Topology

Contents

HVR's **Topology** view provides a real-time, web-based graphical visualization of how the source and target locations are connected using channels defined in HVR. It also graphically represents various elements in replication like source and target locations, volume of data in each locations, channels involved in replication, direction of replication, volume of replication, latency in replication, and problems like latency threshold exceeded or job failure etc. This helps to see at a glance where trouble lies in the replication: locations and channels displayed in the **Topology** view are color-coded based on the data volume and latency. Locations or channels alerting red can be immediately clicked into for diagnosis and troubleshooting.

In **Topology**, a specific location or channel can be selected to view the **statistics** related to that specific selection. For more information, see section Live Status Card.

Stats Job

The stats job (**hvrstats**) generates the information required for **Topology** and **Statistics** and saves it into the catalog table (**HVR_STATS**) which is responsible for maintaining the statistics data. So, the stats job must be running to display live details in **Topology** or **Statistics**. The stats job is created along with the catalog tables during HVR's installation and automatically started when starting the **HVR Scheduler**.
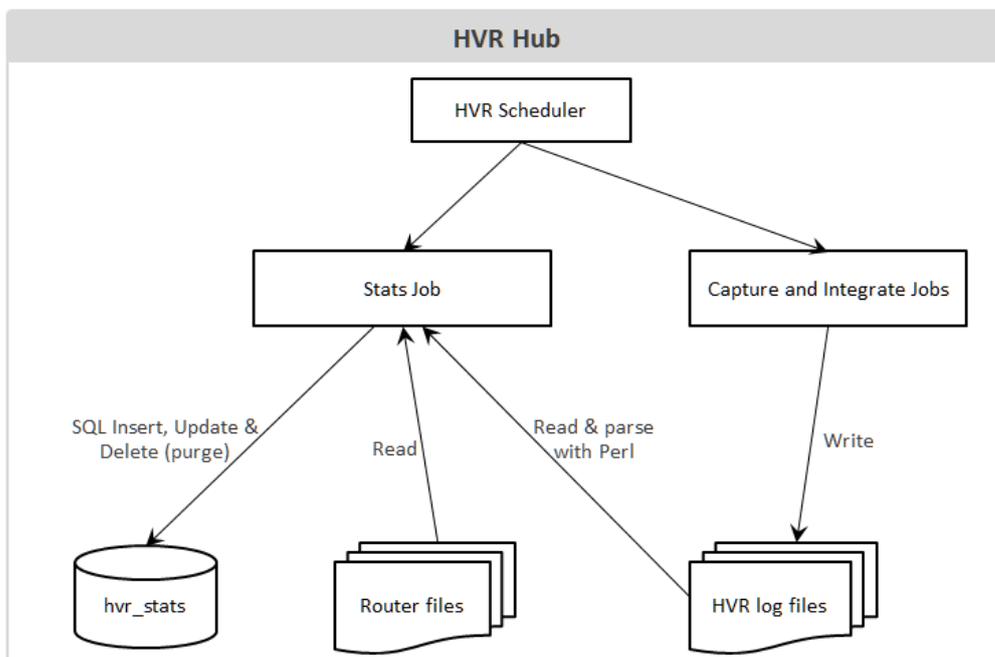
To generate the information required for **Topology** and **Statistics**,

1. The stats job reads data from the HVR log files and the router transaction files.

2. The stats job then modifies (using **insert**, **update**, and **delete** SQL statements) the catalog table - **hvr_stats** based on the data read from the HVR log files and the router transaction files. It also aggregates the statistics data that are written in the **hvr_stats** table.

The **hvr_stats** table consists of a number of columns that store statistical information about data replication. In particular, the **hvr_stats** table include the **metric_name** and **metric_value** columns storing data on a variety of metrics captured by HVR, such as capture/integrate latency, captured row counts, integrated change counts. For more information, see Metrics for Statistics.

Since HVR 5.7.0/17 and 5.7.5/11, by default, only the basic/important metrics that are gathered by the **hvrstats** job from the HVR log files. The behavior of the **hvr_stats** job gathering metrics can be configured by defining **Scheduling /StatsMetrics**.

Aggregation of Statistics Data

The stats job performs two types of aggregations (grouping) when writing statistics data to the **hvr_stats** table:

1. **Scope aggregation**

   The metrics information received from the HVR log files are written into the **hvr_stats** table based on the scope defined by a channel name (column **chn_name**), location name (column **loc_name**), and table name (column **tbl_name**), which can be either named explicitly or regarded as '*****' (which means applies to all channels, locations, tables).
   For example, if there are **5** 'captured inserts' with **chn_name**='*chn1*', **loc_name**='*src*' and **tbl_name**='*tbl1*' and **5** 'captured inserts' with **chn_name**='*chn1*', **loc_name**='*src*' and **tbl_name**='*tbl2*'. The **hvr_stats** table will store these values, but it will also store value **10** for **tbl_name**='*', the sum of both values ('captured inserts').

   For more information on various scopes that can be defined, see **hvrstats** (option **-s**).
2. **Time granularity aggregation**

   Metrics are gathered/output with a per-minute granularity. For example, the value of 'captured inserts' for one-minute granularity means the number of rows inserted within that minute. These values can be aggregated up to 10 minutes, 1 hour and 1 day. For more information on the time granularity, see **hvrstats** (option **-T**).

Launching Topology from HVR GUI

Topology can only be launched from HVR GUI, and it can only be viewed within the **Insights** interface in a web browser.

Settings for Viewing Insights

The **Insights** interface for **Topology**, **Statistics**, and **Events** can be viewed only in the web browser.

Following are the two available options that can be configured (**View Insights Web App**) for viewing the **Insights** interface:

- **Open in local web browser** (default) - Automatically open the respective **Insights** interface in the default web browser.

  When this option is used and if the URL is shared with other users, only the users who are connected to the machine on which the HVR GUI is executed can access the **Insights** interface.
- **Show URL only** - A prompt is displayed with an option to copy the **Insights** URL, which can be then pasted into any web browser's address bar to view the respective **Insights** interface. This option is used in any of the following situations:
  - If the machine on which the HVR GUI is executed does not have a web browser installed.
  - To share the URL with all other users. All other users can access the **Insights** interface even if they are not connected to the machine on which the HVR GUI is executed.

For **Insights** to work, HVR GUI should be running. If HVR GUI is closed with the **Insights** window open, then an error message is displayed in the **Insights** window.

- To launch **Topology**, right-click **Scheduler** and select **Topology**.
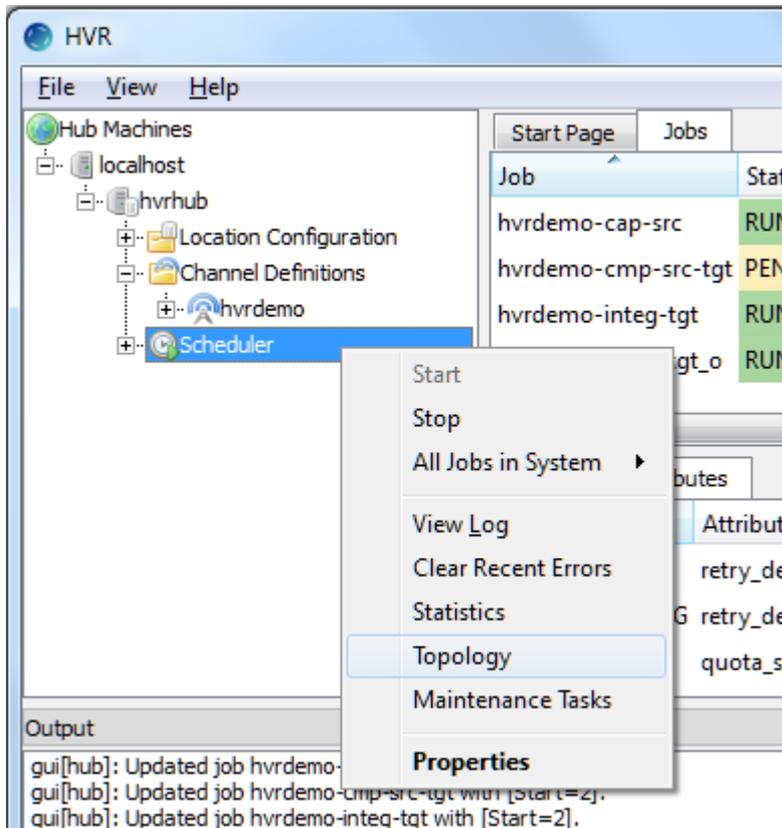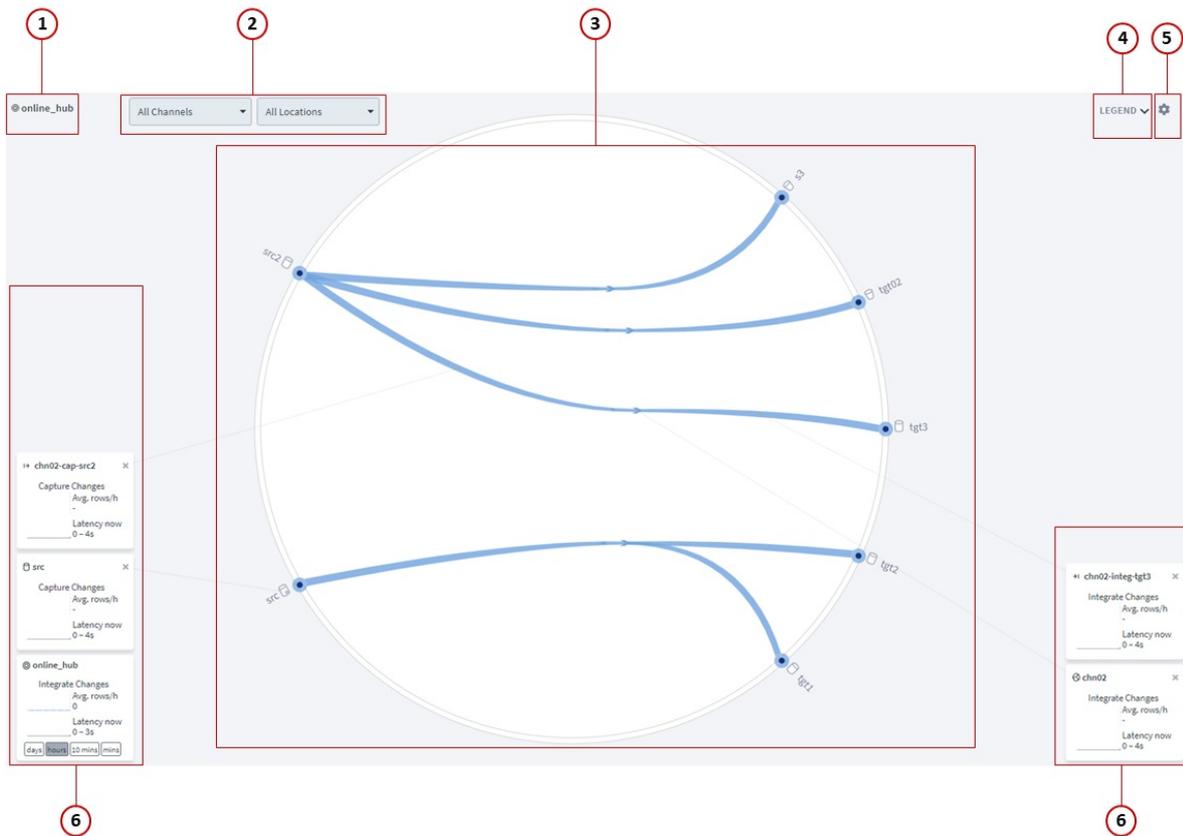

- To launch **Topology** when the viewing option for **Insights Web App** is set as **Show URL only**, the following needs to be performed:

  1. Right-click **Scheduler** and select **Topology**
  2. Click **Copy to Clipboard**.
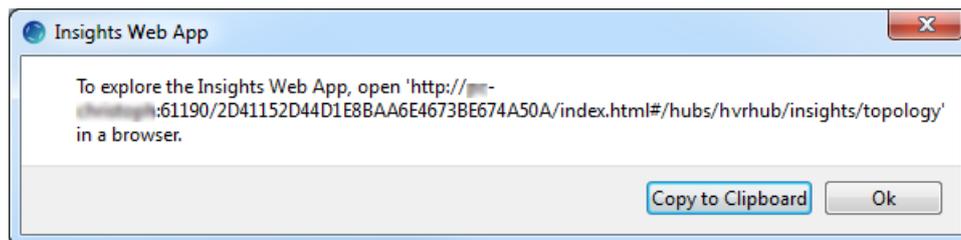
  3. Paste the URL in the web browser's address bar and press **Enter**.

Topology View

The **Topology** view contains the following user interface components:

1. **Hub** - name of the hub for which the topology is displayed.
2. **Scope** - highlights the selected location or channel in the topology. This is same as clicking on a location or channel.
3. **Topology** - graphical representation of locations, channel, direction of replication, volume of data in locations, volume of data being replicated, and latency in replication.
4. **Legend** - show/hide description for the colors and icons displayed in topology.
5. **Settings** - show/hide configuration for the topology view.
6. **Live status card** - displays the performance metrics for the respective element selected in topology. For more information, see Live Status Card.

Live Status Card

Live status card displays the live statistics metrics for the elements selected in topology. Live status card is supported for the following elements - Hub, Channel, Source Location, Capture Job, Integrate Job, and Integrate Location. By default, only the live status card for Hub is displayed in the **Topology** view. The statistics displayed in the live status card can be filtered based on the granularity (days/hours /10 mins/mins) selected. The default granularity is an **hours**.
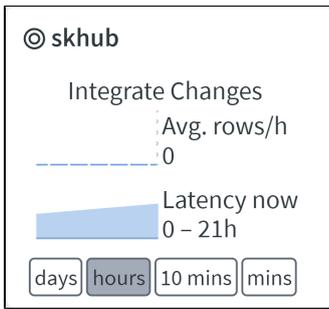
Only two metrics can be displayed at a time in live status card and this can be configured from **Settings Visible metrics**.

Clicking on the live status card opens **statistics** view for the respective element.

Settings

The settings screen allows you to configure/customize the topology view.

The options available in settings screen are:

Settings	Options

Location properties shown	Configure the location properties to be displayed next to a location icon. Only the option selected first is displayed and the remaining are only visible on mouse hover. Options available are: • **Name** (default): Displays the location name. • **Description** (default - visible on mouse hover): Displays the location descripti on. • **Number of tables**: Displays the total number of tables available in the location. • **Class**: Displays the location class/type. • **Remote Node**: Displays the node name where the HVR Remote Listener for this location is running. **Node** name is defined in the **Connection** tab of the **Ne w Location** screen.
Location positioning	Configure the visual layout of locations over left and right edges of the Topology area (source and target locations respectively). Options available are: • **Automatic** (default): 'Ungrouped' view. Source locations and target locations are spread over left and right edges of the Topology area respectively. • **Group by Class**: Source and target locations are grouped by location class. The location class name is displayed as the group name. • **Group by Remote Node**: Source locations and target locations are grouped by remote node. The remote node name is displayed as the group name.
Visible metrics	Configure the metrics to be displayed in live status card for the following elements of replication: <table><tr><td>**Hub**</td><td>Available options are - • **None** • **Capture**: Displays the captured changes graph for the hub. • **Integrate** (default): Displays the integrated changes graph for the hub.</td></tr><tr><td>**Channel**</td><td>Available options are - • **None** • **Number of tables** : Displays the number of tables in the channel. • **Description**: Displays the channel description. • **Capture**: Displays the captured changes graph for the channel. • **Integrate** (default): Displays the integrated changes graph for the channel.</td></tr><tr><td>**Capture job**</td><td>Available options are - • **None** • **Number of tables**: Displays the total number of tables captured by the capture job. • **Capture** (default): Displays the captured changes graph for the capture job.</td></tr></table>

	Integrate job	Available options are - • **None** • **Number of tables**: Displays the total number of tables captured by the integrate job. • **Integrate** (default): Displays the integrated changes graph for the integrate job.
	Capture location	Available options are - • **None** • **Number of tables**: Displays the total number of tables available in the capture location. • **Class**: Displays the capture location class/type. • **Remote Node**: Displays the node name where the HVR Remote Listener for this location is running. • **Description**: Displays the capture location description. • **Capture** (default): Displays the captured changes graph for the capture location.
	Integrate location	Available options are - • **None** • **Number of tables**: Displays the total number of tables available in the integrate location. • **Class**: Displays the integrate location class/type. • **Remote Node**: Displays the node name where the HVR Remote Listener for this location is running. • **Description**: Displays the integrate location description. • **Integrate** (default): Displays the integrated changes graph for the integrate location.
	Bidirectional location	This is applicable only for bidirectional locations. Available options are - • **None** • **Number of tables**: Displays the total number of tables available in the location. • **Class**: Displays the location class/type. • **Remote Node**: Displays the node name where the HVR Remote Listener for this location is running. • **Description**: Displays the location description. • **Capture** (default): Displays the captured changes graph for the location. • **Integrate** (default): Displays the integrated changes graph for the location.
Latency threshold		Slider to configure the threshold for latency.
Show animation		Show/hide animation for data movement in channel.

Icons in Topology

In the Topology view, elements involved in replication are represented by various icons.

Icon	Description
◎	Indicates HVR hub.
⊘	Indicates channel.
⛁	Indicates database location.
⛃	Indicates file location.
⬭	Indicates Kafka location.
⊢→	Indicates capture job.
→⊣	Indicates integrate job.
➤	Indicates the direction of replication. The color of this icon turns red if a job failed or the latency threshold is exceeded.