What's new in ArcGIS 10.1

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A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

ArcGIS 10.1 includes additional and improved functionality throughout the ArcGIS product line. Several product names have changed at 10.1. See A Note About Names in ArcNews for a partial list of product name changes.

The following sections summarize changes in the software in different functional areas. Each section includes links to topics with more information for that specific area of the software.

Mapping

ArcMap basics

- There is a new coordinate system selection experience. This includes the addition of searching for spatial references by name, well-known id and spatial extent.
- Compound datum transformations can now be created in the user interface.
- The dot density renderer now includes the ability to set a seed for the fixed placement of the dots. There's a new option in the dot density renderer that allows you to choose between dot size and dot value as a way to maintain the density.
- There are new layers supported for ArcMap basemap layers
  - Dot density layers
  - Dimension layer
  - TIN and terrain layers
  - Schematics layer
  - Geostatistical layers—contours and filled contours
  - XY event layers
  - Linear referencing event layers
- Python is now supported as a scripting language for all locations where scripting is used. This includes label expressions, display expressions, hyperlink scripts, dimensions, and linear referencing hatching.
- Credits are now available for service layers.

See What's new in ArcMap 10.1 basics for more information.

Text and labeling

The Maplex for ArcGIS extension functionality has been moved into the core ArcGIS for Desktop product and is referred to as the Maplex Label Engine. The following list summarizes new functionality for labeling, annotation, and the Maplex Label Engine:

- There's improved internationalization support for text display of complex scripts (for example, Arabic, Hebrew, and Thai).
- The Maplex Label Engine is the default label engine for ArcMap.

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- The global label placement parameters controlling line connection and multipart polygons have been moved from the general Maplex label options to the label class level.
- Additional ability to control the white space used in your label has been added to the ***Label Expression*** dialog box.
- A new **Label Density** tab has been added to the ***Placement Properties*** dialog box to organize the parameters that affect the density of labels.
- Key numbering has been added as a label-fitting strategy.
- An option has been added to the Regular Placement style to support labeling lines on either side of the feature when the label is stacked and you are using an offset label position.
- An option has been added to the repeat line labels parameter to allow you to label near line junctions and the map border.
- Options have been added to the truncation parameter to allow you control over what characters are removed first, the minimum word length, and the marker character.
- An option has been added to the point label offset parameter to allow you to measure the offset from the exact symbol outline.
- Street Placement has been improved to include the line connection parameter.
- The line options from Standard Label Engine (one per feature, one per feature part, and one per feature segment) have been added to the line connection parameter.
- The spread words parameter can now be applied to polygon labels.

See What's new in Maplex for ArcGIS 10.1 for more information.

Symbols and styles

The following summarizes new functionality for symbols and styles:

- GIFs, PNGs and JPEGs are now supported in picture symbols.
- Representation rules and representation markers stored in a style now support tags for searching.
- The representation rules and representation markers in ESRI.style, C2 Military Operations.style, and Military METOC.style have been populated with search tags indicating representation composition and color.
- When a localized version of ArcGIS is installed, localized versions of commonly used styles will also be installed. These styles will be used by ArcGIS rather than the English versions.

What's new for representations

The following summarizes new functionality for representations:

- ArcGIS 10.1 introduces three new line geometric effects: Extension, Offset tangent, and Suppress.
- Representation marker placement styles have been updated to include a check box to toggle clockwise rotation.
- Representation rules and representation markers stored in a style now support tags for searching.

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See What's new for representations in ArcGIS 10.1 for more information.

Page layouts and data frames

The following summarizes new functionality for page layouts and data frames:

- The legend has been enhanced to be dynamic. That is, legends support the display of only features in the visible extent and feature counts. Also, the legend can now have a fixed area on the page. The frame size will remain fixed, and as legend items are added or removed, they will adjust to fit inside.
- A new True North option has been added as well as calibration angle enhancements.
- Scale bars have been enhanced to allow you to set the zero point as the anchor so that multiple scale bars of differing units can be aligned with each other.

See What's new for page layout and data frames in ArcGIS 10.1 for more information.

Exporting to PDF

The following summarizes new functionality for exporting to PDF:

- ArcGIS now supports exporting password-protected PDF files from the ArcMap user interface. In version 10.0, password protection of PDF documents was only possible via Python scripting. In version 10.1, you can use the **Security** tab in the PDF options of the ***Map Export*** dialog box to set a document-open password and other PDF security features.

See Exporting to PDF for more information.

Automating map workflows

The following summarizes new functionality for automating map workflows:

- You can now automate symbology properties for the following renderers: graduated colors, graduated symbols, unique values, and classified rasters.
- An export report function is available that allows you to automate the generation of reports.
- ArcGIS 10.1 provides access to a layer's time properties so you can perform analysis over time. You can also enable time on layers.
- Various other enhancements have been made to arcpy.mapping including setting text size, setting relative paths, and reading page size.

See What's new for automating map workflows in ArcGIS 10.1 for more information.

Cartographic generalization and symbol conflict detection

The following summarizes new functionality for cartographic generalization and symbol conflict detection:

- Many of the generalization and graphic conflict resolution tools in the Cartography toolbox are now enabled for partitioning to allow them to process much larger datasets. Partitioning dynamically subdivides input data for processing, ensuring that a seamless result is output.
- New geoprocessing tools have been introduced to further support a workflow to process road and building features for clear display at a smaller scale.

See What's new for the Cartography toolbox for more information.

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Sharing maps and data

The following summarizes new functionality for sharing maps and data:

- ArcGIS for Desktop offers a unified publishing experience.
- You can create GP task and Address locator packages from ArcGIS for Desktop.

See What's new for sharing maps and data in ArcGIS 10.1 for more information.

Desktop search

At ArcGIS 10.1, significant improvements have been made to search for your GIS content:

- Spatial search support—The search window supports a variety of ways to spatially search for the GIS content.
  - Map-based spatial search support
  - Text-based spatial search support
  - Scale-dependent spatial search support
- The search window now supports sorting and grouping of your search results so you can quickly narrow down your search results.
- Synonym support.
- Improved indexing performance and added the ability to log corrupt data and attempt to skip over such data at index time.
- Ability to auto-generate thumbnails at index time.
- Several enhancements to improve the look and feel of search results including the ability to show thumbnail for each search result, enabled context menu on each search result item, and so on.

See What's new in the ArcGIS for Desktop search for more information.

Temporal data

The following summarizes new functionality for temporal data:

- The time slider supports visualizing the most current updates to temporal data using the live mode.
- The time window on the time slider can be configured to display or hide temporal data that falls exactly on the start and end time of a specified time window.
- You can embed time as text when exporting images or videos of your time visualization from the data view in ArcMap, ArcScene, or ArcGlobe.

See What's new for temporal data in ArcGIS 10.1 for more information.

Reports

The following summarizes new functionality for reports:

- You can create a report using visible features of a chosen layer by choosing the Visible Extent for the Dataset option.
- You can now generate a report that includes the related data from the source layer.

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- An export report function is available that allows you to automate the generation of reports.

See What's new for Reports in ArcGIS 10.1 for more information.

Data management

Databases

The following functionality is new in ArcGIS 10.1 for Desktop for working with databases:

- The altered ***Database Connections*** dialog box and Create Database Connections geoprocessing tool allow you to connect to a supported database from ArcGIS for Desktop and view the data.
- You can install the ST_Geometry data type in an Oracle or PostgreSQL database using the Create Spatial Type geoprocessing tool.
- You can use the Create Database User tool to add a user to Oracle, PostgreSQL, or SQL Server. Users are granted privileges sufficient to create database objects. In SQL Server, the users also have privileges sufficient to read system tables containing lists of database logins and roles. In Oracle, they are created with privileges sufficient to read the database role system table.
- You can create a database role in an Oracle, PostgreSQL, or SQL Server database using the Create Role geoprocessing tool. You can also use this tool to add users to the roles.
- From ArcGIS for Desktop, you can create tables and feature classes in a database and load data into them.
- You can add, drop, or rename fields in database tables.
- You can rename database tables.
- You can truncate database tables.
- You can create views on database tables using the Create Database View geoprocessing tool.
- You can rebuild indexes on existing database tables using the Rebuild Indexes geoprocessing tool.
- You can use the Analyze Datasets to update database statistics for database tables and their associated indexes.
- A new type of server—the ArcGIS Spatial Data Server—is available to let you serve the geometries, attributes, symbols, and template information for vector data you have stored as tables in your spatially enabled databases in DB2, SQL Server, Oracle, or PostgreSQL.
- You can use the Add Incrementing ID Field geoprocessing tool to add a database-maintained ID field to an existing table.
- A new geoprocessing tool is available (Make Query Layer) to allow you to script the creation of a query layer.

See What's new for databases for more information.

Geodatabases

ArcGIS 10.1 contains numerous new tools implemented to work with geodatabases at 10.1, plus some existing geodatabase functionality has been improved.

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New functionality includes the following:

- A new toolbox is available—Geodatabase Administration—that contains some tools that were previously in the Database toolbox (Upgrade Geodatabase, Upgrade Spatial Reference, Change Privileges, Compress, Migrate Storage, and Register With Geodatabase) plus the following new geodatabase tools:
    - Create Enterprise Geodatabase: Create a database and geodatabase administrator in PostgreSQL or SQL Server and enable enterprise geodatabase functionality in it, or create a tablespace and geodatabase administrator in an existing Oracle database and enable enterprise geodatabase functionality in it. This tool performs the geodatabase administrator creation, geodatabase creation, and authorization functions previously accomplished with the ArcSDE for SQL Server, Oracle, and PostgreSQL Post Installation wizard on Windows.
    - Enable Enterprise Geodatabase: Enable geodatabase functionality in an existing DB2, Informix, Oracle, PostgreSQL, or SQL Server database. This tool performs the geodatabase creation and authorization functions previously accomplished with the ArcSDE for DB2 and Informix Post Installation wizards on Windows.
    - Rebuild Indexes: Data owners can use this tool to rebuild indexes on multiple feature classes. Geodatabase administrators can use this tool to rebuild indexes on the states, state_lineages, and mv_tables_modified system tables. This tool replaces the Rebuild Index tool.
    - Analyze Datasets: Data owners can use this tool to update database statistics for multiple feature classes. Geodatabase administrators can update database statistics on all geodatabase system tables. This tool replaces the ***Analyze*** dialog box opened from the Analyze command on the dataset context menu.
    - Reconcile Versions: Reconcile then post versioned edits in the recommended order to optimize a subsequent geodatabase compress operation. This tool replaces the Reconcile Version tool, which could only reconcile one version at a time.
    - Create Versioned View: Data owners can create a versioned view (formerly called multiversioned views) with a user-specified name on a versioned feature class. If a versioned view already exists on the feature class, it is dropped and the new view created.
    - Create Database View: You can define a view on database or enterprise geodatabase table or tables.
    - Create Database User: You can create users in an enterprise geodatabase or database. This tool can be used with Oracle, PostgreSQL, or SQL Server. Users are granted privileges sufficient to create database objects. In SQL Server, the users also have privileges sufficient to read system tables containing lists of database logins and roles. In Oracle, they are created with privileges sufficient to read the database role system table.
    - Create Role: You can create a database role in an enterprise geodatabase or database and add users to the roles. This tool can be used with Oracle, PostgreSQL, or SQL Server.
- The new Create Database Connection geoprocessing tool allows you to create connections to databases or enterprise geodatabases.

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- The new ***Geodatabase Administration*** dialog box allows geodatabase administrators to view and administer user connections, locks, and versions.
- Geodatabase administrators can block new connections to the geodatabase by changing a property on the database connection in ArcGIS for Desktop.
- Dataset owners can view the locks held on their data in an enterprise geodatabase.
- You can set up your datasets to store information about edits made to the data and who added each record. This is especially helpful if you have a distributed system in which users are making edits from different locations through a feature service. You can enable editor tracking from the table or feature class context menu item (**Enable Editor Tracking**), or use the new Editor Tracking geoprocessing tool. Then, if you want to restrict access to features through a feature service, you can enable ownership-based access control on the feature service when it is published.
- New geoprocessing tools are available for creating and managing geometric networks:
  - Add Edge-Edge Connectivity Rule To Geometric Network
  - Add Edge-Junction Connectivity Rule To Geometric Network
  - Create Geometric Network
  - Remove Connectivity Rule From Geometric Network
  - Remove Empty Feature Class From Geometric Network
  - Trace Geometric Network
  - Set Flow Direction
- A new geoprocessing tool (Export Topology Errors) is available that lets you export topology errors to three feature classes, one for each type of geometry topology error.
- The new Attachments geoprocessing toolset contains the following tools to help you perform batch attachment of files:
  - Enable Attachments
  - Add Attachments
  - Remove Attachments
  - Disable Attachments
  - Generate Attachment Match Table
- Versioned views are automatically created on all data registered as versioned in ArcGIS 10.1. For existing versioned data, you can create versioned views using the Create Versioned Views command in ArcGIS for Desktop or the new Create Versioned Views geoprocessing tool or a Python script.
- The new Upgrade Dataset geoprocessing tool upgrades mosaic datasets, parcel fabrics, and network datasets to the latest ArcGIS release.
- The new Truncate Table geoprocessing tool can be used to delete all rows in a table.
- A new API is available that lets you directly access file geodatabases without using ArcObjects. See the ArcGIS Resource Center for more information.

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- New and upgraded geodatabases in SQL Server will use the SQL Server Geometry type for feature classes by default.

Improved functionality includes the following:

- Database connections are made from the Database Connection node (formerly Spatial Database Connections) in the Catalog tree. The connection dialog box itself has changed:
  - It allows you to connect to databases that do not contain geodatabase tables, functions, and procedures.
  - It simplifies connections to geodatabases.
  - Once you have provided your user name and password when connecting to a SQL Server instance or PostgreSQL database cluster, you can choose from a drop-down list of available databases to make your connection.
- The ***Privileges*** dialog box has been improved as follows:
  - You can see what privileges a user has been explicitly granted on a dataset.
  - You can grant or revoke privileges on database datasets as well as geodatabase datasets.
  - Depending on the DBMS and your permissions in it, you can see a list of database users and roles (or groups) to whom you can assign privileges.
  - You can independently grant or revoke update, insert, and delete privileges on nonversioned datasets.
  - Privileges granted on feature datasets are inherited by new objects added to the feature dataset; you no longer have to regrant privileges after adding a new object to the feature dataset.
- The Version Manager interface (which has moved to the new ***Geodatabase Administration*** dialog box) is improved to provide more information and functionality:
  - A tree view to show how versions are related
  - A list for geodatabase administrators to show the recommended order in which to reconcile geodatabase versions
  - The ability of the version owner to change privileges on multiple versions at once
  - The ability to delete a version and all its child versions
- The Register With Geodatabase tool in ArcGIS for Desktop has been altered to fully register database feature classes; you no longer have to register with ArcSDE and the geodatabase separately.
- You can now control the amount of information that is written to the replica activity log. Set the level of logging through the ***Replication Manager*** dialog box.
- You can make changes to versioned topologies without having to unversion the feature dataset in which they are stored.
- You can see who owns domains in an enterprise geodatabase by looking at the **Domains** tab of the ***Database Properties*** dialog box. A new column, Domain Owner, has been added to this interface.

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- You can rename attribute domains.
- The new Sort Coded Value Domain geoprocessing tool lets you sort the code or description of a coded value domain.
- You can rename fields in tables and feature classes.

Changes in setups include the following:

- To connect directly to a database or enterprise geodatabase, you must install the DBMS client on the ArcGIS client machine. You can download DBMS client files from the Esri Customer Care portal.
- The ArcSDE application server and administration commands are provided as downloads separately from ArcGIS for Server. Note that the ArcSDE application server and administration commands are only supported on 64-bit operating systems.
- No separate installation is needed for geodatabases in DB2 on z/OS since it does not use application server connections. The files that are needed to create a geodatabase on DB2 on z/OS have been placed in the DatabaseSupport folder of ArcGIS clients.

See What's new for geodatabases for more information.

ASCII or text file tables

The process of accessing data in delimited text files and working with them as input for a layer has been made simpler at ArcGIS 10.1. Rather than using the Microsoft OLE DB provider for Open Database Communication (ODBC) drivers and the Microsoft ODBC Text Driver for text files to access tabular data in text files, ArcGIS reads these files directly. This means that schema.ini files are no longer required to display the information from a text file. However, if a schema.ini file is present, ArcGIS will use the settings in the file to display the data.

Additionally, ArcGIS recognizes the coordinate information in the ASCII or text file as numeric fields, which can be used to either display your information as a layer or as input to tasks, such as geocoding.

There are also fewer restrictions on characters that can be used in the field names of the ASCII or text file.

See Adding an ASCII or text file table for more information.

Editing

At ArcGIS 10.1, the ArcMap editing environment contains significant improvements to working with feature templates, editing coincident features and topology, and editing parcels, as well as some general enhancements.

When creating features, working with feature templates is easier and provides you with better feedback. In addition, there is a new tool available to create polygon features.

- Feature templates are created on a layer-by-layer basis rather than for a workspace. If you start editing and no feature templates are present for a particular layer, they are created for you.
- When feature templates for editable layers are not being displayed, a message appears at the top of the ***Create Features*** window. Click it to see a list of any hidden feature templates and get an explanation of why they are not being shown.

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- The new Auto-Complete Freehand construction tool appends polygons to existing ones, creating the shape of the new polygon by drawing a line that follows the movement of your pointer.

It is easier to create and work with topology and shared features, including through map topology. There have also been enhancements to selecting and editing topological elements:

- The new ***Select Topology*** dialog box integrates the experience of using the ***Topology*** toolbar drop-down list to choose the topology and opening a different dialog box to create a map topology. You can now perform these from a single dialog box.
- Map topology now uses layer information and reflects layer properties, including name and visibility.
- The Reshape Edge tool allows you to select and reshape multiple edges at once. Use the new Topology Edit Trace tool to select multiple connected edges.
- The ***Shared Features*** window is dockable and has been enhanced.
- The ***Topology*** and ***Advanced Editing*** toolbars have been redesigned.
- Splitting and moving a topology edge has been simplified.
- The new Generalize Edge tool is used to simplify topology edges.
- You can add a rule or feature class to or remove one from a versioned geodatabase topology without having to unversion it.

ArcGIS 10.1 has a suite of new tools that are designed to help you make your data coincident. Some of these tools work with features, while others require a topology. These tools include Align To Shape, Replace Geometry, and Align Edge.

ArcGIS 10.1 includes the ability to record information about who made changes to datasets and when the edits were performed. Through Editor Tracking, an editor's user name and time stamp are stored in attribute fields directly in the dataset. Editor tracking can help you maintain accountability, enforce quality control standards, and create a log of changes that have occurred to your data.

See What's new for editing in ArcGIS 10.1 for more information.

Editing parcels

At ArcGIS 10.1, significant improvements have been made to the management and editing of parcel fabrics.

- Parcel fabric feature classes and tables can be accessed by expanding the parcel fabric dataset in ArcCatalog or the ***Catalog*** window. You can now add parcel fabric sublayers to ArcMap without having to add to the parcel fabric layer.
- Parcel fabrics or selections of parcel fabrics can be copied and appended using the new Append Parcel Fabric and Copy Parcel Fabric geoprocessing tools.
- Parcel traverses can be adjusted to eliminate closure using the Compass adjustment method, the Transit adjustment method, or the Crandall adjustment method.
- The parcel traverse tool has been further enhanced to allow you to specify starting and ending coordinates for your parcel traverse.

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- Remainder parcels in ArcGIS 10.1 can now be created from multiple, overlapping parcels instead of from a single, overlapping parcel.
- Parcel joining is enhanced to allow the cartographic integration of new parcels even when boundaries do not match or join up.
- Parcel joining has further been enhanced with the trace-link tool, which you can use to detect join links automatically along a traced boundary.
- A selection of parcels can be moved or transformed using the new Transform Parcels tool.
- Replication is now supported for parcel fabrics.
- The attributes of parcel fabric features can be edited in the ***Attributes*** window.
- The new Annotate Parcel Courses tool can be used to annotate and remove duplicate annotation from a selection of parcels. This tool is useful for managing duplicate annotation on parcel fabric boundary lines.

At ArcGIS 10.1, parcel fabrics are supported by replication.

See What's new for editing in ArcGIS 10.1 for more information.

Raster data

ArcGIS 10.1 includes many new options, tools, and functions and offers support for additional raster formats. The following is a summary of new raster data functionality:

- Overall, there have been significant improvements to display, enhance, and process various types of raster and image data in ArcGIS.
- Reading support has been added for 15 formats.
- Raster Product appears as a new data type and is designed to make adding imagery from sensors to your map simpler.
- The ***Image Analysis*** window provides mensuration tools, an interactive stretch window, and a function editor tool.
- New default rendering settings are available for rendering rasters, and the defaults have been improved.
- New geoprocessing tools have been introduced and some existing tools have been enhanced.
- New support is available to directly add and rasterize LAS data, terrain datasets, or LAS datasets in mosaic datasets.
- Batch function editing is available to edit multiple raster functions.
- There's new and improved raster functionality in ArcGIS for Server.

See What's new for rasters in ArcGIS 10.1 for more information.

Metadata

The following new and improved functionality is available for metadata in ArcGIS 10.1:

- Validation has been extended to include more metadata styles.

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- Improvements have been made to the metadata editor's table of contents to help you see if you are missing any information or the wrong type of information for your metadata style.
- A contacts manager page has been added to allow you to store frequently referenced contact information, which can be loaded into your metadata.
- A new ArcGIS to ISO 19139 translator is provided.

See What's new for metadata in ArcGIS 10 for more information.

Geoprocessing and analysis

ArcGIS 10.1 includes geoprocessing packages, numerous new geoprocessing tools, and some changes to the geoprocessing experience. The following sections provide a summary of changes and new functionality. For more information, see the "What's new in geoprocessing" book in the help. To get started, see What's new for geoprocessing in ArcGIS 10.1.

General

Create geoprocessing packages to share your geoprocessing tasks. A package consists of tasks, and each task contains a tool, the data used by the tool, and the environment settings used by the tool.

The way you publish geoprocessing services has changed. At 10.1, publish the results of your analysis directly from the ***Results*** window.

Python and ArcPy

At ArcGIS 10.1, you can program your own buttons and tools using Python add-ins. Python toolboxes are a new kind of toolbox you can create with Python.

Tools

There are numerous new tools available in ArcGIS 10.1. See "New and improved tools" section under "Geoprocessing and Analysis" for a list of them.

Services

ArcGIS for Server has been rearchitected at 10.1 to work in 64-bit architectures and use a more cloud-friendly, web services-oriented design. The following sections provide just a few highlights of new functionality in ArcGIS for Server. See What's new in ArcGIS 10.1 for Server for a more detailed list of enhancements.

Architecture

At 10.1, the following changes have been made in the ArcGIS for Server architecture:

- ArcGIS for Server runs exclusively as a native 64-bit application.
- The SOM and SOC have been replaced with a single component, the GIS server.
- ArcGIS for Server local (DCOM) connections are no longer supported. All communication with GIS services is through HTTP using SOAP or REST.

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- ArcGIS for Server can host services out of the box and does not require a web server on installation. You can optionally connect it to your own web server using a new component called Web Adapter.
- The new REST-based ArcGIS Server Administrator API allows you to administer your ArcGIS Server site through scripting. With this API you can automate tasks such as creating a site, adding machines, publishing services, querying the logs, and starting and stopping services.

ArcGIS Server on Amazon Web Services

Amazon Machine Images (AMI) that can be used to deploy ArcGIS for Server on Amazon Elastic Compute Cloud (EC2) are now available with the following operating systems and database management systems: for the Linux computing platform in addition to Windows. The new ArcGIS for Server architecture allows better support for cache creation and geoprocessing on Amazon EC2.

- ArcGIS Server on Ubuntu Linux with PostgreSQL
- ArcGIS Server on Windows with SQL Server Standard
- ArcGIS Server on Windows with SQL Server Express

There is also a new application—ArcGIS Server Cloud Builder on Amazon Web Services—to deploy your ArcGIS Server on Amazon Web Services site, create templates, make backups of your sites, or delete sites.

Publishing

You can publish services directly from ArcGIS for Desktop, and you now have the option to copy the relevant data to the server at the time you publish. This is especially helpful for distributed deployments or cloud deployments where you may not have permissions to directly log in to the server.

A new service definition file type (.sd) helps with this effort. It contains the complete definition of a GIS service. An SD file can be saved and copied between machines.

All map services are now required to use the optimized drawing engine for ArcGIS Server that was introduced as an option at 9.3.1.

Web ADF

ArcGIS 10.1 for Server is the last release to support ArcGIS Server Web ADF for Microsoft .NET and Java. As a result, the Web ADF Applications Manager has been moved to a separate installation. New web applications should be written as JavaScript, Flex, or Silverlight applications.

Additionally, ArcGIS for Server local (DCOM) connections to Web ADF applications are no longer supported, and Web ADF applications using nonpooled services are no longer supported. Exceptions are connections to pre-10.1 services.

Mobile GIS

ArcGIS smartphone applications and software development kits (SDKs), are on shorter release cycles than ArcGIS, but the following mobile products all have new functionality available in the ArcGIS 10.1 timeframe:

- ArcGIS for Android

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- ArcGIS for iOS
- ArcGIS for Windows Phone
- ArcGIS for Windows Mobile
- ArcPad

See What's new for Mobile GIS for specific versions and functionality.

ArcGIS extensions

The following is a summary of new functionality and changes to ArcGIS extensions:

ArcGIS 3D Analyst extension

At ArcGIS 10.1, the ArcGIS 3D Analyst extension has expanded online integration of 3D. It includes an active blog and a template gallery from which you can download data to practice using 3D data and scenarios.

Additionally, 3D Analyst includes improved support for 3D city and campus-level data for virtual cities and virtual campus models. The editing experience is improved, as is display for the maintenance of urban landscapes and visualization support for large datasets.

You can also expect a vast growth in the support for lidar in 3D Analyst—especially in the development of the LAS dataset. Now ArcGIS 10.1 reads LAS files natively, thereby providing immediate access to lidar data without the need for data conversion or import. Many new optimization methods are available to manage, display, and analyze these las files.

There are also numerous new geoprocessing tools for working with 3D data. See What's new in ArcGIS 3D Analyst 10.1 for more information.

ArcGIS Data Interoperability extension

At ArcGIS 10.1, the Data Interoperability extension has been updated to run on the new FME 2012 spatial data transformation platform by Safe Software. In addition to new transformers and increased support for lidar, the extension is now installed with the following independent setups:

- ArcGIS Data Interoperability extension for Desktop
- ArcGIS Data Interoperability extension for Server

You can install both setups on the same 64-bit machine and run them simultaneously.

The ArcGIS Data Interoperability extension for Server requires its own license and it is not interchangeable with a desktop license.

See What’s new in the Data Interoperability extension for more information.

ArcGIS Geostatistical Analyst extension

There are two new interpolation methods available in ArcGIS Geostatistical Analyst extension:

- Areal interpolation, which extends kriging theory to data averaged or aggregated over polygons
- Empirical Bayesian kriging, which uses repeated simulations to account for the error introduced by estimating the semivariogram

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There is a new normal score transformation available: the multiplicative skewing approximation method for normal score transformation. This is now the default transformation for simple kriging.

Simple kriging is now the default kriging method for Geostatistical Analyst.

Geostatistical Analyst tools now support the mask environment.

See What's new in ArcGIS Geostatistical Analyst 10.1 for more information.

ArcGIS Network Analyst extension

There are five new geoprocessing tools for the ArcGIS Network Analyst extension extension at 10.1:

- Generate Service Areas
- Solve Vehicle Routing Problem
- Update Traffic Data
- Update Traffic Incidents
- Copy Traversed Features

There is a new Network Analyst module within the ArcPy site package; also, support for Python scripts is now available for field and script evaluators.

Additional new functionality for Network Analyst includes the ability to use the hierarchy of a network to solve service areas; the expansion of historical traffic data support to all solvers; support for live traffic data feeds for all solvers; an expanded restrictions model that has the ability to not only prohibit network elements entirely but also to merely avoid or even prefer them; plus several new features for the ArcGIS for Server Network extension.

See What's new in ArcGIS Network Analyst 10.1 for more information.

ArcGIS Schematics extension

See What's new in ArcGIS Schematics 10.1 for more information.

ArcGIS Spatial Analyst extension

See What's new in ArcGIS Spatial Analyst 10.1 for more information.

ArcGIS Tracking Analyst extension

There are two new dockable windows available for the ArcGIS Tracking Analyst extension in the ArcGIS 10.1 release:

- Track Manager allows you to view and interact with the tracks and tracking features contained in your map.
- Tracking Services Monitor allows you to view and monitor the status of your real-time tracking services.

Also, there are two new geoprocessing tools available for the ArcGIS Tracking Analyst extension in the ArcGIS 10.1 release:

- Track Intervals To Feature

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- Track Intervals To Line

See What's new in ArcGIS Tracking Analyst 10.1 for more information.

Maplex

The Maplex for ArcGIS extension functionality has been moved into the core ArcGIS for Desktop product and is referred to as the Maplex Label Engine.

Industry solutions

Defense and intelligence

In ArcGIS 10.1, data in military feature unit layers distributed through ArcGIS.com are symbolized using unique values based on two fields. For more information, see What's new for defense and intelligence in ArcGIS 10.1.

Geocoding

The following new functionality is available for geocoding at ArcGIS 10.1:

- You can create and share locator packages, which are compressed files containing one locator or a composite locator along with its participating locators.
- You can publish geocode services directly from a locator or composite locator in ArcGIS for Desktop.
- A new ***Address Locator Properties*** dialog box is available, which allows you to modify the settings of a locator.
- The ***Geocoding*** toolbar and ***Find*** dialog box contain a new option— **Use Map Extent**—which allows you to search for locations that are relevant only to the current map extent.
- Two new address locator styles have been added: US Address-Street Name and US Address-City State.
- There are two new geoprocessing tools in the Geocoding toolbox: Consolidate Locater and Package Locator.

See What's new for geocoding for more information.

Developing

A new set of software developer kits (SDKs)—ArcGIS Runtime SDKs for Windows and LInux—will be in beta release when ArcGIS 10.1 is released.

Enhancements have been made to the SDKs available for mobile applications.

There have been a few changes to ArcObjects (.NET) enumerations and architecture; new features, such as the ability to renew or upgrade SDKs silently and a streamlined deployment model for server object extensions; new samples are available; and enhancements have been made to libraries throughout the software.

See What's new for developers for more information.

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ArcGIS license administration

At 10.1, renewing or upgrading your license has been simplified and improvements have been made in License Server Administrator.

Automatic license upgrade or renewal

ArcGIS for Desktop, ArcGIS Engine, and License Manager now allow you to upgrade older versions of licenses or renew expired licenses on your machine without having to reauthorize your software. For ArcGIS for Desktop, once the software is installed, you are prompted to upgrade or renew licenses when ArcGIS Administrator is launched. For ArcGIS Engine, licenses can be renewed by launching ArcGIS Administrator, opening the Support Operations folder, then clicking Renew or Upgrade, which launches Authorization Wizard. Authorization Wizard then checks Esri Customer Service for upgradable or renewable licenses and guides you through the process.

Better usage visibility in License Server Administrator

License Server Administrator now displays transferred and checked out licenses in addition to borrowed licenses in the ***Availability*** window.

Selective deauthorization

For ArcGIS for Desktop and ArcGIS Engine Concurrent Use and Single Use licenses, you can now choose which licenses to deauthorize instead of deauthorizing all licenses by default.

Documentation

At ArcGIS 10.1, if you pause your pointer over a control in a toolbar or a menu item, you now see longer, more descriptive ToolTips rather than the single line ToolTips you saw previously. Some of these ToolTips contain a link to the installed ArcGIS for Desktop Help so you can access more information. These ToolTips replace the pop-up context sensitive help that was previously accessed through the **What's This** help tool in the ***Standard*** toolbar. That tool has been removed at 10.1 and the context sensitive help has been retired. ArcObjects developers can specify these new style ToolTips for controls they create, and include links in the ToolTips either to CHM files or web pages.

Pop-up context sensitive help in dialog boxes has also been retired at 10.1 and the question mark (?) control in the top-right corner of the dialog boxes has been removed. Instead, links to the installed Desktop Help topics have been added to many key dialog boxes. The removal of the pop-up context sensitive help, which was based on the obsolete Microsoft WinHelp (HLP) format, improves the compatibility of ArcGIS with Windows 7.

In addition, the ArcGIS Resource Center has been reorganized around functionality to make it easier to find all the online resources for a particular aspect of ArcGIS.

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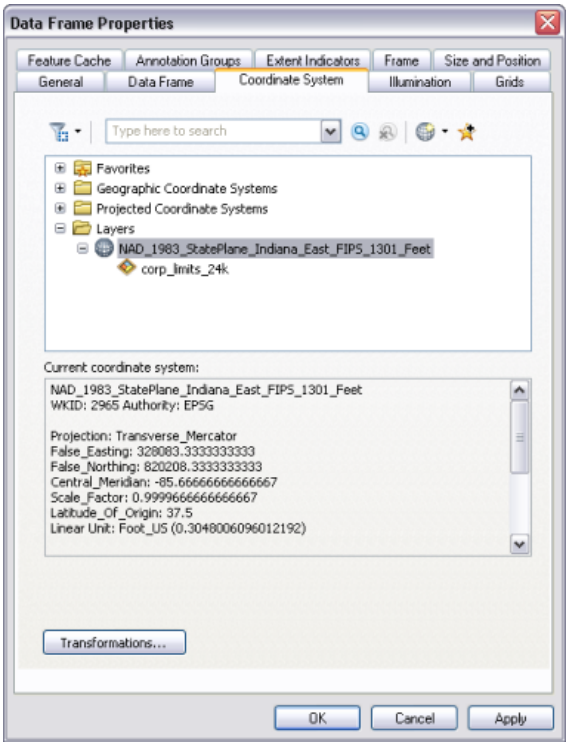
What's new in ArcMap 10.1 basics

Coordinate system

Throughout the ArcGIS software there are many different locations where spatial references are displayed, picked, created, and modified. Previously, these locations may have had different workflows. At 10.1 there is one way provided to work with spatial references.

Learn more about specifying a coordinate system



The ability to set a spatial filter has been added to filter the list of Spatial References based on the extent provided, whether it be the Current Visible Extent, an Outline of Features, an Outline of Selected Graphics, or a Custom Extent.

Use the text input box to search by name or well-known id, also known as factory code. This search string can be multiple words separated by spaces. It will filter based on folder name, spatial reference name, and also factory code. The present search string will be displayed in the input box.

The spatial filter and the search string narrow down results from one another's filters. For example, if you perform a text filter on Projected, then a spatial filter on the current extent only, projected coordinate systems for that current extent will be returned.

Datum transformation

Converting correctly between two geographic coordinate systems requires a geographic or datum transformation. At 10.1 a compound datum transformation is now supported in the user interface. To specify a geographic transformation for the data, click the **Transformations** button and select the desired transformation, or create a custom or compound transformation. ArcMap doesn't automatically choose a

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transformation for you because there are often multiple transformation choices that could be applied between two geographic coordinate systems. At 10.1 the transformations presented in the drop-down list are sorted by suitability for the layer's extent.

Dot density renderer

At 10.1 the dot density renderer has been enhanced to allow you to specify how the dot density will be maintained and also to specify a seed for the random placement of the dots.

After specifying the dot representation you can now maintain the density of the dots while navigating your map. Maintaining the dot density will preserve the visual impression of the map as the scale changes. You have two options to maintain density:

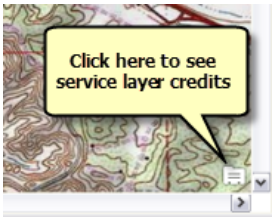
- **By size**—As you zoom in the dot size increases.
- **By value**—As you zoom in the value represented by a dot decreases, and more dots are drawn on the map.

If you specify to display the dots with a nonfixed placement, the dots will be placed randomly each time the map is refreshed. When using this option you can set the Seed for the placement. The Seed is an integer number that initializes the random number generator. Choosing the same number will give you the same result of dot placement as long as your data is identical.

Learn more about using dot density layers

Service layer credits

The credits of an ArcGIS Server or third-party tiled service layer (such as Bing Maps) are available to you so that you can display them in your printed or exported map. When you work with the service layer in Data view you will see an icon located in the lower right corner of the data frame. If you are working with Bing Maps you'll see the Bing logo in the lower left corner of the map. The logo is a permanent part of the Bing Maps image. You cannot remove it.



Clicking this icon opens a separate window that lists all the credits for service layers currently turned on in your data frame.

Once you export the data frame, or switch to Layout view, the icon is replaced with the realized text of the service layer credits. You cannot move or change this text. However, you have the option of replacing this text with the **Service Layer Credits** dynamic text element. This is available from the main menu at **Insert** > **Dynamic Text**. When you initiate this dynamic text element the realized text in the data frame will no longer display. You can work with the **Service Layer Credits** dynamic text element in the same way you can work with other dynamic text elements and position, resize, and change the text symbol as you see fit.

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Symbols and styles

Picture symbol

The picture symbol used by marker, line, and fill symbols now supports .png, .jpg, .jpeg, and .gif file types.

Analyze map

Analyzing your map helps you to improve the drawing performance of your ArcMap documents by generating a list of potential display performance issues.

Learn more about analyzing your map

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for text in ArcGIS 10.1

Labeling and annotation

New Label Expression parser

At ArcGIS 10.1 there has been a new label expression parser added. You can now use Python to add logic to your label expressions, including conditional logic and looping. For example, you could produce labels that have only the first letter of each word capitalized, regardless of how the text strings are stored in the attribute fields.

Learn more about_building_label_expressions

Internationalization

Improved internationalization support for text display of complex scripts (for example, Arabic, Hebrew, and Thai).

Default label engine and font name

At ArcGIS 10.1 you now have the ability to set a default label engine and font name for your .mxds.

Learn more about setting a default label engine and font name

Maplex Label Engine

The Maplex for ArcGIS extension functionality has been moved into the core ArcGIS for Desktop product and is referred to as the Maplex Label Engine.

Label density

A new **Label Density** tab has been added to the ***Placement Properties*** dialog box to organize the parameters that affect the density of labels. The following labeling parameters are on the tab:

- Remove duplicates
- Repeat label (for lines and polygons)
- Label buffer
- Minimum feature size (for lines and polygons)
- Label largest feature part for polygons
- Connecting line segments (for lines only)

Learn more about label density

Line connection and multipart polygons

The global label placement parameters controlling line connection and multipart polygons have been moved from the general Maplex label options to the label class level. This allows the parameters to be set per label class instead of for the data frame.

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Learn more about connecting line segments for labeling
Learn more about labeling the largest feature part for polygons

Spread words in polygon

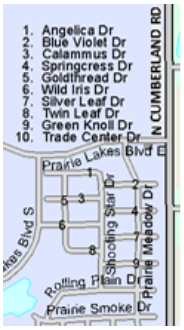
The spread words parameter can now be applied to polygon labels. It is available for the Regular Placement style and the River Placement style.

Learn more about spreading the words of a label inside a polygon

Key numbering

Key numbering has been added as a label-fitting strategy. In areas of a map where there is a high density of features (for example, small subdivisions or groups of buildings, such as a museum or university), you can use key numbering to provide a table showing the key numbers and the original labels.

Learn more about key numbering



Managing white space in a label

The ability to control the white space that is used in your label has been added to the Label Expression dialog box. These settings allow you to remove extra spaces and line breaks from your labels.

Learn more about controlling white space in your labels

The images below illustrate how the **Remove extra spaces from label** and **Remove extra line breaks from label** options affect how a label expression is displayed. In the label expression below, you can see that spaces have been used to spread out the top line of the label, and several new lines have been added to expand the stack. When the white space options are unchecked, you will see the image on the

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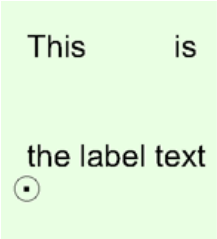
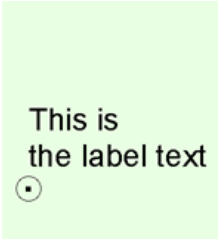
left where the white space is maintained. When the options are checked, you will see the image on the right where the white space has been removed from the label.

```
"This          is" & vbnewline  & vbnewline & vbnewline & "the label text"
```





Offsetting stacked labels

The ability to stack a label on either side of a line feature when you are using an offset label style has been added. You can access this parameter through the Regular Placement style options.

Learn more about offsetting line labels

The images below illustrate the difference in placement when **Allow stacked labels to straddle lines** is enabled. The image on the left illustrates how the offset placement style offsets the stacked label to one side of the street feature. The image on the right shows how the Ventanna Ln label straddles the street feature once **Allow stacked labels to straddle lines** is checked.

Labeling line features near junctions and borders

The ability to label line features near junctions and the map border has been added to the repeat line labels parameter. This is useful when using Data Driven Pages to create map sheets as they often have features that cross the entire map and continue on into the next sheet. Labeling near the map border in this case will make interpretation much easier.

Learn more about repeating labels along lines

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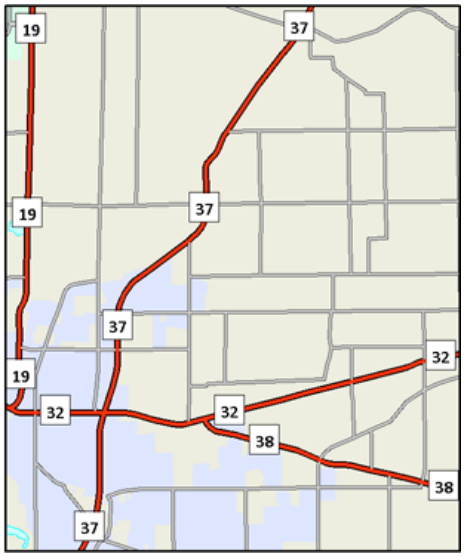
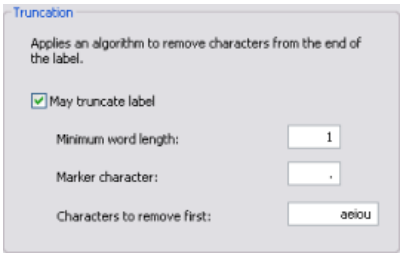


Truncation

Options have been added to the truncation parameter to allow you control over what characters are removed first, the minimum word length, and the marker character.

Learn more about truncating labels



Offset point label from exact symbol outline

An option has been added to the point label offset parameter to allow you to measure the offset from the exact symbol outline. The offset is measured from the boundary of the feature symbol to the outer edge of the label. The boundary for simple geometric symbols is the edge of the symbol; for graphic and font symbols, the bounding rectangle around the symbol is the symbol boundary unless you check the **Measure offset from the exact symbol outline** check box.

Learn more about offsetting point labels

The images below illustrate the difference in placement when **Measure offset from the exact symbol outline** is enabled. The image on the left is a default offset. The image on the right is measuring the offset from the exact symbol outline.

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Removing duplicate labels

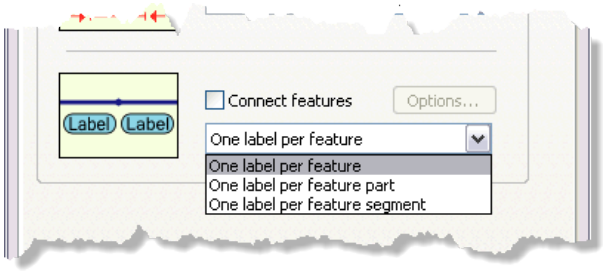
The Search Radius value of 0 is now a special default value that uses the extent of the map from which to remove duplicates.

Learn more about removing duplicate labels

Line labeling options added

The line options from the Standard Label Engine (one per feature, one per feature part, and one per feature segment) have been added to the line connection parameter.

Learn more about placing multiple labels per line feature



Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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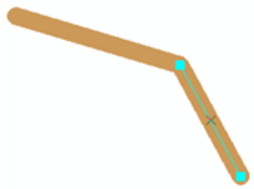
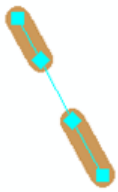
What's new for representations in ArcGIS 10.1

New geometric effects

Three new representation line geometric effects have been added to ArcGIS 10.1.

Click the links to see a detailed description of each parameter for the geometric effect.

Input geometry	Output geometry	Geometric effect	Description	Example
Line	Line	Extension	Creates a dynamic line that is extended from either the beginning or the end of the line feature at a specified deflection angle and length.	
Offset tangent	Creates a dynamic line that is offset from either the beginning or the end of the line feature at a specified distance.			
Suppress	Suppresses sections of line features between pairs of representation control points.			

List of geometric effects

Learn more about working with geometric effects

Marker placement styles

Representation marker placement styles have been updated to include a check box to toggle clockwise rotation.

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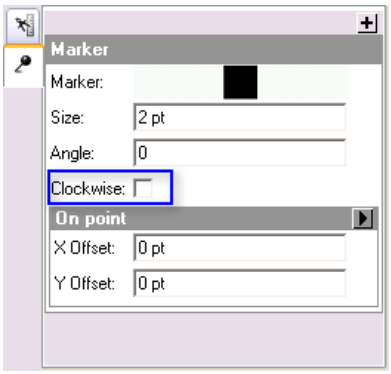

Learn more about working with marker placement styles

Representations stored in styles

Representation rules and representation markers stored in a style now support tags for searching. The representation rules and representation markers in ESRI.style, C2 Military Operations.style, and Military METOC.style have been populated with search tags indicating representation composition and color.

Learn more about organizing representation rules with styles

Related Topics

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What's new for automating map workflows in ArcGIS 10.1

Map automation with Python and arcpy.mapping

There were significant additions to arcpy.mapping for the 10.1 release, including:

- Symbology properties for the following renderers can now be automated: graduated colors, graduated symbols, unique values, and classified rasters.
- An Export Report function is available that allows you to automate the generation of reports.
- ArcGIS 10.1 provides access to a layer's time properties to perform analysis over time. You can also enable time on layers.
- The arcpy.mapping module now allows you to update the individual legend item styles in a Legend Element on a page layout by using the UpdateItem method. You can also remove legend items using the RemoveItem method.
- Two new functions exist to automate the map service publishing in a Python script. The CreateMapSDDraft function has been introduced to create draft service definition files. Secondly, the AnalyzeForSD function has been added to analyze service definition drafts for errors that might prevent publishing.
- ArcGIS provides support for printing WebMaps from the ArcGIS web APIs. The ConvertWebMapToMapDocument function will convert a WebMap that you intend to print or export to a map document. Once the document is converted, the full state of the WebMap exists in the map document.
- Text elements and graphic elements on a page layout can now be cloned.

A detailed list of all additions made at 10.1 is below.

New top-level arcpy.mapping functions:

- **AddTableView**—Provides the ability to add a table to a data frame within a map document (.mxd).
- **AnalyzeForSD**—Analyzes Service Definition Draft (.sddraft) files to determine suitability and sources of potential performance issues before converting a Service Definition Draft file to a Service Definition (.sd) file.
- **ConvertWebMapToMapDocument**—Converts a WebMap (in JSON format) that you intend to print or export to a map document. The map document can be further modified before finally being printed or exported.
- **CreateGISServerConnectionFile**—This function creates a connection file that can be used to connect to a GIS Server.
- **CreateMapSDDraft**—Converts Map Document (.mxd) files to Service Definition Draft (.sddraft) files.
- **ExportReport**—Exports a formatted, tabular report using data from layers or stand-alone tables in a map document along with the report template information that is provided in a report layout file (.rlf).
- **ListBookMarks**—Returns a Python list of named tuples that provide access to each spatial bookmark's name and extent.

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- **ListStyleItems**—Returns a Python list of StyleItem objects. A referenced legend item from a style file (.style) can then be used to update already existing legend items in a layout.
- **RemoveTableView**—Provides the ability to remove a table within a data frame in a map document (.mxd).
- **TableView**—Enables you to reference a table in a workspace as a TableView object so that it can be added to a map document.
- **UpdateLayerTime**—Provides the ability to update a layer's time properties for a layer in a map document (.mxd) by extracting time properties from a source layer.

Updated top-level arcpy.mapping functions:

- **PrintMap**—Added image_quality parameter.

New arcpy.mapping classes:

- **GraduatedColorsSymbology**—Provides access to different properties that allow you to change the appearance of a layer's graduated colors symbology.
- **GraduatedSymbolsSymbology**—Provides access to different properties that allow you to change the appearance of a layer's graduated symbols symbology.
- **LayerTime**—Provides access to time management operations for time-enabled layers.
- **RasterClassifiedSymbology**—Provides access to different properties that allow you to change the appearance of a layer's raster classified symbology.
- **StyleItem**—Provides access to StyleItem class properties.
- **UniqueValueSymbology**—Provides access to different properties that allow you to change the appearance of a layer's unique value symbology.

Updated arcpy.mapping classes:

- **DataDrivenPages Class**
  - **exportToPDF()**—Added optional parameter called show_selection_symbology.
  - **dataFrame**—Returns a reference to the data frame the index layer resides within a Data Driven Pages enabled map document.
  - **indexLayer**—Returns a reference to the index layer in a Data Driven Pages enabled map document.
  - **pageNameField**—Returns a field object that represents the field used in the index feature class when setting up Data Driven Pages.
  - **selectedPages**—Returns a Python list of index numbers that represent selected index layer features in a Data Driven Pages enabled map document.
- **GraphicElement Class**
  - **clone()**—Provides a mechanism to clone an existing graphic element on a page layout.
  - **delete()**—Provides a mechanism to delete an existing graphic element on a page layout.

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- **Layer Class**
  - **isBroken**—Returns True if a layer's data source is broken.
  - **isNetworkAnalystLayer**—Returns True if a layer is an ArcGIS Network Analyst layer type.
  - **maxScale**—Provides the ability to set or get the layer's maximum scale threshold.
  - **minScale**—Provides the ability to set or get the layer's minimum scale threshold.
  - **symbology**—Returns a reference to the layer's symbology class. Each supported layer symbology class has its own unique set of properties.
  - **symbologyType**—Returns a string that represents the layer's symbology class type.
  - **time**—Returns the LayerTime class that provides access to time properties of time-enabled layers.
- **LegendElement Class**
  - **listLegendItemLayers()**—Returns a list of Layer object references for every legend item in a legend.
  - **removeItem()**—The removeItem method allows you to remove a legend item from a legend on a layout.
  - **updateItem()**—The updateItem method allows you to update a number of individual properties for a legend item within a legend on a layout.
  - **isOverflowing**—Returns True if the legend items can't fit when the Fixed Frame option is set within legend properties.
- **MapDocument Class**
  - **activeDataFrame**—Returns a DataFrame object that represents the currently active data frame in a map document (.mxd).
  - **isDDPEnabled**—Returns True if the map document is Data Driven Pages enabled.
  - **pageSize**—Provides the ability to get the layout's page size. It returns a named tuple with the properties width and height.
- **PDFDocument Class**
  - **deletePages()**—Provides the ability to delete one or multiple pages within an existing PDF document.
- **TableView Class**
  - **isBroken**—Returns True if a tableview's data source is broken.
- **TextElement Class**
  - **clone()**—Provides a mechanism to clone an existing text element on a page layout.
  - **delete()**—Provides a mechanism to delete an existing text element on a page layout.
  - **fontSize**—The element font size in page units.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for page layouts and data frames in ArcGIS 10.1

Legends

The legend has been enhanced to be dynamic. That is, legends support the display of only features in the visible extent and features counts. The legend can now have a fixed area on the page. The frame size will remain fixed and as legend items are added or removed, they will adjust to fit inside. Dynamic legends are useful for conventional page layouts as well as Data Driven Pages.

Learn more about dynamic legends

North arrows

A new True North option has been added as well as calibration angle enhancements.

Learn more about north arrows

Scale bars

Scale bars have been enhanced to allow you to set the zero point as the anchor so that multiple, different unit, scale bars can be aligned with each other.

Learn more about scale bars

Dynamic text

Dynamic text tags have been added for Data Driven Pages Display Expression. This is the value of the **Display Expression** set in the **Display** tab of the ***Layer Properties*** dialog box. Using the display expression, you can create a more complex dynamic text element.

Dynamic text tags have been added for Data Driven Pages Attribute. This is the value of the selected index layer attribute for the given page. If subtypes or attribute domains are being used, you have the option of using the domain value or description.

Navigating Data Driven Pages

You can now use the index layer's attribute table to navigate your pages using the **Go to Page** command off the row context menu.

Learn more about Navigating Data Driven Pages

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for sharing maps and data in ArcGIS 10.1

ArcGIS for Desktop offers a unified publishing experience

At ArcGIS 10.0, you could publish GIS resources such as maps, tools, and locators to ArcGIS for Server using ArcGIS for Desktop or Manager. The method that you chose for publishing was based on a variety of factors, such as your level of permissions, experience, or personal preference. At 10.1, GIS resources that you attempt to publish to an ArcGIS Server are put through a more rigorous analysis process to make sure they are ready to be exposed on the web. You'll need to analyze your GIS resources in ArcGIS for Desktop before you can publish them to ArcGIS Server.

The publishing of services to an on-premises or cloud-based ArcGIS for Server can be invoked directly from the main menu in ArcGIS for Desktop by choosing **File** > **Share As** > **Service**. Additionally, you can right-click certain GIS resources, such as a geodatabase, in ArcCatalog or the ***Catalog*** window in ArcGIS for Desktop and choose **Share As Service**. The items on the ***Share As Service*** wizard will help you configure, analyze, and publish your GIS resource to an ArcGIS Server as a service.

To learn more about how to leverage the unified publishing experience, see the topic About publishing services.

Packaging Tile caches, GP tasks, and Address locators

At ArcGIS 10.0, you could package GIS resources such as maps and layers using ArcGIS for Desktop. You could share these packages with others inside or outside your organization either by e-mailing the package, by copying the package to a well-know share on your network, or by uploading the package to ArcGIS Online. At 10.1, you can package Tile caches, GP tasks, and Address locators and share them in a manner similar to map and layer packages.

Learn more about sharing geoprocessing workflows
Learn more about sharing your address locator as a locator package
Learn more about sharing tile packages

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for temporal data in ArcGIS 10.1

Visualizing data updates in live mode

In ArcGIS 10.1, you can visualize the most current updates to your temporal data using the live mode on the time slider. Visualizing the most recent updates to your data can be useful when you are tracking the movement of animals or monitoring the flow in the streams of your watershed. Depending on how often data is being updated, using the live mode will enable you to look at the location of the animals every few seconds or check the flow at various gauging stations every minute.

Learn more about visualizing data updates using the live mode

Working with time window

In ArcGIS 10.1, when visualizing temporal data using the time slider, you can configure the time window to either show all the data that lies within the time window or exclude the data that lies at the start or end time of the time window. Excluding the data at the start and end time of the time window removes the possibility of temporal data being repeated in consecutive time windows.

Learn more about setting the time window for the time slider

Adding time as text in the display

In ArcGIS 10.1, you show the time value as a text stamp in the display of ArcMap, ArcScene, or ArcGlobe. This is particularly useful when you want to include time as part of a printed or exported map image or video. Depending on your preferred view for working with time data, you can add time text to the data view as well as the page layout view.

Adding time text to the map

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for reporting in ArcGIS 10.1

Report automation with ArcPy

An Export Report function is available that allows you to automate the generation of reports.

Related data

For data that participates in a relationship class or relate, ArcGIS 10.1 allows you to access the related records and generate a report that includes attribute information from related datasets. In Report Designer, simply add a RelatedReport element to your report and use the other design elements to customize the format of the related data.

Working with images in reports

There are now 3 ways that you can define the source for an image in your report. You can base the image on a text field containing the path to the file or from a raster field. You can set the image source to a file path on a local drive, network location or on the web. You can also embed the image as a static picture. With the new ability to add related reports, you can also source images from related tables or from Attachments.

Dataset options

When creating a report, you can now choose to filter the data source for the report based on the visible extent of the current map. This means that only the attributes of the visible features in the map for the chosen layer will be used in the report.

Calculated fields

You can calculate fields that are not bound to existing fields in the report. Unbound fields allow you to use other unbound fields to generate dynamic content in the report.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new in ArcGIS for Desktop Search?

Support for Spatial Search

You can now search for your data spatially. Conceptually, a spatial search is simply adding geographic constraints to your search query. When you enable spatial search, the search results are tied to the current visible extents of your map. As you zoom/pan your map, the search results get updated to show the relevant data within (or overlapping) your current visible extents. The behavior is similar to searching for restaurants or other landmarks in Google maps. As you zoom/pan your Google map, it automatically refreshes results in the current visible extents. Search also supports text-based spatial search, meaning you can search for relevant data using geographic names. For example, you can type in a query like `Data in Paris, France`, and ArcGIS figures out the spatial extents of Paris, France, and returns results that match the extents of Paris, France.

Sorting and Grouping of search results

You can now sort your search results using a variety of choices. By default, search results are sorted by relevance. You can change the sorting order any time to meet your specific needs. In addition to sorting, you can group search results by data type. For example, you can quickly examine the breakdown of your search results by data type and pick a subset of the data types that are of interest to you to narrow down your search results.

Synonyms support

Synonyms are a group of words that have roughly the same meaning in a given context. When you search for a word, you get results that match the exact word. Synonyms support extends the search to contain words with the same or similar meaning. For example, if you search for `roads`, you may want to find hits not only for the word `roads` but also relevant results that contain words like `routes` or `streets`. The built-in synonyms support is a generic synonyms list and not specific to GIS terms. You can customize synonyms to meet your organization's specific needs using user-defined synonym support.

Other enhancements

The look and feel of the search results has been enhanced to show thumbnails. Also, a context menu has been added with several actions that you can perform on search results. Indexing options have been improved to optionally generate thumbnails while you index your data.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1
Learn more about Using search in ArcGIS

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What's new for geodatabases in ArcGIS 10.1

ArcGIS 10.1 greatly improves your experience working with enterprise geodatabases and the data they contain. Version 10.1 provides new tools to work with feature classes, geometric networks, topologies, and query layers, plus some existing geodatabase functionality and tools have been improved, such as the Database Connections and Privileges dialog boxes.

All of this, plus numerous other enhancements, is described in the following sections:

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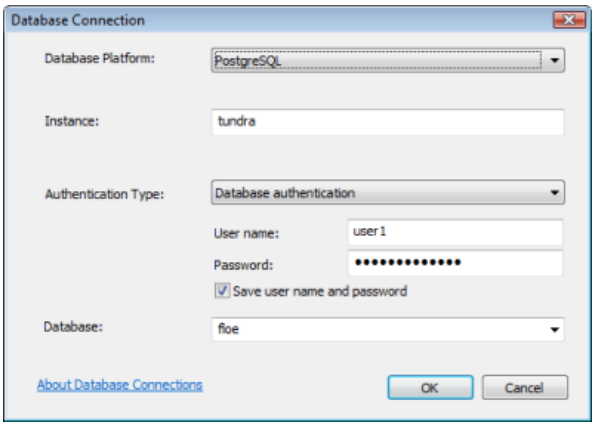
Connections from ArcGIS

Improved enterprise geodatabase connections

At ArcGIS 10.1, the ***Database Connections*** dialog box has been simplified to require less input to make a connection, and functionality has been expanded to allow you to connect to any supported database, even if it does not contain an enterprise geodatabase.

Choose the database you want to connect to, then provide connection information. The following is an example of connecting to a PostgreSQL database:



Access this dialog box from the Database Connections node (formerly the Spatial Database Connections node) in the Catalog tree. For more information on database connections, see Database connections in ArcGIS for Desktop.

Administrators can create a connection file that contains the necessary information and share it with other users. See Preconfiguring connection files for more information.

In addition, the new Create Database Connection geoprocessing tool allows you to create database and geodatabase connections. It takes the same inputs as the ***Database Connections*** dialog box, plus lets you define the version to use when connecting to a geodatabase. This tool can be found in the Workspaces toolset of the Database Administration toolbox.

If you want to create a connection using an ArcSDE service, use the Create ArcSDE Connection File geoprocessing tool.

Because you can now connect to databases from the ***Database Connections*** dialog box or Create Database Connection tool, the ***Add OLE DB Connection*** dialog box has been removed from the Catalog tree.

Update password on connection

If your database password is set to expire, ArcGIS 10.1 will intercept the warning or error returned from the database and provide you with a dialog box allowing you to create a new password.

Update license key on connection

If you have an Esri Developer Network or Educational Site License, your software license keys must be updated periodically. License information is stored in enterprise and workgroup geodatabases. Therefore,

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when your license expires, you must also update the license in your geodatabases. At ArcGIS 10.1, when the geodatabase administrator connects to a geodatabase that contains an expired license, a dialog box is returned to allow the geodatabase administrator to specify a current ArcGIS for Server license.

Create an enterprise geodatabase

If you need the advanced capabilities of the geodatabase, you can enable that functionality in your IBM DB2, Informix, Microsoft SQL Server, Oracle, or PostgreSQL database directly from ArcGIS.

At ArcGIS 10.1, geodatabase administrators can create an enterprise geodatabase in a supported database management system using one of the following:

- The Enable Geodatabase database connection context menu item, which opens the Enable Enterprise Geodatabase tool
- The Enable Enterprise Geodatabase geoprocessing tool, which adds a geodatabase to an existing database and authorizes it
- The Create Enterprise Geodatabase geoprocessing tool, which can create both the database and geodatabase in PostgreSQL or SQL Server and allows you to create a geodatabase and specify certain storage information in Oracle
- A Python script to create a geodatabase or enable geodatabase functionality in an existing database

Connect from the tool or script to the DBMS and log in as a user with the required privileges to create or enable a geodatabase. See one of the following topics for more information:

Creating an enterprise geodatabase
Enabling geodatabase functionality in an existing database

New ArcGIS tools to administer enterprise geodatabases

There are several new geoprocessing tools available in the Geodatabase Administration toolset (formerly the Database toolset) to facilitate the creation and administration of enterprise geodatabases. Two of those were mentioned in the previous section. Additionally, the new ***Geodatabase Administration*** dialog box provides geodatabase administrators with the ability to monitor and manage user connections, locks, and versions. All this new functionality is described below:

Manage versions using the redesigned Version Manager

The redesigned Version Manager has been moved into the Geodatabase Administration dialog box and includes the following new features:

- A tree view that lets you see how versions are related
- The ability to filter for a specific transactional or historical version, versions that could prevent the DEFAULT version from compressing to state 0, or versions owned by a specific user
- The ability to see all the properties of a selected version without having to open a separate dialog box
- A list recommending the order in which versions should be reconciled

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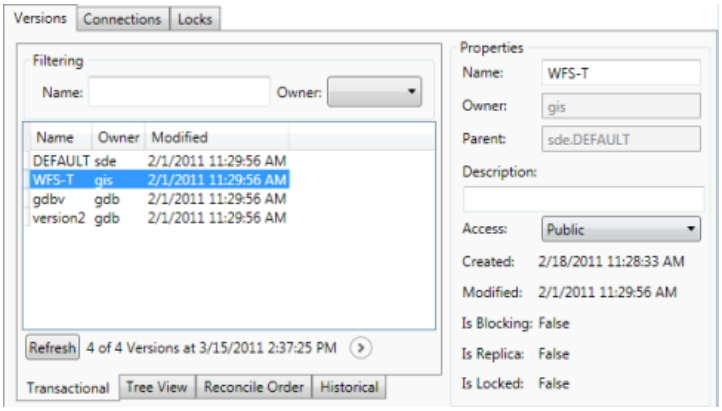
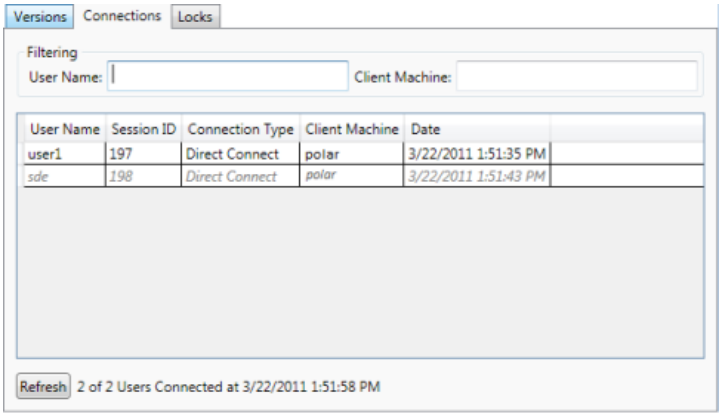


The recommended reconcile order list is only available to the geodatabase administrator, but all other functionality is available to nonadministrator users.

View and remove connections from a geodatabase

Geodatabase administrators can see which clients are connected to an enterprise geodatabase and remove connections from the geodatabase using the **Connections** tab of the ***Geodatabase Administration*** dialog box.



See the topic appropriate to your database for information on removing user connections:

- Removing connections from a geodatabase in DB2
- Removing connections from a geodatabase in Informix
- Removing connections from a geodatabase in Oracle
- Removing connections from a geodatabase in PostgreSQL
- Removing connections from a geodatabase in SQL Server

If you want to script this functionality, you can use the ListUsers and DisconnectUser functions.

View and manage locks on a geodatabase

While accessing and editing data, the geodatabase uses several different types of locks to ensure the consistency of the structure of your data. Three types of locks are used by the geodatabase: schema, state, and version. These locks can be shared, meaning other users can hold shared locks at the same time but exclusive locks are not possible, and some are exclusive, meaning no additional locks are possible on that database object.

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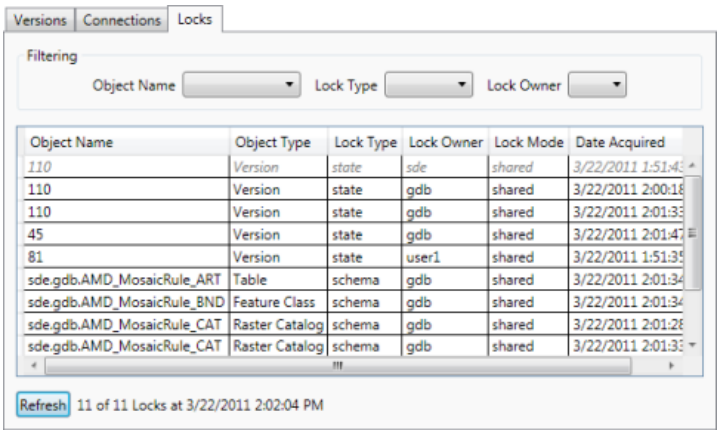
Beginning with 10.1, you can view what type of locks are being held on data in an enterprise geodatabase and who is holding the lock. This is done through the **Locks** tab of the ***Geodatabase Administration*** dialog box.

When the **Locks** tab is opened at the geodatabase level by the geodatabase administrator, all session, version, and object locks are shown for the data and versions in the geodatabase. These can be filtered by lock type, the session holding the lock (lock owner), or the name of the object being locked.

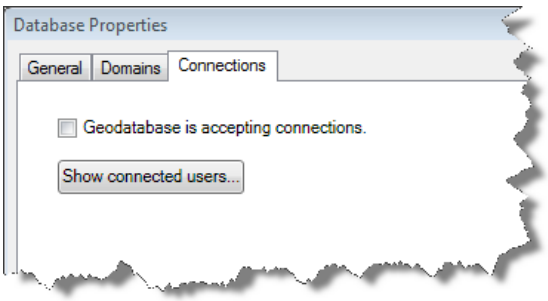


Administrators can disconnect the user, thereby clearing the locks, by right-clicking a record in the list of locks and clicking **Disconnect User**.

Block new connections to a geodatabase

Geodatabase administrators can use a new option on the ***Database Properties*** dialog box to prevent new connections (both ArcSDE services and direct connections) from being made to an enterprise geodatabase.

Unchecking the **Geodatabase is accepting connections** box on the **Connections** tab of the ***Database Properties*** dialog box prevents new connections from being made to the geodatabase. Existing connections remain.



If you want to script this functionality, use the AcceptConnections function.

Rebuild indexes on geodatabase system tables in versioned geodatabases

Geodatabase administrators can rebuild indexes on the states, state_lineages, and mv_tables_modified geodatabase system tables using the Rebuild Indexes geoprocessing tool or a Python script. These three system tables can change significantly in a versioned geodatabase that is edited frequently and indexes

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might need to be rebuilt. See Using the Rebuild Indexes tool on system tables and Rebuilding indexes on geodatabase system tables using a script for more information.

Update statistics on geodatabase system tables

Geodatabase administrators can update statistics on the geodatabase system tables using the new Analyze Datasets geoprocessing tool or a Python script. See Using the Analyze Datasets tool to update statistics on geodatabase system tables and Updating statistics on geodatabase system tables using a script for more information.

Create database users and roles

Two new geoprocessing tools are available to help you manage users in your database or enterprise geodatabase: Create Database User and Create Role.

The Create Database User geoprocessing tool lets you add a user to a database in Oracle, PostgreSQL, or SQL Server. The user that gets created is automatically granted the privileges required to create objects in the database. If a database role already exists to which you want to add this user, you can do that at the time of user creation.

In PostgreSQL, the login role is created in the database cluster and a corresponding schema is created in the specified database.

In SQL Server, a login is added to the SQL Server instance, a user is created in the specified database, a corresponding schema is created in the database, and the specified database is set as the user's default database. If an operating system or network login already exists in the SQL Server instance, you can use the Create Database User tool to add that login to the database you specify and create a schema for it.

In Oracle, the user is created in the Oracle database. if an operating system or network login already exists with that name, you can use the Create Database User to create a database user to which that login gets mapped in the specified Oracle database.

The Create Role geoprocessing tool lets you create a database role in Oracle, PostgreSQL, or SQL Server. With the same tool, you can add a user or list of users to or remove a user or list of users from a database role.

Both the Create Database User and Create Role tools can be opened from the database context menu.

Recover data from a file geodatabase

The new Recover File Geodatabase geoprocessing tool lets you recover simple feature classes and tables from a file geodatabase that has been corrupted and cannot be opened.

This tool can be found in the File Geodatabase toolset of the Data Management toolbox.

New tools to export and import the contents of a geodatabase

You can use the Export XML Workspace Document geoprocessing tool to create an XML document that defines the schema of an existing geodatabase, then use the Import XML Workspace Document tool to import the schema to an empty geodatabase. This is useful if you want to create a template geodatabase schema or want to share your schema with others.

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Tools for managing data

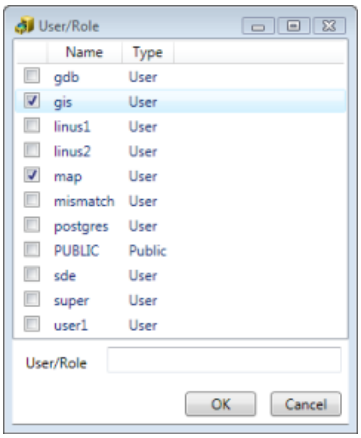
There are many new tools available at 10.1 to help you manage your data. These include the **Locks** tab of the ***Geodatabase Administration*** dialog box, which can be used to view locks held on data and versions; and new geoprocessing tools to rebuild indexes and update database statistics on multiple datasets. You can also create and manage geometric networks, export topology errors, enable or disable editor tracking on a table or feature class, create versioned views, and create database views.

Several existing tools were improved at 10.1: the ***Privileges*** dialog box now provides more information and is easier to use; the **Register with Geodatabase** command is expanded to register tables with both ArcSDE and the geodatabase; replica logging is improved to allow you to choose the name of the log, the location where it is created, and the amount of information that is written to the log; and the **Domains** tab on the ***Database Properties*** dialog box now displays the owner of the domain.

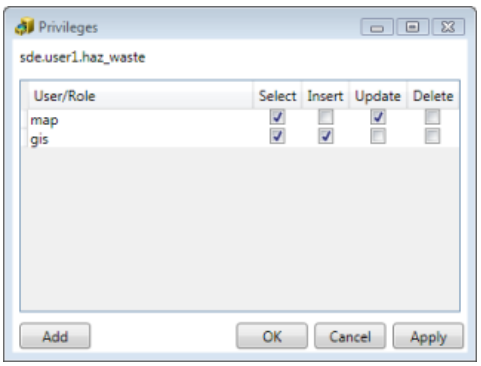
View and manage privileges on datasets

The ***Privileges*** dialog box has been improved to allow you to see what privileges users and roles have been granted on your data and, in most cases, lets you choose from a list those users and roles to which you want to grant privileges.

A list of all users or roles that currently have privileges on the specific dataset are shown on the ***Privileges*** dialog box. You can grant privileges to a new user or role by clicking **Add** and typing or (if you have sufficient privileges in the database) choosing the user or role name. In this example, two login roles are being chosen from a PostgreSQL database to grant privileges to them.



If the data is in a database or a geodatabase and is not versioned, you can independently grant or revoke insert, update, and delete privileges.



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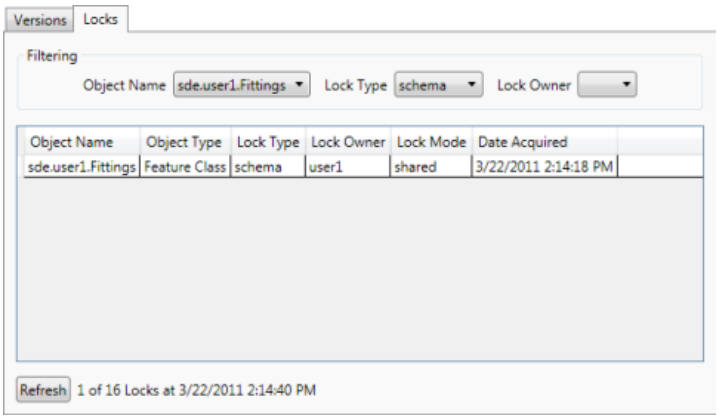
See Granting and revoking privileges on datasets for more information.

View locks on a version or specific dataset

Data or version owners can open the **Locks** tab of the ***Geodatabase Administration*** dialog box at the dataset or version level. When they do this, only locks held on that specific object are shown. In this example, the owner of the feature class checks to see whether any locks are held on the Fittings feature class. Because the Locks tab was opened from the Fittings feature class, the **Object Name** filter is automatically set to the Fittings feature class.



See Viewing dataset or version locks for more information.

Rebuild indexes on multiple datasets using the Rebuild Indexes geoprocessing tool

A new geoprocessing tool is available at 10.1 that allows you to rebuild indexes on multiple datasets that you own in an enterprise geodatabase. You can choose to rebuild only the indexes that are on the delta tables of versioned datasets or rebuild all the indexes on a dataset.

Indexes should be rebuilt after you have inserted a large number of records to or deleted a large number of records from a dataset. This helps improve query performance.

You can open the Rebuild Indexes geoprocessing tool from the Geodatabase Administration toolset in the Data Management toolbox.

Spatial index creation experience improved

In previous ArcGIS releases, you could not create or drop a spatial index on feature classes that used the SQL Server geometry or geography storage types. At 10.1, the Indexes tab of the ***Feature Class Properties*** dialog box has been altered to allow you to do so. The Indexes tab of the ***Feature Class Properties*** dialog box has also been altered to calculate the grid sizes of spatial grid index automatically; you do not have to input grid sizes in this dialog box. See Modifying a spatial index for more information.

Update database statistics on multiple datasets using the Analyze Datasets geoprocessing tool

A new geoprocessing tool is available at 10.1 that allows you to update the statistics on multiple datasets that you own in an enterprise geodatabase. You can choose to analyze the base tables, delta tables, or history table of a dataset or analyze all these tables to update their statistics.

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It is important to keep database statistics up-to-date so the database can execute queries in the most efficient manner. You should update dataset statistics after you have inserted a large number of records to or deleted a large number of records from a dataset or after you compress your geodatabase.

You can open the Analyze Datasets geoprocessing tool directly from the Geodatabase Administration toolset in the Data Management toolbox. Alternatively, you can analyze an individual table or feature class by right-clicking it under the database connection in the Catalog tree, pointing to **Manage**, and clicking **Analyze**.

Store information about edits and manage feature access through feature services

New functionality is available to let you store information about when a row or feature is added to or edited in your table or feature class. You can enable editor tracking on a table or feature class and ArcGIS will record information on who created a record and when and who last edited a record and when in date fields that you specify.

Editor tracking is enabled in ArcGIS for Desktop using the ***Catalog*** window **Enable Editor Tracking** context menu command or with the Enable Editor Tracking geoprocessing tool, which can be found in the Fields toolset of the Data Management toolbox. Once fields are defined, information is automatically recorded in these fields anytime the data is edited.

You can use the owner information fields to control what sort of access nonowners have to individual features by enabling ownership-based access control on a feature service. For example, you can set the feature service to allow query, create, update, and delete operations. To make sure only feature owners can perform these operations on their own features, you enable ownership-based access control and restrict nonowners to just query access.

Register a spatial table in one step

If you own a spatial table that was created by client applications other than ArcGIS, you can now register that table as a feature class from the Catalog tree.

See Registering a table with the geodatabase for more information.

Rename fields

You can change field names in your 10.1 geodatabase tables. To do so, open the Table or Feature Class Properties dialog box, click the **Fields** tab, click on the existing text of the field you want to rename, then type a new name.

Field names must be unique within a table, must start with a letter, cannot contain spaces or database reserved words, and are limited to 31 characters (30 in Oracle and DB2 databases). You cannot rename ObjectID or Shape fields created through ArcGIS. Fields in 9.3.x or prior release geodatabases cannot be renamed.

New tools and settings are available to work with geometric networks

At ArcGIS 10.1, settings that you make to the Utility Network Analyst toolbar persist in map documents. This means that you can set up your network tracing, save the map document, and when it's opened next, the settings from when you last saved are present.

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Also new for geometric networks at 10.1 are the following six geoprocessing tools:

- Create Geometric Network
- Add Edge-Edge Connectivity Rule To Geometric Network
- Add Edge-Junction Connectivity Rule To Geometric Network
- Remove Connectivity Rule From Geometric Network
- Remove Empty Feature Class From Geometric Network
- Trace Geometric Network
- Set Flow Direction

All these tools can be found in the Geometric Network toolset of the Data Management toolbox.

Having this functionality in the form of geoprocessing tools allows you to include them as part of an overall geoprocessing model to manage your geometric networks.

New logging options for replication

Whenever a replica creation or synchronization process is performed, information is recorded in the replica activity log. Until 10.1, the log was called ReplicaLog.dat and was found in the temp directory as defined by the temp environment variable. You can now choose the path and name of this log. You can also choose between five levels of detail to record. You make these settings on the ***Distributed Geodatabase Options*** dialog box, accessible from the ArcMap ***Distributed Geodatabase*** toolbar. See The replica activity log for more information.

New functionality for topologies

In ArcGIS 10.1, you can alter versioned topologies without having to unversion the feature dataset.

In previous releases of ArcGIS, you had to unversion a feature dataset before you could make any changes to a topology or its rules. Beginning with ArcGIS 10.1, you can make the following changes to a topology without having to unregister it:

- Change the cluster tolerance.
- Add a feature class to or remove one from the topology.
- Add or remove a topology rule.
- Change the rank of a feature class.

With the exception of removing a topology rule, which simply removes all errors and exceptions related to the rule, performing any of these changes results in a dirty area and the topology must be revalidated.

Also at 10.1, a new geoprocessing tool—Export Topology Errors—is available that allows you to export a topology's error and exception information to three feature classes, one for each supported geometry type of topology errors. You can grant access to the three feature classes to users who don't have access to the topology itself, allowing them to view the topology error information.

The Export Topology Errors tool can be found in the Topology toolset of the Data Management toolbox.

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Manage properties of an archive class

At 10.1, you can rename an archive class and manage the indexes that are created on it. See Working directly with the archive class for more information.

New toolset and tools for working with geodatabase attachments

The new Attachments toolset contains the following tools to simplify the process of attaching batches of related, nongeographic information to your feature classes:

- Enable Attachments
- Add Attachments
- Remove Attachments
- Disable Attachments
- Generate Attachment Match Table

New tool to create query layers

You can use the new Make Query Layer geoprocessing tool to define a query layer against one or more tables in a database or geodatabase. This tool is useful if you need to create a query layer as part of a model or in a Python script.

This tool can be found in the Layers and Table Views toolset of the Data Management toolbox.

Versioned views are created automatically or can be created manually from ArcGIS

When you register a feature class as versioned from ArcGIS 10.1, a versioned view is automatically created on the feature class. When you version a feature dataset, a versioned view is created for each feature class in the feature dataset.

To create a versioned view on a feature class or feature dataset that was versioned prior to ArcGIS 10.1 or re-create an existing versioned view, use the Create Versioned View context menu command, geoprocessing tool, or a Python script.

Versioned views allow you to view and edit versioned data, including the data in the delta tables, using SQL. See What are versioned views and its related topics for more information.

Edit the DEFAULT version through a versioned view using SQL without opening an edit session

If the edits you make with SQL through a versioned view are short in duration and you want other users to have access to the edits right away, you can edit the DEFAULT version.

This is a new editing model for versioned views; you do not explicitly open an edit session and you must frequently commit your edits to the database so you don't block other users access to the data. See A quick tour of editing versioned data using SQL for an explanation of this new editing model and how it can be used.

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Create a database view from ArcGIS for Desktop

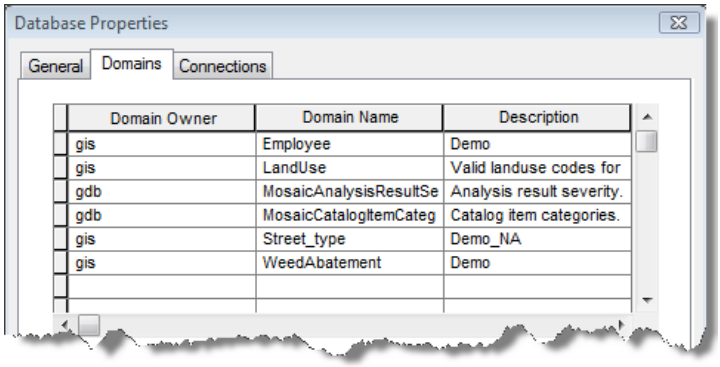
You can create views on tables or feature classes in a database or geodatabase by right-clicking a database connection or a geodatabase under the Database Connections or Database Servers node in the Catalog tree, pointing to **New**, then clicking **View**. On the dialog box that opens, provide a name for the view and construct an SQL query to define it. See Creating a database view in ArcGIS for Desktop for more information.

There is also a new geoprocessing tool for creating database views: the Create Database View tool. You can use this tool or a Python script to define views in your database or enterprise geodatabase.

New functionality for managing domains

View the owner of a domain

The **Domains** tab of the ***Database Properties*** dialog box now shows the owner of the domain in enterprise geodatabases. Right-click the database connection, click **Properties**, then click the **Domains** tab to see this.



Rename attribute domains

In ArcGIS 10.1, you can change the name of existing attribute domains. To do so, click on the text in the **Domain Name** column and type a new domain. If the domain is used with a subtype, the domain name will be updated automatically on the Subtypes tab of the ***Feature Class Properties*** dialog box.

New tool to sort domains

The Sort Coded Value Domain geoprocessing tool lets you sort the code or description of a coded value domain in either ascending or descending order.

This tool can be found in the Domains toolset of the Data Management toolbox.

New tool to upgrade datasets

The Upgrade Dataset tool in the Geodatabase Administration toolset lets you upgrade mosaic datasets, parcel fabrics, and network datasets to the current ArcGIS release.

This tool replaces the Upgrade Network and Upgrade Parcel fabric tools, giving you one tool to use to upgrade these datasets as well as mosaic datasets.

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New tool to delete all rows from a table

The TruncateTable geoprocessing tool in the Tables toolset can be used to delete all rows from a table or feature class.

You should use the Truncate Table tool instead of the Delete Rows tool when you want to delete all rows from a table or feature class.

New rules for data creation in user-schema geodatabases

If you have a geodatabase in Oracle, you have the option to allow other database users to create their own geodatabases. These are called user-schema geodatabases. Beginning with ArcGIS 10.1, the following new rules apply when creating data in an Oracle instance that contains user-schema geodatabases:

- Owners of a user-schema geodatabase can own data only in that geodatabase; they cannot own data in the master sde geodatabase nor another user's schema geodatabase.
- Users who do not own a user-schema geodatabase can only own data in the master sde geodatabase; they cannot own data in another user's schema geodatabase.
- For backwards compatibility purposes, if you have an existing, upgraded user-schema geodatabase that contains data owned by a user other than the geodatabase owner, that user's data is still accessible and the user can continue to create data in that geodatabase.

Interrelease compatibility support

Backward compatibility of the geodatabase—that is the ability of newer releases of ArcGIS to connect to and use older releases of the geodatabase—has always been supported and is still supported at ArcGIS 10.1. Forward compatibility of the geodatabase, which is the ability for older releases of ArcGIS to connect to and use newer releases of the geodatabase, has generally not been supported when new behavior has been added to newer releases of the geodatabase.

At ArcGIS 10.1, several datasets have been updated to provide new functionality. They are as follows:

- Support for Python scripting is available with annotation and dimension feature classes.
- Tables and feature classes now support editor tracking.
- Network datasets support live traffic data, soft restrictions, preferred truck routes, and Python script evaluators.
- Workflows and tools for creating and editing mosaic datasets have been improved, including improved generation of seamlines and footprints, support for more raster types, additional properties, and tools to analyze the mosaic dataset for known errors or limitations.

Starting with ArcGIS 10.1, you no longer need to upgrade the geodatabase to the current release to take advantage of this new geodatabase functionality. When you connect directly from an ArcGIS 10.1 client to a version 10 geodatabase, you can create datasets with 10.1 functionality, while still allowing ArcGIS 10 clients to connect to and use the geodatabase. This new forward compatibility helps you migrate to ArcGIS 10.1 and later releases because it allows you to migrate your desktop clients to take advantage of new functionality without upgrading your server.

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Esri recommends that ArcGIS clients connecting to version 10.1 geodatabases use 10 SP2, which contains several fixes to improve the user experience for connecting to version 10.1 geodatabases. While ArcGIS 10 or 10 SP1 clients can still connect to version 10.1 geodatabases, they will not benefit from the changes made in SP2. While ArcGIS 10 clients can open, query, edit, and save data in 10.1 geodatabases, they cannot open datasets with 10.1 functionality and will encounter the following error message when trying to open one of these datasets:

```
The version of the Geodatabase client is incompatible
with the dataset and cannot open it.
```

This only applies to version 10 geodatabases; to take advantage of new 10.1 functionality with 9.3.x and prior releases of the geodatabase, you must upgrade them to version 10.1.

If you want to upgrade your geodatabase to the current release, use the **Upgrade Geodatabase** button on the General tab of the ***Database Properties*** dialog box, the Upgrade Geodatabase geoprocessing tool, or a Python script.

Once a geodatabase has been upgraded, it can no longer be accessed from ArcGIS 9.3.x or earlier clients.

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Changes in setups and connections

There are some changes in ArcGIS 10.1 that affect configuring enterprise geodatabase connections.

Database client files

You must install database clients to connect to a database or directly to an enterprise geodatabase from all ArcGIS client machines. Obtain the database client from your database management system vendor. Or, for DB2, Informix, Oracle, PostgreSQL, and SQL Server, you can download the database client from the Esri Customer Care Portal.

Separate downloads are available for the ArcSDE application server and command line tools

The recommended method to access enterprise geodatabases is to connect directly from ArcGIS clients. However, you can still use an ArcSDE service. To do so, download the ArcSDE application server installation. This installs the files necessary to create and start an ArcSDE service. It also includes the ArcSDE administration command line tools and documentation.

Note: The ArcSDE application server installation only sets up the ArcSDE service. You must create a geodatabase first using the methods described at the beginning of this topic before you can start an ArcSDE service. The application server installation also does not install a dbinit, giomgr, or dbtune file.

To create ArcSDE service connections from ArcGIS for Desktop, use the Create ArcSDE Connection File geoprocessing tool.

There is also a separate ArcSDE command line tool installation available that includes just the data access commands. Both the ArcSDE application server and separate command line tool installation are available from the Esri Customer Care Portal.

Separate installation not needed for DB2 on z/OS

Beginning with 10.1, geodatabases are created from the ArcGIS client. Since geodatabases in DB2 on z/OS do not use an ArcSDE service for connections, a separate ArcSDE installation is not needed. The files required to set up the subsystem have been moved to the ArcGIS client DatabaseSupport\DB2zOS folder. Instructions for setting up or upgrading a geodatabase in DB2 on z/OS are in the ArcGIS user help.

New functionality for developers

New API to access file geodatabases without ArcObjects

A new set of C++ functions is available that provides a means, not based on ArcObjects, by which advanced developers can work with file geodatabases. This API allows developers to do the following:

- Create a file geodatabase.
- Read the schema of a file geodatabase.
- Create schema objects within the simple feature model.
- Read data from and write data to a file geodatabase.

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- Perform attribute and (limited) spatial queries on datasets.

See the ArcGIS Resource Center for more information.

New SQL functions to return information about geodatabase tables

There are nine new SQL functions available to help SQL developers retrieve information about enterprise geodatabase tables:

- Is_Simple: Returns true if the specified table does not participate in extended geodatabase functionality and can, therefore, be edited outside of ArcGIS
- Geometry_Columns: Returns the names of the spatial column (or columns) in the specified table
- Is_Versioned: Returns true if the specified table is registered as versioned
- Is_Replcated: Returns true if the specified table participates in a geodatabase replica
- Version_View_Name: Returns the name of the versioned view associated with the specified table; if no versioned view exists, a message is returned indicating this.
- RowID_Name: Returns the name of the registered RowID (ObjectID) field in the specified table; if a RowID registered with the geodatabase does not exist, a message is returned.
- Next_RowID: Returns the next valid value to insert to the RowID field
- GlobalID_Name: Returns the name of the registered GlobalID field in the specified table; if a GlobalID field does not exist, a message is returned.
- Next_GlobalID: Returns the next valid value to insert to the GlobalID field

The information returned from these functions is useful if you want to edit enterprise geodatabase tables using SQL; you must know if there are dependencies on the table, the names of the spatial column, ObjectID, and GlobalID fields before you can edit it. You also need unique values for the ObjectID and GlobalID fields when inserting records to geodatabase tables.

ST_Geometry type expanded to include support for parametric circles and wedges

At 10.1, you can create and query parametric circles or wedges in ST_Geometry columns using the ST_Geometry function. See Parametric circles, ellipses, and wedges for more information.

ST_Transform function expanded in Oracle databases

The ST_Transform function in Oracle now allows you to specify a geographic transformation ID to convert between two geographic coordinate systems. See ST_Transform for more information.

SRIDs prepopulated in new and upgraded enterprise geodatabases

When you create a geodatabase or upgrade your existing geodatabase in Oracle or PostgreSQL, the spatial reference system tables are populated with a set of spatial references that use standard EPSG or ESRI codes for their SRIDs. You can use these codes when creating new data through SQL. ArcGIS will also use these SRIDs and spatial references when data is created in ArcGIS clients.

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Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for databases in ArcGIS 10.1

At ArcGIS 10.1, you can connect to and work with databases directly from the ***Database Connection*** dialog box. The data in the database to which you have access is listed under the connection.

Once connected, you can create database users, load data to existing tables, add or drop tables, map spatial data, and publish services. To edit data, you can publish an editable feature service to ArcGIS Spatial Data Server, then edit through the service in ArcGIS for Desktop or a web application. See A quick tour of working with databases for more information.

Database connections from ArcGIS

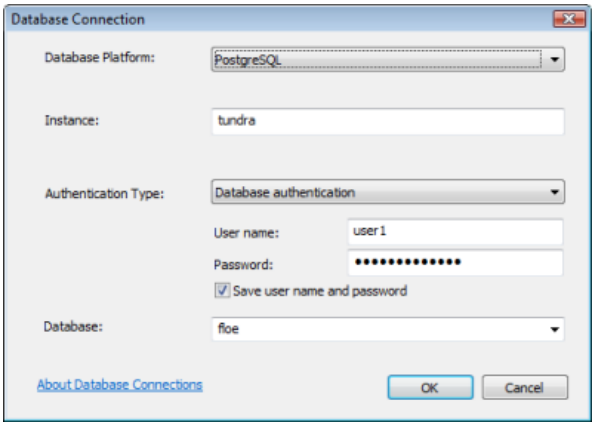
Create connections

At ArcGIS 10.1, the ***Database Connection*** dialog box has been simplified to require less input to make a connection, and functionality has been expanded to allow you to connect to any supported database, even if it does not contain an enterprise geodatabase. Supported database platforms include the following:

- IBM DB2
- Informix
- Microsoft SQL Server
- SQL Azure
- Netezza
- Oracle
- PostgreSQL

First, install the database client for your database management system (DBMS) to connect to a database from ArcGIS. You can obtain the database client from your DBMS vendor, or for all databases except Netezza, you can download the database client from the Esri Customer Care portal.

Next, in ArcGIS for Desktop, open the ***Database Connection*** dialog box, choose the database you want to connect to, then provide connection information. The following is an example of connecting to a PostgreSQL database:



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Access this dialog box from the Database Connections node (formerly the Spatial Database Connections node) in the Catalog tree. For more information on database connections, see Database connections in ArcGIS for Desktop.

Administrators can create a connection file that contains the necessary information and share it with other users. See Preconfiguring connection files for more information.

In addition, the new Create Database Connection geoprocessing tool allows you to create database connections. It takes the same inputs as the ***Database Connection*** dialog box. This tool can be found in the Workspaces toolset of the Database Administration toolbox.

Because you can now connect to databases from the ***Database Connection*** dialog box or Create Database Connection tool, the ***Add OLE DB Connection*** dialog box has been removed from the Catalog tree. However, you can add this tool to ArcCatalog if you need it. See Adding OLE DB connections for more information.

Update password on connection

If your database password is set to expire, ArcGIS 10.1 will intercept the warning or error returned from the database and provide you with a dialog box allowing you to create a new password.

Install the ST_Geometry storage type in an Oracle or PostgreSQL database

A new geoprocessing tool—Create Spatial Type—is available to let you install the ST_Geometry storage type and all its subtypes and functions in your Oracle or PostgreSQL database. This allows you to use the ST_Geometry type to store and access vector data without having to create a geodatabase.

Create a database user to own data

Two new geoprocessing tools are available to help you manage users in your database or enterprise geodatabase: Create Database User and Create Role.

The Create Database User geoprocessing tool lets you add a user to a database in Oracle, PostgreSQL, or SQL Server. The user that gets created is automatically granted the privileges required to create objects in the database. If a database role already exists to which you want to add this user, you can do that at the time of user creation.

In PostgreSQL, the login role is created in the database cluster and a corresponding schema is created in the specified database.

In SQL Server, a login is added to the SQL Server instance, a user is created in the specified database, a corresponding schema is created in the database, and the specified database is set as the user's default database. If an operating system or network login already exists in the SQL Server instance, you can use the Create Database User tool to add that login to the database you specify and create a schema for it.

In Oracle, the user is created in the Oracle database. if an operating system or network login already exists with that name, you can use the Create Database User to create a database user to which that login gets mapped in the specified Oracle database.

The Create Role geoprocessing tool lets you create a database role in Oracle, PostgreSQL, or SQL Server. With the same tool, you can add a user or list of users to or remove a user or list of users from a database role.

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Load data to a database

From ArcGIS for Desktop, you can copy datasets from databases or geodatabases and paste them into a database, create new tables and feature classes in the database, create views on database tables, and load records to database tables using the Simple Data Loader in ArcCatalog or the Catalog window in ArcMap, or using the Copy Features, Copy Rows, or Append geoprocessing tools. See A quick tour of working with databases for more information.

Work with database data

You can map spatial data from your database without having to create a query layer. You can drag spatial tables from your database connection in the ***Catalog*** window in ArcMap to the table of contents. If needed, you can specify a unique identifier field and spatial reference for the data, and the data is displayed in the map.

Once you create a map that contains your database data, you can publish that data to ArcGIS for Server. If you want to edit the data, you can publish an editable feature service to ArcGIS Spatial Data Server.

You can also perform the following operations on tables that you own in the database:

- Rename tables.
- Delete tables.
- Add, delete, or rename fields.
- Truncate tables.
- Grant or revoke privileges to other users or groups.
- Add a database-maintained ID field. An incrementing ID field maintained by the database is required if you want to edit the data through a feature service published to an ArcGIS Spatial Data Server.

Create a database view from ArcGIS for Desktop

You can create views on tables or feature classes in a database by right-clicking a database connection under the Database Connection node in the Catalog tree, pointing to **New**, then clicking **View**. On the dialog box that opens, provide a name for the view and construct an SQL query to define it. See Creating a database view in ArcGIS for Desktop for more information.

There is also a new geoprocessing tool for creating database views: the Create Database View tool. You can use this tool or a Python script to define views in your database or enterprise geodatabase.

Create query layers using a geoprocessing tool or Python script

You can continue to create and use query layers to access your database data from ArcMap. At ArcGIS 10.1, there is a new geoprocessing tool that allows you to create them: the Make Query Layer tool.

This tool can be found in the Layers and Table Views toolset of the Data Management toolbox.

Rebuild indexes and update database statistics for database tables

Table owners can use the Rebuild Indexes geoprocessing tool or a Python script to rebuild existing indexes on their tables. The tool can be used to rebuild the indexes on multiple tables at once.

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To update database statistics for database tables, the owner of the tables can run the Analyze Datasets geoprocessing tool or a Python script.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for editing in ArcGIS 10.1

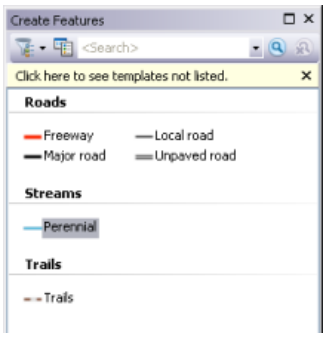
At ArcGIS 10.1, the ArcMap editing environment contains significant improvements to working with feature templates, editing coincident features and topology, and editing parcels, as well as some general enhancements.

Creating features and feature templates

With the introduction of feature templates in ArcGIS 10.0, it was sometimes difficult to determine when feature templates were created automatically and why feature templates were not displayed on the Create Features window. ArcGIS 10.1 reduces this confusion by creating templates at the layer level and providing more guidance about why templates are hidden.

With ArcGIS 10.1, feature templates are created on a layer-by-layer basis, rather than for a workspace. If you start editing and no feature templates are present for a particular layer, they are created automatically for you. Previously, feature templates were only created the first time you started editing in a map, so you had to create them yourself more often.

When feature templates for editable layers are not being displayed, a message appears at the top of the Create Features window. Click it to see a list of any hidden feature templates and get an explanation why they are not being shown.



The following are the main reasons why templates for editable layers are hidden and what you can do to make them appear on the Create Features window:

- The layer is not visible. You need to turn on the layer in the table of contents.
- The layer is part of a group layer that is not visible. You need to turn on the group layer in the table of contents and ensure the sublayer is visible.
- The layer has a visible scale range that is beyond the map's current scale. Right-click the layer in the table of contents and click Zoom To Make Visible to bring the layer into view. You can update or remove the scale range on the General tab of the Layer Properties dialog box.
- The layer is from a parcel fabric dataset. You use the Parcel Editor toolbar to create new parcels rather than the Create Features window.
- The layer has a definition query applied, but the feature templates do not match it. You need to open the feature template's properties and set a default attribute value that satisfies the query. You can update or remove the expression on the Definition Query tab of the Layer Properties dialog box.

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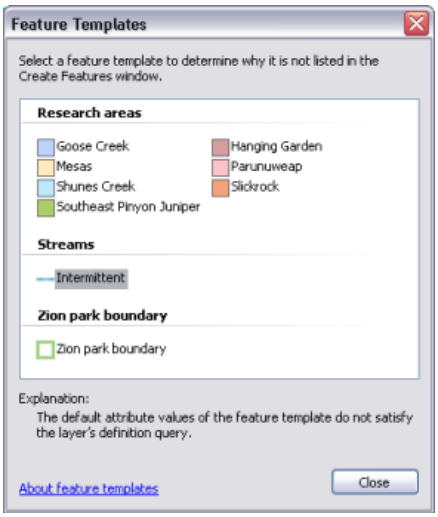

The reasons why feature templates are hidden remain the same as at ArcGIS 10.0; however, you now have better feedback about it. To learn more about feature templates, see Best practices for using feature templates.

Creating feature templates from the properties of existing features

You can use an existing feature as the source for the properties of a new feature template. When you do this, any attribute values for the fields in the existing feature are automatically entered as the new feature template's default attribute values. This allows you to create other features with the same attribute values as the existing feature and avoid manually reentering the values on the Template Properties dialog box.

Once the feature template is created, you can review and change its properties. The feature's attribute values, excluding system fields such as Shape_Length or OBJECTID, are listed as the new template's default attribute values. In addition, other template properties, such as name, target layer, and symbology, are also populated in the new feature template. The name of the new feature template is obtained from the display expression of the selected feature, but it may receive a generic name when no existing text is found. The target layer and symbology for the new feature template are the same as the selected source feature.

To do this, select the feature you want to use as the basis of the new feature template, open the Organize Feature Templates dialog box, click the New Template drop-down arrow, and click New Template From Feature .

Other enhancements to feature templates

- In ArcGIS 10.0, the Create Features window opened automatically at the start of every edit session to help familiarize editors with the new environment. With ArcGIS 10.1, it opens for the very first edit session; after that, the window retains its previous state of being docked, pinned, or closed. For example, if you close the Create Features window because you are only editing existing features or attribute values, it will still be closed the next time you start editing—even in a different map or ArcMap session. When you need the window, display it again from the Editor toolbar. This framework change has been applied to all windows used in the editing environment, such as the Attributes or the Edit Sketch Properties windows. If any editing-related windows are

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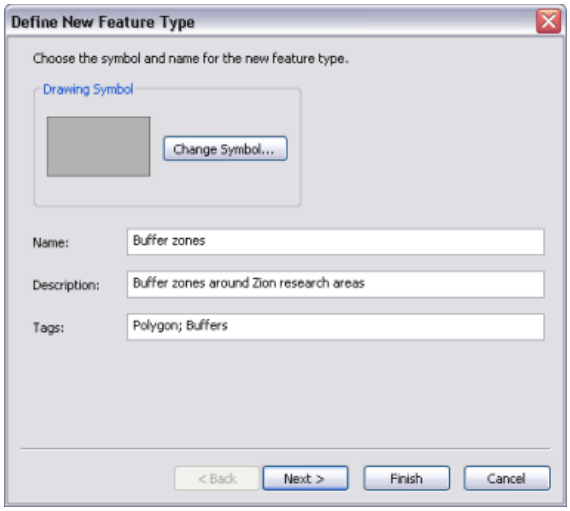
open when you are not in an edit session, the windows are shown in gray to indicate they are inactive.

- Searching for feature templates on the Create Features window uses AND logic, rather than OR. This gives you better search results than before. For example, if you search for fire stations, only feature templates containing both words, fire and stations, are displayed.
- The Define New Feature Type wizard now supports tags as well as unique values on two fields. Previously, you had to add tags later and could only use this wizard for unique values symbolized on only one field.



- You can use the Organize Feature Templates dialog box to update properties of multiple feature templates at once. To do this, select the templates, click Properties, then update the default construction tool or attribute values, for example.

New Auto-Complete Freehand tool

If you are creating polygons of land uses, soils, counties, or property ownership, for example, you often need to create polygons next to one another. The polygons should share a border, but you want to avoid digitizing the border twice or having overlaps or spaces between polygons. You can use the Auto-Complete construction tools when creating new polygons to help ensure that your data forms a continuous fabric. The new polygon can share a border with one or more existing polygons, although the polygons must all be from the same layer as the new feature you are creating. There are two construction tools you can use to create adjoining polygons: Auto-Complete Polygon and Auto-Complete Freehand.

The Auto-Complete Freehand tool is new in ArcGIS 10.1 and appends polygons to existing ones by creating the shape of the new polygon by drawing a line that follows the movement of your pointer. The new segments are smoothed into Bézier curves when you are finished. For example, when you are digitizing a layer of land cover, you might draw lakes or forested areas with the Auto-Complete Freehand tool so you can more easily digitize the curved shapes.

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Creating annotation

You can use Find Text on the Annotation Construction window or CTRL+W iteratively to choose which feature will provide the text for new annotation when there are overlapping features. Now, you can press the N key to cycle through the text strings derived from underlying features after you have used Find Text. Previously, only the topmost feature would supply the text.

Better support for tablet computing when creating features

Keyboard shortcuts have been added to several construction tools to make it easier for you to digitize using a pen. Press the M key when in streaming mode to digitize while the pen is pressed down and stop digitizing when you lift up the pen. The M key also works for the Freehand tool and the new Auto-Complete Freehand tool, so you can draw a freehand line when the pen is pressed down and stop the line when you lift up.

Feature Construction toolbar enhancements

The Feature Construction toolbar is turned off by default and no longer appears automatically while sketching. However, you can display it temporarily if you want to access a command on it. When the toolbar is visible, you can move it and it retains its position relative to the sketch each time you click the map. This is helpful since the toolbar sometimes is positioned where you want to place the next vertex.

If you want to display the Feature Construction toolbar only when you need it, you can press the TAB key to show it temporarily. For example, to create a parallel segment, press the TAB to display the Feature Construction toolbar, click Constrain Parallel, and close it or press TAB again to hide the toolbar.

If you want the Feature Construction toolbar to appear anytime you are sketching, you need to enable it on the Editing Options dialog box. Click the Editor menu and click Options. On the General tab, check Show feature construction toolbar.

Option to snap to feature services and basemap layers

You can now choose whether to snap to features in basemap layers and feature service layers. Previously, snapping was always enabled for all available layers, which caused performance to decrease in some cases. To enable snapping, click the Snapping menu on the Snapping toolbar, click Options, and check Snap to feature service layers or Snap to basemap layers. These options are off by default.

A basemap layer is a special type of group layer that is drawn using optimized map display logic and utilizes a local cache to refresh the map quickly. Basemap layers also help reduce network traffic since ArcMap does not need to contact the server repeatedly to retrieve the map extent. Basemap layers can contain any layer format, such as feature classes, shapefiles, web services, or rasters. If you place feature layers in the basemap, you can snap to their features while editing, measuring, georeferencing, and using other tools that work with the Snapping toolbar.

Although you cannot edit the layers inside a basemap, you can snap to feature layers in a basemap layer. For example, if you were creating a new waterline in relation to building locations, you can still snap to the Building Footprints layer even though it is inside the basemap. Keep in mind that if your features are very large or complex, enabling snapping to basemap layers may reduce the performance benefits provided by basemap layers.

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On another occasion, you are making updates to a city's parks and recreation geodatabase. Roads and utility infrastructure data are shared with you as web-based feature services. When you are creating a new open space area in your parks geodatabase, you can snap to the roads and other features from the feature services.

Editing topology

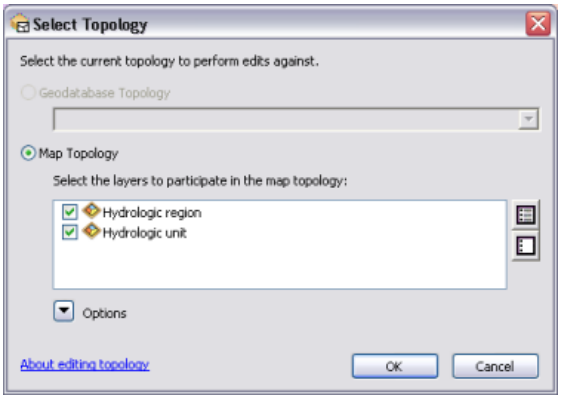
Many vector datasets contain features that share geometry. For example, a forest border might be at the edge of a stream, lake polygons might share borders with land-cover polygons and shorelines, and parcel polygons might be covered by parcel lot lines. When you edit these layers, features that are coincident should be updated simultaneously so they continue to share geometry. Topology allows you to perform edits in this manner.

In ArcGIS 10.1, it is easier to create and edit topology. The new Select Topology dialog box integrates the experience of using the Topology toolbar drop-down list to choose the topology and opening a different dialog box to create a map topology. You can now perform these from a single dialog box, Select Topology.

In addition to these changes, there have also been enhancements to selecting and editing topology edges. For example, you can select edges by tracing along them, reshape more than one edge at a time, move them quicker than before, and generalize them while maintaining coincident geometry.

Setting up topology

To activate a topology during an edit session, click the Select Topology button on the Topology toolbar. This opens a dialog box that allows you to set the type of topology to edit. If you have a geodatabase topology in your table of contents (and ArcGIS for Desktop Standard or ArcGIS for Desktop Advanced license), you can edit shared features using geodatabase topology. Otherwise, use the Select Topology dialog box to create a map topology by specifying the layers that should be edited together. If you click a topology editing tool without having an active topology, you are prompted to create a map topology using this dialog box.



Editing with a map topology

A map topology creates topological relationships between the parts of features that are coincident, which allows you to simultaneously edit features that share geometry. You can create a map topology for point, line, or polygon layers from shapefiles or geodatabase feature classes. The features can be in one or more layers and have different layer types.

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It is easy to create a map topology. You simply choose the layers to participate and set the cluster tolerance. Map topology also now uses layer information and reflects layer properties, including name and visibility. Previously, map topology showed feature class names and allowed you to select topology elements even if the layer was turned off in the table of contents.

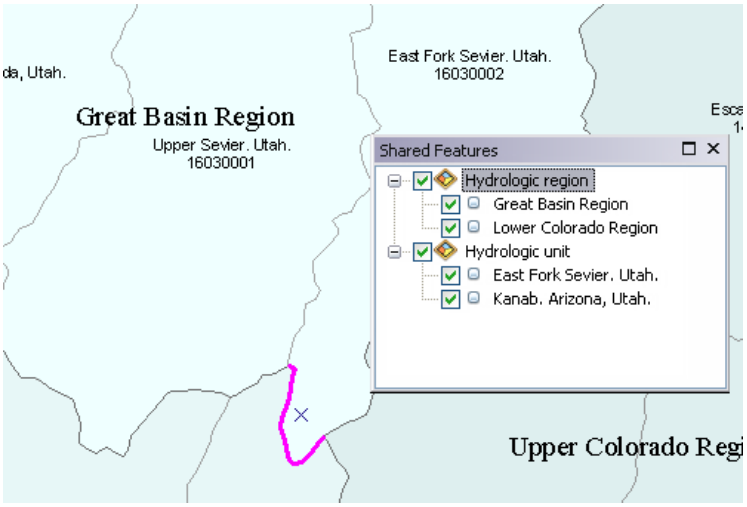
Since a map topology is based on the layers in the map, layer visibility, such as definition queries and scale ranges, is respected. Only visible features are edited when you use the topology tools with a map topology. For example, you have a polygon layer that contains land uses and administrative boundaries but only want to update the land-use features. You can set a definition query on the layer to show the land-use features and hide the administrative boundaries. Since the administrative features are not visible on the map, they will not be updated when you perform topology edits.

Selecting, reshaping, and editing topology edges

It is easier to select topology edges. You can hold down the left mouse button while dragging along an edge with the Topology Edit tool, or use the new Topology Edit Trace tool to select a series of edges that form a path.

Selecting a path is especially useful for reshaping edges, since the Reshape Edge tool now allows you to update more than one edge as long as they form a connected path. Previously, only one edge at a time could be reshaped. Reshape Edge allows you to set options for working with other connected edges. When you reshape an edge, edges that connect to the selected edge are adjusted as well. This allows you to maintain coincident geometry for edges that are not selected. You can control this behavior on the Topology tab of the Editing Options dialog box.

Once you have selected topology edges, open the Shared Features window to see which features are part of the selected edge. The Shared Features window has been redesigned to be dockable, which allows you to interact with the map while the window is open. This way, you can select and deselect topology edges without having to close the window. The Shared Features window also uses the layer's display expression to list features in it.



It is now easier to disconnect and reconnect edges, also known as performing a split-move of an edge. Previously, you needed to select an endpoint node and the edge to move; now, you simply select the edge. As you rest your pointer over the endpoint you want to move, the pointer changes shape to

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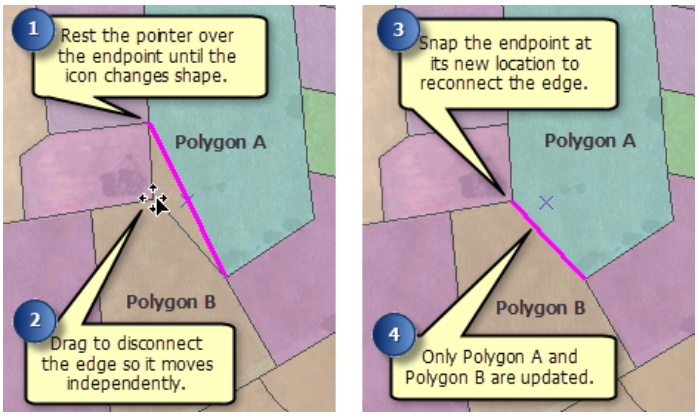
indicate you can disconnect the edge. Simply click, move the edge, and snap it to a new location. By default, when you move edges, the surrounding features stretch to maintain the general shape. If you want topology elements to move independently without having connected features update as well, uncheck the option for proportionate stretching on the Topology tab of the Editing Options dialog box.

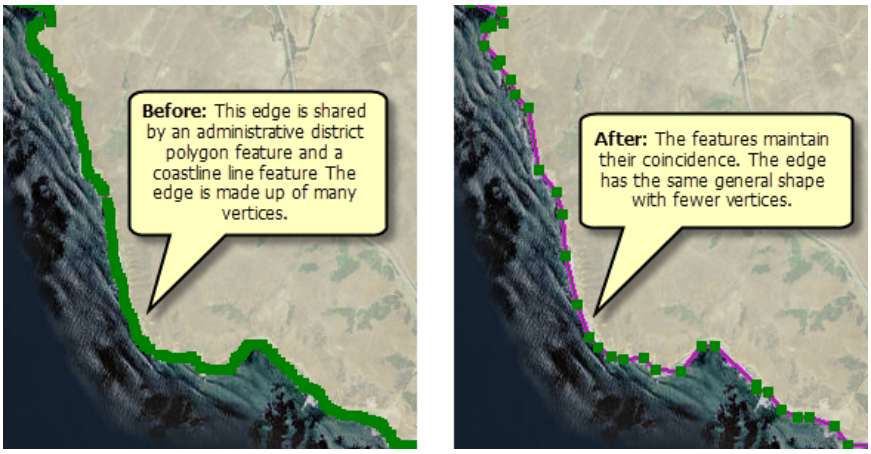


New Generalize Edge command to simplify topology edges

Generalize Edge on the Topology toolbar allows you to simplify edges while maintaining coincident geometry.

Generalizing simplifies the shapes of features and is an important technique for collecting and integrating GIS datasets. You might generalize data to reduce the vertex count in features that were captured in too much detail, eliminate true curves in features, or standardize datasets to a given resolution because features were created at different scales.

For example, in a coastal area, you have a polygon layer of administrative areas and a line layer representing the coastline. The features in these layers are coincident and share edges. However, the edge is too detailed at the scale you are using and has many unnecessary vertices. By setting a proper deviation for the generalization, you can keep the general shape of the coastline while reducing the number of vertices. The Generalize Edge dialog box provides a preview to help you determine the deviation before you perform the edit.



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Generalize Edge is used on topology edges, allowing you to maintain coincident geometry between features when you simplify them. All features that share the edge are updated at once. On the other hand, other generalization tools in ArcGIS could introduce gaps or other errors in your data because they do not use topology.

Simplified topology user interface

The Topology toolbar has been redesigned so it contains commands that are directly related to topology and require a topology to use. Therefore, the Construct Polygons, Split Polygons, and Planarize Lines commands have been removed from the Topology toolbar and are now located on the Advanced Editing toolbar. As in previous releases, these commands require an ArcGIS for Desktop Standard or ArcGIS for Desktop Advanced license.

ArcGIS 10.1 Advanced Editing toolbar

ArcGIS 10.1 Topology toolbar

The menu that appears when you right-click the map with the Topology Edit tool has been simplified to show only the most common tools. If you need any of the commands that were previously on this menu, you can still add them to the user interface from the Customize dialog box.

New tools for aligning data

When editing, you commonly compile data from various sources with different levels of quality assurance. Unfortunately, this can often result in data alignment problems and topological errors. ArcGIS 10.1 includes a suite of new tools that are designed to help you make your data coincident. Some of these tools work with features, while others require a topology. To learn more about the available data alignment tools, see About aligning features.

The new tools include the following:

- Align Edge
- Align To Shape
- Replace Geometry

Align Edge

Sometimes you might find that portions of an existing feature do not line up properly with other features. The Align Edge tool allows you to match one edge to another edge quickly so they are coincident without having to trace or reshape the edge manually. You can click one edge and click another edge, and the first edge instantly matches the second. For example, you have a polygon layer representing land uses and find that some of the polygons need to be modified to make their boundaries align. This tool is particularly helpful when you are working with polygons that contain gaps.

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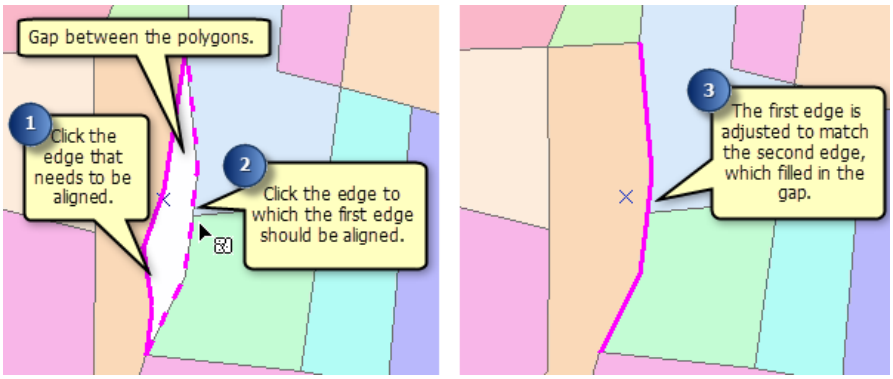
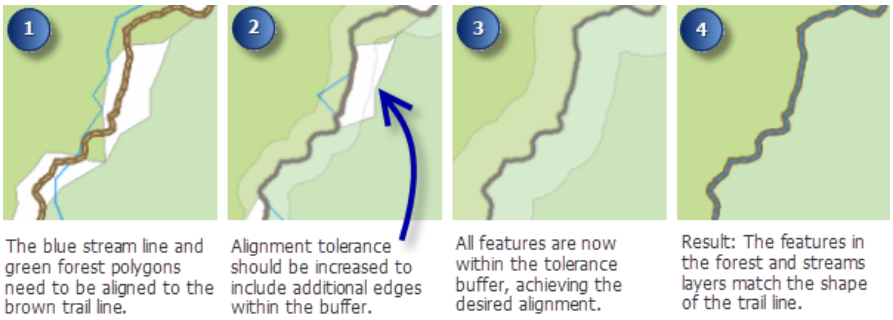


Align To Shape

You can use Align To Shape to adjust layers to a shape you trace. This is useful if you want to match features to the edges of other features. This scenario commonly happens when layers were captured at different resolutions, scales, or time periods—causing edges to become braided, overlap, or have gaps between them. For example, you have a hiking trail that was digitized from very accurate GPS measurements. The trail follows along the banks of a stream at the edges of two types of forests. The stream and forest boundaries should actually be coincident with the trail. However, those layers originated from a coarser resolution or different scale, so they zigzag across the trail. There are also gaps between the polygons and areas where the polygons overlap. You can use Align To Shape to draw a path interactively so the layers are aligned to the trail line and the polygons form a continuous fabric.



Replace Geometry

The Replace Geometry tool allows you to create an entirely new shape for a feature. One of the most common workflows for Replace Geometry is when you have features that should align with adjacent features. In some cases, a feature's shape is significantly different from that of other features with which it should share a boundary. In these instances, particularly when the feature is deemed to be less accurate than the surrounding ones, it is often easiest to recapture the geometry of the feature rather than modify its existing shape.

To use Replace Geometry, you need to select a point, line, or polygon. When you click the Replace Geometry tool, the original feature is still selected but is displayed transparently so you can see its current location. You can then completely replace the shape of the existing feature with a new shape. To sketch its new shape, you can snap to or trace along other features, including the original geometry for the feature you are modifying. All the feature's attributes are maintained; its shape is simply updated.

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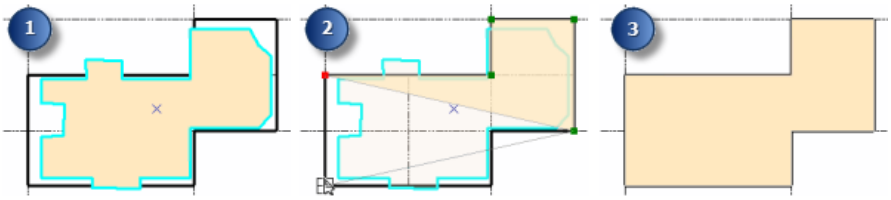

The selected polygon should be coincident with the black lines.

When you digitize the new shape, the original feature is drawn transparently. You can snap to it or any other feature.

The resulting feature has a new shape but the same attributes as before.

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Editing features and attributes

Updating the geometry of existing features by sketching

The Continue Feature tool allows you to update the geometry of an existing feature using a sketch. This allows you to extend a line by digitizing new segments or add a part to a multipart feature.

Although these workflows were available in ArcGIS 9, they were deprecated in ArcGIS 10.0 with the introduction of new feature construction tools that distinguished between creating new features and editing existing features. Since this functionality was commonly requested for ArcGIS 10, it was reintroduced in ArcGIS 10.0 Service Pack 2 through the Continue Feature tool. This tool is found on the Edit Vertices toolbar in ArcGIS 10.1.

ArcGIS 10.1 Edit Vertices toolbar

Stretch geometry proportionately when moving a vertex option added to Edit Vertices toolbar

If you need to move a vertex but keep the general shape of a feature, you can proportionally stretch a feature's geometry. When you drag a vertex to a new location with proportional stretching on, the proportions of the feature's segments are maintained, thereby maintaining the general shape of the feature.

The Edit Vertices toolbar now contains Stretch Proportionately, which is a shortcut to the setting on the General tab of the Editing Options dialog box. This option applies to editing vertices in features and on topology edges.

Better keyboard navigation in the Attributes window

You can use keyboard shortcuts to navigate the Attributes window and attributes grid. In the top of the window, use the up and down arrow keys to navigate through the list of selected features and the right arrow key to expand the tree. In the attributes grid, press the up and down arrows to move to the previous and next rows. Press the ENTER key to start editing the current row, type the attribute value, and press ENTER again to commit the edit and advance to the next row.

For fields containing drop-down menus, such as coded value domains or subtypes, press the ENTER key to open the menu. You can type the first letter of the list item to move to it or use the up and down arrow keys, then press ENTER to choose the value.

Editing annotation

Editing the shape of curved annotation has been enhanced to be more similar to the experience of editing Bézier curve segments in lines and polygon. The vertices change the shape of the baseline and the Bézier handle control points change the curvature.

When editing annotation in follow feature mode, you can now drag annotation across multiple features. For example, if you have road names that follow along centerlines, the annotation smoothly follows along

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each connected line feature. This allows you annotate the road even if it is split and composed of many separate line features. You can also drag multipart annotation in follow feature mode.

Other enhancements to editing features and attributes

- When working with related features and records in the Attributes window, related information is now listed under the relationship label, which is specified when a relationship class is created. By default, the label is the name of the destination feature class or table. If the label is different from the feature class or table name, the name and label are both shown in the Attributes window tree. For example, in a relationship between parcel polygons and a table of landownership information, you might set a label to show that a parcel is owned by a landowner. In this case, the related records are listed under the node for landowner - is owned by.
- Modifying features shows the feature transparently, allowing you to see the shape of the original feature when you are moving vertices and performing other edits.
- The new Attachments geoprocessing toolset helps you manage attachments on multiple feature classes or tables at once. You can now attach multiple files to one or more features or records.
- The icons for Generalize and Smooth on the Advanced Editing toolbar have been updated to resemble the icons for the new alignment tools. The functionality has not changed.

Tracking who edited data

Through editor tracking, ArcGIS can automatically record the following information for each feature or table record in a geodatabase dataset:

- The name of the user who created it.
- The date and time it was created.
- The name of the user who edited it.
- The date and time it was last edited.

This information is recorded in attribute fields directly in the dataset. Editor tracking can help you maintain accountability and enforce quality control standards.

Edits are tracked when items in personal geodatabases, file geodatabases, and ArcSDE geodatabases are edited in ArcGIS for Desktop. In addition, you can also track edits made to data served as feature services in ArcGIS Server. Before you can track edits, you need to enable editor tracking on the dataset.

ArcGIS 10.1 and subsequent clients record editor tracking information. ArcGIS 10.0 and 10.0 Service Pack 1 clients can access datasets that have editor tracking enabled, but any edits made in these releases are not tracked. You should avoid making schema changes when using these clients because doing so will disable editor tracking on the dataset. ArcGIS 10.0 Service Pack 2 and subsequent 10.0 service pack clients cannot access datasets that have editor tracking enabled.

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Editing parcel fabrics

At ArcGIS 10.1, significant improvements have been made to the management and editing of parcel fabrics.

Parcel fabrics

Parcel fabric feature classes and tables can be accessed by expanding the parcel fabric dataset in ArcCatalog or the Catalog window. You can now add parcel fabric sublayers to ArcMap without having to add to the parcel fabric layer.

Parcel fabrics or selections of parcel fabrics can be copied and appended using the new Append Parcel Fabric and Copy Parcel Fabric geoprocessing tools.

Parcel fabric replication

At ArcGIS 10.1, parcel fabrics are supported by replication; however, they are excluded from any replicas you create with the simple model option.

All internal parcel fabric tables are synchronized except for the Jobs table. Any feature class associated with the parcel fabric will not be synchronized.

Annotating parcel fabrics

You can use theAnnotate Parcel Courses tool to create and remove duplicate annotation from a selection of parcels. The tool can be used to convert labels to and remove duplicates from new annotation or the tool can be used to overwrite and remove duplicates from existing annotation.

Editing parcel fabric attributes in the Attributes window

At 10.1, the nonsystem-managed attributes of individual, selected parcel features can be edited in the Attributes window. The Attributes window is located on the Editor toolbar.

Learn more about editing the attributes of parcel fabric features and tables

Parcel traverse

At ArcGIS 10.1, undo/redo functionality works with the parcel traverse. You can undo and redo any data entry changes made in the parcel traverse grid under the Lines tab of the Parcel Details dialog box.

Parcel traverses can be adjusted to eliminate a closure. You can specify which adjustment method to use on the new Closure tab on the Parcel Details dialog box. There are three adjustment closure methods that you can choose from:

- Compass adjustment
- Transit adjustment
- Crandall adjustment

On the Closure tab, you can also specify a starting point or starting coordinate for your parcel traverse. If you are traversing an unclosed parcel, you can specify an ending point or ending coordinate.

Curves greater than 180 degrees are now supported in the parcel fabric traverse at ArcGIS 10.1.

Learn more about the parcel traverse tool

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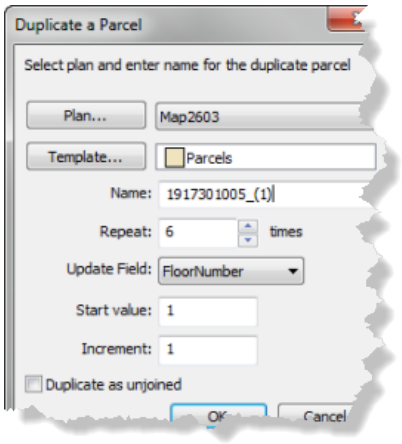
Parcel remainder

At ArcGIS 10.0, remainder parcels could only be created from a single overlapping parcel. At ArcGIS 10.1, remainder parcels can be created from multiple overlapping parcels.

Learn more about creating remainder parcels

Duplicating parcels

At ArcGIS 10.1, parcels can be duplicated multiple times. You specify number of times the parcel is duplicated. You also have the option to increment a long integer, nonsystem field on the parcels table with a numeric value each time a parcel is duplicated. This is useful for adding multiple floor-level parcels to condos. For example, if you add a Floor_Number field to the Parcels attribute table, you can choose to have the Floor_number field incremented by a value of 1 each time a parcel is duplicated.



Learn more about duplicating parcels

Parcel joining

At ArcGIS 10.1, parcels being joined are cartographically fitted to the surrounding fabric even when join parcel lines and existing fabric lines do not match up or align with each other. Straight lines are bent or flexed to fit the location of line points and parcels are joined such that there are no slivers, gaps or overlaps remaining in the fabric.

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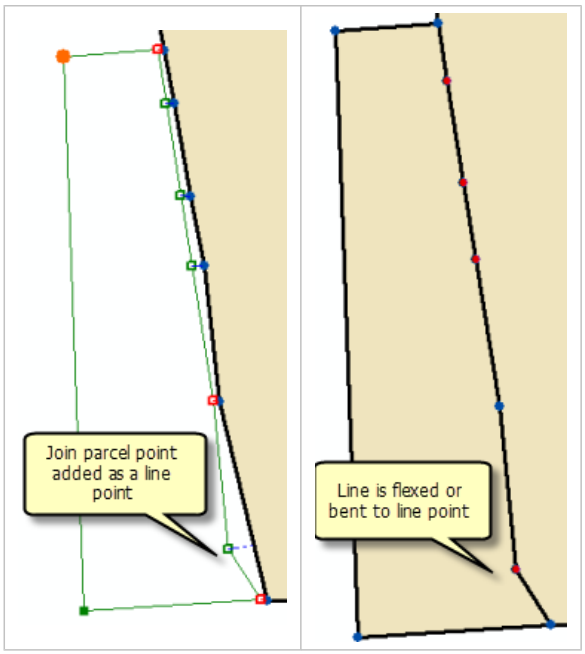

Note: During a least-squares adjustment, any bent or flexed lines are straightened and line points are moved onto the straightened lines. However, if a line point is significantly offset from its straight line, you can choose to keep the straight line bent to the line point.
Learn more about the least-squares adjustment

Creating join links using the new trace link tool

Instead of establishing join links individually point by point, you can use the Trace Fabric To Create Join Link tool located on the Join Parcel dialog box to create join links along traced boundaries. The trace link tool detects join links between the joining parcel line and the traced boundary line if the joining parcel line lies within the specified trace link buffer.

Learn more about parcel joining

Transforming parcels

The ***Transform Parcels*** toolbar can be used to provisionally move a selection of parcels in the parcel fabric. For example, you would want to move parcels so that they line up with an underlying orthophoto. Parcel points can be snapped to existing control points but are not linked to the control point. You would link a control point to a parcel corner point when you want to use that control point in a least-squares adjustment of the parcels.

Learn more about transforming parcels

Establishing line points

At ArcGIS 10.1, you can merge collinear line segments into a single line. These line segments should form one single line but have been split by adjacent parcel points during data migration. Once the line segments are merged into a single line, any adjacent parcel points sitting on the line become line points.

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The Merge Parcel Courses toolcan be used to merge adjacent line courses that differ by an angle less than the tolerance you specify on the Merge Parcel Courses dialog box.

Regenerating parcel fabric geometry

The Regenerate Fabric tool can be used in an edit session to regenerate the geometries of fabric feature classes. Only geometries are regenerated; no points are moved.

When the parcel is regenerated, the geometries of the parcel polygon and parcel lines are re-created. If there are gaps from line points that do not sit directly on top of their adjacent parcel line, the gap is eliminated, and the adjacent parcel line is regenerated to become coincident with any line points. If there are unclosed parcels that are missing buffer geometries, these buffers geometries are regenerated.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for raster and image data in ArcGIS 10.1

Desktop

New or improved support for data sources

Many new raster formats have been added to the list of ArcGIS supported raster datasets, and improved or added raster types for adding data to a mosaic dataset. See the list of supported raster data in ArcGIS.

More raster dataset formats

ArcGIS has added support for reading the following raster formats:

- AIRSAR Polarimetric
- CEOS SAR Image
- Earth Resources Laboratory Applications Software (ELAS)
- ENVISAT Image Product
- Grid eXchange File
- Heightfield raster (HF2)
- Image Display and Analysis (IDA)
- ILWIS raster map
- MrSID Generation 4
- MrSID Lidar
- New Labelled USGS DOQ (DOQ2)
- NOAA .gtx vertical datum shift
- NOAA Polar Orbiter Level 1b Data Set (AVHRR)
- PCI .aux Labelled Raw Format (PAux)
- SAGA GIS Binary Grid
- TerraSAR-X

Lidar support as raster data

LAS, LAS dataset, and terrain raster types are available, allowing you to create a mosaic dataset using lidar data. This is useful for display, management, and dissemination of these data sources. You can publish the data as an image service allowing clients and web applications to use the raster surfaces and allowing clients to download the source files from the image service.

Learn about lidar support in ArcGIS

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More satellite imagery support

Improved support for RADARSAT-2 and SPOT 5 imagery, and added support for others. Added support for the community sensor model (CSM) and the pushbroom sensor model to help support more data and more analysis applications.

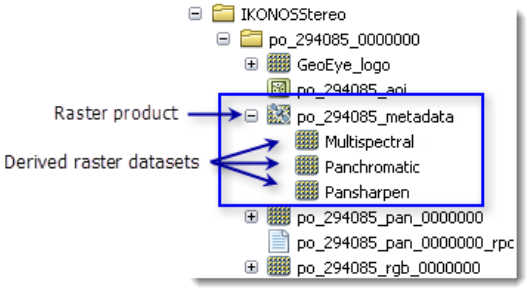
- SPOT 5—By adding the XForm to support the pushbroom sensor, the spatial accuracy of the imagery is improved and the imagery can be orthorectified.
- RADARSAT-2—Added raster type to fully support the dataset and the polarizations. Appropriate filters and radiometric calibrations can be applied based on the product type.
- FORMOSAT-2—Added new raster type and new XForm to support orthorectification.
- KOMPSAT-2—New raster type.

Made imagery easier to use and better to look at

One overarching enhancement to this release is the improvement to the usability of raster data in ArcGIS, which included creating new tools, reading more information, and improving the defaults for display.

Raster products

ArcGIS has a new way to handle specific vendor products, called raster products. These are designed to make it simpler to add these products to your map. A raster product is a raster dataset that uses metadata and header information to pre-create a raster layer from the raw data. One key difference is raster products have their own icon ( ) and when expanded in the catalog, they don't contain traditional raster dataset bands. Instead, they contain one or more derived raster datasets, such as a multispectral or pan-sharpened product, depending on the metadata and available bands.



These raster products can be used for display and can also be used with existing tools.

Learn about raster products

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Key metadata

Key metadata is used to assist the application with some processing and rendering, including providing some useful information such as the band names associated with imagery. It is extracted from the file's metadata and is generally associated with a raster product (and NITF data), a mosaic dataset created using a product description, or for each raster within a mosaic dataset, added using specific raster types.

This information can be found on the **Key Metadata** tab on the ***Properties*** dialog box. Properties such as sensor name, product name, acquisition date, data type, cloud cover, sun information, sensor information, and wavelength is available, if it exists, in the metadata files.

Rendering

ArcGIS has improved the default display of raster data. For starters, if a dataset doesn't have statistics—which are used to enhance the appearance—ArcGIS will generate them from a sampling of pixels in the dataset. Also, ArcGIS now applies rendering settings based on the raster properties and available metadata. The **Source Type** raster property is used to determine default rendering and display resampling—this property is also editable. For raster products or data with particular key metadata, the information is used to apply specific rendering to the data.

The Esri stretch method was added, which analyzes the statistics and histogram and applies a modified sigmoid stretch. This method is useful in providing a good overall stretch with imagery, by preventing pixel values from being stretched to the extreme. Because it isn't a linear stretch, you cannot use the new Interactive Histogram Stretch tool or apply a gamma adjustment.

Additions to the Image Analysis window

There are new tools on the ***Image Analysis*** window, including the Interactive Histogram Stretch tool and the Add Function button.

- The Interactive Histogram Stretch allows you to interactively enhance the raster data in your map by adjusting the minimum and maximum range of values to which the stretch is applied.
- Functions allow you to define processing that is applied to the raster data on the fly; therefore, they can be applied quickly without enduring the time to create a processed product on disk. Functions are organized within a function chain allowing you to create various processed products by chaining together multiple functions. They can be applied to various raster data, including raster datasets, mosaic datasets, and image services.

New or improved tools or capabilities

Many new tools and capabilities have been added to improve all aspects of working with raster data in ArcGIS: for analysis, display, management, and serving.

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Image mensuration

The ***Image Analysis*** window provides a set of tools for image mensuration, including tools to measure point, distance, angle, height, perimeter, and area from an image (raster dataset or mosaic dataset) with sensor information (or geodata transformation).

Learn about mensuration

Geoprocessing additions

There are several new raster geoprocessing tools:

- Alter Mosaic Dataset Schema
- Analyze Mosaic Dataset
- Build Mosaic Dataset Item Cache
- Delete Mosaic Dataset
- Download Rasters
- Edit Raster Function
- Export Mosaic Dataset Paths
- Set Mosaic Dataset Properties
- Set Raster Properties
- Warp From File

Many new tools have been updated with enhancements, and all core raster tools now accept a mosaic dataset as input, when applicable.

Pan-sharpening

The Gram-Schmidt pan-sharpening method has been added. This is based on a general algorithm for vector orthogonalization-the Gram-Schmidt Orthogonalization. This algorithm takes in vectors (for example, 3 vectors in 3D space) that are not orthogonal in the beginning, and then rotates them so that they are orthogonal afterwards. In case of images, each band (panchromatic, red, green, blue, and infrared) corresponds to one high dimensional vector (#dimensions = #pixels).

Learn more about pan-sharpening

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Additional raster function capabilities

Not only have new functions been added, but the usability of the functions has expanded.

- The ***Image Analysis*** window makes it easier to add functions to raster layers in ***ArcMap*** with the **Add Function** button .
- A batch editor improves the capability to edit functions on mosaic datasets and their rasters.
- Raster function templates (.rft.xml) can be generated, allowing you to chain functions together and save them. They can then be applied to rasters, image services, and mosaic datasets.

New raster functions:

- Apparent Reflectance
- Attribute Table
- Band Arithmetic
- Cached Raster
- Contrast And Brightness
- LAS To Raster
- Las Dataset To Raster
- Merge Rasters
- Radar Calibration
- Remap
- Reproject
- Speckle
- Tasseled Cap
- Terrain To Raster

Improved georeferencing

The georeferencing user experience has been enhanced with new and improved tools that provide more capabilities and better workflows. For example,

- An Auto Registration tool helps you automatically find links to georeference your image against a referenced image.
- A new viewer window that allows you to display the data side by side makes image-to-image registration easier.
- An Auto Complete option helps you identify control points between two raster datasets.
- The link table is enhanced with new and improved tools to collect control points.
- Images can be registered in pixel space.
- An image service layer can be georeferenced.

See all the georeferencing tools.

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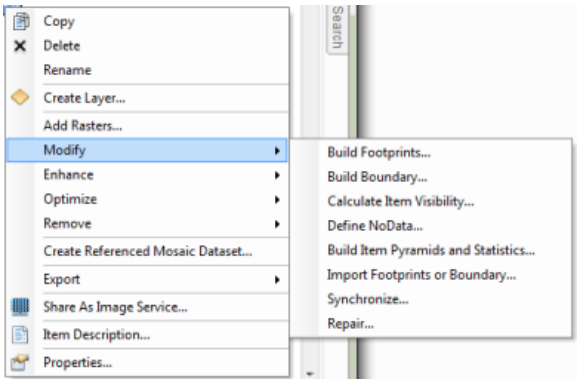
Improvements to mosaic datasets

The workflows and tools for creating and editing mosaic datasets have been enhanced, including improved generation of seamlines and footprints, support for more raster types, additional properties, and tools to analyze the mosaic dataset for known errors or limitations.

- Raster types, such as LAS and RADARSAT-2, have been added, and several have been improved to create better outputs when using some templates and functions, such as pan sharpening and stretching.
- Functions have been added and others improved.
- Additional tools, such as Set Mosaic Dataset Properties and Delete Mosaic Dataset, are now available and others have been improved, such as Build Seamlines, Analyze Mosaic Dataset, and Synchronize Mosaic Dataset.
- batch editing functionality gives you the ability to edit a particular raster function on all your mosaic dataset items at once. This eliminates the need to go into each individual item to edit the function.
- The mosaic dataset's context menu (in the Catalog window) has been redesigned to provide immediate access to the tools most frequently used.



Mosaic datasets are versioned. The following table describes how they are supported:

Client	10.0 mosaic dataset	10.1 mosaic dataset
10.0	Full (read/modify/create)	Not supported
10.1	Read-only	Full (read/modify/create)

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You can upgrade a mosaic dataset to a higher version using the Upgrade Dataset tool.

Seamlines

The Build Seamlines tool has a new method that determines the optimum location of seamlines between images. Seamlines improve a mosaicked image by defining natural or less-obvious joins between images, such as along natural paths like rivers, or boundaries like grass and pavement, and not cutting across buildings. The tool will perform an analysis of overlapping images and determine the path for the seamlines where they will be least perceivable. Where necessary, the seamlines can be edited using the editing tools. Also, the pixels in the images along the seamlines can be blended to make the seamline less perceivable.

Footprints

The Build Footprints tool can generate more accurate footprints to better represent the outline of the data.

Analyzer

The Mosaic Dataset Analyzer tool examines your mosaic dataset to look for commonly known anomalies and report them as errors and warnings along with suggestions to resolve problems and optimize performance. Individual items are analyzed to check for invalid parameters or incorrectly constructed function chains. The tool also performs visibility analysis on the mosaic dataset, checks validity of overviews, and makes general recommendations to improve the performance if the dataset is published.

Synchronize

The Synchronize Mosaic Dataset tool has had many new parameters added to improve the capabilities of the tool. For example, you can choose to update specific fields and build a cache for any LAS items in the mosaic dataset.

Properties

Support for additional properties in all raster data has improved, such as the addition of the key metadata highlighted earlier. Like the raster product support, you can define a mosaic dataset product definition. The product definition allows you to customize the mosaic dataset to contain data with a specific number of bands and wavelengths, such as a three-band natural color mosaic dataset or QuickBird dataset. The product definition controls how the data is added to the mosaic dataset, how it displays by default, and aids in some processing.

Learn about the product definition

There are also new mosaic dataset properties, including the cell-size tolerance factor, blend width, and an option to clip or not clip the data to the boundary.

Server

Publishing a service has changed, for example, the ability to analyze data before publishing and creating service definitions to publish your data and maps. You should review the What's New information for ArcGIS

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for Server and review the steps to publish image services. But, beyond these changes, image services have many improved functionalities.

New publishing steps

The steps to publish an image service have changed, including adding the step to analyze your data before it is published. This identifies a number of commonly known errors and warnings and provides suggestions to optimize the image service.

Server-side processing

More server-side processing is allowed. Now, one or more functions (in a function chain) can be defined in a raster function template, which can be published with the image service. This function chain is exposed through SOAP or REST APIs that can be consumed by web clients.

Caching

Image services can be cached directly, like a map service.

Editing

Clients can edit image services, if the permissions are granted, giving them the ability to do the following:

- Add rasters to an image service. The source raster data is uploaded to the server and added to the mosaic dataset.
- Update raster attributes in an image service.
- Delete a raster item within an image service.

Rendering

The image services can have attribute tables, color maps, and histograms. This allows more rendering options when sharing your raster data.

REST enhancements

The image service REST API exposes new resources, including Tile, Attribute Table, Colormap, Histograms, and Metadata. It also exposes new operations, including add rasters, update rasters, delete rasters, mensuration, and compute histograms.

Clustering

This isn't image service specific, but it's useful information, since some image services have intensive processing that utilizes the processing cores of the servers.

By default, every ArcGIS for Server site has one cluster. If you have multiple server machines, you can configure them to operate in a cluster. Each cluster can be configured to run a dedicated set of services. You can identify the cluster on the service parameters when publishing or creating service definition.

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Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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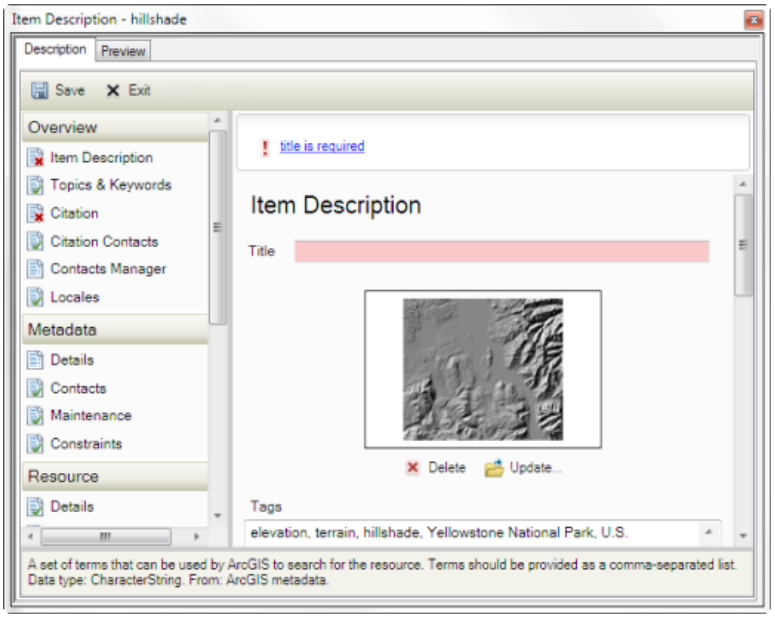
What's new for metadata in ArcGIS 10.1

Creating standard-compliant metadata

All metadata styles provided with ArcGIS other than the Item Description style are designed to support creating formal metadata that follows a specific metadata standard or profile. These metadata styles now include a complete set of rules to guide you in creating metadata that complies with their associated metadata standard or profile.

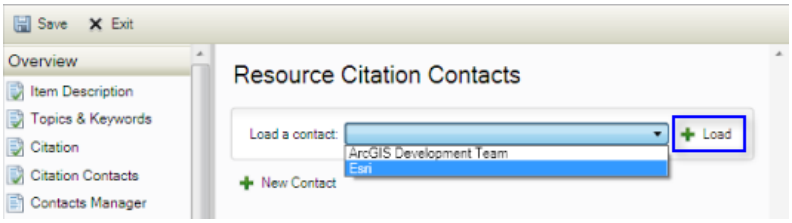
A quick glance at the ArcGIS metadata editor's table of contents is all you need to see which pages you must use to provide required information. For each page with a red X, there will be a list at the top describing the problems occurring on that page. For example, a metadata element might be required for your metadata style, but it has no content. Or an integer might be required in an element, but text or a real number was provided instead.



When all information provided on a page is correct for a style's metadata standard, it will have a green check mark both in the editor's table of contents and at the top of the page.

Saving and loading contact information

Metadata styles that let you edit complete metadata for an item now include a **Contacts Manager** page that lets you save frequently used contact information. Then, on pages where you provide contact information, you can load contact information that was previously saved. This will add a copy of the saved contact information to the item's metadata.



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Exporting metadata to ISO 19139 format

A new ArcGIS to ISO 19139 translator is provided, `ARCGIS2ISO19139.xml`. All ISO-based metadata styles have been updated to use this translator to export ArcGIS metadata to the ISO 19139 XML format. Existing 9.3.1 metadata in the ESRI-ISO format must be upgraded to the ArcGIS metadata format to successfully export the item's metadata content with this translator.

The translator provided in previous releases, `ESRI_ISO2ISO19139.xml`, continues to be provided with the current release of ArcGIS for Desktop. You may continue to use it to export ArcGIS or ESRI-ISO metadata to the ISO 19139 XML format. However, there are several known issues with this translator that can't be resolved. Existing geoprocessing models or Python scripts that export metadata to the ISO 19139 XML format should be updated to use the new translator.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for geoprocessing in ArcGIS 10.1

Geoprocessing packages

You can create geoprocessing packages to share your work. Geoprocessing packages are files that can be uploaded to `arcgis.com` or emailed to colleagues. A package consists of results and each result contains a tool, the data used by the tool, and the environment settings used by the tool. Packages are created by right-clicking a result in the ***Results*** window and choosing **Share As** > **Geoprocessing Package**.

Learn more about geoprocessing packages

Geoprocessing services

You create geoprocessing services by right-clicking a result in the ***Results*** window and choosing **Share As** > **Geoprocessing Service**. This opens the ***Share As Service*** step-by-step wizard and the ***Service Editor*** dialog box. For those of you that published geoprocessing services at 10.0, the major differences are:

- Tool layers in a map document are no longer needed. In fact, creation of tool layers in 10.1 is no longer supported (you can still use them, however).
- The option for right-clicking a toolbox and publishing to ArcGIS server has been removed—you can only publish results.
- You don't have to edit your models to configure them as services—you use the ***Service Editor*** instead. The ***Service Editor*** gives you full control over the definition of the input and output parameters of your service.

Learn more about geoprocessing services

Geodesic buffering

The Buffer tool now creates true geodesic buffers for line and polygon input data. Prior to 10.1, only input point features would create geodesic buffers.

New environment variables

If you develop your own script or model tools, you may be interested to know that there are two new read-only variables you can access from geoprocessing environments: Scratch GDB and Scratch Folder. The Scratch GDB environment variable contains a path to a scratch file geodatabase which is guaranteed to exist when your tool is run. The Scratch Folder environment variable contains a path to a folder that's guaranteed to exist when your tool is run. Other new environment settings are:

- Cartographic Partitions
- NoData
- Resampling Method
- Transfer Domain Descriptions

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Python and ArcPy

Python add-ins

You can now program your own buttons and tools using Python add-ins.

Learn more about Python add-ins

Python toolboxes

Python toolboxes are geoprocessing toolboxes that are created entirely in Python. A Python toolbox and the tools contained within look, act, and work just like toolboxes and tools created in any other way. If you have developed your own Python script tools in the past, you'll be interested in Python toolboxes, for there are a few features of Python toolboxes that are not available with script tools:

- You can implement your own licensing checks.
- You can create Value Table parameters. Value Tables are multicolumn tables that allow you to input multiple values (columns) per row. An example of a Value Table parameter is the **Input Features** parameter of the Union tool.
- You can create your own composite data types from existing data types. For example, you can create a parameter that will accept either a Feature Layer or a Raster Layer.

Learn more about Python toolboxes

New ArcPy modules and functions

The data access module, arcpy.da, is a Python module for working with data. It allows control of the edit session, edit operation, improved cursor support (including faster performance), functions for converting tables and feature classes to and from NumPy arrays, and support for versioning, replicas, domains, and subtypes workflows.

Learn more about the data access module

The Network Analyst module, arcpy.na, is a Python module that provides access to all of the geoprocessing tools available in the Network Analyst toolbox as well as helper functions and classes. You can use this module with other ArcPy modules to automate network analysis workflows using Python.

Learn more about the Network Analyst module

Various enhancements have been made to the mapping module (arcpy.mapping), including access to symbology properties, reporting, and layer time properties. See What's new for automating map workflows in ArcGIS 10.1 for more information.

Other Python functionality

- **Python 2.7:** ArcGIS 10.1 has been upgraded to include the Python 2.7 release.
- **Spatial references:** SpatialReference objects can now be created directly from spatial reference names and authority code (factory code) ID values. Additional functions for supporting spatial references and transformations include ListSpatialReferences and ListTransformations.
- **New geometry methods:** Geometry classes now support:

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  - Topological operators (boundary, buffer, clip, convexHull, difference, distanceTo, intersect, symmetricDifference, and union)
  - distanceTo, projectAs and positionAlongLine methods
  - Methods for accessing geodesic lengths and areas (getLength and getArea)
- **Geodatabase administration:** New functions, AcceptConnections, DisconnectUser and ListUsers, to support geodatabase administration workflows.
- **Geoprocessing tool history:** In Python, you can determine whether history logging is active and turn it on or off using GetLogHistory and SetLogHistory functions.
- **Alias names:** The AlterAliasName function can be used to update alias names on tables or feature classes.
- **Named arguments:** ArcPy functions now support named arguments.
- **Describe properties:** A new set of properties for Editor tracking datasets.
- **WKB:** New FromWKB function for creating geometry from well-known binaries (WKB).
- **WKT:** New FromWKT function for creating geometry from well-known text (WKT).

Related Topics

3D Analyst toolbox
Analysis toolbox
Cartography toolbox
Conversion toolbox
Coverage toolbox
Data Interoperability toolbox
Data Management toolbox
Data Reviewer toolbox
Defense Mapping toolbox
Editing toolbox
Geocoding toolbox
Geostatistical Analyst toolbox
Linear Referencing toolbox
ModelBuilder toolbox
Multidimensional toolbox
Nautical toolbox
Network Analyst toolbox
Parcel Fabric toolbox
Production Mapping toolbox
Schematics toolbox
Server toolbox
Spatial Analyst toolbox
Spatial Statistics toolbox
Tracking Analyst toolbox

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What's new in the 3D Analyst toolbox

With the introduction of the LAS dataset and increased demand for additional 3D analytical operations, the 3D Analyst toolbox at 10.1 features eight new tools along with numerous performance and functionality improvements to existing tools.

Toolset changes

Several new toolsets have been introduced at 10.1 to accommodate new tools and reorganize existing ones into logical groupings that emphasize their utility.

- **3D Features toolset:** two new tools were added and several tools that previously resided in this toolset were moved to the newly created Visibility toolset.
- **Conversion toolset:** includes the new From LAS Dataset toolset that contains the LAS Dataset To TIN tool.
- **Data Management toolset:** contains tools for creating and managing terrain, TIN, and LAS datasets.
- **Functional Surface toolset:** includes the new Intersect 3D Line With Surface and Stack Profile tools.
- **Triangulated Surface toolset:** renamed from Terrain and TIN Surface due to the LAS dataset support provided by the Locate Outliers tool.
- **Visibility toolset:** contains the new Sun Shadow Volume tool along with several existing tools that previously resided in other toolsets:
  - Construct Sight Lines
  - Line Of Sight
  - Observer Points
  - Skyline
  - Skyline Barrier
  - Skyline Graph
  - Viewshed

New tools

Toolset	Tool	Description
3D Features toolset	Buffer 3D	Creates a 3D buffer around point or line features.
Enclose Multipatch	Creates closed multipatch features in the output feature class using the features of the input multipatch.	
Conversion > From LAS Dataset toolset	LAS Dataset to TIN	Exports a triangulated irregular network (TIN) from a LAS dataset.

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Data Management > LAS Dataset toolset	Change LAS Class Codes	Modifies the class code values of LAS files referenced by a LAS dataset.
Set LAS Class Codes Using Features	Classifies data points in LAS files referenced by a LAS dataset using point, line, and polygon features.	
Functional Surface toolset	Intersect 3D Line With Surface	Computes the geometric intersection of 3D line features and one or more surfaces to return the intersection as segmented line features and points.
Stack Profile	Creates a table and optional graph denoting the profile of line features over one or more multipatch, raster, TIN, or terrain surfaces.	
Visibility toolset	Sun Shadow Volume	Creates a feature class that models shadows cast by each input feature using sunlight for a given date and time.

Improved tools

Several tools were enhanced to provide a more robust experience with airborne lidar data in the LAS format by supporting the LAS dataset as an input surface:

- Add Surface Information
- Interpolate Shape
- Locate Outliers
- Line of Sight
- Skyline

Additional tool changes include the following:

Tool	Improvement
Add Surface Information	Supports polygon as an input feature, thereby allowing the summary of surface characteristics by area.
Construct Sight Lines	OBSRVR_OID field added to the attribute table of the output feature class which helps identify the unique ID of the observer point used for constructing the sight lines.
Difference 3D	An optional output table can be created to establish the link between each feature in the difference output, the originating feature, and the subtraction feature used to create the output. This table could be used to establish a relationship class that maps to the attributes of each contributing feature class.
Import 3D Files	An optional anchor point feature can be provided to align the imported 3D models within a given coordinate system.
Intersect 3D (3D Analyst)	Provides for the specification of the output geometry, thereby offering a wider range of applications for the tool. The available options are: • SOLID—Creates a closed multipatch representing the overlapping volumes between input features. This is the default. • SURFACE—Creates a multipatch surface representing shared faces between input features. • LINE—Creates a polyline feature class representing shared edges between input features.
LAS to Multipoint	A new option has been added for specifying that input folders will be recursively scanned to read LAS files in their subdirectories, thereby allowing one parent folder to be entered as an input in lieu of numerous child folders.

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Line of Sight	OBSTR_MPID field added to the attribute table of the output feature class which identifies the unique ID of a multipatch obstruction.
Point File Information	A new option has been added that returns an improved point spacing estimate for LAS files.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Analysis toolbox

A number of changes were made to the Analysis toolbox at 10.1, including two new tools in the Statistics toolset; improvement to the Buffer tool to allow the creation of geodesic buffers for points, lines, and polygons; general improvement in large overlay performance; and better support for data stored in ArcSDE geodatabases.

Toolset changes

No new toolsets were added.

New tools

Toolset	Tool	Description
Statistics toolset	Polygon Neighbors	Creates a table with statistics based on polygon contiguity (overlaps, coincident edges, or nodes).
Tabulate Intersection	Computes the intersection between two feature classes and cross-tabulates the area, length, or count of the intersecting features.	

Improved tools

Tool	Improvement
Buffer	Geodesic buffers can now be generated for all feature types (points, lines, and polygons).
Spatial Join	A number of new match options have been added for determining the spatial relationship between two feature classes, including INTERSECT_3D, WITHIN_A_DISTANCE, WITHIN_A_DISTANCE_3D, COMPLETELY_CONTAINS, and CONTAINS_CLEMENTINI.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Cartography toolbox

At version 10.1, many of the generalization and graphic conflict resolution tools in the Cartography toolbox can be enabled for partitioning to allow them to process much larger datasets. Partitioning dynamically subdivides input data for processing, ensuring that a seamless result is output. Partitioning is controlled by polygon features specified in the Cartographic Partitions geoprocessing environment variable.

The following tools can be enabled for partitioning:

- The Aggregate Polygons tool
- The Collapse Road Detail tool
- The Delineate Built-Up Areas tool
- The Detect Graphic Conflict tool
- The Merge Divided Roads tool
- The Resolve Building Conflicts tool
- The Resolve Road Conflicts tool
- The Thin Road Network tool

Learn more about generalizing large datasets using partitions

New tools

Toolset	Tool	Description
Generalization toolset	Collapse Road Detail	Collapses small, open configurations of road segments that interrupt the general trend of a road network, such as traffic circles, for example, and replaces them with a simplified depiction.
Create Cartographic Partitions	Creates a mesh of polygon features that cover the input feature class where each polygon encloses no more than a specified number of input features, determined by the density and distribution of the input features.	
Delineate Built-Up Areas	Creates polygons to represent built-up areas by delineating densely clustered arrangements of buildings on small-scale maps.	

Improved tools

Tool	Improvement
Aggregate Polygons	• A new parameter called **Barrier Features** has been added to identify lines or polygons over which input features cannot be aggregated. • The output table that is generated has been exposed as an optional parameter, **Output Table**, allowing the name and location to be explicitly specified.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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Conversion toolbox

New and improved tools for the Conversion toolbox at 10.1.

Toolset changes

The From GPS toolset was introduced to contain tools that create features from GPS files.

New tools

Toolset	Tool	Description
From GPS toolset	GPX To Features	Converts GPX files into features.
To Raster toolset	LAS Dataset To Raster	Creates a raster using elevation, intensity, or RGB values stored in the lidar files (`*.las`) referenced by the LAS dataset.

Improved tools

Tool	Improvement
KML To Layer	New parameter: **Include Ground Overlay**. If the KML contains ground overlays (for example, rasters or aerial photos) they can be converted to a raster catalog inside the file geodatabase.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Coverage toolbox

There are no changes for the Coverage toolbox at version 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Data Interoperability toolbox

There are no changes to the Data Interoperability toolbox at version 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Data Management toolbox

New and improved tools for the Data Management toolbox at 10.1.

Toolset changes

- **Attachments toolset**—This new toolset contains five new tools for enabling, disabling, adding, and removing attachments from a geodatabase table or feature class.
- **Distributed Geodatabase toolset**—This toolset contains two new tools for working with XML workspace documents.
- **Fields toolset**—This toolset contains two new tools for managing editor tracking: Disable Editor Tracking and Enable Editor Tracking. There is also a new tool to add a database-maintained identifier column on a database table: Add Incrementing ID Field.
- **File Geodatabase toolset**—The Compact tool was moved to this toolset from the Database toolset.
- **Geodatabase Administration toolset**—This toolset was named the Database toolset in previous releases. This toolset contains seven new tools to manage geodatabases. A few of these tools also work on databases. The Clear Workspace Cache tool was moved to the Workspace toolset. The Compact tool was moved to the File Geodatabase toolset.
- **Geometric Network toolset**—This new toolset contains tools for creating geometric networks, adding and removing connectivity rules, and tracing the network.
- **LAS Dataset toolset**—This new toolset contains tools for creating and managing LAS datasets. The LAS dataset is a new data type designed to provide rapid visualization and analysis on airborne lidar data in the LAS format.
- **Layers and Table Views toolset**—This toolset contains new tools for creating Query Layers and LAS Dataset Layers.
- **Package toolset**—This toolset contains new tools for consolidating and packaging geoprocessing results and locators, as well as tool for creating map tile packages.
- **Photos toolset**—This new toolset contains tools for matching digital photo files to table records (such as GPS points) based on a timestamp, and creating new point feature classes from the coordinate information stored in GPS-enabled or geotagged digital photos.
- **Workspace Toolset**–This toolset contains two new tools (Create Spatial Type and Create Database Connection) as well as one tool (Clear Workspace Cache) that was in the Database toolset at the prior ArcGIS release.

New tools

Toolset	Tool	Description

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Attachments toolset	Add Attachments	Adds file attachments to the records of a geodatabase feature class or table. The attachments are stored internally in the geodatabase in a separate attachment table that maintains linkage to the target dataset. Attachments are added to the target dataset using a match table that dictates for each input record (or an attribute group of records) the path to a file to add as an attachment to that record.
Disable Attachments	Disables attachments on a geodatabase feature class or table. Deletes the attachment relationship class and attachment table. Learn more about geodatabase attachments Learn more about working with the Attachments geoprocessing tools	
Enable Attachments	Enables attachments on a geodatabase feature class or table. Creates the necessary attachment relationship class and attachment table that will internally store attachment files.	
Generate Attachment Match Table	ArcGIS geoprocessing tool that creates a match table to be used with the Add Attachments and Remove Attachment tools.	
Remove Attachments	Removes attachments from geodatabase feature class or table records. Since attachments are not actually stored in the input dataset, no changes will be made to that feature class or table, but rather to the related geodatabase table that stores the attachments and maintains linkage with the input dataset. A match table is used to identify which input records (or attribute groups of records) will have attachments removed.	
Fields Toolset	Add Incrementing ID Field	The Add Incrementing ID Field tool adds a database-maintained ID field to an existing table or feature class in an IBM DB2, Microsoft SQL Server, Oracle, or PostgreSQL database. This type of field is required on all feature classes or tables you plan to edit through a feature service.
Disable Editor Tracking	Disables editor tracking on a feature class, table, mosaic dataset, or raster catalog.	
Enable Editor Tracking	Enables editor tracking for a feature class, table, mosaic dataset, or raster catalog.	
Distributed Geodatabase toolset	Export XML Workspace Document	Creates a readable XML document of the geodatabase contents.
Import XML Workspace Document	Imports the contents of an XML workspace document into an existing geodatabase.	
Geodatabase Administration toolset	Analyze Datasets	Updates database statistics of base tables, delta tables, and archive tables, along with the statistics on those tables' indexes. This tool is used in enterprise geodatabases to help get optimal performance from the RDBMS's query optimizer. Stale statistics can lead to poor geodatabase performance.

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Create Database User	The Create Database User tool creates a database user with privileges sufficient to create data in the database.	
Create Enterprise Geodatabase	The Create Enterprise Geodatabase tool creates a database, storage locations, and a database user to be used as the geodatabase administrator and owner of the geodatabase depending on the database management system (DBMS) used. It grants the geodatabase administrator privileges required to create a geodatabase, then creates a geodatabase in the database.	
Create Role	The Create Role tool creates a database role and lets you add users to or remove users from the role.	
Enable Enterprise Geodatabase	The Enable Enterprise Geodatabase tool creates geodatabase system tables, stored procedures, functions, and types in an existing enterprise database, thereby enabling geodatabase functionality in the database.	
Rebuild Indexes	Updates indexes of datasets and system tables stored in an enterprise geodatabase. This tool is used in enterprise geodatabases to rebuild existing attribute or spatial indexes. Out-of-date indexes can lead to poor geodatabase performance.	
Upgrade Dataset	Upgrades the schema of a mosaic dataset, network dataset, or parcel fabric to the current ArcGIS release. Upgrading the dataset allows the dataset to make use of new functionality available in the current software release.	
Geometric Network toolset	Add Edge-Edge Connectivity Rule to Geometric Network	Adds an edge-edge connectivity rule to a geometric network.
Add Edge-Junction Connectivity Rule to Geometric Network	Adds an edge-junction connectivity rule to a geometric network.	
Create Geometric Network	Creates a geometric network in a geodatabase using the specified feature classes, role for each feature class, and the specified weights with weight associations.	
Remove Connectivity Rule From Geometric Network	Removes a connectivity rule from the geometric network.	
Remove Empty Feature Class from Geometric Network	Removes an empty feature class from a geometric network.	
Trace Geometric Network	Solves the specified network analysis problem based on the flags, barriers, and specified weight properties.	
Set Flow Direction	Sets the flow direction for a geometric network based on either the digitized direction or the source/sink settings in the geometric network.	

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LAS Dataset toolset	Create LAS Dataset	Creates a LAS dataset referencing one or more LAS files and optional surface constraint features.
Add Files To LAS Dataset	Adds references for one or more LAS files and surface constraint features to a LAS dataset.	
Remove Files From LAS Dataset	Removes one or more LAS files and surface constraint features from a LAS dataset.	
LAS Dataset Statistics	Calculates or updates statistics for a LAS dataset and generates an optional statistics report.	
LAS Point Statistics As Raster	Creates a raster whose cell values reflect statistical information about measurements from LAS files referenced by a LAS dataset.	
Layers and Table Views toolset	Make Query Layer	Creates a query layer from a DBMS table based on an input SQL select statement.
Package toolset	Consolidate Result	Consolidates one or more geoprocessing results into a specified output folder.
Package Result	Packages one or more geoprocessing results, including all tools and input and output datasets, into a single compressed file (`.gpk`).	
Consolidate Locator	Consolidate a locator or composite locator by copying all locators into a single folder.	
Package Locator	Package a locator or composite locator to create a single compressed `.gcpk` file.	
Create Map Tile Package	Generates tiles from a map document and packages the tiles to create a single compressed `.tpk` file.	
Photos toolset	GeoTagged Photos To Points	Creates points from the x-, y-, and z-coordinate information stored in geotagged photos. Optionally adds photo files to features in the output feature class as geodatabase attachments.
Match Photos To Rows By Time	Matches photo files to table or feature class rows according to the photo and row time stamps. The row with the time stamp closest to the capture time of a photo will be matched to that photo. Creates a new table containing the ObjectIDs from the input rows and their matching photo paths. Optionally adds matching photo files to the rows of the input table as geodatabase attachments.	
Topology toolset	Export Topology Errors	Exports the errors from a geodatabase topology to the target geodatabase. All information associated with the errors and exceptions, such as the features referenced by the error or exception, are exported. Once they are exported, the feature classes can be accessed using any license level of ArcGIS. The feature classes can be used with the ***Select by Location*** dialog box or the Select Layer By Location tool and can be shared with other users who do not have access to the topology itself.

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Versions toolset	Reconcile Versions	Reconciles a version or multiple versions against a target version.
Create Versioned View	Creates a versioned view on a table or feature class.	
Workspace_toolset	Create Database Connection	Creates a connection file that can be used to connect to an enterprise database or ArcSDE geodatabase.
Create Spatial Type	The Create Spatial Type tool adds the ST_Geometry SQL type, subtypes, and functions to an Oracle or PostgreSQL database. This allows you to use the ST_Geometry SQL type to store geometries in a database that does not contain a geodatabase. This tool also can be used to upgrade an existing ST_Geometry installation in an Oracle or PostgreSQL database.	

Improved tools

Geodatabase Administration

Tool	Improvement
Register With Geodatabase	Prior to ArcGIS 10.1, database tables and feature classes had to be registered with ArcSDE using an ArcSDE command line utility before they could be registered with the geodatabase. Database tables and feature classes can now be registered with the geodatabase in one step.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Data Reviewer toolbox

Two ArcGIS Data Reviewer tools changed during the 10.1 release. Changes included usability and stability improvements.

Toolset changes

No new toolsets were added.

Improved tools

Note: The following three tools have been reengineered for the ArcGIS 10.1 release. Models built in previous versions of ArcGIS will not work at the 10.1 release. You will have to repair these models by referencing the new version of these tools.
Learn more about repairing a model

Tool	Improvement
Create Reviewer Session	Changes include the following: • Reengineered from a script tool to a built-in tool. • Added session_template input parameter. • Added session derived output parameter.
Execute Reviewer Batch Job	Changes include the following: • Reengineered from a script tool to a built-in tool. • Changed session_name parameter to session. A session includes session name and the numeric session identifier: "Session 1 : Test Session." • Changed production_database parameter name to production_workspace. • Removed version parameter. The production_workspace parameter contains the geodatabase version. • Added processing_area parameter. This parameter limits validation to a specified geometry. • Added changed_features parameter. This parameter limits validation to geodatabase change filters. See the tool help for more information.
Write_To_Reviewer_Table	Changes include the following: • Added Review Status parameter. Use this parameter to associate a status string with a set of features that are written to the reviewer table.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Defense Mapping toolbox

The Defense Mapping toolbox at version 10.1 has not significantly changed since version 10 service pack 2. Changes are limited to two tools with different parameter names.

Toolset changes

- **Cartographic Data**: This toolset contains two new tools and a new toolset. The new tools are Populate_Map_Sheet_Info and Create_Smooth_TLM_Elevation_Guide_Bands_from_RasterThe new toolset, Banding, contains three tools: Create_JOG_Elevation_Tints_Bands; Create_Smooth_TLM_Elevation_Guide_Bands_from_Raster; Create_TLM_Elevation_Guide_Bands.
- **Features**: The Features toolset contains a new tool, GAIT.

New tools

Toolset	Tool	Description
Cartographic Data toolset	Create Smooth TLM Elevation Guide Bands from Raster	Creates smooth band features for an Elevation Guide Box surround element. This element is frequently used on defense map products such as Topographic Line Maps (TLMs). Band features refer to elevation bands derived from a raster.
Populate_Map_Sheet_Info	Populates text in defense-specific graphic elements on an ArcMap layout. Text is populated with feature attribute values from a selected area of interest (AOI) feature in the map. The tool searches each graphic element for bracketed ([ ]) text. It compares bracketed text to values in a list. Any matching values are replaced in the graphic element with an attribute value from the selected AOI feature.	
Features_toolset	GAIT	The Geospatial Analysis Integrity Tool (GAIT) validates data against a data model. GAIT checks geometry, feature codes, attribute values and domains, and metadata. The tool writes its results as line and point shapefiles to an output directory. GAIT can execute against data in MGCP, GIFD, TDS, and VMap data models.

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Improved tools

Tool	Improvement
Geodatabase To Shape	The following parameter names have changed: • in_shape_folder to output_folder • in_output_type to coded_value_domain_export_mode
Create TLM Elevation Guide Bands	The following parameter names have changed: • AOI_Feature_Class to AOI_Features • Exclusion_Feature_Classes to Exclusion_Features

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Editing toolbox

There are no changes for the Editing toolbox at version 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Geocoding toolbox

Two new tools were added to the Geocoding toolbox at 10.1 to support packaging and sharing locators.

Toolset changes

No new toolsets were added.

New tools

Tool	Description
Consolidate Locator	Consolidate a locator or composite locator by copying all locators into a single folder.
Package Locator	Package a locator or composite locator to create a single compressed `.gcpk` file.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Geostatistical Analyst toolbox

The new and improved functionality of Geostatistical Analyst in ArcGIS 10.1 includes a new empirical Bayesian kriging tool and a tool that aggregates areal interpolation layers to new polygons.

Learn more about what's new in ArcGIS Geostatistical Analyst 10.1

New tools

Toolset	Tool	Description
Interpolation toolset	Empirical Bayesian Kriging	Empirical Bayesian Kriging is an interpolation method that accounts for the error in estimating the underlying semivariogram through repeated simulations.
Geostatistical Layers toolset	Areal Interpolation Layer To Polygons	Reaggregates the predictions of an Areal Interpolation layer to a new set of polygons.

Improved tools

Tool	Improvement
GA Layer To Points	Added the **Append all fields from input features** parameter. This parameter specifies whether all fields of the input feature class will be copied to the output feature class.

Related Topics

What's new for geoprocessing in ArcGIS 10.1
What's new in ArcGIS Geostatistical Analyst

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What's new in the Linear Referencing toolbox

There are no changes for the Linear Referencing toolbox at version 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the ModelBuilder toolbox

Changes were made to include new data types for the Iterate Field Value, Calculate Value, and Get Field Value tools.

Toolset changes

No new toolsets were added.

New tools

No new tools were added.

Improved tools

Toolset	Tool	Description
Iterator toolset	Iterate Field Value	A number of new data types have been added: Calculator Expression, Cell Size XY, LAS Dataset, LAS Dataset Layer, ServerConnection, and WMS Map.
Model Only toolset	Calculate Value	A number of new data types have been added: Calculator Expression, Cell Size XY, LAS Dataset, LAS Dataset Layer, ServerConnection, and WMS Map.
Model Only toolset	Get Field Value	A number of new data types have been added: Calculator Expression, Cell Size XY, LAS Dataset, LAS Dataset Layer, ServerConnection, and WMS Map.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Multidimensional toolbox

No changes to the Multidimensional toolbox at 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Nautical toolbox

The Nautical Solution toolbox experienced significant changes at the 10.1 release. Tools were added to and removed from the Cartography toolset. The S-57 toolset was removed.

Toolset changes

Two tools were added to the Cartography toolset. Several tools were removed from the Cartography toolset. You still have access to these tools, as they are in other toolsets. Tools removed include the following:

- Calculate Visual Specifications—Available in the **Production Mapping toolbox** > **Symbology toolset**
- Feature Outline Masks—Available in the **Cartography Tools toolbox** > **Masking tools toolset**
- Intersecting Layer Masks—Available in the **Cartography Tools toolbox** > **Masking tools toolset**
- Make Grids and Graticules Layer—Available in the **Cartography Tools toolbox** > **Grids and Graticules toolset**
- Magnetic Calculator—Available in the **Production Mapping toolbox** > **Cartographic Data** > **Magnetic toolset**

The S-57 toolset has been removed. The **Export Nautical Product** command in the ***Product Library*** window provides similar functionality.

New tools

Toolset	Tool	Description
Cartography toolset	Generate Annotation Masks	Generates polygon masks for annotation features that intersect other polygon features. This tool supports nautical cartographic workflows that require masking based on geographic coincidence to specified input features. The specified input features (those that intersect the input annotation features) can be polygons or polylines from the Esri Nautical Solution data model or other sources.
Generate Cartographic Limits	Limits the display of features that are coincident with a coastline to the seaward limit of those features. This tool improves the display of digital and hard copy nautical charts by reducing the number of coincident features along a coastline and eliminating masks. This decreases drawing and export times of nautical products.	

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Network Analyst toolbox

Several new tools and a Server toolset are included in the Network Analyst toolbox at 10.1. In all, five tools were added. Two tools were added to support new live-traffic capabilities. Two more were added to make it easier to set up and publish network analysis services for service areas and vehicle routing problems. And one tool, Copy Traversed Source Features, was added to make it easy to extract the source features of the network dataset that were traversed in a network analysis.

Toolset changes

- **Server toolset:** This new toolset contains tools to facilitate the creation of web services for solving vehicle routing problems and generating service areas. It also contains tools for downloading live traffic data from the web services of data providers.

New tools

Toolset	Tool	Description
Server toolset (New)	Generate Service Areas	Creates a service area network analysis layer, sets the analysis properties, and solves the analysis. This tool is ideal for setting up a service area geoprocessing service on the web. A network service area is a region that encompasses all streets that can be accessed within a given distance or travel time from one or more facilities.
Solve Vehicle Routing Problem	Creates a vehicle routing problem (VRP) network analysis layer, sets the analysis properties, and solves the analysis, which is ideal for setting up a VRP web service. A vehicle routing problem analysis layer finds the best routes for a fleet of vehicles.	
Update Traffic Data	Downloads live traffic data from a web service and stores it in a dynamic traffic format (DTF) file, which is a file that network datasets can read for live-traffic analysis and display.	
Update Traffic Incidents	Creates a point feature class containing live traffic-incident data from a web service. Traffic incidents include events such as accidents and road construction.	
Network Analysis toolset	Copy Traversed Source Features	Creates two feature classes and a table, which together contain information about the edges, junctions, and turns that are traversed while solving a network analysis layer.

Improved tools

Tool	Improvement
Make Service Area Layer	Now you have the option to solve service areas using a network hierarchy.
Make Location Allocation Layer	Solve capacitated location-allocation problems using a new problem type: Maximize Capacitated Coverage. Now facilities have a Capacity property to limit how much demand can be allocated to facilities. This makes it possible to solve computationally complex problems, such as choosing the best sites for new schools or hospitals while considering, among other constraints, their student or patient capacity. You can also use capacitated location-allocation to simply allocate demand to existing facilities without choosing new ones.

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• Make Closest Facility Layer • Make Location Allocation Layer • Make OD Cost Matrix Layer • Make Service Area Layer	At ArcGIS 10, only the route and vehicle routing problem analysis layers supported time-dependent solves. At version 10.1, all the other network analysis layers have been enhanced to support traffic data as well.
Solve	Simplifying geometries can reduce the number of vertices and make it faster to transfer and draw geographic data. This is especially useful when working in a server environment. With 10.1, you can solve your network analysis layers and choose to simplify the output.
Directions	Directions can now be generated for a language that you choose.

Deprecated Tools

Upgrade Dataset was introduced at ArcGIS 10.1 as a single replacement for the Upgrade Network tool and other similar upgrade tools that were tailored for specific dataset types. If you need to upgrade a network dataset to the latest ArcGIS version and take advantage of new functionality, use Upgrade Dataset. (You won't have to re-create any existing scripts or models that reference Upgrade Network; they will continue to work.)

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Parcel Fabric toolbox

At version 10.1, we added new tools to support the copying and appending of parcels to and from parcel fabrics.

Toolset changes

- **Parcel Features toolset:** This new toolset contains tools that are used to copy and append parcels to and from parcel fabrics.

New tools

Toolset	Tool	Description
Parcel Features toolset (New)	Append Parcel Fabric	Appends one or multiple parcel fabrics into an existing target parcel fabric. The spatial reference of the input parcel fabrics must match the spatial reference of the target parcel fabric.
Copy Parcel Fabric	Copies parcels from the input parcel fabric dataset or layer to a new parcel fabric.	

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Production Mapping toolbox

The Production Mapping toolbox has significant changes at the 10.1 release. Usability and stability improvements were made to two tools: Magnetic Calculator and Calculate Visual Specifications. The Magnetic Isolines and Apply View tools were removed from the Production Mapping toolbox. A new toolset, Product Library, introduces 11 new tools that help you manage the Product Library.

Toolset changes

- **Magnetic Toolset (Cartographic Data)**—The Magnetic Isolines tool has been removed from this toolset. This tool was reworked into a geoprocessing model and placed on the ArcGIS Resource Center.
- **Product Library toolset**—This new toolset contains 11 new tools to help you manage the Product Library.
- **Symbology**—The Apply View tool has been removed from this toolset. Use the Production Symbology toolbar to manage and apply views. Existing models that use this tool will break at ArcGIS 10.1. You must repair any models that use this tool.
  Learn more about repairing models

New tools

Toolset	Tool	Description
Product Library toolset	Attach Database	Attaches a .mdf file to an instance of SQL Server Express. This creates a geodatabase from the input .mdf file. Detach and attach allow you to move geodatabases between instances of SQL Server Express.
Checkin File	Checks a file back into a Product Library.	
Checkout File	Checks out a file from a Product Library.	
Create Product Library	Creates a new product library in a geodatabase.	
Create Production Database	Creates a new production database within a geodatabase. A production database stores tables used by Esri Mapping and Charting Solutions. Esri Production Mapping, Esri Defense Mapping, and the Esri Aeronautical Solution store different data models in their production databases. These data models describe hard-copy maps or charts based on product specifications.	
Detach Database	Detaches a SQL Server Express geodatabase (.mdf).	
Get Local Copy	Gets a local copy of a file stored inside the Product Library. It allows you to view or edit a file without exclusively locking the file in a Product Library. Changes made to the local copy are not tracked in the Product Library.	
List Files	Returns a list of files associated with a node in the Product Library Tree.	
List Items	Returns a list of child items that are associated with a node in the Product Library Tree.	

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Upgrade Product Library	Upgrades a product library schema.	
Upgrade Production Database	Upgrades a production database schema. A production database stores tables used by Esri Mapping and Charting Solutions. Esri Production Mapping, Esri Defense Mapping, and the Esri Aeronautical Solution store different data models in their production databases. These data models describe hard-copy maps or charts based on product specifications.	

Improved tools

Tool	Improvement
Magnetic Calculator	The tool's signature has changed. Some parameters were removed and others renamed. The following parameters have been removed: • in_SQL_Set—Use any selection tools, such as Select Layer By Attribute, to select features. • in_linear_unit and in_altitude—These were combined into a single altitude parameter. • out_feature_class—The tool calculates magnetic values on the input features only. Use Copy Features to create a copy of **Input Features**. • All individual magnetic field parameters such as in_output_declination_field have been replaced with a value table of field names and magnetic components.
Calculate Visual Specifications	The tool's signature has changed. The selected_only parameter was removed; the tool will run against any existing selection set. Other parameters were renamed.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Schematics toolbox

There are no changes for the Schematics toolbox at version 10.1.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Server toolbox

A number of changes were made to the Server toolbox at 10.1, including a new toolset for publishing GIS services and a toolset for exporting web maps for printing.

Toolset changes

- **Publishing toolset:** This new toolset contains tools to stage and publish GIS services.
- **Printing toolset:** This new toolset contains a tool that allows you to print the current state of a web map.

New tools

Toolset	Tool	Description
Caching toolset	Manage Map Server Cache Status	Manages internal data kept by the server about the built tiles in a map or image service cache.
Printing toolset (New)	Export Web Map	This tool takes the state of a web application (for example, included services, layer visibility settings, and client-side graphics) and returns a printable page layout or basic map of the specified area of interest.
Publishing toolset (New)	Sign In To Portal	Allows you to sign in to portals. If you are publishing to an ArcGIS Online portal you need to be signed in to ArcGIS Online in order to publish. For those organizations that would like to use ArcGIS Online behind the firewall or in their own private cloud, there is a version that you can install and use on your own computer networks. It is called Portal for ArcGIS.
Sign Out From Portal	Signs out from the portal that you are currently signed in to. For those organizations that would like to use ArcGIS Online behind the firewall or in their own private cloud, there is a version that you can install and use on your own computer networks. It is called Portal for ArcGIS.	
Stage Service	Stages a service definition. A staged service definition (`.sd`) file contains all the necessary information needed to publish a GIS service, including data that must be copied to the server because it does not appear in the server's data store.	
Upload Service Definition	Uploads and publishes a GIS service to a specified GIS server based on a staged service definition (`.sd`) file.	

Improved tools

Tool	Improvement
Caching toolset	Various tools in the Caching toolset have been updated to support ArcGIS Online caching and the new ArcGIS for Server user experience for caching at 10.1. Some of these changes affect parameter order, naming, and keywords. If you use Python scripts for caching, they may require migration and should be carefully checked against the 10.1 documentation and sample scripts.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Spatial Analyst toolbox

While there are no new tools for Spatial Analyst, there have been improvements in stability and speed.

The Topo to Raster and Topo to Raster by File tools now use an updated version of ANUDEM.

Improved tools

Tool	Improvement
Line Statistics	Added new Length parameter. Removed the Standard Deviation statistic parameter, which was mistakenly present in previous versions of ArcGIS.
Topo to Raster Topo to Raster by File	Topo to Raster uses the latest version of ANUDEM (5.3) which has many additions and improvements over the previous version of ANUDEM (4.6.3). The improvements include: • The lake boundary algorithm has been upgraded to enable automatic determination of lake heights that are fully compatible with connecting stream lines and neighboring elevation values. • Cliff lines, which permit a complete break in continuity between neighboring cells, are now supported. • Improved representation of DEMs near coastlines which ensure that cells near the coast have non-negative elevations is also included in this new version. • Three new output feature classes that can be used to assess the quality of the fitted DEM, for optimizing DEM resolution and for detecting errors in the input data have been added.

Related Topics

What's new for geoprocessing in ArcGIS 10.1
What's new in ArcGIS Spatial Analyst

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What's new in the Spatial Statistics toolbox

The Spatial Statistics toolbox has three new tools in 10.1, including: Incremental Spatial Autocorrelation for choosing an appropriate scale of analysis, Exploratory Regression for finding a properly specified OLS model, and Grouping Analysis for finding natural groups in your data based on multiple attributes, and both space and time relationships. There are also several improved tools in 10.1, including a new PDF report for Ordinary_Least_Squares and the ability to create Space/Time relationships using Generate_Spatial_Weights_Matrix.

Toolset changes

No new toolsets were added.

New tools

Toolset	Tool	Description
Analyzing Patterns toolset	Incremental Spatial Autocorrelation	Measures spatial autocorrelation for a series of distances and optionally creates a line graph of those distances and their corresponding z-scores. Z-scores reflect the intensity of spatial clustering, and statistically significant peak z-scores indicate distances where spatial processes promoting clustering are most pronounced. These peak distances are often appropriate values to use for tools with a Distance Band or Distance Radius parameter.
Mapping Clusters toolset	Grouping Analysis	Groups features based on feature attributes and optional spatial/temporal constraints.
Modeling Spatial Relationships toolset	Exploratory Regression	The Exploratory Regression tool evaluates all possible combinations of the input candidate explanatory variables, looking for OLS models that best explain the dependent variable within the context of user-specified criteria.

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Improved tools

Tool	Improvement
Cluster_and_Outlier_Analysis	A derived output, source_id, has been added for use in models for joining the output dataset to the original dataset if desired.
Export_Feature_Attribute_to_ASCII	A new parameter, **Add Field Names to Output**, has been added to allow field names to be added to the output text file.
Generate_Spatial_Weights_Matrix	Relationships between features can now be defined using both space and time, using several new parameters. For space/time analyses, select the new `SPACE_TIME_WINDOW` option for the **Conceptualization of Spatial Relationships** parameter. You define space by specifying a **Threshold Distance** value; you define time by specifying a **Date/Time Field** and both a **Date/Time Type** (such as HOURS or DAYS) and a **Date/Time Interval Value**, all of which are new parameters. The **Date/Time Interval Value** is an Integer. For example, if you enter 1,000 feet, select HOURS, and provide a **Date/Time Interval Value** of 3, features within 1,000 feet and occurring within three hours of each other would be considered neighbors.
Hot_Spot_Analysis	A derived output, source_id, has been added for use in models for joining the output dataset to the original dataset if desired.
Ordinary_Least_Squares	A new parameter has been added, **Output Report File**, that allows the user to specify the location of the optional output PDF report. The new PDF report includes the results and diagnostics from the OLS analysis, as well as several graphics to help interpretation.

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in the Tracking Analyst toolbox

At 10.1, two new tools were added to support the analysis of tracking data.

New tools

Tool	Description
Track Intervals To Feature	Calculates values that are computed from the difference between successively ordered features in a track. New fields are added to the input feature class or layer to store the calculated values (distance, duration, speed, and course).
Track Intervals To Line	Calculates values that are computed from the difference between successively ordered features in a track. A new line feature class is created to represent the track intervals and store the calculated values (distance, duration, speed, and course).

Related Topics

What's new for geoprocessing in ArcGIS 10.1

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What's new in ArcGIS 10.1 for Server

The architecture, functionality, and workflows used with ArcGIS for Server have seen significant changes at version 10.1. This topic highlights many of those changes and is of particular interest to users of previous versions of ArcGIS for Server.

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Installation

ArcGIS for Server is now a 64-bit application

ArcGIS for Server runs as a native 64-bit application so that your GIS services can take full advantage of your hardware. This change enhances the throughput and scalability of ArcGIS for Server. Given that 64-bit hardware is the current industry standard, support for 32-bit operating systems has been discontinued.

As an exclusive 64-bit application, ArcGIS for Server requires a 64-bit Windows computing platform, such as Windows Server 2008 R2. If you are unsure whether your operating system is supported with ArcGIS for Server, see the system requirements.

Setups distinguished by Windows or Linux

Previously, two setups of ArcGIS for Server were offered: ArcGIS Server for the Microsoft .NET Framework, and ArcGIS Server for the Java Platform. At 10.1, the setups are distinguished by operating system. The two setups are now ArcGIS for Server (Windows) and ArcGIS for Server (Linux).

Simplified installation

The ArcGIS for Server installation experience has been greatly simplified to eliminate many dependencies and steps that were required in previous releases.

- You are no longer required to install the .NET framework or a particular Java runtime.
- Integrating with a separate web server (Microsoft IIS, WebSphere, and so on) is no longer a requirement. Installing ArcGIS for Server provides you with a ready-to-use web services-based GIS server, which includes all web management tools and applications.
- During the setup you provide you'll be asked to provide just one account that will access your GIS resources, data, and run the ArcGIS Server service. This account is called the ArcGIS Server account. At 10.1, there is no postinstallation to complete, and there are no SOM, SOC, or ArcGIS web services accounts to configure.
- There are no dependencies on DCOM, simplifying the configuration of firewalls within your network.

The process of creating a multiple-machine deployment of ArcGIS Server has also been simplified. You run the same installation on each machine and connect the machines using ArcGIS Server Manager.

The Getting started after install book of this help system contains topics and step-by-step instructions that can help you configure and deploy ArcGIS for Server.

Configure ArcGIS Server Account utility

Configure ArcGIS Server Account is a small utility included with the ArcGIS for Server setup that allows you to change the ArcGIS Server account. If you encounter a situation where you need to modify the account, you can launch the utility from your ArcGIS for Server installation location.

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The ArcGIS Server site replaces the SOM-SOC model

In previous versions of ArcGIS Server, the GIS server was composed of two distinct parts: the server object containers (SOCs) and server object manager (SOM). SOCs hosted GIS services, while the SOM managed these services and provided them to clients for use.

In ArcGIS 10.1 for Server, the SOM-SOC model has been replaced by the ArcGIS Server site. A site is a deployment of one or more machines (GIS servers) that have ArcGIS for Server installed and work together. The 10.1 site architecture is more robust than the SOM-SOC model. It reduces the chances of failure, and simplifies the provisioning and recovery of new machines.

To learn more, see Inside an ArcGIS Server site.

ArcGIS Web Adaptor

The ArcGIS Web Adaptor is a setup that you can install to allow ArcGIS for Server to work with your own web server. ArcGIS for Server can expose REST and SOAP web services out of the box, but if you want to configure a custom URL for your site or integrate with your web server's security model, you should install the ArcGIS Web Adaptor. This component is also recommended when you configure a site with multiple machines, or when you want to tighten security on your GIS server.

For more information, see the topic About the ArcGIS Web Adaptor.

Site administration

ArcGIS Server Manager has a new look and feel

You'll use ArcGIS Server Manager as the primary tool to administer your site. Although Manager has a new look and feel, it has a lot of the same functionality as in previous releases. New features in Manager include the ability to deploy server object extensions (SOEs) and an improved interface for viewing logs.

A difference with Manager in 10.1 is that you will usually not use it to publish services. Most of the publishing can happen directly from ArcGIS for Desktop. If you need to publish something from Manager, you can create a service definition (.sd) file in ArcGIS for Desktop and transfer it to the machine running Manager. At 10.1, Manager only supports the publishing of service definitions and cannot publish other file types.

To get started using Manager, see Logging in to Manager.

Connect to ArcGIS Server with a 'Publisher' role

In previous releases of ArcGIS Server, you had to connect to the server as an administrator in order to create or update services. In 10.1 you can now assign users the publisher role. This way you can allow users to publish, stop, and start services without giving them access to advanced administrative tasks such as adding machines to a site.

Script the administration of your server

ArcGIS for Server exposes a new administrative REST API that allows you to script common actions such as adding a machine to a site, publishing a service, adding permissions, and so on. You can use the

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ArcGIS Server Administrator API with any programming language that supports the use of HTTP requests, such as Python, PHP, Perl, JavaScript, or PowerShell.

To learn more, see Scripting ArcGIS Server administration.

GIS server clusters help you organize hardware resources in your ArcGIS Server site

The GIS servers you have configured to participate in your site can be organized into groups, called clusters. Each cluster you create can be configured to run a dedicated subset of services. For example, if you have five machines participating in your site, you could configure one cluster of two machines to run all your map services and a second cluster of three machines (perhaps with higher processing power) to run all your geoprocessing services.

For more information about clusters, see About GIS server clusters.

New logging framework and user experience in Manager

At ArcGIS 10.1 for Server, logs are distributed among all GIS server machines participating in your site. It's recommended that you view and query the 10.1 logs using ArcGIS Server Manager or the ArcGIS Server Administrator Directory, rather than attempting to sort out the logs on your own.

For more information about logging, see About server logs.

Server object extensions are deployable from Manager

Server object extensions (SOEs) allow you to extend the base functionality of ArcGIS for Server by using ArcObjects code to work with GIS data and maps. Deploying SOEs becomes a lot easier at 10.1. In your development environment, such as Eclipse or Visual Studio, you create a .soe file that encapsulates all the necessary parts of the SOE. You can transfer this .soe file between machines and deploy it in one step using ArcGIS Server Manager. The help for SOEs has been expanded and describes the entire process.

Learn more about SOEs

Set of basic services preconfigured for you

ArcGIS for Server comes with a collection of preconfigured services that you will see when you first create a site.

The SampleWorldCities map service is available to allow you to immediately preview the functionality of ArcGIS Server. You can click its thumbnail in Manager to open it in a web application. If you no longer need the service, you can delete it.

The System folder contains services used internally to perform basic operations such as map caching or publishing. Only users with Publisher and Administrator access to the server can see and use these services. These services start automatically, and you can't delete them.

The Utilities folder contains the following services which are stopped by default. If you want to use them, you'll need to explicitly start them.

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- A geometry service that allows your server to accommodate requests for geometric calculations such as buffering, simplifying, calculating areas and lengths, and projecting. For more information, see About the geometry service.
- A PrintingTools service that generates maps for printing from your web applications. For more information, see Printing in web applications.
- A search service that you can use to make a searchable index of your organization's GIS content available on your local network. Search services are most useful in large enterprise environments where GIS data is distributed among multiple geodatabases and file shares. For more information, see Search services.

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Publishing services

ArcGIS for Desktop offers a unified publishing experience

At ArcGIS 10, you could publish GIS resources such as maps, tools, and locators to ArcGIS Server using Desktop or Manager. The method that you chose for publishing was based on a variety of factors, such as your level of permissions, experience, or personal preference. At 10.1, GIS resources that you attempt to publish to ArcGIS for Server are put through a more rigorous analysis process to make sure they are ready to be exposed on the web. You'll need to analyze your GIS resources in ArcGIS for Desktop before you can publish them to the server.

The publishing of services to on-premises or cloud-based ArcGIS for Server can be invoked directly from the main menu in ArcGIS for Desktop by choosing **File** > **Share As** > **Service**. Additionally, you can right-click certain GIS resources, such as a geodatabase, in ArcCatalog or the ***Catalog*** window in ArcGIS for Desktop and choose **Share As Service**. The items on the ***Share As Service*** dialog help you configure, analyze, and publish your GIS resource as a service to ArcGIS for Server.

To learn more about the 10.1 publishing experience, see About publishing services.

You can optionally copy your data directly to the server when publishing

At 10.1, you can optionally allow any data referenced by your GIS resource to be copied to ArcGIS Server at the time you publish a service. There are pros and cons to this approach, but it is useful when you want to completely separate the tasks of authoring and publishing services, when your datasets are small and do not change frequently, or when you are not able to log on to the cloud-based server.

For more information, see Copying data to the server.

Service definitions encapsulate your GIS resources and data for later publishing

Service definition files offer you a way to take a snapshot of your GIS resources and data and publish them as services to ArcGIS Server at a later time. This can be useful in cloud environments, in secure environments, or when the server is not immediately available.

To learn more, see About service definitions.

Data registration helps guarantee ArcGIS for Server can access your data

At 10.1, ArcGIS for Desktop offers tools that allow you to register a specific set of enterprise geodatabases and data directories with ArcGIS for Server. Data registration helps you ensure that the GIS resources and data you've made available to ArcGIS for Server are truly accessible by the server. This is often necessary in environments where you will be replicating data between an on-premises machine running ArcGIS for Desktop and a cloud-based ArcGIS for Server running on Windows or Linux.

To learn more, see About registering your data with ArcGIS for Server.

Server directories automatically exposed through virtual path, or URL

When you create a server directory (for output, jobs, cache, and so forth), it is automatically exposed through a virtual path, or URL. You no longer have to explicitly create a virtual directory on your web

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server and associate it with your server directory. This is possible because ArcGIS for Server has an embedded web server. See About server directories to learn more about this change.

Services Directory REST cache cleared automatically

Information in the ArcGIS Server Services Directory is cached so that you can have fast performance when navigating its links. In ArcGIS 10.1 for Server, if you add, remove, or modify a service, the REST cache is cleared automatically.

Detailed metadata can be applied to services

ArcGIS 10.1 for Server allows you to apply detailed metadata to your services. To do this, you use the same metadata editing interface that you are accustomed to using in ArcGIS for Desktop. In many cases, the metadata that you have applied to your map or other resource is applied automatically to the service once you publish the resource. You can then edit the metadata as desired.

The metadata you apply to your services is also available to web developers through REST.

There is no longer a distinction between MXD- and MSD-based map services

All map services now use the fast drawing engine that was associated with MSDs in previous releases. Thus, in ArcGIS for Server, there is no longer a distinction between MXD- and MSD-based map services. At 10.1, you'll simply publish your map document as a service using ArcGIS for Desktop.

To find out which functionality is supported with the map services drawing engine, see Supported functionality in map services.

Methodology for publishing geoprocessing services has changed

You create geoprocessing services by right-clicking a result in the ***Results*** window and choosing **Share As** > **Geoprocessing Service**. This opens the ***Share As Service*** step-by-step wizard and the ***Service Editor*** dialog box. For those of you that published geoprocessing services at 10.0, the major differences are:

- Tool layers in a map document are no longer needed. In fact, creation of tool layers in 10.1 is no longer supported (you can still use them, however).
- The option for right-clicking a toolbox and publishing to ArcGIS server has been removed—you can only publish results.
- You don't have to edit your models to configure them as services—you use the ***Service Editor*** instead. The ***Service Editor*** gives you full control over the definition of the input and output parameters of your service.

Learn more about geoprocessing services

Map services allow clients to change layer appearance and behavior dynamically

Clients of ArcGIS for Server, such as the ArcGIS web APIs, can change layer appearance and behavior in a map service dynamically. Behaviors such as which layers will appear in a map, layer symbology, layer order and position, and labeling can be achieved on the server through the use of dynamic layers. In this way, dynamic layers can increase the amount of interaction that users are able to have with your maps.

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For more information, see About dynamic layers.

Faster performance when using geocode services through REST

Performance for finding addresses and reverse geocoding using REST has been significantly improved in geocode services.

Batch geocoding using REST

In addition to finding single addresses and performing reverse geocoding, you can now do batch geocoding using REST.

Geometry service offers new options for precise buffering and measuring

The geometry service offers some new options for calculating buffers, areas, and lengths.

Geodesic buffers are now available when using the buffer method. These account for the earth's actual shape during the calculation of the buffers.

Also, when calculating lengths and areas of vector features, it's important to take the web map and its coordinate system into account. Therefore, some new calculation types have been introduced for the lengths and areasAndLengths methods:

- **Planar—**The planar measurement uses 2D Cartesian mathematics to calculate area and length. In most cases, it's more accurate to use the Geodesic or PreserveShape options.
- **Geodesic—**For a geodesic calculation, each line segment is interpreted as the shortest path on the surface of the earth between each pair of vertices in a polygon or polyline. If the unit for the area or length is not defined, the result is returned in meters. Use this calculation type if you want to know the geodesic length or area for a geometry. If you want to calculate the length or area for the geometry drawn on the map, use PreserveShape.
- **PreserveShape—**In a PreserveShape calculation, areas and lengths for polygons or polylines are calculated on the surface of the earth's ellipsoid. The shape of the geometry is preserved in its coordinate system. This means regardless of the web map's coordinate system (geographic or projected), the geometry drawn on the map is always preserved when the area and length is calculated. For example, if you draw a long line across a flat world map, a geodesic measurement would give the length of the shortest path on the earth's surface between the two ends of the line, whereas the PreserveShape measurement would give the length along the exact line you drew (even though that line might not be the shortest path between the ends of the line).

Network extension improvements include live traffic support, as well as service area and vehicle routing tools

At 10.1, the Network Analyst extension adds live traffic capabilities, so now you can use current traffic conditions for visualization and network analysis purposes. Also, new geoprocessing tools facilitate creating and working with service-area and vehicle-routing-problem web services.

These new features, as well as others, are listed below:

- Geoprocessing tools to support live traffic

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- Generate Service Area geoprocessing tool
- Solve Vehicle Routing Problem geoprocessing tool
- The Network Analyst module (Python)
- Support for Python scripts in evaluators
- Copy Traversed Source Features geoprocessing tool
- Better support for real-time routing of moving vehicles

See What's new in the Network Analyst extension for more information.

OGC WPS and WMTS specifications are now supported

ArcGIS for Server now supports WPS (Web Processing Service) and WMTS (Web Map Tile Service) specifications as part of the OGC web services lineup for 10.1. WPS is a specification for serving and executing geospatial processing on the web and works in conjunction with geoprocessing services. WMTS is a specification for serving digital maps using cached image tiles, which are automatically provided through a cached map service.

See OGC support in ArcGIS for Server to learn more about OGC services at 10.1.

New platforms and technologies for services

This section describes some of the new platforms and technologies for publishing services with ArcGIS. Some of these are not included in the ArcGIS for Server installation, but they are new at 10.1, and it's important for you to know about them as potential supplements or replacements for your existing architecture.

Spatial Data Server

The ArcGIS Spatial Data Server is a small-footprint server that lets you serve the geometries, attributes, symbols, and template information for vector data stored in a database or geodatabase to your browser or custom client application. The Spatial Data Server exposes one service type: feature service. You write or build client applications to draw spatial features through the feature service.

The Spatial Data Server is appropriate when you want to place your spatially enabled enterprise data on a map without having to install ArcGIS for Server.

Separate installations of the Spatial Data Server are available for .NET and Java.

ArcGIS Online hosted services

You can now publish services directly to ArcGIS Online, an Esri-hosted cloud. When you publish to ArcGIS Online, you don't have to install any special software to publish to ArcGIS Online. In fact, you can publish services to ArcGIS Online directly from ArcGIS for Desktop.

The types of services you can publish to ArcGIS Online are tiled map services and vector feature services. When you publish a feature service, you can choose to make it available for web editing. When you publish a tiled map service, the tiles are built and stored in the cloud.

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In order to publish services to ArcGIS Online, you must have an organizational subscription to ArcGIS Online

ArcGIS Server on Amazon Web Services

The Amazon Elastic Compute Cloud (EC2) allows you to deploy software on virtual machines running in Amazon's data centers. You can quickly deploy ArcGIS for Server on Amazon EC2 using an Esri-provided Amazon Machine Image (AMI). The revised architecture of ArcGIS for Server, described elsewhere in this document, yields a better experience when publishing services, creating caches, and performing asynchronous geoprocessing in the Amazon EC2 environment.

Prior to 10.1, it was required that you use the AWS Management Console or a third-party administrative application to set up ArcGIS for Server on Amazon EC2. At 10.1, Esri created the ArcGIS Server Cloud Builder on Amazon Web Services for setting up a site on Amazon EC2. Advanced users can still choose to use the AWS Management Console.

For more information, visit the ArcGIS Server on Amazon Web Services page on the ArcGIS Resource Center.

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Caching services

You can define and build a cache at the time you publish a service

You can choose to define your cache tiling scheme and other parameters before you even publish the service. All the caching properties are available on the ***Service Editor***, whether you've published the service yet or not. The initial dialog box for defining a cache has been simplified, with more advanced properties being relegated to another dialog box.

If you click **Analyze** ✓, this allows you to see any warnings about potential problems with your tiling scheme.

New options in 10.1 allow you to build the cache at the time you publish the service, a convenient choice when you're caching just a small area or your tiling scheme's smaller scales.

You can get estimates of cache size before you start building tiles

When you first define your cache, you can click **Calculate Cache Size** to get an estimate of the amount of disk space your cache will require. You can also use this figure to get a better guess of the time required to create your cache. This will help you make a better decision about whether to create tiles automatically when you publish.

You can cache image services

You can create server-side caches of tiles for image services in the same way that you can create caches for map services. You use the same tools that are used for map caching to do this.

You can define your caching area of interest manually

When running the caching tools in ArcMap, you can just draw a polygon on the screen to define the area to be cached. Of course, you can always choose to supply a feature class as in previous versions.

Caching jobs are offloaded to a geoprocessing service

Instead of your map, globe, or image service being heavily utilized during caching, the work has been offloaded to a geoprocessing service named CachingTools. This service is configured for you when you create your site. You can confine the CachingTools service to run within a defined cluster of machines, thus freeing up other machines in your site to quickly respond to service requests.

See Allocation of server resources to caching.

You don't have to leave ArcGIS open while you cache

Using 10.1, you can request that your caching jobs run asynchronously. This means you can submit a large caching job to the server and close any running ArcGIS applications, such as ArcMap, without interrupting tile creation. At any time, you can re-open ArcGIS and request a status report on your job or suspend caching.

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You can get detailed status reports on your cache as it builds

For any cached map, you can now request a report showing level-by-level statistics of cache completion status. You can also view the status of each caching job you've submitted.

See Viewing cache completion status.

Easier context menus are available for caching

When a service has a cache defined, you can now right-click it in the Catalog tree and choose **Manage Cache** to access a variety of caching tools.

Caches expose minimum and maximum cached scales

Another addition is the concept of Minimum Cached Scale and Maximum Cached Scale. This allows you to define a range of scale levels in your tiling scheme at which tiles can be created. The remaining scales still exist in your tiling scheme, but users of the caching tools cannot create tiles at those levels unless you change the minimum or maximum cached scale.

For example, to be interoperable with other cached web services, you might choose to use the ArcGIS Online / Bing Maps / Google Maps tiling scheme for your cache. However, you might not ever want to create tiles at the two largest scales (approximately 1:1100 and 1:2200). You can set the maximum cached scale at 1:4500 to prevent anyone from creating tiles at a larger scale.

When you choose to share your map as a service, ArcGIS Server reads your map and attempts to suggest a minimum and maximum cached scale based on the scale ranges and extents used in your map document. You are welcome to deviate from these suggestions.

New PNG format saves space while maintaining visual quality

The new **PNG** cache image format examines each tile as it's built and determines the most efficient bit depth for the PNG. Although this causes tile creation to take longer, it results in smaller caches while preserving excellent visual quality. You can still explicitly choose the formats of **PNG8**, **PNG24**, or **PNG32** if don't want to use the new **PNG** format.

Web ADF

ArcGIS 10.1 for Server is the last release to offer the Web ADF for Microsoft .NET and Java. The ADF is available through a separate installation called ArcGIS Web Applications.

If you have developed a web ADF application in previous releases of ArcGIS Server, consider migrating your application to use the ArcGIS web APIs or the ArcGIS configurable viewers. Consult the help topic Migration to ArcGIS 10.1 for Server for more information on how to migrate your web application to the web APIs.

If you are interested in building web applications at ArcGIS 10.1 for Server, see the following topics:

ArcGIS API for JavaScript

ArcGIS API for Flex

ArcGIS Viewer for Flex

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ArcGIS API for Silverlight

ArcGIS Viewer for Silverlight

ArcGIS Web Applications Manager

When you install ArcGIS Web Applications, you also get the former component of ArcGIS Server Manager that allowed you to create a web ADF-based application using a wizard. This is called ArcGIS Web Applications Manager.

Availability of local connections to the server in the web ADF

Within web ADF applications, you cannot make local or Distributed Component Object Model (DCOM) connections to 10.1 sites. Local connections were previously used for the purposes of web editing and working with fine-grained ArcObjects. At ArcGIS 10.1 for Server, ArcObjects can be used to extend the server through Server Object Extensions (SOEs) without the need for a local connection. If you want to build a web editing application, you can use feature services in conjunction with the ArcGIS web APIs, the ArcGIS Viewer for Flex, and the ArcGIS Viewer for Silverlight.

What is a server object extension?

What is a feature service?

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for Mobile GIS

This topic provides links to information on new Esri mobile product offerings and on what's new for existing mobile products.

New products since ArcGIS 10.0

The new ArcGIS app

- ArcGIS application for Android
- ArcGIS application for iOS
- ArcGIS application for Windows Phone

New SDKs

- ArcGIS Runtime SDK for Android (previously known as ArcGIS API for Android)
- ArcGIS Runtime SDK for iOS (previously known as ArcGIS API for iOS)
- ArcGIS Runtime SDK for Windows Phone (previously ArcGIS API for Windows Phone)
- ArcGIS Runtime SDKs for WPF (for Windows) and Java (for Windows and Linux), first release in beta at time of publication, allow you to bring ArcGIS capabilities to small-footprint, focused applications you build. If your users don't have a network or Internet connection, you can provision their devices so that they can work while disconnected. They can perform spatial analysis, geocoding, routing, and editing while disconnected.

ArcGIS Runtime SDKs for WPF and Java, like other Esri Runtime SDKs, include support for GPS/location-aware applications.

What's new in mobile applications

- ArcGIS for Windows Mobile (previously ArcGIS Mobile) applications. Includes:
  - An application for Windows Mobile devices
  - An application for Windows running on notebooks and tablets
  - Mobile Project Center
  - Mobile geoprocessing tools
- ArcPad.
- For information on Esri smartphone and tablet apps, as well as user-created smartphone and tablet apps, (for Android, iOS, and Windows Phone) see ArcGIS smartphone and tablet apps.

What's new in mobile SDKs

- ArcGIS API for Flex. You can build mobile apps with this API; for details, see Mobile applications with Flex.
- ArcGIS API for JavaScript. With this API you can build mobile web pages (see the mobile folder), or, with a third-party tool, you can build mobile apps.

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- ArcGIS Runtime SDK for Windows Mobile (previously ArcGIS Mobile SDK).
- ArcPad (includes what's new for developers).

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new in ArcGIS 3D Analyst 10.1

ArcGIS 3D Analyst is an extension available for Desktop, Engine, and Server. You will find that the ArcGIS 3D Analyst extension at 10.1 solidifies the 3D GIS story delivered with 10. Continuing to expand a fully functional and easy-to-use solution for visualizing, managing, analyzing, and sharing your GIS information in 3D. The new capabilities at 10.1 target specific user groups by expanding and improving the support in key areas.

Learn more about 3D Analyst
See a quick tour of 3D Analyst

Here is what you can expect for significant improvements with ArcGIS 3D Analyst 10.1:

Who and what was addressed for 10.1?	Examples
Targeted users of: • Virtual Cities • Virtual Campuses • Surfaces	Such as: • Urban planners, Emergency response, Public safety • Facilities managers, Defense, Universities, Hospitals • Civil engineers, Defense, Forestry, Government
Improvement and expansion areas: • Online integration for 3D • Support for authoring and maintaining 3D city and campus-level data • Support for point clouds with a focus on airborne lidar (LAS) data	Such as: • New options to easily find, consume, and publish 3D GIS data online, as well as an active blog, training videos, and templates. • Enhanced performance and usability for urban landscape data as well as an improved editing experience. • Several new and upgraded geoprocessing tools, and the ability to consume LAS in 3D natively as points and surfaces.

Online integration of 3D

The ability to consume and share 3D content and analysis results is an essential part of the growing 3D Analyst story in ArcGIS. To enhance the user experience in this regard, 10.1 offers:

A new 3D GIS Resource Center

At 10.1, a new 3D GIS Resource Center was launched to host guide videos and templates. These are aimed to show you how to leverage your potential with 3D analysis, as well as enable you to get comfortable with common workflows using your own data in the recommended setup. You can also browse an active blog for tips and announcements.

New and easier options to find, consume, and publish city data online

ArcGlobe has applied several new improvements to how you consume and share 3D GIS data:

- You can add basemaps and online services directly to the 3D view. Utilize the options **Add Data from ArcGIS online** or **Add Basemap** in ArcGlobe from the **Add Data** drop-down menu on the ***Standard*** toolbar. These are also available through the **File** menu.
- You can easily publish globe services. Click **File** > **Share As** to start a streamlined workflow to publish your 3D GIS data to the web. A new set of analyzers are automatically applied to flag any potential issues before deploying the document as a globe service.
- You have access to additional globe services available through ArcGIS online, such as country and state boundary lines and labels.

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Improved support for 3D city and campus-level data

It is now easier to maintain, analyze, and share urban landscape data at both the city and building level. ArcGlobe and ArcScene have significantly enhanced the support for both virtual city data (3D city models) and virtual campus data (3D campus models) to improve performance, usability, editing, and analysis.

Visualization improvements for city and campus-level data in 3D include:

- Navigate through extremely large building datasets in ArcGlobe and ArcScene.
  - ArcGlobe now automatically adjusts the default layer display settings for visualizing buildings. You can now easily add and navigate over 1 million untextured buildings with better performance and usability. ArcScene has also improved its ability to handle large datasets.
- Display a grid and graticule in ArcGlobe
  - You now have the ability to turn on a reference grid (Military Grid Reference System) or graticule (Lat/Long lines) display to help you locate areas of interest and navigate on the globe. It is purely a visual aid on top of the globe view with no interactivity or analysis capabilities. The on-screen benefit is that you will see greater detail and a finer grid as you zoom in.
- Downloadable virtual city templates
  - Browse the **Template Gallery** on the 3D GIS Resource Center for templates that enable you to conduct common workflows by taking out the guess work for how to best set up your document. Examples include volumetric shadow analysis or constructing a textured 3D overpass feature in a virtual city. You can use the templates later for your own projects and substitute your own data ensuring an improved authoring experience.
- Release of BISDM 3.0
  - Building Interior Space Data Model (BISDM) version 3.0 is now available and includes support for 3D networks (interior network routing) and a structure for storing building assets. The primary purpose of the data model is to provide a structure in GIS to support the aggregation of building information from CAD, BIM, and lidar into a single seamless data source at the facility scale. Although component features are generalized (thinned) down to 2D, the associated 3D height attributes are maintained as attributes so you can generate 3D representations of your building information.
- New Directional Arrow navigation graphic for ArcScene
  - A new directional arrow in ArcScene provides on-screen feedback to improve the sense of location in 3D space. Accessed through the ***View Settings*** dialog box, the three-point arrow graphic represents the x-, y-, and z-axes of your 3D space.

Intuitive editing of city and campus-level data

The editing experience inside ArcScene and ArcGlobe has been improved so that many common tasks are easier to use with better visual feedback.

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Move feedback

Improved overall visual feedback to help you better understand where you are moving your selected features to. For example, features that are set to display draped on a surface will move with the look and feel of being draped. This surface-hugging behavior is a more intuitive way to relocate features in a 3D space. There is also a new keyboard shortcut experience to assist by interactively dragging to move in x,y, and in z.

3D anchor points

3D anchor points are now enabled to work with snapping, rotating, and scaling of features. You can now:

- Move a feature and snap it to a specific spot.
- Rotate around key locations.
- Scale about key locations.

Snap to displayed geometry

The snap environment in a 3D edit session will now correctly honor layer settings, such as base heights and extrusion properties. So when snapping to 3D features, the height value is honored when new features are constructed from the snap location. Using this improvement has also allowed the following three tools to perform with better visual feedback by allowing 3D snapping to honor 3D geometry: Copy Parallel, Cut Polygon, and Split Line.

Copy Parallel in Z

3D lines will correctly inherit their z-values when constructed using the Copy Parallel tool. This is useful for 3D interior transportation networks and creating flat road sections over terrains.

Cut Polygon tool feedback

Improved feedback when being used inside the 3D view. The newly created feature will retain the z-values inherited from the source polygon. This is useful for interior spaces and network designs.

Split Line tool feedback

Improved feedback when being used inside the 3D view. The newly created feature will retain the z-values inherited from the source line. This is useful for utilities, for example, if you need to split electric cable lines.

Current Z control when editing

The Current Z control is new functionality for 3D editing in ArcScene. It is adapted from the same experience in ArcMap, except you will see a semitransparent plane defined in the view at a height you specify. This is especially useful for digitizing new features, such as rooms and floors for building interiors.

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Feedback for maintaining lines and editing vertices in 3D

The overall 3D editing experience for maintaining lines and polygons in 3D is easier, especially in ArcScene, with the ability to move individual vertices highlighted in the view. You can also constrain the movement to just the z-direction and drag one or more vertices interactively to their new height. Modifying vertex properties can be performed as tasks within the view or using the ***Edit Sketch Properties*** window. For more information, refer to the following topics:

Vertex editing in 3D
Using the Edit Sketch Properties window

Enhanced analysis tools

Several geoprocessing tools have been enhanced specifically for the support of city and campus-level projects, including:

- Feature Shadow Volume
- 3D Buffer
- Line Of Sight
- Intersect 3D Line With Surface

Increased support for lidar

Lidar (LIght Detection and Ranging) is increasingly becoming one of the main methods for collecting information about the world around us. ArcGIS 10.1 recognizes the need to meet the growing demand to better manage, visualize, and analyze these huge collections known as point cloud data.

A new data type—LAS dataset

At 10.1, ArcGIS reads LAS files natively, thereby providing immediate access to lidar data without the need for data conversion or import. The LAS dataset has been developed to handle airborne lidar data stored and managed in LAS files. A LAS dataset stores reference to one or more LAS files on disk, as well as to additional surface features.

LAS attributes can be used to filter out content and symbolize the points in 2D and 3D. Also, as lidar data often comes as a group of files, ArcGIS provides the ability to define logical sets of LAS files for working in localized projects.

At 10.1, you can:

- Quickly view lidar data in 2D (ArcMap) and in 3D (ArcScene)
- Manage huge volumes of lidar-holding data
- Display LAS datasets as points or with TIN surface renderers
- Perform quality assurance checks on LAS files
- Update lidar class codes
- Analyze the lidar as a surface
- Improve the quality of the lidar surface (such as for hydro-enforcement) with constraint features
- Use LAS point clouds as a backdrop for digitizing 3D features

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- Take height and distance measurements from LAS point clouds
- Utilize a new and interactive LAS dataset toolbar

With a Standard ArcGIS license you can create a LAS dataset, view it in 2D, include it in a mosaic dataset, and convert it to a raster DEM/DSM. You'll need a 3D Analyst license, however, to view a LAS dataset in 3D, edit LAS class codes, or analyze the LAS dataset with surface analysis tools.

Improved tools for working with lidar data

Several tools have been enhanced for working with lidar data by supporting the LAS dataset as an input surface. These include:

- Add Surface Information
- Interpolate Shape
- Locate Outliers
- Line of Sight
- Skyline

New geoprocessing tools for LAS datasets with flexible licensing requirement levels

Although most tools for working with LAS datasets new at 10.1 require the 3D Analyst extension, some are licensed a little differently to allow more flexibility. The tools located inside the 3D Analyst toolbox require 3D Analyst. The tools located in core toolboxes work if you have one of these three options: 3D Analyst, Spatial Analyst, or ArcGIS Standard.

The 3D Analyst toolbox includes the following LAS tools, all of which require the 3D Analyst extension:

- LAS Dataset To TIN
- Change LAS Class Code
- Set LAS Class Code Using Features

The core Conversion toolbox includes the following LAS tools which have more flexible licensing requirements:

- LAS Dataset To Raster
- LAS Point Statistics As Raster

The core Data Management toolbox includes the following LAS tools which have more flexible licensing requirements:

- Add Files To LAS Dataset
- Create LAS Dataset
- LAS Dataset Statistics
- Remove Files from LAS Dataset

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New 3D Analyst geoprocessing tools and enhancements

A large effort was put into creating several new tools and reorganizing existing ones into more logical groupings withing the 3D Analyst toolbox. A full summary of the toolset changes can be found listed inside What's new in the 3D Analyst toolbox.

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The following tables provide an overview of the new tools introduced at 10.1:

New tools in the 3D Features toolset

Geoprocessing tool	Description
Buffer 3D	Creates a 3D buffer around point or line features.
Enclose Multipatch	Creates closed multipatch features in the output feature class using the features of the input multipatch.

New geoprocessing tools in the 3D Features toolset

New tools in the Conversion toolset

Geoprocessing tool	Description
LAS Dataset to TIN	Creates a triangulated irregular network (TIN) from the lidar files referenced by a LAS dataset.

New geoprocessing tools in the Conversion toolset

New tools in the Data Management toolset

Geoprocessing tool	Description
Change LAS Class Codes	Change the lidar classification codes of LAS files referenced by a LAS dataset.
Set LAS Class Codes Using Features	Changes lidar class code values assigned to data points using features.

New geoprocessing tools in the Data Management toolset

New tools in the Functional Surface toolset

Geoprocessing tool	Description
Intersect 3D Line With Surface	Computes a geometric intersection of input 3D line features and one or more surfaces to return the intersection as segmented line features and points.
Stack Profile	Creates a table and optional graph denoting the profile of line features over one or more multipatch, raster, TIN, or terrain surfaces.

New geoprocessing tools in the Functional Surface toolset

New tools in the Visibility toolset

Geoprocessing tool	Description
Sun Shadow Volume	Creates a model of the shadows cast by the sun for each input feature on a given date and time.

New geoprocessing tools in the Visibility toolset

Enhanced 3D Analyst geoprocessing tools

As mentioned in the previous section, there were several tools specifically improved for working with lidar data to support a LAS dataset as an input surface.

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Several other geoprocessing tools were enhanced overall for 3D Analyst in10.1 and are outlined in the table below.

Toolset	Tool	Improvement
3D Features toolset	Difference 3D	An optional output table can be created to establish the relationships between the collection of features removed from the original collection of multipatch features.
Intersect 3D (3D Analyst)	Supports more input and output geometry types. The available options are: • SOLID—Creates a closed multipatch representing the overlapping volumes between input features. This is the default. • SURFACE—Creates a multipatch surface representing shared faces between input features. • LINE—Creates a polyline feature class representing shared edges between input features.	
Conversion toolset	LAS To Multipoint	A new parameter has been added to specify input folders will be recursively scanned to read lidar files in their subdirectories. This flag will allow for more easily importing of nested folders of LAS files.
Point File Information	Reports more accurate point spacing.	
Functional Surface toolset	Add Surface Information	An additional input type has been added for polygons in order to summarize surface characteristics by area.
Visibility toolset	Construct Sight Lines	Added new output fields: • OBSRVR_OID—The OID of the observer point. • TARGET_OID—The OID of the target feature. • DIST_ALONG—The distance along the target feature if it's a line or polygon.
Line of Sight	A new output field, OBSTR_MPID, has been added to identify multipatch obstructions. This new field is populated with the ObjectID of the feature which blocks the line of sight.	

Other 3D Analyst enhancements

There are several usability improvements incorporated to the overall 3D Analyst functionality.

Visualization

- Improved level of detail for BING map layer consumed from ArcGIS Online
- Scalability—the undo/redo edit stack for 3D editing is more reliable
- Interactive **3D Selection** capabilities in ArcGlobe and ArcScene
  - There are three selection tools now in both ArcGlobe and ArcScene. Selection functionality by dragging a rectangle is available from the main selection tool on the ***Tools*** toolbar and also using the Edit Placement tool during an edit session. Open the Select

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Features drop-down arrow on the toolbar to access and switch between the other methods—Select By Draped Envelope and Select By 3D Box. Interactive selection is more intuitive in a 3D space as you can now drag over a surface to select multiple features, or press SHIFT to expand a 3D box making it easier to select features stacked in 3D.

- The primary selection tool, Select by Screen Rectangle, has built-in dragging gesture capabilities to refine your selection experience. When dragging in a left to right motion, only features completely within the box will be selected. Alternatively, dragging from the right to the left will include features that are both completely and partially within the box.

- More alerts (pop-up messages) to appear and inform when ArcGlobe or ArcScene needs to take an action as a result from the current situation. These include:
  - You will be notified when display settings will be autocorrected when trying to consume large datasets.
  - Before starting an edit session, if any layer is identified as having layer offsets, that property will be turned off during an edit session but will be reapplied afterwards.
- More on-screen tools and interactive tools to make your navigation and editing experiences more intuitive: Grid and Graticule, Directional arrow, Area of Interest selection, and many keyboard shortcuts to simplify editing, selecting, and navigating the 3D view.

Analysis

Area of Interest tool—You can now interactively reduce the extent of your 3D view in ArcScene by creating an area of interest box. This greatly improves performance and targets specific work areas. All features that are completely outside of the box will discontinue to be rendered until the extent is reset.

Shadow Analysis—The user experience for creating and analyzing feature shadows has been greatly enhanced. With one tool, the Feature Shadow Volume tool, it allows you to create shadow volumes for 3D features such as buildings. Also, on the 3D GIS Resource Center, there are templates that show you how to create shadow volumes over time and analytical shadow maps.

Grading Tool—The ***TIN Editing*** toolbar has a newly added interactive tool to the drop-down menu. Grade From Centerline is used to modify the TIN surface based on grading parameters applied to a selected linear feature. This is useful for adding roads and berm-like features to your TIN surface.

Profile Graph—This tool has been enhanced to support a default graph template. This means that there are preset design options for how you want the graph to be displayed.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What’s new in the Data Interoperability extension 10.1

At ArcGIS 10.1, the Data Interoperability extension has been updated to run on the new FME 2012 spatial data transformation platform by Safe Software. In addition to new transformers and increased support for lidar, the extension is now installed with the following independent setups:

- ArcGIS Data Interoperability extension for Desktop
- ArcGIS Data Interoperability extension for Server

New readers and writers

FME Reader and Writer	Description
ASPRS LIDAR Data Exchange Format (LAS)	A lidar writer for point cloud geometry conforming to the American Society for Photogrammetry and Remote Sensing (ASPRS) LIDAR (LAS) specifications.
Google Spreadsheet	Enables FME to read any arbitrary single spreadsheet accessible in a particular user's document list by name. Individual worksheets or pages in the spreadsheet will be treated as separate feature types in FME. Each column in a spreadsheet corresponds to an attribute name on a feature type, and each row, a feature. The Google Spreadsheet Writer allows single feature types to be converted to CSV files and automatically uploaded to the account of an authenticated Google docs user. Note that update and delete operations are not yet supported.
LiDAR (XYZ)	Implementation of a LiDAR XYZ Reader and Writer.

New Transformers

FME Transformer name	Description
Amalgamator	Joins nearby features into a single amalgam feature with donut or polygon geometry.
AttributeCompressor	Compresses the values of specified attributes. Used in conjunction with the AttributeDecompressor.
AttributeDecompressor	Decompresses the values of the specified attributes that were compressed by the AttributeCompressor.
CoordinateSwapper	Swaps coordinate axes of the input features.
CsmapReprojector	Reprojects feature coordinates from one coordinate system to another using the CS-MAP library.
CustomTransformerLooper	Allows external looping over a selected LINKED custom transformer. It iterates over the custom transformer, sending features emitted from the OUTPUT port back to the INPUT port over each iteration. The intent is to allow looping in workspaces without being subject to blocking features getting in the way.
DGNStyler	Allows styling data intended for MicroStation Design.
DWGStyler	Allows styling data intended for AutoCAD DWG.
FeatureReader	Performs queries against any FME format. The queries can have both a spatial and a nonspatial component to them. One query is issued to the FME format for each feature that enters the transformer. The results of the query are then output.
GeometryInstantiator	Implements new transformer to instantiate geometry instances and optionally recursively decompose them into pieces. Anything not a geometry instance remains unchanged.
ListKeeper	Keeps the selected list attributes from incoming features and removes the rest.
MapInfoStyler	Allows styling data intended for MapInfo.

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MeshMerger	Merges mesh features (features with IFMEMesh geometries) into a single output mesh. The final merged mesh is postprocessed to remove duplicate vertices, texture coordinates, and vertex normals.
PointCloudCoercer	Decomposes all point clouds into points. This transformer is used when writing to formats that do not support point clouds.
PointCloudCombiner	Combines multiple geometries into a single point cloud.
PointCloudPropertyExtractor	Extracts the properties of a point cloud feature and exposes them as attributes. The attribute values are for reference only and may become out of date if the point cloud properties change.
PointCloudSplitter	Splits a single point-cloud feature into multiple point-cloud features, each having a homogeneous value for the point component that governs the split.
SherbendGeneralizer	The Sherbend algorithm iteratively simplifies bends in a line by using the diameter parameter to select bends for simplification. Simplification may combine or eliminate bends.
SQLCreator	Generates FME features from the results of a SQL query against a database. One FME feature is created for each row of the results of the SQL Query.
XMLFormatter	Provides various options for formatting and cleaning up XML documents.
XMLFragmenter	Maps elements from an XML document into XML fragments.
XMLNamespaceDeclarer	Declares missing name spaces in XML documents by matching prefixes from another sample XML file whose name spaces are fully declared.
XMLValidator	Validates the syntax or schema of an XML file or text.

Database and miscellaneous enhancements

FME Reader and Writer	Description
ASPRS LIDAR Data Exchange Format (LAS)	Updated the existing lidar reader to use true point cloud geometry.
CSV	Added a Reader format attribute named csv_number_of_fields to store the number of nonempty fields read per feature. Added a Writer parameter called Write UTF-8 Byte Order Mark to choose whether the BOM should be written in a UTF-8 encoded CSV file.
Directory and file path names	Added ability to retrieve a file's last accessed, last modified, and creation dates. Added ability to retrieve a file/folder's owner name. Added ability to denote if a file/folder is read-only or not.
File Copy	Added support for renaming the destination file.
GeoMedia SQL Server Warehouse	Added Unicode support for GeoMedia SQL Server writer. Added ability for reader and writer to use Windows authentication in place of user-defined name and password.
JSON	Significantly reduce memory usage in all JSON-related formats, factories, and functions. Runtimes should decrease as well.
Microsoft SQL Server Database (Attributes Only)	Added timeout parameter. Changed timeout parameters from type TEXT to INTEGER. Added more attribute indices: primary_key, not_null. indexed_not_null and clustered_not_null.
Microsoft SQL Server Database (Spatial)	Implemented support for reading and writing multiple columns. Changed timeout parameters from type TEXT to INTEGER. Added more attribute indices: primary_key, not_null, indexed_not_null, and clustered_not_null. Added a feature type parameter to supply SQL for Spatial Index creation.

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UI enhancements

- Added the following shortcut keys to FME Workbench: Ctrl++ to zoom in, Ctrl+- to zoom out, Ctrl+0 to zoom to 100%, and F3 to search the current workspace.
- Added ability to pause running FME translation via **Pause** toolbar button. Paused translation can then be resumed by pressing the **Run or Resume Translation** (green triangle) toolbar button.
- When workbench is translating, the window title now begins with the message ***(Running)***, to indicate the status of the application when the window is minimized.
- Allow users to change the type of any published parameter, including a transformer/format parameter.
- Added published parameter type **Choice with Alias (Multiple)**.
- Added the concept of **Private Parameters**. They are used to share values across multiple transformers, without user prompts.
- Allow drag-and-drop of files into ***Workbench***, even when the startup screen is open.
- Enhanced drag-and-drop to allow multifile drops. If multiple workspaces are dropped, only the first one is opened. Mixed drops are also allowed. For example, drop workspace + dataset files.

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What's new in ArcGIS Geostatistical Analyst 10.1

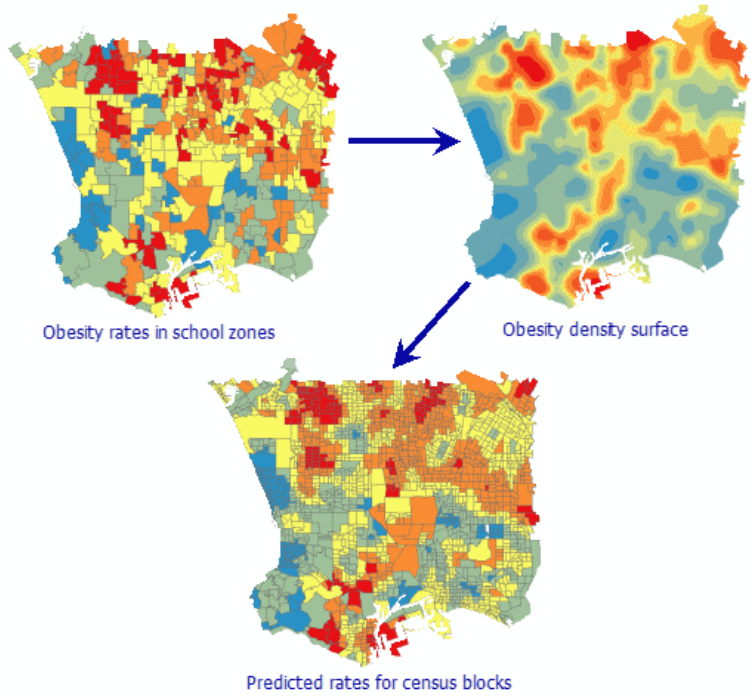
The ArcGIS Geostatistical Analyst extension provides a broad range of powerful spatial modeling and analysis capabilities. With version 10.1, the Geostatistical Analyst extension provides two new interpolation methods, a new transformation, and two new ArcPy classes.

New interpolation methods in the ArcGIS Geostatistical Analyst extension

There are two new interpolation methods for Geostatistical Analyst extension in ArcGIS 10.1.

Areal interpolation

Areal interpolation is a geostatistical interpolation technique, available in the ***Geostatistical Wizard***, that extends kriging theory to data averaged or aggregated over polygons. Other kriging methods are only valid for continuous Gaussian data, but areal interpolation additionally accepts counts or probabilities. In conjunction with the Areal Interpolation Layer To Polygons tool, predictions can be made from one set of polygons to another set of polygons, such as predicting obesity rates in census blocks from known obesity rates in school zones. The smooth prediction surface is created in the ***Geostatistical Wizard***, and the reaggregation to new polygons is done with the geoprocessing tool, as shown in the graphic below.



Polygon-to-polygon predictions using areal interpolation

Empirical Bayesian Kriging

Empirical Bayesian Kriging is a kriging method that uses repeated simulations to account for the error introduced by estimating the semivariogram. Because the method does not require interactive semivariogram modeling, it is offered through the Empirical Bayesian Kriging tool and in the ***Geostatistical Wizard***.

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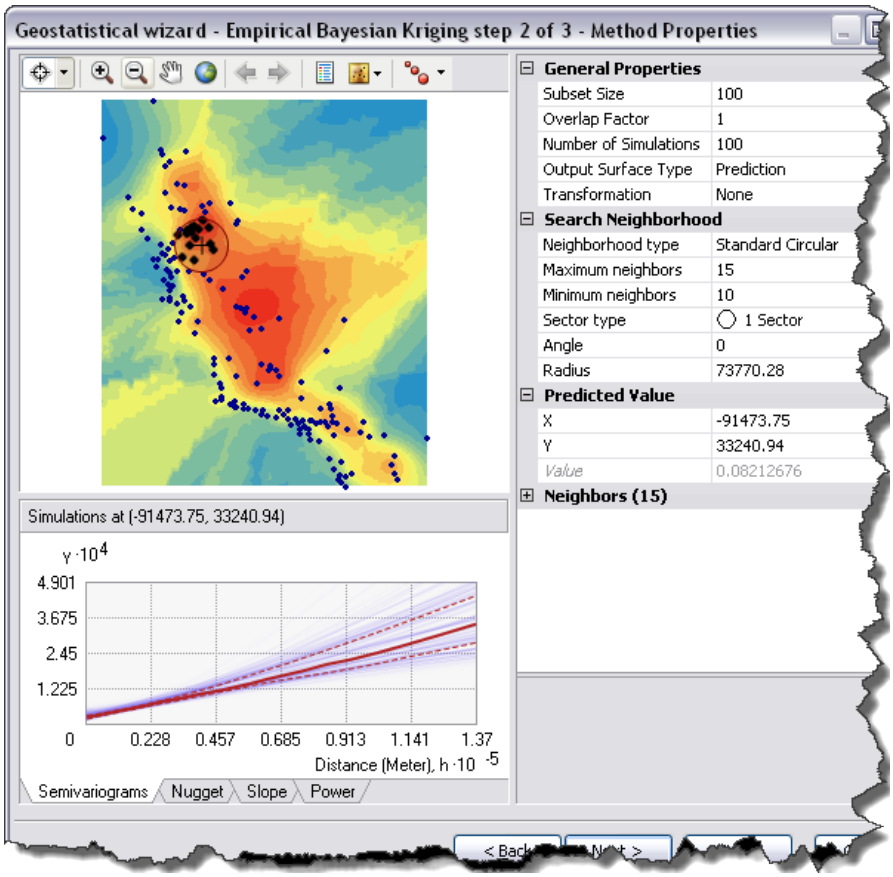

Empirical Bayesian Kriging

New normal score transformation

The new Multiplicative Skewing approximation method for normal score transformation has been included for version 10.1. It is now the default transformation for simple kriging, and it comes with a choice of five base distributions: Student's t, Lognormal, Gamma, Empirical, and Log Empirical. Using Lognormal, Gamma, or Log Empirical base distributions guarantees that predictions will never be negative, which is often appropriate for environment variables such as rainfall.

New ArcPy classes

Because Empirical Bayesian Kriging does not support elliptical search neighborhoods, two new ArcPy classes have been added for version 10.1. The first is a standard circular neighborhood, and the second is a smooth circular neighborhood.

New default kriging method

Simple kriging is now the default kriging method; in previous versions, the default was Ordinary kriging. The change was made because of the flexibility of the new Multiplicative Skewing normal score transformation.

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Mask environment

All tools in the Geostatistical Analyst toolbox, that output rasters, now support the Mask environment.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1
Geostatistical Analyst toolbox

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What's new in ArcGIS Network Analyst extension at 10.1

Hierarchical service areas

The time to generate a service area was drastically reduced in ArcGIS 10.1 because service areas now support using the hierarchy of a network dataset as they solve. This diminishes the number of roads that must be searched in the solve process and therefore makes solving a service area layer much faster.

Learn more about service areas
Learn more about hierarchies

Capacitated location-allocation

The Location-Allocation solver, which was introduced in ArcGIS 10, included six problem types for minimizing facilities, maximizing market share, and so on. At ArcGIS 10.1, a new problem type is added: Maximize Capacitated Coverage. This problem type is ideal for choosing facility locations when space or supply is limited and relevant to what is being provided by the facilities. You can use Maximize Capacitated Coverage to better locate hospitals with a given number of beds, schools with a limited student occupancy, and warehouses with allotted storage space for inventory.

Restrictions: Prohibit, Avoid, and Prefer

Previously, using a restriction on a network element allowed you to prohibit traversal on it. At 10.1, restrictions were expanded to allow you to prohibit, avoid, or even prefer network elements.

- Prohibiting elements allows you to model one-way streets, illegal turns, weight limits, and so on.
- Avoiding elements means Network Analyst will try to detour around network elements that use the restriction, but only if doing so isn't too far or if traveling on the restricted element isn't required. For instance, you might want to avoid toll roads as long as that doesn't cause you to go too far out of your way.
- Preferring elements makes them more attractive to a solver. For example, you might want to prefer designated hazardous-materials roads when routing trucks that are carrying hazmats. Similarly, you can create routes for bicycles that prefer bike paths and roads with bike lanes. (Of course you can mix the various kinds of restrictions to model your mode of transportation, for instance, you can prefer bike lanes and bike paths but prohibit Interstate highways.)

To support this functionality, all restriction attributes are assigned a Restriction Usage parameter, which allows you to choose whether to prohibit, avoid, or prefer network elements that use the restriction. If you want to avoid or prefer elements, you can specify the degree to which they are avoided or preferred.

Learn more about restriction attributes

Live traffic data

Network datasets created with ArcGIS 10.1 can incorporate live traffic data, which makes it possible to:

- Visualize current traffic conditions on a map
- Solve any network analysis using live travel speeds

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The live traffic model builds on the historical traffic model, which was released with 10.0. Historical traffic provides travel times that vary depending on the time of day and day of the week. The times are based on historical averages. Performing a network analysis using historical traffic data returns more accurate results than those returned using a simple, static cost attribute.

Live traffic fills in where the historical traffic model falls short: accounting for current traffic conditions. When you solve a network analysis based on the current time, using live traffic will tend to improve results, even over those created using historical traffic.

Learn more about modeling traffic in the network dataset

Update Traffic Data geoprocessing tool

This tool was added to support the live traffic model. It downloads live traffic data from a data provider's web service and stores the data in a file format that network datasets can read. You set up this tool to periodically download data and create dynamic traffic format (DTF) files and configure a network dataset to reference these files via a UNC path or HTTP endpoint.

Learn more about Update Traffic Data

Update Traffic Incidents geoprocessing tool

This tool downloads traffic incidents, such as vehicle accidents and construction work, from a data provider and creates a point feature class of the incidents. Overlaying incidents on a map of live traffic provides insight into why travel speeds are slower than normal. This tool is typically configured to write to an enterprise geodatabase so that the incidents can be viewed or shared as a map or feature service while still being periodically updated.

Learn more about Update Traffic Incidents

Support for traffic data in all solvers

In 10.0, historical traffic was introduced, but it was supported by just two of the six solvers: Route and Vehicle Routing Problem. Now all solvers support traffic data. Furthermore, they all support live traffic along with historical traffic.

To use traffic data, you choose a time-enabled cost attribute and set a start time for the analysis layer.

Learn more about the network analysis layers

The Network Analyst module (Python)

The Network Analyst module is a Python module that provides access to all of the geoprocessing tools available in the Network Analyst toolbox as well as helper functions and classes. You can use this module with other ArcPy modules to automate workflows using Python.

Learn more about the Network Analyst module

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Support for Python scripts in evaluators

Previously, the field and VBScript evaluators only supported VBScript. These two evaluators were enhanced for ArcGIS 10.1 to also support scripts written in Python. Accordingly, VBScript evaluators are now referred to as script evaluators.

Learn more about evaluators

Copy Traversed Source Features geoprocessing tool

This geoprocessing tool creates feature classes containing the edges, junctions, and turns that a solved network analysis layer traversed.

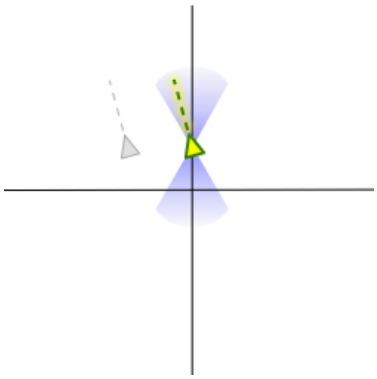
After performing a network analysis, you might want to study some aspect of the underlying network using this tool. For example, once you have generated several routes in a study area, you can use Copy Traversed Source Feature to help you determine the number of times a particular street segment was traversed.

Learn more about Copy Traversed Source Features

Better support for loading moving vehicles into an analysis layer

Loading network locations into a network analysis layer can account for the bearing and bearing tolerance of the input points so that they placed more accurately on the network. This feature is especially useful when loading GPS data from moving vehicles.

In the illustration below, the gray triangle to the left marks a vehicle's location and its bearing as captured by a GPS receiver. Clearly, the location and bearing were somewhat inaccurate. If bearing was ignored, the point would be located on the east–west edge since that is closest to the gray triangle; however, by snapping the triangle to edges and comparing the bearing with a bearing tolerance, it is clear that the point should be located on the north–south street heading to the north.



Learn more about the Bearing and BearingTol fields

ArcGIS Server

64 bit

Many kinds of network analyses push the limits of the computer resources due to the sheer quantity of network elements and attribute values that are processed. Because ArcGIS Server is a true 64-bit

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application at 10.1, the limits have been raised significantly, and now it is possible to solve much larger network analyses using ArcGIS Server.

Generate Service Areas geoprocessing tool

ArcGIS 10.0 and prior versions allowed you to create web services that solved service area problems; however, the new Generate Service Areas geoprocessing tool simplifies and streamlines this process.

Prior to 10.1, you needed to add the Make Service Area Layer tool to a model, know which other geoprocessing tools to add to the model, and know the proper sequence in which to link them. Now you only need to add one tool only, Generate Service Areas, choose which parameters to expose, then publish the model. The inputs for Generate Service Areas are feature sets, and the outputs are feature classes; these formats simplify managing the input and output data in a web environment.

Note that you should continue to use Make Vehicle Routing Problem Layer when working within ArcGIS for Desktop only.

Learn more about Generate Service Areas

Solve Vehicle Routing Problem geoprocessing tool

A new VRP tool, Solve Vehicle Routing Problem, is included with ArcGIS Network Analyst 10.1 to facilitate the process of authoring, publishing, and managing data for VRP web services. It should be used for ArcGIS Server instead of a model that includes Make Vehicle Routing Problem.

Similar to the benefits of Generate Service Areas over Make Service Area Layer, Solve Vehicle Routing Problem lets you configure and publish a model containing a single tool. Also, the inputs and outputs of the new tool are feature sets and feature classes, which make handling the web service's data simpler.

Note that Make Vehicle Routing Problem is still the tool of choice when creating network analysis layers for use outside of ArcGIS for Server.

Learn more about Solve Vehicle Routing Problem

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new in ArcGIS Schematics 10.1?

ArcGIS Schematics is an extension available with ArcGIS for Desktop, ArcGIS Engine for Windows, ArcGIS Engine for Linux, and ArcGIS for Server:

- The scope of ArcGIS 10.1 for Desktop and Engine functionality is generally similar to what was available in ArcGIS 10.0. However, there have been general improvements in stability and performance.
- The major change for Schematics at 10.1 is the new Schematics Server Object Extension.

Schematics Server Object Extension

ArcGIS 10.1 for Server comes with the new Schematics Server Object Extension.

Schematics Server Object Extension allows you to publish the schematic content you create on ArcGIS for Desktop to ArcGIS for Server and expose that content on the web in client web applications using the ArcGIS web APIs. It allows you to display, create, update, and lay out schematic diagrams in supported client applications.

Learn more about the Schematics Server Object Extension

General changes

Some other Schematics changes and enhancements have been included in ArcGIS for Desktop.

Building schematic diagrams from network dataset elements

In Schematics versions prior to 10.1, when working with data organized into a network dataset, you could configure diagram templates to work with the Network Dataset builder and generate schematic diagrams from any network analysis layer containing a performed Route, Closest Facility, Service Area, or Vehicle Routing Problem network analysis. This was the only way to generate schematic diagrams from network dataset data. In 10.1, the Standard builder has been enhanced to allow you to generate diagrams from selected sets of network dataset elements.

Learn more about schematic diagrams from selected sets of network dataset elements

Learn more about schematic diagrams from network analysis layers

Appending new features to diagrams based on the Standard builder without a full synchronization of the whole diagram content

Prior to Schematics 10.1, when using the Update Diagram command to append new features to a diagram based on the Standard builder, the whole diagram content was always fully synchronized regarding the geodatabase. A full synchronization ensures that the entire diagram content is in complete coherence with the current state of all the GIS features associated with the schematic features contained in the diagram, but it is time-consuming, in particular on diagrams containing a very large number of features. Also, such a full synchronization may be unnecessary when you know that the network features associated with the schematic features in your diagram didn't change and you simply want to append new features to it. In 10.1, the full synchronization is no longer automatic and becomes optional when appending new features to a diagram. By default, the process now executes a partial synchronization of

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your diagram content regarding the geodatabase content, which only impacts the diagram's part where the features are appended.

Learn more updating a diagram by appending new features to it

Schematic diagrams layout

- A new schematic layout algorithm has been added called Relative Main Line. This algorithm arranges the schematic nodes and links in the active schematic along parallel straight lines for which all the connected links have the same attribute value and places the branches coming from those lines, preserving both their directions with regard to the straight lines and distances proportional to the initial distances and relative to each other. This algorithm can be applied to any kind of data but is particularly interesting to use on diagrams containing lines that are parallel, such as those representing rail tracks.
  Learn more about the new Relative Main Line layout algorithm
- Schematic layout algorithms now try to keep the diagram extent as close as possible to its extent before the algorithm execution, when they run with relative parameters.

Searching for schematic diagrams

The Find Related Diagrams command is now called Find Diagrams. This command still can be used to search for diagrams that contain schematic features associated with the geographic features currently selected in the map or with the schematic features currently selected in the active diagram. However, it has been enhanced to also allow searching for diagrams where schematic features have been removed or added during their last update.

Learn more about the new Find Related Diagrams command

Miscellaneous

- In the previous version, when the update or generation of a schematic diagram failed, you had no explicit messages to help you understand why and where the process failed. At 10.1, error messages are now better managed and more explicit.
- Schematic objects geometry is now better managed for containers and links without initial geometry, nodes without initial coordinates, and so on.
- In prior versions, a join could be configured on feature layers that compose a schematic diagram layer. But joined feature layers were not always working properly—in particular, when starting an edit session on the schematic diagrams. They are now managed in a better way.

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What's new in ArcGIS Spatial Analyst 10.1

For the ArcGIS 10.1 Spatial Analyst extension, the scope of functionality is generally similar to what was available in ArcGIS 10.0. However, there have been general improvements in stability and performance.

The interactive tools from the Spatial Analyst toolbar have been updated to operate on the data within the extent of your ArcMap window and at the screen resolution. This provides the benefit of being able to respond quickly even on very large input raster datasets.

Geoprocessing updates

Spatial Analyst tools can now read and write rasters to an in-memory workspace.

The version of ANUDEM used in the Topo to Raster and Topo to Raster by File tools has been updated to version 5.3. For more information, see What's new in the Spatial Analyst toolbox.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1
Spatial Analyst toolbox

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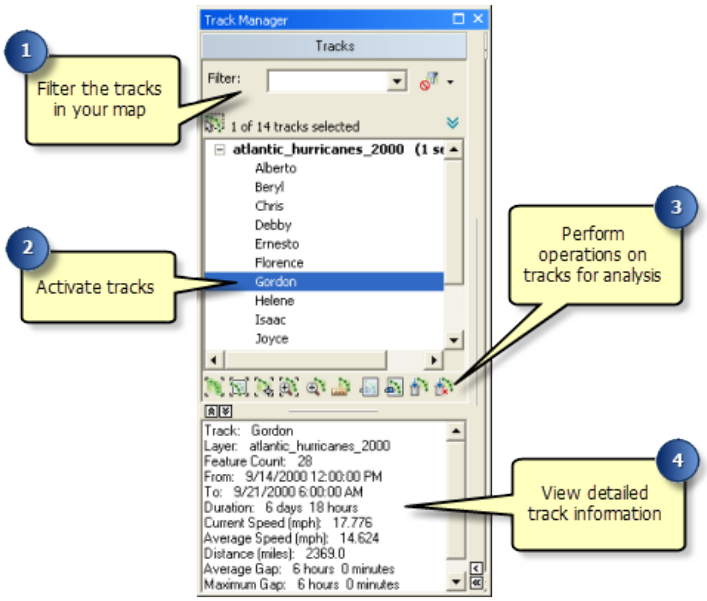
What's new in ArcGIS Tracking Analyst 10.1

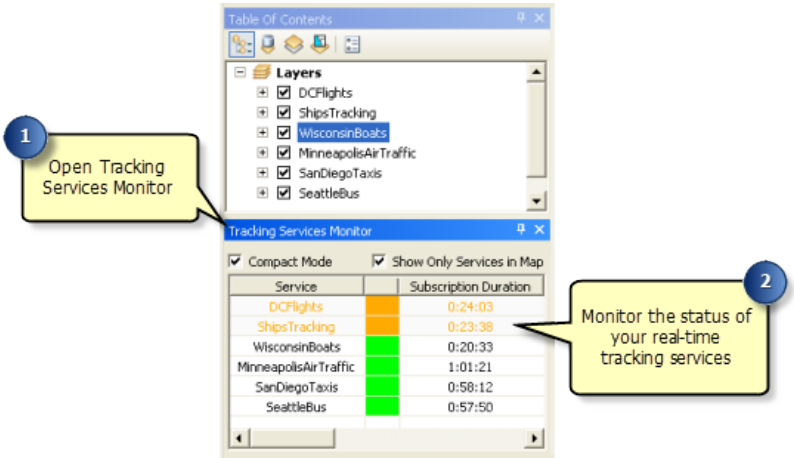
Track Manager dockable window

Track Manager is a dockable window that allows you to view and interact with the tracks and tracking features contained in your map. ***Track Manager*** contains a ***Tracks*** panel, which allows you to view a list of tracks, highlight tracks, zoom to tracks, and perform other track-based operations on any set of tracks you define. The ***Features*** panel allows you to view the details of individual features contained within the tracks.



Tracking Services Monitor dockable window

Tracking Services Monitor is a dockable window that allows you to view and monitor the status of your real-time tracking services. This can be especially useful if you are working with multiple Tracking Server connections or large numbers of tracking services and you need to have up-to-the-second information about their status.



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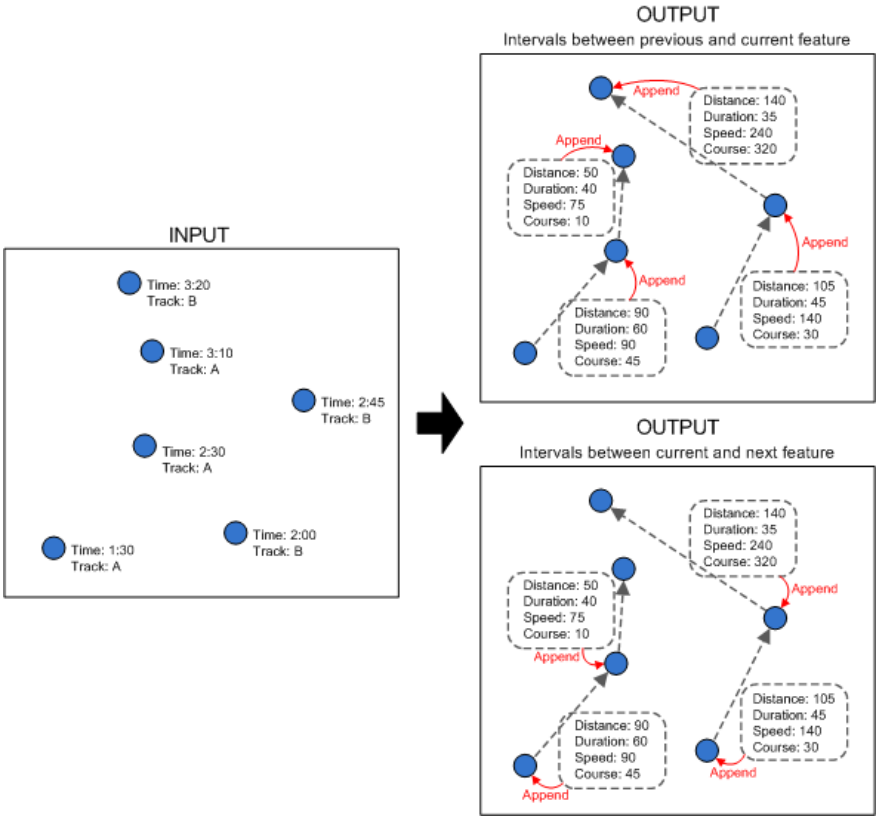
New Geoprocessing Tools in Tracking Analyst toolbox

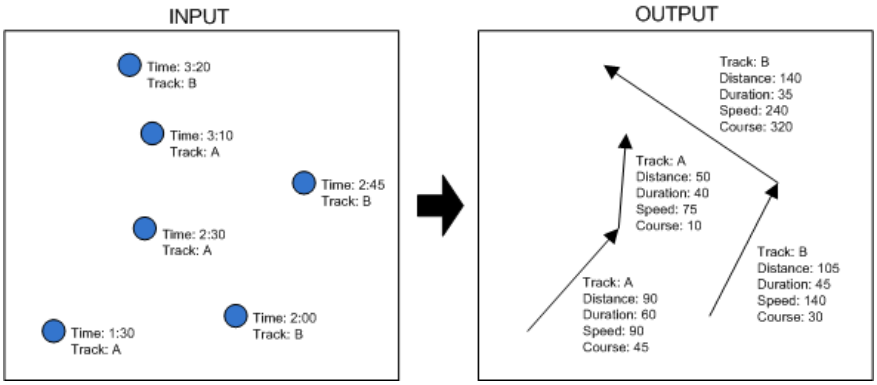
Track Intervals to Feature

Calculates values that are computed from the difference between successively ordered features in a track. New fields are added to the input feature class or layer to store the calculated values (distance, duration, speed, and course).



Track Intervals to Line

Calculates values that are computed from the difference between successively ordered features in a track. A new line feature class is created to represent the track intervals and store the calculated values (distance, duration, speed, and course).



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Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new in Maplex for ArcGIS 10.1

Maplex Label Engine

The Maplex for ArcGIS extension functionality has been moved into the core ArcGIS for Desktop product and is referred to as the Maplex Label Engine.

Learn more about what's new in the Maplex Label Engine

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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What's new for defense and intelligence in 10.1

This topic describes what's new in ArcGIS 10.1 for defense and intelligence.

- The data in Esri military feature unit layers distributed through ArcGIS.com are symbolized using unique values based on two fields. The two required fields are symbol name and echelon. For more information, see Define new types of UEI features.
- A new topic was added, Create a military feature from a SIDC, to better help users create a feature from a symbol identification code (SIDC), such as SFGPEVAI--MOUSG.
- At this release, the two main symbol specifications that ArcGIS military features are based on are:
  - MIL-STD-2525C (and its related publication, FM 1-02 Operational Terms and Symbols)
  - APP-6(B)

  For details on symbol specification support, see Military symbol specifications supported by ArcGIS.
- If you are using Military Analyst and MOLE, review Migrating from Military Analyst and MOLE to help you transition to ArcGIS 10.1.

For help getting started, see Getting started with defense in ArcGIS.

Related Topics

A quick tour of what's new in ArcGIS for Desktop and Server at 10.1

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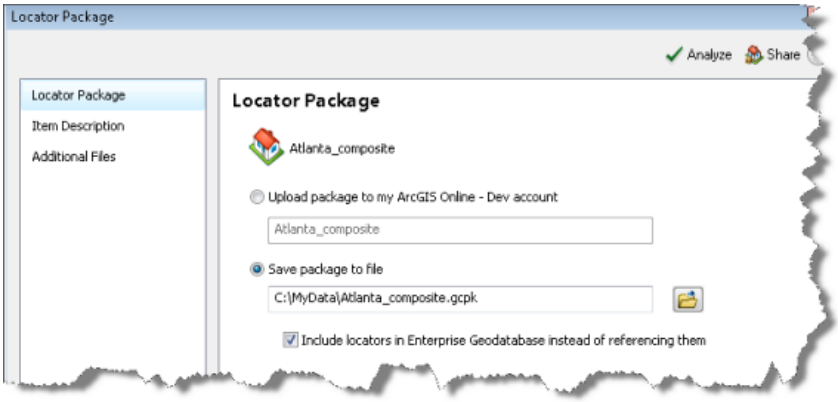
What's new for geocoding in ArcGIS 10.1

Locator packages

Locator packages (.gcpk) make it easy to share locators with others. A locator package may contain one locator or a composite locator along with its participating locators packaged into one convenient, portable file. The file size of the locator package is smaller than the locator as it is compressed and thus makes file transfer easier. Locator packages can be used for easy sharing of locators between colleagues in a work group, across departments in an organization, or with any other ArcGIS users via ArcGIS Online. Locator packages can also be used to create an archive of the locators.

Locator packages can be created by right-clicking a locator or composite locator in the ***Catalog*** window and choosing **Share As** > **Locator Package**. Then you can create the package using the ***Locator Package*** dialog box.



Learn more about sharing your address locator as a locator package

Publishing geocode services

ArcGIS 10.1 introduces a unified publishing experience for publishing GIS resources such as maps, tools, and locators to an ArcGIS Server.

The publishing of services to an on-premises or cloud-based ArcGIS Server can be invoked directly from the main menu in ArcGIS for Desktop or by right-clicking a locator or composite locator in the ***Catalog*** window and choosing **Share As** > **Geocode Service**.

Learn more about sharing your address locator as a geocode service

What's new in ArcGIS for Server 10.1

Address Locator Properties dialog box

ArcGIS 10.1 introduces the ***Address Locator Properties*** dialog box, which allows you to modify the settings of a locator and easily fine-tune the locator. The properties are listed in groups.

To view or modify a locator's settings, right-click the address locator you want to modify in the ***Catalog*** window and click **Properties** to open the ***Address Locator Properties*** dialog box.

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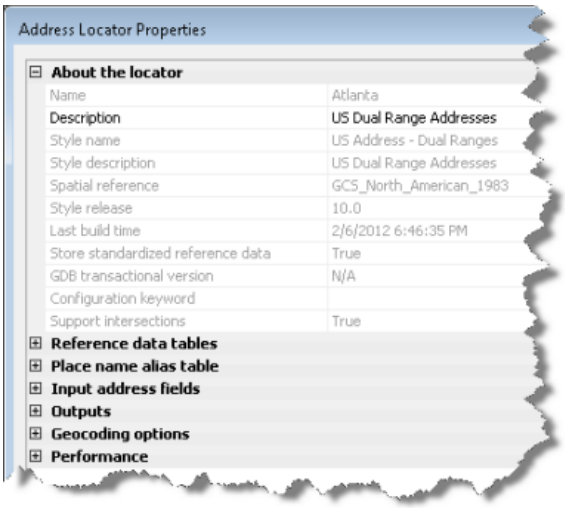

Learn more about modifying an address locator's settings

New locator properties

Several new properties have been added to locator styles that allow you to do the following:

- For street or point address locator styles, geocode addresses without house numbers or zones.
- Add more information to a locator, such as display extent, specific street ID, and rank of feature.
- Control geocoding performance.

Geocoding options properties
Locator output properties
Locator performance properties

Searching for locations in current map extent

In ArcMap, a new option, **Use Map Extent**, is added to the **Geocoding** toolbar and the ***Find*** dialog box. If you want to search for locations that are relevant only to the area on the map, the **Use Map Extent** option allows you to limit the search for candidates within the current map extent.

Finding an address using the Geocoding toolbar
Finding an address in the Find dialog box

New address locator styles

The US Address—Street Name locator style is an additional style for creating address locators that support finding addresses without house numbers. The US Address—City State style allows you to create a locator for geocoding city and state names in the United States. See Commonly used address locator styles for more information about locator styles.

Geocoding geoprocessing tools

Two new geocoding tools are in the ***Geocoding*** toolbox:

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- Consolidate Locator—Consolidates a locator or composite locator by copying all locators in a single folder
- Package Locator—Packages a locator or composite locator to create a single compressed .gcpk file

Learn more about the Geocoding toolbox

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What's new for developers

- New SDKs since ArcGIS 10.0:
  - ArcGIS Runtime SDK for Android (previously known as ArcGIS API for Android)
  - ArcGIS Runtime SDK for iOS (previously known as ArcGIS API for iOS)
  - ArcGIS Runtime SDK for Windows Phone (previously ArcGIS API for Windows Phone)
  - ArcGIS Runtime SDKs for WPF (for Windows) and Java (for Windows and Linux), first release in beta at time of publication, allow you to bring ArcGIS capabilities to small-footprint, focused applications you build. If your users don't have a network or Internet connection, you can provision their devices so that they can work while disconnected. They can perform spatial analysis, geocoding, routing, and editing while disconnected.
- What's new in mobile SDKs:
  - ArcGIS Runtime SDK for Windows Mobile (previously ArcGIS Mobile SDK).
  - ArcPad (includes what's new for developers).
- What's new in Web APIs:
  - Flex
  - JavaScript
  - Silverlight
- What's new in ArcObjects:
  - .NET
  - C++
  - Java
- What else is new for developers:
  - ArcGIS Online API
  - REST specification
  - ArcGIS for SharePoint
  - Geoprocessing (see the Python and ArcPy section)

Related Topics

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