

# ArcGIS®

An Open Platform for Innovation



# Open and Interoperable

During our nearly 50-year journey, Esri has pioneered the development and evolution of geographic information system (GIS) software.

While our initial software was created as mapping and spatial analysis tools for our consulting projects, we later shifted our efforts to develop a general-purpose GIS product for a wider community. This shift changed our focus from being a services-based organization to a software company.

We started out delivering source code with our software, and over time, we evolved our technology to be a standard (COTS) product that implemented a variety of open strategies. This change provided our customers with better reliability and security. It also allowed us to scale our technical support and provide better quality, consistency, and strong documentation.

Today our technology, ArcGIS®, is a powerful **open and interoperable platform** that is used by hundreds of thousands of organizations. It's designed to support individual projects and scale to complete enterprise and SDI systems.

To ensure that ArcGIS is an open platform, we take multiple approaches, including

- Releasing many of our core technologies as **open specifications** to foster community standards and interoperability.
- Supporting **open standards** and participating in standards development efforts.
- Integrating **open data** sharing as part of our platform to achieve transparency and improve collaboration.
- Providing many of our tools as **open-source software** available on GitHub.

For software developers who wish to build custom or new geospatial applications, the ArcGIS platform is a powerful alternative to open-source software. It provides developers with a large and rich library of geospatial software components to use and extend. This affords users, developers, and system integrators many avenues for **open innovation**, including

- Configuring and deploying applications with easy-to-use templates.
- Embedding advanced GIS functionality using open APIs.
- Using modular and extendable components and services that are well documented, tested, and scalable.
- Extending and integrating geospatial functionality into other systems for domain-specific workflows.

Among the benefits of the ArcGIS Platform is an open, supported, and well-engineered architecture that includes rich functionality for data entry, data management, mapping, 3D visualization, and spatial analysis.

Thousands of software developers have embraced the open ArcGIS platform to build and deliver enterprise applications and custom systems, illustrating the success of this flexible approach.

Esri continues to work with our users to push new GIS functionality. Some of our current work is focused on advancing analytics and visualization with big data, real-time Internet of Things (IoT) data, and new distributed GIS architectures that break down barriers for sharing geographic knowledge and encouraging citizen engagement.

We're passionate about the ability of GIS to address complex problems and are constantly striving to increase its power and make it easier to use.

Our open platform approach provides flexible, configurable, customizable, scalable, interoperable, and easily deployable technology. Our ongoing goal is to enable our users and partners to apply their creativity and skills to ensure that GIS innovation and application continue to march forward along their many pathways.



**Jack Dangermond**  
President and CEO

# Extending GIS Functionality

Esri dedicates more than 30 percent of our annual revenue to research and development. Following are some of the capabilities that we are investing in.



ArcGIS Pro provides the next generation 64-bit desktop GIS with 2D and 3D **mapping** in an intuitive user interface, with analytical tools to identify patterns and trends.



Insights™ for ArcGIS allows you to explore, interact, and do **spatial analysis** with your data collections to gain further understanding.



**3D** urban environments can be built using Esri® CityEngine® with existing data and data that is generated based on dynamic models.



ArcGIS GeoEvent™ Server connects to massive **real-time** data streams and updates map features with the latest information as it becomes available.



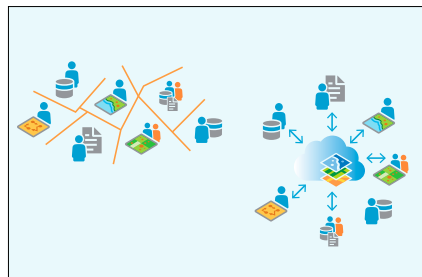
The ArcGIS raster analytics module performs raster data analytics on large **imagery** stores using distributed computing.



Collector for ArcGIS enables **field mobility**, allowing you to port GIS to tablets and mobile devices to collect and update information, with or without network connectivity.



**ArcGIS Business Analyst™** allows businesses to see people and opportunities in a clear way for market planning, site selection, and customer segmentation.



**Smart communities** are utilizing a hub approach to extend open data by deploying interactive applications that engage public participation around known problems.



ArcGIS Runtime **developer technologies** allow you to create powerful, lightweight GIS applications for desktop and mobile devices.

To read more about Esri's open vision, visit [esri.com/software/open](http://esri.com/software/open).

# Flexible

ArcGIS supports developers with a flexible approach to programming languages, platforms, and open-source coding practices.

Esri enables developers to work in the **programming languages** that they know, with support for all the popular development languages: C++, C, SQL, Java, Python, C#, .NET, Qt, Objective-C, and more.

ArcGIS has been extended with each new computing **platform** to encompass desktop, web, mobile, and cloud-based applications.

Esri is committed to supporting **open-source** technology in many ways. The ArcGIS platform implements and leverages many open-source technologies (such as GDAL),

and Esri actively contributes to many of these projects. Esri also supports close integration with leading open-source platforms, including Linux, Postgres, JavaScript, Python, and R.

Esri provides many focused open-source solutions for customizing and extending ArcGIS. We have shared more than 350 open-source projects on the developer collaboration platform GitHub ([esri.github.io](https://github.com/esri)) for such operations as building geodatabases, transforming geospatial data, analyzing spatial data, managing big data, and editing OpenStreetMap data. These projects allow developers to take full advantage of the ArcGIS platform for building web or mobile applications, integrating with enterprise or expert systems, and consuming external data sources.

## ArcGIS Integrates Many Types of Data



Vector



Tabular



Business



Raster



IoT



Big Data

# Configurable

The ArcGIS platform offers configuration options that empower users at all levels without having to write a single line of code.

- The **ArcGIS solutions** team delivers more than 300 map and app templates to jump-start your projects. These templates are organized by product and industry so that you can quickly find, configure, and use solutions to meet the needs of your organization.
- **AppStudio for ArcGIS** allows users to build apps using wizards and configurable out-of-the-box templates. Users port their maps to consumer-friendly mobile apps. These apps are built once and are ready for use on Android, iOS, Windows, OS X, and Linux devices.
- **Web AppBuilder for ArcGIS** provides a foundation for building focused apps that run anywhere, on any device.
- **Esri Story Maps** packages and presents map information using a template-driven approach to combine authoritative maps with narrative text, images, and multimedia content.

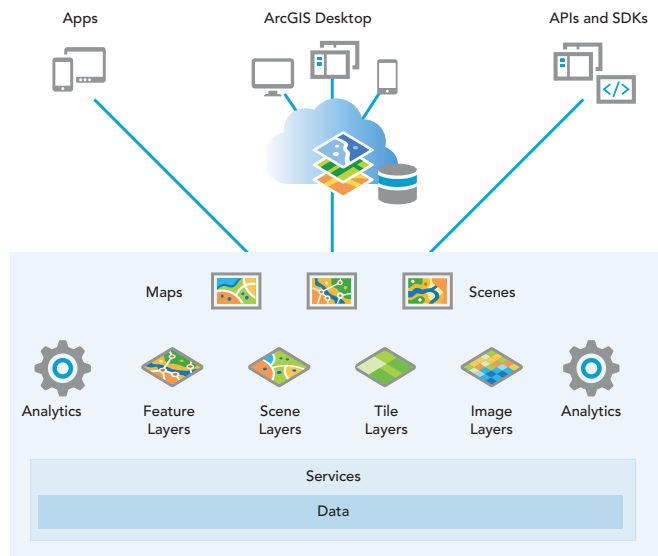


Build configurable apps that work on any device, using templates such as Crowdsource Reporter.

# Customizable

The ArcGIS platform allows those who are more comfortable with scripting and coding languages to build applications by customizing a solution using a rich library of geospatial software components. This enables them to use, embed, and extend geospatial functionality.

Esri's open application programming interfaces (**APIs**) and software development kits (**SDKs**) provide access for various systems (GIS and others) to engage and communicate with the ArcGIS platform. This includes both client and server technologies. ArcGIS Runtime SDK allows developers to create native mapping apps for multiple devices and platforms, including Android, iOS, Java, macOS, .NET, and Qt. ArcGIS API for JavaScript allows users to build full-featured 3D applications. ArcGIS Pro SDK for the Microsoft .NET Framework extends the tools and workflows using the Microsoft .NET framework and Visual Studio. ArcGIS API for Python uses this scripting language to automate tasks. ArcGIS REST API provides a standard way for web clients to communicate with GIS servers.



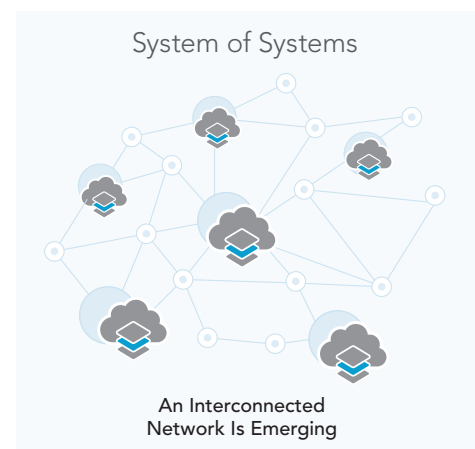
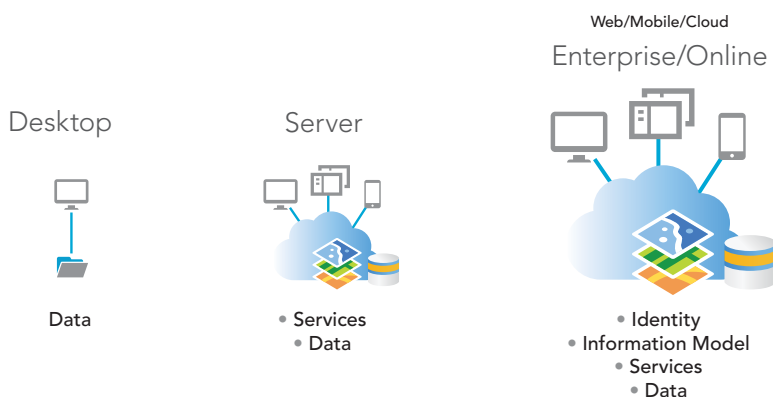
# Scalable

Smart communities and large organizations are looking for a platform that engages an increasing number of stakeholders and constituents. At the same time, they're dealing with a volume, velocity, and variability of big data that can be daunting. To meet these needs, the ArcGIS platform is open to expansion. It can handle an increasing volume of data, serve more users, and process increased data loads as needs arise.

The open ArcGIS platform can scale either by leveraging the power of the cloud or adopting a distributed platform approach for on-premises deployment. The cloud is

increasingly fueling this expansion with limitless data storage, streaming capacity, and high-performance computing to tackle complex compute- and data-intensive problems.

Scalability is important for handling a large volume of data, either at rest or in motion. The open ArcGIS platform filters, analyzes, and displays **real-time** streaming data as it becomes available. It can also process a large volume of vector-based feature data and raster-based imagery to analyze patterns and aggregate **big data** in the context of both space and time.



# Interoperable

Esri has a long-standing commitment to **standards** and **interoperability**. We work with many standards organizations to develop new standards and update existing ones. This work involves data formats for the exchange of data, metadata to describe and efficiently search data, and services to leverage data online. The ArcGIS platform leverages these standards to enhance interoperability.

Esri releases many aspects of its core technology as **open specifications**. These open specifications include the following: Indexed 3D Scene (i3S), a specification for the ArcGIS scene service that encodes 3D data such as 3D objects and integrated meshes; Limited Error Raster Compression (LERC), a highly efficient algorithm for fast lossless and controlled lossy compression of image and raster data; an open XML schema for the geodatabase for importing and exporting all items; and the shapefile format for storing geospatial data as points, lines, or polygons.

ArcGIS supports hundreds of data format standards via direct read and/or extract, transform, and load (ETL) tools for data validation, migration, and distribution. **ArcGIS Data Interoperability** provides a zero-coding environment to read, transform, and write in hundreds of GIS- and business-friendly formats from files, databases, and the web.

In addition to support for a wide range of non-GIS data formats, Esri provides focused solutions to support specialized workflows through **product interoperability**. These solutions include ArcGIS for AutoCAD, ArcGIS Maps for Office, Esri Maps for SharePoint, and ArcGIS Maps for Power BI. We also interoperate with large enterprise resource planning (ERP) systems; commercial database systems like SAP HANA, Oracle, and Microsoft SQL Server; and open-source database systems like Postgres and several NoSQL databases.

Esri has achieved Open Geospatial Consortium, Inc. (OGC), **compliance** on a wide range of products, certifying

that users can access or exchange data and information using OGC standards. Esri has achieved Federal Risk and Authorization Management Program (FedRAMP) compliance to offer a cloud environment that satisfies



## A Sample of Standards

### Open Geospatial Consortium

WFS, WMS, WMTS, WPS, WCS, CSW, Simple Features, GML, and many more (To see a complete list of Esri's support for OGC standards, visit [www.opengeospatial.org](http://www.opengeospatial.org).)

### International Organization for Standardization

Technical Committee 211 (ISO/TC211)

ISO 19115, 19115, 19119, 19125, 19128, 19136, and many more

### American Society for Photogrammetry and Remote Sensing (ASPRS)

LAS

### International Hydrographic Organization (IHO)

S-57, AML, IENC, and encrypted S-63

### Federal Geographic Data Committee

CSDGM

### Geospatial Intelligence Standards

NITF (imagery), MISB (full-motion video), and MIL-STD-2525 (military symbology)

the stringent security requirements of federal agencies. Esri is also Section 508 Information and Communication Technology (ICT) accessibility standards compliant, ensuring that federal agencies provide software and websites that are accessible to people with disabilities.

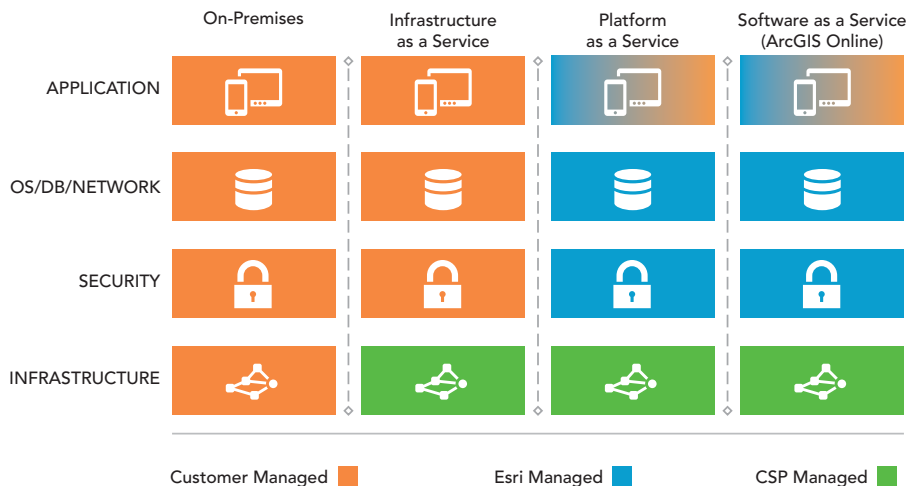
# Deployable

The ArcGIS platform is easily and readily deployable—**provisioned** with self-service mapping; applications that work across all devices and browsers; content to enable your mapping efforts; services for routing, addressing, geoprocessing, and analysis; and more. It comes packaged with the Living Atlas of the World, a repository of authoritative data to prime users' maps, apps, and analysis.

**Open data** initiatives are fueling greater government transparency. The open ArcGIS platform streamlines open data delivery and discovery. Smart communities are using a hub approach to extend open data beyond discovery by deploying interactive applications that engage public participation around known problems. The hub provides a framework to inform, listen to, and monitor issues and make progress.

The ArcGIS platform offers multiple **deployment options**. On-premises deployment is made convenient and simple,

using scripting technologies that handle and automate the installation and configuration of various components. With this option, the user manages the application, network, security, and infrastructure. Esri partners with cloud service providers (CSPs) Microsoft and Amazon to offer Infrastructure-as-a-Service deployment on their distributed computing platforms, with users managing application, network, and security. Esri offers managed services where we deploy and manage ArcGIS as a platform-as-a-service delivery model; this gives users shared control of applications, data, and services, with Esri handling the network, security, and infrastructure. We also offer ArcGIS<sup>SM</sup> Online, a cloud-based mapping platform that is provided using a software-as-a-service delivery model. ArcGIS is a secure and trustworthy location platform with many privacy and security assurances ([trust.ArcGIS.com](https://trust.arcgis.com)), including FedRAMP compliance.



## Join Esri's Open Community

Esri focuses on the millions of smart, passionate people who work around the globe to solve important problems using GIS. Join the conversations in our hosted GeoNet community forum ([geonet.esri.com](https://geonet.esri.com)), where users engage our developers and interact with each other. Immerse yourself in the community by attending one of our many events—visit [esri.com/events](https://esri.com/events).

Are you a developer? See [developers.arcgis.com](https://developers.arcgis.com).

Are you contemplating starting your own business? The Esri Startup Program is a free three-year program that gives emerging businesses the tools to build mapping and location analytics capabilities into their products. See [developers.arcgis.com/startups](https://developers.arcgis.com/startups).

To read more about Esri's open vision, visit [esri.com/software/open](https://esri.com/software/open).



Esri, the global leader in geographic information system (GIS) technology, helps government, industry, and organizations unlock the full potential of their data to improve operational results.

Esri software is deployed in more than 350,000 organizations, including the world's largest cities, most national governments, 75 percent of Fortune 500 companies, and more than 7,000 colleges and universities. Esri engineers the most advanced mapping and spatial analysis solutions for use across desktops, servers, and mobile platforms. Using our market-leading platform to reveal deeper insight into their data, Esri users are creating the maps that run the world. Visit us at [esri.com](http://esri.com).



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