HPE OMi Business Value Dashboard

Software Version: 10.11

Installation and Administration Guide

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The title page of this document contains the following identifying information:

- Software Version number, which indicates the software version.
- Document Release Date, which changes each time the document is updated.
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Contents

Color Your Data

This section introduces BVD:

Introducing BVD

Data does not have to be big to be confusing. It often comes in different formats or languages, and is spread over different locations and devices. This makes it all the harder to bring data together into one view, displaying only the latest and most important information.

HPE OMi Business Value Dashboard (BVD) brings your data to life. Use BVD to create custom, flexible dashboards that visualize information in an appealing way and that can be accessed anywhere, anytime, from any device. Incorporate your own graphics, add color to identify status, and receive real-time updates—so you always understand the value driven by your IT environment.

<div align="center">

BVD, color your data.

</div>

Anytime, Anywhere. BVD dashboards are real-time dashboards. You choose how often you send data to BVD; BVD displays the data with no delay. You decide where you want to view your dashboards: PC, tablet, or phone. BVD supports the major browsers. Choose your favorite!

Simple, Colorful, Flexible. Design your dashboards using Microsoft Visio. BVD provides a Visio stencil with shapes that then later become the widgets in your dashboards. The shapes include widgets for drawing charts, coloring text or values, displaying information feeds, web pages (for example, video streams), and many more. You can of course also style your dashboards according to your company's style guidelines. BVD provides sample dashboards to help you get started.

Connect. Once uploaded to BVD, you connect your widgets to the data. The BVD Manage Dashboards page makes this task simple and efficient. You can set additional widget options such as rules that determine the visibility and status colors of the widgets; or you can link widgets to other dashboards to enable drill down.

Integrate. BVD can process any kind of data as long as it is sent in JavaScript Object Notation (JSON), a language-independent, open data format. The out-of-the-box integration with OMi facilitates the integration of event and KPI status as well as metrics data. Operations Connector provides policies that automatically forward data collected from various sources to BVD. Alternatively, create your own integrations for any data source by writing an adapter for BVD. The adapter must convert the source data to JSON and send the JSON-enabled data to the BVD data receiver.

Logging Into BVD

You can access BVD using a supported web browser from any computer with a network connection to the BVD server. The level of access granted to a user depends on the user's permissions.

For a list of supported browsers, see the support matrix:

Support Matrices for Operations Center products

Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

Tasks

This section includes:

- "How to Log Into BVD" below
- "How to Log Out of BVD" below

How to Log Into BVD

1. In a browser, enter the following URL:

   `http(s)://<BVD_server>:<port>/login/`

   where

   `<BVD_server>` represents the Fully Qualified Domain Name (FQDN) of the BVD server; `<port>` is the port assigned to BVD during the configuration. Example: `http://bvd.example.com:80/login`

2. Enter your login name and password. Initial access can be gained using the administrator user name and password as specified during the BVD configuration.

   > **Caution:** We recommend that the system superuser change this password upon first login to prevent unauthorized entry. For details on changing the user password, see "My Account" on the next page. The login name cannot be changed.

   > **Note:** You will be temporarily locked out from signing into BVD after five failed attempts to sign into BVD. When your account is locked you will not be able to sign in, even with the correct password. The lock lasts for 15 minutes and resets automatically.

After you log in, your login name appears on the ⚇ **Personal User Settings** menu.

How to Log Out of BVD

When you complete your session, it is recommended that you log out to prevent unauthorized entry.

Click **Log Out** on the ⚇ **Personal User Settings** menu.

My Account

The My Account dialog box enables individual users to change their name and password. In addition, users can provide their email address.

The changes made here are also applied to the user's configuration in User Management. For details, see "User Management" on page 71.

To access

Click **My Account** on the ⌂ **Personal User Settings** menu.

Tasks

How to Update My Account Information

1. In the **Email** field, enter your email address.

2. In the **Name** field, type a new display name.

3. Click **Change Password** and enter the old and the new password.

   > **Note:** The **Change Password** button is not available for LDAP users.

4. Click **Change** to save your changes.

Get Started

<div style="background-color:#2ca37f; color:white; text-align:center; padding:10px;">Step 1: Before You Begin</div>

1. Make sure Visio is installed on the system where you plan to create dashboards for BVD.

2. Log into BVD:

   a. Access BVD at the following URL:

      `http://<BVD_server>:<port>/login/`

      Enter your login name and password.

   b. *Recommended.* Open the ⚇ **Personal User Settings > My Account** menu and specify a new password.

3. In BVD, open 🔧 **Administration > System Settings**, and copy the **API Key**.

   This key identifies your BVD instance and must be included in the data submitted by the data senders.

   > **Note:** The System Settings page is only available to users with administrator privileges.

4. Download the following tools and samples in 🔧 **Administration > Download Tools & Samples**, and install them:

   ○ Visio Stencil (Contains the BVD widgets for Visio.)

   ○ Data Generator Sample (Contains a VBScript and a batch file to send data to the OMi sample dashboard.)

Step 2: Try the OMi Sample Dashboard

BVD provides the sample dashboard **OMi Event and KPI Status Samples** (`omi_sample`) as well as a batch and a VBScript file for sending data to the example. By following the steps below, you will become more familiar with the BVD dashboards, sending data to BVD, and connecting the data to dashboard widgets.

You could also look through the BVD Getting Started dashboards, which are based on the OMi sample dashboard and guide you through the process of modifying a Visio file, uploading the exported SVG file to BVD, and then sending data to the dashboard.

1. Run the data generator `samplegen.bat` after extracting it from `samplegen.zip`. When prompted, enter the URL of your data receiver, your API key, and the HTTP proxy and port, if required.

   > **Example:**
   >
   > ```
   > Please enter the data receiver URI, e.g. https://receiver.coloryourdata.io/:
   > http://bvd.example.com:12224/
   > Please enter your BVD API Key: 47a648e9065d465012e541288b5a345e
   > Host name of your HTTP proxy server (leave empty if not required):
   > httpproxy.example.com
   > Port name of your HTTP proxy server: 8080
   > Sending sample data to ...
   > ```

   The batch file generates random values and sends them every two seconds to the sample dashboard.

2. View the OMi sample dashboard in 📈 **Dashboards > omi_sample**. Take a moment to explore the information displayed and watch it updating as new data arrives.
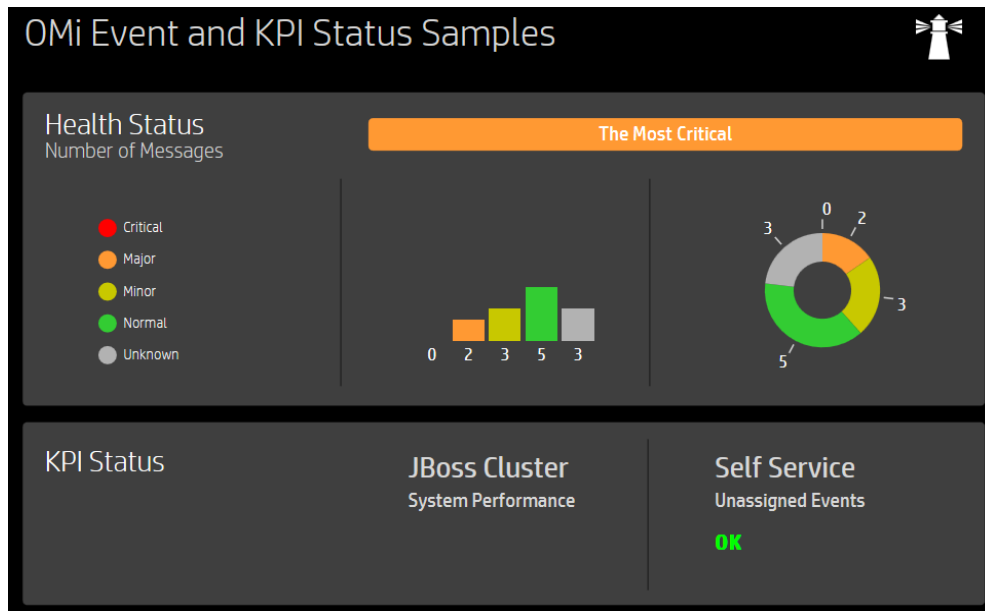
3. Configure the `omi_sample` dashboard in 🔧 **Administration > Manage Dashboards > omi_sample**. Take a moment to look at the properties of the dashboard widgets, the data channels, fields, and rules.

   The following steps demonstrate to you how BVD maps data to widgets:

   a. Edit the text value widget below **JBoss Cluster System Performance**, and delete the existing data channel (⬡omi ⬡kpi ⬡OprSample ⬡IT JBoss Cluster ⬡System Performance).

b. Place the cursor in the **Data Channel** field and type `omi`. The editor displays a list of all data channels that match the search string `omi`. Select ⬦`omi` ⬦`kpi` ⬠`OprSample` ⬠`IT JBoss Cluster` ⬠`System Performance` again.

c. In the **Data Field**, click the down arrow and select `status` from the drop-down list. This step configures the text value widget to retrieve the data from the `status` field in the connected data channel.

d. Click **Cancel** to return to the **Manage Dashboards** page.

For more information on sending data to BVD, see "Example: Sending JSON Data to BVD" on page 105.

Step 3: Send Your Own Data to the Dashboard

Before creating your first BVD dashboard, think about the data you want to send and show. You may have numbers indicating the currently logged-in users of your online banking system, metrics indicating the response time of your web servers, or measurements of the temperature in your data centers.

BVD expects to receive your data as HTTP post requests in JavaScript Object Notation (JSON) format.

The URL should look something like this:

`http(s)://<BVD_server>:<port>/api/submit/<API_key>/dims/<dims>`

`<BVD_server>`

> The Fully Qualified Domain Name (FQDN) of the BVD server.

`<port>`

> The port assigned to the BVD receiver during the configuration. Default: 12224 (HTTP) or 12225 (HTTPS).

`<API_key>`

> Identifies your BVD instance. You can find the API key in 🔧 **Administration > System Settings**.

`<dims>`

> The names in your JSON name-value pairs. Select and combine dims that uniquely identify your data.

For more information on the URL of the BVD data receiver, see .

Example URL:

`http://bvd.example.com:12224/api/submit/47a648e9065d465012e541288b5a345e/dims/viewName,ciName,kpiName/tags/omi,kpi`

Example data channel in BVD:

Data Channel:

| omi | kpi | OprSample | Employee Self Service |
| Unassigned Events |

Tags: `omi, kpi`

Dims: `OprSample` (=viewName), `Employee Self Service` (=CiName), `Unassigned Events` (=kpiName)

Step 4: Design Your Own Dashboard in Visio

1. In Visio, create a new drawing. Drag and drop the BVD shapes to your drawing and then arrange and modify them as required.

   HPE recommends that you do not change the shape data of the BVD shapes in Visio itself. BVD enables you to adapt the widgets in the uploaded dashboard, which is faster and more convenient (🔧 **Administration > Manage Dashboards**).

   For an overview of the available widgets and the associated properties, see "Widgets" on page 110.

2. Save your drawing as an SVG file, making sure that the following Visio settings are selected:

   ○ Save as type: **Scalable Vector Graphics (*.svg)**

   ○ Select: **Include Visio data in the files**

   ○ Tip: Press **Ctrl+A** to select everything in the drawing. This ensures that your entire drawing is exported and not the currently selected element only.

   Alternatively, click the **Export Dashboard** button in the **Dashboard** ribbon, if you have installed the BVD **Visio Addin**.

Step 5: Upload your Dashboard to BVD

1. In BVD, open 🔧 **Administration > Manage Dashboards** and click ➕ **Add**, select your SVG file, and then click **Upload Dashboard** to import it. The BVD dashboard editor opens and displays your uploaded dashboard.

2. You can change the properties of the dashboard itself (for example, the SVG file associated with the dashboard, the title, or the background color).

   To edit the properties of a widget, click the widget. When you click the **Data Channel** field, a drop-down list opens showing all data streams that have been received by BVD. The data you sent in Step 3 should be included in the list. Select it, adjust any of the other properties as required, and click **Save**. For more information about the widget properties, see "Widget Properties" on page 119.

3. By default, newly imported dashboards are visible in the **Dashboards** menu. To show or hide a dashboard, click the 📈 **Show in Menu/Hide from Menu** button.

4. View your dashboard by selecting it in the 📈 **Dashboards** menu. Then watch your dashboard updating as you send data over your data channels.

Installation and Configuration

This section describes how to install, configure, and update BVD.

You can find information about supported operating systems, databases, browsers, as well as coexistence in the support matrix:

Support Matrices for Operations Center products

Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

Prerequisites

The hardware, network configuration, database, and installing user requirements are listed in this guide. For a list of supported platforms, web browsers, database management systems, visualization tools as well as coexistence and virtualization information, see the support matrix:

Support Matrices for Operations Center products

Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

This section includes:

- "Hardware Requirements" on the next page
- "Network Configuration Requirements" on the next page
- "Database Requirements" on the next page
- "User Account Requirements" on page 19
- "Linux Requirements" on page 19
- "Sizing and Performance Recommendations" on page 20

Hardware Requirements

- **Processor.** 2 CPU cores minimum, 4 recommended. All CPU cores must run at 2.4 GHz or faster.

  In a virtual environment, make sure the number of virtual CPUs is equivalent to 2 (or 4) physical CPU cores.

- **Disk space.** 10 GB

  BVD installs to the following default directories:

Directory	Reference in Documentation	Windows (default)	Linux (default)
Application folder	*<BVD_Install_Dir>*	`C:\Program Files\Hewlett Packard Enterprise\BVD\`	`/opt/HP/BVD`
Data folder	*<BVD_Data_Dir>*	`C:\ProgramData\Hewlett Packard Enterprise\BVD\`	`/var/opt/HP/BVD`
Shared content installation folder		`C:\Program Files\HP\HP BTO Software\`	`/opt/OV`
Shared content data folder		`C:\ProgramData\HP\HP BTO Software\`	`/var/opt/OV`

  The default Linux directories cannot be changed during the installation.

- **Memory (RAM).** 2 GB (absolute minimum)

For information about the hardware requirements in large computing environments, see "Sizing and Performance Recommendations" on page 20.

Network Configuration Requirements

- **IP Address.** If the system on which you are running BVD supports IPv6, then, by default, only IPv6 addresses will be allowed to access BVD.

  If you want BVD to only be accessible via IPv4 instead, manually disable IPv6 on your system. On Windows, access the **Network and Sharing Center**, click **Change adapter settings** and disable Internet Protocol Version 6 (TCP/IPv6) in the properties for the corresponding connection.

Database Requirements

When configuring BVD, you can choose between an external PostgreSQL database and an embedded PostgreSQL database.

There are no specific requirements for the embedded PostgreSQL database other than making sure that you meet the hardware requirements listed in "Hardware Requirements" above. BVD installs and configures the embedded PostgreSQL database instance for you on the BVD server.

The requirements for the external PostgreSQL database are as follows:

- **Hardware.** For PostgreSQL hardware requirements, see the PostgreSQL documentation available at:

  http://www.postgresql.org/docs/manuals/

- **PostgreSQL version.** For a list of supported PostgreSQL database versions, see the support matrix at:

  Support Matrices for Operations Center products

  Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

- **Installation.** For details on the PostgreSQL software installation, see the installation guide in the documentation for your specific PostgreSQL version.

  > **Caution:** Make sure you configure the `pg_hba.conf` file on the PostgreSQL server to accept remote connections. Otherwise, the connection to the PostgreSQL database cannot be established when configuring BVD.

- **Configuration.** A database for use by BVD must already be configured. The name of the database must not be `postgres`. In addition, the user that accesses the database must have permissions to create tables.

  For details on connecting BVD to the database, see .

User Account Requirements

- **Windows.** You need administrative privileges on the host system on which you are installing and configuring BVD.

- **Linux.** You must use the root user account to install and configure BVD.

Linux Requirements

In a non-root environment, SELinux must be disabled on your system:

1. Edit the configuration file: `/etc/selinux/config`
2. Disable SELinux: `SELINUX=disabled`
3. Save the file.

Sizing and Performance Recommendations

If BVD is deployed in large computing environments, refer to the following recommendations to estimate the requirements and improve the performance of your BVD system.

- **Required number of CPUs.** The following recommendations are based on the assumption that the default settings for the **Web Server Processes** and **Receiver Processes** are used.

  On a system with an internal PostgreSQL database and a fast disk (for example SSD), the average load handled by BVD is **100 msg/sec per CPU core**.
  For an external PostgreSQL database, the write rate of the database can be a limiting factor.

  In order to estimate the msg/sec (messages per second) for your BVD environment, calculate the following:

  > **Example:**
  >
  > The number of channels equals the number of dashboards multiplied by the number of widgets per dashboard. The messages per minute equals the number of channels multiplied by the updates per minute (per widget). The messages per second equals the messages per minute divided by 60.
  >
  > | Number of dashboards | Number of widgets per dashboard | Number of channels | Updates per minute | Messages per minute | Messages per second |
  > | --- | --- | --- | --- | --- | --- |
  > | 100 | 10 | 1000 | 1 update/min | 1000 msg/min | 16 msg/sec |
  > | 1000 | 10 | 10000 | 1 update/min | 10000 msg/min | 160 msg/sec |
  > | 1000 | 10 | 10000 | 5 updates/min | 50000 msg/min | 833 msg/sec |
  > | 1000 | 20 | 20000 | 1 update/min | 20000 msg/min | 333 msg/sec |

- **Required disk space.**

  On top of the 10 GB minimum requirement, additional disk space is required for large environments.
  In order to estimate the additional disk space requirements for your BVD environment, calculate the following:

  > **Example:**
  >
  > The example is based on the following assumptions: your BVD environment consists of 100 dashboards, each containing 10 widgets. 500 messages per widget are kept in the cache and the average data sample size is 500 bytes.

  If you configure the Aging by Maximum Age instead of Maximum Number, you need to calculate the average incoming message rate multiplied by the time span for aging.

For example, if the configured Maximum Age is 1 day and the average incoming message rate is 1 message per minute per widget, then roughly 1440 messages are stored per widget.

- **Required RAM.**

  HPE recommends 8 GB RAM for configurations up to 8 CPUs, and 12 GB RAM for larger environments up to 16 CPUs.

Installation

This section includes:

- "Installation Process" below
- "Preparation" below
- "Installation on Windows Systems" below
- "Installation on Linux Systems" on page 27
- "Silent Installation" on page 28
- "Service Pack Installation" on page 29

Installation Process

Install BVD 10.11 as follows:

1. Run `install.bat` (Windows) or `install.sh` (Linux) to install OMi 10.10. The installation wizard can also run in silent mode.
2. Install the 10.11 Service Pack.

Preparation

1. Download the following `.zip` archive file to the system where you want to install BVD:

   `HPE_BVD_<Version>.zip`

2. Extract all files from the archive.
3. Change to the directory that contains the BVD installation files:

   `HPE_BVD_<Version>`

4. *Optional for Linux.* You can verify that the installation files are original HPE-provided code and have not been manipulated by a third-party by using HPE Public Key and the verification instructions on the following web site: HPE GPG or RPM Signature Verification

Installation on Windows Systems

1. Make sure no other installations or processes requiring Windows Installer are running.
2. Start the installation by running the following command:

   `install.bat`

The BVD setup begins.

3. Choose the language.

   Your installer may offer additional languages. The language that you choose in the language selection window becomes the language of the installation wizard.

   From the drop-down list, select the language that you want to use in the installation wizard, and then click **OK**.

   > **Note:** Your selection does not affect the following:
   >
   > ○ The language of the configuration wizard (it is determined automatically from the operating system settings).
   >
   > ○ The language used in the BVD console.

4. Read the introduction.

   The **Introduction (Install)** page describes the installation wizard. Familiarize yourself with the information provided and then click **Next**.

5. Review the license agreement.

   In the **License Agreement** page, accept the license agreement and click **Next** to continue with the installation. If you decline, the installation cannot proceed.

6. Specify the installation folders:
   - Shared content installation folder (default):

     `C:\Program Files\HP\HP BTO Software\`

   - Shared content data folder (default):

     `C:\ProgramData\HP\HP BTO Software\`

   - Application folder (default):

     `C:\Program Files\Hewlett Packard Enterprise\BVD\`

     Referred to as `<BVD_Install_Dir>` in this documentation.

   - Data folder (default):

     `C:\ProgramData\Hewlett Packard Enterprise\BVD\`

     Referred to as `<BVD_Data_Dir>` in this documentation.
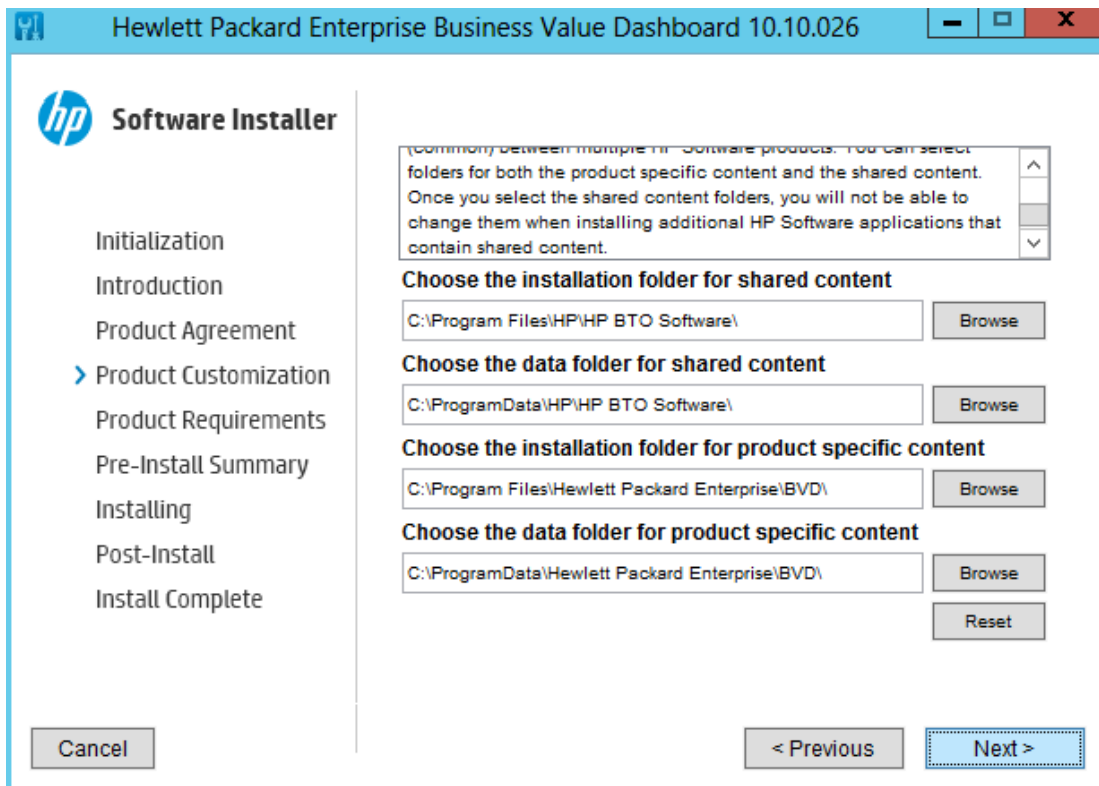
Note: If you are installing BVD on a system with shared content already installed (for example, a system with OMi installed), you cannot select folders for shared content.

Click **Next**.

7. Review the product requirements.

   The installation wizard checks that the system meets the requirements for installing BVD.
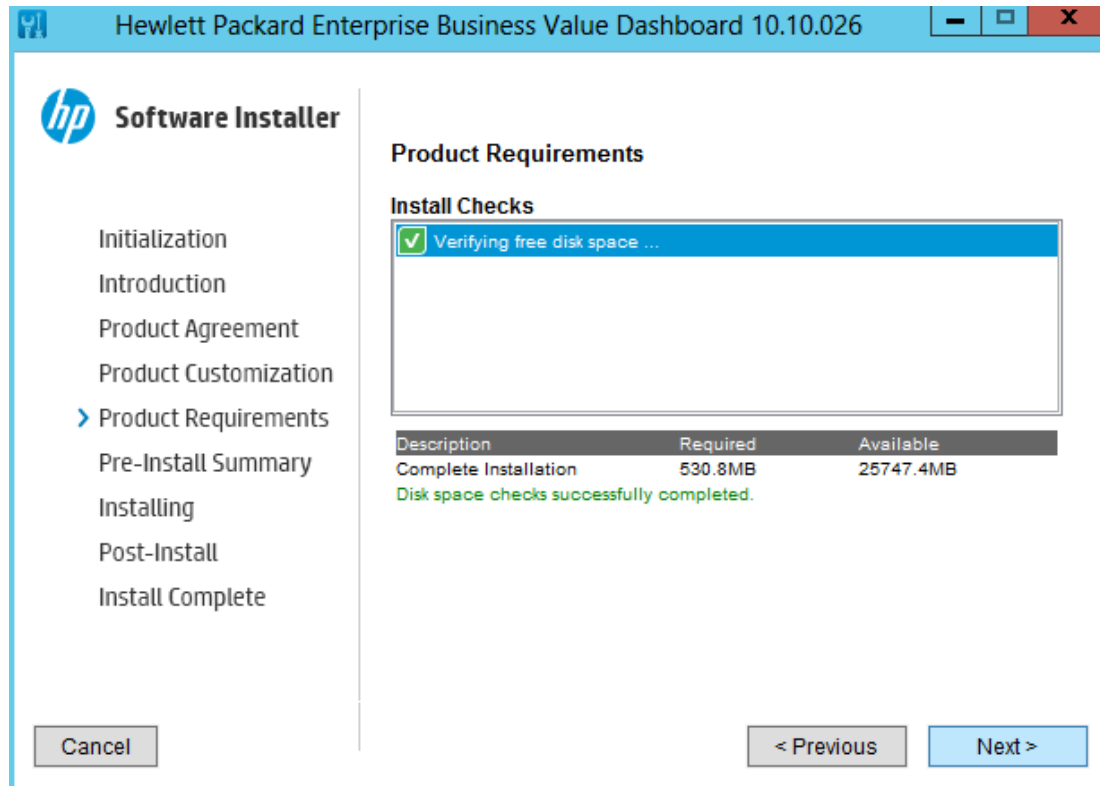
In the **Product Requirements** page, click **Next**.

> **Note:** If a requirement check fails, review the warning message and make sure the system meets the product requirements listed in this document. After updating the system resources, click **Previous** and then **Next** to continue with the installation.

8. Install BVD.

   Review the information in the **Pre-Install Summary** page and then click **Install** to start the installation.
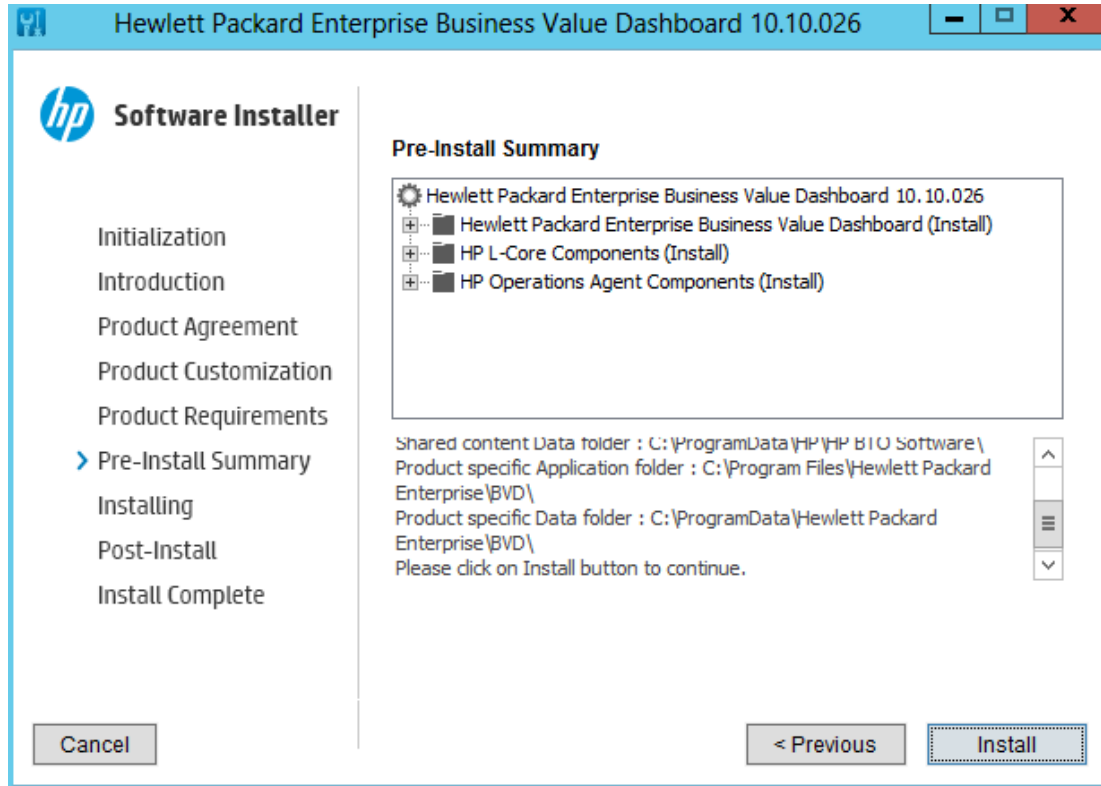
9. Review the information in the **Installation Complete** page, for example by clicking **View log file**. When you have finished, click **Done** to close the installation wizard.
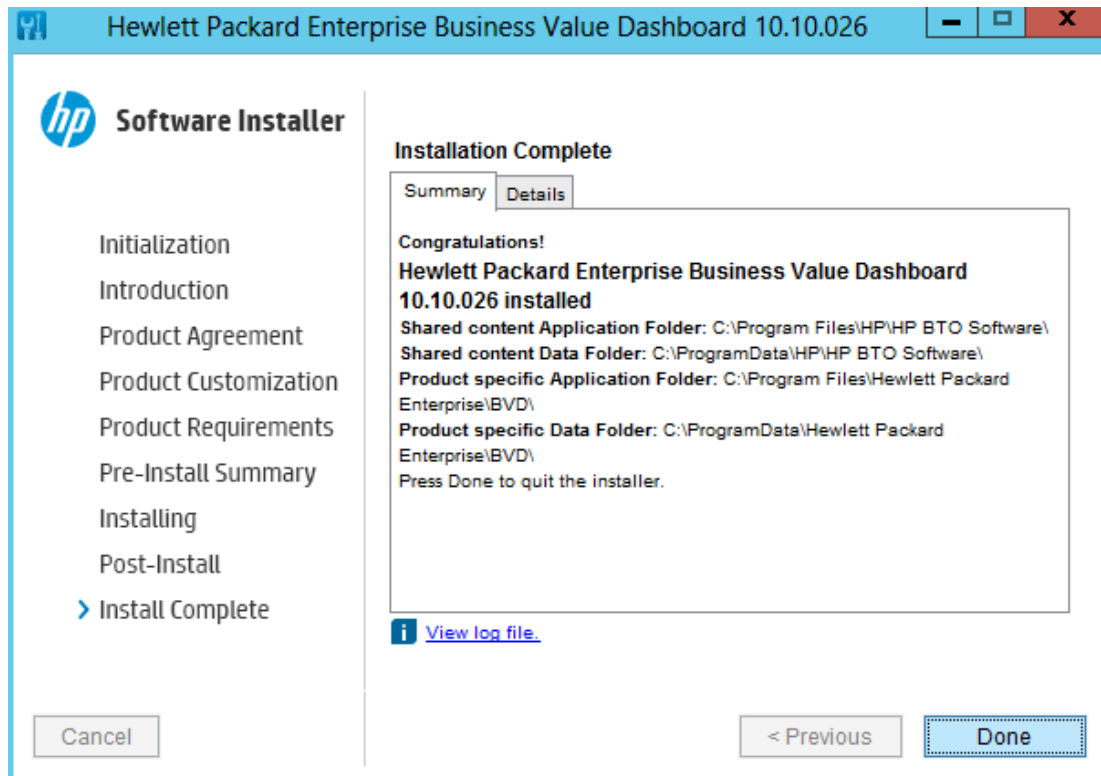
10. Configure BVD as described in "Configuration" on page 30.

Installation on Linux Systems

1. Log in to the server as user **root**.

2. Start the installation by running the following command:

   `./install.sh`

   The BVD setup begins.

   > **Tip:** To install BVD from the console, run the installation script with the `-console` option:
   >
   > `./install.sh -console`
   >
   > Alternatively, unset the `$DISPLAY` shell environment variable, and run the command without specifying the `-console` option.

3. Choose the language.

   Your installer may offer additional languages. The language that you choose in the language selection window becomes the language of the installation wizard.
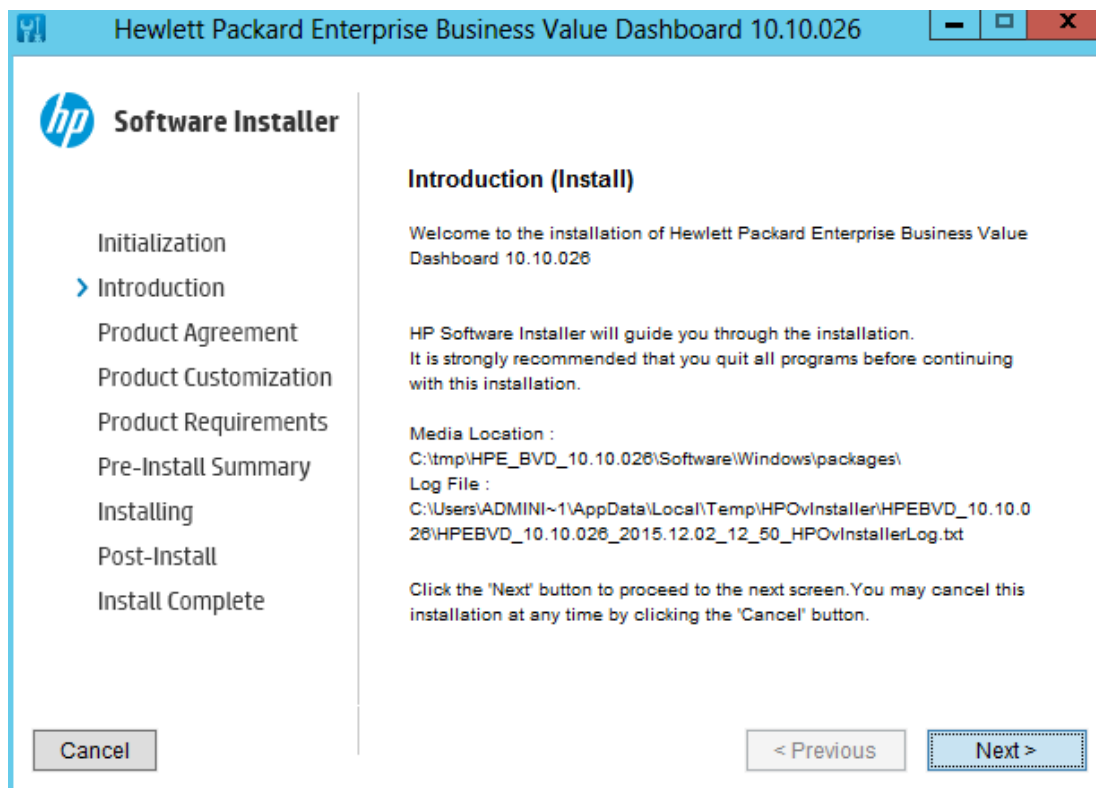
   From the drop-down list, select the language that you want to use in the installation wizard, and then click **OK**.

   > **Note:** Your selection does not affect the following:
   >
   > ○ The language of the configuration wizard (it is determined automatically from the operating system settings).
   >
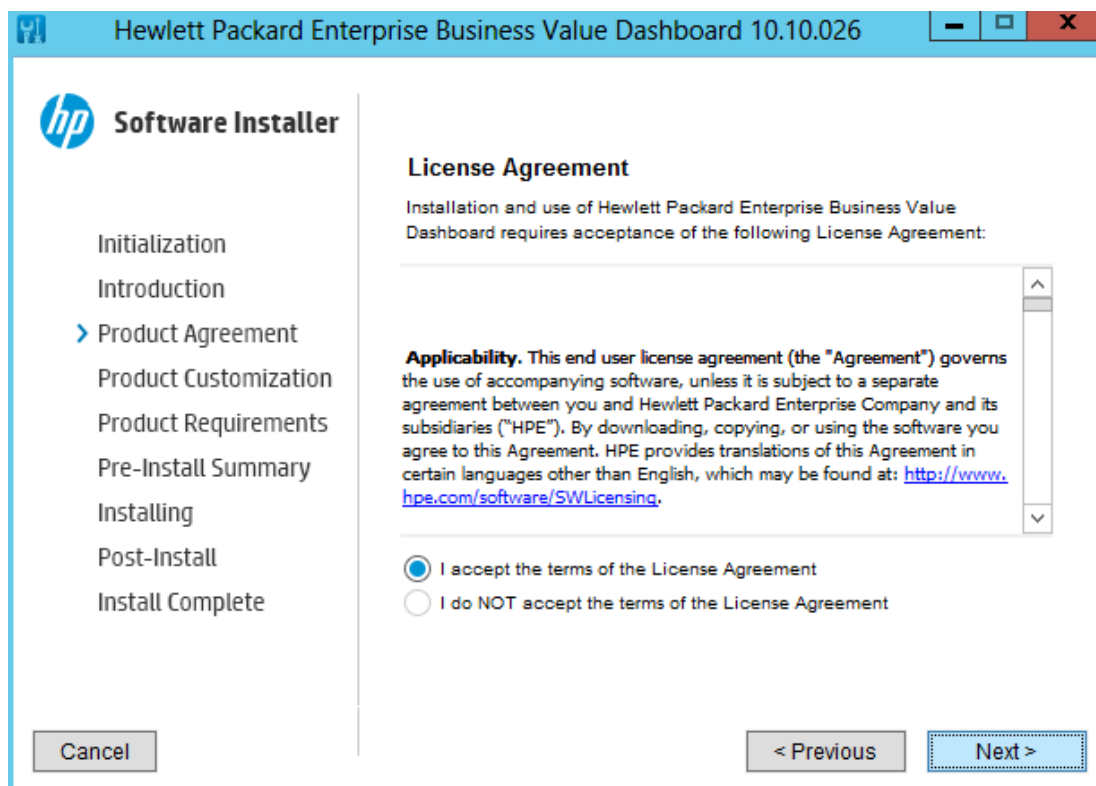   > ○ The language used in the BVD console.

4. Read the introduction.

   The **Introduction (Install)** page describes the installation wizard. Familiarize yourself with the information provided and then click **Next**.

5. Review the license agreement.

   In the **License Agreement** page, accept the license agreement and click **Next** to continue with the installation. If you decline, the installation cannot proceed.

6. Review the product requirements.

   The installation wizard checks that the system meets the requirements for installing BVD.

   In the **Product Requirements** page, click **Next**.

   > **Note:** If a requirement check fails, review the warning message and make sure the system meets the product requirements listed in this document. After updating the system resources, click **Previous** and then **Next** to continue with the installation.

7. Install BVD.

   Review the information in the **Pre-Install Summary** page and then click **Install** to start the installation.

8. Review the information in the **Installation Complete** page, for example by clicking **View log file**.

   When you have finished, click **Done** to close the installation wizard.

   BVD installs to the following default directories:

- ○ Shared content installation folder: `/opt/OV`

- ○ Shared content data folder: `/var/opt/OV`

- ○ Application directory: `/opt/HP/BVD`

  Referred to as *`<BVD_Install_Dir>`* in this documentation.

- ○ Data directory: `/var/opt/HP/BVD`

  Referred to as *`<BVD_Data_Dir>`* in this documentation.

9. Configure BVD as described in "Configuration" on page 30.

Silent Installation

The BVD installation wizard can be invoked to run in a silent mode. In this mode, the wizard does not display a graphical user interface.

1. Create an empty file called `ovinstallparams.ini` in the same directory as the installation executable file, for example:

   - ○ Windows:

     ```
     HPE_BVD_<Version>\Software\Windows\HPEBVD_<version>_setup.exe
     HPE_BVD_<Version>\Software\Windows\ovinstallparams.ini
     ```

   - ○ Linux:

     ```
     HPE_BVD_<Version>/Software/Linux/HPEBVD_<version>_setup.bin
     HPE_BVD_<Version>/Software/Linux/ovinstallparams.ini
     ```

2. Copy the following section to the `.ini` file on the BVD server:

   ```
   [installer.properties]
   setup=HPEBVD
   ```

3. *Windows only.* To change the default installation directories, add the following lines at the end of the file:

   ```
   installDir=<SharedComponentsBinaryFilesDirectory>
   dataDir=<SharedComponentsDataDirectory>
   prodInstallDir=<BVDBinaryFilesDirectory>
   prodDataDir=<BVDDataDirectory>
   ```

   > **Note:** The first two lines apply to the HPE shared data (shared components), and the last two lines apply to BVD.

4. Run the installation wizard silently by starting the setup file with the `-silent` option, for example:

   - ○ Windows:

     ```
     HPE_BVD_<Version>\install.bat -silent
     ```

   - ○ Linux:

     ```
     HPE_BVD_<Version>/install.sh -silent
     ```

5. Configure BVD as described in "Configuration" on page 30.

Service Pack Installation

After the installation and before you configure BVD, install the 10.11 service pack that is available either as part of your installation files or from Software Support Online.

Preparation

- To install the service pack as part of your installation files, prepare the following:

    a. Unzip the BVD service pack installation folder `HPE_OMi_10.11_BusinessValueDashboard`.

    b. Change the current directory as follows:

       Windows: `HPE_OMi_10.11_BusinessValueDashboard\Software\Windows\`

       Linux: `HPE_OMi_10.11_BusinessValueDashboard\Software\Linux\`

    c. Extract all files from the archive `OMI_00145.zip` (Windows) or `OMI_00146.zip` (Linux) into the application folder `<BVD_Install_Dir>`.

- To install the service pack from Software Support Online, prepare the following:

    a. Depending on your operating system, access the Software Support Online website that contains the service pack:

       BVD 10.11 Service Pack for Windows

       BVD 10.11 Service Pack for Linux

    b. Download the `.zip` file `OMI_00145.zip` (Windows) or `OMI_00146.zip` (Linux).

    c. Extract all files from the archive into the application folder `<BVD_Install_Dir>`.

Installation

Run the service pack installation script:

Windows: `<BVD_Install_Dir>\installation\HPE_BVD_1011\scripts\setup.bat -install`

Linux: `<BVD_Install_Dir>/installation/HPE_BVD_1011/scripts/setup.pl -install`

Configuration

This section includes:

Configure BVD

1. When configuring BVD for the first time, you need to specify a password for the configuration wizard. To set the password and start the configuration, run the following command:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat -p <password>`

   Linux: `/opt/HP/BVD/bin/configure.sh -p <password>`

   You will need to enter this password every time you open the configuration wizard.
   The password must be at least eight characters long, contain one lower-case and one upper-case letter, one digit, and one special character. Special characters should be ASCII characters only.

2. In a browser, enter the URL:

   `http://localhost:5000`

   > **Note:** `localhost:5000` uses the default port `5000`. If this port is already in use, follow the instructions displayed in the command line to identify the correct URL.

3. Enter the password you previously specified and click **Submit**.

4. Modify the BVD settings in the configuration wizard. Click **Download** to download your settings as configuration file or **Apply** to start the configuration.

   The configuration wizard contains steps to configure connections (the web server, the BVD data receiver, and the TLS usage), login settings, security, LDAP, the database, data aging, and licensing.

   - "Configuration Type" on page 32

   - "Connection" on page 33

- "Login" on page 34

- "Security " on page 35

- "LDAP" on page 36

- "Database" on page 37

- "Aging" on page 37

- "License" on page 38

- "Summary" on page 38

5. After you complete the configuration, run the following command to start all BVD and agent processes:

    `ovc -start`

6. Verify that the BVD processes are running:

    `ovc -status`

    The following processes must be running:

    ```
    bvdaging     BVD Aging                  BVD      (2632)   Running
    bvdpg        BVD Postgres DB            BVD      (3776)   Running
    bvdrc        BVD Receiver               BVD      (2532)   Running
    bvdredis     BVD Redis Server           BVD      (3516)   Running
    bvdsc        BVD Sidecar                BVD      (3840)   Running
    bvdws        BVD Web Server             BVD      (2576)   Running
    ovbbccb      OV Communication Broker    CORE     (2600)   Running
    ovcd         OV Control                 CORE     (2492)   Running
    ovconfd      OV Config and Deploy       COREXT   (3244)   Running
    ```

7. *Optional.* Check the configuration log file at:

    Windows: `<BVD_Data_Dir>\BVD\log\configserver.log`

    Linux: `/var/opt/HP/BVD/log/configserver.log`

8. In a browser, enter the BVD URL:

    `http(s)://<BVD_server>:<port>/login/`

    where

    `<BVD_server>` represents the Fully Qualified Domain Name (FQDN) of the system on which you configured BVD; `<port>` is the port assigned to the BVD server during the configuration. Example: `http://localhost:80/login`

9. Enter your login name and password. Initial access can be gained using the administrator user name and password that you specified during the configuration. See also "Login" on page 34.

10. After you complete the BVD configuration, you can access the configuration wizard again to reconfigure BVD. Alternatively, you can modify the `bvdconfig.conf` file that you were able to download during the configuration. See also "Reconfigure BVD" on page 49.

Configuration Type

To decide how BVD will be configured, choose between a custom configuration and an express configuration.

Custom Configuration

Default. Custom configurations display the complete configuration wizard. You can specify custom values for all BVD configuration settings.

Express Configuration

Express configurations use default values for all settings to speed up the configuration process. Only the global password needs to be specified. When this option is chosen, BVD automatically uses an embedded PostgreSQL database, no HTTPS or LDAP setup, and a 60-day evaluation license.

Connection

Configure the web server, receiver, and TLS.

> **Note:** HPE recommends to enable TLS and use a trusted certificate for both the web server and the receiver. If you do not use TLS, the communication between the servers and web browsers is not secure.

Web Server

HTTP Port

HTTP port of the web server. Uncheck **Use HTTPS** to configure the web server without TLS.

Default: `80` (HTTP), `443` (HTTPS)

Web Server Processes

Number of web server processes running in parallel. Increase or decrease this number to balance the web and receiver servers according to your usage pattern. For example, if you have many viewers but only a small number of data senders, increase the number of web server processes and decrease the number of receiver processes.

Default: Half of the number of CPUs on the BVD system (`1` if it is a single core system)

Header Name

Use if BVD is configured with a load balancer or proxy. The name of the header that is used to get the IP address of the UI client system. If the specified header is not found, BVD uses the IP address of the TCP connection. This IP address is used to determine which process of the BVD web server handles all requests from a certain UI client (sticky session).

Default: `x-forwarded-for`

Receiver

HTTP Port

HTTP port of the receiver. Uncheck **Use HTTPS** to configure the web server without TLS.

Default: `12224` (HTTP), `12225` (HTTPS)

Receiver Processes

Number of receiver processes running in parallel. Increase or decrease this number to balance the web and receiver servers according to your usage pattern. For example, if you have many viewers but only a small number of data senders, increase the number of web server processes and decrease the number of receiver processes.

Default: Half of the number of CPUs on the BVD system (`1` if it is a single core system)

TLS Certificate

Click **Use HTTPS** for the web server, the receiver, or both in order to enable the TLS Certificate settings.

Complete the following steps to configure BVD for TLS:

1. Obtain a server certificate from your certificate authority (CA). Make sure the certificate is issued to the FQDN of your BVD server. BVD supports certificates in PEM or PFX format.

2. Place the certificates in the file system on your BVD server and make sure the certificates are readable by the Windows SYSTEM user or, on Linux, by the user under whose account the BVD processes are running (default: root).

3. Complete the following information in the BVD configuration wizard to define the TLS setup:

   Certificate Type

   Choose the certificate type. The certificate can either be an X.509 or CA certificate in PEM or PFX format.

   Certificate File

   Upload the certificate you obtained from your certificate authority.
   Example: `certificate.pem`

   Key File

   Upload the private key file of the certificate.
   Example: `key.pem`

   Use Passphrase

   If the key file is encrypted, click **Use passphrase** to specify the passphrase.

   Note: Make sure that your system allows connections from the HTTPS ports you specified (443 and 12225 by default). You might have to add exception rules to your firewall to allow TCP requests from these ports.

Login

One built-in super-admin user is defined for every installation of BVD. The login and the password for this account are specified in the **Login** page of the configuration wizard.

Name

Login name of the built-in BVD super-admin.

The built-in super-admin is not listed among the users in user management. If you have logged in as the super-admin, you can change the user's information, including password and contact information, in the **My Account** page in the 👤 **Personal User Settings** menu.

Default: `admin`

   Note: The login name cannot be changed when reconfiguring BVD.

Password

Password of the built-in super-admin.

Security

Make BVD more secure by configuring the values in the **Security** page of the configuration wizard.

Login Delay

The minimum time interval (in milliseconds) between a user's consecutive logins. Users will not be able to log in again unless their last login dates back later than the specified login delay. The maximum are 5000 milliseconds.

Default: `2000`

Login Attempts Allowed

Number of allowed login attempts before an error message is displayed. After the specified number of login attempts, the user profile will be locked for as long as specified in the **User lock out time**.

Default: `5`

Lock Out Time

The length of time (in seconds) for which a user is locked out of BVD if the number of allowed login attempts is exceeded.

Default: `900`

Linux Only: Non-Root User

On Linux, the BVD and associated processes by default run under the root user account. You can change the user account that is associated with the processes to another user by checking the box **Run as non-root user** and specifying the following Non-Root User settings in the BVD configuration wizard.

The following processes are affected:

- BVD processes
- Operations Agent core processes (ovbbccb, ovcd, ovconfd)

> **Note:** On Linux servers, non-root users cannot open ports in the range 0 to 1023. You must therefore specify ports above 1023 for the BVD web server.
>
> Alternatively, you can use the Linux `setcap` utility to set file capabilities that are extended attributes on the BVD web server process; for example: `setcap 'cap_net_bind_service=+ep' /opt/HP/BVD/node/node`

User Name

User account under which the processes will run. BVD will create the user account if it does not yet exist.

Group Name

Group account of the user under which the processes will run. BVD will create the group account if it does not yet exist.

LDAP

Simplify the user management process for administrators by enabling and configuring LDAP. Authentication is performed through the LDAP server which stores the user information.

For details on configuring an LDAP server for BVD user authentication, see "LDAP Authentication and Mappings" on page 76.

Database

BVD requires a database to store information. You can choose to create a new, embedded database, or you can connect to an already existing database.

> **Note:** Before connecting to an external PostgreSQL database, make sure the database is installed as required by BVD. For details, see "Database Requirements" on page 18.

Database Type

Choose the type of database to be used.

PostgreSQL external: for use with an external PostgreSQL database.

PostgreSQL internal: for use with the embedded PostgreSQL database.

Connection

Specify how to connect to the chosen database type.

Host

External database only. The name of the host machine on which PostgreSQL is installed.

Default: `localhost`

Database Name

External database only. The name of a PostgreSQL database that already exists. The database name must not be `postgres`.

Default: `bvd`

Port

The PostgreSQL listening port.

Default: `5432`

PostgreSQL Superuser

Embedded database only. The name and password of a user with administrative permissions on the embedded PostgreSQL database.

Default: `pg_admin`

Database User

The name and password of a user that BVD uses to connect to and retrieve data from the BVD database. The user must have permissions to create tables in the database.

Default: `pg_user`

Aging

Configure the data aging process that scans the database configuration.
By default, up to 500 data records per data channel are stored in the database. You can modify the default and adjust additional data aging settings as described in "Data Aging" on page 131.

License

BVD is installed with a 60-day evaluation license. If you have obtained a permanent license, you can upload the license by clicking the **Add license from file** option.

For details on configuring licensing for BVD, see "Licensing" on page 55.

Summary

Review the configuration settings and confirm your changes in order to start the configuration.

Click on one of the headings (for example Connection) to change any of the entered values. You will be redirected to the corresponding configuration page. Click **Next** until you return to the Summary page.

Click **Download** to download your configuration settings as `bvdconfig.conf` file. As this file contains passwords, save it in a secure place and use it if you want to reconfigure BVD silently at another time.

Click **Apply** to start the configuration.

To change your settings after the initial configuration, see "Reconfigure BVD" on page 49.

Apply Configuration

Attend the BVD configuration based on the settings you reviewed in the **Summary** page.

After the configuration is finished, click **Launch BVD** to start BVD right away. Close the configuration wizard and the Command Prompt.

To reconfigure BVD after the initial configuration, see "Reconfigure BVD" on page 49.

Silent Configuration

The BVD configuration can be invoked to run in a silent mode. In this mode, you modify the BVD settings in a configuration .conf file, then run the BVD configuration tool with the configuration file as input.

1. Open a command prompt or shell.

2. Log in as user with administrator privileges (for example, root on Linux).

3. Create a copy of the sample configuration .conf file:

   Windows: `<BVD_Install_Dir>`\BVD\bvdconfig_example.conf

   Linux: /opt/HP/BVD/bvdconfig_example.conf

4. Modify the BVD settings in your copy of the configuration .conf file.

   The configuration file contains settings for the database, the web server, the data receiver, TLS usage, license usage, the built-in administrator user, the LDAP configuration, and data aging.

Linux Only. NonRoot Parameters

Prerequisite

In a non-root environment, SELinux must be disabled on your system:

a. Edit the configuration file: `/etc/selinux/config`

b. Disable SELinux: `SELINUX=disabled`

c. Save the file.

Specify the following parameters in the `[NonRoot]` section of the BVD configuration file to change the user account that is associated with BVD and associated processes.

Parameter	Description
username	User account under which the processes will run. BVD will create the user account if it does not exist yet. Leave empty to run BVD under root user account.
group	Group account for the user under which BVD will run. BVD will create the group account if it does not exist yet. Leave empty to run BVD under root group account.

Database Parameters

Complete the following parameters in the `[Database]` section of the BVD configuration file to define how the database will be configured.

> **Note:** Before connecting to an external PostgreSQL database, make sure the database is installed as required by BVD. For details, see "Database Requirements" on page 18.

Parameter	Description

type	The type of database to be used:
	`postgres`: for use with an external PostgreSQL database
	`internal`: for use with the embedded PostgreSQL database
	Default: `internal`
host	*External database only*. The name of the host machine on which PostgreSQL is installed.
	Default: `localhost` for the embedded database
database	*External database only*. The name of a PostgreSQL that already exists. The database name must not be `postgres`.
	Default: `bvd` for the embedded database
port	The PostgreSQL listening port.
	Default: `5432`
username	The name of a user that BVD uses to connect to and retrieve data from the BVD database. The user must have permissions to create tables in the database.
	Default: `pg_user`
password	The password of the user. This setting is empty by default.
adminuser	*Embedded database only*. The name of a user with administrative permissions on the embedded PostgreSQL database.
	Default: `pg_admin`
adminpassword	*Embedded database only*. The password of the administrative user. This setting is empty by default.

Web Server Parameters

Complete the following parameters in the `[WebServer]` section of the BVD configuration file to configure the web server.

Parameter	Description
port	HTTP port of the web server.
	Default: `80`
usessl	Enables or disables TLS for the web server. If set to true, you must also specify the `sslport` parameter for the TLS port.
	Note: HPE recommends to enable TLS and use a trusted certificate for both the web server and the receiver.
	Default: `true`

`sslport`	TLS port of the web server. Default: `443`
`wsProcesses`	Number of web server processes running in parallel. If this number exceeds the number of the machine's CPUs/cores, this setting will be ignored and the number of available CPUs/cores is used instead. Default: `1`
`stickySessionHeader`	*Optional if BVD is configured with a load balancer or proxy.* The name of the header that is used to get the IP address of the UI client system. If the specified header is not found, BVD uses the IP address of the TCP connection. This IP address is used to determine which process of the BVD web server handles all requests from a certain UI client (sticky session). Default: `x-forwarded-for`
`loginDelay`	The minimum time interval (in milliseconds) between a user's consecutive logins. Users will not be able to log in again unless their last login dates back later than the specified login delay. Default: `2000`
`allowedLoginAttempts`	Number of allowed login attempts before an error message is displayed. After the specified number of login attempts, the user profile will be locked for as long as specified in the `userLockOutTime`. Default: `5`
`userLockOutTime`	The length of time (in seconds) for which a user is locked out of BVD if the number of allowed login attempts is exceeded. Default: `900`

Receiver Parameters

Complete the following parameters in the `[Receiver]` section of the BVD configuration file to configure the BVD data receiver.

Parameter	Description
`port`	HTTP port of the data receiver. Default: `12224`
`usessl`	Enables or disables TLS for the receiver. If set to true, you must also specify the `sslport` parameter for the TLS port. **Note:** HPE recommends to enable TLS and use a trusted certificate for both the web server and the receiver. Default: `true`

`sslport`	TLS port of the receiver. Default: `12225`
`rcProcesses`	Number of receiver processes running in parallel. If this number exceeds the number of the machine's CPUs/cores, this setting will be ignored and the number of available CPUs/cores is used instead. Default: `1`

TLS Parameters

You can configure the BVD web server, the BVD receiver, or both to support secure connections only.

Complete the following steps to configure BVD for TLS:

a. Obtain a server certificate from your certificate authority (CA). Make sure the certificate is issued to the FQDN of your BVD server. BVD supports certificates in PEM or PFX format.

b. Place the certificates in the file system on your BVD server and make sure the certificates are readable by the Windows SYSTEM user or, on Linux, by the user under whose account the BVD processes are running (default: root).

c. In the `[Web Server]` and `[Receiver]` sections, enable TLS by setting `usessl` to `true` and specifying a `sslport`.

d. Complete the following parameters in the `[SSL]` section of the BVD configuration file to define the TLS setup:

Parameter	Description
`certificate`	Specify the file name of the certificate. The certificate must be an X.509 or CA certificate in PEM or PFX format. Example: `certificate.pem`
`key`	Private key of the certificate. Example: `key.pem`
`pfx`	Container file with the certificate, private key, and CA certificates, in PFX format. Example: `certificate.pfx`
`passphrase`	*Optional*. Passphrase used to encrypt the key or .pfx file.

License Parameter

Complete the following parameter in the `[License]` section of the BVD configuration file to configure the license.

For details on configuring licensing for BVD, see .

Parameter	Description
`file`	File name and path to the license file containing the BVD license. Leave empty to use the 60-day evaluation license.

Administrator Parameters

One built-in super-admin user is defined for every installation of BVD. Complete the following parameters in the `[Administrator]` section of the configuration file to specify the account details:

Parameter	Description
`name`	Login name of the built-in BVD super-admin.
	The built-in super-admin is not listed among the users in user management. If you have logged in as the super-admin, you can change the user's information, including password and contact information in the **My Account** page in the ⌂ **Personal User Settings** menu.
	Default: `admin`
`password`	Password of the built-in super-admin. This setting is empty by default.

LDAP Parameters

Automatic user creation from LDAP servers and mapping groups in BVD simplifies the user management process for administrators as authentication is performed through the LDAP server.

For details on LDAP, permissions, and setup workflows, see "LDAP Authentication and Mappings" on page 76.

In order to configure the connection to the LDAP server silently, complete the following settings in the `[LDAP]` section of the configuration file:

Parameter	Description
`enabled`	Set to `true` to enable LDAP authentication; set to `false` to disable LDAP authentication. (If the parameter is missing, LDAP is enabled and you must complete the following parameters.)
	Default: `false`
`domain`	*Required*. The LDAP domain used to uniquely identify the LDAP server connection.
	Example:
	If you specify `emea`, users will be able to log in to BVD in the format `emea\janedoe`.
	Alternatively, users can log in using the mail address format, for example, `jane.doe@example.com`. In the case of email addresses, the domain suffix (`example.com`) has to be chosen as the unique domain name.

url	*Required*. The URL to the LDAP server including the port number. The required format is: `ldap(s)://<LDAP_FQDN>:<port>` LDAP servers typically use port 389 or secure port 636. **Example:** `ldap://192.0.2.24:389`
bindDn	*Required*. The Distinguished Name (DN) of a user with search privileges on the LDAP directory server. Leave this entry blank for an anonymous user. **Example:** `bindDn=CN=Administrator,CN=Users,DC=hpe,DC=com`
bindCredentials	*Required*. The password of the user entitled to search the LDAP server entities. Leave this entry blank for an anonymous user.
bindProperty	*Optional*. When an LDAP user tries to log on, the search-entitled user specified in `bindDn` searches the LDAP server entities for that user. When found, the user is authenticated against LDAP based on one of the user's LDAP properties, by default the `dn` property. You can use the `bindProperty` parameter to specify another user property to use for authentication (for example, `sAMAccountName` or `email`). **Example:** `bindProperty=dn`
searchBase	*Required*. The Distinguished Name (DN) of the LDAP entity from which you want to start your user search. **Example:** `searchBase=CN=Users,DC=omi,DC=hpe,DC=com`

searchFilter	*Required*. Enter the relevant parameters to indicate which attributes are to be included in the user search.
	
	Note:
	You must use the literal `{{username}}` to search for the given login name.
	
	BVD by default uses the `??sub` scope; other scopes are not supported.
	
	Example:
	`searchFilter=(cn={{username}})`
	`searchFilter=(sAMAccountName={{username}})`

groupSearchBase	*Required*. The Distinguished Name (DN) of the LDAP entity from which you want to start your groups search.
	Example: `groupSearchBase=CN=Groups,DC=hpe,DC=com`

groupSearchFilter	*Required*. Enter the relevant parameters to indicate which attributes are to be included in the groups search.
	
	Note:
	
	○ You must use the literal `{{dn}}` to search for group members with a given distinguished name.
	
	○ You can search for group members that are part of one out of two groups by using nested queries (see second example).
	
	○ BVD does not support dynamic LDAP groups. Dynamic groups are therefore ignored in groups search.
	
	Examples:
	
	`groupSearchFilter=(member={{dn}})`
	
	`groupSearchFilter=(member=(&(objectCategory=Person)(userPrincipalName={{username}})(|(memberOf=slk-Admin,OU=Groups,OU=slk-Acc,DC=slka,DC=slkb,DC=slkc)(memberOf=cn=slk-Viewer,OU=Groups,OU=slk-Acc,DC=slka,DC=slkb,DC=slkc)))`

groupDnProperty	*Optional*. By default, the LDAP user property `dn` is used to identify users in groups. You can use the `groupDnProperty` setting to specify other properties. **Example:** `groupDnProperty=dn`
tlsCA	*Required with LDAPS only*. This parameter is only required if the secure LDAP (LDAPS) protocol is used for communication with the LDAP server. Specify a comma-separated list of trusted CA certificate files. The certificate files must be PEM-encoded. **Example:** `tlsCA=/tmp/ca1_certificate.crt,/tmp/ca2_certificate.crt`

tlsVerifyServerCertificate	*Optional with LDAPS only*. This parameter is optional for LDAPS connections to the LDAP server. If set to `true` or missing, the LDAP server certificate is verified against the list of trusted CA certificates specified in `tlsCA`. Default: `true`
mixedMode	*Required*. When set to `true`, both LDAP users and local users can log into BVD. When set to `false`, only LDAP users are able to log in. Default: `true`
autoCreateUser	*Required*. When set to `true`, BVD automatically creates a user for every LDAP user when the user logs into BVD with correct credentials for the first time. When set to `false`, an LDAP user can only log into BVD when created manually in BVD User Management. Default: `true`

Aging Parameters

By default, up to 500 data records per data channel are stored in the database. The aging process scans the database every hour to identify and automatically delete records that exceed the configured maximum or that are older than 100 days.

Complete the following parameters in the `[Aging]` section of the configuration file to modify the aging defaults:

Parameter	Description
agingInterval	Time interval (in minutes) at which the aging process scans the database to identify and automatically delete data records. If the parameter is missing or commented out, the aging process runs every 60 minutes by default. The value must be an integer greater than 0. Default: `60` minutes
purgeMoreThan	Maximum number of data records stored in the database per data channel. If this number is exceeded, the oldest records are deleted by the aging process. If the parameter is missing or commented out, no records are deleted based on this criteria. The value must be an integer greater than 0. Default: `500`

purgeOlderThan	Time period (in days) during which data records are kept in the database. Records older than the configured time period are automatically deleted by the aging process.
	If the parameter is missing or commented out, no records are deleted based on this criteria. The value must be an integer greater than 0.
	Default: 100 days
unusedChannelStorageTime	Time period (in days) during which a data channel is available in the list of data channels in the widget properties. If a data channel does not receive any data during the configured time period and the data channel is not associated with a widget, it is deleted from the data store. If the data channel is associated with a widget, the channel is not deleted even if the data last received for the channel is older than the configured time period.
	If the parameter is missing or commented out, no records and channels are deleted based on this criteria. The value must be an integer greater than 0.
	Default: 1 day

Note: The aging process cannot identify and automatically delete data records if both purgeMoreThan and purgeOlderThan are missing or commented out. The database will therefore grow with the number of records received.

5. Run the BVD configuration tool by using your configuration .conf file as input:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat -c <file_path>\<config_file>.conf`

   Linux: `/opt/HP/BVD/bin/configure.sh -c <file_path>/config_file>.conf`

6. After the configuration tool completes, verify that the BVD processes are running. Run the following command:
   `ovc -status`

7. *Optional.* Check the configuration log file at:

   Windows: `<BVD_Data_Dir>\BVD\log\configure.log`

   Linux: `/var/opt/HP/BVD/log/configure.log`

8. In a browser, enter the BVD URL:

   `http(s)://<BVD_server>:<port>/login/`

   where

   `<BVD_server>` represents the Fully Qualified Domain Name (FQDN) of the system on which you configured BVD; `<port>` is the port assigned to BVD during the configuration. Example: `http://localhost:80/login`

9. Enter your login name and password. Initial access can be gained using the administrator user name and password that you specified in the configuration .conf file.

10. Store the configuration .conf file in a secure place.

    After the BVD configuration completes, the .conf file is only needed if you want to reconfigure BVD. See also "Reconfigure BVD" on page 49.

    Caution: As the .conf file contains passwords in plain text, move it to a secure location where only

authorized users can access it.

Reconfigure BVD

If—at a later time—you want to modify any of the configuration settings, you can start the configuration wizard again (non-silent mode) or you can modify the configuration .conf file (silent mode).

Prerequisites

- *Embedded PostgreSQL database only.* Before reconfiguring BVD, make sure that there are no additional connections to the embedded PostgreSQL database except for the connection from BVD.

  Example: If you have any backup tools running that have an open connection to the PostgreSQL database, reconfiguring BVD will not be possible.

Non-silent BVD reconfiguration

1. If you previously configured BVD by using the configuration wizard, start the configuration wizard again by running the following command:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat`

   Linux: `/opt/HP/BVD/bin/configure.sh`

   If you previously configured BVD silently, run the following command to set a password for the configuration wizard:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat -p <password>`

   Linux: `/opt/HP/BVD/bin/configure.sh -p <password>`

   You will need to enter this password every time you open the configuration wizard.
   The password must be at least eight characters long, contain one lower-case and one upper-case letter, one digit, and one special character. Special characters should be ASCII characters only.

1. In a browser, enter the URL:

   `http://localhost:5000`

   > **Note:** `localhost:5000` uses the default port `5000`. If this port is already in use, follow the instructions displayed in the command line to identify the correct URL.

2. Enter the password for the configuration wizard and click **Submit**.

3. Modify the settings you want to change in the corresponding configuration page, and click **Next** until you arrive at the **Summary** page. Click **Download** to download your settings as configuration file or **Apply** to start the configuration.

   > **Note:** You do not need to reupload files. If no files are uploaded, the ones submitted in the previous configuration will be used. This applies to the TLS certificate, the key file, and the license file.

4. *Optional.* Check the configuration log file at:

   Windows: `<BVD_Data_Dir>\BVD\log\configserver.log`

   Linux: `/var/opt/HP/BVD/log/configserver.log`

Silent BVD reconfiguration

If you want to reconfigure BVD silently instead, complete the following steps:

1. If you configured BVD silently, modify the configuration .conf file that was used for the previous configuration.

   If you configured BVD by using the configuration wizard, modify the downloaded `bvdconfig.conf` file. If you did not download the configuration file before, start the configuration wizard again, click **Next** until you arrive at the **Summary** page and click **Download** to save and modify the `bvdconfig.conf` file.

2. Run the BVD configuration tool using the modified configuration .conf file as input:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat -c <file_path>\<config_file>.conf`

   Linux: `/opt/HP/BVD/bin/configure.sh -c <file_path>/config_file>.conf`

3. After the configuration tool completes, verify that the BVD processes are running. Run the following command:

   `ovc -status`

4. *Optional.* Check the configuration log file at:

   Windows: `<BVD_Data_Dir>\BVD\log\configure.log`

   Linux: `/var/opt/HP/BVD/log/configure.log`

Update

You can update BVD 10.10 to BVD 10.11 by installing the service pack that is available either as part of your installation files or from Software Support Online.

Preparation

- To install the service pack as part of your installation files, prepare the following:
    a. Stop all BVD processes: `ovc -stop BVD`
    b. Unzip the BVD service pack installation folder `HPE_OMi_10.11_BusinessValueDashboard`.
    c. Change the current directory as follows:

    Windows: `HPE_OMi_10.11_BusinessValueDashboard\Software\Windows\`

    Linux: `HPE_OMi_10.11_BusinessValueDashboard\Software\Linux\`

    d. Extract all files from the archive `OMI_00145.zip` (Windows) or `OMI_00146.zip` (Linux) into the application folder `<BVD_Install_Dir>`.

- To install the service pack from Software Support Online, prepare the following:
    a. Stop all BVD processes: `ovc -stop BVD`
    b. Depending on your operating system, access the Software Support Online website that contains the service pack:

    BVD 10.11 Service Pack for Windows

    BVD 10.11 Service Pack for Linux

    c. Download the `.zip` file `OMI_00145.zip` (Windows) or `OMI_00146.zip` (Linux).
    d. Extract all files from the archive into the application folder `<BVD_Install_Dir>`.

Installation

1. Run the service pack installation script:

   Windows: `<BVD_Install_Dir>\installation\HPE_BVD_1011\scripts\setup.bat -install`

   Linux: `/opt/HP/BVD/installation/HPE_BVD_1011/scripts/setup.pl -install`

2. BVD 10.11 includes a new password policy. Edit your previously used configuration .ini file to follow these requirements for the database and administrator passwords: passwords must be at least eight characters long, contain one lower-case and one upper-case letter, one digit, and one special character.

3. Run the configuration tool using your 10.10 configuration file as input:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat -c <file_path>\<config_file>.ini`
   Linux: `/opt/HP/BVD/bin/configure.sh -c <file_path>/config_file>.ini`

4. Verify that the BVD processes are running: `ovc -status`

Note: After updating to BVD 10.11, all channel statistics are temporarily lost. The channel statistics are back once BVD receives new data.

Uninstallation

Uninstall BVD completely by using the installation wizard or uninstall only the BVD 10.11 service pack.

This section includes:

- "Uninstallation on a Windows System" below
- "Uninstallation on a Linux System" below
- "Uninstallation of the BVD 10.11 Service Pack" on the next page

Uninstallation on a Windows System

1. Navigate to the folder that contains the BVD installation files and run `install.bat`.

   The BVD installation wizard starts.

   Alternatively, use the Windows Control Panel to start the installation wizard.

2. In the **Maintenance Selection** page, click **Uninstall** and then **Next**.

   Follow the wizard instructions when prompted.

3. If the following folders have not been removed by the uninstallation, remove them manually:

   - Application folder (default):

     `C:\Program Files\Hewlett Packard Enterprise\BVD\`

   - Data folder (default):

     `C:\ProgramData\Hewlett Packard Enterprise\BVD\`

   > **Caution:** If BVD was the *only* HPE Software application on the system, remove the following folders:
   >
   > - Shared content installation folder (default):
   >
   >   `C:\Program Files\HP\HP BTO Software\`
   >
   > - Shared content data folder (default):
   >
   >   `C:\ProgramData\HP\HP BTO Software\`
   >
   > If BVD was *not* the only HPE Software application on the system, run the following command:
   >
   > - `C:\Program Files\HP\HP BTO Software\bin\win64 ovconfchg –edit`
   >
   >   Remove all configuration sections that start with `bvd`, for example `[bvd.Database]`.

Uninstallation on a Linux System

1. Navigate to the folder that contains the BVD installation files and run the following command to start the installation wizard:

   `./install.sh`

2. In the **Maintenance Selection** page, click **Uninstall** and then **Next**.

   Follow the wizard instructions when prompted.

3. If the following directories have not been removed by the uninstallation, remove them manually:

   ○ Application directory: `/opt/HP/BVD`

   ○ Data directory: `/var/opt/HP/BVD`

> **Caution:** If BVD was the *only* HPE Software application on the system, remove the following directories :
>
> ○ Shared content installation folder: `/opt/OV`
>
> ○ Shared content data folder: `/var/opt/OV`
>
> If BVD was *not* the only HPE Software application on the system, run the following command:
>
> ○ `/opt/OV/bin/ovconfchg –edit`
>
>   Remove all configuration sections that start with `bvd`, for example `[bvd.Database]`.

Uninstallation of the BVD 10.11 Service Pack

Uninstall only the BVD 10.11 service pack. This will revert BVD to version 10.10.

On a Windows System:

1. Stop all running BVD processes:

   `ovc -stop BVD`

2. Run the following command in the BVD 10.11 installation directory to deinstall BVD 10.11:

   `<BVD_Install_Dir>\installation\HPE_BVD_1011\scripts\setup.bat -remove`

3. Navigate to the `packages` folder in the BVD 10.11 installation directory:

   `cd <BVD_Install_Dir>\installation\HPE_BVD_1011\packages`

> **Caution:** If you have OMi installed on the same system as BVD, do not follow steps 4 to 7.

4. Run the following commands to remove the Agent, JRE and Perl packages that were installed with BVD 10.11:

   ```
   ovc -kill
   start /wait msiexec /x {2DE17E6C-3742-485C-AB65-1C8DE1270FB5}
   ZBIGNORECONDITIONS=TRUE   &REM to remove HPOvJREB
   start /wait msiexec /x {C1BDEE5D-50A5-4CFB-B66D-9EAB0F81E87E}
   ZBIGNORECONDITIONS=TRUE   &REM to remove HPOpsAgt
   start /wait msiexec /x {031EBAED-86FE-4E5D-BD99-03380B2029F1}
   ZBIGNORECONDITIONS=TRUE   &REM to remove HPOvPerlA
   ```

5. Uninstall the Shared Components package using the Windows Control Panel:

   a. Access the **Programs and Features** Control Panel Item

   b. Right-click **HP Shared Component** and choose **Uninstall**

6. Navigate to the `packages` folder in the BVD 10.10 installation directory:

   ```
   cd <Install_Files_10.10>\Software\Windows\packages
   ```

7. Run the following commands to install the Agent and Shared Component packages for BVD 10.10:

   > **Note:** Specify the same paths as defined in the original agent installation if you defined different paths than the defaults.

   ```
   msiexec /i HPSharedComp-12.00.078-Win5.2_64-release.msi /qr
   msiexec /i HPOvPerlA-05.16.009-Win5.2_64-release.msi /qr
   msiexec /i HPOpsAgt-12.00.078-Win5.2_64-release.msi /qr
   msiexec /i HPOvJREB-01.08.045-Win5.2_64-release.msi /qr
   ```

8. Start the BVD processes:

   ```
   ovc -start
   ```

On a Linux System:

1. Stop all running BVD processes:

   ```
   /opt/OV/bin/ovc -stop BVD
   ```

2. Run the following command to deinstall BVD 10.11:

   ```
   /opt/HP/BVD/installation/HPE_BVD_1011/scripts/setup.pl -remove
   ```

3. Run the following commands to remove the Agent and Shared Component packages that were installed with BVD 10.11:

   ```
   /opt/OV/bin/ovc -kill

   rpm -e --nodeps HPOvXpl HPOvSecCo HPOvSecCC HPOvPerlA HPOvPerfMI HPOvPerfAgt
   HPOvPacc HPOvOpsAgt HPOvJxpl HPOvJsec HPOvJREB HPOvJPacc HPOvJbbc HPOvGlanc
   HPOvEaAgt HPOvDepl HPOvCtrl HPOvConf HPOvBbc HPOvAgtLc
   ```

4. Navigate to the `packages` folder in the BVD 10.10 installation directory:

   ```
   cd <Install_Files_10.10>/Software/Linux/packages
   ```

5. Run the following commands to install the Agent and Shared Component packages for BVD 10.10:

   ```
   rpm -i --replacefiles HPOvXpl-*.rpm HPOvSecCo-*.rpm HPOvSecCC-*.rpm HPOvPerlA-*.rpm
   HPOvPerfMI-*.rpm HPOvPerfAgt-*.rpm HPOvPacc-*.rpm HPOvOpsAgt-*.rpm HPOvJxpl-*.rpm
   HPOvJsec-*.rpm HPOvJREB-*.rpm HPOvJPacc-*.rpm HPOvJbbc-*.rpm HPOvGlanc-*.rpm
   HPOvEaAgt-*.rpm HPOvDepl-*.rpm HPOvCtrl-*.rpm HPOvConf-*.rpm HPOvBbc-*.rpm
   HPOvAgtLc-*.rpm
   ```

6. In a non-root environment, run the following command to restore the non-root permissions:

   ```
   /opt/HP/BVD/dashboard/config/tools/configSwitchUser.sh <username> <groupname>
   ```

7. Start the BVD processes:

   ```
   /opt/OV/bin/ovc -start
   ```

Licensing

BVD is licensed with the Operations Bridge Premium and Ultimate Edition Suites and, if an OMi license is purchased as part of the Express Edition Suite, with the BVD AddOn license. For the Premium and Ultimate Edition Suites, the number of dashboards you are entitled to create depends on the number of nodes licensed with the Operations Bridge licenses. For the BVD AddOn license, you are entitled to create a number of additional dashboards. You install your Operations Bridge license using the BVD configuration wizard as described in "License Installation" on the next page.

If you do not have an Operations Bridge license yet, you can use BVD with the 60-day Evaluation license, which entitles you to up to 50 dashboards. To use the Evaluation license, click **Evaluation for 60 days** in the configuration wizard. The Evaluation license cannot be renewed.

For more information on licensing in OMi, see **Administration Guide > Setup and Maintenance > License Management** in the OMi Administration Guide or Online Help.

This section includes:

- "License Installation" on the next page
- "Updating Operations Bridge Licenses for BVD" on page 57
- "Additional License Authorizations for Systems Management Center Products" on page 57

License Installation

To install the license for BVD, complete the following steps:

1. Obtain the Operations Bridge license file from the OMi administrator or from HPE. For details on updating existing Operations Bridge licenses, see "Updating Operations Bridge Licenses for BVD" on the next page.

   Place the license file in the file system on your BVD server. The license file has the `.dat` file name extension.

2. Start the configuration wizard by running the following command:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat`

   Linux: `/opt/HP/BVD/bin/configure.sh`

3. In a browser, enter the URL:
   `http://localhost:5000`

   > **Note:** `localhost:5000` uses the default port `5000`. If this port is already in use, follow the instructions displayed in the command line to identify the correct URL.

4. Navigate to the step **License** and click **Add license from file**.

   Browse to select the `.dat` license file you want to upload.

5. Click **Next** until you arrive at the **Summary** page. Review the configuration settings, then click **Apply** to save your changes.

If you have multiple license files, you can accelerate the process of running the configuration wizard to add each license. Merge the `.dat` files into one file, then upload that file to BVD:

Windows: `copy /y license1.dat + license2.dat + license3.dat licensesMerged.dat`

Linux: `cat license1.dat license2.dat license3.dat > licensesMerged.dat`

BVD posts a license notification when the license has expired or when the number of configured dashboards exceeds the allowed number.

You can look up license information such as the license expiration date in the ? **Help > About** page. The following license types are displayed:

INSTANT_ON	60-day Evaluation license
REGULAR	Operations Bridge licenses
NO LICENSE	Expired 60-day Evaluation license

Tip: After a license update, log out and log in again to see your changes in the ? **Help > About** page.

Updating Operations Bridge Licenses for BVD

If you purchased an Operations Bridge license before OMi version 10.10, you need to retrieve and activate a new, up-to-date license in order to use BVD. To do so, perform the following:

1. Retrieve your up-to-date license in the **HPE My Software Updates** portal: https://www.hpe.com/software/updates

2. Activate the license in the **HPE Licensing for Software** portal: https://h30580.www3.hp.com

3. Install the new license by following the steps in "License Installation" on the previous page.

If you purchased an OMi Event Foundation license, you can continue using your license, but you will not be able to use BVD. To be entitled to the use of BVD, you can exchange your old license for a new license in the new Operations Bridge licensing structure. For more information, contact your sales representative to discuss your options.

Additional License Authorizations for Systems Management Center Products

For details on the content of the individual Operations Bridge suites, see the Additional License Authorizations for HPE Systems Management Center software products.

For the most up-to-date version, go to http://support.openview.hp.com/contracts_licensing.jsp. In the **Additional license authorizations for Enterprise Security, Information Management, IT Management and Vertica software products** table cell, click **English (.PDF)**. Download and open the resulting PDF document and scroll down to the **Systems Management Center Products** section to find the suite you would like to learn more about. Click the number to the right of the product name to download the corresponding Additional License Authorizations.

High Availability

You can improve your system availability and reliability using high availability options that combine multiple BVD servers, an external load balancer or proxy, and failover procedures.

Implementing a high availability configuration means setting up your BVD servers so that service is continuous despite power outages or system downtime.

The figure describes a BVD high availability setup with a primary and a backup BVD server, both connected to the same external PostgreSQL database. A load balancer or proxy handles the incoming BVD connections. During failover, the backup server is started and the load balancer / proxy redirects the BVD connections to the backup server.

Because BVD stores its configuration and dashboard data in the database and both servers access the same database, no additional synchronization tasks are required. However, immediately after the failover, the list of available data channels in the widget properties may be empty. The list will be populated again as data arrives at the backup server, redirected through the load balancer.
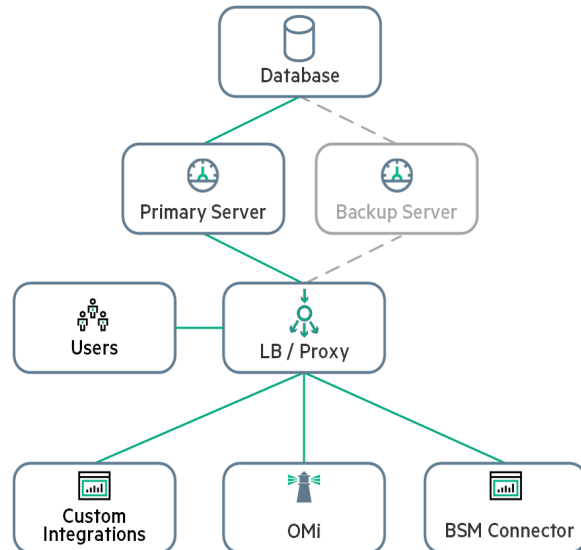
> **Note:** BVD does not support actual load balancing. The load balancer mentioned in this chapter works as a proxy between two BVD servers that redirects BVD connections to the backup server during a failover. Configure the load balancer / proxy so that even if both BVD servers are running, only one BVD server receives data and serves UI clients. If data is split between two BVD servers (for example by using a round robin method) then both BVD servers will show a dashboard with partial data.

This section includes:

- "Prerequisites" below
- "How to set up high availability for BVD" on the next page
- "How to initiate a failover" on the next page

Prerequisites

- **Remote PostgreSQL database.** BVD uses a remote PostgreSQL database. (BVD with an embedded PostgreSQL database does not support a high availability setup.)
- **Load balancer.** All connections to BVD must be handled by a load balancer. Configure the load balancer to handle connections from both the primary and the backup BVD server. The primary server should be registered as primary, the backup server as secondary server. When the primary server fails, the load balancer automatically redirects the connections to the backup server.
- **Backup BVD server.** In addition to the primary BVD server a backup server must be configured and connected to the same database as the primary server.

> **Note:** During failover the backup server needs to be started or, if already running, restarted. BVD does not start the backup server automatically.

How to set up high availability for BVD

1. Configure the load balancer for data provider and user access as follows:

   - Configure the load balancer for data provider access.

     All data providers must be able to access the virtual IP of the load balancer. Use the standard settings for the load balancer, but set the following:

     - **Persistence.** Set persistence to **IP based** stickiness or **destination address affinity** (depending on the load balancer). If neither of these options are available and the choice is between **cookie based** stickiness and **stickiness by session enabled**, then we recommend trying **stickiness by session enabled**.

     - **Priority activation.** Configure a priority or weight for the primary and backup BVD servers. The primary server should be assigned the highest priority number, the backup server the next higher priority. The load balancer distributes all BVD traffic to the server with the highest priority, that is the primary server. When the primary server becomes unavailable, the load balancer sends all traffic to the server with the next highest priority, that is the backup server.

   - Configure the load balancer for user access.

     Use the standard settings for the load balancer, but set the following:

     - **Persistence.** Use the standard settings for the load balancer, but set persistence to **stickiness by session enabled** or **destination address affinity** (depending on the load balancer). If neither of these options are available and the choice is between **cookie based** stickiness and **IP based** stickiness, then we recommend trying **IP based** stickiness. If this is not done properly, you may experience intermittent user interface failures.

2. Install BVD on the backup server. For details, see "Installation" on page 21.

   > **Note:** There is no need to stop BVD on the primary server during the installation of the backup server.

3. Configure BVD on the backup server. During the configuration, connect BVD to the same remote PostgreSQL database to which the primary server is connected.

   > **Tip:** Use the same configuration settings that were used to configure the primary BVD server.

   For details, see "Configuration" on page 30.

4. Stop BVD after the configuration completes:

   `ovc -stop BVD`

How to initiate a failover

1. When the primary BVD server fails, start the backup server:

   `ovc -start BVD`

2. Users will lose their BVD browser session and must log in again.

Administration

This section describes the administration areas of BVD.

System Settings

The System Settings page displays your API key and enables you to change the look and feel of your dashboards and BVD using a custom style sheet.

To access

🔧 **Administration > System Settings**

Learn More

API Key

The API key connects your BVD data to your BVD instance. The key must be included in all of you data streams and ensures that your data arrives in your dashboards.

You can request a new API key, for example if your old key has been compromised. To request a new key, click **Request New API Key** in the System Settings page. BVD displays your new key immediately. Remember to update your data senders to include your new API key.

System Settings

API Key

2657dee4662e4a10bf98e313c34a01a2

REQUEST NEW API KEY
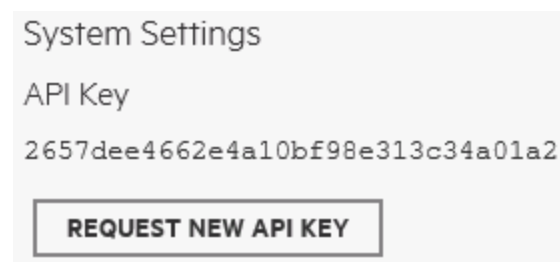
Style Customization

You can change the look and feel of BVD, for example, the color of the masthead. To do so, inspect the HTML element that you want to change, type the new style in the **Style customization** field and click

Upload changed style.

See also "Use Custom Fonts in Your Dashboards" below for detailed instructions on how to choose a web font other than Google Fonts for your dashboards.

Do It Yourself

Use Custom Fonts in Your Dashboards

BVD dashboards by default use fonts served by Google at http://www.google.com/fonts. To use custom fonts for your dashboards, do the following:

1. Use your preferred fonts in the Visio drawings of your dashboards, open the exported SVG file in a text editor, and then search for the string `font`. In SVG files, fonts are declared in CSS definitions similar to the following:

```
<style type="text/css">
<![CDATA[
    .st1 {fill:none;stroke:none;stroke-linecap:round;stroke-linejoin:round;stroke-width:0.75}
    .st2 {fill:#000000;font-family:Arial;font-size:3em}
    .st3 {fill:#000000;font-family:Courier New;font-size:3em}
    .st4 {fill:#000000;font-family:Metric;font-size:3em}
    .st5 {font-size:1em}
    .st6 {fill:none;fill-rule:evenodd;font-size:12px;overflow:visible;stroke-linecap:square;stroke-miterlimit:3}
]]>
</style>
```

   Take note of the font family name, for example `Metric`.

2. Make sure your custom fonts are installed on a publicly accessible web server.

   The web server must allow access to the font resources from other sites. To do so, it must include a properly configured `Access-Control-Allow-Origin` header in each reply to a font request.

3. Create a custom CSS font definition in BVD:

   Open 🔧 **Administration > System Settings** and type your CSS definition in the **Style customization** field, then click **Upload changed style**.

   > **Example:**
   >
   > ```
   > @font-face {
   >     font-family: "Metric";
   >     src: url("https://www.example.com/fonts/metric.woff") format("woff");
   > }
   > ```

Dashboard Management

The **Manage Dashboards** page lists all available dashboards, and enables you to upload, delete, download, edit, or show or hide dashboards in the dashboards menu.

To access

🔧 **Administration > Manage Dashboards**

Learn More

This section includes:

Dashboard Icons

Use these buttons to manage your dashboards as follows:

+	Upload a dashboard from an SVG file. The maximum dashboard size is 20 MB.
🗑	Delete a dashboard from BVD.
⤓	Download a dashboard to an SVG file.

> **Note:** The ⤓ **Download** button is not available when working with BVD on mobile devices.

✎	Edit a dashboard in BVD.
↗	Show or hide a dashboard in the ↗ **Dashboards** menu. This action does not impact permissions to view dashboards granted through roles. To change view permissions, see "User Management" on page 71.

> **Tip:** On mobile devices, click the buttons twice to trigger their actions.

The following icons notify you of missing or incorrect configurations when editing a dashboard:

⚠	Not all required fields of the widget have been completed; for example, the data channel has not been selected yet. You can save dashboards that have warnings.
◆	The widget configuration contains errors (for example, incorrect color values, incorrect HTTP protocol in web page widgets, and so on). You must first resolve the errors before the dashboard can be saved.
✱	The widget has unsaved changes.

Uploading Dashboards

You can upload an SVG file as often as you want. Edit the dashboard, and in the dashboard properties click ⬆ **Replace Dashboard**. The maximum dashboard size is 20 MB. If the file already exists, BVD replaces the previous version of the file with the newer version and opens the associated dashboard for you to edit. The newer version does not overwrite existing dashboard properties or widgets, only new widgets are added.

Deleting widgets from an SVG file only deletes the widgets from the dashboard. The configuration of the deleted widgets remains in the database so that you can easily re-upload a previous version of an SVG file to reactivate the previously deleted widgets.

Downloading Dashboards

When you upload an SVG file created from Visio, the SVG file usually does not have any data channels configured. This task is best done in the BVD Manage Dashboards UI.

To obtain a version of your SVG files with the data channels configured, you can download the dashboards from BVD by using the ⬇ **Download** button in the Manage Dashboards UI. The download creates an SVG file with the original name.

You can then transfer this file to another BVD instance and upload it there, or store it in a safe location for backup purposes.

> **Note:** The downloaded SVG file does not include the assigned categories.

Categorizing Dashboards

To be able to grant dashboard permissions to a user, a dashboard must have one or more categories assigned. Categories are arbitrary text strings that you enter in the Categories field in the dashboard properties. Once entered, a category can be selected and added to any dashboard.

Dashboard Properties

File:
omi_sample.svg

Title:
omi_sample

Categories:
x omi   x sample

Background Color:
#000000

When you create a user role, you can assign view or full control permissions to a dashboard category. This restricts a user's access to dashboards of the specified category. See also "How to Set Permissions" on page 75.

	View	Full Control
All	☐	☐
Assigned to category	☐	☐
omi	✓	✓
sample	✓	☐
Not assigned to category	☐	☐

⚙ Manage categories

Changing the Title of a Dashboard

When you upload an SVG file, the file name automatically becomes the title of the dashboard. This behavior can make the ⤴ **Dashboards** menu look very technical:

Consider changing the title of your dashboards in the dashboard's properties:

🔧 **Administration > Manage Dashboards >** ✏ **Edit**

In the **Title** field, enter a descriptive name.

> **Note:** The following characters are not allowed in the dashboard title: ! [ ] / \ = + ; ? * % &

Dashboards ✕

Filter Dashboards 🔍

🏠 2-AO_world

🏠 omi_sample

Dashboard Properties

File:
omi_sample.svg ⤴

Title:
omi_sample

Categories:
✕ omi   ✕ sample

Background Color:
#000000 ⬛

Selecting Widgets for Editing

To edit the properties of a widget, edit the dashboard that contains the widget and then click the widget. The properties are displayed to the right of the dashboard for you to edit. When done, click **Apply** or **Save**.

If your dashboard contains widgets that are stacked on top of each other so that you cannot access the ones below, do one of the following:

- **Two widgets.** If there are only two widgets stacked on top of each other, click the top one once and once again. The second click selects the one below.

- **More than two widgets.** If you have a stack of more than two widgets, go the dashboard properties, and under **Widgets** click **Select a widget for configuration** to open a list of available widgets:
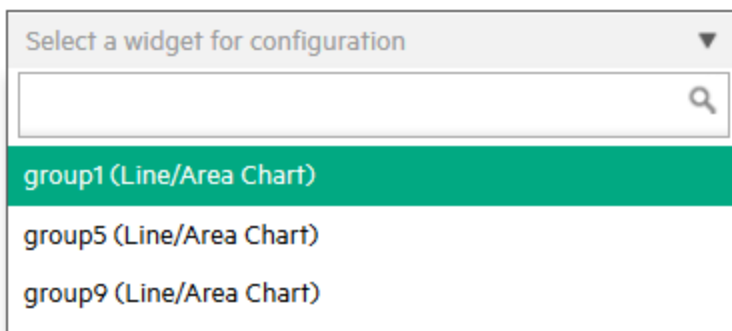
Select the widget you want to edit to access the widget's properties.

Using Dashboards as Templates

Use existing dashboards as templates in order to create multiple instances that use the same widgets but different data.

Templates consist of the original dashboard and a number of individual instances, which can be viewed in the ⟋ **Dashboards** menu.

Follow these steps to convert a dashboard into a template:

1. Access the properties of the dashboard you want to use as a template:

   🔧 **Administration > Manage Dashboards >** ✎ **Edit**

2. Click on the dimension that you want to use as a variable for the instances, for example ⬡dim.

3. Click **Yes** in the resulting dialog to open the Template Manager.

   The original dashboard is automatically added as the first instance of the template. For more information, see "Template Manager" on the next page.

Example:

You have a dashboard with a widget that uses the data channel ⬡bvd ⬡kpi ⬡nyc. You have two more data channels that, compared to the first data channel, differ only in the dimension **location**:

⬡bvd ⬡kpi ⬡boston

⬡bvd ⬡kpi ⬡atlanta
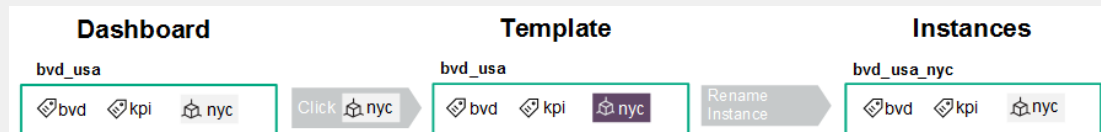
Instead of creating a new dashboard for every location, click on the dimension ⬡nyc in the existing dashboard and click **Yes** in the resulting dialog. This converts the dashboard into a template using the dimension ⬡nyc as variable. The original dashboard is automatically added as the first instance. Rename the instance and click **Save**.
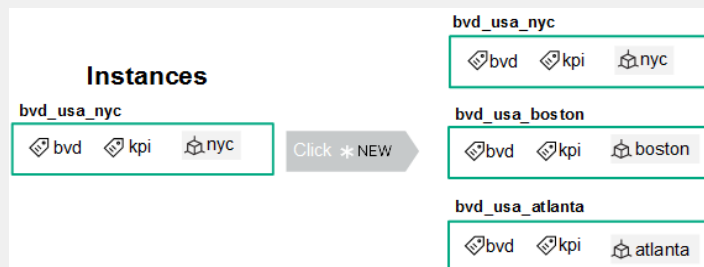
After this, create one instance of the template for every location by choosing different values for the variable **location**.

This results in three individual dashboard instances. The dashboards show different data for the widget that is using the data channel.

Template Manager

The **Template Manager** enables you to edit, download, and delete dashboard templates. You can add new instances, or edit and delete existing ones.

To access

⚒ **Administration > Manage Dashboards**

Choose a dashboard, click ✎ **Edit**, then select the dimension that you want to use as a variable for your instances, for example ⬡ dim. Click **Yes** in the resulting dialog.

Alternatively, choose an already created template and click ✎ **Edit**.

Learn More

This section includes:

- "Licensing for Templates and Instances" below
- "Template and Instance Icons" on the next page

Licensing for Templates and Instances

The number of dashboards you are entitled to create depends on your Operations Bridge licenses.

Each instance counts as one dashboard. The template itself is not counted.

For more information on licensing, see "Licensing" on page 55.

Template and Instance Icons

Use these buttons to manage your dashboard templates as follows:

🗑 Delete the template and all its instances from BVD.

> **Caution:** Deleting the template will also delete all instances of the template. To only delete a single instance, use the delete button in the Instances pane.

⬇ Download the template to an SVG file.

✎ Edit the template.

Use these buttons to manage your instances as follows:

✳ NEW Add an instance of the template.

🗑 Delete an instance of the template. Click **undo** after the deletion to restore the deleted instance.

📈 Show or hide the instance in the 📈 **Dashboards** menu. This action does not impact permissions to view dashboards granted through roles. To change view permissions, see "User Management" on page 71.

Tasks

This section includes:

- "How to Add New Instances" below
- "How to Edit Instances" on the next page
- "How to Modify Templates" on the next page

How to Add New Instances

After creating the dashboard template, the original dashboard is automatically added as the first instance of the template.

Add additional instances by clicking ✳ **New** in the middle pane. On the right pane, you can edit the title of the dashboard (recommended), the categories, and variables.

If you do not edit the values of the variables, the widgets will show the default values of the template.

For more information, see "How to Edit Instances" on the next page.

How to Edit Instances

Click an instance in the middle pane to open the properties on the right.

Edit any of the following properties:

Title

Recommended. Change the title of the instance in order to differentiate between the similar dashboards.

Categories

Instances inherit the categories that are assigned to the template, but can also have individual categories assigned to them. Remove or add new categories to restrict a user's access to dashboards of a specified category. For more information, see "Categorizing Dashboards" on page 64.

Variables

The Variables section displays the dimensions you selected as variables when creating the template, and the available values of the dimensions. Change the values to create individual instances. To add more variables, see "How to Modify Templates" below.
If you remove all variables, the instances will be deleted and the template will be converted back into a dashboard.

You can use variables in URLs and embedded web pages. For more information, see "Web Page Widgets" on page 119.

> **Tip:** If recently added variables and/or values are not displayed, select another instance in the right pane, then reselect the instance you want to modify.

How to Modify Templates

Editing Templates

Click the 🖉 **Edit** button in the left pane.

Edit any of the general Dashboard Properties, or select a widget for editing.

To add more variables to your template, select a widget for editing. Click on the dimensions you want to use as variables and save the template.

Saving the modified dashboard template will apply these changes to all instances.

Make sure to assign different values of the variables to each instance. If no values are assigned, the instances will show the default values of the template.

Replacing Templates

You can upload an SVG file as often as you want. Click the 🖉 **Edit** button in the left pane, and in the Dashboard Properties click ⬆ **Replace Dashboard**. Upload a new file with the same name.

Alternatively, click ➕ in the **Manage Dashboards** page and upload a new file with the same name.

You can choose to replace the SVG only or replace both the SVG and the instances:

Click **Replace SVG** to replace the previous version of the template with the newer version while preserving the instances. The newer version does not overwrite existing dashboard properties or widgets, only new widgets are added. The changes of the new dashboard template are applied to all instances.
Click **Replace Template** to replace the previous version of the template with the newer version while removing the previous instances. The newer version overwrites existing dashboard properties and widgets.

User Management

Use the **User Management** page to create users and groups and to define roles and permissions. To reduce the effort and complexity involved in configuring roles for individual users in BVD, permissions are granted only through roles.

You can specify roles either by assigning them to a group (so that all members of the group are assigned the same roles) or by assigning roles to a user directly. The user and group configuration depends on the functions the user or group of users fulfill, as well as the tasks that they perform.

For a suggested workflow and overview of the steps involved in setting up users, groups, and roles, see "Best Practices" below.

For a step-by-step description of the tasks you can perform through user management, see "Tasks" on page 73.

To access

🔧 **Administration > User Management**

Learn More

This section includes:

- "Best Practices" below
- "Roles and Permissions" on the next page
- "Permissions for Templates and Instances" on the next page
- "Users and Groups" on the next page
- "Super-Admin User" on page 73
- "LDAP Users" on page 73

Best Practices

Below is a set of planning best-practices and a suggested workflow for setting up user management in BVD:

1. Before you configure users, groups, and roles, you should map out the required roles and their relevant permissions, as well as the users and groups you intend to assign the roles to. For example, enter the following information in an Excel sheet:

   a. A list of users who are to access BVD, edit, and create dashboards. Gather appropriate user details such as user names, logins, and initial passwords. Although not needed to define users, at this stage it might be useful to also collect user contact information such as email addresses.

   b. If multiple users require similar permissions, create a list of groups, and the users that should belong to each group.

   c. The appropriate permissions for each role. To aid in this process, review the Permissions Reference section to learn about dashboard categories and resources for which permissions can be granted. For details, see "Permissions Reference" on page 76.

2. Create roles and assign relevant permissions.

3. Create groups and grant them the appropriate roles.

   For step-by-step instructions on how to create a group, see "How to Create Groups" on page 74.

4. Create users, grant them the appropriate roles and place them in the appropriate groups.

   For step-by-step instructions on how to create a user, see "How to Create Users" on the next page.

Roles and Permissions

BVD enables you to fine-tune permissions management by applying permissions within roles. Permissions enable you to restrict the scope of a role. You can assign roles to users and groups enabling access to specific areas of BVD.

Permissions consist of resources, for example, **Dashboards**, to which operations, for example **View**, are applied.

- When the **View** operation is one of the resource's available operations and you select one of the other available operations, the **View** operation is also automatically selected.
- The **Full Control** operation automatically includes all operations available on the resource. When applied, the other operations are automatically selected.

For a list of available resources and descriptions of operations in BVD, see "Permissions Reference" on page 76.

Permissions for Templates and Instances

For dashboard templates, you can either assign **View** or **Full Control** permission for the template itself, or assign permissions only for specific instances.

This depends on the categories you assign to the template and each instance.

If you grant a user or group **Full Control** or **View** permission for a category assigned to the template, the user or group will have these permissions also for every instance of the template.

If you grant a user or group **Full Control** or **View** permission for a category assigned to an instance, the user will have these permissions only for that instance.

For information on how to set permissions, see "How to Set Permissions" on page 75.

Users and Groups

- **Groups.** Groups make managing roles more efficient; instead of assigning roles to each user one at a time, you can group users who are assigned the same roles into a single unit.
- **User Types.** BVD supports different user types:

  Users with the appropriate dashboard permissions can view, edit, or create dashboards and instances. They can download tools and samples to aid in the development of dashboards and the integration of data.

  Users with edit permissions can view the **Error Notifications** icon on the menu bar. This icon is useful when binding dashboards to data sources. Clicking the icon displays the error list.

  Administrator users (users with super-admin permissions) have the following capabilities:

- Full control and view on all dashboards.

- Manage users, groups, and roles, including the creation and deletion of dashboard categories.

- Apply custom style sheets and reset API keys in the BVD system settings.

Super-Admin User

One built-in super-admin user is defined for every installation of BVD. The login and the password for this account are specified during the BVD configuration.

The built-in super-admin is not listed among the users in user management. If you have logged in as the super-admin, you can change the user's information, including password and contact information in the **My Account** page in the ⌂ **Personal User Settings** menu.

You can apply **Super-Admin** permissions to other users in the system. These super-admin users can be modified in user management. For information on how to grant super-admin status to a user, see "How to Create Users" below.

> **Note:** Super-admins have all permissions assigned and are the only user type that can work with user management and system settings.

LDAP Users

To obtain more user management capabilities and security, we recommend using external LDAP user management. You can apply the **LDAP User** type when creating or editing users to manually configure them as LDAP users. LDAP users will be authenticated against the chosen LDAP server. For information on how to configure BVD to work with LDAP, see "LDAP Authentication and Mappings" on page 76.

Tasks

This section includes:

- "How to Create Users" below
- "How to Create Groups" on the next page
- "How to Create Roles" on the next page
- "How to Set Permissions" on page 75

How to Create Users

1. Click **Create New User** on the user management screen.

   Alternatively, access the **Manage Users** pane and select **New User**.

2. In the Properties section, enter the required user name, login, password, and optional email.

3. *Optional.* If LDAP is enabled, you can select the **LDAP User** check box to mark the user as a manually-created LDAP user. For information on LDAP, see "LDAP Authentication and Mappings" on page 76.

4. Select the groups the user will be a member of.

5. Assign roles or (*optional*) set the user as a Super-admin with all permissions assigned. When finished, click **Create User**. For information on the Super-admin user type, see "Super-Admin User" above.

The user's basic information, as well as groups they belong to and roles assigned and inherited from groups, now appears on the right of the **Manage Users** pane when selecting the user.

To delete existing users, select **Manage Users**, select one or more users you want to delete, and click the Delete User or Users button.

> **Tip:** In the Manage Users pane (⚲ **Administration > User Management**), you can click the **Deactivate** button to apply the **Inactive User** flag to users who are set to be temporarily inactive, for example, while the administrator is setting up roles and groups or if the user is on vacation or leave. Inactive users cannot log on to BVD.

How to Create Groups

1. Click **Create New Group** on the user management screen.

   Alternatively, access the **Manage Groups** pane and select **New Group**.

2. In the Properties section, enter the required group name and optional description.

3. *Optional.* If LDAP is enabled, you can search for and select the LDAP groups that are mapped to the BVD group. For information on LDAP, see "LDAP Authentication and Mappings" on page 76.

4. Add group members and assign roles in the relevant sections of the group editor. When finished, select **Create Group**.

   > **Tip:** You can select multiple users to add to the group by clicking the **...** button next to the **Add user...** field. The **Select Users** editor opens. Select a single user, and then hold down the **Ctrl** key while you click other users that you want to select.
   >
   > When working with BVD on a mobile device, make sure to click a user twice to select it.

The group's basic information, including roles assigned, now appears on the right of the Manage Groups pane when selecting the group. You can also navigate between groups in the group's information pane.

To delete existing groups go to the **Manage Groups** pane, select one or more groups you want to delete, and click the Delete Group or Groups button.

How to Create Roles

1. Click **Create New Role** on the user management screen.

   Alternatively, access the **Manage Roles** pane and select **New Role**.

2. In the Properties section, enter the required role name and optional description.

3. In **Permissions**, you can select the relevant category and set the appropriate permissions by checking the related boxes, or use the drop-down menus on each permission summary.

   For a list of permissions and related descriptions see "Permissions Reference" on page 76.

   For a detailed task on setting permissions, see "How to Set Permissions" on the next page.

   If you have already created users or groups, you can assign them during role creation or editing. When finished, select **Create Role**.

To delete existing roles, select **Manage Roles**, select one or more roles you want to delete, and click the Delete Role or Roles button.

> **Note:** When there are more than 1000 users in the system, the user search box is no longer displayed. Click the **...** button to access the user list and search filter dialog box.

How to Set Permissions

In this task, you set or modify the permissions in BVD roles. Users require permissions to view, edit, or create BVD dashboards, templates, and instances.

1. In the **User Management** page or in the **Manage Roles** page, create or edit the role you want to configure.

2. Scroll to the permissions section in the **Create Role** or **Edit Role** page.

3. Expand **Dashboards > Categories** and assign an operation to one or more dashboard categories:

   ○ **All.** To grant permissions to all dashboards and instances regardless of the category, click **View** or **Full Control** for **All**.

   ○ **Assigned to category.** To grant permissions to all dashboards and instances with any category, click **View** or **Full Control** for **Assigned to category**.

   Alternatively, to grant access to individual dashboard categories, select the appropriate category.

   ○ **Not assigned to category.** To grant permissions to all dashboards and instances without a category, click **View** or **Full Control** for **Not assigned to category**.

4. Click **Manage Categories** to add new categories to the permissions list. You can also delete categories from the list if they are no longer needed.

Note: Changes to a user account are only fully available after the user whose account was changed logs in again to BVD.

Permissions Reference

Dashboards

Categories	All	Grants view or full control permission for all dashboards (with or without categories assigned).	
		Full control on **All** grants the following additional permissions:	
		• Upload dashboards.	
		• Convert dashboards into templates.	
		• Delete dashboards, templates, and instances.	
		• Create and delete categories, and assign categories to dashboards and instances.	
		• Download tools and samples from the 🔧 **Administration** menu.	
	Assigned to category <category> **Not assigned to category**	View	Grants permission to: • View dashboards and instances in the ⤴ **Dashboards** menu. • Make a dashboard the default dashboard.
		Full Control	• Edit dashboards in the **Manage Dashboards** page. • Show or hide dashboards in the ⤴ **Dashboards** menu. • Download dashboards. • Convert dashboards into templates. • Edit, download, and delete templates. • Edit and delete instances.

LDAP Authentication and Mappings

Automatic user creation from LDAP servers and mapping groups in BVD simplifies the user management process for administrators as authentication is performed through the LDAP server.

Learn More

This section includes:

LDAP Authentication Overview

You can use an external LDAP server to store user information (user names and passwords) for authentication purposes, instead of using the internal BVD service. You can manually create BVD users and LDAP users, and use LDAP servers to automatically create LDAP users in BVD and map LDAP groups to groups in BVD.

For optimal performance, it is recommended that LDAP servers be in the same subnet as the BVD server.

For optimal security, it is recommended to either configure a TLS connection between the BVD server and the LDAP server, or to have the BVD server and the LDAP servers on the same secure internal network segment. Authentication is performed by the LDAP server, and authorization is handled by the BVD server.

You configure the LDAP server for authentication and automatic user creation using the BVD configuration wizard. For details, see "How to Configure the Connection to the LDAP Server" on page 80.

Permissions

BVD users can automatically get all permissions that are assigned to BVD groups when a mapping between the LDAP groups and the BVD groups has been previously established. When the user logs in the first time, the LDAP group is used to identify the mapped BVD group. The user then automatically gets all permissions that are assigned to the group.

LDAP users who do not yet exist in BVD, are created as BVD users. Their permissions are determined as follows:

- If the users belong to a mapped LDAP group, they automatically get the permissions assigned to the BVD group that is mapped to their LDAP group, as set in BVD User Management.
- If their group is not mapped to a BVD group, or if they do not belong to an LDAP group, they are created as a BVD user with no group mapping and therefore no permissions. Login of such users to BVD is successful but no dashboards are visible in BVD due to the missing permissions.

If users are moved between LDAP groups mapped to BVD groups, their permissions change according to the roles assigned to the mapped BVD groups.

LDAP Setup Workflows

The following section contains overviews of user management processes when LDAP is enabled:

Workflow: LDAP User Authentication, Automatic User Creation, Automatic Group Mapping

- The BVD administrator uses the BVD configuration wizard to configure an LDAP server connection and enable automatic creation of users. In addition, the BVD administrator maps BVD groups to LDAP groups in BVD User Management.
- The BVD user logs on to BVD with their login name or email address and their company password (defined in the LDAP server). The domain name is the unique identifier of an LDAP connection.
- The BVD server authenticates the user with the LDAP server, creates the user, gets the group membership from the LDAP server and identifies the corresponding BVD groups that have been mapped.

Note: When setting up LDAP configurations in BVD, ensure that no local BVD user exists that has the same login name as the unique ID attribute (for example, `sAMAccountName` or `email`) of an LDAP user. If such a local user already exists, the LDAP user will not be automatically created and will not be able to log in to BVD.

Workflow: LDAP User Authentication Only (No User Creation and No Group Mapping)

- The BVD administrator uses the BVD configuration wizard to configure an LDAP server connection and to disable automatic creation of users. In addition, no BVD groups are mapped to LDAP groups in BVD User Management.

  The BVD administrator creates a new user with the **LDAP User** check box selected and with the unique identifier as the login name (or any other unique LDAP ID that has been configured), manually assigns roles to the user, and places them in groups.

- The LDAP or BVD-LDAP user logs in to BVD with their domain name and/or email address as the login name and their company password (defined in the LDAP server).
- The BVD server authenticates the user against the LDAP server.

Workflow: Mixed Mode Authentication

- Mixed mode is enabled by default in the BVD configuration wizard
- The BVD administrator configures an LDAP server connection and optionally enables automatic creation of users.
- A BVD user logs in to BVD. An LDAP user logs in to BVD.
- BVD authenticates the users against LDAP and, if this is not successful, against BVD. With mixed mode disabled, BVD users that are not flagged as LDAP users are not able to log in to BVD.

Note: Mixed mode authentication can be disabled for hardening purposes in the BVD configuration wizard, either when configuring BVD for the first time or when reconfiguring BVD. When you disable mixed mode during the initial configuration of BVD, the built-in super-admin is created as LDAP user. When you disable mixed mode after the initial configuration, the built-in super-admin is authenticated

against BVD (you can manually create additional LDAP super-admins).

When you disable mixed mode after the initial configuration of BVD, the super-admin built into BVD becomes an LDAP user and the configuration tries to authenticate this user against the LDAP server. Therefore, you must make sure that the name and password that are specified for the Administrator in the configuration wizard exist on the LDAP server; if not, the configuration will fail. See also "Configuration" on page 30.

Managing Users

To view LDAP users in BVD, click **Manage Users** on the main BVD User Management page. LDAP users are marked by the ⬤ icon.

Matching the Users Search Filter

To log into BVD, an LDAP user must match the values of the **Root Entry for User Search** settings defined in the BVD configuration wizard.

Any new LDAP user who satisfies the users search filter and authenticates successfully with the LDAP password will be created as a BVD user on first login. Ask your LDAP administrator to help you narrow down the filter definition so that only appropriate users can gain access to BVD.

Obsolete Users

Users that have been removed from the LDAP server are still displayed as BVD users, even though they are no longer registered as LDAP users and cannot log in to BVD.

OMi LDAP Properties Comparison

If you configured LDAP in OMi, you will notice there are differences between the LDAP properties in OMi and BVD. Because BVD and OMi use different libraries, the wording of the properties is not always the same.

See the following table to map the OMi LDAP properties to the BVD LDAP properties from the configuration wizard or the silent configuration file.

OMi LDAP Property	BVD Configuration Wizard	BVD Silent Configuration
LDAP Server URL **Example:** `ldap://192.168.254.69:389/ CN=Users,DC=omi,DC=com`	Combination of the URL and the Distinguished Name (DN) of the Root Entry for User Search	Combination of url and searchBase **Example:** `url=ldap://192.168.254.69:389 searchBase=CN=Users,DC=omi,DC=com`
Unique domain	LDAP Domain	domain

Distinguished Name of Search-Entitled User	Distinguished Name (DN) of the User Entitled to Search LDAP	bindDn
Password for Search-Entitled User	Password of the User Entitled to Search LDAP	bindCredentials
Users filter	Search Filter for the Root Entry for User Search	searchFilter
Groups base DN	Distinguished Name (DN) for the Root Entry for Group Search	groupSearchBase
Groups search filter	Search Filter for the Root Entry for Group Search	groupSearchFilter
No equivalent in OMi. **Note:** In most LDAP environments, these properties can use the default value dn.	Identifying Properties for Users and Groups	For users bindProperty, for groups groupDnProperty

Tasks

This section includes:

-
-

How to Configure the Connection to the LDAP Server

You configure the LDAP server for authentication and automatic user creation using the BVD configuration wizard:

1. Start the configuration wizard by running the following command:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat`

   Linux: `/opt/HP/BVD/bin/configure.sh`

2. In a browser, enter the URL:
   `http://localhost:5000`

   > **Note:** `localhost:5000` uses the default port `5000`. If this port is already in use, follow the instructions displayed in the command line to identify the correct URL.

3. Enter the password for the configuration wizard and click **Submit**.

4. Navigate to the step **LDAP**, click **Use LDAP** and complete the following settings:

   LDAP Domain

   Specify the LDAP domain used to uniquely identify the LDAP server connection.

   Example:

> If you specify `emea`, users will be able to log in to BVD in the format `emea\janedoe`.
>
> Alternatively, users can log in using the mail address format, for example, `jane.doe@example.com`. In the case of email addresses, the domain suffix (`example.com`) has to be chosen as the unique domain name.

URL

The URL to the LDAP server including the port number.

The required format is: `ldap(s)://<LDAP_FQDN>:<port>`

LDAP servers typically use port 389 or secure port 636.

> **Example:**
>
> `ldap://192.0.2.24:389`

Verify Server Certificate

Specify secure LDAP (LDAPS) connections to the LDAP server. The LDAP server certificate is verified against the trusted CA certificates that are uploaded in **LDAPS CAs**.

LDAPS CAs

Required with LDAPS only. This setting is only required if the secure LDAP (LDAPS) protocol is used for communication with the LDAP server. Upload trusted CA certificate files. The certificate files must be PEM-encoded.

> **Example:**
>
> `tlsCA=/tmp/ca1_certificate.crt,/tmp/ca2_certificate.crt`

Mixed Mode

When selected, both LDAP users and local users can log into BVD. Otherwise only LDAP users are able to log in.

Auto Create User

When selected, BVD automatically creates a user for every LDAP user when the user logs into BVD with correct credentials for the first time. When not selected, an LDAP user can only log into BVD when created manually in BVD User Management.

User Entitled to Search LDAP

Define the Distinguished Name (DN) and password of a user with search privileges on the LDAP directory server.

> **Note:** Some LDAP servers allow anonymous search.

> **Example:**
>
> `bindDN=CN=Administrator,CN=Users,DC=hpe,DC=com`

Root Entry for User Search

Specify the root entry for your LDAP user search.

Distinguished Name (DN)

The Distinguished Name (DN) of the LDAP entity from which you want to start your user search.

Example:

```
searchBase=CN=Users,DC=omi,DC=hpe,DC=com
```

Search Filter

Enter the relevant parameters to indicate which attributes are to be included in the user search.

Note:

You must use the literal `{{username}}` to search for the given login name.

BVD by default uses the `??sub` scope; other scopes are not supported.

Example:

```
searchFilter=(cn={{username}})
searchFilter=(sAMAccountName={{username}})
```

Root Entry for Group Search

Specify the root entry for your LDAP group search.

Distinguished Name (DN)

The Distinguished Name (DN) of the LDAP entity from which you want to start your group search.

Example:

```
groupSearchBase=CN=Groups,DC=hpe,DC=com
```

Search Filter

Enter the relevant parameters to indicate which attributes are to be included in the group search.

You can configure the search attribute in the **Identifying Properties For Group** setting.

Note:

- You must use the literal `{{dn}}` to search for group members with a given distinguished name.

- You can search for group members that are part of one out of two groups by using nested queries (see second example).

- BVD does not support dynamic LDAP groups. Dynamic groups are therefore ignored in groups search.

Examples:

```
groupSearchFilter=(member={{dn}})

groupSearchFilter=(member=(&(objectCategory=Person)(userPrincipalName=
{{username}})(|(memberOf=slk-Admin,OU=Groups,OU=slk-
Acc,DC=slka,DC=slkb,DC=slkc)(memberOf=cn=slk-Viewer,OU=Groups,OU=slk-
Acc,DC=slka,DC=slkb,DC=slkc)))
```

Identifying Properties

Specify the LDAP properties to use when authenticating users or group members in the LDAP search.

For User

Optional. When an LDAP user tries to log on, the search-entitled user specified in **User Entitled to Search LDAP** searches the LDAP server entities for that user. When found, the user is authenticated against LDAP based on one of the user's LDAP properties, by default the distinguished name. You can use this option to specify another user property to use for authentication (for example, `sAMAccountName` or `email`).

> **Example:**
>
> `bindProperty=dn`

For Group

Optional. By default, the distinguished name is used to identify users in groups. You can use this setting to specify other properties.

> **Example:**
>
> `groupDnProperty=dn`

5. Click **Next** until you arrive at the **Summary** page. Review the configuration settings, then click **Download** to download your settings as configuration file or **Apply** to start the configuration.

How to Map Groups Configured in BVD to Groups Configured on the LDAP Server

1. LDAP must be configured in the BVD configuration wizard as described in "How to Configure the Connection to the LDAP Server" on page 80.

    Make sure the **Root Entry for Group Search** settings are configured.

2. Open User Management in BVD:

    🔧 **Administration > User Management**

3. Click the **Manage Groups** button and select the group you want to edit or create a new group.

4. In the properties section of the selected group, search for and assign LDAP groups in the **Mapped LDAP groups** field as required. When done, save the group.

    > **Note:** Although dynamic groups can be selected, they are not supported by BVD and therefore ignored in groups search.

Download Tools and Samples

BVD provides an extensive set of tools and samples to help you develop dashboards and integrate data:

Visio Stencil (required)

> `BusinessValadmueDashboardStencil.zip`. Contains the BVD widgets for Visio. Start Visio; in the **Shapes** window, click **More Shapes > Open Stencil** and select the extracted BVD stencil file.
>
> You can also save the stencil file to **C:\Users\<user name>\My Documents\My Shapes** folder and then access the BVD stencil in Visio in **More Shapes > My Shapes**.

Visio Dashboard Template (useful)

> `Dashboard_Template.zip`. Contains a Visio template with an embedded macro. The macro exports your

Visio drawing to SVG each time you save it. The SVG file has the same name as the Visio drawing and is stored in the same folder.

You can add the BVD template to Visio by specifying the template file name in **Visio Options > Save > Default personal templates location**.

Visio Addin (useful)

`VisioAddIn.zip`. Contains an installer for a Visio ribbon called **Dashboard**. The button **Export Dashboard** in the ribbon exports your Visio drawing to an SVG file with the same name and in the same folder as the drawing itself.

Make sure you have administrative privileges when installing the Visio Addin.

Data Generator Sample (interesting)

`samplegen.zip`. Contains a VBScript and a batch file to send data to the OMi sample dashboard. The batch file prompts you for the URL of your data receiver, your API key, and the HTTP proxy and port.

Sample OMi Status Dashboard (interesting)

`omi_sample.zip`. Contains the Visio drawing of the OMi sample dashboard. The dashboard is the target of the data sent by the data generator VBScript. You can use it as the basis for creating your own OMi event and KPI status dashboards.

AO-Bank Sample Dashboards (useful)

`ao-bank.zip`. Contains the Visio files for the AO-Bank sample dashboards, which you can view at the BVD demo.

AO-Cellular Sample Dashboards (useful)

`ao-cellular.zip`. Contains the Visio files for a sample cellular provider.

OMi 10.x Tools (required for the OMi integration)

`bvd-omi-tools-10.x.zip`. Contains the script/batch files required for integrating event, status, and metrics data from OMi 10.x. The tools are included out-of-the-box with OMi 10.10 and later. See also .

OMi 09.x Tools (required for the OMi integration)

`bvd-omi-tools-09.x.zip`. Contains the script/batch files required for integrating event, status, and metrics data from OMi 9.x. See also .

Data Integration

BVD provides out-of-the-box integrations with HPE Software products such as HPE Operations Manager i (OMi) and HPE Operations Connector (OpsCx).

However, you can create your own integrations for any data source by writing an adapter for BVD. The adapter must convert the source data to JSON and send the JSON-enabled data to the BVD data receiver. Predefined dashboards, which are designed and configured to display the received data, then complement your integration.

This section includes:

OMi Integration

BVD can be integrated either with OMi 10.10 and earlier versions, or with OMi 10.11.

Support matrix

For a list of supported OMi versions including required hotfixes, see the support matrix:

Support Matrices for Operations Center products

Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

Data forwarding

The following OMi data can be forwarded to BVD:

Event Status data: The event status data to be forwarded is collected from an OMi monitoring dashboard that you specify.

KPI Status data: The KPI status is collected from all CIs that are associated with a view and the KPI set that you specify.

Metrics data: The metrics, or Performance Dashboard, data is collected from your graph favorites (public favorites in 10.11) in OMi.

Version overview

BVD can be integrated either with OMi 10.10 and earlier versions, or with OMi 10.11. You need to follow different integration processes depending on your BVD version.

If you integrated OMi with BVD 10.10 and then upgraded to BVD 10.11, your old integration will not be valid anymore. Follow the steps described in "OMi 10.11 Integration" below to reenable the data forwarding to BVD.

This section includes:

- "OMi 10.11 Integration" below
- "OMi 10.10 and earlier Integration" on page 88

OMi 10.11 Integration

You can configure OMi 10.11 to send Event Status, KPI Status and Performance Dashboard data to BVD. Use the BVD Data Forwarding rules manager on the OMi server to specify which data you want to forward. To forward Performance Dashboard data, save your performance dashboard charts as favorites with the **Share as Public** option enabled before including this data in a rule. For details, see "Enable Performance Dashboard Data Forwarding on the OMi Server" on the next page.

For information on how to forward this data to BVD, see "Forward OMi Data to BVD" on the next page.

This section includes:

- "BVD Data Channels for OMi Data" below
- "Enable Performance Dashboard Data Forwarding on the OMi Server" below
- "Forward OMi Data to BVD" below

BVD Data Channels for OMi Data

When you send BVD data to OMi by using forwarding rules, BVD creates data channels that uniquely identify the data you are sending.

Each data channel consists of tags and dimensions (dims). Tags are static labels and dimensions are names that are associated with a specific value. For more information, see "Custom Integrations" on page 102.

The data channels are structured differently depending on the data you choose to forward:

Event Status
```
<tags connected server><tags forwarding rule><dim monitoring dashboard><dim widget
label><dim widget type>
```

KPI Status
```
<tags connected server><tags forwarding rule><dim view name><dim CI name><dim KPI
name>
```

Performance Dashboard
```
<tags connected server><tags forwarding
rule><metricName><instanceName><dSName><systemName><className>
```

`<tags connected server>` are all tags that are specified when adding a BVD Connected Server.
`<tags forwarding rule>` are all tags that are specified when creating a BVD Data Forwarding Rule.

Enable Performance Dashboard Data Forwarding on the OMi Server

To enable performance dashboard data forwarding to BVD, follow these steps:

1. In the Performance Perspective, select the charts that you want to forward and save them as favorites:
   a. In OMi, access **Workspaces > Operations Console > Performance Perspective**.
   b. In the **View Explorer**, select a view and then the CI for which you want enable data forwarding.
   c. In the **Performance** pane, choose a performance dashboard from the drop-down list.
   d. Click the title of the chart you want to save as favorite and click **Add to Favorite**.
   e. Choose to add the favorite to the default page, user-defined favorite page, or create a new user-defined favorite page. Click **Save**.
   f. Open the favorite in the **Performance** pane, access the menu and click **Save**. Check the **Share as Public** option and click **Save**.
2. *Optional*. In OMi, open the Infrastructure Settings:
   a. **Administration > Setup and Maintenance > Infrastructure Settings**
   b. In the **Applications** list, select **Performance Dashboard**.
   c. If required, configure the setting **Data Forward Interval to Endpoint**.

Forward OMi Data to BVD

Note: Before you create BVD data forwarding rules in OMi, access **Administration > Setup**

and Maintenance > Connected Servers to add your BVD instance as a Connected Server.

To forward OMi data to BVD, access **Administration > Setup and Maintenance > BVD Forwarding Rules**.

1. In the right pane, click **Create**. Alternatively, click ✳ **New**.

2. In the **General** section, complete the following information:

   a. Enter a display name and (optional) a description for the forwarding rule.

   b. *Optional*. Enter a comma-separated list of tags.

      Data channels can be tagged to separate data from incoming streams and to create more specific data channels. For example, if you have separate OMi servers for different regions and you want separate dashboards for each region, you can add a tag that identifies the region in which this OMi server is located.

      The tags you enter will be added to the data channel after the tags specified for the BVD Connected Server. For details, see "BVD Data Channels for OMi Data" on the previous page.

3. In the **Target BVD Server** section, choose one or multiple Connected Servers from the drop-down list. This list shows all Connected Servers of the type BVD and Alias. If your BVD connection is not listed in the drop-down, access **Administration > Setup and Maintenance > Connected Servers** to ensure that the server connection was set up correctly.

4. *Optional*. In the **Event Status** section, choose one or multiple monitoring dashboards from which you want to forward data to BVD.

   > **Caution:** If the monitoring dashboard name is changed, the data channel is **not** updated. Instead, a new data channel with the changed monitoring dashboard name is created. Widgets that use the old data channel in BVD will not receive data from OMi anymore and need to be updated to the new data channel.

5. *Optional*. In the **KPI Status** section, choose the one or multiple views from which you want to forward KPI status data. Click 🔧 next to the view name to choose specific KPIs. If no individual KPIs are selected, KPI status data will be forwarded for all CIs that are associated with the chosen view.

6. *Optional*. In the **Performance Dashboard Data** section, choose one or multiple public favorites of your performance dashboards for which you want to forward data to BVD. For information on how to add performance dashboards as favorites, see "Enable Performance Dashboard Data Forwarding on the OMi Server" on the previous page.

7. *Optional*. Clear the check box **Activate after save** if you want the status of the rule to be inactive after clicking **Save**. You can activate the rule at a later point in time.

8. Click **Save** to save the BVD data forwarding rule.

OMi 10.10 and earlier Integration

You can configure OMi 10.10 or earlier versions to send Event Status, KPI Status and Metrics data to BVD. Use the bvd-event-status command-line interface on the OMi server to forward event status data, and the bvd-kpi-status command-line interface to forward KPI status data.
To forward Metrics data, enable data forwarding in Performance Graphing (known as Performance Dashboard in OMi 10.10), then save your graphs as favorites with the export (or forward) data option enabled. See "Forward OMi Metrics Data" on page 98.

This section includes:

- "Install and configure the event and KPI status forwarding tools on the OMi server" below
- "Configure and enable metrics data forwarding on the OMi server" on the next page
- "Import the BVD certificate to the OMi server" on page 92

Install and configure the event and KPI status forwarding tools on the OMi server

1. *OMi versions earlier than 10.10 only.* Download and install the BVD-OMi integration tools on the OMi server. This step is only required for OMi versions earlier than 10.10. The tools are included out-of-the-box with OMi 10.10 and later.

    a. In BVD, download the data forwarding tools for your version of OMi: 10.0x or 9.2x. Go to 🔧 **Administration > Download Tools & Samples** and download **OMi 10.x Tools** or **OMi 09.x Tools**.

    b. In BVD, open 🔧 **Administration > System Settings**, and copy the **API Key**.

    This key identifies your BVD instance and must be included in the data submitted by the data senders.

    > **Note:** The System Settings page is only available to users with administrator privileges.

    c. Copy the ZIP file to a temporary directory on the OMi gateway server, and extract it to the OMi installation directory `C:\HPBSM\` or `/opt/HP/BSM/`.

    The following files are placed on your system:

    ```
    opr/bin/bvd-event-status.bat
    opr/bin/bvd-event-status.sh
    opr/bin/bvd-kpi-status.bat
    opr/bin/bvd-kpi-status.sh
    opr/examples/bvd/bvdconf-sample.json
    opr/lib/bvd/groovy-all.jar
    opr/lib/bvd/bvd-omi-tools.jar
    ```

2. Create the subdirectory `opr` on the OMi server, copy the sample configuration file `bvdconf-sample.json` to that directory, and rename it to `bvdconf.json`:

    Windows: `%OvDataDir%\shared\server\conf\opr\bvdconf.json`

    Linux: `/var/opt/OV/shared/server/conf/opr/bvdconf.json`

3. Edit the file `bvdconf.json` and fill in the following information in the `OMiEventStatus` and `OMiKPIStatus` sections:

`url`	*Required.* URL of the BVD receiver including your API key, which identifies your BVD instance.
	Replace *<BVD_URL>* with the URL of your BVD receiver:
	`http(s)://<BVD_server>:<port>`
	<BVD_server> represents the Fully Qualified Domain Name (FQDN) of the BVD server; *<port>* is the port assigned to the BVD receiver during the configuration (default: 12224 or 12225).
	Replace *<YourApiKey>* with your BVD API key from **Administration > System Settings**.

dims	*Required.* Comma-separated list of dims. Dims are the fields in the data you send to BVD, for example, `viewName`, `ciName`, and `kpiName`.
tags	*Optional.* Comma-separated list of tags. Tags enable you to create more specific data channels. For example, adding the tags `omi,kpi` creates the data channel ⟡omi ⟡kpi ⬡viewName ⬡ciName ⬡kpiName.
proxyHost	*Optional.* If your network includes a proxy, insert the FQDN of the proxy server (for example, `myproxy.example.com`).
proxyPort	*Optional.* Port of the proxy (for example, `8888`).
proxyUser	*Optional.* User account to access the proxy.
proxyPassword	*Optional.* Password of the proxy user account.

> **Tip:** Changing the default dims and tags also requires you to update the data channels that are configured in the dashboards (for example, in the sample dashboard omi_sample).

Configure and enable metrics data forwarding on the OMi server

1. *Prerequisite.* Make sure the Performance Graphing hotfixes for your version of OMi are installed. For details, see the support matrix:

   Support Matrices for Operations Center products

   Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

2. In BVD, open 🔧 **Administration > System Settings**, and copy the **API Key**.

   This key identifies your BVD instance and must be included in the data submitted by the data senders.

   > **Note:** The System Settings page is only available to users with administrator privileges.

3. Edit the file `bvdconf.json` file on the OMi gateway server:

   Windows: `%OvDataDir%shared\server\conf\opr\bvdconf.json`

   Linux: `/var/opt/OV/shared/server/conf/opr/bvdconf.json`

   > **Tip:** If the file does not yet exist, download and extract the OMi data forwarding tools from BVD. For details, see "Install and configure the event and KPI status forwarding tools on the OMi server" on the previous page.

4. Fill in the following information:

name	*Required.* Replace `<YourEndpointName>` with the name of the endpoint to which Performance Graphing forwards data, for example, `ColorYourData`. This name must match the endpoint name set in the Performance Graphing infrastructure setting "Endpoint Name" on the next page.

url	*Required.* URL of the BVD receiver including your API key, which identifies your BVD instance.
	Replace *<BVD_URL>* with the URL of your BVD receiver:
	`http(s)://<BVD_server>:<port>`
	<BVD_server> represents the Fully Qualified Domain Name (FQDN) of the BVD server; *<port>* is the port assigned to the BVD receiver during the configuration (default: 12224 or 12225).
	Replace *<YourApiKey>* with your BVD API key from **Administration > System Settings**.
tags	*Optional.* Comma-separated list of tags. Tags enable you to create more specific data channels. For example, the tags `PerformanceGrapher,OMi` create the data channel
	⊘PerformanceGrapher ⊘OMi ⬡metricName ⬡instanceName ⬡dSName ⬡systemName ⬡className.
proxyHost	*Optional.* If your network includes a proxy, insert the FQDN of the proxy server (for example, `myproxy.example.com`).
proxyPort	*Optional.* Port of the proxy (for example, `8888`).
proxyUser	*Optional.* User account to access the proxy.
proxyPassword	*Optional.* Password of the proxy user account.

5. In OMi, open Infrastructure Settings:

   ○ OMi 9.2x and 10.0x: **Admin > Platform > Setup and Maintenance -> Infrastructure Settings**
   In the **Applications** list, select **Performance Graphing**.

   ○ OMi 10.10: **Administration > Setup and Maintenance > Infrastructure Settings**
   In the **Applications** list, select **Performance Dashboard**.

   Configure the following settings:

Endpoint Name	Name of the endpoint to which the Performance Graphing data is forwarded. It must match the endpoint name specified in the `bvdconf.json` file.
Turn on Data forwarding to Endpoint	Set this parameter to true to enable data forwarding from Performance Graphing to the BVD endpoint. Default: false
Data Forward Interval to Endpoint	Configure the interval (in seconds) at which Performance Graphing forwards the data to the endpoint. Default: 15 seconds
Data Collection interval for non-real time datasource	Configures the interval (in minutes) at which Performance Graphing collects the data from non-real time data sources. The data collected is then forwarded to the configured endpoint. Default: 5 minutes

6. In the Performance Perspective, select the metrics that you want to forward and save them as favorites. For details, see "Forward OMi Metrics Data" on page 98.

Note: If you make any subsequent changes to the `bvdconf.json` file, you must reset the **Turn on Data forwarding to Endpoint** setting in the Infrastructure Settings. To reset, set **Turn on Data forwarding to Endpoint** to false and then set it back to true.

Import the BVD certificate to the OMi server

Note: This step is mandatory for OMi 10.10, but applicable for OMi 9.2x and 10.0x only if SSL is enabled.

Secure the connection to BVD for metrics data forwarding by importing the BVD certificate to the OMi gateway server.

1. Export the BVD certificate using a web browser, for example Firefox:

    a. In the Firefox address bar, click the padlock icon, then click **More Information**. The **Page Info** page opens at the **Security** tab.

    b. In the **Security** tab, click **View Certificate**.

       Open the **Details** tab and click **Export**. Choose the file name and folder where you want to save the exported certificate and click **Save**. The export places the certificate file <*file_name*>.crt on your system.

    c. Make sure the downloaded certificate is available on the OMi gateway server.

    Tip: You can also export the certificate from Internet Explorer if you first installed it in the browser: **Internet Options > Content > Certificates > Export**.

2. On the OMi gateway server, import the certificate to the local Java certificate store:

    ○ OMi 9.2x and 10.0x:

    `<OMi_HOME>/JRE[64]/bin/keytool -import -trustcacerts -keystore <path_to_keystore> -storepass <password> -alias <alias> -file <path_to_certificate>`

    Example:

    ```
    %TOPAZ_HOME%\JRE64\bin\keytool.exe -import -trustcacerts -keystore %TOPAZ_
    HOME%/JRE64/lib/security/cacerts -storepass changeit -alias myRootCA -file
    c:\temp\BVDcert.crt
    ```

    ○ OMi 10.10:

    `<OMi_HOME>/bin/opr-cert-mgmt.[bat|sh] -import <alias> <path_to_certificate>`

    Example:

    ```
    %TOPAZ_HOME%\bin\opr-cert-mgmt.bat -import -alias myRootCA c:\temp\BVDcert.crt
    ```

3. Verify that the certificate was successfully added to the keystore:

    ○ OMi 9.2x and 10.0x:

    `<OMi_HOME>/JRE[64]/bin/keytool -list -keystore <path_to_keystore>`

    Example:

```
%TOPAZ_HOME%\JRE64\bin\keytool.exe -list -keystore %TOPAZ_
HOME%/JRE64/lib/security/cacerts
```

  ○ OMi 10.10:

  `<OMi_HOME>/bin/opr-cert-mgmt.[bat|sh] -list`

  Example:

  `%TOPAZ_HOME%\bin\opr-cert-mgmt.bat -list`

Forward OMi Event Status

Use the bvd-event-status command-line interface to forward event status data from OMi to BVD.

BVD data channels opened up by the bvd-event-status command-line interface:

⬨omi ⬨mdb ⬨dashboard_name ⬨label ⬨type

Before you can use the tool, install it as described in "Install and configure the event and KPI status forwarding tools on the OMi server" on page 89.

Location

`<OMi_HOME>/opr/bin/bvd-event-status.[bat|sh]`

Synopsis

bvd-event-status <connection> **-dashboard_name** <Dashboard Name> [**-polling_interval** <Polling Interval>] [**-dashboard_config** <BVD Config File>] **-help** | **-verbose** | **-version**

Options

Option	Description
{**-dashboard_ name**|**-dn**} <Dashboard Name>	Sets the name of the dashboard for which event status data will be collected.
{**-polling_ interval**|**-pi**} <Polling Interval>	Sets the polling interval (in milliseconds) for collecting event status data. Default: 10,000 milliseconds (10 seconds)
{**-dashboard_ config**|**-dc**} <BVD Config File>	Sets the path to the BVD configuration file bvdconf.json. If omitted, it assumes the file in the following directory: Windows: %OvDataDir%\shared\server\conf\opr\bvdconf.json Linux: /var/opt/OV/shared/server/conf/opr/bvdconf.json
{**-post2**|**-p2**}	For internal use only.
{**-help**|**-h**}	Displays a summary of the command options.

Option	Description
{-verbose|-v}	Prints verbose output.
-version	Displays version information for the tool.

Syntax for <connection>

-username <*Login name*> [**-password** <*password*> | **-smartcard** | **-winCrypto** | **-jks** <*keystore path*> **-jksPassword** <*keystore password*>] [[**-port** <*port*>] [**-server** <*gatewayserver*>] [**-ssl**]]

Note: If you do not specify the OMi server to connect to (using the `-server` option), the command is executed on the server to which you are logged on.

Option	Description
{-username|-user} <*login name*>	Sets the login name of the user required to execute CLI operations on the target gateway server.
{-password|-pw} <*password*>	Sets the password for the specified user. If using SSH on Cygwin, either enter the password in free text or use other communication methods, for example Java keystore, Windows keystore, or smart card authentication. Default value: empty string
{-smartcard|-sc}	Uses the certificate stored on smart card or security token for authentication.
{-winCrypto|-wc}	If OMi is configured for TLS mutual authentication, this option specifies to use the Windows certificate store for authentication. The certificate store must hold exactly one client certificate, which OMi will use to authenticate the user. This option is only available on Windows systems.
{-jks|-j} <*keystore path*>	If OMi is configured for TLS mutual authentication, this option can be used to specify the Java keystore to be used for authentication. The keystore must hold exactly one client certificate, which OMi will use to authenticate the user. **Note:** It is not necessary that the client certificate contains the flag "Smart Card Logon (1.3.6.1.4.1.311.20.2.2)" in the "Enhanced Key Usage" field.
{-jksPassword|-jp} <*keystore password*>	If OMi is configured for TLS mutual authentication, this option can be used to specify the Java keystore to be used for authentication. The keystore must hold exactly one client certificate, which OMi will use to authenticate the user. **Note:** It is not necessary that the client certificate contains the flag "Smart Card Logon (1.3.6.1.4.1.311.20.2.2)" in the "Enhanced Key Usage" field.

Option	Description
{-port|-p} <port>	Uses port <port> to connect to the target gateway server.

Default value of <port>:
80 for HTTP connections
443 for HTTPS connections |
| -server <GatewayServer> | Sets the target gateway server, using <GatewayServer> as the hostname or IP address to locate it.

Default value of <GatewayServer>:
FQDN of the OMi gateway server |
| -ssl | When this option is specified, the HTTPS protocol is used to connect to the target gateway server. If omitted, the HTTP protocol is used. |

Exit Status

Exit Status	Description	Output
0	Successful completion of the requested operation	No output.
1	Failure of the requested operation	An error message stating why the operation failed, followed by the tool's help text.
300-399	HTTP Redirection (300-399)	An error message stating the HTTP error number and description.

For more information about HTTP error status values, see publicly available HTTP documentation. |
| 400-499 | HTTP Client Error (400-499) | |
| 500-599 | HTTP Internal Server Error (500-599) | |

Examples

The following example forwards event status from the OMi monitoring dashboard OMi Health Status to BVD:

```
\HPBSM\opr\bin\bvd-event-status.bat -username admin -dashboard_name "OMi Health Status"
```

Forward OMi KPI Status

Use the bvd-kpi-status command-line interface to forward KPI status data from OMi to BVD.

Before you can use the tool, install it as described in "Install and configure the event and KPI status forwarding tools on the OMi server" on page 89.

BVD data channels opened up by the bvd-kpi-status command-line interface:

omi<>kpi<>viewName<>ciName<>kpiName

🏷omi🏷kpi🏷viewName🏷ciName🏷kpiName

Location

<*OMi_HOME*>/opr/bin/bvd-kpi-status.[bat|sh]

Synopsis

bvd-kpi-status <connection> **-view_name** <*View Name*> [**-kpi_name** <*KPI Name*>] [**-polling_ interval** <*Polling Interval*>] [**-dashboard_config** <*BVD Config File*>] **-help** | **-verbose** | **- version**

Options

Option	Description
{**-view_name**|**-vn**} <*View Name*>	Sets the name of the view for which KPI status data will be collected.
{**-kpi_name**|**-kn**} <*KPI Name*>	Sets the name of the KPI for which status data will be collected. If omitted, bvd-kpi-status sends the status of all KPIs for all CIs that are related to the given view name.
{**-polling_ interval**|**-pi**} <*Polling Interval*>	Sets the polling interval (in milliseconds) for collecting event status data. Default: 10,000 milliseconds (10 seconds)
{**-dashboard_ config**|**-dc**} <*BVD Config File*>	Sets the path to the BVD configuration file bvdconf.json. If omitted, it assumes the file in the following directory: Windows: %OvDataDir%\shared\server\conf\opr\bvdconf.json Linux: /var/opt/OV/shared/server/conf/opr/bvdconf.json
{**-post2**|**-p2**}	For internal use only.
{**-help**|**-h**}	Displays a summary of the command options.
{**-verbose**|**-v**}	Prints verbose output.
-version	Displays version information for the tool.

Syntax for <connection>

-username <*login name*> [**-password** <*password*> | **-smartcard** | **-winCrypto** | **-jks** <*keystore path*> **-jksPassword** <*keystore password*>] [[**-port** <*port*>] [**-server** <*gatewayserver*>] [**- ssl**]]

> **Note:** If you do not specify the OMi server to connect to (using the -server option), the command is executed on the server to which you are logged on.

Option	Description
{-username|-user} <login name>	Sets the login name of the user required to execute CLI operations on the target gateway server.
{-password|-pw} <password>	Sets the password for the specified user. If using SSH on Cygwin, either enter the password in free text or use other communication methods, for example Java keystore, Windows keystore, or smart card authentication. Default value: empty string
{-smartcard|-sc}	Uses the certificate stored on smart card or security token for authentication.
{-winCrypto|-wc}	If OMi is configured for TLS mutual authentication, this option specifies to use the Windows certificate store for authentication. The certificate store must hold exactly one client certificate, which OMi will use to authenticate the user. This option is only available on Windows systems.
{-jks|-j} <keystore path>	If OMi is configured for TLS mutual authentication, this option can be used to specify the Java keystore to be used for authentication. The keystore must hold exactly one client certificate, which OMi will use to authenticate the user. **Note:** It is not necessary that the client certificate contains the flag "Smart Card Logon (1.3.6.1.4.1.311.20.2.2)" in the "Enhanced Key Usage" field.
{-jksPassword|-jp} <keystore password>	If OMi is configured for TLS mutual authentication, this option can be used to specify the Java keystore to be used for authentication. The keystore must hold exactly one client certificate, which OMi will use to authenticate the user. **Note:** It is not necessary that the client certificate contains the flag "Smart Card Logon (1.3.6.1.4.1.311.20.2.2)" in the "Enhanced Key Usage" field.
{-port|-p} <port>	Uses port <port> to connect to the target gateway server. Default value of <port>: 80 for HTTP connections 443 for HTTPS connections
-server <GatewayServer>	Sets the target gateway server, using <GatewayServer> as the hostname or IP address to locate it. Default value of <GatewayServer>: FQDN of the OMi gateway server
-ssl	When this option is specified, the HTTPS protocol is used to connect to the target gateway server. If omitted, the HTTP protocol is used.

Exit Status

Exit Status	Description	Output
0	Successful completion of the requested operation	No output.
1	Failure of the requested operation	An error message stating why the operation failed, followed by the tool's help text.
300-399	HTTP Redirection (300-399)	An error message stating the HTTP error number and description.
400-499	HTTP Client Error (400-499)	For more information about HTTP error status values, see publicly available HTTP documentation.
500-599	HTTP Internal Server Error (500-599)	

Examples

The following example forwards KPI status to BVD for all CIs in the view `OprSample` that have the KPI `Unassigned Events` assigned:

```
\HPBSM\opr\bin\bvd-kpi-status.bat -username admin -view_name OprSample -kpi_name
"Unassigned Events"
```

Forward OMi Metrics Data

You can configure Performance Graphing (known as Performance Dashboard in OMi 10.10) to forward metrics data from OMi to BVD. The metrics data is collected from your graph favorites in OMi. Your favorites must be configured to export or forward data to BVD.

Before Performance Graphing starts forwarding data, configure and enable data forwarding to BVD as described in "Configure and enable metrics data forwarding on the OMi server" on page 90.

BVD data channels opened up by Performance Graphing:

🏷metricName 🏷instanceName 🏷dSName 🏷systemName 🏷className

Saving charts as favorites for data forwarding

1. In OMi, open the **Performance Perspective**:

   OMi 9.2x: **Applications > Operations Management > Performance Perspective**

   OMi 10.x: **Workspaces > Operations Console > Performance Perspective**

2. From the **View Explorer**, select a view and then the CI for which you want to draw graphs (or dashboards). Then save the graphs as favorites with the "export to BVD" option selected as described below:

○ OMi 9.2x and 10.0x:

From the **Metrics** tab on the **Performance** pane, select the data source, the metrics class, the instance, and the metrics you want to forward. Drag the metrics that you want to see in BVD to the **Drawn Graphs** pane.

Click 💾 **Save as Favorite**. In the **Save as Favorite** dialog box, select **Export Data**, then click **Save**.

○ OMi 10.10:

In the Performance pane, click ⊞ **Dashboard Selection** and then click the dashboard to view the dashboard. Click the title of the chart and then click **Add to Favorite**. In the **Favorites** dialog box, you can add the favorite to the default page, user-defined favorite page, or create a new user-defined favorite page. Then click **Save**.

Launch the favorite, click the 🔖 **Enable/Disable data forward to BVD** button, and then click **Save** to save your changes to the favorite.

Performance Graphing forwards metrics for all graphs that are saved as favorites and that are configured to export or forward data to BVD.

Operations Connector Integration

To forward performance data from Operations Connector to BVD, create a Data Forwarding policy in Operations Connector. The policy must specify your BVD instance as a target and contains rules that specify which data is sent to BVD.

Learn More

Support matrix

For a list of supported Operations Connector versions, see the support matrix:

Support Matrices for Operations Center products

Download and extract the support matrix files, open the document SUMA.htm and select **Operations Manager i Business Value Dashboard** from the product list.

Tasks

This section includes:

Configuring data forwarding in Operations Connector

1. In BVD, open ⚒ **Administration > System Settings**, and copy the **API Key**.

   This key identifies your BVD instance and must be included in the data submitted by the data senders.

   > **Note:** The System Settings page is only available to users with administrator privileges.

2. In Operations Connector, click ✳ **Create** in the toolbar. Then click **Forwarding >** 📋 **Data Forwarding**.

3. In the **Properties** page, define information that is related to the policy itself (for example, the name and description of the policy).

4. In the **Targets** page, set up your BVD instance as a target to which the data is forwarded:

   a. In the target list, click ✳ **New Item** above the **Name** column to add a new target.

   b. Enter the name of the BVD target and a description.

   c. Enter the URL of your BVD data receiver. The URL must include your API key and dimensions or tags (or both dimensions and tags) to create unique data channels for your metrics data:

   BVD expects to receive your data as HTTP post requests in JavaScript Object Notation (JSON) format.

   The URL should look something like this:

   `http(s)://<BVD_server>:<port>/api/submit/<API_key>/dims/<dims>`

   `<BVD_server>`

   > The Fully Qualified Domain Name (FQDN) of the BVD server.

   `<port>`

   > The port assigned to the BVD receiver during the configuration. Default: 12224 (HTTP) or 12225 (HTTPS).

   `<API_key>`

   > Identifies your BVD instance. You can find the API key in ⚒ **Administration > System Settings**.

   `<dims>`

   > The names in your JSON name-value pairs. Select and combine dims that uniquely identify your data.

   For more information on the URL of the BVD data receiver, see .

   > **Example:**
   >
   > You can add the following metrics attributes as dimensions to the URL:
   >
   > `dims/dataDomain,relatedCi,name,metricClass,node`
   >
   > This results in the following data channel:
   >
   > ⬡HPBsmIntOEM ⬡oem.example.com/oracle_database/oemdb
   >
   > ⬡Average Active Sessions ⬡Throughput ⬡oem.example.com

For information on the metrics attributes, see the Operations Connector documentation.

    d. Select **JSON** as **Wire format**.

    e. Make sure **Use Guaranteed Delivery** is cleared. If you select this check box, Operations Connector attempts to resend data that could not be delivered earlier and BVD may receive outdated data.

5. Configure data forwarding rules:

   ○ To forward metrics data after policy rules are applied, select the **Metric** page and configure metric data forwarding rules.

   Metric forwarding rules define what a Data Forwarding policy should do in response to specific metric data. Each rule consists of a condition and of settings for the data generated by the policy. The settings enable you to configure what data Operations Connector forwards to which target.

   ○ To forward structured input data, that is, data gathered by a policy before the policy rules are applied, select the **Structured Input** page and configure structured input data forwarding rules.

   Structured input data rules define what a Data Forwarding policy should do in response to specific structured input data. Each rule consists of a condition and of settings for the data generated by the policy. The settings enable you to configure what data Operations Connector forwards to which target.

   Discarding rules have a higher precedence than forwarding rules.

6. Click **Save and Close** to save the policy and close the editor.

7. Activate the Data Forwarding policy in Operations Connector. Operations Connector starts sending data to BVD.

   In BVD, connect your widgets to the data channels opened up by Operations Connector.

Forwarding data using an HTTP proxy

If you need to redirect the connection from Operations Connector to BVD through an HTTP proxy, configure the Operations Connector system as follows:

1. Edit the XPL configuration file:

   ```
   ovconfchg -edit
   ```

2. Add the following lines:

   ```
   [bbc.http]
   PROXY=<proxy_hostname>:<proxy_port>+(<included hosts>)-(<excluded hosts>)
   ```

   Replace `<included_hosts>` with a comma-separated list of hostnames or IP addresses to which the proxy enables communication. Replace `<excluded hosts>` with a comma-separated list of hostnames or IP addresses to which the proxy cannot connect. Asterisks (*) are wild cards in hostnames and IP addresses. Both `<included_hosts>` and `<excluded hosts>` are optional.

   To specify multiple proxies, separate each proxy with a semicolon (;). The first suitable proxy in the list takes precedence.

   > **Example:**
   >
   > ```
   > [bbc.http]
   > PROXY=myproxy.example.com:8888+(mybvd.example.com)
   > ```

3. Restart the Operations Connector process that forwards the data:

```
ovc -restart opcgeni
```

Forwarding data using HTTPS

By default, Operations Connector only trusts the OMi server as certificate authority (CA). For Operations Connector to trust the CA that issued the BVD certificate, you must download the root CA certificates from the BVD CA and import them to Operations Connector trusted root certificate store.

1. Obtain the root CA certificates from the root and any intermediate authorities that issued the BVD server certificate.

2. On the Operations Connector system, import the certificates to the trusted root certificate store:

```
ovcert –importtrusted –file <certificate_file>
```

3. *Optional.* On the Operations Connector system, run the following command to verify that the trust has been established:

```
bbcutil -ping https://<BVD_server>:<port>
```

> **Example:**
>
> ```
> bbcutil -ping https://bvdserver.example.com:12225
> ```

The following output indicates that the HTTPS connection is successful.

```
https://<BVD_server>:<port>:
(bbc-288) status=eServiceError coreID= bbcV= appN= appV= conn=0 time=471 ms
```

`eServiceError` is normal and indicates that there is no BBC service on the BVD system. If the output includes eSSLError (or similar), the HTTPS connection was not successful, possibly because the trust has not been established correctly.

Custom Integrations

BVD expects to receive your data as HTTP post requests in JavaScript Object Notation (JSON) format.

It is recommended that your JSON input contains flat data, consisting of name-value pairs. If you need to send nested data, BVD automatically flattens the data (see also "Nested JSON data" on page 105). You can also send JSON data in arrays. This enables you to send multiple data objects in a single web service call (see also "JSON data arrays" on page 104).

See also "Example: Sending JSON Data to BVD" on page 105.

Learn More

This section includes:

- "Sending dimensions and tags in the receiver URL" on the next page
- "Sending dims and tags as HTTP parameters" on the next page
- "Sending dims and tags in the receiver URL and as HTTP parameters" on page 104
- "JSON data arrays" on page 104

Sending dimensions and tags in the receiver URL

The BVD receiver URL should look something like this:

- URL with dimensions only:

  http(s)://<BVD_server>:<port>/api/submit/<API key>/dims/<dims>[,<dims=value>]

- URL with tags only:

  http(s)://<BVD_server>:<port>/api/submit/<API key>/tags/<tags>

- URL with both dimensions and tags:

  http(s)://<BVD_server>:<port>/api/submit/<API key>/dims/<dims>[,<dims=value>]
  /tags/<tags>

  The tags can also precede the dims:

  http(s)://<BVD_server>:<port>/api/submit/<API key>/tags/<tags>/dims/<dims>
  [,<dims=value>]

<BVD_server>

   The Fully Qualified Domain Name (FQDN) of the BVD server.

<port>

   The port assigned to the BVD receiver during the configuration. Default: 12224 (HTTP) or 12225 (HTTPS).

<API_key>

   Identifies your BVD instance. You can find the API key in 🔧 **Administration > System Settings**.

<tags>

   Static labels that you can attach to your data to create more specific data channels.

<dims>

   The names in your JSON name-value pairs. Select and combine dimensions (dims) that uniquely identify
   your data.

<dims=value>

   The names and values in your JSON name-value pairs. Directly assign values with names to improve
   data identification. Use this option, for example, if you have separate servers of the same data source for
   different locations and you want separate dashboards for each location. These name-value pairs do not
   have to be part of the JSON input. If they are, the values in the JSON input will be overwritten by the
   values in the URL.

Sending dims and tags as HTTP parameters

You can also submit the dims and tags as HTTP parameters of the URL.

Example:

```
http://bvd.example.com:12224/api/submit/47a648e9065d465012e541288b5a345e?dims=viewNam
e,ciName,kpiName,location=nyc&tags=omi,kpi
```

Sending dims and tags in the receiver URL and as HTTP parameters

You can combine the receiver URL and HTTP parameters to send dims and tags. Define the dims and tags as part of the URL path first, then add additional dims and tags as HTTP parameters.

> **Example:**
>
> ```
> http://bvd.example.com:12224/api/submit/47a648e9065d465012e541288b5a345e/dims/viewNam
> e,ciName=abc/tags/omi,kpi?dims=kpiName,location=nyc&tags=bvd
> ```

However, if the same dimension or tag is specified more than once, the value of the last query parameter overwrites the values of the previous parameters. The value of the last query parameter appears multiple times as data channel.

> **Example:**
>
> ```
> http://bvd.example.com:12224/api/submit/47a648e9065d465012e541288b5a345e/dims/locatio
> n=boston?dims=location=nyc&tags=east&dims=location=atlanta
> ```
>
> In this example, the dim `location` will have the value `atlanta`. Because dimensions are accumulated, the value `atlanta` appears three times as data channel.

JSON data arrays

You can submit multiple JSON objects in a single web service call by adding them to an array.

Array:

```
[
    {
        a: 1,
        b: 2
    },
    {
        c: 3,
        d: 4
    }
]
```

Nested JSON data

If the input contains nested data, BVD automatically flattens the data by renaming nested name-value pairs to include the names of the parent elements, separated by slashes (/), for example:

Nested JSON data:

```
{
    a: 1,
    b: 2,
    c: {
        x: 6,
        y: 7
    }
}
```

Flattened JSON data:

```
{
    a: 1,
    b: 2,
    c/x: 6,
    c/y: 7
}
```

Data storage

BVD stores only a specific number of data records per channel. The records are only kept if they are related to a widget. The BVD data aging process scans the database every hour to identify and automatically delete records that exceed the configured maximum number or maximum age. You can modify the aging defaults; for details, see "Data Aging" on page 131.

Example: Sending JSON Data to BVD
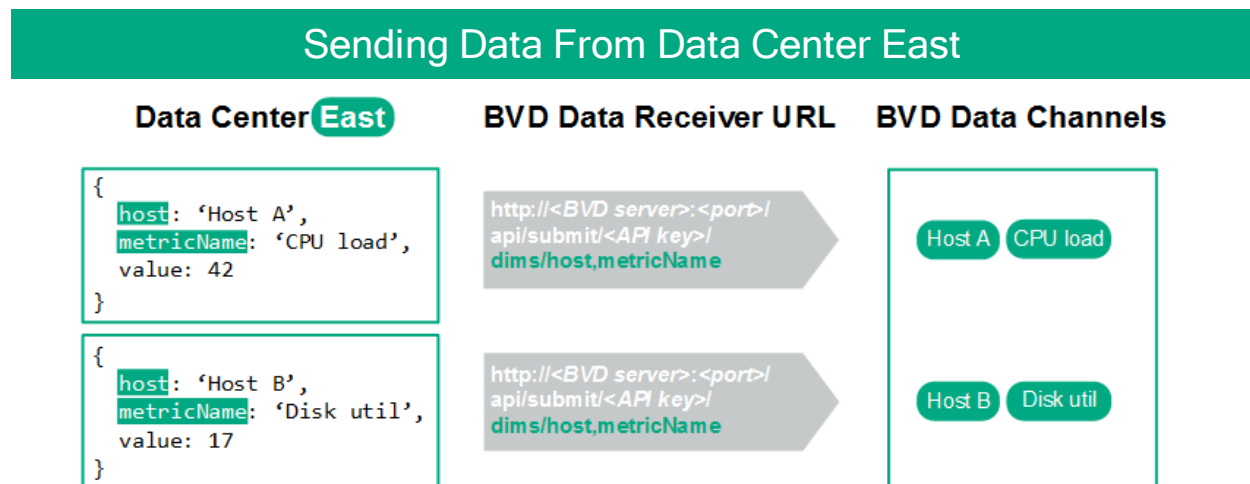
In this example, Data Center East sends two sets of JSON data to the BVD server. In both sets, the data fields host and metricName uniquely identify the value. The fields are therefore selected as dimensions (dims) and included in the URL. Once received by the BVD server, the JSON data creates two data channels:

⬡Host A ⬡CPU load and ⬡Host B ⬡Disk util.

Lessons learned: Pick the fields in your data that uniquely identify the values you want to send to BVD and include the fields as dimensions in the HTTP post request.

Sending Additional Data From Data Center East

Data Center East

```
{
  host: 'Host A',
  metricName: 'CPU load',
  value: 42
}
```

```
{
  host: 'Host B',
  metricName: 'Disk util',
  value: 17
}
```

BVD Data Receiver URL

http://<BVD server>:<port>/
api/submit/<API key>/
dims/host,metricName,loc=NYC

http://<BVD server>:<port>/
api/submit/<API key>/
dims/host,metricName,loc=Boston

BVD Data Channels

Host A CPU load NYC

Host B Disk util Boston
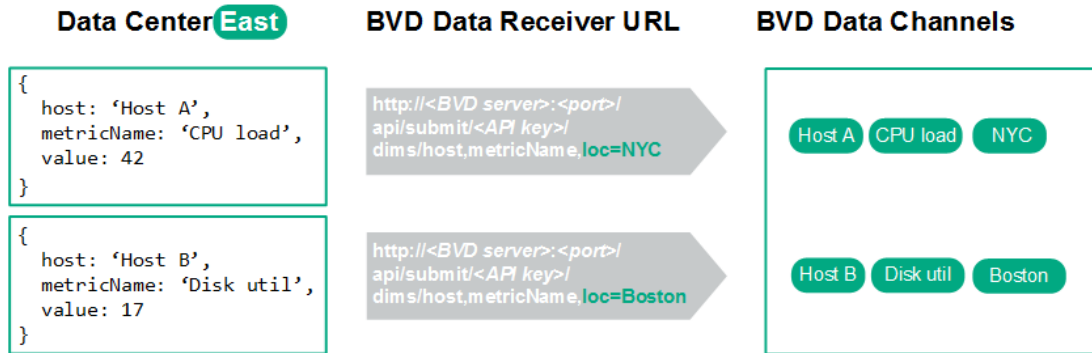
The primary location of Data Center East is in New York City, with backup servers located in Boston. Both locations send the same set of JSON data. To differentiate the data from the two locations without modifying the JSON data, you can add an additional dimension `loc` with the corresponding value to the URL. The modified URL updates the data channels to

Host A CPU load NYC and Host B Disk util Boston.

In this example, we added the dimension `loc` to the URL.

Lessons learned: Directly assign values to your dimensions by adding dim=value pairs to the HTTP post request.

Sending Data From Data Center West

Data Center East

```
{
  host: 'Host A',
  metricName: 'CPU load',
  value: 42
}
```

```
{
  host: 'Host B',
  metricName: 'Disk util',
  value: 17
}
```

BVD Data Receiver URL

http://*<BVD server>:<port>/*
api/submit/*<API key>/*
dims/host,metricName,loc=NYC/**tags/east**

http://*<BVD server>:<port>/*
api/submit/*<API key>/*
dims/host,metricName/loc=Boston/**tags/east**

BVD Data Channels

east   Host A   CPU load   NYC

east   Host B   Disk util   Boston

Data Center West

```
{
  host: 'Host A',
  metricName: 'CPU load',
  value: 66
}
```

```
{
  host: 'Host B',
  metricName: 'Disk util',
  value: 23
}
```

BVD Data Receiver URL

http://*<BVD server>:<port>/*
api/submit/*<API key>/*
dims/host,metricName/loc=NYC/**tags/west**

http://*<BVD server>:<port>/*
api/submit/*<API key>/*
dims/host,metricName/loc=Boston/**tags/west**

BVD Data Channels

west   Host A   CPU load   NYC

west   Host B   Disk util   Boston

A second data center, Data Center West, starts sending data similar to the JSON data sent by Data Center East. The data from Data Center West uses the same data channels as the data from East. To distinguish the data from the two centers, you need to add the origin to the data. You can do this by adding tags to the URL. Tags are static labels that you can attach to your data to create more specific data channels.

In this example, we added the tags `east` and `west` to the URL. The tags precede the dims in the data channels.

Lessons learned: Attach tags to your data to create specific data channels.

Associating Data Channels with Widgets
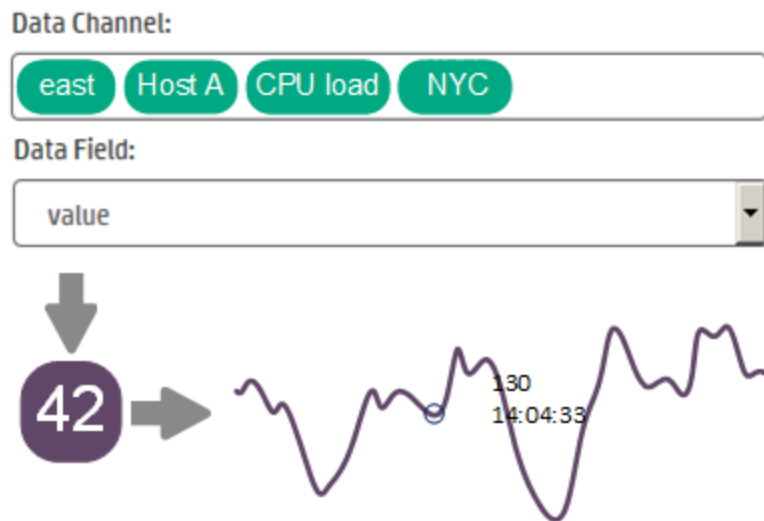
Once BVD has received the data, it creates the corresponding data channels. You can then associate a data channel with your widget in the widget's properties. In this example, the data channel ⬡east ⬡Host A ⬡CPU load ⬡NYC has been selected for the sparkline widget.

By default, the widget consumes data from the `value` data field. In this example, the current value is 42. If the field that holds the values you are interested in has a different name (for example, metricVal), select that name in the Data Field property of the widget.

Lessons learned: Connect your data to a widget by selecting the corresponding data channel in the widget's properties.

Knowledge Base

This section provides more advanced details about configuring BVD. It includes reference information, procedures, and tips that you may find useful.

Read this section when you are comfortable with the basic configuration steps, and refer back to it when necessary. The information in this section is organized as a reference.

Widgets

The topics in this section describe all available dashboard widgets. You can create the widgets from the following BVD shapes in Visio:
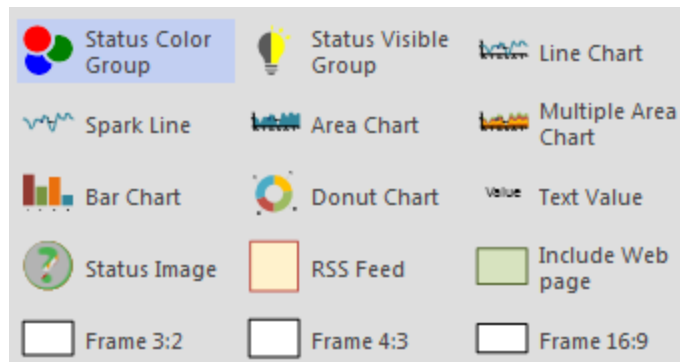
You can edit the properties of a widget in Visio (by editing the Shape Data) or in BVD (by editing a dashboard in Manage Dashboards). We recommend that you make your changes in BVD because the dashboard editor simplifies this task by offering values in drop-down lists for you to choose.

Some advanced operations can only be done in Visio itself. See "Tips and Tricks" on page 132 for details.

You can upload an SVG file as often as you want. If the file already exists, BVD replaces the previous version of the file with the newer version and opens the associated dashboard for you to edit. The newer version does not overwrite existing dashboard properties or widgets, only new widgets are added.

Rule Operators

Rules use operators to compare current and given values. The available operators are:

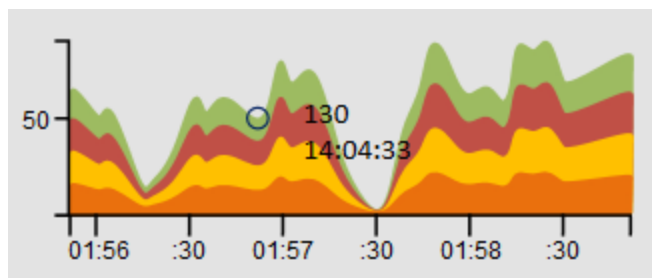|	
==	equal
<	less than
>	greater than
<=	less than or equal
>=	greater than or equal

!=	not equal

Available widgets:

Area and Multiple Area Chart Widgets

Area charts are used to display quantitative data. They are based on line charts.

If you have only one set of data to display, use a simple **Area Chart** widget:
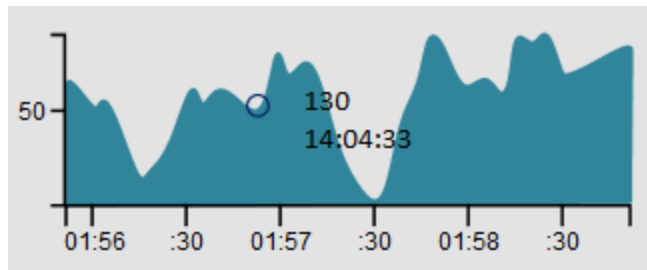
To display multiple sets of data, use a **Multiple Area Chart** widget:

You can customize the x- and y-axes by changing the font and color in Visio.

See also:

- "Data Channel" on page 123
- "Data Field" on page 123
- "Min Value" on page 127

- "Max Value" on page 126

- "Chart Autoscale" on page 120

- "Mouse Over" on page 128

- "Show Chart Numbers" on page 129

- "Chart Colors" on page 120

- "Chart Period" on page 121

- "Number Format" on page 128

- "Visibility Rule" on page 131

- "Hyperlink" on page 125

Bar Chart Widgets

Use the **Bar Chart** widget to display a bar chart. Bar charts are useful when you want to compare multiple values from the same data channel. Each bar in a bar chart corresponds to a field in the data received over the associated data channel.

The **Data Field** and the **Chart Colors** properties refer to the bars using a numbering scheme. Bar number 1 is the leftmost bar with numbering continuing to the right:
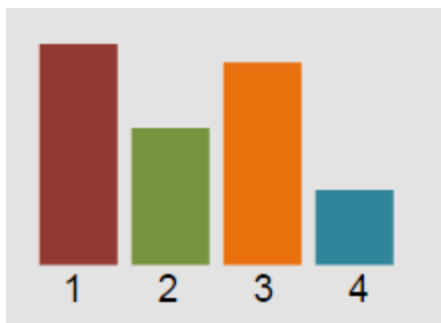
For details on how to set the colors of the individual bars, see "Chart Colors" on page 120.

To make room for larger labels, you can rotate the bar chart labels in Visio.

The **Angle** property in Visio determines the orientation of the label. A default bar chart label has a start angle of 0 (zero). To rotate the labels, set the angle of the first label to the angle at which you want all labels to appear. You can do this either by clicking on the label and rotating it or by changing the value of the label's **Angle** property:
Access the tab **View**. Click **Task Panes > Size & Position**. Click on the first label of the bar chart and adjust the **Angle** property.

For example, to rotate the labels of the following bar chart, set the angle of the first label to -45 degrees. As a result, all other labels will be rotated to the same degree in BVD.
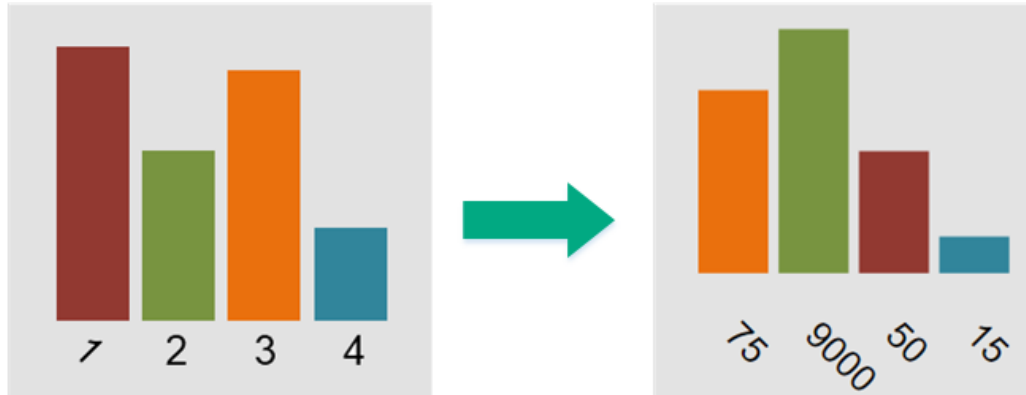
See also:

- "Data Channel" on page 123
- "Data Field" on page 123
- "Max Value" on page 126
- "Chart Autoscale" on page 120
- "Show Chart Numbers" on page 129
- "Chart Colors" on page 120
- "Number Format" on page 128
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Donut Chart Widgets

Use the **Donut Chart** widget to display a donut chart. Each slice in a donut chart corresponds to a field in the data received over the associated data channel.

The **Data Field** and the **Chart Colors** properties refer to the donut slices using a numbering scheme. Slice number 1 is the top right slice with numbering continuing clockwise:
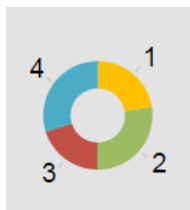
The **Start Angle** and **Donut Size** properties determine the orientation and size of the donut. A default donut chart has a start angle of 0 (zero) and a size of 360 degrees. To create a partial donut, set the start angle to the angle at which you want the first slice to appear and specify the size of the donut, also in degrees.

For example, to create the following gauge-like semicircle donut, set the start angle to 270 and the donut size to 180. The first slice starts at 270 degrees with the data sources organized clockwise.
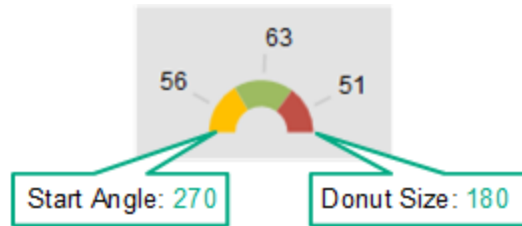
See also:

- "Data Channel" on page 123
- "Data Field" on page 123
- "Start Angle" on page 129
- "Donut Size" on page 124
- "Donut Hole Size" on page 125
- "Max Value" on page 126
- "Reverse Order of Data Fields" on page 128
- "Show Chart Numbers" on page 129
- "Chart Colors" on page 120
- "Number Format" on page 128
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Feed Widgets

The **Feed** widget enables you to display information feeds, similar to well-known RSS feeds. Feeds must be sent as JSON-encoded data. The data channel must include the fields `title` and `link` in order to display the feed. New feed items are always added to the top of the list.

The Feed widget displays the following items:

- The creation time stamp of the item.
- The title field as text (retrieved from the `title` data field).
- The link field as hyperlink (retrieved from the `link` data field).

Example feed data:

```
{
    "time":1437633749317,
    "type":"test",
    "title":"Tests show UK Quran manuscript is among world's oldest",
    "link":"http://rss.cnn.com/~r/rss/cnn_latest/~3/HgufPus_pOs/index.html"
}
```

Note: Do not rotate Feed widgets. This breaks the widget functionality.

You can style the displayed feed items by providing a custom CSS definition in the BVD System Settings. For more information, see "System Settings" on page 60.

Example:

```
.feedItem .ts {display: none;}
.feedItem .even {background-color: #262627;}
.feedItem a:hover {text-decoration: none;}
.feedItem section {hight:30px; padding: 3px; margin: 0}
```

See also:

- "Data Channel" on page 123
- "Feed Max Items" on page 125
- "Transparent Background" on page 130
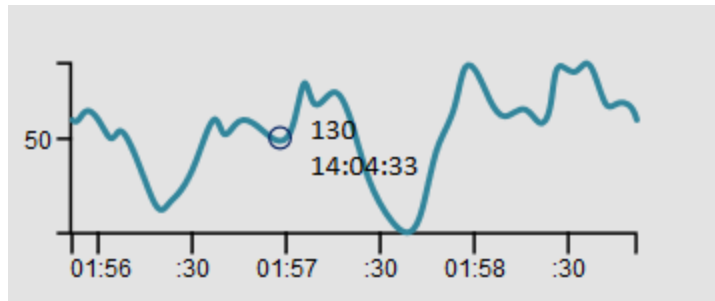
Frame Widgets

BVD offers the following Frame shapes:

- Frame 3:2
- Frame 4:3
- Frame 16:9

The shapes do not have any shape data defined. Their purpose is to help you lay out your dashboards based on predefined ratios.

Line Chart and Sparkline Widgets

Use the **Line Chart** widget to show a line chart with axes and coordinates:

The **Sparkline** widget creates a sparkline chart. Typically, a sparkline is a very small chart, shown without axes or coordinates:
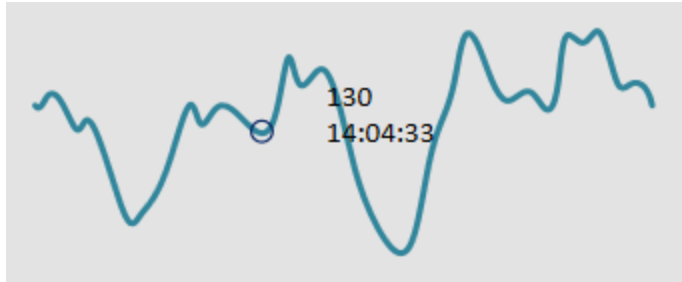
> **Tip:** Position sparklines next to an absolute number to provide you with a quick reference to the data trend.

You can change the style of the line in Visio.

See also:

- "Data Channel" on page 123
- "Data Field" on page 123
- "Min Value" on page 127
- "Max Value" on page 126
- "Chart Autoscale" on page 120
- "Mouse Over" on page 128
- "Chart Period" on page 121
- "Number Format" on page 128
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Status Color Group

Group the **Status Color Group** shape with other shapes in Visio to make them change color depending on the values received. You can define the values that cause a color change using the Coloring Rule property.

Use the group widget when you want to change the color of non-BVD shapes or to color a large number of shapes. Then it is easier to group the shapes with the Status Color Group and set the coloring rule in the group widget.

The Status Color Group widget can color the following SVG elements: `<path>`, `<rect>`, `<ellipse>`, `<circle>`, and `<polygon>`.

See also:

- "Data Channel" on page 123
- "Coloring Rule" on page 122
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Status Image Widgets

Use the Status Image widget to display an image depending on the value received for the Status Field or depending on a rule.

The Status Image shape is a group of shapes. Each shape in the group is an image, and each image has the shape data Switch Value defined. For example, the "error" image in the BVD Status Image shape has the Switch Value "red". BVD then selects the image to display depending on the values received in the data channel. You can choose the data field to use as input by selecting it in the Status Field (default: `status`), or you can define an image selection rule. For example, if the result of the image selection rule is "red", the "error" image is displayed.

You can take a look at the Status Image shape in Visio by right-clicking the shape and selecting **Group > Open Status Image**.

> **Caution:** Never ungroup the Status Image shape.

The shape consists of the following four images:

Image Name	Switch Value	Image
ok	green	
warning	yellow	
error	red	
unknown	grey	

Do it yourself - Create your own Status Image

1. Make sure Visio is running in developer mode:

   File > Options > Advanced > Run in developer mode

2. Drag the BVD Status Image shape to your drawing.

3. Right-click the Status Image shape and select **Group > Open Status Image**.

   You are now inside the shape. You can start editing, deleting, or adding shapes as required.

4. If you add a new shape, you must add the shape data **Switch Value** to the shape:

a. Right-click the added shape and select **Data > Define Shape Data**.

b. Add a property with the name `opr_switch_value` of the type `String`.

c. Set the value of the property to a value of the Status Field or one that can be selected by an Image Selection Rule.

After uploading the exported SVG file to BVD, select the data channel for your Status Image widget. Then either select a data field for the Status Field property or configure an image selection rule. You also need to set a default value for situations when no value is available or the value is not one of the defined switch values.

See also:

- "Data Channel" on page 123
- "Status Field" on page 129
- "Default Value" on page 124
- "Image Selection Rule" on page 125
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Status Visible Group

Group the invisible **Status Visible Group** Visio shape with other shapes to show or hide the widgets depending on the result of the rule defined in the **Visibility Rule** property.

> **Tip:** Use the group widget when you want to show or hide non-BVD shapes, or to show or hide a large number of shapes. Then it is easier to group the shapes with the Status Visible Group and set the visibility rule in the group widget. You can also set the visibility of a widget based on its **Visibility Rule** property. Use this property to show or hide individual widgets.

See also:

- "Data Channel" on page 123
- "Visibility Rule" on page 131
- "Hyperlink" on page 125

Text Value Widgets

Use the Text Value widget to display values or to color text. Text attributes like font, alignment, and rotation are not updated.

For example, you could use the text value widget to display the current temperature in your store in New York City. As temperature measurements arrive, the number changes reflecting the current temperature measured in the store. Additionally, you could configure the text value widget to change the color of the value displayed depending on the current temperature:

Temperature in NYC: 25

See also:

- "Data Channel" on page 123

- "Data Field" on page 123

- "Number Format" on page 128

- "Coloring Rule" on page 122

- "Visibility Rule" on page 131

- "Hyperlink" on page 125

Web Page Widgets

Web Page widgets enable you to show web pages in a dashboard. For example, you can include web pages that stream television, video, or audio.

The website must be accessible via HTTPS because the BVD UI is also only accessible via HTTPS. However, if the website sends an X-Frame-Options HTTP header restricting the embedding of this page to same origin, the browser will not display this web page within the dashboard.

> **Note:** Do not rotate Web Page widgets. This breaks the widget functionality.

If you use web page widgets in dashboard templates, you can add variables to the URL. Variables will be replaced by their assigned value when an instance is viewed.

See also:

- "URL" on page 130

Widget Properties

The topics in this section describe all available widget properties.

Chart Autoscale

Chart Autoscale automatically scales the maximum values and, if available, minimum values.

Bar charts only. If you set Max Value to 0, the bar with the highest value will be shown in full height; the height of all other bars is shown relative to the highest bar.

Default: not selected

Examples:

The following three sparklines have the same size and show the same data. The scaling, however, differs because of different min and max values or Autoscale:

Chart Colors

The **Chart Colors** property enables you to set colors for your charts. Provide a semicolon-separated list of RGB color codes in hexadecimal notation.

You can choose the coloring of the first four colors by changing the colors in Visio. However, the colors you specify in the Chart Colors property override the colors defined in Visio.

If you specify only one color, BVD uses this color for the first data field, and uses the Visio-defined colors for data fields two to four. If more than four data fields but no colors are defined, BVD randomly chooses a color for data fields five and higher.

Default: not defined

Example Donut Chart:

The donut chart in the OMi sample dashboard uses the following color codes:

`FF0000;FF9933;C8C800;33CC33;B2B2B2`

They color the donut chart like this:
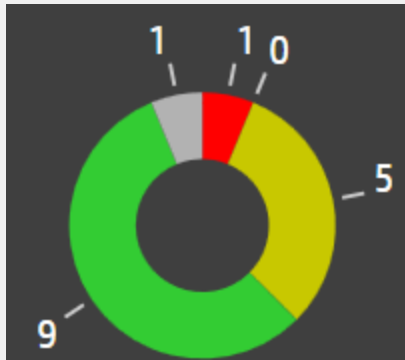
Chart Period

Use the **Chart Period** property to set the period of time (in minutes) for which the widget will display data.

BVD stores only the last 500 data records received from the data senders. To be able to display data, you need to align the chart period with the rate data is received. For example, if BVD receives one value per day, the maximum chart period would be 720,000 minutes (500 days). If data is received every 15 minutes, the maximum chart period would be 7,500 minutes (5.2 days).

Default: 10 minutes

Examples:

The following two sparklines have the same size and show the same data. The upper line shows the data for the last 10 minutes, the lower line only the last minute.
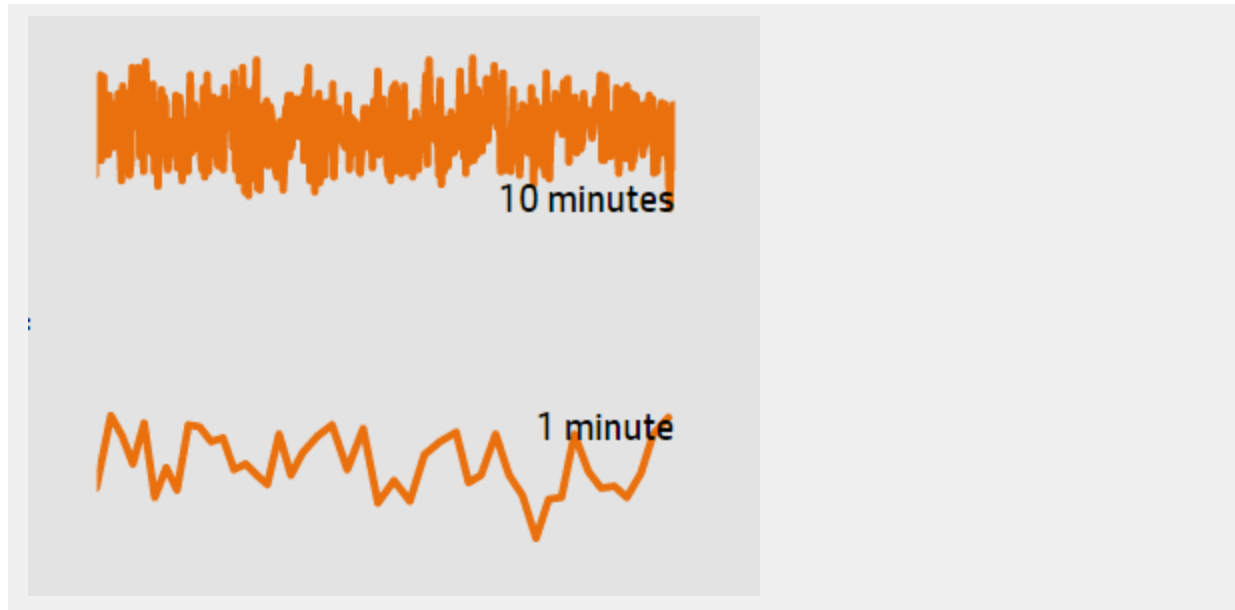
Coloring Rule

The **Coloring Rule** property enables you to determine the color to display depending on the outcome of a rule.

You can add multiple coloring rules separated by semicolons:

Rule format: `<rule>;<rule>;...`

Coloring rules can contain a value only; for example, the value `#008000` in a coloring rule colors the widget green. Rules can also contain conditions that must be matched; for example, `#008000:temperature<60` colors a widget green when the value of the data field `temperature` is less than 60.

Rules are evaluated from left to right. When one condition is matched, no additional rules will be evaluated. If no rule matches, the default is applied; therefore, when you define a set of rules, always insert the default as the last rule.

Coloring rules have the following format:

`<color>[:<property><operator><value>]`

`<color>`
    RGB color code; for example, `#000000`.

`<property>`
    The name of the data property to use to calculate the color.

`<operator>`
    The operation that is used to compare the current value of the property with the given value. For a list of operators, see "Rule Operators" on page 110.

`<value>`
    The value the operator works on.

Example:

`#AABBCC:temperature<60;#7FFF00:temperature<30;#00ff00`

> If the value of the data field `temperature` is less than 60, the color #AABBCC is used. If the value is less than 30, the color #7FFF00 is used. In all other cases, #00ff00 is used as the color.

Data Channel

The **Data Channel** property enables you to select the data stream over which you want to feed data into the widget. Before you can select a data stream, you must send data to BVD, addressed to the data channel you want to select for your widget.

> **Example:**
>
> To show the rise and fall of the temperature in your store in New York City, select the following data channel for your widget:
>
> Data Channel:
>
> NYC store   Temperature   Monitor
>
> The data received includes the following:
>
> ```
> type: Temperature
> element: Monitor
> value: 20.9
> status: #008000
> ```

Data Field

Select one or more data fields in the data that BVD received through the data channel to display in your widget.

Single Data Field

Sparkline, line, and area charts as well as status image and text value widgets support only one data field.

For single data fields, BVD assumes that the data includes the data field `value` and uses the values received for `value` in the widget.

Default: `value`

> **Example Line Chart:**
>
> The temperature data BVD is receiving from your New York City store already happens to include the `value` data field, so you do not need to select it. Otherwise select the data field with your temperature values.
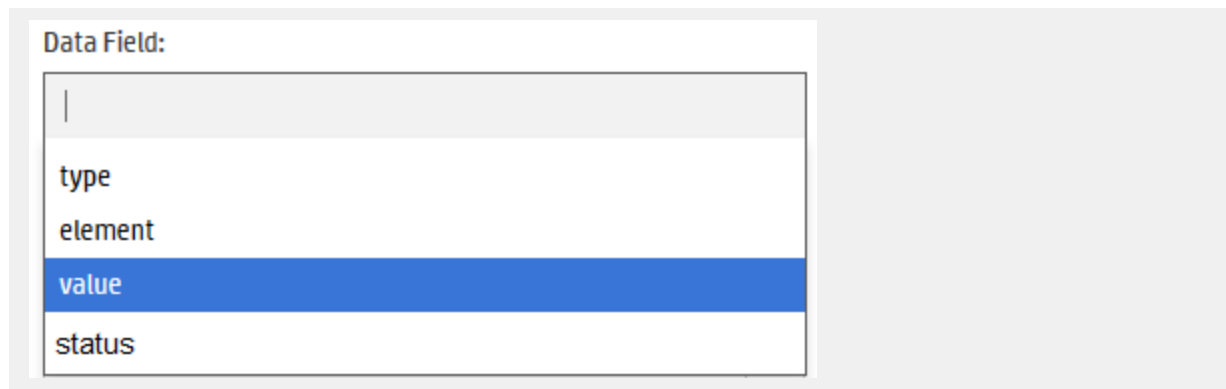
Multiple Data Fields

Multiple area, bar, and donut charts support multiple data fields. Select a data field for each area, bar, or slice in the chart. If you select more than four data fields, BVD automatically chooses the colors of the additional fields. For details, see "Chart Colors" on page 120.

Donut charts only. If you select only one data field for a donut chart, a second one will be automatically generated based on the max value. For details, see "Max Value in Donut Charts" on page 126.

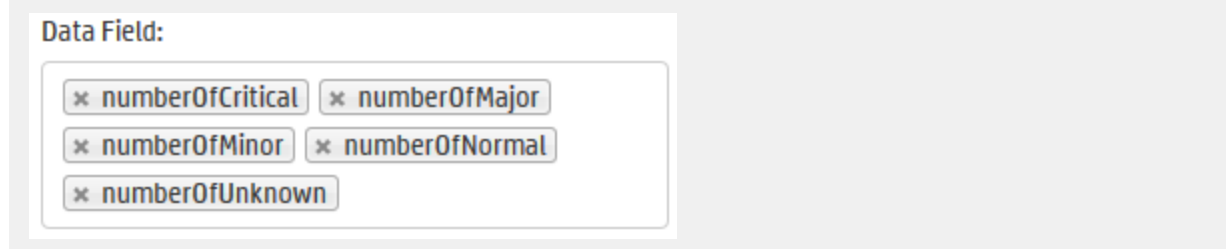**Example Donut Chart:**

The donut chart in the OMi sample dashboard displays the five data fields representing the number of events per severity, resulting in a donut with five slices:

Default Value

The value set in **Default Value** is used when the data in the Status data field is empty or is not one of the defined switch values. For example, if `status: blue` or if `status: <empty>`, then the selected default value will be used by the Status Image widget.

You can only select one of the switch values defined in the Status Image widget.

The switch values of the BVD default Status Image widget are grey, red, green, and yellow.

Default: grey

Donut Size

The **Donut Size** property configures the size of a donut chart within the 360 degrees of the circle of the donut chart. By default, a donut completes a full circle (360 degrees). To create a gauge-like semicircle, set the donut size to 180 degrees.

Default: 360

Donut Hole Size

The **Donut Hole Size** property configures the size (in percent) of the hole in the middle of a donut chart. To create a pie chart, set the donut hole size to 0 percent.

Default: 35

Feed Max Items

The **Feed Max Items** property sets the maximum number of items to display in the Feed widget.

Hyperlink

The **Hyperlink** property enables you to link a widget to another dashboard or to a URL. When a user then clicks the widget, the linked dashboard or URL opens and replaces the current dashboard in the browser.

You can add variables from dashboard templates to the URL. Variables will be replaced by their assigned value when an instance is viewed. Add variables to the URL in the format `${variable}`.

For example, a company uses a URL in a dashboard template to show the floor plan of their company location. They use different instances for each location and want to show the floor plan specific to each location.

The following URL replaces the query value with the value of the variable `location` that is assigned to the instance:

`https://example.com/office-locations/floor-plans?site=${location}`

When viewing the instance with the assigned value `Atlanta`, the floor plan for the company location in Atlanta is shown. The `location` variable is replaced with `Atlanta` in the URL:
`https://example.com/office-locations/floor-plans?site=Atlanta`

If the variable is not defined or the template is converted back into a dashboard, the variable expression in the URL is not resolved.

For more information on templates and variables, see .

Image Selection Rule

The **Image Selection Rule** property enables you to determine the image to display depending on the outcome of a rule.

> **Note:** Image selection rules override the values received for the Status Field.

You can add multiple rules separated by semicolons:

Rule format: `<rule>;<rule>;...`

Rules can contain a value only; for example, the value `green` in an image selection rule selects the switch value `green`. Rules can also contain conditions that must be matched; for example,

`green:statusColor==verde` selects the switch value `green` when the value of the data field `statusColor` is `verde`.

Rules are evaluated from left to right. When one condition is matched, no additional rules will be evaluated. If no rule matches, the default is applied; therefore, when you define a set of rules, always insert the default as the last rule.

Image selection rules have the following format:

`<switch value>[:<property><operator><value>]`

`<switch value>`
Switch value assigned to an image in the Status Image shape. The switch values of the default Status Image shape are `green`, `yellow`, `red`, and `grey`.

`<property>`
The name of the data property to use to calculate the color.

`<operator>`
The operation that is used to compare the current value of the property with the given value. For a list of operators, see "Rule Operators" on page 110.

`<value>`
The value the operator works on.

> **Example:**
>
> `green:statusColor==verde;yellow:statusColor==amarillo;red:statusColor==rojo;grey`
>
> If the value of the data field statusColor is `verde`, the image with the switch value `green` is selected. The value `amarillo` selects the image `yellow`, `rojo` selects `red`, and the image `grey` is displayed in all other cases.

Max Value

Max Value in Bar Charts

Set **Max Value** to set the maximum value the chart should display.

Default: 100

Max Value in Donut Charts

Set **Max Value** to set a maximum value for the chart. Setting the Max Value property is only relevant for donut charts with only one data field. If two or more fields are selected, Max Value is disabled.

Default: 100

> **Example Donut Chart:**
>
> If the current value of the data field is 30 and Max Value is set to 100, the donut chart will display two slices: one slice with the value 30 and the other slice with the value 70.

Max Value in Line, Sparkline, Area, and Multiple Area Charts

Line, sparkline, area, and multiple area charts have a min and a max value property. Set Min Value and Max Value to adjust the range of data displayed in the chart. Data outside this range is cut from the chart.

If Chart Autoscale is used, the min and max values are ignored.

Default: 100

Examples:

The following three sparklines have the same size and show the same data. The scaling, however, differs because of different min and max values or Autoscale:

Min Value

Set **Min Value** and **Max Value** to adjust the range of data displayed in the chart. Data outside this range is cut from the chart. If Chart Autoscale is used, the min and max values are ignored.

Default: 0

Examples:

The following three sparklines have the same size and show the same data. The scaling, however, differs because of different min and max values or Autoscale:
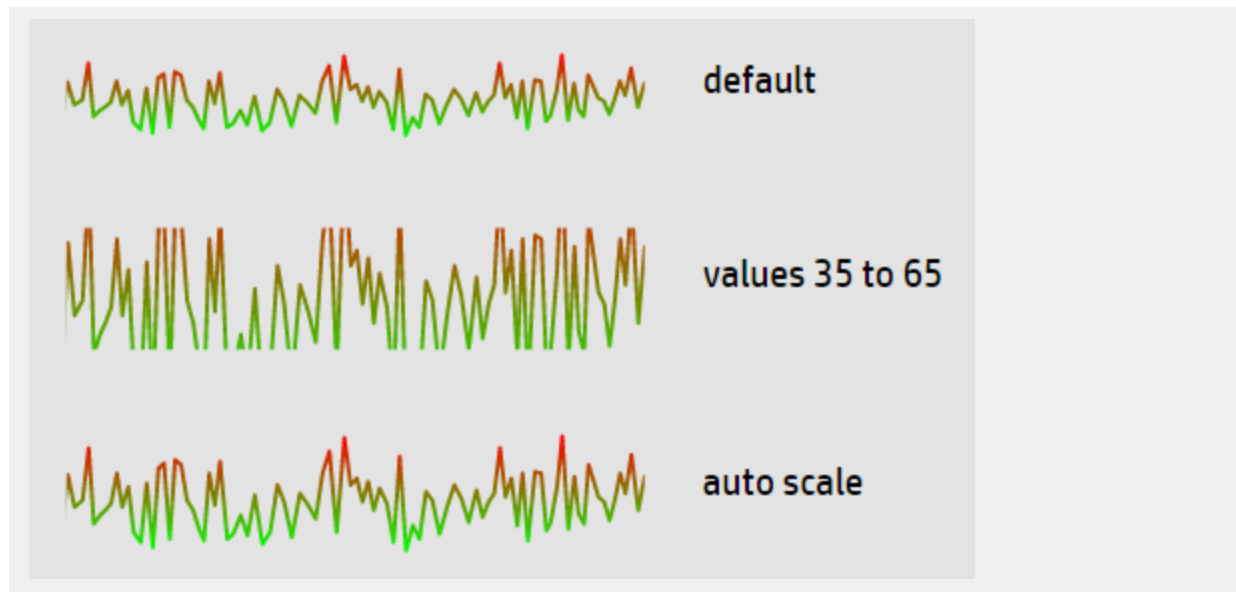
Mouse Over

The **Mouse Over** property enables you to enable or disable the mouse over tooltip. The tooltip offers detailed information on the current data point. The indicator and the tooltip font can be customized in Visio.

Default: selected

Number Format

Use the **Number Format** property to format or manipulate the values displayed below the charts.

Number format works as documented here: http://numeraljs.com/

Number format respects the current locale for formatting.
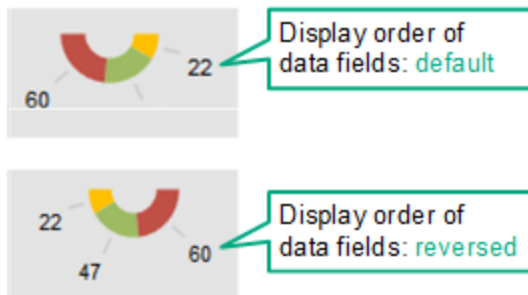
> **Example:**
>
> `'$0,0.00'`
>
> This example changes the number 1000.234 to the string $1,000.23.

Reverse Order of Data Fields

Use the **Reverse Order of Data Fields** property to change the display order of the donut slices (or data fields) from clockwise to counterclockwise. This property is useful when your donut chart starts at an angle contrary to the natural reading direction.

For example, to create the following gauge-like semicircle donut, set the start angle to 90 and the donut size to 180. The first slice starts at 90 degrees with the data sources organized clockwise. To change the order of the slices to counterclockwise, click the **Reverse the Display Order of the Data Fields** check box in the donut widget properties.

Default: not selected

Show Chart Numbers

The **Show Chart Numbers** property has the following effect:

- **Bar and donut charts.** Shows or hides the numbers.

  You can customize the formatting of the numbers (for example, change color or font) by reformatting the number "1" in Visio.

- **Line, area, and multiple area charts.** Shows or hides x- and y-axes. See also "Showing or hiding x- and y-axes" on page 133.

  You can customize the x- and y-axes by changing the font and color in Visio.

Default: selected

> **Tip:** Use the **Number Format** property to format or manipulate the values.

Start Angle

The **Start Angle** property determines the location of the first slice in a donut chart. By default, the first slice (or data field) starts at 0 (zero) degrees within the 360 degrees of the circle of the donut chart.

Default: 0 (zero)

Status Field

The **Status Field** property enables you to select a data field in the received data that contains a switch value for the Status Image widget.

By default, BVD assumes that the data includes the data field `status` and uses the values received for `status` to update the color.
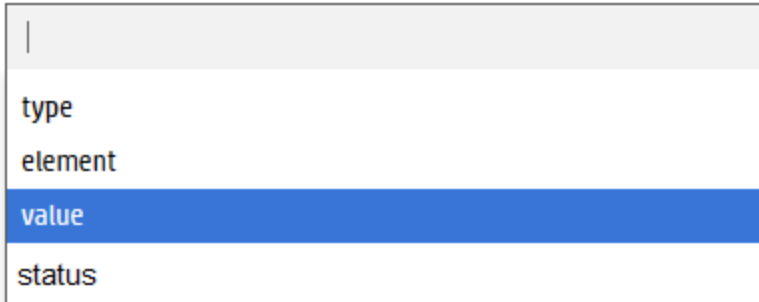
> **Note:** Image selection rules override the values received for the Status Field.

Default value: `status` (providing switch values)

> **Example:**
>
> The temperature data BVD is receiving from your New York City store already happens to include the `status` data field, so you do not need to select it. Otherwise select the data field that contains your switch values.
>
>

Transparent Background

Select **Transparent Background** to hide the placeholder shape and show the feed as a transparent overlay.

URL

Specifies the **URL** of the web page you want to show in this widget.

> **Example:**
>
> `https://softwaresupport.hpe.com/group/softwaresupport/search-result?keyword=`

You can add variables from dashboard templates to the URL. Variables will be replaced by their assigned value when an instance is viewed. Add variables to the URL in the format `${variable}`.

For example, a company uses a URL in a dashboard template to show the floor plan of their company location. They use different instances for each location and want to show the floor plan specific to each location.

The following URL replaces the query value with the value of the variable `location` that is assigned to the instance:

`https://example.com/office-locations/floor-plans?site=${location}`

When viewing the instance with the assigned value `Atlanta`, the floor plan for the company location in Atlanta is shown. The `location` variable is replaced with `Atlanta` in the URL:
`https://example.com/office-locations/floor-plans?site=Atlanta`

If the variable is not defined or the template is converted back into a dashboard, the variable expression in the URL is not resolved.

For more information on templates and variables, see "Template Manager" on page 68.

Visibility Rule

The **Visibility Rule** property enables you show or hide the widget based on the outcome of a rule.

> **Tip:** You can also use the Status Visible Group widget to show or hide a widget. Use the group widget when you want to show or hide non-BVD shapes, or to show or hide a large number of shapes. Then it is easier to group the shapes with the Status Visible Group and set the visibility rule in the group widget. See also "Status Visible Group" on page 118.

Visibility rules have the following format:

`<property><operator><value>`

`<property>`
    The name of the data property to use to calculate the visibility.

`<operator>`
    The operation that is used to compare the current value of the property with the given value. For a list of operators, see "Rule Operators" on page 110.

`<value>`
    The value the operator works on.

> **Example:**
>
> `errors>=10`
>
> If the value of the data field `errors` is greater than or equal to ten, the widget is shown in the dashboard. In all other cases, the widget is hidden.

Data Aging

By default, up to 500 data records per data channel are stored in the database. The aging process scans the database every hour to identify and automatically delete records that exceed the configured maximum. You can modify the aging defaults as follows:

1. Start the configuration wizard by running the following command:

   Windows: `<BVD_Install_Dir>\BVD\bin\configure.bat`

   Linux: `/opt/HP/BVD/bin/configure.sh`

2. In a browser, enter the URL:
   `http://localhost:5000`

   > **Note:** `localhost:5000` uses the default port `5000`. If this port is already in use, follow the instructions displayed in the command line to identify the correct URL.

3. Enter the password for the configuration wizard and click **Submit**.

4. Navigate to the step **Aging** and complete the following settings:

   Scanning Interval (in minutes)

Time interval (in minutes) at which the aging process scans the database to identify and automatically delete data records.

The value must be an integer greater than 0.

Default: 60 minutes

Data Records

Purge old data records based on their age, their maximum number, or both.

Maximum Age

Time period (in days) during which data records are kept in the database. Records older than the configured time period are automatically deleted by the aging process.

The value must be an integer greater than 0.

Default: 100 days

Maximum Number

Maximum number of data records stored in the database per data channel. If this number is exceeded, the oldest records are deleted by the aging process.

The value must be an integer greater than 0.

Default: 500

Data Channel Statistics

Time period (in days) during which a data channel is available in the list of data channels in the widget properties. If a data channel does not receive any data during the configured time period and the data channel is not associated with a widget, it is deleted from the data store. If the data channel is associated with a widget, the channel is not deleted even if the data last received for the channel is older than the configured time period.

The value must be an integer greater than 0.

Default: 1 day

5. Click **Next** until you arrive at the **Summary** page. Review the configuration settings, then click **Download** to download your settings as configuration file or **Apply** to start the configuration.

Tips and Tricks

This section includes:

- "Font usage" on the next page
- "Exporting Visio drawings to SVG" on the next page
- "Showing or hiding x- and y-axes" on the next page
- "Displaying small fonts in Firefox" on the next page
- "Displaying horizontal or vertical lines with gradient line color" on the next page
- "Showing widget tooltips even if the widget is overlaid by another shape" on page 134
- "Inserting Twitter feeds in a dashboard" on page 135
- "Linking dashboards" on page 135
- "Improving loading time of dashboards with raster graphics" on page 135

Font usage

For BVD to be able to render the text as designed in Visio, you must make the fonts used in Visio available to the web browser where you view the dashboards. If the web browser does not have access to the fonts, the system default fonts are used.

For example, if you use the Windows font Calibri in Visio, and then view your dashboard in a browser on a Linux system, the browser will substitute Calibri with a Linux system font because Calibri is not installed.

To enable platform-independent text rendering, use Google Fonts when designing your dashboard drawings in Visio. BVD then directs the browser to load the fonts from http://www.google.com/fonts when displaying a BVD dashboard.

You can also use custom fonts but you must set up a publicly accessible web server that serves the fonts and specify a CSS definition for your custom font in the System Settings page. See "Use Custom Fonts in Your Dashboards" on page 61 for details.

Exporting Visio drawings to SVG

When you save a Visio drawing as an SVG file make sure that the following settings are selected:

- Save as type: **Scalable Vector Graphics (*.svg)**
- Select: **Include Visio data in the files**
- Tip: Press **Ctrl+A** to select everything in the drawing. This ensures that your entire drawing is exported and not the currently selected element only.

Alternatively, click the **Export Dashboard** button in the **Dashboard** ribbon, if you have installed the BVD **Visio Addin**.

Showing or hiding x- and y-axes

Line, area, and multiple area charts by default show x- and y-axes. You can hide the axes by clearing the **Show Chart Numbers** check box in the widget properties.

The availability of the check box is controlled by the Visio shape data **Show Chart Numbers**, which is by default set to TRUE. If you change this to FALSE and then re-import the exported SVG file, the check box is removed from the widget properties. To re-enable the check box, change the setting to TRUE in Visio and re-import the drawing to BVD.

Displaying small fonts in Firefox

Firefox displays small fonts in SVGs larger than their intended size. To work around this problem, make the original SVG file bigger and let the browser scale it down.
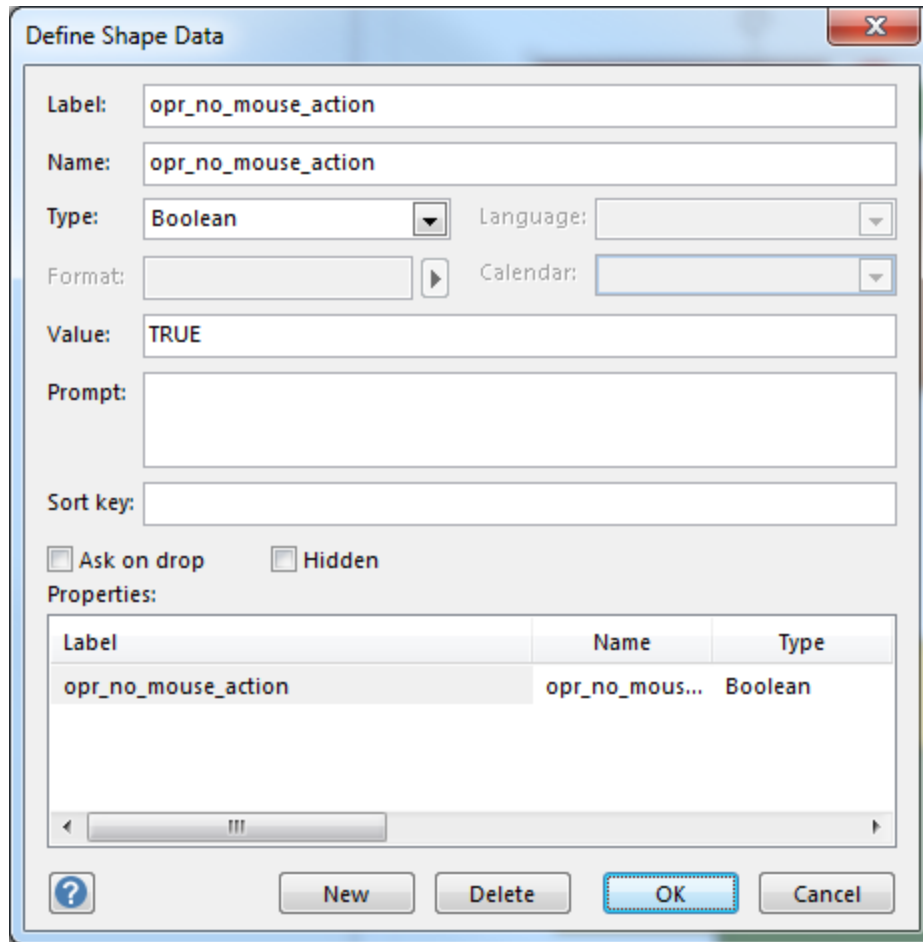
Displaying horizontal or vertical lines with gradient line color

SVG files do not display horizontal or vertical lines with gradient line color. The lines need to deviate from being horizontal or vertical.

Showing widget tooltips even if the widget is overlaid by another shape

Note: To add data to a shape, Visio must be running in developer mode: **File > Options > Advanced > Run in developer mode**.

If you have placed a Visio shape on top of a BVD shape, you can configure the obscuring shape to display the BVD tooltips by adding the shape data **opr_no_mouse_action**:

Set the value of **opr_no_mouse_action** to TRUE. This makes the obscuring shape transparent to the mouse and enables the BVD widget to display tooltips on mouse over.

Inserting Twitter feeds in a dashboard

Although the name suggests it, Twitter feeds cannot be inserted directly in a dashboard using the Feed widget. You would first need to convert the tweets to JSON format and then send the converted tweets to BVD.

The steps below describe an alternative method to include tweets using the Web Page widget:

1. *Prerequisite.* You need a web server that is configured to serve HTML files and allows the inclusion of its pages into the BVD page (X-Frame-Option HTTP Header).

2. Place an HTML file with the following content on the web server:

```
<html>
    <head>
        <style>
            iframe {
                    height: 100%;
                    }
        </style>
    </head>
    <body style="margin:0">
    </body>
```

3. Place the HTML snippet provided by Twitter between the body tags of the HTML file.

4. Add a Web Page widget to your dashboard and set its URL property to the URL of the page located on your web server. For details, see "Web Page Widgets" on page 119.

Linking dashboards

You can link dashboards by inserting any widget and selecting the target dashboard in the **Hyperlink** property. When a user clicks the widget, the linked dashboard opens and replaces the current dashboard in the browser.

If the link should be a simple button, without status updates, use the Text Value widget as follows:

1. Insert a Text Value widget in your Visio drawing, change the default text "Value" to what will be your link, and style the widget as desired. Export the drawing to SVG and then upload the SVG file to BVD.

2. In BVD, edit the Text Value widget:

   a. Do not select a **Data Channel**. This will cause an error, which you can ignore.

   b. Use the **Hyperlink** drop-down list to select the dashboard you want to link to.

3. Save your changes to the dashboard. Then view the dashboard and test the link.

For details, see "Text Value Widgets" on page 118.

Improving loading time of dashboards with raster graphics

Raster graphics images in dashboards increase the size and therefore the loading time of the dashboards. To reduce the size of the images, compress them in Visio before saving your drawing to SVG. In Visio, select the image, then click **Format > Compress Picture**. Increasing the compression reduces the file size but also the quality of the image.

Troubleshooting

This section includes:

-
-
-
-
-
-
-
-
-

Installation log files

The following log file contains the logs of the overall installation process:

Windows: `%TEMP%\HPEBVD_<version>_HPOvInstaller.txt`

Linux: `/tmp/HPEBVD_<version>_HPOvInstaller.txt`

For log files of the individual packages, see the following directory:

Windows: `%TEMP%\HPOvInstaller\HPEBVD_<version>`

Linux: `/tmp/HPOvInstaller/HPEBVD_<version>`

Configuration and runtime log files

BVD keeps log files to help you troubleshoot the application. You can view log files with any text editor. Most log files are located in the following directory:

Windows: `<BVD_Data_Dir>\BVD\log\`

Linux: `/var/opt/HP/BVD/log/`

`aging-process.log`

> Log file of the BVD data aging process. See also "Data Aging" on page 131.

`audit.log`

> Log file containing audit logs for successful and failed user logins. See also "Logging Into BVD" on page 8.

`configserver.log`

> Log file of the BVD configuration process. This file also contains the information from the `configure.log` file. See also "Configuration" on page 30.

`configure.log`

> Log file of the BVD silent configuration process. See also "Silent Configuration" on page 39.

`pgsql.log`

> Log file of the BVD embedded PostgreSQL database.

`receiver.log`

> Log file of the BVD data receiver.

`redis.log`

> Log file of the BVD embedded Redis in-memory database.

`sidecar.log`

> Log file of the BVD bvdsc (sidecar) process. The sidecar process is responsible for licensing in BVD.

`web-server.log`

> Log file of the BVD web server.

Managing BVD processes

The following BVD processes must be running for BVD to operate successfully:

```
bvdaging      BVD Aging               BVD         (2632)   Running
bvdpg         BVD Postgres DB         BVD         (3776)   Running
bvdrc         BVD Receiver            BVD         (2532)   Running
bvdredis      BVD Redis Server        BVD         (3516)   Running
bvdsc         BVD Sidecar             BVD         (3840)   Running
bvdws         BVD Web Server          BVD         (2576)   Running
ovbbccb       OV Communication Broker CORE        (2600)   Running
ovcd          OV Control              CORE        (2492)   Running
ovconfd       OV Config and Deploy    COREXT      (3244)   Running
```

The BVD processes are registered with the `OV Control` service, which is an HPE L-Core Component and included in the shared content installed with BVD. Use the ovc command-line interface to manage the BVD processes:

- **Status.** To check whether the processes are running, type `ovc -status`.

- **Stop, start, and restart.** You can stop, start, and restart the processes by using the `-stop`, `-start`, and `-restart` options.

- **Help.** For more information on ovc, type `ovc -help`.

> **Tip:** On Linux, ovc may not by default be included in the PATH variable. To add the path to the shared content to the PATH variable, type:
>
> `export PATH=/opt/OV/bin:$PATH`

Enabling debug logs

In debug mode, BVD records more detailed output in its log files. To enable debugging, complete the following steps for each process that you want to debug. You can enable debugging for the BVD aging, receiver, and web server processes.

1. Edit the JavaScript file for the process that you want to debug:

   Windows: `<BVD_Install_Dir>`\BVD\dashboard\scripts*.js

   Linux: /opt/HP/BVD/dashboard/scripts/*.js

2. Remove the two slashes (//) at the beginning of the following line:

   `//process.env.DEBUG='bvd:*';`

3. Restart the processes, for example:

   `ovc -restart bvdaging bvdrc bvdws`

Clearing user locks

BVD locks out users if the number of failed login attempts exceeds the **Login Attempts Allowed**, specified during the configuration. The lock clears after the **Lock Out Time** is up (also specified during the configuration). To clear the lock manually, restart the BVD web server:

`ovc -restart bvdws`

Browser limitations

- **Internet Explorer only:** Uploading a dashboard locks the SVG file on disk

  In Internet Explorer 10 or 11 browsers, the upload of SVG files locks the files in the file system. For example, after uploading an SVG file in Internet Explorer, when you then click **Apply** or **Save** in the Manage Dashboards page and try to re-export to the file from Visio, the Visio changes are not saved to the SVG file.

  This is a known problem in Internet Explorer 10 and 11:
  https://connect.microsoft.com/IE/feedback/details/817183/ie10-and-ie11-keep-files-locked-after-uploading

  Workaround: After saving the uploaded dashboard, refresh the Manage Dashboards page, for example by pressing **F5**.

- **Chrome only:** It is not possible to download a dashboard that includes a picture

  In Chrome browsers, downloading a dashboard from the **Administration > Manage Dashboards** page is not working. This affects dashboards that include images of more than 2MB.

  Workaround: Chrome has a limitation of 2MB for data URI downloads:
  https://code.google.com/p/chromium/issues/detail?id=44820

Verifying metrics forwarding from OMi to BVD

Metrics Forwarding from Performance Graphing in OMi 9.2x and 10.0x:

1. In OMi, open Infrastructure Settings:

   Admin > Platform > Setup and Maintenance > Infrastructure Settings

   In the **Applications** list, select **Performance Graphing**.

2. Set the option **Trace Level** to 2.

3. Access the `ovpmtrace.0.txt` file available at the following location:

   Windows: `%ovdatadir%\shared\server\log`

   Linux: `/var/opt/OV/shared/server/log`

4. The log file contains trace messages that indicate that Performance Graphing is forwarding the data to the endpoint.

   The following are samples from the log file:

   ```
   com.hp.pm.core.configuration.PostDataTask:run() -> JSON data to post ...
   com.hp.pm.core.configuration.PostDataTask:postDashboardData() -> Post data  to
   service dashboard endpoint is success
   ```

Metrics Forwarding from Performance Dashboard in OMi 10.10:

1. In OMi, open Infrastructure Settings:

   Administration > Setup and Maintenance > Infrastructure Settings

   In the **Applications** list, select **Performance Dashboard**.

2. Access the `bvd.log` file available at the following location:

   Windows: `<OMi_HOME>\log\pmi`

   Linux: `/opt/HP/BSM/log/pmi`

3. The log file contains trace messages that indicate that Performance Dashboard is forwarding the data to the endpoint.

   The following are samples (trace level set to INFO) from the log file:

   ```
   com.hp.pm.core.configuration.bvd.PostDataTask:postDashboardData()
   -> BVD - Post data to endpoint is success
   ```

Notification messages

BVD displays notification messages if there are issues with the created dashboards. The following sections describe the messages and solutions.

The data received from the server does not contain {0} but {1} values

Widgets: Bar Chart, Donut Chart

The chart is configured to display {0} values. However, the data sent by the server only contains {1} values.

Check the data sent by the server and make sure that it contains all required data fields. Open 🔧 **Administration > Manage Dashboards** to verify the configured data fields and the data sent by the server in the data channel selector.

There is no valid data channel set

Widgets: Bar Chart, Status Color Group, Donut Chart, Feed, Status Images, Sparkline / Multiple Area Chart, Text Value, Status Visibility Group

There is no data channel set for this widget. Therefore it will not receive any data to display. Open 🔧 **Administration > Manage Dashboards** to configure a data channel for the widget.

There are no 'path' or 'rect' elements for the dashboard item '{0}'

Widgets: Status Color Group

The Status Color Group is coloring lines and areas of the grouped shapes. If these do not contain lines and areas, coloring will fail with this error. Open the dashboard in Visio and make sure that valid shapes are grouped with this Status Color Group.

The property '{0}' used in the coloring rule is not part of the data. Please check the syntax of the rule. (Dashboard item '{1}')

Widgets: All widgets with coloring/image selection rules

Open 🔧 **Administration > Manage Dashboards** and verify the rule's syntax: the rule should only use data fields that are included in the data sent by the server.

The coloring rule '{0}' is not valid. Please check the syntax of the rule. (Dashboard item '{1}')

Widgets: All widgets with coloring/image selection rules

Open 🔧 **Administration > Manage Dashboards** and verify that the rule adheres to the format described in "Coloring Rule" on page 122.

The data received from the server is missing either the 'link' or the 'title' field (Feed '{0}')

Widgets: Feed

Make sure that the data sent by the server contains the data fields "link" and "title".

The data received from the server does not contain a status (Status images '{0}')

Widgets: Status Image

The status field configured in 🔧 **Administration> Manage Dashboards** is not part of the data sent by the server. Make sure that the server sends the correct data or the correct status field is chosen.

The data received from the server does not contain a property called '{0}' (Spark line '{1}')

Widgets: Sparkline / Multiple Area Chart

The data field configured in 🔧 **Administration> Manage Dashboards** is not part of the data sent by the server. Make sure that the server sends the correct data or the correct data field is chosen.

There is no valid URL for the dashboard item '{0}'

Widgets: Web Page

There is no URL set for this widget. Therefore it will not display any data. Open 🔧 **Administration> Manage Dashboards** to configure a URL for the dashboard item.

The property '{0}' used in the visibility rule is not part of the data. Please check the syntax of the rule. (Dashboard item '{1}')

Widgets: All widgets with visibility rules

Open 🔧 **Administration> Manage Dashboards** and verify the rule's syntax: the rule should only use data fields that are included in the data sent by the server.

The visibility rule '{0}' is not valid. Please check the syntax of the rule. (Dashboard item '{1}')

Widgets: All widgets with visibility rules

Open 🔧 **Administration> Manage Dashboards** and verify that the rule adheres to the format described in "Visibility Rule" on page 131.

Unable to calculate a color with the data received from the server (Dashboard item '{0}')

Widgets: All widgets with coloring rules

The value sent by the server, together with the provided coloring rule, did not result in a color. Open 🔧 **Administration> Manage Dashboards** to verify the accuracy of your coloring rule and provide a default color as the last entry. For details on defining coloring rules, see "Coloring Rule" on page 122.

Install and Configure

Investigate installation issues by accessing the installation log file. For details, see "Installation log files" on page 136.

Investigate configuration issues by accessing the configuration log files. For details, see "Configuration and runtime log files" on page 137.

Linux Only: Unzip error during installation

Cause

The BVD installation requires unzip to be installed on the system. If unzip is not installed, the installation will fail with a corresponding error message.

Solution

On most Linux systems, unzip and zip utilities are not installed by default. To manually install unzip, run the following command:

```
yum install unzip
```

Linux Only: Configuration fails with error "Unable to register and start BVD"

Problem

During the configuration, the error "Unable to register and start BVD" is shown. BVD cannot be configured successfully.

Solution

Run `ovc -status` to see which processes are running. If the process `bvdws` is running, but not `bvdrc`, run the following commands:

```
ovc -kill
ovc -start
```

Send Documentation Feedback

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on Installation and Administration Guide (OMi Business Value Dashboard 10.11)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to ovdoc-asm@hpe.com.

We appreciate your feedback!

Go OMi!