precisely

Spectrum Spatial Analyst

Spectrum Spatial Analyst Installation Guide

Version 2022.1

Table of Contents

8 - Frequently Asked Questions

9 - Appendix

1 - Getting Started

In this section

Supported Languages

Spectrum Spatial Analyst supports the following languages:

1. cy (Welsh)
2. cz (Czech)
3. da (Danish)
4. de (German)
5. en (English- default)
6. en-au (English- Australian)
7. en-gb (English- British)
8. es (Spanish)
9. et (Estonian)
10. fi (Finnish)
11. fr (French)
12. it (Italian)
13. ja (Japanese)
14. nl (Dutch)
15. pt (Portuguese)
16. tr (Turkish)

To launch Spectrum Spatial Analyst Analyst in one of these languages, add a “lang” parameter to the end of the URL. For example:

```
https://<server>:<port>/connect/analyst/?lang=en-gb
```

Spectrum Spatial Analyst Documentation

The following documents are available with this release of Spectrum Spatial Analyst:

- Spectrum Spatial Analyst Installation Guide containing information for Windows and Linux.
- Spectrum Spatial Analyst User's Guide

- Spectrum Spatial Analyst Release Notes

You can find all Spectrum Spatial Analyst documents at **support.precisely.com**.

2 - Windows Installation

Note: Use **Run as Administrator** to install Spectrum Spatial Analyst application.

You can install Spectrum Spatial Analyst in two ways:

1. **Installing Spectrum Spatial Analyst through Wizard** on page 10
2. **Installing Spectrum Spatial Analyst through Batch File**

Note: During the upgrade process, the default banner and the `brand.css` file will be replaced with the Precisely branding. If you have customized banner and `brand.css` file, please ensure that these are copied back from the backup folder created during the upgrade.

In this section

System Requirements for Windows

Prerequisites

Spectrum Spatial Analyst requires Spectrum Technology Platform versions 2022.1 with Spatial and Routing Modules installed and licensed. Spectrum should already be installed and working and be accessible to the server on which Spectrum Spatial Analyst is being installed.

> **Note:** Spectrum Spatial Analyst installer requires that the Basic authentication is enabled on Spectrum Spatial Server. After installation, the Basic authentication can be disabled if required. To disable it, see Disabling Basic Authentication section in the Spectrum Spatial guide. **Disabling Basic Authentication**.

Analyst can also be deployed to the same server as Spectrum if desired (subject to **server requirements**).

> **Note:** In both cases we recommend Spectrum is fully patched.

> **Note:** Spectrum Spatial needs a license file to be applied after Spectrum is installed and before it can be used by Spectrum Spatial Analyst.

Spectrum Spatial Analyst 2022.1 also supports the Spectrum Spatial Map Uploader utility. While the older uploader can be used, it is recommended that all customers upgrade to the new version of the uploader to make use of full support for label layers and layer friendly names.

> **Note:** The Spectrum Spatial Map Uploader utility requires MapInfo Professional 17.0 64-bit or higher.

Once Spectrum is installed you will as a minimum need to create one named connection in Spectrum using the Spectrum Spatial Manager. The named connection is used by the map uploader to locate the data referenced in the map uploader. Spectrum Spatial Manager can be accessed from the Spectrum landing page under *Spectrum Spatial* > *Utilities* > *Spatial Manager*. The Map Uploader can be downloaded from *Spectrum Spatial* > *Utilities* > *Map Uploader*.

Server Requirements

The following are the server requirements:

Operating Systems

- Windows Server 2012 R2
- Windows Server 2019

64-bit

The server requires a 64-bit system. 32-bit systems are not supported.

Disk Space

Spectrum Spatial Analyst will use 1.5 GB approx. of system space for installer package and installation.

Memory

Spectrum Spatial Analyst applications will use minimum of 3GB RAM. Please make sure the server on which Analyst is installed has enough RAM to run other processes including Windows.

Additional Requirements

- Java 11 Oracle JDK or Azul Zulu Java11.
- Set JAVA_HOME environment variable
- Append JAVA_HOME/bin to PATH variable
- Administrator rights

Installing Spectrum Platform and Spectrum Spatial Analyst on the same Server

If you are installing the Spectrum Platform with Spectrum Spatial Analyst, please ensure that sufficient memory is available for both.

We recommend a minimum of 20 GB RAM. The default memory usage settings for the major components are as follows:

- Spectrum Platform uses up to 8 GB of memory for its internal processes (4 GB for the wrapper, 2GB for the Neo4J internal database and 2GB for ElasticSearch)
- Spectrum Spatial uses 2 GB as a minimum
- Spectrum Spatial Analyst will use 3 GB as a minimum
- You will also need sufficient memory available for the system and other processes.

The minimum processor cores we recommend in this scenario is 8 cores.

> **Note:** If other Spectrum Modules are also installed, such as Geocoding, then you will need sufficient additional memory for those in addition to the above.

Setting the Pool Size for the Spectrum Platform Spatial Components

The default pool setting for Spectrum Spatial is 1, which means it will only be able to handle 1 concurrent mapping and feature request at a time.

For production use, you must change the pool setting upwards.

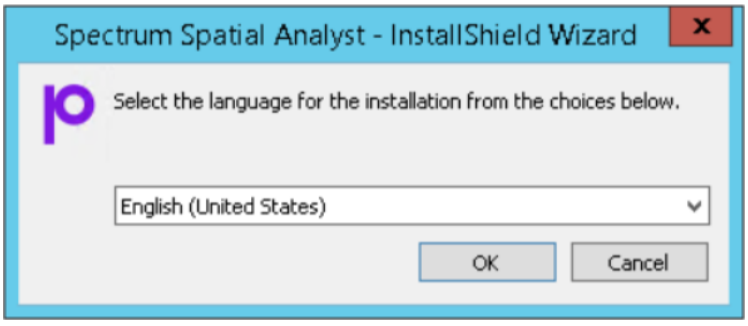
> **Note:** It is recommended to have at least 1 pool for each processor core and no more than 2 pools per core. Hence, on an 8 core server you will set the minimum pool settings to be 8 for the mapping component and also 8 for the feature component.

Installing Spectrum Spatial Analyst through Wizard

To install Spectrum Spatial Analyst, follow the steps given below:

1. Download Spectrum Spatial Analyst using the download instructions contained in your welcome email.
2. Extract the downloaded file to a temporary location on the server where you want to install Spectrum Spatial Analyst.
3. Double-click the file `setup.exe`.

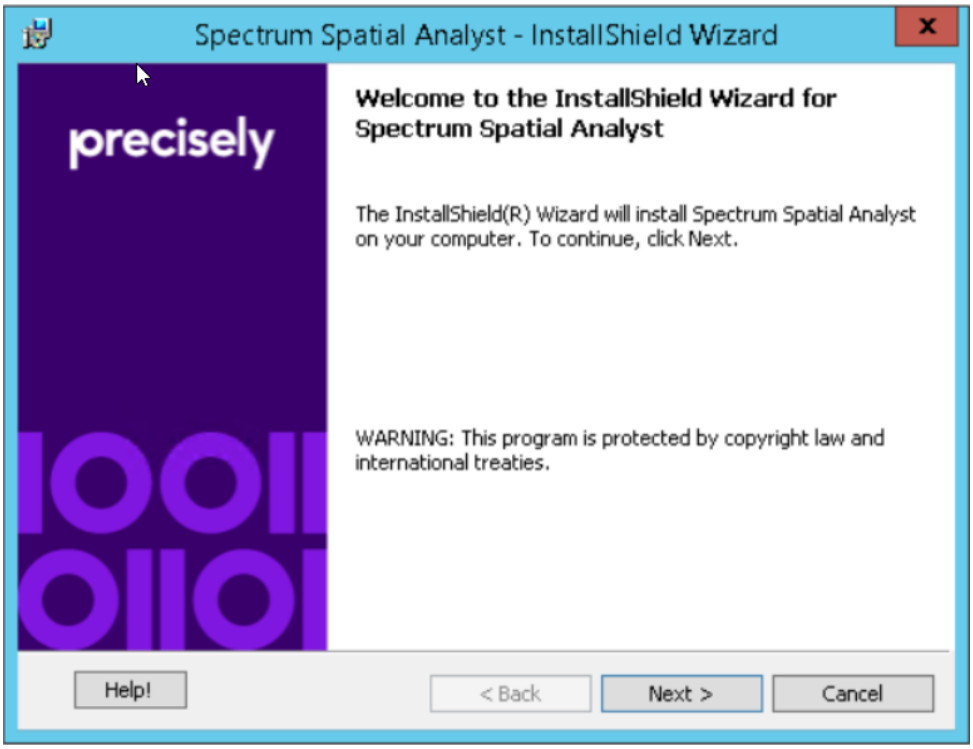
   The **Spectrum Spatial Analyst- InstallShield Wizard** appears.



4. Select the language for the installation from the drop-down list and click **OK**.

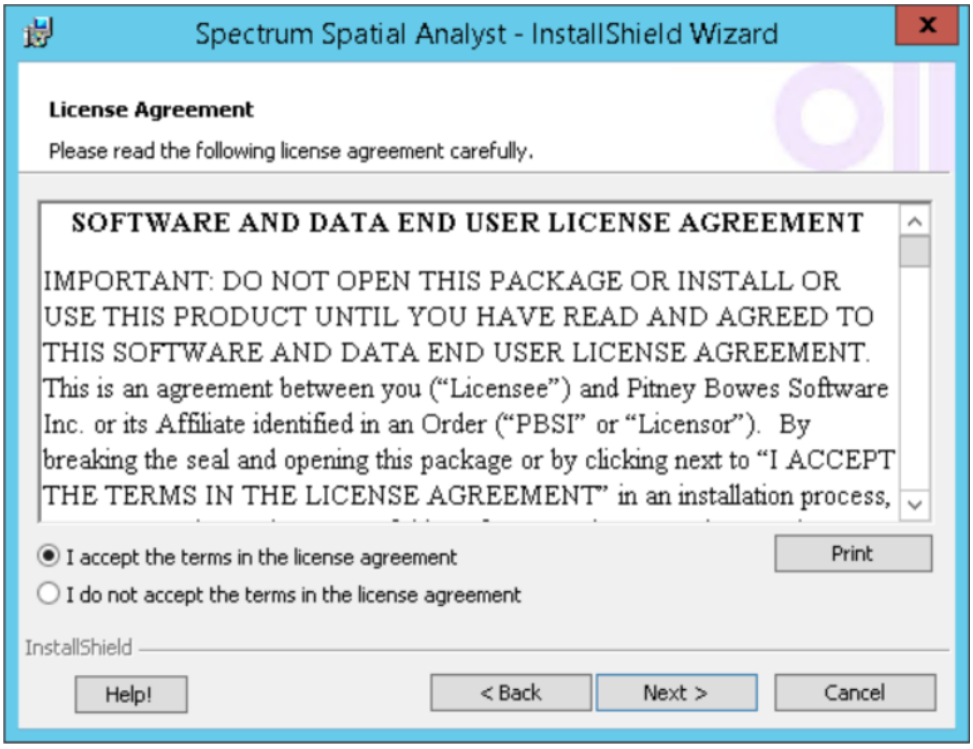
   The **Spectrum Spatial Analyst- InstallShield Wizard** appears and walks you through the installation process.

   Figure 1: Spectrum Spatial Analyst- InstallShield Wizard



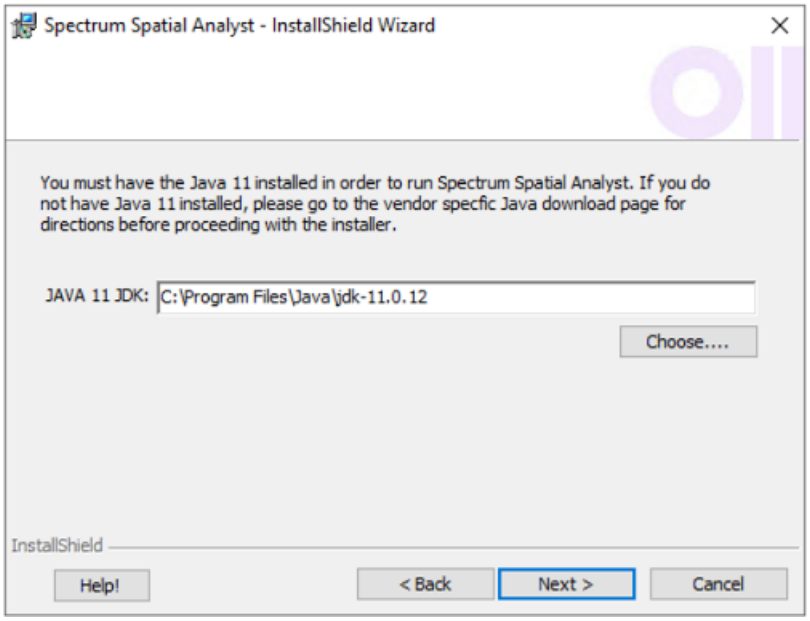
5. Click **Next**.
   The **License Agreement** dialog box appears.

Figure 2: Spectrum Spatial Analyst - License Agreement



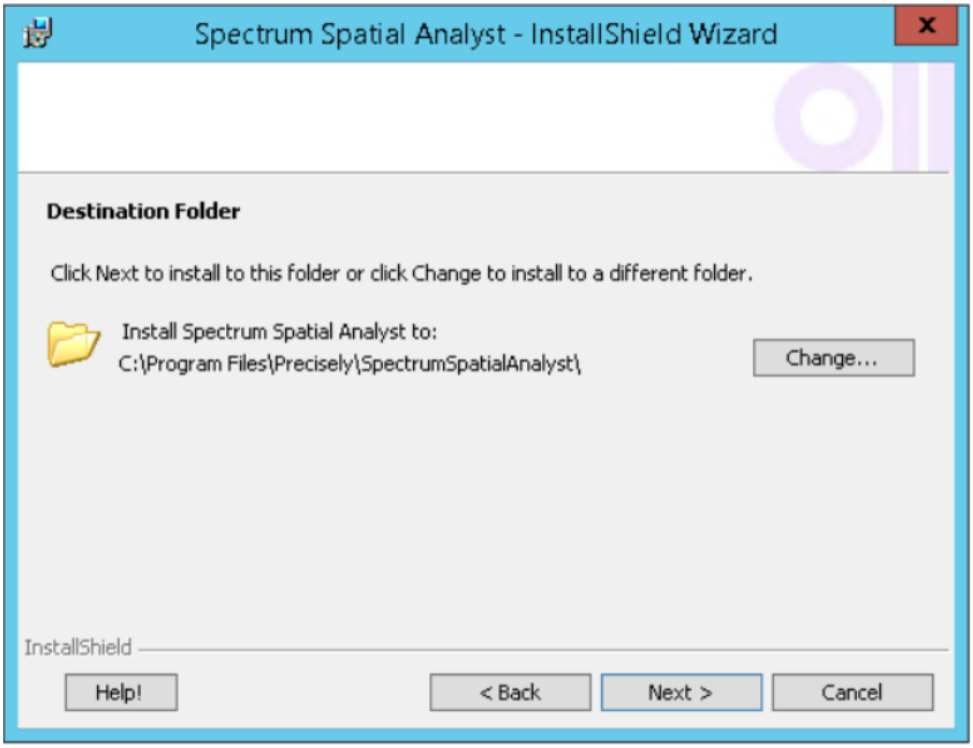
6. Please read the **License Agreement** carefully and click **Next**
   The **System Configuration - JAVA 11 JDK Folder** dialog box appears.

   Figure 3: System Configuration - JAVA 11 JDK Folder



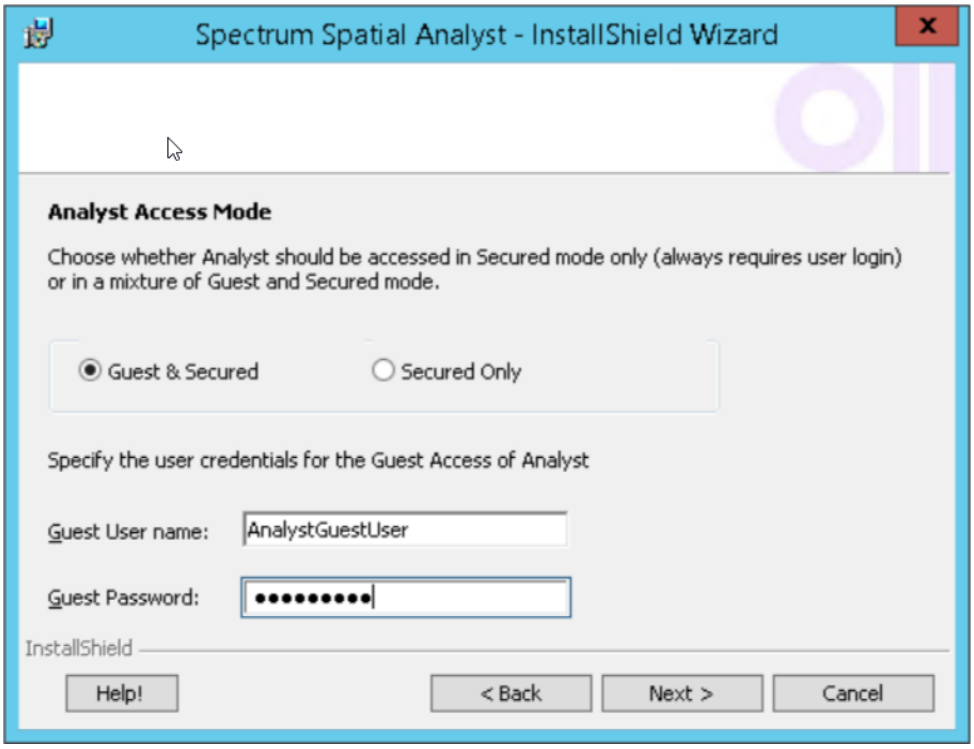
7. Click **Change** button to select a different directory or click **Next** to install to this default folder.
   The **Destination Folder** dialog box appears.
8. Select a directory and click **OK** button to install or click **Next** to install to this default folder.
   The **Destination Folder** dialog box appears to install the Spectrum Spatial Analyst application.

   Figure 4: Spectrum Spatial Analyst - Destination Folder



9. Click **Change** button to select a different directory or click **Next** to install to this default folder. The **Spectrum Spatial Analyst Access Mode** dialog box appears.

Figure 5: Spectrum Spatial Analyst Access Mode



10. Choose whether you wish to enable **Guest&Secured** or **Secured Only** access for Spectrum Spatial Analyst application.
    a) **Guest&Secured**- In Guest&Secured mode Analyst will use the credentials of the guest user that you have provided in **Guest User name** and **Guest Password** text boxes. It will allow anyone to see data which that user's role can read without logging in. You need to create this role in Spectrum as **AnalystGuestRole** by using Spectrum Management Console.
    b) **Secured Only**- Secured Only mode requires log-in. Secured users can subsequently click sign-in to see secured data.

    Note: You can enable Guest User manually after Analyst is installed. For more information, refer to Spectrum Spatial Guide.

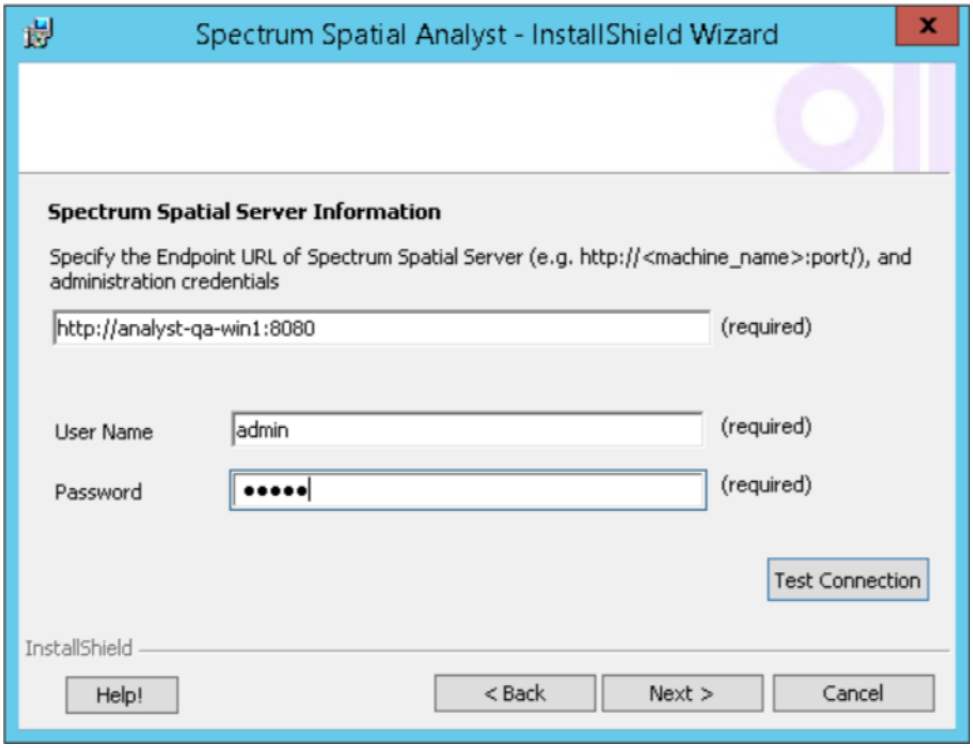
11. If you choose **Guest&Secured** mode then enter the **Guest user name** and **Password** for guest user.

    Note: For details on how guest access works and how to add this user to Spectrum and Analyst manually, refer to Spectrum Spatial Guide.

12. Click **Next**.
    The **Spectrum Spatial Server Information** dialog box appears.

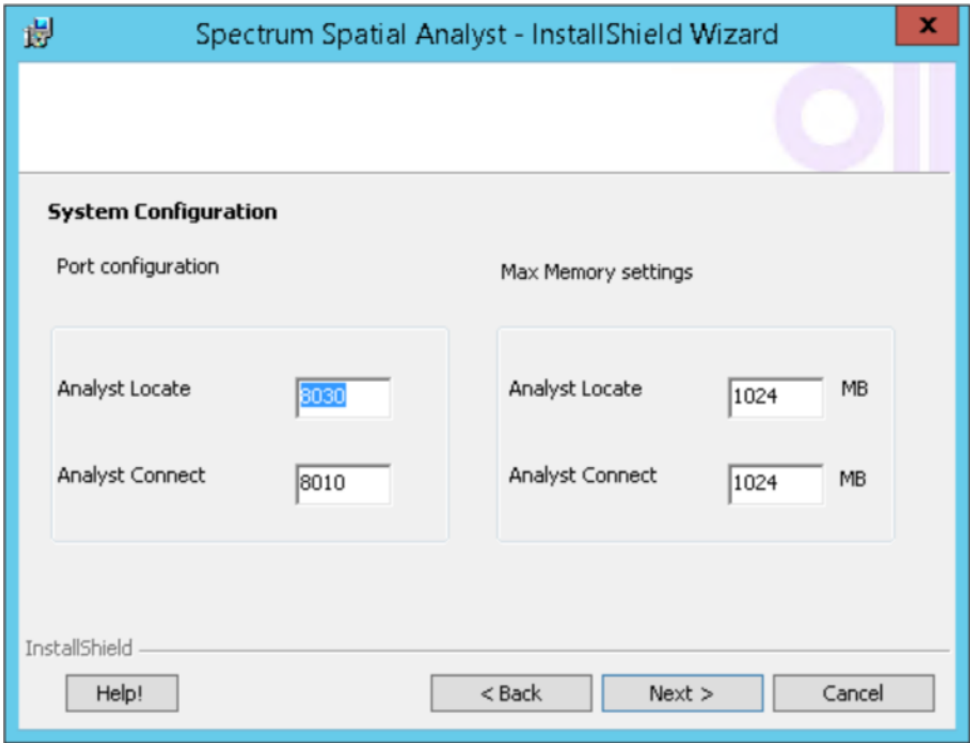
    Note: The URL, User name and Password displayed in the above image is for reference purpose only. Please contact your administrator for log-in credentials.

Figure 6: Spectrum Spatial Server Information



13. Specify the endpoint URL for Spectrum Spatial Server.
14. Click **Test Connection** to ensure that the server is accessible. The installer will attempt to read the WSDL for the Spatial Mapping Service.
15. Specify the **User Name** and **Password** in the text box.
16. Click **Next**.
    The **System Configuration** dialog box appears.

    Figure 7: System Configuration



17. Specify the **Port configuration** and **Max memory settings**. The default values for Analyst Locate and Analyst Connect are provided.
    Note: Please ensure that the chosen connector ports above are not used on your server prior to installation. Also note that the Analyst installer will use 3 additional ports for the Tomcat shutdown, Redirect and AJP ports. The Shutdown port will always be the chosen port plus 1 for shutdown, plus 2 for Redirect and plus 3 for AJP (hence in the case of 8010, all 4 ports 8010, 8011, 8012 and 8013 are used).

    You can edit Max Memory settings later by navigating to the Tomcat installation folder from command prompt and running the following command:

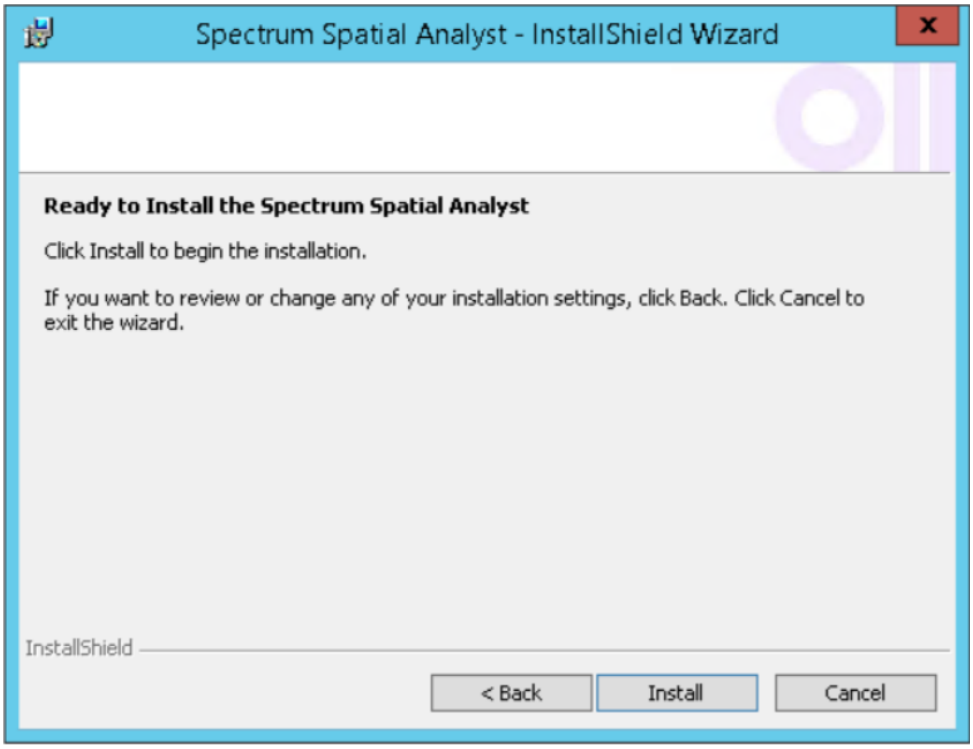
    `tomcat9w.exe//ES//<service_name>`

    Where `<service_name>` can be any one of the following:

    - AnalystConnect
    - AnalystLocate

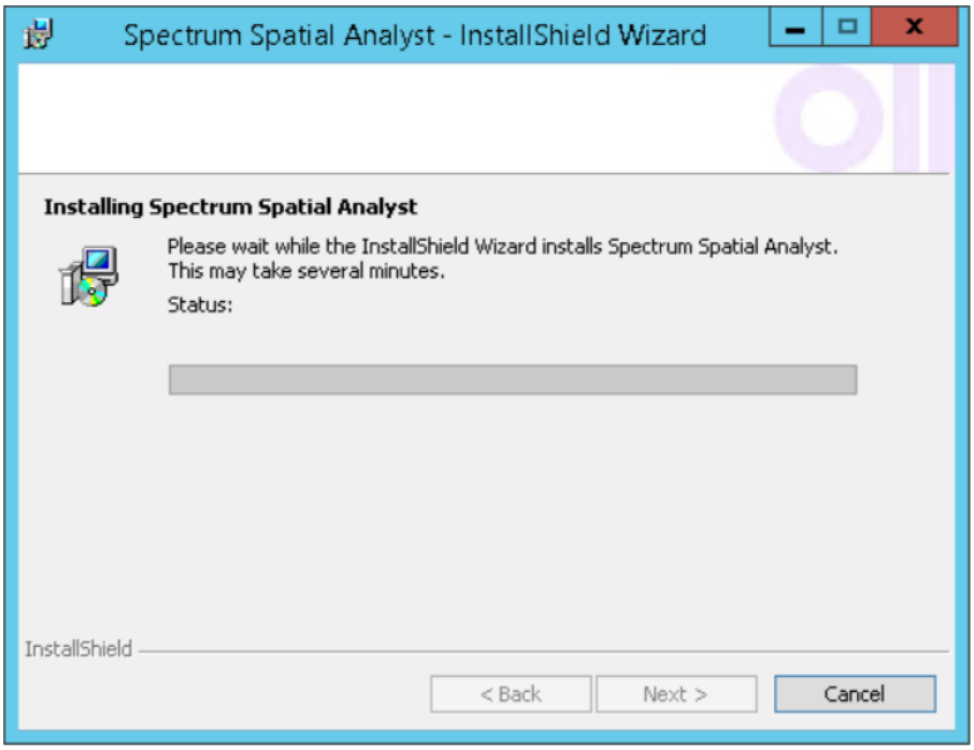
18. Click **Next**.
    The **Ready to Install the Spectrum Spatial Analyst** dialog box appears.

    Figure 8: Ready to Install the Spectrum Spatial Analyst



19. Click **Install** to begin the installation.
    The **Installing Spectrum Spatial Analyst** dialog box appears.

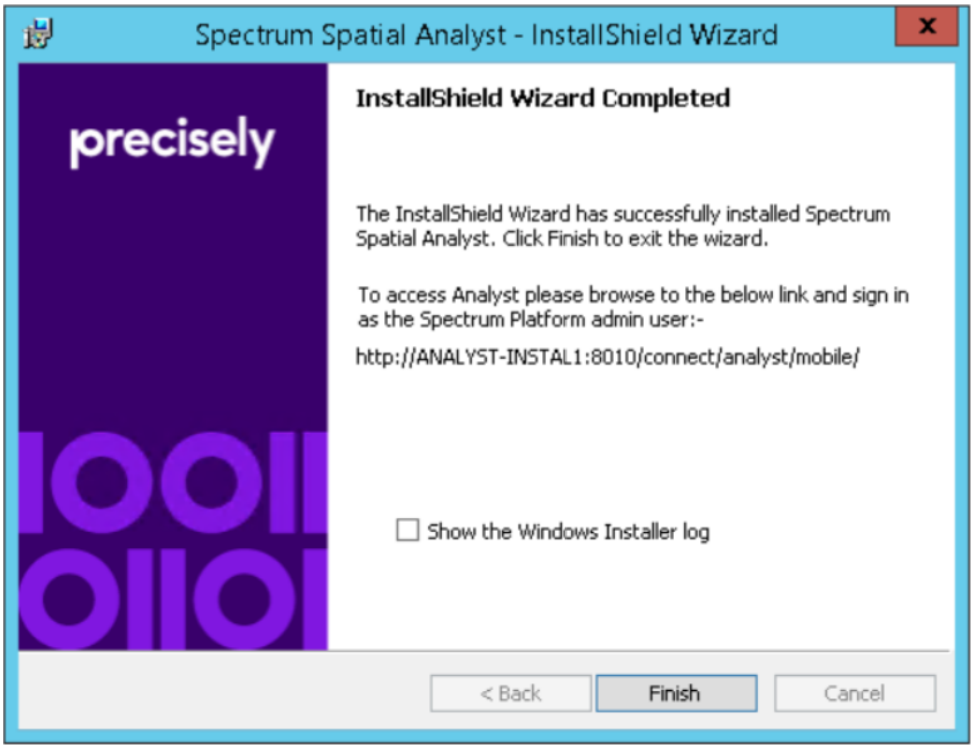
    Figure 9: Installing Spectrum Spatial Analyst



The installer installs Tomcat (Tomcat 9.x) for Analyst and Index search. Both will be installed on the same machine. The ports can be configured during installation process (Step 13 above). The tomcats will be deployed as Windows services in Windows which can be started and stopped in Administrative Tools – Services.

20. Click **Finish** to exit the **Spectrum Spatial Analyst - InstallShield Wizard**.

Figure 10: Installation Completed



The log file created during installation is placed here:

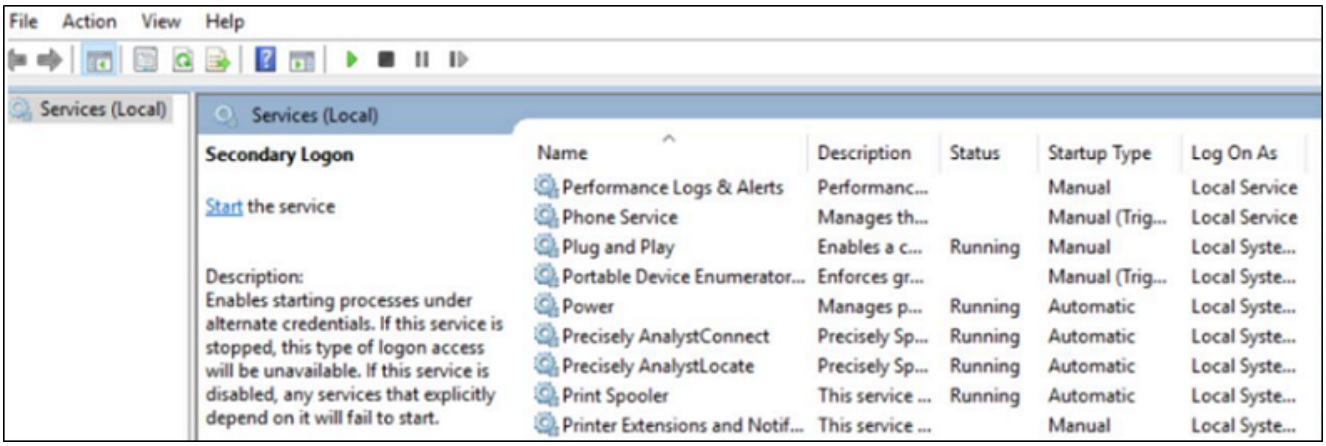
```
C:\Users\{windows-user-name}\AppData\Local\Temp\ANALYST_MSI_SetupLog.log
```

Congratulations! The Spectrum Spatial Analyst is installed in your machine and is ready to use.

Spectrum Spatial Analyst Services

After successful installation, there are three services available which can be seen in `services.msc`, and started as shown in figure below:

Figure 11: Spectrum Spatial Analyst Services



You can browse to the following Spectrum Spatial Analyst web applications:

- Spectrum Spatial Analyst- `http://<server>:<port>/connect/analyst`

You can sign in using the built-in Spectrum account named "admin" (where `server` and `port number` are the values you have specified during the installation).

Enabling Public Access to Analyst using Reverse Proxy

This section explains enabling public access to Spectrum Spatial Analyst using reverse proxy.

Customers who wish to make Analyst available publicly over the internet can configure IIS 7 on their public facing web server to act as reverse proxy to the internal Analyst Connect URL at `http://<server>:<port>/connect/analyst/` where `server` and `port` match the server and port name of your installation. We recommend configuring using a HTTPS with SSL end point for public access to ensure that access is encrypted should users choose to sign in.

The IIS 7 extensibility model lets you develop and deploy Web server components, named modules, as either native DLLs that use native C++ APIs or managed types developed by using ASP.NET APIs. You may utilize URL Rewrite 2.0 module for configuring IIS web server as reverse proxy. The Reverse Proxy Rule Template of this module can be used to generate inbound and outbound rewrite rules that implement reverse proxy configuration. Please refer to the following links for more information.

http://www.iis.net/downloads/microsoft/url-rewrite

http://www.iis.net/learn/extensions/url-rewrite-module/using-url-rewrite-module-20

Alternatively, you may wish to use a third party tool such as an ISAPI filter. Internet Server Application Programming Interface (ISAPI) filters are programs that you can add to IIS to enhance Web server

behavior. ISAPI filters receive every HTTP request made to the Web server to provide additional functionality for the server, such as logging request information, authenticating and authorizing users, rewriting URLs, and compressing Web content to reduce bandwidth cost. Please refer to the following link for more information on how to set up ISAPI filters for configuring IIS web server as reverse proxy.

http://technet.microsoft.com/en-us/library/cc733109(v=ws.10).aspx

Modifying Spectrum Spatial Analyst

This section explains how to upgrade from one version to another of Spectrum Spatial Analyst.

Spectrum Spatial Analyst provides you an option to upgrade. Running an installer again when same version of Spectrum Spatial Analyst is installed will provide following options:

1. **Repair**: It will repair the installation.
2. **Modify**: The installer will allow users to change values that were set during previous installation.
3. **Remove**: Same as uninstall.

Note: You must run the installer as an administrator.

Note: The upgrade installer for Spectrum Spatial Analyst 2022.1 will only upgrade from versions 2020.1. Customers who are migrating from past versions of Analyst will need to upgrade to 2020.1, first.

Uninstalling Spectrum Spatial Analyst

This section explains how to uninstall Spectrum Spatial Analyst.

Before uninstalling any product, back up any files you may need in the future.

To uninstall Spectrum Spatial Analyst:

1. Use the Windows Add/Remove Programs control panel to uninstall Spectrum Spatial Analyst from your machine.
2. When prompted select **Yes** to un-install Spectrum Spatial Analyst from your machine.

Note: While uninstalling, the installer will create a back-up of customerconfigurations at `C:\Backup_CustomerConfigs folder`.

3 - Linux Installation

You can install Spectrum Spatial Analyst in any one of the following ways:

1. Console
2. Installation Wizard

> **Note:** The installation directory path should not contain spaces. It may cause the installation to fail.

In this section

System Requirements for Linux

Package Content

The package of Spectrum Spatial Analyst for Linux contains following items:

1. Installation Guide
2. Application (`Analyst.bin`)

Server Requirements

Spectrum Spatial Analyst requires Spectrum Technology Platform 2022.1 with the Spatial and Routing Module to be installed and accessible to the server on which Spectrum Spatial Analyst is being installed. Spectrum Spatial Analyst can also be deployed to the same server as Spectrum if desired.

The following are the server requirements:

Operating Systems

- Ubuntu 20.04 and above
- CentOS 7.0

64-bit

The server requires a 64-bit system.

> **Note:** 32-bit systems are not supported.

Disk Space

Spectrum Spatial Analyst will use 2GB of system space for installer package and installation.

Memory

Spectrum Spatial Analyst applications will use minimum of 3GB RAM. Please make sure the server on which Analyst is installed has enough RAM to run other processes.

Additional Requirements

Java 11 Oracle JDK

Set `JAVA_HOME` environment variable

Append `$JAVA_HOME/bin` to `PATH` variable.

Prerequisites

You will need to know whether you are running a 32-bit or a 64-bit Operating System:

`uname -m`

- x86_64: 64-bit kernel
- i686: 32-bit kernel

General Notes About Installing the Spectrum Spatial Analyst on Linux

- Anyone (not only root users) can run the Spectrum Spatial Analyst installer on a Linux platform.
- For fresh install of Spectrum Spatial Analyst 2022.1, sudo right is not required, however, for upgarding from 2020.1 to Spectrum Spatial Analyst 2022.1 sudo right is needed.
- The installer for Spectrum Spatial Analyst 2022.1 can be upgraded from versions 2020.1 only. Customers who are migrating from older versions of Spectrum Spatial Analyst will need to upgrade to 2020.1 first and then to versions 2022.1

  Note:

  Please ensure Java 11 is installed on your Linux system, in the absence of Java 11, the following error message appears:

  No Java virtual machine could be found from your PATH environment variable.

Installation through Console

To install Spectrum Spatial Analyst through console on `CentOS` or `Ubuntu`, follow the steps given below:

Note: For fresh install of Spectrum Spatial Analyst 2022.1, sudo right is no more required, however, for upgarding from 2020.1 to Spectrum Spatial Analyst 2022.1 sudo right is needed.

1. Download Spectrum Spatial Analyst using the download instructions in your welcome letter.
2. Extract the downloaded file to a temporary location (for example, `/analyst`) on the server where you want to install Spectrum Spatial Analyst.
3. Run the following command from the terminal window:

```
./Analyst.bin -i console
```

where, `Analyst.bin` is the file name of the installer.

> **Note:** Please ensure the correct JAVA version is installed on your system, in the absence of Java 11, the following error message appears *No Java virtual machine could be found from your PATH environment variable*.

4. It will prompt to install, press **Enter** to continue.
5. Accept the Terms & Conditions.
6. Enter the desired location to install Spectrum Spatial Analyst or press **Enter** to accept the default path. For example, in case of your home directory the default location looks like `/home/analyst-s/SpectrumSpatialAnalyst`.
7. Enter the path for Java 11 JDK and press **Enter**.
8. Enter the type of Analyst Access Mode and press **Enter**.
9. Press **1** for **Guest and Secured** or **2** for **Secured Only**.
10. If you choose **Guest&Secured** mode, then enter the **Guest user name** and **Password** for guest user.
11. Specify the Endpoint URL in the following format, then press **Enter**

    `http://<machine_name>:port`
12. Specify the credentials for Spectrum Spatial Server.
13. Specify the port number for `Analyst Locate`, or press **Enter** to accept the default port.

    The default port is 8030.
14. Specify the port number for `Analyst Connect`, or press **Enter** to accept the default port.

    The default port is 8010.
15. Specify the max memory settings for `AnalystLocate`, or press **Enter** to accept the default memory.

    The default is 1024.
16. Specify the max memory settings for `AnalystConnect` or press **Enter** to accept the default memory.

    The default is 1024.
17. Carefully review the pre-installation summary.
    The installation process starts. The installer installs two separate Tomcat instances on two different ports. Both will be installed on the same machine. The ports can be configured during installation process.

Congratulations! The Spectrum Spatial Analyst is installed in your machine and is ready to use.

Installation through Wizard

To install Spectrum Spatial Analyst through wizard on `CentOS` or `Ubuntu`, follow the steps given below:

1. Download Spectrum Spatial Analyst using the download instructions contained in your welcome letter.
2. Extract the downloaded file to a temporary location (for example, `/analyst`) on the server where you want to install Spectrum Spatial Analyst.
3. Run the following command from the terminal window:

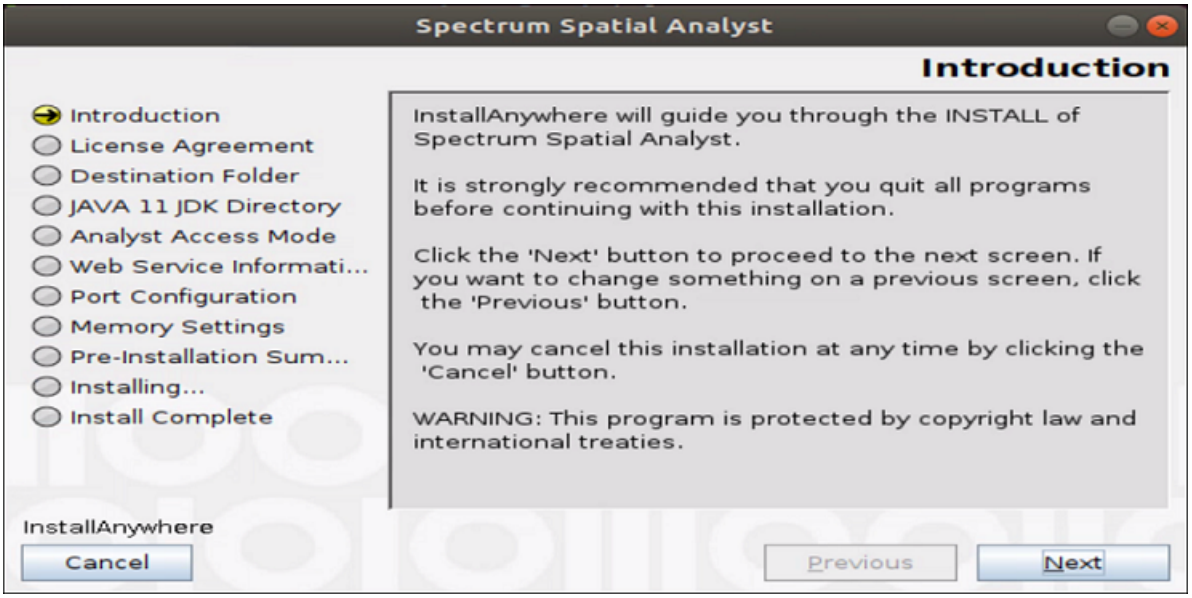
   ```
   ./Analyst.bin
   ```

   where, `Analyst.bin` is the file name of the installer.

4. Enter your password to proceed.

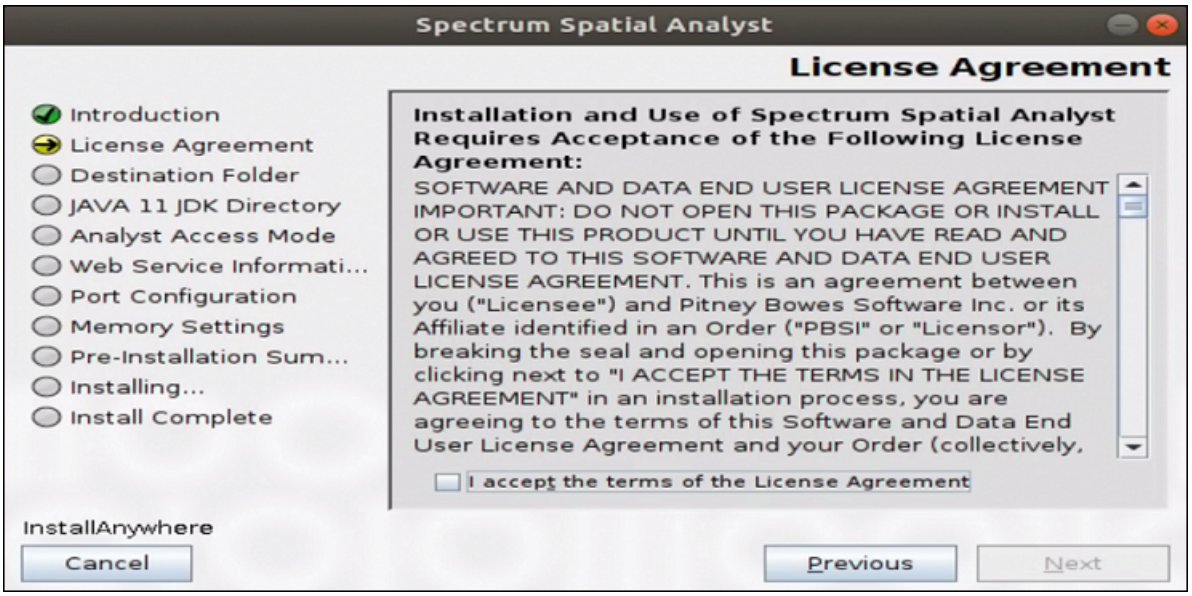
   The **Spectrum Spatial Analyst- Introduction** install wizard appears and walks you through the installation process.

   Figure 12: Spectrum Spatial Analyst- Introduction



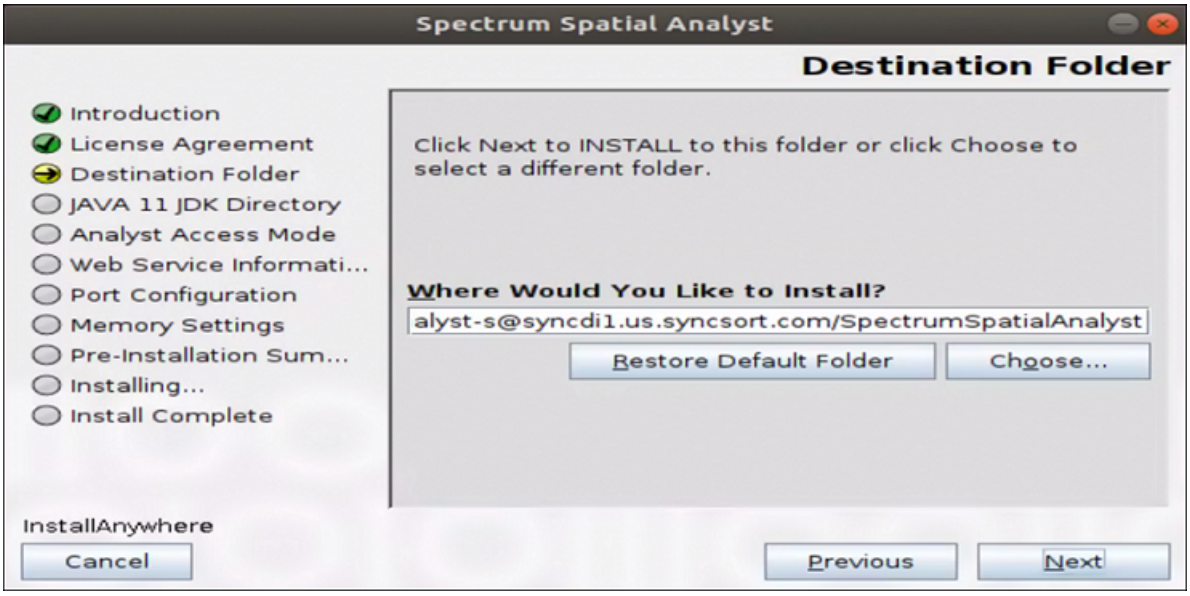
5. Click **Next**.
   The **License Agreement** dialog box appears

   Figure 13: Spectrum Spatial Analyst- License Agreement



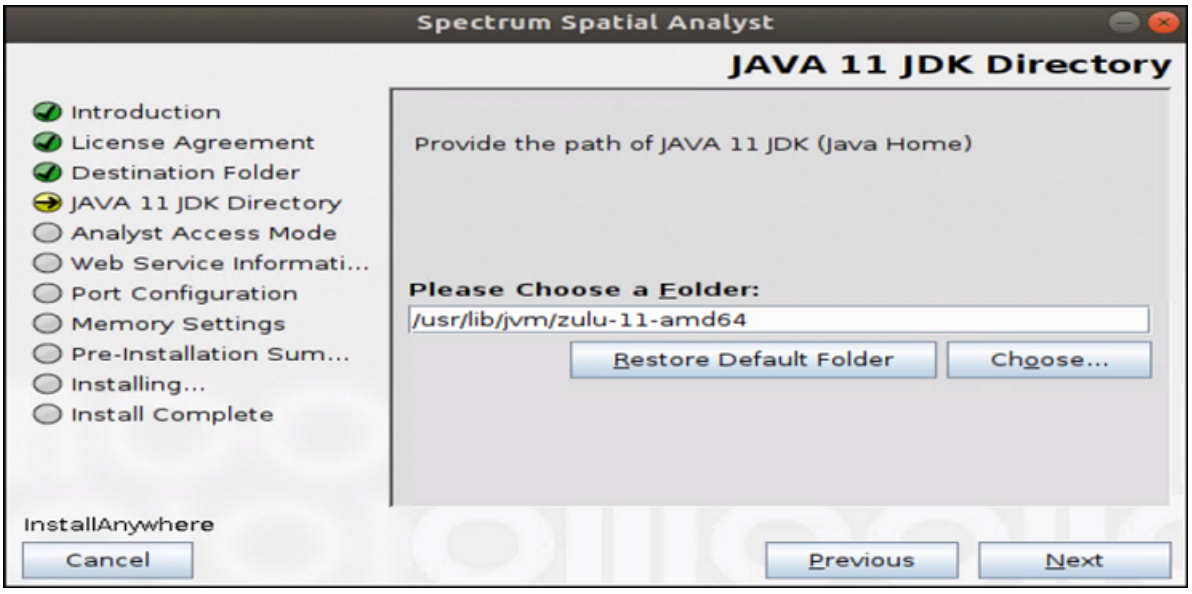
6. Select **I accept the terms of the License Agreement** and click **Next**.
   The **Destination Folder** dialog box appears.

Figure 14: Spectrum Spatial Analyst- Destination Folder



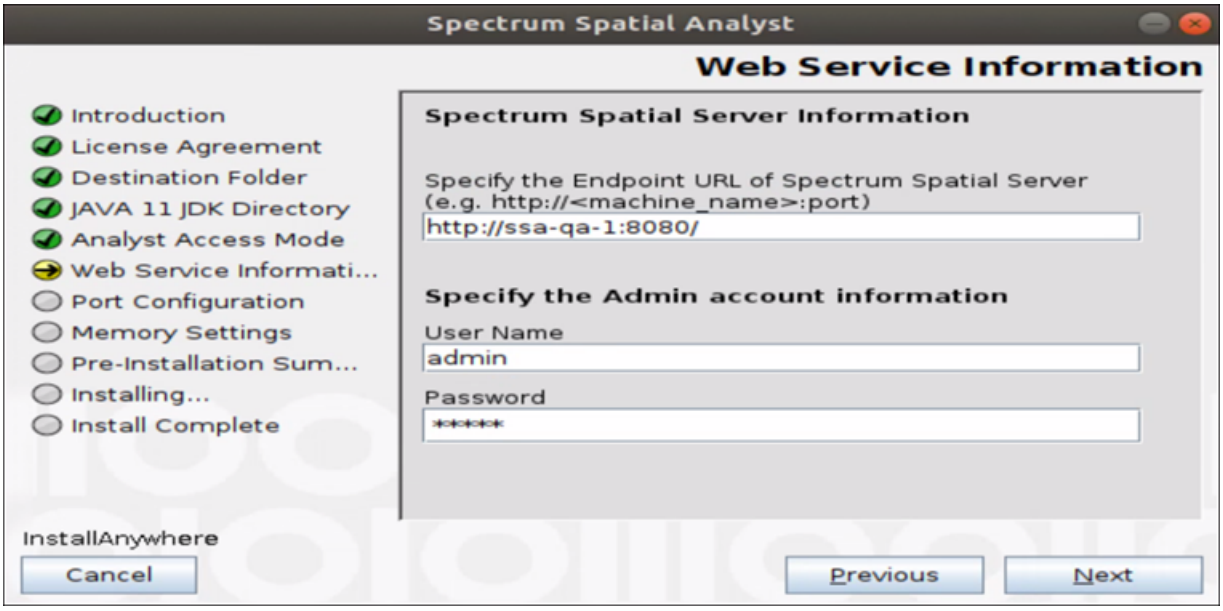
7. Click **Choose** button to select a different directory or click **Next** to install in the default folder and move to next step.
   The **JAVA 11 JDK Directory** appears.

Figure 15: Spectrum Spatial Analyst- JAVA 11 JDK Directory



8. Click **Choose** button to select a different directory or click **Next** to install JAVA 11 JDK in the default folder.
   The **Analyst Access Mode** appears.

Figure 16: Spectrum Spatial Analyst- Analyst Access Mode



9. Choose whether you wish to enable **Guest and Secured** or **Secured Only** access for Spectrum Spatial Analyst application.
   a) **Guest and Secured**- In Guest and Secured mode Analyst will use the credentials of the guest user that you have provided in **Guest User name** and **Guest Password** text boxes. It will allow anyone to see data which that user's role can read without logging in. You need

to create this role in Spectrum as **AnalystGuestRole** by using Spectrum Management Console.

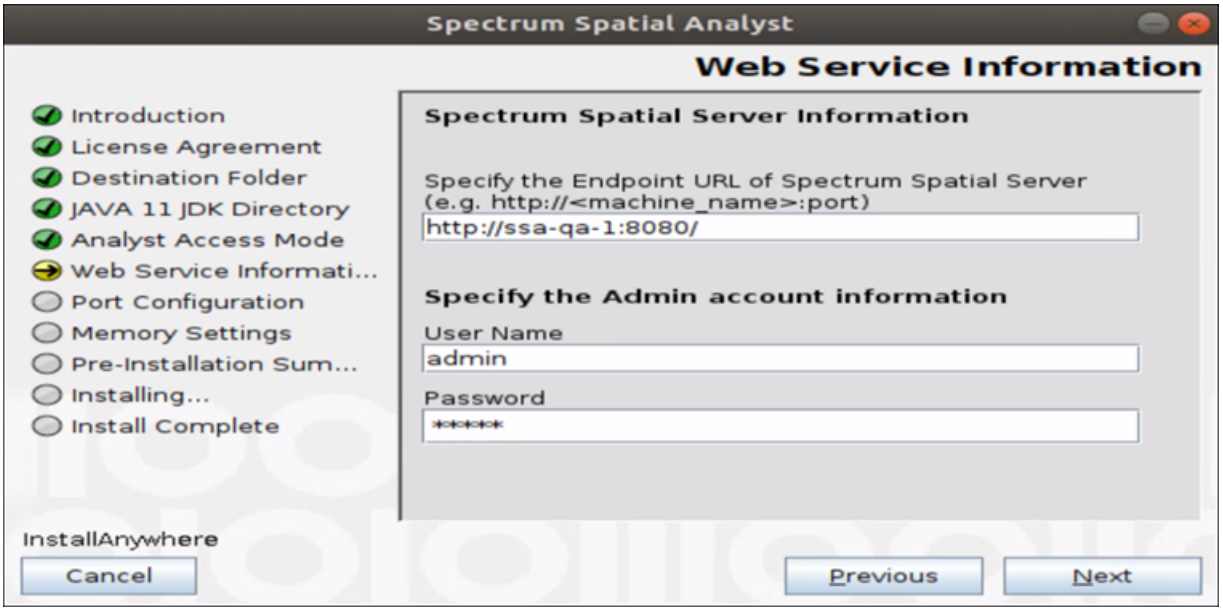
b) **Secured Only**- Secured Only mode requires log-in. Secured users can subsequently click sign-in to see secured data.

10. If you choose **Guest&Secured** mode then enter the **Guest user name** and **Password** for guest user.

    Note: For details on how guest access works and how to add this user to Spectrum and Analyst manually, refer to *Spectrum Spatial Manager Guide*.

11. Click **Next**.
    The **Web Service Information** dialog box appears.

Figure 17: Spectrum Spatial Analyst- Web Service Information



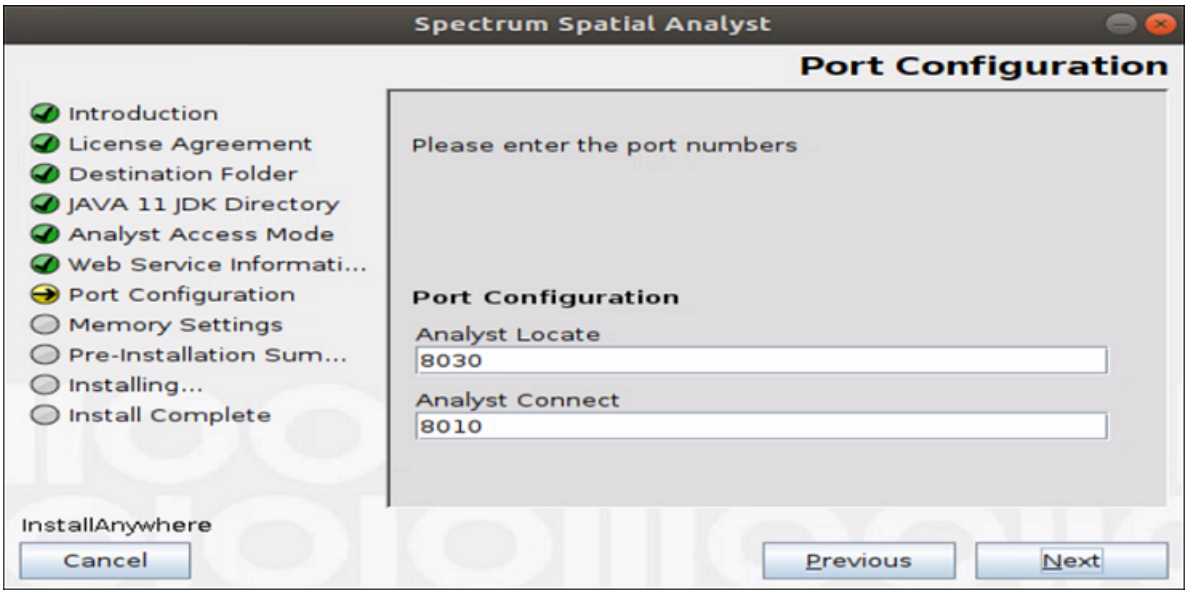
12. Specify the endpoint URL of Spectrum Spatial Server.
13. Specify the Admin account information by entering User name and Password.

    Note: The URL, User name and Password displayed in the above image is for reference purpose only. Please contact your administrator for log-in credentials.

    To migrate existing configurations from Spectrum Spatial Analyst 2018.2, you must have admin credentials. For more information, please see **Migration from Spectrum Spatial Analyst 2018.2**.

14. Click **Next**.
    The **Port Configuration** dialog box appears.

Figure 18: Spectrum Spatial Analyst- Port Configuration

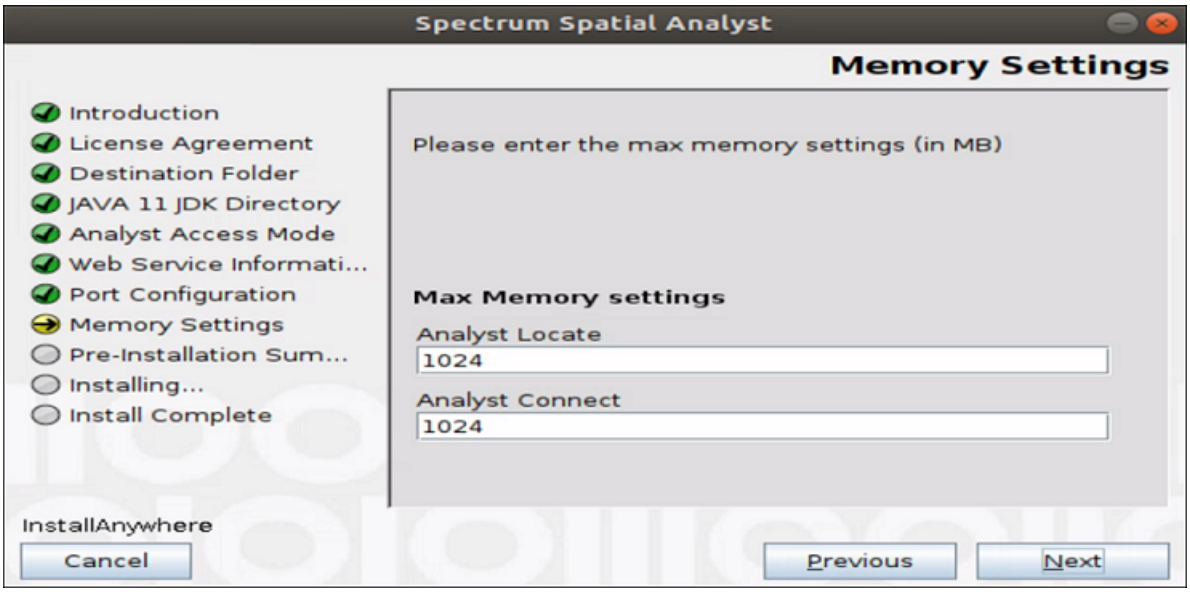


15. Enter the port numbers under the **Port configuration** section. The default values for Analyst Locate and Analyst Connect are provided.

    Note: Please ensure that the chosen connector ports above are not used on your server prior to installation. Also note that the Analyst installer will use 3 additional ports for the Tomcat shutdown, Redirect and AJP ports. The Shutdown port will always be the chosen port plus 1 for shutdown, plus 2 for Redirect and plus 3 for AJP (hence in the case of 8010, all 4 ports 8010, 8011, 8012 and 8013 are used).

16. Click **Next**.
    The **Memory Settings** dialog box appears.

Figure 19: Spectrum Spatial Analyst- Memory Settings



17. Specify the **Max memory settings** in MB. The default values for Analyst Locate and Analyst Connect are provided.

    Note:

    You can edit Max Memory settings later by navigating to the Tomcat installation folder:

    - AnalystConnect

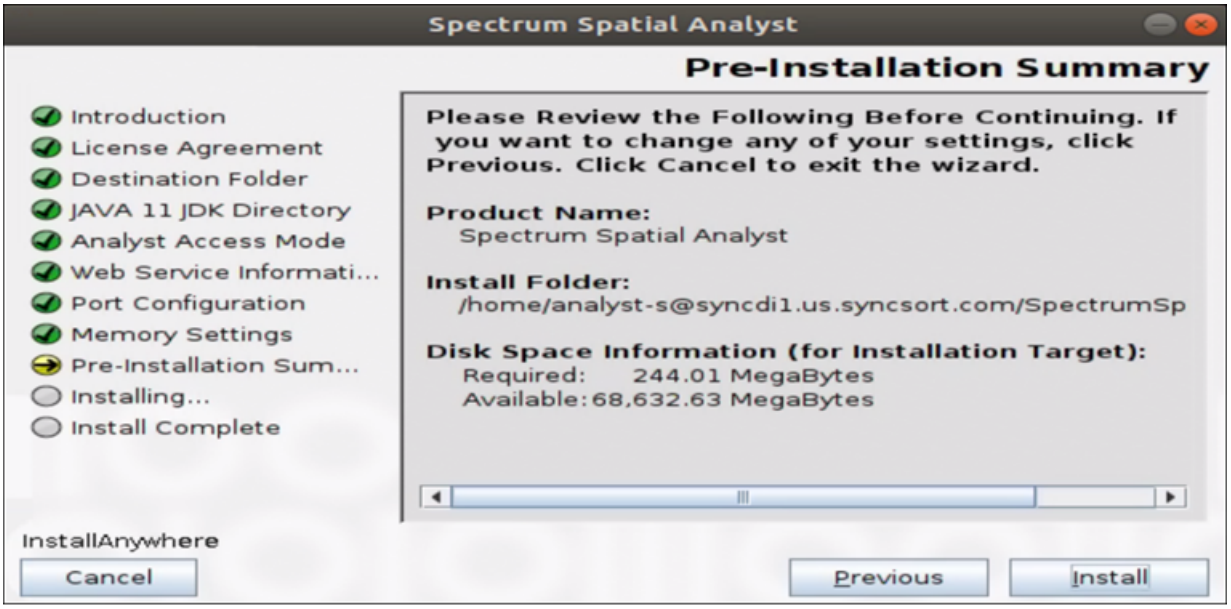
    ```
    <install directory>/analyst/connect/bin/setenv.sh
    ```

    - AnalystLocate

    ```
    <install directory>/analyst/index-search/bin/setenv.sh
    ```

18. Click **Next**.
    The **Pre-Installation Summary** dialog box appears. Please review the information before going to next step.

    Figure 20: Spectrum Spatial Analyst- Pre-Installation Summary



19. Click **Install** to begin the installation process.
    The **Installing** dialog box appears and shows the installation progress.

    The installer installs three different Tomcat (Tomcat 9.x) on three different ports. All three will be installed on the same machine. The ports can be configured during installation process.

    Figure 21: Spectrum Spatial Analyst- Installing

20. Click **Done** to exit the **Spectrum Spatial Analyst** installation wizard.

    Congratulations! The Spectrum Spatial Analyst is installed in your machine and is ready to use.

Spectrum Spatial Analyst Services

After successful installation, there are three services available which can be seen by running the following commands from terminal window:

```
sudo ps -ef | grep tomcat
```

You can browse to the following Spectrum Spatial Analyst web applications:

- Spectrum Spatial Analyst- `http://<server>:<port>/connect/analyst`

  For example, `http://UbUntU-x64:8010/connect/analyst/`

You can sign in using the built-in Spectrum account named "admin" (where `server` and `port number` are the values you have specified during the installation).

Uninstalling Spectrum Spatial Analyst

Before uninstalling any product, back up any files you may need in the future.

Uninstall via Console

To uninstall Spectrum Spatial Analyst, run the following command from the terminal window

1. Navigate to the directory where Spectrum Spatial Analyst is installed.

```
cd /<name of the installation directory>
```

2. List folders by using the following command:

```
ls -a
```

You will see a file **Change Spectrum Spatial Analyst Installation**)

3. Run the Uninstaller by entering following command:

```
./Change\ Spectrum\ Spatial\ Analyst\ Installation
```

Note: While uninstalling, the installer will create a back-up of customer configurations.

4 - Migrating Spectrum Spatial Analyst

In this section

Default Configurations

If you are installing Spectrum Spatial Analyst as a first-time installation, the following resources will be created:

1. Default map project
2. Default functionality profile
3. Default print templates
4. Analyst Configuration

The installer also creates a guest role and a guest user if you choose to install Spectrum in **Guest and Secured** mode, if you are installing it first-time or upgrading the existing installation.

The installer will also generate logs and reports directories for easily tracking the status of these resources.

Note for extensibility developers – The configuration file for extensible components *CustomAnalystModuleConfig.json*contains the references of map projects. After upgrading to later version, you will need to update this file manually and provide the repository path of these map projects.

Migrating from Older Versions

The following information applies if you are migrating from an older version of Spectrum Spatial Analyst (older than 2020.1) to 2020.1, or 2022.1.

Migrating from Version 2018.2

> **Note:** The functionality in the Spectrum Spatial Analyst Administration Console has moved to Spectrum Spatial Manager on the **Project Properties** tab. As a result, the installer will create default resources as part of the first-time installation. If you are migrating from version 2018.2, the installer will also migrate the existing resources available in *customerconfigurations* directory to Spatial repository.

Migration

If you are upgrading Spectrum Spatial Analyst from version 2018.2, then you will have number of existing map projects, functionality profiles, print templates along with other configurations like WMS,

third party tile services, geocoding and routing configurations, data bindings, etc. The installer will migrate all of these configurations to Spatial repository as named resources.

The installer will also generate logs and reports directories for easily tracking the status of these resources.

Note for extensibility developers – The configuration file for extensible components *CustomAnalystModuleConfig.json*contains the references of map projects. After upgrading to version 2019.1, you will need to update this file manually and provide the repository path of the map projects.

Migrating from Version 2012.2

If you are migrating from 12.2 to 2020.1, you need to update the migrated templates manually with some CSS classes in each *.html files.

This is because in version 2020.1 the Bootstrap has been upgraded and according to the guidelines of Bootstrap framework you need to manually edit the templates and make the following changes.

1. Open a template HTML file in a text editor like notepad ++. You can find the template files under this directory: `SpectrumSpatialAnalyst\customerconfigurations\analyst\theme\infotemplates\`.
2. Replace all occurrences of xs.

   Using search and replace feature, replace 'xs-' with an empty string which means specify nothing in the replace field.

3. Save the HTML template file.
4. Load Analyst project in a browser.
5. Validate if the issue is resolved. For example, invoke a callout and check if everything works fine.
6. After the issue is resolved for one template, make the changes in all the HTML templates.

5 - Spectrum Spatial Analyst Clustering

In this section

Introduction

Modern high-traffic websites serve thousands of concurrent requests from users and return the correct text, images, video, or application data, all in a fast and reliable manner. In order to serve these high volumes of requests, modern computing best practices keep adding more servers. A load-balancer acts as the “traffic cop” sitting in front of your servers and routing user requests across all servers, capable of fulfilling those requests.

Cluster Architecture

Spectrum Spatial Analyst can communicate with a single Spectrum instance or a cluster. In the case of the Spectrum cluster, Spectrum Spatial Analyst should use the URL for the corresponding load-balancer.

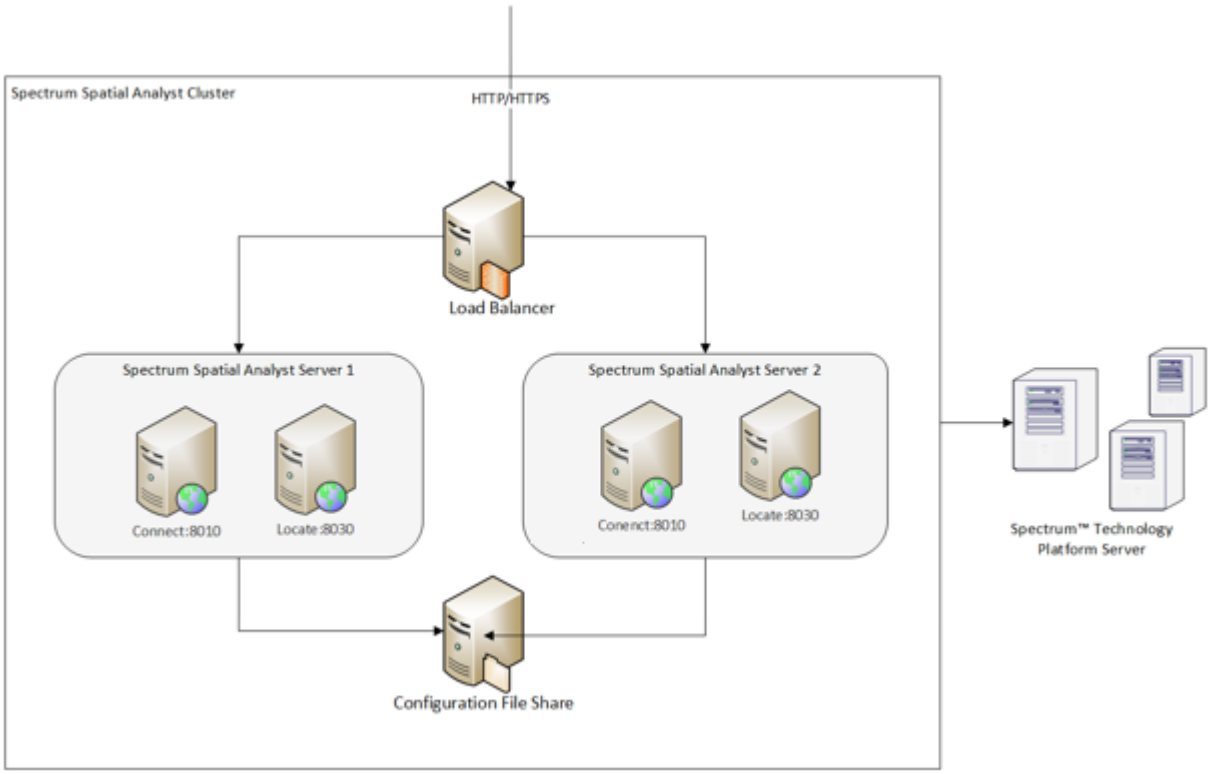
In a clustered environment, the processing is shared among two or more instances of the Spectrum Spatial Analyst servers. The deployment architecture includes a load balancer, a Spectrum Spatial Analyst cluster, Spectrum Technology Platform server, and a file share for customer configuration. All communication with Spectrum Spatial Analyst is through a load balancer. Instead of using the URL and port of Spectrum Spatial Analyst, clients use the URL and port of the load balancer. Consider using this approach if you require failover and high-volume, high- performance processing.

In a typical single server deployment Spectrum Spatial Analyst is comprised of two nodes:

1. Locate Service
2. Analyst

In order to achieve failover the best approach is to have two or more servers each of which contains two nodes. That way each node is on a separate server, hence if one server fails the other one still has a node available. The installer will deploy both the nodes on each server that you install Spectrum Spatial Analyst on.

The following diagram illustrates this architecture showing two servers for Spectrum Spatial Analyst:



Load Balancer

A load balancer acts as the “traffic cop” sitting in front of Spectrum Spatial Analyst servers and routing user requests across all servers, capable of fulfilling those requests.

The distributed Spectrum Spatial Analyst architecture is implemented behind the scenes. All the clients use a load balancer URL to access the Spectrum Spatial Analyst application. The load balancer URL consists of host name and port (typically port 80 for a distributed environment).

As the requests come, the load balancer identifies an appropriate Spectrum Spatial Analyst node to handle the request as per the configured load balancing algorithm. The request is then processed by an Spectrum Spatial Analyst node.

Nodes

A node in the Spectrum Spatial Analyst cluster is a single server in Spectrum Spatial Analyst installation. Each Spectrum Spatial Analyst installation has three types of nodes

- Locate Service
- Analyst

You need to configure separate routes for Admin console, Address Search and Analyst nodes.

A failover cluster is a group of independent computers that work together to increase the availability and scalability of clustered roles. The clustered servers (also called nodes) are connected by physical cables and by software. If one or more of the cluster nodes fail, other nodes begin to provide service.

Customer Configuration File Share

The configuration file share provides a folder for storing the Spectrum Spatial Analyst customer configuration. This folder holds the configuration data for map configuration, address search, branding and other Spectrum Spatial Analyst functionality. Whenever an administrator makes any changes to Spectrum Spatial Analyst, those are saved to configuration. All Spectrum Spatial Analyst nodes need to use a single configuration file share to ensure that each node has access to updated configuration.

The `shared.properties` file in the customer configuration folder will point to a single Spectrum Technology Platform server end point that is used by all Spectrum Spatial Analyst nodes. This end point may itself be a load balancer that sits in front of the Spectrum Technology Platform.

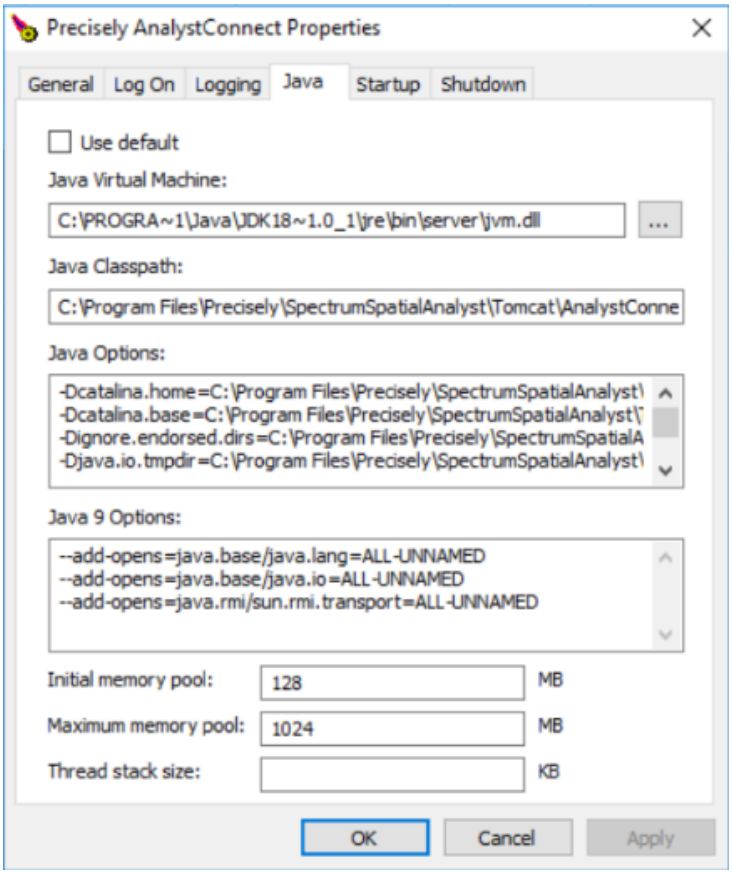
Customer configuration setup for Windows

You need to configure each Spectrum Spatial Analyst node to use the common customer configuration file share.

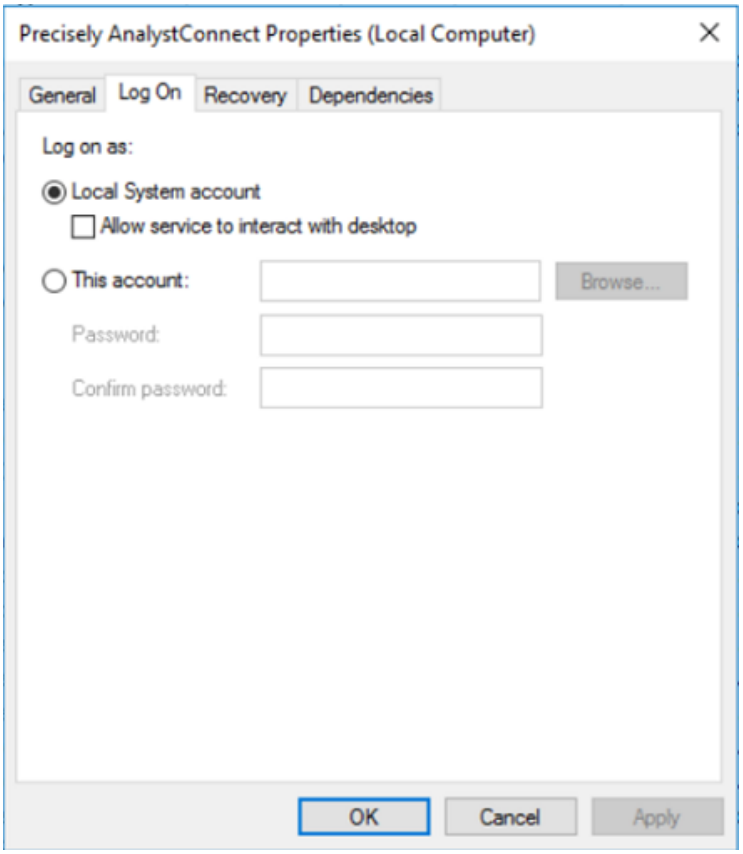
You need to execute the below steps for each of Spectrum Spatial Analyst nodes. The service names for Locate and Connect are **AnalystLocate** and **AnalystConnect**. In the notes below replace *SERVICE_NAME with the actual* service name of the node you are configuring.

The SSA_INSTALL_DIR denotes Spectrum Spatial Analyst base directory.

1. Stop the service- *<SERVICE_NAME>*
2. Open a command prompt as administrator
3. Change the directory to *"<SSA_INSTALL_DIR>\Tomcat9\<SERVICE_NAME>\bin"*
4. Run the command: *tomcat9w.exe //ES//<SERVICE_NAME>.* This will open a new window as shown below:



5. Click on the *Java* tab.
6. Modify the *"-Dstratus.customer.config.dir"* option in the *Java Options box* and set it to refer to the file share path to Spectrum Spatial Analyst customer configuration
7. You will also need to set the logon user to an account that has write access to the customer configuration folder. Usually the local system account cannot see network resources and you may need to create a domain account for this purpose. Click on the logon tab and modify the account to “this account” and provide the username and password of the account to be used.



8. Click Apply.
9. Click on the General tab and restart the service

Spectrum Spatial Analyst Cluster

Spectrum Spatial Analyst cluster is a collection of nodes using a file share holding the configuration. 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. An Spectrum Spatial Analyst cluster has to be organized into three sub- clusters of Admin console, Address search and Analyst.

Setting up a Spectrum Spatial Analyst Cluster

To set up a cluster, you need to install the (two or more) Spectrum Spatial Analyst servers one at a time. Each time you add a Spectrum Spatial Analyst server, you have to update the nodes to use the customer configuration file share.

Requirements:

- All servers that host Spectrum Spatial Analyst 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 Spectrum Spatial Analyst servers in a cluster must be of the same version, so be sure that the version you install is the same as the existing servers.

Installing Spectrum Spatial Analyst

If you haven't already installed, the first thing to do is to download and install latest Spectrum Spatial Analyst. For instructions, refer to the **Installing Spectrum Spatial Analyst through Wizard** on page 10.

File share setup for customer configuration

You need to configure Spectrum Spatial Analyst to use a common configuration. This ensures that configurations settings are managed across cluster. You need to copy the customer configuration directory *`customerconfigurations`* under the Spectrum Spatial Analyst installation directory to a central file share.

> **Note:** Ensure that the user account running Spectrum Spatial Analyst should have read/write access to configuration directory in file share.

Configure Spectrum Spatial Analyst to use the file share configuration

You need to configure each Spectrum Spatial Analyst node to use the common customer configuration file share.

You need to execute the below steps for each of Spectrum Spatial Analyst nodes. The service names for Locate and Connect are **AnalystLocate** and **AnalystConnect**. In the notes below replace *SERVICE_NAME with the actual* service name of the node you are configuring.

After copying the customer configuration to a shared path, you need to mount the shared path on the system where Spectrum Spatial Analyst is installed. Then, open 'setenv.sh' file in a text editor and update -Dstratus.customer.config.dir parameter value to the shared customer configuration directory path. You need to edit following files for a Spectrum Spatial Analyst instance:

The SSA_INSTALL_DIR denotes Spectrum Spatial Analyst base directory.

1. Stop the service- *<SERVICE_NAME>*
2. Open a command prompt as administrator
3. Change the directory to *"<SSA_INSTALL_DIR>\Tomcat9\<SERVICE_NAME>\bin"*
4. Run the command: <SERVICE_NAME>.exe //ES//<SERVICE_NAME>
5. Click on the *Java* tab.
6. Modify the *"-Dstratus.customer.config.dir"* option in the *Java Options box* and set it to refer to the file share path to Spectrum Spatial Analyst customer configuration.
7. Click on Apply.
8. Click on the general tab and restart the service

Installing a load balancer

You can use any appropriate load balancer. Please follow the procedures described in the load balancer's documentation when installing or configuring it.

You can cluster at the request or session-level.

Request level means that each request may go to a different node - this is the ideal since the traffic would be balanced across all nodes, and if a node goes down, the user has no idea. This requires session sharing between all nodes.

Sessionlevel clustering means if your application is one that requires a login or other forms of session-state, all the requests for a user session will go to a single node. If you configure session replication and one or more of your nodes go down, on their next request, the user will not be asked to log in again since their stored session is available on the node that serves the request. And you still get the benefits of load balancing across nodes, which allows us to scale out our application horizontally across many machines.

Setting up a Cluster for Analyst

Execute the instructions specified below to configure session sharing:

1. Shut down *AnalystConnect* service

2. Go to the directory: "<SSA_INSTALL_DIR>\Tomcat9\AnalystConnect\conf"
3. Use a cluster aware session manager
   a. Open file "*context.xml*" for editing.
   b. Uncomment the following section under *Context* element <*Manager className="org.apache.catalina.ha.session.DeltaManager" expireSessionsOnShutdown="false" notifyListenersOnReplication="true"/>*
4. Configure session sharing
   a. Open file "server.xml" for editing
   b. Append an attribute with name "jvmRoute" to <*Engine*> element. The value of attribute should be a unique name across all the Connect nodes.
   c. Uncomment <cluster> element
   d. Optionally you can change the receiver port for this node if there is a port specified in <Receiver> is already occupied. Edit the port under below element: <Receiver className="org.apache.catalina.tribes.transport.nio.NioReceiver" *port*="4110" autoBind="9" selectorTimeout="5000" maxThreads="6"/>
5. Configure cluster nodes & membership – you need to register all the other Connect nodes with this node. Refer to next section for details.

Setting up a Cluster for Analyst on Linux

Analyst cluster supports request level clustering i.e., requests can be distributed to any node in the cluster as the session is shared across all the nodes. Follow the instructions specified below to configure session sharing.

1. Shut down *AnalystConnect* service
2. Setting 'jvmRoute': The jvmRoute attribute of the Engine element allows the load balancer to match requests to the JVM currently responsible for updating the relevant session. It does this by appending the name of the JVM to the JSESSIONID of the request.
   - Go to the directory: "<SSA_INSTALL_DIR>\analyst\connect\conf\"
   - Open file "server.xml" for editing
   - Append an attribute with name "jvmRoute" to <Engine> element.
3. Use a cluster-aware session manager - Use DeltaManager, which provides cluster-aware session management, as well as additional capabilities. The attributes we have configured, "expireSessionsOnShutdown" and "notifyListenersOnReplication", have been configured to prevent a failing node from destroying sessions on other clustered nodes and explicitly notify the ClusterListeners when a session has been updated. Follow the below steps:
   - Go to the directory: "<SSA_INSTALL_DIR>/analyst/connect/conf/"

- Open file "*context.xml*" for editing.
- Add/Uncomment following section under Context element <Manager className="org.apache.catalina.ha.session.DeltaManager" expireSessionsOnShutdown="false" notifyListenersOnReplication="true"/>

4. Configure the cluster :
   - Go to the directory: "<SSA_INSTALL_DIR>/analyst/connect/conf/"
   - Open "*server.xml*" file for editing.
   - Uncomment <cluster> element
5. Currently, the analyst application is not fully distributable due to a third party dependency (javamelody). To make the application distributable, perform the below steps::
   - Go to the directory: "<SSA_INSTALL_DIR>\analyst\connect\conf\webapps\connect\WEB-INF\lib"
   - Delete *javamelody-core-1.45.0.jar* file for editing.
   - Start the <AnalystConnect> service

Configure Cluster Membership

You need to configure cluster membership by specifying all other nodes in the cluster. Be sure not to include a node in its own cluster membership. If this were done, the node would sync to itself as if it were a different node in the cluster.

A cluster member is specified by a host & port combinations as shown below:*<Member className="org.apache.catalina.tribes.membership.StaticMember" port="<PORT_NUMBER>" host="<HOST_NAME>"/>*

Execute the instruction given below:

1. Open file "server.xml" for editing.
2. Find *StaticMembershipInterceptor* and add all other members of the cluster.
3. 3. Be sure not to include a node in its own cluster membership. If this were done, the node would sync to itself as if it were a different node in the cluster.

   Note: Note: You need to configure the cluster membership on all the nodes when adding a new node so that every node is aware of each other.

The Cluster element in server.xml should look like this after changes:

```
<Cluster className="org.apache.catalina.ha.tcp.SimpleTcpCluster"
channelSendOptions="8" channelStartOptions="3">
<Channel className="org.apache.catalina.tribes.group.GroupChannel">
<Sender
```

```
className="org.apache.catalina.tribes.transport.ReplicationTransmitter">

 <Transport
className="org.apache.catalina.tribes.transport.nio.PooledParallelSender"/>
</Sender>
<Receiver className="org.apache.catalina.tribes.transport.nio.NioReceiver"
 address="node.example.com" port="4010" autoBind="9"
selectorTimeout="5000"
      maxThreads="6" />
<Interceptor
className="org.apache.catalina.tribes.group.interceptors.TcpPingInterceptor"
 staticOnly="true"/>
<Interceptor
className="org.apache.catalina.tribes.group.interceptors.TcpFailureDetector"/>
<Interceptor
className="org.apache.catalina.tribes.group.interceptors.MessageDispatch15Interceptor"/>
<Interceptor
className="org.apache.catalina.tribes.group.interceptors.StaticMembershipInterceptor">
<Member className="org.apache.catalina.tribes.membership.StaticMember"
       port="4010" host="152.144.219.25"
       uniqueId="{0,0,0,0,0,0,0,0,0,0,0,0,0,0,2,5}" />
<Member className="org.apache.catalina.tribes.membership.StaticMember"
       port="4010" host="152.144.219.110"
       uniqueId="{0,0,0,0,0,0,0,0,0,0,0,0,0,1,1,0}" />
       </Interceptor>
       </Channel>
<Valve className="org.apache.catalina.ha.tcp.ReplicationValve" filter=""/>
<Valve className="org.apache.catalina.ha.session.JvmRouteBinderValve"/>
<ClusterListener
className="org.apache.catalina.ha.session.JvmRouteSessionIDBinderListener"
 />
<ClusterListener
className="org.apache.catalina.ha.session.ClusterSessionListener"/>
</Cluster>
```

Note: Make sure ports are open and accessible from other Nodes. Check if there is any firewall installed.

Setting up a Cluster for Address Search

There are no changes required at the node level to support request level cluster as index-search is stateless. You should configure request level clustering for Address search nodes. However, you need to update the configuration with the URL for the Address search cluster so that Admin console and Analyst nodes use the cluster for address search. Follow the instructions specified below:

The Single Line Address /index-search Service URL and WSDL

indexsearch.singleLineSearch.url=http://loadbalancer.example.com:<port>/index-search/SingleLineAddressService

indexsearch.singleLineSearch.wsdl= **http://loadbalancer.example.com:<port>/index-search/**

SingleLineAddressService?wsdl

Adding a new node to the Spectrum Spatial Analyst cluster

1. Install Spectrum Spatial Analyst.
2. You should perform this step only if you are adding an Analyst node. Shutdown all the nodes in the Analyst cluster
3. Follow the steps mentioned in Setting up a Cluster for Analyst to set up a new node.
4. Update cluster membership for all the existing cluster nodes - Configure Cluster membership.

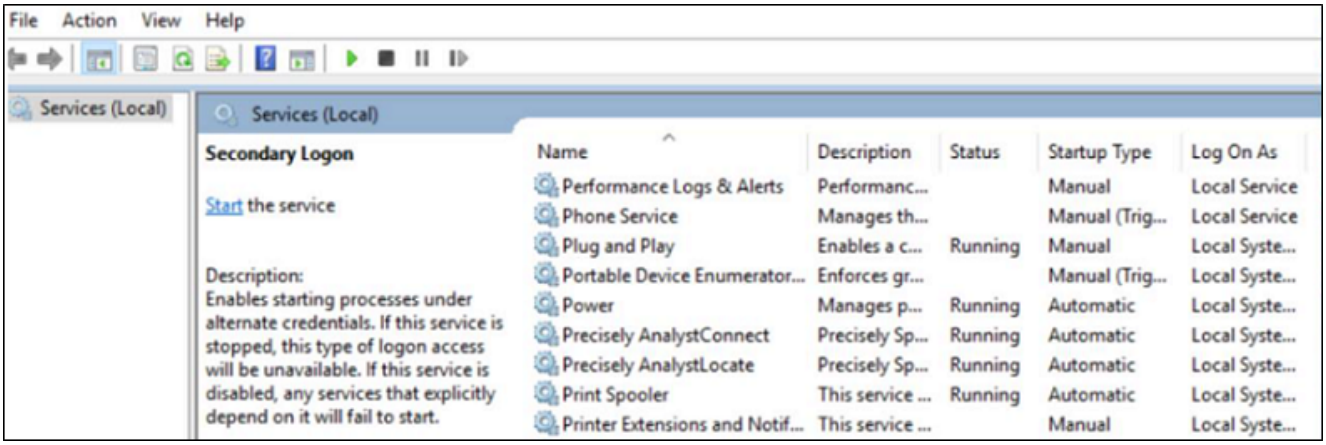
6 - Spectrum Spatial Analyst Services

In this section

Spectrum Spatial Analyst Windows Services

After successful installation, there are two services available which can be seen in `services.msc`, and started as shown in figure below:

Figure 22: Spectrum Spatial Analyst Services



You can browse to the following Spectrum Spatial Analyst web applications:

- Spectrum Spatial Analyst- `http://<server>:<port>/connect/analyst`

You can sign in using the built-in Spectrum account named "admin" (where `server` and `port number` are the values you have specified during the installation).

Spectrum Spatial Analyst Linux Services

After successful installation, there are two services available which can be seen by running the following commands from terminal window:

```
ps -ef | grep tomcat
```

You can browse to the following Spectrum Spatial Analyst web applications:

- Spectrum Spatial Analyst- `http://<server>:<port>/connect/analyst`

  For example, `http://UbUntU-x64:8010/connect/analyst/`

You can sign in using the built-in Spectrum account named "admin" (where `server` and `port number` are the values you have specified during the installation).

7 - Uninstalling or Removing Spectrum Spatial Analyst

In this section

Uninstalling Add/Remove Programs

Before uninstalling any product, back up any files you may need in the future.

To uninstall Spectrum Spatial Analyst:

1. Use the Windows Add/Remove Programs in control panel to uninstall Spectrum Spatial Analyst from your machine.
2. When prompted select **Yes** to un-install Spectrum Spatial Analyst from your machine.

   Note: While uninstalling, the installer will create a back-up of customerconfigurations at `C:\Backup_CustomerConfigs folder`.

Uninstalling via Wizard

Before uninstalling any product, back up any files you may need in the future.

Uninstall via Wizard

To uninstall Spectrum Spatial Analyst via wizard move to the location where installer is located.

1. Run the following command from the terminal window:

   `./Analyst.bin`

   where, `Analyst.bin` is the file name of the installer.
   This command will bring up the **Configure Spectrum Spatial Analyst** dialog box. Uninstall Analyst from your machine.

2. Select **Uninstall Product** option and click **Next** button. The uninstallation process starts and removes Spectrum Spatial Analyst from your machine.

   Note: While uninstalling, the installer will create a back-up of customer configurations.

Uninstall via Console

To uninstall Spectrum Spatial Analyst, run the following command from the terminal window

1. Ensure you are a super user **sudo –s**
2. Navigate to root and enter:

```
cd /root
```

3. List folders by using command

```
ls -a
```

   You will see a file **Change Spectrum Spatial Analyst Installation**)

4. Run the Uninstaller by entering following command

```
./Change\ Spectrum\ Spatial\ Analyst\ Installation
```

8 - Frequently Asked Questions

In this section

How to validate Tomcat Services in Spectrum Spatial Analyst?

This section validates if tomcat services are up and running in Spectrum Spatial Analyst.

You can validate if the services are running by using-

```
netstat –peanut|grep 8010
```

This is a port **specific to the Spectrum Spatial Analyst end user application Analyst Connect** and if returns values you can be sure it is running.

```
tcp6 0 0 :::8010 :::* LISTEN 0 330448 29941/java
```

To start a service you use browse to the folder `/analyst/connect/bin`

```
sudo ./catalina.sh --help
```

It would show you all possible options please note it is double hyphen.

```
sudo ./catalina.sh stop
```

This would stop the service.

```
sudo ./catalina.sh start
```

This would start the service.

> **Note:** You can repeat the process for the Locate (aka index-search) services. Also, please ensure that the locate service is always the first service while starting. Note that the locate service is on port 8030.

How to configure Connector while setting SSL

How to configure SSL support on Tomcat?

Spectrum Spatial Analyst uses Tomcat as a server. The Tomcat version has been upgraded to 9.

To define SSL connector, use Tomcat 9 style configuration.

You need to edit server.xml file under `SpectrumSpatialAnalyst\Tomcat\AnalystConnect\conf` directory.

```
 port="8443"
 protocol="org.apache.coyote.http11.Http11NioProtocol"
 connectionTimeout="20000" URIEncoding="UTF-8" compression="on"
 compressionMinSize="512"

compressableMimeType="text/html,text/xml,text/plain,text/css,application/javascript,application/json,text/json-comment-filtered"

  maxThreads="200" SSLEnabled="true">
 <SSLHostConfig protocols="TLSv1.2">
  <Certificate certificateKeystoreFile="D:\SSA\certificates\tomcat.p12"

  certificateKeystorePassword="changeit"/>
 </SSLHostConfig>
```

Note: You need to replace the bold values with the actual values in your environment.

How to install Java for Spectrum Spatial Analyst?

To install JAVA, follow the steps given below:

```
sudo add-apt-repository ppa:webupd8team/java
sudo apt-get update
sudo apt-get install oracle-java8-installer
```

Setting Java home variable for Spectrum Spatial Analyst

Set the below commands from the terminal window `/etc/bash.bashrc`

```
JAVA_ROOT=/usr/lib/jvm/java-8-oracle
export JAVA_ROOT

JAVA_HOME=$JAVA_ROOT
export JAVA_HOME

# PATH must be set to point to the JDK area
PATH=$JAVA_ROOT/bin:$PATH
export PATH

update-alternatives --install /usr/bin/java java
/usr/lib/jvm/java-8-oracle/bin/java 100
update-alternatives --install /usr/bin/javac javac
/usr/lib/jvm/java-8-oracle/bin/javac 100
```

and run the following command from the same terminal-

```
source /etc/bash.bashrc
```

How to start Spectrum Spatial Analyst Services?

To start Spectrum Spatial Analyst service, follow the steps given below:

Start tomcat for locate (index-search) service

```
cd /analyst/index-search/bin/
sudo ./startup.sh
```

Start tomcat for the Spectrum Spatial Analyst end user application Analyst Connect

```
cd /analyst/connect/bin/
sudo ./startup.sh
```

Now check the respective URLs in browser-

```
http://<analyst-server-ip-address>:8010/connect/<tenant>/
```

How to stop Spectrum Spatial Analyst services?

To stop Spectrum Spatial Analyst service, follow the steps given below:

Stop Spectrum Spatial Analyst for the locate (index-search) service

```
/analyst/index-search/bin/
sudo ./shutdown.sh
```

Stop Spectrum Spatial Analyst for the Spectrum Spatial Analyst end user application Analyst Connect

```
cd /analyst/connect/bin/
sudo ./shutdown.sh
```

9 - Appendix

In this section

Appendix A- Configuring HTTPS Communication for Spectrum Spatial Analyst

This appendix describes how to configure Spectrum Spatial Analyst to use HTTPS communications for end users browsing to the application. Communications between Spectrum Spatial Analyst and the back-end Spectrum Services can remain on HTTP if desired. If these are to be configured for HTTPS also then please see **Appendix B- Configuring HTTPS Communication with Spectrum Spatial** on page 62.

The default supported channel for an initial Spectrum Spatial Analyst installation is HTTP, but you can configure Spectrum Spatial Analyst to use HTTPS if you are concerned about security. This ensures that the data being sent is encrypted by one side, transmitted, and then decrypted by the other side before processing.

To configure Spectrum Spatial Analyst to use HTTPS communication, you first need to successfully install it and then follow these steps:

1. Prepare a Keystore
2. Import your site certificates
3. Establish Trust with certificate authority
4. Configure the Spectrum Spatial Analyst Tomcat to use the Keystore
5. Test the Spectrum Spatial Analyst application

1. Prepare a Keystore

The first step to enabling SSL on Spectrum Spatial Analyst is to prepare a keystore. The keystore contains the keys that the Spectrum Spatial Analyst Tomcat uses for SSL transactions. Spectrum Spatial Analyst Tomcat supports only these keystore formats: `JKS, PKCS11 or PKCS12`. If you already have a keystore – `JKS, p12, pfx` file, then you can jump to step 3 - **Establish trust with certificate authority**. Otherwise, you need to create a certificate and get it signed by a certificate authority.

Create a new Keystore

> **Note:** You have to replace the `<placeholders>` while running the commands.

Open a command line and set JAVA_HOME & PATH environment properties so that you can use keytool commands seamlessly:

```
set JAVA_HOME=C:\Program Files\Java\jdk1.8.0_162
set PATH=%JAVA_HOME%\bin;%PATH%
```

Now, execute the following command, it generates a key pair and certificate directly into a JKS keystore-

```
keytool -genkeypair -alias <your_alias> -keystore <ssa_keystore_name.p12>
 -storetype pkcs12  -keyalg RSA -validity 360 -keysize 2048  -sigalg
SHA256withRSA
```

Enter the name of the server host in the ‘First name and Last name’ field.

You now have the minimal requirements to run a HTTPS connection and could proceed directly to configure an SSL connector. However, the browser will not trust the certificate you have generated and prompts the user to this effect. While what you have at this point is often sufficient for testing, most public sites need a trusted certificate, which is demonstrated in the section generating a Certificate Signing Request (CSR) with the Key tool.

Create a Certificate Signing Request

Substitute the values you chose earlier for the <placeholders>

```
keytool -certreq -alias <server_name> -keystore <ssa_keystore_name> -file
 <your_certificate_name>.csr
```

The Keytool will create a file called `your_certificate_name.csr`, which you can submit to the Certificate Authority you've chosen via the process they provide on their website. Using this file, they will generate a custom certificate for your server, which you can download according to the instructions they provide on their website.

2. Import your site Certificates

Once you've downloaded both your own Certificate and the Root certificate provided by your Certificate Authority, import them into your keystore with the commands specified in next sections.

Install your site Certificate

To import a certificate into a Java keystore issue the following command:

```
keytool -import -alias <server_name> -keystore <ssa_keystore_name> -file
 <certificate_file_name>
```

3. Establish trust with certificate authority

Install the Root Certificate

```
keytool -import -alias <root_ca_certificate_name> -trustcacerts -file
<root_ca_certificate_file_name> -keystore
"%JAVA_HOME%\jre\lib\security\cacerts"
```

You can verify if the certificate was imported correctly by issuing this command:

```
keytool -list -v -keystore "%JAVA_HOME%\jre\lib\security\cacerts" -alias
 <root_ca_certificate_alias>
```

Install the Intermediate Certificate file

This is an optional step. If your certificate authority provided an intermediate certificate file, you will need to install it here by typing the following command:

```
keytool -import -alias <intermediate_ca_certificate_name> -trustcacerts
 -file <intermediate_ca_certificate_file_name> -keystore
"%JAVA_HOME%\jre\lib\security\cacerts"
```

4. Configuring Tomcat for using the keystore file

Open your Spectrum Spatial Analyst installation directory and go to: `<installation directory>\Tomcat`, you should find two tomcat installation as shown below:

- `AnalystConnect`
- `AnalystLocate`

The following section describes changes for configuring HTTPS for AnalystConnect tomcat only, you should follow the same steps if you want to configure Address search service on HTTPs. You have to ensure that you use unique values of “port” for each configuration, otherwise tomcat will fail to start.

First you need to stop `PreciselyAnalystConnectService` . After that you need to go to the directory <installation directory>\Tomcat\ AnalystConnect\conf, if you want to set HTTPs communication for Connect. Open the server.xml file.

Uncomment this section and provide values for port, certificateKeystoreFile and certificateKeystorePassword.

```
<Connector port="8443"
protocol="org.apache.coyote.http11.Http11NioProtocol"
connectionTimeout="20000"
compression="on" compressionMinSize="512"
compressableMimeType="text/html,text/xml,text/plain,text/css,
application/javascript,application/json,text/json-comment-filtered"
maxThreads="200" SSLEnabled="true">
<SSLHostConfig protocols="TLSv1.2">
<Certificate certificateKeystoreFile="conf/server.p12"
certificateKeystorePassword="changeit" type="RSA"/>
</SSLHostConfig>
</Connector>
```

> **Note:** Provide values for **port, certificateKeystoreFile**, **certificateKeystorePassword**.
>
> The same can be applied to the `AnalystLocate` folder to configure that for HTTPS.

At the end restart AnalystConnect service.

5. Let’s test it!

Start Tomcat service and try to access-

```
https://YOUR_SSA_HOST_NAME:8443/connect/analyst.
```

You will see the Spectrum Spatial Analyst login page.

Appendix B- Configuring HTTPS Communication with Spectrum Spatial

This appendix describes how to configure Spectrum Spatial Analyst to use HTTPS communications whilst communicating with the backend Spectrum Spatial instance. As a prerequisite, the Spectrum Platform must already be configured to use HTTPS. If this has not yet been done please see the relevant sections in the Spectrum Spatial Guide on configuring HTTPS for Spectrum and the Map Uploader.

By default, Spectrum Spatial Analyst uses the HTTP channel for communication with Spectrum Spatial web services. You can configure Spectrum Spatial Analyst to use HTTPS if you want to secure the network communications between Analyst and Spectrum Spatial. The steps are given below:

1. Stop Spectrum Spatial Analyst services.
2. Open `shared.properties` file in `<AnalystLocation>/customerconfigurations/global`directory.
3. Ensure that all the URLs having Spectrum Spatial server host name starts with https.

You have to import the CA certificate into the Java trust store if Spectrum Spatial Server is using a Self-signed certificate. Spectrum Spatial Analyst uses the default Java trust store located in `<JAVA_HOME%>/jre/lib/security/cacerts`.You can use the Java keytool utility to import CA Certificate into the trust store as shown below:

1. keytool -importcert-alias CA -file cacert.der -keystore cacerts
2. Enter password for the cacerts. The default password is `changeit`
3. Verify the imported CA certificate by executing this command:

```
keytool -list -v -keystore "%JAVA_HOME%/jre/lib/security/cacerts"
-alias (alias value given in step 1)
```

Now, restart the Spectrum Spatial Analyst services.

Appendix C - Installing SSL Certificate for WMS

This appendix describes how to install SSL certificate for web map service (WMS).

If you are adding a HTTPs WMS URL which uses a SSL certificate that is not trusted by Spectrum Spatial Analyst server, you need to install the root certificate or any intermediate certificates for corresponding certificate authority in Spectrum Spatial Analyst trust store. Spectrum Spatial Analyst server by default makes use of default JDK trust store file *cacerts* found in JDK directory.

Perform the steps given below to import the certificates.

1. Get a root/intermediately certificates from your certificate authority and save it. For example, you can save it as `Example_SSL_CA_G2.cer`.
2. Backup `cacerts` keystore file in `%JAVA_HOME%/jre/lib/security`.
3. Open a Command prompt as administrator.
4. Import certificate into `cacerts`. Now, execute below command after replacing the values in <>:

```
"%JAVA_HOME%/bin/keytool" -import -alias <alias_for_CA_certificate>
-keystore <path_to_cacerts> -trustcacerts -file
<path_to_root_certificate>
```

   A sample command looks like:

```
"%JAVA_HOME%/bin/keytool" -import
        -alias Example_SSL_CA_G2 -keystore
"%JAVA_HOME%/jre/lib/security/cacerts" -trustcacerts
        -file "F:/SSL/Example_SSL_CA_G2.cer"
```

5. Enter the password as `changeit`.
6. A success message is displayed after you press **Enter** key - "*Certificate was added to keystore*".
7. Restart *AnalystConnect*.
8. Now, add the WMS map to Spectrum Spatial Analyst map config.

Appendix D - Setting up Proxy Server Configuration for Spectrum Spatial Analyst

This appendix describes how to setup proxy server configuration for Spectrum Spatial Analyst.

In some cases Spectrum Spatial Analyst needs to make calls to external services from the server. This may include:

- Printing base maps from Bing, OSM Europa
- Making calls to Bing Location Services
- Making calls to test tile and WMS maps
- Authenticated WMS maps

The proxy server details need to be configured in the JAVA Options of `AnalystConnect` service when a proxy server is used at a customer site for outbound internet access. This allows the proxy to be passed as a system parameter to java processes and the local machine, where the Spatial service is installed and configured for No Proxy use.

Prerequisite

- Ensure that there is a network connectivity between Spectrum Spatial Analyst machine and the Internet proxy server.
- You must allow list the URL for external service endpoints at Proxy server. For example, to use Bing Geocoder search in Spectrum Spatial Analyst, proxy should allow internet access for the URL https://dev.virtualearth.net.

Follow the steps given below to set up an internet proxy server:

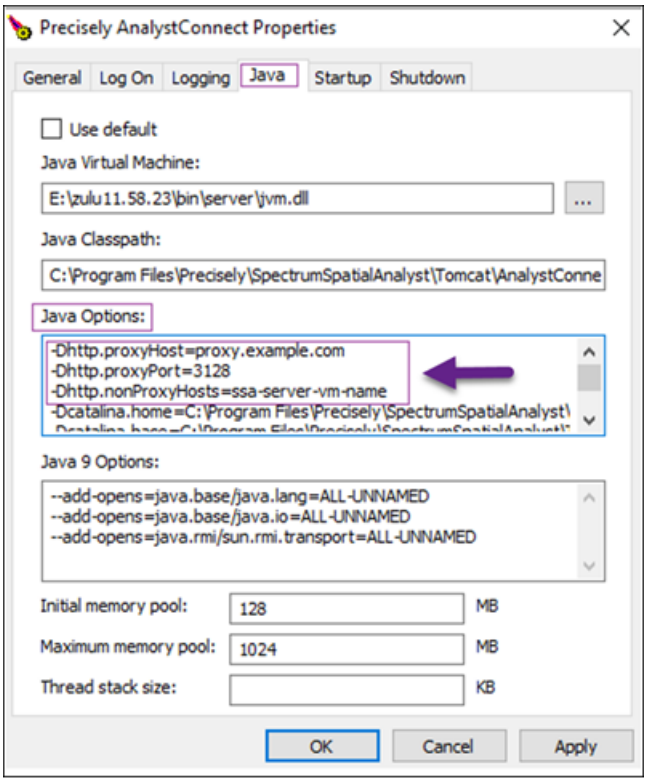
1. Stop the `AnalystConnect` service.
2. At the command prompt, go to Spectrum Spatial Analyst bin directory by executing the following command:

   ```
   cd “C:\Program
   Files\Precisely\SpectrumSpatialAnalyst\Tomcat\AnalystConnect\bin”
   ```

3. Type the following command to launch `AnalystConnect` and press enter:

   ```
   tomcat9w.exe //ES//AnalystConnect
   ```

4. A server “Account Control” dialog appears asking for permission. .
5. Click **Yes**.
6. The Precisely AnalaystConnect Properties dialog opens.



7. Take a backup of all text under the `Java Options` text box.
8. Add the following to the end/begining of the `Java Options`. The values should match the proxy server settings for your environment. Please note that the proxy server name is case sensitive.

```
-Dhttp.proxyHost=proxy.example.com // Proxy server host name
-Dhttp.proxyPort=3128 // Proxy server port
     -Dhttp.nonProxyHosts=ssa-server-vm-name // Server where Spectrum
 Spatial Analyst is deployed
```

9. Optionally, use **https** if the proxy server is **https**. You can also add proxy authentication, if needed. For example:

```
-Dhttp.proxyUser=username
-Dhttp.proxyPassword=userspassword
```

10. Ensure that the value of `nonProxyHosts` matches with the host name given for `spatialserver.rest.baseurl` property in `C:\Program Files\Precisely\SpectrumSpatialAnalyst\customerconfigurations\_global_\shared.properties`.

    Note: Providing only the host name is enough, the port no is not required.

11. Start the `AnalystConnect` service.

Appendix E - Implementing Spectrum Single Sign-on (SSO)

Spectrum Spatial Analyst now provides single sign-on (SSO) leveraging the Spectrum Technology Platform SSO implementation and Active Directory Federation Services (AD FS). SSO allows logged-in users to access Spectrum Spatial Analyst and Spectrum Technology Platform Web-based services with one set of credentials. AD FS allows the sharing of trusted party information, seamlessly, using cookie-based authentication.

For more information refer to **Implementing Spectrum Single Sign-on (SSO)** section in Spectrum Technology Platform administration.

Configuration assumptions and SSO deployment checks

The system administrator must complete the following tasks before enabling SSO in Spectrum Spatial Analyst and make the necessary security changes.

Ensure that the system administrator has completed-

- the deployment of the ADFS server
- SSO configuration in Spectrum Technology Platform

Server configuration for SSO support

Prerequisites

Your Spectrum Spatial Analyst server must be HTTPS enabled before setting up the configurations in this section. Ensure that following two steps are completed:

1. HTTPS communication configuration between Spectrum Spatial Analyst and Spectrum spatial, and
2. Configuration of HTTPS communication with Spectrum Spatial Analyst

If you are new to Spectrum Spatial Analyst, it may be helpful to review these topics:

- **Appendix A- Configuring HTTPS Communication for Spectrum Spatial Analyst** on page 59
- **Appendix B- Configuring HTTPS Communication with Spectrum Spatial** on page 62

Set Analyst Login URL

You need to configure the SSO login URL for Analyst in the following file using a text editor -

```
<serverinstallationlocation>customerconfigurations/_global_/controller.properties
```

Please amend the entry for the `sso.start.url` as follows:

```
sso.start.url=#ognl("@spectrum_server/sso-integration/?externalapp=y&relaystate="
+requestAttributes["original_request_uri"]
+"/security-check?TargetResource="
+urlEncode(requestAttributes["original_request_uri"])
+insertLocale("&"))
```

> **Note:** The entry for `slo.start.url` should be left unchanged.

Enabling Guest access

If you wish to enable guest access, ensure that you have completed the configuration - Adding a Guest Role and User for Guest Access

Managing Idle Session timeout

Spectrum Spatial Analyst, Spectrum platform and ADFS has separate session management. In Spectrum Spatial Analyst you can define the session inactivity period in the Settings tab of the administration console.

> **Note:** For setting the inactivity period on Spectrum platform, refer to **Manage AD FS session timeout properties**. As a best practice, it is recommend to define all of these properties, with the same timeout value.

Managing and mapping roles

For creating roles, please refer to User and Roles used by Spectrum Spatial Analyst in Spatial Manager guide. After you have created the roles in Spectrum, you may need to map the roles to AD groups.

> **Note:** For more details refer to **Mapping LDAP/SSO roles** to Spectrum Technology Platform roles in Spectrum administration guide.

1700 District Ave Ste 300
Burlington MA 01803-5231
USA

www.precisely.com