ArcGIS Enterprise: Data Storage Strategies

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Agenda

- What and Why
- Storage options
- Technical architecture
- Example data strategies
- Related topics
What is your role?

- DBA
- System Architect
- Analyst
- Developer
- Executive / Manager
- All of the above?
ArcGIS Enterprise: Data Storage Strategies

Your organization’s plan for achieving its goals
What is a data strategy?

A comprehensive plan for your geospatial data

• Store
• Access
• Manage
What is a data strategy?

• Feasible
• Economical
• Tailored to your business needs
• Evolves as necessary
What is a data strategy?

Many forms
- Prescriptive manuals
- Checklists
- General user guidelines
- Handbooks

... an integral part of your geospatial platform
More data than ever before

Imagery  3D

Raster

Real-time

Big data

Urban

Indoor

Field

Demographic

Third party

Living Atlas

Unstructured

Vector & tabular

Utility networks

Drone

Cloud

ArcGIS Enterprise supports your data workflows
Why?

Flexible  Accessible  Functional  Interoperable
Why?

To provide a strong foundation to support new challenges, workflows, and innovation
Options have evolved ...

1980s: Coverages
1990s: Shapefiles
SDE (enterprise geodatabase)
Personal geodatabase, file geodatabase
2014: ArcGIS Data Store
### Available options in ArcGIS Enterprise today

<table>
<thead>
<tr>
<th><strong>Geodatabases</strong></th>
<th><strong>Folders &amp; files</strong></th>
<th><strong>ArcGIS Data Store</strong></th>
<th><strong>Cloud storage</strong></th>
<th><strong>Big data storage</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enable on top of commercial RDBMS</td>
<td>• Local or network</td>
<td>• Storage included with ArcGIS Enterprise</td>
<td>• Amazon, Azure integrations</td>
<td>• Hadoop, Hive</td>
</tr>
<tr>
<td>• Large scale, multi-user, authoritative data</td>
<td>• E.g. file geodatabase</td>
<td>• 3 different flavors</td>
<td>• Store map and image caches</td>
<td>• Input and output of big data analysis (vector, tabular)</td>
</tr>
<tr>
<td></td>
<td>• Storage for different file formats (csv, shp, etc)</td>
<td>• Powers hosted data</td>
<td>• Optional output of raster analytics</td>
<td></td>
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</table>
Two categories

• User managed
• ArcGIS managed
Categories defined

User managed
- You manage (provision, scale, tune)
- You register to ArcGIS Enterprise

Direct management of the underlying storage

ArcGIS managed
- Data storage included with ArcGIS Enterprise
- Installed as part of your ArcGIS Enterprise deployment

Management through ArcGIS interfaces and APIs
Relationship to data

User managed
(Geodatabase)

ArcGIS managed
(hosted, ArcGIS Data Store)

The system references the data in place

The system hosts (stores) the data for you

This defines the term ‘hosted.’
Storage types

**User managed**
(Geodatabase)

**ArcGIS managed**
(hosted, ArcGIS Data Store)

- Enterprise geodatabase
- Cloud storage
- File shares
- Big data storage

- ArcGIS Data Store
  - Relational
  - Tile Cache
  - Spatiotemporal
Publishing and access

User managed (Geodatabase)

- Data does not move
- Accessed through database connections, REST services and items in portal
  - Delete the service, data remains

ArcGIS managed (hosted, ArcGIS Data Store)

- Copy data or publish directly in your portal
- Accessed through REST and items in portal
  - The data is the service
Use Cases

User managed
(geodatabase)

- Authoritative system of record
- Utility networks and parcels
- Need strict spatial and attribute quality
- Support for multi-user versioning workflows
- Comprehensive, relational database

ArcGIS managed
(hosted, ArcGIS Data Store)

- Often used for self-service portal workflows
- Good alternative for storing file-based data
- Some advanced options (domains, views, etc)
- Relatively isolated, standalone datasets
# Data in ArcGIS: User Managed and ArcGIS Managed

The below table includes some of the differences between ArcGIS managed and user managed data:

<table>
<thead>
<tr>
<th></th>
<th>User managed (enterprise geodatabase)</th>
<th>ArcGIS managed (hosted data in the ArcGIS Data Store)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database Technology</td>
<td>Option of RDBMS (Oracle, SQL Server, PostgreSQL, Informix, Db2, SAP HANA, etc.)</td>
<td>The database is chosen by ArcGIS; not a bring-your-own-database nor a general-purpose database.</td>
</tr>
<tr>
<td>User Access</td>
<td>Multuser, with both direct connect from desktop applications and via REST-based map and feature services.</td>
<td>Multuser, solely via REST-based map and feature services.</td>
</tr>
<tr>
<td>Rendering</td>
<td>Map services can render the output server-side using map image layers. Both map and feature services can render client-side via feature layers. Map image layers support advanced renderers and cartographic options not available in feature layers.</td>
<td>Hosted feature layers only support client-side rendering with out-of-the-box symbol set and cartographic options.</td>
</tr>
<tr>
<td>Versioning and Archiving</td>
<td>Supports both traditional versioning and branch versioning. Archiving historical snapshots is supported.</td>
<td>Versioned editing is not supported; the last edit submitted is stored for the feature layer. No archiving.</td>
</tr>
<tr>
<td>Topology</td>
<td>Topology rules can be created and enforced.</td>
<td>Topology rules not supported.</td>
</tr>
<tr>
<td>Scalability</td>
<td>The underlying RDBMS can be scaled to support a large number of users, editors and data using native RDBMS features and</td>
<td>The relational data store type of ArcGIS Data Store can be scaled vertically; adding more capacity &amp; resources to a</td>
</tr>
</tbody>
</table>
The ArcGIS Data Store complements your storage strategy; it does not replace your enterprise geodatabase.
ArcGIS Enterprise Architecture

- ArcGIS Enterprise portal
- ArcGIS Server
- ArcGIS Data Store
  - ArcGIS Managed

Enterprise geodatabases, folders, cloud storage
  - User managed
Workflow: Publish by reference from ArcGIS Pro

ArcGIS Enterprise portal
*Feature layer (item) created*

ArcGIS Server
*Feature service created*

ArcGIS Data Store

Enterprise geodatabases, folders
*Data remains here*
Workflow: Publish as a copy from ArcGIS Pro

ArcGIS Enterprise portal
*Feature layer (item) created*

ArcGIS Server
*Feature service created*

ArcGIS Data Store
*Copy of data stored here*

Enterprise geodatabases, folders
*Data copied from here*
Workflow: Directly upload a CSV to your portal

- ArcGIS Enterprise portal
  - Feature layer (item) created

- ArcGIS Server
  - Feature service created

- ArcGIS Data Store
  - Data stored here
A data strategy can take on many forms

**ArcGIS Online**

- Public content
- Open data
- Non-employees (volunteers, contractors)
- Collaborated data from ArcGIS Enterprise for field operations

**ArcGIS Enterprise**

- Enterprise geodatabase:
  - Continuous, multi-user datasets

- Hosted data:
  - Innovation, projects, PoC, learning
  - Replacement for file geodatabases
Where to start?
Think about your end goal first
And then work backwards

Start here:
“I want to make a cake.”

Then put the pieces in place to get there:
Butter, flour, a mixing bowl, an oven,...
Working from your end goal backwards

What do you want to do?

I want to maintain an accurate inventory of parcels in my city.

I need to be able to have many editors working at once and to track changes.

My users have ArcGIS Pro licenses and we’re using ArcGIS Enterprise.

I’ll use an enterprise geodatabase and use branch versioning off of web services.

The cake: I want to maintain an accurate inventory of parcels in my city.

The ingredients: I need to be able to have many editors working at once and to track changes.

The supplies: My users have ArcGIS Pro licenses and we’re using ArcGIS Enterprise.

The recipe: I’ll use an enterprise geodatabase and use branch versioning off of web services.
Example questions to jumpstart your strategy:

**Collected**
How will we capture your data?

**Edited**
Who will need to make changes?

**Kept accurate**
What type of quality assurance is needed?

**Accessed**
Who needs to be able to find and use it?

**Scaled**
Will our data grow? Will our userbase grow?

**Used**
What is the function of our data? Where will it be used?
Related topics

- **Distributed collaboration**
  - *Sharing data between ArcGIS Enterprise environments and with ArcGIS Online*

- **ArcGIS Enterprise sites**
  - *Tailored landing pages for your users to discover and interact with your GIS*

- **Bulk publishing**
  - *A new option for publishing all of your enterprise geodatabase data as web services*
Questions?
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