Esri Support for Geospatial Standards: OGC and ISO/TC211

An Esri® White Paper
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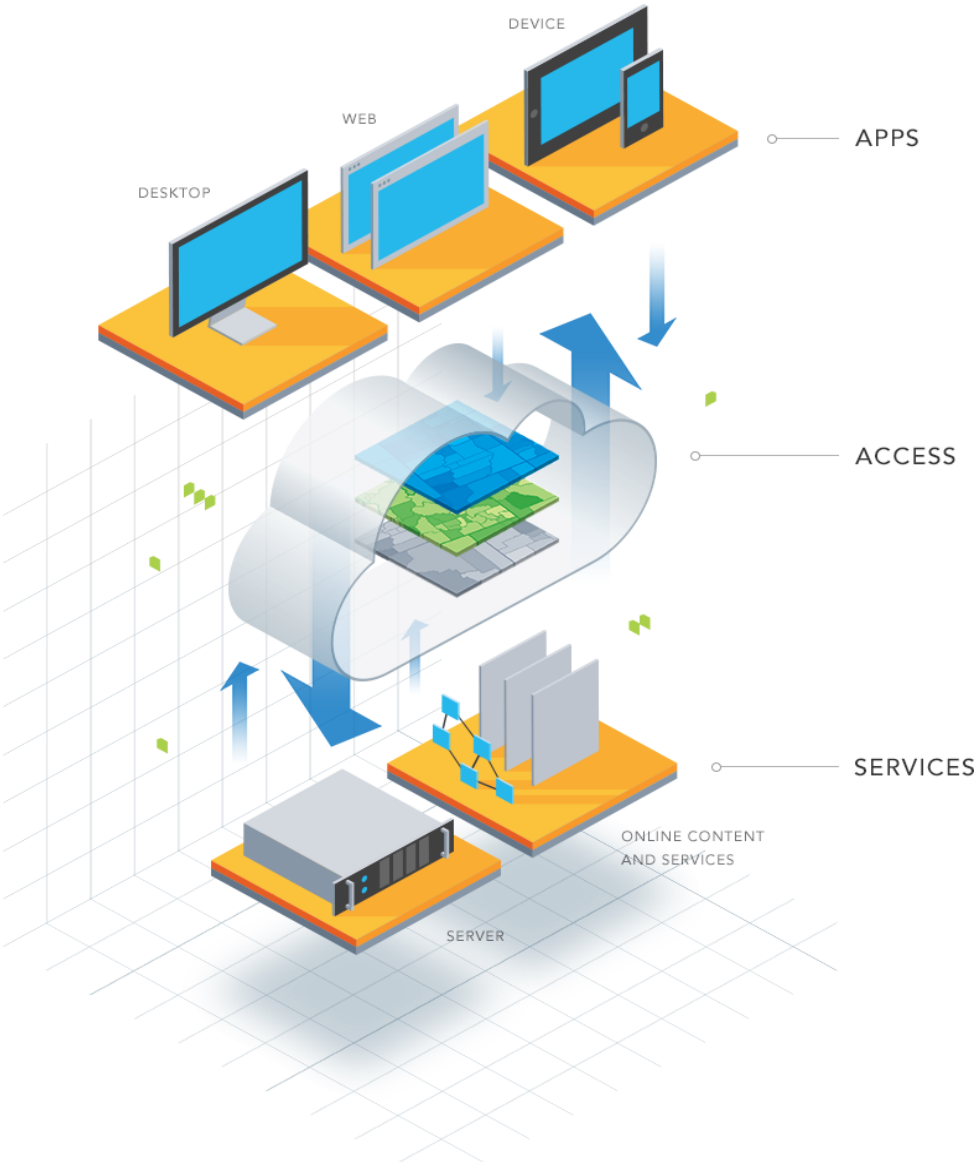
The ArcGIS Platform

At Esri, we believe applied geography helps people better understand our world. We base our work on that belief. We built and are constantly improving the geographic information system (GIS) called the ArcGIS® platform.

People all over the world and across every field use ArcGIS to integrate and unify data. It empowers people to see and share information holistically, work efficiently, and make smarter and faster decisions. ArcGIS users have created countless essential GIS applications across hundreds of thousands of organizations. Through it all, Esri has kept a focus on interoperability as a basic design principle. Our aim is to ensure that the ArcGIS platform works seamlessly with other geospatial systems as well as various data formats and non-GIS information technologies.



The ArcGIS platform is open and interoperable.

Designed for Interoperability

At its heart, GIS is a field where people integrate data from multiple sources so they can view and analyze it and answer specific questions. That data is often developed and maintained by one business, agency, or department and then used by another. In addition to multisourced and shared data, GIS involves the use of different technologies, data formats and models, and projections. Esri designs ArcGIS with all that in mind.

ArcGIS allows people to use and integrate data from a large variety of sources, see and analyze that data in a comprehensive way, then share the results with anyone. In short, ArcGIS is designed for interoperability.

In fact, ArcGIS is built on the Open Geospatial Consortium Inc., (OGC) Simple Feature Specification, which is how ArcGIS stores basic geographic features. Fundamental geographic objects are implemented using the OGC standard for Simple Feature and are then extended for more complex objects like networks, topologies, and cadastral fabrics. These fundamental GIS building blocks create the foundation for GIS interoperability.

Interoperability also applies to multiple layers within a GIS technology stack from operating systems to data stores, application server technologies, data models, semantics, web services protocols, browsers, and mobile devices. ArcGIS works on a wide variety of operating systems and external software programs and technologies. ArcGIS interacts with CAD and raster data, geospatial files from third-party developers, and various relational databases and provides a choice of developer tools to extend the ArcGIS platform. These developer tools include ArcGIS Runtime SDKs and APIs.

Understanding Interoperability Enablers

GIS interoperability enablers ensure users successfully interoperate and do so easily. The ArcGIS platform also supports these important interoperability enablers:

- Openly published data formats and models
- Openly published application programming interfaces (APIs)
- Direct read/write of a wide variety of data formats
- Extract, transform, and load (ETL) technology
- Hardware platform choices
- Database choices
- Operating environment choices
- Developer tool choices
- Support for multiple coordinate, address, and temporal reference systems
- Support for thousands of datums and projections
- Adoption and use of fundamental information technology (nongeospatial) web and cloud standards, patterns, and best practices

Supporting Open and Protected Source, Open Standards and Open Data

Interoperability and openness are often interconnected. The Esri® ArcGIS platform is designed to help our users be interoperable with other GIS and IT systems and enable our users to openly share their data and work. Esri's goal is to build the best GIS platform to enable core analytical GIS work, simple web mapping, and extensibility by developers. Therefore, Esri defines *open* as being open to using both protected and open-source software in our own engineering. Most organizations no longer see the choice between protected and open-source coding as a black and white choice between being "open or closed" as this construct is no longer true. Therefore, we use and deploy the best of both the protected and open-source paradigms, and our users benefit from both approaches.

The following are benefits of building and delivering the ArcGIS platform as standards commercial off-the-shelf software (SCOTS):

- These out-of-the-box products are engineered for end users and developers.
- Product are built by a team of engineers using well-known and recognized development and testing regimes.
- Products are scalable, extensible, and secure.
- Intellectual property rights (IPR) are well understood.
- The platform is integrated and offers full-feature GIS across the cloud, web, servers, desktops, and mobile devices.
- Highly developed training is available in the classroom, online, and Esri Press books.
- Esri technical support is offered.
- More than 2000 Esri partners offer customized products, services, and training extending and supporting the ArcGIS platform.
- Esri stands behind its products and is responsible for our engineering.
- A sustainable business model means we are there for our users.
- It is cost effective in that all the above is provided out of the box from the ArcGIS platform and without the added expense and complexity of in-house software coding.

The following features highlight the value of ArcGIS platform open-source engineering and the openly published Esri GitHub resources that are offered:

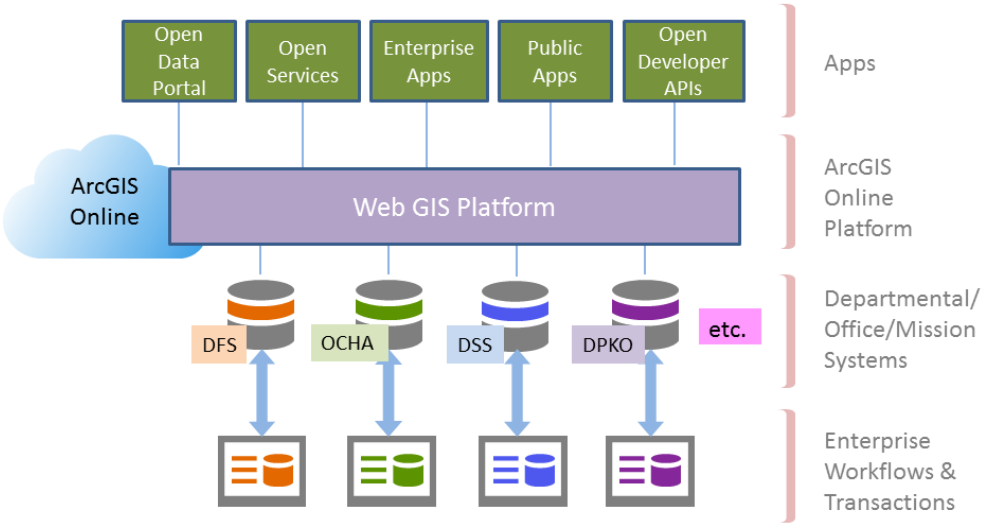
- Community driven and participant development
- Flexible
- Can be quickly deployed
- Reusable code

Esri has hundreds of open-source projects that allow developers to take full advantage of the platform for building web or mobile applications, integrating with enterprise or expert systems, and consuming external data sources.

For more information, please visit esri.github.io to see more than 266 open-source projects.

Additionally, Esri frequently sponsors, supports, or participates in open-source events, such as the FOSS4G conference, OpenSourceBridge, and OSCON and for the past 10 years, Esri has organized developer conferences and Dev Meetups where thousands of developers from across the globe join and exchange expertise, code, and ideas.

An important part of the ArcGIS platform is ArcGIS Open Data, which helps organizations join the open data movement and easily publish their data for others to discover and use.



The ArcGIS platform opens up data across an organization.

Supported OGC Standards

Note that not all OGC standards have compliancy tests. Esri implements many OGC standards for which there are no tests yet.

Part 1 is a list of Esri's OGC Compliant Products. Part 2 is a list of OGC Standards that Esri additionally implements.

Please note the Esri product naming convention: OGC compliant products are listed here by the names they were called at the time of testing. Esri has gone through a naming convention change for the ArcGIS platform products around the time of the 10.0 release. This was done to reflect the unified nature of the Esri family of products.

For the most up-to date list of Esri's support for OGC standards, please visit the OGC website at http://www.opengeospatial.org/resource/products.

PART 1: Esri OGC Compliant Products

OpenGIS Web Coverage Service (WCS) Implementation Specification (Corrigendum) 1.1.1.1

- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server

OpenGIS WCS Implementation Specification (Corrigendum) 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0
- ArcGIS Server 9.3

Web Feature Service (WFS) 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 Service Pack 1
- ArcIMS® 9.3
- ArcIMS 9.2
- ArcIMS 9.1 SP1

OpenGIS Web Map Service (WMS) Implementation Specification 1.3.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3
- ArcIMS 9.3

OpenGIS WMS Implementation Specification 1.1.1

- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0
- ArcGIS Server 9.3
- ArcIMS 9.3
- ArcGIS Server 9.2
- ArcIMS 9.2
- ArcIMS 9.1
- ArcIMS 9.0

OpenGIS Catalogue Service Implementation Specification 2.0.2 (CAT 2.0.2)

- Esri Geoportal™ Server 1.2.5 (Official OGC Reference Implementation)
- Esri Geoportal Server 1.2.4
- Esri Geoportal Server 1.2.2
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.0

Catalogue Service for the Web 2.0.2

- Esri Geoportal Server 1.2.5 (Official OGC Reference Implementation)
- Esri Geoportal Server 1.2.4
- Esri Geoportal Server 1.2.2
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1

OpenGIS Information Specification for Geospatial Information—Simple Features Access 1.1 (SFS 1.1) (Core)

- ArcGIS 10.3 for Server—Informix
- ArcGIS 10.3 for Server—DB2
- ArcGIS 10.3 for Server—SQL Server

- ArcGIS 10.3 for Server—SQLite
- ArcGIS 10.3 for Server—Netezza
- ArcGIS 10.3 for Server—Oracle
- ArcGIS 10.3 for Server—PostgreSQL
- ArcGIS 10.3 for Server—Teradata
- ArcGIS 10.2 for Server—Informix
- ArcGIS 10.2 for Server—DB2
- ArcGIS 10.2 for Server—SQL Server
- ArcGIS 10.2 for Server—SQLite
- ArcGIS 10.2 for Server—Netezza
- ArcGIS 10.2 for Server—Oracle
- ArcGIS 10.2 for Server—PostgreSQL
- ArcGIS 10.2 for Server—Teradata
- ArcGIS 10.1 for Server Enterprise (ArcSDE®)—DB2
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—Informix
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—Oracle
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—PostgreSQL
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—SQL Server
- ArcGIS Server Enterprise (ArcSDE) 10.0—DB
- ArcGIS Server Enterprise (ArcSDE) 10.0—Informix
- ArcGIS Server Enterprise (ArcSDE) 10.0—Oracle
- ArcGIS Server Enterprise (ArcSDE) 10.0—PostgreSQL
- ArcGIS Server Enterprise (ArcSDE) 10.0—SQL Server
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—DB2
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—Informix
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—Oracle
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—PostgreSQL
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—SQL Server
- ArcGIS Server 9.3—DB2
- ArcSDE 9.3—Informix
- ArcSDE 9.3—Oracle
- ArcSDE 9.3—PostgreSQL
- ArcSDE 9.3—SQL Server
- ArcGIS Server Enterprise 9.2—DB2
- ArcGIS Server Enterprise 9.2—Informix
- ArcGIS Server Enterprise 9.2—Oracle
- ArcGIS Server Enterprise 9.2—SQL
- ArcGIS Server Enterprise 9.2—SQL Express
- ArcSDE 9.1—DB2
- ArcSDE 9.1—Informix
- ArcSDE 9.1—Oracle
- ArcSDE 9.1—SQL Server
- ArcSDE 9.0—DB2
- ArcSDE 9.0—Informix
- ArcSDE 9.0—Oracle
- ArcSDE 9.0—SQL Server
- ArcSDE 8.1—DB2
- ArcSDE 8.1—Informix
- ArcGIS 8.1—OLE/COM
- Spatial Database Engine™ Datajoiner 3.0.2—DB2

- Spatial Database Engine Datajoiner 3.0.2—Informix
- Spatial Database Engine Datajoiner 3.0.2—Oracle

OpenGIS Information Specification for Geospatial Information—Simple Features SQL Types and Functions 1.1 (SFS TF) (Compliance Alternative)

- ArcGIS 10.3 for Server—PostgreSQL
- ArcGIS 10.3 for Server—DB2
- ArcGIS 10.3 for Server—Informix
- ArcGIS 10.3 for Server—Oracle
- ArcGIS 10.3 for Server—Netezza
- ArcGIS 10.3 for Server—SQLite
- ArcGIS 10.3 for Server—Teradata
- ArcGIS 10.2 for Server—PostgreSQL
- ArcGIS 10.2 for Server—DB2
- ArcGIS 10.2 for Server—Informix
- ArcGIS 10.2 for Server—Oracle
- ArcGIS 10.2 for Server—Netezza
- ArcGIS 10.2 for Server—SQLite
- ArcGIS 10.2 for Server—Teradata
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—DB2
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—Informix
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—Oracle
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—PostgreSQL
- ArcGIS Server Enterprise (ArcSDE) 10.0—DB2
- ArcGIS Server Enterprise (ArcSDE) 10.0—Informix
- ArcGIS Server Enterprise (ArcSDE) 10.0—Oracle
- ArcGIS Server Enterprise (ArcSDE) 10.0—PostgreSQL
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—DB2
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—Informix
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—Oracle
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—PostgreSQL
- ArcGIS Server 9.3—DB2
- ArcSDE 9.3—Informix
- ArcSDE 9.3—Oracle
- ArcSDE 9.3—PostgreSQL
- ArcGIS Server Enterprise 9.2—DB2
- ArcGIS Server Enterprise 9.2—Informix
- ArcGIS Server Enterprise 9.2—Oracle
- ArcSDE 9.1—DB2
- ArcSDE 9.1—Informix
- ArcSDE 9.0—DB2
- ArcSDE 9.0—Informix
- ArcSDE 8.1—DB2
- ArcSDE 8.1—Informix
- Spatial Database Engine Datajoiner 3.0.2—DB2
- Spatial Database Engine Datajoiner 3.0.2—Informix
- Spatial Database Engine Datajoiner 3.0.2—Oracle

OpenGIS Information Specification for Geospatial Information—Simple Features Binary Geometry 1.1 (SFS BG) (Compliance Alternative)

- ArcGIS 10.3 for Server—Oracle
- ArcGIS 10.3 for Server—SQL Server
- ArcGIS 10.2 for Server—Oracle
- ArcGIS 10.2 for Server—SQL Server
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—Oracle
- ArcGIS 10.1 for Server Enterprise (ArcSDE)—SQL Server
- ArcGIS Server Enterprise (ArcSDE) 10.0—Oracle
- ArcGIS Server Enterprise (ArcSDE) 10.0—SQL Server
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—Oracle
- ArcGIS Server Enterprise (ArcSDE) 9.3.1—SQL Server
- ArcSDE 9.3—Oracle
- ArcSDE 9.3—SQL Server
- ArcGIS Server Enterprise 9.2—Oracle
- ArcGIS Server Enterprise 9.2—SQL Server
- ArcGIS Server Enterprise 9.2—SQL Server Express
- ArcSDE 9.1—Oracle
- ArcSDE 9.1—SQL Server
- ArcSDE 9.0—Oracle
- ArcSDE 9.0—SQL Server

Part 2: Esri Products Implementing OGC Standards

See part 1 above for a list of Esri products that have OGC compliancy certificates. Having OGC compliancy also means there is an OGC standard implementation. Here is the list of Esri products that implement OGC standards for which there are no compliancy tests:

OpenGIS Catalogue Service Implementation Specification Catalog Service for the Web (CSW) 2.0.2

- ArcGIS 10.3
- ArcGIS 10.2
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS 9.3
- Esri Geoportal Server 1.2.5
- Esri Geoportal Server 1.2.4
- Esri Geoportal Server 1.2.2
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1
- ArcGIS Explorer

OpenGIS Catalogue Service Specification 2.0.2—ISO Metadata Application Profile 1.0.0

- ArcGIS Server Geoportal Extension 10.0
- Esri Geoportal Server 1.2.5
- Esri Geoportal Server 1.2.4
- Esri Geoportal Server 1.2.2

OpenGIS Catalogue Service Implementation Specification (Catalog Service for the Web) 2.0.1

- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcIMS Metadata Server 9.0
- ArcGIS Explorer
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

Catalog Interface 1.1.1

- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3
- ArcIMS Metadata Server 9.0
- ArcIMS Metadata Server 4.0.1
- ArcIMS Metadata Server 4.0
- GIS Portal Toolkit 2.0

Catalog Interface 1.0

- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3
- ArcIMS Metadata Server 9.0
- ArcIMS Metadata Server 4.0.1
- ArcIMS Metadata Server 4.0
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

OpenGIS Catalogue Services—Part 1: ebRIM Profile of CSW 1.0.0

- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1

Catalog Service for the Web—ebRIM Registry Service—Part 2: Basic Extension Package 1.0.0

- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1

OpenGIS City Geography Markup Language (CityGML) Encoding Standard 1.0

- ArcGIS 10.3 Data Interoperability Extension
- ArcGIS 10.2.2 Data Interoperability Extension
- ArcGIS 10.2.1 Data Interoperability Extension
- ArcGIS 9.3 Data Interoperability Extension

OpenGIS Filter Encoding Implementation Specification 2.0

- ArcGIS 10.3 for Server
- ArcGIS 10.3

OpenGIS Filter Encoding Implementation Specification 1.1

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.1
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1

Filter Encoding 1.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.2
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.2
- ArcIMS 9.1 SP1
- ArcIMS 9.1
- ArcIMS 4.0.1
- ArcIMS 4.0
- GIS Portal Toolkit 3.1

OpenGIS GML Encoding Standard 3.2.1

- ArcGIS 10.3 for Server
- ArcGIS 10.3 Data Interoperability Extension
- ArcGIS 10.2 for Server
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1

OpenGIS GML Encoding Specification 3.1.1

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0

- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1

GML 3.1.1 Simple Feature Profile 1.0.0

- ArcGIS 10.3
- ArcGIS 10.2
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- ArcGIS 9.2

OpenGIS GML Encoding Standard 3.0

- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcIMS 9.1 SP1
- ArcIMS 9.1
- ArcGIS Data Interoperability Extension 9.0
- ArcIMS Data Delivery Extension 9.0

GML 2.1.2

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcIMS 9.1 SP1
- ArcIMS 9.1
- ArcGIS Data Interoperability Extension 9.0
- ArcIMS Data Delivery Extension 9.0
- ArcIMS 4.0.1
- ArcIMS 4.0

GML 2.1.1

- ArcGIS 10.3 for Server
- ArGIS 10.3 Data Interoperability Extension
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcIMS 9.1 SP1
- ArcIMS 9.1
- ArcGIS Interoperability Toolbar Add-on 8.3

- ArcIMS 4.0.1
- ArcIMS 4.0

OGC GeoPackage Encoding Standard 1.0

- ArcGIS Runtime
- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.1

GeoRSS, An Introduction to 1.0.0

- Esri Geoportal Server 1.2.5
- Esri Geoportal Server 1.2.4
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3

OGC Keyhole Markup Language (KML) 2.2.0

- ArcGIS 10.3 for Server
- ArcGIS Online
- Portal 10.3 for ArcGIS
- Portal 10.2 for ArcGIS
- ArcGIS 10.3 Data Interoperability Extension
- ArGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- Esri Geoportal Server 1.2.5
- Esri Geoportal Server 1.2.4
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- GIS Portal Toolkit 9.3

Keyhole Markup Language 2.1 Reference—An OGC Best Practice 2.1.0

- ArcGIS 10.3
- ArcGIS 10.2.2
- Portal 10.3 for ArcGIS
- Portal 10.2 for ArcGIS
- ArcGIS Online
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0

- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- GIS Portal Toolkit 9.3

OpenGIS Location Services (OpenLS) Implementation Specification: Core Services 1.1

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenLS Core Services (Parts 1–5) 1.0

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenLS Core Services (Part 1: Directory Service) 1.0

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenLS Core Services (Part 2: Gateway Service) 1.0

- ArcWeb Services 2006

OpenLS Core Services (Part 3: Location Utility Service) 1.0

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenLS Core Services (Part 4: Presentation Service) 1.0

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenLS Core Services (Part 5: Route Service) 1.0

- ArcIMS 9.1
- ArcIMS 9.0
- ArcWeb Services 2006

OpenGIS Implementation Specification for Geographic Information—Simple Feature (SF) Access 1.1

- ArcGIS 10.2.2 for Server
- ArcGIS 10.2 for Server
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1

OpenGIS Simple Feature Implementation Specification for OLE/COM 1.1

- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1

Simple Features (SF)—SQL Binary Geometry 1.1

- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 9.3 SP1

SF—SQL Types and Functions 1.1

- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 9.3 SP1

SF—SQL Normalized Geometry 1.1

- ArcGIS Server 9.3 SP1

OpenGIS Sensor Observation Service 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server

OpenGIS Styled Layer Descriptor (SLD) Implementation Specification 1.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.3
- ArcGIS 10.2
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.2
- ArcIMS 9.1 SP1
- ArcIMS 9.1
- ArcIMS 4.0.1
- ArcIMS 4.0
- GIS Portal Toolkit 3.1

OpenGIS Web Map Context Implementation Specification 1.1

- ArcGIS 10.2.2
- ArcGIS 10.2.1

Web Map Context Document 1.0

- ArcExplorer™ Web

WCS Implementation Standard 2.0.1

- ArcGIS 10.3 for Server

WCS Implementation Specification (Corrigendum) 1 1.1.1

- ArcGIS 10.3
- ArcGIS 10.3 for Server
- ArcGIS 10.2.2

- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1

WCS Implementation Specification 1.1.0

- ArcGIS 10.3
- ArcGIS 10.2
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS 10.3 for Server
- ArcGIS 10.2 for Server
- ArcGIS Server 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3

WCS Implementation Specification (Corrigendum) 1.0.0

- ArcGIS 10.3
- ArcGIS 10.3 for Server
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.0
- ArcGIS Server 9.0
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

OpenGIS WFS Interface Standard (also ISO 19142) 2.0

- ArcGIS 10.3 for Server
- ArcGIS 10.3

OpenGIS WFS Implementation Specification 1.1.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1
- ArcGIS 10.1 for Server
- ArcGIS 10.0
- ArcGIS Server 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcIMS 4.0.1
- ArcIMS 4.0
- GIS Portal Toolkit 3.1

OpenGIS WFS Implementation Specification (Transactional) 1.1.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0

Web Feature Service 1.0.0

- ArcGIS 10.3
- ArcGIS 10.3 for Server
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.2
- ArcIMS 9.1
- ArcGIS Data Interoperability Extension 9.0
- ArcIMS Data Delivery Extension 9.0
- ArcGIS Interoperability Toolbar Add-on 8.3
- ArcIMS 4.0
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

Web Feature Service (Transactional) 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server
- ArcGIS Server 10.0

OpenGIS WMS Implementation Specification 1.3.0

- ArcGIS 10.3
- ArcGIS Online
- ArcGIS Runtime
- ArcGIS API for JavaScript
- Portal 10.3 for ArcGIS
- Portal 10.2 for ArcGIS
- ArcGIS 10.2.2
- ArcGIS 10.2.1
- Esri Geoportal Server 1.2.4
- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 3.1
- ArcGIS Explorer

OpenGIS WMS Implementation Specification 1.3.0

- ArcGIS 10.3 for Server
- ArcGIS Online
- ArcGIS Runtime
- ArcGIS API for JavaScript
- Portal 10.3 for ArcGIS
- Portal 10.2 for ArcGIS
- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.2

Web Map Service 1.1.1

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS Online
- ArcGIS Runtime
- ArcGIS API for JavaScript
- Portal 10.3 for ArcGIS
- Portal 10.2 for ArcGIS
- ArcGIS 10.2.1 for Server

- ArcGIS 10.2.1
- ArcGIS 10.2 for Server
- ArcGIS 10.1.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArGIS Server 9.3.1
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS Server 9.3 SP1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- ArcGIS 9.2
- ArcIMS 9.1 SP1
- ArcGIS 9.0
- ArcExplorer Web
- ArcGIS Explorer
- ArcIMS 4.0.1
- ArcIMS 4.0
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

Web Map Service 1.1

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS Online
- ArcGIS Runtime
- ArcGIS API for JavaScript
- Portal 10.3 for ArcGIS
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1
- ArcIMS 9.0
- ArcExplorer Web
- ArcGIS Explorer
- ArcGIS Interoperability Toolbar Add-on 8.3
- ArcIMS 4.0.1
- ArcIMS 4.0
- GIS Portal Toolkit 2.0

Web Map Service 1.0

- ArcGIS 10.3
- ArcGIS Runtime
- ArcGIS API for JavaScript
- ArcGIS 10.2.2
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server

- ArcGIS Server 9.3.1
- ArcGIS Server 9.3 SP1
- ArcIMS 9.0
- ArcExplorer Web
- ArcGIS Explorer
- ArcIMS 4.0
- ArcIMS 3.0
- GIS Portal Toolkit 2.0

Web Map Context Documents 1.0

- ArcGIS 9.3
- GIS Portal Toolkit 2.0

OpenGIS Web Map Tile Service Implementation Standard 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.3
- ArcGIS 10.2
- ArcGIS Online
- ArcGIS Runtime
- ArcGIS API for JavaScript
- Portal 10.3 for ArcGIS
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1
- ArcGIS 10.2.1 for Server
- ArcGIS 10.1
- ArcGIS 10.1 for Server

Web Processing Service 1.0.0

- ArcGIS 10.3 for Server
- ArcGIS 10.2.2 for Server
- ArcGIS 10.2.1 for Server
- ArcGIS 10.2 for Server
- ArcGIS 10.1 for Server

Supported ISO/TC211 Standards

Part 1: Supported Standards

Most ISO/TC211 standards are conceptual in nature, providing the underpinnings for many OGC implementation standards. They are used in the development of national and information community profiles and application schema standards and/or in the design of geographic management and production systems. The ISO standards that inform or are implemented by Esri are summarized below:

ISO 6709:2008—Standard representation of latitude, longitude, and altitude for geographic point locations; 6709/Cor. 1

This standard specifies a variable-length format to represent of latitude, longitude, and altitude for data interchange used in Esri products.

ISO 19101:2002—Reference model (under revision)
ISO 19101-1—Reference model—Part 1: Fundamentals (revision)
ISO 19101-2:2008—Reference model—Part 2: Imagery

These standards provide a framework for the 191** Family of Standards and are used by Esri and others to understand the organization of ISO/TC211 standards and how they work together.

ISO 19103:2005—Conceptual schema language (under revision)
ISO 19103—Conceptual schema language (revision)

This standard provides Esri and other users with an understanding of the UML and basic types and Object Constraint Language used in the ISO/TC211 standards.

ISO 19104:2008—Terminology

This standard provides an understanding of the terminology used by the ISO/TC211 standards.

ISO 19106:2004—Profiles

A profile is a subset of one or more generic standards with selected options. A profile provides the limited scope and functionality for effective specialist implementations of data and systems.

Esri uses this standard to understand ISO and OGC profiles and when it is working with organizations to develop profiles.

ISO 19107:2003—Spatial schema

This standard defines and describes a fundamental model for computer representations of geometry and topology that is referenced to reality by coordinates systems.

Esri has used the concepts in this standard in the development of ISO 19125 and ISO 19115; basic concepts defined in this standard are implemented in ArcGIS and the design of geodatabases. This is the foundation for Simple Features GML and all standards that deal with vector geometry and topology.

ISO 19108:2002—Temporal schema
ISO 19108/Cor. 1

This standard defines standard concepts needed to describe the temporal characteristics of geographic information.

Esri supports the concepts in this standard in metadata and the handling of time-aware data in ArcGIS.

ISO 19109:2005—Rules for application schema (under revision)
ISO 19109—Rules for application schema (revision)

This defines the general feature model and rules for creating and documenting application schemas for modeling features and their properties, allowing physical applications to understand and share data.

Using the concepts described in this standard, Esri defines application schemas using a conceptual schema language (e.g., UML). The ArcGIS Data Interoperability extension applies the concepts of mapping from one application schema to another for data transfer as defined in the standard. Esri also uses the same concepts as the general feature model (GFM) as defined in the standard.

ISO 19110:2005—Methodology for feature cataloging (under revision)
ISO 19110:2005/Amd. 1:2011
ISO 19110 - Methodology for feature cataloguing (revision)

This describes a methodology for creating a catalog defining features and properties for a domain of interest and/or a dataset and a schema for encoding in XML.
Esri participates in several standards organizations to develop encoding for feature catalogs based on the concepts in this standard. Encoded catalogs can be used as additional metadata.

ISO 19111:2007—Spatial referencing by coordinates
ISO 19111-2:2009—Spatial referencing by coordinates—Part 2: Extension for parametric value

This standardizes a common method for defining coordinate reference systems.
Esri implements the basic concepts defined in this standard through GML and in coordinate reference system libraries in ArcGIS.

ISO 19112:2003—Spatial referencing by geographic identifiers

This details the metadata about/defining a reference system that uses spatial unit identifiers other than coordinates (e.g. gazetteer, postal codes).
Esri uses the concepts defined in this standard in the implementation of gazetteers as well as wherever spatial referencing by geographic identifiers is used.

ISO 19113:2002—Quality principles (replaced by ISO 19157)

This defines the principles and elements/subelements of data quality.
Esri implements the concepts in these standards in its mapping and charting solution products and database production services.
See ISO 19157 below.

ISO 19114:2003—Quality evaluation procedures ISO 19114/Cor. 1 (replaced by ISO 19157)

This defines procedures for determining data quality.
Esri implements the concepts in these standards in its mapping and charting solution products and database production services.
See ISO 19157 below.

ISO 19115:2003—Metadata; 19115/Cor. 1 (replaced by 19115-1)

This defines metadata elements and schema describing geospatial datasets
Esri products implement several major profiles of this standard: North American Profile, Infrastructure for Spatial Information in Europe (INSPIRE), and the complete ISO 19115. Esri played a lead role in supporting the development of this standard and led the revision project.

This standard is implemented in the following:

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.1
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS 9.3

    - GIS Portal Toolkit 9.3
- ArcIMS Metadata Server 9.0
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

ISO 19115-1—Metadata - Part 1: Fundamentals

This details the revision of ISO 19115, which defines metadata elements and schema describing geospatial resources (i.e., datasets and services).

ISO 19115-2:2009—Metadata—Part 2: Extensions for imagery and gridded data

This defines additional metadata elements and schema describing imagery and gridded geospatial datasets.

ISO 19117:2005—Portrayal (under revision)
ISO 19117—Portrayal (revision)

This provides applications with a common interface to support standard symbol sets. These concepts are used by the OGC Styled Layer Descriptor specification.
See OpenGIS Styled Layer Descriptor (SLD) Implementation Specification 1.0 above.

ISO 19118:2005—Encoding (under revision)
ISO 19118—Encoding (revision)

This defines an encoding rule based on XML.
Esri used the concepts defined in this standard while leading the development of SF-GML and ISO 19139.

ISO 19119:2005—Services (under revision)
ISO 19119/Amd. 1
ISO 19119—Services (revision)

This provides a framework and defines the metadata for services, enabling users to access and process geographic information across a generic computing interface. The metadata portion of this standard has been moved to ISO 19115-1.
Esri is using the concepts defined in this standard in its implementation of the OGC W*S specifications.

ISO 19123:2005—Schema for coverage geometry and functions

This defines the conceptual schema for the spatial characteristics of mapping from a collection of points in a coordinate space to attribute values where attribute types are common to all geographic positions within the spatial domain called coverages.
Esri uses the concepts defined in this standard for exchanging and interfacing with raster, matrix, and TIN structures.

ISO 19125-1:2004—Simple feature access—Part 1: Common architecture

This describes the common architecture for simple feature geometry based on the concepts in ISO 19107.
See OpenGIS Information Specification for Geospatial Information—Simple Features Access 1.1 in Part 1: Esri OGC Compliant Products above.

ISO 19125-2:2004—Simple feature access—Part 2: SQL option

This standard specifies a SQL schema that supports storage, retrieval, query, and update of simple geospatial feature collections based on the architecture defined in part 1.
See OpenGIS Information Specification for Geospatial Information—Simple Features Access 1.1 in Part 1: Esri OGC Compliant Products above.

ISO 19126:2009—Profile—FACC Data Dictionary

This is a profile of ISO 19110 used by the defense community.
Esri implements this standard in the Esri Defense Mapping solution and in database production work.

ISO 19128:2005—Web Map Server interface

This specifies a service for rendering spatially referenced digital image maps for display on a computer screen, dynamically derived from geographic information.
See OpenGIS WMS Implementation Specification 1.3.0 and OpenGIS WMS Implementation Specification 1.3.0 above.

ISO 19130:2010—Sensor and data models for imagery and gridded data

This specifies a sensor model describing the physical and geometric properties of frame, wisk broom, and push broom sensors.
Esri uses these concepts when exploiting remotely sensed imagery.

ISO 19130-2— Sensor and data models for imagery and gridded data— Part 2: SAR, InSAR, lidar and sonar

This specifies a sensor model describing the physical and geometrical properties of the identified sensors.
Esri follows the general modeling concepts in the use of Lidar and Sonar.

ISO 19131:2007—Data product specifications

This standard provides requirements for the specification of geographic data products. These include the application schema, spatial and temporal referencing systems, quality and data capture, and maintenance processes.
Esri is required to understand and respond to these requirements in data production.

ISO 19136:2007—Geography Markup Language

This standard provides an XML encoding and XML schema syntax that allows an open, vendor-neutral framework for the definition of geospatial application schemas and objects for the storage and transportation of application schemas and datasets.
See OpenGIS Geography Markup Language Encoding Standard and Geography Markup Language versions above.

ISO 19138:2006— Data quality measures (replaced by ISO 19157)

This defines commonly used measures for reporting data quality for the subelements defined in ISO 19113 and a structure so they may be maintained in a register.
Esri implements the concepts in these standards in its mapping and charting solution products and database production services.
See ISO 19157 below.

ISO 19139:2007—Metadata—XML schema implementation

This provides encoding rules and a schema for implementing ISO 19115 in XML.

It is implemented in the following:

- ArcGIS 10.3
- ArcGIS 10.2.2
- ArcGIS 10.2.1
- ArcGIS 10.1
- ArcGIS 10.0
- ArcGIS Server Geoportal Extension 10.3
- ArcGIS Server Geoportal Extension 10.2
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- ArcGIS 9.3
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

ISO 19142:2010—Web Feature Service

This specifies a web service which provides direct, fine-grained access to geographic information at the feature and feature property level.
See OpenGIS WFS Interface Standard 2.0 above.

ISO 19143:2010—Filter encoding

This standard describes an XML and kay-value pair (KVP) encoding of a system-neutral syntax for expressing projections and selection and sorting clauses, collectively called a query expression.
See OpenGIS Filter Encoding Implementation Specification 2.0 above.

ISO 19144-1:2009—Classification Systems—Part 1: Classification system structure

This specifies the general criteria and structure of a land-cover classification system.
Esri supports the concepts defined in this standard when dealing with land classification systems.

ISO 19144-2—Classification systems—Part 2: Land Cover Meta Language

This specifies a Land Cover Meta Language (LCML) expressed as a UML metamodel that allows different land-cover classification systems to be described based on physiognomic aspects.
Esri supports the concepts defined in this standard when dealing with land classification systems.

ISO 19156—Observations and measurements

This standard defines a conceptual schema for observations and features involved in sampling when making observations—an act that results in the estimation of the value of a feature property.
Esri implements these concepts when dealing with sensor observations.

ISO 19157—Data quality (revision of ISO 19113, 19114, and 19138)

This defines the principles and components for describing and evaluating data quality and the measures used for reporting it. This revises and replaces ISO 19113, 19114, 19138.
Esri participated in the development of this standard.
Esri will be implementing this standard once the ISO 19157-2 XML encoding standard is finalized.

ISO 19158—Quality assurance of data supply

This technical specification provides a quality assurance framework for the producer and customer in their production relationship. It identifies methods of managing the quality of production more efficiently and effectively.
Esri follows these principles when working with customers during database production.

ISO 15836:2009—The Dublin Core metadata element set

These are cross-domain resource descriptions, which are not limited to specific resources.

They are implemented in the following:

- ArcGIS Server Geoportal Extension 10.3
- ArcGIS Server Geoportal Extension 10.0
- ArcGIS Server Geoportal Extension 9.3.1
- GIS Portal Toolkit 9.3
- GIS Portal Toolkit 3.1
- GIS Portal Toolkit 2.0

Part 2: ISO/TC211 Standards Development Supported by Esri

ISO 19115-2—Metadata—Part 2: Extensions for imagery and gridded data (Revision of ISO 19115-2:2009)

This defines additional metadata elements and schema describing imagery and gridded geospatial datasets.

Esri is leading the revision process for this standard.

ISO 19115-3—Metadata—Part 3: XML schema implementation of metadata fundamentals
This provides a schema for implementing ISO 19115-1 in XML.
Esri is participating in the development of this standard and has performed test implementations.

ISO 19150-2—Ontology—Part 2: Rules for developing ontologies in the Web Ontology Language
This defines the conversion of the UML static view modeling elements used in the ISO geographic information standards into the Web Ontology Language (OWL).
Esri is participating in the development of this standard.

ISO 19157-2—Data Quality—Part 2: XML Schema Implementation of ISO 19157
This provides a schema for implementing ISO 19157 in XML.
Esri is participating in the development of the schema.

ISO 19160-1—Addressing—Part 1: Conceptual model
This defines a conceptual model for address information (address model), together with the terms and definitions that describe the concepts in the model.
Esri is participating in the development of this standard.

ISO 19162—Well-known text representation of coordinate reference systems
This standard defines the structure and content of a text string implementation of the abstract model for coordinate reference systems described in ISO 19111:2007 and ISO 19111-2:2009.
Esri is actively participating in the development of this standard.

ISO 19165—Preservation of digital data and metadata
This standard will define the rules for the long-term preservation of digital geospatial data.
Esri is participating in the development of this standard.

Additional Resources

Esri Website
esri.com

OGC, Inc. Implementing Products Webpage
opengeospatial.org/resource/products

ArcGIS for Server Documentation: OGC Support in ArcGIS Server
server.arcgis.com/en/server/latest/publish-services/windows/ogc-support-in-arcgis-server.htm

Esri inspires and enables people to positively impact their future through a deeper, geographic understanding of the changing world around them.

Governments, industry leaders, academics, and nongovernmental organizations trust us to connect them with the analytic knowledge they need to make the critical decisions that shape the planet. For more than 40 years, Esri has cultivated collaborative relationships with partners who share our commitment to solving earth's most pressing challenges with geographic expertise and rational resolve. Today, we believe that geography is at the heart of a more resilient and sustainable future. Creating responsible products and solutions drives our passion for improving quality of life everywhere.

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