



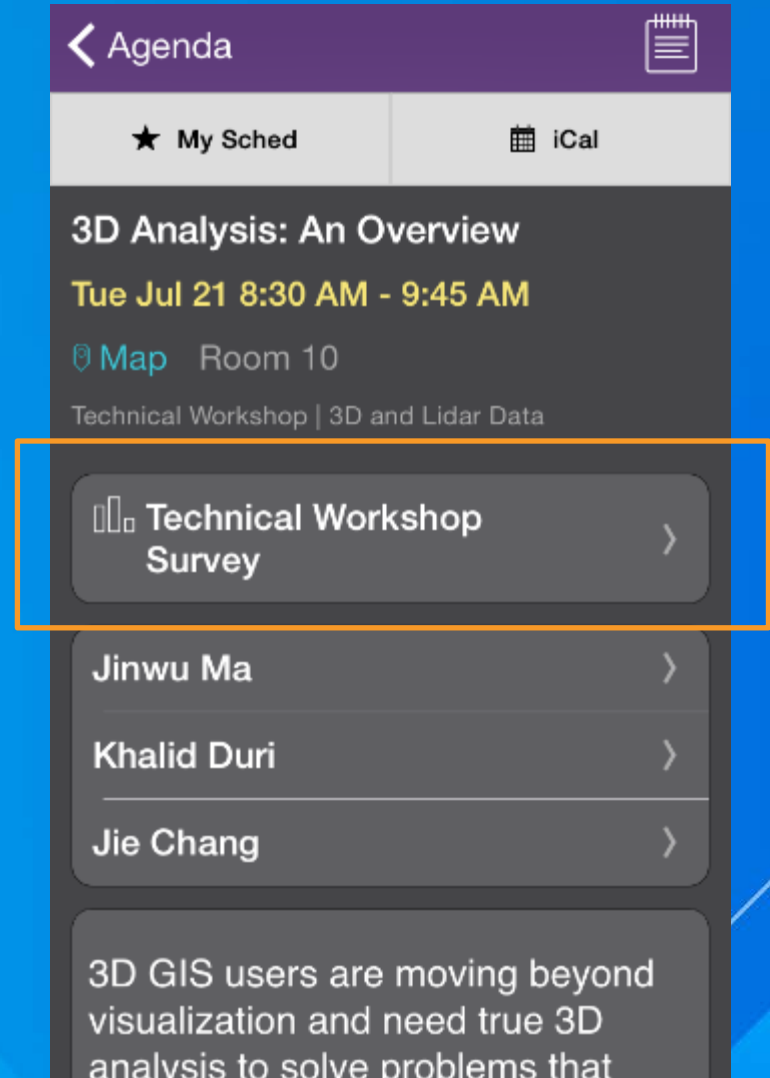
Achieving Interoperability using the ArcGIS Platform

Satish Sankaran

Roberto Lucchi

Thank you...

- Please fill out the session survey in your mobile app
- Select [Achieving Interoperability using the ArcGIS Platform] in the Mobile App
 - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments



The ArcGIS Platform

- **An Open & Interoperable Platform**

- Supporting a thriving ecosystem of focused apps and applications.

- **A Standards Compliant Platform**

- Supporting many relevant standards including those from ISO TC 211 and OGC.



User Scenarios

Organizations participating in SDI and Large Federal and Defense Infrastructures

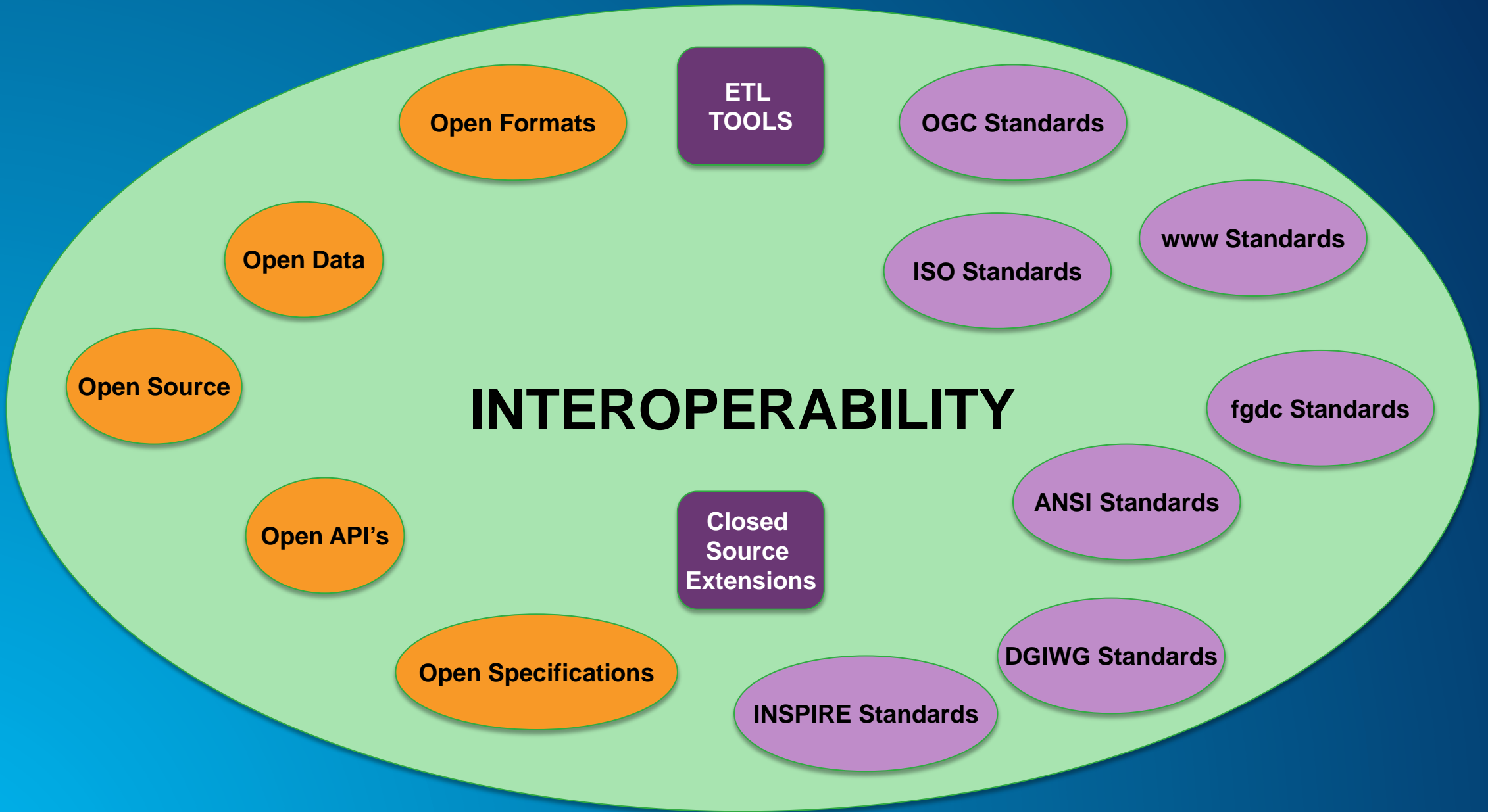
Help me satisfy my obligations (workflows) using mandated standards

Organizations participating in Opendata

Help me satisfy my obligations

Organizations participating in cross-domain, cross organizational workflows

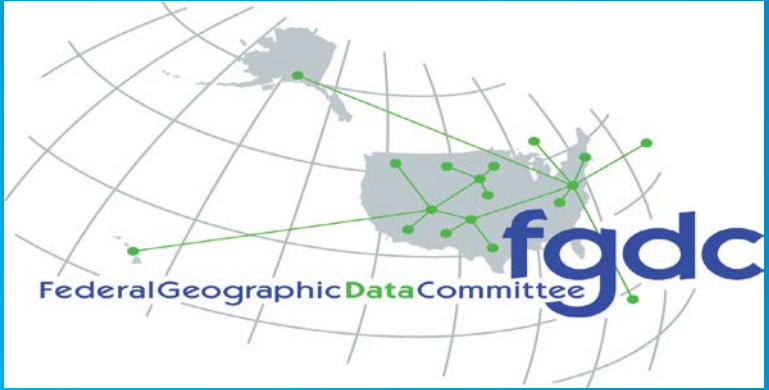
Help my workflow. Help me work with my other stakeholders and business entities



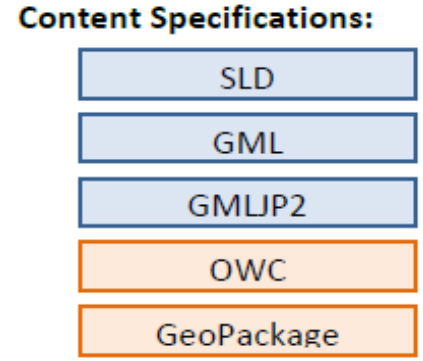
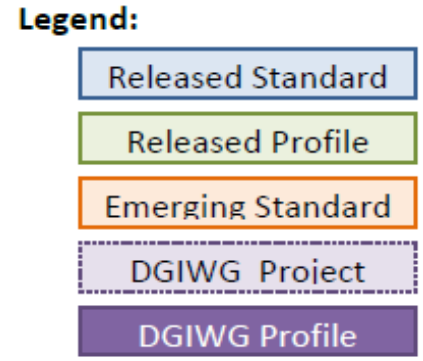
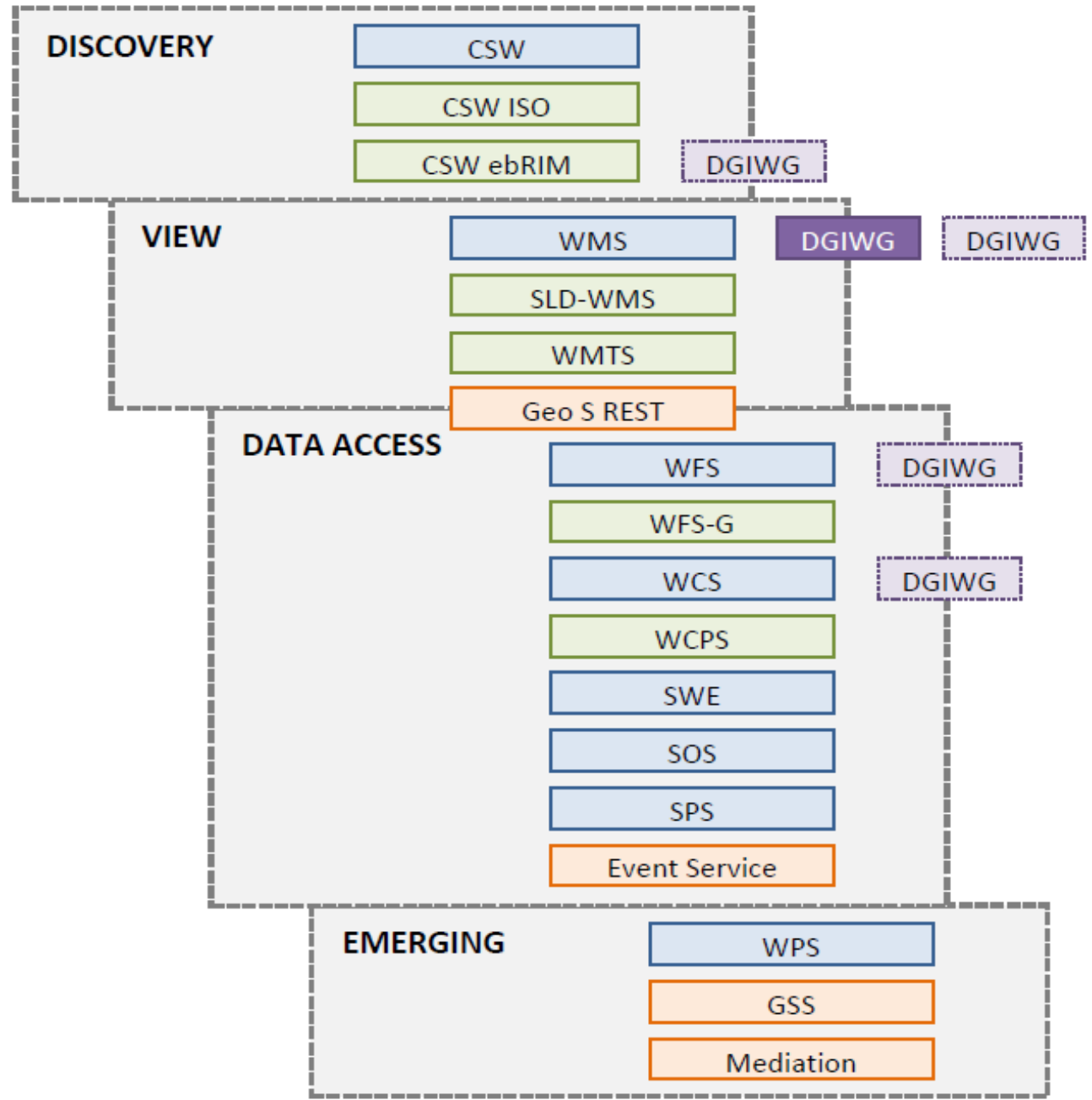
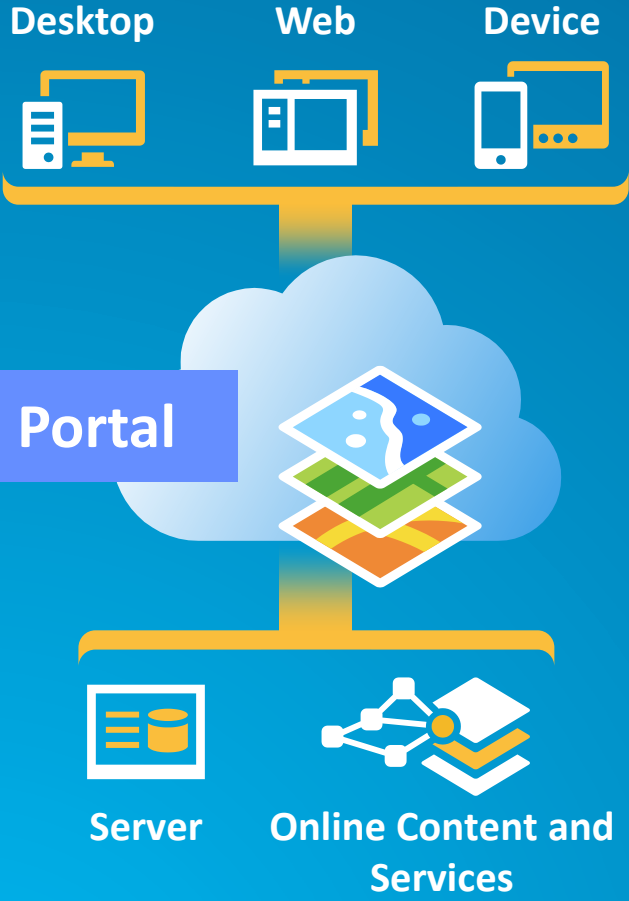
Achieving Interoperability



ArcGIS Technology (supporting standards)



ArcGIS - Platform



<http://ise.gov>

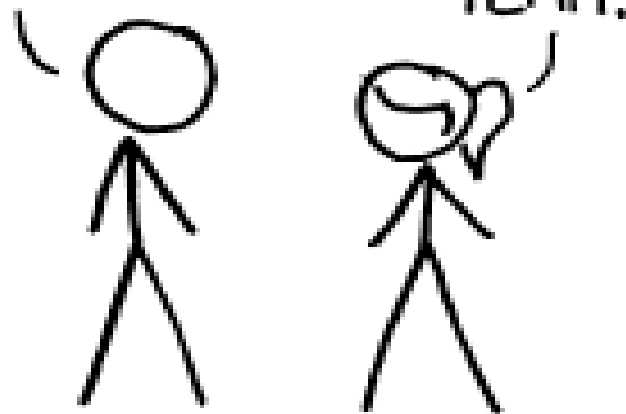
from ... Geospatial Interoperability Reference Architecture (GIRA)

HOW STANDARDS PROLIFERATE:

(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)

SITUATION:
THERE ARE
14 COMPETING
STANDARDS.

14?! RIDICULOUS!
WE NEED TO DEVELOP
ONE UNIVERSAL STANDARD
THAT COVERS EVERYONE'S
USE CASES.



SOON:

SITUATION:
THERE ARE
15 COMPETING
STANDARDS.

OGC Support

SERVER TECHNOLOGIES

Server

Support WMS, WFS, WCS, WPS,
WMTS, KML, SLD, FE

ArcGIS Online / Portal

CLIENT TECHNOLOGIES

Desktop

wms, wcs,wfs kml oPeNDAP, gml,
NetCDF, geopackage

Runtime

Kml, wms, wmts

ArcGIS Online / Portal

Register wms,kml services
Webmap / mapviewer : Add wms,
wmts, kml layers

Javascript Web Api

wms, wmts, kml

ArcGIS Platform Components

Portals
(AGOL, Portal)

Providing &
Consuming

Developer Solutions
(runtime, Javascript
Api)

Consuming

Server

Providing

Desktop
(ArcMap & PRO)

Consuming

Apps

Consuming

Core Standards

Metadata
(ISO, FGDC, ...)

Data
(Geopackage,
geoJSON, gml-
JPEG 2000...)

Portrayal
Standards

Services
(wms,wfs,wcs,
wps,sos,cs-w, ...)

Standards Requirements – Across the platform What we are hearing!

- **Online / Portal**
 - Register OGC services
 - Consume OGC services
 - Create hosted OGC services
 - Geopackage support
 - Allow analyses on OGC services
 - Support Discovery Standards – OGC CS-W, OpenSearch, DCAT
 - Managing Secured OGC Services
- **Metadata Support across the platform**
- **Federated searches across portals**
- **Server**
 - Improve existing OGC support (compliance, update to new version, new profiles)
- **Desktop (ArcMap / Pro)**
 - Consume OGC services
 - Geopackage support
- **Runtime and Apps**
 - Consume OGC services
 - Geopackage support
- **Javascript API**
 - Consume OGC services

Standards Support

portals
(ArcGIS Online, Portal for ArcGIS)

**Producing &
Consuming**

- **Producing**

- **Hosted WMS service (2016)**
- **Hosted WFS Service (2016)**

- **Consuming**

- **WMS (support identify operation)**
- **WMTS**
- **WFS (2016) – Support as a first class layer type**
- **WCS**
- **GeoPackage**
- **KML**
- **Metadata Support (@ version 3.8)**

 Ongoing Work

 Planned Work

 Supported Today

Standards Support

**Portals
(Portal for ArcGIS)**

Producing &
Consuming



Geoportal

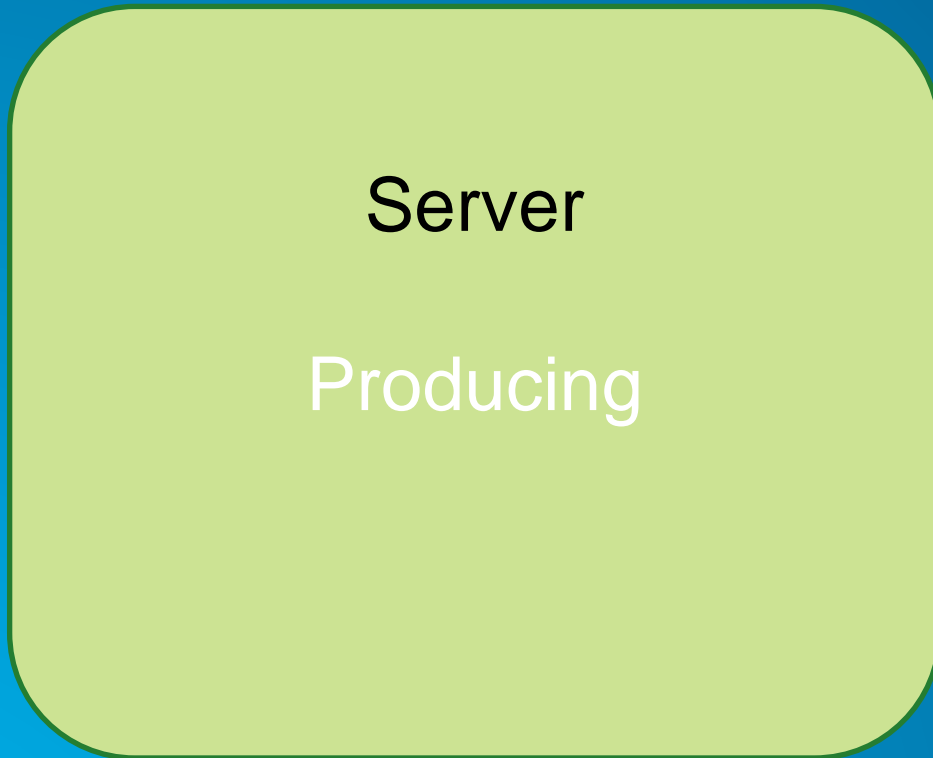
- **CS-W Support**
- **Federated Portals**
 - Federated Searches & Metadata Harvesting
- **Metadata Support (Special Profiles)**

 Ongoing Work

 Planned Work

 Supported Today

Standards Support



- **Server**
 - WMS
 - WFS (WFS-T)
 - WCS
 - WMTS
 - WPS
 - KML
 - **GeoJSON (@ 10.4)**
 - **WPS 2.0**
 - **WCS – Met Ocean Profile**

 Ongoing Work

 Planned Work

 Supported Today

Standards Support

Developer Solutions
(Runtime, Javascript
Api)

Consuming

- **Runtime**

- Wms
- Wmts
- GeoPackage
- **Wfs**

- **Javascript Api**

- WMS
- WMTS
- WFS (@ version 3.1.4)

 Ongoing Work

 Planned Work

 Supported Today

Standards Support

Apps
Consuming

- Apps
 - WMS , WMTS , WFS, WCS, GeoPackage

 Ongoing Work

 Planned Work

 Supported Today

Standards Support

Desktop
(ArcMap & PRO)

Consuming

- **ArcMap**

- WMS , WMTS , GeoPackage, WCS, KML
- WFS
- **WFS-T (part of production mapping)**

- **PRO**

- **WMS , WMTS , GeoPackage, KML**
- **WFS /WFS-T**
- **WCS**

 Ongoing Work

 Planned Work

 Supported Today

Standards Support

Desktop
(PRO)
Consuming

- PRO 1.1
 - WMS , WMTS , Geopackage, KML,
 - WFS (import –part of Data Interop)
- PRO 1.2
 - **WMS , WMTS , Geopackage, WFS**
/WFS-T
- PRO (2016)
 - **WCS**

 Ongoing Work

 Planned Work

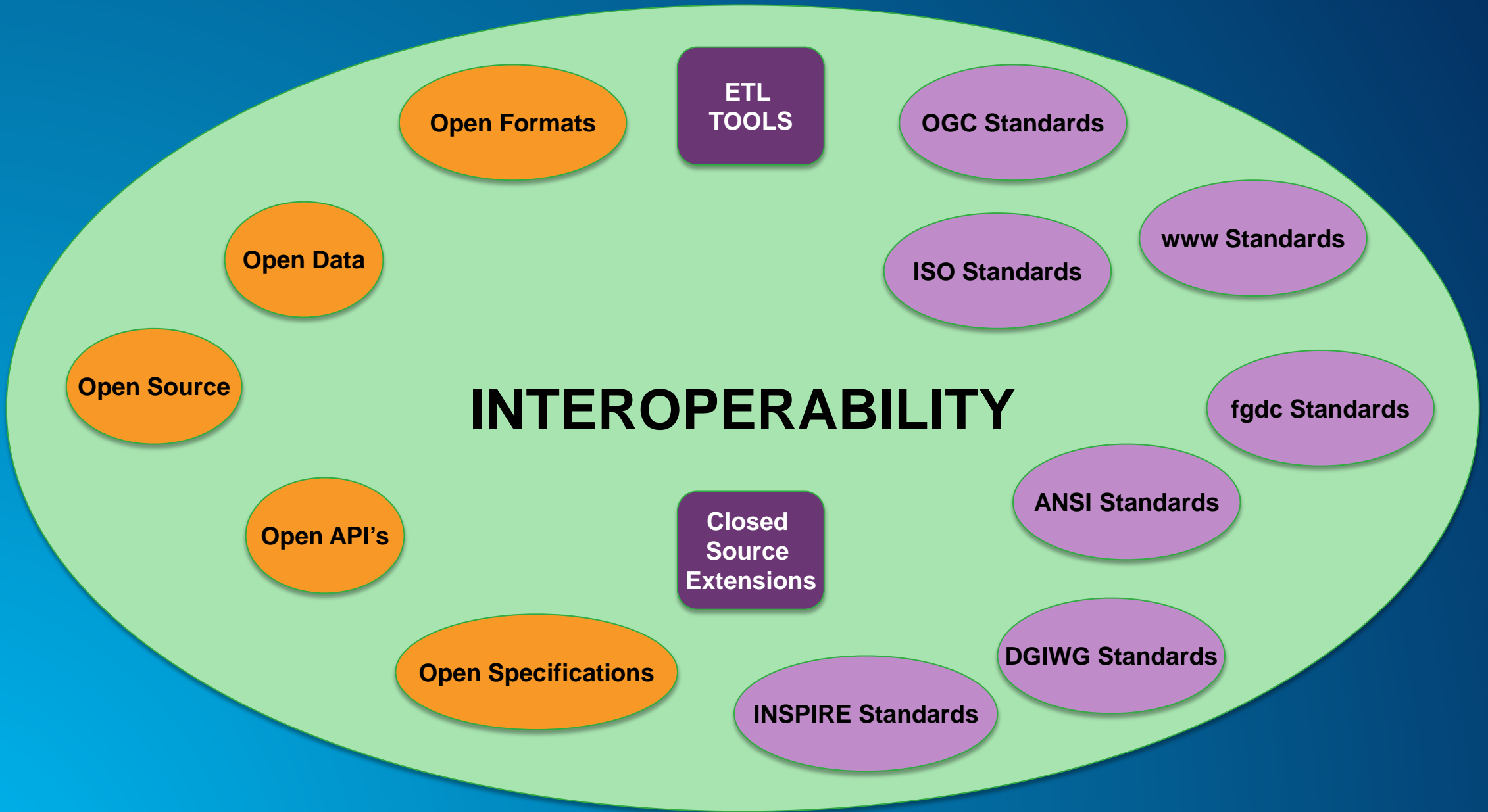
 Supported Today

OGC / ISO standards support (ArcGIS 10.3)

- WMS
 - + Style Layer Descriptor
 - + Filter Encoding Support
 - + Time Support
- WFS
 - + Transactions
 - + Filter Encoding Support
- WCS
 - +GeoTiff, NITF, HDF, JPEG, JPEG2000, PNG
- WMTS
 - + REST & KVP Encoding
- WPS
 - + Synchronous
 - + Asynchronous
 - + Data and Services as inputs
- CSW
 - + OGC Core
 - + ISO 19139
- Simple Features
- GML
- KML
- GeoPackage
 - +Vectors, Tiles
- Metadata
 - +ISO, FGDC, ...

<http://www.esri.com/library/whitepapers/pdfs/supported-ogc-iso-standards.pdf>

<http://www.opengeospatial.org/resource/products/compliant#ESRI>



Achieving Interoperability

Explore Open.

(Hint, with Esri the possibilities are endless.)

<http://www.esri.com/software/open-site>



Esri's Open Initiatives

Our strategy incorporates the many aspects of an open platform - **open code, open data, open formats, open content, and open community.**

- Centralized many of our Open Source Software projects via the Esri Github community
- GeoPortal – Esri's Open Source Platform for Collaboration & Sharing
- Openstreetmap Editor – Esri's OS Arcmap extension for editing OpenStreetMap Data
- Open-sourced a core geometry engine to enable developers to leverage the Hadoop Big Data platform.
-

..... **Join & Collaborate**

Esri - Open Specifications

- **Shapefile**
- **File Geodatabase API**
- **Geoservices REST Specification**
- **Esri i3S specification** (<https://github.com/esri/i3s-spec>)

..... Advancing Interoperability

.... Some Links to Esri's Open Source Libraries

- <https://github.com/Esri/geoservices-js>
- <https://github.com/Esri/Terraformer>
- <https://github.com/ajturner/geoservices-ruby>
- <http://dte-sci01.esri.com/OGCApps/OpenLayersApp>
- <https://github.com/kevinsigwart/EsriOpenLayersClient/>
- <https://github.com/Esri/esri-leaflet>
- <https://github.com/Esri/koop>
- <https://github.com/Esri/3d-cities-template/tree/master/Workflows/3DCityMaintenance/CityGML%20Tools>

<http://esri.github.io/>

ArcGIS Open Data Platform

Open Data About Forums About ArcGIS

Explore **27,331 Open Datasets** from **2,149 Organizations** Worldwide

Search for data about

Featured Organizations Sharing Data

  HALIFAX   

<http://opendata.arcgis.com/>

Demonstrations



Working with Metadata
(Desktop, portal)

Working with Multidimensional data
using OGC Services

Publishing OGC Services using
ArcGIS Desktop

Working with Inspire Services

Working with WFS 2.0 Stored Queries in
ArcGIS for Server

Working with WFS-Transactions

Working with OGC services in
Online / Portal

Github Tour
(koop, esri-leaflet, GeoServices,
Terraformer, ...)

Working with cityGML

Leveraging Open Data Sites
for Information

Working with OGC Services in
ArcGIS PRO

Working with AiXM

Using GeoPortal

Federating search using
Portal + Geoportal

Working with WPS services
using ArcGIS for Server &
ArcGIS Desktop (WPS extension from 52N)

Working with GeoPackages

Working with geoJSON

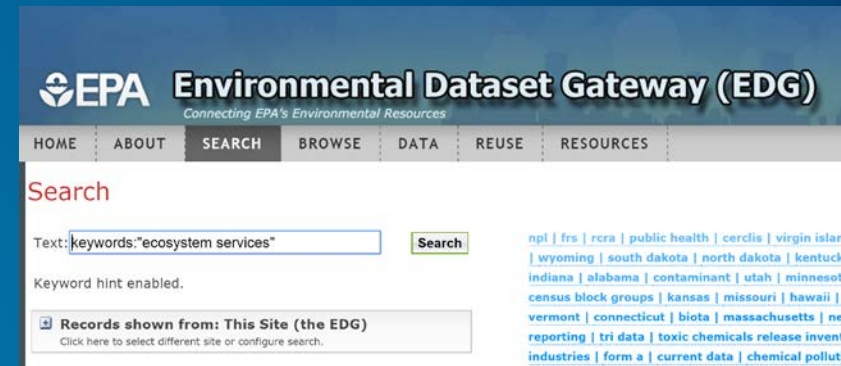
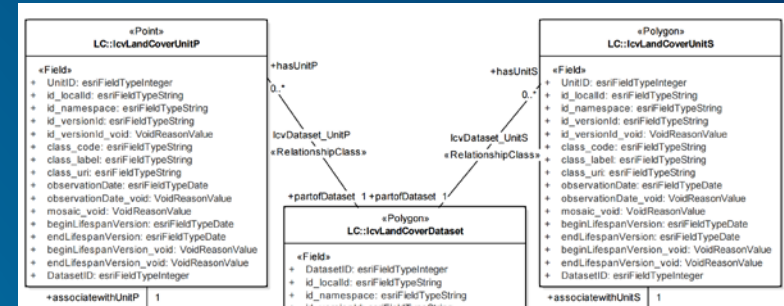
Working with Sensor Observation Services
using AGS (with 52 N extension)

Organizations participating in SDI and Large Federal and Defense Infrastructures

Organizations participating in Opendata

Organizations participating in cross-domain, cross organizational workflows

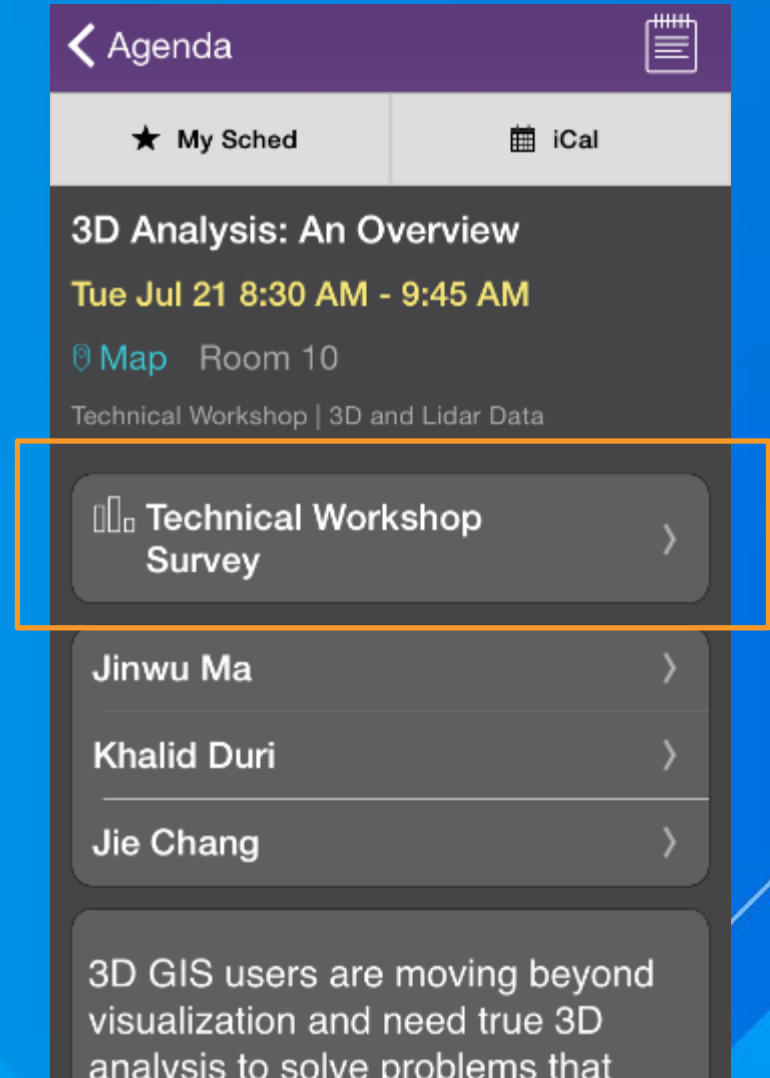
User Scenarios



Examples

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Understanding our world.