

Spectrum™ Technology Platform

Version 12.0

Installation Guide

Unix and Linux



Table of Contents

1 - Planning Your Installation

Installation Scenarios	6
System Requirements	9

2 - Standard Installation

Installing a New Server	26
Upgrading a Server	28
Installing a License Key	31
Installing the Server with a Silent Installer	32
Adding Modules	32
Removing the Server	33

3 - Cluster

Clustered Architecture	36
Requirements	42
Installing a Cluster	42
Installing a Cluster for the Location Intelligence Module	49
Upgrading a Cluster	54
Upgrading a Cluster with the Data Hub Module	55
Upgrading a Cluster with the Location Intelligence Module	58
Removing a Node from a Cluster	60
Adding Modules to a Cluster	60
Starting a Cluster	61
Stopping a Cluster	62
Using Enterprise Designer with a Cluster	62
Disabling Host Checks in Token Authentication	63

4 - Cluster with Separated Configuration Database

Installing a Cluster with a Separated Configuration Database	66
Upgrading a Cluster with a Separated Database	71
Upgrading a Cluster with a Separated Database and Data Hub Module	74
Converting to a Separated Configuration Database	77
Converting from a Separated Configuration Database to a Standard Installation	79
Adding Modules to a Cluster	81

5 - Spectrum Databases

Installing the Address Now Module Database	83
Installing the Advanced Matching Module Database	84
Installing Data Normalization Module Databases	85
Installing Enterprise Geocoding Module Databases	87
Installing Enterprise Routing Module Databases	90
Installing Enterprise Tax Module Databases	91
Installing GeoEnrichment Module Databases	95
Installing Global Addressing Module Databases	96
Installing Global Geocoding Module Databases	98

Installing the Global Sentry Module	
Database	100
Installing Location Intelligence Module	
Databases	103
Installing Universal Addressing Module	
Databases	103
Installing Universal Name Module	
Databases	105
Using the Database Silent Installer	107

6 - Client Tools

Installing the Client Tools	110
Installing Enterprise Designer with a Silent Installer	111
Upgrading Enterprise Designer	112
Removing Enterprise Designer	113

7 - Client API

Installing the Client API	115
Removing the Client API	115

8 - SAP, Siebel, and Microsoft Dynamics

Configuring SAP	117
Configuring Siebel	123
Configuring Microsoft Dynamics CRM	163

9 - Support

Support	167
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1 - Planning Your Installation

In this section

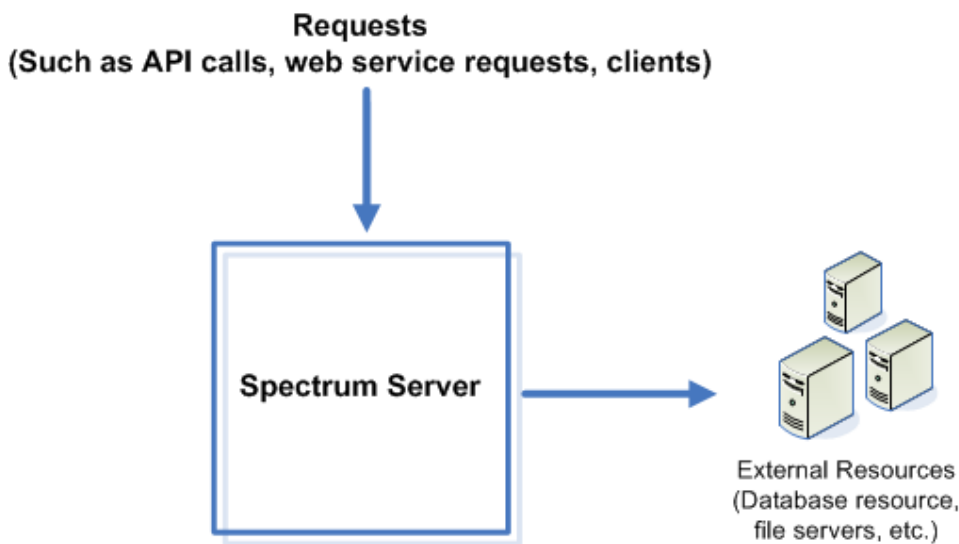
Installation Scenarios	6
System Requirements	9

Installation Scenarios

Spectrum™ Technology Platform supports a variety of installation scenarios that scale to fit the needs of your organization.

Standard

The standard scenario is the simplest installation scenario. You install Spectrum™ Technology Platform on a single server. All activity is handled by this one server, including designing dataflows, storage of configuration information, running jobs, and handling service requests.

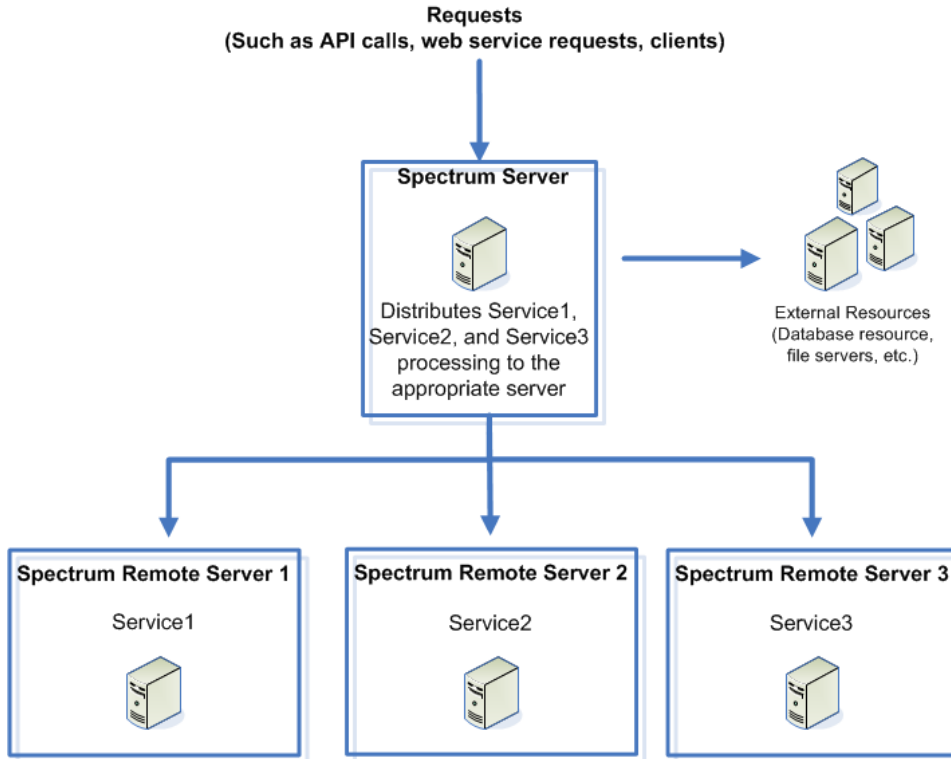


Remote Servers

Remote servers are useful if you have licensed many modules. To use remote servers, you install Spectrum™ Technology Platform on several different servers, installing different modules on each server. You then configure the individual services to execute on one of the remote servers. This approach has the following advantages:

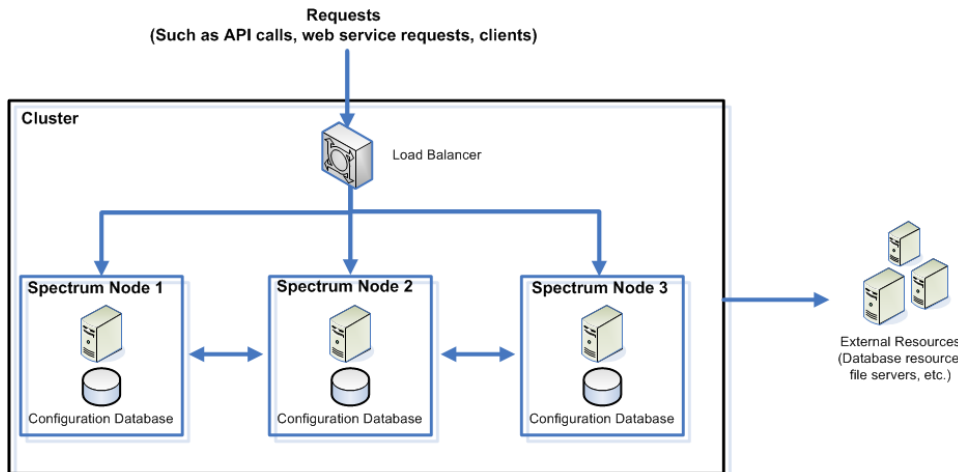
- Improved performance, especially for web service and API calls. For jobs, there may be some performance improvement, but the time it takes to send data across the network to the remote server may offset any performance gains.
- Ability to perform database updates on individual modules without interrupting the availability of other modules. For example, if you need to update a postal database for the Universal Addressing Module, you could install the update by stopping just the remote server handling the Universal Addressing Module, allowing other modules to remain available on other remote servers.

- Startup time can be reduced. With all modules on one server, it can take a long time for the server to start up. With modules installed on separate servers, each server will start up more quickly.



Cluster

In a clustered environment, processing is shared among two or more instances of the server. All communication with Spectrum™ Technology Platform goes through a load balancer. Consider clustering if you require failover redundancy and high-volume, high-performance processing.



This approach has the following advantages:

- Processing is automatically distributed among the nodes in the cluster for optimal performance.
- Configuration settings are automatically synchronized across nodes.
- Uptime can be improved since if a node goes down the other nodes remain available to handle processing requests.
- Adding a new node is easy.

Cluster with Separated Configuration Database

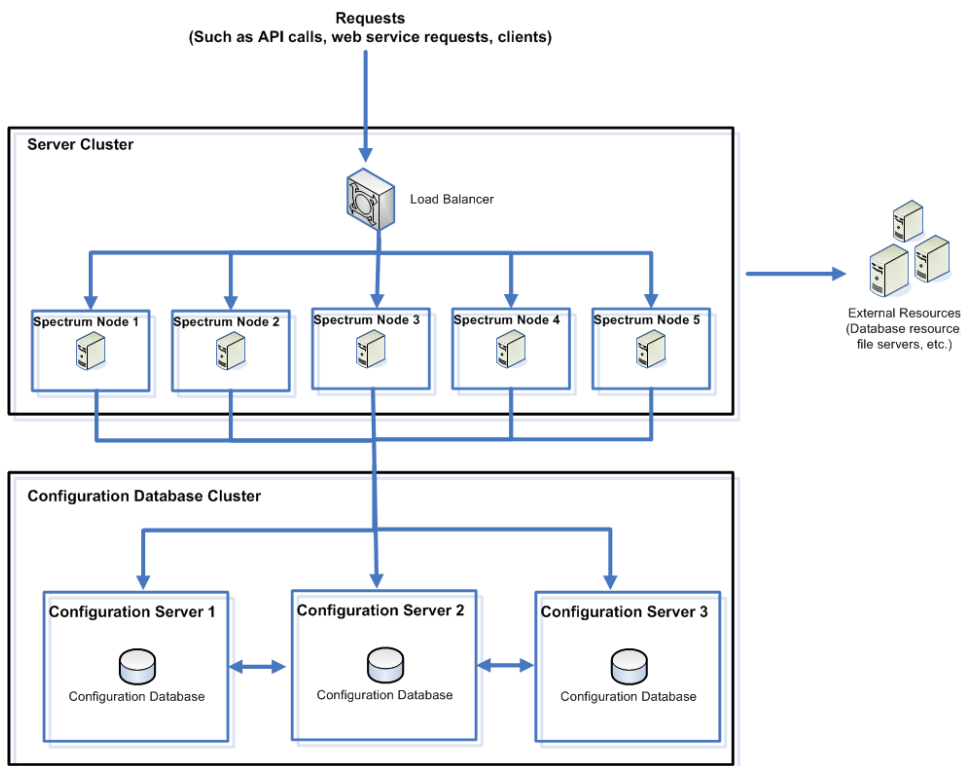
When you install the Spectrum™ Technology Platform server you are installing two things: server software and a configuration database. The server handles the execution of jobs and service requests, reporting, and logging. The configuration database stores data such as users and roles, data connections, dataflows, and the audit log.

For clusters consisting of only a few nodes, installing the server and configuration database together on each node provides acceptable performance. However, a cluster that consists of a large number of nodes may have its performance negatively affected by having a copy of the configuration database on each node. This is because an increasing number of nodes results in increased data replication between nodes during synchronization. Performance may also suffer if users are accessing the configuration database frequently through activities such as editing dataflows or job schedules. These activities require processing power, resulting in less CPU capacity available for running jobs and responding to service requests.

If you have an implementation with four or more nodes, you should consider installing the configuration database to separate servers. This is the most scalable installation scenario because you can add nodes without necessarily adding another instance of the configuration database. For example, say you have five nodes and three configuration database servers. You could add another five nodes, bringing the total number of nodes to 10, while still using just the three configuration databases to support all 10 nodes.

Installing the configuration database to a separate server has the following advantages:

- More CPU is available to the server for running jobs, process flows, and service requests because reading and writing to the configuration database is handled by a separate server.
- Reduced network traffic due to reduced configuration data replicated between nodes. For example, you could have five Spectrum™ Technology Platform servers for handling execution while having only three repositories. With just three repositories instead of five, data only needs to replicate between three servers rather than five.
- Most scalable installation scenario.



System Requirements

Server

Operating Systems

Operating System	Notes
AIX 6.1	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS
AIX 7.1	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS To use the Address Now Module on this operating system you must install the gcc332 libraries.
CentOS 5	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Enterprise Tax Module • Global Geocoding Module • Universal Address Module service Validate Address AUS

Operating System	Notes
CentOS 6	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Address Module service Validate Address AUS
CentOS 7	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Address Module service Validate Address AUS MrSID raster images require libpng12.so on this operating system.
HP-UX 11.31 (Itanium)	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Address Now Module • Enterprise Tax Module • GeoConfidence Module • Global Geocoding Module • Location Intelligence Module • Universal Address Module service Validate Address AUS
Oracle Linux 6	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Enterprise Geocoding Module (U.S.) • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Address Module service Validate Address AUS
Oracle Linux 7	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Address Module service Validate Address AUS
Red Hat Enterprise Linux 5	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS
Red Hat Enterprise Linux 6	The following modules are not supported on this operating system: <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS • Location Intelligence Module stages Closest Site and Legacy Point in Polygon

Operating System	Notes
Red Hat Enterprise Linux 7.1	<p>The following modules are not supported on this operating system:</p> <ul style="list-style-type: none"> • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Address Module service Validate Address AUS
Solaris 10 (SPARC only)	<p>The following modules are not supported on this operating system:</p> <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS • Location Intelligence Module stages Closest Site and Legacy Point in Polygon
Solaris 11 (SPARC only)	<p>The following modules are not supported on this operating system:</p> <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS • Location Intelligence Module stages Closest Site and Legacy Point in Polygon
SUSE Enterprise Linux Server 11	<p>Requires the following:</p> <ul style="list-style-type: none"> • glibc-2.9 or glibc-2.11 • These runtime libraries installed as follows: <pre>zypper install libstdc++33-32bit zlib-32bit</pre> <p>The following are not supported on this operating system:</p> <ul style="list-style-type: none"> • Universal Address Module service Validate Address AUS • Location Intelligence Module stages Closest Site and Legacy Point in Polygon
SUSE Enterprise Linux Server 12	<p>Requires the following:</p> <ul style="list-style-type: none"> • glibc-2.9 or glibc-2.11 • These runtime libraries installed as follows: <pre>zypper install libstdc++33-32bit zlib-32bit</pre> <p>The following modules are not supported on this operating system:</p> <ul style="list-style-type: none"> • Enterprise Geocoding Module (U.S.) • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Universal Addressing Module service Validate Address AUS

Operating System	Notes
Ubuntu 12.04 LTS	<p data-bbox="662 302 1214 331">Requires these runtime libraries installed as follows:</p> <pre data-bbox="678 359 1224 428">apt-get install libstdc++5:i386 zlib1g:i386</pre> <p data-bbox="662 464 1365 493">The following modules are not supported on this operating system:</p> <ul data-bbox="662 506 1073 772" style="list-style-type: none">• Address Now Module• Enterprise Geocoding Module (U.S.)• Enterprise Tax Module• Global Geocoding Module• Microsoft Dynamics CRM Module• SAP Module• Siebel Module• Universal Addressing Module
Ubuntu 14.04 LTS	<p data-bbox="662 806 1214 835">Requires these runtime libraries installed as follows:</p> <pre data-bbox="678 863 1224 932">apt-get install libstdc++5:i386 zlib1g:i386</pre> <p data-bbox="662 968 1273 997">The following are not supported on this operating system:</p> <ul data-bbox="662 1010 1419 1339" style="list-style-type: none">• Address Now Module• Enterprise Geocoding Module (U.S.)• Enterprise Tax Module• Global Geocoding Module• Location Intelligence Module stages Closest Site and Legacy Point in Polygon• Microsoft Dynamics CRM Module• SAP Module• Siebel Module• Universal Addressing Module

Operating System	Notes
Ubuntu 16.04 LTS	<p>Requires these runtime libraries installed as follows:</p> <pre>apt-get install libstdc++5:i386 zlib1g:i386</pre> <p>The following are not supported on this operating system:</p> <ul style="list-style-type: none"> • Address Now Module • Enterprise Geocoding Module (U.S.) • Enterprise Tax Module • Global Geocoding Module • Location Intelligence Module stages Closest Site and Legacy Point in Polygon • Microsoft Dynamics CRM Module • SAP Module • Siebel Module • Universal Addressing Module

Note: A 64-bit operating system is required. 32-bit operating systems are not supported.

Disk Space

New Installation	Upgrade
<ul style="list-style-type: none"> • The disk where you are installing Spectrum™ Technology Platform must have 5 GB of free space to install all modules, less if installing fewer modules. • The disk where the temp folder is located must have at least 10 GB of free space for the installation to extract the files it needs. You may need more depending on the options you are installing. If necessary, modify your TEMP environment variable (Windows) or IATEMPDIR environment variable (Unix and Linux) to point to a location with enough space. 	<ul style="list-style-type: none"> • The disk where you are installing Spectrum™ Technology Platform must have free disk space equal to three times the size of your current installation. To determine the size of your current installation, look at the size of the folder where you installed Spectrum™ Technology Platform. • If you are adding modules as part of your upgrade, you will need 3 GB to install all modules, less if installing fewer modules. • The disk where the temp folder is located must have 10 GB of free space plus four times the size of your current installation. For example, if your current installation is 5 GB, you would need 30 GB of temp space: (4 x 5 GB) + 10 GB = 30 GB. If necessary, modify your TEMP environment variable (Windows) or IATEMPDIR environment variable (Unix and Linux) to point to a location with enough space.

Note: If you are installing a module that uses a reference database, such as a postal database, geocoding database, or data normalization tables, you will need space for this data. The total disk space varies, depending on which modules and databases you are installing.

Memory

- Basic memory requirement: 16 GB
- The Enterprise Geocoding Module requires an additional 500 MB memory for the first non-U.S. geocoder, and 250 MB for each additional non-U.S. geocoder, with these exceptions:
 - Germany, Australia, and the U.K. each require 1 GB additional memory
 - Japan requires 2 GB additional memory
- The Data Normalization Module and Universal Name Module require additional memory if you use these name databases:
 - Arabic Plus Pack: 5.5 GB
 - Asian Plus Pack - Chinese: 32 MB
 - Asian Plus Pack - Japanese: 1.6 GB
 - Asian Plus Pack - Korean: 8 MB
 - Core Names: 1.1 GB
- The Machine Learning Module requires an additional 1 GB memory.

Additional Requirements

- For all Unix and Linux systems, a minimum of 8192 file descriptors is required. This can be set by running the `ulimit` command:

```
ulimit -n 8192
```

Note: Do not set `ulimit` to `unlimited`. Doing so may cause issues with system resources and security alerts that will cause the installation to fail.

- The file size limit needs to be set to 2 GB in order to install Spectrum™ Technology Platform. To set the file size limit, use the `ulimit` command:

```
ulimit -f 4194304
```

This is only required to run the installer. It is not required to run Spectrum™ Technology Platform after installation.

- For IBM AIX systems only, you must download and install Java 8, both the 32-bit version and the 64-bit version, before installing Spectrum™ Technology Platform. If you do not have Java 8 installed, download and install it from:

www.ibm.com/developerworks/java/jdk/aix/service.html

Requirements for the Address Now Module

- Red Hat and SUSE Linux: 512 MB RAM, gcc compiler, and library version 4.1.2
- Sun Solaris: At least an UltraSparc processor with a speed of at least 400 MHz and at least 512 MB RAM, gcc compiler, and library version 3.3

Requirements for the Enterprise Big Data Module

For the stages using Hadoop, which are **Read from Hive File**, **Read from Hadoop Sequence**, **Write to Hadoop Sequence**, and **Write to Hive File**, and for the activities **Run Hadoop MapReduce Job** and **Run Hadoop Pig**:

- Hadoop version 2.6 and above

For the activities using Spark, which are **Submit Spark Job** and **Spark Sorter**:

- Spark 2.0.1 and above.

Network Ports

The Spectrum™ Technology Platform server uses several network ports for communication. Network port conflicts can result in module components failing to start. One indication that a component has failed to start is if it does not appear in Management Console. To troubleshoot the problem, look in the Spectrum™ Technology Platform wrapper log. This log shows which port is causing the problem. You can find the Spectrum™ Technology Platform wrapper log in:

```
server\app\repository\logs\wrapper.log
```

You can change the ports by modifying the properties in this file and restarting the server:

```
server\app\conf\spectrum-container.properties
```

Note: In a clustered environment you must modify the `spectrum-container.properties` file on *each node* in the cluster.

Port	Description
5001	<p>This port is used by the Spectrum™ Technology Platform configuration database.</p> <p>To use a different port in a non-clustered environment, modify this property:</p> <pre>spectrum.repository.server.coordinator.port</pre> <p>To use a different port in a clustered environment:</p> <ul style="list-style-type: none"> • Specify the port you want instead of 5001 in <code>spectrum.repository.server.coordinator.port</code>. • Specify the seed nodes for the configuration database in <code>spectrum.repository.server.cluster.seeds</code>.
5701	<p>This port is used by Hazelcast for managing distributed processing between Spectrum™ Technology Platform servers in a cluster.</p> <p>To use a different port in a non-clustered environment, modify this property:</p> <pre>spectrum.hazelcast.port</pre> <p>To use a different port in a clustered environment:</p> <ul style="list-style-type: none"> • Specify the port you want to use instead of 5701 in <code>spectrum.hazelcast.port</code>. • Include the Hazelcast port number after each IP address specified in <code>spectrum.cluster.seeds</code>. For example, if <code>spectrum.hazelcast.port</code> is set to 5702 and the IP address of a seed node is 1.2.3.4.5, you would specify <code>1.2.3.4.5:5702</code> in <code>spectrum.cluster.seeds</code>.

Port	Description
6362	This port is used if you enable backups of the Spectrum™ Technology Platform configuration database. To use a different port, modify this property: <code>spectrum.backup.http.port</code>
7474	This port is used by the Spectrum™ Technology Platform configuration database. To use a different port, modify this property: <code>spectrum.repository.server.connector.http.port</code>
7687	This port is used by the Spectrum™ Technology Platform configuration database. To use a different port, modify this property: <code>spectrum.repository.server.connector.bolt.port</code>
8080	The port used for communication between the server and Enterprise Designer and Management Console. This port is also used by web services. To use a different port, modify this property: <code>spectrum.http.port</code>
9200	This port is used by the search index engine used by the Advanced Matching Module. To use a different port, modify this property: <code>spectrum.index.http.port</code>
9300	This port is used by the search index engine used by the Advanced Matching Module. To use a different port in a non-clustered environment, modify this property: <code>spectrum.index.tcp.port</code> To use a different port in a clustered environment: <ul style="list-style-type: none"> Specify the port you want to use instead of 9300 in <code>spectrum.index.tcp.port</code> and after the colon in <code>spectrum.index.client.addresses</code>. Specify the seed nodes for the search index in <code>spectrum.index.server.cluster.seeds</code>.
10119	This port is used for API calls made to services. To use a different port, modify this property: <code>spectrum.socketgateway.port</code>
15431-15432	These ports are used by the Machine Learning Module.
32750	This port is used for JDBC connections model stores which are created in Metadata Insights. To use a different port, modify this property: <code>spectrum.metadata.jdbc.port</code>
32751	This port is used for ODBC connections model stores which are created in Metadata Insights. To use a different port, modify this property: <code>spectrum.metadata.odbc.port</code>

Enterprise Designer

Enterprise Designer requires the following:

- Operating system requirements:
 - Windows 7
 - Windows 10
- 86 MB of disk space to install Enterprise Designer without any modules. Each module you install requires additional disk space.
- Microsoft .NET Framework 4.6 (available from the Spectrum™ Technology Platform Welcome Page, <http://<SpectrumServerName>:8080>)
- A monitor with at least 1024 x 768 resolution
- Maximum Windows DPI setting: 150%
- Adobe Reader 7 or later (for viewing and saving reports)

Web Browsers

- Internet Explorer 11
- Google Chrome 56 or later
- Firefox 51 or later
- To use the Data Hub Relationship Analysis Client, a browser with Microsoft Silverlight 5 installed. See www.microsoft.com/getsilverlight. Because Google Chrome no longer supports Microsoft Silverlight, you will need to access these client tools using Internet Explorer or Firefox.

Command Line Tools

Administration Utility

- Operating system requirements:
 - Windows 7
 - Windows 10
- The Administration Utility requires Java 8 or later. If you are installing the Administration Utility on the same computer where the Spectrum™ Technology Platform server is installed, Java 8 is already installed since it is included with the server. If you want to install the Administration Utility on another computer, make sure that the computer has Java 8 or later installed.

Job Executor and Process Flow Executor

The Job Executor and Process Flow Executor command line tools require Java 8 or later.

User Interface Languages

Spectrum™ Technology Platform user interfaces such as Management Console, Enterprise Designer, and web applications are localized for these languages:

- English
- French
- German
- Japanese
- Spanish

Client SDK

The Client SDK provides API access to Spectrum™ Technology Platform services. To use the Client SDK your computer must meet the following requirements:

- 1.25 GB disk space
- JDK 1.5 is required to install the Client SDK. Be sure that JDK 1.5 is in the PATH environment variable. Once installed, the Client SDK supports JDK 1.4 and greater.

Supported Compilers

The Spectrum™ Technology Platform Client SDK is supported with the following compiler and runtime minimum versions.

Java

Client SDK Package Directory: `clientSDK/platforms/java`

Client SDK requires the Java JDK, version 1.4 or higher. This is not installed with the Client SDK.

Windows 32-bit

- JDK: 1.4
- C Compiler: MSVC 6.0 SP3, MSVC 2003, MSVC 2005, MSVC 2008
- C++ Compiler: MSVC 6.0 SP3, MSVC 2003, MSVC 2005, MSVC 2008
- C# .NET: Microsoft .NET Framework 1.1
- Visual Basic: MS Visual Basic 6.0

Windows 64-bit

- JDK: 1.4
- C Compiler: MSVC 2005, MSVC 2008
- C++ Compiler: MSVC 2005, MSVC 2008

HP-UX RISC

- JDK: 1.4
- C Compiler: cc: HP92453-01 A.11.01.21 HP C (Bundled) Compiler
- C++ Compiler: aCC: HP aC++ B3910B A.03.30 HP aC++ B3910B A.03.27

The clientSDK 32-bit lib is linked to the following libraries:

- libpthread.1
- librt.2
- libnsl.1
- libxti.2

The clientSDK 64-bit lib is linked to the following libraries:

- libpthread.1
- libnsl.1
- librt.2
- libdl.1
- libc.2
- libxti.2
- libdl.1

HP-UX Itanium

- JDK: 1.4
- C Compiler: cc: HP aC++/ANSI C B3910B A.06.05
- C++ Compiler: aCC: HP aC++/ANSI C B3910B A.06.05

The clientSDK 32-bit lib is linked to the following libraries:

- libpthread.so.1
- libnsl.so.1
- librt.so.1
- libxti.so.1
- libdl.so.1

The clientSDK 64-bit lib is linked to the following libraries:

- libpthread.so.1
- libnsl.so.1
- librt.so.1
- libxti.so.1
- libdl.so.1

Red Hat (32-bit)

- Operating System: Red Hat Linux 2.4.9-e.65smp
- C Compiler: gcc version 2.96 (gcc 4.1 required for the Address Now Module)

- C++ Compiler: g++ version 2.96

The clientSDK lib is linked to the following libraries:

- libstdc++-libc6.2-2.so.3
- libm.so.6
- libc.so.6
- ld-linux.so.2

Red Hat (64-bit)

- Operating System: Red Hat Linux version 2.6.9-34.0.2.ELsmp
- C Compiler: gcc version 3.4.5
- C++ Compiler: g++ version 3.4.5

The clientSDK lib is linked to the following libraries:

- libstdc++.so.6
- libm.so.6
- libgcc_s.so.1
- libpthread.so.0
- libc.so.6
- ld-linux-x86-64.so.2

SuSE

- Operating System: SuSE SLES 8 (powered by UnitedLinux 1.0) (i586)\nKernel 2.4.21-295-smp (0).
- C Compiler: gcc version 3.2.2
- C++ Compiler: g++ version 3.2.2

The clientSDK lib (32-bit) is linked to the following libraries:

- libstdc++.so.5
- libm.so.6
- libgcc_s.so.1
- libc.so.6
- ld-linux.so.2

Solaris

- Operating System: Solaris 5.8
- C Compiler: cc: Forte Developer 7 C 5.4 2002/03/09
- C++ Compiler: CC: Forte Developer 7 C++ 5.4 Patch 111715-16 2005/04/28

The clientSDK 32-bit lib is linked to the following libraries:

- libpthread.so.1
- libsocket.so.1

- libnsl.so.1
- librt.so.1
- libc.so.1
- libdl.so.1
- libmp.so.2
- libaio.so.1
- libc_psr.so.1

The clientSDK 64-bit lib is linked to the following libraries:

- libpthread.so.1
- libsocket.so.1
- libnsl.so.1
- librt.so.1
- libc.so.1
- libmp.so.2
- libmd5.so.1
- libscf.so.1
- libaio.so.1
- libdoor.so.1
- libuutil.so.1
- libm.so.2
- libc_psr.so.1
- libmd5_psr.so.1

AIX

- Operating System: AIX version 5.1.0.0
- C Compiler: xlc 6.0 Visual Age C 6.0
- C++ Compiler: xlc 6.0 Visual Age C++ 6.0

The clientSDK 32-bit and 64-bit lib are linked to the following libraries:

- libC.a
- libc_r.a
- libpthread.a
- librtl.a

Location Intelligence Module Support

Database

The Location Intelligence Module supports the following spatial databases for use with the spatial services, data, and resources:

- Oracle 11gR2, Oracle 12C

- SQL Server 2008 R2, SQL Server 2012, SQL Server 2014
- SAP HANA 9.3
- PostgreSQL 8+ (PostGIS 2.x)
- GeoPackage (Windows and CentOS)

Data Format

The Location Intelligence Module supports the following data formats for use with the spatial services:

- Generic JDBC (with XY)
- TAB (native, native extended, raster, grid, seamless, DBF)
- ESRI shapefile

Raster Format

The following raster and grid formats (64-bit only) are supported in the Location Intelligence Module:

Raster formats:

Format	File Extension
ADRG	.gen
ASRP	.gen
BMP	.bmp, .wbmp
CADRG	.gen
CIB	various
ECW (SDK v5)	.ecw
GeoTiff	.geotif
GIF	.gif
JPEG	.jpg/.jpeg
MrSID (SDK v9)	.sid
<p>Note: Supports MG4 (MrSID Generation 4). On CentOS 7.1, libpng12.so is required for reading MrSID rasters.</p>	
NITF	.ntf
PNG	.png
TIFF	.tif

Note: TIFF files used by the Feature Service and Mapping Service cannot exceed 2GB.

Note: Solaris or AIX machines, whether installed with 32- or 64- bit JVM, do not support ECW and MrSID raster formats.

Grid Formats

Format	File Extension
Defense Digital Terrain Elevation Data (DTED)	.dt0, .dt1, .dt2, .dt3
MapInfo Grid	.mig
MRR (Multi-Resolution Raster)	.mrr
<p>Note: This support is provided on Windows 64-bit and the following Linux environments:</p> <ul style="list-style-type: none"> • Oracle Linux 6.5 and 7.1 • CentOS 6.4 and 7.1 • Ubuntu 12.04, 14.04, and 16.04 	
Vertical Mapper Classified Grid	.grc
Vertical Mapper Continuous Grid	.grd

In order to use rasters and grids as a map layer, there must be an associated .TAB file containing georeference information about the image, including the bounds, coordinate system, and registration points.

Utilities

The Location Intelligence Module utilities (Tile Generator, WMTS Tile Generator, and the Geometry Validator) require at a minimum Java 8. If you are installing these utilities on the same computer where the Spectrum™ Technology Platform server is installed, Java 8 will be installed since it is included with the server. If you want to install the utilities on another computer, make sure that the computer has Java 8 or later installed.

Samples

The .NET samples require at a minimum Visual Studio 2013 and Microsoft .NET Framework 4.5.

MapInfo Professional Compatibility

The Location Intelligence Module is compatible with MapInfo Professional up to version 16.x. See Tools > MapInfo Pro in the *Spectrum Spatial Getting Started Guide* for more information about the interoperability of the two products.

WebDAV

When communicating to the server over HTTPS to map a drive to the repository, a WebDAV client is required to use the TLS v1.2 protocol. For client machines running on Windows 7 SP1, Windows Server 2008 R2 SP1, and Windows Server 2012, you must apply a security patch and registry update to leverage this protocol. For instructions, see the "Managing Security" chapter in the Administration section of the *Spectrum Spatial Guide*.

2 - Standard Installation

In this section

Installing a New Server	26
Upgrading a Server	28
Installing a License Key	31
Installing the Server with a Silent Installer	32
Adding Modules	32
Removing the Server	33

Installing a New Server

Prerequisites:

- Before installing Spectrum™ Technology Platform, be sure to read the release notes. The release notes contains important compatibility information as well as release-specific installation notes.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

To install a new server:

1. If you are installing Spectrum™ Technology Platform on Red Hat Enterprise Linux 6 or 7, Oracle Linux 6 or 7, or CentOS 6 or 7, you must install the 32-bit glibc runtimes before installing Spectrum™ Technology Platform. There are two ways to install the 32-bit glibc runtimes:
 - Using your local yum repository execute the following command:

```
yum install -y libstdc++.i686 libstdc++-devel.i686 libstdc++-devel.x86_64 zlib.i686 zlib.x86_64
```
 - Perform a media-based rpm install. Install the following:

```
libstdc++.i686
libstdc++-devel.i686
libstdc++-devel.x86_64
zlib.i686
zlib.x86_64
```
2. Download Spectrum™ Technology Platform using the download instructions contained in your welcome email or the release announcement email.
3. Extract the downloaded file to a temporary location on the server where you want to install Spectrum™ Technology Platform.
4. Change the directory to the location of `install.sh`.
5. Be sure you have execute permission on the files by typing the following command:

```
chmod a+x install.sh
```
6. Run `install.sh`.
7. The installer guides you through the installation process. Note the following:
 - If you are setting up an environment where the configuration database is installed on a separate server choose **Server only**. Otherwise choose **Standard installation**.
 - When prompted, select the modules that you want to install.
 - Make sure that Spectrum™ Technology Platform is selected.

- If you are installing the SAP Module you must install these modules: **Address Now Module** and **Advanced Matching Module**. The Enterprise Tax Module is optional. The **Universal Addressing Module** is only required if you will be using the SAP module service SAPValidateAddressWithCandidates.
- If you are installing the Siebel Module you must install these modules: **Advanced Matching Module**, **Data Normalization Module**, and **Universal Name Module**. You may need to install one or more of these modules depending on the features you have licensed: **Address Now Module**, **Enterprise Geocoding Module**, and **Universal Addressing Module**.
- When prompted, enter the HTTP port that you want to use then press **Enter**. The default is 8080. For a complete listing of ports used by Spectrum™ Technology Platform see [Network Ports](#) on page 15.

8. Start the server.

Note: If you are installing a cluster, you do not need to start the server.

- a) Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.

For example:

```
cd /usr/g1/tst/server/bin
```

- b) Source the setup file.

For example:

```
./setup
```

- c) Start the Spectrum™ Technology Platform server.

- To start Spectrum™ Technology Platform in the background, type the following command:

```
./server.start
```

- To start Spectrum™ Technology Platform in the foreground, type the following command:

```
./server.start console
```

9. To ensure that Spectrum™ Technology Platform has started, open the log file `<Spectrum Installation Location>/server/app/repository/logs/wrapper.log` and look for this message:

```
INFO [Server] Pitney Bowes Spectrum(TM) Technology Platform
      (Version version build) Started
```

Important: Do not attempt to stop the server until after it has fully started for the first time. Stopping the server before it performs an initial startup can cause your installation to become unusable.

10. Apply all the updates for the platform and any modules you have installed. For a listing of updates, see the [Update Summary](#) on the Pitney Bowes support website.

Upgrading a Server

Prerequisites:

- Before upgrading, be sure to read the release notes for the new version. The release notes contain important compatibility information, supported upgrade paths, and module-specific data backup recommendations.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

This procedure is for upgrading a single Spectrum™ Technology Platform server. Follow this procedure when upgrading a standard installation or when upgrading a node in a cluster. If you are upgrading a cluster, be sure to follow the cluster upgrade process. For more information, see [Upgrading a Cluster](#) on page 54.

If you use remote servers, you must upgrade the remote servers and start them before upgrading the main server. If you upgrade the main server and start it before upgrading and starting the remote servers, you will need to recreate the remote server connections in Management console after upgrading.

Note: It will take about one hour to upgrade an average installation to Spectrum™ Technology Platform 12.0. If your installation has a large number of flows or a long transaction history, your upgrade process could take four to six hours.

1. Download the updated version of Spectrum™ Technology Platform using the download instructions contained in the release announcement email.
2. Unzip the downloaded installer to a temporary folder on the server you want to upgrade.
3. Back up the server. For instructions on creating a backup, see the *Administration Guide*.

Important: We recommend that you create a backup before upgrading so that you can recover your flows, security settings, and other settings, if an error occurs during the upgrade process.

4. If you use LDAP or Active Directory for Spectrum™ Technology Platform authentication, back up this file:

```
server\app\conf\spring\security\spectrum-config-ldap.properties
```

5. Back up module-specific data for any of these modules if you have them installed.

Module	Items to Back Up
Advanced Matching Module, Data Normalization Module, and Universal Name Module	<p>Back up the contents of these subfolders located in <i>SpectrumLocation/server/modules</i>:</p> <ul style="list-style-type: none"> • cdqdb • lucene • matcher • parser • searchindex • tables .
Data Hub Module	<p>Open the Relationship Analysis Client and click Manage. Select the model you want to back up then click Backup.</p> <p>In addition to backing up your models, back up these two property files:</p> <ul style="list-style-type: none"> • server\modules\hub\hub.properties • server\modules\db\neo4j.properties
Location Intelligence Module	<p>Back up your named resources, data, and configuration files.</p>

6. In Enterprise Designer, go to **View > Execution History**. If the combined number of records on the **Jobs** and **Process Flows** tabs is more than 10,000, we recommend that you purge and archive the oldest records before upgrading. This will significantly reduce the amount of time it will take to upgrade. For example, if you have 6,000 records in your job history and 11,000 records in your process flow history, you would have a total of 17,000 records and we would recommend that you purge the oldest 7,000 records to get the total down to 10,000. If you have fewer than 10,000 records in total on the **Jobs** and **Process Flows** tabs, you can skip this step.

If you are upgrading from 9.0 SP3 or 10.0 SP1, delete old history records manually using Management Console.

If you are upgrading from version 11.0, or 11.0 SP1, follow the procedure below to delete old history records. This process is faster than manually deleting records in Management Console, but is only available on versions 11.0 and 11.0 SP1.

- a) Open a web browser and go to `http://server:port/jmx-console`

Where:

server is the IP address or hostname of your Spectrum™ Technology Platform server.

port is the HTTP port used by Spectrum™ Technology Platform. The default is 8080.

- b) Log in using the admin account.
- c) Under **Domain: com.pb.spectrum.platform.config**, click **com.pb.spectrum.platform.config:manager=ArchiveTransactionManager**.
- d) (Optional) If you want to save an archive of the history that you are going to purge, specify the path where you want to save the archive in the **ArchiveDirectory** field, then click **set**. Then, set **ArchiveEnabled** to **true** and click **set**.
- e) In the **ArchiveRetain** field, specify how many days of records you want to keep in the history then click **set**. For example, if you enter 45 then history records that are 45 days old or newer would be retained, and records 46 days old and older would be purged. To determine how many days of records you can retain, look at the job and process flow history in Enterprise Designer and identify the point in time where the number of records exceeds 10,000.
- f) In the **PurgeOperation** field, leave the value set to **ALL**.
- g) To run the purge, click **Invoke**.

You have purged flow and execution history so that you now have a smaller configuration database to upgrade. This will speed up the upgrade process.

7. Source the `<SpectrumLocation>/server/bin/setup` script.
8. Run the `<SpectrumLocation>/server/bin/server.stop` script to stop the Spectrum™ Technology Platform server.
9. Wait for the server to finish the shutdown process before proceeding.

Important: If you have the Data Hub Module installed, make sure that all models shut down properly. Models that do not shut down properly will not open successfully after upgrading.
10. If you have the Address Now Module installed, stop the Address Now server by executing the `<SpectrumLocation>/server/bin/stop_adn_server.sh` script.
11. If you have the Global Sentry Module installed, shut down the Global Sentry database server by executing the `<SpectrumLocation>/server/GlobalSentryDatabase/bin/globalsentrydb.stop` script.
12. Run the Spectrum™ Technology Platform installer to upgrade your system.
13. Apply all the updates for the platform and any modules you have installed. For a listing of updates, see the [Update Summary](#) on the Pitney Bowes support website.
14. If you use LDAP or Active Directory for Spectrum™ Technology Platform authentication, open this file in a text editor:

```
server\app\conf\spring\security\spectrum-container-ldap.properties
```

Set the properties in this file to match those in the copy of this file that you backed up before upgrading.

Note: Any job or subflow stored in the system during a server upgrade is marked as exposed to provide the same behavior for those jobs and subflows as before the upgrade. Any job or subflow that is exported prior to the upgrade will not be exposed. Therefore, when importing these jobs or subflows back into the system, you must manually expose the imported job or subflow.

Some modules have post-upgrade steps you need to perform.

Data Hub Module

Open this file in a text editor: `server/modules/hub/neo4j.properties` and set the property `allow_store_upgrade` property to `true`. The purpose of this property is to protect against unintentional and irreversible store upgrades. Setting this property to "true" indicates that you understand the ramifications of proceeding with an upgrade and have taken the necessary precautions before proceeding.

Restart the Spectrum™ Technology Platform server. The server will upgrade each model. Examine the file `server/app/repository/logs/wrapper.log` for errors or warning messages. Once all models have been upgraded, go back to the `hub.properties` file and comment out the `allow_store_upgrade` property.

Installing a License Key

The license key provides access to software pursuant to the terms of your license. It is an encrypted XML file with a file name ending in `.key`.

Note: When you upgrade an existing Spectrum™ Technology Platform installation, you may continue to use your existing license key. You do not need to get a new one.

To install a license key:

1. Locate the email containing your license key that you received from Pitney Bowes.

Important: You must install the license key within 45 days of receiving it. If you do not you will need to contact Pitney Bowes for another license key.

2. Copy the `.key` file to the following directory:

```
$G1DCG/server/app/import
```

The license key is applied to your system. There is no need to restart your server.

If there was a problem installing the license key, check the log file in:

```
$G1DCG/server/app/repository/logs
```

Depending on whether the key was processed successfully or there was an error processing the key, the processed key goes into one of these folders:

- `$G1DCG/server/app/import/archive/license-keys`
- `$G1DCG/server/app/import/error/license-keys`

Installing the Server with a Silent Installer

The silent install process for the server allows you to pre-configure the server installation process so that it runs without user intervention. Instead of responding to prompts for information such as the installation location and which modules to install, you specify these responses in a properties file which the installer uses instead of user prompts.

1. In the Spectrum™ Technology Platform installer, go to the folder `SilentInstaller`.
2. Open the file `installer.properties` in a text editor.
3. Edit `installer.properties` as necessary to specify the installation settings you want to use. See the comments in `installer.properties` for additional information.
4. To run the installer in silent mode, place `installer.properties` in the same directory as `install.sh`. When the installer executes it will detect `installer.properties` and automatically run in silent mode.

Alternatively, you can place `installer.properties` in different directory and give the absolute path to the property in the command prompt using the `-f` argument, as follows:

```
install.sh -f PathOfPropertyFile/installer.properties
```

Adding Modules

Spectrum™ Technology Platform is designed so that modules can be added as you grow your system over time. For example, you may have one Spectrum™ Technology Platform module and then license another module a few months later. The second product may be built on a newer version of Spectrum™ Technology Platform. This will require you to upgrade your version of Spectrum™ Technology Platform. In another case, the second product is compatible with the installed version. In both cases, the install program recognizes if it needs to upgrade Spectrum™ Technology Platform and will do so without prompting. If an upgrade is not required, the installer will skip the Spectrum™ Technology Platform install steps and install the new module.

The process for adding a module is similar to that of a new installation. In both cases you start the installation process by running the Spectrum™ Technology Platform installer. Note that Spectrum™ Technology Platform modules do not have their own installer. Instead, you use the Spectrum™ Technology Platform installer to add modules.

1. If the Spectrum™ Technology Platform server is running, stop it by typing the following command in the Spectrum™ Technology Platform bin directory:

```
./server.stop
```

2. Change the directory to the location of `install.sh` in the Spectrum™ Technology Platform installer.
3. Run `install.sh`.

4. Load any necessary databases for the new product. See the instructions in [Spectrum Databases](#) on page 82.
5. Start the server:
 - a) Go to the Spectrum™ Technology Platform bin directory.
 - b) Source the setup file. For example,


```
./setup
```
 - c) Type the following command:


```
./server.start
```
6. Install the license key for the module. For instructions, see [Installing a License Key](#) on page 31.

Removing the Server

Before uninstalling any product, back up any files you may need in the future. Uninstalling Spectrum™ Technology Platform will remove all jobs and settings.

1. If the Spectrum™ Technology Platform server is running, stop the server by typing the following command in the Spectrum™ Technology Platform working directory:


```
./server.stop
```
2. Source the setup file. For example,


```
./setup
```
3. Uninstall the Spectrum™ Technology Platform modules by running the uninstall script for each module. The scripts are located in the `Uninstall/Uninstall_IUCode` directory, where *IUCode* is the installation unit code for the module you want to uninstall.

Module Name	IU Code
Analytics Scoring Module	AAM
Address Now Module	ADN
Advanced Matching Module Data Normalization Module Universal Name Module	CDQ
Big Data Integration Module	BDI
Business Steward Module	BSM
Data Federation Module	SDF
Data Hub Module	GRF

Module Name	IU Code
Enterprise Data Integration Module	EDI
Enterprise Geocoding Module (Australia)	IAU
Enterprise Geocoding Module (Global)	GLOBAL
Enterprise Geocoding Module (U.K.)	IGB
Enterprise Geocoding Module (U.S.)	KGL
Enterprise Geocoding Module (World)	IXW
Enterprise Routing Module Location Intelligence Module	LIM
Enterprise System Connector	ESC
Enterprise Tax Module	GSL
GeoComplete Module	GCM
GeoConfidence Module	GCO
Global Address Validation Module	GAV
Global Sentry Module	OIS
Information Extraction Module	IEM
Microsoft Dynamics CRM Module	MSD
SAP CRM 7.0 Module	70S
SAP ECC 6.0 Module	E6C
Siebel Business 8.0 Module	SQB
Siebel Business 8.1.1 Module	81B
Siebel Industry 8.0 Module	SQI
Siebel Industry 8.1.1 Module	81I
Universal Addressing Module	UNC
Visual Insights Module	SBI

- After uninstalling all Spectrum™ Technology Platform modules, uninstall Spectrum™ Technology Platform by running the uninstall script located in the `Uninstall/Uninstall_LES` directory.

3 - Cluster

In this section

Clustered Architecture	36
Requirements	42
Installing a Cluster	42
Installing a Cluster for the Location Intelligence Module	49
Upgrading a Cluster	54
Upgrading a Cluster with the Data Hub Module	55
Upgrading a Cluster with the Location Intelligence Module	58
Removing a Node from a Cluster	60
Adding Modules to a Cluster	60
Starting a Cluster	61
Stopping a Cluster	62
Using Enterprise Designer with a Cluster	62
Disabling Host Checks in Token Authentication	63

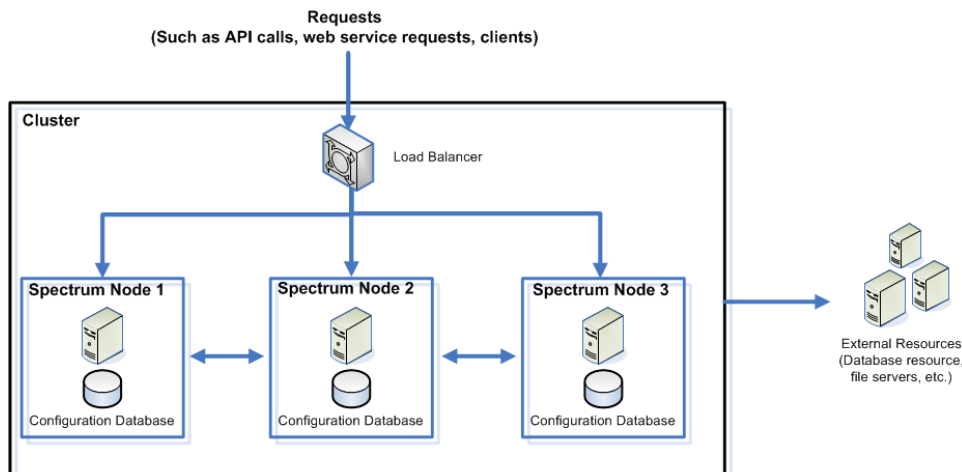
Clustered Architecture

In a clustered environment, processing is shared among two or more instances of the server. All communication with Spectrum™ Technology Platform goes through a load balancer. Consider clustering if you require failover redundancy and high-volume, high-performance processing.

There are two ways to run Spectrum™ Technology Platform in a cluster. You can install the Spectrum™ Technology Platform server and configuration database on each node in the cluster, or you can separate the server from the configuration database.

Cluster with Server and Configuration Database on Each Node

In this configuration, a complete Spectrum™ Technology Platform server is installed on each node so that each node has both the server software and the configuration database. The configuration database stores things like your user names and passwords, connections, flows, history, and audit log.



This configuration has these advantages:

- Processing is automatically distributed among the nodes in the cluster for optimal performance.
- Configuration settings are automatically synchronized across nodes.
- Uptime can be improved since if a node goes down the other nodes remain available to handle processing requests.
- Adding a new node is easy.

Cluster with Separated Configuration Database

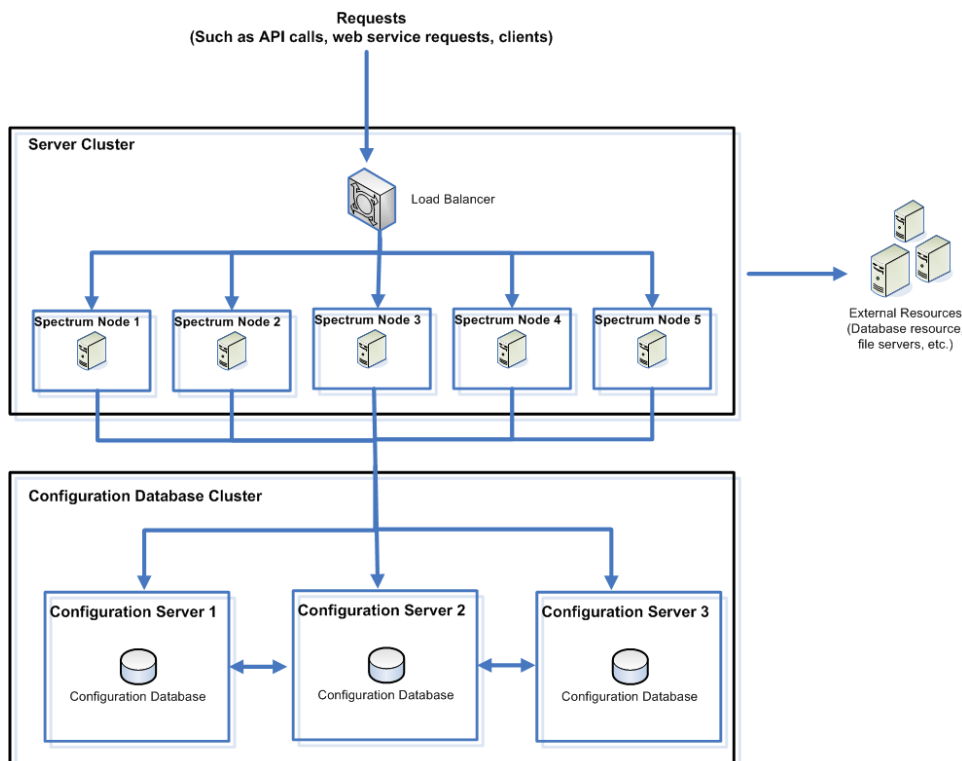
When you install the Spectrum™ Technology Platform server you are installing two things: server software and a configuration database. The server handles the execution of jobs and service requests, reporting, and logging. The configuration database stores data such as users and roles, data connections, dataflows, and the audit log.

For clusters consisting of only a few nodes, installing the server and configuration database together on each node provides acceptable performance. However, a cluster that consists of a large number of nodes may have its performance negatively affected by having a copy of the configuration database on each node. This is because an increasing number of nodes results in increased data replication between nodes during synchronization. Performance may also suffer if users are accessing the configuration database frequently through activities such as editing dataflows or job schedules. These activities require processing power, resulting in less CPU capacity available for running jobs and responding to service requests.

If you have an implementation with four or more nodes, you should consider installing the configuration database to separate servers. This is the most scalable installation scenario because you can add nodes without necessarily adding another instance of the configuration database. For example, say you have five nodes and three configuration database servers. You could add another five nodes, bringing the total number of nodes to 10, while still using just the three configuration databases to support all 10 nodes.

Installing the configuration database to a separate server has the following advantages:

- More CPU is available to the server for running jobs, process flows, and service requests because reading and writing to the configuration database is handled by a separate server.
- Reduced network traffic due to reduced configuration data replicated between nodes. For example, you could have five Spectrum™ Technology Platform servers for handling execution while having only three repositories. With just three repositories instead of five, data only needs to replicate between three servers rather than five.
- Most scalable installation scenario.



Cluster Components

A cluster is comprised of these components:

Load balancer

As requests come into the cluster, the load balancer identifies the best available Spectrum™ Technology Platform node to handle the request. The request is then passed to a Spectrum™ Technology Platform node.

From the user's perspective, the distributed architecture is handled automatically behind the scenes. The user sends a request to the load balancer's URL and port for Spectrum™ Technology Platform (typically port 80 for a distributed environment) as if it were a single Spectrum™ Technology Platform server.

Nodes

A node is a Spectrum™ Technology Platform server. A node can contain a copy of the server and configuration database, or if you installed the configuration database to a separate cluster, each node contains either the server or the configuration database. Nodes are continuously synchronized. This enables each node to share the same settings, such as license information, dataflows, and database resources.

To configure the cluster, simply point Management Console or Enterprise Designer to the load balancer's URL and port for Spectrum™ Technology Platform (typically port 80 for a distributed environment).

External resources

The definitions for external resources such as database resources (postal databases and geocoding databases for example), JDBC connections, and file servers, reside in the configuration database. The resources themselves (databases, files, web services) can reside anywhere you choose. Database resources can be installed either on each node in the cluster or on a shared network location.

Because the database resources themselves reside outside the cluster, multiple clusters can share the same database resources.

You must create the resource definitions in each cluster using Management Console. For example if you want multiple clusters to share the same geocoding database, you can install the geocoding database on a server accessible from each cluster, then in Management Console point each cluster to the geocoding database.

Installing a Cluster

For instructions on installing a cluster, see the *Spectrum™ Technology Platform Installation Guide*.

Clustered Architecture for the Data Hub Module

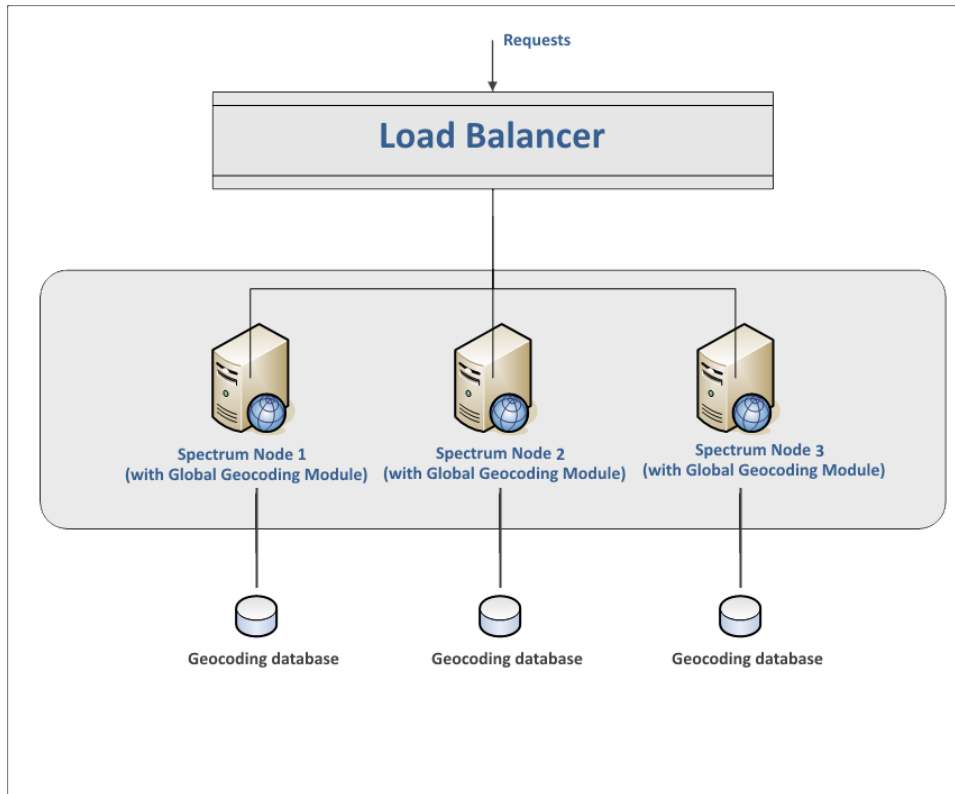
In a clustered environment, Data Hub Module graph databases are replicated to each Spectrum™ Technology Platform server in the cluster. The server that receives the first request to open a model is the master. All other servers maintain a replicated mirror of that master. If different servers receive requests to open different models, the masters for the models are on different servers. All writes to the database are synchronized with the master. Any server can process read requests.

We recommend that clusters have a minimum of three servers in order to achieve a level of fault tolerance. Also, an odd number of servers provide better resiliency per server than an even-numbered cluster. We make these recommendations because once the model is running, the system will continue running as long more than half the servers are in communication. For example, in a cluster of six servers, four must stay in communication; for a cluster of three servers, two must stay in communication, and for a cluster of two servers, all servers must be in communication. Both a three-server cluster and a four-server cluster can tolerate a maximum of one lost server.

All servers in the cluster must be available in order to open or create a model. If any server is unavailable, the server will wait for all servers to join the cluster. If this number of servers do not join within the timeout period, the operation fails.

Clustered Architecture for the Global Geocoding Module

In a clustered environment, processing is shared among two or more instances of the server. The diagram below illustrates the deployment architecture of such a configuration. Load balancing can be used to support high availability and scaling. The deployment architecture includes a load balancer, Spectrum™ Technology Platform nodes with Global Geocoding Modules and Geocoding databases.



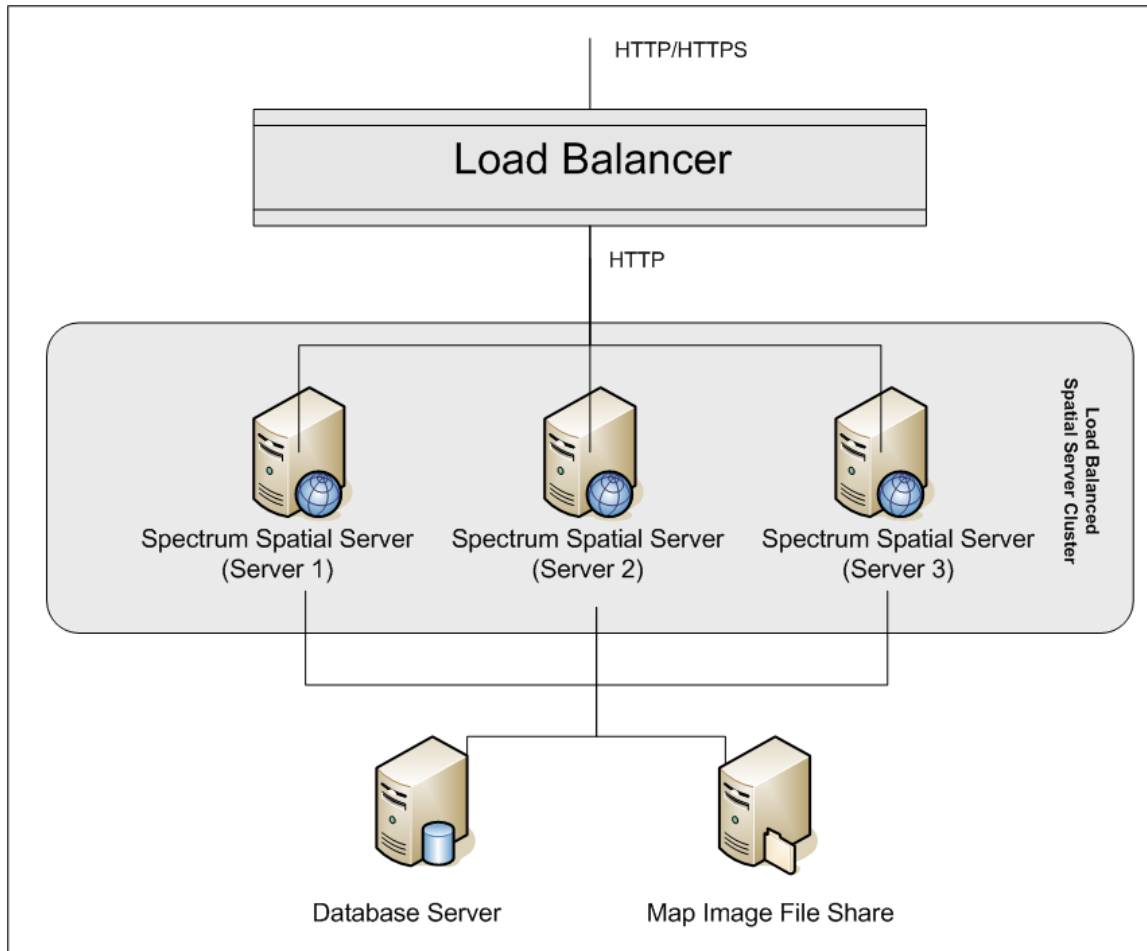
Note: Each Geocoding database MUST be installed in the same location on all of the nodes for the cluster to work properly. For example, if the Geocoding database for “Spectrum Node 1” is installed on `C:\data\`, then the other Spectrum nodes' Geocoding database must also reside on `C:\data\`.

Clustered Architecture for the Location Intelligence Module

In a clustered environment, processing is shared among two or more instances of the server. The diagram below illustrates the deployment architecture of such a configuration. Load balancing can be used to support high availability and scaling. The deployment architecture includes a load balancer, a Spectrum Spatial cluster, a database, and a file share. With this approach it is possible to scale both horizontally and vertically. You can cluster the Location Intelligence Module with or without platform clustering.

Note: Setting up both a Spectrum™ Technology Platform cluster and a Location Intelligence Module cluster is recommended and has several benefits:

- Security (ACL) synchronization happens automatically for named resources .
- Dataflows, users, and roles created on one node will automatically synchronize to all nodes.
- All Location Intelligence Module demo pages and utilities (such as Spatial Manager) can and should point to the load balancer.



Load Balancer

The load balancer spreads requests between the Spectrum Spatial instances. Any load balancer that supports load balancing HTTP/HTTPS requests can be used.

Spectrum Spatial Cluster

The cluster is a collection of Spectrum instances with LIM sharing administration, named resources, geographical metadata content and configuration settings. Additional nodes can be added to the cluster for resilience or to deliver support for greater loads. Each node can be scaled vertically through additional hardware resources and/or additional instances should this be required for hardware with massive resources. Spectrum can be configured to use restricted numbers of CPUs.

Database

Spectrum stores named resources (maps, layers, tables and styles), geographic metadata and configuration in a repository. In the default single server installation an embedded database is used to store these resources on the local server. To create a resilient scalable solution

this embedded database should be replaced with a resilient independent database. Oracle, PostGreSQL/PostGIS and Microsoft SQL Server are the supported repository databases.

In the load balanced configuration, Spectrum nodes cache these resources in a local cache and search index in each node in the cluster. When a Spectrum node receives a request it uses the local cache and index to find resources. Named resources can be added through any node in the cluster. Each node keeps its cache current by checking for differences between its local cache and the central database. This check occurs every 2 seconds by default. Time frequency can be configured. This architecture ensures the server delivers high performance transactions and the load on the repository database is kept to a minimum. If a new Spectrum node is added to the cluster the cache and index are created automatically. Such a scenario can occur to remedy a node failure or grow the capability of the deployment.

File Share

The file share provides a folder to hold map images generated by Spectrum. When maps are rendered using the web services the server supports the map images being returned through URLs or returned as a base 64 encoded image. When a URL is returned the map image is stored as a file and served on request of the URL. To ensure any Spectrum node can return the map image a file share is used to store the images.

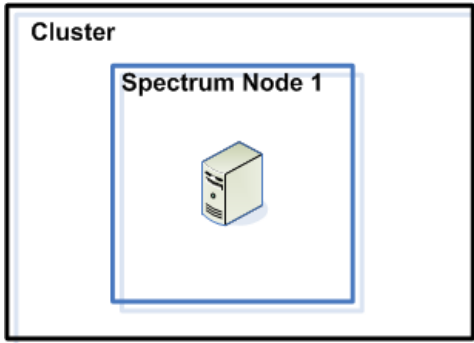
Requirements

- All servers that host a node must have their system clocks synchronized in order for the cluster to function. Verify that all systems point to the same time service to synchronize their clocks.
- All nodes in a cluster must be the same version of Spectrum™ Technology Platform so be sure that the version you install is the same as the existing nodes.
- All nodes in a cluster must have the same modules installed.
- A cluster should have at least three nodes.

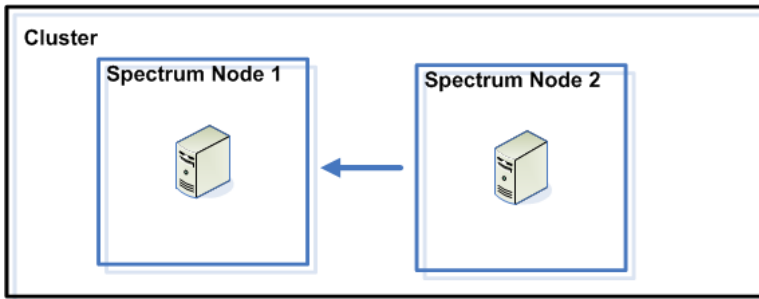
Installing a Cluster

Installing a cluster involves setting up one Spectrum™ Technology Platform server at a time. Each time you add a server you need to point it to an existing server which will act as a seed node. A *seed node* is a server that has a copy of the Spectrum configuration data that it can copy to a new node so that the new node's configuration is synchronized with the other nodes in the cluster. The following diagrams illustrate this process.

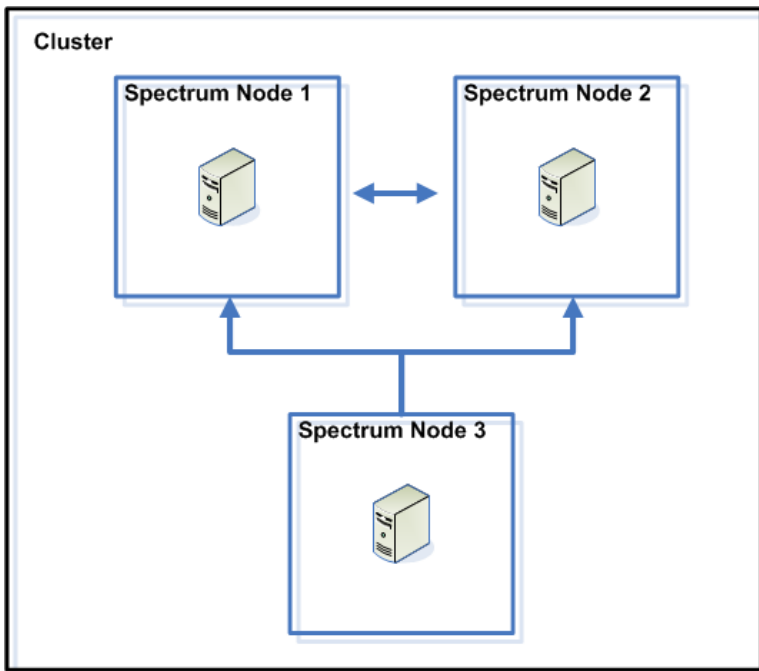
After installing the first node you will in effect have a cluster with only one node:



When you install the second node it must point to the first node as a seed node. This will enable the second node to receive a copy of the first node's configuration database, resulting in a cluster with two nodes with synchronized configuration information.



As you add additional nodes, the new nodes can point to any of the existing nodes as a seed node. You must also configure the first node to point to at least one other node in the cluster so that if it is ever brought down it can rejoin the cluster.



Before you begin, install a load balancer. You can choose for yourself an appropriate load balancer. Follow the procedures described in the load balancer's documentation when installing.

Note: The load balancer must be configured to allow encoded forward slashes. If the load balancer does not allow encoded forward slashes you may get HTTP 404 errors while using the cluster. For example, if you are using an Apache load balancer, you can configure it to allow encoded forward slashes by opening the `httpd.conf` file and specifying this property: `AllowEncodedSlashes On`. For other types of load balancers, refer to the load balancer's documentation.

Once you have your load balancer installed, follow these steps to install nodes in the cluster.

1. Install Spectrum™ Technology Platform on a server where you want to host a node. For instructions, see [Installing a New Server](#) on page 26.

Important: Do not start the server when the installation completes. You must complete the following steps before starting the server.

2. Configure the properties files.
 - a) Edit the properties in the file `server/app/conf/spectrum-container.properties` as described in [Cluster Properties](#) on page 47.
 - b) Save and close the `spectrum-container.properties` file.
 - c) Some modules have module-specific settings that you must configure to enable the module to work in a cluster.

Module	Cluster Configuration Settings
Advanced Matching Module	<p data-bbox="813 306 1414 390">These settings configure clustering for full-text search indexes. If you do not use full-text search indexes you do not need to configure these settings.</p> <p data-bbox="813 411 1114 436">Open this file in a text editor:</p> <pre data-bbox="813 457 1230 541"><i>SpectrumFolder</i>\server \modules\searchindex\es- container.properties</pre> <p data-bbox="813 562 1097 588">Configure these properties:</p> <p data-bbox="813 604 1230 630">es.index.default_number_of_replicas</p> <p data-bbox="995 646 1349 961">Enter the number of additional copies you want created for each search index. This number should be the number of nodes in your cluster minus 1. For example, if your cluster has five nodes, you would enter "4" in this property.</p> <p data-bbox="813 982 1219 1008">es.index.default_number_of_shards</p> <p data-bbox="995 1024 1349 1276">Enter the number of shards you want your index to have in the distributed environment. The more nodes that are in your cluster, the higher this number should be.</p> <p data-bbox="813 1297 1382 1352">Save and close <code>es-container.properties</code> when you are done editing these properties.</p> <p data-bbox="898 1369 1406 1579">Note: Search indexes created prior Spectrum™ Technology Platform 10.0 do not support clustering. To enable clustering for indexes created prior to the 10.0 release, you must recreate the search index using the 10.0 API after modifying the <code>es-container.properties</code> file.</p>

Module	Cluster Configuration Settings
Data Hub Module	<p data-bbox="813 306 1114 331">Open this file in a text editor:</p> <pre data-bbox="813 348 1393 411"><i>SpectrumFolder</i>\server\modules\hub\hub.properties</pre> <p data-bbox="813 428 1101 453">Configure these properties:</p> <p data-bbox="813 470 1065 495">hub.models.path.base</p> <p data-bbox="995 512 1360 940">Specifies the folder where models are stored. By default, each model is placed in a subdirectory under the <i>SpectrumFolder</i>\server\modules\hub\db folder. If you want to store models in a different location, uncomment this property and specify the folder where you want to store models.</p> <p data-bbox="813 957 1091 982">hub.neo4j.database.type</p> <p data-bbox="995 999 1349 1138">Change the value of this property to ha. The default value embedded is for non-clustered installations.</p> <p data-bbox="813 1155 1075 1180">hub.servers.per.cluster</p> <p data-bbox="995 1197 1365 1373">Uncomment this line. Set the value of this property to the number of Spectrum™ Technology Platform servers in the cluster.</p> <p data-bbox="813 1390 1380 1453">Save and close <code>hub.properties</code> when you are done editing these properties.</p> <p data-bbox="813 1470 1414 1680">The <i>SpectrumFolder</i>\server\modules\hub\db\neo4j.properties controls how the graph databases are configured, using Neo4j Enterprise. This file is used as a template for each model. If needed, each model can be configured separately by placing a copy of this property file into the store directory for that model.</p>

Module	Cluster Configuration Settings
Machine Learning Module	<p>Open this file in a text editor:</p> <pre>SpectrumFolder\server\modules \machinelearning/java.vargs</pre> <p>Configure these properties:</p> <p>-Xmx</p> <p>Specifies the maximum memory allocation. We recommend sizing your Machine Learning Module cluster to be approximately four times the size of your data and for all nodes to be allocated the same amount of memory. To avoid swapping, be sure the -Xmx allocation does not exceed the physical memory on any node.</p>

3. Start the server. To start the server, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.start`.

4. Repeat this procedure to install additional nodes in the cluster.

Note: You should install at least three nodes in a cluster.

5. After installing all the nodes, go back to the first node and add the other nodes as seed nodes.

- On the first node you installed, open the properties file `server/app/conf/spectrum-container.properties`.
- In the property `spectrum.cluster.seeds`, add the host name or IP address of the other nodes in the cluster, separating each with a comma.
- Save and close the `spectrum-container.properties` file. You do not need to restart the server.

Cluster Properties

The `spectrum-container.properties` file contains the properties that configure a cluster. This table describes how to set the cluster properties for a cluster where the server and configuration database are installed together on each node, and for nodes in the server cluster in a separated configuration database installation. If you are setting up a configuration database cluster, see [Cluster Properties for a Configuration Database Cluster](#) on page 70.

Property	Description
<code>spectrum.cluster.enabled</code>	Set this to true.
<code>spectrum.cluster.name</code>	<p>If this is the first node in the cluster, set this to the name you want to give to the cluster.</p> <p>If this is not the first node in the cluster, set this to the name of the cluster that you want this node to join. If you are unsure of the cluster name, check the <code>spectrum.cluster.name</code> property on another node in the cluster.</p>
<code>spectrum.cluster.address</code>	Specify the node's own IP address.
<code>spectrum.cluster.seeds</code>	<p>If you are setting up the first node in the cluster, or if this is the first node you are starting after having stopped the cluster, specify only the host name or IP address of this server. This effectively points this node to itself as a seed node, which is necessary in order for it to be able to start as the first node in the cluster. Do not specify 127.0.0.1.</p> <p>If this is not the first node in the cluster, specify the host name or IP address of each of the other nodes in the cluster, including nodes that you have not yet installed. Separate each seed node with a comma. When starting up, the node will attempt to access each seed node in the order listed. If none of the seed nodes can be reached, the node will not join the cluster.</p> <p>Tip: We recommend that you specify multiple seed nodes so that if one seed node is down others can be used to allow nodes to join the cluster. We also recommend that you specify the same seed nodes in the same order on all nodes in the cluster.</p>
<code>spectrum.cluster.nodeID</code>	<p>Set this to an integer value to use as the ID for this node. The ID must be an integer and must be unique among all nodes in the cluster.</p> <p>Tip: We recommend that the first node you install have a node ID of 1, the second one 2, and so on.</p>
<code>spectrum.runtime.hostname</code>	Un-comment this property and set this property to the load balancer host name.
<code>spectrum.runtime.port</code>	Un-comment this property and set this property to the port on which you have configured the load balancer to listen.

Property	Description
<code>spectrum.repository.addresses</code>	<p>Set this to the same IP address specified in <code>spectrum.cluster.address</code>. The default value <code>localhost</code> cannot be used in a clustered environment.</p> <p>If you are configuring a server node in a server-only cluster, specify the IP addresses of the nodes in the configuration database cluster. Separate each with a comma.</p>
<code>spectrum.security.authentication.token.verify</code>	<p>Set this value to false if nodes in the cluster are behind different network devices, such as different VM adapters. Setting this property to false will prevent "invalid token" errors when using token authentication for web service requests. For more information, see Disabling Host Checks in Token Authentication on page 63.</p>

Installing a Cluster for the Location Intelligence Module

To set up a cluster for the Location Intelligence Module, you must first configure a common repository (depending on the type of database you have) then configure your system to prepare it for clustering.

Note: Setting up both a Spectrum™ Technology Platform cluster and a Location Intelligence Module cluster is recommended and has several benefits:

- Security (ACL) synchronization happens automatically for named resources .
- Dataflows, users, and roles created on one node will automatically synchronize to all nodes.
- All Location Intelligence Module demo pages and utilities (such as Spatial Manager) can and should point to the load balancer.

Related tasks

[Installing a Cluster on the Platform](#) on page 42

Setting Up a Common Repository Database

You must configure the Location Intelligence Module to use a common repository database for the cluster. This ensures that named resources, geographic metadata and configuration settings are managed across the cluster.

The repository is installed with a set of named resources, geographic metadata and configuration files. To migrate these resources to the common database repository the resources need to

be exported from the default internal repository database and reimported into the new shared repository database.

For bulk export and import of repository content, use the `limrepo import` and `limrepo export` commands in the Administration Utility. These commands give you the option of preserving permissions (see the Administration section of the *Spectrum Spatial Guide* for instructions.)

These steps describe how to set up your repository on a common database, either PostgreSQL, Oracle, or Microsoft SQL Server:

1. Export all repository resources to a local folder using the `limrepo export` command in the Administration Utility (see the Administration section of the *Spectrum Spatial Guide* for instructions).

The contents of the installed repository must be exported. This step only needs to be performed once, as the contents of the repository should be the same at this point for all instances of Spectrum™ Technology Platform.

2. Stop the Spectrum™ Technology Platform server on all nodes (for instructions, see [Stopping a Cluster](#) on page 62.)

3. On all nodes of Spectrum™ Technology Platform modify the configuration to specify the common database.

a) Copy the contents of `repository.<databaseType>.xml` to `repository.xml` located under the `server/modules/spatial/jackrabbit` folder where `<databaseType>` is the appropriate type for your database (postgres, oracle, or mssql).

b) In `repository.xml`:

- Modify the DataSource section with the server host name, port, database, user, and password.
- Modify the Cluster section to assign a distinct cluster ID, like Node1. Ensure unique IDs are assigned to every subsequent node in the cluster (for example, Node2, Node3).
- Save the changes to `repository.xml`.

c) Remove these folders from the `/server/modules/spatial/jackrabbit` folder: `repository`, `version`, `workspaces`.

4. If your database has previously contained any repository content, you must remove tables from it so that a clean repository can be created. These tables need to be removed:

default_binval	security_binval
default_bundle	security_bundle
default_names	security_names
default_refs	security_refs
rep_fsentry	version_binval

rep_global_revision	version_bundle
rep_journal	version_names
rep_local_revisions	version_refs

If using Oracle, then also delete `version_seq_names_id`, `security_seq_names_id`, and `default_seq_names_id`.

5. On the seed node only, import the backed up repository content.
 - a) Start the Spectrum™ Technology Platform server (for instructions, see [Starting a Cluster](#) on page 61).
 - b) Import the contents using the `limrepo import` command, pointing to the seed node.
6. Start the remaining nodes in the cluster (for instructions, see [Starting a Cluster](#) on page 61).

Configuring Your System

Once the Spectrum™ Technology Platform is installed and you have configured a common repository, you need to configure your instance before you can replicate it to another virtual machine. If you are not using a virtual machine environment, you will need to perform these steps on each of your Spectrum™ Technology Platform installations.

Configure the Map File Share

To configure the map file share (a shared image folder) to Spectrum™ Technology Platform you first need a shared map image directory. To create a map file share, see [Creating a Map Image File Share on Unix/Linux](#) on page 52 or [Creating a Map Image File Share on Windows](#) on page 52.

Once a map image directory has been created, configure the map file share:

1. Modify the Mapping Service configuration by pointing to a shared image folder and load balance server. In the ImageCache change the Directory parameter to a common image directory, and change the AccessBaseURL parameter to the load balancer machine image URL.

If you are using a virtual machine environment, remember this IP address, as you must set the load balancer VM to this IP address.

For Unix/Linux installations:

```
<ImageCache>
<Directory>/<spatial server root>/server/modules/spatial/images</
Directory>
<AccessBaseURL>http://<loadbalance_IP_address>/rest/Spatial/
MappingService/internal/imageCache</AccessBaseURL>
<FileExpire>30</FileExpire>
<ScanInterval>30</ScanInterval>
```

```
</ImageCache>
```

For Windows installations:

```
<ImageCache>
<Directory>\\server\Share\images</Directory>
<AccessBaseURL>http://<loadbalance_IP_address>/rest/Spatial/
MappingService/internal/imageCache</AccessBaseURL>
<FileExpire>30</FileExpire>
<ScanInterval>30</ScanInterval>
</ImageCache>
```

2. For Unix/Linux installations, you must set up a symbolic link to enable map images to go to the shared file system.

Create an `images` subfolder in the mounted share folder, e.g., `/mnt/<linux mount>/images`

```
cd /<spatial server root>/server/modules/spatial
rm -Rf images
ln -s /mnt/<linux mount>/images ./images
```

Creating a Map Image File Share on Unix/Linux

The file share provides a folder to hold map images generated by Spectrum Spatial. Create a shared folder accessible to all Spectrum nodes. The file share is not required if maps are returned from the web services as Base64-encoded images.

To create a map image file share on Unix/Linux:

1. Mount a shared folder on each operating system hosting Spectrum. The commands below mount a drive on a Microsoft Windows Server or network drive supporting CIFS.

```
mkdir /mnt/<linux mount>
mount -t cifs //<windows host>/<windows share> /mnt/<linux mount>-o
username=shareuser,password=sharepassword,domain=pbj
```

2. Set the image share to load at startup in `/etc/fstab`.

```
//<windows ip address for share>/share /path_to/mount cifs
username=server_user,password=secret,_netdev 0 0
```

Creating a Map Image File Share on Windows

The file share provides a folder to hold map images generated by Spectrum Spatial. Create a shared folder accessible to all Spectrum nodes. The file share is not required if maps are returned from the web services as Base64-encoded images.

To create a map image file share on Windows:

1. In Windows Explorer, select the image folder you want to share.
2. Right-click, and then click **Share** or **Share with**.

3. Select the users who will be writing to the image folder. These users must have read/write privileges.

Modifying OGC Service Configurations for Clustering

To ensure clustering works when you have both a Spectrum™ Technology Platform cluster and a Location Intelligence Module cluster, changes are required to the OGC services configuration files using Spatial Manager: From the WFS, WMS, and WMTS settings pages, change the online resource (service) URL to the IP address and port of the load balancer. See the *Spatial Manager Guide* in the Utilities section of the *Spectrum Spatial Guide* for more information.

Modifying the Java Properties Files in All Nodes

You must change the java property file in all nodes of the cluster. To modify the java properties for Spectrum™ Technology Platform:

1. Modify the `java.properties` file, located in `<spectrum>/server/modules/spatial/java.properties`, to point to the load balance server.
2. Change the `images.webapp.url` and all of the service host and port numbers to point to the load balance server.

Configuring Ports for Multiple Spectrum Instances

If you have multiple Spectrum™ Technology Platform instances on a single machine, you must change the port numbers.

To change the port numbers for each Spectrum™ Technology Platform instance:

1. Change all ports in `<Spectrum root>/server/app/conf/spectrum-container.properties` to new port values that are not in use. The http port reflects the port number entered in the installer.
2. Update the rmi port in `bootstrap.properties` in the `/<spectrum root>/server/modules/spatial` folder (for example, 11099). The default is 1099.

Shared Spectrum Local Data

If you are using TAB file data on the file system, this data needs to be in a shared location accessible by all instances of Spectrum in the load balanced environment. It is also important to note that all named resources in the repository accessing data on the file system should point to this shared location.

Each VM or machine hosting Spectrum needs to have access to the mounted shared drive.

Note: Using named resources that point to database tables do not require a shared drive, as the named resources in the repository do not access the data using a file path; rather they use a named connection to the data in the database.

Upgrading a Cluster

Prerequisites:

- Before upgrading, be sure to read the release notes for the new version. The release notes contain important compatibility information, supported upgrade paths, and module-specific data backup recommendations.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

This procedure is for upgrading a cluster where the Spectrum™ Technology Platform server and configuration database are installed on each node of the cluster. To upgrade a cluster, you upgrade one node at a time. The first node you upgrade is handled slightly differently than the other nodes because you must point the node to itself as a seed node since no other nodes will be running in the cluster when it starts up.

Note that these scenarios have special procedures for upgrading a cluster:

- If you have one cluster for server nodes and another cluster for configuration database nodes, see [Upgrading a Cluster with a Separated Database](#) on page 71.
- If you are upgrading a cluster for the Location Intelligence Module only, see [Upgrading a Cluster with the Location Intelligence Module](#) on page 58. If you are upgrading both Spectrum and Location Intelligence Module clusters, before shutting down all nodes also see [Upgrading a Cluster with the Location Intelligence Module](#) on page 58 for some required pre-upgrade steps.
- If you are upgrading a cluster running the Data Hub Module, see [Upgrading a Cluster with the Data Hub Module](#) on page 55.

If these scenarios do not apply to you, follow this procedure to upgrade your cluster:

1. Back up the server. For instructions on creating a backup, see the *Administration Guide*.

Important: We recommend that you create a backup before upgrading so that you can recover your flows, security settings, and other settings, if an error occurs during the upgrade process.

2. Stop all the nodes in the cluster. For more information, see [Stopping a Cluster](#) on page 62.

3. On the last node that you stopped:

- a) Open the file `server/app/conf/spectrum-container.properties` in a text editor.
- b) In the `spectrum.cluster.seeds` property, remove all nodes except for the current node.

Note: Make a note of the nodes you remove so you can add them back later.

- c) Save and close `spectrum-container.properties`.
- d) Upgrade the node. For more information, see [Upgrading a Server](#) on page 28.

- e) Open the file `spectrum-container.properties` in a text editor and configure the cluster properties. For more information, see [Cluster Properties](#) on page 47. Be sure to leave `spectrum.cluster.seeds` set to only the current node's IP address or host name.
 - f) Save and close `spectrum-container.properties`.
 - g) Start the server.
4. Upgrade each of the other nodes, one at a time, by following this procedure:
- Important:** Follow this procedure only when upgrading nodes other than the first node. See step 3 for the procedure to upgrade the first node.
- Important:** Be sure you have backed up your server before proceeding.
- a) Delete this folder:


```
SpectrumLocation\server\app\repository\store\databases
```
 - b) Upgrade the node. For more information, see [Upgrading a Server](#) on page 28.
 - c) Open the file `spectrum-container.properties` in a text editor and configure the cluster properties. For more information, see [Cluster Properties](#) on page 47. Save and close the file when you are done.
 - d) Delete this folder:


```
SpectrumLocation/repository/data/databases/graph.db
```

Note: You must delete this folder before you start the new node. If you do not, the node will fail to join the cluster.
 - e) Start the server.
5. After you have upgraded all the nodes, go back to the first node you upgraded, open `spectrum-container.properties`, and add the seed nodes you removed from `spectrum.cluster.seeds`.

Upgrading a Cluster with the Data Hub Module

Prerequisites:

- Before upgrading, be sure to read the release notes for the new version. The release notes contain important compatibility information, supported upgrade paths, and module-specific data backup recommendations.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

In a cluster that runs the Data Hub Module, each node hosts the Spectrum™ Technology Platform server as well as Data Hub Module models. When upgrading, you need to upgrade your models in addition to upgrading the Spectrum™ Technology Platform server.

The upgrade process consists of these steps:

1. Back up your models and properties files.

2. On the master server, upgrade Spectrum™ Technology Platform then upgrade your models.
3. On each non-master server, upgrade Spectrum™ Technology Platform then copy the upgraded models from the master server to the non-master server.

To upgrade a cluster that runs the Data Hub Module, follow this procedure:

1. Back up the server. For instructions on creating a backup, see the *Administration Guide*.

Important: We recommend that you create a backup before upgrading so that you can recover your flows, security settings, and other settings, if an error occurs during the upgrade process.

2. Open the Relationship Analysis Client and click **Manage**. Select the model you want to back up then click **Backup**.

In addition to backing up your models, back up these two property files:

- `server\modules\hub\hub.properties`
- `server\modules\db\neo4j.properties`

3. Identify which node is the serving as the master server for the Data Hub Module.

a) Open a web browser and go to:

`http://LoadBalancer:8080/jmx-console/HttpAdaptor/list`

b) Scroll down to the **neo4j.org** domain.

You will see a set of objects for each model. The **Role** attribute in the **HighAvailability** object indicates whether a server is the master for a model.

c) If you have more than one model and each model has a different master, you need to make one server the master of all the models. To do this, restart the cluster then open the Relationship Analysis Client using the hostname or IP address of one of the nodes rather than the load balancer. In the Relationship Analysis Client, open each model by running a query on each model. This will make the server you are connected to the master for each model.

4. Stop each non-master node in the cluster, then stop the master server last. Stop nodes one at a time rather than all at once.

Important: Make sure that Spectrum™ Technology Platform stops without errors. If a server does not stop properly, Data Hub Module models on the server will not open successfully after upgrading. To ensure that Spectrum™ Technology Platform stopped cleanly, examine the `SpectrumDirectory\server\app\repository\logs\wrapper.log` file for errors during shutdown.

5. Upgrade the master server.

- a) If you are upgrading from Spectrum™ Technology Platform 10.0 or later, each model directory must contain a `version.data` file. Review all the `model.ModelName` subdirectories located under `SpectrumDirectory/server/modules/hub/db` to confirm that they contain a `version.data` file. If any model directory is missing this file, copy the corresponding `version.data` file from one of the non-master nodes.
- b) Run the Spectrum™ Technology Platform installer to upgrade the master server to the new version of Spectrum™ Technology Platform.

- c) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and confirm that the property `hub.neo4j.database.type` is set to `embedded`:

```
hub.neo4j.database.type=embedded
```

- d) Open the file `SpectrumFolder\server\modules\hub\db\neo4j.properties` in an editor and set the `allow_store_upgrade` property to `true`:

```
allow_store_upgrade=true
```

- e) Start the Spectrum™ Technology Platform server.
 f) Open each model in the Relationship Analysis Client and run a query. Any query is sufficient.
 g) Stop the Spectrum™ Technology Platform server.
 h) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and set the property `hub.neo4j.database.type` to `ha`:

```
hub.neo4j.database.type=ha
```

- i) Compare any properties files that you backed up to the installed files and make any necessary changes. Do not overwrite new files with old files because new files may contain properties that old files do not.

6. Upgrade the non-master servers.

- a) Delete the models in the `SpectrumDirectory\server\modules\hub\db` directory.

Warning: Do not delete the models from the master server.

- b) On one of the non-master servers, run the Spectrum™ Technology Platform installer to upgrade it to the new version of Spectrum™ Technology Platform.
 c) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and set the property `hub.neo4j.database.type` to `ha`:

```
hub.neo4j.database.type=ha
```

- d) Compare any properties files that you backed up to the installed files and make any necessary changes. Do not overwrite new files with old files because new files may contain properties that old files do not.
 e) Copy the `SpectrumFolder\server\modules\hub\db\model.*` directories from the master server to the non-master server.
 f) Repeat these steps for each non-master server in the cluster.

7. Start the cluster.

- a) Start the master server, followed by non-master servers.
 b) Ensure that each server in the cluster is functioning. Check `SpectrumFolder\server\app\repository\wrapper.log` for any errors.
 c) While directly connected to the master server (bypassing the load balancer), open each model, one at a time, and inspect the `wrapper.log` file for errors.

Upgrading a Cluster with the Location Intelligence Module

When a common repository database is used for clustering, these additional steps required before and after the Spectrum™ Technology Platform upgrade process. Before the upgrade, you must move to a local database setup; after the upgrade, you then change back to the cluster setup by pointing `repository.xml` to the external database.

Note: To preserve access control settings, use the Administration Utility instead of WebDAV. See the Administration section of the *Spectrum Spatial Guide* for instructions on using the Administration Utility. The `limrepo` commands in the Administration Utility were available beginning in version 11.0; if you are upgrading from a version prior to 11.0, you must use WebDAV.

1. Before upgrading Spectrum™ Technology Platform, back up the repository by following these steps.
 - a) Select a node from the cluster. This will be the seed node (see [Installing a Cluster](#) on page 42).
 - b) Back up the repository content using the Administration Utility's `limrepo export` command with ACL, pointing to the seed node.
 - c) Back up the `Spectrum\server\modules\spatial\jackrabbit` folder to a location outside the installation folder.
2. Switch the common repository database to a local database (temporarily, just for upgrade purposes). Apply these steps to all nodes in the cluster.
 - a) Stop the Spectrum™ Technology Platform server.
 - b) Delete the jackrabbit folder (`Spectrum\server\modules\spatial\jackrabbit`) and create an empty "jackrabbit" folder in the same location.
 - c) Copy `repository.xml` into the jackrabbit folder from `Spectrum\server\app\tmp\RepositoryService.war-xxxxxxx-contents\webapp\WEB-INF\classes\org\apache\jackrabbit\core`. If you cannot find this file, you can extract it from `RepositoryService.war` under `Spectrum\server\app\deploy`.
 - d) Start the Spectrum™ Technology Platform server.
 - e) Import the repository content (backed up in Step 1b) into the repository using WebDAV (the `limrepo import` command will not work with an empty folder).
 - f) Stop the Spectrum™ Technology Platform server.
3. Follow normal procedures to upgrade Spectrum™ Technology Platform to the new version on all nodes.
4. For the seed node only, after the Spectrum™ Technology Platform upgrade is complete, back up the upgraded content by following these steps.
 - a) Start the Spectrum™ Technology Platform server

- b) Download the Administration Utility from the upgraded Spectrum™ Technology Platform server.
 - c) Back up the content from the repository using the `limrepo export` command with ACL.
 - d) Stop the Spectrum™ Technology Platform server.
 - e) Back up the upgraded `Spectrum\server\modules\spatial\jackrabbit` folder to a location outside the installation folder.
5. Configure the platform cluster as described in [Installing a Cluster](#) on page 42.
 6. On all nodes of Spectrum™ Technology Platform modify the configuration to specify the common database.
 - a) Copy the contents of `repository.<databaseType>.xml` to `repository.xml` located under the `server/modules/spatial/jackrabbit` folder where `<databaseType>` is the appropriate type for your database (postgres, oracle, or mssql).
 - b) In `repository.xml`:
 - Modify the DataSource section with the server host name, port, database, user, and password.
 - Modify the Cluster section to assign a distinct cluster ID, like Node1. Ensure unique IDs are assigned to every subsequent node in the cluster (for example, Node2, Node3).
 - Save the changes to `repository.xml`.
 - c) Remove these folders from the `/server/modules/spatial/jackrabbit` folder: `repository`, `version`, `workspaces`.
 7. If your database has previously contained any repository content, you must remove tables from it so that a clean repository can be created. These tables need to be removed:

default_binval	security_binval
default_bundle	security_bundle
default_names	security_names
default_refs	security_refs
rep_fsendry	version_binval
rep_global_revision	version_bundle
rep_journal	version_names
rep_local_revisions	version_refs

If using Oracle, then also delete `version_seq_names_id`, `security_seq_names_id`, and `default_seq_names_id`.

8. On the seed node only, import the backed up repository content.
 - a) Start the Spectrum™ Technology Platform server (for instructions, see [Starting a Cluster](#) on page 61).

- b) Import the contents using the `limrepo import` command, pointing to the seed node.
9. Start the remaining nodes in the cluster (for instructions, see [Starting a Cluster](#) on page 61).

Removing a Node from a Cluster

To remove a node from a cluster, stop the Spectrum™ Technology Platform server.

1. Stop the node you want to remove:
 - On Unix or Linux, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.stop`.
 - On Windows, right-click the Spectrum™ Technology Platform icon in the system tray and select **Stop Spectrum™**.
2. Open the file `server/app/conf/spectrum-container.properties` in a text editor and set `spectrum.cluster.enabled` to `false`.
3. On each of the other nodes in the cluster, open the `spectrum-container.properties` file and remove the node from the `spectrum.cluster.seeds` property.

For Location Intelligence Module users: If you want to keep the node standalone and able to run outside the cluster, copy back the original `repository.xml` file and remove the following folders from the `/server/modules/spatial/jackrabbit` directory for each instance of Spectrum™ Technology Platform: `repository`, `version`, `workspaces`. Restart the server and import the repository content.

Adding Modules to a Cluster

This procedure describes how to add one or more modules to an existing cluster.

1. Stop all the Spectrum™ Technology Platform nodes in the cluster. For more information, see [Stopping a Cluster](#) on page 62. If your cluster has a separated configuration database cluster, you only need to stop the server cluster, not the configuration database cluster.

Warning: To prevent data loss you must stop the cluster by following the procedure described in [Stopping a Cluster](#) on page 62.

2. On any node in the cluster, install the module or modules you want to add. For more information, see the *Spectrum™ Technology Platform Installation Guide*.
3. Open this file in a text editor:

```
server/app/conf/spectrum-container.properties
```

4. In the `spectrum.cluster.seeds` property, remove all host names and IP addresses except for the one for this server. Save the host names and IP addresses so that you can re-add them later.
5. Save the file.
6. Start the server.

Note: Wait for the server to fully start before proceeding.

7. In the file `spectrum-container.properties`, add the host names and IP addresses that you had removed.
8. Save the file. You do not need to restart the server.
9. Install the modules on each of the other nodes in the cluster. Start each node after installing the modules on it, and wait for it to fully start before installing the modules on the next node. You do not need to modify the `spectrum.cluster.seeds` property when installing modules on subsequent nodes.

Starting a Cluster

If all the nodes in a cluster are stopped, you must follow this procedure to start the cluster safely and avoid data loss.

1. On the last node that was stopped last, remove the seed nodes and start the server.

Warning: The first node that you start must be the last node that was stopped, and that node must be a seed node. Starting another node first may result in loss of data such as job history and configuration settings. If you do not know which node was stopped last, look in each node's wrapper log for the time stamp of the shutdown message. You can find the wrapper log in: `Spectrum Location\server\app\repository\logs\wrapper.log`.

- a) Open this file in a text editor:

```
server/app/conf/spectrum-container.properties
```

- b) In the `spectrum.cluster.seeds` property, remove all host names and IP addresses except for the one for this server. Save the host names and IP addresses so that you can re-add them later.
- c) Save the file.
- d) Start the server.
- e) Wait for the Spectrum™ Technology Platform server to *completely* start.

You can tell when the Spectrum™ Technology Platform server has completely started by looking in the wrapper log: `Spectrum Location\server\app\repository\logs\wrapper.log`. This message is displayed when the server is completely started:

```
Pitney Bowes Spectrum(TM) Technology Platform (Version Version
Number) Started.
```

- f) In the properties file `spectrum-container.properties`, in the `spectrum.cluster.seeds` property, add the host names or IP addresses that you had removed, separating each with a comma.
 - g) Save and close the file. You do not need to restart the server.
2. Start the other nodes in the cluster.

Warning: Be sure to wait for the first node to start *completely* before starting additional nodes. Starting additional nodes before the first one is started may result in loss of data.

Stopping a Cluster

To stop an entire cluster:

1. Identify which nodes are seed nodes. To do this, open the file `SpectrumFolder/server/app/conf/spectrum-container.properties` and look at the nodes listed in the `spectrum.cluser.seeds` property.
 2. Stop each Spectrum™ Technology Platform server in the cluster, making sure that the last node you stop is a seed node.
 - On Unix or Linux, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.stop`.
 - On Windows, right-click the Spectrum™ Technology Platform icon in the Windows system tray and select **Stop Spectrum™**.
- Warning:** To prevent loss of data the last node you stop must be a seed node.
3. Make a note of which node was the last node you stopped. You will need this information when starting up the cluster.

Warning: To prevent loss of data when starting the cluster, the first node you start must be the last node that was stopped, and that node must be a seed node.

Using Enterprise Designer with a Cluster

1. Launch Enterprise Designer.
2. In the **Server name** field, enter the server name of the load balancer.
3. In the **Port** field, enter the port that you have configured the load balancer to listen on.

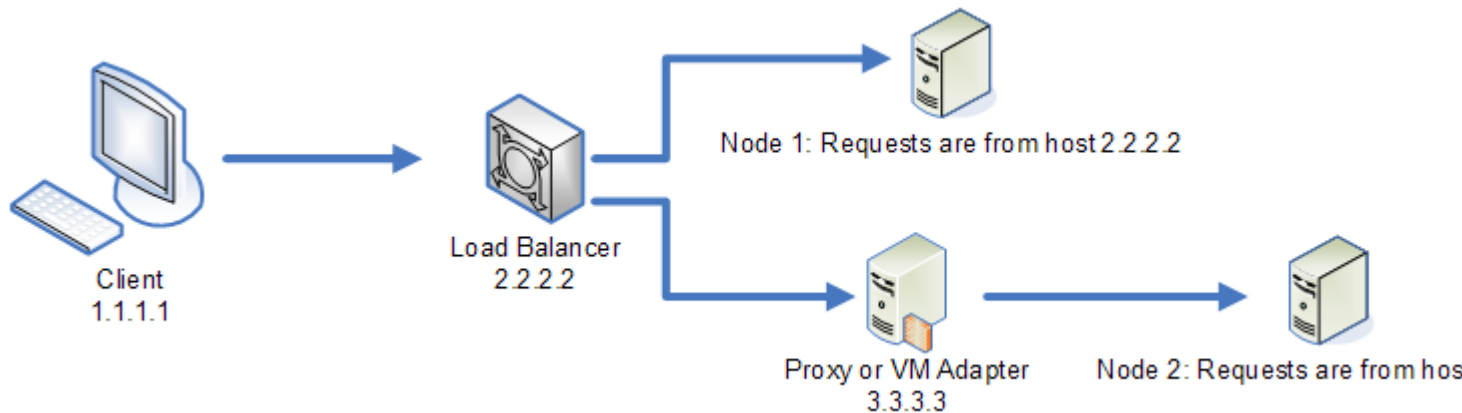
Note: Input files, output files and database resources must be on a shared drive, or file server, or some commonly-accessible location. Otherwise, all files must be loaded on each server that hosts a Spectrum™ Technology Platform server and must be located in the same path.

Once you have logged in you can use Enterprise Designer as normal. The actions you take will apply to all Spectrum™ Technology Platform instances in the cluster where you are logged in.

Disabling Host Checks in Token Authentication

In token authentication, the Spectrum™ Technology Platform server examines the token presented by the client before responding to the request. The server checks the token to see if it has expired, if it is encrypted correctly, and if it is from the correct host. For session tokens, the server also checks the session ID. If any of these checks fail, the token is rejected and the server does not respond to the request.

In a clustered environment, it is possible that requests may be redirected in a way that makes the request appear to be coming from a different host than is specified in the token, resulting in "invalid token" errors. For example, say you have a cluster with two nodes as shown here:



Let's say that the client makes a request and the request is routed to Node 1. A token is created and tied to host 2.2.2.2 (the load balancer) since the node views the request as coming from the load balancer. If the next request from the client is routed to Node 2, the token will still be tied to host 2.2.2.2 but the request will appear to be coming from the proxy server, 3.3.3.3. In this case the node will reject the token because it appears that it is not associated with the host making the request.

In this situation you must configure the Spectrum™ Technology Platform server to ignore the host information included in the token. This should only be done if you have an environment where there are different network devices between the load balancer and the nodes. If all nodes are behind the same network device, there is no need to disable the host check.

Note: If you follow this procedure, client tokens will in effect become open tokens since the host check will be disabled. Session tokens will continue to be tied to a specific session ID but not a specific host.

1. Open the following properties file on the Spectrum™ Technology Platform server:

```
SpectrumLocation/server/app/conf/spectrum-container.properties
```

2. Set the following property to false.

```
spectrum.security.authentication.token.remoteClientCheck.enabled=false
```

3. Save and close the properties file.
4. Repeat this process on all the nodes in the cluster.

4 - Cluster with Separated Configuration Database

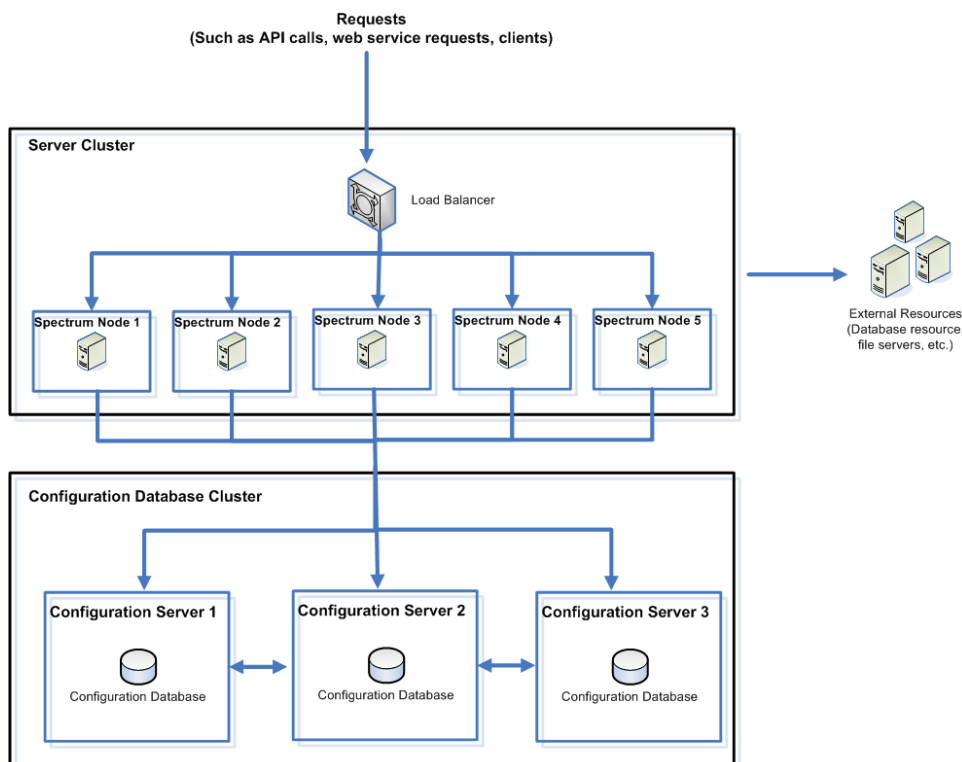
In this section

Installing a Cluster with a Separated Configuration Database	66
Upgrading a Cluster with a Separated Database	71
Upgrading a Cluster with a Separated Database and Data Hub Module	74
Converting to a Separated Configuration Database	77
Converting from a Separated Configuration Database to a Standard Installation	79
Adding Modules to a Cluster	81

Installing a Cluster with a Separated Configuration Database

This procedure creates two clusters: one for the server nodes and one for configuration database nodes. The nodes in the server cluster point to the servers in the configuration database cluster for their configuration data. The nodes in the configuration database cluster replicate their data between each other.

The following diagram illustrates this installation scenario:



To install a separate database repository, you first install the configuration database on servers in a cluster, then install the server on nodes in a separate cluster. At least one configuration database must be running before you can install the server.

1. Place the Spectrum™ Technology Platform installer on the server where you want to install the configuration database.
2. Run `installdb.sh`.
3. Follow the prompts to install the configuration database.
4. Edit the file `Database/repository/spectrum-container.properties` as described in [Cluster Properties for a Configuration Database Cluster](#) on page 70.
5. Save and close `spectrum-container.properties`.

6. Start the configuration database. To start the configuration database, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.start`.
7. Install the configuration database on additional servers as needed to complete the configuration database cluster.
8. Install the server cluster.
 - a) Install Spectrum™ Technology Platform on a server where you want to host a node. For instructions, see [Installing a New Server](#) on page 26.

Important: When installing each server select the **Server only** option in the installer and provide the host and port of one or more of the configuration database servers. You can find the port in the file `InstallationLocation\Database\repository\spectrum-container.properties`. The port is specified in the `spectrum.repository.server.connector.bolt.port` property.
 - b) If the Spectrum™ Technology Platform server is running, stop it. To stop the server, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.stop`.
 - c) Edit the properties in the file `server/app/conf/spectrum-container.properties` as described in [Cluster Properties](#) on page 47.
 - d) Save and close the `spectrum-container.properties` file.
 - e) Some modules have module-specific settings that you must configure to enable the module to work in a cluster.

Module	Cluster Configuration Settings
Advanced Matching Module	<p data-bbox="813 306 1414 390">These settings configure clustering for full-text search indexes. If you do not use full-text search indexes you do not need to configure these settings.</p> <p data-bbox="813 411 1114 436">Open this file in a text editor:</p> <pre data-bbox="813 457 1230 541"><i>SpectrumFolder</i>\server \modules\searchindex\es- container.properties</pre> <p data-bbox="813 562 1097 588">Configure these properties:</p> <p data-bbox="813 604 1230 630">es.index.default_number_of_replicas</p> <p data-bbox="995 646 1349 961">Enter the number of additional copies you want created for each search index. This number should be the number of nodes in your cluster minus 1. For example, if your cluster has five nodes, you would enter "4" in this property.</p> <p data-bbox="813 982 1219 1008">es.index.default_number_of_shards</p> <p data-bbox="995 1024 1349 1276">Enter the number of shards you want your index to have in the distributed environment. The more nodes that are in your cluster, the higher this number should be.</p> <p data-bbox="813 1297 1382 1350">Save and close <code>es-container.properties</code> when you are done editing these properties.</p> <p data-bbox="898 1371 1398 1579">Note: Search indexes created prior Spectrum™ Technology Platform 10.0 do not support clustering. To enable clustering for indexes created prior to the 10.0 release, you must recreate the search index using the 10.0 API after modifying the <code>es-container.properties</code> file.</p>

Module	Cluster Configuration Settings
Data Hub Module	<p data-bbox="813 310 1114 331">Open this file in a text editor:</p> <pre data-bbox="813 352 1393 411"><i>SpectrumFolder</i>\server\modules\hub\hub.properties</pre> <p data-bbox="813 432 1101 453">Configure these properties:</p> <p data-bbox="813 474 1065 495">hub.models.path.base</p> <p data-bbox="995 516 1365 940">Specifies the folder where models are stored. By default, each model is placed in a subdirectory under the <i>SpectrumFolder</i>\server\modules\hub\db folder. If you want to store models in a different location, uncomment this property and specify the folder where you want to store models.</p> <p data-bbox="813 961 1089 982">hub.neo4j.database.type</p> <p data-bbox="995 1003 1349 1136">Change the value of this property to ha. The default value embedded is for non-clustered installations.</p> <p data-bbox="813 1157 1073 1178">hub.servers.per.cluster</p> <p data-bbox="995 1199 1365 1373">Uncomment this line. Set the value of this property to the number of Spectrum™ Technology Platform servers in the cluster.</p> <p data-bbox="813 1394 1382 1453">Save and close <code>hub.properties</code> when you are done editing these properties.</p> <p data-bbox="813 1474 1414 1680">The <i>SpectrumFolder</i>\server\modules\hub\db\neo4j.properties controls how the graph databases are configured, using Neo4j Enterprise. This file is used as a template for each model. If needed, each model can be configured separately by placing a copy of this property file into the store directory for that model.</p>

Module	Cluster Configuration Settings
Machine Learning Module	<p>Open this file in a text editor:</p> <pre>SpectrumFolder\server\modules \machinelearning/java.vargs</pre> <p>Configure these properties:</p> <p>-Xmx</p> <p>Specifies the maximum memory allocation. We recommend sizing your Machine Learning Module cluster to be approximately four times the size of your data and for all nodes to be allocated the same amount of memory. To avoid swapping, be sure the -Xmx allocation does not exceed the physical memory on any node.</p>

- f) Start the server. To start the server, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.start`.
- g) Repeat this procedure to install additional nodes in the server cluster.
9. After installing all the nodes in the server cluster, go back to the first node you installed in the server cluster and add the other nodes as seed nodes.
 - a) On the first node you installed, open the properties file `server/app/conf/spectrum-container.properties`.
 - b) In the property `spectrum.cluster.seeds`, add the host name or IP address of the other nodes in the cluster, separating each with a comma.
 - c) Save and close the `spectrum-container.properties` file. You do not need to restart the server.

Cluster Properties for a Configuration Database Cluster

A configuration database cluster is a cluster where each node contains the configuration database only, and not the server. If you are setting up a cluster where the server and configuration database are installed together on each node, or are setting up a server-only cluster, see [Cluster Properties](#) on page 47.

The settings for a configuration database cluster are located in this properties file:

```
Database\repository\spectrum-container.properties
```

This table describes each property:

Property	Description
<code>spectrum.cluster.enabled</code>	Set this to true.
<code>spectrum.cluster.name</code>	<p>If this is the first node in the cluster, set this to any name you want to give to the configuration database cluster. Be sure that the name is unique if you have multiple clusters.</p> <p>If you are adding a node to an existing cluster, set this to the name of the configuration database cluster that you want this node to join.</p>
<code>spectrum.cluster.address</code>	Specify the node's own IP address.
<code>spectrum.cluster.seeds</code>	<p>If you are setting up the first node in the cluster, or if this is the first node you are starting after having stopped the cluster, specify only the host name or IP address of this server. This effectively points this node to itself as a seed node, which is necessary in order for it to be able to start as the first node in the cluster.</p> <p>If this is not the first node in the cluster, set this to the host name or IP address of the Spectrum™ Technology Platform server whose configuration will be replicated on this node when it joins the cluster, resulting in synchronized configuration. You can specify multiple seed nodes by separating each with a comma. When starting up, the node will attempt to access each seed node in the order listed. If none of the seed nodes can be reached, the node will not join the cluster.</p> <p>Tip: We recommend that you specify multiple seed nodes so that if one seed node is down others can be used to allow nodes to join the cluster. We also recommend that you specify the same seed nodes in the same order on all nodes in the cluster.</p>
<code>spectrum.cluster.nodeID</code>	Set this to an integer value to use as the ID for this node. The ID must be an integer and must be unique among all nodes in the database cluster. For example, you could set the node ID for the first node to 1, the second node's node ID to 2, and the third node's node ID to 3.

Upgrading a Cluster with a Separated Database

Prerequisites:

- Before upgrading, be sure to read the release notes for the new version. The release notes contain important compatibility information, supported upgrade paths, and module-specific data backup recommendations.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

This procedure describes how to upgrade Spectrum™ Technology Platform when you have separated the configuration database from the server. To upgrade an environment that has a separated configuration database, you first upgrade the configuration database cluster, then the server cluster.

1. Back up the server. For instructions on creating a backup, see the *Administration Guide*.

Important: We recommend that you create a backup before upgrading so that you can recover your flows, security settings, and other settings, if an error occurs during the upgrade process.

2. Back up module-specific data for any of these modules if you have them installed.

Module	Items to Back Up
Advanced Matching Module, Data Normalization Module, and Universal Name Module	Back up the contents of these subfolders located in <i>SpectrumLocation/server/modules</i> : <ul style="list-style-type: none"> • cdqdb • lucene • matcher • parser • searchindex • tables •
Data Hub Module	Open the Relationship Analysis Client and click Manage . Select the model you want to back up then click Backup . In addition to backing up your models, back up these two property files: <ul style="list-style-type: none"> • server\modules\hub\hub.properties • server\modules\db\neo4j.properties
Location Intelligence Module	Back up your named resources, data, and configuration files.

3. Stop all the nodes in the server cluster then stop all the nodes in the configuration database cluster. Make a note of the last node that you stop in the configuration database cluster. You must start this node first after upgrading. For instructions on stopping a cluster, see [Stopping a Cluster](#) on page 62.

4. On the *last* node that you shut down in the configuration database cluster, execute `installdb.sh`. The installer upgrades the configuration database.

Warning: The first node that you upgrade must be the last node that was stopped. This is because on some operating systems the configuration database will start automatically at the end of the upgrade process. If the first node that starts is not the last node that was stopped, data such as job history and configuration settings may be lost. If you do not know which node was stopped last, look in each node's wrapper log for the time stamp of the shutdown message. You can find the wrapper log in: `Spectrum Location\Database\repository\logs\wrapper.log`.

5. Configure clustering for the database cluster.
 - a) Edit the file `Database/repository/spectrum-container.properties` as described in [Cluster Properties for a Configuration Database Cluster](#) on page 70.
 - b) Save and close the `spectrum-container.properties` file.
 - c) Start the *last* node that was stopped in the configuration database cluster. To start the configuration database, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.start`.
 - d) After the upgraded configuration database is fully started, repeat the previous steps to upgrade each of the remaining servers in the configuration database cluster and start each of them.
6. Upgrade each node in the server cluster. For more information, see [Upgrading a Cluster](#) on page 54.

Important: When installing each server select the **Server only** option in the installer and provide the host and port of one or more of the configuration database servers. You can find the port in the file `InstallationLocation\Database\repository\spectrum-container.properties`. The port is specified in the `spectrum.repository.server.connector.bolt.port` property.

Note: Any job or subflow stored in the system during a server upgrade is marked as exposed to provide the same behavior for those jobs and subflows as before the upgrade. Any job or subflow that is exported prior to the upgrade will not be exposed. Therefore, when importing these jobs or subflows back into the system, you must manually expose the imported job or subflow.

Some modules have post-upgrade steps you need to perform.

Data Hub Module

Open this file in a text editor: `server/modules/hub/neo4j.properties` and set the property `allow_store_upgrade` property to `true`. The purpose of this property is to protect against unintentional and irreversible store upgrades. Setting this property to "true" indicates that you understand the ramifications of proceeding with an upgrade and have taken the necessary precautions before proceeding.

Restart the Spectrum™ Technology Platform server. The server will upgrade each model. Examine the file `server/app/repository/logs/wrapper.log` for errors or warning messages. Once all models have been upgraded, go back to the `hub.properties` file and comment out the `allow_store_upgrade` property.

Upgrading a Cluster with a Separated Database and Data Hub Module

Prerequisites:

- Before upgrading, be sure to read the release notes for the new version. The release notes contain important compatibility information, supported upgrade paths, and module-specific data backup recommendations.
- Apply all the latest updates available for your operating system, especially those that resolve issues with Java.

This procedure describes how to upgrade Spectrum™ Technology Platform when you have separated the configuration database from the server and you have the Data Hub Module installed. The upgrade process consists of these steps:

1. Stop the server cluster.
2. Stop the configuration database cluster.
3. Upgrade the last node that was stopped in the configuration database cluster.
4. Upgrade the other nodes in the configuration database cluster.
5. Upgrade the server acting as the Data Hub Module master in the server cluster.
6. Upgrade the non-master servers in the server cluster.

To upgrade a cluster with a separated configuration database and the Data Hub Module, follow this procedure:

1. Back up the server. For instructions on creating a backup, see the *Administration Guide*.

Important: We recommend that you create a backup before upgrading so that you can recover your flows, security settings, and other settings, if an error occurs during the upgrade process.

2. Open the Relationship Analysis Client and click **Manage**. Select the model you want to back up then click **Backup**.

In addition to backing up your models, back up these two property files:

- `server\modules\hub\hub.properties`
- `server\modules\db\neo4j.properties`

3. Identify which node is the serving as the master server for the Data Hub Module.

- a) Open a web browser and go to:

`http://LoadBalancer:8080/jmx-console/HttpAdaptor/list`

- b) Scroll down to the **neo4j.org domain**.

You will see a set of objects for each model. The **Role** attribute in the **HighAvailability** object indicates whether a server is the master for a model.

- c) If you have more than one model and each model has a different master, you need to make one server the master of all the models. To do this, restart the cluster then open the Relationship Analysis Client using the hostname or IP address of one of the nodes rather than the load balancer. In the Relationship Analysis Client, open each model by running a query on each model. This will make the server you are connected to the master for each model.
4. Stop all the non-master nodes in the server cluster then stop the master server last. Stop nodes one at a time rather than all at once.

Important: Make sure that Spectrum™ Technology Platform stops without errors. If a server does not stop properly, Data Hub Module models on the server will not open successfully after upgrading. To ensure that Spectrum™ Technology Platform stopped cleanly, examine the `SpectrumDirectory\server\app\repository\logs\wrapper.log` file for errors during shutdown.
 5. Stop all the nodes in the configuration database cluster. Make a note of the last node that you stop in the configuration database cluster. You must start this node first after upgrading.
 6. On the *last* node that you shut down in the configuration database cluster, execute `installdb.sh`. The installer upgrades the configuration database.

Warning: The first node that you upgrade must be the last node that was stopped. This is because on some operating systems the configuration database will start automatically at the end of the upgrade process. If the first node that starts is not the last node that was stopped, data such as job history and configuration settings may be lost. If you do not know which node was stopped last, look in each node's wrapper log for the time stamp of the shutdown message. You can find the wrapper log in: `Spectrum Location\server\app\repository\logs\wrapper.log`.

7. Configure clustering for the database cluster.

- a) Edit the file `server/app/conf/spectrum-container.properties` as described in [Cluster Properties for a Configuration Database Cluster](#) on page 70.
- b) Save and close the `spectrum-container.properties` file.

- c) Start the *last* node that was stopped in the configuration database. To start the configuration database, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type the following command: `./server.start`.

Warning: The first node that you start must be the last node that was stopped, and that node must be a seed node. Starting another node first may result in loss of data such as job history and configuration settings. If you do not know which node was stopped last, look in each node's wrapper log for the time stamp of the shutdown message. You can find the wrapper log in: `Spectrum Location\server\app\repository\logs\wrapper.log`.

- d) After the upgraded configuration database is fully started, repeat the previous steps to upgrade each of the remaining servers in the configuration database cluster and start each of them.

8. Upgrade the Data Hub Module master server in the server cluster.

- a) If you are upgrading from Spectrum™ Technology Platform 10.0 or later, each model directory must contain a `version.data` file. Review all the `model.ModelName` subdirectories located under `SpectrumDirectory/server/modules/hub/db` to confirm that they contain a `version.data` file. If any model directory is missing this file, copy the corresponding `version.data` file from one of the non-master nodes.
- b) Run the Spectrum™ Technology Platform installer to upgrade the master server to the new version of Spectrum™ Technology Platform.
- c) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and confirm that the property `hub.neo4j.database.type` is set to `embedded`:

```
hub.neo4j.database.type=embedded
```

- d) Open the file `SpectrumFolder\server\modules\hub\db\neo4j.properties` in an editor and set the `allow_store_upgrade` property to `true`:

```
allow_store_upgrade=true
```

- e) Start the Spectrum™ Technology Platform server.
- f) Open each model in the Relationship Analysis Client and run a query. Any query is sufficient.
- g) Stop the Spectrum™ Technology Platform server.
- h) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and set the property `hub.neo4j.database.type` to `ha`:

```
hub.neo4j.database.type=ha
```

- i) Compare any properties files that you backed up to the installed files and make any necessary changes. Do not overwrite new files with old files because new files may contain properties that old files do not.

9. Upgrade the Data Hub Module non-master servers in the server cluster.

Important: When installing each server select the **Server only** option in the installer and provide the host and port of one or more of the configuration database

servers. You can find the port in the file `InstallationLocation\Database\repository\spectrum-container.properties`. The port is specified in the `spectrum.repository.server.connector.bolt.port` property.

a) Delete the models in the `SpectrumDirectory\server\modules\hub\db` directory.

Warning: Do not delete the models from the master server.

b) On one of the non-master servers, run the Spectrum™ Technology Platform installer to upgrade it to the new version of Spectrum™ Technology Platform.

c) Open the file `SpectrumFolder\server\modules\hub\hub.properties` in an editor and set the property `hub.neo4j.database.type` to ha:

```
hub.neo4j.database.type=ha
```

d) Compare any properties files that you backed up to the installed files and make any necessary changes. Do not overwrite new files with old files because new files may contain properties that old files do not.

e) Copy the `SpectrumFolder\server\modules\hub\db\model.*` directories from the master server to the non-master server.

f) Repeat these steps for each non-master server in the cluster.

10. Start the cluster.

a) Start the master server, followed by non-master servers.

b) Ensure that each server in the cluster is functioning. Check `SpectrumFolder\server\app\repository\wrapper.log` for any errors.

c) While directly connected to the master server (bypassing the load balancer), open each model, one at a time, and inspect the `wrapper.log` file for errors.

Converting to a Separated Configuration Database

Converting an existing Spectrum™ Technology Platform installation to a separated configuration database enables you to take advantage of the improved scalability of a separated configuration database. When you convert to a separated configuration database, your existing installation is converted from one where the configuration database is part of the server to one where the configuration database is in a separate cluster.

At a high level, this is the conversion process:

- Stop your existing Spectrum™ Technology Platform server.
- Set up the new configuration database cluster:
 - Install the separate configuration database software on a new server.
 - Copy your existing configuration database to the new server.
 - Configure clustering and start the configuration database cluster.
- Install the server-only cluster and start it up.

Note: This procedure applies both to converting a single server to a separated configuration database, and converting a cluster to a separated configuration database.

To convert to a separated configuration database:

1. Back up module-specific data for any of these modules if you have them installed.

Module	Items to Back Up
Advanced Matching Module, Data Normalization Module, and Universal Name Module	<p>Back up the contents of these subfolders located in <i>SpectrumLocation/server/modules</i>:</p> <ul style="list-style-type: none"> • cdqdb • lucene • matcher • parser • searchindex • tables .
Data Hub Module	<p>Open the Relationship Analysis Client and click Manage. Select the model you want to back up then click Backup.</p> <p>In addition to backing up your models, back up these two property files:</p> <ul style="list-style-type: none"> • server\modules\hub\hub.properties • server\modules\db\neo4j.properties
Location Intelligence Module	<p>Back up your named resources, data, and configuration files.</p>

2. If the server you are converting is running Spectrum™ Technology Platform 11.0 SP1 or earlier, you must upgrade to the latest version of Spectrum™ Technology Platform before converting from a standard installation to a separated configuration database. For more information, see [Upgrading a Server](#) on page 28 (for upgrading a single server) or [Upgrading a Cluster](#) on page 54 (for upgrading a cluster).
3. Stop the server. If you have a clustered installation, stop the cluster.
4. Install the configuration database to a new server.
 - a) Place the Spectrum™ Technology Platform installer on the machine where you want to install the configuration database. This must be a different machine from the one where you have your existing Spectrum™ Technology Platform server installed.
 - b) Run `installdb.sh`.
 - c) Follow the prompts to install the configuration database.

- d) Copy the `Database\repository\data\databases` folder from your existing server to the server where you installed the separate configuration database. Replace the existing folder.
 - e) Configure the cluster properties for the database cluster by editing the file `Database\repository\spectrum-container.properties` as described in [Cluster Properties for a Configuration Database Cluster](#) on page 70.
 - f) Save and close the `spectrum-container.properties` file.
 - g) Start the configuration database. To start the configuration database, change the working directory to the Spectrum™ Technology Platform server's `bin` directory, source the setup file, then type this command: `./server.start`.
 - h) Install the configuration database on additional servers as needed to complete the configuration database cluster.
5. Install the server.
- a) (Optional) If you are upgrading to a new version and you want to use the same machine to host the upgraded server as hosted the existing server, uninstall the existing server of Spectrum™ Technology Platform.
 - b) Install the server cluster. For more information, see [Installing a Cluster](#) on page 42.

Important: When installing each server select the **Server only** option in the installer and provide the host and port of one or more of the configuration database servers. You can find the port in the file `InstallationLocation\Database\repository\spectrum-container.properties`. The port is specified in the `spectrum.repository.server.connector.bolt.port` property.

Converting from a Separated Configuration Database to a Standard Installation

If you have a cluster that consists of separate clusters for the server and for the configuration database, you can convert your installation to a standard installation where the server and configuration database are installed together on the same server.

1. Back up module-specific data for any of these modules if you have them installed.

Module	Items to Back Up
Advanced Matching Module, Data Normalization Module, and Universal Name Module	<p>Back up the contents of these subfolders located in <i>SpectrumLocation/server/modules</i>:</p> <ul style="list-style-type: none"> • cdqdb • lucene • matcher • parser • searchindex • tables .
Data Hub Module	<p>Open the Relationship Analysis Client and click Manage. Select the model you want to back up then click Backup.</p> <p>In addition to backing up your models, back up these two property files:</p> <ul style="list-style-type: none"> • server\modules\hub\hub.properties • server\modules\db\neo4j.properties
Location Intelligence Module	Back up your named resources, data, and configuration files.

2. Stop all the nodes in the server cluster then stop all the nodes in the configuration database cluster.
3. The configuration database must be of the same version of Spectrum™ Technology Platform as the server you are converting to. If the configuration database is from an older version, upgrade the configuration database to the same version of Spectrum™ Technology Platform as the version you want to use for the standard server. On the *last* node that you shut down in the configuration database cluster, execute `installdb.sh`. The installer upgrades the configuration database.

Warning: The node that you upgrade must be the last node that was stopped. This is so that data such as job history and configuration settings are not lost. If you do not know which node was shut down last, look in each node's wrapper log for the time stamp of the shutdown message. You can find the wrapper log in: *Spectrum Location\server\app\repository\logs\wrapper.log*.

4. Install a new server. For instructions, see [Installing a New Server](#) on page 26.

Note: When prompted, be sure to select **Standard Installation**, not **Server only**.

5. Stop the server.

6. Copy the `SpectrumLocation\Database\repository\data\databases` folder from the last configuration database server you stopped to the new server, replacing the existing folder.
7. Start the server.

Adding Modules to a Cluster

This procedure describes how to add one or more modules to an existing cluster.

1. Stop all the Spectrum™ Technology Platform nodes in the cluster. For more information, see [Stopping a Cluster](#) on page 62. If your cluster has a separated configuration database cluster, you only need to stop the server cluster, not the configuration database cluster.

Warning: To prevent data loss you must stop the cluster by following the procedure described in [Stopping a Cluster](#) on page 62.

2. On any node in the cluster, install the module or modules you want to add. For more information, see the *Spectrum™ Technology Platform Installation Guide*.
3. Open this file in a text editor:

```
server/app/conf/spectrum-container.properties
```

4. In the `spectrum.cluster.seeds` property, remove all host names and IP addresses except for the one for this server. Save the host names and IP addresses so that you can re-add them later.
5. Save the file.
6. Start the server.

Note: Wait for the server to fully start before proceeding.

7. In the file `spectrum-container.properties`, add the host names and IP addresses that you had removed.
8. Save the file. You do not need to restart the server.
9. Install the modules on each of the other nodes in the cluster. Start each node after installing the modules on it, and wait for it to fully start before installing the modules on the next node. You do not need to modify the `spectrum.cluster.seeds` property when installing modules on subsequent nodes.

5 - Spectrum Databases

After you have installed the server you need to install the databases that support the module(s) you have installed. Databases provide the information that Spectrum™ Technology Platform modules use to process data, such as postal address data, name data, or geospatial data. For example, if you have installed the Enterprise Geocoding Module, you will need to install databases that contain geospatial data; if you have installed the Universal Addressing Module, you will need to install databases that contain postal data.

In this section

Installing the Address Now Module Database	83
Installing the Advanced Matching Module Database	84
Installing Data Normalization Module Databases	85
Installing Enterprise Geocoding Module Databases	87
Installing Enterprise Routing Module Databases	90
Installing Enterprise Tax Module Databases	91
Installing GeoEnrichment Module Databases	95
Installing Global Addressing Module Databases	96
Installing Global Geocoding Module Databases	98
Installing the Global Sentry Module Database	100
Installing Location Intelligence Module Databases	103
Installing Universal Addressing Module Databases	103
Installing Universal Name Module Databases	105
Using the Database Silent Installer	107

Installing the Address Now Module Database

Note: If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.

1. Copy the `liclcs.sbi` license file provided by Pitney Bowes into the following directory:
`<SpectrumPlatformLocation>/server/modules/anow/license.`
2. Make sure that Spectrum™ Technology Platform is stopped. To stop Spectrum™ Technology Platform, change the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

3. Insert the database DVD containing the database(s) you want to install.

Note: You must install the Postal databases if you want to use the Enhanced databases.

4. If your system does not auto-mount the DVD, issue the appropriate mount command to indicate that the DVD device is a file system.

If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

5. Run the `load_adn_db` script inside `<SpectrumPlatformLocation>/server/bin.`
6. Press `<Enter>` to accept the default location of the Address Now directory:
`<SpectrumPlatformLocation>/server/modules/anow.` Do not change this path or the database will not install correctly.
7. Follow the prompts as the script verifies your environment and database location. When prompted for the location of the Installation Media Directory, be sure to select the directory on the database DVD that contains the **kbase** folder.
8. Start the Address Now server by going to `<SpectrumPlatformLocation>/server/bin` and running the `start_adn_server` script.
9. Start the Spectrum™ Technology Platform by changing the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```

Installing the Advanced Matching Module Database

The Advanced Matching Module provides a load utility to install databases. The database files that you install depend on the databases you have licensed.

1. If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.
2. Make sure that Spectrum™ Technology Platform is stopped. To stop Spectrum™ Technology Platform, change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

3. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

4. If you are installing from DVD and your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system.

If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

5. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
6. Source the "setup" bourne shell script to setup the environment by typing the following command:

```
./setup
```

7. Execute the script for installing the database by typing the following command:

```
./installdb_cdq
```

8. Follow the prompts as the script verifies your environment and database location.
9. Open the file `<SpectrumDirectory>/server/bin/wrapper/wrapper.conf` in a text editor.
10. Increase the Java settings for initial heap size (`wrapper.java.initmemory`) and maximum heap size (`wrapper.java.maxmemory`) to reflect the total amount of memory required for the Arabic Plus Pack and Asian Plus Pack.

- Arabic Plus Pack: 5.5 GB
- Asian Plus Pack - Chinese: 32 MB

- Asian Plus Pack - Japanese: 1.6 GB
- Asian Plus Pack - Korean: 8 MB
- Core Names: 1.1 GB

11. Save and close `wrapper.conf`.

12. Start the Spectrum™ Technology Platform by changing the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```

Installing Data Normalization Module Databases

The Data Normalization Module provides a load utility to install databases for the Advanced Transformer, Open Parser, and Table Lookup components. The database files that you install depend on the databases you have licensed. Use this list of database tables to determine which files you should download and install. For more information on the tables contained in each database, refer to the reference documentation for each component.

Stage	Available Databases
Advanced Transformer	Data Normalization Module - Base Tables
Open Parser	<ul style="list-style-type: none"> • Data Normalization Module - Base Tables • Core Names Database • Company Names Database • Arabic Plus Pack • Asian Plus Pack
Table Lookup	<ul style="list-style-type: none"> • Data Normalization Module - Base Tables • Core Names Database • Arabic Plus Pack • Asian Plus Pack • ZREPLACE (Used by the SAP Module for French address validation)

1. If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.
2. Make sure that Spectrum™ Technology Platform is stopped. To stop Spectrum™ Technology Platform, change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

3. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

4. If you are installing from DVD and your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system.

If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

5. Change the working directory to the bin directory of where Spectrum™ Technology Platform is installed.

6. Source the "setup" bourne shell script to setup the environment by typing the following command:

```
./setup
```

7. Execute the script for installing the database by typing the following command:

```
./installdb_dnm
```

8. Follow the prompts as the script verifies your environment and database location.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

9. Open the file `<SpectrumDirectory>/server/bin/wrapper/wrapper.conf` in a text editor.

10. Increase the Java settings for initial heap size (`wrapper.java.initmemory`) and maximum heap size (`wrapper.java.maxmemory`) to reflect the total amount of memory required for the Arabic Plus Pack and Asian Plus Pack.

- Arabic Plus Pack: 5.5 GB
- Asian Plus Pack - Chinese: 32 MB
- Asian Plus Pack - Japanese: 1.6 GB
- Asian Plus Pack - Korean: 8 MB
- Core Names: 1.1 GB

11. Save and close `wrapper.conf`.

12. Start the Spectrum™ Technology Platform by changing the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```

Installing Enterprise Geocoding Module Databases

This module has several databases. You may have one or more of these, depending on the features you have licensed.

International Geocoding Databases

International geocoding databases contain the data necessary to perform geocoding and reverse geocoding for locations outside the U.S. Each country has its own database, and some countries have optional databases that provide enhanced geocoding.

Note: If you install multiple databases, install each database to a separate folder.

To install the international geocoding databases you need to meet the following requirements:

- You must have Java 8 installed.
 - You must point your JAVA_HOME environment variable to your JDK 1.8 installation location.
1. Download your licensed SPD files from the Pitney Bowes eStore using the link provided in the release announcement or welcome email.
 2. Unzip the file to a temporary location.
 3. Place the .spd files in:

```
SpectrumLocation/server/app/dataimport
```

The SPD file is automatically extracted to:

```
SpectrumLocation/server/app/repository/datastorage
```

Once the database has been extracted to the `datastorage` folder, it is installed and you can define it as a database resource using Management Console or the Administration Utility.

You can modify the Spectrum database installation process if needed:

- You can change the location of the data import directory by altering the **platform** property in the `<SpectrumLocation>/server/app/conf/dataimportdirectories.properties` file.
- You can change the location of the data storage folder by altering the **spectrum.data.manager.storage.directory** property in the Data Manager settings section of the `<SpectrumLocation>/server/app/conf/spectrum-container.properties` file.
- By default, the SPD files are deleted after the files are extracted. However, you can archive SPD files by setting the **spectrum.data.manager.archive.data** property to "true" in the Data Manager settings section of the `<SpectrumLocation>/server/app/conf/spectrum-container.properties` file.

AUS-GNAF

If you installed the Australia Geocoded National Address File (G-NAF), you must specify the `GNAF123` and `GNAF456` as separate paths but in the same database resource in the Management Console.

`GNAF123` contains the point-level dictionary. This has the highest precision of geocoding (characterized by Reliability Level 1, 2, or 3.) `GNAF456` contains the remainder of address information in G-NAF that does not meet high precision geocoding criteria (characterized by Reliability Level 4, 5, or 6.)

We recommend that you use both databases to validate the existence of addresses but only use `GNAF123` for parcel-level geocoding. If you do not require parcel-level geocodes you can use `GNAF456` for geocoding.

U.S. Geocoding Databases

The U.S. geocoding databases contain the spatial data necessary to perform address standardization and geocoding. You must install at least one of these databases.

- **Centrus Enhanced Geocoding**—This database consists of TIGER data provided by the U.S. Geological Survey and address data provided by the U.S. Postal Service.
- **TomTom Geocoding**—This database provides more up-to-date data than the Centrus Enhanced Geocoding database. It requires an additional license. The data is provided by TomTom, a third-party provider of spatial data, and postal data from the U.S. Postal Service.
- **NAVTEQ Geocoding**—This database provides more up-to-date data than the Centrus Enhanced Geocoding database. It requires an additional license. NAVTEQ data is provided by NAVTEQ, a third-party provider of spatial data. For more information about these databases, contact your sales representative.
- **ZIP + 4 Centroid**—This database provides only address standardization and ZIP + 4 centroid matching. It does not provide street-level matching.

These databases use proprietary files called GSD files. For ZIP Code centroid matching, the file `us.Z9` contains all the centroid info for all states and normally has a `z9` extension.

Each geocoding database has an optional Statewide Intersections Index. The Statewide Intersection Index is designed to enable fast intersection identification on a statewide basis. For example, the Statewide Intersection Index will allow the database to search for "1st and Main St, CO" and return a list of possible matches in Colorado more quickly than searching the entire geocoding database for each instance of the intersection.

1. Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
2. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
3. If you have previously installed the Centrus Data Product Suite, delete any copies of the `.gsd`, `.gsl`, `.gsi`, `.gsu`, `.gsz`, `.z9`, `.dir`, `.las`, `.los`, `.apn` and `.elv` files.
4. Copy the files you need to a local directory.

5. After you install the database files, use the Database Resource tool in the Management Console to define the database as a resource. For more information, see the *Administration Guide*.

Points Databases (U.S. Only)

Points databases contain data for locating the center of a parcel. These databases provides enhanced geocoding accuracy for internet mapping, property and casualty insurance, telecommunications, utilities, and others.

- **Master Location Data**—This database provides the best available address point location for every mailable and deliverable address in the United States.
- **Centrus Points**—This database contains the data necessary to locate the center of a parcel or building. It does not contain assessor's parcel number (APN) or elevation data.
- **Centrus Elevation**—This database contains the same data as Centrus Points, plus elevation data.
- **Centrus Enhanced Points**—This database contains the same data as Centrus Points, plus APN data.
- **Centrus Premium Points**—This database contains the same data as Centrus Points, plus both APN and elevation data.
- **TomTom Points Database**—The data in this database is provided by TomTom, a third-party provider of spatial data.
- **NAVTEQ Points**—This database is provided by NAVTEQ, a third-party data provider. It contains data used to locate addresses at the center of the actual building footprint or parcel.

Note: If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.

1. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

2. If you are installing from DVD and your system auto-mounts, skip this step. If your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system. If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

3. If you are installing a Centrus points database:
 - a) If you have previously installed any of the Centrus points databases, delete these files: `cpoints.gsd`, `cpoints.gsi`, `cpoints.apn`, `cpoints2.apn`, `cpoints3.apn`, and `cpoints.elv`.

- b) Copy these files to the Spectrum™ Technology Platform server: `points.gsd`, `cpoints.gsi`, `cpoints.apn`, `cpoints2.apn`, `cpoints3.apn`, and `cpoints.elv`.
4. If you are installing the Centrus TomTom Points database:
 - a) If you have previously installed the Centrus TomTom Points database, delete these files: `points.gsd` and `points.gsi`.
 - b) Copy these files to the Spectrum™ Technology Platform server: `points.gsd` and `points.gsi`.
5. After you install the database files, use the Database Resource tool in the Management Console to define the database as a resource. For more information, see *Spectrum™ Technology Platform Administration Guide*.

Early Warning System (U.S. Only)

The USPS provides free Early Warning System (EWS) data to prevent matching errors due to the age of the address information in the `.gsd` files. The USPS creates a new EWS data set each week that you can download from the USPS website (ribbs.usps.gov).

To install the Early Warning System (EWS) database rename the database file from `OUT` to `EWS.txt` and place it in the same folder as the primary database.

Installing Enterprise Routing Module Databases

1. To install the routing databases you need to meet the following requirements:
 - You must have Java 6 installed.
 - You must point your `JAVA_HOME` environment variable to your JDK 1.6 installation location.

Note: If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.
2. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.
3. If you are installing from DVD and your system auto-mounts, skip this step. If your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system.
4. If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

5. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
6. Source the "setup" bourne shell script to setup the environment by typing the following command:

```
. ./setup
```
7. Execute the `dbloader.bin` script.
8. Follow the prompts as the script verifies your environment and database location.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

9. After you install the database files, use the Database Resource tool in the Management Console to define the database as a resource. For more information, see the "Configuring Database Resources" chapter of the *Spectrum™ Technology Platform Administration Guide* on support.pb.com.

Installing Enterprise Tax Module Databases

Depending on the features you have licensed, you need to install one or more of these databases.

Database Compatibility

The Enterprise Tax Module version 9.0 SP2 and later uses a different data format than previous releases. You must download and install the **GeoTAX/Enterprise Tax Premium database** for use in this version. The GeoTAX/Enterprise Tax Premium database is not compatible with any releases prior to version 9.0 SP2.

Downloading Database Files

Note: Prior to downloading the data files: If you have previously installed database files, you should back up those files and delete any copies of the `.gdi`, `.gsd`, `gsi`, `.gsl`, `.gsu`, `.gsz`, `.gsx`, `.z9`, `.dir`, `.las` and `.los` files in the data install directory.

Downloading from the eStore

Use the link in your welcome email to download the zip file. Extract the files and make note of the directory where you save the files.

Downloading from the Technical Support Web Site

Download the database from the technical support web site, www.g1.com/support. The data file will be downloaded as a .zip file. Extract the files and make note of the directory where you save the files.

After Downloading the Database Files

You will need to decrypt the zip5.gs_ file before it can be installed. To perform this process, open a command prompt, navigate to the /datasets/UNIX/<platform> directory included on the data media, where <platform> is your operating system, and execute the following command:

```
centrus_decrypt.exe <New Data>/zip5.gs_ Clear28050
```

Where <New Data> is the location of the downloaded or copied updated data. Your file is now ready to be installed.

Downloading Florida Format Files

You can obtain the Florida format files from the Florida Department of Revenue. The Florida Department of Revenue compiles the database based on county.

1. Download the files from the Florida website at: <https://pointmatch.state.fl.us/General/AddressFiles.aspx/>.
2. Unzip the downloaded files and transfer them to the server.

Note: Be sure to FTP your files in binary format.

3. Combine the county files into a single file if you downloaded more than one county. If you downloaded the entire state list, you have approximately 67 files. You must combine all the files into one file.
Your file is ready for loading.

Downloading TS-158 Format Files

The Federation of Tax Administrators (FTA) maintains a website with links to all data sources that use the TS-158 format.

1. Download the files from the Florida website at: <https://pointmatch.state.fl.us/General/AddressFiles.aspx>.
2. Unzip the downloaded files and transfer them to the Spectrum™ Technology Platform server.
3. State files are often broken up into individual county files. Combine all state and/or county files into a single file.
Your file is ready for loading.

Database Options

The following describes the database options presented in the UNIX/Linux Database Install script.

GeoTAX master files

The GeoTAX/Enterprise Tax Premium Database is a required dataset and is the master file for the Enterprise Tax Module software. The master files identify all geographic components associated with a street address, such as the latitude/longitude, census tract, and block group.

Point Data files

Point Data products include Master Location Data (MLD), Centrus Points, Centrus NAVTEQ Points, and Centrus TomTom Points. The point data provides point-level geocoding for the most accurate placement of addresses throughout the U.S. The Master Location Data database provides the best available address point location for every mailable and deliverable address in the United States.

User auxiliary file

This is a user-defined file that the Enterprise Tax Module uses to override results from the master files in street-level matching. If you have data that is more current than that in the master files, you can enter the new data into the auxiliary file and use it for your address matching. The Enterprise Tax Module returns matches made with a code that signifies the answer came from the auxiliary file. You can also return user-defined data from the auxiliary file with the match. The install program creates the file `G1GTAUX` in the specified destination.

GeoTAX auxiliary file

This file contains new addresses that have not yet been added to the master files. It provides the most up-to-date address data possible. The install program creates the indexed sequential file `G1GTAX2` in the specified destination.

Landmark auxiliary file

This is a user-defined file that allows you to specify customized address information in your input records. The recommended primary use of this file to match to your company's non-address locations such as well heads, transmission towers or any other descriptive location. The latitude/longitude that is part of the input needed to build this file allows companies to automatically keep track of any jurisdictional changes that affect these unique locations. Matching to this file requires that the input record information match exactly to the Landmark file contents. This also applies to street records if you choose to enter them in the Landmark file. For more information, refer to the *Enterprise Tax Module Guide*.

State-supplied Florida format file

This is a state-supplied file in Florida-native format which is provided by individual state governments. The Enterprise Tax Module first attempts to match to the state database. If the Enterprise Tax Module cannot find a state match, it attempts a match to the GeoTAX Auxiliary file, if loaded, then to the master files.

State-supplied TS-158 format file

This is a state-supplied file in TS-158 (ANSI Transaction Set No. 158) format which is provided by individual state governments. The Enterprise Tax Module first attempts to match to the state database. If the Enterprise Tax Module cannot find a

state match, it attempts a match to the GeoTAX Auxiliary file, if loaded, then to the master files.

Boundary file

Boundary files provide additional data about locations of special tax districts:

- Special Purpose Tax Districts (spd.txb)
- Insurance Premium Tax Districts (ipd.txb)
- Payroll Tax Districts (pay.txb)
- Personal Property Tax Districts (ptd.txb)
- User-defined Boundary file (usr.txb)

PB Software tax rate file

The Pitney Bowes Software Sales and Use Tax Rate file allows you to use the Enterprise Tax Module to provide sales and use tax rates for each of the assigned tax jurisdictions as well as the total rate for the assigned locations. The install program creates the indexed sequential file GTTAXRT.

Payroll tax correspondence file

Payroll tax cross-reference file allow you to use third-party software to determine the payroll tax rates. The cross-reference files combine the U.S. Government Federal Information Processing Standards (FIPS) codes with the proprietary geocodes used by tax software from third parties. The Payroll System Tax Code file is a customized file that you build to return the payroll tax codes used by your payroll system. The install program produces database files called G1GTPTC and G1GTPTC.vix.

Taxware[®] cross reference file

This sales tax cross-reference file enables you to use the Enterprise Tax Module to determine tax jurisdictions for a given address, then use Taxware[®] software to determine the sales tax rates for those jurisdictions.

Vertex[®] cross reference file

This sales tax cross-reference files allows you to use the Enterprise Tax module to determine tax jurisdictions for a given address, then use Vertex[®] software to determine the sales tax rates for those jurisdictions.

PB Software Vertex[®] cross reference file

This is a Vertex[®] cross-reference file supplied by Pitney Bowes. The install program produces a database file GTMSTR2 in the specified destination.

Installing the Database Files

1. Open a command prompt.
2. If the database that you are installing is larger than 2 GB, type the following two commands:

```
export LARGE_FILE_LIMIT_2TB=1
export USE_LARGE_FILE_API=1
```

3. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.

4. Type the following to source the setup script:

```
../setup
```

5. Run the database install script `installdb_gsl`.

The GeoTAX Database Installation Menu displays.

6. Enter the number of the database you want to install.

Note: For Point Data, enter the number for the **GeoTAX master files**.

7. Follow the instructions provided in the script.

Note: When specifying the destination folder:

- All Enterprise Tax Module databases and cross-reference files must be installed in the same directory.
- You may install databases on a mapped drive, but performance will be affected since you will be accessing them on a network rather than accessing them locally. .

Note: If you are installing a User-defined Boundary file, the filename is name- and case-sensitive and should be specified as `usr.txb`.

8. In Management Console, open the Enterprise Tax Module database resource tool and define a database resource that includes the database you just installed. Be sure to update Assign GeoTAX Info and Reverse GeoTAX Info Lookup to use the new database resource.

Installing GeoEnrichment Module Databases

1. Download your database(s). The database is downloaded as a `.tar.bz2` file.

2. Extract the `.tar.bz2` file.

Tip: A tool that supports extracting the `.tar.bz2` and `.tar` formats is "7-Zip". This open-source tool can be downloaded from: <http://www.7-zip.org/download.html>

3. Extract the `.tar` file.

4. Copy the data to any directory. Note the file name and path.

Note: You may install databases on a mapped drive, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

5. After you install the database files, you will need to define the database as a resource. For more information, see "Adding a GeoEnrichment Module Database Resource" in the *GeoEnrichment Guide* on support.pb.com.

Installing Global Addressing Module Databases

This procedure describes how to download and install Global Addressing Module databases in the Spectrum™ Product Database (SPD) format from the Pitney Bowes eStore or from the technical support web site, <http://www.g1.com/support>.

Disk Space

The disk space requirements for extracted and non-extracted SPD bundles are:

- Extracted bundles (all SPD) - 50 GB
- Non-extracted bundles (all SPD) - 20 GB

Memory

The following table provides information on the Global Address Module memory requirements for each country database.

Table 1: Global Address Validation Memory Requirements (in Megabytes)

Country Database Name	Global Address Validation	Global Type Ahead	Both
Australia (AUS)	700	n/a	1900
Austria (AUT)	900	700	1900
Belgium (BEL)	900	700	1900
Switzerland (CHE)	700	700	1900
Germany (DEU)	700	700	1900
Denmark (DNK)	2100	700	3400
Spain (ESP)	1300	700	1900
Finland (FIN)	900	700	1900
France (FRA)	2800	700	4100
United Kingdom (GBR)	980	700	1900
Greece (GRC)	700	n/a	1900
Ireland (IRL)	900	700	1900
Italy (ITA)	700	700	1900

Country Database Name	Global Address Validation	Global Type Ahead	Both
Norway (NOR)	700	700	1900
New Zealand (NZL)	700	n/a	1900

To download and install a Global Addressing Module database resource in the Spectrum™ Product Database (SPD) format:

1. Make sure no applications are running.
2. Select and download your licensed SPD files (xxx.spd) from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, <http://www.g1.com/support>.
3. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
4. Install the SPD files:
 - a) Place the SPD files in `<SpectrumLocation>/server/app/dataimport`. This is the default location for SPD files. The Spectrum™ Technology Platform server monitors this folder and looks for new files in two-second intervals.
You can change the location of the data import directory by altering the **platform** property in the `<SpectrumLocation>/server/app/conf/dataimportdirectories.properties` file.
 - b) When the server detects new SPD files, the server automatically extracts the SPD files to `<SpectrumLocation>/server/app/repository/datastorage`.
You can change the location of the data storage folder by altering the **spectrum.data.manager.storage.directory** property in the Data Manager settings section of the `<SpectrumLocation>/server/app/conf/spectrum-container.properties` file.
 - c) By default, the SPD files are deleted after the files are extracted. However, you can archive SPD files by setting the **spectrum.data.manager.archive.data** property to "true" in the Data Manager settings section of the `<SpectrumLocation>/server/app/conf/spectrum-container.properties` file.
 - d) The server will deploy and register the data with the Spectrum™ Technology Platform Data Manager. At this point the data will become available and you can add it as a data source in the **Spectrum™ Databases** section of Management Console.
 - e) After you install the database files, use either the Database Resource tool in the Management Console or the Global Addressing Command Line Interface (CLI) database commands to define the database as a resource. For more information on the CLI database commands, see the section "Global Addressing Module Databases" in the *Administration Guide*.

Installing Global Geocoding Module Databases

This module supports databases for both US and non-US countries.

Non-US Geocoding Databases

Non-US geocoding databases contain the data necessary to perform geocoding and reverse geocoding for locations outside the U.S.

Note: If you install multiple databases, install each database to a separate folder.

To install the international geocoding databases you need to meet the following requirements:

- You must have Java 8 installed.
- You must point your JAVA_HOME environment variable to your JDK 1.8 installation location.
- 1. Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
- 2. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
- 3. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
- 4. Source the "setup" bourne shell script to setup the environment by typing the following command:

```
. ./setup
```
- 5. Execute the `dbloader.bin` script.
- 6. Follow the prompts as the script verifies your environment and database location.

Note: Do not install geocoding databases on a network drive. Doing so can cause performance problems.

- 7. After you install the database files, use either the Database Resource tool in the Management Console or the Global Geocode CLI database commands to define the database as a resource. For more information, see the *Administration Guide*.

U.S. Geocoding Databases

The U.S. geocoding databases contain the spatial data necessary to perform address standardization and geocoding. You must install at least one of these databases.

- **TomTom Geocoding**—This database provides street segment data by TomTom, a third-party provider of spatial data, and postal data from the U.S. Postal Service.

- **NAVTEQ Geocoding**—This database provides street segment data by NAVTEQ, a third-party provider of spatial data.

These databases use proprietary files called GSD files. For ZIP Code centroid matching, the file us.Z9 contains all the centroid info for all states and normally has a z9 extension.

Each geocoding database has an optional Statewide Intersections Index. The Statewide Intersection Index is designed to enable fast intersection identification on a statewide basis. For example, the Statewide Intersection Index will allow the database to search for "1st and Main St, CO" and return a list of possible matches in Colorado more quickly than searching the entire geocoding database for each instance of the intersection.

1. Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
2. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
3. If you have previously installed the Centrus Data Product Suite, delete any copies of the .gsd, .gsl, .gsi, .gsu, .gsz, .z9, .dir, .las, .los, .apn and .elv files.
4. Copy the files you need to a local directory.
5. After you install the database files, use either the Global Geocoding Database Resource tool in the Management Console or the Global Geocoding CLI database commands to define the database as a resource. For more information, see the *Administration Guide*.

Points Databases (U.S. Only)

Points databases contain data for locating the center of a parcel. These databases provides enhanced geocoding accuracy for internet mapping, property and casualty insurance, telecommunications, utilities, and others.

Note: To use a points database, you must also install a streets database. See [U.S. Geocoding Databases](#) on page 98 for the list of available US streets databases.

- **Master Location Data** —This database provides the best available address point location for every mailable and deliverable address in the United States.
- **Centrus Points**—This database contains the data necessary to locate the center of a parcel or building. It does not contain assessor's parcel number (APN) or elevation data.
- **Centrus Elevation**—This database contains the same data as Centrus Points, plus elevation data.
- **Centrus Enhanced Points**—This database contains the same data as Centrus Points, plus APN data.
- **Centrus Premium Points**—This database contains the same data as Centrus Points, plus both APN and elevation data.
- **TomTom Points**—The data in this database is provided by TomTom, a third-party provider of spatial data.

- **NAVTEQ Points**—This database is provided by NAVTEQ, a third-party data provider. It contains data used to locate addresses at the center of the actual building footprint or parcel.

Note: If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.

1. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

2. If you are installing from DVD and your system auto-mounts, skip this step. If your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system. If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

3. If you are installing a Centrus points database:
 - a) If you have previously installed any of the Centrus points databases, delete these files: `cpoints.gsd`, `cpoints.gsi`, `cpoints.apn`, `cpoints2.apn`, `cpoints3.apn`, and `cpoints.elv`.
 - b) Copy these files to the Spectrum™ Technology Platform server: `points.gsd`, `points.gsi`, `points.apn`, `points2.apn`, `points3.apn`, and `points.elv`.
4. If you are installing the Centrus TomTom Points database:
 - a) If you have previously installed the Centrus TomTom Points database, delete these files: `points.gsd` and `points.gsi`.
 - b) Copy these files to the Spectrum™ Technology Platform server: `points.gsd` and `points.gsi`.
5. After you install the database files, use either the Global Geocoding Database Resource tool in the Management Console or the Global Geocoding CLI database commands to define the database as a resource. For more information, see the *Administration Guide*.

Installing the Global Sentry Module Database

These databases are required to run Global Sentry in real-time mode:

- `ofac.db`
- `pep.db`
- `sanctions.db`

These files are required to run Global Sentry in batch mode:

- globalsentrydb.addresses-ofac.csv
- globalsentrydb.fullNames-ofac.csv
- globalsentrydb.ids-ofac.csv
- globalsentrydb.names-ofac.csv
- globalsentrydb.addresses-pep.csv
- globalsentrydb.fullNames-pep.csv
- globalsentrydb.ids-pep.csv
- globalsentrydb.names-pep.csv
- globalsentrydb.addresses-sanctions.csv
- globalsentrydb.fullNames-sanctions.csv
- globalsentrydb.ids-sanctions.csv
- globalsentrydb.names-sanctions.csv

In addition, you must install the **Data Normalization Module** and **Advanced Matching Module** databases to use Global Sentry. For instructions, see [Installing Data Normalization Module Databases](#) on page 85 and [Installing the Advanced Matching Module Database](#) on page 84.

If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.

Ensure the Global Sentry Database Server is in up and running. In case it is not, use the option in the utility to start it before you begin data loading.

Note: You need to perform data loading after every upgrade of Spectrum™ Technology Platform.

1. Make sure that Spectrum™ Technology Platform is stopped. To stop Spectrum™ Technology Platform, change the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

2. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

3. If you are installing from DVD and your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system. If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

4. In the `server/bin` directory, source the "setup" bourne shell script to setup the environment by typing the following command:

```
. ./setup
```

- Execute the script for installing the database by typing the following command:

```
./installdb_ois
```

Note: It is mandatory to maintain all the CSV and DB files in a correct folder structure. The `ofac`, `pep`, and `sanctions` folder should have their respective DB and four CSV files, and all these should be in one root folder (which you can name according to your convention and convenience). An example of the folder hierarchy is depicted below with `GlobalSentryDatabaseFiles` as the root folder:

```
GlobalSentryDatabaseFiles:
ofac pep sanctions

GlobalSentryDatabaseFiles/ofac:
globalsentrydb.addresses-ofac.csv globalsentrydb.fullNames-ofac.csv globalsentrydb.ids-ofac.csv globalsentrydb.names-ofac.csv ofac.db

GlobalSentryDatabaseFiles/pep:
globalsentrydb.addresses-pep.csv globalsentrydb.fullNames-pep.csv globalsentrydb.ids-pep.csv globalsentrydb.names-pep.csv pep.db

GlobalSentryDatabaseFiles/sanctions:
globalsentrydb.addresses-sanctions.csv globalsentrydb.fullNames-sanctions.csv globalsentrydb.ids-sanctions.csv globalsentrydb.names-sanctions.csv sanctions.db
```

- Follow the prompts as the script verifies your environment and database location.

Note: You may install databases on a network drive, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

- After installing the Global Sentry Module database, you must configure a JDBC connection in the Spectrum™ Technology Platform Management Console.
- Start Spectrum™ Technology Platform. To start Spectrum™ Technology Platform, change the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```

- Log in to the **Management Console** and configure the driver and connection properties using these steps:

- In a web browser go to this URL:

```
http://server.port/managementconsole
```

Where *server* is the server name or IP address of your Spectrum™ Technology Platform server and *port* is the HTTP port used by Spectrum™ Technology Platform. By default, the HTTP port is 8080.

- Enter your user name and password to access the **Home** page of the **Management Console**.
- On the Main Menu, click **Systems > Drivers** to open the **Drivers** page
- Click **Add**
- Type these JDBC properties in the applicable text boxes:
 - JDBC driver configuration name: HSQLDB
 - JDBC driver class name: org.hsqldb.jdbcDriver
 - Connection string template: jdbc:hsqldb:hsqldb://\${host}:\${port}/\${instance}
- Add this driver file:

```
<SpectrumPlatformLocation>/GlobalSentryDatabase/lib/hsqldb.jar
```
- To define connection properties, go to **Resources > Data Sources**.
- Click **Add**, and define these connection properties:

- Connection name: Global Sentry
 - Database driver: select the HSQLDB JDBC driver that you created in the previous steps.
- i) Enter these values in the **Connection Properties** dialog box:
- user: sa
 - password: <there is no password>
 - host: localhost or <your server name>
 - port: 9001
 - instance: globalsentrydb
- j) Click **Test** to verify the connection works.
- k) Click **OK**, then click **Save**

Installing Location Intelligence Module Databases

1. Place the data on the file system, or install the data into a database.
2. Use Spatial Manager to define Location Intelligence Module database resources (named connections and tables). For more information, see the "Configuring Database Resources" chapter of the *Spectrum™ Technology Platform Administration Guide* on support.pb.com.

Installing Universal Addressing Module Databases

This procedure describes how to install databases used by Get Candidate Addresses, Get City State Province, Get Postal Codes, Validate Address, and Validate Address AUS. For instructions on installing databases used by Validate Address Global, see [Installing Validate Address Global Databases](#) on page 104. For instructions on installing databases used by Validate Address Loqate, see [Installing Validate Address Loqate Databases](#) on page 105.

Note: If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.

1. Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
2. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
3. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
4. Source the "setup" bourne shell script to set up the environment by typing the following command:

```
./setup
```

- Execute the script for installing the database by typing the following command:

```
./installdb_unc
```

- Follow the prompts as the script verifies your environment and database location.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

- If you choose to install Residential Delivery Indicator, an optional database that you license directly from the U.S. Postal Service, you are prompted for the nine-digit RDI table and the eleven-digit RDI table. These are the .R9 and .R11 files provided from the U.S. Postal Service.

Installing Validate Address Global Databases

This procedure describes how to install the databases used by the Validate Address Global stage. For instructions on installing databases used by other Universal Addressing Module stages, see the *Spectrum™ Technology Platform Administration Guide*.

- Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
- The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
- Unzip the database file to the location you want. The database zip files are:
 - VAGlobal-EMEA.zip—Contains the data for Europe, Middle East, and Africa.
 - VAGlobal-APAC.zip—Contains the data for Asia-Pacific.
 - VAGlobal-Americas.zip—Contains the data for the Americas.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

- Stop Spectrum™ Technology Platform. To do this, change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

- Install the unlock code:

- Open the following file in a text editor:

```
<SpectrumLocation>/server/modules/addressglobal/conf/  
unlockcodes.txt
```

- Enter your unlock codes, one per line.
- Save and close the file.

- Start the Spectrum™ Technology Platform by changing the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```


Installing Validate Address Loqate Databases

This procedure describes how to install the databases used by the Validate Address Loqate stage. For instructions on installing databases used by other Universal Addressing Module stages, see the *Spectrum™ Technology Platform Administration Guide*.

1. Download the database from the Pitney Bowes Software eStore using the link provided in the release announcement or welcome email. You can also download the database from the technical support web site, www.g1.com/support.
2. The database is downloaded as a zip file. Unzip the database before proceeding with the installation.
3. Unzip the database file(s) to the location you want. If you are installing data from multiple zip files or discs, be sure to unzip them all to the same location. The database zip files are:

- LQ0/DB_Setup—Contains general database setup files.

Note: Regardless of which set of data you use, the files in LQ0 must be installed.

- LQ1/APAC_AFR_ME-I—Contains the data for Asia-Pacific, Africa, and Middle East.
- LQ2/Americas-I—Contains the data for the Carribean, Central America, and South America.
- LQ3/Europe-I—Contains the data for Eastern and parts of Western Europe.
- LQ4/Americas-II—Contains the data for parts of North America.
- LQ5/Europe-II—Contains the data for parts of Western Europe.
- LQ6/Americas-III—Contains the data for parts of North America.
- LQ7/APAC_AFR_ME-II—Contains the data for parts of Asia-Pacific, Africa, and Middle East.
- LQ8/Europe-III—Contains the data for parts of Western Europe.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

4. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
5. Source the "setup" bourne shell script to setup the environment by typing the following command:


```
./setup
```
6. Execute the script for installing the database by typing the following command:


```
./install.sh
```
7. Follow the prompts as the script verifies your environment and database location.

Installing Universal Name Module Databases

The Universal Name Module provides a load utility to install databases. The database files that you load depend on the databases you have licensed.

1. If you have Oracle environment variables set in your profile, these environment variables may interfere with DVD database loading processes. If you experience database loading problems and are using Oracle, check that the Oracle environment variables are not active when you perform the DVD database loads.
2. Make sure that Spectrum™ Technology Platform is stopped. To stop Spectrum™ Technology Platform, change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.stop
```

3. Insert the database DVD or download the database from www.g1.com/support.

Note: If you download the database from the technical support web site, it will be downloaded as a zip file. Unzip the database before proceeding with the installation.

4. If you are installing from DVD and your system does not auto-mount, issue the appropriate mount command to indicate that the DVD device is a file system.

If necessary, issue the `/etc/filesystem` command to update your system so that it recognizes this file system. Specify the correct device name for the DVD device on your system.

Note: Your system must allow DVDs created under the ISO 9660 format to be mounted as a file system.

5. Change the working directory to the `bin` directory of where Spectrum™ Technology Platform is installed.
6. Source the "setup" bourne shell script to setup the environment by typing the following command:

```
. ./setup
```

7. Execute the script for installing the database by typing the following command:

```
./installdb_cdq
```

8. Follow the prompts as the script verifies your environment and database location.

Note: You may install databases on a network share, but performance will be affected since you will be accessing them on a network rather than accessing them locally.

9. Open the file `<SpectrumDirectory>/server/bin/wrapper/wrapper.conf` in a text editor.
10. Increase the Java settings for initial heap size (`wrapper.java.initmemory`) and maximum heap size (`wrapper.java.maxmemory`) to reflect the total amount of memory required for the Arabic Plus Pack and Asian Plus Pack.
 - Arabic Plus Pack: 5.5 GB
 - Asian Plus Pack - Chinese: 32 MB
 - Asian Plus Pack - Japanese: 1.6 GB
 - Asian Plus Pack - Korean: 8 MB
 - Core Names: 1.1 GB
11. Save and close `wrapper.conf`.

12. Start the Spectrum™ Technology Platform by changing the working directory to the bin directory of where Spectrum™ Technology Platform is installed, then type the following command:

```
./server.start
```

Using the Database Silent Installer

The silent install process allows you to pre-configure the database installation process so that it runs without user intervention. Instead of responding to prompts from the installation process for information such as the installation location, you specify these responses in a properties file that the installer uses instead of user prompts.

Using the Loqate Database Silent Installer

1. In the Spectrum™ Technology Platform server installer (not the database installer), browse to the `SilentInstaller` folder.
2. Using a text editor, open the `uam_loqate.installer.properties` file.
3. Edit the properties file as necessary to specify the installation settings you want to use. See the comments in the properties file for additional information.
4. To run the installer in silent mode, place the properties file in any directory except the location where you are going to install the Loqate data and give the absolute path to the property in the command prompt, as follows:

```
./install.sh %PathOfPropertyFile%\uam_loqate.installer.properties
```

Using the Universal Addressing Module Database Silent Installer

These instructions are for all Universal Addressing Module databases with the exception of Loqate. Please see [Using the Loqate Database Silent Installer](#) on page 107 for Loqate-specific instructions.

1. In the installed Spectrum™ Technology Platform Server, browse to the `bin` folder.
When the Spectrum™ Technology Platform is installed, the properties file is created in the `<Spectrum Location>/server/bin` folder.
2. Using a text editor, open the `silentinstalldb_unc.properties` file.
3. Edit the properties file as necessary to specify the installation settings you want to use. See the comments in the properties file for additional information.

Note: The silent installer for Universal Addressing Module supports U.S. Postal, Canadian Postal, and International Postal databases.

Region	Database
Validate Address U.S.	<ul style="list-style-type: none">• U.S. Postal database• Delivery Point Validation database• LACS^{Link} database• Early Warning System database• Residential Delivery Indicator database
Validate Address Canada	Canadian Postal Database
Validate Address International	International Postal Database

4. Run the installer in silent mode. When the installer executes it will detect the properties file and automatically run in silent mode.

6 - Client Tools

In this section

Installing the Client Tools	110
Installing Enterprise Designer with a Silent Installer	111
Upgrading Enterprise Designer	112
Removing Enterprise Designer	113

Installing the Client Tools

The Spectrum™ Technology Platform client tools are applications that you use to administer your server and design and run flows. The client tools are:

Enterprise Designer

Enterprise Designer is a Windows application that you use to create, modify, and run flows.

Job Executor

Job Executor is a command line tool that you can use to run a job from a command line or script. The job must have been previously created and saved on Spectrum™ Technology Platform using Enterprise Designer.

Process Flow Executor

Process Flow Executor is a command line tool that you can use to run a process flow from a command line or script. The process flow must have been previously created and saved on Spectrum™ Technology Platform using Enterprise Designer.

Administration Utility

The Administration Utility provides command line access to administrative functions. You can use it in a script, allowing you to automate certain administrative tasks. You can also use it interactively.

Note: Before installing, be sure to read the release notes. The release notes contains important compatibility information as well as release-specific installation notes.

To install the client tools:

1. Open a web browser and go to the Spectrum™ Technology Platform Welcome Page at:

`http://<servername>:<port>`

For example, if you installed Spectrum™ Technology Platform on a computer named "myspectrumplatform" and it is using the default HTTP port 8080, you would go to:

`http://myspectrumplatform:8080`

2. Click **Platform Client Tools**.
3. Download the client tool you want to install.

Installing Enterprise Designer with a Silent Installer

The silent install process installs Enterprise Designer without user intervention. Instead of prompting the user for information such as the installation location, the installer uses pre-configured selections that you specify.

To use the silent installer you must first create an installer properties file by running the client installer and responding to the prompts. The resulting properties file can then be used to silently install Enterprise Designer on other computers.

1. Open a web browser and go to the Spectrum™ Technology Platform Welcome Page at:

`http://<servername>:<port>`

For example, if you installed Spectrum™ Technology Platform on a computer named "myspectrumplatform" and it is using the default HTTP port 8080, you would go to:

`http://myspectrumplatform:8080`

2. Click **Platform Client Tools**.
3. Click **Download Installer**.
4. Choose to save the file to a location on your computer.

Note: Save the installer on a Windows computer that does not already have Enterprise Designer installed. You will need to run the installer in order to specify the options you want to use in the silent install process.

5. Open a Windows command prompt.
6. In the command prompt, change directories to the directory where you saved the installer.
7. Execute the following command:

```
Setup.exe -r installer.properties
```

8. Respond to the installer prompts by selecting the options that you want to use when the installer runs silently.

For example, if you want the silent installer to install Enterprise Designer to `C:\Spectrum\EnterpriseDesigner`, specify `C:\Spectrum\EnterpriseDesigner` when prompted for an installation folder.

When the installer finishes running, a properties file named `installer.properties` is created in the same folder as the `Setup.exe` file.

9. Open the file `installer.properties` in a text editor.
10. Add the following on line 8 of the file:

```
INSTALLER_UI=silent
```

Note: This is case sensitive to be sure to enter it exactly as shown above.

11. Save and close the properties file.

You have now configured a properties file that will enable you to install Enterprise Designer silently.

12. To install Enterprise Designer silently, place `installer.properties` and `Setup.exe` in the same folder on the computer where you want to install Enterprise Designer and run `Setup.exe`. When the installer executes it will detect `installer.properties` and automatically run in silent mode.

Alternatively, you can place `installer.properties` in different directory and give the absolute path to the property in the command prompt using the `-f` argument, as follows:

```
Setup.exe -f PathOfPropertyFile\installer.properties
```

Upgrading Enterprise Designer

Upgrading from 11.0 or 11.0 SP1

If you are upgrading to Spectrum™ Technology Platform 12.0 from 11.0 SP1 or 11.0, you do not need to upgrade Enterprise Designer. However, you should delete this file before logging into 12.0:

```
C:\Users\UserName\AppData\Roaming\Pitney Bowes\Enterprise Designer
\Settings.xml
```

Upgrading from a version prior to 11.0

If you are upgrading to Spectrum™ Technology Platform 12.0 from a version prior to 11.0, you must upgrade Enterprise Designer due to security changes.

Important: Once you upgrade your server to 12.0 from a version prior to 11.0, you will not be able to log in to Enterprise Designer until you upgrade it.

To upgrade Enterprise Designer:

1. Uninstall the existing client tools by going to **Start > All Programs > Pitney Bowes > Client Tools > Setup**.
2. Make sure that you have .NET 4.6 installed on the client machine. This is a newer version of .NET than was required in previous releases. Note that Windows 10 comes with this version of .NET installed by default.
3. Download the client tools installer from the Spectrum™ Technology Platform welcome page, <http://SpectrumServer:Port>. The default port is 8080.
4. Run the installer.

Removing Enterprise Designer

1. Back up any files you may need in the future.
2. Use the Windows Add/Remove Programs control panel to uninstall Enterprise Designer.

7 - Client API

In this section

Installing the Client API	115
Removing the Client API	115

Installing the Client API

The Client API is used to integrate Spectrum™ Technology Platform functionality into your applications. If you will be creating your own program to call Spectrum™ Technology Platform, you need to install the Spectrum™ Technology Platform Client API on the system where you will be developing your application. The Client API allows access to Spectrum™ Technology Platform through several programming languages, including Java, C++, and web services.

To run the Client API install and uninstall procedures, you must have the Spectrum™ Technology Platform-supported version of Java installed on your machine. Add the `/jre/bin` location to `$PATH`. If you are installing the Client API on the same machine as Spectrum™ Technology Platform, you can use the version of Java included with Spectrum™ Technology Platform by sourcing the `server/bin` setup script in your Spectrum™ Technology Platform install location.

1. Open the folder where you have downloaded the Spectrum™ Technology Platform Client API installer.
2. Type the following:

```
./sdkinst.bin
```
3. The installer guides you through the installation process.

Removing the Client API

1. Navigate to the folder where you installed the Client API. If you installed the Client API to the default location, navigate to the following path: `/PBSpectrum_ClientSDK/Uninstall_SDK`.
2. Type the following and press **Enter**:

```
# ./Uninstall_SDK
```
3. The uninstall script guides you through the uninstall process.

Note: If the Client API and the Spectrum™ Technology Platform server were installed on the same machine and you used the Java installation from Spectrum™ Technology Platform to install the Client API, you cannot remove the server before uninstalling the Client API. If you remove the Spectrum™ Technology Platform server before removing the Client API, you will need to install Java on your machine to complete the uninstallation of the Client API.

8 - SAP, Siebel, and Microsoft Dynamics

In this section

Configuring SAP	117
Configuring Siebel	123
Configuring Microsoft Dynamics CRM	163

Configuring SAP

Integrating with SAP

To integrate Spectrum™ Technology Platform with SAP, you need to install supporting databases and dataflows on the Spectrum™ Technology Platform server, and then configure your SAP system to communicate with Spectrum™ Technology Platform. Once you do this, users of SAP will have access to address validation and geocoding functionality from within SAP.

1. On the Spectrum™ Technology Platform server, install the databases required to perform address validation, geocoding, and tax jurisdiction assignment and define database resources for each database.

You must give the database resources the following names.

Database	Required Name for Database Resource
Enterprise Geocoding Module - Canada Database	IGEO_CAN
Enterprise Geocoding Module - U.S. Database	EGM_US
Enterprise Tax Module Database	ETM
Universal Addressing Module - Canada Database	Canada
Universal Addressing Module - Loqate Database	Loqate
Universal Addressing Module - U.S. Database	UAM_US

2. When you install the SAP Module, several dataflow files are automatically installed. Other dataflow files must be manually copied into Spectrum™ Technology Platform.
 - a) If you are adding the Address Now Module, Enterprise Tax Module, or Universal Addressing Module to an existing installation, open Spectrum™ Technology Platform Enterprise Designer, select **View > Server Explorer**, and delete this dataflow: SAPValidateAddressWithCandidates.
 - b) Go to: `SpectrumFolder\server\modules\dataflows\sap`.
 - c) Review the following table then copy the applicable dataflow files to:

`SpectrumFolder\server\app\import`

If you are installing this set of modules Copy these dataflow files to the import folder

Address Now Module	SAPValidateAddressWithCandidates.ANOW.df
Address Now Module Universal Addressing Module	SAPGenerateCASSReport.df SAPValidateAddressWithCandidates.ANOW.df SAPValidateAddressWithCandidates.UAM.df
Address Now Module Enterprise Geocoding Module	SAPValidateAddressWithCandidates.ANOW_EGM.df
Address Now Module Enterprise Geocoding Module Universal Addressing Module	SAPValidateAddressWithCandidates.UAM_ANOW_EGM.df
Address Now Module Enterprise Tax Module Universal Addressing Module	SAPAssignGeoTAXInfo.df SAPBatchAssignGeoTAXInfo.df SAPGenerateCASSReport.df SAPValidateAddressAndAssignGeoTAXInfo.df SAPValidateAddressWithCandidates.UAM_ANOW_ETM.df
Address Now Module Enterprise Geocoding Module Enterprise Tax Module Universal Addressing Module	SAPValidateAddressWithCandidates.UAM_ANOW_ETM_EGM.df
Universal Addressing Module without Loqate	SAPGenerateCASSReport.df SAPValidateAddressWithCandidate_UAM.df
Universal Addressing Module without Loqate Enterprise Tax Module	SAPAssignGeoTAXInfo.df SAPBatchAssignGeoTAXInfo.df SAPGenerateCASSReport.df SAPValidateAddressAndAssignGeoTAXInfo.df SAPValidateAddressWithCandidates.UAM_ETM.df
Universal Addressing Module with Loqate	ValidateAddressWithCandidates_UAM_Loqate.df
Universal Addressing Module with Loqate Enterprise Geocoding Module	ValidateAddressWithCandidates_UAM_Loqate_EGM.df
Universal Addressing Module with Loqate Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_ETM.df

If you are installing this set of modules Copy these dataflow files to the import folder

Universal Addressing Module with Loqate Enterprise Geocoding Module Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_EGM_ETM.df
Universal Addressing Module, Loqate only	ValidateAddressWithCandidates_Loqate.df
Universal Addressing Module, Loqate only Enterprise Geocoding Module	ValidateAddressWithCandidates_Loqate_EGM.df
Enterprise Geocoding Module	GeocodeUSAddressWithCandidates.df ValidateAddressWithCandidates_EGM.df
Enterprise Tax Module	ValidateAssignGeoTAXInfo.df ValidateAddressWithCandidates_ETM.df SAPBatchAssignGeoTAXInfo.df

Note: If errors occur in Management Console or Enterprise Designer, delete the contents of `<WindowsTemporaryDirectory>\glAssemblies`, where `<WindowsTemporaryDirectory>` is one of the following: `%TMP%`, `%TEMP%`, `%USERPROFILE%`, or the Windows directory. Typically, `C:\Documents and Settings \<USERNAME>\Local Settings\Temp\glAssemblies`. After you delete the contents of this folder log in again.

3. Import .SAR files.

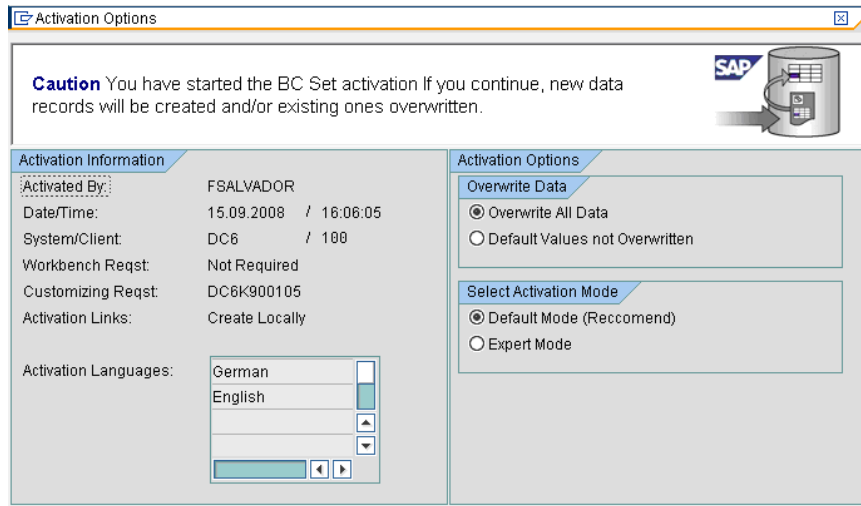
A .SAR file is a file that contains a third-party add-on package for SAP, such as the Spectrum™ Technology Platform SAP Module. The .SAR file is located on the Spectrum™ Technology Platform installer in the `SAP Objects` folder. For information on importing .SAR files into SAP applications, see your SAP Basis administrator.

4. Activate the BC sets.

- a) Log-on to the client where the settings for the Spectrum™ Technology Platform SAP Module is to be configured.
- b) Enter the transaction code `SCPR20`.

This activates Business Configuration (BC) sets. This will place the default entries on the Spectrum™ Technology Platform customizing tables.

- c) In the **BC Set** field, enter `/HSGRP1/BCSET_BC_BAS_PV`.
- d) Activate it with the options **Overwrite All Data** and **Default Mode**.



- e) Select and activate the remaining BC sets with the activation options set to **Overwrite All Data** and **Expert Mode**.

Note: Active these BC sets in the order listed.

/HSGRP1/BCSET_BC_BAS_GTX
 /HSGRP1/MERGE_SETTINGS
 /HSGRP1/BCSET_BUPA_CUSTOM
 /HSGRP1/BCSET_BC_BAS_DES
 /HSGRP1/BCSET_VENDOR

5. Set up the RFC destination.

- a) Enter transaction code **SM59**.
- b) Click **Create**.
- c) In the **RFC Destination** field, enter a name of your choice.
- d) In the **Connection Type** field, enter **G** (HTTP connection to external server).
- e) In the **Description 1** field, enter a meaningful description.
- f) Press the Enter key.
- g) Click the **Technical Settings** tab.
- h) In the **Target Host** field, enter the computer name or IP Address of the Spectrum™ Technology Platform server.
- i) In the **Service No** field enter 8080.
- j) Click the **Special Options** tab.
- k) Select **No Timeout**.
- l) Select **HTTP 1.1**.
- m) After you save, click **Connection Test**.

Note: If there is a pop-up window, check the **Accept All Further Cookies** box and select YES.

- n) When the test is successful, go to the **Response Body** tab to view the Spectrum™ Technology Platform page.
6. Set up the Spectrum™ Technology Platform Logging Object
 - a) Enter transaction code `SLG0`.
 - b) Click **New Entries**.
 - c) In the **Object** column, enter `/HSGRP1/DQC`.
 - d) In the **Object text** column, enter `DQC Logging`.
 - e) Save the change.
 7. Configure the BuildGlobalAddress web service in the SAP Visual Admin:
 - a) Go to `<drive>:/usr./sap/<system id>/DVEBMGS01/j2ee/admin` and click `go.bat` and enter `J2EE_ADMIN` password.
 - b) Go to **Cluster > Server > Services > JCo RFC Provider** and select the **Bundles** tab.
 - c) Enter all of the information needed by the application and click **Set** to save the changes.
 - d) Go to **Cluster > Server > Services > Web Services Security**.
 - e) Create a proxy in **Web Services Client > sap.com > Dynamic WSProxies** with the name `PBBIWebServiceConnectorBGA`.
 - f) For the URL, enter:


```
http://<spectrumservername>:<port>/soap/BuildGlobalAddress?wsdl
```

For example,

```
http://MySpectrumServer:8080/soap/BuildGlobalAddress?wsdl
```
 - g) Restart the application server.
 8. If you will be using French address validation, you must install the Data Normalization Module table `cdq-TableLookup-SAP.tba` on the Spectrum™ Technology Platform server. For more information, see the *Spectrum™ Technology Platform Installation Guide*.
 9. To configure DPV and RDI options, open T-code `/hsgrp1/options`, and specify **Y** (to enable) or **N** (to disable), as needed.
 - **PVPO**: For PO Box address validation
 - **PVST**: For street address validation
 - **PVQU**: For batch address validation

Installing Support Files for Read from SAP

The Read from SAP stage reads data from an SAP database as input to a Spectrum™ Technology Platform dataflow. In order for the Read from SAP stage to access data in your SAP system you must make the following changes on your SAP system:

- Install the SAP Java Connector
- Install the SAP Transport Requests that support Read from SAP

Note: You will not be able to use the Read from SAP stage until you perform these steps.

1. Install the SAP Java Connector (SAP JCo).
 - a) Go to service.sap.com/connectors and log in with your SAP Marketplace credentials.
 - b) Go to **SAP JCo Connector > Tools & Services**.
 - c) Download SAP JCo to your system.
 - d) Unzip the SAP JCo zip file to a temporary location.
 - e) Stop the Spectrum™ Technology Platform server.
 - f) Copy the .jar file to the following directory on the Spectrum™ Technology Platform server:
`SpectrumDirectory/server/app/lib`
 - g) Copy the .so file to the following directory on the Spectrum™ Technology Platform server:
`SpectrumFolder/server/bin/wrapper`
 - h) Start the Spectrum™ Technology Platform server.
2. Install the SAP Transport Requests that support Read from SAP.

Note: The following steps should be performed by your SAP Basis administrator.

- a) In the Spectrum™ Technology Platform installer, go to the folder `AP Data Integration Objects\Enterprise System Connectors`.
- b) Deploy the SAP Transport Requests contained in this folder. See your SAP documentation for instructions on deploying SAP Transport Requests.

Compatibility Matrix

This tables give a list of SAP add-on versions and system kernel levels that are compatible with the various releases of Spectrum™ Technology Platform for installation and upgrade of ECC 6.0 and CRM 7.0.

Table 2: Compatibility Matrix for New Installation

Spectrum Release	SAP Add-on Version	SAP System Kernel Level
9.x	9.x	720 and above
10.x	10.x	741 and above
11.x	11.x	741 and above

Table 3: Compatibility Matrix for Upgrade

Spectrum Release	SAP Add-on Version	SAP System Kernel Level
9.x	Any to 9.3	720 and above

Spectrum Release	SAP Add-on Version	SAP System Kernel Level
10.x	Any to 10.x	741 and above
11.x	Any to 11.x	741 and above

Note: It is recommended that you contact the Pitney Bowes representative or coordinator assigned to you before starting the process.

Configuring Siebel

Integrating with Siebel Data Quality

To integrate Spectrum™ Technology Platform with Siebel Data Quality, you need to install supporting databases and dataflows on the Spectrum™ Technology Platform server, and then configure your Siebel system to communicate with Spectrum™ Technology Platform. Once you do this, users of Siebel Data Quality will have access to address validation and geocoding functionality from within Siebel Data Quality.

1. On the Spectrum™ Technology Platform server, install the databases required to perform address validation, geocoding, and tax jurisdiction assignment and define database resources for each database.

You must give the database resources the following names.

Database	Required Name for Database Resource
Enterprise Geocoding Module - Canada Database	IGEO_CAN
Enterprise Geocoding Module - U.S. Database	EGM_US
Enterprise Tax Module Database	ETM
Universal Addressing Module - Canada Database	Canada
Universal Addressing Module - Loqate Database	Loqate
Universal Addressing Module - U.S. Database	UAM_US

2. When you install the Siebel module, several dataflow files are automatically installed. Other dataflow files must be manually copied into the Spectrum™ Technology Platform server.

a) Browse to one of the following folders on your Spectrum™ Technology Platform server:

- For Siebel Business Applications, go to: <SpectrumPlatformLocation>\server\modules\dataflows\siebel\sea

- For Siebel Industry Applications, go to: <SpectrumPlatformLocation>\server\modules\dataflows\siebel\sia
- b) Review the following table then copy the applicable dataflow files to:

SpectrumLocation\server\app\import

Table 4: Dataflow Files To Import

If you are installing this set of modules Copy these dataflow files to the import folder of modules

Address Now Module only	SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.ADN.df
Address Now Module Universal Addressing Module	SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.UAM_ADN.df
Address Now Module Enterprise Geocoding Module	GeocodeUSAddressWithCandidates.df SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.EGM_ADN.df
Address Now Module Enterprise Geocoding Module Universal Addressing Module	GeocodeUSAddressWithCandidates.df SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.UAM_EGM_ADN.df
Universal Addressing Module only	ValidateAddressWithCandidates_UAM.df
Universal Addressing Module Enterprise Geocoding Module	GeocodeUSAddressWithCandidates.df ValidateAddressWithCandidates_UAM_EGM.df
Universal Addressing Module Enterprise Tax Module	GeocodeUSAddressWithCandidates.df ValidateAssignGeoTAXInfo.df ValidateAddressWithCandidates_UAM_ETM.df
Universal Address Module with Loqate	ValidateAddressWithCandidates_UAM_Loqate.df
Universal Addressing Module with Loqate Enterprise Geocoding Module	ValidateAddressWithCandidates_Loqate_EGM.df
Universal Addressing Module, Loqate only Enterprise Geocoding Module	ValidateAddressWithCandidates_Loqate_EGM.df
Universal Addressing Module with Loqate Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_ETM.df

If you are installing this set Copy these dataflow files to the import folder of modules

Universal Addressing Module with Loqate Enterprise Geocoding Module Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_EGM_ETM.df
Universal Addressing Module, Loqate only	ValidateAddressWithCandidates_Loqate.df
Enterprise Geocoding Module	ValidateAddressWithCandidates_EGM.df
Enterprise Tax Module	ValidateAssignGeoTAXInfo.df

Note: If errors occur in Management Console or Enterprise Designer, delete the client cache. To delete the client cache, go to **Tools > Options** in Management Console or Enterprise Designer, click the **Advanced** tab, then click **Clear Cache**. After you clear the cache, restart Management Console or Enterprise Designer.

3. Optional: If you are using the Enterprise Geocoding Module, configure the geocoding dataflow to use the geocoding database resource name you have configured on your system:
 - a) In Enterprise Designer, open the dataflow GeocodeUSAddressWithCandidates.
 - b) In each dataflow, open the Geocode US Address stage.
 - c) In the **Database** field, select the name of the geocoding database as defined in the Management Console. The default name is KGDDatasource but if the geocoding database has a different name on your system, select the appropriate name.

Note: For more information about database resources, see the *Spectrum™ Technology Platform Administration Guide*.

- d) Save and close each dataflow.
4. Copy Siebel objects to your system:
 - a) Browse to the location where you downloaded the Spectrum™ Technology Platform installer.
 - b) Browse to the appropriate folder for your version of Siebel as shown in the following table.

Siebel Version	Folder
Siebel Business Applications 8.0 SDQ	Siebel Objects\8.0\Business\SDQ
Siebel Business Applications 8.1.1 SDQ	Siebel Objects\8.1.1\Business\SDQ
Siebel Industry Applications 8.0 SDQ	Siebel Objects\8.0\Industry\SDQ

Siebel Version	Folder
Siebel Industry Applications 8.1.1 SDQ	Siebel Objects \8.1.1\Industry\SDQ

c) Copy the contents of the folder to a temporary directory.

Note: This temporary folder will be referred to as <Spectrum Package> in the following steps.

5. Create objects and allow object locking:

a) Log in to Siebel Tools as the user SADMIN. In the **Connect to** field select **Server**.

b) In the Object Explorer, click **Project**.

c) Create three new records using the following values in the **Name** column. To create a new record, right-click in the Projects area and select **New Record**.

Group 1 Data Quality

Group 1 EAI Testing

Group 1 Workflow

d) Open the file <Spectrum Package>\tools\CDQP_Queries.txt.

e) Copy and paste the query contents to the Project list of your Object Manager. Cross-check the query result with the table below and perform the action suggested. To toggle object locking, go to Object Explorer and browse to the Project object. From the Project area, right-click and select the project, and select **Toggle Object Locking**.

Table 5: Queries for Siebel SDQ

Siebel Business Applications	Siebel Industry Applications	Project	Action
	X	Account	Toggle Object Locking
X		Account (SCW)	Toggle Object Locking
X	X	Account (SSE)	Toggle Object Locking
X	X	Contact	Toggle Object Locking
		Contact (SSE)	Toggle Object Locking
		CUT Account	Toggle Object Locking
		CUT Siebel Communications	Toggle Object Locking
		CUT Usage	Toggle Object Locking
		DNB Data	Toggle Object Locking

Siebel Business Applications	Siebel Industry Applications	Project	Action
		DeDuplication	Toggle Object Locking
		eAutomotive	Toggle Object Locking
X	X	Employee	Toggle Object Locking
		FINS Contract	Toggle Object Locking
		FINS Contract Info	Toggle Object Locking
		FINS Deal Commercial	Toggle Object Locking
		FINS Financial Services	Toggle Object Locking
		FINS Opportunity	Toggle Object Locking
X	X	Group 1 Data Quality	Create and Toggle Object Locking
X	X	Group 1 EAI Testing	Create and Toggle Object Locking
X	X	Group 1 Workflow	Create and Toggle Object Locking
		List Mgmt (Import)	Toggle Object Locking
X	X	List Mgmt (UI)	Toggle Object Locking
		Mvg	Toggle Object Locking
		Oppty	Toggle Object Locking
		Oppty (SSE)	Toggle Object Locking
X		Personal Contact	Toggle Object Locking
X	X	Picklist	Toggle Object Locking
		Server Component Requests	Toggle Object Locking
		Siebel Sales Enterprise	Toggle Object Locking
		Siebel Universal Agent	Toggle Object Locking
	X	VERT CUT Address	Toggle Object Locking

Siebel Business Applications	Siebel Industry Applications	Project	Action
		VERT Cut Common	Toggle Object Locking

6. Check out the Siebel Projects:

- Log in to Siebel Tools as the user SADMIN. In the **Connect to** field select **Local**.
- Select **Tools > Check Out**.
- Select the projects indicated in the following table and click **Checkout**.

Table 6: Siebel Projects for SDQ

Siebel Business Applications	Siebel Industry Applications	Project
	X	Account
X	X	Account (SCW)
X	X	Account (SSE)
X	X	Contact
		Contact (SSE)
		CUT Account
		CUT Siebel Communications
		CUT Usage
		DNB Data
		DeDuplication
		eAutomotive
X	X	Employee
		FINS Contract
		FINS Contract Info
		FINS Deal Commercial
		FINS Financial Services
		FINS Opportunity

Siebel Business Applications	Siebel Industry Applications	Project
		Group 1 Data Quality
X	X	Group 1 EAI Testing
X	X	Group 1 Workflow
		List Mgmt (Import)
X	X	List Mgmt (UI)
		Mvg
		Oppty
		Oppty (SSE)
X		Personal Contact
X	X	Picklist
		Server Component Requests
X		Siebel Sales Enterprise
		Siebel Universal Agent
	X	VERT CUT Address
		VERT Cut Common

7. Import the Spectrum™ Technology Platform Siebel Objects.
 - a) Select **Tools > Import from Archive**.
 - b) Browse to the Spectrum™ Technology Platform installation package. In the *Siebel Objects* folder, browse to the subfolder for your version of Siebel and select the SIF files.
 - c) Select **Merge the object definition in the repository** and click **Next**.
8. Check in all locked projects:
 - a) Select **Tools > Check In**.
 - b) Select all the Projects to check in and click **Check in**.
9. (Open UI Only) Import the Spectrum™ Technology Platform Siebel Objects for Open UI:
 - a) Select **Tools > Import from Archive**.
 - b) Browse to the Spectrum™ Technology Platform installation package. In the *Siebel Objects* folder, browse to the *OPEN_UI* subfolder for your version of Siebel and select the SIF files.
 - c) Select **Merge the object definition in the repository** and click **Next**.
10. Compile all Projects:

- a) Select **Tools > Compile Projects**.
- b) Click **All Projects**.
- c) In the **Siebel Repository File** field, enter the path of your Siebel Web Client SRF file.
- d) Click **Compile**.

11. Deploy the Siebel objects in the client:

Note: Keep a backup of the old SRF in case old binaries need to be re-implemented.

- a) Copy the generated SRF to your web client objects folder.

For example, on Windows the web client object folder may be `C:\Program Files\Siebel\8.0\web client\OBJECTS\ENU`. On Unix or Linux the folder may be `/disk2/sia78/webclient/OBJECTS/enu/`.

- b) Copy the contents of `<Spectrum Package>\dll` to your BIN folder.
- c) Copy the contents of `<Spectrum Package>\cfg` to your BIN/ENU folder.

12. Deploy the Siebel objects to the server:

- a) Stop the Siebel server.
- b) Copy the generated SRF file to your web client objects folder.

For example, the folder for Siebel Business on Windows may be `C:\sea80\siebsrvr\OBJECTS\ENU`. On Unix or Linux the folder may be `/disk2/sea78/siebsrvr/OBJECTS/enu/`.

- c) Copy the libraries to your server.
 - For Windows, copy the contents of `<Spectrum Package>\lib\win` to your BIN folder.
 - For Unix or Linux, copy the contents of `<Spectrum Package>/lib/sol` to your LIB folder.
- d) Copy the contents of `<Spectrum Package>\cfg` to your BIN\ENU folder.
- e) Start the Siebel server.

13. Install the options file.

- a) Click **Site Map > Administration - Data > LOV Explorer**.
- b) Click **New**.
- c) In the **Type** column, enter `FILE_PATH`.
- d) Click **Query**.
- e) In the **Type** column, enter `FILE_PATH`.
- f) Browse to the **Values** folder.
- g) In the **Display Value** column, enter the absolute path to the folder where you want to keep the options file. You can specify any folder you want.
- h) Browse to the Spectrum™ Technology Platform installation package.
- i) In the `Siebel Objects` folder, browse to the `cfg` subfolder for your version of Siebel and select the `Group1Connector.opt` file.
- j) Copy this file to the folder you specified for `FILE_PATH`.

14. Activate the Spectrum™ Technology Platform workflows in the Siebel web client:

- a) Log in to the Siebel application, connecting to the server data source.
- b) Select **Site Map > Administration - Business Process > Workflow Deployment**.
- c) Query for all the GROUP 1* workflows.
- d) Click **Activate** for each workflow.
- e) Query for all the Promote* workflows.
- f) Click **Activate** for the ff workflows **Promote Prospect (Single)** and **Promote Prospect (Many)**.

15.Verify the installation:

- a) Log in to Siebel Application.
- b) All applets should load properly without error.

16.Configure the Siebel instance configuration parameters:

- a) Select **Site Map > Administration - Server Configuration > Enterprises**.
- b) Verify/Change the ff Parameters:
 - Data Cleansing Type—G1Cleansing
 - DeDuplication Data Type—G1DataMatching
- c) Click **Component Definitions** and select the ff components. For each component, verify parameters and values.

Table 7: Siebel Business

Component Definitions	Parameter	Value/Value on Restart
*Data Quality Manager *Sales Object Manager (ENU) *List Import Service Manager	Data Cleansing Type	G1Cleansing
	Data Cleansing Enable Flag	True
	DeDuplication Data Type	G1DataMatching
	DeDuplication Enable Flag	True

Table 8: Siebel Industry

Component Definitions	Parameter	Value/Value on Restart
*Data Quality Manager *eAutomotive Object Manager (ENU) *List Import Service Manager	Data Cleansing Type	G1Cleansing
	Data Cleansing Enable Flag	True
	DeDuplication Data Type	G1DataMatching
	DeDuplication Enable Flag	True

- d) Select **Site Map > Server Configuration > Servers**. Repeat steps b through c for server configuration parameters.

- e) Select **Site Map > User Profile Preferences > Data Quality**. Change the following settings:

Parameter	Value
Enable DeDuplication	Yes
Enable Data Cleansing	Yes

- f) Browse to <Siebel Installation>\bin\ENU and open the appropriate file:

- Siebel Business: siebel.cfg and uagent.cfg
- Siebel Industry: auto.cfg

- g) Under the area [DataCleansing] change the ff Parameters:

```
Enable = TRUE
Type = G1Cleansing
```

- h) Under the area [DeDuplication] change the ff Parameters:

```
Enable = TRUE
Type = G1DataMatching
```

- i) Select **Site Map > Administration - Server Configuration**. Click the **Synchronize** link and select **Synchronize** after being redirected.

17. Configure data cleansing configuration parameters:

- a) Select **Site Map > Administration > Data Quality > Third Party Administration**. On the Vendor Applet, include the ff value

Name	DLL Name
G1Cleansing	Group1Connector

- b) Add the ff BC Vendor Field Mapping:

Table 9: Siebel Business

Business Component	Operation
Account	Data Cleansing
Business Address	Data Cleansing
Contact	Data Cleansing
List Mgmt Prospective Contact	Data Cleansing
Personal Address	Data Cleansing

Table 10: Siebel Industry

Business Component	Operation
Account	Data Cleansing
CUT Address	Data Cleansing
Contact	Data Cleansing
List Mgmt Prospective Contact	Data Cleansing
Personal Address	Data Cleansing

c) Under each BC operation, add the ff field mappings:

Table 11: Siebel Business

Business Component Field	Mapped Field
Account	
Name	FirmName
Business Address	
City	City
Country	CountryName
County	USCountyName
Disable DataCleansing	DisableDataCleansing
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude
G1 Location Code	LocationCode
G1 Longitude	Longitude
G1 Match Code	MatchCode
G1 Residential Delivery Indicator	RDI
Postal Code	PostalCode
State	StateProvince

Business Component Field	Mapped Field
Street Address	AddressLine1
Street Address 2	AddressLine2
Contact	
First Name	FirstName
Last Name	LastName
M/M	TitleOfRespect
Middle Name	MiddleName
List Management Prospective Contact	
City	City
Country	CountryName
County	USCountyName
Disable DataCleansing	DisableDataCleansing
First Name	FirstName
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude
G1 Location Code	LocationCode
G1 Longitude	Longitude
G1 Match Code	MatchCode
G1 Residential Delivery Indicator	RDI
Last Name	LastName
Middle Name	MiddleName
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2

Business Component Field	Mapped Field
Personal Address	
City	City
Country	CountryName
County	USCountyName
Disable DataCleansing	DisableDataCleansing
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude
G1 Longitude	Longitude
G1 Residential Delivery Indicator	RDI
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2

Table 12: Siebel Industry

Business Component Field	Mapped Field
Account	
Name	FirmName
CUT Address	
City	City
Country	CountryName
County	USCountyName
Disable Data Cleansing	DisableDataCleansing
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude

Business Component Field	Mapped Field
G1 Location Code	LocationCode
G1 Longitude	Longitude
G1 Match Code	MatchCode
G1 Residential Delivery Indicator	RDI
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2
Contact	
First Name	FirstName
Last Name	LastName
Middle Name	MiddleName
M/M	TitleOfRespect
List Management Prospective Contact	
City	City
Country	CountryName
County	USCountyName
Disable DataCleansing	DisableDataCleansing
First Name	FirstName
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude
G1 Location Code	LocationCode
G1 Longitude	Longitude
G1 Match Code	MatchCode
G1 Residential Delivery Indicator	RDI

Business Component Field	Mapped Field
Last Name	LastName
Middle Name	MiddleName
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2
Personal Address	
City	City
Country	CountryName
County	USCountyName
Disable DataCleansing	DisableDataCleansing
G1 Delivery Point Validation Indicator	DPV
G1 Latitude	Latitude
G1 Longitude	Longitude
G1 Residential Delivery Indicator	RDI
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2

d) Add the ff Vendor Parameters.

Table 13: Siebel Business

Name	Value
Account DataCleanse Record Type	Account
Business Address DataCleanse Record Type	Business Address
Contact DataCleanse Record Type	Contact

Name	Value
List Mgmt Prospective Contact DataCleanse Record Type	List Mgmt Prospective Contact
Personal Address DataCleanse Record Type	Personal Address

Table 14: Siebel Industry:

Name	Value
Account DataCleanse Record Type	Account
CUT Address DataCleanse Record Type	CUT Address
Contact DataCleanse Record Type	Contact
List Mgmt Prospective Contact DataCleanse Record Type	List Mgmt Prospective Contact
Personal Address DataCleanse Record Type	Personal Address

- e) Select **Site Map > Administration - Data Quality > Third Party Administration > Data Quality Settings**. Add the ff data for Data Quality Settings. These settings enable data cleansing for your Siebel Application

Name	Value
Enable DataCleansing	Yes

18.Configure data matching configuration parameters:

- a) Select **Site Map > Administration > Data Quality > Third Party Administration**. On the Vendor Applet, include the ff value

Name	DLL Name
G1DataMatching	Group1Connector

- b) Add the ff BC Vendor Field Mapping:

Table 15: Siebel Business Applications

Business Component	Operation
Account	DeDuplication
Business Address	DeDuplication

Business Component	Operation
Contact	DeDuplication
List Mgmt Prospective Contact	DeDuplication

Table 16: Siebel Industry Applications

Business Component	Operation
Account	DeDuplication
CUT Address	DeDuplication
Contact	DeDuplication
List Mgmt Prospective Contact	DeDuplication

c) Under each BC operation, add the ff Field Mappings.

Table 17: Siebel Business Applications

Business Component Field	Mapped Field
Account	
Dedup Token	DedupToken
Id	Id
Location	Location
Name	Name
Primary Account City	City
Primary Account Country	CountryName
Primary Account Postal Code	PostalCode
Primary Account State	StateProvince
Primary Account Street Address	AddressLine1
Business Address	
City	City
Country	CountryName

Business Component Field	Mapped Field
Id	Id
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2
Contact	
First Name	FirstName
Id	Id
Last Name	LastName
Middle Name	MiddleName
Primary Account Name	AccountName
Primary City	City
Primary Country	CountryName
Primary Postal Code	PostalCode
Primary State	StateProvince
List Management Prospective Contact	
Account	Account
City	City
Country	CountryName
First Name	FirstName
Id	Id
Last Name	LastName
Middle Name	MiddleName
Postal Code	PostalCode
State	StateProvince

Business Component Field	Mapped Field
Street Address	AddressLine1
Street Address 2	AddressLine2

Table 18: Siebel Industry Applications

Business Component Field	Mapped Field
Account	
Dedup Token	DedupToken
Id	Id
Location	Location
Name	Name
Primary Account City	City
Primary Account Country	Country
Primary Account Postal Code	PostalCode
Primary Account State	State
Primary Account Street Address	AddressLine1
CUT Address	
City	City
Country	Country
Id	Id
Postal Code	PostalCode
State	State
Street Address	AddressLine1
Street Address 2	AddressLine2
Contact	
First Name	FirstName

Business Component Field	Mapped Field
Id	Id
Last Name	LastName
Middle Name	MiddleName
Primary Account Name	Name
Primary City	City
Primary Country	Country
Primary Postal Code	Code
Primary State	State
List Management Prospective Contact	
Account	Account
City	City
Country	CountryName
First Name	FirstName
Id	Id
Last Name	LastName
Middle Name	MiddleName
Postal Code	PostalCode
State	StateProvince
Street Address	AddressLine1
Street Address 2	AddressLine2

d) Add the ff Vendor Parameters:

Note: Token Expression and Query Expression are custom fields in their respective Business Components.

Table 19: Vendor Parameters

Name	Value
Account DeDup Record Type	Account
Account Query Expression	" " + [Query Expression 1] + [Query Expression 2] + [Query Expression 3]
Account Token Expression	" " + [Token Expression 1] + [Token Expression 2] + [Token Expression 3]
Batch Max Num of Records	200
(Siebel Business Only) Business Address DeDup Record Type	Business Address
(Siebel Industry Only) CUT Address DeDup Record Type	CUT Address
Contact DeDup Record Type	Contact
Contact Query Expression	" " + [Query Expression 1] + [Query Expression 2] + [Query Expression 3]
Contact Token Expression	" " + [Token Expression 1] + [Token Expression 2] + [Token Expression 3]
List Mgmt Prospective Contact DeDup Record Type	List Mgmt Prospective Contact
List Mgmt Prospective Contact Query Expression	" " + [Query Expression 1] + [Query Expression 2] + [Query Expression 3]
List Mgmt Prospective Contact Token Expression	" " + [Token Expression 1] + [Token Expression 2] + [Token Expression 3]
Realtime Max Num of Records	200

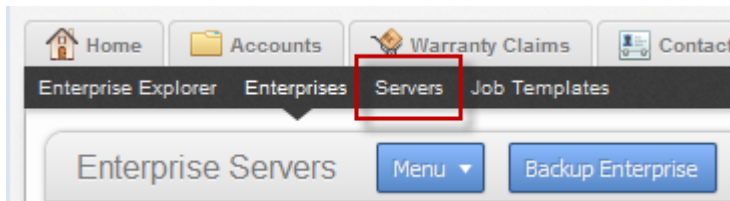
- e) Select **Site Map > Administration - Data Quality > Third Party Administration > Data Quality Settings**. Add the ff data for Data Quality Settings. These settings enable data matching for your Siebel Application.

Name	Value
Enable DeDuplication	Yes
Force User DeDupe - Account	Yes

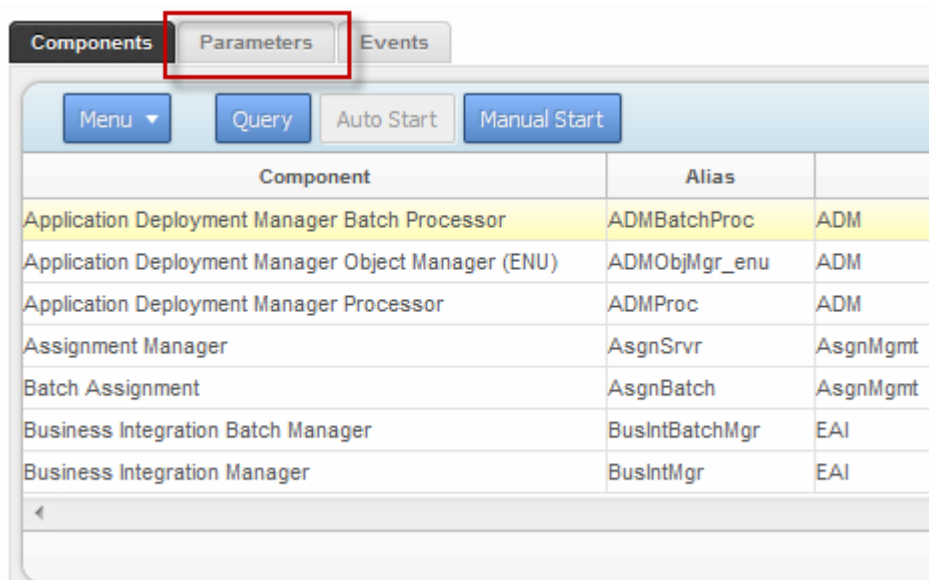
Name	Value
Force User DeDupe - Contact	Yes
Force User DeDupe - List Mgmt	Yes

19.(Open UI Only) Grant the EAI File Transport business service access to the file system by following these steps.

- a) Click **Navigate > Site Map**.
- b) Click **Administration - Server Configuration**.
- c) In the **Administration - Server Configuration** section, under **Enterprises**, click **Parameters**.
- d) Click **Query**.
- e) In the **Name** column, enter EAI File Transport Folder List.
- f) Click **Go**.
- g) In the **Value** column, enter the root of the drive where you have Siebel installed. For example, C:\.
- h) Click the **Servers** link:



- i) Click the **Parameters** tab:

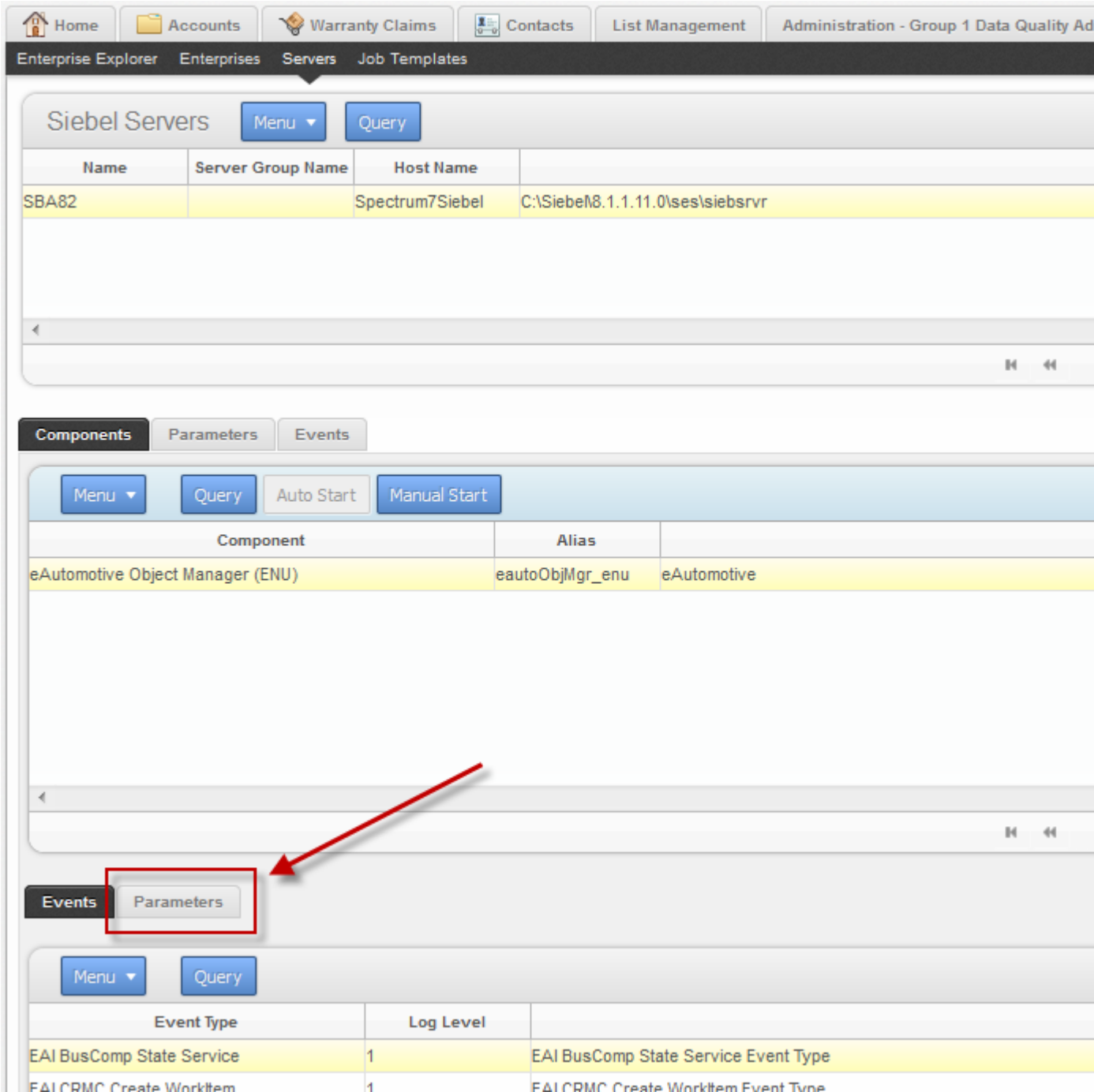


- j) Click **Query**.
- k) In the **Name** column, enter EAI File Transport Folder List.
- l) Click **Go**.

- m) In the **Value** column, enter the root of the drive where you have Siebel installed. For example, C:\.
- n) Add the following values to the .cfg file appropriate for your system (for example, auto.cfg, tools.cfg, and so on).

```
[EAIFileTransportConfigSubsys]
EAIFileTransportFolders=C:\
```

- o) Restart the Siebel server and gateway.
- 20.** Set the EditProfileAttr parameter:
- a) Click **Navigate > Site Map**
 - b) Click **Administration - Server Configuration**.
 - c) In the **Administration - Server Configuration** section, under **Servers**, click **Components**.
 - d) On the **Components** tab, click **Query**.
 - e) In the **Component** column, enter the name of the Object Manager component. For example, "eAutomotive Object Manager".
 - f) Click **Go**.
 - g) Click the **Parameters** tab at the bottom of the window.



- h) Scroll to the parameter EditProfileAttr.
- i) Enter True in the **Value**, **Value on Restart**, and **Default Value** columns.

You have now configured Siebel SDQ to use Spectrum™ Technology Platform for data quality processing.

Integrating with Siebel Non-SDQ

To integrate Spectrum™ Technology Platform with Siebel Non-SDQ, you need to install supporting databases and dataflows on the Spectrum™ Technology Platform server, and then configure your Siebel system to communicate with Spectrum™ Technology Platform. Once you do this, users of Siebel Non-SDQ will have access to address validation and geocoding functionality from within Siebel Non-SDQ.

1. On the Spectrum™ Technology Platform server, install the databases required to perform address validation, geocoding, and tax jurisdiction assignment and define database resources for each database.

You must give the database resources the following names.

Database	Required Name for Database Resource
Enterprise Geocoding Module - Canada Database	IGEO_CAN
Enterprise Geocoding Module - U.S. Database	EGM_US
Enterprise Tax Module Database	ETM
Universal Addressing Module - Canada Database	Canada
Universal Addressing Module - Loqate Database	Loqate
Universal Addressing Module - U.S. Database	UAM_US

2. When you install the Siebel module, several dataflow files are automatically installed. Other dataflow files must be manually copied into the Spectrum™ Technology Platform server.

a) Browse to one of the following folders on your Spectrum™ Technology Platform server:

- For Siebel Business Applications, go to: <SpectrumPlatformLocation>\server\modules\dataflows\siebel\sea
- For Siebel Industry Applications, go to: <SpectrumPlatformLocation>\server\modules\dataflows\siebel\sia

b) Review the following table then copy the applicable dataflow files to:

SpectrumLocation\server\app\import

Table 20: Dataflow Files To Import

If you are installing this set of modules Copy these dataflow files to the import folder

Address Now Module only	SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.ADN.df
Address Now Module Universal Addressing Module	SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.UAM_ADN.df
Address Now Module Enterprise Geocoding Module	GeocodeUSAddressWithCandidates.df SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.EGM_ADN.df
Address Now Module Enterprise Geocoding Module Universal Addressing Module	GeocodeUSAddressWithCandidates.df SiebelGetGlobalCandidateAddresses.df ValidateAddressWithCandidates.UAM_EGM_ADN.df
Universal Addressing Module only	ValidateAddressWithCandidates_UAM.df
Universal Addressing Module Enterprise Geocoding Module	GeocodeUSAddressWithCandidates.df ValidateAddressWithCandidates_UAM_EGM.df
Universal Addressing Module Enterprise Tax Module	GeocodeUSAddressWithCandidates.df ValidateAssignGeoTAXInfo.df ValidateAddressWithCandidates_UAM_ETM.df
Universal Address Module with Loqate	ValidateAddressWithCandidates_UAM_Loqate.df
Universal Addressing Module with Loqate Enterprise Geocoding Module	ValidateAddressWithCandidates_Loqate_EGM.df
Universal Addressing Module, Loqate only Enterprise Geocoding Module	ValidateAddressWithCandidates_Loqate_EGM.df
Universal Addressing Module with Loqate Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_ETM.df
Universal Addressing Module with Loqate Enterprise Geocoding Module Enterprise Tax Module	ValidateAddressWithCandidates_UAM_Loqate_EGM_ETM.df

If you are installing this set Copy these dataflow files to the import folder of modules

Universal Addressing Module, Loqate only	ValidateAddressWithCandidates_Loqate.df
Enterprise Geocoding Module	ValidateAddressWithCandidates_EGM.df
Enterprise Tax Module	ValidateAssignGeoTAXInfo.df

Note: If errors occur in Management Console or Enterprise Designer, delete the client cache. To delete the client cache, go to **Tools > Options** in Management Console or Enterprise Designer, click the **Advanced** tab, then click **Clear Cache**. After you clear the cache, restart Management Console or Enterprise Designer.

3. Optional: If you are using the Enterprise Geocoding Module, configure the geocoding dataflow to use the geocoding database resource name you have configured on your system:
 - a) In Enterprise Designer, open the dataflow GeocodeUSAddressWithCandidates.
 - b) In each dataflow, open the Geocode US Address stage.
 - c) In the **Database** field, select the name of the geocoding database as defined in the Management Console. The default name is KGDDatasource but if the geocoding database has a different name on your system, select the appropriate name.

Note: For more information about database resources, see the *Spectrum™ Technology Platform Administration Guide*.

- d) Save and close each dataflow.
4. Copy Siebel objects to your system:
 - a) Browse to the location where you downloaded the Spectrum™ Technology Platform installer.
 - b) Browse to the appropriate folder for your version of Siebel as shown in the following table.

Siebel Version	Folder
Siebel Business Applications 8.0 Non-SDQ	Siebel Objects\8.0\Business\non SDQ
Siebel Business Applications 8.1.1 Non-SDQ	Siebel Objects\8.1.1\Business\non SDQ
Siebel Industry Applications 8.0 Non-SDQ	Siebel Objects\8.0\Industry\non SDQ
Siebel Industry Applications 8.1.1 Non-SDQ	Siebel Objects\8.1.1\Industry\non SDQ

- c) Copy the contents of the folder to a temporary directory.

Note: This temporary folder will be referred to as <Spectrum Package> in the following steps.

5. Create objects and allow object locking:

- a) Log in to Siebel Tools as the user SADMIN, with the connection pointing to the server data source.
- b) Go to **Object Explorer**, drill down to the **Project** object. From the Project area, right-click and select **New Record**. Create the following projects:
 - Group 1 Data Quality
 - Group 1 EAI Testing
 - Group 1 Workflow
- c) Open the file <Spectrum Package>\tools\CDQP_Queries.txt.
- d) Copy and paste the query contents to the Project list of your Object Manager. Cross-check the query result with the table below and perform the action suggested. To toggle object locking, go to Object Explorer and browse to the Project object. From the Project area, right-click and select the project, and select **Toggle Object Locking**.

Table 21: Queries for Siebel non-SDQ

Siebel Business Applications	Siebel Industry Applications	Open UI	Project	Action
X	X	X	Account	Toggle Object Locking
X	X	X	Account (SCW)	Toggle Object Locking
X	X	X	Account (SSE)	Toggle Object Locking
X	X	X	Contact	Toggle Object Locking
X	X	X	Contact (SSE)	Toggle Object Locking
	X	X	CUT Account	Toggle Object Locking
	X	X	CUT Siebel Communications	Toggle Object Locking
	X	X	CUT Usage	Toggle Object Locking

Siebel Business Applications	Siebel Industry Applications	Open UI	Project	Action
X	X	X	DNB Data	Toggle Object Locking
X	X	X	DeDuplication	Toggle Object Locking
	X	X	eAutomotive	Toggle Object Locking
X	X	X	Employee	Toggle Object Locking
	X	X	FINS Contract	Toggle Object Locking
	X	X	FINS Contract Info	Toggle Object Locking
	X	X	FINS Deal Commercial	Toggle Object Locking
	X	X	FINS Financial Services	Toggle Object Locking
	X	X	FINS Opportunity	Toggle Object Locking
X	X	X	Group 1 Data Quality	Create and Toggle Object Locking
X	X	X	Group 1 EAI Testing	Create and Toggle Object Locking
	X	X	Group 1 Workflow	Create and Toggle Object Locking
X			List Mgmt (Import)	Toggle Object Locking
X	X	X	List Mgmt (UI)	Toggle Object Locking
X			Mvg	Toggle Object Locking

Siebel Business Applications	Siebel Industry Applications	Open UI	Project	Action
X	X	X	Oppty	Toggle Object Locking
X	X	X	Oppty (SSE)	Toggle Object Locking
X	X	X	Personal Contact	Toggle Object Locking
X	X	X	Picklist	Toggle Object Locking
X	X	X	Server Component Requests	Toggle Object Locking
X		X	Siebel Sales Enterprise	Toggle Object Locking
X			Siebel Universal Agent	Toggle Object Locking
	X	X	VERT CUT Address	Toggle Object Locking
	X	X	VERT Cut Common	Toggle Object Locking

6. Check out the Siebel Projects:

- a) Log in to Siebel Tools on Local Datasource.
- b) Select **Tools > Checkout**.
- c) Select the projects indicated in the following table and click **Checkout**.

Table 22: Siebel Projects for non-SDQ

Siebel Business Applications	Siebel Industry Applications	Project
X	X	Account
X	X	Account (SCW)
X	X	Account (SSE)
X	X	Contact

Siebel Business Applications	Siebel Industry Applications	Project
X	X	Contact (SSE)
	X	CUT Account
	X	CUT Siebel Communications
	X	CUT Usage
X	X	DNB Data
X	X	DeDuplication
	X	eAutomotive
X	X	Employee
	X	FINS Contract
	X	FINS Contract Info
	X	FINS Deal Commercial
	X	FINS Financial Services
	X	FINS Opportunity
X	X	Group 1 Data Quality
X	X	Group 1 EAI Testing
	X	Group 1 Workflow
X		List Mgmt (Import)
X	X	List Mgmt (UI)
X		Mvg
X	X	Oppty
X	X	Oppty (SSE)
X	X	Personal Contact
X	X	Picklist
X	X	Server Component Requests
X		Siebel Sales Enterprise

Siebel Business Applications	Siebel Industry Applications	Project
X		Siebel Universal Agent
	X	VERT CUT Address
	X	VERT Cut Common

7. Import the Spectrum™ Technology Platform Siebel objects:

- a) Select **Tools > Import from Archive**.
- b) Import the Siebel SIF files located in <Spectrum Package>\sif. Select **Overwrite the object definition in the repository** and click **Next** to proceed until the import process has been completed.

- G1_NEW.sif
- G1_APPLET.sif
- G1_BO.sif
- G1_LINK.sif
- G1_BC.sif
- G1_BC_SCRIPTS.sif
- G1_EAI_TESTING.sif
- G1_APPLICATION.sif
- G1_PICKLIST.sif
- G1_VIEW.sif
- G1_WORKFLOW.sif
- (8.1.1 only) Rebranding.sif
- PB_SecToken.sif

Note: *PB_SecToken.sif* must be imported in the end.

- c) (Open UI Only) Import the Siebel SIF files located in <Spectrum Package>\OPEN_UI. Select **Overwrite the object definition in the repository** and click **Next** to proceed until the import process has been completed.

- FINS Personal Address List Applet.sif
- G1 Common Browser Scripts Service.sif
- Siebel Sales Enterprise.sif

8. Check in all locked projects:

- a) Select **Tools > Check In**.
- b) Select all the Projects to check in and click **Check in**.

9. Compile all Projects:

- a) Select **Tools > Compile Projects**.
- b) Click **All Projects**.
- c) In the **Siebel Repository File** field, enter the path of your Siebel Web Client SRF file.

d) Click **Compile**.

10. Update the application .CFG file:

a) Open the appropriate .cfg file in an editor:

For example, for Siebel Business:

- Siebel Call Center—uagent.cfg
- Siebel Sales—siebel.cfg

For example, for Siebel Industry:

- eAutomotive—auto.cfg
- Financial—fins.cfg
- eCommunication—ecomm.cfg

Siebel .cfg files are usually found in the following locations:

- Siebel thick client—Siebel\<>version>\web client\bin\enu
- Siebel thin client—<Siebel Server>\bin\enu

b) Add the following lines under the [SWE] section:

```
ClientBusinessService0 = G1 Async Service
ClientBusinessService1 = G1 Business Name Standardization Service
ClientBusinessService2 = G1 Common Browser Scripts Service
ClientBusinessService3 = G1 Common Server Scripts Service
ClientBusinessService4 = G1 DNB VBC Service
ClientBusinessService5 = G1 Data Cleansing Service
ClientBusinessService6 = G1 DeDuplication Service
ClientBusinessService7 = G1 Generate HashKey Service
ClientBusinessService8 = G1 GeoCoding Service
ClientBusinessService9 = G1 Interactive Service
ClientBusinessService10 = G1 Merge Records Service
ClientBusinessService11 = G1 Name Casing Service
ClientBusinessService12 = G1WebService
```

11. Deploy the Siebel objects in the client:

Note: Keep a backup of the old SRF in case old binaries need to be re-implemented.

a) Copy the generated SRF to your web client objects folder.

For example, on Windows this folder may be C:\Program Files\Siebel\8.0\web client\OBJECTS\ENU. On Unix or Linux this folder may be /disk2/sia78/webclient/OBJECTS/enu/.

b) Open a command prompt and go to the BIN folder of the web client.

For example, on Windows this folder may be C:\Program Files\Siebel\8.0\web client\BIN. On Unix or Linux, this folder may be /disk2/sia80/webclient/BIN.

c) Generate browser scripts by issuing this command:

On Windows:

```
genbscript "ENU\siebel.cfg" "[public\enu folder]"
```

On Unix or Linux:

```
genbscript [location of .cfg] [public/enu folder]
```

For example, on Windows:

```
C:\Program Files\Siebel\8.0\web client\BIN>genbscript "enu
\siebel.cfg" "C:\Program Files\Siebel\8.0\web client\PUBLIC\enu"
```

On Unix or Linux:

```
genbscript /disk2/sia80/webclient/BIN/enu/siebel.cfg sia80/
webclient/PUBLIC/enu
```

- d) Copy `g1_check.gif` and `g1_x.gif` from the temporary folder to `public\enu\images` in the Siebel web client.
- e) Copy the contents of `<Spectrum Package>\dll` to your BIN folder.
- f) Copy the contents of `<Spectrum Package>\cfg` to your BIN/ENU folder.

12. Deploy the Siebel objects to the server:

- a) Stop the Siebel server.
- b) Copy the generated SRF file to your web client objects folder.

For example, the folder for Siebel Business on Windows may be `C:\sea80\siebsrvr\OBJECTS\ENU`. On Unix or Linux the folder may be `/disk2/sea80/siebsrvr/OBJECTS/enu/`.

- c) Open a command prompt and go to the BIN drive of the web client.

For example, on Windows this folder may be `C:\sia80\siebsrvr\BIN`. On Unix or Linux this folder may be `/disk2/sea80/siebsrvr/BIN`.

- d) Generate browser scripts by issuing this command:

On Windows:

```
genbscript "ENU\siebel.cfg" "[webmaster folder]"
```

On Unix or Linux:

```
genbscript [location of Siebel.cfg] [webmaster folder]
```

For example, on Windows:

```
C:\sia80\siebsrvr\BIN>genbscript "enu\siebel.cfg" "C:
\sia80\siebsrvr\WEBMASTER"
```

For example, on Unix or Linux:

```
genbscript /disk2/sea80/siebsrvr/BIN/enu/siebel.cfg /disk2/sea80/
siebsrvr/WEBMASTER/
```

- e) Copy `g1_check.gif` and `g1_x.gif` from the temporary folder to the following folder on the Siebel sever.

On Windows:

public\enu\images

On Unix or Linux:

WEBMASTER/images/enu

Note: For Siebel Thin Client, copy `g1_check.gif` and `g1_x.gif` from the temporary directory to `SWEApp/PUBLIC/enu/images`.

- f) Copy the generated browser scripts from `/WEBMASTER` to `<SWEApp Location>/public/ENU`.
- g) Start the Siebel server.

13. Activate the Spectrum™ Technology Platform workflows in the Siebel web client:

- a) Log in to the Siebel application, connecting to the server data source.
- b) Select **Site Map > Administration - Business Process > Workflow Deployment**.
- c) Query for all the GROUP 1* workflows.
- d) Click **Activate** for each workflow.
- e) Query for all the Promote* workflows.
- f) Click **Activate** for the ff workflows **Promote Prospect (Single)** and **Promote Prospect (Many)**.
- g) Click **Import Process** in the **Menu** option in the **Active Workflow Process** screen. Specify the file `<Spectrum Package>\workflows\PB Token WS Workflow.xml`.

14. Load the Group 1 configuration.

- a) Log in to the Siebel application connecting to the server data source.
- b) Go to **Site Map > Administration - Business Service > Simulator**.
- c) In the top applet, create a new record and set the following fields:

Service Name	Workflow Process Manager
Method Name	Run Process
Iterations	1

- d) In the Input Arguments applet, load:

`<Spectrum Package>\tools\OptionsManagerLoadData.xml`

Note: Delete the entry if previous GROUP 1 options already exist in the database. Run the following SQL Script: `DELETE SIEBEL.S_LST_OF_VAL WHERE CODE = 'G1'`

- e) Click **Run** in the top applet of the Simulator view. Delete the record.
- f) Repeat steps c. and d. for the ff files:
 - `ViewAccessLoadData.xml`
 - `AdminAccessLoadData.xml`
- g) Go to **Site Map > Administration - Application > Responsibilities**:
- h) Query for the responsibility Group 1 Responsibility.

- i) In the Users tab, add SADMIN or any Siebel administrator. This associates the Group 1 Administration Screen to the user.

Note: In order to see the changes you must log-in again.

- j) Go to **Site Map > Administration - Group 1 Data Quality > Options Manager > General Behavior**.
- k) Change the server and port number where the Spectrum™ Technology Platform server is located.

15. Verify the installation:

- a) Log in to Siebel Application.
- b) All applets should load properly without error.

16. Modify and apply web services.

- a) Go to **Site Map > Administration - Web Services > Outbound Web Services**.
- b) Click **Import** on the **Outbound Web Services** area and then specify the file `<Spectrum Package>\webservices\G1WebService.xml`.
- c) Query on the Name field `ValidateAddress`, and modify its settings as follows:

On the Service Port applet, change the following fields:

- Transport: Local Business Service
- Address: G1 WebService Filter Service

On the Operations applet, change the following fields:

- Response Filter Service Display: G1 WebService Filter Service
- Response Filter Method Display: filter Response

- d) Click **Import** on the **Outbound Web Services** area and then specify the file `<Spectrum Package>\webservices\TokenManagerServiceImplService.xml`.

17. Encrypt and apply Spectrum™ Technology Platform user name and password.

- a) Run the following command on the command prompt:

```
java -version
```

Java Runtime Environment (JRE) 1.4.x is required. If none is installed, you can download from java.sun.com/j2se/1.4.2/download.html. Download the JRE of your target platform.

- b) Acquire the file `<Spectrum Package>\tools\Base64.class`.
- c) On the command prompt, type the following command:

```
java Base64 -encode -s "<username>:<password>"
```

where `<username>` and `<password>` is to the login information of Spectrum™ Technology Platform server. Copy the generated value.

Note: The default Spectrum™ Technology Platform password can be found in `<Spectrum Package>\tools\Default Password.txt`.

- d) Go to **Site Map > Administration - Group 1 Data Quality > Password Manager**. Paste the value generated in step c. and click **Save Changes**.

18.Configure Siebel server configuration events.

The Siebel server must be configured so that the records created in the local database can be synchronized to the server.

- a) Navigate to **View > Administration - Server Configuration > Servers > Components > Event**.
- b) Locate the Workflow Process Manager Server components.
- c) Set the following Component Event Configuration for Workflow Process Manager:

Task Configuration	4
Component Tracing	3
SQL Parse and Execute	4
Workflow Definition Loading	4
Workflow Engine Invoked	4
Workflow Step Execution	4
Workflow Process Execution	4
Object Manager Business Service Operation and SetErrorMsg Log	4
Object Manager Business Component Operation and SetErrorMsg Log	4
Object Manager SQL Log	4

- d) Locate the Transaction Merger server components.
- e) Set the following Component Event Configuration for Transaction Merger:

General Events	4
Components Tracing	3
SQL Parse and Execute	4

19.Enable marketing server components.

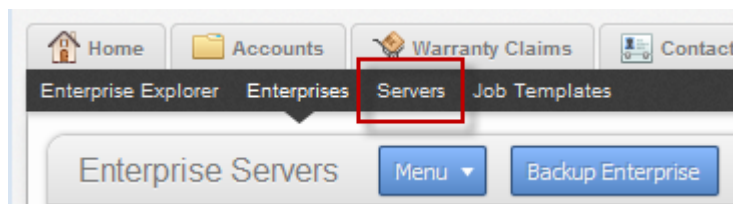
The Marketing Server Components must be enabled to import a list from the List Management business object.

- a) Navigate to **Administration - Server Configuration > Enterprises > Component Groups**.
- b) In the Spectrum™ Technology Platform Server list, select the appropriate server.

- c) In the Enterprise Component Groups list, locate each of the required component groups using the following table. If the **Enable State** field does not contain the value **Enabled**, select the component groups, click the menu button, and choose **Enable Component Group**.

Group Name	Components	Description
MktgOM	<ul style="list-style-type: none"> • Marketing Obj Mgr • eMarketing Obj Mgr • eEvents Obj Mjr 	Marketing Object Manager. Supports the user interface and business objects for the Marketing application.
Mktg Srv	List Import Service Manager	Marketing Server. Used for list management list import.

- d) Click the **Synchronize view** tab and click **Synchronize**.
- e) Restart the Siebel server. The Siebel server must be restarted each time synchronization occurs.
- 20.(Open UI Only) Grant the EAI File Transport business service access to the file system by following these steps.
- Click **Navigate > Site Map**.
 - Click **Administration - Server Configuration**.
 - In the **Administration - Server Configuration** section, under **Enterprises**, click **Parameters**.
 - Click **Query**.
 - In the **Name** column, enter `EAI File Transport Folder List`.
 - Click **Go**.
 - In the **Value** column, enter the root of the drive where you have Siebel installed. For example, `C:\`.
 - Click the **Servers** link:



- Click the **Parameters** tab:

Component	Alias	
Application Deployment Manager Batch Processor	ADMBatchProc	ADM
Application Deployment Manager Object Manager (ENU)	ADMObjMgr_enu	ADM
Application Deployment Manager Processor	ADMProc	ADM
Assignment Manager	AsgnSrvr	AsgnMgmt
Batch Assignment	AsgnBatch	AsgnMgmt
Business Integration Batch Manager	BusIntBatchMgr	EAI
Business Integration Manager	BusIntMgr	EAI

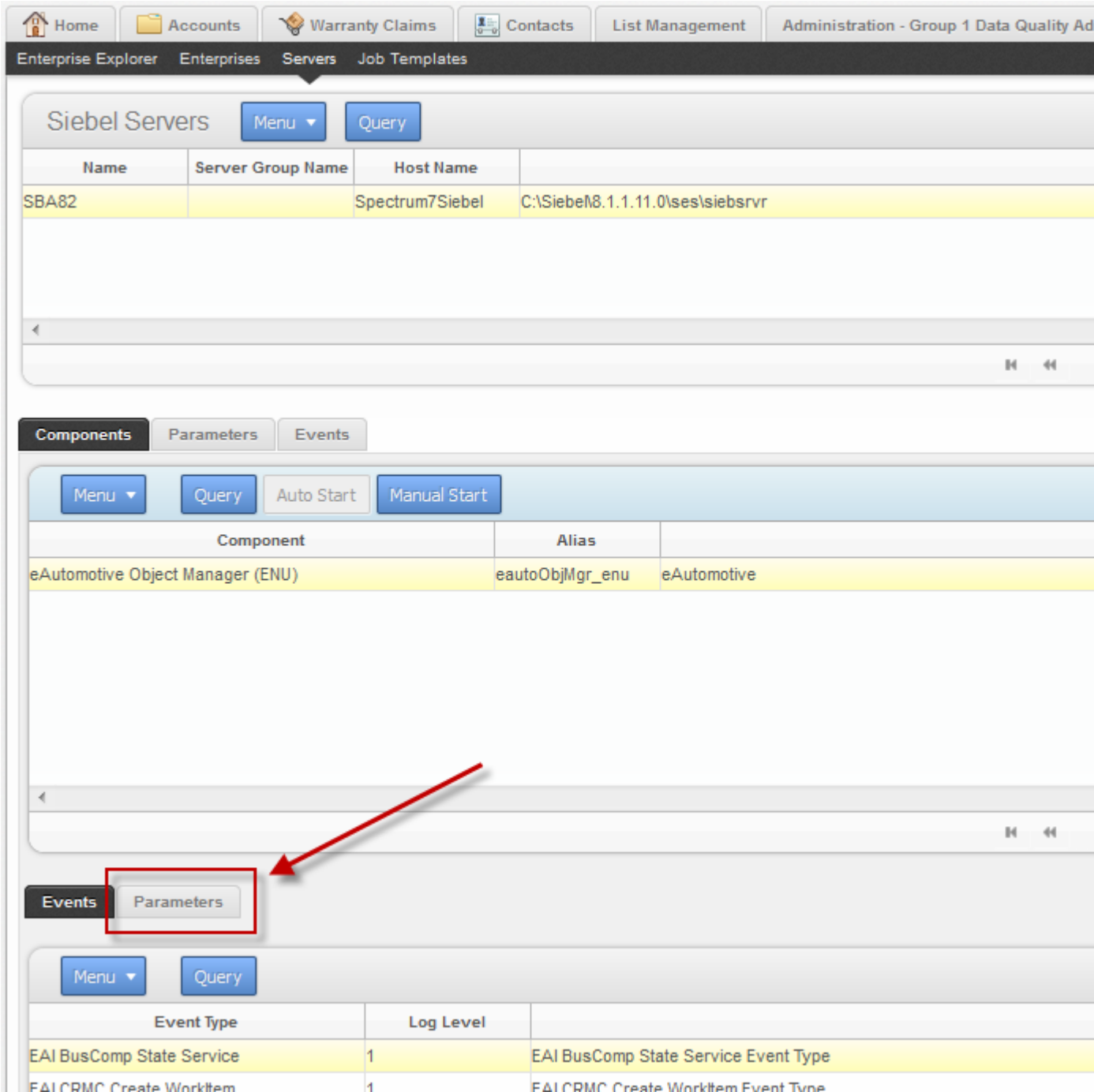
- j) Click **Query**.
- k) In the **Name** column, enter EAI File Transport Folder List.
- l) Click **Go**.
- m) In the **Value** column, enter the root of the drive where you have Siebel installed. For example, C:\.
- n) Add the following values to the .cfg file appropriate for your system (for example, auto.cfg, tools.cfg, and so on).

```
[EAIFileTransportConfigSubsys]
EAIFileTransportFolders=C:\
```

- o) Restart the Siebel server and gateway.

21. Set the EditProfileAttr parameter:

- a) Click **Navigate > Site Map**
- b) Click **Administration - Server Configuration**.
- c) In the **Administration - Server Configuration** section, under **Servers**, click **Components**.
- d) On the **Components** tab, click **Query**.
- e) In the **Component** column, enter the name of the Object Manager component. For example, "eAutomotive Object Manager".
- f) Click **Go**.
- g) Click the **Parameters** tab at the bottom of the window.



- h) Scroll to the parameter EditProfileAttr.
- i) Enter True in the **Value**, **Value on Restart**, and **Default Value** columns.

You have now configured Siebel non-SDQ to use Spectrum™ Technology Platform for data quality processing.

Configuring Microsoft Dynamics CRM

Integrating with Microsoft Dynamics CRM

To integrate Spectrum™ Technology Platform with Microsoft Dynamics CRM, you must install the supporting databases and dataflows on the Spectrum™ Technology Platform server, and deploy the Spectrum™ Technology Platform solution on your Microsoft Dynamics CRM. Once you do this, users of Microsoft Dynamics CRM will have access to address validation, geocoding, and duplicate detection functionality from within Microsoft Dynamics CRM.

Note: End users who use Internet Explorer must use Internet Explorer 10 or 11. Older versions of Internet Explorer are not supported. All versions of Chrome and Firefox are supported.

Before you begin, confirm that you are using a compatible version of Microsoft Dynamics. These versions are supported:

Microsoft Dynamics CRM 2013
 Microsoft Dynamics CRM 2013 SP1
 Microsoft Dynamics 2015

1. If you are using Spectrum™ Technology Platform for address validation or geocoding, install the databases required to perform address validation and geocoding and define database resources for each database.

Note: If you are using Spectrum™ Technology Platform for duplicate detection only, you can skip this step.

You must give the database resources these names:

Database	Required Name for Database Resource
Enterprise Geocoding Module - Canada Database	IGEO_CAN
Enterprise Geocoding Module - U.S. Database	EGM_US
Universal Addressing Module - Canada Database	Canada
Universal Addressing Module - Loqate Database	Loqate
Universal Addressing Module - U.S. Database	UAM_US

Note: You must install the Delivery Point Validation (DPV) data and the Residential Delivery Indicator (RDI) data in order to perform DPV and RDI processing on U.S. addresses.

2. Import the Microsoft Dynamics CRM Module dataflows into your Spectrum™ Technology Platform server.

- a) On the Spectrum™ Technology Platform server, open this folder:

SpectrumFolder\server\modules\dataflows\mscrm

Note: This folder is only available if you have installed the Microsoft Dynamics CRM Module.

- b) As mentioned in the table below, copy the applicable dataflow files to the *import* folder:

SpectrumFolder\server\app\import

If you have installed this set of modules	Copy these dataflow files to the import folder
Advanced Matching Module	<i>GenerateMatchKey.df</i> <i>GenerateMatchScore.df</i> <i>GenerateSearchKey.Consonant.df</i> <i>GenerateSearchKey.df</i> <i>GenerateSearchKey.Metaphone.df</i> <i>GenerateSearchKey.Substring.df</i>
Universal Addressing Module without Loqate	<i>ValidateAddressWithCandidates_UAM.df</i>
Universal Addressing Module without Loqate Enterprise Geocoding Module	<i>ValidateAddressWithCandidates_UAM_EGM.df</i>
Universal Addressing Module with Loqate	<i>ValidateAddressWithCandidates_UAM_Loqate.df</i>
Universal Addressing Module with Loqate Enterprise Geocoding Module	<i>BatchAddressValidate.df</i> <i>ValidateAddressAndGenerateMatchKey.df</i> <i>ValidateAddressWithCandidates_UAM_Loqate_EGM.df</i>
Universal Addressing Module, Loqate only	<i>ValidateAddressWithCandidates_Loqate.df</i>
Universal Addressing Module, Loqate only Enterprise Geocoding Module	<i>ValidateAddressWithCandidates_Loqate_EGM.df</i>
Enterprise Geocoding Module	<i>GeocodeUSAddressWithCandidates.df</i>

3. Import the Microsoft Dynamics CRM Module into your Microsoft Dynamics CRM system.

- a) In the Spectrum™ Technology Platform installation package, browse to this folder:

MS CRM Objects\Proxy

- b) Copy the file *netProxy.aspx* to this folder on your Microsoft Dynamics CRM server:

MicrosoftDynamicsCRMInstallation\CRMWeb

- c) Copy the file `netProxy.dll` to this folder on your Microsoft Dynamics CRM server:

MicrosoftDynamicsCRMInstallation\CRMWeb\Bin

- d) Log in to Microsoft Dynamics CRM as an administrator.
 e) Click **Microsoft Dynamics CRM** then click **Settings**.
 f) Click **Solutions**.
 g) Click **Import**.
 h) Browse to the Spectrum™ Technology Platform installation package and select the file:

MS CRM Objects\mscrm\PBMSDynamicsCRMConnector_4_0_0_managed.zip

- i) Click **Next** then **Publish All Customizations**.
 j) Restart the Microsoft Dynamics CRM server.
4. Define the connection between Microsoft Dynamics CRM and the Spectrum™ Technology Platform server.
- a) Log in to Microsoft Dynamics CRM as an administrator.
 b) Click **Microsoft Dynamics CRM > Settings**.
 c) Click **Settings > Pitney Bowes**. You will have to scroll to the right to find the Pitney Bowes link.
 d) Click **Administration**.
 e) Click **New**.
 f) In the **Name** field, enter `PB`.
 g) In the **Server Name** field, enter the server name or IP address of the Spectrum™ Technology Platform server.
 h) In the **Port** field, enter the port used by the Spectrum™ Technology Platform server for HTTP communication. By default the port is 8080.
 i) In the **Account ID** field, enter the Spectrum™ Technology Platform user name.
 j) In the **Password** field, enter the password for the Spectrum™ Technology Platform user.
 k) Click **Save**

The Microsoft Dynamics CRM system now has access to address validation and, optionally, geocoding services on the Spectrum™ Technology Platform server.

9 - Support

In this section

Support

167

Support

Technical Support

If you run into an issue, Pitney Bowes Technical Support can help guide you to a solution. When you contact Pitney Bowes Technical Support, please provide the following information:

- A description of the task you were performing
- The level or version of your operating system
- The patch level or service pack
- The log file located in your install directory at: `<SpectrumInstallationLocation>\server\app\repository\logs\wrapper.log`

Contact information for Technical Support can be found at:

support.pb.com/spectrum

Note: If you purchased Spectrum™ Technology Platform through a third-party partner, please contact the partner for technical support.

Documentation

Product documentation can be found at:

support.pb.com/spectrum

Digital Insights

Digital Insights is an online resource for Pitney Bowes leadership to share innovations, goals, and product news, as well as exchange ideas with visitors. You can access Digital Insights at:

blogs.pb.com/digital-insights/

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