HPE Service Virtualization

Software Version: 3.80 Patch 2

Installation Guide

Hewlett Packard Enterprise

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Service Virtualization Overview

HPE Service Virtualization provides a framework for creating virtual services for use in testing your applications under development.

You can create virtual services to simulate the behavior of services with limited access, such as unavailable or expensive services. Service Virtualization places a virtual service between the client application (application under test) and the real service to which you require access. Once you create virtual services to simulate the real services that you require, you reconfigure your client applications to use the virtual services, instead of the real services.

Service Virtualization Components

Service Virtualization consists of the following applications:

- **Designer.** A client application enabling you to create virtual services, and run simulations of real service behavior. The Service Virtualization Designer is used for design and validation of virtual services within the same desktop environment, and includes an embedded server for hosting virtual services.
- **Server.** *(Optional.)* A standalone server application which hosts the running of virtual services. The Service Virtualization Server is optimized for performance, can contain many more services than the Designer, and can be accessed by multiple Designers.

  For details on configuring the Service Virtualization Server, see "HPE Service Virtualization Server" on page 46.
- **Management Interface.** *(Optional.)* A web application enabling you to view and manage all services from Service Virtualization configured servers, without opening the Designer or individual projects. Service Virtualization Management is installed by default when you install the Service Virtualization Server.

Note:

- You can choose to install the Designer alone, or both the Designer and the standalone Server. These applications can be installed together on a single machine or separately as a distributed application.
- Service Virtualization Management is installed by default when you install the Service Virtualization Server.

Installation and Configuration Overview

This guide includes the following information to guide you through installation, as well as additional server configuration information:

Name	Description
"System Requirements" on page 6	Supported hardware and software systems.
"Installation" on page 14	Step-by-step instructions to install and configure Service Virtualization.
"Command Line Installation" on page 20	Instructions for installing the Service Virtualization components from the command line.
"Upgrade and Migration" on page 25	Overview of the process for upgrading to a new version of Service Virtualization.
"TCP Port Configuration" on page 31	Information on manually configuring the TCP ports that Service Virtualization uses for HTTP/HTTPS communication.
"Enable TLS to replace deprecated SSL protocols" on page 44	Enable TLS security protocols in place of the deprecated SSL protocols.
"HPE Service Virtualization Server" on page 46	Additional configuration information for the Service Virtualization Server.
"How to Start Service Virtualization" on page 59	Instructions on starting the Service Virtualization components: Designer, Server, and Service Virtualization Management.
"Virtual Service Deployment" on page 61	Deploying services on the Service Virtualization Server.

Chapter 1: System Requirements

This chapter provides an overview of the hardware and software requirements for installing Service Virtualization.

This chapter includes:

Hardware Requirements

This section includes:

Minimal Hardware Configuration

The Service Virtualization Server 3.80 and Service Virtualization Designer 3.80 can run on any hardware configuration that is using a supported operating system and has at least 1GB of physical memory installed and available for each product.

With the minimal hardware configuration, you can perform all functional testing scenarios and some basic performance testing scenarios, provided that they do not create too much load on virtualized services.

Recommended Hardware Configuration

Virtualization hardware sizing is complicated and may include many factors. For detailed sizing recommendations, contact HPE Customer Support. For contact information, see "Support" on page 3.

The following hardware configurations provide a good performance balance for normal usage scenarios, where each product is installed on a separate machine.

Service Virtualization Designer 3.80

- Intel® Core™2 Duo T7500 @ 2.2GHz or similar
- 4GB physical memory
- Free physical disk storage space

  The Designer typically uses less than 1GB of space for installation and all Service Virtualization projects, as follows:

  - 250 MB for the Designer installation
  - 10 MB for each service, where this figure can grow as recorded traffic increases

  Use the following calculation to calculate your required size:

  15*MSG_SIZE*MSG_COUNT

  where:

  MSG_SIZE = learned message size in kilobytes

  MSG_COUNT = the number of unique messages learned during the learning process

Service Virtualization Server 3.80 (32-bit edition)

- Intel® Xeon® 5140 @ 2.33GHz or similar
- 4GB physical memory

- Free physical disk storage space:
  - 250 MB for the Server installation.
  - The Server does not maintain any data on the local disk. Data are loaded from and saved to the Database Server.

Service Virtualization Server 3.80 (64-bit edition)

- Intel® Xeon® 5140 @ 2.33GHz or similar
- 8GB physical memory
- Free physical disk storage space:
  - 250 MB for the Server installation.
  - The Server does not maintain any data on the local disk. Data are loaded from and saved to the Database Server.

Database Server

- Intel® Xeon® 5140 @ 2.33GHz or similar
- 8GB physical memory
- Database storage:

  The database typically requires 1GB of disk space, but this figure can grow as recorded traffic increases.

  Use the following calculation to calculate your required size:

  30*MSG_SIZE*MSG_COUNT

  where:

  MSG_SIZE = learned message size in kilobytes

  MSG_COUNT = the number of unique messages learned during the learning process

Software Requirements

- Before installing this product, it is recommended to contact HPE Customer Support to check for any available software updates. For contact information, see "Support" on page 3.
- For the full list of supported environments, refer to the support matrix on the HPE Software Support site at: https://softwaresupport.hp.com/group/softwaresupport/support-matrices, or contact support.
- In addition to the prerequisites listed here, there may be additional protocol-specific prerequisites for running virtual services. For details, see the documentation on "How to Configure Agents" in the *HPE Service Virtualization User Guide*.

This section includes:

- "Supported Browsers" on page 11
- "Access Rights" on page 12
- "Additional Software Prerequisites" on page 12

The following environments are supported for Service Virtualization 3.80:

Supported Operating Systems

- Microsoft® Windows® 10 (32 and 64-bit)
- Microsoft® Windows® 8.1 (32 and 64-bit)
- Microsoft® Windows® 8 (32 and 64-bit)
- Microsoft® Windows® 7 SP1 (32 and 64-bit)
- Microsoft® Windows Server® 2012 R2 (64-bit)
- Microsoft® Windows Server® 2012 (64-bit)
- Microsoft® Windows Server® 2008 (32 and 64-bit)
- Microsoft® Windows Server® 2008 R2 (64-bit)

Note: When using Service Virtualization for performance testing, we recommend installing the Service Virtualization Server on one of the supported Windows Server 64-bit versions.

Supported Database Servers

Note: If you do not have a supported database server installed, you can install the Microsoft SQL Server Express included with the Service Virtualization installation package. In the installation root folder, run **autorun.exe**.

- Microsoft® SQL Server® 2014
- Microsoft® SQL Server® 2012 Express
- Microsoft® SQL Server® 2012
- Microsoft® SQL Server® 2008 R2 Express
- Microsoft® SQL Server® 2008 R2
- Oracle Database 11g
- Oracle Database 12g

For working with Oracle:

Prerequisite: The appropriate version of Oracle Data Access Components (ODAC) for your system, which contain Oracle client side drivers, must be installed. The ODAC client should be the same version or later as the Oracle database version.

Note:

ODAC 11: Visual C++ 2013 is required.

ODAC 12:

- For Windows 7: Visual C++ 2013 is required.
- For Windows 2008, Windows 8, and Windows 8.1: Visual C++ 2013 and Visual C++ 2010 are required.
- Windows 10 is not supported.

Recommended:

- For the Service Virtualization Designer and 32-bit Service Virtualization Server, install the 32-bit ODAC 12.1 version.
- For the 64-bit Service Virtualization Server, install the 64-bit ODAC 12.1 version.

If you are installing the Designer and Server on the same machine, you must install both the 32-bit and 64-bit versions of ODAC. Install each version in a separate folder.

Recommended ODAC downloads (xcopy version):

- Oracle x86: http://www.oracle.com/technetwork/database/windows/downloads/utilsoft-087491.html
- Oracle x64: http://www.oracle.com/technetwork/database/windows/downloads/index-090165.html

To install ODAC:

1. At the command line, run: `install.bat all <target-path> odac`.

   Tip: Set a descriptive target path, such as `C:\ODAC_12.1_32bit`.

   Installation copies files to <target-path> and installs several .NET assemblies to the GAC. Service Virtualization requires Oracle.DataAccess assembly of version 4.112.3.0 or later in the GAC. If it is not installed, the Database connection test fails during Service Virtualization installation and an error is displayed.
2. Add the target path that you defined above to the Windows system path environment variable.

   Caution: Modifying the target path for the ODAC 12.1 installation may cause conflicts with existing Oracle products installed on your machine, due to a problem with the Oracle.DataAccess version. The .NET assembly requires a specific version of the native dll to be in the Path variable. If you have multiple entries in the Path, then the dll from the first entry is used. If that is a dll for another version of the Oracle.DataAccess assembly, then the Service Virtualization installation will fail, displaying an additional error.

   Solution: The Path variable may only include references to dlls that are compatible with the Oracle.DataAcces assembly that Service Virtualization is using. You must remove references to incompatible dlls.

To check what assemblies are present in your GAC, you can use GAC Explorer: gacexplorer.codeplex.com

Supported Browsers

To work with Service Virtualization Management, you must use a supported browser.

- Microsoft Internet Explorer 9, 10, and 11

  Note: For Service Virtualization Management to function properly, compatibility mode must be turned off in Internet Explorer.
- Mozilla Firefox
- Google Chrome
- Apple Safari
- Microsoft Edge

Access Rights

The following permissions are required:

	Windows	MS SQL database	Oracle database
Installation	Windows administrator rights.	The following MS-SQL account **Server Roles** are required: • dbcreator • public	The following permissions are required: • GRANT CREATE TABLE TO username; • GRANT CREATE SESSION TO username; • GRANT CREATE SEQUENCE TO username; • GRANT CREATE PROCEDURE TO username; • GRANT CREATE TRIGGER TO username; To specify space requirements, use one of the following: • GRANT UNLIMITED TABLESPACE TO username; • ALTER USER username QUOTA 100M ON tablespace_name;
To run the Service Virtualization Server	Windows administrator rights on the Server machine.	The following MS-SQL **User Mapping** user privileges to access the database: • db_owner • public	
To run the Service Virtualization Designer	To configure the Service Virtualization HTTP/S agent, Windows administrator rights are required.	The following MS-SQL **User Mapping** user privileges to access the database: • db_owner • public	

Additional Software Prerequisites

The following prerequisite software is required for Service Virtualization. These applications are included in the Service Virtualization installation package. When you run the installation, you are

prompted to allow Service Virtualization to install all required prerequisites that are not yet installed. You can choose to install, or exit the installation.

Service Virtualization Designer:

- Windows Installer 4.5
- Microsoft Visual C++ 2013 x86 Redistributable
- Windows Imaging Component
- .NET Framework 4.5.2

Service Virtualization Server:

- Windows Installer 4.5
- Microsoft Visual C++ 2013 x86/x64 Redistributable
- Windows Imaging Component
- .NET Framework 4.5.2
- IIS 7.5 Express *(If IIS 8.0 is not installed)*

Chapter 2: Installation

This section explains how to install Service Virtualization using the installation wizard.

If you are upgrading from a previous version of Service Virtualization, make sure to first review the upgrade information in "Upgrade and Migration" on page 25.

For command line installation, see "Command Line Installation" on page 20.

To install Service Virtualization:

1. Make sure to review the prerequisites for installation. For details, see "System Requirements" on page 6.

   Note: If you do not have a supported database server installed, you can install the Microsoft SQL Server Express during installation. It is included in the Service Virtualization installation package.

2. Insert the Service Virtualization installation DVD into your drive, or navigate to the installation folder and run **autorun.exe**. The Welcome screen displays the following options:
   - Install Service Virtualization Server 3.80
   - Install Service Virtualization Designer 3.80
   - Install HPE Autopass License Server
   - Install SQL Server® 2008 R2 Express

   Note:

   Service Virtualization Server:

   - A valid product license is required to start the application. The installation wizard installs a 30-day trial license. After successful server installation, see "Server License Installation" on page 47 for the additional steps required for license installation.

   Autopass:

   - For details, refer to the HPE Autopass License Server documentation, included with the Service Virtualization installation files.
   - For details on working with the Autopass License Server in Service Virtualization, see the *HPE Service Virtualization User Guide*.

   SQL Server:

   - Installation of Microsoft® SQL Server® 2008 R2 Express is required only if no other supported database is available for the HPE Service Virtualization installation.
   - SQL Server must be installed by an admin user, or by a user with the following user rights:
     - Backup files and directories (SeBackupPrivilege)
     - Debug Programs (SeDebugPrivilege)
     - Manage auditing and security log (SeSecurityPrivilege)

Details can be found at http://support.microsoft.com/kb/2000257.

- To run the installation, you must have Administrator access rights.

3. Select an option to start the installation.

   You will be prompted to install all required prerequisites that are not yet installed.

   Follow the installation wizard instructions to install the product. For details on installation wizard options, see below.

   Note: The Server and Designer installation processes generate log files, which are saved in the following locations:

   - **Server:** %ALLUSERSPROFILE%\Hewlett Packard Enterprise\HPE Service Virtualization Server\logs\HPEServiceVirtualizationServer-x64.installation.log
   - **Designer:** %APPDATA%\Hewlett Packard Enterprise\HPE Service Virtualization Designer\logs\HPEServiceVirtualizationDesigner.installation.log

Installation Wizard Options

The following section describes the options available during installation of the **Service Virtualization Designer** and the **Service Virtualization Server**:

- **Installation destination folder**. On the Custom Setup page, you can change the installation destination folder using the **Browse** button.
- **Database configuration parameters**. On the Database Setup page, fill in values for the following parameters. If the database does not exist, the installation wizard creates it with the name you specify.

  Caution:

  - Each Service Virtualization component (Designer and Server) requires a dedicated tablespace – the database defined by name in MS SQL, and by user account in Oracle. Each Service Virtualization component can drop all data in its tablespace during its initialization. Sharing of the same tablespace with other applications or use of the system account in an Oracle database can lead to invalid behavior or data loss.
  - The Service Virtualization Designer requires a separate database for each user. The database is mainly used by the embedded server running inside the Designer, and also for caching recent projects.

Name	Description
Database Type	Select MS SQL Server or Oracle database.

Name	Description
Data Source	The data source part of the connection string. Basic syntax: **MSSQL:** server\instance,port **Oracle:** host/servicename, host:port/servicename, or host/servicename:port This works for SERVICE_NAME and not for SID. If you want to connect using SID, you must use the connection string. For example: `(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=hpswvm234088)(PORT=1521)))(CONNECT_DATA=(SERVER=DEDICATED)(SID=orcl)))` **Default:** localhost\SQLExpress_SV • If you are working with the full SQL Server version, you can exclude the instance name to use the default instance. • If you are working with SQL Server Express, you must specify the exact database instance name. • If you are working with Oracle and have problems connecting, you can use SQLPlus to verify if you are able to connect to the Oracle database by opening a command window and typing: `sqlplus user/pwd@server:port/serviceName`
Properties	**Optional:** Additional database connection properties. The properties you specify are appended to the connection string after the server and instance parameters. For example: • Use `Encrypt='true'` to use an SSL connection to the database server. • Use `Proxy User Id=pUserId;Proxy Password=pPassword` to specify proxy authentication for connection to an Oracle server.
Database Name	The database name. For MS SQL Server only.

Name	Description
Create	For MS SQL Server only. If the **Create** option is selected: • Creates the database during product installation. • Recreates the database if it already exists. • Removes the database when the product is uninstalled. If you clear the **Create** checkbox: • Uses the existing database. • Drops all user objects in the specified database to prepare a clean database for the application. **Note:** • **For Service Virtualization Server:** To maintain your data, make sure to run the **Backup** and **Restore** options provided by Service Virtualization. ◦ During Server upgrade: The **Backup** and **Restore** options are provided later in this installation wizard. ◦ During Server reinstall: Manually run the **Backup** and **Restore** options described in "Server Backup and Restore" on page 56. • In order to install the product successfully, the database user must have the proper privileges. If you select the option to create the database automatically during installation, the database user must have sufficient privileges to create the database – the SQL server roles `dbcreator` and `public`, and the database role `db_owner`. If you are using an existing database, the database user must have sufficient privileges to create the database schema -- the SQL server role `public` and the database role `db_owner`.
Authentication	The database server authentication type.
User	The database server authentication user. For SQL authentication only.
Password	The database server authentication password. For SQL authentication only.
Test Connection	Tests the database connection.
Connection String	View or modify the complete database connection string.

- **Additional installation options:**

Name	Description
Performance Monitor Remote Access	To create a new user with privileges to remotely read the performance monitor, select **Create performance monitor user**. This account can be used for remote access to the application's performance monitor counters. For details on the Service Virtualization performance counters, see the *HPE Service Virtualization User Guide*.
Server Encryption	**Enable server configuration encryption.** Encrypts all passwords, certificates, and other sensitive configuration data stored in the embedded or standalone Service Virtualization Server, using a user-defined password. For more details on encryption, see "Password Encryption" on page 54.
Management Endpoint	For Server installation: **Enable authentication for Server management endpoint:** • Encrypts the communication between the Service Virtualization Server and clients using TLS/SSL security. • Requires user credentials to access the secured server. **HTTPS port:** The port number of the management endpoint. Leave the default port number 6085, or enter another available port number between 1 and 65535. For more details on server authentication, see "Server Authentication" on page 49. **Note:** Working with a secured Service Virtualization Server is not supported for integrations with some older versions of HPE Service Test or HPE LoadRunner.
	For Designer installation: **Enable authentication for management endpoint of Designer's embedded server:** • Encrypts the communication between the Designer's embedded server and clients using TLS/SSL security. • Requires user credentials to access the secured server. **Note:** The port number of the management endpoint of the Designer's embedded server can be set in the file `%ALLUSERSPROFILE%\Hewlett Packard Enterprise\HPE Service Virtualization Designer\DesignerSharedConfiguration.xml`. This file is created when the Designer is started for the first time.
The following options are available when installing the Service Virtualization Server only:	

Name	Description
Management Interface	Configures the port for the Service Virtualization Management Interface. The Management Interface uses HTTPS communication. The default port is 6086. For details on working with the Management Interface, see the *HPE Service Virtualization User Guide*.
Windows Services	Installs the following: • The Windows service that starts the Service Virtualization Server with each computer startup. You can also run the Server as a standalone console application. • The Windows service that starts the Service Virtualization Management interface. Accept the default log on to use the local system account, or enter a different user account.

Chapter 3: Command Line Installation

This section describes how to install Service Virtualization from the command line.

For wizard installation, see "Installation" on page 14.

This section includes:

Command line installation options

Note:

- Command Line Installation does not verify prerequisites.
- Each property may apply to the Service Virtualization Designer, Server, or to both.
- In order to install the product successfully, the database user must have the proper privileges. If you use the DB_CREATE property to create the database automatically during installation, the database user must have sufficient privileges to create the database – the SQL server roles `dbcreator` and `public`, and the database role `db_owner`. If you are using an existing database, the database user must have sufficient privileges to create the database schema -- the SQL server role `public` and the database role `db_owner`.

The installers can be executed from the command line by running **msiexec** with the following properties:

Property	Installer	Description	Defined in UI
CREATE_SERVER_SERVICE	Server	Create the Service Virtualization Server service. **Values:** true/false **Default:** true	YES
CREATE_USER_ENABLE	Both	Set true to create a new local user for remote Performance Monitor access. For details on the Service Virtualization performance counters, see the *HPE Service Virtualization User Guide*. **Values:** true/false **Default:** false	YES

Property	Installer	Description	Defined in UI
CULTURE	Both	Set installation language. **Values:** Supported values correspond to product localization variants. **Default:** en	NO
DB_ AUTHENTICATION	Both	Database authentication uses either Windows or database credentials. **Values:** WinAuth / SqlAuth **Default:** WinAuth	YES
DB_CREATE	Both	Create database. Set to **true** to create the database during product installation, and remove the database when the product is uninstalled. Set to **false** to use the existing database. **Values:** true/false **Default:** true For MS SQL Server only.	YES
DB_DATASOURCE	Both	The data source part of the connection string. Basic syntax: **MSSQL:** server\instance,port **Oracle:** host/servicename, host:port/servicename, or host/servicename:port **Default:** localhost\SQLExpress_SV	YES
DB_NAME	Both	Database name. **Default:** • Designer installation: **<username>_designer** • Server installation: **<username>_server** For MS SQL Server only.	YES

Property	Installer	Description	Defined in UI
DB_PROPERTIES	Both	Additional database connection properties, such as: • `Encrypt='true'` to use an SSL connection to the database server. • `Proxy User Id=pUserId;Proxy Password=pPassword` to specify proxy authentication for connection to an Oracle server.	YES
DB_TYPE	Both	Database type selection. **Values:** mssql/oracle **Default:** mssql	YES
DB_USERNAME	Both	Database user name. Used only when using database credentials mode of authentication.	YES
DB_USERPASS	Both	Database user password. Used only when using database credentials mode of authentication.	YES
IGNORE_DB_ ERROR	Both	• Set *true* to install product despite database errors. • Set *false* to fail installation in the event of a database error. **Values:** true/false **Default:** false	NO
INSTALL_ DESKTOP_ DESIGNER_ SHORTCUT	Designer	Create desktop icon for Designer. **Values:** true/false **Default:** true	YES

Property	Installer	Description	Defined in UI
INSTALLLOCATION	Both	Installation target directory. **Default:** • **Designer:** c:\Program Files\HPE\HPE Service Virtualization Designer (On a 64-bit Windows systems, replace "Program Files" with "Program Files (x86)") • **Server (32-bit):** c:\Program Files\HPE\HPE Service Virtualization Server (On a 64-bit Windows systems, replace "Program Files" with "Program Files (x86)") • **Server (64-bit):** c:\Program Files\HPE\HPE Service Virtualization Server	YES
LICENSE_SERVER	Designer	URL of license server to initialize concurrent licensing of the Designer. Value can be changed in the Designer after installation.	NO
MANAGEMENT_ ENDPOINT_AUTH	Both	Set authentication on the management endpoint of the Designer's embedded server or the Service Virtualization Server. **Values:** true/false **Default:** true	YES
MANAGEMENT_ ENDPOINT_PORT	Server	Set port of Service Virtualization Server management endpoint.	YES
MANAGEMENT_ INTERFACE_PORT	Server	Port number for the Service Virtualization Management Interface. **Values:** May be in the range 1 to 65535. **Default:** 6086	YES
PERFORMANCE_ MONITOR_ USERNAME	Server	Login name of Performance Monitor user. For details on the performance counters, see the *HPE Service Virtualization User Guide*. **Default:** SVMonitor	YES
PERFORMANCE_ MONITOR_ USERPASS	Server	Password of Performance Monitor user.	YES

Property	Installer	Description	Defined in UI
SERVICE_LOGIN_TYPE	Server	Specifies if the Windows services that start the Service Virtualization Server and Service Virtualization Management are run under the local system account, or by a different user account. **Values:** system/user **Default:** system	YES
SERVICE_USER_NAME	Server	The name of the user account running the Service Virtualization services. Valid only if SERVICE_LOGIN_TYPE=user.	YES
SERVICE_USER_PASSWORD	Server	The password of the user account running the Service Virtualization services. Valid only if SERVICE_LOGIN_TYPE=user.	YES

Quiet Server installation example

The following is an example of a quiet Server installation with the following parameters:

- Installs 32-bit Server with SQL database authentication
- Creates Performance monitor user and Windows Service Virtualization
- Sets Management endpoint authentication.
- Logs installer output in the **installer-server-x86.log** file

```
msiexec /i HPEServiceVirtualizationServer-x86.msi /l*V "installer-server-x86.log" /passive DB_
DATASOURCE=czb240 DB_PROPERTIES="Encrypt='false'" DB_AUTHENTICATION=SqlAuth
DB_USERNAME="guest" DB_USERPASS="guest" CREATE_USER_ENABLE="true"
PERFORMANCE_MONITOR_USERNAME="SVMonitor" PERFORMANCE_MONITOR_
USERPASS="changeit"
```

Quiet Designer installation example

The following is an example of a quiet Designer installation with the following parameters:

- Installs Designer with Windows database authentication
- Logs installer output in the **installer-designer.log** file

```
msiexec /i HPEServiceVirtualizationDesigner.msi /l*V "installer-designer.log" /passive DB_
DATASOURCE=localhost\ SQLExpress_SV DB_PROPERTIES="Encrypt='false'" DB_
AUTHENTICATION=WinAuth
```

Chapter 4: Upgrade and Migration

This chapter includes:

The Upgrade Process

If you were working with an earlier version of Service Virtualization, follow the upgrade process to install and start working with a new version.

Designer upgrade

When you upgrade to a new version of the Service Virtualization Designer, the previous version is removed before the new version is installed. Virtualization projects and services are not affected, and remain on the Designer machine.

To install the new version of the Service Virtualization Designer on client machines, see "Installation" on page 14.

After installation, you must migrate your projects. For details, see "Project Migration" on page 28.

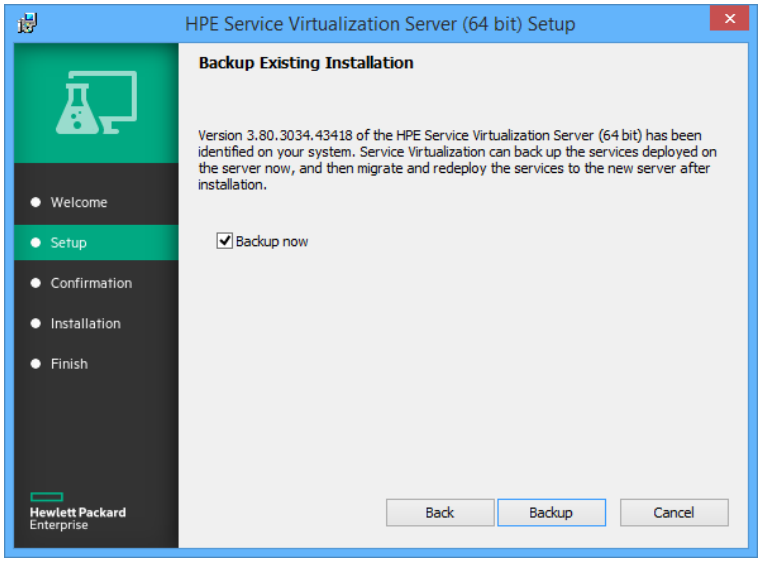
Server upgrade

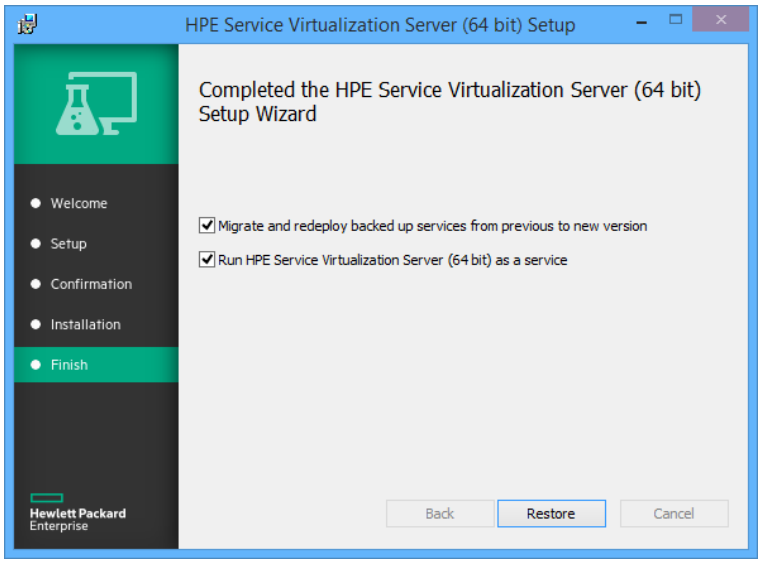
When you upgrade to a new version of the Service Virtualization Server, the previous version is removed before the new version is installed, and all deployed services are undeployed. To assist you with the upgrade process, the Server Backup tool is run during the upgrade process, which backs up the Service Virtualization Server state before installing the new version.

Note: To work with FIPS mode and Service Virtualization 3.80, enable FIPS only after successfully installing Service Virtualization Server 3.80.

After installing the new version, the installer migrates the backed up services to the new version and runs Server Restore, which redeploys the virtual services and restores other configuration information to the server.

The installation wizard provides the following backup, migration, and deployment options.





For more details on installing the new version of the Service Virtualization Server, see "Installation" on page 14.

Use-case scenario:

The following example demonstrates how you might implement the upgrade process in your organization.

Server administrator:

1. Upgrade all Service Virtualization Servers in the department to the new version.
2. Using the Resource Manager migration tool, migrate project and virtual services located in shared repositories, such as on a network file system, or in HPE ALM.

   Note: You cannot deploy services to the upgraded server until they are migrated.

3. Using the Resource Manager deployment tool, deploy migrated services to your Service Virtualization Servers.

Designer user:

1. Upgrade the Service Virtualization Designer on your local machine.

   Note: You cannot work with upgraded projects or services until you upgrade the Designer.

2. Using the Designer or the Resource Manager tool, migrate and deploy virtual services that are stored locally on your machine.

For more details on these tools, or to run them manually, see:

- "Server Backup and Restore" on page 56
- "Project Migration" below
- "Virtual Service Deployment" on page 61

Project Migration

When you upgrade Service Virtualization to a new version, you must also migrate your virtual services. Migration updates your projects and services, enabling them to work with the new version. You cannot use the projects until they are migrated.

There are two methods for migrating virtualization projects:

- **From the Designer.** When you open a project in the Designer after installing a new Service Virtualization version, you are prompted to allow Service Virtualization to migrate the project.

  This is useful, for example, if you are going to work on a specific project in the new version of the Designer, and the project is not yet migrated. For details, see the *HPE Service Virtualization User Guide*.
- **Using the Resource Manager migration tool.** After installing a new version of Service Virtualization, you can use the Resource Manager command line migration tool to migrate projects.

  You can migrate projects and services stored in the file system or in HPE Application Lifecycle Management (ALM). This is especially useful, for example, if you have a number of projects stored in the file system or ALM, and want to migrate them without opening each one in the Designer.

  Note: Installation of the ALM client is not a prerequisite for working with the Resource Manager. The ALM client is downloaded automatically if it is required.

The Resource Manager migration tool enables you to migrate the following:

- A virtualization project (.vproj files). The .vproj file includes information on all project entities (virtual services, service descriptions, simulation models, etc.) included in the project.
- A project archive (.vproja files). A .vproja archive file is created when you export a project from within the Service Virtualization Designer.

You can also specify a folder to migrate. If you specify a folder, all relevant project entities inside the folder are migrated. For example, you may have a folder that contains multiple archived projects.

For details on using the Resource Manager migration tool, see "How to Migrate Virtualization Projects" below.

How to Migrate Virtualization Projects

You can migrate virtualization projects and archived projects located in the file system or in ALM.

Note:

- If migration fails, the entities are not modified. You can fix the problem, and run the Resource Manager migration tool again.
- To migrate projects or files stored in an ALM version-control enabled project, the ALM resources must be checked in. Resource Manager checks out the resources, and checks them back in after migration.
- You must turn off FIPS before migrating encrypted projects that were created before Service Virtualization version 3.80. This is not required for .vproja project archives.
- The migration process generates a log file, which indicates the success or failure status of each entity. The log file is located in the Service Virtualization Server or Designer log folder, accessible from the Windows Start menu.

1. Do one of the following:
   - On the Service Virtualization Server, open a command prompt. Navigate to the \bin folder under the Service Virtualization Server installation folder. By default, C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin.
   - On the Service Virtualization Designer machine, open a command prompt. Navigate to the \bin folder under the Service Virtualization Designer installation folder. By default, C:\Program Files (x86)\HPE\HPE Service Virtualization Designer\Designer\bin.
2. Run **ResourceManager.exe -migrate** at the command line, using the following options:

   Note: If an argument contains spaces, it must be enclosed in quotation marks. For example, "Resources\My Project".

Option	Description
General Options	

Option	Description
/f [source_path]	**Source path.** The path to the project file (.vproj) or project archive file (.vproja). • If you specify a folder, all relevant project entities inside the folder are migrated. • The files may be located in the file system or in ALM. • To specify a resource stored in ALM, use the following format: Resources\[path to file or folder] For example, Resources\MyVirtualProject\VirtualProject1.vproja **Tip:** To locate and copy an ALM folder path, in the Designer, from the main menu, select **File > Open Project/Solution**. On the sidebar, select ALM Resources, and navigate to the desired folder. Copy the path from the **Look in** box.
ALM Connection Options	
/s [ALM_URL]	**ALM URL.** The URL of the ALM server on which the files are located, in the following format: <ALM server IP or hostname>:<port number>/qcbin. The path must contain /qcbin at the end.
/d [ALM domain]	**ALM domain.** The ALM domain name in which the files are located.
/p [ALM project]	**ALM project.** The ALM project name in which the files are located.
/u [ALM user]	**ALM user.** The ALM user for the ALM connection.
/pw [ALM user password]	**ALM user password.** The password for the ALM user. The password is case-sensitive.
/c [Check-in comment]	**Check-in comment.** When migration is performed in a version-control enabled ALM project, a default check-in comment is added, indicating that the resource was modified by the Service Virtualization migration tool. Use this option to override the default comment and enter your own comment.

Example:

```
ResourceManager.exe -migrate /f Resources\MyVirtualProject /s
http://MyALMServer:8080/qcbin /d Default /p MyProject /u alex_alm /pw alexalex11
```

This command migrates projects and services located on the ALM Server **http://MyALMServer:8080/qcbin**, in the domain **Default**, in the project **MyProject**, in the Resources module under the folder **MyVirtualProject**.

Chapter 5: TCP Port Configuration

This chapter includes:

Service Virtualization TCP Port Overview

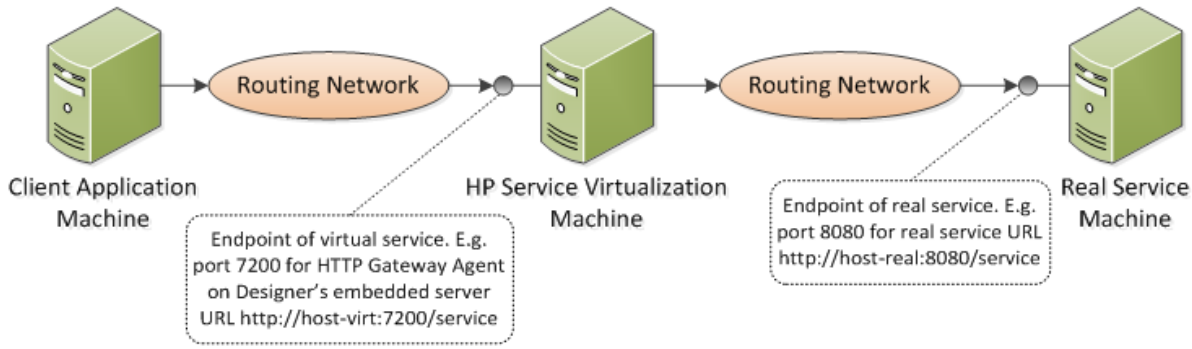
Service Virtualization uses several TCP ports for communication. To configure Service Virtualization to work correctly in a protected network environment, you must verify that all required network ports are open.

This section describes the communication paths in Service Virtualization, and the ports that are used. For details on port configuration support in Service Virtualization, see "Windows Firewall and TCP Port Configuration" on page 34.

This section includes:

Virtual Service Endpoint

In order to record and simulate the communication between a client application and a real service endpoint, you must place Service Virtualization between them. In this scenario, communication from the client application to the virtual service, and from the virtual service to the real service is as follows:



In this figure, the client application is reconfigured to communicate with the virtual service instead of the real service. The virtual service can be deployed on one of the following:

- The Service Virtualization Designer's embedded server
- The Service Virtualization Server

The port that Service Virtualization uses depends on the Service Virtualization agent that the virtual service is using. (Service Virtualization Agents handle communication between a client and a real or virtual service.)

Service Virtualization agents use the following default ports for HTTP/HTTPS communication:

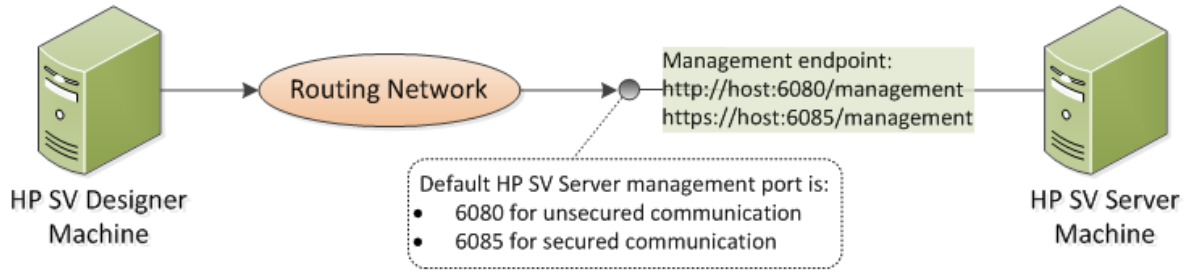
Agent	Protocol Type	Service Virtualization Designer	Service Virtualization Server
Gateway	HTTP	7200	6070
	HTTPS	7205	6075
Proxy	HTTP	7201	6071
	HTTPS	7206*	6076*
JDBC	HTTP	7288	6088

** The HTTPS Proxy Agent accesses this port directly using TCP.*

The virtual service communicates with the real service's original endpoint. This is the same endpoint that the client application used before the client was reconfigured to communicate with the virtual service endpoint.

Service Virtualization Management Endpoint

The Service Virtualization Designer communicates with the Service Virtualization Server using the Service Virtualization management endpoint. This communication is required when deploying virtual services on the Service Virtualization Server. Communication between the Service Virtualization Designer and the remote Service Virtualization Server using the management endpoint is as follows:



The Service Virtualization Designer also provides a management port, used mainly for connecting to integration testing tools.

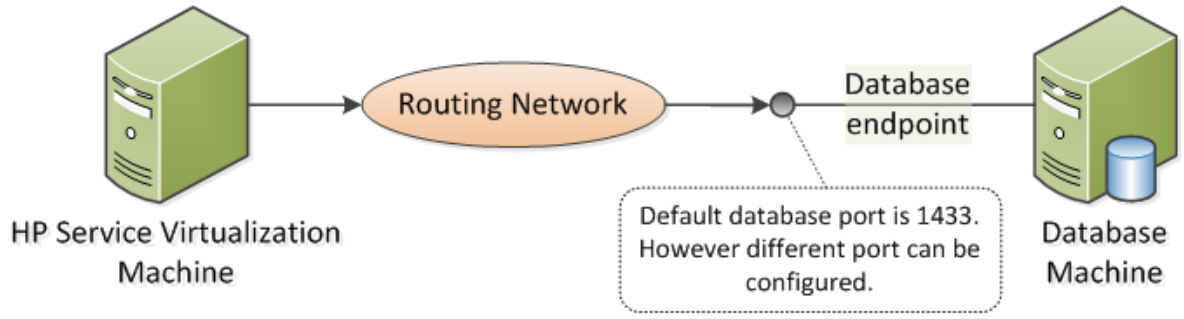
The Service Virtualization management endpoint uses the following default port values:

Management API	Protocol Type	Service Virtualization Designer*	Service Virtualization Server
Not Secured	HTTP	7280	6080
Secured	HTTPS	7280	6085

* An alternative port number may be used if this port is not available when the Designer starts. The currently used port is displayed in the properties of the embedded server in the Designer, or in the log file.

Database Endpoint

Both the Service Virtualization Designer and the Service Virtualization Server require a database for data storage. The communication scenario between Service Virtualization and the database is as follows:



The default port of the database endpoint is **1433**. However, the database administrator can reconfigure the database to use a different port.

Service Virtualization Management Interface Endpoint

The Service Virtualization Management interface enables you to view and manage all services from Service Virtualization configured servers, without opening the Designer or individual projects.

The Management interface endpoint communicates with the Service Virtualization Server on which it is configured using the server's Management API endpoint (ports 6085 or 6080).

The default port of the Service Virtualization Management interface endpoint is **6086**.

For more details on Service Virtualization Management, see the *HPE Service Virtualization User Guide*.

Windows Firewall and TCP Port Configuration

Microsoft Windows must be configured to allow the Service Virtualization Management API endpoint, the Service Virtualization Management service, and the Service Virtualization agents to listen for HTTP or TCP requests.

Service Virtualization performs the required configuration automatically. When a listener in one of the Service Virtualization component starts, it checks all relevant firewall exceptions, URL reservations, and certificate bindings, and updates the Windows system configuration if needed. When you start the Designer, Windows User Account Control may prompt you to allow the Designer to run in elevated mode. No additional user input is required.

Service Virtualization configures the following:

- **Windows Firewall.** Adds firewall exceptions to enable Service Virtualization components to receive TCP and HTTP requests. For details, see "Windows Firewall Settings" on the next page.
- **URL reservation (Windows urlacl).** Enables applications to receive messages for specific URLs, as needed for working with Service Virtualization.
- **Certificate binding.** Imports all certificates used by Service Virtualization into the Windows certificate store and binds them to the related ports. For details, see "SSL Certificate Specification" on page 38.

This automatic configuration is enabled in Service Virtualization by default. You can modify the automatic configuration settings in any of the Service Virtualization applications - Designer, Server, or Service Virtualization Management.

To change the automatic configuration settings:

1. Open the configuration file for the relevant application:
   - Service Virtualization Designer: Located in the installation folder. By default: `C:\Program Files (x86)\HPE\HPE Service Virtualization Designer\Designer\bin\VirtualServiceDesigner.exe.config`.
   - Service Virtualization Server: `C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin\HP.SV.StandaloneServer.exe.config`
   - Service Virtualization Management: `C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin\HP.SV.ServiceVirtualizationManager.Host.exe.config`
2. Edit the following section:

   ```
   <httpConfig
   managePortRegistrations="true"
   manageFirewall="true"
   />
   ```

   Where:

   - managePortRegistrations="true" - Service Virtualization automatically updates certificate binding and URL reservations, if necessary.
   - manageFirewall="true" - Service Virtualization automatically opens Windows Firewall for ports used by Service Virtualization components to listen for requests.

This section also includes:

Windows Firewall Settings

If Windows Firewall is enabled on the machine on which Service Virtualization is installed, requests from remote services to Service Virtualization are blocked. To enable the required TCP/HTTP communication, Service Virtualization adds a set of exceptions to the Firewall. This set of inbound rules is maintained automatically by Service Virtualization, and does not generally require any manual configuration.

To change the automatic configuration settings, see "Windows Firewall and TCP Port Configuration" on page 34.

This section includes:

Overview

For **TCP listeners**, a firewall exception is created for the Service Virtualization Server and Designer executable files.

For **HTTP listeners**, Service Virtualization uses the .NET HttpListener component to listen for HTTP/HTTPS requests. Service Virtualization cannot define an exception for the HttpListener executable itself, because HttpListener runs in a separate kernel process and is shared by all applications running on the machine. Instead, a firewall exception is created for all ports where the HttpListener component is used by the Service Virtualization Designer or Server to listen for HTTP/HTTPS requests.

The Service Virtualization components use the listeners as follows:

TCP Listener:

- SSL component of the HTTP Proxy agent
- IMS agent

The Service Virtualization installer creates a firewall exception for the Service Virtualization Server and Designer executables.

.NET HttpListener

- HTTP Gateway agent
- HTTP port of the HTTP Proxy agent
- JDBC agent
- Service Virtualization Management API endpoint in unsecured mode
- HTTPS Gateway agent
- Service Virtualization Management API endpoint in secured mode

Service Virtualization creates firewall exceptions for the specific ports that the agents use, makes the relevant URL reservations, and registers an SSL certificate for each port listening for HTTPS requests.

Note: All firewall rules that Service Virtualization creates are removed if the product is uninstalled.

Default Windows Firewall Settings

The default inbound rules that Service Virtualization creates during installation of the Designer or when the Server is run for the first time are as follows:

- Rules with specified ports are used by the System HTTP Listener server, and not directly by Service Virtualization. The ports are open for any program running on the machine.
- Rules that are assigned directly to the Service Virtualization applications enable the Service Virtualization agents to access TCP ports directly.

Name	Program	Port
HPE Service Virtualization Designer	VirtualServiceDesigner	Any
HPE Service Virtualization Designer (HTTP Gateway)	Any	7200
HPE Service Virtualization Designer (HTTP Proxy)	Any	7201
HPE Service Virtualization Designer (HTTPS Gateway)	Any	7205
HPE Service Virtualization Designer (Java SE 6/7 JDBC)	Any	7288
HPE Service Virtualization Designer (RestManagementService)	Any	7280
HPE Service Virtualization Server	HP.SV.StandaloneServer	Any
HPE Service Virtualization Server (HTTP Gateway)	Any	6070
HPE Service Virtualization Server (HTTP Proxy)	Any	6071
HPE Service Virtualization Server (HTTPS Gateway)	Any	6075
HPE Service Virtualization Server (Java SE 6/7 JDBC)	Any	6088
HPE Service Virtualization Server (RestManagementService)	Any	6080 (secured) or 6085 (secured)
HPE Service Virtualization Management (HTTP Server)	Any	6086

How to Check Windows Firewall Settings

To review the current Windows Firewall settings for Service Virtualization:

1. In Windows Control Panel, open **Windows Firewall**.
2. Select **Advanced Settings** to open Windows Firewall with Advanced Security.
3. Select **Inbound Rules**, and sort by group.

   The rules defined for Service Virtualization start with **Service Virtualization Designer** or **Service Virtualization Server**.

   All rules are created by Service Virtualization for the Windows Firewall Private profile, using TCP protocol, and are enabled by default.

SSL Certificate Specification

All programs using the .NET HttpListener for HTTPS communication must register a certificate on the port that they are using. Service Virtualization automatically configures the required certificate registration.

During installation, Service Virtualization generates one self-signed certificate, issued with the name of the machine on which Service Virtualization is installed. This certifiate is used as a default certificate for all Service Virtualization components that require a certificate.

The generated self-signed certificate is suitable for an initial setup of Service Virtualization. It is recommended to consider reconfiguring Service Virtualization components at a later time to use a certificate issued by the certificate authority which is trusted by clients connecting to Service Virtualization.

All certificates defined in Service Virtualization are imported into the Personal folder of Windows Certificate Store. They are bound to the related ports according to their thumbprint values.

To change the automatic configuration settings, see "Windows Firewall and TCP Port Configuration" on page 34.

Certificates for Service Virtualization components are specified as follows:

Management API Endpoint (REST)	The self-signed certificate generated during Service Virtualization installation is used for the Management API endpoint if you chose the option to enable authentication. For details on changing authentication options, see "Changing Server Security Settings" on page 52. The location of the certificate is specified in the Service Virtualization Server configuration file `HP.SV.StandaloneServer.exe.config`, located in the installation folder. `<restManagementServiceConfiguration certificatePath="..\..\ConfigurationTools\certificates\server-cert.p12" certificatePassword="changeit" openFirewall="true" />` • The path to the certificate file can be absolute, or relative to the Server's executable file. • The password is encrypted if the password encryption feature is enabled. For details, see "Password Encryption" on page 54. • The certificate is bound to its related port when the Service Virtualization Server is started.
Service Virtualization Management	The location of the certificate is specified in the Service Virtualization Management configuration file `HP.SV.ServiceVirtualizationManager.Host.exe.config`, located in the installation folder. `<svmConfig ssl="true" certificatePath="..\..\ConfigurationTools\certificates\server-cert.p12" certificatePassword="changeit" openFirewall="true" port="6086" />` • If **certificatePath** and **certificatePassword** are specified, certificate binding is checked and updated when Service Virtualization Management is started. • If **openFirewall** is enabled, Windows Firewall is opened for the specified port when Service Virtualization Management is started. • **port** defines the TCP port where Service Virtualization Management is running.

Service Virtualization Agents	You specify the path to a certificate when you configure the agent. For details on agent configuration, see the *HPE Service Virtualization User Guide*. The certificate is bound to the selected port when the related agent is started. The path to the certificate must be valid on the machine where the agent will run.

HTTP Listener Configuration

Service Virtualization updates port settings for HTTP/HTTPS communication according to the Service Virtualization default configuration, during installation of the Designer, or when the Server is run for the first time. When you create or modify Service Virtualization agent configurations, Service Virtualization automatically updates these settings. Checking the settings manually may be useful for troubleshooting purposes.

To change the automatic configuration settings, see "Windows Firewall and TCP Port Configuration" on page 34.

This section includes:

Default Port Settings

Default settings are defined for the Service Virtualization Server, Designer, and Service Virtualization Management. Ports are also defined for the product demos, which are not required for anything else.

The default configuration is as follows:

Product	Detail	Reserved URL	Protocol	Certificate Binding
Designer	HTTP Gateway Agent	http://+:7200/	HTTP	No
	HTTP Proxy Agent	http://+:7201/	HTTP	No
	HTTPS Gateway Agent	https://+:7205/	HTTPS	Yes
	Management Endpoint	http://+:7280/	HTTP	No
		https://+:7280/	HTTPS	Yes
	JDBC Agent	http://+:7288/	HTTP	No
Server	HTTP Gateway Agent	http://+:6070/	HTTP	No
	HTTP Proxy Agent	http://+:6071/	HTTP	No
	HTTPS Gateway Agent	https://+:6075/	HTTPS	Yes
	Management Endpoint	http://+:6080/	HTTP	No
		https://+:6085/	HTTPS	Yes
	JDBC Agent	http://+:6088/	HTTP	No
Service Virtualization Management	Web interface	https://*:6086/	HTTPS	Yes
Demos* (installed with Designer)	Not specific	http://+:8101/	HTTP	No
		http://+:8102/	HTTP	No
		http://+:8103/	HTTP	No
		http://+:8104/	HTTP	No

* Only URL Reservations are created for ports used by the demo projects to allow you to start the demos. Windows Firewall is not opened for the ports used by the demos for security reasons. As a result, you can only call demos from the local machine.

How to Check Port Settings

Checking the settings manually may be useful for troubleshooting, especially if Windows User Access Control (UAC) is enabled.

You can use the Windows `netsh` command line tool to check the port settings used for HTTP communication. For older Windows operating systems, use the `httpcfg` tool.

Examples:

- To show ACLs on all ports:

  ```
  netsh http show urlacl
  ```
- To show SSL certificate bindings on all ports:

  ```
  netsh http show sslcert
  ```
- To show ACLs on a specific port for HTTP:

  ```
  netsh http show urlacl http://+:PortNumber/
  ```
- To show ACLs on a specific port for HTTPS:

  ```
  netsh http show urlacl https://+:PortNumber/
  ```
- To show SSL certificate binding on a specific port:

  ```
  netsh http show sslcert ipport=0.0.0.0:PortNumber
  ```

where **PortNumber** is the TCP port number.

How to Check Port Status

You can use the Windows `netstat` command line tool to list protocol statistics and network connection information. For example, you can check that the Service Virtualization agents are listening on their assigned ports to determine that the virtual service endpoints are functioning. The statistics can also be useful to troubleshoot port conflicts that might require you to reconfigure agent port assignments.

To list all ports on the local machine on which services are listening:

```
netstat -a | find /i "listening"
```

The output lists all listening services. The ports used by the Service Virtualization Server are as follows:

```
TCP [::]:6070 hostname:0 LISTENING

TCP [::]:6071 hostname:0 LISTENING

TCP [::]:6075 hostname:0 LISTENING

TCP [::]:6076 hostname:0 LISTENING

TCP [::]:6085 hostname:0 LISTENING

TCP [::]:6088 hostname:0 LISTENING
```

How to Check Connectivity to Ports

The open connection between the machine running the real service and the machine running Service Virtualization is essential for successful message recording. The connectivity can be blocked and checking it with a simple tool can save you time. For example, for a Service Virtualization agent listening on a port, you can check the connectivity to this port using **telnet**.

Note: The telnet client may not be enabled in Windows. You can enable it using Windows Control Panel.

Example:

To check connectivity from the machine where the real service is running to the machine where Service Virtualization is running, type the following at a command prompt:

```
telnet ServerName PortNumber
```

where:

- `ServerName` is the machine where Service Virtualization is running
- `PortNumber` is the TCP port number of the agent for requests

The result is one of the following:

- A connection failure - a message is displayed.
- A successful connection - the command window is cleared and displays only a blinking cursor. If you enter Crtl^C, the connection is closed and a message is displayed.

Successful connection indicates that the communication should be open and the recording of real service messages by Service Virtualization should work. However, if it still does not work, this indicates that the problem is not caused by firewall or port settings. The problem is more likely with the virtual service configuration.

A failed connection via telnet indicates that the communication is blocked in transit. The first thing to do is to check Windows Firewall settings and TCP port configurations.

If everything is set correctly but the connection is still blocked, the problem is likely caused by the infrastructure between the machines.

Chapter 6: Enable TLS to replace deprecated SSL protocols

If your security guidelines require the use of new TLS security protocols in place of the deprecated SSL protocols, you need to enable TLS in Windows.

Incoming connections

Service Virtualization uses Microsoft IIS and the related HTTP listener for the implementation of the Service Virtualization HTTP(S) Gateway agent, the REST management service, and Service Virtualization Management.

By default, IIS and the HTTP listener support the security protocols SSL 2.0 and 3.0 for incoming connections. These protocols are no longer considered secure, and are replaced by TLS 1.1 and TLS 1.2 protocols.

IIS and HTTP listener also support TLS 1.1 and 1.2, but TLS is not enabled in most Windows versions by default. If your security guidelines requires use of new security protocols, you need to enable TLS in Windows.

Note:

- Enabling TLS improves security settings but may prevent some older clients or services from connecting to Service Virtualization.
- This change impacts all applications and users using the IIS service on the machine — not only Service Virtualization.

To update the system registry to use TLS instead of SSL:

1. Run the following script provided by Service Virtualization: **setUseTLSInsteadOfSSL.bat**, located in ConfigurationTools subfolder of the Service Virtualization Server or Designer installation folder. This script backs up the relevant part of the system registry to your %USERPROFILE% folder and updates the system registry to use TLS instead of SSL.
2. Restart the computer to apply changes.

Outgoing connections

Outgoing (client) connections from Service Virtualization are not restricted to using TLS by default. Enforcing the use of TLS security protocol for outgoing connections may prevent Service Virtualization from connecting to older real services that are being virtualized, and is therefore not recommended.

You can modify the set of enabled security protocols used by Service Virtualization for outgoing connections by modifying the following entries in the application configuration files. The default values are:

<add key="SV.Https.Client.UseSsl3" value="True" />
<add key="SV.Https.Client.UseTls10" value="True" />

<add key="SV.Https.Client.UseTls11" value="True" />
<add key="SV.Https.Client.UseTls12" value="True" />

By default, the configuration files are located in the following locations:

- Service Virtualization Server configuration file: C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin\HP.SV.StandaloneServer.exe.config.
- Designer configuration file: C:\Program Files (x86)\HPE\HPE Service Virtualization Designer\Designer\bin\VirtualServiceDesigner.exe.config.

The list of enabled security protocols can also be restricted on the system level, by modification of the registry keys under:

HKEY_LOCAL_
MACHINE\SYSTEM\CurrentControlSet\Control\SecurityProviders\SCHANNEL\Protocols

If any security protocol is disabled in the system, it is not possible to use it regardless of the Service Virtualization settings.

For more details about management of security protocols: https://support.microsoft.com/en-us/kb/245030.

Chapter 7: HPE Service Virtualization Server

HPE Service Virtualization Server is a standalone server application which hosts the running of virtual services. The Service Virtualization Server is optimized for performance, and can host many more services than the Designer. The Service Virtualization Server uses its own database, separate from the Designer database. It can be accessed by multiple Designers, as well as by third-party tools.

The Service Virtualization Server is installed by the installer as a Windows service, but can also be run on demand as a console application by running the same **.exe** file associated with the Windows service.

Note: Every deployed virtual service requires 4-5 database connections.

This chapter includes:

Server License Installation

The Service Virtualization Server is installed with a 30-day trial license. To continue working with the Server, you must install a license from HPE.

Install the new license using the License Utility. The license must be installed on the same machine on which the Service Virtualization Server is installed.

You receive your license from the HPE License Delivery Center, either in a **.dat** file or a license key. You then install the license using the License Utility. In addition, the License Utility enables you to view all installed licenses. It also displays the Host ID required for product licensing.

Note: After you install a new Service Virtualization Server license, you must restart the server service.

To install a new license:

1. To run the License Utility, from the Windows Start menu, select All Programs > **HPE Software > HPE Service Virtualization > Server > HPE SV Server License Utility**.
2. In the License Utility window, click **Install New Licenses**. The New License dialog box opens.
3. To install the license from a **.dat** license file:
   a. Select **Install licenses using a license file**.
   b. Click **Browse** to navigate to and select your .dat license file.
   c. If your license file contains multiple licenses, click **View License File Content** to display all available licenses. Select the desired licenses.
4. To install the license as a text string:
   a. Select **Install a license using a license key**.
   b. Copy your License Key string and paste it into the **License Key** box.
5. In the New License dialog box, click **Install** to install the license.
6. Click **Close** to close the Install License dialog box. The new license is displayed in the License Utility window.

Service Virtualization Functionality by Edition

Service Virtualization is available in several editions, which determine the functionality available to you in the application.

- The **Premium Edition** provides full Service Virtualization functionality.
- The **Express Edition** provides a subset of the full Service Virtualization functionality, as described in this section.

Service Virtualization Designer Editions:

Service Virtualization Feature	Designer - Express Edition	Designer - Premium Edition
Connect to Express Edition Server	✓	✓
Connect to Premium Edition Server	✗	✓
Limited simulation throughput for the Designer's embedded server	10 transactions per second	10 transactions per second
In-memory simulation for the Designer's embedded server	✗	✗
ALM integration	✗	✓

Service Virtualization Server Editions:

Service Virtualization Feature	Server - Express Edition	Server - Premium Edition
Manage Express Edition Server	✓	✗
Manage Premium Edition Server	✗	✓
Maximum deployed services on the Service Virtualization Server	100	Full functionality
Maximum concurrent users connected to Service Virtualization Management	10	Full functionality
Maximum managed Service Virtualization Servers in Service Virtualization Management	1	Full functionality
Maximum CPU cores	8	Full functionality
Limited simulation throughput	10 transactions per second	Full functionality

Service Virtualization Feature	Server - Express Edition	Server - Premium Edition
In-memory simulation	✓	✓
ACL/Server access permission functionality	✗	✓
ALM integration	✗	✓

Additional information:

- The limits specified here are default settings for the editions. They may change according to your license agreement.
- Upgrading your edition: Upgrade your edition by adding the appropriate license. You can backup your server on one edition and restore it on a different edition.
- When you first install the Service Virtualization Designer or Server, a 30-day trial license is installed. This license runs the Premium Edition.

Server Authentication

To prevent unauthorized service management of the Service Virtualization Server, you can limit access to the server through user authentication.

The Service Virtualization Designer accesses the Service Virtualization Server using HTTP Basic Authentication, over HTTPS. The Server grants access to the Designer based on one of the following:

- A local Windows users account, located on the Server machine.
- A Windows domain account in a trusted domain, or in the same domain as the Service Virtualization Server.

To configure authentication:

- Enable authentication during Service Virtualization Server installation. For details, see "Installation" on page 14.
- Enable or disable authentication at a later time. For details, see "Changing Server Security Settings" on page 52.

This section also includes:

- "Service Virtualization User Groups" below
- "Server Access Permissions" on page 51

Service Virtualization User Groups

During installation of the Service Virtualization Server, built-in user groups are created on the server. These groups grant various levels of access to a Service Virtualization Server, or its resources, such as virtual services and agents, as follows:

User Group	Permissions
SV Operators	• View virtual services deployed on the Service Virtualization Server • Switch service simulation modes • Unlock services **Note:** SV Operators can view only partial agent configuration information.
SV Publishers	• View virtual services deployed on the Service Virtualization Server • Switch service simulation modes • Unlock services • Deploy services; full access to owned services (deploy, undeploy, update) **Note:** SV Publishers can view only partial agent configuration information.
SV Runtime Administrators	• View, create, configure, and delete agent configurations on the Service Virtualization Server **Note:** SV Runtime Administrators do not have permissions for viewing or managing services.
SV Server Administrators	• Full access to Server resources • Modify Server access permissions **Managing access permissions:** You can also manage group membership using the Service Virtualization Management interface. In addition, you can manage access permissions to individual resources on the Service Virtualization Server, such as virtual services. For details on Service Virtualization Management, see the *HPE Service Virtualization User Guide*.
SVM Users	• Log in to Service Virtualization Management. For details on Service Virtualization Management, see the *HPE Service Virtualization User Guide*.

Caution: By default, the Windows **Everyone** group is a member of each Service Virtualization user group.

- To limit access, remove the **Everyone** group and add only specific user accounts or other Windows domain groups to the Service Virtualization user groups.
- To provide users with full permissions, add them to multiple groups.

- A user who is not assigned to any of the groups cannot view any agent data or any services deployed on the server.

Note:

- Service Virtualization enforces access permissions only when server authentication is enabled.
- The groups are created regardless of whether the Server authentication option is selected during the Server installation. This enables you to reconfigure at a later stage. For details on changing authentication options, see "Changing Server Security Settings" on the next page.
- Uninstalling or reinstalling Service Virtualization does not affect these groups. Your changes to group membership are maintained between installations.
- **Server upgrade:** If you are upgrading from a Service Virtualization Server earlier than version 3.00, all users and groups that were members of the **Service Virtualization Users** group are placed in the new Service Virtualization groups.
- Every authenticated Windows user has access to /ping and /info resources. This does not depend on Service Virtualization authentication.

Server Access Permissions

You can view access permissions to a Service Virtualization Server and its resources using the Service Virtualization Management interface.

If you are a member of the **SV Server Administrators** group, or the creator of a resource, you can also add and configure permissions for additional users and groups.

Note: You cannot delete the built-in Service Virtualization user groups from the server or from a server resource, or modify the permissions.

For more details on Service Virtualization Management, see the *HPE Service Virtualization User Guide*.

Server Configuration

There are several options for configuring a Service Virtualization Server:

Configure the management endpoint

As the Service Virtualization Server is a .NET application, it can be configured by editing the standard `.config` file. The Service Virtualization Server application configuration file, **HP.SV.StandaloneServer.exe.config**, is located on the Service Virtualization Server machine in the server installation folder. By default, C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin.

You can customize the address of the management REST endpoint. As Windows Communication Foundation framework is exposing the management API, the address can be easily changed by editing the corresponding WCF section of the configuration file. For example, to change the address to `http://localhost:7700/hpsv`, the corresponding entry in `.config` file should look like this:

```
<configuration>
```

```
  ...
  <system.serviceModel>
    ...
      <service name="RestManagementService">
        <host>
          <baseAddresses>
            <add baseAddress="http://localhost:7700/hpsv"/>
            <!--<add baseAddress="https://localhost:6085/management"/>-->
          </baseAddresses>
        </host>
        <endpoint binding="webHttpBinding" contract="ServerManagement.IRestClient"
              bindingConfiguration="unsecured"
              behaviorConfiguration="restDispatchBehavior"/>
      </service>
         ...
  </system.serviceModel>
  ...
</configuration>
```

Command Line Parameters

Service Virtualization Server also accepts command line parameters. Currently, the only supported command line parameter option is the ability to recreate the database used by Service Virtualization Server. This can be useful when testing the application, as it enables the user to quickly wipe the database without the need to manually remove each service from the Designer. To recreate the Service Virtualization Server database, add `recreateDatabase=true` to the command line when running the Server, as in the following example:

```
HP.SV.StandaloneServer.exe recreateDatabase=true
```

Agent Configuration

You can configure Service Virtualization Agents for a standalone Service Virtualization Server using the Designer. For details, see the Service Virtualization Agents section in the *HPE Service Virtualization User Guide*.

When the server is not running, you can edit the agent configuration manually for the server. The agent configuration file is **%ProgramData%\Hewlett Packard Enterprise\HPE Service Virtualization Server\Agents\configurations.xml**.

Tip: To reset the default agent configurations, delete this file.

Changing Server Security Settings

If you choose to change security settings after installing the Service Virtualization Server, you must manually edit the **HP.SV.StandaloneServer.exe.config** configuration file. The file is located in the <**HPE Service Virtualization Server installation directory>\Server\bin** subdirectory. By default, the Server installation path is **C:\Program Files\HPE\HPE Service Virtualization Server**. In the

system.serviceModel configuration section, you must edit the settings for the exposed REST management service.

This section includes:

- "REST management service configuration for disabled authentication" below
- "REST management service configuration for enabled authentication" below

REST management service configuration for disabled authentication

To disable authentication, set the following:

1. Under the **endpoint** element, set the **bindingConfiguration** attribute to **unsecured**.
2. Make sure that the **HTTP** address is not commented out, and the **HTTPS** address is commented out.
3. After reconfiguration, restart the Service Virtualization Server.
4. In order to enable the new configuration, you must redirect all of your projects to the updated URL. For details, see the section on how to change servers in the *HPE Service Virtualization User Guide*.

```
<configuration>
   ...
   <system.serviceModel>
     ...
       <service name="RestManagementService">
         <host>
           <baseAddresses>
             <add baseAddress="http://localhost:6080/management"/>
             <!--<add baseAddress="https://localhost:6085/management"/>-->
           </baseAddresses>
         </host>
         <endpoint binding="webHttpBinding" contract="ServerManagement.IRestClient"
               bindingConfiguration="unsecured"
               behaviorConfiguration="restDispatchBehavior"/>
       </service>
          ...
  </system.serviceModel>
  ...
</configuration>
```

REST management service configuration for enabled authentication

To enable authentication, set the following:

1. Under the **endpoint** element, set the **bindingConfiguration** attribute to **secured**.
2. Make sure that the **HTTPS** address is not commented out, and the **HTTP** address is commented out.
3. After reconfiguration, restart the Service Virtualization Server.

4. In order to enable the new configuration, you must redirect all of your projects to the updated URL. For details, see the section on how to change servers in the *HPE Service Virtualization User Guide*.

```
<configuration>
   ...
   <system.serviceModel>
     ...
       <service name="RestManagementService">
         <host>
           <baseAddresses>
             <!--<add baseAddress="http://localhost:6080/management"/>-->
             <add baseAddress="https://localhost:6085/management"/>
           </baseAddresses>
         </host>
         <endpoint binding="webHttpBinding" contract="ServerManagement.IRestClient"
               bindingConfiguration="secured"
               behaviorConfiguration="restDispatchBehavior"/>
       </service>
          ...
  </system.serviceModel>
  ...
</configuration>
```

Password Encryption

You can encrypt sensitive data stored in Service Virtualization, such as passwords stored in agent configuration files or in the Service Virtualization Credential Store.

Service Virtualization encrypts data using a password that you provide. You can enable password encryption by defining an encryption password for the following application components:

- **Service Virtualization Server encryption.** During server installation, you can select the server encryption option, and define a password to use for encryption. The password is stored for the Windows system account user, and used for all server encryption.
- **Designer/Embedded Server encryption.** During Designer installation, or if you are running the Designer for the first time, you can define a password for encrypting sensitive information stored in the server. Each Windows user running the Designer can define an encryption password, used to encrypt their own data and configuration information.
- **Project encryption.** You can define a password for encrypting virtualization projects. When you export a virtualization project and a **.vproja** project archive file is created, the project is encrypted using the encryption password. For other users to open the exported project, you must provide them with the encryption password.

For more details on project encryption, see the *HPE Service Virtualization User Guide*.

This section includes:

Using Encrypted Passwords in Service Virtualization Configuration Files

You may want to use encrypted passwords in Service Virtualization configuration files, in place of regular text passwords. You may also want to modify existing passwords stored in the files. For example, for the REST management endpoint, the Agent configuration files, or database credentials stored in the registry.

To add or edit encrypted passwords, manually edit the configuration files as follows:

1. Generate an encrypted password using the Service Virtualization Configuration Tool. For details, see "Generating an Encrypted Password" below.
2. In the file you want to configure, add the `enc-` attribute to the relevant file, as shown in the example below.
3. Replace "xxxx" with the encrypted password string generated by the Configuration Tool.

Example:

Unencrypted:

<restManagementServiceConfiguration certificatePath="..\..\ConfigurationTools\certificates\server-cert.p12" **certificatePassword="changeit"** openFirewall="true" />

Encrypted:

<restManagementServiceConfiguration certificatePath="..\..\ConfigurationTools\certificates\server-cert.p12" **enc-certificatePassword="xxxx"** openFirewall="true" />

Generating an Encrypted Password

You can generate an encrypted password string using the Service Virtualization Configuration Tool.

1. From the command line, navigate to the Service Virtualization Server or Designer installation directory's `\bin` folder, and run `ConfigTool.exe`.
2. Use the `enc-printEncryptedValue` option to generate an encryption string, as follows:

   `ConfigTool.exe enc-printEncryptedValue [server encryption password] [value]`

   where

   `[server encryption password]` = the designer or server encryption password, defined during installation

   `[value]` = the password you want to encrypt, such as a certificate password

   An encrypted password string is generated for the password and displayed.

3. Copy the encrypted password string into the file you want to edit.

Example:

Run `C:\Program Files (x86)\HPE\HPE Service Virtualization Server\Server\bin>ConfigTool.exe enc-printEncryptedValue 123 mySecret`

where

`123` = the designer or server encryption password, defined during installation

`mySecret` = the password you want to encrypt

Changing the Service Virtualization Server Encryption Password

If you want to change the Service Virtualization Server's or Designer's encryption password entered during installation, use Windows Credential Manager.

Caution: If you change the encryption password, Service Virtualization will not be able to read encrypted information that was encrypted using the previous password. To correct this, use the Configuration Tool to modify the encrypted passwords.

Server Backup and Restore

The backup and restore tool enables you to create a backup archive file of your Service Virtualization Server, and then to restore the content to any Service Virtualization Server machine. It is a command line tool installed as part of the Service Virtualization Server installation. You can run it on the Server machine only.

Tip: For enhanced security, use the backup tool's encryption option.

Server upgrade. When you run the Server installation wizard to install a new version of the Service Virtualization Server, the installation wizard provides the option to run the backup tool before the new version is installed. After installation is complete, you can select an option to run the restore tool on the upgraded server. For more details on upgrade, see "The Upgrade Process" on page 26.

You might also use the backup and restore tool for the following:

- **For general backup.** Create a backup when you plan to make changes in your virtual services and may want to roll back.
- **When moving to a new server machine.** Backup the Service Virtualization Server, and restore it on the new server machine.

The following data is backed up and restored:

- Virtual services that are deployed on the server and their data.

- Virtual service mode. Services that are in Simulation or Standby modes are backed up and then restored to those same modes. Services that are in Learning mode at the time of backup are removed from the server and must be manually redeployed after the restore process is complete.
- Service Virtualization agent configurations defined on the server.
- The list of servers that are accessed and managed through the Service Virtualization Management interface.

Note: If you restore the backup to a later version of the Service Virtualization Server, the backed up content is automatically migrated to the new version. For more details on migration, see "Project Migration" on page 28.

To backup or restore the state of the Service Virtualization Server:

1. On the Service Virtualization Server machine, stop the server service. From the Windows Start menu, select **All Programs > HPE Software > HPE Service Virtualization > Server 3.80 > Stop Services of HPE Service Virtualization Server**.
2. Open a command prompt and navigate to the \bin folder under the Service Virtualization Server installation folder. By default, C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin.
3. At the command line, run **BackupandRestore.exe** using the following options:

Option	Description
/b:[archive_path]	Creates a backup file, and saves it in a location you specify. **[archive_path]** Specify a file system location and a name for the backup file. For example, **C:\Server_backups\backup_june17**.
/r:[archive_path]	Restores the server state from the backup file you specify in [archive_path].
/q:true	Runs the backup or restore process in silent mode. No user interaction is required. Use this option when you are working with automation.
/e:true	Encrypts or decrypts the backup file. When you run a backup, you are prompted to enter an encryption password. If the backup is set with encryption, you must also use this option when running the restore tool. For more details on encryption, see "Password Encryption" on page 54.

Example:

When moving to a new server machine:

a. On the current server machine, navigate to C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin and run the following command to backup the server:

```
backupandrestore.exe /b:C:\Server_backups\backup_June17
```

b. Install Service Virtualization Server on the new machine.

c. Copy the backup file from the old machine to the same location on the new machine.

d. On the new server machine, navigate to C:\Program Files\HPE\HPE Service Virtualization Server\Server\bin and run the following command to restore the server:

```
backupandrestore.exe /r:C:\Server_backups\backup_June17
```

4. After you restore a Service Virtualization Server, you may want to do the following:

   a. Redeploy additional services stored in shared repositories, such as in the file system or in ALM. For details, see "Virtual Service Deployment" on page 61.

   b. Review group memberships for Service Virtualization user groups. For details, see "Server Authentication" on page 49.

Chapter 8: How to Start Service Virtualization

This section explains how to start the Service Virtualization applications. For more details on each component, see "Service Virtualization Overview" on page 4.

Service Virtualization Designer	From the Windows Start menu, select **All Programs > HPE Software > HPE Service Virtualization > Designer 3.80 > HPE Service Virtualization Designer**.
Service Virtualization Server	Do one of the following: • Start the Server as a Windows service: From the Windows Start menu, select **All Programs > HPE Software > HPE Service Virtualization > Server 3.80 > Start Services of HPE Service Virtualization Server**. • Start the Server as a standalone console application: From the Windows Start menu, select **All Programs > HPE Software > HPE Service Virtualization > Server 3.80 > Service Virtualization Server**. The Service Virtualization Server can be configured as either secured or unsecured. To prevent unauthorized access, it may be configured as secured. For additional details and configuration information on the Service Virtualization Server, see "Server Authentication" on page 49. For details on working with a Service Virtualization Server, see the *HPE Service Virtualization User Guide*.

Service Virtualization Management	**To start the Service Virtualization Management service:** On the Service Virtualization Server machine, from the Windows Start menu, select **All Programs > HPE Software > HPE Service Virtualization > Server 3.80 > Start Services of HPE Service Virtualization Server**. This option starts both the Service Virtualization Server service and the Service Virtualization Management service. **To access the Service Virtualization Management interface:** Open a browser window and enter one of the following URLs: • **The Service Virtualization Management URL:** https://<Service Virtualization Server IP or hostname>:<Service Virtualization Management port> By default, the Service Virtualization Management port is 6086. • **The Service Virtualization Server URL:** <Service Virtualization Server IP or hostname>:<HTTP/HTTPS port number>/management For more details on Service Virtualization network ports, see "Service Virtualization TCP Port Overview" on page 32.

Chapter 9: Virtual Service Deployment

This chapter includes:

Virtual Service Deployment

There are several ways to deploy virtual services on the Service Virtualization Server:

Per project. In the Service Virtualization Designer, you can open a project and assign it to a Service Virtualization Server. All services in the project are deployed on the specified server. For details, see the *HPE Service Virtualization User Guide*.

Per server. As a Service Virtualization Server administrator, you can use the Resource Manager to deploy virtual services.

The Resource Manager is a command line tool enabling you to deploy services in multiple projects, without the need to open each project in the Designer. You can deploy services stored in the file system, or in ALM.

Note: The Resource Manager deployment tool does not require installation of the ALM client.

The Resource Manager deployment tool can deploy services from the following file types:

- A virtualization project (.vproj files). The .vproj file includes information on all project entities (virtual services, service descriptions, simulation models, etc.) included in the project.
- A project archive (.vproja files). A .vproja archive file is created when you export a project from within the Service Virtualization Designer.

The Resource Manager can be particularly useful during the upgrade process. When you upgrade the Service Virtualization Server to a new version, all deployed services are undeployed. After the new version is installed, you need to redeploy all of the virtual services.

You run the Resource Manager from the command line on a Service Virtualization Server. You can deploy services on the same machine, or on any Service Virtualization Server located on another network machine.

Note: You can also deploy services to your server using Service Virtualization Management. For details on Service Virtualization Management, see the *HPE Service Virtualization User Guide*.

For details on using the Resource Manager deployment tool, see "How to Deploy Virtual Services" below.

How to Deploy Virtual Services

You can deploy virtual services located in the file system or in ALM to any Service Virtualization Server.

Note: The deployment process generates a log file, which indicates the success or failure of deployment for each entity. The log file is located in the Service Virtualization Server or Designer log folder, accessible from the Windows Start menu.

1. Do one of the following:
   - On the Service Virtualization Server, open a command prompt. Navigate to the \bin folder under the Service Virtualization Server installation folder. By default, C:\Program Files\HPE\HPE

Service Virtualization Server\Server\bin.

- On the Service Virtualization Designer machine, open a command prompt. Navigate to the \bin folder under the Service Virtualization Designer installation folder. By default, C:\Program Files (x86)\HPE\HPE Service Virtualization Designer\Designer\bin.

2. Run **ResourceManager.exe -deploy** at the command line, using the following options:

Note: If an argument contains spaces, it must be enclosed in quotation marks. For example, "Resources\My Project".

Option	Description
Source and Destination Options	
/f [source_path]	**Source path.** The path to the project file (.vproj) or project archive file (.vproja). • If you specify a folder, all services inside the folder are deployed. • The files may be located in the file system or in ALM. • To specify a resource stored in ALM, use the following format: Resources\[path to file or folder] For example, Resources\MyVirtualProject\VirtualProject1.vproja **Tip:** To locate and copy an ALM folder path, in the Designer, from the main menu, select **File > Open Project/Solution**. On the sidebar, select ALM Resources, and navigate to the desired folder. Copy the path from the **Look in** box.
/sa [Server URL]	**Server URL.** Specify the Service Virtualization Server on which to deploy the services. By default, Service Virtualization attempts to deploy the services on the server specified in the project. Use the /sa option if you want to specify a different server on which to deploy the services.
/sau [User]	**User.** A user account with access to the Service Virtualization Server.
/sapw [Password]	**Password.** The user password for accessing the Service Virtualization Server. The password is case-sensitive.
/ppw [Project_encryption_password]	**Project encryption password.**To deploy an encrypted project, enter the project encryption password. For more details on encryption, see "Password Encryption" on page 54.
/simulate	Deploy the services and places them into simulation mode.

Option	Description
/skip	Services that are already deployed are not redeployed. Use this option, for example, if you are running the deploy tool on a folder containing some services that are already deployed.
ALM Connection Options	
/s [ALM_ URL]	**ALM URL.** The URL of the ALM server, in the following format: <ALM server IP or hostname>:<port number>/qcbin. The path must contain /qcbin at the end.
/d [ALM domain]	**ALM domain.** The ALM domain name in which the files are located.
/p [ALM project]	**ALM project.** The ALM project name in which the files are located.
/u [ALM user]	**ALM user.** The ALM user for the ALM connection.
/pw [ALM user password]	**ALM user password.** The password for the ALM user. The password is case-sensitive.

Example:

```
ResourceManager.exe -deploy /f Resources\MyVirtualProject /s
http://MyALMServer:8080/qcbin /d Default /p MyProject /u alex_alm /pw alexalex11
/sa https://demoserv:6085/management /sau alex /sapw alexalex11
```

This command deploys services located in the ALM Server **http://MyALMServer:8080/qcbin**, in the domain **Default**, in the project **MyProject**, in the Resources module under the folder **MyVirtualProject**.

The services are deployed to the Service Virtualization Server **https://demoserv:6085/management**.

Send Us Feedback

Let us know how we can improve your experience with the Installation Guide.

Send your email to: docteam@hpe.com