# ARCGIS 10.3.1 FOR SERVER
## FUNCTIONALITY MATRIX

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# ArcGIS 10.3.1 for Server Functionality Matrix

**Introduction**

Web GIS is a pattern for delivering GIS capabilities and is at the center of Esri's strategic direction for implementing GIS as a platform. The key concept of Web GIS is that all members of an organization can easily access and use GIS content within a collaborative environment. Web GIS leverages your existing GIS investments and makes them discoverable and more accessible. It provides a platform for integrating your GIS with other business systems and promotes cross organizational collaboration. In this way, Web GIS extends the reach of GIS to everyone in your organization enabling better decision making.

ArcGIS for Server enables the Web GIS pattern by deploying the ArcGIS Platform in your own infrastructure. This deployment enables anyone in your organization to discover, create, use and share geographic content from anywhere, anytime, on any device. ArcGIS for Server is designed to run in your infrastructure, either on-premises or in virtualized environments. It can be configured to work within your existing IT infrastructure and integrate with your enterprise security systems.

Conceptually, ArcGIS for Server includes three main tiers: services, access, and apps, see Figure 1. The *services* tier includes a GIS Server that enables GIS resources to be shared as GIS web services. The *access* tier includes a portal (aka. the Portal for ArcGIS extension) that represents a gateway to access your GIS content. It is a user-friendly website that connects the people in your organization to the GIS resources and products powered by the GIS Server. Portal users can search and discover your GIS assets, create new maps, leverage application templates, and even create web apps from scratch without programming. The Portal helps you organize, secure, and facilitate access to spatial information products in your organization. The apps tier includes a collection of ready-to-use productivity apps for the web, smart phones and tablets, and plug-ins for common business systems (such as Microsoft Office, SharePoint, Cognos, Salesforce, and MicroStrategy). All of these tiers comprise the Web GIS pattern in your own infrastructure and together are included in ArcGIS for Server.
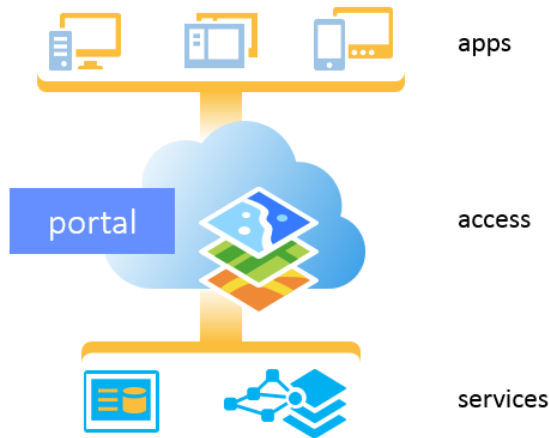
Figure 1: The Web GIS pattern with ArcGIS for Server's three conceptual tiers: services, access, and apps.

Additionally, developers can build customized apps that work with ArcGIS for Server using the ArcGIS REST API, ArcGIS API for JavaScript, and a host of ArcGIS Runtime SDKs.

**How to use this document**

This document is a guide for helping you determine the edition and capacity level of ArcGIS for Server that best fits your organization.

In the overview section that follows, you are presented with GIS services capabilities (including analytics and workflow capabilities), available apps, and the capacity levels of ArcGIS for Server. You should compare this information with the capabilities you need with the number of people in your organization and the work they perform.

Next, the details section contains additional information about important concepts that are unique to ArcGIS for Server and its components.

At the end, you will find a group of ArcGIS for Server use cases based on common customer deployments that may be helpful when comparing to your own situation.

As always, your local Esri representative can help you further define what capabilities you require to meet your objectives.

# Functionality Matrix Overview

**Selecting the Appropriate ArcGIS for Server Edition and Level**

When selecting the appropriate ArcGIS for Server edition and level for your organization, consider these two questions:

1. What functionality (GIS service capabilities and applications) do you require?
2. What level of capacity (storage and number of simultaneous connections) do you want to support?

**Functionality**

ArcGIS for Server is offered in three editions. Each successive edition offers greater functionality.

**Basic**

With the Basic edition, you get geodatabase management and the ability to publish feature services for map visualization and query. Web-based editing using feature services is not available with the Basic edition. You also get the geometry service and the ability to publish geodata services.

**Standard**

With the Standard edition, you get everything in the Basic edition, plus all the GIS web service types offered by ArcGIS for Server. This allows you to web-enable your maps, imagery, 3D scenes and globes, and more. You can also support web-based editing using feature services and publish geoprocessing services from any tool included in ArcGIS for Desktop Standard. Lastly, you get the Portal for ArcGIS extension, which enables you to deploy your own Portal.

**Advanced**

With the Advanced edition, you get everything in the Standard edition, plus the ability to publish geoprocessing services from any tool included in ArcGIS for Desktop Advanced.

|  | Editions | | |
| --- | --- | --- | --- |
| **GIS Service Capabilities** | **Basic** | **Standard** | **Advanced** |
| Support for Spatially Enabled Databases* | Included | Included | Included |
| Geodatabase Management** | Included | Included | Included |
| Create and manage GIS Web Services | Included | Included | Included |
| Support for web mapping Apps | Included | Included | Included |
| Support for smartphone and tablet Apps | Included | Included | Included |

| | | | |
|---|---|---|---|
| Hosting/managing map-centric content (aka. Portal for ArcGIS) | - | Included | Included |
| Image processing and analysis | - | Included | Included |
| Web Editing | - | Included | Included |
| Visualizing 3D spatial content*** | - | Included | Included |
| Geoprocessing | - | Included | Included |
| Advanced Geoprocessing with Extensions | - | With Analyst Extensions**** | Included |
| Real-Time Data Processing and Monitoring | - | With ArcGIS GeoEvent™ Extension for Server | With ArcGIS GeoEvent Extension for Server |

*Spatially enabled databases are those that include native database spatial data types. See the Spatially Enabled Databases section for more details.

**Requires ArcGIS for Desktop Standard or Advanced.

***For scene services, ArcGIS Pro and Portal for ArcGIS configured with a hosting server (ArcGIS Data Store only) is required.

To publish 3D analysis tools as geoprocessing services, the ArcGIS 3D Analyst for Server extension is required.

****See list of extensions and other products below.

For more information about each category, see the Functionality Matrix Details section of this document.

You can supplement ArcGIS for Server capabilities by adding extensions and other products.

| Extensions and Other Products | Editions | | |
| --- | --- | --- | --- |
| | Basic | Standard | Advanced |
| Portal for ArcGIS | - | Included* | Included* |
| ArcGIS Schematics for Server | - | Included | Included |
| ArcGIS Spatial Analyst for Server | - | - | Included |
| ArcGIS 3D Analyst for Server | - | - | Included |
| ArcGIS Geostatistical Analyst for Server | - | - | Included |
| ArcGIS Network Analyst for Server | - | Optional | Included |
| ArcGIS GeoEvent Extension for Server | - | Optional | Optional |
| ArcGIS Image Extension for Server | - | Optional | Optional |
| ArcGIS for INSPIRE | - | Optional | Optional |
| ArcGIS Data Interoperability for Server | - | Optional** | Optional** |
| ArcGIS Data Reviewer for Server | - | Optional** | Optional** |
| ArcGIS Workflow Manager for Server | - | Optional** | Optional** |
| ArcGIS for Maritime: Server | - | Optional** | Optional** |
| Esri Defense Mapping for Server | - | - | Optional** |
| Esri Production Mapping for Server | - | Optional** | Optional** |
| Esri Roads and Highways | - | Optional** | Optional** |

* ArcGIS for Server customers are entitled to a number of named user licenses with their Portal for ArcGIS extension. These named users will be added to any other named user entitlements that the customer may want to allocate to Portal for ArcGIS as well as any additional purchased named users for their Portal. See GIS Portal section for more details.

** Windows only

For further details on the typical functions and capabilities included with each extension, refer to ArcGIS for Server extensions.

ArcGIS for Server includes a broad range of ready to use apps. The following table lists which apps are available for each ArcGIS for Server edition.

| ArcGIS Applications | Editions | | |
|---|---|---|---|
| | Basic | Standard | Advanced |
| ArcGIS for iOS, Android, and Windows Phone | Included | Included | Included |
| Operations Dashboard for ArcGIS | - | Included* | Included* |
| Collector for ArcGIS | - | Included** | Included** |
| Explorer for ArcGIS | - | Included | Included |
| Esri Maps for Office | - | Included** | Included** |
| Esri Maps for SharePoint | - | Included** | Included** |
| Esri Maps for IBM Cognos | - | Included** | Included** |
| Esri Maps for MicroStrategy | - | Included** | Included** |
| Esri Maps for Dynamics CRM | - | Included** | Included** |
| Esri Maps for Salesforce | - | Included** | Included** |
| Esri Maps for SAP BusinessObjects | - | Included** | Included** |
| ArcGIS for Windows Mobile | - | Included | Included |
| Web AppBuilder for ArcGIS | - | Included*** | Included*** |

*Operations Dashboard for ArcGIS includes two versions:

1. A desktop, Windows-based version for creating and monitoring operation views.

2. A browser-based version for monitoring operation views.

**Requires a named user license. These ArcGIS applications are provisioned to specific named users by Portal for ArcGIS administrators.

***Requires a named user license to create new apps (this includes the Developer Edition). Deployed apps do not require a named user if shared to public.


## Capacity

The ArcGIS for Server editions described in the previous section are available at two levels, scaled according to capacity: Workgroup and Enterprise.

| | Capacity Level | |
|---|---|---|
| | Workgroup | Enterprise |
| Simultaneous connections to multiuser geodatabase | 10 | Unlimited |
| Multiuser geodatabase storage capacity | 10 GB* | Unlimited |
| Maximum number of licensable cores | 4 cores | Unlimited |
| Maximum number of Portal for ArcGIS named users | 10 | Unlimited |
| Distributed deployment of ArcGIS for Server components | Not supported** | Supported |

*ArcGIS 10.3.x for Server Workgroup ships with Microsoft SQL Server Express 2012, which is limited to databases of up to 10 GB in size.

**Workgroup-level components can only be installed on one machine.

Selecting functionalities and the capacity level you want will determine the ArcGIS for Server edition and level you need. For example, ArcGIS for Server Enterprise Standard supports unlimited simultaneous connections, a large multiuser geodatabase, and a standard set of functionality. For more examples, see the ArcGIS for Server Use Case Scenarios section at the end of this document.

### Deployment

All editions and levels of ArcGIS for Server must be installed on 64-bit operating systems. The software can be deployed on physical or virtualized servers as well as on cloud infrastructures.

|  | Deployment Options | |
| --- | --- | --- |
|  | **Workgroup** | **Enterprise** |
| Windows 64-bit operating systems | Supported | Supported |
| Linux 64-bit operating systems | Not supported | Supported |

For the most up-to-date information about system requirements and supported operating systems, refer to System requirements.

# Functionality Matrix Details

## GIS Portal

A GIS portal enables an organization to make their geographic content and services available to a larger community beyond the GIS department. It brings geographic information together from various organizational resources in a uniform way, making it easier to search, discover, use, and share that information.

Portal for ArcGIS is an extension that is included with ArcGIS for Server Standard and Advanced. It provides a user-friendly, searchable repository for your maps and apps that can be deployed in your infrastructure (on-premises or in the cloud). Portal for ArcGIS is used for creating and sharing web maps and web apps, searching for GIS content in your organization, creating groups to help manage access to content, and providing a collaborative environment for your GIS assets and map information products.

| | Editions | | |
|---|---|---|---|
| | **Basic** | **Standard** | **Advanced** |
| Portal for ArcGIS | - | Included | Included |

Portal for ArcGIS is a central component of the ArcGIS platform to enable Web GIS in your own infrastructure. It includes:

- A website where people in your organization can search, discover, use and share content.

- A Map Viewer for authoring and saving web maps.

- A Scene Viewer for authoring and saving 3D web scenes.

- Application templates that can be leveraged to deploy focused web apps for your web maps.

- Web AppBuilder for ArcGIS for creating and deploying custom web apps for your web maps.

- Administrator tools for managing users, groups, and content.

- The ability to store hosted web layers (tiled and feature services) when configured with a hosting server.

- ArcGIS apps, including Collector for ArcGIS, Operations Dashboard for ArcGIS, and the Esri Maps for … apps (Office, SharePoint, Cognos, Salesforce, and MicroStrategy).

**Hosted Web Layers:**

When Portal for ArcGIS is configured with a hosting server (an ArcGIS Server site that is federated with Portal and has the ArcGIS Data Store enabled), Portal members can publish content directly to Portal. For example, from ArcGIS for Desktop, ArcGIS Pro, Esri Maps for Office, or through the Portal website.

Hosted web layers (aka. hosted web services) are designed for map visualization, editing, and query. You can publish the following types of hosted web layers:

**Feature layers:**

Hosted feature layers support vector feature querying, visualization, and editing. Hosted feature layers are most appropriate for visualizing data on top of your basemaps. In web apps, hosted feature layers are drawn by the browser and support interactive highlighting, queries, and pop-ups.

You can publish existing features from zipped shapefiles, comma-separated values (CSV) files, feature collections, ArcMap documents, ArcGIS Pro maps, or file geodatabases to be hosted as feature layers in your Portal.

**Tile layers**

Hosted tile layers support fast map visualization using a collection of pre-drawn map images, or tiles. These tiles are created and stored on the server after you upload your data. Hosted tile layers are appropriate for basemaps that give your maps geographic context. You can publish tiles from a service definition file or ArcMap document that is hosted in your Portal.

Portal for ArcGIS is a separate software installation from ArcGIS for Server.

## Named User Entitlements

ArcGIS for Server includes a set of named user entitlements to be used with Portal for ArcGIS based on the level and capacity of the implementation.

| | Named User Entitlements | |
| --- | --- | --- |
| **ArcGIS for Server** | **Workgroup** | **Enterprise** |
| Advanced | 10* | 50** |
| Standard | 5* | 5** |

*ArcGIS for Server Advanced and Standard (Workgroup) customers are limited to 10 named users per ArcGIS for Server implementation.

**ArcGIS for Server Advanced and Standard (Enterprise) customers can purchase additional named user licenses to use with Portal for ArcGIS.

These entitlements may not be applicable if you are licensed under a special program such as: Enterprise License Agreement (ELA), Education site license, etc. Please contact your local Esri representative for more details on named user entitlements.

Portal for ArcGIS is not available with ArcGIS for Server Basic (Enterprise or Workgroup). However, customers are permitted to register services from ArcGIS for Server Basic with their Portal for ArcGIS implementation.

## Web Services

Web services make it easy to share GIS resources across client applications, including ArcGIS for Desktop, web mapping applications, mobile devices, and third-party applications.

### What are GIS Web Services?

GIS web services are used to share resources over a local network or the Internet. ArcGIS for Server web services conform to web standards (Representational State Transfer [REST]); industry standards (Simple Object Access Protocol [SOAP]); and Open Geospatial Consortium, Inc.® (OGC®), standards.

GIS web services are available as follows:

| GIS Web Services | Editions | | |
|---|---|---|---|
| | Basic | Standard | Advanced |
| Geodata service | Included | Included | Included |
| Feature service (read-only) | Included | Included | Included |
| Geometry service | Included | Included | Included |
| Dynamic Map service | - | Included | Included |
| Cached Map service | - | Included | Included |
| Image service | - | Included | Included |
| Feature service (read and write) | - | Included | Included |
| Geoprocessing service | - | Included | Included |
| Geocoding (Locator) service | - | Included | Included |
| Globe service | - | Included | Included |
| Print service | - | Included | Included |
| Enterprise Search service | - | Included | Included |
| Scene service* | - | Included | Included |
| Schematic service** | - | Included | Included |
| Stream service*** | - | Optional | Optional |
| Network service**** | - | Optional | Included |
| Windows Mobile service | - | Included | Included |

*Scene services can only be published from ArcGIS Pro to Portal for ArcGIS configured with a hosting server (ArcGIS Data Store only).

**Schematic services require the ArcGIS for Server Schematics extension.

***Stream services require the ArcGIS GeoEvent Extension for Server.

****Network services require the ArcGIS Network Analyst for Server extension.

## Open Geospatial Consortium Standards

The Open Geospatial Consortium (OGC) is an international industry consortium of 511 companies, government agencies and universities participating in a consensus process to develop publicly available interface standards. ArcGIS for Server Standard and Advanced editions support OGC web services.

The OGC web services that are supported by ArcGIS for Server:

- Web Map Service - WMS (versions: 1.0, 1.1, 1.1.1, and 1.3)
- Web Feature Service - WFS (versions: 1.0, 1.1, and 2.0)
- Web Coverage Service - WCS (versions: 1.0.0, 1.1.0, 1.1.1, 1.1.2, and 2.0.1)

- Web Map Tile Service - WMTS (version 1.0)
- Keyhole Markup Language - KML (version 2.2)
- Web Processing Service - WPS (version 1.0)

The GIS server also supports many optional parts to these specifications please refer to this Esri whitepaper for details: Esri Support for Geospatial Standards OGC and ISO/TC211. ArcGIS 10.3 for Server is listed in the OGC Compliance database and the certification details are available here: Esri Current OGC Compliant Listings.

## Real-time Data Processing

Real-time data processing is an important consideration for organizations that work with high velocity, high volume data, and both in static formats and in motion data streams. As the number of data sources providing real-time data streams increases, it is becoming more important that your applications are able to consume and immediately display this event data. ArcGIS for Server provides this capability through an optional extension.

**What is the ArcGIS GeoEvent Extension for Server?**

The ArcGIS GeoEvent Extension for Server extends the capabilities of ArcGIS for Server, enabling real-time event-based data streams to be integrated as data sources in your enterprise GIS.

|  | Editions | | |
| --- | --- | --- | --- |
|  | Basic | Standard | Advanced |
| ArcGIS GeoEvent Extension for Server | - | Optional | Optional |

Event data can be filtered, processed, and sent to multiple destinations, allowing you to connect with virtually any type of streaming data and automatically alert personnel when specified conditions occur, all in real-time.

The GeoEvent Extension is capable of consuming event data from multiple real-time data streams. Filters and processors enable analysts to discover and focus on the most interesting events, locations, and thresholds for their operations.

The GeoEvent Extension includes a Manager application similar to the ArcGIS Server Manager but is used to create and configure GeoEvent services. (Note: GeoEvent services are NOT used by ArcGIS for Server client apps.) It also includes:

- Out-of-the-box connectors for common data formats, such as text, RSS, Esri feature JSON, and generic JSON, and data communication channels, such as system file, HTTP, TCP, UDP, WebSocket, and feature services.

- A rich set of processors that perform specific actions on the GeoEvents, such as identification or enrichment as GeoEvents are routed from inputs to outputs.

- A configurable set of standard operators for attribute filtering and a powerful set of spatial filters for filtering GeoEvents based on a spatial relationship with a GeoFence.

The GeoEvent Extension changes your everyday GIS applications into frontline decision applications, helping you respond faster with increased awareness whenever and wherever change occurs.

The GeoEvent Extension is a separate software installation from ArcGIS for Server.

**What Are Stream Services?**

The GeoEvent Extension allows you to create and publish a stream service that emphasizes low latency, real-time data dissemination, for client-server data flows. Client apps connecting to a stream service begin receiving data immediately upon subscribing to the service. Clients can specify and reconfigure both spatial and attribute constraints without first unsubscribing and then reconnecting to the service.

Stream service content can be incorporated into ArcGIS Online and Portal for ArcGIS web maps as well as exposed through clients developed using the ArcGIS API for JavaScript.

## Imagery Management and Processing

ArcGIS for Server provides the ability to effectively process and serve imagery, making imagery and imagery-derived products accessible to a wide range of applications. Image services can serve single images or collections of images in mosaic datasets.

**What is the ArcGIS Image Extension for Server?**

The ArcGIS Image Extension for Server is required to serve a mosaic dataset or a raster layer containing a mosaic function in ArcGIS for Server.

A mosaic dataset is a data model in the geodatabase that references large collections of imagery and defines associated mosaic rules and on-the-fly processing. Mosaic datasets are typically created using tools in ArcGIS for Desktop (Standard or Advanced) and provide rich functionality to work with imagery collections. They can be used directly in a desktop or served as image services using ArcGIS for Server. The image service APIs enable applications to access the mosaic datasets as a catalog, control many properties of the image display, as well as access the data values for analysis.

| Functionality | Editions | | |
|---|---|---|---|
| | **Basic** | **Standard** | **Advanced** |
| Image Services—From single image | Not Available | Included | Included |
| Image Services—From mosaic datasets | Not Available | Optional | Optional |

**What are Image Services?**

Image services enable fast serving of imagery and rasters as web services. They can be used for visualization and analysis. Image services can be defined with on-the-fly processing capabilities such as orthorectification, pan sharpening, hillshading, and band algebra.

Image services can directly serve nearly any image source. They can also be used to perform processing to transform the imagery from the original source into different products without requiring preprocessing. Multiple image products can be served from a single source. Image services are accessed using the image service API.

ArcGIS for Server image processing is comparable to ArcGIS for Desktop image processing and analysis capabilities. Image services can be directly served from raster datasets, such as a TIFF file as well as from raster layers, which reference a raster dataset and apply additional processing on the fly.

**Other Ways to Serve Imagery**

Imagery can also be cached and served directly using ArcGIS for Server.

Imagery from a mosaic dataset can be cached (in Desktop or Server) and served through a map document. Serving imagery as a cache is a scalable method of serving imagery when only visual context and no additional processing or analysis is required.

## Web Editing

The ability to make spatial and attribute edits and updates to databases and geodatabase-enabled databases via the web is made possible through the following ArcGIS for Server services:

- Feature service
- Hosted feature layer (see previous section on page 8)
- Geometry service (optionally used to support editing workflows)

**What is a Feature Service?**

Feature services support multiuser database editing across your intranet or the Internet. Through this web service, you can add, delete, and update geographic features from web browsers, mobile applications, and any REST and OGC Transactional Web Feature Service (WFS-T) capable client.

The feature service is implemented as a stateless REST web service, providing maximum performance and scalability. It exposes feature templates created in ArcGIS for Desktop to clients and enables structured editing of your GIS data over the web; this gives clients an intuitive web editing user experience.

Feature services support direct access to spatial types in databases and geodatabases (see the section Why Use a Geodatabase?). ArcGIS for Server Standard and ArcGIS for Server Advanced support read and write feature

services with native spatial types from your database without the need to register tables in the geodatabase.

**What is the Geometry Service?**

The geometry service helps applications perform geometric calculations such as buffering, simplifying, calculating areas and lengths, merging, splitting, validating topological relationships, and projecting data. Often, the geometry service is used in combination with the feature service to support sophisticated GIS editing over the web.

## Visualizing 3D spatial content

Maps typically have 2D data content that are representations of reality and include additional information to enhance our understanding of the world around us. For cases where the vertical axis is important, ArcGIS Pro includes the ability to tilt up a 2D map and view spatial relationships in a three-dimensional scene. This makes the data more understandable and may help to reveal new insights. ArcGlobe is another application that enables 3D visualization.

Working in 3D can highlight influences such as the undulations of the terrain and the 3D extent of features like trees, buildings, and subsurface geology. Additionally, the display of quantitative GIS content such as population, temperature, or relative occurrences of an event, can often be communicated more effectively in a 3D view.

ArcGIS Server supports two types of web services for 3D visualization:

- Scene service
- Globe service

**What Is a Scene Service?**

ArcGIS Pro enables you to create and manage 3D spatial content, which can be shared with a portal (ArcGIS Online or Portal for ArcGIS). A scene service is a web service originating from a 3D scene layer in ArcGIS Pro. Scene services (aka. web scene layers) allow you to share 3D content as a web service and can be aggregated together into a web scene. Web scenes are interactive displays of geographic information that are useful when you need to expose 3D data on the web for visualization and analysis.

To enable ArcGIS Pro to share 3D data to Portal for ArcGIS, Portal must be configured with a hosting server. A hosting server is an ArcGIS Server site that is federated with Portal and has the ArcGIS Data Store enabled. ArcGIS Pro can share 3D content to Portal for ArcGIS as a scene service (aka. web scene layer) or as a web scene.

**What Is a Globe Service?**

A globe service gives you access to 3D content originating from an ArcGlobe document (.3dd). It supports all the same display options that are available

when viewing the layer locally. For example, globe services can be created to share 3D objects, such as a virtual city of building features and street furniture, or high-resolution elevation surfaces.

## Geoprocessing

ArcGIS for Server provides an extensive array of geoprocessing functionality.

### What Is a Geoprocessing Service?

Geoprocessing services are how you expose the powerful analytic capabilities of ArcGIS. They contain geoprocessing tasks, which take simple data captured in a web application, processes it, and returns meaningful and useful output in the form of features, maps, reports, and files.

Geoprocessing takes an input dataset, performs an operation on that dataset, and returns the result of the operation as an output dataset.

With ArcGIS for Server, you can publish geoprocessing services that allow you to submit jobs to the server and return a set of results. Building a geoprocessing service requires that you first create a model using the ModelBuilder™ feature in ArcGIS for Desktop. A model is a logical sequence of geoprocessing tools and/or scripts that help automate a GIS operation. The server accesses the model and does the work, freeing client computer resources and eliminating the problem of having to share copies of the model across client computers.

Geoprocessing supports tools comparable to the ArcGIS for Desktop Standard software-level geoprocessing toolbox.

### What Is Advanced Geoprocessing?

Advanced geoprocessing refers to the additional tools available with ArcGIS for Server Analyst Extensions (3D Analyst, Spatial Analyst, Geostatistical Analyst, and Network Analyst). Advanced routing and suitability analysis are also examples of advanced geoprocessing.

ArcGIS for Server Advanced edition includes extensions for specialized advance analytics.

## Support for Spatially Enabled Databases

ArcGIS for Server allows you to work directly with spatial data stored and managed by commercial databases that support spatial types. With ArcGIS for Server Basic edition, you can enable read-only feature services for your data. These feature services will allow you to display and query your database information on a map from web browsers and mobile devices. The following databases are supported:

- ALTIBASE®
- Amazon Relational Database Service (RDS) for Microsoft SQL Server

- Amazon Relational Database Service (RDS) for PostgreSQL
- IBM® DB2®
- IBM Informix® Dynamic Server
- IBM Netezza®
- Microsoft® SQL Server®
- Microsoft Windows Azure® SQL Database
- Oracle®
- PostgreSQL
- SAP HANA®
- Teradata®

Note: All databases are read-only in ArcGIS for Server Enterprise Basic edition and read/write in ArcGIS for Server Enterprise Standard and Enterprise Advanced editions (except for Netezza, which is read-only). SQL Server Express is read-only in ArcGIS for Server Workgroup Basic edition and read/write in ArcGIS for Server Workgroup Standard and Workgroup Advanced editions.

## Geodatabase Management

The geodatabase enables ArcGIS for Server to extend the spatial capabilities of databases to support more sophisticated GIS data management workflows such as versioning, and geospatial data models (e.g., topologies, geometric networks, and network datasets).

### Why Use a Geodatabase?

Commercial databases support simple spatial features. Geodatabases build on this framework and extend the capabilities of your database to ensure that you can enrich your GIS data models and satisfy the most demanding GIS workflows such as the following:

- Long transactions and conflict resolution (versioning)
- Modeling of utility, water, and transportation networks (geometric networks and network datasets)
- Data validation including topological, attribute, and connectivity rules (topologies)
- Tracking of historic transactions (archiving)
- Complex features: annotations (text), dimensions, parcel fabrics, etc.
- Advanced symbology (cartographic representations)
- Replication across multiple commercial databases in connected and disconnected environments (geodata services)

ArcGIS for Server Enterprise level supports multiuser geodatabases on the following relational database management systems (RDBMS):

- IBM DB2
- IBM Informix Dynamic Server
- Microsoft SQL Server
- Oracle
- PostgreSQL

ArcGIS for Server Workgroup level only supports Microsoft SQL Server Express.

ArcGIS for Desktop Standard or Advanced includes tools to create a multiuser geodatabase.

## ArcGIS Client Apps and APIs

ArcGIS for Server users benefit from a variety of ready to use client applications:

- ArcGIS Online and Portal for ArcGIS map viewers
- Web Application Templates
- Collector for ArcGIS
- Operations Dashboard for ArcGIS
- Explorer for ArcGIS
- Esri Maps for Office
- Esri Maps for SharePoint
- Esri Maps for IBM Cognos
- Esri Maps for MicroStrategy
- Esri Maps for Dynamics CRM
- Esri Maps for Salesforce
- Esri Maps for SAP BusinessObjects
- Web AppBuilder for ArcGIS

Application developers can build custom web mapping apps using these ArcGIS APIs with ArcGIS for Server services:

- ArcGIS API for JavaScript™
- ArcGIS API for Flex
- ArcGIS API for Silverlight™

## Smartphone and Tablet Apps/Runtime SDKs

ArcGIS for Server supports a variety of mobile applications across all editions and on many platforms:

- ArcGIS for iOS
- ArcGIS for Android
- ArcGIS for Windows Mobile
- Collector for ArcGIS
- Operations Dashboard for ArcGIS
- Explorer for ArcGIS

Application developers can build custom native apps for desktop and mobile devices using the ArcGIS Runtime SDKs:

- ArcGIS Runtime SDK for iOS
- ArcGIS Runtime SDK for Android
- ArcGIS Runtime SDK for OS X
- ArcGIS Runtime SDK for Qt
- ArcGIS Runtime SDK for Java

- ArcGIS Runtime SDK for the Microsoft .NET Framework

| Functionality | | Editions | | |
|---|---|---|---|---|
| | | Basic | Standard | Advanced |
| ArcGIS for Windows Mobile Application and SDK | Workgroup | Not Available | Not Available | Optional |
| | Enterprise | Not Available | Included | Included |

| Functionality | Editions | | |
|---|---|---|---|
| | Basic | Standard | Advanced |
| ArcGIS Runtime SDK for iOS, Android, OS X, Qt, Java, and Microsoft .NET Framework | Included | Included | Included |

## ArcGIS for Server Use Case Scenarios

### ArcGIS for Server Enterprise Advanced

ArcGIS for Server Enterprise Advanced may be used by a large organization, such as a city government supporting a population of over 250,000 people. The organization may be operating under a directive from its mayor's office for better government transparency, including interactive maps of city projects and planning efforts for public access.

The GIS department may be composed of seven or more staff members who support multiple departments throughout the organization, each with its own GIS analyst. For example, the GIS department may support the following:

- The police department by providing advanced crime analysis models and mapping (1 desktop user and 5 web users)
- The planning department by providing demographic analysis and modeling (2 desktop user and 3 web users)
- The engineering department by providing imagery and 3D visualization (2 desktop user and 10 web users)
- The public works department by providing mobile data collection and mapping (1 desktop user and 40 field users)

In addition, the IT department provides multiple internal applications and services that require geocoding and mapping to non-GIS staff, including data updates supporting more than 50 web users, as well as multiple external web mapping applications for public consumption supporting potentially thousands of concurrent web users.

As part of its regular services, the GIS department maintains extensive spatial databases and services for land-use records for the city's planning department, involving over 10 GB of vector data; asset inventories tied to the city's enterprise resource planning (ERP) system; public works project mapping tied to a work order management system; and high-resolution aerial photography of over 700 GB of imagery updated twice every five years.

The IT department maintains a distributed system of servers and networks that supports all departments and includes the following:

- An internal Portal for ArcGIS instance that serves as the central hub for the city's geospatial assets – this is used by the various city departments with their content divided into different groups
- The Portal references web services from several internal ArcGIS for Server deployments
- An ArcGIS Online subscription to support the external-facing GIS web apps and creation of web maps for map visualization
- An ArcGIS for Server deployment in the organization's DMZ for external consumption by the general public
- A multiuser geodatabase on top of a commercial database system for simultaneous editing from ArcGIS for Desktop
- A separate ArcGIS for Server node for mobile access and editing from the field
- Several deployments of Collector for ArcGIS used by the city's field crews

This scenario requires ArcGIS for Server Enterprise Advanced because, overall, there are more than 10 simultaneous users connecting to the enterprise geodatabase (6 desktop users plus a number of map service connections that will exceed 20 given the potential load of web users). The multiuser geodatabase will likely require over 10 GB of data for simultaneous editing during any work period.

To support the different applications, Portal for ArcGIS provides a common gateway into all web maps and GIS applications delivered by the GIS department. Portal for ArcGIS and the GIS Server are deployed across several physical machines. The ArcGIS Online subscription is included with the ArcGIS for Desktop licenses and is powered by the external-facing ArcGIS Servers.


**ArcGIS for Server Enterprise Advanced on Amazon Web Services**

ArcGIS for Server Enterprise Advanced on Amazon Web Services may be used by a large interagency emergency management center to provide centralized support for multiple emergency response teams on-site and in remote offices, as well as in the field.

In this scenario, the emergency management center supports the following:

- Internal operations groups with common operating picture applications
- Daily briefing meetings with up-to-date maps of operations, resources, assets, and planning
- Multiple external web mapping applications for public consumption (potentially thousands of concurrent web users)
- A centralized repository for all geospatial data and analysis during the incident

The deployment of ArcGIS for Server includes a fault-tolerant geodatabase on top of a commercial database system for simultaneous editing, load balancing and auto-scaling in the cloud for external consumption of mapping applications

and services, an internal ArcGIS for Server deployment for basic mapping and querying capabilities, and scalable data storage in the cloud.

This scenario requires ArcGIS for Server Enterprise Advanced on Amazon Web Services because of the likelihood of having an unreliable or nonexistent local computing infrastructure within or near the emergency site, and the impact on computing resources during the emergency may be unpredictable.

In addition, it is likely that, overall, more than 10 simultaneous users will be connecting to the enterprise geodatabase (4 desktop users plus a number of map service connections that will exceed 20 given the potential load of web users) and that the enterprise geodatabase will require over 10 GB of data for simultaneous editing during any work period.

**ArcGIS for Server Workgroup Standard**

ArcGIS for Server Workgroup Standard may be used by a small land-use planning and engineering consulting business composed of two planners, three GIS analysts, and four engineers who may require constant access to the project GIS database.

At any given time, the firm may be using 3 GB of vector data stored in SQL Server Express and configured for concurrent edits from three desktop seats, over 50 GB of imagery stored as TIFF files, and 15 GB of data stored in file geodatabases.

The firm may also make use of customer datasets and ArcGIS Online basemaps to augment applications and mapping efforts. Applications could include several internal web mapping applications to manage projects with web applications configured to support up to 40 simultaneous users over an intranet. The work may require services that use the ArcGIS Data Interoperability, Network Analyst, and Image extensions.

The entire deployment could be sustained on a single four-core machine with 10 or fewer concurrent desktop users or map service connections to the workgroup geodatabase at any given time. Data stored in the geodatabase (Microsoft SQL Server Express) would not exceed 10 GB.

**ArcGIS for Server Enterprise Standard**

ArcGIS for Server Enterprise Standard may be used by a medium-sized company with a GIS staff of two developers and one GIS analyst. They may provide GIS services for internal and external applications including routing, mapping, and geocoding services for web users (potentially thousands of concurrent users), as well as mapping and querying capabilities for more than 100 internal web users. ArcGIS for Server may be configured for high availability.

ArcGIS for Server may be deployed across three environments: development, staging, and production.

- Development environment: Two Esri® Developer Network (EDNSM) licenses for development and testing
- Staging environment: Distributed ArcGIS for Server Enterprise Standard deployment including a multiuser geodatabase and a GIS server farm of four physical 16-core blade servers and four redundant web servers; ArcGIS for Server licensed for staging environment
- Production environment: Similar to staging environment; ArcGIS for Server Enterprise Standard licensed for production use

**Note:** To support full enterprise deployment, organizations should make use of development, staging, and commercial licenses of ArcGIS for Server.

This scenario requires ArcGIS for Server Enterprise Standard because deployment is distributed across multiple machines and calls for functionality provided with the Standard edition: mapping, geocoding, and routing (which requires an additional extension).

**ArcGIS for Server Enterprise Basic**

ArcGIS for Server Enterprise Basic may be used by a small city government to support 100 Microsoft SharePoint and Office users with interactive mapping capabilities. This scenario may be used in conjunction with an ArcGIS Online subscription.

This scenario requires ArcGIS for Server Enterprise Basic because the data is stored in a spatially enabled SQL Server Standard database, and users are provided read-only access to feature services via web clients. To take advantage of applications such as Esri Maps for Office, a subscription to ArcGIS Online is required.

## Resources

ArcGIS for Server 101 – ArcUser Technical article

Portal for ArcGIS 101 – ArcUser Technical article

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