Editing Versioned Geodatabases: An Introduction

Cheryl Cleghorn and Shawn Thorne
Assumptions:

- Basic knowledge of relational databases

- Basic knowledge of the Geodatabase data model

  - Other sessions that focus on the geodatabase data model
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?
  - The Geodatabase Management Approach
  - Different types of Geodatabases
  - 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>
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<td>Multiple editors &amp; readers</td>
</tr>
<tr>
<td><strong>Distributed GDB functionality</strong></td>
<td>Check out/check in One way replication</td>
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<td>Replication (all types) &amp; versioning</td>
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</table>
Mulit-user Geodatabase Data Management Approach

DBMS

Short transactions
Integrity
Reliability
Flexibility
Scalability

Extend functionality and data integrity

Simple classes

logic
Multi-user Geodatabase Data Management Approach...

Editing and data compilation

Oops!
Multi-user Geodatabase Data Management Approach...

• Versioning workflows
  - Long transactions
  - Distributed data management

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

• Previously called an ArcSDE Geodatabase
• ESRI’s geospatial technology
• Unique capabilities:
  - Many supported DBMSs
  - Full, open SQL access
  - Versioning
  - Archiving
  - Replication
How is ArcSDE technology included in ArcGIS?
Three editions of Multi-user Geodatabase

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

- Same functionalities
## Which Multi-user Geodatabase edition?

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Session Path

• 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
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
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
Shawn Thorne
Versioned Editing – Reconcile and Post

- How can versions be consolidated?
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

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Non-Versioned Editing

- Directly editing the base tables
- Benefits IT integration
- Database integrity rules
- Simple data only (Points, Lines, Polygons)
- No Undo/Redo
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-ArcGIS 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-ArcGIS 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?

- **Edit history**
  - Versioned data
  - Non-versioned data

- **Temporal queries**
Versioned Archiving: How it works

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

Archives Table

Base Table

Delta Tables

Adds

Deletes

Default version
Versioned Archiving: How it works

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

Base Table

Delta Tables

Archive Table

- Adds
- Deletes
Non-versioned Archiving: How it works

Business Table

Enable archiving

Edits

Current Data View
Geodatabase Archiving: usage

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

Shawn Thorne
Session Path

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• Types of Editing
• Archiving
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Geodatabase Replication

- Distribute subsets of data
  - Platform independent

- Data edited independently
  - Synchronized when needed
Distributed Geodatabase Use Cases

Central Hub

Multiple Levels / Replica Tree

Mobile Users

Production / Publication
Geodatabase Replication - Concepts

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

Check out / Check in

One-way

Two-way

Parent geodatabase

Child geodatabase

Edits

Once only

Multiple times

Edits

Edits

OR

Multiple times
Geodatabase Replication Demo

Shawn Thorne
Geodatabase Replication - Summary

- Distribute data across Geodatabases

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

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Thank you…

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