Understanding our world.
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?
  - 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>
<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>
</tr>
</tbody>
</table>
Geodatabase Data Management Approach

DBMS

Short transactions
Integrity
Reliability
Flexibility
Scalability

Extend functionality and data integrity

Simple classes + logic
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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>ArcGIS and Desktop Engine*</td>
<td>ArcGIS Server Workgroup</td>
<td>ArcGIS Server Enterprise</td>
</tr>
<tr>
<td>Administration</td>
<td>ArcGIS Desktop</td>
<td>ArcGIS Desktop</td>
<td>ArcGIS Desktop, Geoprocessing tools</td>
</tr>
</tbody>
</table>
## Which Multi-user Geodatabase edition?

<table>
<thead>
<tr>
<th>ArcGIS Product</th>
<th>ArcSDE for ArcGIS Desktop</th>
<th>ArcSDE for ArcGIS Server Workgroup</th>
<th>ArcSDE for ArcGIS Server Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArcGIS Desktop and Engine</td>
<td>ArcGIS Desktop and Engine</td>
<td>ArcGIS Server Workgroup</td>
<td>ArcGIS Server Enterprise</td>
</tr>
<tr>
<td>Number of users</td>
<td>Max 3 users, 1 editor at any one time</td>
<td>Max 10 clients at one time No limit to the number of connections</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Administration</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop, Geoprocessing tools</td>
</tr>
<tr>
<td>ArcGIS Product</td>
<td>ArcSDE for ArcGIS Desktop</td>
<td>ArcSDE for ArcGIS Server Workgroup</td>
<td>ArcSDE for ArcGIS Server Enterprise</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------</td>
<td>-----------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Number of users</td>
<td>Max 3 users, 1 editor at any one time</td>
<td>Max 10 clients at one time</td>
<td>Unlimited</td>
</tr>
<tr>
<td></td>
<td>No limit to the number of connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported DBMS</td>
<td>SQL Server Express</td>
<td>SQL Server Express</td>
<td>Oracle, SQL Server, DB2, Informix, PostGreSQL</td>
</tr>
<tr>
<td>Administration</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop, Geoprocessing tools</td>
</tr>
</tbody>
</table>
## Which Multi-user Geodatabase edition?

<table>
<thead>
<tr>
<th>ArcGIS Product</th>
<th>ArcSDE for ArcGIS Desktop</th>
<th>ArcSDE for ArcGIS Server Workgroup</th>
<th>ArcSDE for ArcGIS Server Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of users</td>
<td>Max 3 users, 1 editor at any one time</td>
<td>Max 10 clients at one time No limit to the number of connections</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Supported DBMS</td>
<td>SQL Server Express</td>
<td>SQL Server Express</td>
<td>Oracle, SQL Server, DB2, Informix, PostgreSQL</td>
</tr>
<tr>
<td>Resource limits</td>
<td>Max database size 4 Gig 1 GB RAM on a single cpu</td>
<td>Max database size 4 Gig 1 GB RAM on a single cpu</td>
<td>No limits</td>
</tr>
<tr>
<td>Administration</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop (ArcCatalog)</td>
<td>ArcGIS Desktop, Geoprocessing tools</td>
</tr>
</tbody>
</table>
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 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
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
Versioned Editing – Reconcile and Post

- 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
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?
• 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
Geodatabase Archiving: How it works

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

Base Table

Delta Tables

Archive Table

Adds

Deletes
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

Multiple levels

Mobile Users

Production / Publication

Other Clients

ArcGIS Server
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

OR

Check out /
Check in
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!

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

Offering ID: ###

Questions??
Understanding our world.
Put presentation name on the footer:
Go to **Insert** tab > **Header & Footer** > **Apply to All**

*Type Presentation Name Here*