

# Manual of the Aarenet VoIP Switch Support Tools

## Introduction

The VoIP Switch Administrators, Operators, Supporters find here information about the Aarenet VoIP Switch "On Board" tools for analyzing and supporting general VoIP Switch issues and customer problems:

- ◇ The ConfigCenter "Support Log" displays the VoIP Switch internal activities
- ◇ The ConfigCenter "Traces" displays the signaling between the VoIP Switch and external devices
- ◇ The ConfigCenter "Call Data" lists the CDR of all incoming or outgoing connections or connection attempts. The "Call Data" provide shortcuts to SIP, SDP trace and RTP statistic information of a single call.
- ◇ The ConfigCenter "Address Registration" displays if a SIP device or MGCP MTA has registered a telephone number
- ◇ The ConfigCenter "System Components" displays the state and activity of the VoIP Switch components
- ◇ The ConfigCenter "Channels" displays the state of connections
- ◇ The ConfigCenter "System Utilization" displays a statistical overview of the VoIP Switch resource utilization

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# VoIP Switch ConfigCenter Support Tools

## The ConfigCenter Support Log

The "Support Log" provides the supporter with information from the internal processes of the ServiceCenter:

- ◇ Registration
- ◇ Connection setup, release and exceptions
- ◇ Call Routing
- ◇ Used Ruleset
- ◇ Emergency calls
- ◇ etc

The "Support Log" provides filters for:

- ◇ Time based selection: From ? Until, From ? Duration
- ◇ Text filter
- ◇ Registration events
- ◇ Call events
- ◇ etc.

The "Support Log" has a limited history. The history may last from a few hours up to some days. The length of the history may be different from VoIP switch to VoIP switch and depends on the length of log files and amount of logging events.

**Note** The "Support Log" is tenant sensitive. This means a supporter of tenant A is not able to see events of tenant B!

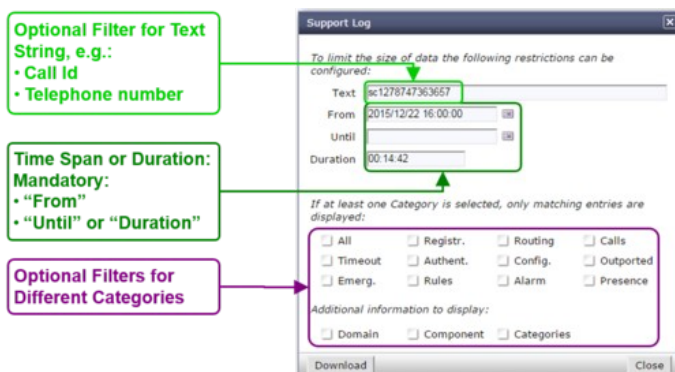
## Navigate to the "Support Log"

ConfigCenter:

- Menu "Support"
- Menu "Support Log"

## Get a "Support Log"

Dialog: "Support Log":



When the dialog "Support Log" opens it contains by default in "From" the actual date/time (-5min) and in "Duration" a duration of 5min:

1. Click the Button [ Download ]
2. Via HTTP an ASCII formatted file with the last 5 minutes will be downloaded

Retrieving a "Support Log" in the past:

1. Insert the in "From" the desired start date/time
2. Insert in "Duration" the needed length
3. Press on the PC keyboard the 'Enter' key : The "Until" date/time will be computed
4. Click the Button [ Download ]

or

1. Insert the in "From" the desired start date/time
2. Insert the in "Until" the desired stop date/time
3. Press on the PC keyboard the 'Enter' key: The "Duration" will be computed
4. Click the Button [ Download ]

**Best Practice**

Get the events of a connection in the past:

1. Search the Call ID of the connection in the "Call Data"
2. Use the Call ID in the "Text" filter of the Support Log dialog
3. Make sure that the connection date/time match "From"- "Until"
4. Download the Support Log

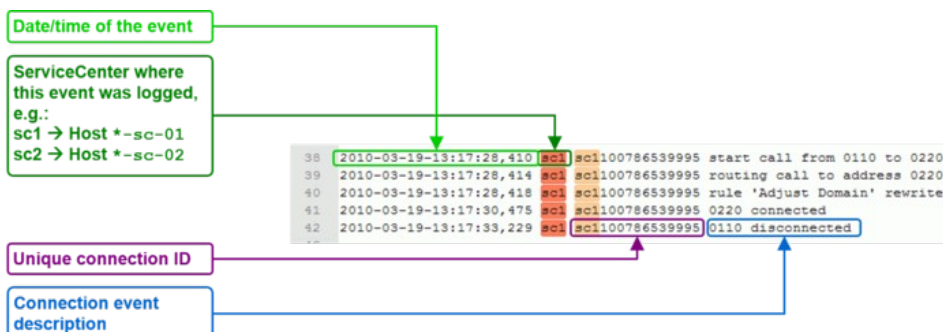
Get the events of a just finished connection:

1. Set the "Duration" to 5min (or shorter)
2. Download the Support Log
3. Search for the connection

## Interpretation of a "Support Log"

The interpretation of a "Support Log" is quite easy and straight forward. With a little experience one will be soon familiar with the interpretation.

Interpretation and example of a call setup and release:



## ConfigCenter Trace

The "Trace" provides the supporter with information from the message traffic between the VoIP switch and external VoIP devices, such as PSTN gateway, SIP CPE, SIP or MGCP telephones.

The "Trace" contains:

- ◇ Session Initiation Protocol SIP registration and connection signaling messages
- ◇ Media Gateway Control Protocol MGCP audit and endpoint control messages
- ◇ Session Description Protocol SDP streaming media initialization parameters

The "Trace" provides filters for:

- ◇ Time based selection: From ? Until, From ? Duration
- ◇ Text filter

The "Trace" has a limited history. The history may last from a few hours up to some days. The length of the history may be different from VoIP switch to VoIP switch and depends on the length of log files and amount of logging events.

The interpretation of a "Trace" (PCAP formatted file) has to be done in an external application like Wireshark network protocol analyzer. Wireshark offers deep and rich VoIP analysis .

**Note**

The "Trace" is **not** tenant sensitive. This means a supporter of tenant A is able to see signaling messages of tenant B!

Due to this open display of information it may be possible that the "Trace" is not available for the supporters and operators on a multi tenant VoIP Switch.

## Navigate to the "Trace"

ConfigCenter:

- Menu "Support"
- Menu "Trace"

## Get a "Trace"

Dialog: "Trace":

**Optional Filter for Text String, e.g.:**

- Call Id
- Telephone number

**Time Span or Duration: Mandatory:**

- "From"
- "Until" or "Duration"

The screenshot shows the 'Trace' dialog with the following fields: Text (0443027192), From (2015/12/22 16:00:00), Until (empty), and Duration (00:05:00). There are 'Download' and 'Close' buttons at the bottom.

When the dialog "Trace" opens it contains by default in "From" the actual date/time (-5min) and in "Duration" a duration of 5min:

1. Click the Button [ Download ]

2. Via HTTP an PCAP formatted file with the last 5 minutes will be downloaded

Retrieving a "Trace" in the past:

1. Insert the in "From" the desired start date/time
2. Insert in "Duration" the needed length
3. Press on the PC keyboard the 'Enter' key: The "Until" date/time will be computed
4. Click the Button [ Download ]

or

1. Insert the in "From" the desired start date/time
2. Insert the in "Until" the desired stop date/time
3. Press on the PC keyboard the 'Enter' key: The "Duration" will be computed
4. Click the Button [ Download ]

Get the events of a connection in the past:

1. Search the connection in the "Call Data"
2. Click the Button [ Trace ]

### Best Practice

Get the events of a just finished connection:

1. Set the "Duration" to 5min (or shorter)
2. Download the Trace
3. Search for the connection

## Interpretation of a "Trace"

The interpretation of a "Trace" needs experience!

For more information:

- ◇ See also article "Brief Tutorial of the SIP Signaling and SDP Media Protocols"
- ◇ Get a Wireshark training

Example of a Wireshark call capture, SIP setup and release:

The image shows a Wireshark packet capture of a SIP call. The top pane displays a list of packets with columns for No., Time, Source, Destination, Protocol, Length, and Info. The selected packet (No. 64264) is an INVITE message. The middle pane shows the packet details, including Ethernet II, Internet Protocol Version 4, User Datagram Protocol, and Session Initiation Protocol (INVITE). The bottom pane shows the message body, which is a Session Description Protocol (SDP) message. The SDP message includes fields for Session Description Protocol Version, Owner/Creator, Session Name, Connection Information, Time Description, and Media Description with various attributes like rtpmap, fmtp, and sendrecv.

No.	Time	Source	Destination	Protocol	Length	Info
64264	2015-11-06 08:49:19.390000	81...	81...	SIP/SDP	794	Request: INVITE sip:0435210557081
64265	2015-11-06 08:49:19.408000	81...	81...	SIP	319	Status: 100 Trying
64266	2015-11-06 08:49:19.543000	192.168.222.53	192.168.222.53	SIP/SDP	947	Request: INVITE sip:mcf_conf@192.168.222.53:5062
64267	2015-11-06 08:49:19.544000	192.168.222.53	192.168.222.53	SIP	388	Status: 100 Trying
64268	2015-11-06 08:49:19.547000	192.168.222.53	192.168.222.53	SIP/SDP	692	Status: 200 OK
64269	2015-11-06 08:49:19.550000	81...	81...	SIP/SDP	663	Status: 200 OK
64270	2015-11-06 08:49:19.573000	81...	81...	SIP	434	Request: ACK sip:0435210557081:5060
64271	2015-11-06 08:49:19.574000	192.168.222.53	192.168.222.53	SIP	353	Request: ACK sip:mcf_conf@192.168.222.53:5062
64272	2015-11-06 08:49:43.095000	81...	81...	SIP	434	Request: BYE sip:0435210557081:5060
64273	2015-11-06 08:49:43.095000	81...	81...	SIP	353	Status: 200 OK
64274	2015-11-06 08:49:43.098000	192.168.222.53	192.168.222.53	SIP	342	Request: BYE sip:mcf_conf@192.168.222.53:5062
64275	2015-11-06 08:49:43.099000	192.168.222.53	192.168.222.53	SIP	372	Status: 200 OK

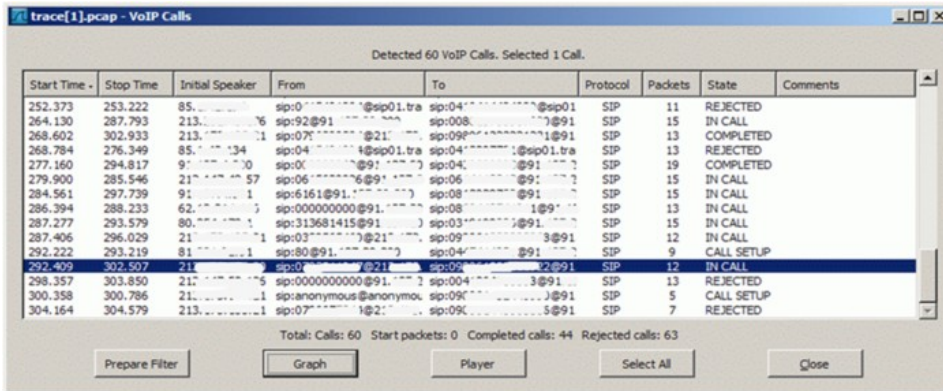
Example of a Wireshark call list:

Navigate in Wireshark:

➔ Menu "Statistics"

➔ Menu "VoIP Calls"

Wireshark dialog where all calls are listed of the actual trace:



Detected 60 VoIP Calls. Selected 1 Call.

Start Time	Stop Time	Initial Speaker	From	To	Protocol	Packets	State	Comments
252.373	253.222	85.111.111.111	sip:0100000000@91	sip:0400000000@91	SIP	11	REJECTED	
264.130	287.793	213.111.111.111	sip:92@91	sip:0080000000@91	SIP	15	IN CALL	
268.602	302.933	213.111.111.111	sip:0700000000@21	sip:0900000000@1@91	SIP	13	COMPLETED	
268.794	276.349	85.111.111.134	sip:0400000000@91	sip:0400000000@91	SIP	13	REJECTED	
277.160	294.817	91.111.111.110	sip:0000000000@91	sip:0400000000@91	SIP	19	COMPLETED	
279.900	285.546	217.111.111.57	sip:0600000000@91	sip:0600000000@91	SIP	15	IN CALL	
284.561	297.739	91.111.111.111	sip:6161@91	sip:0800000000@91	SIP	15	IN CALL	
286.394	288.233	62.111.111.111	sip:0000000000@91	sip:0800000000@91	SIP	13	IN CALL	
287.277	293.579	80.111.111.111	sip:313681415@91	sip:0300000000@91	SIP	15	IN CALL	
287.406	296.029	217.111.111.111	sip:0300000000@21	sip:0900000000@3@91	SIP	12	IN CALL	
292.222	293.219	81.111.111.111	sip:80@91	sip:0400000000@91	SIP	9	CALL SETUP	
292.409	302.857	211.111.111.111	sip:0000000000@91	sip:0060000000@2@91	SIP	12	IN CALL	
298.357	303.850	211.111.111.111	sip:0000000000@91	sip:0040000000@3@91	SIP	13	REJECTED	
300.358	300.786	211.111.111.111	sip:anonymous@anonymous	sip:0900000000@1@91	SIP	5	CALL SETUP	
304.164	304.579	213.111.111.111	sip:0700000000@21	sip:0900000000@5@91	SIP	7	REJECTED	

Total: Calls: 60 Start packets: 0 Completed calls: 44 Rejected calls: 63

Buttons: Prepare Filter, Graph, Player, Select All, Close

Example of a Wireshark call flow:

Navigate in Wireshark:

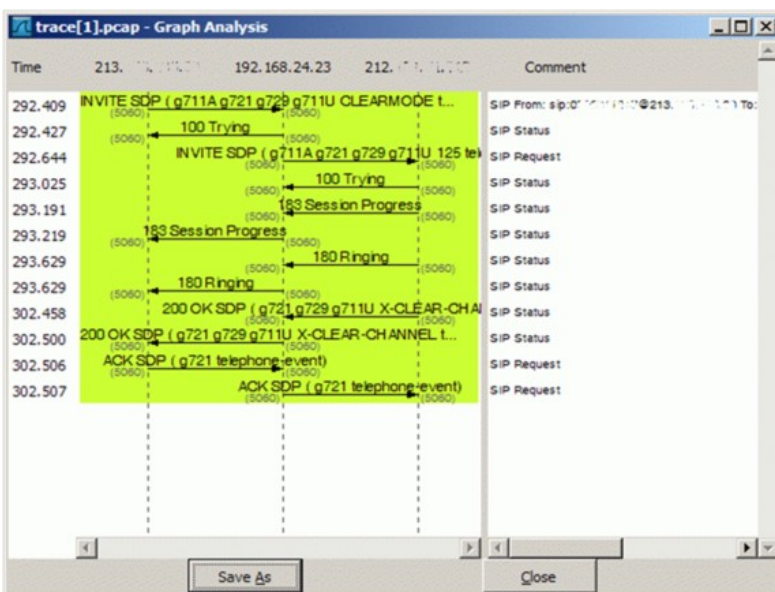
➔ Menu "Statistics"

➔ Menu "VoIP Calls"

➔ Select the call of interest

➔ Click Button [ Graph ]

Wireshark dialog where the message flow is shown of the selected call:



## The ConfigCenter Call Data

The "Call Data" lists the CDR of all incoming or outgoing connections or connection attempts. Extended filters enable the supporter to search for specific calls. The filters can be combined with logical AND.

Filter CDRs according:

- ◇ Call start and end date/time
- ◇ Call duration
- ◇ Call charges
- ◇ Telephone number of caller and/or callee.
- ◇ Tenants & account
- ◇ Price list attributes "Destination Type" & "Destination"

The "Call Data" has a limited history. The length of the history may be different from VoIP switch to VoIP switch and depends on the CDR storage length in the date base.

Selected CDR details allow direct access to the information of:

- ◇ SIP Trace:  
The SIP message contents of this specific connection or call attempt is shown. For the interpretation of the trace consult the article "Brief Tutorial of the SIP Signaling and SDP Media Protocols", chapter "Knowhow SIP Signaling" .
- ◇ RTP/RTCP Media:  
The RTP/RTCP information and statistics of this specific connection or call attempt is shown. For the interpretation of the media information consult the article "Brief Tutorial of the SIP Signaling and SDP Media Protocols", chapter "Knowhow Media Stream" .

### Note

- The "Call Data" has a limited history. The length of the history may be different from VoIP switch to VoIP switch and depends on the CDR storage length in the date base.
- Not all filter options may be available on the VoIP Switch.
- The "Call Data" is tenant sensitive. This means a supporter/operator of tenant A is not able to see events of tenant B!

### Warning

Depending on the settings of a VoIP system it may be possible to change values in CDR.

**Changing a CDR's contents may be a legal violation in the country of operation of the VoIP Switch!**

## Navigate to the "Call Data"

ConfigCenter:

- Menu "Rating"
- Menu "Call Data"

## Get the "Call Data"

Dialog: "Call Data":

**Filter for ranges of:**

- Time
- Duration
- Charge

Hint:  
Insert at start "Duration"  
"00:00:00" for displaying  
call attempts.

**Filter for telephone numbers**

**Export the displayed CDRs in a MS Excel file.**

**Do not use for support reasons!**

**Start the searching**

By clicking on the line of a CDR a dialog pops up, which provides a) more details of the connection and b) one click access to the call's SIP trace and media RTP/RTCP information and statistics:

**Call details**

**Do not use for support reasons!**

**Get a trace of this call as PCAP file.**

**Get the RTP information and statistics of this call as HTML file.**

For the interpretation of the trace consult the article: "Brief Tutorial of the SIP Signaling and SDP Media Protocols", chapter "Knowhow SIP Signaling"

For the interpretation of the media information consult the article: "Brief Tutorial of the SIP Signaling and SDP Media Protocols", chapter "Knowhow Media Stream"

# The ConfigCenter Address Registration

The ConfigCenter "Address Registration" displays if a SIP device or MGCP MTA has registered the telephone number. The supporter finds the following information of the registering devices:

- ◇ Type of registration, SIP, notifications, presence, etc
- ◇ IP address
- ◇ SIP user agent
- ◇ Registration time left.

Registrations can be de-registered on the VoIP Switch by force.

Hint:

The device cannot be informed that it was de-registered on the VoIP Switch. That means you have to wait until it re-registers automatically or force the device manually to re-register.

## Navigate to "Registrations"

ConfigCenter:

→ Menu "Addresses"

or

→ Menu "Accounts"

→ Click on the line of the desired account

→ Click on the right arrow at "Addresses"

For details:

→ Click on the line of the desired address

→ Click on the right arrow at "Registration"

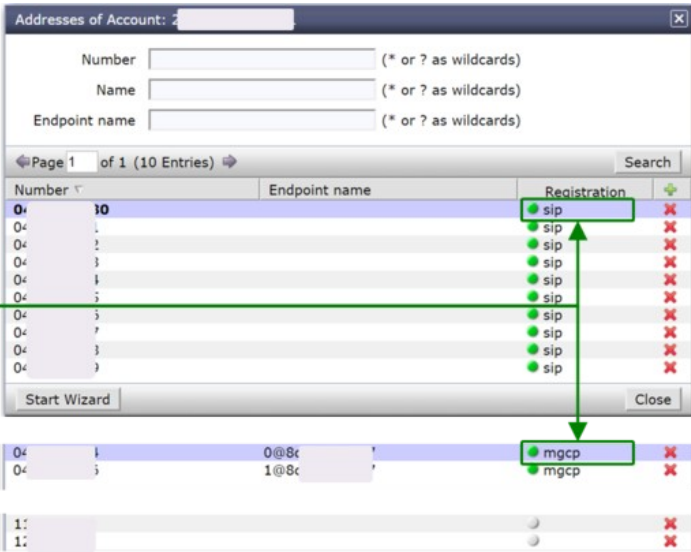
## Interpretation of "Registrations" Information

Display of "Addresses" and registration overview:

**Status and type of registration:**

- Active registration
- No registration

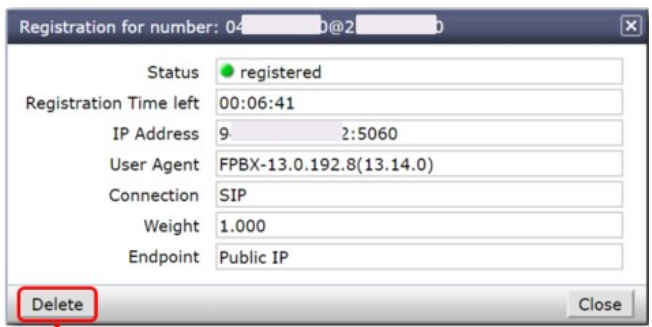
**Note:**  
If no icon is shown then more than 100 addresses are listed.



Number	Endpoint name	Registration
04 10		● sip
04 1		● sip
04 2		● sip
04 3		● sip
04 4		● sip
04 5		● sip
04 6		● sip
04 7		● sip
04 8		● sip
04 9		● sip
04 10		● sip
04 11	0@8c	● mgcp
04 12	1@8c	● mgcp
1:		○
1:		○

By clicking on the line of an address and then the right arrow at "Registration" a dialog pops up, which provides informations of all registrations of the address:

**Release all registrations of all devices on the VoIP Switch.**



## The ConfigCenter Components

The "Components" displays the state and activity of the VoIP Switch components. The components are the entities of the VoIP Switch that provide all functionality and features. The display is automatically updated every few seconds and shows the actual state and load of every component.

**Note** On most VoIP Switches the "Components" display is not available for the supporters and operators.

## Navigate to "Components"

ConfigCenter:

- Menu "System"
- Menu "Components"

## Interpretation of "Components" Information

Display of "Components":

**Name of all installed components.**

**Presents the state of a connection:**

- **active:**  
The component is working correctly and is active.
- **passive:**  
The component is correctly working and ready for jump in.
- **barred:**  
The component is correctly working but is suspended from its task.
- **unavailable:**  
The component is not working correctly!

**In the remarks mostly the load of an active component is displayed. In an exceptional situation a short description is given.**

Name	State	Remark
HealthCheck 1	active	
HealthCheck 2	passive	
LoadBalancer 1	active	153/508 messages
LoadBalancer 2	passive	0/0 messages
CallBalancer 1	active	
CallBalancer 2	passive	
MediaServer 1	active	919 streams
MediaServer 2	active	914 streams
ServiceCenter 1	active	434 calls
ServiceCenter 2	active	453 calls
MediaCenter 1	active	
MediaCenter 2	active	
FaxServer 1	active	
FaxServer 2	active	
CallAgent 1	active	108 endpoints
CallAgent 2	active	102 endpoints
CDRCollector	active	
RatingCenter 1	passive	
RatingCenter 2	passive	
AdminCenter 1	active	
AdminCenter 2	active	28 sessions
ConfigCenter 1	active	6 sessions
ConfigCenter 2	active	
Database 1	active	209 connections
Database 2	active	95 connections

By clicking on the line of a component a dialog pops up, which provides more informations or enables to send messages or handle the work load of the component:

**IP address of the component within the VoIP Switch internal communication.**

**Installed software version of the component**

**The Acceptance defines the work load that a component has to take over. A value of 0 puts the component in the "barred" state.**

**Enables the possibility to generate a message with a certain severity and any text in the log files of the component.**

**With a severity higher than "Info" an E-mail will be sent to the defined addressees in the Xymon alerting.**

## The ConfigCenter Channels

The ConfigCenter "Channels" is a live display of the current active connections and connection build-up. The administrator can filter an search the connections. If needed a connection can be forced to be released.

**Note** On most VoIP Switches Entries the "Channels" display is not available for the supporters and operators.

### Navigate to "Channels"

ConfigCenter:

➔ Menu "Channels"

### Interpretation of "Channels" Information

Display of "Channels":

**The telephone number of the connection peers.**  
Click on "Number" or "Peer" for sorting the list.

**Search for text string, e.g.:**

- Telephone number
- ServiceCenter

**Release a connection by clicking X.**

**Indicates on which ServiceCenter server the connection is handled:**

- sc1: ServiceCenter 1
- sc2: ServiceCenter 2

Click on "SC" for sorting the list.

**Presents the call leg of a connection:**

- Calling: A leg
- Called: B leg

Click on "Direction" for selecting just one or all call leg.

**State and duration of the connection.**  
Click on "State" or "Duration" for sorting the list.

# The ConfigCenter System Utilization

The "System Utilization" gives a statistical overview of the VoIP Switch resource utilization:

- ◇ Number of accounts
- ◇ Number of addresses (telephone numbers)
- ◇ Number of registrations
- ◇ etc

**Note** On most VoIP Switches the "System Utilization" display is not available for the supporters and operators.

## Navigate to "System Utilization"

ConfigCenter:

- Menu "System"
- Menu "Utilization"

## Interpretation of the "System Utilization" Information

The "System Utilization" provides the numbers of used resources:

The screenshot shows a window titled "System Utilization" with a list of resources and their counts. Two callout boxes provide detailed explanations for specific categories:

- Usage of accounts & addresses:**
  - Accounts:** Number of valid accounts
  - Accounts "total":** Total number of valid plus invalid accounts
  - Addresses:** Number of valid addresses
  - Addresses "total":** Total number of valid plus invalid addresses
- SIP registrations:**
  - Registration:** Number of active and valid registrations
  - Registration "total":** Total number of active and outdated (invalid) registrations

Resource	Value
Tenants	61
Accounts	33406 (total 41628)
Addresses	93449 (total 117088)
Answering Machines	6101
Messages	2102
Cdrs	16135465
Calls	1
SIP Registrations	33394 (total 48715)
MGCP Registrations	1588
Gateways	13
Devices	2541
Pricelists	3
TopStops	41379
Rulesets	43
Rules	190
Routing Tables	4
Routes	97
Profiles	25
Numbering Plans	4
Admin	160
Call Forwards	40203
VAS Numbers	56483
VAS Tariffs	1112
Subscriptions	971