NASTEL
Driving Business Transaction Performance ®

Nastel XRay User's Guide

Version 1

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History of this Document

Table 1. Document History		
Release Date	**Document Number**	**Summary**
January 2019	XRUG1.00	Initial release.
May 2019	XRUG1.01	The concept of data types with examples added (section 1.3), updated Chapter 2: Using Nastel XRay, sections 2.3 Toolbar, 2.5 Viewlets (detailed descriptions of viewlet types and their options with samples added), Chapter 4: Functions, Chapter 5: Using jKQL. New content added: 2.4.2.4 Assign to Teams, Chapter 3: Settings.
August 2019	XRUG1.02	Added information on two-factor authentication and the online Help site. Updated information on viewlets including renaming, filtering, and editing/creating using forms. Added Chapter 7, Troubleshooting.
September 2019	XRUG1.03	Updated figure numbers in sections 2.5.7 and 2.5.8. Minor formatting update to Case 7 in Chapter 7.
March 2020	XRUG1.04	Updated miscellaneous figures. Updates to sections 2.3.6, 2.4.4, 2.5.5, 3.1 and 3.2. Added information about the following new features: • Sharing viewlets (section 2.5.10) • Closing dashboard tabs (section 2.4.2.3) • Expanding/collapsing viewlets (section 2.5.8.6) • Data loss prevention in dashboards and viewlets (2.4 and 2.5) • Undo/redo viewlets (section 2.5.3) • "Move to dashboard" option for *Console* viewlets (section 2.4.4) • Configurations for charts that have axes, like bar and col charts (2.5.1.2) • Tree viewlets (2.5.4.14) • Drilldown feature (2.5.1.2) • Override option (2.6.2.1, 2.6.3.1 and 2.6.4.1)
April 2020	XRUG1.05	Add option, "Use data from another Repository," to section 2.4.2.1, Dashboard Actions – Create.
February 2021	XRUG 10.6	Update figures 2.4.2.2-A (Open Dashboard) and Figure 3.2.5-C (Add Fields for Schema). Add figure 3.2.5-D (Alias Names). Update section 3.1.1.4. Update section 2.5 (add links to viewlet chart type sections). Add sections 2.5.4.15 (Clustering), 2.5.4.16 (Correlation), 2.5.4.17 (Feature Suggestion, 2.5.4.18 (Forecast) and 2.5.4.19 (Expected). Add sections 2.5.11 - Nastel AutoPilot Integration, and 2.5.4.20 – Images.

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Chapter 1: About Nastel XRay

1.1 Introduction

For IT Ops professionals, members of the DevOps group, and developers, the ultimate advantage would be to know everything as it happens in their business – and everything that could happen. To know all and see all with complete vision is the competitive ideal: operations managers armed with real-time analytics, detecting performance problems before delays arise; the company discovering trends the moment they form.

If there is a function in modern technology that offers anything close to this ideal of omniscience, it's providing real-time analytics to prevent problems (or at least their impact) and forensics to resolve the problems you can't prevent.

Such awareness is difficult to attain, and it is often impossible for companies to know in advance what events need to be analyzed and when that analysis must happen. IT must store and analyze everything, or risk missing evidence of operational lags, risks, or rising customer trends. For security compliance reasons alone, enterprises are required to maintain good logs, store them securely for at least one year, and review them daily.

An important consideration is whether staff is looking at the data with the right degree of resolution. A low-resolution viewlets support staff isolate a problem to a specific infrastructure tier and then pass the problem to a specialist who will start diagnosing the problem all over again with a different tool. While this common approach works, it is time-consuming, expensive, and disruptive. A more productive approach would be to use a high-resolution analysis, enabling application support to diagnose a problem, and with the forensics tools to immediately begin its resolution.

To answer business-centric questions and provide guidance for decision-makers, Nastel XRay combines:

- Analytics using advanced predictive anomaly detection and machine learning algorithms for problem prevention across apps, messaging, logs, mobile, and the IoT.
- Insight into applications including: payment processing, trade compliance, order tracking, healthcare claims processing, compliance, machine data, and more.
- Visibility across the IBM stack (MQ, IIB, DP, MFT), Java, mobile, and the newer open-source technologies such as Kafka, STORM, Spark, MQTT, log files, Python, REST, and much more.
- Multi-tenancy with private data repositories available on premise or in SaaS.
- Lambda architecture with grids for real-time, in-memory analytics as well as historical analytics, data replication, and time-to-live for all streaming data.
- End-to-end business transaction tracking that spans technologies, tiers, and organizations.
- Intuitive, easy-to-use data visualizations and dashboards.

These capabilities fuse seamlessly across dynamic IT environments, from mobile to mainframe. They provide the broad array of analytic and decision-support capabilities needed by developers, IT admins, and business analysts to satisfy real-time operations intelligence and APM needs.

1.2 Key Benefits

Key benefits are insight, visibility, prediction, and machine learning that is easy-to-use to:

- **Improve service to customers and reduce operational risk** – using machine learning analytics.

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- **Highly scalable with self-service access, without need for data scientists** – using flexible web-based UI's and natural language for ease of use and a powerful Lambda architecture with microservices for scalability.
- **Reduce support costs** – via Docker deployment, open-source data collectors and ease of use.

1.3 Activities, Events and Snapshots Concept Overview

The Nastel XRay data model consists of the following items:

Events: Actions or occurrences recognized by software that may be handled by the software. Event is the smallest item, which can be measured by time.

Activities: A collection of related tracking events (TrackingEvent) and other sub-activities. Relation is established via a grouping specified by a developer or set of correlators (across thread, application boundaries). Activities may have a set of user-defined properties which are grouped into property snapshots (PropertySnapshot).

Sets: Named collections of Activities that meet specific criteria.

Snapshots: A collection of properties with category, name, and a time stamp associated with when the snapshot is taken. Activities may have one or more property snapshots.

Dictionaries: Generic, free-form items that can have user-defined properties.

Sources: Represent origins of Events and Activities. They can be references generically as Sources, or by the specific class of source:

GeoLocation; DataCenter; Network; Device; Address; Server; Process; Runtime; AppServer; Application; SourceUser; VirtualSource

The concept of activities, events and snapshots are displayed in the following figure.

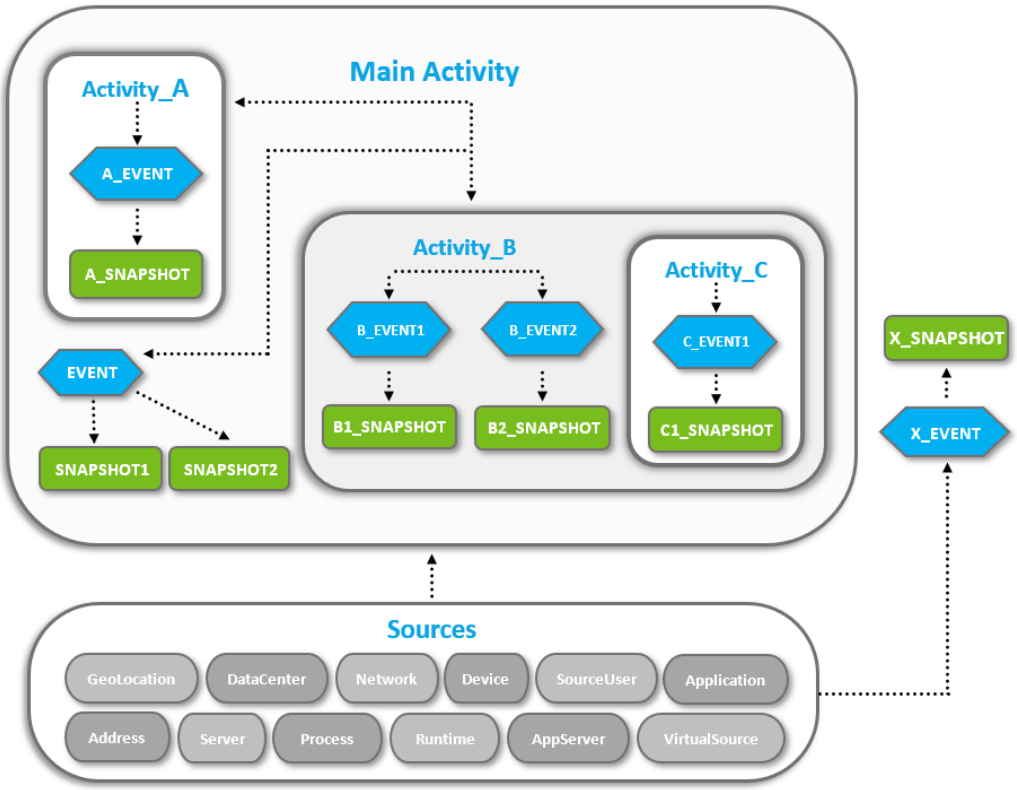

Figure 1.3-A. Activities, Events and Snapshots Concept

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1.3.1 Example: My Workday

See *Figure 1.3.1-A* below for an example. The main activity is "My Workday" which is the highest (super) activity. It is the outcome of smaller activities, events and snapshots.

For example, "My Workday" consists of the following smaller activities:

- I come to work
- I go to lunch
- I have a Skype call

These smaller activities are outcomes of related events. For example, "I come to work," consists of the following related events:

- I open the office door with my key card
- I say hello to my colleague
- I turn on my computer

Events not related to the main activity can exist; they occur on their own without any parent activity. For example, "a bird hit a window." It happened during your workday and you saw it in your office, but it is not related to your workday (the main activity).

The events can have snapshots. Snapshots are collections of event data aspects which can be measured statistically. For example:

- The amount of time it took to enter the office with my key card
- The eye color of my colleague
- The type of computer I use

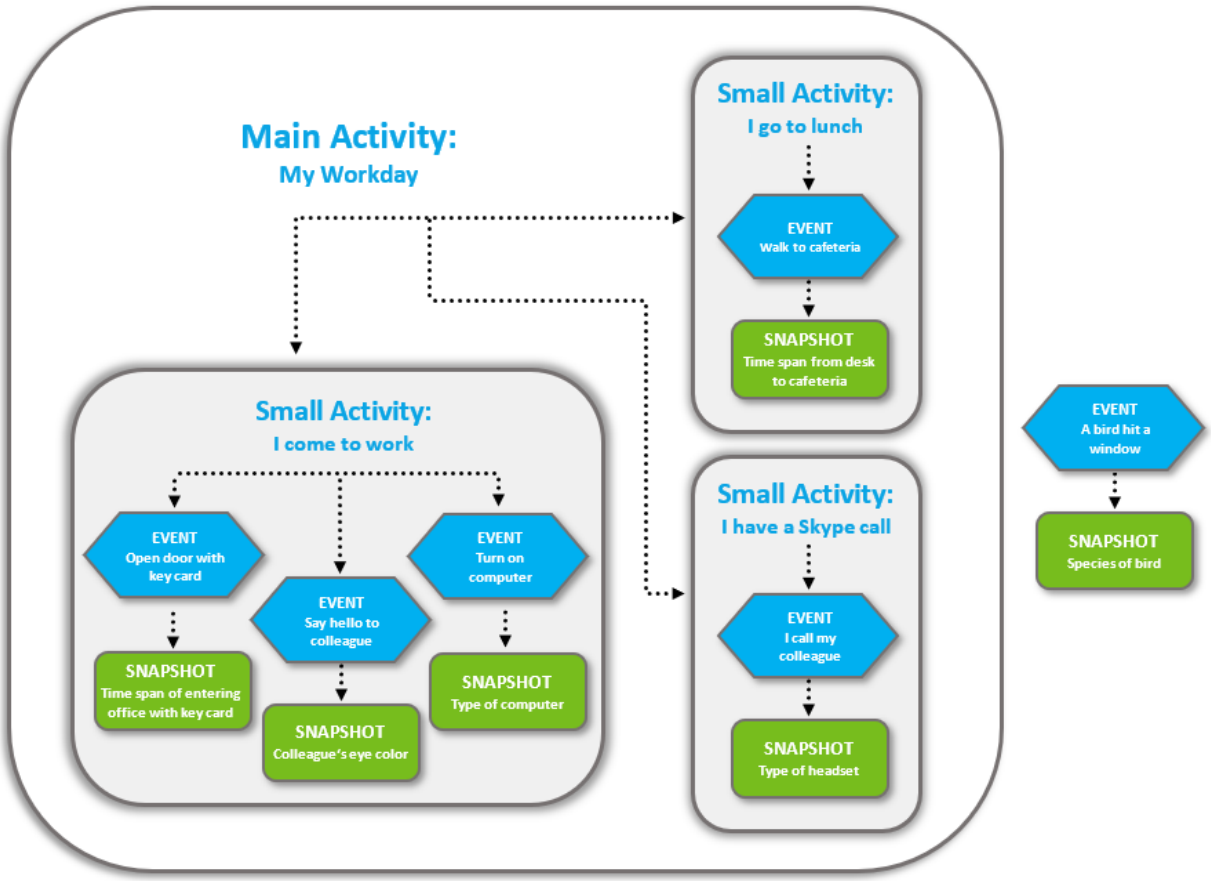

Figure 1.3.1-A. Example: My Workday

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1.3.2 Example: Grocery Shopping

You are buying products in the supermarket (this is the activity). The event would be the process of scanning the product barcodes. The snapshots are all related to the event of scanning. Examples are the time it took to scan the products, package color, product weight.

Activity: You are buying products in the supermarket

Event: The process of scanning product barcodes

Snapshots: The time it took to scan, product package colors, product weight

1.4 Data

Users can either stream their data or upload a file (*Section 2.2.1*) in order to use Nastel XRay to analyze and present their data.

1.5 jKQL

jKQL is an English-like query and stream processing language for analyzing machine data in flight (Fast Data) and at rest. It defines the syntax of statements used for manipulating data in the Nastel XRay Data Model. It enables the user to search, filter, group, and count data. It is designed to be used by both the business user and the data scientist. Use jKQL to analyze anomalies, behavior, flows, relationships, and patterns in time-series data as it relates to your business. (See *Chapter 5: Using jKQL*).

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Chapter 2: Using Nastel XRay

Nastel XRay puts your data (streaming or imported from a file) in a repository and displays it as a collection of customized viewlets grouped into one or more dashboards depending on your needs.

2.1 Accessing Nastel XRay

1. Open your internet browser.
2. Go to the URL address provided by your System Administrator and press **Enter**. The Nastel XRay login dialog box is displayed.

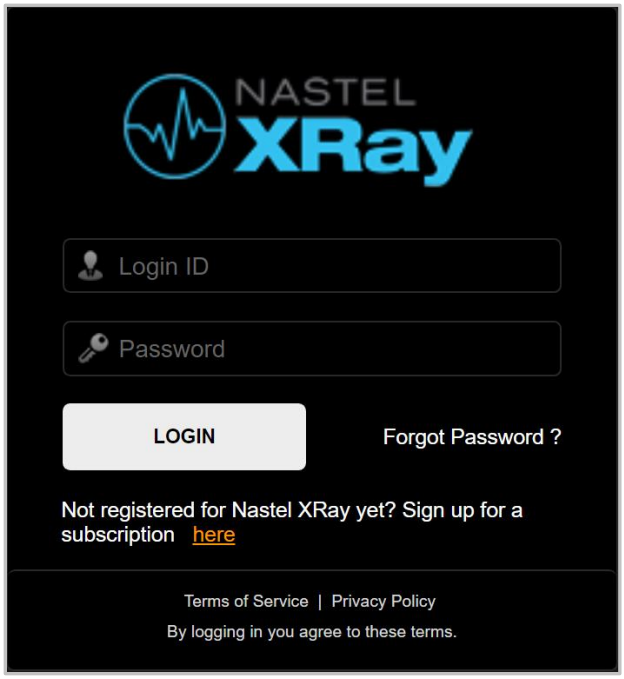

Figure 2.1-A. Login Dialog Box

NOTE	The login dialog box may display your company logo instead of the Nastel XRay logo. Please see *Section 3.1.1, Branding*.

3. Enter your **Login ID** and **Password** and click **LOGIN**. If you would like to reset your password, click **Forgot Password**.

NOTE	Please note that the *Forgot Password* page is specified by going to the **Main Menu** and selecting **Admin Settings** > **Branding** > **Login Page** > **Forgot Password URL** (see *Section 3.1.1.2, Login Page*).

4. By default, the Landing Page is displayed. Please see the next section, 2.2, Landing Page, for more information.

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2.2 Landing Page

The Landing Page is used as an initial screen for Nastel XRay novices, providing guidance on what the solution provides as well as an easy-to-use wizard for importing data. Experienced users can skip this screen and go directly to their dashboards by clicking **Go to Dashboard**.

The landing page can be accessed at any time by clicking the **Main Menu** and selecting **Landing Page** (*Figure 2.3.6-A*).

The *Landing Page* provides three options:

- **Analyze Your Data** (*Section 2.2.1*): import your data
- **Explore a Demo** (*Section 2.2.2*): sample walk-throughs
- **Go to Dashboard** (*Section 2.2.3*): view your dashboard

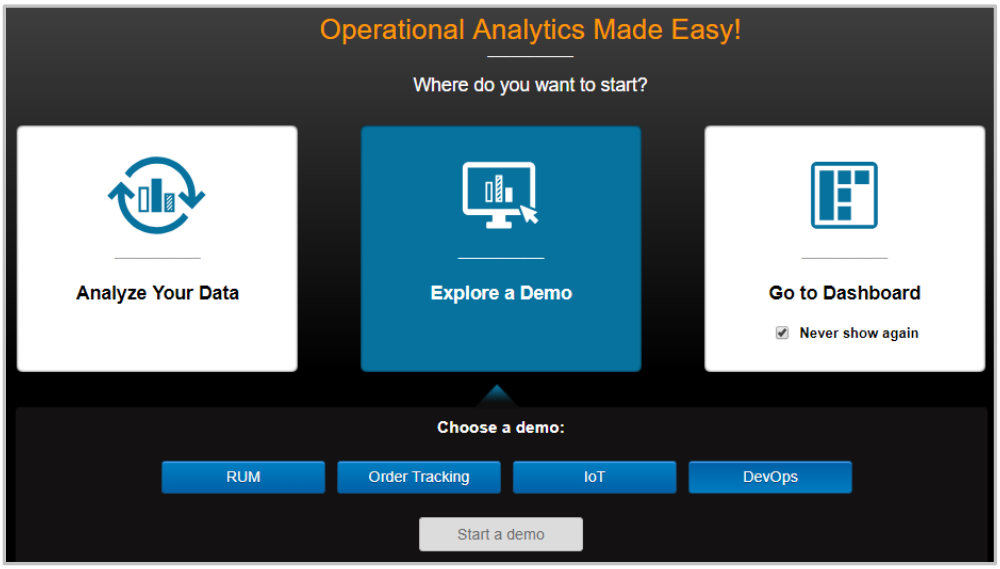

Figure 2.2-A. Landing Page

2.2.1 Analyze Your Data: Import a File

To import your data, select **Analyze Your Data** from the Landing Page (*Figure 2.2-A*). The following file formats are supported:

- .xls, .xlsx
- Apache log
- .csv
- Custom (with configuration)

NOTE	From the dashboard, users can also import data by clicking the green **Import Data** button located on the top right of the screen. Please note that this button does not appear for sample repositories.

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Perform the following to import your file:

1. Click **Choose File** to select a file to import.

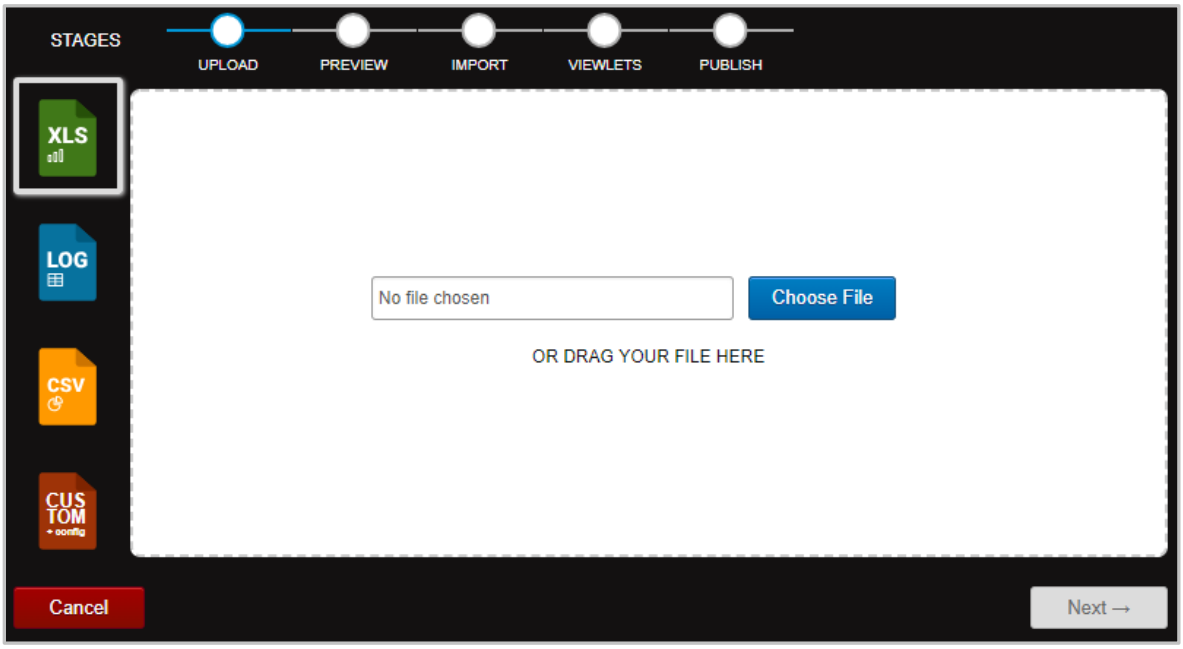

Figure 2.2.1-A. Import File

2. If you selected the wrong file, you can update it by clicking **Change** and selecting another file. Click **Next**.

Figure 2.2.1-B. Change Your File Selection

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3. Analyze the preview. If your file does not look correct, click **Advanced** to change processing options.

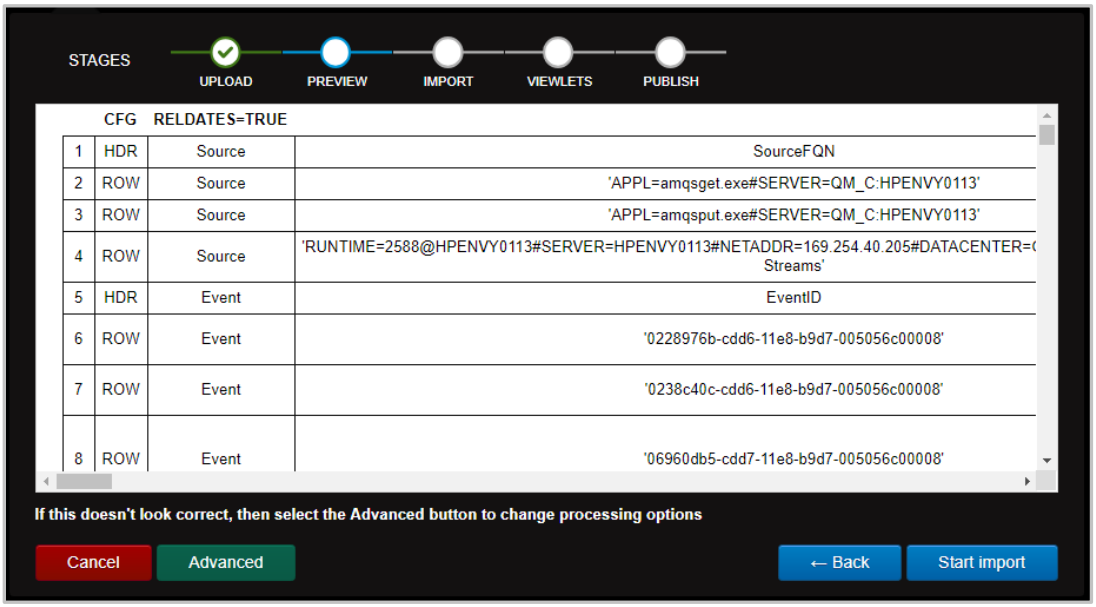

Figure 2.2.1-C. Preview Imported File

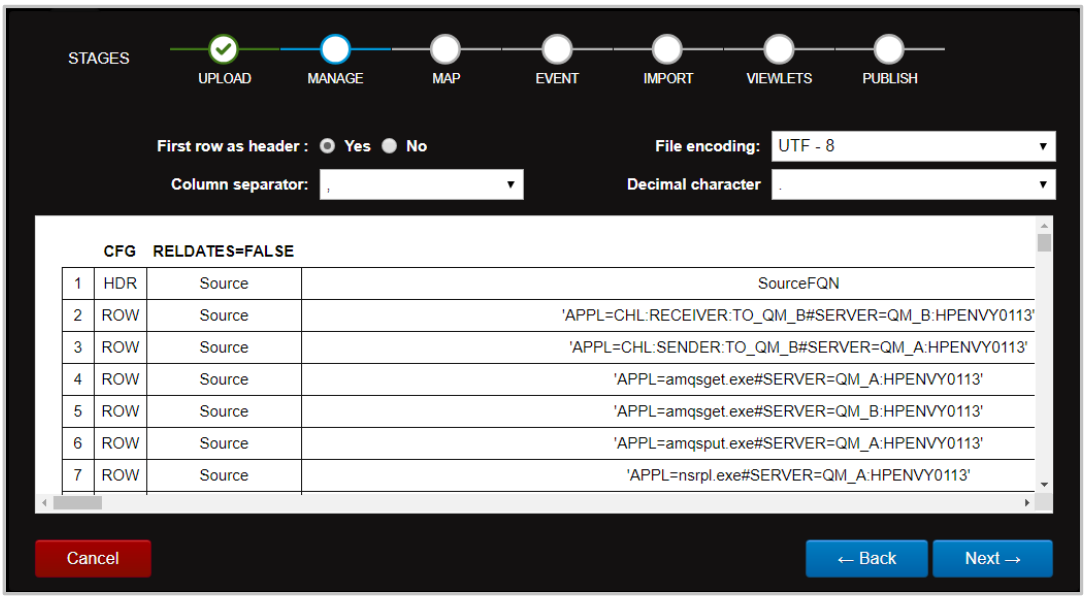

Figure 2.2.1-D. Advanced Options for Imported File

4. The following options are available:

   - **First row as header** – Specify if the first row is a header row.
   - **File encoding** – Select encoding type.
   - **Column separator** – From the drop-down menu select the column delimiter: comma, semicolon or tab.
   - **Decimal character** – Specify the decimal number delimiter: period or comma.

   After you have made your selections, click **Next**.

5. This screen allows you to:

   - Change the name of column headers. You can select from the drop-down list or type over the existing header name.

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- Map data imported into Nastel XRay to an existing field within the Nastel XRay data model. Alternatively, by selecting the option "new property," this can be used to import custom data and label it with a name that has relevance to the user.
- Remove a column.

Click **Next** to continue.

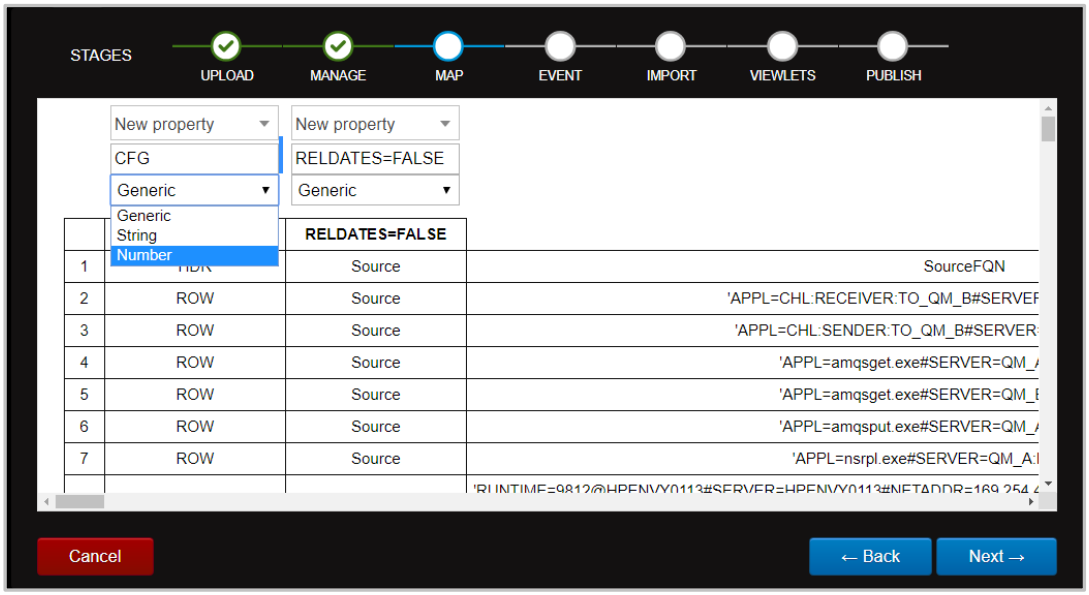

Figure 2.2.1-E. Additional Advanced Options for Imported File

6. The fields on the following screen are optional. Populate them to make the data more detailed.
   - **Application name:** Enter the application name.
   - **Server name:** Enter the name of the server.
   - **Network address:** Enter the data source IP address.
   - **Data center:** Specify the name of the data center.
   - **Geo address** – Click **Use current location** to populate the field with the latitude and longitude of your current location.

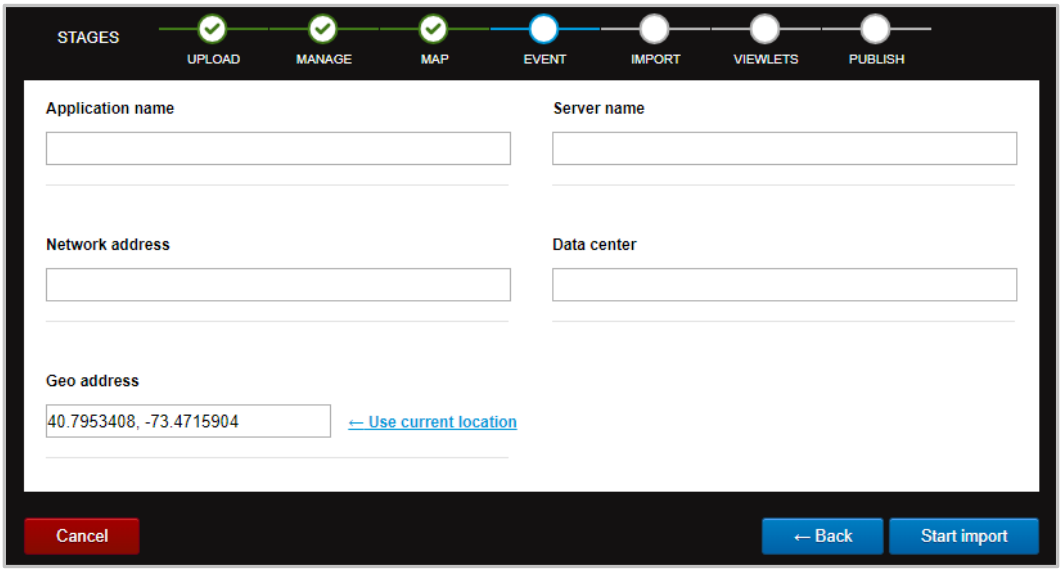

Figure 2.2.1-F. More Advanced Options for Imported File

Click **Start import** to import your file.

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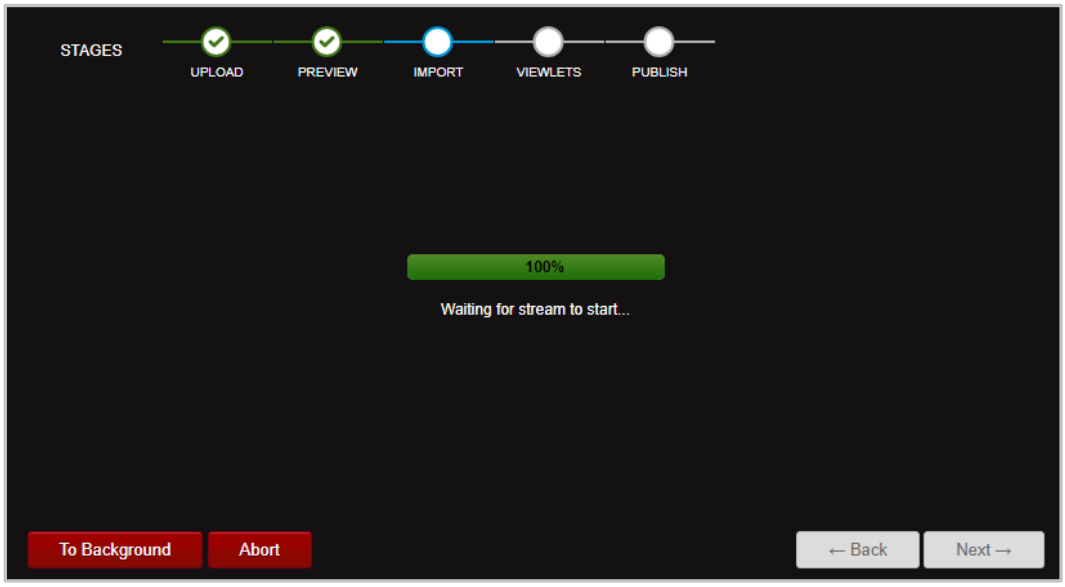

Figure 2.2.1-G. Import Process

The import process can be run in the background by clicking **To Background**. To cancel the import, click **Abort**. A confirmation dialog box will appear when the import is finished. Click **Next**.

If you selected to run the import process in the background, you can view the imported data by going to **Main Menu** > **Import / Export** > **Data** where you can create viewlets and specify a dashboard (see *Section 2.6.1, Data*, for more information). Otherwise, continue on to step 7.

7. A summary of the data will display on the following screen. Click next to select viewlets or click **Finish** to load default viewlets.

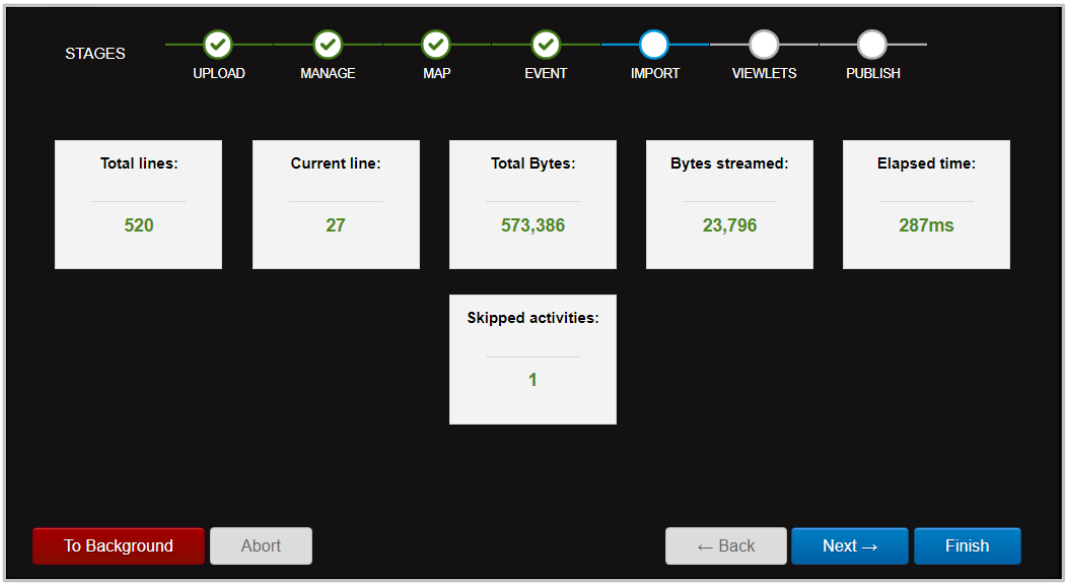

Figure 2.2.1-H. Imported File Summary

8. A default set of viewlets is provided. By default, all viewlets are selected (selected viewlets appear in blue). Simply click a viewlet to unselect it (unselected viewlets appear in full color). Click **Next** to add the selected viewlets to a dashboard.

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Figure 2.2.1-I. Viewlets for Imported File

9. Add your viewlets to an existing dashboard or create a new dashboard.
   - **Add to Dashboard** section– Add your viewlets to an existing dashboard by selecting a dashboard from the **Select dashboard** drop-down list.
   - **Create New Dashboard** section – Add your viewlets to a new dashboard. Enter a name for the new dashboard and select one, two, or three columns.

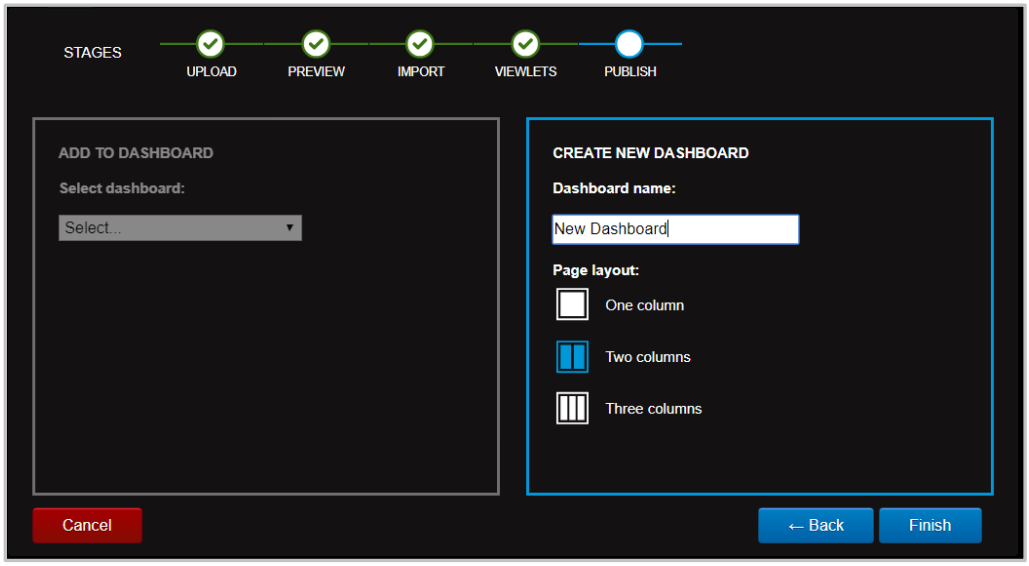

Figure 2.2.1-J. Add Imported File Viewlets to Dashboard

Click **Finish** to display your imported data in your dashboard.

NOTE	See *Section 2.6.1, Data*, for information on how to view and manage all data previously imported.

2.2.2 Explore a Demo

Clicking **Explore a Demo** on the *Landing Page* provides walk-throughs of the following four business issue scenarios where Nastel XRay can be used to solve a problem:

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- **RUM** (Real User Monitoring): illustrates how to determine the root cause of poor end-user experience. (Go to https://www.youtube.com/watch?v=OuYvkRix6iM to watch a brief use-case demonstration.)
- **Order Tracking:** illustrates how to trace the flow of an order from order placement through verification, payment, shipping, and more.
- **IoT**: illustrates the Internet of Things (IoT) as used in athletics, specifically basketball.
- **DevOps**: illustrates how to analyze the Build and Deploy processes.

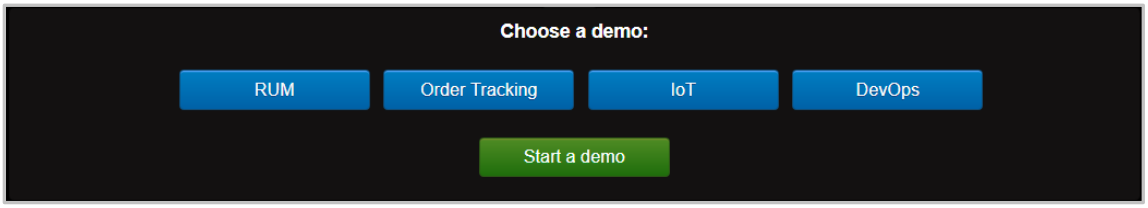

Figure 2.2.2-A. Choose a Demo

Each walk-through starts with an explanation of the problem, the solution, and the steps taken to solve the problem. To view a demo, select it and click **Start a demo**.

At the end of each demo, there is an option to load your own data into the example. Click **Load your data** and select your file (refer to *Section 2.2.1, Analyze Your Data*, for information on importing data).

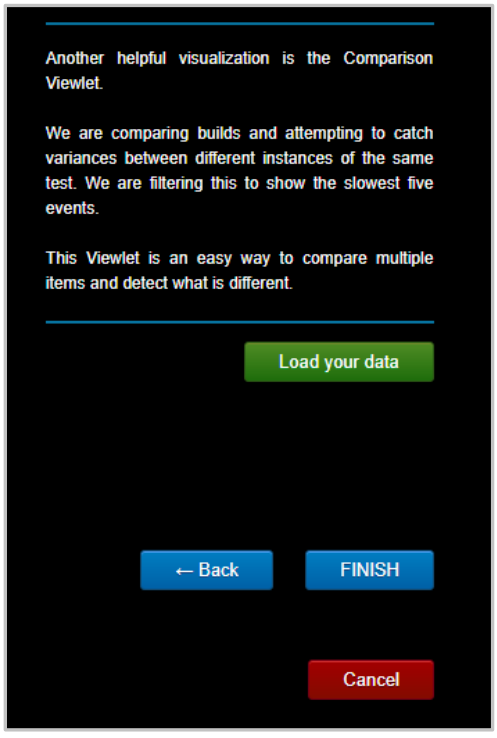

Figure 2.2.2-B. Load Your Data

The next section is a walk-through of the **Order Tracking** demo.

2.2.2.1 Order Tracking Demo

After selecting **Explore a Demo**, select **Order Tracking**. Click **Start a demo**.

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Figure 2.2.2.1-A. Start a Demo

A viewlet is displayed which shows a topology map of the business milestones. The jKQL query that produced this viewlet is shown at the top of the viewlet.

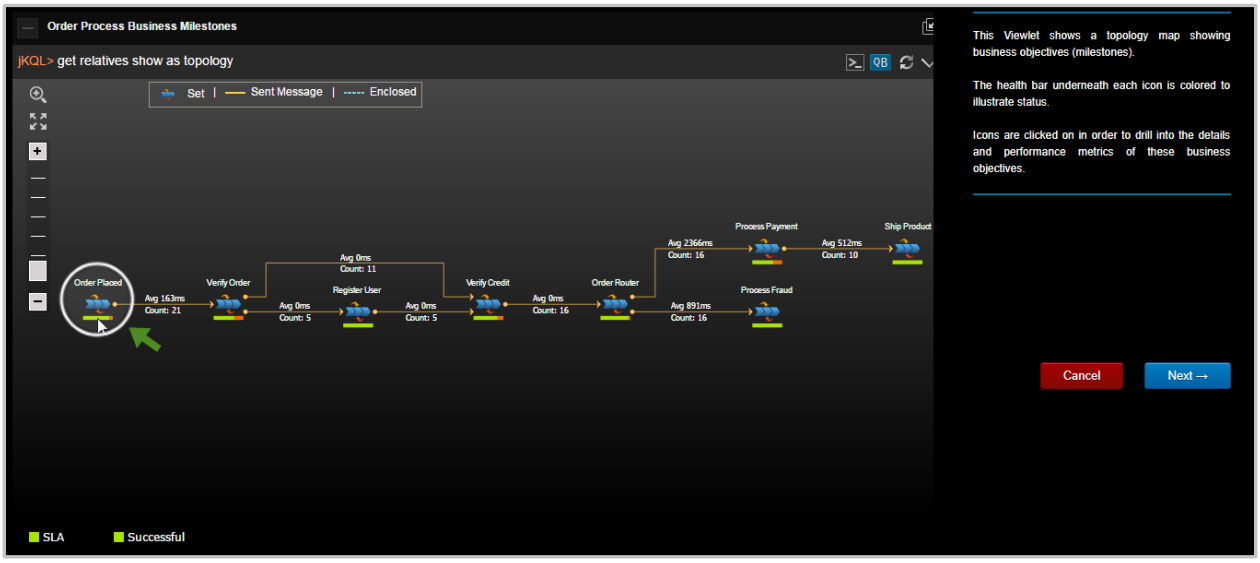

Figure 2.2.2.1-B. Order Tracking Demo – Page 1

- The healthbar under each icon is color coded to reflect status (green = good, yellow = warning, red = critical).
- To drill into the details of an event, click the icon. Click **Next** to view the details of the circled milestone, **Order Placed**.
- Clicking the health bar for **Order Placed**, produces a pop-up menu for drill-down into SLAs and performance metrics for transactions and activities.

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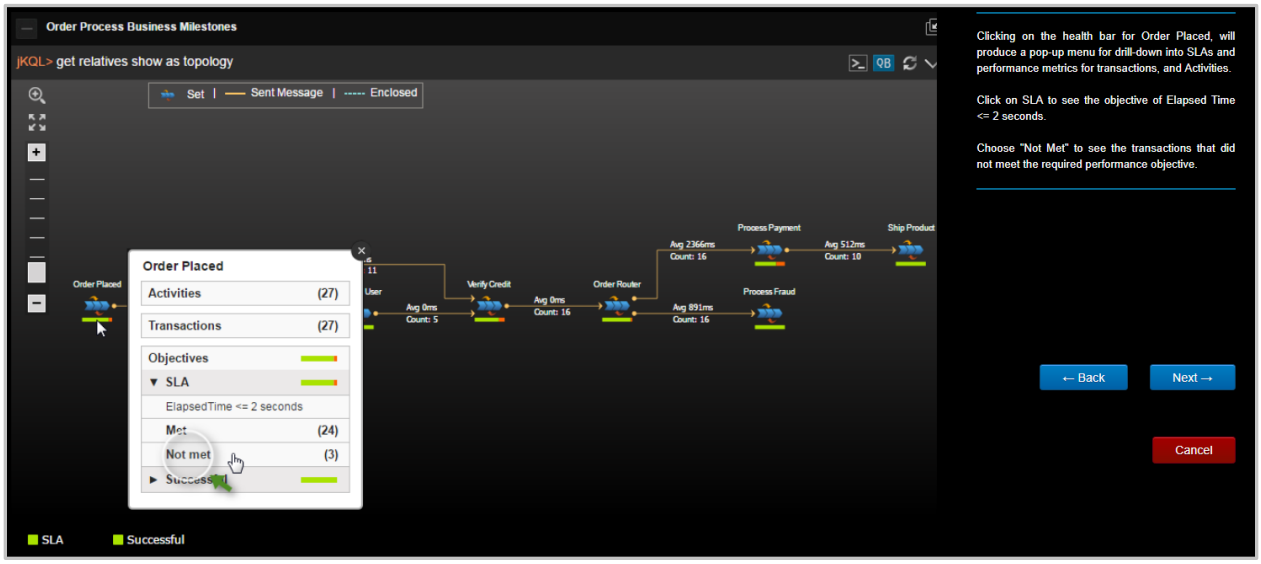

Figure 2.2.2.1-C. Order Tracking Demo – Page 2

- Click **SLA** to see the objective of **Elapsed Time <= 2 seconds**.
- Choose N**ot Met** to see the transactions that did not meet the required performance objective.
- Click **Next** to proceed.

This screen shows the open **Console** where the slow transactions are listed. In this example, a transaction was selected, and topology chosen. Click **Next** to view the topology.

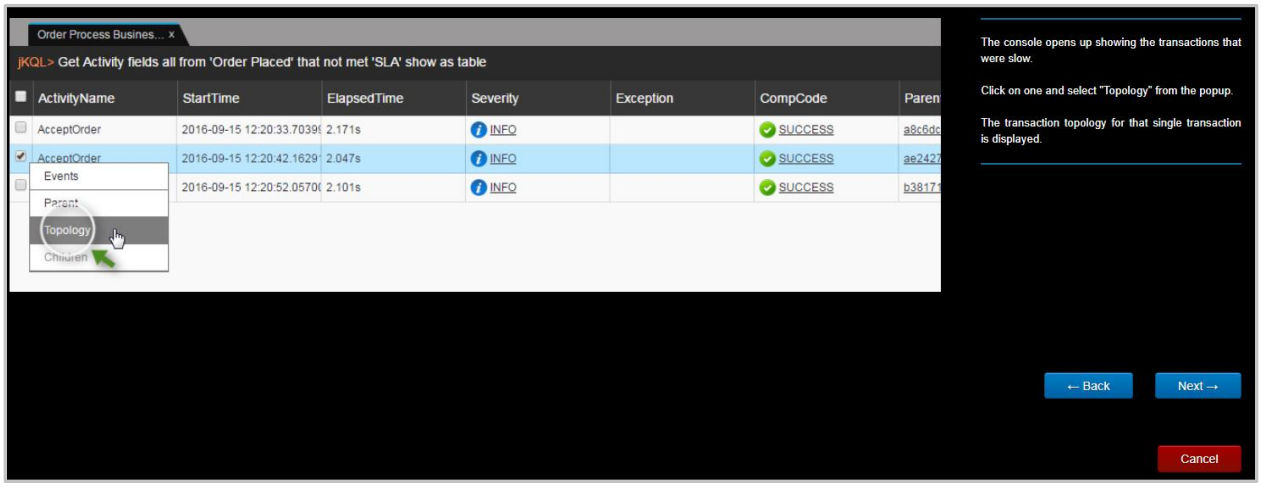

Figure 2.2.2.1-D. Order Tracking Demo – Page 3

This screen shows the topology. By clicking the various icons, you can drill down into each event to see the root cause of the problem.

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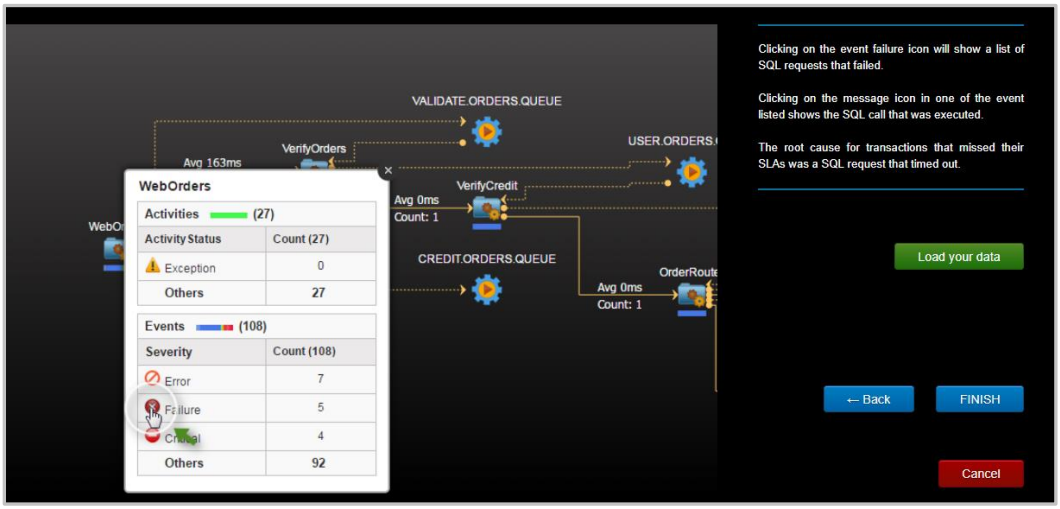

Figure 2.2.2.1-E. Order Tracking Demo – Page 4

This is the end of this demo. You can either:

- Return to the *Landing Page* by clicking **Finish**.

  OR

- Import your own data file into the example by clicking **Load your data** and following the prompts (see *Section 2.2.1, Analyze Your Data*, for more information).

2.2.3 Go to Dashboard

The **Go to Dashboard** option on the Landing Page takes you to your dashboard if you have previously created one. If no dashboards exist, you will be asked to create one (*Figure 2.4.2.1-B*).

See the next section, Disable Landing Page, for information on the **Never show again** option.

2.2.4 Disable Landing Page

The landing page can be disabled to allow users to view their dashboard immediately after logging in. Perform one of the following to disable the landing page:

- Before clicking **Go to Dashboard** from the Landing Page, enable the **Never show again** option.

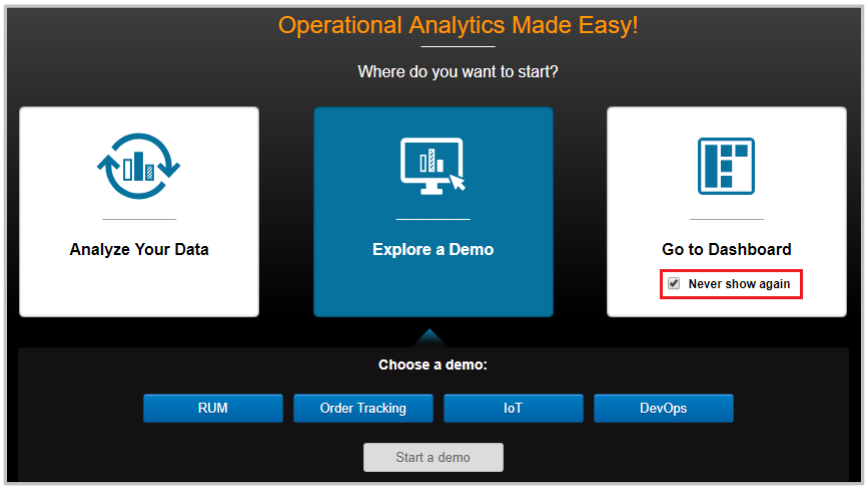

Figure 2.2.4-A. Landing Page – Never Show Again

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- Or on the **Main Menu**, select **User Settings** > **Configure Dashboards** to open the *Configure Dashboard* dialog box. Select **Off** for **Landing page** and click **Save** (See *Figure 3.2.4.5*).

2.3 Toolbar

The main toolbar of the screen has the following options. Use the figure below as a reference.

A-C: **Repository Quota Limits** (*Section 2.3.1.1*)

A: **Data Points**

B: **Stream Messages Per Day**

C: **Stream Bytes Per Day**

D: **Repository** Drop-down (*Section 2.3.1*)

E: **Search** (*Section 2.3.4*)

F: **Current User**

G: **Help** (*Section 2.3.2*)

H: **Log Out** (*Section 2.3.3*)

I: **Default Date & Time** (*Section 2.3.5*)

J: **Main Menu** (*Section 2.3.6*)

K: **Import Data** button (*Section 2.2.1*)

L: Add **Viewlet** button (*Section 2.5.1*)

M: **Modify** button (*Section 2.5.8.1*)

Figure 2.3-A. Main Toolbar

2.3.1 Repository

To load a repository, select it from the **Repository** drop-down menu on the main toolbar as seen in the figure below. Repositories appearing under **Global Repositories** are sample repositories available to all users (see *Section 2.4.1, Sample Dashboards*, for more information).

Figure 2.3.1-A. Repository

Each section within the **Repository** drop-down menu represents a different organization (organization name will be bolded) and their repositories. Use the search field to quickly search the menu.

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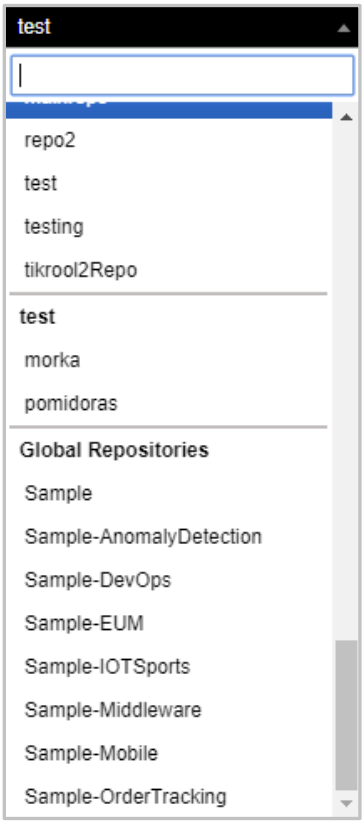

Figure 2.3.1-B. Repository Drop-down Menu

2.3.1.1 Repository Quota Limits

The **Repository Quota Limit** drop-down (immediately to the left of the **Repository** drop-down) displays your data and repository limits (dependent on your license). Click the **Repository Quota Limit** drop-down menu to view limit amounts for **Data points**, **Stream messages per day** and **Stream bytes per day**.

For limited licenses, the data point usage percentage will display within the drop-down.

Figure 2.3.1.1-A. Data Points Percentage

For unlimited licenses, **Unlimited** will display.

Figure 2.3.1.1-B. Unlimited Data Points

Clicking on the limit bar will generate a **Data Points** dashboard consisting of viewlets displaying data points of events, activities and snapshots from the latest week (see *Section 5.4* for examples of "*Last*" and "*Latest*").

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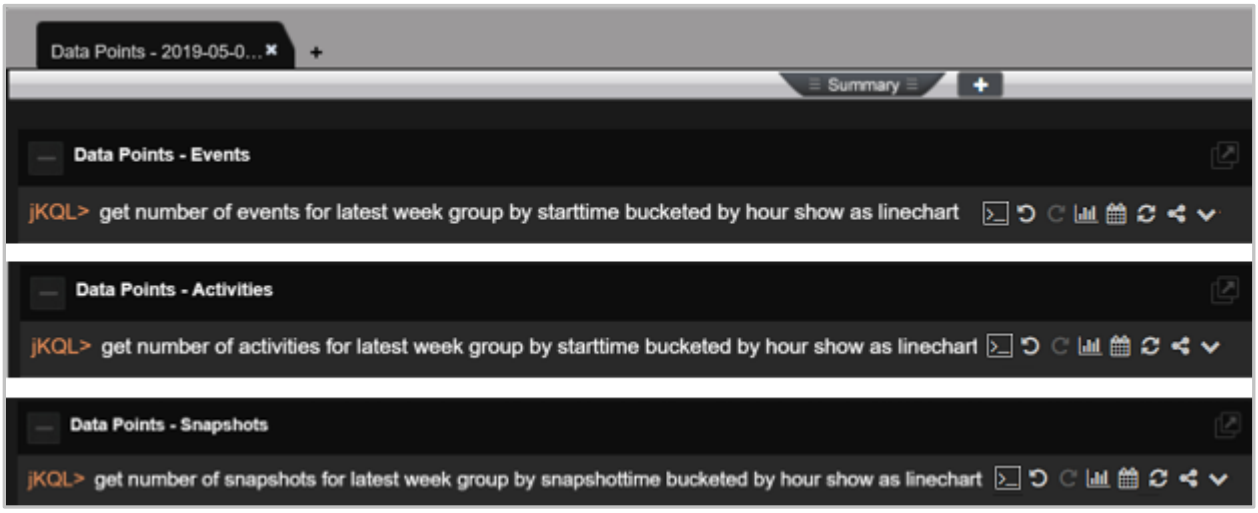

Figure 2.3.1.1-B. Data Points Dashboard

2.3.2 Help

Click the question mark icon on the toolbar (*Figure 2.3-A*) to access the help page. This link is defined in **Main Menu** > **Admin Settings** > **Branding** > **Index Page** > **Help url** (see *Section 3.1.1.4, Index Page*).

2.3.3 Logout

Click the **Logout** icon on the toolbar (*Figure 2.3-A*) to exit the system. Before exiting, the following dialog box appears asking if you would like to save or discard updates made.

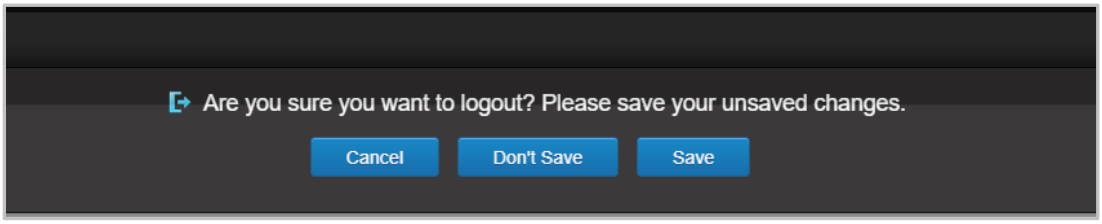

Figure 2.3.3-A. Save Changes

2.3.4 Search

At the top right of the screen there is a **Search** field used to search through event data. Within the **Search** field, enter a word or phrase relevant to event data. The search will run a jKQL query as follows:

```
jKQL> Find 'typed search word' in Events
```

The results will display in a viewlet within a new dashboard titled, **Search - <*search query*> - <*date and time*>**. In the below example, **longest activity** was entered in the **Search** field.

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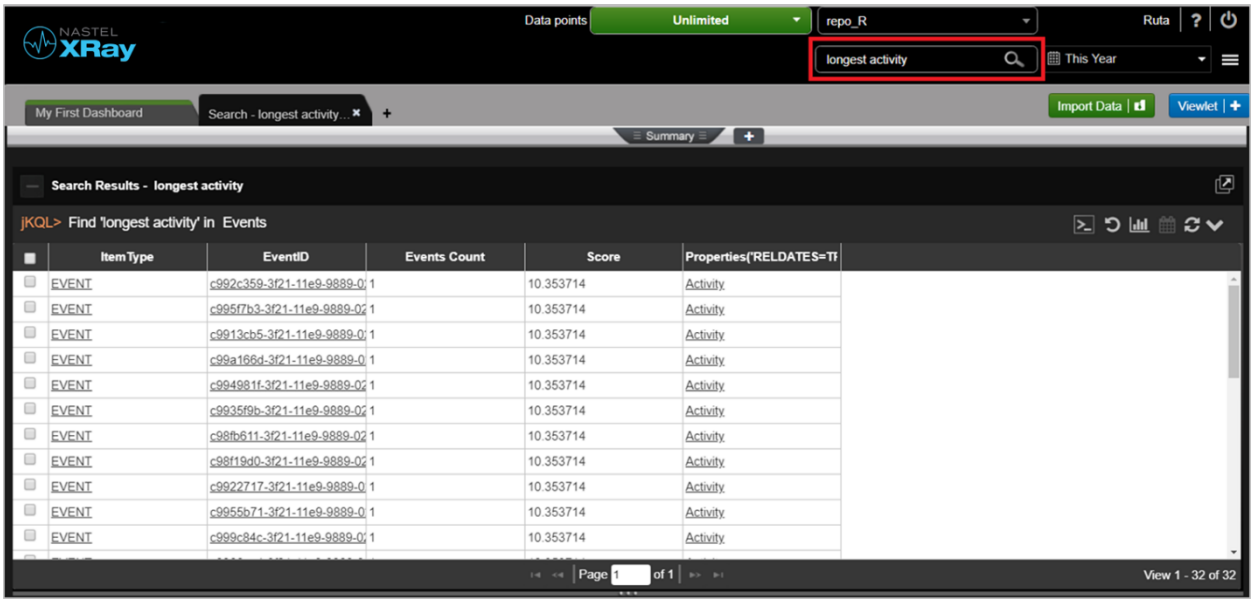

Figure 2.3.4-A. Search Field

NOTE	Please note that the Search box only searches events data. To search through activity and snapshot data, use jKQL queries (see *Chapter 5*).

2.3.5 Default Date & Time Range

Use the **Date & Time Range** option on the toolbar (*Figure 2.3.5-A*) to set the date and time for the viewlets of the selected repository. Click the drop-down menu to customize. The following are possible options:

Predefined

- This: Hour, Week, Month, Year
- Last: Hour, Week, Month, Year
- Today
- Yesterday

Custom

- Limit
  - This
  - Earliest
  - Last
  - Latest
- Value: Enter a number value (available when *This* is not selected)
- Units
  - Minute
  - Hour
  - Day
  - Week
  - Month
  - Year

Date range

- From: Enter the start date and time, or select from the scheduler with additional options.
- To: Enter the end date and time, or select from the scheduler with additional options.

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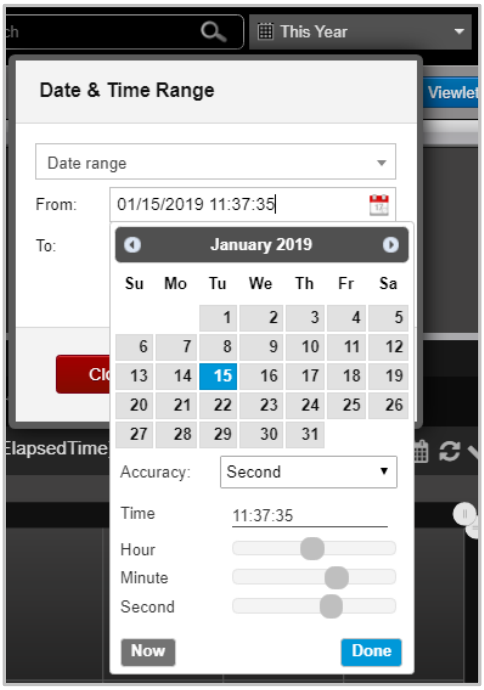

Figure 2.3.5-A. Date & Time Range

Please note that this date and time range will only be effective for the current session; when you exit and log back in, the default date and time range will be used. To set the default date and time range go to **Main Menu** > **User Settings** > **Date & Time Range** (see *Section 3.2.3, Date & Time Range*).

2.3.6 Main Menu

The **Main Menu** is accessed by clicking the menu icon at the top right of the screen. This menu provides the functionality described in Table 2 below.

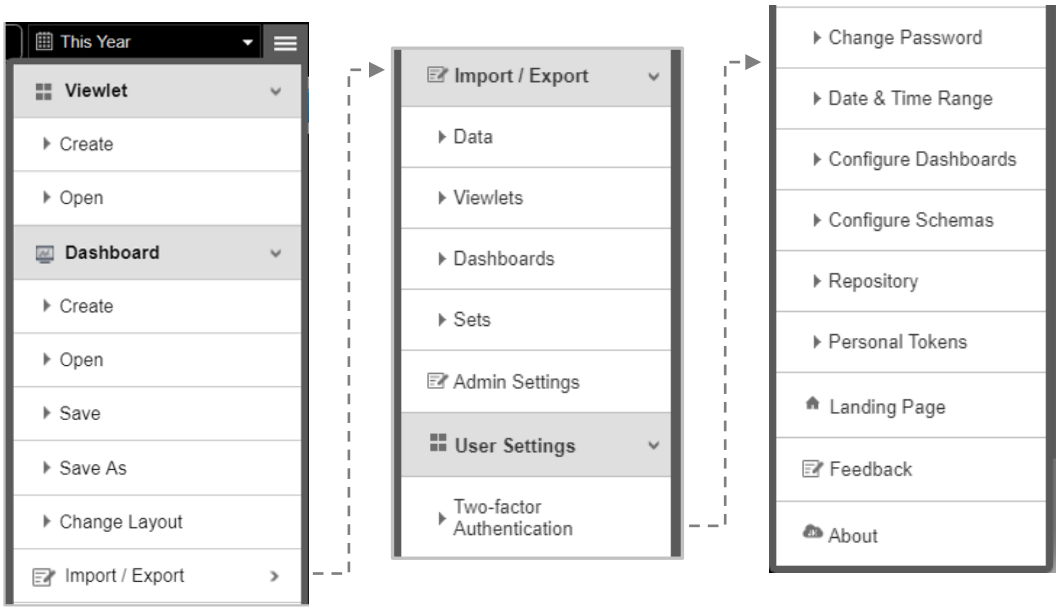

Figure 2.3.6-A. Main Menu

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Table 2. Main Menu Functions	
Viewlet	Expand to access the following viewlet options: • **Create**: *Section 2.5.1* • **Open**: *Section 2.5.1.4*
Dashboard	Expand to access the following Dashboard options: • **Create**: *Section 2.4.2.1* • **Open**: *Section 2.4.2.2* • **Save**: *Section 2.4.2.5* • **Save As**: *Section 2.4.2.6* • **Change Layout**: *Section 2.4.2.8*
Import / Export	Expand to access the Import / Export sub-menu. See *Section 2.6, Import / Export*, for more information.
Admin Settings	Opens the *Admin Settings* dialog box. Please see *Section 3.1, Admin Settings*, for more information. Please note that only administrative users with repository permissions will have this option available.
User Settings	Please see *Section 3.2, User Settings*, for more information.
Landing Page	Takes you to the Landing Page *(Figure 2.2-A)*.
Feedback	Opens the page to leave feedback and ask questions. This page is defined in **Branding** > **Index Page** > **Leave Feedback**.
About	Displays the user's data point definitions and application information. Includes links for getting collectors and license information: • Click **Get Collectors** to open the page of open source collector download links. The Get Collectors URL can be changed in **Branding** > **Index Page** > **Collectors URL**. • Click **License** to view license and upgrade information. The license URL can be changed in **Branding** > **Index Page** > **License URL**.

2.4 Dashboards

A dashboard is a collection of viewlets. Your data repository can have multiple dashboards. Each dashboard is displayed by clicking the desired dashboard tab located at the top of the screen.

Figure 2.4-A. Dashboard Tabs

A red asterisk appearing at the front of a dashboard name signifies an unsaved dashboard. To save a dashboard, right click the dashboard tab and select **Save**, or select **Dashboard** > **Save** from the main menu. If your browser crashes before saving, the dashboard will be restored upon next login.

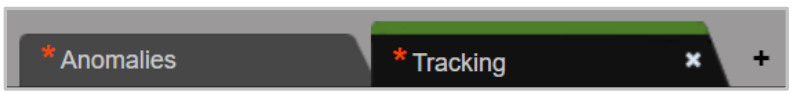

Figure 2.4-B. Unsaved Dashboards

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2.4.1 Sample Dashboards

In your system sample repositories are provided. You can find these within the **Global Repositories** section of the **Repository** drop-down menu (see *Section 2.3.1*). It is recommended to review the sample repository dashboards before creating your own.

The **Sample Order Tracking** dashboard is shown in the figure below. To open this dashboard, select the **Sample-OrderTracking** repository. The individual viewlets are described in *Section 2.5.4, Viewlet Chart Types and Samples*.

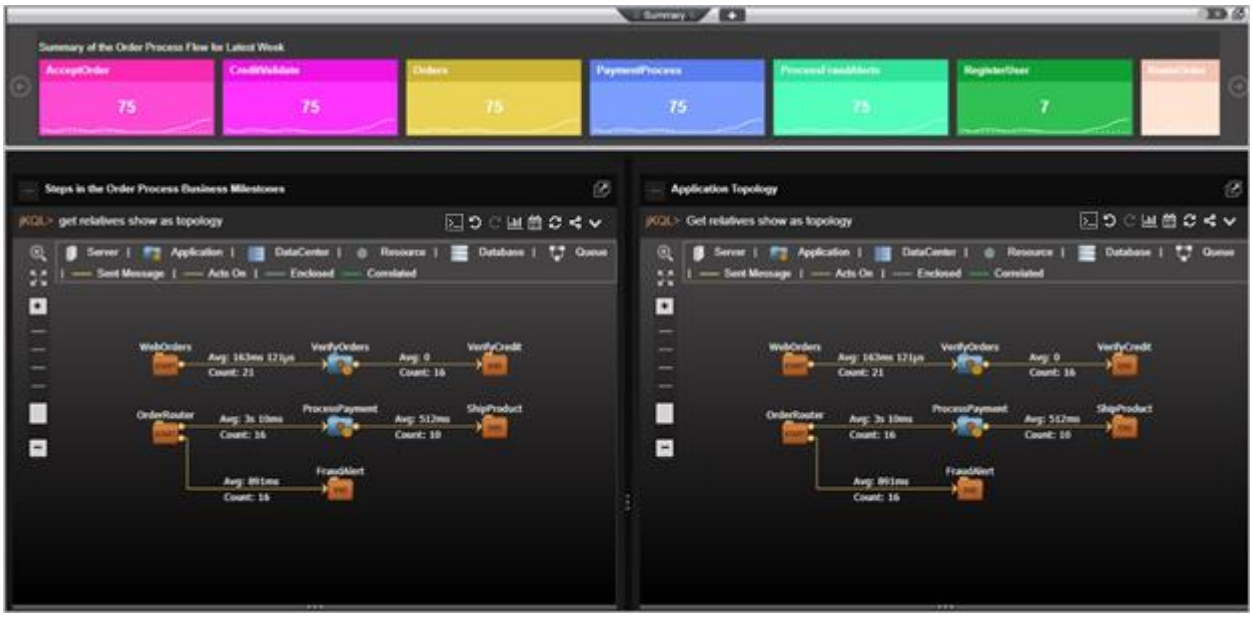

Figure 2.4.1-A. Sample Dashboard

Global Repositories have limited features. For example, if you right click on a dashboard tab of a Global Repository, **Save As** and **Set As Default** are not available in the pop-up menu because this is a "sample" repository which is read-only. Updates made in sample repositories are not saved before changing the repository or logging out. If it were a repository created by you, all functions would be available.

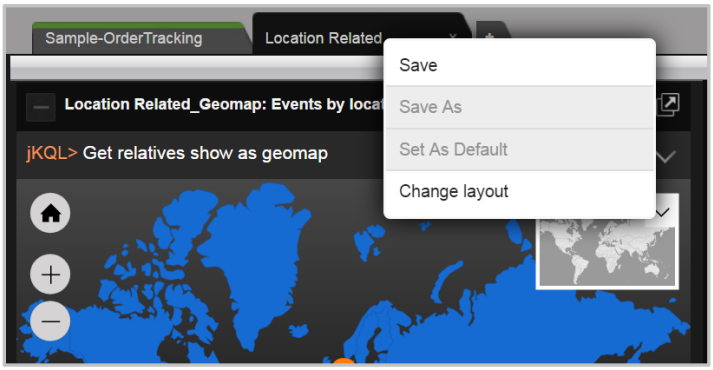

Figure 2.4.1.B. Dashboard Menu

2.4.2 Dashboard Actions

2.4.2.1 Create

Users create multiple dashboards as a way of grouping different data or analytics. While all could be on a single dashboard within the same repository, it can be more convenient to break them up by separate dashboard tabs.

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After clicking **Go to Dashboard** from the **Landing Page** *(Figure 2.2-A)*, the *Create new Dashboard* dialog box opens if no dashboards have been previously created.

You can also create a new dashboard by going to **Main Menu** > **Dashboard** > **Create** *(Figure 2.3.6-A)* or by clicking the plus button + immediately to the right of the existing dashboard tabs.

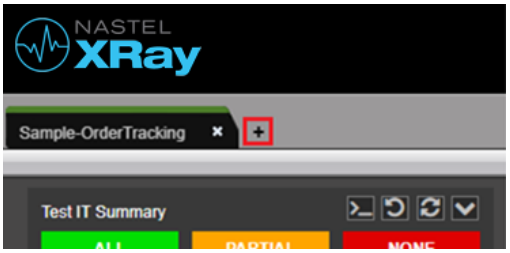

Figure 2.4.2.1-A. Create Dashboard Button

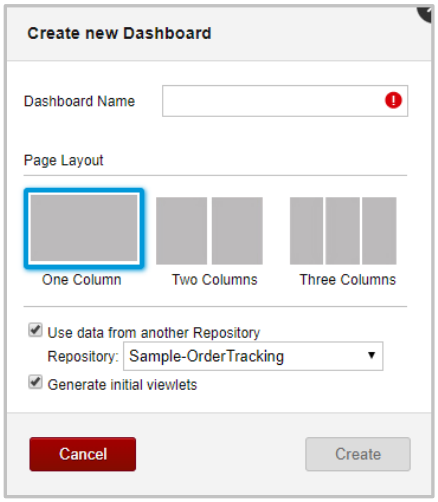

Figure 2.4.2.1-B. Create New Dashboard Dialog Box

To create your dashboard:

1. Enter a name for your dashboard.
2. Select the number of columns.
3. To make writing queries easier, enable the **Use data from another Repository** option to specify data will come from a distinct repository. Select the repository from the drop-down menu. The repositories you can select from are the ones that are available to you, including global repositories.
4. To create a set of default Viewlets, select **Generate initial viewlets**.
5. Click **Create**. Your dashboard has been added. The figure below shows a new dashboard with a set of default viewlets displayed as thumbnails. By clicking the viewlet thumbnail, the viewlet opens in the Console at the bottom of the screen.

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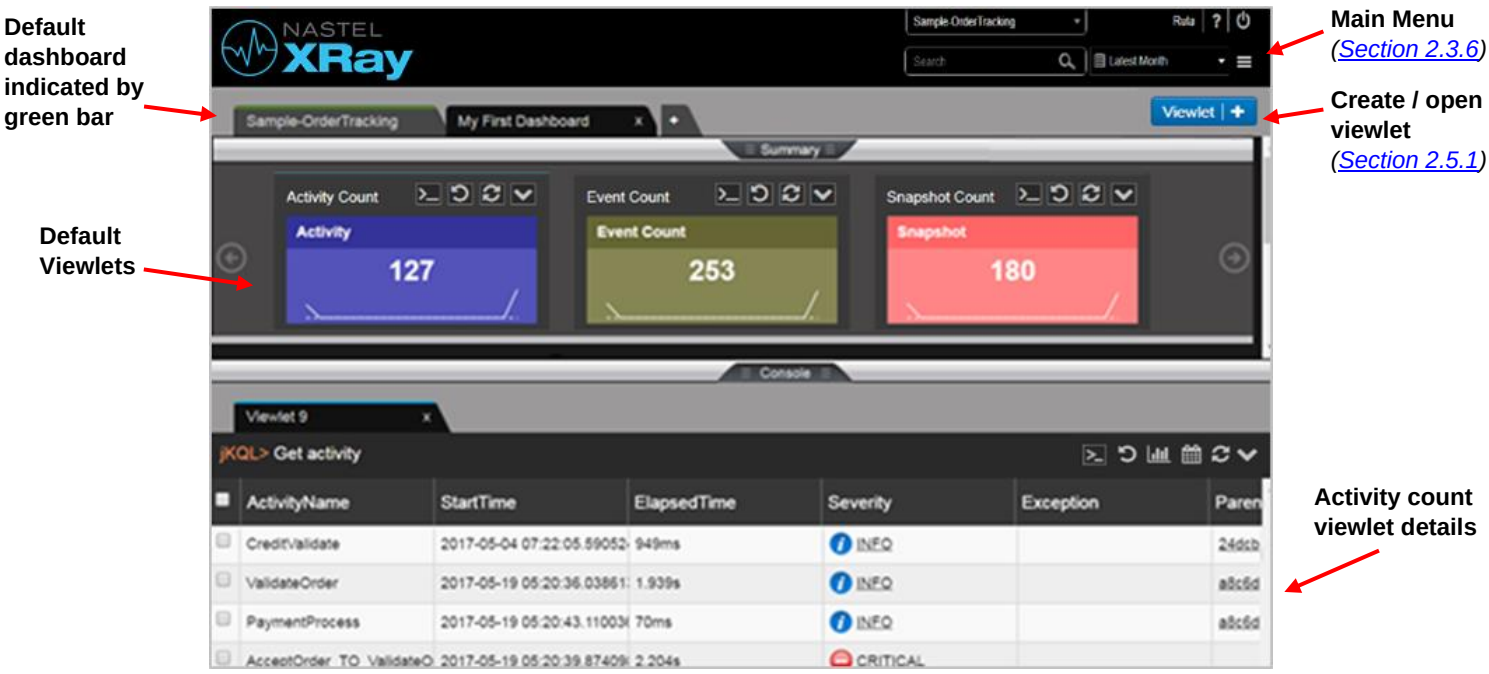

Figure 2.4.2.1-C. Default Viewlets

The upper portion of the screen above is called the Summary Panel. It contains summary viewlets which are used when counting the number of objects like events, activities, or snapshots and presenting the count in a summarized view. It can be closed and default to closed when no summaries are defined for that dashboard (See *Section, 2.5.4.10 Summary*).

2.4.2.2 Open

To open a dashboard, go to **Main Menu** > **Dashboard** > **Open**. The *Open Dashboard* dialog box opens. If there are no additional dashboards, this option will be greyed out.

All saved dashboards will be listed in the **Dashboard Name** drop-down menu. Select the desired dashboard and click **Open**.

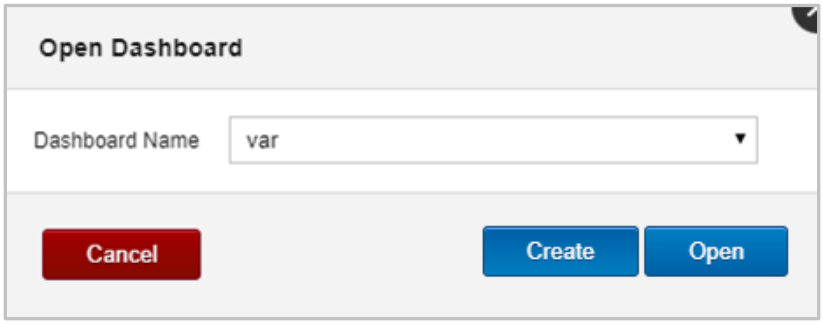

Figure 2.4.2.2-A. Open Dashboard

2.4.2.3 Menu

To display the menu of a dashboard, right click on the dashboard tab. A pop-up menu opens with the following options:

- **Assign to Teams** (*Section 2.4.2.4*)
- **Save** (*Section 2.4.2.5*)
- **Save As** (*Section 2.4.2.6*)

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- **Set As Default** (*Section 2.4.2.7*)
- **Configure** (*Section 2.4.2.8*)
- **Close other tabs**: close all other tabs except for the tab you are currently viewing
- **Close tabs to the right**: close all tabs appearing to the right of the tab you are currently viewing
- **Close tabs to the left**: close all tabs appearing to the left of the tab you are currently viewing

2.4.2.4 Assign to Teams

The **Assign to Teams** option allows you to enable view and modify permissions for teams. Hover over this option to view all teams which have been added to the dashboard's repository.

NOTE	To create a team, add a user to a team and manage team repositories, go to **Main Menu** > **Admin Settings** > **Organization** > **Teams** (see *Section 3.1.3.4.1, Edit Team*, for more information).

After hovering over the **Assign to Teams** option, simply click the eye icon to enable viewing privileges and/or the pencil icon for modifying privileges (clicking on the pencil icon selects both options). Enabled options for the teams will appear in green. Assigning teams viewing privileges prevents the users from saving changes.

Please note that this feature is only available for creators of the dashboard (dashboard owners), users who belong to a team with modification permissions, and repository admin users.

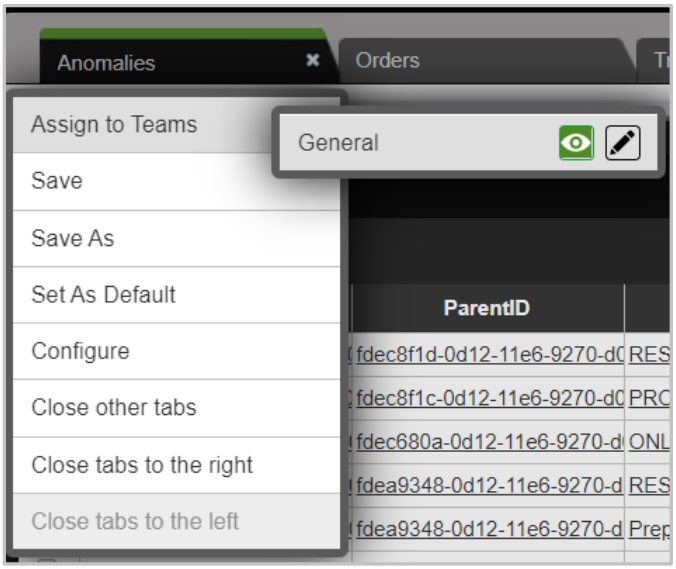

Figure 2.4.2.4-A. Assign to Teams

2.4.2.5 Save

To save a dashboard to a repository so that it appears every time you log in, either right click on the dashboard tab and select **Save** from the pop-up menu (*Figure 2.4.2.4-A*), or go to **Main Menu** > **Dashboard** > **Save** (*Figure 2.3.6-A*). A dialog box appears confirming that the dashboard has been saved.

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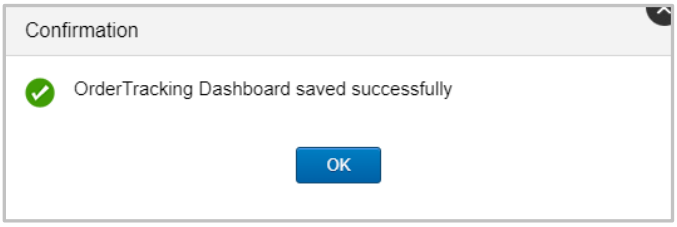

Figure 2.4.2.5-A. Dashboard Successfully Saved

2.4.2.6 Copy (Save As)

To make a copy of a dashboard, go to **Main Menu** > **Dashboard** > **Save As** or right click the dashboard tab and select **Save As** from the pop-up menu. Type in a new name for the dashboard.

2.4.2.7 Default

Your default dashboard is indicated by a green bar on the top of the tab. When a repository is loaded, the default dashboard will automatically display first.

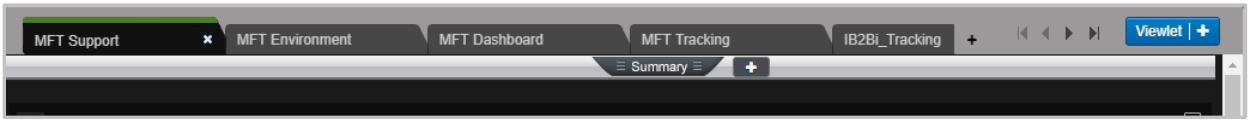

Figure 2.4.2.7-A. Dashboard Tabs

To set a dashboard as the default, right click on the tab of the dashboard and select **Set As Default** from the pop-up menu (*Figure 2.4.2.4-A*). The dashboard is now set as default and will have a green bar located at the top of its tab.

2.4.2.8 Change Layout

Users can change the layout and schema of the dashboard. Open the *Change Layout* dialog box by right clicking the dashboard tab and selecting **Configure** (*Figure 2.4.2.4-A*) from the pop-up menu, or go to **Main Menu** > **Dashboard** > **Change Layout**. The *Change Layout* dialog box opens.

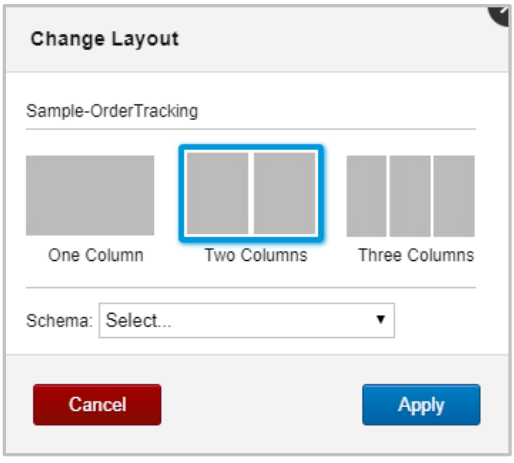

Figure 2.4.2.8-A. Change Layout

A new layout can be selected (one, two, or three columns). Select an option from the **Schema** drop-down menu. The schema will change how viewlets are displayed in your dashboard. The schema selected will control which columns are displayed and their sequence in viewlets (See *3.2.5, Configure Schemas*]. Please note that schemas are not available for Global Repository dashboards (the sample repositories).

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To go back to the default schema where all columns are displayed in viewlets, choose **Select** from the **Schema** drop-down menu.

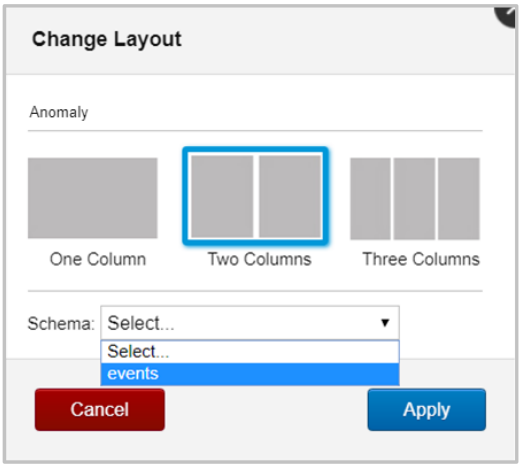

Figure 2.4.2.8-B. Change Schema

Additional dashboard customization options are available on the *Configure Dashboard* dialog screen. See *Section 3.2.4, Configure Dashboards*, for more information.

2.4.2.9 Dashboard Arrangement

The order in which dashboards display can be changed. Click on the tab of the dashboard you would like to move and drag and drop it to a new position.

2.4.2.10 Close

To close a dashboard, simply click the **X** located on the right side of the dashboard tab. The **X** will appear if the dashboard is currently displayed. For dashboards not displayed, hover over the tab and the **X** will appear.

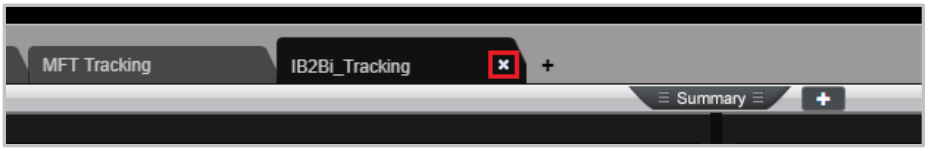

Figure 2.4.2.10-A. Delete Dashboard

Once the **X** is clicked, a confirmation dialog box will appear. If it's a global repository dashboard, the dialog box will confirm the close action (*Figure 2.4.2.10-B*). If the dashboard is in a repository created by you, the dialog box will ask to save your changes (*Figure 2.4.2.10-C*).

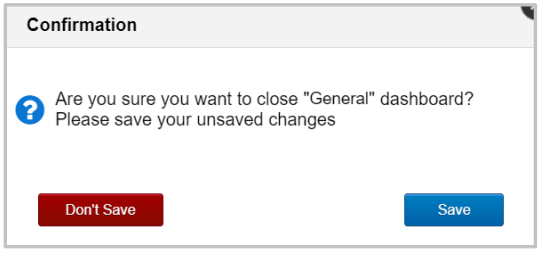

Figure 2.4.2.10-B. Close Dashboard Confirmation

2.4.2.11 Import / Export

Please see *Section 2.6.3, Dashboard,* for more information on importing and exporting dashboards.

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2.4.2.12 Rename

Please see *Section 3.2.4.1, Rename*, for more information.

2.4.2.13 Delete

Please see *Section 3.2.4.3, Delete Dashboard*, for more information.

2.4.2.14 Refresh

Please see *Section 3.2.4.6, Refresh Dashboard*, for more information.

2.4.3 Summary Panel

The Summary panel appears at the top of the screen. It contains summary viewlets, which can be created several ways. See *Section 2.5.4.10, Summary*, for more information about summary viewlets.

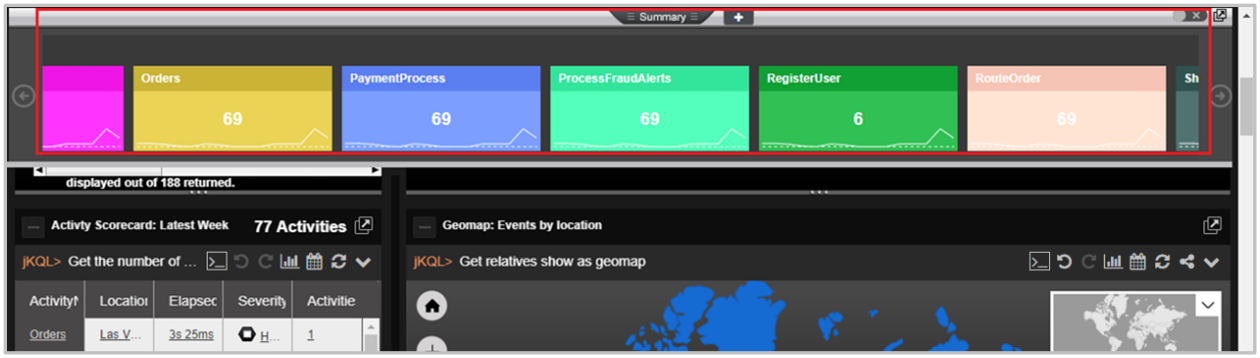

Figure 2.4.3-A. Summary Viewlets

2.4.3.1 Auto-Play Viewlets

Summary viewlets can automatically scroll for easy viewing. To implement this feature, enable **Auto-Play** located at the top right of the **Summary** panel.

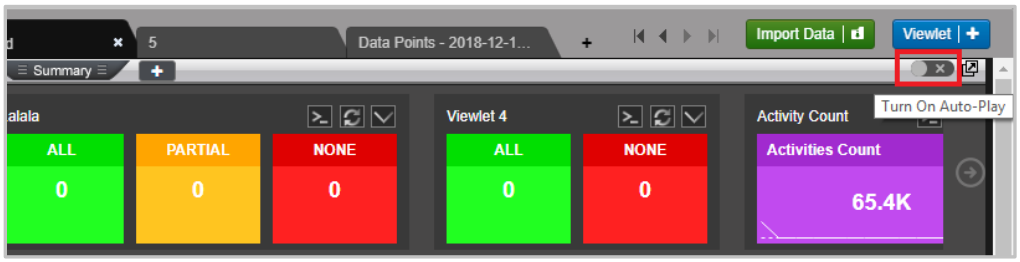

Figure 2.4.3.1-A. Turn On Auto-Play

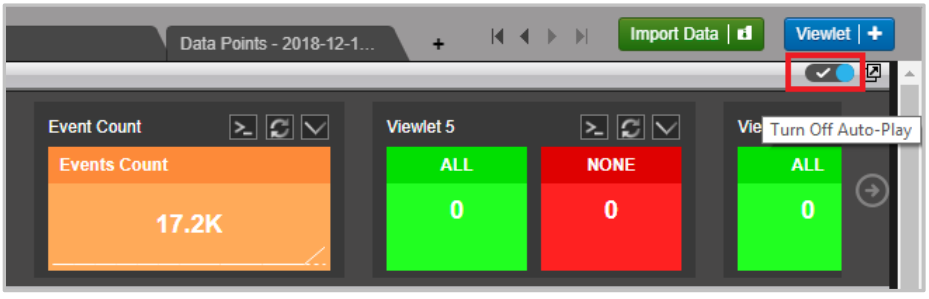

Figure 2.4.3.1-B. Turn Off Auto-Play

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2.4.3.2 Scrolling Viewlets

Summary viewlets not displayed on the screen can easily be viewed by clicking on the left and right arrows at each end of the Summary panel.

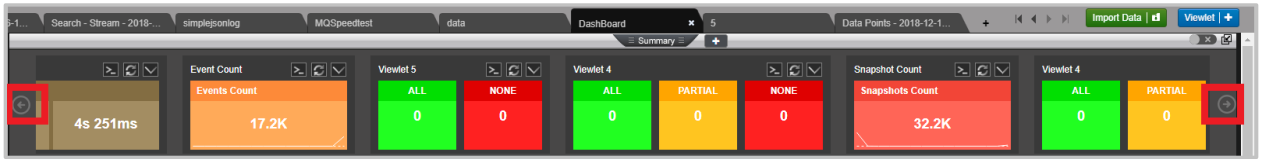

Figure 2.4.3.2-A. Scrolling Summary Viewlets

2.4.3.3 Show / Hide Section

The Summary panel can be hidden by simply clicking the **Summary** tab to collapse the section. The system can be configured to automatically have the Summary panel hidden every time you log in. Please see *Section 3.2.4.4, Summary Console*, for more information.

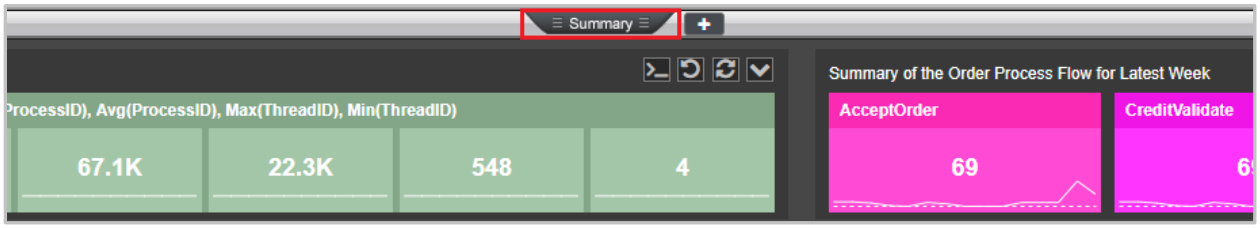

Figure 2.4.3.3-A. Show / Hide Summary Section

2.4.4 Console Panel

When users click on data records from any of the viewlets on a dashboard to view additional details, new viewlets will open in the **Console** panel allowing users to drill deeper into the data.

Within the **Console** panel, new temporary viewlets can be created (see *Section 2.5.1.3, Create Temporary Viewlet*).

Click the **Console** tab

to display or hide this section. When no viewlets are in the **Console**, the section will collapse automatically. The viewlets in the Console panel are temporary – they will not be saved after switching repositories or logging out.

If any data is clicked within **Console** panel viewlets, the additional details will display in new tabs.

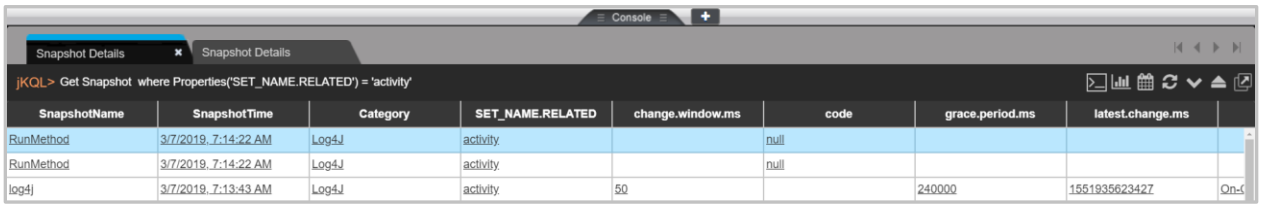

Figure 2.4.4-A. Viewing Console Viewlet Details

Console panel viewlets can be moved to the **Summary** panel so that they can be saved for future sessions. Click the **Move to dashboard** button to perform this.

Figure 2.4.4-B Console Viewlet Toolbar – Move to Dashboard

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2.4.5 End User Monitoring

The Nastel XRay RUM (Real-User Monitoring) plugin (https://github.com/Nastel/jkool-rum-plugin) can be added to get data and monitor web pages using Nastel XRay. When the data is streamed through this plugin to Nastel XRay, the **EUM** button will appear on the main toolbar. When clicked, it produces a separate dashboard with viewlets that can be used to monitor the activity data of your webpages. Examples of these viewlets can be found in the **Sample-EUM** repository.

Figure 2.4.5-A. End User Monitoring Button

2.5 Viewlets

Viewlets display data in various chart layouts. Examples of possible viewlet layouts along with jKQL queries are provided in the sample dashboards of the Global Repositories. The chart layouts include the following:

- Table
- Column
- Bar
- Line
- Pie
- Stack
- Geo Map
- Scorecard
- Area
- Summary
- Topology
- Anomaly
- Histogram
- Compare
- Tree
- Clustering
- Correlation
- Feature Suggestion
- Forecast
- Expected

A red asterisk appearing in front of a viewlet name signifies an unsaved viewlet. Save the viewlet from the viewlet's menu (click the down arrow on the top right corner, see *2.5.7 Viewlet Menu* for more information), or save the entire dashboard (see *2.4.2.5 Save*). If your browser crashes before saving, the viewlet will be restored upon next login.

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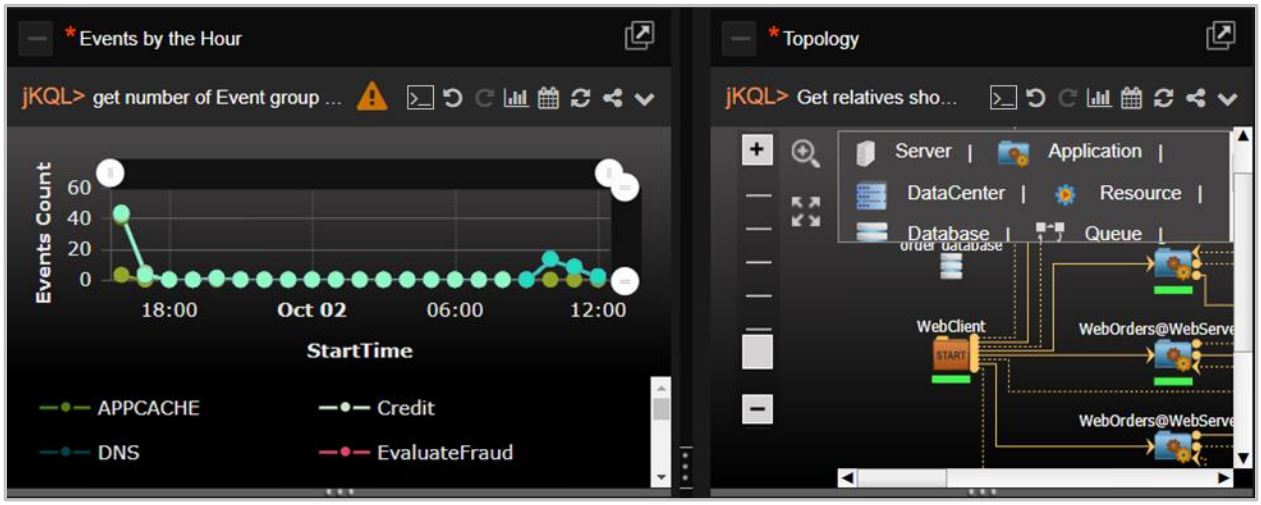

Figure 2.5-A. Viewlets

2.5.1 Create / Open Viewlets

Viewlets can be created by using forms or jKQL queries. To create viewlets, open the *Create/Open Viewlet* dialog box by clicking the **Viewlet** button at the top right of the screen (*Figure 2.5.1-A*) or by going to **Main Menu** > **Viewlet** > **Create** (see *Section 2.3.6, Main Menu*). Users that have the jKQL query interface suppressed (see *Section 3.1.3.1, Create New Users*, for more information on suppressing jKQL queries) will have the **Viewlet Form** button instead (*Figure 2.5.1-B*; *see Section 2.5.1.2 Create a Viewlet with a Form*).

NOTE	To import or export viewlets, please see *Section 2.6.2, Viewlets*, for more information.

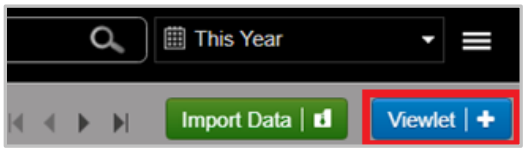

Figure 2.5.1-A. Create Viewlet with Viewlet Button

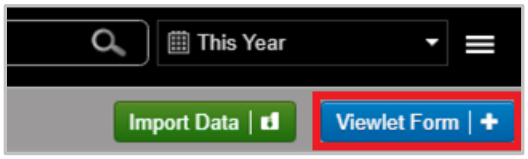

Figure 2.5.1-B. Create Viewlet with Viewlet Form Button

The *Create/Open Viewlet* dialog box opens. See sections 2.5.1.1 (Create Viewlet with a jKQL Query) and 2.5.1.2 (Create a Viewlet with a Form) below on how to add viewlets.

2.5.1.1 Create Viewlet with a jKQL Query

NOTE	Please see *Chapter 5, Using jKQL*, for information on jKQL query language.

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1. After clicking the blue **Viewlet** button, select **Create Viewlet with jKQL** on the *Create/Open Viewlet* dialog box.

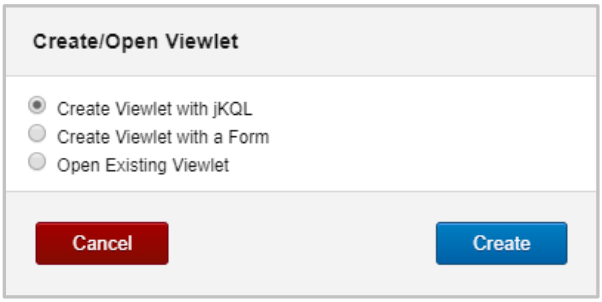

Figure 2.5.1.1-A. Create/Open Viewlet – Create Viewlet with jKQL

2. In this example, the query **Get Log** is entered. As you type, suggestions are provided in a drop-down list.

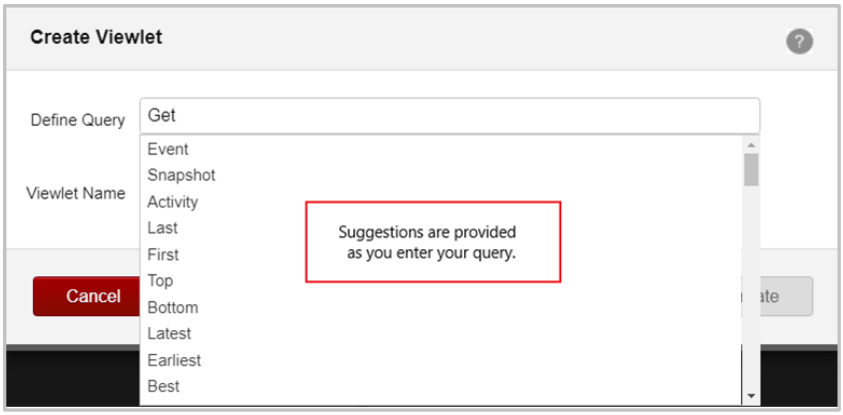

Figure 2.5.1.1-B. Enter a jKQL Query

3. Enter a name for your viewlet. In this example, **My First Query** was entered.

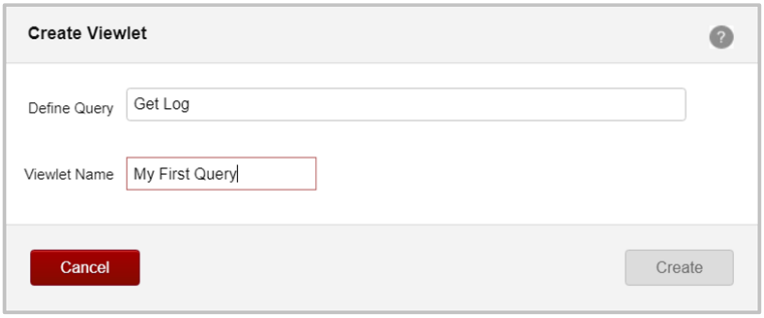

Figure 2.5.1.1-C. Name Your Viewlet

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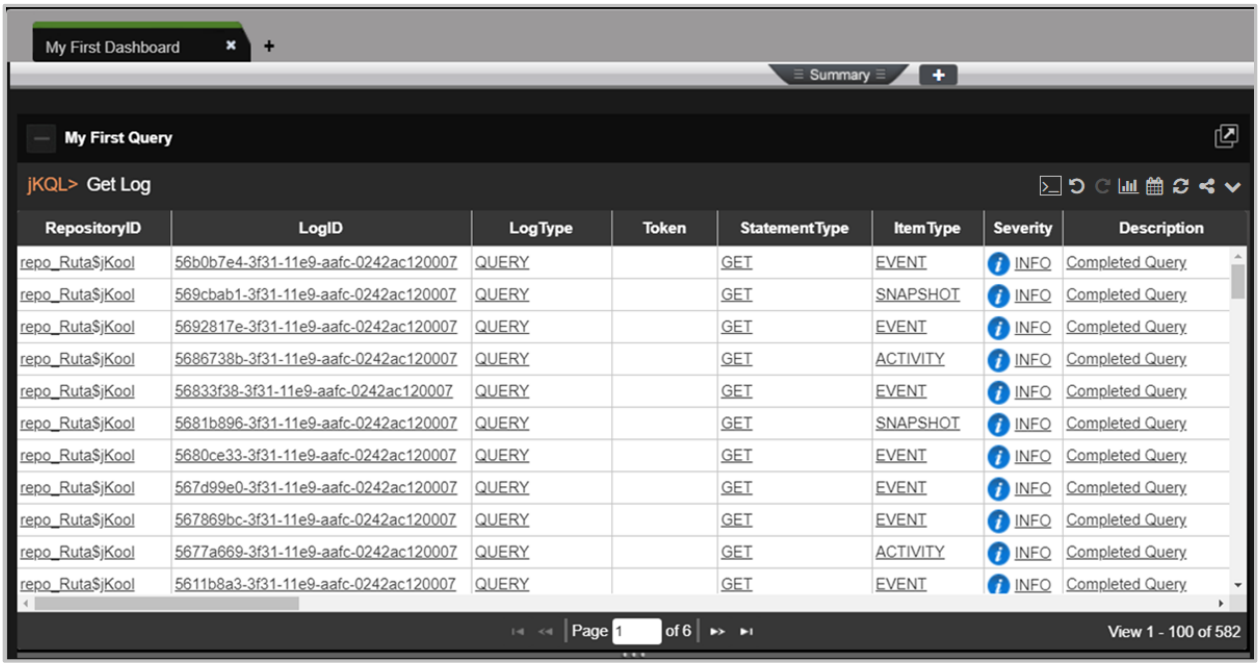

Figure 2.5.1.1-D. My First Query

4. Click **Create**. Your first viewlet is added to the dashboard.

2.5.1.2 Create a Viewlet with a Form

Select **Create Viewlet with a Form** on the *Create/Open Viewlet* dialog box.

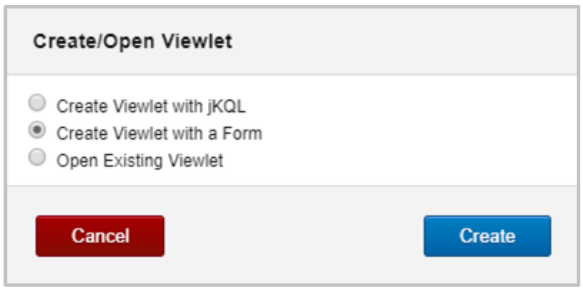

Figure 2.5.1.2-A. Create/Open Viewlet – Create Viewlet with a Form

The form view opens with all available options for the viewlet. Options are explained in the sections immediately below.

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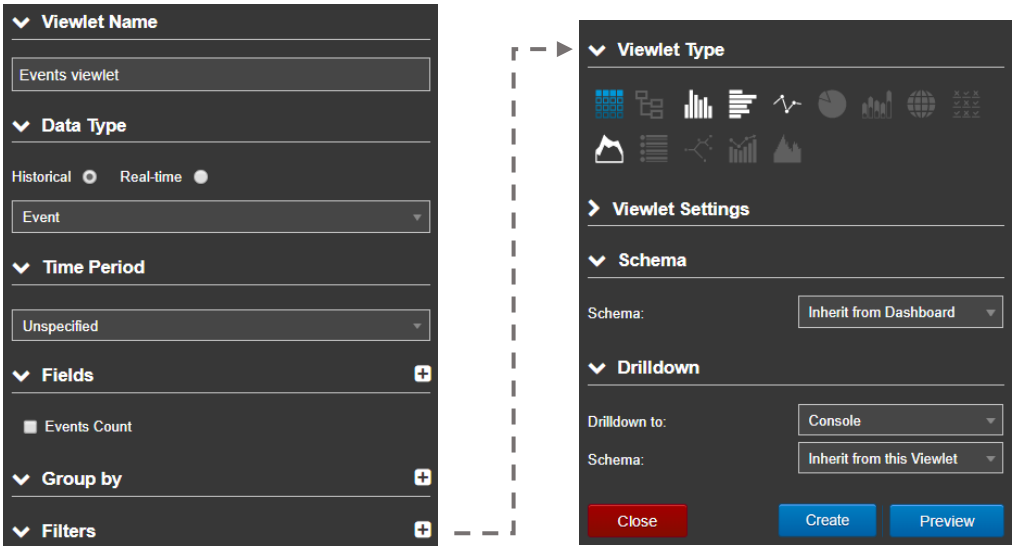

Figure 2.5.1.2-B. Form Options

Viewlet Name

Specify a name for the viewlet. The name must be unique; if a viewlet name already in use is entered, the field border will appear red and the **Create** button will be deactivated.

Data Type

Within this section, select if you would like to view **Historical** or **Real-Time** data:

- **Historical**: Select the data type from the drop-down menu. Specify the timespan you would like to view within the **Time Period** section immediately below, select from the following:
  - **Unspecified**: No time filter will be used
  - **Predefined**: Select from the predefined options.
  - **Custom**: Specify a custom time period using a value and a selected time unit.
  - **Date Range**: Enter specific start and end dates.
- **Real-Time**: Select the data type from the drop-down menu. Populate the following fields within the **Real-time Settings** section immediately below:
  - **Frequency:** The time interval in which the viewlet is refreshed with new data.
  - **Window Size:** The amount of the most recent responses from the server to report on. For example, if set to 50, the data is displayed from the latest 50 responses.

Fields

Within this section, specify the fields to display in the viewlet. Depending on the chart type, the **Count** option is required for certain viewlets (please see *Section 2.5.4, Viewlet Chart Types and Samples*, for more information on viewlet types). Associated required fields will be signified with a red box as seen in the figure below.

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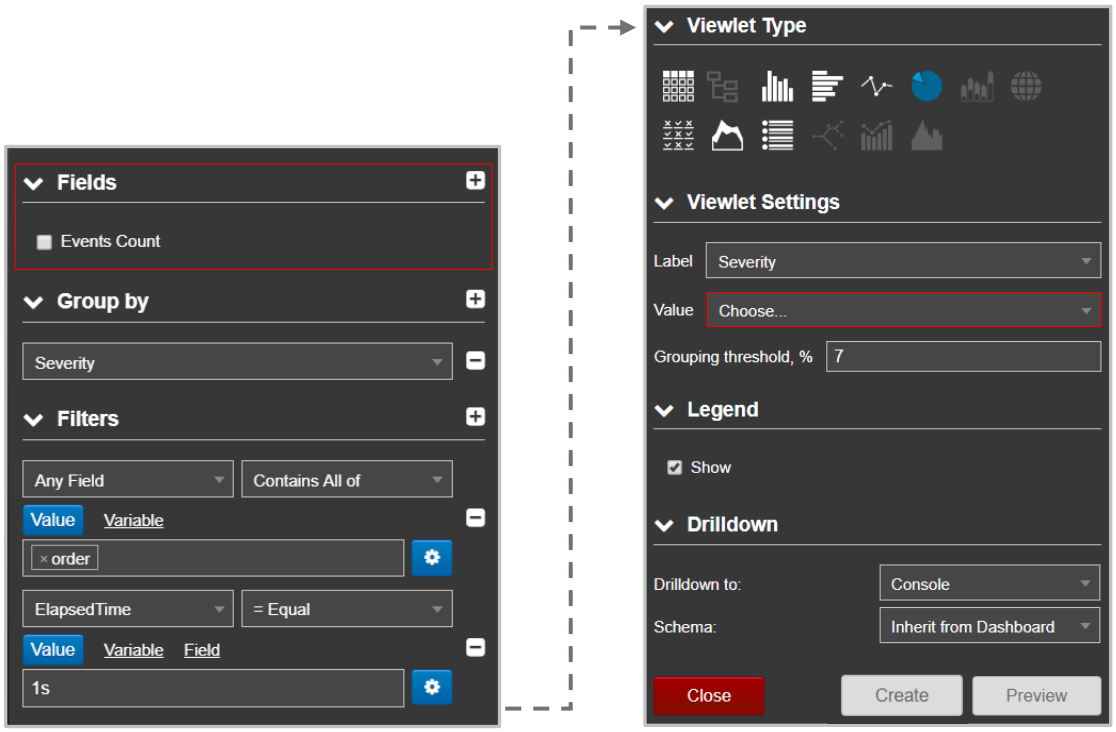

Figure 2.5.1.2-C. Field Requirements

Click the **Add** ⊞ button to add a field. From here you can select multiple fields and their associated functions. These fields and the operation outcome of the selected function will display in the viewlet. Please see *Section 4.5 Built-in Aggregate Functions* for more information on these functions.

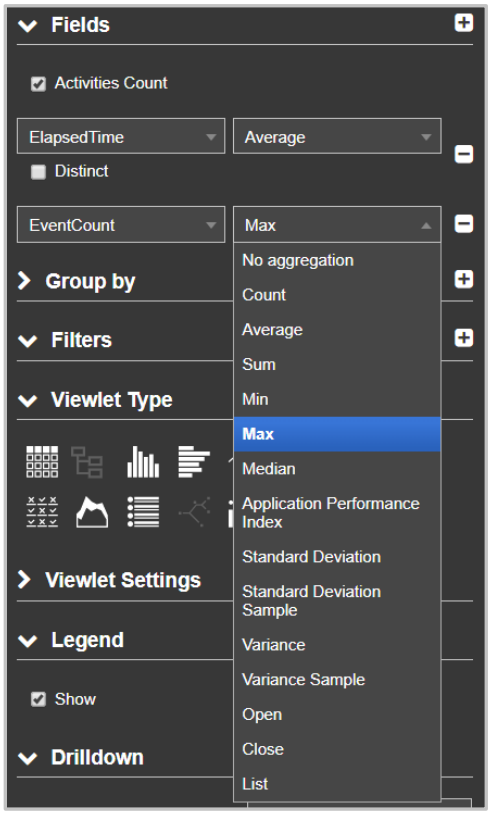

Figure 2.5.1.2-D. Add Fields

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In the example below, the fields and their information are displayed in the pop-up.

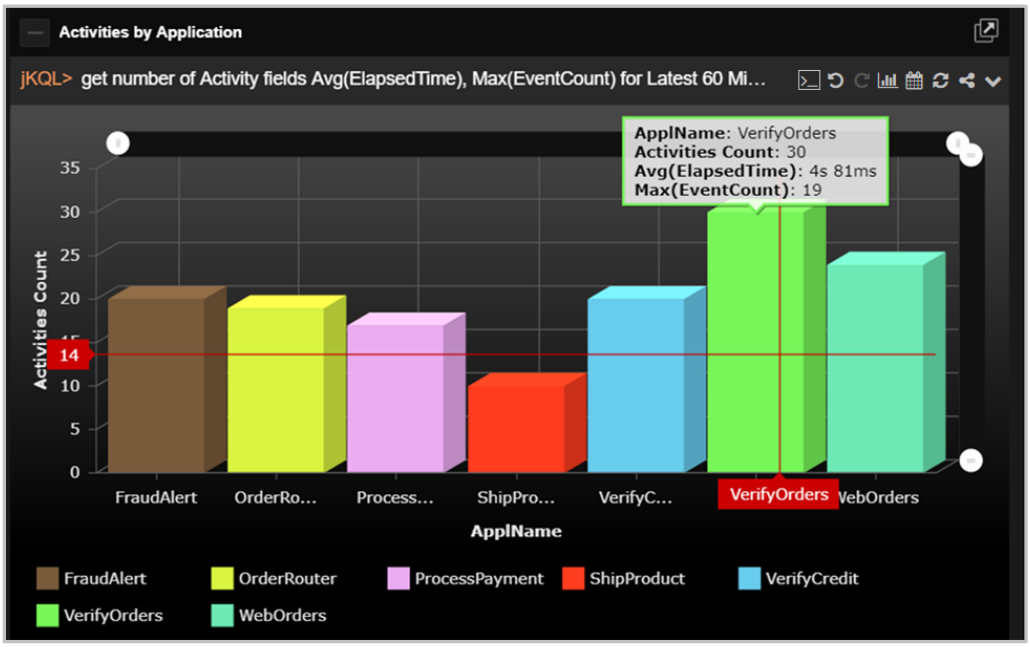

Figure 2.5.1.2-E. Fields Example

Group By

Within this section, select an option from the drop-down menu to use as the criteria to group data. Items with numerical elements will have a **bucket** option which allows you to specify how data should be grouped. Enable this option and select the type of bucketing. The types of bucketing are described in *Section 2.5.4.13*.

Filters

Use the **Filters** section to add multiple filters. Click the **Add** button ⊞ to add a filter and select an operator.

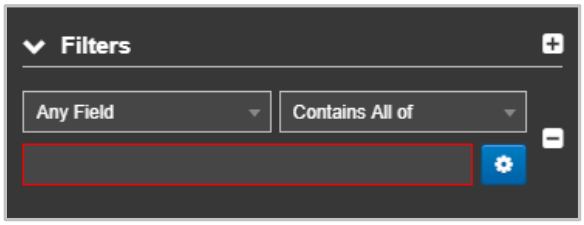

Figure 2.5.1.2-F. Filters Options

After selecting the filter and operator, populate the **Value** field or click the settings button ⚙ to filter by **Variables** or **Fields** (depending on the item type, these filtering options may not be available). Please note that one filter tab can be used at a time. For more information on filtering with variables, see *Section 2.5.8.1, Filtering with Variables*.

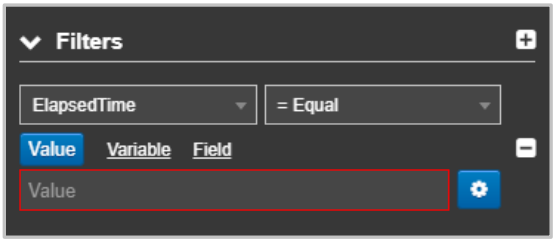

Figure 2.5.1.2-G. Filters Options

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When a time-related filter is selected, the appropriate time can be set by clicking on the calendar icon . The field value automatically populates with the current day/time, but you can change it using the time widget. Click **Done** when finished.

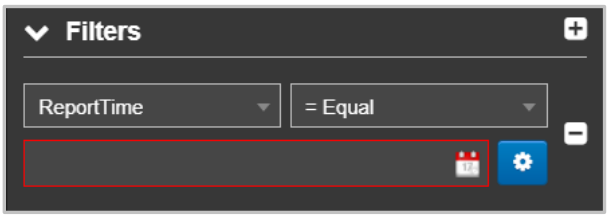

Figure 2.5.1.2-H. Filters Operators

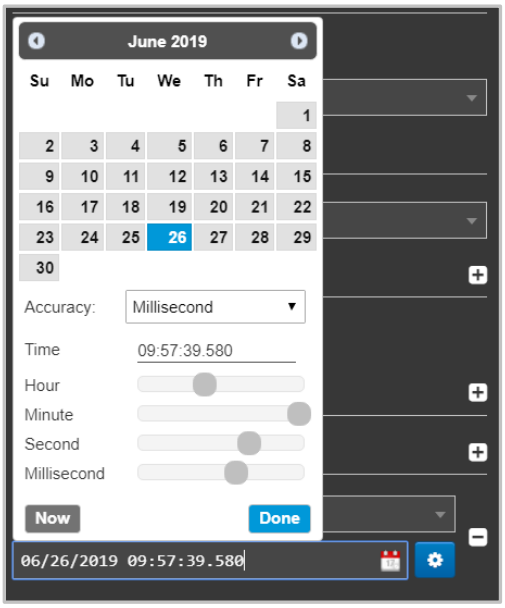

Figure 2.5.1.2-I. Time Setup

Click the **Variable** tab and then the pencil button to create or modify variables used to filter viewlets. After the pencil button is clicked, the **Create new variable** window opens (see *Section 2.5.8.1, Filtering with Variables*, for more information).

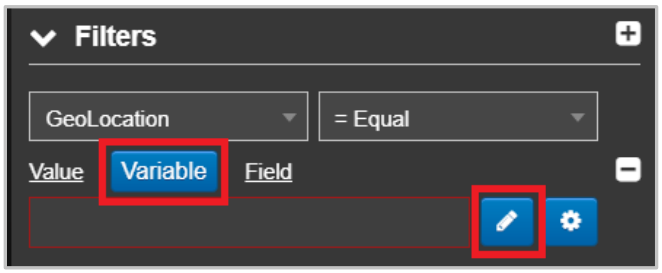

Figure 2.5.1.2-J. Variable Filtering

When you select the **Field** tab, a drop-down menu becomes available. The selected fields will be filtered using operators from this list.

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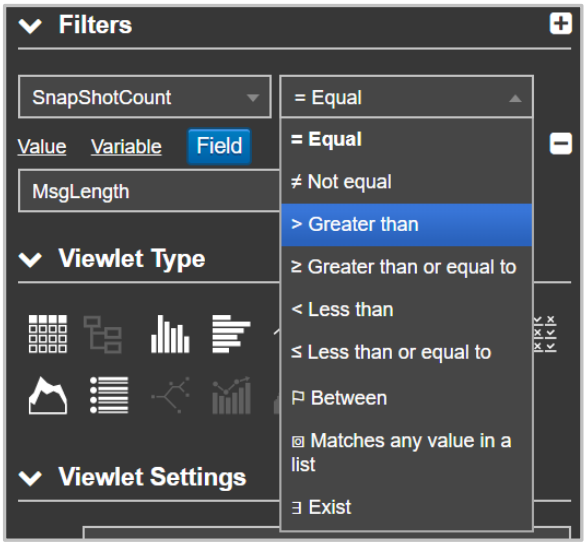

Figure 2.5.1.2-K. Filters Operators

Viewlet Type

Select the viewlet type within this section. Please see *Section 2.5.4, Viewlet Chart Types and Samples*, for more information on viewlet types.

Viewlet Settings

Modify viewlet options. Please note that not all viewlets will have this section. Select the X and Y axes values and the **Collated by** option (available for column, bar, line, stack and area charts).

To set the axis width and label display (axis labels can display vertically or horizontally), click the **Settings** button immediately to the right of the X and Y axis fields. Specify either **Auto** or **Manual** (enter pixel value) for the width and check off the **Rotate labels** setting to rotate the Axis labels.

Enable the **Show** option within the **Legend** section to display the chart definitions.

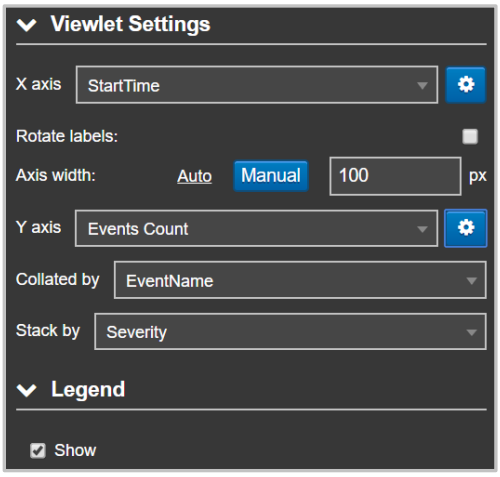

Figure 2.5.1.2-L. Barchart Form Options

Pie charts will have the following options to specify: **Label**, **Value** and **Grouping threshold, %**.

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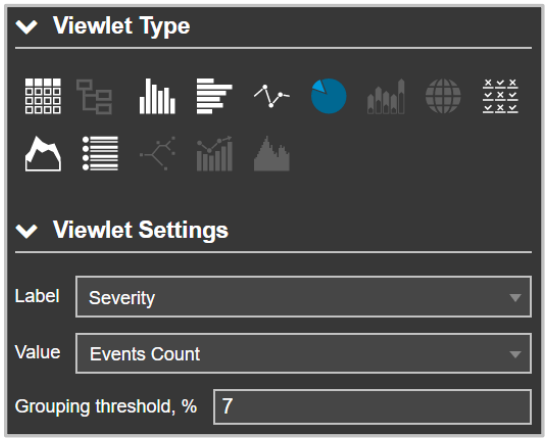

Figure 2.5.1.2-M. Piechart Form Options

Drilldown

The drilldown feature is a convenient way to investigate a given problem in more details. You can either drilldown to a viewlet's details within the *Console* panel, which is the default method, or to a target dashboard (including the current dashboard) that utilizes variables. The variable filter from the data selected in the originating viewlet is passed to the specified dashboard and updates that dashboard's viewlets using the variable.

The following is an example scenario of drilling down to a target dashboard:

- Dashboard #1: Contains a viewlet with data for average temperature by state. You have configured this viewlet to drilldown to Dashboard #2 using its state variable.
- Dashboard #2: Contains the following three viewlets which have a filter defined for state:
    - Temperature by city
    - Humidity by city
    - Rainfall by city

  When you select a specific state within the viewlet located in Dashboard #1, you will be brought to Dashboard #2. All three viewlets in Dashboard #2 will reflect data for the state selected from Dashboard #1's viewlet.

TIP	Watch the following video for an overview of the drilldown featured: https://vimeo.com/383411780

NOTE	Topology and geomap viewlets do not have the drilldown option.

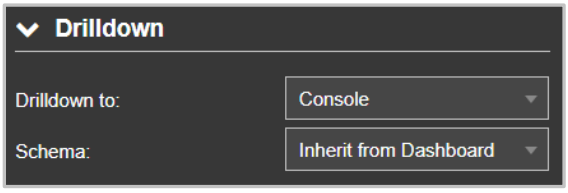

Figure 2.5.1.2-N. Drilldown Options

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The **Drilldown** section controls viewlet filtering within and across dashboards. From the **Drilldown to** dropdown setting, select one of the following options to specify how the drilldown will behave:

- **Console**: this option is enabled by default. Leave this option set if you want to open drilldown results within the *Console* panel. Within the **Schema** field, specify which schema to apply to the viewlet (the schema determines which fields are displayed within the viewlet).

  -OR-

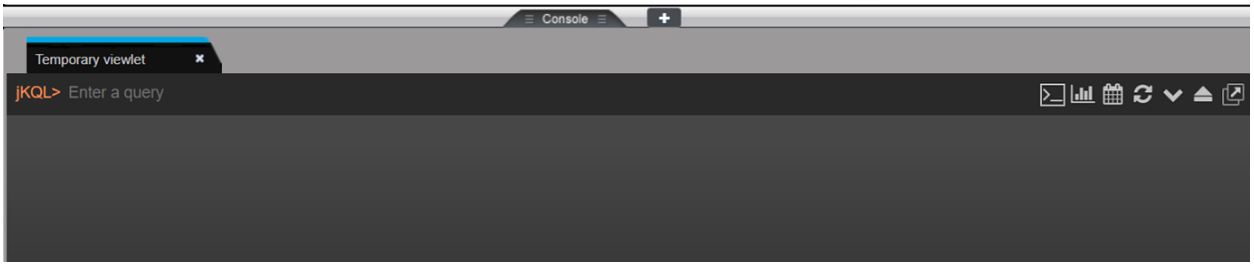
  Dashboard: select this option to drilldown to a specific dashboard. This option should only be used with dashboards that utilize variables (see Section 2.5.8.1, Filtering with Viewlets, for more information) as data will be passed to them upon drilldown.
  Select the desired dashboard from the **Dashboard Name** field. The selected dashboard's associated variables will display. Select the parameter you want to pass into the variable.
  From this point forward, when you click on the configured data in the viewlet, instead of going to the *Console* panel, you will be brought to the selected dashboard instead. Please note, if the destination dashboard is closed, it will automatically open. All of the viewlets will be updated to show you data for the specified variable from the originating dashboard.

  If **Self** was selected for the dashboard, when drilling down, instead of opening a new dashboard, the current dashboard will be refreshed. This is a handy way of creating a dashboard that you want to quickly refresh its viewlets with variable data. There are lots of other use cases, for example, you can have your top 10 problematic queues in MQ located at the top of the dashboard which will be dynamically updated.

2.5.1.3 Create Temporary Viewlet

Create temporary viewlets in the **Console** panel by clicking the **+** button immediately to the right of the **Console** tab. Enter a query in the jKQL query line to generate your desired viewlet. For more information on the Console panel, please see *Section 2.4.4, Console Panel*.

Figure 2.5.1.3-A. Add Console Viewlet



2.5.1.4 Open Existing Viewlet

Selecting **Open Existing Viewlet** on *Create/Open Viewlet* dialog box will open the *Open Existing Viewlet* dialog box. The view can be changed by selecting **Details** from the **View By** drop-down for a more descriptive view (*Figure 2.5.1.4-B*). Use the **Sort By** drop-down to arrange the viewlets in alphabetical order or by chart type. Quickly search for viewlets by viewlet name using the search box.

Select a viewlet and click **Open**. The dashboard's focus will now be the selected viewlet.

The *Open Existing Viewlet* dialog box can also be opened from the **Main Menu** (*Section 2.3.6*).

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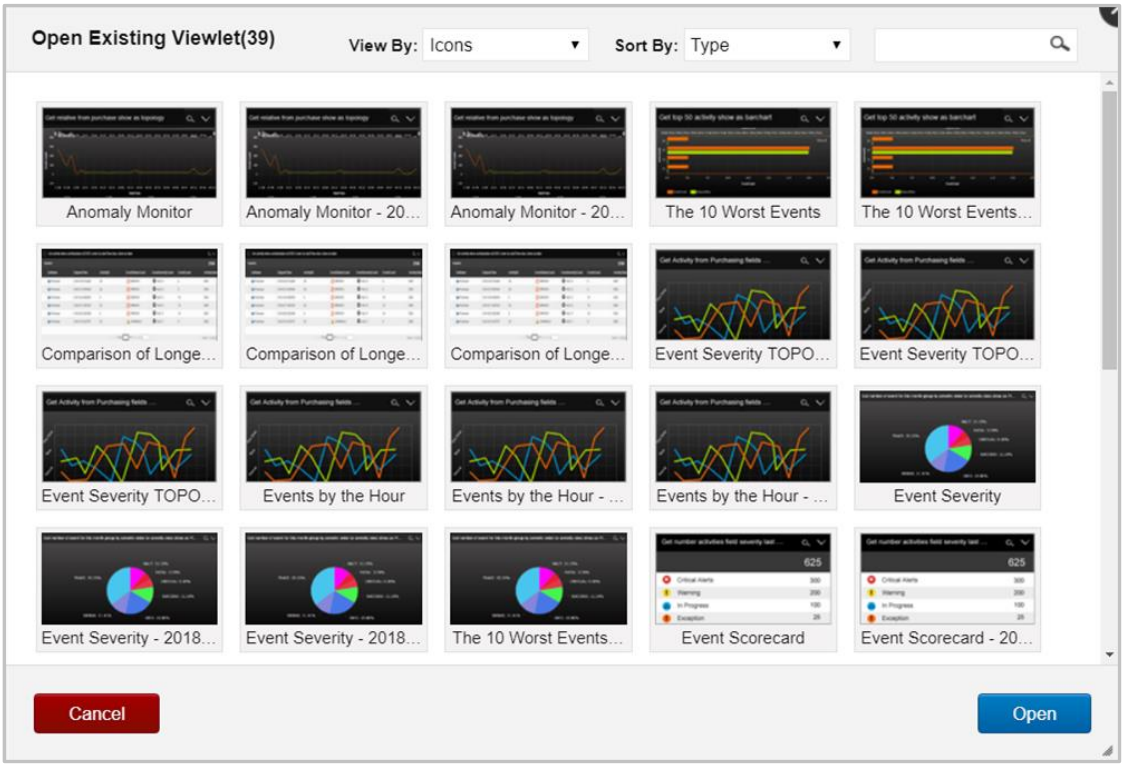

Figure 2.5.1.4-A. Open Existing Viewlet – View By Icons

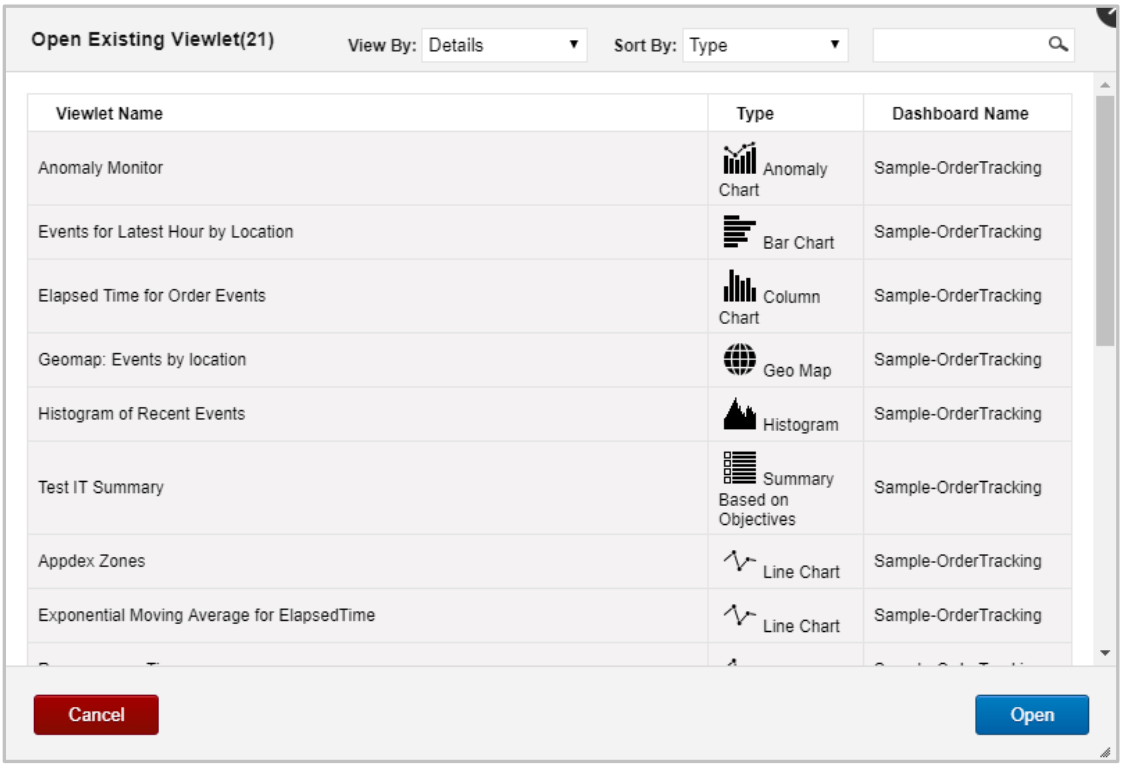

Figure 2.5.1.4-B. Open Existing Viewlet – View By Details

2.5.2 Edit Query

The query line becomes an editable field after you click the edit query icon or you can simply click the query line. Make your changes. As you edit, you will be prompted with suggestions as in *Figure 2.5.1.1-B*.

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Figure 2.5.2-A. Edit Query

2.5.3 Undo / Redo

The undo and redo buttons are used to revert or reapply changes from the current user session history. Changes tracked which can be undone or reapplied include updates made to viewlet names, settings and queries.

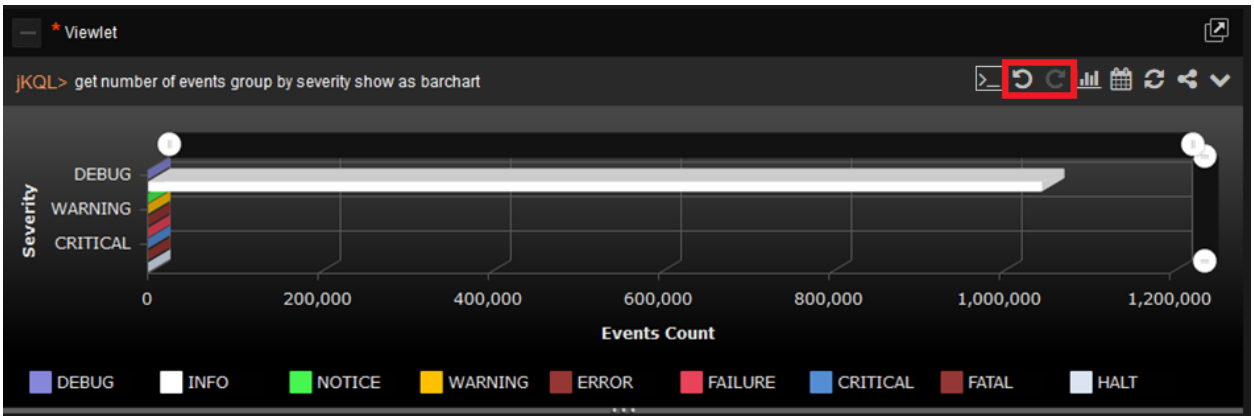

Figure 2.5.10-E. Undo / Redo Buttons

2.5.4 Viewlet Chart Types and Samples

The data in viewlets can be formatted in various chart types.

Easily update a viewlet's chart type by clicking the **Chart** icon . The selected chart type of a viewlet will be highlighted blue. See Sections 2.5.4.1 – 2.5.4.13 below for an explanation of each chart type. Within each section there are samples of the chart types and an explanation of a scenario in which the chart type is useful. Some of these samples can be found in the **Sample-OrderTracking** repository.

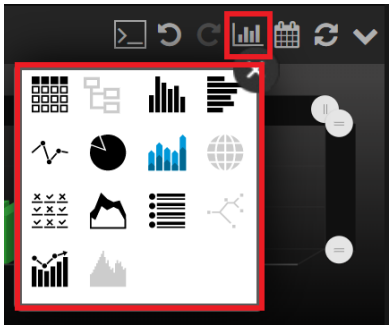

Figure 2.5.4-A. Chart Types

2.5.4.1 Table

Table is the default chart type for viewlets. All data imported will display, unless a schema is used. In table viewlets, schemas control what columns are displayed and in what order. See *Sections 3.2.5, Configure Schemas*, and *2.4.2.8 Change Layout* for more information. Use the scroll bar at the bottom

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of the viewlet to view additional columns. Columns can also be expanded by hovering over the line separators within the header sections.

Click columns headers to sort the data in ascending ( ) or descending ( ) order.

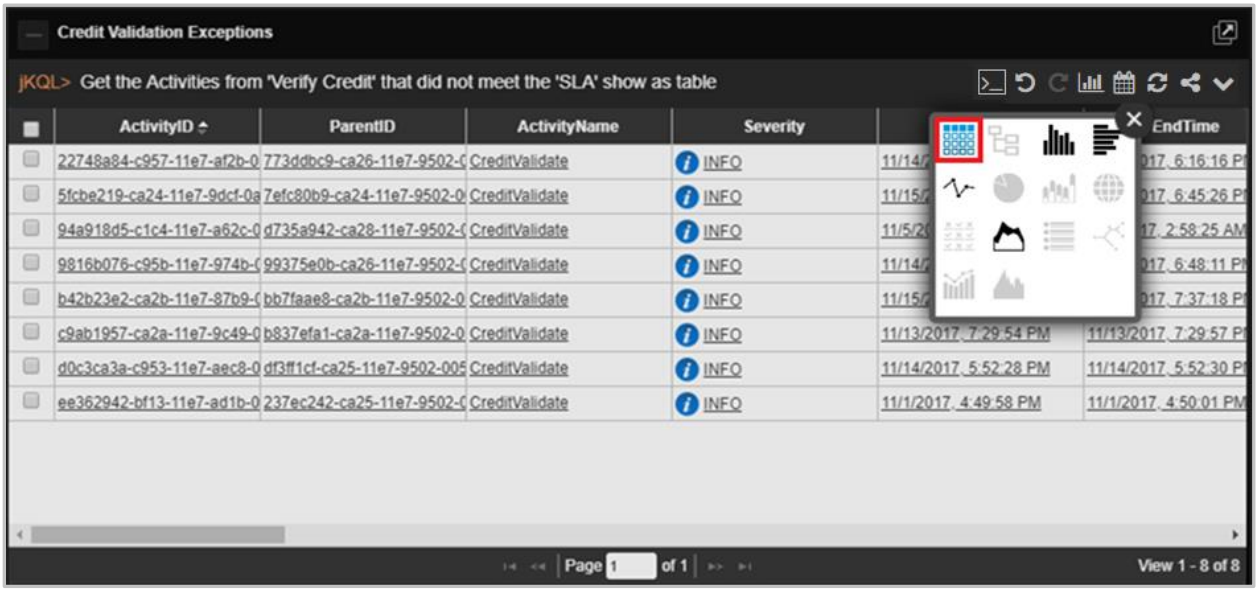

Figure 2.5.4.1-A. Table

Viewlets with a lot of data to display will have multiple pages. Use the left and right arrows to easily navigate through the pages. The **First** and **Last Page** buttons allow users to quickly jump to the first and last pages. Use the **Previous** and **Next Page** buttons to navigate through each page. Enter a page number to load a specific page.

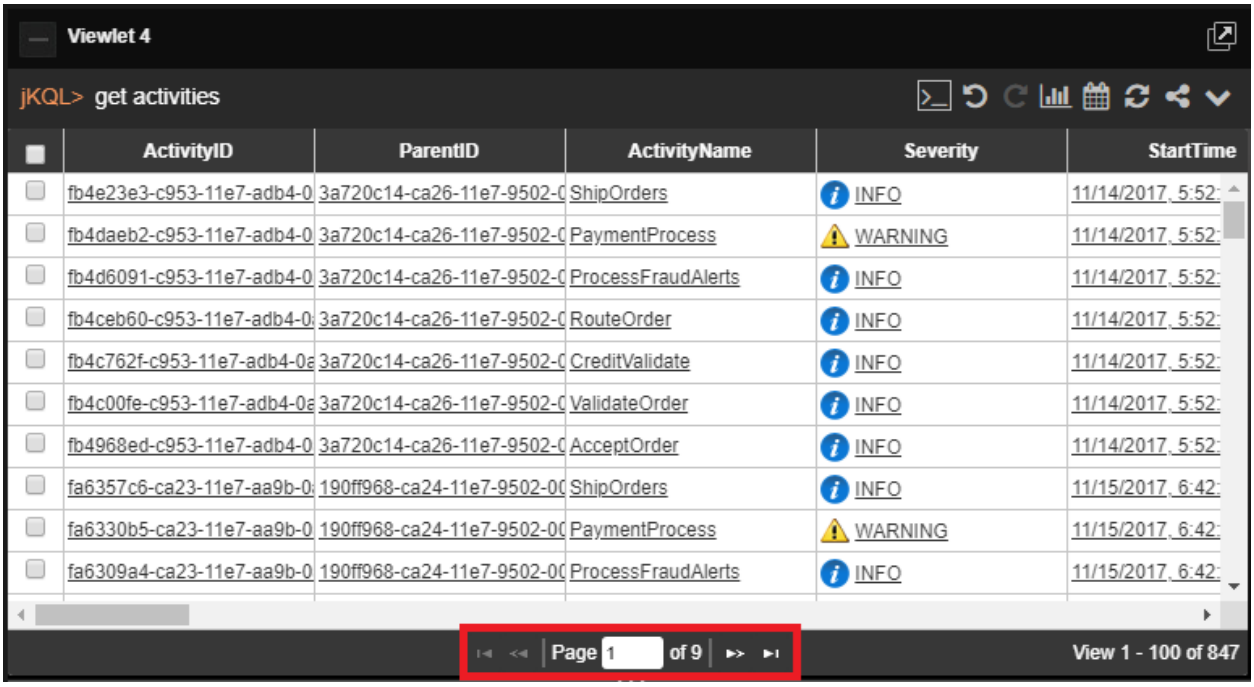

Figure 2.5.4.1-B. Page Navigation

Click on any of the data records to view additional details in a new viewlet within the **Console** section. See *Section 2.4.4, Console Panel*, for more information.

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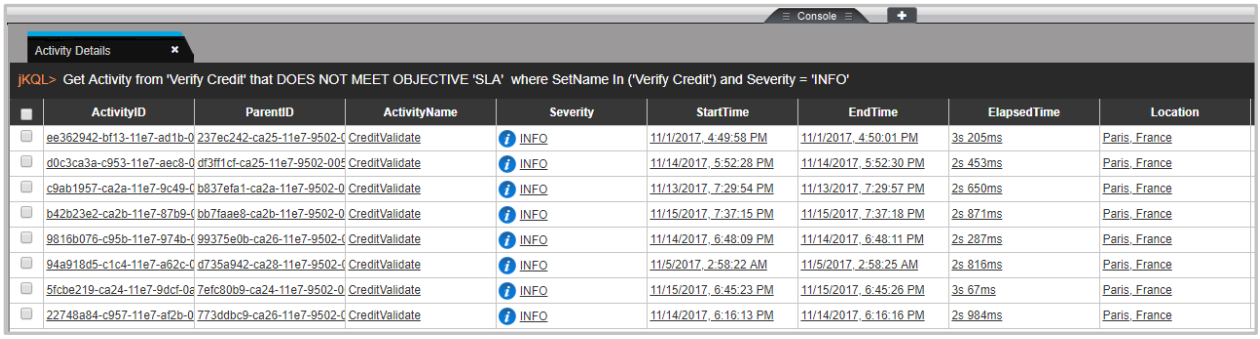

Figure 2.5.4.1-C. Additional Details in Console

2.5.4.1.1 Table Menu Options

Users have different options to dig deeper into the data of table charts. Select all desired records or use the top box to select all records. A pop-up menu appears. Select an option from the pop-up menu to view additional data details within the **Console** section.

The pop-up menu options depend on the data type. A viewlet containing events (*Get events*) will have the following menu items:

- Related
- Parent
- Analyze
- Topology
- Compare (available only when more than one line is selected)

A viewlet containing activities (*Get activities*) will have the following menu options:

- Events
- Related
- Parent
- Topology
- Root Cause (available only for severity status of Error, Halt, Failure, Fatal or Critical)
- Children (available when one or more activities with children are selected)
- Compare (available only when more than one line is selected, see *Figure 2.5.4.1.1-A* and *Figure 2.5.4.1.1-B*).

Tables produced by jKQL queries with the following expressions will not have a pop-up menu: snapshots, logs, actions, active users, count of/number of, token, organization, teams, repository, set, license, fields, items, relatives, provider types, keywords, parameter, dictionary, features, access token, IP location, resource, group by.

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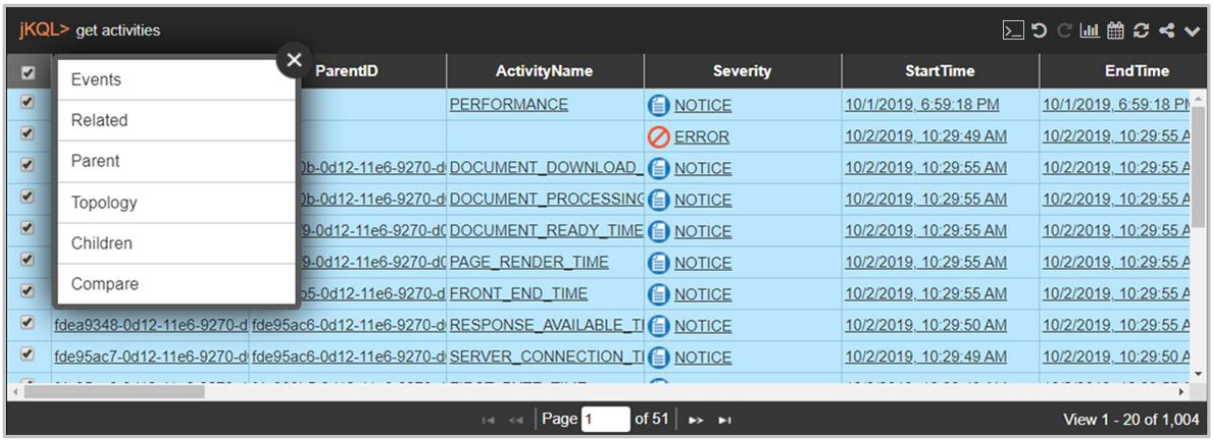

Figure 2.5.4.1.1-A. Table - Select All

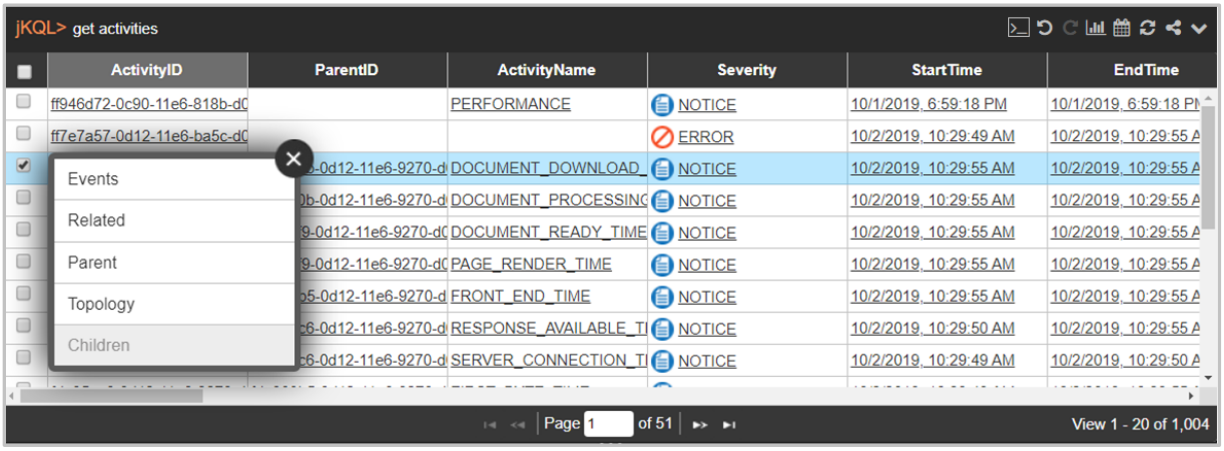

Figure 2.5.4.1.1-B. Table – Select One

After selecting an option on the pop-up menu, a new viewlet related to the option selected will open in the **Console** section.

If **Events**, **Related**, **Parent**, **Children** or **Analyze** were selected, the data will display in a table by default. You can modify the jKQL query to customize the viewlet. These tables have their own pop-up menus which allow users to dig deeper into data. Every selection from the pop-up menu will open a new viewlet within the **Console** section.

2.5.4.1.1.1 Events

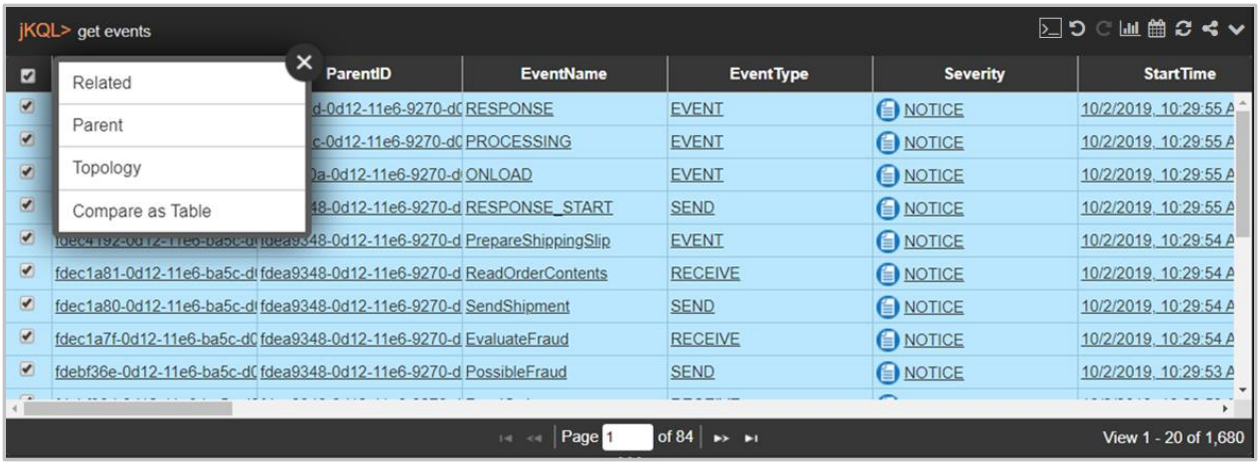

Figure 2.5.4.1.1.1-A Events

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The above example was generated by selecting **Events** from the activity's table pop-up menu. The tab name is the selected menu option and the name of the main viewlet. In the example above, the tab name is **Events_Event Severity**.

2.5.4.1.1.2 Related

The below figure is the viewlet that appears when **Related** is selected from the pop-up menu of the **Events_Event Severity** tab**.** The table displays events which have the same selected Activity ID(s).

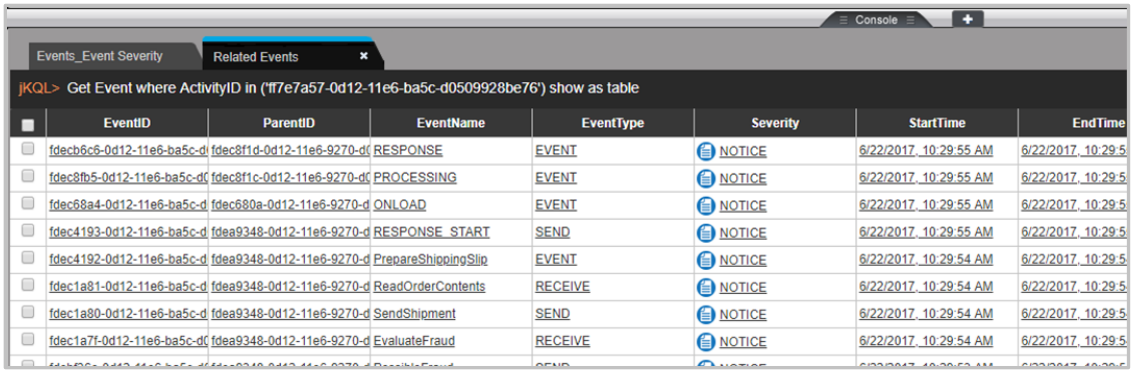

Figure 2.5.4.1.1.2-A. Related

2.5.4.1.1.3 Parent

Select **Parent** from the pop-up menu to open a viewlet which displays parent activities (activities with a greater hierarchical status) of the selected activities or events. Only items with values within the **ParentID** column will have a **Parent** menu option on the table's pop-up menu.

The parent activities of other activities or events will display. An activity without a **ParentID** means that it is the prime activity with the highest hierarchical status.

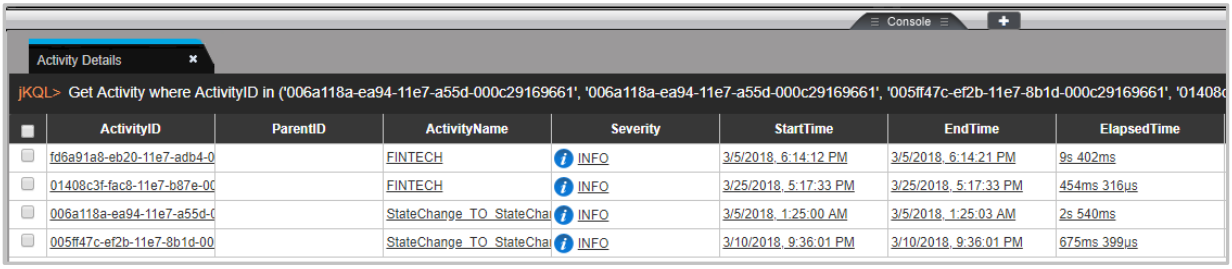

Figure 2.5.4.1.1.3-A. ParentID

2.5.4.1.1.4 Analyze

The analyze function creates an analysis of what factors impacted events. To make the analysis, this function uses event and related event data, which is a collection of snapshots.

After selecting **Analyze** from the pop-up menu of the Event table, the **Create an Analysis Viewlet** window appears. Specify desired options. Please note that **Show Trend Line** becomes active when **Show Elapsed Time** is enabled. Enable the **Remember My Choice** check box if you would like to save your selections. Click the **Next** button for additional customization or **Create** to create the viewlet.

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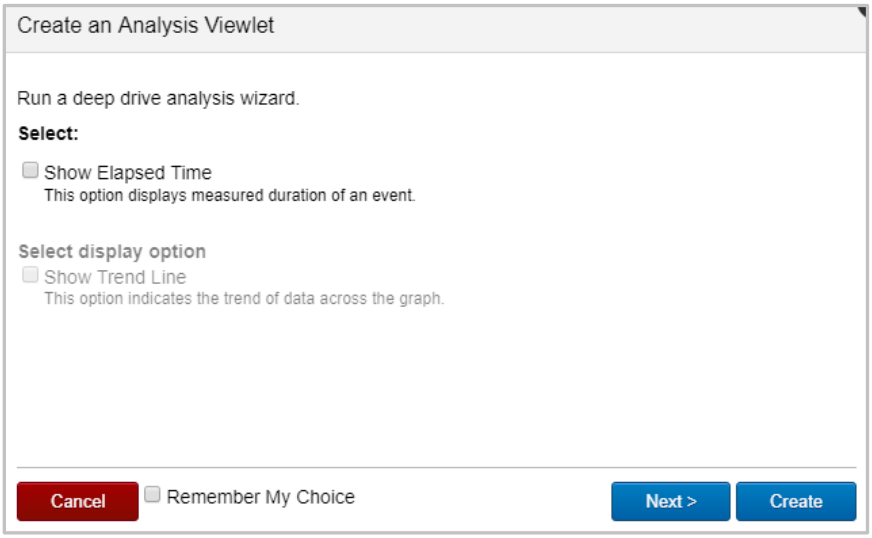

Figure 2.5.4.1.1.4-A. Create an Analysis Viewlet

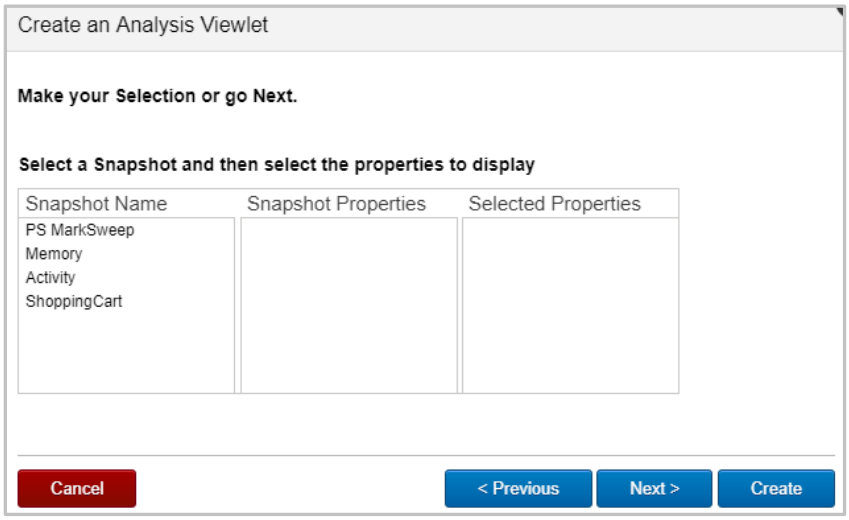

Figure 2.5.4.1.1.4-B. Create an Analysis Viewlet – Additional Options

Select a snapshot from the **Snapshot Name** column and select all desired options from the **Snapshot Properties** column. The selected properties will display in the last column. Click **Create** to finish or **Next** for additional customization.

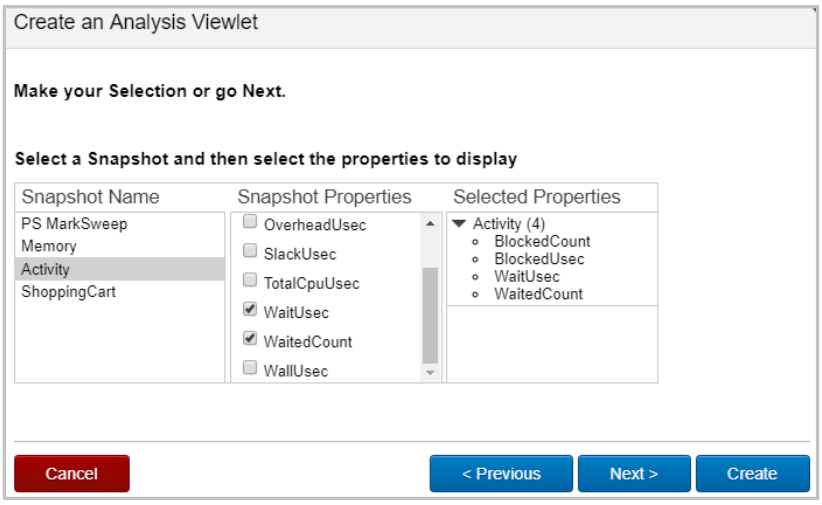

Figure 2.5.4.1.1.4-C. Create an Analysis Viewlet – Select Options

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Select which items you would like the viewlet to display and click **Create**. The *Analyze_Event Details* viewlet will appear within the Console panel.

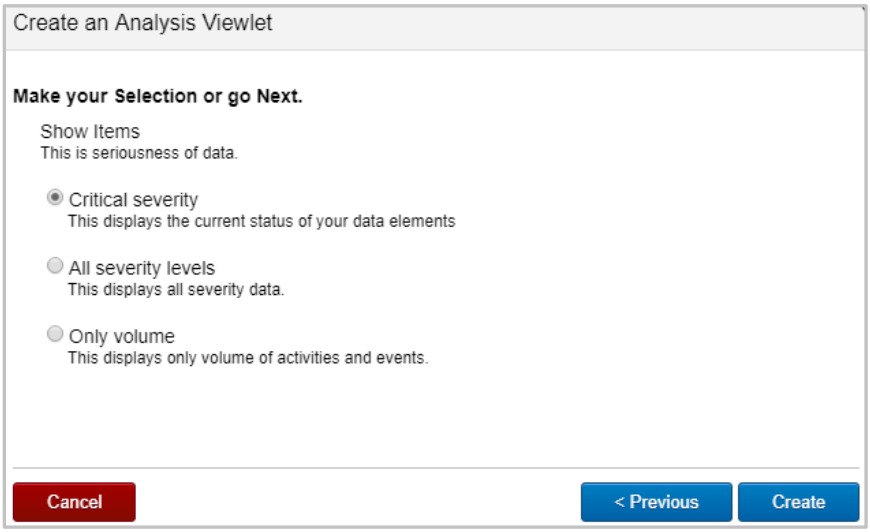

Figure 2.5.4.1.1.4-D. Create an Analysis Viewlet – Select Items

2.5.4.1.1.5 Topology

Select Topology in the pop-up menu to generate a topology viewlet using the selected items within the **Console** section. For more information on topologies, see *Section 2.5.4.11, Topology*.

2.5.4.1.1.6 Root Cause

When selecting activity table records with a severity status of Error, Halt, Failure, Fatal or Critical, **Root Cause** will be an option on the pop-up menu. Clicking this will open a viewlet in the **Console** section displaying a topology. The topology will allow you to dig deeper into the data and find the root cause of the issue.

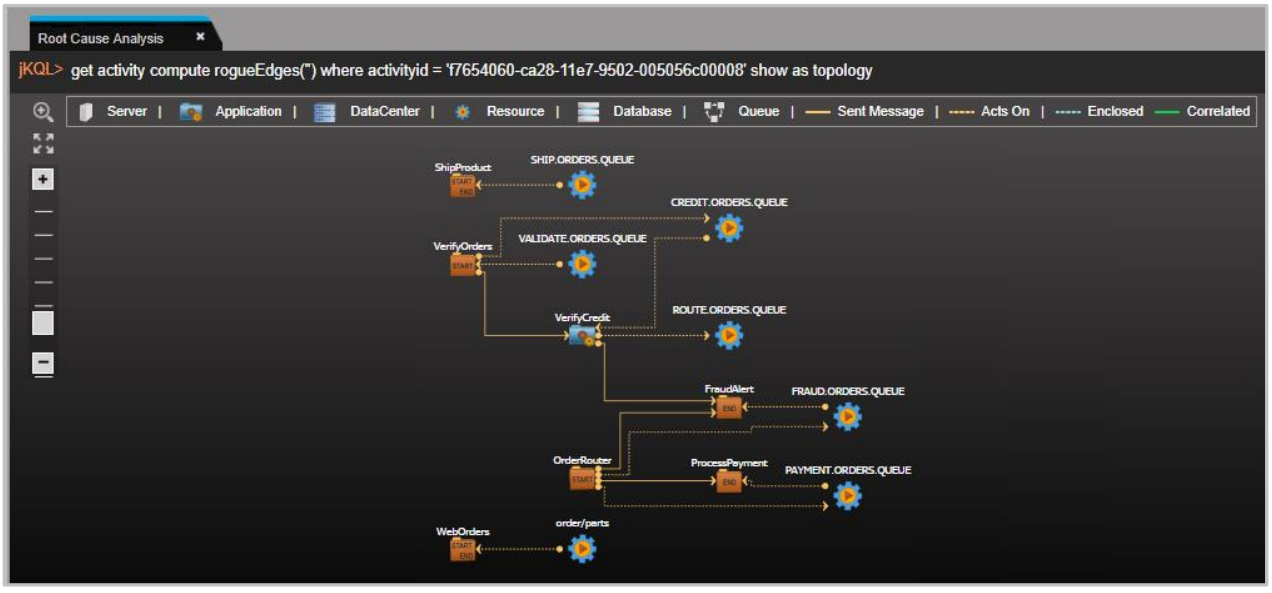

Figure 2.5.4.1.1.6-A. Root Cause

2.5.4.1.1.7 Children

Select **Children** from the pop-up menu to open a viewlet which displays child activities. Please note that not every data record will have child activities and will therefore not have the **Children** option in the pop-up menu. Activities or events of an activity will display.

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2.5.4.1.1.8 Compare

Select more than one record to enable the **Compare** option within the table's pop-up menu. This will open a compare table within the **Console** panel (See *Section 2.4.4, Console Panel*).

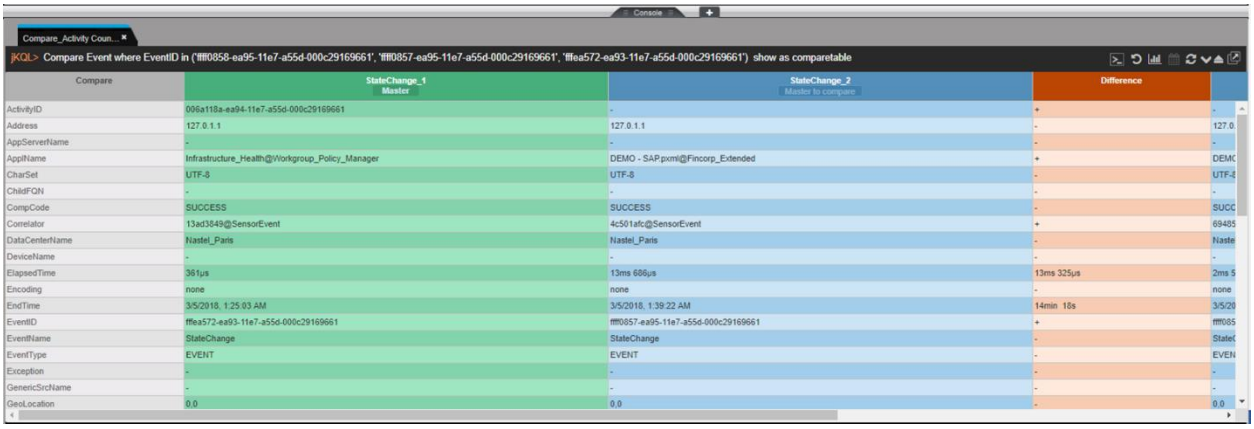

Figure 2.5.4.1.1.8-A. Compare Table in Console

You can also view a compare table in the main workspace by using the 'Compare' command in a jKQL query line, for example:

Query: **jKQL>** `Compare Activity where ActivityID in ('activity ID of first selected activity', 'activity ID of second selected activity') show as comparetable`

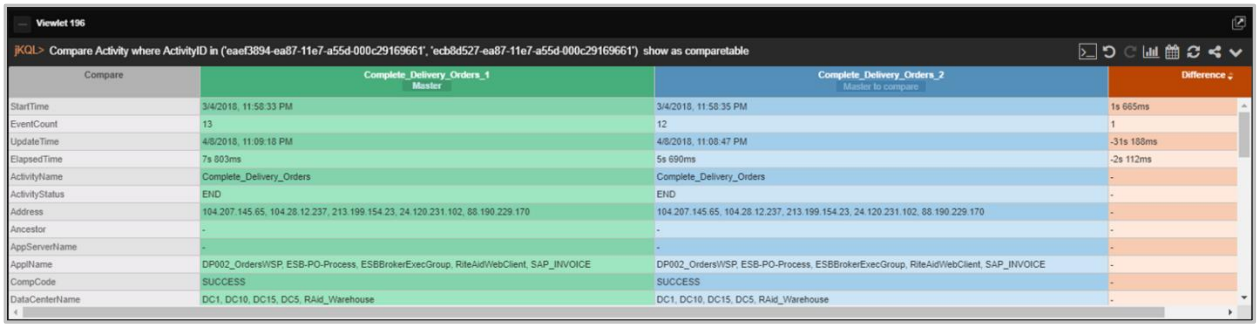

Figure 2.5.4.1.1.8-B. Compare Table in Workspace

In the **Compare** column the items to compare are displayed in alphabetical order. Change the order by clicking the sort buttons, ▲ (ascending) or ▼ (descending). This same function is available in all other columns.

The green column with **Master** Master located in the column header signifies the master record. All other selected records will display in blue and will be compared to the master record. To change the master record, simply click the **Master to Compare** button Master to compare within any of the other blue columns. The column will move to the first position and will change to green. All other fields will now be compared against this new master.

In the **Difference** column, the **+** and **-** symbols signify whether there is a difference. If the difference can be measured mathematically, the numeric value will be displayed (for example, the microsecond difference of elapsed time, *Figure 2.5.4.1.1.8-C*).

To change the width of the columns, hover over the lines between column headers until you see the size icon ←‖→. Move it left or right to adjust column width.

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Event b1e5ef5c-f31c-11e8-93a7-0242ac12000a Master	Event b1e3a568-f31c-11e8-93a7-0242ac12000a Master to compare	Difference
b1e52c12-f31c-11e8-a2df-0242ac12000d	b1e3092e-f31c-11e8-a2df-0242ac12000d	+
5ms 755µs	4ms 868µs	-887µs
11/28/2018, 4:48:40 PM	11/28/2018, 4:48:40 PM	-
b1e5ef5c-f31c-11e8-93a7-0242ac12000a	b1e3a568-f31c-11e8-93a7-0242ac12000a	+
b1e52c12-f31c-11e8-a2df-0242ac12000d	b1e3092e-f31c-11e8-a2df-0242ac12000d	+
11/28/2018, 4:48:40 PM	11/28/2018, 4:48:40 PM	-
11/28/2018, 4:48:40 PM	11/28/2018, 4:48:40 PM	-
11/28/2018, 4:49:17 PM	11/28/2018, 4:49:17 PM	-

Figure 2.5.4.1.1.8-C. Difference Column

The viewlet can be updated to display only rows with differences. Click the **Viewlet Menu** button and select **Edit Viewlet**. Enable the **Only Show Differences** option on the form. Only rows in which the data is different will now display.

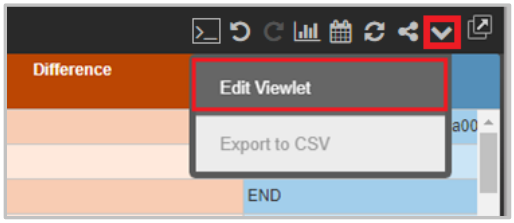

Figure 2.5.4.1.1.8-D. Compare Table - Edit Viewlet

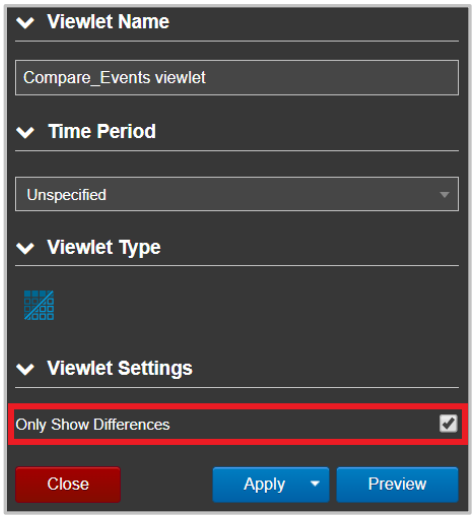

Figure 2.5.4.1.1.8-E. Only Show Differences

2.5.4.1.2 Table Arrangement

Users can create a customized table with specified columns and column order. Use 'fields' and 'order by <*field name*> asc' or 'order by <*field name*> desc' expressions (*asc* is ascending order and *desc* is descending, see *Section 5.4, Additional Query Options*, for more information on jKQL sorting options).

The following is an example:

Query: jKQL> `Get activities fields ParentID, ActivityID, EventID order by ParentID desc`

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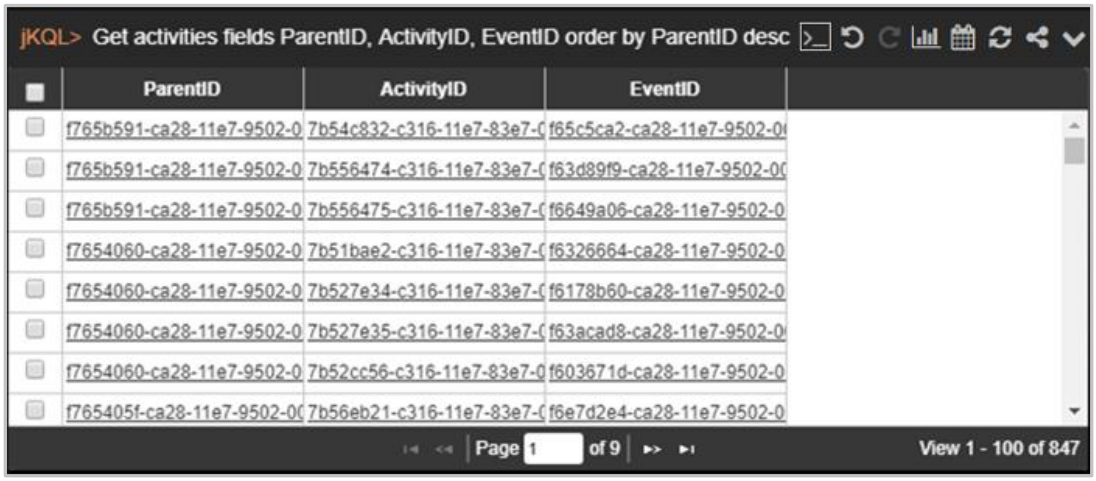

Figure 2.5.4.1.2-A. Custom Table Arrangement

This query will produce a table composed of three columns in the order specified in the query. The data will be sorted by the **ParentID** column in descending order (*Figure 2.5.4.1.2-A*).

Table columns can also be rearranged manually. Simply click and drag a column header to the new desired position.

2.5.4.1.3 Sample: Credit Validation Exceptions

Query: jKQL> `Get the Activities from 'Verify Credit' that did not meet the 'SLA' show as table`

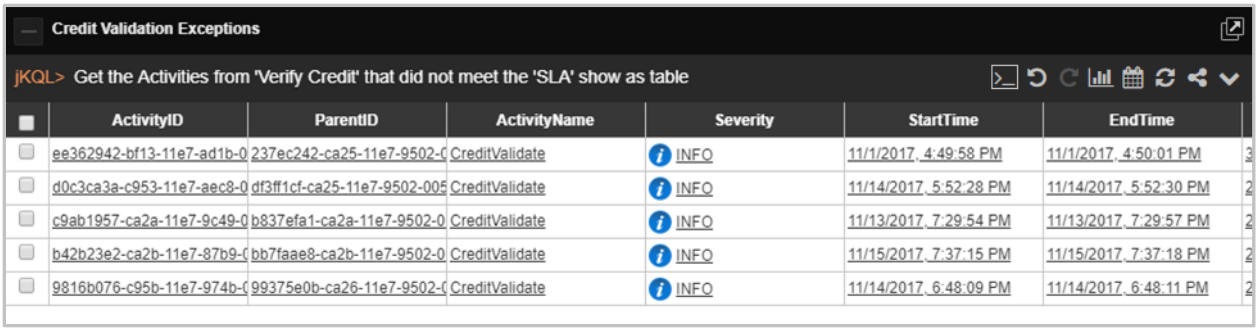

Figure 2.5.4.1.3-A. Sample Viewlet – Credit Validation Exceptions

The viewlet above is located in the **Sample-OrderTracking** repository. It is showing an example of exceptions or errors for specific activities. Here we are checking for ones that missed their service level agreement (SLA) requirements. A user would utilize this to find the errors and then drill down into the specifics in the **Console** to try and learn why. This is part of the forensics process.

2.5.4.1.4 Sample: Snapshots

A table of snapshots will not have check boxes. To get additional data details, click on the underlined elements. Additional details will display in the **Console** section (*Figure 2.5.4.1.4-B*). See *Section 2.4.4, Console Panel*, for more information.

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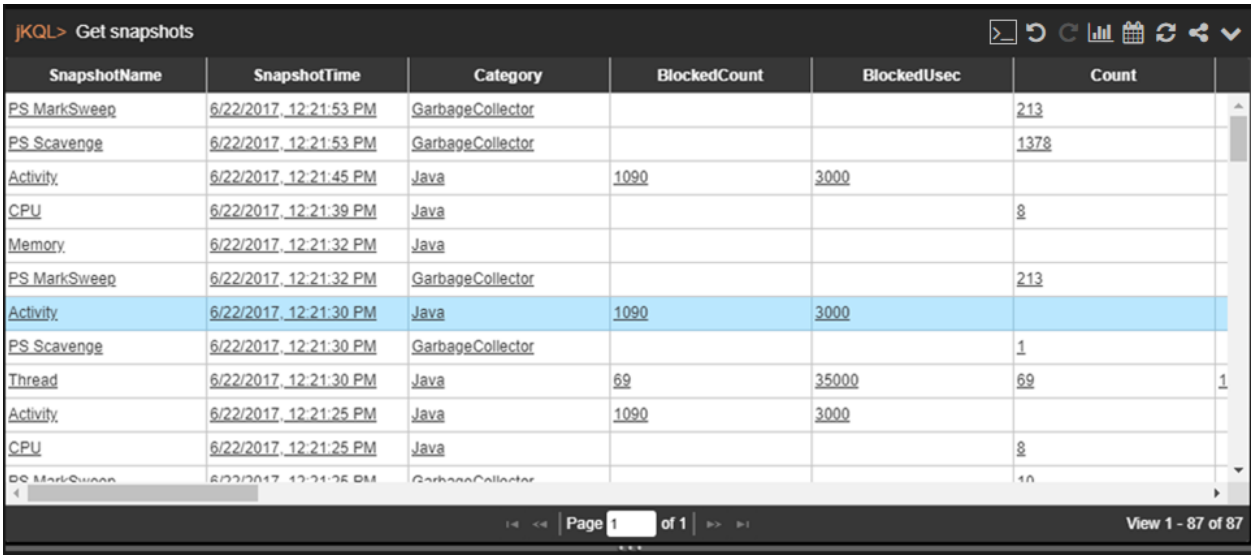

Figure 2.5.4.1.4-A. Snapshot Viewlet

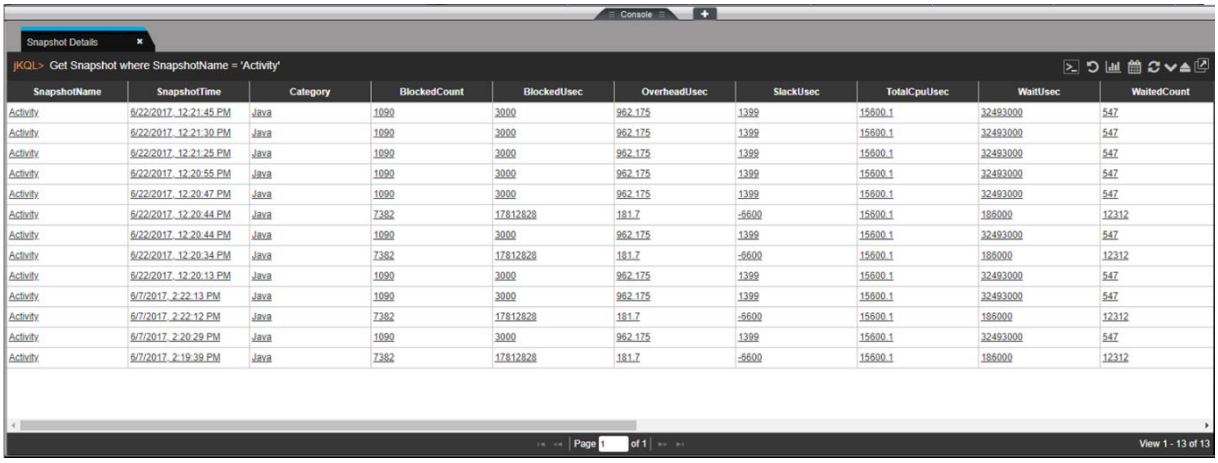

Figure 2.5.4.1.4-B. Detailed Console Viewlet

If a user has permissions to run jKQL queries, the jKQL query can be modified by changing the *Show as* expression.

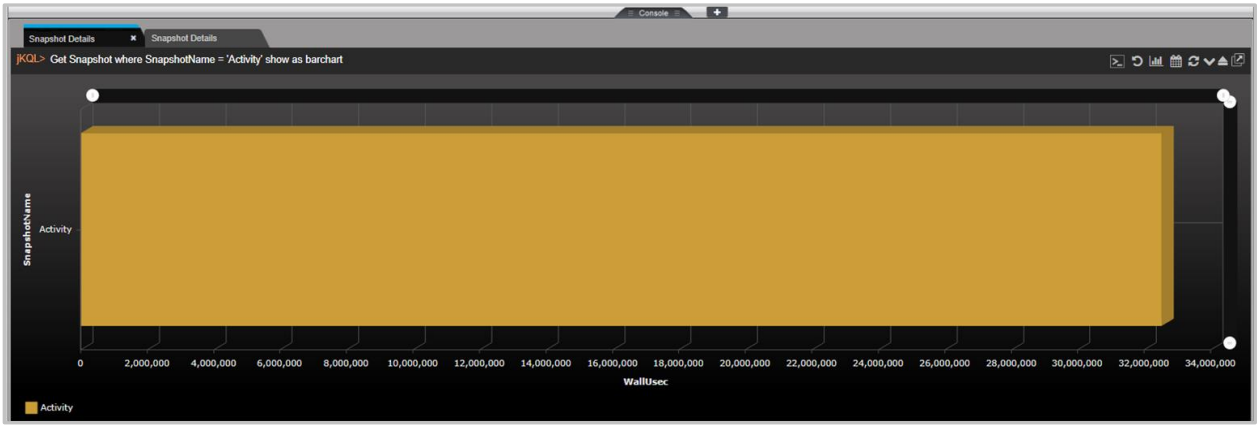

Figure 2.5.4.1.4-C. Changing the Show As Expression

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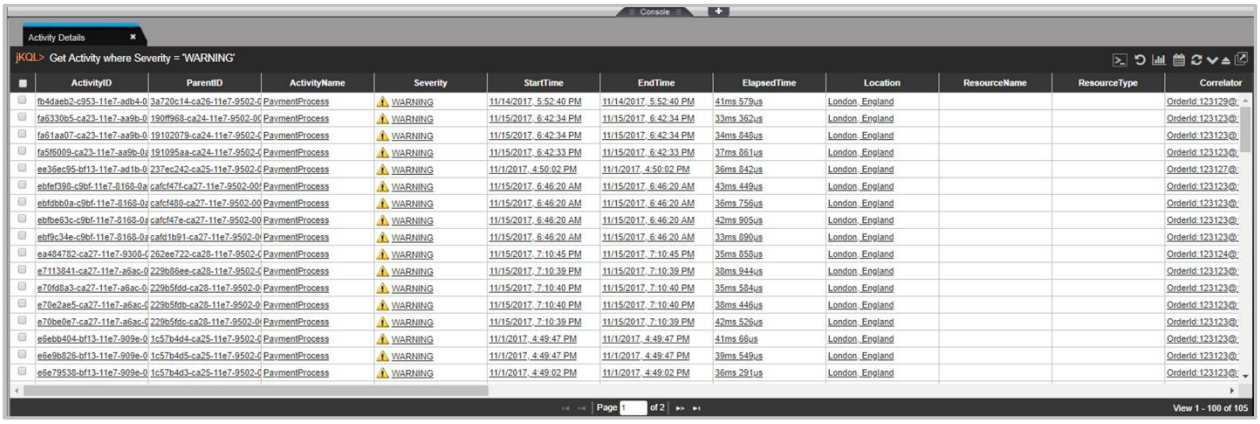

Figure 2.5.4.1.4-D. Activity Details

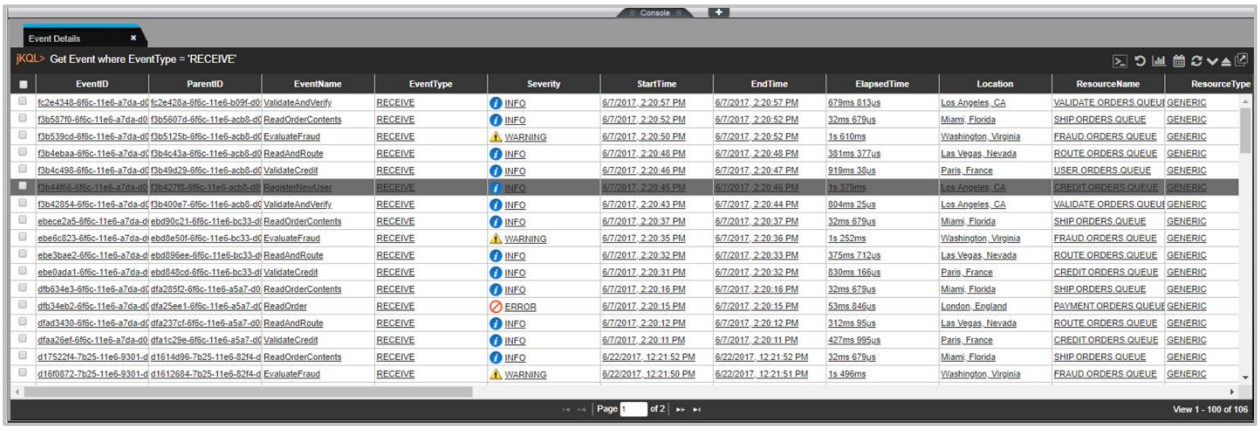

Figure 2.5.4.1.4-E. Event Details

2.5.4.2 Column

Column charts allow users to view a large data set in an easy to read column view. See *Section 2.5.8, Filtering and Display Options*, for information on filtering options available.

Figure 2.5.4.2-A. Column

Hover over any of the bars in the chart to view a status pop-up.

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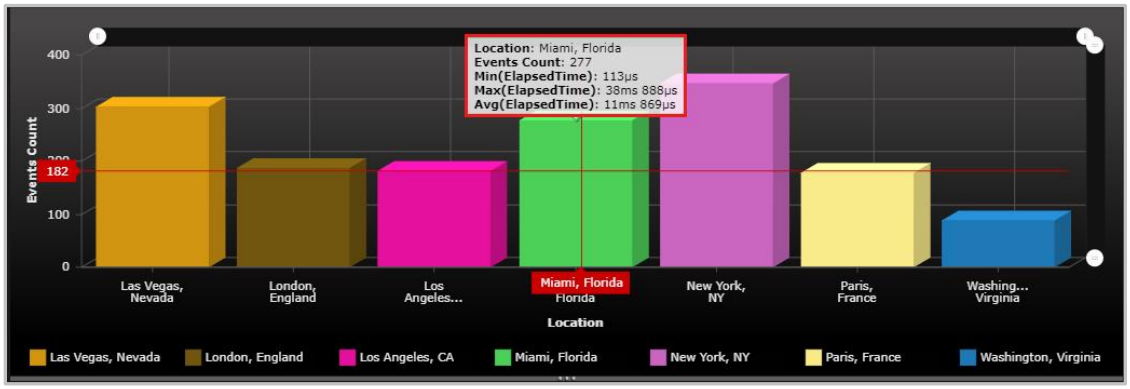

Figure 2.5.4.2-B. Status Pop-up

Click on any of the bars in the chart to view additional details in a **Console** viewlet. See *Section 2.4.4, Console Panel*, for more information.

2.5.4.2.1 Sample: Elapsed Time for Order Events

Query: jKQL> `Get the number of events fields Min(ElapsedTime), Max(ElapsedTime), AVG(ElapsedTime) group by location show as colchart`

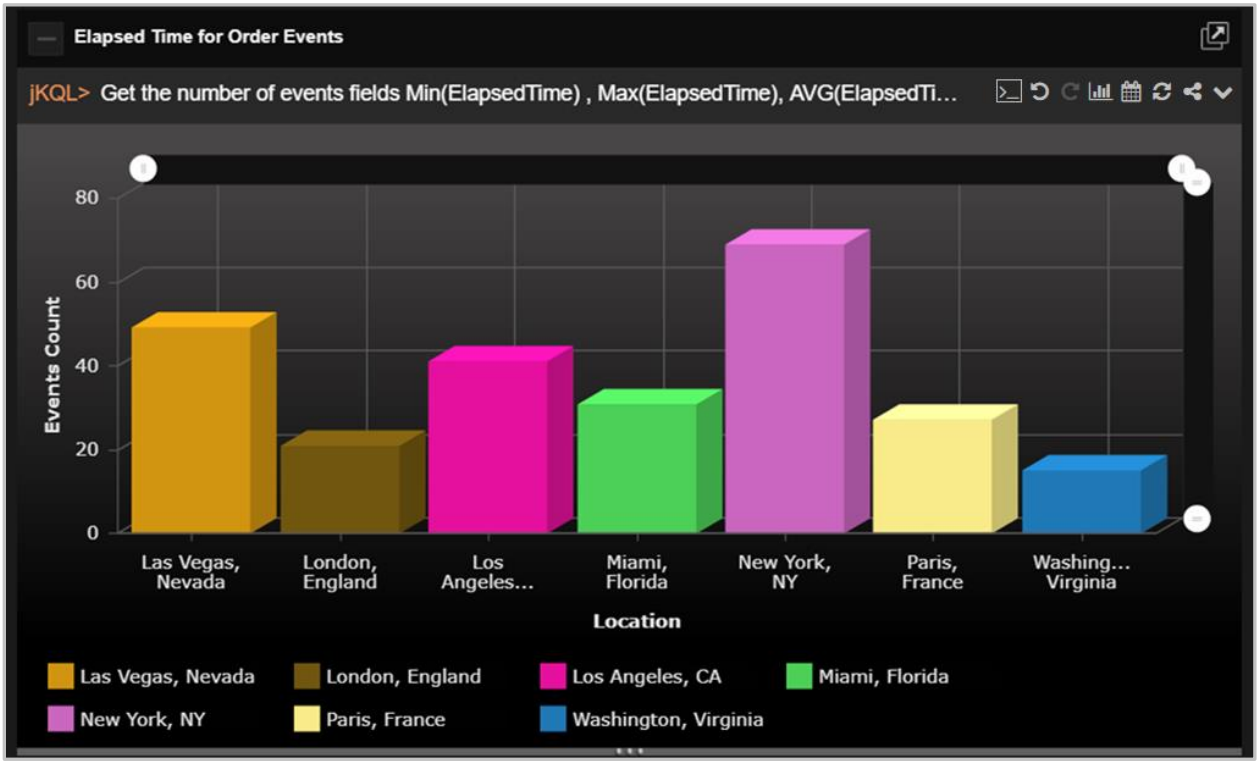

Figure 2.5.4.2.1-A. Sample Viewlet – Elapsed Time for Order Events

The viewlet above is located in the **Sample-OrderTracking** repository. It uses the functions min, max, and average as applied to elapsed time for events.

2.5.4.3 Bar

Bar charts generate data in a viewlet with horizontal bars. See *Section 2.5.8, Filtering and Display Options*, for information on filtering options available.

Similar to the Column chart explained above in *Section 2.5.4.2, Column*, hovering over the bars will display a status pop-up and clicking on the bars will open a **Console** viewlet to view additional details.

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See *Section 2.4.4, Console Panel*, for more information. *Number*, *count* or other numeric expressions must be included in the query or form.

Figure 2.5.4.3-A. Bar

2.5.4.3.1 Sample: Events for Latest Hour by Location

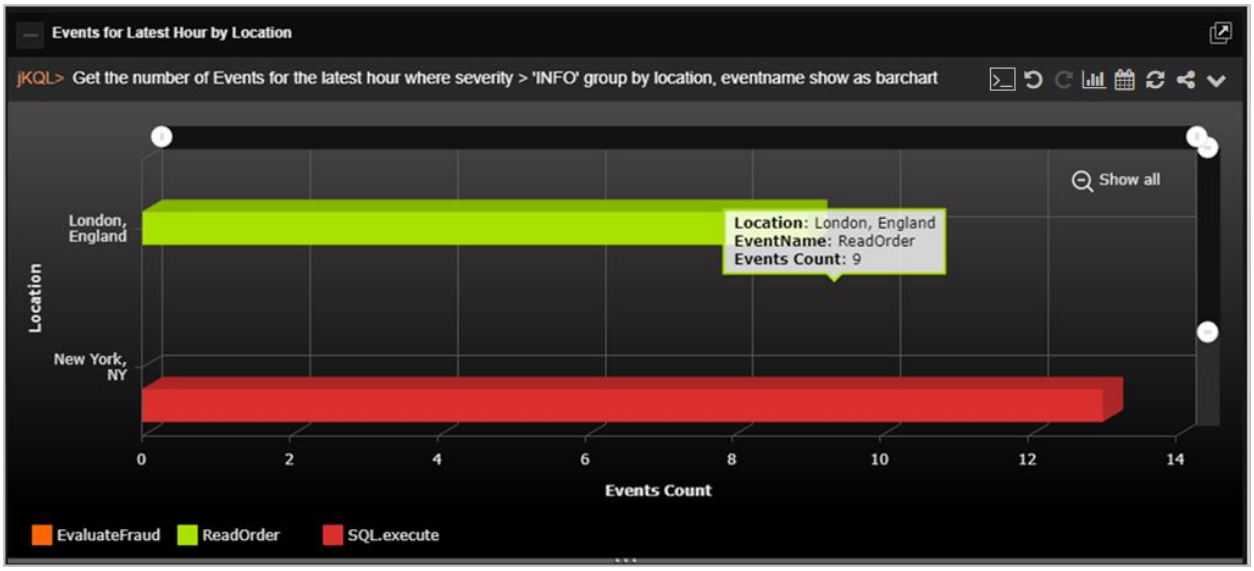

Figure 2.5.4.3.1-A. Bar Chart – Events for the Latest Hour by Location

The barchart viewlet is useful as it allows you to easily see the differences of various item counts, grouped by location, severity or other keyword.

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2.5.4.3.2 Sample: Events by Severity

Figure 2.5.4.3.2-A. Bar Chart – Events by Severity

This barchart shows the number of events, grouped by severity. Modify the chart colors in **Main Menu** > **Admin Settings** > **Graph** to make the viewlet more informative and easier to analyze (*Section 3.1.6*).

2.5.4.4 Line

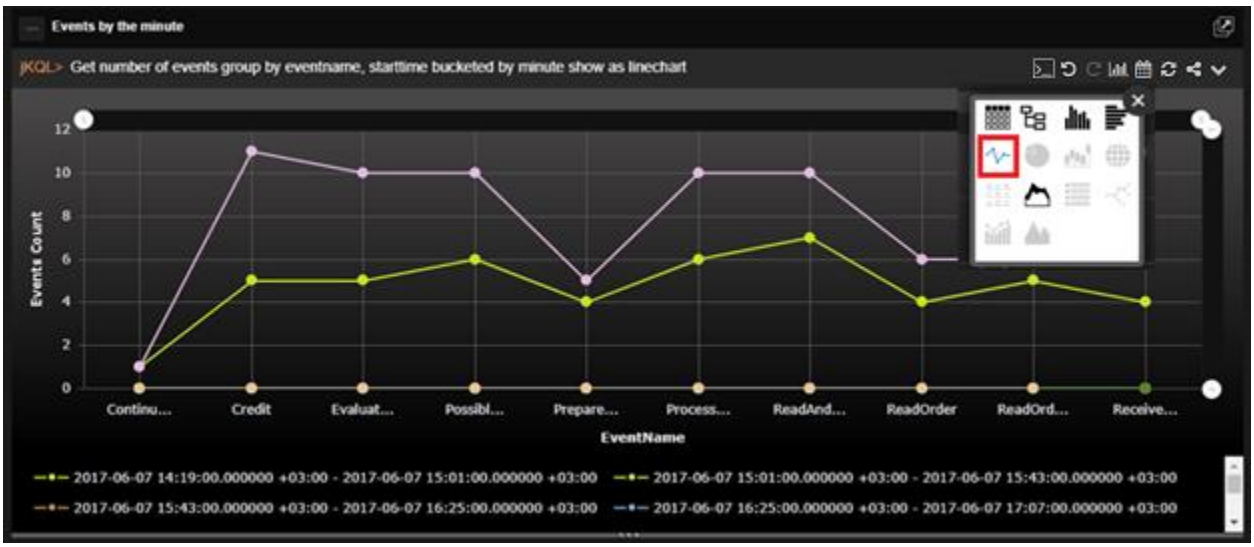

Figure 2.5.4.4-A. Line

Hover over the dots to view a status pop-up and exact axes values.

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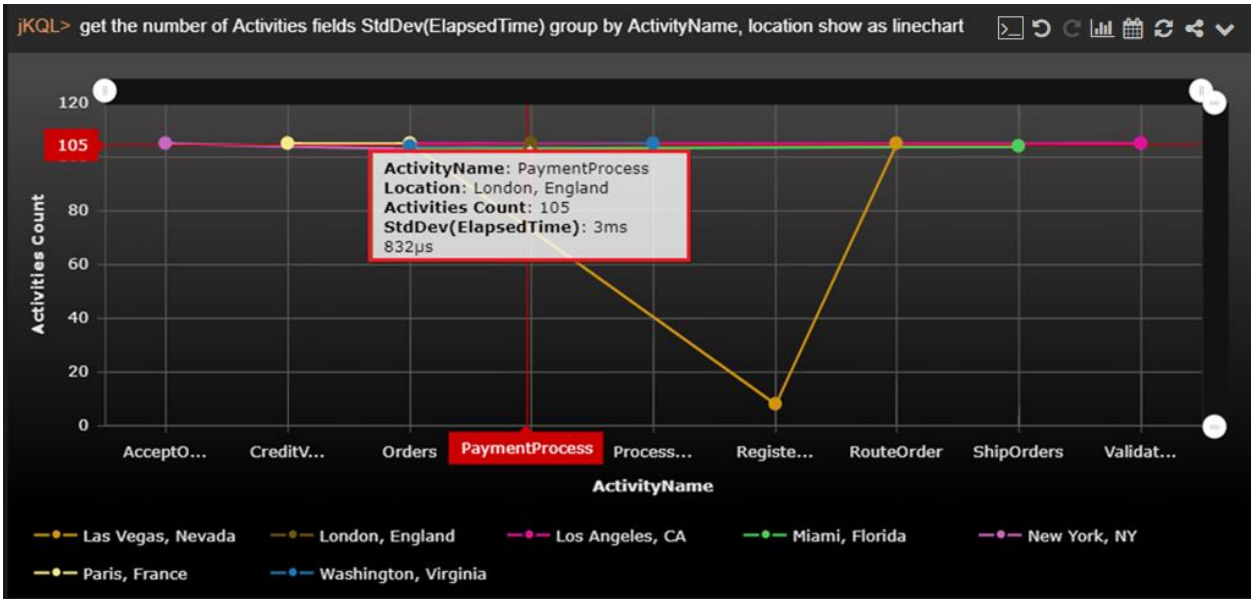

Figure 2.5.4.4-B. Status Pop-up

Click on any of the dots to view additional details in a **Console** viewlet. See *Section 2.4.4, Console Panel*, for more information.

2.5.4.4.1 Sample: Exponential Moving Average for ElapsedTime

Query: jKQL> `get events compute EMA(ElapsedTime, 20) show as linechart`

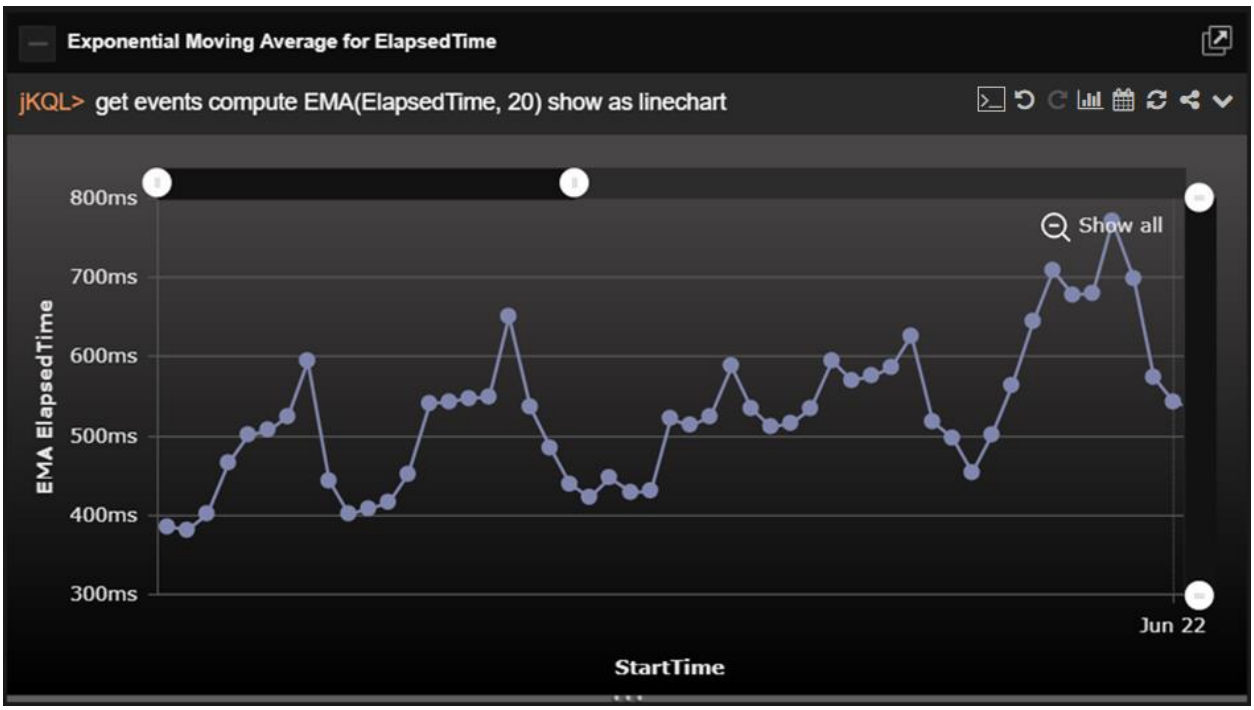

Figure 2.5.4.4.1-A. Sample Viewlet – Exponential Moving Average for ElapsedTime

The viewlet above is located in the **Sample-OrderTracking** repository. An exponential moving average (EMA) is being computed to chart elapsed time over a window of time. EMAs are used with trends and enables one to see the rate of change between one data point and the next.

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2.5.4.4.2 Sample: Events for Latest Time Range by Location

Query: jKQL> `Get the number of Events for the latest 4 years group by location show as linechart`

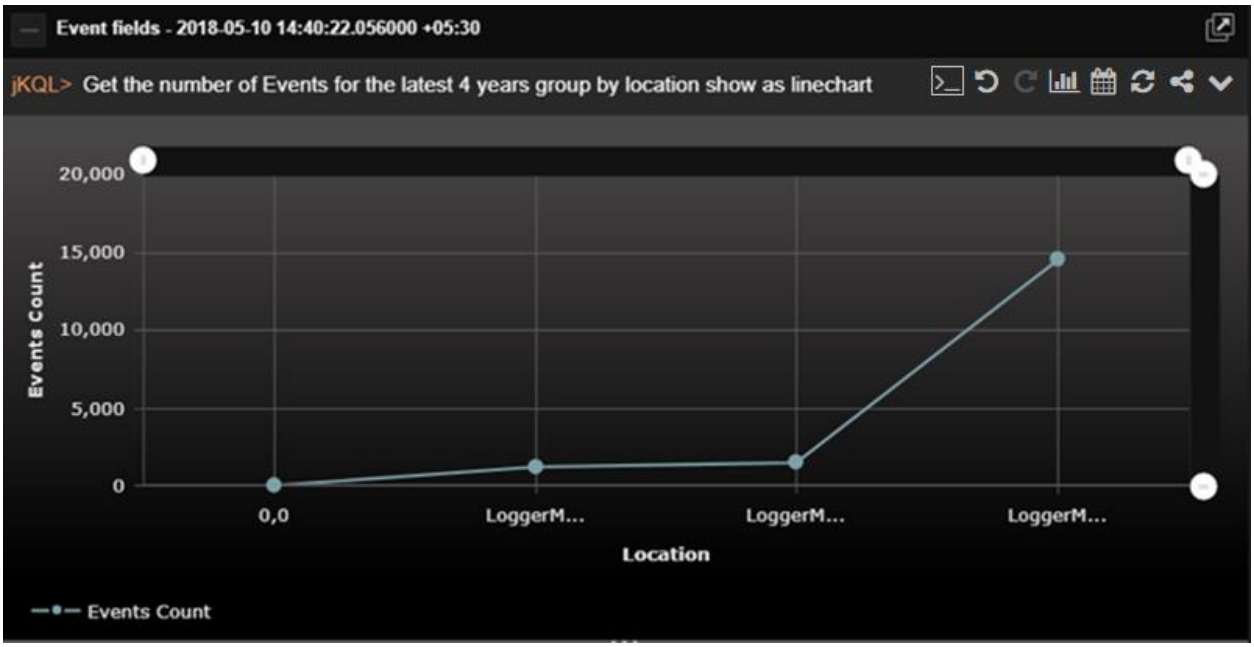

Figure 2.5.4.4.2-A. Sample Viewlet – Events for Latest 4 Years by Location

The viewlet above is located in the **Sample-OrderTracking** repository. It is a line chart showing the trend in important event occurrences. Clicking on any of the "dots" or points will take the user to the **Console** where they can see additional details about each event. From there they can compare events or display the topology of an individual transaction.

2.5.4.5 Pie

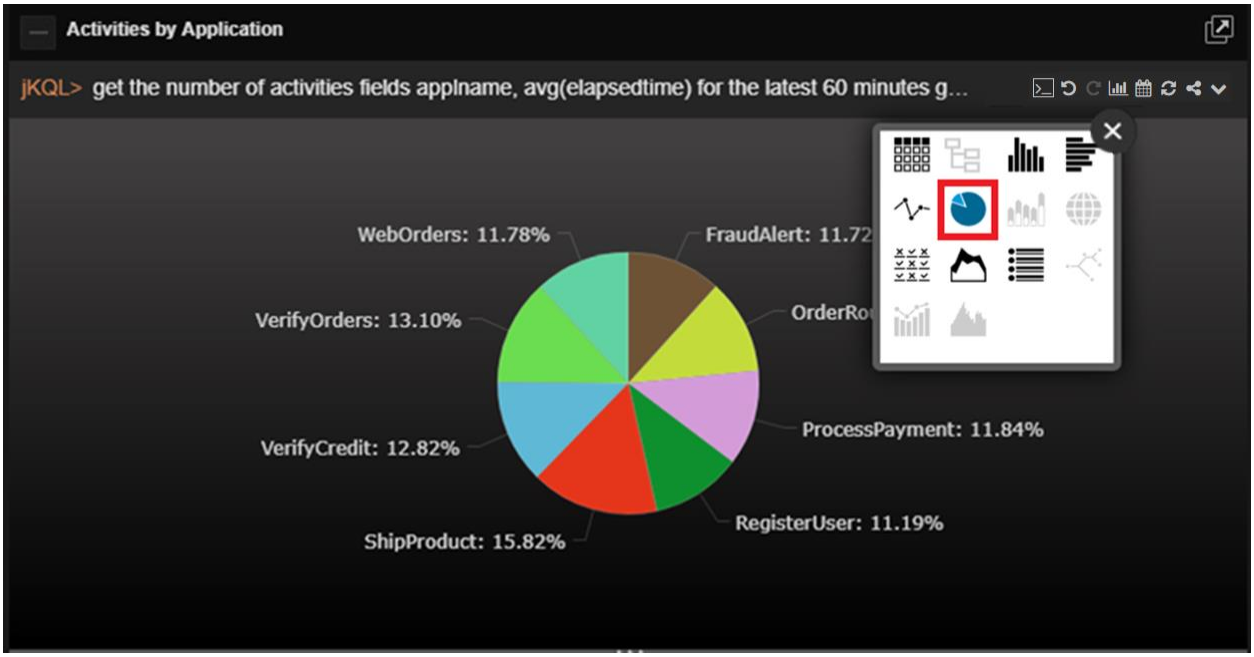

Figure 2.5.4.5-A. Pie

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2.5.4.5.1 Sample: Serious Event Distribution

Query: jKQL> `Get the number of events for the latest hour where severity > 'WARNING' group by location, severity order by severity show as piechart`

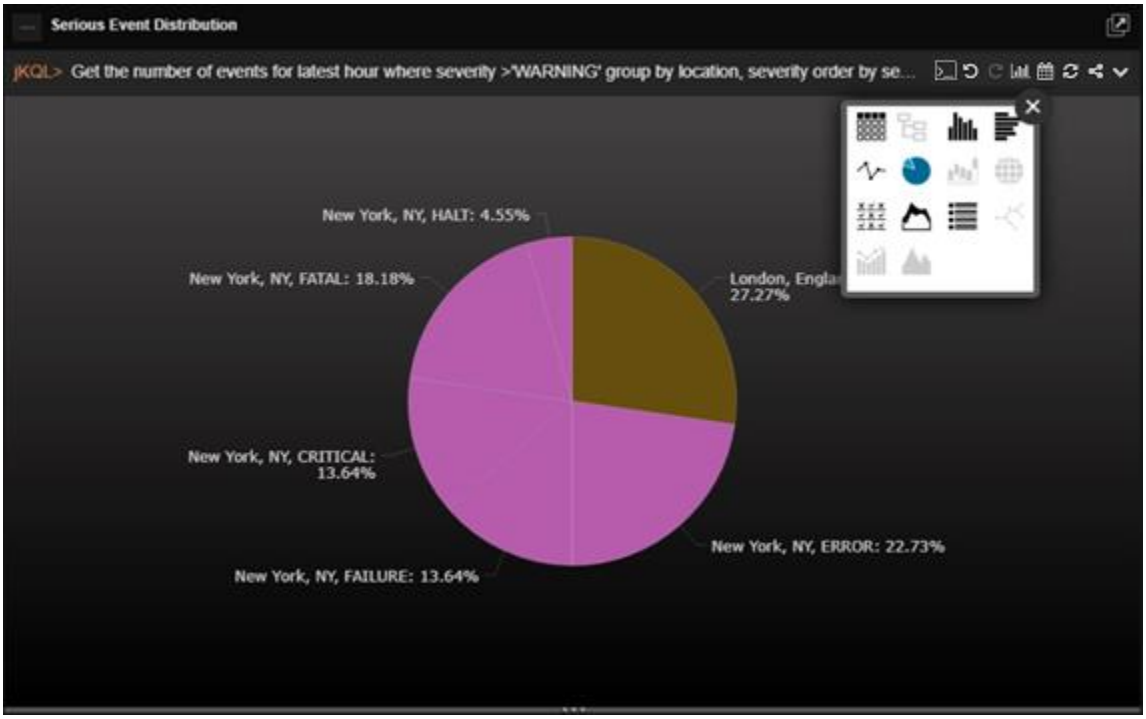

Figure 2.5.4.5.1-A. Sample Viewlet – Serious Event Distribution

The viewlet above is located in the **Sample-OrderTracking** repository. It is a pie chart which is often used when counting something and you want to show the distribution of results for each member of a group or specifically severity in this case. This approach makes it easy to see where the biggest groups are that may need attention and further forensic analysis.

2.5.4.6 Stack

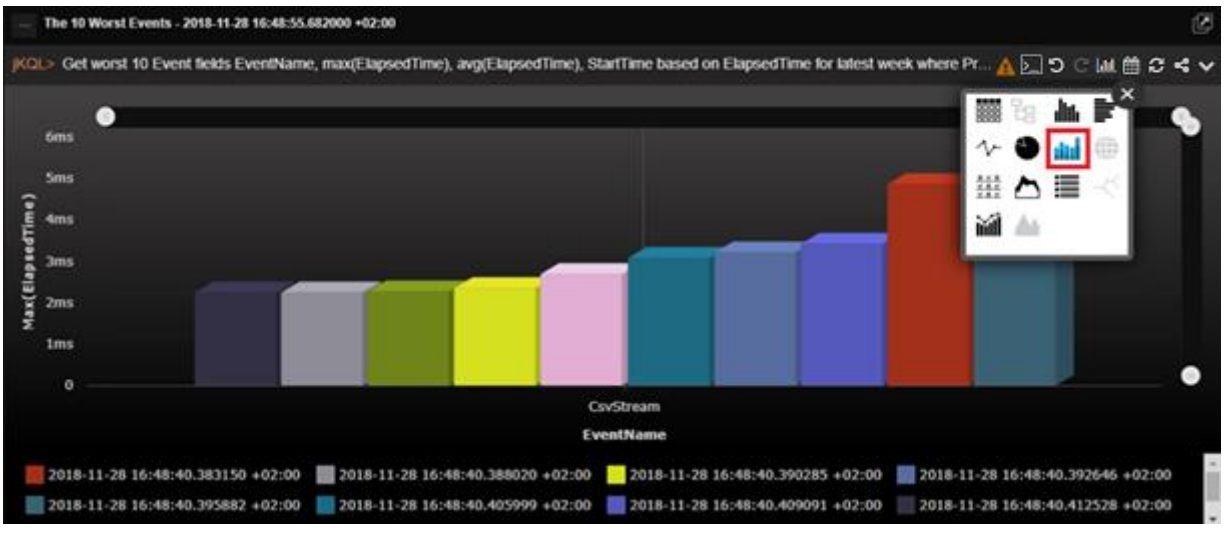

Figure 2.5.4.6-A. Stack

Stack charts must contain **Group By** expressions.

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2.5.4.6.1 Sample: Orders for the Latest 3 Days that Missed their SLA

Query: jKQL> `Get the number of activities for the latest 3 days that did not meet 'SLA' group by location, activityname, severity, starttime bucketed by minute show as stackchart`

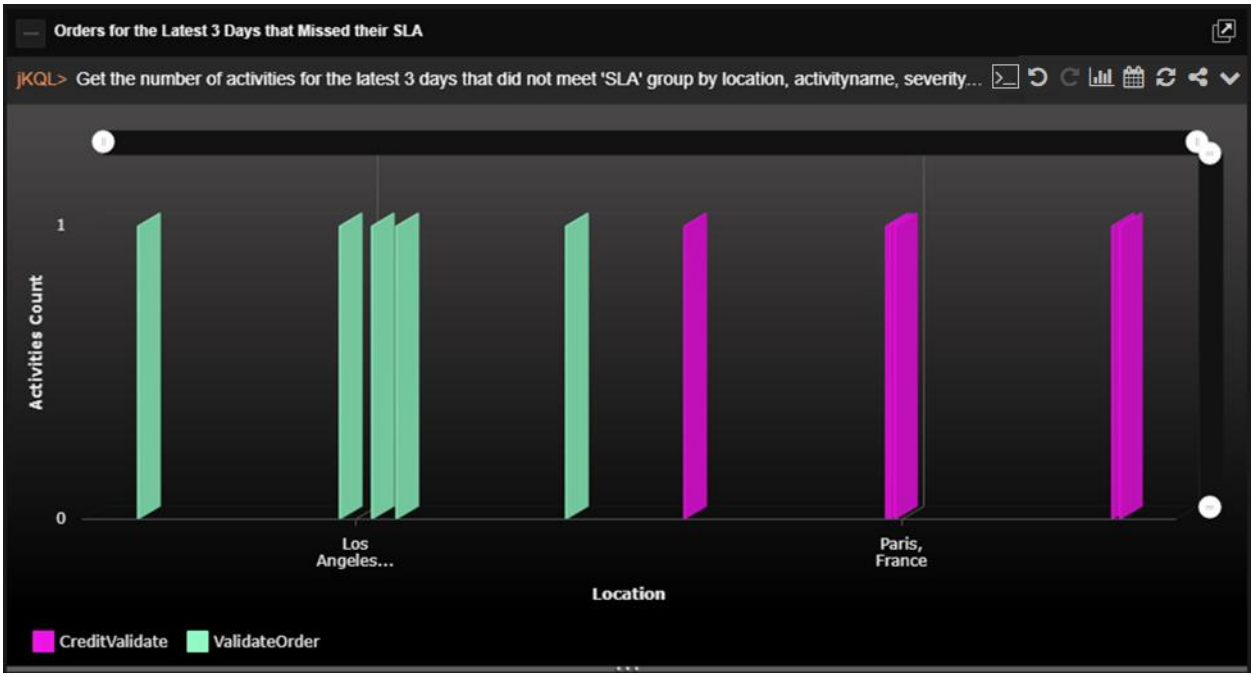

Figure 2.5.4.6.1-A. Sample Viewlet – Orders for the Latest 3 Days that Missed their SLA

The viewlet above is located in the **Sample-OrderTracking** repository. It is searching for missed SLAs (service level agreements) and is presenting them in a stacked barchart grouped by name, location, severity, and time.

Stacked barcharts are a powerful way to display a lot of data about the status of something in a very concise way.

2.5.4.7 Geo Map

Geo map viewlets are useful when transactions and operations between different countries or even continents are needed to be monitored and analyzed. Geo maps are used when location is important, and you want to first start with that, then drill down to specific applications when troubleshooting a problem.

Supported types for geo map viewlets are relatives and activities – select them while creating a viewlet with a form or specify them in a jKQL query line. If using activity data type, the viewlet must have the 'Group by GeoLocation' expression.

Below is an example of a geo map viewlet, which can be found in the **Sample-OrderTracking** repository (*Figure 2.5.4.7.1-A*).

2.5.4.7.1 Sample: Geo Map Events by Location

Query: jKQL> `Get relatives show as geomap`

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Figure 2.5.4.7.1-A. Sample Viewlet – Geo Map Events by Location

The above viewlet displays the set of items within a geographic location. Each icon (push pin) represents a location, e.g., United States and the collection of all the entities such as applications, activities, events, and servers in that location. Each of the arrows shows a relationship between entities in one location with another. The dotted line shows a parent-child relationship (called enclosed) between the locations, while a solid line would represent an observation of an event in one location sending a message to an event in another (called send-to).

You can modify the jKQL query and get a geo map of activities where the data will focus on the perspective of agents.

2.5.4.7.2 Sample: Geo Map Activities

Query: **jKQL>** `Get activity group by geolocation show as geo map`

Figure 2.5.4.7.2-A. Sample Viewlet – Activities Geo Map

On the left side of the geo map viewlet, there are zoom in ( ), zoom out ( ) and fit to screen ( ) buttons for better scope of the data.

On the right side of the viewlet there is a grey copy of the map. It is used as a navigation field to quickly change the map's focus.

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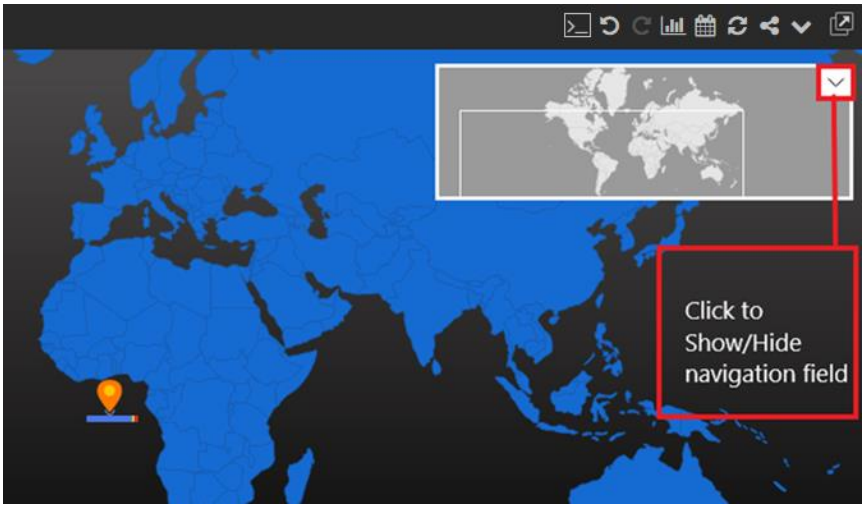

Figure 2.5.4.7.2-B. Geo Map – Navigation Field

After clicking on a specific location, the entire country will appear in light blue.

Figure 2.5.4.7.2-C. Selecting a Country

Click on the health bars above country names to drill into the data.

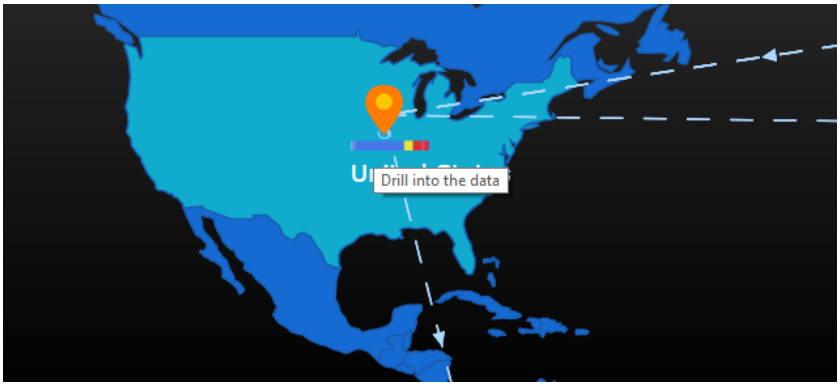

Figure 2.5.4.7.2-D. Country Health Bars

A status window opens. Click on any of the items to view additional details in a viewlet. The viewlet opens in the **Console** section.

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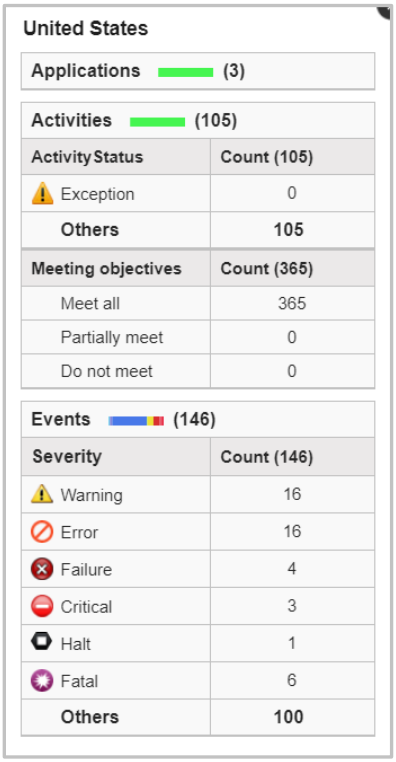
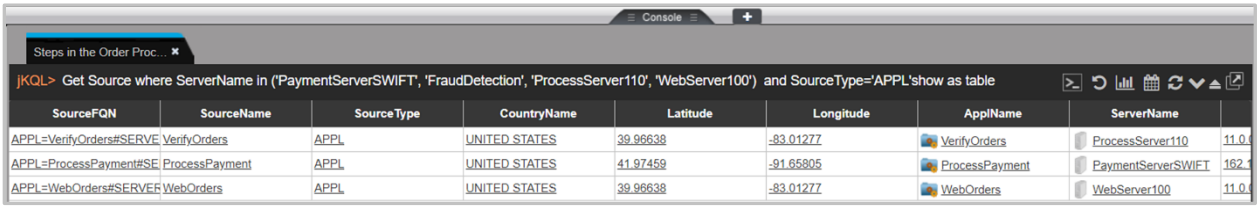


United States	
Applications (3)	
Activities (105)	
Activity Status	Count (105)
Exception	0
Others	105
Meeting objectives	Count (365)
Meet all	365
Partially meet	0
Do not meet	0
Events (146)	
Severity	Count (146)
Warning	16
Error	16
Failure	4
Critical	3
Halt	1
Fatal	6
Others	100

Figure 2.5.4.7.2-E. Status Window



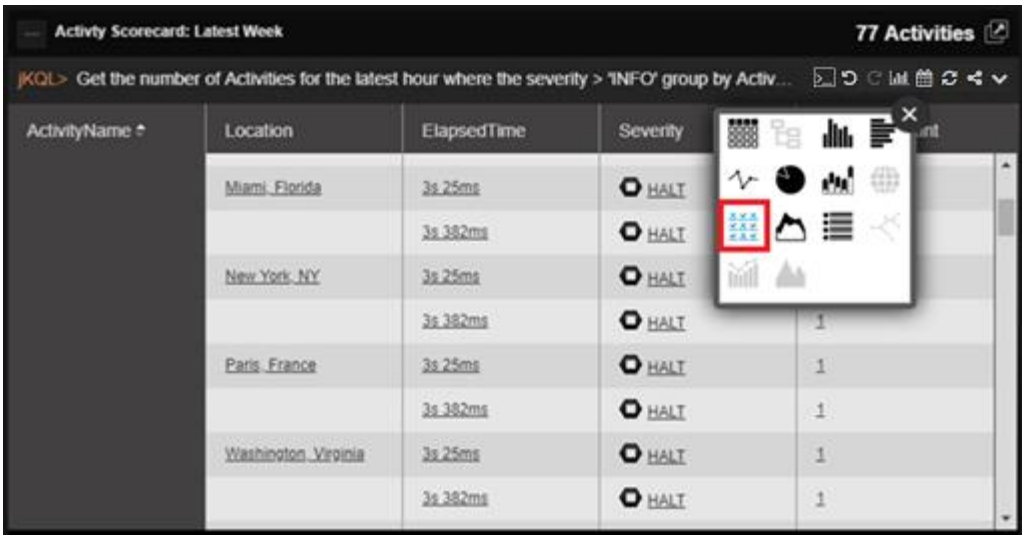
Steps in the Order Proc...

jKQL> Get Source where ServerName in ('PaymentServerSWIFT', 'FraudDetection', 'ProcessServer110', 'WebServer100') and SourceType='APPL'show as table

SourceFQN	SourceName	SourceType	CountryName	Latitude	Longitude	ApplName	ServerName	
APPL=VerifyOrders#SERVE	VerifyOrders	APPL	UNITED STATES	39.96638	-83.01277	VerifyOrders	ProcessServer110	11.0.(
APPL=ProcessPayment#SE	ProcessPayment	APPL	UNITED STATES	41.97459	-91.65805	ProcessPayment	PaymentServerSWIFT	162.1
APPL=WebOrders#SERVER	WebOrders	APPL	UNITED STATES	39.96638	-83.01277	WebOrders	WebServer100	11.0.(

Figure 2.5.4.7.2-F. Additional Details

2.5.4.8 Scorecard



Activity Scorecard: Latest Week — 77 Activities

jKQL> Get the number of Activities for the latest hour where the severity > 'INFO' group by Activ...

ActivityName	Location	ElapsedTime	Severity	
	Miami, Florida	3s 25ms	HALT	
		3s 382ms	HALT	
	New York, NY	3s 25ms	HALT	
		3s 382ms	HALT	1
	Paris, France	3s 25ms	HALT	1
		3s 382ms	HALT	1
	Washington, Virginia	3s 25ms	HALT	1
		3s 382ms	HALT	1

Figure 2.5.4.8-A. Scorecard

To create a scorecard viewlet, **Group by** must be used. Use within the jKQL query (see *Section 2.5.1.1, Create Viewlet with a jKQL Query*) or select within the Create / Edit viewlet form (see *Section 2.5.1.2, Create a Viewlet with a Form*).

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2.5.4.8.1 Sample: Activity Scorecard Latest Week

Query: jKQL> `Get the number of Activities for the latest week where the severity > 'INFO' group by ActivityName, location, elapsedtime, severity order by ActivityName, severity desc show as scorecard`

Figure 2.5.4.8.1-A. Sample Viewlet – Activity Scorecard Latest Week

The viewlet above is located in the **Sample-OrderTracking** repository. It is a Scorecard being used in this example to display details about activities that have an important severity (ones that need attention). The scorecard layout groups activity names in the first column and their details in the subsequent columns. Each row shows an additional instance of activities with the same name. Activity names are not unique. They are differentiated by their activity ID.

The line, **severity desc show as scorecard**, within the jKQL query sorts the results in descending order.

Scorecards are most often used as a grouping mechanism to see at a glance the status of a specific application or activity.

2.5.4.8.2 Sample: SLA Violation Scorecard

Query: jKQL> `Get the number of Activities for the latest week that did not meet the 'SLA' group ActivityName, location, elapsedtime order by ActivityName show as scorecard`

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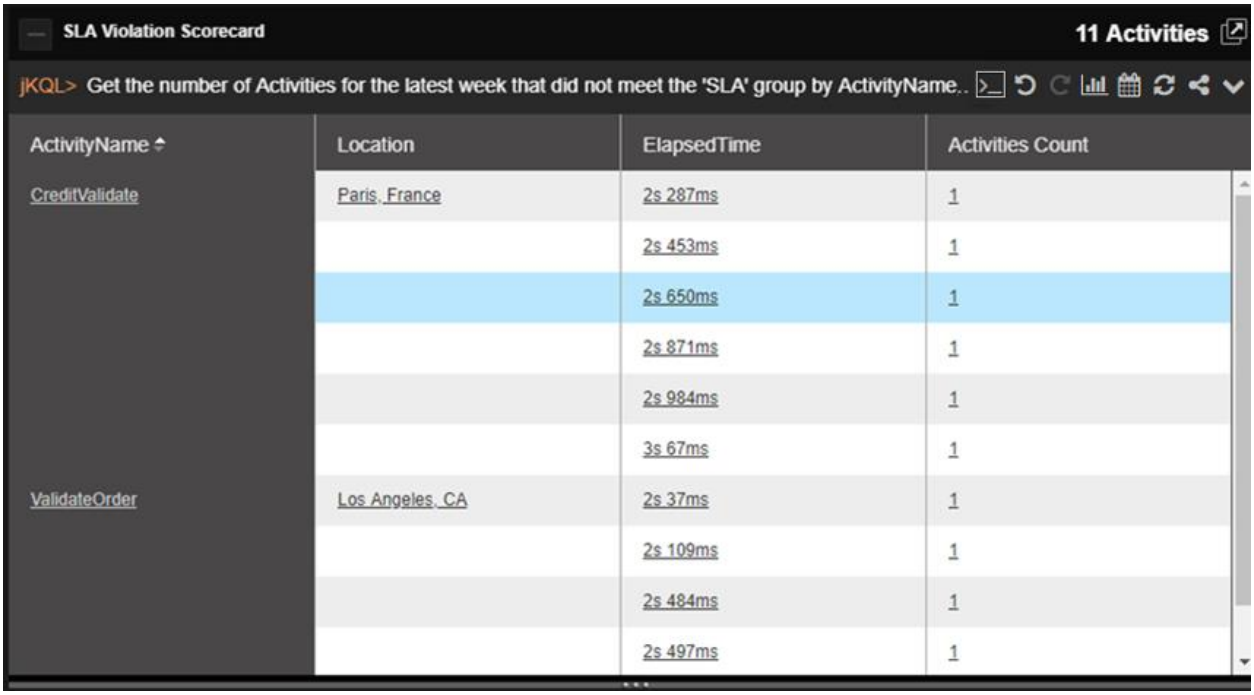

Figure 2.5.4.8.2-A. Sample Viewlet – SLA Violation Scorecard

The viewlet above is located in the **Sample-OrderTracking** repository. It is a scorecard displaying SLA violations for each activity grouped by location.

2.5.4.8.3 Sample: Application Performance Index Analytics

Query: jKQL> Get activities fields Apdex(ElapsedTime, 3sec,4.5sec) group by ActivityName, location order by ActivityName show as scorecard

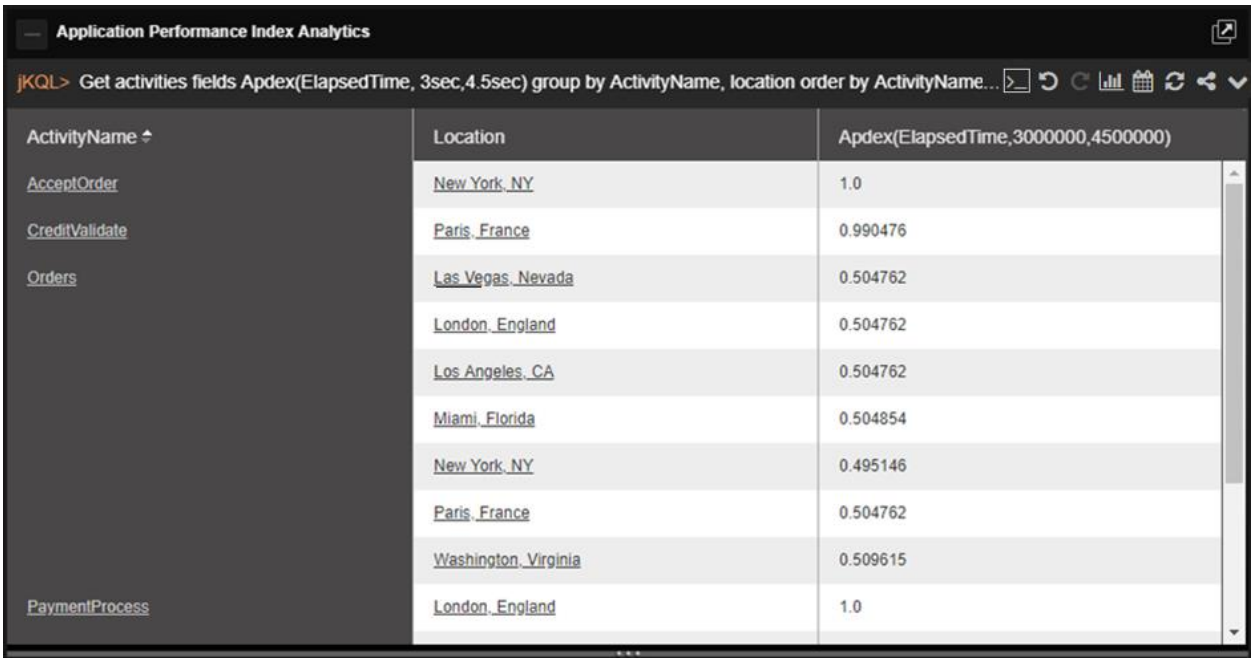

Figure 2.5.4.8.3-A. Sample Viewlet – Application Performance Index Analytics

The viewlet above is located in the **Sample-OrderTracking** repository. It is using the statistical function Apdex. Nastel XRay comes with a large library of functions built into it including Bollinger bands, EMA, SMA, Floor, Median, Round, Standard Deviation, and many more. Apdex stands for application

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performance index. It defines a method for reporting and comparing the performance of software applications in order to measure user satisfaction.

Here it is used to determine the experience of users in each geographic area for each activity and its related applications. A "0" means no users are satisfied, while a "1" means all users are satisfied. A number in-between shows a mix of satisfaction levels. This is measured in relationship to the target elapsed time, in this case, between 3 to 4.5 seconds.

2.5.4.8.4 Sample: Function Analysis

Query: jKQL> `Get Activities fields StdDevPop(properties('OrderAmount')), StdDevSample(properties('OrderAmount')), VariancePop(properties('OrderAmount')), VarianceSample(properties('OrderAmount')) for this year group by props('COUNTRY_NAME') show as scorecard`

Figure 2.5.4.8.4-A. Sample Viewlet – Function Analysis

TIP	The same query can be written without noting "properties," as in the example below (a simpler way of writing the query). The query will produce the same viewlet. See *Chapter 5: Using jKQL* for more information on jKQL queries.

Query: jKQL> `Get Activities fields StdDevPop(OrderAmount), StdDevSample(OrderAmount), VariancePop(OrderAmount), VarianceSample(OrderAmount) for this year group by COUNTRY_NAME show as scorecard`

Figure 2.5.4.8.4-B. Sample Viewlet – Function Analysis

The viewlet above is located in the **Sample-OrderTracking** repository. It is an example of using standard deviation on the order amount field. Standard deviations are used to determine how far a value is from the expected value or mean and can illustrate the volatility of this value over time.

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2.5.4.9 Area

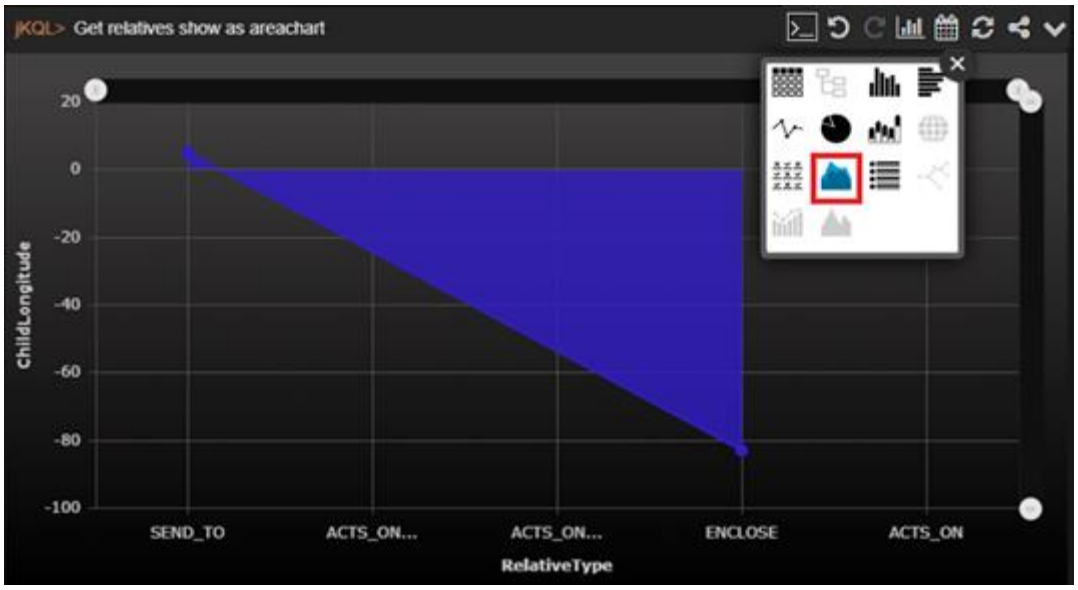

Figure 2.5.4.9-A. Area

Area charts are used to represent values over a specified period of time. The general tendencies of data changes or other items are visually represented. In the example below, the frequency of dpStatusCPUUsage snapshots (with defined word in snapshot name) from the previous 10 months is displayed.

Sample: CPU Usage

The viewlet below can be found on the **DataPower Metrics** dashboard of the **Sample-Middleware** repository.

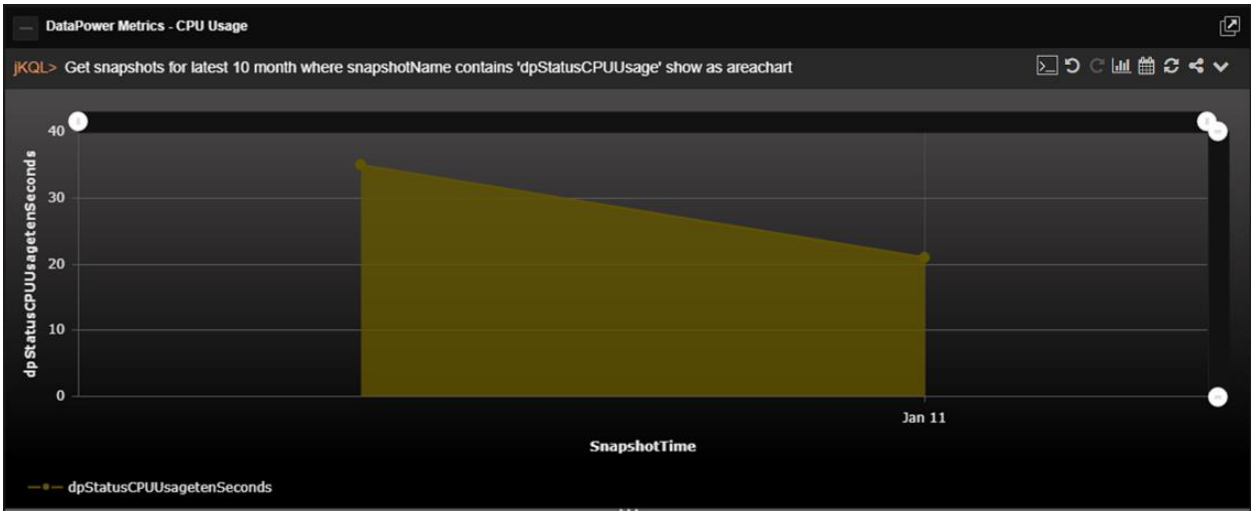

Figure 2.5.4.9-A. Area Chart – CPU Usage

Query: jKQL> `Get snapshots for latest 10 month where snapshotName contains 'dpStatusCPUUsage' show as areachart`

Hover over chart points to view details in a pop-up display, or click a point to view the details in a Console panel viewlet.

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Figure 2.5.4.9-B. Area Chart – Details

2.5.4.10 Summary

Summary viewlets are used to quickly view various data totals of the repository. They are displayed in the Summary panel (*see Section 2.4.3, Summary Panel*).

2.5.4.10.1 Adding Summary Viewlets

2.5.4.10.1.1 Add Summary Viewlet from a Dashboard Viewlet

Add a new summary viewlet from a dashboard viewlet by clicking the **Change chart type** and selecting the **Summary** chart type.

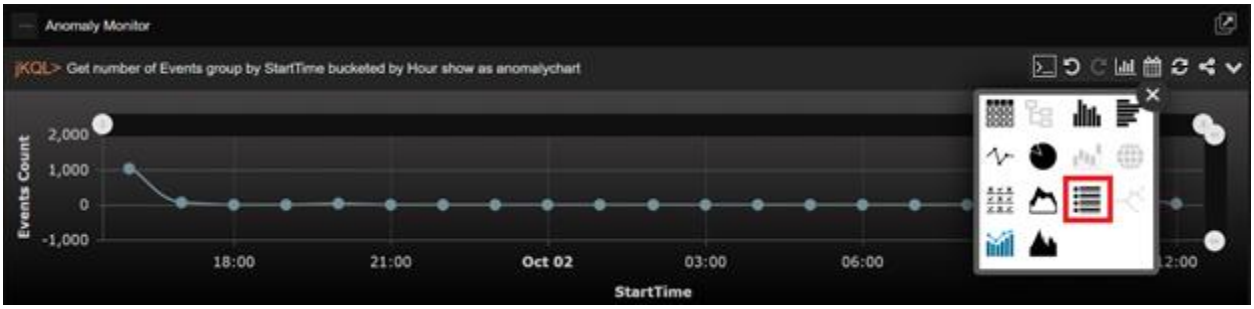

Figure 2.5.4.10.1.1-A. Add Summary from Viewlet

2.5.4.10.1.2 Add Summary Viewlet when Creating a Viewlet with a Form

When creating a viewlet using a form, users can specify to add a summary viewlet. See Create a Viewlet with a Form (*Section 2.5.1.2*) for more information.

Within the **Fields** section, enable the **Count** option. Depending on the data type, this option can be displayed as **Events Count**, **Activities Count**, or **Snapshots Count**.

When **Create** is clicked and the viewlet is generated, a summary viewlet will also be created.

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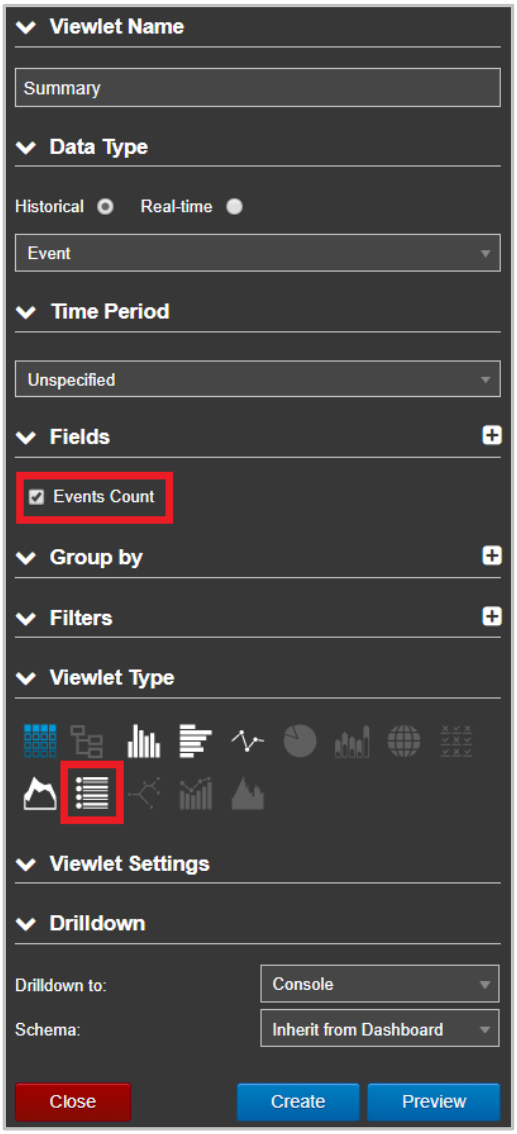

Figure 2.5.4.10.1.2-A. Count Option

2.5.4.10.1.3 Add Summary Viewlets When Creating New Dashboards

When adding a new dashboard, enable **Generate Initial Viewlets** on the *Create new Dashboard* dialog box. Please see Create a Dashboard (*Section 2.4.2.1*) for more information on adding a new dashboard. Three default viewlets will be created: Activities Count, Events Count and Snapshots Count.

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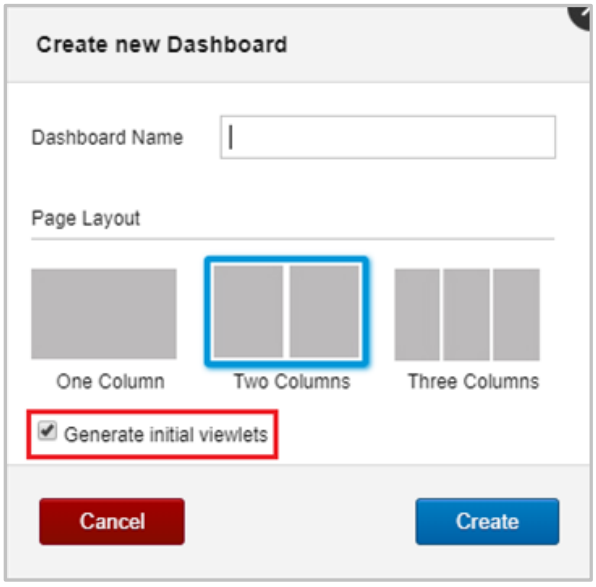

Figure 2.5.4.10.1.3-A. Create New Dashboard – Generate Initial Viewlets

2.5.4.10.1.4 Add Summary Viewlet from the Create/Open Summary *Dialog Box*

1. Click the **Create Summary** icon

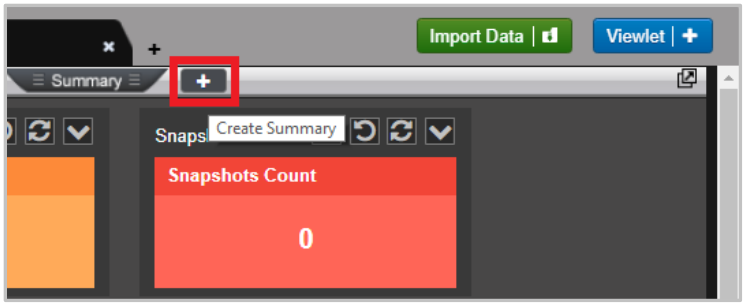

Figure 2.5.4.10.1.4-A. Create Summary Icon

2. The *Create/Open Summary* dialog box opens. An explanation of each option is explained below.

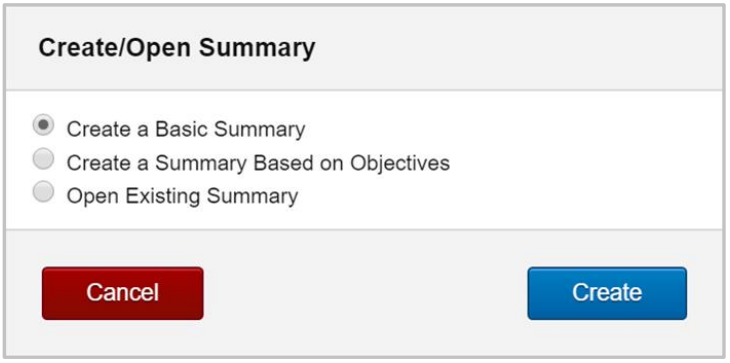

Figure 2.5.4.10.1.4-B. Create/Open Summary Dialog Box

2.5.4.10.1.4.1 Create a Basic Summary

Selecting the **Create a Basic Summary** option will open the *Create Summary* dialog box. Specify **Define Query** and **Viewlet Name**.

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Figure 2.5.4.10.1.4.1-A. Create Summary Dialog Box

The summary viewlet is now created in the Summary panel.

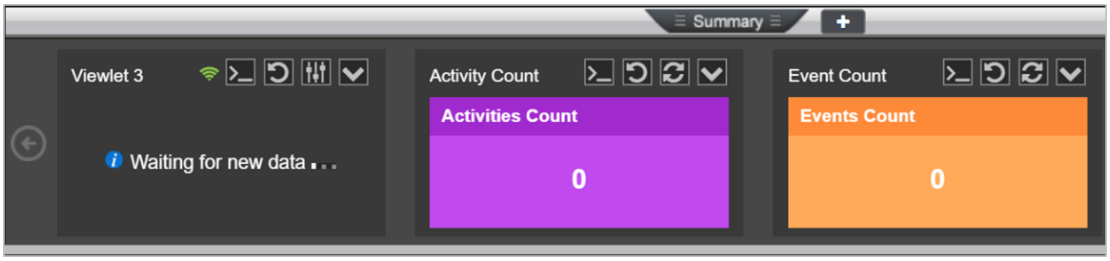

Figure 2.5.4.10.1.4.1-B. Summary Viewlet

2.5.4.10.1.4.2 Create a Summary Based on Objectives

Selecting **Create a Summary Based on Objectives** on the *Create/Open Summary* dialog box will open the *Wizard: Summary Based on Objectives* dialog box. Perform the following:

1. Select all desired objectives. Multiple objectives can be selected from the same set.

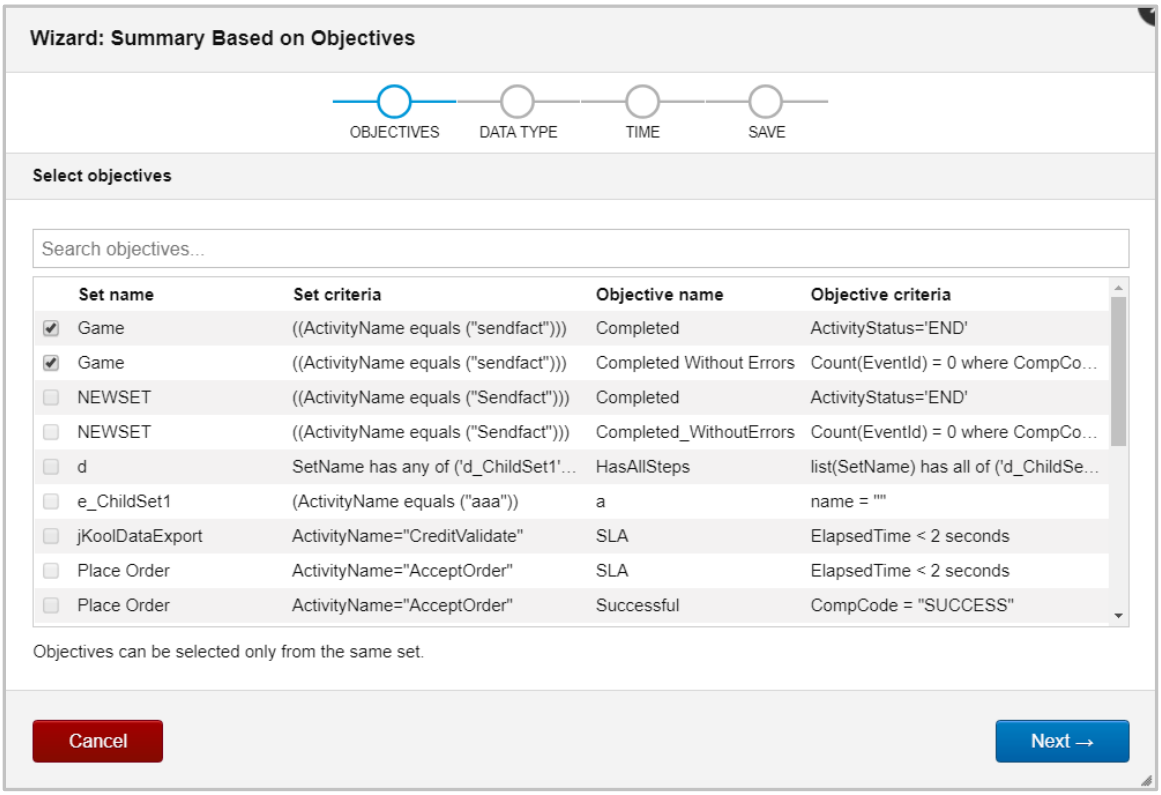

Figure 2.5.4.10.1.4.2-A. Wizard: Summary Based on Objectives – Objectives

2. Select either **Activities** or **Events** for the Data Type.

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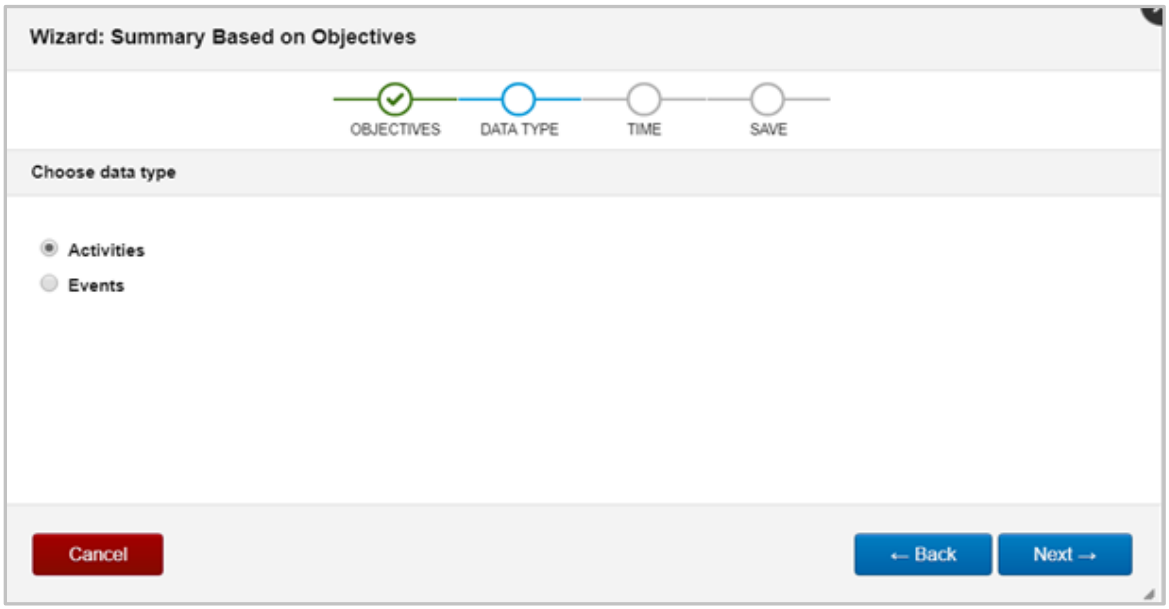

Figure 2.5.4.10.1.4.2-B. Wizard: Summary Based on Objectives – Data Type

3. Select a time limit from the drop-down menu.

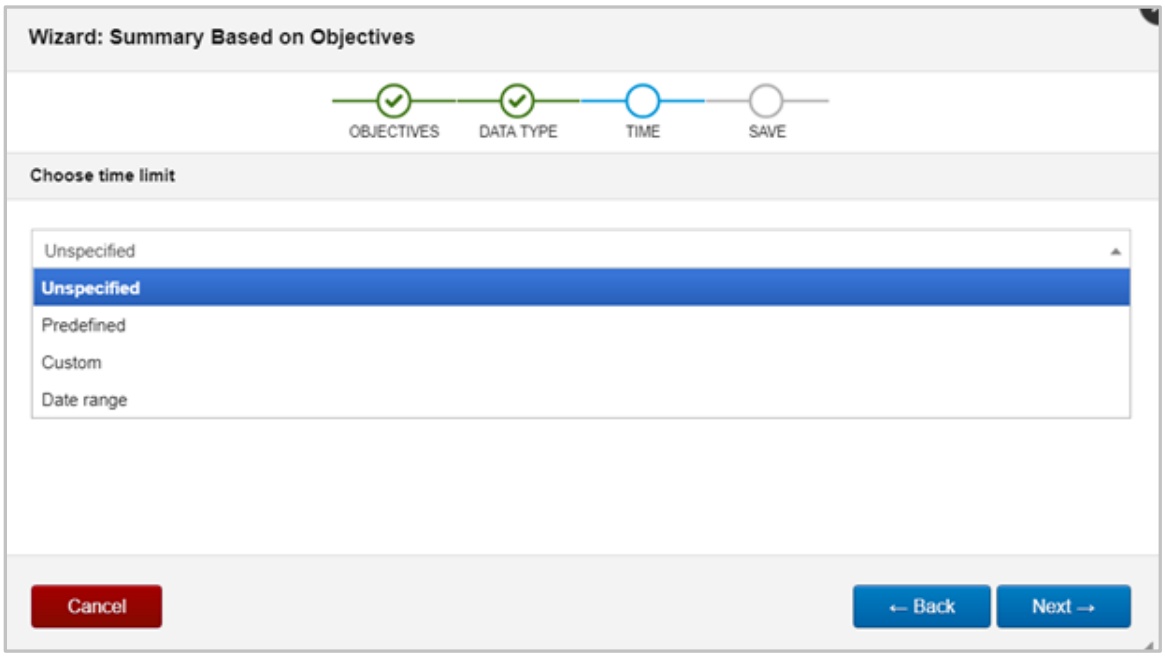

Figure 2.5.4.10.1.4.2-C. Wizard: Summary Based on Objectives – Time

4. Enter a name for the viewlet within the **Viewlet name** field. From the **Dashboard** drop-down, select which dashboard the new viewlet should be added to. Click **Save**.

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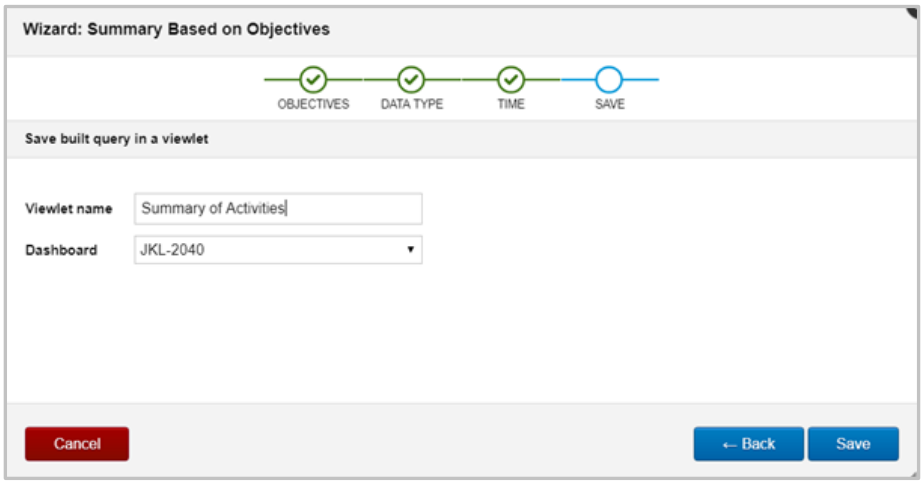

Figure 2.5.4.10.1.4.2-D. Wizard: Summary Based on Objectives – Save

The viewlet is now added to the Summary panel with three fields:

- **All**: Represents the count of activities that met the criteria of all selected objectives.
- **Partial**: Displays the count of activities that met the criteria of at least one of the selected objectives.
- **None**: The count of activities which did not meet any of the selected objectives' criteria.

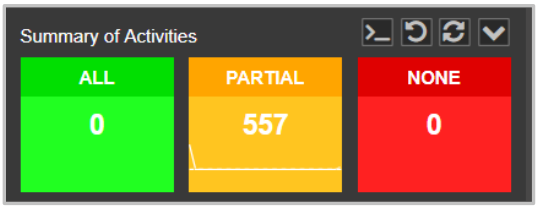

Figure 2.5.4.10.1.4.2-E. Summary Viewlet Based on Objectives

2.5.4.10.1.4.3 Open Existing Summary

Selecting **Open Existing Summary** on *Create/Open Summary* dialog box will open the *Open Existing Viewlet* dialog box (*Figure 2.5.1.4-A*). See *Section 2.5.1.4, Open Existing Viewlet* for more information on *Open Existing Viewlet*. Select a viewlet and click **Open**. The dashboard's focus will now be the selected viewlet.

The *Open Existing Viewlet* dialog box can also be opened from the **Main Menu** (*Section 2.3.6*).

2.5.4.10.2 Tear Off Viewlets

The Summary Dock can be opened in its own browser window. Click the **Tear Off** button to view the summary viewlets in their own window. See *Tear Off* for more information.

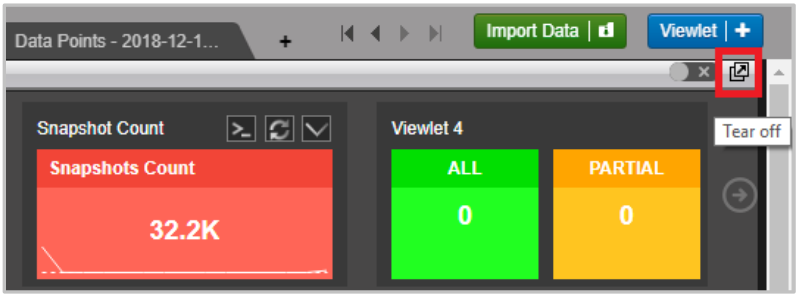

Figure 2.5.4.10.2-A. Summary – Tear Off

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2.5.4.10.3 Exact Total

Hover over a count to view the exact total.

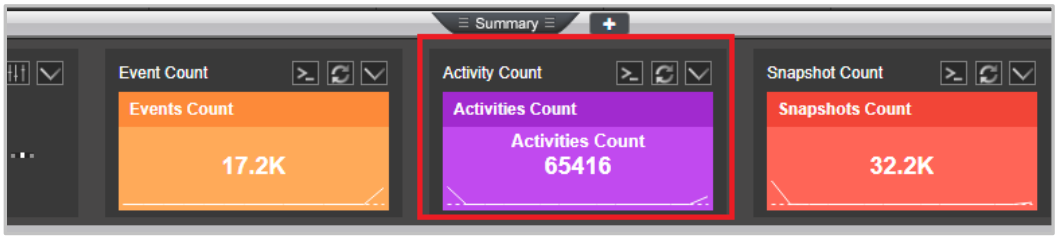

Figure 2.5.4.10.3-A. Summary – Exact Total

2.5.4.10.4 Edit Viewlet Query

Click the **Edit Query** button to update the viewlet's query.

Figure 2.5.4.10.4-A. Summary Viewlet - Edit Query Button

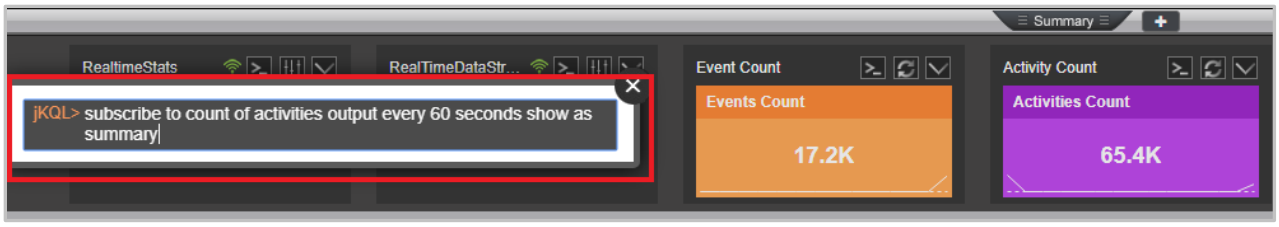

Figure 2.5.4.10.4-B. Summary Viewlet – Edit Query

2.5.4.10.5 Reset Query

Click the **Reset Query** button to reset a viewlet's jKQL query to the last saved query.

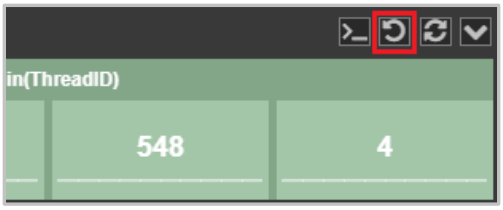

Figure 2.5.4.10.5-A. Reset Query

2.5.4.10.6 Refresh Viewlets

To refresh summary viewlets, click the **Refresh Viewlet** button. This process will check for new data.

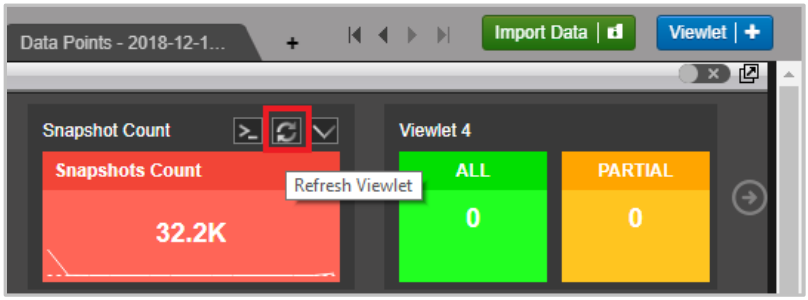

Figure 2.5.4.10.6-A. Refresh Viewlet Button

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2.5.4.10.7 Viewlet Menu

The **Summary Viewlet Menu** button allows users to edit, save, save as, remove or delete summary viewlets.

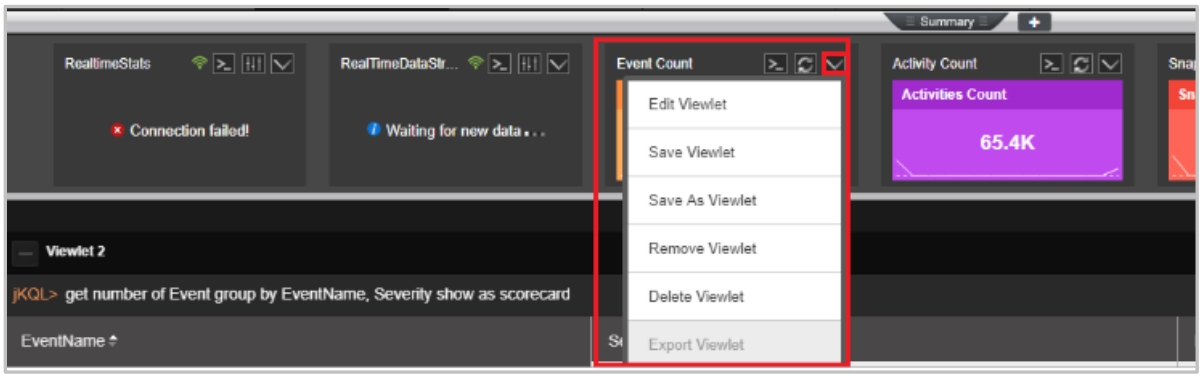

Figure 2.5.4.10.7-A. Summary Viewlet Menu

2.5.4.10.7.1 Edit Viewlet

Selecting **Edit Viewlet** allows users to update the summary viewlet's details using a form. After making updates, click **Preview** to view changes before saving. To cancel and discard changes, click **Close**. To save changes made, click **Apply**.

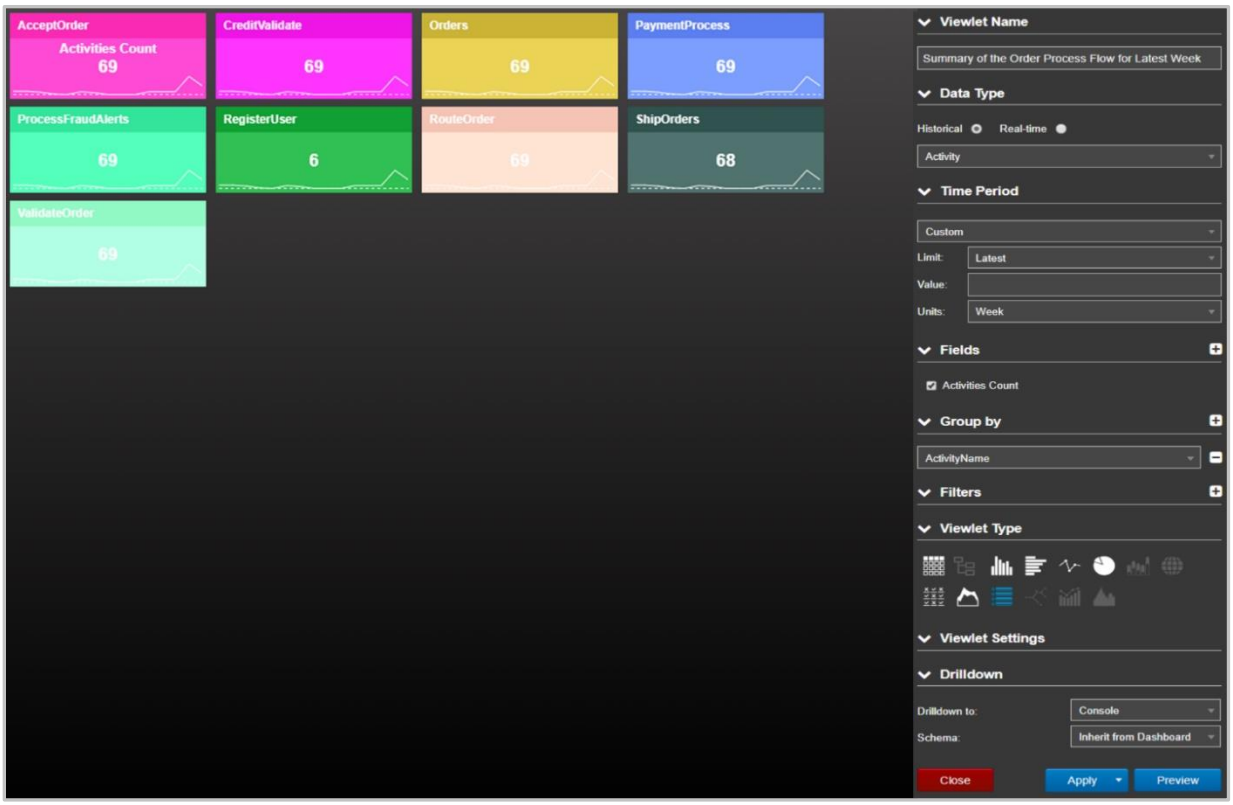

Figure 2.5.4.10.7.1-A. Edit Summary Viewlet

2.5.4.10.8 Real-time Subscription Viewlet Options

For real-time subscription summary viewlets, use the **Real Time Menu** button to set an interval and pause/resume the viewlet data.

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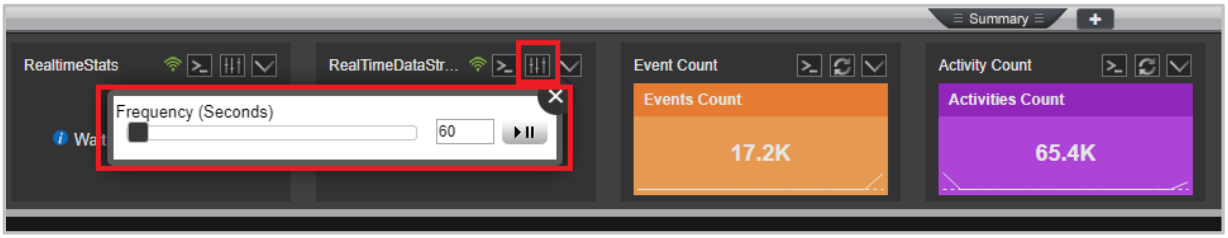

Figure 2.5.4.10.8-A. Real Time Menu Button

2.5.4.10.9 Visual History of Changes

The Summary viewlets include line charts displaying increase/decrease count history as seen in the below figure.

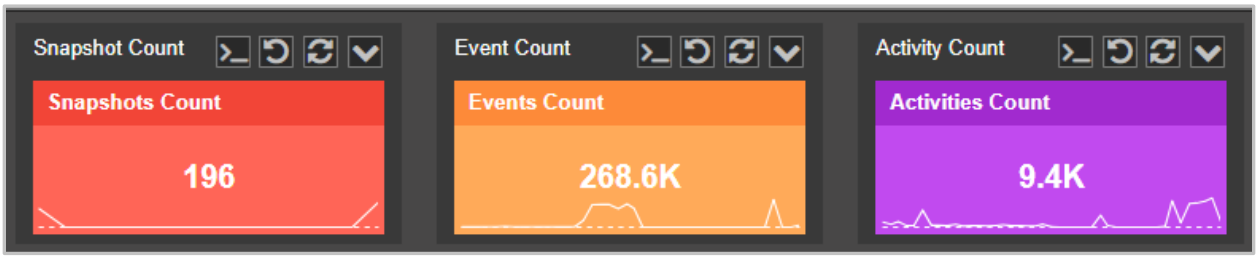

Figure 2.5.4.10.9-A. Count History Chart

2.5.4.11 Topology

Figure 2.5.4.11-A. Topology

A topology is often used to see the "flow" of what happened, and when it happened. This is very helpful in understanding the status of your applications and objectives.

2.5.4.11.1 Sample: Steps in the Order Process Business Milestone

Query: jKQL> `get relatives show as topology`

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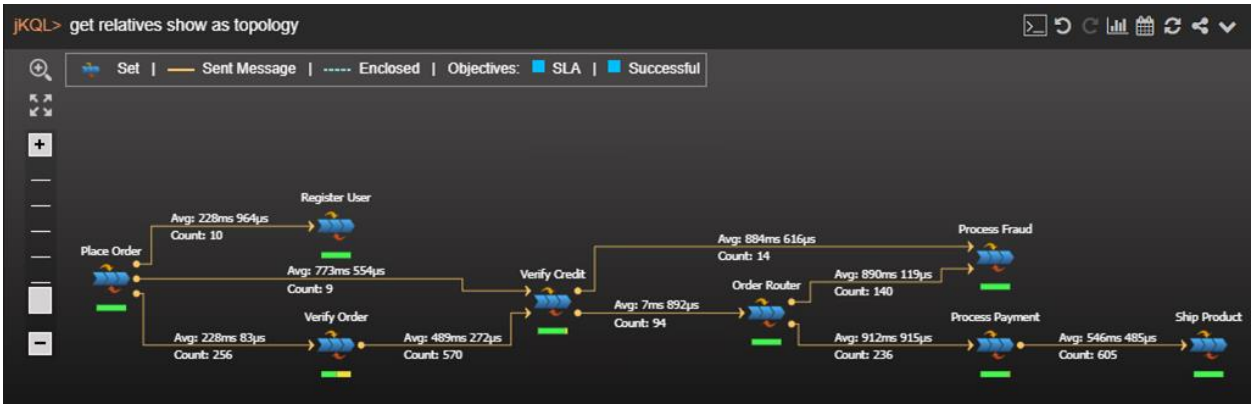

Figure 2.5.4.11.1-A. Sample Viewlet – Steps in the Order Process Business Milestone

The viewlet above is located in the **Sample-OrderTracking** repository. It shows the auto-discovered topology of an Order Process, displayed at the business milestone tier. Topologies can be shown at the geographical, datacenter, server, application, or milestone tiers. Each of the blue "chevron"-like icons above represents a specific business milestone. A business milestone is there to represent the completion of a business objective in the "real-world". It is defined based on established criteria, while its completion determines its status. Milestones often form a sequence or flow. This happens automatically as the analytics engine determines an observed relationship between them. The colored bars underneath each icon are called a healthbar. The healthbar under each icon is color coded to reflect status (green = good, yellow = warning, red = critical). It can be clicked to see the status of the milestone. The arrows between icons shows data flow between milestones. This is automatically discovered. The numbers surrounding the arrow show statistics for the relationship including elapsed time and count.

2.5.4.11.2 Create / Edit Topology Viewlet

To populate *Topology* viewlets, the 'Get relatives <*any criterias*> show as topology' statement must be used. If you're creating a topology with a form, select **Relative** as the data type.

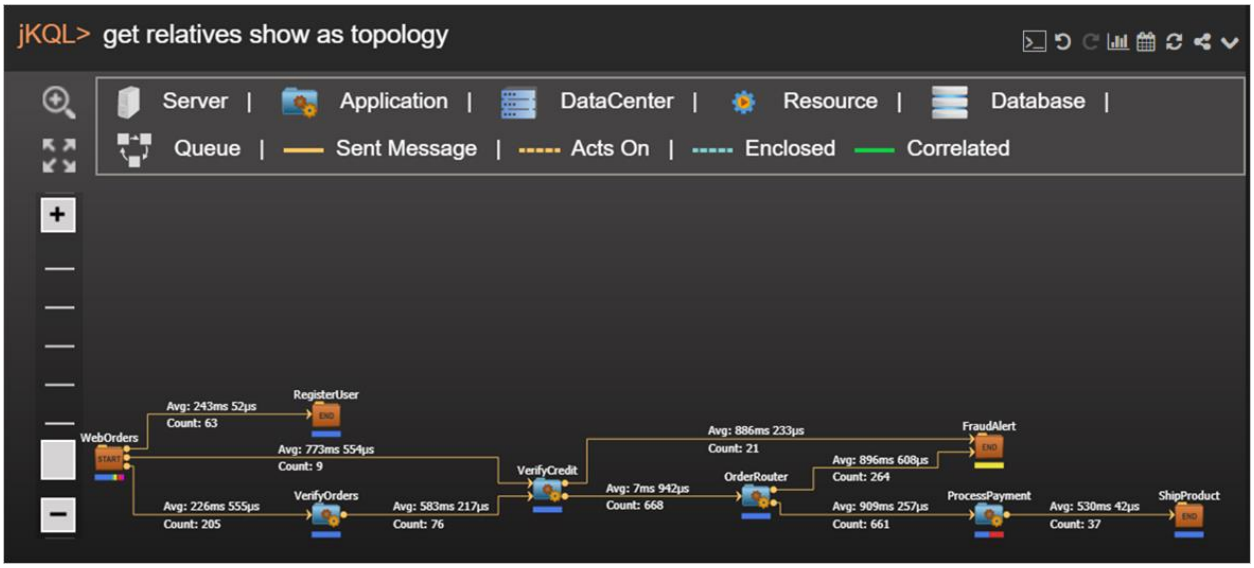

Figure 2.5.4.11.2-A. Topology

To modify the *Topology* viewlet, click the down arrow and select **Edit Viewlet** from the viewlet's drop-down menu. The viewlet's editing form opens.

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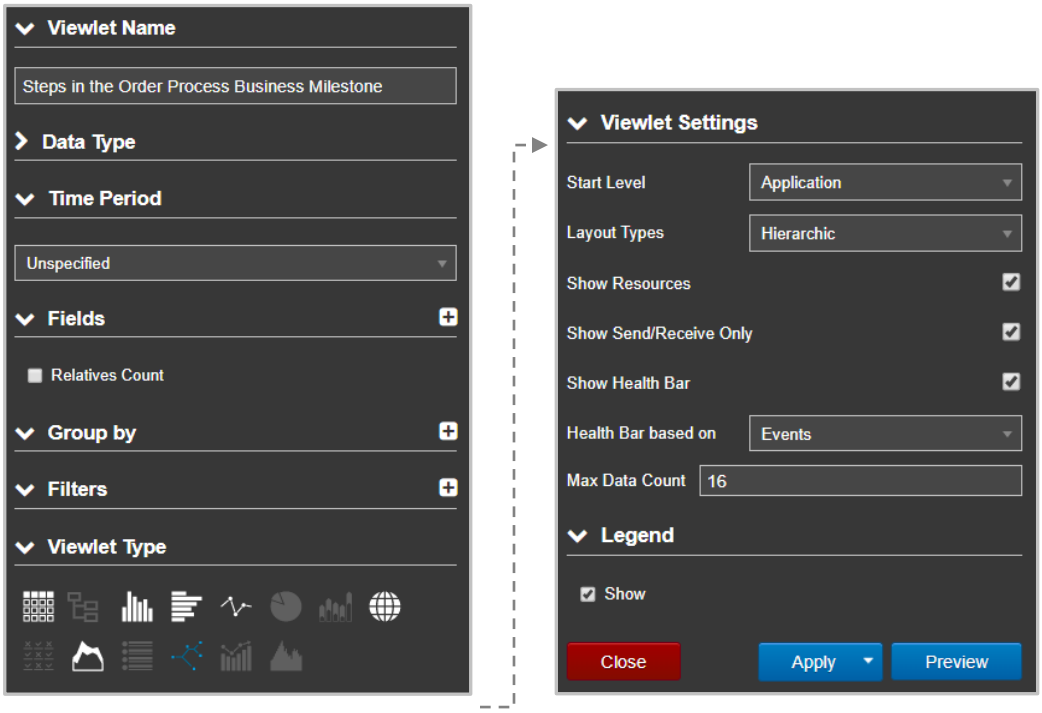

Figure 2.5.4.11.2-B. Edit Topology Viewlet Form

Select desired options from the drop-down menus. Check off the **Legend** check box to enable/disable the displaying of legend icons. The legend is displayed at the top of topology viewlets.

In the **Viewlet Settings** section, you can modify the properties of the topology viewlet. From the **Start Level** drop-down menu, select the item type.

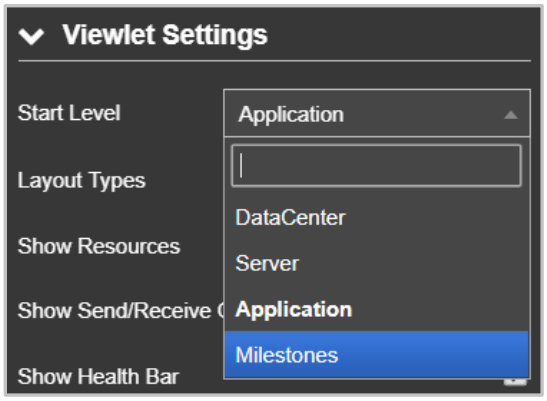

Figure 2.5.4.11.2-C. Start Level Drop-Down Menu

Depending on the start level item type selected, the appearance of the viewlet will differ. In the example below, **Server** was selected to be the start level.

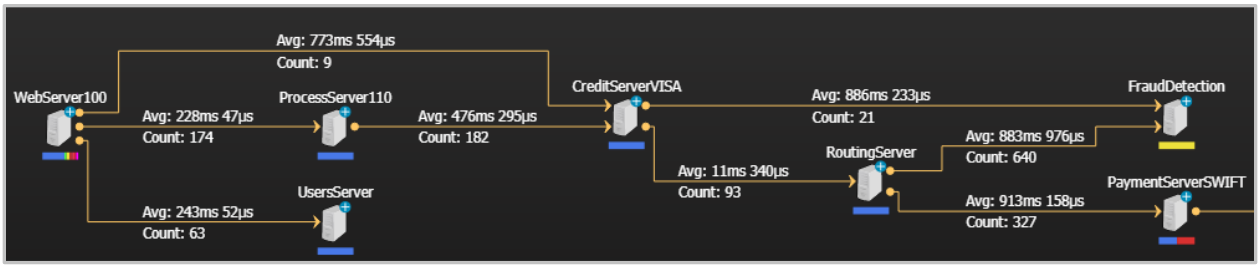

Figure 2.5.4.11.2-D. Topology Viewlet with Server as Start Level

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Select a layout type from the **Layout Types** drop-down menu.

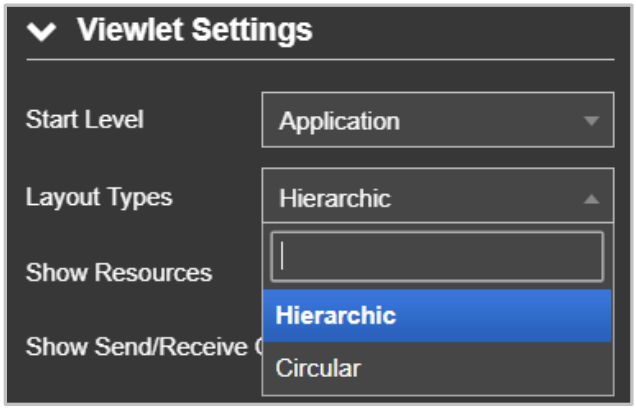

Figure 2.5.4.11.2-E. Layout Types Drop-Down Menu

The topology figures above are displaying the hierarchic layout type. Below is an example of the circular layout type.

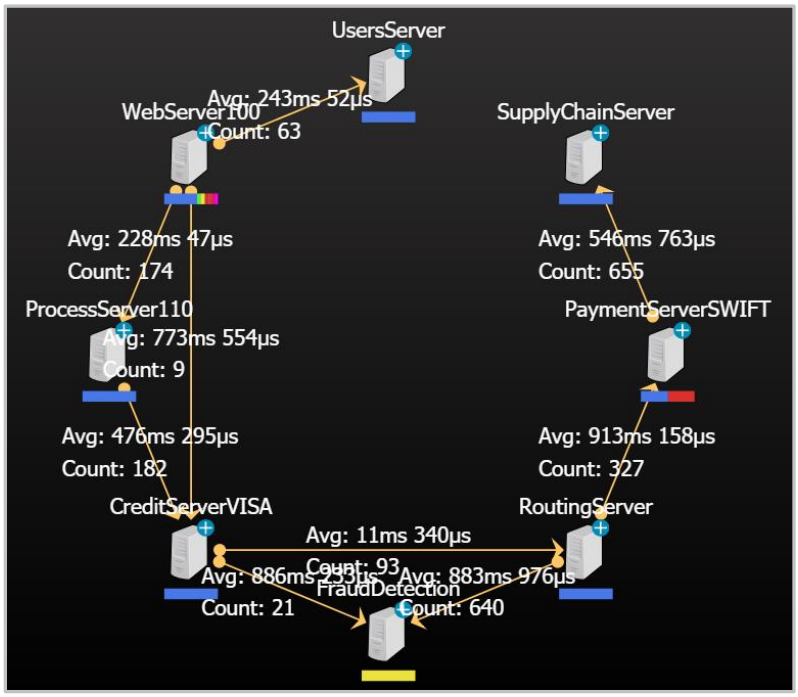

Figure 2.5.4.11.2-F. Circular Layout Type

Select all other desired options within the **Viewlet Settings** section.

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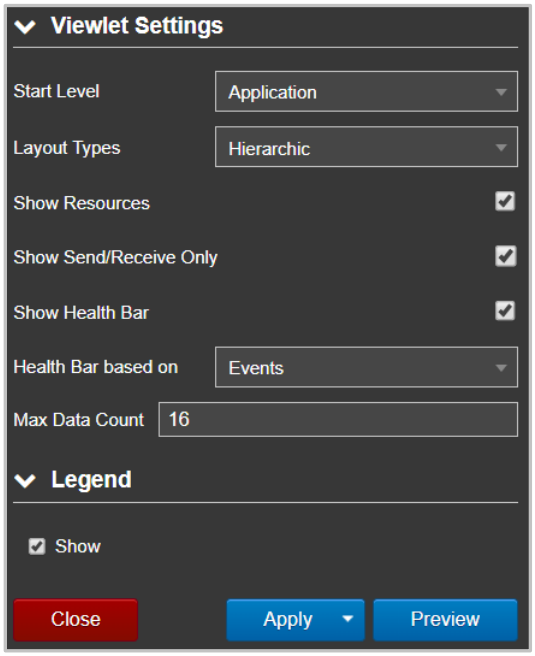

Figure 2.5.4.11.2-G. Circular Layout Type

Click the **Preview** button to view the topology viewlet's updates. Click the **Apply** button to save the changes. The **Close** button will close the form without saving changes.

2.5.4.11.3 Topology Viewlet Properties

Topology viewlets can be displayed within the main view or on the Console panel (when generated from a table viewlet, see *Section 2.5.4.1.1.5, Topology*, for information), but the properties of the viewlets are the same in both cases.

The arrows represent the relationships between relatives. Click on these arrows to view statistics.

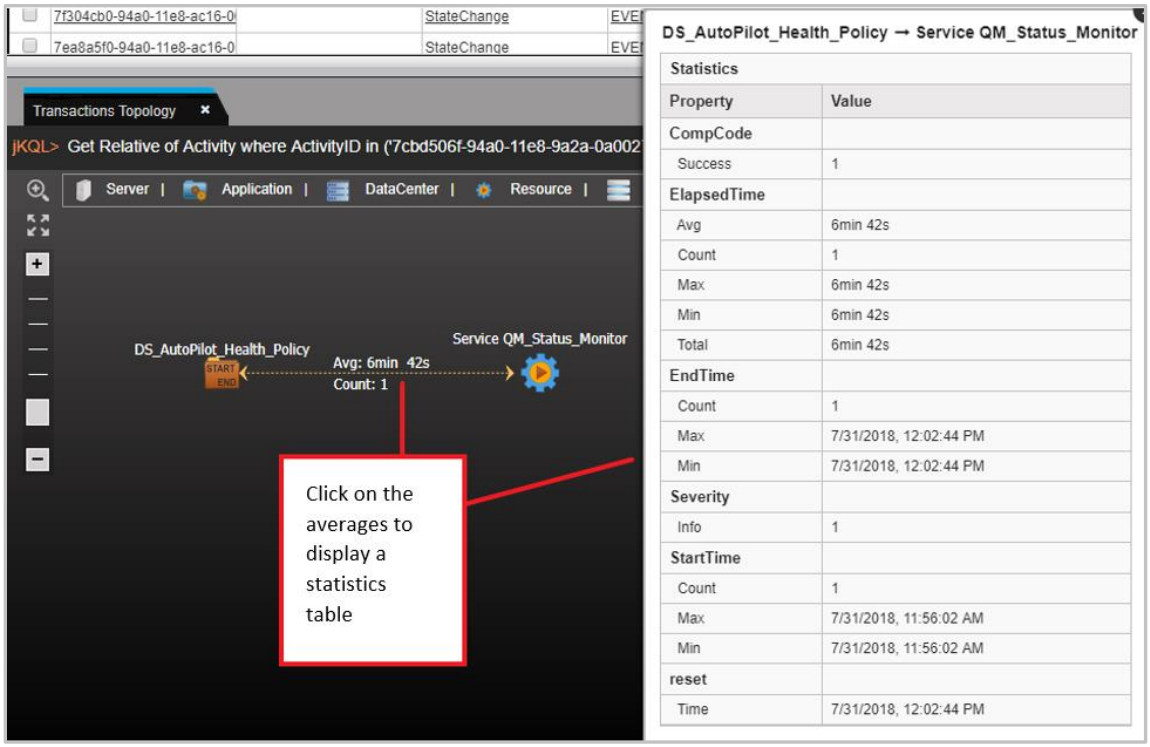

Figure 2.5.4.11-B. Topology - Statistics Chart

Users have the following additional options to customize topology viewlets.

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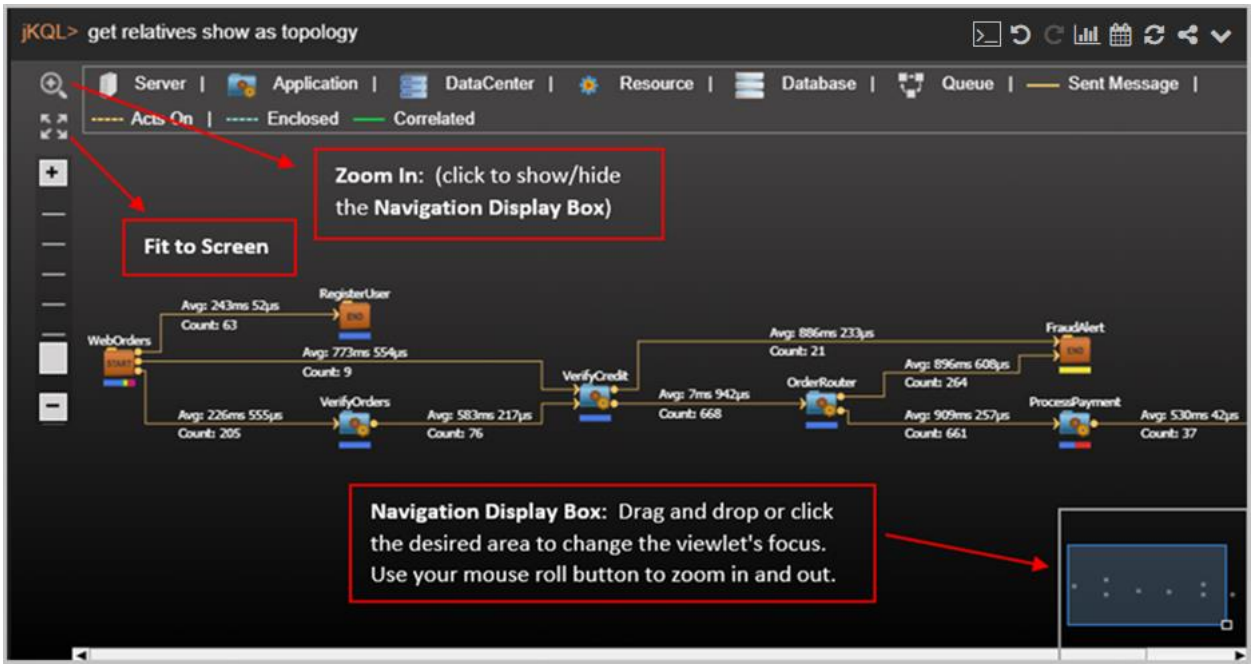

Figure 2.5.4.11.3-B. Topology – Options

2.5.4.12 Anomaly

Anomaly chart viewlets are useful to quickly see data distribution deviations compared to the normal distribution.

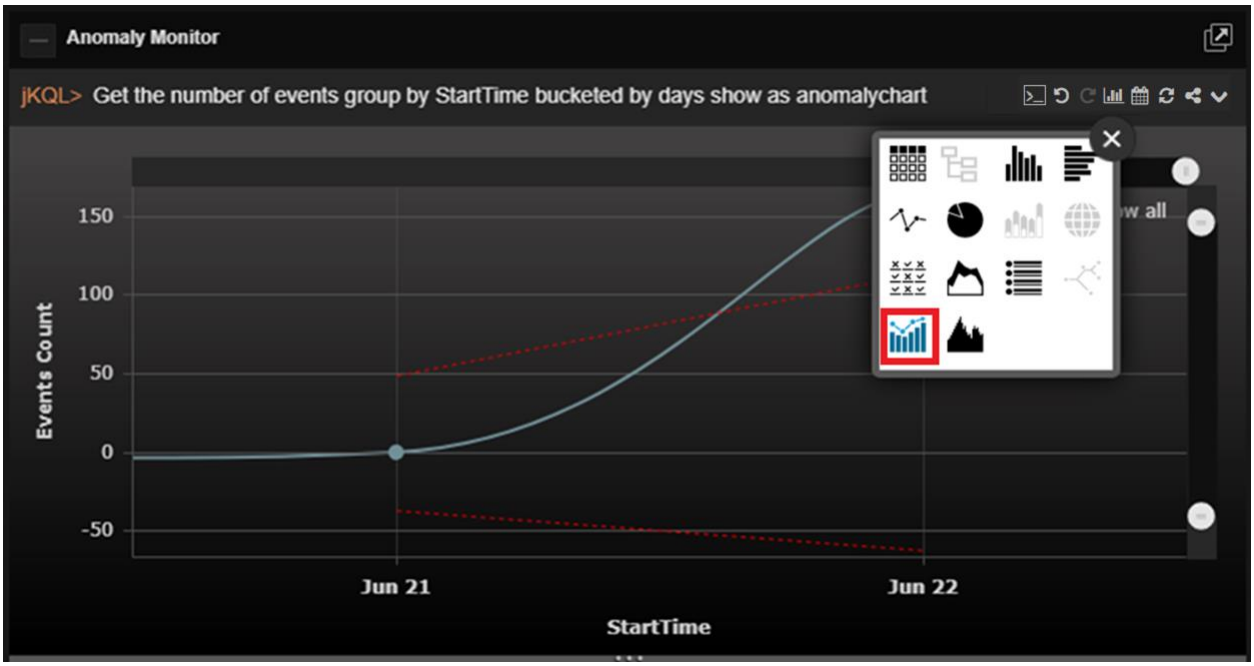

Figure 2.5.4.12-A. Anomaly

2.5.4.12.1 Sample: Anomalies via Bollinger Bands

Query: jKQL> `Get number of events group by starttime bucketed by minute show as anomalychart`

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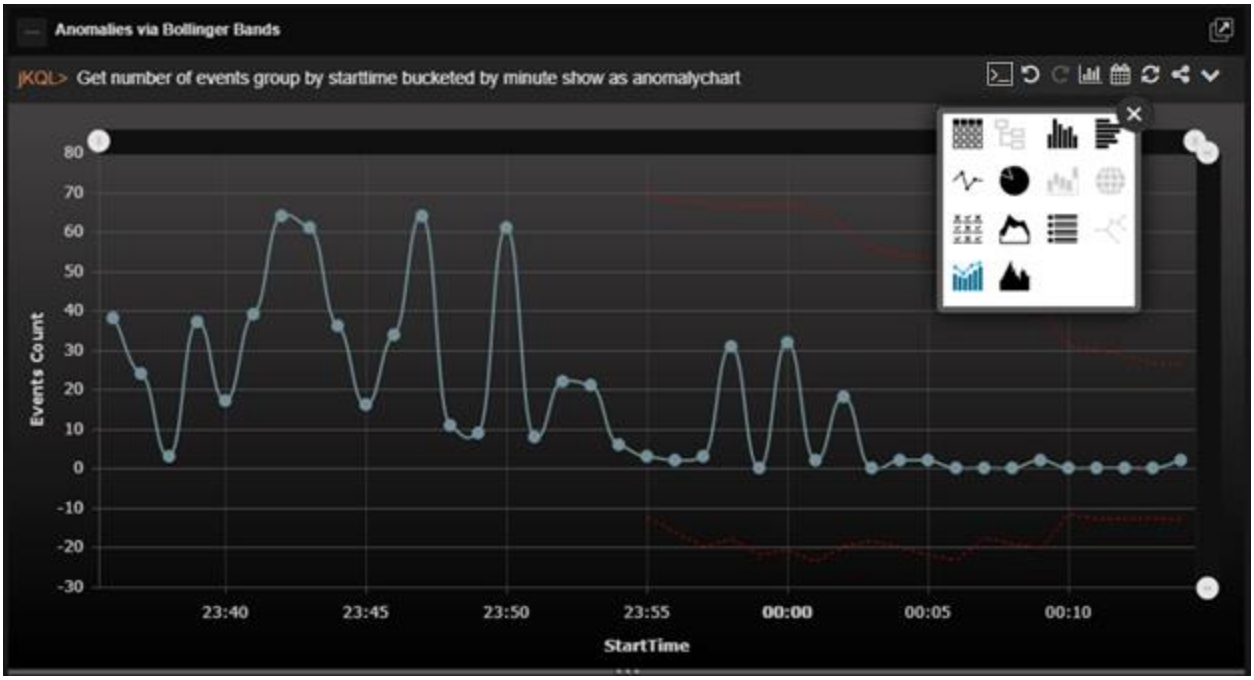

Figure 2.5.4.12.1-A. Sample Viewlet – Anomaly Monitor

The viewlet above is located in the **Sample-OrderTracking** repository. This viewlet, which is called an anomaly chart, is using the function Bollinger Bands to automatically detect anomalies in the number of events per day. The red dashed line displays the average event count and the blue displays the actual event count. The point at which the blue line surpasses the red dashed line is when the anomaly is suspected.

2.5.4.13 Histogram

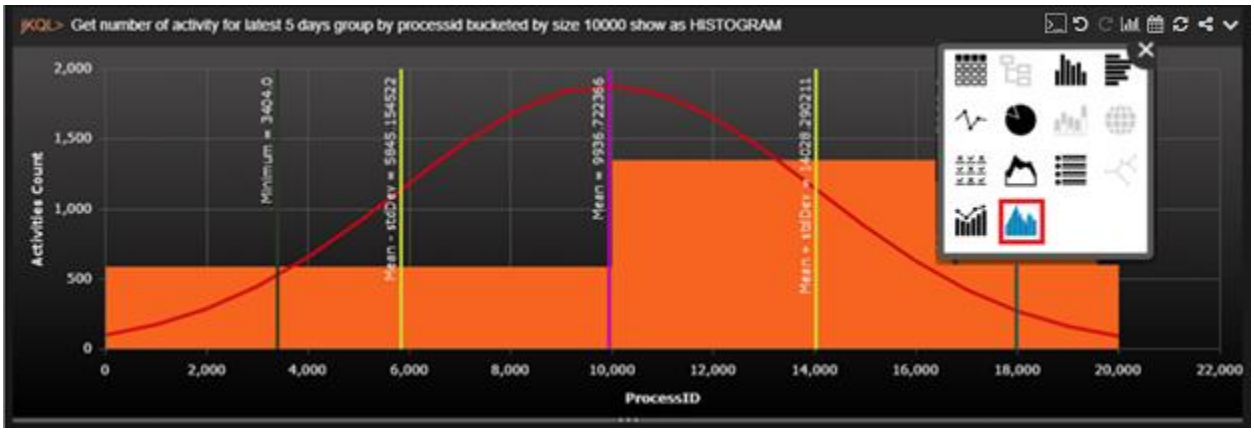

Figure 2.5.4.13-A. Histogram

A **histogram** represents the distribution of numerical data. To create a histogram, the frequency of data within a range of values will need to be bucketed into intervals. Opposed to bar charts, histograms display the frequency of continuous data. The red line displays the normal distribution. The **Mean - stdDev** (stdDev – standard deviation), **Mean** and **Mean + stdDev** lines display statistical means. The **Minimum** line displays the minimum count.

If creating a histogram viewlet using a form (for more information on forms, see *Section 2.5.1.2, Create a Viewlet with a Form*), the following settings are required:

- Within the **Fields** section, enable the **Count** option. Depending on the type of viewlet, this option can be displayed as **Events Count**, **Activities Count**, or **Snapshots Count**.

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- From the **Group by** section, select a numerical element that has the **bucket** option. Enable this checkbox and specify all associated options. For more information on bucketing, see *Section 2.5.1.2, Create a Viewlet with a Form*. If **EventCount** is selected, you will have the following options:
    - **Size**: the viewlet generated will divide the data into intervals by the size range defined within the bucket value field.
    - **Count**: distributes the data in the number of intervals specified within the bucket value field.
    - **Auto**: if you do not need to specify a particular bucket range.
- Select the **Histogram** option within the **Viewlet Type** section.

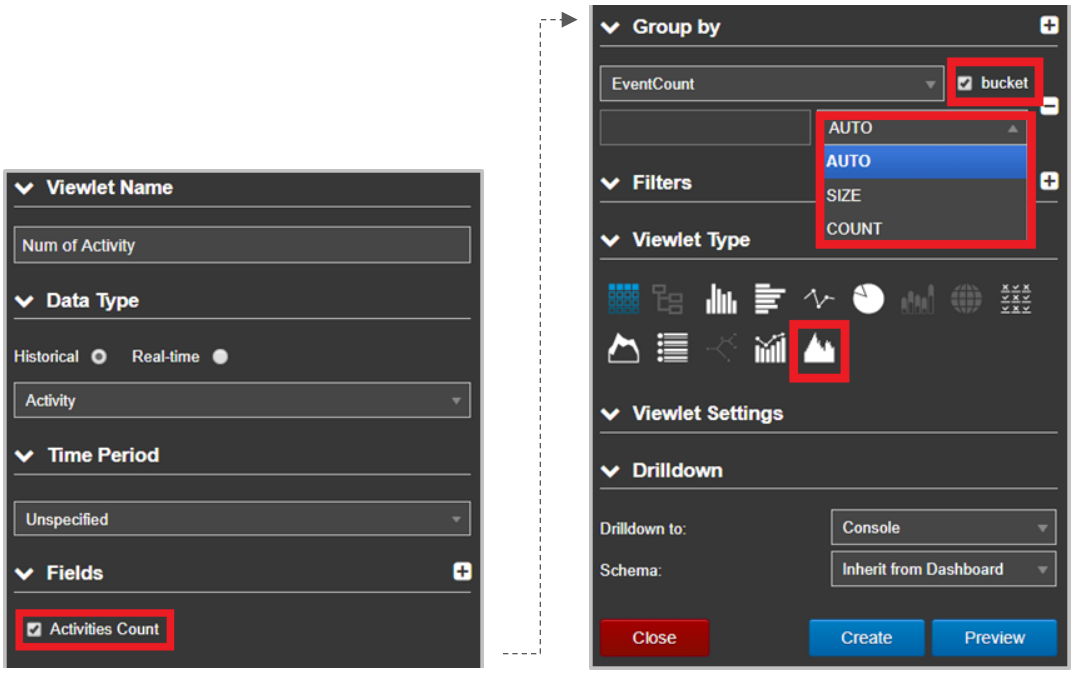

Figure 2.5.4.13-B. Histogram Form Options

The following viewlet gets generated using the options selected in the figure above. The same viewlet can be populated also with jKQL (see *Chapter 5, Using jKQL*, for more information):

Query: jKQL> `get number of Activity group by EventCount bucketed by size 3 show as histogram`

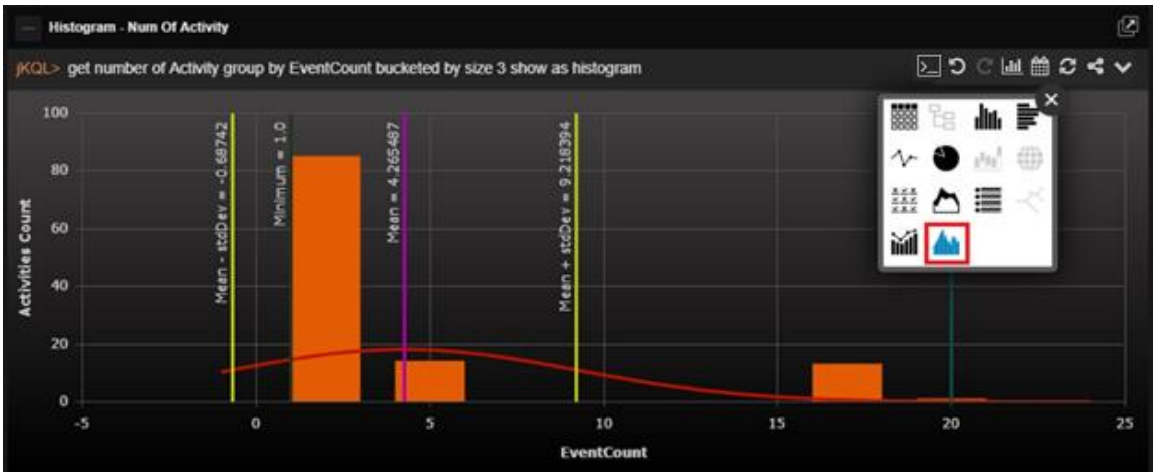

Figure 2.5.4.13-C. Histogram Viewlet

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Sample: The frequency of SnapshotCount

In the example below, the frequency of SnapshotCount is shown: how many activities have snapshot counts within the specific range, defined by bucketing size.

Query: jKQL> `get number of Activity group by SnapshotCount bucketed by size 10 show as histogram`

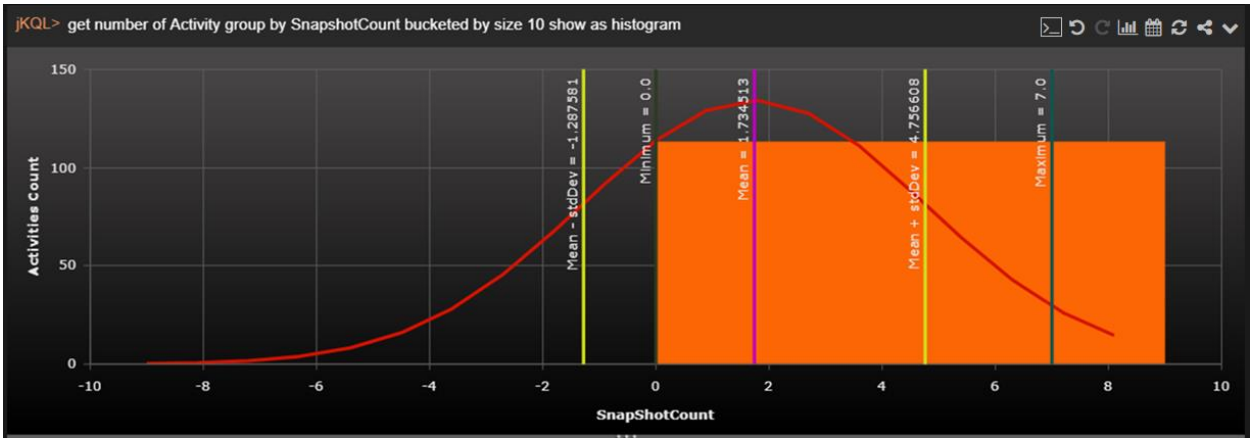

Figure 2.5.4.13-D. Histogram Viewlet – The Frequency of SnapshotCount

You can change the bucketing type from **Size** to **Count** by typing the following expressions in a jKQL query. The expression, *bucketed show as histogram*, corresponds to Auto bucketing type.

Query: jKQL> `get number of Activity group by EventCount bucketed show as histogram`

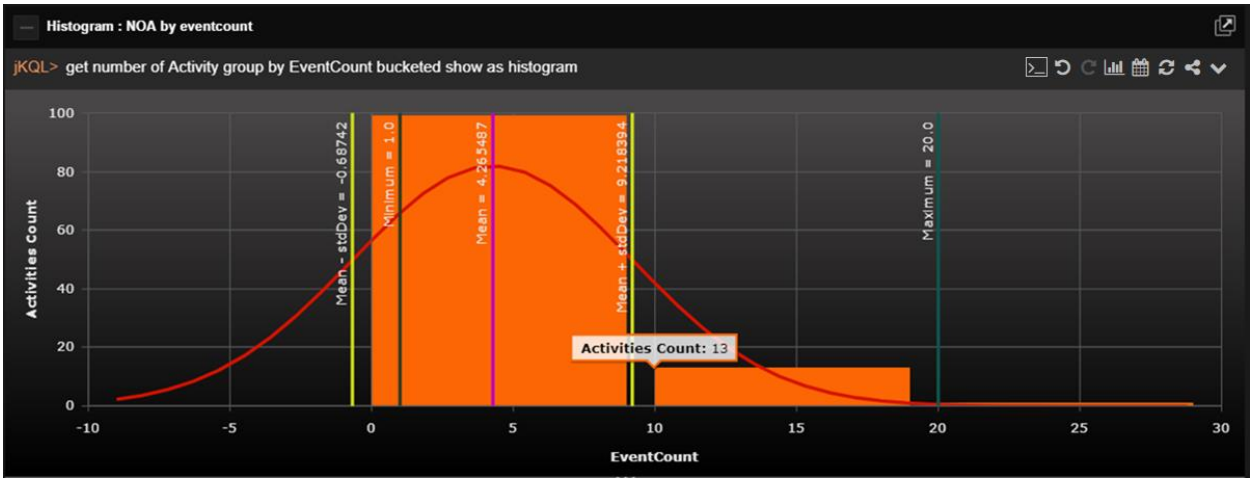

Figure 2.5.4.13-E. Histogram Viewlet – The Frequency of EventCount

You can see the difference between size and count bucketing in the table viewlets below. To generate these examples, click on the **Chart** button from the viewlet's toolbar and select the table chart type , or modify the jKQL query's *show as* expression.

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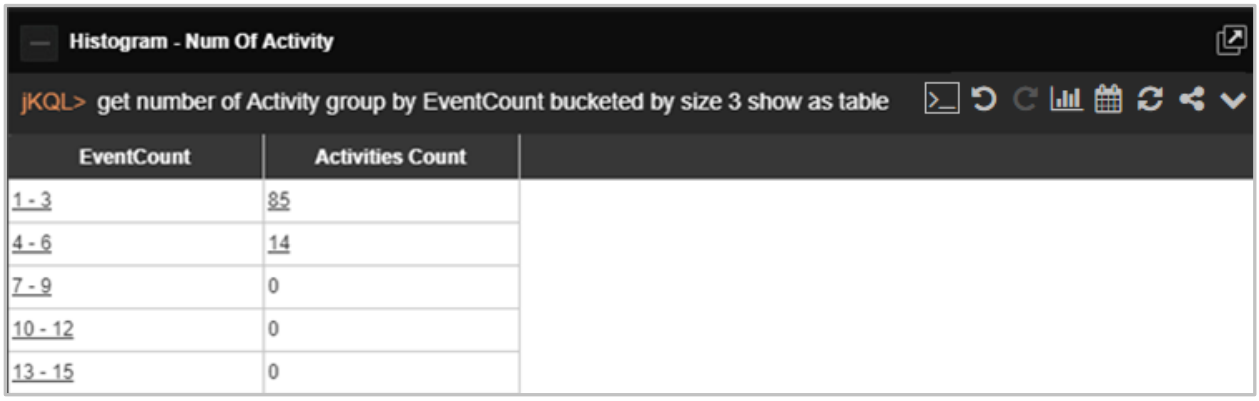
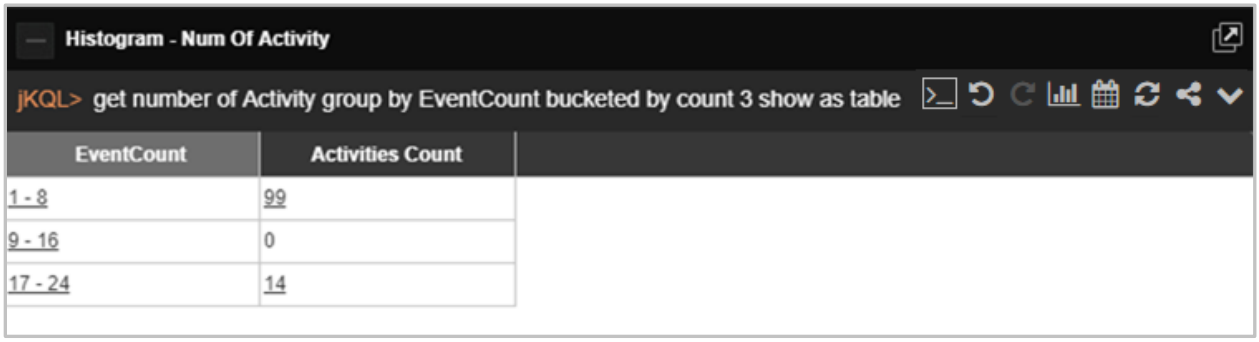


EventCount	Activities Count
1 - 3	85
4 - 6	14
7 - 9	0
10 - 12	0
13 - 15	0

Figure 2.5.4.13-F. Bucketed by Size



EventCount	Activities Count
1 - 8	99
9 - 16	0
17 - 24	14

Figure 2.5.4.13-G. Bucketed by Count

In *Figure 2.5.4.13-F*, the EventCount is divided in an unspecified number of groups by 3. For example, the first row of data (EventCount is 1-3 and Activities Count is 85) shows that there are 85 activities taking place within one to three events. The second row of data (EventCount is 4-6 and Activities count is 14) shows that there are 14 activities which occur within four to six events.

Figure 2.5.4.13-G shows the data, divided into a specified number of intervals, by an unspecified range number.

2.5.4.14 Tree

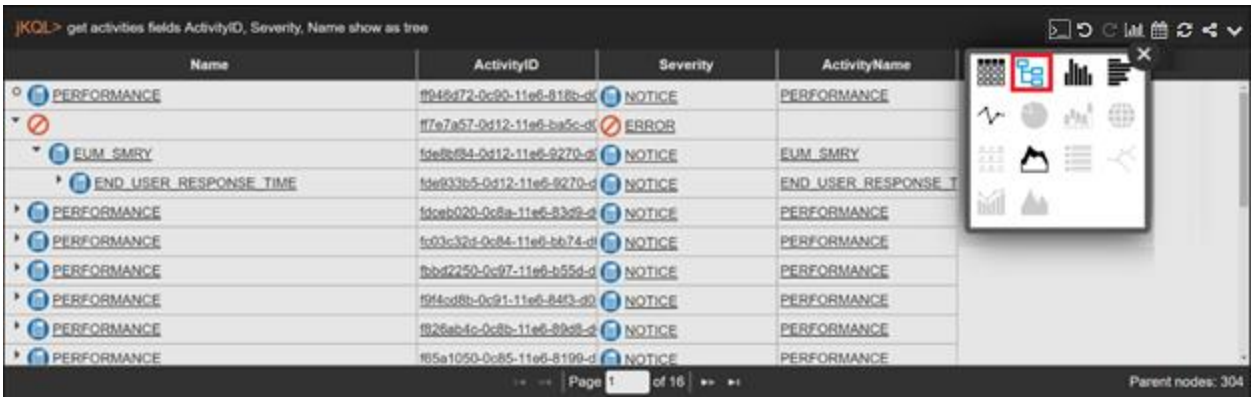


Figure 2.5.4.14-A. Tree

Query: jKQL> `get Activity fields ActivityID, Severity, ActivityName show as tree`

Tree viewlets are only available for *activities*. By default, only the activity's name and severity icon are displayed (basic query example: `get activities show as tree`), but the viewlet can be enriched by adding *field* conditions as in the example above.

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Expand an activity's tree by clicking the arrow immediately before the activity name. All of the child activities, events or snapshots are displayed. An activity with no child records will have a circle instead of an arrow.

2.5.4.15 Clustering

Clustering charts use machine learning data to group data into clusters so that users can gain insight into the data. This is 'unsupervised' learning; a type of machine learning that looks for previously undetected patterns in a data set with no pre-existing labels and with a minimum of human supervision

Below are examples of a clustering viewlets.

Query: **jKQL>** `Get dataset compute clusters(3,PETAL_LENGTH,PETAL_WIDTH,SEPAL_LENGTH,SEPAL_WIDTH,'3',false) show as table`

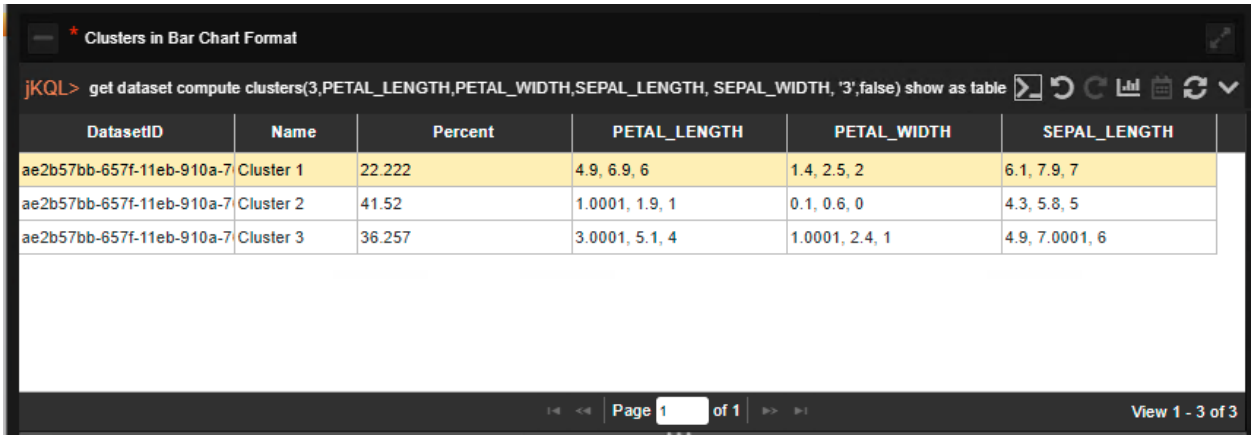

Figure 2.5.4.15-A. Clusters in Bar Chart Format

Query: **jKQL>** `Get dataset compute clusters3d(PETAL_LENGTH,PETAL_WIDTH,SEPAL_LENGTH,SEPAL_WIDTH,'3',true)`

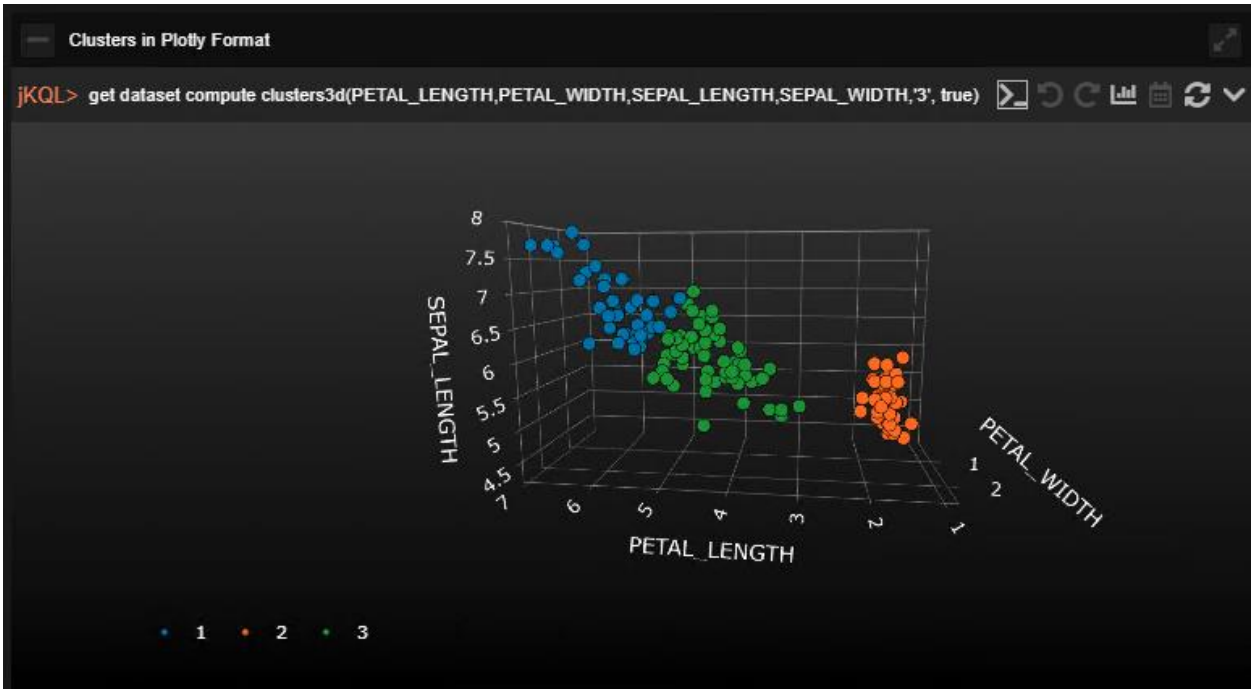

Figure 2.5.4.15-B. Clusters in Plotty Format

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2.5.4.16 Correlation

Correlation charts use machine learning data to correlate the data fields. A high positive or negative number indicates a strong correlation (negative is strong in opposing directions, i.e., the more positive one number gets, the more negative the correlated number gets).

The below image is an example of a correlation viewlet.

Query: **jKQL>** `get dataset compute correlate(PETAL_LENGTH,PETAL_WIDTH,SEPAL_LENGTH,SEPAL_WIDTH)`

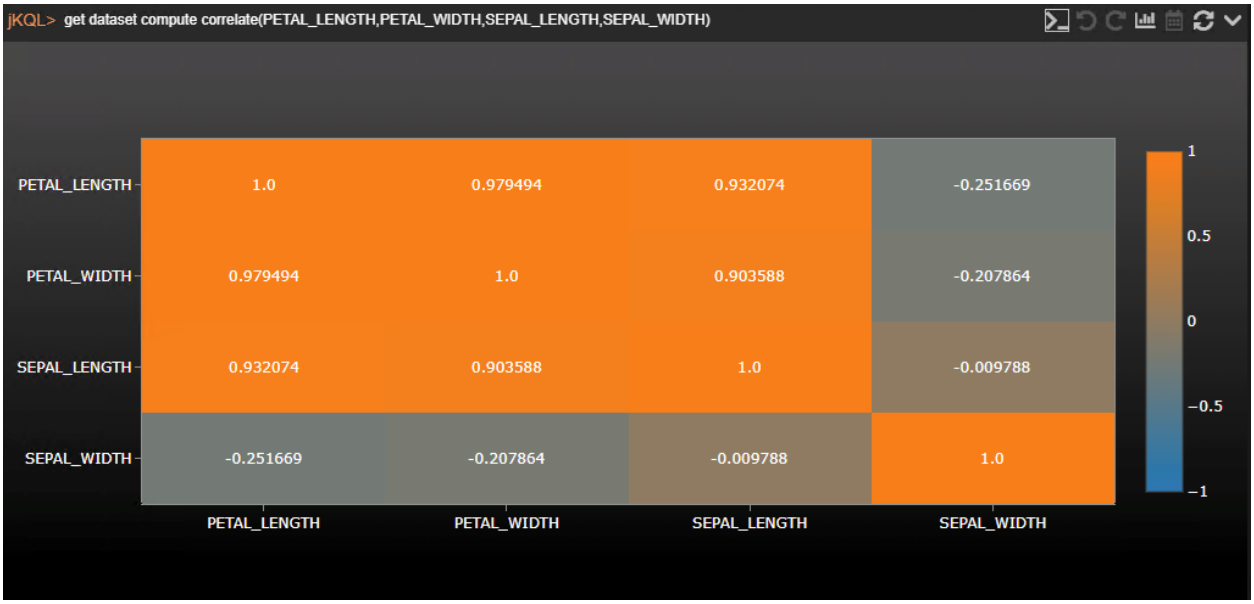

Figure 2.5.4.16-A. Correlation

2.5.4.17 Feature Suggestion

Feature suggestion chart types use machine learning data to display the fields the machine learning model considers the most important when predicting a target variable (the fields which effect the target variable the most).

The below images are examples of feature suggestion viewlets.

Query: **jKQL>** `get dataset compute featuresuggestion(PETAL_LENGTH,PETAL_WIDTH,SEPAL_LENGTH,SEPAL_WIDTH,SPECIES) show as table`

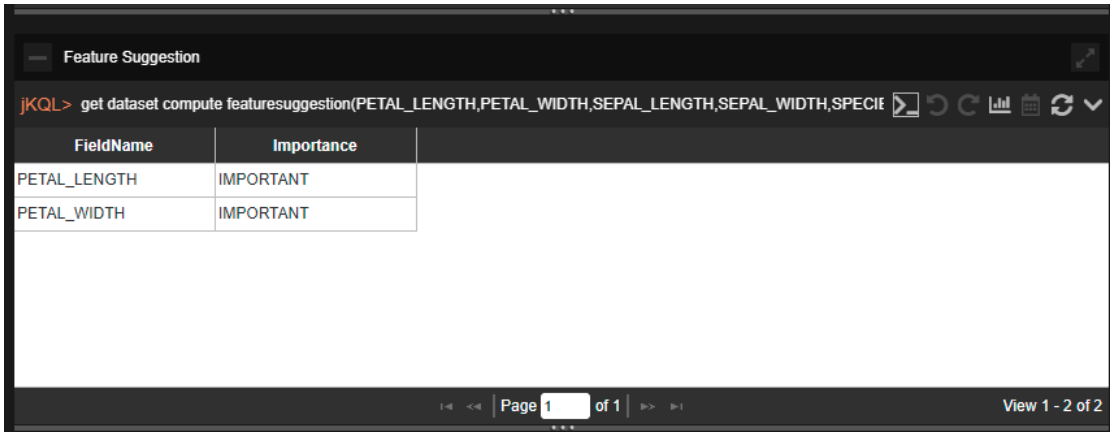

Figure 2.5.4.17-A. Feature Suggestion Table

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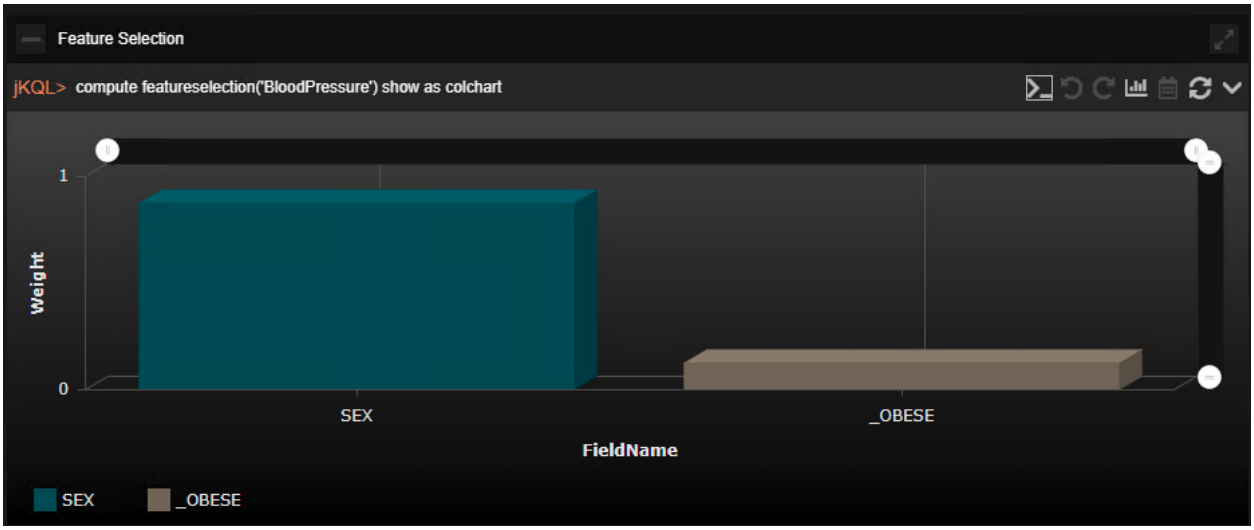

Figure 2.5.4.17-B. Feature Suggestion Diagram

2.5.4.18 Forecast

Forecast charts use machine learning data to display a future projection. The below image is an example of a forecast viewlet.

Query: jKQL> `compute forecast('closingPriceDaily',100)`

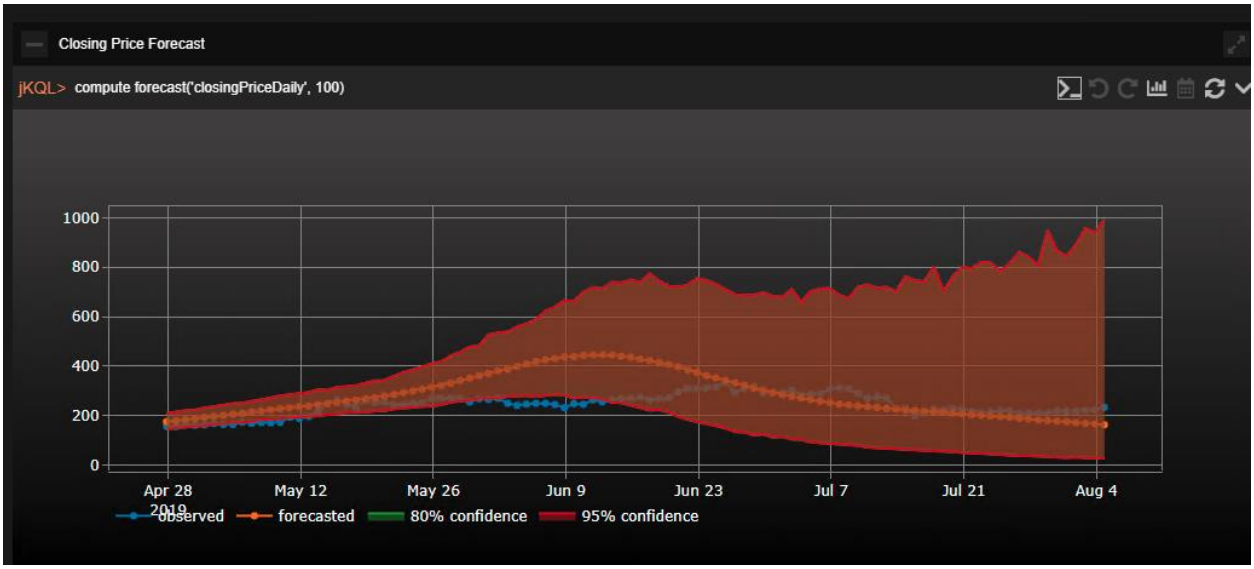

Figure 2.5.4.18-A. Forecast

2.5.4.19 Expected

Expected charts use machine learning data to display predictions. Given certain variables, the expected target variable is displayed. The below images are examples of expected viewlets.

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Query: jKQL> `compute expected('SPECIES')show as table`

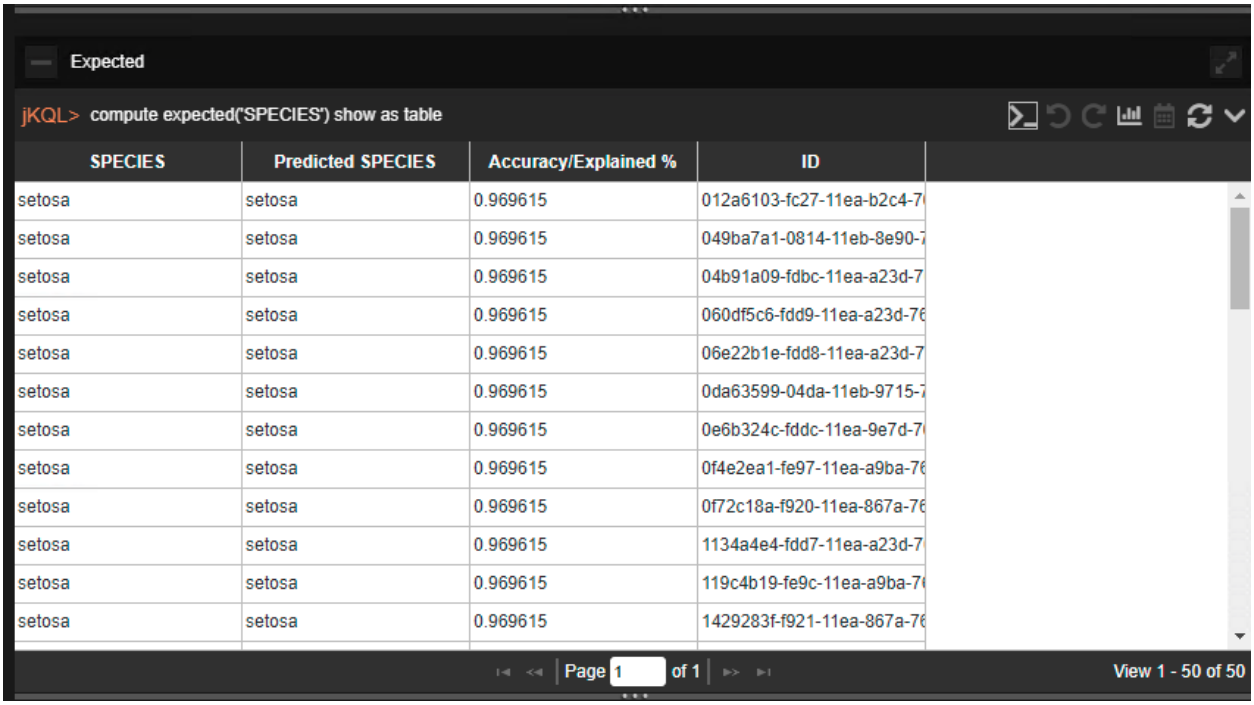

Figure 2.5.4.19-A. Expected Table

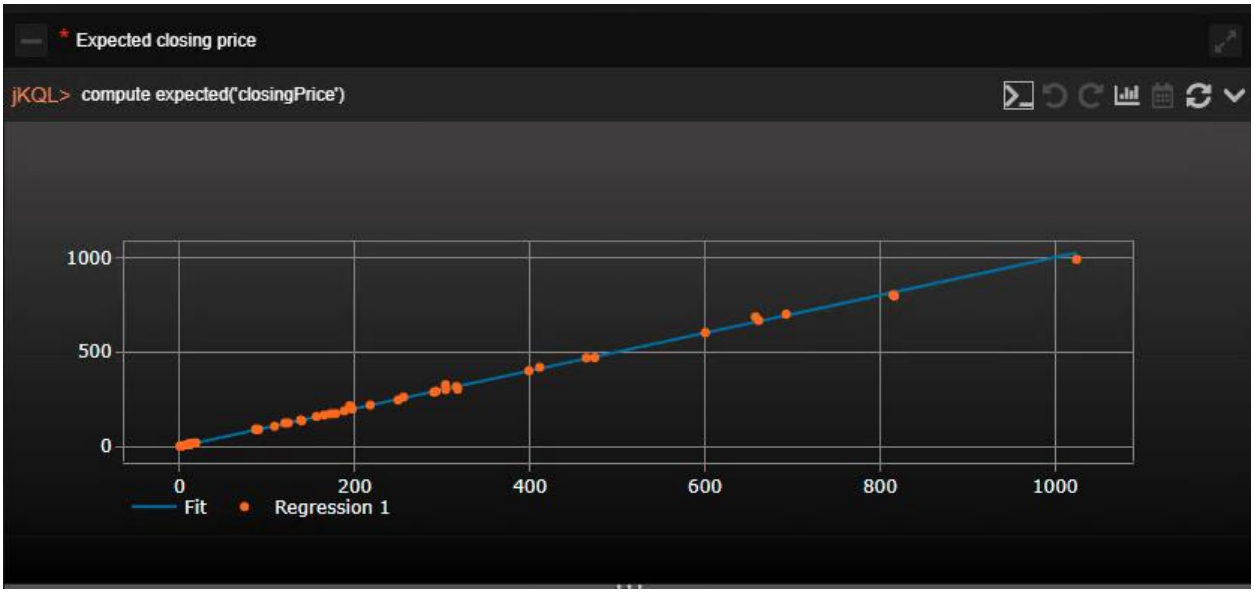

Figure 2.5.4.19-A. Expected Diagram

2.5.4.20 Images

Image viewlets allow you to display data on any predefined SVG image with custom bindings. For binding realization, the powerful, lightweight rules engine, json-rules-engine, is used.

SVG images have many elements, but the most important are the following:

- <metadata >
- <style>

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- <defs>
- <g>

The following is an example:

Query: jKQL> `Get sensor fields all where PolicyName='DEMO – EAI Workflow Business Process.bsp'Show As Image('demo1')`

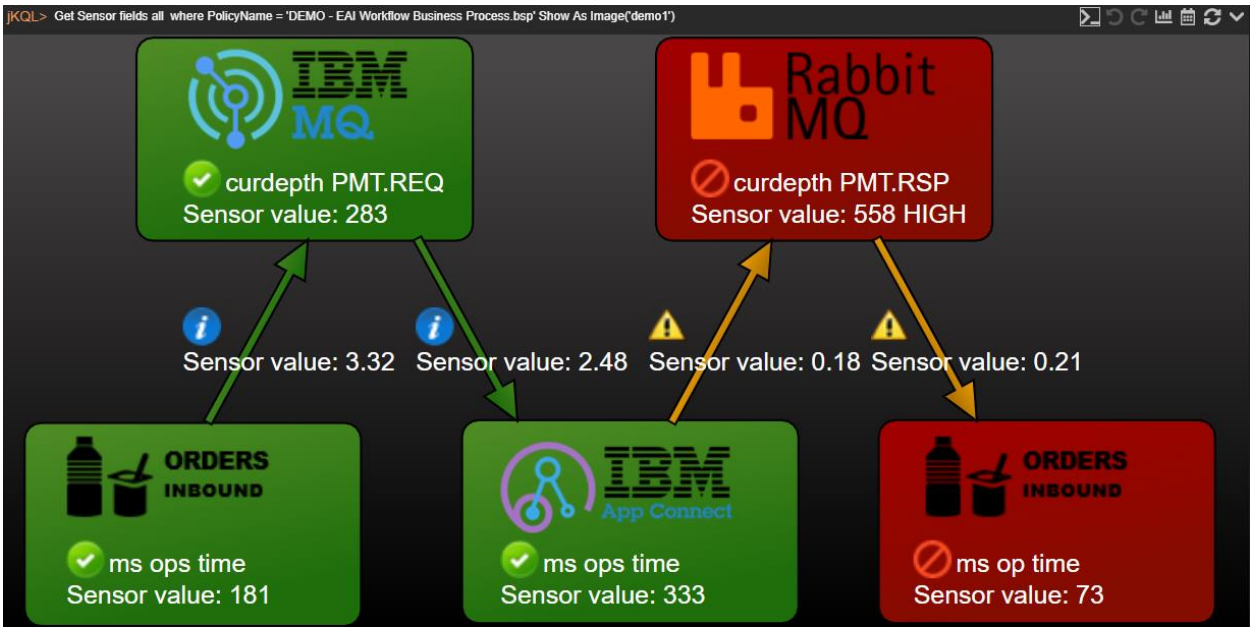

Figure 2.5.4.20-A. SVG Image Viewlet

2.5.5 Date and Time

2.5.5.1 Select Date and Time Range

Viewlet date and time range can be updated. Perform the following:

1. Click the **Date & Time Range** icon.

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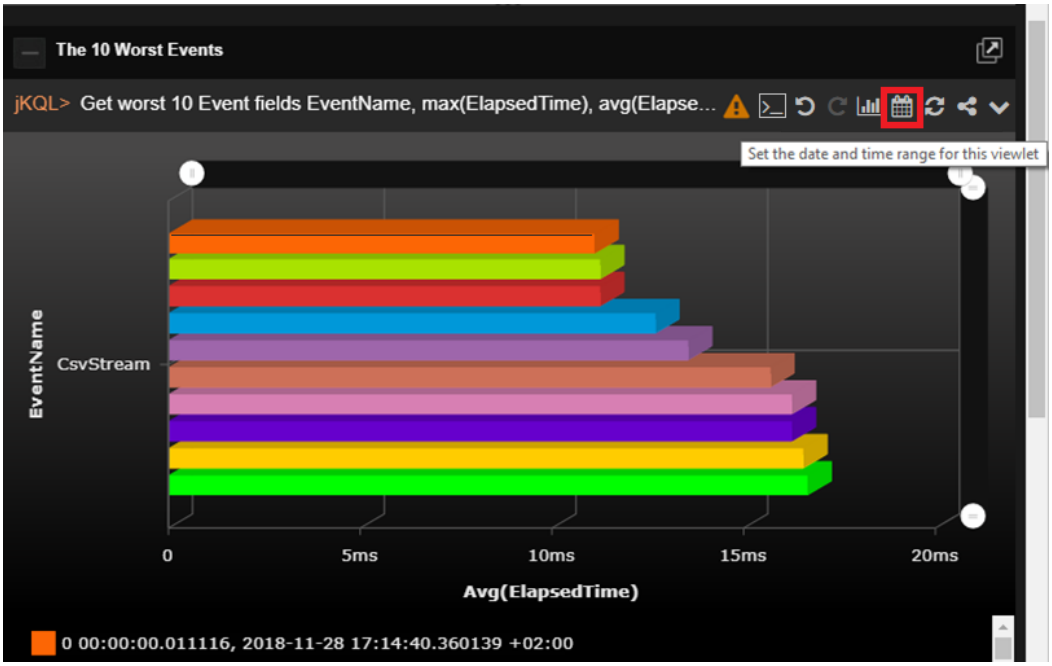

Figure 2.5.5.1-A. Date & Time Range Icon

2. The *Date & Time Range* dialog box appears.

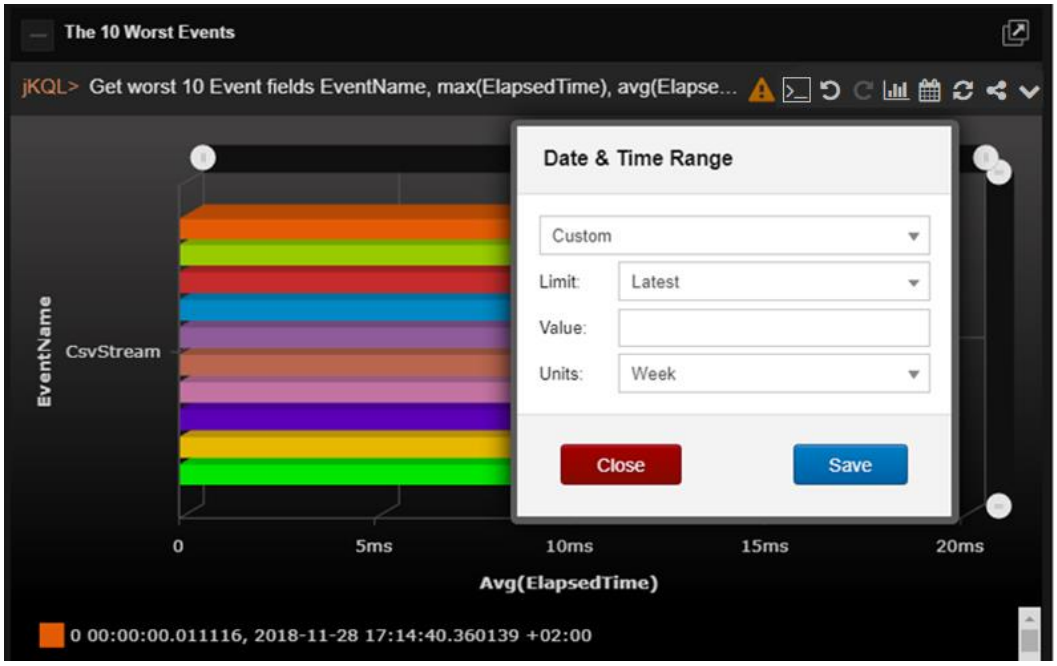

Figure 2.5.5.1-B. Date & Time Range Dialog Box

3. From the drop-down menu select the filter type: **Unspecified**, **Predefined**, **Custom** or **Date Range**. After selecting a type, specify all associated filter options and click **Save**.

2.5.5.2 Date and Time Filtering in Viewlets

Child viewlets inherit date and time conditions (i.e., *for last week, from*, *to*, etc.) from their parent viewlets, however the time expression will not appear in the child's jKQL query. See the figures immediately below for an example.

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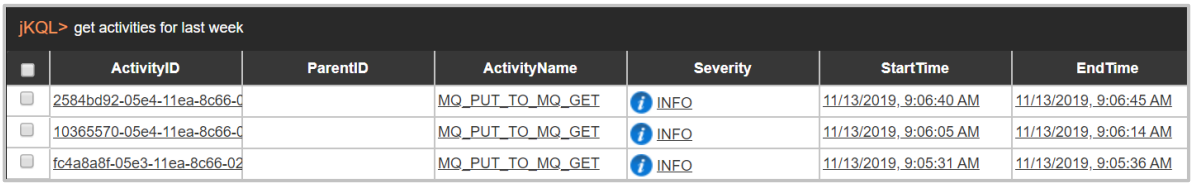

Figure 2.5.11-A. Summary Panel (parent) Viewlet: Includes Time Condition

Figure 2.5.11-B. Console Panel (child) Viewlet: Time Condition Applies (but does not appear in jKQL query line)

To view the date and time condition, simply hover over the Console viewlet's orange "jKQL>" label.

If the originating parent viewlet does not have a "for" condition, or if a Console viewlet does not have a parent viewlet, then the dashboard's default date and time will be applied to the Console viewlet and will display in the label.

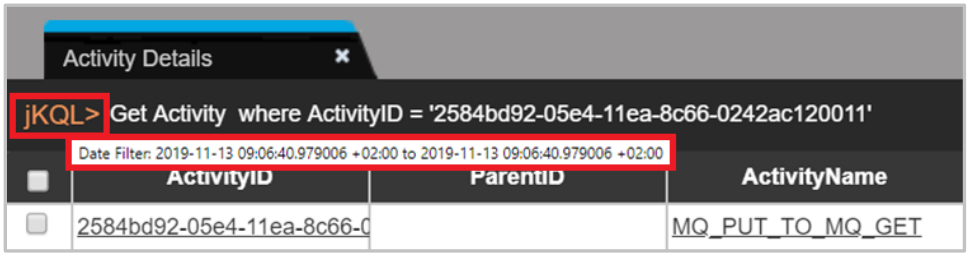

Figure 2.5.11-C. Hover to See Date Condition

NOTE	If the dashboard has a default date and time (see *Section 2.3.5, Default Date & Time Range*), it is applied for all viewlets within the dashboard. If the date and time is set for a viewlet, then it will take precedence over the dashboard's default date and time.

2.5.6 Refresh Viewlet

To refresh viewlets, click the **Refresh Viewlet** button. This process will check for new data.

Figure 2.5.6-A. Refresh Viewlet

2.5.7 Viewlet Menu

Click the menu icon to open the viewlet menu. Functions are described below.

- **Edit Viewlet**: See section 2.5.7.1 below for more information.
- **Save Viewlet**: Allows you to save any changes to the viewlet.

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- **Save as Viewlet**: Allows you to create and save a copy of the viewlet with a new name. The new viewlet can be found on the **Open Viewlet** dialog box *(Figure 2.5.1.4-A)* and added to any dashboard.
- **Remove Viewlet**: Allows you to remove the viewlet from the dashboard. A dialog box opens asking you to confirm the removal. The viewlet is not deleted and can be restored by opening the **Main Menu** and selecting **Viewlet** > **Open** (*Open Existing Viewlet* dialog box opens), select the viewlet, to be restored, and click **Open**.
- **Delete Viewlet**: Allows you to delete the viewlet. A dialog box opens asking you to confirm the deletion.
- **Export to CSV** or **Export Viewlet**: For table and scorecard viewlets, this option will be **Export to CSV** (to download data to a .csv file). For all other viewlet chart types, this option will be **Export Viewlet** (to download data to a .svg file). Please note that viewlets can also be exported in .json file format, see *Section 2.6.2.2, Export*, for more information.
- **Share Viewlet:** Viewlets can be shared on a web page or internet browser. See *Section 2.5.10, Share Viewlet*, for more information.

2.5.7.1 Editing a Viewlet

Click the **Viewlet Menu** icon and select **Edit Viewlet**.

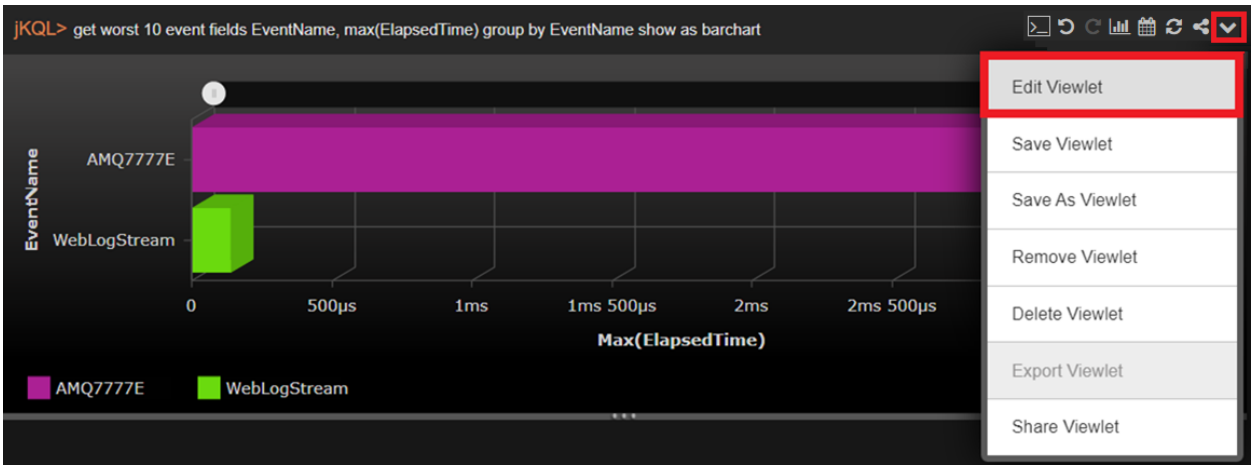

Figure 2.5.7.1-A. Edit Viewlet Menu

Options are different for each display type. All traits of a viewlet are displayed on the right side of the screen.

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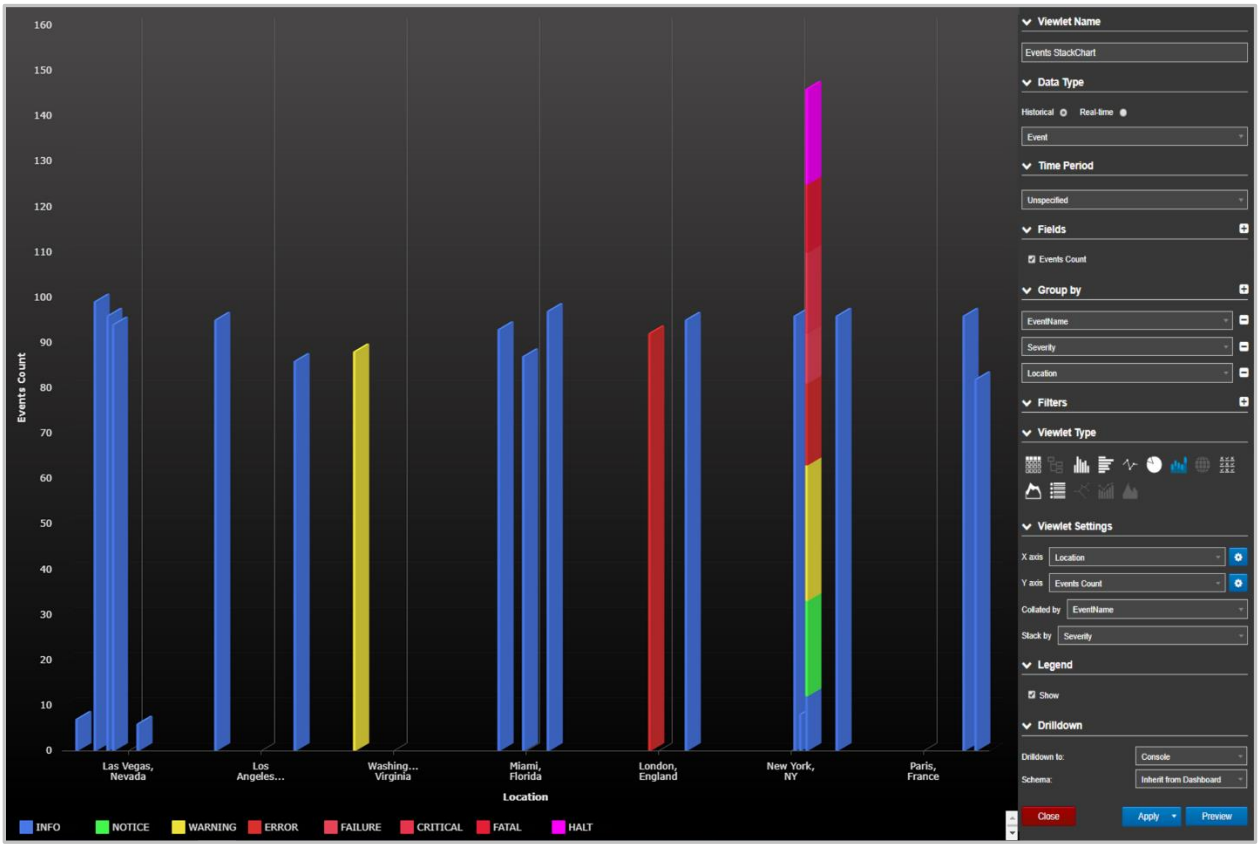

Figure 2.5.7.1-B. Edit Viewlet Form

After making changes, click **Preview** to view updates made before applying. To discard changes and cancel, click **Close**. Click **Apply** to apply the updates (updates will not be saved) or click on the downwards arrow on the right side of the **Apply** button to get the **Save** option to save the changes (this will save the modifications).

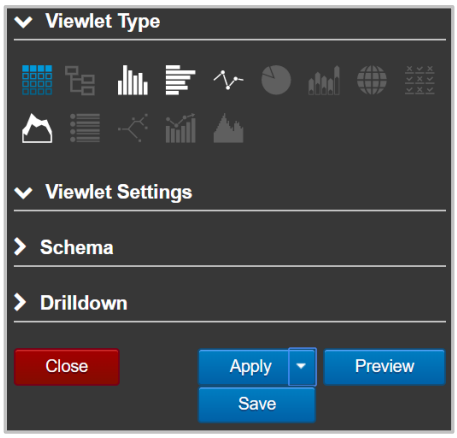

Figure 2.5.7.1-C. Form Options

2.5.8 Filtering and Display Options

Users can view more detailed data displayed within viewlets. Use the following methods to drill into viewlet data and customize how viewlets are displayed.

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2.5.8.1 Filtering with Variables

Viewlets can easily be filtered using variables. While creating or editing a viewlet with a Form (see *Section 2.5.1.2, Create a Viewlet with a Form*, or *2.5.7.1, Editing a Viewlet*), click the plus button within the **Filters** section to add a new filter.

Select a filter and the function from the drop-down menu and click the settings button to expand the filters toolbar. Select the **Variable** tab and click the pencil button. Please note, that not every filter will have this tab.

The *Create new variable* window opens. Type in a name for the variable and check off the **Auto suggestion** checkbox if it is not selected to get item suggestions to use as the filter criteria (this option is available only for items which have auto suggestion functionality). When the **Auto suggestion** is not available, the variable will need to be updated manually (no suggestions will be provided).

NOTE	Multiple variables filters can be created by repeating the same steps described above, but their names must be unique.

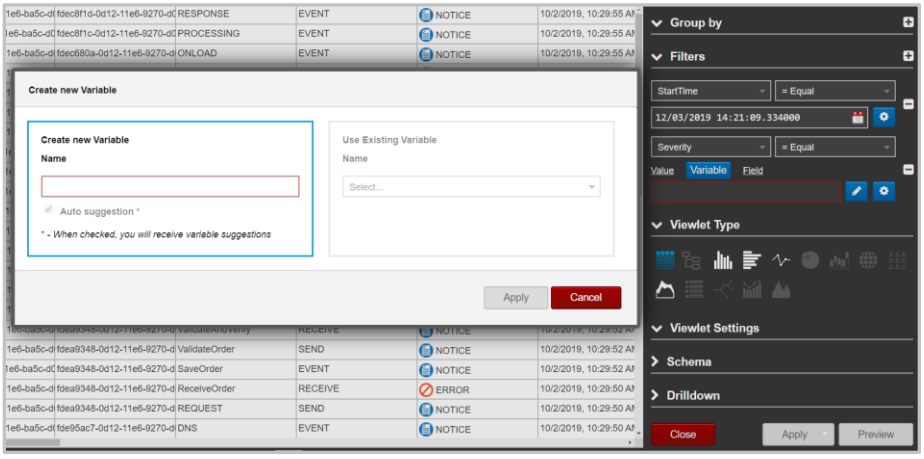

Figure 2.5.8.1-A. Modify Variables

Click the pencil button to edit the name of the variable filter. To remove a filter, click the minus button . The variable value label is placed between curly brackets { } (this is how variable expressions appear in jKQL queries). For example:

```
jKQL> Get Events where Severity = ${E:Severity:Event:Severity} show as
table
```

Expression "`${E:Severity:Event:Severity}`" can be manually replaced with a severity type, i.e. INFO:

```
jKQL> Get Events where Severity = 'INFO' show as table
```

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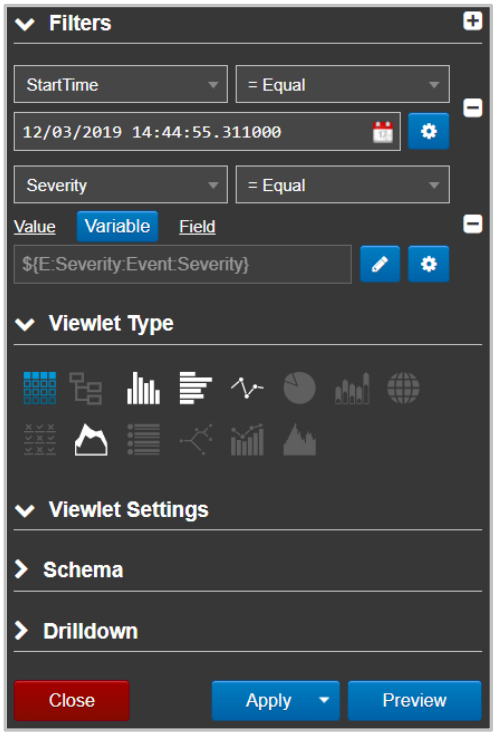

Figure 2.5.8.1-B. Modify Variables

Click **Apply** or **Save** (click the **Apply** button's drop-down menu). The **Modify Variables** window opens. If multiple variable filters were added, they all will appear in this window. If the **Auto suggestion** checkbox was checked off while creating or editing the variable, the *Modify Variables* window will have a drop-down menu with suggestions provided, for example, the viewlet data can be filtered by severity type.

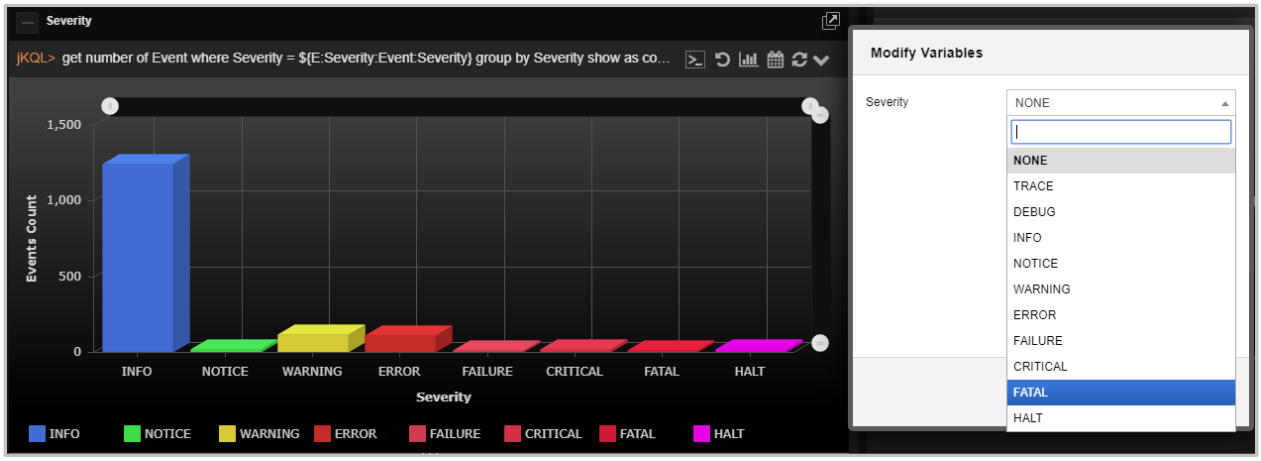

Figure 2.5.8.1-C. Modify Variables

Select the severity type from the suggested drop-down menu and click **Apply**. In the figures above and below, the **Fatal** severity type was selected. The jKQL query and the *Severity* viewlet were modified according to the selected variable.

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Figure 2.5.8.1-D. Modify Variables

To modify variables, perform one of the following:

- Modify directly in a viewlet's jKQL query by entering a value between the curly brackets { }
- Modify within a viewlet's form
- Click the **Modify** button on the top right corner of the workspace to update all viewlets that use the same variable within the dashboard

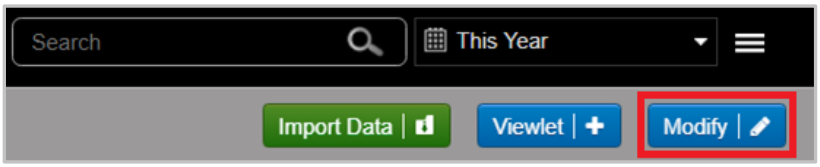

Figure 2.5.8.1-E. Modify Variables

2.5.8.2 Viewlet Scroll Bars

Use the scroll bars within viewlets to view a specific time range and change the amount of data displayed. These scroll bars appear in column, bar, line, stack, area and anomaly chart types. The top scrolls control the X axis of the chart and the right side scrolls control the Y axis.

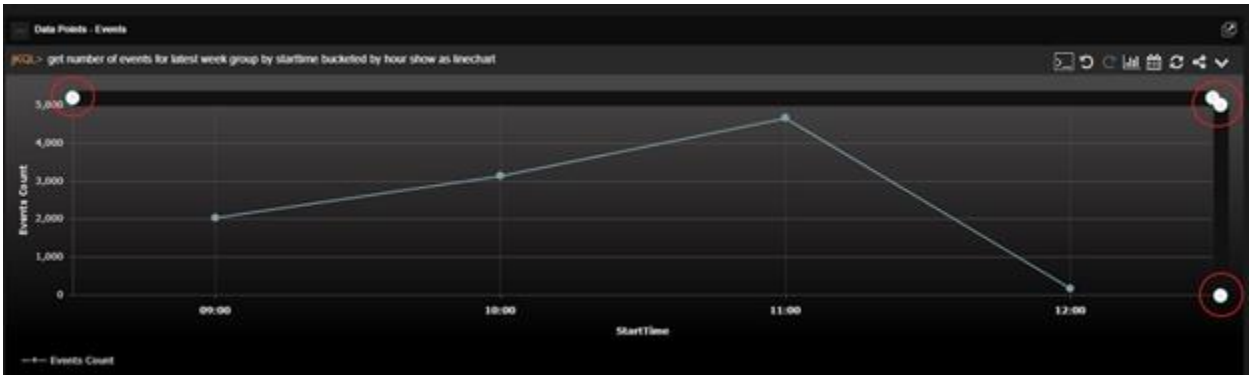

Figure 2.5.8.2-A. Viewlet Scrolling

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2.5.8.3 Zoom In / Show All

Select data for a more detailed view. Using your mouse, draw a box around the area you would like to drill into.

Figure 2.5.8.3-A. Zoom In On a Specific Area

Only the area selected will display. This feature functions within the following chart types: column, bar, line, stack, area, topology and anomaly.

Figure 2.5.8.3-B. Zoomed In Area

To disregard scroll filters and drilling down, click **Show all** to show all data originally displayed.

Figure 2.5.8.3-C. Show All

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2.5.8.4 Show / Hide Chart Elements

Within line chart viewlets, a unique line is included for each queue manager, queue combination. Click legend keys to turn a specific resource off and on. When off, the resource's line will be removed from the chart and its key in the legend will appear grey.

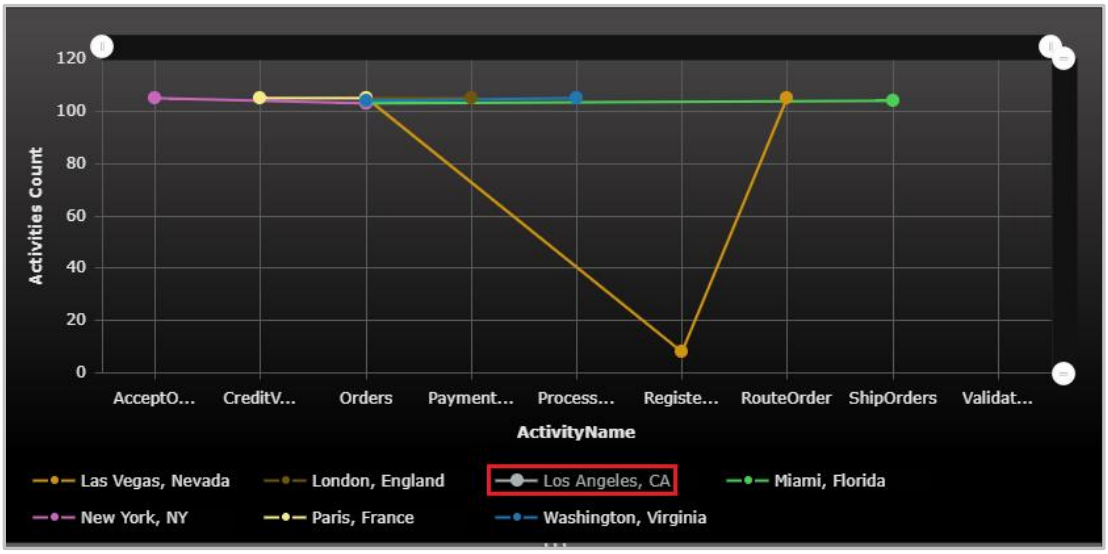

Figure 2.5.8.4-A. Disable Line Chart Lines

2.5.8.5 Viewlet Size

The size of viewlets can be changed using the ellipses symbols appearing on the sides of the viewlets.

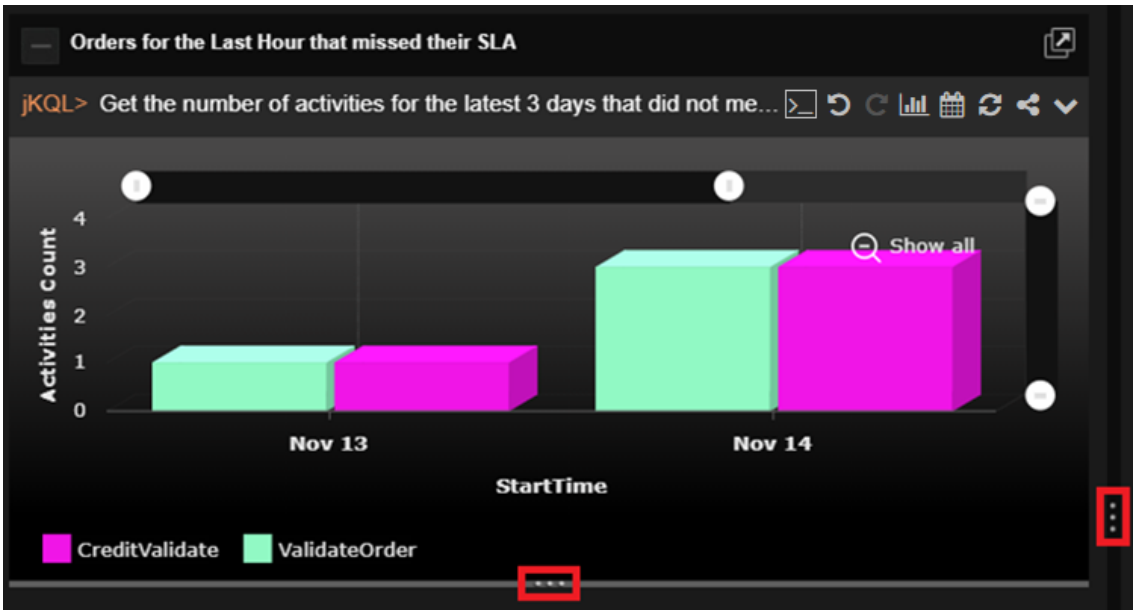

Figure 2.5.8.5-A. Change Viewlet Size

The vertical ellipses ⋮ appearing on the sides of viewlets allow users to:

- Increase/decrease viewlets by sliding the ellipses left or right. This will increase/decrease the size of all viewlets appearing within the same column.
- Expand viewlets appearing in the same column to fill the screen by clicking the ellipses. If there are viewlets appearing in the right column of the dashboard, these viewlets will be hidden until the ellipses is clicked again.

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The horizontal ellipses appearing on the top/bottom of viewlets will increase/decrease the height of viewlets.

2.5.8.6 Show / Hide Viewlets

Click on the box immediately to the left of viewlet titles to collapse or expand viewlets. A viewlet's collapsed or expanded state will remain until changed (even between logins).

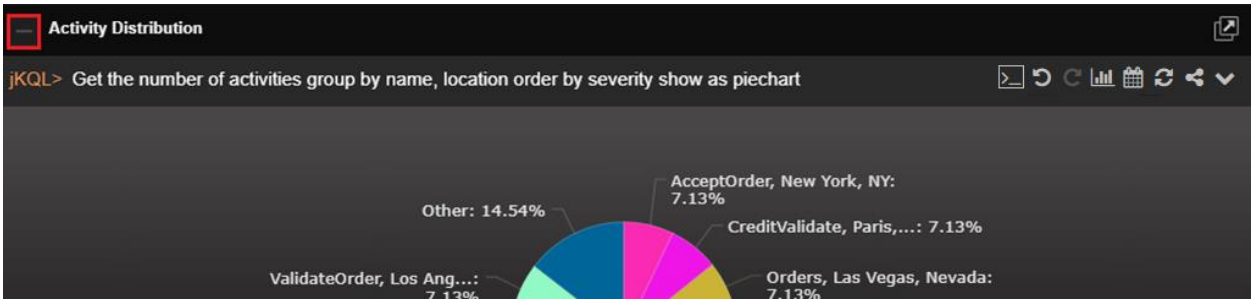

Figure 2.5.8.6-A. Show / Hide Viewlets

2.5.8.7 Tear Off

Notice that all viewlets have a **Tear Off** button located at the top right corner. Clicking the **Tear Off** button will open the viewlet in a new, larger window.

This feature is helpful in a datacenter where you may wish to display a viewler or dashboard on a large monitor. For example, a large screen of summary viewlets can display a high-level environment status view.

An alternative use case might be for an administrator or developer with multiple screens. They can have the full dashboard on one screen and a specific viewlet they are configuring on the other.

2.5.9 Rename Viewlet

To rename a viewlet, double click the viewlet's name. The field becomes editable and will appear with a blue frame. Specify a new name and hit the **Enter** key on your keyboard to save changes.

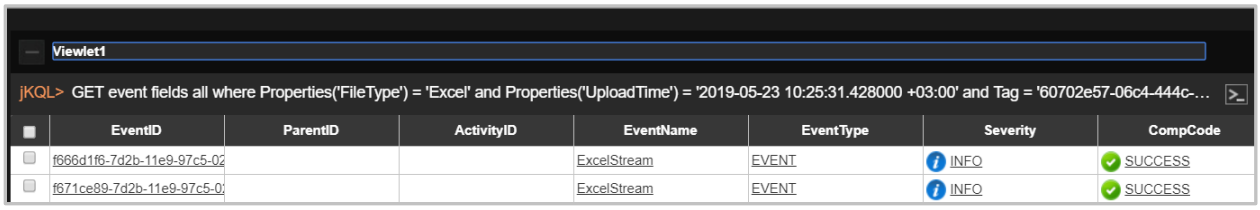

Figure 2.5.9-A. Rename Viewlet

2.5.10 Share Viewlet

Viewlets and their schemas can easily be shared as a URL or embedded on to a web page without requiring the viewer to login. The URLs are public, so there is no need for viewers to log in. This feature is useful for viewlets that need quick, frequent access; simply bookmark the URLs for easy access.

To share a viewlet, select **Share Viewlet** from the viewlet's menu (see *Section 2.5.7*). For this option to appear on the viewlet's menu, be sure to save the viewlet's dashboard. After selecting this option, the *Share Viewlet* window opens.

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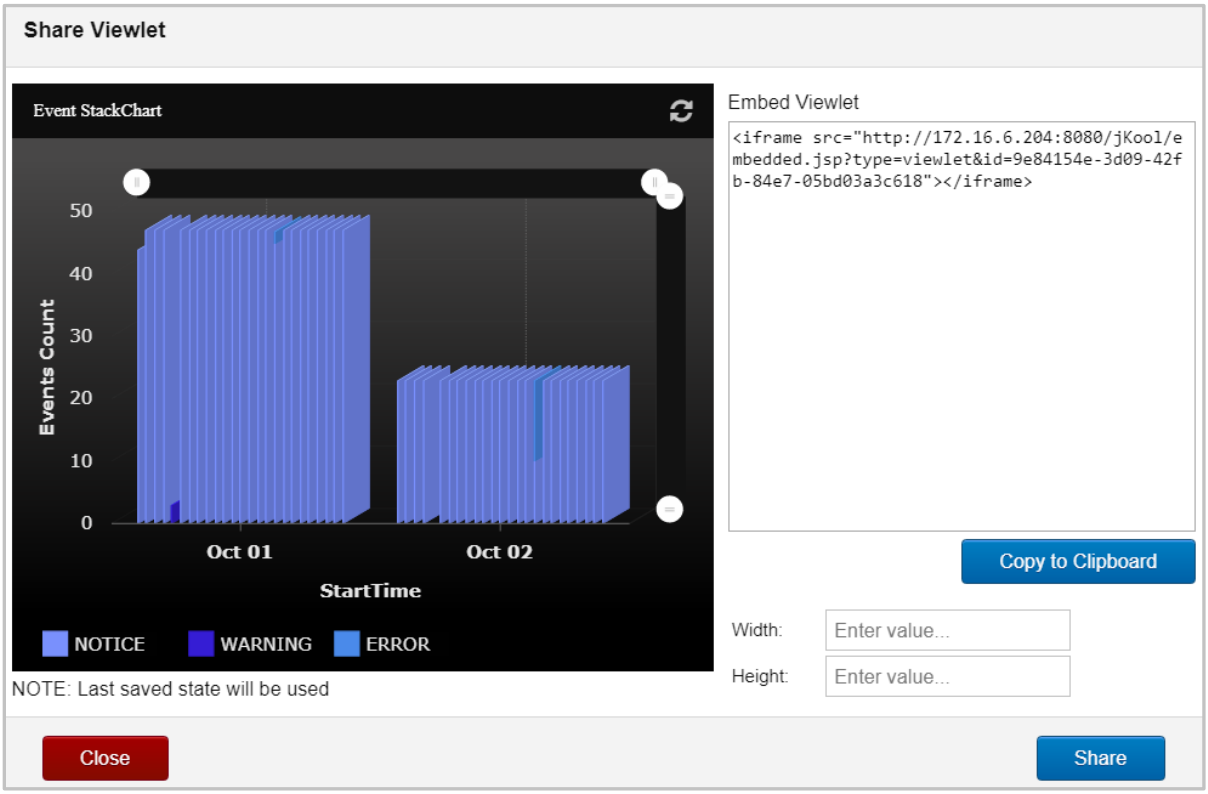

Figure 2.5.10-A. Share Viewlet Window

A preview of the viewlet displays on the left side of the menu. Click the **Refresh** icon to refresh the viewlet if needed.

The code to embed the viewlet in a webpage appears in the *Embed Viewlet* section on the right side of the window. Copy this link manually or click **Copy to Clipboard**. Before copying, you can enter dimensions within the **Width** and **Height** fields to specify the size of the viewlet. To simply open the viewlet in an internet browser, copy the link appearing within the double quotation marks and paste into the browser's address bar.

The final step to enable this feature is to click **Share**. After **Share** is clicked, the **Shared Viewlet** icon will appear on the viewlet's toolbar and the viewlet will be viewable.

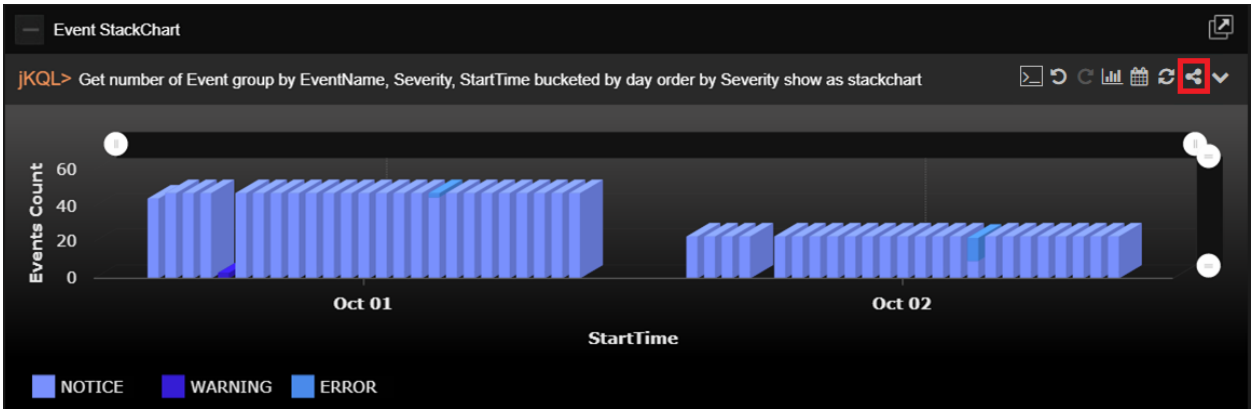

Figure 2.5.10-B. Shared Viewlet Icon

Click the **Shared Viewlet** icon to reopen the *Share Viewlet* window. You can copy the share code, update the viewlet's dimensions or stop sharing the viewlet (click **Stop Sharing**). The **Viewlet Shared** checkbox appears at the top right displaying the shared status.

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If **Stop Sharing** is clicked and a user attempts to view the viewlet, the message, **Embedded viewlet is not available**, will appear.

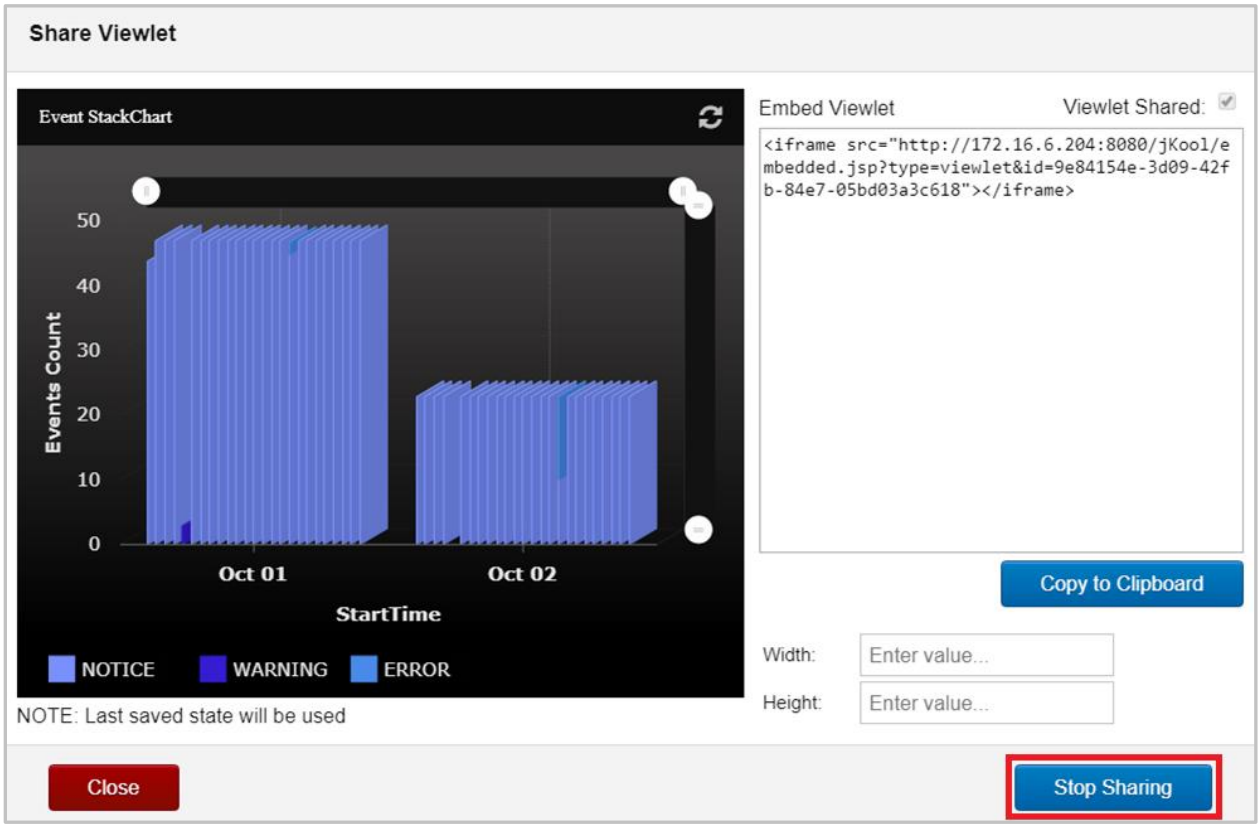

Figure 2.5.10-C. Stop Sharing a Viewlet

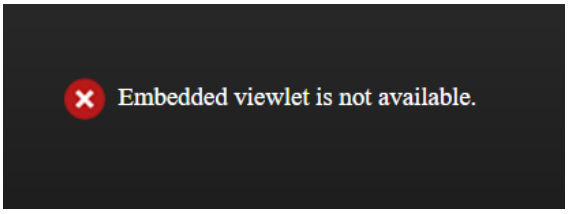

Figure 2.5.10-D. Stop Sharing a Viewlet

2.5.11 Nastel AutoPilot Integration

Nastel AutoPilot can be used as an External Data Source (EDS), allowing it to be integrated with Nastel XRay. With this integration, users can perform Nastel AutoPilot functions directly in Nastel XRay. Users can query via a jKQL statement to view information about policies that are running on a CEP instance in Nastel AutoPilot. In addition, users can also invoke actions such as starting/stopping a policy and acknowledging/unacknowledging a sensor. See below for examples of how this integration is useful.

Query: jKQL> `get policies fields all`

This will return a list of all the policies and policy managers that they belong to. It shows all policies over all policy managers. This also will return all fields defined in the external data source, not just the default ones.

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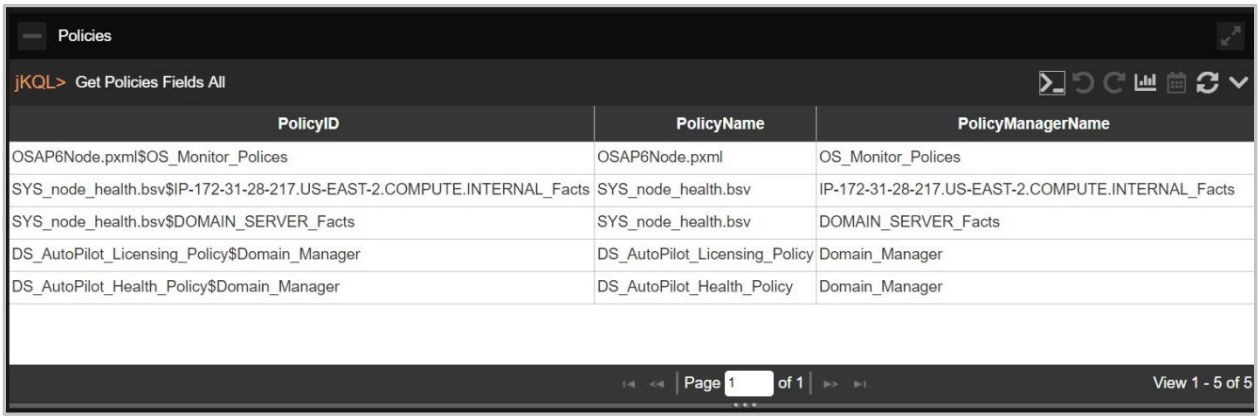

Figure 2.5.11-A. Get Policies Fields All

Query: jKQL> `get policies fields all where policy_manager_name='Domain_Manager'`

This will return a list of all the policies under the policy manager Domain_Manager. This would be the policies in AP EM under the policies folder under the Domain_Manager policy manager. Again this returns all fields, not just the default ones.

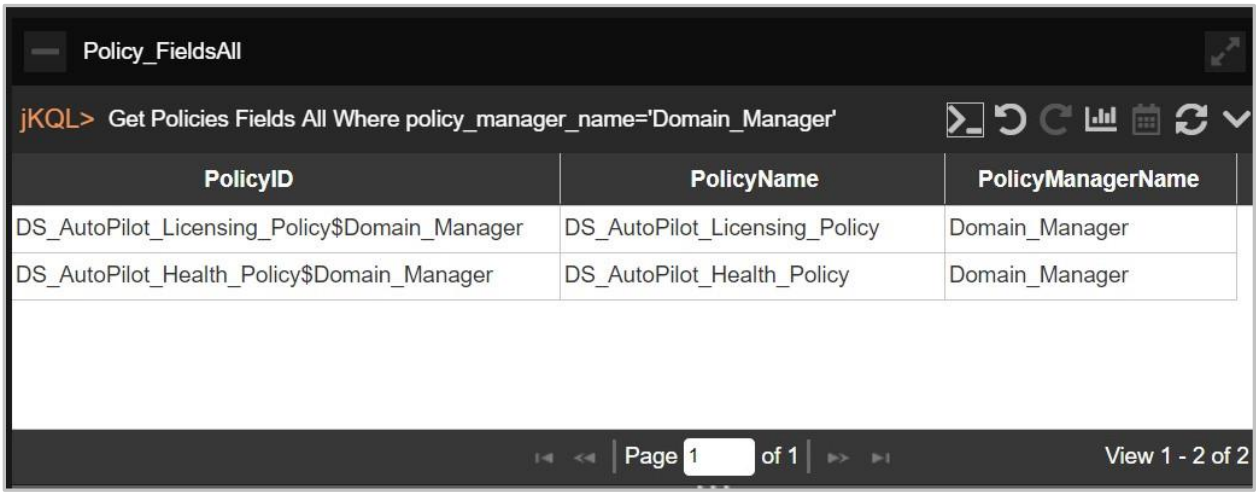

Figure 2.5.11-B. Get Policies Fields All Where…

Query: jKQL> `get policies of policymanager 'Domain_Manager' fields all`

This is equivalent to the previous query.

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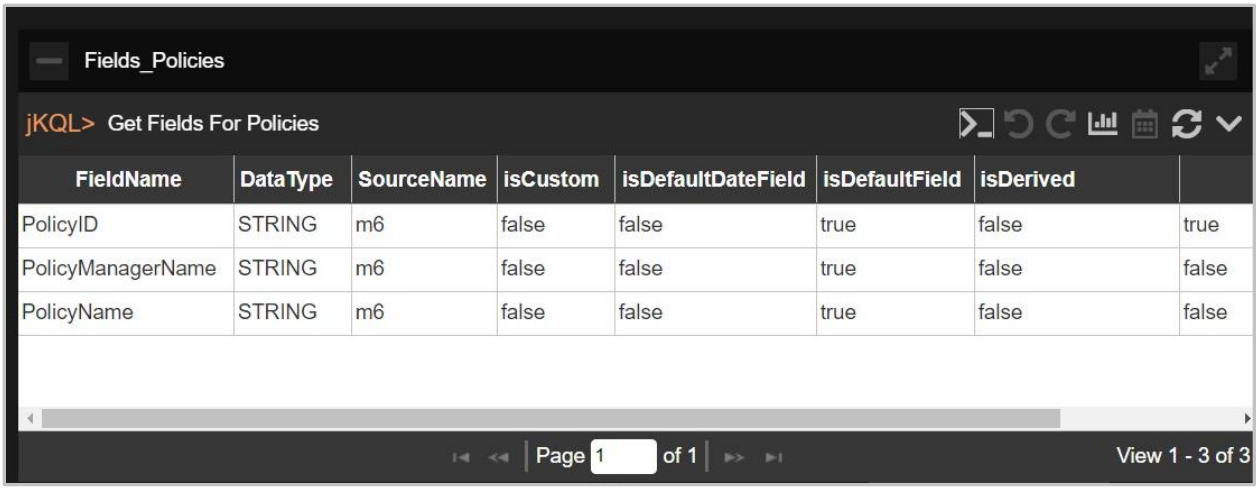
Query: jKQL> `get fields for policies`

This will give the list of fields that are associated with the "policy" item.



Fields_Policies

jKQL> Get Fields For Policies

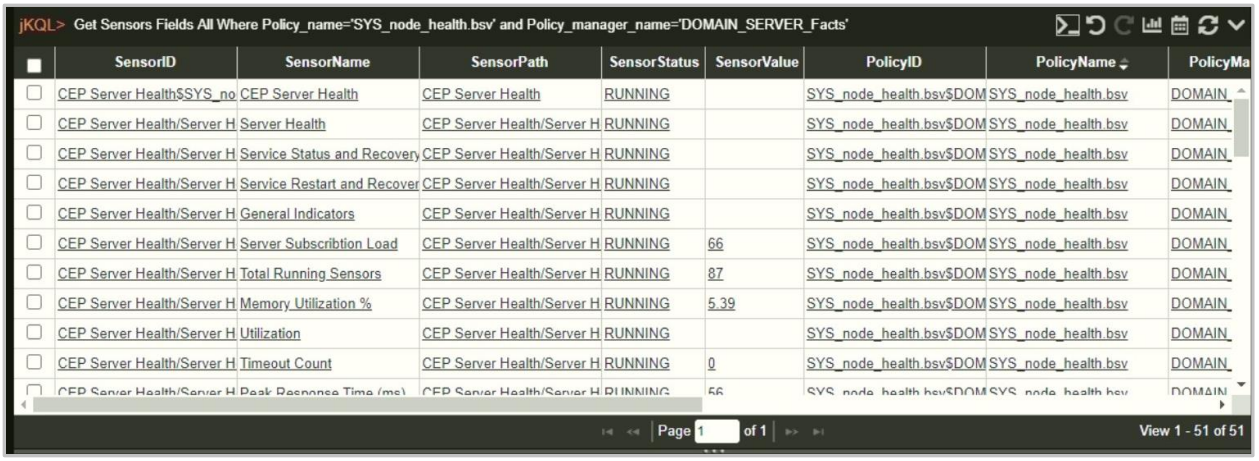
FieldName	DataType	SourceName	isCustom	isDefaultDateField	isDefaultField	isDerived	
PolicyID	STRING	m6	false	false	true	false	true
PolicyManagerName	STRING	m6	false	false	true	false	false
PolicyName	STRING	m6	false	false	true	false	false

Page 1 of 1 View 1 - 3 of 3

Figure 2.5.11-C. Get Fields for Policies

Query: jKQL> `get sensors fields all where policy_name='SYS_node_health.bsv' and policy_manager_name=' DOMAIN_SERVER_Facts'`

This will give a list of all sensors for policy SYS_node_health.bsv under the DOMAIN_SERVER_Facts policy manager. Omitting the policy manager name will give a list of the sensors under all policies with the name "SYS_node_health.bsv" regardless of the policy manager.



jKQL> Get Sensors Fields All Where Policy_name='SYS_node_health.bsv' and Policy_manager_name='DOMAIN_SERVER_Facts'

SensorID	SensorName	SensorPath	SensorStatus	SensorValue	PolicyID	PolicyName	PolicyMa
CEP Server Health$SYS_no	CEP Server Health	CEP Server Health	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Server Health	CEP Server Health/Server H	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Service Status and Recovery	CEP Server Health/Server H	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Service Restart and Recover	CEP Server Health/Server H	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	General Indicators	CEP Server Health/Server H	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Server Subscribtion Load	CEP Server Health/Server H	RUNNING	66	SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Total Running Sensors	CEP Server Health/Server H	RUNNING	87	SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Memory Utilization %	CEP Server Health/Server H	RUNNING	5.39	SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Utilization	CEP Server Health/Server H	RUNNING		SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Timeout Count	CEP Server Health/Server H	RUNNING	0	SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_
CEP Server Health/Server H	Peak Response Time (ms)	CEP Server Health/Server H	RUNNING	56	SYS_node_health.bsv$DOM	SYS_node_health.bsv	DOMAIN_

Page 1 of 1 View 1 - 51 of 51

Figure 2.5.11-D. Get Sensors Fields All Where…

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Query: **jKQL>** `get sensors fields all where policy_manager_name='LOCALHOST.LOCALDOMAIN_Facts'`

This will give all sensors for all policies under a given policy manager. Note that each sensor has a unique path (i.e. PolicyManager\Policy\Sensor1\Sensor2\Sensor3) and so this would be the unique identifier for a sensor.

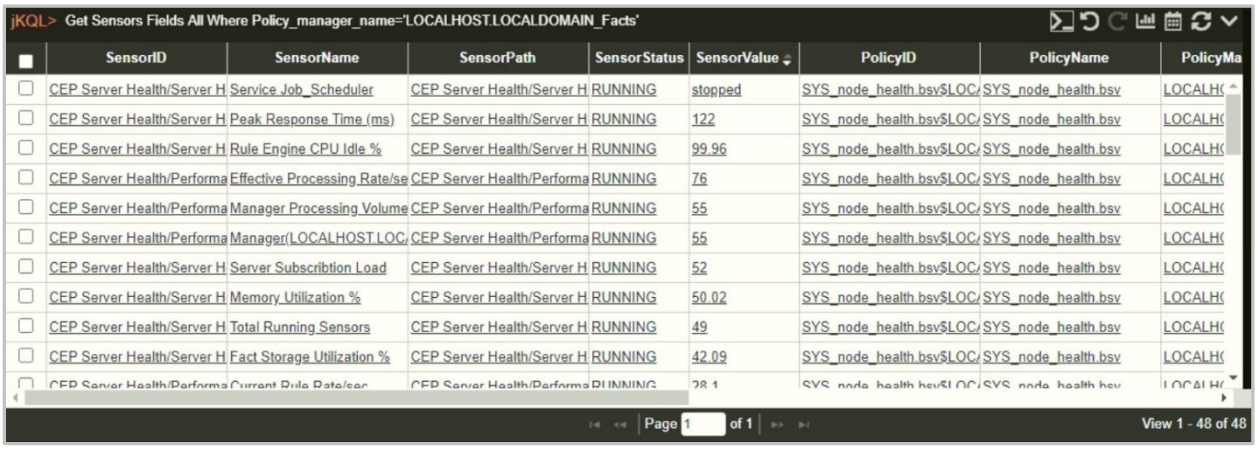

Figure 2.5.11-E. get sensors fields all where policy_manager_name='LOCALHOST.LOCALDOMAIN_Facts'

Another way to get sensors would be to issue a statement like:

Query: **jKQL>** `Get sensors of policy 'SYS_node_health.bsv'`

This is equivalent to a statement like "get sensors where policy_name='SYS_node_health.bsv' but provides a sort of "short hand". These are consistent with the jKQL query language.

Query: **jKQL>** `invoke AcknowledgeSensor using (PolicyManagerName='MyPolicies',PolicyName='Tester1', SensorPath='Untitled/Sense1')`

This will acknowledge a sensor called Sense1 in the Tester1 policy. Similarly using the verb UnacknowledgeSensor will cause the Sesne1 sensor to clear the ack flag.

Query: **jKQL>** `invoke StopPolicy using (PolicyManagerName='MyPolicies',PolicyName='Tester1')`

This will stop the policy named Tester1. Similarly using the verb StartPolicy will start the Tester1 policy under the MyPolicies policy manager.

You can also get sensor facts by issuing statements like:

Query: **jKQL>** `get sensor_fact where sensorid='CEP Server Health/Server Health/Utilization/Timeout Count$SYS_node_health.bsv$PC_152_Facts'`

This will return the facts of the Timeout Count sensor that is part of the SYS_node_health.bsv policy. It will also return a predetermined set of properties that are associated with this fact (things like 'last-changed','max','min').

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2.6 Import / Export

Go to **Main Menu** > **Import / Export** for the following import and export options:

- **Data** (*Section 2.6.1*)
- **Viewlets** (*Section 2.6.2*)
- **Dashboard** (*Section 2.6.3*)
- **Sets** (*Section 2.6.4*)

2.6.1 Data

To view all data previously imported, go to **Main Menu** > **Import / Export** > **Data**. The *Manage Imported Data* dialog box opens which lists all data files that have been imported into the system. Perform the following to select a file and generate a dashboard to view the imported data. Please note that only data imported into the selected repository will be displayed in this import list.

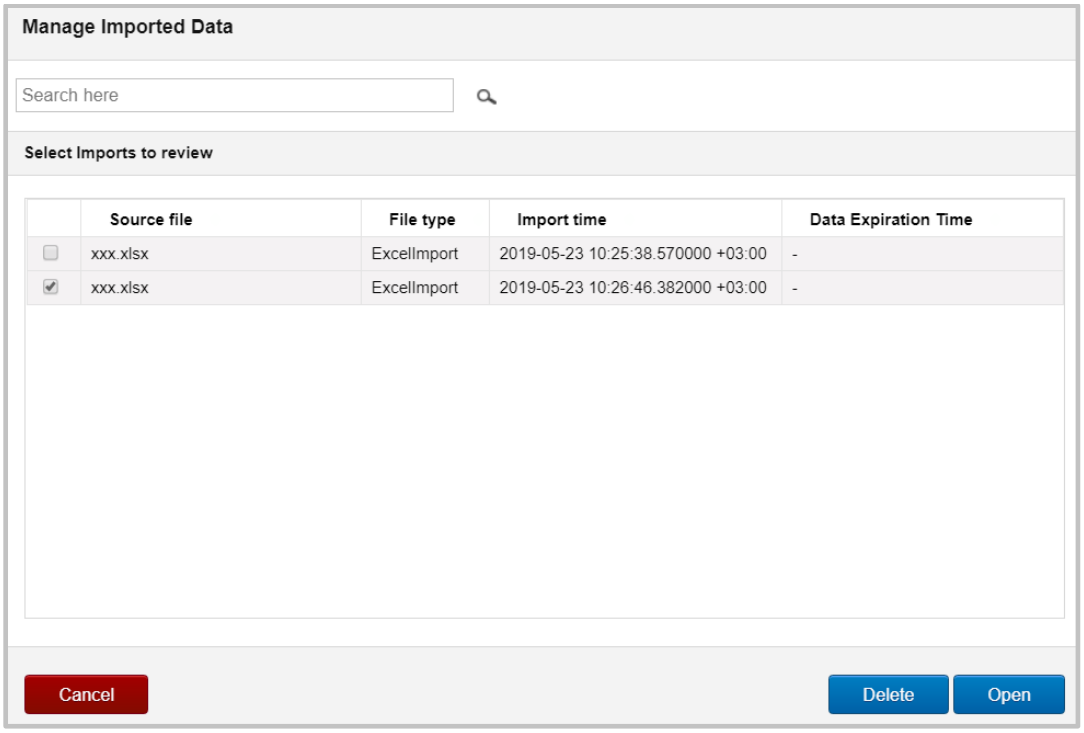

Figure 2.6.1-A. Manage Imported Data

2.6.1.1 Open

1. Select a file from the list of imported files and click **Open** to start the Wizard. The Wizard will alter the data, import it into a dashboard and create new viewlets.

2. New viewlets are automatically created. By default, all viewlets are selected. Deselect the viewlets you do not want to add to your dashboard. Click **Next**.

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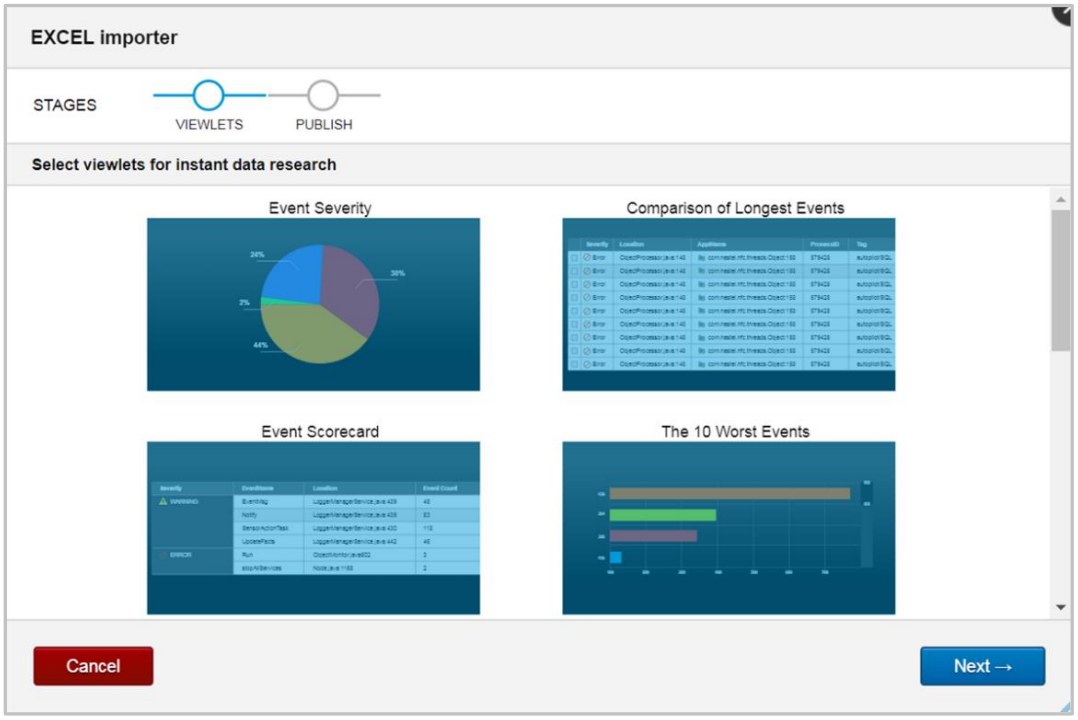

Figure 2.6.1.1-A. Default Viewlets Created

3. Select an existing dashboard or create a new one by giving your dashboard a name and selecting the number of columns in the layout. Click **Finish** to publish your viewlets in the new or existing dashboard.

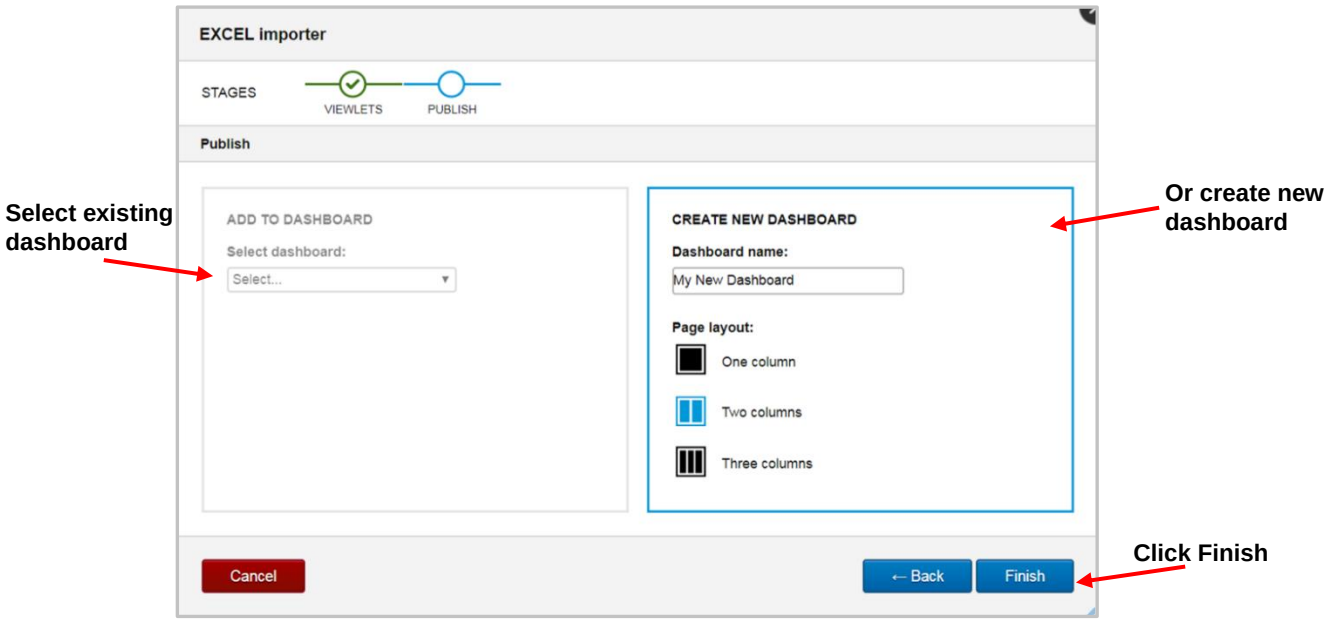

Figure 2.6.1.1-B. Publish Viewlets to a Dashboard

2.6.1.2 Delete Imported Data

To delete imported data, simply select all desired files and click the **Delete** button. The files and their data will be deleted.

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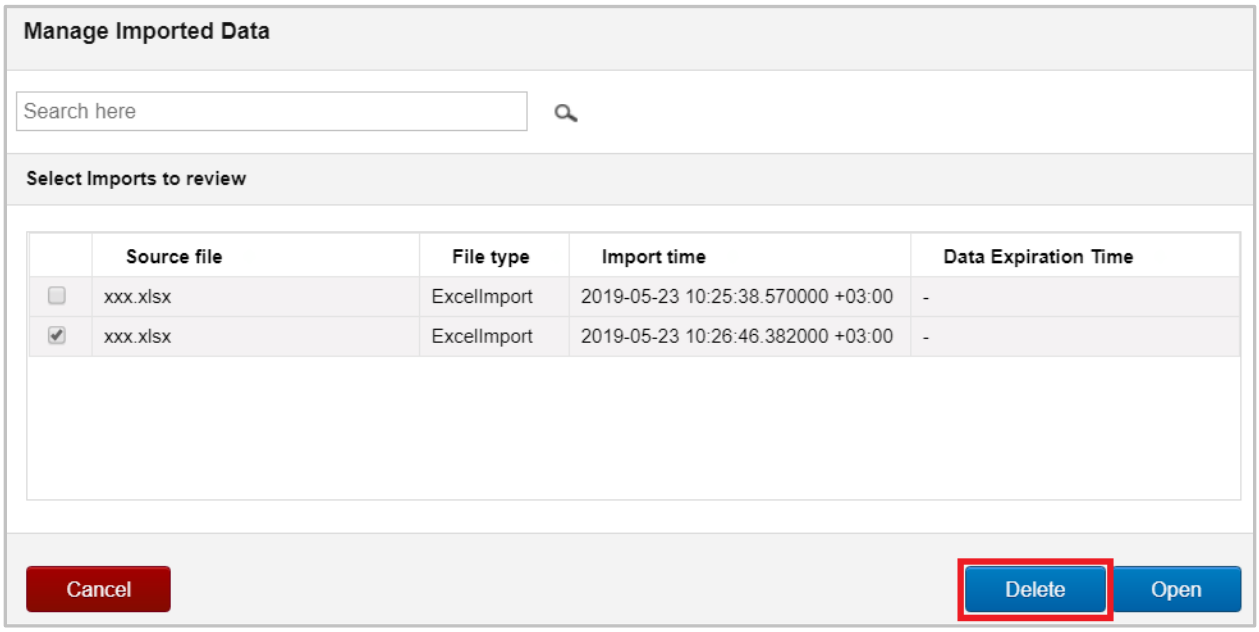

Figure 2.6.1.2-A. Delete Imported Data

2.6.2 Viewlets

To import or export viewlets, go to **Main Menu** > **Import / Export** > **Viewlets**. The *Import/Export Viewlets* dialog box opens. The file format used is .json or .csv.

NOTE	Viewlets can also be exported in .svg or .csv format. See *Section 2.5.7, Viewlet Menu*, for more information.

2.6.2.1 Import

Perform the following to import a viewlet:

1. On the *Import / Export Viewlets* dialog box, go to the **Import** tab.

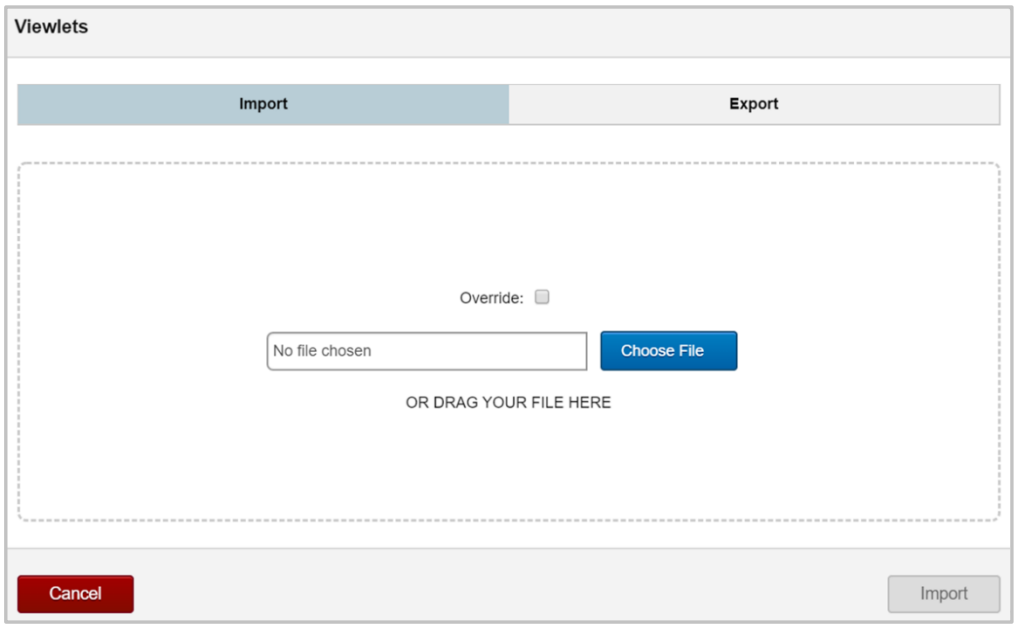

Figure 2.6.2.1-A. Import / Export Viewlets – Import Tab

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2. Check off the **Override** check-box to replace an existing viewlet. A viewlet with the same ID will be overwritten. Please note, IDs are generated automatically. The **Override** option is useful when exporting viewlets and importing them back into the same repository (for example, to restore previous viewlets).
3. Click **Choose File** to select the .json or .csv file.
4. Click **Import**. The viewlet is added to the *Open Viewlet* dialog box *(Figure 2.5.1.4-A)* and can be added to any dashboard.

2.6.2.2 Export

Perform the following to export a viewlet:

1. On the *Import / Export Viewlets* dialog box, go to the **Export** tab.

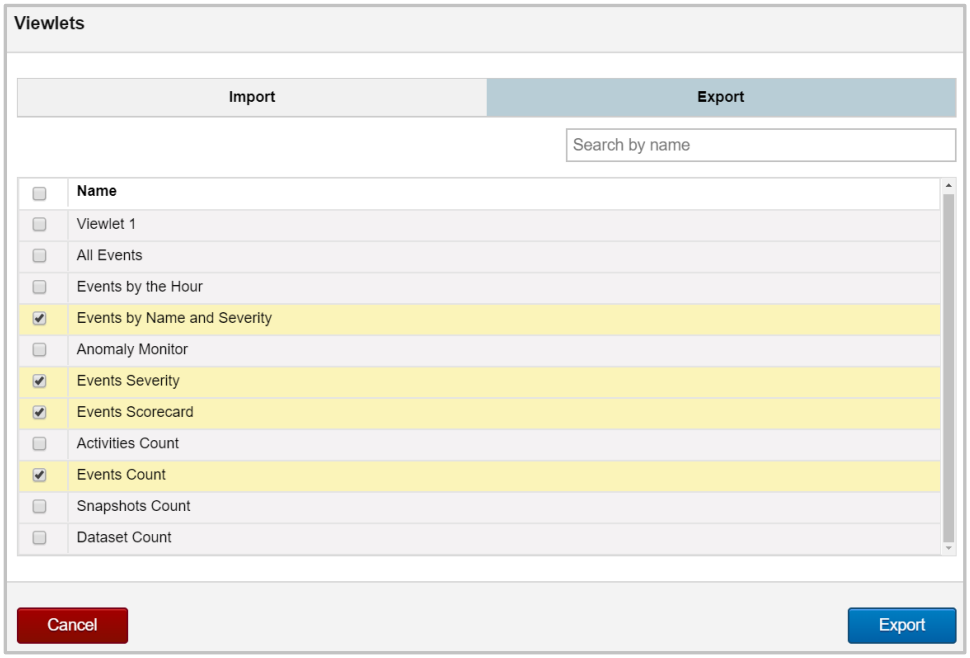

Figure 2.6.2.2-A. Import / Export Viewlets – Export Tab

2. Select the viewlets you would like to export or check the **Select All** option.
3. Click **Export**. The viewlets are downloaded in .json file format.

2.6.3 Dashboard

To import and export dashboards, go to **Main Menu** > **Import / Export** > **Dashboards**. The *Import / Export Dashboards* dialog box opens. The file format used is .json.

2.6.3.1 Import

Users can import a dashboard with a .json file. To import the file, confirm you are on the **Import** tab (the tab will be blue). Click **Choose File** to specify the import file.

Check off the **Override** check-box to replace an existing dashboard. A dashboard with the same ID will be overwritten. Please note, IDs are generated automatically. The **Override** option is useful when exporting dashboards and importing them back into the same repository (for example, to restore previous dashboards).

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Click **Import** to start the import process. Once the import is finished, a confirmation message will appear.

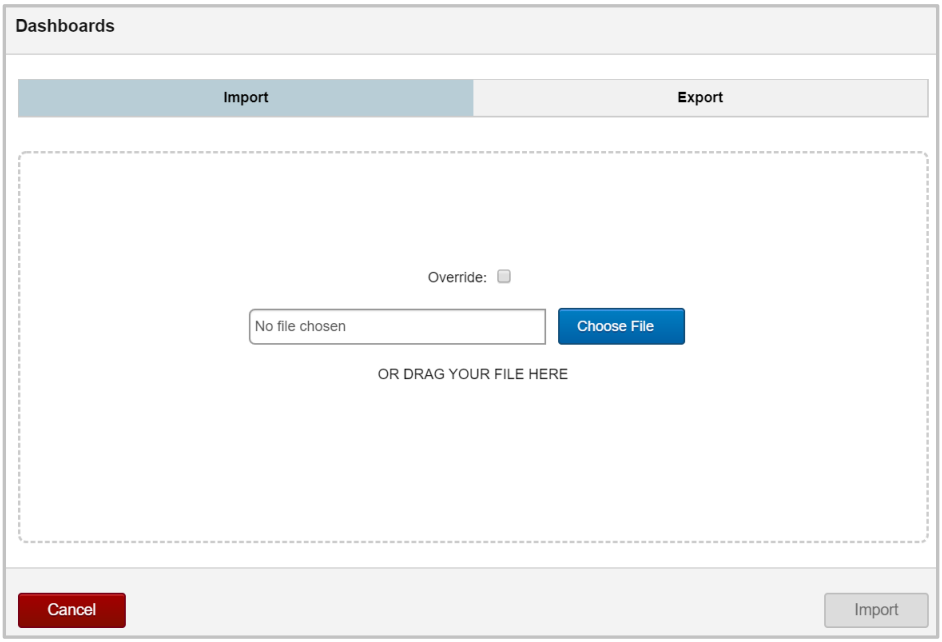

Figure 2.6.3.1-A. Import Dashboards

2.6.3.2 Export

The dashboards can be exported to a .json file. To export a dashboard, go to the **Export** tab of the *Import / Export Dashboards* dialog box. A list of your saved dashboards will display. Select all desired dashboards or check off **Select All**. Click **Export** and the file, **ExportDashBoards.json**, will download.

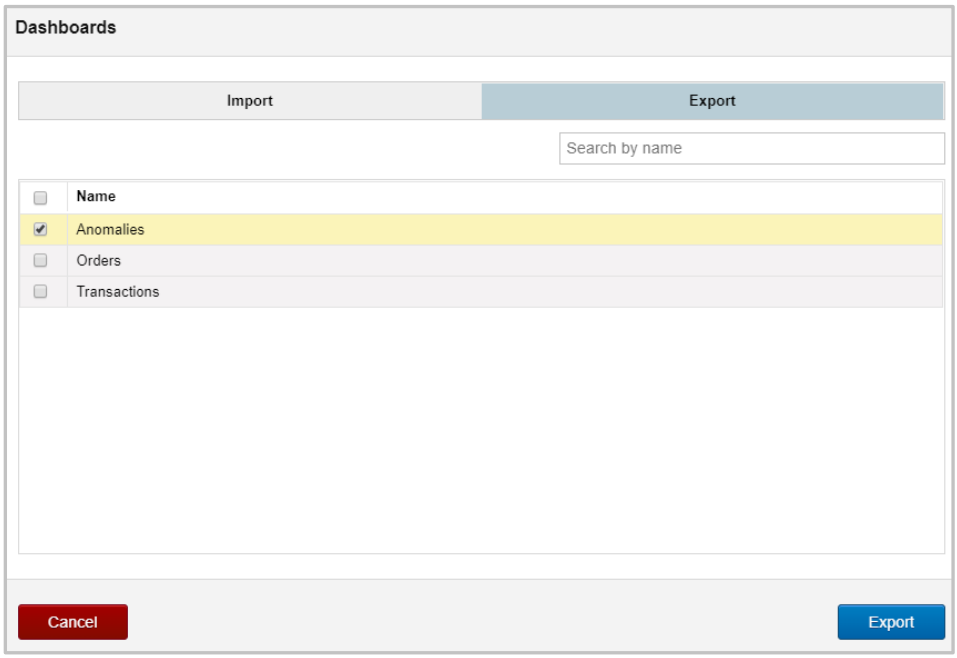

Figure 2.6.3.2-A. Export Dashboards

2.6.4 Sets

To import and/or export sets, go to **Main Menu** > **Import / Export** > **Sets**. The *Sets* dialog box opens. The file format used is .csv. For more information on sets, please see *Section 3.1.2, Sets*.

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2.6.4.1 Import

To import sets, go to the **Import** tab of the *Sets* dialog box. Click **Choose File** to specify the import file or drag and drop your file.

Check off the **Override** check-box to replace an existing set. A set with the same ID will be overwritten. Please note, IDs are generated automatically. The **Override** option is useful when exporting sets and importing them back into the same repository (for example, to restore previous sets).

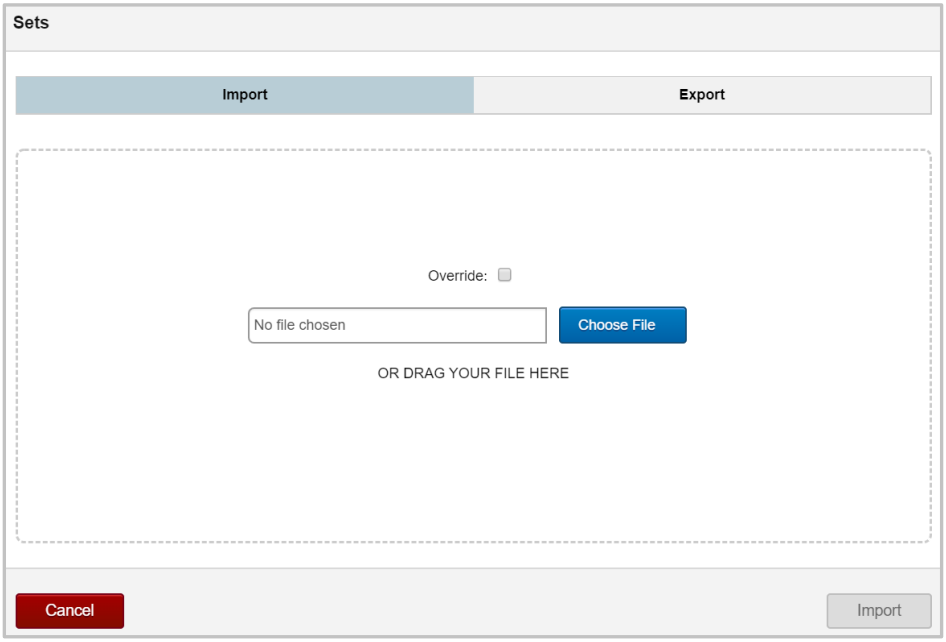

Figure 2.6.4.1-A. Import Sets

To change the file, click the **Change** button or drag a new file. Click **Import** to start the import process. Once the import is finished, a confirmation message will appear.

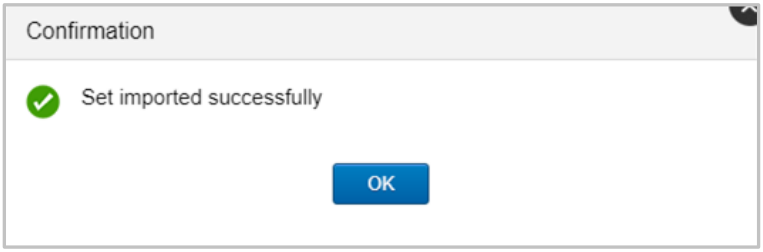

Figure 2.6.4.1-B. Import Sets – Confirmation

2.6.4.2 Export

Go to the **Export** tab of the *Sets* dialog box to export a set. A list of existing sets (imported or created) will appear. Select all desired sets or check the **Select All** check box immediately to the left of the **Name** header. Click **Export** to download the files.

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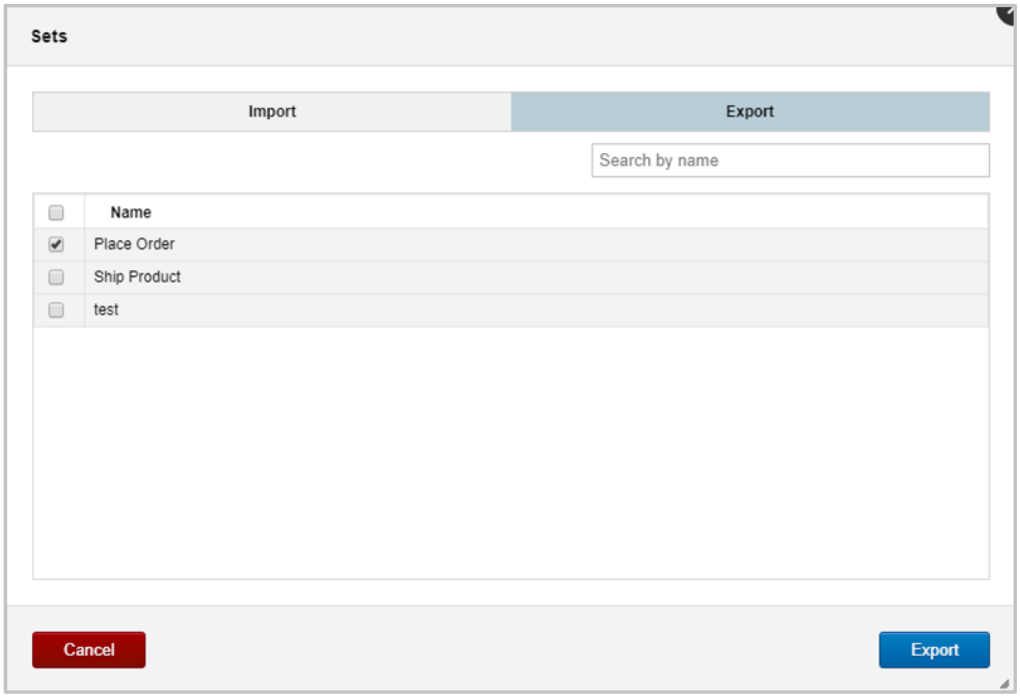

Figure 2.6.4.2-A. Export Sets

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Chapter 3: Settings

3.1 Admin Settings

When **Admin Settings** is selected on the **Main Menu**, the *Admin Settings* window opens. See sections 3.1.1 – 3.1.7 below for an explanation of the administrative options available.

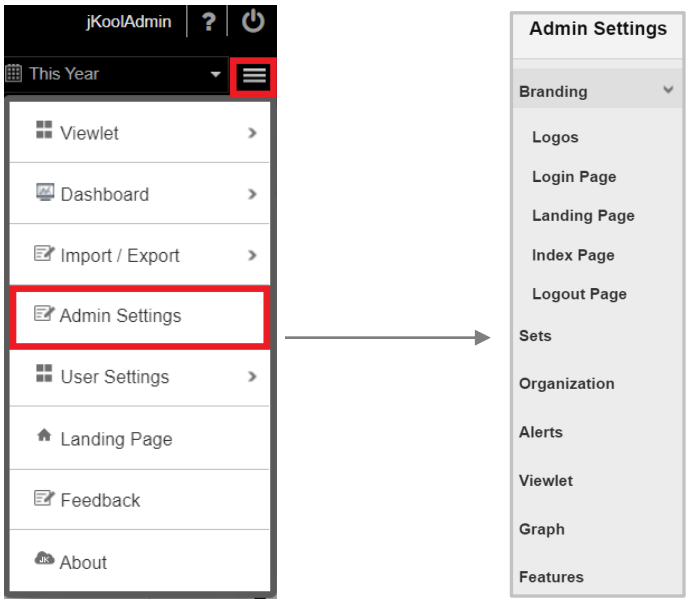

Figure 3.1-A. Admin Settings Menu

NOTE	Only administrative users with repository permissions will have this option.

3.1.1 Branding

Select **Branding** from the side menu of *Admin Settings* (*Figure 3.1.1-A*) to display its sub-menu. This menu allows users to configure the branding of their main page. A description of each menu option is described below in sections 3.1.1.1 – 3.1.1.5.

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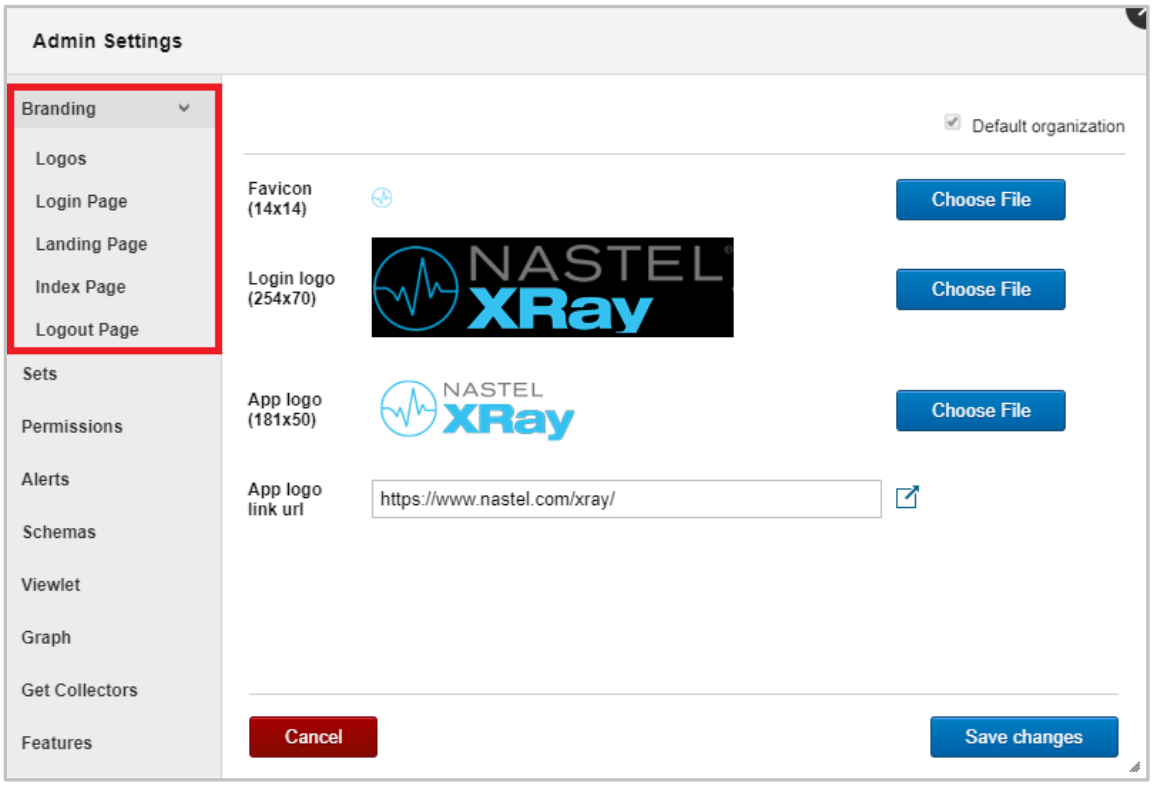

Figure 3.1.1-A. Branding Sub-Menu

If a user belongs to or is an owner of multiple organizations, the **Organization** drop-down is displayed on the top right corner of the window as in *Figure 3.1.1-A* above. Use this menu to switch between organizations and make updates for each organization.

On each Branding page, there is the option at the top right of the screen, **Default organization**. Use this option if you would like to use your organization's default branding instead of customized organization configurations. In the example below, Nastel is the organization.

Figure 3.1.1-B. Branding – Organization

3.1.1.1 Logos

Select **Logos** from the **Branding** sub-menu to change the logos appearing on the main application window.

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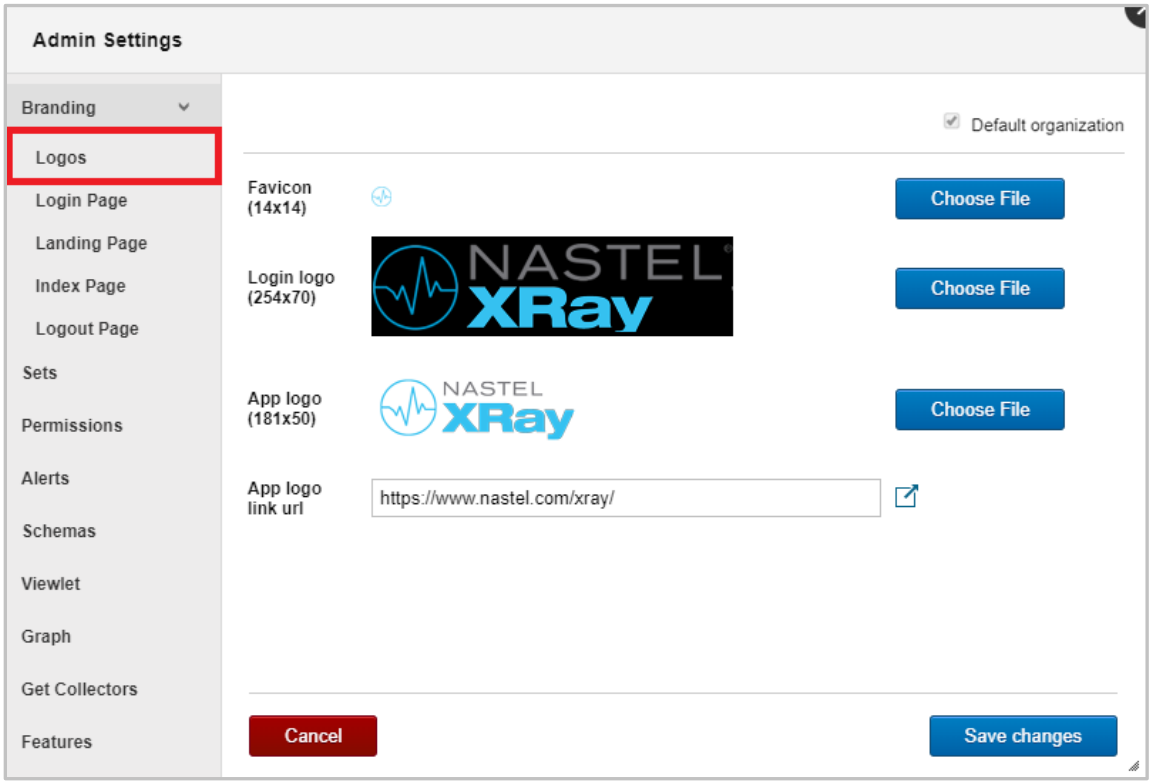

Figure 3.1.1.1-A. Branding – Logos

3.1.1.2 Login Page

Select **Login Page** from the **Branding** sub-menu to configure the login page settings.

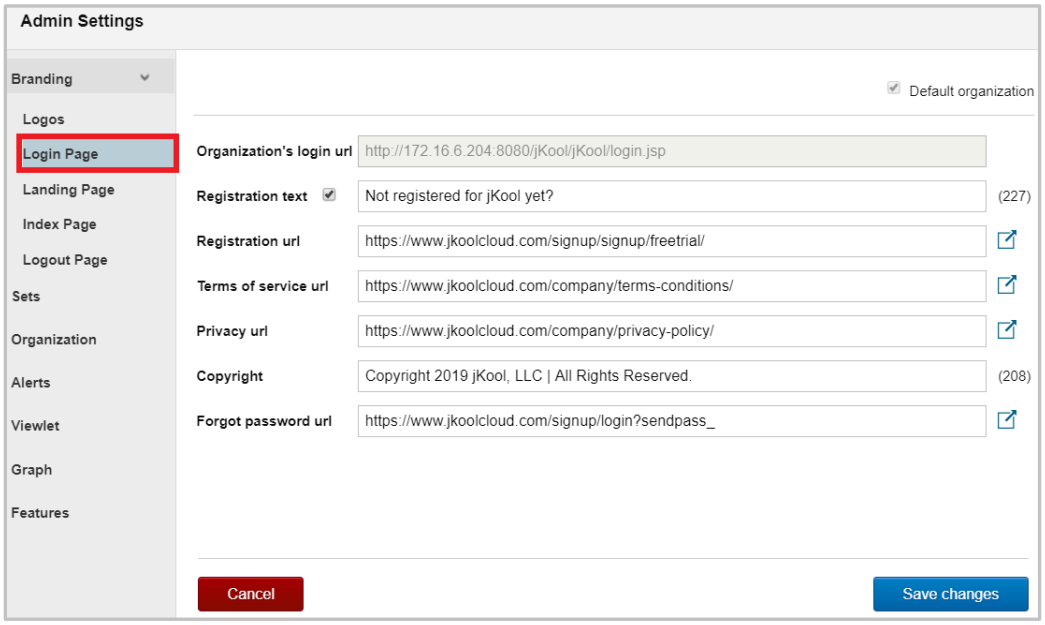

Figure 3.1.1.2-A. Branding – Login Page

3.1.1.3 Landing Page

Select **Landing Page** from the **Branding** sub-menu to specify the text of the landing pages (*Figure 3.1.1.3-A*). The character limit is displayed immediately to the right of each field.

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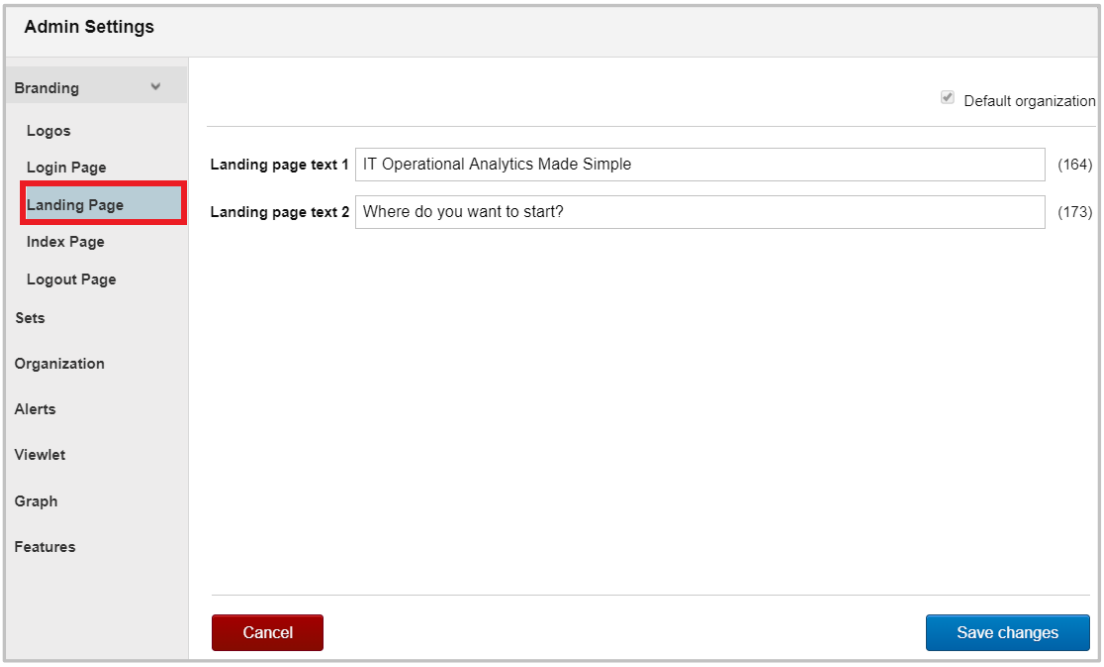

Figure 3.1.1.3-A. Branding – Landing Page

3.1.1.4 Index Page

Select **Index Page** from the **Branding** sub-menu to specify the contact email and hyperlinks for feedback, collectors and check/upgrade license pages. The **Query prompt text** field allows administrators to customize the "jKQL>" field label in viewlets (this is the orange field label that appears immediately to the left of a viewlet's query).

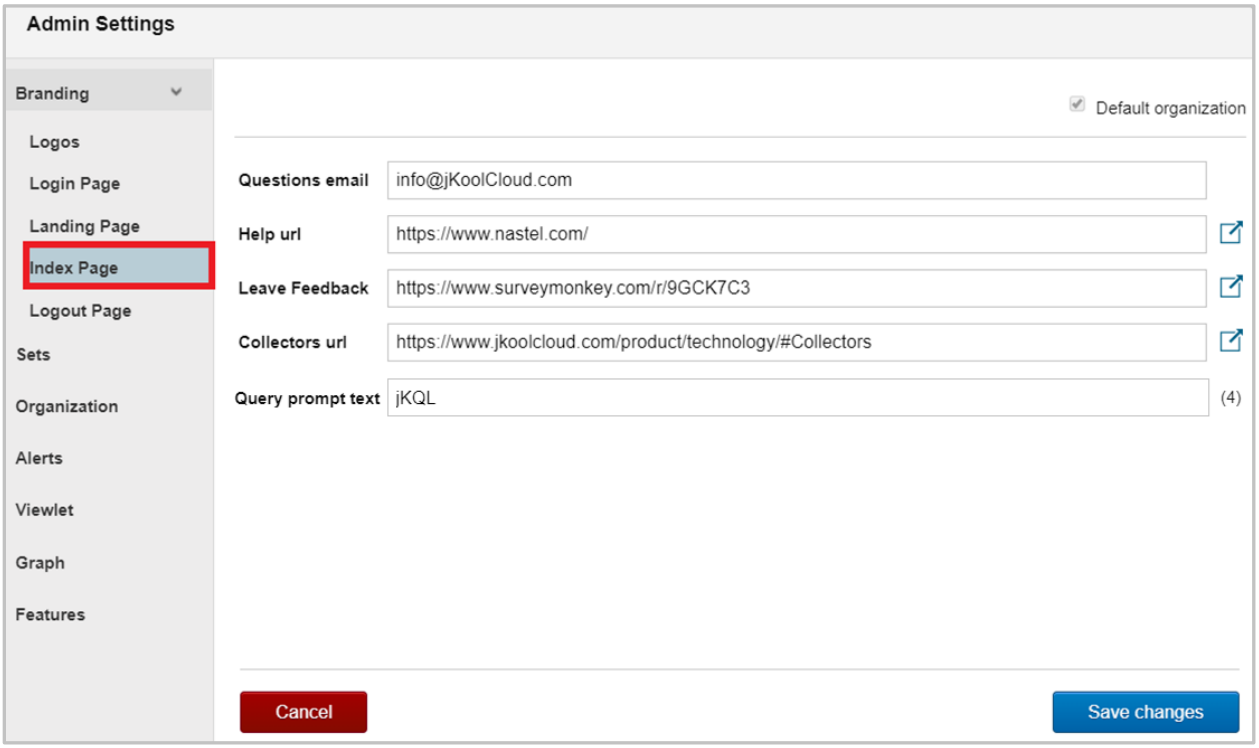

Figure 3.1.1.4-A. Branding – Index Page

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3.1.1.5 Logout Page

Select **Logout Page** from the **Branding** sub-menu to specify the logout message text. The character limit appears immediately to the right of the **Logout message text** field.

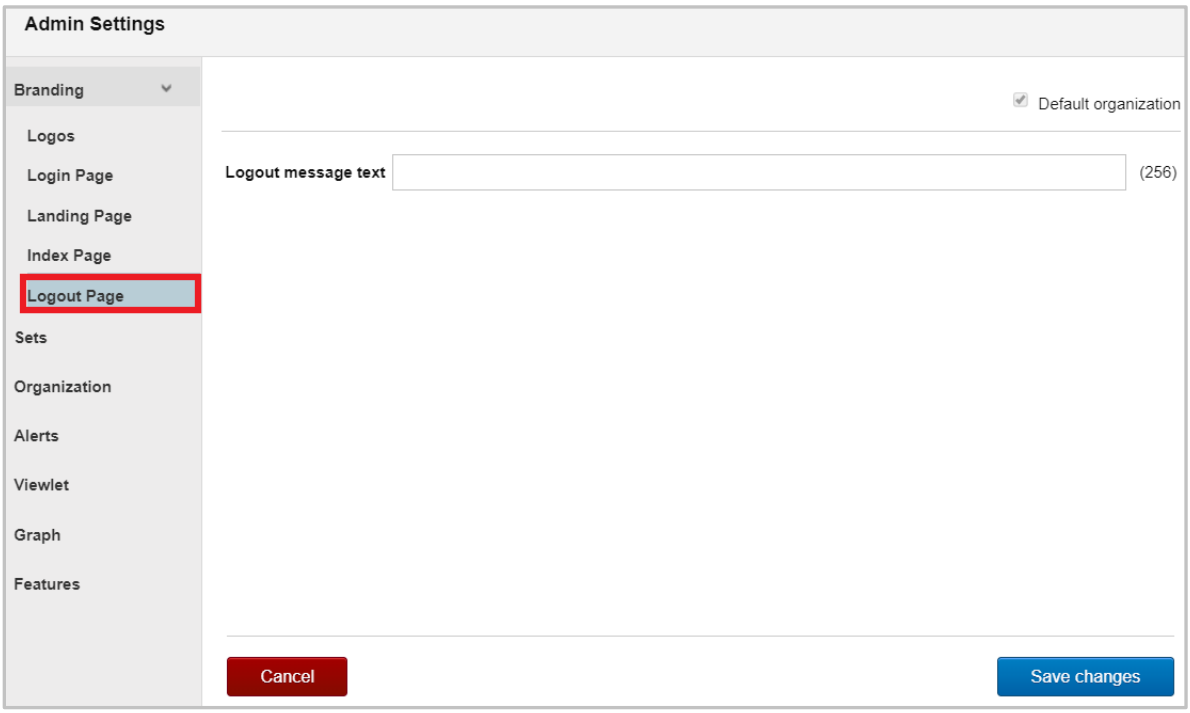

Figure 3.1.1.5-A. Branding – Logout Page

3.1.2 Sets

Select **Sets** from the side menu of *Admin Settings* (*Figure 3.1.2-A*). On this window, users can create, edit or delete sets (see sections 3.1.2.1 – 3.1.2.3 below for more information).

Sets are configurations used to group repository data. The system uses sets to determine how data is displayed in event and activity viewlets. Sets can be created manually or imported with a .csv file (see *Section 2.6.4*).

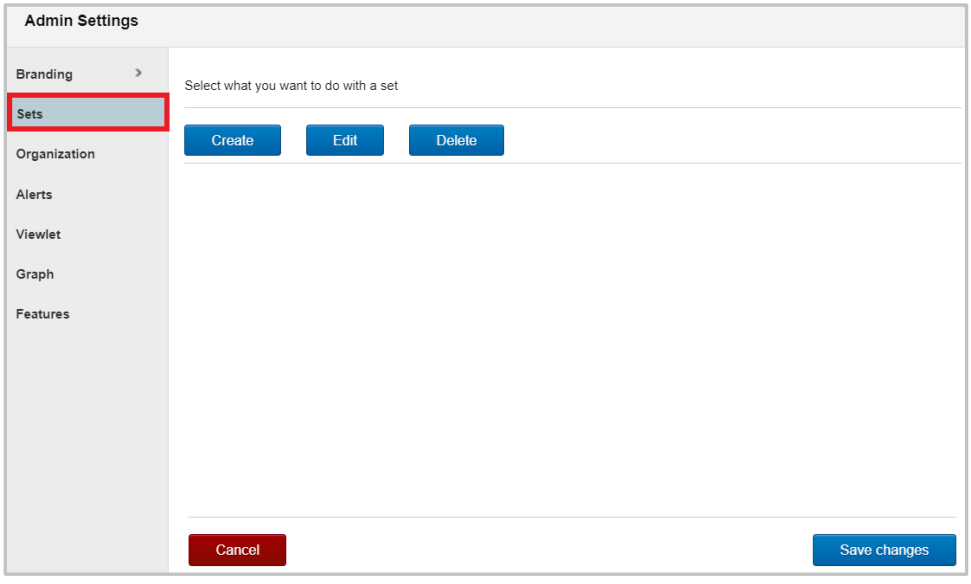

Figure 3.1.2-A. Admin Settings – Set Actions

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3.1.2.1 Create Set

Click the **Create** button on the *Sets* window (*Figure 3.1.2-A*) to create a new set. The *Create a group* wizard appears.

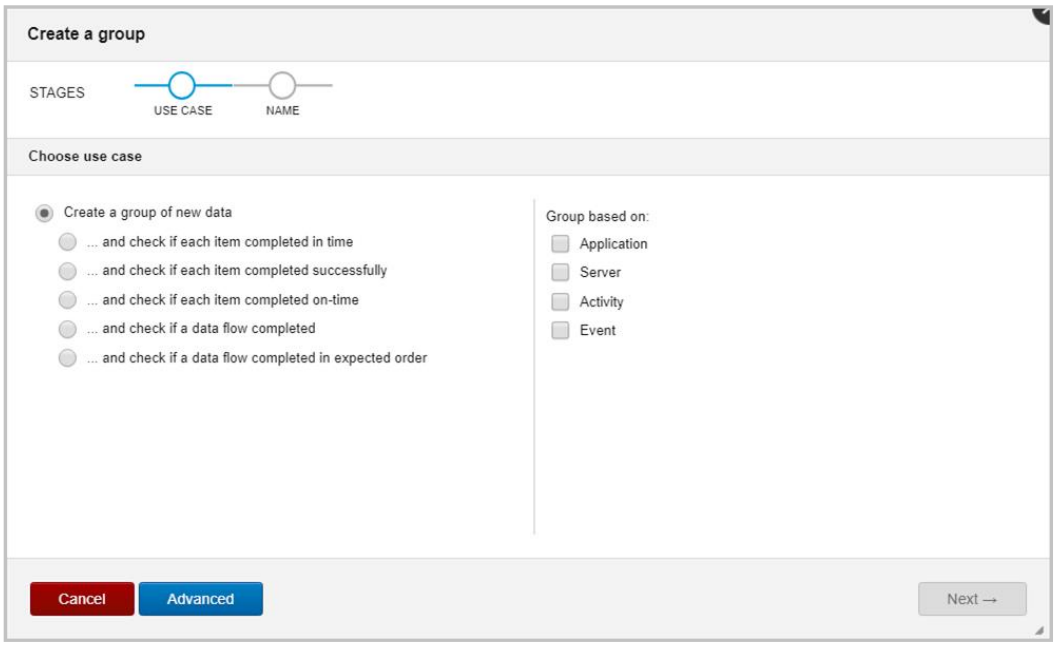

Figure 3.1.2.1-A. Admin Settings – Sets – Create a Group

Select an option on the left side of the window to specify how the data should be grouped.

On the right side of the screen, select the type of data the group will be based on. More than one option can be selected, but please note that both **Activity** and **Event** cannot be selected at the same time.

Click **Next**.

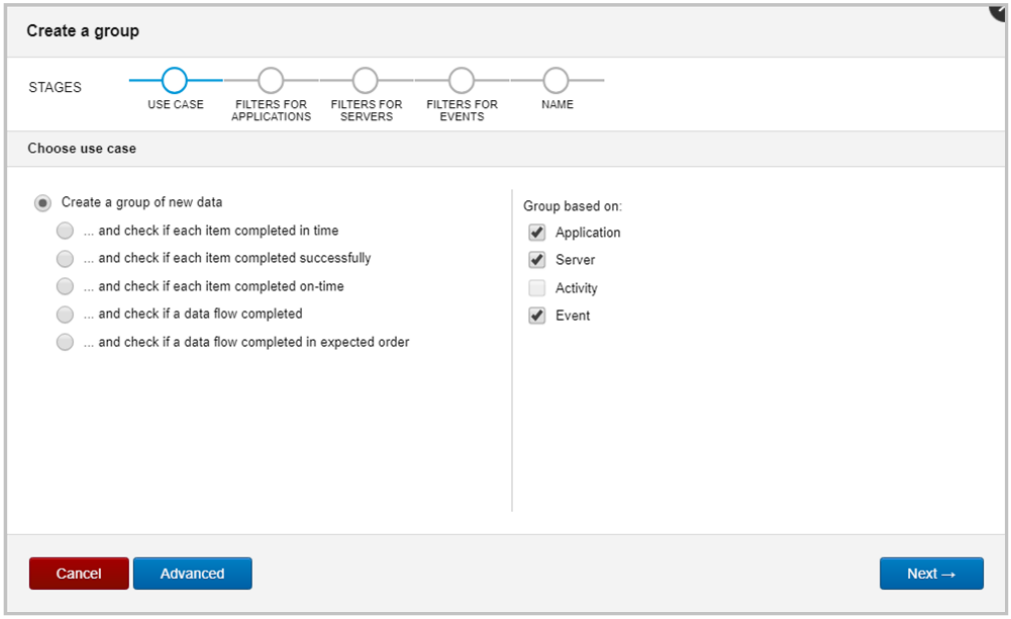

Figure 3.1.2.1-B. Admin Settings – Sets – Create a Group

Advanced settings are specified on the next screen. Specify the following:

a) **Name**: Enter a name for the set. It must be at least 3 characters long (required).

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b) **Scope**: Select either **Singular** or **Related** from the drop-down menu.

c) **Criteria**: Enter a criteria value.

d) **Set Sequence**: Enter the set sequence. These should be quoted values separated by commas. For example, if **Related** was selected for **Scope**, 'set1:set2','set2:set3' means set1 is first, set2 is next and set3 is last.

e) **Objectives**: Add objectives in this section. On the right side of the screen, click the blue add icon **+**. Enter the objective name and value, for example, ElapsedTime > 1 minute. To remove an objective, click the blue minus **-** icon.

Click **Finish**.

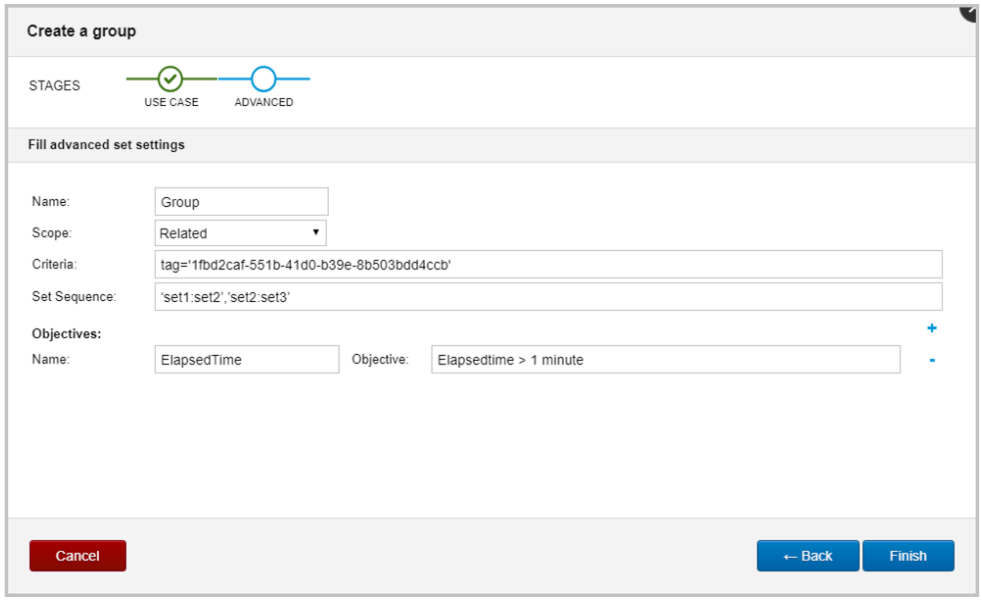

Figure 3.1.2.1-C. Admin Settings – Sets – Create a Group – Advanced

Within the **Console** section the details of your new set will display.

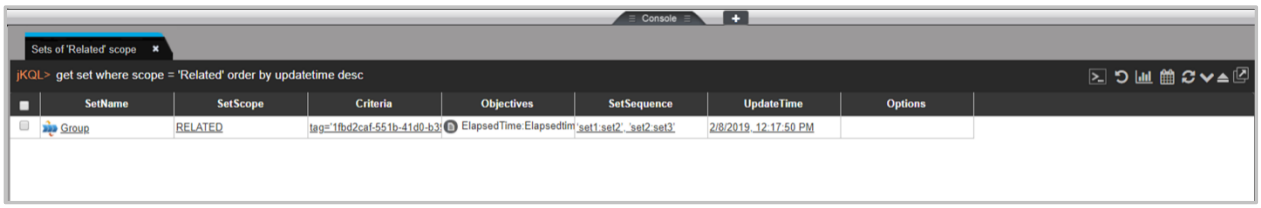

Figure 3.1.2.1-D. New Set

3.1.2.2 Edit Set

Click the **Edit** button on the *Sets* window (*Figure 3.1.2-A*) to edit an existing set. The *Edit a Set* window opens. Select a set from the list and click **Edit**.

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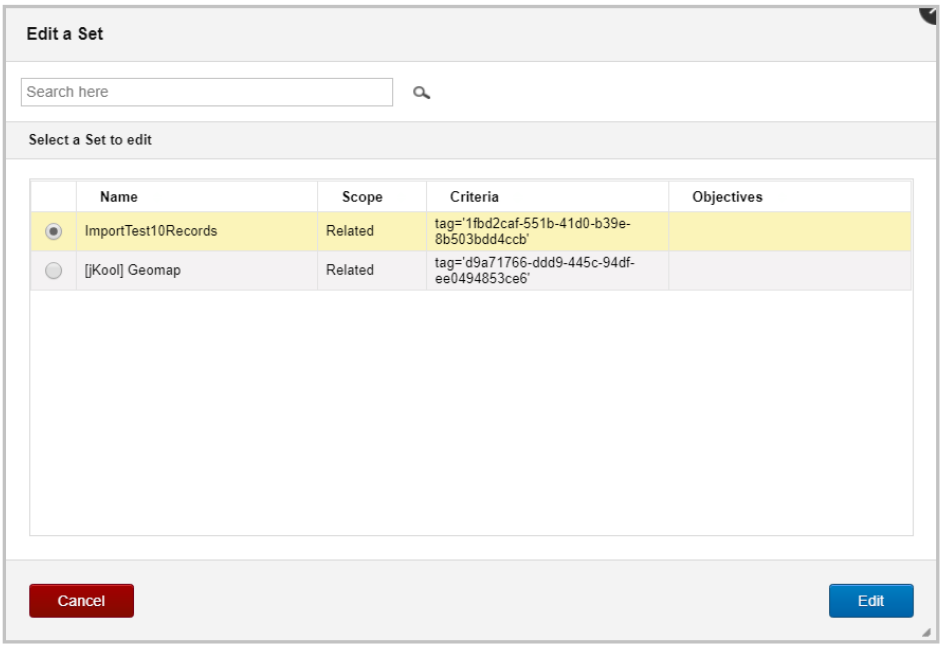

Figure 3.1.2.2-A. Admin Settings – Sets – Edit a Set

On the *Edit a group* window update all desired fields. Please note that the name of a set cannot be updated.

Click **Save** when finished.

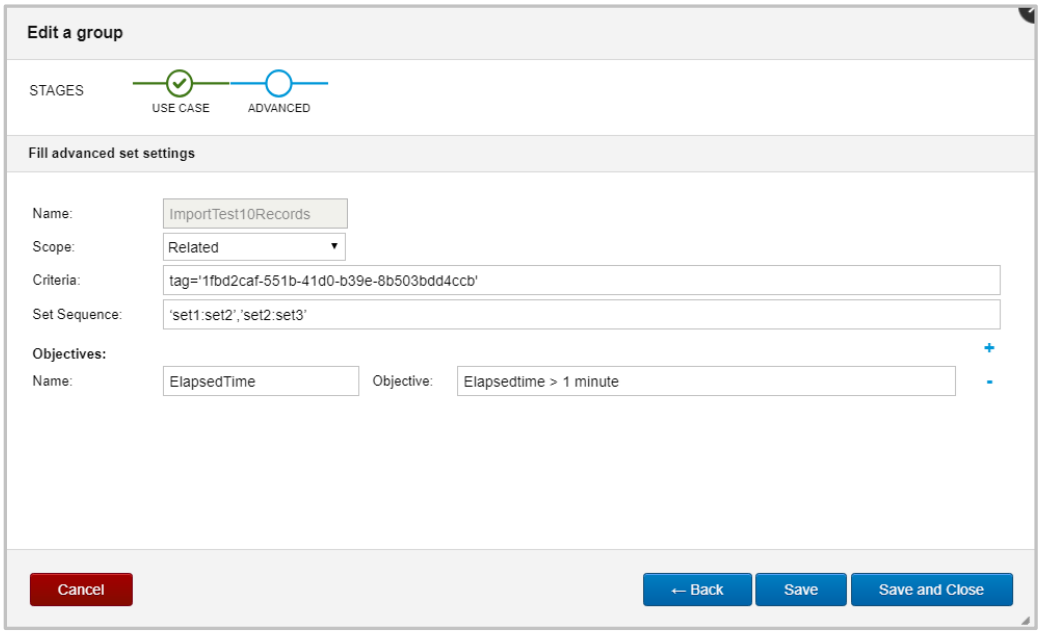

Figure 3.1.2.2-B. Admin Settings – Sets – Edit a Group

3.1.2.3 Delete Set

Click the **Delete** button on the *Sets* window (*Figure 3.1.2-A*) to delete a set. The next window will display all existing sets.

Use the **Search here** field at the top of the window to quickly search for sets by name. Select the sets to remove from the system and click **Delete**.

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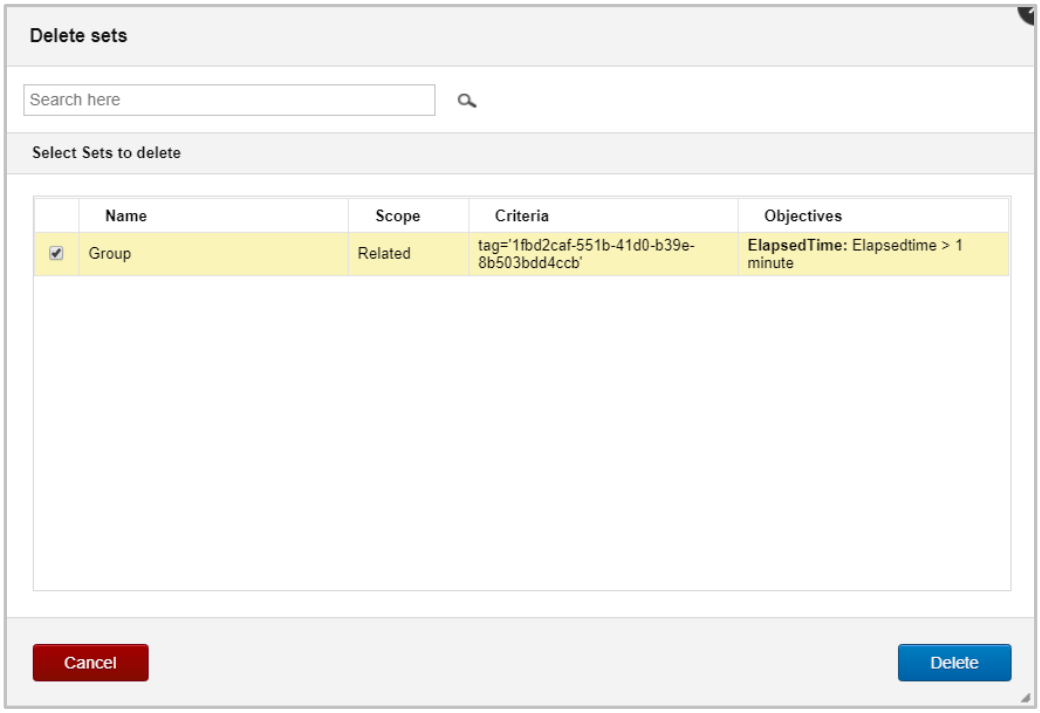

Figure 3.1.2.3-A. Admin Settings – Sets – Delete Sets

The following dialog box will appear after the sets are successfully deleted.

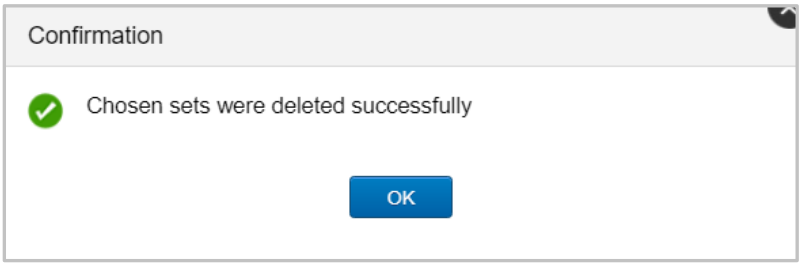

Figure 3.1.2.3-B. Admin Settings – Sets – Delete Sets – Confirmation Dialog Box

3.1.3 Organization

Select **Organization** from the side menu of *Admin Settings* (*Figure 3.1-A*) to open the *Organization Manager* window. An explanation of each side menu option on the *Organization Manager* window is explained in sections 3.1.3.1 – 3.1.3.6 below.

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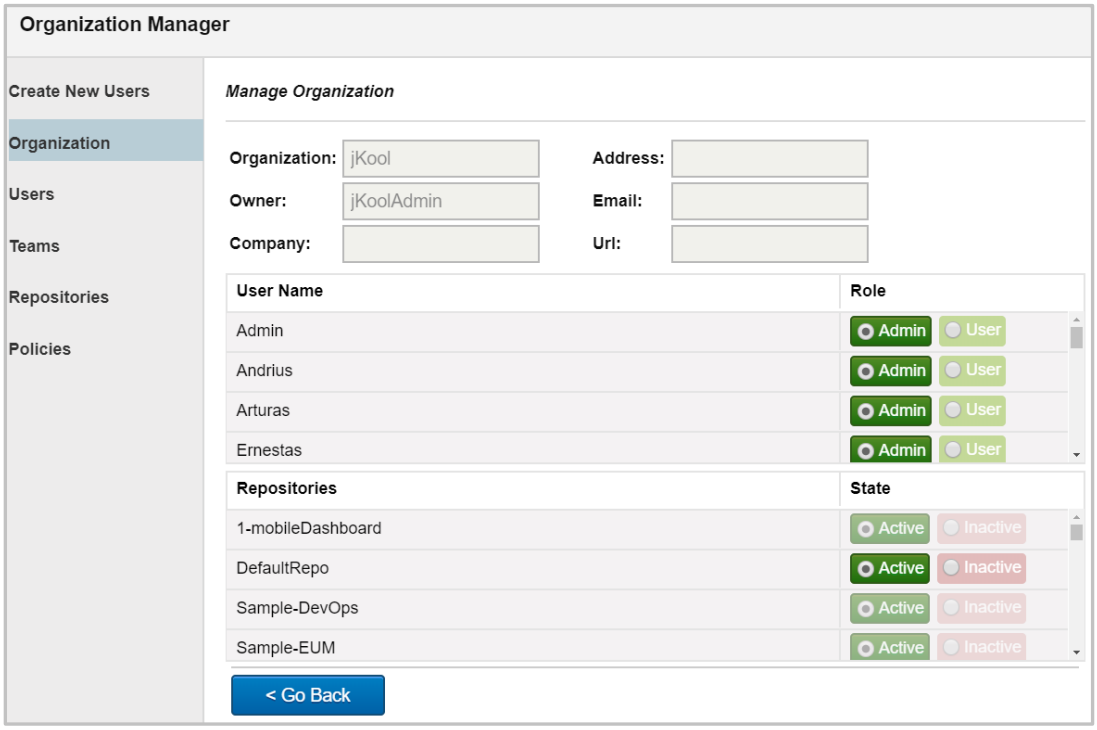

Figure 3.1.3-A. Organization Manager

3.1.3.1 Create New Users

Select **Create New Users** from the *Organization Manager* (*Figure 3.1.3-A*) side menu to add new users. The following window will appear.

If you do not have an unlimited user account, on the top right corner a message will appear with information on your user quota limit and a link with more information.

Select the *Create user manually* radio button and click **Next**.

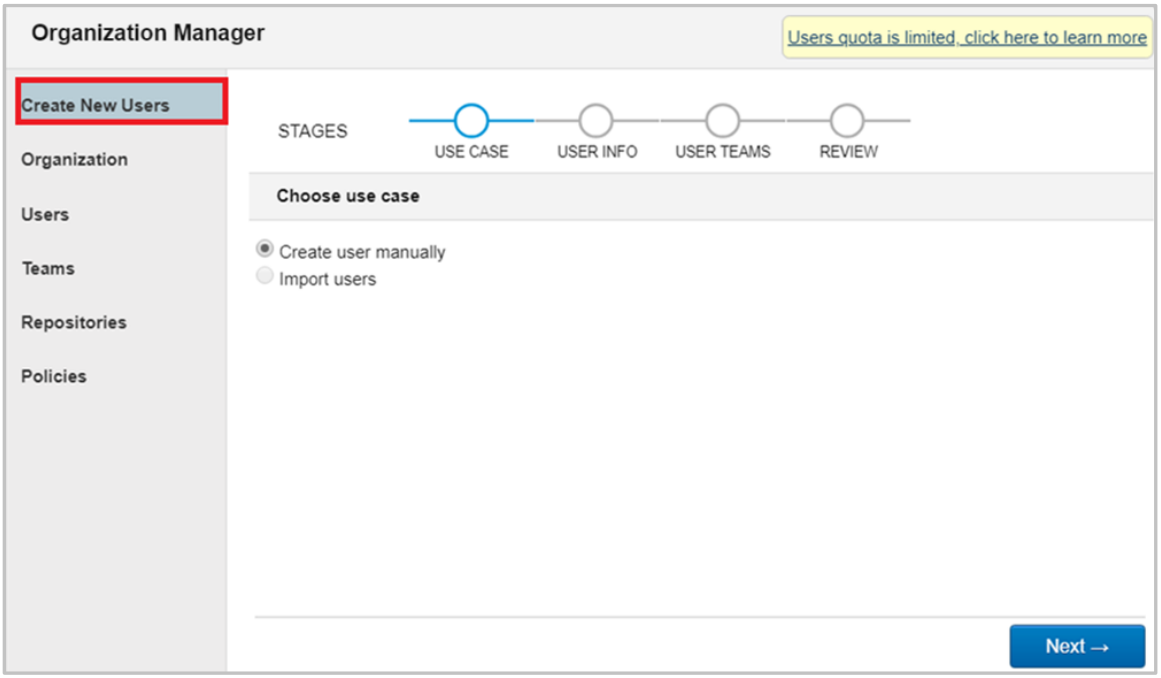

Figure 3.1.3.1-A. Organization Manager - Create New Users

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Fill in required fields (required fields have a red asterisk). If you would like jKQL query lines within viewlets not visible to the user, check off **Suppress jKQL interface**. The red alert icon in the **Password** and **Confirm Password** fields will disappear after having typed the same password in both fields. Click **Next**.

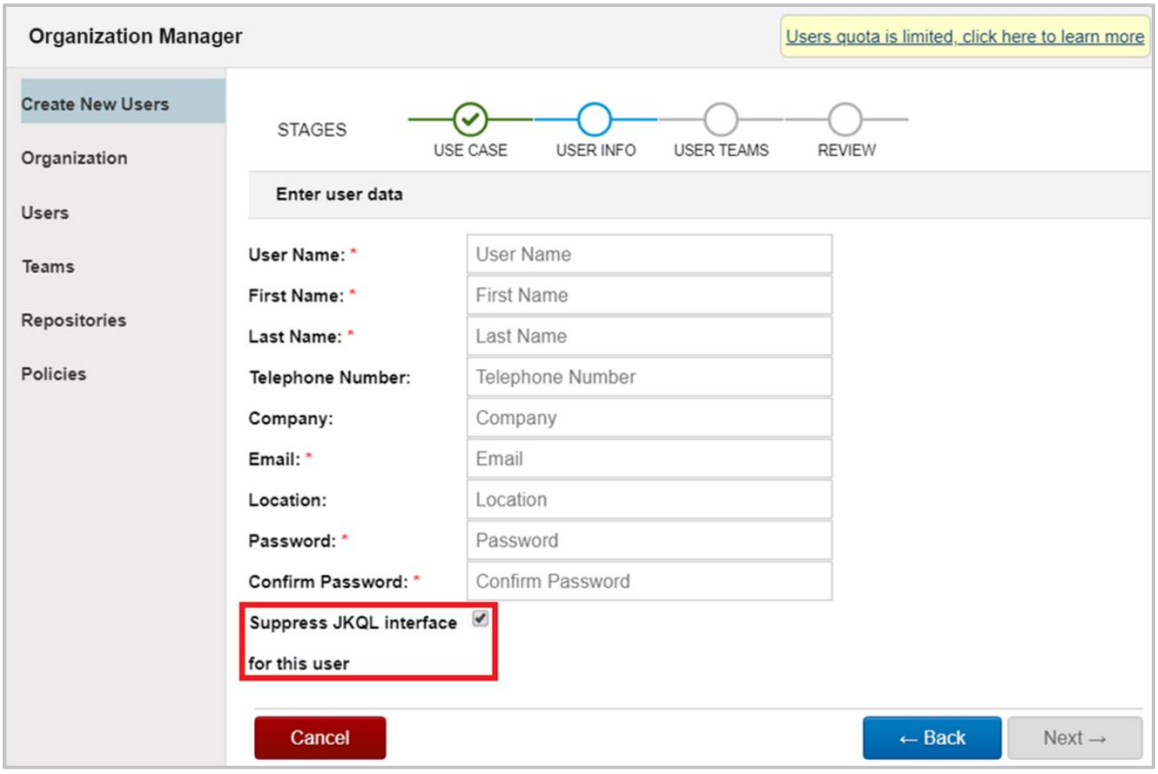

Figure 3.1.3.1-B. Organization Manager - Create New Users

On the next screen, the user can be added to teams (multiple teams can be selected for a user). For each team a user is added to, select their access role – **Admin** or **User**. Click **Next**. Please see *Section 3.1.3.4* for information on how to create teams.

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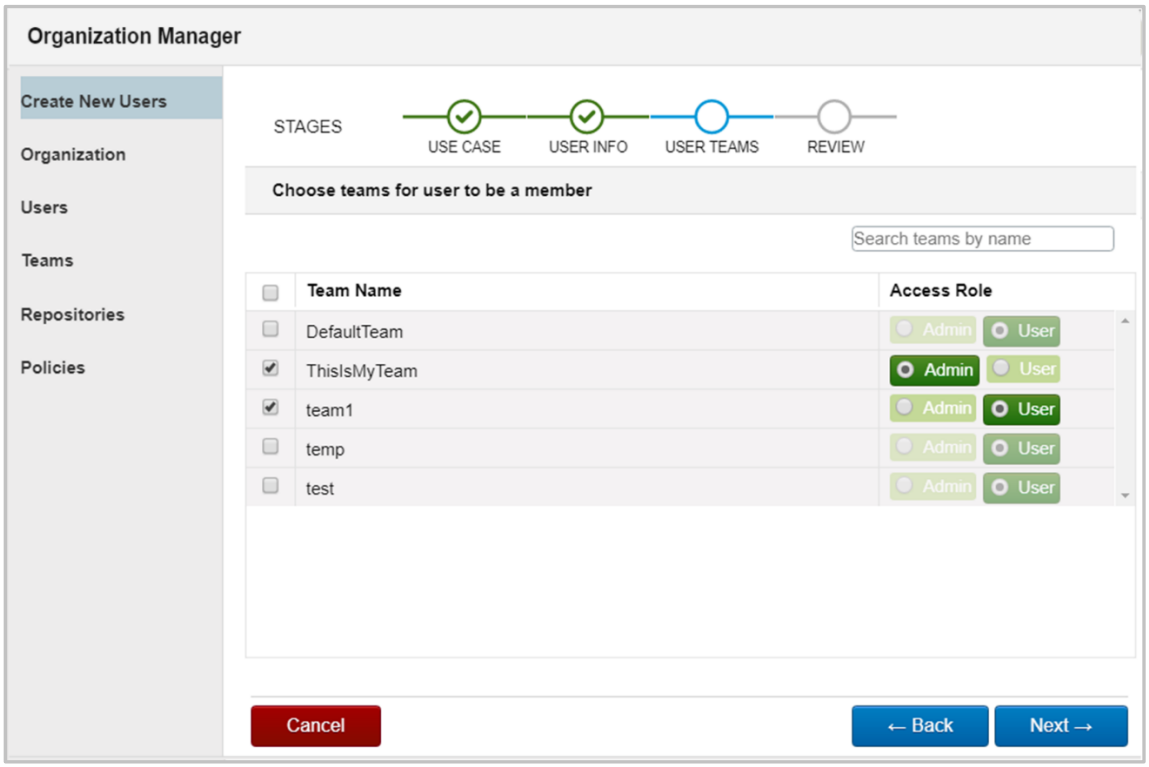

Figure 3.1.3.1-C. Organization Manager - Create New Users

Review the user's information. If updates are needed click the **Back** button. If all information is correct, click **Finish** to create the user.

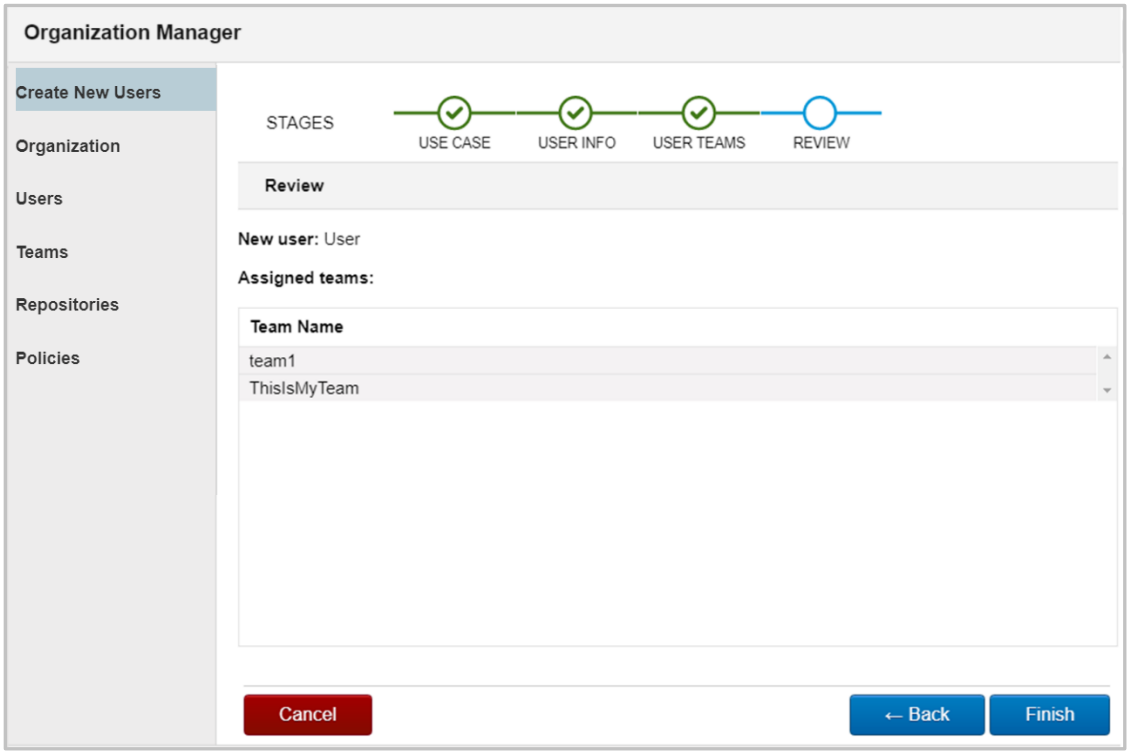

Figure 3.1.3.1-D. Organization Manager - Create New Users

3.1.3.2 Organization

Select **Organization** from the *Organization Manager* (*Figure 3.1.3.2-A*) side menu to update user organization roles (**Admin** or **User**) and the states of the organization repositories (**Active** or **Inactive**).

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NOTE

If your license permits, you can add/update users to organizations on the following screen.

If running on premise, external security is used where the users are defined externally and come from AutoPilot although the teams and other options are still configured there (teams cannot be created).

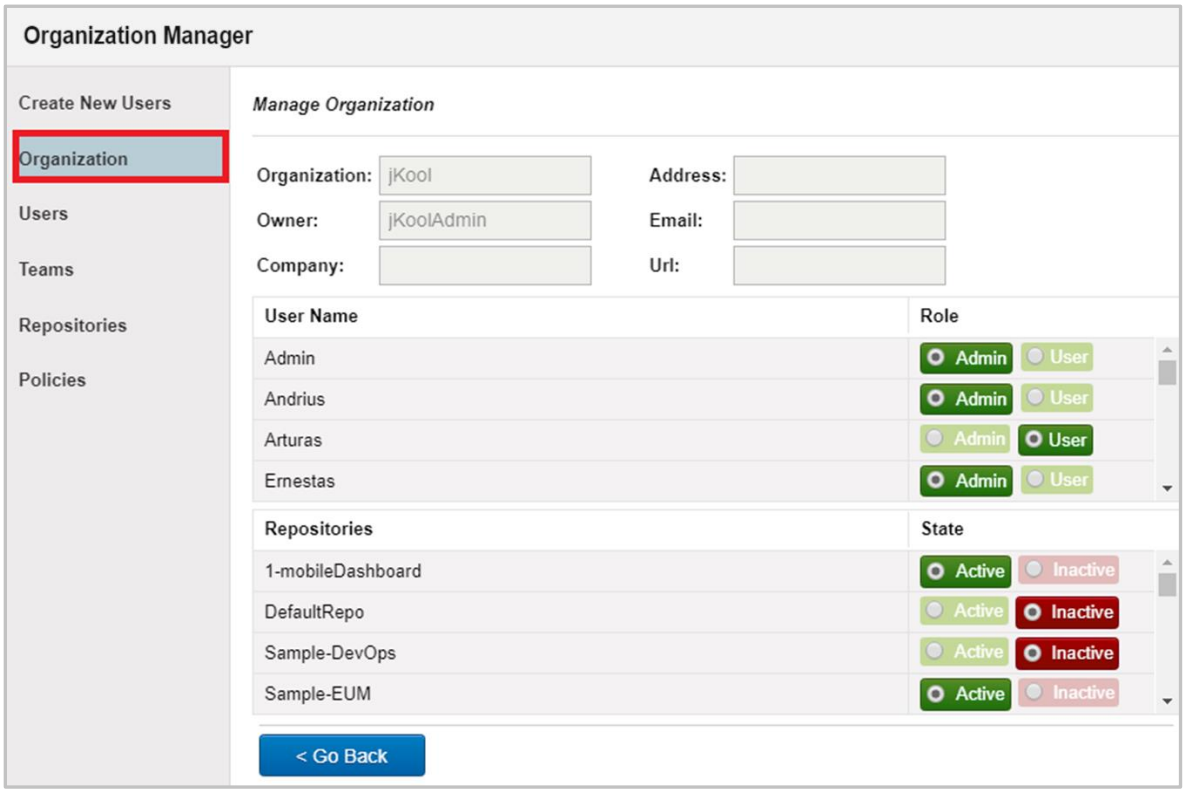

Figure 3.1.3.2-A. Organization Manager – Organization

3.1.3.3 Users

Select **Users** from the *Organization Manager* (*Figure 3.1.3.3-A*) side menu to view all system users. On this window you can edit, create, delete or change a user roles. The field on the bottom right of the window displays the number of existing users and the maximum number of potential users.

To edit a user's settings, simply select the user and click **Edit** (see *Section 3.1.3.3.1*).

To delete a user, click the garbage can icon . Users with Owner or Admin roles cannot be deleted.

To create a new user, click the **Create** button (see *Section 3.1.3.3.2*). The number of existing users and the total number of possible users are displayed on the bottom right corner of the window. On the top right corner of the window there is a note about user amount limitation and a link for more information.

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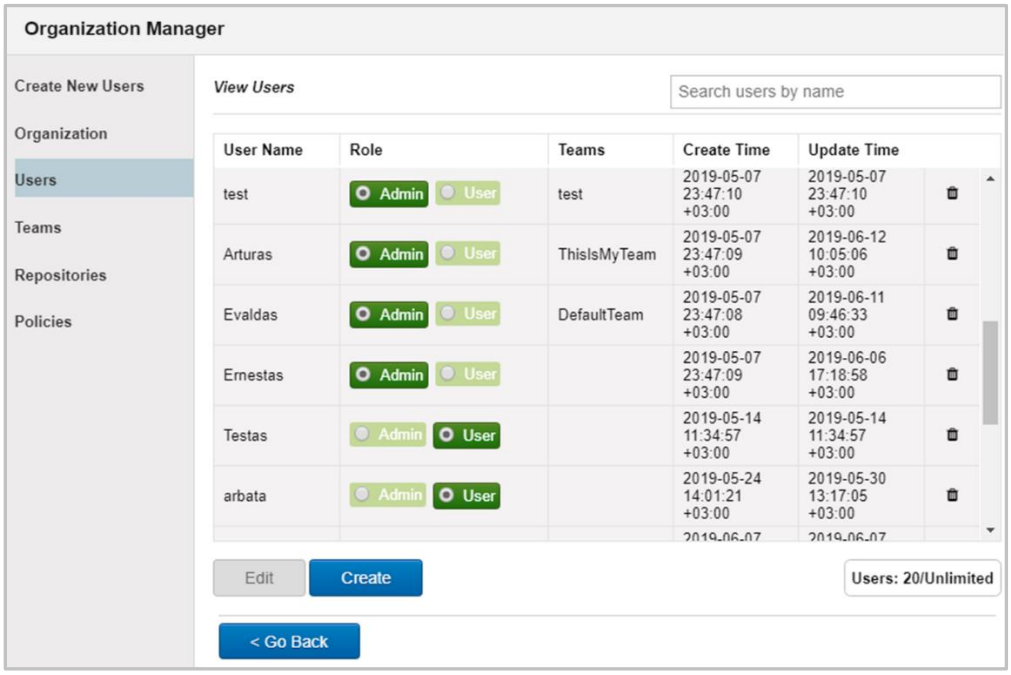

Figure 3.1.3.3-A. Organization Manager – Users

3.1.3.3.1 Edit User

After selecting a user and clicking **Edit**, the below window appears. On the **Edit User** tab, user details can be updated. Fields with an asterisk are required.

Checking the **Suppress jKQL interface for this user** option will hide the jKQL queries within viewlets for this user. The user of this type will access only a **Viewlet Form** button to add a new viewlet (*Figure 2.5.1-B*) and will not have the option to create viewlets with jKQL or open existing viewlets.

Clicking **Reset two-factor authentication** will reset 2FA for the user (see *Section 3.2.1.2, Reset*, for more information).

After all updates have been made, click **Save**.

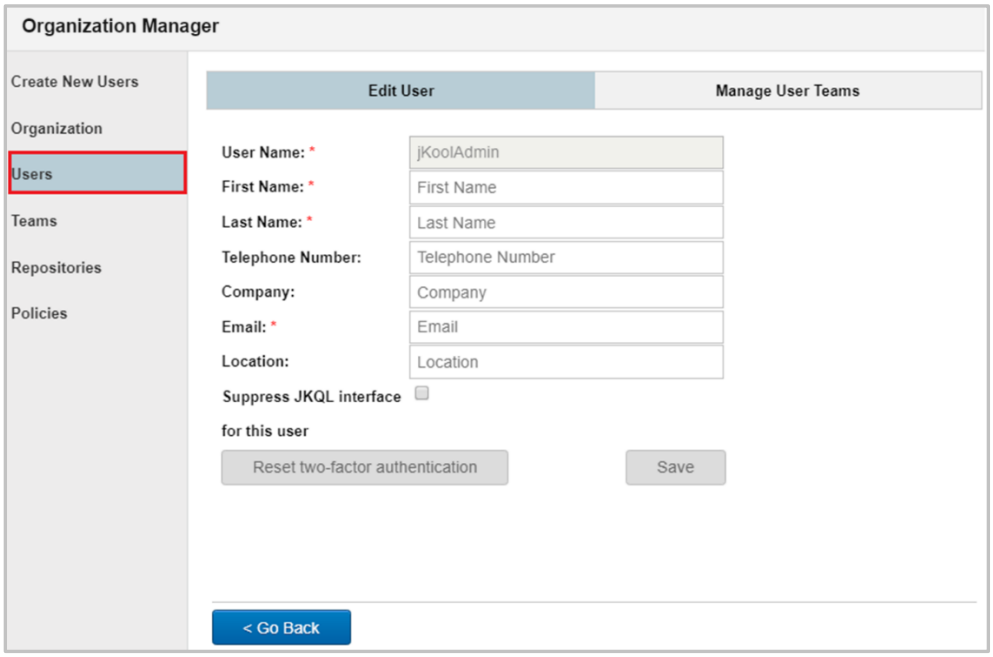

Figure 3.1.3.3.1-A. Organization Manager – Users – Edit User

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The teams the user is a member of are displayed on the **Manage User Teams** tab. To remove a user from a team, simply click the red **X** within the **Delete** column.

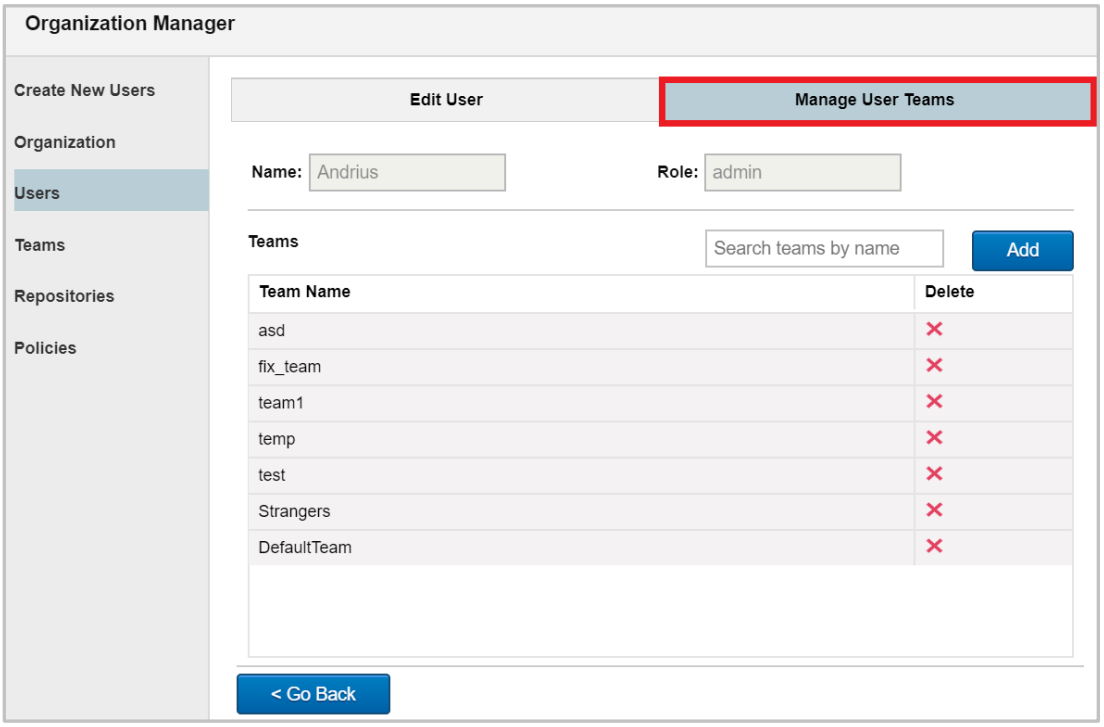

Figure 3.1.3.3.1-B. Organization Manager – Users – Manage User Teams

To add the user to additional teams, click the **Add** button. On the *Add User to Teams* screen, select all desired teams and click the **Add** button. Select if they should have an **Admin** or **User** role.

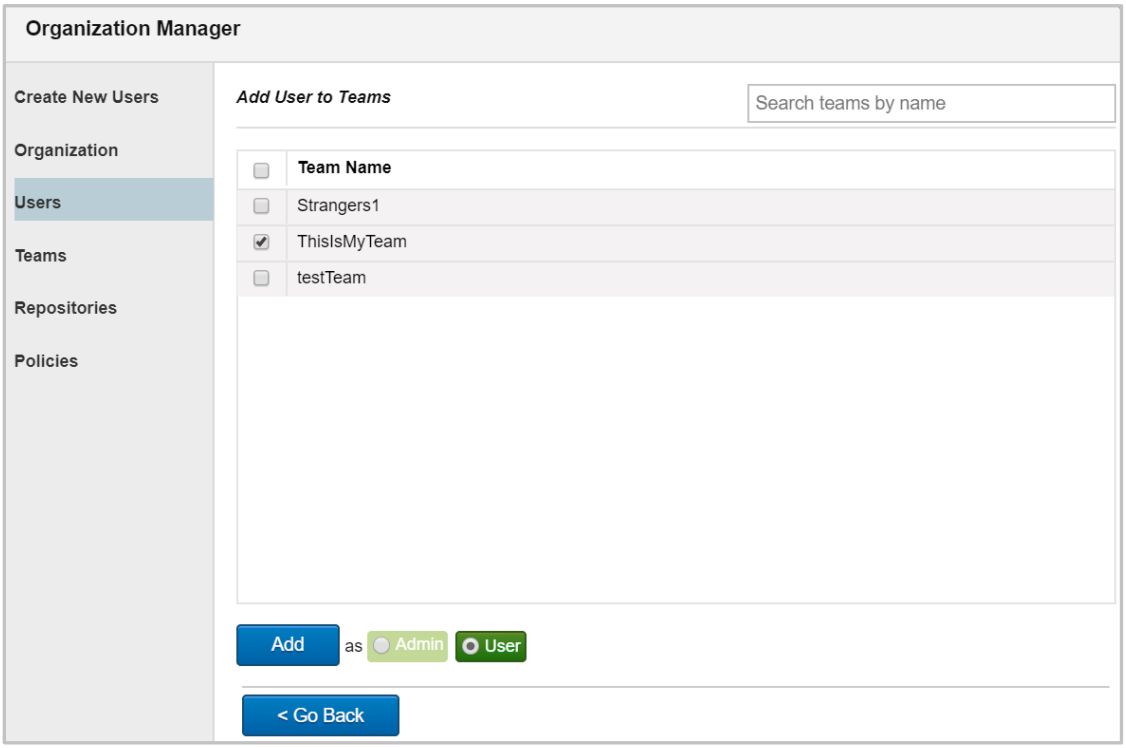

Figure 3.1.3.3.1-C. Organization Manager – Users – Manage User Teams – Add User to Teams

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3.1.3.3.2 Create User

After selecting **Users** from the *Organization Manager* side menu, click the **Create** button to add a new user to the system. The same window described in *Section 3.1.3.1, Create New Users,* will display. This is a quick method to create a user. Additional user options will not be available from this screen; after the user is created, click the **Edit** button to fully customize the new user's permissions.

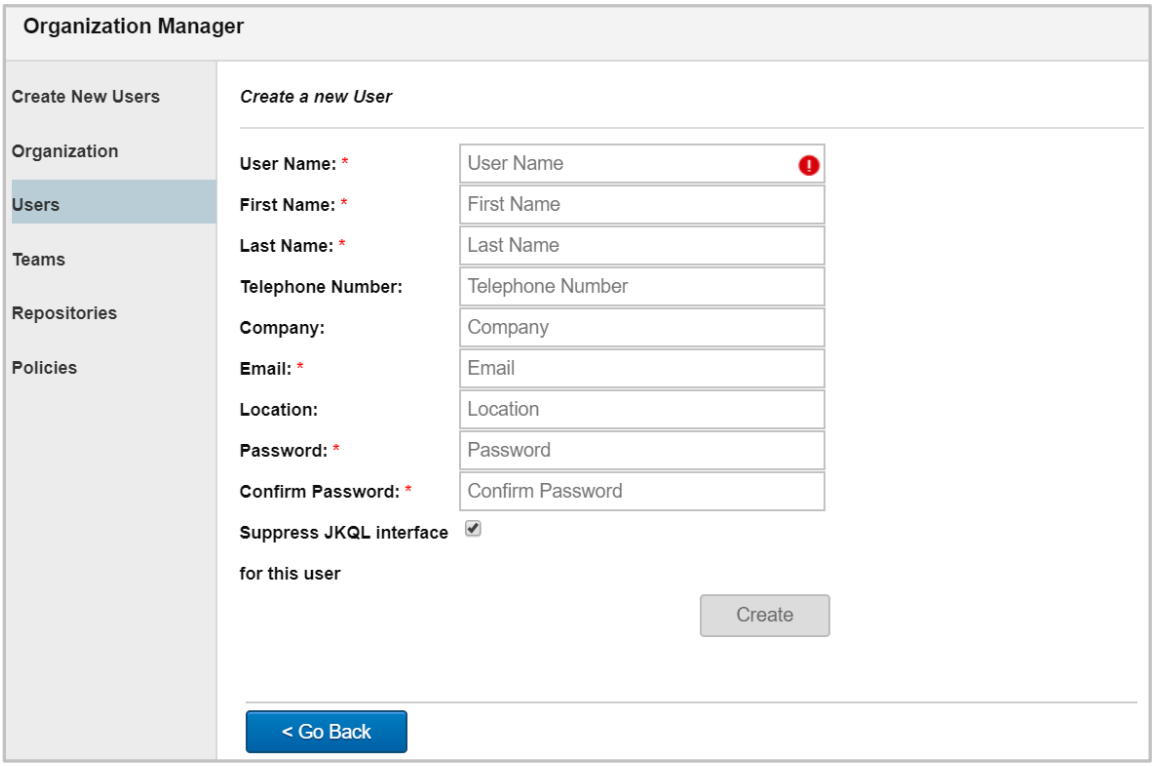

Figure 3.1.3.3.2-A. Organization Manager – Users

3.1.3.4 Teams

Select **Teams** from the *Organization Manager* (*Figure 3.1.3.4-A*) side menu to create and maintain teams. All teams and their members will be listed, as well as the date/time of creation and the last update.

The bottom right corner of the window will display total number of current teams out of your maximum team limit. If you have reached your team limit, this field will appear in red and you will not be able to create new teams. A message will appear on the top right corner of the window with a link for more information.

To edit a team, select the team and click **Edit**. See *Section 3.1.3.4.1, Edit Team*, below for more information.

To add a team, click the **Create** button. See *Section 3.1.3.4.2, Create Team*, below for more information.

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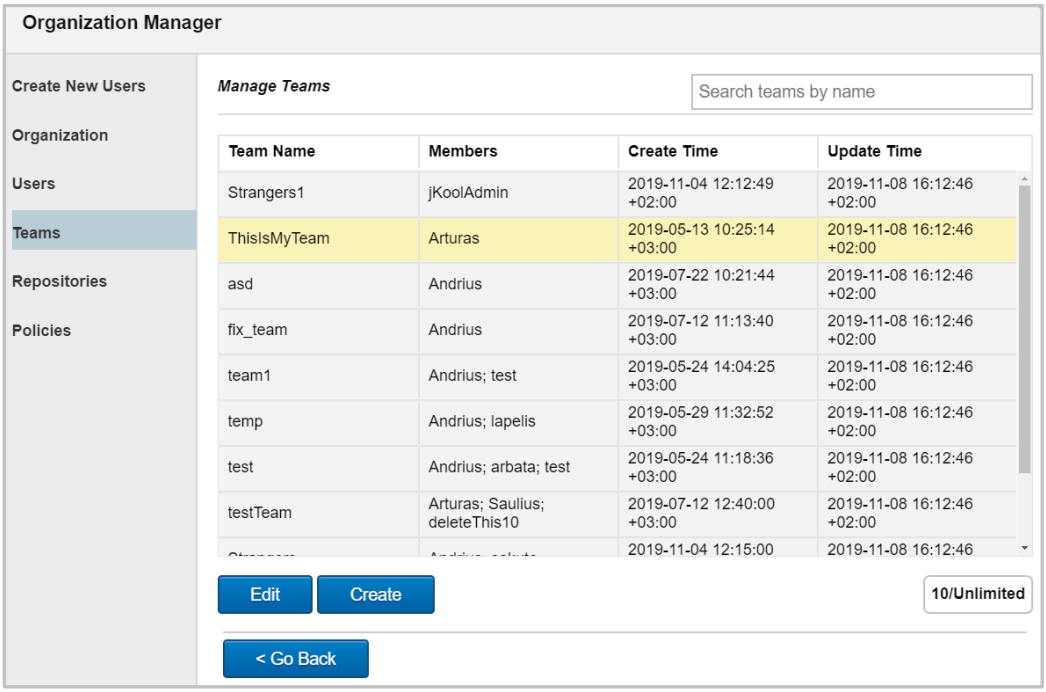

Figure 3.1.3.4-A. Organization Manager – Teams

3.1.3.4.1 Edit Team

To edit a team, select it and click **Edit** on the *Manage Teams* window (*Figure 3.1.3.4.1-A*). The below window displays. On the **Manage Team Repositories** tab, the team's repositories will display. On this tab you can:

- Remove a repository from a team: simply click the red **X** button within the **Delete** column.
- Add a repository to a team: click the **Add** button. All available repositories in your system will display (*Figure 3.1.3.4.1-B*). Select all desired repositories you would like to add to the team and specify the **Access Role** – either **Admin** or **User**. Click **Add**.

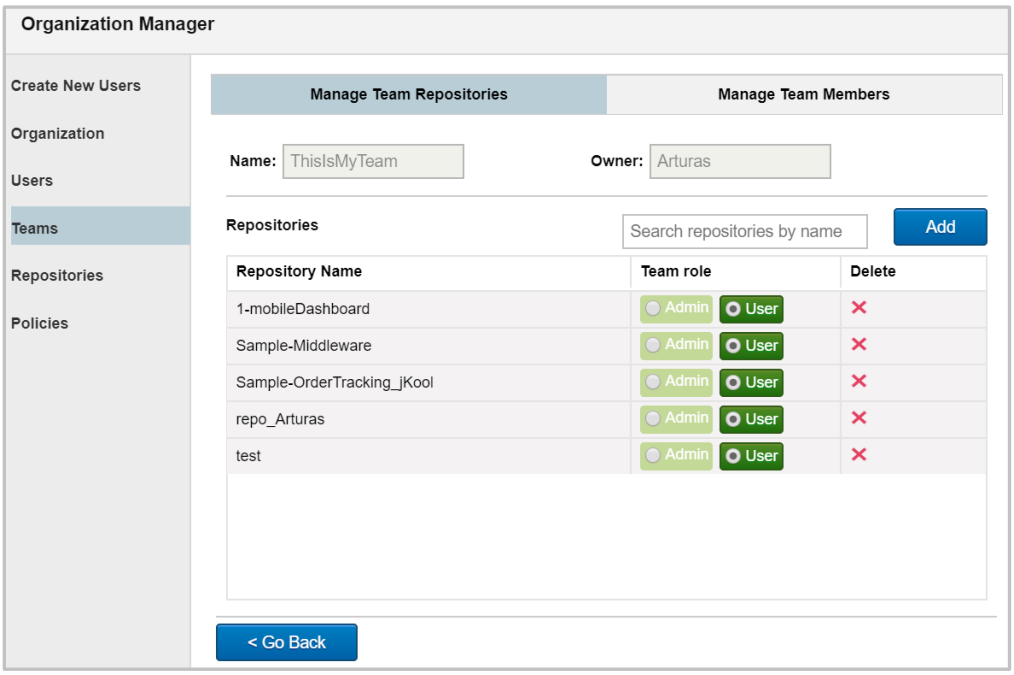

Figure 3.1.3.4.1-A. Organization Manager – Teams – Manage Team Repositories Tab

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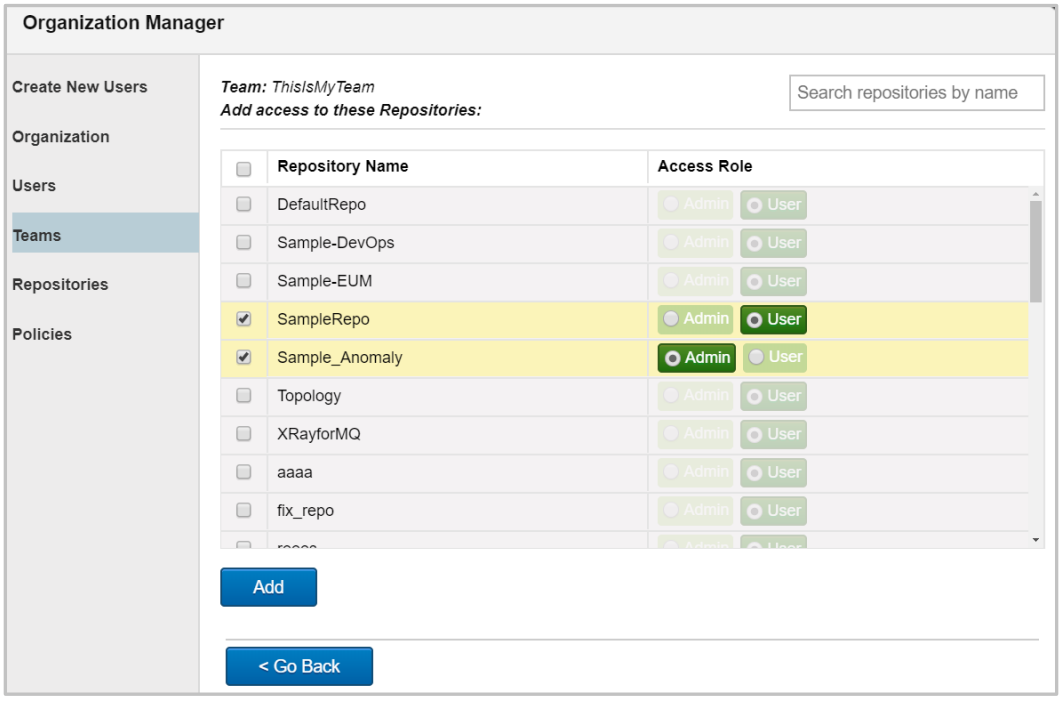

Figure 3.1.3.4.1-B. Add Repositories

On the **Manage Team Members** tab, all users in the team are displayed. On this tab you can:

- Update user roles: Select **Admin** or **User**.
- Delete a user from the team: Simply click the red **X** within the **Delete** column. Please note that Owner and Admin users cannot be deleted.
- Add a new user to the team: Click the **Add** button. All system users will display (*Figure 3.1.3.4.1-D*). Select the users to add to the team and specify their role (**Admin** or **User**). Click **Add**.

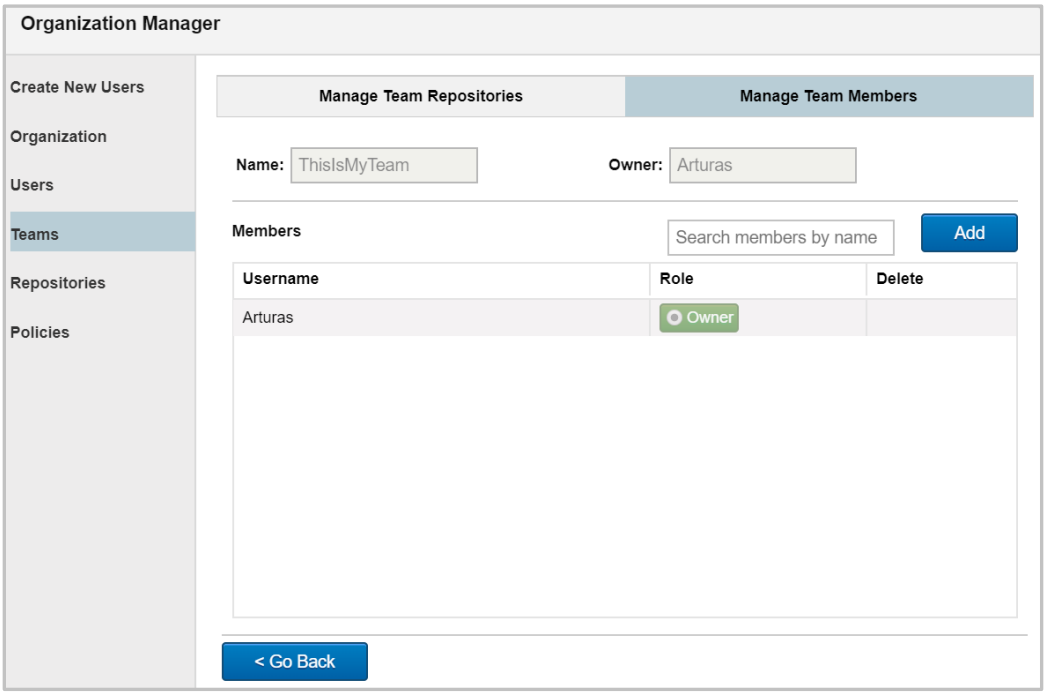

Figure 3.1.3.4.1-C. Organization Manager – Teams – Manage Team Repositories Tab

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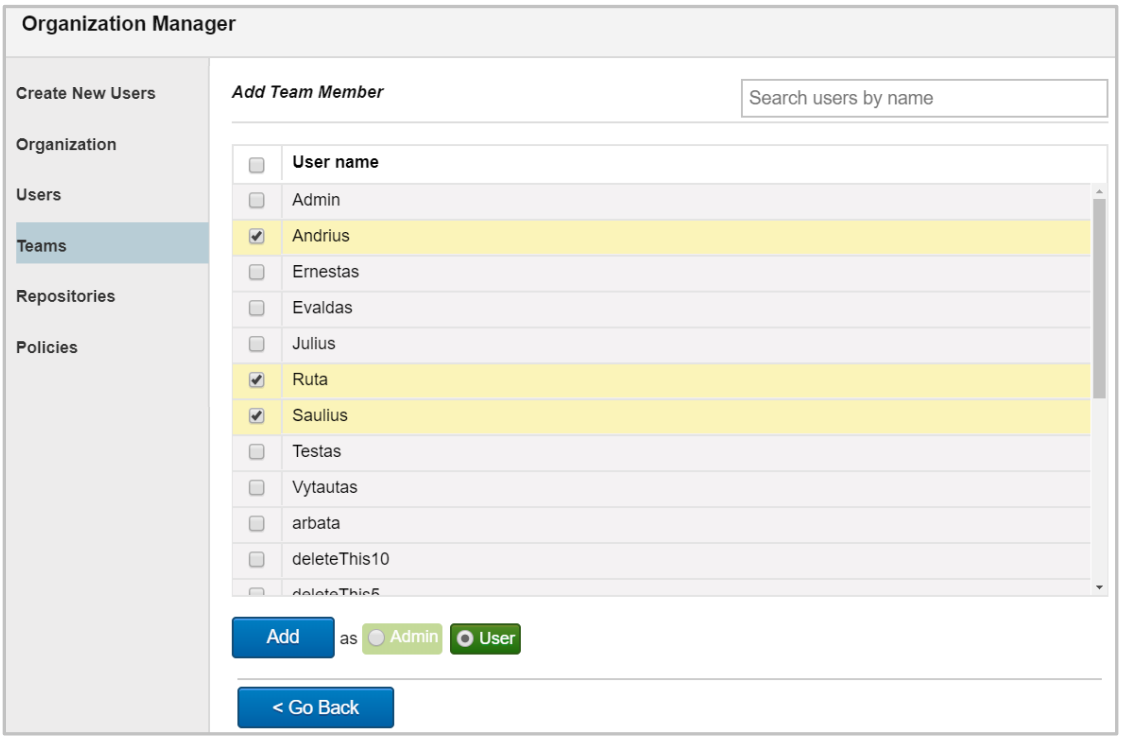

Figure 3.1.3.4.1-D. Add Team Users

3.1.3.4.2 Create Team

To create a new team, click the **Create** button on the *Manage Teams* window (*Figure 3.1.3.4-A*). Enter a name for the new team. After at least 3 characters are entered, the **Create** button will be enabled and the red exclamation point will disappear after at least 3 characters are entered.

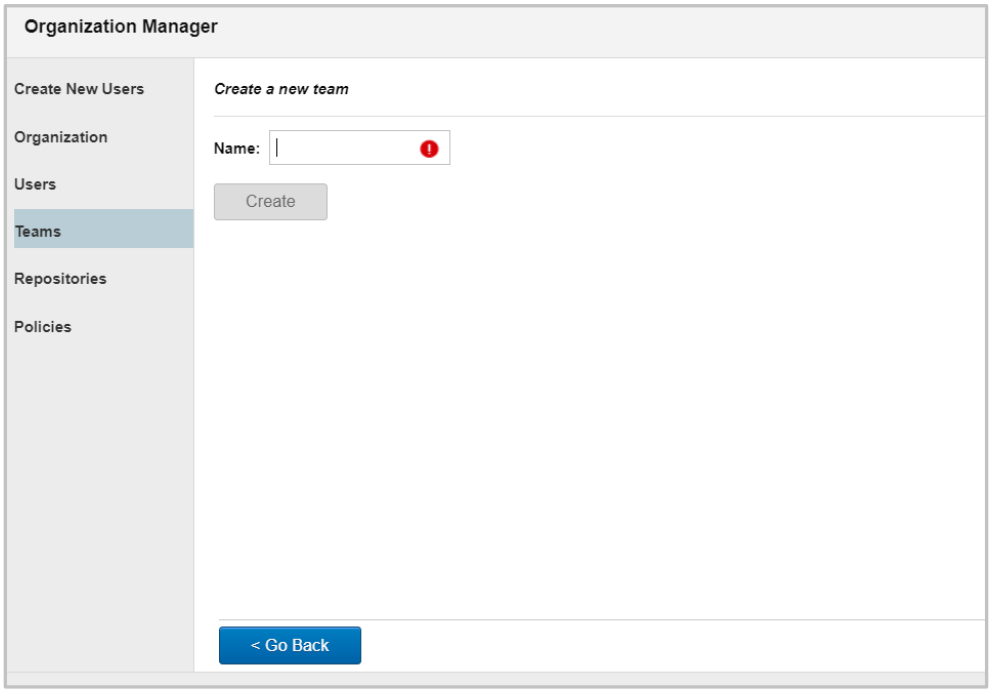

Figure 3.1.3.4.2-A. Add a New Team

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3.1.3.5 Repositories

Select **Repositories** from the *Organization Manager* (*Figure 3.1.3.5.1-A*) side menu. The *Manage Repositories* window opens (*Figure 3.1.3.5.1-A*) where you can create or update repositories. The field on the bottom right of the window displays the number of existing repositories and the maximum limit.

A default repository can be specified so that each time you log into Nastel XRay, the default repository's data will load. This is a user based setting. See *Section 3.2.6, Repository*, for more information.

For information on repository data limits, see *Section 2.3.1, Repository*.

3.1.3.5.1 Manage Repositories

A list of all system repositories is displayed on the *Manage Repositories* window. Click on the **Active** and **Inactive** buttons to change the repository status. The selected status is displayed in green. **Create Time** and **Update Time** are also displayed.

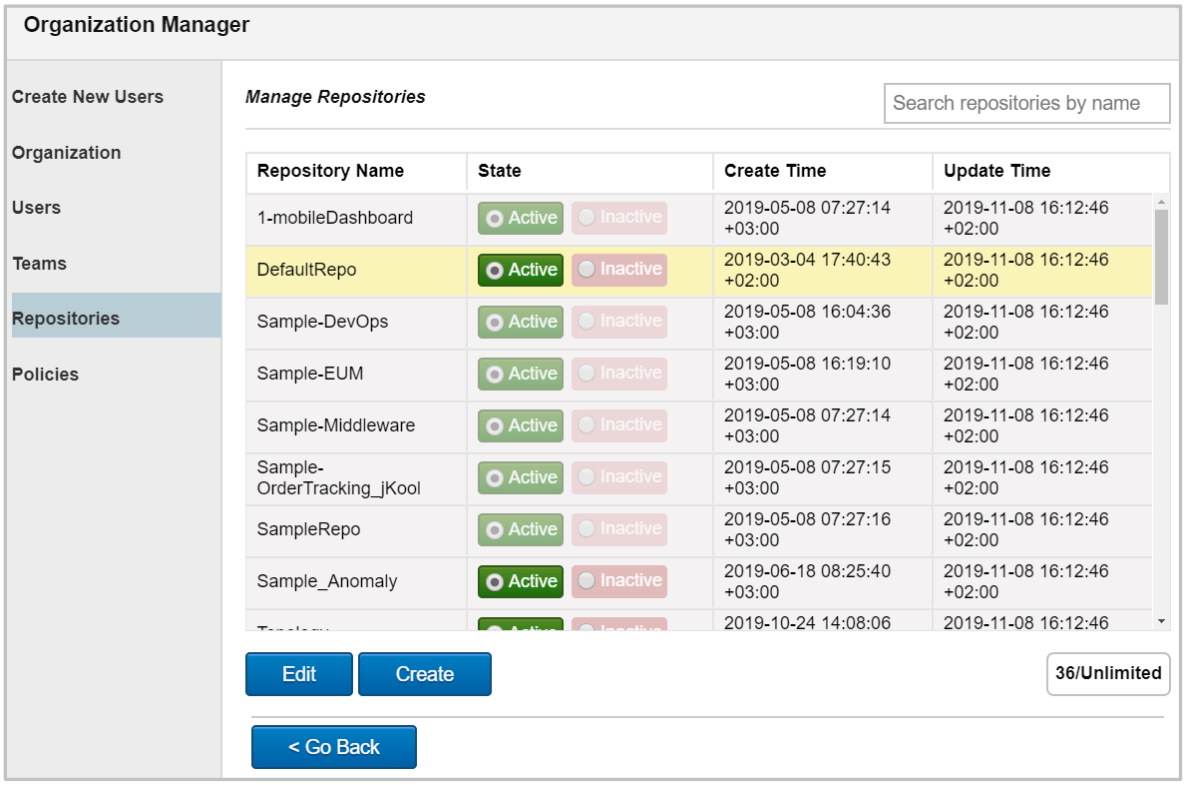

Figure 3.1.3.5.1-A. Organization Manager - Repositories

3.1.3.5.2 Edit Repository

Select a repository (the row will change to yellow) and click the **Edit** button. The below window displays.

On the **Manage Repository Tokens** tab, the status of **Stream**, **Query**, **Modify**, **Delete** and **Admin** can be configured to be active or inactive. Click the arrows to show / hide token information. Click the eye to show / hide the full token. To delete a token, simply click the red **X** within the **Action** field.

On the bottom right corner of the window, the number of existing tokens and the token limit are displayed. If the token limit has been reached, the **Generate token** button will be disabled and a warning message with more information will display at the top right corner.

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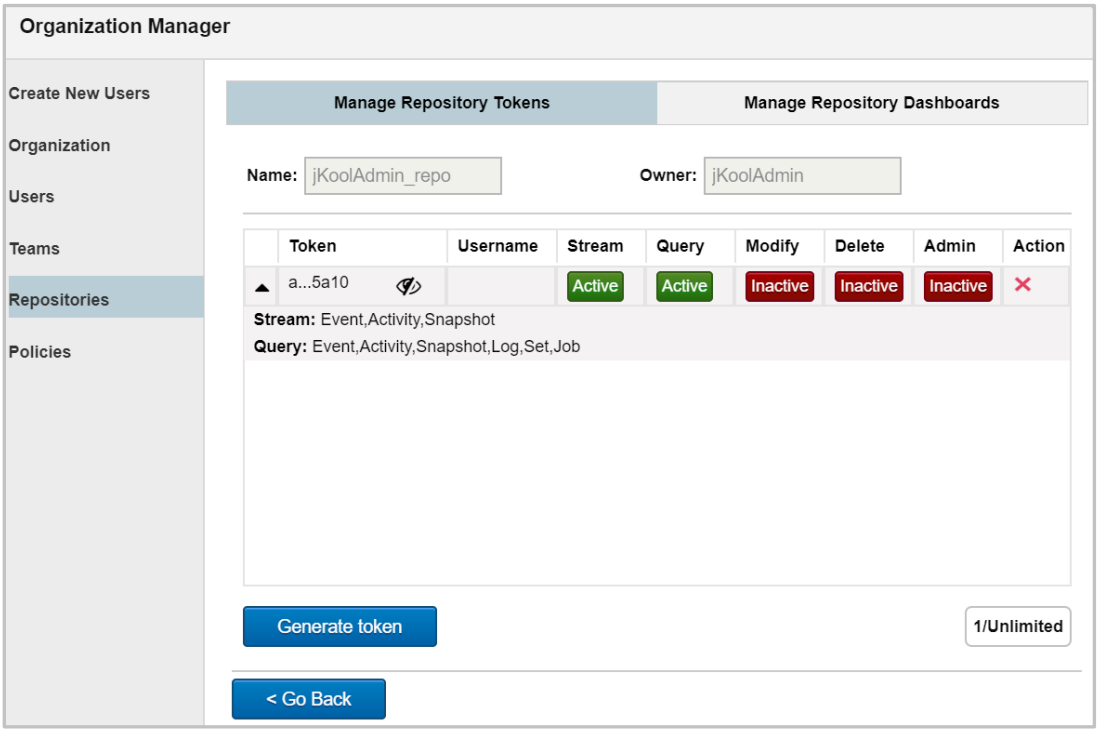

Figure 3.1.3.5.2-A. Manage Repository Tokens Tab

On the **Manage Repository Dashboards** tab, a list of all dashboards is displayed. For each dashboard, the number of columns and assigned teams are displayed. To delete a dashboard, simply click the red **X** within the **Action** field.

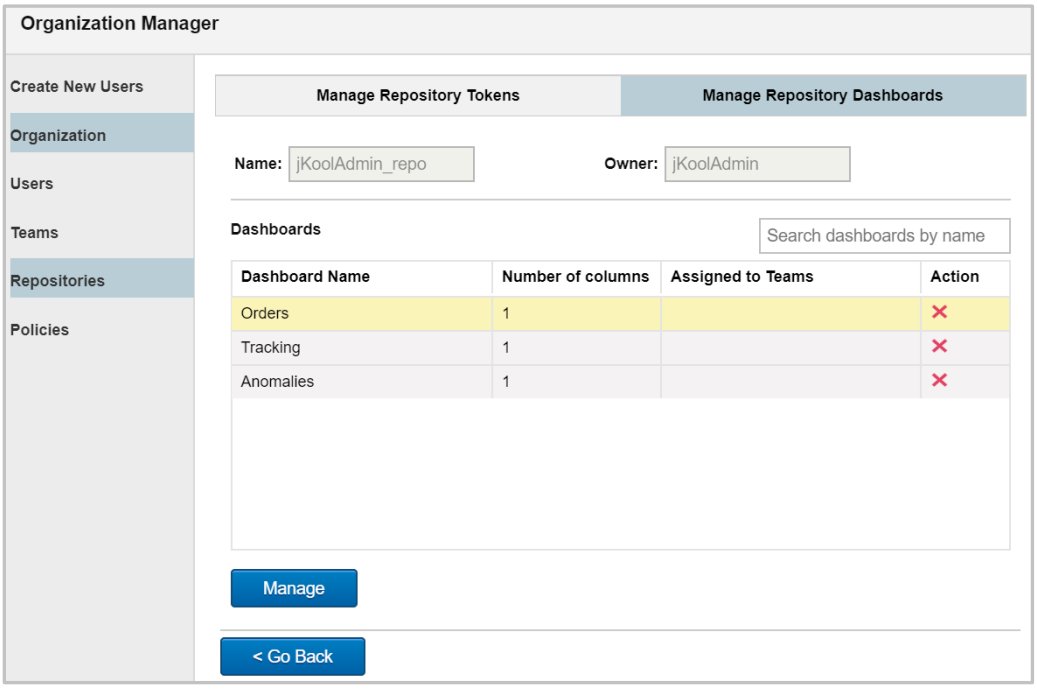

Figure 3.1.3.5.2-B. Manage Repository Dashboards Tab

To configure a dashboard's teams, select the dashboard and click the **Manage** button. The *Manage Repository Dashboard Teams* window appears. The list of the dashboard's assigned teams is displayed.

Delete teams by clicking the red **X** in the **Action** field of the dashboard within the **Assigned Teams** section. To add a new team, select it from the **Available Teams**, specify if it should be added as an

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Admin or **User** and click the **Add** button. To quickly search for teams within the list, use the **Search teams by name** search field located at the top right of the window.

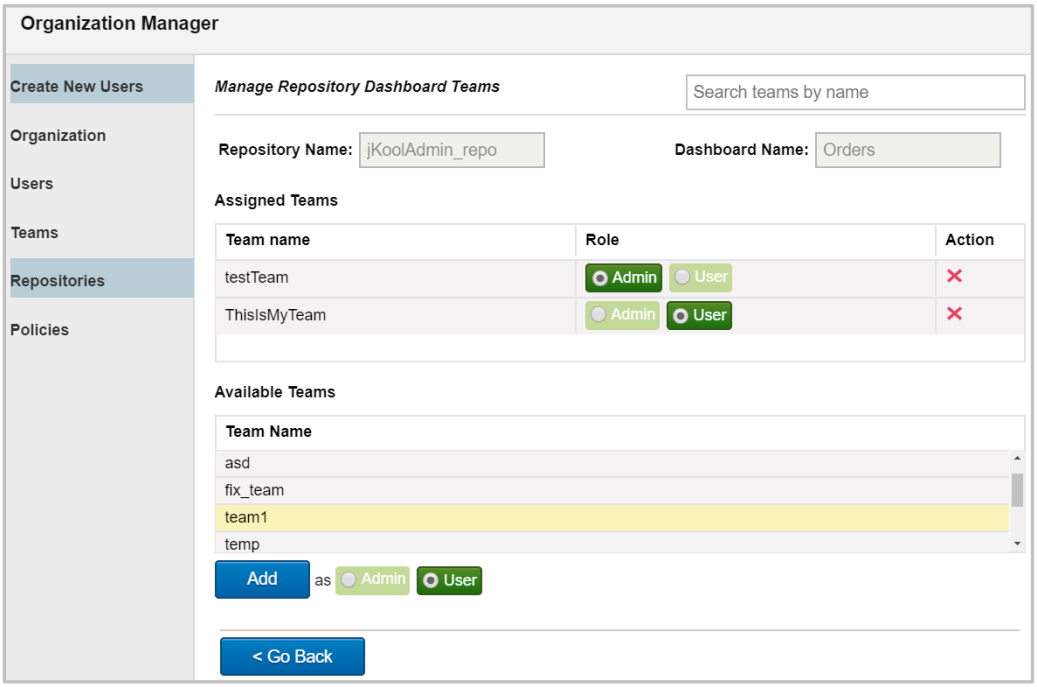

Figure 3.1.3.5.2-C. Manage Repository Dashboard Teams

3.1.3.5.3 Create Repository

On the *Manage Repositories* window (*Figure 3.1.3.5.3-A*), click the **Create** button to add a new repository to the system.

NOTE	On the bottom right corner of the window the total number of current repositories and the maximum limit amount are displayed. Please note that if the repository maximum limit has been met, the **Create** button will be disabled and a warning message in a yellow box with a link for more information will display at the top right corner of the dialog box.

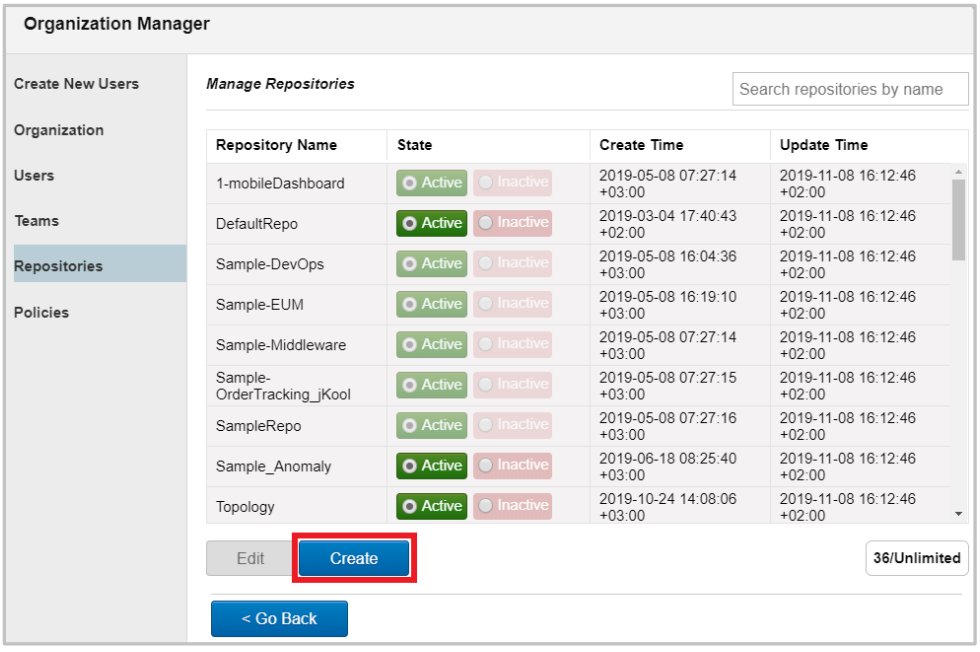

Figure 3.1.3.5.3-A. Create Repository Button

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The *Create Repository* window will appear. Enter a name for the repository that is at least 3 characters long. The exclamation point warning will go away once this criteria is met.
Click **Create**.

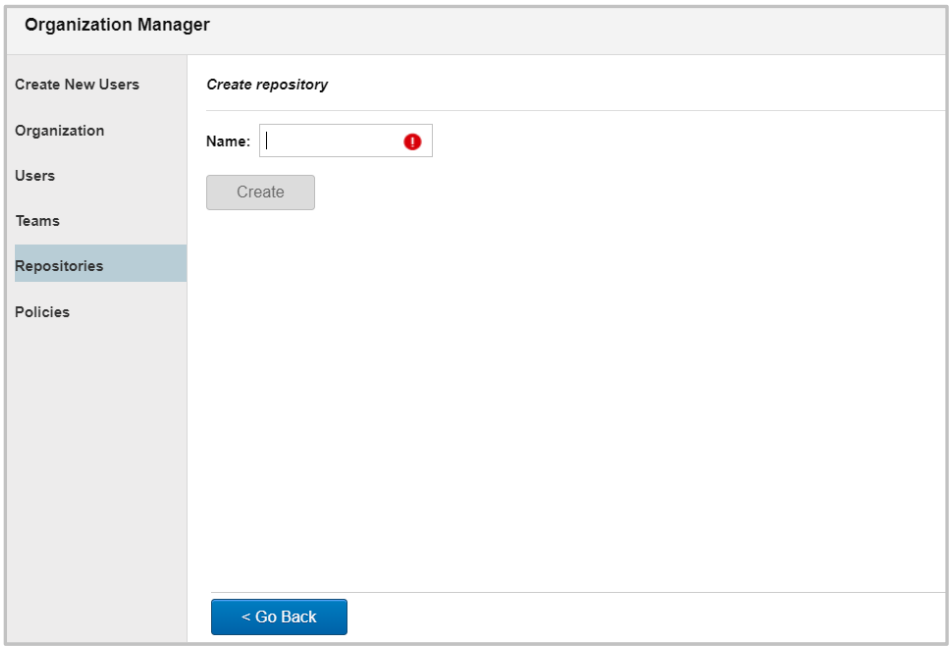

Figure 3.1.3.5.3-B. Create Repository

3.1.3.6 Policies

Select **Policies** from the *Organization Manager* side menu. Users can view the requirements which are being applied for password creation. Editing of these requirements will be available in a future release.

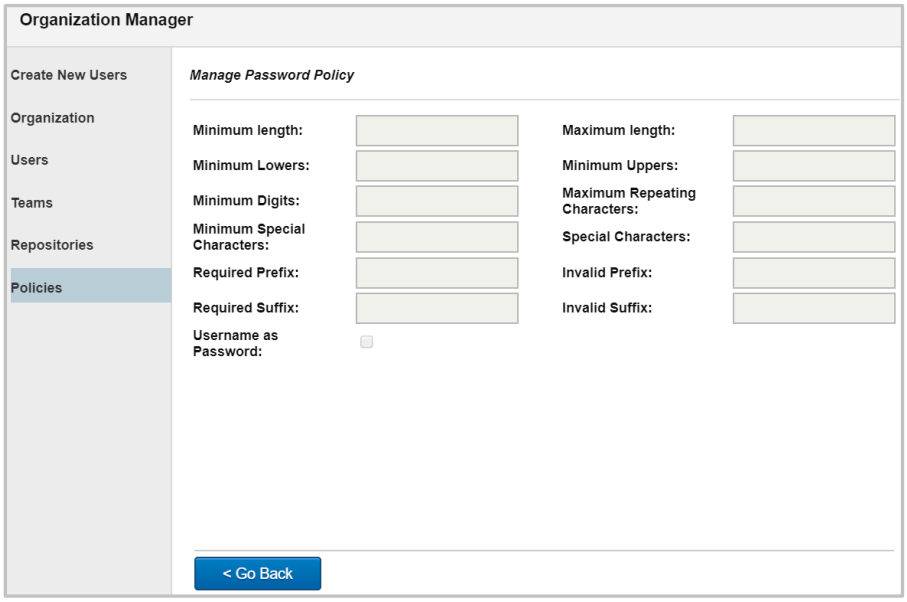

Figure 3.1.3.6-A. Manage Password Policy

3.1.4 Alerts

Select **Alerts** from the side menu of *Admin Settings* (*Figure 3.1-A*) to setup email notifications about events. An explanation of each side menu option on the *Alert Wizard* window is explained in sections 3.1.4.1 – 3.1.4.5 below.

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3.1.4.1 Create an Alert

On the *Alert Wizard* window, select **Create an Alert** from the side menu to create alerts for specific activities or events. In your repository, if you have imported sets with objectives, you will see a list of possible sets. Only one set or sets with the same name can be selected at the same time to be used for the creation of an alert.

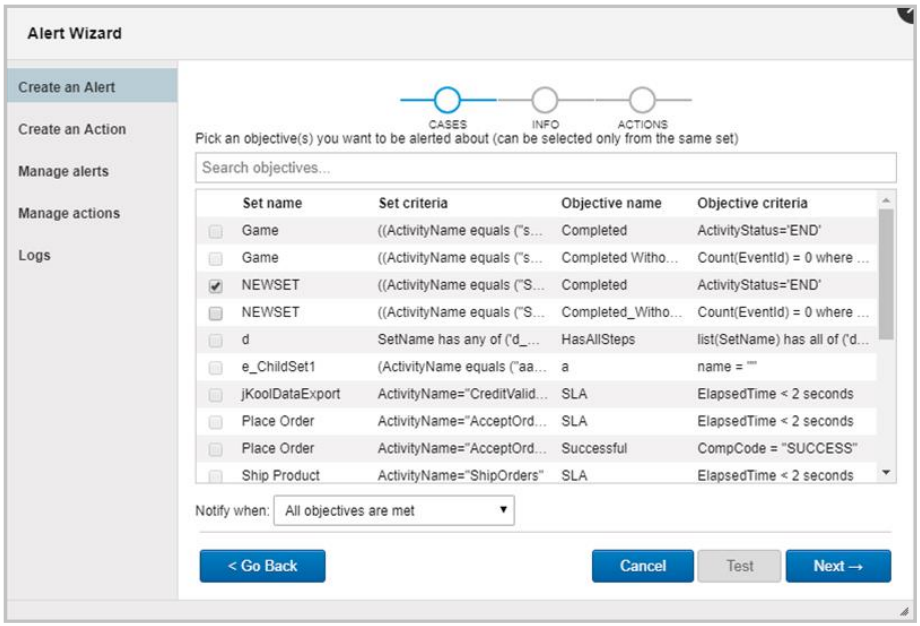

Figure 3.1.4.1-A. Objectives

Select all desired sets. From the **Notify when** drop-down menu, select when to get a notification. Click **Next** to continue configuring.

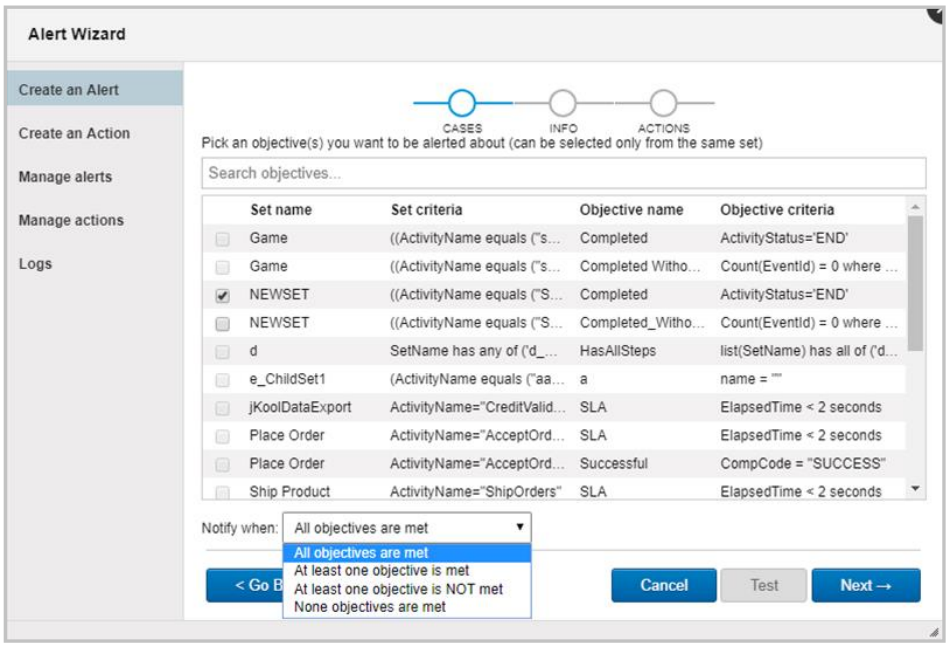

Figure 3.1.4.1-B. Notification

On the next screen, select the severity type from the **Severity** drop-down menu, specify the type of data to monitor – **Activities** or **Events** and how often you would like to get the reports. Click **Next** to continue.

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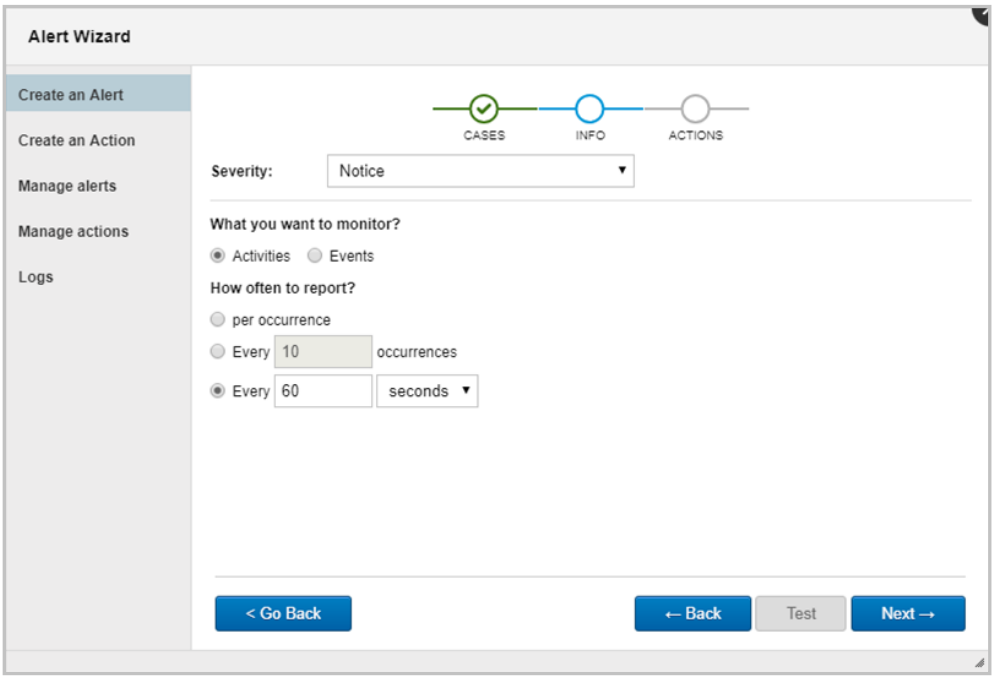

Figure 3.1.4.1-C. Alert Cases

On the next screen, enter the **Name** of the alert, select the **Action type** – whether you would like an alert to be sent by email or to be written to a logfile. Choose the **Action** from the drop-down menu or **Create new** (*see Section 3.1.4.2, Create an Action*).

Within the **Mail To** field, enter the email addresses the alert should be sent to or select emails from the suggestion menu (click the **X** to remove emails).

Modify the **Subject** text and customize the content of the **Message**.

Click **Set default values** button to use predefined values or select the ones to add using the **Browse available placeholders** link immediately below the **Message** field. The *Available placeholders* window is displayed. Copy a placeholder or place your cursor in a message field and click to open this window.

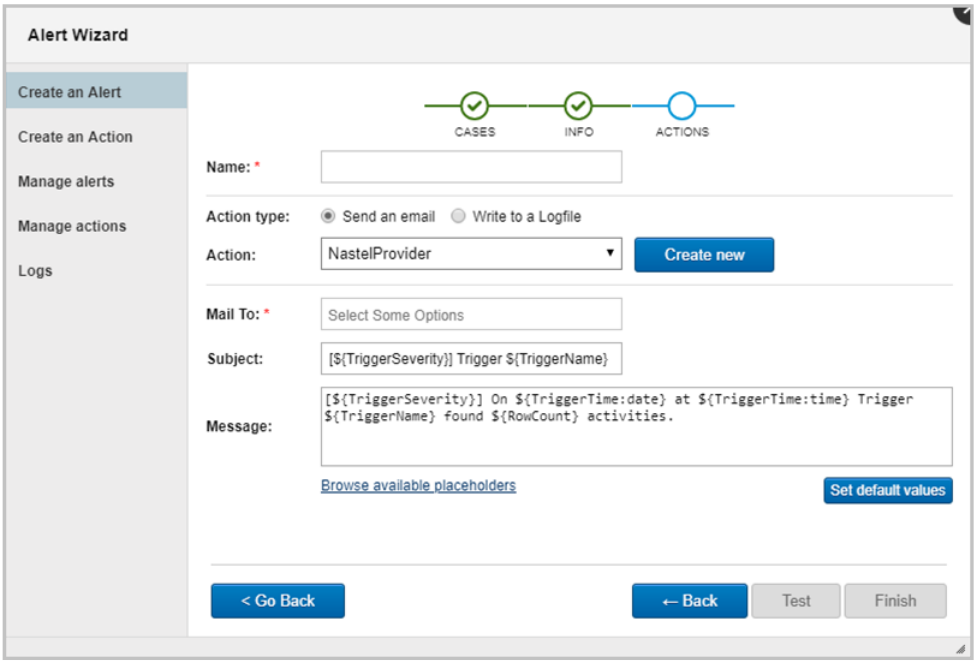

Figure 3.1.4.1-D. Alert Information

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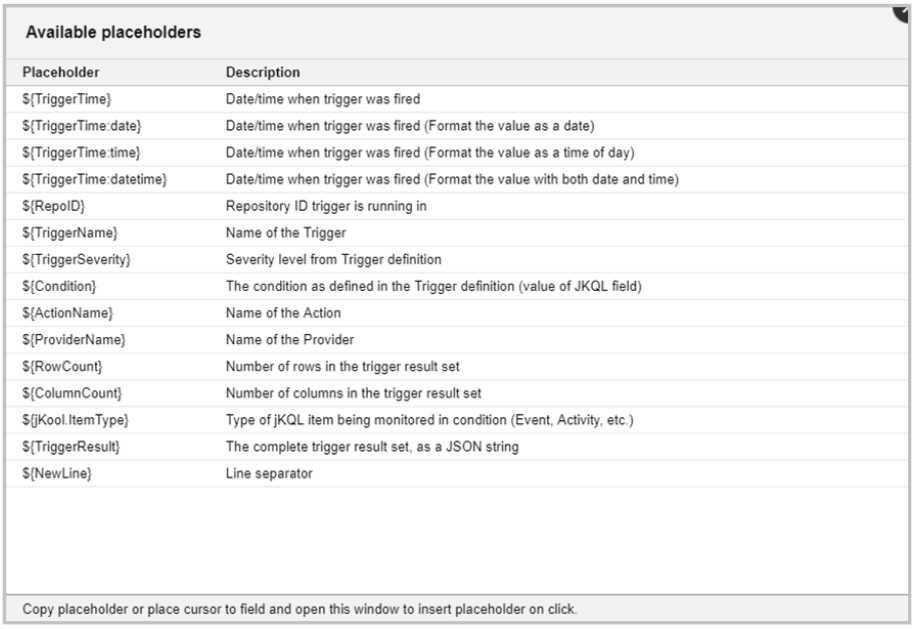

Figure 3.1.4.1-E. Available Placeholders

Back on the *Alert Wizard* window, click the **Test** button (enabled when alert name and email address are specified) to send a test message to your email address.

Click **Finish** to save the newly created alert which is now seen on the window displayed by clicking **Manage alerts** from the side menu.

3.1.4.2 Create an Action

On the *Alert Wizard* window, select **Create an Action** from the side menu to specify the action for alerts. Alerts can either be written to a log file or sent to email.

To create an action for an alert, specify the **Choose action type**.

If **Send an email** was selected, populate the fields within the **Set up your email provider** section. All fields marked with an asterisk are required. If your email provider required to use STARTTLS, check the **Enable STARTTLS** option.

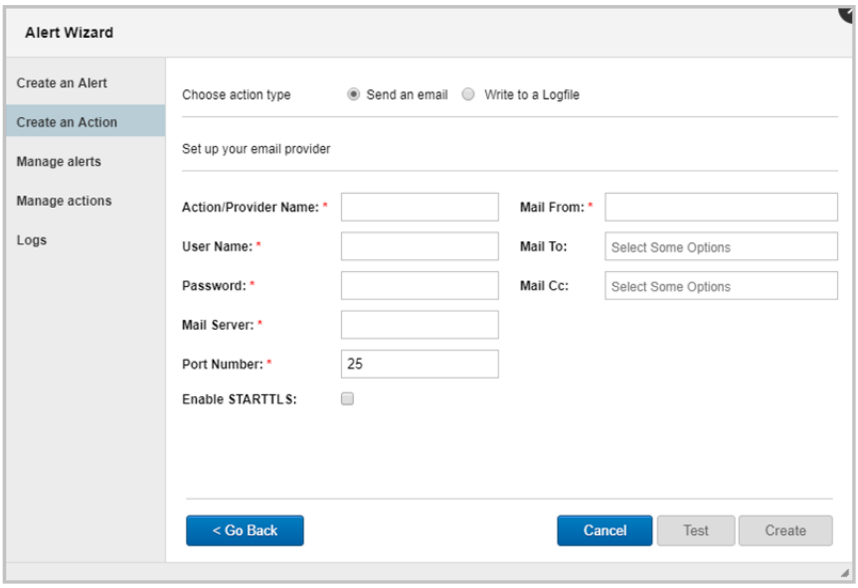

Figure 3.1.4.2-A. Create an Action

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When **Write to a Logfile** is selected (available only in the on-premise version), a window similar to the following appears. Populate all fields. The **Line** field can be filled with placeholders (see *Section 3.1.4.1, Create an Alert* for information on how to add placeholders).

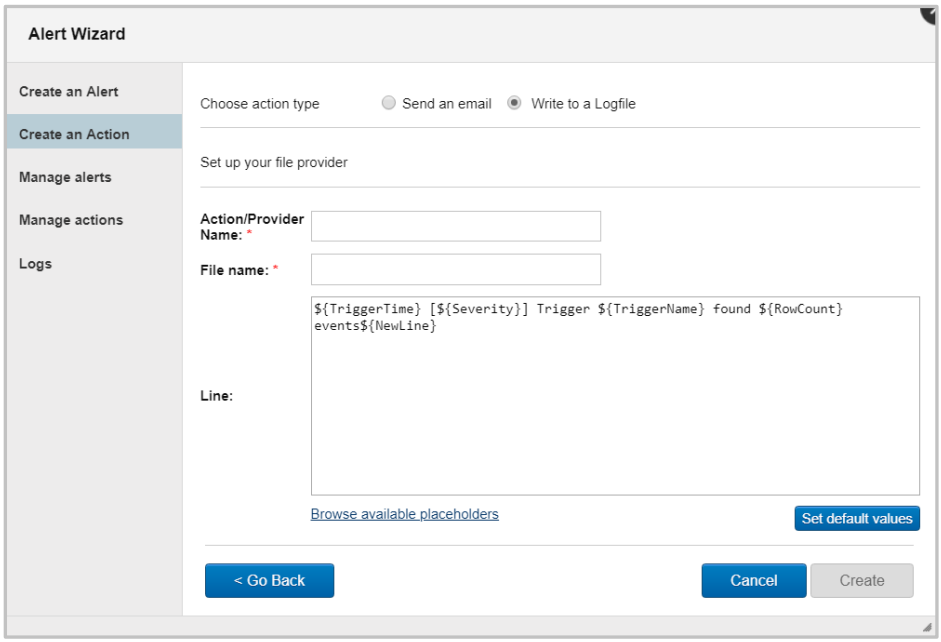

Figure 3.1.4.2-B. Write to a Logfile

A newly created action will appear on the **Manage actions** window.

3.1.4.3 Manage Alerts

On the *Alert Wizard* window, select **Manage alerts** from the side menu to maintain existing alerts. A list of all created alerts is displayed. Manage alert status (Active or Inactive), edit alerts by clicking the pencil icon , delete alerts by clicking the trashcan icon or test an alert by clicking the check icon . Click **Create** to create a new alert (see *3.1.4.1 Create an Alert*).

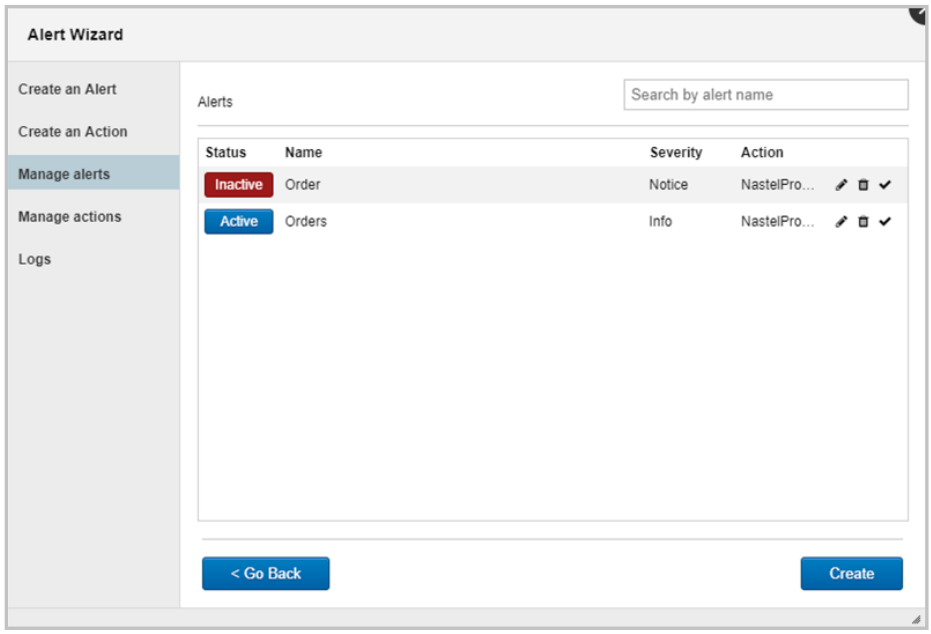

Figure 3.1.4.3-A. Manage Alerts

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3.1.4.3.1 Edit Alert

After clicking the pencil icon to edit a selected alert, the same window seen when creating an alert will display. The only difference is that the **Test** button is now active.

Click the **Go Back** button to modify the previous steps configurations. Click **Test** to send a test notification to your email address (specified on the *Create an Action* window or updated on the *Manage actions* window). Click **Next** to continue editing. After all edits have been made, click **Finish**. See *3.1.4.1 Create an Alert* for detailed instructions.

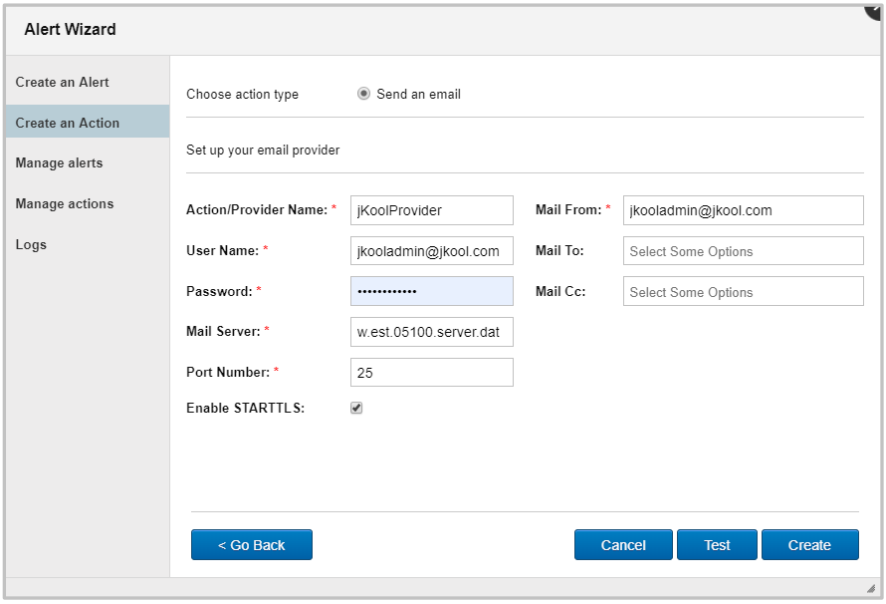

Figure 3.1.4.3.1-A. Edit Alert

3.1.4.4 Manage Actions

On the *Alert Wizard* window, select **Manage actions** from the side menu to view a list of all created actions. Users can edit (, see *Section 3.1.4.2, Create an Action* for more information), delete ( ), copy ( ) or test ( ) selected actions. Click the **Create** button to create a new action.

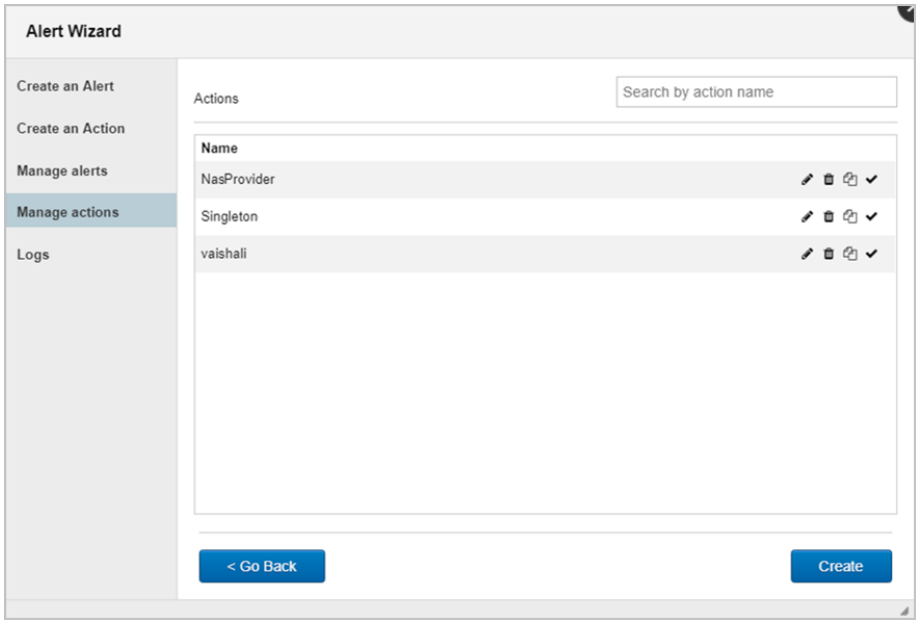

Figure 3.1.4.4-A. Manage Actions

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3.1.4.5 Logs

Sent alert information is displayed when **Logs** is selected from the *Alert Wizard* side menu.

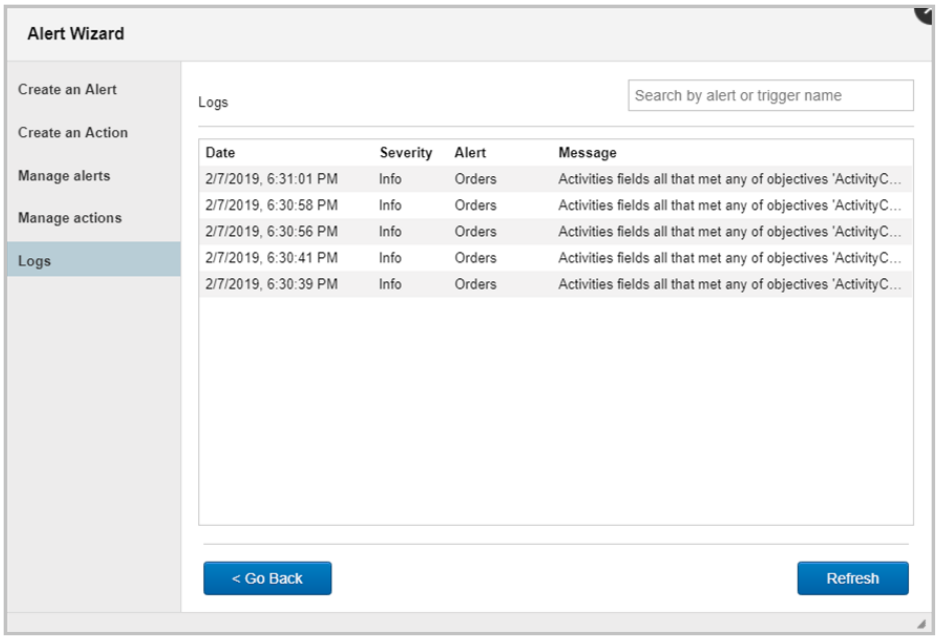

Figure 3.1.4.5-A. Alert Logs

3.1.5 Viewlet

Select **Viewlet** from the side menu of *Admin Settings* (*Figure 3.1.5-A)* to specify maximum data points per viewlet page and maximum data groups in summary viewlets.

Maximum Data Points per Viewlet Page is the specified data amount that can be displayed in each viewlet. When a viewlet has more data records than the specified limit, additional pages will be present to view all data. The amount of data points displayed can be manually changed, see *Section 2.5.8.5, Viewlet Size*, for more information.

The **Maximum Data Groups in Summary Viewlet** defines how many data groups can be combined into one Summary viewlet (see *Section 2.5.4.10, Summary*, for more information on Summary viewlets).

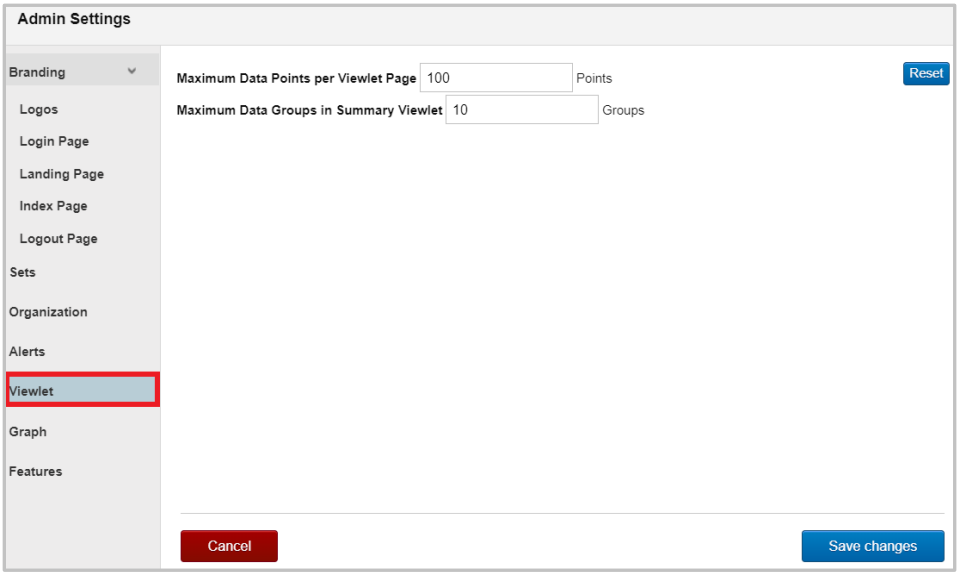

Figure 3.1.5-A. Maximum Data Points and Groups

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3.1.6 Graph

Select **Graph** from the side menu of *Admin Settings* (*Figure 3.1.6-A*) to customize default colors for severity and status fields used in charts.

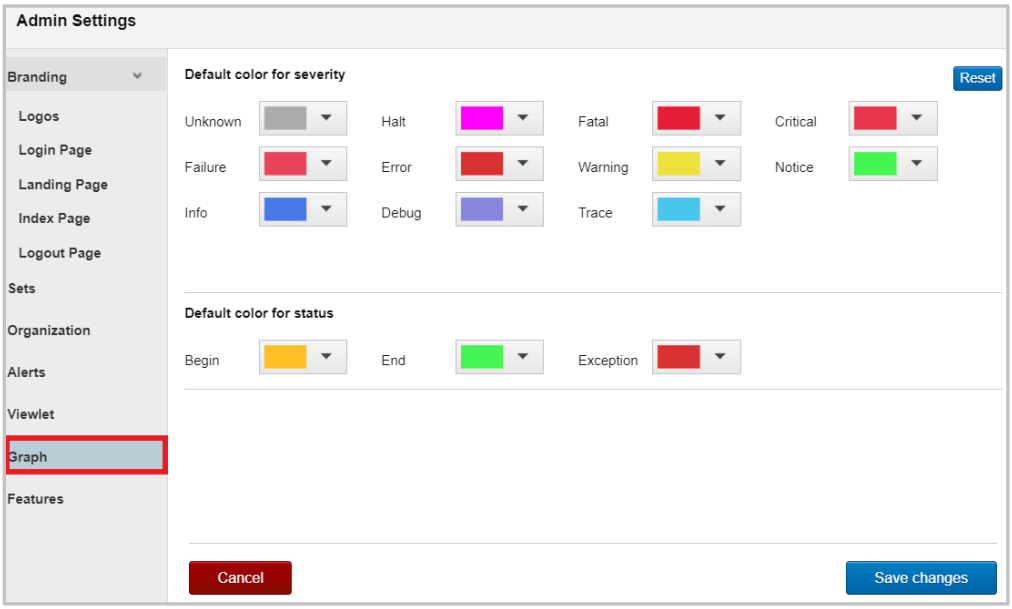

Figure 3.1.6-A. Color Customization

3.1.7 Features

Select **Features** from the side menu of *Admin Settings* (*Figure 3.1.9-A*) to view a list of features which are active and available to your organization.

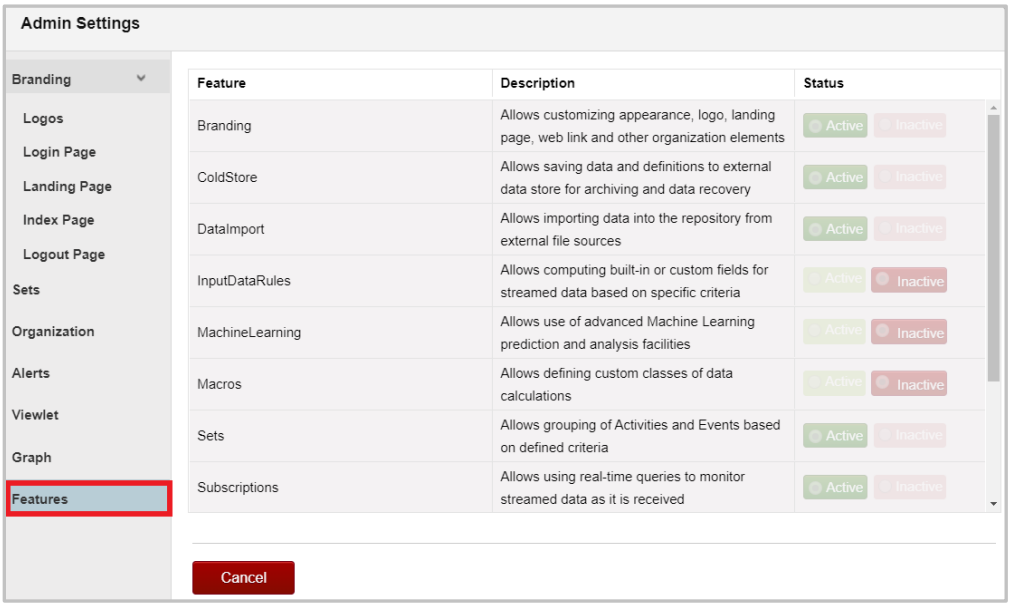

Figure 3.1.7-A. Features

3.2 User Settings

There are settings that can be set at user level. Clicking **User Settings** from the **Main Menu** gives users the following options. See sections 3.2.1 – 3.2.7 for information on each option.

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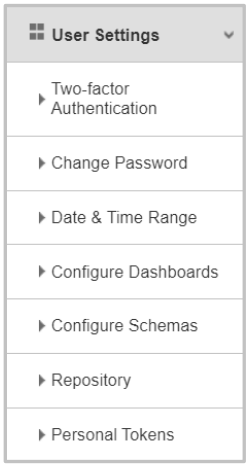

Figure 3.2-A. Main Menu > User Settings

3.2.1 Two-factor Authentication

Two-factor authentication (2FA) is used to ensure a secure login by requiring verification when logging in. A TFA app is required, for example, Google Authentication or FreeOTP.

3.2.1.1 Setup

For each user that will utilize 2FA, perform the following within each user's account to enable this feature:

1. Go to **Main Menu > User Settings > Two-factor Authentication**. The below window opens. Change the **Status** of two-factor authentication to **Enabled** and click **Save**.

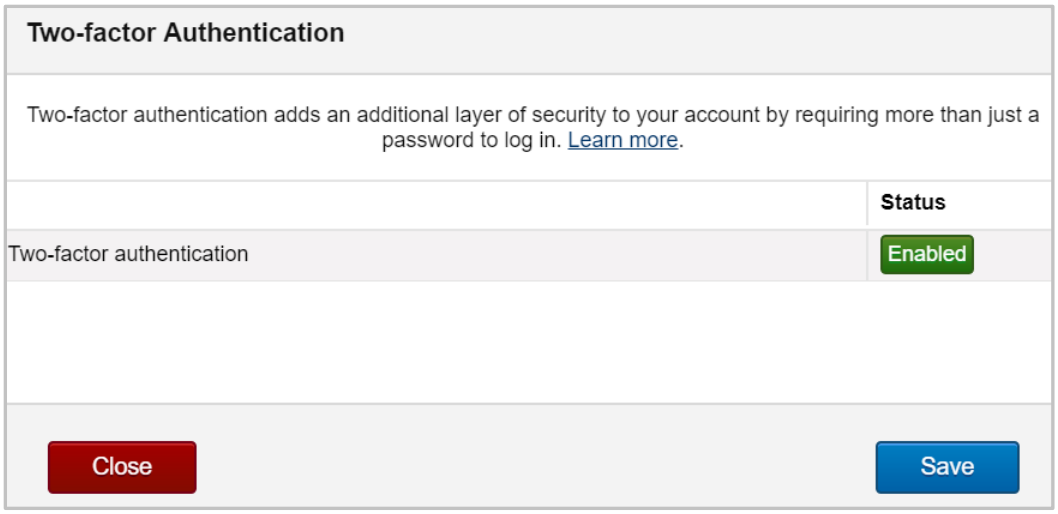

Figure 3.2.1.1-A. Two-factor Authentication

2. You will need to scan your personal token's QR code from your 2FA app. Click the QR icon which displays after saving the 2FA status as enabled. Scan the code with your 2FA app.

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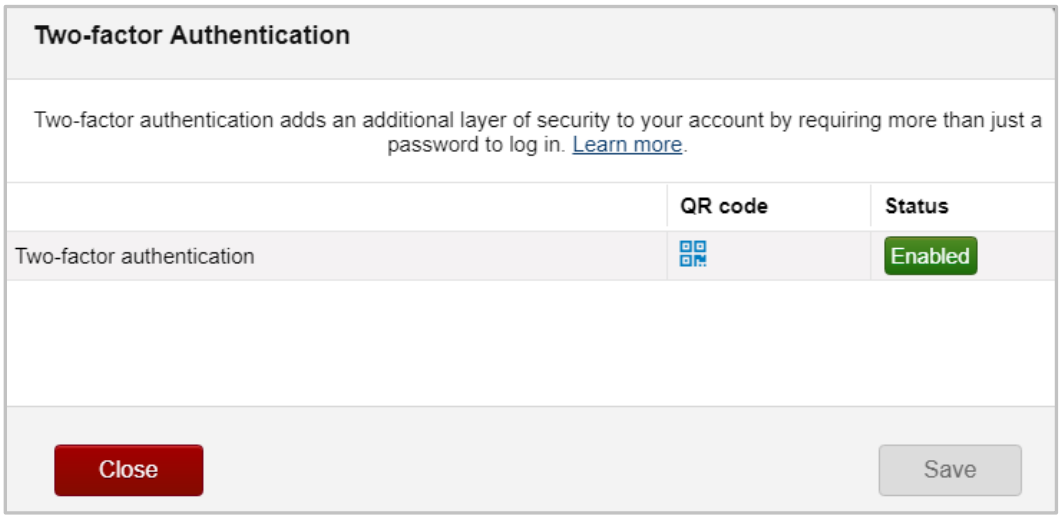

Figure 3.2.1.1-B. Two-factor Authentication – QR Code Generated

Figure 3.2.1.1-C. Two-factor Authentication – QR Code

3. From this point forward, the user will be required to enter a 6-digit code from the 2FA app when logging in.

3.2.1.2 Reset

To disable 2FA for a user, perform the below steps. Only organization users with admin roles have this ability.

1. Go to **Admin Menu** > **Organization** > **Users**.
2. Select the user.
3. Click **Reset two factor authentication** button.

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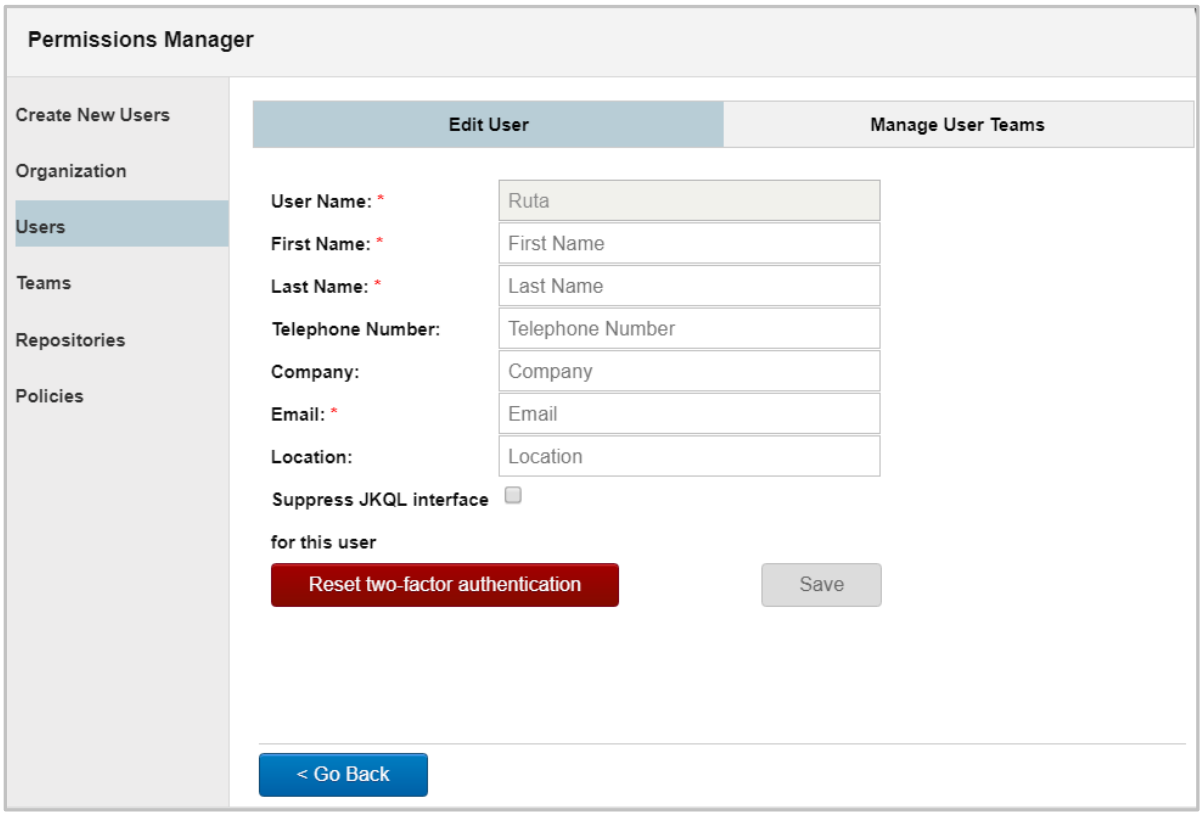

Figure 3.2.1.2-A. Reset Two-factor Authentication

3.2.2 Change Password

To change your user password, go to **Main Menu** > **User Settings** > **Change Password**. The following screen opens. Enter your current password within the **Existing Password** field. Enter your new password within the **New Password** and **Confirm New Password** fields. Click **CHANGE PASSWORD**.

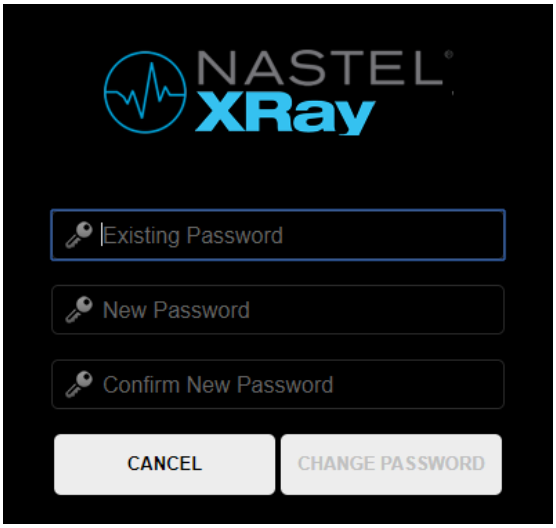

Figure 3.2.2-A. Change Password

3.2.3 Date & Time Range

Set the default date and time range for dashboards and their viewlets for the repository you currently have open. To set the default date and time range, go to **Main Menu** > **User Settings** > **Date & Time**

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Range. Use the options within the drop-down menus (*Figure 3.2.3-A*). For more information see *Section 2.3.5, Default Date & Time Range*).

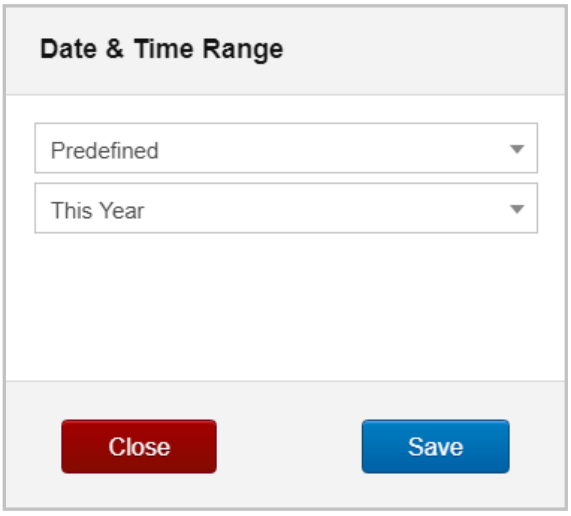

Figure 3.2.3-A. Date & Time Range

Please note that the date and time range of viewlets and dashboards can still be updated, but the update will only be active within the current session. When logging back into the application, the default date and time range specified within the *Date & Time Range* dialog box above will be applied.

3.2.4 Configure Dashboards

The *Configure Dashboards* dialog box is used for customizing a user's dashboards. To open the Configure Dashboard dialog box, go to **Main Menu** > **User Settings** > **Configure Dashboards**. On this dialog box, users have the option to:

- Rename dashboards
- Change dashboard layouts
- Delete dashboards
- Disable / enable the **Summary** panel
- Disable / enable the displaying of the Landing Page
- Specify the refresh interval

3.2.4.1 Rename

To rename a dashboard, go to **Main Menu** > **User Settings** > **Configure Dashboards**. Click the pencil icon of the dashboard you would like to rename.

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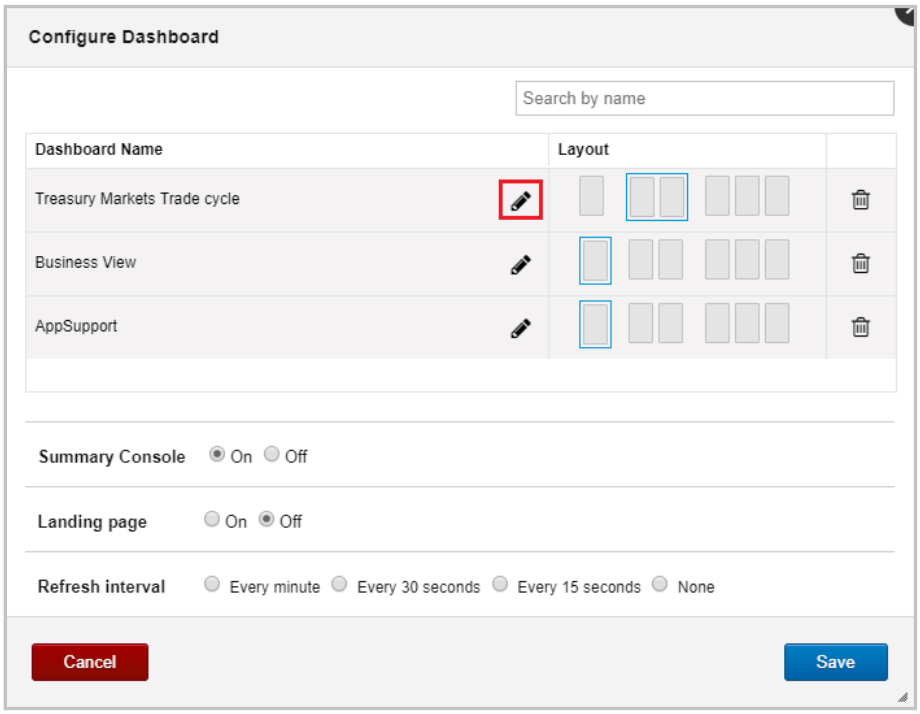

Figure 3.2.4.1-A. Configure Dashboard – Rename Dashboard

Enter a new name and click the check mark ✔. Click **Save**.

3.2.4.2 Change Layout

Dashboard layouts can either be one, two or three columns. To change the layout of a dashboard, go to **Main Menu** > **User Settings** > **Configure Dashboards**.

The **Layout** field of each dashboard will have a blue box around the layout the dashboard is using. To change the layout of a dashboard, simply select the new layout and click **Save**.

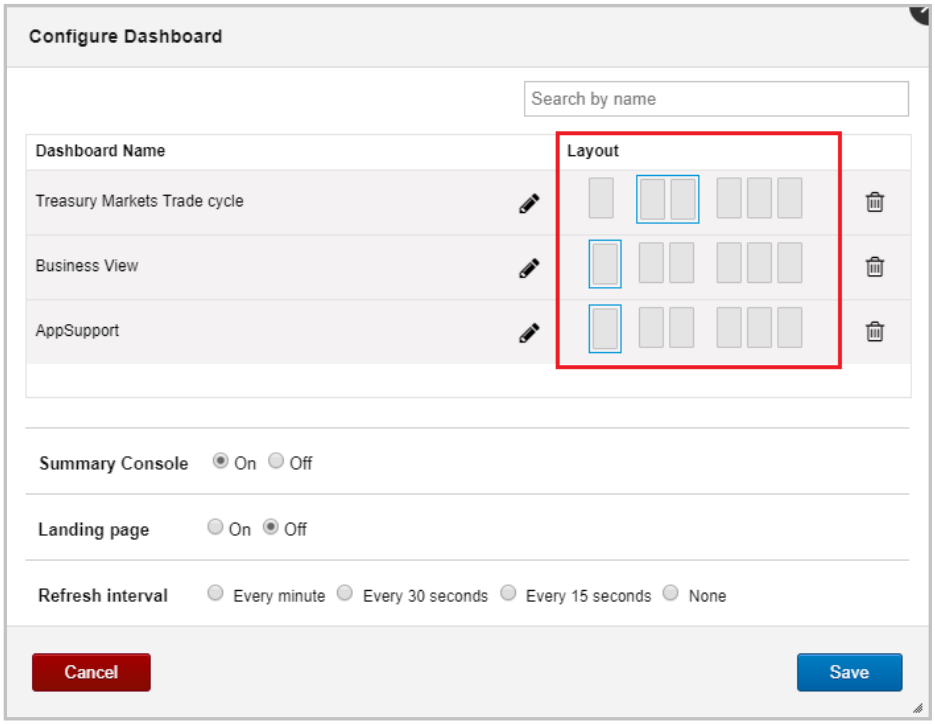

Figure 3.2.4.2-A. Configure Dashboard – Dashboard Layout

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3.2.4.3 Delete Dashboard

To delete a dashboard, go to **Main Menu** > **User Settings** > **Configure Dashboards**. Your list of dashboards will display. Scroll through the list to find the dashboard you would like to delete or use the **Search by name** search field. Click the trash button to delete the selected dashboard.

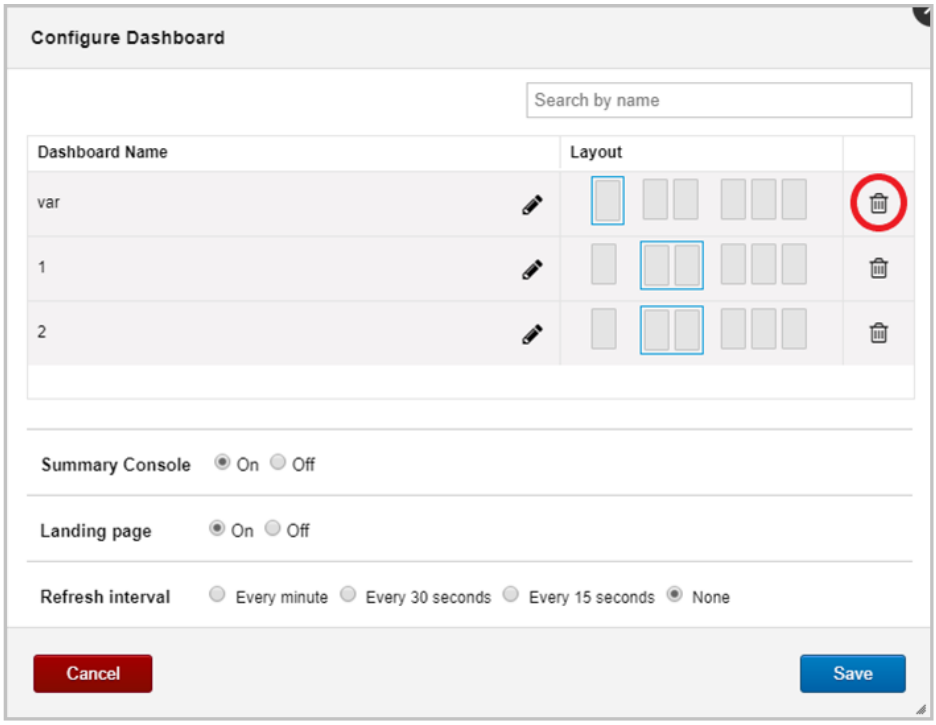

Figure 3.2.4.3-A. Delete Dashboard

After clicking the delete button, an **Undo** button will appear. Click this button if would like to cancel the delete action.

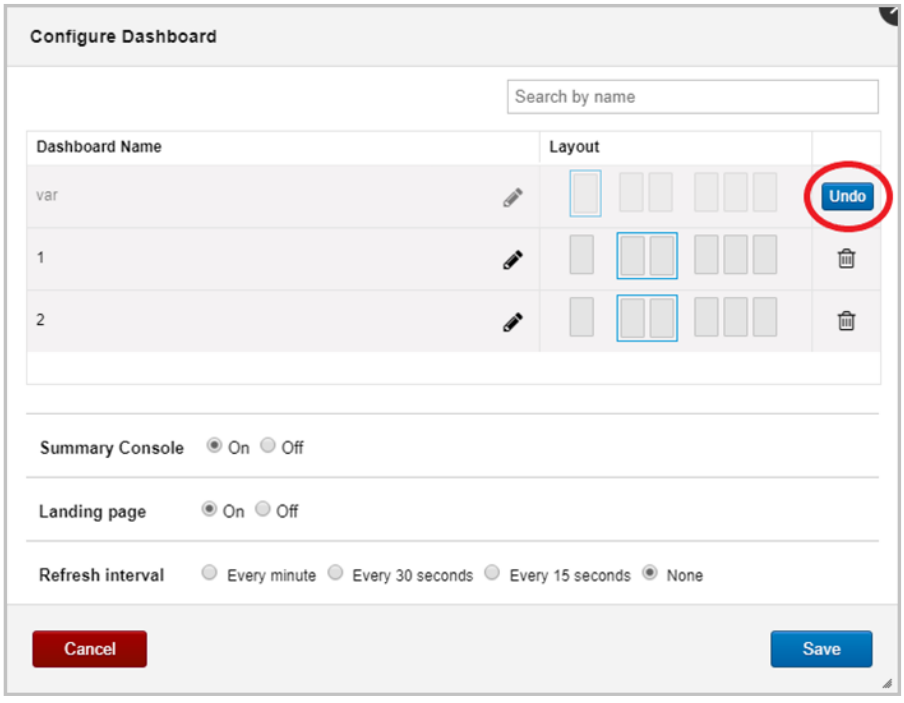

Figure 3.2.4.3-B. Delete Dashboard – Undo

To continue deleting, click **Save**. A confirmation dialog box appears. Click **Yes** to delete.

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Click **No** to close the dialog box. You will be brought back to the *Configure Dashboard* screen where you can click **Undo** to cancel the deletion.

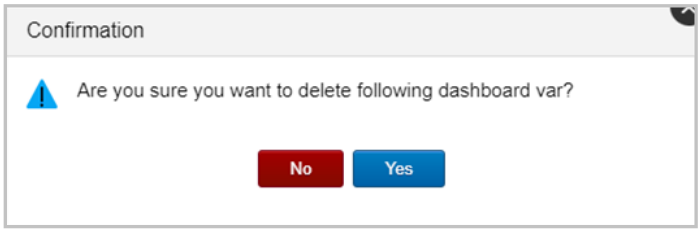

Figure 3.2.4.3-C. Delete Dashboard Confirmation

A confirmation will appear stating that the dashboard has been successfully deleted.

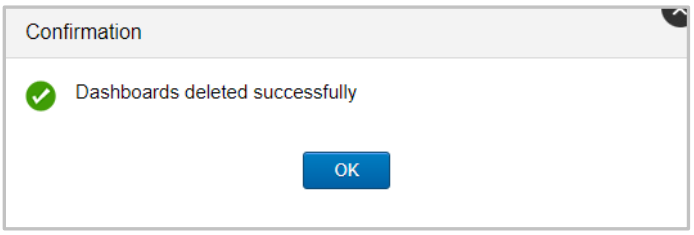

Figure 3.2.4.3-D. Dashboard Successfully Deleted

3.2.4.4 Summary Console

The system can be configured to automatically have the Summary Console displayed or hidden every time you log in. Go to **Main Menu** > **User Settings** > **Configure Dashboards**. For **Summary Console**, select either **On** or **Off**.

Please note that if **Off** is selected, the Summary Console can still be viewed by clicking the **Summary** tab on the dashboard.

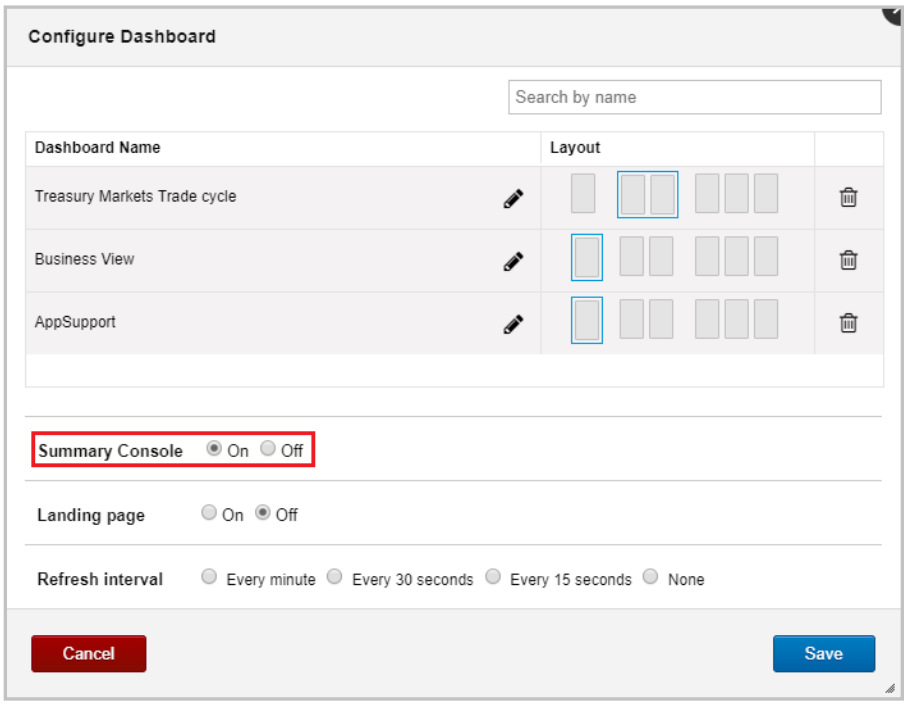

Figure 3.2.4.4-A. Hide Summary Console by Default

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3.2.4.5 Landing Page

The Landing Page displayed when logging into Nastel XRay can be configured to be disabled or always shown. This will allow the user to view their dashboard immediately upon logging in.

Go to **Main Menu** > **User Settings** > **Configure Dashboard**. Within the **Landing Page** section select either **On** or **Off**.

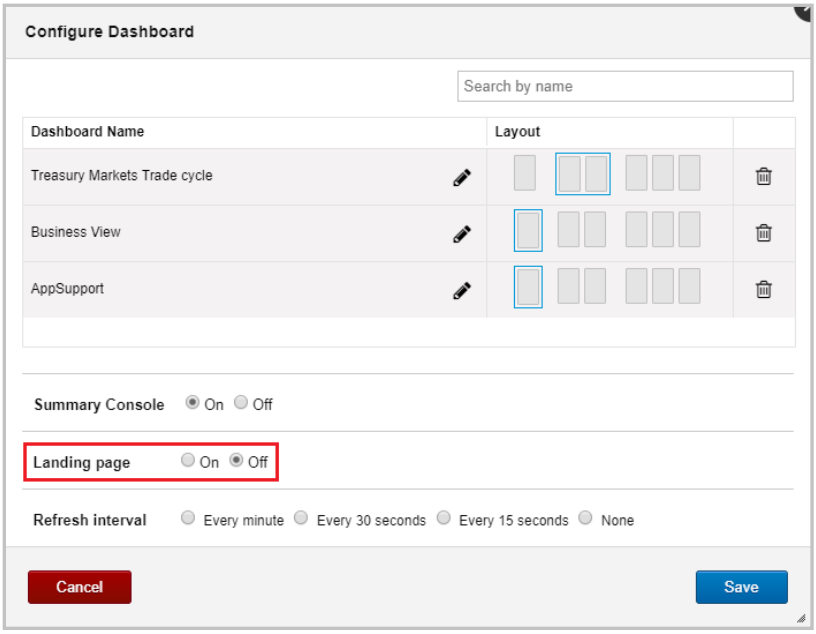

Figure 3.2.4.5-A. Configure Dashboard – Landing Page

3.2.4.6 Refresh Dashboard

The dashboard refresh interval specifies how often viewlets will be refreshed in all dashboards. It is especially useful for viewlets which display real-time data.

To specify the refresh interval, go to **Main Menu** > **User Settings** > **Configure Dashboards**. Within the **Refresh interval** section, select the desired refresh time.

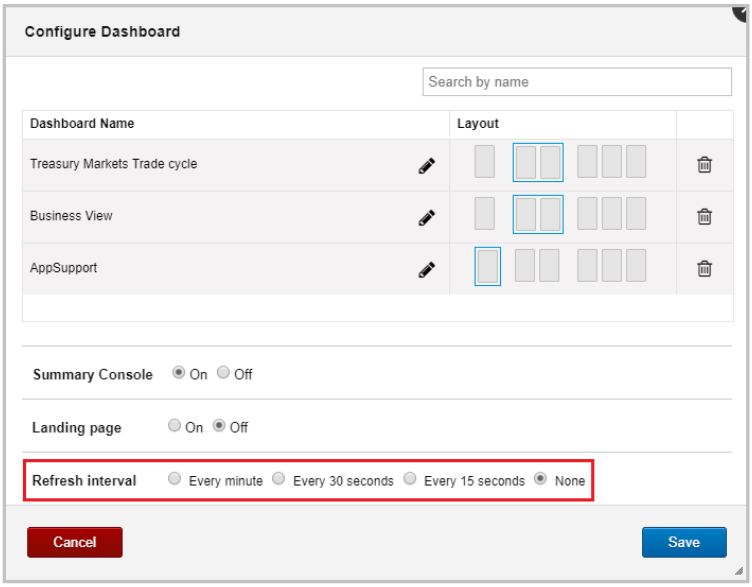

Figure 3.2.4.6-A. Dashboard Refresh Interval

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3.2.5 Configure Schemas

Select **Configure Schemas** from **User Settings** menu to create and maintain data view schemas. Schemas are used to customize how data is displayed in table viewlets using various filters. The **Schemas** window opens.

Click the pencil icon to edit existing schemas. To delete a schema, simply click the trashcan icon. Click the **Create** button to create a new schema (*Section 3.2.5.1, Create / Edit Schema*).

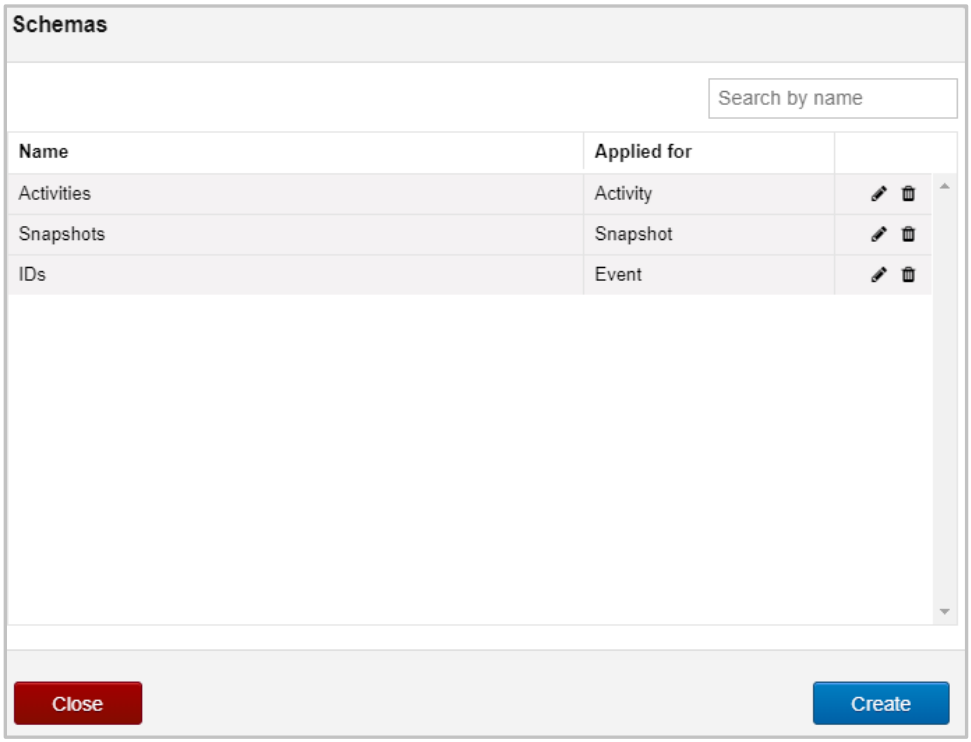

Figure 3.2.5-A. Schemas

3.2.5.1 Create / Edit Schema

To create a schema, click the **Create** button on the *Schemas* window (*Figure 3.2.5-A*). Specify the **Schema Name** (required). Multiple item types can be added to a schema (activity, event, snapshot). To add an item type, select it from the **Item Type** drop-down menu. Add filters to the item type by clicking the **Add fields** button.

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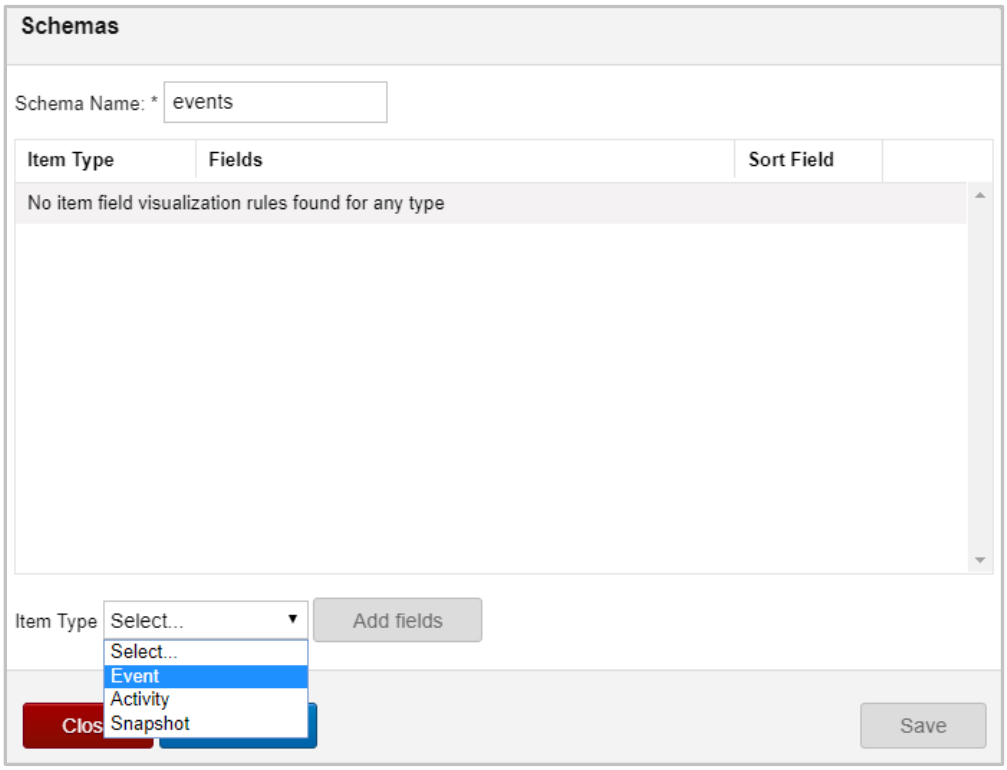

Figure 3.2.5-B. Create New Schema

On the window that opens, users specify what fields should be displayed in viewlets and the order in which they should be displayed.

From the **Available Fields** box located on the left side of the screen, select a field and click the right arrow button » to add the field to the **Selected Fields** section on the right side of the screen. Multiple fields can be selected and added at one time by holding down the **Ctrl** key. Select the **Move all** button with right arrows Move all » to move all available fields.

Use the left arrow button « or the left Move all button « Move all to remove the fields from the **Selected Fields** section.

On the right side of the **Selected Fields** section, use **Move to Top**, **Move to Bottom**, **Move Up** and **Move Down** arrows to change the field sequence. This is the order the fields will appear in viewlets.

In the **Current item type fields sorted by** drop-down menu, all fields within the **Selected Fields** section will appear. Select a field to be used as the main field for sorting viewlets.

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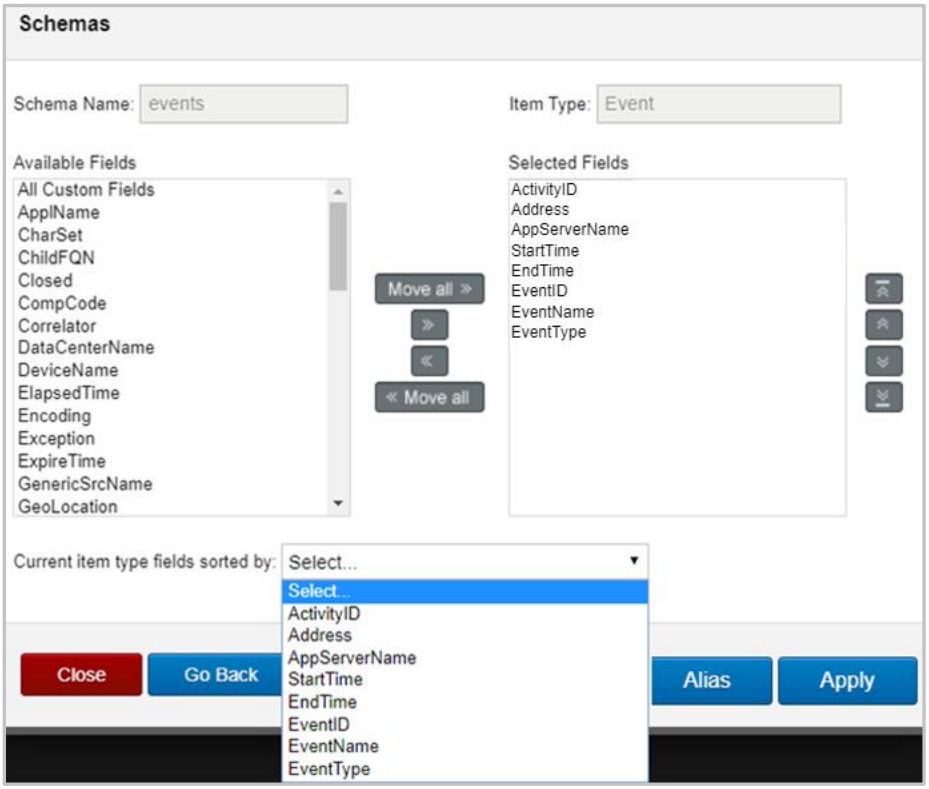

Figure 3.2.5-C. Add Fields for Schema

You can specify alias names for the selected fields. These names will display in viewlets instead of the default names of the fields. To do this, click the **Alias** button. A screen opens listing all fields that were selected. Enter the alias name for all desired fields. If you do not want an alias name used for a field, simply leave it blank. In the below example, EventID will display as "ID" and EventName will display as "Name" in viewlets.

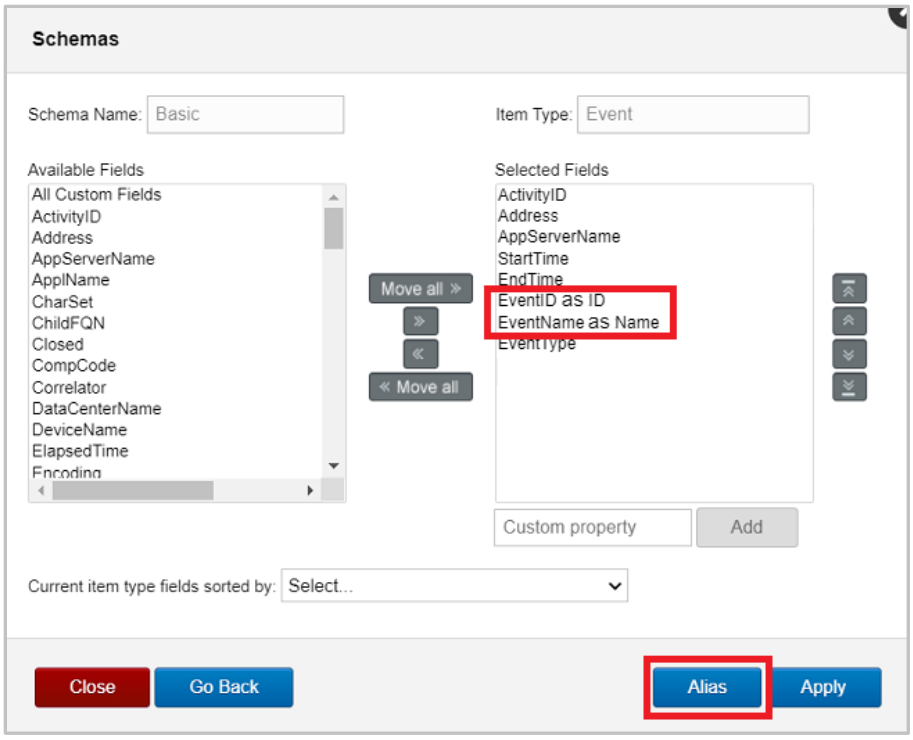

Figure 3.2.5-D. Alias Names

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Click **Apply** when you are finished.

In the following window the summary details of your newly created schema appears. Click the pencil icon to edit, or the trashcan icon to delete this schema. Click **Save** to save the configurations done.

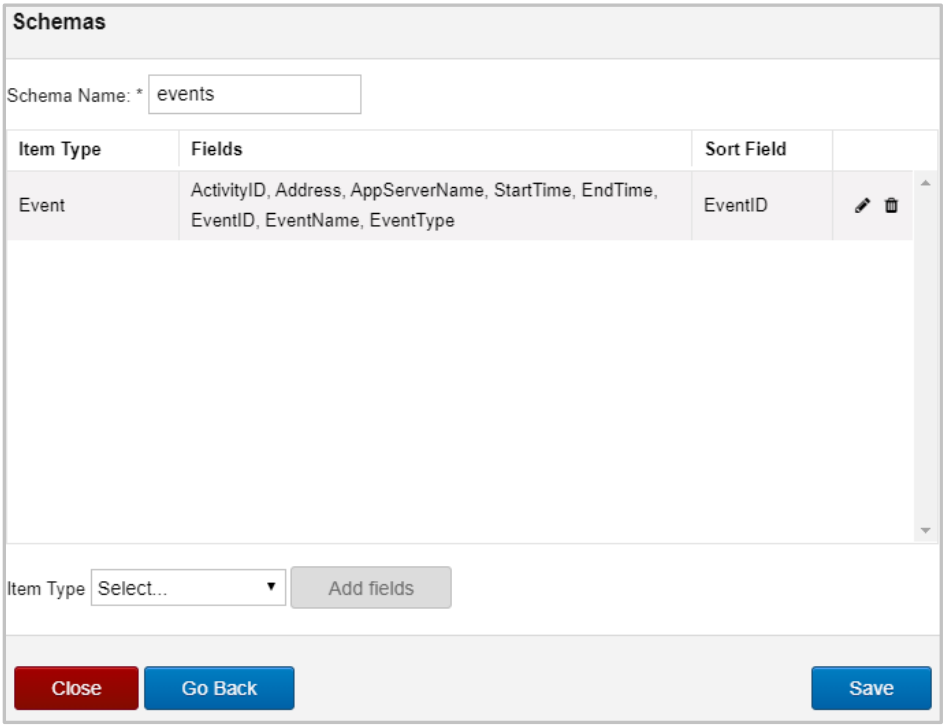

Figure 3.2.5-E. Schema Summary

The created schema now appears in a schemas' list. See *Section 2.4.2.8, Change Layout*, to learn how to apply a schema to a dashboard's viewlets.

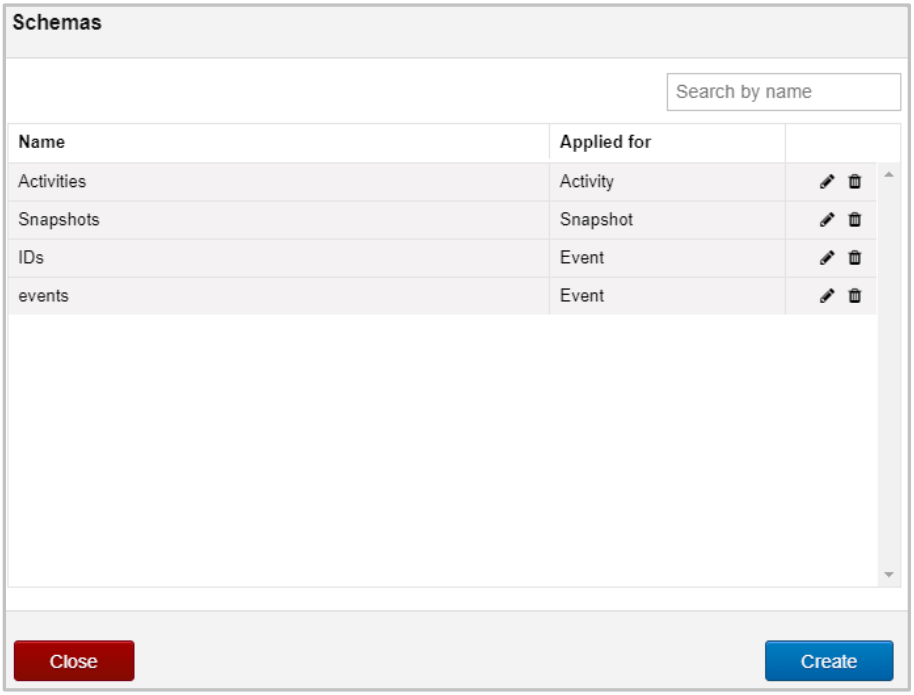

Figure 3.2.5-F. Schemas List

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3.2.6 Repository

A repository can be specified as the default repository so that every time you log into Nastel XRay, the repository will automatically be loaded. Go to **Main Menu** > **User Settings** > **Repository**. The *Repository* dialog box opens. Select a repository from the drop-down menu and click **Save**. From this point forward, the selected repository will be loaded when logging into Nastel XRay.

Figure 3.2.6-A. Default Repository

3.2.7 Personal Tokens

Go to **Main Menu** > **User Settings** > **Personal Tokens** to view all tokens. Please note that the **Personal Tokens** option is only available on the **User Settings** menu when using a non-Global repository. Maintain existing tokens and generate new tokens with unique QR codes for repositories. Personal tokens with QR codes are useful for users of the mobile Nastel XRay application.

When **Stream** status is set to **Active**, real-time data will be supported. When **Query** status is set to **Inactive**, Nastel XRay API users using this token will not have the ability to run queries.

Click arrows to show / hide token information. Click the eye to show / hide the full token. Click the copy icon to copy a token to a clipboard.

Figure 3.2.7-A. Personal Tokens

Click the blue square icon within the **Action** column display the QR code.

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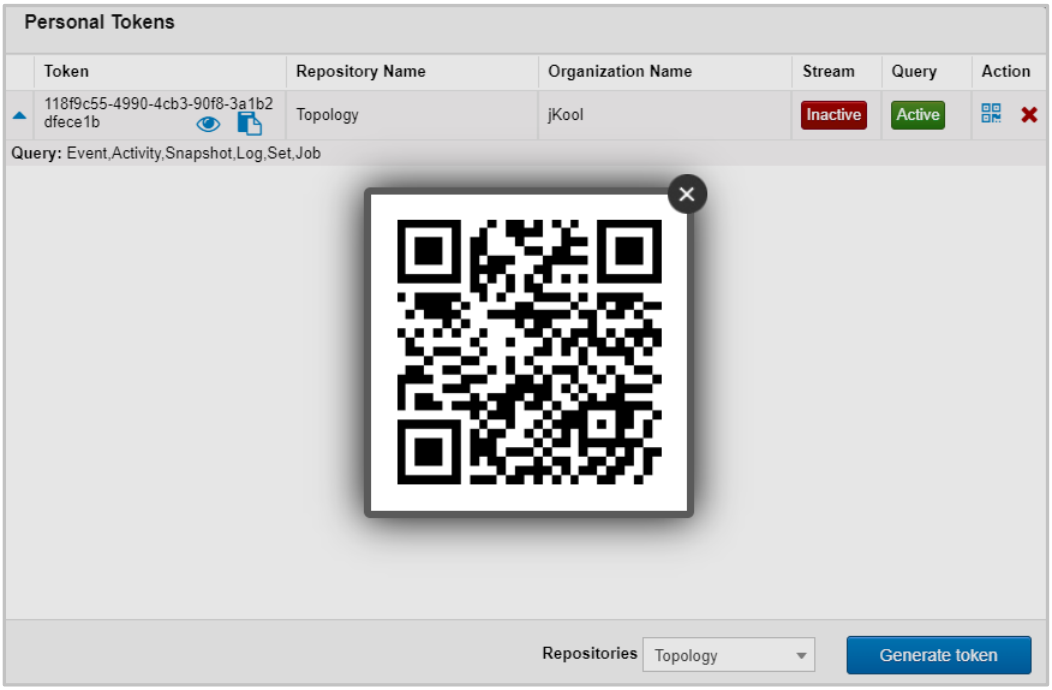

Figure 3.2.7-B. Personal Tokens – Display QR Code

To generate a new token with a unique QR code for a repository, select a repository from the **Repositories** drop-down menu and click **Generate token**.

Click the red **X** button to delete a token.

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Chapter 4: Functions

See below sections for the library of functions available in Nastel XRay.

4.1 General Functions

Table 3. General Functions

Function	Definition

`Cast(`***`expr`***`,`***`type`***`)`	Converts ***`expr`*** to the specified ***`type`***, where `type` is one of the following:
	`BINARY`
	`BOOLEAN`
	`DECIMAL`
	`INTEGER`
	`STRING`
	`TIMESTAMP`
	`TIMEINTERVAL`
	If ***`expr`*** cannot be converted to the specified ***`type`***, then `NULL` is returned.

`Coalesce(`***`expr`***`, ...)`	Returns the first non-`NULL` argument, or `NULL` if all arguments are `NULL`.
`Convert(`***`expr`***`,`***`type`***`)`	Synonym for `Cast`.
`FindIn(`***`item`***`,`***`list`***`)`	Returns the 0-based index of ***`item`*** in ***`list`***. If ***`item`*** is not found, returns -1.
`UUID()`	Returns a newly-generated UUID.
`ValueAt(`***`pos`***`,`***`list`***`)`	Returns the item in 0-based position ***`pos`*** in ***`list`***. Returns null if ***`pos`*** is negative or >= ***`list`*** size.

4.2 Numeric Functions

Table 4. Numeric Functions

Function	Definition
`Abs(`***`x`***`)`	Returns the absolute value of ***`x`***.
`Ceil(`***`x`***`)`	Return the smallest integer value not less than ***`x`***.
`Ceiling(`***`x`***`)`	Synonym for `Ceil`.
`Exp(`***`x`***`)`	Returns Euler's number *e* raised to the power ***`x`*** (e^x) .

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`Floor(`***x***`)`	Returns the largest integer value not greater than ***x***.
`Ln(`***x***`)`	Returns the natural logarithm of ***x***.
`Log(`***x***`)`	Synonym for `Ln`.
`Log10(`***x***`)`	Returns the base-10 logarithm of ***x***.
`Pow(`***x***`,`***y***`)`	Synonym for `Power`.
`Power(`***x***`,`***y***`)`	Returns `x` raised to the power ***y*** (x^y).
`Round(`***x***`)`	Returns the closest integer to ***x***.
`Sqrt(`***x***`)`	Returns the square root of ***x***.

4.3 String Functions

Table 5. String Functions

Function	Definition
`Concat(`*expr*`,`*expr*`,...)`	Returns the string resulting from concatenating the string representation of each *expr* in order. `NULL` values are skipped.
`ConcatWS(`*sep*`,`*expr*`,`*expr*`,...)`	Returns the string resulting from concatenating the string representation of each *expr* in order, with each value being separated by *sep*, which must be a `STRING`. `NULL` values are skipped.
`Lcase(`*expr*`)`	Synonym for `Lower`.
`Left(`*expr*`,`*len*`)`	Returns the left-most *len* characters from string representation of *expr*.
`Len(`*expr*`)`	Synonym for `Length`.
`Length(`*expr*`)`	Returns the length of the specified *expr*. If *expr* is a list, returns the number of items in the list. Otherwise, returns the number of characters in the string representation of *expr*.
`Locate(`*expr*`,`*substr*`,` `[`*pos*`,[`*occ*`]])`	Synonym for `Position`.
`LocateRE(`*expr*`,`*regex*`,` `[`*pos*`,[`*occ*`]])`	Synonym for `PositionRE`.
`Lower(`*expr*`)`	Returns the lower-case string representation of *expr*.
`Position(`*expr*`,`*substr* `[,`*pos*`[,`*occ*`]])`	Returns the 0-based index of the *occ* occurrence (default is 1) of *substr* in string representation of *expr*, starting at 0-based

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	position *pos* (defaults to 0). Returns -1 if number of required occurrences of *substr* are not found.
PositionRE(*expr*,*regex* [,*pos*[,*occ*]])	Returns the 0-based index of the *occ* occurrence (default is 1) of substring matching *regex* in string representation of *expr*, starting at 0-based position *pos* (defaults to 0). Returns -1 if number of required occurrences of *substr* are not found.
Replace(*expr*,*substr* [,*repl*[,*pos*]])	Replaces each occurrence of *substr* in string representation of *expr*, starting at 0-based position *pos* (defaults to 0), with *repl*. If *repl* is not specified, then each occurrence of *substr* is removed.
Right(*expr*,*len*)	Returns the right-most *len* characters from string representation of *expr*.
StrAt(*expr*,*pos*[,*sep*])	Returns the string at 0-based position *pos* from result of splitting string representation of *expr* using *sep* as element separator. If *sep* is not specified, then string representation of *expr* is treated as a simple character array, and returns the character at *pos* as a string.
SubStr(*expr*,*start*[,*end*])	Returns the substring from string representation of *expr*, starting at 0-based position *start* inclusive, ending at position *end*, exclusive. If *end* is not specified, then defaults to end of *expr*.
SubStrRE(*expr*,*regex* [,*pos*[,*occ*]])	Returns the *occ* (occurrence), or regex group (default is 1) of the substring from string representation of *expr*, starting at 0-based position *pos* (defaults to 0). Returns NULL if number of required occurrences of substring matching *regex* are not found.
Tokenize(*expr*[,*sep*])	Returns the list of strings formed by splitting the string representation of *expr* with *sep* being the separator between tokens (default is ",").
Ucase(*expr*)	Synonym for Upper.
Upper(*expr*)	Returns the upper-case string representation of *expr*.

4.4 Date and Time Functions

Table 6. Date and Time Functions

Function	Definition
CurrentTime()	Synonym for Now.
CurTime()	Synonym for Now.
DateAdd(*tstamp*,*intvl*)	Adds time interval *intvl* to timestamp *tstamp*, returning the resulting timestamp.

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DateAdjust(*tstamp*,*cal*[,*dir*])	Returns the timestamp resulting from adjusting the specified *tstamp*, based on the specified calendar component *cal* and the adjustment direction *dir*. *cal* is one of: YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, MILLISECOND, MICROSECOND, WEEK dir is one of: START, END (if omitted, defaults to START) Example: DateAdjust(StartTime, 'DAY', 'START') returns the start of the day for timestamp in StartTime field.
DateDiff(*tstamp1*,*tstamp2*)	Returns the difference between the 2 timestamps (*tstamp1* – *tstamp2*) as a time interval.
DateExtract(*tstamp*,*cal*)	Returns the value of the specified calendar component *cal* from timestamp *tstamp*. *cal* is one of: YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, MILLISECOND, MICROSECOND, WEEK
DayOfWeek(*tstamp*)	Returns the day of the week that timestamp *tstamp* falls on.
Now()	Returns current time as a timestamp.

4.5 Built-in Aggregate Functions

Table 7. Built-in Aggregate Functions

Function	Definition
Apdex([DISTINCT] *expr*, *target*[,*tolerable*])	Returns the Apdex (Application Performance Index), which is a measure of satisfaction level, in the range 0.0 – 1.0, of the set of values for *expr* based on target value *target* and tolerable value *tolerable*, where 0.0 means totally unacceptable and 1.0 means totally satisfied. The target value is the value such that all values below it are satisfactory, or acceptable, values. The tolerable value is the value at or below which the values are tolerable. This value defaults to 4 times target value.

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	The Apdex formula is defined as follows: $$Apdex = \frac{SatisfiedCount + 0.5(ToleratedCount)}{TotalCount}$$ Where: *SatisfiedCount* is the number of `expr` values < `target` *ToleratedCount* is the number of `expr` values >= `target` and <= `tolerable` *TotalCount* is the total number of `expr` values (including those that are > `tolerable`). If `DISTINCT` is specified, returns the Apdex value from set of distinct values.
`Average([DISTINCT] expr)`	Synonym for `Avg`.
`Avg([DISTINCT] expr)`	Returns the average of all `expr` values for group. If `DISTINCT` is specified, returns the average of distinct set of values.
`Close([DISTINCT] expr [,basedon])`	Returns the "closing" or "ending" value of `expr`, which is the value of `expr` having the maximum value of `basedon` expression. If `basedon` is not specified, then the default date field for item type in statement is used. `DISTINCT` is accepted, but is ignored.
`Count([DISTINCT] expr)`	Returns the number of `expr` values for group. If `DISTINCT` is specified, returns the number of distinct values.
`List([DISTINCT] expr)`	Returns the comma-separated list of all `expr` values. If `DISTINCT` is specified, returns the list of distinct values.
`Max([DISTINCT] expr)`	Returns the maximum of `expr` values for group. `DISTINCT` is accepted, but is ignored.
`Maximum([DISTINCT] expr)`	Synonym for `Max`.
`Mean([DISTINCT] expr)`	Synonym for `Avg`.
`Median([DISTINCT] expr)`	Returns the "middle" value, based on sorted order of all values for `expr`. If `DISTINCT` is specified, returns the middle value from set of sorted distinct values.
`Min([DISTINCT] expr)`	Returns the minimum of `expr` values for group. `DISTINCT` is accepted, but is ignored.
`Minimum([DISTINCT] expr)`	Synonym for `Min`.
`Open([DISTINCT] expr`	Returns the "opening" or "starting" value of `expr`, which is the value of `expr` having the minimum value of `basedon`

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[,*basedon*])	expression. If *basedon* is not specified, then the default date field for item type in statement is used. DISTINCT is accepted, but is ignored.
StdDev([DISTINCT] *expr*)	Synonym for StdDevPop.
StdDevPop([DISTINCT] *expr*)	Returns the population standard deviation of all values for *expr*. If DISTINCT is specified, returns population standard deviation of distinct set of values.
StdDevSample([DISTINCT] *expr*)	Returns the sample standard deviation of all values for *expr*. If DISTINCT is specified, returns sample standard deviation of distinct set of values.
Sum([DISTINCT] *expr*)	Returns the sum of all *expr* values for group. If DISTINCT is specified, returns the sum of distinct set of values.
Var([DISTINCT] *expr*)	Synonym for VariancePop.
Variance([DISTINCT] *expr*)	Synonym for VariancePop.
VariancePop([DISTINCT] *expr*)	Returns the population variance of all values for *expr*. If DISTINCT is specified, returns population variance of distinct set of values.
VarianceSample([DISTINCT] *expr*)	Returns the sample variance of all values for *expr*. If DISTINCT is specified, returns sample variance of distinct set of values.
VarPop([DISTINCT] *expr*)	Synonym for VariancePop.
VarSample([DISTINCT] *expr*)	Synonym for VarianceSample.

4.6 Built-in Analytic Functions

Table 8. Built-in Analytic Functions

Function	Definition
Anomaly(*expr, season*)	Will detect an anomaly on the value of expr. This function uses Netflix RAD Outlier detection which requires a season. The season will be either 'day/week' or 'hour/day'. Queries using this function must group by a time and bucket by either week or day (depending on the season chosen). For example: `Get activity compute anomaly avg(ElapsedTime),'day/week') where name = 'Orders' and startTime > '2017-01-02' and starttime < '2017-02-01' group by starttime bucketed by day`
anomalyDeepDiveRogueEdges()	Once an anomaly is detected, anomalyDeepDiveRogueEdges can provide further insight into why the anomaly occurred. It will return records which when shown as a topology in the Nastel XRay UI, will color red and edges that contain numeric values that deviate from the norm for the edge by a specified margin.

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`Average(`*`expr`*`)`	Synonym for `Avg`.
`Avg(`*`expr`*`)`	Returns the average of all `expr` values.
`BBands(`*`expr`* `[,`*`window`*`[,`*`stdevs`* `[,`*`useEMA`*`]]])`	Returns the Bollinger Bands based on value of *`expr`*. Bollinger Bands are used to measure the "highness" or "lowness" of a value relative to previous values. They consist of: • a *`window`*-period (default is `20`) moving average (MA). • an upper band at *`stdevs`* (default is `2`) times the N-period standard deviation above the moving average (MA + Kσ) . • a lower band at *`stdevs`* times an N-period standard deviation below the moving average (MA − Kσ) . The moving average is computed as an Exponential Moving Average (EMA) if *`useEMA`* is `true` (the default), or as a Simple Moving Average (SMA) if *`useEMA`* is `false`.
`BollingerBands(`*`expr`* `[,`*`window`*`[,`*`stdevs`*`[,`*`useEMA`*`]]])`	Synonym for `BBands`.
`EMA(`*`expr`* `[,`*`window`*`])`	Returns the Exponential Moving Average (EMA) based on value of *`expr`*. An EMA is a *`window`*-period (default is `20`) type of moving average that is similar to a simple moving average, except that more weight is given to the latest data. The general formula is: *"curEMA = "(("curVal - priorEMA")" * weight")" + priorEMA"* Where: *weight* = 2 / (window + 1)
`Max(`*`expr`*`)`	Returns the maximum of *`expr`* values.
`Maximum(`*`expr`*`)`	Synonym for `Max`.
`Mean(`*`expr`*`)`	Synonym for `Avg`.
`Median(`*`expr`*`)`	Returns the "middle" value, based on sorted order of all values for *`expr`*.
`Min(`*`expr`*`)`	Returns the minimum of *`expr`* values for group.
`Minimum(`*`expr`*`)`	Synonym for `Min`.
`SMA(`*`expr`*`[,`*`window`*`])`	Returns the Simple Moving Average (SMA) based on value of *`expr`*. An SMA is a *`window`*-period (default is `20`) type of moving average that gives equal weight to each data item. It is essentially the mean of the data items in the window.

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StdDev(*expr*)	Synonym for StdDevPop.
StdDevPop(*expr*)	Returns the population standard deviation of all values for *expr*.
StdDevSample(*expr*)	Returns the sample standard deviation of all values for *expr*.
Subanomaly(*begin, end, anomaly-begin, anomaly-end, season, expr*)	Will provide further detail if an anomaly was detected when the Anomaly function was run from *begin* to *end* with the season and an anomaly was detected between anomaly-begin and anomaly-end. For example: `get activity compute subanomalies('2017-01-02','2017-02-01','2017-01-22','2017-01-23','day/week','avg(elapsedTime)')`
Sum(*expr*)	Returns the sum of all *expr* values for group.
Var(*expr*)	Synonym for VariancePop.
Variance(*expr*)	Synonym for VariancePop.
VariancePop(*expr*)	Returns the population variance of all values for *expr*.
VarianceSample(*expr*)	Returns the sample variance of all values for *expr*.
VarPop(*expr*)	Synonym for VariancePop.
VarSample(*expr*)	Synonym for VarianceSample.

Example

The following example is to compute the BollingerBands for events based on the average daily elapsed time based on a 10-day exponential moving average for this month:

```
jKQL> Get Events Compute BBands(Avg(ElapsedTime), 10) For This Month Group By StartTime Bucketed by Day
```

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Chapter 5: Using jKQL

The jKQL Data Query Language allows you to *talk* to your data. Create viewlets and modify them to get visually represented information about your data.

To generate viewlets, queries require certain components at a minimum. The syntax of a jKQL query includes the operation or action to be used for a specific item type, as well as, various date &time, numeric expressions, limiting operators, result grouping modifiers and viewlet chart type names. The syntax of a jKQL query should appear as follows (required elements are bolded):

```
jKQL> <action> <numeric expression> <limiting operator> <item type>
<date/time expression> <comparison operator> <result grouping modifier>
<viewlet chart type>
```

The table below lists basic query elements.

Table 9. Query Syntax Elements

Query Element	Expression
<action>	• Get (*Section 5.1*) • Subscribe to (*Section 5.3*) • Compare (*Section 5.4*) • Find (*Section 5.4*)
<numeric expression>	Specify any number of data items, which should be included in a viewlet – 5, 8, 10, etc.
<limiting expression>	These operators limit the query results. If the number of items, to which the limits will be set was not specified, the default number will be "1". • Best • Bottom • Earliest • First • Largest • Last • Latest • Longest • Shortest • Smallest • Top • Worst
<item type>	jKQL recognizes singular or plural form of the expression, i.e. Activity / Activities, so both forms are valid to use. • Activity

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	• Event • Snapshot • Source • Resource • Set • Relative • Field • Provider • Action • Trigger • Log • Function • Repository • Team • Organization • User • Parameter • License Expressions 'Count of' or 'Number of' can be added before item type names.
<date/time expression>	jKQL recognizes singular or plural expression forms, i.e. Year / Years, so both forms are valid to use. • Year • Month • Week • Day • Hour • Minute • Second • Millisecond • Microsecond These date and time expressions can be combined with numbers and limiting operators, i.e. last 5 years, latest 3 weeks and so on. Below is a list of date and time limiting operators: • Last • Next • Latest • Earliest • This • Today

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	• Yesterday • Tomorrow An exact time value can be added for certain time expressions, i.e. yesterday at 9 am.
`<comparison operator>`	• Starts with all / any of <*listed items*>; Does not start • Matches all / any / none of <*listed items*>; Does not match • Contains all / any / none of <*listed items*>; Does not contain • Ends with all / any / none of <*listed items*>; Does not end • Is (=); Is not (!= or <>) in <*list of items*> • Has all / any / none of <*listed items*>; Does not have • Between; Not between • > or >= – greater than or equal to specified *expression* • < or <= – less than or equal to specified *expression*
`<result grouping modifier>`	• Group by • Sort by • Order asc / desc (ascending / descending) • Bucketed by See *Section 5.4, Additional Query Options*, for more information.
`<viewlet chart type>`	'Show as' expression must be used before specifying the chart type. All chart types are noted in *Section 5.2, Show As*. 'Show as table' is the default.

For more information on the data model and functions jKQL supports, please see the *jKQL User's Guide*.

5.1 Get

The **Get** statement is used for retrieving items from the database. Please see *Table 10* below for examples.

Table 10. Get Examples

Definition	Query Statement
To get default fields for all Activity items	`jKQL> Get Activities`
To get all fields for all Activity items in Set "*Purchasing*"	`jKQL> Get Activity Fields All from 'Purchasing'`
To get the number of Activity items in Set "*Purchasing*"	`jKQL> Get number of Activities from 'Purchasing'`

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To get the number of Activity items in Set "*Purchasing*" that started today	`jKQL> Get number of Activities from 'Purchasing' for today`
To get the 10 longest running Activities in Set "*Purchasing*" that started today	`jKQL> Get top 10 Activities from 'Purchasing' for today sort by ElapsedTime desc`
To get the number of Activities in "*Payment*" last week grouped by their start time	`jKQL> Get number of Activities from Payment for last week group by starttime`
To get the number of Activities in Set "*Purchasing*" for each Activity status for the last week	`jKQL> Get number of Activities from 'Purchasing' for last week group by Status`
To get the number of Activities in Set "*Purchasing*" that met all objectives	`jKQL> Get number of Activities from 'Purchasing' that met all objectives`
To get the number of Activities in Set "*Purchasing*" that did not meet some objectives	`jKQL> Get number of Activities from 'Purchasing' that have not met all objectives`
To get the number of Activities in Set "*Purchasing*" that did not meet objectives "*A*" and "*B*"	`jKQL> Get number of Activities from 'Purchasing' that have not met objectives 'A','B'`
To get Activities in Set "*Purchasing*" that did not meet objectives "*A*" and "*B*" from set "*Web Purchases*"	`jKQL> Get Activities from 'Purchasing' that have not met objectives 'A','B' from 'Web Purchases'`

5.2 Show As

Users can specify the format of the displayed results by using **show as** at the end of a query. **Show as Table** is the default. Other **show as** viewlet type options are: column chart ("`colchart`"), bar chart ("`barchart`"), line chart ("`linechart`"), pie chart ("`piechart`"), stack chart ("`stackchart`"), geo map ("`geomap`"), scorecard ("`scorecard`"), area chart ("`areachart`"), summary ("`summary`"), topology ("`topology`"), anomaly chart ("`anomalychart`"), compare table ("`comparetable`") and histogram ("`histogram`").

The following is an example:

```
jKQL> Get relatives show as topology
```

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5.3 Subscribe To

The **Subscribe** statement is used for submitting real-time queries, which are queries that are evaluated as the data is streamed in. The following are examples:

- jKQL> `Subscribe to Number Of Event group by Severity output every 5 seconds show as barchart`

- jKQL> `Subscribe to Number Of Event group by Severity output every 5 seconds ORDER BY severity show as piechart`

- jKQL> `Subscribe to number of events where eventname contains 'Order' group by eventname, severity order by severity output every 2 seconds show as colchart`

5.4 Additional Query Options

Enrich your queries with additional items such as:

- **Time ranges –** Month, day, hour
  jKQL> `Get events for this month`

- **Group by –** Creates a row for each unique set of values for columns being grouped on
  jKQL> `Get events fields location where eventname contains 'order' group by location show as barchart`

- **Buckets –** Bucketing allows multiple "*group by*" result rows to be combined into a single result row. Used when a "*group by*" statement returns too much data. Bucketing can only be applied to `INTEGER`, `DECIMAL`, `TIMESTAMP`, and `TIMEINTERVAL` data types

  jKQL> `Get number of events group by starttime bucketed by minute show as anomalychart`
  * this query will use the auto bucketing type

  jKQL> `Get number of activities group by snapshotcount bucketed by size 7 show as histogram`
  * this query will use the "*size*" bucketing type. It displays data, divided in multiple intervals according to the size range specified.

  jKQL> `Get number of activities group by eventcount bucketed by count 3 show as table`
  * this query will use the "*count*" bucketing type. It displays data, divided in a specified number of intervals.

- **Locations –** Geolocation
  jKQL> `Get Event for This Month where Location ='London, England'`

- **Sort by –** Sorting criteria
  jKQL> `Get Activities from 'Purchasing' for today sort by ElapsedTime desc`

- **Order by –** Sort data in ascending (asc) or descending (desc) ordering
  jKQL> `Get Events order by eventID desc`

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- **Last –** Filter data for a specified time range

  ```
  jKQL> Get number of events for last 5 days
  ```

- **Latest –** Starts filtering from latest time period, which includes displayable data. This differs from "*last*" which could return nothing as there may not be any events in the last 5 days

  ```
  jKQL> Get number of events for latest 5 days group by starttime bucketed
  by day, severity show as stackchart
  ```

- **Compare** – Compare two or more items (*section 2.5.4.1.1.8*). Use the expression "*only diffs"* to display only differences in the table.

  ```
  jKQL> Compare Activity where ActivityID in ('activity ID of first
  selected activity', 'activity ID of second selected activity') show as
  comparetable
  ```

  ```
  jKQL> Compare Event where EventID in ('event ID of first selected event',
  'event ID of second selected event') show as comparetable
  ```

  ```
  jKQL> Compare only diffs longest 2 event show as comparetable
  ```

- **Find –** Search through the items (*section 2.3.4*)

  ```
  jKQL> Find 'order' in Activities
  ```

  ```
  jKQL> Find 'critical' in Events
  ```

  ```
  jKQL> Find 'CPU' in Snapshots
  ```

- **Modify** – Filter viewlet data (*Section 2.5.8.1*). Use the expression, "*where <item_type>=${E:<item_type>:<item>:<item_type>}*".

  ```
  jKQL> get number of Event where EventType = ${E:event
  type:Event:EventType} group by Severity show as colchart
  ```
  *Change the values between the curly brackets

  ```
  jKQL> get relative where RelativeType = ${E:Relative
  Type:Relative:RelativeType} show as topology ⟶ get Relative where
  RelativeType = 'SendTo' show as topology
  ```

  ```
  jKQL> get event containing all of ${SM:<filter_name>} show as table
  ```

  ```
  jKQL> get Event where Severity = ${E:severity:Event:Severity} AND
  ElapsedTime > ${V:etime} AND CompCode >= ${E:compcode:Event:CompCode}
  show as table
  ```
  * *"AND"* expressions can be used to apply multiple variables

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Chapter 6: Use Case Examples

6.1 Root Cause Analysis of Application Performance Problems

Figure 6.1-A. Root Cause Analysis

Nastel XRay uses machine learning to detect anomalies in time-series data and can automatically determine the probable root cause of this anomaly. It can create a dynamic visualization of application topology and show the chain of causality between the anomaly and the applications that it has impacted. It can also detect if any business objectives or SLAs were impacted by this anomaly.

The sample viewlet above is using machine learning to detect anomalies. This scenario is based on real data representing airport terminals and flights. We have represented an airline at a terminal as an application, a terminal as a server, a data center as an airport, and the sky as a resource.

An anomaly was detected on February 18th with an average delay for the day of 45 minutes. If we click on the anomaly, we are transported to the console for a drill-down showing the topology of that anomaly. The graph shows a US Air flight traveling from Charlotte (CLT) to Phoenix (PHX). The red edges, called rogue edges, represent a problematic relationship between the terminal in Charlotte and the one in Phoenix. Clicking on the rogue edge provides a root-cause analysis of the problem. There was a delay on Charlotte and it took 8 times longer than average to get into the air. The average delay was about 9 minutes, while the worst actual delay was about 1 hour and 16 minutes.

While this example used airports, it's easy to see how this would be applied to elapsed time for applications in an IT operation use case.

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6.2 Real User Monitoring

Figure 6.2-A. Real User Monitoring

The screenshot above shows a real user monitoring scenario focusing on users in North America. The popup on the geographic map is showing a full breakdown of the components and elapsed time for the user transaction.

Complete tracking of the end user's experience is provided in real-time. Browsers are automatically injected with instrumentation without a need to modify your applications. Nastel XRay can find the bottlenecks that cause a user to have a negative experience and correlate their problems with issues in the browser itself, applications that the user's session is dependent on such as JVMs or databases. Nastel XRay tracks transactions end-to-end starting at the user with a web browser and interacting with application servers, middleware, databases, and local or Cloud mainframes.

6.3 Managed File Transfer (MFT)

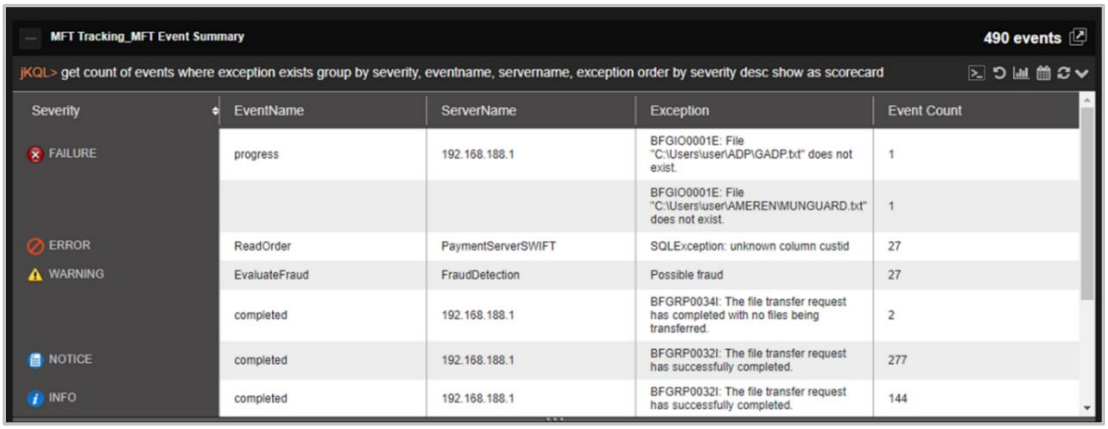

Figure 6.3-A. Managed File Transfers

The Nastel XRay dashboard above has been set up to analyze managed file transfers (MFTs). There are various viewlets to track MFTs by application, agent, resource, destination, and status.

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Nastel XRay tracks all data movement across complex topologies. All MFT transfers are connected with downstream events from sources including other MFTs, middleware, brokers, and other business applications. Metrics on MFTs are captured in real-time and evaluated in terms of SLAs and business objectives. Appropriate notifications are sent out for missed objectives. A search capability is provided to review past transfers and their attributes. Nastel XRay provides a dynamic topology of all MFT transactions.

6.4 Application Performance Monitoring

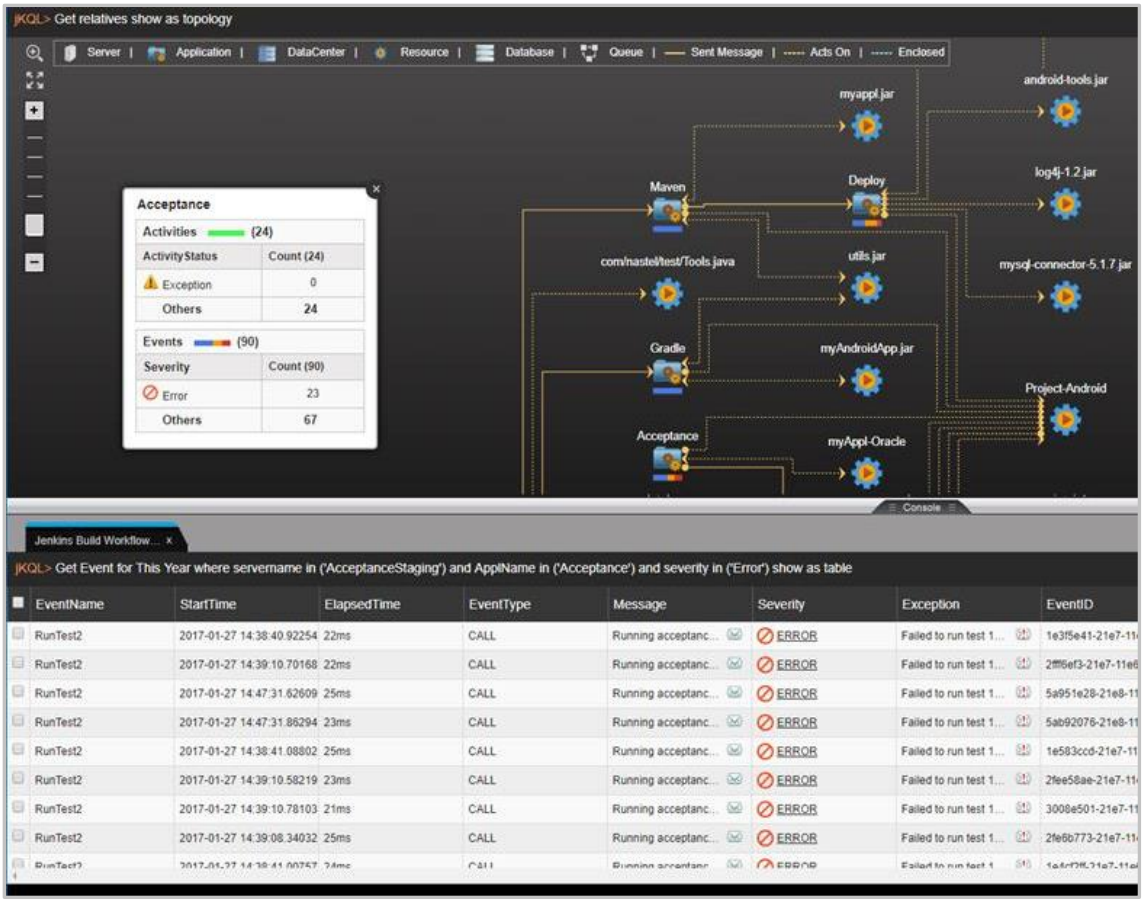

Figure 6.4-A. Application Performance Monitoring

The Nastel XRay dashboard example above for application performance monitoring (APM) is illustrating how to monitor the DevOps Jenkins based continuous build-deploy process. The top viewlet is an automatically discovered topology map showing applications and their relationships to other applications such as "Maven" to "Deploy" as well as resources such an Oracle database and a log4j jar file. It shows the flow of a deployment process and any exceptions incurred. The bottom viewlet is called the Console and it opens when a user drills down into an object on a viewlet in order to get additional details.

Nastel XRay provides deep-dive monitoring of the performance and availability of applications end-to-end across Web Services, application servers (Java, .Net), middleware, mainframes, and more. Its automation eliminates the need for constant "eyes-on-screen" monitoring to eradicate false alarms and provide automated notification of real situations that require attention.

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6.5 Mobile Analytics

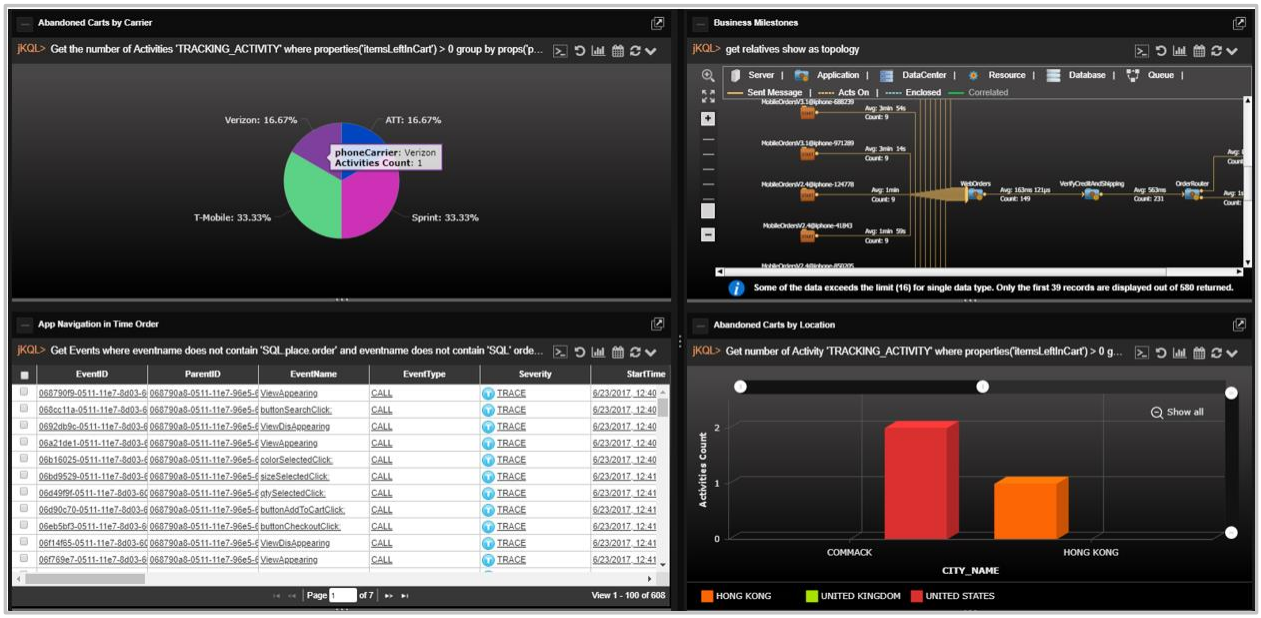

Figure 6.5-A. Mobile Analytics

The sample mobile analytics dashboard above is highlighting a scenario where performance is compared to mobile app version, carrier and device. Using our mobile APIs we can track user experience through every mobile app screen, analyze user experience and determine which app versions, devices and carriers deliver the best experience.

Nastel XRay provides end-to-end visibility into mobile application behavior and performance for both iOS and Android. RESTful APIs for streaming data and real-time tracking are provided. Mobile apps can stream their data to Nastel XRay, submit interactive queries, and subscribe to real-time analytics. Crashes can be captured and analyzed for forensic purposes. The APIs enable complete analysis of a user's interaction with your applications, relating the specific click path through an application correlated with app version, device information, and even business behavior such as purchasing or cart abandonment.

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6.6 Kafka Monitoring

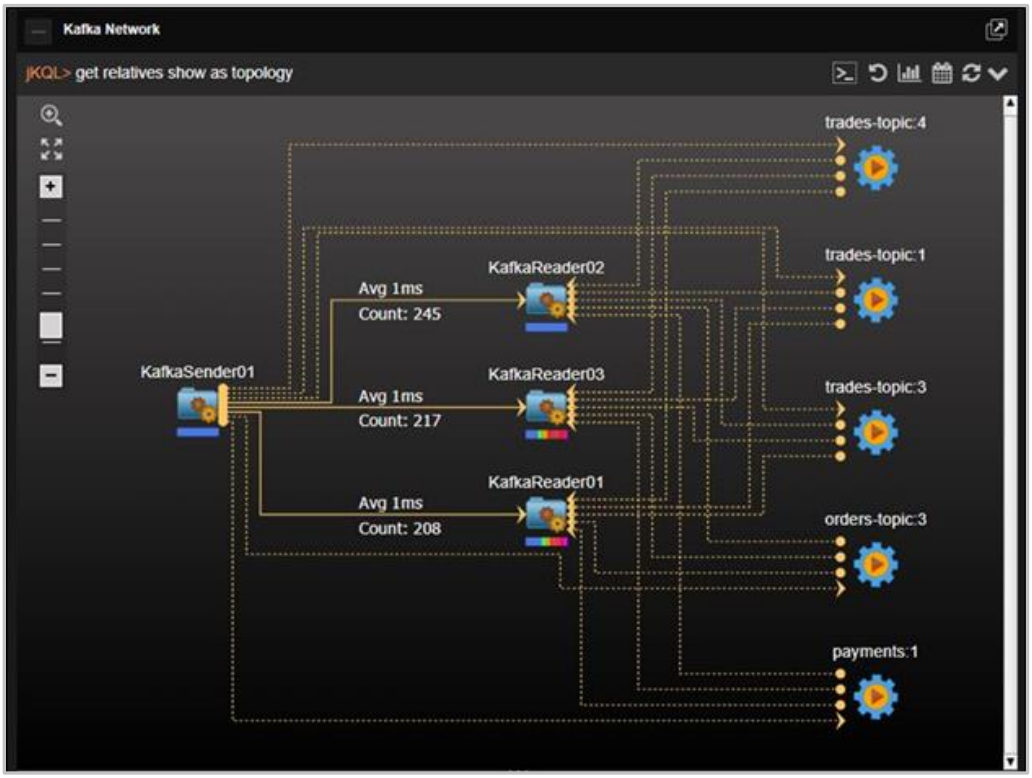

Figure 6.6-A. Kafka Monitoring

The viewlet above shows the auto-discovered, publish-subscribe topology of a Kafka network including senders, readers, and topics. Each edge (the lines between nodes) has statistics showing average elapsed time and count. This image shows the topology of a Kafka sender publishing messages with topics and several Kafka readers subscribed to specific topics.

A single-point-of-truth is provided to track performance, latency, logs, auditing, and content surveillance. Nastel XRay provides complete message flow analytics relating applications to the messages they publish to Kafka and the applications that subscribe to them.

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Chapter 7: Troubleshooting

The following are examples of jKQL query errors and suggestions on how to resolve them.

Case 1: The message, *No record found*, is displayed in the viewlet.

→ Try to modify the viewlet's date and time range. Confirm that your repository has imported data.

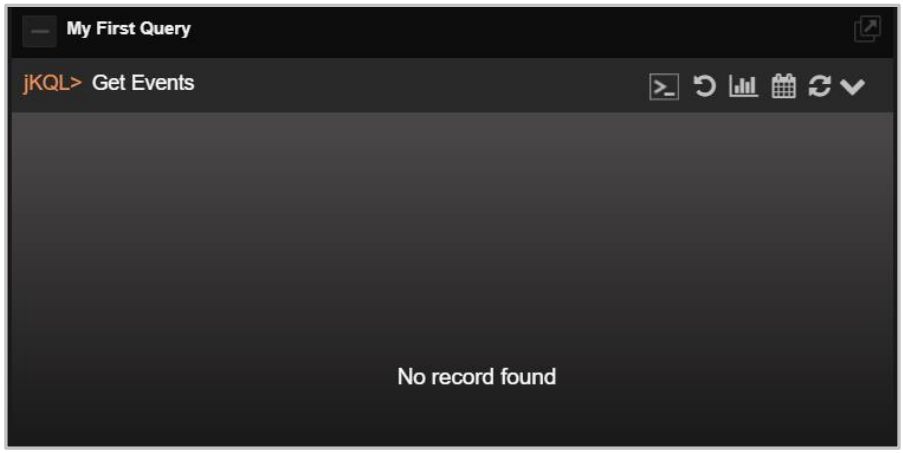

Figure 7-A. No Record Found Message

→ Try to modify the query conditions if the date and time range do not work.

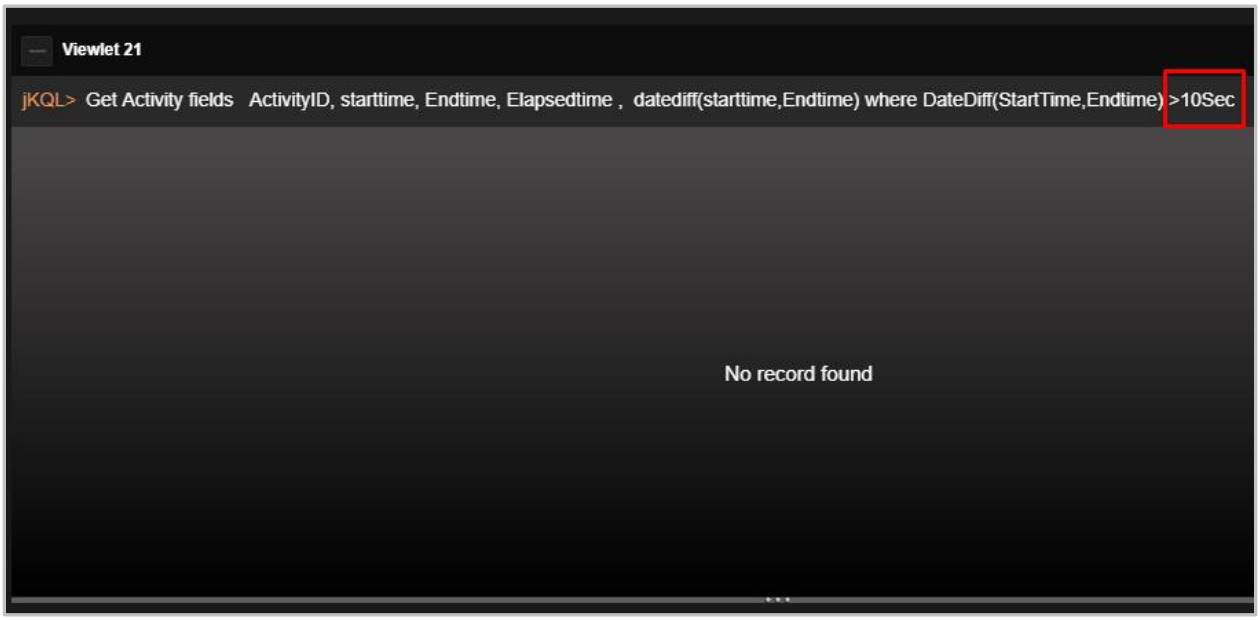

Figure 7-B. No Record Found – Modify Query

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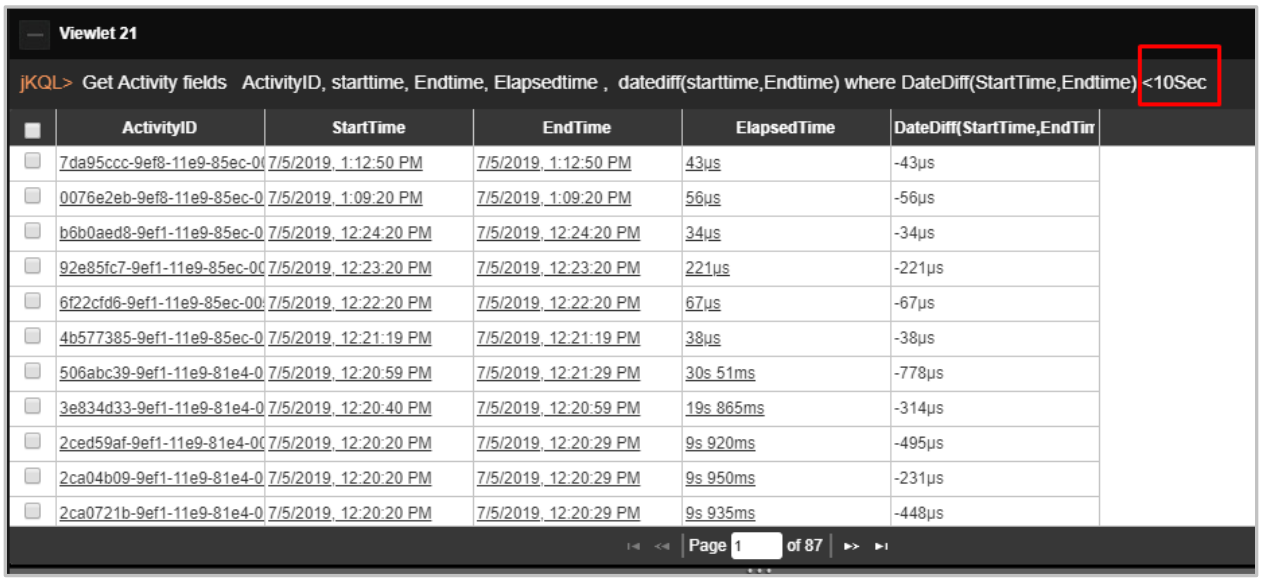

Figure 7-C. No Record Found – Modify Query

Case 2: The viewlet message displays the requirements of the query.

→ Update your query according to the viewlet's message.

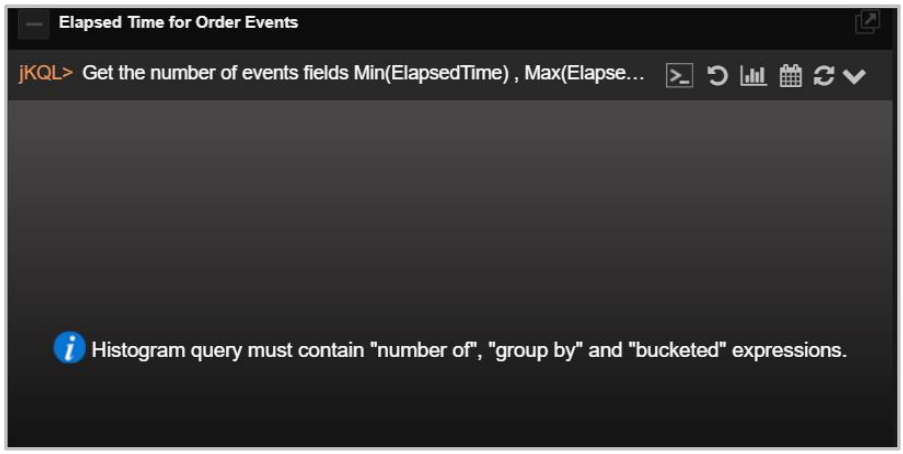

Figure 7-D. Query Requirements Message

Case 3: The viewlet message states that the query needs to be modified.

→ Modify the query's expressions. Confirm that the appropriate data is supplied for the chart axes.

A notification similar to the example below is displayed when a Y axis has incorrect data defined, for example, "String." Another example would be when a histogram's X axis has "Timestamp" defined.

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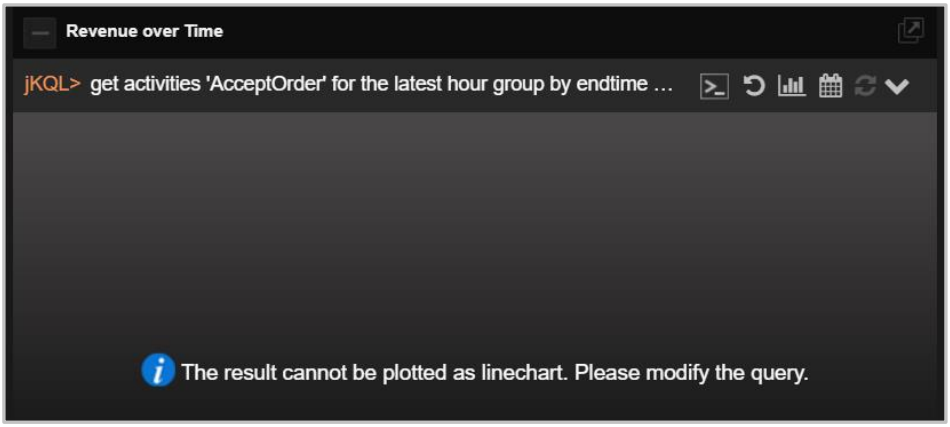

Figure 7-E. Query Requirements Message

Case 4: System displays an error message.

→ Modify the query using the information provided in the error message.

Using the example below, many times the solution is to increase "Bucketed by size."

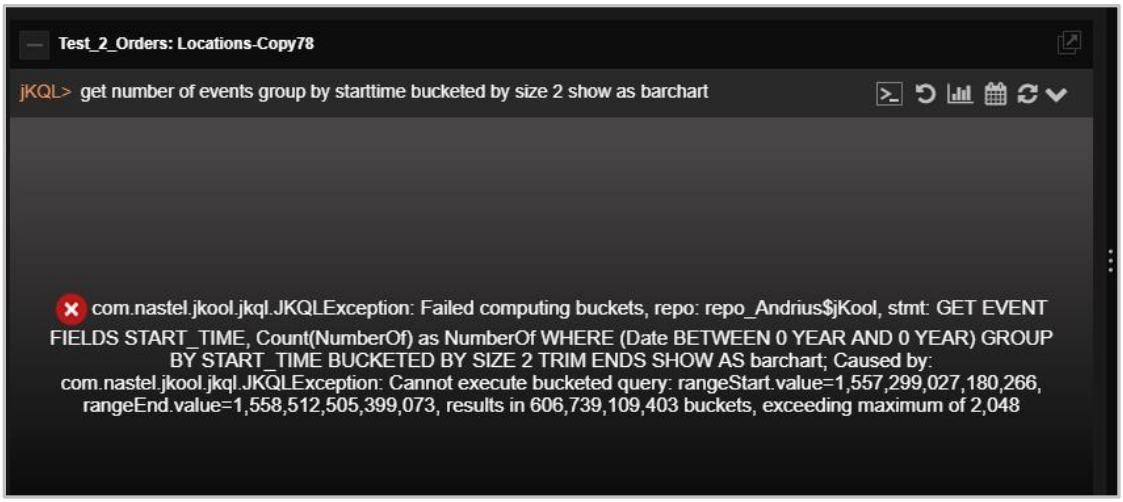

Figure 7-F. Query Error Message

When data of "enum" data type (i.e. severity, compcode) are queried to display, the data type values must be used. The severity name can be replaced with the ID from the severity values table, specified by the query.

jKQL> `Get enumeration for severity`

For example: **jKQL>** `Get events where severity is ('3')`

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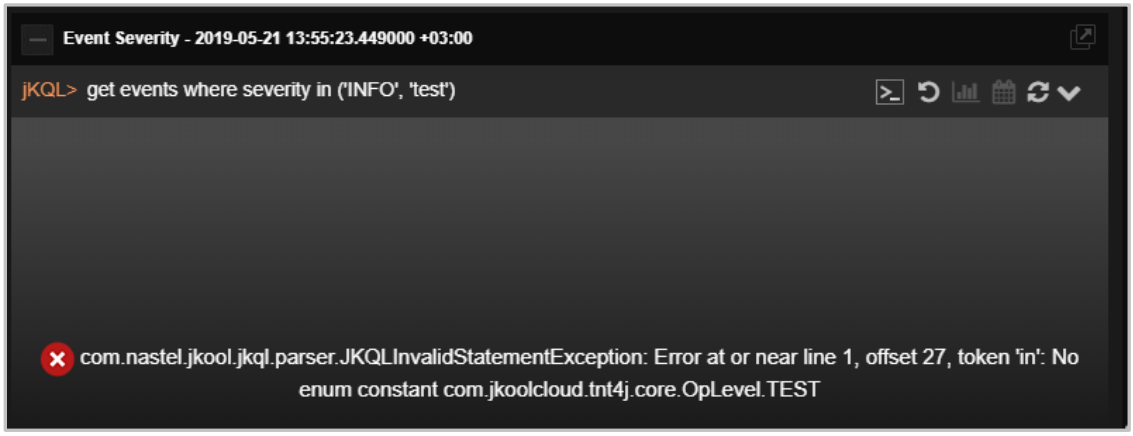

Figure 7-G. Query Error Message

"String" functions such as "Starts With," "Ends With," "Contains," cannot be defined for "Enum" data types.

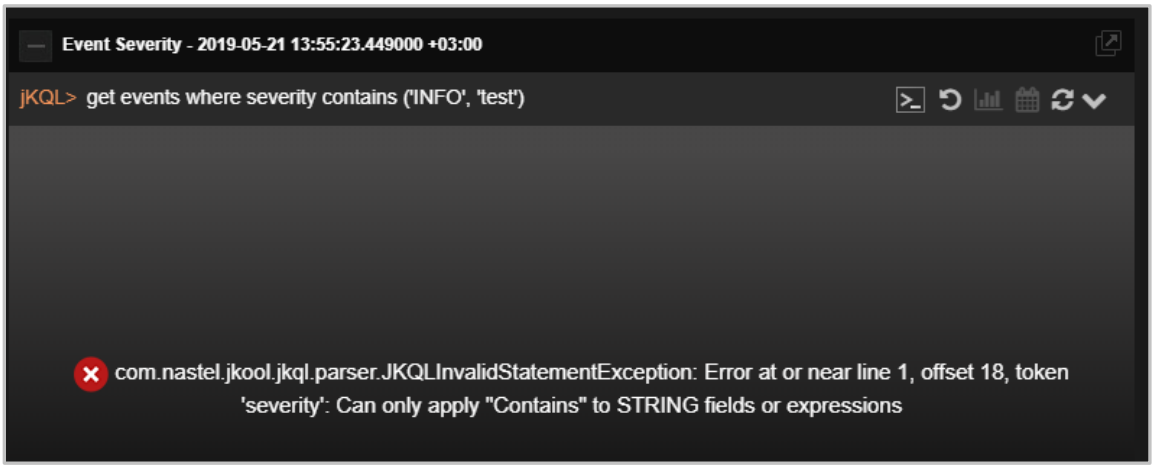

Figure 7-H. Query Error Message

Case 5: System displays invalid field.

→ Modify the query by using the function prop before the field.

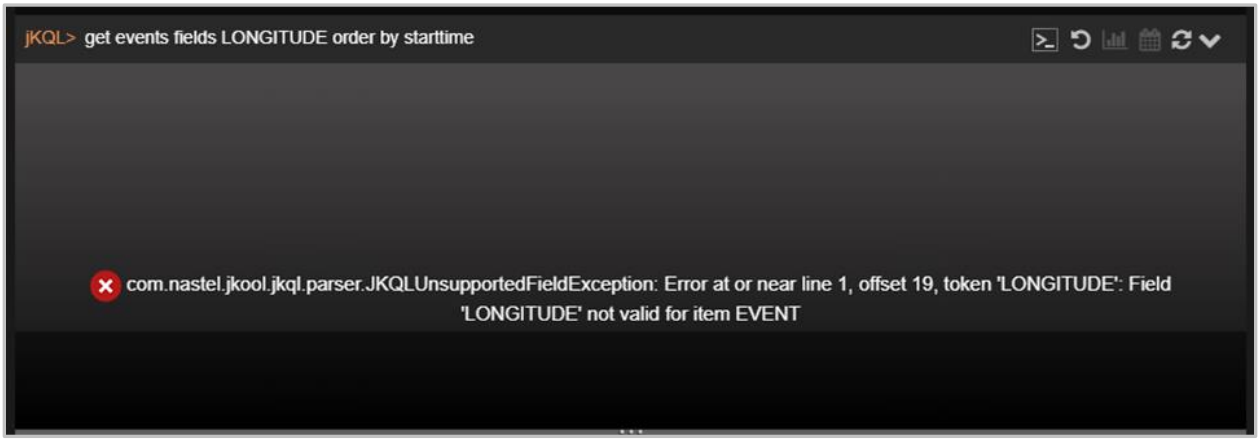

Figure 7-I. Invalid Field

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Some fields are property fields which must be used with the function "prop."

```
jKQL> get events fields prop('LONGITUDE') order by start time
```

Figure 7-J. Prop Function

Case 6: Access required error

An error similar to the below is displayed when trying to access sets, but this feature is disabled.

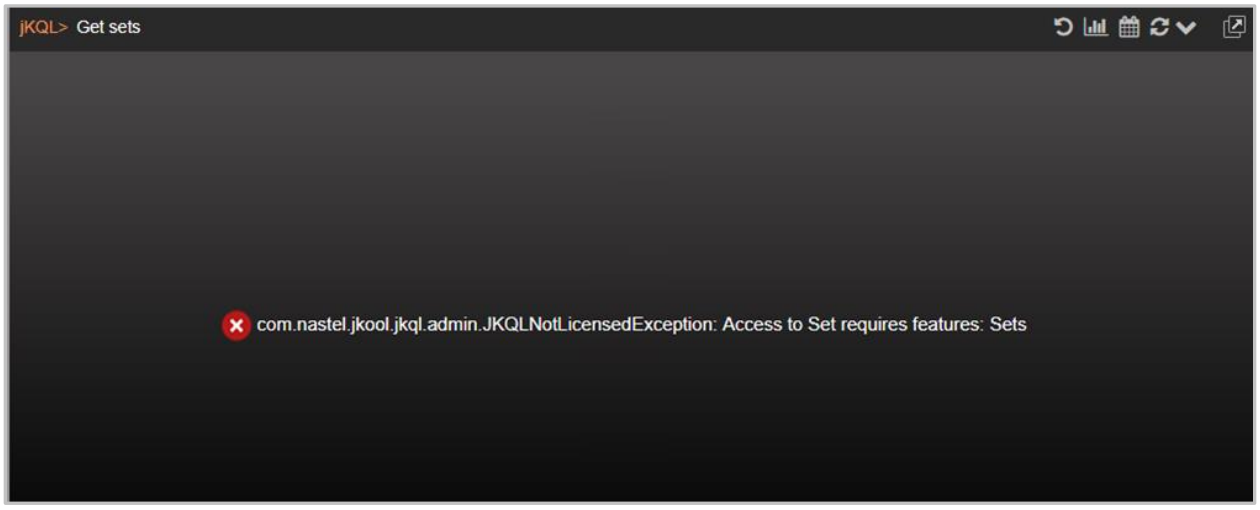

Figure 7-K. Access Required Error

→ Enable sets from the **Features** tab of the *Admin Settings* window.

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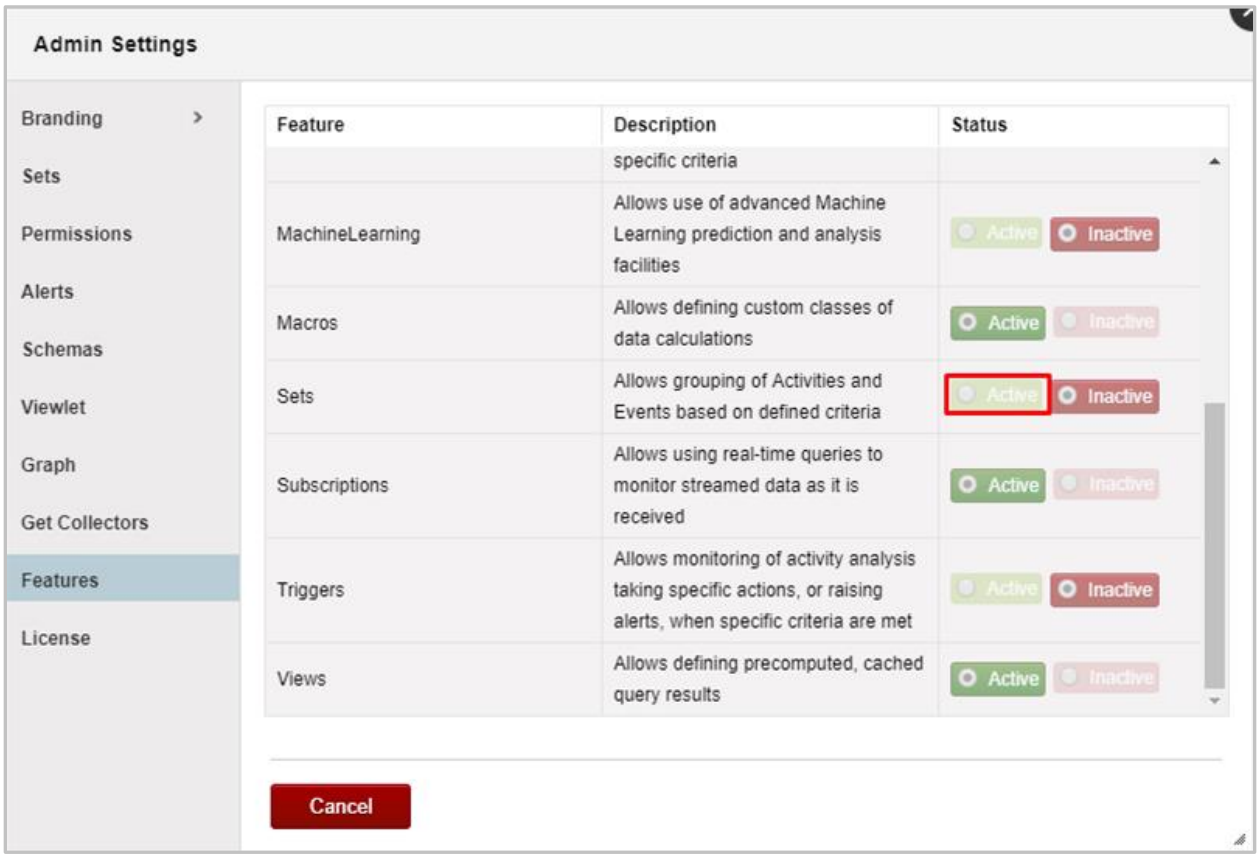

Figure 7-L. Enable Sets

Case 7: Syntax error.

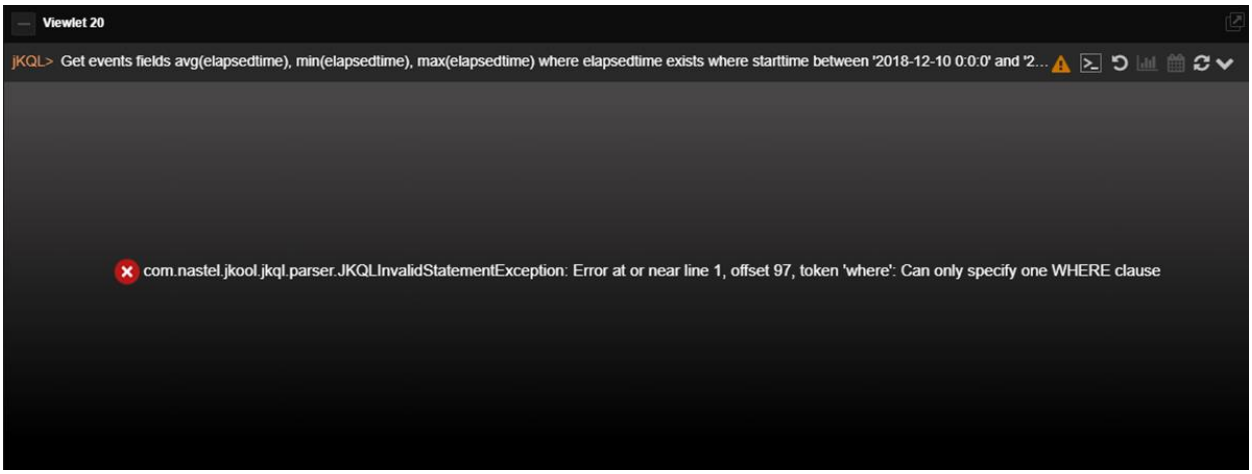

Figure 7-M. Syntax Error

As the error above mentions, only one where clause should be mentioned as seen in the example below.

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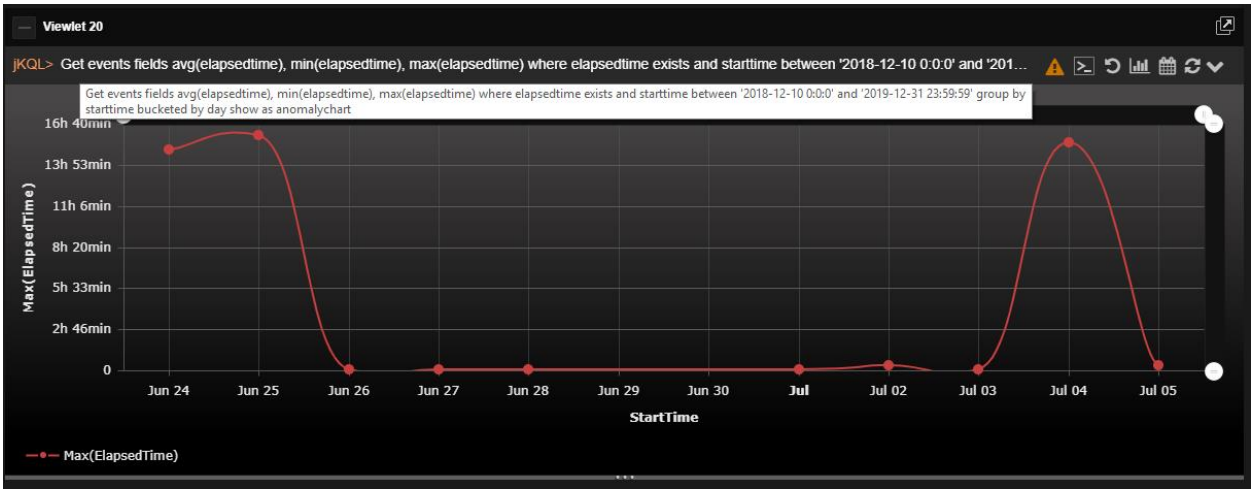

Figure 7-N. One Where Clause

Syntax error query > Get events fields avg(elapsedtime), min(elapsedtime), max(elapsedtime) where elapsedtime exists where starttime between '2018-12-10 0:0:0' and '2019-12-31 23:59:59' group by starttime bucketed by day show as anomalychart

Correct syntax > Get events fields avg(elapsedtime), min(elapsedtime), max(elapsedtime) where elapsedtime exists and starttime between '2018-12-10 0:0:0' and '2019-12-31 23:59:59' group by starttime bucketed by day show as anomalychart

Case 7.1: When passing a field name to a function, do not use the **‘** symbol.

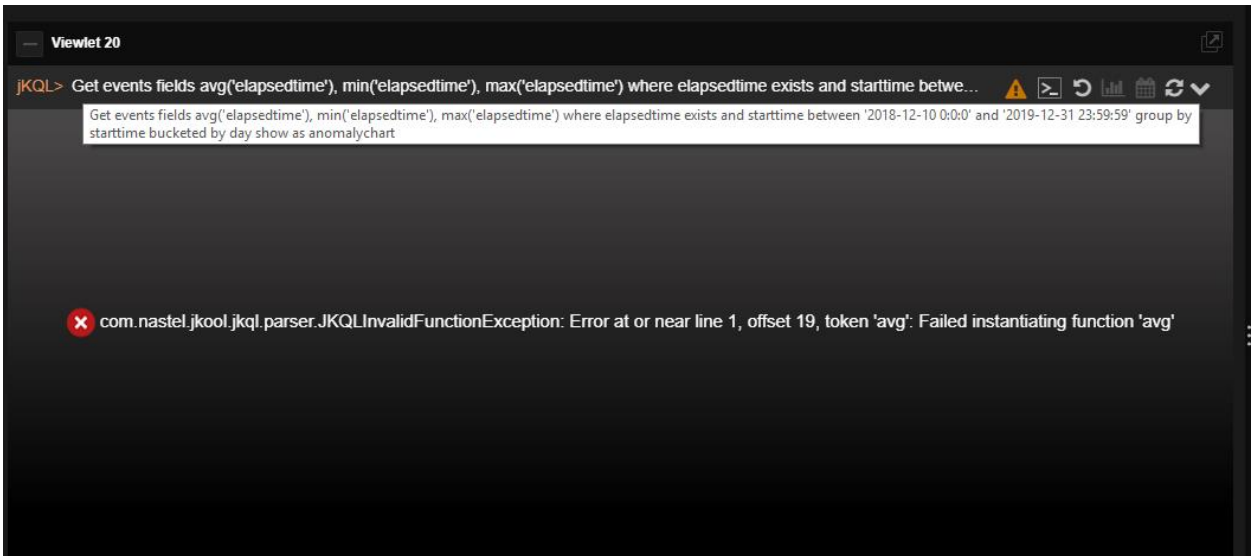

Figure 7-O. Syntax Error Due to ‘ Symbol

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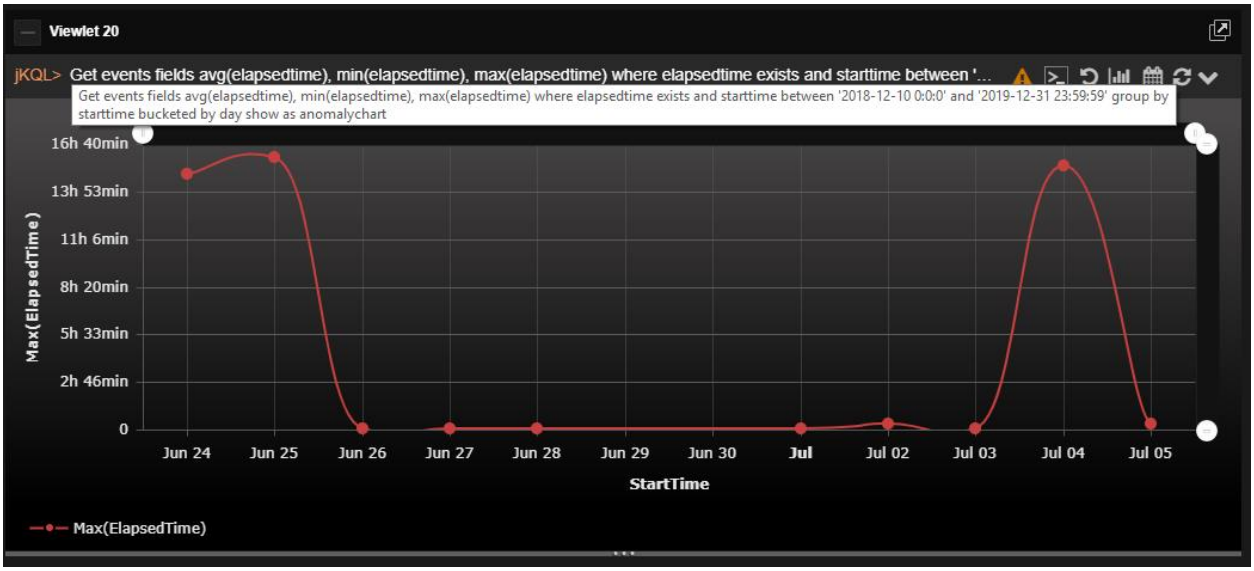

Figure 7-P. Passing Field Name

For example:

jKQL> `Get events fields avg(elapsedtime), min(elapsedtime), max(elapsedtime) where elapsedtime exists and starttime between '2018-12-10 0:0:0' and '2019-12-31 23:59:59' group by starttime bucketed by day show as anomalychart`

Case 8: Request time out is displayed.

→ Try to refresh the viewlet by clicking on the **Refresh** button located at the top right corner of the viewlet.

Sometimes the response can take longer than expected due to various reasons, for example, a network issue.

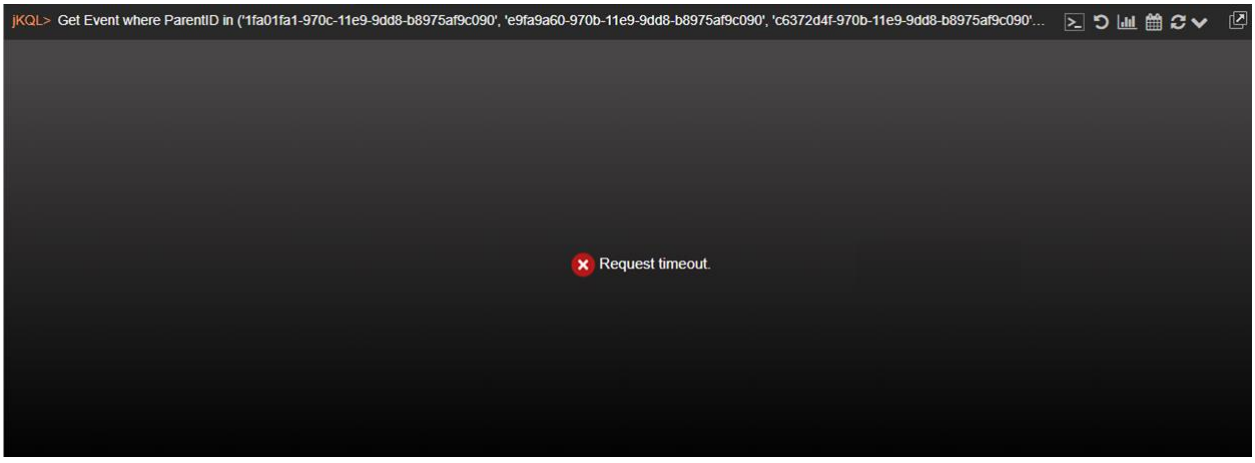

Figure 7-Q. Request Timeout

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Case 9: "Show as" type is invalid.

→ An incorrect viewlet chart type was used. Specify a valid chart type to display the data (see the subsections of 2.5.4 for available chart types to use).

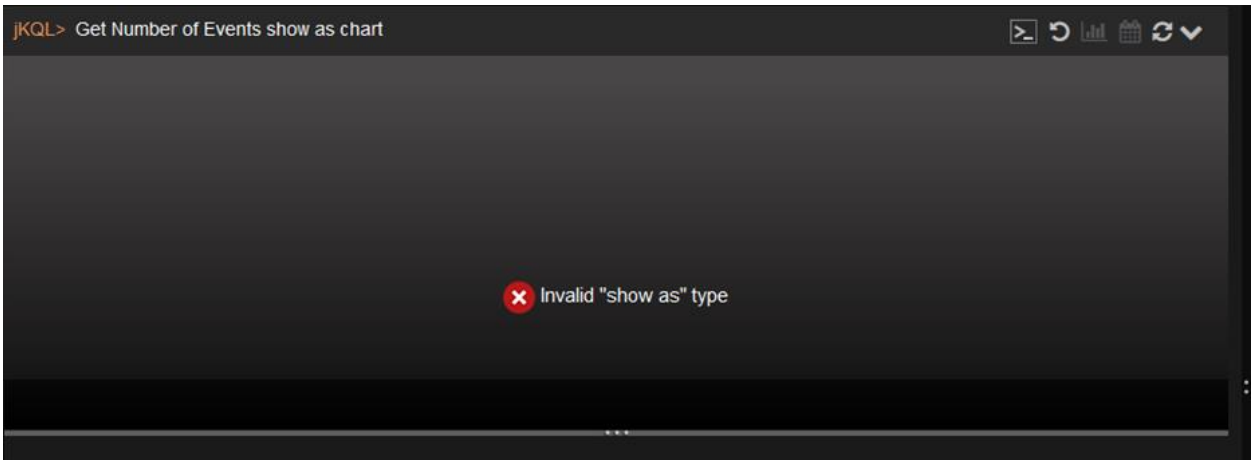

Figure 7-R. Invalid Type

Case 10: Error message when using the Relative function.

→ The Relative function currently only works for activities.

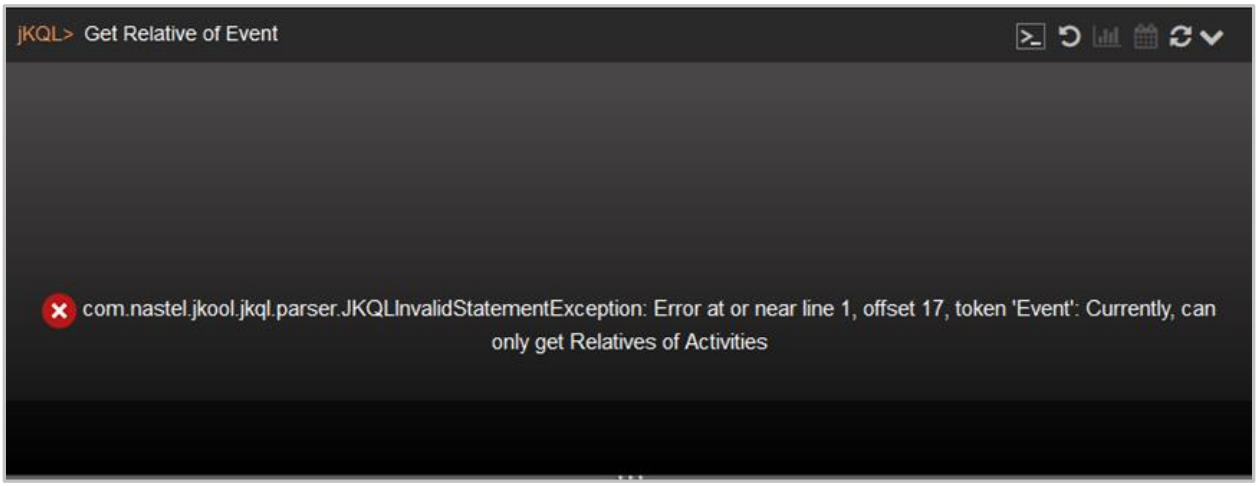

Figure 7-S. Relatives Error

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