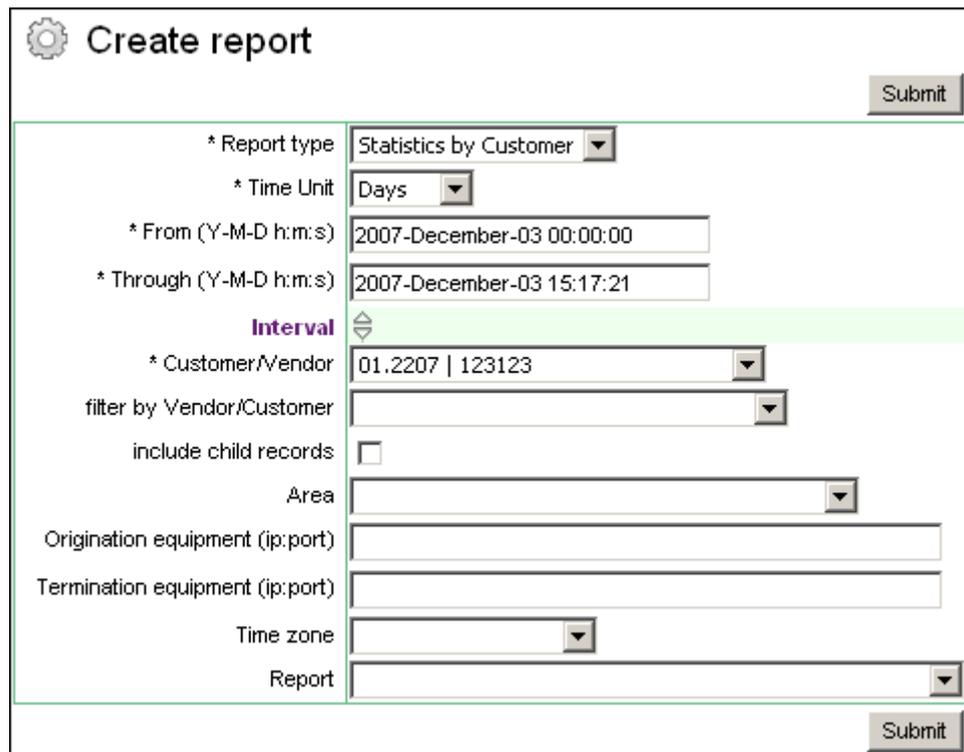


**Fig. 121** Opening a previously generated report

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.5 STATISTICS BY TIME

This object allows the operator to generate reports on ASR and other statistics with data grouped by predefined time intervals and sorted by customers and vendors.



**Fig. 122** Creating a “Statistics by time” report

To generate a report specify the following information in the ‘Create report’ dialog box (the fields marked with an asterisk are required fields):

**\*Report type** – select the type of the report using the drop-down list of the combo box;

**\*Time unit** – define the time unit to be used for grouping data (minute, hour, day, week, month, year)

**\*from.../\*through...** – specify the start and end date of the reporting period;

**Interval** – use this group of parameters to define time intervals taken into account during report creation;

**filter by Customer** – select the name of the customer from the drop down list of the combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this customer (see section 3.9.1);

**filter by Vendor** – select the name of the vendor from the drop down list of this combo box;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with this vendor (see section 3.9.1);

**Area** – select the destination area you are interested in;

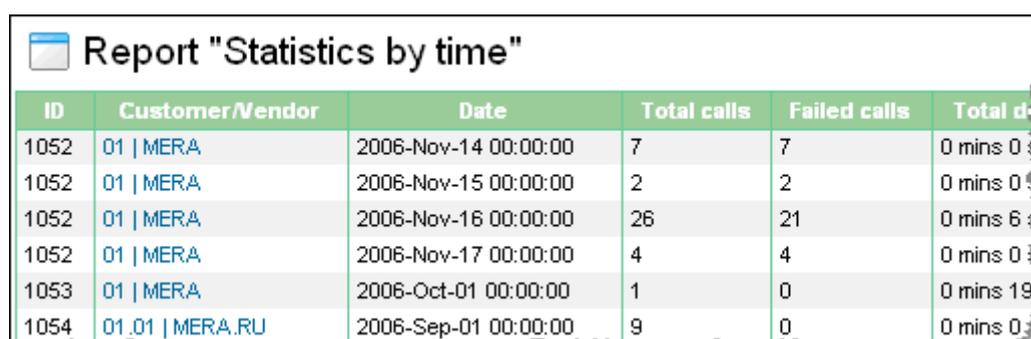
**Origination equipment/Termination equipment** – enter the IP address and port of the origination/termination equipment. Using the metacharacter “%”, whose function is similar to the function of the comparison operator “Like”, you can enter patterns of IP addresses in these fields. For example, in case you enter the pattern “192.168.32%” in the field ‘Termination equipment’ and leave the field ‘Origination equipment’ empty, the report will include information only about calls involving termination equipment with IP addresses beginning with “192.168.32”.

**Time zone** – this combo box allows selection of the time zone for the created report. The time specified in the fields **from...** and **through...** will be the time of the selected time zone. The time displayed in the columns **First call** and **Last call** of the report will be recalculated for the defined time zone. In case the time zone is not defined the report is created in the System local time configured with the help of the configuration parameter **Time zone** (see section 5.9.1). The time zone a customer/vendor is associated with is configured with the help of the same-name parameter in the object **Customers/Vendors** (see section 5.1.1).

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table ‘All reports’. Information about the data presented in the report and the table is given below.

### Report “Statistics by time”



ID	Customer/Vendor	Date	Total calls	Failed calls	Total duration
1052	01   MERA	2006-Nov-14 00:00:00	7	7	0 mins 0 s
1052	01   MERA	2006-Nov-15 00:00:00	2	2	0 mins 0 s
1052	01   MERA	2006-Nov-16 00:00:00	26	21	0 mins 6 s
1052	01   MERA	2006-Nov-17 00:00:00	4	4	0 mins 0 s
1053	01   MERA	2006-Oct-01 00:00:00	1	0	0 mins 19 s
1054	01.01   MERA.RU	2006-Sep-01 00:00:00	9	0	0 mins 0 s

Fig. 123 Report “Statistics by time”

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Customer/Vendor** – hierarchical classifier and the name of the customer or the vendor depending on the type of the report selected;

**Date** – starting date and time of the interval;

**Total calls** – total number of calls originated/terminated by the customer/vendor during the reporting period;

**Failed calls** – number of failed calls;

**Total duration** – total duration of calls in seconds;

**ASR** – ASR value;

**Average duration** – average duration of a call;

**Customer's payables (domestic currency)** – amount due from the Customer in the SysO's domestic currency;

**Vendor's receivables (domestic currency)** – amount due to the Vendor in the SysO's domestic currency;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

**Table "All reports"**



<input type="checkbox"/>	ID	Description
<input type="checkbox"/>	1052	Rep.#: 1052, ASR by Days by Customer: MERA, 2006-11-13 00:00:00 - 2006-11-18 00:00:00
<input type="checkbox"/>	1053	Rep.#: 1053, ASR by Months by Vendor: MERA, 2006-09-01 00:00:00 - 2006-12-01 00:00:00
<input type="checkbox"/>	1054	Rep.#: 1054, ASR by Months by Vendor: MERA.RU, 2006-09-01 00:00:00 - 2006-12-01 00:00:00
<input type="checkbox"/>	1055	Rep.#: 1055, ASR by Hours by Customer: MERA, 2006-11-16 00:00:00 - 2006-11-17 00:00:00

**Fig. 124 Table of the "Statistics by time" reports**

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

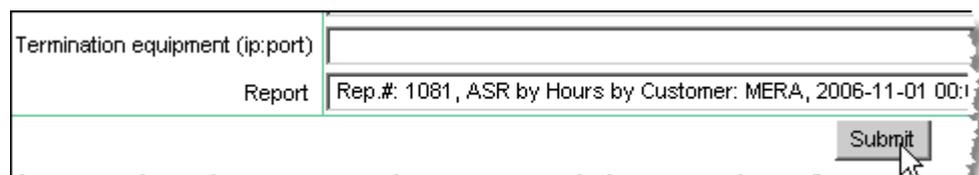
**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**from.../through** – start and end date of the reporting period;

**Origination equipment/Termination equipment** – IP addresses of the origination/termination devices.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the 'Report' combo box (the dialog box 'Create report') and click the 'Submit' button (see Fig. 125). The population of the drop-down list of this combo box is similar to the population of the table 'All reports'.



Termination equipment (ip:port)	<input type="text"/>
Report	Rep.#: 1081, ASR by Hours by Customer: MERA, 2006-11-01 00:00:00
<input type="button" value="Submit"/>	

**Fig. 125 Opening a previously generated report**

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

## 5.8.6 SETTLEMENTS BY CUSTOMER/VENDOR

This object allows the operator to generate reports on settlements between the SysO and its customers and vendors.

The screenshot shows a 'Create report' dialog box with the following fields and values:

* Report type	Settlements by Customer
* From (Y-M-D h:m:s)	2007-December-03 00:00:00
* Through (Y-M-D h:m:s)	2007-December-04 00:00:00
* Customer/Vendor	- All customers/vendors -
filter by Vendor/Customer	
include child records	<input type="checkbox"/>
Time zone	
Report	

Submit

Fig. 126 Creating a “Settlements by Customer/Vendor” report

To generate a report specify the following information in the ‘Create report’ dialog box (the fields marked with an asterisk are required fields):

**\*Report type** – select the type of the report using the dropdown list of the combo box;

**\*from.../\*through...** – specify the start and end date of the reporting period;

**\*Customer/Vendor** – specify the name of the customer or vendor depending on the type of the report selected;

**filter by Vendor /Customer**– select the name of the customer/vendor depending on the type of the report selected;

**include child records** – select this check box if you want the report to include the information about calls pertaining to the users affiliated with the customer/vendor (see section 3.9.1);

**Time zone** – this combo box allows selection of the time zone for the created report. The time specified in the fields **from...** and **through...** will be the time of the selected time zone. The time displayed in the columns **First call** and **Last call** of the report will be recalculated for the defined time zone. In case the time zone is not defined the report is created in the System local time configured with the help of the configuration parameter **Time zone** (see section 5.9.1). The time zone a customer/vendor is associated with is configured with the help of the same-name parameter in the object **Customers/Vendors** (see section 5.1.1).

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table ‘All reports’. Information about the data presented in the report and the table is given below.

### Report “Settlements by Customers/Vendors”

Report "Settlements by Customer/Vendor"								
ID	Customer/Vendor	Area	Minimum rate	Maximum rate	Total calls	Successful calls	ASR	Average duration
805	01   MERA	CHILE SANTIAGO (5627)	1.63026	1.63026	1	1	1	
805	01   MERA	GREECE (30)	0	0	6	5	.83	
805	01   MERA	UNITED STATES (1)	0	0	1	1	1	
805	01   MERA				40	12	.3	

Fig. 127 Report "Settlements by Customer/Vendor"

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Customer/Vendor** – hierarchical classifier and the name of the customer or vendor depending on the type of the report selected;

**Area** – name of the call destination area;

**Minimum rate/Maximum rate** – minimum and maximum call termination rates to this destination area used during the reporting period. The rates are determined based on the data specified in the field 'Rate' of the table of dial peers (report "Settlements by vendors") or of the table of destinations (report "Settlements by customers"). For example, during the reporting period the following four dial peers have been used for call termination to a certain area:

Name	Rate
Dial peer 1	0.1
Dial peer 2	0.2
Dial peer 3	0.3
Dial peer 4	0.4

In this case the columns "Minimum rate" and "Maximum rate" will display 0.1 and 0.4, respectively.

**Total calls** – total number of calls originated/terminated by the customer/vendor;

**Successful calls** – total number of successful calls;

**ASR** – ASR value;

**Average duration** – average duration of calls in seconds;

**Total duration** – total duration of calls in seconds;

**Amount** – due amount/amount to be paid depending on the type of report selected;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** - date and time of the last call that took place during the reporting period;

**Average PDD** – average PDD (Post Dial Delay) value.

### Table "All reports"

All reports		
<input type="checkbox"/>	ID	Description
<input type="checkbox"/>	746	Rep.#: 746, Settlements by customer : Customer 01.01.01, 2000-01-01 00:00:00 - 2002-01-01 00:00:00
<input type="checkbox"/>	744	Rep.#: 744, Settlements by customer : Customer 01.01.01, 2000-01-01 00:00:00 - 2009-01-01 00:00:00
<input type="checkbox"/>	745	Rep.#: 745, Settlements by customer : Customer 01.01.01, 2000-01-01 00:00:00 - 2007-01-01 00:00:00

**Fig. 128 Table of the “Settlements by Customer/Vendor” reports**

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**from.../through...** – start and end date of the reporting period.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the ‘Report’ combo box, the dialog box ‘Create report’, and click the ‘Submit’ button (see Fig. 129). The population of the drop-down list of this combo box is similar to the population of the table ‘All reports’.

**Fig. 129 Opening a previously generated report**

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.7 PROFITABILITY REPORTS

This object allows the operator to generate a variety of profitability reports.

**Fig. 130 Creating a profitability report**

To generate a report specify the following information in the ‘Create report’ dialog box (the fields marked with an asterisk are required fields):

**\*Customer/\*Vendor** – use these combo boxes to select the type of report. In addition to the lists of customers and vendors both combo boxes include the options ‘Total’ and ‘All customers/vendors’. Choosing different combinations of the settings of these combo boxes you can generate the following reports:

**Table 21 Types of profitability reports**

Combination of the combo boxes Customer-Vendor	Type of report
<b>Total – Total</b>	Global profitability report for the specified period
<b>All customers – Total</b>	Global profitability report for the specified period sorted by customers
<b>Total – All vendors</b>	Global profitability report for the specified period sorted by vendors
<b>All customers – All vendors</b>	Profitability of calls for all occurring Customer-Vendor pairs
<b>Customer A – All vendors</b>	Profitability of all calls originated by Customer A sorted by vendors
<b>All customers – Vendor B</b>	Profitability of calls terminated by Vendor B sorted by customers
<b>Customer A – Vendor B</b>	Profitability of calls originated by Customer A and terminated by Vendor B
<b>Customer A – Total</b>	Profitability of calls originated by Customer A
<b>Total – Vendor B</b>	Profitability of all calls terminated by Vendor B

**\*from.../\*through...** – specify the start and end date of the reporting period.

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table ‘All reports’. Information about the data presented in the report and the table is given below.

**Report “Profitability”**

ID	Customer	Vendor	Profitability (%)	Minimum rate (destination)	Maximum rate (destination)	Minimum rate (percentage)
1501	01.01.01   Customer 01.01.01	- Total -	-42	.01143	8.21805	.0069
1501	01.02   Customer 01.02	- Total -	11	.01143	4.03179	.0071
1501	01.03   Customer 01.03	- Total -	8	.00966	1.57345	.0071
1501	01.04   Customer 01.04	- Total -	-5	.01177	3.2679	.0098
1501	01.05   Customer 01.05	- Total -	0			
1501	01.06   Customer 01.06	- Total -	5	.00618	3.87331	.0059

**Fig. 131 Profitability report**

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Customer** - hierarchical classifier and the name of the customer;

**Vendor** - hierarchical classifier and the name of the vendor;

**Profitability** – profitability value;

**Note:** Profitability is calculated by the formula:

$$( \text{customer payables} - \text{vendor receivables} ) / \text{vendor receivables} ) * 100$$

If vendor receivables=0, the System will display “9999999999”

**Minimum rate (destination)/Maximum rate (destination)** – minimum and maximum call termination rates for the customer(s) used during the reporting period. The rates are determined based on the data specified in the field ‘Rate’ of the table of destinations.

**Minimum rate (dial peer)/Maximum rate (dial peer)** – minimum and maximum call termination rates for the SysO used during the reporting period. The rates are determined based on the data specified in the field ‘Rate’ of the table of dial peers.

**Total calls** – total number of calls;

**Failed calls** – number of failed calls;

**Total duration** – total duration of calls in seconds;

**Customer chargeable duration** – chargeable call duration for the customer(s). Chargeable duration can differ from the value displayed the ‘Total duration’ field since there can be different billing schemes applied to the calls.

**SysO chargeable billable duration** – chargeable call duration for the SysO. Chargeable duration can differ from the value displayed the ‘Total duration’ field since there can be different billing schemes applied to the calls.

**ASR** – ASR value;

**Average duration** – average duration of call sessions;

**Average PDD** – average PDD value;

**Customer payables** – amount due from the customer(s) in the SysO’s domestic currency;

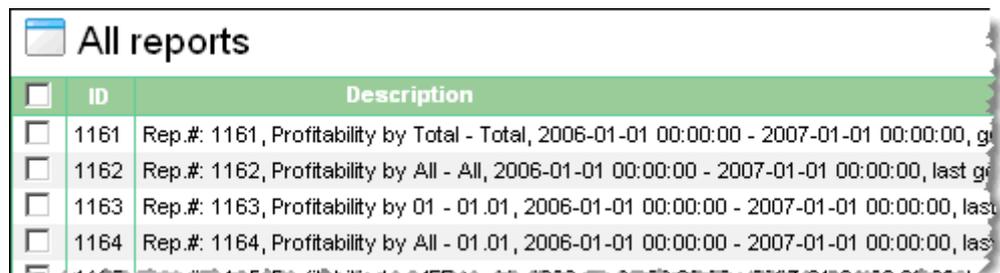
**Vendor receivables** – amount due to the vendor(s) in the SysO’s domestic currency;

**Margin** - the difference between customer payables and vendor receivables in domestic currency;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

**Table “All reports”**



<input type="checkbox"/>	ID	Description
<input type="checkbox"/>	1161	Rep.#: 1161, Profitability by Total - Total, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, gr
<input type="checkbox"/>	1162	Rep.#: 1162, Profitability by All - All, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, last gr
<input type="checkbox"/>	1163	Rep.#: 1163, Profitability by 01 - 01.01, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, last
<input type="checkbox"/>	1164	Rep.#: 1164, Profitability by All - 01.01, 2006-01-01 00:00:00 - 2007-01-01 00:00:00, last

**Fig. 132 Table of the profitability reports**

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

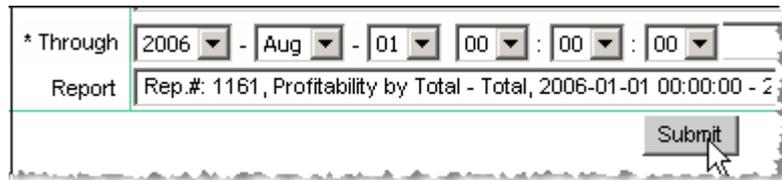
**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – report type;

**from.../through** – start and end date of the reporting period;

**Customer/Vendor** – customer and vendor names;

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the 'Report' combo box (the dialog box 'Create report') and click the 'Submit' button (see Fig. 133). The population of the drop-down list of this combo box is similar to the population of the table 'All reports'.

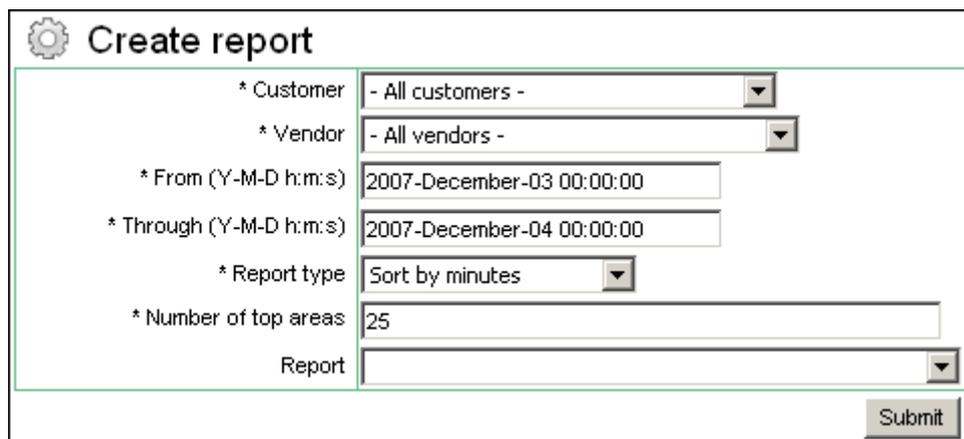


**Fig. 133** Opening a previously generated report

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.8 TOP AREAS

This object allows the operator to generate a variety of reports on the System statistics for different geographic areas.



**Fig. 134** Creating a "Top areas" report

To generate a report specify the following information in the 'Create report' dialog box (the fields marked with an asterisk are required fields):

**\*Customer/\*Vendor** use these combo boxes to select the customer and vendor;

**\*from.../\*through** – start and end date of the reporting period;

**\*Report type** – select the data sorting criterion for the report:

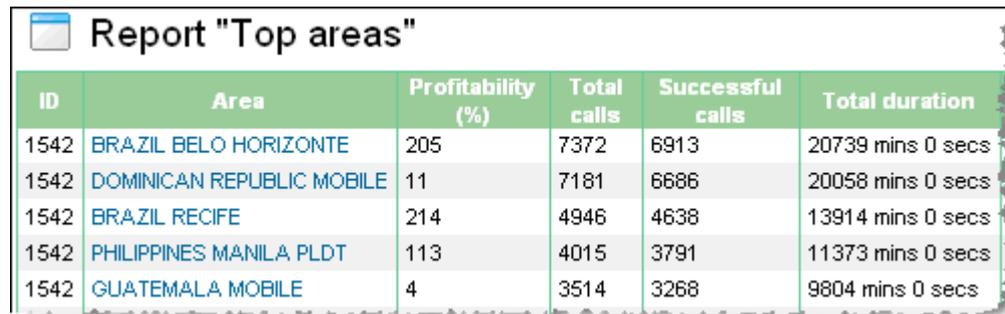
- Sort by minutes
- Sort by ASR
- Sort by Profit
- Sort by the number of calls

\***Number of top areas** – this field allows the operator to define the number of top areas (i.e. the areas with the best figures for the selected sorting criterion), for which the report will be generated. To generate a report for all areas, enter the number equal to or higher than the number of records in the table ‘Area prefixes’.

This done, click the ‘Submit’ button.

Below the dialog box you will see the report and the table ‘All reports’. Information about the data presented in the report and the table is given below.

### Report “Top areas”



ID	Area	Profitability (%)	Total calls	Successful calls	Total duration
1542	BRAZIL BELO HORIZONTE	205	7372	6913	20739 mins 0 secs
1542	DOMINICAN REPUBLIC MOBILE	11	7181	6686	20058 mins 0 secs
1542	BRAZIL RECIFE	214	4946	4638	13914 mins 0 secs
1542	PHILIPPINES MANILA PLDT	113	4015	3791	11373 mins 0 secs
1542	GUATEMALA MOBILE	4	3514	3268	9804 mins 0 secs

Fig. 135 Top area report

Each line of the report comprises the following data:

**ID** – unique identifier of the report;

**Area** – the name of the geographic area;

**Profitability** – profitability value;

**Total calls** – total number of calls;

**Successful calls** – number of successful calls;

**Total duration** – total duration of calls in seconds;

**ASR** – ASR value;

**Average duration** – average duration of call sessions;

**Average PDD** – average PDD value;

**Customer payables** – amount due from the customer(s) in the SysO’s domestic currency;

**Vendor receivables** – amount due to the vendor(s) in the SysO’s domestic currency;

**First call** – date and time of the first call that took place during the reporting period;

**Last call** – date and time of the last call that took place during the reporting period.

### Table “All reports”



ID	Description
1265	Rep.#: 1265, Sort by minutes, Top 25, Total - MERA.RU, 2006-01-01 00:00:00 - 2007-01-01-01 00:00:00
1266	Rep.#: 1266, Sort by minutes, Top 25, Total - Total, 2000-01-01 00:00:00 - 2000-01-01 00:00:00
1267	Rep.#: 1267, Sort by minutes, Top 25, Total - Total, 2006-01-01 00:00:00 - 2007-01-01 00:00:00
1281	Rep.#: 1281, Sort by profit, Top 25, Total - Total, 2006-01-01 00:00:00 - 2007-01-01 00:00:00
1521	Rep.#: 1521, Sort by minutes, Top 25, Total - Total, 2000-01-01 00:00:00 - 2000-01-01 00:00:00

Fig. 136 Table of the “Top area” reports

---

This table presents information about previously generated reports:

**ID** – unique identifier of the report;

**Description** – report-related information (ID, type, reporting period, date and time of generation);

**Report type** – data sorting criterion;

**from.../through...** – start and end date of the reporting period;

**Customer/Vendor** – customer and vendor names.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the 'Report' combo box (the dialog box 'Create report') and click the 'Submit' button (see Fig. 137). The population of the drop-down list of this combo box is similar to the population of the table 'All reports'.



* Number of top areas	<input type="text"/>
Report	Rep.#: 1265, Sort by minutes, Top 25, Total - MERA.RU, 2006-01-
<input type="button" value="Submit"/>	

**Fig. 137** Opening a previously generated report

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.9

#### CUSTOM REPORTS

This object allows the operator to create customized reports by applying different filtering and sorting criteria to the CDRs available in the DB.

## Create report

* Report type	ASR by Customer
* From	2008-January-15 00:00:00
* Through	2008-January-15 15:23:37
filter by Customer	
include child records	<input type="checkbox"/>
filter by Vendor	
include child records	<input type="checkbox"/>
Area	
Origination equipment (ip:port)	
Termination equipment (ip:port)	
Time zone	
Report	

Fig. 138 Creating a customized report

To generate a customized report specify the following information in the 'Create report' dialog box (the fields marked with an asterisk are required fields):

**\*from/\*through** – use these controls to specify the period for which you want to generate a report;

**DST number used for routing** – called party number after the "IN DST translate" modification but before the "OUT DST translate" modification (see section 5.2.1), i.e. the destination number as it was used by TMngr for call routing. Using the metacharacter "%", whose function is similar to the function of the comparison operator "Like", you can enter patterns of destination numbers in this field. For example, in case you enter the pattern "123%", the report will include information only about calls involving destination numbers beginning with "123".

**\*Group DST numbers by first N digits** – you can use this control to define how CDRs should be grouped in the report. For example, if you select "3" all the calls to the numbers beginning with the same three digits will be represented by a single line in the resulting report. This parameter is valid only if the 'DST number used for routing' option is selected in one of the fields "Group order" (see below).

**\*Customer** – select the name of the customer from the drop down list of this combo box;

**\*Vendor** – select the name of the vendor from the drop down list of this combo box;

**Area** – select the area name from the drop down list of this combo box;

**Minimum duration/Maximum duration** – enter the minimum and maximum duration of calls to be included in the report;

**Disconnect code** – use this combo box to define the disconnect code for the calls to be included in the report;

**Origination equipment (ip:port) /Termination equipment (ip:port)** – enter the IP address and port of the origination/termination equipment. The use of the metacharacter "%" is also possible in these fields.

**Origination equipment/Termination equipment** – select the names of the origination/termination devices from the drop down lists of these combo boxes;  
**\*Group order** – define sorting criteria for the generated report and include the following options:

- **DST number used for routing**
- **Customer**
- **Vendor**
- **Area**
- **Disconnect code**
- **Source IP**
- **Destination IP**
- **Source equipment**
- **Destination equipment**

Define one or several sorting criteria keeping in mind that the higher is the number of the criterion the lower is its precedence. The figure below presents an excerpt of the report with the options 'Area' and 'Customer' selected as the first and second sorting criteria, respectively.

ID	Area	Customer	Total calls	Successful calls	duration (s)
1781	AFGHANISTAN	01.123   Customer 01.123	1	1	3
1781	AFGHANISTAN	01.138   Customer 01.138	1	1	3
1781	AFGHANISTAN	01.144   Customer 01.144	1	1	3
1781	AFGHANISTAN MOBILE AWCC	01.123   Customer 01.123	1	0	0
1781	AFGHANISTAN MOBILE AWCC	01.135   Customer 01.135	1	1	3
1781	AFGHANISTAN MOBILE AWCC	01.165   Customer 01.165	3	3	9
1781	AFGHANISTAN MOBILE AWCC	01.2102   Customer 01.2102	2	2	6
1781	AFGHANISTAN MOBILE AWCC	01.2140   Customer 01.2140	1	1	3
1781	AFGHANISTAN MOBILE AWCC	01.2163   Customer 01.2163	2	2	6
1781	AFGHANISTAN MOBILE ROSHAN	01.125   Customer 01.125	2	2	6
1781	AFGHANISTAN MOBILE ROSHAN	01.129   Customer 01.129	1	1	3
1781	AFGHANISTAN MOBILE ROSHAN	01.183   Customer 01.183	6	6	18
1781	AFGHANISTAN MOBILE ROSHAN	01.185   Customer 01.185	2	2	6

**Fig. 139 Customized report**

When finished with filling out the form click the Submit button.

Below the dialog box you will see the report and a table with a list of the previously generated reports.

*Generation of customized reports can take some time. Remember that the more CDRs are involved and the more sorting criteria you apply, the longer it will take the System to generate a report (especially when filtering or sorting by geographic areas is required).*

In addition to the data selected as sorting criteria, the report will comprise the following statistical data:

- Total calls** – total number of calls;
- Successful calls** - number of successful calls;
- Total duration** – total duration of calls in seconds;
- ASR** – ASR value;
- Average duration** – average duration of call sessions;
- Average PDD** – average PDD value;
- First call** – date and time of the first call that took place during the reporting period;
- Last call** – date and time of the last call that took place during the reporting period.

**Table “All reports”**

All reports		
<input type="checkbox"/>	ID	Description
<input type="checkbox"/>	1706	Rep.#: 1706, All customers - MERA.RU, etc., 2006-01-01 00:00:00 - 2007-01-01 00:00:00
<input type="checkbox"/>	1707	Rep.#: 1707, MERA.RU - All vendors, etc., 2006-01-01 00:00:00 - 2007-01-01 00:00:00
<input type="checkbox"/>	1721	Rep.#: 1721, All customers - All vendors, etc., 2006-01-01 00:00:00 - 2007-01-01 00:00:00
<input type="checkbox"/>	1722	Rep.#: 1722, MERA.RU - All vendors, etc., 2000-01-01 00:00:00 - 2000-01-01 00:00:00

**Fig. 140 Table of customized reports**

This table presents information about previously generated reports, such as report description, generation date, sorting criteria, etc.

The operator can view previously generated reports. For this, select the report of interest from the drop-down list of the ‘Report’ combo box (the dialog box ‘Create report’) and click the ‘Submit’ button (see Fig. 141). The population of the drop-down list of this combo box is similar to the population of the table ‘All reports’.

Group order (9th)

Report Rep.#: 1761, MERA.RU - All vendors, etc., 2006-01-01 00:00:00 -

**Fig. 141 Opening a previously generated report**

Unused and obsolete reports can be removed from the table. For this, invoke the pop-up menu and select the appropriate command.

### 5.8.10 REPORTS FOR RATE PLAN PREPARATION

The object **Rates and statistics** allows the operator to view termination rates charged by vendors for different destinations together with statistics for the dial peers. Based on these data the operator can decide on the pricing policy with respect to customers.

The screenshot shows a software interface with three main sections:

- Show rates and statistics:** A configuration panel with the following fields:
  - Include "Enabled":
  - Exclude "Blocked":
  - Routing group: [Dropdown menu]
  - Group dial peers by routing group:
  - Area: [Dropdown menu]
  - Prefix pattern: 1234
- Report:** A table with the following data:
 

Prefix	Area	Vendor	Routing group	Max/Min rate (domestic currency)	Rate (domestic currency)
<input type="checkbox"/> 1234	UNITED STATES OHIO	01   Your Company		.11255   .11255	.11255
<input type="checkbox"/> 1234	UNITED STATES OHIO	empty record			
- Create customer-facing report:** A section with an "OK" button.
- Customer-facing report:** A table with the following data:
 

ID	Prefix	Area	Customer rate
<input type="checkbox"/> 114	1234	UNITED STATES OHIO	.256

**Fig. 142 Rates and statistics**

The object comprises four elements:

**Show rates and statistics** – a dialog box that serves for defining the dial peer filtering criteria. Note that the field **Prefix pattern** allows the use of the metacharacters “%” and ‘\_’ (see [Appendix A](#)).

**Report** – a table that shows a list of dial peers requested by the operator. The dial peers (from 1 to 5) are grouped by prefixes. There is a record with an empty **Vendor** field beneath every group (see Fig. 142). Using this record the operator can specify the rate at which the operator will charge customers (see Fig. 143). If more than 5 dial peers with the same prefix satisfy the specified criteria, the System displays a group of 5 least costly dial peers.

**Create customer facing report** – a tool for generation of a price list that can be later exported into a CSV file and sent to customer.

**Customer facing report** – a table that includes generated price lists.

Report	
Prefix	1234
Area	UNITED STATES OHIO
Customer rate	0.0245
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

Fig. 143 Defining the customer rate

## 5.8.11 CHARTS

Use the 'Chart' dialog box to create a graphical representation of statistical data.

Chart	
* Data type	Total calls
* Type of chart	Bars
* Width (pxls)	400
* Height (pxls)	300
* Vendor	Top 10 - Total calls
* X axis graduation value	10
* Graduation unit	Hour
* From (Y-M-D h:m:s)	2007-November-03 00:00:00
* Through (Y-M-D h:m:s)	2007-December-03 00:00:00
<input type="button" value="Submit"/>	

Fig. 144 Configuring graphical representation of statistics

To display a graph fill the following fields of the 'Chart' dialog box (the fields marked with an asterisk are required fields):

**\*Data type** – use the drop-down list of this combo box to select the data of interest. The list items include:

- Total calls – total number of calls transferred to the termination partner
- Profit – revenues gained from terminating traffic via the Vendor's DPs
- ASR – ASR average for the routing paths offered by the Vendor
- ACD – session duration average for calls terminated through the Vendor (seconds)

**\*Type of chart** – the drop-down list offers the following options:

- Bars
- Lines
- Line-points
- Area
- Points
- Pie

- Stackedbars
- Squared

\***Width** – specify the width of the plot area in pixels;

\***Height** – enter the plot area height in pixels;

\***Vendor** - select the name of the termination partner (Vendor) from the drop-down list. The list also contains two alternate options for graphical representation:

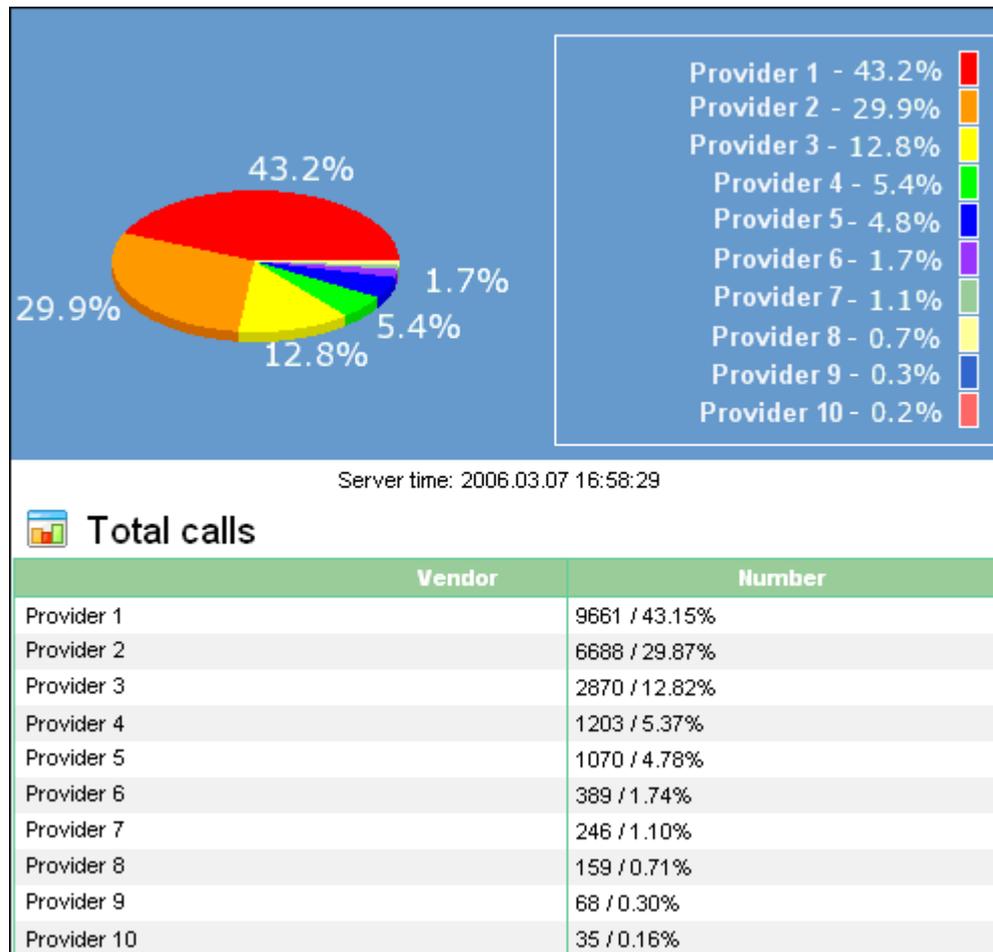
- Top 10 – Total calls – top 10 Vendors that received biggest amounts of calls for termination
- Top 10 – Profit – top 10 Vendor’s termination through which ensured most gains

\***X axis graduation value** – specify the size of the chart X axis graduation value, that is a plotting step for the future graph (i.e. 1, 2, 3, .... 5 etc.);

\***Graduation unit** – select a measurement unit for the graduation value configured above;

\***from.../\*through...** – Specify the start and end date for the period the plot is expected to cover.

When through with data entering, click the **OK** button to display a graphical representation of the statistics.



**Fig. 145 Graphical and tabular representation of total-calls statistics**

## 5.9

## CATEGORY GLOBAL SETTINGS



The category '[Global settings](#)' allows management of various System configuration parameters.

Table 22 presents an overview of objects comprising the category "Configuration".

**Table 22 Objects of the category Configuration**

Object	Description
<b>System global settings</b>	Presents a listing of the TMngr global configuration parameters
<b>GUI settings</b>	Allows configuration of the web-interface
<b>Disconnect codes</b>	Provides reference about call disconnect codes
<b>Global area names</b>	Provides information about correspondence of area codes to geographic areanames.
<b>ASR notification thresholds</b>	Presents the names of geographic areas and allows the operator to set the ASR notification thresholds for the areas.
<b>Global LAR settings</b>	Intended for configuration of the LAR (Look Ahead Routing or re-routing) functionality.

<b>USA states NPA-NXX</b>	Provides information about correspondence between the names of USA states and NPA-NXX codes used within those states.
<b>Calling party category</b>	Provides the list of Calling party categories and allows the SysO to set up additional charges for different categories of calling users.
<b>Disconnect sound options</b>	Allows the operator to configure sound files played to the calling party depending on the received call disconnect code.
<b>DNS servers</b>	Presents data for DNS servers.
<b>RADIUS servers</b>	Presents information about the RADIUS servers the System interoperates with.
<b>Mail servers</b>	Allows the operator to configure the mail server(-s) to be used for sending System notifications.
<b>Data import</b>	Allows the operator to import data into the DB.
<b>Web password settings</b>	Allows the operator to configure web-access password policies.

### 5.9.1 SYSTEM GLOBAL SETTINGS

The view 'System global settings' presents a list of the TMngr configuration parameters.

The screenshot shows a web interface titled 'System global settings'. At the top, there is a 'Switch to edit mode' button, a 'Rows:' section with navigation arrows and a dropdown set to '1-25', and a 'Rows on page:' section with a dropdown set to '25'. Below this is a table with columns: Name, Value, Unit, Min value, and Max value. The table contains 17 rows of configuration parameters, each with a checkbox in the first column.

	Name	Value	Unit	Min value	Max value
<input type="checkbox"/>	Native currency	USD			
<input type="checkbox"/>	DNS server IP	192.168.132.8			
<input type="checkbox"/>	DNS server timeout	1000	ms	0	5000
<input type="checkbox"/>	Number of calls for EMA calculation of Short ASR	10	calls	1	16
<input type="checkbox"/>	Number of calls for EMA calculation of Long ASR	20	calls	1	16
<input type="checkbox"/>	Number of calls for EMA calculation of ACD	20	calls	1	
<input type="checkbox"/>	Number of calls for EMA calculation of PDD	40	calls	1	
<input type="checkbox"/>	Number of calls for EMA calculation of QoS	1800	sec.	0	
<input type="checkbox"/>	Number of calls for EMA calculation of Profitability	20	calls	1	
<input type="checkbox"/>	Average profitability period	600	sec.	1	
<input type="checkbox"/>	Global ASR notification threshold	0.51	%	0	1
<input type="checkbox"/>	Global ACD notification threshold	5	sec.	0	
<input type="checkbox"/>	Global PDD notification threshold	5	sec.	0	
<input type="checkbox"/>	Low disk space notification threshold	1000	MB	0	
<input type="checkbox"/>	Notifications accumulation time	10	sec.	0	
<input type="checkbox"/>	Interval between recurrent notifications for the same event	10	sec.	0	

Fig. 146 Table of System global settings

The parameters in the table include:

---

**Native currency** – enter the ISO 4217 three-letter code for the SysO’s domestic currency;

**DNS server** – the IP address of the DNS server. You can enter several IP addresses in this field delimiting them with semicolons. The System polls all servers at once and uses the one that responds first. All other responses are neglected.

**DNS Timeout** - maximum wait time for response from the DNS server(-s)

**Duration of latest calls for EMA calculation of QoS** – duration of latest calls used in calculating EMA-based QoS;

**Number of calls for EMA calculation of Short ASR** – number of calls used in calculating EMA-based Short ASR. Short ASR is an additional parameter showing quick recent fluctuations. Usually it is recommended to keep the number of calls used for calculation of Short ASR 3-5 times lower than the number used for Long ASR;

**Number of calls for EMA calculation of Long ASR** – number of calls used in calculating EMA-based Long ASR. Long ASR is the main ASR parameter in the system used by default in all ASR-based restrictions;

**Number of calls for EMA calculation of ACD** – number of calls used in calculating EMA-based ACD;

**Number of calls for EMA calculation of PDD** – number of calls used in calculating EMA-based PDD;

**Number of calls for EMA calculation of average call interval** - number of calls for calculation of the average interval between calls on dial peers

**Number of calls for EMA calculation of Profitability** – number of calls to be used in EMA-based profitability calculation;

**Average profitability period** – this parameter serves to define the time (in seconds) to be considered during average profitability calculation;

**Global ASR notification threshold** – If the overall system ASR drops below the configured notification threshold, the System generates an e-mail alert (for more detailed information about notifications refer to section 5.1.4);

**Global ACD notification threshold** – In case the overall system ACD value drops below the configured notification threshold, the System generates an e-mail notification (for more detailed information about notifications refer to section 5.1.4);

**Global PDD notification threshold** – In case the overall system PDD value exceeds the configured threshold, the System generates an e-mail notification (for more detailed information about notifications refer to section 5.1.4);

**Low disk space notification threshold** – define the notification value. In case free disk space drops below the specified value, the System generates an e-mail alert (for more detailed information about notifications refer to section 5.1.4);

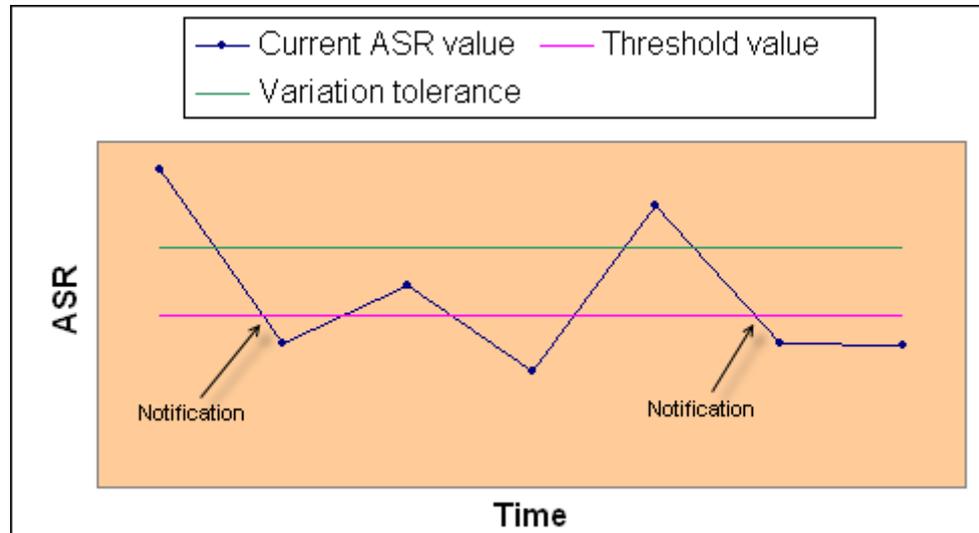
**Notifications accumulation time** – to avoid the wasteful use of the server’s computing power and a flood of notification emails the notification process is organized so that the System does not send individual notifications as the events causing them occur. Rather, the System forms message packages consisting of notifications that have piled up for some time. 30-60 seconds would be the optimum length for such pile-up period.

**Interval between recurrent notifications for the same event** – the interval during which no notifications are sent if there occurs the same event, that triggered a notification less than this interval ago. The recommended interval length depends on how often the SysO would like to get the updates on the same events. Starting from 600 to 3600 seconds (10-60 minutes) might be a good compromise;

**Interval between grouped notifications** – sets a time interval between grouped notifications in minutes;

---

**Notifications threshold tolerance** – variation tolerance for ASR, ACD, and PDD values expressed in fractions of the threshold values (e.g. 0.05 corresponds to 5%). This parameter is used to prevent the System from generating repetitive notifications when ASR, ACD and PDD values vary about the threshold values (see section 5.1.4). You can also use this parameter to prevent the System from generating repetitive TS notifications “TM006, DBMS overload”.



**Fig. 147 Alert tolerance**

**Group similar notifications** – when set to ‘1’, this parameter makes the System group notifications about same-type events;

**Adaptive capacity ASR threshold** – acceptable ASR minimum for DPs. If the actual ASR drops below the configured minimum the System decreases the DP’s adaptive capacity;

**Global maximum call duration** – global parameter, which sets maximum duration for all calls handled by the System;

**Minimum successful call duration** – enter the minimum call duration of calls to be considered successful;

**Maximum routes number** – define the maximum number of routing options (DPs) returned to Traffic Switch. Valid values: from 1 through 1000. Default value: 6. Note that only DPs are counted, not devices. Thus, if one of the DPs has 5 pieces of equipment in its Equipment group, total number of routes (or different IPs) tried will be  $5+5=10$ .

---

*Changing the default value of the parameter ‘Max routes number’ to a higher value can adversely affect the System performance.*

---

**Registration TTL** – serves to define the time interval for a full-scale re-registration of the devices registered with the System;

**Reservation period** – define the time interval, for which the System will calculate the amount to be reserved in the customers’ accounts to make sure that the currently active calls would not deplete the account below the Min. balance;

**Maximum number of rows in Application log** – maximum allowable number of records in the table of the application log. After the limit is reached, new records will overwrite the obsolete records;

---

**Logging block size** – define the size of blocks of lines written to the Application log. The parameter valid values are integers ranging from 1 through 500. This parameter is used by the MERA support team to optimize System performance.

**Data storage period (Web activity log)** – define the data storage period for the web activity log;

**Data storage period (Notification log)** – define the data storage period for the notification log;

**Data storage period (Login history)** – define the data storage period for the login history;

**Application log reset flag** – enter 1 for the System to remove all rows and truncate the table of the application log when the allowable number of rows is reduced. This parameter is used by the MERA support team to optimize System performance.;

**Global SRC number translation pattern** – enter a regular expression to determine the source number translation rule that will be applied to all calls;

**Global DST number translation pattern** – enter a regular expression to determine the destination number translation rule that will be applied to all calls;

**CDRs backup frequency** – serves to set a CDRs backup interval. Valid values: ‘d’ or ‘D’ (daily) and ‘w’ or ‘W’ (weekly). CDRs backup procedure is launched every day or every Monday (depending on the configured frequency) at 2.00 a.m. when traffic is slack. Backup CDRs are saved to the directory /opt/apache2/htdocs/export/ as CSV files. The names of backup files have the same format as described in section 5.6.5). After the backup procedure is complete the user with the record ID defined in the field **ID of user responsible for CDRs backup** is sent a notification with the procedure results and description of errors, if any. Note that the user’s e-mail should be configured in the table of contacts (**Users > Contacts**).

**ID of user responsible for CDRs backup** – unique identifier of the user with the role of Super Administrator whose settings (language and contacts) should be taken into account during CDRs backup. This parameter is mandatory for the CDR backup and removal functionality.

**Dial peer storage period** – serves to define keeping time for obsolete dial peer records in months. Null or ‘0’ prevents records unloading.

**Destination storage period** – serves to specify keeping time for obsolete destination records in months. Null or ‘0’ prevents records unloading.

**User ID for Backup raw DP and Destinations** – serves to define the ID of the system user whose privileges, language settings and contact data will be used when unloading obsolete DP and destination records.

On the 10th day of each month at 01:30 a.m. the System launches a script that removes obsolete records from the tables of dial peers and destinations and saves them to CSV files in the directory /opt/apache2/htdocs/export/. The names of files have the following format:

*BackUp\_<table\_name>.<procedure\_start\_date\_and\_time>.csv*

When unloading is complete the user with the ID specified in the configuration parameter **User ID for Backup raw DP and Destinations** gets two email notifications with information about unloaded DP and destination data. In case the procedure fails, the same user receives an appropriate unloading failure notification. Note that the user’s e-mail should be configured in the table **Contacts** (see 5.1.5.8), and the user is expected to have the role of Super administrator or Administrator. If this parameter is not defined, the functionality is disabled.

**Synchro node usage mode** – use this parameter to define the synchro node usage mode.

Valid values:

- 0 – the synchro node is not used
- 1 (default) – if the synchro node fails, the System will continue to handle calls

- 2 – if the synchro node fails, the System will reject all calls with LDC 57 (unique code 65593) “Synchro node transaction aborted”

**CDRs storage period** – positive integer showing for how many months obsolete CDRs should be kept in the DB. To preclude the possibility of accidental removal of CDRs that have not been backed up, this parameter is valid only when the parameter **CDRs backup frequency** is defined. The CDRs removal procedure starts at 02.00 a.m. on the first day of every month or after the backup procedure is complete, if it is scheduled for the day. All the CDRs that have been kept for longer than the configured number of full months are removed from the DB. After CDRs removal is complete the user whose record ID is defined in the parameter **ID of user responsible for CDRs backup** is sent a notification with the procedure results and description of errors, if any.

---

*Remember that removed CDRs CAN NOT be restored!*

---

**Send looping alerts** – engages/disengages looping notification. Valid values:

- 0 – disengage call looping notification
- 1 (default) – engage call looping notification

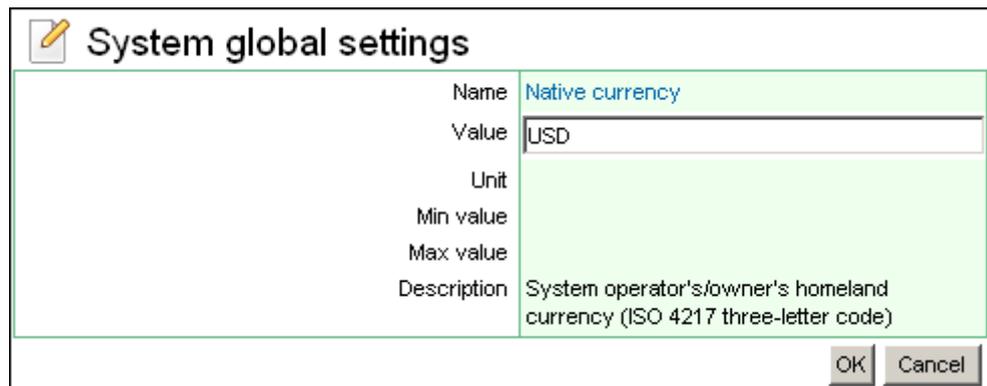
**Maximum number of loops per call** – maximum allowable number of loops per call. In case the configured number is exceeded, the dial peer that causes call looping is excluded from the next routing attempt to cease endless looping.

**Time zone** – this parameter serves to set the System time and is taken into account during creation of statistical reports. Value format: a string defining the time offset from Coordinated Universal Time (UTC). For example, “+02” (never “+2”!) or “-03:30”. Default value: +00.

**Call duration rounding** – use this parameter to define how the System will round duration of calls. Valid values:

- 0 (default) – call duration is rounded in accordance with mathematical rules
- 1 – call duration is always rounded up to the next second

To configure a parameter point the mouse to the desired records in the table view. Invoke the pop-up menu and select  **Edit**.

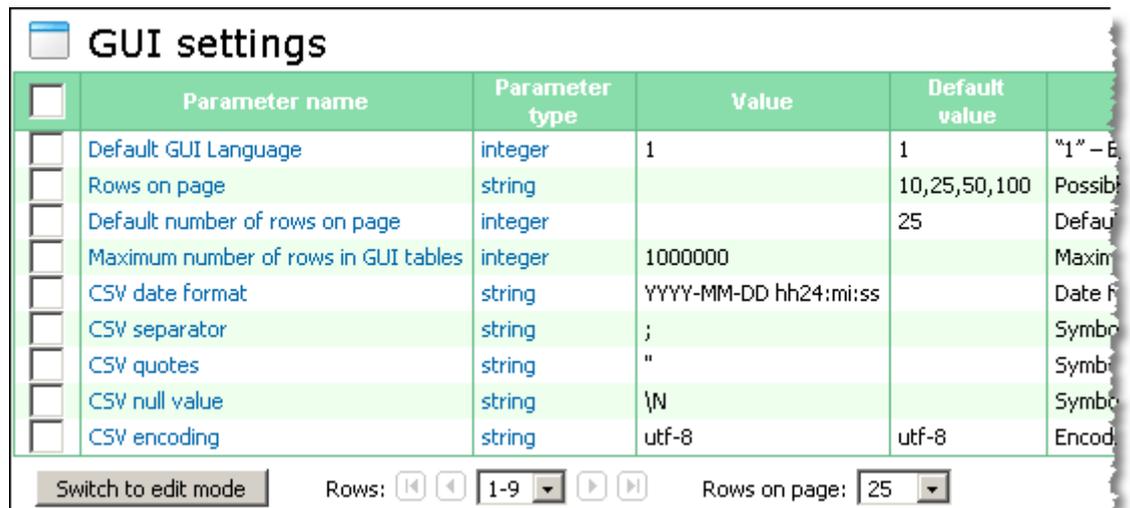


System global settings	
Name	Native currency
Value	USD
Unit	
Min value	
Max value	
Description	System operator's/owner's homeland currency (ISO 4217 three-letter code)

OK Cancel

**Fig. 148 Configuring System e-mail address**

Type the required parameter value in the edit field **Value** (see Fig. 148) and click the OK button. To discard the made changes click Cancel.



	Parameter name	Parameter type	Value	Default value	
<input type="checkbox"/>	Default GUI Language	integer	1	1	"1" – E
<input type="checkbox"/>	Rows on page	string		10,25,50,100	Possibl
<input type="checkbox"/>	Default number of rows on page	integer		25	Defau
<input type="checkbox"/>	Maximum number of rows in GUI tables	integer	1000000		Maxim
<input type="checkbox"/>	CSV date format	string	YYYY-MM-DD hh24:mi:ss		Date f
<input type="checkbox"/>	CSV separator	string	;		Symb
<input type="checkbox"/>	CSV quotes	string	"		Symb
<input type="checkbox"/>	CSV null value	string	\N		Symb
<input type="checkbox"/>	CSV encoding	string	utf-8	utf-8	Encod

Switch to edit mode      Rows: 1-9      Rows on page: 25

Fig. 149 GUI settings table

The table **GUI settings** allows the operator to customize the System web-interface with the help of the following parameters:

**Default GUI language** – serves define the default language of the web interface (1 – English; 2 – Russian);

**Rows on page** – serves to define the numbers populating the drop-down list of the **Rows on page** combo box;

**Default number of rows on page** – serves to define the default number of rows displayed on every page;

**Maximum number of rows in GUI tables** – serves to define the maximum number of table records displayed in GUI. In case the number of records in the DB exceeds the defined limit the user is advised to apply a filter to the table data. The parameter was implemented to facilitate the display of tables with large amounts of data.

**CSV date format** – define the date format to be applied to the exported data, for example YYYY.MM.DD.HHAM.MI.SS or DD.MM.YY.HH24.MI.SS, where:

YYYY – year in the Gregorian calendar (2006)

YY – two last digits of the year (06)

MM – month of the year between 01 (January) and 12 (December)

DD – day of the month between 01 and 31

HH – hours in the 12-hour format without AM/PM indicators

HHAM – hours in the 12-hour format with AM/PM indicators

HH24 – hours in the 24-hour format

MI – minutes

SS – seconds

You can use the following symbols as delimiters, when setting the date format: “.”, “:”, “-”, “-” or “white space”. The table below presents several examples of different date formats:

Format	Result
YYYY-MM-DD HH24:MI:SS	2006-12-11 13:50:09

YYYYMMDD HH24MISS	20061211 135009
DD.MM.YYYY HH.MI.SS	11.12.2006 01.50.09
DD.MM.YYYY HH24.MI.SS	11.12.2006 13.50.09

**CSV separator** – serves to define the symbol to be used to delimit data fields in exported CSV files;

**CSV quotes** – serves to enter the symbol that will enclose data fields in exported CSV files;

**CSV null value** – serves to enter the symbols to be used for null values in exported CSV files;

**CSV encoding** – you can use this parameter to define the encoding of exported data. For encoding conversion the System uses the UNIX iconv utility. The supported encodings for data export include but not limited to:

- utf-8
- utf-16
- windows-1251
- CP1251
- IBM284(Spanish)
- IBM297(French)
- KOI-8
- IBM273(German)
- IBM850(Portuguese)
- EBCDICES(Greek)

To configure a parameter, invoke the edit dialog box, type in the required parameter value, then click the **OK** button. To discard changes click **Cancel**.

### 5.9.3 DISCONNECT CODES

The table 'Disconnect codes' presents a listing of call disconnect codes. To quicken search of the necessary information you can use search filters. Refer to section 4.3.2 for information about the use of search filters.

<input type="checkbox"/>	Unique code	Protocol	Code	H.323 mapping	SIP mapping	Successful	
<input type="checkbox"/>	131182	H.323	110				Message with unr
<input type="checkbox"/>	131183	H.323	111		500		Protocol error, uns
<input type="checkbox"/>	131199	H.323	127				Interworking, unsp
<input type="checkbox"/>	262244	SIP	100				Trying
<input type="checkbox"/>	1048977	Traffic Manager	401	21	403		Rate plan service
<input type="checkbox"/>	1049076	Traffic Manager	500	111	500		Routing error
<input type="checkbox"/>	1049077	Traffic Manager	501	34	404		Route not found
<input type="checkbox"/>	1048576	Traffic Manager	0	0	200	Yes	OK
<input type="checkbox"/>	1048676	Traffic Manager	100	111	500		Unspecified error
<input type="checkbox"/>	1048677	Traffic Manager	101	111	400		Invalid request
<input type="checkbox"/>	1048776	Traffic Manager	200	21	403		Authentication err

Fig. 150 Table of call disconnect codes

---

The table presents the following information:

**Unique code** – the disconnect code number used in communication between the TS and the TMngr;

**Protocol** – the protocol of the disconnect code:

- H.323;
- SIP;
- Local MVTS;
- Local MVTM;

**Code** – call disconnect code;

**H.323/SIP mapping** – this columns present the disconnect codes, which will be sent to the calling or called parties, instead of local TS and TMngr disconnect codes, or, if configured, instead of the H.323 or SIP disconnect code received from the terminating party (code mapping). The equipment supportive of H.323 protocol will receive the code from the column **H.323 mapping**, the SIP devices will receive the code from the column **SIP mapping**;

**Successful** – when set to “Yes” this parameter indicates that the calls completed with this disconnect code should be considered successful during ASR evaluation. To set the parameter to “Yes” place the cursor over the record of interest, left-click to invoke the pop-up menu and select  **Edit** . Select the respective checkbox in the displayed dialog box and click the OK button.

**Reason** – disconnect reason.

You can also use the table of disconnect codes to map or substitute disconnect codes according to your preferences and needs. To map a code to another one, simply select the code of interest, switch to the edit mode and enter the required code in the appropriate field. When done click the **OK** button. The tool **Synchronize codes** located below the table will display a message informing about the quantity of rows affected by the change. It means that the TS’s internal table of disconnect codes needs updating for proper operation of the application. Click the **Submit** button under the tool for updating.

---

*Note: The code mapping functionality requires installation of the ‘mvts3g-sqlclient’ utility supplied in the TMngr installation packet.*

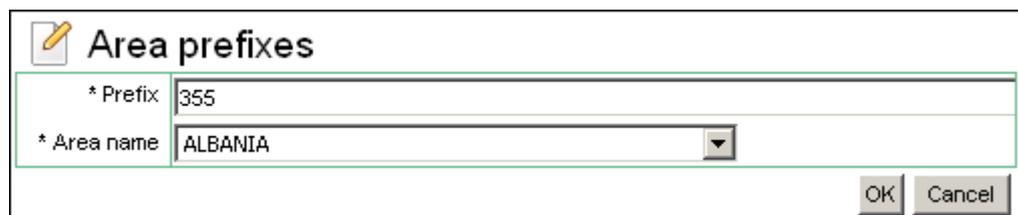
---

## 5.9.4

### GLOBAL AREA NAMES

The table of global area names provides the correspondence of area codes (prefixes) to names of geographic areas.

To add a new record, display the pop-up menu by left clicking the mouse over the table area and select  **Add** .



Area prefixes	
* Prefix	355
* Area name	ALBANIA

OK Cancel

**Fig. 151 Add area prefix dialog box**

Fill the edit boxes of the add-prefix dialog onscreen with pertinent data (the fields marked with an asterisk are required fields):

\***Prefix** – enter the prefix;

\***Area** – select the area name.

When through with filling out the configuration form, click  to submit the changes.

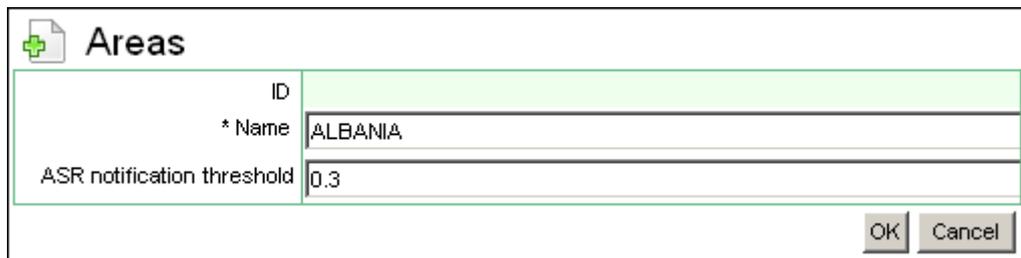
Alternatively, click  to discard the changes and return to the table of prefixes.

Select the appropriate items of the pop-up menu to edit or delete the selected table record.

## 5.9.5 ASR NOTIFICATION THRESHOLDS

The table of ASR notification thresholds presents the names of geographic areas. In addition this table allows the operator to set thresholds for the “Vendor ASR for a specific area is below the configured threshold” type of notifications (for more information about notifications refer to section 5.1.4). By default this value is set to 0.7 for all areas.

To add a new record to the table invoke the pop-up menu and select  **Add** .



ID	
* Name	ALBANIA
ASR notification threshold	0.3

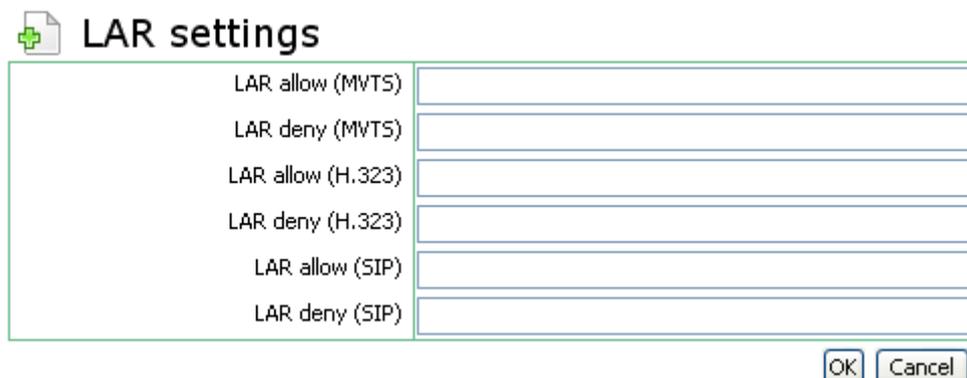
**Fig. 152 Add ASR notification threshold dialog box**

Enter the area name and ASR notification threshold (if required) in the appropriate edit fields and click **OK**. Your next step is to specify the prefix of the newly added area (see section 5.9.4).

To edit or delete a record from the table select the appropriate command on the pop-up menu.

## 5.9.6 GLOBAL LAR SETTINGS

This object is intended for configuration of the LAR (Look Ahead Routing, re-routing) functionality. With its help you can define the way the Traffic Switch acts depending on the call disconnect code received from the first termination device. Upon receipt of an allowed disconnect code Traffic Switch tries to establish a call via the next device within the group, otherwise the call is rejected.



LAR allow (MVT5)	
LAR deny (MVT5)	
LAR allow (H.323)	
LAR deny (H.323)	
LAR allow (SIP)	
LAR deny (SIP)	

**Fig. 153 LAR settings**

To add a list of allowed or restricted disconnect code, left click the ‘LAR settings’ table and select ‘Edit’ on the pop-up menu. In the displayed dialog box enter the code numbers either

only in the fields of allowed codes or only in the fields of restricted codes. At that, all the codes not specified in the fields of allowed codes are considered restricted, while the codes not specified in the fields of restricted codes are considered allowed. You can enter individual code numbers, as well ranges of numbers delimiting them with semicolons (for instance, 200-300;304;305;400-500). Reference information about call disconnect codes is presented in the table “Disconnect codes”, see section 5.9.3.

In addition to these parameters used for global configuration of the LAR function, there is a possibility to configure individual LAR settings for each termination device, see section 5.2.1. Individual LAR settings override the global ones.

### 5.9.7 USA STATES NPA-NXX

The table NPA (Numbering Plan Area) is used by TMngr to distinguish between interstate and intrastate calls within North America billed at different rates.

NPA	
Location	NPA
AL	334
AL	205
AL	256
AL	251
AR	870
AR	501

**Fig. 154 The table of NPA codes**

When a call with both source and destination numbers in the NANP (North American Numbering Plan) format arrives, TMngr analyzes the numbers to determine whether the call is intrastate or interstate.

The format of NANP numbers is as follows:

1-XXX-YYY-ZZZZ

where

1 – international country code

XXX – geographic numbering plan area (NPA code). There can be several NPA codes associated with the same USA state.

YYY – code of a particular switch within a telephone system (NXX code),

ZZZZ – last 4 digits of the subscriber’s number.

TMngr identifies the number as one belonging to the North American Numbering Plan when it either starts with 1 or begins with any other digit and comprises 10 digits.

Comparing the NPA codes of the source and destination numbers against the data presented in the table of NPA codes TMngr decides upon an appropriate choice of routing options, which can be one of the following:

- usual routing – regular routing procedure as described in section 3.3
- intrastate – intrastate routing, i.e. when the call is originated and terminated in the same state
- interstate – interstate routing, when the call is originated and terminated in different states
- indeterminate jurisdiction – this type of routing is applied in case when TMngr can not determine the state of the call origin by the NPA code of the source number.

Some carriers in United States charge for such calls differently as for Indeterminate jurisdiction calls. A call from, say, Paris to New York might be considered by such carriers as an Indeterminate jurisdiction call.

To make use of the NPA routing feature you should create and properly configure records of dial peers (see section 5.3.2).

## 5.9.8 CALLING PARTY CATEGORY

This object allows the SysO to allow or restrict access to services or apply additional charges for different categories of calling users.

*Currently this feature is supported only in case the SIP protocol is used on the incoming call leg.*

This feature is based on the use of a two-digit code (info digits) transferred in the `isup-oli` field of the INVITE message. The code identifies what kind of phone line a call is being placed from.

ID	Code	Category
1	00	Business or Residence
2	01	Multi-party line
3	02	ANI failure
4	06	Station Level Rating: (ex. Hotel call with no room identification)
5	07	Special operator handling required
6	10	Test call code
25	93	Private virtual network

Category	Rate plan
Private pay station	Mera Rate Plan2

Fig. 155 Calling party category

The object comprises two tables:

**Calling party category** – presents reference information about two-digit codes and their meaning;

**Rate plan** – presents information about what calling party categories (CPC) are allowed to use the services of particular rate plans. Rate plans are assigned to users in their authentication records (see section 5.1.2). Also, the table **Rate plans** (the category of objects **Origination**) comprises the field 'Verify calling party category'. When the field is set to 'Yes', on receipt of a call the System checks if the user's rate plan allows for the CPC declared in the INVITE message. For example, the System will reject a call from a payphone in case an appropriate record is not available in the table 'Rate plan' of the object 'Calling party category'.

---

To add a record to the table, invoke the pop-up menu by a left mouse click on the table records and select  **Add** . In the displayed dialog box, define the category and the rate plan with the help of the respective combo boxes. When done, click .

### 5.9.9 DISCONNECT SOUND OPTIONS

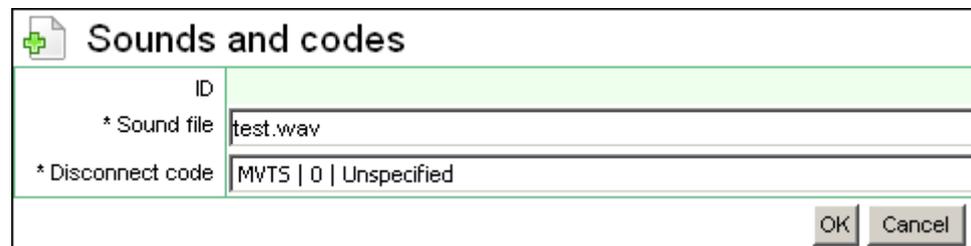
This object is intended for service providers dealing with retail customers. You can use this object to configure sound files played to the calling party depending on the received call disconnect code. For instance, you can configure the System to play the prompt “The number is invalid. Please check the number and try again”, in case the caller misdials the number. After the prompt is finished the System completes the call with the appropriate disconnect code.

The object “Disconnect sound options” comprises three tables:

- Sounds and codes** – presents information about sound files and disconnect codes associated with them;
- Sound groups** – presents information about configured sound groups;
- Sound group settings** – this table is intended for combining sound files into groups.

To configure the playback of sound files proceed as follows.

1. In the table “Sounds and codes”, define the name of the sound file and the disconnect code associated with it. Invoke the pop-up menu and select the Add option. Enter the appropriate information in the displayed dialog box and click . The record will be added to the table of similar records with a unique identifier the System assigns it.



Sounds and codes	
ID	
* Sound file	test.wav
* Disconnect code	MVT5   0   Unspecified

OK Cancel

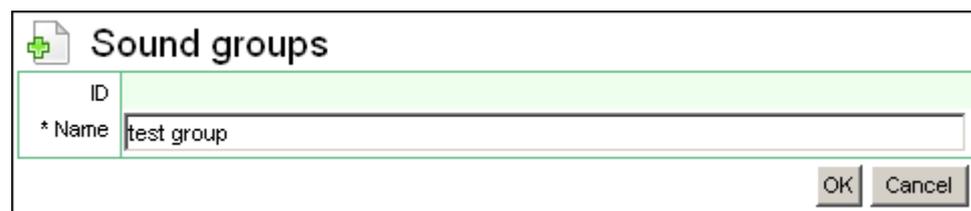
**Fig. 156 Sounds and codes**

---

*The path to the sound files is defined in the configuration file of the TS with the help of the parameter `rbtfilesdir` (the section `'media'`).*

---

2. Create a new sound group the sound file will belong to. For this, invoke the pop-up menu and select the Add option. Enter the name of the group being in the displayed dialog box and click .



Sound groups	
ID	
* Name	test group

OK Cancel

**Fig. 157 Sound groups**

The number of sound groups is not limited. For example, you can create several groups that will comprise sound files with prompts in different languages and to assign the groups to the users' devices according to their language preferences (see section 5.2.1)

3. Go to the table "Sound group settings" and define the group the sound file will belong to. For this, invoke the pop-up menu and select the Add option.



Fig. 158 Sound group settings

In the displayed dialog box, select the name of the group and the sound file ID assigned on creation. When done, click the  button.

## 5.9.10 DNS SERVERS

The table DNS server presents data for DNS servers *associated with ENUM registers*.

To add a DNS server record to the table, select  Add in the pop-up menu.

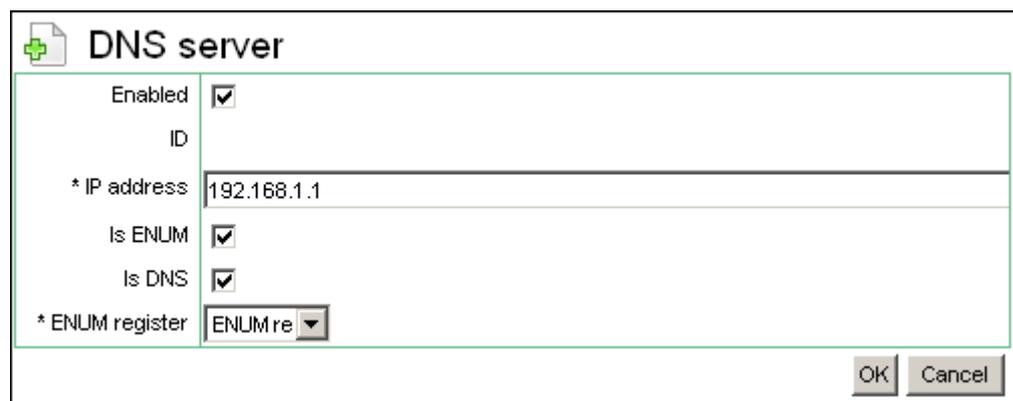


Fig. 159 Adding a DNS server record

Enter the following data in the displayed dialog (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active;

**ID** – unique server identifier, generated automatically;

**\*IP address** – enter the server's IP address;

**Is ENUM** – select the checkbox when the server is capable of mapping E.164 numbers to NAPTR records;

**Is DNS** – select the checkbox if the server being configured serves for mapping domain names to A/AAA records;

**\*ENUM register** – specify the ENUM register to which the DNS server being configured refers.

When done, click the **OK** button.

## 5.9.11 RADIUS SERVERS

This object is intended for configuration of connections to RADIUS servers in case of the use of external billing and accounting systems.

The object comprises the following elements:

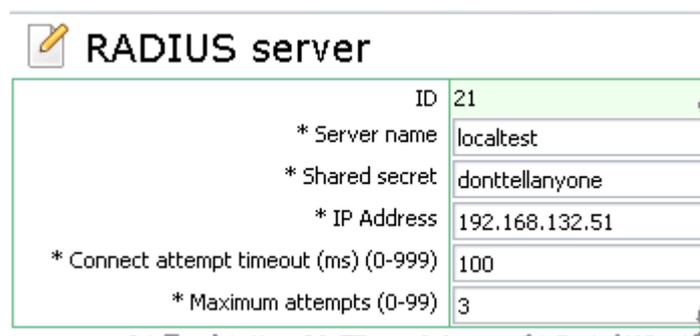
the table **RADIUS server** – stores the information required for connection to RADIUS servers;

the table **Access to RADIUS servers** – allows the operator to control users access rights to different RADIUS servers;

the table **Test Radius** – allows the operator to shape test RADIUS packets and

the tool **Send message** to be used for sending test RADIUS packets.

To add a record for a RADIUS server, left click the mouse over the table RADIUS server and select  **Add** on the pop-up menu.



	ID
* Server name	localtest
* Shared secret	donttellanyone
* IP Address	192.168.132.51
* Connect attempt timeout (ms) (0-999)	100
* Maximum attempts (0-99)	3

**Fig. 160 Adding a RADIUS server record**

Fill out the displayed dialog box. The fields marked with an asterisk are required fields.

**\*Server name** – enter the name of the RADIUS server;

**\*Shared secret** – enter a coding key (according to the ‘shared secret’ standard) for communication with the RADIUS server;

**\*IP address** – specify the IP address of the RADIUS server. The default port for accounting is 1813. If you wish to define some other port, enter it dividing from the IP address with a colon;

**\*Connect attempt timeout** – define the length of the wait period for response from the RADIUS server (milliseconds);

**\*Maximum attempts (0-99)** – enter the maximum number of attempts for connection with the RADIUS server.

Click  to add the new record to the table.

Your next step is to define the users (at the organizational level) that will have access to this RADIUS server.

For this, left click the mouse over the table **Access to RADIUS servers** and select  **Add** on the pop-up menu. In the displayed dialog box select the required company name and the name of the RADIUS server. This done, click the  button to add the new record to the table.

## Test Radius

Each record in this table is a specific packet attribute included in the test packet. By adding or deleting records to/from the table, you can shape any type of RADIUS packets as need may be provided the designed packets are in compliance with appropriate RFCs.

Once the test packet is ready, switch to the **Send message** tool, select a RADIUS server of interest and a type of message. This done, click the **Submit** button. A line will appear under the tool displaying the test result.

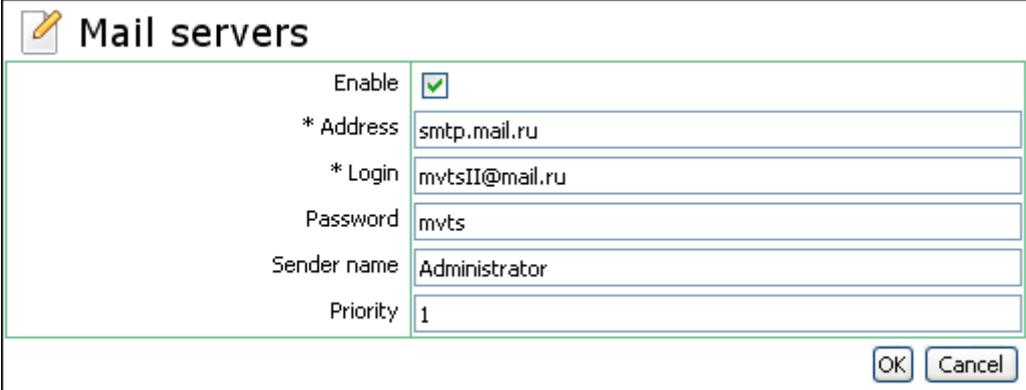
**Note:** The testing functionality requires installation of the ‘mvts3g-sqlclient’ utility supplied in the TMngr installation package.

## 5.9.12 MAIL SERVERS

This object allows the operator to configure the mail server(-s) that will be used for sending System notifications. The object comprises two elements:

- the table **Mail servers** representing a list of configured servers and
- the tool **Send mail** that allows the operator to send test notifications.

To add a mail server record to the table, select  **Add** in the pop-up menu.



Enable	<input checked="" type="checkbox"/>
* Address	smtp.mail.ru
* Login	mvtsII@mail.ru
Password	mvts
Sender name	Administrator
Priority	1

OK Cancel

**Fig. 161 Adding a mail server record**

Enter the following data in the displayed dialog box (the fields marked with an asterisk are required fields):

**Enabled** – select the checkbox to make the record active;

**\*Address** – enter the server’s IP address or its DNS name;

**\*Login** – enter a login name in the format “login@domainname”. You can also enclose the login in angle brackets required by some of the mail servers;

**Password** – enter a password, if necessary;

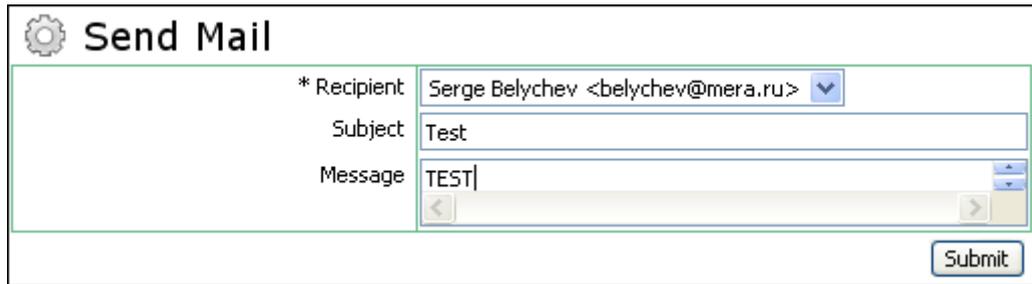
**Sender name** – enter the name that will be used in the field “From” of the System notifications;

**Priority** – you can use this field to set the priority of mail servers configured in the DB. The lower is the number the higher is the priority. In case the first server on the list fails, the System uses the next server on the list.

Click the **OK** button to add the record to the table.

When done with configuring the mail servers, you can use the **Send Mail** tool to test the notification mechanism.

---



**Fig. 162 Preparing a test notification**

Select a recipient of the test message from the drop-down list of the combo box **\*Recipient** (the list is populated by the records available in the table **Contacts**, see section 5.1.5.8).

Type in the message subject (max. 256 characters) in the field **Subject**, then enter an arbitrary text (max. 4000 characters) in the text field **Message** and click the **Submit** button to send the message.

### 5.9.13 DATA IMPORT

This object allows you to import data into the DB.

You can import data into the following tables:

- **Account**
- **ASR notification thresholds**
- **Global area names**
- **Customers/Vendors**
- **Dial peer**
- **Equipment groups**
- **Equipment**
- **Web authentication**
- **Customer authentication**
- **Routing groups**
- **Rate plans**
- **Destinations**

The object organized as a wizard with a four-step procedure.

#### Step 1

**Load file**

\* From file: D:\account\_2008\_02\_1 063op...

\* To table: Account

Column sequence: template

\* Separator: ;

Include headers:

\* Charset: utf8

\* Date format: yyyy-mm-dd hh24:mi:ss

\* Set of unique columns: "Account name", "Customer/Vendor"

Template: ./x-tm-data-import/template/accounts.csv

Load

**Fig. 163 Data import. Step 1**

In step 1 you define the following data (the fields marked with an asterisk are required fields):

\***From file** – click **Browse** and locate the source file;

\***To table** – select the target table;

**Column sequence** – select the required sequence of columns. This parameter has the following options:

- if nothing is defined, the wizard will use the default column layout, that can be obtained by exporting the needed table to a .csv file through the menu;
- **template** – with this option selected the System will use the column layout of the template file;
- **custom** – the list of sequences created and saved by user.

\***Separator** – define the separator used to delimit data in the source file;

**Include headers** – select this check box if the source file contains column headers. This will instruct the System to ignore the first row of data during import.

\***Charset** – select the type of encoding used in the source file;

\***Date format** – use this control to define the date format to be applied to the imported data;

\***Set of unique columns** – this field shows the list of columns checked for uniqueness during import;

**Template** – by clicking this hyperlink you can download a template CSV file for import to the selected table.

When done, click the **Load** button. If the file contains disallowed symbols you will be displayed with the appropriate error message. If the file is correct you will be displayed with the second wizard page with information about the number of loaded rows and a hyperlink to the SQL\*loader log file.

## Step 2

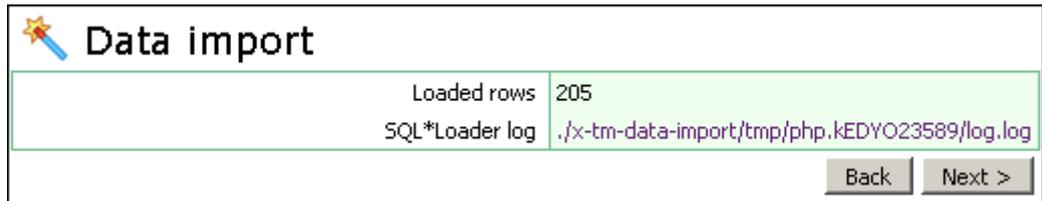


Fig. 164 Data import. Step 2

Click the **Next** button to continue.

### Step 3

In step 3 you can re-arrange the columns so that they correspond to the sequence of imported data. Use the **◀** and **▶** buttons in column headers to move them to the leftmost or rightmost position or click the header name, drag it to the required position and click again to insert it.

The customized column order can be saved for further use. For this, click the **Save sequence** button and enter the layout's name in the **Save column sequence** dialog box.

To delete unnecessary sequences click the **Delete sequence** button and select the needless layout's name in the **Delete column sequence** dialog box.

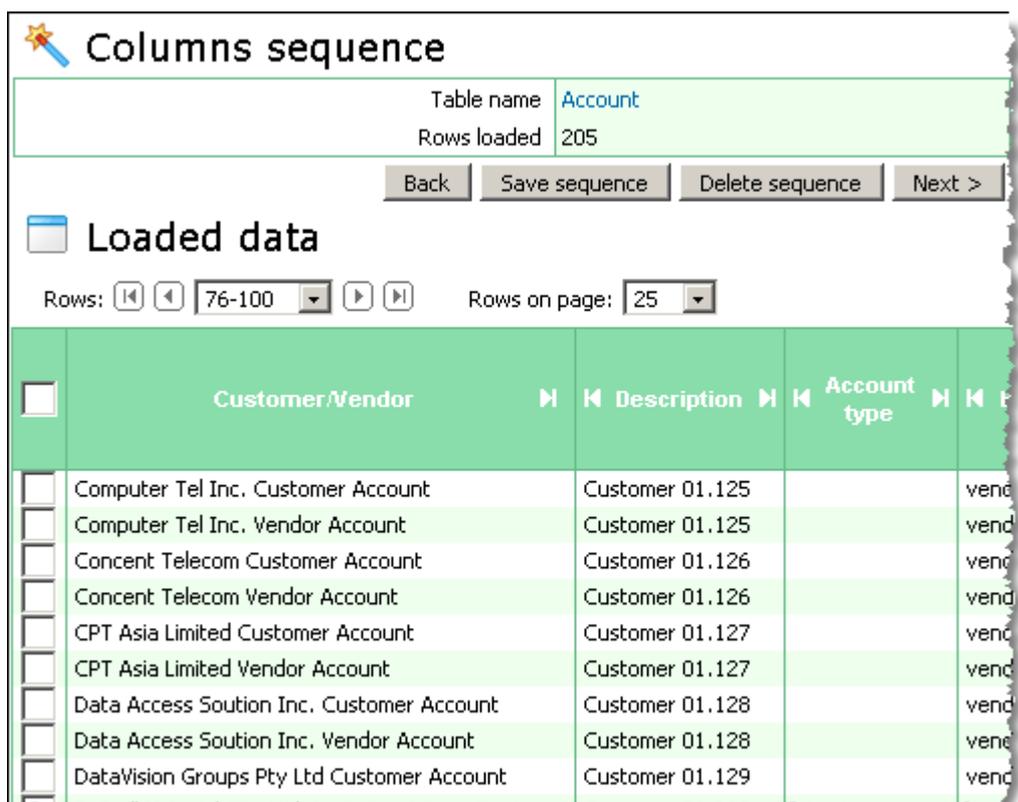


Fig. 165 Data import. Step 3

When done, click the **Next** button. The system will save the current arrangement of columns for further use (with the name of the sequence added to the drop-down list of the **Column sequence** combo box on the first page of the wizard), delete unnecessary sequences and check the validity of imported data. The validity check may take some time if the amount of data is large.

Note that if the System detects invalid values in fields with predetermined values, it automatically resets them to default values. For example, if by mistake you entered “2” or “Ywss” for the **Notify** parameter of the table **Accounts** that requires “0” (or “No”) or “1” (or “Yes”), the System will reset this value to the default “0”.

#### Step 4

Screen 4 of the wizard presents information about imported data including:

- Target table
- Total number of imported records
- Number of new records
- Number of updated records
- Number of records ready for insert
- Number of records ready for update
- Number of duplicated records, duplicated records will not be uploaded
- Number of erroneous records, such records also will not be uploaded
- RegExp column – see below

The screenshot shows the 'Import data' wizard interface. At the top, there is a summary section with the following data:

Table name	Account
Rows loaded	205
Inserted rows	0
Updated rows	0
Rows ready for insert	0
Rows ready for update	0
Rows with error	205
Duplicated rows	0
RegExp column	

Below this is the 'Data for import' section, which includes a table with columns: Error, Ready for, ID, Account name, Customer/Vendor, Description, and Account t. The table contains three rows, all of which are highlighted in red, indicating errors. The first row shows 'MERA' as the account name and 'vendor account' as the description. The second row shows 'MERA' as the account name and '01 | MERA' as the customer/vendor, with the description 'customer account'. The third row shows 'MERA' as the account name and 'vendor account' as the description.

Fig. 166 Data import. Step 4

The table **Data for import** is a temporary table with data imported from the CSV file in Step 1. In addition to the columns that constitute regular tables, the table **Data for import** contains the column **Errors** that provides information on detected errors. Records with erroneous data are highlighted in red.

You can add new records to the temporary table or edit the existing ones in the same way as you do it in regular tables. Click the **Import** button to move the data to the regular table.

---

It is also possible to use regular expressions for defining values in the table columns. This may be instrumental when you need to create multiple almost identical records, for example, several dial peer records that differ only by the number prefix (value of the column **Prefix**) (000, 001, 002, 003, 004....997, 998, 999).

To do this, perform the following steps:

1. Create a dial peer record for multiplication in the table **Data for import** and enter [0-9][0-9][0-9] in the field **Prefix**.
2. Select the column **Prefix** from the drop-down list of the **RegExp column** combo box.
3. Click the **RegExp** button. The System will create 1000 dial peer records with prefixes from 000 through 999.

This procedure is applicable to all table columns whose names populate the drop-down list of the **RegExp column** combo box.

Allowed metacharacters:

[ ] – square brackets – all the characters or range characters within the brackets

*Example:*

Pattern 123[57]4[3-6] means that you want to create records with prefixes beginning with “123”, with the fourth digit “5” and “7”, the fifth digit “5” and ending in “3”, “4”, “5” and “6”.

As a result the records with the following DP prefixes will be created:

123543  
123544  
123545  
123546  
123743  
123744  
123745  
123746

; - semicolon – use semicolons to delimit lists of values

*Example:*

192.168.132.1;192.168.155.25;192.168.131.18

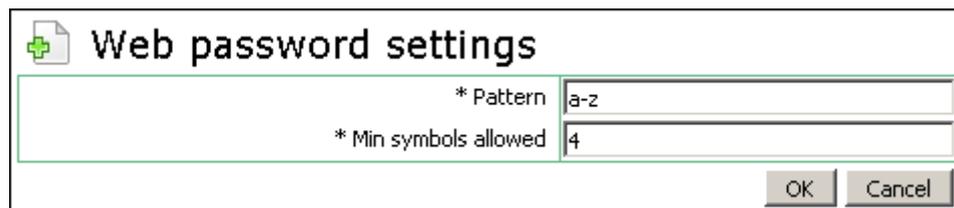
You can also define IP addresses in the CIDR format.

Use the **Exit** button to exit the wizard and return to Step 1.

## 5.9.14 WEB PASSWORD SETTINGS

This object allows the operator to configure flexible web-access password policies. The table ‘Web password settings’ represents the existing policies. To add a new one, select

 **Add** in the pop-up menu.



**Fig. 167** Adding a new web password policy

Enter the following data in the displayed dialog (all fields are required):

**Pattern** – define patterns or individual symbols that can be used in web-access passwords (for example: 0-9, a-z, A-Z, @, etc.); The pattern “0(zero)-z” means that passwords can include digits from 0 to 9 and letters a-z (both upper- and lower case).

**Min symbols allowed** – enter the minimum number of symbols allowed in passwords.

When done, click the OK button.

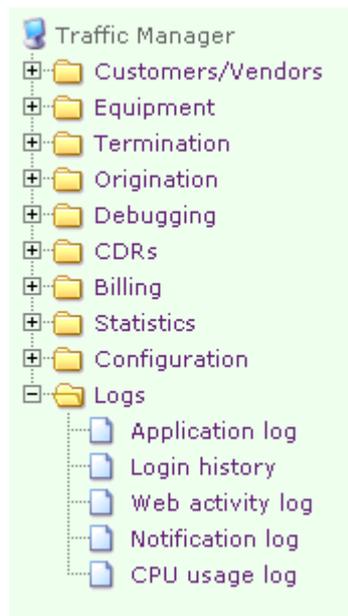
For example, assume that the following password policy is configured:

Pattern	Min symbols allowed
a-z	4
0-9	3

It means that a web-access password must contain at least 4 lower-case letters and at least 3 digits.

Note that this object is accessible to users with the role of Super Administrator only.

## 5.10 CATEGORY LOGS



This category comprises objects that provide information about System operation and user activities.

Table 23 Objects of the category Logs gives a brief overview of the System objects that fall under the category Logs.

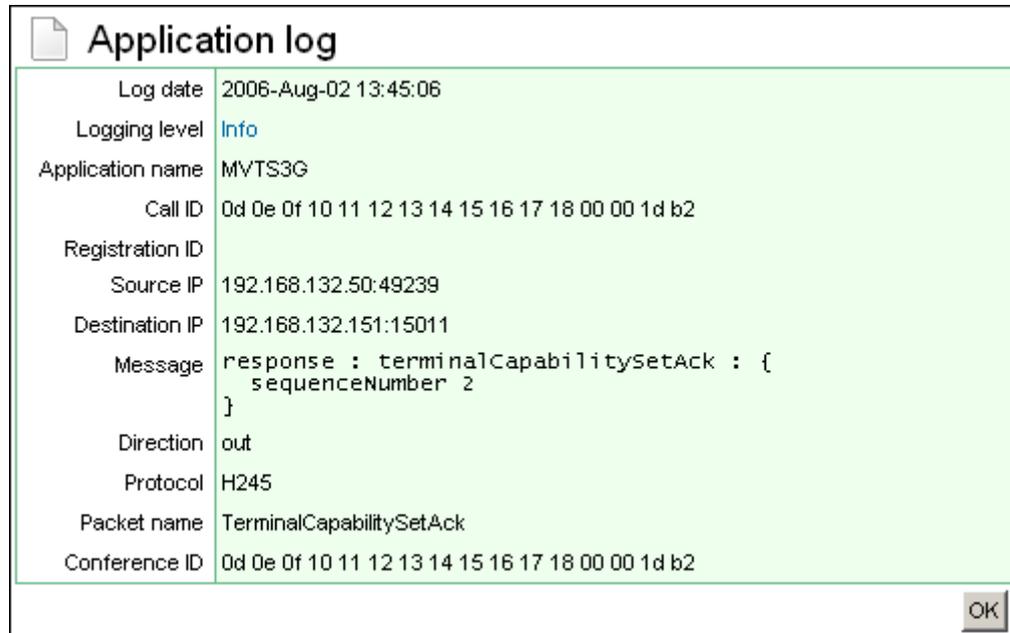
**Table 23 Objects of the category Logs**

Object	Description
Application log	Includes runtime traffic and TMngr-TS interaction logs
Login history	Presents information about users' logon attempts,

	including failed ones
<b>Web activity log</b>	Presents information about web user activities
<b>Notification log</b>	Presents information about System notifications sent to the users
<b>CPU usage log</b>	Presents information about top 5 processes on the server hosting the Traffic Manager for the current day

### 5.10.1 APPLICATION LOG

The table Application log includes runtime logs for the system. An individual log consists of messages from the DB and traffic switches. The runtime logs provide information about the System operation processes and can be used for administration and debugging. It is worth mentioning that logging is done only when the [logging level parameter](#) is configured in customer authentication records (see section 5.1.2).



**Fig. 168 Example of an application log**

Runtime logs may include all or part of the following data:

**Log date** – date and time the log was created;

**Logging level** shows how many details the information contained in the log provides:

- Error - is the minimum logging level when the System writes errors only to the log file
- Warning - is a more detailed logging level that produces a log file that in addition to critical errors also contains minor errors that do not affect the System serviceability
- Info - provides a medium quantity of details in a log
- Debug - is the maximum logging level that assures most detailed information

**Application name** – name of the application that originated the message (Traffic Switch, DB or application server);

**Call ID** – call identifier;

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**Registration ID** – registration identifier (for registering devices only);

**Source IP** – IP address of the call originator;

**Destination IP** – IP address of the call destination;

**Message** – message text;

**Direction** – shows ingress or egress character of the message: IN for ingress messages and OUT for egress messages;

**Protocol** – name of the employed signaling protocol (SIP or H.323);

**Packet name** – title of the packet;

**Conference ID** – ID used by TS to identify incoming and outgoing call legs;

**Logging mode** – logging level

---

*Debug logs (especially with the highest logging level) may occupy too much of disk space, therefore the System administrator should periodically perform archiving and removal of obsolete and unneeded logs, or set a reasonably low Maximum number of rows in Application log in Global system settings.*

---

## 5.10.2 LOGIN HISTORY

This object presents information about users' logon attempts, including failed attempts.



The screenshot shows a dialog box titled "Login history" with a document icon. It contains a table with the following data:

Login date	2008-January-16 14:42:46
Last activity date	2008-January-16 16:15:24
User	461   Admin
IP address	192.168.132.2
Login	admin
Realm	Default web realm
Successful	Yes
Session ID	ad7f530e222983f6c55d74f1c1b38b3b

An "OK" button is located at the bottom right of the dialog box.

**Fig. 169 Viewing logon history record**

Each history record includes the following data:

**Login date** – date and time of the latest connection;

**Last activity date** – date and time of the latest user activity;

**User** – name of the user;

**IP address** – IP address, from which the user accessed the TMngr;

**Login** – user's login name;

**Realm** – name of the web realm the user belongs to;

**Successful** – "Yes" indicates that the logon attempt was successful;

**Session ID** – unique ID of the access session.

To quicken search of the necessary information, use search filters. Refer to section 4.3.2 for information about the use of search filters.

### 5.10.3 WEB ACTIVITY LOG

This object allows the operator to trace user activity, when and what changes have been made to the database. To enable logging, set the parameter “Web activity log” in the table of the System global settings to “1” (see section 5.9.1).



<input type="checkbox"/>	Log date	User	Table	Action	Data
<input type="checkbox"/>	2006-Oct-20 11:38:34	John Smith	Active calls	view	views table
<input type="checkbox"/>	2006-Oct-20 11:38:32	John Smith	Destinations	view	views table
<input type="checkbox"/>	2006-Oct-20 11:38:31	John Smith	Destinations	view	views table
<input type="checkbox"/>	2006-Oct-20 11:38:26	John Smith	Contacts	update	<ROWSET> <ROW> <OWNER_HI>01.01</> <PERSON_ID>261</P> <CONTACT_T>1</CON> <PARAM>john.smith

Fig. 170 Web activity log

The log table presents the following information:

**Log date** – date and time the log was created;

**User** – user name;

**Table** – table (object) name;

**Action** – user action;

**Data** – information about the changes made, if any.

To quicken search of the necessary information you can use search filters. Refer to section 4.3.2 for information about the use of search filters.

### 5.10.4 NOTIFICATION LOG

This log presents information about System notifications sent to the users.

Each record of the log and includes the following data:

**Log date** – date and time the log was created;

**Sent date** – date and time the message was sent to the user;

**Recipient** – recipient of the message;

**Subject** – subject of the message;

**Body** – body of the message.

To quicken search of the necessary information you can use search filters. Refer to section 4.3.2 for information about the use of search filters.

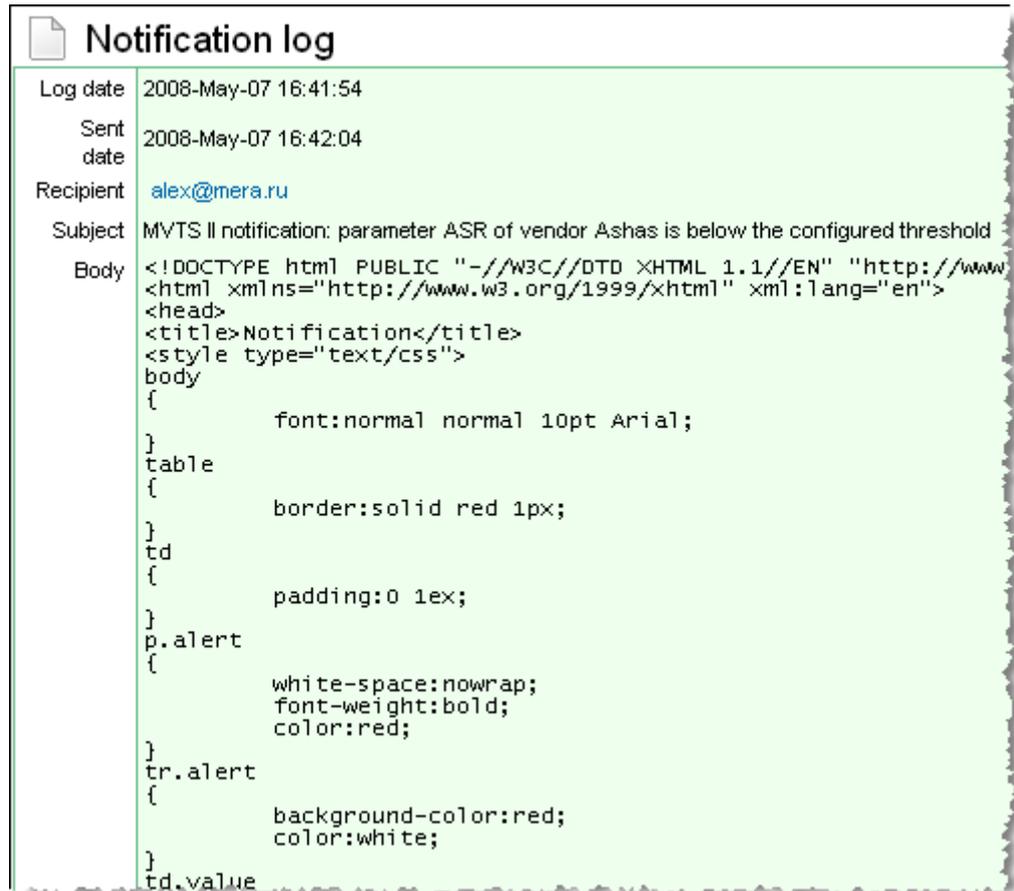


Fig. 171 Viewing notification log

### 5.10.5 SCHEDULER LOG

This log presents information about completed scheduled procedures and their results.

Each record of the log includes the following data:

**Run date** – date and time the procedure completed

**Job ID** - procedure identifier

**Job name** – name of the procedure

**Successful** – “Yes” indicates that the procedure was completed successfully

**Data** – information detailing the procedure results.

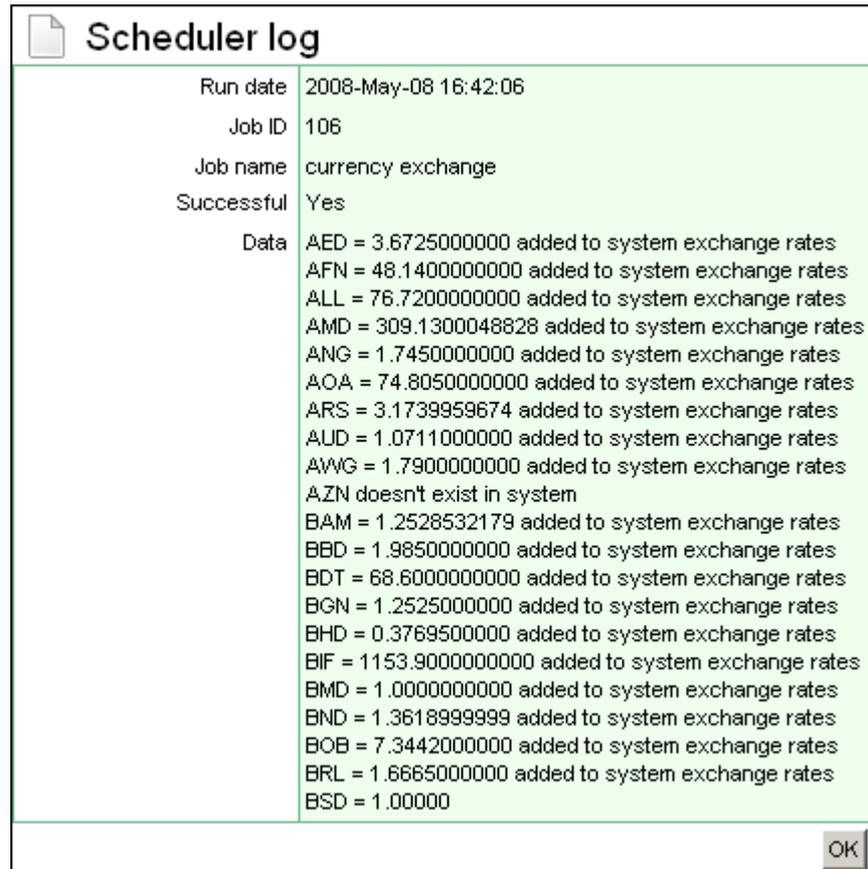


Fig. 172 Viewing schedulre log

### 5.10.6 CPU USAGE LOG

This log presents information about top 5 processes on the server hosting the Traffic Manager for the current day.

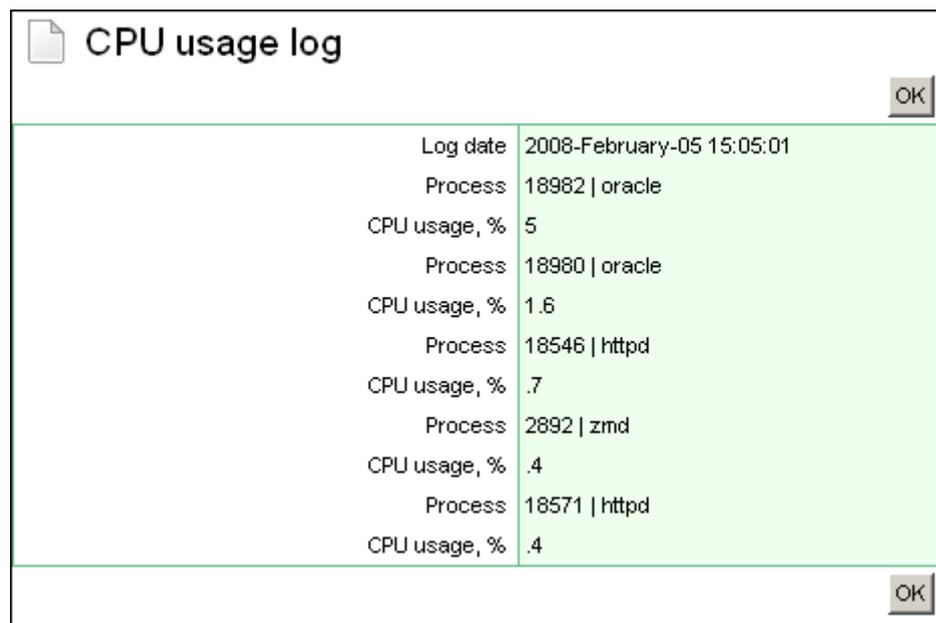


Fig. 173 CPU usage log

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Each record of the log includes the following data:

**Log date** – date and time the log was created, logs are created every 5 minutes by default;

**Process** - process PID and name;

**CPU usage** - the percentage of time each of the top 5 processes used the CPU at the time of the logging.

---

## 6 APPENDIX A. METACHARACTERS, REGULAR EXPRESSIONS AND NUMBER TRANSLATION

### 6.1 USE OF METACHARACTERS IN SEARCH

The comparison operators **Like** and **Not like** allow the use of patterns in search. Search patterns may include metacharacters '%' and '\_'.

The character '%' is used to denote any character string including an empty string that is a zero-length string. For example, the search pattern '123%' corresponds to character strings starting with '123'. The pattern '%123' corresponds to all character strings that end with '123'. The pattern '%123%' corresponds to character strings that include the sub-string '123'. The meta-symbol '%' used individually corresponds to all character strings including empty strings.

The underlining sign '\_' is used to mean a single arbitrary character. Therefore, the pattern '\_123' corresponds to all character strings starting with an arbitrary character followed by '123' (for example, '0123', '1123' and so on.) The same meta-symbol can be used with reference to string inclusions that occur in strings that start and end with definite characters and include an indefinite one, for example '1\_23'. A search pattern can comprise any number of metacharacters. For example, the search pattern '%1\_23%' corresponds to character strings '04513234', '1823', '11123456' etc.

When you use the comparison operator **Like** the System will display all data that correspond to the search pattern. With the operator **Not like** the System will output all data that do not correspond to the search pattern.

### 6.2 USE OF REGULAR EXPRESSIONS IN SEARCH

Regular expressions provide a powerful tool for defining information search criteria. Regular expressions used in search consist of alphanumeric characters and metacharacters the description of which follows

Metacharacters	Description
<b>Character match</b>	
.	Any character
[]	Any characters matching those in square brackets
<b>Location</b>	
^	Beginning of character string (string head)
\$	End of character string (string tail)
<b>Quantity matching</b>	
?	Matches zero or one occurrence of the previous expression
*	Matches zero or more occurrences of the previous expression

+	Matches one or more occurrences of the previous expression
{x}	x occurrences of the previous expression
{x,}	x or more occurrences of the previous expression
{x,y}	At least x occurrences, but not more than y occurrences of the previous expression
<b>Alternation</b>	
	The alteration operator that matches either the expression before or the expression after the operator
<b>Grouping</b>	
()	Logical grouping

*Note: To instruct the system to treat a metacharacter as an ordinary character, precede the metacharacter with a backslash (“\”).*

## Examples

Suppose, you are looking for CDRs involving numbers beginning with “7095123” or “7095124” or “7095125” and ending in any 4 digits. In this case you should use the following regular expression pattern.

**`^7095(123|124|125).{4}$`**

As a result, the system will display all the records related to calls involving numbers 70951231234, 70951243333, 70951254567, 70951255678, etc.

Suppose you are looking for all numbers that begin with “7095” and end in either 1, 2, or 3. You can use the following regular expression pattern for the search.

**`^7095.*[123]$`**

As a result, this pattern will match “70951111111,” “709500002,” “70951234563”, etc.

In case you want the system to display all the records involving numbers beginning with "345" and followed by at least 1 but not more than 6 digits. Use the following regular expression pattern.

**`^345.{1,6}$`**

As a result, this pattern will match "3450," "3451111," "345888888", etc.

## 6.3 NUMBER TRANSLATION

The purpose of number translation is transformation of a telephone number aimed at bringing it to the necessary format. Number translation involves the use of regular expressions. A translation expression consists of two parts (except for the special patterns `src`, `dst` and `rand`, see below): a search pattern and a replacement string delimited by the symbol `</>`.

---

Use the brackets «( )» to create separate sections in a search pattern. The replacement string can include a replacement sub-string for a section. The replacement substring is represented by the number of the search pattern section preceded by the backslash symbol «\».

The most common number transformation tasks are removal, addition and replacement of number prefixes.

## Examples

**Goal:**

Remove prefix 1234 from number 123456789

**Translation pattern:**

$^1 2 3 4 ( . * ) / \backslash 1$

*(remove prefix 1234, that precedes the first section, i.e. \1)*

**Result:**

123456789 → 56789

**Goal:**

Remove prefix 1234# from number 1234#123456 and replace it with prefix 0000#

**Translation pattern:**

$^1 2 3 4 \# ( . * ) / 0 0 0 0 \# \backslash 1$

*(replace prefix 1234# that precedes the first section with prefix 0000#)*

**Result:**

1234#1234567 → 0000#1234567

**Goal:**

Add prefix 0000# to all numbers

**Translation pattern:**

$^ ( . * ) / 0 0 0 0 \# \backslash 1$

*(append prefix 0000# to the beginning of any string, i.e. before section 1)*

**Result:**

1234567 → 0000#1234567

7654321 → 0000#7654321, etc.

One and the same goal can be achieved using different translation patterns:

- translation pattern  $^1 2 3 4 \# / 0 0 0 0 \#$  is equal to pattern  $^1 2 3 4 \# ( . * ) / 0 0 0 0 \# \backslash 1$  (replace prefix 1234# with prefix 0000#);
- translation pattern  $^ / 0 0 0 0 \#$  is equal to pattern  $^ ( . * ) / 0 0 0 0 \# \backslash 1$  (add prefix 0000# to all numbers).

---

One string can contain several translation patterns delimited by semicolons (;). The first pattern in the string that matches the number will be used for number translation.

To explain this let us take the following translation patterns:

- `^(78312)/01#\1` (add prefix 01# to numbers beginning with **78312**);
- `^(7831)/02#\1` (add prefix 02# to numbers beginning with **7831**).

For number **7831255555** from string `^(78312)/01#\1;^(7831)/02#\1` TMngr will choose the first pattern and as a result prefix 01# will be added to the number (01#7831255555). At the same time, for number **7831555555** TMngr will choose the second pattern. As a result prefix 02# will be added to the number (02#7831555555).

---

*If you need to remove a technical prefix, the best way to do so is to configure it in the Customer authentication record. In such a case it will be removed automatically after authentication with the help of the less demanding algorithm than RegExp.*

---

Along with the patterns based on regular expressions you can use several additional patterns:

- the pattern `src` replaces the destination number with the source number;
- the pattern `dst` replaces the source number with the destination number;
- the pattern `rand(n)` replaces the number with a random n-digit number;
- the pattern `<arbitrary number>` replaces the number with the number specified as a translation pattern;
- the pattern `blank` replaces “empty” numbers with the number defined after “/”

#### **Example**

`blank/123;rand(5)`

This string of patterns means "if the number is empty replace it with number 123, otherwise replace it with a random 5-digit number.

`^1234(.*)\1;rand(10)`

This string of patterns means “if the number starts with prefix 1234, remove the prefix, otherwise replace the number with a random 10-digit number.”

---

## 7 APPENDIX B. MVTS II LOCAL DISCONNECT CODES

### 7.1 TS LOCAL DISCONNECT CODES

Code	Reason
0	Unknown internal error
1	No compatible codecs
2	Signaling channel disconnect (H.323)
3	Control channel disconnect (H.323)
4	Failure to open signaling channel (H.323)
5	Failure to establish connection at the transport level (H.323)
6	H.245 control channel error
7	H.323 socket error
8	TCS/MSD procedure error (H.323)
9	Failure to receive ACK message
10	Normal call completion. BYE received
11	Error during sending CallBegin message to TMngr
12	TMngr response timeout
13	Failure to open sockets for RTP stream
14	Normal system shut-down
15	All routes failed
16	Call impossible without media proxy
17	Failure to decode signaling packet
18	Maximum call time exceeded
19	SIP gateway stopped responding
20	Error when processing INVITE without SDP, ACK received without SDP
33	DBMS overload
34	DBMS query processing error
35	DBMS query failed
36	DBMS query forcefully aborted
37	Failure to send DBMS query to TMngr
38	License number of concurrent calls exceeded.
39	SIP request timeout
40	TMngr responded with unsupported signaling protocol

41	No routes available
42	The list of codecs received from the call originator does not match the list configured in the DB
43	All routing options rejected due to mismatching codec capability of the call originator
44	Signaling node crashed
45	SIP socket error
46	Time reserved for the call exceeded (displayed in the TS CLI)
47	Incompatible media proxy modes set for originator and terminator
48	Failure to resolve domain name
49	Slow Start is not supported in non-proxy operation
50	Redial timeout
51	Failure to create SIP socket
52	Failure to transform received calling number, name etc. into valid SIP URI
53	Time reserved for the call exceeded (displayed in the TMngr web-interface)

## 7.2 TMNGR LOCAL DISCONNECT CODES

Code	Description
0	Normal call completion
100	Internal System error
101	Not used
102	Invalid format or size of received data. For example, dialed number is too long.
104	Data caching error in DB contexts
200	Authentication error
201	Full authentication by parameters received from caller failed.
202	Failed fast authentication by authentication record ID found during registration.
203	Origination equipment blocked (check up the field <b>Origination blockings</b> of the table <b>Equipment</b> )
204	Customer authentication record blocked (check up field <b>Restraints</b> in the table <b>Customer authentication data</b> ). The record could be blocked due to low balance in the customer's account.
205	Maximum number of concurrent calls for the origination EP exceeded. (check up the fields <b>Incoming calls</b> and <b>Max incoming calls</b> in the table <b>Equipment</b> ).

206	Maximum allowed number of concurrent calls defined in the customer authentication record exceeded (check up the fields <b>Incoming calls</b> and <b>Max incoming calls</b> in the table <b>Customer authentication data</b> ).
207	Registration failed
208	Disabled Customer record (check up the <b>Enabled</b> field in the table <b>Customers/Vendors</b> )
209	Disallowed caller CPC (calling party category) for the selected rate plan (check up the table <b>Rate plan</b> in the object <b>Calling party category</b> (category of objects <b>Configuration</b> )).
210	Disabled equipment record is (check up the field <b>Enabled</b> in the table <b>Equipment</b> ).
300	Not used
400	Authorization error
401	Customer's rate plan does not cover requested destination.
402	The requested destination is disallowed (check up the field 'Deny' in the table of destinations).
500	Routing error
501	No available routing options (both in DPs and ENUM registry)
600	Error occurred when processing billing data
601	Error occurred when processing billing data for the customer
602	Error occurred when processing billing data for the vendor
701	Not used
702	Not used
703	All routes failed
704	Statistics calculation error
705	Call aborted prior to Call_Begin processing completion
799	This code is automatically generated for dangling calls terminated in the DB by a special background process after the maximum call duration is exceeded.

## 8 APPENDIX C.MVTS II CODEC SORTING AND PROXYING

Table 24 the shows proxy modes that can be configured for origination and termination devices.

**Table 24 MVTS II proxy modes**

Proxy mode	Explanation
Force Proxy	Always proxy media traffic
Non-proxy recommended	Avoid proxy operation if possible, otherwise proxy media traffic
Force non-proxy	Disallow proxy operation for media

Source gateway \ Destination gateway	Force proxy	Force non-proxy	Non-proxy recommended
Force proxy	Proxy on	No calls	Proxy off Proxy on
Force non-proxy	No calls	Proxy off	Proxy off
Non-proxy recommended	Proxy off Proxy on	Proxy off	Proxy off Proxy on

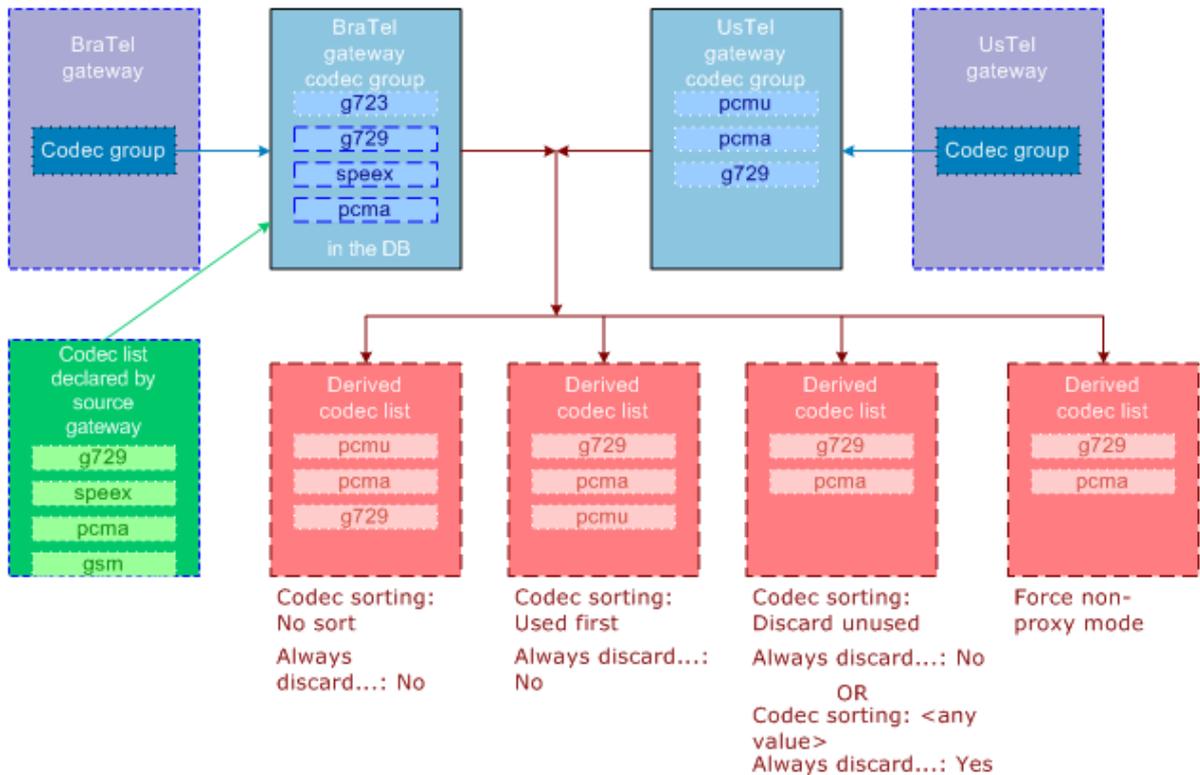
Table 25 shows codec sorting rules that origination and termination devices can be assigned. The rules apply to voice codecs only. RFC2833 (DTMF) and T38 (fax) codecs are ignored.

**Table 25 Codec sorting rules**

Rule	Explanation
<i>Termination devices</i>	
No sort	Do not sort codecs and send the list of codecs from the termination device codec group without changes;
Use first	Move codecs matching the codecs supported by the call originator to the beginning of the list (in the same order), move the rest of codecs to the end of the list
Discard unused	Include in the list only codecs matching the codecs of the call originator, and exclude all other codecs
Use first only	Use the first supported codec found in the originator list of codecs;
Discard unused with failsafe	Apply the “Discard unused” rule and in case the resulting list is empty send the list of codecs from the

	termination device codec group without changes.
<i>Origination devices</i>	
Always discard codecs not used by originator	Same as in the rule “Discard Unused”. In case this rule is selected all rules set for termination equipment are ignored.

The figure below shows an example of application of codec sorting rules, where the BraTel gateway acts as an originator and the UsTel gateway acts as a call terminator. The pink boxes show the lists of codecs resulting from application of different codec sorting rules.



**Fig. 174 Codec sorting rules**

Table 26 presents the list of local disconnect codes (LDCs) that indicate that the call was rejected because of the inconsistency of codec sorting rules and/or proxy modes.

**Table 26 Disconnect cause codes pertaining to codec sorting rules and proxy modes**

Disconnect cause code	Explanation
Source Media Discarded	The application of the codec sorting rule results in an empty list of codec matches returned to the originator.
Direct Slow Start Not Supported	The resulting list of matching codecs for origination or termination device is empty and media proxying is disallowed at least for one of the parties.
All Routes Media Discarded	All routes were rejected due to the incompatibility of codecs resulting from the codec sorting and proxy mode settings.

---

Incompatible Proxy Media Policy	Media proxying mode is turned on for one of the call parties and disallowed for the other
---------------------------------	---

#### Notes

Whenever possible, the originator's codec lists returned to TS comprise codecs in the order as they were received. For example, in case the list of codecs received from the origination device included codecs "g729, g711" and the list of supported codecs configured for it in the DB is "g729, g723, g711", the list of codecs sent to TS will look like "g729, g711, g723"

The order of codecs in the terminator's codec lists sent to TS with the "No sort" rule applied is determined by the codec priority configured in the table **Codec group setup**.