

Federal GIS Conference 2014

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# Standards in action

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# ESRI learns about and supports standards through active participation:

## Organizations

- ISO TC 211
- OGC
- ANSI/INCITS -L1
- CEN
- Global Map
- GSDI
- DGIWG
- IHO
- GWG



## Implementations

- IT/industry standards
- GIS standards



UNIX®



## Standards Development

- International Standards
- Regional Standards
- National Standards
- Information Community Standards

## Projects/Testbeds

- OGC Web Services testbeds
- GEOSS
- INSPIRE
- NATO Core GIS

- ESRI provides leadership role in ISO TC 211 Standards Development:
  - Project lead on many ISO Standards
  - Provide technical experts on many Work Item project teams
  - Provide support for ISO TC 211 standards outreach
  - Meeting sponsorship



# ISO TC 211 Standards

6709:2008 - Standard representation of latitude, longitude and altitude for geographic point locations

19101:2002 - Reference model Part 1: Fundamentals

19101-2:2008 - Reference model - Part 2: Imagery

19103:2005 - Conceptual schema language

19104:2008 - Terminology

19105:2000 - Conformance and testing

19106:2004 - Profiles

19107:2003 - Spatial schema

19108:2002 - Temporal schema

19109:2005 - Rules for applicaiton schema

19110:2005 - Methodology for feature cataloguing

19111:2007 - Spatial referencing by coordinates

19111-2:2009 - Extension for parametric value

19112:2003 - Spatial referencing by geographic identifiers

19113:2002 - Quality principles

19114:2003 - Quality evaluation procedures

19115:2003 - Metadata

19115-2:2009 - Extension for imagery and gridded data

19116:2004 - Positioning services

19117:2005 - Portrayal

19118:2005 - Encoding

19119:2005 - Services

19120:2001 - Functional standards

19121:2000 - Imagery and gridded data

19122:2004 - Qualifications and Certification of personnel

19123:2005 - Schema for coverage geometry and functions

19124 - Imagery and gridded data components

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

19125-2:2004 - SQL option

19126:2009 - Profile - FACC Data Dictionary

19127:2005 - Geodetic codes and parameters

19128:2005 - Web Map server interface

19129:2009 - Imagery, gridded and coverage data framework

19130:2010 - Sensor and data models for imagery and gridded data

19130-2 - SAR, InSAR, Lidar and Sonar

19131:2007 - Data product specifications

19132:2007 - Location based services - Reference model

19133:2005 - Location based services - Tracking and navigation

19134:2007 - Multimodal location based services for routing and navigation

19135:2005 - Procedures for registration of geographical information items

19135-2 - XML Schema Implementation

19136:2007 - Geography Markup Language

19137:2007 - Core profile of the spatial schema

19138:2006 - Data quality measures

19139:2007 - Metadata - XML schema implementation

19141:2008 - Schema for moving features

19142:2010 - Web Feature Service

19143:2010 - Filter encoding

19144-1:2009 - Classification Systems – Part 1: Classification system structure

19144-2 - Land Cover Meta Language (LCML)

19145 - Registry of representations of geographic point location

19146:2010 - Cross-domain vocabulary

19147 - Transfer nodes

19148 - Linear referencing

19149 - Rights expression language for geographic information

19150-1 - Ontology - Part 1: Framework

19150-2 - Ontology - Part 2: Rules for developing OWL

19148 - Linear referencing

19152 - Land Administration Domain Model (LADM)

19153 - Geospatial Digital Rights Management Reference Model

19154 - Ubiquitous public access - Reference model

19155 - Place Identifier (PI) Architecture

19156 - Observations and measurements

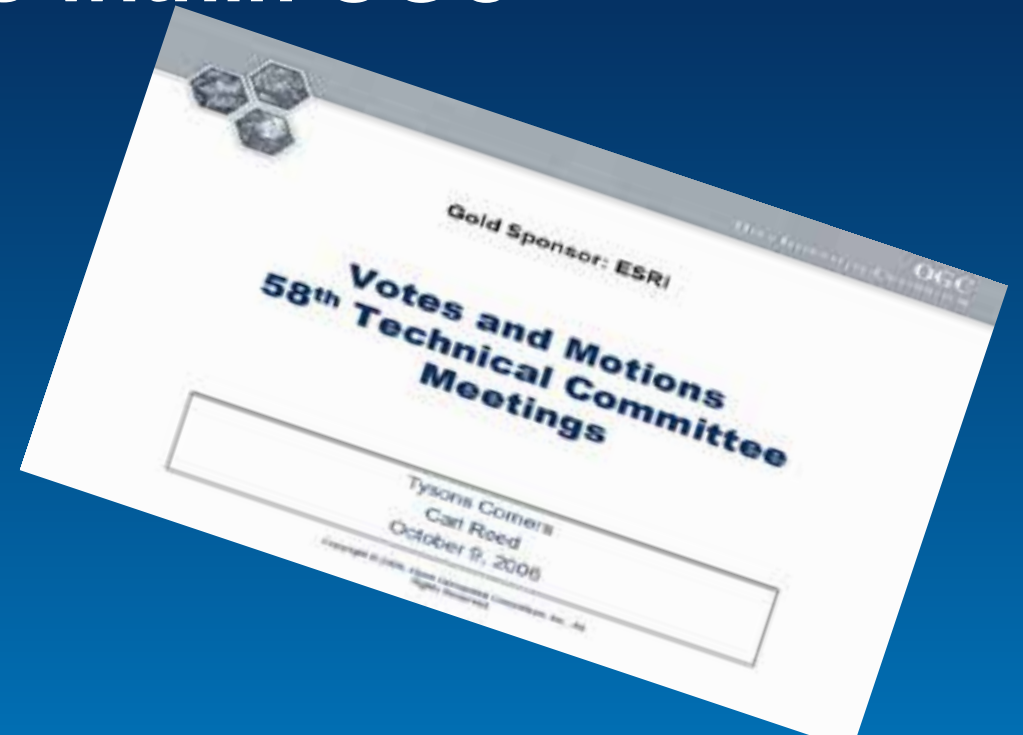
19157 - Data quality

19158 - Quality assurance of data supply

19159 - Calibration and validation of remote sensing imagery sensors and data

19160 - Addressing

# ESRI serves many roles within OGC



Board of Directors

Architecture Board

Planning Committee

Technical Committee

Lead several Standards and Domain Working Groups

Joint Advisory Group to ISO TC211

OGC II

OGC Europe

OGC Forums

Testbeds & Plugfests

Testing & Compliancy

Outreach Program

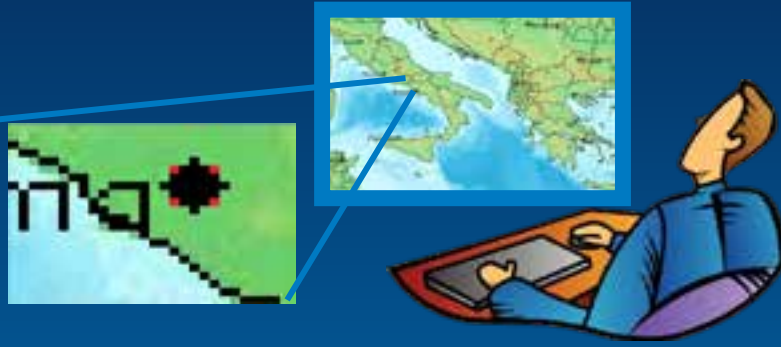
Financial Support



# OGC Standards

1. **Cat: ebRIM App Profile: Earth Observation Products**
2. **Catalogue Service**
3. **CityGML**
4. **Coordinate Transformation**
5. **Filter Encoding**
6. **GML in JPEG 2000**
7. **GeoAPI**
8. **GeoSparql**
9. **Geography Markup Language**
10. **Geospatial eXtensible Access Control Markup Language (GeoXACML)**
11. **KML**
12. **Location Services (OpenLS)**
13. **NetCDF**
14. **Observations and Measurements**
15. **Open GeoSMS**
16. **Ordering Services Framework for Earth Observation Products**
17. **OWS Context**
18. **PUCK**
19. **SWE Common Data Model**
20. **SWE Service Model**
21. **Sensor Model Language**
22. **Sensor Observation Service**
23. **Sensor Planning Service**
24. **Simple Features**
25. **Simple Features CORBA**
26. **Simple Features OLE/COM**
27. **Simple Features SQL**
28. **Styled Layer Descriptor**
29. **Symbology Encoding**
30. **Table Joining Service**
31. **WaterML**
32. **Web Coverage Processing Service**
33. **Web Coverage Service**
34. **Web Feature Service**
35. **Web Map Context**
36. **Web Map Service**
37. **Web Map Tile Service**
38. **Web Processing Service**
39. **Web Service Common**

# OGC Web Services



**Web Map Service**  
Geospatial “picture” publishing/viewing service



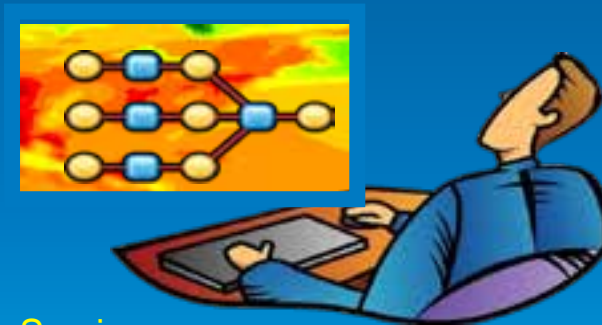
**Web Map Tile Service**  
static base maps where the bounding box and scales have been constrained to discrete **tiles**



**Web Feature Service**  
Geospatial feature publishing/streaming service



**Web Coverage Service**  
Imagery and gridded data publishing/processing service



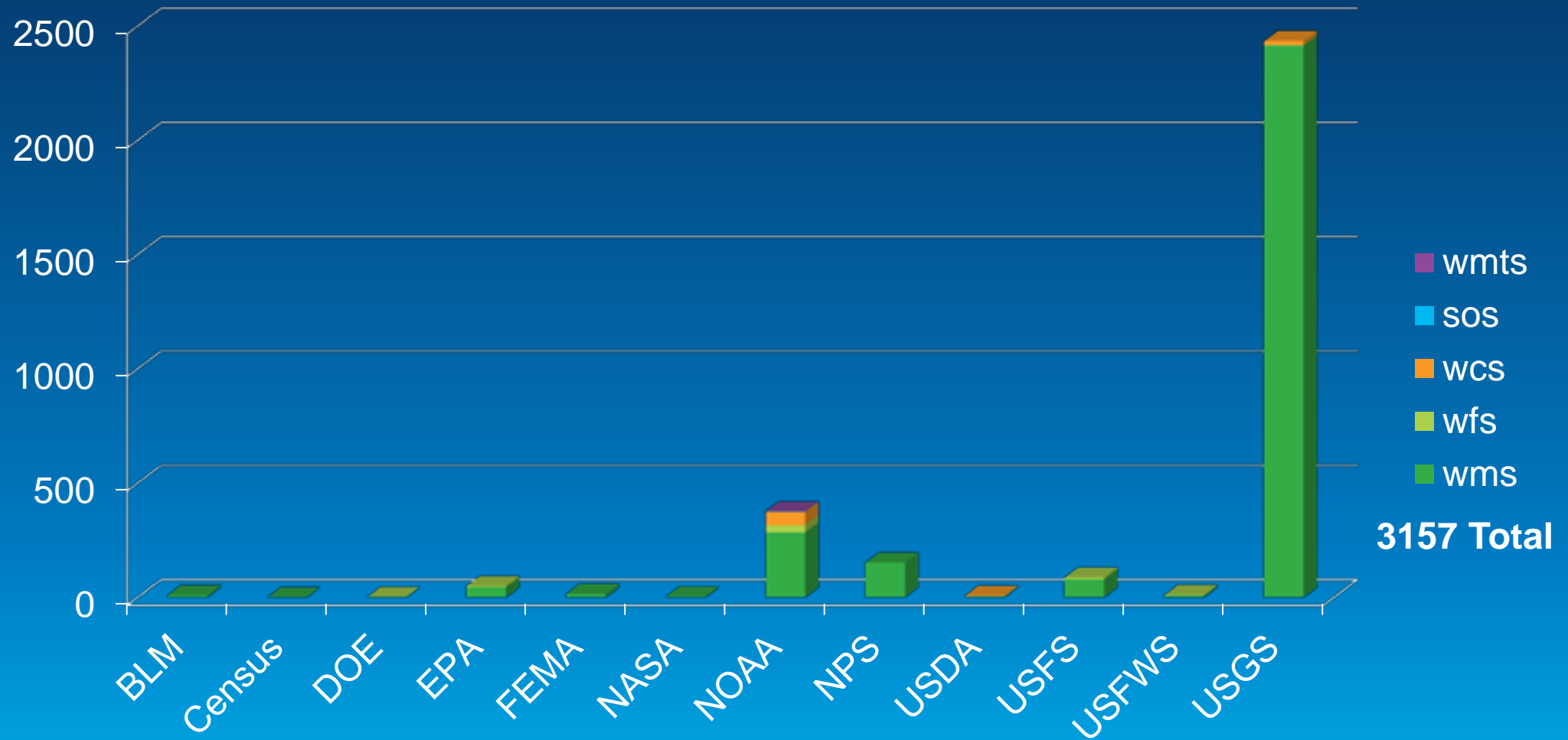
**Web Processing Service**  
Interface for publishing geospatial algorithms, calculations or models

Global Map <http://www>  
Abstract: vector data  
NOAA Weather [htt](http://www)  
Abstract: point featur  
Landsat <http://www.N>  
Abstract: 30m satell



**Catalog Service-Web**  
Metadata publishing/search service

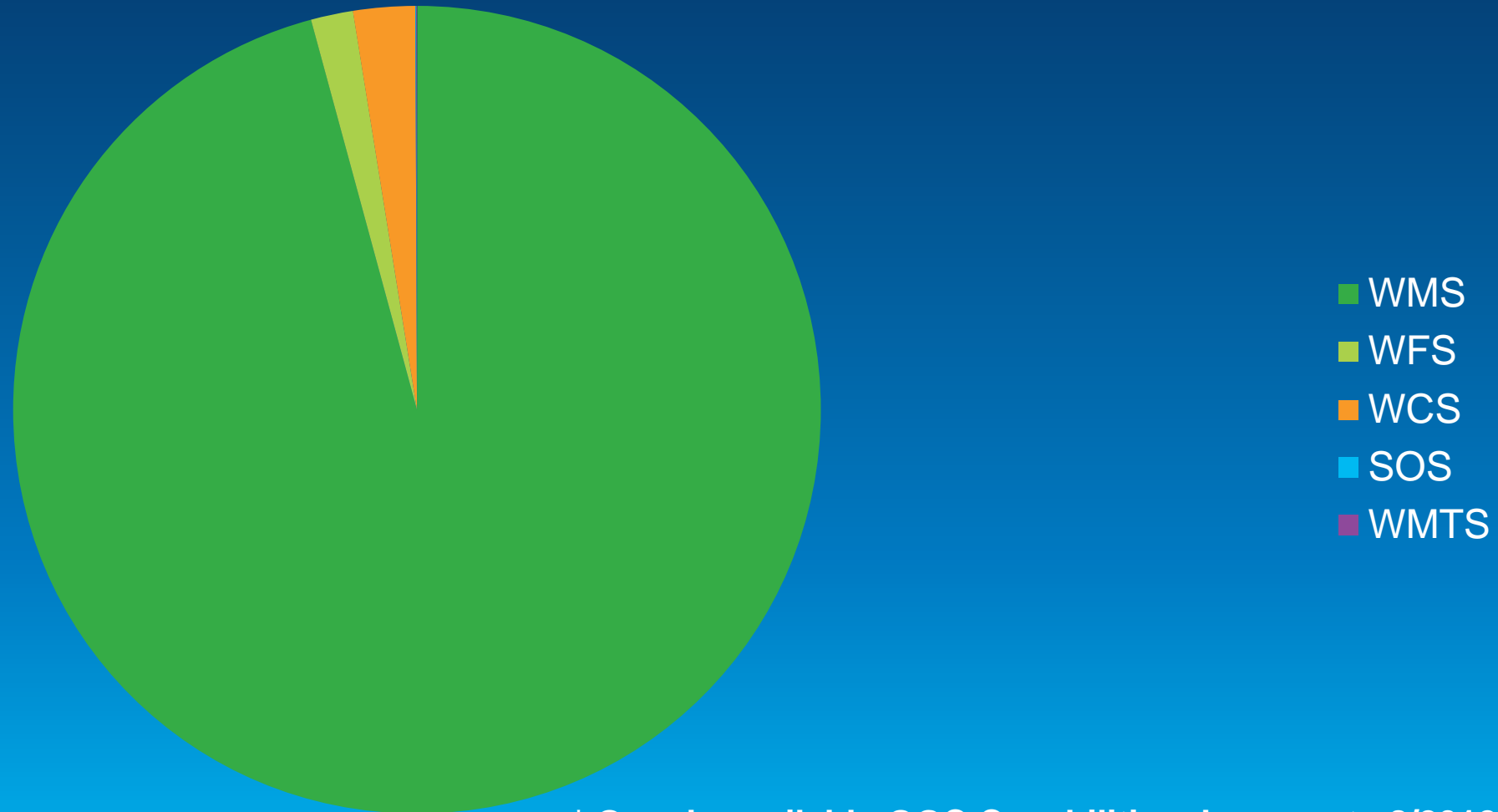
# US Federal Agencies providing services using OGC Specifications\*



\* Openly available OGC Capabilities documents 8/2012

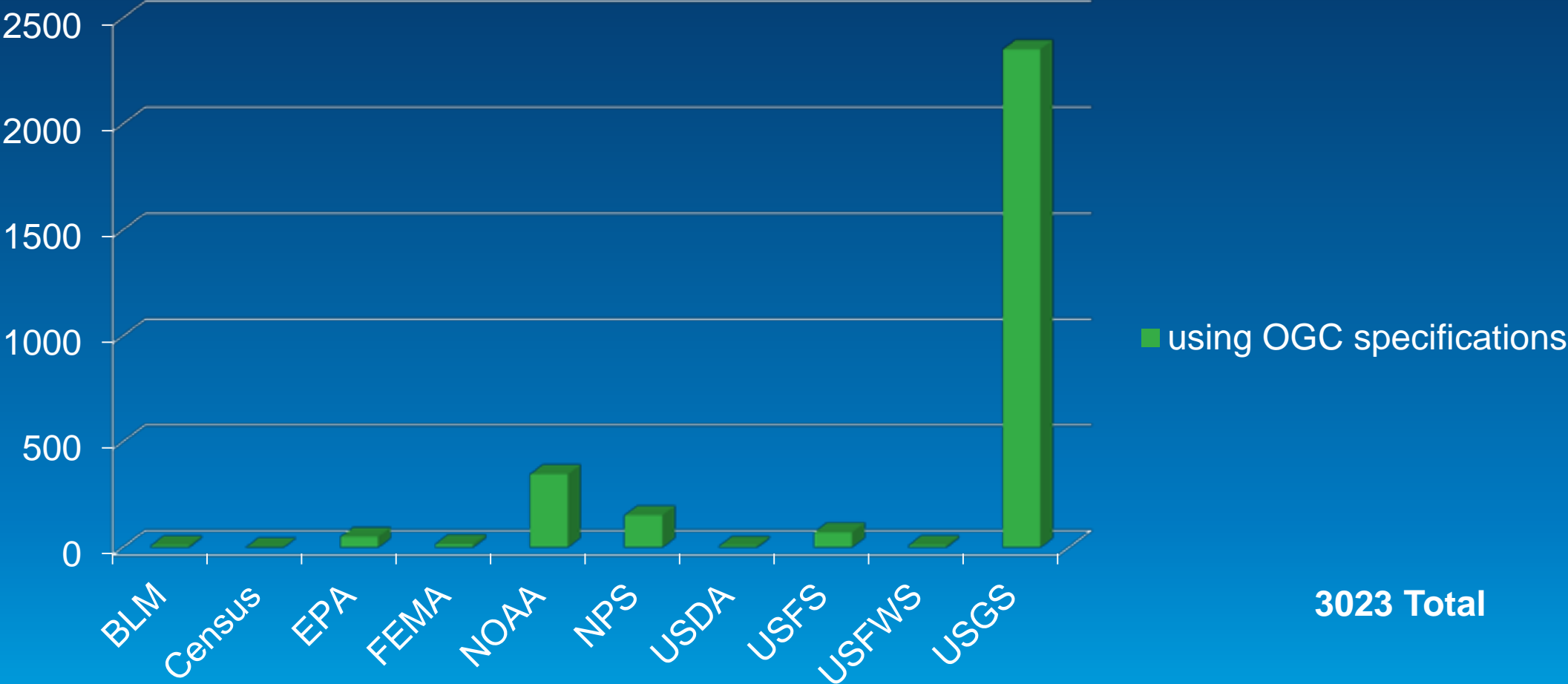


## OGC specification use by US Federal agencies



\* Openly available OGC Capabilities documents 8/2012

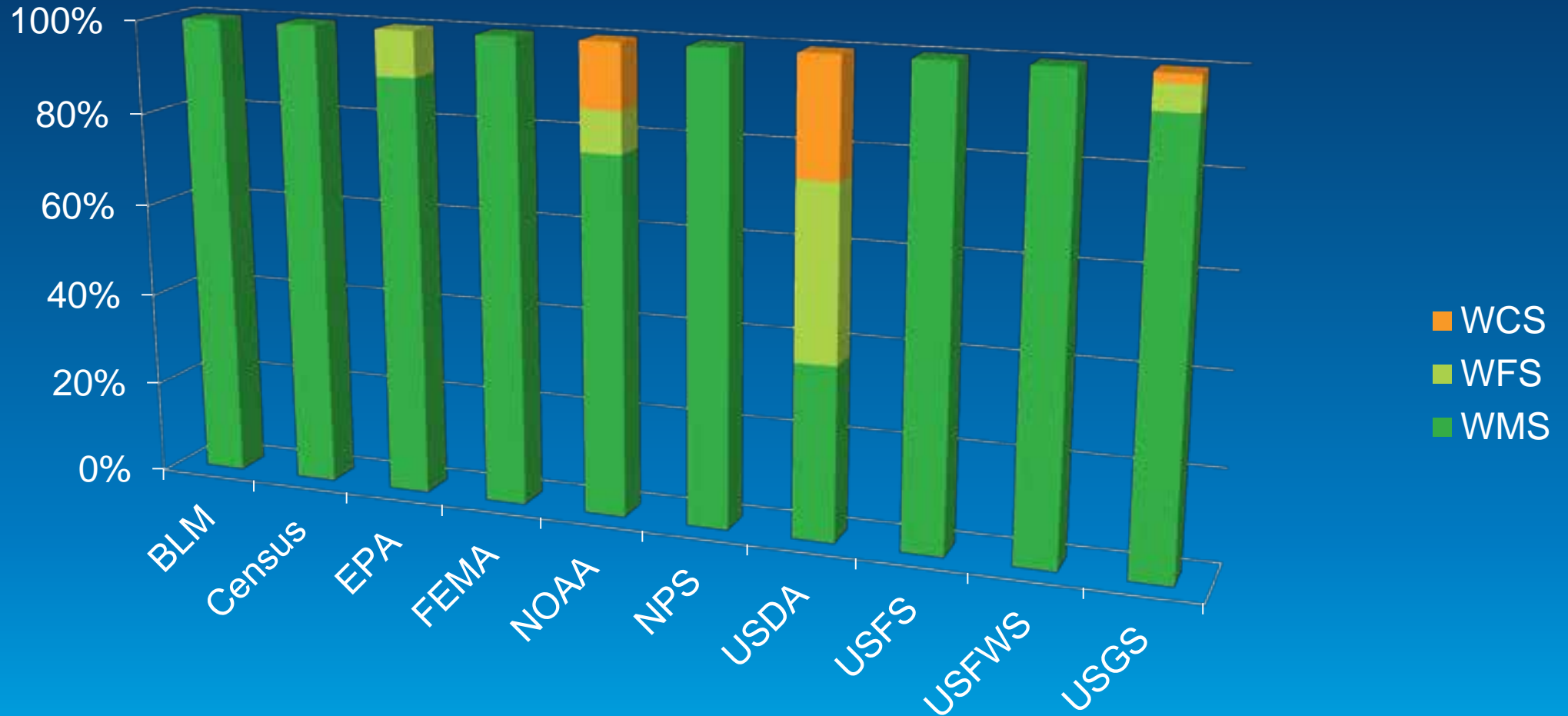
# US Federal Government services using Esri products\* using OGC specifications



3023 Total

\* Openly available OGC Capabilities documents 8/2012

# US Federal agency OGC service types using Esri products\*



\* Openly available OGC Capabilities documents 8/2012

# Community "Domain" Standards

Military/Intel/NATO, Hydrographic, Emergency



- **Defence Geographic Information Working Group**

- Technical Panels and Project Teams
  - Data Access TP
  - Data Structures TP
  - Service and Interface TP



- **Multi-National Geospatial Co-production Program**

- **Geospatial Intelligence Standards WG**

- Community Sensor Model Working Group (CSMWG)
- Geographic Portrayal Focus Group (PFG)
- Metadata Focus Group (MFG)
- Geospatial Web Services Focus Group (GWS FG)



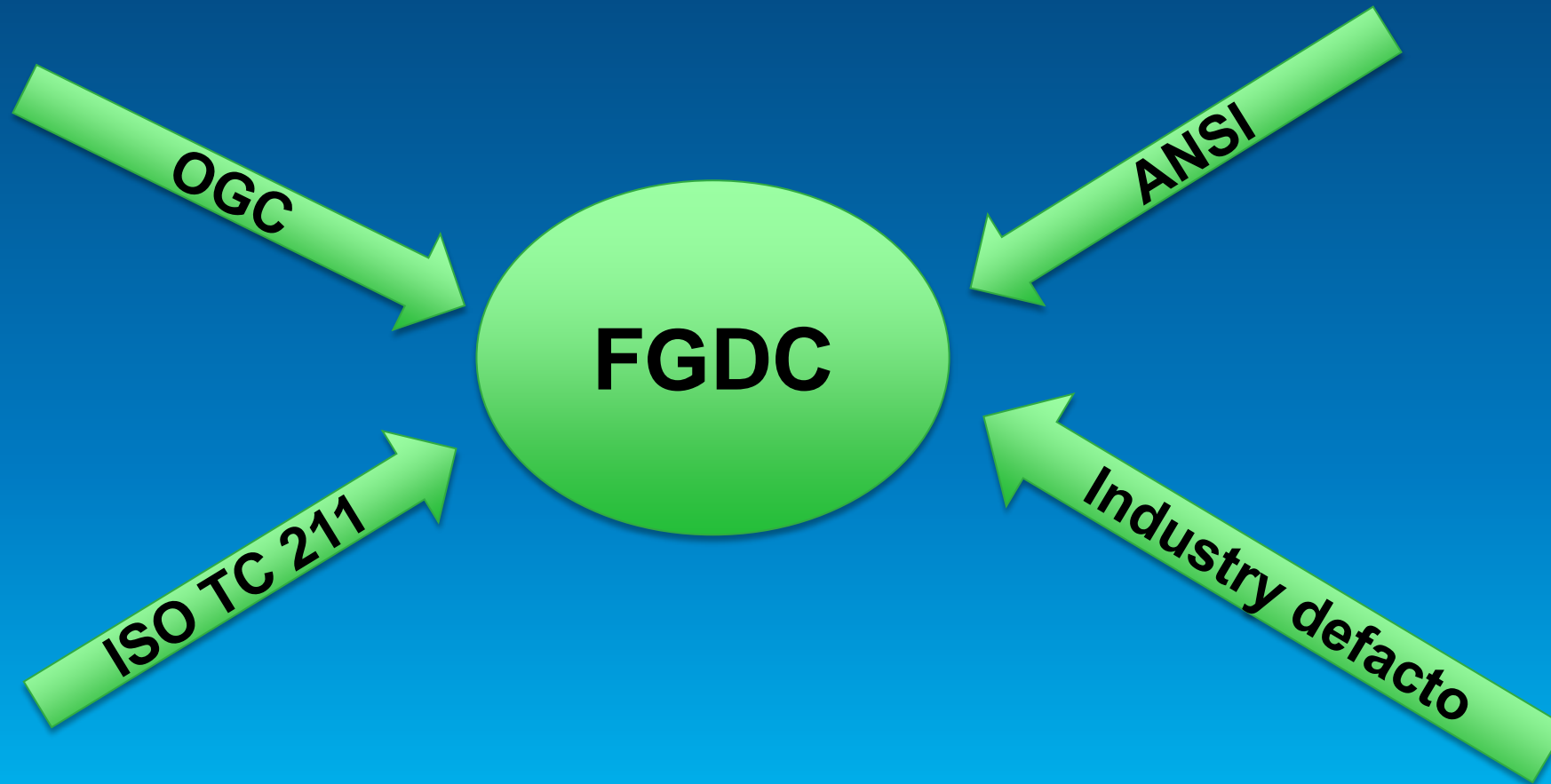
- **International Hydrographic Organization**

- Transfer Standard Maintenance and Application Development Working Group
- Geospatial Maritime WG2



- **Emergency Management Technical Committee**

# FGDC Endorsed External Standards



# FGDC endorsed External Standards (1)



[http://www.fgdc.gov/standards/fgdc-endorsed-external-standards/index\\_html](http://www.fgdc.gov/standards/fgdc-endorsed-external-standards/index_html)

- **GeoTIFF Revision 1.0**
- **Hierarchical Data Format V 5.0**
- **Codes for Identification of Hydrologic Units in the U.S. and the Caribbean (Outlying) Areas . . .**
- **Codes for the Identification of Counties and Equivalent Areas of the United States . . .**
- **Codes for the Identification of the States and Equivalent Areas within the United States, Puerto Rico, and the Insular Areas**
- **Identifying Attributes for Named Physical and Cultural Geographic Features (Except Roads and Highways) of the United States . . .**
- **North American Profile of ISO 19115:2003 - Geographic information - Metadata (NAP - Metadata)**
- **Codes for the Identification of Metropolitan and Micropolitan Statistical Areas and Related Statistical Areas of the United States and Puerto Rico**
- **Codes for the Identification of Congressional Districts and Equivalent Areas of the United States . . .**
- **ISO 19107 - Spatial schema**
- **ISO 19108 - Temporal schema w/Corrigendum 1**
- **ISO 19110 - Methodology for Feature Cataloguing**
- **ISO 19111 - Spatial referencing by coordinates + extension for parametric values**
- **ISO 19112 - Spatial referencing by geographic identifiers**
- **ISO 19115 - Metadata + Corrigendum 1**
- **ISO 19115 - Metadata - Part 2: Extensions for imagery and gridded data**
- **ISO 19118 - Encoding**
- **ISO 19119 – Services + Amd 1**
- **ISO 19123 - Schema for coverage geometry and functions**
- **ISO 19132 - Location Based Services - Reference model**
- **ISO 19133 - Location Based Services - Tracking and navigation**
- **ISO 19134 - Location Based Services - Multimodal routing and navigation**
- **ISO 19135 - Procedures for registration of geographical information items**
- **ISO 19141 - Schema for moving features**
- **ISO 19109 - Rules for application schema**
- **ISO 19127 - Geodetic codes and parameters**
- **ISO 19131 - Data product specifications + Amendment 1**
- **ISO 19136 - Geographic Markup Language**
- **ISO 19144 -- Classification Systems -- Part 1: Classification system structure**
- **ISO 3166 - Codes for the Representation of Names Of Countries and their Subdivisions**

# FGDC endorsed External Standards (2)



[http://www.fgdc.gov/standards/fgdc-endorsed-external-standards/index\\_html](http://www.fgdc.gov/standards/fgdc-endorsed-external-standards/index_html)

- ISO 6709 Standards representation of geographic point locations by coordinates w/Corrigendum 1
- ISO/IEC 13818 -2: MPEG 2 - video
- ISO/IEC 13818-3: MPEG 2 - audio
- ISO/IEC 15444-1: JPEG 2000
- ISO/IEC IS 10918-1 : JPEG
- ISO 19103 - Conceptual schema language
- ISO 19104 - Terminology
- ISO 19138 -- Data quality measures
- ISO 19139 -- Metadata -- XML schema implementation
- NetCDF (Network Common Data Form)
- Web Feature Service Implementation Specification, version 1.1.0 with Corrigendum 1
- Filter Encoding Implementation Specification, version 1.1
- Web Map Context (WMC) Documents Implementation Specification, Version 1.1.0 w/Corrigendum 1
- Web Processing Service, Version: 1.0.0 w/ Corrigendum
- Symbology Encoding Implementation Specification, version 1.1.0
- Styled Layer Descriptor profile of the Web Map Service Implementation Specification, version 1.1.0
- Sensor Observation Service Interface Standard, version 1.0.0
- Location Services: Tracking Service Interface Standard
- Web Map Service Implementation Specification, Version 1.3.0
- SensorML Encoding Standard v 1.0 w/Schema Corrigendum 1 (1.01)
- Catalogue Service (CAT) Implementation Specification (2.0.2) + Corrigendum for OpenGIS Implementation Specification 07-006: Catalogue Services, Version 2.0.2
- Catalogue Services Specification 2.0.2 - ISO Metadata Application Profile
- Web Map Tile Service Implementation Standard, version 1.0.0
- Web Coverage Service (WCS) Implementation Standard, version 1.1.2 w/Corrigendum 2
- Location Services (OpenLS): Core Services, version 1.2
- OGC KML 2.2 – Abstract Test Suite (1.0.0)
- KML, version 2.2.0
- Location Services (OpenLS): Part 6-Navigation Service
- Location Services: Tracking Service Interface Standard
- Sensor Planning Service Implementation Specification, version 1.0.0
- Tagged Image File Format (TIFF)
- Unified Model Language (UML)2.2
- GENC Ed.1 Geopolitical Entities, Names, and Codes Standard, Edition 1.0
- ISO 19156 Observation and Measurements
- OGC WaterML 2.0 Part 1 – Time series
- Time-Space-Position Information (TSPI), Version 2.0

## GWG Mandated Standards

- Geospatial-Intelligence Standards Working Group



- “...coordinate population of the DoD IT Standards and Profile Registry (DISR) with GEOINT standards...”



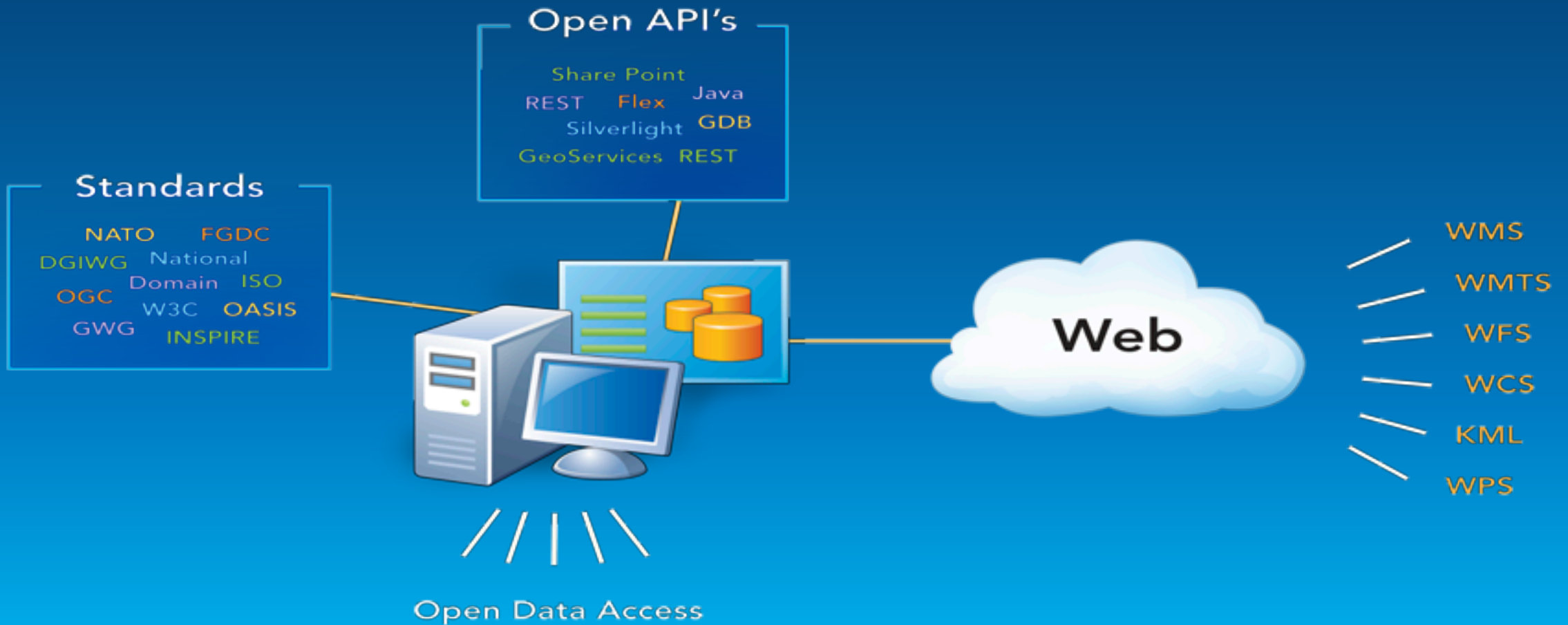
# DISR approved GEOINT Standards – mandated (1)

<b>AIXM 5.1</b>	<b>Aeronautical Information Exchange Model</b>	<b>ISO 8601:2004</b>	<b>Representation of dates and times</b>
<b>BPCGM01.00</b>	BIIF Profile for Computer Graphics Metafile	<b>ISO/IEC 12087-5</b>	Basic Image Interchange Format
<b>BPJ2K01.10</b>	BIIF Profile for JPEG 2000,	<b>ISO/IEC 13818-1</b>	Generic coding of moving pictures and associated audio information
<b>CAT 2.0.2</b>	Catalogue Service (CAT) Implementation Specification	<b>ISO/IEC 13818-2</b>	MPEG-2 Video
<b>DGIWG FACC</b>	DGIWG Feature and Attribute Coding Catalogue	<b>ISO/IEC 13818-3</b>	MPEG-2 Audio
<b>GRIB WMO No. 306</b>	Manual on Codes, International Codes,	<b>ISO/IEC 15444-1:</b>	JPEG 2000 image coding system: Edition 1
<b>Ext. BUFR WMO</b>	Manual on Codes, International Codes, Volume 1.2	<b>ISO/IEC 15444-9</b>	JPEG 2000 image coding system: Interactivity tools,
<b>GeoTIFF Revision 1</b>	GeoTIFF Format Specification,	<b>ISO/IEC 8632-1</b>	Computer Graphics - Metafile for the storage and transfer of picture description information - Functional specification,
<b>GeoXACML GML2</b>	Geospatial eXtensible Access Control Markup	<b>ISO/IEC 8632-3</b>	Computer Graphics - Metafile for the storage and transfer of picture description information - Binary encoding,
<b>GeoXACML GML3</b>	Geospatial eXtensible Access Control Markup Language	<b>ISO/IEC 8632-3</b>	Computer Graphics - Metafile for the storage and transfer of picture description information - Binary encoding,
<b>GML 3.1.1</b>	Geography Markup Language Encoding Specification	<b>ISO/TS 19138:2006</b>	Data quality measures
<b>IEC 80000-6:2008</b>	Quantities and units - Part 6: Electromagnetism	<b>ISO/TS 19139:2007</b>	Metadata - XML schema implementation
<b>ISO 19107:2003</b>	Spatial schema	<b>ITU-R TF460-6</b>	Standard-frequency and time-signal emissions
<b>ISO 19108:2002</b>	Temporal schema	<b>ITU-T Rec. H.264</b>	Advanced video coding for generic audiovisual service
<b>ISO 19109:2005</b>	Rules for application schema	<b>ITU-T T.81</b>	Digital compression and coding of continuous-tone still images
<b>ISO 19110:2005</b>	Methodology for feature cataloguing	<b>Joint METOC</b>	Joint METOC Broker Language
<b>ISO 19111:2007</b>	Spatial referencing by coordinates	<b>JMBLv. 3.31</b>	
<b>ISO 19112:2003</b>	Spatial referencing by geographic identifiers	<b>MIL-STD-188-198A</b>	JPEG Image Compression for NITF
<b>ISO 19115-2:2009</b>	Metadata - Part 2: Extensions for imagery and gridded data	<b>MIL-STD-188-199</b>	Vector Quantization Decompression for NITF
<b>ISO 19115:2003</b>	Metadata, 8 May 2003, with Technical Corrigendum 1	<b>MIL-STD-2401</b>	DoD World Geodetic System 84 (WGS84)
<b>ISO 19119:2005</b>	Services	<b>MIL-STD-2407(1)</b>	Interface Standard for Vector Product Format (VPF)
<b>ISO 19123:2005</b>	Schema for coverage geometry and functions,	<b>MIL-STD-2411(2)</b>	Raster Product Format; with Notice of Change,
<b>ISO 19126:2009</b>	Feature concept dictionaries and registers,	<b>MIL-STD-2411-1</b>	Registered Data Values For Raster Product Format
<b>ISO 19135:2005</b>	Procedures for item registration,	<b>MIL-STD-2411-2(1)</b>	Raster Product Format Files into NITF
<b>ISO 19136:2007</b>	Geography Markup Language,	<b>MIL-STD-2500C</b>	National Imagery Transmission Format Standard
<b>ISO 19142:2010</b>	Web Feature Service,	<b>MISB 0102.9</b>	Security Metadata Universal and Local Sets for Digital Motion Imagery
<b>ISO 3166-1:2006</b>	Part 1: Country codes,	<b>MISB 0301.5, v1.5</b>	Profile for Aerial Surveillance and Photogrammetry Applications
<b>ISO 3166-2:2007</b>	Part 2: Country subdivision code,	<b>MISB 0404</b>	Compression for Infrared Motion Imagery
<b>ISO 6709:2008</b>	Standard representation of geographic point location by	<b>MISB 0601.5</b>	UAS Datalink Local Metadata Set
<b>w/Cor1:2009</b>	coordinates	<b>MISB 0604.2</b>	Time Stamping and Transport of Compressed Motion Imagery and Metadata
<b>ISO 80000-1:2009</b>	Quantities and units - Part 1: General	<b>MISB 0807.10</b>	KLV Metadata Dictionary
<b>ISO 80000-3:2006</b>	Quantities and units - Part 3: Space and time	<b>MISB 0902.1</b>	Motion Imagery Sensor Minimum Metadata Set
<b>ISO 80000-4:2006</b>	Quantities and units - Part 4: Mechanics	<b>MISB STD 0107.1</b>	Bit and Byte Order for Metadata in Motion Imagery Files and Streams
<b>ISO 80000-7:2008</b>	Quantities and units - Part 7: Light	<b>MISB STD 0403.3</b>	Digital Representation for Infrared Motion Imagery
		<b>MISB STD 0603.1</b>	Common Time Reference for Digital Motion Imagery
		<b>MISB STD 0605.3</b>	Inserting Time Stamps and Metadata in High Definition Uncompressed Video

# DISR approved GEOINT Standards – mandated (2)

<b>MISB STD 0903.3</b>	<b>Video Moving Target Indicator and Track Metadata</b>	<b>OGC SLD 1.1.0</b>	<b>Styled Layer Descriptor</b>
<b>MISP v6.4</b>	Motion Imagery Standards Profile	<b>OGC WCS 1.1.2</b>	Web Coverage Service (WCS) Implementation Standard
<b>NGA.IP.0001_2.0</b>	Implementation Profile for GeoTIFF	<b>OpenGIS Filter 1.1</b>	Filter Encoding Implementation Specification, Version 1.1.0
<b>NGA.IP.0002_1.0</b>	High Resolution Elevation (HRE) Products,	<b>OpenGIS SOS 1.0</b>	Sensor Observation Service Implementation Specification,
<b>NGA.IP.0003_1.0</b>	NITF Implementation Profile for LiDAR Systems	<b>Rec. BT.601-6 (01/07)</b>	Studio encoding parameters of digital television for standard 4:3 and 16:9 aspect ratios,
<b>NGA.IP.0006_1.0</b>	NITF Implementation Profile for Tactical Hyperspectral Imagery	<b>SDSFIE 3.0 Gold</b>	Spatial Data Standards for Facilities, Infrastructure, and Environment,
<b>NGA.STND.0012-1_2.1</b>	NSG Metadata Foundation (NMF) - Part 1: Conceptual Schema	<b>SE 1.1.0</b>	Symbology Encoding Implementation Specification, Version: 1.1.0
<b>NGA.STND.0012-2_1.0</b>	NSG Metadata Foundation (NMF) - Part 2: Quality Metadata,	<b>SMPTE 336M-2007</b>	Data Encoding Protocol Using Key-Length-Value,
<b>NGA.STND.0012-3_1.0.0</b>	NSG Metadata Foundation (NMF) - Part 3: Metadata for Imagery and Gridded Data	<b>SMPTE 377M-1-2009</b>	Material Exchange Format (MXF) - File Format Specification
<b>NGA.STND.0015_3.1</b>	Display Performance Standard, Version 3.1	<b>SPS 1.0</b>	Sensor Planning Service Implementation Specification
<b>NGA.STND.0016_2.1</b>	Softcopy Exploitation Facility Standard, Version 2.1	<b>STANAG 3809</b>	Digital Terrain Elevation Data (DTED) Exchange Format
<b>NGA.STND.0017_3.0.1</b>	Community Sensor Model (CSM) Technical Requirements Document	<b>STANAG 4559</b>	NATO Standard ISR Library Interface, Edition 3
<b>NGA.STND.0018_2.1</b>	NSG Metadata Implementation Specification (NMIS) XML Exchange Schema	<b>STANAG 4607</b>	NATO Ground Moving Target Indicator Format (GMTIF), Edition 3
<b>NGA.STND.0020_5.0</b>	NSG Feature Data Dictionary (NFDD), Version 5.0	<b>STANAG 7098 Edition 2</b>	Compressed ARC Digitized Raster Graphics (CADRG)
<b>NGA.STND.0021_5.0</b>	NSG Entity Catalog (NEC), Version 5.0	<b>STANAG 7099 Edition 2</b>	Controlled Image Base (CIB), 26 November 2004
<b>NGA.STND.0022_5.0</b>	NSG Application Schema (NAS) - Part 1: Platform Independent Model, Version 5.0	<b>STANAG 7172 (Ed.2)</b>	Use of Geomagnetic Models
<b>NGA.STND.0024-1_1.0</b>	Sensor Independent Complex Data (SICD) Design & Implementation Description Document	<b>STANAG 7194 Edition 1</b>	NATO Imagery Interpretability Rating Scale (NIIRS)
<b>NGA.STND.0024-2_1.0</b>	SICD, File Format Description Document	<b>STDI-0001 v1.3/CN3</b>	National Support Data Extensions (SDE) for the NITF
<b>NGA.STND.0024-3_1.0</b>	SICD Image Projections Description Document	<b>STDI-0002-1_4.0</b>	Controlled Extensions (CE) for NITF Tagged Record Extensions
<b>NGA.STND.0025-1_1.0</b>	SIDD Design and Implementation Description Document	<b>STDI-0002-2_1.0</b>	The Compendium of Controlled Extensions (CE) for NITF
<b>NGA.STND.0025-2_1.0</b>	Sensor Independent Derived Data (SIDD) NITF File Format Description Document, Version 1.0	<b>STDI-0006, 23 July 2008</b>	National Imagery Transmission Format (NITF)
<b>NGA.STND.0025-3_1.0</b>	Sensor Independent Derived Data (SIDD) GeoTIFF File Format Description Document	<b>T3D v6.4r1</b>	Tasked Target Text Data v6.4r1
<b>NGA.STND.0026_5.0</b>	NSG Topographic Data Store (TDS) Content Specification, Version 5.0	<b>TIFF Revision 6.0</b>	TIFF, Revision 6.0, Adobe Systems Inc.
<b>NGA.STND.0033_1.0</b>	Geopolitical Entities, Names, and Codes (GENC) Standard, Edition 1.0	<b>U.S. DoD IP 1.1</b>	Motion Imagery for Situational Awareness
<b>NGA.STND.0034_4.1.26</b>	Joint OPIR Logical Data Model (JODM) Version 4.1.26	<b>U.S. DoD USIP 1.1</b>	Line of Sight Transmission of Motion Imagery for Battlespace Awareness
<b>OCL v2.2</b>	Object Constraint Language (OCL), Version 2.2	<b>U.S. DoD USIP 1.2:2012</b>	Beyond Line-of-Sight Transmission of Sensor Data for Battle Space Awareness
<b>OGC GML sfp v2.0 w/Cor</b>	Geography Markup Language (GML) simple features profile,	<b>UML 2.2</b>	Unified Modeling Language (UML) Superstructure
<b>OGC KML 2.2.0</b>	OGC KML, Version 2.2.0	<b>WFS 1.1</b>	Web Feature Service
<b>OGC SensorML v1.0.0</b>	OpenGIS Sensor Model Language (SensorML)	<b>WMC 1.1</b>	Web Map Context
		<b>WMS 1.3</b>	Web Map Service
		<b>WMTS v1.0.0</b>	Web Map Tile Service Implementation Standard
		<b>WPS 1.0</b>	Web Processing Service

# ArcGIS delivering interoperability



**Federal GIS Conference 2014**

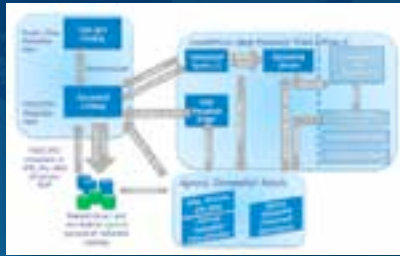
February 10–11, 2014 | Washington DC



# Standards in Action

@martenhogeweg

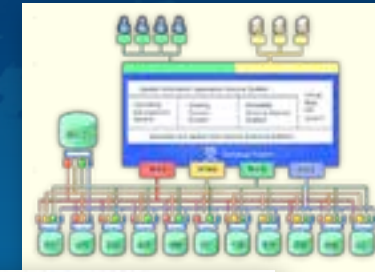
# Standards Support Creating Regional and National GIS Infrastructures



US



Russia



China



EU



Geneva,  
Switzerland



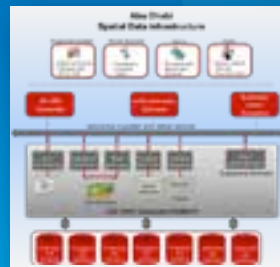
Bogotá,  
Colombia



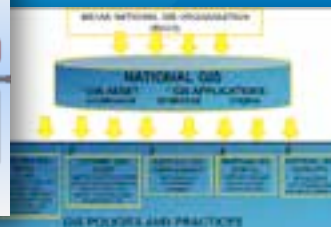
Singapore



Indonesia

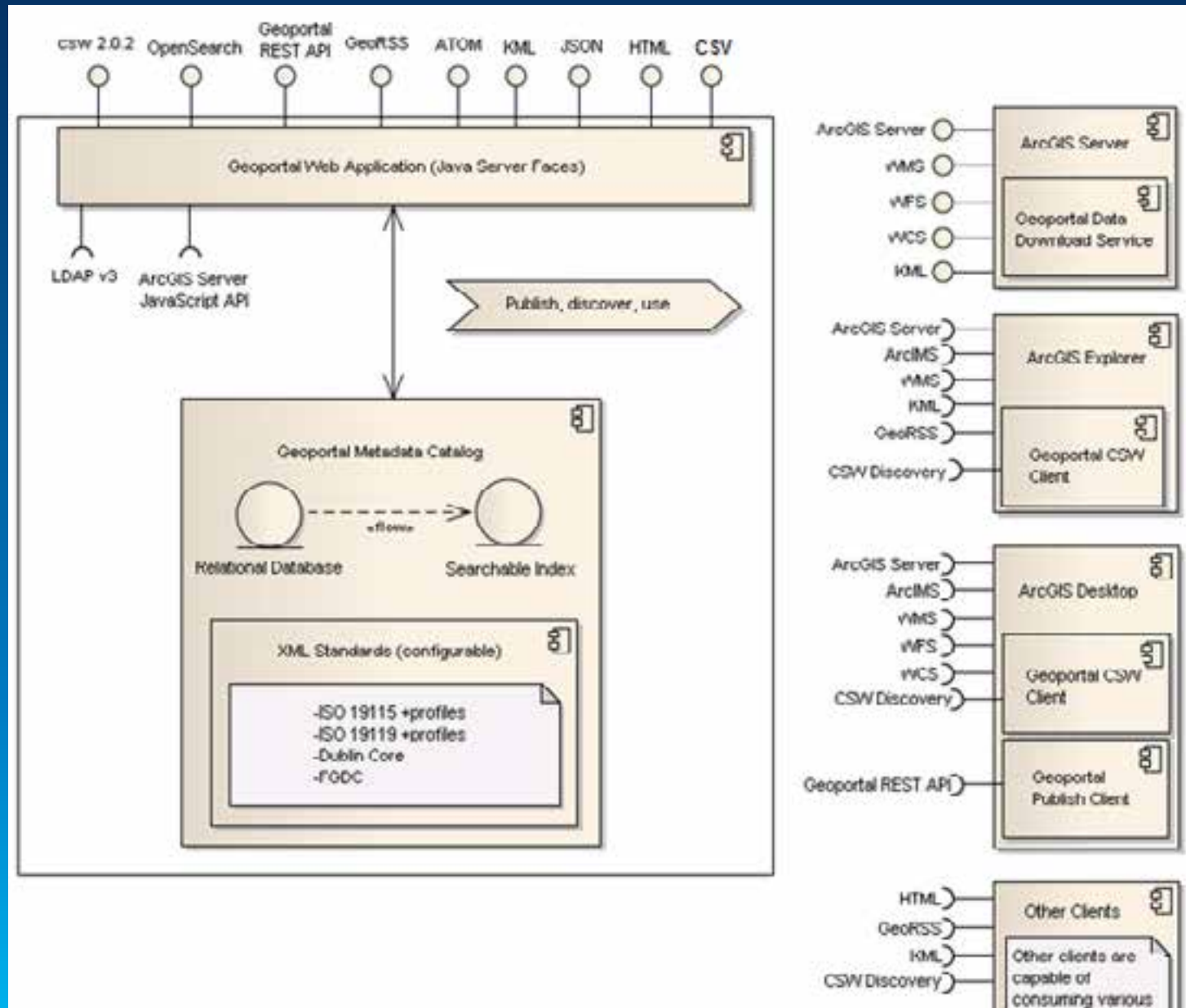


Abu Dhabi



India

# SDI Require Using Standards



DEMO

# Standards in Action

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