Getting started with the Civilian Topographic Map (CTM) product

# Introduction

Civilian Topographic Map (CTM) is a product designed to allow users to easily create civilian style topographic data and maps using Esri Production Mapping. CTM includes a geodatabase data model as well as sample configurations for editing, quality assurance, cartography, and generalization. CTM can also be configured as a sample map product for Product on Demand (POD), a web application that allows users to create high quality cartographic products through a light weight web interface.

The schema of CTM is based on the National System for Geospatial Intelligence Feature Data dictionary (NFDD). The NFDD is a comprehensive dictionary and coding scheme for feature types, feature attributes, and attribute values. The NFDD conforms to a subset of ISO 19126, Geographic information - Feature concept dictionaries and registers, and its information schema. Esri has chosen a subset of NFDD feature types and attributes for CTM that are appropriate for those doing topographic mapping in a civilian context.

For more information about the NFDD specification visit, <https://nsgreg.nga.mil/fdd/registers.jsp?register=NFDD>. On this page you will see links that allow you to browse or search the NFDD specification for a complete list of feature and attribute types.

The CTM product files are distributed through GitHub.  For the latest product files visit - <https://github.com/Esri/CTM/releases>.  It is recommended that you only use released product files.  The CTM development branches, including master, may contain updates that are not fully tested and therefore may not be functional.  Because the product files and sample scripts in the development branches contains functionality that may not be in final form, using them could result in products that do not meet specifications and could cause data corruption.

## Getting started

Begin by downloading and extracting the appropriate Civilian Topographic Map release to a local folder. The files needed for CTM are extracted into a directory structure which organizes the CTM content.

Civilian Topographic Map is divided into a number directories:

|  |  |
| --- | --- |
| **Directory** | **Description** |
| Fixed25K | All of the files and configurations required to collected data and make a civilian topographic map product at a scale of 1:25,000. |
| Product Library | The Product Library contains many of the business rules for editing and cartography that are need to produce civilian topographic data and maps at any scale. |
| Styles | Contains the symbology style for all scales of civilian topographic map products. |

The specific content of each directory and how to use the files are explained below. Regardless of the products you choose to implement, always begin by following the steps for setting up the styles and product library as these are used for all products.

## Styles

The Styles directory contains the symbology style for all scales of civilian topographic map products.

### Setting up CTM style

By default, the style path is set to **<install drive>:\Program Files\ArcGIS\Desktop<release number>\Styles**, which is the location where the styles that are installed with ArcGIS are stored. In order for all users on the machine to have access to the style and in order for Production Mapping configurations using the style to work correctly, you must copy the style file to the default style path.

1. Copy the **Civilian Topographic Map (CTM).style** file from the CTM\Styles directory and paste it to the following directory:

* <install drive>:\Program Files\ArcGIS\Desktop<release number>\Styles

*Note: You may need administrative access to the machine to copy files to this location*

1. Repeat step one for all machines that will be used to create Civilian Topographic Map products.

## Product Library

The product library contains many of the business rules for editing and cartography that are need to produce civilian topographic data and maps at any scale.

The product library is typically a single, centralized database to which all members of the organization go access the configuration files used to produce a product. Having one centralized product library ensures that when changes are made to the configurations, everyone has immediate access to the updates. If multiple versions of the product library exist within your organization, there is no way to guarantee that everyone is using the latest version.

When setting up the product library in SDE, best practice documents are available to help you appropriately configure the SDE repository.

* + For more information about administering your product library in **SQL Express** see: <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/introduction-to-configuring-the-product-library-in-sql-server-express.htm>
  + For more information about administering your product library in **SQL Server** see: <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/introduction-to-configuring-the-product-library-in-sql-server.htm>
  + For more information about administering your product library in **Oracle** see: <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/introduction-to-configuring-the-product-library-in-oracle.htm>

### Setting up the CTM product library

To begin using the product library provided with CTM.

1. Unzip the **CTM\_Product\_Library.gdb.zip** in the CTM\ProductLibrary directory.
2. Start ArcMap.
3. If necessary, open the **Product Library** window by clicking **Customize > Production > Product Library** on the main menu.
4. Right-click the **Product Library** icon and click **Select Product Library**…
5. Browse to the location where you unzipped the **CTM\_Product\_Library.gdb**
6. Click OK

## Fixed 25K

### Contents

The fixed 25K directory contains subdirectories with all of the files and configurationsrequired to collected data and make a civilian topographic map product at a scale of 1:25,000.

The following files are provided as part of the fixed 25K product:

|  |  |  |
| --- | --- | --- |
| **Directory** | **Sub Directory** | **Description** |
| Batch Jobs |  | Contains Reviewer Batch Jobs which are used to validate the attributes, geometry, and spatial relationships of data in the Civilian Topographic Map schema. |
| Cartography | Grids | Contains Grid XML files used by the Grids and Graticules GP tool to create cartographic grids appropriate for the 25K civilian topographic map product. |
| Map Generation | Contains a python toolbox with tools used to automate the generation the 25K civilian topographic map product. |
| Map Templates | Contains a sample MXD which contains the template layout used to produce 25K civilian topographic map products. |
| Schema |  | Contains a workspace XML file along with topology rules that can be used to generate an empty geodatabase with the civilian topographic map schema. |

### Setting up Civilian Topographic Map Fixed 25K for Data Production

The Fixed 25K directory contains all of the files and configurations needed to create a new geodatabase with the CTM schema and to setup the Production Mapping environment for collecting and maintaining data.

#### Create new a CTM database

If you do not wish to use the sample CTM geodatabase provided which includes data near Salt Lake City, UT, you can create a new geodatabase that has the CTM schema and topology rules but does not include any data.

1. Open ArcMap
2. In the Catalog window, navigate to the CTM directory.
3. Create a new file geodatabase and give it a name such as My\_CTM.gdb
   * See: <http://desktop.arcgis.com/en/desktop/latest/manage-data/administer-file-gdbs/create-file-geodatabase.htm>
4. <your location>\Fixed25K\Schema\CTM.xml is a geodatabase schema workspace xml which contains the data model schema for CTM. Import the CTM schema into your new geodatabase.
   * See: <http://desktop.arcgis.com/en/desktop/latest/manage-data/geodatabases/importing-a-geodataase-schema-from-an-xml-workspace-document.htm>
5. <your location>\Fixed25K\Schema\CTM\_Topology.rul is a topology rules file which contains the rules that will be use to constrain the CTM data. Create a new topology in the CTM dataset in your new geodatabase.
   * See: <http://desktop.arcgis.com/en/desktop/latest/manage-data/topologies/creating-a-topology.htm>
   * When prompted to select feature classes to include, click the Select All button.
   * When prompted to specify rules for the topology, click the Load Rules… button and browse to the CTM\_Topology.rul file.

#### Link the CTM database to the configuration rules

All of the editing configuration rules used in Production Mapping are stored in the product library. In order for the rules to be applied, a link must be created between the data you are editing and the product library.

If using the My\_CTM.gdb that you created following the Create a new CTM geodatabase steps above, you will need to execute all of the steps in this section. If using the sample CTM.gdb provided, you will only need to execute the first two steps.

1. If necessary, Open ArcMap
2. If necessary, set the product library to the CTM\_Product\_Library.gdb. See [Setting up the CTM product library.](#_Setting_up_the)
3. Add data from the **My\_CTM.gdb** to ArcMap, this is the database you created following the [Create a new CTM geodatabase](#_Create_new_a) steps above.
4. In the Product Library window, if necessary, expand **Production Data**.
5. Right-click the **My\_CTM.gdb** and click **Create Production Database**.
6. Once process is finished, right-click the **My\_CTM.gdb** and click **Choose Data Model Versions**.
7. Choose **CTM (1.0.0.0)** and click OK.

#### Viewing the editing configurations

By creating a link between the product library and the CTM database, Production Mapping knows which editing configurations to use. These next steps will describe how you can quickly see where the editing configurations are used.

1. If necessary, add data from the CTM database to ArcMap.
2. Start an Edit Session by clicking the **Production Start Editing** button.
3. If necessary, turn to the Create tab in the Manage Features dialog
4. To view the field configurations included in CTM:
   1. Select any template from the template list in the Create Tab
   2. In the create attributes window, the attributes for the feature will be grouped and otherwise organized
   3. To toggle between the organize view and the full unorganized list of attributes, right click anywhere in the Create Attributes window and click **Enable Field Configurations**.
5. To view the Editing templates included in CTM:
   1. Right click anywhere in the template list in the Create Tab and choose Select Views Workspace…
   2. Ensure that the Views Table Location is set to the Product Library. Click OK.
   3. Right click anywhere in the template list in the Create Tab and click **Load Templates from View > CTM\_25K\_EditTemplates**
   4. See: <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/loading-feature-templates-from-a-view.htm>
6. Attribute rules stored in the product library can be run using the Apply button in Feature Manager. Anytime you change attributes and click the Apply button the attributes are checked against the attribute validation rules before the attribute change is committed. To validate features using CTM Attribute Validation rules:
   1. Select any template from the template list in the Create Tab. For example, **Building / important** from the StructureSurfaces layer.
   2. Change an attribute in the Create Attributes window. For example, set the Feature Function (**FFN**) attribute to **931 – Place of Worship**.
   3. Click the **Apply** button. If the attribute combination fails a validation rule, a message will popup reporting the issue.
   4. For more information about on-the-fly validation see: <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/validating-attributes-using-a-batch-job.htm>
7. Spatial rules stored in the product library can be run using the Run Selected Batch Jobs tool on the Production Editing toolbar. Anytime you edit feature geometries, you can run the tool on the selected features or the current extent to validate the spatial accuracy of the edits. To validate features using CTM Spatial Validation rules:
   1. For more information about the Run Selected Batch Jobs tool see:
   2. <http://desktop.arcgis.com/en/desktop/latest/guide-books/extensions/production-mapping/validating-a-selected-set-of-features-with-batch-jobs.htm>

### Setting up Civilian Topographic Map Fixed 25K for Cartographic Production

Once data is collected over an area, CTM provides the styles, map templates, and other cartographic configurations are used to make a compelling cartographic product at a scale of 1:25,000.