

LizardTech

Express Server 9.5

ExpressZip Manual

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Preface

The *ExpressZip Manual* is written for geographic information system (GIS) professionals that want to view and export Express Server imagery with the ExpressZip web application. Additionally, the manual includes information for developers that want to compile and modify the ExpressZip application from the source code. The guide assumes basic knowledge of GIS, including base maps, map projections, and shapefiles.

Table of Contents

Preface	iii
Table of Contents	iv
Chapter 1: Introduction	1
Product Overview	1
Accessing ExpressZip	1
The ExpressZip User Interface	2
Security Disclaimer	3
Chapter 2: Configuring ExpressZip	4
Configuring ExpressZip Overview	4
The Export Directory	4
The Base Layer	6
Job Size Limits	7
Mail Notifications	8
The Thread Pool	9
Restarting Tomcat	10
Chapter 3: Using ExpressZip	11
Using Express Zip Overview	11
Step 1: Layer Selection	11
Step 2: Region Selection	13
Step 3: Job Export	15
Step 4: Job Status and Download	18
Chapter 4: Developing for ExpressZip	20
Developing for ExpressZip Overview	20
Building ExpressZip	20
Deploying ExpressZip	21

Chapter 1: Introduction

Product Overview.....	1
Accessing ExpressZip.....	1
The ExpressZip User Interface.....	2
Security Disclaimer.....	3

Product Overview

ExpressZip is an open-source web application that you can use to view and export Express Server imagery. The following list describes some of the features of ExpressZip:

- Easily view Express Server imagery.
- Use filters and location search to find imagery.
- Select multiple layers that you want to export.
- Select an area of interest that you want to export.
- Use shapefiles to select a region that you want to export.
- Create image tiles.
- Select between multiple raster formats including MrSID Generations 2, 3, and 4, JPEG, GeoTIFF, PNG, GIF, BMP, and LiDAR formats MrSID, LAS, and LAZ.

You are free to redistribute the application and to modify the source code to suit your needs. For more information on modifying the source code, see [*Developing for ExpressZip*](#) on page 20.

Accessing ExpressZip

By default, you can access ExpressZip via HTTPS and HTTP. Both are protocols for communication over a network, however, HTTPS adds encryption for an increased layer of security.

To access ExpressZip, open a web browser and navigate to one of the following URLs:

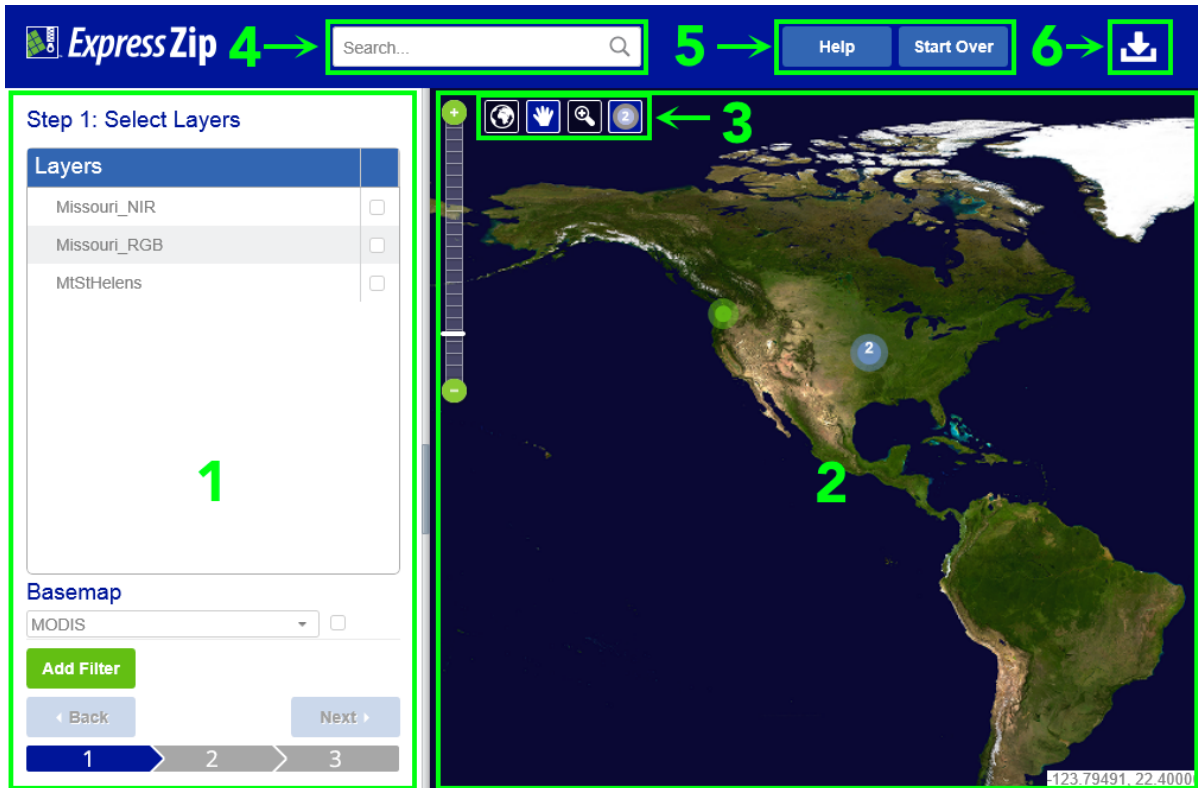
- For HTTP:
`http://<Express Server name>:<http port>/ExpressZip`
- For HTTPS:
`https://<Express Server name>:<https port>/ExpressZip`

The HTTPS port number is configured during installation. By default, the port number for HTTP is 8080 and the HTTPS port number is 8443. For example, to access ExpressZip via HTTPS, you might enter the following URL:

```
https://local-express-server:8443/ExpressZip
```

The ExpressZip User Interface

The following figure shows the ExpressZip user interface:



1. **Options pane.** View layer selection options, area selection options, and export options.
2. **Preview pane.** View an interactive map that you can use to preview layers and select areas of interest.
3. **Preview controls.** Use controls to manipulate the map in the **Preview** pane. You can pan around the map, zoom, and draw a region of interest.
4. **Search bar.** Search for a location by name, address, or latitude and longitude. The map in the **Preview** pane pans to the result of a search.
5. **Menu bar.** Open the ExpressZip Manual or reset the current instance of ExpressZip to the default map and options.
6. **Job Manager.** View the status of submitted jobs, download completed jobs, and view log files for completed jobs.

Security Disclaimer

For ease of use and for simple extensibility, the ExpressZip application does not require user authentication. If your instance of the ExpressZip application is accessible over the internet or a public network, you should be aware of the following potential security concerns:

- Any image export jobs that you submit are accessible to all of the users of the application. This may be an issue if the region of interest that you want to export is of a sensitive nature.
- Any user can access the **Job Manager** to remove current and existing jobs, even jobs submitted by other users.

Chapter 2: Configuring ExpressZip

Configuring ExpressZip Overview.....	4
The Export Directory.....	4
The Base Layer.....	6
Job Size Limits.....	7
Mail Notifications.....	8
The Thread Pool.....	9
Restarting Tomcat.....	10

Configuring ExpressZip Overview

You can configure ExpressZip to complete the following tasks:

- Change the export directory.
- Add a custom base layer.
- Change the default base layer.
- Change the Express Server WMS host.
- Set limits on job size.
- Enable mail notifications.

The main ExpressZip configuration file is stored in the following location:

```
<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties
```

*NOTE: When you change the configuration of ExpressZip, restart Tomcat, then click **IISReset** on the **Status** page of the ExpressServer console for the changes to take effect.*

The Export Directory

When you submit an export job in ExpressZip, the application stores files related to the job in the export directory. The export directory contains the following files:

- Zip files that contain the images created by each export job and a log file of each job.
- Temporary files.

By default, the export directory is stored in the following location:

```
<Installation Directory>\ImageServer\var\export_dir\
```

Clearing the Export Directory

As you submit more jobs to ExpressZip, the size of the export directory grows. To minimize the space used by the export directory, you may want to periodically remove files from the export directory.

You can delete files from the export directory manually, or you can delete files from the export directory from the ExpressZip interface. Remove a job from the **Job Manager** to delete the image files created for the job. For more information on jobs and removing a job, see [Step 4: Job Status and Download](#) on page 18.

*NOTE: When you restart Tomcat, the list of jobs in the **Job Manager** is cleared. However, the files created by past jobs are not deleted from the export directory. To view files from past jobs, click **Browse Archived Jobs** in the **Job Manager**. To delete those files, open the export directory in a file manager.*

Changing the Export Directory

To alleviate space constraints, you may specify another directory as the export directory. For example, you may choose to store the export directory on an external drive.

To change the export directory, complete the following steps:

1. Ensure that Express Server has the correct permissions to access the directory. For more information on permissions, see the *Express Server User Manual*.
2. Open the following file in a text editor with administrator or root permissions:
`<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties`
3. Edit the value of the `exportdirectory` line. For example, you might enter the following line:
`exportdirectory=D:\Data\export_directory`
4. Save the file.
5. Open the following file in a text editor with administrator or root permissions:
`<Installation Directory>\ImageServer\Tomcat\conf\server.xml`
6. Edit the value of the `Context docBase` line. For example, you might enter the following line:
`<Context docBase="D:\Data\export_directory" path="/exportdir"/>`
7. Save the file.
8. Restart Tomcat. For more information, see [Restarting Tomcat](#) on page 10.
9. Click **IISReset** on the **Status** page of the ExpressServer console.

The Base Layer

The base layer provides geographic context for your imagery. It is the default image layer that appears in the **Preview** pane when you open ExpressZip. You can select from multiple base layers in the **Options** pane.

By default, the base layer is set to the MODIS imagery that ships with Express Server. To add more base layers or to change the default base layer, edit the **ExpressZip.properties** file.

Adding a Custom Base Layer

You can add a custom base layer to the list of available base layers in the **Options** pane.

To add a custom base layer, complete the following steps:

1. Open the Express Server Manager and add the custom base layer as an image catalog.
2. Publish the image catalog.
3. Open the following file in a text editor with administrator or root privileges:
`<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties`
4. Edit the value of the `availableLocalBaseLayers` line. For example, you might enter the following line:
`availableLocalBaseLayers=MODIS,CustomWORLD`
5. Save the file.
6. Restart Tomcat. For more information, see [Restarting Tomcat](#) on page 10.
7. Click **IISReset** on the **Status** page of the ExpressServer console.

*NOTE: The custom base layer must be a single image catalog. When a layer is displayed as a base layer, it is excluded from the list of available layers in the **Options** pane. If you add a catalog group as a base layer, all of the image catalogs in the group are treated as a single image catalog and excluded from the list of available layers.*

Changing the Default Base Layer

By default, you can change the base layer to one of the following available layers:

- MODIS
- Open Street Map
- Google Maps
- OpenLayers WMS

If you want to set a custom base layer as the default, first add the base layer to the list of available layers. If for any reason ExpressZip cannot render the default base layer, it attempts to render the next base layer in the list of available base layers.

To change the default base layer, complete the following steps:

1. Open the following file in a text editor with administrator or root privileges:
`<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties`
2. Edit the value of the `defaultBaseLayerName` line. For example, you might enter the following line:
`defaultBaseLayerName="Open Street Map"`
3. Save the file.
4. Restart Tomcat. For more information, see [Restarting Tomcat](#) on page 10.
5. Click **IISReset** on the **Status** page of the ExpressServer console.

Job Size Limits

ExpressZip users can submit jobs that will generate enormous amounts of data—especially when working with LiDAR data sets.

You can reduce the maximum size of data for a job by setting limits on the number of tiles a job can include and the maximum amount of data it will be allowed to produce.

When a user attempts to submit a job that exceeds either or both of these limits, the job will not be processed and the invalid entry will be indicated with a red asterisk.

Setting Job Limits

*NOTE: If entries for **maxTiles** and **maxJobSize** do not exist in the **ExpressZip.properties** file, add them on separate lines within the file.*

To change job limits:

1. Open the following file in a text editor with administrator or root permissions:
`<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties`
2. Edit the value of the `maxTiles` line. The default is 10000 tiles. For example, you might enter the following:
`maxTiles=10000`
3. Edit the value of the `maxJobSize` line. This value is expressed in bytes, with the default being 10737418240 (10 GB). For example, you might enter the following:
`maxJobSize=4000000`
4. Save the file.
5. Restart Tomcat. For more information, see [Restarting Tomcat](#) on page 10.
6. Click **IISReset** on the **Status** page of the ExpressServer console.

Mail Notifications

When an image export job finishes, ExpressZip can send mail notifications to the user that submitted the job. By default, mail notifications are disabled. To set up mail notifications, complete the following steps:

1. Open the following file in a text editor with administrator or root privileges:
`<Installation Directory>\ImageServer\Tomcat\conf\context.xml`
2. Find the `<Resource>` element:
`<Resource name="mail/Session" auth="Container"
type="javax.mail.Session" />`

3. Change the <Resource> element to the following line:

```
<Resource name="mail/Session" auth="Container"  
type="javax.mail.Session" mail.smtp.host="SMTP_Server_name" />
```

(Replace SMTP_Server_name with the name of your SMTP server.)

*NOTE: To configure additional options for the mail server, including a custom port number, see the JavaMail documentation at the following URL:
<https://javamail.java.net/nonav/docs/api>*

4. Save the file.
5. Restart Tomcat. For more information, see *Restarting Tomcat* on page 10.
6. Click **IISReset** on the **Status** page of the ExpressServer console.

NOTE: On Linux, the ExpressZip application may display an option to enter an email address for an export job even though email notifications have not been configured. This occurs when ExpressZip detects that there is an existing mail server on the machine that hosts the Express Server. In this case, ExpressZip attempts to use the existing mail server, but the mail notifications may not be delivered successfully.

The Thread Pool

ExpressZip uses multiple threads to handle multiple job requests concurrently. By default, ExpressZip uses two threads. Each thread can run one job at a time. On machines with limited system resources, you may want to decrease the number of threads to one.

NOTE: If you increase the number of threads, you risk encountering out of memory issues. The application may run out of memory because Tomcat has a fixed amount of memory assigned.

To configure the number of threads used by ExpressZip, complete the following steps:

1. Open the following file in a text editor with administrator or root permissions:

```
<Installation Directory>\ImageServer\Tomcat\conf\ExpressZip.properties
```

2. Edit the value of the `threadpoolsize` line. For example, you might enter the following line:

```
threadpoolsize=1
```

3. Save the file.

4. Restart Tomcat. For more information, see *Restarting Tomcat* on page 10.
5. Click **IISReset** on the **Status** page of the ExpressServer console.

Restarting Tomcat

ExpressZip runs as a web application in Tomcat. Tomcat is a web server and servlet container that hosts web applications like ExpressZip and the Express Server Manager. When you change the configuration for ExpressZip, you must restart Tomcat for the changes to take effect.

Restarting Tomcat on Windows

On Windows, Tomcat runs as a service called the LizardTech Express Server Tomcat service, also known as `lttpomcat7`. To restart the service, complete the following steps:

1. Open the Windows **Services** utility.
2. Find the LizardTech Express Server Tomcat service.
3. Right-click on the service and click **Restart**.

Restarting Tomcat on Linux

On Linux, Tomcat runs as a daemon called `lttpomd`. To restart the daemon, complete the following steps:

1. Open a terminal.
2. Run the following command with root permissions:

```
/etc/init.d/lttpomd restart
```

Chapter 3: Using ExpressZip

Using Express Zip Overview.....	11
Step 1: Layer Selection.....	11
Step 2: Region Selection.....	13
Step 3: Job Export.....	15
Step 4: Job Status and Download.....	18

Using Express Zip Overview

This chapter describes how to view and export imagery with ExpressZip. Complete the following steps to export imagery in ExpressZip:

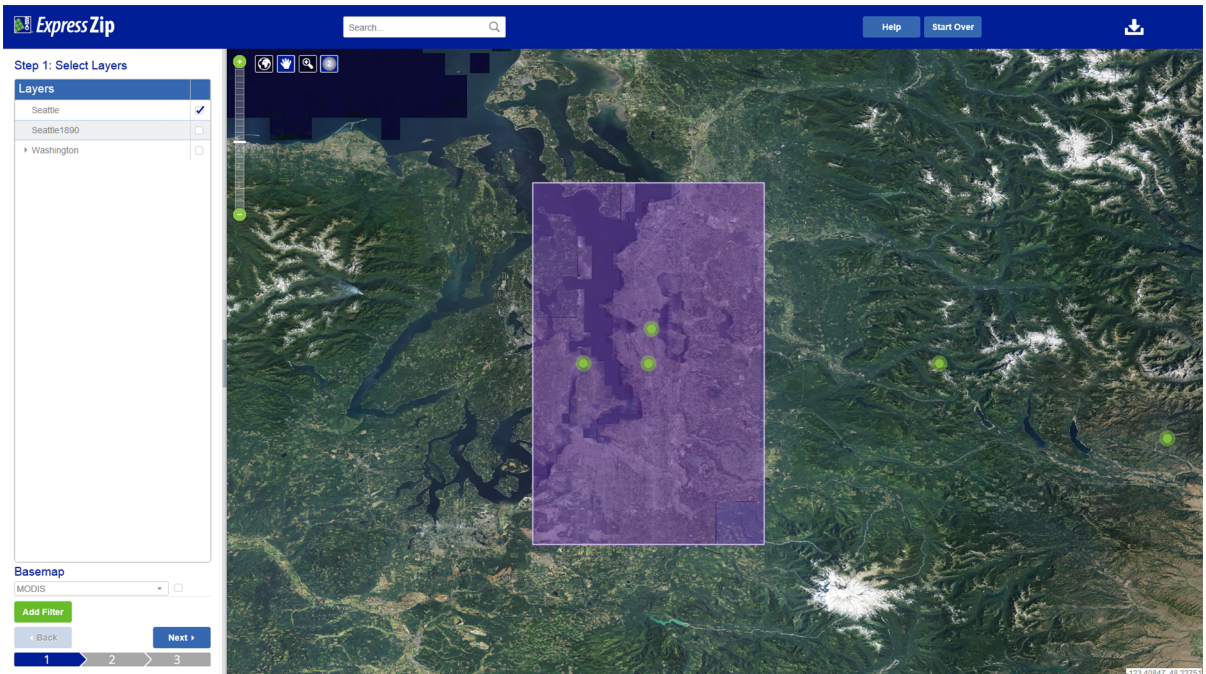
1. Select one or more image layers that you want to export and click **Next**.
2. Select the region that you want to export or upload a shapefile that defines the region that you want to export and click **Next**.
3. Set the export options and click **Submit**.
4. View the status of the export job and download the exported imagery in the **Job Manager**.

If you make a mistake and want to start again, click **Start Over** in the menu bar.

Step 1: Layer Selection

When you open ExpressZip, the application displays a list of Express Server image layers in the **Options** pane. Additionally, the location of each layer is displayed in the **Preview** pane. You can select the layers that you want to export in either the **Options** pane or the **Preview** pane.

When you finish selecting the layers that you want to export click **Next**.



Selecting Layers in the Options Pane

If you know the name of the image layer that you want to export, browse through the **Layers** table in the **Options** pane and select the check box for the layer. To confirm that you have selected the correct layer, you may want to right-click on the layer and click **Zoom to**.

Selecting Layers in the Preview Pane

If you know the location of the image layer, pan to the location in the **Preview** pane. Click the layer marker to display the name of the layer in a dialog box. If there is more than one layer in the same location, ExpressZip displays the names of all the layers. Select the check box for the layer in the dialog box. The **Layers** table in the **Options** pane updates to display your selection.

*TIP: When you zoom in on a location in the **Preview** pane, the **Options** pane only displays the layers that fall within the zoom area.*

Selecting All Layers

If you want to select all the layers for export, right-click a layer in the **Layers** table and click **Export all**. If you right-click on a layer and click **Select all**, the layers appear highlighted and the boundary of each layer is displayed in the preview pane. You may also click **Export none** or **Clear Selection**.

NOTE: You may need to zoom in to see the layer boundaries.

Selecting the Base Layer

If you want to include the base layer as a background for your image export, select the check box next to the base layer drop-down in the **Options** pane.

NOTE: You can only export base layers that are hosted on the Express Server. Only the MODIS base layer imagery is installed on Express Server; you can convert a catalog or catalog group to a base layer. See see [Adding a Custom Base Layer](#) on page 6.

Searching for Layers

Use the **Search** bar to search for a location by name, address, or latitude and longitude. For example, you might search for `Seattle`. The map in the **Preview** pane pans to the result of a search.

You can also use filters to search for layers. Click the **Add Filters** button in the **Options** pane to open the **Add Filters** dialog box. Use filters to search for layers by layer name, by keyword, by location, or by coordinate reference system.


When you finish selecting the layers that you want to export click **Next**.

Step 2: Region Selection

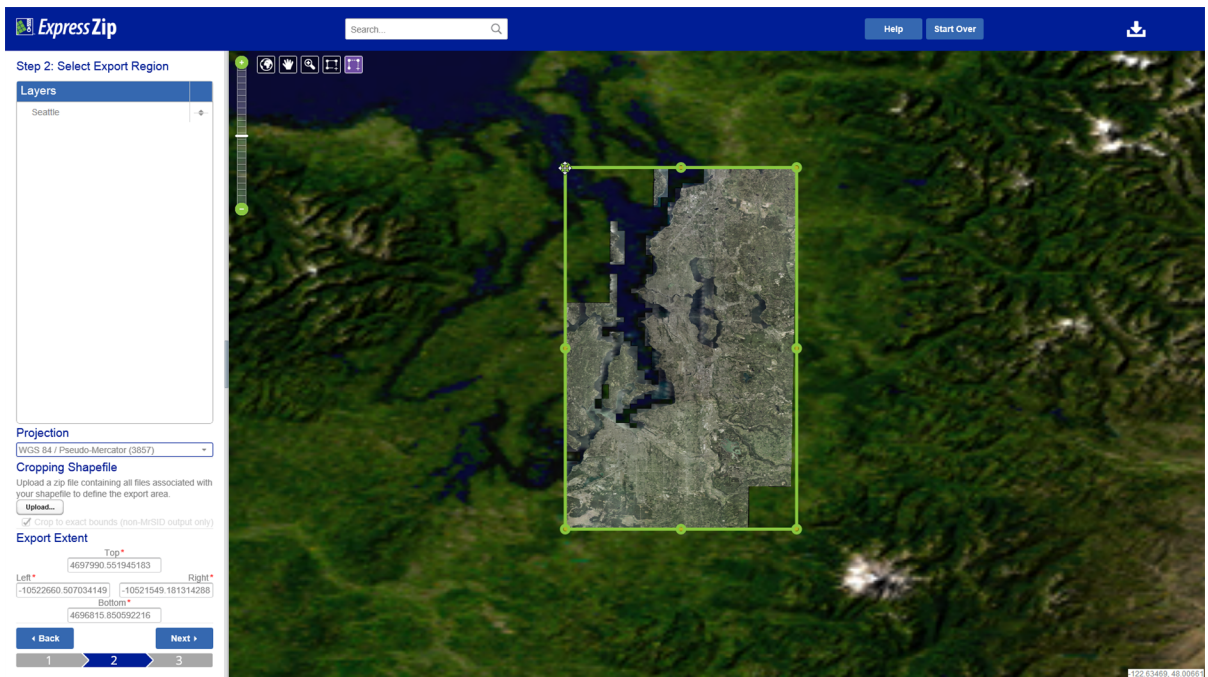
To select a region of interest for export, you can draw the region in the **Preview** pane and upload a shapefile in the **Options** pane. If you use both methods to select a region of interest, ExpressZip finds the intersection of the drawn selection and the shapefile selection.



*TIP: If you are exporting multiple layers, you can change the order of the layers to determine which layer appears on top in the image export. To change the order of the layers, drag the layers in the **Options** pane.*

Drawing a Region of Interest

If the region of interest that you want to export is a simple rectangle, draw the region that you want to export in the **Preview** pane. To draw a region of interest, click the **Draw** icon  in the preview controls.

Then, press and hold the mouse button while you draw the region of interest. When you have finished drawing a selection, you can resize or move the selection by dragging the selection handles.

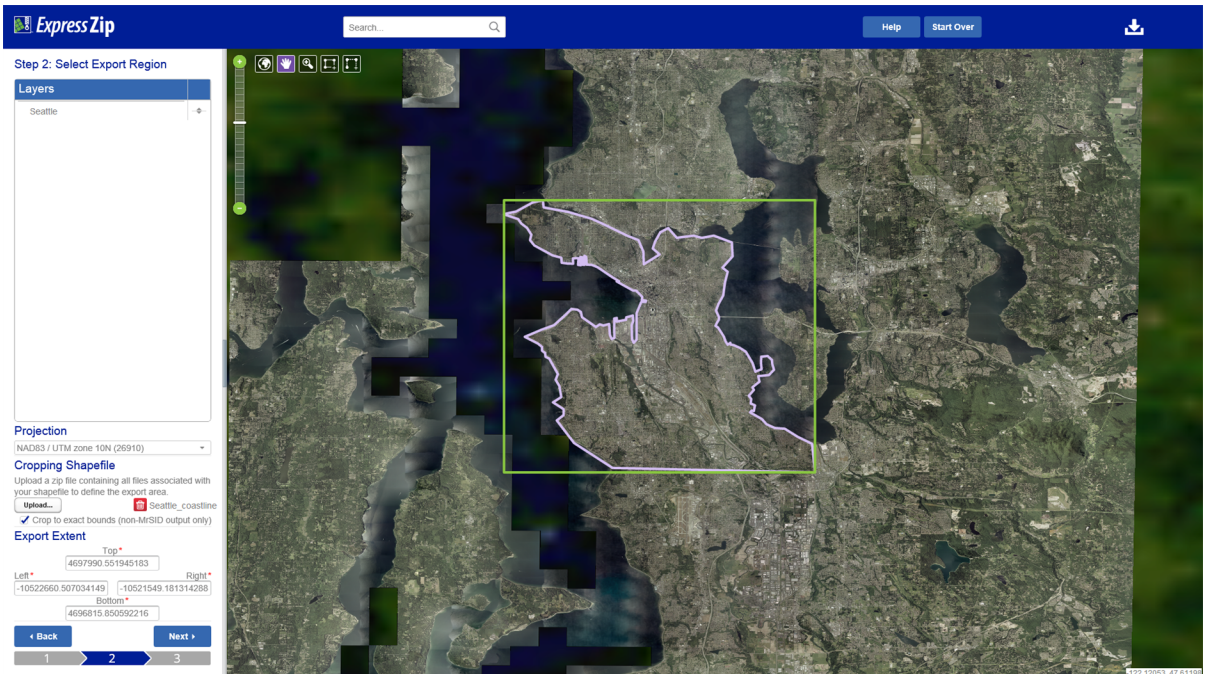


To pan around the **Preview** pane without making a selection or modifying the selection, click the **Pan** icon . If, after panning you want to edit the selection, click the **Edit** icon .

Uploading a Shapefile

If the region of interest that you want to export is a complex shape or requires precise positioning, you may want to upload a shapefile that defines the region of interest. Click **Upload Shapefile** in the **Options** pane to browse to a zip file that contains the shapefile, then click **Open**. If the shapefile uses a different projection system than the one selected in the **Options** pane, then the shapefile is reprojected to the correct reference system.

The shapefile is displayed in the **Preview** pane.



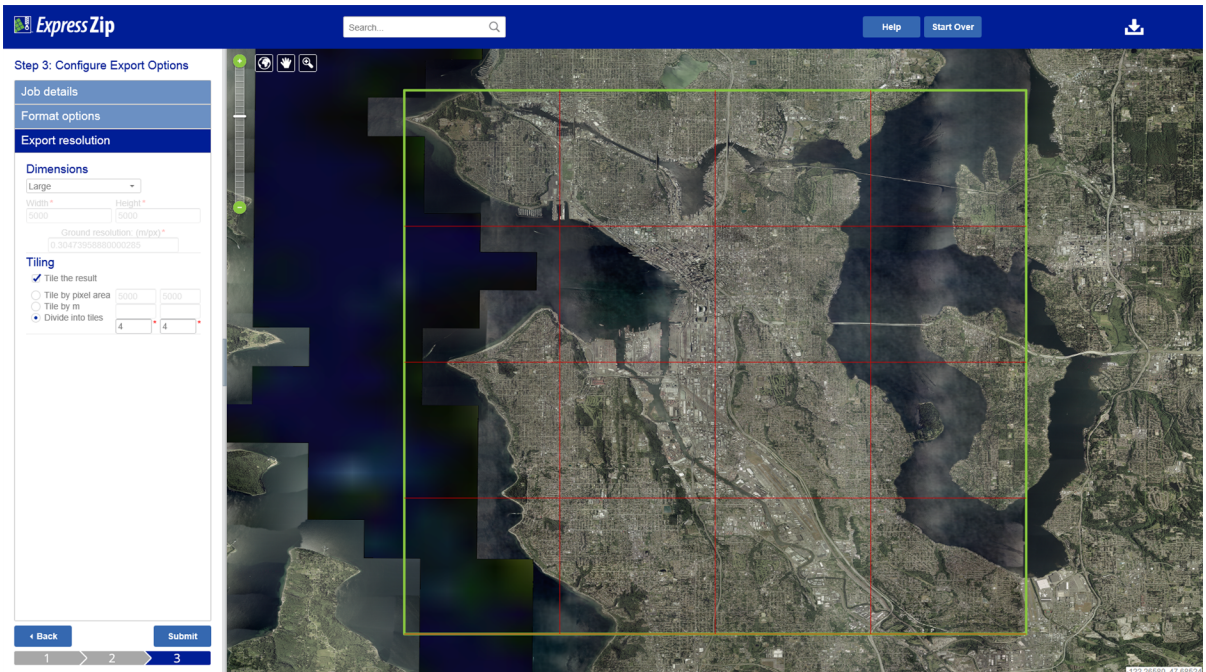
NOTE: You can only upload one shapefile at a time and the shapefile must be contained in a zip file.

When you finish selecting the export region click **Next**.

Step 3: Job Export

To submit an export job for the selected imagery, configure export options and click **Submit**. You can configure job details, format options, and the export resolution in the **Options** pane.

If the **Submit** button is not available, your job may exceed the allowed size. Check the **Job details** panel to see if the estimated output is too large. If you have specified tiling options, check the **Export resolution** panel. If there is a red asterisk present, point at it to see what the potential problem is.



Job Details

You can configure the following options in the **Job Details** table:

- **Job name.** Required. The name that you want to assign to the image export job. The name of each job that you submit must be unique. If the job name that you select already exists in the list of jobs, ExpressZip displays an error icon next to the job name field.
- **User name.** Your name. When you view the status of a job in the **Job Manager**, you can sort the jobs by user name to find your jobs.
- **Email address.** Your email address. When the job finishes, ExpressZip can send you an email notification. If you do not see the email address field, ensure that you have configured mail notifications for ExpressZip. For more information, see [Mail Notifications](#) on page 8.

*NOTE: If you enter an email address that is not correct or does not exist, the ExpressZip application does not send you a notification. If you want to verify that you entered the correct email address for a job, see the log file for the job in the **Job Manager**.*

Additionally, you can view a summary of the export job in **Job Details**. The summary includes the number of tiles into which the image will be exported and the approximate disk space required for the exported imagery. Configure tiling options in the **Export Resolution** table.

Format Options

Enter the output format for the exported imagery. You can select one the following output formats:

Raster	LiDAR Point Cloud	LiDAR DEM
<ul style="list-style-type: none">• MG4• MG3• MG2• TIFF• PNG• JPEG• GIF• BMP	<ul style="list-style-type: none">• MrSID• LAS• LAX	<ul style="list-style-type: none">• MrSID• TIFF

You can also enter the compressed file format that you want to use to package the imagery. When you download the exported imagery, you download a compressed file that bundles all the exported images. You can select the ZIP or TAR file formats.

For LiDAR Point Clouds, you can specify a thinning factor, which is the fraction of the total points to be returned. For example, a thinning factor of 0.5 will return 50% of the total points.

For DEM, you can specify the data type: 32-bit floating point (FLOAT32), 16-bit unsigned integer (UINT16), or 16-bit signed integer (16SINT).

Under General LiDAR Options, you can specify the Minimum and Maximum values of Z (the height of points in the Point Cloud); only points falling within the selected range will be returned.

If your catalog includes Classifications for LiDAR images, you can select as many of them as you'd like; only those points within the Point Cloud corresponding to one or more of the selected classifications will be returned.

Export Resolution

Use the **Export Resolution** table to configure the dimensions of the exported imagery and tiling options.

You can select one of the following dimensions:

- Small. Scale the exported image to a width or height of 512 pixels.
- Medium. Scale the exported image to a width of 1280 pixels.
- Large. Scale the exported image to a width of 5000 pixels.

- Native resolution. Export the imagery at its native resolution.
- Custom. Enter a custom width, height, or ground resolution for the imagery.

*NOTE: If you select **Small, Medium, or Large** as the **Export Resolution**, ExpressZip determines which side of the image is longer, the width or the height, then sets the longer side to a predefined pixel value. For example, if you select **Small** for a wide image, ExpressZip sets the width of the image to 512 pixels then scales the height of the image to match.*

You can also enter tiling options to divide the output image into multiple tiles. If you manually enter the number of tiles that you want, the dimensions of each tile equals the dimensions that you set for the image divided by the number of tiles. For example, say you set the dimensions of an image to 1000 pixels by 1000 pixels. If you divide the image into 2 tiles by 2 tiles, the dimensions of each tile are 500 pixels by 500 pixels.

Step 4: Job Status and Download

After you submit an image export job, click the **Job Manager** icon  to complete the following tasks:

- View the status of the job. The **Status** column refreshes automatically to show the progress of the job.
- Download the exported imagery. When the export job finishes, the download URL displays a link to the imagery.
- View the log file for the job. A link to the log file appears when a job finishes or when a job fails. The log file displays information about each tile created, about the packaging of the job, and about the email notification for the job.
- Remove the job. When you remove a job, you delete the job from the **Job Manager** and delete the image files associated with the job from the export directory.

NOTE: If you remove a job that is still running, the job is canceled and deleted. ExpressZip displays a prompt to confirm that you want to cancel the job.

- Browse archived jobs. If you restart Tomcat, ExpressZip clears the list of jobs in the **Job Manager**. However, ExpressZip does not delete the files associated with the jobs. To view a list of all jobs in the export directory, including jobs that have been cleared from the Job Manager, click **Browse Archived Jobs**.
- View the version of ExpressZip.



Remove

version
9.5.0.4526

Job Name	User Name	Status
Seattle	Joe Mariner	Exporting tile 2 of 4

Selected Job

Job Name Seattle

Status Exporting tile 2 of 4

Download URL <http://localhost:8080/ExpressZip>

User name Joe Mariner

Log URL

[Browse Archived Jobs](#)

Chapter 4: Developing for ExpressZip

Developing for ExpressZip Overview.....	20
Building ExpressZip.....	20
Deploying ExpressZip.....	21

Developing for ExpressZip Overview

The ExpressZip application is open-source software. The source code for the application is stored in the following location:

```
<Installation Directory>\ImageServer\docs\samples\ExpressZip
```

You are free to modify and redistribute the software subject to the conditions of the Apache 2.0 license. A copy of the license is included with the source code. Alternatively, you can view the license online at the following URL:

<http://www.apache.org/licenses/LICENSE-2.0.html>

Building ExpressZip

The ExpressZip application is a Java web application for Tomcat. Before you can build the ExpressZip application from the source code, you must install the following software:

- Java Software Development Kit version 1.8 or later.
- Maven version 3.3.9 or later. Maven is a build manager that simplifies the process of building and maintaining projects.

To compile ExpressZip, complete the following steps:

1. From the command line, navigate to the directory that contains the ExpressZip source code. By default, the ExpressZip source code is stored in the following directory:

```
<Installation Directory>\ImageServer\docs\samples\ExpressZip\express  
zip
```

NOTE: The directory contains a `pom.xml` file. The `pom.xml` file is the main configuration file that Maven uses to build the project.

2. Enter the following command to build the project:

```
mvn package
```

Maven builds the project, prints a build success or failure message, and creates a WAR file in the `target` directory.

Deploying ExpressZip

The WAR file created by maven is a JAR file packaged for use as a web application. To deploy the web application in Tomcat, complete the following steps:

1. Move a copy of the WAR file created by Maven to the Tomcat webapps directory. By default, you can find this directory at the following location:

```
<Installation Directory>\ImageServer\Tomcat\webapps\
```

2. Open the Tomcat `server.xml` file in a text editor. By default, you can find this file at the following location:

```
<Installation Directory>\ImageServer\Tomcat\conf\server.xml
```

3. Search for the `<Host>` element.
4. In the `<Host>` element, ensure that the `unpackWARs` and `autoDeploy` properties are set to `true`. For example, you might change the `<Host>` element to the following line:

```
<Host name="localhost" appBase="webapps"
unpackWARs="true" autoDeploy="true">
```

These properties ensure that Tomcat deploys the ExpressZip application.

5. Restart Tomcat. For more information, see [Restarting Tomcat](#) on page 10.

When Tomcat starts, the ExpressZip application is extracted from the WAR file and deployed.

6. Configure an export directory and base layer. For more information, see [Configuring ExpressZip Overview](#) on page 4.