Autodesk MapGuide® Enterprise 2010

Getting Started

Autodesk®

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Fundamentals

1

MapGuide is a software platform for distributing spatial data over the Internet or on an intranet. There are two versions of MapGuide: MapGuide Open Source, and Autodesk MapGuide Enterprise. The concepts in this first chapter of the *Getting Started Guide* will help you understand and use either version. The second chapter summarizes the development process in the form of a flow diagram. The final chapter provides examples of authoring tasks, which will give you some initial hands-on experience, using the sample data included on the Autodesk MapGuide Enterprise product CD.

What's New in Autodesk MapGuide Enterprise 2010?

Welcome to Autodesk MapGuide Enterprise 2010. The following list describes what's new in this release.

Support for SQL Server 2008

Autodesk MapGuide Enterprise 2010 includes an FDO provider for Microsoft SQL Server 2008.

Enhance Server Error Reporting

Autodesk MapGuide Enterprise 2010 enhances the Server error and trace logs to include more detailed information about server operations.

Performance Improvements

Autodesk MapGuide Enterprise 2010 includes a number of performance enhancements:

- Improved connection time for Oracle feature sources and faster authoring in Studio
- Improved map generation time by enabling multiple open connections to raster feature sources
- Improved loading and selection times for flexible web layouts
- Improved rendering time by caching coordinate system transformation objects

Raster Re-projection

Autodesk MapGuide Enterprise 2010 now includes an efficient raster re-projection algorithm that is based on tessellating an image into smaller triangles and re-projecting the triangles.

Information About Licensing and Upgrading

Licensing

For information about licensing MapGuide Enterprise, refer to the *Network Licensing Guide*. The *Network Licensing Guide*is available from the Media Browser of your Autodesk MapGuide Enterprise 2010 installation CD.

Upgrading

For information about upgrading from the previous version of MapGuide Enterprise, refer to one of the following documents:

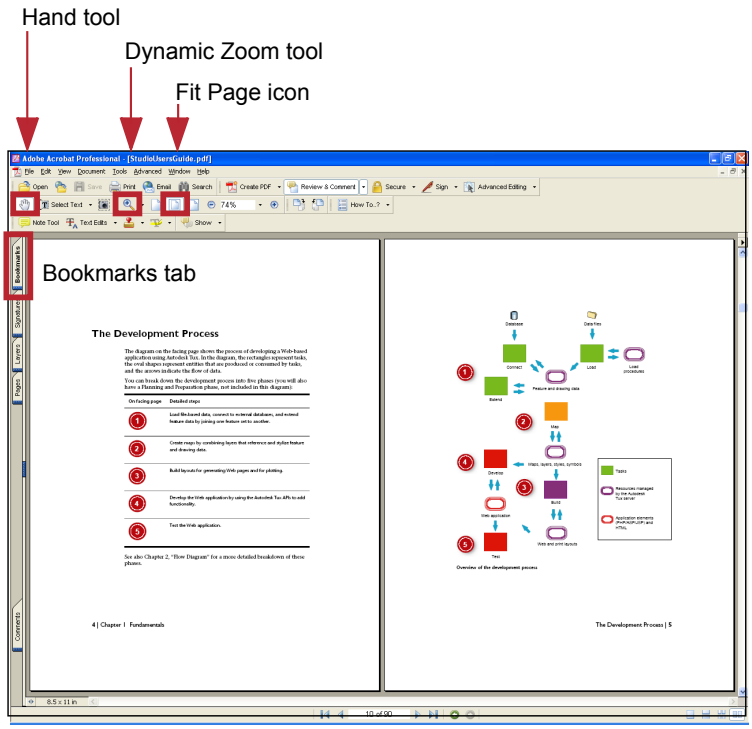
- Installing and Configuring on Windows
- Installing and Configuring on Linux

The document appropriate for your operating system is available from the Media Browser of your Autodesk MapGuide Enterprise 2010 installation CD.

PDF Tips

NOTE This book is in PDF format, which is optimized for viewing on a high-resolution monitor (preferably set to 1280x1024), and for printing. To read this guide online, follow these suggestions for the best viewing experience:

- Close the bookmarks tab (you can easily open it when you need it).
- Click the Fit Page icon (this gives you two full pages on most monitors).
- Use the Dynamic Zoom tool to adjust the view so that you can see as much of the double-page spread as possible without straining your eyes to read the text.
- Use the Hand tool to move the page left and right.
- Use the Page Up and Page Down keys to go forward and back.

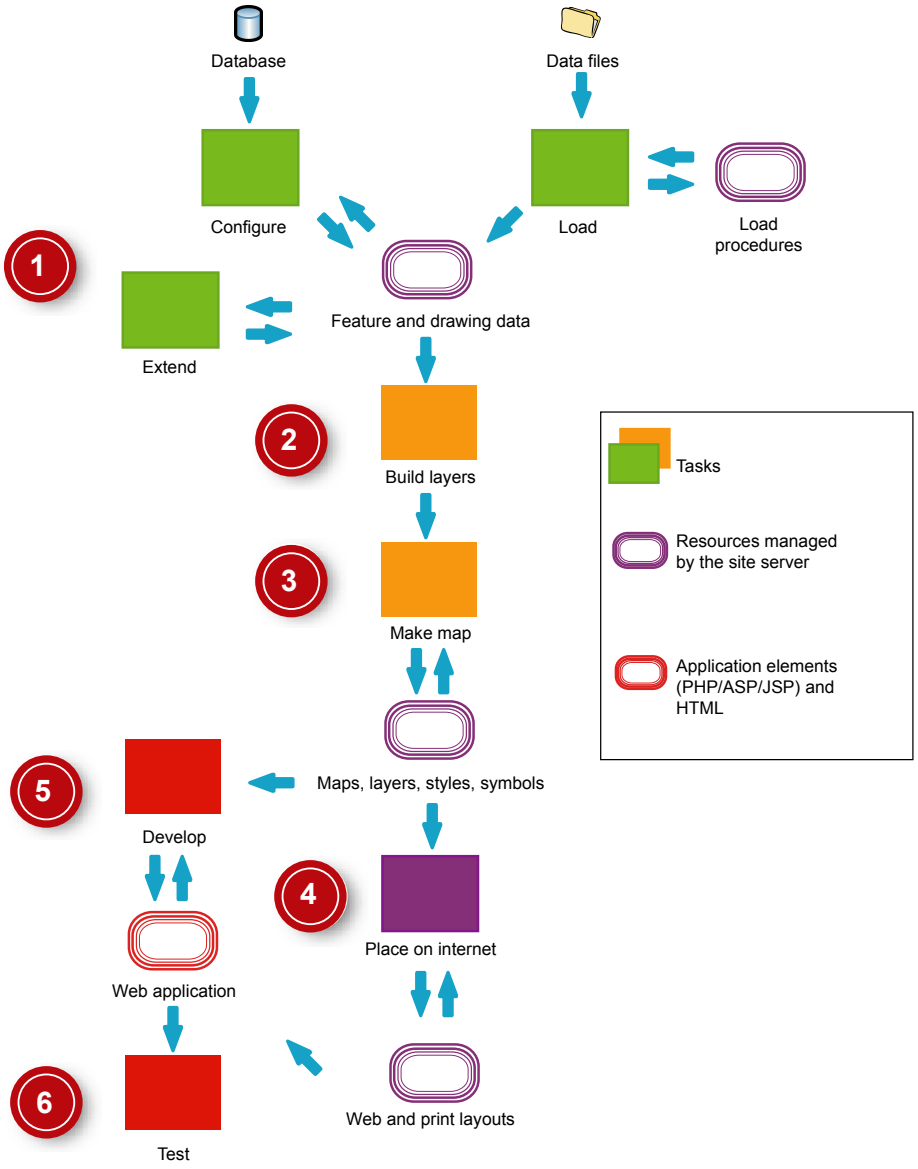

Hand tool
Dynamic Zoom tool
Fit Page icon
Bookmarks tab
The Development Process

The Development Process

The diagram on the facing page shows the process of developing a Web-based application using MapGuide. In the diagram, the rectangles represent tasks, the oval shapes represent entities that are created by the tasks or used by them, and the arrows indicate the flow of data. You can break down the development process into five phases (you may also have a Planning and Preparation phase, not included in this diagram):

On facing page	Detailed steps
	Load file-based data, configure connections to external databases, and extend feature data by joining one feature source to another.
	Build layers that reference, theme, and style the data.
	Create maps by combining layers.
	Place the map on the Internet or intranet using layouts for generating web pages and for plotting.
	Develop the web application, using the MapGuide APIs to add functionality.
	Test the web application.

See also Chapter 2, “Flow Diagram” for a more detailed diagram of these phases.



Overview of the development process

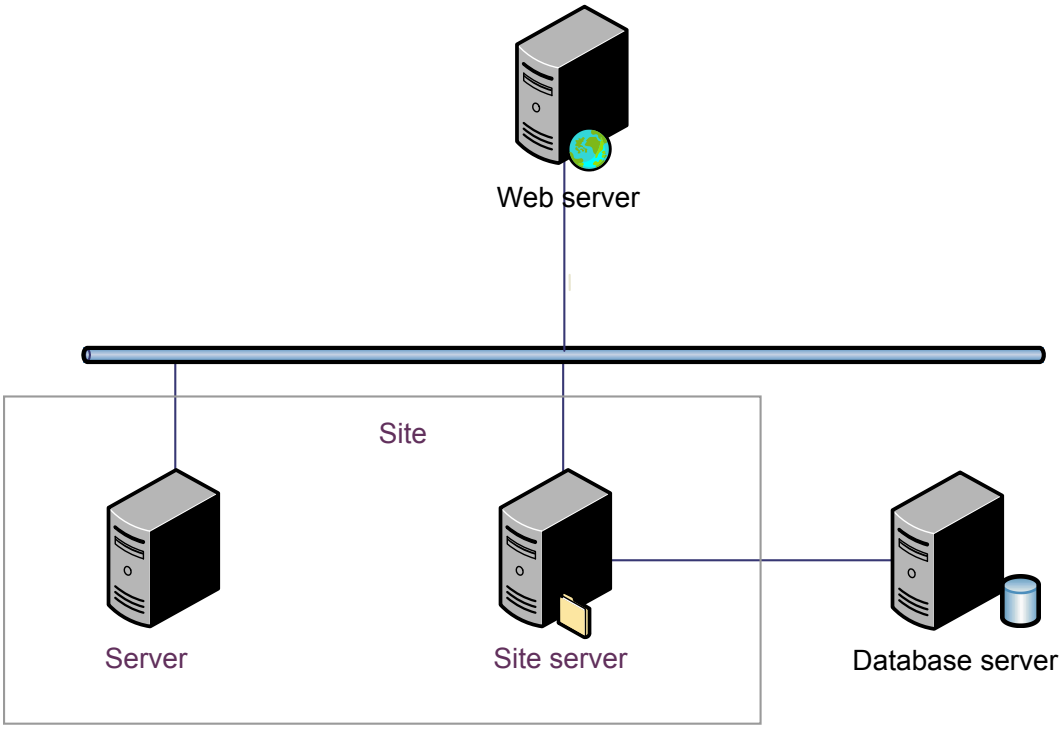
Sites and Servers

The collection of servers that process requests in MapGuide is called a *site*. You can divide the processing load between two or more servers within the site. Each site shares a single *resource repository* among its servers. The resource repository stores the *resources* that map authors use to create maps, for example, pre-defined layers for features such as roads or land parcels.

In the diagram on the facing page, the site contains two servers, one of which is designated as the *site server*. The site server contains the resource repository. It also connects to any database server or servers.

MapGuide Server provides seven *services*: Site, Resource, Drawing, Feature, Mapping, Rendering, and Tile. If you are using a single server, that server performs all of these services. In any case, the site server always runs the first two services, because they handle data access and manage the resources for the site. However, if you have two or more servers, you can split off the other services and allocate them to another server or servers. For example, the Mapping and Rendering services are the most processor-intensive operations and can benefit from having a dedicated server to handle them.

- The Mapping service creates the view of a map in response to requests from the clients.
- The Rendering service creates the final map image for the AJAX viewer from input provided by the Mapping service.



A typical site with two servers

Installation

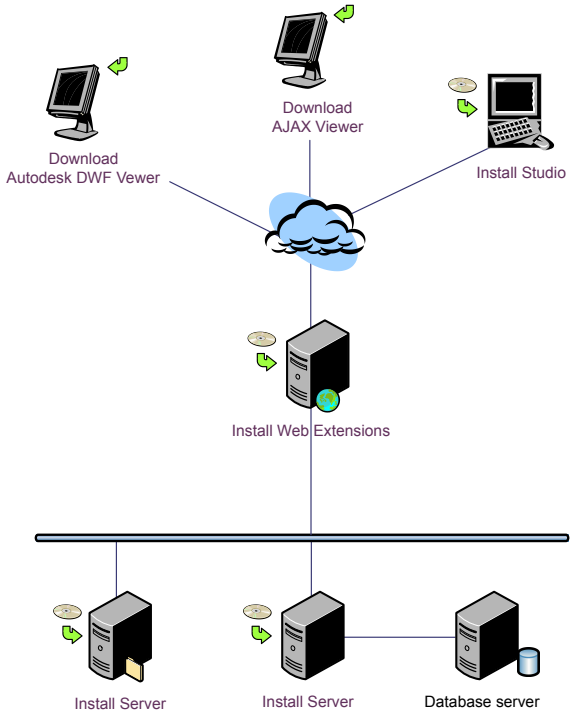
MapGuide consists of four separate components, which should be installed in the following order:

- MapGuide Server
- MapGuide Web Extensions (for application development)
- Autodesk MapGuide Studio (for map authoring)
- MapGuide Viewer

You can access detailed information about hardware and software requirements for installation from the Installation HTML page of the CD browser that appears when you insert the Autodesk MapGuide Enterprise product CD. Here is a short summary:

- MapGuide Server and MapGuide Web Extensions run on both Linux and Windows.
- MapGuide Web Extensions run on IIS and Apache (Windows) and Apache (Windows and Linux).
- Autodesk MapGuide Studio runs on Windows. A preview version is provided for use with MapGuide Open Source. The full version is part of Autodesk MapGuide Enterprise.
- The MapGuide Viewers work with Microsoft Internet Explorer and Firefox browsers.
- The MapGuide Web Extensions support application development in PHP, ASP, and JSP.

The diagram on the facing page shows where to install the different components of the software.



Typical site showing where to install the MapGuide components

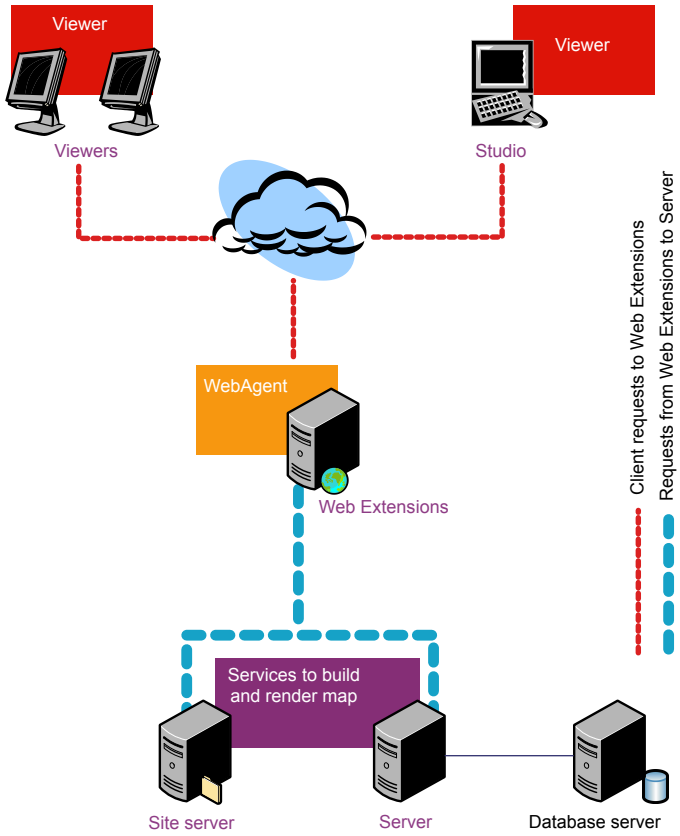
Component Overview

The diagram on the facing page provides a high-level overview of how the four components work together after installation. Each component is described in more detail in the next four topics of this chapter.

Autodesk MapGuide Studio and the MapGuide Viewer are client applications of MapGuide Server. Requests coming from these clients, and from the other client applications that you develop using the API, go to the Web Extensions by means of HTTP protocol. The WebAgent component of the Web Extensions processes the requests and forwards them on to MapGuide Server. When you start Autodesk MapGuide Studio, you enter the name or the IP address of the web server that is hosting the Web Extensions. For example, http://144.111.19.94/mapguide2010

When it receives a request, MapGuide Server accesses the resources stored in the resource repository, builds and renders the map in DWF format or as a static image for the AJAX viewer, and returns it to the Web Extensions, which in turn send it back to the client.

Autodesk MapGuide Studio has the MapGuide Viewer built into it. The Viewer displays the rendered data onscreen and manages the layers and other properties of the data returned from the server.



The four components of MapGuide

Autodesk MapGuide Studio

Autodesk MapGuide Studio is an authoring environment that handles all aspects of collecting and preparing geospatial data for distribution on the Internet (except custom coding). When you use Autodesk MapGuide Studio, you will generally follow these steps:

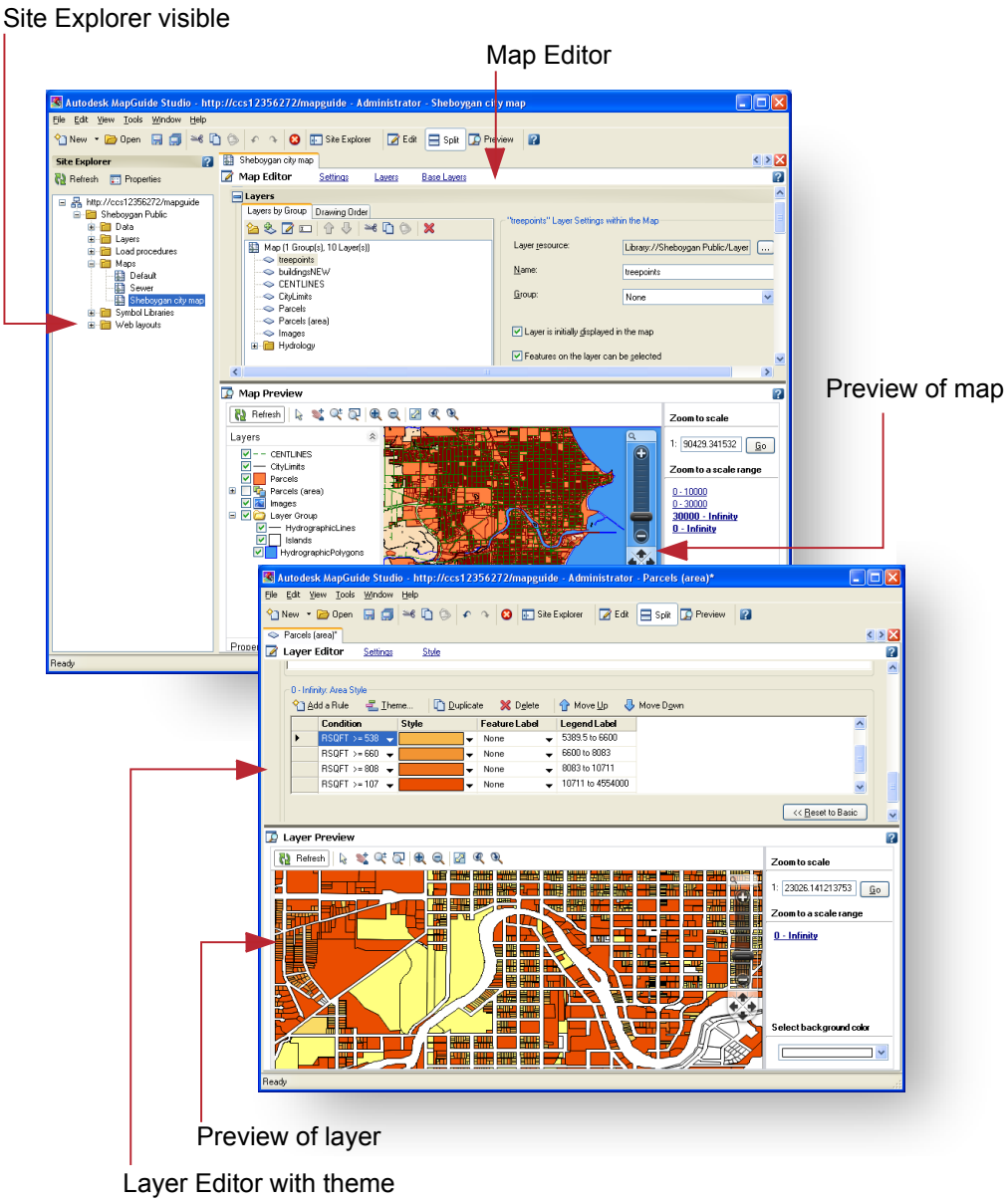
1. Create resources from your source data, either by loading file-based data or by connecting directly to external databases.
2. Build styled and themed layers from the resources.
3. Compile the layers into a map.
4. Embed the map in a web page using a web layout.

After you have a web layout, you can customize the appearance and functions of the web application by adding your own programming code. The final step is to publish the completed web application to the Internet or intranet for viewing and interaction.

The Autodesk MapGuide Studio interface is divided into three parts:

- The Site Explorer
- The MapGuide Viewer
- The Editor

When you open Autodesk MapGuide Studio and connect to your site server (via the WebAgent), the Site Explorer shows you the resources stored in the resource repository, as shown in the upper image on the facing page. Double-clicking any resource in the Site Explorer opens the appropriate editor for that resource. If the resource is a layer or a map, the Viewer also opens and displays a preview of the data.



Two views of Autodesk MapGuide Studio

MapGuide Server

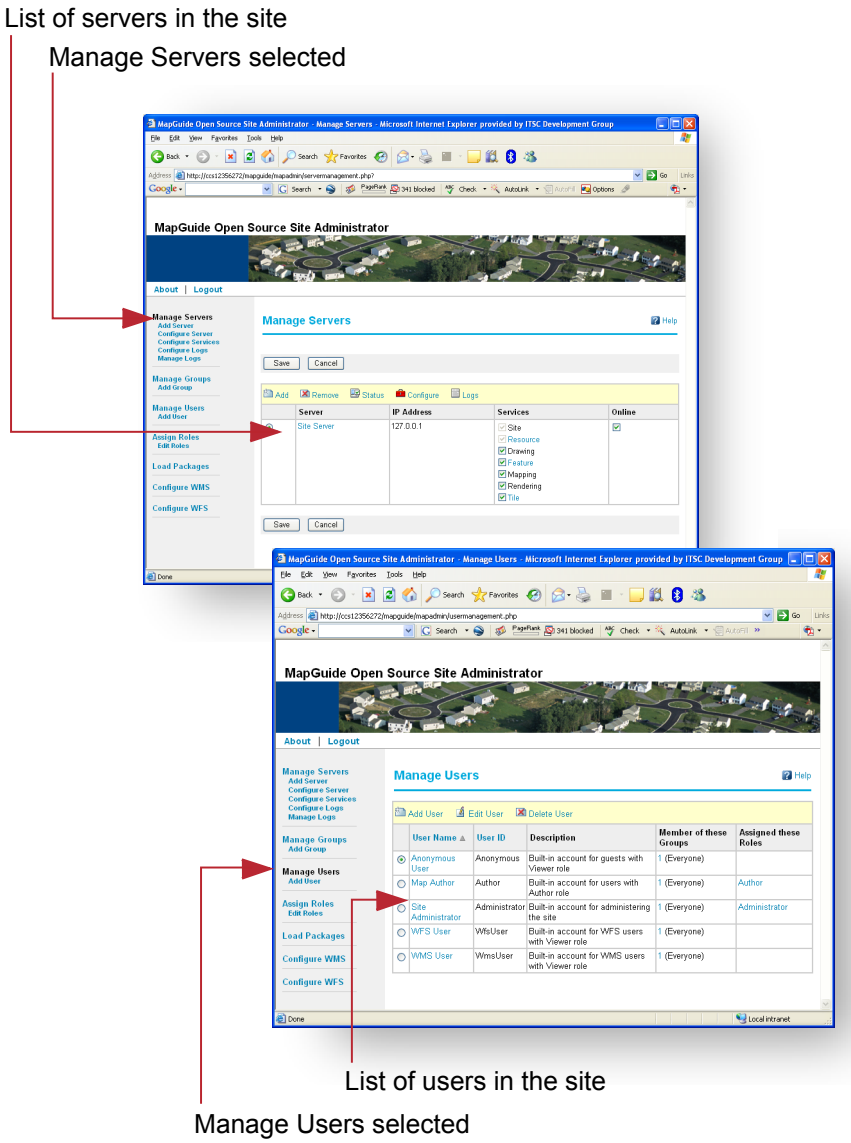
The MapGuide Server component hosts the MapGuide services and responds to requests from client applications through TCP/IP protocol.

You can manage your site and its servers with the Site Administrator program. This program is installed with the Web Extensions. It has a Web-based interface that you can access from any web browser. To start the program, you open a browser and enter: http://*servername*/mapguide/mapadmin/login.php, using the name or IP address of the server on which you installed the Web Extensions.

When you log onto the Site Administrator program, you can:

- Manage your site. For example, you can add and remove servers, or take them offline for maintenance.
- Assign services to the servers. For example, one server can process mapping requests while another handles rendering tasks.
- Monitor the status of any server.
- Define users and groups and assign roles and access permissions to them.

The illustration on the facing page shows two views of the Site Administrator program. The upper image shows the home page, which lists the servers in the site. The lower image shows a typical list of users and the groups that they belong to.



Two views of the Site Administrator program

MapGuide Web Extensions

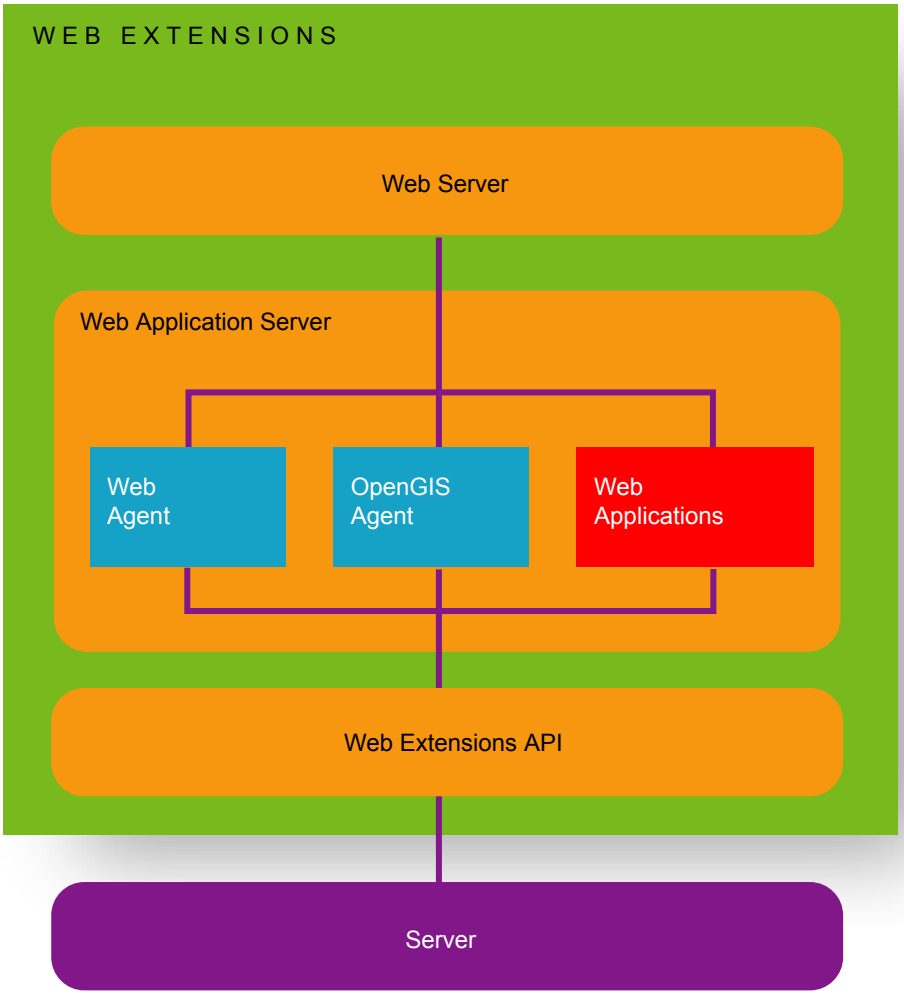
The MapGuide Web Extensions are internal components which can be accessed through the Web Extensions API. (There is also a forms-based interface which you can access: http://*servername*/mapguide/mapagent/index.html). The Web Extensions expose the services offered by the MapGuide Server to client applications over the Internet or an intranet using HTTP protocol. The diagram on the facing page shows the main sub-components of the MapGuide Web Extensions.

The WebAgent processes requests coming from clients and passes them to the MapGuide Server. Two of the clients are Autodesk MapGuide Studio and the MapGuide Viewer. The WebAgent implements the MapGuide services HTTP Protocol, which it uses when directing requests to the server. The WebAgent processes incoming request parameters, establishes a connection to the appropriate server, and calls the service API(s) required to process the request. When the service API responds, any data returned from the API is streamed back to the client.

The OpenGIS Agent implements a number of the OpenGIS web-mapping protocols to expose the services offered by the MapGuide Server to standards-based OpenGIS clients.

The MapGuide Web Extensions provide a platform for application development, based on the services offered by the MapGuide Server. The Web Extensions API supports three languages/environments: ASP, JSP, and PHP.

For more information, see the *Developer's Guide*.



Architecture of the MapGuide Web Extensions

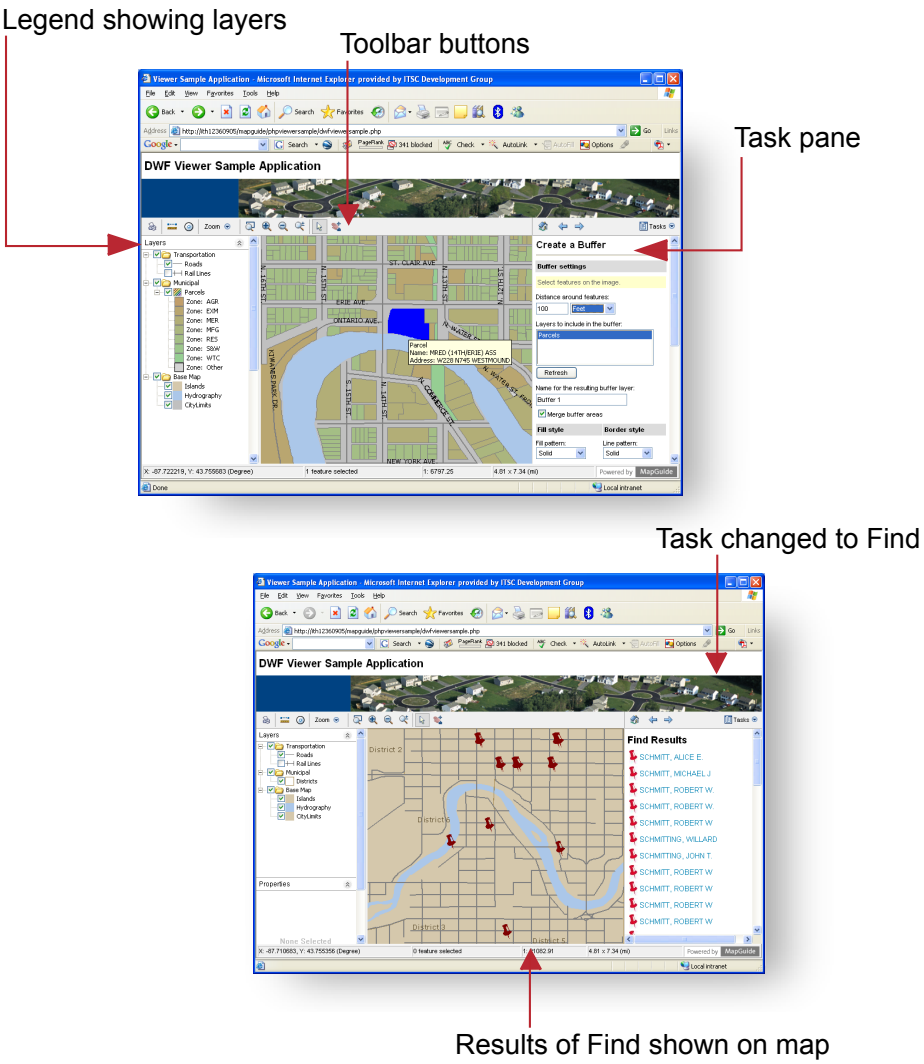
MapGuide Viewer

The MapGuide Viewer provides a means of viewing a map in a web browser. After you have made your spatial data available on the Internet or on your intranet, users can use the viewer to display the data and interact with it.

There are three flavors of the MapGuide Viewer:

- The AJAX viewer (or "zero-client viewer") does not need a download. It works with Microsoft Internet Explorer, running on Windows, or with Internet Explorer or Firefox on other operating systems, such as MacOS or Linux.
- The Fusion-based AJAX Viewer uses the popular Open Layers project for both non-tiled and tiled maps.
- The downloadable viewer (Autodesk DWF viewer) is based on a Microsoft ActiveX Control and has full support for the DWF format. It works with the Microsoft Internet Explorer browser only.

You can customize the appearance of the MapGuide Viewer and select which toolbar commands you want to use with a template called a web layout. Of course, you can also add features and functions to the basic layout using your own program code.



Two views of the MapGuide Viewer

Load and Configure

Before you can build maps in MapGuide, you must make your source data available. There are three ways to make source data available:

- Load any file-based data, such as DWG, SHP, or SDF, onto the MapGuide site. You can also load raster files.
- Connect to SDF, SHP, and raster files not loaded into the MapGuide resource repository.
- Configure connections to databases, such as Oracle, ArcSDE, or MySQL.

Load data by converting all, or part of, the source file into a format that MapGuide can use, and storing it as a resource. For example, you can load all the layers in a DWG file and create a separate resource for each one.

Connect to SDF, SHP, or raster files without loading them into the MapGuide resource repository. The files can be located on the same server as MapGuide or on a different server.

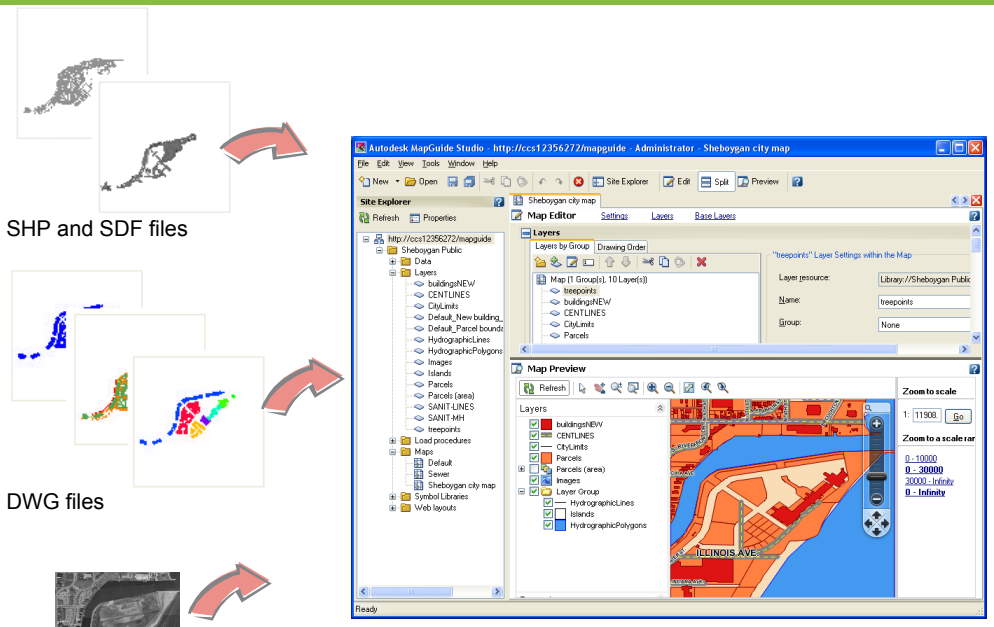
Data stored in a database does not need to be loaded. You simply connect to it by configuring a data source for it. In this case, the information necessary to connect to the database is stored as the resource.

If the database is a simple file (Microsoft Access MDB or Microsoft Excel XLS), Autodesk MapGuide Studio uploads it when you connect to the server. It is stored on the server as source data for the resource.

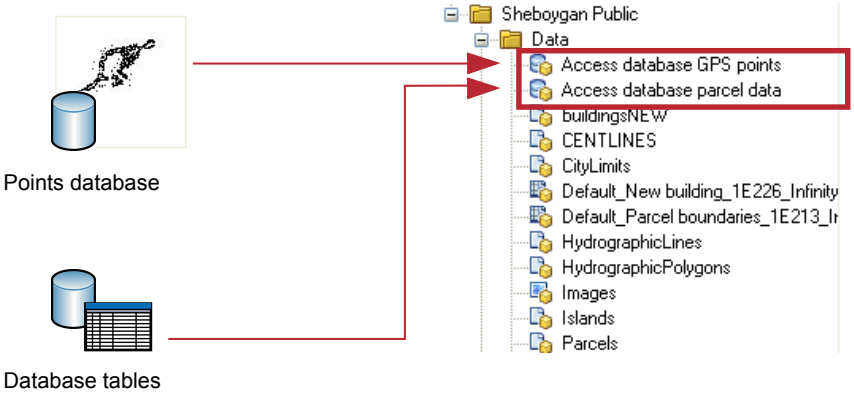
MapGuide uses Autodesk and OSGeo FDO providers. An FDO provider is an implementation of the FDO (Feature Data Objects) API that provides access to data in a particular DataStore. (For more information about FDO, see the Open Source Geospatial website at https://mapguide.osgeo.org/gettingstarted.html.)

Connections to databases are stored as resources in the resource repository and can be edited just like any other resource.

Drag files to Site Explorer



Configure connections to databases



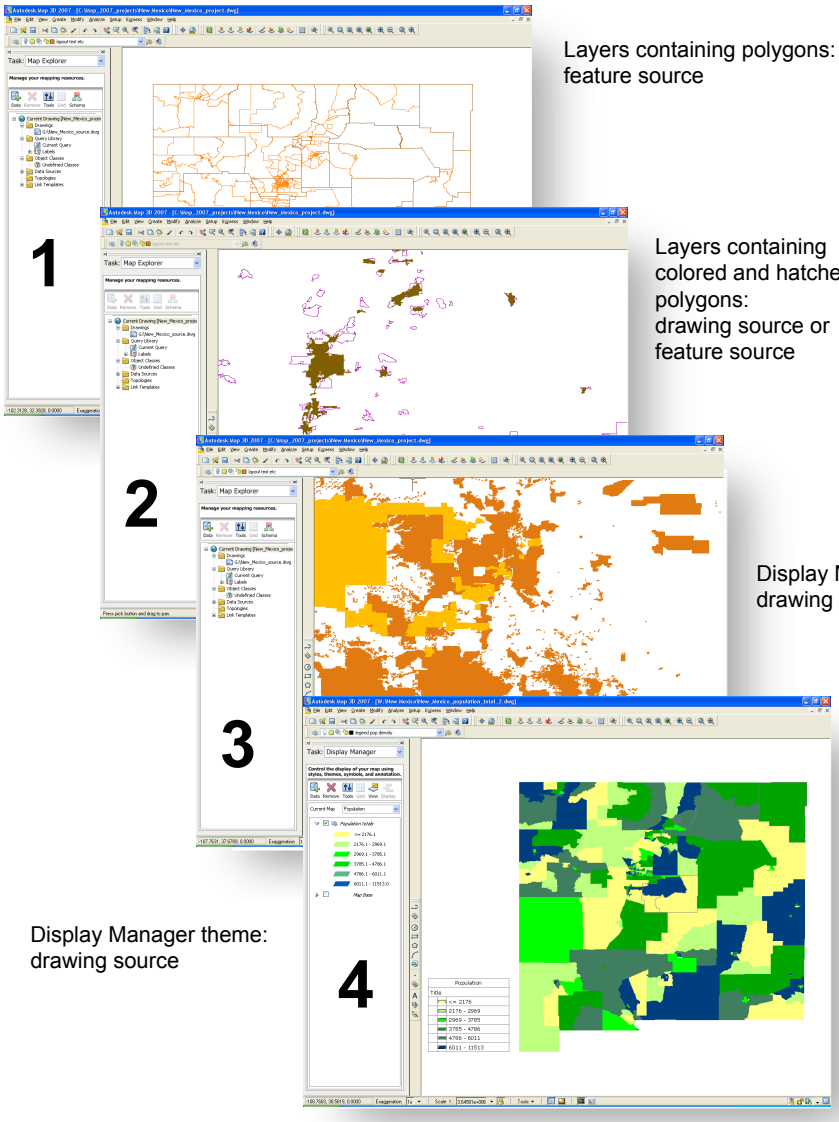
Loading files and configuring connections to databases

Feature Sources and Drawing Sources

During the load process, MapGuide transforms source data into formats that are optimal for serving over the Web. Some formats are already optimal for use on the Web, including: Autodesk SDF, Autodesk DWF, and ESRI SHP. These formats are loaded directly without transformation. Other formats are converted into either SDF or DWF, which are the two native file-formats in MapGuide. SDF is used for *feature sources* and DWF is used for *drawing sources*.

- Feature sources are the best choice when you simply want to load the raw geometry and then style or theme it in Autodesk MapGuide Studio.
- Drawing sources are best when you want to retain any styles or themes already applied to the source data.

For example, the diagram on the facing page shows four views of a DWG file in Autodesk Map. The layer containing unstylized polygons (screenshot 1 at top) is converted to a feature source, because it contains simple geometry. The Display Manager styles and themes (3 and 4) already have some stylization, and so they are converted to drawing sources. There is also a polygon layer that has some stylization (2). In this case, you can choose to convert the layer either to a feature source (and lose the stylization) or to a drawing source (and keep it).



Views of a DWG file in Autodesk Map, showing options for converting to feature sources or drawing sources

Load Procedures

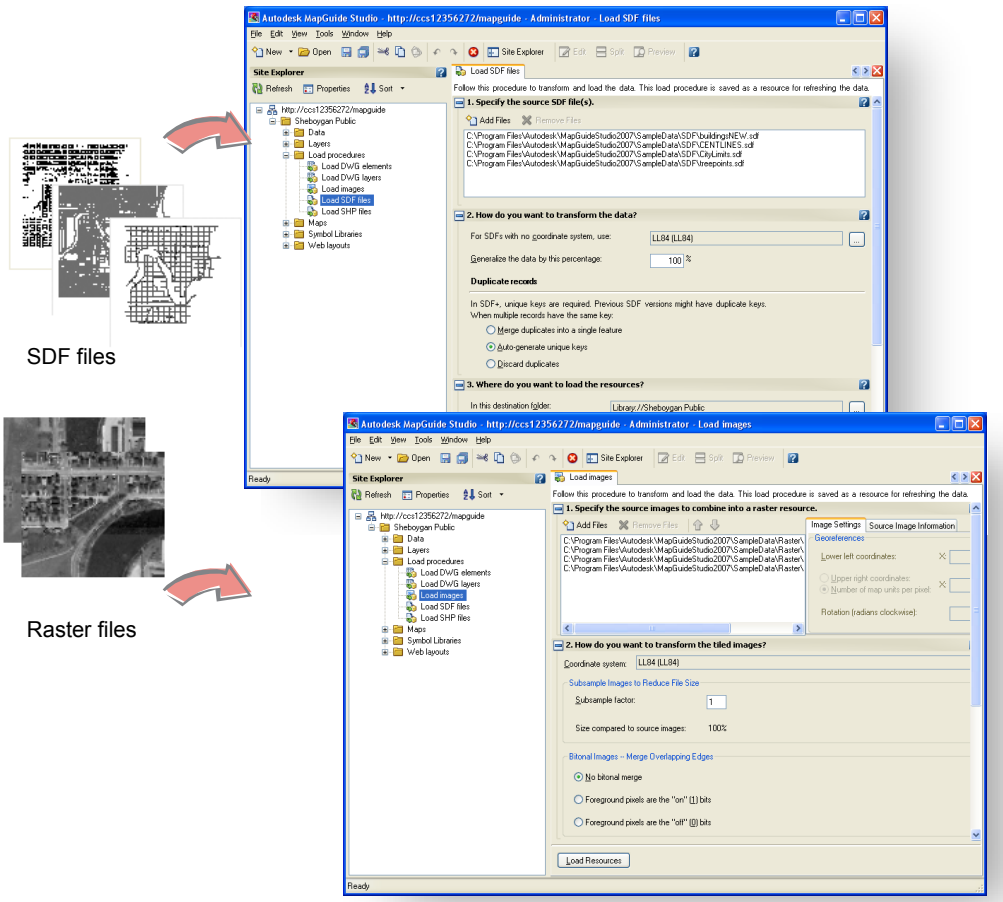
When you drag a file or a set of files of the same format to the Site Explorer in Autodesk MapGuide Studio, you get a new *load procedure*. Load procedures are essentially saved scripts for reloading data. You can use load procedures to automate the updating of resources on the server. They capture the location of the source files, the conversion rules, and where to put the resulting data on the server.

You can execute these conversion rules (either interactively in Autodesk MapGuide Studio or through a script) to refresh file-based spatial data on your site. Scripts can be run overnight or at regular intervals to keep the data up-to-date.

Load procedures are themselves stored as resources in the repository. Open them in Autodesk MapGuide Studio whenever you need to add or delete files, change the destination, or update any of the other parameters.

The illustration on the facing page shows two load procedures open in Autodesk MapGuide Studio. Both procedures load multiple files at the same time. One loads SDF files, and the other loads raster files.

Drag files to the Site Explorer



Load procedures for SDF files (top) and raster files (bottom)

Resource Repository

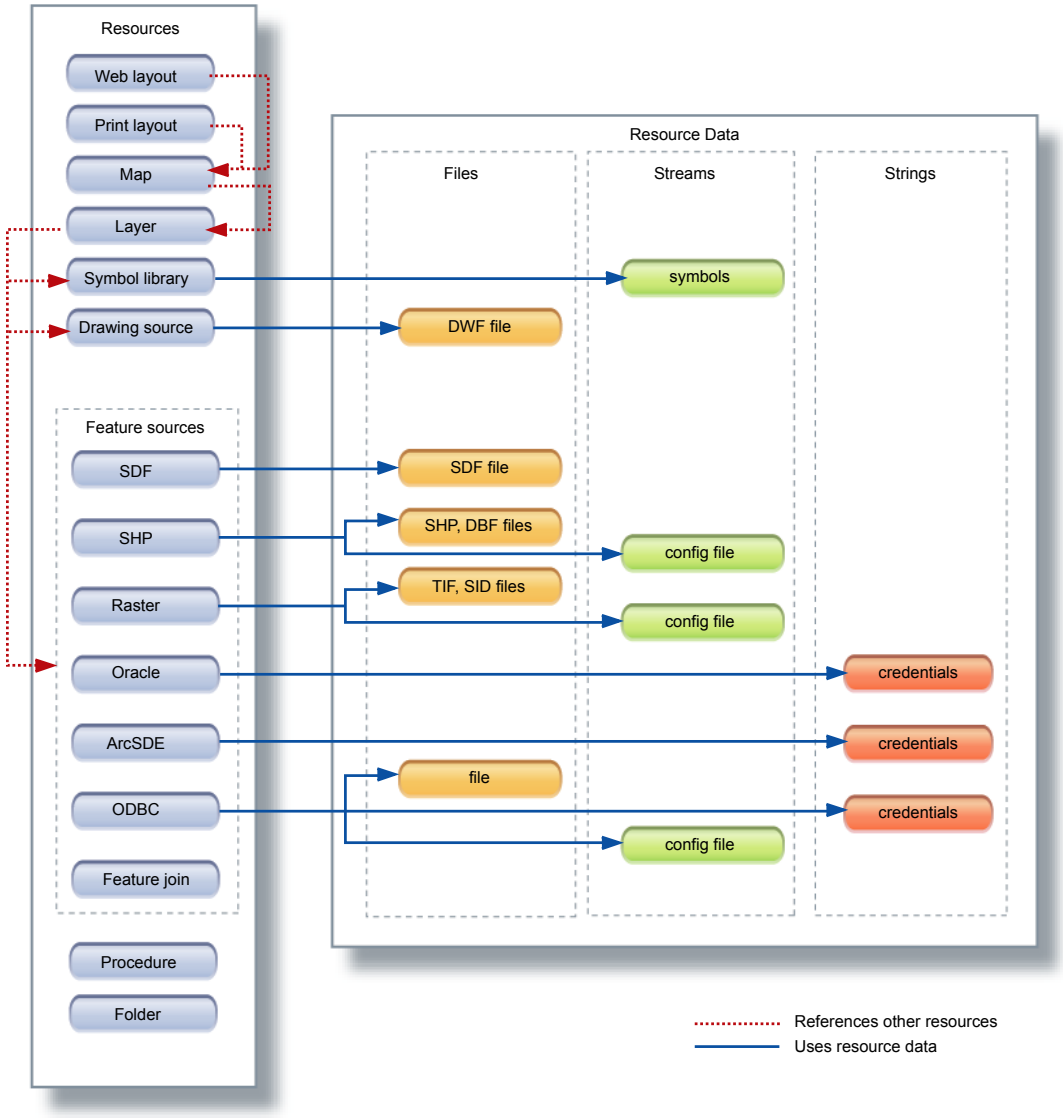
The resource repository is an XML database that stores the resources created by loading file-based data or by connecting to databases. There is one repository per site and it resides on the site server. The diagram on the facing page shows how the resources are stored in the repository.

Resources are designed to be reused and shared. Some resources reference other resources. For example, maps and layers are stored as separate resources, and the map references the layers that are included in the map. Layers reference feature or drawing sources. When you update the original feature source, the layer is automatically updated as well.

Other resources, such as print layouts, are self-sufficient and do not reference any other resources or files. Some resources use associated resource data. For example, an ArcSDE feature source uses a file which holds the database credentials. Resource data can be stored as files, streams, or strings.

- Files are used when the amount of data is large, such as DWF or SDF files.
- Streams are used for faster access to smaller pieces of binary data, such as symbols.
- Strings are used for small pieces of text data, such as database access credentials.

For information on backing up and restoring the resource repository, see the document *RepositoryAdmin.pdf*, installed with MapGuide.



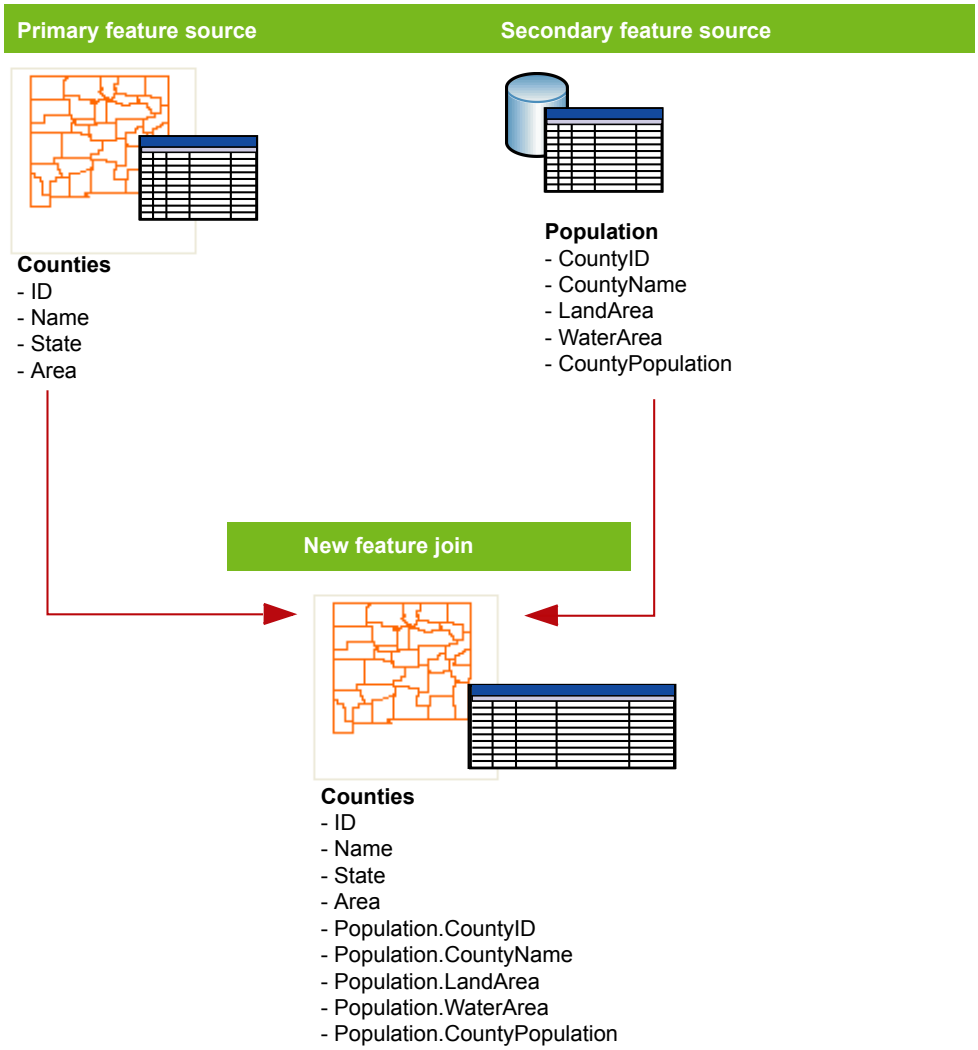
Contents of the resource repository

Feature Joins

After you have loaded your data or connected to it, you can establish relationships between any two feature sources. These relationships are called feature joins. A feature join is saved as a new resource in the repository. When you join feature sources, you create a feature-join resource, which is similar to a relational join in a database, except that you are "extending" a feature resource to create a new one.

The example on the facing page shows how a feature source containing county boundaries is joined to another feature source containing census population data, using the following general steps:

- Select the primary resource (for example, Counties).
- Select the secondary resource (for example, Population).
- Match the feature classes (a feature class is equivalent to a table, for example, Counties or Population).
- Enter a name for the extender property (serves as the prefix for the joined properties, for example, Population).
- Map the identifying properties (for example, ID and CountyID).



Joining two feature sources

Learning MapGuide

MapGuide provides learning materials to get you started using the software, and complete documentation to serve as a reference.

The *Autodesk MapGuide Enterprise Getting Started Guide* introduces the most important concepts in MapGuide. After reading through it, and perhaps doing some of the suggested exercises using the sample files provided, you should feel comfortable enough to start working with your own data.

The *Autodesk MapGuide Studio User's Guide* is a Help file in CHM format with a table of contents, an index, and keyword search. You can print out the Help topics that interest you.

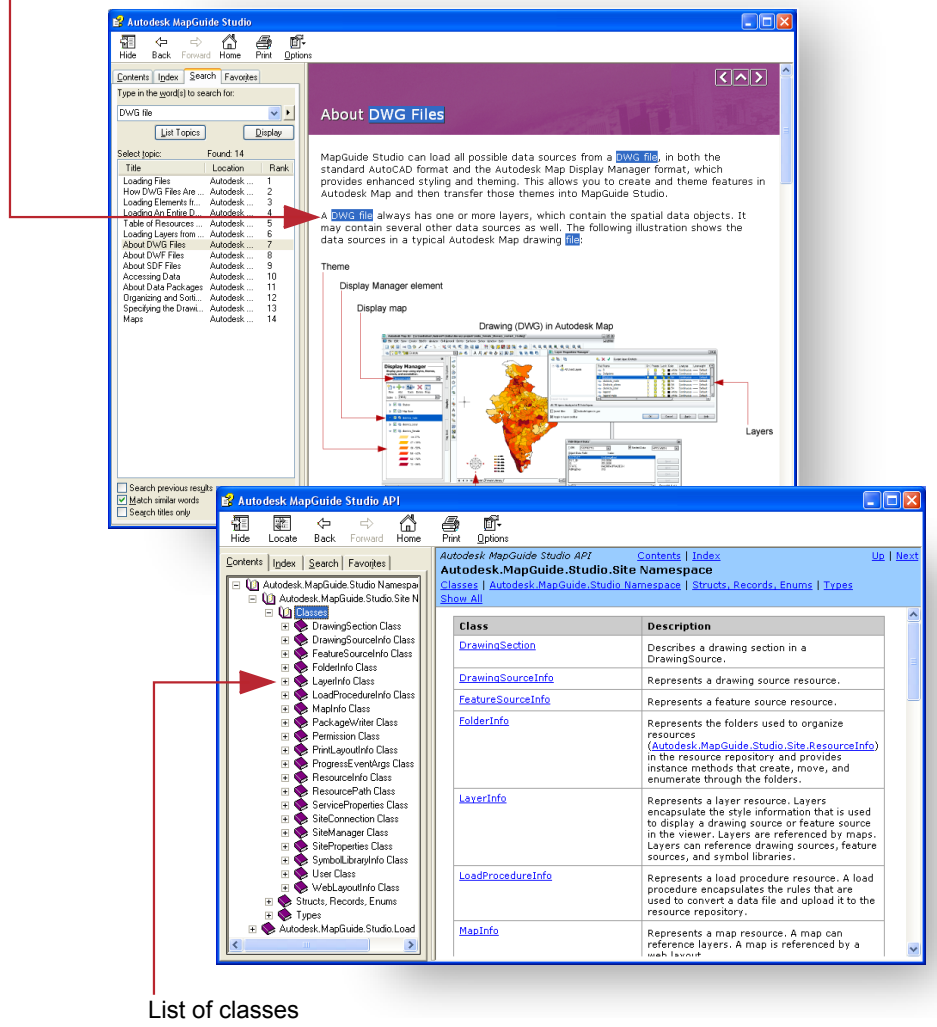
MapGuide Server Site Adminstrator Help is a set of HTML pages that you can access from the Site Administrator program.

The *MapGuide Developer's Guide* is a book in PDF format that covers all topics related to developing Web-based applications using the APIs provided with MapGuide. It includes many practical examples with sample code that you can copy and use.

The *MapGuide Web API Reference* and *Studio API Reference* are HTML pages. They contain detailed information about all the APIs and include many code samples.

The *MapGuide Sample Application* is a web application, written in PHP, that demonstrates many of the features and services provided by the MapGuide Server APIs.

The phrase you searched for is highlighted.



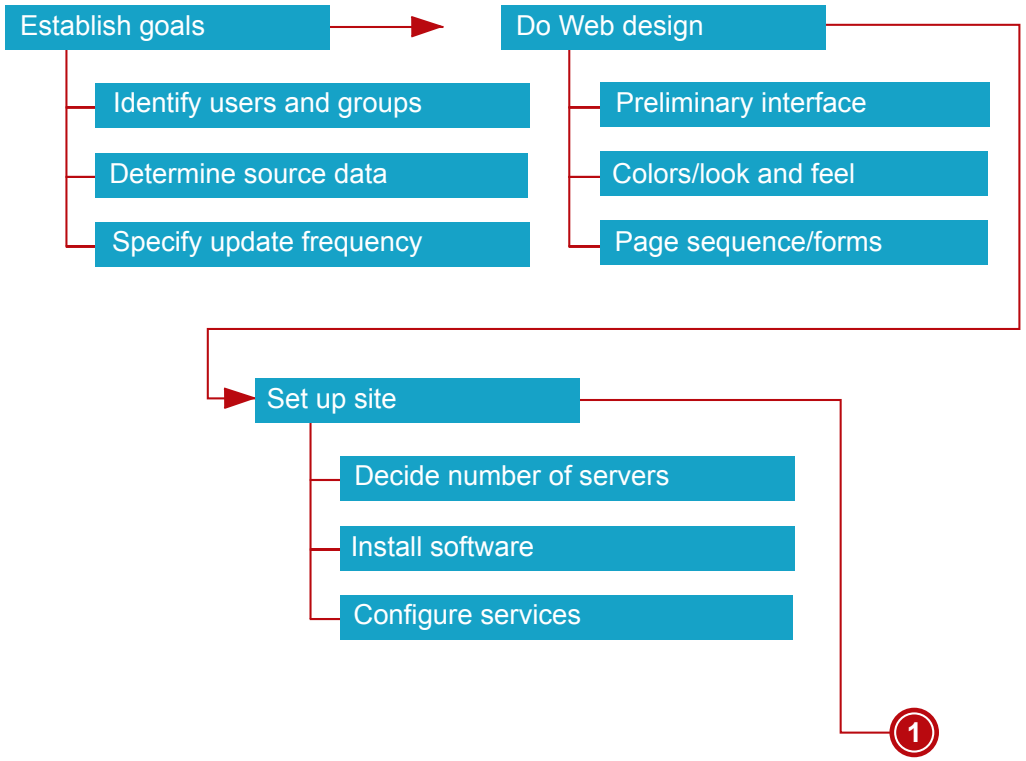
MapGuide Studio API Reference (bottom) and Studio User's Guide (top)

Flow Diagram

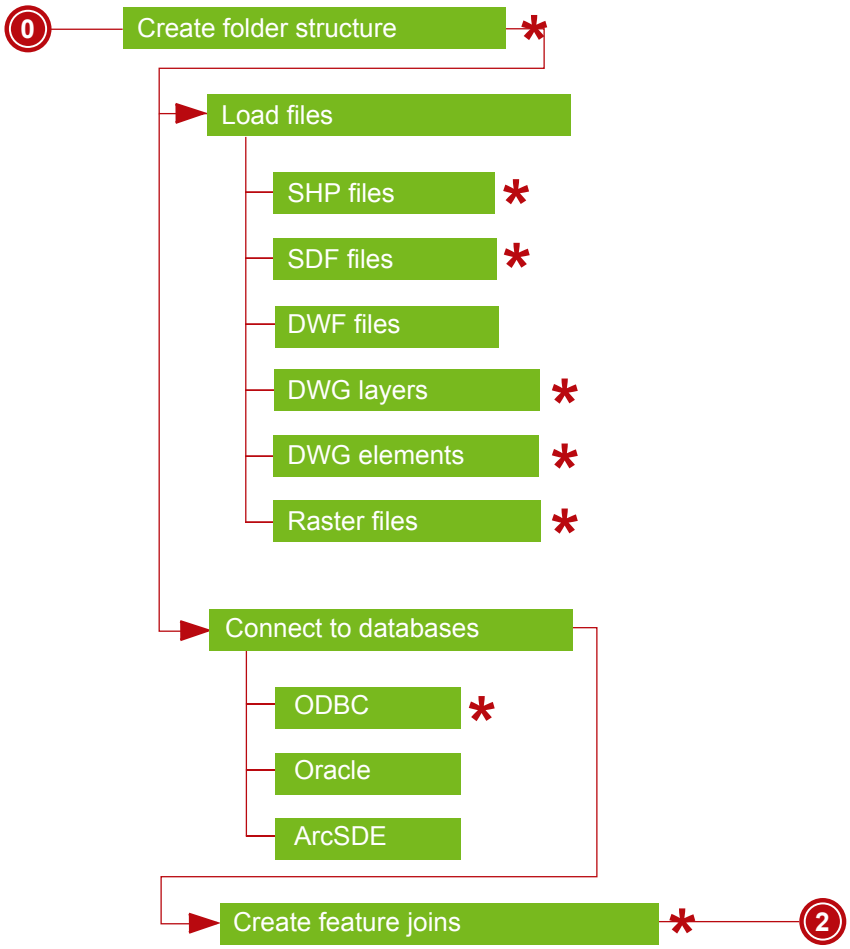
2

The detailed flow diagram in this chapter summarizes the process of developing a Web application using MapGuide. The numbers of the phases in this flowchart correspond to the numbered steps in The Development Process topic at the beginning of Chapter 1, “Fundamentals.” Some of the tasks in the flow diagram are marked with an asterisk icon (*). Step-by-step tutorials for these tasks are included in Chapter 3, “Examples.”

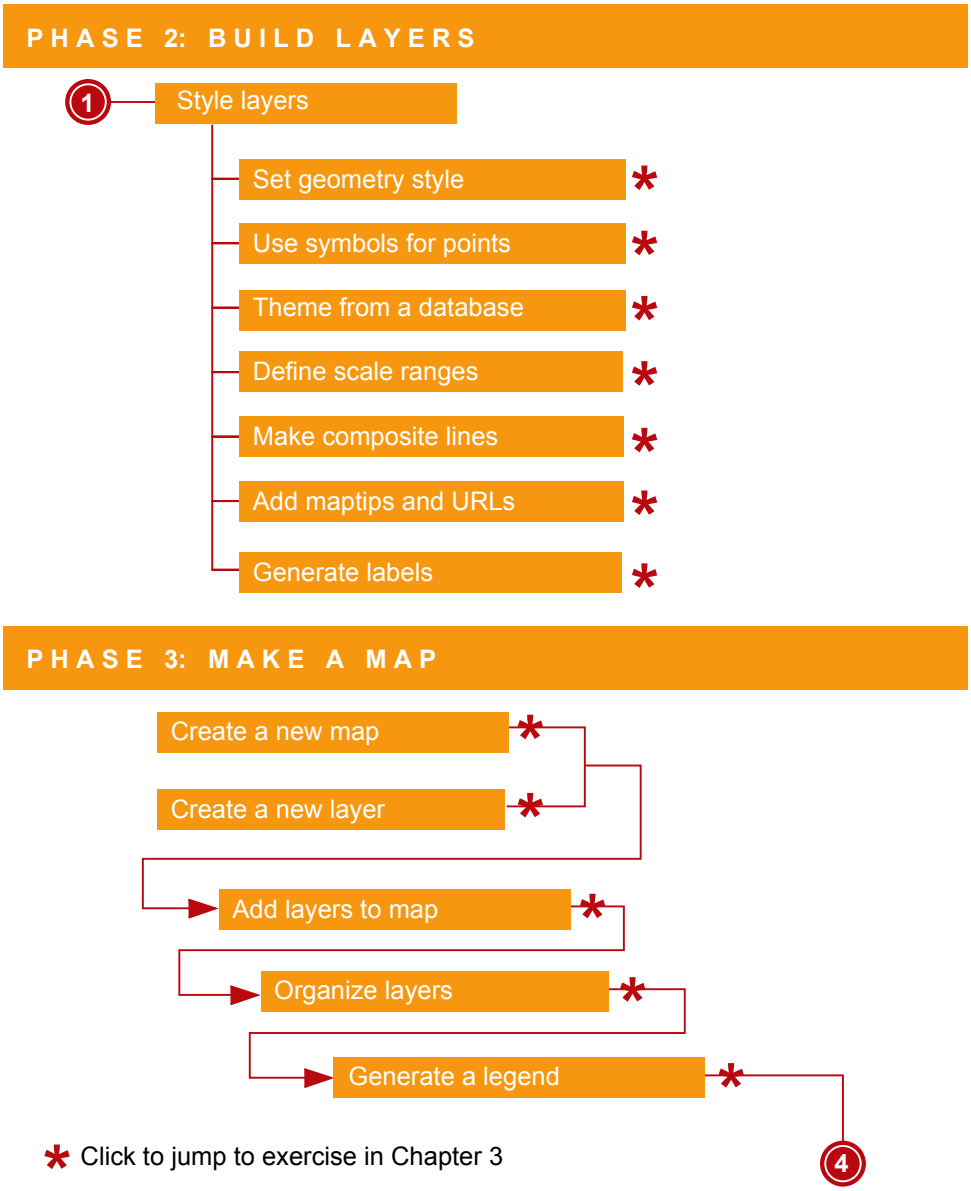
PHASE 0: PLANNING



PHASE 1: LOAD AND CONFIGURE

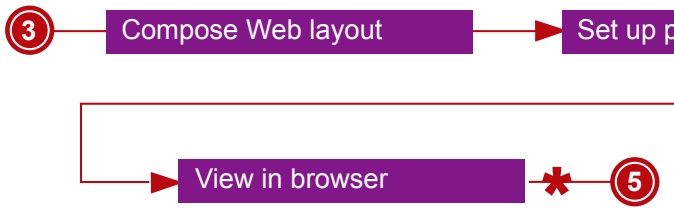


* Click to jump to exercise in Chapter 3

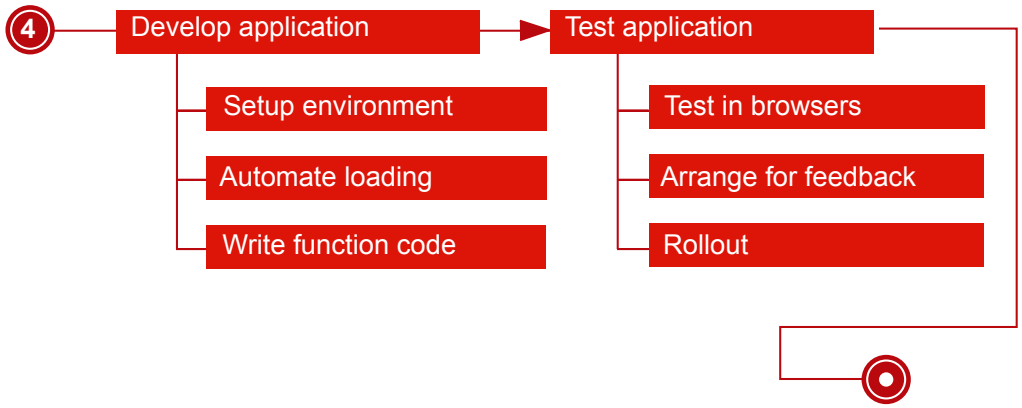


* Click to jump to exercise in Chapter 3

PHASE 4: PLACE ON INTERNET



PHASES 5 AND 6: DEVELOP AND TEST



Click to jump to exercise in Chapter 3

Exercises

3

The exercises in this chapter cover the whole process of map authoring in Autodesk MapGuide Studio. You can work through the exercises in this chapter using the sample data provided. By the end of the chapter, you should have a map ready to post to the Internet or intranet. You can also skip the "tutorial" phase and begin right away using your own data.

You can print this chapter and use it as a quick reference to common tasks, such as loading source data or theming layers.

About the Exercises

The following exercises are laid out on facing pages. The steps are on the left-hand page with matching illustrations on the right-hand page. The illustrations provide a summary of the task while the text includes the detailed steps for the exercise. The large red numbers relate the two pages.

It is recommended that you read the text carefully the first time you do these exercises and use the illustrations to confirm that your results are correct. Later, you may find it useful to print out this chapter and use the illustration pages as a quick reference to common tasks.

Create a Folder Structure

In this exercise, you create the recommended folder structure for a new project in Autodesk MapGuide Studio.

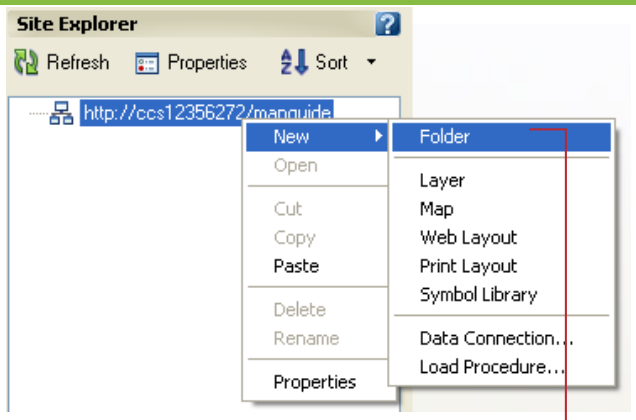
Number	Detailed steps
	1 Right-click the URL at the top of the Site Explorer (as shown in the illustration on the facing page), and then click New ➤ Folder. **2** Name the new folder *Sheboygan Public*.
	1 Right-click *Sheboygan Public* in the Site Explorer and then click New ➤ Folder. **2** Name the new folder *Data*.
	➤ Repeat the last two steps to create the folder structure shown on the facing page.

Creating the Recommended Folder Structure

New > Folder

1

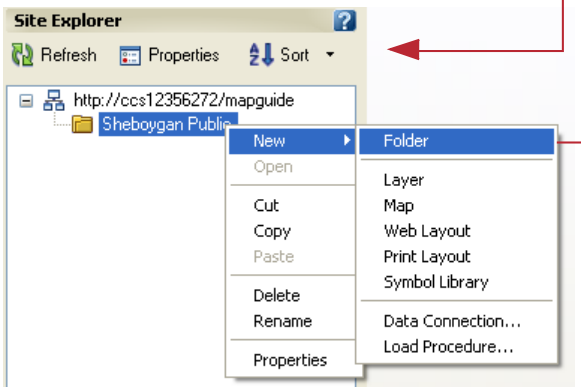
Create a root folder



New > Folder

2

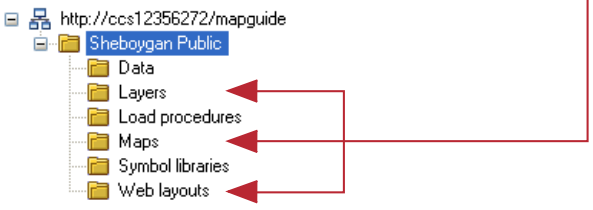
Create a subfolder



3

Repeat to create structure

Result in Site Explorer:
Folder structure

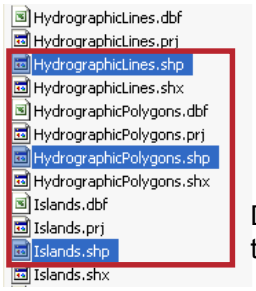


Load Shapefiles

In this exercise, you load SHP files in the simplest way, by dragging them directly into a folder in the Site Explorer.

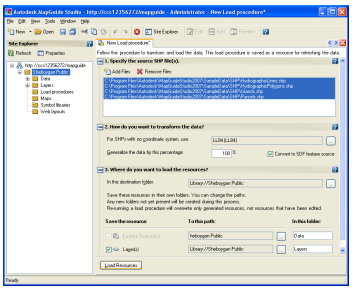
Number	Detailed steps
	1 In Windows Explorer, navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\SHP*. **2** Select the four files: *HydrographicLines.shp*, *HydrographicPolygons.shp*, *Islands.shp*, and *Parcels.shp*. Drag the files to the Sheboygan Public folder in the Site Explorer.
	➤ In the Load Procedure Editor, select the coordinate system WGS84 datum, Latitude-Longitude; Degrees (in the Category Lat Longs, code=LL84).
	1 Click Load Resources. Note the new feature sources and layer resources in the Site Explorer Data and Layers folders. **2** Click File ➤ Save and save the load procedure resource in the Load Procedures folder with the name *Load SHP files*. **3** Close the load procedure editor.

Loading Shapefiles



1

Drag files to folder

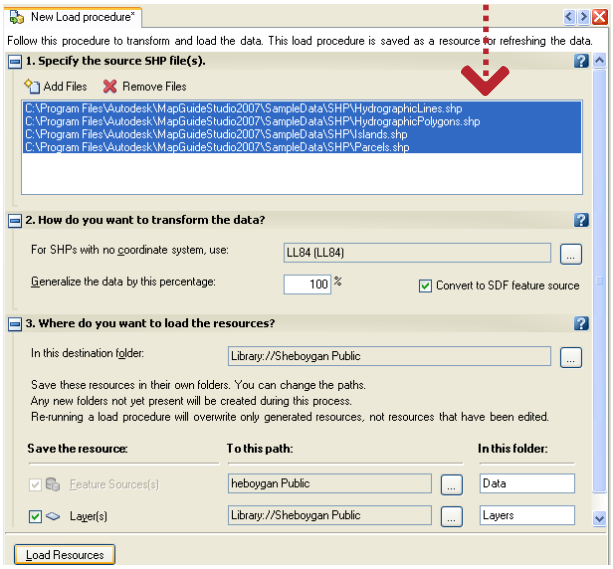


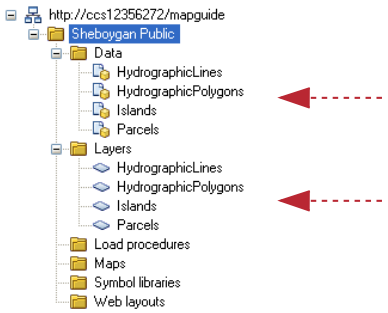
2

Specify load procedure

3

Load resources





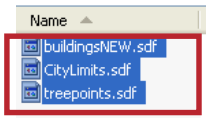
Result in Site Explorer: New feature sources and layers

Load SDF Files

In this exercise, you add more data source files to the site. Like SHP files, you load SDF files by dragging them directly into a folder in the Site Explorer.

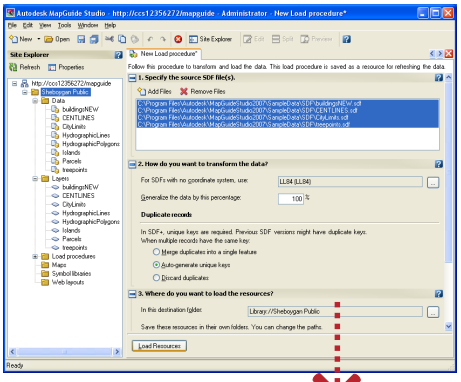
Number	Detailed steps
	1 In Windows Explorer, navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\SDF*. **2** Select the four files: *buildingsNEW.sdf*, *CENTLINES.sdf*, *CityLimits.sdf*, and *treepoints.sdf*. Drag the files to the Sheboygan Public folder in the Site Explorer.
	1 In the Load Procedure Editor, select the coordinate system WGS84 datum, Latitude-Longitude; Degrees (in the Category Lat Longs, code=LL84). **2** For Duplicate Records, select Auto-Generate Unique Keys.
	1 Click Load Resources. Note the new feature sources and layer resources in the Site Explorer. **2** Click File ➤ Save and save the load procedure resource in the Load Procedures folder with the name *Load SDF files*. **3** Close the load procedure editor.

Loading SDF files



1

Drag files to folder

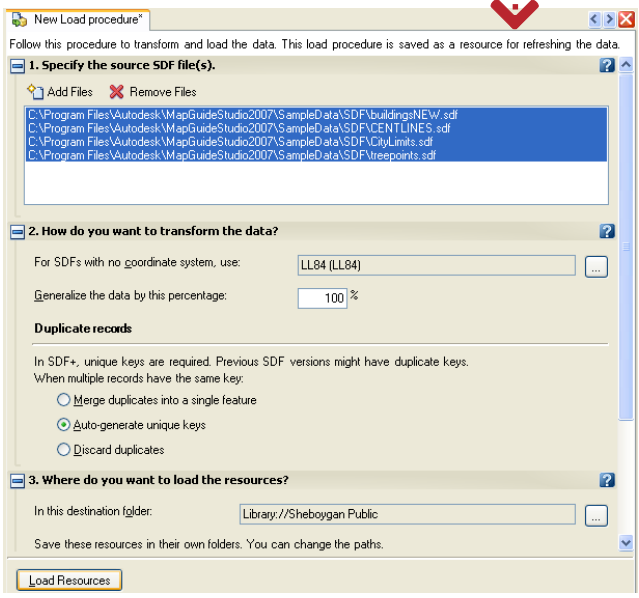


2

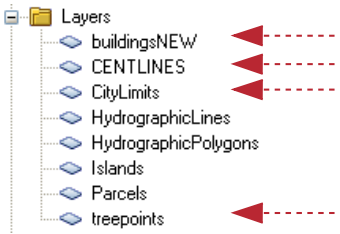
Specify load procedure

3

Load Resources



Result in Site Explorer:
New feature sources and layers



Load Geometry from a DWG File

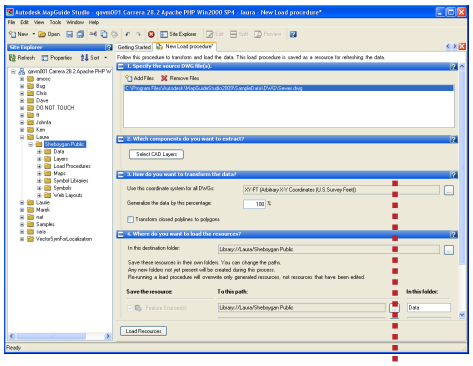
In this exercise, you load a DWG file and select a subset of the layers in the file. A feature source and a layer resource are created for each layer in the DWG.

Number	Detailed steps
	1 In Windows Explorer, navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\DWG*. 2 Select the *Sewer.dwg* file. Drag the file to the Sheboygan Public folder in the Site Explorer.
	1 For Which Components Do You Want To Extract, click Select CAD Layers. 2 In the Select Individual Components dialog box, click Clear All. 3 Select the layers *SANIT-LINES* and *SANIT-MH*. Click OK. 4 For How Do You Want To Transform The Data, select the coordinate system WGS84 datum, Latitude-Longitude; Degrees (in the Category Lat Longs).
	1 Click Load Resources. 2 Click File ➤ Save and save the load procedure resource in the Load Procedures folder with the name *Load DWG layers*. 3 Close the load procedure editor. 4 In the Site Explorer, double-click the new layers to view the results of the load.

Loading Geometry From a DWG File

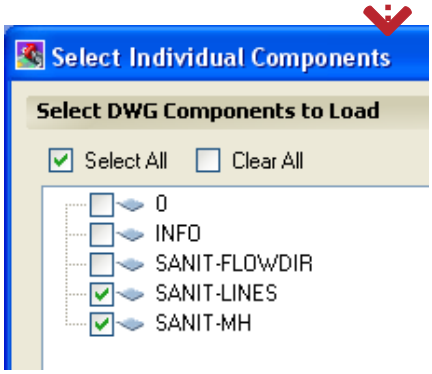
1

Drag file to folder



2

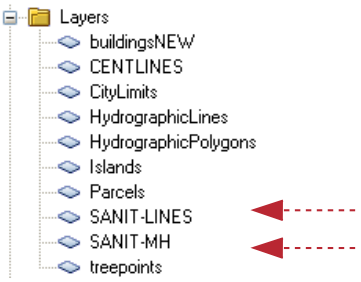
Select layers to load



3

Load Resources

Result in Site Explorer: New feature sources and layers

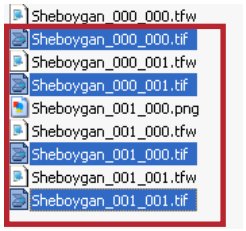


Load Raster Images

In this exercise, you load four raster images as a raster catalog resource. A raster catalog stores the definition of multiple related images.

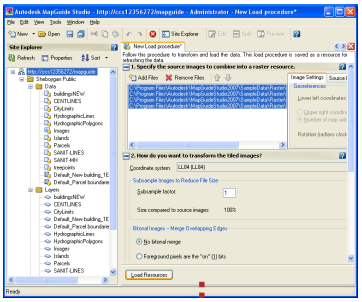
Number	Detailed steps
	1 In Windows Explorer, navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\Raster*. 2 Select the four TIF files in the folder. Drag the files to the Sheboygan Public folder in the Site Explorer.
	1 In the Load Procedure Editor, select the coordinate system SheboyganWI-F (in the Category USA, Wisconsin). 2 Under Where Do You Want To Load The Resources? change the Raster Catalog Resource Name to *Images*.
	1 Click Load Resources. Note the new raster catalog and layer resources in the Site Explorer. 2 Click File ➤ Save and save the load procedure resource in the Load Procedures folder with the name *Load images*. 3 Close the load procedure editor.

Loading Raster Files



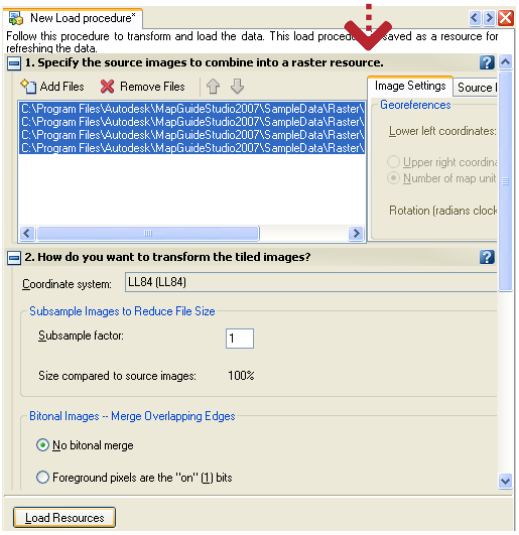
1

Drag files to folder



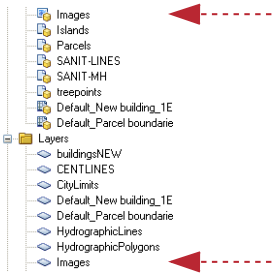
2

Specify load procedure



3

Load Resources



Result in Site Explorer: New raster catalog and layer

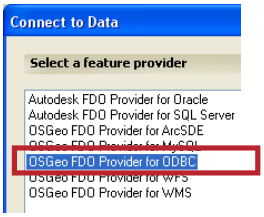
Connect to an Access Database

In this exercise, you make a connection to the Microsoft Access database for the Sheboygan parcels data and save the connection as a resource.

Number	Detailed steps
	1 Right-click the Data folder in the Site Explorer and then click New ➤ Data Connection. 2 In the Connect to Data dialog box, select OSGeo FDO Provider for ODBC.
	1 In the New Feature Source Editor, for Type Of Connection, select **Connect To A File And Upload To The MapGuide Library**. 2 Under Data File And Any Associated Files To Be Uploaded, click New and then navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\Database*. 3 Select *Parcels.mdb*. Click Open.
	1 Click File ➤ Save and save the connection resource in the Data folder with the name *Access database connection*. 2 It may take a minute for the file to upload to the server. Click Test Connection. You should see a "Successful Connection" message. 3 Close the resource editor.

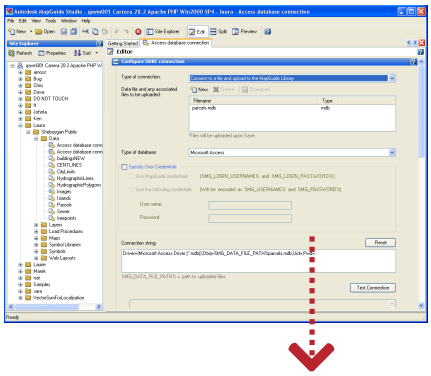
Connecting to a Microsoft Access Database

New > Database Connection



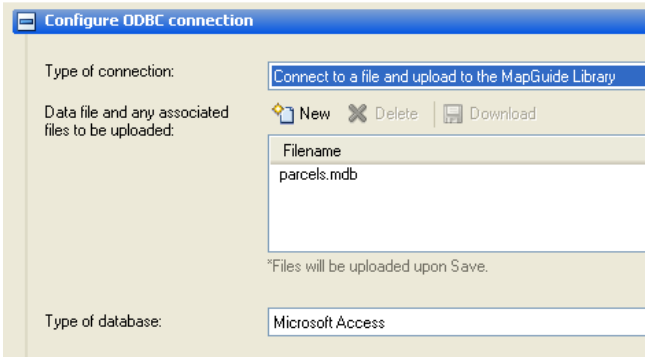
1

Select ODBC provider



2

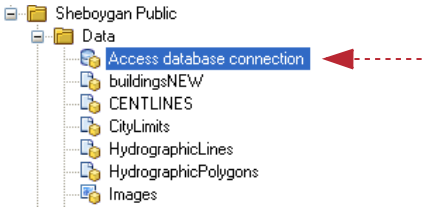
Specify connection string and upload file



3

Save, then test connection

Result in Site Explorer:
New feature source
No layer



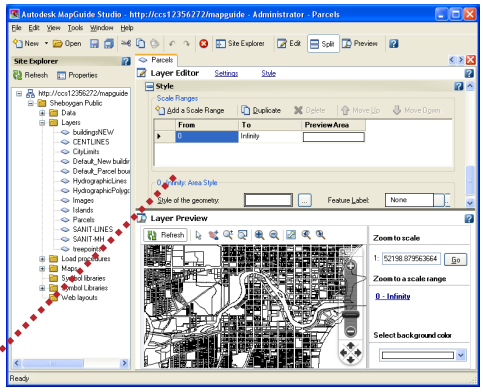
Set the Style for a Polygon Layer

In this exercise, you set a basic style for a polygon layer by selecting a fill color and a border color.

Number	Detailed steps
	1 In the Site Explorer, double-click the layer *Parcels* (not the Parcels feature source). The Layer Editor is displayed with the default window split between the Preview panel (below) and Editor panel (above). **2** Click Refresh in the Preview panel to see the layer. **3** Use the Zoom To Rectangle tool to zoom the Layer Preview window so that you can see the parcels clearly. **4** At the top of the Layer Editor, click Style (blue text, not a button). The Layer Editor brings the Style panel of the editor to the top. Scrolling to the Style panel makes it easier to specify the style for the layer.
	1 In the Layer Editor, for Style Of The Geometry, click [...]. **2** In the Style Area dialog box, for Fill Foreground Color, select an orange color. For Border Line Color, select a dark-red color. **3** Click OK.
	1 In the Layer Preview panel, click Refresh to test the style. **2** On the toolbar, click Save to save the layer resource.

Setting a Style for Polygons

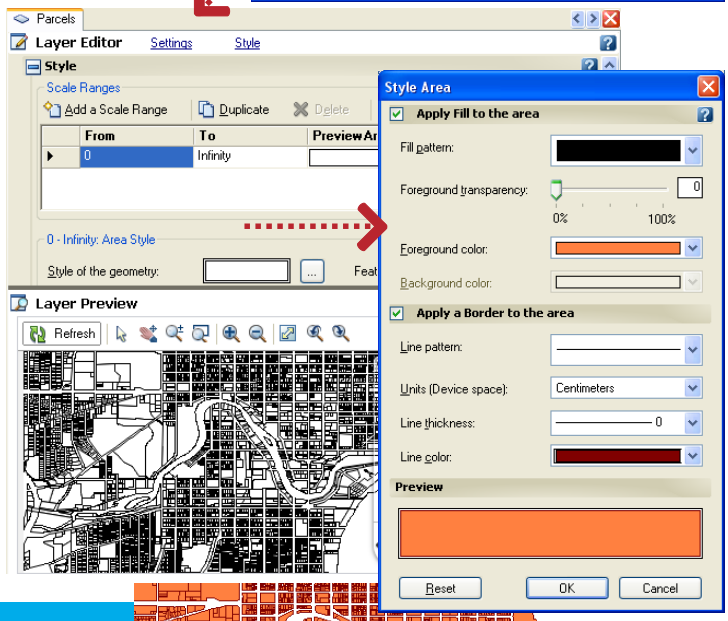
Double-click *Parcels* layer



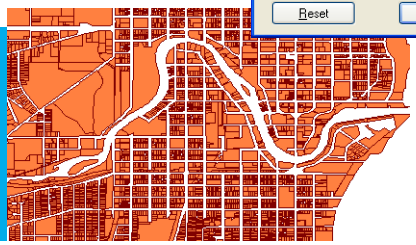
1. Open the Layer Editor

2. Set the style

3. Save the layer



Result in Layer Editor:
Styled polygons



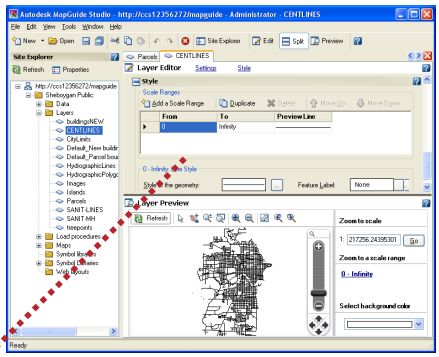
Make Composite Lines

In this exercise, you define a composite line style for a polyline layer. In the next exercise, you will specify the scale range at which this style appears.

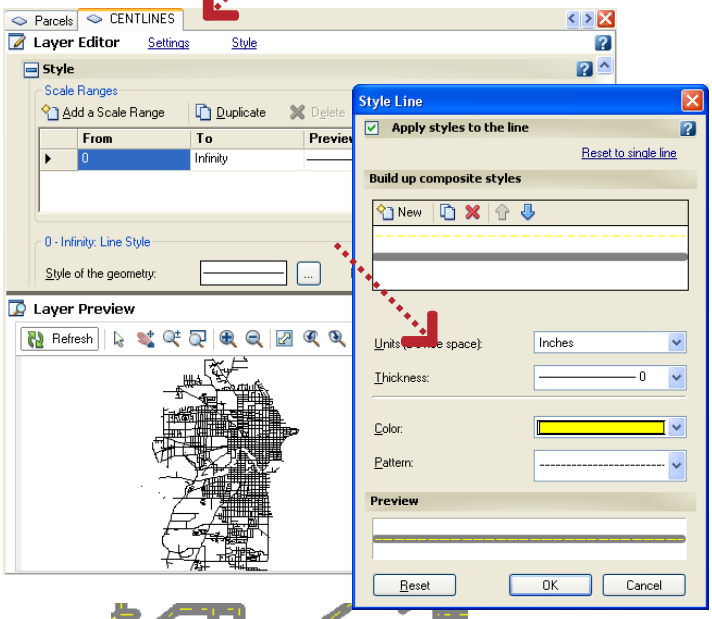
Number	Detailed steps
	1 In the Site Explorer, double-click the layer *CENTLINES* (not the CENTLINES feature source). The Layer Editor is displayed with the default window split between the Preview panel (below) and Editor panel (above). **2** Click Refresh in the Preview panel to see the layer. **3** At the top of the Layer Editor, click Style. The Layer Editor brings the Style panel of the editor to the top. Scrolling to the Style panel makes it easier to specify the style for the layer.
	1 In the Layer Editor, for Style Of The Geometry, click [...]. **2** In the Style Line dialog box, click Create Composite Lines. **3** For Thickness, select 0.2 and then select a dark gray color. For Build Up Composite Styles, click New and then select a yellow color. For Pattern, select Dot. Click OK. You should have a thick dark gray line with a thin dashed yellow line inside it.
	1 In the Layer Preview panel, click Refresh. **2** Use the Zoom To Rectangle tool to zoom the Layer Preview panel. **3** On the toolbar, click Save to save the layer resource.

Making Composite Lines

Double-click *CENTLINES* layer



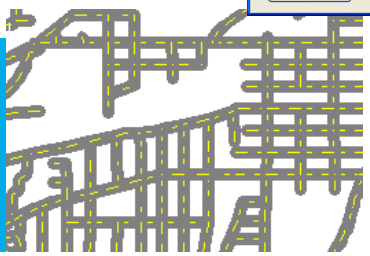
1. Open the Layer Editor



2. Set the style

3. Save the layer

Result in Layer Editor:
Styled polylines



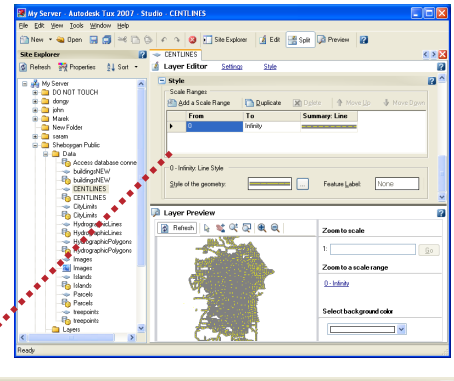
Define Scale Ranges

In this exercise, you specify the scale range at which you want a particular style to appear.

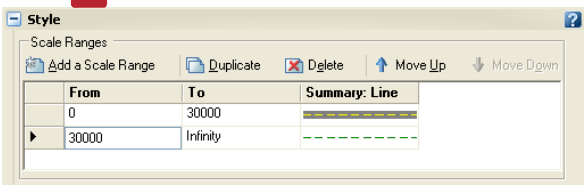
Number	Detailed steps
	1 In the Site Explorer, double-click the layer CENTLINES to open it, if it is not already open. If it is open, click its tab to view it. The Layer Editor is displayed with the default window split between the Preview panel (below) and Editor panel (above). 2 At the top of the Layer Editor, click Style. The Layer Editor brings the Style panel of the editor to the top. Scrolling to the Style panel makes it easier to specify the style for the layer.
	1 For Style, click Add A Scale Range. 2 Set the new scale range to 30000-Infinity. Change the color and linetype to green-dotted. 3 Set the scale range with the dark-gray and yellow composite line to 0-30000.
	1 In the Layer Preview panel, click Refresh. 2 Test the scale ranges using the zoom tools to zoom in and out. You can also click the links under Zoom To A Scale Range. 3 On the toolbar, click Save to save the layer resource.

Defining Scale Ranges

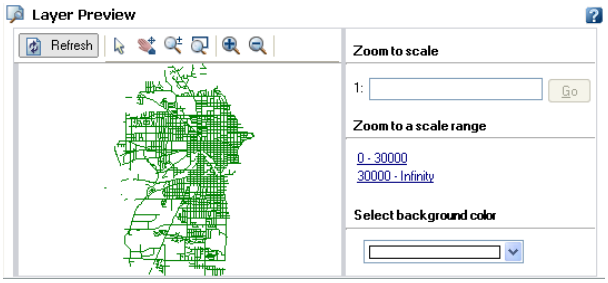
Double-click *CENTLINES* layer



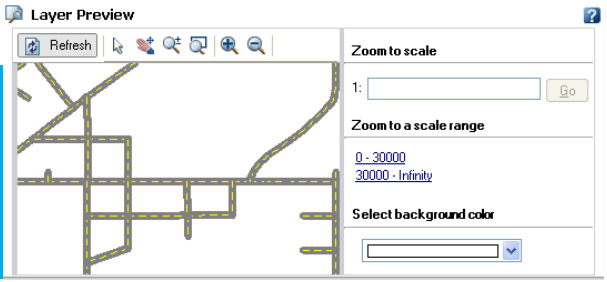
1. Open the Layer Editor



2. Define scale ranges



3. Test scale ranges and save the layer



Result in Layer Editor: Styles appear at correct scales

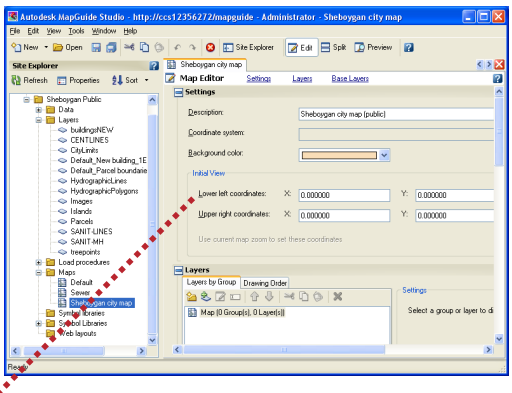
Create a New Map

In this exercise, you begin a new map and set its properties.

Number	Detailed steps
	1 In the Site Explorer, right-click the Maps folder, and then click New ➤ Map. The Map Editor is displayed with the default window split between the Preview panel (below) and Editor panel (above). **2** On the MapGuide Studio toolbar, click Edit (in the row of buttons: Edit, Split, and Preview). The Map Editor hides the Preview panel and displays only the Editor panel. Hiding the Preview panel makes it easier to view and specify the properties for the map.
	1 For Description, enter *Sheboygan city map (public)*. **2** For Coordinate System, leave blank (the map will use the coordinate system of the first layer that you add to it). **3** For Background Color, select a light color or leave as white.
	➤ Click File ➤ Save and save the map resource in the Maps folder with the name *Sheboygan city map*.

Starting a New Map

New > Map

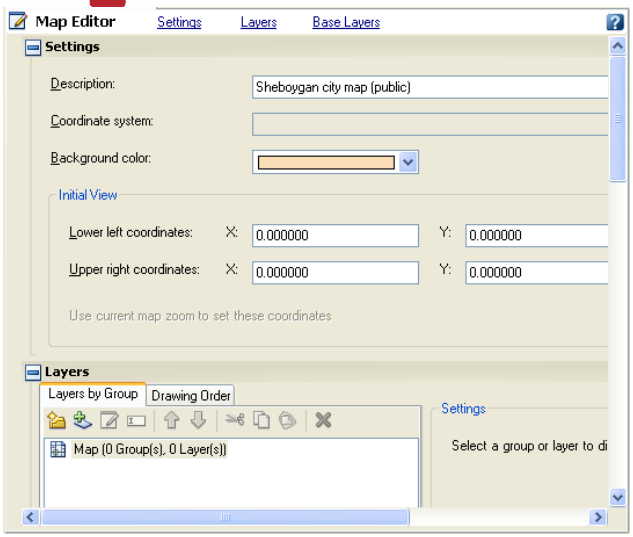


1

Begin a new map

2

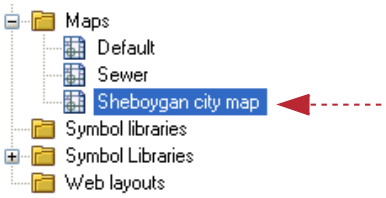
Specify the properties of the map



3

Save the map

Result in Site Explorer:
New map resource

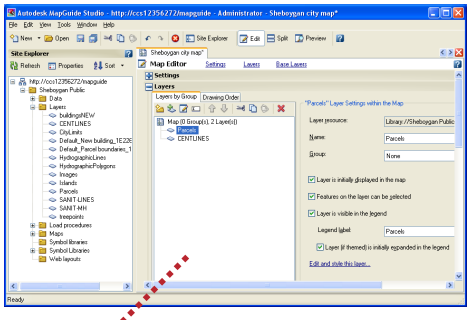


Add Layers to a Map

In this exercise, you add layers to the map and preview the results.

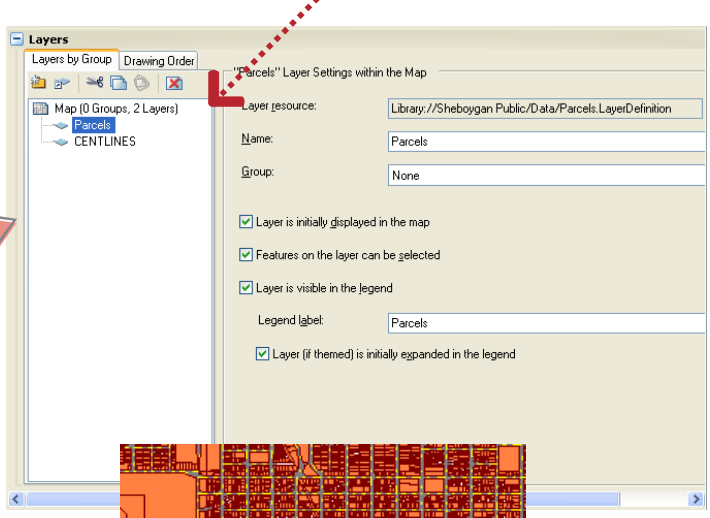
Number	Detailed steps
	1 In the Site Explorer, double-click *Sheboygan City Map* to open it. If it is already open, click its tab to view it. **2** On the MapGuide Studio toolbar, click Edit to hide the preview panel. **3** Close the Settings panel by clicking the minus (-) sign, so that you can see more of the Layers panel.
	1 In the Site Explorer, select the *Parcels* layer and drag it to the list of layers in the Layers panel. **2** Drag the *CENTLINES* layer to the list.
	1 On the toolbar, click Split to show the Preview panel. **2** Click Refresh in the Preview panel. The two layers should appear correctly. Zoom in and out to test the scale ranges that you applied to the CENTLINES layer. **3** On the toolbar, click Save to save the map resource.

Adding Layers to a Map



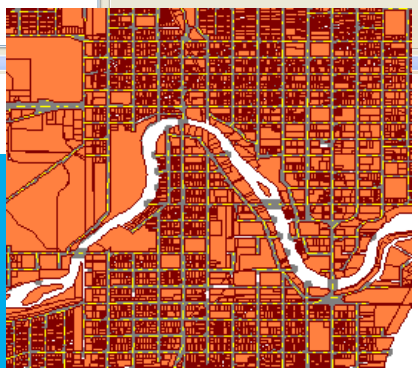
1. Open the Map Editor

2. Drag layers



3. Preview and then save the map

Result in Map Editor: Multiple layers



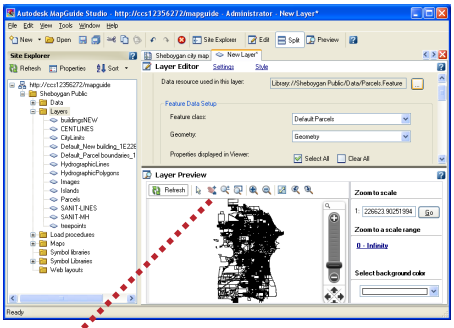
Create a New Layer

In this exercise, you create a new layer referencing an existing data source, in this case, the parcels data that you loaded earlier. You will theme this layer in the next exercise.

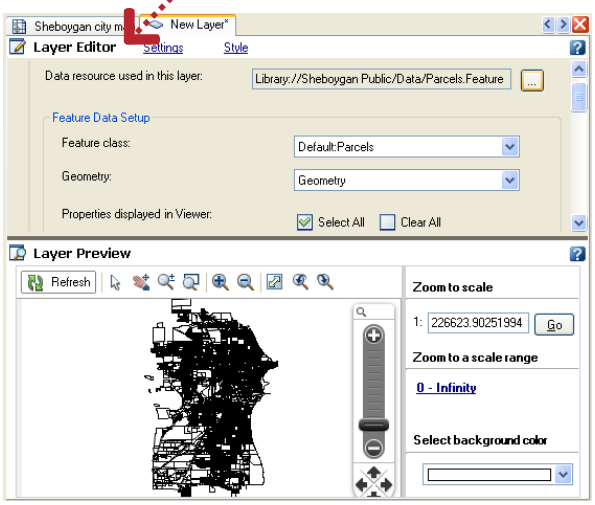
Number	Detailed steps
	➤ Right-click the Layers folder in the Site Explorer and then click New ➤ Layer.
	1 In the Layer Editor, for Data Resource Used In This Layer, click [...]. **2** Navigate to the folder *Sheboygan Public\Data* and then select the data source *Parcels*. **3** Click Open. Click Refresh to see the parcel polygons in the Preview panel.
	➤ Click File ➤ Save and save the layer resource in the Layers folder with the name *Parcels (area)*.

Reference Data in a New Layer

New > Layer

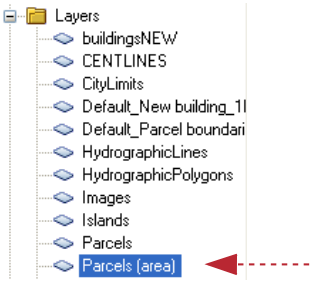


1. Open the Layer Editor



2. Select the data resource and preview

3. Save the layer



Result in Site Explorer:
New layer refers to
Parcels data source

Theme from a Database Table

In this exercise, you theme the parcels in your map according to their area in square feet, using a column (property) from a database table.

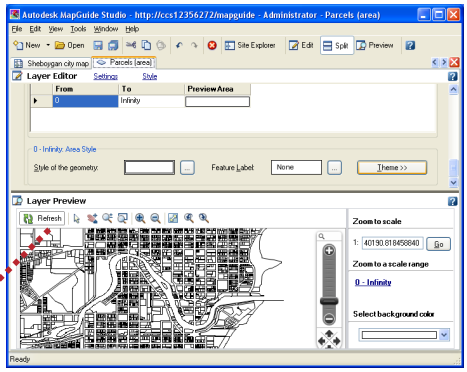
Number	Detailed steps
	1 In the Site Explorer, double-click the layer *Parcels (area)* to open it, if it is not already open. If it is open, click its tab to view it. **2** At the top of the Layer Editor, click Style to bring the Style panel to the top.
	1 In the Style panel, click the Theme button. **2** Under 0-Infinity: Area Style, click the Theme button. **3** In the Theme dialog box, for Property, select RSQFT. For Distribution, select Quantile. **4** For Rules, enter 6 for the number of rules to create. **5** For Style Ramp, click the Browse button and then, for Foreground Color, select yellow and red for the start and finish colors. Click OK. **6** Select Create Legend Labels, and then for Label Text, enter *Area*. Click OK.
	1 In the Layer Preview panel, click Refresh to test the theme. **2** Save and close the layer resource.

Theming from a Database Table

Double-click *Parcels (area)* layer

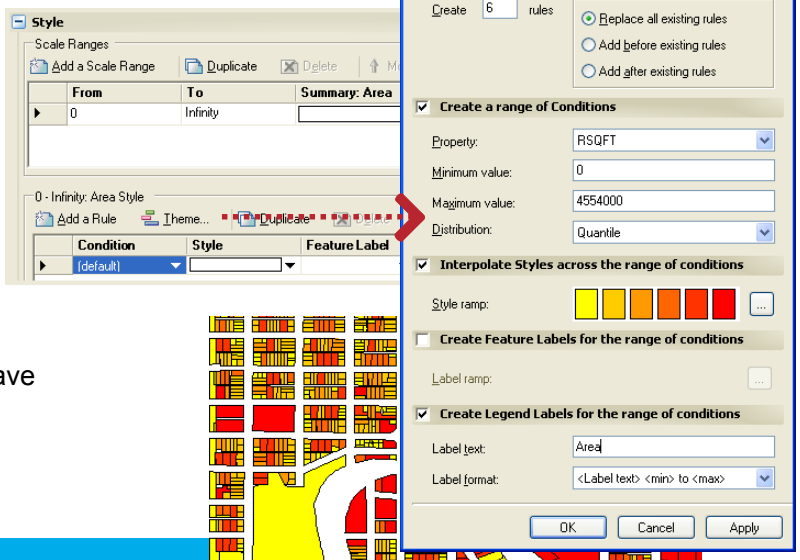
1

Open the Layer Editor



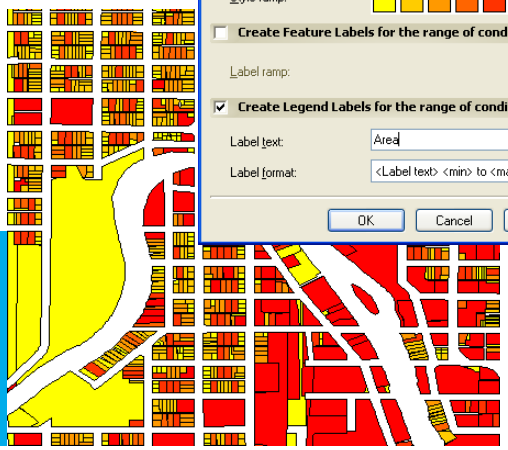
2

Select the property and set up the theme



3

Test and then save the layer



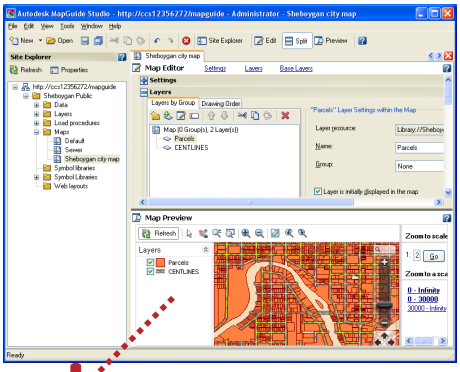
Result in Layer Editor:
Parcels are themed

Organize the Layers in a Map

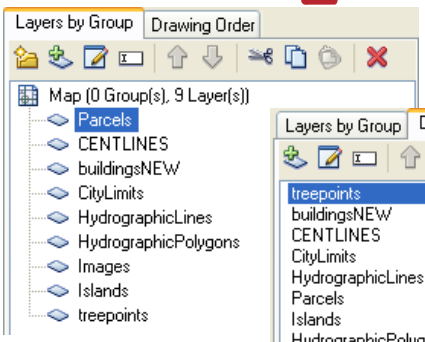
In this exercise, you add more layers to your map, and use the Drawing Order and Layer Group tools to organize them.

Number	Detailed steps
1	➤ Double-click *Sheboygan City Map* in the Site Explorer to open it. If it is already open, click its tab to view it.
2	**1** On the MapGuide Studio toolbar, click Edit to hide the preview panel. **2** In the Site Explorer, select the layer *buildingsNew* and drag it to the list of layers in the Layers panel (*CENTLINES* and *Parcels* should already be in the list). **3** Repeat to drag the layers shown in the illustration on the facing page to the list. You should have a list of layers in no particular order, as shown in the illustration.
3	**1** Click the Drawing Order tab, then use the arrow buttons to move the layers into the order shown in the illustration, with the layer *Images* at the bottom and *treepoints* at the top. **2** Click the Layers By Group tab. Right-click in the list and select New Group. **3** Name the new group *Hydrology* and drag the hydrology layers plus *Islands* into it. **4** Save the changes to the map resource.

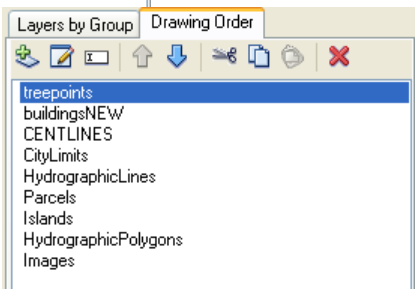
Organizing the Layers in a Map



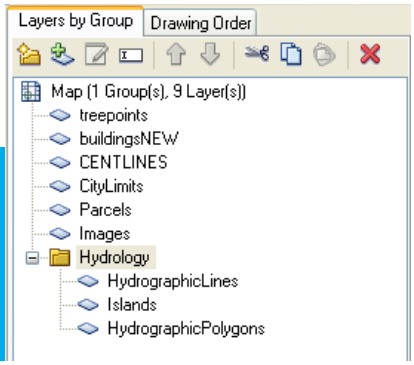
1. Open the Map Editor



2. Drag layers to layers list



3. Set draw order and make layer groups



Result in Map Editor:
Layers organized

Edit Layers

In this exercise, you provide styles for some of the layers that have not yet been edited, so that the layers in the map are displayed in color and at the appropriate scales.

Number	Detailed steps
	1 In the Site Explorer, double-click the layer *HydrographicPolygons* to open it. **2** At the top of the Layer Editor, click Style to bring the Style panel to the top. In the Layer Editor, for Style Of The Geometry, click [...]. **3** In the Style dialog box, for Fill Foreground Color, select a mid-blue color. For Border Line Color, select a dark-blue color. **4** Save and close the resource.
	1 In the Site Explorer, double-click the layer *buildings-NEW* to open it. **2** In the Style dialog box, for Fill Foreground Color, select a red color. For Border Line Color, select a brown color. For Scale Ranges, edit the To field so that the scale range is from 0-30000. **3** Save and close the resource.
	1 In the Site Explorer, double-click the layer *treepoints*. **2** In the Style dialog box, Width and Height enter 0.1. For Fill Foreground Color and Border Line Color, select a green color. For Scale Ranges, edit the To field so that the scale range is from 0-10000. Note: ten thousand not thirty thousand. **3** Save and close the resource.

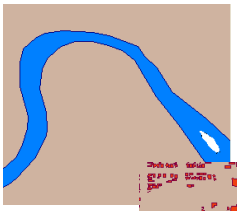
Editing the Style of the Layers

1. Edit *Hydrographic Polygons* and save.

2. Edit *buildingsNEW* and save.

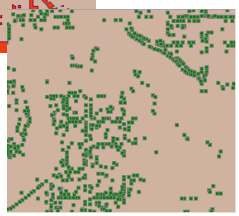
3. Edit *treepoints* and save.

Scale range = 0-Infinity

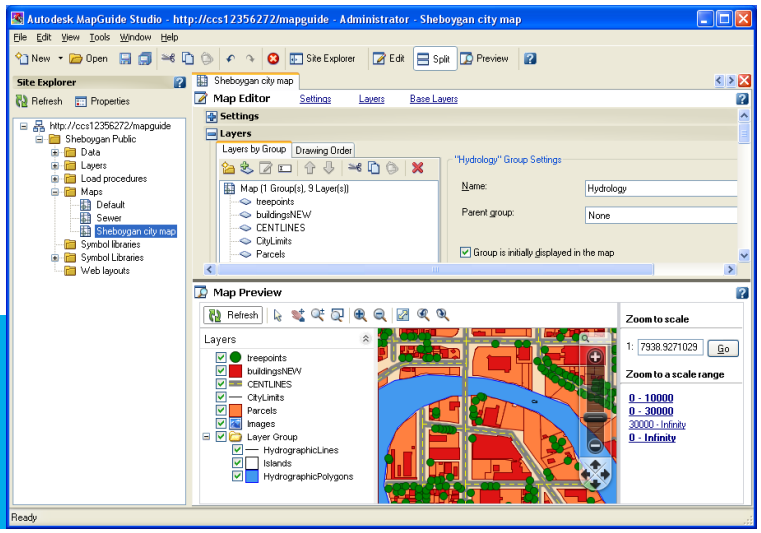


Scale range = 0-30000

Scale range = 0-10000



Result in Map Editor: Styled layers



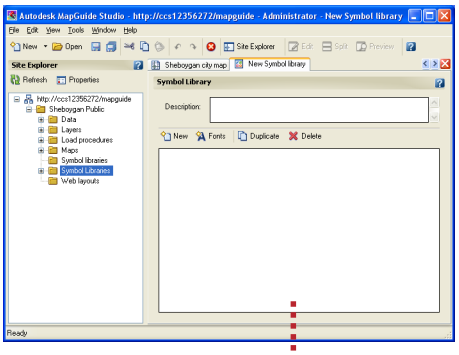
Create a Symbol Library

In this exercise, you create a new symbol library. You will use one of the symbols from it in the next exercise.

Number	Detailed steps
	➤ In the Site Explorer, right-click the folder Symbol Libraries and then click New ➤ Symbol Library.
	1 In the Symbol Library Editor, for Description, enter *Trees in top view*. **2** Click New. **3** Navigate to the folder: *C:\Program Files\Autodesk\MapGuideStudio\Sample Data\Symbols*. **4** Select all five *tree* files and click Open.
	➤ Click File ➤ Save and save the symbol library resource in the Symbol Libraries folder with the name *Trees*.

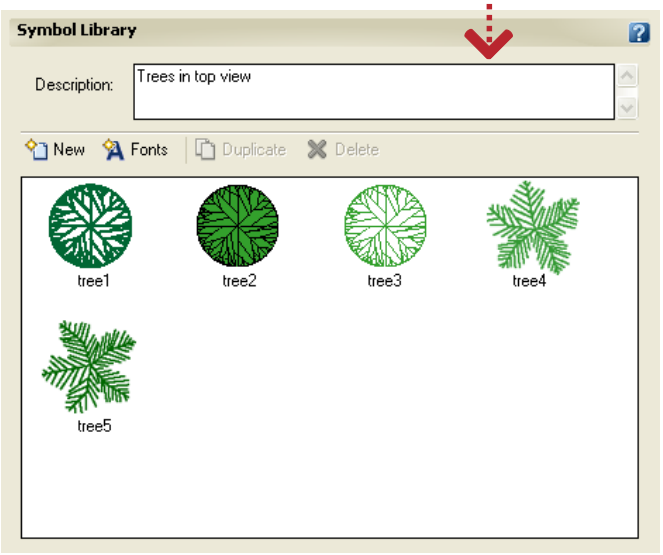
Creating a Symbol Library

New > Symbol Library



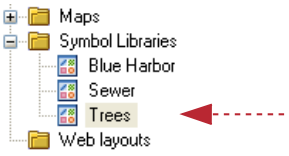
1. Open the Symbol Library Editor

2. Select the files to include in the library



3. Save the symbol library

Result in Site Explorer:
New symbol library



Use Symbols for Points

In this exercise, you replace a point style with a symbol from a symbol library.

Number	Detailed steps
	1 In the Site Explorer, double-click the *treepoints* layer to open it. Click refresh to see the preview. **2** Under Zoom To A Scale Range, click 0-10000 to zoom the Layer Preview window so that the points are visible. **3** At the top of the Layer Editor, click Style to bring the Style panel to the top.
	1 In the Layer Editor, for Style Of The Geometry, click [...]. **2** In the Style dialog box, for Symbol, Select Symbol Library. **3** Navigate to the *Trees* Symbol Library. **4** Select *tree3* and click OK. **5** In the Style Point dialog box, for Width and Height enter 0.3 and click OK.
	1 In the Layer Preview panel, click Refresh. **2** Save the layer resource. **3** View the updated layer in the map.

Using Symbols for Points

Double-click *treepoints* layer

1

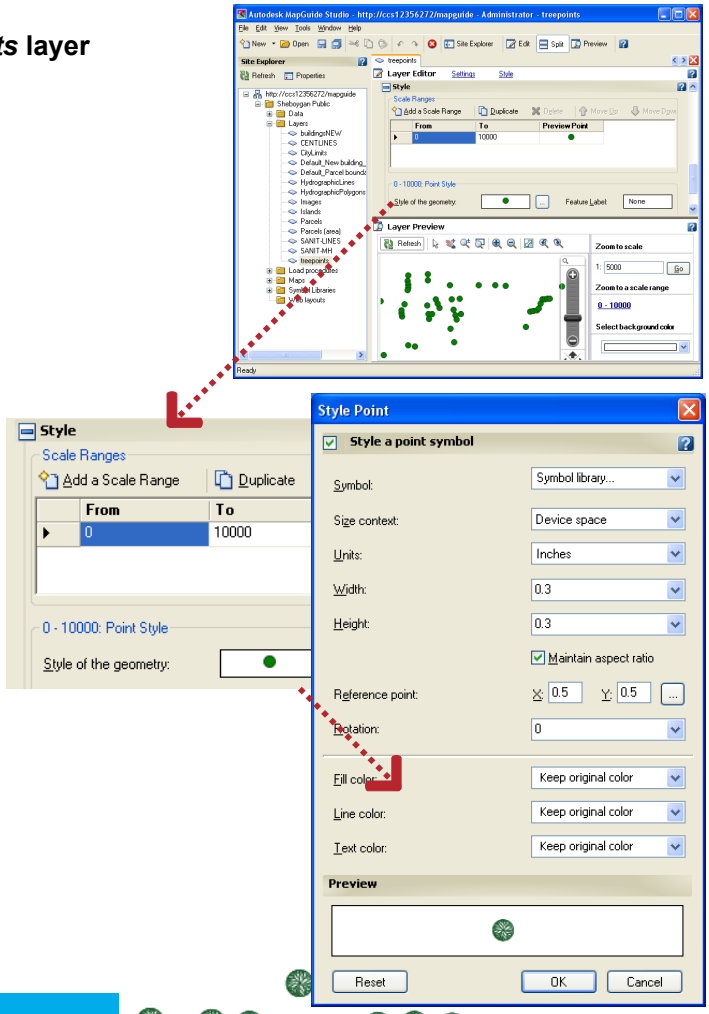
Open the Layer Editor

2

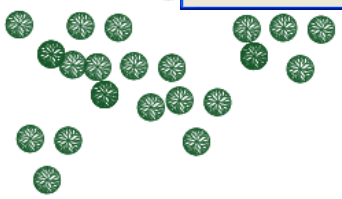
Select the symbol

3

Save the layer



Result in Layer Editor:
Symbols replace points



Generate Labels

In this exercise, you define the labels that appear on the major streets in your map.

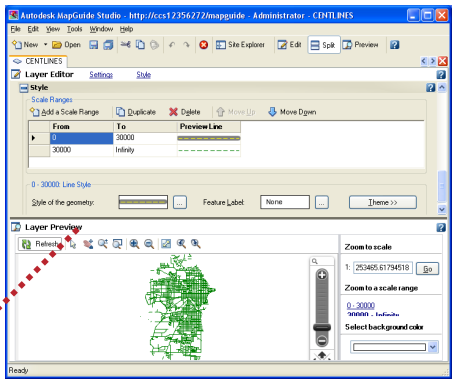
Number	Detailed steps
	1 In the Site Explorer, double-click the layer *CENTLINES* to open it. 2 At the top of the Layer Editor, click Style to bring the Style panel to the top.
	1 In the Layer Editor, click the 0-30000 scale range to select it. 2 For Feature Label, click [...]. 3 In the Style Label dialog box, select Create A Label. 4 For Property To Display, select Name. 5 For Units, select points. 6 For Size, enter 10. 7 For Format, select Bold and then click OK.
	1 In the Layer Preview panel, click Refresh. 2 Under Zoom To A Scale Range, click 0-30000 to zoom the Layer Preview window so that the labels are visible. 3 Save and close the layer resource. 4 View the updated layer in the map.

Generating Labels

Double-click *CENTLINES* layer

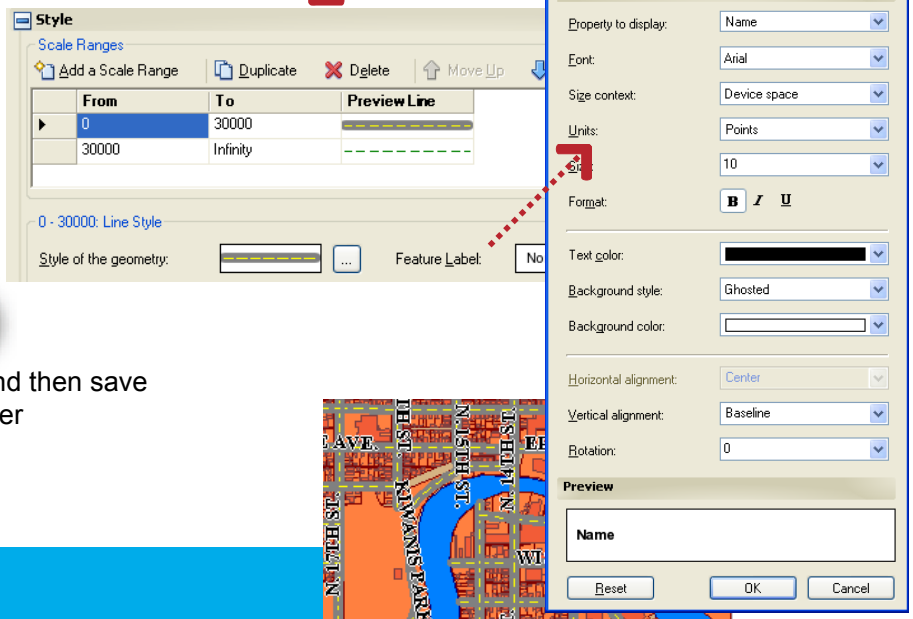
1

Open the Layer Editor



2

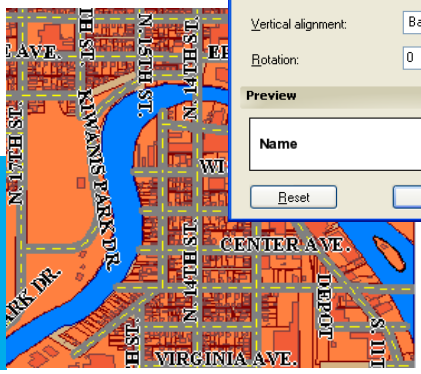
Select the property to use as a label



3

Test and then save the layer

Result in Map Editor:
Streets are labeled



Add Tooltips

In this exercise, you select properties to display in Tooltips. Tooltips are pop-up boxes that contain information about the features in the map. You will be able to view the tooltips in the Web browser in the final exercise.

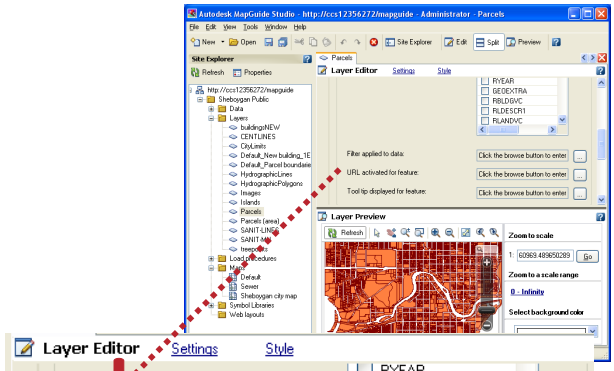
Number	Detailed steps
	➤ In the Site Explorer, double-click the *Parcels* layer to open it (do not open *Parcels (area)*.
	1 In the Settings panel, for Tool Tip Displayed For Feature, click [...]. **2** In the Create/Modify Expressions dialog box, click Create A Multiline Label. **3** Replace the default expression with the following expression: **CONCAT (CONCAT (NAME , '\n'), RBILAD)** **4** Click Validate to make sure the expresssion is correct. **5** Click OK. The completed expression is displayed in the Settings panel. **6** Save the *Parcels* layer.
	1 After you have created the Web Layout in the final exercise, double-click the *City Map* web layout in the Site Explorer to open it. **2** In the Preview panel, click Refresh. **3** Move the mouse pointer over the parcels in the Preview panel to test the tooltips. **4** Save and close the layer resource.

Adding Tooltips

Double-click *Parcels* layer

1

Open the Layer Editor

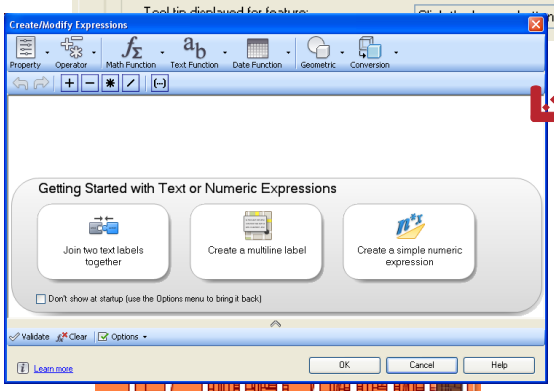


2

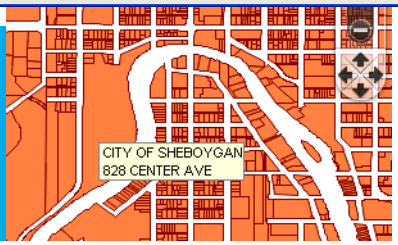
Select the properties to display

3

Test and then save the layer



Result in Layer Editor: Tooltips appear for the parcels



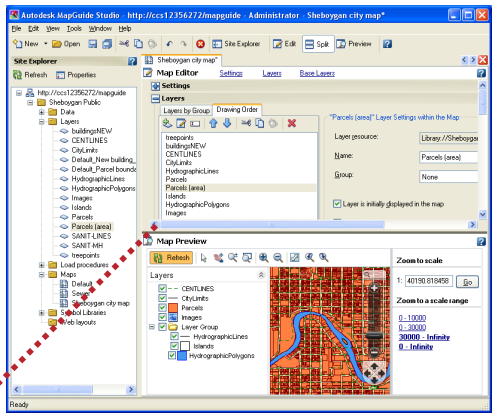
Set Up the Map Legend

In this exercise, you specify how you want the legend to appear. Some layers are initially turned on while others are turned off. You will be able to view the legend in the Web browser in the next exercise.

Number	Detailed steps
	1 In the Site Explorer, double-click the map *Sheboygan City Map* to open it. **2** On the MapGuide Studio toolbar, click Edit.
	1 Drag the *Parcels (area)* layer from the *Layers* folder to the list of layers in the Layers panel. **2** Click the Drawing Order tab and move the *Parcels (Area)* layer up until it is immediately below the *Parcels* layer. **3** Click the Layers By Group tab and make sure that the *Parcels (Area)* layer is still selected. Clear the check-boxes for Layer Is Initially Displayed In The Map and Layer (If Themed) Is Initially Expanded In The Legend. The layer will be turned off when the map is displayed in the viewer and the color-key for the theme will not be expanded.
	1 On the MapGuide Studio toolbar, click Split. **2** In the Map Preview panel, click Refresh to test the legend. **3** Clear the checkbox next to Parcels and select the one next to *Parcels (area)*. Expand the *Parcels (area)* layer to view the key to the theme. **4** Save the map resource.

Setting Up the Legend for the Map

Double-click *Sheboygan City Map*

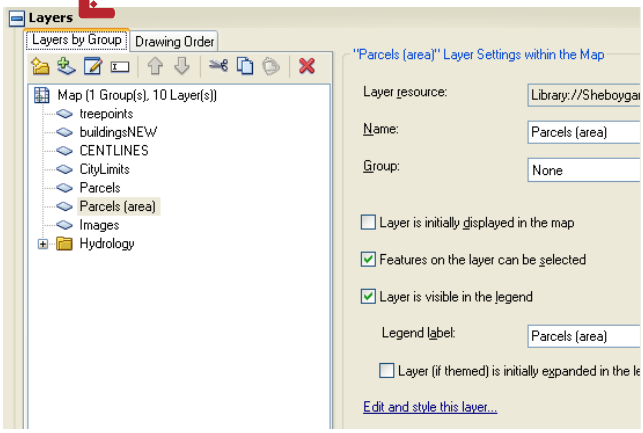


1

Open the Map Editor

2

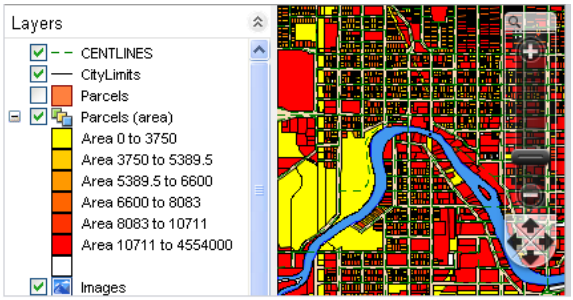
Specify which layers are visible



3

Preview and then save the map

Result in Map Editor: Preview of legend



View the Map in a Web Browser

In this exercise, you create a new Web layout and embed the map in it. Finally, you test the map by viewing it in a Web browser.

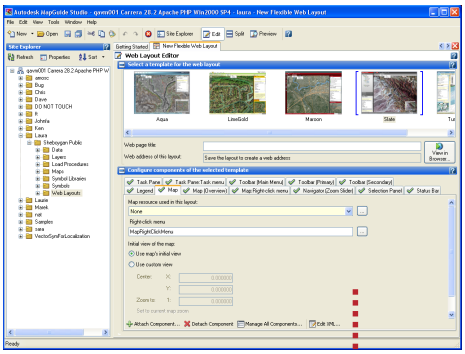
Number	Detailed steps
	➤ Right-click the folder Web Layouts and then click New ➤ Web Layout ➤ Flexible Layout.
	1 On the toolbar, click Edit to hide the Preview panel. **2** Under Select A Template For The Web Layout, click Slate. **3** In the Web Layout Editor, for Web Page Title, enter *Sheboygan City Map*. For Map Resource Used In This Layout, navigate to the *Sheboygan Public/Maps* folder and select *Sheboygan City Map*.
	1 Click File ➤ Save and save the Web layout in the Web Layout folder with the name *City Map*. You must save the Web layout before you can test it in the browser. **2** In the Web Layout Editor, click View In Browser... on the right edge of the editor. Your Web browser starts and displays the map in the Flexible Layout viewer. **3** Test your map, using the tools provided by the viewer. You should be able to see tooltips for the parcel layer. You should also see the *CENTLINES* and *buildingsNew* layers appear as you zoom in beyond 1-30000, and the *treepoints* layer at 1-10000.

Viewing the Map in a Web Browser

New > Web Layout

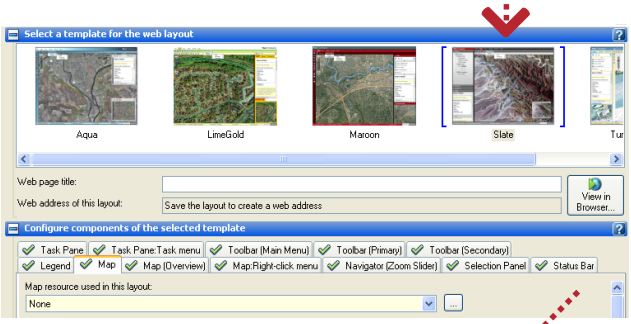
1

Create a new Web layout



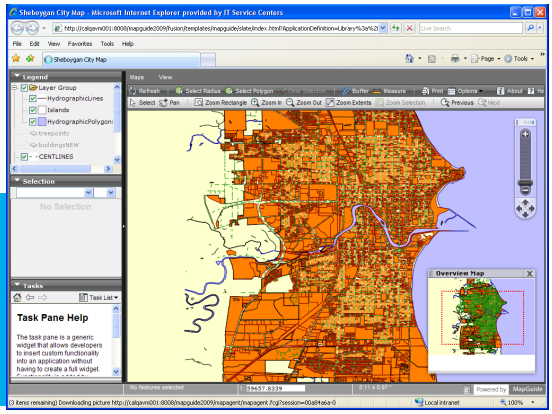
2

Select the map to use



3

Save the web layout and then test



Result in Web browser: Map with DWF Viewer controls

Glossary

AJAX viewer See *MapGuide viewer (AJAX viewer)*.

attributes Tabular data that describes the characteristics of a feature. For example, the number of lanes and pavement-type belonging to a road feature. See also *feature*, *property*.

Autodesk MapGuide Studio The MapGuide component that handles all aspects of collecting and preparing geospatial data for distribution on the Internet (except custom coding).

blocks In AutoCAD or Autodesk Map, compound objects that have been saved for reuse in the drawing or in multiple drawings, for example, a North arrow. In MapGuide, blocks are converted into symbols when they are loaded. See also *symbol*.

CD Browser The program that appears when you insert the product CD, and which provides access to installation instructions and other information.

credentials The user ID and password needed to connect to a database.

data store In FDO, a collection of feature classes contained in a single data storage location. The data store consists of an integrated set of objects, which are modeled by classes or feature classes defined within one or more schemas. Data stores can be either file-based, such as SDF, or a database, such as Oracle Spatial.

Display Manager In Autodesk Map, the component that handles the styling and theming of features in a DWG file.

Display Manager element A set of features that has been assigned a specific style or theme in Display Manager and which can be selected individually for loading into Autodesk MapGuide Studio.

display map A map presentation, consisting of Display Manager elements, that can be stored in a DWG file.

Drawing service The service that allows low level access to DWF data stored in a resource repository as part of a drawing source.

drawing source One of the two types of resources created by loading file-based data. Drawing sources are stored in the repository in DWF format and retain any styles or themes already applied to the source data. Compare with *feature source*.

drive alias In Autodesk Map, the mechanism that points to the folder where attached DWG files are stored.

DWF Design Web Format. An Autodesk file format for sharing 2D, 3D, and spatially-enabled design data.

DWF Viewer The free viewer for the DWF file format. The DWF Viewer can be used to preview layers and maps in Autodesk MapGuide Studio and to display the completed map in MapGuide Viewer.

DWG The Autodesk file format for storing 2D, 3D, and spatially-enabled design data.

expression An automatic calculation used to specify values for URL, tooltip, and feature labels. For example, you might create a text expression that specifies a state name and population for a label. To express the population in millions, you might apply a number expression that divides the population value by 1,000,000.

FDO Feature Data Objects. An Autodesk software standard and general purpose API for accessing features and geospatial data regardless of the underlying data store. See also *feature*, *feature class*.

FDO provider An implementation of the FDO API that provides access to data in a particular data store, such as an Oracle or ArcSDE database, or to a file-based data store, such as SDF or SHP.

feature An abstraction of a natural or man-made real world object. A spatial feature has one or more geometric properties. For example, a road feature might be represented by a line, and a hydrant might be represented by a point. A non-spatial feature does not have geometry, but can be related to a spatial feature which does. For example, a road feature may contain a sidewalk feature that is defined as not containing any geometry.

feature class A schema element that describes a type of real-world object. It includes a class name and property definitions. Commonly used to refer to a set of features of a particular class, for example, the feature class “roads” or the feature class “hydrants.” See also *schema*.

feature join A relationship that joins one feature source to another, similar to a relational join in a database.

Feature service The service that allows low level access to SDF 3 data stored in a resource repository as part of a feature source.

feature source One of the two types of resources created by loading file-based data or by connecting to a spatial database. Feature sources are stored in the repository in SDF 3 format or as database connections and contain raw geometry only. Compare with *drawing source*.

generalization In a load procedure, a method of reducing the number of vertices in the source data by a specific percentage.

layer A resource that references a feature source or a drawing source. The layer contains styling and theming information, and a collection of scale ranges.

Load procedure A saved script for reloading file-based data. You can use load procedures to automate the updating of resources on the server. They capture the location of the source files, the conversion rules, and where to put the resulting data on the server.

map A resource that references a collection of layers and displays them within a consistent coordinate system and extents.

MapGuide A software platform for distributing spatial data over the Internet or on an intranet. Exists in two versions: Open Source (supported by the community) and Enterprise (supported by Autodesk). (www.osgeo.org)

MapGuide Server The MapGuide component that hosts the MapGuide services and responds to requests from client applications through TCP/IP protocol.

MapGuide Viewer (AJAX viewer) The version of the MapGuide Viewer component that does not need a download (also known as "zero-client viewer"). It works with Microsoft Internet Explorer, running on Windows, or with Internet Explorer or Firefox on other operating systems, such as MacOS or Linux.

MapGuide Viewer (DWF viewer) The version of the MapGuide Viewer component that is based on a Microsoft ActiveX Control and has full support for the DWF format. It works with the Microsoft Internet Explorer browser only.

MapGuide Web Server Extensions The MapGuide component that exposes the services offered by the MapGuide Server to client applications over the Internet or on an intranet using HTTP protocol.

Mapping service The service that creates the view of a map in response to requests from the clients.

OpenGIS Agent The component of the MapGuide Web Extensions that implements a number of the OpenGIS web-mapping protocols to expose the services offered by the MapGuide Server to standards-based OpenGIS clients.

package A compressed file that can speed up the process of loading data onto the server. Large source-data files can be zipped up in this file format and saved to a network location or copied to a CD.

print layout An XML template for customizing the appearance of printed maps.

property A single attribute of a class. A class is described by one or more property definitions. For example, a Road feature class may have properties called Name, NumberLanes, or Location. See also *feature class*.

query In Autodesk Map, executable statements that retrieve specific objects, for example, a layer-based query that displays only the objects on the layers that contain state and district boundaries.

raster catalog A list of image files and their lower-left and upper-right coordinates. MapGuide scans the catalog file to find the images that correspond to the area being viewed, and then sends only the data for that area.

reference point For a symbol, the point that controls the position of a symbol over a feature in a map. The default reference point is the center of the symbol.

Rendering service The service that creates the final map image for the HTML viewer from input provided by the Mapping service.

resource A feature source, drawing source, or application component that is stored in the resource repository and which can be reused and shared.

resource repository An XML database that stores the resources created by loading file-based data or by connecting to databases.

Resource service The service that manages repositories and resources.

schema The definition of multiple feature classses and the relationships between them. The logical description of the data types used to model real-world objects. A schema does not reference the actual data instances (a particular road or land parcel), rather it is metadata. See also *feature class*.

SDF (SDF 3) Spatial Database Format. The current version of the SDF format. It is the native format for MapGuide Enterprise and MapGuide Open Source and is new in Autodesk Map 3D 2007. Each SDF 3 file can contain multiple feature classes or types of data stored in tables with attributes and geometry.

SDF 2 The previous version of the SDF file format. It was the native file format for Autodesk MapGuide (the last release was Autodesk MapGuide 6.5). Each SDF 2 file generally contained one feature or type of data, for example points, lines, polygons, or text.

services The software modules that reside on the MapGuide Server and which implement its core functions. See also *Site service*, *Resource service, Drawing service, Feature service, Mapping service, Rendering service*, and *Tile service*.

sheet In a DWF file, a plot layout containing a specific view of the original data.

site The collection of servers that process MapGuide requests.

Site Administrator A Web-based application, installed with MapGuide Server, for managing a site and its servers.

Site Explorer The tree view in Autodesk MapGuide Studio that shows you the resources stored in the resource repository.

site server The server that contains the resource repository.

Site service The service that provides basic site-related functionality, such as enumerating users and creating user sessions.

spatial context The general metadata or parameters within which geometry for a collection of features resides. In particular, the spatial context includes the definition of the coordinate system, spheroid parameters, units, spatial extents, etc. for a collection of geometries owned by features.

styling The process of assigning display characteristics (such as line color, line pattern, fill color, fill pattern, and so on) to a feature (points, polylines, polygons). See also *theming*.

symbol A bitmap or vector image that is used to represent a point.

symbol lbrary A collection of related symbols. Image files are converted into symbols when they are brought into the symbol library. The symbol library is stored in the resource repository.

task bar In MapGuide Viewer, a pane that contains tools and controls for specific tasks, such as searching or buffering.

theme In Autodesk Map, pre-defined thematic elements stored in the Display Manager, for example, a theme that colors district polygons according to their population.

theming The process of styling features according to an attribute value. See also *styling*.

Tile service The service that supports smooth pans and zooms in the AJAX viewer.

tooltips Pop-up boxes that contain information about the features in the map.

web layout A template for customizing the appearance of the MapGuide Viewer and for specifying which toolbar commands will be available.

web surround The extra functionality that is automatically built for a web layout, which resides outside of the map itself.

WebAgent The component of the MapGuide Web Extensions that processes requests and forwards them on to the server.

zero-client viewer See *HTML viewer*.

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