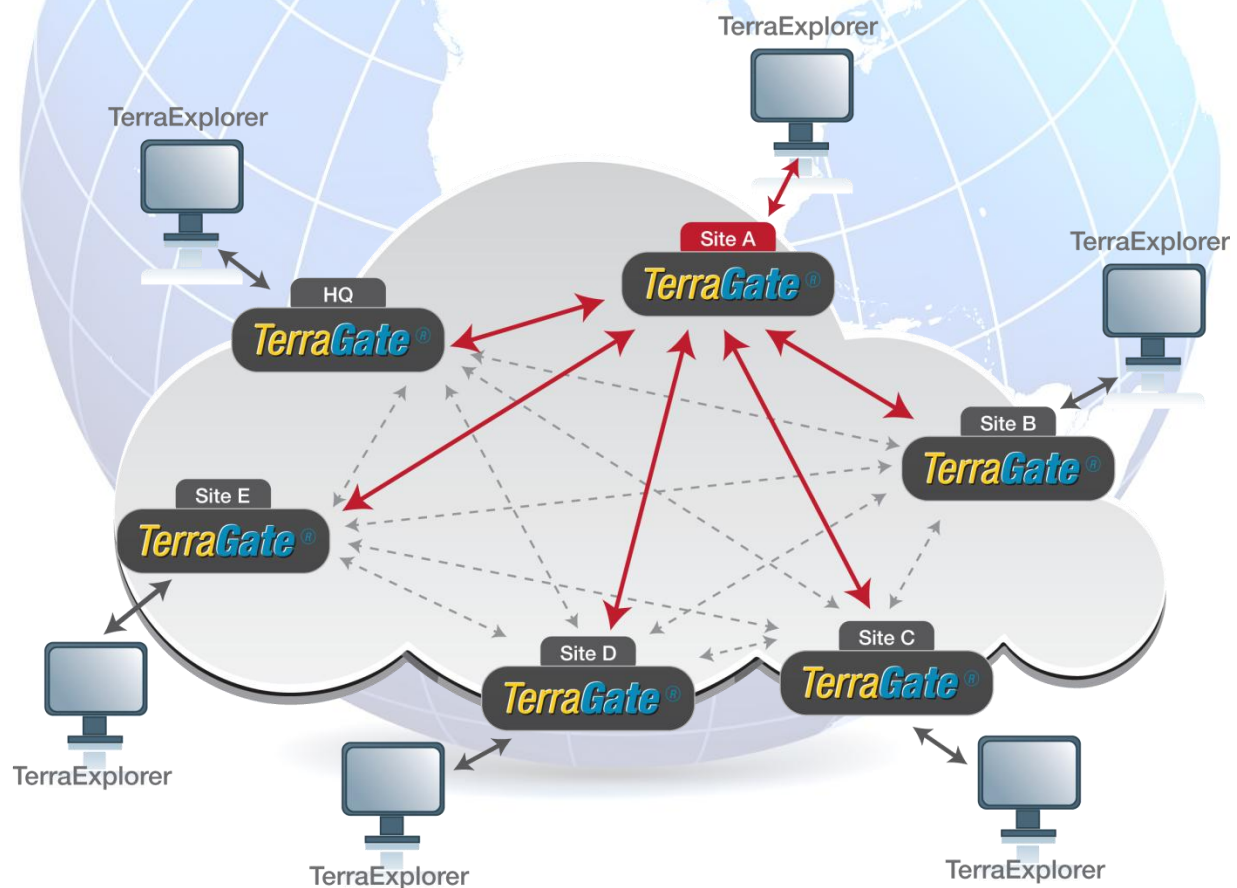


Federated TerraGate Network

Overview

Skyline's federated SkylineGlobe network comprises a cluster of geographically distributed TerraGate servers (nodes) that share each other's geospatial data to provide a fused global view of the data. Each node typically provides data for a different geographic area and manages a data cache for sections of data handled by other TerraGate server nodes. When users connect to a dataset on a local node, it can access the other nodes and seamlessly fuse the unique data they serve into a consolidated dataset which the user then sees. This distributed data concept enables the data for each area of operation to be managed by those who have the latest data, while fusing it into a comprehensive consolidated dataset (the master project) for all users. There is no need to send all the data to a central repository, or to rebuild or recompile the entire dataset to add or update data. When data in a specific area is added or modified, users automatically get the latest updates. Remote caching capabilities provide redundancy as well, by allowing continued access to the remote nodes' data when the network connection is lost.



Federated Network

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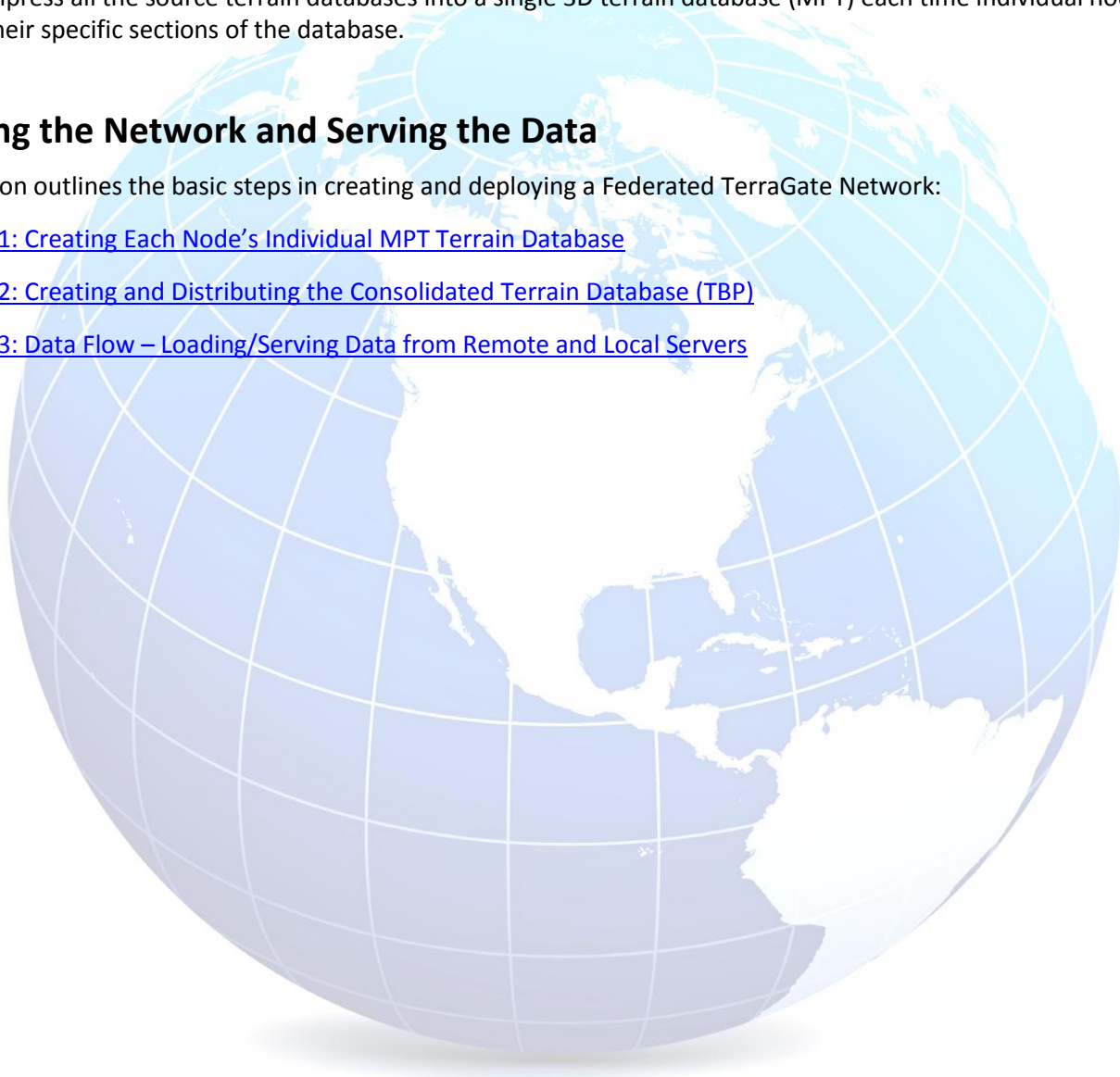
About the Network Nodes

Each TerraGate network node typically provides the data for a different geographic region of the global project in a multi-resolution, stream-optimized terrain database file (MPT) that is published by TerraGate and is accessible to remote users. An operator associated with any one of the nodes can then reference data from some or all of the nodes' terrain databases in a master - terrain project (TBP). TerraGate DirectConnect, on the server side, enables TerraExplorer clients connected to any of the nodes to fly directly over the fused terrain project (TBP), saving the time and resources needed to re-compress all the source terrain databases into a single 3D terrain database (MPT) each time individual nodes update their specific sections of the database.

Building the Network and Serving the Data

This section outlines the basic steps in creating and deploying a Federated TerraGate Network:

- [Step 1: Creating Each Node's Individual MPT Terrain Database](#)
- [Step 2: Creating and Distributing the Consolidated Terrain Database \(TBP\)](#)
- [Step 3: Data Flow – Loading/Serving Data from Remote and Local Servers](#)



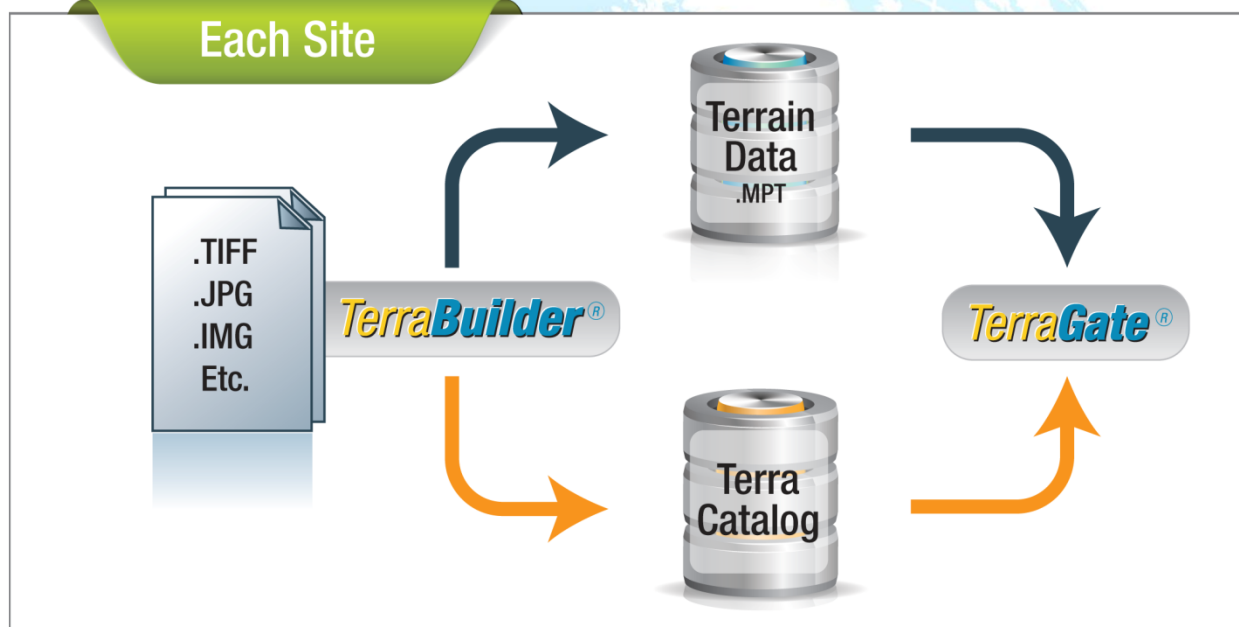
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Step 1: Creating each Node's Individual MPT Terrain Database

The first step in creating a federated TerraGate network is creating each node's individual terrain database(s) (MPT).

For each node:

1. Use TerraBuilder to import elevation and imagery sources for an area of interest and then create an MPT file. If a node is responsible for more than one area of interest, an MPT should be created for each of the areas.
2. Publish the MPT(s) to each node's local TerraGate.
3. If not set up to publish automatically, publish the MPT to the TerraGate Web Catalog Service (CSW) to provide TerraCatalog search interface for remote users.



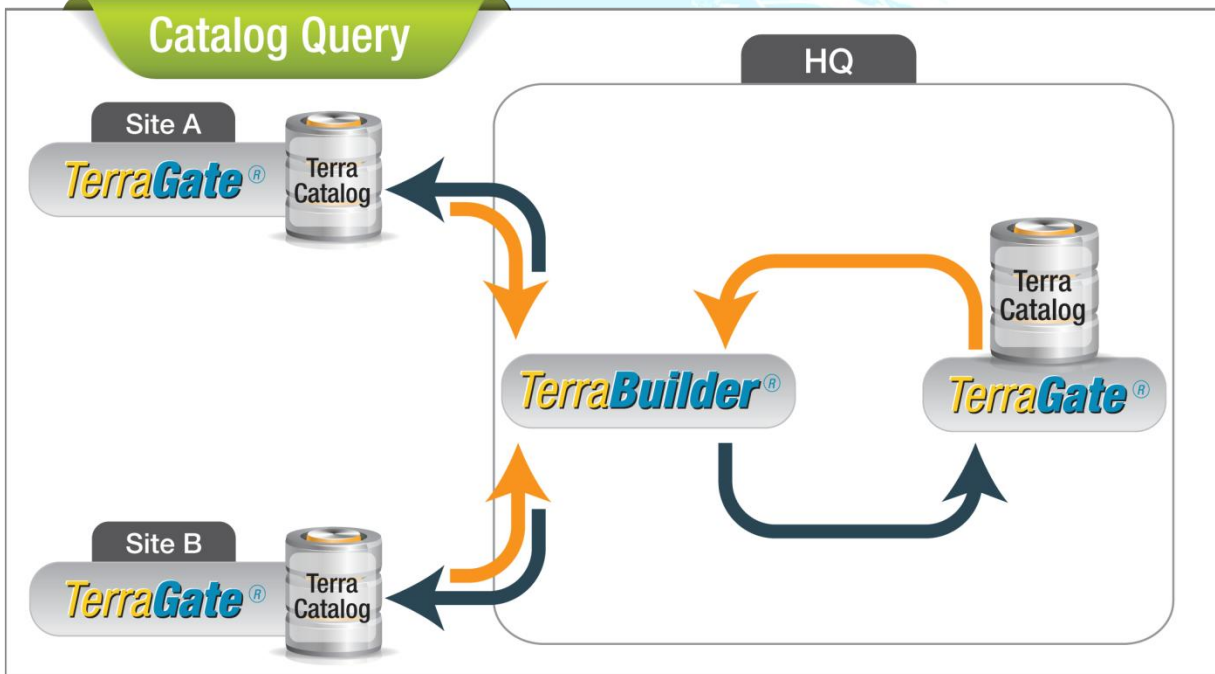
Creating Each Node's Database

Step 2: Creating and Distributing the Consolidated Terrain Database (TBP)

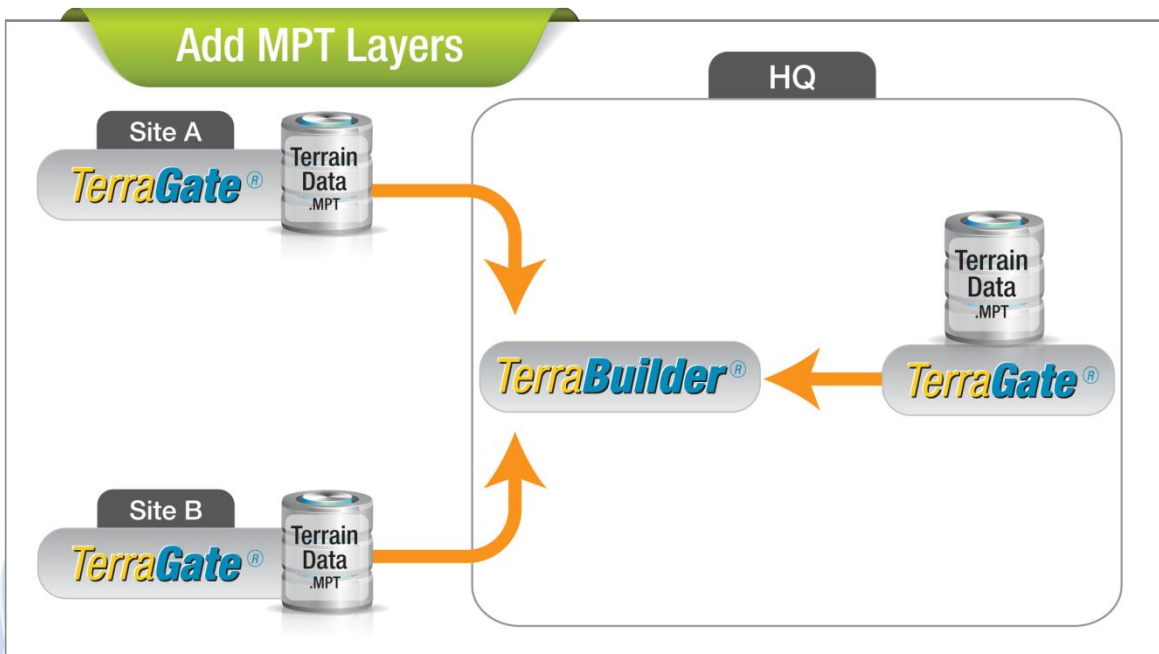
An operator, associated with any one of the nodes, though most commonly with the Headquarters site, combines the terrain data from all sites into a seamless virtual terrain mosaic. This is done in a TerraBuilder Project (TBP) that retains the IP addresses of each of the TerraGate servers that the MPTs are published on.

For the “Headquarters” node:

1. Using TerraBuilder, create a TerraBuilder project and then query TerraCatalog for the local and remote nodes MPTs.

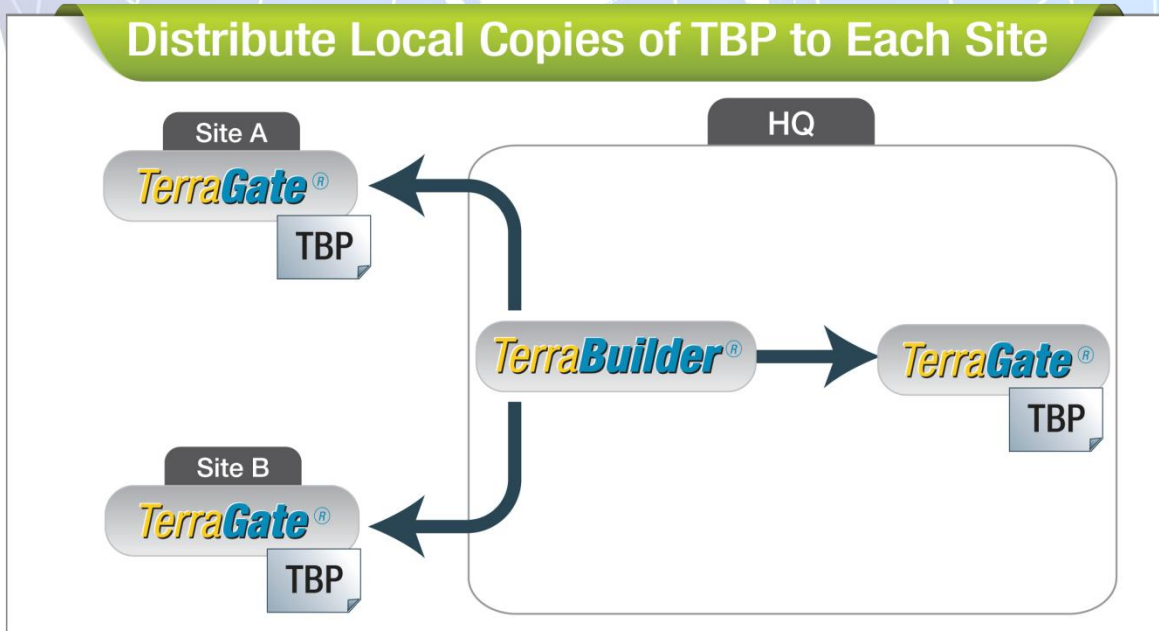


- Using TerraBuilder, insert the required MPT sources in the terrain project (TBP), prepare the project for publishing and then save the TBP. Once complete, the project is ready to be served by TerraGate.



Adding MPT Layers to the TBP

- The Headquarters (HQ) site then distributes the TBP to each TerraGate node.



Distributing the TBP to Each Network Node

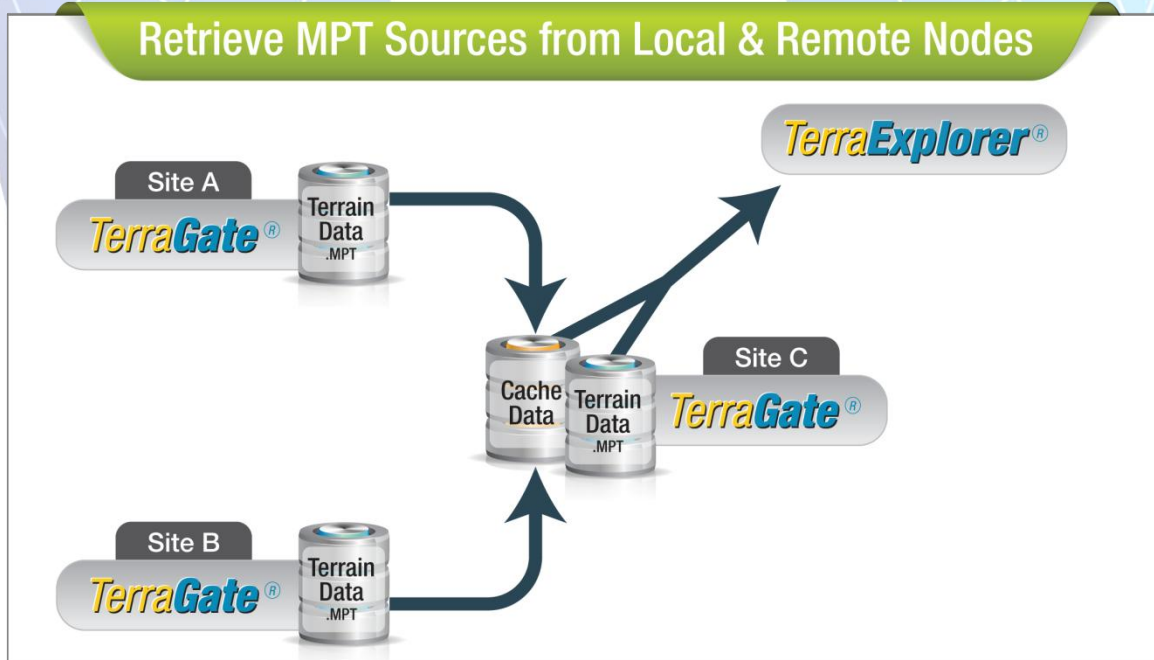
Step 3: Data Flow – Loading/Serving Data from Remote and Local Servers

TerraGate DirectConnect allows a user to directly view a copy of the consolidated TerraBuilder Project (TBP) that is composed from a fusion of local and remote MPT files, dynamically updating the terrain each time individual nodes modify their specific sections of the database.

Separate cache files are dynamically created for each source file accessed by a DirectConnect project. Each cache file is uniquely created according to the parameters of its source file, and settings in the project. A new version of the cache file is created on-demand whenever changes are introduced to the project.

For a TerraExplorer user on any of the local sites:

- Connect to the TerraBuilder project (TBP), from the local TerraGate server using TerraGate DirectConnect.
 - When viewing data referenced in the TBP that originates from a local node, the local TerraGate streams the required data.
 - When viewing data referenced in the TBP that originates from a remote node, a request is sent to the local node which then requests the data from the relevant remote node (if not cached).
 - When data is sent from a remote node, a cache of this data is saved on the local node that requested it, allowing faster response on successive requests, as well as continued access to data originating in the remote node even when the server connection is broken. Generally, cache is created gradually and dynamically, in response to user requests for new sections of the data.



Retrieving TBP's Local and Remote Data Sources

Managing the Cache Database

The node administrator may pre-cache part of the data to improve overall network performance as well as preparedness in case of server disconnection, using either of the following techniques:

- **Manual copy** – Copy remote MPT files to the local cache database.
- **Manual pre-caching** (using TB) – In TerraBuilder, either Create Resolution Pyramids for individual sources, or use the preview option to create an MPT terrain database for a specific section of your project.



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