

# What's new in ArcGIS 10.2.x



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# What's new in ArcGIS 10.2

ArcGIS 10.2 is a full release of the ArcGIS platform. It includes enhanced functionality, stability improvements, and better support for connectivity, security, and enterprise readiness.

ArcGIS 10.2 introduces several new products. Portal for ArcGIS is now a core product that you deploy on your internal network to share maps, applications, and other geographic information with other members of your organization. It enables the capabilities of ArcGIS Online behind your organization's firewall. With the introduction of a new extension to ArcGIS for Server called ArcGIS GeoEvent Processor, organizations can process extensive real-time data on the fly and display relevant information from these feeds in ArcGIS clients.

Other enhancements in ArcGIS 10.2 include improved support for using maps in the field in an enterprise, many new geoprocessing tools, support for new data formats and databases, and better search capabilities for rasters and imagery. In addition, new mobile applications and updated SDKs and APIs have been released.

 **Note:** [Click here](#) to download a PDF version of What's new in ArcGIS 10.2

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.

## Geoprocessing

There are a number of new tools, improvements to existing tools, and new ArcPy functions at ArcGIS 10.2.

### New and improved tools

The following geoprocessing tools have been added or improved for ArcGIS 10.2:

#### *3D Analyst toolbox*

The new **CityEngine** toolset in the 3D Analyst toolbox includes two new geoprocessing tools to help you process and display 3D data using embedded CityEngine capabilities:

- **Features From CityEngine Rules** tool creates multipatch geometries from 2D or 3D input features using rules authored in CityEngine. This allows you to generate detailed 3D models directly from within ArcGIS.
- **Export To 3D Web Scene** tool exports ArcScene documents to a CityEngine Web Scene format (.3ws) which you can upload and share via ArcGIS Online. Web Scenes can be viewed on any WebGL-compliant browser.

The **Visibility** toolset contains a new tool for visibility analysis: **Intervisibility** tool.

The **Raster To TIN** tool now honors the **output extent** environment setting.

The **Construct Sight Lines** tool includes a new **Output The Direction** parameter which adds two additional fields to the output sight lines to indicate direction: **AZIMUTH** and **VERT\_ANGLE** (vertical angle).

#### *Cartography toolbox*

The **Delineate Built-Up Areas** tool includes a new **Minimum Building Count** parameter to control the minimum number of buildings that must be collectively considered for representation by an output built-up area polygon.

#### *Conversion toolbox*

A new **Excel toolset** has been added for converting Excel spreadsheets to and from tables.

A new **JSON toolset** has been added for converting features to and from their JSON representation.

The new **Multipatch to Raster** tool provides the ability to convert a Multipatch dataset to a raster surface.

### Data Management toolbox

The Data Management toolbox includes a new [Archiving toolset](#), which contains tools for working with geodatabase archiving. The following changes have been made in the Raster toolset:

- The following new tools have been added:
  - The [Compute Pansharpen Weights](#) tool calculates the pan-sharpening weights for any set of pan-sharpening datasets.
  - The [Merge Mosaic Dataset Items](#) tool merges mosaic dataset items into the same row.
  - The [Split Mosaic Dataset Items](#) tool unmerges any mosaic dataset items that have been merged together previously.
- The [GeoTagged Photos To Points](#) tool now records directional information for a photo when supported by the capturing device. The output feature class will have a new field `Direction` with values from 0–359.99, indicating the direction the device was pointing when the photo was captured.
- The following tools have new parameters. Consult the tool documentation for more information about these parameters.

| Tool  | New parameter name  |
|---|---|
| <a href="#">Alter Mosaic Dataset Schema</a>   | <code>editor_tracking</code>  |
| <a href="#">Build Seamlines</a>               | <code>blend_width_units</code>  |
| <a href="#">Clip</a>                          | <code>maintain_clipping_extent</code>                                     |
| <a href="#">Set Mosaic Dataset Properties</a> | <code>data_source_type</code> and <code>minimum_pixel_contribution</code> |
| <a href="#">Synchronize Mosaic Dataset</a>    | <code>skip_existing_items</code>  |

### Data Reviewer toolbox

The Data Reviewer toolbox includes a new tool, [Delete Reviewer Session](#). This tool removes one or more Reviewer sessions and all records associated with them. Use this tool with other Reviewer geoprocessing tools such as [Create Reviewer Session](#) and [Execute Reviewer Batch Job](#) to automate quality-control workflows.

### Geostatistical Analyst

A new [GeostatisticalDatasets](#) ArcPy class has been added. For more information, see the [Extensions](#) section below.

### Spatial Analyst toolbox

A new [Visibility](#) tool has been added to the Surface toolset.

Multi-core support has been added to the following tools: [Reclassify](#), [Weighted Overlay](#), [Weighted Sum](#), [Zonal Statistics](#), [Zonal Statistics As Table](#).

For more information on these updates, see the [Extensions](#) section below.

### Spatial Statistics toolbox

A new [Optimized Hot Spot Analysis](#) tool has been added.

Both the [Cluster and Outlier Analysis](#) and [Hot Spot Analysis](#) tools have a new [Apply False Discovery Rate \(FDR\) Correction](#) parameter.

## ArcPy

- You can now automate publishing geocode services using Python. [CreateGeocodeSDDraft](#) function can be used to create service definitions from your address locators.
- You can create an SQLite database that contains the Esri ST\_Geometry type or SpatialLite using the new [CreateSQLiteDatabase](#) workspace function.

## ArcPy functions


### *Raster functions*

[RasterToNumPyArray](#) now supports the direct conversion of multiband rasters to three-dimensional numPy arrays. Specifically,

- If the input Raster instance is based on a multibanded raster, it returns a three-dimensional (3D) array, where the length of the first dimension represents the number of bands. The 3D array will have the dimensions (bands, rows, columns).
- If the input Raster instance is based on a single raster or a specific band from a multibanded raster, it returns a two-dimensional (2D) array with the dimensions (rows, columns).

[NumpyArrayToRaster](#) supports the direct conversion of three-dimensional numPy arrays to multiband raster.

- If the input array has three dimensions (3D), it returns a multiband raster, where the number of bands equals the length of the first dimension and the size of the raster is defined by the second and third dimensions (bands, rows, columns).
- If the input array has two dimensions, it returns a single-band raster, where the size of the raster is defined by the dimensions (rows, columns).

 **Note:** Note: If the input array has three dimensions, and the first dimension has size 1, it returns a single-band raster.

## Geoprocessing services

Geoprocessing tools in ArcGIS Server Linux are on average 25 percent faster due to file input/output optimization.

## Signing in to ArcGIS Online from ArcGIS for Desktop

Signing in to ArcGIS Online allows you to access your content, your organization's data and applications, and public content from Esri, communities, and users. You also need to sign in to publish and share on ArcGIS Online.

ArcGIS 10.2 includes enhancements to the process of signing in to ArcGIS Online from the ArcGIS for Desktop applications. These include security improvements and the ability to specify how often ArcGIS for Desktop checks for a connection to ArcGIS Online.

Signing in from an ArcGIS for Desktop application is performed similarly regardless of whether you are accessing the ArcGIS Online website or a local portal. Many users will sign in with an ArcGIS account, either an [ArcGIS public account](#) or one that is part of ArcGIS Online for organizations. Your administrator can utilize your organization's enterprise security infrastructure and set up other forms of authentication, such as allowing you to sign in to ArcGIS Online with your Windows login. In that case, you see the same ArcGIS Online sign in dialog box, but you enter the login information provided by your administrator. Your administrator could also allow you to insert a security card to sign in to ArcGIS Online. By default, ArcGIS for Desktop connects to the ArcGIS Online website. To sign in to a portal or use these security methods, your administrator needs to enter the portal URL in the [Manage ArcGIS Portal Connections dialog box](#).

By default, ArcGIS for Desktop checks for a connection when you start an application, such as ArcMap. If you have an intermittent connection, such as if you are in the field with periodic connectivity, you should change this setting to have ArcMap test for a connection at an interval. This way, you can be alerted when you lose your connection and are unable to access the functionality dependent on it. If you work completely offline, you can tell ArcGIS to never check for a connection. You can change the frequency of the check through the properties of the ArcGIS Connection Utility in the Windows system tray.

## Mapping

### Document compatibility between ArcGIS 10.1 and 10.2

ArcGIS 10.1 and 10.2 map, globe, and scene documents are directly compatible with each other. You can open an ArcGIS 10.2 document in ArcGIS 10.1 without any special steps.

### Bing Maps

Complimentary use of Bing Maps is being phased out for Esri products. With ArcGIS 10.2, you need to obtain a [license key directly from Microsoft](#) to use any of the basemaps in the Bing Maps collection. If an administrator registers a Bing Maps key with an ArcGIS Online for organizations account, any user in the organization can access Bing Maps when signed in. You can enter the key through the Set Bing Key application (SetBingKey.exe), which you can access in the \bin folder in the location where you installed ArcGIS.

As a replacement, consider using the ArcGIS World Imagery basemap. It provides one meter or better satellite and aerial imagery in many parts of the world and lower resolution satellite imagery worldwide.

### Reports

ArcGIS reporting tools now allow you to create customizable mailing labels from data in a layer or table. See [Creating mailing labels](#) for more information.

## Geodata

### Geodatabases and databases

Support has been added for IBM Netezza 7.0 and INZA 2.5, which includes the Netezza Spatial Esri Package. The Netezza Spatial Esri Package is an ST\_Geometry data type rather than a varchar.

Support has been added for PostgreSQL 9.2. You must use the 9.2 versions of the st\_geometry libraries when creating a geodatabase or installing ST\_Geometry in a PostgreSQL 9.2 database. The 9.2 st\_geometry libraries can be found in the DatabaseSupport directory in ArcGIS client installation directories.

Beginning with ArcGIS 10.2, you can connect to and work with simple feature data in a [Teradata](#) database or [SQLite](#) database. This allows you to view and analyze the spatial data you have stored in these databases without having to move your data to a geodatabase. An ArcPy function is provided with ArcGIS 10.2 that creates an SQLite database. See [CreateSQLiteDatabase](#) for more information.

The following changes have been made in ArcGIS 10.2 that affect versioned views:

- The Create Versioned View geoprocessing tool is no longer available; however, existing scripts and models that use the tool will still work.
- You can create a versioned view on a versioned dataset that does not have one by right-clicking the dataset in the Catalog tree in ArcGIS for Desktop, pointing to **Manage**, and clicking **Enable SQL Access**. **Enable SQL Access** replaces the **Create Versioned View** menu item.
- Versioned views created in ArcGIS 10.2 or later releases follow the naming convention <table name>\_ewv.

Geodatabase archiving is now supported on tables that are not registered as versioned. When the nonversioned table is enabled for archiving, an archive view is created. Use the archive view to update, insert into, or delete rows from the archive-enabled table using SQL. If you need to create an archive view on the table after it is enabled for archiving (for example, if you did not have privileges to create views when you enabled archiving), you can use **Manage > Enable SQL Access** in ArcGIS for Desktop.

After you create a table or feature class, you might decide that one of your field definitions needs to change to fit your workflow. For example, you may find that a field you defined as not nullable actually needs to allow null values. Starting with ArcGIS 10.2 for Desktop, you can alter certain field properties in existing tables and feature classes. See [Modifying field properties](#) for more information.

To let you determine the exact version of your geodatabase, the Upgrade Status on the **General** tab of the **Database Properties** dialog box in ArcGIS 10.2 for Desktop will show the version and service pack or patch level of the 10.2 or later release geodatabase to which you are connected.

At 10.2, you can publish data from your DB2, Informix, Oracle, PostgreSQL, or SQL Server database as a feature service on your ArcGIS Server. See [Publishing feature services from databases](#).

### Raster

Desktop search for imagery was previously limited to search based on file format. The **Search** window has been extended to enable the searching of imagery based on accessible metadata. The search index can be configured to search specified paths for raster products, mosaic datasets and items within a mosaic dataset and will extract from imagery key metadata. Once indexed, users can quickly find imagery from a specific sensor, covering a specific location with specific metadata tags, such as cloud cover. From the search results imagery can be added directly to desktop or into a mosaic dataset. See [Searching for images in ArcGIS](#) for more information.

Support for three new raster types has been added: DMCii, Pleiades, and SPOT6. Also, ArcGIS 10.2 supports a new extension that allows you to add various raster types for Chinese Satellite Imagery into a mosaic dataset. See [Raster Types for Chinese Satellite Imagery](#) for more information.

There are three new raster geoprocessing tools: [Merge Mosaic Dataset Items](#), [Split Mosaic Dataset Items](#), and [Compute Pan-sharpening Weights](#). As well, there were many upgrades to existing raster geoprocessing tools.

The [Local function](#) is a new raster function that allows you to perform bitwise, conditional, logical, mathematical, and statistical operations on a pixel-by-pixel basis. The Spatial Analyst extension is required to use the Local function.

The Sum operator has been added to any tools and functions that use the mosaic operator. The Sum operator allows you to add the pixel values of all the overlapping cells into the output mosaic.


## CAD

Direct-read support has been added for AutoCAD 2013 DWG drawing file format 19.0. This is a new DWG file format introduced by Autodesk for all AutoCAD 2013 related products and a critical format for customers who work with AutoCAD source data.

## Editing

### Parcel editing

#### *Creating new parcels*

When creating a new parcel, you can click **Load Cadastral XML**  on the **Parcel Details** dialog box to append a parcel traverse from a cadastral xml file into the **Lines** grid. The load cadastral xml functionality appends a single set of parcel traverse lines. Any populated line attributes saved with the cadastral xml file are also appended into corresponding attributes in the **Lines** grid.

#### *Parcel history*

When creating a new plan, if a **LegalDate** attribute is entered for the plan attributes, this attribute will be copied down to the **LegalStartDate** attribute of new parcels created in the plan. The **LegalDate** attribute is also copied down to the **LegalEndDate** attribute of any parcels that become historic as a result of a new parcel transaction, for example, merging parcels to create a new parcel.



## Services

### GIS services are supported on Portal for ArcGIS

Portal for ArcGIS is now a core product that you deploy on your internal network to share maps, applications, and other geographic information with other members of your organization. The content that you share is delivered to the people in your organization through a website, which you can customize to fit your organization's look and feel.

You can configure ArcGIS 10.2 for Server to work with Portal for ArcGIS. This allows you to host map and feature services on ArcGIS Server that you can make available to the users in your organization through the portal. You can also use your ArcGIS Server print and geocode services to support maps and applications your users create in Portal for ArcGIS.

### Back up and restore your site configuration

You can now make a backup of your site configuration and use it to restore your settings if your site is taken offline unexpectedly or experiences other changes that you want to roll back. The backup and restore operations are invoked through included command line utilities or through the ArcGIS Server Administrator API. The backup information is stored in a single file that you can reference when you perform the restore.

See [Backing up and restoring your ArcGIS Server site configuration](#).

### Publishing feature services from databases

Prior to 10.2, you could only publish a map service with feature access enabled (a feature service) to ArcGIS Server if the database contained a geodatabase. At 10.2, you can publish editable feature services from supported database management systems. See the [ArcGIS database management system requirements](#) for a list of supported databases and spatial data types.

Beginning with ArcGIS 10.2, you should use ArcGIS Server feature services to publish data from a database rather than using ArcGIS Spatial Data Server feature services, as these have been deprecated.

### Map, feature, image, and WFS services now use standardized queries

ArcGIS Server includes a security option that forces developers to use standardized SQL queries when working with map, feature, image, and WFS services through REST or SOAP. This helps prevent SQL injection attacks and also makes it easier for developers and applications to query ArcGIS Server services. Standardized queries are enforced by default, but can be disabled by the server administrator.

For more information, see [About standardized queries](#).




### New CachingControllers service improves stability when multiple cache jobs are submitted at once

A new geoprocessing service **CachingControllers** is preconfigured in the System folder. This service manages all the jobs being processed by the **CachingTools** service.

The CachingControllers service can help your server from becoming overwhelmed when multiple publishers submit caching jobs at the same time. The maximum number of instances you allow for the CachingControllers service represents the maximum number of caching jobs you can run simultaneously. Additional caching jobs are queued.

### ArcGIS Server Manager enhancements

ArcGIS Server Manager includes a number of improvements that can help you administer your ArcGIS Server site:

- If you're an ArcGIS Server administrator and you want to prevent publishers from automatically copying data to the server when they publish, you can disable data copying using Manager. Previously, this functionality was only exposed through the ArcGIS Server Administrator Directory. For full instructions, see [Disabling automatic data copying when publishing to the server](#).
- A new dialog box—**Service Workspaces**—has been added to ArcGIS Server Manager to help you keep track of which folders or databases your services are using. For more information, see [Reviewing service workspaces in Manager](#).
- The **Restart** button  has been removed from the **Manage Services** module in Manager. Additionally, the **Stop** button  is active only for a service if the service is running, and the **Start** button  is active only when a service is stopped. To restart a service, click **Stop** then click **Start** to restart it.

### OLE DB data source support

OLE DB connections provide uniform access to data from a variety of sources but are nonspatial connections. At ArcGIS 10.2 for Server, you can now use these data sources in your map and geoprocessing services. When publishing, you can have the OLE DB data copied to the server as part of the publishing action, or alternatively, you can register it with the server to prevent data copying. OLE DB data sources are not supported with feature services.

- [About registering your data with the server](#)
- [Copying data to the server automatically when publishing](#)

## Extensions

### ArcGIS 3D Analyst extension

#### *LAS dataset*

At ArcGIS 10.2 when statistics are calculated, a [LAS auxiliary file \(.lasx\)](#) is created for each LAS file. It stores the calculated statistical information and a new spatial index for each LAS file. Spatial indexes provide faster access to the source lidar data and they improve the overall performance of a LAS dataset. The improvements are particularly effective for larger LAS files (e.g., greater than 500 MB) and for organizations that have a central LAS repository that is exposed on a network.

#### *3D Web Scenes*

ArcScene documents can now be exported to 3D Web Scenes using the new [CityEngine toolset](#). The output 3D Web Scene (.3ws) is a new ArcGIS Online item type for ArcGIS 10.2 and can be easily uploaded and shared to ArcGIS Online, Portal, or a local Web Server. This new capability allows you to visualize and share your 3D data in a web browser, making it easier to communicate complex 3D content with others.

#### *Rule-driven 3D content*

ArcGIS 10.2 allows ArcGIS 3D Analyst users to utilize [rule packages authored in CityEngine 2013](#) with their existing geoprocessing workflows. Multipatches are generated from existing 2D and 3D features with the applied rules.

### ArcGIS GeoEvent Processor for Server extension

The ArcGIS GeoEvent Processor for Server extension is a new extension for ArcGIS for Server that enables real-time GIS for streaming data. It allows you to connect with virtually any type of streaming data and automatically alert personnel when specified conditions occur—all in real time. GeoEvent Processor changes your everyday GIS applications into frontline decision apps, helping you respond faster with remarkable accuracy whenever and wherever change occurs.

For more information, see [What is the ArcGIS GeoEvent Processor for Server extension?](#)

### ArcGIS Geostatistical Analyst extension

The new [GeostatisticalDatasets](#) ArcPy class can be used to automate geostatistical interpolation by providing a mechanism for applying interpolation parameters to new datasets.

### ArcGIS Schematics extension

#### *Packaging schematic data and copying schematic data when publishing a schematic service*

Map packages (.mpk) have been enhanced to support schematic diagram layers. This means that starting with ArcGIS 10.2 for Desktop, you can package schematic diagrams that are referenced in a map document. For more information, see [About packaging schematic diagrams](#).

Due to this enhancement, schematic data can also be copied to the server when publishing. Moreover, this is now the default behavior when your schematic data is not registered with the server. For more information, see [About publishing schematics data](#).

#### *Migration and export schematic dataset functions changes*

In Schematics versions prior to 10.2, when migrating and exporting schematic datasets, you had no way to filter the schematic diagrams you want to export or migrate. Schematics 10.2 provides new migration and export schematic dataset functions that allow you to filter out the set of diagrams you want to migrate or export.

### ArcGIS Spatial Analyst extension

#### *New visibility analysis tool*

A more comprehensive way for analyzing the surface locations visible to a set of observers is provided by the new [Visibility](#) tool. One of the primary benefits of this tool over the previous Observer Points and Viewshed tools is the ability to define visibility parameters directly in the tool, instead of as static values from the attribute table of the input observer features.

### *Multi-core support*

Support for multi-core processors has been enabled for certain tools, offering substantial improvement in their performance.

The following tools are now multi-core aware: [Reclassify](#), [Weighted Overlay](#), [Weighted Sum](#), [Zonal Statistics](#), and [Zonal Statistics As Table](#). Consult the help of those tools for more details on how multi-core support works for them.

### Data Interoperability extension

Support for U.S. Census Bureau TIGER/GML, Google Spreadsheet, and 14 other file formats have been added. See [Supported formats with the Data Interoperability extension](#) for a complete listing of supported formats.

## Industry solutions

### Geocoding

Geocoding a table of addresses with the ArcGIS Online World geocode service is supported. You may use the service to geocode addresses and places in over 100 countries from a single end point. To use the service for batch geocoding, an ArcGIS Online for organizations subscription is required. Once you have the subscription, you can set up a service connection to the World geocode service. See [Geocoding a table of addresses using ArcGIS Online geocode service](#) for more information and instructions.

If you need to use the previous version of ArcGIS Online geocode services, you may set up a service connection to the services in <http://tasks.arcgisonline.com/arcgis/services>.

### ArcGIS for 3D Cities

The ArcGIS for 3D Cities solution helps you plan and understand your city by providing the foundation for managing, visualizing, analyzing, and sharing 3D urban spaces. It organizes all your city data—such as your buildings, zoning regulations, facilities, and city-managed assets like trees and street lights—into a well-defined information model, and comes with a set of specialized tools and workflows. It also takes advantage of powerful new 3D geoprocessing tools in ArcGIS 10.2 for content creation and 3D urban analysis such as visual impact.

## Mobile GIS

### Applications

The following are new apps released since ArcGIS 10.1:

- [Operations Dashboard for ArcGIS](#)
- [Collector for ArcGIS \(Android\)](#)
- [Collector for ArcGIS \(iOS\)](#)

See these topics for new functionality in existing mobile applications:

- [ArcGIS application for Android](#)
- [ArcGIS application for iOS](#)
- [ArcGIS for Windows Mobile](#)
- [ArcGIS application for Windows Phone](#)
- [ArcPad](#)

### APIs

- You can build mobile apps with the [ArcGIS API for Flex](#); for details, see [Mobile applications with Flex](#).
- You can [build mobile web pages](#) with the [ArcGIS API for JavaScript](#) API (see the mobile folder). Alternatively, you can build mobile apps with a third-party tool.
- To see what's new in native SDKs for developing mobile apps, see the following section.

## SDKs and APIs

- New software development kits (SDKs) released since ArcGIS 10.1 include:
  - [ArcGIS Runtime SDK for OS X](#)

- [ArcGIS Runtime SDK for Qt](#)
- [ArcGIS Runtime SDK for Windows Store apps](#)
- See these topics for what's new in existing mobile SDKs:
  - [ArcGIS Runtime SDK for Windows Mobile](#) (previously ArcGIS Mobile SDK).
  - [ArcPad](#) (includes what's new for developers).
- See these topics for what's new in ArcGIS Runtime SDKs:
  - [ArcGIS Runtime SDK for Android](#)
  - [ArcGIS Runtime SDK for iOS](#)
  - [ArcGIS Runtime SDK for Java](#) (Windows and Linux)
  - [ArcGIS Runtime SDK for Windows Phone](#)
  - [ArcGIS Runtime SDK for WPF](#) (for Windows)
- See the following topics for information on what's new in Web APIs:
  - [ArcGIS API for Flex](#)
  - [ArcGIS API for JavaScript](#)
  - [ArcGIS API for Silverlight](#)
- These topics include information on what's new in ArcObjects:
  - [.NET](#)
  - [C++](#)
  - [Java](#)
- For information on other changes and new features for developers, see these topics:
  - [ArcGIS REST specification](#)
  - [Geoprocessing](#) (Python and ArcPy)

# What's new in ArcGIS 10.2.1

ArcGIS 10.2.1 includes new functionality throughout the ArcGIS platform. That functionality is summarized in the following sections:

## Geoprocessing

There are a number of new tools, improvements to existing tools, and new ArcPy functions at ArcGIS 10.2.1.

### Highlights

Following are a few new tools and improvements of particular interest. Other new tools and improvements can be found in the toolbox sections below.

#### *Renaming fields*

The new [Alter Field Properties](#) tool allows you to rename a field and change its alias. The input table must be a geodatabase table or feature class; shapefiles and coverages cannot have their field properties altered.

#### *Near, Generate Near Table, and geodesic distance*

The [Generate Near Table](#) and [Near](#) tools have been completely rewritten to be dramatically faster and they now have an optional **Method** parameter that determines how distances are computed. When **Method** is set to GEODESIC, distances are calculated across the earth's surface. This is most accurate when the distance between features is large and you want to minimize the distortion inherent in all projected coordinate systems, particularly in projections like Web Mercator. When PLANAR, Euclidean distances are calculated using the coordinates of the features and is appropriate for projections that minimize distance distortion or when the distance between features is small.

The improvements made to Generate Near Table have not yet been implemented for the Point Distance tool. In most workflows, you can use Generate Near Table in place of Point Distance.

#### *New conflation tools*

The Editing toolbox now has a new [Conflation toolset](#) with five new tools for edge matching and rubber sheeting.

| Tools                                      | Description  |
|--|--|
| <a href="#">Edgematch Features</a>         | Modifies input line features by spatially adjusting their shapes, guided by the specified edgematch links, so they become connected with the lines in the adjacent dataset.                              |
| <a href="#">Generate Edgematch Links</a>   | Finds matching but disconnected line features along the edges of the source data's area and its adjacent data's area, and generates edgematch links from the source lines to the matched adjacent lines. |
| <a href="#">Generate Rubbersheet Links</a> | Finds where the source line features spatially match the target line features and generates lines representing links from source locations to corresponding target locations for rubbersheeting.         |
| <a href="#">Rubbersheet Features</a>       | Modifies input line features by spatially adjusting them through rubbersheeting, using the specified rubbersheet links, so they are better aligned with the intended target features.                    |
| <a href="#">Transfer Attributes</a>        | Finds where the source line features spatially match the target line features and transfers specified attributes from source features to matched target features.  |

Tools in the Conflation toolset

In addition to these five new tools, the [Data Comparison toolset](#) in the Data Management toolbox has a new [Detect Feature Changes](#) tool that is useful in conflation workflows.

#### *Similarity Search*

The Spatial Statistics toolbox has one new tool, [Similarity Search](#) that identifies which candidate features are most similar or most dissimilar to one or more input features based on feature attributes.

#### *Add Geometry Attributes*

The [Add Geometry Attributes](#) tool adds new attribute fields to the input features representing the spatial or geometric characteristics and location of each feature, such as length or area and x-, y-, z-, and m-coordinates.

### *Geoprocessing services*

You can find geoprocessing services when searching ArcGIS Online and open the link to the service. Opening the link will add the geoprocessing service as a toolbox to the ArcToolbox window.

### 3D Analyst toolbox

The following tools now support the LAS dataset:

- Stack Profile
- Surface Aspect
- Surface Contour
- Surface Slope

The default resampling technique for the following tools has been changed from Nearest Neighbor to Bilinear interpolation:

- Raster Surface toolset: Aspect, Contour, Contour List, Curvature, Cut Fill, Hillshade, Slope.
- Visibility toolset: Observer Points, Viewshed, Visibility

### Data Management toolbox

#### *New tools*

[Migrate Relationship Class](#) tool is used to prepare your relationship class or attachment to participate in feature services that will be used in offline editing workflows. See [Authoring feature services](#) for information on preparing data for offline use.

The [Data Comparison toolset](#) has one new tool:

- [Detect Feature Changes](#)

As mentioned in the [highlights section](#) above:

- The [Fields toolset](#) has the new [Alter Field Properties](#) tool for renaming fields and their alias.
- The [Features toolset](#) has the new [Add Geometry Attributes](#) tool adds new attribute fields to the input features representing the spatial or geometric characteristics and location of each feature.

The [Geometric network toolset](#) has three new tools:

[Find Disconnected Features In Geometric Network](#)  
[Verify And Repair Geometric Network Connectivity](#)  
[Rebuild Geometric Network](#)

The [Versions toolset](#) has two new tools for version conflict management:

[Add Field Conflict Filter](#)  
[Remove Field Conflict Filter](#)

The [Raster toolset](#) has two new tools:

[Export Mosaic Dataset Geometry](#)  
[Export Mosaic Dataset Items](#)

### Editing toolbox

#### *New tools*

As described in the [highlights section](#) above, there is a new [Conflation toolset](#) containing five new tools:

[Edgematch Features](#)  
[Generate Edgematch Links](#)  
[Generate Rubbersheet Links](#)  
[Rubbersheet Features](#)  
[Transfer Attributes](#)

### Geostatistical Analyst toolbox

Improvements have been made to the [Empirical Bayesian Kriging](#), and [GA Layer to Contour](#) tools.

For more information, see the [Extensions](#) section below.

## Network Analyst toolbox

### *New tools*

The [Server toolset](#) has a new tool:

[Find Closest Facilities](#)

### *Tools with new parameters*

[Update Traffic Data](#) has a new **Speed Unit** parameter so you don't need to convert your traffic feed data into miles per hour.

## Spatial Statistics toolbox

### *New tools*

As described in the [highlights section](#) above, the [Mapping Clusters](#) toolset has one new tool:

[Similarity Search](#)

## Spatial Analyst toolbox

A new [Rescale by Function](#) tool has been added to the Reclass toolset.

Improvements have been made to the [Kernel Density](#) and [Point Density](#) tools.

The default resampling technique for all the [Surface](#) tools (except for Contour with Barriers) has been changed from Nearest Neighbor to Bilinear interpolation.

For more information, see the [Extensions](#) section below.

## Python and ArcPy

ArcGIS 10.2.1 has been upgraded to include Python 2.7.5. Third-party Python libraries have also been upgraded: NumPy has been upgraded to 1.7.1 and matplotlib to 1.3.0.

ArcPy geometry objects now support `cut`, `measureOnLine`, `snapToLine`, and `queryPointAndDistance` methods. Previously existing geometry methods `getArea` and `getLength` now have an optional `units` argument to control the units the values will be calculated in.

## Geodata

### Geodatabases and databases

#### *New tools are available to work with geometric networks*

As mentioned in the Geoprocessing section, three new tools have been added to help discover and correct invalid data within a geometric network:

- [Find Disconnected Features In Geometric Network](#)
- [Verify And Repair Geometric Network Connectivity](#)
- [Rebuild Geometric Network](#)

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

In addition, the **Verify Connectivity** and **Repair Connectivity** commands on the **Geometric Network Editing** toolbar in ArcMap now have the option to be run against the geometric network features within the current extent of the map to perform more exhaustive checks on those features. These checks are limited to an extent because they compare the geometric coincidence of network features with the logical connectivity and, therefore, take more time to complete.



*New version conflict management tools and functionality are available*

Buttons have been added to the **Conflict Management** dialog box that allow you to view only those fields in conflict. For more information, see [A quick tour of reviewing conflicts](#).

Also new for version conflict management at ArcGIS 10.2.1 are the following two geoprocessing tools, which provide the ability to filter specific fields during conflict detection if the **Define Conflicts by Attribute** setting is used during the reconcile process. These tools can be found in the Versions toolset of the Data Management toolbox.

- [Add Field Conflict Filter](#)
- [Remove Field Conflict Filter](#)

You can use the new [ListFieldConflictFilters](#) ArcPy function to determine which fields have conflict filters.

*New database version and operating system support*

Support has been added to connect to new versions of IBM DB2, PostgreSQL, and Oracle from ArcGIS 10.2.1. For information on supported database versions, see the ArcGIS RDBMS system requirements pages.

Also beginning with ArcGIS 10.2.1, you can connect from ArcGIS for Server on a Linux box to a DB2 database on the z operating system.

## Raster

You can now view Landsat 8 data in its native format. The [Landsat 8 raster type](#) allows you to ingest Landsat 8 data into your mosaic dataset. The Landsat 8 raster product allows you add layers, that are processed on-the-fly, into the display.

There two new raster geoprocessing tools:

| Tool name                                      | Description  |
|--|--|
| <a href="#">Export Mosaic Dataset Items</a>    | Outputs all or selected processed mosaic dataset items to a specified folder and format. |
| <a href="#">Export Mosaic Dataset Geometry</a> | Outputs the footprint, boundary, and seamlines of a mosaic dataset to feature classes.   |

Additionally, there are existing geoprocessing tools that have new parameters added:

| Tool name                       | New parameters  |
|---------------------------------|---|
| <a href="#">Register Raster</a> | Maximum RMS   |
| <a href="#">Split Raster</a>    | Split Polygon Feature Class, Clip Type, and Template Extent |

There is a new raster function available:

| Function name                       | Description   |
|-------------------------------------|---|
| <a href="#">Binary thresholding</a> | Convert your raster into foreground and background values, based on the Otsu algorithm. |

## Lidar - LAS Optimizer Utility

The LAS Optimizer improves archiving, sharing, and use of LAS format lidar. This freely available utility provides compression and decompression capabilities, leading to significant reduction in LAS file size. Anyone, with or without ArcGIS, can take advantage of this technology. Licensed ArcGIS users have the added benefit of being able to work with Optimized LAS files (\*.zlas) directly in ArcGIS without needing to decompress them first by adding them to a LAS Dataset. The optimized LAS files also include statistics and spatial indexes that regular LAS files don't have, so they're actually easier and more efficient to use. Since optimized LAS files are indexed, queries to retrieve data from them are significantly more efficient than regular LAS. The LAS Optimizer utility can be found on the [3D GIS community gallery](#).

## CAD

Direct-read support has been certified for the AutoCAD 2014 DWG drawing file format, software version 19.1. This DWG file format was introduced by Autodesk for all AutoCAD 2013 and AutoCAD 2014 related products and is a critical format for customers who work with AutoCAD source data.

## Metadata

A new ISO 19139 metadata style is available that exports XML files that reference the GML 3.2.1 namespace and validates with XML Schemas that also reference this namespace. For more information about this new style, see [Support for ISO metadata standards](#).

## Shapefiles

Shapefiles created with ArcGIS 10.2.1 and subsequent releases use UTF-8 encoding. This allows you to share shapefiles across computers with different locale settings.

## Geocoding

### Single-field batch geocoding

In addition to geocoding a table of addresses in multiple fields, you can geocode addresses that are stored in a single field. A single input field stores the complete address, for example, 303 Peachtree St NE, Atlanta GA 30308. See [Geocoding a table of addresses in ArcMap](#) or [Geocode Addresses geoprocessing tool](#).

### Zooming to found locations

Zooming to the predefined area of the found location is supported in the **Find** dialog box, **Geocoding** toolbar, or **Interactive Rematch** dialog box. This feature is possible when predefined x,y minimums and maximums exist for each feature from the reference data. See [Understanding address locator styles](#).

### Local search on a specified proximity

Local search is enabled when you zoom in to the map on a radius that is less than 50,000 meters when using the ArcGIS Online World Geocoding service in ArcMap. ArcGIS sorts the candidates based on the proximity to the center of the map. The priority of candidates within this area is boosted relative to those outside the area. If no candidates are found in the area, candidates outside the area are searched.

### Locator as ArcGIS Runtime content

By enabling the locator to work with ArcGIS Runtime, your Runtime applications can geocode against the locator, including when disconnected from the Internet.

## Services

For a summary of what new and improved functionality is available in ArcGIS 10.2.1 for Server and ArcGIS 10.2.1 Web Adaptor, see [What's new in ArcGIS 10.2.1 for Server](#). For Portal for ArcGIS, see [What's new in Portal for ArcGIS 10.2.1](#).

## Extensions

### ArcGIS Geostatistical Analyst extension

Empirical Bayesian Kriging now supports additional semivariogram models. These additional models will allow more accurate modeling of data with different spatial properties.

The performance of [GA Layer to Contour](#) tool has been improved by utilizing multiple computer cores.

The contouring algorithm for drawing geostatistical layers has been made parallel to utilize multiple computer cores. This will be most noticeable when using Empirical Bayesian Kriging.

### ArcGIS Network Analyst extension

#### *ArcGIS Online network services*

If you don't have access to reliable street data or a Network Analyst license, or even to ArcGIS for Desktop, it's still possible to perform network analyses by using ArcGIS Online services.

The ArcGIS Online network services reference a continually growing, worldwide dataset of streets, which Esri and its partners curate. Use an organizational account and the [Ready-To-Use Services in ArcMap](#) to generate service areas, find closest facilities, route one vehicle at a time, or route an entire fleet of up to 100 vehicles to optimally service as many as 20,000 orders. (The Ready-To-Use Services are available in the Catalog window in ArcGIS 10.2 for Desktop and later releases.)

If you seek a simple solution or don't have access to ArcMap, solve network problems in your web browser. With an organizational account, you can [perform analysis in the ArcGIS.com Viewer](#), including generating drive-time areas and finding what's nearest in terms of driving time or driving distance.

### *ArcGIS Runtime transportation networks*

Route vehicles on mobile devices, even when disconnected from the Internet, by using ArcGIS Runtime and transportation networks. ArcGIS 10.2.1 lets you package a network dataset into a transportation network, which you can distribute with your Runtime application to support offline routing. By also including a Runtime-enabled locator, your offline users can find addresses or other locations and route between them.

### *Network Analyst Tools Toolbox*

[Find Closest Facilities](#) was added to the Network Analyst Tool toolbox to make it easier to create services to find the nearest facilities, such as restaurants, hospitals, and ATMs.

[Generate Service Areas](#) and [Find Closest Facilities](#) have a Time Zone Usage parameter that lets you choose between specifying UTC times or times based on the time zone in which the input points are located.

### *Network Analyst Python module*

`GenerateDirectionsFeatures`, a new function in the Network Analyst Python module, produces text directions as a feature class that pairs each piece of the text direction with a corresponding line feature on the map. Use the output feature class to visualize turns and other maneuvers. Also, `StreetDirectionProperties` lets you learn what languages, units, and so on are available for directions so it's easier to work with and generate language- and region-specific directions.

## ArcGIS Spatial Analyst extension

### *New tools for Spatial Analyst*

There is a new tool in the Reclass toolset for reclassification of continuous raster data. It rescales the input raster values by applying linear and nonlinear transformation functions and then transforming the resulting function values onto a specified continuous evaluation scale.

#### [Rescale by Function](#)

### *Spatial Analyst Python module*

A set of new [Transformation Function](#) ArcPy classes has been added to support the new Rescale by Function tool.

### *Improved Density tools*

The [Kernel Density](#) and [Point Density](#) tools have an improved method for calculating the default radius.

### *Improved Surface tools*

For the tools in the [Surface toolset](#), the default resampling method is changed from Nearest Neighbor to Bilinear. This is to give improved results when analyzing continuous raster surfaces.

## Data Interoperability extension

The Data Interoperability Extension now supports Safe Software's Feature Manipulation Engine 2013 SP1 (FME 2103 SP1). FME 2103 SP1 includes enhanced support for additional column types in Excel and reading and writing of the Salesforce data format.

## Apps

See these topics for new functionality in apps:

- [Operations Dashboard for ArcGIS](#)
- [Collector for ArcGIS](#)
- [ArcGIS app for smartphones and tablets](#) (Android, iOS, Windows Phone)
- [ArcGIS for Windows Mobile](#)
- [ArcPad](#)

## SDKs and APIs

- New software development kits (SDKs) released since ArcGIS 10.2 include:
  - [ArcGIS Runtime SDK for OS X](#)
  - [ArcGIS Runtime SDK for .NET](#)
  - [ArcGIS Runtime SDK for Qt](#)
- See these topics for what's new in existing mobile and Runtime SDKs:
  - [ArcGIS Runtime SDK for Android](#)
  - [ArcGIS Runtime SDK for iOS](#)
  - [ArcGIS Runtime SDK for Java \(Windows and Linux\)](#)
  - [ArcGIS Runtime SDK for Windows Mobile \(previously ArcGIS Mobile SDK\)](#)
  - [ArcGIS Runtime SDK for Windows Phone](#)
  - [ArcGIS Runtime SDK for WPF \(for Windows\)](#)
  - [ArcPad \(includes what's new for developers\)](#)
- See the following topics for information on what's new in Web APIs:
  - [ArcGIS API for Flex](#)
  - [ArcGIS API for JavaScript](#)
  - [ArcGIS API for Silverlight](#)
- For information on changes and new features for REST developers, see:
  - [ArcGIS REST specification](#)