**Oracle® Communications Performance Intelligence Center Observability**

**Application Guide**

**Release 10.4.0**

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**ORACLE**®

Oracle® Communications Performance Intelligence Center Observability Application Guide, Release 10.4.0

**CAUTION: Use only the guide downloaded from Oracle Help Center.**

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# MY ORACLE SUPPORT

My Oracle Support (MOS) is your initial point of contact for any of the following requirements:

- **Product Support:**

  The generic product related information and resolution of product related queries.

- **Critical Situations:**

  A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

  o A total system failure that results in loss of all transaction processing capability

  o Significant reduction in system capacity or traffic handling capability

  o Loss of the system's ability to perform automatic system reconfiguration

  o Inability to restart a processor or the system

  o Corruption of system databases that requires service affecting corrective actions

  o Loss of access for maintenance or recovery operations

  o Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle.

**Training Need:**

Oracle University offers training for service providers and enterprises.

A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at http://www.oracle.com/us/support/contact/index.html. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select 2 for New Service Request
2. Select 3 for Hardware, Networking and Solaris Operating System Support
3. Select 2 for Non-technical issue

You will be connected to a live agent who can assist you with MOS registration and provide Support Identifiers. Simply mention you are a Tekelec Customer new to MOS.

MOS is available 24 hours a day, 7 days a week.

# 1. INTRODUCTION

This section gives an overview of the new Observability Application in OCPIC. The new Observability application shall be responsible for creating configuration so that the KPIs generated by OCPIC mediation system is also stored on the server hosting InfluxDB and can be visualized using Grafana.

## Overview

The new observability feature in OCPIC will provide rich visualization by leveraging Grafana's dashboard capabilities. OCPIC will provide the integration with the Grafana Server; it will provide an option to the user to configure the data source for the Grafana server. The Grafana server will have the InfluxDB installed on it. The InfluxDB will store the KPIs exported from the OCPIC system and dashboards will be created using the Grafana. The mediation server will be enhanced to support writing into InfluxDB along with the Oracle database. The IxpStore process in the mediation server will use an HTTP interface to write into InfluxDB.

A new Observability Application available on the OCPIC portal shall provide the configuration for the Grafana and InfluxDB data source. The application additionally shall support the export of the custom KPIs and pre-packaged KPIs towards Grafana Server. The new Observability application shall be developed in OJET and Spring boot. The observability Application shall be available inside the Configuration perspective on the Management application portal.

**Note:** Only Management Admin user will be able to access the Observability Configuration Application
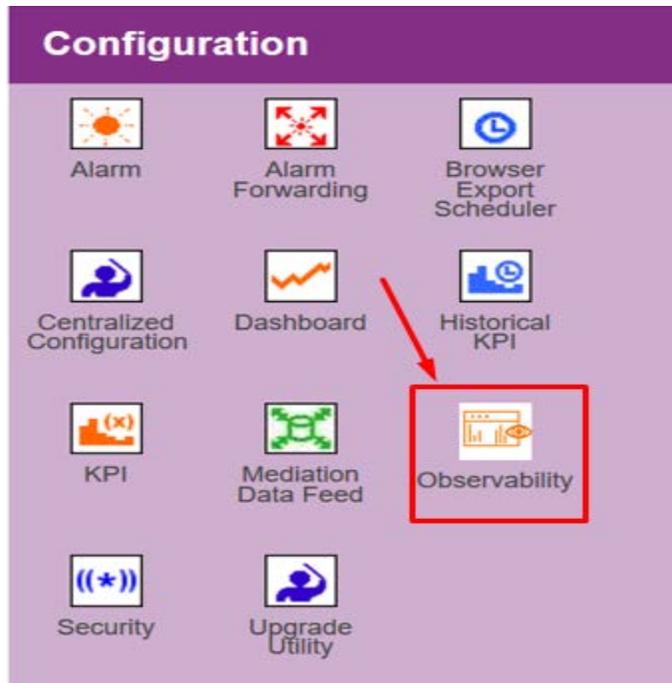
# Functional Overview

The observability feature shall provide the following functionalities:

Grafana Server API key configuration: The user will be required to configure the Grafana server API key for its Organization. The API key will be used by OCPIC Observability application to create the exports of the custom and pre-packaged KPIs on the Grafana server. The API key can be modified for the organization but once added could not be deleted. Currently, only one organization can be added to the observability application. The API key shall also be used for creating the pre-packaged dashboards on the Grafana Server. The OCPIC system shall store the API key into its database.

InfluxDB Data source configuration: The user will be required to configure the InfluxDB data source. The InfluxDB credentials and data source URL will be required. The retention policy on the InfluxDB for the particular data source shall also be required during the configuration. More than one InfluxDB data sources are supported. The InfluxDB parameters will be stored in OCPIC Management database and will be made available to the mediation server during the creation of the custom and pre-packaged KPIs export.

Custom KPIs Configuration: The user will be required to export the KPIs into the InfluxDB in case it wants to create the visualization using the Grafana Dashboard capabilities. The user will select the input statistics sessions (output session of the KPIs already running on OCPIC system) and associate it with the InfluxDB data source created earlier. It will select the output session that shall be created on the InfluxDB, an option to select the Tag keys will be provided. The Tag keys are helpful in a group by queries on the Grafana Dashboard. After the custom KPI export is configured, the user will be notified to synchronize the changes to the mediation server. On the completion of the sync action, an IxpStore process on the mediation server shall be created that shall be responsible for writing the KPIs generated by OCPIC system into the output session on InfluxDB. The custom KPIs can be viewed and deleted from the observability application.

Pre-packaged KPI Configuration:  The pre-packaged KPIs are the useful generic KPIs bundled with dashboard configurations. These are defined for the ease of OCPIC system users so that they do not have to configure the KPIs and dashboard separately. The pre-requisite for the pre-packaged KPIs is that the input reconstitution session should already be created on the OCPIC system. The user can select the various 3G/4G/5G/VOIP and Usage statistics KPIs from the pre-packaged configuration screen available under the new Observability application. The dashboard configuration is also bundled along with the KPI definition. The KPIs selected for the pre-packaged dashboards are generic in nature and any customer-specific adaptations should be done using the custom KPI flow. The pre-packaged KPIs can be configured and deleted from the Observability application.

Launching Grafana Dashboard from Observability application: The link to the Grafana dashboard will be available from the Observability application. On clicking this link, the user shall be taken to the Grafana login page.

# High-level Architecture
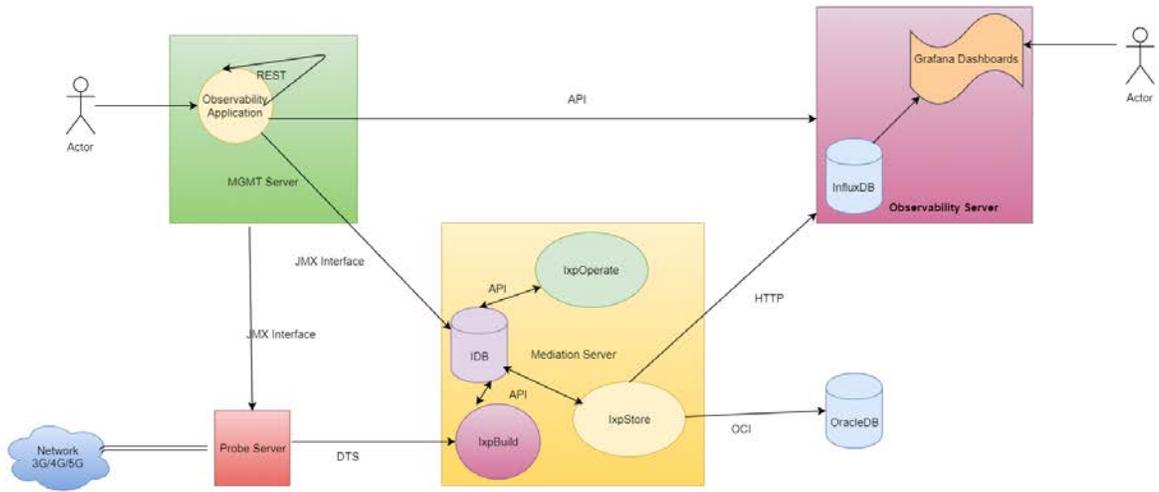
# 2. Hardware Requirements

The Observability Application will be deployed on the OCPIC Management Server, so there are no additional hardware requirements for the new Observability Application.

The server hosting Grafana and InfluxDB can either be a virtual machine or bare-metal server. The hardware recommendations for the server hosting Grafana and InfluxDB are mentioned below:

- CPU: 4 vCPUs

- RAM: 4GB

- Disk Space: 200 GB or a separate partition of having 200GB of space.

# 3. Software Requirements

The new Observability application shall be deployed along with the other Management server applications and there are no specific software requirements for it.

Grafana Software
- Grafana 6.5.x
- Download Link: https://grafana.com/grafana/download
  - v6.5.x
  - OS: RedHat & CentOS

InfluxDB Software
- InfluxDB version 1.7
- Download Link: https://portal.influxdata.com/downloads/
  - v1.7.x
  - OS: RedHat & CentOS

# 4. Installation

The installation chapter shall provide the installation steps for the Grafana and InfluxDB open source applications.

## Observability Application

The Observability Application shall be deployed along with other applications, there is no separate installation required for the new application.

### Grafana Server

Pre-requisite:

A virtual machine or server with hardware configure identified in section Chapter 2: Hardware Requirements should already be installed with Oracle Linux 7.4 or any other compatible LINUX distribution like RedHat or CentOS. NTP rpm should be installed and NTP should be synced with NTP server used by PIC system.

### Grafana Application

Login to the Grafana server using root
Copy the downloaded Grafana rpm on the server
Execute rpm –Uvh <rpm file path for Grafana rpm>
Allow port 3000  for Grafana GUI access
firewall-cmd --permanent --add-port=3000/tcp

Refer URL https://grafana.com/docs/grafana/latest/installation/configuration/ , in case of other detailed configuration for Grafana, application is needed. The integration with OCPIC will work with the default configuration.

**Grafana Plugins**:
Install the Pie chart plugin
Use https://grafana.com/grafana/plugins/grafana-piechart-panel/installation

InfluxDB Application
Login to the Grafana server using root
Copy the downloaded InfluxDB rpm on the server
Execute rpm –Uvh <rpm file path for InfluxDB rpm>
Allow port 8086 and 8088 for InfluxDB
firewall-cmd --permanent --add-port=8086/tcp
firewall-cmd --permanent --add-port=8088/tcp

Refer https://docs.influxdata.com/influxdb/v1.7/introduction/installation/#configuring-influxdb-oss
Customize the "/etc/influxdb/influxdb.conf" file
Update [Meta] section, for the value of "dir" with the path where InfluxDB should be created
Update [Data] section, for the value of "dir" with the path where InfluxDB should be created
Update [Data] section, for the value of "wal-dir" with the path where InfluxDB should be created

```
###
### [meta]
###
### Controls the parameters for the Raft consensus group that stores metadata
### about the InfluxDB cluster.
###

[meta]
  # Where the metadata/raft database is stored
  dir = "/opt/data/influxdb/meta"

  # Automatically create a default retention policy when creating a database.
  # retention-autocreate = true

  # If log messages are printed for the meta service
  # logging-enabled = true


###
### [data]
###
### Controls where the actual shard data for InfluxDB lives and how it is
### flushed from the WAL. "dir" may need to be changed to a suitable place
### for your system, but the WAL settings are an advanced configuration. The
### defaults should work for most systems.
###

[data]
  # The directory where the TSM storage engine stores TSM files.
  dir = "/opt/data/influxdb/data"

  # The directory where the TSM storage engine stores WAL files.
  wal-dir = "/opt/data/influxdb/wal"

  # The amount of time that a write will wait before fsyncing.  A duration
  # greater than 0 can be used to batch up multiple fsync calls.  This is useful for slower
  # disks or when WAL write contention is seen.  A value of 0s fsyncs every write to the WAL.
  # Values in the range of 0-100ms are recommended for non-SSD disks.
  # wal-fsync-delay = "0s"
```

**Note:** This path should have the write permissions, otherwise InfluxDN service will not start. Refer https://docs.influxdata.com/influxdb/v1.7/introduction/installation/#configuration-file
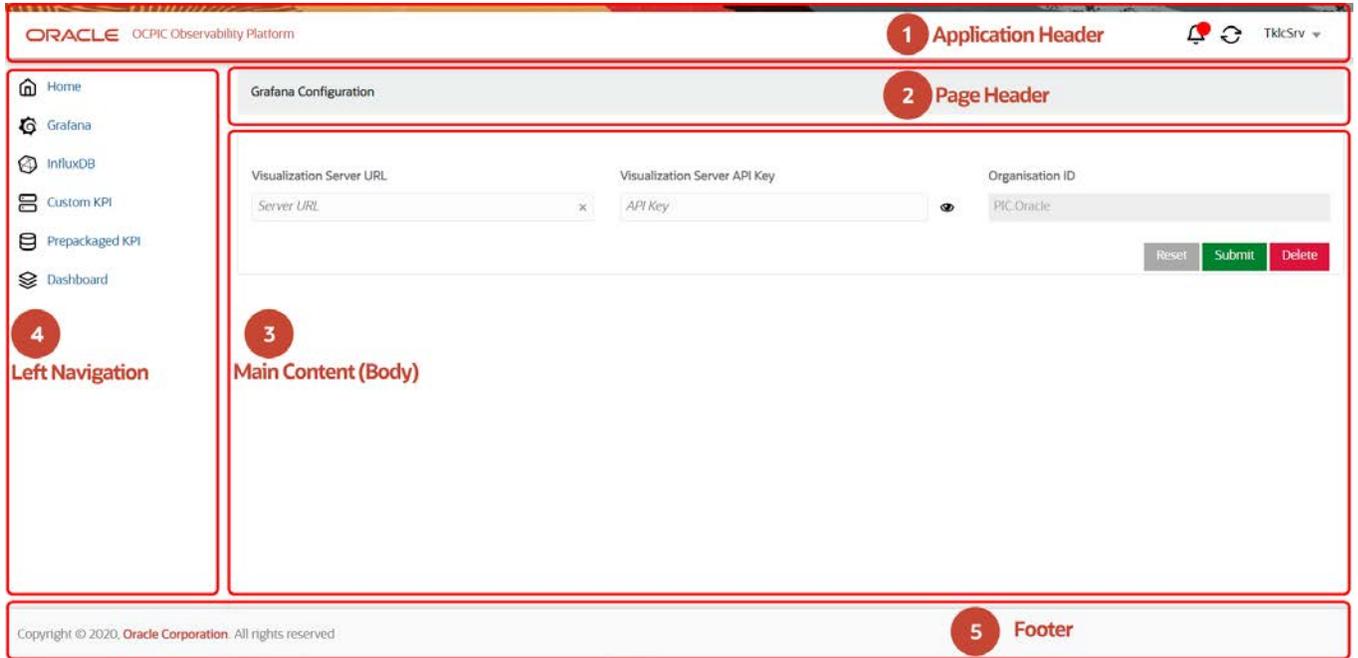
# 5. Application Screens & Workflows



*Figure 1: Landing page*

# Bell Notification and Apply Change

- Bell Notification will appear for any configuration modification to synchronize the changes to PIC-Mediation Server.
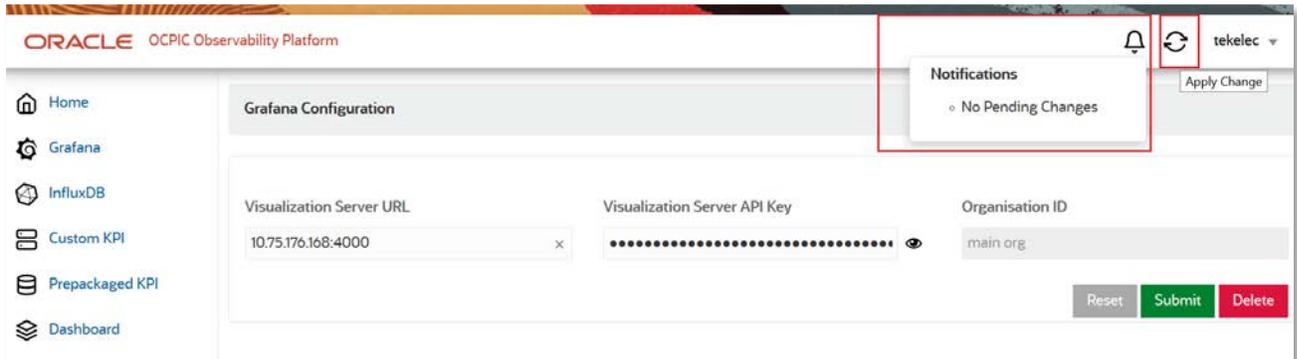- User should perform the sync action by clicking Apply Change icon.



*Figure 2: Bell Notification and Apply Change Action*
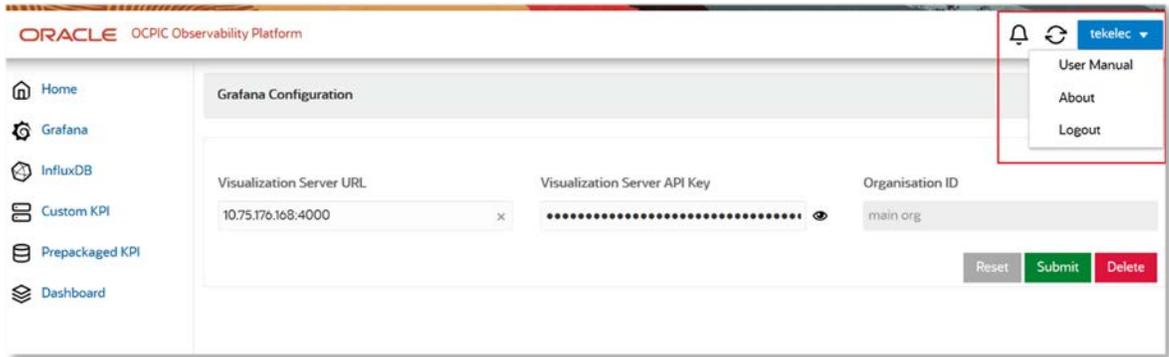
# User Details



*Figure: User details*

# Grafana Configuration

The Grafana Data source configuration shall be done from the new Observability Application. This is the first operation user will be required to perform. After the Grafana data source has been configured user shall be navigated to InfluxDB Configuration.
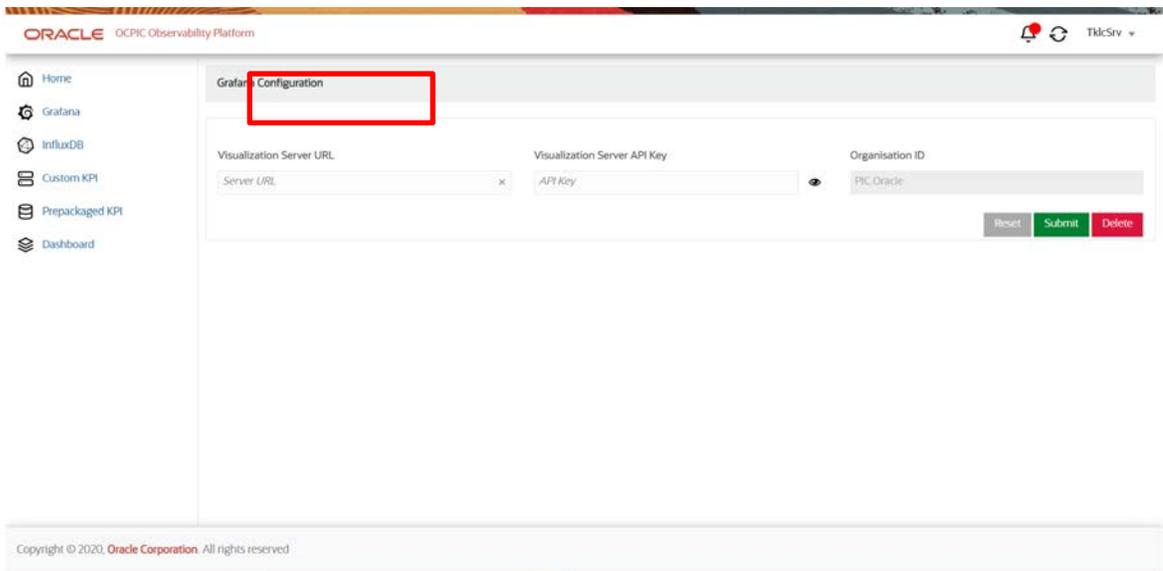


*Figure 3: Grafana Configuration*

**Add Grafana Server**



*Figure 4: Add Grafana Server*

- Provide IP Address and Port of the Grafana Server in the *Visualization Server URL*
- Provide API key in the *Visualization Server API Key*. The API key can be generated using the procedure defined in **Appendix C: How to generate API Key in Grafana**
- *Organization ID* will be automatically filled after configuration saved successfully by clicking Submit button.
- The *eye/show* button beside the *Visualization Server API Key* field will help the user to view the API key.

**Edit Grafana Server**



*Figure 5: Edit Grafana Server*

- Provide IP Address and Port of the Grafana Server in the *Visualization Server URL*

- Provide API key in the *Visualization Server API Key*. The API key can be generated using the procedure defined in  **Appendix C: How to generate API Key in Grafana**

- *Organization ID* will be automatically filled after configuration saved successfully by clicking Submit button.

- The *eye/show* button beside the *Visualization Server API Key* field will help the user to view the API key.

     **Note:** In case user is only modifying the API key, then the API key must belong to the same organization.
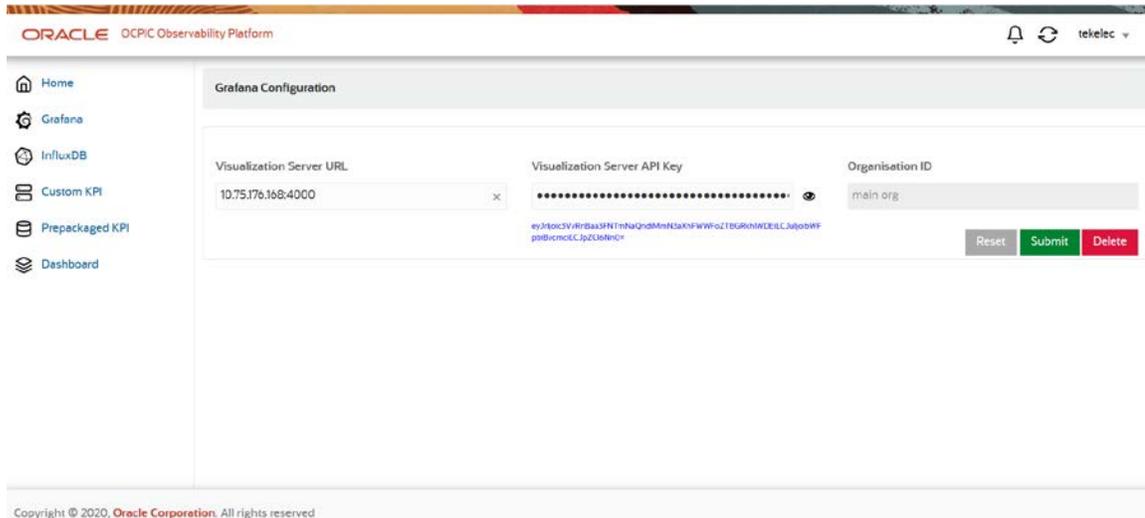
**Delete Grafana Server**



*Figure 6: Delete Grafana Server*

- Grafana Server configuration shall be deleted on clicking Delete button in case there is no dependent configuration for InfluxDB, Custom KPI and /or Pre-packaged KPI.

- The deletion shall fail if there are any dependent configurations remaining.

**Note:** There shall be no deletion of Dashboards created by the user manually on the Grafana server.

**Getting Started with Grafana**
The following guides can be referred for creating visualization using Grafana tool:
https://grafana.com/docs/grafana/latest/getting-started/getting-started/
https://grafana.com/tutorials/

# Influx DB Configuration

The user shall be required to configure the InfluxDB data source as the second step. Multiple data sources (up to 20) can be added**.**
Either clicking on Submit button on Grafana Configuration or clicking on the InfluxDB Configuration in the side menu bar, user will be redirected to the InfluxDB Configuration page.

## Influx Server Configuration

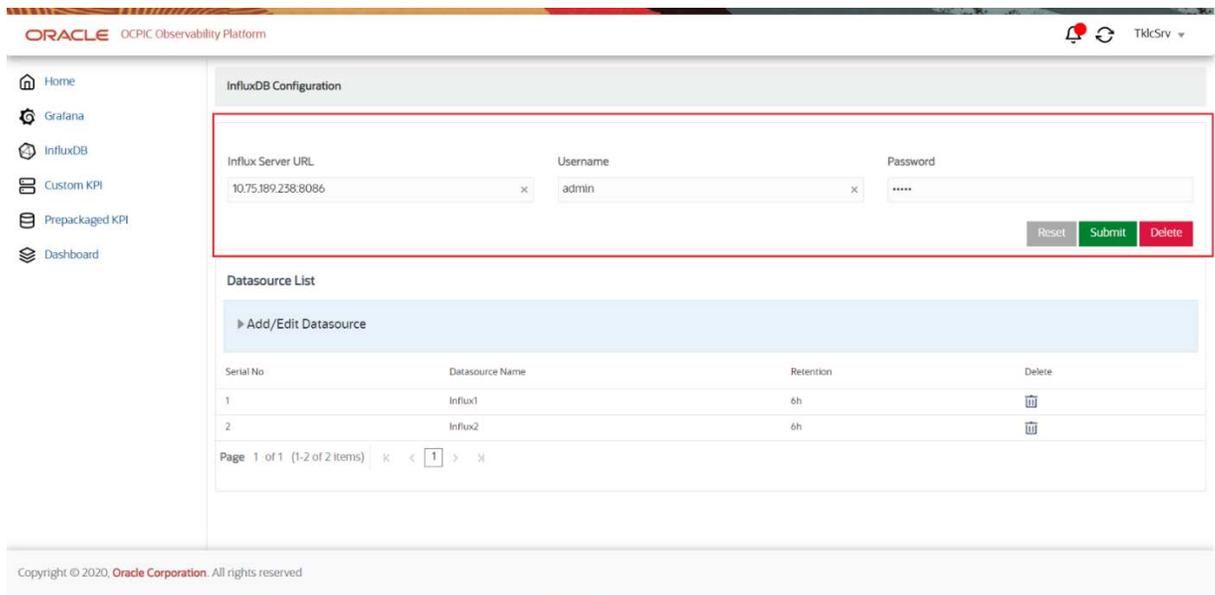### *Add Influx Server*



*Figure 7: Add Influx Server*

- ***User can add only one Influx Server***
- To Add Influx Server - User has to enter ***Influx Server URL <server_ip: influxdb_port>*** *|* ***Username*** *|* ***Password*** and click ***Submit*** Button.
- '#' character is not allowed in **Password** field.

*Edit Influx Server*



*Figure 8: Edit Influx Server*

- In case of the Influx Server is configured on any existing OCPIC server, there can be two possibilities

  - IP Address of the existing OCPIC server is changed: User first need to perform the IP change of that OCPIC server using the IP address change procedures defined in the maintenance guide and then Edit Influx Server configuration using this screen.

  - Influx Server is moved from existing OCPIC server to external server: User need to delete all the configuration like Custom KPIs, PrePkg KPIs, Influx Datasources, Influx Server and Grafana Server configuration using Observability application and then add Grafana Server and Influx Server with the new server details and create the datasources and KPIs again.

- To edit external Influx Server: User should update *Influx Server URL <server_ip: influxdb_port>* | *Username* | *Password* and click *Submit* Button.

- '#' character is not allowed in **Password** field.

  Note: Any change in Influx Server URL will affect all the datasources as well in Grafana.

*Delete Influx Server*
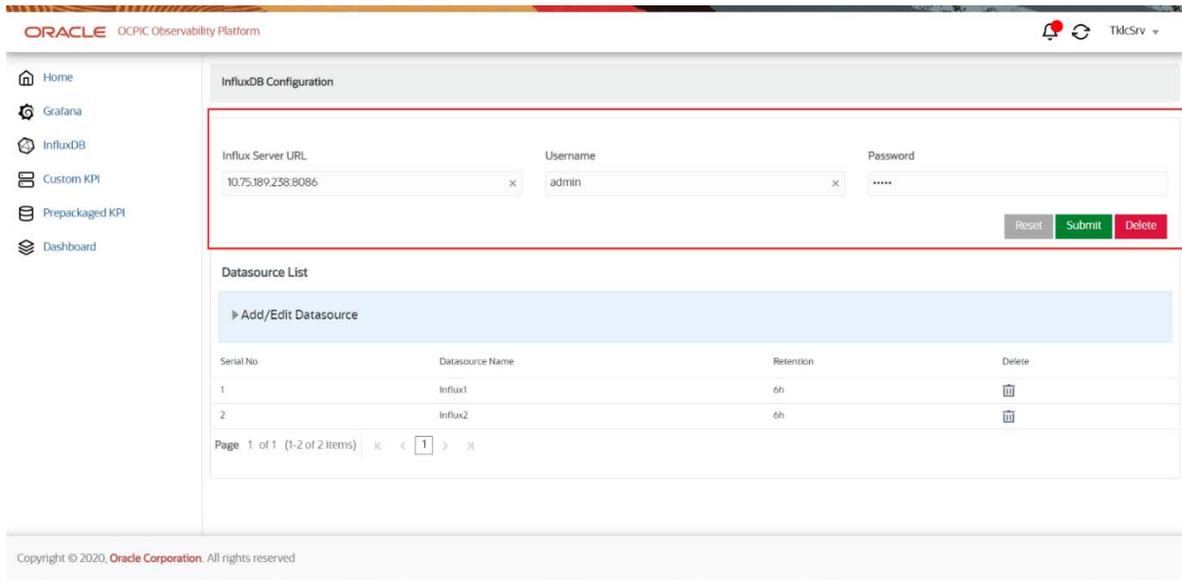


*Figure 9:Delete Influx Server*

- To Delete Influx Server - User need to click **Delete** Button.
- User will be asked for confirmation and Bell Notification will appear to synchronize the changes with PIC-Mediation.

**Datasource Configuration**

*Add Datasource*
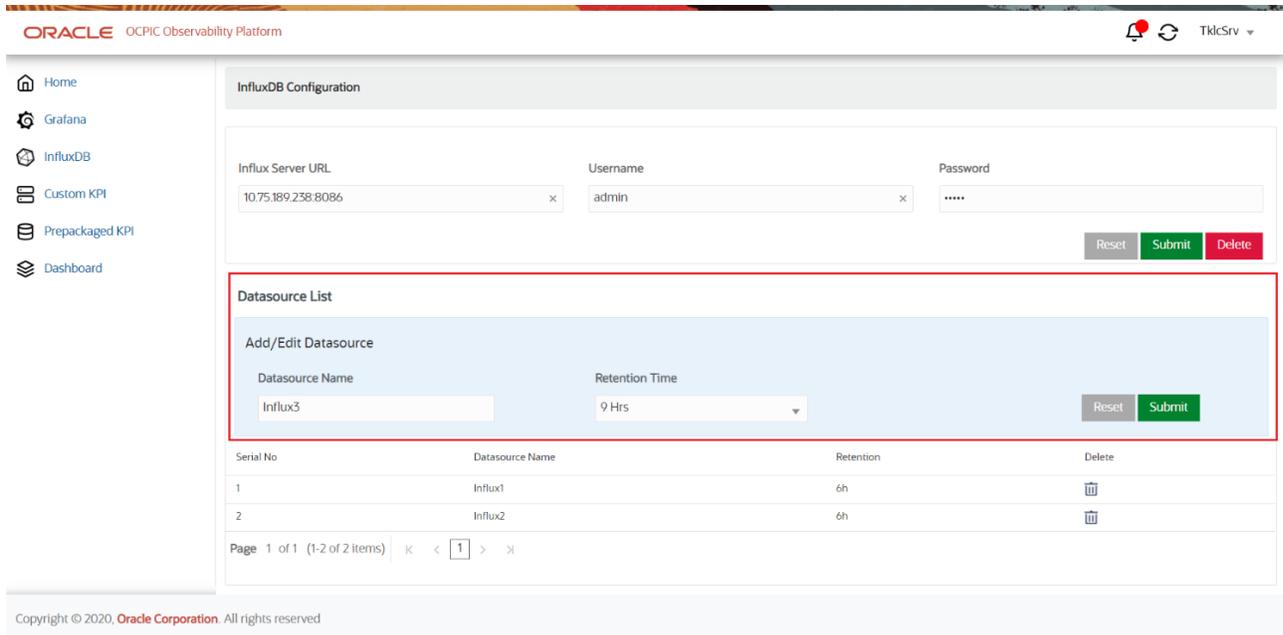
*Figure 10:Add Datasource*

- **_User can add up to 20 Datasources_**.

- User need to provide *Datasource Name | Retention Time* and click Submit to add datasource.

- User can select different Retention time while adding the Datasource from the Retention Time Dropdown field. This value determines how long InfluxDB stores data. Data older than the duration are automatically dropped from the database.

*Edit Datasource*



*Figure 11: Edit Datasource*

- User need to provide existing *Datasource Name | Retention Time* and click Submit to update Datasource Retention Time only.

- Datasource Name can be found out using below method:

    o   User can provide existing Datasource Name from the tabular list displayed on the screen.

    o   The list will be available as a dropdown, once user will start typing name of Datasource.

- User can select different Retention time while adding the Datasource from the Retention Time Dropdown field. This value determines how long InfluxDB stores data. Data older than the duration are automatically dropped from the database.

22

*Delete Datasource*
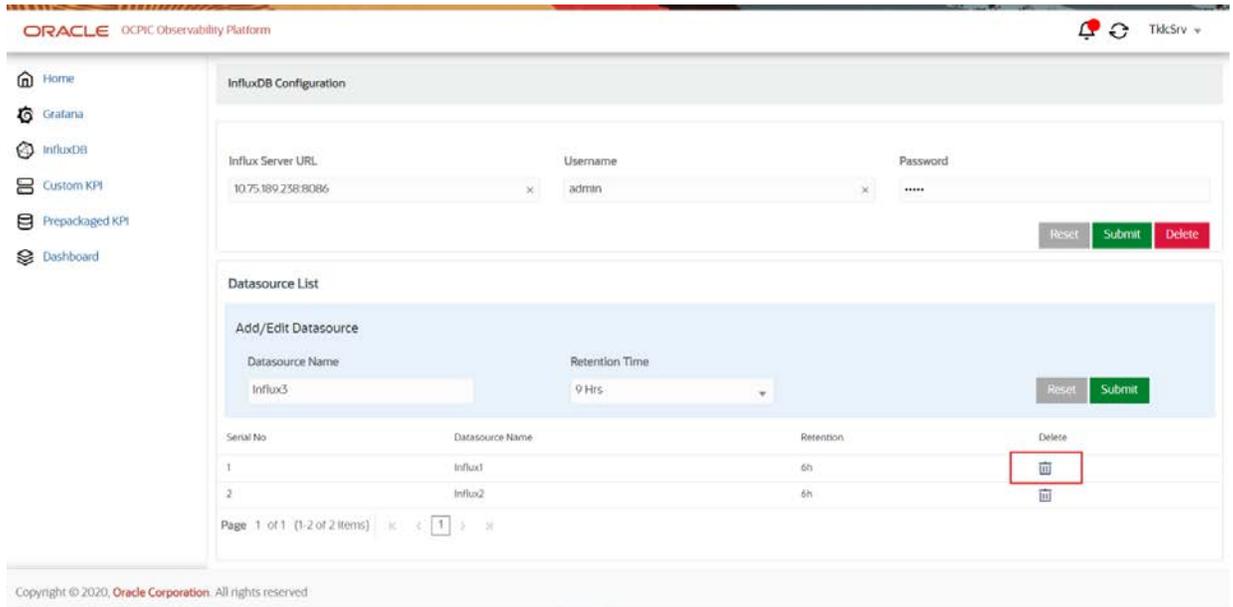


*Figure 12: Delete Datasource*

- User can delete the existing Datasource by clicking the *Delete icon* corresponding to the datasource.

- Datasource can only be deleted if it does not have any dependent configuration (Custom or pre-packaged KPI).

**Getting Started with InfluxDB**
The following guide can be referred for the various InfluxDB operations
https://docs.influxdata.com/influxdb

# Custom KPI

**Note:** If the original KPI is modified, then corresponding custom KPI should be deleted and re-created again.
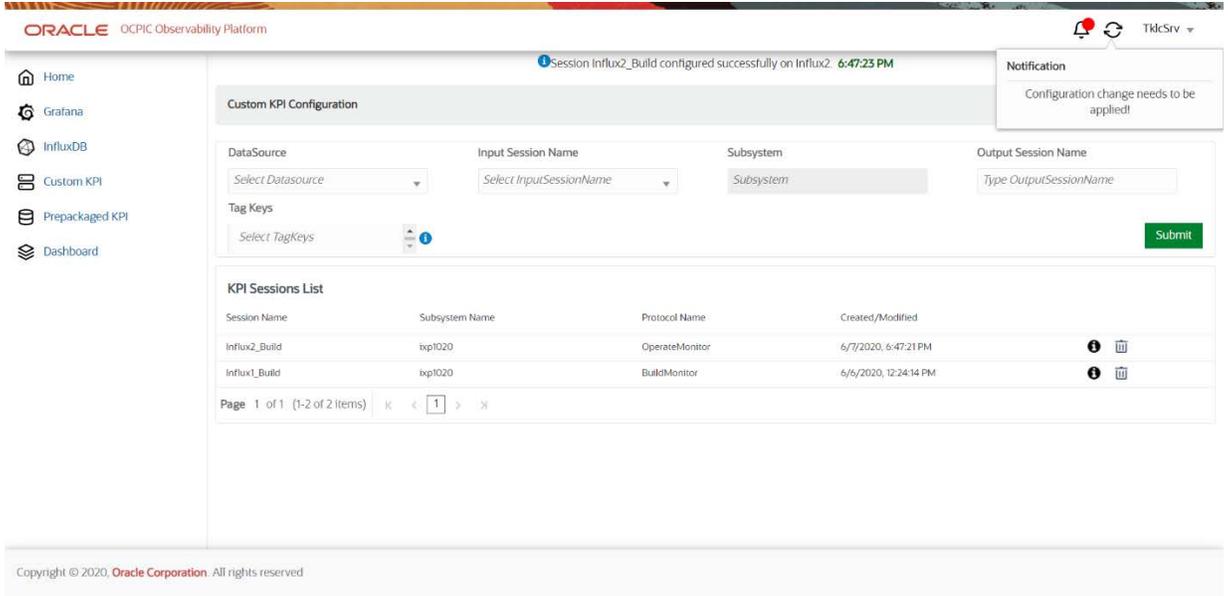


*Figure 13: Custom KPI Creation*

- After clicking on the Custom KPI Configuration on the side menu-bar, User will be navigated to Custom KPI Configuration screen.

- In Custom KPI Configuration screen User can create KPI Sessions by selecting *DataSource* | *Input*
  *Session Name* | *Tag Key(s)* and enter *Output Session Name.*

- *Subsystem* field is not editable for user and will be auto-populated based on selected *Input Session Name*.

- All created session(s) will be displayed in a tabular format under **KPI Session List**.

**Note: User can create up to 100 sessions including (Custom and Pre-packaged) using Observability Application.**

*Figure 14: Tag Key(s) Selection*

- In this screen, User can select either single or multiple Tag Keys form the **Tag Keys** dropdown.
- Based on the **Input Session Name,** the **TAG Keys** will populate in the dropdown.

*Figure 15: Delete Custom KPI*

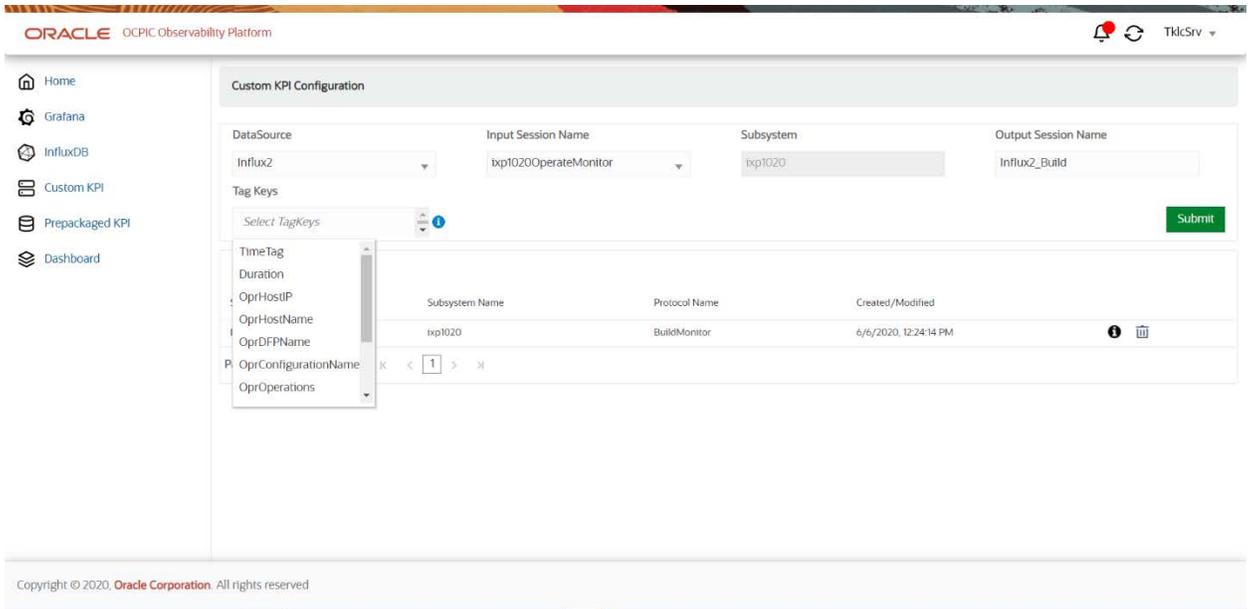- To delete any KPI Session from the **KPI Session List**, user need to click on the *Delete icon* as highlighted in the above screen capture.

- After clicking on the Delete button, the Pop-up alert will display for *Confirmation*.

  **Note:**
  1. Related Grafana dashboards will not be deleted from above action. User has to delete the dashboard manually from Grafana home page → Dashboards → manage.
  2. Once the Grafana dashboard is deleted it will not be recoved/restored using any backup restore. User has to recreate the required KPI configuration using Observability application.

- User also has the option to view TAG key(s) details by clicking in the *information / i icon* corresponding to the *KPI Session* as highlighted in the above screen capture.

# Pre-Packaged KPI Configuration

Pre-packaged KPI is the combination of KPI and the respective pre-defined dashboard. The user should select the dashboard and input session. On submit, the KPI will be generated by OCPIC-Mediation and the corresponding dashboard will be pushed to the Grafana server.

Pre-packaged dashboards are defined for the configured dictionaries in the Observability application. A user shall be able to configure same Pre-packaged Dashboard for different input sessions belonging to the selected dictionary. This gives flexibility to the user to create the same dashboards for different input sessions.

On Apply change, the mediation server will start writing into the output session on InfluxDB.



- After clicking on the Pre-Packaged KPI Configuration on the side menu-bar, User will be navigated to Pre-Packaged KPI Configuration screen.

- In this screen, User need to select *Generation* →*Builder Name* and *Dashboard* and then User need to select *Input session Name* which will be populated based on the selected Builder Name.
    - **Generation:** Protocol family.
    - **Builder Name:** Dictionary of builders supported for the selected Generation.
    - **Dashboard:** Combination of different KPIs and Visualization. **For more info Refer KPI Description**

- User need to select the Datasource on which Pre-packaged configuration should be applied.

- *Subsystem* field is disabled and will be auto-populate based on the *Input Session Name*.

**Note: User can create up to 100 sessions including (Custom and Pre-packaged) using Observability Application.**

*Figure 16:Pre-packaged KPI Description*

- User need to click on the "information / i icon" as highlighted in the above screen capture to view the dashboard description.
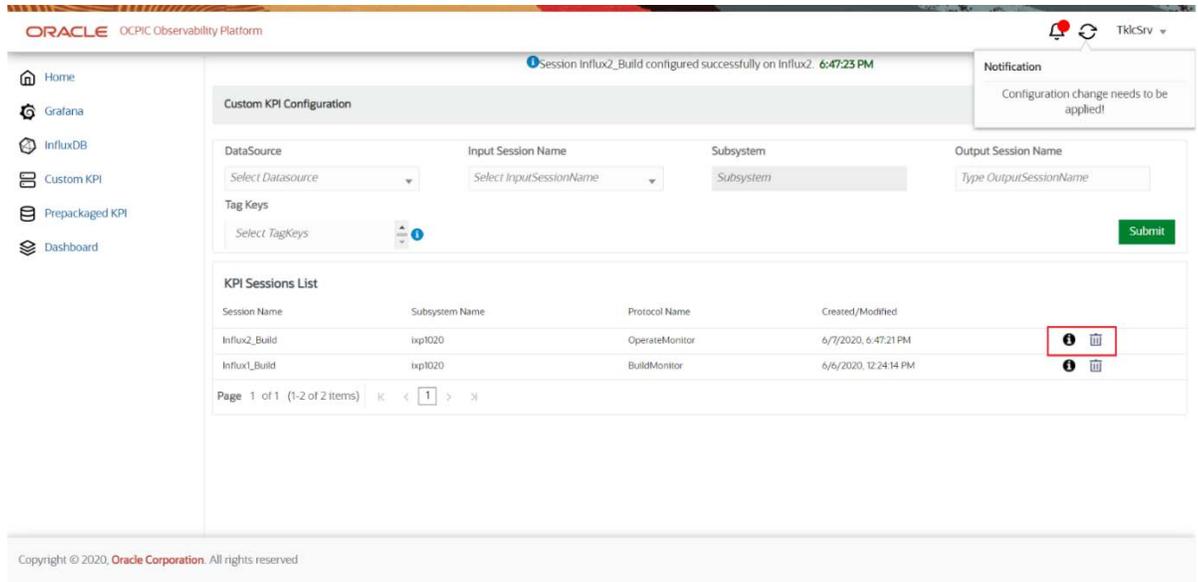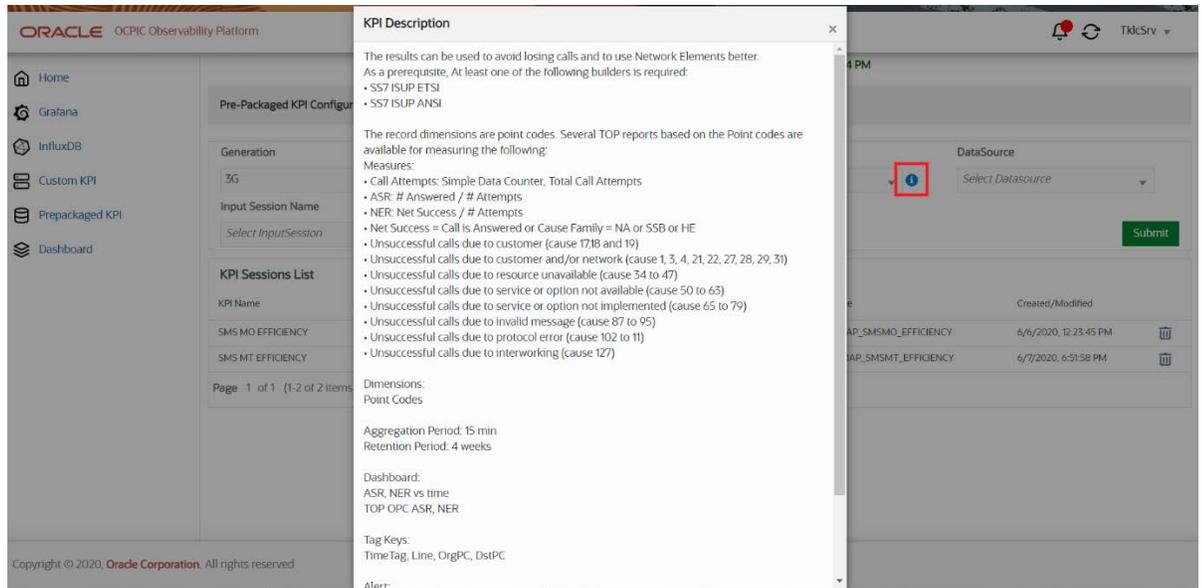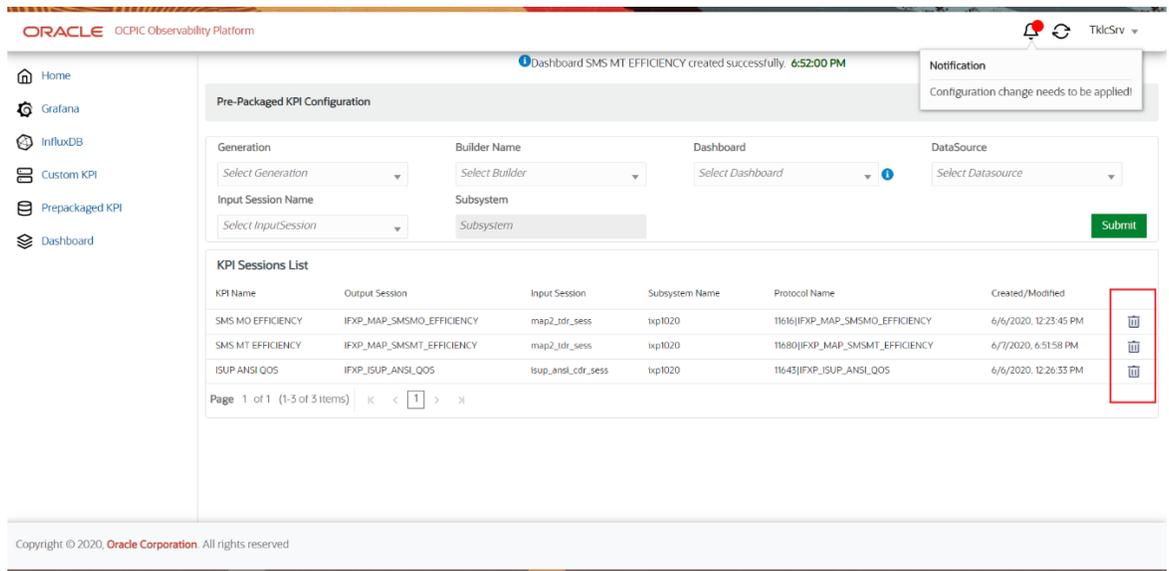
*Figure 17: Delete Pre-packaged KPI*

- To delete any Pre-packaged KPI session from the **KPI Session List**, user
  need to click on the *Delete icon* as highlighted in the above screen capture.

- After clicking on the Delete button, the Pop-up alert will display for *Confirmation*.

  <u>**Note:**</u>
  1. Related Grafana dashboards will not be deleted from above action*.* User has to delete the
     dashboard manually from Grafana home page → Dashboards → manage.
  2. Once the Grafana dashboard is deleted it will not be recoved/restored using any backup
     restore. User has to recreate the required KPI configuration using Observability application.
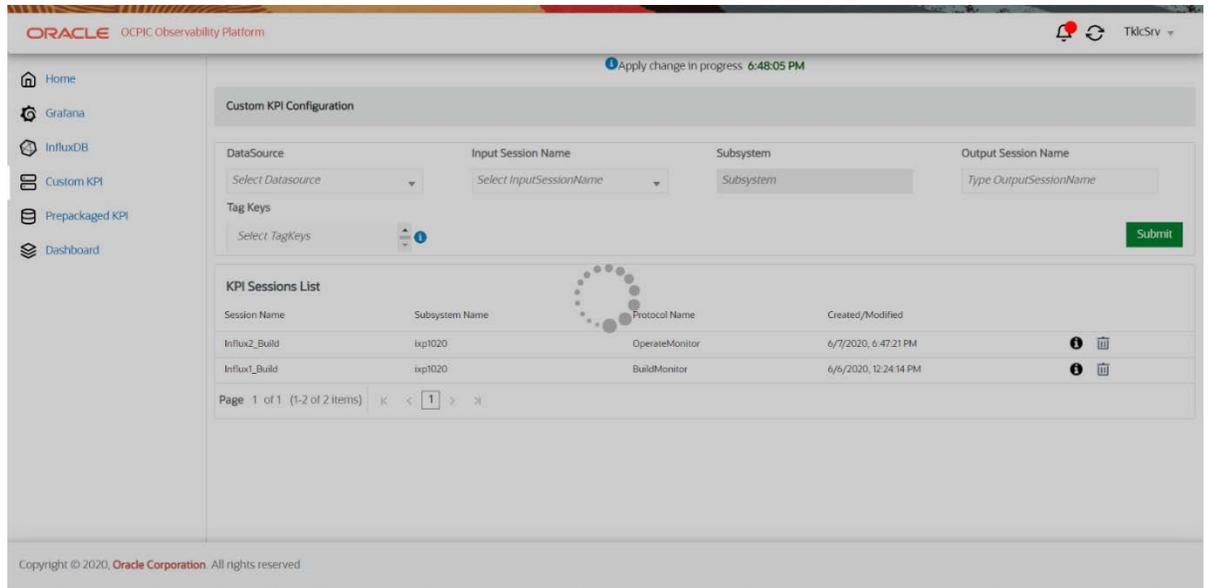
*Figure 18: Apply Change*

- After being notified, User has to click on the **Apply Change** icon on the **Top right corner section in the header** to synchronize the configuration with Mediation server.
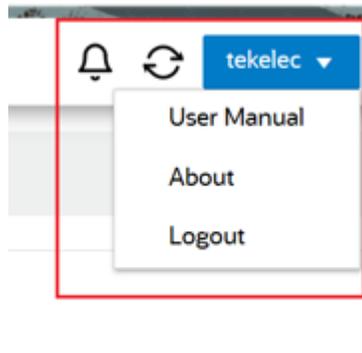


*Figure 19: User Menu*

- By default, the User details panel will display the Current Logged-in User Name.
- User need to click on the User Menu dropdown to access :
    a. Application User Guide from User Manual.
    b. Application Version Information from About.
    c. Logout from the application using Logout.

# Supported Resolution

The supported resolutions are given below:

| Browser | Supported Resolution |
|---|---|
| Internet Explorer | 150% |
| Chrome | 100% |
| Firefox | 100% |
| EDGE | 100% |

# 6. Troubleshooting

## Grafana Troubleshooting

Refer the below URL for any Grafana server-specific troubleshooting.
https://grafana.com/docs/grafana/latest/installation/troubleshooting/
https://grafana.com/docs/grafana/latest/administration/cli/

## InfluxDB Troubleshooting

Refer the below URL for any InfluxDB server-specific troubleshooting
https://docs.influxdata.com/influxdb/v1.7/troubleshooting/

## Observability configuration backup and restore

- The configuration of InfluxDb and Grafana dashboards are not part of any backup and restore.
- Observability Application KPI configurations are part of global backup and restore. For more information refer the section *Backup and restoring an Mediation Subsystem* in **Centralized Configuration Guide**.

## Browser Settings

### Auto Refresh in Internet Explorer

The Observability Application might appear to function incorrectly if you use webpage caching in Internet Explorer 11. You must disable caching if you want to use this browser to access the Observability Application. Please refer the following link to disable the caching:

Disable Webpage Caching in IE11

# Appendix A: Customize Pre-packaged Reports

It is recommended not to customize the pre-packaged reports. However, in case it is required then the following procedure can be used:

**Note**: Only new Line(s) can be added in the FSE config and no column addition/deletion/modification should be done. No modification should be done to the file name of the report.

- The report is already configured:
1. Delete the configured report e.g ISUP ACCOUNTING
2. Update the report configuration file at /opt/nsp/observer/ISUP ACCOUNTING.txt
   Look for "FSECONTENT" in the configuration file, add one or more Lines
   For example, following a new line can be added
   SECTION:LINE:3:PASS:30:0:2
   NAME:DataRow
3. Save the file and reload the Observability application
4. Configure the updated report.


- The report is not yet configured:
1. Update the report configuration file at /opt/nsp/observer/ISUP ACCOUNTING.txt
Look for "FSECONTENT" in the configuration file, add one or more Lines
For example, following the new line can be added
SECTION:LINE:3:PASS:30:0:2
NAME:DataRow
2. Save the file and reload the Observability application
3. Configure the updated report.

# Appendix B: How to generate API Key in Grafana

1. Log in as an admin user in Grafana
2. http://<server_ip>:3000
3. Create the API key using the following screenshot
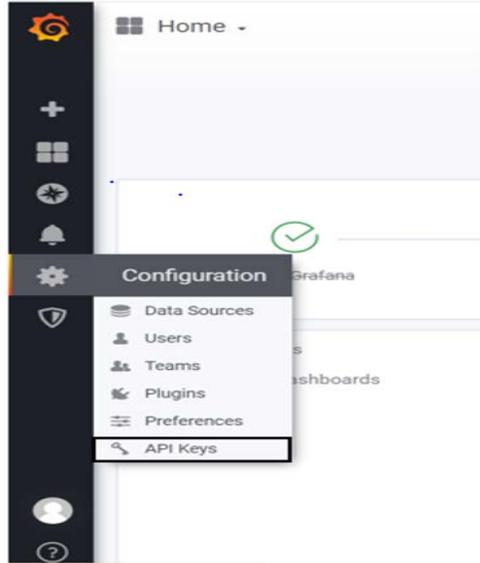


4. Add API Key button
5. Give any API Key name
6. Give the role of admin and Time to live as "10y"