DevSummit DC

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Geodatabase Programming with Python

Craig Gillgrass

Assumptions

- Basic knowledge of python
- Basic knowledge enterprise geodatabases and workflows

- Please turn off or silence cell phones

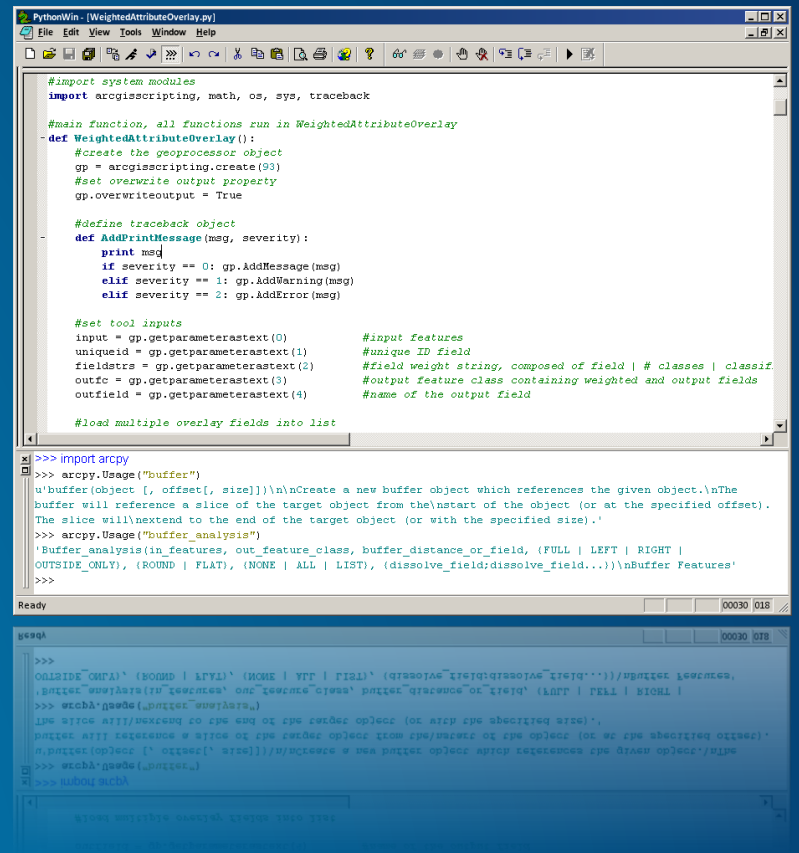
Roadmap

- **Session is divided into parts**
  1. **Intro**
  2. **Geodatabase concepts**
  3. **Geodatabase Creation and Schema Management**
  4. **Version Management**

- **Demos throughout**

Why Python

- Free
- Simple and easy to learn
- Easy to maintain
- Wide-acceptance
- Modular
- Cross platform
- Scheduling



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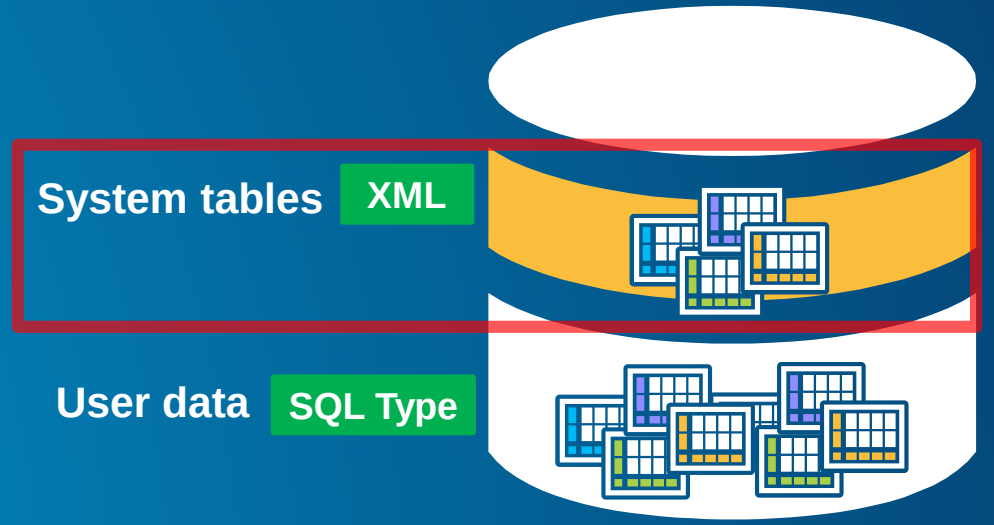
What is the Geodatabase

- A physical store of geographic data
  - Scalable storage model supported on different platforms
- Core ArcGIS information model
  - A comprehensive model for representing and managing GIS data
  - Implemented as a series of simple tables
- A transactional model for managing GIS workflows
- Set of components for accessing data

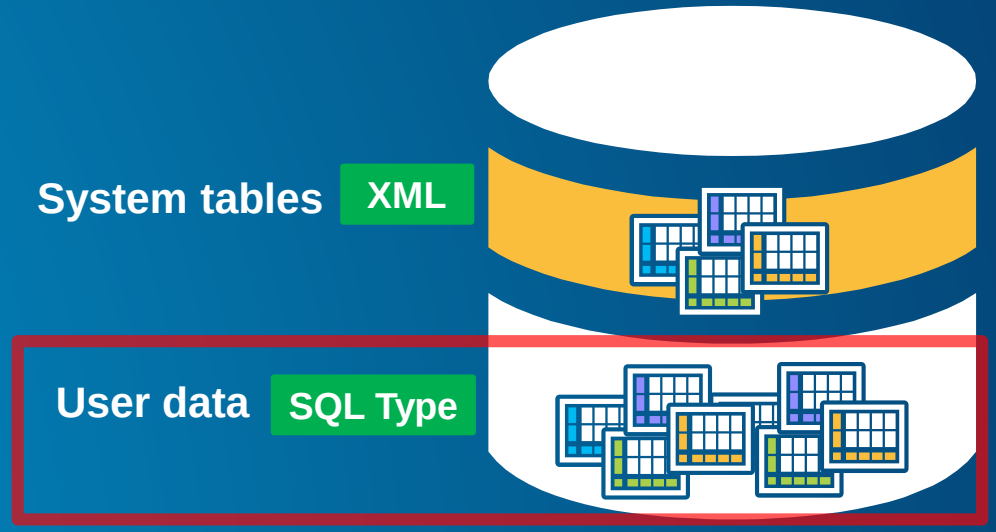
Geodatabase system tables

- System tables store definitions, rules, and behavior for datasets
- Tracks contents within a geodatabase
- Stores some database level metadata
  - Versions, domains, etc.
- Admin operations:
  - Version management
  - Connection management
  - Geodatabase upgrade



User-defined tables

- Stores the content of each dataset in the geodatabase
  - Datasets are stored in one or more tables
- Administrative Operations:
  - Granting/revoking privileges
  - Updating statistics/indexes
  - Registering as versioned
  - Adding global id’s
  - Enabling editor tracking



Types of administrators

- Database administrator
- Geodatabase administrator
- Dataset administrator (aka data owner)

- May or may not be the same person.

Types of administrators

Database

- Database administrator
- Instance level admin

Types of administrators

Geodatabase

- Geodatabase administrator
- Owns the geodatabase repository

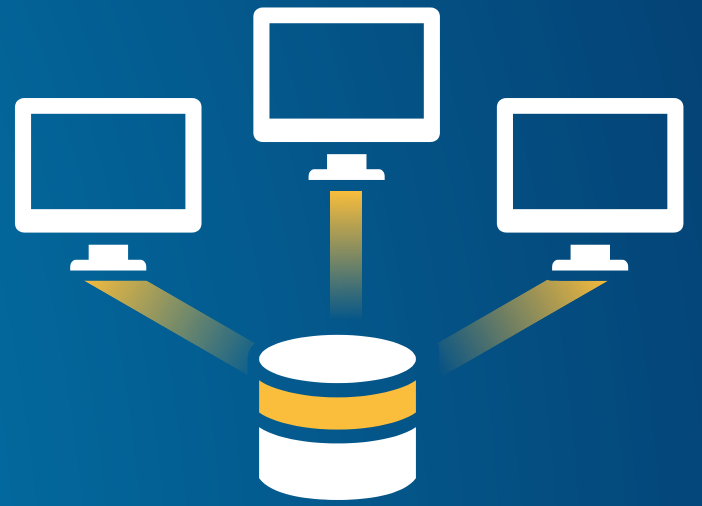
Types of administrators

Data Owner

- Dataset administrator
- Granting privileges to data
  - Modifying schema of data
  - Database statistics and index maintenance

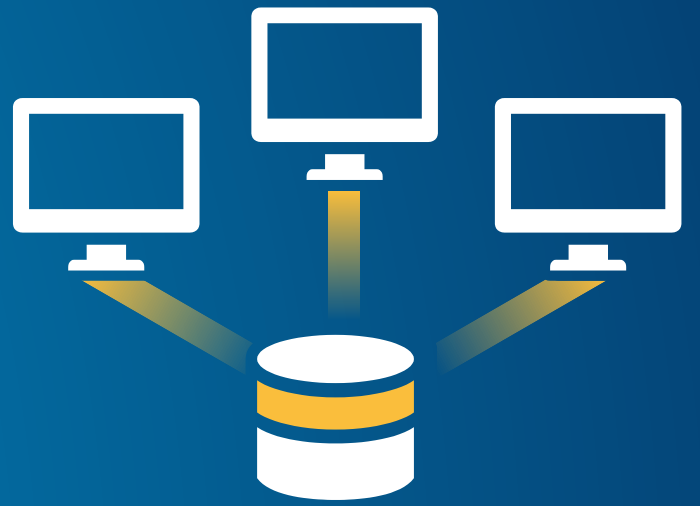
Connections

- A connection file is needed to access an enterprise geodatabase
- Control how you are connected to the database
- What user is connected
  - Creating data
  - Schema changes
  - Administering the geodatabase
- Instance/database you are connected to
- Version, historical archive or moment in time
- Changing properties requires new connection files.



Connection Tools

- Create database connection
  - Output ‘.sde’ file
  - Can connect to both databases and geodatabases
- Create ArcSDE connection file
  - Only way to create 3-tier connections
  - Will be deprecated.



Demo 1

Creating Connections

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Creating Enterprise Geodatabases

- Create Enterprise Geodatabase tool
- When you have a need for:
  - Creating testing or development environments
  - Database does not already exist
- Run as database administrator

Enabling geodatabase behavior

- You already have an existing database
- Enable Enterprise Geodatabase
  - From an existing database you can enable geodatabase functionality
  - Lays down geodatabase repository
    - GDB tables and stored procedures
- Must connect as appropriate user.

Creating Users

- Create database user tool
- Creates a user in enterprise geodatabase or database
- DBA not geodatabase admin.

Creating Database Roles

- Makes it easier to assign/revoke privileges to a group
- Prior to creating users in the geodatabase
- When creating users you can assign them to a role
- DBA not geodatabase admin.

Demo 2

Creating users and roles

Creating and Loading Data

- Numerous tools for creating any type of data:
  - Create table, Create feature class, Create Raster Dataset, etc.
  - Create Geometric Network, Create Topology, Create Domain, etc.

- Also tools for loading data:
  - Feature class to feature class (single)
  - Feature class to geodatabase (multiple)
  - Import XML workspace

- Write a custom script

Managing privileges

- Allow other users of the geodatabase to view or edit data that you own
- Change privileges tool
- Allows multiple inputs to be passed in
- Grant view only or view and edit
  - View = select
  - Edit = insert, update, delete
- Must be connected as data owner

Demo 3

Putting it all together

Geodatabase Creation

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Parts of the version administration workflow

- Reconciling/posting/compressing
- Updating statistics and indexes on system tables
- Updating statistics and indexes on user data tables
- Managing user connections

Disconnecting user connections

- A user who is connected but has gone home
- Create a cold backup of the database
- Running large queries that are using up resources
- Reconcile/post/compress process (optional)

Managing user connections

- Block/allow connections
  - `arcpy.AcceptConnections`
  - Provide boolean
- Finding connected users
  - `arcpy.ListUsers`
  - Returns a tuple of properties for each connected user
  - ID, name, machine name, connection time, connection type
- Disconnecting users
  - `arcpy.DisconnectUser`
  - Use ids provided from listusers function or use ‘ALL’ keyword

Demo 4

Connection Management

Reconciling and Posting Versions

- Reconcile = pulling changes from a parent to child version
- Post = pushing reconciled changes to parent version from child
- Reconcile versions tool
- Recommended to run as geodatabase administrator
  - Can ‘see’ and reconcile all versions in the geodatabase

Indexes and Statistics

- Update after major ‘data change’ events
  - Reconcile
  - Compress
  - Appending data
  - Typically not necessary after loading new data
- Can be done by both:
  - Geodatabase Admin (system tables)
  - Data owner (data tables)
- We suggest to run regularly.

Demo 5

Version Maintenance

Summary

- Geodatabase is open to Python developers
- Geodatabase and schema administration with Python
- Provides ability to automate processes