About This Guide

Google Earth Enterprise Fusion is designed for organizations that want to display their own geospatial data in Google Earth and Google Maps. You can use it to create graphically rich geographic information system (GIS) databases for distribution to your customers or in-house end users. With Google Earth Enterprise Fusion, you can integrate your own geospatial data, publish it to the Google Earth Enterprise Server, and view it using Google Earth Enterprise Client (EC), the Google Maps API, or the Google Earth API.

Before you begin working with real data in Google Earth Enterprise Fusion, it is important for you to familiarize yourself with the process of defining and building different types of data. This tutorial provides a series of exercises that you can perform in an environment where it is all right to make mistakes. Once you start working with real data, it will be more difficult to correct mistakes, so please take your time working through the tutorial until you feel comfortable with Google Earth Enterprise Fusion.

The Basic Tasks section of this tutorial guides you through creating and publishing a Google Earth Enterprise Fusion database from raw source material, using the tutorial files provided on the Google Earth Enterprise Fusion installation DVD.

Note: Work through the first five lessons in order.

The Advanced Tasks section of this tutorial guides you through more advanced topics. You can work through the advanced lessons in any order you wish. Alternatively, you can skip the Advanced Tasks section until you want to learn about something new. Then, you can come back to the tutorial and work through the lessons of your choice.

Audience

This guide is intended for individuals who are new to Google Earth Enterprise Fusion. It assumes that you have some familiarity with GIS data and have used a Google Earth client, but have no familiarity with this application. It also assumes that Google Earth Enterprise Fusion, the Google Earth Enterprise Server, and Google Earth EC have been installed either on a network drive accessible to you or on your local workstation. If any of those three applications are not installed, contact your system administrator or refer to the *Google Earth Enterprise Administration Guide*.

In This Guide

This guide provides five basic lessons and five advanced lessons.

The **Basic Tasks** section includes:

1. Setting Up For the Tutorial
2. Defining and Building Resources
3. Defining and Building Projects
4. Defining and Building Databases
5. Publishing and Viewing a Database

The **Advanced Tasks** section includes:

6. Configuring Display Rules for Point Data
7. Configuring Display Rules for Polygon Data
8. Importing and Exporting Style Templates
9. Configuring a Searchable Database
10. Specifying Search Fields for Individual Layers

11. Creating a Map Database
12. Creating Imagery Mosaics
13. Segmenting Large Imagery Files
14. Creating a Historical Imagery Project

Appendix A: Sample Data Files provides a list of all of the sample data files included when you install the tutorial data.

Introduction

Google Earth Enterprise (GEE) 4.4.1 is a network-based, rich 3D and 2D mapping solution that makes vast amounts of data easily accessible from a desktop application. With GEE, you can create a central geographic information system (GIS) database that can be distributed simultaneously to thousands of users.

Documentation

For offline use, documentation is available on the server where you installed GEE. You can find it in the directory `/opt/google/share/doc/manual/`(by default).

The GEE documentation provided with your software includes:

Google Earth Enterprise documentation

Installation Guide - Guides you through preparation for and installation of GEE.

Administration Guide - Covers configuration of Fusion, GEE Server software, and the GEE tutorial work space. Also includes a command reference and a list of common error messages and their resolutions.

Fusion Tutorial - Guides you through the basic steps of creating and publishing a Fusion database from raw source data, and provides a series of advanced lessons for specific data preparation tasks.

Reference Guide - Provides comprehensive reference material about Fusion and how you can use it to create graphically-rich GIS databases for distribution to your in-house users.

Portable Globe and Server - Describes the portable globe and server: installation of the server, cutting globes, serving and broadcasting, and command line tools.

Search Framework Developer's Guide - Explains how to use the Search Framework Java API to write a plug-in application for Google Earth or Google Maps to search a custom data source. The plug-in creates requests and responses in the framework's Common Search Format, a generic format that can be adapted to deal with data from any data store.

Release Notes - Describes the latest feature enhancements and improvements for GEE.

Google Earth Client documentation

Google Earth User Guide - Describes how users can view published databases in Google Earth Client (EC), as well as common functions in the Earth Client.

Earth Enterprise Client and Earth Plugin Release Notes - Describes updates and known issues in EC and the Earth Plugin.

API documentation

Googe Maps API

Google Maps API Developer's Guide and Reference - The Google Maps API lets you embed Google Maps in your own web pages with JavaScript. The API provides a number of utilities for manipulating maps and adding content to the map through a variety of services, allowing you to create robust maps applications on your website.

Google Maps API extensions for GEE - A special extension class called **GFusionMap** is

needed to view 2D Maps hosted from a GEE Server. Additional information about building 2D Maps is available in the **Google Earth Enterprise Reference Guide**.

Google Earth API

Google Earth API Developer's Guide and Reference - The Google Earth API allows you to embed three-dimensional maps into web pages.

Google Earth API extensions for Google Earth Enterprise - Additional information about connecting the Google Earth API to a local GEE Server.

Requesting technical support

Google Earth Enterprise Technical Support - Technical Support is available to all current GEE customers from a dedicated, web-based Support Portal. An account is required to access the portal. Please complete this form if you do not have an account yet.

Legal Notices and License Agreements

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Setting Up the Tutorial

The Google Earth Enterprise Fusion tutorial data is provided on the Google Earth Enterprise Fusion installation DVD and should have been installed in `/opt/google/share/tutorials/fusion/` on your workstation or network. In addition, your system administrator should have configured a tutorial environment for you to work on the tutorial lessons, keeping your practice data separate from your live production data.

If Google Earth Enterprise Fusion or the tutorial files are not installed or you encounter an error message that tells you that a tutorial source file is not readable or you cannot save a resource, contact your system administrator or refer to the *Google Earth Enterprise Administration Guide* to install the files and configure the tutorial environment before saving any practice data.

Before you begin the tutorial, read Chapter 1 of the *Google Earth Enterprise Fusion Reference Guide* to familiarize yourself with the Google Earth Enterprise suite of applications and for a good overview of Google Earth Enterprise Fusion. Then follow the steps in this lesson to begin learning about the Google Earth Enterprise Fusion user interface and to perform the initial set-up tasks recommended before you begin importing data.

Select the Tutorial Asset Root

There are two occasions when you must select a different asset root:

- When multiple users share a single workstation, you must select your own tutorial asset root.
- When you switch from the tutorial data to real production data, you must select the appropriate asset root.

This section explains how to select a different asset root.

Caution: Even though your source volumes and asset roots are separate for each user or for the tutorial and production data, there is only one publish root on each virtual server for Earth databases and one for Map databases.

When two users are sharing a single workstation, both users are publishing to the same publish root. When one user publishes a database on that workstation, it overwrites any database that might have been published previously by another user on that same workstation. Likewise, if you are switching back and forth between tutorial and production data on the same workstation, it is possible to overwrite a production database with a tutorial database and vice versa. Of course, you can republish the desired database to make it available to Google Earth EC again.

To select the tutorial asset root:

1. On the command line, log in as root.
2. Stop the system manager by entering:

   ```
   /etc/init.d/gefusion stop
   ```

3. Enter:

   ```
   geselectassetroot --assetroot /username/assets
   ```

   where *username* is the name you or your system administrator used when configuring the tutorial asset root. (If you do not know the path of your tutorial asset root, contact your system administrator.)
4. When you return to the prompt, log out as root.
5. Start the system manager by entering:

   ```
   /etc/init.d/gefusion start
   ```

Launch Google Earth Enterprise Fusion

To launch Google Earth Enterprise Fusion:

1. Open a Linux terminal window.
2. Enter `fusion` (or `fusion &` to return to the Linux prompt).

When the application starts, the Google Earth Enterprise Fusion graphical user interface (GUI) appears. Refer to the **Fundamentals** chapter of the **Google Earth Enterprise Fusion Reference Guide** for information about the Google Earth Enterprise Fusion GUI.

Build the Asset Navigation Tree

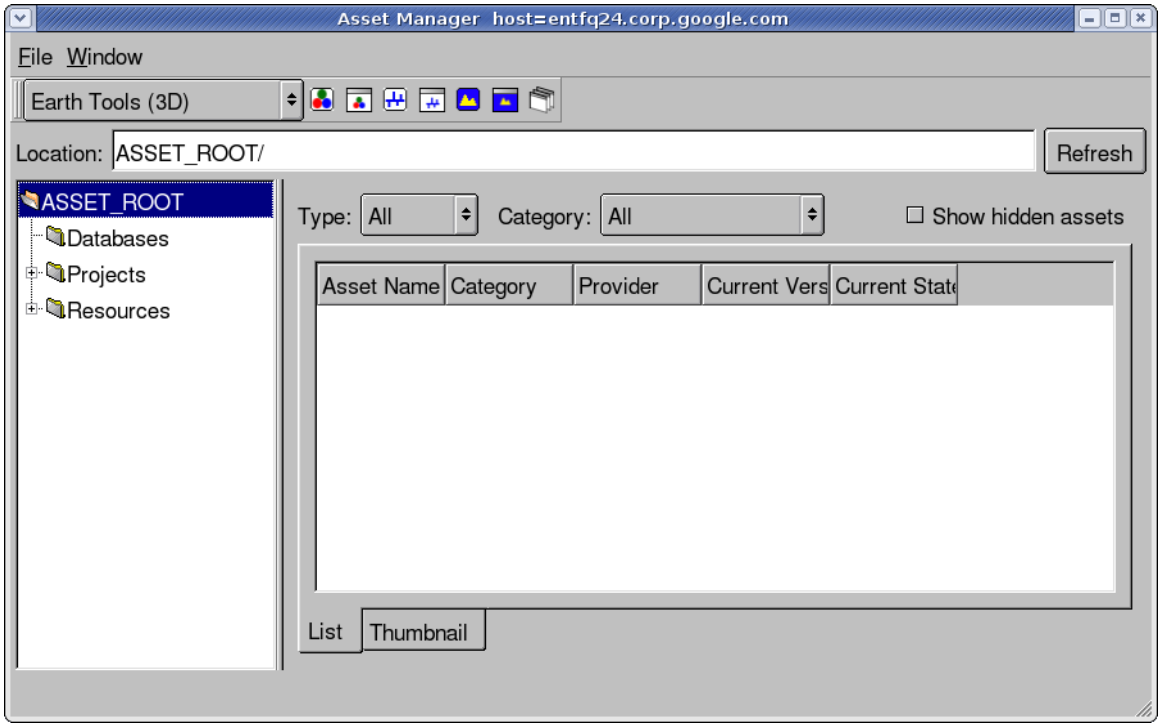
The components of a Google Earth Enterprise Fusion database are called *assets*. The main location where you store all of your Google Earth Enterprise Fusion assets is called the *asset root*. The asset root is located in the main Google Earth Enterprise Fusion volume--in most cases, `/gevol/assets`. For the tutorial lessons, this guide refers to the *tutorial asset root* to differentiate it from the asset root that contains your live data.

In this exercise, you add subfolders to the tutorial asset root, so you can store your assets in an organized way.

Caution: Once you create subfolders in your asset root, you cannot delete them. This makes it especially important for you to plan out and organize your subfolders before you or anyone else begins working with real data in Google Earth Enterprise Fusion.

To add a subfolder:

1. Open the Asset Manager by selecting **Tools > Asset Manager**. The Asset Manager appears.



   The asset navigation tree appears on the left side of the Asset Manager, and `ASSET_ROOT` is the only folder on the tree.

2. Right-click **ASSET_ROOT**, and select **New Subfolder** from the context menu.

   The New Subfolder dialog appears.

3. Enter **Resources** as the name of the new subfolder, and click **OK**.

   The new subfolder appears in the asset navigation tree.

4. In the same way, add three more subfolders:
   - **MapLayers**
   - **Projects**
   - **Databases**

   All four subfolders appear in alphabetical order in the asset navigation tree.

5. For each of the four folders you just created, right-click to create the following subfolders:
   - **Vector**
   - **Imagery**
   - **Terrain**

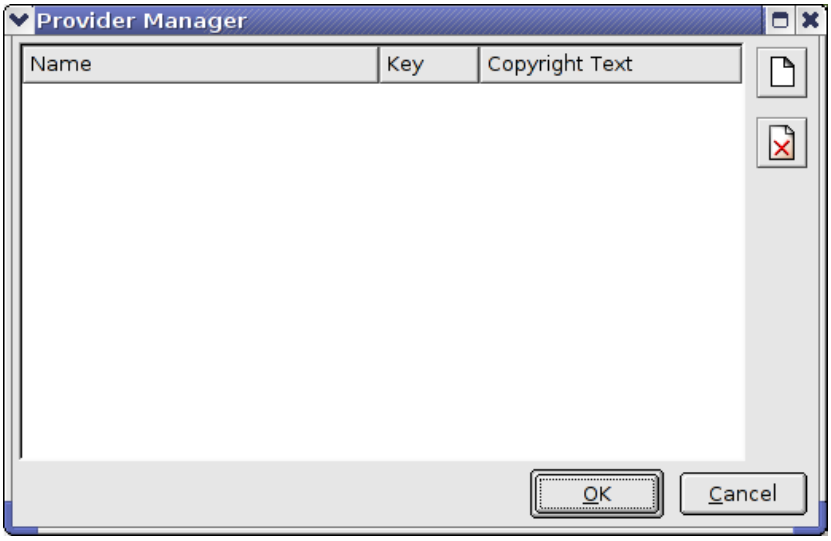
6. Close the Asset Manager by clicking the close box (**X**) in the top right corner.

Define Source Providers

The **Provider Manager** allows you to create a list of organizations that provide the source data you use in Google Earth. For each provider, you specify a unique lookup key (any unique abbreviation you choose) and copyright information. When you create a resource, a data provider is associated with it, so that when the resource is displayed in Google Earth EC, the appropriate copyright information is also displayed.

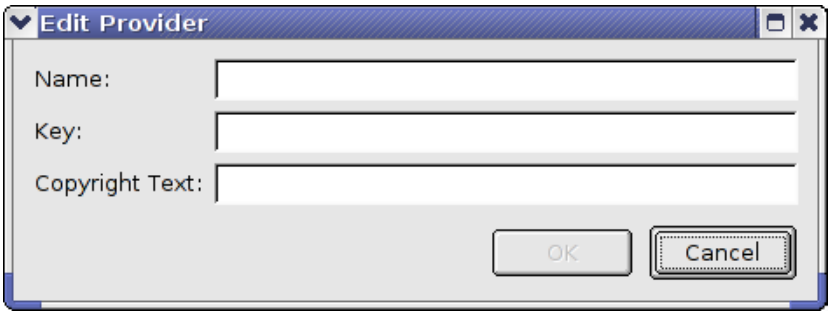
To create a source provider:

1. Open the Provider Manager by selecting **Tools > Provider Manager**.



2. Click the page icon: 

   The **Edit Provider** dialog appears.



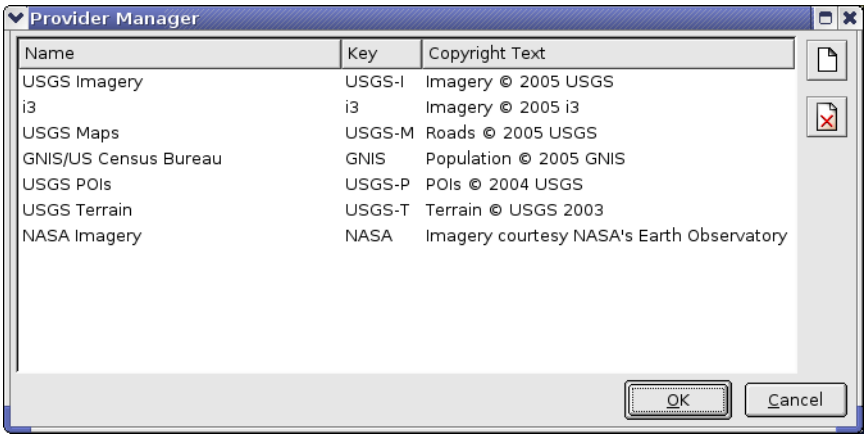
3. Enter the following information:

   Name: USGS Imagery
   Key: USGS-I
   Copyright Text: Imagery © 2005 USGS

4. Click **OK**.
5. Repeat steps **2** through **4** to add the following source providers:

Name	Key	Copyright Text
i3	i3	Imagery © 2005 i3
USGS Maps	USGS-M	Roads © 2005 USGS
GNIS/US Census Bureau	GNIS	Population © 2005 GNIS
USGS POIs	USGS-P	POIs © 2004 USGS
USGS Terrain	USGS-T	Terrain © USGS 2003
NASA Imagery	NASA	Imagery courtesy NASA's Earth Observatory

The new providers appear in the Provider Manager dialog in the order in which you added them:



6. Click **OK** to close the Provider Manager, and go on to the next lesson.

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Defining and Building Resources

The first step in preparing data is to define resources by importing the source data into Google Earth Enterprise Fusion. You import imagery, terrain, and vector data separately.

This lesson guides you through defining and building imagery, terrain, and vector resources.

Define Imagery Resources

The following exercises guide you through exploring your source data and defining and building imagery resources. Resources comprise the most basic components of a Google Earth Enterprise Fusion database.

Explore Imagery Source Files

In this exercise, you learn to use the Preview panes in the Google Earth Enterprise Fusion GUI to investigate imagery source files to be sure they cover the desired area before you import them into Google Earth Enterprise Fusion.

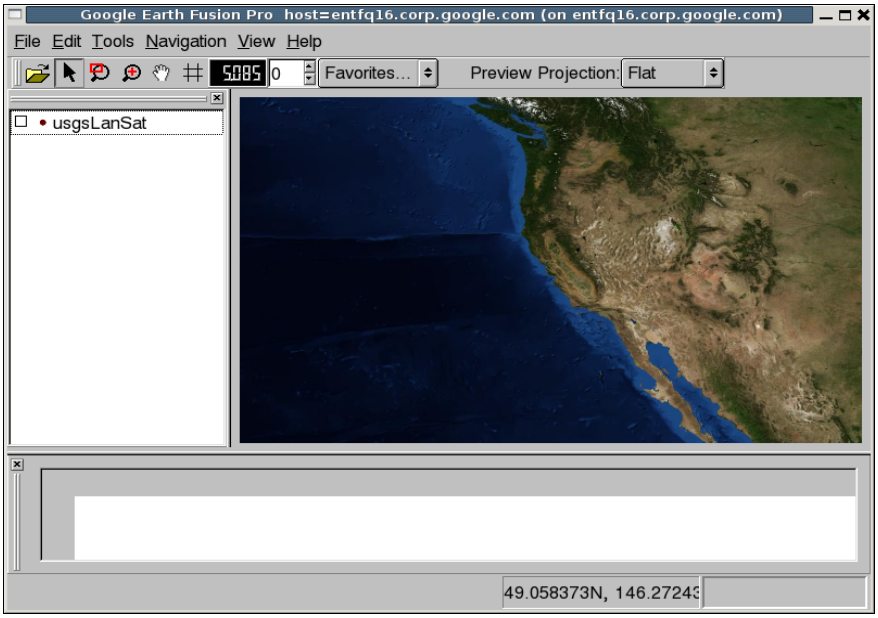
The following limitations apply to previewing data.

- Certain display rule settings are ignored:
  - Simplification method
  - Suppress duplicates
  - Elevation/height
  - Highlight style
  - Road label
  - Road shield
- Lines and polygons are drawn as lines only (not filled), so use Line Color or Outline Color, if you want to see the colors of lines or polygons in the Preview pane.
- Labels appear in the assigned color, but scaling and centering are ignored for labels.
- Icons do appear in the Preview pane, but any style settings (color, scale) are ignored.
- Icons are not selectable, and their pop-up text is not displayed.

To explore imagery source files:

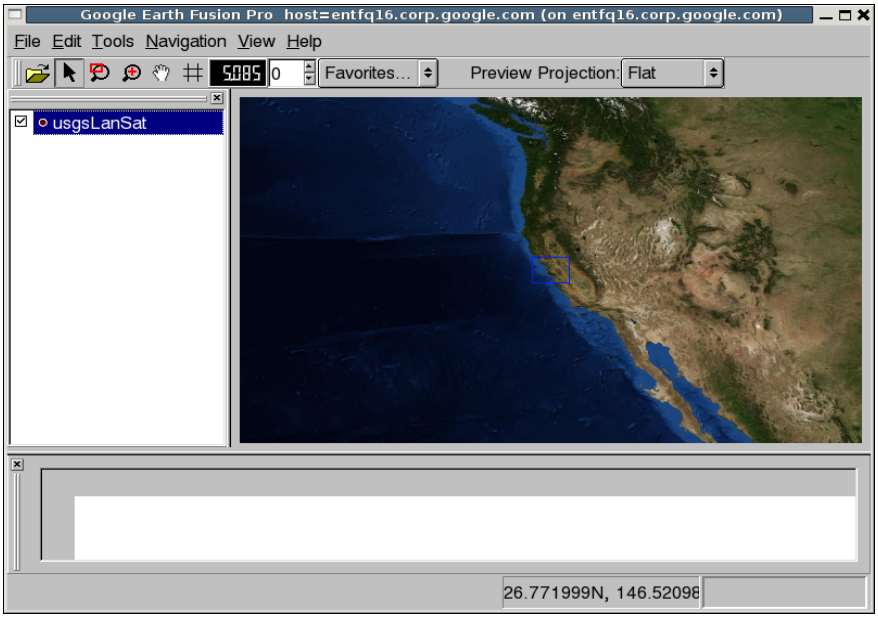
1. Click the Open icon:  .
2. Select `/opt/google/share/tutorials/fusion/Imagery/usgsLanSat.jp2` and click **Open**.

   The image name appears in the Preview List pane. This is called a *layer* (an individual source file or resource).



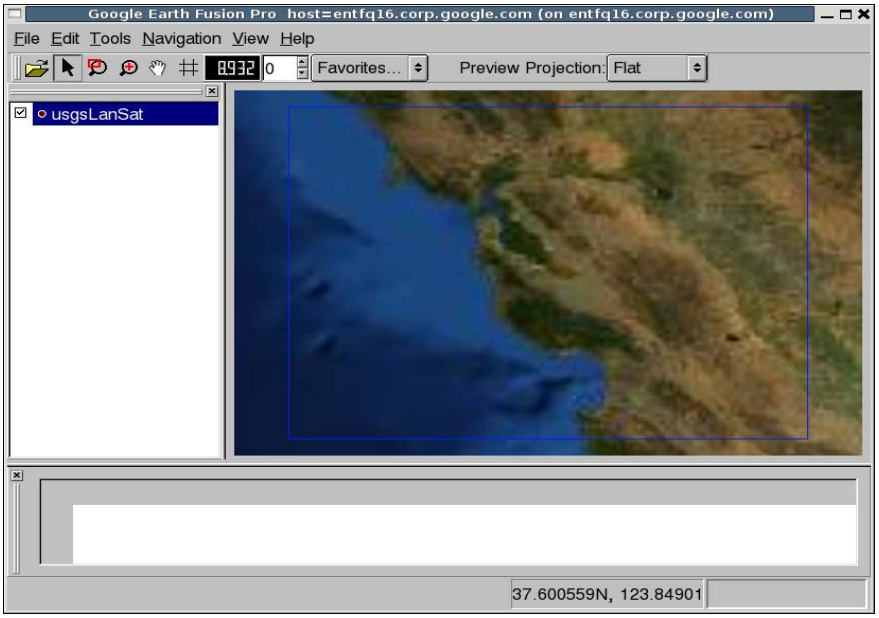
3. Select the layer's checkbox.

   A bounding box in the Preview pane indicates the extents of the imagery in the selected file.



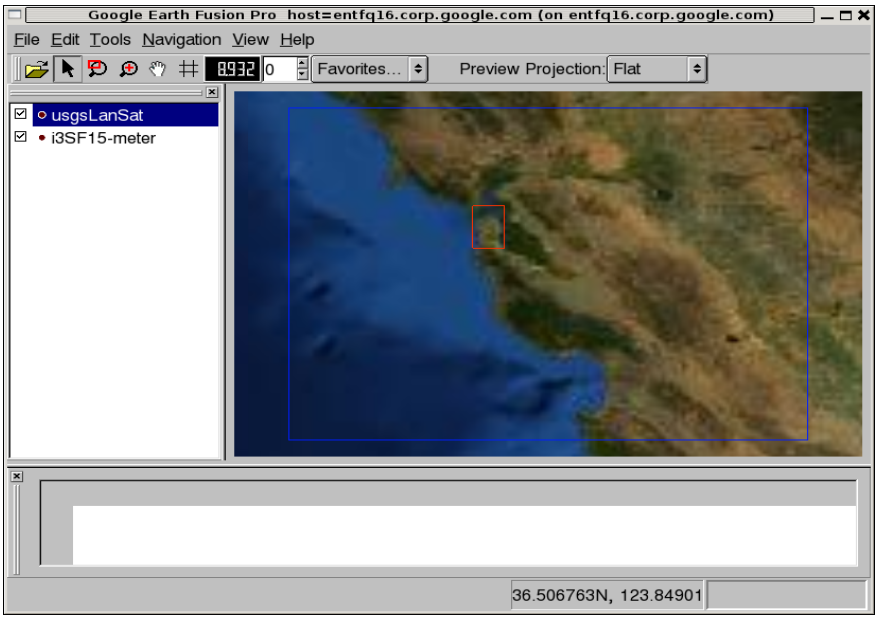
4. Right-click the layer in the Preview List pane, and select **Zoom to Layer** from the context menu.

   The Preview pane zooms to show only the region in the selected imagery file.



5. Repeat the steps above, this time selecting the **i3SF15-meter.tif** file.

   When you select the checkbox next to this second layer, a bounding box indicates the extents of the second layer within the first layer. You can see the relationship of each area to the other in the Preview pane.



6. When you finish viewing the imagery layers, right-click either layer in the Preview List pane, and select **Remove All Layers** from the context menu.

   A message prompts you to confirm that you want to remove all layers from the Preview panes.

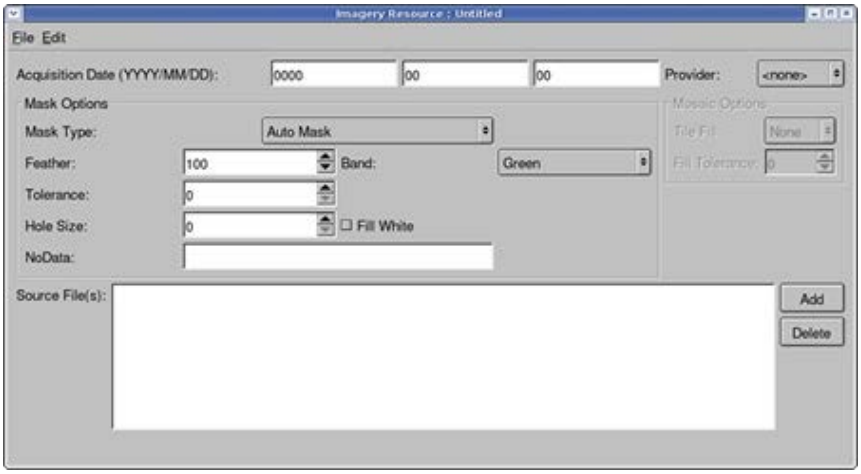
7. Click **OK**.
8. Press **Ctrl-R** to reset the view to the whole Earth.

Define Imagery Resources

In this exercise, you create imagery resources from the imagery data provided for this tutorial.

To define an imagery resource:

1. Select **Tools > Asset Manager**.
2. In the Asset Manager, click  on the toolbar. The Imagery Resource window appears.



3. Set the **Acquisition Date** to today's date. This is required if you will be creating a historical imagery project later.

   The date you set for the imagery **Acquisition Date** is visible in the Google Earth Client when hovering the cursor over a tile. If you add this information to the imagery at a later point, a rebuild of the imagery project is required (as the date needs to be encoded in the JPEG tiles).

   When entering date information, the day or month values can be left blank. For example:

   - `2008-01-00` indicates January 2008
   - `2008-00-00` indicates 2008
   - `0000-00-00` indicates undefined.

   Leading zeros are not required when entering dates.

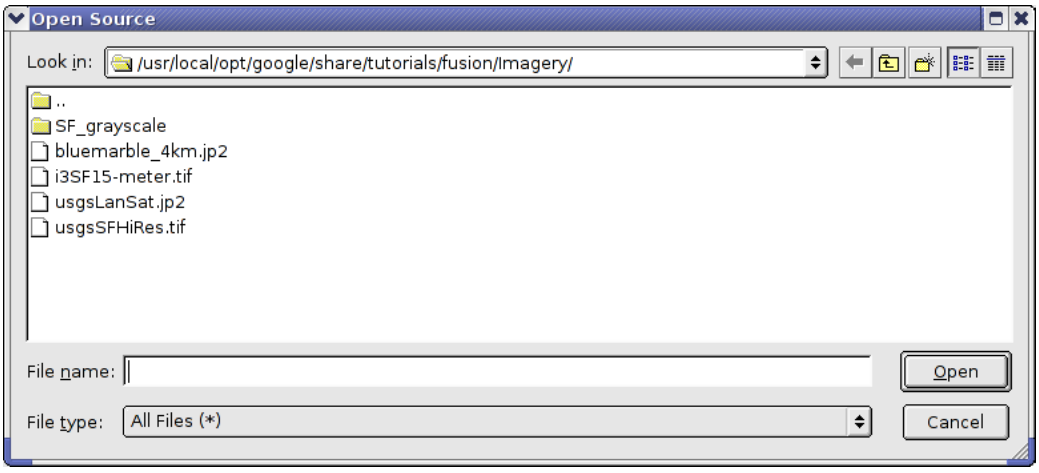
   Note: When you work with real data, the acquisition date should reflect the date the data was released. You can obtain this information from the provider. However, for the purpose of simplifying this tutorial, use the current date for all **Acquisition Date** fields.

4. Select **NASA Imagery** from the **Provider** drop-down list. Notice that the Provider drop-down list contains all of the providers you added earlier.
5. Set the **Mask Type** to **No Mask**.

   You are about to import the BlueMarble source data. Since that data covers the entire world, there is no need for a mask. That is, there is no fill data to mask out in the imagery. (For details about masking, see the **Mask Options** section (under **Defining Imagery Resources**) in the Google Earth Enterprise Reference Guide.

6. Click **Add**.

   The Open Source dialog opens to the `/opt/google/share/tutorials/fusion/Imagery` folder.



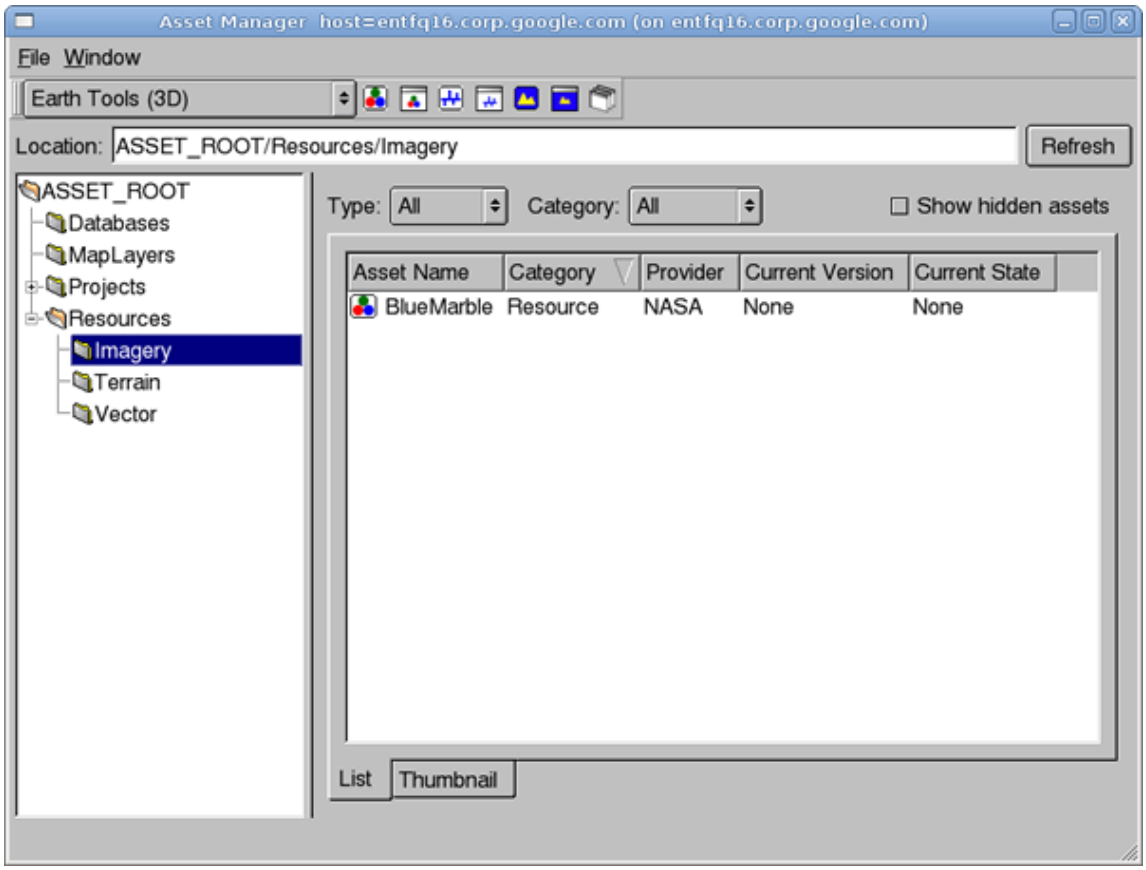
7. Select the `bluemarble_4km.jp2` file, and click **Open**.
8. Select **File > Save** and navigate to the `/ASSET_ROOT/Resources/Imagery` folder you created in the previous chapter.
9. Enter the name **BlueMarble** for the resource, and click **Save**.

Notes: Your system administrator should have configured a tutorial environment for you to work on the tutorial lessons, keeping your practice data separate from your live production data. If you encounter an error message that tells you that a tutorial source file is not readable or you cannot save a resource, contact your system administrator or refer to the **Google Earth Enterprise Administration Guide** and configure the tutorial environment yourself before saving any practice data.

When you finish using any of the asset editors (such as the Imagery Resource Editor used in this exercise), you can either leave it open and move it to the side or close it. Generally, if you know you have more work to do on a given asset, you leave the editor open. If you know you are done with an asset for now, you can close it and get it out of the way.

Caution: When you are defining assets for your live production system, it is important to remember that you cannot delete or edit asset names after you save them.

In the Asset Manager, the name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Imagery` folder in the asset navigation tree.



Build an Imagery Resource

Before you can view the imagery resource in the Preview pane or include it in a project, you must build it. You do not have to build each resource right away, however. You can define several resources and then build them all at the same time, if you prefer. There are advantages and disadvantages to both approaches. You can develop your own routine as you get more comfortable with Google Earth Enterprise Fusion.

In this exercise, you build the first resource right away.

To build an imagery resource:

1. In the Asset Manager, select the `/ASSET_ROOT/Resources/Imagery` folder.

   BlueMarble appears on the right with the **Current Version** and the **Current State** set to **None**, indicating that the resource has not yet been built.

2. Right-click **BlueMarble**, and select **Build** from the context menu. The status of the resource immediately changes to **Queued** and then to **In Progress**.

   Note: Because imagery files are data intensive, it can take some time to build imagery resources.

3. Double-click the **Current Version** or **Current State** column for the resource to view the progress of the build.

   The **Version Properties** dialog displays the most recent version of that resource. You can expand the version tree to view the status of the build in real time by clicking the **+** signs.

4. When you are done reviewing the information in the **Version Properties** dialog, close that window.

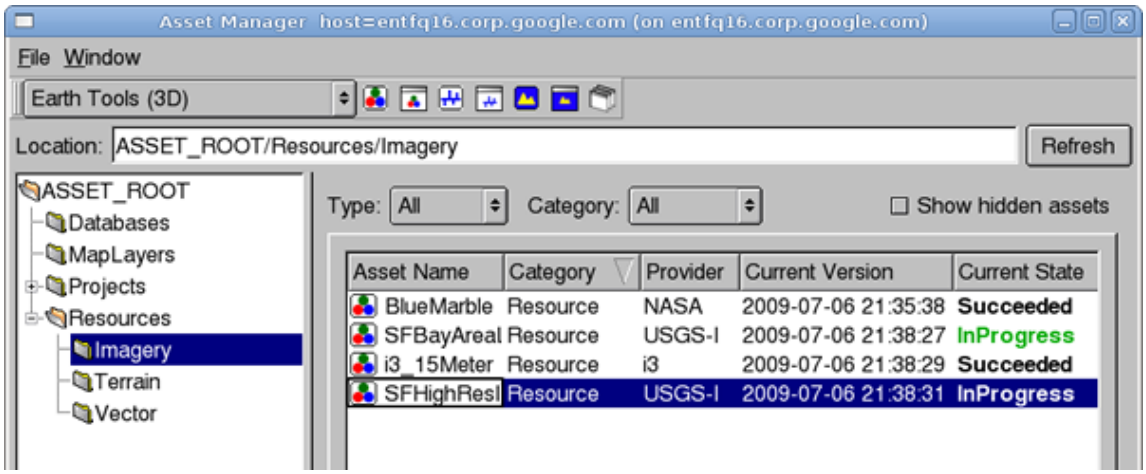
When the BlueMarble resource finishes building, its **Current State** column in the Asset Manager changes to **Succeeded**, and its **Current Version** column changes to the date and time the most recent build was started.

Define and Build the Remaining Imagery Resources

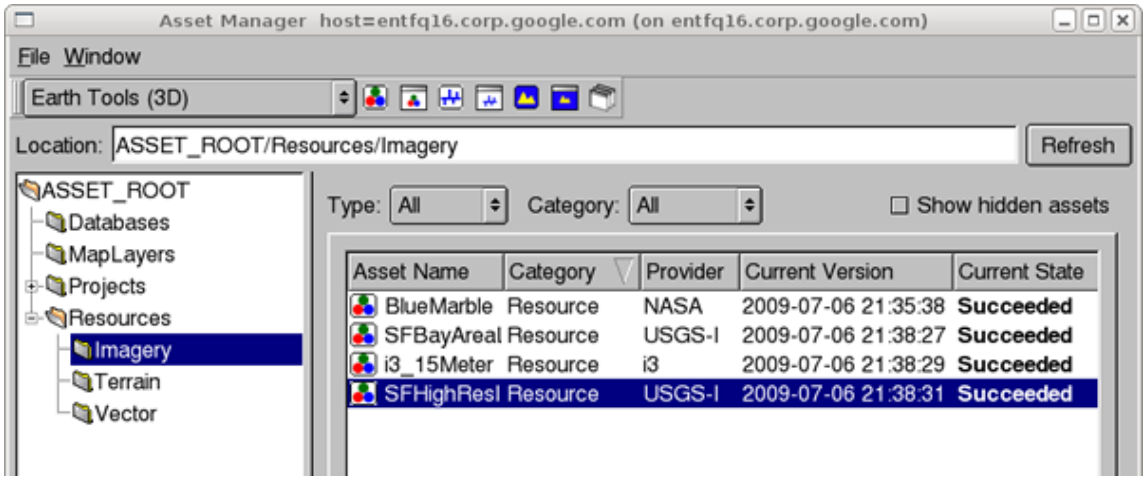
Now that you have defined and built one imagery resource, you can define and build the remaining imagery resources provided for this tutorial:

Name (Resources/Imagery/...)	Acquisition Date	Provider	Mask	Source file
SFBayAreaLanSat_20021010	Today's date	USGS Imagery	**Auto Mask Tolerance**: 2 Default for all other mask values.	`usgsLanSat.jp2`
i3_15Meter_20041010	Today's date	i3	**Auto Mask** Default values.	`i3SF15-meter.tif`
SFHighResInset_20061010	Today's date	USGS Imagery	**Auto Mask** Default values.	`usgsSFHiRes.tif`

While the resources are building, the Asset Manager list looks something like this:



It could take several minutes to build all of the imagery resources. When the builds are all complete, it looks like this:



Preview the Imagery Resources

After you successfully build the imagery resources, you can view some of them in the Preview pane of the Google Earth Enterprise Fusion GUI.

To preview imagery resources:

1. In the Asset Manager, drag and drop the **SFHighResInset** resource from the Asset Name column onto the Preview List pane.
2. Drag and drop the **SFBayAreaLanSat** resource onto the Preview List pane, and then close the Asset Manager.

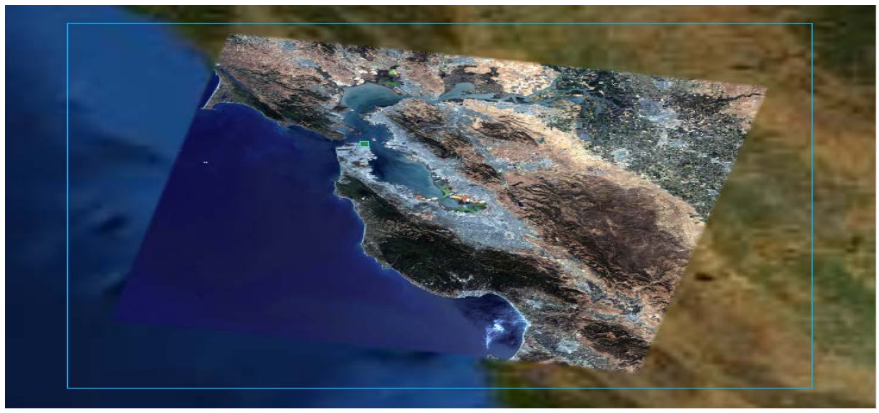
   > **Note:** Google Earth Enterprise Fusion displays the resources in the order in which they are listed in the Preview List pane with the last asset on the list at the bottom of the stack and the first asset on the list on top. In this case, the SFHighResInset resource provides much higher resolution imagery for a small area of the SFBayAreaLanSat resource, so you want SFHighResInset to appear on top.

3. Check the box next to each resource in the Preview List pane to display the associated imagery.

   Bounding boxes appear where the imagery is located on the base imagery; however, they appear to be very small because the display level is so high.

4. Right-click **SFBayAreaLanSat** in the Preview List pane, and select **Zoom to Layer** from the context menu.

   The Preview pane zooms to the outermost edges of the selected layer. Notice the bounding box for the other resource.



5. Right-click **SFHighResInset** in the Preview List pane, and select **Zoom to Layer** from the context menu.

   The Preview pane zooms to the outermost edges of the selected layer.

6. To prepare for the next exercise, zoom out to a display level between 11 and 12  to view more of the San Francisco bay area, as shown in the following graphic.

   To zoom out, you can either select  and then click in the Preview pane and push the mouse away from you, or roll the mouse wheel away from you.

Define Terrain Resources

Defining terrain resources is very similar to defining imagery resources. The following exercises guide you through defining and building terrain resources.

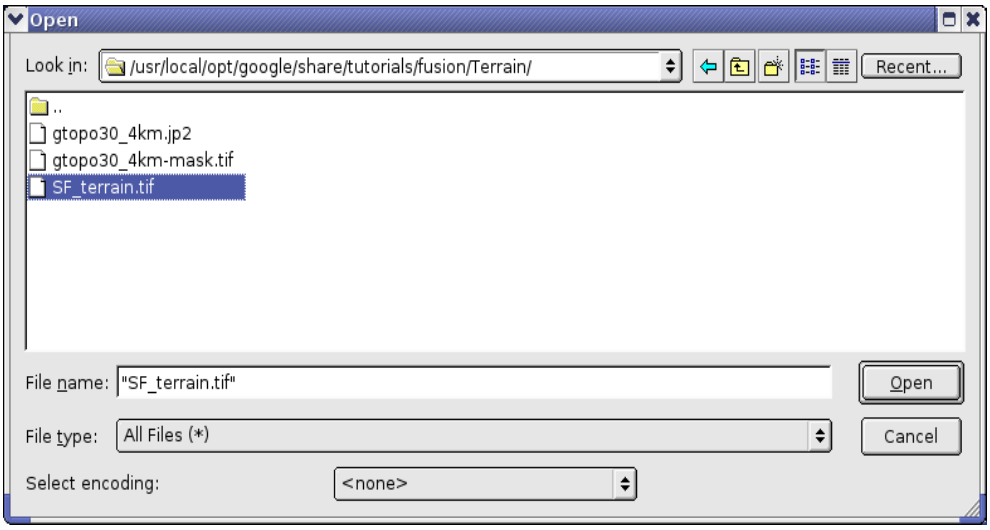
Explore Terrain Source Files

As with imagery files, you can preview terrain source files to be sure they cover the correct area before you convert them to resources. Although you learned about previewing source files in a previous exercise, this exercise gives you an opportunity to learn about more about the preview tools.

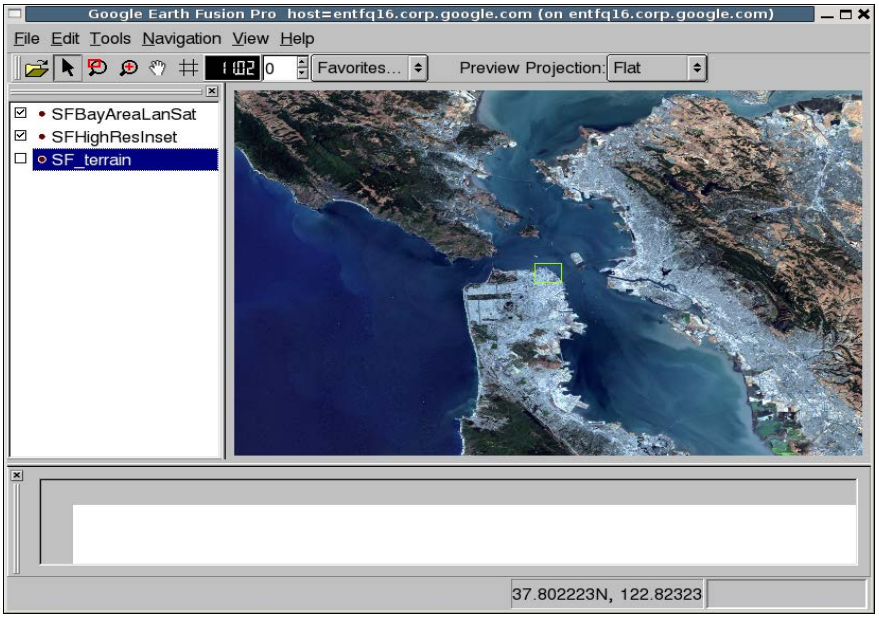
To explore terrain source files:

1. Click  .

   The Open dialog appears.
2. Navigate to the `/opt/google/share/tutorials/fusion/Terrain` folder.
3. Select `SF_terrain.tif`, and click **Open**.



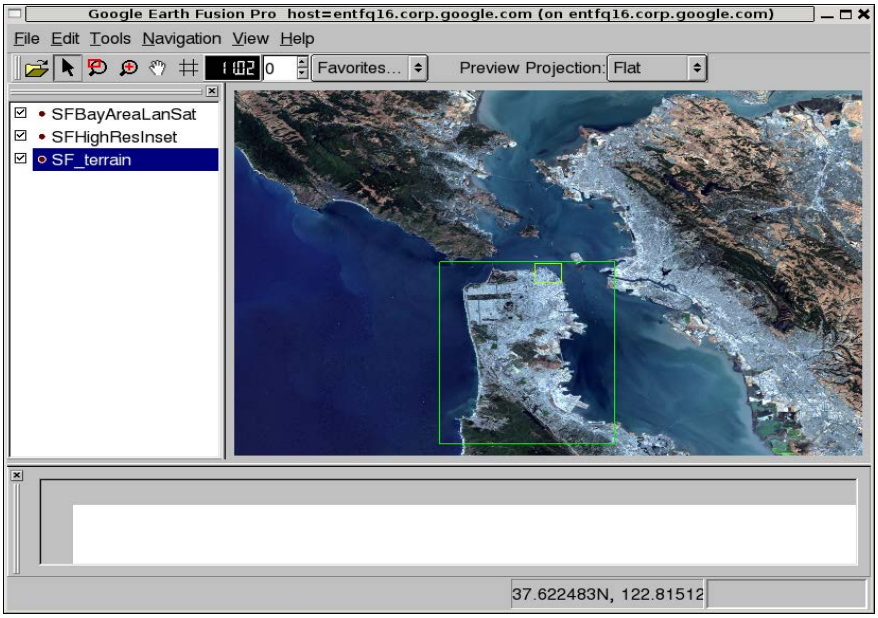
The new layer name appears in the Preview List pane unchecked.



4. Select **Enable All Layers** from the Edit menu to check the boxes for all layers.

   A bounding box appears for the terrain layer.
5. Zoom out a bit to see the entire bounding box.

> **Note:** The Preview pane displays a bounding box for terrain source data, not the actual terrain imagery. You must define and build terrain resources to be able to see a preview of the actual terrain.



6. Right-click **SF_terrain**, and select **Zoom to Layer** from the context menu.

   This fills the Preview pane with the city of San Francisco. The high-resolution imagery inset, SFHighResInset, is still part of this view, and the SFBayAreaLanSat provides the background imagery.

7. Use the toolbar buttons and/or your mouse wheel to zoom in and out to explore the terrain extents on the underlying imagery.
8. Right-click any layer and select **Remove All Layers**.

   A message prompts you to confirm that you want to remove all layers.

9. Click **OK**.

   All of the layers disappear from the Preview panes. You can leave the preview pane zoomed in to prepare for an upcoming exercise, even though the imagery is too close to make out any details at this point.

Define Terrain Resources

In this exercise, you create terrain resources from the terrain data provided for this tutorial.

To define a terrain resource:

1. Open the Asset Manager, and click  on the toolbar.

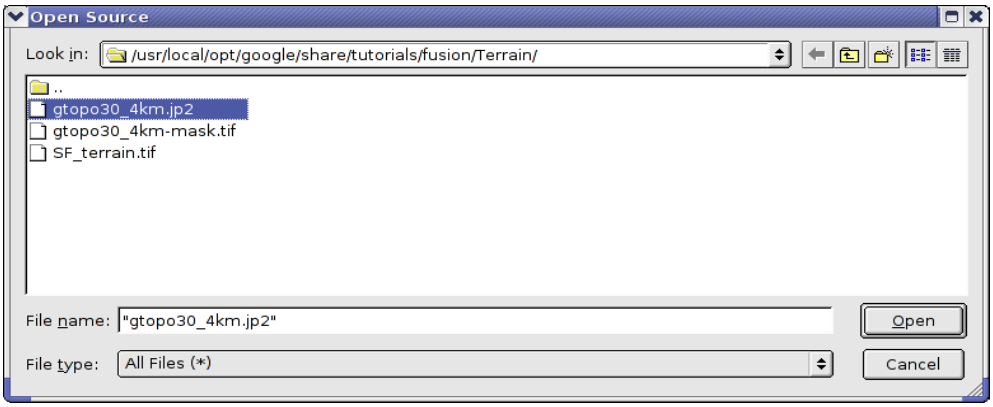
The Terrain Resource Editor appears.

2. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
3. Select **USGS Terrain** from the Provider drop-down list.
4. Set the Mask Type (under Mask Options) to **Have Mask**.

   The mask file for your import must be located in the same folder as the source file, and the file name must match the name of the source file with `-mask` appended. For example, in the tutorial files provided, the source file is called `gtopo30_4km.jp2`, and its mask file is named `gtopo30_4km-mask.tif`. Google Earth Enterprise Fusion automatically applies the mask file by reference to the source file.

   Note: You can use the **Have Mask** option for resources that contain one source file only.
5. Accept the Elevation Units default, **Meters**.
6. Click **Add**.

   The Open Source dialog opens to the `/opt/google/share/tutorials/fusion/Terrain` folder.
7. Select **gtopo30_4km.jp2**, and click **Open**.



   The selected file appears on the Source File(s) list.
8. Select **Save** from the File menu.

   The Save dialog appears.
9. Navigate to the `/ASSET_ROOT/Resources/Terrain` folder you created in Lesson 1.
10. Enter the name **WorldTopography** for the resource, and click **Save**.

    The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Terrain` folder in the asset navigation tree.

To define another terrain resource:

1. In the **Asset Manager**, click  on the toolbar.

   The Terrain Resource Editor appears.
2. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
3. Select **USGS Terrain** from the Provider drop-down list.
4. Set the Mask Type (under Mask Options) to **Auto Mask**, and accept the default mask settings:
   - Feather: **100**
   - Hole Size: **0**
   - NoData: **-99999:0**

   (For details about masking, see the **Mask Options** section in the **Defining Resources** chapter of the **Reference Guide**.)
5. Accept the Elevation Units default, **Meters**.
6. Click **Add**.

   The Open Source dialog appears.
7. From the `/opt/google/share/tutorials/fusion/Terrain` folder, select **SF_terrain.tif**, and click

Open.

The selected file appears on the Source File(s) list.

8. Select **Save** from the File menu.

   The Save dialog appears.

9. Navigate to the `/ASSET_ROOT/Resources/Terrain` folder you created in Lesson 1.
10. Enter the name **SFTerrain** for the resource, and click **Save**.

    The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Terrain` folder in the asset navigation tree.

Build and Modify Terrain Resources

As with imagery resources, in this exercise, you build the terrain resources right away.

Note: The WorldTopography terrain resource is quite large and could take up to 30 minutes to build, depending on the speed of your CPU. It is a good idea to start this exercise close to lunch time or just before you attend a meeting, so it can be building while you are busy doing something else.

To build and modify a terrain resource:

1. In the Asset Manager, select the `/ASSET_ROOT/Resources/Terrain` folder.

   The terrain resources appear on the right with the Current Version and the Current State set to **None**, indicating that the resources have not yet been built.

2. Right-click **WorldTopography**, and select **Build** from the context menu.

   The status of the resource changes to **Queued** and then to **In Progress**.

3. Right-click **SFTerrain**, and select **Build** from the context menu.

   The status of the SFTerrain resource changes to **Queued** until the WorldTopography resource finishes building and then to **In Progress**.

   When each resource finishes building, the Current State column in the Asset Manager changes to **Succeeded**, and its Current Version column changes to the date and time the most recent build was started.

   Drag the **SFTerrain** resource into the Preview List pane, and check the box next to it.

4. Right-click **SFTerrain**, and select **Zoom to Layer**.

   The bounding box for the terrain resource appears in the Preview pane, and the grayscale terrain imagery appears in the bounding box.

   Note: Since the Preview pane in Google Earth Enterprise Fusion is meant for preview purposes only, it does not render terrain in 3D like Google Earth EC. Instead, it renders a grayscale interpretation of the terrain. The lighter pixels represent the higher elevations, and the darker pixels represent lower elevations. For this reason, the Preview pane is not useful for comparing elevation values from different resources.

Because the background is a very low-resolution image, it is hard to determine what you are looking at. The solution to this problem is to add high-resolution imagery to the Preview pane to give you a frame of reference.

5. In the Asset Manager, navigate to `ASSET_ROOT/Resources/Imagery`, and drag **SFBayAreaLanSat** to the Preview List pane, and check the box next to it.

   The higher-resolution imagery appears under the terrain imagery, so you can get a better idea of where the terrain is located.

   The mask automatically generated by Google Earth Enterprise Fusion removes all of the fill data in the terrain resource, using the feather value specified in the Terrain Resource Editor.

   The preview shows that the default feather of 100 pixels is far too aggressive, removing much of the terrain data around the coastline. In a real-world situation, you can provide your own mask for the data to be sure you can see every detail around the coastline. For this tutorial, however, simply adjust the feather value for the mask that Google Earth Enterprise Fusion generates automatically.

6. Double-click the for the **SFTerrain** resource in the Asset Manager.

   The Terrain Resource Editor appears with all of the SFTerrain resource's settings.

7. Change the Feather value to **5**.
8. Select **Save** from the File menu.

   Google Earth Enterprise Fusion saves the terrain resource with the same name.

9. Build the SFTerrain resource again.
10. Drag and drop the **SFTerrain** resource onto the Preview List pane.

    The new version of the resource appears at the bottom of the list with a number after the resource name to distinguish it from other versions of the same resource.

11. Uncheck the box next to the original version of the resource, and check the box next to the modified version.

    The Preview pane displays the modified version of the resource.

    Because the second version of the resource is listed below the imagery resource in the Preview List pane, it appears below the imagery in the Preview pane. Because of the list order, the imagery

resource is actually obscuring the terrain resource. All you can see is the mask.

12. Right-click any layer in the Preview List pane, and select **Remove All Layers** from the context menu.

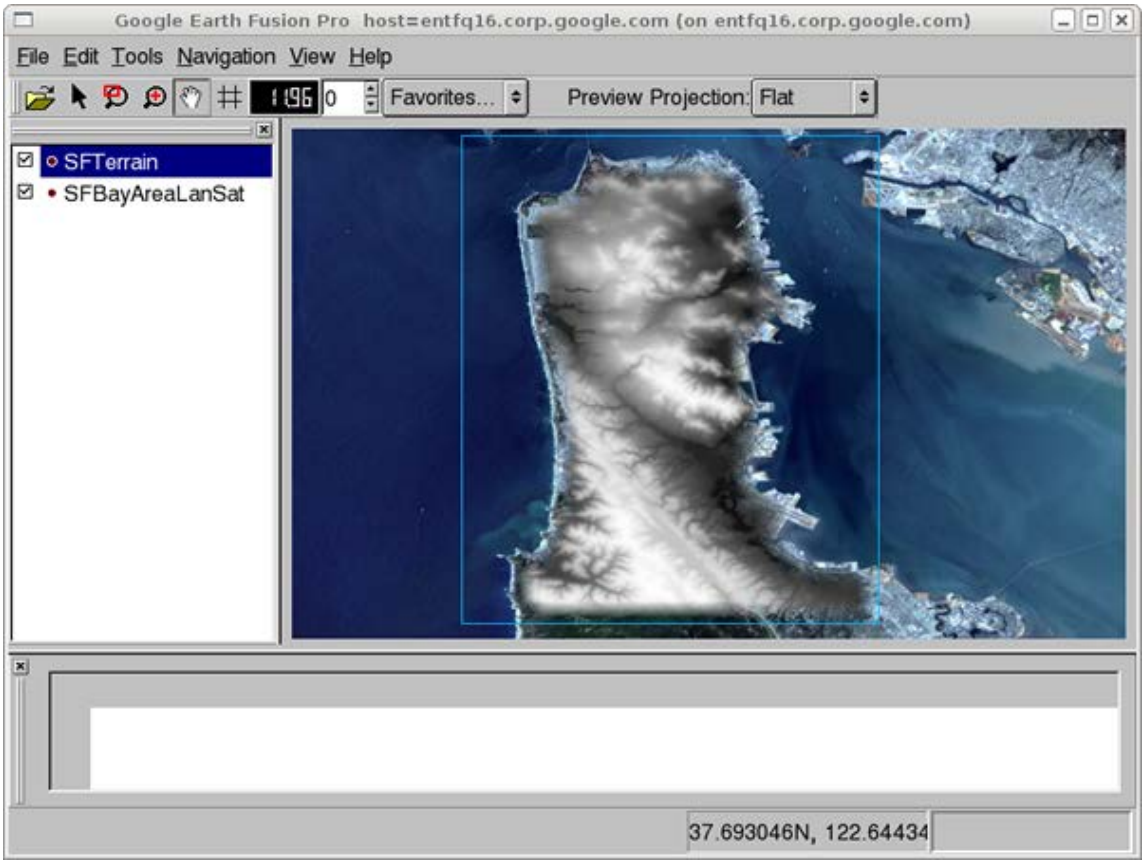
    A message prompts you to confirm that you want to remove all layers.

13. Click **OK**.

    All of the layers disappear from the Preview panes.

14. In the Asset Manager, navigate to `ASSET_ROOT/Resources/Terrain`, and drag and drop the new version of the **SFTerrain** resource onto the Preview List pane, and check the box next to it.
15. Navigate to `ASSET_ROOT/Resources/Imagery`, and drag **SFBayAreaLanSat** to the Preview List pane, and check the box next to it.

    Now you can see the preview of the terrain over the imagery. With a feather value of 5, the mask removes the fill data but removes much less of the real data, allowing the actual terrain data to be visible out to the edges of the coastline.



16. When you finish examining the preview, right-click either layer in the Preview List pane, and select **Remove All Layers** from the context menu.

    A message prompts you to confirm that you want to remove all layers.

17. Click **OK**.

    All of the layers disappear from the Preview panes.

18. Press **Ctrl-R** to reset the view to the whole Earth.

Define Vector Resources

The following exercises guide you through the process of defining and building a vector resource for California highway data.

Explore Vector Source Files

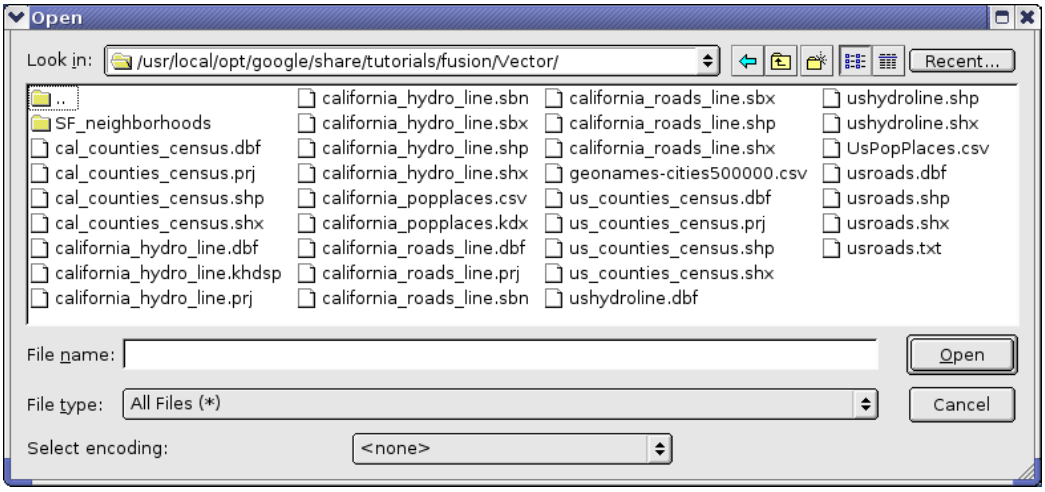
As with imagery and terrain files, you can preview vector source files to be sure they provide the data you want before you convert them to resources. This exercise provides an opportunity for you to use some additional preview tools.

To explore vector source files:

1. Click  .

   The Open dialog appears.

2. Navigate to the `/opt/google/share/tutorials/fusion/Vector` folder.

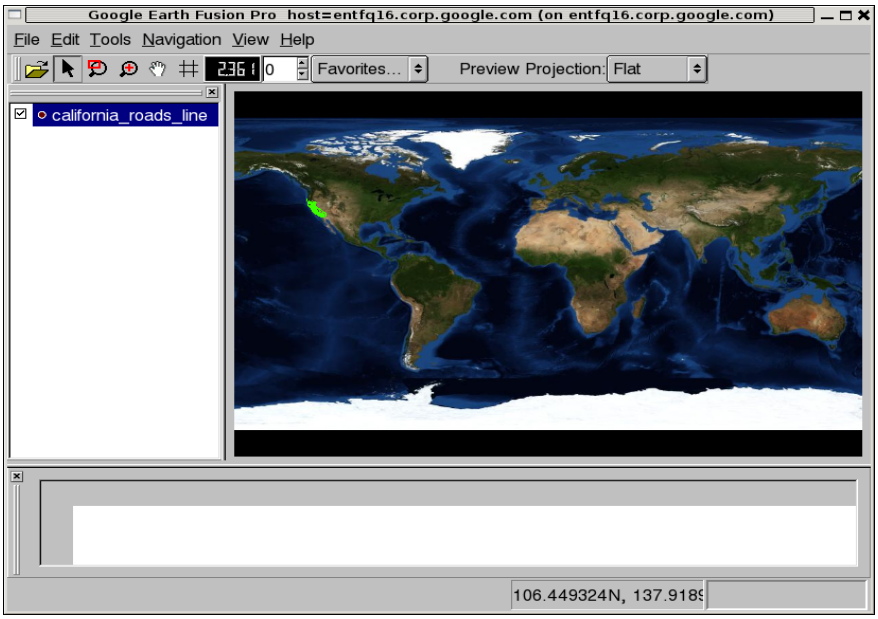


3. Select `california_roads_line.shp`, and click **Open**.

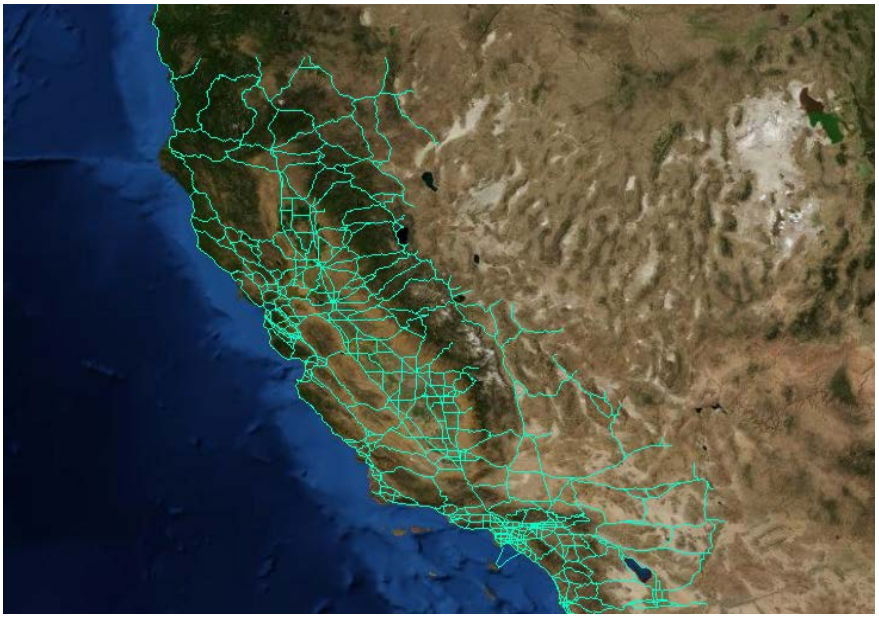
   The layer name appears in the Preview List pane.

4. Check the box next to `california_roads_line`.

   The highway and road lines appear on California. (It appears below in bright green; it might appear in a different color on your screen.)



5. Right-click **california_roads_line**, and select **Zoom to Layer** to zoom into the San Francisco Bay area to view the road features.



6. Make sure the layer is selected (highlighted) in the Preview List pane. Then, with  selected on the toolbar, drag a selector rectangle around the City of San Francisco.

   The selected area is highlighted (yellow), and the data fields that correspond to the selected area appear in the Data List pane.

   You can scroll through this data and sort it by columns to explore the values of each field to determine the potential attributes to use in the filters you set up in Lesson 3.
7. When you finish exploring the data, right-click the **california_roads_line**, and select **Remove Layer** to clear the Preview panes.

   A message prompts you to confirm that you want to remove the layer.
8. Click **OK**.

   The layer disappears from the Preview panes.
9. Press **Ctrl-R** to reset the view to the whole Earth.

Define a Vector Resource

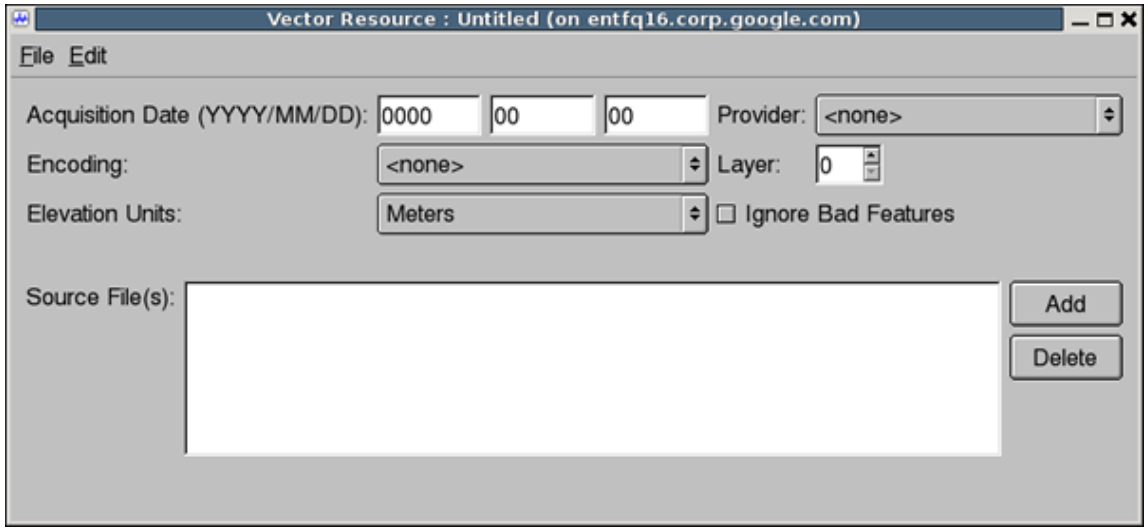
In this exercise, you define vector resources from the vector data provided for this tutorial.

To define a vector resource:

1. Select **Asset Manager** from the Tools menu.

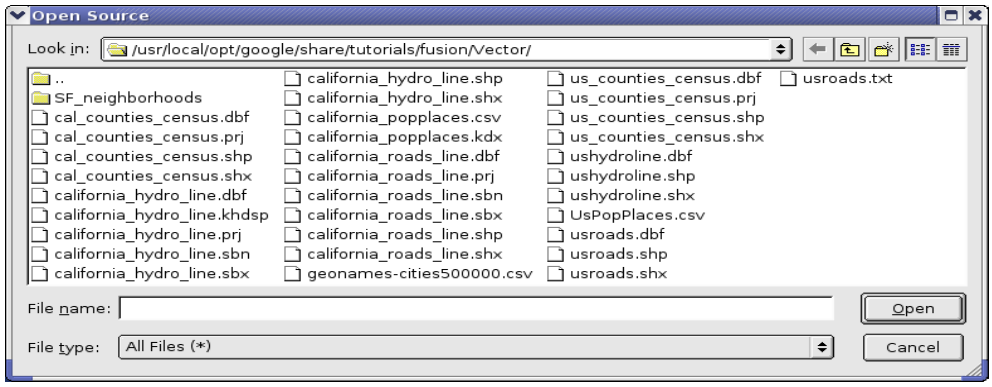
   The Asset Manager appears.
2. Click  on the toolbar.

   The Vector Resource Editor appears.



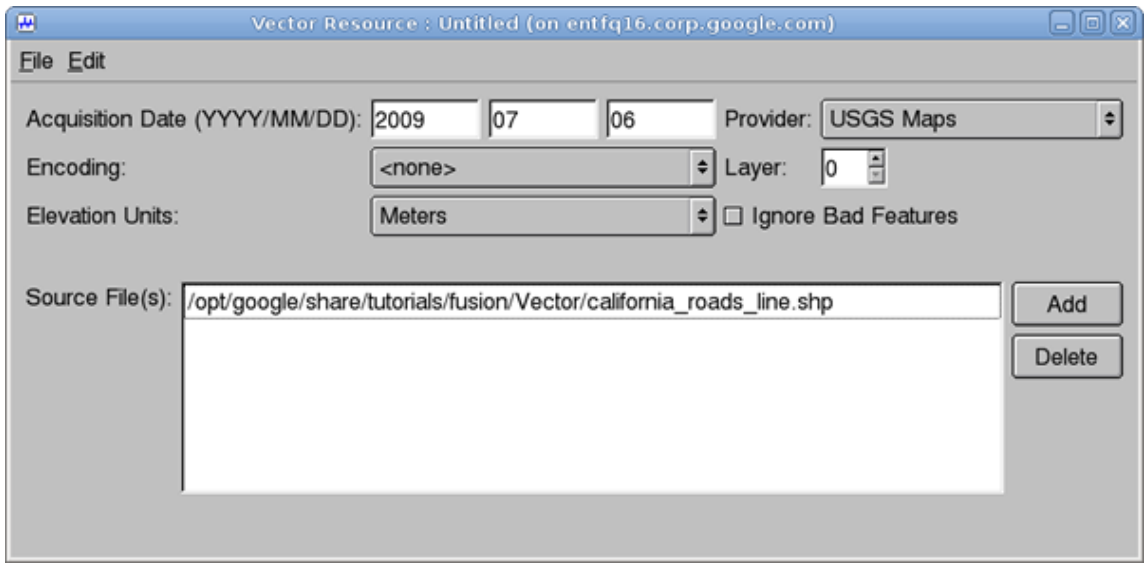
3. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
4. Select **USGS Maps** from the Provider drop-down list.
5. Click **Add**.

   The Open Source dialog opens to the `/opt/google/share/tutorials/fusion/Vector` folder.



6. Select the `california_roads_line.shp` file, and click **Open**.

   The selected file appears on the Source File(s) list.



7. Select **Save** from the File menu.

   The Save dialog appears.
8. Navigate to the `/ASSET_ROOT/Resources/Vector` folder you created in Lesson 1.
9. Enter the name **CAHighways** for the resource, and click **Save**.

The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Vector` folder in the asset navigation tree.

Build a Vector Resource

As with the imagery and terrain resources, in this exercise, you build the vector resource right away. In fact, you must build vector resources before you can include them in projects.

To build a vector resource:

1. In the Asset Manager, select the `/ASSET_ROOT/Resources/Vector` folder.

   CAHighways appears on the right with the Current Version and the Current State set to **None**, indicating that the resource has not yet been built.

2. Right-click **CAHighways**, and select **Build** from the context menu.

   The status of the resource changes to **Queued** and then to **In Progress**. When the CAHighways resource finishes building, its Current State column in the Asset Manager changes to **Succeeded**, and its Current Version column changes to the date and time the most recent build was started.

Define and Build the Remaining Vector Resources

Now that you have defined and built one vector resource, you can define and build the remaining vector resources provided for this tutorial.

Follow the steps in Define a Vector Resource to define resources for the following vector source files:

- **CAPopPlaces**
  - Acquisition Date: today's date
  - Provider: **USGS POIs**
  - Source File: `california_popplaces.csv`
  - Name: **CA _POIs**
- **USCensusbyCounty**
  - Acquisition Date: today's date
  - Provider: **GNIS/US Census Bureau**
  - Source File: `us_counties_census.shp`
  - Name: **US_Population**

After defining each resource, right-click it, and select **Build** from the context menu. By the time you finish defining the last resource, the other builds should all be complete.

When Google Earth Enterprise Fusion finishes building the last resource, close the Asset Manager by clicking the close box (**X**) in the top right corner, and go on to the next lesson.

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Defining and Building Projects

The following exercises guide you through defining and building imagery, terrain, and vector projects, using the resources you created in the previous lesson.

Define an Imagery Project

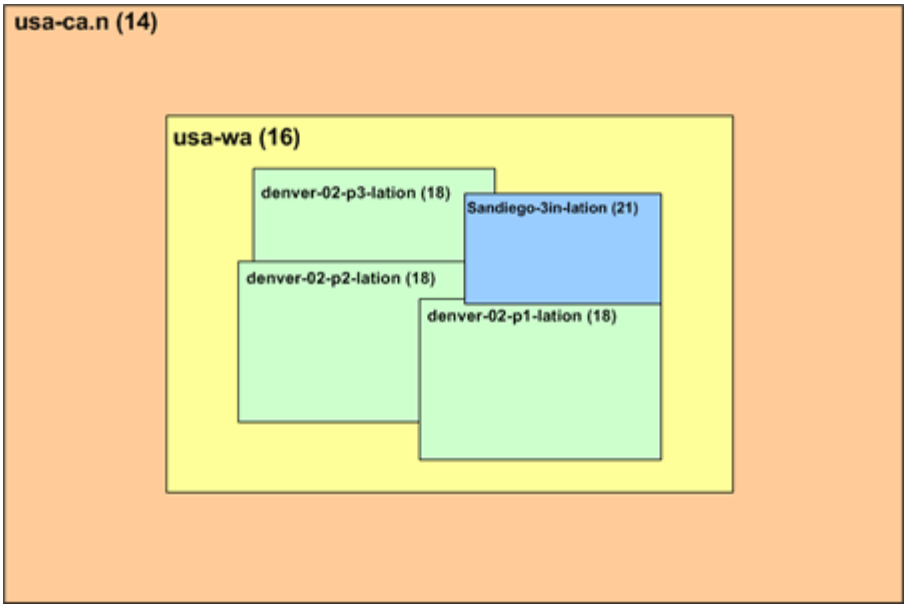
If you intend to use your own imagery data, it makes sense to define and build the imagery project before adding vector data. That way, you can use the imagery project as the base image map in the Preview pane in Google Earth Enterprise Fusion when you develop your vector project, making it easier to visualize how your vector data will appear over your actual imagery.

Add Resources to an Imagery Project

Although you can change the display order of imagery and terrain resources within a project, the order is ultimately determined by the resolution of the source files. That is, lower-resolution insets are automatically ordered below higher-resolution insets. So in reality, you can change the order of resources with the same resolution only.

The following example shows a number of imagery resources in a project ordered by resolution. The resolution of each resource appears in parentheses after the resource name.

The order in which the imagery or terrain resource data appears in the Imagery and Terrain Project Editors is the same as the stacking order of the insets in Google Earth EC. That is, higher-resolution insets appear above lower-resolution insets, so that viewing preference is given to the higher-quality imagery. The stacking order of same-resolution insets follows the order you define in the project. The following graphic illustrates this concept.



To add resources to an imagery project:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click  on the toolbar. The Imagery Project Editor appears.
3. Accept all of the default values in the Legend area. (Refer to the *Google Earth Enterprise Fusion Reference Guide* for details about these settings.)

4. Click  . The Open dialog appears.
5. Navigate to the `ASSET_ROOT/Resources/Imagery` folder.
6. Select **BlueMarble**, and click **Open**. The BlueMarble resource appears in the Imagery Project Editor.
7. Repeat steps 4 through 6 for each of the following resources:
   - **SFBayAreaLanSat**
   - **i3_15Meter**
   - **SFHighResInset**

   The resources appear in order by resolution, with the higher resolution imagery at the top of the list.
8. Select **File > Save**.
9. Navigate to the `ASSET_ROOT/Projects/Imagery` folder.
10. Enter **SFBayArea** as the name of your project, and click **Save**. The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Imagery** in the asset navigation tree.

Build an Imagery Project

As with resources, you do not have to build projects right away. You can define several projects and then build them all, or you can wait until you include them in a database and build the entire data hierarchy at the same time. However, in this lesson, you build the imagery project right away, so you can use it as a base map in the Preview pane.

Note: It could take up to 10 minutes for the project to build. Do this exercise when you can spend some time away from your computer while the project builds.

1. In the Asset Manager, right-click **SFBayArea**.
2. Select **Build** from the context menu.

   The status of the project immediately changes to **Queued** and then **In Progress**. (Sometimes the status changes so fast that it appears to change directly to **In Progress**.)

As with building imagery resources, you can view the progress of the build by double-clicking the Current Version or Current State column for the project. The Version Properties dialog displays the most recent version of that project. You can expand the version tree to view the status of the build in real time by clicking the + signs.

When the status of the imagery project build is **Succeeded**, go on to the next exercise.

Preview an Imagery Project

You can preview an imagery project after you build it.

Note: Only bounding boxes appear in the Preview pane, not the actual imagery.

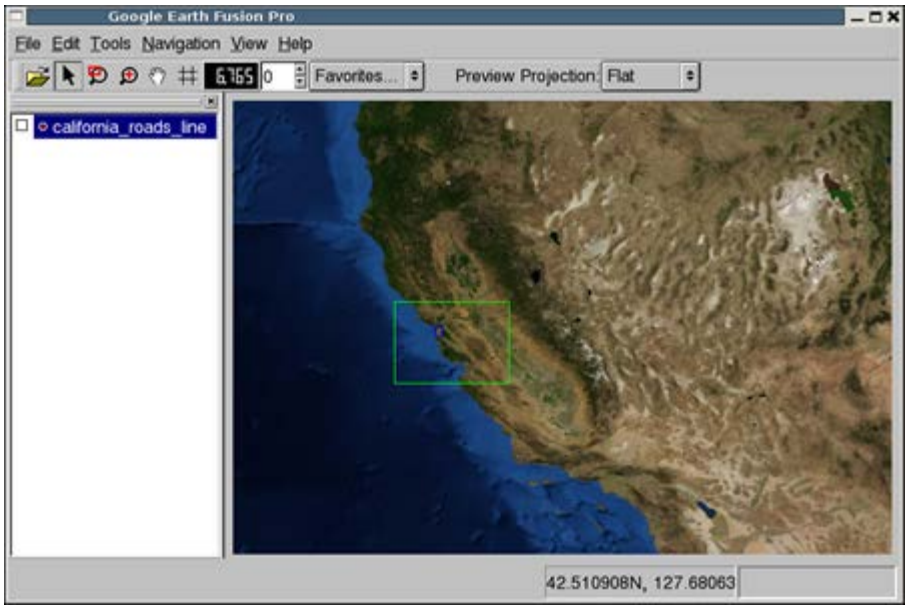
To preview an imagery project:

1. Double-click the name of the imagery project you built in the last exercise, **SFBayArea**. The Imagery Project Editor for that project opens.
2. Check the box next to **Preview** above the list of source files, and then switch to the main Google Earth Enterprise Fusion window.

   Bounding boxes indicate the extents of each of the individual imagery resources. The largest bounding box is around the entire Earth, which is the BlueMarble imagery. (You might have to zoom out a bit to see it.) The other three bounding boxes are in the San Francisco Bay Area. You can zoom in to see them.

   Note: The name of the project does not appear in the Preview List pane. When you close the Imagery Project Editor or uncheck the box next to **Preview**, the bounding boxes

disappear. You can reset the view by pressing **Ctrl-R**.



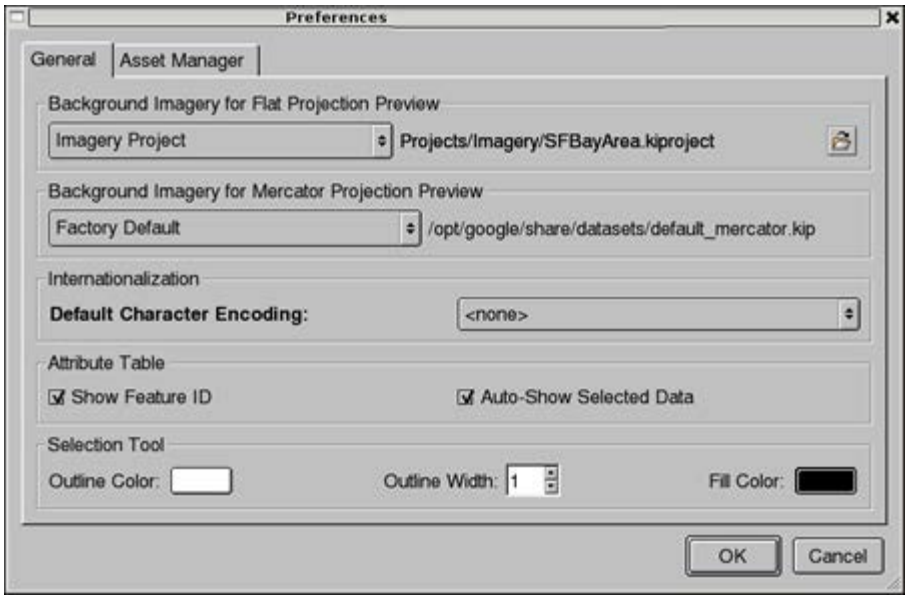
Specify an Imagery Project as Your Base Map

When the imagery project build is done, you can specify it as your base map.

To specify an imagery project as your base map:

1. Select **Preferences** from the Edit menu. The Preferences dialog appears.
2. Under Background Imagery, select **Imagery Project** from the drop-down list.
3. Click  to the right of the drop-down list. The Open dialog appears.
4. Navigate to `ASSET_ROOT/Projects/Imagery`, and select **SFBayArea**.

   The full path within the tutorial asset root appears to the right of the drop-down list.



5. Click **OK**. The Preview pane displays the specified imagery. The specified imagery will remain the background imagery until you change it to another image or return it to the default imagery in the Preferences dialog.

Define a Terrain Project

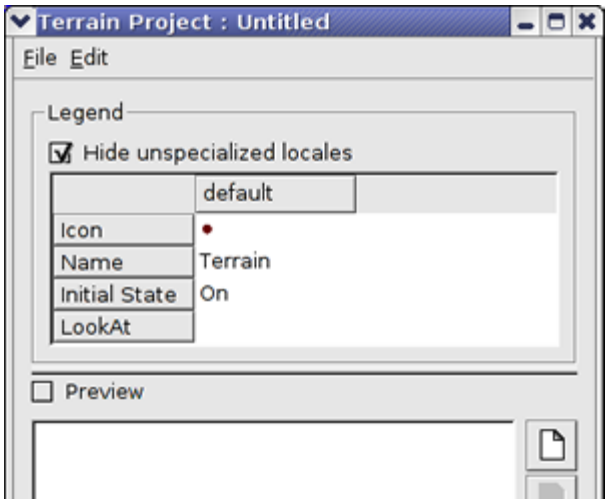
The terrain project for this tutorial is very simple. It includes one of the resources you built in the previous lesson.

Add a Resource to a Terrain Project

The following procedure provides the steps to add resources to a terrain project.

To add resources to a terrain project:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click  on the toolbar. The **Terrain Project** editor appears.



3. Accept all of the default values in the Legend area. (Refer to the **Reference Guide** for details about these settings.)
4. Click  . The Open dialog appears.
5. Navigate to the `ASSET_ROOT/Resources/Terrain` folder.
6. Select **SFTerrain**, and click **Open**. The SFTerrain resource appears in the Terrain Project Editor.

   Note: For a real terrain project, you should have worldwide coverage. However, a project with worldwide coverage would take too long to build, so for the purpose of this lesson, you use a smaller terrain image.
7. Check the box next to **Preview**.
8. Right-click the name of the resource, and select **Zoom to Layer** from the context menu.

   The Preview pane zooms in to the bounding box that indicates the extents of the terrain resource.

9. In the Terrain Project Editor, Select **File > Save**.
10. Navigate to the `ASSET_ROOT/Projects/Terrain` folder. Enter **SFTerrain** as the name of your project, and click **Save**.
11. The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Terrain** in the asset navigation tree.

Build a Terrain Project

As with the imagery project, in this exercise, you build the terrain project right away.

1. In the Asset Manager, right-click **SF Terrain**.
2. Select **Build** from the context menu.

   The status of the project immediately changes to **Queued** and then **In Progress**.

   > **Note:** It could take a while for this project to build, depending on the speed of your workstation.

When the status of the terrain project build is **Succeeded**, go on to the next exercise.

Define a Vector Project

The following exercises cover how to define, configure, and build a vector project using the resources you created in the previous lesson.

You spend the majority of your time in Google Earth Enterprise Fusion configuring display rules for vector projects, determining how they look in Google Earth EC. Using the data in your vector source files, you can designate specific data for a variety of display purposes, such as road labels, features lines, and icons at viewing altitudes that are most appropriate for each feature. For example:

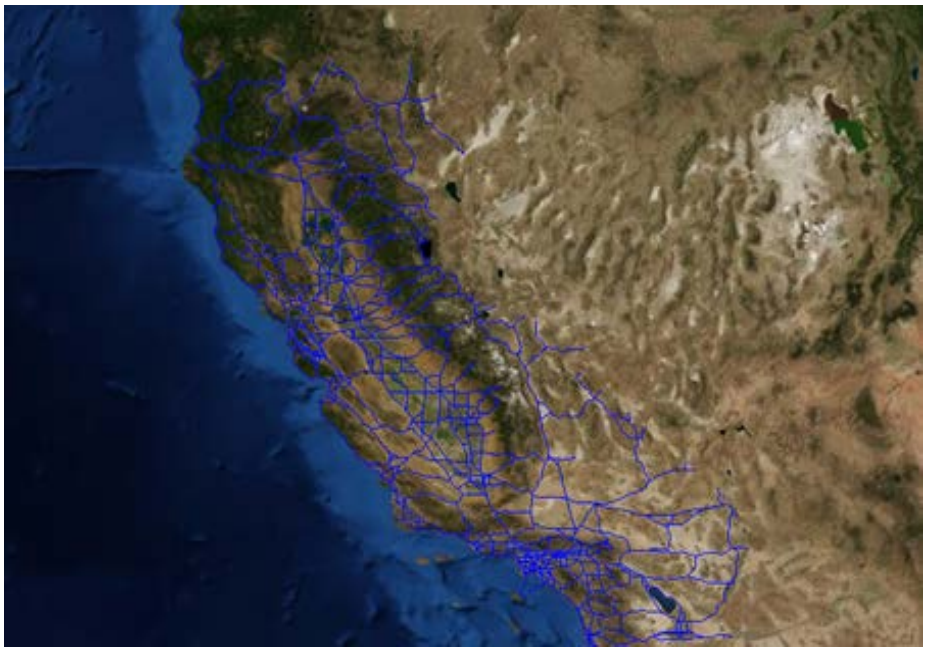
Add Resources to a Vector Project

Before specifying the display rules for this vector project, you must add the resource you created in Lesson 2.

To add resources to a vector project:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click  on the toolbar. The Vector Project Editor appears.
3. Click  . The Open dialog appears.
4. Navigate to the `ASSET_ROOT/Resources/Vector` folder.
5. Select **CAHighways**, and click **Open**. The CAHighways resource appears in the Vector Project Editor.
6. Repeat steps 3 through 5 to add **USPopulation** to the project. Notice that a check box appears next to each resource/layer in the project.
7. Check the box next to **CAHighways**.
8. Right-click **CAHighways**, and select **Zoom to Layer** from the context menu.

   The roads in the CAHighways resource appear in the Preview pane.



9. Check the box next to **USPopulation**, switch to the Preview pane, and zoom out a bit.

   Since this resource contains US census data by county, the outlines of counties across the US appear in the Preview pane as well as the roads in California.

> **Note:** The name of the project does not appear in the Preview List pane. When you close the Vector Project Editor or uncheck the boxes next to the resources, the vector data disappears. You can reset the view, if desired, by pressing **Ctrl-R**.

10. In the Vector Project Editor, select (highlight) **USPopulation**, and click  to remove the US Population resource from the project. A message prompts you to confirm the deletion.
11. Click **OK**. The **USPopulation** disappears.

> **Note:** Removing the resource from the project does not delete the resource. The resource remains intact and available for use by other projects. It is just not part of this particular project.

12. Select **File > Save**.
13. Navigate to the `ASSET_ROOT/Projects/Vector` folder.

14. Enter **CARoads** as the name of your project, and click **Save**. The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Vector** in the asset navigation tree.

Now you are ready to begin configuring the vector layer.

Configuring Layer Properties for a Vector Project

This exercise covers how to configure layer properties for your vector project. Layer properties determine a number of aspects of how your data appears and is accessed in Google Earth EC.

To configure layer properties:

1. In the Asset Manager, double-click **CARoads** in the `/ASSET_ROOT/Projects/Vector` folder. The Vector Project Editor appears and displays the resource you added in the previous lesson.
2. Right-click **CAHighways**, and select **Layer Properties** from the context menu. The Layer Properties dialog appears.
3. Click **Off** next to Initial State to change it to **On**. Changing the initial state to **On** results in the CAHighways layer being automatically checked (turned on) in Google Earth EC.
4. Click the blank field next to **LookAt**. The Open dialog appears.
5. Navigate to `/opt/google/share/tutorials/fusion/KML`, select `San Francisco View Oblique.kmz`, and click **Open**.

   When you specify a KML/KMZ file in this field, Google Earth EC users can fly directly to the specified camera view by double-clicking the layer.

   The latitude and longitude of the selected KMZ file appear in the LookAt field. (You can only see the beginning of the latitude unless you expand the default column width.)
6. Click **OK**. You return to the Vector Project Editor.
7. Select **File > Save**. Google Earth Enterprise Fusion saves the vector project with the same name.

Configure Display Rules for a Vector Project

This exercise covers how to specify display rules for your vector project. Display rules determine how your data looks in Google Earth EC.

Each resource in a project is known as a *layer*. Each layer can have one set of display rules. Each display rule includes feature and label formatting that you specify and one or more filters for the selected layer. The filters for each display rule determine which data in the layer to apply that formatting to. For example, in this exercise, you work with road data that includes major and minor highways. You might want the major highways to appear as blue lines and the minor highways as yellow lines. To accomplish that, you create two display rules for the layer--one for major highways and one for minor highways. The filter(s) for each rule determine which data are affected by that rule's formatting specifications.

In this exercise, you create and modify a number of display rules for the CAHighways layer, so Google Earth EC displays the road information at the desired display levels with appropriate labels and coloring to distinguish between major freeways and other roads.

A key part of knowing how to configure display rules for vector data requires familiarity with the data fields in the source data. For the CAHighways layer of your vector project in this tutorial, you can refer to the description of the data fields at this web site:

```
http://www.nationalatlas.gov/mld/roadtrl.html
```

To configure a vector layer:

1. In the Vector Project Editor, right-click **CAHighways**, and select **Configure Display Rules** from the context menu.

   The Display Rules dialog appears with the Feature tab in the foreground and the **default**

select all rule highlighted.

When you first create a vector project, the default display rule--**default select all--**is the only rule listed for each layer. The filter for the default rule has no matching criteria, so it matches all data. This rule is considered the *catch-all* rule. It is designed to catch all of the data that does not match any other rules you create.

Tip: Google Earth Enterprise Fusion executes the display rules sequentially, based on the order in which they are listed on the Rules list. So you should always make the **default select all** rule the last one on the list.

First, Google Earth Enterprise Fusion attempts to match the filter specified for the first rule to the data in the resource. Then it applies the formatting specified for that rule to any matching data.

Next, it attempts to match the filter specified for the second rule to the remaining data in the resource (that is, data not selected for the first filter). It applies the formatting specified for that rule to any matching data.

Then, it applies the formatting you specify for the **default select all** rule (or the default formatting, if you do not change it) to any data that does not match the previous rules on the list, if any. This ensures that all vector data for the layer is displayed.

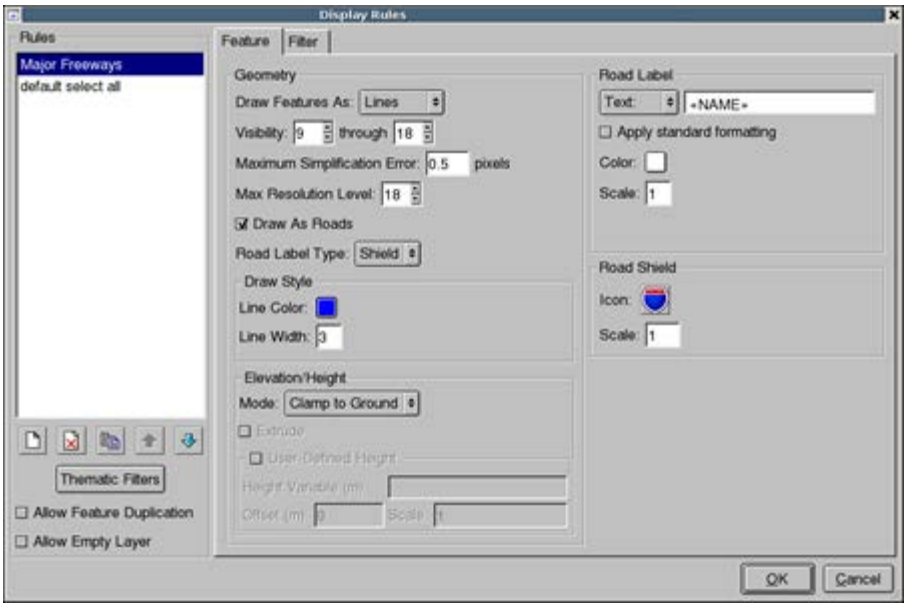
Configure the Default Select All Rule

In this part of the exercise, you define the **default select all** rule. This rule applies to all of the surface streets that are left after the highways and freeways are covered by other rules. You define the additional rules for highways and freeways later in this exercise, because they are based on this default rule.

To define the default select all rule:

1. Specify the geometry characteristics of the lines:
    a. For Draw Features As, select **Lines**.
    b. For Visibility, set the lower end of the range to **9**, and the upper end of the range to **18**.
    c. For Maximum Simplification Error, accept the default setting, **0.5**.
    d. For Maximum Resolution Level, select 18. This sets visibility level and the point where the Google Earth Enterprise Fusion stops building the resource.
2. Check the box next to **Draw As Roads**, and specify the options related to road labels:
    a. For Road Label Type, accept the default setting, **Label**.
    b. Under Draw Style, for Line Color, set it to bright red.
    c. For Line Width, enter **2.0**.
    d. For Elevation/Height Mode, accept the default setting, **Clamp to Ground**.

    These settings display the roads as red lines when Google Earth EC is zoomed in fairly close.
3. In the **Road Label** section on the right:
    a. Click the empty text field. The Label Format dialog appears. This option allows you to specify the text that appears on the label.
    b. Click the Insert Field drop-down list to display the names of all of the fields in your source data.
    c. Select **NAME** from the list. The string «**NAME**» appears in the text field.
    d. Click **OK**. The string «**NAME**» appears in the Text field. The Display Rule dialog shows all of your selections. These settings result in Google Earth EC displaying the value of the NAME column for each road in your source data.



e. Click **OK** to save your display rule.

4. Verify that your display rule does what you intend:
   a. Ensure that nothing is listed in the Preview List pane. If one or more assets are listed, right-click any asset, and select **Remove All Layers** from the context menu; then click **OK** to confirm the removal.
   b. In the Vector Project Editor, check the box next to **CAHighways**.
   c. Right-click **CAHighways**, and select **Zoom to Layer** from the context menu.

      No roads appear because your display level is approximately 7, and you set the visibility level to between **9** and **18** in the Display Rules dialog.

   d. Zoom in to a display level of just over **9**. Red lines appear for the roads in the Preview pane.

      > **Note:** Labels for vector projects do not appear in the Preview pane.

   e. Zoom out to a display level less than **9**. The roads disappear from the Preview pane.
5. Save the vector project by selecting **Save** from the File menu in the Vector Project Editor.

   This saves the project with the same name. If you want to save a project you create outside this tutorial with a different name, you can select **Save As** from the File menu, and follow the instructions in Add Resources to a Vector Project.

   > **Note:** Whenever you modify display rules or filters for your data, it is a good idea to save the project.

Display Rules for Major Freeways

This exercise guides you through creating the display rules necessary to achieve the desired appearance for the major freeways in the San Francisco Bay Area. When you finish this exercise, you should have a good understanding of the use of filters in managing complex data.

When setting display rules for vector data, it is critical that you are familiar with the source data you are working with and have an understanding of the fields used to classify different types of vector data. In the source data for this tutorial, the FEATURE column sorts the roads and highways into the following types:

- Principal Highway
- Other Through Highway
- Other Highway
- Limited Access Highway

In this exercise, you create a second filter and use the FEATURE column values to distinguish the limited access highways (major freeways) from other types of highways and roads, and then

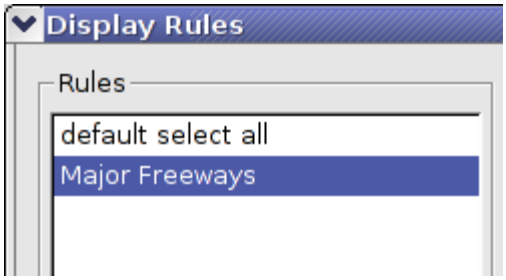
display them appropriately.

To define a display rule for major freeways:

1. In the Vector Project Editor, right-click **CAHighways**, and select **Configure Display Rules** from the context menu.

   The Display Rules dialog appears with the Feature tab in the foreground and the **default select all** rule highlighted.

2. Click  at the bottom-left of the dialog. The New Rule dialog appears.
3. Enter **Major Freeways** in the New Rule Name field, and click **OK**. The new rule name appears on the Rules list below the **default select all** rule.



4. Click  to move the new rule up, so it appears before the **default select all** rule.

   Because Google Earth Enterprise Fusion applies display rules in the order in which they appear on this list, the MajorFreeways rule must appear before the *catch-all* rule (**default select all**), which covers all data not covered by other rules.

5. On the Feature tab, specify the geometry characteristics for the Major Freeways rule:
   a. For Draw Features As, select **Lines**.
   b. For Visibility, set the low end of the range to **9** and the high end of the range to **18**.
   c. For Maximum Simplification Error, accept the default setting, **0.5**.
6. Check the box next to **Draw as Roads** (if it is not already checked).
   a. For Road Label Type, select **Shield**.
   b. Under Draw Style, for Line Color, set it to royal blue.
   c. For Line Width, enter **3.0**.
   d. Under Elevation/Height, for Mode, accept the default, **Clamp to Ground**.

      These settings display the roads as thick blue lines when Google Earth EC is zoomed in fairly close.
7. In the Road Label section, accept the current settings.
8. In the Road Shield section on the right, click the button next to **Icon**. The Icons dialog appears.

9. Scroll down, and select **shield1**, and click **OK**.

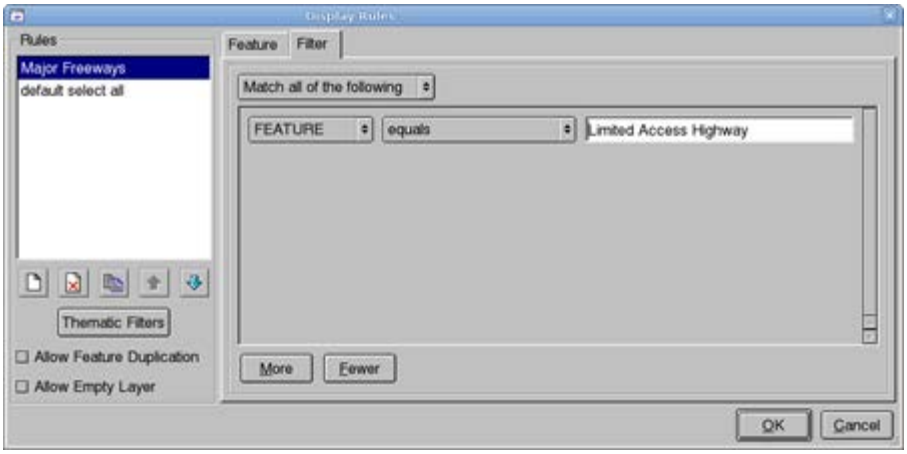
   The Display Rule dialog shows all of your selections.

10. Click the **Filter** tab, and specify the filter for the Major Freeways rule:
    a. Accept the default selection, **Match all of the following**, at the top of the tab.
    b. Click **More** at the bottom of the tab.

       Two drop-down lists and a text box appear on the list of filters.

    c. Select **FEATURE** from the left drop-down list.
    d. Select **equals** from the other drop-down list.
    e. Enter **Limited Access Highway** in the text field.

       The Filter tab shows your selections.



    f. Click **OK** to save your changes to the display rule.

       When this data is displayed in Google Earth EC, this filter causes the display settings on the Feature tab to be applied only to the road segments in your source data with the value **Limited Access Highway** in their FEATURE column.

11. Verify that both filters and rules are working correctly:
    a. In the Vector Project Editor, check the box next to **CAHighways**, if it is not already checked.
    b. Zoom in to a display level between **9** and **18**, if necessary.

       Both thin red roads and thicker blue roads appear in the Preview pane. The thicker blue roads are the roads defined in the MajorFreeways filter, and the thinner red roads are the rest of the roads in the source data, which are defined by the **default select all** filter.

12. Save the vector project by selecting **Save** from the File menu in the Vector Project Editor.

    This saves the project with the same name.

Build a Vector Project

As with imagery and terrain projects, in this exercise, you build the vector project as soon as you finish configuring display rules.

1. In the Asset Manager, right-click **CARoads**.
2. Select **Build** from the context menu.

   The status of the project immediately changes to **Queued** and then **In Progress**.

When the status of the vector project build is **Succeeded**, close the Asset Manager by clicking the close box (**X**) in the top right corner, and go on to the next lesson.

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Defining and Building Databases

The following exercises guide you through defining and building a database, using the projects you created in the previous lesson.

Define a Database

When you define a database, you specify one or more Google Earth Enterprise Fusion projects that Google Earth Enterprise Fusion combines into a single self-contained world that is flyable in Google Earth EC. You can select up to three projects for a database--one of each type:

- Vector
- Imagery
- Terrain

Because the majority of your efforts involve defining and configuring different projects for inclusion in your database, it is relatively fast to define a database once the projects are created. You simply select the projects that comprise the database and give it a name.

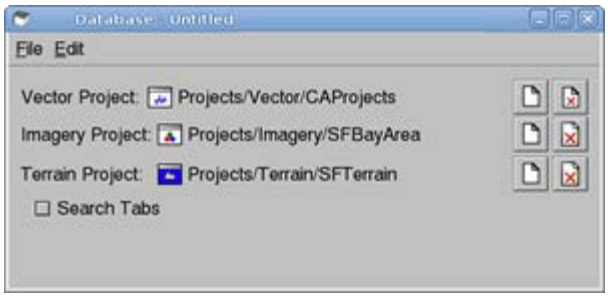
To define a database:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click the page icon on the toolbar:  The Database Editor appears with no projects selected.

3. Click the page icon in the **Vector Project** row: 
4. Navigate to `ASSET_ROOT/Projects/Vector`.

   Note: The selection in the **Type** drop-down list near the bottom of this dialog determines the type of projects that appear on the list. Vector Project is automatically selected, so only vector resources appear on the list.
5. Select the **CA_Projects** project and click **Open**. The CA Roads project appears in the Database Editor next to Vector Project.
6. Click the page icon in the **Imagery Project** row and select `Projects/Imagery/SFBayArea`.
7. Click the page icon in the **Terrain Project** row and select `Projects/Terrain/SFTerrain`.

   All three projects are now listed in the Database Editor window:



8. Select **File > Save** and navigate to the `ASSET_ROOT/Databases` folder.
9. Enter **SFHighways** as the name of your database, and click **Save**.

   The name of the database is displayed when you select the `/ASSET_ROOT/Databases` folder in the asset navigation tree.

Build a Database

Once the database has been defined, it is ready to be built.

Note: If you had not built the projects included in this database previously, the following process would build them in the course of building the database. As you might expect, the database build process takes much longer if it is building all of the projects in the database at once. However, since Google Earth Enterprise Fusion gives you the option to build each project as soon as you finish making modifications or when you build the database, you can determine the best work style for yourself.

To build a database:

1. In the Asset Manager, select the `/ASSET_ROOT/Databases` folder.

   SFHighways appears on the right with the Current Version and the Current State set to **None**, indicating that the database has not yet been built.

2. Right-click **SFHighways** and select **Build**. The status of the database immediately changes to **Queued** and then to **In Progress**.
3. Double-click the Current Version or Current State column of the **SFHighways** to view the progress of the build.

   The Version Properties dialog displays the most recent version of that database. You can expand the version tree to view the status of the build in real time by clicking the **+** signs.

When Google Earth Enterprise Fusion finishes building the database, its Current State column in the Asset Manager changes to **Succeeded**, and its Current Version column changes to the date and time the most recent build was started.

Close the Asset Manager by clicking the close box (**X**) in the top right corner, and go on to the next lesson.

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Publishing and Viewing a Database

Publishing a database is the process of making a Google Earth Enterprise Fusion database available on a Google Earth Enterprise Server for viewing with Google Earth EC.

Note: This lesson assumes that Google Earth Enterprise Fusion, the Google Earth Enterprise Server, and Google Earth EC are all installed on your local workstation. If any of these applications are installed elsewhere on your network, adjust the instructions in this lesson accordingly.

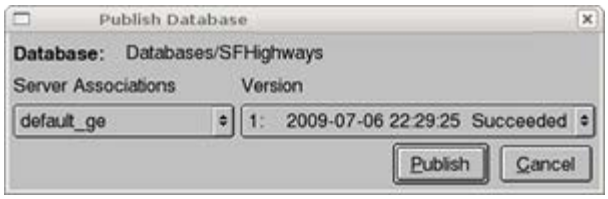
Publish Your Database

After you define and build your database, publishing your database is a breeze!

To publish a database:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Navigate to the **SFHighways** database you built in Lesson 4.
3. Right-click the name of the database, and select **Publish** from the context menu.

   The Publish Database dialog appears. The default server association (default_ge) is the only option on the Server Associations drop-down list. The most recent version of the selected database is the default selection on the Version drop-down list.



4. Click **Publish**. Google Earth Enterprise Fusion runs the publishing process on the database, and displays a success message when it is done.

   Note: If you get an error message, contact your Google Earth Enterprise Server administrator for help, or check the *Google Earth Enterprise Administration Guide* for more information.

View Your Database

After you publish your database, you can view it in Google Earth EC.

To view your database:

1. Launch Google Earth EC.

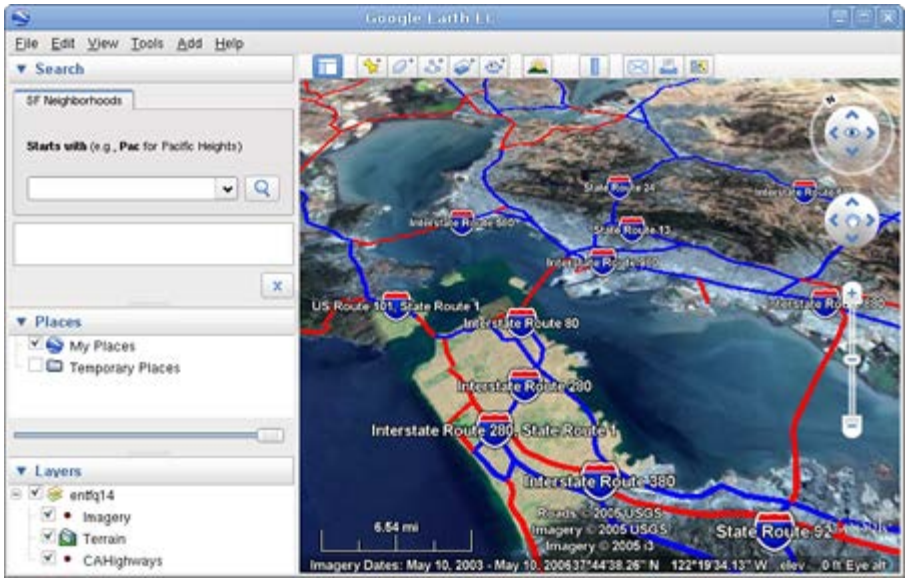
   The Login dialog appears.

2. Enter or select the URL or IP address of your server in the Server field, and accept the default setting, **80**, in the Port field (unless you know that your server uses a different port).
3. Click **Login**.

Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

Google Earth EC displays your database. The Layers panel shows the terrain, imagery, and vector layers in the database you published in the previous exercise.

4. Double-click **CAHighways** to zoom in to your road data.



This concludes the basic lessons in this tutorial. If you want to continue with the advanced lessons, you can work through them in any order you want. Alternatively, you can start working with real data now and come back and work through the advanced lessons as you need them. Be sure to use the *Google Earth Enterprise Fusion Reference Guide* often, as it contains much more detailed information than this tutorial.

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Configuring Display Rules for Point Data

Point data can provide useful information about points of interest (POIs) around the globe or even in your home town. Google Earth Enterprise Fusion allows you to configure the display rules for point data to distinguish different types of information. This lesson guides you through the process of graphically distinguishing the popular places in California using display rules.

Define, Configure, and Build a Vector Project

This exercise walks you through the process of defining, configuring, and building a vector project using a resource you created in Lesson 2.

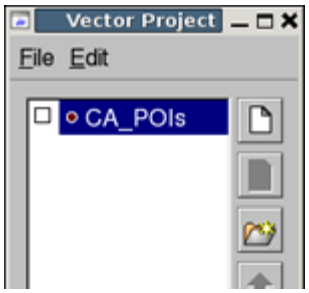
To define and build a vector project and configure display rules for points:

1. Select **Asset Manager** from the Tools menu.

   The Asset Manager appears.

2. Click  on the toolbar. The Vector Project Editor appears.

3. Click  . The Open dialog appears.
4. Navigate to the `ASSET_ROOT/Resources/Vector` folder.
5. Select **CA_POIs** (a resource that you built in Lesson 2), and click **Open**. The CA_POIs resource appears in the Vector Project Editor.



6. Right-click **CA_POIs**, and select **Configure Display Rules** from the context menu.

   The Display Rules dialog appears with the Feature tab in the foreground and the **default select all** rule highlighted.

7. Specify the geometry characteristics of the POIs:
   a. For Draw Features As, select **Points**.
   b. For Simplification Method, select **Representative Subset Per Tile**.
   c. For Choose, accept the default, **75**% points.
   d. For Min Points, enter **50**.
   e. For Max Points, enter **200**.
   f. Check the box next to **Suppress Duplicate Points**.
   g. Under Elevation/Height, set Mode to **Clamp to Ground.**

   These settings depend on the type of data you are working with. You can try settings you think will work, publish the data, review the result in Google Earth EC, and then go back and adjust the settings to make the data look the way you want. (Refer to the *Google Earth Enterprise Fusion Reference Guide* for complete details about each of the settings in this dialog.)

8. On the right side of the dialog, check the box next to **Draw Label**.

9. For Visibility, accept the default range, **5** through **24**.
10. Do not make any changes under Label Properties,

    This area allows you to specify the content and appearance of a text label for each POI. However, there are so many POIs in California that the view in Google Earth EC would be too crowded.

11. Check the box next to **Draw Icon** and then:
    a. Click the icon pair. The Icons dialog appears.

    b. Scroll down, if necessary, and select **blue_star**, and click **OK**.

       A yellow star appears next to Highlight, and a blue star appears next to Normal. The result of this setting is that Google Earth EC displays a blue star for each POI, and when you mouse over the star (highlight it), it turns yellow.

    c. For both Highlight and Normal, accept the default color, white.
    d. For Highlight, accept the default scale, **1**.
    e. For Normal, change the scale to **0.89**.

       The result of these settings is that when you mouse over a star, Google Earth EC displays the yellow (highlighted) star a little larger than the blue star.

12. In the Balloon section, select **Text**, and then click the empty text field. The Label Format dialog appears.
    a. Select **COUNTY** from the **Insert Field** drop-down list.

       «**COUNTY**» appears in the text box under Popup Text.

       > **Note:** You can use some basic HTML tags to format the Label text, if desired. (See Appendix C, “HTML Tags Allowed” in the *Google Earth Enterprise Fusion Reference Guide* for details.)

    b. To the left of «**COUNTY**» enter ****.
    c. To the right of «**COUNTY**» enter **

, and press **Enter.

       Adding this HTML code formats the name of the county as bold, followed by two line breaks to separate it from the text that follows (next step).

    d. Select **NAME** from the Insert Field drop-down list. «**NAME**» appears on the next line of the text box.
    e. To the right of «**NAME**» enter **

, and press **Enter.
    f. On the next line, enter **Latitude:** , and then select **LATITUDE** from the Insert Field drop-down menu.
    g. To the right of «**LATITUDE**» enter **

, and press **Enter.
    h. On the next line, enter **Longitude:** , and then select **LONGITUDE** from the Insert Field drop-down menu.

i. Click **OK**

13. For Style, select **Default** from the drop-down list.
14. Check the box next to **Directions** to include “To here” and “From here” links in the description balloon in Google Earth EC.
15. Click the **Text Color** button, and select a medium blue.
16. Click the **Background Color** button, and select a light yellow.
17. Click **OK**.

    You return to the Vector Project Editor.

18. Select **File > Save**.

    The Save dialog appears.

19. Navigate to the `ASSET_ROOT/Projects/Vector` folder.
20. Enter **CA_POIs** as the name of your project, and click **Save**.

    The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Vector** in the asset navigation tree.

21. Right-click **CA_POIs**, and select **Build** from the context menu.

    Google Earth Enterprise Fusion builds the project.

Define and Build an Imagery Project

Although you can build and publish a database that includes a vector project only, you cannot connect directly to your server with Google Earth EC to view that data unless your database also includes an imagery project. If you publish a database that includes a vector project only, you must use the **Add Database** command on the File menu in Google Earth EC to add the database to the to the base imagery after logging in to `kh.google.com` or some other server that serves a database that includes imagery.

This exercise walks you through the process of defining and building an imagery project using a resource you created in Lesson 2. Since the focus of this lesson is on polygon display rules, it is not desirable to spend a lot of time building a large imagery project. So this exercise walks you through creating a small and simple imagery project.

Note: If you have already completed this exercise in Lesson 7, skip this exercise and move on to Define, Build, and Publish a Database for the Point Data.

To define and build an imagery project:

1. In the Asset Manager, click  on the toolbar. The Imagery Project Editor appears.
2. Accept all of the default values in the Legend area. (Refer to the *Google Earth Enterprise Fusion Reference Guide* for details about these settings.)
3. Click  .

   The Open dialog appears.

4. Navigate to the `ASSET_ROOT/Resources/Imagery` folder.
5. Select **BlueMarble**, and click **Open**.

   The BlueMarble resource appears in the Imagery Project Editor.

6. Select **File > Save**.

   The Save dialog appears.
7. Navigate to the `ASSET_ROOT/Projects/Imagery` folder.
8. Enter **BlueMarble** as the name of your project, and click **Save**.

   The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Imagery** in the asset navigation tree.
9. Right-click **BlueMarble**, and select **Build** from the context menu.

   Google Earth Enterprise Fusion builds the project.

Define, Build, and Publish a Database for the Point Data

This exercise walks you through the process of defining, building, and publishing a database using the projects you created in the previous exercise.

To define, build, and publish a database:

1. Click  on the toolbar. The Database Editor appears with no projects selected.
2. Click  next to Vector Project. The Open dialog appears.
3. Navigate to `ASSET_ROOT/Projects/Vector`.
4. Select the **CA_POIs** project, and click **Open**. The CA_POIs project appears in the Database Editor next to Vector Project.
5. Repeat steps **2** through **4** to add **BlueMarble** as the imagery project.

   You do not need to add a terrain project for this exercise. Both projects appear on the list.
6. Select **File > Save**.
7. Navigate to the `ASSET_ROOT/Databases` folder.
8. Enter **CA_POIs** for the name of your database, and click **Save**. The name of the database appears on the right when you select the `/ASSET_ROOT/Databases` folder in the asset navigation tree.
9. Right-click **CA _OIs**, and select **Build** from the context menu. Google Earth Enterprise Fusion builds the database.
10. Right-click **CA_POIs**, and select **Publish** from the context menu. The Publish Database dialog appears.
11. Click **Publish**. Google Earth Enterprise Fusion runs the publishing process on the database, and displays a success message when it is done.

View Your Database in Google Earth EC

This exercise walks you through the process of viewing your database in Google Earth EC.

To view your database:

1. Launch Google Earth EC. The Login dialog appears.
2. Enter or select the host name or IP address of your server in the Server field, and accept the default setting, **80**, in the Port field (unless you know that your server uses a different port).
3. Click **Login**.

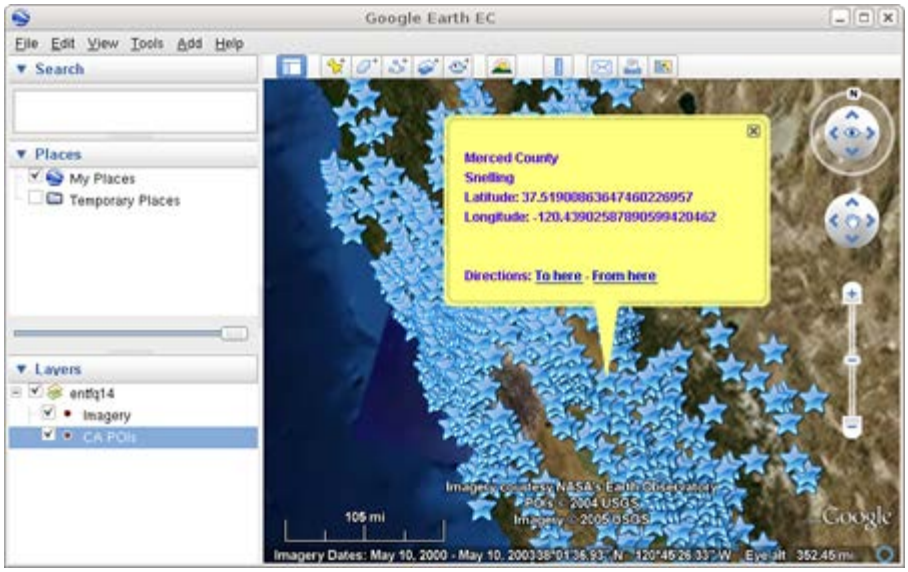
> **Caution:** If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

4. Zoom in to the west coast of the US.

   When you zoom in enough, Google Earth EC displays blue stars all over California. The closer you zoom in, the more spread out the stars are and the more stars you can see.

When you mouse over a star, it turns yellow. When you click a star, a description balloon displays the information you specified in the format you defined in the Display Rules dialog.

Note: If you cannot see the vector data, make sure the check box next to **CA_POIs** in the Layers panel is checked.



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Configuring Display Rules for Polygon Data

You can use elevation, color, and text labels to distinguish the characteristics of polygon shapes in your data. This lesson guides you through the process of graphically distinguishing the population in each county in California using display rules.

Define and Build a Vector Resource Using Polygon Data

This exercise walks you through the process of defining and building a vector resource using US census data for the state of California organized by county.

To define and build a vector resource using polygon data:

1. Select **Asset Manager** from the Tools menu.

   The Asset Manager appears.

2. Click  on the toolbar.

   The Vector Resource Editor appears.

3. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
4. Select **GNIS/US Census Bureau** from the Provider drop-down list.
5. Click **Add**.

   The Open Source dialog appears.

6. Navigate to the `/opt/google/share/tutorials/fusion/Vector` folder.
7. Select the `cal_counties_census.shp` file, and click **Open**.

   The selected file appears on the Source File(s) list.

8. Select **File > Save**.

   The Save dialog appears.

9. Navigate to the `/ASSET_ROOT/Resources/Vector` folder you created in Lesson 1.
10. Under **Label Properties**, select **Text** from the drop-down list, and then click the empty text field.
11. Enter the name **CACountyPopulation** for the resource, and click **Save**.

    The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Vector` folder in the asset navigation tree.

12. Right-click **CACountyPopulation**, and select **Build** from the context menu.

    Fusion builds the resource.

Define, Configure, and Build a Vector Project

This exercise walks you through the process of defining, configuring, and building a vector project using the resource you created in the previous exercise.

To define and build a vector project and configure display rules for polygons:

1. Click  on the toolbar. The Vector Project Editor appears.

2. Click  .

   The Open dialog appears.

3. Navigate to the `ASSET_ROOT/Resources/Vector` folder.
4. Select **CACountyPopulation**, and click **Open**.

   The CACountyPopulation resource appears in the Vector Project Editor.
5. Right-click **CACountyPopulation**, and select **Configure Display Rules** from the context menu.

   The Display Rules dialog appears with the Feature tab in the foreground and the **default select all** rule highlighted.
6. Specify the geometry characteristics of the polygons (in this case, the counties):
   a. For Draw Features As, select **Polygons**.
   b. For Visibility, accept the default range, **4** through **24**.
   c. For Maximum Simplification Error, accept the default setting, **0.5**.
   d. Under Draw Style, set:
      - Mode to **Outlined and Filled.**
      - Fill Color to medium green.

        Tip: When you set fill color, specify a value of 125 for the alpha channel instead of 255. This makes the fill color semi-transparent instead of opaque.
      - Outline Color to black.
      - Outline Width to **1.**

      The result of these settings is that Google Earth EC displays each county as a green polygon with a black outline.
   e. Under Elevation/Height, set:
      - Mode to **Relative.**
      - Check the box next to **Extrude**.
      - Check the box next to **User-Defined Height**.
      - Height Variable to **POP2000**. (Click the empty text field, select **POP2000** from Insert Field the drop-down list, and click **OK**.)
      - Offset to **0**.
      - Scale to **0.05**.

      The result of these settings is that Google Earth EC displays each county at an elevation relative to its population. That is, counties with higher population appear *taller*. Counties with lower population appear *shorter*. (Refer to the *Google Earth Enterprise Fusion Reference Guide* for complete details about each of the settings in this dialog.)
7. On the right side of the dialog, check the box next to **Draw Label**.

   This allows you to specify the content of a text label for each county.
8. For Visibility, set the range to **4** through **24**.
9. Under Label Properties, select **Text** from the drop-down list, and then click the empty text field.

   The Format Label dialog appears.
   a. Select **COUNTY** from the Insert Field drop-down list, and click **OK**.
   b. For Highlight, set:
      - Color to pale yellow.
      - Scale to **1**.

      The result of these settings is that Google Earth EC displays each county's name in bright yellow text. Each text label is centered within its county
   c. For Normal, set:
      - Color to bright yellow.
      - Scale to **1**.
   d. Check the box next to **Center Label**.
10. Click **OK**.

You return to the Vector Project Editor.

11. Select **File > Save**.

    The Save dialog appears.

12. Navigate to the `ASSET_ROOT/Projects/Vector` folder.
13. Enter **CACountyPopulation** as the name of your project, and click **Save**.

    Note: Although this is the same name as the resource, Fusion allows it, because they are different asset types and, therefore, have different file name extensions. In addition, they are being stored in different folders.

    The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Vector** in the asset navigation tree.

14. Right-click **CACountyPopulation**, and select **Build** from the context menu.

    Fusion builds the project.

Define and Build an Imagery Project

Although you can build and publish a database that includes a vector project only, you cannot connect directly to your server with Google Earth EC to view that data unless your database also includes an imagery project. If you publish a database that includes a vector project only, you must use the **Add Database** command on the File menu in Google Earth EC to add the database to the to the base imagery after logging in to `kh.google.com` or some other server that serves a database that includes imagery.

This exercise walks you through the process of defining and building an imagery project using a resource you created in Lesson 2. Since the focus of this lesson is on polygon display rules, it is not desirable to spend a lot of time building a large imagery project. So this exercise walks you through creating a small and simple imagery project.

Note: If you have already completed this exercise in Lesson 6, skip this exercise and move on to Define, Build, and Publish a Database for the Polygon Data.

To define and build an imagery project:

1. Click  on the toolbar.

   The Imagery Project Editor appears.

2. Accept all of the default values in the Legend area. (Refer to the *Google Earth Enterprise Fusion Reference Guide* for details about these settings.)
3. Click  .

   The Open dialog appears.

4. Navigate to the `ASSET_ROOT/Resources/Imagery` folder.
5. Select **BlueMarble**, and click **Open**.

   The BlueMarble resource appears in the Imagery Project Editor.

6. Select **File > Save**.

   The Save dialog appears.

7. Navigate to the `ASSET_ROOT/Projects/Imagery` folder.
8. Enter **BlueMarble** as the name of your project, and click **Save**.

   The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Imagery** in the asset navigation tree.

9. Right-click **BlueMarble**, and select **Build** from the context menu.

   Fusion builds the project.

Define, Build, and Publish a Database for the Polygon Data

This exercise walks you through the process of defining, building, and publishing a database using the projects you created in the previous exercise.

To define, build, and publish a database:

1. Click  on the toolbar.

   The Database Editor appears with no projects selected.

2. Click  next to Vector Project.

   The Open dialog appears.

3. Navigate to `ASSET_ROOT/Projects/Vector`.
4. Select the **CACountyPopulation** project, and click **Open**.

   The CACountyPopulation project appears in the Database Editor next to Vector Project.

5. Repeat steps 2 through 4 to add **BlueMarble** as the imagery project.

   You do not need to add a terrain project for this exercise. Both projects appear on the list.

6. Select **File > Save**.

   The Save dialog appears.

7. Navigate to the `ASSET_ROOT/Databases` folder.
8. Enter **CACountyPopulation** for the name of your database, and click **Save**.

   The name of the database appears on the right when you select the `/ASSET_ROOT/Databases` folder in the asset navigation tree.

9. Right-click **CACountyPopulation**, and select **Build** from the context menu.

   Fusion builds the database.

10. Right-click **CACountyPopulation**, and select **Publish** from the context menu.

    The Publish Database dialog appears.

11. Click **Publish**.

    Fusion runs the publishing process on the database, and displays a success message when it is done.

View Your Database in Google Earth EC

This exercise walks you through the process of viewing your database in Google Earth EC.

To view your database:

1. Launch Google Earth EC. The Login dialog appears.
2. Enter or select the host name or IP address of your server in the Server field, and accept the default setting, **80**, in the Port field (unless you know that your server uses a different port).
3. Click **Login**.

   Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

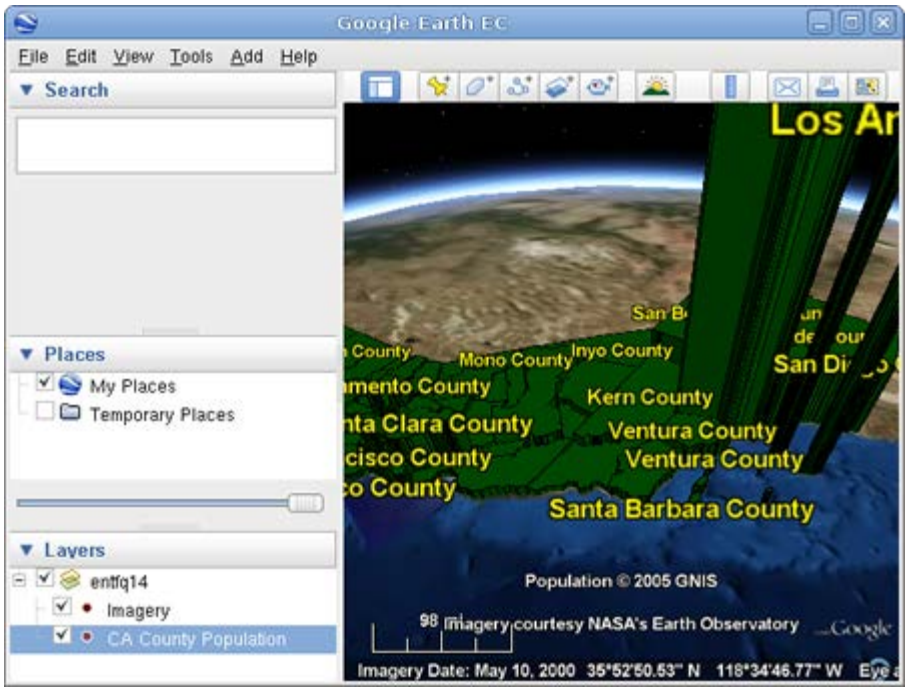
4. Zoom in to the west coast of the US.

   Google Earth EC displays all of the counties in California labeled with the names of the counties. The closer you zoom in, the more spread out the counties look and the more county names you can see.

Note: If you cannot see the vector data, make sure the checkbox next to **CACountyPopulation** in the Layers panel is checked.

5. Turn and tilt the Earth so you can see the *heights* of the counties.

   Each county's height indicates its relative population. Counties with higher populations are *taller*, and counties with lower populations are *shorter*.



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Importing and Exporting Style Templates

Often when you define the display rules for one set of data, you can use the same display rules (sometimes with minor tweaking) for other similar sets of data. In fact, to make your data look consistent across different layers, you probably want to use the same display rules. To do so, you can simply export as a style template the display rules you want to reuse and then import that style template into other projects.

For example, if a project contains two resources with different providers, and you want the data to look the same except for the copyright information, you can define the display rules for one resource, export the display rules as a template, and then import the template for the other resource. Another example is that you might want to define display rules for a small set of data and then use those same rules on a larger set of data. There are many more circumstances in which you can save time by using style templates.

This lesson guides you through the process of defining display rules for a small set of data (the state of California) and then exporting those rules as a style template. In a subsequent exercise, you import that same style template for a larger set of data (the entire US). Since you already defined display rules for population by county in the state of California in the last chapter, most of the work is already done.

Note: If you have not completed **Configuring Display Rules for Polygon Data**, you must complete at least the first three exercises in that lesson (Define and Build a Vector Resource Using Polygon Data, Define, Configure, and Build a Vector Project, and Define and Build an Imagery Project) before continuing with this lesson.

Export the Display Rules

1. Select **Asset Manager** from the Tools menu.

   The Asset Manager appears.
2. Navigate to the `/ASSET_ROOT/Projects/Vector` folder you created in Lesson 7.
3. Double-click **CACountyPopulation** to open it in the Vector Project Editor.
4. Right-click **CACountyPopulation**, and select **Export Configuration as Template** from the context menu.

   The Export Template dialog appears.
5. Navigate to your home folder, and click  to create a new folder; name the new folder **templates**.
6. Open the templates folder, enter **Counties** in the File name field, and click **Save**.

   You return to the Vector Project Editor.
7. Close the Vector Project Editor.

Import the Template

This exercise walks you through importing the template you created in the previous exercise into a new project.

To define a project and import a template:

1. Click  on the toolbar. The Vector Project Editor appears.

2. Click  . The Open dialog appears.
3. Navigate to the `ASSET_ROOT/Resources/Vector` folder.
4. Select **USPopulation**, and click **Open**.

   The US Population resource appears in the Vector Project Editor.
5. Right-click **USPopulation**, and select **Import Configuration from Template** from the context menu.

   The Import Template dialog appears.
6. Navigate to the folder where you saved the template in the previous exercise.
7. Select **Counties.khdsp**.
8. Check the box next to **Apply display rules** but not **Apply legend settings** at the bottom of the dialog.

   If you check the box next to **Apply legend settings**, this step would apply all of the legend settings for the project from which the template was created to this project, including changing the name of the layer. (See Chapter 5 in the *Google Earth Enterprise Fusion Reference Guide* for details about these settings.)
9. Click **Open.**

   You return to the Vector Project Editor.
10. Right-click **USPopulation**, and select **Layer Properties** from the context menu.

    The Layer Properties dialog appears.
11. Click **Off** next to Initial State to change it to **On**.

    Changing the initial state to on results in the US Population layer being automatically checked (turned on) in Google Earth EC.
12. Click **OK**.

    You return to the Vector Project Editor.
13. Select **File > Save**.

    The Save dialog appears.
14. Navigate to the `ASSET_ROOT/Projects/Vector` folder.
15. Enter **USPopulation** as the name of your project.
16. Click **Save**.

    The new project appears in the Asset Manager when you select **ASSET_ROOT/Projects/Vector** in the asset navigation tree.

Define, Build, and Publish a Database for Your Data

This exercise walks you through the process of defining, building, and publishing a database using the projects you created in the previous exercise.

To define, build, and publish a database:

1. Click  on the toolbar. The Database Editor appears with no projects selected.
2. Click  next to Vector Project. The Open dialog appears.
3. Navigate to `ASSET_ROOT/Projects/Vector`.
4. Select the **USPopulation** project, and click **Open**. The US Population project appears in the Database Editor next to Vector Project.
5. Repeat steps **2** through **4** to add **BlueMarble** as the imagery project. You do not need to add a terrain project for this exercise. Both projects appear on the list.
6. Select **File > Save**.
7. Navigate to the `ASSET_ROOT/Databases` folder.

8. Enter **USPopulation** for the name of your database, and click **Save**.

   The name of the database appears on the right when you select the `/ASSET_ROOT/Databases` folder in the asset navigation tree.

9. Right-click **USPopulation**, and select **Build** from the context menu.

   Google Earth Enterprise Fusion builds the database. The build process might take a little longer than it has for previous databases, because it is building the project as well, since you did not build the project at the end of the previous exercise.

10. Right-click **USPopulation**, and select **Publish** from the context menu. The Publish Database dialog appears.
11. Click **Publish**. Google Earth Enterprise Fusion runs the publishing process on the database, and displays a success message when it is done.

View Your Data in Google Earth EC

This exercise walks you through the process of building, publishing, and viewing your database in Google Earth EC.

To build, publish, and view your database:

1. Launch Google Earth EC.

   The Login dialog appears.

2. Enter or select the host name or IP address of your server in the Server field, and accept the default setting, **80**, in the Port field (unless you know that your server uses a different port).
3. Click **Login**.

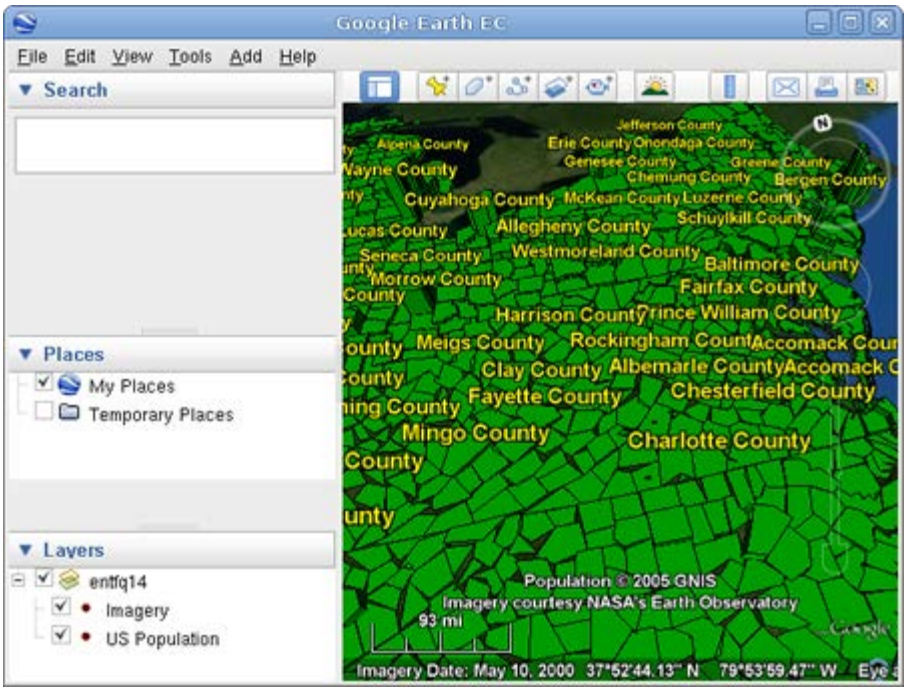
Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

1. Zoom in until you can see part of the US.
2. Turn and tilt the Earth so you can see the *heights* of the counties.

   Google Earth EC displays all of the counties in the US labeled with the names of the counties. The closer you zoom in, the more spread out the counties look and the more county names you can see. As with the database you created in Lesson 7, each county's height indicates its relative population. Counties with higher populations are *taller*, and counties with lower populations are *shorter*.

   Note: If you cannot see the vector data, make sure the check box next to **CA County Population** in the Layers panel is checked.

If this were a real project, you might decide that displaying the names of the counties makes this view too cluttered. You can go back into the vector project, modify the display rules, rebuild and publish the database, and then view your data in Google Earth EC again. Repeat this process as many times as required to get the result you want.


Google Earth EC
File Edit View Tools Add Help
Search
Places
My Places
Temporary Places
Layers
entfq14
Imagery
US Population
Jefferson County
Erie County
Onondaga County
Genesee County
Greene County
Chemung County
Bergen County
Cuyahoga County
McKean County
Luzerne County
Schuylkill County
Allegheny County
Westmoreland County
Baltimore County
Fairfax County
Harrison County
Prince William County
Meigs County
Rockingham County
Clay County
Albemarle County
Fayette County
Chesterfield County
Mingo County
Charlotte County
Population © 2005 GNIS
Imagery courtesy NASA's Earth Observatory
93 mi
Imagery Date: May 10, 2000 37°52'44.13" N 79°53'59.47" W

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Configuring a Searchable Database

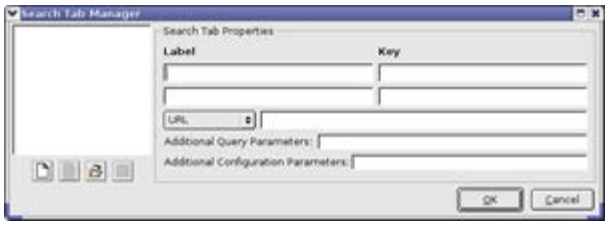
Search tabs allow Google Earth EC and Google Maps users to search external databases on Google Earth Enterprise Servers as well as non-Google servers. For example, if you have a database of San Francisco neighborhoods that contains specific information that your users need about each neighborhood, you can add a search tab called SF Neighborhoods and configure it to search for neighborhoods in your database, even if that database is stored on another server. Google distributes some sample databases with the Google Earth Enterprise Server.

The first thing you need to do is pre-configure search tabs using the Search Tab Manager. Then you can associate the search tabs with a particular database. The exercises in this lesson show you how to perform both steps.

Define Search Tabs

To define a new search tab:

1. Select **Tools >Search Tab Manager**. The **Search Tab Manager** appears.



2. Click  . The **New Search Tab** dialog appears.
3. Enter **SFNeighborhoods** in the Search Tab Label field, and click **OK**.

   The search tab name appears on the list on the left and is selected.
4. In the first Label field, enter:

```
<b>Starts with</b> (e.g., <b>Pac</b> for Pacific Heights)
```

   Note: You can use some basic HTML to format the Label text, if desired. Google Earth EC accepts only basic font styling HTML codes, such as font size, color, bold, italic, and superscript. It does not accept line breaks.

   After you build and publish the database, the text value in the first Label field appears above the first search field in Google Earth EC.
5. Enter **neighborhood** in the first Key field.

   When a Google Earth EC user specifies a search value, the Key value is associated with the value specified by the user and added to the `URL GET` request submitted to the preconfigured plug-in. It does not necessarily correlate to a field in the search database.

   You can enter Label and Key values for one or two fields on each search tab. In this exercise, you use the first Label and Key fields only.
6. Select **Plug-in Name** from the drop-down list, and enter **ExamplePlugin** in the text field.

   This is the plug-in example supplied with Google Earth Enterprise Fusion. For more information about plug-ins for search tabs and the other fields in this dialog, see the **Managing Search Tabs** section in the **Setting Up Your Workspace** chapter of the **Reference Guide**.
7. Click **OK**. Now the search tab is ready for you to add to your databases.

Add Search Tabs To Your Database

To add search tabs to your database:

1. Select **Asset Manager** from the Tools menu.

   The Asset Manager appears.

2. Navigate to `ASSET_ROOT/Databases` in the asset navigation tree, and double-click the **SFHighways** database that you built in Lesson 4.

   The Database Editor appears with the imagery, terrain, and vector projects specified.

3. Check the box next to **Search Tabs**.

   The Database Editor extends to include a Search Tabs definition area.

4. Click  on the right side of the Search Tabs area.

   A pop-up list displays the search tab you created in the previous exercise.

5. Click **SFNeighborhoods**.

   The selected tab appears in the Search Tabs area.

6. Select **File > Save**.

   Google Earth Enterprise Fusion saves the changes to the database with the same name.

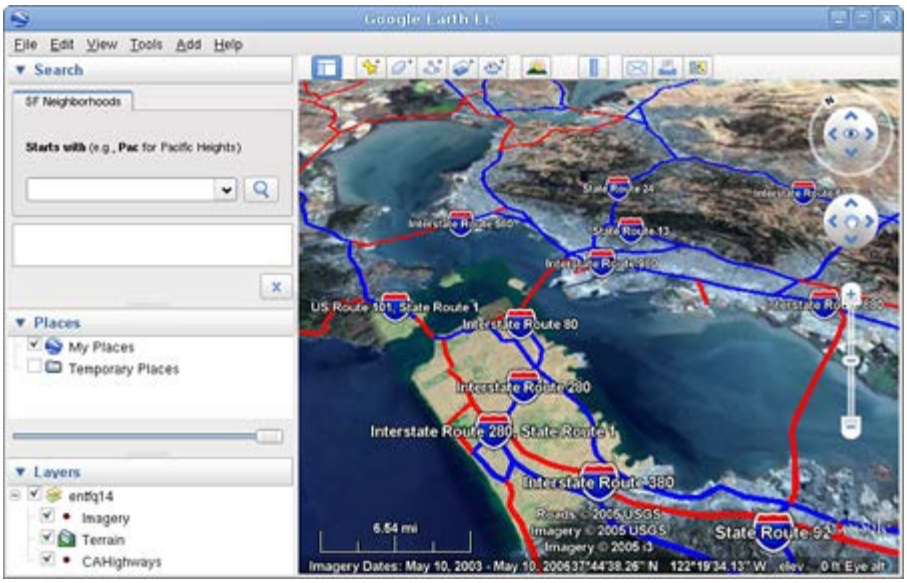
7. Close the Database Editor.
8. Rebuild the database by right-clicking **SFHighways** and selecting **Build** from the context menu.

   Even though you built the database before, you must build it again to include the new search tabs. See **Adding Search Tabs to a Database**, in the **Defining and Building Databases** chapter of the **Reference Guide**.

9. Publish the database by right-clicking **SFHighways** and selecting **Publish** from the context menu. The **Publish Database** dialog appears. Notice that the default version is now 2.
10. Click **Publish**. Google Earth Enterprise Fusion runs the publishing process on the database, and displays a success message when it is done.
11. Launch Google Earth EC, and log in to your server.

Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

Google Earth EC displays your database with the search tabs you specified.


Google Earth LT
File Edit View Tools Add Help
Search
SF Neighborhoods
Starts with (e.g., Pac for Pacific Heights)
Places
My Places
Temporary Places
Layers
entlq14
Imagery
Terrain
CAHighways
US Route 101
State Route 1
Interstate Route 80
Interstate Route 280
Interstate Route 380
State Route 92
6.64 mi
Imagery Dates: May 10, 2003 - May 10, 2006

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Specifying Search Fields for Individual Layers

You can specify one or more fields in your source data on which users can search by configuring layer properties. This lesson guides you through the process of specifying one field on one layer as searchable, using the vector project you created in the Configuring Display Rules for Polygon Data chapter. If you have not yet completed that chapter, complete at least the first two sections, Define and Build a Vector Resource Using Polygon Data and Define, Configure, and Build a Vector Project, before continuing with this lesson.

Specify Search Fields in Layer Properties

To specify the search fields in your data:

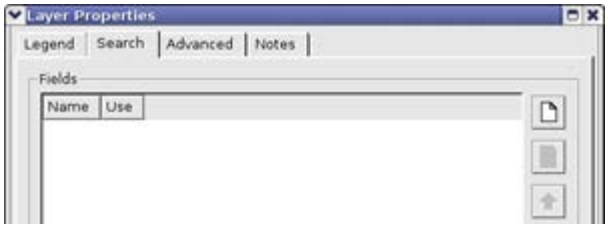
1. Select **Asset Manager** from the Tools menu.

   The Asset Manager appears.

2. Navigate to the `/ASSET_ROOT/Projects/Vector` folder.
3. Right-click **CACountyPopulation**, and select **Layer Properties** from the context menu.

   The Layer Properties dialog appears.

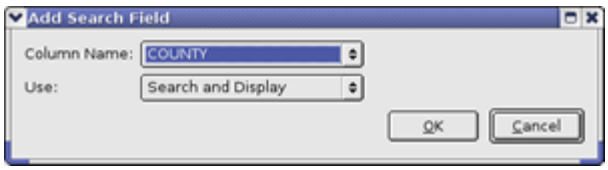
4. Click the **Search** tab.



   When you specify one or more search fields on this tab, a search tab appears in Google Earth EC that allows users to search for data in the selected field(s).

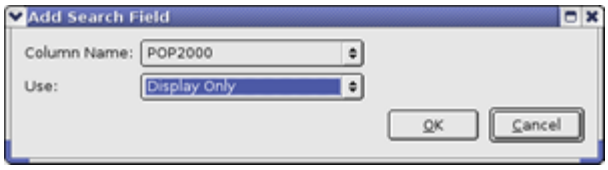
5. Click  . The **Add Search Field** dialog appears.

6. Select **COUNTY** from the drop-down list next to Column Name, select **Search and Display** from the drop-down list next to Use, and then click **OK**.



   These selections allow users to search on the COUNTY field and display the county name in the description balloon.

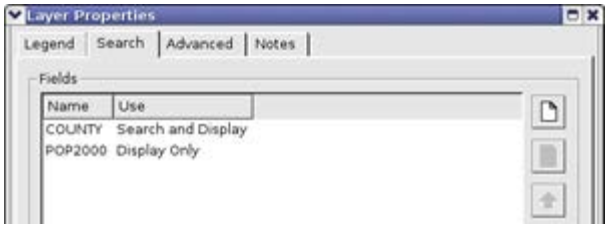
7. Select **POP2000** from the drop-down list next to Column Name, select **Display Only** from the drop-down list next to Use, and then click **OK**.



These selections result in the county population being displayed in the description balloon for each county that matches the user's search criteria. The first field selected for display becomes the placemark name. The second field selected for display becomes the snippet. Any additional fields selected for display become the description.

Note: This is currently an exact search, which means that the Google Earth EC user must enter the value exactly as it appears in the database. It is also a wildcard search, so users can enter part of the text they want to match. For example, if a user enters "dakota" in a state search, it matches "North Dakota" and "South Dakota".

Your selections appear on the list of search fields on the Search tab in the order in which you added them.



The order in which the fields appear on this list dictates the order in which they appear in the description balloon in Google Earth EC.

Note: Since you cannot change the order of the fields after you add them, be sure to add them in the order in which you want them to appear in the description balloon in Google Earth EC.

8. Click **OK**.

   The Search Tab Properties fields appear at the bottom of the Vector Project Editor.
9. Change the Tab Label value to **County Population Search**.
10. Change the Search Field Label value to **Enter county name:**
11. Save the project.

Add Search Tabs To Your Database

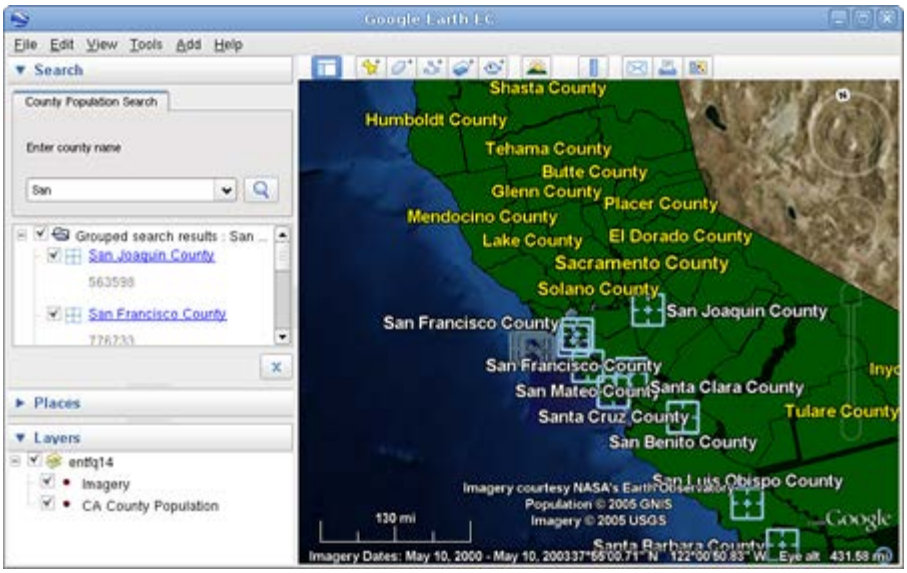
1. In the Asset Manager, navigate to the `/ASSET_ROOT/Databases` folder.
2. Double-click to open the **CACountyPopulation** database. Check the box next to **Search Tabs**.
3. Click  , and select **CountyPopulationSearch** from the pop-up list.

   The County Population Search tab appears in the Search Tabs area.
4. Save and build the CACountyPopulation database (which also builds the CACountyPopulation project that you modified).
5. Publish the CACountyPopulation database.
6. Launch Google Earth EC, and log in to your server.

Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the *Google Earth User Guide*.

Google Earth EC displays your database with the search tab you specified. When you enter a search string, such as "San", all of the counties containing that string appear in the search results,

and POI icons indicate the location of each of the search results on the map.



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Creating a Map Database

In addition to using Fusion to prepare and publish data in Google Earth, you can use it to prepare and publish map data in Google Maps. This lesson guides you through preparing your data for Google Maps.

The first step in preparing any data for publication is to import the source data as Fusion resources. You can use one of the vector resources you defined in Defining and Building Resources for Google Maps.

> **Note:** For Google Maps, you define vector data only. When you define a Google Maps database, however, you can include an imagery project. The imagery project is the same for Google Maps as for Google Earth EC, so you can use the imagery project you defined in Defining and Building Resources as well.

After you define your vector resources, Google Maps requires an additional step. You must define and build at least one map layer for each map project. The first exercise in this lesson, Define a Map Layer describes how to do so.

The remaining steps are the similar for Google Maps data as for Google Earth EC data.

- Define and build a map project.
- Define and build a map database.
- Publish the map database.

Define a Map Layer

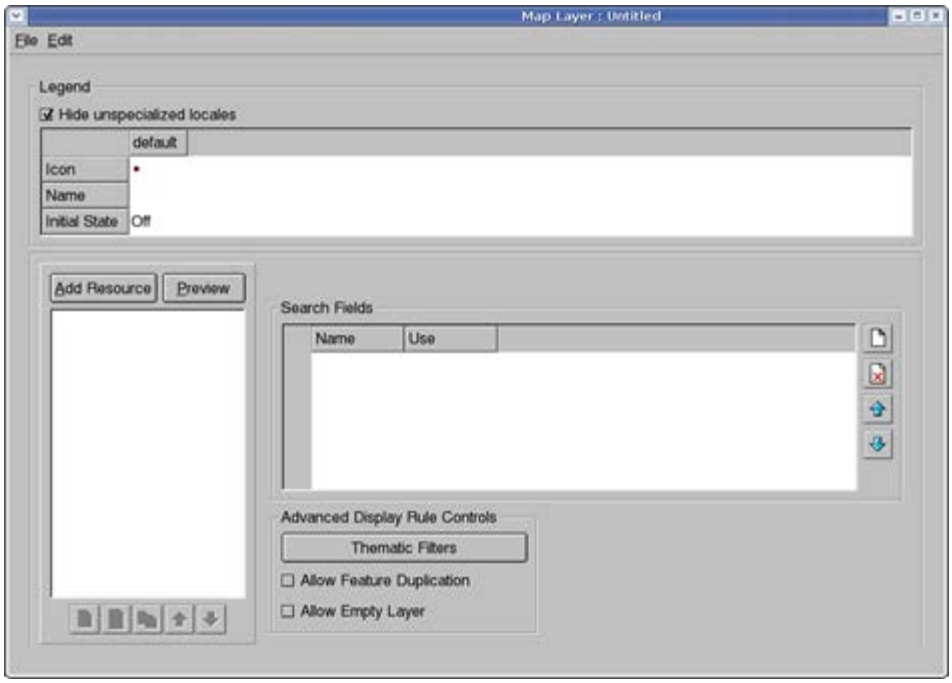
Defining a map layer consists of adding resources to the layer and defining the display rules and filters for the layer. This is similar to the process of defining display rules and filters for a vector project destined for Google Earth EC.

To define a map layer:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Select **Flat Projection Map Tools (2D)** or **Mercator Map Tools (2D)** from the drop-down menu.

> **Note:** The Flat Projection Maps layer uses the local copy of the Google Maps API and has no communication wth google.com. The Mercator Maps layer includes Google Maps layers and uses the Google Maps API from google.com. If you use Mercator projection, it requires a separate imagery database. For more details about the differences between the two types of map layers, see the *Google Earth Enterprise Reference Guide*.

3. Click  . The Map Layer Editor appears.



The legend area displays the current value of each property you can set for the map layer. The top row lists the names of the locales you support. When you first open this dialog for a new map layer, only the default locale and its values appear, and the box next to **Hide unspecialized locales** is checked. Google Maps uses the default locale settings when you do not specify different settings for a user's locale in this tab.

4. Set the property values for the default locale as follows:
   a. Click the icon in the Icon field, select **places3_new**, and click **OK**. This is the icon that appears next to the name of the map layer in the Layers panel of Google Maps.
   b. Click in the Name field, and enter **CAfreeways**, and press **Enter** to save the change. This is the text label that appears in the Layers panel of Google Maps.
   c. For Initial State, accept the default setting, **Off**. This setting determines whether the map layer is turned on or off in Google Maps.

      (Refer to the **Reference Guide** for more details about these property values.)
5. Click **Add Resource**.
6. Navigate to the `ASSET_ROOT/Resources/Vector` folder.
7. Select **CAHighways**, and click **Open**. The CAHighways resource appears on the resource list.
8. Select **default select all** under the resource name.

   The **Feature** and **Filter** tabs appear on the right. The first option on the **Feature** tab is **Draw Features As**. This option allows you to specify the display rules for the selected resource. The value you set for **Draw Features As** determines the options available for you to specify.

   In this lesson, you define display rules for label only.
9. For **Draw Features As**, select **Lines**. The **Lines** options appear.
10. Under **Line**, accept the default visibility range for the lines, **8** and **14**.
11. For **Color**, set it to orange.
12. For **Line Width**, accept the default, **2**.
13. Check the box next to **Label**.
14. Under **Label**, accept the default setting on the drop-down list, **Text**.
15. Click the empty text field. The **Label Format** dialog appears.

    The **Insert Field** drop-down list contains the names of all fields in your source data.
16. Select **NAME**, and click **OK**.

    In the source file for the selected resource, the **Name** column lists the names of the roads, so when you select the **Name** field here, it results in the names of the roads appearing in

Google Maps.

17. For the label, change the visibility range to **10** through **14**.

    The visibility range refers to the zoom level at which your labels are visible in Google Maps.

18. The default text style is black on white in the Sans 12 font. Click the text style button (labeled **Sans/12**) to specify a different text style for the labels.

    The **Text Style** dialog appears.

19. For **Size**, change the value to **10**, and accept the default setting for Color, black.

    > **Note:** The only font that Fusion provides by default is *Sans regular*. To add fonts, including international fonts such as Chinese, Japanese, or Hebrew, you can create a configuration file called a "font list" file. See *Configuring Fonts For the Text Style Dialog* in the *Administration Guide*.

    A preview of the label appears in the Preview box.

20. Drag the preview over any button on the left. The new style is stored on that button. The button name reflects the font face and size of the style, and it appears with the selected color and outline attributes.

    After you save a style to a button, you can simply click that button to automatically select its text style settings for another label in the future.

21. Click **OK**. You return to the Map Layer Editor, and the Feature tab shows all of your selections.
22. Select **Save** from the File menu**.**
23. Navigate to the `ASSET_ROOT/MapLayers` folder.
24. In the Name field, enter **SFMapLayer**, and click **Save**. The new map layer name appears in the Asset Manager's asset list.

Define a Map Project

The first step in defining a map project is to specify which map layers to include and give the project a name. Before you define a map project, however, add a subfolder to the asset navigation tree in the Asset Manager in which you can store your map projects.

To add a subfolder for map projects:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Right-click **Projects** in the asset navigation tree, and select **New Subfolder**. The New Subfolder dialog appears.
3. Enter **Map** in the Folder Name field, and click **OK**. The new Map subfolder appears under Projects in the asset navigation tree.

To create a map project:

1. In the Asset Manager, click  . The Map Project Editor appears.
2. Click  . The Open dialog appears.
3. Navigate to the `ASSET_ROOT/MapLayers` folder.
4. Select **SFMapLayer**, the map layer you created in the previous exercise, and click **Open**. SF Map Layer appears in the Map Project Editor.

   The default legend name of the map layer, **CAFreeways**, appears in the Legend Name column, followed by **<DEFAULT>**, which indicates that this is the name you specified for the legend when you created the layer. The name and path of the map layer appears in the Layer column.

5. Double-click **CAFreeways**. The Layer Legend dialog displays the current values for the map layer.

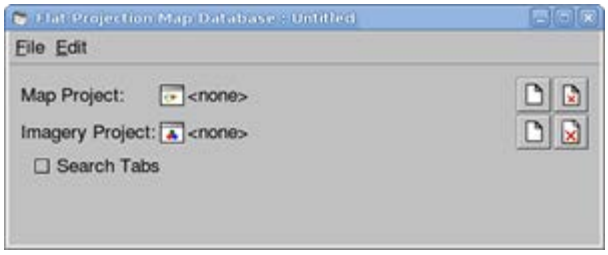
6. Click the name field, change the name to **California Freeways**, press **Enter** to save the change, and click **OK**.

   The new legend name appears in the Map Project Editor. Notice that **<DEFAULT>** no longer appears after the legend name. (If you ever want to return to the default name, right-click the value in the Legend Name field, and select **Use Layer Defaults** from the context menu.)

7. Select **File > Save**.
8. Navigate to the `ASSET_ROOT/Projects/Map` folder.
9. In the Name field, enter **SFMapProject**, and click **Save**. The new map project name appears in the Asset Manager's asset list.

Define a Flat Map Database

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Select Flat Projection Map Tools. The tools for Flat maps appear in the toolbar.
3. Click  . The Map Database Editor appears with no projects selected.



4. Click  next to **Map Project**. The Open Asset dialog appears.
5. Navigate to the `ASSET_ROOT/Projects/Map` folder.
6. Select **SFMapProject**, and click **Open**. The SF Map Project appears in the Map Database Editor next to Map Project.
7. Click  next to **Imagery Project**. The Open Asset dialog appears.
8. Navigate to the `ASSET_ROOT/Projects/Imagery` folder.
9. Select **SFBay Area**, and click **Open**. The SF Bay Area project appears in the Map Database Editor next to Imagery Project.

   Both projects appear on the list.

10. Select **File > Save**.
11. Navigate to the `ASSET_ROOT/Databases` folder.
12. In the Name field, enter **SFMapDatabase**, and click **Save**.

    In the Asset Manager, the new map database appears, along with the other databases you have created. Notice that the Category column distinguishes between the Google Earth databases and the Google Maps database.

13. Right-click **SFMapDatabase**, and select **Build** from the context menu. The status of the database immediately changes to **Waiting** or **Queued** and then to **In Progress**.

Note: It might take a while to build the map database, because it is also building the project, since you did not build the it in the previous exercise.

When Fusion finishes building the database, its Current State column in the Asset Manager changes to **Succeeded**, and its Current Version column changes to the date and time the most recent build was started.

Publish a Map Database

1. Right-click the name of the map database you built in the previous exercise, and select **Publish** from the context menu. The Publish Database dialog appears.

Note: Only server associations configured for publishing map databases appear on the drop-down list of server associations.

2. Click **Publish**.

   Fusion runs the publishing process on the database, and displays a success message when it is done.

Note: If you get an error message, contact your Google Earth Enterprise Server administrator for help, or check the *Google Earth Enterprise Administration Guide* for more information.

If you choose to use the Google Geo database, check to make sure the Rewrite rule in `/opt/google/gehttpd/conf.d/virtual_servers/default_map.location` is set correctly:

```
RewriteRule ^/default_map/+$ /maps/maps_google.html [PT]
```

If you choose to use a local maps database, set the rule to:

```
RewriteRule ^/default_map/+$ /maps/maps_local.html [PT]
```

View Your Map Database

After you publish your database, you can view it in a browser.

To view your map database:

1. Launch any web browser.
2. Point your browser to:

   serverURL`/default_map`

   where *serverURL* is the full URL of the stream server to which you published the map database, including the protocol, the server location, and the port (if the port is other than the default, port 80). For example:

   ```
   http://my_host_name/default_map
   ```

   If you are not sure which server you published to, contact your Google Earth Enterprise Server administrator for help.

   Google Maps displays your database.

Note: When you zoom in beyond full resolution of the background imagery, it disappears. Google Maps cannot magnify imagery beyond full resolution.

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Creating Imagery Mosaics

The simplest way to import source data is to create one resource from each data file. In certain cases, though, you might obtain multiple source files that comprise a single image. In that case, you can combine the source files into a single resource, called a *mosaic*. This lesson guides you through the process of creating an imagery mosaic.

Note: All of the steps in this lesson apply to terrain data as well.

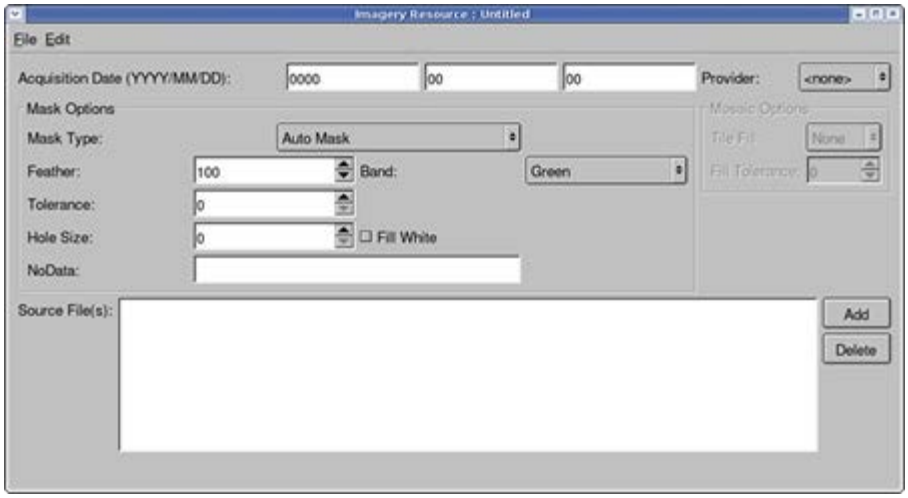
Create an Imagery Resource

To create a mosaic, the source images must meet the following requirements:

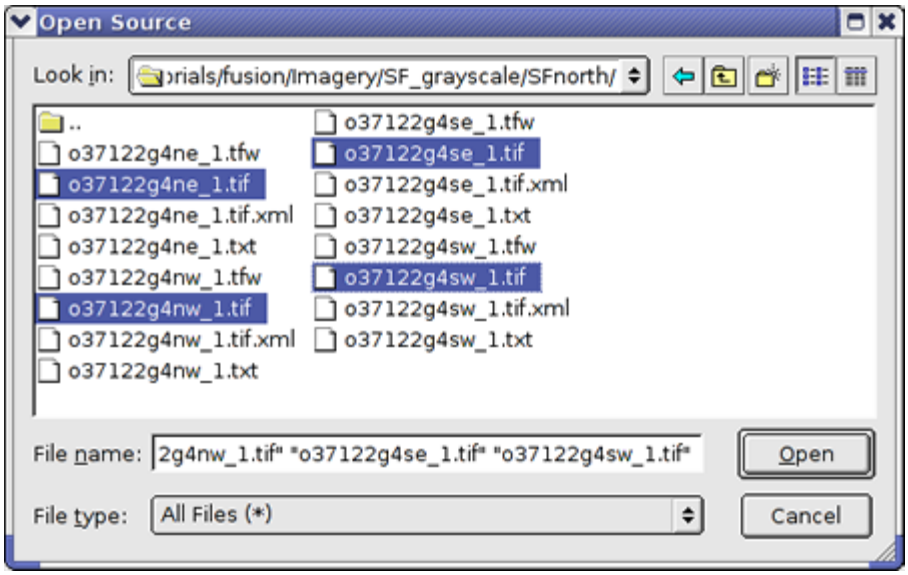
- Source images must be in the same projection and use the same coordinate system.
- Source images must have the same resolution.
- Source images must have geographic proximity to each other.
- Ideally, the individual source images are perfectly abutting (no overlap, no gaps).

To define an imagery mosaic:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click  on the toolbar. The Imagery Resource Editor appears.



3. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
4. Select **USGS Imagery** from the Provider drop-down list.
5. Set the Mask Type (under Mask Options) to **No Mask**.
6. Click **Add**. The Open Source dialog appears.
7. Navigate to the `/opt/google/share/tutorials/fusion/Imagery/SF_grayscale/SFnorth` folder.
8. Select all four TIFF files (only the four files with the `.tif` extension), and click **Open**.



The selected files appear on the Source File(s) list.

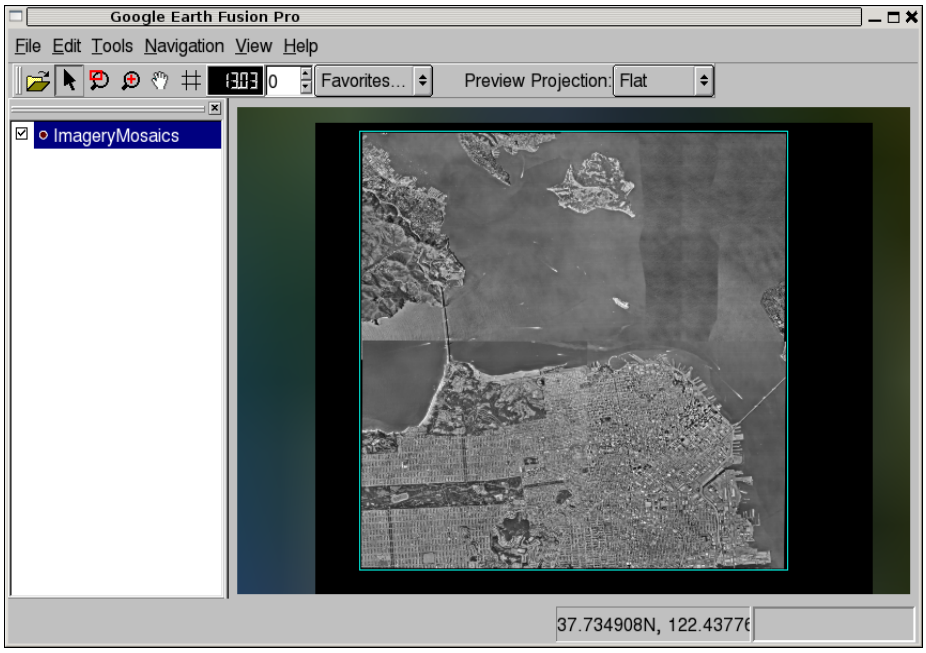
Notice that the Mosaic Options area is enabled when you import more than one imagery file. (Refer to the **Reference Guide** for detailed explanations of these settings.)

9. Under Mosaic Options, for Tile Fill, select **Black**. Now the Fill Tolerance option is enabled.
10. For Fill Tolerance, select **1**.
11. Select **File > Save**.
12. Navigate to the `/ASSET_ROOT/Resources/Imagery` folder you created in Lesson 1.
13. Enter the name **ImageryMosaic** for the resource, and click **Save**.

    The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Imagery` folder in the asset navigation tree.
14. Right-click **ImageryMosaic**, and select **Build** from the context menu. Google Earth Enterprise Fusion builds the resource.

    Note: Building this resource could take several minutes, since it contains four images.
15. When the status of the resource changes to **Succeeded** in the Asset Manager, drag it to the Preview List pane.
16. Check the box next to **ImageryMosaic** in the Preview List pane, and then right-click it and select **Zoom to Layer** from the context menu.

    The grayscale image of San Francisco appears in the Preview pane, surrounded by a bounding box. This is the single mosaic resource created from four separate source files.



Notice the black border and uneven edges of the mosaic. These are called *fill pixels*. The fill pixels fill the frame around the imagery where its borders are uneven.

If you want to add more imagery around this image and have all of the imagery blend together seamlessly, you need to *mask* the fill pixels. Masking blocks the pixels that you do not want users to see. The auto mask feature in Google Earth Enterprise Fusion does a very good job of creating masks for most situations. The *Google Earth Enterprise Fusion Reference Guide* provides instructions for doing so.

In some cases, however, you might want to use a custom mask that you create outside of Google Earth Enterprise Fusion so you have more control over the pixels that are blocked and the pixels that are allowed to show through. However, since Google Earth Enterprise Fusion allows you to use custom masks with resources that include a single source file only, you cannot apply a custom mask to a resource that includes more than one source file.

There is a way to resolve this problem. You can create a *virtual mosaic* and apply your custom mask to it. A virtual mosaic is a single source file created from multiple source files. The following exercises walk you through the process of creating a virtual mosaic and applying a custom mask to it.

Create a Virtual Mosaic

If you have multiple source files that you want to combine into a single resource to which you want to apply a custom mask, you can create a virtual mosaic using command line tools and then apply the custom mask within the GUI.

To create a virtual mosaic:

1. At the command prompt, change to the folder that contains the imagery source files by entering:

   ```
   cd /opt/google/share/tutorials/fusion/Imagery/SF_grayscale/SFnorth
   ```

2. Create a virtual raster file by entering (all on one line):

   ```
   gevirtualraster --fill 0,0,0 -o /gevol/src/all_files.khvr *.tif
   ```

   This command specifies the fill value to be used for the mosaic (`0,0,0` = black), the name of the file to be generated (`all_files.khvr`), and includes all of the `.tif` files in the specified folder as input.

3. Change to `/gevol/src`, and enter the following command to be sure the file was created

successfully:

```
ls a*
```

The file `all_files.khvr` should be listed.

4. Preview the new virtual mosaic:

   a. In the Google Earth Enterprise Fusion GUI, click  .

      The Open dialog appears.

   b. Navigate to the `/gevol/src` folder.

   c. Select **all_files.khvr**, and click **OK**.

      Two entries appear in the Preview List pane: **all_files:0** and **all_files:1**. (If Imagery Mosaic is still listed, you can leave the box next to it checked.)

      When you check the box next to **all_files:0**, a bounding box indicates the position of the entire virtual mosaic. When you check the box next to **all_files:1**, four bounding boxes indicate the position of each of the individual source files.

      > **Note:** Because you have not yet built this resource, only the bounding boxes appear, not the actual imagery.

5. You can check and uncheck the boxes to see the different views. When you finish, right-click any layer in the Preview List pane, and select **Remove All Layers** from the context menu. A message prompts you to confirm that you want to remove all layers from the Preview panes.
6. Click **OK**. All of the layers disappear from the Preview panes.
7. Back at the command prompt, enter the following command:

   ```
   cp /opt/google/share/tutorials/fusion/Imagery/SF_grayscale/all_files-mask.tif
    /gevol/src/
   ```

   This command copies the mask file provided with the tutorial data into the same folder as `all_files.tif` you created in step 2.

8. Change to the /gevol/src folder, if necessary, and enter the following command:

   ```
   ls a*
   ```

   Both files, `all_files.khvr` and `all_files-mask.tif` should be listed.

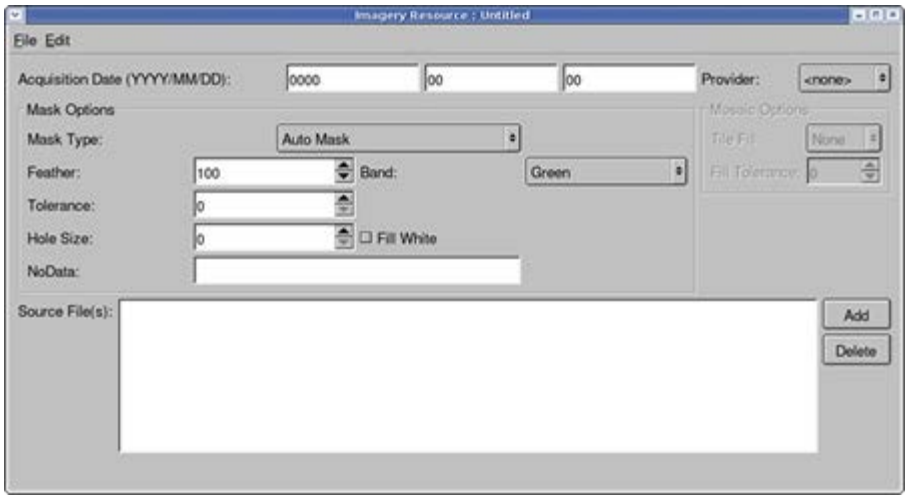
The mask for your input must be located in the same folder as the source file, and the file name must match the name of the source file with `-mask` appended. In this case, the mask file is named `all_files-mask.tif`. When you select **Have Mask** in the Imagery Resource Editor in the next exercise, Google Earth Enterprise Fusion automatically applies the mask file by reference to the source file.

Apply a Custom Mask to the Virtual Mosaic

Now that you have a virtual mosaic and a custom mask for it, you can import the virtual mosaic into a resource and apply the mask. This exercise guides you through that process.

To apply a custom mask to the virtual mosaic:

1. Select **Asset Manager** from the Tools menu. The Asset Manager appears.
2. Click  on the toolbar. The Imagery Resource Editor appears.



3. Set the acquisition date to today's date in year-month-day format by clicking each section of the date and enter the values.
4. Select **USGS Imagery** from the Provider drop-down list.
5. Set the Mask Type (under Mask Options) to **Have Mask**.
6. Click **Add**. The Open Source dialog appears.
7. Navigate to the `/gevol/src` folder.
8. Select `all_files.khvr`, and click **Open**. The selected file appears on the Source File(s) list.
9. Select **File > Save**.
10. Navigate to the `/ASSET_ROOT/Resources/Imagery` folder you created in Lesson 1.
11. Enter the name **VirtualMosaic** for the resource, and click **Save**. The name of the resource appears on the right when you select the `/ASSET_ROOT/Resources/Imagery` folder in the asset navigation tree.
12. Right-click **VirtualMosaic**, and select **Build** from the context menu. Google Earth Enterprise Fusion builds the resource.

    Note: Building this resource could take several minutes.
13. When the status of the resource changes to **Succeeded** in the Asset Manager, drag it to the Preview List pane.
14. Check the box next to **VirtualMosaic** in the Preview List pane, and then right-click it and select **Zoom to Layer** from the context menu.

    The grayscale image of San Francisco appears in the Preview pane, surrounded by a bounding box. This is the mosaic created from four separate tiles.

    Notice that the black border and uneven edges of the mosaic are gone. The mask has done its job.

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Segmenting Large Imagery Files

Google Earth Enterprise Fusion does not allow you to import raw imagery source files larger than 80 GB. (Raw size = number of pixels width * number of pixels height * 3.) Therefore, if you have an imagery source file that is larger than 80GB, you can split it into two or more source files using the command. (For complete details about the `gesplitkhvr` command, refer to Appendix A in the *Google Earth Enterprise Fusion Reference Guide*.)

The `gesplitkhvr` tool produces a grid of image files designated as rows and columns. For example, if you specify 2 rows and 2 columns, the image is split into four smaller files. If you create a separate resource for each resulting source file, it would look like this in the Preview pane:

However, you can reconnect the split images by adding them all to a single resource, which would look like this in the Preview pane:

To split a large source file into multiple smaller files:

1. At the command prompt, change to the folder that contains the tutorial imagery source files by entering:

   ```
   cd /opt/google/share/tutorials/fusion/Imagery
   ```

2. Convert a `.tif` file to a `.khvr` file by entering:

   ```
   gevirtualraster -o path/virtual_raster.khvr usgsSFHiRes.tif
   ```

   where *path* is the path to the folder where you want to save the resulting `.khvr` file. (See Lesson 12 for more information about the `gevirtualraster` tool.)

   Note: The path where you save the resulting `.khvr` file must be on a known volume. (See "`geconfigureassetroot --editvolumes`" in Appendix A of the *Google Earth Enterprise Administration Guide*.)

3. Change to the folder where you stored the virtual_raster.khvr (the value of *path* in step 2) by entering:

   ```
   cd path
   ```

4. Split the `.khvr` file into a 4x4 grid (16 image files) with a 10-pixel overlap among all of the files by entering:

   ```
   gesplitkhvr --rows 4 --cols 4 --overlap 10 virtual_raster.khvr
   ```

   The names of the resulting files appear on the screen as they are created. The file names are constructed from the name of the original file (`virtual_raster`), a row and column designation for each file (starting with `-R1C3`), and the `.khvr` extension.

Now you can import the 16 resulting image files into a resource.

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Building a Historical Imagery Project

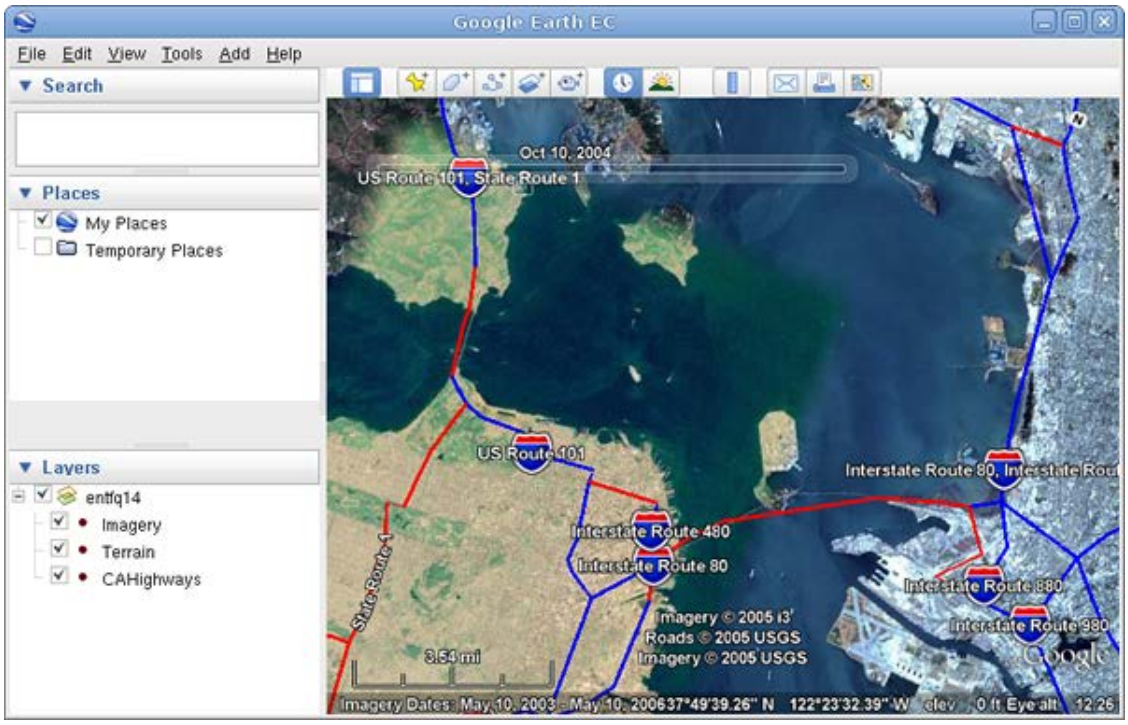
To build a historical imagery project:

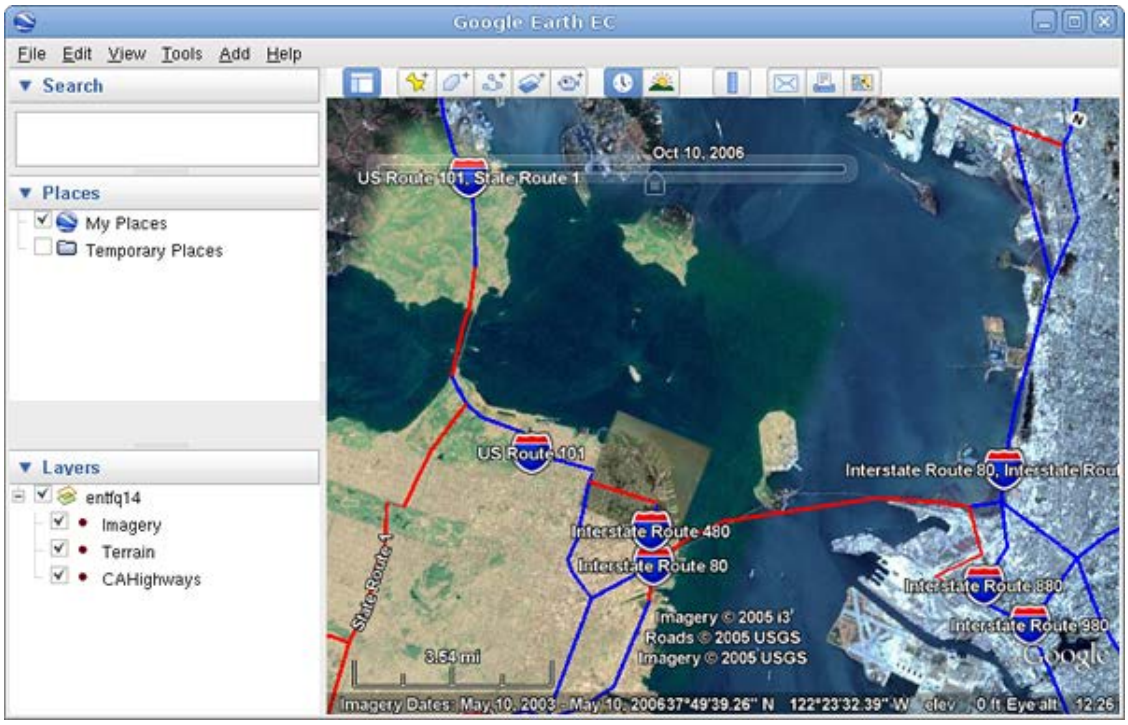
1. Follow the steps in Defining and Building Resources to define and build the following:

Name (Resources/Imagery/...)	Acquisition Date	Provider	Mask	Source file
BlueMarble	Any date. The date of the base image does not affect historical imagery browsing.	NASA Imagery	**No Mask**	`bluemarble_4km.jp2`
SFBayAreaLanSat_20021010	2002-10-10	USGS Imagery	**Auto Mask Tolerance**: 2 Default for all other mask values.	`usgsLanSat.jp2`
i3_15Meter_20041010	2004-10-10	i3	**Auto Mask** Default values.	`i3SF15-meter.tif`
SFHighResInset_20061010	2006-10-10	USGS Imagery	**Auto Mask** Default values.	`usgsSFHiRes.tif`

2. Open a new Imagery Project and add each of the image resources to the project:
   - **Resources/Imagery/BlueMarble**
   - **Resources/Imagery/SFBayAreaLanSat_20021010**
   - **Resources/Imagery/i3_15Meter_20041010**
   - **Resources/Imagery/SFHighResInset_20061010**
3. Select the **Support Historical Imagery** checkbox and accept all of the default values in the **Legend** area.
4. Enter **Projects/Imagery/SFBayAreaHistorical** as the name of your project, and **Save**.
5. Build the **SFBayAreaHistorical** project.
6. Create a new Earth Database and add the **SFBayAreaHistorical** project.
7. Save the new database as **Databases/Historical**.
8. Build the database, and publish it to the `default_ge` virtual server.
9. Open `http://`*`your_hostname`*`/default_ge` (replace *`your_hostname`* with the IP address or name of your server).
10. Navigate to the San Francisco Bay Area.
11. Select the **Historical Imagery** toolbar button  to display a time slider. The time slider allows you to move the view through time.

The following two screens show how this project is displayed in the Google Earth EC client. Notice the timeslider is visible and the differences between the imagery dates and content.





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Sample Data Files

This appendix provides a list of all of the sample data files included when you install the tutorial data. The files are listed hierarchically with folder names in bold. Blue font designates files that are not used in the tutorial lessons. You can use those files as you choose to explore the features of Google Earth Enterprise Fusion.

Imagery

```
bluemarble_4km.jp2
i3SF15-meter.tif
usgsLanSat.jp2
usgsSFHiRes.tif

SF_grayscale
  all_files-mask.tif

  SFnorth
    o37122g4ne_1.tfw
    o37122g4ne_1.tif
    o37122g4ne_1.tif.xml
    o37122g4ne_1.tfw
    o37122g4nw_1.tif
    o37122g4nw_1.tif.xml
    o37122g4nw_1.txt
    o37122g4nw_1.tfw
    o37122g4se_1.tif
    o37122g4se_1.tif.xml
    o37122g4se_1.txt
    o37122g4se_1.tfw
    o37122g4sw_1.tif
    o37122g4sw_1.tif.xml
    o37122g4sw_1.txt
    o37122g4sw_1.tfw

  SFsouth
    o37122f4ne_1.tfw
    o37122f4ne_1.tif
    o37122f4ne_1.tif.xml
    o37122f4ne_1.tfw
    o37122f4nw_1.tif
    o37122f4nw_1.tif.xml
    o37122f4nw_1.txt
    o37122f4nw_1.tfw
    o37122f4se_1.tif
    o37122f4se_1.tif.xml
    o37122f4se_1.txt
    o37122f4se_1.tfw
    o37122f4sw_1.tif
    o37122f4sw_1.tif.xml
    o37122f4sw_1.txt
    o37122f4sw_1.tfw
```

Terrain

```
gtopo30_4km.jp2
gtopo30_4km-mask.tif
SF_terrain.tif
```

Vector

```
cal_counties_census.dbf
cal_counties_census.prj
cal_counties_census.shp
cal_counties_census.shx
california_hydro_line.dbf
california_hydro_line.khdsp
california_hydro_line.prj
california_hydro_line.sbn
california_hydro_line.sbx
california_hydro_line.shp
california_hydro_line.shx
california_popplaces.csv
```

```
california_popplaces.kdx
california_roads_line.dbf
california_roads_line.prj
california_roads_line.sbn
california_roads_line.sbx
california_roads_line.shp
california_roads_line.shx
us_counties_census.dbf
us_counties_census.prj
us_counties_census.shp
us_counties_census.shx
ushydroline.dbf
ushydroline.shp
ushydroline.shx
UsPopPlaces.csv
usroads.dbf
usroads.shp
usroads.shx
usroads.txt
geonames-cities500000.csv (courtesy of geonames.org)

SF_neighborhoods
  realtor_neighborhoods0.bmp
  realtor_neighborhoods.dbf
  realtor_neighborhoods.htm
  realtor_neighborhoods.html
  realtor_neighborhoods.prj
  realtor_neighborhoods.shp
  realtor_neighborhoods.shp.xml
  realtor_neighborhoods.shx
```

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- OpenSSL
- PostGIS
- PostgreSQL
- PROJ
- Tomcat
- Tornado

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About This Guide

This document discusses the Google Earth Enterprise Fusion software application and how you can use it to create graphically rich geographic information system (GIS) databases for distribution to your in-house end users. With Google Earth Enterprise Fusion, you can integrate your own geospatial data, publish it to the Google Earth Enterprise Server, and view it using Google Earth Enterprise Client (EC).

Audience

This guide is intended for individuals who want to prepare source data for publishing and publish it to a Google Earth Enterprise Server. If you are new to Google Earth Enterprise Fusion, the best way to learn about it is to read through Chapters 1 and 2 of this guide and then complete the lessons in the "Basic Tasks" section of the Google Earth Enterprise Fusion Tutorial. Then you can use this guide as a reference and continue with the lessons in the "Advanced Tasks" section of the Google Earth Enterprise Fusion Tutorial, as you need to learn them.

In This Guide

This guide includes the following chapters and appendices:

Introduction provides essential information that you should know before you begin working with data in Google Earth Enterprise Fusion, including:

- An overview of the Google Earth Enterprise solution
- An introduction to Google Earth Enterprise Fusion
- The structure of Google Earth Enterprise Fusion data
- Best practices when preparing data using Google Earth Enterprise Fusion

Fundamentals explains how to launch Google Earth Enterprise Fusion and general information about the Google Earth Enterprise Fusion graphical user interface (GUI), including global features that are available throughout the GUI.

Setting Up Your Workspace offers complete information about how to set up certain options in advance, so you can select them from lists as you prepare your data for publication.

Defining Resources provides everything you need to know about how to import your source data into Google Earth Enterprise Fusion.

Defining Projects provides everything you need to know about defining Google Earth projects.

Defining and Publishing Databases provides everything you need to know about defining and publishing Google Earth databases.

Building Assets explains how to build every type of asset in Google Earth Enterprise Fusion, including resources, projects, and databases.

Preparing Data for Google Maps provides everything you need to know about preparing data for Google Maps, including defining map layers, projects, and databases.

Command Line Reference explains all of the shell commands you can enter on the command line for Google Earth Enterprise Fusion.

Creating Your Own Source Data, Icons, and Masks provides helpful information about creating and importing your own data, icons, and masks.

HTML Tags Allowed provides a list of HTML mark-up tags allowed in labels, descriptions, layer names, and so on.

Sample Plug-ins describes the sample plug-ins provided with the Google Earth Enterprise system.

Common Error Messages provides a list of possible error messages that you might encounter while using Google Earth Enterprise Fusion, the meaning of each message, and suggestions for how to resolve the error.

Glossary provides definitions of terms used in this document and in Google Earth Enterprise.

About This Guide

This document discusses system administration for the Google Earth Enterprise (GEE) system. This includes hardware and network preparation steps, as well as installation, configuration, and maintenance for all system components:

- Fusion
- GEE Server
- Fusion Tutorial

Audience

This guide is intended for individuals who are responsible for installing, configuring, and maintaining any part or all of the Google Earth Enterprise (GEE) system.

In This Guide

This guide includes the following chapters:

- Configuring Google Earth Enterprise Server explains how to configure GEE Server.
- Configuring Google Earth Enterprise Fusion explains how to configure Fusion.
- Configuring Tutorial Work Space explains how to set up a separate work space for each user to work on the Fusion Tutorial, as well as how to remove the tutorial data when each user is finished.
- Command Reference provides a list of all of the system administration commands you can use to configure the GEE system.
- Common Server Error Messages provides a list of common error messages that you might encounter when you install and configure the GEE system.
- Multiple Database Support describes the feature in Google Earth Client (EC) 6.0 that supports simultaneous connection to multiple databases.

Configuring Google Earth Enterprise Server

Overview

Before you use many of the Google Earth Enterprise Server configuration tools, you must stop the Google Earth Enterprise Server and then start it after you change the configuration. To stop/start the Google Earth Enterprise Server, enter:

```
/etc/init.d/geserver [stop | start | restart]
```

In general, no additional configuration is required after you install the Google Earth Enterprise Server. However, there are a number of ways in which you can customize your Google Earth Enterprise Server configuration, if desired. This chapter provides information about those configuration options. (See the Command Reference chapter for a complete list of commands available to system administrators.)

The `geserveradmin` command handles many of the Google Earth Enterprise Server configuration changes you might want to make. All of the options and uses for `geserveradmin` are described in the geserveradmin section of the **Command Reference** doc.

Verifying That Google Earth Enterprise Server Is Running

Because Google Earth Enterprise Server is critical to many operations you perform with Google Earth Enterprise Fusion, verify that it is running.

1. Open a web browser (either on the machine where the server is installed or any other computer that has network access to that machine).
2. Enter the URL for the server host (such as `http://www.example.com`).

   If Google Earth Enterprise Server is running, the browser displays the Google logo.

   If Google Earth Enterprise Server is not running, the browser displays an error message informing you that the page cannot be found. On the command line, enter:

   ```
   /etc/init.d/geserver start
   ```

   If you again reach an error page, make sure that you have network access to the machine on which the server is installed and that the DNS entry for that machine is up-to-date.

Configuring Virtual Servers

Before publishing to virtual servers other than the default virtual servers, please familiarize yourself with the Apache Virtual Host documentation (http://httpd.apache.org/docs/2.2/vhosts/).

Caution: Publishing to virtual servers other than the default server is supported only in version 4.2 or later of Google Earth EC. If you are using version 4.0 or earlier, only databases that you publish to the default server can be accessed by Google Earth EC.

Defining the virtual server

To define a virtual server, use the `geserveradmin` command (see geserveradmin for more details):

```
geserveradmin --addvs name --vstype type --vsurl url
```

Where:

- *name* is the name of the virtual server
- *type* is either `ge` (for 3D streaming) or `map` (for maps)
- *url* is the location of the virtual server. This will usually look like `/somename_ge`; refer to geserveradmin in the **Command Reference** chapter for more information on the required format.

Creating the configuration file

After defining a virtual server, create a configuration file that specifies required information for that particular virtual server. To do so:

1. Log in to the server you want to configure.
2. Change to the directory where the sample configuration files are stored:

   ```
   cd /opt/google/gehttpd/conf.d/examples
   ```

3. Copy a sample configuration file to `/opt/google/gehttpd/conf.d/virtual_servers` and rename it. For example:

   ```
   cp /opt/google/share/gehttpd/examples/port_based_ge_vs_example.vhost
     /opt/google/gehttpd/conf.d/virtual_servers/private_ge.vhost
   ```

   When choosing a configuration file to copy, use a file that:

   - contains `_ge_` if you are creating a Google Earth Enterprise Fusion virtual server.
   - contains `_map_` if you are creating a Google Maps virtual server.
   - starts with `location_based` if you are creating a location-based virtual server.
   - starts with `name_based` if you are creating a name/domain-based virtual server.
   - starts with `port_based` if you are creating a port-based virtual server.

   You must maintain the `.location` or `.vhost` extension on the file name.

4. Edit the new file with the text editor of your choice, making the following changes:

   In a location-based configuration file:

   a. Change `<LOCATION>` to the `vsurl` value specified in the `geserveradmin` command you used to register the virtual server.

   Note: For a Google Maps virtual server, you must make this change in five places.

   b. Change `<VS_NAME>` to the `addvs` name specified in the `geserveradmin` command you used to register the virtual server.

   In a name-based configuration file:

   a. Change `<HOST.DOMAIN>` to the desired server name.
   b. Change `<VS_NAME>` to the `addvs` name specified in the `geserveradmin` command you used to register the virtual server.

   In a port-based configuration file:

   a. Change `<IP_ADDRESS>` to the IP address of the host.

b. Change `<PORT>` to the number of the port you want to use.
c. Change `<VS_NAME>` to the `addvs` name specified in the `geserveradmin` command you used to register the virtual server.

> **Note:** You can optionally create combinations of name-based or port-based and location-based virtual servers. If you do, you must create an Apache configuration file with the `.vhost` extension that references multiple virtual servers. Make sure you create the corresponding virtual servers using the `geserveradmin --addvs` command. (See geserveradmin for more information.)

5. Save the file.

Next, you must configure a server association for the new virtual server.

Configuring Server Associations

The Google Earth Enterprise Server consists of a stream server and a search server. You can publish a Google Earth Enterprise Fusion database to stream and search virtual servers running on your local workstation or on a remote server. Associated stream and search virtual servers can be located on different physical servers or on the same server.

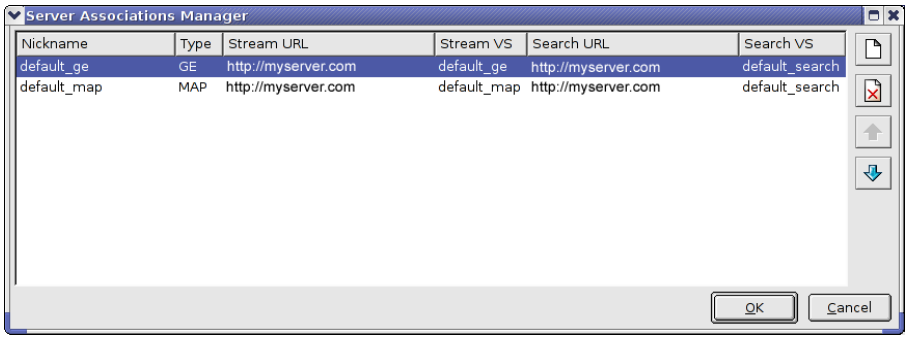
The **Server Associations Manager** allows you to specify server associations in preparation for publishing your databases. You can specify any number of additional server associations in the Server Associations Manager. Then you can select the desired server association in the **Publish Database** dialog. (Refer to **Publishing a Database** in the *Google Earth Enterprise Fusion Reference Guide* for more information.)

> **Caution:** If you're working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the **Tools** menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user's changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

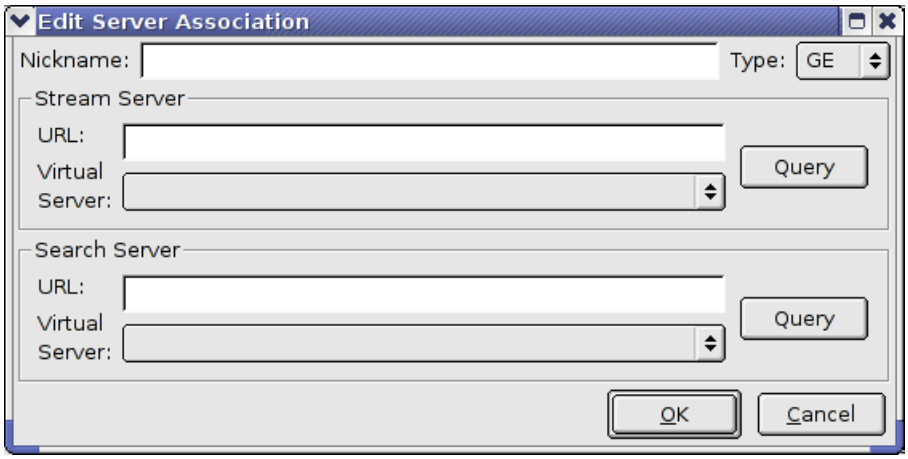
To specify server associations:

1. Select **Tools > Server Associations Manager**.

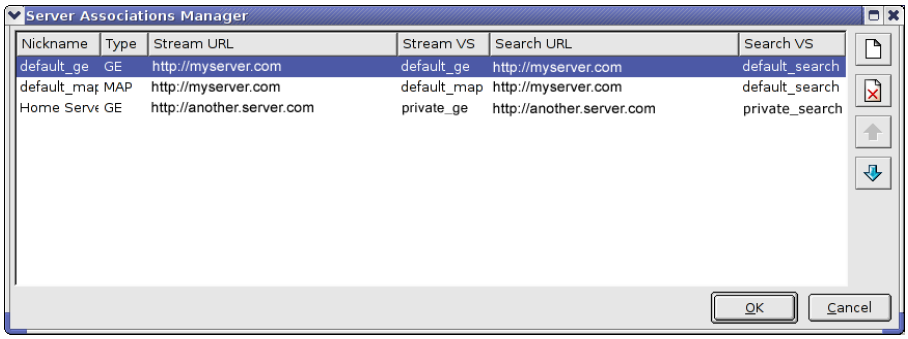
   The Server Associations Manager window appears with two default server associations listed--one for publishing to Google Earth and the other for publishing to Google Maps. The default server associations assume that you have Google Earth Enterprise Server installed on the same workstation as Google Earth Enterprise Fusion.



2. To add a server association, click the page icon  . The Edit Server Association dialog appears.



3. Enter a unique name for the server association in the **Nickname** field. (When you're ready to publish a database, the nickname appears on the list of server associations to which you can publish.)
4. For **Type**, select **GE** for Google Earth databases or **MAP** for Google Maps databases.
5. Enter the URL for the Stream Server (and a port number, if other than 80; for example, `http://www.example.com:9090`).
6. Click **Query** to populate the **Virtual Server** drop-down list with all of the virtual servers available at that URL (and port, if specified).
7. Repeat for the Search Server.
8. Click **OK**. The new server association appears on the list in the **Server Associations Manager**.



Repeat the steps above for each server association you want to add. The server associations appear on this list in the order in which you added them. They also appear on the **Server Associations** drop-down list in the **Publish Database** dialog in the same order. The first server association listed here is the default in the **Publish Database** dialog.

If you want to reorder the server associations on the list (particularly if you publish to a certain server most of the time and want it to be the default in the Publish Database dialog), select the server association that you want to move, and click the up or down arrows to change that server association's position in the list.

9. When you have finished adding and sorting server associations, click **OK**. The server associations are ready for you to select when you publish a database. (Refer to **Publishing a Database** in the *Google Earth Enterprise Fusion Reference Guide* for more information.)

Configuring Secure Servers

You can configure your Google Earth Enterprise Server to use HTTPS connections by editing the virtual server's configuration file. Each time you restart Google Earth Enterprise Server, publish a database ,or start Apache, Apache reads this file.

To configure a secure server:

1. Enable the main Apache server to run HTTPS by activating the SSL engine. (If you need assistance with this step, read the Apache HTTP server documentation at http://httpd.apache.org/docs/2.2/.)

2. In a text editor, open the configuration file (`gehttpd.conf`) for the virtual server you want to make secure.

   The configuration file is stored in `/opt/google/gehttpd/conf.d/virtual servers`. (See Configuring Virtual Servers for details.) The contents of the configuration file look like:

   ```
   <LocationMatch "/private_ge/*">
           Include conf.d/virtual_servers/runtime/private_ge_runtime
   </LocationMatch>
   ```

3. Add the two bold lines below to the `LocationMatch` directive exactly as they appear here:

   ```
   <LocationMatch "/private_ge/*">
           Include conf.d/virtual_servers/runtime/private_ge_runtime
           SSLRequireSSL
           SSLVerifyClient none
   </LocationMatch>
   ```

4. Save and close the configuration file.
5. Restart the Apache service.

This procedure gets you to a point where you have “bare bones” security on your server. It requires that users use the HTTPS protocol instead of HTTP when they specify a location. However, if you want to add more security, you can do so by following the instructions provided in the Apache 2.2 documentation at http://httpd.apache.org.

Configuring the Publish Root

When you install the Google Earth Enterprise Server, you specify a location for your publish root, the directory in which all of your published databases are stored.

To add a publish root:

1. At the command line prompt, log in as root.
2. Stop the Google Earth Enterprise Server:

   ```
   /etc/init.d/geserver stop
   ```

3. Specify the location of the new publish root:

   ```
   geconfigurepublishroot
   ```

   When prompted, enter the path where you want to create the publish root. For example, if you have designated a separate volume for publishing called `/gepub`, enter `/gepub/published_dbs`.

4. When you see the success message, start your Google Earth Enterprise Server:

   ```
   /etc/init.d/geserver start
   ```

5. Log out as root.

When you create a new publish root, it is automatically selected. The next time you publish a database, Google Earth Enterprise Fusion stores it in the selected publish root.

If you have multiple publish roots, you can go back and forth among them, using different publish roots for different purposes.

Note: If you have multiple publish roots, be sure to select the corresponding *asset root* for the intended publish root before you publish. Otherwise, it could end up with an incompletely published database. (See geselectpublishroot in the **Command Reference** chapter for more information.)

To select a different publish root:

1. At the command line prompt, log in as root.
2. Stop the Google Earth Enterprise Server:

```
/etc/init.d/geserver stop
```

3. Select the desired publish root:

   ```
   geselectpublishroot path
   ```

   where *path* is the full path to the publish root, such as `/gepub/published_dbs`.

4. When you see the success message, start your Google Earth Enterprise Server:

   ```
   /etc/init.d/geserver start
   ```

5. Log out as root.

Configuring Authentication

Authentication is the process of verifying the identity of a user, a system, or a process. *Controlled access* refers to any content or process that requires authentication. The following sections describe how to configure:

- Publishing authentication - To restrict the users allowed to publish databases
- Client authentication - To restrict the users allowed to view published databases

Configuring Publishing Authentication

By default, Google Earth Enterprise Server does not require authentication for publishing. However, you can configure your server to control access for publishing using standard Apache authentication methods. This section is primarily for system administrators who are unfamiliar with configuring Apache authentication.

First, decide which authentication method you want to use.

- HTTP Digest authentication (enable the `mod_auth_digest` Apache module)
- HTTP Basic authentication (enable the `mod_auth_basic` Apache module)

Both methods are essentially the same, except that `mod_auth_digest` encrypts the users' password, and `mod_auth_basic` does not. However, `mod_auth_digest` is not supported by all browsers. See http://httpd.apache.org/docs/2.2/mod/mod_auth_digest.html and http://httpd.apache.org/docs/2.2/mod/mod_auth_basic.html for complete details on these two authentication methods.

Google strongly encourages you to use HTTP Digest authentication (`mod_auth_digest`) instead of HTTP Basic authentication. The following procedure describes configuring publishing authentication using HTTP Digest.

To configure publishing authentication on your server:

1. Create a password file by entering on the command line:

   ```
   /opt/google/gehttpd/bin/htdigest -c path_to_pwd_file Publisher user_name
   ```

   The first part is the path to the Apache utility you use to create the password file, `htdigest`. The `-c` option indicates that you are creating a new file. The *path_to_pwd_file* is the location where you want to store the password file and the name of that file; it can be any name and location you choose. `Publisher` is the realm, and you must enter it exactly as it appears above. The *user_name* is the first user name you want to add to the password file.

   When you press **Enter**, the utility prompts you to enter a password for the specified user.

2. Enter the password, and retype it when prompted.

   The `htdigest` utility creates the password file, which contains only that one user name, the realm, and the encrypted password. For example, if you view the contents of the password file, it might look like this:

   ```
   jsmith:Publisher:f9d3c803aeb515f35568b37ec2d65399
   ```

3. Add each user name and password to the same password file by entering:

   ```
   /opt/google/gehttpd/bin/htdigest path_to_pwd_file Publisher user_name
   ```

   Use the same *path_to_pwd_file* as you used for the first user. Do not include the `-c` option, since you are not creating a new file this time.

4. When you finish adding users to the password file, copy the `publisher_digest_auth.conf` file from `/opt/google/gehttpd/conf.d/examples` to `/opt/google/gehttpd/conf.d`.
5. Open the copy (`/opt/google/gehttpd/conf.d/publisher_digest_auth.conf`) in an editor and:
   - Uncomment the `<Location>` directive(s) for stream publisher and/or search publisher by removing the `#` at the beginning of each line. (If you want to configure authentication for one type of server only, uncomment only its directive. If you want to configure both the search server and the stream server, uncomment both directives.)
   - Change `<<PATH_TO_USER_FILE>>` to the password file path (the value of *path_to_pwd_file* in step *1)*.
6. Save and close the `publisher_digest_auth.conf` file.
7. Restart the server by entering:

   ```
   /etc/init.d/geserver restart
   ```

When a server is configured for publishing authentication, Google Earth Enterprise Fusion users who try to publish to that server must enter their user name and password. Refer to **Publishing a Database** in the *Google Earth Enterprise Fusion Reference Guide* for more information.

Configuring Client Authentication

Configuring client authentication is very similar to configuring publishing authentication, except that client authentication is specific to each virtual server, whereas publishing authentication is not.

To configure client authentication for a virtual server:

1. Create a password file by entering on the command line:

   ```
   /opt/google/gehttpd/bin/htdigest -c path_to_pwd_file Client user_name
   ```

   The first part is the path to the Apache utility you use to create the password file, `htdigest`. The `-c` option indicates that you are creating a new file. The *path_to_pwd_file* is the location where you want to store the password file and the name of that file; it can be any name and location you choose. `Client` is the realm. You can use any realm you want; however, you must use the same realm in step **4**. The *user_name* is the first user name you want to add to the password file.

   Note: Set the umask to `0022` before using `htdigest` to create the `htdigest_password_file` or change permissions to `rw-r--r-- (644)` after the `htdigest_password_file` is created. Check the permissions for the `htdigest_password_file` and if the permissions are set to `rw-r-----`, change the group ownership to `gegroup`.

2. Press **Enter**. The utility prompts you to enter a password for the specified user. Enter the password, and retype it when prompted.

   The `htdigest` utility creates the password file, which contains only that one user name, the realm, and the encrypted password. For example, if you view the contents of the password file, it might look like this:

   ```
   jsmith:Client:f9d3c803aeb515f35568b37ec2d65399
   ```

3. Add each user name and password to the same password file by entering:

   ```
   /opt/google/gehttpd/bin/htdigest path_to_pwd_file Client user_name
   ```

   Use the same *path_to_pwd_file* as you used for the first user. Do not include the `-c` option, since you are not creating a new file this time.

4. When you finish adding users to the password file, open the `/opt/google/gehttpd/conf.d/virtual_servers/`*config_file* file (where *config_file* is the configuration file for the virtual server you want to protect) in an editor, and add the following lines at the beginning of the `<Location>` directive:

```
AuthType Digest
AuthName "Client"
AuthDigestProvider file
AuthUserFile path_to_pwd_file
Require valid-user
```

   Where `Client` is the exact name of the realm and *path_to_pwd_file* is the same path you used in the `htdigest` command in step **1**.

   If this is a _ge_ virtual server, add:

```
BrowserMatch "GoogleEarth" AuthDigestEnableQueryStringHack=On
```

   If this is a _map_ virtual server, add:

```
BrowserMatch "MSIE" AuthDigestEnableQueryStringHack=On
```

   For more information about `AuthDigestEnableQueryStringHack`, refer to the Apache documentation at http://httpd.apache.org/docs/2.2/mod/mod_auth_digest.html#msie.

   The final `<Location>` directive looks like:

```
<LocationMatch /default_ge/*>
        AuthType Digest
        AuthName "Client"
        AuthDigestProvider file
        AuthUserFile path_to_pwd_file
        Require valid-user
        Include conf.d/virtual_servers/runtime/default_ge_runtime
        BrowserMatch "GoogleEarth" AuthDigestEnableQueryStringHack=On
</LocationMatch>
```

5. Save and close the virtual server configuration file.
6. Restart the server by entering:

```
/etc/init.d/geserver restart
```

Configuring LDAP Authentication For Publishing

If you use LDAP for user authentication on your network, you can configure LDAP authentication for publishing with Google Earth Enterprise Fusion. Since Basic authentication is used for password challenge, Google suggests that you publish through an SSH tunnel. (See Configuring Secure Remote Publishing (Using an SSH Tunnel) for more information about configuring an SSH tunnel.)

To securely configure LDAP authentication for publishing:

1. Copy the `publisher_ldap_auth.conf` file from `/opt/google/gehttpd/conf.d/examples` to `/opt/google/gehttpd/conf.d`.
2. Open `/opt/google/gehttpd/conf.d/publisher_ldap_auth.conf` in an editor.
3. Uncomment the following lines to enable LDAP authentication on the stream server:

```
<Location /StreamPublisher/>
        AuthType Basic
        AuthName "Publisher"
        AuthBasicProvider ldap
        AuthzLDAPAuthoritative off
        AuthLDAPURL "<<LDAP_SERVER_URL_and_LDAP_SEARCH_PARAMETERS>>"
        Require valid-user
</Location>
```

4. Change `<<LDAP_SERVER_URL_and_LDAP_SEARCH_PARAMETERS>>` to the actual path to your LDAP server and any parameters you want to set, for example:

```
ldap://ent-test-ldap.mycompany.com/dc=mycompany,dc=com?uid?sub?(objectClass=*)
```

5. Uncomment the following lines to enable LDAP authentication on the search server:

```
<Location /SearchPublisher/>
        AuthType Basic
        AuthName "Publisher"
        AuthBasicProvider ldap
        AuthzLDAPAuthoritative off
        AuthLDAPURL "<<LDAP_SERVER_URL_and_LDAP_SEARCH_PARAMETERS>>"
        Require valid-user
</Location>
```

6. Change `<<LDAP_SERVER_URL_and_LDAP_SEARCH_PARAMETERS>>` to the actual path to your LDAP server and any parameters you want to set.
7. Save the file.

Configuring LDAP Authentication For Virtual Servers

If you use LDAP for user authentication on your network, you can configure LDAP authentication for any virtual servers you configure. As with LDAP authentication for publishing, since the AuthDigestProvider directive does not support LDAP and AuthBasicProvider does not encrypt passwords, please contact Google technical support for help configuring secure LDAP authentication for virtual servers.

Securing Your Search Server

If you publish a database that you want to keep private and allow access only to certain users, configuring client authentication provides that security with regard to the stream server. However, if you host a searchable private database on the same server with a publicly accessible database, users who are able to log in to the public database can, theoretically, search the private database on that server. Such a user would need to be very knowledgeable about Google Earth Enterprise Fusion and would need to know the exact URL of the private database, so the likelihood of this breach is small; however, it is possible.

Therefore, to ensure that a database is completely secure (that is, no unauthorized users can view or search the data), you must publish that database on a separate search server host that requires authentication and allows access to only approved users.

Note: If you are short of server space, you can publish the private database to a shared stream server (that is, a mix of databases that do and do not require authentication) and just publish the private database to a search server on a separate (authentication only) host.

Configuring Secure Remote Publishing (Using an SSH Tunnel)

When Google Earth Enterprise Fusion publishes a database, it does not encrypt the data. If you want to encrypt the data during the publishing process to a remote server (or even on separate remote stream and search servers), you can use an SSH tunnel.

To publish securely to a remote server:

1. Open an SSH tunnel by entering on the command line:

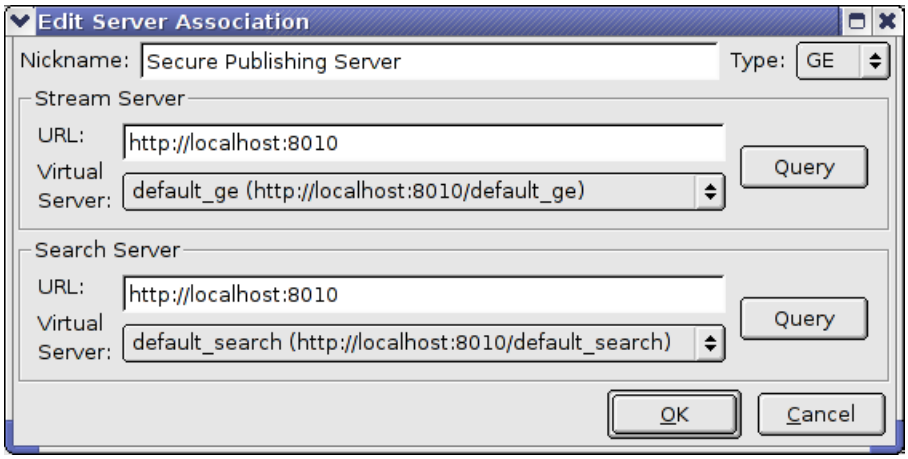
   ```
   ssh -L port_num:host_name:80 host_name
   ```

   For example:

   ```
   ssh -L 8010:remoteServer:80 remoteServer
   ```

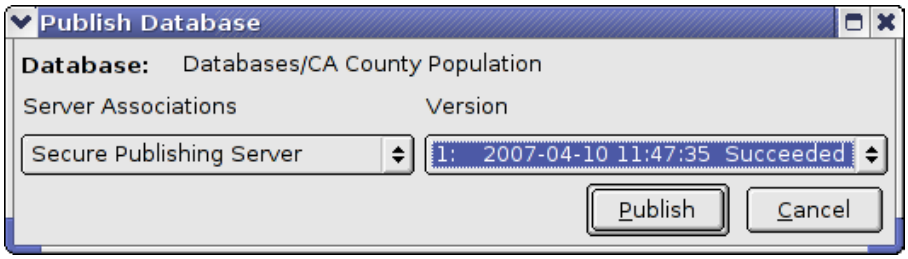
   Note: You can use any port that is available, but Google recommends a high number.

2. Follow the instructions in Configuring Server Associations to configure a server association using the local port number you designated in the `ssh` command, for example:



Note: If the remote server requires authentication, it prompts you to log in when you click **Query**.

3. Publish the database to the server association you just created, for example:



4. Close the SSH tunnel by entering **Ctrl-D** or `exit` in the terminal window.

The next time you want to publish securely to that same remote server, you can skip step 2.

To publish securely to separate remote search and stream servers:

1. In one terminal window, open an SSH tunnel to the stream server by entering on the command line:

   ```
   ssh -L port_num:host_name:80 host_name
   ```

   For example:

   ```
   ssh -L 8010:remoteServer:80 remoteServer
   ```

   Note: You can use any port that is available, but Google recommends a high number.

2. In a different terminal window, open an SSH tunnel to the search server by entering the same command with a different port number, for example:

   ```
   ssh -L 8020:remoteServer:80 remoteServer
   ```

3. Follow the instructions in Configuring Server Associations to configure a server association:
   - Use the local port number you designated for the stream server in the Stream Server's URL field.
   - Use the local port number you designated for the search server in the Search Server's URL field.
4. Publish the database to the server association you just created.
5. Close both SSH tunnels by entering **Ctrl-D** or `exit` in the terminal windows.

The next time you want to publish securely to that same remote server association, you can skip step **3**.

Disconnected Publishing

If you want to publish databases on a server that does not have a network connection to your Google Earth Enterprise Fusion workstations, you can configure a server with the disconnected server add-on.

New in Google Earth Enterprise 4.0 is the ability to combine disconnected publishing and connected publishing together. Prior to 4.0, only one type was supported for a database. With this change, for example, a large database can be copied to portable media and loaded onto the server using disconnected publish, saving the time and bandwidth required to send terabytes of data over the network. Later, deltas for the same databases can be sent over the wire.

Note: Disconnected production servers require X11 libraries, including Mesa. Google Earth Enterprise Server does not require an X server to be running or installed, however. Only the libraries are required.

Prepare a disconnected database

To create the disconnected database, use `gedisconnectedsend` from the command line. In the example below, the `--report_size_only` flag is turned on; the size of the database should be compared to the free space on your removeable media.

```
gedisconnectedsend --report_size_only --sendpath \
/gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/gedb

rm -rf /portable_media/new_dir
mkdir -p /portable_media/new_dir

gedisconnectedsend --output /portable_media/new_dir \
--sendpath /gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/gedb
```

Making delta disconnected databases

Use `--havepath` or `--havepathfile` to create a delta database.

When publishing from `machine_one` to `machine_two`, for example:

On `machine_two`:

```
geserveradmin --fusion_host machine_one --listdbs > /portable_media/dblist
```

On `machine_one`:

```
gedisconnectedsend --output /portable_media/new_dir \
--havepathfile /portable_media/dblist \
--sendpath /gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/gedb
```

Publish on the remote Server host

Connect the portable media to the Server host and mount the drive. Then:

1. Add the database manifest to the Server:

   ```
   geserveradmin -stream_server_url http://your_stream_server \
   --search_server_url http://your_search_server \
   --adddb \
   /portable_media/new_dir/gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/g
   edb
   ```

2. Push the files to the Server:

   ```
   geserveradmin --stream_server_url http://your_stream_server \
   --search_server_url http://your_search_server \
   --pushdb \
   /portable_media/new_dir/gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/g
   edb
   ```

3. Publish the database on the Server:

   ```
   geserveradmin --stream_server_url http://your_stream_server \
   --search_server_url http://your_search_server \
   --publishdb \
   ```

```
/portable_media/new_dir/gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/g
edb
```

4. Verify the database manifests:

```
geserveradmin --stream_server_url http://your_stream_server \
--search_server_url http://your_search_server \
--listdbs

geserveradmin --stream_server_url http://your_stream_server \
--search_server_url http://your_search_server \
--dbdetails \
/portable_media/new_dir/gevol/assets/Databases/igain.kdatabase/gedb.kda/ver001/g
edb
```

5. Verify the integrity of files in the published database:

```
ssh your_server /opt/google/bin/geindexcheck --database \
/gevol/published_dbs/stream_space/your_server/gevol/assets/
  Databases/igain.kdatabase/gedb.kda/ver001/gedb

ssh your_server /opt/google/bin/geindexcheck --mode all --database \
/gevol/published_dbs/stream_space/your_server/gevol/assets/
  Databases/igain.kdatabase/gedb.kda/ver001/gedb
```

Note: The paths in the examples above were split onto two lines for documentation. They should be entered on one line when completing your commands.

The steps to delete DBs at end of life, for disconnected servers, is same as what was described in over the wire publishing section.

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Configuring Google Earth Enterprise Fusion

Before You Begin

Before you use many of the Fusion configuration tools, you must stop the system manager and then start it after you change the configuration. To stop/start the system manager, enter:

```
/etc/init.d/gefusion [stop | start | restart]
```

Configuring Your Data Locations

The Google Earth Enterprise installation script prompts you to enter information about your system and then properly configures your primary asset root and source volume. After you install Fusion, use the `geconfigureassetroot` command to:

- **Add asset roots.**

  If you use the *Google Earth Enterprise Fusion Tutorial*, Google recommends that you specify separate asset roots for each user's tutorial data and a completely different asset root for your real working data.

- **Identify source volumes.**

  You must identify each directory that contains your source data files (or subdirectories of your source data files). Fusion is not able to read files located in other directories.

- **Modify the current volume.**

  You can modify volume definitions when migrating from a single- to a multiple-workstation configuration or when modifying the local path of a network-mounted source volume (for example, when adding a larger drive for source data).

For more information on these commands, see geconfigureassetroot in the **Command Reference** chapter.

Caution: Do not modify the volume definition after you save data to that volume. Because the local name and the network path definitions are used by Fusion for resources, projects, and database definitions, any change to a volume definition invalidates the data already processed on that volume.

If you add multiple asset roots, you can use the `geselectassetroot` to specify the volume in which you want to work and to switch back and forth among the available asset roots, if desired. For more information on these commands, see geselectassetroot in the **Command Reference** chapter.

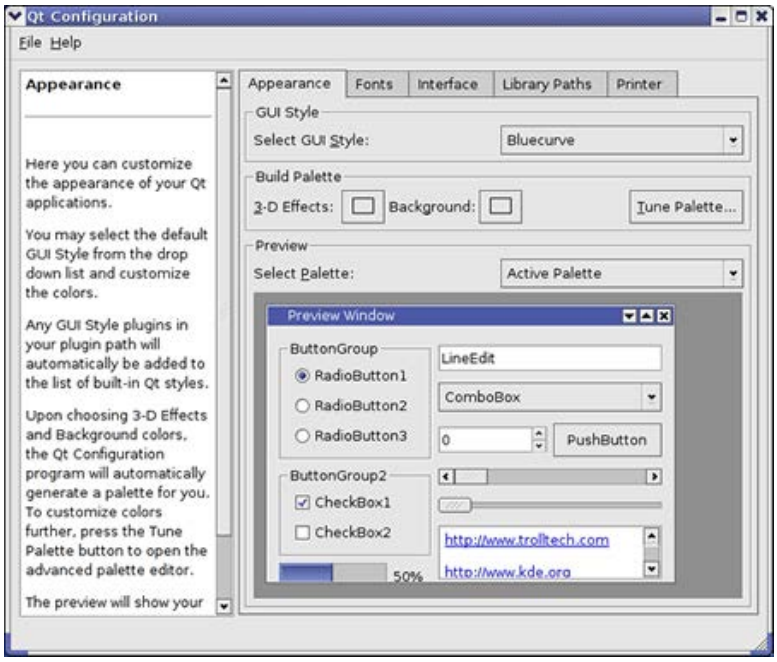
Configuring Font Size in the GUI

If you want to customize certain aspects of the Fusion GUI (such as menus, button labels, tables, lists, and so on), you can use a graphical configuration tool called Qt Configuration to customize the font size and other GUI features.

To customize the appearance of the Fusion GUI:

1. On the command line, enter `qtconfig`.

   The Qt Configuration dialog appears.



2. Click the tabs at the top of the right side of the window to view the available options, and use the help text on the left side for help with each tab.

> **Note:** The Qt Configuration tool is not a Google product. For more information about Qt Configuration, select either of the options on the Help menu.

Configuring Fonts For the Text Style Dialog

Fusion provides the *Sans regular* font for map vector labels. If you want to let users create labels in additional fonts, you can define a "font list" file so that the Text Style dialog displays a list of the fonts you support. For example, you can display international fonts such as Chinese, Japanese, or Hebrew character fonts. (For more information about the Text Style dialog, see the *Google Earth Enterprise Fusion Reference Guide*.)

To create a font list file:

1. Create an ASCII text file and save it as `/opt/google/share/fonts/fontlist`.
2. For each font you want to support, enter one line in the file that contains the four following pieces of information:
   - **Font name** - the name of the font, which appears in the drop-down list of fonts available in the Text Style dialog (for example, `TimesRoman`). No spaces are allowed in the font face name. Multiple variations of the font, such as regular, bold, italic, are automatically grouped under the same name in the drop-down list.
   - **File Path** - the full path to the TrueType (`.ttf`) font file. No spaces are allowed in this path.
   - **Bold** - 1 if the font is bold; 0 if not.
   - **Italic** - 1 if the font is italic (or oblique); 0 if not.
3. Save the file.

For example, your font list file might contain:

```
LucidaBrightDemi /usr/local/lib/fonts/LucidaBrightDemiBold.ttf 1 0
LucidaBrightDemi /usr/local/lib/fonts/LucidaBrightDemiItalic.ttf 0 1
LucidaBright /usr/local/lib/fonts/LucidaBrightItalic.ttf 0 1
LucidaBright /usr/local/lib/fonts/LucidaBrightRegular.ttf 0 0
LucidaSansDemi /usr/local/lib/fonts/LucidaSansDemiBold.ttf 1 0
LucidaSans /usr/local/lib/fonts/LucidaSansRegular.ttf 0 0
LucidaTypewriter /usr/local/lib/fonts/LucidaTypewriterBold.ttf 1 0
LucidaTypewriter /usr/local/lib/fonts/LucidaTypewriterRegular.ttf 0 0
LucidaTypewriter /usr/local/lib/oblique-fonts/LucidaTypewriterBoldOblique.ttf 1 1
LucidaSansDemi /usr/local/lib/oblique-fonts/LucidaSansDemiOblique.ttf 0 1
LucidaSans /usr/local/lib/oblique-fonts/LucidaSansOblique.ttf 0 1
LucidaTypewriter /usr/local/lib/oblique-fonts/LucidaTypewriterOblique.ttf 0 1
```

Customizing Your Google Maps Landing Page

Google used the Google Maps API to create a sample web application that provides a very basic way to display your Google Maps database output in a browser. The sample web application and the Google Maps API are automatically installed with Fusion.

Google recommends that you use the sample application to display your Google Maps data at first. After you see how it looks, you can create your own Google Maps web application that looks more your other web applications, using the provided sample web application as a guide. Documentation for the Google Maps API is at http://www.google.com/apis/maps/.

To get started, make a copy of the sample application files (`maps_local.html`, `maps_google.html`, `fusionmaps.js`, and `fusionmaps.css`). Then configure a virtual server on which you can experiment, and move the copied files to that virtual server. (See Configuring Virtual Servers for help, if you need it.) When you create the Apache configuration file for the new virtual server, change "`/maps/maps_google.html`" or "`/maps/maps_local.html`" in the following line to point to your copy of the example files on the new virtual server:

```
RewriteRule ^/default_map/+$ /maps/maps_google.html [PT]
```

or

```
RewriteRule ^/default_map/+$ /maps/maps_local.html [PT]
```

You can edit the rest of the sample application in whatever ways you like, adding your own logo, branding, and so on.

Configuring the Google Maps API License Key

Google Maps supports only specific browser/operating system combinations. Even if you are using a supported browser, there are some features in Fusion that are not supported by some browsers on certain operating systems. (See **Google Maps Browser Support and Incompatibilities** in the *Google Earth Enterprise Fusion Reference Guide*.)

As long as you are connected to the Internet and have a license key for the Google Maps API, there is no problem (regardless of your platform), since your server contacts Google's servers for functions that are not supported in the browser.

Note: The following procedure assumes that you have received an email from Google that contains your license key for the Google Maps API.

To configure your Google Maps API license key:

1. Open `/opt/google/gehttpd/htdocs/maps/maps_google.html`.
2. Locate the following line in the script:

   ```
   <script src="http://maps.google.com/maps?file=api&v=2&key=abcdefg"type="text/javascript"></script>
   ```

3. Replace the `key` placeholder ('`abcdefg`') with your Google Maps API license key. Your key is contained in an email sent from Google.
4. Save the `maps_google.html` file.
5. Restart the Google Earth Enterprise Server (as root):

   ```
   sudo /etc/init.d/geserver restart
   ```

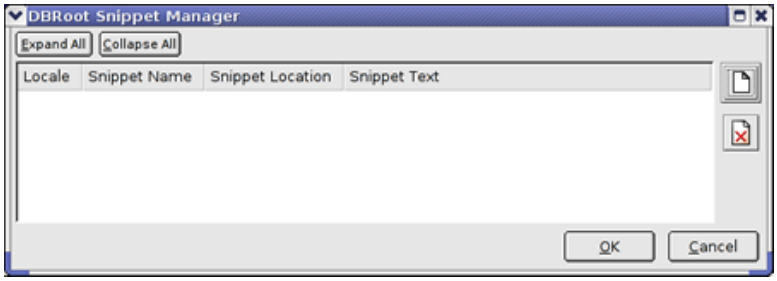
Using the dbRoot Snippet Manager

The dbRoot is a file that contains information that Fusion passes to Google Earth EC when you publish a database. The dbRoot Snippet Manager allows you to add your preferences to the dbRoot. Many of these preferences (or *snippets*) apply to display characteristics, such as showing or hiding the Google logo in Google Earth EC. The snippets you specify in the dbRoot Snippet Manager apply to all databases you publish from Fusion.

Caution: If you are working with multiple Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user's changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

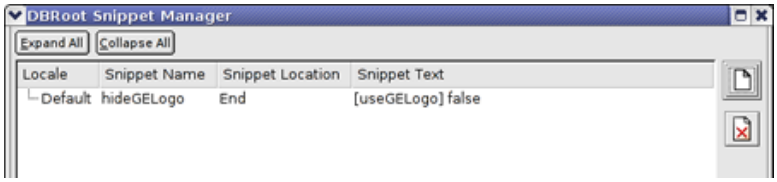
To add a snippet:

1. Select **Tools > dbRoot Snippet Manager**. The dbRoot Snippet Manager appears.



2. Click the page icon  . The **Add New Snippet** dialog appears.
3. Enter a name for the new snippet, and click **OK**. The snippet appears on the list in the dbRoot Snippet Manager.

4. Click in the **Snippet Text** column to enter the appropriate snippet text. The next section contains a list of allowable snippets. Snippet text syntax is as follows: `[snippetName] value`



5. If you want to specify different snippet text for each supported locale, right-click the name of the snippet, and select a locale.
6. When finished, click **OK**.

dbRoot Snippet Syntax

The following table lists the syntax for all of the possible dbRoot snippets.

Snippet Name	Purpose	Syntax - Default Value	Notes
userGuideURL	Help menu > User Guide	`../userguide/v4/userGuideURL`	Defaults to local PDF file for Google Earth EC. Can be set to an internal IP or hostname address.
supportCenterURL	Help menu > Support Center	`../userguide/v4/support`	Hidden in Google Earth EC if dbRoot setting does not exist. Can be set to an internal IP or hostname address.
tutorialGuideURL	Help menu > Tutorial	`../userguide/v4/tutorials/index.htm`	Can be set to an internal IP or hostname address.
keyboardShortcutURL	Help menu > Keyboard shortcuts link	`../userguide/v4/ug_keyboard.html`	Can be set to an internal IP or hostname address.
defaultWebPageURL	Tools menu > Web browser home page	`http://www.google.com`	Can be set to an internal IP or hostname address.
useGELogo	Shows/hides Google Earth logo in lower right corner of display	boolean	Default is true.
bbsServer.host	Host name	*string*	bbs.keyhole.com
bbsServer.port	Port	*int*	80
bbsServer. fileSubmitPath	URL to post KMZ content to	*string*	/ubb/postbouncer.php
bbsServer. postWizardPath	URL where posting wizard is located	*string*	/ubb/postcatcher.php
bbsServer.timeout	Timeout in seconds	*double*	15.0
bbsServer.retries	Number of retries before failing	*int*	2
bbsServer.secureSS	true = use HTTPS connection to	boolean	Default is false.

	hostfalse = use HTTP connection		
cobrandInfo	Custom co-branded logo	[export.cobrandInfo] { <etCobrandInfo> [top-center] { "http://your_server.com/your_logo.png" 0.5 0.95 true true top-center 0.25 }	
earthIntlURL	Localize international URL for Google Earth	http://earth.google.com/intl/%1/	
supportAnswerIntlURL	Localize international URL for support answers	http://earth.google.com/support/bin/answer.py?answer=%4&hl=%1	
supportTopicIntlURL	Localize international URL for support topics	http://earth.google.com/support/bin/topic.py?topic=%4&hl=%1	
supportRequestIntlURL	Localize international URL for support requests	http://earth.google.com/support/bin/request.py?hl=%1	
startupTipsURL	Localize international URL for startup tips	http://earth.google.com/intl/%1/tips/v4/	
userGuideIntlURL	Localize international URL for documentation	http://earth.google.com/intl/%1/userguide/v4/	
supportCenterIntlURL	Localize international URL for the support center	http://earth.google.com/support/?hl=%1	
businessListingIntlURL	Localize international URL for business listings	http://www.google.com/local/add/login?hl=%3&gl=%2	
defaultWebPageIntlURL	Localize international URL for the default web page	http://www.google.com (English) http://www.google.com/intl/pt-BR (Portuguese) http://www.google.com/intl/%1 (all other languages)	
numStartupTips	Set the number of startup tips	13	
hideUserData	true = Suppress user name and license key information in the Help -> About windowfalse = Display user name and license key	boolean	Default is false.

	information		
export.options. disableDiskCache	true = Disable disk caching, so databases can ask Google Earth EC not to use disk cache at all.false = Enable disk caching.	boolean	Default is false.

reverseGeocodingServer...	Defines the reverse geocoding server.	The default uses Google's geocoding server:
		`[googleMFEReverseGeocoder] http://maps.google.com/ maps/api/earth/ GeocodeService.Search`
		`[reverseGeocodingServerVersion] 3`
		`[reverseGeocodingServer.host] geo.keyhole.com`
		`[reverseGeocodingServer.path] /maps`
		To use your own geocoding server:
		`[reverseGeocodingServerVersion] 2`
		`[reverseGeocodingServer.host] your_geocoding_server`
		`[reverseGeocodingServer.path] /path_for_queries`	

Note: Advanced users of previous versions of Fusion were able to hand edit the dbRoot preamble. That is no longer possible. Most of the hand edits that users made in the past are now features built in to Fusion (such as the Search Tab Manager), and other changes are possible using the dbRoot Snippet Manager. However, there are some edits that advanced users made in dbRoot in previous versions of the software that are no longer allowed at all, including:

- Manually editing streamed layers combined for hybrid service.
- Appending a KML file to dbRoot.
- Manually adding a nested layer.

If you have any questions about these functions, please contact Google Earth Enterprise Fusion technical support.

To modify a snippet:

1. If you want to change the location of the snippet in dbRoot, click in the Snippet Location field for the snippet you want to move.

   This field toggles between the values **End** and **Beginning** to move the snippet to the end or beginning of the dbRoot. This setting is useful when you want to change the order in which the layers appear in Google Earth EC by reordering them in dbRoot.

2. If you want to change the snippet text, click in the Snippet Text field for the snippet you want to modify, and edit the text.

   Note: If you modify a dbRoot snippet, it does not force you to rebuild project affected by that change. If that dbRoot snippet affects a project that has already been built, when you publish a database that includes that project, the previous dbRoot snippet remains in effect. If something else in that project subsequently triggers a build, the modified dbRoot snippet will take effect in the resulting version.

To delete a snippet:

1. Select the snippet you want to delete, and click  .

   A message prompts you to confirm that you want to delete the selected snippet.

2. Click **OK**.

   The snippet disappears from the dbRoot Snippet Manager.

Monitoring System Processes

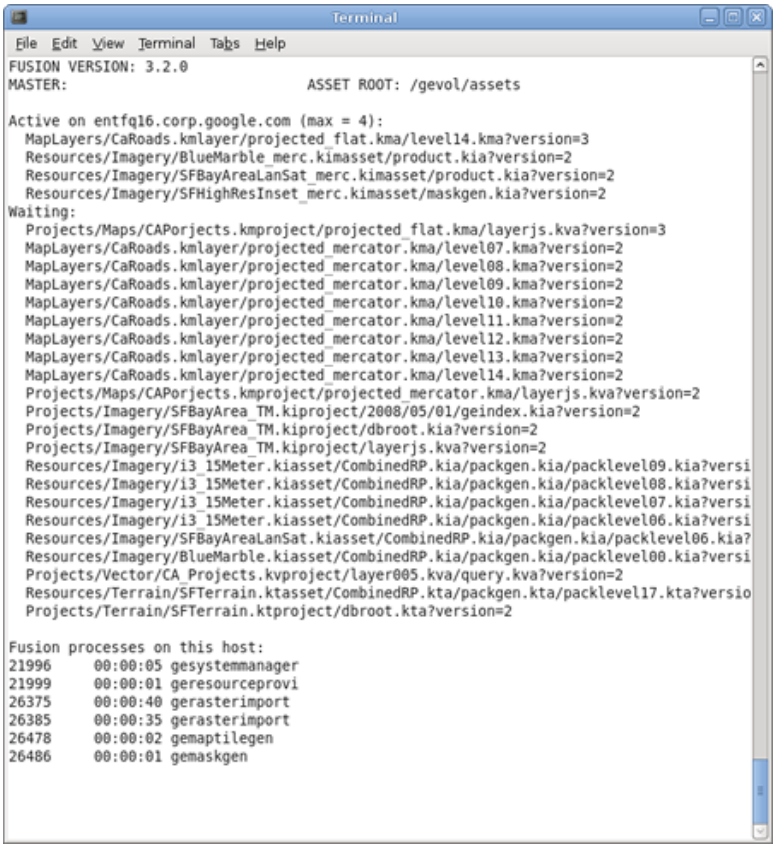
You can watch all active Fusion system tasks and processes using the `getop` command. This command is similar to the Unix command `top`, but is specific to Fusion processing. It is the command line equivalent to the System Manager in the

Fusion GUI. See getop in the **Command Line Reference** chapter for more information.

The `getop` command outputs the following data for the workstation to the console:

- Version of Fusion running
- Host name of the master
- Currently selected asset root
- The active process and maximum number of jobs allowed (max = *n*)
- List of processes waiting to run
- Process IDs, running time, and names of all Fusion processes running

For example, the output might look something like this:



Backing Up Your Data

Generally, the important Google Earth Enterprise Server data is all within the `/var` directory. If you perform regular back-ups of `/var`, that covers most of the server data. Google recommends that you also back up the following directories:

```
/etc
/opt/google/gehttpd/conf
/opt/google/gehttpd/conf.d
/opt/google/getomcat/conf
/opt/google/gehttpd/htdocs
```

With regard to Fusion data, Google strongly recommends that you back up all of your original source data (vector and raster). In addition, Google encourages you to back up all of the `.xml` files within your asset root(s). In theory, if you have the source data and the asset root `.xml` files, everything else can be reconstructed. Google Earth Enterprise does not include any tools for doing such a reconstruction, but the data is there and it could be done, if necessary.

You do not need to back up your publish root(s), since there is nothing there that cannot be reproduced. If you have the space and want to back them up, however, recovery will be faster, but it is not necessary.

Many Google Earth Enterprise users also back up their product files. These are the low-level files that result from building resources (for example, `.kip`, `.ktp`, `.kmp`, `.kvp`). That way, if you do need to reconstruct, you can import the product files (rather than raw source files) to recreate the resources. This will save you some build time.

Running Fusion on a Machine with Multiple CPU Cores

Fusion can be configured to use a maximum number of CPU cores on a machine with the command:

```
/opt/google/bin/geselectassetroot --assetroot /my/assetroot --numcpus X
```

This number will show up as the `maxjobs` entry within `getop` output and corresponds to how many concurrent jobs Fusion may spawn at any one time. Note that the value for `--numcpus` should be equal to, or less than, the total number of CPUs permitted by your Fusion license; it should never exceed the number of physical CPU cores on the machine.

Each task within Fusion is configured to use 1 CPU by default. Changing the maximum number of CPUs using the above command will *not* affect the number of CPUs assigned to each individual task. Some tasks in Fusion are capable of multithreaded support including:

- `gepackgen` (imagery and terrain projects)
- `gemaptilegen` (2D vector-based map tiles)
- `gecombineterrain` (3D databases)

These tasks may be multithreaded by enabling 'Taskrules' within Fusion. Implementation of Taskrules is described in: `/opt/google/share/taskrules/README`.

The `PacketLevel.taskrule`, `MapLayerLevel.taskrule`, and `CombinedTerrain.taskrule` taskrules will enable multiple CPUs to work on each individual task. For example, configuring a `minNumCPUs` and `maxNumCPUs` of 2 for `gepacken` means that up to 4 gepackgen processes may run on Fusion, with 2 CPUs assigned each, when 8 CPU cores are allocated.

As a best practice, `PacketLevel.taskrule` and `MapLayerLevel.taskrule` should be configured such that multiple `gepackgen` and `gemaptilegen` processes can run concurrently. Since `gecombineterrain` is CPU-intensive and can be an operational bottleneck, more CPUs should be assigned to that task to expedite processing.

So on a machine with 8 CPU cores available for Fusion processing:

1. Set `--numcpus`=7. It's recommended to set the maximum number of CPUs allocated to Fusion to (N-1), such that one CPU core is reserved for system operations
2. Set `minNumCPU`=2 and `maxNumCPU`=2 in `PacketLevel.taskrule` for imagery projects (3 concurrent `gepackgen` jobs possible)**
3. Set `minNumCPU`=3 and `maxNumCPU`=4 in `PacketLevel.taskrule` for terrain projects (2 concurrent `gepackgen` jobs possible)**
4. Set `minNumCPU`=3 and `maxNumCPU`=4 in `MapLayerLevel.taskrule` (2 concurrent `gemaptilegen` jobs possible)
5. Set `minNumCPU`=7 and `maxNumCPU`=7 in `CombinedTerrain.taskrule` (1 `gecombineterrain` job)

Note: Fusion will use up to 200% CPU processing for imagery projects per `gepackgen` process, and up to 600% CPU processing for terrain projects. There is fundamentally a balance between assigning sufficient numbers of CPUs to each individual process for `gepackgen` while still enabling multiple concurrent `gepackgen` processes for parallel processing.

All other tasks in Fusion will continue to operate with min/max 1 CPU.

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Configuring the Tutorial Work Space

In order to accommodate users who are working through the tutorial at the same time other users (or even those same users) are working on production data, Google recommends that you configure a tutorial work space on each workstation where you install the tutorial data. That way, you can keep the tutorial source volume and asset root separate from your production source volume(s) and asset root.

In addition, for any user who plans to work through the tutorial lessons on search tabs and search layers, you must register the search plug-in.

This chapter describes how to configure the tutorial work space and register the search plug-in. It also provides instructions for users who need to switch back and forth between the tutorial asset root and the production asset root, and instructions for cleaning up the tutorial files when they are no longer needed.

Configuring the Tutorial Asset Root and Source Volume

When you install Google Earth Enterprise, you configure a source volume and asset root for your production data. If you accepted the default values, they are `/gevol/src` and `/gevol/assets`, respectively.

The installation script installs the tutorial files in `/opt/google/share/tutorials/fusion`, so you must add that path as the source volume for the tutorial. In addition, Google recommends that you add a tutorial asset root for users to store the data they create with Google Earth Enterprise Fusion while working through the tutorial.

The following procedure describes how to configure an asset root and the tutorial source volume for each tutorial user. You must configure them for *each* user on *each* workstation where you install the Google Earth Enterprise Fusion tutorial files.

To configure a tutorial asset root and source volume:

1. On the command line, log in as root.
2. Stop the system manager by entering:

   ```
   /etc/init.d/gefusion stop
   ```

3. Enter:

   ```
   geconfigureassetroot --new --assetroot /username/assets
   ```

   where *username* is the name of the user.

   The *username* does not have to be the user's official account name. It can be anything that distinguishes that user from other users on that particular workstation, such as `edaniels` or just `Emily`.

   Note: Google recommends that you place the tutorial asset root on the same partition as the publish root, so the publisher uses hard links instead of making copies of the tutorial databases. (See *Planning the Location of Your Publish Root* for more information.)

   If you place the tutorial asset root on the root partition, ensure that there is enough disk space for the data created by each user working through the tutorial. If a user completes all lessons in the tutorial, allow 1.5 GB of disk space.

   The tool asks if you want to create a new source volume.

4. Enter `Y`, and press **Enter**.

You are prompted to enter a directory for the source volume.

5. Enter `/opt/google/share/tutorials/fusion`, and press **Enter**.

   The tool asks if you want to add more volumes.

6. If you want to create tutorial work spaces for more users, enter `Y`, press **Enter**, and repeat steps **3** through **5**. If not, skip this step. Otherwise, enter `N`, and press **Enter**.

   The tool displays the message "Configured */username*`/assets`" and returns you to the command line prompt.

7. Log out as root.
8. Start the system manager by entering:

```
/etc/init.d/gefusion start
```

Note: The new source volume and asset root are automatically selected for you. You do not have to run the `geselectassetroot` command. (See the next section, Selecting the Tutorial Asset Root, for more information about selecting different asset roots.)

Selecting the Tutorial Asset Root

There are two occasions when users must select a different asset root:

- When multiple users share a single workstation, each user must select his or her own tutorial asset root.
- When a user switches from the tutorial data to real production data, he or she must select the appropriate asset root.

This section explains how to select a different asset root.

Caution: Note that even though your source volumes and asset roots are separate for each user or for the tutorial and production data, there is only one publish root on each virtual server for Earth databases and one for Map databases.

When two users are sharing a single workstation, they are both publishing to the same publish root. When one user publishes a database on that workstation, it overwrites any database that might have been published previously by another user on that same workstation. Likewise, if a user is switching back and forth between tutorial and production data on the same workstation, it is possible to overwrite a production database with a tutorial database and vice versa. Of course, the user can simply republish the desired database to make it available to Google Earth EC again.

To select the tutorial asset root:

1. On the command line, log in as root.
2. Stop the system manager by entering:

```
/etc/init.d/gefusion stop
```

3. Enter:

```
geselectassetroot --assetroot /username/assets
```

   where *username* is the name you used in step **3** of Configuring the Tutorial Asset Root and Source Volume.

4. Log out as root.
5. Start the system manager by entering:

```
/etc/init.d/gefusion start
```

Registering the Search Plug-In

When you install the Google Earth Enterprise software, it installs a sample plug-in (called

`ExamplePlugin`) in `/opt/google/share/searchexample`. Users are instructed to reference that plug-in in the **Defining Search Tabs** lesson in the tutorial.

You must register the plug-in before users can reference it. (See Search Plug-in in the **Command Reference** chapter for more information about the search plug-in commands for the `geserveradmin` tool.)

To register the sample plug-in for tutorial users, on the command line, enter:

```
geserveradmin --addplugin ExamplePlugin --jar_path \
  /opt/google/search/plugins/ExamplePlugin.jar \
  --class com.google.earth.search.plugin.ExamplePlugin
```

This command registers the plug-in and makes it available for users to reference on search tabs.

Cleaning Up the Tutorial Work Space

When a user completes the tutorial or no longer needs the tutorial data, you can clean up that tutorial work space, if desired, by removing the tutorial source files, asset root, and published databases. This section describes the best way to perform that clean-up.

Note: Google recommends that you keep the tutorial files intact, since they use very little space and can come in handy for users to practice, even after they have quite a bit of experience with Google Earth Enterprise Fusion.

To remove the tutorial source files, asset root, and databases:

1. At the command line prompt, log in as root.
2. Stop the system manager by entering:

   ```
   /etc/init.d/gefusion stop
   ```

3. Select the production asset root by entering:

   ```
   geselectassetroot --assetroot /gevol/assets
   ```

   Substitute the appropriate asset root path, if necessary.

4. Stop the Google Earth Enterprise Server:

   ```
   /etc/init.d/geserver stop
   ```

   Note: If you are upgrading from version 2.4 to 3.x for the first time, the command to stop the server is `/etc/init.d/khhttpd stop`.

5. Insert the distribution DVD, and mount the DVD drive.
6. Run the installer from any directory.

   Command-line installer:

   ```
   /media/cdrom/InstallGEFusion.sh
   ```

   GUI installer:

   ```
   /media/cdrom/InstallGEFusionGUI.sh
   ```

   Substitute the designation for your DVD drive for `cdrom`, if necessary.

   The installation script starts running, and the first prompt asks what product(s) you want to install.

7. Enter **3** for the Google Earth Enterprise Fusion Tutorial.

   The **X** next to Google Earth Enterprise Fusion Tutorial disappears. Removing the **X** causes the installation script to remove the tutorial files.

8. Enter **F** to finish selecting products.

9. Follow the rest of the prompts.

   The installer removes the tutorial files but does not change any of your other installed products. When it completes the installation, it returns you to the prompt.

10. Delete the user's tutorial asset root by entering:

    ```
    rm -Rf /username/assets
    ```

    where *username* is the name of the user you specified when you configured the tutorial work space.

    Caution: Make sure you are removing the tutorial asset root, not the production root. If you delete the production root, there is no way to recover it (other than from back-ups, if available).

11. Start the Google Earth Enterprise Fusion system manager and Google Earth Enterprise Server:

    ```
    /etc/init.d/gefusion start
    /etc/init.d/geserver start
    ```

    The order in which you start them does not matter.

12. List the databases on the current server by entering:

    ```
    geserveradmin --listdbs
    ```

    The tool displays a list of all databases ever published (except any deleted databases) on the server. If the server type is omitted, the server type defaults to `stream`.

13. Select the database you want to remove by entering:

    ```
    geserveradmin --deletedb db_name...
    ```

    where *db_name* is the name of the database you want to delete.

    Note: If you want to delete a currently published database, you can either publish a different database to the same virtual server or disable the virtual server on which it is published. Then you can delete the database.

    This tool does not delete the actual files. It is similar to putting files in the trash on a Windows or Macintosh desktop.

14. Permanently delete the selected databases by entering:

    ```
    geserveradmin --garbagecollect
    ```

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Command Reference

This appendix describes all of the command line tools for system administrations in alphabetical order. If you prefer, you can find each tool's syntax by entering the name of the tool with the `--help` option, for example:

```
geconfigureassetroot --help
```

This appendix uses the following typographic conventions:

Italic	Information that the user must supply
Bold	Text that the user must type exactly as shown
Ellipsis **...**	Argument that can be repeated several times in a command
Square brackets **[ ]**	Optional commands or arguments
Curly braces **{ }** with options separated by pipes **|**; for example: **{even | odd}**	Lists a set of choices from which the user can select only one
Parentheses **( )**	Grouped items that function together
`Courier font`	Code or program output

geconfigureassetroot

```
geconfigureassetroot {--new --assetroot path | --repair | --editvolumes | --
fixmasterhost | --noprompt} [--srcvol path]
```

Purpose

To add volume definitions or edit existing volume definitions.

Note: You must stop the system manager before using this command and then start it again after you are done. You must also run this command as root.

Example

```
geconfigureassetroot --new --assetroot /gevol/assets
geconfigureassetroot --new --assetroot /gevol/assets --srcvol /data1/src
geconfigureassetroot --repair
geconfigureassetroot --editvolumes
```

Commands

```
--new --assetroot path
```

***Optional*. Specify the path to the new asset root.**

Note: If you omit all options, the system creates `/gevol/assets`.

```
--repair
```

Optional. **Repairs various inconsistencies in the asset root (such as permissions, ownership, missing ID files, and so on). When you run this command, the tool auto-detects the problems that need to be repaired and fixes them.**

> **Note: Do not use this command unless you see a system message instructing you to do so.**

```
--editvolumes
```

Optional. **Follow the prompts to add a volume to the selected asset root or, modify the `localpath` definition for an existing volume, or to add a volume definition.**

```
--fixmasterhost
```

Optional. **Change the *assetroot host* entry to match the current host name. (This command corrects cases where a host name is changed after installing and configuring Fusion.)**

```
--noprompt
```

Optional. **Perform the command without prompting the user for any input. This option requires that some commands have arguments specified on the command line.**

```
--srcvol path
```

Optional. **Specify the path to the source volume.**

geconfigurepublishroot

```
geconfigurepublishroot [--path=path] [--allow_symlinks] [--noprompt]
```

Purpose

To specify the path where you want to publish databases for the current GEE Server. Follow the prompts.

> **Note: You must run this command as root.**

Example

```
geconfigurepublishroot --path /gevol/published_dbs --allow_symlinks
```

Commands

```
--path=path
```

Optional. **The path to the publish root. Default value is `/gevol/published_dbs`.**

```
--allow_symlinks
```

Optional. **Configures the publisher to accept symbolic links. Useful when the publish root is on a separate logical volume from the asset root. Default is no.**

```
--noprompt
```

Optional. **Perform the command without prompting the user for any input. This option requires that some commands have arguments specified on the command line. If the arguments are insufficient or the configuration fails, the program will return -1 (0 is returned on success).**

Caution: Do not create more than one publish root for a single asset root. That configuration produces unpredictable or undesirable results, including the inability to publish at all from that asset root.

gedisconnectedclean

```
gedisconnectedclean [--dbpath dbpath] [--list assetroot]
```

Purpose

To clean a disconnected database from a disconnected mock asset root.

Example

```
gedisconnectedclean --dbpath /gevol/assets/Databases/MyPOIs.kdatabase
```

Commands

```
--dbpath dbpath
```

Required. Specify the database path to clean. This must be a low-level path to a database directory (one of the entries in the *assetroot*`/dbpaths.list` file). See `--list` command option to find databases stored within the mock asset root.

```
--list assetroot
```

Optional. List all dbpaths currently in disconnected asset root

gedisconnectedpublish

```
gedisconnectedpublish [db_alias] db_name
```

Purpose

To publish a database on a disconnected server.

Example

```
gedisconnectedpublish MyPOIs
```

Commands

```
db_alias
```

Optional. Since *db_name* is the "low-level" name of the database, *db_alias* allows you to enter a name that is easier to remember, for example, `Databases/SF Highways.kdabase?ver=1`.

```
db_name
```

Required. The full, "low-level" name of the database you want to publish.

gedisconnectedreceive

Deprecated in version 4.0
`gedisconnectedreceive` **is required only when the disconnected database was sent with an older (pre 4.0) version of Fusion.**

```
gedisconnectedreceive --input dirname
```

Purpose

To copy a disconnected database from either detachable media or local storage into the mock asset root.

Example

For detachable media:

```
gedisconnectedreceive --input /mnt/usbdrive/SFHighways_3dDatabase_v20
```

For local storage:

```
gedisconnectedreceive --input
   /gevol/src/disconnected_databases/SFHighways_3dDatabase_v20
```

Commands

```
--input dirname
```

***Required*. Specify the directory that contains the files to be copied. This is typically the mount point of a hard drive.**

Notes:
The `gedisconnectedreceive` command will create an asset tree that mirrors the asset tree of the Fusion system that built the database.

The `gedisconnectedreceive` command will copy data to the mock asset root if the input folder is on a separate volume than the mock asset root. Links to the input folder to the mock asset root will be created if both the input and mock asset root folders on the same volume.

gedisconnectedsend

```
gedisconnectedsend [--extra filename] [--havepath dbpath] [--havepathfile file]
   --output dirname [--sendpath dbpath] [--sendver dbver]
```

Purpose

To gather all the files from a Fusion asset root necessary for a disconnected publish, for either publishing new databases or publishing "delta" updates.

Example

```
gedisconnectedsend --sendver Databases/SFHighways.kdatabase?version=2
   --output /gevol/src/disconnected_databases/SFHighways_3dDatabase_v2
```

Commands

```
--extra filename
```

***Optional*. Specify an extra file to package. This is typically used to repair broken files.**

```
--havepath dbpath
```

***Optional*. Specify which database path already exists on the target server. This must be a low-level path to a database directory and may be specified more than once.**

```
--havepathfile file
```

***Optional*. Specify the file that contains the list of existing database paths (copy of**

assetroot`/dbpaths.list` from the remote server).

```
--output dirname
```

Required. Specify where to gather the files. The directory must already exists and be empty. This is typically the mount point of a hard drive.

```
--sendpath dbpath
```

Optional. Specify which database path to send. This must be a low-level path to a database directory. You can determine this path by entering `gequery --outfiles` *dbver* on the source server.

```
--sendver dbver
```

Optional. Specify which database version to send. Use the `?version=...` syntax. Available database versions may be found with the `gequery --versions` command.

Note: The `gedisconnectedpublish` command may be used for publishing new databases to a remote server, or for "delta" publishes (which include only changes between versions) to a remote server.

geindexcheck

```
geindexcheck [--mode= {index | all}] [--verbose= n] [--progress n]
   [--help] { --index=index_path | --database=database_name }
```

Purpose

To diagnose problems with Fusion databases. You can run geindexcheck on either the unified index or intermediate indexes. The most common errors geindexcheck detects are CRC errors and missing files. For missing files, it reports the full file path. For CRC errors, it reports the full file path and the position within the file where the error occurred. After reporting an error, geindexcheck stops searching. This is because searching a corrupt index usually generates large numbers of redundant or irrelevant error messages caused by the initial error.

Example

```
geindexcheck --mode all --database
/gevol/published_dbs/stream_space/your_server/gevol/assets/Databases/igain.kdatabase/
gedb.kda/ver001/gedb
```

Commands

```
--mode= {index | all}
```

Optional. Search the index only (default) or specify "all" to search both the index and packet files (in index order).

```
--verbose= n
```

Optional. Specify the level of error reporting from 0 (fatal error) to 7 (all messages). The default is 3. This overrides KH_NFY_LEVEL.

```
--progress n
```

Optional. Request progress messages every n index locations. The default is 100000. To disable, set to 0.

Note: If enabled, this requires a verbose level of 3 or greater.

```
--help
```

***Optional*. Print the error message.**

```
--index=index_path | --database=database_name
```

***Required*. Specify either the index or the database parameter, but not both. For index, specify the path to the index to search. The index can be of any type. For database, specify the path from the asset root to the database. The unified index for the database is searched. Defaults to the latest version. To override the default, append "?version=n", where "n" is the version number.**

gepublishdatabase

Deprecated in version 4.0

You can now publish databases using either the geserveradmin tool or the Fusion GUI.

```
gepublishdatabase [--delete db_name [--serverurl url]][--listdbs [--serverurl
url]][--publish dbname [--server nickname]][--publisheddbs [--serverurl url]]
```

Purpose

To publish a database.

Examples

```
gepublishdatabase --publish msDelta
gepublishdatabase --publish msDelta --server mainServer
gepublishdatabase --listdbs --serverurl http://private.company.com
```

Commands

```
--delete db_name
```

Delete a registered database from the server.

```
--serverurl url
```

***Optional.* Use a specific server URL, such as http://private.company.com.**

```
--listdbs
```

List all databases registered on the server.

```
--serverurl url
```

***Optional.* Use a specific server URL, such as http://private.company.com.**

```
--publish dbname
```

Specify the location and name of the database that you want to publish relative to the asset root, for example, `Databases/databaseA`.

```
--server nickname
```

***Optional.* Specify the nickname of the server association to which you want to publish. If you omit the server specification, Fusion publishes to the default server. (Consult your**

administrator or refer to the *Google Earth Enterprise Administration Guide* for information about setting up server associations.)

```
--publisheddbs
```

List all of the published databases on the server.

```
--serverurl url
```

Optional. Use a specific server URL, such as http://private.company.com.

geselectassetroot

```
geselectassetroot [--lock] [--noprompt] [--unlock]
   ( [--assetroot path [--role {master | slave}] [--numcpus num]] )
```

Purpose

To perform a variety of operations related to existing asset roots on the current machine.

> **Note:** You must stop the system manager before using this command and then start it again after you are done. You must also run this command as root.

Example

```
geselectassetroot --lock
geselectassetroot --unlock
geselectassetroot --assetroot /gevol/assets
geselectassetroot --assetroot /gevol/assets --role slave --numcpus 3
```

Commands

```
--lock
```

Optional. Disables the ability to select a different asset root on this machine.

```
--noprompt
```

Optional. Perform the command without prompting the user for any input. This option requires that some commands have arguments specified on the command line.

```
--unlock
```

Optional. Enables the ability to select a different asset root on this machine. (Use only if `--lock` is enabled.)

```
--assetroot path
```

Optional. Specify the path to the asset root for this machine.

```
--role {master | slave}
```

Optional. Specify this machine's role in the asset root (master or slave). The default role is master. This command is available only in combination with `--assetroot`.

```
--numcpus num
```

Optional. Specify the number of CPUs on this machine to use for processing. The default will be the maximum number of CPUs detected on the machine during installation. This command is available only in combination with `--assetroot`.

geselectpublishroot

```
geselectpublishroot path [--noprompt]
```

Purpose

To specify a different publish root. The specified path must exist. If you want to create a publish root, see geconfigurepublishroot.

Example

```
geselectpublishroot /gevol/published_dbs
```

Arguments

path

Required. Specify the path to the desired publish root.

Options

```
--noprompt
```

Optional. Perform the command without prompting the user for any input. This option requires that some commands have arguments specified on the command line.

geserveradmin

```
geserveradmin [options] commands
```

Purpose

To configure your GEE Server. This section breaks down the `geserveradmin` commands into the following categories:

- Database
- Virtual server
- Search plug-in
- Admin
- Miscellaneous

All of the commands of each type are described below. At least one command is required.

Examples

```
geserveradmin --listdbs
geserveradmin --listplugins
geserveradmin --server_type map --dbdetails
/gevol/assets/Databases/USCounties.kdatabase/gedb.kda/ver001/gedb
geserveradmin --server_type map --dbdetails "/gevol/assets/Databases/SF
Neighborhoods.kdatabase/gedb.kda/ver001/gedb"
geserveradmin --addvs private --vstype ge
geserveradmin --disablevs private
geserveradmin --addplugin ExamplePlugin --jar_path /your_path/ExamplePlugin.jar--
class com.google.earth.search.plugin.ExamplePlugin
```

Options

```
--stream_server_url url
```

Optional. Specify a stream server other than the default. The default is the current server.

```
--search_server_url url
```

***Optional*. Specify a search server other than the default. The default is the current server.**

```
--server_type {stream | search}
```

***Optional*. Specify whether the servers in question are stream or search servers. The default is stream. If you want to reference a search server, this option is required with the `listdbs`, `dbdetails`, `listvss`, `vsdetails`, `addvs`, `deletevs`, `disablevs`, and `garbagecollect` commands.**

Commands

Database

Each of the database commands is listed below, along with its syntax and description. If the name of the database contains one or more spaces, double quote the entire path. (See the examples above.)

```
--adddb db_name [--dbalias alias]
```

Register a new database with the specified name.

```
--dbalias alias
```

***Optional*. Specifies a user-friendly name for the database.**

```
--dbdetails db_name
```

Provides a list of all of the files required by the specified database. If omitted, the server type defaults to `stream`.

```
--deletedb db_name
```

Deletes the specified database entry from the server. Does not delete the actual files. (This command is similar to putting files in the trash on a Windows or Macintosh desktop. See also `--garbagecollect`.)

Note: If you want to delete a currently published database, you can either publish a different database to the same virtual server or disable the virtual server on which it is published. Then you can delete the database. (See also `--disablevs`.)

```
--listdbs
```

Lists all databases ever published (except any deleted databases) on the server. If the server type is omitted, the server type defaults to `stream`.

```
--listplugins
```

Lists all plug-ins used on the server.

```
--publishdb db_name [--push] [--streamvs vs_name] [--searchvs vs_name]
```

Publish one or more databases on the specified virtual server. If the virtual server name is omitted, it publishes to the default server.

```
--push
```

***Optional*. Push the specified database to the virtual server.**

```
--streamvs vs_name
```

***Optional*. Specify the name of the stream server.**

```
--searchvs vs_name
```

***Optional*. Specify the name of the search server.**

```
--publisheddbs
```

Lists the databases currently published on the server. If the server type is omitted, the server type defaults to `stream`.

```
--pushdb db_name...
```

Push one or more databases to the server.

Virtual Server

Each of the virtual server commands is listed below, along with its syntax and description.

> **Caution: Publishing to virtual servers other than the default server is supported only in version 4.2 or later of Google EC. If you are using version 4.0 or earlier, only databases that you publish to the default server can be accessed by Google EC.**

```
--addvs vs_name [--vstype {ge | map}] --vsurl url [--vscachelevel num]
```

Registers a new virtual server with the specified name. Spaces are not allowed in the virtual server name. If the server type is omitted, the server type defaults to `stream`.

```
--vstype {ge | map}
```

***Optional for stream servers*. Specify the type of databases to be published to the new virtual server. If omitted, the `virtual server type` defaults to `ge`.**

```
--vsurl url
```

***Required*. The `vsurl` specifies the location of the virtual server. It must match the corresponding server-side virtual server configuration. There are three ways to specify the `vsurl`:**

- **Location-based URL, such as `/private_ge`. For example, if the entire URL is `http://www.company.com/private_ge`, you enter `/private_ge`.**

  > **Note: Google recommends that you use the `_ge` and `_map` naming convention to make it easier to distinguish between virtual server types.**

- **Port-based URL, such as:**

  ```
  http://www.company.com:1234
  ```

  The entire URL, including protocol, server name, path (if applicable), and port are required.

- **Name-based URL, such as:**

  ```
  http://corp.company.com
  ```

For this type of specification, you must modify your DNS appropriately for the virtual server.

After you use this command, you must create a configuration file for the new virtual server. (See *Configuring Virtual Servers* for details.)

```
--vscachelevel num
```

Optional. Specify a cache level (`1`, `2`, or `3`) for the virtual server. The default is `2`.

This cache is different than the client cache. This option caches only the index nodes at display levels 4, 8, and 12 (not data packets). If you increase this setting, Fusion caches more of the index in RAM, thereby decreasing server latency at the cost of server RAM. Level 3 uses approximately 1 GB of RAM. Level 2 uses approximately 4 MB of RAM. Level 1 uses approximately 16 KB of RAM. Each additional cache level consumes 256 times the RAM as the previous level and saves one disk read per packet served.

The server makes no checks that the RAM needed for caching does not exceed the total RAM on the machine. For example, if you have three virtual servers set to cache at level 3 on a machine that has only2 GB of RAM, the machine will thrash memory. The default is Level 2, so you should be able to create as many virtual servers as you want at the default cache level without worrying about running out of RAM.

Typically, users increase only a small number of virtual servers to cache level 3 on production servers and leave the rest of them at level 2. On servers that share a machine with Fusion, do not increase the level to 3. Google Earth Enterprise Fusion needs more RAM than the server does.

```
--deletevs vs_name
```

Permanently delete the specified virtual server. If the server type is omitted, the server type defaults to `stream`.

```
--disablevs vs_name
```

Temporarily disable the specified virtual server, primarily to prevent Google EC users from connecting to that server temporarily. If the server type is omitted, the server type defaults to `stream`.

> **Note:** To re-enable a disabled virtual server, simply publish a database to it.

```
--listvss
```

Provides a list of all virtual servers configured for the current machine. If the server type is omitted, the server type defaults to `stream`.

```
--vsdetails vs_name
```

Displays the name and URL of the specified virtual server. If the server type is omitted, the server type defaults to `stream`.

Search Plug-in

Each of the search plug-in commands is listed below, along with its syntax and description.

> **Note:** These commands are available on search servers only.

```
--addplugin plugin_name --jar_path path --class class_name
```

Registers a new search plug-in.

```
--jar_path path
```

Required. Specify the path to the `.jar` file for the plug-in.

```
--class class_name
```

Required. Specify a fully qualified class name for the plug-in.

```
--deleteplugin plugin_name
```

Deletes the specified search plug-in.

```
--listplugins
```

Lists all registered plugins.

Admin

Each of the admin commands is listed below, along with its syntax and description.

```
--garbagecollect
```

Permanently deletes the files for databases that have been selected for deletion. Generally, you run this command nightly to remove the files for databases that users have deleted to free up space on the storage device. (This command is similar to emptying the trash on a Windows or Macintosh desktop. See also `--deletedb`.)

> Note: Deletes only those files that are not used by other databases on that server.

Miscellaneous

Each of the miscellaneous commands is listed below, along with its syntax and description.

```
--enable_cutter
```

Enables cutting of portable globes. For more information about portable globes, please refer to the Portable Globe and Server guide.

```
--disable_cutter
```

Disables cutting of portable globes.

getop

```
getop --delay seconds
```

Purpose

To display a list of what Fusion is currently working on and whether `gesystemmanager` and `geresourceprovider` are currently running.

Enter Ctrl-C to exit and return to the prompt.

Example

```
getop --delay 30
```

Commands

```
--delay seconds
```

Optional. Specify the number of seconds delay between refreshes. For example, if you specify `30`, `getop` runs every 30 seconds. If you do not specify the delay, it does not refresh.

geupgradeassetroot

```
geupgradeassetroot --assetroot path [--noprompt]
```

Purpose

To upgrade an existing asset root after installing a later version of the software.

Note: You must stop the system manager before using this command and then start it again after you are done. You must also run this command as root.

Example

```
geupgradeassetroot --assetroot /data1/assets
```

Commands

```
--assetroot path
```

Required. Specify the path to the asset root. If omitted, the asset root defaults to `/gevol/assets`.

```
--noprompt
```

Optional. Perform the upgrade without prompting the user for any input. This option requires that some commands have arguments specified on the command line.

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Common Server Error Messages

Server error messages appear mainly when:

- The server (or part of it) is not running.
- The network connection to the server is down.

To determine whether the server is running, enter the server's URL or IP address in a browser window. If it is running, the browser displays the Google Earth logo. If it is not running, the browser displays a Page Not Found error message. To start the server, if necessary, enter:
`/etc/init.d/geserver start`

The remainder of this appendix provides additional information about the most common error messages you might see in Google Earth Enterprise Server, including:

If you encounter any errors that include the text "internal error", contact Google technical support.

Authentication required

Where It Appears

When you try to publish a database on a server that requires authentication.

Why the Error Occurred

You entered an invalid user name or password three times.

Resolution

Check with your system administrator to be sure you have permission to publish a database and have a valid user name and password. Then try entering the user name and password.

> **Note:** Be sure that CapsLock is not on.

Database is currently published. Please disable the stream virtual server first.

Where It Appears

When you try to delete a published database with `geserveradmin --deletedb db_name`. (See

geserveradmin.)

Why the Error Occurred

You cannot delete a published database.

Resolution

Either publish a different database, or disable the virtual stream server, and then try deleting the database again.

Either the virtual server *vs_name* does not exist or is already disabled.

Where It Appears

When you are trying to publish to a virtual server.

Why the Error Occurred

Either the virtual server has been disabled, or you made a typographical error when you entered the command.

Resolution

Use `geserveradmin --listdbs` to list all databases registered on the server. (See geserveradmin.)

Incorrect cache level

Where It Appears

When you add a virtual server.

Why the Error Occurred

You set the cache level to a number other than 1, 2, or 3.

Resolution

Set the cache level to 1, 2, or 3. (See “geserveradmin” on page A-11 for details.)

Invalid database

Where It Appears

When you try to publish a database using the `geserveradmin --publishdb` command. (See geserveradmin .)

Why the Error Occurred

The database path is incorrect, the database has not yet been built, or the database has been corrupted.

Resolution

Enter the correct path or build/rebuild the database.

Plugin already exists.

Where It Appears

When you are trying to register a plug-in.

Why the Error Occurred

The plug-in is already registered.

Resolution

No action is required.

Plugin *plug-in_name* is not registered.

Where It Appears

When trying to create a search tab.

Why the Error Occurred

You tried to create a search tab with a plug-in that is not registered with the server.

Resolution

Register the plug-in using `geserveradmin`. (See "geserveradmin" on page A-11.)

Search server push failed
Stream server push failed

Where It Appears

When you try to publish a database.

Why the Error Occurred

The network connection to the server is down, or permissions are set incorrectly where the publisher is attempting to write data.

Resolution

Check your network connections and ensure that the targeted server is running and accessible. Check the access permissions in the publish root directory.

Unable to contact server
Unable to contact search server
Unable to contact stream server

Where It Appears

When you try to publish a database.

Why the Error Occurred

The specified server is not running, or a service that it requires is not running.

Resolution

Enter the following command as root to restart the server:

```
/etc/init.d/geserver restart
```

Upload failed

Where It Appears

When you try to publish a database.

Why the Error Occurred

The network connection to the server is down, or permissions are set incorrectly where the publisher is attempting to write data.

Resolution

Check your network connections and ensure that the targeted server is running and accessible. Check the access permissions in the publish root directory.

Virtual server already exists

Where It Appears

When you are creating a virtual server with `geserveradmin --addvs`. (See “geserveradmin” on page A-11.)

Why the Error Occurred

You tried to use a virtual server name that has already been used for another server.

Resolution

Always use a unique name for a new virtual server.

Virtual server URL missing

Where It Appears

When you add a virtual server.

Why the Error Occurred

You did not provide a URL for the virtual server you are trying to add.

Resolution

Include a URL in the command. (See “geserveradmin” on page A-11 for details.)

Additional Support

For the most up-to-date information about Google Earth Enterprise, please email the Google Enterprise Support team at enterprise-support@google.com.

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Multiple Database Support

Google Earth EC 4.0+ supports simultaneous connections to multiple databases. This feature allows users to view extra data and imagery layers drawn on top of each other.

The first database the user connects to is identified as the primary database. After logging in, the user can connect to other databases (which are identified as secondary databases) with the **Add Database** option from the **File** menu.

There is no hard limit to the number of databases that a user can connect to simultaneously. However the disk cache system supports a maximum number of eight databases. For all practical purposes, that means that a user should connect to a maximum of seven secondary databases in addition to the primary database.

Layers

The layers of each database are grouped in the **Layers** panel under the name of the database.

Imagery Layers

Google Earth EC draws the imagery of the primary database first. It draws other imagery layers from secondary databases (if present) on top.

Users can make these additional imagery layers partially or totally transparent using the transparency slider that appears at the bottom of the Layers panel when a secondary database is selected. The transparency slider may not appear if the selected database does not contain any imagery layers. This feature facilitates comparison of imagery layers.

Vector Layers

Google Earth EC draws vector layers independently of each other. Users can enable any number of vector layers from any connected databases (primary or secondary).

Search Tabs

Custom search tabs can be configured for secondary databases, as well as for the primary database. The customization takes effect only after Google Earth EC connects to that database by either logging in to it as the primary database, or by adding it as a secondary database. (See the *Google Earth Enterprise Fusion Reference Guide* for instructions for configuring search tabs and adding them to a database.)

If you log in to a primary database for which custom search tabs are configured, those search tabs appear in Google Earth EC. If you add a secondary database that also has search tabs configured for it, the secondary database's search tabs do NOT appear in Google Earth EC; only the primary database's search tabs appear. The search tabs configured for the secondary database appear in Google Earth EC only if the primary database has no custom search tabs configured for it.

Authentication Considerations

The prevailing authentication mode in any Google Earth EC session (that is, while logged in) is the mode used by the primary databases. For instance, if the primary database has authentication turned off, it is not possible to successfully download data from a database such as `kh.google.com`, because it requires session cookie authentication (`khauth`). However, Google Earth EC does not report any errors while trying to connect to that database; it just fails to download the imagery data.

Authentication Modes

The following list includes all possible authentication modes and the modes with which each is compatible:

Authentication Modes

Mode	Description	Compatible Modes
khauth	Regular authentication used by `kh.google.com` and other Google Earth servers	khauth, LDAP, LDAP+SSL, noauth
LDAP	HTTP 1.1 authentication with user name/password	LDAP, LDAP+SSL, noauth
LDAP + SSL	HTTPS authentication with user name/password	LDAP, LDAP+SSL, noauth
noauth	Servers that do not require any authentication	LDAP, LDAP+SSL, noauth

Sample Scenarios

A user wants to connect to the following databases:

- `kh.google.com` (khauth authentication mode)
- `publicDB`, which requires no authentication (noauth authentication mode)
- `internalDB`, which uses LDAP authentication (LDAP authentication mode)

The user connects to `kh.google.com` as the primary database, and then adds `publicDB` and `internalDB` as secondary databases.

First, Google Earth EC authenticates itself with `kh.google.com`. Then, when it downloads the first packet from `internalDB`, it prompts the user to enter credentials on that server (the username/password combination configured by the administrator of that database). The primary authentication mode in this case is **khauth**, which is compatible with both **noauth** and LDAP.

Failure Scenarios

Connecting to `publicDB` first then to `kh.google.com` as secondary database fails. Google Earth EC downloads no imagery from `kh.google.com` (although it reports no error), because **noauth**, as noted in the table above, is not compatible with **khauth**.

The same holds true if `internalDB` is the primary database and the user adds `kh.google.com` as a secondary database. In that case, the primary database uses LDAP authentication, which is not compatible with **khauth**.

Another unsupported mode is connecting to a **khauth** primary database and a **miniauth** secondary database. In that case, the user cannot successfully log in to the secondary database (although, as with the first scenario, it reports no error).

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Introduction

The Google Earth Enterprise solution is a network-based, rich 3D and 2D mapping system that makes vast amounts of data easily accessible from a desktop application. With the Google Earth Enterprise solution, you can create a central geographic information system (GIS) database that can simultaneously be distributed to thousands of users.

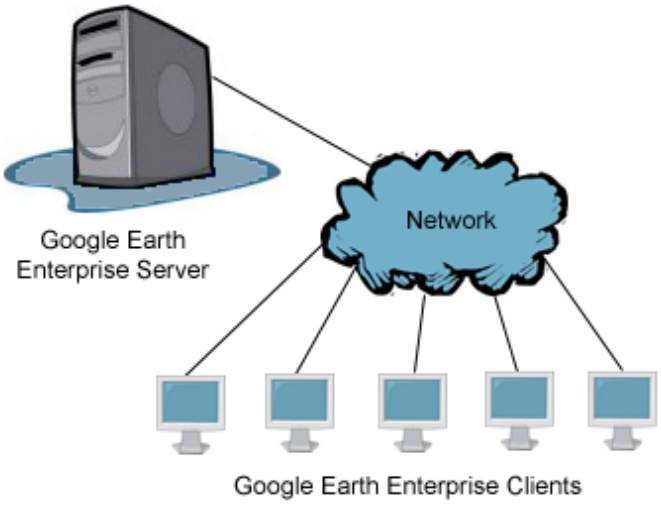
Overview of the Google Earth Enterprise Solution

The Google Earth Enterprise solution consists of three basic products:

- **Google Earth Enterprise Client (EC)**

  Google Earth EC is the client software that creates an interactive 3D globe by connecting to geospatial databases created with Google Earth Enterprise Fusion. A Google Earth Enterprise Fusion database consists of imagery, terrain, and vector data. Unlike some traditional GIS software, Google Earth EC is easy to use and allows users to view any location on the globe in seconds without specialized training. Google Earth EC supports common security protocols for user access control and includes powerful features for experts and non-experts alike, including:

  - Simultaneous access to multiple Google Earth Enterprise Servers
  - Geographic data display in the form of KML
  - 3D buildings with textures
  - Import of data in common GIS file formats
  - Movie-making capability
  - Large-format printing



- **Google Earth Enterprise Fusion**

  Google Earth Enterprise Fusion is the integration component of the Google Earth Enterprise solution and is designed for businesses that want to create their own GIS and imagery data. With Google Earth Enterprise Fusion, businesses can create a standalone GIS database, as explained in "Google Earth Enterprise Fusion Products" on page 1-2.

- **Google Earth Enterprise Server**

  The Google Earth Enterprise Server is the distribution component of the Google Earth Enterprise solution. It allows your organization to serve its own data from your own servers using your standalone database. In addition, you can use the secure server login feature of the Google Earth Enterprise Server to deliver sensitive data in a secure environment.

- **Google Maps**

  The Google Maps API enables you to create 2D views of your Google Earth Enterprise Fusion database in any web page that can be displayed in a browser. The Google Maps API utilizes Asynchronous JavaScript XML (AJAX) technology to deliver a high performance, easy to use, interactive user experience similar to Google Maps on the World Wide Web (http://maps.google.com). The Google Maps API also allows you to integrate additional datasets as overlays using XML, allowing you to utilize the power of web services to create *mashups* inside your own organization.

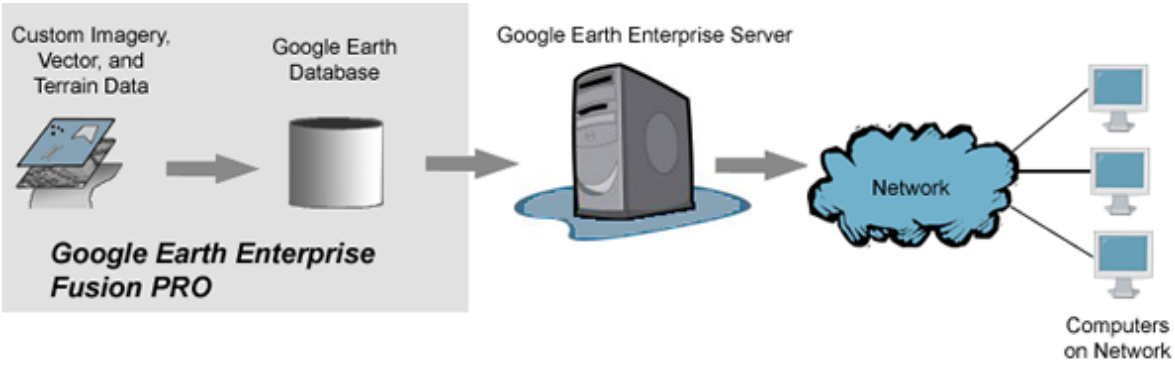
  Combined with the features of Google Earth Enterprise, the Google Maps API allows you to:

  - View published databases in an easy to navigate AJAX-based application that allows users to zoom, pan, and search their data without refreshing the entire page.
  - Turn on and off tile overlay sets created from Google Earth Enterprise Fusion-built vectors.
  - Search against city- and street-level geocoders as well as all plug-ins registered as part of the search framework.

    The Google Maps API resides within an HTML page which you control as the administrator. Google Earth Enterprise Fusion generates a simple web page with appropriately configured Google Maps API JavaScript code when a user publishes a map database. From that point forward, the user interface is fully yours to determine. (See http://www.google.com/apis/maps for complete Google Maps API documentation.)

Google Earth Enterprise Fusion Products

With Google Earth Enterprise Fusion **PRO**, you can create a standalone GIS database that includes imagery, terrain, and vector data, and then serve it using the Google Earth Enterprise Server.



Structure of Google Earth Enterprise Fusion Data

When you look at the graphical representation of data in Google Earth EC, it appears to be one cohesive set of data. In reality, it is a much more complex collection of different types of data that you build in stages. You use Google Earth Enterprise Fusion to prepare the different types of data to display smoothly together and to provide the types of information you want to display for your viewers.

Source data is the most basic information you start with when working in Google Earth Enterprise Fusion. The source data that you import into Google Earth Enterprise Fusion falls into two broad categories:

- **Vector Data (line, polygon, and point data)**

  Vector data consists of geographic features which are either geographic coordinates (points), sequences of connected geographic coordinates (lines), or closed sequences of connected geographic coordinates (polygons). Each feature typically has attribute fields, such as name, street address, or web site URL.

  Google Earth Enterprise Fusion supports common vector and point data file formats. For a listing of specific formats, see the Supported Source File Formats section of the **Defining**

Resources chapter.

- **Imagery and Terrain Data (raster data)**

  You can use Google Earth Enterprise Fusion PRO to import your own imagery and terrain data in order to integrate it with your vector data.

  Raster data is a grid of cells covering an area of interest. Each pixel, the smallest unit of information in the grid, displays a unique attribute. There are two types of raster data in Google Earth Enterprise Fusion:

  - Imagery data consists of satellite and overhead photographs.
  - Terrain data provides topographical information about a geographic area.

    In Google Earth EC, the imagery data is *draped* over the terrain data, giving the imagery a topographical appearance.

    Google Earth Enterprise Fusion PRO supports common imagery and terrain data formats. For a listing of specific formats, see the Supported Source File Formats section of the **Defining Resources** chapter.

After you import source data and begin working with it to create your own GIS data, it becomes part of three fundamental components of Google Earth Enterprise Fusion:

- Resources
- Projects
- Databases

The relationship among these three components is well defined. Resources comprise projects, and projects comprise databases. A given resource can be used in more than one project, and a given project can be used in more than one database.

When you prepare map data, there are four components:

- Resources (vector and imagery)
- Map Layer (flat projection and mercator maps supported)
- Map Projects (map and imagery)
- Map Database

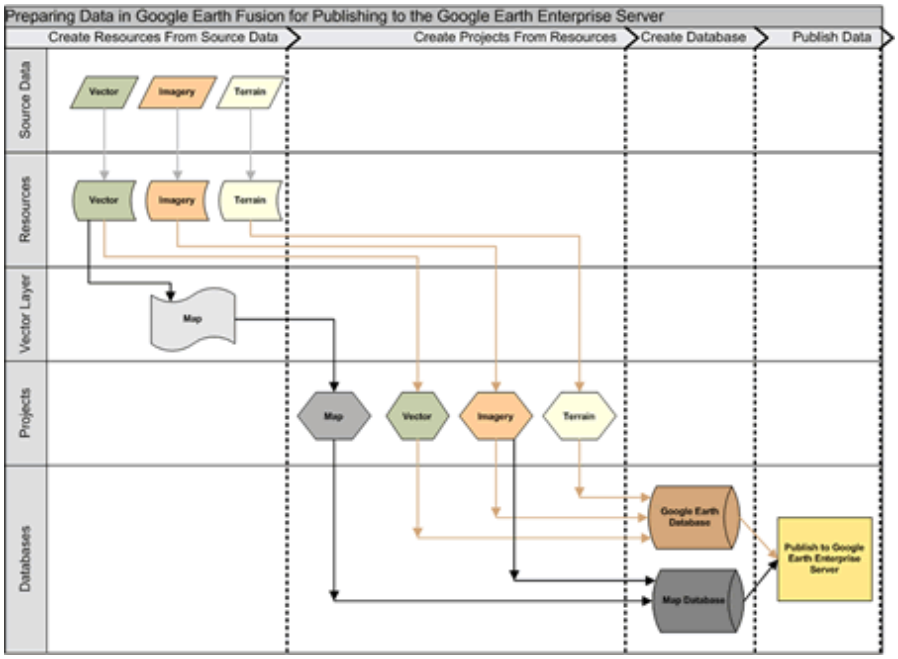
You can use the same vector and imagery resources for both Google Earth EC and Google Maps. However, you have the additional step of creating map layers for Google Maps. (See Preparing Data for Google Maps for complete details.)

Google Earth Enterprise Fusion Workflow

The Google Earth Enterprise Fusion workflow is based on four general steps (with an additional step if you are creating Google Maps databases): the steps described in the previous section plus a publishing step. Generally, you perform these steps in the following order:

1. Create and build resources from source data by type (imagery, terrain, or vector).
2. Create and build a map layer (for Google Maps only).
3. Create and build projects from your resources by type (imagery, terrain, vector, or map layers).
4. Create and build a database from your projects.
5. Publish your database.

The following diagram illustrates this process:



Each step consists of a definition stage and a building stage. You *define* the asset (that is, specify the properties of that asset), and then you *build* the asset. When the building process is complete, Google Earth Enterprise Fusion stores a new *version* of the asset in its file system. When you define projects and databases, you select each asset you want to include. When you publish a database, you can select the version of the database you want to publish.

As you define your data, you specify:

- Which source data comprises each resource
- Which resource(s) comprise each project
- Which project(s) comprise each database

If you are working with map data, you also specify:

- Which resource(s) comprise each map layer
- Which map layer(s) comprise each Maps vector project
- Which Maps vector project and imagery project comprise each Maps database

You can define and build assets either by using the Google Earth Enterprise Fusion graphical user interface (GUI) or by entering shell commands on the command line. The main chapters of this guide provide information about performing these steps using the GUI. For information about the shell commands, see the Command Line Reference chapter.

You can build each resource as soon as you finish defining it, or you can wait and build several resources at the same time. You must build a resource, however, before you add it to a project. It is up to you to determine your own work style based on the type of data you are working with, the number of changes you are making, and so on.

If you build a resource while you are defining other resources, the build process takes place in the background. By the time you finish defining the second resource, the build process for the first resource might be complete. Likewise, if you build all of your projects as you go, by the time you get ready to build your database, it takes relatively little time. With this work style, building each resource as soon as you finish defining it saves you time. The disadvantage of this work style is that building large amounts of data (particularly imagery data) uses much of your system resources, so working on something else while building large assets could create performance issues for you.

If you wait to build your projects and databases at the same time, the build process takes more time and CPU cycles. The advantage of this work style, however, is that if you time it right, you can start a build just before you go to a meeting, lunch, or home for the night, and the build process can have your workstation all to itself.

Tip: Since builds occur in the background and Google Earth Enterprise Fusion is always running, you can close the Google Earth Enterprise Fusion GUI after you start a build, if you do not need to use it for anything else. In fact, this is a good practice, because it frees up RAM and CPU cycles on the workstation, which can improve build performance.

Best Practices

This section contains general information about best practices to follow as you become familiar with Google Earth Enterprise Fusion. This information is helpful to know and can sometimes save you time.

Organizing Your Google Earth Enterprise Fusion Subfolders

Google Earth Enterprise Fusion employs the concept of an *asset root* as the root of the directory tree where all Google Earth Enterprise Fusion assets (resources, projects, and databases) are stored. You can (and should) create a hierarchy of subfolders within the asset root to organize your assets, so you and other users can find them easily.

Since Google Earth Enterprise Fusion currently does not allow you to delete or rename subfolders after they are created, Google strongly recommends that you plan out your subfolder hierarchy and create all of the subfolders you can anticipate needing before you begin working with your data. You can always add more subfolders later, but a little preplanning in this area goes a long way.

There are several ways to organize your subfolders. Google recommends the following general structure:

```
Databases/
MapLayers/
Projects/
     Imagery
     Terrain
     Vector
Resources/
     Imagery
     Terrain
     Vector
```

Note that spaces or other non-alpha characters are not recommended in folder or asset names.

It is unnecessary to further organize your database folder, because you will have only a handful of databases at most (possibly only one or two). Subdividing your projects by data type is useful, but it is not necessary to go into any greater detail for projects.

For Resources, however, depending on the type of data you work with, you can further organize your subfolders by:

- Provider (such as USGS, NOAA, and so on)
- Region (such as Europe, which includes France, Germany, and so on; North America, which includes Canada, United States, Mexico)
- Type (roads, borders, streams, and so on)

Starting with the basic structure recommended above, your full folder structure might look something like this:

```
Databases
MapLayers
Projects/
   Imagery
   Terrain
   Vector
Resources/
   Imagery/
      NoAmer/
         USA/
            California
            NewMexico
            Texas
         Canada/
            Ontario
   Terrain/
      NoAmer/
```

```
          USA/
             California
             NewMexico
             Texas
          Canada/
             Ontario
   Vector/
      NoAmer/
          USA/
             California
             NewMexico
             Texas
          Canada/
             Ontario
```

Determining How Many Databases and Projects To Create

Since Google Earth Enterprise Fusion currently does not allow you to delete or rename assets, Google recommends that you plan out your databases and projects, as much as possible, before you begin working with your data.

Most organizations publish only one database for a particular purpose. If you have multiple purposes (such as commercial property for sale and residential property for sale), you must create a separate database for each purpose or project.

Note: Google Earth Enterprise Fusion does not allow you to associate multiple projects of the same type (such as two vector projects) with a database at the same time. You can associate one vector, one imagery, and one terrain project with each database.

After you define a database (that is, define the projects that comprise that database), that database definition should not change. You might update the underlying source data and rebuild the database; however, the association of the projects to the database and the resources to the projects should not change.

For example, you might define one database that contains the current real estate listings for your area and another database that contains the current week's new listings. You can update the source data for each database as often as you like and then rebuild the databases and publish the new versions, but you never need to change the projects associated with each database. The main reason for this convention is so your users can always connect to a particular server (or virtual server) to get the most up-to-date listings.

Using the example described in the previous paragraph, you can publish each database to a virtual server:

- www.example.com/allcurrent
- www.example.com/thisweek

To save time and work efficiently, a good strategy is to create one main project and one evaluation project. The main project contains all of the resources you want to publish. You keep the evaluation project small, working only on new or changing layers. Because you are working on a small amount of data at a time, the evaluation project does not take long to build, so you can iteratively tweak it and view the results very quickly. When you finish working on a layer in the evaluation project, you can export that layer and import it into your main project. The next time you build and publish the database, the new layer is included.

Setting File Access Permissions

When you acquire the source data that you intend to import into Google Earth Enterprise Fusion, it is a good idea to store it in `/gevol/src`[1]. After you organize the subfolders in that location and copy your source data into those folders, you must set the file access permissions so that Google Earth Enterprise Fusion can open the source files. This is because Google Earth Enterprise Fusion has a special user name and is part of a special group, so you must set your file access permissions to allow all users and groups to read and execute the source data files.

To set file permissions for your source data:

1. Enter the following command:

```
chmod a+r /gevol/src
```

Each time you add source files to `/gevol/src` directories, you must ensure that the permissions for the new files are set correctly by running this command.

Note: If you specify a different volume, substitute your volume name for `gevol`.

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Fundamentals

Before using Google Earth Enterprise Fusion, review the content of this chapter, which explains concepts and components fundamental to the software.

Launching Fusion

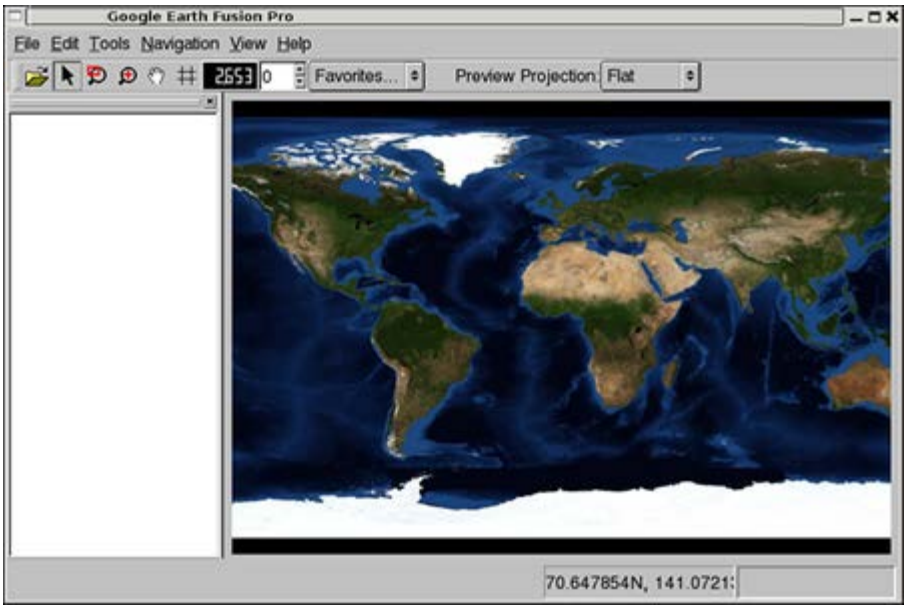
To launch the Google Earth Enterprise Fusion GUI, open a terminal window, and enter `fusion` at the prompt. When the applications starts, the Google Earth Enterprise Fusion GUI appears.

Using the Fusion GUI

Google Earth Enterprise Fusion integrates the Google Earth patent-pending software with your source data--imagery, terrain, vector, even your own comma-separated (`.csv`) data. Using the Google Earth Enterprise Fusion GUI, you can import source data, configure the display of data, and publish your work to a Google Earth server.

If you prefer, you can perform many of these steps from the command line. For complete information about how to perform these steps from the command line, see the Command Line Reference chapter.

The Google Earth Enterprise Fusion GUI provides a multi-paned workspace that allows you to manage assets and the process of building a publishable database. You can also use the GUI to view the internal data fields for vector files and additional data that you enter for your assets.



The Data Preview Panes

The Google Earth Enterprise Fusion GUI provides three data preview panes:

- Preview pane: List of data sources and assets that are displayed in the Preview pane
- Preview List pane: Preview of vector and imagery data
- Attribute Table: The selected data in the displayed vector file in row and column format

Customizing the Preview Panes

You can show or hide the Preview List and Attribute Table panes individually.

You can also dock the Preview List and Attribute Table panes to any side of the main window or position them on your desktop as independent windows. To move a pane, grab the docking handle on the top or left side of the pane with your mouse and drag it to its new location.

Use the close boxes (**X**) at the top of the Preview List or Attribute Tables to hide them. The remaining panes fill the GUI.

- To show the Attribute Table when it is hidden, select **View > Attribute Table**.
- To show the Preview List pane when it is hidden, select **View > Preview List**.

When each pane is redisplayed, it appears in the same position it was in when it was hidden.

You can customize these panes to suit your preferences and make the best use of available screen space. If you exit Google Earth Enterprise Fusion and later restart it, the GUI configuration is the same as it was when you exited.

Controlling Automatic Display of the Attribute Table

When working with the Preview pane, it is common to close the Attribute Table to allow more space for the imagery display. However, when working with vector data, you can set a preference to automatically display the Attribute Table when vector features are selected. To do so, select **Auto-Show Selected Data** in the Attribute Table section of the Preferences dialog.

See Setting Your Preferences in the **Setting Up Your Workspace** chapter for more information.

The Menu Bar

The menu bar provides options from six menus. The menus and their options are:

- **File Menu**
  - **Open** - Open an asset in the Preview pane. See the Previewing Data section of this chapter for more information about the Preview pane.
  - **Exit** - Close the Google Earth Enterprise Fusion GUI.
- **Edit Menu**
  - **Enable All Layers** - Check all check boxes in the Preview List pane.
  - **Disable All Layers** - Uncheck all check boxes in the Preview List pane.
  - **Expand All Layers** - Show the display rules for all layers listed in the Preview List pane. When the layers are expanded, you can right-click the name of a display rule for a layer and select **Configure Display Rules** to display the Display Rules dialog for that rule.

    See the Configuring Display Rules section of the **Defining Projects** chapter for more information.
  - **Collapse All Layers** - Hide the display rules for all layers listed in the Preview List pane.
  - **Preferences** - Open the Preferences dialog to set your preferences. These are described in the Setting Your Preferences section of the chapter on **Setting Up Your Workspace**.
- **Tools Menu**
  - **Asset Manager** - See the section on Using the Asset Manager in this chapter for details on managing your assets.

DB Snippet Manager - Manage your preferences to the DBRoot. Many of these preferences (or snippets) apply to display characteristics, such as showing or hiding the Google logo in Google Earth EC. Please refer to the **Administration Guide** for more information.

- **Favorites Manager -** Manage your list of favorites in Google Earth Enterprise Fusion. More on Adding and Managing Favorites can be found later in this chapter.
- **Icon Manager** - Create, import, and manage custom icons. See the Managing Icons section of the **Setting Up Your Workspace** chapter.
- **Label Manager** - Specify custom labels for layers in vector projects. See Managing Labels in the **Setting Up Your Workspace** chapter.
- **Locale Manager** - Set up and manage the locales you intend to support in your databases. See Managing Locales.
- **Provider Manager** - Set up and manage the list of providers from whom you receive source data. See Managing Data Providers for more information.
- **Search Tab Manager** - Add and pre-configure the search tabs that you can add to your databases later. Refer to Managing Search Tabs.
- **Server Associations Manager** - Specify server associations in preparation for publishing your databases. Refer to the **Administration Guide** for more information.
- **System Manager** - Track the progress of various processes in the Google Earth Enterprise Fusion system. Please read the section on Monitoring Current and Recent Activity in the **Building Assets** chapter.

- **Navigation Menu**
  - **Add Favorite** - Add the current location to your Favorites list, so you can find it again quickly in Google Earth Enterprise Fusion. See Adding and Managing Favorites.
  - **Reset View** - Reset the Preview pane to the default view.
- **View Menu**
  - **Preview List** - Display or hide the Preview List pane. See Previewing Data.
  - **Attribute Table** - Display or hide the Attribute Table, which lists the attribute data for the features selected in the Preview pane.
  - **Toggle Textures** - Display or hide the imagery in the Preview pane. Use this option when you have a vector layer that you want to examine without underlying imagery. This can be helpful when the color of the data does not contrast enough with the underlying texture, and you want to see the lines more clearly.
  - **Toggle Base Texture** - Display or hide the base texture (the default imagery) in the Preview pane. Use this feature when you have an imagery *inset* positioned over a base texture, and you want to see the inset separately from the base texture.
  - **Cycle Mask Textures** - Cycle through four ways to view the mask for an imagery inset.
    - Render the imagery with the transparent portion of the mask showing through to the base texture. This view is most representative of how the imagery will look in Google Earth EC (default view).
    - Render the imagery as red with the transparent portion of the mask showing through to the base texture. This is a good way to view the cropped coverage of the imagery with the mask when the original imagery is very close in color to the background.
    - Render the imagery as red and the transparent portion of the mask as blue. This is a good way to visualize the effect of the current feathering setting.
    - Render the original imagery with no masking. This is good way to look at the original data to help debug masking problems.
  - **Snap to Level** - Lock zooming to integral zoom levels (such as 1, 2, 3, 4, and so on) to allow you to preview map tiles, which are not scalable in your web browser.
- **Help Menu**
  - **Contents** - Display the table of contents for the Google Earth Enterprise Fusion online help system.
  - **About** - Display version and other configuration information about the current installation of Google Earth Enterprise Fusion.

The Toolbar

The toolbar provides quick access to the most common Google Earth Enterprise Fusion actions. The toolbar buttons and their actions are:

Open File - Open a source file in the Preview pane.Click this icon, navigate to and select the source you want to view, and click **Open**. The source appears in the Preview List pane. See the Supported Source File Formats section of the **Defining Resources** chapter for details.

Select - Select a region of the image in the Preview pane. Select the resource in the preview list pane, and select this icon; then click and drag the mouse to highlight a region in the Preview pane. The Preview pane highlights everything you touch in the selected resource (even if you only touch a corner of it) and displays the data for the highlighted features in the Attribute Table. If you are previewing multiple resources, you can select a region in each resource, and then toggle between them to compare their data in the Attribute Table.

Zoom Box - Outline the zoom area of the imagery displayed in the Preview pane to select precisely the region you want to view. Select (highlight) an item in the Preview List pane, select this icon, and then click and drag a rectangle around the region you want to view. The contents of the selected region replaces the previous view. Press **Ctrl+r** to return to the default view.

Zoom Drag - Zoom in or out on the Preview pane.Select this icon and then:

- Hold down the left mouse button and push the mouse away from you to zoom out.
- Hold down the left mouse button and pull the mouse toward you to zoom in.

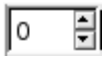
Press **Ctrl+r** to return to the default view.

Pan - Move the imagery around in the Preview pane.Select this icon and then click and drag the view to pan in any direction. Press **Ctrl+r** to return to the default view.

Toggle Tile Grid - Toggle between showing and hiding the *tile* grid.Select this icon to turn on the grid; unselect it to turn it off.

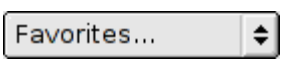
Display Level - The current display level; also referred to as *LOD* - level of detail. The general display level for:

- the world is about 2.5.
- a continent is about 4.5.
- a country the size of the United States is about 5.
- a city is about 10.



Display Level Offset - Set the value added to or subtracted from the display level set in the data to a whole number between -5 and +5. See Adjusting Vector Data Display Levels for details.

Select the value and enter a new one, or use the up and down arrow keys to change the value. Press **Ctrl+r** to return to the default view.



Favorites Menu - Quickly return to a saved location. See the next section, Adding and Managing Favorites for details.

Preview Projection - choose between preview of Mercator and Flat projections

In addition, you can:

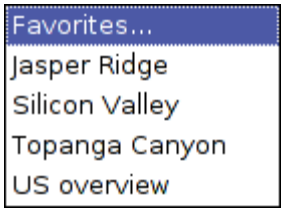
- Click the middle button (or wheel) on your mouse and drag the view to pan in any direction.
- Scroll the wheel on your mouse to zoom in and out.

Adding and Managing Favorites

After you find a favorite location, you can add it to the Favorites menu, so you can find that location again quickly.

To add a favorite:

1. Navigate to the desired location in the Preview pane.
2. Select **Navigate > Add Favorite**. The **New Favorite** dialog appears.
3. Enter a name for the favorite that will help you recognize it later, and click **OK**. Google Earth Enterprise Fusion adds the new favorite name to the Favorites drop-down list.

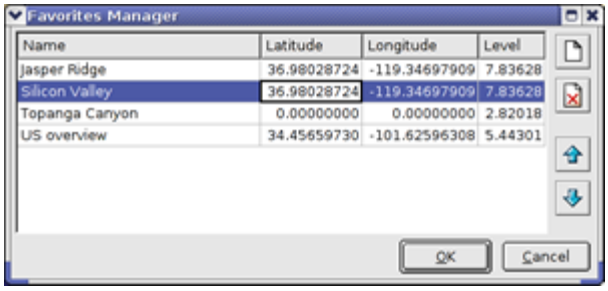


Note: The Favorites menu in Google Earth Enterprise Fusion is unrelated to placemarks in Google Earth EC.

After you add some locations to the Favorites menu, you can use the **Favorites Manager** to rename, remove, or reorder the list.

To manage your favorites:

1. Select **Tools > Favorites Manager**. The Favorites Manager displays all of your favorites in the order in which you added them.



2. Use the Favorites Manager to perform any of the following tasks:

   - **Create a new favorite:** Click  . The Edit Favorite dialog appears. Enter the data for a favorite and click **OK**. (Unless you know the exact latitude and longitude of a location, it is often easier to find the location in the Preview pane and then select **Add Favorite** from the Navigation menu to create a new favorite.)

   - **Change the name or position of an existing favorite:** Double-click the name of a favorite. The Edit Favorite dialog appears. Change the name or the latitude, longitude, or display level of the favorite.

- **Delete a favorite:** Select a favorite and click  .

- **Change the favorite order:** Select a favorite and click  or  to move it up or down.

Previewing Data

You can use the preview panes to inspect imagery, vector, or terrain data in either source data or resource form. You can also open different types of data files at the same time using the preview panes. For example, you might preview an imagery resource along with vector source data to confirm that the vector data aligns properly with the imagery data. Previewing data is a great "litmus test" of how the data will look in Google Earth EC.

Note: Although you can preview source files anytime, you must build resources before you can preview them.

Some applications for the preview panes are:

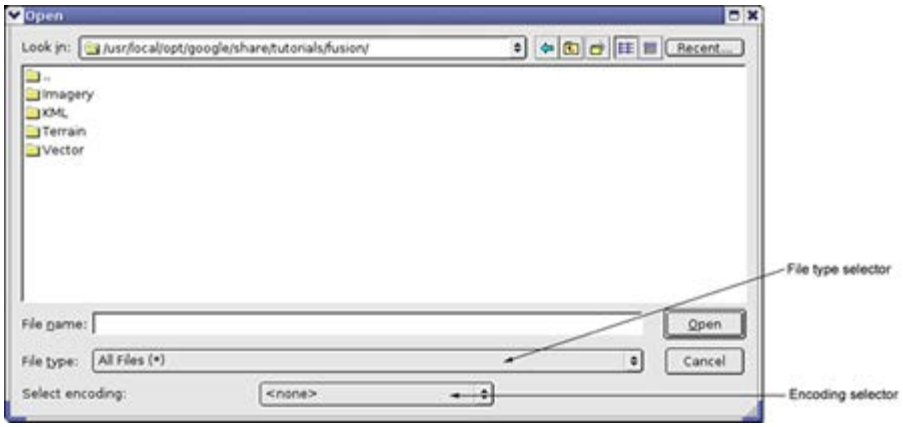
- Determine the correct encoding to use for vector source data before converting the source to a resource.
- Determine which layers of a multi-layer vector source file to use in a resource.
- Test simple display rule settings before defining a vector resource in a project.
- Determine whether the Auto Mask feature sets the mask properties for an imagery resource appropriately before using it in a project.
- Inspect transitions between adjacent source imagery files.

Although certain limitations apply to viewing your original raw data source files in the preview panes, you have full access to all of the preview functionality when you preview built resources. If you preview raw imagery source files, only a bounding box appears in the Preview pane. If you preview built imagery resources, the actual imagery appears in the Preview pane. The following limitations apply to previewing data:

- The following display rule settings are ignored:
  - Simplification method
  - Suppress duplicates
  - Elevation/height
  - Highlight style
  - Road label
  - Road shield
- Lines and polygons are drawn as lines only (not filled), so use Line Color or Outline Color, if you want to see the colors of lines or polygons in the Preview pane.
- Labels appear in the assigned color, but scaling and centering are ignored for labels.
- Icons do appear in the Preview pane, but any style settings (color, scale) are ignored.
- Icons are not selectable, and their pop-up text is not displayed.

To preview a source file:

1. Click  . The **Open** dialog appears.



2. Navigate to the location that contains the desired file.

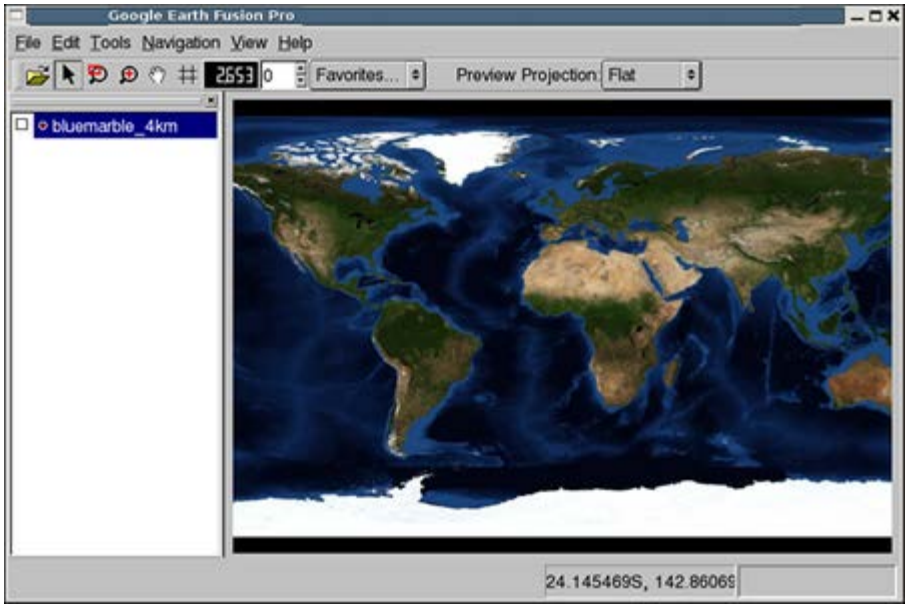
   You can set the **File type** selector to display only files of a particular format, such as ESRI Shape files, or you can display all files in each folder.

3. Select the file to preview.
4. Select the appropriate encoding type for the selected data, if you know it (optional).

   Notes: Encoding applies only to vector data. For example, the `geonames-cities500000.csv` vector source file provided with your Google Earth Enterprise Fusion tutorial installation uses UTF-8 character encoding. To see the data from specially-encoded files such as this, specify the correct encoding.

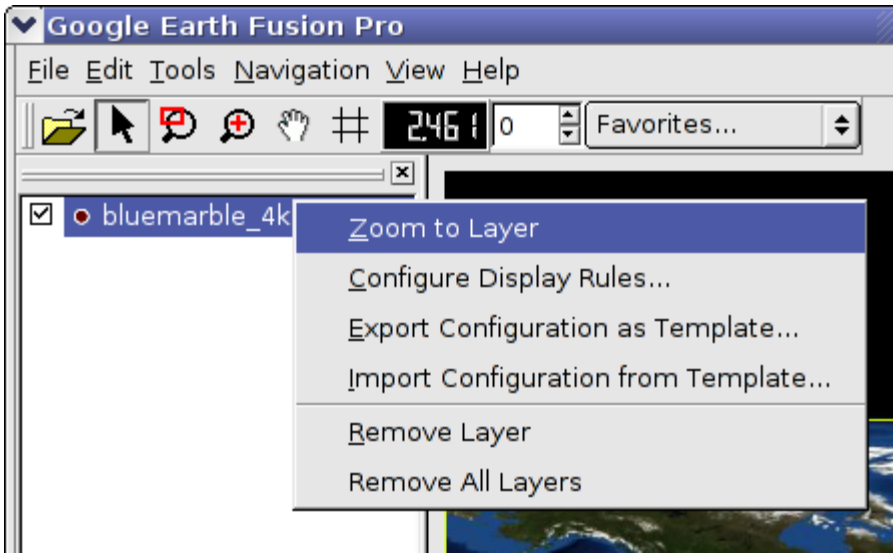
   If you do not specify the correct encoding type for such files, special characters might not display properly. For example, with default character encoding specified, é appears as .

5. Click **Open**. The file appears as a layer in the Preview List pane with its check box unchecked by default.
6. Select the check box next to a layer in the Preview List pane.



   This action displays the data in the Preview pane; however, you might not see it, if your current display level is too high or too low.

7. Right-click the layer, and select **Zoom to Layer** from the context menu.



This action resets the view to encompass the entire area of the data layer.

> **Note:** If the data in the layer extends off of one side of the picture of the Earth and onto the other side, sometimes using the Zoom to Layer feature does not look like it zoomed in at all. That is because the preview must include both sides of the picture of the Earth.

To preview a resource:

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Navigate to the folder that contains the resource you want to preview.
3. Drag and drop the resource onto the Preview List pane.

> **Note:** You must build resources before you can preview them.

Using Preview Options

After you open a layer in the Preview List pane, you can right-click its name, and select any of the following options from the context menu:

- **Zoom to Layer**

  Allows you to reset the Preview pane to the entire selected layer. For example, if the Preview pane is displaying a portion of the layer, selecting **Zoom to Layer** causes the Preview pane to zoom out to display the entire layer. Likewise, if the Preview pane is displaying an area larger than the data in the selected layer, selecting **Zoom to Layer** causes the Preview pane to zoom in to display the area covered in the selected layer.

- **Configure Display Rules**

  Allows you to specify the display properties for vector source data and resources. See Configuring Display Rules in the **Defining Projects** chapter for details.

  > **Note:** This option applies to vector source data and resources only, since the display rules for imagery or terrain data are set when you import the source data as a resource. Although you can actually set display rules for imagery and terrain source data, the preview of that data appears as an outline. Any display rule configurations applied to imagery or terrain data in the Preview pane affect only the outline of the image. See the next section, Previewing Imagery and Terrain Source Data for more information.

- **Import / Export Configuration as Template**

  Allows you to save display rules as template files and reapply them to other layers. See the sections on Exporting Display Rules and Importing Display Rules in the **Defining Projects** chapter for more information.

- **Remove Layer / Remove All Layers**

  Allows you to remove individual layers or all layers from the preview panes.

Note: Removing layers from the preview panes does not delete the data source files or the resource. It simply removes them from the preview.

Previewing Imagery and Terrain Source Data

When you preview terrain or imagery source data, you view only the boundaries of the data, not the imagery itself, in the Preview pane. In order to see the full imagery or terrain data in the Preview pane, you must create a resource from the source data and build the resource.

Note: Google Earth Enterprise supports preview of both Mercator and Flat Projection imagery. When previewing imported imagery resources, make sure the desired **Preview Projection** is selected in the toolbar.

When you open imagery or terrain source data in the Preview pane, Google Earth Enterprise Fusion draws a bounding box for the imagery. The bounding box is the outermost region of the image data.

When you open imagery or terrain resources in the Preview pane, the full imagery is displayed within the bounding box.

Viewing Imagery Tiles

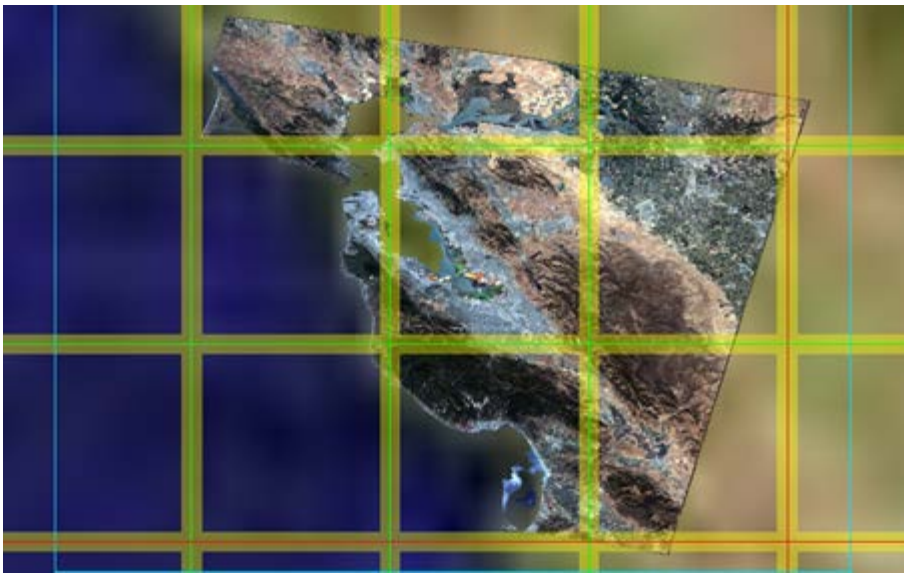
You can use the tile grid toggle button  to turn on the tile grid, so you can examine the tiling of imagery data, as well as the resolution levels and geospatial boundaries of imagery insets.

Although it is easy to visually determine at which display level a vector resource appears or changes, it is not always apparent with imagery insets. When you click the tile grid toggle button, a grid in a contrasting color overlays the current view. As you zoom in or out of this view and move through various levels, the grid updates its size and changes color to provide information about the imagery.

How many imagery tiles are present at a particular display level?

Google Earth Enterprise Fusion provides 24 display levels. When you turn on the grid, at level 0, there is only one *tile*, or grid square (256 pixels x 256 pixels) for the entire Earth. The number of tiles displayed quadruples at each display level.

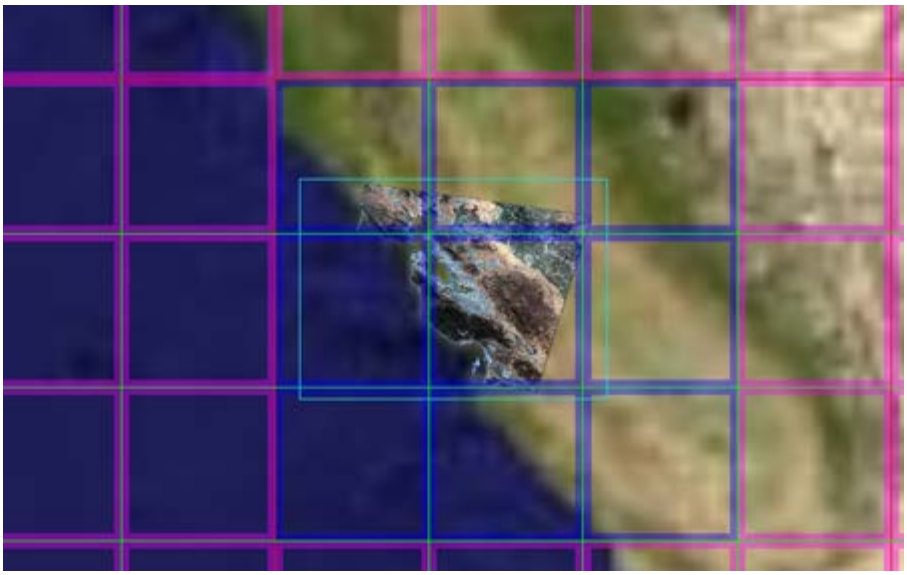
When you use the Zoom to Layer feature, all of the grid squares are the same color. This is the lowest display level number (the highest elevation) at which you can view the full extents of the inset. In the following examples, consider Zoom To Layer the starting point.

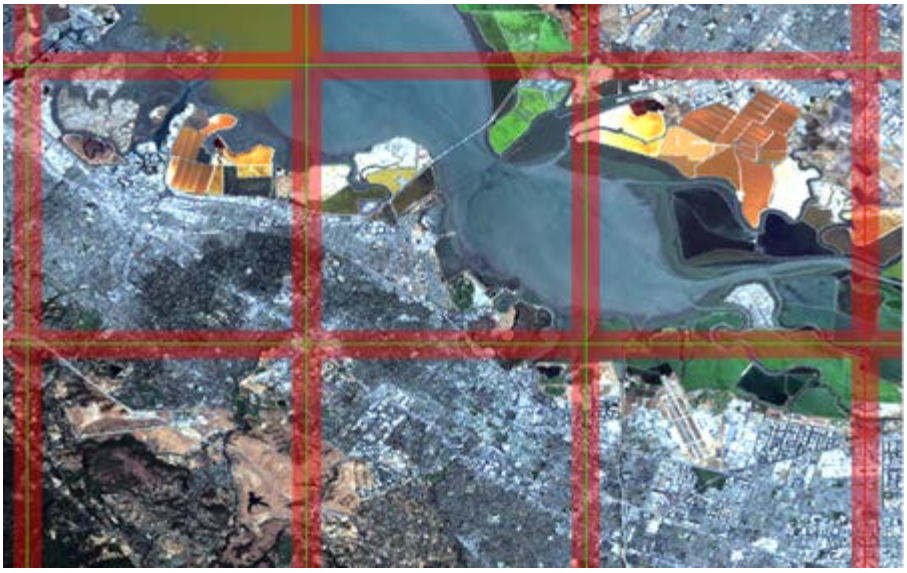


If you zoom out from the starting point, the grid squares change color, indicating areas of different resolution in the imagery. In the following example, the blue grid squares indicate high-resolution imagery, and the pink squares indicate lower-resolution imagery.

Note: The blue grid squares do not indicate the boundaries of the high-resolution imagery. Any grid square that touches any part of the high-resolution imagery appears in blue. The bounding box indicates the actual boundaries of the high-resolution imagery.

If you zoom in from the starting point, the grid squares are all the same color, are larger, and there are fewer of them in the Preview pane until you get to the next level. Then they appear smaller and are more numerous again.





Note: All references to the grid refer to the semi-transparent lines, not the thin solid lines that designate the borders of the grid squares.

Showing and Hiding Imagery

You can use the texture viewing features on the View menu to control the display of imagery and terrain data when you want to debug data in the Preview pane. Using these features, you can:

- **Toggle Textures**

  Turn off all textures in the Preview pane.

- **Toggle Base Texture**

  Turn on or off only the base texture in the Preview pane.

- **Cycle Mask Textures**

  Cycle through four ways to view the mask for an imagery inset.

(See The Menu Bar for more information about these features.)

Previewing Vector Data

You can preview vector source data and resources to explore preliminary display settings, properties, and groupings for resources you are considering using in a project. Keep in mind that you cannot save the display settings you create in the Preview pane, so it is recommended that

you set only the most basic display rules in Preview pane.

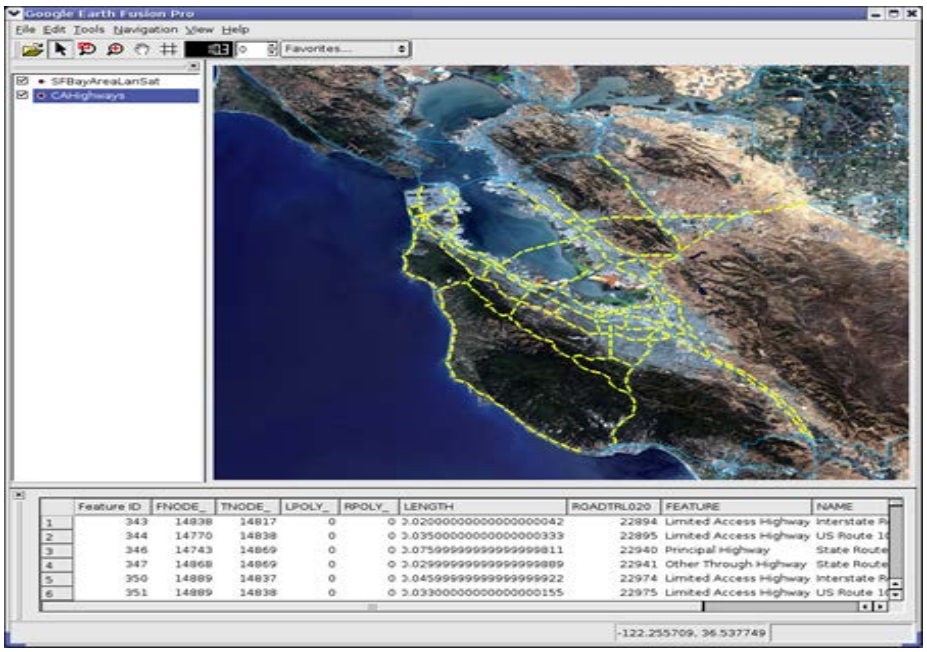
Tip: If you create display rules for vector data in the Preview pane, you can select **Export Configuration as Template** from the context menu to save and re-use those settings for an actual layer in a project. See Exporting Display Rules in the **Defining Projects** chapter.

You can view the internal data fields of vector resources that you can see in the Preview pane. After you select vector fields for display, you can manipulate the display of that view and see even more detailed information about specific entries.

To select and view vector data fields:

1. Select the layer whose data you want to view.
2. Select  , if it is not already selected.
3. Drag a region box around some of the data features you want to view.

The internal data for each selected element appears as a row in the Attribute Table.



Adjusting Vector Data Display Levels

While using the interactive zoom features, you might notice that vector features appear and disappear, depending on your viewing elevation. When this happens, note the number that appears

in the Display Level indicator, which increases as the view gets closer to the Earth.

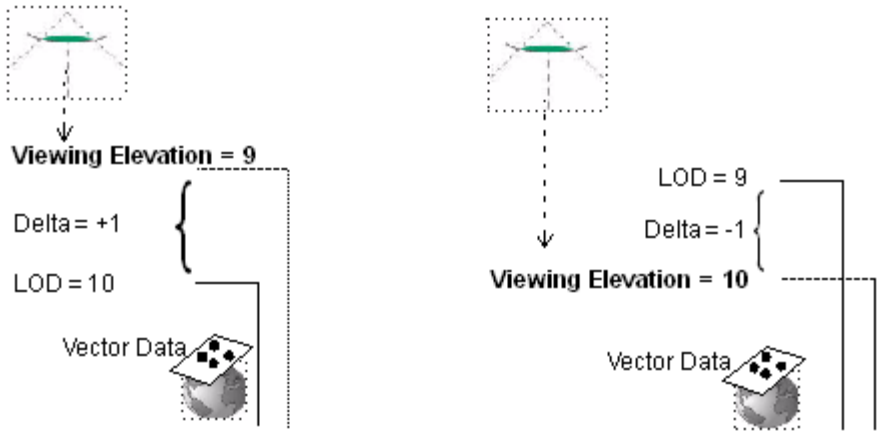
The value shown in the Display Level indicator corresponds to your viewing elevation in the Preview pane. Data that you import into projects can be configured to appear at a specific level--a number that you provide in the display rules for vector data. (See Configuring Display Rules in the **Defining Projects** chapter for details.)

You can use the Display Level indicator as an analysis tool to determine the appropriate display levels for resources. By setting the correct display level for vector data, you can prevent informational clutter in Google Earth EC.

To the right of the Display Level indicator is the Display Level Offset. You can adjust this selection to whole number values between -5 and +5. Google Earth Enterprise Fusion adds or subtracts the value in this window to the display level set in the data. You can use this feature to quickly adjust the level at which vector features are displayed in the Preview pane without having to reset the value in the display rule. When you find the optimal display level, you can reset the value in the project's display rule.

For example, if you define a feature to be drawn at level 10, it does not appear in the Preview pane at level 9.2. However, if you set the Display Level Offset to **1**, you can see the feature at level 9.2. Google Earth Enterprise Fusion adds 1 (the offset) to 9.2 (your current display level) to adjust your viewing elevation to 10.2.

The following illustration shows two examples of how you can adjust viewing elevation to display the data at a higher or lower elevation perspective.



Manipulating Data in the Attribute Table

When vector data is displayed in the Attribute Table, Google Earth Enterprise Fusion provides several options on a context menu to help you work with that data. To access the options, right-click the data in a cell in the Attribute Table, and select one of the following options from the context menu (where *Column* is the name of the selected column):

- **Sort by *Column* Ascending**

  Reorders all data in the Attribute Table in ascending order based on the selected column. For example, for a numeric column, it reorders the data in that column from the smallest to the largest number. For a text column, it reorders the data in that column from A to Z.

- **Sort by *Column* Descending**

  Reorders all data in the Attribute Table in descending order based on the selected column. For example, for a numeric column, it reorders the data in that column from the largest to the smallest number. For a text column, it reorders the data in that column from Z to A.

- **Export *Column* Column**

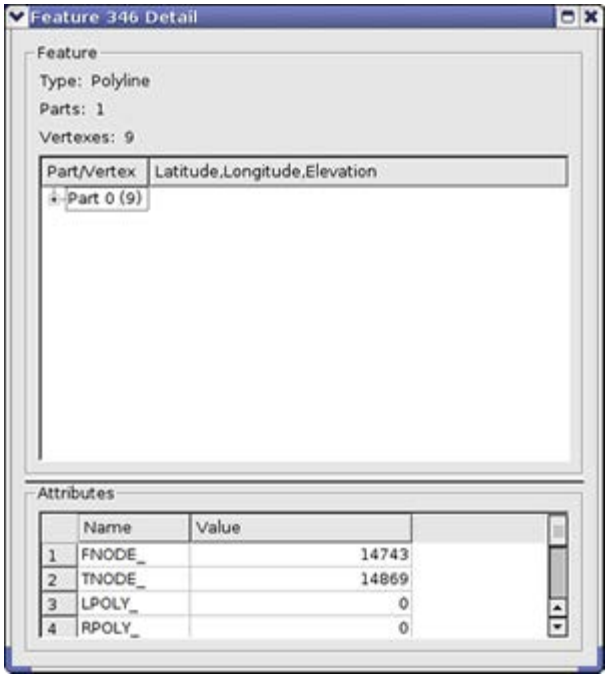
Exports the values of the entire column to a comma-separated value (CSV) text file using this option.

- **Export All Columns**

  Exports all of the data in the Attribute Table to a CSV text file.

- **Feature Details**

  Displays detailed information about the selected feature in the Feature Detail dialog, including all of the column attributes of the selected row, the number of vertices making up the vector feature, and the latitude and longitude of each vertex or part.



- **Zoom to Feature**

  Zooms to the selected feature.

- **Copy Cell Contents**

  Copies the contents of the cell to the window manager's clipboard. Then you can paste the contents of the cell into Google Earth Enterprise Fusion or another application.

  Tip: For example, when you are filtering data with international characters, and you do not know how to enter those characters from your English keyboard, you can use this option to copy the string from the actual data and paste it into the filter expression.

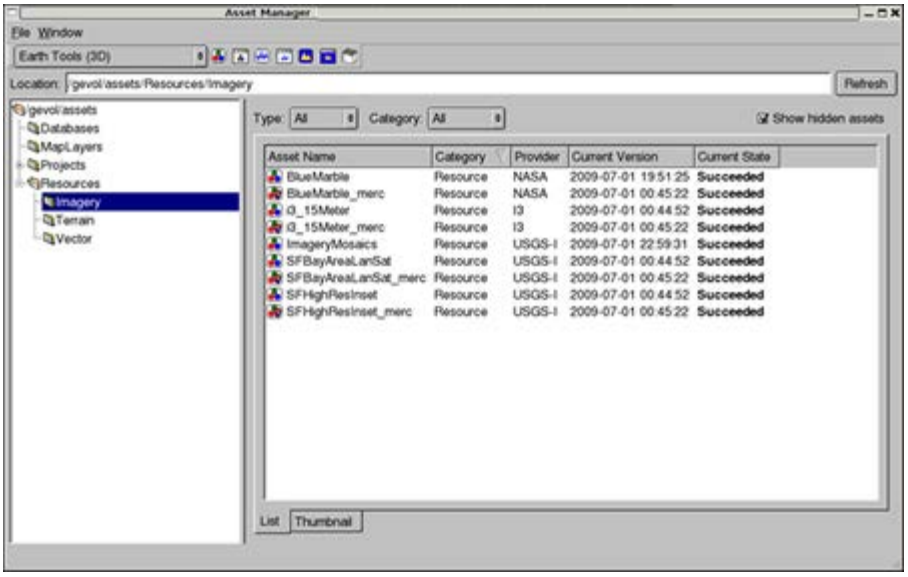
Using the Asset Manager

The Asset Manager is the main tool you use in Google Earth Enterprise Fusion. You use it to import and build all of your assets in preparation for publishing your Google Earth and Google Maps databases, so it is important for you to become very familiar with it.

Caution: If you are working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, whoever saves an object last overwrites any previous versions of that object. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure you do not clobber each other's work.

If it is likely that several people will be working in the Asset Manager at the same time, it is particularly important to ensure that no two users are working on the same asset at the same time.

To access the Asset Manager, select **Asset Manager** from the **Tools** menu.



The title bar of the Asset Manager identifies the name of the host on which you started the Google Earth Enterprise Fusion GUI.

The Asset Manager's menu bar provides two menus with the following options:

File

- **New Asset** - Displays the New Asset dialog (See the chapter on Defining Resources for more information about the New Asset dialog.

Window

- **Close All** - Closes all open asset editors
- **Cascade** - Rearranges all open asset editors in a cascading pattern

Below the **File** and **Window** menus, a selection box provides access to three groups of toolbar buttons. The available selections are:

- **Earth Tools (3D)**: for Google Earth databases
- **Mercator Map Tools (2D)**: for Mercator Projection Maps databases
- **Flat Projection Map Tools (2D)**: for Flat Projection Maps databases

The Asset Manager's toolbar provides the following icons so you can create new resources, projects, and databases. You will see only a subset of these icons at any time, depending on your **Tools** selection above.

Vector Resource	Vector Project
Imagery Resource	Imagery Project
Mercator Imagery Resource	Mercator Imagery Project
Terrain Resource	Terrain Project
Map Layer	Map Project

 Database

 Map Database

 Mercator Map Database

Click the icon for the type of asset you want to create. The appropriate type of new asset window appears. Refer to the appropriate chapter of this Reference Guide for information on adding specific types of assets.

Note: Mercator imagery resources are different than Flat Projection imagery resources. If you wish to use the same imagery for both an Earth database and a Mercator Maps database, you must import and store two copies of the imagery resources. Using google.com map base layers requires a Mercator Map database.

You can, however, share imagery resources between an Earth database and a Flat Projection Maps database.

The Location field at the top of the Asset Manager window displays the asset root. The asset root is the main location where you store all of your Google Earth Enterprise Fusion data. Depending on how you set your preferences, the location displays as either `ASSET_ROOT` or as the full path to the asset root (such as `/gevol/assets/`).

See Setting Your Preferences in the chapter on **Setting Up Your Workspace** for more information about setting this preference.

Note: You cannot edit the **Location** field.

The asset navigation tree appears on the left side of the Asset Manager. When you first start using Google Earth Enterprise Fusion, only the asset root appears. As you add subfolders to the asset root, they appear hierarchically in the asset navigation tree. (See Organizing Assets for more information.) All of the data you create with Google Earth Enterprise Fusion is stored in subfolders of the asset root.

As you navigate through the folders in the asset navigation tree, the **Location** field displays the full path of the selected folder.

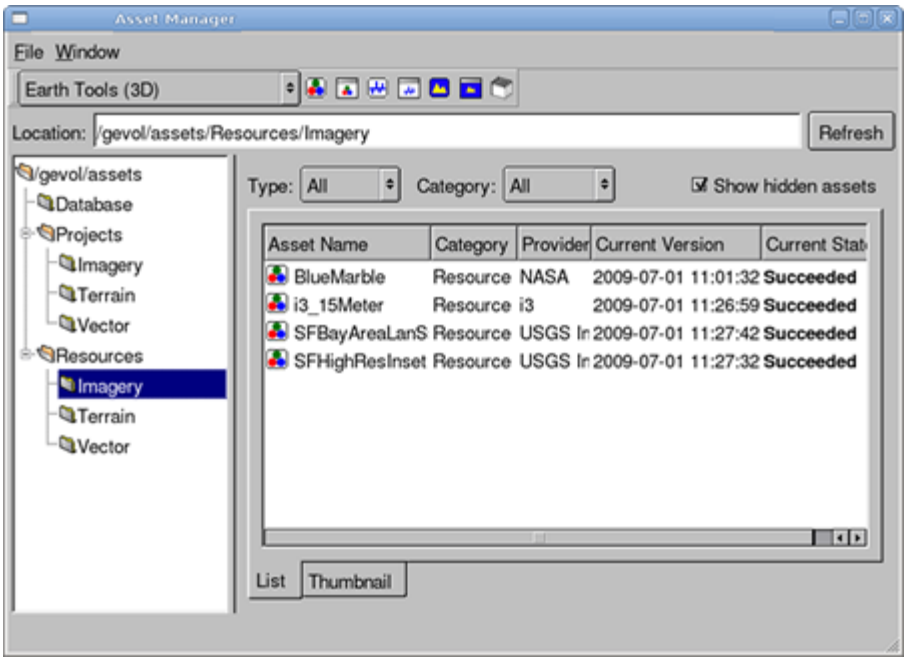
The right side of the window contains two tabs:

- List
- Thumbnail

The contents of these tabs are described in the following sections.

List Tab

The List tab displays the list of assets in the folder that is selected in the navigation tree on the left.



You can double-click the name of any asset on the list to display its properties in an editor, so you can modify the asset. You can double-click an asset's current version or current state to display the Version Properties dialog for that asset. (See Debugging Asset Builds in the **Building Assets** chapter for more information about this dialog.)

You can click the **Refresh** button to the right of the Location field at any time to refresh the status of the assets displayed on the List tab.

Above the asset list are two filters:

- **Type** - If you select **Vector**, **Imagery**, **Terrain**, or **Map** from the Type drop-down list, only the selected type of assets appear on the list. If you select **All**, all of the assets in the selected folder appear on the list.
- **Category** - If you select **Resource**, **Layer**, **Project**, or **Database** from the Category drop-down list, only the selected category of assets appear on the list. If you select **All**, all of the assets in the selected folder appear on the list.

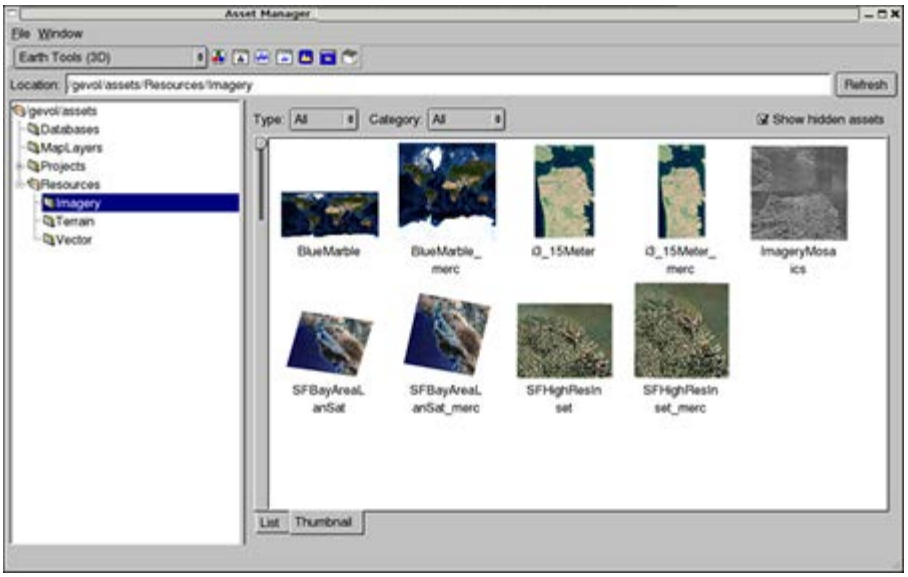
In addition, you can display hidden assets by checking the box next to **Show hidden assets**. Hidden assets are those assets that you do not need to display regularly, such as assets that are incorrectly named. See Using the Asset Editors for information on how to designate assets as hidden.)

Thumbnail Tab

The Thumbnail tab displays a thumbnail image of each asset in the folder that is selected in the navigation tree on the left.

> **Note:** The Thumbnail tab is useful for raster (imagery and terrain) data only.

In addition to the Type and Category filters and the **Show hidden assets** check box, which are available for this tab as well, this tab provides a zoom bar. You can drag the zoom bar down to enlarge the thumbnail images.



To close the Asset Manager, click the close box (**X**) in the top corner.

Using the Asset Editors

You use the asset editors (such as the Resource Editor, the Project Editor, and the Database Editor) to define and build your assets. When you finish using any of the asset editors (such as the Imagery Resource Editor used in this exercise), you can either leave it open and move it to the side or close it. Generally, if you know you have more work to do on a given asset, you leave the editor open. If you know you are done with an asset for now, you can close it and get it out of the way.

Caution: It is important to remember that you cannot delete assets after you save them. You can clean them, so they are no longer available to use in Google Earth Enterprise Fusion; however, you can never really eliminate them. See Cleaning Asset Versions in the **Building Assets** chapter for more information.

All of the asset editors provide menu options that allow you to perform specific tasks on the assets you are editing.

The menu options are:

File:

- **Save** - Saves the asset. The first time you save an asset, you can specify its name and location. After that, Google Earth Enterprise Fusion saves the asset with the same name and location.
- **Save As** - Saves a copy of the asset with a new name and location that you specify.
- **Build** - Builds the asset. If you have made changes to the asset that are not saved, Google Earth Enterprise Fusion prompts you to save it before it builds it.
- **Close** - Closes the asset editor. If you have made changes to the asset, a message prompts you to save it.

Edit:

- **Notes** - Displays a dialog that allows you to enter notes about the asset. Simply enter the text of your note. To insert the current date and time, click **Insert Timestamp**.

  When you finish composing your note, click **OK**.

  Note: The notes appear in Google Earth Enterprise Fusion only.

- **Hidden** - Toggles the **Hidden** setting on and off for the asset.

  You can check this option to hide assets that you do not need to display regularly, such as assets that are incorrectly named. Check it again to allow the asset to show.

Note: You can display hidden assets by checking the box next to **Show hidden assets** on the List Tab in the Asset Manager. See the List Tab section for more information.

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Setting Up Your Workspace

Overview

Before you begin importing your source data, it is important to:

- Set your preferences.
- Set up the subfolders in which you will store your Google Earth Enterprise Fusion data.
- Pre-configure various list options that you need to select later.

If you want to add more subfolders or list options later, you can do so at any time. However, it is more efficient for one person to configure them in advance, resulting in more consistent data in Google Earth EC.

Note: Preference settings are stored for each user. Subfolders and list options are shared by all users of a Google Earth Enterprise Fusion on a particular workstation.

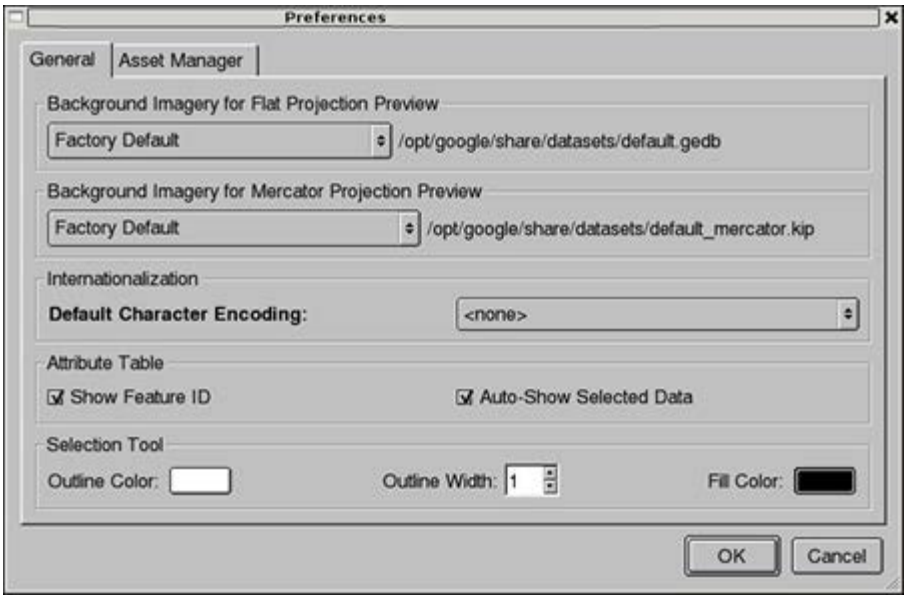
Setting Your Preferences

Google Earth Enterprise Fusion allows you to set certain preferences to customize the GUI to your own needs. When you make changes to your preferences, those changes do not affect other users.

To set preferences for Google Earth Enterprise Fusion:

1. Select **Preferences** from the Edit menu.
2. Specify your preferences on the General and Asset Manager tabs, as described in the following sections.
3. Click **OK**.

General Tab



On the General tab, you can set the following preferences:

- **Background Imagery**

  Google Earth Enterprise Fusion is initially configured to refer to the NASA Blue Marble imagery as the default background imagery of the Earth. If you have higher-resolution imagery that you prefer to use as your default background imagery, select an option from the drop-down list (a Google Earth Enterprise Fusion imagery project). If you select **Stream Server (HTTP)**, enter the URL of the desired database.

  > **Note:** You cannot add a stream server that requires authentication, including `kh.google.com`.

- **Background Imagery for Mercator Projection Preview**

  If you want to use the Mercator imagery, you can select either the raster or a Mercator imagery project. If you choose a Mercator mimagery project, enter the location of the desired database.

- **Internationalization**

  If most of your vector data has a particular character encoding, you can specify that as the default character encoding to avoid having to set the encoding every time. For example, if the majority of your vector data fields have character encoding of type ISO8859-1, select **ISO8859-1** from the drop-down list. The default character encoding for vector files is ASCII (plain text) (**<none>** on the drop-down list).

  > **Note:** Google Earth Enterprise Fusion supports bi-directional character encoding. However, right-to-left character encoding and multi-byte character sets are not supported in map layers.

- **Attribute Table**

  The settings in the Attribute Table section affect the behavior of the Attribute Table.

  - **Show Feature ID** - Select this option to display the feature IDs for the selected data in the first column of the Attribute Table. Uncheck it if you do not want to display the ID column.

    The feature ID is an internal, unique ID applied to all vector data converted to Google Earth Enterprise Fusion resource format. The IDs are assigned sequentially in the order the features are imported.

  - **Auto-Show Selected Data** - Select this option to automatically display the Attribute Table when vector features are selected in the Preview List pane.

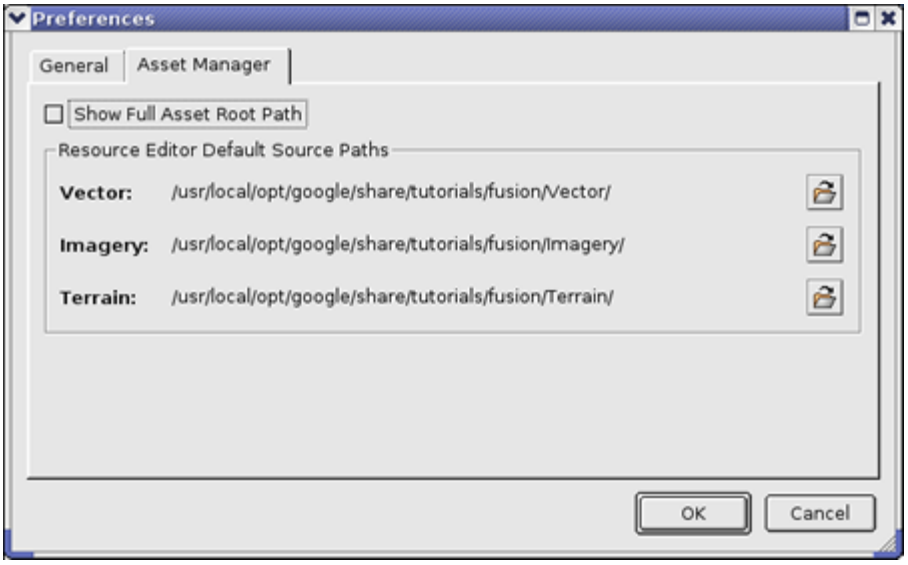
- **Selection Tool**

  You can specify your preference for the outline color, outline width, and fill color of the selection tool. Generally, you set these options based on the overall coloring of your imagery

data to make sure the selection tool is visible.

- **Outline Color** - Click the button next to **Color**, and select a color. See Draw Style in the **Defining Projects** chapter for more information.
- **Outline Width** - The default outline width is 1. To change the outline width, enter the desired value. The larger the number, the thicker the outline.
- **Fill Color** - Click the button next to **Color**, and select a color. See Draw Style in the **Defining Projects** chapter for more information.

Asset Manager Tab



On the Asset Manager tab, you can set the following preferences:

- **Show Full Asset Root Path**

  If you prefer to view the full path name of the Google Earth Enterprise Fusion asset root (such as `/gevol/assets/`) in the Location field of the Asset Manager, check this option. If you do not check this option, the Location field at the top of the Asset Manager shows the path starting with `ASSET_ROOT/`.

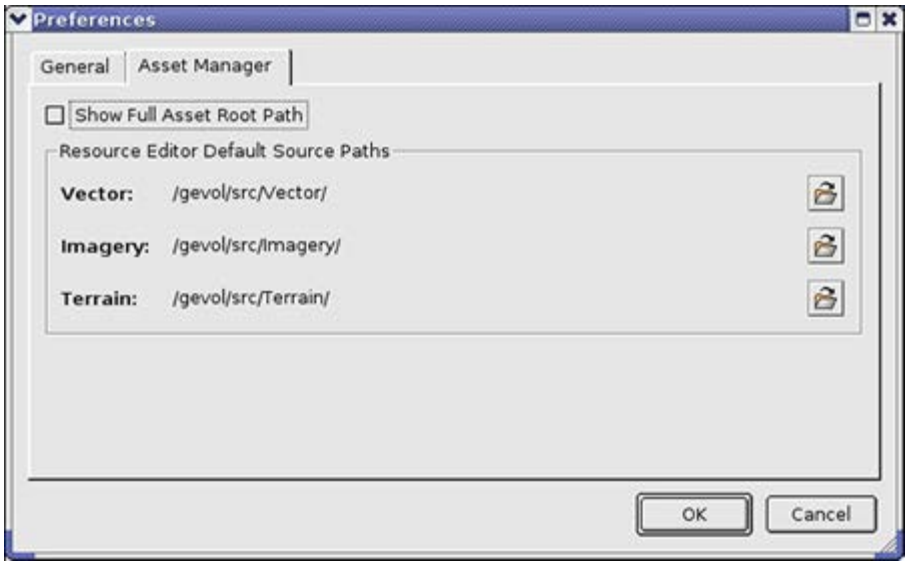
- **Resource Editor Default Paths**

  You can specify the default path for each type of source data (vector, imagery, and terrain), if desired. Whenever you add a source file to a resource, the Open dialog opens to the specified folder. If you do not specify a default path here, the Open dialog opens to the folder from which you launched Google Earth Enterprise Fusion.

  > **Note:** Initially, these paths are set to the appropriate paths for the *Google Earth Enterprise Fusion Tutorial*, if you installed the tutorial files. You do not need to change these paths until you start working with your own data. Then change each path to the top-most directory where each type of data is stored.

To specify the default paths:

1. Click  next to **Vector**. The Select Folder dialog appears.
2. Navigate to the folder you want to set as the default folder to open for vector source files, and click **OK**.
3. Repeat for **Imagery** and **Terrain**. The specified paths appear next to each type of source file.



4. Click **OK**.

Organizing Assets

When you have a plan in place for your folder structure and naming conventions, you can start adding subfolders to the asset root. See Organizing Your Google Earth Enterprise Fusion Subfolders in the **Introduction** chapter for details about planning and organizing your subfolders.

Caution: Folders and subfolders can not be deleted after they've been created in your asset root. This makes it especially important for you to plan out and organize your subfolders before you or anyone else begins working with data in Google Earth Enterprise Fusion.

To add a subfolder:

1. Right-click the folder in which you want to add the new subfolder (in this case, **ASSET_ROOT**), and select **New Subfolder** from the context menu.

   A dialog prompts you to enter the name of the folder.

2. Enter a unique name that helps identify the contents of the folder, and click **OK**.

   Tip: Consider using subfolder names that correspond to the type of resource that you are creating. For instance, you might first create a subfolder named `vector` to indicate the type of source data. Under the `vector` folder, you could create additional subfolders to further distinguish the source by provider, if desired, or by some other category. See Organizing Your Google Earth Enterprise Fusion Subfolders in the **Introduction** chapter for more information.

   The new subfolder appears in the asset navigation tree.

3. Repeat the previous steps to add more subfolders.
4. When you're finished, click **OK**.

Managing Locales

Note: If you do not intend to translate your layer names or supply different data for different languages, you can skip this section. You do not need to create a locale in the Locale Manager for your primary locale.

The Locale Manager allows you to set up language support for your users' locales. If you specify locales here, you can enter layer names in multiple languages. Google Earth EC and Google Maps use the locale setting of the computer to select which language-specific content to display. If you do not specify any locales, all labels in Google Earth EC and Google Maps appear in your native language.

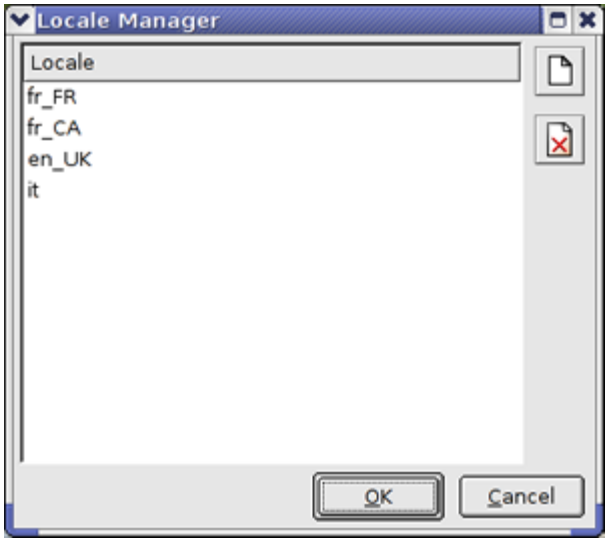
Caution: If you are working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user's changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

After you add all of the locales you want to support using the Locale Manager, you can select the locales you want to support for each layer in your project using the Layer Properties dialog. See Configuring Layer Properties in the **Defining Projects** chapter for more information.

To create a new locale:

1. Select **Tools > Locale Manager**. The Locale Manager appears.
2. Click  . The **Support New Locale** dialog appears.

3. Enter the name of the new locale using standard ISO locale language abbreviations (such as **fr**, **de**, **it**, or **fr_CA**). If you need to distinguish among regions, you can use regional designations as well (such as **fr_FR**, **fr_CA**, **en_UK**, and so on).
4. Click **OK**. The locale appears in the Locale Manager.



5. Repeat steps **2** through **4** for each new locale.
6. Click **OK** when you've finished adding locales.

Managing Labels

Note: The **Label** panel has been removed from the Google Earth Enterprise Client as of version 5.0. The **Label Manager** feature of Google Earth Enterprise Fusion is no longer applicable, and will be removed in a future version.

Managing Data Providers

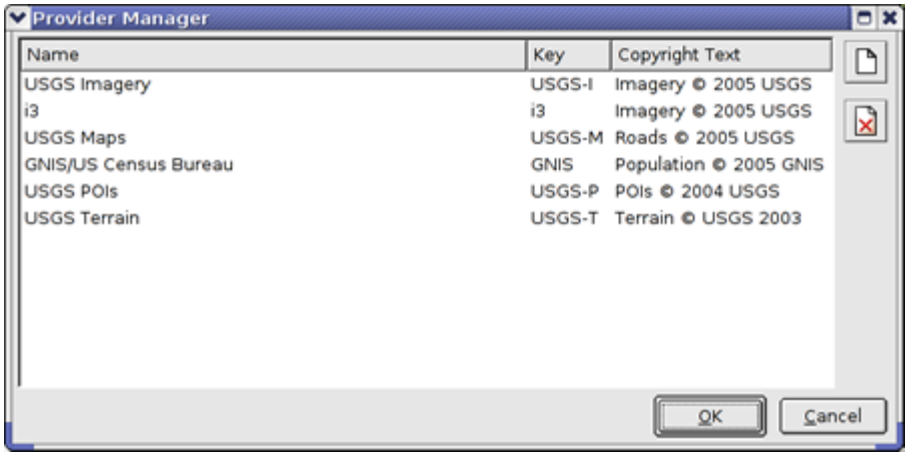
The Provider Manager allows you to create a list of organizations that provide the data you use in

Google Earth. For each provider, you specify a lookup key (any unique abbreviation you choose) and copyright information. When you create a resource, you associate a data provider with it, so that when the resource is displayed in Google Earth EC, it displays the appropriate copyright information.

Caution: If you are working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user's changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

To create a provider:

1. Select **Tools > Provider Manager**. The **Provider Manager** window appears.
2. Click  to open the **Edit Provider** dialog.
3. Enter the following information:
   - **Name**: Full name of the resource provider.
   - **Key**: An abbreviation of your choice that is unique to this provider.
   - **Copyright Text**: This string appears at the bottom of the viewer in Google Earth EC when the corresponding imagery, map, road, or terrain data is displayed. Enter any free-form text string, including white spaces.
4. Click **OK**. The new provider appears at the end of the list of providers.



5. Repeat steps **2** through **4** to add more providers.
6. When you finish adding providers, click **OK**.

To modify a provider:

1. Double-click the name of the provider you want to change.
2. Modify the information as desired, and click **OK**. The updated information appears in the Provider Manager.

Note 1: Changing the copyright text for a provider does not force a rebuild of the affected resources. The old copyright text will be displayed until the resources are rebuilt.

Note 2: If you change a provider's key, the copyright information associated with that provider can no longer be displayed for associated resources in Google Earth EC.

To delete a provider:

1. Select the provider to delete, and click . You are prompted to confirm the deletion.
2. Click **OK** to permanently delete the provider.

Caution: If you delete a provider, the copyright information associated with that provider can no longer be displayed for associated resources in Google Earth EC.

Managing Icons

In addition to the standard icons that are supplied with your installation of Google Earth Enterprise Fusion, you can create, import, and manage your own collection of icons that you can apply to vector data. See Creating Custom Icons in the chapter on **Creating Your Own Source Data, Icons, and Masks** for details.

Caution: If you are working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user's changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

To add a custom icon:

1. Select **Tools > Icon Manager**. The Icon Manager appears.

   Note: The Icon Manager is empty if you have not yet imported any custom icons. The standard icons provided with Google Earth Enterprise Fusion do not appear in this dialog. You cannot add to or delete from the standard collection.

2. Click  .
3. Select the desired image file and click **Open**. The new icon appears in the Icon Manager.
4. Repeat these steps to add more icons.
5. When finished, click **OK**.

After you add an icon to your collection, you can use it as a road shield or other marker for vector data, as described in Road Labels and Shields in the **Defining Projects** chapter.

To delete a custom icon:

1. Select the icon to delete and click  . A message prompts you to confirm the deletion.
2. Click **OK**. The icon no longer appears in the Icon Manager.

Note: If you delete an icon from the Icon Manager, it does not force you to rebuild projects that reference that icon. If that icon was previously referenced in a project that has already been built, when you publish a database that includes that project, the old icon appears. If something else in that project subsequently triggers a build, the new icon will appear in the resulting version.

If you delete an icon from the Icon Manager that is referenced in a saved but unbuilt project, that project's build fails. If the Project Editor is open when you delete the icon from the Icon Manager, when you close and then reopen the project editor and look at the Display Rules dialog for the affected layer, a large red box appears instead of the deleted icon.

If you see this red box, you must select a different icon for the affected layer.

If the deleted icon is referenced in a template (that is, you referenced it, saved the template, and then deleted the icon from the Icon Manager), the next time you import that template and try to build the project, the build fails. As in the first case, the next time you open the project and look at the Display Rules dialog for the affected layer, a large red box appears instead of the deleted icon, and you must select a different icon for the affected layer. In addition, it would be a good idea to save a new version of that template that includes an icon in the Icon Manager.

Managing Search Tabs

Search tabs allow Google Earth EC or Google Maps users to:

- Replace the standard search tabs in Google Earth EC.
- Search Google Earth EC or Google Maps databases created with Google Earth Enterprise Fusion.
- Access other databases not related to Google Earth Enterprise Fusion (such as geocoders, Google Search appliance, and so on).
- Access external search servers (such as a real estate search).

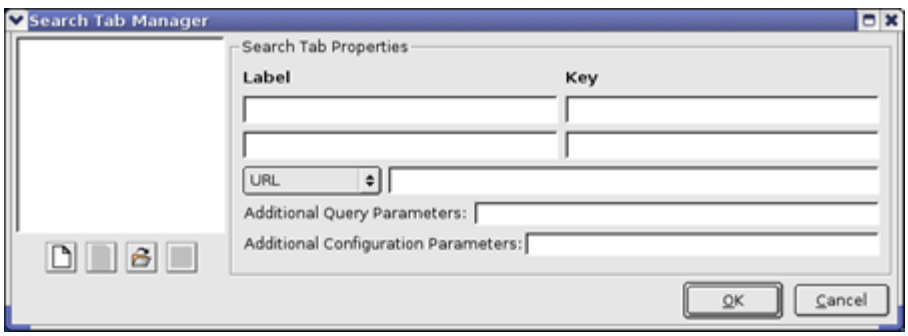
For example, if you have a database of property locations that contains specific information that your users need, you can create a search tab called “Property Search” and configure it to search for locations in your property database, even if that database is stored on another server.

The Search Tab Manager allows you to pre-configure the search tabs to be used for any database you create with Google Earth Enterprise Fusion. You define all of the search tabs you need using the Search Tab Manager, and then you can select up to three of those search tabs for a specific database using the Database Editor. See Adding Search Tabs to a Database in the **Defining and Publishing Databases** chapter for details.

Caution: If you are working with multiple Google Earth Enterprise Fusion users on multiple workstations, it is important to remember that all managers on the Tools menu can be accessed by all users at the same time. If multiple users are working with the same manager at the same time, when one user closes the manager, that user’s changes overwrite all previous data for that manager. So if you are working in a multi-user environment, be sure to coordinate with the other users to be sure that only one user has this manager open at a time.

To define a new search tab:

1. Select **Tools > Search Tab Manager**. The **Search Tab Manager** window appears.

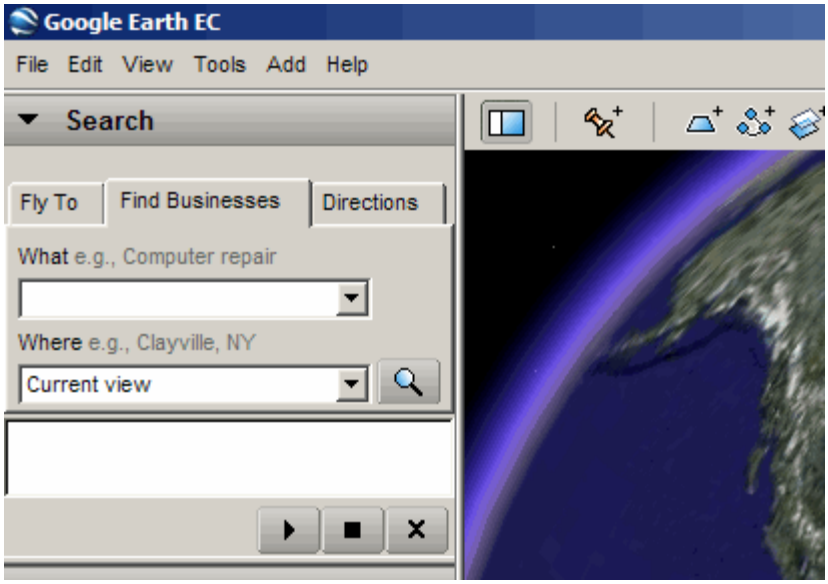


2. Click  to open the **New Search Tab** window.
3. Enter a unique name for the search tab, and click **OK**. The search tab name appears on the list on the left and is selected.
4. Enter **Label** and **Key** values for each field you want to display on the search tab. You can enter Label and Key values for one or two fields.

   Basic HTML tags are supported in the Label text. See the HTML Tags Allowed chapter for details.

   The **Label** value appears above the search field in Google Earth EC. In the example below, the Label value is:

   ```
   What <font color="#999999>e.g., Computer repair</font>.
   ```

   The **Key** value is the name of a search key in your search application. The value the user enters in the corresponding field in Google Earth EC is paired with the key in the search expression that Google Earth EC passes back to your search server in its query URL. For example, in the screen shown above, the key for the first field might be `what`, and the key for the second field might be `where`. You must know, however, the exact names of the search keys in your search application.
5. Select **URL** or **Plug-in Name** from the drop-down list.
   - Select **URL** if you want to specify the URL of the non-Google server. Enter the URL in the text field.
   - Select **Plug-in Name** if you want to reference a *plug-in* for the search tab. Enter the name of the plug-in. The following plug-ins are installed with Google Earth Enterprise Fusion and are located in the `/opt/google/search/tabs` directory:
     - `Coordinates.gestd`
     - `Example_Plugin.gestd`
     - `GeocodingFederated.gestd`
     - `GSA_Plugin.gestd`
     - `Places.gestd`

     After you create the search tab, you need to make sure the plug-in is registered. Use the following command to see the registered plug-ins:

     ```
     geserveradmin --listplugins
     ```

     See the **Search Framework Developer's Guide** for more information about creating your own plug-ins for search tabs. To get you started, Google provides eight sample plug-ins that are ready to use in the Sample Plug-ins chapter.

To register a plug-in that is not regisitered by default, issue the following command:

```
/opt/google/geserveradmin --addplugin Plugin_name --jar_path
/opt/google/search/plugins/Plugin_name.jar
  --class com.google.earth.search.plugin.Plugin_name
```

You can specify the plug-ins the `GeocodingFederated` plug-in uses in the `GeocodingFederatedPlugin.properties` file:

```
plugins=GEPlacesPlugin,CoordinatePlugin
```

You can add the plug-in names in the comma separated list for `plugins`. The plug-in must be registered or `GeocodingFederatedPlugin` will fail to initialize. If you want to add `MyPlugin` to the `GeocodingFederatedPlugin`, for example:

```
plugins=GEPlacesPlugin,CoordinatePlugin,MyPlugin
```

To unregister `GeocodingFederatedPlugin`:

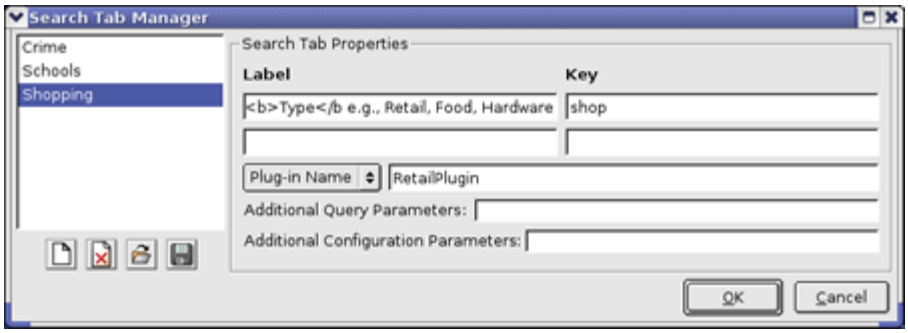
```
/opt/google/bin/geserveradmin --deleteplugin GeocodingFederatedPlugin

/opt/google/bin/geserveradmin --addplugin MyPlugin
  --jar_path /opt/google/search/plugins /MyPlugin.jar
  --class com.google.earth.search.plugin.MyPlugin

/opt/google/bin/geserveradmin
  --addplugin GeocodingFederatedPlugin
  --jar_path /opt/google/search/plugins /GeocodingFederatedPlugin.jar
  --class com.google.earth.search.plugin.GeocodingFederatedPlugin
```

6. If you want to add query parameters that are hidden from Google Earth EC, such as the way the results will be sorted or the number of results displayed at a time, enter them in the **Additional Query Parameters** field.

   The syntax is `key1=value1&key2=value2`. For example, **sortby=name&numresults=10** sorts by the **name** field and displays 10 results at a time. Your search application must be able to understand and respond to these key/value pairs, so you must be very familiar with your search application to use this field.

   > **Caution:** Any web service, servlet, or web application you configure the search tabs to query must return valid KML to Google Earth EC. For Google Maps, it must return valid JavaScript in the specified structure.

7. If you are licensed to use Google-hosted services, you can enter additional configuration parameters in the **Additional Configuration Parameters** field. For more information, refer to the Google Earth Enterprise support web site. Log in at https://support.google.com then point your browser to https://support.google.com/enterprise/Earth.
8. Repeat steps **2** through **7** to add all of the search tabs that you and other Google Earth Enterprise Fusion users plan to use in your databases.



As you add each search tab, it appears on the list. You can view or modify the properties for any search tab by selecting (highlighting) it on the list.

> **Note:** The number of search tabs you add in the Search Tab Manager is unlimited. However, you cannot add more than three search tabs to any particular database.

9. When you finish configuring search tabs, click **OK**. The search tabs are ready for you to add

to your databases. See Adding Search Tabs to a Database in the **Defining and Publishing Databases** chapter.

To import a search tab from a plug-in:

1. Select **Tools > Search Tab Manager**. The **Search Tab Manager** appears.
2. Click  . The **Import Search Tab Definition** dialog appears with **Google Earth Search Tab Definition** selected as the file type.
3. Navigate to and select the desired search tab definition file, and click **Open**. The imported search tab appears in the Search Tab Manager.
4. Click **OK** to close the Search Tab Manager.

To export a search tab:

1. Select **Tools > Search Tab Manager**. The **Search Tab Manager** appears.
2. Select the desired search tab, and click  . The **Export Search Tab Definition** dialog appears with **Google Earth Search Tab Definition** selected as the file type.
3. Navigate to the folder where you want to save the exported search tab definition file, enter a name for the file, and click **Save**.

   Google Earth Enterprise Fusion saves the file with the `.gestd` extension. Now you can copy or move that file wherever you want and import the search tab definitions elsewhere.
4. Click **OK** to close the Search Tab Manager.

To delete a search tab definition:

1. Select **Tools > Search Tab Manager**. The **Search Tab Manager** appears.
2. Select search tab to delete and click  . You are prompted to confirm the deletion.

   Caution: When you delete a search tab definition from the Search Tab Manager, Google Earth Enterprise Fusion does not check to see if any databases are currently using that search tab definition. If you delete a search tab definition that is used in a database that has already been built and published, there is not problem if you delete it. However, if you delete a search tab definition that has been used in a database that has not yet been built, when you try to build that database, Google Earth Enterprise Fusion displays a message informing you that it is unable to find the deleted search tab. You must remove that search tab from the database before you can build it.
3. Click **OK**.

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Defining Resources

Overview

This chapter describes key concepts related to importing imagery, terrain, and vector source data to define resources in Google Earth Enterprise Fusion. It describes all of the tasks related to creating, modifying, organizing, and managing resources. For information about building resources and other assets, see the chapter titled Building Assets.

You first import your source data into Google Earth Enterprise Fusion as a resource. There is a one-to-one correspondence between the type of source file and the type of resource that is created from it:

- Vector resources are created from vector data.
- Imagery resources are created from imagery data.
- Terrain resources are created from terrain data.

You can create a single resource from a single source file, or you can create a single resource from many different source files. See Defining Resources for more information.

Providers often split large source files into several smaller source files to make them more acceptable to download. The main purpose of grouping multiple source files into a single resource in Google Earth Enterprise Fusion is to return source files that were split up for artificial reasons (such as file size) to their original state as a single entity. For example, you might acquire four source files that together comprise a large single data set, such as an image of the state of Texas. You combine all four source files into a single resource to put the original data back together.

When you combine source files in a single resource, the source files must be of the same type (imagery, terrain, or vector). In addition, they must be similar in other ways.

- For raster (imagery and terrain) resources, the source files must be of the same resolution and geographic proximity.
- For vector resources, the source files must contain the same columns of data.

An important difference between vector resources and raster (imagery and terrain) resources is that the display rules for vector data can differ between projects. You can use different colors, icons, and filters for the same resource in different projects. With raster resources, however, most of the display settings are specified when you first import the imagery or terrain resource. These settings “stick” with the resource, regardless of which project is using it.

Supported Source File Formats

The following tables list the raster data (imagery and terrain) file formats and the vector file formats that are supported by Google Earth Enterprise Fusion.

All raster (imagery and terrain) data must have geographic coordinates and projection information

included in the file headers or contained in external text-based world files and projection files. All imagery data must be in 8-bit format with either one band for panchromatic or three bands for color. All terrain data can be in 16-bit or 32-bit format with a single band.

Supported Imagery and Terrain Formats

File Format	Notes
DTED	
Erdas Imagine (IMG)	
GeoTIFF	
GIF	Geographic coordinates and projection information must be accompanied by external world and projection files.
JPEG	Geographic coordinates and projection information must be accompanied by external world and projection files.
JPEG2000	
Microstation (DGN)	Microstation DGN files from prior to version 8 are supported. Versions 8 and later are not supported.
MrSID	
NITF	
PNG	Geographic coordinates and projection information must be accompanied by external world and projection files.
TAB	
TIF	Geographic coordinates and projection information must be accompanied by external world and projection files.
USGS ASCII DEM	
USGS SDTS DEM	

Note: Google Earth Enterprise Fusion does not allow you to import imagery resources larger than 80GB in raw size. (Raw size = number of pixels width * number of pixels height * 3.)

Supported Vector Formats

File Format	Notes
ESRI Shape File (`.shp`)	For each ESRI shape file you import into Google Earth Enterprise Fusion, one DBF and one SHX configuration file, each with the same name as the original

	and the appropriate extension (.dbf and .shx) must be located in the same folder. In addition, if there is any projection in the image, a PRJ file with the same name as the original file and the appropriate extension (.prj) must be located in the same folder. Other associated files you can include with each SHP file are SBN, SBX, CPG, and LYR.
Generic ASCII	Point data only in comma-separated values or tab-delimited text format.
KML/KMZ	
MapInfo File (`.tab`)	
US Census Tiger Line Files	

Supported Data Projections

All raster data imported into Google Earth Enterprise Fusion must include geographic coordinates as well as information about the projection used to create the data. The supported data projections are:

Albers Equal-Area Conic	Lambert Azimuthal Equal Area	Polar Stereographic
Azimuthal Equidistant	Lambert Conic Conformal (1SP)	Polyconic
Cassini-Soldner	Lambert Conic Conformal (2SP)	Robinson
Cylindrical Equal Area	Lambert Conic Conformal (2SP Belgium)	Rosenmund Oblique Mercator
Eckert IV	Lambert Cylindrical Equal Area	Sinusoidal
Eckert VI	Mercator (1SP)	Stereographic
Equidistant Conic	Mercator (2SP)	Swiss Oblique Cylindrical
Equi-rectangular	Miller Cylindrical	Swiss Oblique Mercator
Gall Stereographic	Mollweide	Transverse Mercator
Gauss-Kruger	New Zealand Map Grid	Transverse Mercator (Modified Alaska)
Gnomonic	Oblique Mercator	Transverse Mercator (South Oriented)

Hotine Oblique Mercator	Oblique Stereographic	Tunisia Mining Grid
Laborde Oblique Mercator	Orthographic	Van der Grinten

Special Cases

The GIS tool you use to create your source data generally embeds projection and geotransform information in your source data file. Sometimes, however, the GIS tool improperly encodes this information or leaves it out altogether. The result is that Google Earth Enterprise Fusion cannot properly locate your source data on the globe.

When the projection and geotransform information is missing or inaccurate, you can provide the required data in the form of auxiliary files to ensure that Google Earth Enterprise Fusion properly converts your data. The auxiliary files must have the same file name as the source file, be located in the same folder, and have the appropriate extension, such as:

- `.prj` - Provides projection information
- `.tfw` - Provides geo-transform information

In addition to the standard PRJ format (OpenGIS well known text), Google Earth Enterprise Fusion supports two other file formats for projection data:

- `EPSG:`*x* where *x* is a valid EPSG projection number
- PROJ.4 projection specification, such as:`+proj=latlong +ellps=GRS80 +towgs84=-199.87,74.79,246.62`

Defining Resources

The first step in preparing your GIS data for use in Google Earth Enterprise Fusion involves importing it into the Asset Manager. When you import source data using the Asset Manager, Google Earth Enterprise Fusion creates a resource that you can add into your projects. The Asset Manager is available both with shell commands entered at the command line and as part the Google Earth Enterprise Fusion GUI. For information on importing large batches of source data, see the Command Line Reference.

As you import more data into the Asset Manager, you create a collection of resources that can be used in different projects. When you create resources for use in Google Earth Enterprise Fusion projects, keep in mind the following:

- **Configuration settings differ depending on the type of source data.**

  In general, when you create a resource from vector data, you are setting metadata for that resource, such as the source date, provider, and character encoding. On the other hand, when you create a resource from imagery and terrain data, your settings also affect the display of the data itself, such as mask, fill values, and mosaic options. Settings that affect the display of vector data are defined in the project that contains the vector resource.

- **You create a single resource at a time, whether you use a single source or multiple sources.**

  Each new resource creation command creates a single resource. If you select multiple source data files, you are creating a single resource that is a composite of multiple sources. The source imagery must have identical resolution.

  On the other hand, if you want to import several source files where each one is created as a single resource, you must issue a separate New command for each source file you want to import. Refer to the Command Line Reference for information on how to use batch

commands for adding source data.

- **Composite resources require similar source data.**

  Typically, vector resources are created from multiple sources when you have contiguous data of the same type. For example, you can create a single resource that displays all of the zip code boundaries for a state by importing several vector files that each contain the zip code boundaries for a specific county. When combining vector source files in this manner, the data itself must have the same projection, and the attribute headers must match in order for the import to be successful.

  For imagery data, large images are frequently cut in to smaller pieces, so each piece fits on a single CD. When you use data in this format, you must add all of the imagery source files to a single resource, rather than creating a separate resource for each source file.

  > **Note:** Recombining multiple imagery source files that were created by artificially splitting a large image is the only intended use for this process. It is not a general purpose, multi-resolution mosaic tool.

- **New resources must have unique names.**

  You can create a new resource only if a resource of that name/type does not already exist in the target folder. However, because imagery, terrain, and vector resources have different file extensions, you can use the same file name once for each type of resource.

  > **Note:** Because resources can be flagged as hidden so that they don't appear in the Asset Manager, be aware that a name for a resource you create might be used by a hidden resource. Select the **Show hidden resources** check box before creating new resources if you have many hidden resources in your tree.

  Each resource is a separate entity from the source file or files. If you want to specify a different (or updated) source file for an existing resource, you use a different command. See Modifying Resources for more information.

  > **Note:** Certain characters in Fusion asset names caused problems with the Publisher and Server. Fusion prevents the creation and use of assets with invalid characters in their names. **The following characters are no longer allowed in Fusion asset names:**
  >
  > & % ' \ " * = + ~ ` ? < > : ; and the space character
  >
  > If any assets have a name containing any of the characters mentioned previously, rename the asset (and path) to a valid name that does not include and of those characters. This requires you to rebuild the assets, as well as the projects and databases that contain them.
  >
  > The Fusion installer checks the current asset root (if any) to detect, and subsequently warn, if invalid asset names exists before installation will continue. In cases where creating new copies of the assets requires too much effort or expensive rebuilding of resources, a script is available from Google Earth Enterprise Support that will rename the assets automatically. This script requires using great care, and that is why it is not run automatically.

- **You can update an existing resource with new source data.**

  When you acquire updated source data for a resource that is already included in a Google Earth Enterprise Fusion database, you can easily replace the old source data with the new source data. If the new source file has the same name as the old source file and you are not changing anything else, simply replace the old source file with the new source file on disk, and rebuild the database. The next time you publish the database, everything else remains the same except for the new source data.

Defining Vector Resources

The Vector Resource Editor

Define Vector Properties

[Adding a Source File to a Resource]

[Adding KML/KMZ Source Files to a Resource]

The Vector Resource Editor

1. Select **Tools > Asset Manager**. The **Asset Manager** appears.
2. Click  . The **Vector Resource Editor** appears.
3. Define the properties of the vector resource as described in the next section, Define Vector Properties.
4. When you finish defining the properties for the resource, select **Save** from the File menu.

   The first time you save a new resource, the **Save** dialog appears. Navigate to the folder where you want to save the resource, provide a unique name for it, and click **Save**.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

When you finish defining each resource, you can build it individually or build several resources at the same time; however, you must build a vector resource before you can include it in a project. See the Building Assets chapter for complete details.

Define Vector Properties

You use the Vector Resource Editor to define the following properties:

- **Acquisition Date**

  The acquisition date appears in year-month-day format.

  Note: You can decide whether to use the date you acquire the data, the date you import it into Google Earth Enterprise Fusion, or the actual date of the source image. Regardless of which method you use, it is best to adopt a consistent policy for all your resources to avoid confusion.

  Click each section of the date and enter the values. Alternatively, you can use the right and left arrow keys to move among the three parts of the date.

- **Provider**

  Select the source provider from the Provider drop-down list. The provider identifies the source of the data and its copyright information in Google Earth EC.

  Note: If you specify the same provider for multiple resources that end up appearing together in Google Earth EC, Google Earth EC is smart enough to display the provider's name and copyright information only once.

  The providers that appear on the list are defined in the Provider Manager. See the section on Managing Data Providers in the **Setting Up Your Workspace** chapter for more information.

- **Encoding**

  If the field data in your vector resource has a particular encoding for characters, such as ISO8859-1, select the appropriate option, so your data is displayed correctly in Google Earth EC. If you do not select an encoding option, the character encoding defaults to ASCII (plain text).

- **Layer**

  Use this option if your source data contains multiple layers and you want to extract a specific layer from the data for your resource. If you leave this option set to **0** and your source data contains more than one layer, Google Earth Enterprise Fusion extracts the first layer of the source file to create the resource.

  Note: In most cases, source vector data has only one layer; however, Tiger vector data

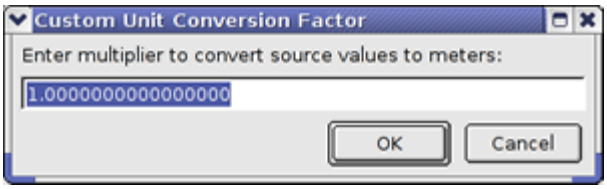
can contain multiple layers. Because there is a one-to-one correspondence between a vector resource and a single vector source layer, resource creation from multi-layer source data must specify a layer.

If you are unsure which layer to indicate when creating a resource from multi-layer source data, you can open the vector source file in Preview pane to display all of the layers in the source data. Examine each layer, and select the appropriate layer to import.

- **Elevation Units**

  Google Earth Enterprise Fusion interprets elevation in meters, so the default selection for this option is **Meters**.

  - If the unit of measure for elevation in your source data is feet, select either **Feet (International)** or **Feet (US Survey)**, whichever applies. Google Earth Enterprise Fusion converts the feet data to its metric equivalent.
  - If you select **Other**, the Custom Unit Conversion Factor dialog appears.

    Enter the multiplier for Google Earth Enterprise Fusion to use to convert the data to meters. For example, if the elevation is in yards, enter **0.9144**. When you click **OK**, the number you enter here appears as the **Elevation Units** value.

- **Feature Type Converting**

  Google Earth Enterprise Fusion imports polygon features as they are classified in the data set, so the default selection for this option is **None**. But if for some reason polygon features in the data set are classified incorrectly, you can apply force conversion.

  - **force 2D**

    Select force 2D to force conversion of 2.5D polygon features to 2D polygon features.

  - **force 2.5D**

    Select force 2.5D to force conversion of 2D polygon features to 2.5D polygon features.

Note: The 2.5D polygonal features are mainly used in “buildings” data sets. Fusion does an analysis of area of features during the vector resource import and based on the result of this analysis it can propose force converting to 2D for source data set originally classified as 2.5D polygonal resource. Information is reported in resource import log: “Found number of very large features classified as Polygon25D. Possibly the source data is classified incorrectly. Consider importing with --force2D".

- **Ignore Bad Features**

  By default, if there are *bad features* in a source file, Google Earth Enterprise Fusion fails to build the resource. The error log states that there are bad features. If you check the box next to **Ignore Bad Features**, Google Earth Enterprise Fusion ignores the bad features and builds the resource anyway.

- **Don't Fix Invalid Geometries**

  By default, if there are *invalid geometries* in a source file Google Earth Enterprise Fusion detects and tries to fix them. It removes zero length edges and "spikes" in polygonal geometry. As a result of removing *invalid geometries* polygonal features may become degenerate (zero area polygon). The resource import log states that there are degenerate features and they are skipped. If you check the box next to **Don't Fix Invalid Geometries**, Google Earth Enterprise Fusion does not clean up *invalid geometries* and builds the resource anyway.

- **Source Files**

  The Source Files list displays the names of the source files selected for this resource. Click

Add to add a source file. See the next section, Adding a Source File to a Resource, for more information.

To delete a file on the Source Files list and no longer associate it with this resource, select the file and click **Delete**. A message prompts you to confirm the deletion. Click **OK**. The file no longer appears on the list.

Note: You can select one or more source files to create a single resource, such as an imagery mosaic or a vector composite. If you use more than one source data file for a single resource, all of the raster data must have the same projection and attribute values, and all of the vector data must be of the same type (lines, points, or polygons).

Adding a Source File to a Resource

Each resource must contain at least one data source file. Perform the following procedure for each source file you want to add.

1. In the Vector Resource Editor, click **Add**. The Open Source dialog appears.
2. Navigate to the folder containing the source data file(s) you want to add.
3. Select the desired source data file(s), and click **Open**. The new source data file(s) appear on the Source File(s) list.

Adding KML/KMZ Source Files to a Resource

You can import KML or KMZ files created in Google Earth as resources in Google Earth Enterprise Fusion. There are a few limitations on the type of KML files that Google Earth Enterprise Fusion can import:

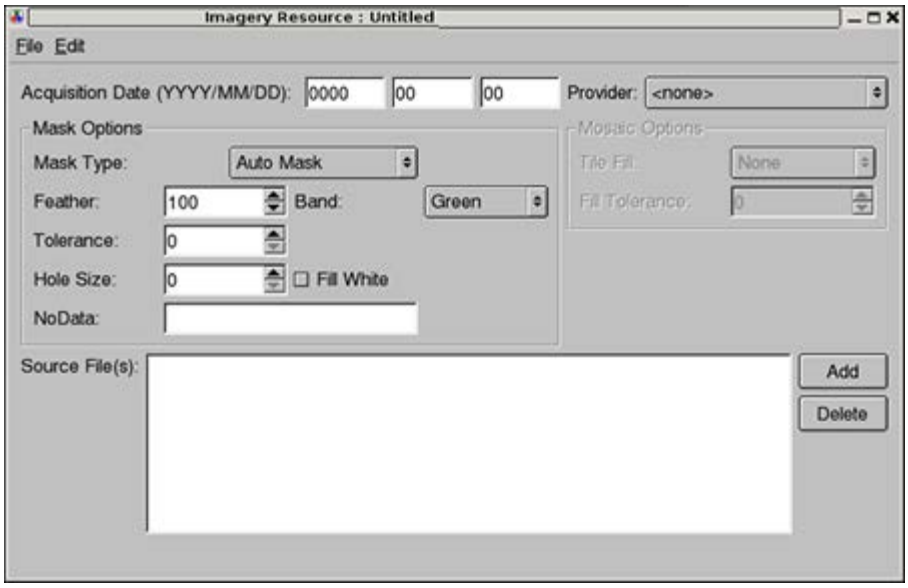
- You can import the name, description, LookAt, and geometry only, not style information or custom icons.
- You can import point and line geometry in 2D only; however, you can import polygons in 2D or 2.5D.
- You cannot import networked KML or super-overlay KML.

To import KML/KMZ files:

1. In the Vector Resource Editor, click **Add**. The Open Source dialog appears.
2. Select **Keyhole Markup Language** (or **All Files**) for the file type to display.
3. Navigate to the folder containing the KML or KMZ file you want to add.
4. Select the desired KML or KMZ file, and click **Open**. The new source data file appears on the Source File(s) list.

Defining Imagery Resources

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Click  . The Imagery Resource Editor appears.



3. Define the properties of the imagery resource as described in the next section, Define Imagery Properties.
4. When you finish defining the properties for the resource, click **Save**.

   The first time you save a new resource, the Save dialog appears. Navigate to the folder where you want to save the resource, provide a unique name for it, and click **Save**.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

When you finish defining each resource, you can build it individually or build several resources at the same time. See the Building Assets chapter for complete details.

Define Imagery Properties

Use the Imagery Resource Editor to define the following properties:

- **Acquisition Date**

  The acquisition date appears in year-month-day format. **This is required for historical imagery projects**.

  The date you set for the Imagery Acquisition Date is visible in the Google Earth Client when hovering the cursor over a tile. This requires that the imagery resource has acquisition dates recorded with it and requires a rebuild of the imagery project (since for this feature the date needs to be encoded in the JPEG tiles). Imagery and Vector Resource dialogs now support an improved acquistion date format: unspecified days and months are now supported, for example:

  - 2008-01-00 indicates January 2008
  - 2008-00-00 indicates 2008
  - 0000-00-00 indicates undefined. Leading 0's are not necessary in specifying dates.

  Google Earth Enterprise supports the creation and displaying of historical imagery that works just as the historical imagery in the Google Earth client.

- **Note:** You can decide whether to use the date you acquire the data, the date you import it into Google Earth Enterprise Fusion, or the actual date of the source image. Regardless of which method you use, it is best to adopt a consistent policy for all your resources to avoid confusion.

  Click each section of the date and enter the values. Alternatively, you can use the right and left arrow keys to move among the three parts of the date.

- **Provider**

  Select the source provider from the Provider drop-down list. The provider identifies the

source of the data and its copyright information in Google Earth EC.

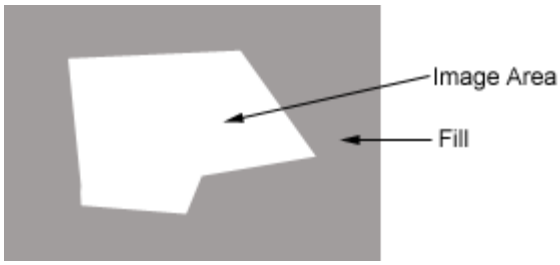
> **Note:** If you specify the same provider for multiple resources that end up appearing together in Google Earth EC, Google Earth EC will display the provider's name and copyright information only once.

The providers that appear on the list are defined in the Provider Manager. See Managing Data Providers in the **Setting Up Your Workspace** chapter for more information.

> **Tip:** If you create a single resource from multiple source files that you received from multiple providers, you can create a special entry in the Provider Manager that gives credit to all providers who contributed to that resource. For example, if you combine source files from USGS and i3 into one resource, you can use the Provider Manager to create a special provider called **USGS/i3**. In the copyright field, you can enter **Imagery © USGS 2005 and i3 2006**. When you define the resource, select **USGS/i3**.

- **Mask Options**

  When image data is captured, certain areas contain unusable data. This unusable data is called *fill*, since it exists simply to fill out the rest of the tile or tiles. Fill data is usually true black (0,0,0), true white (255,255,255), or a value close to one of those two values.

  Since the fill data contains no useful information, Google Earth Enterprise Fusion needs to *mask* the fill areas, allowing the underlying image layers (with usable data) to show through. You can create a mask for a given area yourself, or you can allow Google Earth Enterprise Fusion to create a mask for the fill area automatically. The Auto Mask feature is sufficient in most cases.

  If you create a mask yourself, it must either be of the same file format as the original image file, or it must be a TIFF file. See Creating Custom Masks for more information.

  If you select **Auto Mask** for an image, you can set some options to adjust the mask you create. The values you can adjust are described in the following sections.

  Select the mask type from the Mask Type drop-down list.

  - **Auto Mask** (the default)

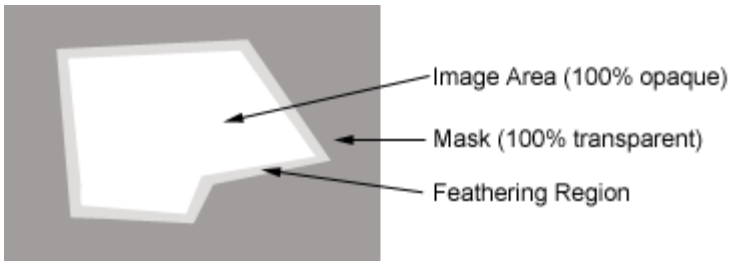
    In most situations, particularly when you are creating a mosaic from contiguous source imagery, the **Auto Mask** setting is the best choice. For example, if you have four square contiguous pieces of imagery that are bounded by land on all sides, you would likely select **Auto Mask**. The Auto Mask function automatically uses a fill value based on the colors in the four corners of the source imagery to create the mask.

    If you select **Auto Mask**, you can set the following options:

    - **Feather**

      The feathering value allows you to provide a smooth transition between the image (usable) data and the fill (unusable) data. You use the feathering option to define a blending region between the actual image and the transparent mask.

      At the edge of the feather area closest to the image, 100 percent of the image area is visible. From this point to the edge of the mask, the transparency of the image increases and its opacity decreases. At the same time, the opacity of the mask increases and its transparency decreases. At the edge of the feather area closest to the mask, the image value is 100 percent transparent, and the underlying imagery shows through completely.



The default feather value is **100** pixels. If the default feather value results in masking out too much data, you can specify a lower value (that is, a narrower band of blending) and experiment with the results. However, if you specify a value that is too low, you could create sharp edges between insets, possibly even leaving black lines between insets. See Defining Terrain Resources for more information. See also the **Tutorial** for an example.

- **Band**

  Use this option to indicate which channel to use when generating the mask (**Red**, **Green**, or **Blue**). Typically, **green** provides the best contrast between Earth data and no data and is, consequently, the default. However, some data works best when the blue channel is used for mask selection.

- **Tolerance**

  Tolerance specifies the color range for mask selection. The default tolerance is **0**, which is adequate for many fill colors that are pure black or pure white. However, when data is compressed and uncompressed, it is sometimes modified slightly. Although these modifications are imperceptible to the human eye, a computer can detect them. A fill pixel with an original value of (0,0,0), for example, might decompress to a value of (0,1,0).

  If you want to ignore slight variations in fill color values, you can specify a tolerance value, which represents the amount of variation from true black or true white that Google Earth Enterprise Fusion ignores when it creates the Auto Mask. Typically, a setting of 1 or 2 is adequate.

- **Hole Size**

  Use this option if you have fill regions inside the boundaries of your imagery data. The default setting for hole size is **0**, which is off.

  The hole size indicates the number of contiguous pixels Google Earth Enterprise Fusion uses when matching any color region inside your imagery with the same value specified as your fill. For example, if you set the Hole Size value to 100 and the imagery has a block of pixels that is 100 or more pixels in width or height with the same color as one of the corners (fill value), Google Earth Enterprise Fusion treats that area as a *hole* in the data and applies the mask to it. The end result is that whatever data is under the masked data shows through.

  Be aware that if you use the hole-checking feature, there are trade-offs that can dramatically increase the time it takes to generate a mask, including:

  - Images photographed late in the day often contain shadows that look like holes.
  - If the specified hole size is too small, it could slow performance.
  - If the specified hole size is too large, medium-sized holes could be overlooked.

    Specifying an appropriate hole size involves some familiarity with the actual data.

- **Fill White**

  Fill data is usually indicated by areas of black pixels, so the default fill color is black (0,0,0). If you know that the vendor has used white (255,255,255) as well as black as a fill color, be sure to check the **Fill White** box when you import the imagery. Checking this box allows both black and white to be considered as fill

data when the Auto Mask is created. The following image is an example of source imagery with both black and white fill data.

- **No Data**

  Use this option to specify the pixel value for NoData in the terrain data (the pixel values to include in the mask). Multiple values may be specified in this field, including ranges (two numbers separated by a colon ":") and individual values. For example, `-99999:0` is the default which will mask any pixel value from `-99999` through `0`, inclusive. The values `-99999` and `0` alone, can be masked by using `-99999, 0` instead of `-99999:0`. Alternatively, `'-99999:-32768, 32768:999999'` means mask pixel values `-99999` through `-32768` and `32768` through `999999`.

- **Have Mask**

  Select **Have Mask** if you have a corresponding alpha mask or file for your source. (See Creating Custom Masks for details about creating your own custom masks.) Google Earth Enterprise Fusion automatically applies the mask file to the source file. The mask for your input must be located in the same folder as the source file, and the file name must match the name of the source file with `-mask` appended. For example, if your source file is called `NewYork.tif`, its mask file must be named `NewYork-mask.tif`.

  You might select the **Have Mask** option in a situation where your source file imagery is bounded by water, and a significant portion of the image is water. In that case, you would likely create a mask by hand in order to preserve the high-resolution detail around your shoreline while masking the water imagery.

  If you are creating a resource from multiple imagery source files, you cannot select **Have Mask** as the mask setting value.

- **No Mask**

  Select **No Mask** only for base map imagery that extends to the entire database, such as the NASA Blue Marble imagery.

- **Mosaic Options**

  The simplest way to import source data is to create one resource from each data file. In some cases, though, it is actually necessary or just more efficient to import multiple source images into a single resource, called a *mosaic*. To create a mosaic, the source images must meet the following requirements:

  - Source images must be in the same projection and use the same coordinate system.
  - Source images must have the same resolution.
  - Source images must have geographic proximity to each other.
  - There should be no gaps between the individual source images.

Use the Mosaic Options area for setting the tile fill values and fill tolerance for fill areas of overlapping imagery tiles. These options are available only when you import more than one imagery file.

> **Note:** This process of recombining images that were artificially split is the only intended use for combining multiple imagery source files into a single resource. It is not a general purpose, multi-resolution mosaic tool.

- **Tile Fill**

  When there is an overlap between the tiles, the pixels in the top tile obscure the pixels in lower tiles. To expose the pixel beneath the top tile, you specify the color to make transparent.

  > **Note:** The Tile Fill setting makes the specified pixels *transparent*. Masking *blocks* the specified pixels. Both methods, however, define the pixels to be maintained and the pixels that show through.

  For example:

  - If the top pixel is black and you want to expose the pixels beneath it (on a lower tile in the stack), select **Black** to make transparent.
  - If the top pixel is white and you want to expose the pixels beneath it, select **White** to make transparent.
  - If the top pixel is a color other than black or white and you want to expose the pixels beneath it, select **Other**. The Select Color dialog appears, and you can select the desired color to make transparent.
  - If you select **None**, Google Earth Enterprise Fusion applies no tile fill to the adjacent imagery. That is, any overlapping pixels in the top tile obscure the pixels in the tile beneath it.

  > **Note:** Google Earth Enterprise Fusion applies the Tile Fill setting and other mosaic-related settings to the imagery to create a single larger image before it applies the mask. Any fill value you set here has no impact on the mask you use for the entire image.

- **Fill Tolerance**

  The tolerance setting functions just as it does for fill values on the Auto Mask. See Tolerance under the **Auto Mask** bullet above.

- **Source Files**

The Source Files list displays the names of the source files selected for this resource. Click **Add** to add a source file. See Adding a Source File to a Resource for more information.

> **Note:** You can select one or more source files to create a single resource, such as an imagery mosaic or a vector composite. If you use more than one source data file for a single resource, all of the source data must have the same projection and attribute values.
>
> Google Earth Enterprise Fusion does not allow you to import raw imagery source files larger than 80 GB. (Raw size = number of pixels width * number of pixels height * 3.) Therefore, if you have an imagery source file that is larger than 80GB, you can create two or more source files using the `gesplitkhvr` command. (See gesplitkhvr in the **Command Line Reference** chapter for details.)

Defining Terrain Resources

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Click  . The **Terrain Resource Editor** appears.
3. Define the properties of the imagery resource as described in the next section, Define Terrain Properties.
4. When you finish defining the properties for the resource, select **Save** from the File menu.

   The first time you save a new resource, the Save dialog appears. Navigate to the folder

where you want to save the resource, provide a unique name for it, and click **Save**.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

When you finish defining each resource, you can build it individually or build several resources at the same time.

Define Terrain Properties

Use the Terrain Resource Editor to define the following properties:

- **Acquisition Date**

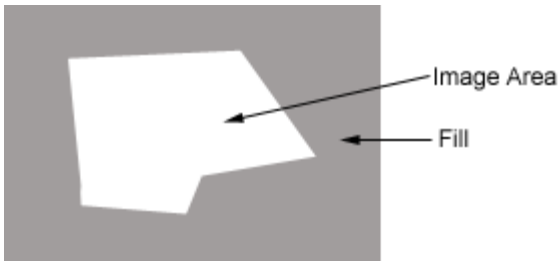
  The acquisition date appears in year-month-day format.

  Note: You can decide whether to use the date you acquire the data, the date you import it into Google Earth Enterprise Fusion, or the actual date of the source image. Regardless of which method you use, it is best to adopt a consistent policy for all your resources to avoid confusion.

  Click each section of the date and enter the values. Alternatively, you can use the right and left arrow keys to move among the three parts of the date.

- **Mask Options**

  When terrain data is captured, certain areas contain unusable data. This unusable data is called *fill*, since it exists simply to fill out the rest of the tile or tiles.

  Since the fill data contains no useful information, Google Earth Enterprise Fusion needs to *mask* the fill areas, allowing the underlying terrain layers (with usable data) to show through. You can create a mask for a given area yourself, or you can allow Google Earth Enterprise Fusion to create a mask for the fill area automatically. The Auto Mask feature is sufficient in most cases.

  If you create a mask yourself, it must either be of the same file format as the original image file, or it must be a TIFF file. See Creating Custom Masks in the chapter titled **Creating Your Own Source Data, Icons, and Masks** for more information.

  If you select **Auto Mask** for terrain data, you can set some options to adjust the mask you create. The values you can adjust are described in the following sections.

  Select the mask type from the Mask Type drop-down list.

  - **Auto Mask** (the default)

    In most situations, particularly when you are creating a mosaic from contiguous terrain source data, the **Auto Mask** setting is the best choice. The Auto Mask function automatically uses a fill value based on the elevation value in the four corners of the source terrain to create the mask.

    If you select **Auto Mask**, you can set the following options:

    - **Feather**

      Feathering blends the edges of your terrain tile into adjacent areas for a smoother transition. The default feather value for Auto Mask is **100** pixels, but you can adjust it for a wider or narrower margin, if desired. See Defining Imagery Resources for

more details about feathering.

- **Hole Size**

  Use this option if you have masked regions inside the boundaries of your terrain data. The default setting for hole size is **0**, which is off. See Defining Imagery Resources for more details about hole size.

- **No Data**

  Use this option to specify the pixel value for NoData in the terrain data (the pixel values to include in the mask). Multiple values may be specified in this field, including ranges (two numbers separated by a colon ":") and individual values. For example, `-99999:0` is the default which will mask any pixel value from `-99999` through `0`, inclusive. The values `-99999` and `0` alone, can be masked by using `-99999, 0` instead of `-99999:0`. Alternatively, `'-99999:-32768, 32768:999999'` means mask pixel values `-99999` through `-32768` and `32768` through `999999`.

- **Have Mask**

  Select **Have Mask** if you have a corresponding alpha mask or file for your source. Google Earth Enterprise Fusion automatically applies the mask file to the source file. The mask for your input must be located in the same folder as the source file, and the file name must match the name of the source file with `-mask` appended. For example, if your source file is called `NewYork.tif`, its mask file must be named `NewYork-mask.tif`.

  You might select the **Have Mask** option in a situation where your terrain data is bounded by water, and a significant portion of the terrain is water. In that case, you would likely create a mask by hand in order to avoid processing the water data.

  If you are creating a resource from multiple terrain source files, you cannot select **Have Mask** as the mask setting value.

- **No Mask**

  Select **No Mask** only for base map terrain that extends to the entire database, such as the `gtopo30_4km` terrain data.

- **Mosaic Options**

  The simplest way to import source data is to create one resource from each data file. In some cases, though, it is actually necessary or just more efficient to import multiple source files into a single resource, called a *mosaic*. See **Mosaic Options** in Defining Imagery Resources for details.

  - **Tile Fill**

    When there is an overlap between the tiles, the pixels in the top tile obscure the elevation samples in lower tiles. To expose the elevation samples beneath the top tile, you specify the elevation value to make transparent.

    > **Note:** The Tile Fill setting makes the specified pixels *transparent*. Masking *blocks* the specified pixels. Both methods, however, define the pixels to be maintained and the pixels that show through.

    For example:

    - If you want to expose the pixels beneath the overlap, select **Other**. The Custom Mosaic Fill Color dialog appears, and you can enter the desired elevation to make transparent.
    - You can specify negative values so that NoData pixels are excluded from terrain mosaics. Setting the value to -9999 directs Fusion to exclude pixels with value -9999 from the merged mosaic during Fusion terrain resource import.
    - If you select **None**, Google Earth Enterprise Fusion applies no tile fill to the adjacent terrain. That is, any overlapping pixels in the top tile obscure the pixels in the tile beneath it.

      > **Note:** 1.Google Earth Enterprise Fusion applies the Tile Fill setting and other mosaic-related settings to the terrain to create a single larger image before it applies the mask. Any fill value you set here has no impact on the mask you

use for the entire image.

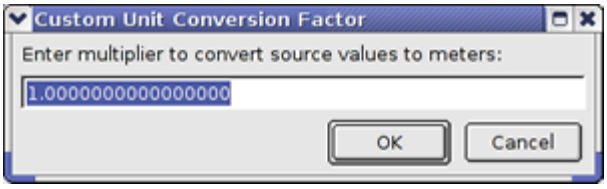
- **Fill Tolerance**

  The tolerance setting functions just as it does for fill values on the Auto Mask. The default tolerance is **0**, which is adequate for most terrain data. However, you can adjust the tolerance to compensate for any possible loss in precision. Typically, a setting of 1 or 2 is the highest tolerance value required.

- **Elevation Units**

  Google Earth Enterprise Fusion interprets elevation in meters, so the default selection for this option is **Meters**.

  - If the unit of measure for elevation in your source data is feet, select either **Feet (International)** or **Feet (US Survey)**, whichever applies. Google Earth Enterprise Fusion converts the feet data to its metric equivalent.
  - If you select **Other**, the Custom Unit Conversion Factor dialog appears.



  Enter the multiplier for Google Earth Enterprise Fusion to use when it converts the data to its metric equivalent. When you click **OK**, the number you enter here appears as the Elevation Units value.

- **Set Negative Elevation to 0 (Preview Feature)** : Resets all negative elevation values in the source files to zero during resource import. This option must be unchecked to import and use negative elevation data. This option can be checked for positive and negative elevation datasets. This option is checked by default for any resources that were originally imported with Fusion 3.0.x or earlier, to preserve the original behavior of those resources.
- **Source Files**

  The Source Files list displays the names of the source files selected for this resource. Click **Add** to add a source file. See Adding a Source File to a Resource for more information.

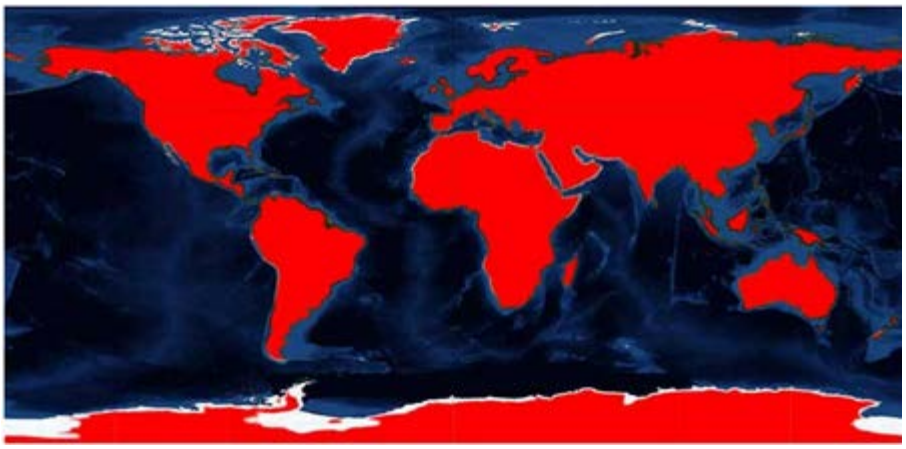
> **Note:** You can select one or more source files to create a single resource, such as an terrain mosaic or a vector composite. If you use more than one source data file for a single resource, all of the source data must have the same projection and attribute values.

Using Negative Elevation Terrain Resources

By using negative elevation resources, you can build elevation models for the world sea floors, lake beds, and below sea surface locations (Death Valley, CA) along with positive value terrain data for land masses. Properly importing negative elevation terrain requires additional data preparation, however, the end-to-end data workflow is the same for importing terrain resources and building terrain projects.

Previous versions of Fusion Pro would impose an artificial elevation floor value of 0 to any data sets with negative elevation values. This restriction was enforced because the Google Earth Enterprise Client (EC) could not display negative elevations. The Google Earth Enterprise Client software can display negative elevation models, as of version 5.0, and the Fusion artificial elevation ‘floor’ is no longer imposed. Data users can build terrain models with only positive values only – if no negative elevation terrain is available – or build terrain models with both positive and negative elevation data.

In the following example, a terrain project is built from the GTOPO world terrain dataset (1-kilometer resolution). It includes positive elevation values for land, a NoData value of -9999, a pixel value of 0 for the oceans and lakes, and a world-wide bathymetric terrain dataset with a NoData value of -9999 for all pixels out of the oceans and on the land. The entire globe has terrain coverage:



Importing Preprocessed Resources

If you purchase preprocessed data from Google or receive preprocessed data from another Google Earth Enterprise Fusion user, it arrives as a complementary pair of folders. These folders share the same name but have different extensions. Folders with a `.kip` extension are imagery data. Folders with a `.ktp` extension are terrain data. Folders with a `.kmp` extension are mask files.

You must use the Google Earth Enterprise Fusion shell commands to add preprocessed data to your asset root. See Importing Preprocessed Resources in the **Command Line Reference** chapter for complete details.

Modifying Resources

After you create any type of resource, you can use the Asset Manager to modify it in any of the following ways:

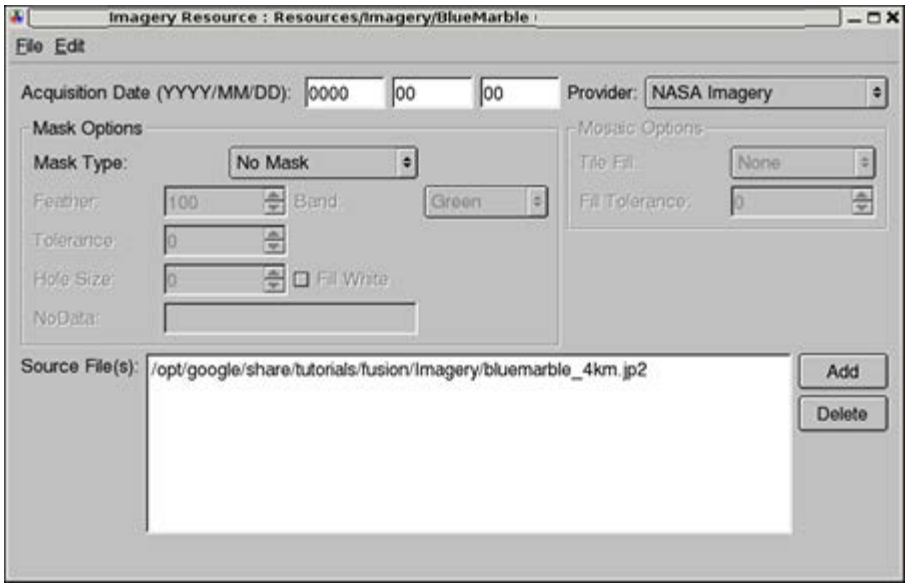
- Associate a newer version of the original source data file, if it changes.
- Add another source file.
- Delete a previously associated source file.
- Modify the resource's properties, such as its fill value or mask settings.
- Hide the resource so it does not appear in the Asset Manager unless the **Show hidden resources** check box is selected. With this feature, you can "turn off" resources you do not need to display regularly, such as those that are incorrectly named.

Note: When you save a modified resource, Google Earth Enterprise Fusion replaces the old resource definition with the new one. When you build that new resource, Google Earth Enterprise Fusion creates a new version. When you select a resource to include in a project, it is always the latest version of the resource. However, your modifications to a resource have no effect on earlier versions of that resource that were previously built into a database.

To modify an existing resource:

1. Right-click the name of the resource you want to redefine in the Asset Manager, and select **Modify** from the context menu (or double-click the name of the resource).

   The Resource Editor for that resource type displays all of the current settings.



2. Make the appropriate modifications.

   See the section on defining Vector, Imagery, or Terrain resources for details about each option.

   If one or more source files have changed since you last saved the resource, a message at the bottom of this dialog informs you that the original source files have changed on disk. You do not have to change anything to take advantage of the updated source files; Google Earth Enterprise Fusion automatically includes any updated source files when you save the resource.

3. When you finish modifying the settings for the resource, select **File > Save**.

   Google Earth Enterprise Fusion saves the resource in the same place with the same name. If you have already built the resource, you must rebuild it after making changes.

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Defining Projects

Overview

This chapter describes all of the tasks necessary to define and build projects with Google Earth Enterprise Fusion. It includes information about vector, terrain, and imagery projects. For information about Google Maps projects, see the chapter titled Defining a Map Project.

The purpose of creating projects is to specify the resources you want to display, the order in which you want to display them, and, for vector projects, the display properties for each resource.

Google Earth Enterprise Fusion supports four types of projects:

- Vector projects
- Imagery projects
- Terrain projects
- Map vector projects (covered in the Defining a Map Project chapter)

Defining Vector Projects

Within each type of project, you can add multiple resources of the same type. Each resource within a project is identified as a *layer*.

You can assign related layers to a layer group, which allows Google Earth EC users to turn on and off the entire group at the same time. See the Working with Vector Layer Groups section of this chapter for more information.

For vector projects, the name of each layer appears in the Layer panel of Google Earth EC (outlined in red in the following graphic). You can use simple HTML codes in the layer names to display special designations.

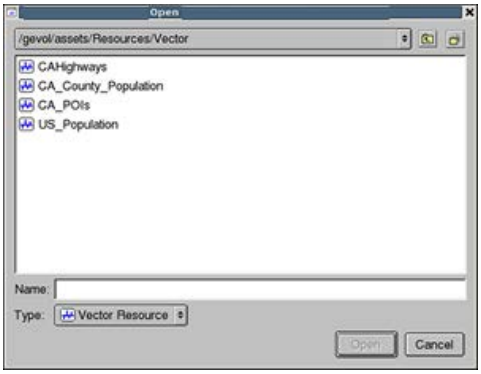
The most effective way to create valuable vector data is to apply specific display rules to each layer. A display rule determines exactly which features of the layer are displayed and how Google Earth displays them. For more information on display rules for vector resources, refer to the Configuring Display Rules section of this chapter.

Creating a Vector Project

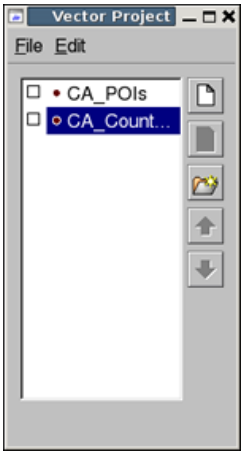
The first step in defining a vector project is to specify which resources to include and give the project a name.

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Click  to open the Vector Project Editor.
3. Click  . The Open dialog appears.
4. Navigate to the folder that contains your vector resources.

   Note: The selection in the Type drop-down list near the bottom of this dialog determines the type of resources that appear on the list. Vector Resource is automatically selected when you open this dialog from the Vector Project Editor, so only vector resources appear on the list.
5. Select the resource you want to add to the project, and click **Open**.

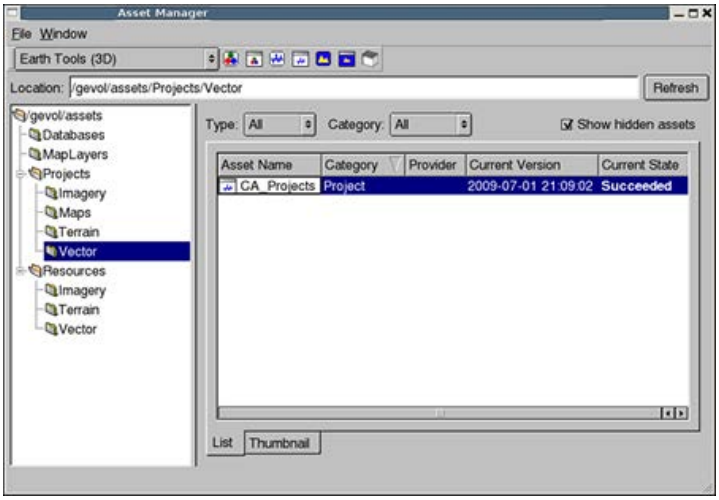


The selected resource appears in the Vector Project Editor.



6. Check the box next to the resource, if you want to view it in the Preview pane. When a resource's preview box is checked, you can right-click the resource and select **Zoom to Layer** to zoom in on that resource.
7. Repeat the previous steps for each additional resource you want to include in the project.
8. To finish adding resources, select **File > Save**.
9. Navigate to the folder where you want to save your project, or click  to create a new folder in the desired location.
10. Enter the name of your project, and click **Save**.

    The new project name appears in the Asset Manager's asset list.



Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

The following sections describe the many ways that you can modify the layers in your project to customize it. When you finish modifying each project, you can build it individually, build several projects at the same time, or wait until you build your database to build all of its projects at the same time. See the chapter on Building Assets for complete details.

When you modify and then save a project, Google Earth Enterprise Fusion saves it in the same place with the same name as the original. If you modify a project that you have already built, you can rebuild it now or include it when you build the associated database.

Working with Layers in Vector Projects

After you create a vector project, you can add, remove, skip, or change the order of its layers.

Note: You must rebuild the project before the changes appear in the Preview pane.

When you add layers to your project, they appear in the order in which you added them. The order in which they appear in the Vector Project Editor determines the order in which they appear in the Layers panel of Google Earth EC. You can rearrange them in the Vector Project Editor, if you want them to appear in a different order in Google Earth EC.

Modifying layers in a vector project

1. In the Asset Manager, double-click the name of the project in which you want to modify layers. The Vector Project Editor displays the list of layers included in the project.
2. Perform the desired procedure(s) below.
3. Select **File > Save**. Google Earth Enterprise Fusion saves your changes to the project, using the same project name.

Adding layers to a project

Follow steps **3** through **5** in Creating a Vector Project for each layer you want to add to the project.

Skipping a layer in a project

In the Vector Project Editor, right-click the layer you want to skip, and select **Skip Layer**. The selected layer appears with a strike-through.

Skipping a layer temporarily excludes it from the build. To include the skipped layer in a later build, right-click the layer and select **Don't Skip Layer**.

Removing layers from a project

In the Vector Project Editor, select the layer to remove and click  .

Alternatively, right-click the layer and select **Remove Layer** from the context menu.

Reordering layers in a project

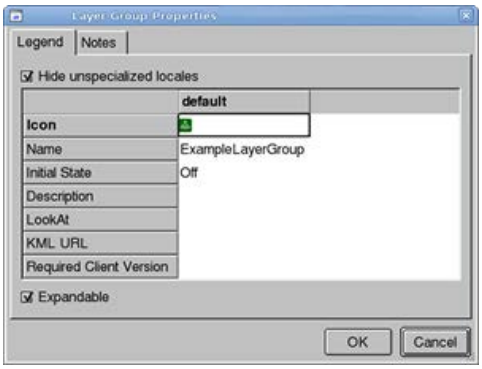
1. Select the layer to move.
2. Click  or  to move the selected layer to the desired position on the list.
   (Or, right-click the layer and select **Move Layer Up** or **Move Layer Down** from the context menu.)
3. Repeat these steps until the layers are in the order in which you want them to appear in the Layers panel of Google Earth EC.

Working with Vector Layer Groups

When creating vector projects, you can group layers together so they appear in a folder in the Layers panel in Google Earth EC. For example, you might have one vector layer that contains all the commuter rail lines for a given area and another vector layer that contains all the commuter rail station points for that area. You can place both layers in a folder named **Transit - Rail Lines**.

When you publish the database, a single folder named **Transit - Rail Lines** appears in the Layers panel in Google Earth EC. When a Google Earth EC user expands that folder, both the commuter rail line and the commuter rail station layers appear within it. In Google Earth EC, users can view the individual layers by turning them on or off individually.

If you would prefer a layer group to behave as a single layer, rather than as individual layers, deselect the **Expandable** checkbox in the **Layer Group Properties** dialog.



Creating a Layer Group

1. In the Vector Project Editor, click  . The **New Layer Group** dialog appears.
2. Enter a unique name for the layer group folder that allows it to be easily identified by users. The name you enter here appears as the layer group name in Google Earth EC.
3. Click **OK**. The name of the layer group folder appears in the Vector Project Editor.
4. Drag and drop the layers you want to add over the layer group folder. Once the first layer is added to the group, the layer group folder expands to display its layers.

Removing a Layer from a Layer Group

Right-click the layer to delete and select **Take Layer Out of Group**.

Alternatively, drag the layer to be deleted to the white space below the layer group folder. The layer appears below the list.

Configuring Layer Properties

After you add vector-based layers to your project, you can customize the layers to determine how the layer list (or *legend*) appears in Google Earth EC. This applies to layer groups as well as to individual layers.

You can view the layer properties for a resource in a project by right-clicking the layer name in the Vector Project Editor and selecting **Layer Properties** from the context menu.

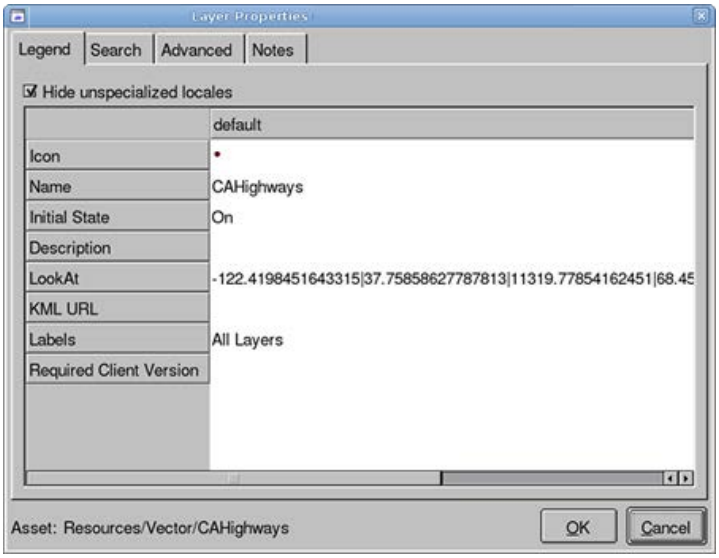
The Layer Properties dialog contains four tabs:

- **Legend**
- **Search**
- **Advanced**
- **Notes**

The following sections describe each tab.

Legend Tab

The **Legend** tab displays the selected layer's properties.



When you first open this dialog for a new layer, only the default locale and its values appear, and the box next to **Hide unspecialized locales** is checked. Google Earth EC uses the default locale settings when you do not specify different settings here for a user's locale (as specified in the user's operating system). See the section on Locale-specific Values below for information on setting property values for individual locales.

The property values available for each locale are:

- **Icon**

  The icon that appears next to the name of the layer in the Layers panel of Google Earth EC. You can select a different icon for the layer by clicking the value in the Icon column and then selecting a new icon from the Icons dialog.

  > **Note:** You can use the Icon Manager to create more icons. See Managing Icons in the **Setting Up Your Workspace** chapter for more information.

- **Name**

  The name of the layer displayed in the Layers panel of Google Earth EC. You can change the name of the layer by clicking the value in the Name column and changing it to a name that makes it easier for users to identify the layer.

- **Initial State**

  Determines whether the layer is turned on or off by default in Google Earth EC. The first time a user connects to the database containing this layer:

  - If you select **On** as the default state here, the check box for the layer is automatically checked.
  - If you select **Off** as the default state here, the check box for the layer is automatically unchecked.

  Google Earth EC saves the state of the check box when a user disconnects from the database. For example, if you set the initial default state to **Off**, and then a user subsequently checks the box for a layer in Google Earth EC and then disconnects from the database, the next time that user connects to that database, the state of the check box for that layer is the same as when the user disconnected; that is, the box is checked.

  > **Caution:** If you select **On** as the default state for the layer, be aware of the performance impact on Google Earth EC. If a user selects too many layers simultaneously in Google Earth EC, it can seriously impact performance. So it is best not to turn on too many layers at the same time. In most situations, setting the default state to **Off** is the best choice.

- **LookAt**

  Allows you to specify a camera view by selecting a KML/KMZ file that includes a LookAt element. If you specify a KML/KMZ file in this field, Google Earth EC users can fly directly to the specified camera view by double-clicking the layer.

  1. In Google Earth EC, set the desired camera view (tilt, pan, and zoom), create a placemark, and then save the placemark. (Refer to the Google Earth EC documentation for help with this step, if necessary.)
  2. Copy the resulting KML/KMZ file to the workstation where you run Google Earth Enterprise Fusion.
  3. Click the **LookAt** field for the desired locale. The Open dialog appears.
  4. Navigate to the folder containing the KML/KMZ file, select it, and click **Open**. The content of the KML/KMZ file (a series of numbers) appears in the **LookAt** field.

     When Google Earth EC users double-click the name of this layer, Google Earth EC flies to the camera view of the placemark defined in that file.

- **KML URL**

  Allows you to specify a KML/KMZ file for this layer. (The KML/KMZ file must be hosted on a local or remote server.)

  > **Caution:** If you specify a KML/KMZ file in this field, the content of the KML/KMZ file replaces the resource for which it is defined. So if you intend to specify a KML URL, include the simplest possible “dummy” resource (very small source file) in the project instead of a resource you actually want to display in Google Earth EC.

- **Labels**

  Defines which labels apply to this layer. You can create labels using the Label Manager.

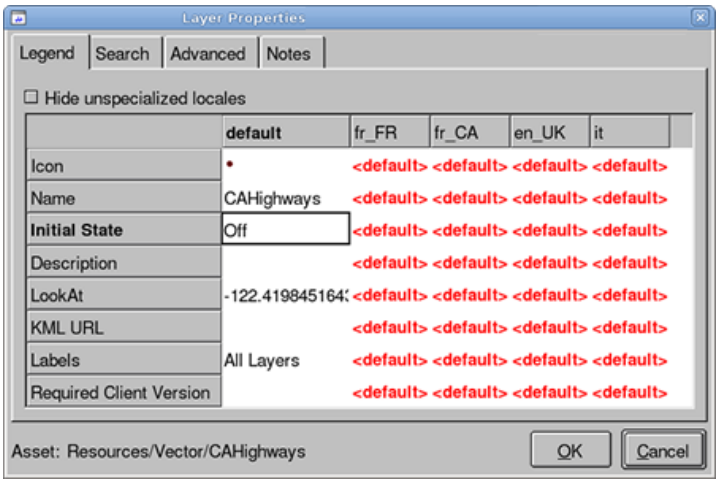
- **Required Client Version**

  (Optional) Indicates specific versions of Google Earth that the layer will support. For example:

  - `5.0.11733` indicates that the layer is included if the Google Earth client version is 5.0.11733 or newer.
  - `5.0.11733-4.0.2291` indicates that the layer is included if the Google Earth client version is between versions 4.0.2291 and 5.0.11733.
  - `-4.0.2291` excludes the layer if the Google Earth client version is 4.0.2291 or earlier.

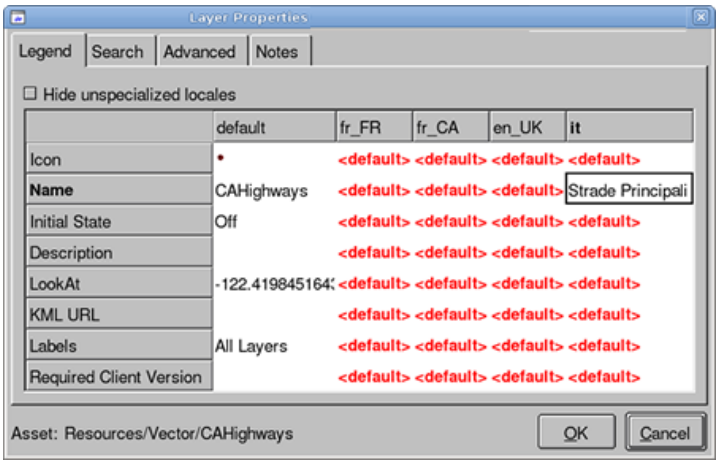
Locale-specific Values

If you uncheck the box next to **Hide unspecialized locales**, all of the locales that you created with the Locale Manager appear in the table.

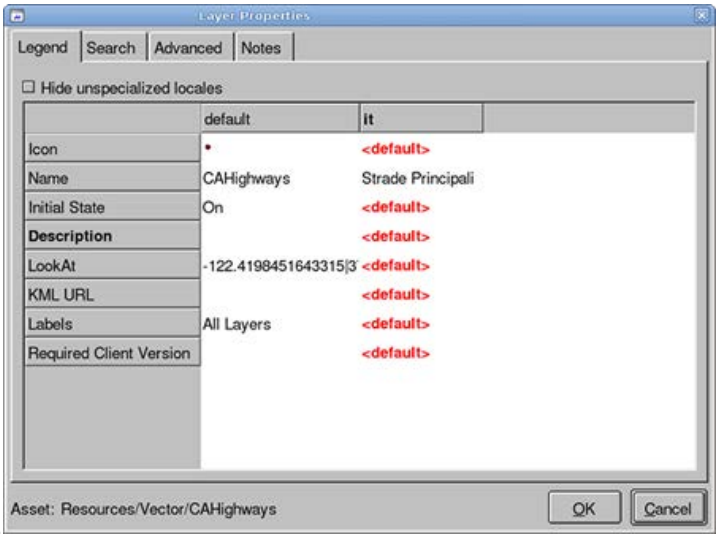


All of the values for non-default locales are set to the default values unless you change them. That means that regardless of which locale a user selects in Google Earth EC, the default values appear.

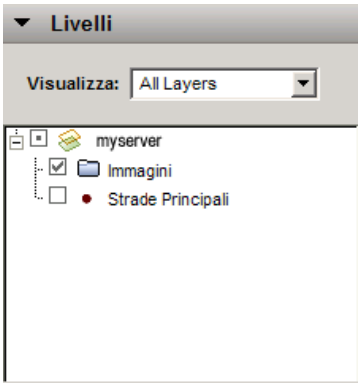
To change the value of a field for a specific locale, click the locale in the top row of the table. Click its field, and change the value. Some fields contain a drop-down menu, and some allow you to enter free-form text. For example, to support the Italian locale, enter values for the fields under **it**:



If Italy is the only locale for which you want to specify values other than the defaults, you can unclutter this dialog by checking the box next to **Hide unspecialized locales**. This hides the locales where no specialized values are defined and displays only the **default** and **it** columns.

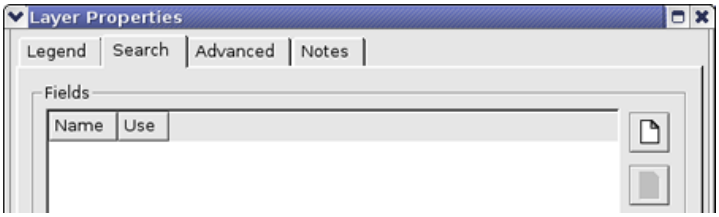


Continuing with this example, when a Google Earth EC user selects Italy as their locale, Google Earth EC displays the values listed under **it**.



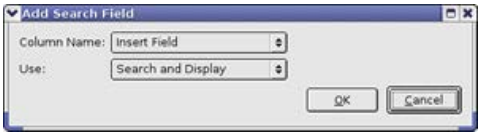
Search Tab

The Search tab allows you to specify one or more fields in the source data on which users can search. When you select one or more search fields on this tab of the Layer Properties dialog, a search tab appears in Google Earth EC that allows users to search for data in the selected field(s).



Adding Search Fields

1. Click  The **Add Search Field** dialog appears.



2. Select the desired field from the **Column Name** drop-down list.
3. Select an option from the **Use** drop-down list:
   - **Search Only** - Google Earth EC searches against the selected field but does not display the results.
   - **Display Only** - Google Earth EC displays the values of the selected field in the results but does not search against the selected field.
   - **Search and Display** - Google Earth EC searches against the selected field and displays the results.

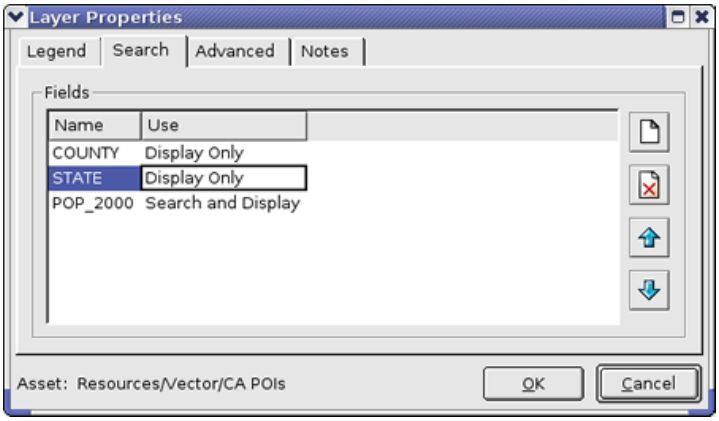
     For example, if you have a database of trees that includes the common names of the trees and their ages, you could set up a search of all trees with a particular name and display their ages and locations. To do so, you would:

   - Select the **NAME** field and select **Search Only**.
   - Select the **LOCATION** field and select **Display Only**.
   - Select the **AGE** field and select **Display Only**.

     In Google Earth EC, users could then enter **oak** as the search term, and the results would be the names and locations of all oak trees in the database. If the user enters **elm**, the results would be the names and locations of all **elm** trees in the database.

     Note: This is currently an exact search, which means that the Google Earth EC user must enter the value exactly as it appears in the database. In the example described above, if the user enters **oak**, the search results would include only trees listed as “oak”, not trees listed as “California live oak” or “cork oak”.
4. Repeat the steps above for each additional field you want to add to the search.

   Your selections appear on the list of search fields on the **Search** tab in the order in which you added them:



The order in which the fields appear on this list is the order in which they appear in the description balloon in Google Earth EC. (The fields designated as **Search Only** do not affect the order in which the fields to be displayed appear.) In this case, the description balloon for a POI might look like:

Click  or  to move the fields up or down in the list to change the order in which they appear in Google Earth EC.

When you finish defining all of the layer properties, click **OK**. The **Search Tab Properties** fields appear at the bottom of the Vector Project Editor.

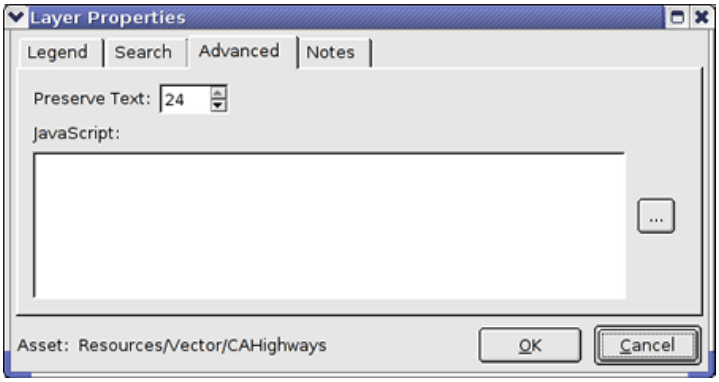
You can modify the **Tab Label** and **Search Field Label** values to names that suit your search.

Note: Google Earth Enterprise Fusion combines all of the fields you select for all of the layers in a project into one search tab with one search field label. If you want more flexibility or control over your search tabs, use the **Search Framework API** to create plug-ins, and then reference those plug-ins when you create search tabs with the Search tab Manager.

If you delete all of the search fields from the Layer Properties dialog, the **Tab Label** and **Search Field Label** fields disappear from the Vector Project Editor. If you ever add search fields to this project again, these fields reappear with the most recent values you provided.

Advanced Tab

The **Advanced** tab allows you to specify additional text-related options for the layer.



Preserve Text

You can specify the level at which you want to preserve text labels on roads after the vector data for the road itself fades away. This feature is typically useful when a Google Earth EC user zooms in close enough to see the roads in the image, so it is no longer necessary to draw the road vector. However, it is still useful to see the name of the street.

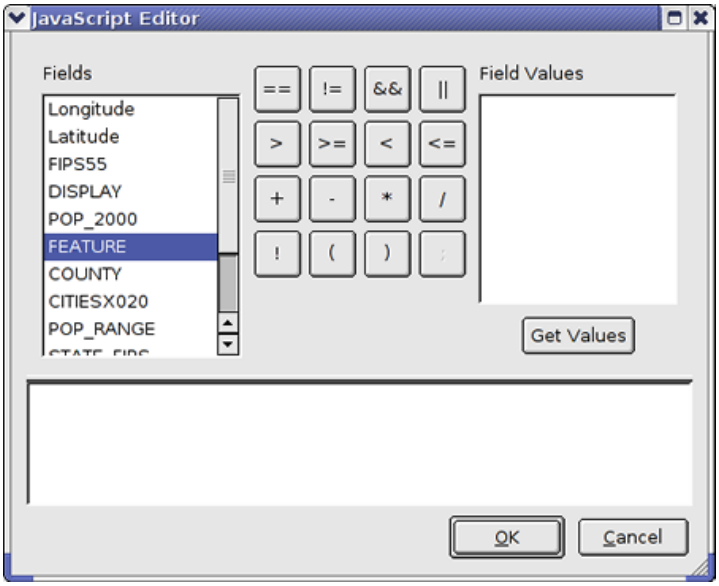
To specify the correct value:

1. Create a road layer, set the desired styles and levels of detail, and build it.
2. Open the build log for that layer:
   - In the **Asset Manager**, double-click the value in the **Current State** column for the desired vector project.
   - Expand the **CHILD: VectorLayer** subtype for the desired layer. (If you do not know which layer is which, expand all of the **CHILD: VectorLayer** subtypes, and look at the **INPUT: Resource** values.)
   - Click  next to **CHILD: VectorFuse** for the desired layer.
3. Locate the last line in the build log that starts with `Begin export of level x`. The value of *x* is the last level at which vector lines are displayed.
4. Go back to the **Advanced** tab of the **Layer Properties** dialog.
5. In the **Preserve Text** field, specify the last display level value indicated in the build log.

   Note: This setting affects roads only.

JavaScript

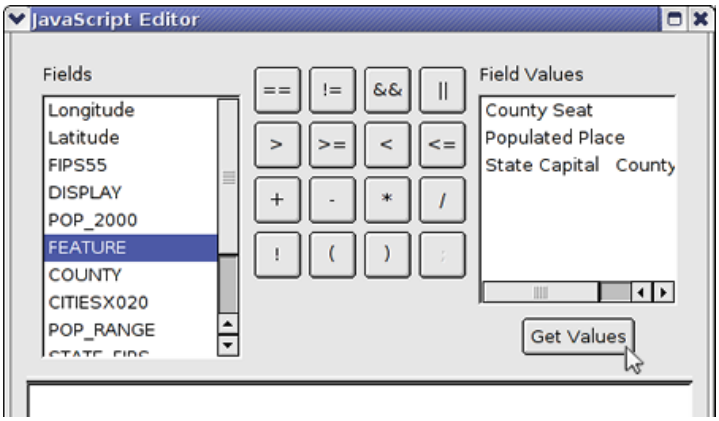
The JavaScript Editor allows you to create JavaScript functions. Click the insertion button (**...**) to the right of the empty text field to display the JavaScript Editor.



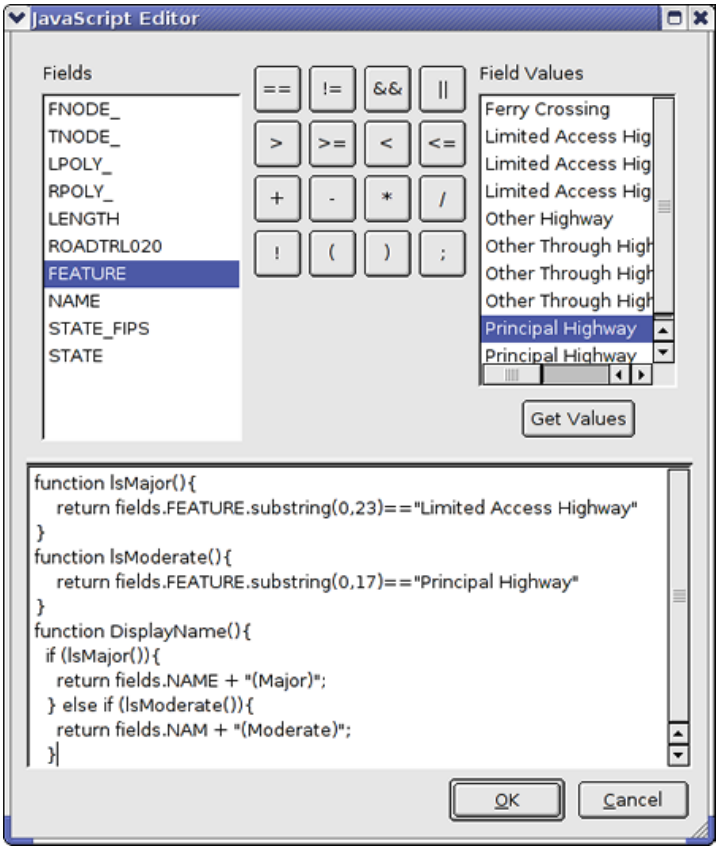
Note: You need to be somewhat familiar with JavaScript to use the JavaScript Editor. You can use all of the standard JavaScript functions or objects that you would use in a JavaScript-enabled web page with the exception of `window`, `document`, `browser`, and so on.

Select a field (or function, if you have created any) on the left, and click **Get Values** to display the values of that field for the selected data set in the **Field Values** list on the right.

Tip: If your data set is very large, it can take a long time to find all of the values. In that case, a progress dialog appears showing you an ongoing count of how many values it has found. You can click **Cancel** on that dialog at any time to stop scanning your source file for unique values and populate the **Field Values** list with the unique values found so far. Typically, it stops finding unique values part way through the file. So when the counter virtually stops, that is a good time to click **Cancel** without concern that you might be missing some unique values.

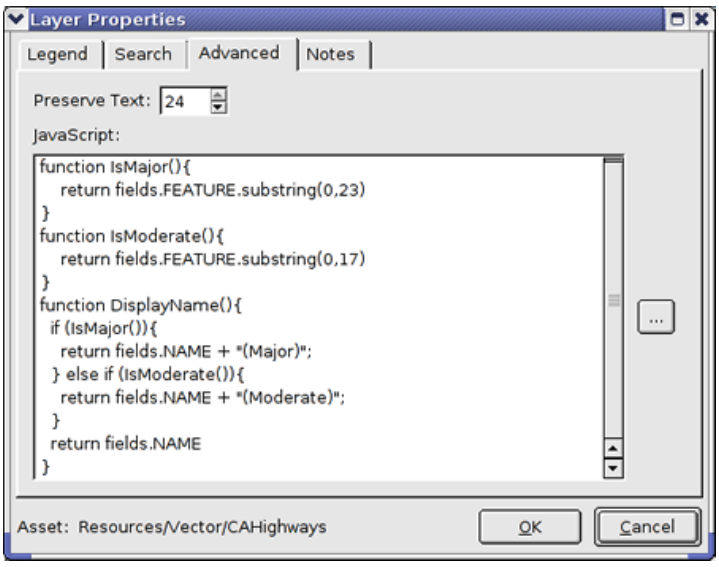


Use the buttons in this dialog to help you write your JavaScript functions.



The functions you create here become available in the other JavaScript Editors, where you are defining label strings or filter expressions for the current layer.

When you finish creating your JavaScript functions, click **OK**. The functions appear in the **JavaScript** field on the **Advanced** tab of the **Layer Properties** dialog.



Notes Tab

The **Notes** tab allows you to enter notes about the layer.

Enter the text of your note. To insert the current date and time, click **Insert Timestamp**.

Note: The notes appear in Google Earth Enterprise Fusion only.

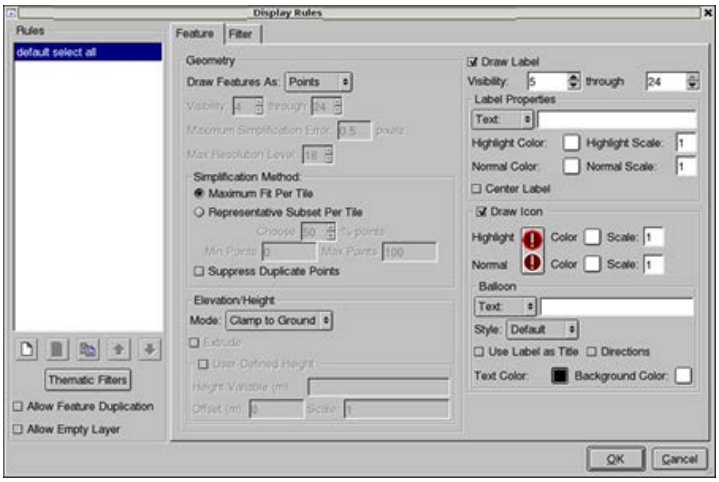
Configuring Display Rules

To specify how you would like to display vector data, you configure display rules for each layer. For example, you might add a vector resource that includes the boundaries of lakes, but the line color is not different enough from the color of the lake, so the boundaries of the lakes are not visible at higher altitudes. Using display rules, you can change the color of the border and set the display level of

the resource to a lower number, so the lake borders are visible at higher altitudes.

To define a display rule, right-click a layer in the Vector Project Editor, and select **Configure Display Rules** from the context menu.

The Display Rules dialog appears with the **Feature** tab selected.



The Display Rules Window

The default rule, **default select all**, appears automatically in the **Rules** list and is selected. Below the list of rules are five small buttons. Their functions are:


Create a new rule.


Delete selected rule.


Make a copy of the selected rule.


Move the selected rule up.


Move the selected rule down.

Thematic Filters

When you click **Thematic Filters**, the Thematic Filtering Editor appears. This editor allows you to easily create a series of filters to show data with a particular theme. For example, to show the population of counties in California, you could create a series of filters that show counties with the highest population in a dark shade of green, the lowest population in a light shade of green, and mid-level population in a medium green. (See "Creating Thematic Filters" on page 5-23 for more details.)

Allow Feature Duplication

When you check the box next to **Allow Feature Duplication**, Google Earth Enterprise Fusion allows data to be matched by more than one filter and, therefore, apply more than one rule to it. For example, if you want to apply one type of formatting to counties and another kind of formatting to zip code areas, you can check this box to apply both types of formatting to the same data.

Allow Empty Layer

When you check the box next to **Allow Empty Layer**, Google Earth Enterprise Fusion allows empty layers. This works well if you are using a dynamic data set you want to display.

Feature Tab

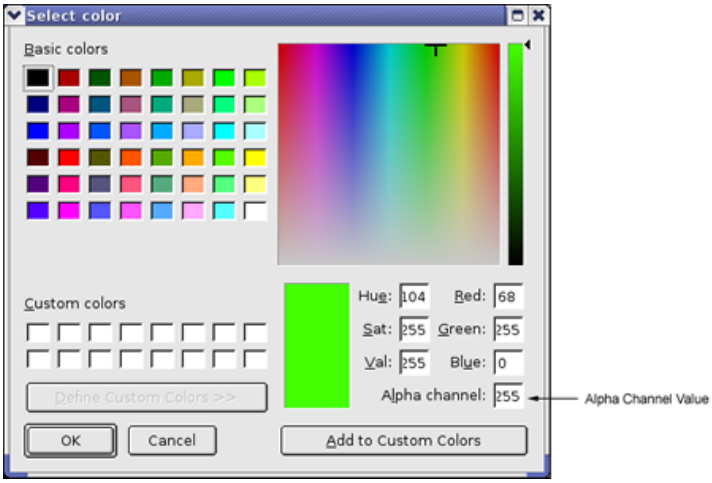
The **Feature** tab displays the current settings for the selected rule. If you add rules, you can select any rule on the **Rules** list to display its settings on the Feature tab. See Adding a rule for more information.

Filter Tab

The **Filter** tab lists any filters for the rule selected in the **Rules** list. See Filtering Vector Data in this chapter for more information about the **Filter** tab.

Selecting Colors

When you click the color button  anywhere it appears (regardless of what color it is), the **Select Color** dialog appears.



Click to select the desired color from the color grid on the left or the color spectrum on the right. To change the transparency of the lines, specify the desired **Alpha channel** value.

The Alpha channel value can range from 0 to 255, where 0 is transparent and 255 is solid. If you specify a slight transparency, underlying geographic imagery is not obscured by the feature when viewed in Google Earth EC. To determine the correct transparency setting, first select a mid-range number, such as 127, and view the results in Google Earth EC. Adjust from there as needed.

Creating Thematic Filters

Thematic filters allow you to create a series of filters to show data with a particular theme. The following procedure guides you through creating thematic filters that show counties in California with the highest population in a dark shade of green, the lowest population in a light shade of green, and three mid-levels of population in a medium green.

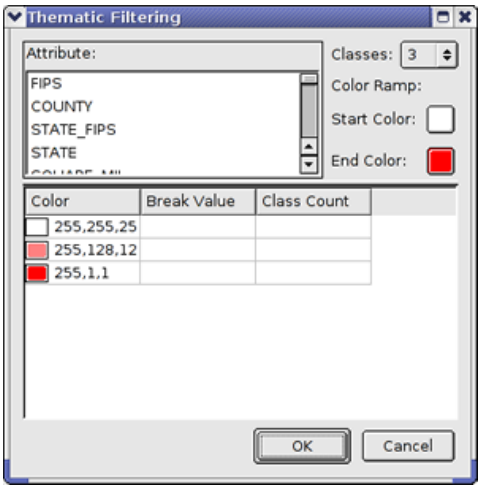
Note: The Thematic Filter Editor replaces any rules you might have defined previously.

To create thematic filters:

1. Click **Thematic Filters** on the Display Rules dialog.

   The Thematic Filtering Editor appears. The Thematic Filters Editor automates the creation of a series of filters.

   Notice that under Color Ramp, Start Color is set to **white**, End Color is set to **red**, and Classes is set to **3**. These are the default settings, which result in dividing the values of the selected attribute (or column) into three equal-size classes (or as close as possible) and assigning the colors white, pink, and red to those classes. In the table in the lower half of the dialog, the Color column lists three classes--white, pink, and red. Listed next to each color is its RGB value.



2. Select the field from the **Attribute** list that contains the data you want to filter.

   Google Earth Enterprise Fusion divides the number of data values for the selected field by 3 (the default number of classes) and fills in the **Break Value** and **Class Count** columns.

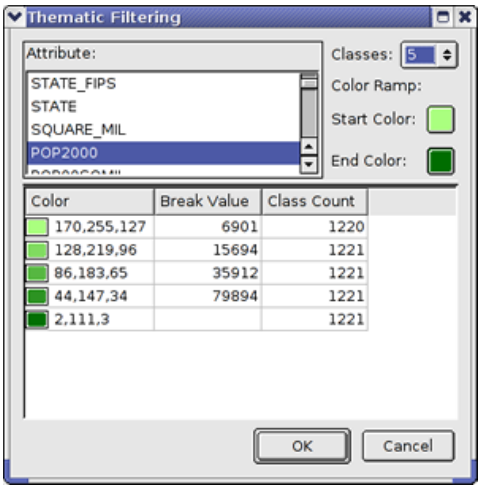
   Note: You do not need to (nor should you) change the Break Value and Class Count values.

3. Select the number of filters you want to create from the **Classes** drop-down list.

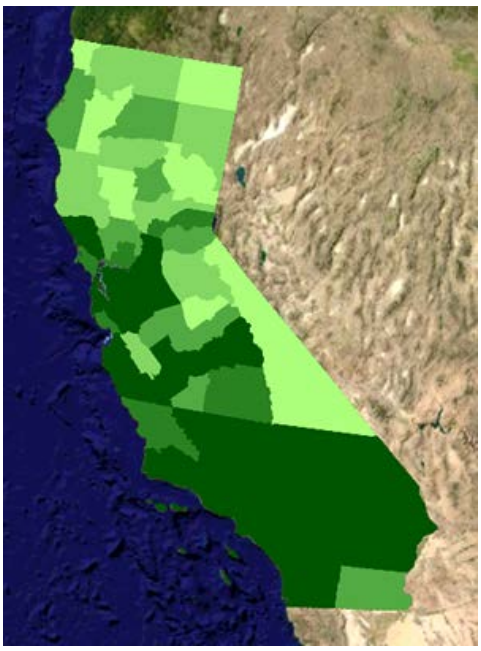
   Google Earth Enterprise Fusion divides the number of data values for the selected field by the selected **Classes** value and recalculates the **Break Value** and **Class Count** fields.

4. Click the **Start Color** button and select a color.
5. Click the **End Color** button and select a color.

The **Color** column lists the shades of color to be used and the RGB value of each color.



6. When you finish defining the thematic filters, click **OK**.
   The thematic filters appear in the **Rules** list in the **Display Rules** dialog, replacing any rules you might have defined previously.
7. Click each rule on the list to see that rule's display attributes on the **Feature** tab and its filters on the **Filter** tab.
   When you publish a database that contains the layer associated with these display rules, it looks something like this:



Additional Rule Configuration Options

The following procedures describe how to add, copy, reorder, and rename rules and allow feature duplication for multiple filters.

To add a rule:

1. Click  . The **New Rule** dialog appears.
2. Enter a name for the rule, and click **OK**. The new rule appears on the list, and the default settings appear on the **Feature** and **Filter** tabs.

To copy an existing rule:

1. Select the rule to copy.
2. Click  . Google Earth Enterprise Fusion makes a copy of the selected rule and appends `(copy)` to its name.

You can use this feature when you want to use the properties from an existing rule to build a new one.

To reorder a rule in the list:

1. Select the rule to move.

2. Click  or  to move the rule up or down in the list.

The rules are executed in sequence, so it is typical to list the most exclusive rules before the least exclusive.

To rename a rule:

1. Double-click the desired rule. The **Rename Rule** dialog appears.
2. Enter a new name for the rule, and click **OK**. The new name appears on the list of rules.

To allow feature duplication for multiple filters:

Check the box next to **Allow Feature Duplication** below the list of rules.

Configuring Display Rules for Points

The first option in the Display Rules dialog is **Draw Features As**, and you can select **Points**, **Lines**, or **Polygons**. The default setting reflects the type of data you are configuring. For example, if you are configuring point data, **Points** is the default selection. If you are configuring line data, **Lines** is the default selection.

The options that appear in this dialog are based on the option selected for **Draw Features As**. This section describes the display rule options for **point** features.

Simplification Method

If you have a large number of point features in your data, you can simplify the data set by displaying a subset of points instead of the entire data set. Select the simplification method you prefer from these options:

- **Maximum Fit per Tile** - This is the default simplification method, which displays the maximum number of point features possible per *tile* without sacrificing good visibility. (See The Toolbar in the **Fundamentals** chapter for more information about turning the grid on and off.)
- **Representative Subset per Tile** - You can control the number of point features displayed by specifying the decimation ratio. If you select this option, you can specify any of the following:
  - **Choose % points** - The percentage of point features that appear at certain levels to represent the whole set of available points.
  - **Min Points** - Set the minimum number of point features to display per tile.
  - **Max Points** - Set the maximum number of point features to display per tile.

Note: The minimum and maximum points impose limits on the percentage you set. For example, if you specify 50% with a minimum of 20 points and a maximum of 500 points:

- If your data set includes 100 points, Google Earth EC displays 50 data points.
- If your data set includes only 10 points, Google Earth EC displays all 10 points, because the full data set is less than the minimum you specified.
- If your data set includes 100,000 points, Google Earth EC displays only 500 points, the maximum you specified.

Suppress Duplicate Points

Point primitives that have exactly the same coordinates and exactly the same label attributes qualify as duplicates. Check this box to automatically suppress duplicate point features.

Elevation/Height

The **Elevation/Height** option allows you to specify whether your data is displayed at ground level or is elevated. If it is elevated, you can specify either a relative position above ground level or an absolute elevation above sea level.

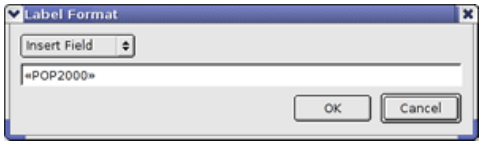
You can specify custom **Elevation/Height** values for geometry of any feature that uses points, lines, or polygons. The height value can either be a constant offset or derived from source attribute data. You can use this feature to create powerful theme maps, such as neighborhoods in a city raised in height based on crime statistics.

The **Mode** options are:

- **Clamp to Ground** - Select this option if you want your data to appear to be on the ground, regardless of the elevation of the ground.
- **Relative** - Select this option if you want your data to appear to be hovering a particular height above ground level.
- **Absolute** - Select this option if you want your data to appear to be hovering at a certain elevation above sea level.

If you select **Relative** or **Absolute**, the following options become available:

- **Extrude** - Check the box for this option if you want a drop line for points. This results in your point features appearing to be attached to the ground and projecting up to the specified height.
- **User-Defined Height** - Check the box for this option if you want to display the features in your source data with elevation that reflects the values of particular type of data. For example, if you have source data that includes population by county in a particular state, you can display the counties at different heights based on population. A county with a dense population can be displayed higher than a county with a sparse population. When you select this option, you must specify:
  - **Height Variable (m)** - Click the insertion button (**...**), and select a field from the **Insert Field** drop-down list. Using the same example, you would select the **Population** field.



Then determine your input ranges from the data and calculate the values for **Offset** and **Scale**. For example, if:

Population = 20,000 - 150,000

Target Height = 10 - 200 meters

use the following linear transformations:

target height = 10 + ((population - 20,000) / (150,000 - 20, 000)) * (200 - 10)

offset = ((20,000 * (200 - 10) / (150,000 - 20,000)) + 10

scale = (200 - 10) / (150,000 - 20,000)

- **Offset (m)** - Enter the result of the offset calculation. (For this example, it is 39.2307692.)
- **Scale** - Enter the result of the scale calculation. (For this example, it is 0.00146153.)

Draw Label

When you select the **Draw Label** checkbox, the label options become available.

The **Draw Label** section appears on the right side of the **Display Rules** dialog when you are defining display rules for points or polygons, or if you do not click **Draw As Roads** when you are defining lines.

The label options are:

- **Visibility**

  The **Visibility** option allows you to specify the display level range at which your data is visible in Google Earth EC. The default values for the range are **5** and **24**. To determine your visibility setting, preview the layer in the Preview pane.

  Note: For geographically dense data, the data should only be visible when the user has sufficiently zoomed in to the area. Otherwise, the data clutters the view of the Earth from a high perspective. In addition, drawing dense vector data at a high level unnecessarily increases data processing time.

  If you change the lower end of the range, Google recommends that you set it to no less than **4**.

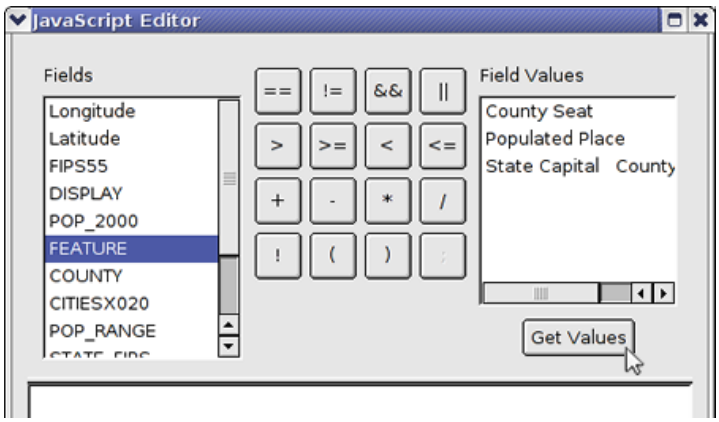
- **Label Properties**

  The **Text/JS Text** option allows you to specify the text that appears on the label. Select the option you prefer from the drop-down list, and then click the empty text field to open an editor.

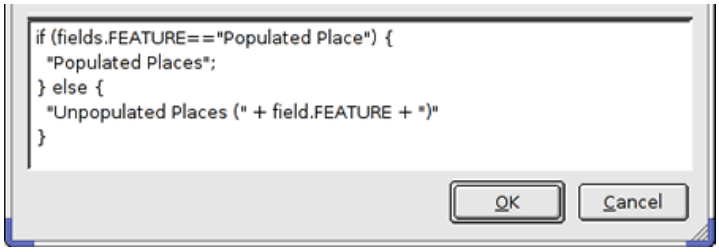
  - **Text** - The **Label Format** dialog appears. The **Insert Field** drop-down list contains the names of all of the fields in your source data. Select a field name from the list, and click **OK**. For example, if you select **NAME**, the names of the roads appear in Google Earth EC.
  - **JS Text** - The **JavaScript Editor** appears, and you can compose a JavaScript expression, which returns the string to use as the label.

    Select a field (or function, if you have created any) on the left, and click **Get Values** to display the values of that field for the selected data set in the Field Values list on the right.

    Tip: If your data set is very large, it can take a long time to find all of the values. In that case, a progress dialog appears showing you an ongoing count of how many values it has found. You can click **Cancel** on that dialog at any time to stop scanning your source file for unique values and populate the Field Values list with the unique values found so far. Typically, it stops finding unique values part way through the file. So when the counter virtually stops, that is a good time to click **Cancel** without concern that you might be missing some unique values.



You can use the buttons in this dialog to help you write your JavaScript expression.



When you finish creating your JavaScript expression, click **OK**. The expression appears in the **JavaScript** field on the **Display Rules** dialog.

- **Color and Scale** - Select the color and enter the scale for the label when it is **highlighted** (selected) and **normal** (not selected).
  - **Color** - Click the **Color** button and select a color.
  - **Scale** - Enter the magnification factor of the text label. The default value is **1**, which is equivalent to the value the user sets in Google Earth EC preferences. Greater than 1 makes the text size larger than the user's preferred size. Less than 1 (such as 0.9) makes the text smaller than the user's preferred size.

    Note: Setting the scale to less than 1 could potentially yield invisible text labels, depending on the label size preference users set in Google Earth EC.
  - **Center Label** - If you check the **Center Label** box, the label appears centered over the point in Google Earth EC. If you do not check this box, the label appears to the right of the point.

Draw Icon

When you select the **Draw Icon** checkbox, the icon options become available.

You can select the icon you want to use when it is highlighted (selected) and normal (not selected) and the background color and scale of each.

- **Color** - Click the button next to **Color**, and select a color.
- **Scale** - Determines the relative size of the icon. The default value is **1**, which displays the icon in Google Earth EC at its original size. To make the icon smaller, enter a value less than 1 in decimal. This option is useful when you want the highlighted (selected) icon to appear larger than the normal icon (not selected). For example, you could enter 0.8 for the normal icon and 1 for the highlighted icon.
- The **Balloon** options allow you to define the text and images that appear in the description balloon, as well as certain display properties.
  - The **Text/JS Text** option allows you to specify the text that appears in the description balloon. Select the option you prefer from the drop-down list, and then click the empty text field to open an editor.

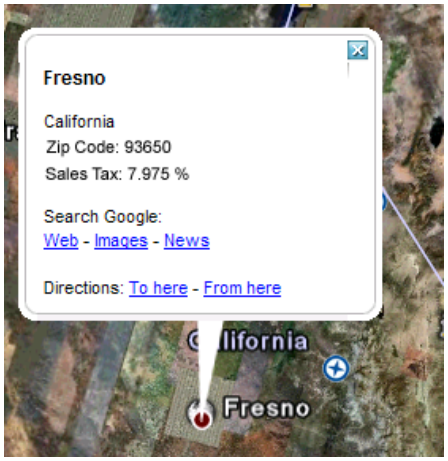
    Tip: You can include HTML to point to an image, if desired. To do so, use standard HTML code, such as `<img src="http://www.example.com/image.jsp?newImages=true&imageId=1191">`. If you do so, you must ensure that the image you reference actually appears in the location you specify.
    - **Text** - The **Label Format** dialog appears.

      The **Insert Field** drop-down list contains the names of all of the fields in your source data. Select a field name from the list, and click **OK**. For example, if you select **NAME**, the names of your features appear in Google Earth EC.

      Alternatively, you can click **Auto Populate** to automatically insert the name of every field in the source data and its value.

      When you use the Auto Populate feature and a user clicks the icon for a point in Google Earth EC, all of the data associated with the point appears in the description balloon. For example, if the data set includes state, county, zip code, and sales tax percentage for each data point, the description balloon might look like this:



- **JS Text** - The JavaScript Editor appears, and you can compose a JavaScript expression, which returns the string to use as the label. See Label Properties for more information about this editor.

- **Style** - The Style option allows you to define certain properties of the description balloon. Select an option from the drop-down list.
  - **Default** - Select **Default** to make any of the following changes to the balloon properties:
    - Select **Use Label as Title** if you want to use the text you defined in Label Properties as the title of the description balloon. If you do not check this box, the description balloon has no title.
    - Select **Directions** if you want to include **To here** and **From here** links in your description balloon. By default, these links are *not* included.
    - Select **Text Color** to choose a color.
    - Choose a **Background Color**.
  - **Advanced** - Select **Advanced** to enter your own JavaScript for the description balloon display properties.
    - Click the empty text field. The **Balloon Style Text** dialog appears. Click **Insert Default Text** to insert the JavaScript for the default text in the text editing field. Now you can edit the JavaScript to change the appearance of the description balloon. When you are done editing, click **OK**.

Configuring Display Rules for Lines

The first option in the **Display Rules** dialog is **Draw Features As**, and you can select **Points**, **Lines**, or **Polygons**. The default setting reflects the type of data you are configuring. For example, if you are configuring points data, **Points** is the default selection. If you are configuring line data, **Lines** is the default selection.

The options that appear in this dialog are based on the option selected for **Draw Features As**. This section describes the display rule options for **Lines**.

Visibility

The Visibility option allows you to specify the display level range at which your data is visible in Google Earth EC. The default values for the range are **4** and **24**. To determine your visibility setting, preview the layer in the Preview pane.

Note: For geographically dense data, the data should only be visible when the user has sufficiently zoomed in to the area. Otherwise, the data clutters the view of the Earth from a high perspective. In addition, drawing dense vector data at a high level unnecessarily increases data processing time.

Note: If you change the lower end of the range, Google recommends that you set it to no less than **4**.

Maximum Simplification Error

The value you specify is used in Google Earth Enterprise Fusion's simplification algorithm to determine the maximum pixel error tolerated when displaying line vector data. The default is 0.5 pixels, which is appropriate in most cases.

Note: This functionality is intended for expert users.

Max Resolution Level

Caps the level at which vector packets are built for a particular display rule. For example, if you want to see roads to level 24, set the **Visibility through** level to 24 and **Max Resolution Level** to 18. This *builds* the roads at level 18, but those roads are visible down to level 24 (the maximum level displayed in the Google Earth Client). **Max Resolution Level** defaults to 18 because beyond level 18, the number of packets and subsequent build time and database size quickly become unwieldy. If you set the **Max Resolution Level** beyond 18, monitor the vector fuse build to determine how many packets will be built and how long this will take. A warning message is displayed if you try to set both **Max Resolution Level** and the **Visibility through** level to greater than 18.

Draw as Roads

Select this option if your line data represents roads. When you do so, the **Road Label** option becomes active, and the right side of the dialog changes to road-related options. For **Road Label Type**, if you select **Label**, only the **Road Label** section on the right becomes available. If you select **Shield**, both the **Road Label** and **Road Shield** sections become available. See Road Labels and Shields below for details.

Do not select this box if your line data represents something other than roads (such as rivers or streams), do not check this box. See

Drawing Labels for more information.

Draw Style

The draw style options allow you to specify the color, transparency, and width of the lines used to represent your line data.

- **Line Color** - To set the color and transparency, click the button next to **Line Color**, and select a color.
- **Line Width** - The default line width is **1**. To change the line width, enter the desired value. The larger the number, the thicker the line. For example, if you would like to overlay a subway map, you might want to set the scale to 4 or 5 so that the drawing resembles a real-world subway map.

  Note: Setting the line width to less than 1 could potentially yield invisible text labels, depending on the label size preference users set in Google Earth EC.

Elevation/Height

The **Elevation/Height** option allows you to specify whether your data is displayed at ground level or is elevated. If it is elevated, you can specify either a relative position above ground level or an absolute elevation above sea level.

You can specify custom **Elevation/Height** values for geometry of any feature that uses points, lines, or polygons. The height value can either be a constant offset or derived from source attribute data. You can use this feature to create powerful theme maps, such as neighborhoods in a city raised in height based on crime statistics.

The Elevation/Height options are:

- **Clamp to Ground** - Your data appears to be on the ground, regardless of the elevation of the ground.
- **Relative** - Your data appears to be hovering a particular height above ground level.
- **Absolute** - Your data appears to be hovering at a certain elevation above sea level.

If you select **Relative** or **Absolute**, the following addition options become available:

- **Extrude** - Draw side walls for lines that are elevated. Your line features appear to be attached to the ground and project up to the specified height.
- **User-Defined Height** - See the description of User-Defined Height earlier in this chapter.

Road Labels and Shields

When you select **Draw As Roads** on the left side of the Display Rules dialog and select **Label** for the **Road Label Type**, the **Road Label** section appears on the right. If you select **Shield** for the **Road Label Type**, both the **Road Label** and **Road Shield** sections appear on the right.

Road Label

These options allow you to define the text that appears on the road label.

- The **Text/JS Text** option allows you to specify the text that appears on the label. Select the option you prefer, and then click the empty text field.
  - **Text** - The **Label Format** dialog appears.

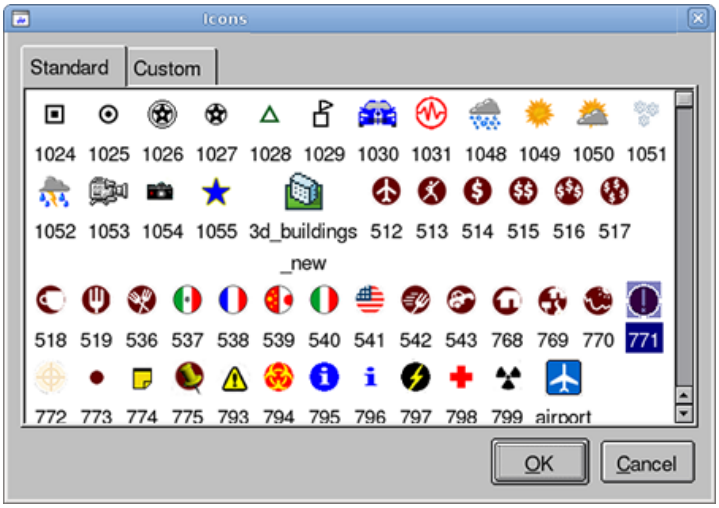
    The **Insert Field** drop-down list contains the names of all of the fields in your source data. Select a field name from the list, and click **OK**. For example, if you select **NAME**, the names of the roads appear in Google Earth EC.
  - **JS Text** - The JavaScript Editor appears, and you can compose a JavaScript expression, which returns the string to use as the label. See Label Properties for more information about this editor.
- Select the **Apply standard formatting** box to apply the standard Google Earth Enterprise Fusion text formatting to road data labels. With this formatting:
  - Street and road names are displayed with initial upper case letters.
  - Directional modifiers, such as N, E, S, W, appear in upper case.
  - Some words (such as “Ramp” and “Intersection”) are removed.
  - Extra white space between the fields is removed.
- **Color** - Select a color and transparency value to use for road labels.
- **Scale** - Determines the magnification factor of the text label. The default value is **1**, which is equivalent to the value the user sets in Google Earth EC preferences. Greater than 1 makes the text size larger than the user’s preferred size. Less than 1 (such as 0.9) makes the text smaller than the user’s preferred size.

  Note: Setting the scale to less than 1 could potentially yield invisible text labels, depending on the label size preference users set in Google Earth EC.

Road Shield

These options allows you to define the shield that appears on the road. The options are:

- **Icon** - Determines the actual road shield icon that appears on the roads. To change the icon, click it. The **Icons** dialog appears.



The **Standard** tab displays all of the standard icons that Google Earth Enterprise Fusion provides. The **Custom** tab displays any custom icons you have created and imported using the Icon Manager.

Select the icon of your choice, and click **OK**. The new icon appears next to **Icon** under Road Shield.

- **Scale** - Determines the relative size of the icon. The default value is **1**, which displays the icon in Google Earth EC at its original size. To make the icon larger, enter a value greater than 1. For example, to render the icon twice as large as the original graphic, enter **2**.

Configuring Display Rules for Polygons

The first option in the **Display Rules** dialog is **Draw Features As**, and you can select **Points**, **Lines**, or **Polygons**. The default setting reflects the type of data you are configuring. For example, if you are configuring points data, **Points** is the default selection. If you are configuring line data, **Lines** is the default selection.

The options that appear in this dialog are based on the option selected for **Draw Features As**. This section describes the display rule options for **Polygons**.

Visibility

The **Visibility** option allows you to specify the display level range at which your data is visible in Google Earth EC. The default values for the range are **4** and **24**. To determine your visibility setting, preview the layer in the Preview pane.

Note: For geographically dense data, the data should only be visible when the user has sufficiently zoomed in to the area. Otherwise, the data clutters the view of the Earth from a high perspective. In addition, drawing dense vector data at a high level unnecessarily increases data processing time.

If you change the lower end of the range, Google recommends that you set it to no less than **4**.

Maximum Simplification Error

The value you specify is used in Google Earth Enterprise Fusion's simplification algorithm to determine the maximum pixel error tolerated when displaying polygon data. The default is 0.5 pixels, which is appropriate in most cases.

Note: This functionality is intended for expert users.

Max Resolution Level

Caps the level at which vector packets are built for a particular display rule. For example, if you want to see polygons to level 24, set the **Visibility through** level to 24 and **Max Resolution Level** to 18. This *builds* the polygons at level 18, but those polygons are visible down to level 24 (the maximum level displayed in the Google Earth Client). **Max Resolution Level** defaults to 18 because beyond level 18, the number of packets and subsequent build time and database size quickly become unwieldy. If you set the **Max Resolution Level** beyond 18, monitor the vector fuse build to determine how many packets will be built and how long this will take. A warning message is displayed if you try to set both **Max Resolution Level** and the **Visibility through** level to greater than 18.

Note: Fusion does an analysis of size of features during the import of vector resources and based on this analysis states in resource import log the *Recommended Min/Max and Efficient Resolution Levels*.

- The *Recommended Min Resolution Level* corresponds to the LOD at which the largest feature of the vector resource has a diameter equal to 1/8 of the tile size.
- The *Recommended Max Resolution Level* corresponds to the LOD at which the smallest feature of the vector resource has a diameter equal to 1/8 of the tile size.
- The *Efficient Resolution Level* corresponds to the LOD at which the average feature of the vector resource has a diameter equal to 1/8 of the tile size.

These values can be helpful in setting the **Visibility levels** and the **Max Resolution Level**. So based on the *Recommended Min Resolution Level* you can set the **Visibility min level**. And based on the *Recommended Max Resolution Level* you can set the **Visibility max level** and the **Max Resolution Level**.
For example, if you want to see the maximal feature of the data set with visible size not less than 1/8 of the tile size at the corresponding LOD you need to set the **Visibility min level** equal to the *Recommended Min Resolution Level*. Each level doubles the resolution, so if you want to see the maximal feature of the data set with visible size not less than 1/4 of the tile size you need

to set the **Visibility min level** equal to the *Recommended Min Resolution Level + 1* and vice versa, if you want to see the maximal feature of the data set with visible size not less than 1/16 of the tile size you need to set the **Visibility min level** equal to the *Recommended Min Resolution Level - 1*.
The same logic is applied to the minimal feature of the data set and setting the **Visibility max level** and the **Max Resolution Level**. For example, if you want to see the minimal feature of the data set with visible size not more than 1/8 of the tile size at the corresponding LOD you need to set the **Visibility max level** equal to the *Recommended Max Resolution Level*. Each level doubles the resolution, so if you want to see the minimal feature of data set with visible size not more than 1/4 of the tile size at the corresponding LOD you need to set the **Visibility max level** equal to the *Recommended Max Resolution Level + 1* and vice versa, if you want to see the minimal feature of the data set with visible size not more than 1/16 of the tile size you need to set the **Visibility max level** equal to the *Recommended Max Resolution Level - 1*.
For setting the **Max Resolution Level** the rule sounds like if you want to build the data set with resolution until minimal feature of the data set has visible size not more than 1/8 of the tile size at the corresponding LOD you need to set the **Max Resolution Level** equal to the *Recommended Max Resolution Level* and so on.
The *Efficient Resolution Level* in pair with range of the *Recommended Min/Max Resolution Levels* can be useful in case you have a large variance in your feature size distribution (it can be estimated based on the range of the *Recommended Min/Max Resolution Level*). For such data sets if the *Efficient Resolution Level* is closer to the *Recommended Max Resolution Level* then you have a data set which contains primarily small features and so you can increase the **Visibility min level** up to *Efficient Resolution Level*. And vice versa, if the *Efficient Resolution Level* is closer to the *Recommended Min Resolution Level* then you have a data set which contains primarily large features that may be properly represented at the lower LOD and so you can decrease the **Max Resolution Level** down to the *Efficient Resolution Level*.

Draw Style

You can use the Draw Style options to render filled 2D and 2.5D (extruded) polygon primitives.

You can render polygons in filled, outlined, or both modes. You can also render polyline data sets as filled polygons.

- **Mode** - The Mode option indicates whether the polygons appears as outlined, filled, or both in Google Earth EC.
- **Fill Color** - Select a fill color and transparency value for the polygon.
- **Outline Color** - Select an outline color and transparency value.
- **Outline Width** - The default outline width is 1.0. To change the outline width, enter the desired value. The larger the number, the thicker the outline.

  Note: Setting the outline width to less than 1 could potentially make it invisible.

Elevation/Height

The **Elevation/Height** option allows you to specify whether your data is displayed at ground level or is elevated. If it is elevated, you can specify either a relative position above ground level or an absolute elevation above sea level.

You can specify custom **Elevation/Height** values for geometry of any feature that uses points, lines, or polygons. The height value can either be a constant offset or derived from source attribute data. You can use this feature to create powerful theme maps, such as neighborhoods in a city raised in height based on crime statistics.

The Elevation/Height options are:

- **Clamp to Ground** - Your data appears to be on the ground, regardless of the elevation of the ground.
- **Relative** - Your data appears to be hovering a particular height above ground level.
- **Absolute** - Your data appears to be hovering at a certain elevation above sea level.

If you select **Relative** or **Absolute**, the following addition options become available:

- **Extrude** - Draw side walls for lines that are elevated. Your line features appear to be attached to the ground and project up to the specified height.
- **User-Defined Height** - See the description of User-Defined Height earlier in this chapter.

Draw Label

When you select **Draw Label**, the label options become available. See Drawing Labels for details.

Filtering Vector Data

From the **Display Rules** window, click the **Filter** tab to access filter-related features.

A filter is a pattern expression that is applied to a specific field of a vector resource. When the pattern expression matches the specified field in the associated vector data, Google Earth Enterprise Fusion selects the matching records and applies the feature settings for the rule to those records. Filters are inclusive.

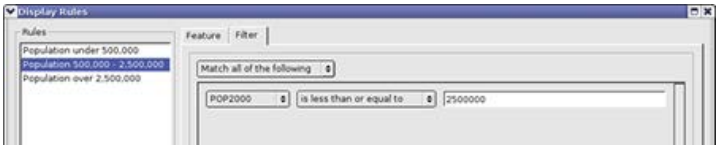
Note: Filters match string and numeric data only, not dates and other complex patterns.

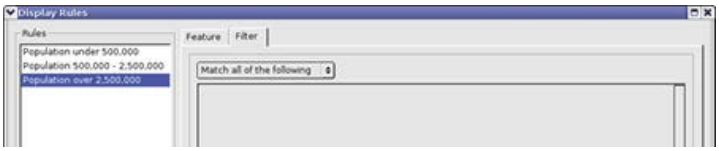
To create an expression, select a field to match from your resource, select an operator, and enter a value to match. Alternatively, you can write a JavaScript expression (see To add an expression for details).

For example, if you have census data by county in California, you can use filters to graphically represent counties with:

- Population under 500,000.
- Population between 500,000 and 2,500,000 inclusive.
- Population over 2,500,000 (the remaining counties - no need for a filter).

The following graphics show these three filters:

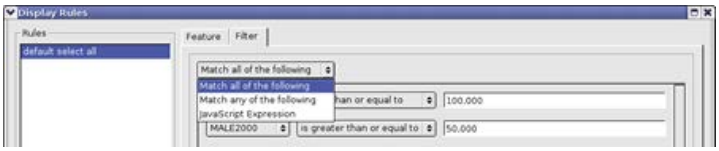




In Google Earth EC, these filters and display rules result in the colors you assigned for each rule distinguishing the counties with the population ranges you specified in the filters:

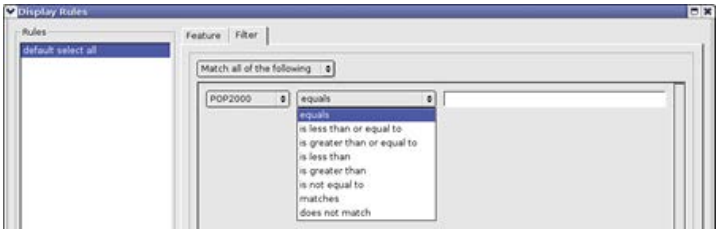
To add an expression:

1. From the **Filter** tab of the **Display Rules** window, click **More**. A new undefined expression appears on the list with the first field in the resource selected by default.
2. If you will be defining more than one expression for your filter, use the drop-down list above the filter list to define how restrictive you want the filter to be. If you will be using one expression, accept the default value, **Match all of the following**.

   If you select:

   - **Match all of the following expressions**, the data must match all expressions in the filter, or the associated rule is not applied.
   - **Match any of the following expressions**, the data can match any one or more of the expressions for the associated rule to be applied.
   - **JavaScript Expression**, click the insertion button (**...**) to the right of the empty text field to display the JavaScript Editor. The results of the expression are interpreted as Boolean. If the Boolean is true, the feature matches. If the Boolean is false, the feature does not match.
3. Select the field that you want to match from the first drop-down list in the filter window.
4. Select an operator from the second drop-down list. Filter operators are described in the next section.



5. Enter the value to match in the text field.
6. Click **More** to add another expression to the filter, if desired. Click **OK** to save the filter.

Filter Operators

	Example	
Operator	**Value in the text field:**	**Matches:**
equals[1]	2000	Only **2000**
is less than or equal to	2000	**2000** or any number less than 2000
is greater than or equal to	2000	**2000** or any number greater than 2000
is less than	2000	Any number less than 2000
is greater than	2000	Any number greater than 2000
is not equal to	2000	Any number other than **2000**
matches	[hc]?at	Only **hat**, **cat**, and **at**
does not match	[hc]?at	Anything other than **hat**, **cat**, and **at**

If you select **equals** or **is not equal to**, you can use wildcard characters when matching against a string in the vector data. The supported wildcard characters are:

Wildcard	Description	Example
*	Matches zero or more characters.	To display all states that end in the letter **a**: `*a`
?	Matches exactly one character (any character).	To display all states whose second letter is “o”: `?o*`

[]	Matches the specific character(s) or range of characters listed in the brackets.	To display all states whose second letter is either “a,” “o,” or “n.”
		`?[aon]*`
		To display all states that begin with letters “A” through “M.”
		`[A-M]*`

Note: The full set of wildcard characters is not currently available in Google Earth Enterprise Fusion, so forward and back slashes are not treated as special. For character negation, select **is not equal to expression** from the expression operator drop-down list.

If you select **matches** or **does not match**, you must enter a regular expression pattern in the text field instead of a text value. Regular expressions are much more powerful than wildcard characters. Google Earth Enterprise Fusion does not support full Perl regular expression functionality, but it does support most standard regular expressions.

For example:

`^M` -- Matches all values that begin with “M”

`a$` -- Matches all values that end with “a”

`(North|South)` -- Matches all values that have “North” or “South” anywhere in the text

To remove an expression:

1. Click **Fewer**. The last expression on the list disappears.

2. Repeat until you have removed all of the expressions desired.
3. Click **OK** to save the filter.

To select all, defining no specific filter:

If you have only a single rule defined for your vector data and you want to display all of the data available, simply leave the filter undefined.

To select all remaining elements after other filter-rule combinations are applied:

If you have one or more filter-rule combinations defined but want to display all of the data available, you can add a final rule with no filter definition to match all elements not matched by previous rules. This results in the application of the final rule to all elements not matched by previous rules.

Filtering Conventions

Keep in mind the following conventions when using multiple rules and filters for your vector data.

- **Rules and filters are meant to operate together.**

  A rule is the collection of settings on the **Feature** and **Filter** tabs, but you must provide a distinct filter for each rule in the list in order to have distinct features or labels for different data.

- **The order of your rules determines which filter is applied to the data.**

  For example, you might specify the following rule-filter combinations:

  Filter 1: All parcels with IDs over 30.

  Rule 1: Display boundaries in red.

  Filter 2: All parcels with IDs between 30 and 40.

  Rule 2: Display boundaries in blue.

  In this case, all boundaries shown are red, because filter 1 includes all of the data that would be covered by filter 2. Rule 2 never gets applied.

  To achieve the desired effect, you must reverse the order of these filter-rule combinations:

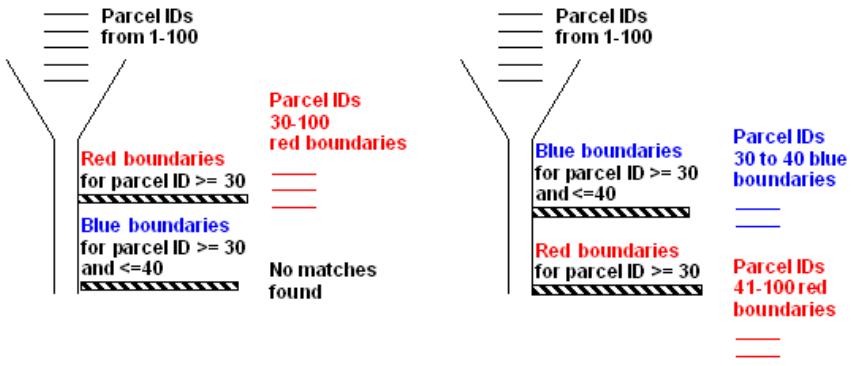
  Filter 1: All parcels with IDs between 30 and 40.

  Rule 1: Display boundaries in blue.

  Filter 2: All parcels with IDs over 30.

  Rule 2: Display boundaries in red.

  Then rule 1 is applied to the parcels with IDs between 30 and 40, so those boundaries are blue, and rule 2 is applied to parcels with IDs over 40, so those boundaries are red.



- **For adjoining boundary data, most recent matches overlay prior matches.**

  When you are matching line data that is adjoining, such as boundary data, the last items matched are displayed on top. Consequently, if two parcels share a boundary and the last display rule sets boundary color to red, the boundary between the two parcels is red.

  Using the example above, if parcel 40 is surrounded by parcels with IDs greater than 40, the boundaries around parcel 40 are red, not blue, even though the filter accurately applies blue boundaries to parcel 40. This is because all the parcels surrounding 40 are configured with the last filter, which, in effect, “covers” their boundaries with the surrounding red boundaries.

- **Character matches are case sensitive.**

  You can use square brackets to provide both upper and lower case characters to allow for case-insensitive matching. For example, if you want to match both **ID** and **id**, you can enter `[Ii][Dd]` to be sure both versions are considered a match.

Exporting and Importing Display Rule Templates

You can export a set of display rules as a *template*, and then later import the template to apply the same display rules to other vector layers. The template contains all of the filters and formatting information that you specified for the associated layer.

When you export display rules, Google Earth Enterprise Fusion saves the information in a file with a name and in a location of your choice. You can save it on your local workstation, or you can save it in a shared folder on a network drive, so that other users in your

organization can access it.

You can use the template file:

- To ensure that multiple layers in the same project or in different projects have identical configuration.
- To create display rules for multiple layers that you want to look the same except for minor changes.
- As a backup. For example, you can save the template file, along with the vector resource's KVP file, on a separate computer. Then, if your asset root gets damaged by disk failure and you do not have a more integrated backup solution, you can create a new resource from the KVP file and quickly reconfigure the layer in a new project by importing the template.
- To use with projects you create using shell commands. See Creating a Vector Project for more information.

The following sections describe how to export and import display rule templates.

Exporting Display Rules

When you finish configuring the filters and display rules for a vector layer, you can export the settings as a template file. You can also use the template at the command line when adding to a vector project in batch mode. See Project Commands in the **Command Line Reference** chapter for details about using display templates from the command line.

To export a display template:

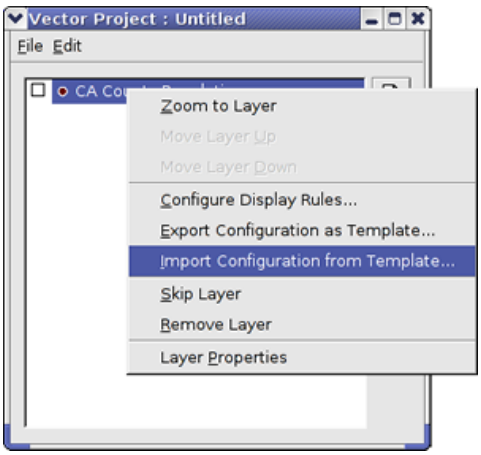
1. In the Vector Project Editor, right-click the vector layer whose display settings you want to export.
2. Select **Export Configuration as Template** from the context menu. The **Export Template** dialog appears.
3. Navigate to the folder where you want to save the template, or click  to create a new folder in the desired location.
4. Click **Save**. Google Earth Enterprise Fusion saves the file with a `.khdsp` extension.

Importing Display Rules

After you export display rules as a template file, you can import the template and apply those display rules to other vector layers.

To import a display template:

1. In the Vector Project Editor, right-click the vector layer to which you want to apply the saved settings.



2. Select **Import Configuration from Template** from the context menu. The **Import Template** dialog appears.
3. Navigate to the template file that contains the settings you want to apply, and select it.
4. Check one or both of the boxes at the bottom of the dialog as follows:
   - Check **Apply display rules** to apply only the display rules from the template to the layer.
   - Check **Apply legend settings** to apply only the legend settings from the template to the layer.
   - Check both boxes to apply both the display rules and legend settings from the template to the layer.
5. Click **Open**. Google Earth Enterprise Fusion applies the settings contained in that template to the selected vector layer.

After you apply the template, be sure to confirm that the results are as you intended. If you apply a template to data that does not contain the exact same attributes as the original data for which that template was created, you might need to modify the display rules for the current data. To view the settings or make modifications to them, perform the steps described in the section titled Configuring Display Rules.

Defining Imagery and Terrain Projects

Within each type of project, you can add multiple resources of the same type. However, unlike vector projects, the entire imagery project appears as a single layer in Google Earth EC, regardless of how many source files it includes. See Display Order of Imagery and Terrain Resources for details.

Creating an Imagery or Terrain Project

The first step in defining an imagery or terrain project is to specify which resources to include and give the project a name.

To create an imagery project:

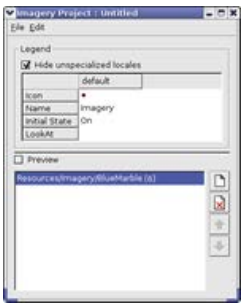
The following instructions describe how to create an imagery project, but the steps are the same for a terrain project as well.

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Click  . The Imagery Project editor appears.

3. If you are creating a historical imagery project, select the **Support Historical Imagery** option. An acquisition date must be defined for this imagery.
4. Specify values in the **Legend** area for the entire imagery project by clicking the following fields under **default**:
   - **Icon**: The icon that appears in the legend in Google Earth EC.
   - **Name**: The text label that appears in the legend in Google Earth EC.
   - **Initial State**: Determines whether the imagery is turned on or off by default in Google Earth EC. The first time a user connects to the database containing this imagery:
     - If you select **On** (the default) as the initial state here, the check box for the imagery is automatically checked.
     - If you select **Off** as the initial state here, the check box for the imagery is automatically unchecked.

     Google Earth EC saves the state of the check box when a user disconnects from the database. For example, if you set the initial state to **Off**, and then a user subsequently checks the box for an imagery project in Google Earth EC and then disconnects from the database, the next time that user connects to that database, the state of the check box for that imagery is the same as when the user disconnected; that is, the box is checked.
   - **LookAt**: If you specify a KMZ file in this field, Google Earth EC users can fly directly to a particular camera view by double-clicking the layer. See LookAt.
5. If you want to add language support for additional locales, uncheck the box next to **Hide unspecialized locales**. See the Legend Tab section for more information about this option.
6. Click  . The **Open** dialog appears.
7. Navigate to the folder that contains your imagery resources.

   Note: The selection in the **Type** drop-down list near the bottom of this dialog determines the type of resources that appear on the list. **Imagery Resource** is automatically selected when you open this dialog from the Imagery Project Editor, so only imagery resources appear on the list.
8. Select the resource you want to add to the project, and click **Open**. The selected resource appears in the Imagery Project Editor.



9. Repeat steps **6** through **8** for each additional resource you want to include in the project.
10. When you finish adding resources, select **File > Save**.
11. Navigate to the folder where you want to save your project, or click  to create a new folder in the desired location.
12. Enter the name of your project, and click **Save**. The new project name appears in the Asset Manager's asset list.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

There are some additional actions you can take with resources after you add them to an imagery and terrain project, including:

- Check the box next to **Preview** to display a preview of the project in the Preview pane. A bounding box appears for each

resource in the project. When **Preview** is checked, you can right-click a resource and select **Zoom to Layer** to zoom in on that resource.

- Rearrange the order of the resources. See the next section, Display Order of Imagery and Terrain Resources for restrictions and To reorder layers in a project for additional information.
- Lower the resolution. You might want to take this action if a resource is much higher resolution than you need. You can artificially lower the resolution for a resource within a project without affecting the original resource or any other projects that use it.

  To lower the resolution of a resource, right-click it and select **Adjust Max Level Override**. Then drag the slider to the left to adjust the resolution down. Click outside the slider to apply the new setting to the resource. The override appears in parentheses after the name of the resource in the Project Editor.
- To force a resource with lower resolution to appear above a resource with higher resolution, you can lower the resolution of the higher resolution resource as described above and then use the arrow keys to move it below the lower-resolution resource.

Note: The number of imagery resources that you can include within a single project is currently over 3000. If you add more that 3000 resources, you could experience a performance degradation when you build the project.

Tip: Every imagery and terrain project should include at least one resource that spans the entire Earth, such as `BlueMarble` or `gtopo30`. Everywhere you have a high-resolution inset, you should include a medium-resolution inset between it and BlueMarble.

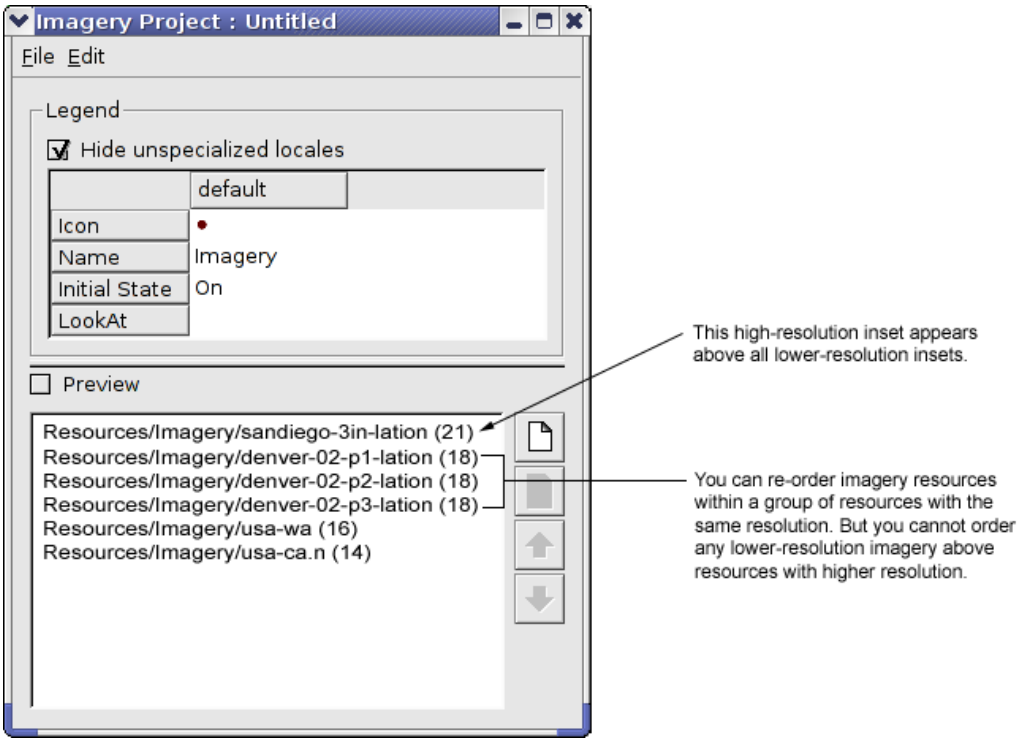
As with vector projects, you can build imagery and terrain projects individually, build several projects at the same time, or wait until you build your database to build all of its projects at the same time. See the Building Assets chapter for complete details.

Display Order of Imagery and Terrain Resources

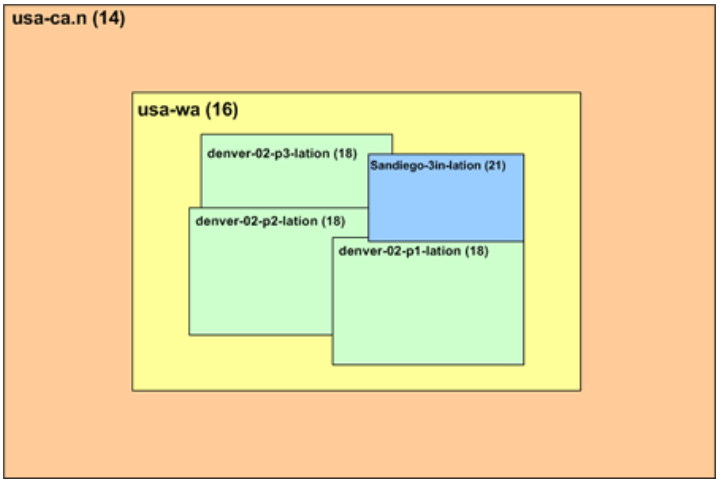
Although you can change the display order of imagery and terrain resources within a project, the order is ultimately determined by the resolution of the source files. That is, lower-resolution insets are automatically ordered below higher-resolution insets. So in reality, you can change the order of resources with the same resolution only.

In addition, the resolution of the imagery inset determines its optimal display level.

The following example shows several imagery resources in a project ordered by resolution. The resolution of each resource appears in parentheses after the resource name.



The order in which the imagery or terrain resource data appears in the Imagery and Terrain Project Editors is the same as the stacking order of the insets in Google Earth EC. That is, higher-resolution insets appear above lower-resolution insets, so that viewing preference is given to the higher-quality imagery. The stacking order of same-resolution insets follows the order you define in the project. The following graphic illustrates this concept.



Creating a Historical Imagery Project

Creating a historic imagery project is very similar to a standard imagery projects and differs in two key aspects:

1. a user must select the **Support Historic Imagery** checkbox in the Imagery Project editor, and
2. each image resource added to the project must have an assigned acquisition date.

To create a Historical Imagery Project:

1. Create and build a new imagery resource which includes an acquisition date (in the format `YYYY`, `YYYY-MM`, or `YYYY-MM-DD`).
2. Create a new imagery project, select the **Support Historic Imagery** option, and add imagery resources to the project.
3. Build the imagery project.
4. Build the database and publish.

Note: Imagery will be ordered by resolution first, and then by acquisition date. If three 1-meter resolution images for 2009, 2006, and 1999 are added to the imagery project, they will appear in order in Google Earth EC; however, if the 1999 image is 0.3-meter resolution it will be layered above the lower resolution (1-meter) 2009 and 2006 images and will always be visible despite having the time slider set to 2009 or 2006.

Modifying Projects

After you create a project, you can modify it in any of the following ways:

- Add another resource.
- Delete a previously associated resource.
- Modify the project's layer properties.
- Configure display rules for layers in a vector project.
- Hide the project so it does not appear in the Asset Manager unless the **Show hidden resources** check box is selected. With this feature, you can "turn off" projects you do not need to display regularly, such as those that are incorrectly named.

Note: When you save a modified project, Google Earth Enterprise Fusion replaces the old project definition with the new one. When you build that new project, Google Earth Enterprise Fusion creates a new version. When you select a project to include in a database, it is always the latest version of the project. However, your modifications to a project have no effect on earlier versions of that project that were previously built into a database.

To modify an existing project:

1. Right-click the name of the project you want to modify in the Asset Manager, and select **Modify** (or double-click the name of the project). The Project Editor for that project type displays all of the resources currently included in that project.
2. Make the desired modifications. See Defining Vector Projects or Defining Imagery and Terrain Projects for details.
3. When you finish modifying the settings for the project, select **File > Save**.

   Google Earth Enterprise Fusion saves the project in the same place with the same name. If you have already built the project, you can rebuild it now or when you build the associated database.

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Defining and Publishing Databases

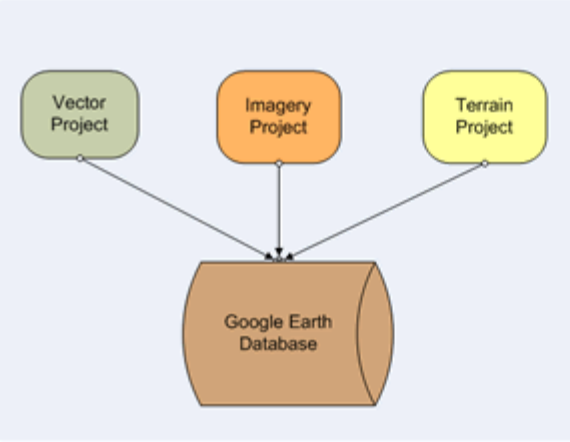
Overview

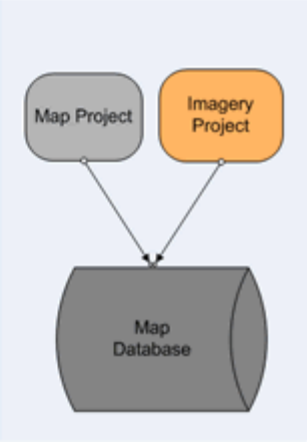
This chapter provides information on how to define Google Earth databases with Google Earth Enterprise Fusion. For information about defining Google Maps databases, see the chapter titled Defining a Map Database.

Defining a Database

When you finish defining your projects, you define your database. To define a database, you specify one or more projects whose data functions together on the Google Earth Enterprise Server. You can select up to three projects for a database--one of each type:

- Vector
- Imagery
- Terrain





Because the majority of your efforts go into defining and configuring projects, it is relatively simple to define a database. You simply select the projects that comprise the database and give it a name.

To define a database:

1. Select **Tools > Asset Manager**. The **Asset Manager** appears.
2. Click  . The **Database Editor** appears with no projects selected.
3. Click  next to Vector Project. The **Open** dialog appears.
4. Navigate to the folder that contains the vector project you want to include.

Note: The selection in the **Type** drop-down list near the bottom of this dialog determines the type of projects that appear on the list. **Vector Project** is automatically selected, so only vector projects appear on the list.

5. Select the vector project you want to add to the database, and click **Open**. The selected project appears in the **Database Editor** next to **Vector Project**.
6. Repeat steps **3** through **5** to add imagery and terrain projects. All three projects appear on the list.
7. To add search tabs for the database, click the box next to **Search Tabs**. See Adding Search Tabs to a Database for details.
8. When you've finished defining your database, select **File > Save**.
9. Navigate to the folder where you want to save your database, or click  to create a new folder in the desired location.
10. Enter the name of your database, and click **Save**.

Now you are ready to build your database. See the Building Assets chapter for complete details.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

To modify a database:

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. In the asset navigation tree on the left, navigate to the folder that contains the database you want to change, and select it. The database appears on the right.
3. Double-click the name of the database. The Database Editor displays its contents.

To change one of the selected projects, click  next to the project you want to replace. The **Open** dialog appears.

1. Navigate to the folder that contains the project you want to include.
2. Select the project you want to add to the database, and click **Open**. The selected project appears in the **Database Editor**.
3. Select **File > Save**.

To remove a project from the database and not include any project of that type, click  next to the project you want to remove, then select **File > Save**.

In both cases, Google Earth Enterprise Fusion saves the database in the same place with the same name. If you have already built the database, you must build a new version to make the changes available for publishing.

Adding Search Tabs to a Database

Search tabs allow Google Earth EC and Google Maps users to search external databases on non-Google servers. For example, if you have a database of property locations that contains specific information that your users need, you can add a search tab call “Property Search” and configure it to search for locations in your property database, even if that database is stored on another server.

The Search Tab Manager allows you to add and pre-configure the standard search tabs to be used throughout Google Earth Enterprise Fusion. See Managing Search Tabs for more information. After you have configured the search tabs in the Search Tab Manager, you can select the search tabs you want to use for each database you define.

Note: Regardless of how many search tabs you add, even if you add only one or two, the custom search tab(s) replace all three default search tabs in Google Earth EC. If you do not create any tabs, Google Earth EC displays the default search tabs.

To add search tabs to your database:

1. In the Database Editor, select the **Search Tabs** checkbox. The Database Editor extends to include a **Search Tabs** area.
2. Click  on the right side of the **Search Tabs** area. A pop-up list displays a list of the available search tabs.

   Note: If you specified search fields for a layer in the selected vector project, the tab label you provided in the Vector Project Editor for that project appears on this pop-up list. See Search Tab for details. You can select that search tab or not.
3. Click the name of the first search tab you want to add. The selected tab appears in the **Search Tabs** area.
4. You can add up to three search tabs (including the layer-specific search fields, if you specified them for the selected vector project) by repeating the above steps.

   After you add three tabs, the  button is disabled.
5. If you want to delete one of the tabs, select it and click  , then OK to confirm.

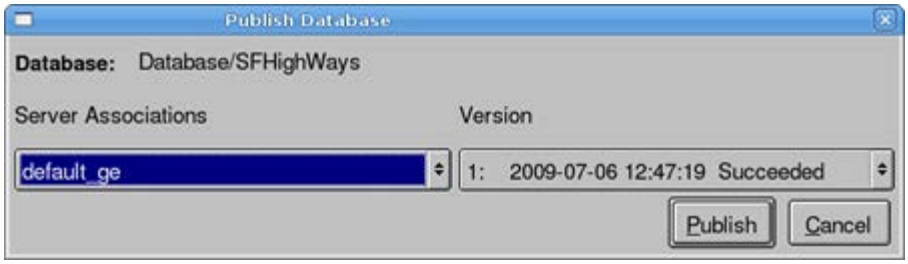
   The tab disappears from the Search Tabs dialog, and the  button is enabled again.
6. To change the order of the search tabs, select the tab you want to move, and then click  or  to move it.
7. When you finish defining the search tabs, save the database, as described in Defining a Database.

Publishing a Database

After you successfully build a database, you are ready to publish it to a Google Earth Enterprise Server. Publishing a database is fairly straightforward after you set up your server associations. Consult your administrator or refer to the **Administration Guide** for complete details about setting up server associations.

To publish a database:

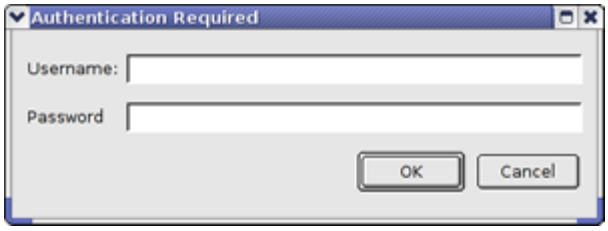
1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Navigate to the folder where the database you want to publish is located.
3. Right-click the database name, and select **Publish**. The Publish Database dialog appears.



The first server association on the list in the Server Associations Manager is the default

selection on the **Server Association** drop-down list. The most recently built version of the database is the default selection on the **Version** drop-down list.

4. If you want to publish the database to a different server association, select it from the **Server Associations** drop-down list; otherwise, leave the default selected.
5. If you want to publish a different version of the database, select it from the **Version** drop-down list; otherwise, leave the default selected.
6. Click **Publish**.
7. If the server is configured for publishing authentication, the **Authentication Required** dialog appears.



Enter your user name and password, and click **OK**.

Contact your system administrator if you do not know your user name and password.

A progress dialog shows you the progress of the publishing operation. When the publishing operation is complete, a message confirms that the database was successfully published. If the publishing operation is unsuccessful, see the Common Error Messages chapter for more information.

Viewing Your Database

After you publish your database, you can view it in Google Earth EC.

To view your database:

1. Launch Google Earth EC. The **Select Server** dialog appears.
2. Enter or select the URL or IP address of your server in the Server field, and accept the default setting, **80**, in the **Port** field (unless you know that your server uses a different port).
3. Click **Login**.

Caution: If you have logged in to this server with Google Earth EC previously, log out, clear your cache, and log back in. For help with clearing your cache, refer to the **Google Earth User Guide**.

Google Earth EC displays your database. The Layers panel shows the terrain, imagery, and vector layers in the published database.

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Building Assets

Overview

Building assets is the process of preparing each asset for inclusion in another asset--for example, building resources before you include them in a project.

Google Earth Enterprise Fusion allows you to build each project separately or together with its associated database. You can also build imagery and terrain resources and map layers with their associated projects or databases. You must build vector resources separately, however, before you can add them to a project. In fact, most of the work is done at the database level, so building projects is unnecessary.

You can sometimes optimize your work, however, by building one asset while working on another.

Tip: Since builds occur in the background and Google Earth Enterprise Fusion is always running, you can close the Google Earth Enterprise Fusion GUI after you start a build, if you do not need to use it for anything else. In fact, this is a good practice, because it frees up RAM and CPU cycles on the workstation, which can improve build performance.

Building an Asset

The building process is the same for all assets--resources, map layers, projects, and databases. This section describes how to build assets, as well as how to debug and resume failed builds, and clean or mark asset versions as bad.

To build an asset:

1. In the Asset Manager, right-click the asset you want to build.
2. Select **Build** from the context menu.

   The status of the asset immediately changes to **Queued**. If no other jobs are waiting, the status changes to **In Progress**.

   Note: Sometimes the status changes so fast that it appears to change directly to **In Progress**. For very large projects (such as an imagery project with thousands of resources), however, it can take several minutes before the state changes to **Queued** or **In Progress**. In extreme cases, it can take 30 minutes or longer. During this time, the Google Earth Enterprise Fusion GUI is unresponsive. Please wait for the GUI to respond.

You can view the progress of the build by double-clicking the **Current Version** or **Current State** column for the asset. The **Version Properties** dialog displays the most recent version of that asset. You can expand the version tree to view the status of the build in real time by clicking the **+** signs.

Note: You can use the shell commands to set up automatic, successive builds for the same database to ensure that you always have the most up-to-date work for a particular data set. See the Command Line Reference chapter for more information.

After you build an asset, it is ready to be included in the next step.

Debugging Asset Builds

When you build a new or modified asset, Google Earth Enterprise Fusion assigns it a version number. Using the Asset Manager, you can determine the status of each version, as well as the availability of older versions of assets.The table below lists the possible states for each asset.

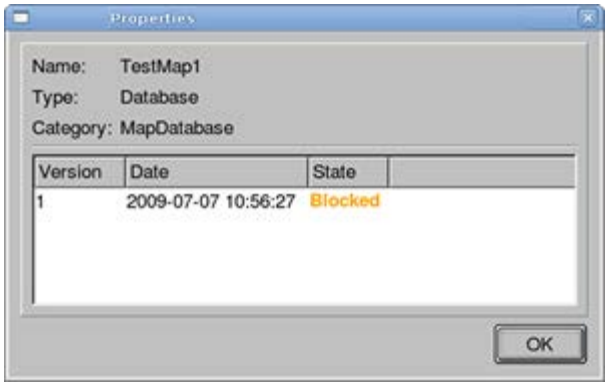
Asset States

Status	Description
Waiting	The asset is waiting for its included assets to finish building.
Blocked	The asset build cannot proceed. One or more of its data sources or subcomponents has failed, is marked bad, or is otherwise unavailable. The responsible component is listed.
Queued	The asset (or its subcomponents) is queued and waiting to be built.
In Progress	The asset (or subcomponents) is actively being built.
Failed	The asset build failed. Click  next to the failed build in the Version Properties dialog to see the Asset Log. See Common Error Messages for more information about each error message that might appear in the log.
Succeeded	The asset build (and subcomponents) succeeded.
Canceled	The asset build was canceled by a user.
Cleaned	The asset version is unavailable, because it has been cleaned.
Bad	The asset version is unavailable, because it has been marked as bad.

To view an asset's build versions:

1. In the Asset Manager, right-click the asset whose version history you want to see, and select **Asset Versions** from the context menu.

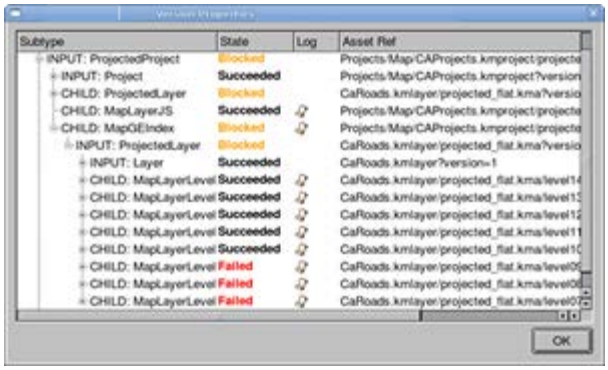
   The **Properties** dialog displays a list of all of the build versions for that asset, including the state of each build. The most recent build appears at the bottom of the list.



2. Double-click the build version you want to investigate.

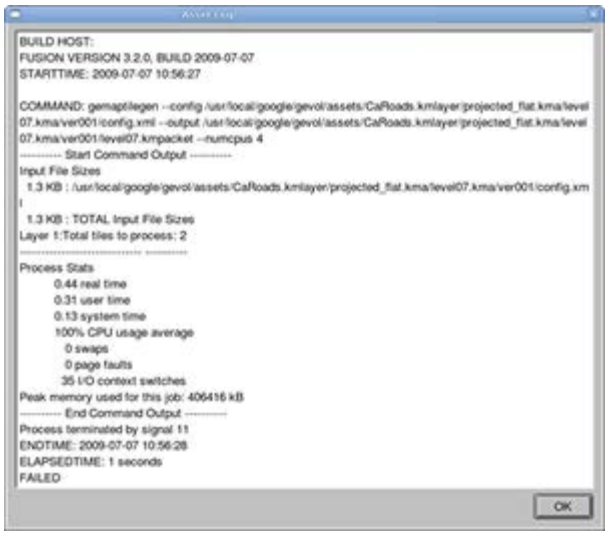
The **Version Properties** dialog displays the hierarchical relationship of the asset and its subcomponents.

Note: You can go directly to the **Version Properties** dialog for the latest asset version simply by double-clicking its **Current Version** or **Current State** field in the Asset Manager.



3. Expand the tree by clicking the **+** next to each version until you display the element that caused the build failure.

4. Click  next to the failed build to view the details about a particular failed process.



The log file provides one or more error messages that describe the problem--typically at or near the end of the command output. With long logs, scroll to the end and then look back for the error messages. See the Common Error Messages chapter of this guide for more information about the error messages in the log.

Resuming Failed Asset Builds

If an asset build fails for an external reason (such as running out of disk space or incorrect file permission settings), you can resume the build after correcting the cause of the failure. When you resume the build, it starts from the point at which failure occurred, rather than repeating the entire build process from the start.

In the example shown in the previous section, the error message is `Fusion Warning: Failed to open source` and the path and file name that could not open. In that case, the permissions were set wrong on the source file. After you change permission on that file, so that Google Earth Enterprise Fusion can open it, your build should be successful.

Note: The **Resume** command is available for assets with a status of **Failed** or **Canceled** only. Its purpose is to continue a build on an asset where there has been no change to the data itself

or to the configuration of the asset. If you change the source data or any configuration detail for the asset, you must start the build from the beginning using the **Build** command instead of the **Resume** command.

When Google Earth Enterprise Fusion successfully completes a build that failed in the past, it uses the same version number for that build as for the previously failed build.

To resume a failed build after correcting the cause of the failure:

1. In the **Version Properties** window, right-click the line that shows the failed build.
2. Select **Resume**.

The asset build continues from that point forward.

For more details on resuming asset builds, see Handling Asset Build Failures in the **Command Line Reference** chapter.

Marking Asset Versions as Bad

You can mark a successfully built asset version as **Bad** to prevent it from being used by any project or database. For example, you might successfully build an asset, but when you preview it, you realize that it does not look the way you intended.

To mark an asset as Bad:

1. In the Asset Manager, right-click the desired asset, and select **Current Version Properties** from the context menu. The **Version Properties** dialog appears.
2. Right-click the version you want to mark as **Bad**, and select **Mark as bad** from the context menu.

   Google Earth Enterprise Fusion immediately changes the state of the asset to **Bad**.

Cleaning Asset Versions

Each asset you build in Google Earth Enterprise Fusion has a version number, so you can easily track successive updates to a particular asset. Each version of an asset is saved as a separate group of data files. Since assets with many versions can take up a significant amount of disk space, you can use the Asset Manager to *clean* unused asset versions.

The clean-up process:

- Removes the data files for all asset versions associated with the selected version that are not used by other assets.
- Cleans downward.

  That is, if you clean a database version, it cleans the associated projects and resources as well. If you clean a project version, however, it cleans only the associates resources, not any databases with which the project might be associated. If you clean a resource version, it cleans that resource version only.
- Changes the state of the asset version to **Cleaned**, which makes that version of the asset unavailable for use by any other asset.

Cleaning an asset version DOES NOT remove:

- Any raw source files associated with the selected asset.
- Any other versions of the selected asset.
- The metadata associated with the asset (such as the version's build history and the names of the assets associated with it).
- Any asset version that is currently being used in a project or a database.

  If you attempt to clean an asset version that is used in another asset, the operation fails, and Google Earth Enterprise Fusion displays a list of related assets.
- Any asset version with an active status (such as **In Progress** or **Queued**).

  If you attempt to clean an asset version that is in the process of being built, Google Earth Enterprise Fusion prompts you to cancel the build before cleaning it.
- The last good version of resources or projects.

To clean an asset version:

1. In the Asset Manager, right-click the asset you want to clean, and select **Current Version Properties** from the context menu. The **Version Properties** dialog appears.
2. Right-click the version that you want to clean, and select **Clean** from the context menu.

   A message prompts you to confirm that you want to clean the asset.
3. Click **Clean**.

   Google Earth Enterprise Fusion cleans the selected asset version and changes its state to **Cleaned**.

Tip: When you want to clean asset versions, start by cleaning databases, working from the oldest to the most current. In most cases, this process cleans old versions of all of the projects and resources related to that database.

Monitoring Current and Recent Activity

The System Manager allows you to view the recent activity log and monitor the progress of background tasks, such as building a database.

To monitor current or recent activity:

1. Select **Tools > System Manager**. The System Manager appears.

Note: No user operations are allowed in the System Manager. It is for monitoring purposes only. See getop in the **Command Line Reference** chapter for the command line equivalent of this information.

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Preparing Data for Google Maps

Overview

In addition to using Google Earth Enterprise Fusion to prepare and publish data in Google Earth, you can use it to prepare and publish 2D map data in Google Maps. This chapter describes all of the steps to prepare your data for Google Maps. It also describes the Google Fusion Maps API.

The first step in preparing any data for publication is to import the source data as Google Earth Enterprise Fusion resources. You can use the same vector resources you defined in the Defining Resources chapter for Google Maps.

Note: For Google Maps, you define vector data only. You can use the same imagery project for both Google Maps and Google Earth EC databases

After you define and build your vector resources, Google Maps requires an additional step. You must define and build at least one map layer for each map project. The Defining a Map Layersection describes how to do so.

The remaining steps are similar for Google Maps data as for Google Earth EC data.

1. Define and build a project.
2. Define and build a database.
3. Publish the map database.

Google Maps Browser Support and Incompatibilities

Google Maps is supported by the following browsers:

- Microsoft Internet Explorer (IE) 7.0 and later (for Windows)
- Firefox 3.6 and later (for Windows, Mac, and Linux)
- Safari 3.1 and later (for Mac and Windows)
- Google Chrome (for Windows and Mac)

Even if you are using a supported browser, there are some features in Google Earth Enterprise Fusion that are not supported by some browsers on certain operating systems. As long as you are connected to the Internet and have a license key for the Google Maps API, there is no problem (regardless of your platform), since your server contacts Google's servers for functions that are not supported in the browser.

If you do not have a license key or access to the Internet, however, the following features will not work, since these features require that you connect to a Google server:

Directions
- Traffic
- KML overlays
- Geocoding
- LocalSearch

In addition, drawing polylines on maps requires the vector drawing facilities of the browser. If a browser does not support drawing polylines, Google Maps gets the support it requires from the Google servers via the Internet. If your server does not have access to the Internet and the browser does not have the required vector drawing facilities, polylines will not appear in Google Maps. See http://www.google.com/apis/maps/documentation/reference.html#GPolyline for more information.

Google provides a sample application with Google Earth Enterprise Fusion to support drawing polylines, if you are not connected to the Internet or do not have a license key for the Google Maps API. The sample application is in:

```
/opt/google/gehttpd/htdocs/maps
```

The sample application files are:

```
example_google.html
example_local.html
maps_google.html
maps_local.html
```

To create your own application, make a back-up copy of these files, and then edit them for the desired results.

Caution: Neither this document nor the sample application is intended to teach you how to write JavaScript. You must test your application during run-time to ensure that it works correctly on all browsers you intend to support.

Defining a Map Layer

Google Earth Enterprise supports the following types of imagery for a map layer:

- *Mercator Map*. The Mercator Map includes the Google Maps layer and uses the Google Maps API from google.com. It also uses a local copy of the Google Maps API and has no communication with google.com.
- *Flat Projection Map*. The Flat Projection Map uses the local copy of the Google Maps API and has no communication with google.com. The Flat Projection map is useful because the imagery layers for Google Earth and Maps can share the same database.

Note: The Flat Projection Map us not compatible with the maps.google.com layers that are in the Mercator Map projection. A Mercator Map and Google Google Earth database require separate copies of the imagery to work together.

Defining a map layer consists of adding resources to the layer and defining the display rules and filters for the layer. This section describes how to do so.

To define a map layer:

1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. From the drop-down menu, select **Mercator Maps Tools (2D)** or **Flat Projection Map Tools (2D)**.
3. Click  . The Map Layer Editor appears.
4. Specify values in the Legend area for the entire map layer by clicking the following fields

under **default**:

- **Icon**: The icon that appears in the legend in Google Maps.
- **Name**: The text label that appears in the legend in Google Maps.
- **Initial State**: Determines whether the map layer is turned on or off by default in Google Maps. The first time a user connects to the database containing this map layer:
  - If you select **On** as the initial state here, the check box for the map layer is automatically checked.
  - If you select **Off** as the initial state here, the check box for the map layer is automatically unchecked.

  Google Maps saves the state of the check box when a user disconnects from the database. For example, if you set the initial state to **Off**, and then a user subsequently checks the box for a map layer in Google Maps and then disconnects from the database, the next time that user connects to that database, the state of the check box for that map layer is the same as when the user disconnected; that is, the box is checked.

  > **Caution:** If you select **On** as the initial state for the map layer, be aware of the performance impact on Google Maps. If a user selects too many map layers simultaneously in Google Maps, it can seriously impact performance. So it is best not to turn on too many map layers at the same time. In most situations, setting the initial state to **Off** is the best choice.

- **Thematic Filters**

  Determines which type of thematic information you want displayed in your map layer. Thematic filters are used to show variations of colors for different values of vector features.

  For example, you can use color polygons to show population differences for different counties in a state. You can set the filter to analyze the distribution of populations for the set and then apply a gradient of color to each polygon that represents a county.

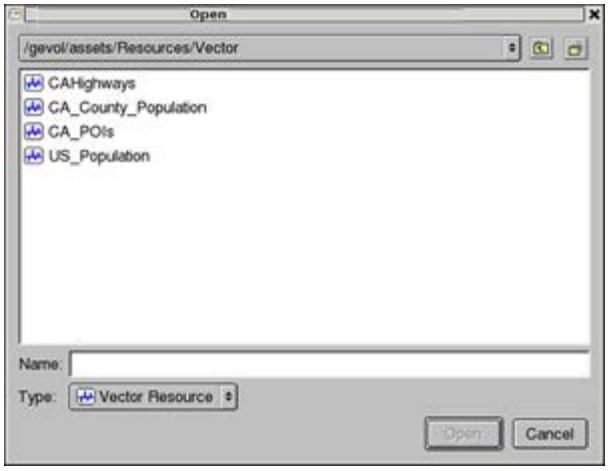
- **Allow Feature Duplication**

  Determines if the same map feature is displayed.

- **Allow Empty Layer**

  Determines if an empty layer in the map is allowed.

5. If you want to add language support for additional locales, uncheck the box next to **Hide unspecialized locales**. See the Legend Tab section of the **Defining Projects** for more information about this option.
6. Click **Add Resource**. The **Open** dialog appears.



7. Navigate to and select the vector resource you want to add to the map layer, and click **Open**. The selected resource appears on the list on the left of the Map Layer Editor.
8. Repeat steps **6** and **7** to add more resources to the map layer.

9. If you want to change the order of the resources on the list, use the  or  to move them up or down.

   Note: The order in which the resources are listed in this dialog reflects the order in which they are rendered in Google Maps, which affects visibility and label placement. The resource at the bottom of the list is rendered first and the resource at the top of the list is rendered last. So the resource at the top of the list is always visible.

   For complete details about the buttons below the list of rules, see Additional Rule Configuration Options in the **Defining Projects** chapter.

10. Select a display rule for a resource on the list. The **Feature** and **Filter** tabs appear on the right.

    The first option on the **Feature** tab is **Draw Features As**. Your selection determines the options available for you to specify:

    - Label Only
    - Lines
    - Polygons
    - Points

11. When you finish specifying all of the feature options for the selected display rule, you can specify one or more filters for each rule. See Specifying Filters for a Map Layer.
12. When you finish defining display rules and filters for the resources, select **File > Save**.
13. Navigate to the folder where you want to save your map layer, or click  to create a new folder in the desired location.
14. Enter the name of your map layer, and click **Save**. The new map layer name appears in the Asset Manager's asset list.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

Label Only

This section describes your options when you select **Label Only** for **Draw Features As** in the Map Layer Editor.

To define a display rule for a label:

1. Select **Text** or **JS Text**.
2. Either enter the text you want to appear for all features or click the text insertion button (**...**) to the right of the empty text field. If you click the text insertion button:
   - **Text** - The Label Format dialog appears.

     The Insert Field drop-down list contains the names of all of the fields in your source data. Select a field name from the list, and click **OK**. For example, if you select **NAME**, the names of the roads appear in Google Earth EC.

   - **JS Text** - The JavaScript Editor appears, and you can compose a JavaScript expression, which returns the string to use as the label. See Label Properties in the **Defining Projects** chapter for more information about this editor.)
3. Specify the visibility range for the layer.

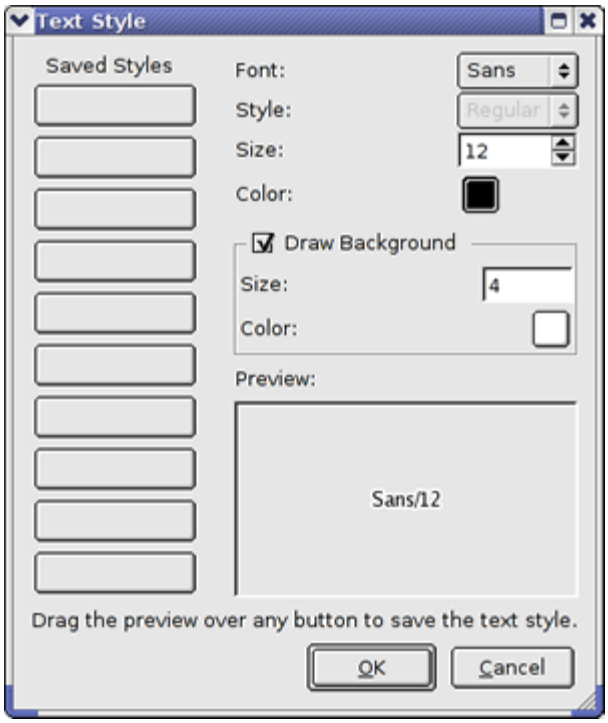
   The visibility range refers to the zoom level at which your labels are visible in Google Maps. The default values for the range are **8** and **14**. That means that when a Google Maps user has a zoom level setting below **8** and above **14**, the labels are not visible.

   Caution: The default visibility range is much smaller that the default visibility range for vector layers destined for Google Earth EC. The reason is that building Google Maps databases can take significantly longer than building the same data for Google Earth EC.

Even small increases to the end level of the range can add significant time to the build time.

4. The default text style is black on white in the Sans 12 font. Click the text style button to specify a different text style for the labels.

   The **Text Style** dialog appears.



5. Select a different option, if desired, for the **Size** or **Color** of the text.

   Note: The only font that Fusion provides by default is *Sans regular*. To add fonts, including international fonts such as Chinese, Japanese, or Hebrew, you can create a configuration file called a "font list" file. See *Configuring Fonts For the Text Style Dialog* in the *Administration Guide*.

6. Select **Draw Background** if you want to highlight your labels with a background color.

   If you select **Draw Background**, you can specify the size and color of the background. The Preview area provides a preview of a sample label as you make changes.

   - The default background size is **4**. To change the background size, enter the desired value. The larger the number, the larger the background.

     Note: Setting the background size to less than 4 could potentially crop the edges of the text. Specifying too large a number can result in overlapping labels.

   - Click the **Color** button and select a color for the background.

7. To save the text style settings, drag the preview over any button on the left.

   The new style is stored on that button, replacing any style previously assigned to that button. Each button name reflects the font face and size of the style, and it appears with the selected color and outline attributes.

   After you save a style to a button, you can simply click that button to automatically select its text style settings for another label in the future.

8. Click **OK**.

Lines

This section describes your options when you select **Lines** for **Draw Features As** in the Map Layer Editor.

To define a display rule for lines:

1. Specify the visibility range for the lines.

   The visibility range refers to the zoom level at which your labels are visible in Google Maps. The default values for the range are **8** and **14**. That means that when a Google Maps user has a zoom level setting below **8** and above **14**, the labels are not visible.

   > **Caution:** The default visibility range is much smaller that the default visibility range for vector layers destined for Google Earth EC. The reason is that building Google Maps databases can take significantly longer than building the same data for Google Earth EC. Even small increases to the end level of the range can add significant time to the build time.

2. Specify the color of the lines by clicking the button next to **Color** and selecting a color.
3. Specify the width of the lines.

   The default line width is **2**. To change the line width, enter the desired value next to Line Width. The larger the number, the thicker the line.

   > **Note:** Setting the outline width to less than 1 could potentially make it invisible.

4. Select **Label** if you want to include a text label, and specify the options for the label. The label generally appears along the line, such as a street name. See Label Only for more information.
5. Select **Shield** if you want to include a shield for road data, and specify the Shield options.

   The Shield options are the same as the Label options, except that you can also specify the Outline Color for the shield. To do so, click the button next to **Outline Color**, and select a color.

Polygons

This section describes your options when you select **Polygons** for **Draw Features As** in the Map Layer Editor.

To define a display rule for polygons:

1. Specify the visibility range for the polygons.

   The visibility range refers to the zoom level at which your labels are visible in Google Maps. The default values for the range are **8** and **14**. That means that when a Google Maps user has a zoom level setting below **8** and above **14**, the labels are not visible.

   > **Caution:** The default visibility range is much smaller that the default visibility range for vector layers destined for Google Earth EC. The reason is that building Google Maps databases can take significantly longer than building the same data for Google Earth EC. Even small increases to the end level of the range can add significant time to the build time.

2. Select a mode from the drop-down list.

   The mode indicates whether the polygons appears as outlined, filled, or both in Google Maps. If you select:

   - **Fill Only** - You can set the fill color by clicking the color button.
   - **Outline Only** - You can set the outline width and outline color.

     The default outline width is **2**. To change the outline width, edit the value in the text field. The larger the number, the thicker the outline.

     > **Note:** Setting the outline width to less than 1 could potentially make it invisible.

   - **Outline and Fill** - You can set the fill color, outline width, and outline color.
3. Select **Center Label** if you want to include a text label in the center of the polygon, and specify the options for the label. See Label Only for more information.)
4. If you selected **Outline and Fill** or **Outline Only**, select **Outline Label** if you want to include an outline label, and specify the options for the label. See Label Only for more information.

Points

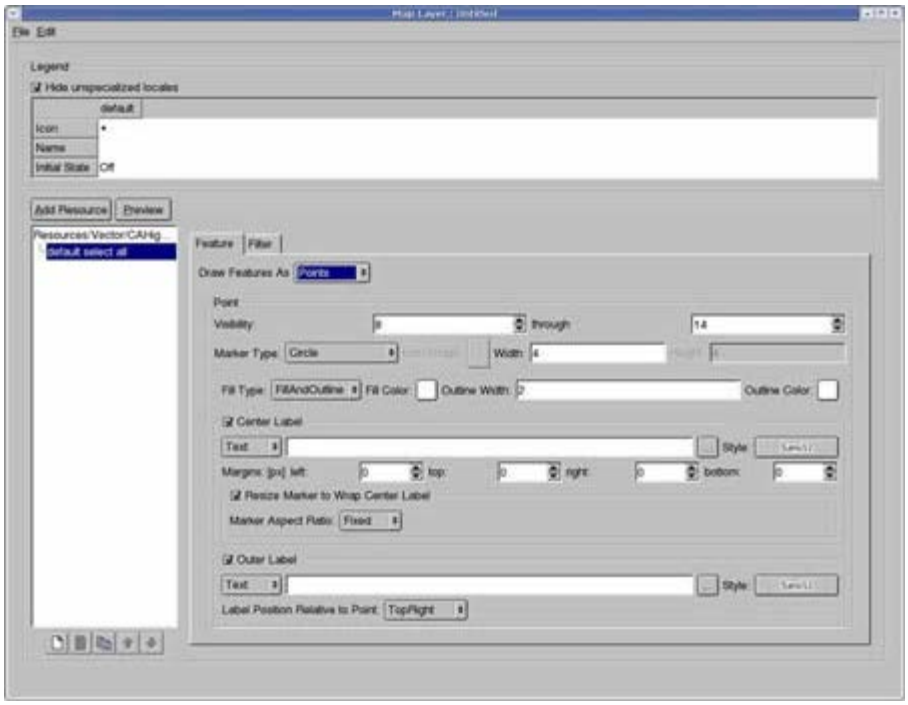
This section describes your options when you select **Points** for **Draw Features As** in the Map Layer Editor.

To define a display rule for points:

1. Specify the visibility range for the points.

   The visibility range refers to the zoom level at which your labels are visible in Google Maps. The default values for the range are **8** and **14**. That means that when a Google Maps user has a zoom level setting below **8** and above **14**, the labels are not visible.

   > **Caution:** The default visibility range is much smaller that the default visibility range for vector layers destined for Google Earth EC. The reason is that building Google Maps databases can take significantly longer than building the same data for Google Earth EC. Even small increases to the end level of the range can add significant time to the build time.



2. Specify the **Marker Type** from the drop-down menu.

   If you select:

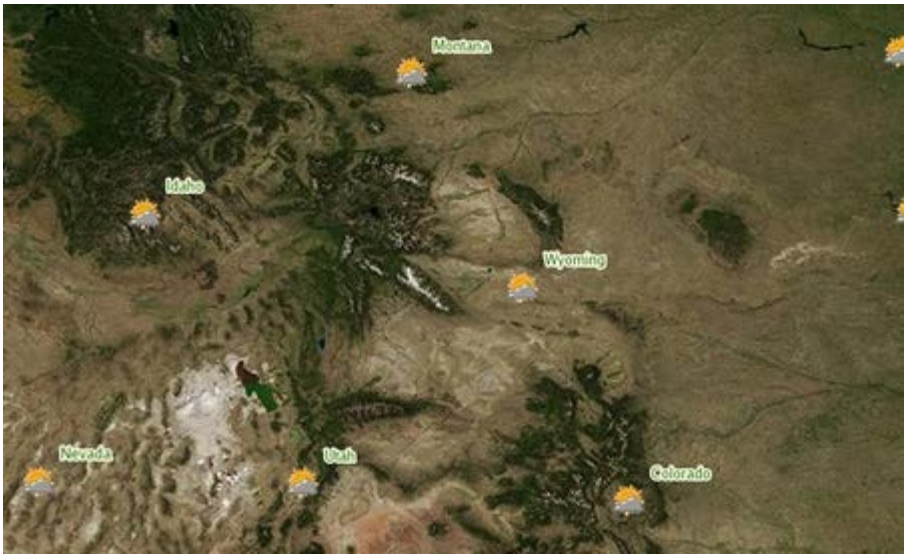
   - **Circle** - You can set width.
   - **Oval** - You can set width and height.
   - **Square** - You can set the width.
   - **Rectangle** - You can set the width and height.
   - **Equilateral Triangle** - You can set the width.
   - **Triangle** - You can set the width and height.
   - **Icon** - You *cannot* set width or height.
   - The default outline width is **2**. To change the outline width, edit the value in the text field. The larger the number, the thicker the outline.

     > **Note:** Setting the outline width to less than 1 could potentially make it invisible.

   - **Outline and Fill** - You can set the fill color, outline width, and outline color.
3. Specify the **Center Label** type from the drop-down menu. You can choose Text to JavaScript text.
4. Specify the **Style** and **Margins** for the text within the point.
5. Specify the **Outer Label** text, style, and label position relative to the point.

The following is an example of points that use a center label:

This example shows points with an icon marker type and an outer label:



This example shows a square marker type with a border:

Specifying Filters for a Map Layer

A filter is a pattern expression that is applied to a specific field of a map layer. When the pattern expression matches the specified field in the associated vector data, Google Earth Enterprise Fusion selects the matching records and applies the feature settings for the rule to those records. Filters are inclusive. Specifying filters for map layers is identical to specifying filters for vector projects.

Note: Filters match string and numeric data only, not dates and other complex patterns.

Defining a Map Project

This section describes defining map projects for Google Maps only. For information about defining vector projects for Google Earth EC, see the chapter titled Defining Projects.

Creating a Map Project

The first step in defining a map project is to specify which map layers to include and give the project a name.

To create a map project:

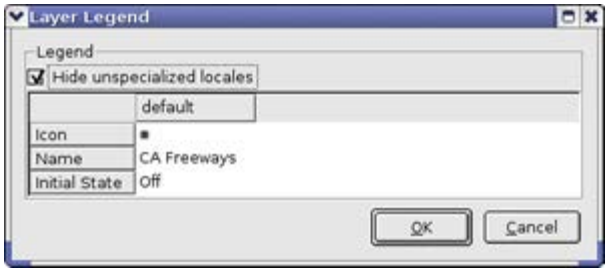
1. Select **Tools > Asset Manager**. The Asset Manager appears.
2. Click  . The Map Project Editor appears.
3. Click  . The Open dialog appears.
4. Navigate to the folder that contains your map layers.

   Note: The selection in the Type drop-down list near the bottom of this dialog determines the type of assets that appear on the list. Map Layer is automatically selected when you open this dialog from the Map Project Editor, so only map layers appear on the list.
5. Select the map layer you want to add to the project, and click **Open**.

   The selected map layer appears in the Map Project Editor.

   The value defined in the layer's **Name** field (at the top of the Map Layer Editor) appears under **Legend Name**, and the path and layer name appears under Layer.
6. If you want to override the default icon, legend name, or initial state setting, double-click the value under **Legend Name**.

   The **Layer Legend** dialog appears.



7. Change the desired value(s), and click **OK**.

   The new legend name appears in the Map Project Editor.

   Tip: If you ever want to return to the default label and initial state settings, right-click the layer and select **Use Layer Defaults** from the context menu.

8. Repeat steps **3** through **7** for each additional map layer you want to include in the project.

9. To remove a layer from a project, select the layer you want to remove, and click  .

   Alternatively, you can right-click the layer, and select **Remove Layer** from the context menu.

10. To reorder layers in a project:
    a. Select the layer you want to move.
    b. Click  or  to move the selected layer until it appears where you want it on the list.

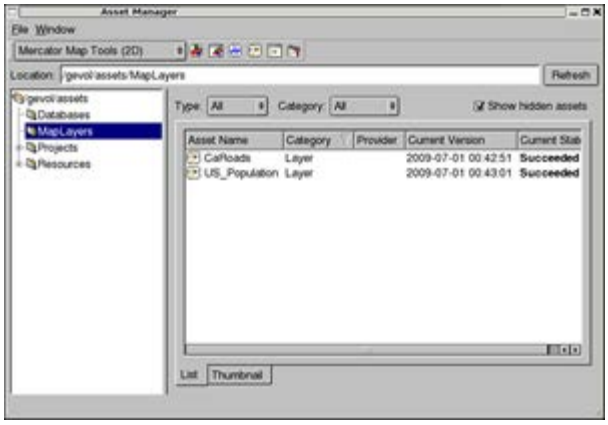
       Alternatively, you can right-click the layer, and select **Move Layer Up** or **Move Layer Down** from the context menu.

    c. Repeat the steps until the layers are in the order in which you want them to appear in the Layers panel of Google Earth EC.

11. When you finish adding/modifying map layers, select **Save** from the **File** menu.

12. Navigate to the folder where you want to save your project, or click  to create a new folder in the desired location.
13. Enter the name of your project, and click **Save**.

    The new map project name appears in the Asset Manager's asset list.



Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

When you finish defining your map project, you can build it individually, build several projects at the same time, or wait until you build your database to build all of its projects at the same time.

When you modify and then save a map project, Google Earth Enterprise Fusion saves it in the same place with the same name as the original. If you modify a map project that you have already built, you must build a new version to make the changes available for use in a database.

Modifying Map Projects

After you create a map project, you can use the Asset Manager to modify it. Modifying a map project is exactly the same as modifying any vector project.

See Modifying Projects in the **Defining Projects** chapter for complete information.

Defining a Map Database

This section provides information on defining map databases for Google Maps only. For information about defining databases for Google Earth EC, refer to the chapter titled Defining and Publishing Databases.

To define a map database:

1. Select **Asset Manager** from the **Tools** menu. The Asset Manager appears.
2. From the selection box, select **Mercator Map Tools (2D)** and click the **New Mercator Map Database** icon.

   The Map Database Editor appears with no projects selected.

3. Click  next to **Map Project**.
4. Navigate to the folder that contains your Map projects.

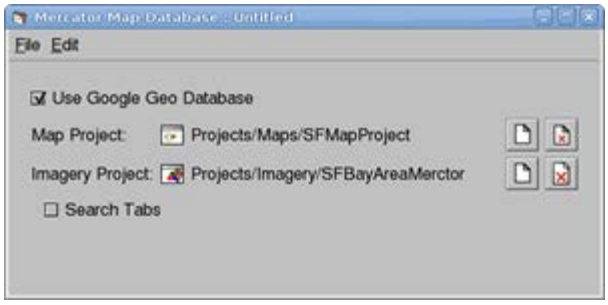
   > **Note:** The selection in the **Type** drop-down list near the bottom of this dialog determines the type of projects that appear on the list. **Map Project** is automatically selected, so only map projects appear on the list.

5. Select the Map project you want to add to the database, and click **Open**.

   The selected project appears in the Map Database Editor next to Map Project.

6. **Mercator Map Databases only**: If you have a license for the Google Geo Database and would like to use it as the imagery for this database, select the **Use Google Geo Database** checkbox. This option will not be available when creating Flat Projection Map Databases.

   If you check this box, you cannot select an imagery project. In those cases, the imagery is supplied by Google, and you can skip step 7.

   > **Note:** Any server that hosts a Google Geo Database must have access to the Internet. If you are not licensed to use the Google Geo Database and would like to know more about it, please contact Google Enterprise Support at enterprise-support@google.com.

7. Repeat steps **3** through **5** to add an imagery project, if you did not check the box next to **Google Geo Database**.

   Both projects appear on the list.

   > **Note:** This imagery project can be the same as one you use in a database that you

publish to Google Earth EC.

8. If you want to configure search tabs for the database, click **Search Tabs**. See Adding Search Tabs to a Database in the **Defining and Publishing Databases** chapter for details.
9. When you finish defining your database, select **Save** from the File menu.
10. Navigate to the folder where you want to save your database, or click  to create a new folder in the desired location.
11. Enter the name of your database, and click **Save**.

Now you are ready to build your database. See the Building Assets chapter for complete details.

Caution: Assets can not be deleted once they are saved. They can be *cleaned*, so that they are no longer available to use in Google Earth Enterprise Fusion; see Cleaning Asset Versions in the **Building Assets** chapter for more information.

Publishing a Map Database

Publishing a database for Google Maps is exactly the same as publishing a database for Google Earth EC, although the list of server associations is different.

See Publishing a Database for complete details. You can publish a map database only to the server associations designated as MAP type.

Viewing a Map Database

After you publish your database, you can view it in a browser.

To view your map database:

1. Launch any web browser.
2. Point your browser to:

   ```
   serverURL/default_map
   ```

   where *serverURL* is the full URL of the stream server to which you published the map database, including the protocol, the server location, and the port (if the port is other than the default, port 80). For example:

   ```
   http://my_host_name/default_map
   ```

   If you are not sure which server you published to, contact your Google Earth Enterprise Server administrator for help.

   Google Maps displays your database.

Using the Fusion Maps API

The Fusion Maps API is used to create and interact with map layers created in Google Earth Enterprise. The API is based on the Google Maps API but includes an additional `GFusionMap` class that will make it easier to interact with map layers generated by Google Earth Enterprise. The documentation for the Google Maps API is available at: http://code.google.com/apis/maps.

Note that the Fusion Maps API does not currently support objects that require calling URLs hosted at Google to operate. Objects that are not supported in the Fusion Maps API include: `GGeoXML`, `GClientGeocoder`, `GDirections`, `GAdsManager`, `GGoogleBarOptions`, `GDirections`, `GTrafficOverlay`, `GStreetViewPanorama`, `GStreetviewOverlay`

class GFusionMap

Instantiate class `GFusionMap` in order to create a Fusion map. This is an extension of the `GMap2`

class, and the `GFusionMap` class should be used instead of `GMap2` to create applications will use layers from Google Earth Enterprise.

Constructor

Constructor	Description
`GFusionMap(container, opts?)`	Creates a new Fusion map inside of the given HTML container, which is typically a DIV element. The options are the same as the options for GMap2. However, if a map type is passed in to the options, the Fusion maps server will override these if an imagery layer is included in the Fusion Maps Database. After this constructor is invoked, the `setCenter()` method should be called before any methods that display Fusion layers on top of the map.

Methods

Methods	Return Value	Description
`showInitialFusionLayers()`	`none`	Show all layers that are enabled by default. This method should only be invoked after the `setCenter()` method has been called to initially draw the map.
`getFusionLayerCount()`	`Number`	Returns the number of Fusion map layers. This does not include the base imagery layer, which is built as a custom map type and serves as the background of the map.
`isFusionLayerVisible(index)`	`Boolean`	Returns true if the layer is currently shown on the map and false if it is hidden.
`showFusionLayer(index)`	`none`	Shows a previously hidden Fusion map layer. This method should only be invoked after the `setCenter()` method has been called to initially draw the map.
`hideFusionLayer(index)`	`none`	Hides the specified Fusion map layer.
`getFusionLayerName(index)`	`String`	Returns the name of the specified layer.
`getFusionLayerIcon(index)`	`String`	Returns the URL of the icon associated with the specified layer.

Examples

Several examples are installed by default illustrate how to use the Fusion Maps API. You can find these examples in:

```
/opt/google/gehttpd/htdocs/maps
```

See the following files:

```
```

```
maps_local.html
maps_google.html
example_google.html
example_local.html
```

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Command Line Reference

Overview

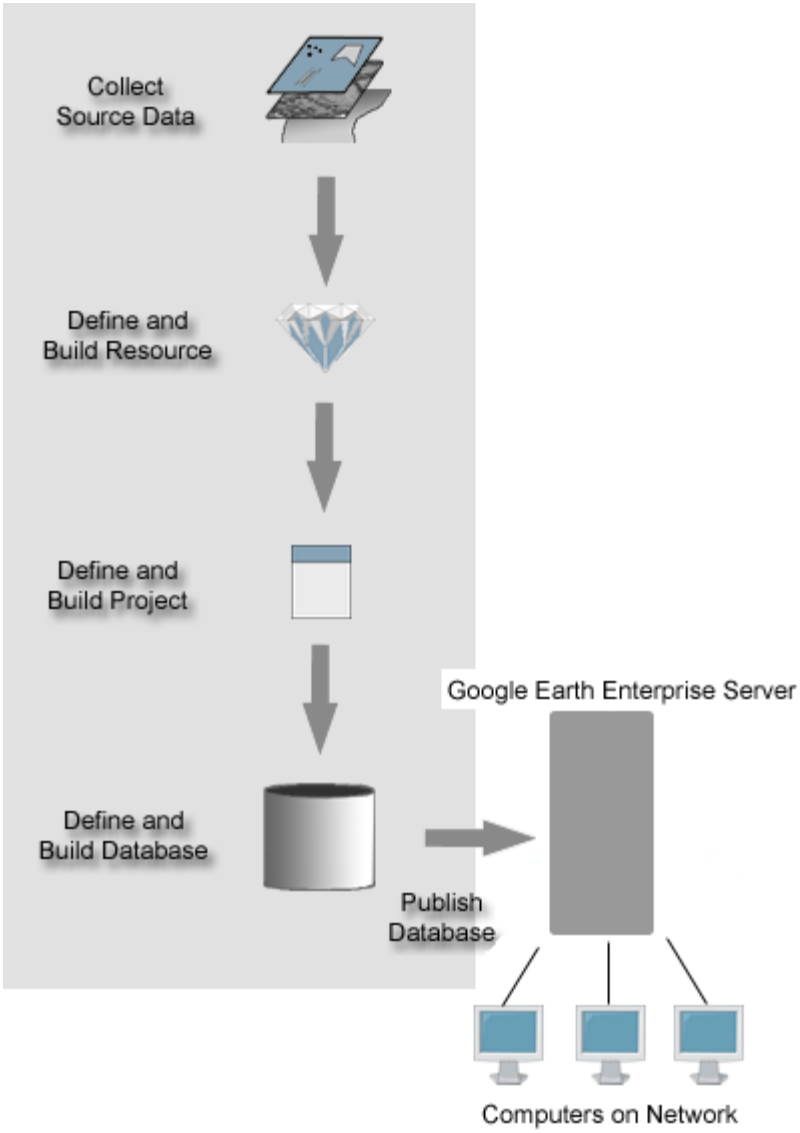
This chapter describes the shell commands for Google Earth Enterprise Fusion. You can use the shell commands to set up an automated environment to build and deliver databases from frequently updated or new source data.

In addition, if you have a large number of sources to process, you can build a command line script to add them rather than adding them individually using the Google Earth Enterprise Fusion GUI.

Note: The commands included in previous releases that began with **kh** have all been changed to begin with **ge** since version 3.0. They are documented by their new names in this guide.

A feature of an automated system is the ability to optimize your work at all phases of data collection--resource, project, and database definition. You can:

- Build a database to process all of the resource and project data that comprise the database.
- Build a project to process all of the resource data that comprise a project.
- Build an individual resource as new source data becomes available.



You can use the Google Earth Enterprise Fusion shell commands to access all components in each building phase of a servable set of GIS data. This appendix provides a list of commands grouped by component--resource, project, or database--and then describes each command in an alphabetical listing. In addition to the information in this appendix, you can determine each command's usage by simply entering the command with the `--help` option, for example

```
genewimageryresource --help
```

This appendix uses the following typographic conventions:

Italic	Information that the user must supply
Bold	Text that the user must type exactly as shown
Ellipsis **...**	Parameter that can be repeated several times in a command line
Square brackets **[ ]**	Optional items
Curly braces **{ }** with options separated by pipes **|**; for example: **{even | odd}**	Set of choices from which the user can select only one
Parentheses **( )**	Grouped items that function together.

`Courier font`	Code or program output

Commands Listed by Functional Area

Resource Commands

This section describes the commands you can use to define and modify terrain, imagery, and vector resources from the command line:

- genewimageryresource
- genewmaplayer
- genewterrainresource
- genewvectorresource
- gemodifyimageryresource
- gemodifyterrainresource
- gemodifyvectorresource

You can use these commands for bulk processing when you have large quantities of data to process. See the Defining Resources chapter for more information.

Defining and Modifying Resources

When defining and modifying resources, keep these points in mind:

- You define a single resource at a time by importing a single source file or multiple source files.
- When you import multiple source files for a single resource, all of the source data must have the same projection, and the header attributes must have the same structure. The source files, however, can be in different formats, such as TIFF or IMG (although this is unlikely).
- You can import the same source file into different resources.
- If you use one of the `modify` commands (`gemodifyimageryresource`, `gemodifyterrainresource`, or `gemodifyvectorresource`) and specify a resource that does not exist, Google Earth Enterprise Fusion creates a new resource with the name you specify.
- When you import multiple source files for a single imagery or terrain resource, the pixel resolution of all files must be the same.
- When you import multiple source files for a single vector resource, the geometry type must be the same.
- You must use a `modify` command to change properties for an existing resource. If you use the one of the `new` (`genewimageryresource`, `genewterrainresource`, or `genewvectorresource`) commands and a resource with the name and type you specify already exists, the command fails.

When you define an imagery or terrain resource, the source file must include geo-reference information. Typically the coordinate and projection information is part of the imagery file itself (as with a GeoTIFF file, for example). However, if your imagery source file does not contain geo-coordinate information, you must provide it in a separate external file. (See Special Cases in the **Defining Resources** chapter for details about external files.)

Importing Preprocessed Resources

If you purchase preprocessed imagery or terrain data from Google or receive preprocessed data from another Google Earth Enterprise Fusion user, it arrives as a complementary pair of folders. These folders share the same name but have different extensions. Folders with a `.kip` extension are imagery data. Folders with a `.ktp` extension are terrain data. Folders with a `.kmp` extension are mask files. Folders with a `.kvp` extension are vector data.

You must use the Google Earth Enterprise Fusion command line tools to add preprocessed data to your asset root. The command line tools for importing preprocessed data are:

- genewimageryresource
- genewterrainresource

These commands have similar options and parameters.

You must specify the **--havemask** option to correctly import the preprocessed mask files with the imagery. You can associate provider copyright information with the resource by specifying the **--provider** option and the appropriate provider key. You specify the resource name and target location in the asset tree with the `-o` option (for example: `-o assets/imagery/north_america/usa/ca/usgsLandSat`), followed by the full path to the source data.

To import preprocessed imagery data:

1. Change to the asset root folder, for example:

   ```
   cd /gevol/assets
   ```

   Tip: Although this step is not necessary, it allows you to use auto-completion (pressing **TAB** after typing the first few letters of a file name) on the command line, which helps you avoid typographical errors.

2. Add the imagery data with the `genewimageryresource` command, for example:

   ```
   genewimageryresource --provider <PROVIDER_KEY> --havemask
   -o path/to/resource/directory/resourcename /path/to/imagery.kip
   ```

3. Press **Enter**.

   Google Earth Enterprise Fusion defines the resource.

To import preprocessed terrain data:

1. Change to the asset root folder, for example:

   ```
   cd /gevol/assets
   ```

2. Add the terrain data with the `genewimageryresource` command, for example:

   ```
   genewterrainresource --provider <PROVIDER_KEY> --havemask
   -o path/to/resource/directory/resourcename /path/to/terrain.kip
   ```

3. Press **Enter**.

   Google Earth Enterprise Fusion defines the resource.

Project Commands

After defining resources, the next phase in producing a Google Earth database involves defining projects and adding resources to them. For your database, you can define up to three different projects--imagery, terrain, and/or vector.

This section describes the commands you can use to define and modify terrain, imagery, and vector projects from the command line:

- genewimageryproject
- genewterrainproject
- genewvectorproject
- gemodifyimageryproject
- gemodifyterrainproject
- gemodifyvectorproject
- geaddtoimageryproject
- geaddtoterrainproject
- geaddtovectorproject
- gedropfromimageryproject
- gedropfromterrainproject
- gedropfromvectorproject

As with resource commands, you can use these commands for bulk processing when you have large quantities of data to process. See Defining Projects for more information.

Defining and Modifying Projects

When defining and modifying resources, keep these points in mind:

- You use the project modification commands to redefine an existing project with a known set of resources. You can use one of the `modify` commands as a single command to achieve this operation, rather than having to use the `addto` or `dropfrom` commands to change the resources in an existing project. That is, when you use the project modification command, the resources you specify replace the previous set of resources for that project.
- When you add terrain and imagery resources to a project, Google Earth Enterprise Fusion automatically orders them according to their resolution. That is, a 1-meter imagery resource is stacked on top of a 3-meter imagery resource. Beyond that, the imagery resources are ordered according to the order in which you list them in the command.
- You can use the `addto` command to add resources to an existing project. To add resources to a project that has not yet been defined, use the `new` command.

Database Commands

This section describes the commands you can use to define and modify terrain, imagery, and vector databases from the command line:

- genewdatabase
- gemodifydatabase

As with resource and project commands, you can use these commands for bulk processing when you have large quantities of data to process. See Defining a Database for more information.

Defining a Database

Before publishing your project and resource data to a Google Earth Enterprise Server, you must define a database. A database typically contains at least a single project--imagery, terrain, or vector. It can contain one project of each type for a total of three projects.

When you define a database without one of the three project types, that project type is supplied by the default project data specified in your Google Earth Enterprise Fusion system configuration. For example, if you define a database using your own imagery and terrain projects, but you supply no vector project, the default vector project is used. (See the *Google Earth Enterprise Administration Guide* for a description of the default project settings.)

> **Tip:** The `gemodifydatabase` command exists as a convenience when you must redefine the projects for a given database. However, it is not recommended that you use this command to repeatedly redefine the projects for a single database. For example, if you want to view different vector data projects in relationship to the same imagery and terrain projects, you should define two separate databases with different vector projects rather than repeatedly redefining the same database in order to switch vector data.

Building Commands

This section describes the commands you can use to build any type of asset--resource, map layer, project, or database--from the command line:

- gebuild
- gecancel
- geclean
- gequery
- geresume
- gesetbad
- geclearbad

Google Earth Enterprise Fusion allows you the flexibility of building the entire database and its

components at the same time or building the individual components one at a time. This flexibility is particularly useful when source data updates become available at varying times, and you want to build some components before other components are updated.

When you define or modify a resource, you are defining the source file and configuration settings for the resource. When you build the resource, you are using those settings to actually produce the resource itself, which is a group of related files that are the result of this processing.

You can use the `gecancel` command to cancel a build that is in progress. If, for example, you realize that you've specified an incorrect value for the configuration of a resource that is already building, you can use this command to stop the build.

Handling Asset Build Failures

Sometimes a build fails for external reasons, such as lack of disk space or file permissions set incorrectly. When that happens, after you resolve the disk space problem, you can use the `geresume` command to continue building the asset from the point at which the build failed. The purpose of the `geresume` command is to continue a build on a version where there has been no change to the data itself--only changes to external factors.

On the other hand, if the build failed because of a configuration or inherent data problem, you can change the configuration of the asset (such as removing a resource from a project or changing the visibility range for a display rule). Then you must use `gebuild` to rebuild the resource, since the underlying data actually changed.

Unlike the `gebuild` command, `geresume` does not define a new version of the resource; it rebuilds a previously failed or canceled version.

Querying Asset Properties

You can use the `gequery` command to debug the process of building an asset when it fails to build or to find a specific version of an asset. Typically, you use the `--status` parameter to determine the initial status of a particular asset.

If for some reason the asset build fails, you can use the other available querying parameters to further expose the details of the build for that asset in order to identify the specific point at which the build failed. A typical debug process involves the following steps:

1. Find the dependency list for a resource.

   ```
   gequery --dependencies imagery/Mississippi/RiverDelta
   ```

2. Determine the first failed element in the dependency list.
3. View the dependency list and note the dependency with a failed status.
4. Use the `gequery` command on the failed element to view its log file.

   ```
   gequery --showlog imagery/Mississippi/RiverDelta/RiverDelta?version=3
   ```

   Note: You can use the `gequery` command for an asset or for source data.

5. View the log file to check for relevant error messages.

Cleaning Assets

Each time you build an asset, Google Earth Enterprise Fusion creates a new version for that asset. As a consequence, many updates to an asset can take up significant disk space. You can use the `geclean` command to clean out assets whose prior versions are no longer needed and are not being referenced by other projects or databases.

For details on cleaning assets and the requirements for this process, see Cleaning Asset Versions in the **Building Assets** chapter.

Marking an Asset as Bad

Using the `gesetbad` command, you can change the status of a resource, project, or database to **Bad** after it has been successfully built. This command is useful if, for example, you incorrectly

configure an asset but do not realize it until after the build is complete. By marking the asset as **Bad**, you can prevent other users (or yourself) from building on that asset in the future.

For example, you can create two versions of an imagery resource, build them both, and preview them, and then decide which one you want to keep. You can use the `gesetbad` command to prevent the rejected resource from being used to build projects and databases.

To revert the **Bad** status to the prior status, use the **--off** parameter.

Building a Database

After you define a database with its project components, you must build it before publishing it to the server. If you have already built some components of your database, Google Earth Enterprise Fusion does not repeat that work when it builds the database. It only builds the components that have not yet been built. However, even if all of your database components have been built prior to being added to the database, you must still build the database before publishing it.

Publishing Command

This section describes the command you use when you are publishing a database:

- gepublishdatabase

After you successfully build a database, you can publish it to a stream and search server association and then view the data with Google Earth EC. See Publishing a Database for more information about publishing.

Miscellaneous Commands

There are several commands you can use to perform various miscellaneous Google Earth Enterprise Fusion tasks from the command line, including:

- geinfo
- gemaskgen
- gepolymaskgen
- geraster2kml
- gereproject
- gesplitkhvr
- getop
- getranslate
- gevirtualraster

Commands Listed Alphabetically

geaddtoimageryproject geaddtoterrainproject

```
geaddtoimageryproject
geaddtoterrainproject --o projectname resourcename...
```

Purpose

To add one or more resources to an existing imagery or terrain project. Use spaces between resources.

Example

This example adds two resources to the project `nySectorB`.

```
geaddtoimageryproject --o projects/imagery/ImageryProjectA
   imagery/nySector2imagery/nySector3
```

Parameters

```
--o projectname
```

Required. Specify the name of the project relative to the asset root, for example, `vector/VectorProjectA`.

```
resourcename
```

Required. Specify at least one resource to add to the project, for example, `vector/VectorResourceA`.

geaddtomapproject

```
geaddtomapproject -o projectname layername...
```

Purpose

To add map layers to an existing map project.

Example

```
geaddtomapproject -o Projects/map/MapProjectA MapLayers/SFneighborhoods
```

Parameters

```
-o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Map/MapProjectA`.

```
layername
```

Required. Specify the location(s) and name(s) of one or more map layers to add to the project.

geaddtovectorproject

```
geaddtovectorproject --o projectname ([--template filename] [vectorresource...])
```

Purpose

To add one or more resources to an existing vector project.

Example

This example adds one resource to vector project `vectorTemplateB`.

```
geaddtovectorproject --o vector/VectorProjectA
   --template templates/vectorTemplateB NewYorkCityStreets
```

Parameters

```
--o projectname
```

Required. Specify the name of the project relative to the asset root, for example, `vector/VectorProjectA`.

```
--template filename
```

Required. Specify the template file that contains the display rules you want to apply to your vector

layer. To create a template file, see Exporting Display Rules in the **Defining Projects** chapter.

```
vectorresource
```

Required. Specify one or more vector resources to add to the project relative to the asset root, for example, `vector/VectorResourceA`. Google Earth Enterprise Fusion applies the specified template to each resource.

geapplylayertemplate

```
geapplylayertemplate [--displayrules] [--legend]
   --project projectname{--layer layername | --layerid channelid}
   --template filename
```

Purpose

To apply a display rules template to a project layer. Use single quotes for names with spaces and when listing more than one layer.

Example

```
geapplylayertemplate --displayrules --legend --project 'CA Roads'
   --layer CAHighways
geapplylayertemplate --displayrules --project 'CA POIs'
   --layer 'LayerA|LayerB|LayerC'
```

Parameters

```
--displayrules
```

Optional. Include if you want to apply the display rules from the template.

```
--legend
```

Optional. Include if you want to apply the legend specifications from the template.

```
--project projectname
```

Required. Specify the name of the project that contains the layers to which you want to apply the template.

```
--layer layername | --layerid channelid
```

Optional. Specify the name of the layer(s) or channel(s) to which you want to apply the template. If omitted, Google Earth Enterprise Fusion applies the template to all layers in the specified project.

```
--template filename
```

Required. Specify the file name of the template you want to apply.

gebuild

```
gebuild assetname
```

Purpose

To build any type of asset (resource, map layer, project, or database).

Example

```
gebuild imagery/SourceInc/MississippiDeltaRegion
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) that you want to build relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

gecancel

```
gecancel assetname [version]
```

Purpose

To cancel a build in progress on the specified asset.

Example

```
gecancel projects/TransitData/BostonTransitLines 2
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose build you want to cancel relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset you want to cancel, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion cancels the current version of the specified asset.

geclean

```
geclean assetname [version]
```

Purpose

To clean a particular version of the specified asset.

Example

```
geclean imagery/SourceInc/MississippiDeltaRegion
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose version you want to clean relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset you want to clean, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion cleans the current version of the specified asset.

geclearbad

```
geclearbad assetname [version]
```

Purpose

To revert a version of an asset that has been marked as **Bad** to its prior status.

Example

```
geclearbad projects/TransitLines/BostonTransitLines 2
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose version you want to revert relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset you want to revert, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion reverts the current version of the specified asset to its previous status.

gedropfromimageryproject
gedropfromterrainproject
gedropfromvectorproject

```
gedropfromimageryproject
gedropfromterrainproject
gedropfromvectorproject --o projectname resourcename...
```

Purpose

To remove one or more resources from the specified project.

Example

```
gedropfromimageryproject --o projects/imagery/ImageryProjectA
   imagery/nySector2 imagery/nySector3
```

Parameters

```
--o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
resourcename
```

Required. Specify the location and name of at least one resource that you want to drop from the project relative to the asset root, for example, `Resources/Vector/VectorResourceA`.

gedropfrommapproject

```
gedropfrommapproject -o projectname layername...
```

Purpose

To drop map layers from an existing map project.

Example

```
gedropfrommapproject -o Projects/map/MapProjectA SFneighborhoods
```

Parameters

```
-o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Map/MapProjectA`.

```
layername
```

Required. Specify the name(s) of one or more map layers to drop from the project.

geexportlayertemplate

```
geexportlayertemplate --project projectname --layer layername -o templatefile
```

or

```
geexportlayertemplate --project projectname --alllayers -o outdir
```

Purpose

To export a template from the display rules defined for one or more layers in a specific project.

Example

```
geexportlayertemplate --alllayers -o fusion/templates
```

Parameters

```
--project
```

Required. Specify the name of the project that contains the layers for which the display rules you want to export have been defined.

```
--layer
```

Required. Specify the name(s) of the layer(s) for which the display rules you want to export have been defined. You can specify more than one layer within single quotes, separated by pipes, for example:

```
--layer ‘folder1|folder2|layerA’
```

where `folder1` and `folder1` are folders that contain a group of layers.

```
-o templatefile
```

Required. Specify this option with the `--layer` option. Enter the location and name of the directory where you want to store the template. This location can be anywhere on your network where Google Earth Enterprise Fusion has write permission.

```
--alllayers
```

Required. Specify this option if you want to export templates for all layers in separate files within

the specified output folder.

```
-o outdir
```

Required. Specify this option with the `--alllayers` option. Enter the location and name of the directory where you want to store the templates. This location can be anywhere on your network where Google Earth Enterprise Fusion has write permission.

geinfo

```
geinfo [--a_srs override_srs] [--dump] [--formats] [--minmax]
   [--nogcp][--nometa] [--sample] [--srs override_srs]
   [--writeprj prjfile] [--writetfw tfwfile] input
```

Purpose

To provide information about the specified raster file.

Example

```
geinfo --writeprj projectionfile.prj myimage.tif
```

Parameters

```
--a_srs override_srs
```

Optional. Specify the SRS to override.

```
--dump
```

Optional. Dump the contents of the raster file.

```
--formats
```

Optional. Display all supported formats in the raster file.

```
--minmax
```

Optional. Compute and display the minimum and maximum pixel values in the raster file.

```
--nogcp
```

Optional. Do not display ground control points in the raster file.

```
--nometa
```

Optional. Do not display metadata in the raster file.

```
--sample
```

Optional. Sample the pixel data in (but not print) the raster file.

```
--srs override_srs
```

Optional. Specify the SRS to override.

```
--writeprj prjfile
```

Optional. Write a PRJ file with the raster file's projection.

```
--writetfw tfwfile
```

Optional. Write a TFW file with the raster file's extents.

```
input
```

Required. Specify the name of the raster file on which to take the specified action(s).

gemaskgen

```
gemaskgen { [--extract] [--mask] [--prep] [--preview] }
   { [--band num] [--debug] [--feather num] [--fill 0-255]
   [--formats][--holesize num] [--maxsize num] [--oformat]
   [--tolerance num] [--whitefill] }rasterproduct output
```

Purpose

To create a mask file for a raster (imagery or terrain) file.

Example

```
gemaskgen --mask --feather 200 raster.kip file-maskold.tif
```

Parameters

Modes:

```
--extract
```

Optional. Specify this mode to extract the image from the specified raster file. No mask is created. The output data type matches the original image file type.

```
--mask
```

Optional. Specify this mode to generate an 8-bit mask file (the default) from the specified raster file.

```
--prep
```

Optional. Specify this mode to generate an 8-bit mask prep file from the specified raster file.

```
--preview
```

Optional. Specify this mode to generate an RGBA preview file from the specified raster file.

Options:

```
--band num
```

Optional. Specify the band number (0-based) to use for the mask and prep files. The defaults are 1 for imagery and 0 for terrain.

```
--debug
```

Optional. Read the input and compute the size of the specified raster file but not to write it to the output file.

```
--feather num
```

Optional. Specify the number of pixels to feather. The default is no feather, 0.

```
--fill 0-255
```

Optional. Specify the pixel value to treat as fill. The default is the corner colors.

```
--formats
```

Optional. Display the supported output formats.

```
--holesize num
```

Optional. Specify the minimum size of the interior holes of the fill color to be masked. The default is not to look for holes.

```
--maxsize num
```

Optional. Specify the maximum mask size. The default is 16000.

```
--oformat
```

Optional. Specify the output file format. The default is GTiff. (Use the `--format` option to determine the supported formats.)

```
--tolerance num
```

Optional. Specify the deviation from the value specified for `--fill` that should also be considered as fill.

```
--whitefill
```

Optional. Specify white as an additional fill color.

```
rasterproduct
```

Required. Specify the name and location of the raster file for which you want to create a mask file.

```
output
```

Required. Specify the name and location of the output file containing the mask. This location can be anywhere on your network where Google Earth Enterprise Fusion has write permission.

genewdatabase
gemodifydatabase

```
genewdatabase
gemodifydatabase -o dbname [--imagery imgproject[?version=x]]
   [--terrain terrainproject[?version=x]] [--vector vectorproject[?version=x]]
```

Purpose

To define or modify a database.

Example

```
genewdatabase -o msDelta --imagery imagery/MississippiDelta?version=21
   --terrain terrain/msDeltaTerrain?version=20 --vector vector/msDeltaCities
```

Parameters

```
-o dbname
```

Required. Specify the location and name of the database relative to the asset root, for example, `databaseA`.

```
--imagery imgproject
```

Optional. Specify the location and name of the imagery project relative to the asset root, for example, `Projects/Imagery/ImageryProjectA`.

```
--terrain terrainproject
```

Optional. Specify the location and name of the terrain project relative to the asset root, for example, `Projects/Terrain/TerrainProjectA`.

```
--vector vectorproject
```

Optional. Specify the location and name of the vector project relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version=x
```

Optional. The version parameter can be applied to any, none, or all of the imagery, terrain, or vector project values. `x` must be a valid project version to be used with the database.

genewmapdatabase gemodifymapdatabase

```
genewmapdatabase
gemodifymapdatabase [--meta key=value] -o dbname [--imagery imgproject]
   [--map mapproject] [--mercator | --flat]
```

Purpose

To define or modify a map database.

Examples

A Flat Projection map database:

```
genewmapdatabase -o Databases/msDelta --imagery Projects/Imagery/MissDelta
--map Projects/Map/MissWaterways
```

A Mercator Projection map database:

```
genewmapdatabase -o Databases/msDeltaMercator --imagery
   Projects/Imagery/MissDeltaMercator
   --map Projects/Map/MissWaterways --mercator
```

Parameters

```
--meta key=value
```

Optional. This option supports any number of optional name/value pairs that you want to store for the data. For example, you might want to provide additional information about the data provider, such as the specific airplane that took the photo, or you might want to assign your confidence level with the data. If the name or value string contains white space, it should be enclosed in quotation marks.

```
-o dbname
```

Required. Specify the location and name of the map database relative to the asset root, for example, `Databases/databaseA`.

```
--imagery imgproject
```

Optional. Specify the location and name of the imagery project relative to the asset root, for example, `Projects/Imagery/ImageryProjectA`.

```
--map mapproject
```

Optional. Specify the location and name of the map project relative to the asset root, for example, `Projects/Map/MapProjectA`.

```
--mercator | --flat
```

Optional. Default value is `--flat`. Specifies the projection of the map database. Only applies to new imagery resources. **Glossary**: Flat Projection, Mercator Projection.

genewimageryproject
gemodifyimageryproject
genewterrainproject
gemodifyterrainproject

```
genewimageryproject
gemodifyimageryproject
genewterrainproject
gemodifyterrainproject -o projectname {[--maxlevel=num] insetresource ...}
```

Purpose

To define or modify an imagery or terrain project.

Example

```
genewimageryproject -o
   projects/imagery/ImageryProjectAimagery/MississippiDeltaRegion
```

Parameters

```
-o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Imagery/ImageryProjectA`.

```
--maxlevel=num
```

Optional. Specify the maximum number of levels in the project.

```
insetresource
```

Optional. Specify the location(s) and name(s) of one or more imagery or terrain resources to add to the project.

genewmaplayer

```
```

```
genewmaplayer --legend=legend_name --output=map_layer_name [options]
   {[--template=filename] vectorresource}...
```

Purpose

Creates a new map layer.

Example

```
genewmaplayer --legend=cars --output=ca-car_map-layer --layericon=car
   --template=/home/doe/template_1.kmdsp Resources/Vector/cities
   Resources/Vector/villages --template=/home/doe/template_2.kmdsp
   Resources/Vector/counties
```

Parameters

```
--legend=legend_name
```

Required. Name of the layer as it appears in a web browser.

```
--output=map_layer_name
```

Required. Name of the map layer asset as it appears in the Asset Manager. This value is relative to the asset root and should not include an extension (eg. `Resources/Vector/counties`).

```
layericon=icon_name
```

Optional. Basename of the icon png file as it appears in the icon browser (eg. `cars`).

```
--default_state_on
```

Optional. Sets this layer's default state to 'on' in the web browser.

```
--template=filename
```

Optional. A KMDSP filename (absolute) and a corresponding vector resource (relative to asset_root and without extension). Specifies the display rules and the vector resource for a sublayer; KMDSP files can be exported from the Map Layer widget of the Fusion GUI. More than one template and vector resource pair can be specified.

genewmapproject gemodifymapproject

```
genewmapproject
gemodifymapproject -o projectname layername...
```

Purpose

To define or modify a map project.

Example

```
genewmapproject -o Projects/map/MapProjectA MapLayers/SFneighborhoods
```

Parameters

```
-o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Map/MapProjectA`.

```
layername
```

Required. Specify the location(s) and name(s) of one or more map layers to add to the project.

genewvectorproject
gemodifyvectorproject

```
genewvectorproject
gemodifyvectorproject -o projectname {[--template filename] vectorresource...}
```

Purpose

To define or replace a vector project.

Example

This example updates the PhoenixRoads project with three resources and applies an existing template to the data:

```
genewvectorproject --template templates/cityRoadData
   resources/vector/RoadData/PhoenixRoad1resources/vector/RoadData/PhoenixRoad2
   resources/vector/RoadData/PhoenixRoad3
```

Parameters

```
-o projectname
```

Required. Specify the location and name of the project relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
--template filename
```

Required. Specify the template file that contains the display rules that you want to apply to the specified resources for this project. To create a template file, see Exporting Display Rules in the **Defining Projects** chapter.

You can apply different templates to different resources as follows:

```
gemodifyvectorproject -o projects/vector/PhoenixRoads --
templatetemplates/cityRoadData resources/vector/RoadData/PhoenixRoad1
resources/vector/RoadData/PhoenixRoad2 --template templates/countyRoadData
resources/vector/RoadData/PhoenixRoad3
vectorresource
```

Optional. Specify one or more vector resources to add to the project.

genewimageryresource
gemodifyimageryresource
genewterrainresource
gemodifyterrainresource

```
genewimageryresource
gemodifyimageryresource
genewterrainresource
gemodifyterrainresource [--havemask] [--nomask] [--mosaicfill nn,nn,nn]
   [--mosaictolerance n] [--band n] [--feather radius] [--feet | --scale num]
   [--holesize n] [--masktolerance n] [--meta name=value] [--provider key]
   [--sourcedate string] [--whitefill] [--srs srs_def]
   -o [path] resourcename
   {sourcefile ... | --filelist file} [--mercator | --flat]
```

Purpose

To define or modify an imagery or terrain resource.

Example

This example defines a single mosaic imagery resource from three source files, specifying `white` as the fill value and setting the feather to 80 pixels for automask generation.

```
genewimageryresource --feather 80 --fill 255,255,255 --provider SourceInc
   --sourcedate 2003-05-10 -o imagery/MississippiDeltaRegion
   /vol/machine2/SourceInc/msRiver1.tif /vol/machine2/SourceInc/msRiver2.tif
   /vol/machine2/SourceInc/msRiver3.tif
```

Parameters

`--havemask`

Optional. Use this option if you have an alpha *mask* or file that you want to use. The mask for your input must be located in the same folder as the source file, and the file name must match the name of the source file with `-mask` appended. For example, if your source file is called `NewYork.tif`, its mask file must be named `NewYork-mask.tif`.

Note: You can use the `--havemask` option only when you include a single source file in the resource. The mask file must be either of the same file format as the original image file, or it must be a TIFF file.

`--nomask`

Optional. Use this option if you do not want Google Earth Enterprise Fusion to generate an alpha mask for the resource.

`--mosaicfill` *`nn,nn,nn`*

Optional. Typically, you specify a fill value if you are importing several imagery files whose borders overlap in the resultant mosaic. Specify the fill value in decimal format. Height map imagery needs a signed 16-bit value (a numeric range between -32,767 and 32,767), whereas color map imagery needs a 24-bit value or a 3x8 bit color. In general, the fill color depth should match that of your source data.

`--mosaictolerance` *`n`*

Optional. Tolerance specifies the color range for mask selection. The default tolerance is zero, which is adequate for many fill colors that are typically pure black or pure white. However, because imagery compression and decompression can affect fill values by 1 or 2 color values, you can adjust the tolerance to compensate for any loss in precision. Typically, a setting of 1 or 2 is adequate in those situations.

If you do not specify `--nomask` or `--havemask`, Google Earth Enterprise Fusion automatically generates a mask. In that case, the following options are also available:

`--band` *`n`*

Optional. Specify the band to use when generating the auto mask. If this option is unspecified, Google Earth Enterprise Fusion uses the green channel. The legitimate values for this option are 0, 1, 2, corresponding to red, green, and blue, respectively.

`--feather` *`radius`*

Optional. Specify the feather value in pixels. If you omit this option, the default value is 100.

`--feet` | **`--scale num`** (terrain only)

Optional. This option sets the elevation scale for your height map imagery. Google Earth Enterprise Fusion interprets height map values as meters. If the elevation unit for your data is not meters, you must use this option to provide the correct conversion number from your data's unit to

meters. For example, if your source height map file has decimeters for its height unit, you would specify `.1` for the scale value in order to have the elevation represented in meters.

Alternatively, you can use the `--feet` parameter as a shorthand mechanism for `--scale .3048`, which represents feet units in their metric equivalent.

Note: Meters is the default scale elevation. If you do not specify this option when defining terrain resources, the elevation units are treated as meters.

```
--holesize n
```

Optional. Use this option if you have masked regions inside the boundaries of your imagery data. The default setting for hole size is 0, which is OFF.

The hole size indicates the number of contiguous pixels Google Earth Enterprise Fusion uses when matching any color region inside your imagery with the same value specified as your fill. For example, if you set the value to 100 and the imagery has 100+ contiguous pixels with the same color as one of the corners (fill value), it treats that area as a “hole” in the data and applies the mask to it. The end result is that whatever data is under the masked data shows through.

```
--masktolerance n
```

Optional. Specify the tolerance to be used when comparing pixels against mask fill value. Tolerance specifies the color range for mask selection. The default tolerance is 0, which is adequate for many fill colors that are typically pure black or pure white. However, because imagery compression and decompression can affect fill values by 1 or 2 color values, you can adjust the tolerance to compensate for any loss in precision. Typically, a setting of 1 or 2 is adequate in those situations.

```
--meta name=value
```

Optional. This option supports any number of optional name/value pairs that you want to store for the source data. For example, you might want to provide additional information about the data provider, such as the specific airplane that took the photo, or you might want to assign your confidence level with the data. If the name or value string contains white space, it should be enclosed in quotation marks.

```
--provider key
```

Optional. Specify a string that identifies the provider of the source data you are importing. This provider key must match the provider key in your database that corresponds to the source data. The provider name and copyright fields associated with this key are displayed for this resource in Google Earth EC. If the key contains white space, you must use quotation marks around the string.

Note: If you are importing several source files to define a single resource, Google Earth Enterprise Fusion assumes that they have a common provider.

```
--sourcedate string
```

Optional. This option is a string that represents the date of acquisition for your source file. It must in the ISO 8601 format (yyyy-mm-dd).

```
--whitefill
```

Optional. Use this option if imagery holes in your source data are filled with white. In some cases, source providers fill missing data inside the imagery with white and use a different color for the boundary mask.

```
--srs srs_def
```

Optional. Specify the spatial reference set to use instead of the embedded SRS. The coordinate systems that can be passed are anything supported by the `OGRSpatialReference.SetFromUserInput()` call, which includes **EPSG PCS** and **GCS**es (for example, `EPSG:4296`), PROJ.4 declarations, or the name of a `.prf` file containing well known text.

```
-o path resourcename
```

Required. Specify the path and name of the resource relative to the asset root, for example, `Resources/Imagery/ImageryResourceA`. If you indicate a subfolder that does not yet exist, Google Earth Enterprise Fusion creates it for you.

```
sourcefile
```

Required. Specify the path and file name of the source file for the resource. You can reference any network-available source file as this value. (Optional if you specify **--filelist** *file*.)

```
--filelist file
```

Optional. Specify the path and file name of a file that contains a list of source files that you want to include in the resource. You can use this option, list files individually, or use a combination of the two.

```
--mercator | --flat
```

Optional. Default value is `--flat`. Specifies the projection of the map database. Only applies to new imagery resources. **Glossary**: Flat Projection, Mercator Projection.

genewvectorresource
gemodifyvectorresource

```
genewvectorresource [--encoding type] [--layer num] [--meta name=value]
   [--provider key] [--sourcedate string] -o [path] resourcename sourcefile ...
gemodifyvectorresource [--encoding type] [--layer num] [--meta name=value]
   [--provider key] [--sourcedate string] -o [path] resourcename sourcefile ...
```

Purpose

To define or modify a vector resource.

Example

```
genewvectorresource --layer 2 --encoding ISO8859-1 --sourcedate 2003-05-15 -o
vector/MyVectorProvider/ResourceAssetA/vol/machine2/source/vector/ResourceSourceA.shp
```

Parameters

```
--encoding type
```

Optional. If the field data in your vector resource has a particular encoding for characters, such as ISO8859-1, set this parameter to correctly display your data in Google Earth EC. If you omit this option, the character encoding defaults to ASCII (plain text). The table below lists the supported encoding formats.

Note: If the encoding strings contain white space, you must use quotation marks around the string.

Supported Encoding Formats

Apple Roman	CP 1258	ISO 8859-15	ISO-10646-UCS-2
Big5	CP 874	ISO 8859-2	JIS7
CP 1250	GB18030	ISO 8859-3	KOI8-R
CP 1251	GBK	ISO 8859-4	KOI8-U
CP 1252	IBM 850	ISO 8859-5	SJIS
CP 1253	ISO 8859-1	ISO 8859-6	TSCII
CP 1254	ISO 8859-10	ISO 8859-7	UTF-8
CP 1255	ISO 8859-11	ISO 8859-8	eucJP
CP 1256	ISO 8859-13	ISO 8859-8-I	eucKR
CP 1257	ISO 8859-14	ISO 8859-9 eucKR	

```
--layer num
```

Optional. Use this option if your source data contains multiple layers and you want to extract a specific layer for your resource. The first layer of your data is 0. If you omit this option, Google Earth Enterprise Fusion uses the first layer of the source file to define the resource.

In most circumstances, source vector data has only one layer; however, Tiger vector data can contain multiple layers. Because there is a one-to-one correspondence between a vector resource and a single vector layer, resource creation from multi-layer data must specify a layer. If you are unsure which layer to indicate in defining a resource from multi-layer source data, you can open the vector source file in the Preview pane. The Preview List pane lists all of the layers in the source data, and you can examine each layer in order to select the appropriate one to import.

```
--meta name=value
```

Optional. Specify any number of name/value pairs that you want to include about the source data. For example, you might want to provide additional information about the data provider. If the name or value string contains white space, you must use quotation marks around the string.

```
--provider key
```

Optional. Specify a string that identifies the provider of the source data you are importing. This provider key must match the provider key in your database that corresponds to the source data. The provider name and copyright fields associated with this key are displayed for this resource in Google Earth EC.

Note: If you are importing several source files to define a single resource, Google Earth Enterprise Fusion assumes that they have a common provider.

```
--sourcedate string
```

Optional. Specify a string to represent the date of acquisition for your source file. It must in the ISO 8601 format (yyyy-mm-dd).

```
-o path resourcename
```

Required. Specify the path and name of the resource relative to the asset root, for example, `Resources/Vector/VectorResourceA`. If you indicate a subfolder that does not yet exist, Google Earth Enterprise Fusion creates it for you.

```
sourcefile
```

Required. Specify the path and file name of the source file for the resource. You can reference any network-available source file as this value.

gepolymaskgen

```
gepolymaskgen [--feather <int_feather>] --base_mask <geotiff_mask_file>
  [options] --output_mask <geotiff_mask_file>
gepolymaskgen [--feather <int_feather>] --base_image <geotiff_image_file>
  [options] --output_mask <geotiff_mask_file>
```

Purpose

Creates a mask file in .tiff format. Accepts geotiff image or mask files, KML polygons, or .shp files as input.

Examples

Simple polygon mask with no feathering:

```
gepolymaskgen --base_image /path/input_image.tif \
  --or_mask /path/polygon.kml \
  --output_mask /path/result_mask.tif
```

Negative polygon mask with some feathering:

```
gepolymaskgen --base_image /path/input_image.tif \
  --feather 30 \
  --feather_border 0 \
  --and_neg_mask /path/polygon.kml \
  --invert \
  --output_mask /path/result_mask.tif
```

OR and AND polygon and tiff masks with different feathers:

```
gepolymaskgen --feather 30 \
  --base_mask /path/base_mask.tif \
  --feather 20 \
  --feather_border 0 \
  --or_mask /path/SF.kml \
  --or_mask /path/daly_city.kml \
  --feather 15 \
  --feather_border 1 \
  --or_mask /path/circle_mask.tif \
  --feather 5 \
  --and_neg_mask /path/gg_park.kml \
  --and_neg_mask /path/northbeach.kml \
  --feather 40 \
  --and_neg_mask /path/circle_mask2.tif \
  --output_mask /path/mask.tif
```

Options

Options are applied in the order given.

```
--feather int
```

Feather to apply to all subsequent masks until a different feather is given. Feather can be 0, positive, or negative. Default is 0.

```
--feather_border int
```

If flag is non-zero, border is feathered. Otherwise, border is left in tact. Flag remains in effect until it is modified. Default is border is feathered.

```
--and_neg_mask <mask_file>
```

Bitwise AND of negative image of polygon or raster mask with the current mask. Polygons can be given in .kml or .shp files and are assumed to be filled with 0x00. Raster masks should be .tif files with the same pixel dimensions as the base mask. Care should be taken not to overlap feathered regions.

```
--or_mask <mask_file>
```

Bitwise OR of polygon or raster mask to the current mask. Polygons can be given in .kml or .shp files and are assumed to be filled with 0xff. Raster masks should be .tif files with the same pixel dimensions as the base mask. Care should be taken not to overlap feathered regions.

```
--threshold <thresh_byte>
```

All pixels at or below the threshold byte are set to 0x00; all other pixels are set to 0xff.

gepublishdatabase

gepublishdatabase [**--delete** *db_name* [**--serverurl** *url*]][**--listdbs** [**--serverurl** *url*]][**--publish** *dbname* [**--server** *nickname*]][**--publisheddbs** [**--serverurl** *url*]]

Purpose

To publish a database (locally or remotely).

Examples

```
gepublishdatabase --publish msDelta
gepublishdatabase --publish msDelta --server mainServer
gepublishdatabase --listdbs --serverurl http://private.company.com
```

Commands

--delete *db_name*

Delete a registered database from the server.

--serverurl *url*

Optional. Use a specific server URL, such as http://private.company.com.

--listdbs

List all databases registered on the server.

--serverurl *url*

Optional. Use a specific server URL, such as http://private.company.com.

--publish *dbname*

Specify the location and name of the database that you want to publish relative to the asset root, for example, `Databases/databaseA`.

--server *nickname*

Optional. Specify the nickname of the server association to which you want to publish. If you omit the server specification, Google Earth Enterprise Fusion publishes to the default server. (Consult your administrator or refer to the *Google Earth Enterprise Administration Guide* for information about setting up server associations.)

```
--publisheddbs
```

List all of the published databases on the server.

```
--serverurl url
```

Optional. Use a specific server URL, such as http://private.company.com.

gequery

```
gequery [--blockers] [--dependencies] [--geocode] [--infiles] [--logfile]
[--outfiles] [--showlog] [--taillog] [--status] [--versions]
assetname [version]
```

Purpose

To query Google Earth Enterprise Fusion about a particular asset's build.

Example

```
gequery --dependencies imagery/TestProject?version=1
```

Parameters

```
--blockers
```

Optional. Display sub-versions that block the specified version.

```
--dependencies
```

Optional. List the dependencies for the indicated asset and the status of each, such as `Succeeded`, `Blocked`, or `Failed`. The purpose of being able to view the dependencies of an asset is to allow easier troubleshooting of failed asset builds. After you view the dependency list for an asset, you can use additional options to query a failed dependent element in order to find out why it failed. For example, you might use **--logfile** to determine the path to the log file for a failed asset.

```
--infiles
```

Optional. Provide the file name and location of the input file for the named asset. You typically use this command on a dependency for an asset file that is listed as `Failed`. For example, if you learn that a project build phase fails, you could use the **--infile** parameter to determine specific image source file for that phase of the build.

```
--logfile
```

Optional. List the path to log file for the specified asset.

Note: Not all resources have log files.

```
--outfiles
```

Optional. List the files output by the specified dependency. This option allows you to trace forward in the dependency chain to see the next step in the process.

```
--showlog
```

Optional. Display the contents of the log file for the specified version.

Note: Not all resource versions have log files.

```
--taillog
```

Optional. Display the contents of the log file for the specified version, but in a manner similar to the UNIX command `tail -f`.

Note: Not all resource versions have log files.

```
--status
```

Optional. List the completion and availability status of assets by version. If no version is specified, it reports the status of the current version. The table below lists the possible status values for each asset.

Status Values

Status	Description
Waiting	The asset is waiting for its input data to finish.
Blocked	The asset version cannot proceed. One or more of its input data or subcomponents has failed, is marked bad, or is otherwise unavailable. The responsible component is listed.
Queued	The asset version (or its subcomponents) is queued and waiting to be built.
InProgress	The asset version (or subcomponents) are actively being built.
Failed	The asset version failed.
Succeeded	The asset version (and subcomponents) succeeded.
Canceled	The asset version was canceled.
Offline	The version of this asset is unavailable because it has been cleaned up.
Bad	The version of this asset has been marked bad.

```
--versions
```

Optional. List the version numbers for the indicated asset.

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose build you want to query relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset you want to query, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion queries the current version of the specified asset.

geraster2kml

```
geraster2kml [--url url_root] [--output dirname] [--layer_name name]
   [--tile_size size] [--kml_only] [--no_kmz] [--jpg_quality qual]
   [--debug]--kip raster.kip --kmp mask.kmp
```

Purpose

To convert a Google Earth Enterprise Fusion resource to the KML Region hierarchy, so you can access the data in any Google Earth client.

If the imagery resource has a source date, that date will be passed to the rasterized KML as well.

Example

```
geraster2kml --kip myimage.kip --kmp myimage-mask.kmp
```

Parameters

```
--url url_root
```

Optional. Specify the URL root for all links.

```
--output dirname
```

Optional. Specify the name of the output directory.

```
--layer_name name
```

Optional. Specify the name of the layer to appear in the Layers panel in Google Earth EC.

```
--tile_size size
```

Optional. Specify the output tile size (`256`, `512`, or `1024`).

```
--kml_only
```

Optional. Generate KML files only (no imagery).

```
--no_kmz
```

Optional. Specify no compression to KMZ files, to output to KML only.

```
--jpg_quality qual
```

Optional. Specify the quality for the JPG compression.

```
--debug
```

Optional. Specify adding debug geometry to the output file.

```
--kip raster.kip
```

Required. Specify the name of the imagery file.

```
--kmp mask.kmp
```

Required. Specify the name of the mask file.

gereproject

```
gereproject [--version] [--formats] [--query] [--snapup] [-co "NAME=VALUE"]*
   [-dstnodata] [-et err_threshold] [-multi] [-of format] [-order n]
   [-ot Byte/Int16/...] [-q] [-rb] [-rc] [-rcs] [-rn] [-s_srs srs_def]
   [-srcnodata value ...] [-t_srs srs_def] [-te xmin ymin xmax ymax]
   [-tr xres yres] [-ts width height] [-wm memory_in_mb] [-wo "NAME=VALUE"]
```

```
    [-wt Byte/Int16] srcfile dstfile
```

Purpose

A simple utility used for image warping.

Example

```
gereproject -s_srs EPSG:4326 usgsLanSat.tif usgsLanSat_rep.tif
gereproject --query SFNorth.img
```

Parameters

```
--version
```

Optional. The project version you want to warp.

```
--formats
```

Optional. Display the supported output formats.

```
--query
```

Optional. Provides information about the specified source file.

```
--snapup
```

Optional. Force the imagery to be magnified to a predefined level.

Options:

```
-co "NAME=VALUE"
```

Optional. Specify construction arguments to pass to the output GDAL dataset. Multiple -co options are allowed.

```
-dstnodata
```

Optional. Set nodata values for output bands (different values can be supplied for each band). If more than one value is supplied, all values should be quoted to keep them together as a single operating system argument. New files will be initialized to this value and if possible the nodata value will be recorded in the output file.

```
-et err_threshold
```

Optional. Specify the error threshold for transformation approximation in pixels. The default is 0.125.

```
-multi
```

Optional. Use multi-threaded warping implementation. Multiple threads will be used to process chunks of image and perform input/output operation simultaneously.

```
-of format
```

Optional. Specify the output format. The default is GeoTIFF (GTiff). Use the short format name.

```
-order n
```

Optional. Specify the order of polynomial used for warping (1 to 3). The default is to select a polynomial order based on the number of GCPs.

```
-ot {Byte|Int16|UInt16|UInt32|Float32|Float64|CInt16|CInt32|CFloat32|CFloat64}
```

Optional. Specify the data type of the output bands. The default is to match the input.

```
-q
```

Optional. Quiet; do not display the process messages in the terminal window.

```
-rb
```

Optional. Use bilinear as the resampling method.

```
-rc
```

Optional. Use cubic as the resampling method.

```
-rcs
```

Optional. Use cubicspline as the resampling method.

```
-rn
```

Optional. Use near as the resampling method.

```
-s_srs srs_def
```

Optional. Specify the source spatial reference set. The coordinate systems that can be passed are anything supported by the `OGRSpatialReference.SetFromUserInput()` call, which includes `EPSG PCS` and `GCSes` (for example, `EPSG:4296`), `PROJ.4` declarations, or the name of a `.prf` file containing well known text.

```
-srcnodata value...
```

Optional. Specify no data masking values for input bands. (You can specify different values for each band.) If you enter more than one value, use single quotes to keep them together as a single argument. Masked values will not be used in interpolation.

```
-t_srs srs_def
```

Optional. Specify the target spatial reference set. The coordinate systems that can be passed are anything supported by the `OGRSpatialReference.SetFromUserInput()` call, which includes `EPSG PCS` and `GCSes` (for example `EPSG:4296`), `PROJ.4` declarations, or the name of a `.prf` file containing well known text.

```
-te xmin ymin xmax ymax
```

Optional. Specify the geo-referenced extents of output file to be created.

```
-tr xres yres
```

Optional. Specify the output file resolution in target geo-referenced units.

```
-ts width height
```

Optional. Specify the output file size in pixels and lines.

```
-wm memory_in_mb
```

Optional. Specify the amount of memory (in megabytes) that the warp API is allowed to use for caching.

```
-wo "NAME=VALUE"
```

Optional. Specify the warp options. See Warp Options.

```
-wt {Byte|Int16}
```

Optional. Specify the working pixel data type in the source image and destination image buffers.

```
srcfile
```

Required. Specify the source file name(s).

```
dstfile
```

Required. Specify the destination file name.

Warp Options

The warp options (for `-wo`) are:

- `INIT_DEST=`*value* or `INIT_DEST=NO_DATA`

  Forces the destination image to be initialized to the indicated value (for all bands) or indicates that it should be initialized to the NO_DATA value in padfDstNoDataReal/padfDstNoDataImag. If this value isn't set the destination image will be read and overlayed.

- `WRITE_FLUSH={YES|NO}`

  Forces a flush to disk of data after each chunk is processed. In some cases this helps ensure a serial writing of the output data otherwise a block of data may be written to disk each time a block of data is read for the input buffer resulting in a lot of extra seeking around the disk, and reduced IO throughput. The default at this time is NO.

- `SKIP_NOSOURCE={YES|NO}`

  Skip all processing for chunks for which there is no corresponding input data. This will disable initializing the destination (INIT_DEST) and all other processing, and so should be used careful. Mostly useful to short circuit a lot of extra work in mosaic creation situations.

  Normally when computing the source raster data to load to generate a particular output area, the warper samples transforms 21 points along each edge of the destination region back onto the source file, and uses this to compute a bounding window on the source image that is sufficient. Depending on the transformation in effect, the source window may be a bit too small, or even missing large areas. Problem situations are those where the transformation is very non-linear or "inside out". Examples are transforming from WGS84 to Polar Steregraphic for areas around the pole, or transformations where some of the image is untransformable.

  The following options provide some additional control to deal with errors in computing the source window:

- `SAMPLE_GRID={YES|NO}`

  Setting this option to YES will force the sampling to include internal points as well as edge points which can be important if the transformation is esoteric inside out, or if large sections of the destination image are not transformable into the source coordinate system.

- `SAMPLE_STEPS`

  Modifies the density of the sampling grid. The default number of steps is 21. Increasing this

can increase the computational cost, but improves the accuracy with which the source region is computed.

- `SOURCE_EXTRA`

  This is a number of extra pixels added around the source window for a given request, and by default it is 1 to take care of rounding error. Setting this larger will increase the amount of data that needs to be read, but can avoid missing source data.

geresume

```
geresume assetname [version]
```

Purpose

To resume a build process that was canceled, blocked, or failed, after correcting the problem, if necessary.

Example

```
geresume imagery/SourceInc/MississippiRiverDelta
geresume imagery/TestImage.kiresource/mosaic.kia?version=1
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose build you want to resume relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset whose build you want to resume, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion resumes the build of the current version of the specified asset.

gesetbad

```
gesetbad assetname [version]
```

Purpose

To specify a version of an asset as **Bad**.

Example

```
gesetbad projects/TransitLines/BostonTransitLines 2
```

Parameters

```
assetname
```

Required. Specify the location and name of the asset (resource, map layer, project, or database) whose version you want to set as **Bad** relative to the asset root, for example, `Projects/Vector/VectorProjectA`.

```
version
```

Optional. Specify the version number of the asset you want to set as **Bad**, or enter `current` or `lastgood`. If you omit the version specification, Google Earth Enterprise Fusion sets as **Bad** the

current version of the specified asset.

gesplitkhvr

```
gesplitkhvr [--rows num] [--cols num] [--overlap num] [--quiet] input.khvr
```

Purpose

To create two or more source files from a large imagery or terrain source file to reduce the size of each source file to under 80 GB in raw size. (Raw size = number of pixels width * number of pixels height * 3.) This tool produces a grid of image files designated as rows and columns.

Example

```
gesplitkhvr --rows 4 --cols 4 --overlap 10 image_file.khvr
```

Parameters

```
--rows num
```

Required. Specify the number of resulting image files across.

```
--cols num
```

Required. Specify the number of resulting image files high.

```
--overlap num
```

Optional. Specify the number of pixels of overlap between the resulting images. The default is 300.

```
--quiet
```

Optional. Do not display the progress messages in the terminal window.

```
input.khvr
```

Required. Specify the name of the input file. It must be a `.khvr` file.

getop

```
getop --delay seconds
```

Purpose

Displays a list of what Google Earth Enterprise Fusion is currently working on and whether `gesystem` and `gehttpd` are currently running.

Example

```
getop 30
```

Parameters

```
--delay seconds
```

Required. Specify the number of seconds delay between refreshes. For example, if you specify `30`, `getop` runs every 30 seconds.

getranslate

```
getranslate [--formats]
   [-ot Byte]Int16|UInt16|UInt32|Float32|Float64|CInt16|CInt32|CFloat32|CFloat64]
   [-not_strict] [-of format] [-b band] [-outsize xsize[%] ysize[%]]
   [-scale src_min src_max [dst_min dst_max]] [-srcwin xoff yoff xsize ysize]
   [-a_src projection] [-projwin ulx uly lrx lry] [-co "NAME=VALUE"]*
   [-mo "META-TAG=VALUE"]* [-quiet]
```

Purpose

A simple utility used for image reprojection. You must use this tool for:

- Extracting a piece for preview purposes
- Reordering bands

Since Google Earth Enterprise Fusion can perform the following tasks, you do not need this utility for:

- Adding projection data to a source file
- Converting data from one format to another

Example

```
getranslate -of Jpeg -a_srs WGS84 usgsSFHiRes.tif HiRes_translate.jpg
```

Parameters

```
-a_src projection
```

Optional. Specify the projection for the output. Options are:

- `NAD27|NAD83|WGS84|WGS72`
- `EPSG:`*num*
- `PROJ.4` definition
- OpenGIS Well Known Text
- Name of file with OpenGIS Well Known Text
- ESRI::ESRI Well Known Text File (`.prj`)

```
--formats
```

Optional. Display the supported output formats.

```
-b band
```

Optional. Specify the band to copy (1-based indexing). You can specify this value multiple times. For example, the following entry reverses the bands:

```
-b 3 -b 2 -b 1
-co "NAME=VALUE"*
```

Optional. Specify construction arguments to pass to the output GDAL dataset.

```
-mo "META-TAG=VALUE"*
```

Optional. Specify that metadata is to be included in the output.

```
-not_strict
```

Optional. Be forgiving of mismatches and lost data when translating to the output format.

```
-of format
```

Optional. Specify the file format of the output. The default is `GTiff`. Use the short format name.

```
-ot Byte|Int16|UInt16|UInt32|Float32|Float64|CInt16|CInt32|CFloat32|CFloat64
```

Optional. Specify the data type of the output bands. The default is to match the input.

```
-outsize xsize[%] ysize[%]
```

Optional. Specify the output image size in pixels or percent of original.

```
-projwin ulx uly lrx lry
```

Optional. Specify the extents and size of the output window. (Similar to `-srcwin` but uses georeferenced coordinate.)

```
-quiet
```

Optional. Do not display the process messages in the terminal window.

```
-scale src_min src_max [dst_min dst_max]
```

Optional. Specify the scale of the input pixel values.

```
-srcwin xoff yoff xsize ysize
```

Optional. Specify the extents and size of the output window.

gevirtualraster

```
gevirtualraster [--crop pixelx,pixely,pixelx,pixelh] [--fill a,b,...]
   [--lut lutfile] [--src override_srs] [--tolerance num] [--validate]
   -o output.khvr {sourcefile ... | --filelist file}
```

Purpose

To create a *virtual mosaic*, which allows you to use a mask created outside of Google Earth Enterprise Fusion for an imagery mosaic.

Example

```
gevirtualraster --fill 0,0,0 -o
  /gevol/src/imagery/usa/XX/new_location/all_files.khvr/gevol/src/imagery/usa/
XX/new_location/*.tif
```

Parameters

```
--crop pixelx,pixely,pixelx,pixelh
```

Optional. Crop the image to the specified pixel extents.

```
--fill a,b,...
```

Optional. Specify band values to use as fill.

```
--lut lutfile
```

Optional. Specify a LUT file for the entire image.

```
--src override_srs
```

Optional. Specify the SRS.

```
--tolerance num
```

Optional. Specify the tolerance to be applied to the fill. The default is 0.

```
--validate
```

Optional. Validate the inputs and exit.

```
-o output.khvr
```

Required. Specify the name of the output file, which must have the `.khvr` extension.

```
sourcefile
```

Required. Specify the path and file name of the source file for the resource. You can reference any network-available source file as this value. (Optional if you specify **--filelist** *file*.)

```
--filelist file
```

Optional. Specify the path and file name of a file that contains a list of source files that you want to include in the resource. You can use this option, list files individually, or use a combination of the two.

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Creating Your Own Source Data, Icons, and Masks

Creating Point Data

In addition to using vector resources in SHP, TAB, and other formats, you can define your own point data and import it as a resource into Google Earth Enterprise Fusion. To do so, you create delimited text files, such as CSV or tab-delimited TXT files.

Each text file must be paired with a configuration file in order for Google Earth Enterprise Fusion to parse the source data. The configuration file defines the source file structure, specifying field/value pairs and the type of delimiter used in the text file (that is, tabs or commas).

The configuration file must be a KDX file, have the same name as the CSV file, and be located in the same folder. For example, if you have a text file called `fast_food_stores.csv`, the configuration file must be stored in the same folder with the name `fast_food_stores.kdx`.

Tip: You can create the KDX file with a text editor, if you know the required format, or you can auto-generate it by importing the CSV file into Google Earth EC. Google Earth EC saves the KDX file in the same folder and with the same name as the original text file but with the `.kdx` extension.

Your installation of Google Earth Enterprise Fusion includes a sample tab-delimited text file with a corresponding configuration file that you can examine. They are called `web_cam.txt` and `web_cam.kdx` and are located in:

```
/opt/google/share/tutorials/fusion/Vector
```

The following sections describe how to create the text and configuration file with Google Earth Enterprise Fusion.

Defining a Configuration File

The key to using your own delimited data with Google Earth Enterprise Fusion is the configuration file, which defines the structure of the data, the data fields, and the type of data contained in the fields. The following is an example of a configuration file:

```
Layout {
  FileType : "delimited"
  Delimiter : ","
  Latitude : "2"
  Longitude : "1"
  SkipRows : "1"
  FieldDefinitions {
    0 {
      Name : "Name"
      Type : "string"
    }
    1 {
      Name : "Longitude"
      Type : "double"
    }
    2 {
      Name : "Latitude"
      Type : "double"
    }
    3 {
      Name : "Comments"
      Type : "string"
    }
```

```
    4 {
      Name : "URL"
      Type : "string"
    }
  }
}
```

File Structure

Notice that the first line of the file begins with the word `Layout` and is followed by a curly brace that has its closing bracket in the last line of the file. This layout block is the basic structure in the configuration file. Each configuration file must start with a layout block. All settings within the layout block must appear inside of its curly braces `{}`.

File Type

The `FileType` value defines the text file type. The options are:

- `delimited` - Data fields are separated by tabs or commas.
- `fixedwidth` - Each data field has a fixed width.

If the file type is `delimited`, you must indicate the delimiter type in the next line. Enter a comma (,) or an actual tab between the quotation marks.

Data Location

The data location is defined by the `Latitude` and `Longitude` values.

The `Latitude` value defines which column contains latitude data. The column count starts with 0. In the example above, the latitude column count is **2**, which is the third column in the file. The required format for the `Latitude` data is degrees. If your data uses degrees-minutes-seconds format, you must convert it to degrees by using the following formula:

Latitude = number of degrees + number of minutes/60 + number of seconds/3600

Record as many numbers after the decimal points as you can to ensure the accuracy of the `latitude` value.

The `Longitude` value defines which column contains longitude data. As with latitude, the column count starts with 0, and the format of the value is in degrees.

Indicating Header Rows

When you want to include a header row in the file for ease of reading but do not want to include it as part of the data Google Earth Enterprise Fusion reads from the file, you can use the `SkipRows` keyword to indicate how many rows should be ignored. For example, the line:

```
SkipRows : "1"
```

indicates that Google Earth Enterprise Fusion should ignore the top row in the source file. If the source file contains more than one header row, indicate the number of rows within the quotation marks.

Field Definitions

The Field Definitions block defines the column structure of the source file. The values for each column are defined in a separate block (indicated by curly braces), and the position of each column is indicated by its index number, starting with 0 for the first column and incrementing by 1 for each subsequent column.

The actual field definitions have the following values:

- **Name** - The name of the column.
- **Type** - The column data type, which can be integer, double, or string.
- **Length** - If the file type is `fixedwidth`, you must use the `Length` keyword to define each column's width, for example:

```
Length : "50"
```

Notes: Google Earth Enterprise Fusion is case-sensitive when reading the configuration file. In addition, the space between each line header and the subsequent colon (:) is required. Make sure that your configuration file has exactly the same syntax as the sample configuration file shown above.

If the configuration file for your source data is not set up correctly, or if the structure of your source file does not match the structure specify in your configuration file, Google Earth Enterprise Fusion generates an error message when trying to import your source data.

For your convenience, instead of creating a configuration file from scratch, you can copy the sample file to the folder where your source data is located, rename it, and then modify the content.

Creating Custom Icons

You can create your own custom icons in the graphics application of your choice for use on roads, points of interest, and other features in Google Earth Enterprise Fusion. When you do so, the following restrictions apply:

- The image must be created and saved in RGBA mode (RGB with an alpha channel).
- The image file must be saved in PNG format.
- Icons must be square. The standard sizes are 32 x 32 pixels up to a maximum of 64 x 64 pixels. However, you can make an icon any size, and when you import it, Google Earth Enterprise Fusion scales the icon *up* to as large as 64 x 64 pixels (changing the proportions to make it square, if it is rectangular). If the original icon image is larger than 64 x 64 pixels, Google Earth Enterprise Fusion scales it *down* to 64 x 64 pixels.
- Each image file must contain two versions of the icon (one for normal display and one when it is selected/highlighted). If you do not include two versions, Google Earth Enterprise Fusion duplicates the single 32 x 32 or 64 x 64 image and uses the same image for both versions. The red phone image below is an example of how an icon image might look. If the original icon is 32 x 32 pixels, the total for this stacked image is 32 x 64 pixels.

- Icons that are highlighted *and* part of a legend must contain a version of the icon for the legend which is 16 x 16, stacked on top and to the left of the top icon. The beach ball image below is an example of how such an image file might look. If the original icon is 32 x 32 pixels, the total for this stacked image is 32 x 96 pixels.

Note: If you change the image used for a custom icon name, it does not force you to rebuild projects that reference that icon. If that icon was previously referenced in a project that has already been built, when you publish a database that includes that project, the old icon appears. If something else in that project subsequently triggers a build, the new icon will appear in the resulting version.

Creating Custom Masks

Google Earth Enterprise Fusion's auto-masking tool provides a very robust and dependable

method of excluding fill data from imagery and terrain resources and requires the least investment of your time, since Google Earth Enterprise Fusion builds the mask itself. There are cases, however, where, in addition to fill data, some of the imagery within a resource should be masked out of view to produce the best quality imagery project.

This section describes how to create a custom mask, including how to create the necessary supporting files.

To create a custom mask:

1. Change to the folder that contains the version of the imagery resource for which you want to create a custom mask, such as:

   ```
   /gevol/assets/Resources/Imagery/
     SFBayAreaLanSat.kiasset/product.kia/ver001
   ```

2. Extract a preview of the imagery resource using the `gemaskgen` command with the `--extract` option. For example:

   ```
   gemaskgen --extract raster.kip file-extract.tif
   ```

   This command creates a preview image file called file-extract.tif.

3. Create a default mask to serve as the base for the custom mask:

   ```
   gemaskgen --mask --feather 200 raster.kip file-maskold.tif
   ```

   This creates a mask file called file-maskold.tif with a feather of 200 pixels.

   Note: It could take a few minutes to generate the mask.

4. If necessary, copy the `file-extract.tif` and `file-maskold.tif` files created in steps **2** and **3** to another computer that has a graphics editing software application installed, such as Adobe Photoshop.
5. Open both files in your graphics editing software application, and edit the mask as desired.
6. When you finish editing the mask, save it with the same name as the original source image file, adding `-mask`.

   For example, if your original file is called `trails.tif`, name your mask file `trails-mask.tif`.

7. Copy the mask file to the computer where you use Google Earth Enterprise Fusion.
8. Within Google Earth Enterprise Fusion, open the imagery resource to which you want to apply the mask, and select **Hand Mask** for Mast Type in the Imagery Resource Editor.

When you build the resource, Google Earth Enterprise Fusion looks for a file with the same name as the original source file with the `-mask` ending, as described in step **6**.

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HTML Tags Allowed

When specifying labels, descriptions, and layer names in Google Earth Enterprise Fusion, you can use limited HTML mark-up tags.

Caution: Although Google Earth Enterprise Fusion allows the mark-up tags listed below, there is no guarantee that there is enough space for Google Earth EC to display the text you enter. Be particularly careful about text that consumes vertical space (such as line breaks, horizontal rules, and so on). Some places in Google Earth EC expand to allow one or two extra lines, but if you add too many, your text could get truncated. Other places in Google Earth EC handle additional lines of text without a problem.

Supported HTML Mark-Up Tags

HTML Tag	Description
`<h1>...</h1>`	Top-level heading.
`<h2>...</h2>`	Second-level heading.
`<h3>...</h3>`	Third-level heading.
`<h4>...</h4>` `<h5>...</h5>`	Headings of lesser importance.
`<p>...</p>`	Left-align paragraph. Adjust the alignment with the align attribute. Possible values are left, right, and center.
`<center>...</center>`	Center paragraph.
`<blockquote>... </blockquote>`	Indented paragraph that is useful for quotes.
`<ul>...</ul>`	Unordered list. You can also pass a type argument to define the bullet style. The default is type=disc; other types are circle and square.
`<ol>...</ol>`	Ordered list. You can also pass a type argument to define the enumeration label style. The default is type="1"; other types are "a" and "A".
`<li>...</li>`	List item. This tag can be used only within the context of `<ol>...</ol>` or `<ul>...</ul>`.
`<dl>...</dl>`	List of definitions, consisting of terms and descriptions.
`<dt>...</dt>`	A term in a list of definitions. This tag can be used only in the context of `<dl>...</dl>`.
`<dd>...</dd>`	Description in a list of definitions. This tag can be used only in the context of `<dl>...</dl>`.
`<pre>...</pre>`	Pre-formatted text. Use for larger chunks of code. White spaces in the contents are preserved. For small bits of code use the inline-style code.
`<div>...</div>` `<span>...</span>`	Block grouping elements. These are used to structure the document, and are often used to provide hints about the intended presentation of the document.

`<em>...</em>`	Emphasis. By default this is the same as `<i>...</i>` (italic).
`<strong>...</strong>`	Strong. By default this is the same as `<b>...</b>` (bold).
`<i>...</i>`	Italic font style.
`<b>...</b>`	Bold font style.
`<u>...</u>`	Underlined font style.
`<s>...</s>`	Strike-out font style.
`<big>...</big>`	Larger font size.
`<small>...</small>`	Smaller font size.
`<sub>...</sub>`	Subscript text.
`<sup>...</sup>`	Superscript text.
`<code>...</code>`	Fixed-width font, such as Courier. By default this is the same as `<tt>...</tt>` (typewriter). For larger chunks of code use the block-tag `<pre>`.
`<tt>...</tt>`	Typewriter font style. This is the same as `<code>...</code>`.
`<font>...</font>`	Customizes the font size, family, and text color. This tag understands the following attributes: • `color` - The text color, for example `color="red"` or `color="#FF0000"`. • `size` - The logical size of the font. Logical sizes 1 to 7 are supported. The value can either be absolute (for example, `size=3`) or relative (`size=-2`). In the latter case, the size is added to the previous font size. • `face` - The family of the font, for example `face=times`.
`<img>`	An image. The image name for the mime source factory is given in the source attribute, for example `<img src="qt.xpm">`. The image tag also understands the attributes `width` and `height`, which determine the size of the image. If the pixmap does not fit the specified size it will be scaled automatically. The `align` attribute determines where the image is placed. By default, an image is placed inline just like a normal character. Specify `left` or `right` to place the image at the specified side.
`<hr>`	Horizontal line.
` `	Line break.
`<nobr>...</nobr>`	No break. Prevents word wrap.

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Google Earth Plugin Support

Google Earth Enterprise supports the Google Earth Plugin and its API. The Google Earth Plugin supports connections to non-Google databases.

Included with Google Earth Enterprise is an example of how to implement the Google Earth Plugin in `/opt/google/gehttpd/htdocs/earth/earth_local.html`. By default, the virtual servers point to `earth_local.html` when accessing through a web browser.

The following is the content of the `earth_local.html` file.

```
<html>
<head>
  <title>Google Earth Enterprise Earth Plug-in: Local Example</title>
  <link rel='stylesheet' type='text/css' href='/earth/earth.css' />

  <script type='text/javascript'>
    // To serve your static content from a different server, simply override
    // GEE_SERVER_URL to the URL of your GEE Server, e.g.:
    // "http://yourhost.com/default_ge/"
    var GEE_SERVER_URL = "";
  </script>

  <!-- Load the required Javascript files.
       The loader for the Earth Plug-in API: earth_plugin_loader.js.
       Utilities for this example UI: fusion_utils.js and search_tabs.js
       The main routine: geeInit() is found in fusion_earthplugin.js which
       defines the example UI and behaviors.
    -->
  <script type='text/javascript' src='/js/earth_plugin_loader.js'></script>
  <script type='text/javascript' src='/js/fusion_utils.js'></script>
  <script type='text/javascript' src='/js/search_tabs.js'></script>
  <script type='text/javascript' src='/js/fusion_earthplugin.js'></script>
</head>

<body onload='geeInit()' onresize='geeResizeDivs();'>

  <div id='header'>
    <div id='logo'>
      <img src="/earth/images/gee.gif" align="left" />
      </div>
    <div id='search_tabs'></div>
  </div>

  <div style="clear: both;"></div>

  <table cellspacing="0" cellpadding="0" width="100%">
    <tr valign="top">
      <td id='left_panel_cell'>
        <div id='left_panel'></div>
      </td>
      <td>
        <div id='map'></div>
      </td>
    </tr>
  </table>

</body>
</html>
```

In order for your users to be able to view your content in a browser, they must install the Google Earth Plugin.

The plugin installer should be placed in the following directory:

```
/opt/google/gethttpd/htdocs/earth/plugin
```

Users are automatically directed here from `earth_local.html`'s default error page. There are two installers, which should be renamed as follows:

- `/opt/google/gehttpd/htdocs/earth/plugin/GoogleEarth-Mac-Plugin-Latest.dmg`
- `/opt/google/gehttpd/htdocs/earth/plugin/GoogleEarth-Windows-Plugin-Latest.msi`

These installers do not require administrative rights on the end-user's machine. They also do not auto-update. If users are unable to download the installer from this location, they should contact their system administrator.

If the user has internet access, they can download an auto-updating installer from http://code.google.com/apis/earth. This installer requires admin rights when installing to Internet Explorer on Windows.

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Glossary

A

Asset

Any component of a Google Earth Enterprise Fusion data set, including:

- Resources
- Map Layers
- Projects
- Databases

Asset Log

A text file that contains information about the build process for a particular asset. Keeps track of the current and previous builds of this asset. Data logged includes: build host, source data paths, date, time spent, and errors encountered.

Asset Manager

The tool you use in Google Earth Enterprise Fusion to import and build your assets in preparation for publishing your Google Earth and Google Maps databases.

Asset Root

The root of the directory tree where all Google Earth Enterprise Fusion assets (resources, projects, and databases) are stored.

Authentication

The process of verifying the identity of a user, a system, or a process.

Authorization

The process that determines whether an authenticated user, system, or process has permission to perform a task.

B

Bad Features

Feature whose geometry is not available in the underlying source file. This could result from a corrupted source file or, more likely, from a source file that is missing the geometry for some of the records.

Blocked

There is a canceled or failed resource that your project or database requires to be completed. You must resolve the problems with these resources before the project or database can successfully complete a build.

Build

The process of preparing one or more assets for inclusion in a Google Earth Enterprise Fusion database.

C

Clean

The process of removing an asset version, making it unavailable for further use in a Google Earth Enterprise Fusion project or database, even though it still appears on the asset list in the Asset Manager.

Controlled Access

Refers to any content or process that requires successful authentication and authorization.

D

Database

An organized body of related information. The final form of a Google Earth Enterprise Fusion data set that is ready to be published to a Google Earth server; can be either a map database or a Google Earth database.

Define

The process of creating an asset and adding source data or other assets to it. For example, when you define a project, you create it and add resources to it.

Display Level

Determines the level at which each layer is visible to users in Google Earth EC. The lower the number, the higher the level at which Google Earth EC users can view the data. Value can range from 2 to 24. The entire Earth can be viewed at level 5. (Also referred to as LOD.)

Display Rule

Determines exactly which feature(s) of the layer are displayed and how Google Earth displays them. Display rules consist of several options you can set, including colors, fonts, display levels, and so on.

E

Extents

The outer boundaries of individual resources or source files.

F

Favorite

A particular location on and orientation to the Earth that you use frequently. You can save a favorite and then return to that view in the Preview pane next time by simply selecting the favorite.

Fill Pixels

Extra pixels (often pure black or pure white) that produce a frame around imagery where its borders are uneven.

Filter (vector)

A pattern expression that is applied to the data fields of the vector resource.

Flat Projection

Also known as plate carrée, equirectangular, or equidistant cylindrical projection, uses the equator

as the standard parallel, and maps meridians and circles of latitude to vertical and horizontal straight lines, respectively.

In Google Earth Enterprise, Flat Projection is used for Earth databases and (optionally) Maps databases. Flat projection imagery is not compatible with **maps.google.com** base imagery. To use **maps.google.com** base imagery, you will need to create Mercator projection imagery resources.

G

GIS

An organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

Grid

A configuration of networked workstations, servers, and storage devices that share the work and data storage in Google Earth Enterprise Fusion.

I

Imagery

High-resolution overhead photographs captured by satellites or from airplanes.

Inset

An individual source image within an imagery or terrain resource.

L

Layer

An individual vector resource within a vector project.

LOD

Level of Detail. Also referred to as display level. Determines the level at which each layer is visible to users in Google Earth EC.

M

Map Layer

A special component in the Google Earth Enterprise Fusion data set that you use in map data sets.

Mask

An opaque graphical layer used to conceal part of an image.

Mercator Projection

A cylindrical map projection, commonly used for nautical purposes. Mercator Projections preserve shapes and directions, but distort size, especially as latitudes approach the poles. **maps.google.com** uses the Mercator projection.

In Google Earth Enterprise, you can create imagery resources in the Mercator Projection to integrate your data with the **maps.google.com** base maps. However, if you are creating both Maps and Earth databases, you will need two copies of the imagery resources: one for Mercator

and one for Flat projection.

Minification

The method used to determine the texture color for a texture mapped pixel, using the colors of nearby texels (pixels of the texture). In short, it blends the texture pixels together by breaking them up into tinier pixels. Another term for texture filtering is called texture smoothing.

Mosaic

A single composite image created by assembling multiple images.

P

Plug-in

A self-contained software component that modifies (adds or changes) function in a particular software system. When you add a plug-in to Google Earth Enterprise Fusion, the foundation of the original software system remains intact. The development of plug-ins requires well defined application programming interfaces (APIs).

Preserve Text

The level at which you want to preserve text labels on roads after the vector data for the road itself fades away.

Preview

To view source data before you import it as a resource, or to view Google Earth Enterprise Fusion assets before you publish them to Google Earth EC.

Project

The intermediate component of a Google Earth Enterprise Fusion data set; can be created from one or more resources; however, the resources must be of the same type as the project (imagery, terrain, vector, or map layer).

Provider

An organization that distributes source imagery, terrain, or vector data.

Publish

The process of making a Google Earth Enterprise Fusion database available on a Google Earth Enterprise Server for viewing with Google Earth EC.

R

Raster Data

A method of storing, representing, or displaying spatial data in digital form. It consists of using cell data (not necessarily square) arranged in a regular grid pattern in which each unit (pixel or cell) within the grid is assigned an identifying value based on its characteristics.

Resource

The most basic component of a Google Earth Enterprise Fusion data set; can be created from imagery, terrain, or vector source data.

S

Server

A computer that delivers information and software to other computers linked by a network.

Source Data

The raw data used to define a Google Earth Enterprise Fusion imagery, terrain, or vector resource.

Status

The current state of a Google Earth Enterprise Fusion build, such as Queued, InProgress, Succeeded.

System Manager

A Google Earth Enterprise Fusion tool that allows you to view the recent activity log and monitor the progress of background tasks, such as building a database.

T

Template

A file external to Google Earth Enterprise Fusion that contains a set of display rules. You can import the template and reapply those display rules to layers in any project.

Terrain

Topographical information about a geographic area.

Tile

The equivalent of one grid square. (See The Toolbar in the **Fundamentals** chapter for more information about turning the grid on and off.)

V

Vector

A method of storing, representing, or displaying spatial data in digital form. It consists of using coordinate pairs (x,y) to represent locations on the Earth. Features can take the form of single points, lines, arcs, or closed lines (polygons).

Version

A particular instance of a build of an asset.

Virtual Mosaic

Allows you to use a mask created outside of Google Earth Enterprise Fusion for an imagery mosaic.

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