



# Release Notes

SRE 3.3.5

## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>What's new in SRE 3.3</b>	<b>2</b>
2.1	Call processing . . . . .	2
2.1.1	SRE-managed STIR/SHAKEN . . . . .	2
2.1.2	Kamailio-managed STIR/SHAKEN . . . . .	3
2.1.3	Call forking . . . . .	4
2.1.4	Custom SIP endpoints . . . . .	4
2.2	Service Logic Editor . . . . .	5
2.2.1	Editor interface . . . . .	5
2.2.2	Detailed node logging . . . . .	5
2.2.3	Logging of actions . . . . .	6
2.2.4	Service logic import . . . . .	6
2.2.5	Simulations import and export . . . . .	6
2.2.6	New nodes . . . . .	7
2.2.7	Improved nodes . . . . .	7
2.3	Datamodel Editor . . . . .	7
2.3.1	Editor Interface . . . . .	7
2.3.2	Table changes tracking . . . . .	7
2.3.3	IPv6 validator . . . . .	8
2.3.4	Datamodel diagram export . . . . .	8
2.3.5	Datamodel versioning . . . . .	9
2.4	Data administration . . . . .	9
2.5	Statistics . . . . .	9
2.5.1	New statistics engine . . . . .	9
2.5.2	Service logic node statistics switch . . . . .	11
2.5.3	Provisioning metrics . . . . .	11
2.5.4	HTTP & ENUM performance metrics . . . . .	12
2.6	Alarms . . . . .	12
2.7	Operations & maintenance . . . . .	12
2.7.1	Call termination API . . . . .	12
2.7.2	Kamailio interface logs . . . . .	12
2.8	Security & auditing . . . . .	13
2.8.1	Force user password change . . . . .	13
2.8.2	REST API audit logging . . . . .	13
2.8.3	Per datamodel access rights . . . . .	13

---

2.8.4	Enhanced LDAP login integration . . . . .	13
2.8.5	Login brute force detection . . . . .	13
2.9	GUI . . . . .	13
2.10	Miscellaneous enhancements . . . . .	14
<b>3</b>	<b>Patch versions release notes</b>	<b>14</b>
3.1	Release 3.3.1 . . . . .	14
3.2	Release 3.3.2 . . . . .	15
3.3	Release 3.3.3 . . . . .	15
3.4	Release 3.3.4 . . . . .	16
3.5	Release 3.3.5 . . . . .	16
3.6	Release 3.3.6 . . . . .	17
<b>4</b>	<b>Upgrade from 3.2</b>	<b>17</b>
4.1	Element managers . . . . .	17
4.1.1	InfluxDB installation . . . . .	17
4.1.2	SRE RPM update . . . . .	18
4.2	Call processors . . . . .	19
<b>5</b>	<b>Downgrade from 3.3 to 3.2</b>	<b>20</b>
<b>6</b>	<b>Patch upgrade path from 3.3.x</b>	<b>20</b>

## 1 Introduction

These release notes provide a comprehensive overview of the new features, enhanced functionalities, and resolved issues found in version 3.3 of SRE. Additionally, it includes the details of the patch versions associated with release 3.3.

## 2 What's new in SRE 3.3

### 2.1 Call processing

#### 2.1.1 SRE-managed STIR/SHAKEN

The SRE has been enhanced to handle the necessary headers for implementing STIR/SHAKEN. For originating service providers, an authentication service can be built using the SRE. It can generate a proper Identity header, encoded with a private key, and add it to the outbound SIP message. Similarly,

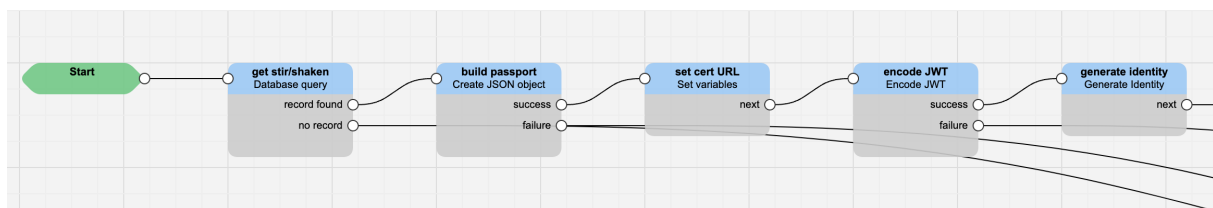
for terminating service providers, a verification service can be implemented. The SRE can extract the Identity header from the received INVITE message and validate it with the corresponding public certificate.

To support these functions, new nodes have been added to handle JSON Web Tokens (JWT), the technology behind the digital certificates of STIR/SHAKEN:

- Encode JWT: This node encodes a JSON payload suitable for STIR/SHAKEN using a private key and a certificate for decoding.
- Decode JWT: This node decodes a JWT into a JSON object for later validation.

Additionally, two other nodes have been introduced to manage Identity headers:

- Generate Identity: This node generates a suitable Identity header from an input JWT and a certificate URL.
- Extract Identity: This node extracts the Identity header from the SIP message and separates the JWT and certificate URL into two distinct variables.



**Figure 1:** Example STIR/SHAKEN nodes for an authentication service

### 2.1.2 Kamailio-managed STIR/SHAKEN

The SRE can also implement STIR/SHAKEN, managed by Kamailio. In this scenario, Kamailio will construct the Identity header on the originating service provider side and extract the Identity header on the terminating service provider side. A new node has been added to instruct Kamailio to generate a new Identity header:

- Add Identity header: This node instructs Kamailio to generate the Identity header by specifying the certificate URL and the attestation level.

On the terminating service provider side, Kamailio will validate the received INVITE with an Identity header against the certificate and pass the validation information through the call descriptor variables.

### **2.1.3 Call forking**

The SRE now can fork calls to multiple destinations, causing them to ring simultaneously. To facilitate this functionality, a new output node called “SIP relay with forking” has been introduced. This node allows for the provision of a list of request URIs from a records list and facilitates the proxying of the INVITE to all the specified destinations. Similar to the “SIP relay node,” this new node supports various options such as CD persistence, recursion, and more.

### **2.1.4 Custom SIP endpoints**

Custom SIP endpoints can now be configured based on a set of criteria, such as:

- method
- source
- destination
- From
- R-URI
- regular expression

With this mechanism, it is possible to trigger different SLs directly from the global configuration. Before, such behavior was only possible by using SL nodes to analyze the incoming calls and dispatching these calls to SSLs inside a single entry point.

SIP
HTTP

**NEW CUSTOM ENDPOINT**

Method

Match type

Match value

Priority

Create

**CUSTOM ENDPOINTS**

Show  entries Search:

Method	Match type	Match value	Priority	Delete
INVITE	Source address and port	10.0.161.186	0	<span style="background-color: #dc3545; color: white; padding: 2px 5px; border-radius: 3px;">Delete</span>
INVITE	From username range	39-23	3	<span style="background-color: #dc3545; color: white; padding: 2px 5px; border-radius: 3px;">Delete</span>
INVITE	Source address and port	10.1.1.1:5060	5	<span style="background-color: #dc3545; color: white; padding: 2px 5px; border-radius: 3px;">Delete</span>
INVITE	Source address and port	10.0.161.188:5062	0	<span style="background-color: #dc3545; color: white; padding: 2px 5px; border-radius: 3px;">Delete</span>
REGISTER	Source address and port	10.0.161.188:5070	0	<span style="background-color: #dc3545; color: white; padding: 2px 5px; border-radius: 3px;">Delete</span>

Showing 1 to 5 of 5 entries

**Figure 2:** Example custom SIP endpoints

## 2.2 Service Logic Editor

### 2.2.1 Editor interface

The background grid automatically expands as nodes are moved to the edges.

In the simulation timeline, the top headers are now frozen, enabling vertical scrolling of variable values while keeping the header lines visible.

### 2.2.2 Detailed node logging

A new logging system has been integrated into the SLE, enhancing the level of detail available for specific nodes (e.g., query nodes) regarding the processing performed by each node. This additional information can be accessed through the tooltip when hovering over a simulation step or by opening the simulation step modal (pop-up).

Step 6 x

counter	0	0
address	64.233.167.139	64.233.167.139
	64.233.167.101	64.233.167.101
	64.233.167.100	64.233.167.100
	64.233.167.138	64.233.167.138
	64.233.167.113	64.233.167.113
64.233.167.102	64.233.167.102	
originalCalled		
originalCalling		
	order preference flag service regexp translation	order preference flag service regexp
r	100 20 b'u' b'E2U+pstn:tel' b'!(.*)\$!tel:\\1' tel:123	100 20 b'u' b'E2U+pstn:tel' b'!(.*
table1_rl	col1 col2 col3 col4 col5	col1 col2 col3 col4
	12 None None None None	12 None None None
	123 None None 2022-10-03 10:30:38.632000 False	123 None None 2022-10-03 10:30:38.63
456 None None 2022-10-03 10:30:38.632000 True	456 None None 2022-10-03 10:30:38.63	

```

Jun 22 12:18:02.667: sending GET https://jsonplaceholder.typicode.com/todos/1 with data:
Jun 22 12:18:02.840: received response code 200 with data: {
  "userId": 1,
  "id": 1,
  "title": "delectus aut autem",
  "completed": false
}

```

**Figure 3:** Example node logging for an HTTP query node

### 2.2.3 Logging of actions

A new logging system has been added to the SLE so that the actions with non-immediate effects (e.g. header manipulations, ...) are logged for such nodes.

### 2.2.4 Service logic import

The service logic import tool has been enhanced to allow you to specify the import suffix.

### 2.2.5 Simulations import and export

It is now possible to export and import simulations, along with the groups they belong to. This can either be applied to all simulations or simulations filtered through some criteria.

### **2.2.6 New nodes**

A new node has been introduced to facilitate the rotation of a list of records. This functionality enables the swapping of columns and rows from an input records list to generate an output records list.

Additionally, a new node has been implemented to extract specific portions of the SIP message, such as headers and/or body, using regular expressions. This node provides flexibility in extracting SDP data or header parameters directly, thereby reducing the number of required nodes.

Furthermore, two new nodes have been included to enable the conversion between records lists objects and JSON objects.

To enhance alarm monitoring, a new node has been incorporated to check the current status of an alarm.

Finally, an additional output node called “custom SIP response” has been introduced. This node allows users to specify both the response code and the reason header of the SIP response sent back to the network.

### **2.2.7 Improved nodes**

A new option has been introduced in the “set variables” node, allowing the skipping of updates for existing variables. This feature is useful for setting default values for variables that are currently undefined.

The “extract SIP header” node has been improved to include the capability of storing header repetitions into a records list when specified.

The “aggregate column” node has been enhanced with a new “count” operator, enabling the calculation of the total number of rows in a records list.

## **2.3 Datamodel Editor**

### **2.3.1 Editor Interface**

The delete table button has been moved up next to the tables re-order buttons.

An exit confirmation alert is displayed if the datamodel is not saved.

### **2.3.2 Table changes tracking**

A new option has been implemented to enable or disable change tracking on a per-table basis. When this feature is enabled, the system will automatically include additional columns in the table to track



changes. These columns will capture the record insert time, record update time, and user information, indicating the user who performed the operation. This tracking functionality applies to changes made through the GUI, REST API, and batch provisioning methods.

DATA ADMINISTRATION INTERFACE

Table label   
The label is used throughout the GUI to identify the table.

Record label format   
This format is used whenever a record from this table is displayed as a foreign key option of another table. Use [placeholder] syntax.

Track activity  Enable tracking of user and modification time.

Column	Label	Display	Validators	TextArea	Hidden
c1	<input type="text" value="c1"/>	<input checked="" type="checkbox"/>	<input type="text" value="No validator"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 4:** Example activation table activity tracking

RESULTS

4 of 4 columns selected

Show  entries Search:

<input type="checkbox"/>	↕ c1	↕ User	↕ Inserted	↕ Updated	↕ Edit	↕ Delete
<input type="checkbox"/>	aaa	None	2023-03-13 09:19:12.332	None	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
<input type="checkbox"/>	ccc	GUI: admin	2023-03-13 09:19:40.154	None	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
<input type="checkbox"/>	ddd	GUI: admin	2023-03-13 09:19:12.332	2023-03-13 09:20:43.680	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>
<input type="checkbox"/>	bbb-fcar	GUI: admin	2023-05-24 15:44:35.981	2023-05-24 15:44:59.671	<input type="button" value="Edit"/>	<input type="button" value="Delete"/>

Showing 1 to 4 of 4 entries First Previous 1 Next Last

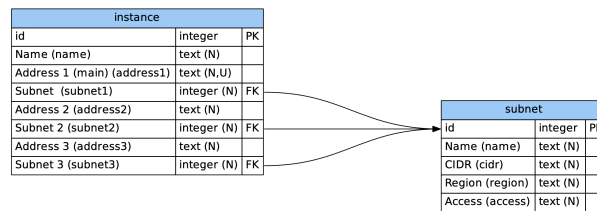
**Figure 5:** Example table changes in data administration

### 2.3.3 IPv6 validator

A new IPv6 validator has been added to the DME and ensures validation of IPv6 addresses inside data admin pages.

### 2.3.4 Datamodel diagram export

An option has been added to export the datamodel relationship diagram as PDF, both from the GUI datamodel versioning page and from the sre-admin tool.



**Figure 6:** Example datamodel diagram export

### 2.3.5 Datamodel versioning

The datamodel versioning page has undergone improvements to enhance user experience. Now, the DM versions are displayed in reverse order, allowing you to conveniently access the most recent versions first and easily navigate to older versions. In addition, we have introduced helpful links that enable quick jumps to the first, last, and active versions for added efficiency.

## 2.4 Data administration

A new option has been added in the system configuration to disable the batch provisioning option “replace all”. This may prevent human errors from mistakenly uploading a corrupt CSV file.

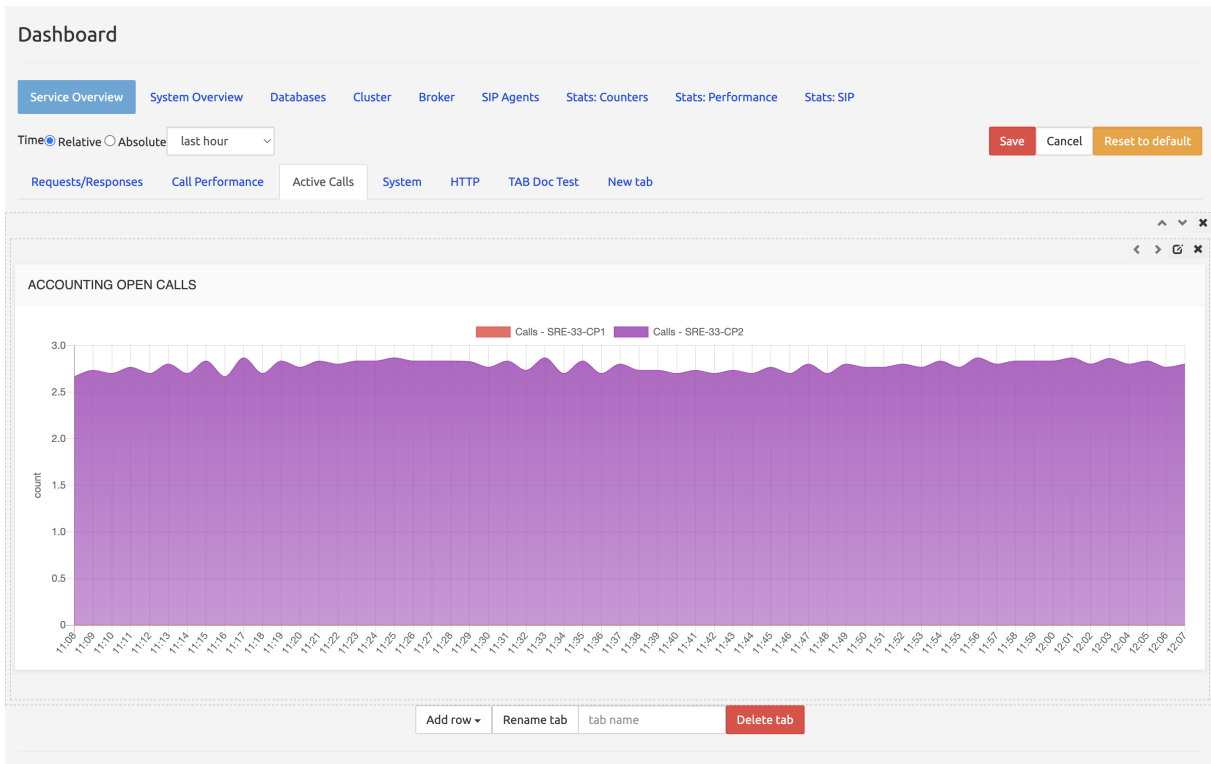
A new button (next to the Edit button) has been added on the records search page to clone an existing record.

## 2.5 Statistics

### 2.5.1 New statistics engine

The statistics engine has been completely redesigned and is now based on InfluxDB, a time-series database. This DB runs on both EMs. Statistics are no longer stored in the PostgreSQL database and so, are no longer replicated to the call processor servers, which greatly reduces the replication activity.

In addition to this new back end, the dashboard has been redesigned to let the administrator customize the dashboard by adding/removing tabs and adding/removing rows of panels on each of these tabs.



For each panel, the administrator can select which data to display, from the set of available metrics and how to display it:

Edit panel
✕

Select graph

Title

Visualization type

Interval 

The interval selected here may be overridden in order to keep the number of graph data points below the configured setting.

Interface

**Metrics**

Class

Name

Aggregation

Servers  


- SRE-33-CP1
- SRE-33-CP2
- SRE-33-EM1

Tags  

Key	Value
<input type="text" value="key"/>	<input type="text" value="value"/>

Color

Class

Name

Aggregation

Servers  


- SRE-33-CP1
- SRE-33-CP2
- SRE-33-EM1

Tags  

Key	Value
<input type="text" value="key"/>	<input type="text" value="value"/>

Color

**Figure 7:** Example graph panel edit form

### 2.5.2 Service logic node statistics switch

A new option has been added to disable the generation of service logic node statistics. By enabling this option, only summary statistics related to requests and responses will be available in the dashboard. Disabling the generation of detailed statistics can significantly improve performance, particularly in systems with heavy loads and complex service logic configurations.

### 2.5.3 Provisioning metrics

Releases 3.3.3+

New counters have been added to monitor the provisioning operations from REST, CSV and GUI. Counters have also been added to monitor the number of records per table. These counters are available on the dashboard and in graphs.

## 2.5.4 HTTP & ENUM performance metrics

Releases 3.3.3+

New metrics have been added to monitor the service logic processing time for the HTTP & ENUM interfaces. These metrics are available on the dashboard and in graphs.

## 2.6 Alarms

A new monitor has been added to monitor the number of records per table and trigger an alarm if the number of records per table varies over the defined percentage threshold. This threshold can be configured per table.

A new monitor has been added to check the validity of TLS certificates and trigger an alarm if the time-to-expire is below a configurable threshold.

Cluster, node, and resource have been added for the Pacemaker cluster subsystem.

A new alarm will be triggered if the CDR collector (running on EM) is not reachable from a CDR sender (running on CP).

Releases 3.3.3+

New alarms have been added to monitor the ENUM processing performance, along with configurable minor, major and critical thresholds.

## 2.7 Operations & maintenance

### 2.7.1 Call termination API

A new REST API endpoint has been implemented, providing the capability for an external system to terminate an active call. When triggered, the SRE will initiate BYE transactions to both the caller and the callee, ensuring the call is effectively terminated. To control access to this API using token-based authentication, the new endpoint has been included in the access token definition.

### 2.7.2 Kamilio interface logs

Kamilio interface logs can now be forwarded to the local syslog subsystem instead of the local interface.log file.

## **2.8 Security & auditing**

### **2.8.1 Force user password change**

An option has been added to force password change on the next user login attempt.

### **2.8.2 REST API audit logging**

In order to enhance auditing capabilities, dedicated audit logging has been implemented for the REST API. This ensures that all operations originating from the REST API are logged in a separate and dedicated file. By doing so, you can easily track and monitor actions performed through the REST API, enabling better visibility and accountability.

### **2.8.3 Per datamodel access rights**

The role definition now allows setting access rights per datamodel, rather than globally for all data-models.

### **2.8.4 Enhanced LDAP login integration**

The LDAP login integration has been enhanced to allow manipulation of usernames and flexible filtering of users, based on configurable criteria. This allows restricting access to the GUI to selected users.

### **2.8.5 Login brute force detection**

Login brute force detection and throttling have been implemented. The threshold can be configured in the system settings and when the client performs too many failed login attempts, the origin IP address will be blacklisted for a predefined duration.

## **2.9 GUI**

The platform title is configurable in the system settings and allows identifying the current environment in case there are several environments.

## 2.10 Miscellaneous enhancements

The following is a list of minor enhancements which do not affect the main functionality of SRE:

- added graphviz and SNMP installation to VM image generation script
- added custom SIP endpoint migration tool for upgrade
- adapted “sre” PostgreSQL user creation to allow datamodel creation
- added NFV image generation helper scripts
- enabled automatic installation of crontab on RPM install
- added support for MongoDB 4.x and 5.x
- added CAC configuration to SREaaS deployment playbooks
- added ability to update multiple DNS zones
- added RPM packaging for RHEL 8
- added a new parameter to set debug topics from config instead of environment variables
- added command sre-admin monitor DB activity to retrieve current DB activity
- added tool to replay PCAPs to validate call processing
- updated jquery library

## 3 Patch versions release notes

### 3.1 Release 3.3.1

---

Pull id	Fix
1271	fixed MongoDB monitoring to query localhost; implemented re-use of DB connections
1257	added accounting refresh in case of re-INVITE or UPDATE
1253	added sre-admin option to test the performance of a service logic
1251	fixed datamodel migrations between column both indexed/unique and column unique only
1247	fixed escaping of HTML to avoid XSS on data admin, users, roles, saved simulations, simulations groups, service logics, releases, configuration settings
1242	fixed display of EM's on dashboard; fixed display and improved performance of counters and stats tabs

---

### 3.2 Release 3.3.2

---

Pull id	Fix
1283	fixed profile access rights after brand-new datamodel creation & activation
1280	fixed conversion of XML response into JSON for node HTTP XML query
1276	hotfix/delete_custom_endpoint
1266	disabled display of tracebacks in case of GUI exceptions by default
1264	added InfluxDB to SREaaS deploy scripts

---

### 3.3 Release 3.3.3

---

Pull id	Fix
1357	added alarms for ENUM performance
1355	fixed SIP agent port shown as N/A in SIP agents list
1351	fixed edit multiple records page to set boolean columns to NULL
1343	fixed service logic INVITE performance alarm to 60 secs window
1333	added provisioning counters (requests and records affected) for REST/CSV/GUI actions; added new dashboard graphs for provisioning counters; added performance stats for interfaces ENUM & HTTP; added new dashboard graphs for ENUM & HTTP performance
1332	added OCI London region to SREaaS deployment scripts
1329	added option to configure different tokens for influxDB hosts
1326	adapted ansible to manage several OCI regions
1324	modified parameter CAC purge timeout to update it without restart
1322	fixed node DB query when no fields are extracted
1319	fixed caching of HTTP query nodes in order to use expanded body as caching key
1312	improved cluster details in dashboard
1308	fixed DB replication status data & alarms
1305	fixed concurrent access to accounting events store for ENUM and HTTP processors

---



---

Pull id	Fix
1294	fixed DNS zone reload mechanism for process sre-dns-updater when a brand new zone, never referenced before, is added

---

### 3.4 Release 3.3.4

---

Pull id	Fix
1384	fixed zone records generation in case of TXT records with spaces
1379	sle: fixed simulation path highlighting when multiple links originate from the same source node
1377	gui: hidden button “forgot password” when LDAP authentication is configured
1374	gui: fixed caching of datamodel when identical tables are present inside different services
1371	dashboard: fixed calculation of now counters and samples
1366	dashboard: added missing SIP responses to build-in dashboard graphs
1365	dashboard: fixed duplicate display of hosts as both EM and CP
1360	fixed missing dashboard.json for SREaaS

---

### 3.5 Release 3.3.5

---

Pull id	Fix
1440	fix XSS vulnerabilities
1435	added optimizations for InfluxDB connections and records writing
1432	added option to define custom SIP endpoints matching any port
1427	fixed datamodel diagram export when special characters are used for names
1418	decreased timeout for InfluxDB commands
1406	added table label to CSV provisioning pages
1395	fixed tel URI handling when URI starts with <

---

---

Pull id	Fix
1392	added record delete operations to GUI audit log
1388	added operators “is NULL” and “is not NULL” for data admin search page

---

### 3.6 Release 3.3.6

---

Pull id	Fix
1460	fixed relationship diagram
1457	corrected node “extract SIP header” when multiple headers share the same suffix
1454	adapted REST audit log to ease parsing
1450	fixed stop of interim CDR generation in case of end event

---

## 4 Upgrade from 3.2

### Note

If you are coming from a release prior to 3.2, refer to the release notes for that release to perform the intermediate steps.

The upgrade of the 3.2 platform can be done by using the new RPM.

Copy the RPM locally on all SRE nodes.

The upgrade should be performed node by node, starting first from the Element managers and then proceeding with the Call processors.

### 4.1 Element managers

#### 4.1.1 InfluxDB installation

Before proceeding with the SRE software upgrade itself, run the following commands to install InfluxDB on both EM.

```
1 # cat <<EOF | sudo tee /etc/yum.repos.d/influxdb.repo
2 [influxdb]
```

```
3 name = InfluxDB Repository - RHEL \${releasever}
4 baseurl = https://repos.influxdata.com/rhel/\${releasever}/\${basearch}/stable
5 enabled = 1
6 gpgcheck = 1
7 gpgkey = https://repos.influxdata.com/influxdata-archive_compat.key
8 EOF
```

```
1 # yum install -y influxdb2-2.4.0-1 influxdb2-client-2.4.0-1
2 # systemctl start influxd
3 # influx setup -u influxuser -p influxuser -t <secret-token> -o influxorg -b
   ↪ bucket -r 1h
4 (it will ask for confirmation)
5 # influx bucket delete -n bucket
```

### Note

To install on nodes without internet access, you can obtain Influx RPMs by downloading them from internal NAS or from software delivery portal [here](#) under the folder:

Supporting\_packages/dependencies SRE 3.3

#### 4.1.2 SRE RPM update

To launch the upgrade, on all EMs do:

```
1 # yum install /<path>/sre.3.3.x-y.x86_64.rpm
```

You must upgrade the internal DB schema. Therefore on the master EM node only, run:

```
1 # /opt/sre/bin/sre-admin db upgrade
```

The DB schema change will be applied to the other nodes through standard DB replication.

After you need to restart SRE on both EMs with:

```
1 # systemctl restart sre
```

In SRE GUI in *Settings->Element Managers* set: - Stats DB token to the secret token you previously choose - Stats DB org to influxorg

Once these changes have been performed, restart the *sre-manager* with the command

```
1 # /opt/sre/bin/supervisorctl restart sre-manager
```

## 4.2 Call processors

Call processors must be upgraded one by one.

If the call processor runs the SIP stack, perform the following steps:

1. Take the CP offline from the GUI (*System->Node operational status->out-of-service*). Alternatively, you can set the CP out-of-service from the SIP client equipment (e.g. SBC, ...). Check traffic has stopped on the CP by checking with tcpdump, sngrep or the dashboard statistics.
2. Shutdown Kamailio with:

```
1 # systemctl stop kamailio
```

3. Upgrade Kamailio to the latest stable 5.5 version if not already in this version (main package and kamailio-python package).

```
1 # yum install --disablerepo=kamailio --enablerepo=kamailio-5.5 kamailio
   ↪ kamailio-python
```

4. Upgrade SRE from the RPM with the same command used for EM:

```
1 # yum install /<path>/sre.3.3.x-y.x86_64.rpm
```

5. Copy the file `/opt/sre/etc/kamailio/kamailio.cfg` to `/etc/kamailio`
6. Adapt the file `/etc/kamailio/kamailio.cfg` depending on the deployment (usually only the line `listen`, which contains the listening address of your Kamailio instance)
7. Restart Kamailio with:

```
1 systemctl start kamailio
```

8. Enable traffic from the GUI (*System->Node operational status->in-service*)

If the call processor runs the ENUM interface or the HTTP interface, perform these steps:

1. If the client equipment allows putting the SRE CP out-of-service so that no requests are sent to it, proceed in this way.
2. Upgrade SRE from the RPM with the same command used for EM:

```
1 # yum install /<path>/sre.3.3.x-y.x86_64.rpm
```

After the upgrade is done at least on 1 CP node, make sure the CP is handling requests in the expected way, as in the previous release. Verify that CDRs are created on EMs (if enabled) for the requests handled by this CP.

If this is confirmed, proceed to the next CP node.

## 5 Downgrade from 3.3 to 3.2

You must downgrade the internal DB schema. Therefore on the master EM node run as user postgres:

```
1 # psql
```

and use the following commands:

```
1 # postgres=# \c sre
2 # sre=# ALTER TABLE web_user DROP COLUMN email CASCADE;
3 # sre=# ALTER TABLE web_user DROP COLUMN changepwd CASCADE;
```

Install the previous rpm on all EMs and CPS with the command:

```
1 # yum downgrade /<path>/sre.3.2.x-y.x86_64.rpm
```

On CPs restore the previous Kamailio configuration file and restart kamailio with:

```
1 # systemctl restart kamailio
```

## 6 Patch upgrade path from 3.3.x

To upgrade to a target patch release, the Admin needs to check the upgrade path to know which actions to take. > It is important to highlight that an action needed at a patch level 3.3.N is also needed for direct upgrade to 3.3.N+1, 3.3.N+2, ...

Patch release	Needed actions
3.3.1	None
3.3.2	None
3.3.3	None
3.3.4	None

In addition to the listed needed actions:

On all nodes, do as root:

```
1 # yum update /<path>/sre.3.3.x.-y.x86_64.rpm
```

Verify always the possible differences of the following files with the diff command:

```
1 # diff /etc/kamailio/kamailio.cfg /opt/sre/etc/kamailio/kamailio.cfg
2
3 # diff -y /etc/cron.d/<crontab file for sre> /opt/sre/etc/crontab
```

If any difference is observed, verify with Netaxis Support/R&D.