Quickstart Guide

TerrainOnDemand® ArcGIS

Connect to Intermap Technologies®' NEXTMap® data within:

ArcGIS® Desktop 9.3.1 and Above

AGDQS0312

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Introduction

TerrainOnDemand® ArcGIS® allows users flexible, on-demand access to Intermap's high-resolution, wide-area terrain data and images through Open Geospatial Consortium (OGC)-compliant Web services. This "data as a service" platform natively supports Web-enabled discovery, acquisition, analysis, and delivery of geographic data that can be brought into OGC-compliant GIS software. When users access TerrainOnDemand Web services within ESRI software, all the tools for accessing or analyzing data are readily available. Since TerrainOnDemand is Web-based, users retain full and immediate access to data, and the traditional needs for on-site data storage and management become obsolete.

This document describes how to connect to Intermap Technologies'' NEXTMap® data within ArcGIS software; it does not provide step-by-step instructions for analyzing digial elevation data. The guide assumes a working knowledge of ArcGIS.

Open Geospatial Consortium

Intermap's® TerrainOnDemand Web services use the OGC OpenGIS® Web service standards: Web Map Service (WMS) and Web Coverage Service (WCS).

OGC is an international, voluntary, consensus standards organization. It originated to bring commercial, governmental, nonprofit, and research organizations to an open consensus on the development and implementation of standards for geospatial content and services, GIS data processing, and data sharing.

The OpenGIS Web Map Service (WMS) interface standard provides a simple HTTP interface for requesting geo-registered map images from a geospatial database. A WMS request is defined by the geographic layer(s) in the area of interest to be processed. The response to the request is a geo-registered map image (returned as JPEG, PNG, TIFF, etc.) that can be displayed in a browser application or OGC-compliant software. The WMS specification displays the map contents as layers using XML.The interface allows users to specify the transparency of the returned images in order to combine layers from multiple services. ArcGIS 9.0 Service Pack 2 and above supports WMS.

The OpenGIS Web Coverage Service (WCS) interface standard offers grid coverages, or raster data, via the Internet. The term "grid coverages," as it pertains to Intermap's data, refers to digital elevation data. WCS provides data and its metadata; has a syntax that is used to make requests against these data; and returns data with its original semantics (instead of pictures), which may be used as input data for 3D analysis and modeling. ArcGIS 9.3 and above supports WCS.WMS and WCS support in ArcGIS will allow access to NEXTMap data via the Internet and add it to existing maps as layers.

Connecting to the TerrainOnDemand ArcGIS

Before the TerrainOnDemand Web services can be retrieved through GIS client software, users will need an active account with a username and password. To set up an account, contact an Intermap sales representative.

Intermap recognizes that geospatial data can contain sensitive information; therefore, we have implemented 128-bit SSL encryption for all transactions. ArcGIS 9.3 does not support SSL authentication so it is necessary to use the TerrainOnDemand Web services connector to access Intermap's TerrainOnDemand WCS service. The connector enables ArcGIS to properly receive the encrypted transactions.

Installing the TerrainOnDemand Service Connector

To use the Web services connector for WCS and WMS data, read the following instructions. When installed, the connector creates a localhost connection that will allow you to securely access TerrainOnDemand data.

1. The TerrainOnDemand Web services connector is available for download here: **https://platform.terrainondemand.com/Analyst/Doc/pages/ServiceConnector.aspx**
2. After the TerrainOnDemand Web services connector is downloaded, open the zip file and double click on the Services Connector Installer.exe file. Follow the prompts to install the connector.
3. Once installed, the TerrainOnDemand Web services connector will be, by default, set to function on most network configurations.
4. If changes are necessary on the network, the setup process allows adjustments to the configuration. Users should check with their system administrator before making any changes since they will affect the accessibility and performance of the TerrainOnDemand data within the software. The following changes can be made during the installation process:
    a. Installation path for the TerrainOnDemand Web services connector
    b. Connection port
    c. Default external connection URL (after installation is complete)

The following URL conventions are used in this document:

- European data clients: **https://platform.terrainondemand.com/services/XXX*.ashx**
- North American data clients: **https://platform-us.terrainondemand.com/services/XXX*.ashx**
- TerrainOnDemand Web services connector – internal URL: **http://localhost:1080/services/XXX*.ashx**

*substitute the required service type (WCS or WMS) with the XXX

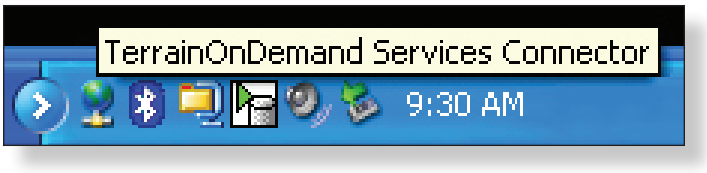
In some instances, the URL used to access Intermap's

TerrainOnDemand Web services may be different than the one listed above. Please check with a sales representative, system administrator, or Intermap's technical support to obtain the appropriate URL.

Verifying the Localhost Connection

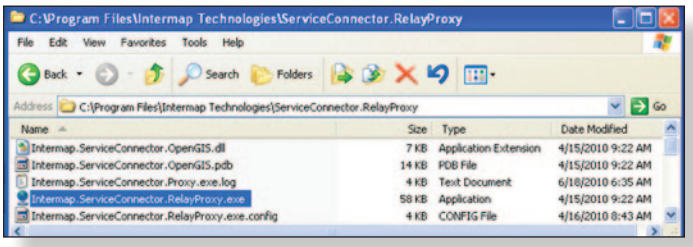
Before starting ArcGIS, ensure that the TerrainOnDemand Web services connector is running. The TerrainOnDemand Web services connector should start automatically when the computer boots up. To verify that the services connector has started, look for the icon circled below. If the services connector icon appears, go to Step 2.

1. Start the Web services connector

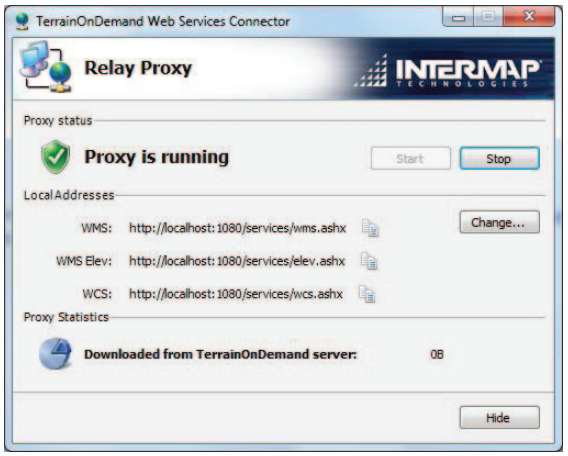


If the icon does not appear, navigate to: C: -> Program Files -> Intermap Technologies -> ServiceConnector.RelayProxy and double click the "Intermap.ServiceConnector. RelayProxy.exe" file (shown below). This will start the service connector and the icon from the image above will appear.

2. Checking the Web services connector status



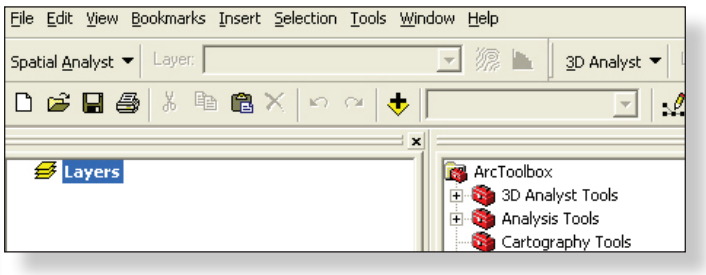
To check if the Web services connector is properly running, double-click the Web services connector icon. The proxy status should display "Proxy is running" and the "Start" button will be grayed out. If not, click the "Start" button. When the proxy status displays "Proxy is running," the Web services connector dialogue can be closed.



Connecting to TerrainOnDemand Web Services within ArcGIS Desktop

Now that the SSL proxy is properly running, ArcGIS can connect to TerrainOnDemand data. Before TerrainOnDemand data layers can be added, first add the individual Web services server to the list of available GIS servers in ArcGIS.

1. Open ArcGIS Desktop
2. Click on the "Add data" button

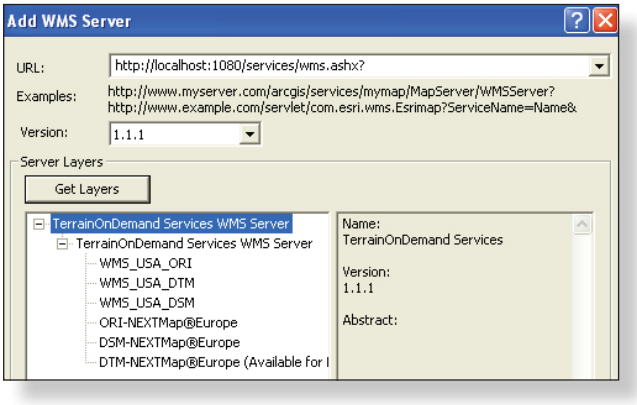


3. From the "Look in" drop-down menu choose "GIS Server." Follow the steps below to add either the WMS server or WCS server.
    a. Adding WMS
        i. Choose "Add WMS Server" and click the "Add" button
        ii. Enter the URL: http://localhost:1080/services/wms.ashx
        iii. Select version 1.1.1 from the "Version" drop-down menu
        iv. Click on the "Get Layers" button
        v. Enter the username and password when prompted*

**Note: If a "Connect to OnDemand" dialog box doesn't appear immediately, or if ArcGIS seems to have frozen and there are no available servers in the "Add Data" window, check behind other open Windows screens to determine if the dialog box is hidden. Although uncommon, this is a known issue with the way the proxy service login request interacts with certain GIS software.*

vi. Check the boxes of the desired services and datasets

vii. Click the "OK" button to add the "TerrainOnDemand Services" to the "Add Data" dialog box.



b. Adding WCS

i. Choose "Add WCS Server" and click the "Add" button

ii. Enter the URL: http://localhost:1080/services/wcs.ashx

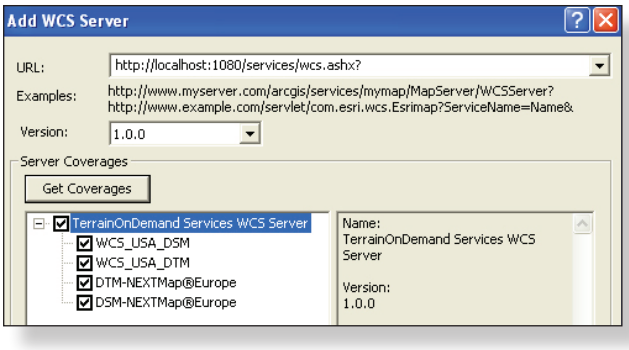
iii. Select version 1.0.0 from the "Version" drop-down menu

iv. Click on the "Get Coverages" button

v. Enter the Username and Password when prompted*

vi. Check the boxes of the desired services and datasets

vii. Click the "OK" button to add the "TerrainOnDemand Services" to the "Add Data" dialog box



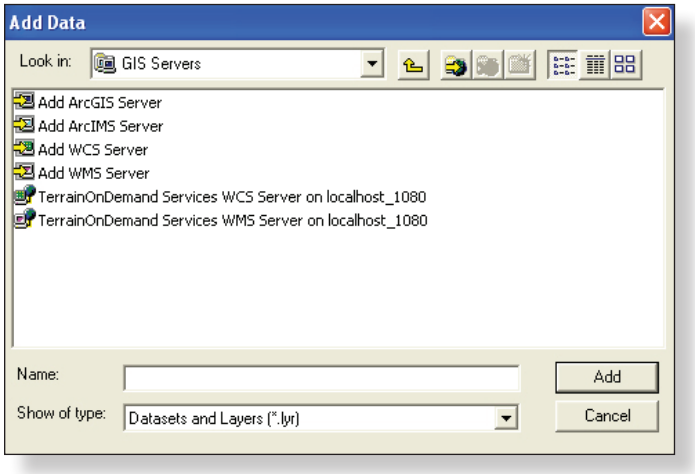
**Note: If a "Connect to OnDemand" dialog box doesn't appear immediately, or if ArcGIS seems to have frozen and there are no available servers in the "Add Data" window, check behind other open Windows screens to determine if the dialog box is hidden. Although uncommon, this is a known issue with the way the proxy service login request interacts with certain GIS software.*

Adding Data Layers for Analysis

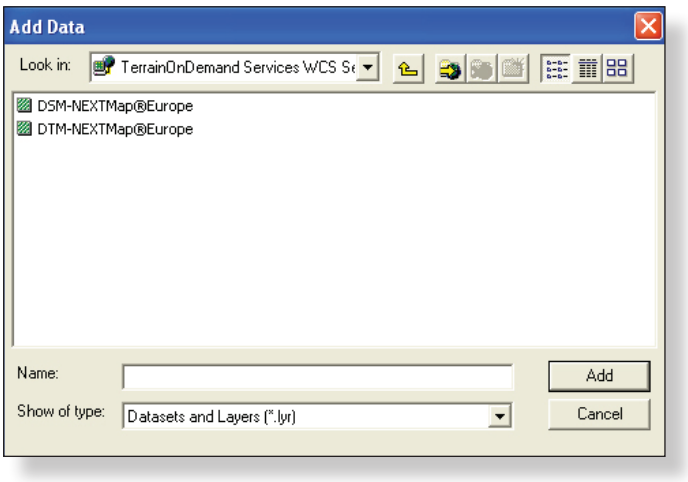
Now that the initial link has been established, data layers are ready to be added for analysis. The TerrainOnDemand Services added in the steps described in the prevoius section will now appear in the "Add Data" dialog box each time ArcGIS is opened. The following steps describe the process for adding layers from a single server at a time. If layers need to be added from multiple servers, it will be necessary to follow the steps below for each server.

1. To bring a new layer into a map, click on the "Add Data" button
2. If TerrainOnDemand layers are being brought in for a new session and a user name and password have not been entered, a "Connect to OnDemand Services" log in box will appear as soon as the "Add Data" button is clicked.

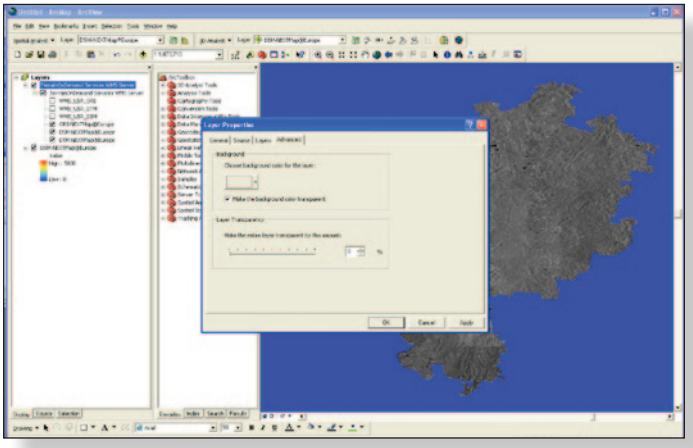
3. Select "GIS Servers" from the "Look in" drop-down menu. All of the "TerrainOnDemand Services" that have previously been added will show.
4. Click once on the desired service to be added (TerrainOnDemand Services WCS or WMS). When the service name is seen in the "Name" text box click the "Add" button.



5. A list of available service layers will appear in a new "Add Data" box. Select an individual layer to add or select multiple layers by holding down the "Ctrl" button and clicking on each layer. When the selected layer appears in the "Name" text box click the "Add" button.



6. The list of added layers will appear in the "Layers" box.



TerrainOnDemand Web Services Layers

NEXTMap Data Layers

The TerrainOnDemand Web services layers are created from NEXTMap 3D elevation models and images.

The following NEXTMap layers are currently available:

Digital surface model (DSM)

NEXTMap Europe / USA – The DSM includes buildings, vegetation, roads, and natural terrain features

Digital terrain model (DTM)

NEXTMap Europe / USA – The DTM is a topographic model of the bare earth. The DTM has had vegetation, buildings, and other cultural features digitally removed, leaving just the underlying terrain.

Orthorectified radar image (ORI)

NEXTMap Europe – The ORI is a grayscale radar image of the earth's surface that has been corrected to remove geometrical distortions

Optional Data Layers

Optional data layers can be converted upon request, and combined with TerrainOnDemand Web services layers. Some examples of the existing elevation data layers that are compatible with the TerrainOnDemand Web services layers in ArcGIS are:

- SRTM
- ASTER GDEM
- TerraSAR-X
- LiDAR data
- Wide-area raster, vector, or derived (e.g., TIN) datasets

Spatial Reference System

All data from TerrainOnDemand Web services are served without projection in Geographic Spatial Reference System (latitude/longitude in degrees) – EPSG: 4326, ellipsoid WGS 84. Data can be projected "on the fly" to the desired spatial reference system in the GIS software.

ArcGIS configuration

WMS layers:

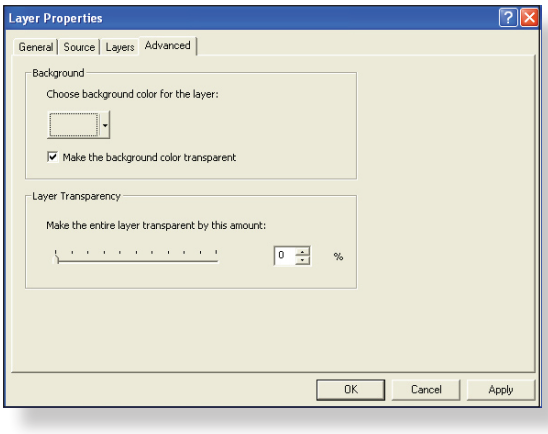
Available WMS NEXTMap layers are: DSM, DTM, and ORI

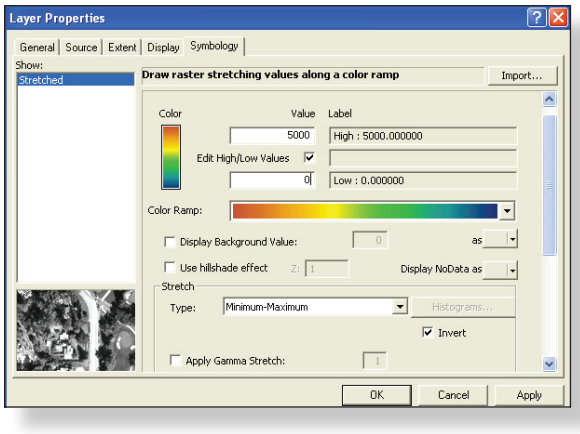
Setting the WMS background color

The default background color (midnight blue) of the WMS layer can be adjusted or hidden by changing these settings:

1. Select "Properties" on TerrainOnDemand Services WMS Server layer
2. Choose the "Advanced" tab
3. Change the background color from the "Choose background color. . . " drop-down menu or check the box to "Make the background color transparent"
4. Select the transparency of the layer by using the slider bar or by typing a percentage directly in the "%" box.

WCS layers:





Default setting Background color transparent

Available WMS NEXTMap layers are: DSM and DTM

Setting the WCS Layer Properties

WCS layers are displayed in ArcGIS with non-existent minimum and maximum values. To see the working area, add new minimum and maximum values (minimum 0 and maximum 5000). These values and color ramp can be changed or the background can be set as no color (value -10000) with the following steps:

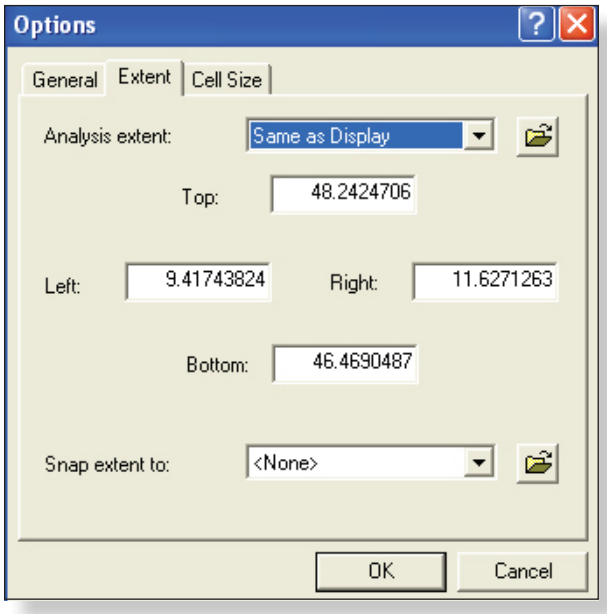
1. Right click on the layer and select select "Properties"
2. Choose the "Symbology" tab
3. Select stretch type as "Minimum-Maximum"
4. Set min and max value 0 – 5000
5. If desired, check "Apply Gamma Stretch" and set value > 1
6. Select "Color Ramp" options from the drop-down menu
7. Check "Display Background Value" and set value -10000 (no Color)

3D/Spatial Analyst

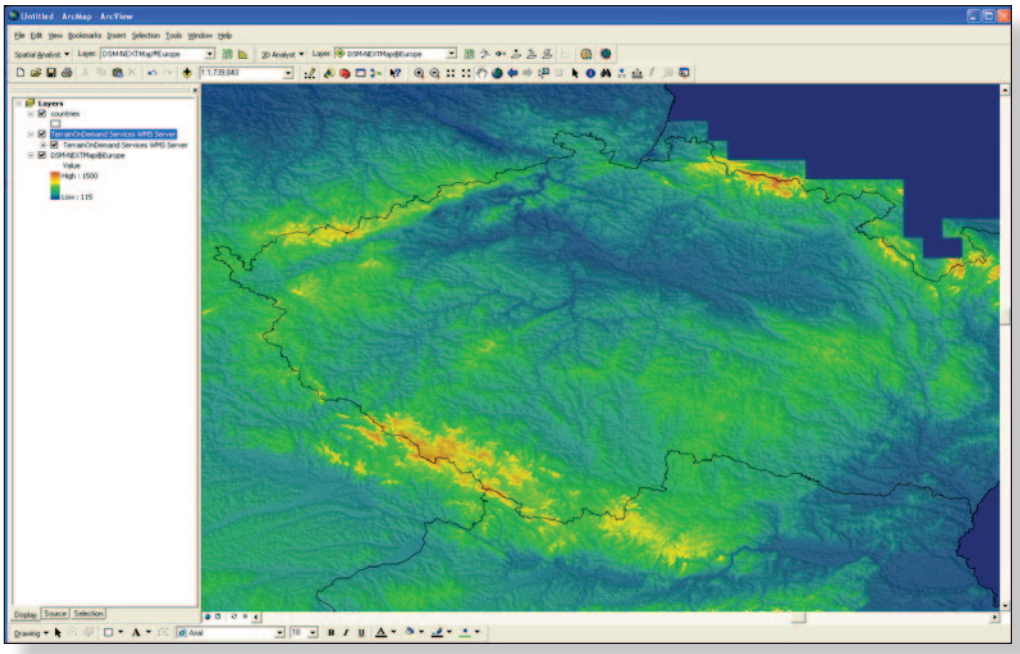
Due to size restrictions on downloaded data, only a limited amount of data can be used for any one spatial function. It is critical to restrict the analysis to the area defined by the view window, or the application will attempt to perform the analysis on the entire dataset. The default value of this restriction is set to 2050 samples in both the X and Y axis, but can be configured. If this limit is exceeded by one of the required values, a WCS exception error will result and likely cause the software to crash.

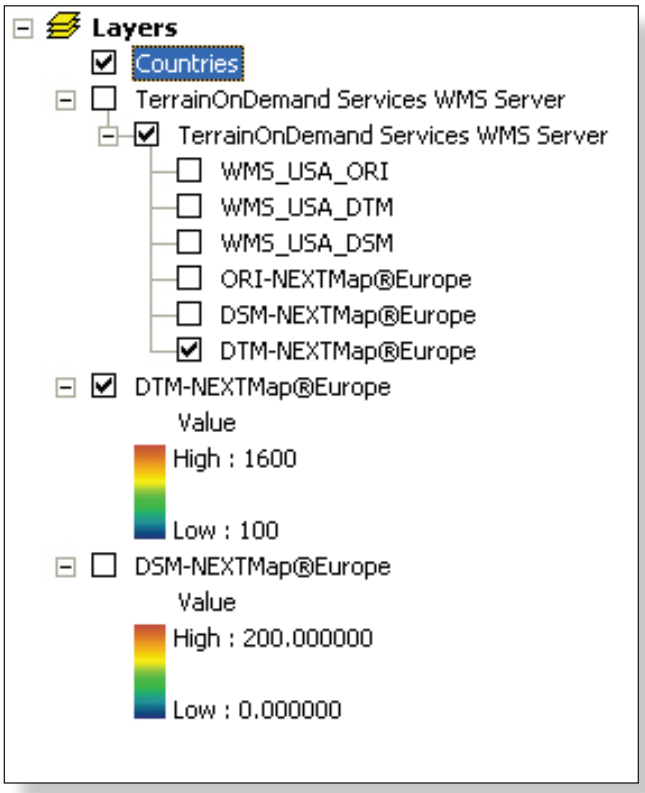
To change the analyst extent, first zoom in on a small area (smaller than 2050 x 2050 pixels). To set the 3D analyst option:

1. Click on the 3D Analyst drop-down menu
2. Select "Same as Display" from the Analyst Extent drop-down menu



Correctly Configured WMS/WCS Layers in ArcMap – Example





Data for the area shown above:

WMS Server – DSM, DTM, and ORI

WCS Server – DSM, DTM

Local vector layer – Countries

Subscription for TerrainOnDemand Web services was limited to the region of the Czech Republic

Spatial Reference System - WGS 84 Web Mercator (Mercator projection on the sphere)

Min – Max values of heights was set to 100-1600 m; gamma stretch was set to 1.5