Editing Versioned Geodatabases: An Introduction

Cheryl Cleghorn
Shawn Thorne
Assumptions:

- Basic knowledge of relational databases

- Basic knowledge of the Geodatabase data model

  - Many other sessions that focus on this
Requests:

- Please hold questions until Q&A
- Please silence smart devices
Session Path

- Introduction to the Multi-user Geodatabase
- Versioning
- Types of Editing
- Archiving
- Geodatabase Replication
- Q & A
Session Path

• Introduction to the Multi-user Geodatabase
  - What is the Geodatabase?
  - Different types of Geodatabases
  - The Geodatabase Management Approach
  - The Multi-user Geodatabase

• Versioning
• Types of Editing
• Archiving
• Geodatabase Replication
• Q & A
What is the Geodatabase?

- Physical data store
- Core ArcGIS data model
- Transactional model
- COM components
# Three Types of Geodatabases

<table>
<thead>
<tr>
<th></th>
<th>Personal GDB</th>
<th>File GDB</th>
<th>Multi-user GDB (3 editions)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Storage format</strong></td>
<td>Microsoft Access</td>
<td>Folder of binary files</td>
<td>DBMS</td>
</tr>
<tr>
<td><strong>Storage capacity</strong></td>
<td>2 GB</td>
<td>1 TB per table*</td>
<td>Depends on edition</td>
</tr>
<tr>
<td><strong>Supported O/S platform</strong></td>
<td>Windows</td>
<td>Any platform</td>
<td>Depends on edition</td>
</tr>
<tr>
<td><strong>Number of users</strong></td>
<td>Single editor Multiple readers</td>
<td>Single editor Multiple readers</td>
<td>Multiple editors &amp; readers</td>
</tr>
<tr>
<td><strong>Distributed GDB functionality</strong></td>
<td>Check out/check in One way replication</td>
<td>Check out/check in One way replication</td>
<td>Replication (all types) &amp; versioning</td>
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</table>
Geodatabase Data Management Approach

Extend functionality and data integrity

DBMS
Simple classes

Short transactions
Integrity
Reliability
Flexibility
Scalability

logic

Extend functionality and data integrity
Geodatabase Data Management Approach...

Editing and data compilation
Geodatabase Data Management Approach…

• Versioning workflows
  - Long transactions
  - Distributed data management

• Robust, customizable framework
What is a Multi-user Geodatabase?

• Also called an ArcSDE Geodatabase

• ESRI's geospatial technology

• Unique capabilities:
  - Many supported DBMSs
  - Full, open SQL access
  - Versioning
  - Replication
  - Archiving
How is ArcSDE technology included in ArcGIS?

ArcGIS

- Geodatabase
- ArcSDE
- DBMS
- Operating system

Multi-user Geodatabase
### Three editions of Multi-user Geodatabase

Scale from small, personal systems up to workgroups and very large enterprises

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<thead>
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<th>ArcGIS Server Workgroup</th>
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<td>Max 3 users, 1 editor at any one time</td>
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**Administration**
- ArcGIS Desktop (ArcCatalog)  
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- **ArcGIS Desktop and Engine** supports ArcGIS Desktop and ArcGIS Engine.
- **ArcGIS Server Workgroup** supports ArcGIS Server Workgroup.
- **ArcGIS Server Enterprise** supports ArcGIS Server Enterprise.
- **Number of users**
  - Max 3 users, 1 editor at any one time
  - Max 10 clients at one time
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- **Supported DBMS**
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**Related topics**

- [ArcGIS Desktop](https://www.arcgis.com/products/desktop/)
- [ArcGIS Server](https://www.arcgis.com/products/server/)
- [ArcSDE](https://www.esri.com/software/arcgis/sde)

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**For more information**

- Visit the [ArcGIS website](https://www.arcgis.com)
- Explore the [ArcGIS documentation](https://docs.arcgis.com)
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• Introduction to the Multi-user Geodatabases

• **Versioning**
  - What is it?
  - Why Use Versioning?

• Types of Editing

• Archiving

• Geodatabase Replication

• Q & A
Versioning: What is it?

- Multi-user Technology
Version:

- An alternative view of the Geodatabase
- Edits independent of other versions
Version:

- An alternative view of the Geodatabase
- Edits independent of other versions
Why Use Versioning?

- Multiple Editors
- Different Views of the Data
- Editing Complex Data (e.g. Geometric Networks)
- Replication and Archiving
Why Use Versioning?

- Editing with long transactions
  - Isolate work across multiple sessions
  - Edits do not impact others

- Model what-if scenarios
Session Path

• Introduction to the Multi-user Geodatabase
• Versioning
  • Types of Multi-user Geodatabase Editing
    - Versioned Editing
    - Non-Versioned Editing
    - Editing through SQL
• Archiving
• Geodatabase Replication
• Q & A
Editing Multi-user Geodatabases

- **Short Transactions**
  - E.g., ATM transactions, Library records, Timecards

- **Long Transactions**
  - E.g., Parcel updates
  - General geographic editing

- **GIS editors need both short and long transactions**
Three ways to edit Multi-user Geodatabases

- Versioned Editing (Long Transactions)
- Non-Versioned Editing (Short Transactions)
- Editing through SQL (Short Transactions)
Versioned Editing

- Versioned Edit Sessions
  - Through a version
  - Concurrent editing
  - Long transactions (hours/days)
  - Undo/Redo
How Versioning Works

- Register as Versioned

Business or Base table
How Versioning Works

- Registered as Versioned
  - Creates Adds and Deletes tables for tracking edits
How Versioning Works

- Adding Features
  - Record added to the Adds Table
  - Version will be referenced (SDE_State_ID Field)
How Versioning Works

- Deleting Features
  - Record added to Deletes Table
  - Version will be referenced (Deleted_At field)
How Versioning Works

• Updating Features
  - Record added to both Adds and Deletes table
  - Version will be referenced (SDE_State_ID Field)
How Versioning Works

• Versioned feature classes:
  - Base Tables, Adds Tables & Deletes Tables
Versioned Editing Demo
• How can versions be merged?
Versioned Editing – Reconcile

- Incorporate changes from the target version
Reconcile and Conflicts

- No locks on edit
  - Data overwritten?
  - Conflict detection
- Conflict Resolution Dialog
Versioned Editing – Post

- Incorporate with target version

- After a post versions are identical
Reconcile & Post Demo
Non-Versioned Editing

- Directly editing the base tables
- Benefits IT integration
- Database integrity rules
  - Simple data only (Points, Lines, Polygons)
But I want both…

Versioned  

Non-versioned
Versioned Editing - Move to Base Option

- **Hybrid**
  - versioned and non-versioned

- **Simple data only**
  - Points, lines, polygons, annotation, relationship classes

IT integration
Database constraints
SQL Editing

- Attributes
- Geometry
  - Spatial Types
    - Non-ESRI Client
    - SQL access to geometries
- Versions
- No geodatabase functionality
Multi-user Geodatabase Editing Summary

• Three ways to edit data
  1. Versioned Editing
  2. Non-Versioned Editing
  3. SQL Editing

• Which one do I use?
• Depends:
  - Short vs. Long Transactions?
  - non-ESRI clients?
  - Multi-editor requirement?
Session Path

• Introduction to the Multi-user Geodatabases
• Versioning
• Types of Editing
• Archiving
  - What is it?
  - How is it used?
• Geodatabase Replication
• Q & A
Geodatabase Archiving: What is it?

- Versioned edit history
  - Default version only
- Temporal queries
Geodatabase Archiving: How it works

- Extends versioning
  1. Register as Versioned
  2. Enable Archiving

Diagram:
- Base Table
- Delta Tables
  - Adds
  - Deletes
- Default version
- Archive Table
Geodatabase Archiving: How it works

- Save edits on the Default version
  - changes added to archive table

Base Table

Delta Tables
  - Adds
  - Deletes

Archive Table
Geodatabase Archiving: usage

- Two query methods
  - specific date and time
  - historical marker
Geodatabase Archiving Demo
Session Path

- Introduction to Multi-user Geodatabases
- Versioning
- Types of Editing
- Archiving
  - Geodatabase Replication
  - Q & A
Geodatabase Replication

- Distribute subsets of data
  - Platform independent
- Data edited independently
  - Synchronized when needed
Distributed Geodatabase Use Cases

Regional offices

Mobile Users

Production / Publication

Multiple levels
Geodatabase Replication - Concepts

- You can replicate:
  - A specific version
  - Specific datasets
  - A subset of features in the chosen datasets
Three Types of Replicas

Check out / Check in
- Parent geodatabase
- Child geodatabase
  - Once only

One-way
- Parent geodatabase
- Child geodatabase
  - Multiple times

Two-way
- Parent geodatabase
- Child geodatabase
  - Multiple times
Geodatabase Replication Demo
Geodatabase Replication - Summary

- Distribute data across Geodatabases

- Different Replication workflows
  - Check out / Check in
  - One-way
  - Two-way
Session Path - Summary

• Introduction to the Multi-user Geodatabases
• Versioning
• Types of Editing
• Archiving
• Geodatabase Replication
Thank you for attending!

Questions??

Please fill out session surveys
www.esri.com/ucsessionsurveys

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