Enterprise Geodatabase: Automating Administration Tasks Using Python

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SEE
WHAT
OTHERS
CAN'T

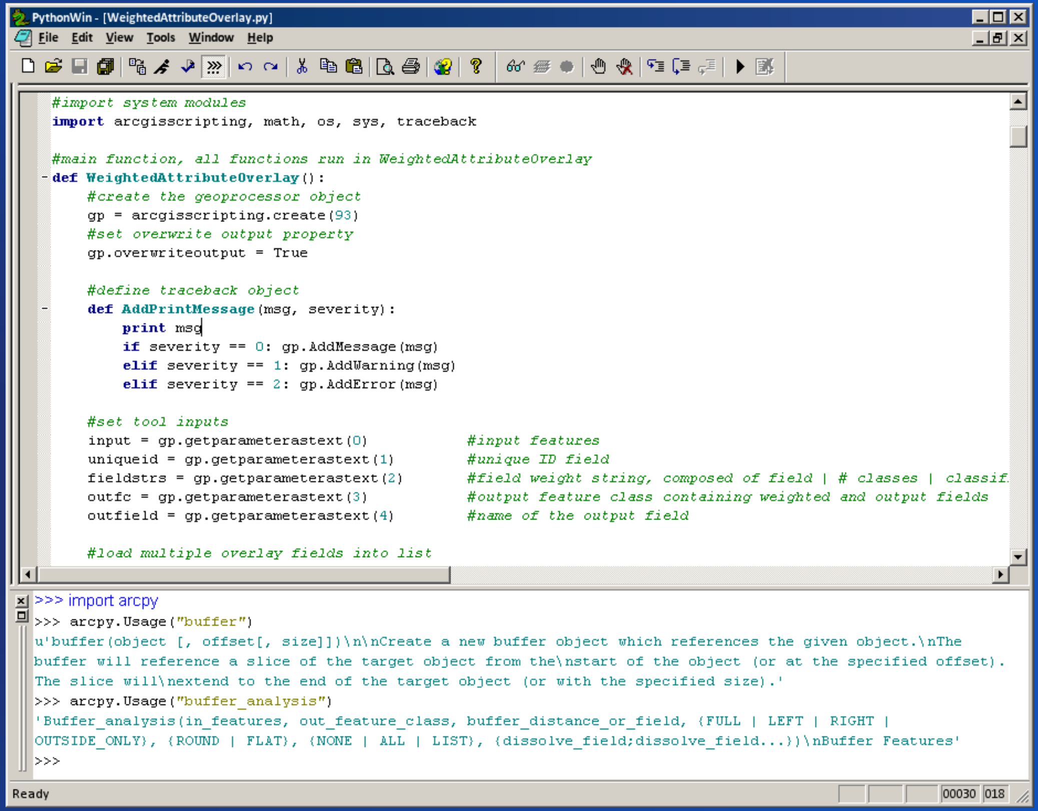
Roadmap

Session is divided into three parts

- Part 1: Types of Administrators
- Part 2: Geodatabase Creation
- Part 3: Version Management

Python

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


PythonWin - [WeightedAttributeOverlay.py]
File Edit View Tools Window Help
Ready
00030 018

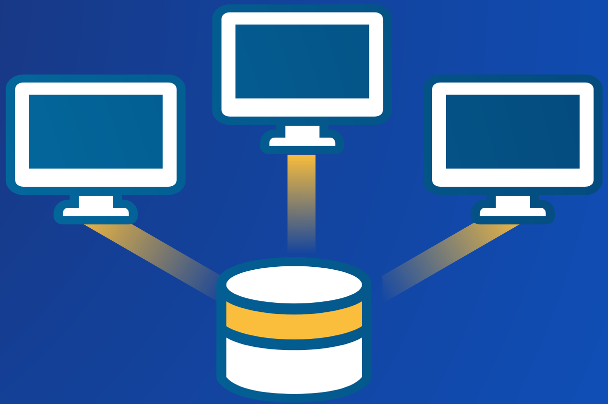
```
#import system modules
import arcgisscripting, math, os, sys, traceback

#main function, all functions run in WeightedAttributeOverlay
def WeightedAttributeOverlay():
    #create the geoprocessor object
    gp = arcgisscripting.create(93)
    #set overwrite output property
    gp.overwriteoutput = True

    #define traceback object
    def AddPrintMessage(msg, severity):
        print msg
        if severity == 0: gp.AddMessage(msg)
        elif severity == 1: gp.AddWarning(msg)
        elif severity == 2: gp.AddError(msg)

    #set tool inputs
    input = gp.getparameterastext(0)          #input features
    uniqueid = gp.getparameterastext(1)       #unique ID field
    fieldstrs = gp.getparameterastext(2)      #field weight string, composed of field | # classes | classif
    outfc = gp.getparameterastext(3)          #output feature class containing weighted and output fields
    outfield = gp.getparameterastext(4)       #name of the output field

    #load multiple overlay fields into list
```

```
>>> import arcpy
>>> arcpy.Usage("buffer")
u'buffer(object [, offset[, size]])\n\nCreate a new buffer object which references the given object.\nThe
buffer will reference a slice of the target object from the\nstart of the object (or at the specified offset).
The slice will\nextend to the end of the target object (or with the specified size).'
>>> arcpy.Usage("buffer_analysis")
'Buffer_analysis(in_features, out_feature_class, buffer_distance_or_field, {FULL | LEFT | RIGHT |
OUTSIDE_ONLY}, {ROUND | FLAT}, {NONE | ALL | LIST}, {dissolve_field;dissolve_field...})\nBuffer Features'
>>>
```

Data Sources

- File Geodatabases
  - System files in a file folder

- Enterprise Geodatabases
  - Oracle, SQL Server, PostgreSQL,
  - DB2, SAP HANA

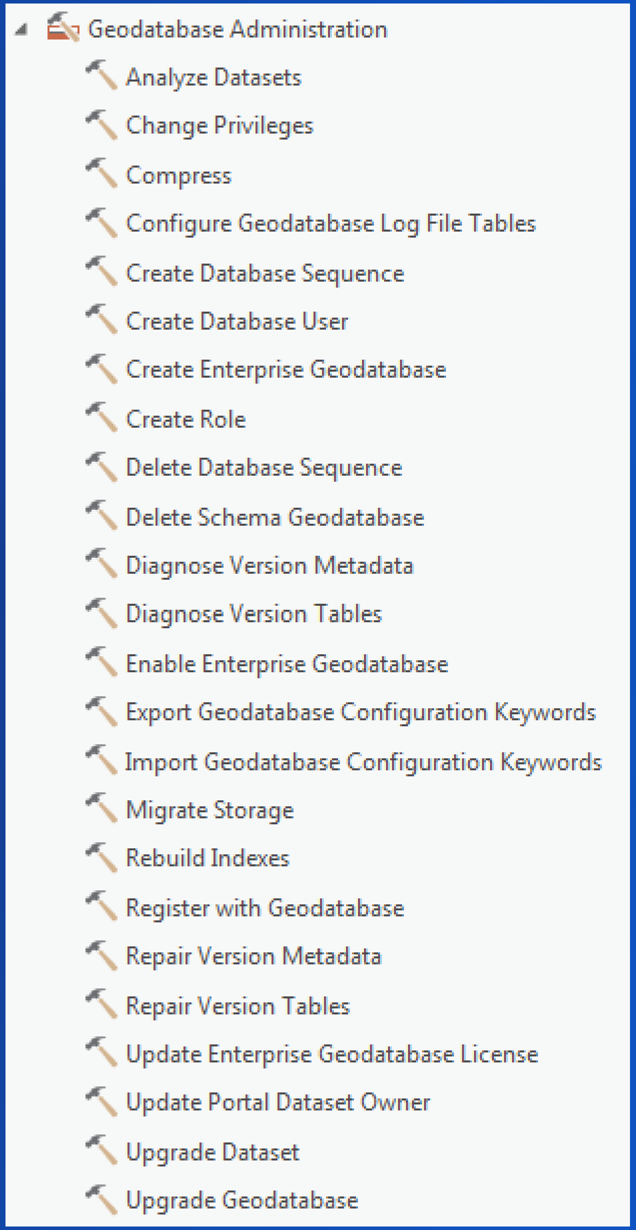


- Enterprise Databases
  - Altibase, Demang, Netezza, Teradata
- Other systems
  - Hadoop

Administration in Desktop and Server

- ArcGIS Desktop
  - GUI Tools
  - GP Tools

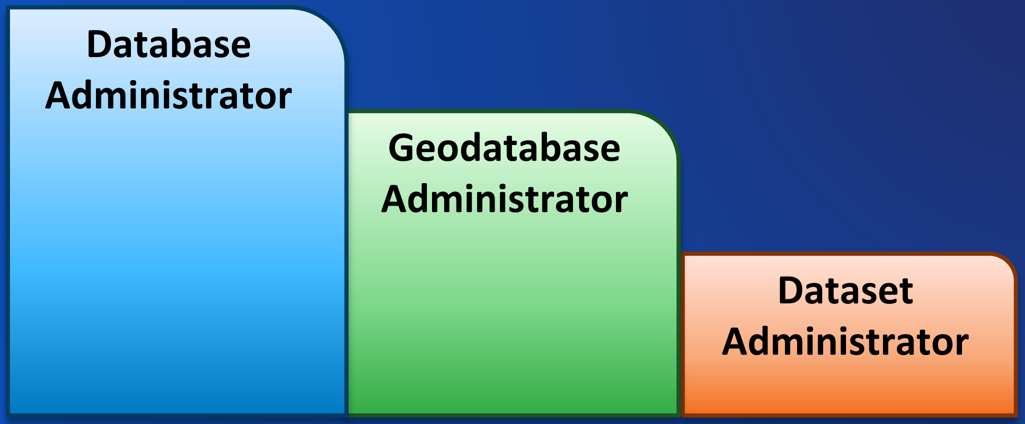
- ArcGIS for Server
  - GP Tools / Python



- Geodatabase Administration
  - Analyze Datasets
  - Change Privileges
  - Compress
  - Configure Geodatabase Log File Tables
  - Create Database Sequence
  - Create Database User
  - Create Enterprise Geodatabase
  - Create Role
  - Delete Database Sequence
  - Delete Schema Geodatabase
  - Diagnose Version Metadata
  - Diagnose Version Tables
  - Enable Enterprise Geodatabase
  - Export Geodatabase Configuration Keywords
  - Import Geodatabase Configuration Keywords
  - Migrate Storage
  - Rebuild Indexes
  - Register with Geodatabase
  - Repair Version Metadata
  - Repair Version Tables
  - Update Enterprise Geodatabase License
  - Update Portal Dataset Owner
  - Upgrade Dataset
  - Upgrade Geodatabase

Types of administrators

1. **Database administrator** (DBA)
2. **Geodatabase administrator** (sde)
3. **Dataset administrator** (a.k.a data owner)



Database Administrator

Geodatabase Administrator

Dataset Administrator

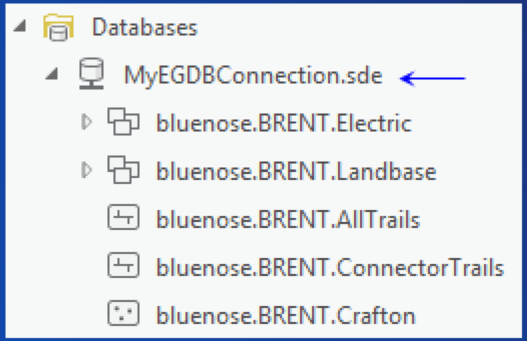
Types of administrators

Database Administrator (DBA)	Geodatabase Administrator (sde user)	Dataset Administrator (data owner)
• Instance level admin • User management • Database backup • Performance monitoring	• Creates the geodatabase repository • View and reconcile any version • Performs Compress • Configuration keyword maintenance	• Grant privileges on data that they own • Modifying schema • Database statistics and index maintenance • Enabling geodatabase behavior on data tables

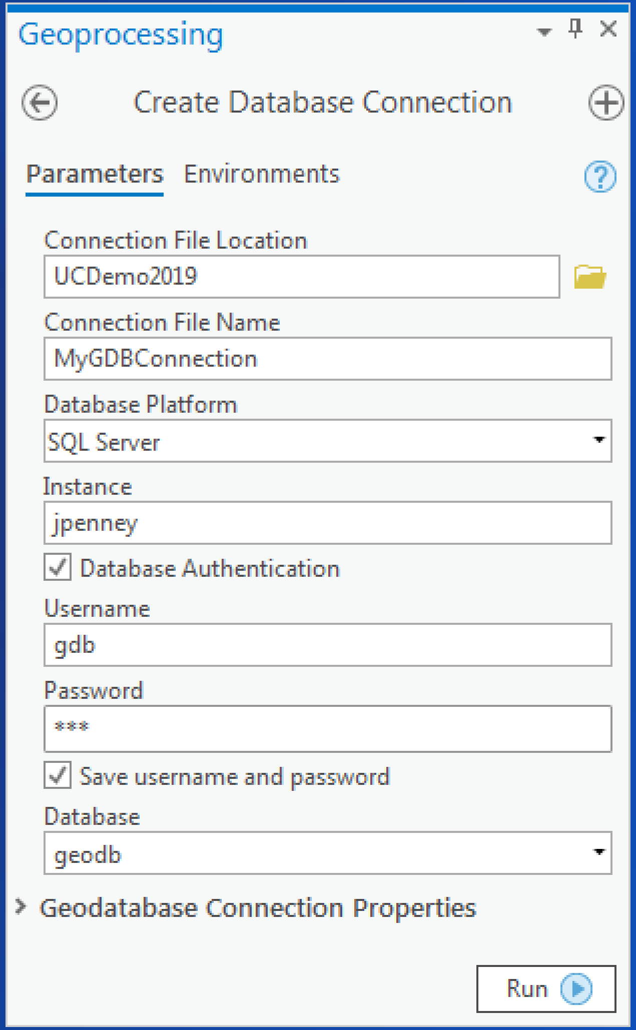
Connecting to an enterprise geodatabase

Connect to the geodatabase

- Create Database Connection GP tool
- Connection files are used by all admins and users
- Can use database or OS authentication
- Connection to a specific version



Databases
- MyEGDBConnection.sde ←
  - bluenose.BRENT.Electric
  - bluenose.BRENT.Landbase
  - bluenose.BRENT.AllTrails
  - bluenose.BRENT.ConnectorTrails
  - bluenose.BRENT.Crafton



Geoprocessing

Create Database Connection

Parameters | Environments

Connection File Location: UCDemo2019

Connection File Name: MyGDBConnection

Database Platform: SQL Server

Instance: jpenney

☑ Database Authentication

Username: gdb

Password: ***

☑ Save username and password

Database: geodb

› Geodatabase Connection Properties

Run

Geodatabase Creation

Performed by Database Administrator (DBA)

Geodatabase Creation

- Create Enterprise Geodatabase GP tool
  - SQL Server, PostgreSQL, Oracle, etc.
  - License File required

Create Roles in the Geodatabase

- Create Role GP tool
  - Easy to assign/revoke privileges to a group of users

Create Users in the Geodatabase

- Create Database User GP tool
  - Assign to a role when creating a new user
  - Can be database or OS authentication

Geodatabase Creation

Performed by Dataset Administrator (data owner)

Create or Load Data into the Geodatabase

- Create Table, Create Feature Class, etc.
- Import XML Workspace, Copy, Feature Class to Geodatabase, etc.

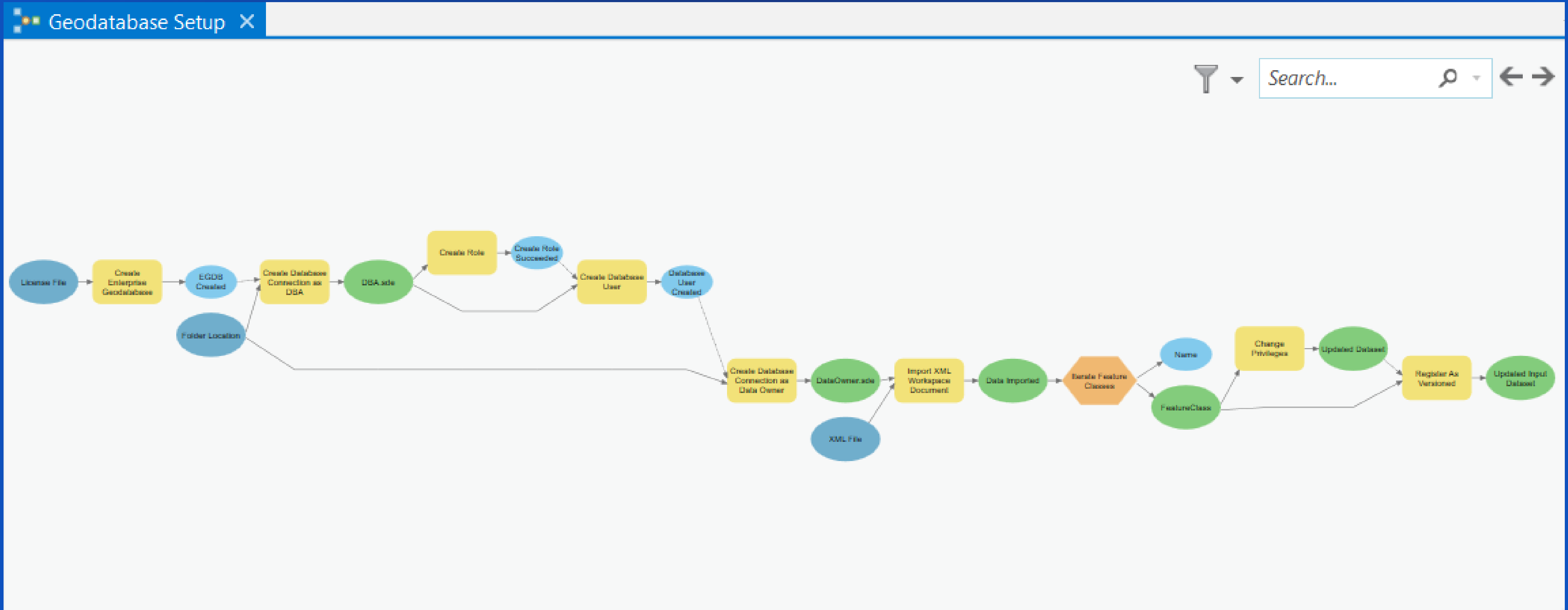
Manage Privileges

- Change Privileges GP tool
  - Grant or revoke view or edit permissions

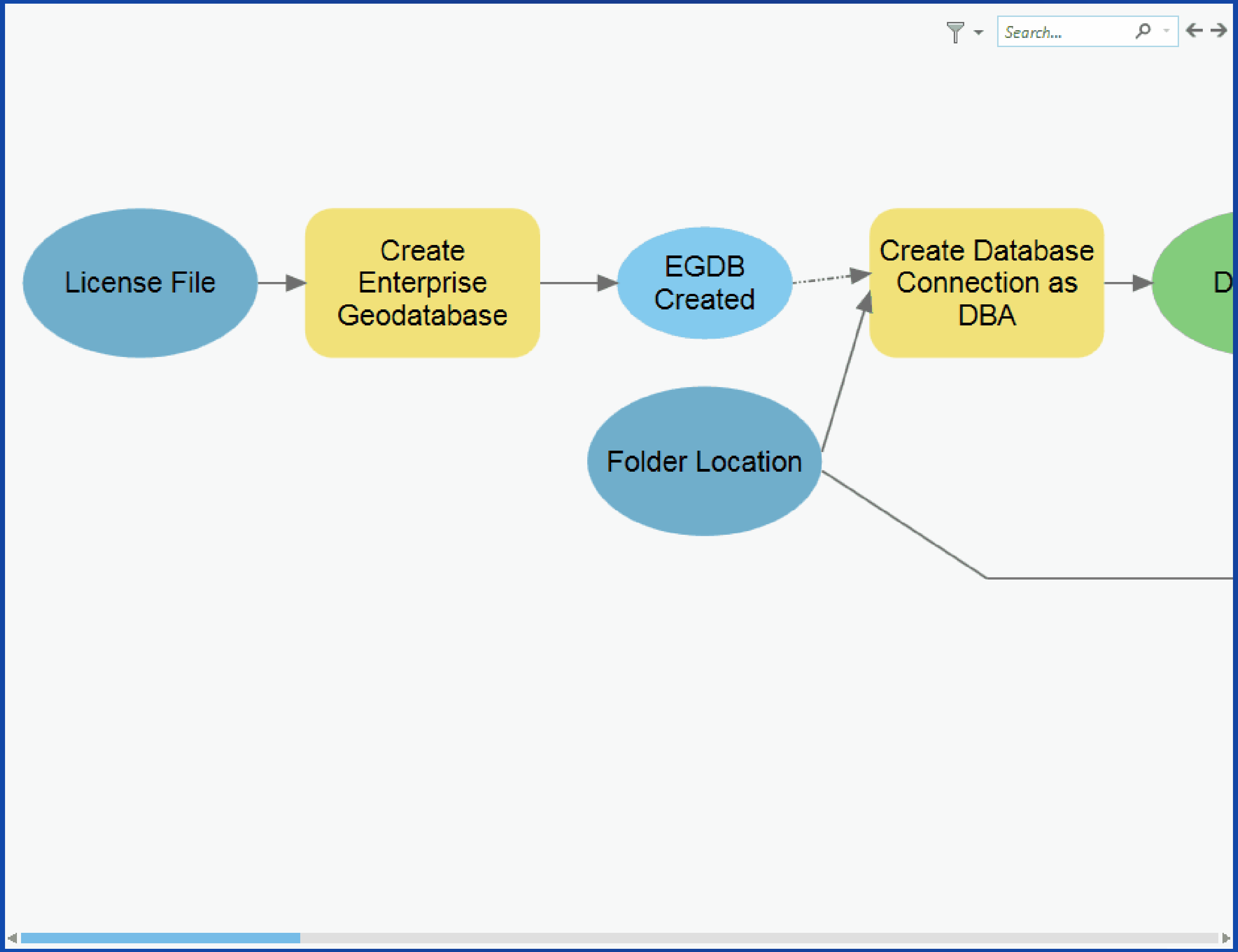
Register As Versioned

- Register As Versioned GP tool
  - If using versioned editing workflows

Geodatabase Creation using ModelBuilder

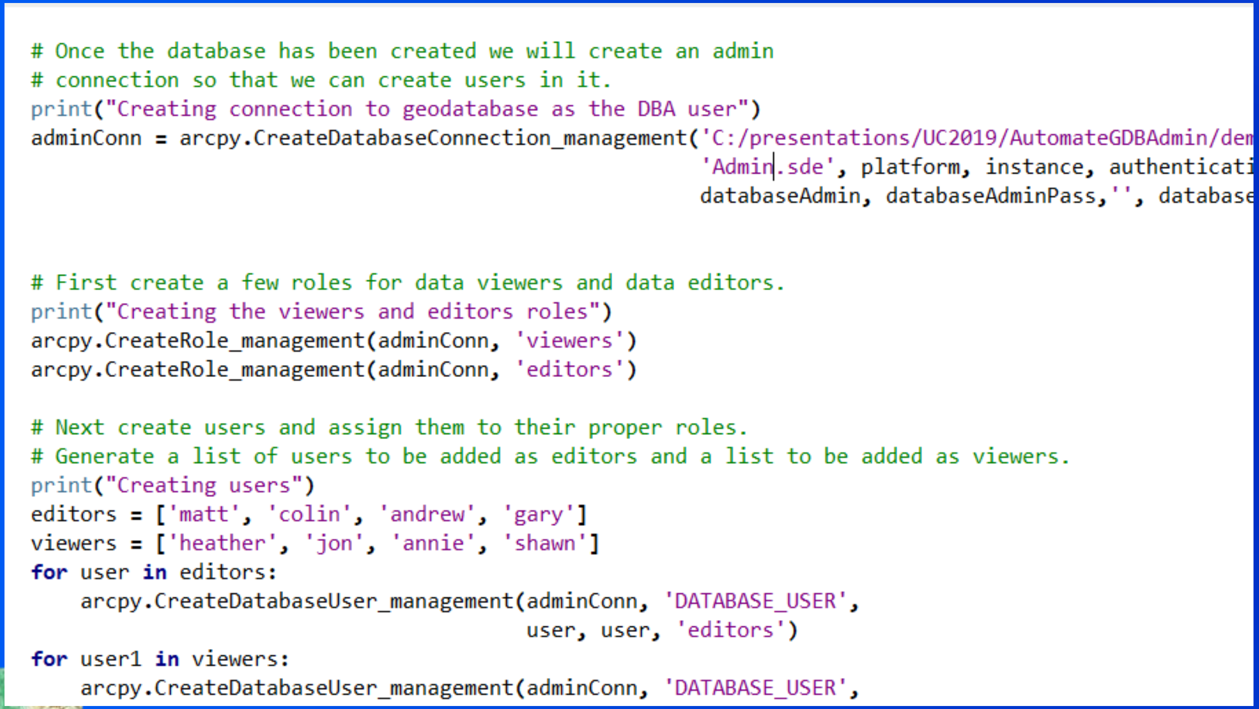


Geodatabase Creation using ModelBuilder


Search...
License File
Create Enterprise Geodatabase
EGDB Created
Create Database Connection as DBA
D
Folder Location

Geodatabase Creation

Creating users and roles,
loading data,
setting permissions



```
# Once the database has been created we will create an admin
# connection so that we can create users in it.
print("Creating connection to geodatabase as the DBA user")
adminConn = arcpy.CreateDatabaseConnection_management('C:/presentations/UC2019/AutomateGDBAdmin/dem
                                                      'Admin.sde', platform, instance, authenticati
                                                      databaseAdmin, databaseAdminPass,'', database


# First create a few roles for data viewers and data editors.
print("Creating the viewers and editors roles")
arcpy.CreateRole_management(adminConn, 'viewers')
arcpy.CreateRole_management(adminConn, 'editors')

# Next create users and assign them to their proper roles.
# Generate a list of users to be added as editors and a list to be added as viewers.
print("Creating users")
editors = ['matt', 'colin', 'andrew', 'gary']
viewers = ['heather', 'jon', 'annie', 'shawn']
for user in editors:
    arcpy.CreateDatabaseUser_management(adminConn, 'DATABASE_USER',
                                        user, user, 'editors')
for user1 in viewers:
    arcpy.CreateDatabaseUser_management(adminConn, 'DATABASE_USER',
```

Version Management

Connection management and versioning workflows

Managing connections with arcpy functions

Performed by the Geodatabase Administrator (sde user)

Block or allow new connections

- `arcpy.AcceptConnections()`

View connected users and their connection properties

- `arcpy.ListUsers()`

Disconnect users (use caution)

- `arcpy.DisconnectUser()`

Version administration tasks

Performed by several administrators as well as users with editing privileges

Data is registered as versioned

- Register as Versioned GP tool
  - Data Owner

Version created for editors

- Create Version GP tool
  - Database users with permissions on data

Editors connect to a specific version to make edits

- Use GP tools or manual edits in the map
  - Database users with edit permissions on data

Version administration tasks

Performed by Geodatabase Administrator and Data Owner

Reconcile and post

- Reconcile = pull changes from parent to child version
- Post = push reconciled changes from child to parent version
- Reconcile Versions GP tool
  - Automate the process
  - Must define how to deal with conflicts
  - Recommended to run as Geodatabase Administrator

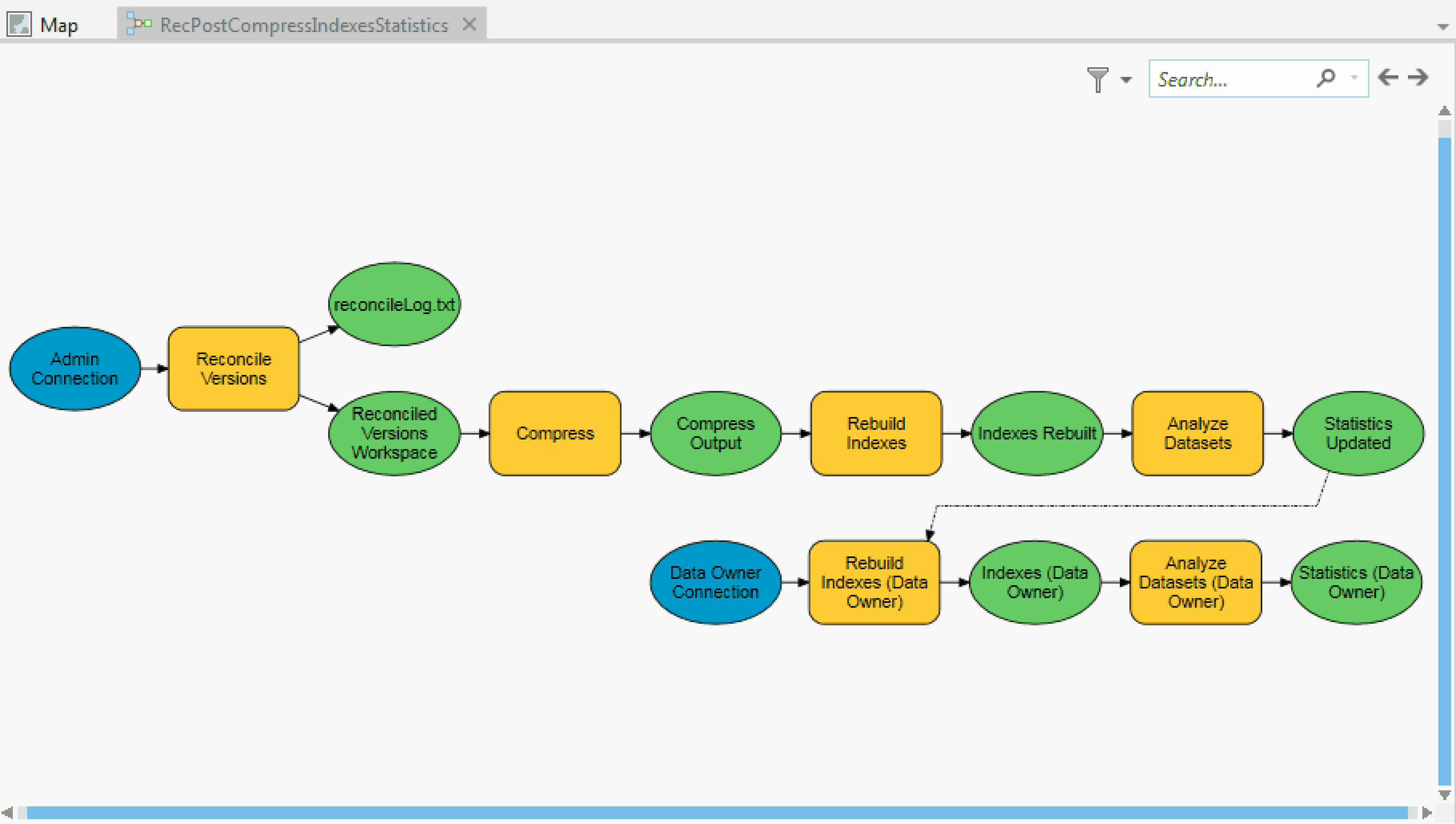
Compress

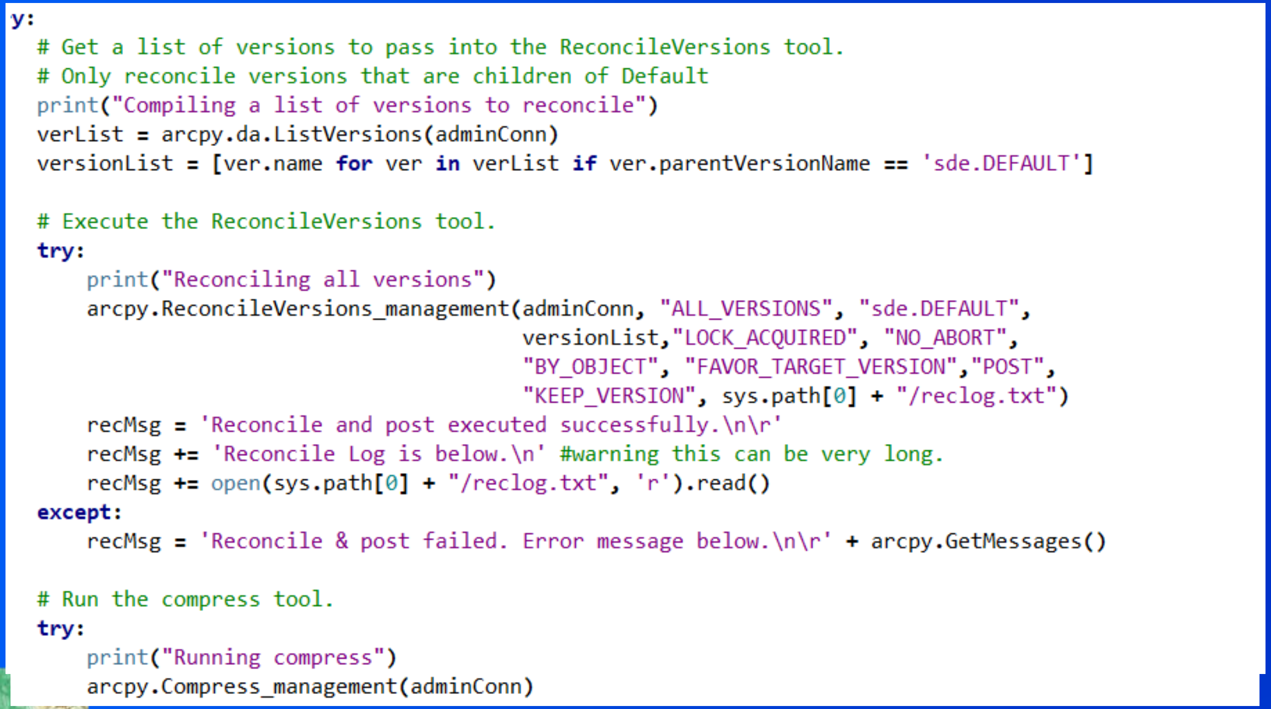
- Compress GP tool
  - Geodatabase Administrator

Update statistics and rebuild indexes (if needed)

- Analyze Datasets GP tool
- Rebuild Indexes GP tool
- Executed by both the Geodatabase Admin and Data Owner

Geodatabase Maintenance using ModelBuilder





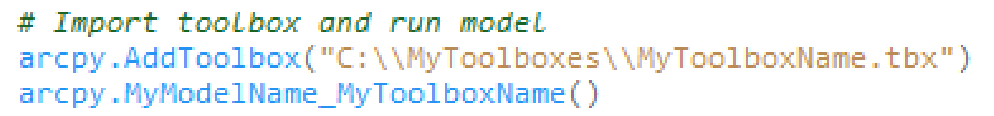
```
y:
  # Get a list of versions to pass into the ReconcileVersions tool.
  # Only reconcile versions that are children of Default
  print("Compiling a list of versions to reconcile")
  verList = arcpy.da.ListVersions(adminConn)
  versionList = [ver.name for ver in verList if ver.parentVersionName == 'sde.DEFAULT']

  # Execute the ReconcileVersions tool.
  try:
      print("Reconciling all versions")
      arcpy.ReconcileVersions_management(adminConn, "ALL_VERSIONS", "sde.DEFAULT",
                                         versionList,"LOCK_ACQUIRED", "NO_ABORT",
                                         "BY_OBJECT", "FAVOR_TARGET_VERSION","POST",
                                         "KEEP_VERSION", sys.path[0] + "/reclog.txt")
      recMsg = 'Reconcile and post executed successfully.\n\r'
      recMsg += 'Reconcile Log is below.\n' #warning this can be very long.
      recMsg += open(sys.path[0] + "/reclog.txt", 'r').read()
  except:
      recMsg = 'Reconcile & post failed. Error message below.\n\r' + arcpy.GetMessages()

  # Run the compress tool.
  try:
      print("Running compress")
      arcpy.Compress_management(adminConn)
```

Version Management

Manage connections & version management tasks

Other considerations

- Ability to run models in Python using arcpy.AddToolbox()



```
# Import toolbox and run model
arcpy.AddToolbox("C:\\MyToolboxes\\MyToolboxName.tbx")
arcpy.MyModelName_MyToolboxName()
```

- Use a task scheduler to run scripts overnight
  - Windows Task Scheduler
  - Linux cron job

Summary

You can definitely use Python to automate your admin tasks!

- Various administration functionality available to use
  - For all types of administrators
  - Use where most comfortable
    - Geoprocessing pane
    - ModelBuilder
    - Python

- Setup your geodatabase for multi-user editing

- Connection management

- Geodatabase maintenance tasks

- Use a task scheduler to automate scripts to run

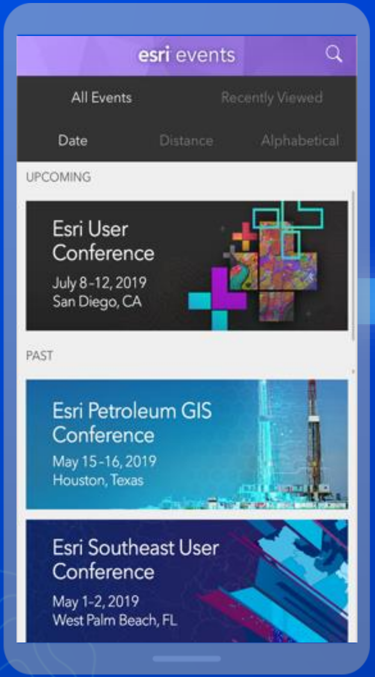
Other sessions at the User Conference

- **Geodatabase Administration**
  - Enterprise Geodatabase: Topics in Oracle Administration (Thursday 1-2pm)
  - Enterprise Geodatabase: Topics in PostgreSQL Administration (Thursday 2:30-3:30pm)
  - Enterprise Geodatabase: Performance Troubleshooting (Thursday 1-2pm)

- **Python/Geoprocessing**
  - Python: Advanced Topics (Thursday 10-11am)
  - Python: Across the Esri Platform (Thursday 8:30-9:30)
  - Python: Building Geoprocessing Tools (Thursday 4-5pm)
  - ArcGIS Pro: Analysis and Geoprocessing Overview (Thursday 4-5pm)

Please Share Your Feedback in the App

Download the Esri Events app and find your event



UPCOMING

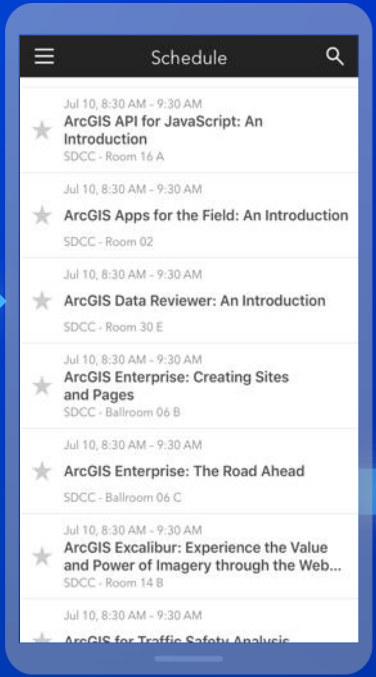
Esri User Conference
July 8-12, 2019
San Diego, CA

PAST

Esri Petroleum GIS Conference
May 15-16, 2019
Houston, Texas

Esri Southeast User Conference
May 1-2, 2019
West Palm Beach, FL

Select the session you attended



Jul 10, 8:30 AM - 9:30 AM
ArcGIS API for JavaScript: An Introduction
SDCC - Room 16 A

Jul 10, 8:30 AM - 9:30 AM
ArcGIS Apps for the Field: An Introduction
SDCC - Room 02

Jul 10, 8:30 AM - 9:30 AM
ArcGIS Data Reviewer: An Introduction
SDCC - Room 30 E

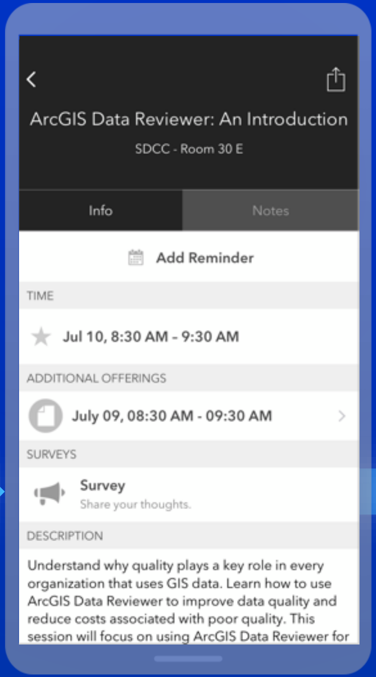
Jul 10, 8:30 AM - 9:30 AM
ArcGIS Enterprise: Creating Sites and Pages
SDCC - Ballroom 06 B

Jul 10, 8:30 AM - 9:30 AM
ArcGIS Enterprise: The Road Ahead
SDCC - Ballroom 06 C

Jul 10, 8:30 AM - 9:30 AM
ArcGIS Excalibur: Experience the Value and Power of Imagery through the Web...
SDCC - Room 14 B

Jul 10, 8:30 AM - 9:30 AM
ArcGIS for Traffic Safety Analysis

Scroll down to “Survey”



ArcGIS Data Reviewer: An Introduction
SDCC - Room 30 E

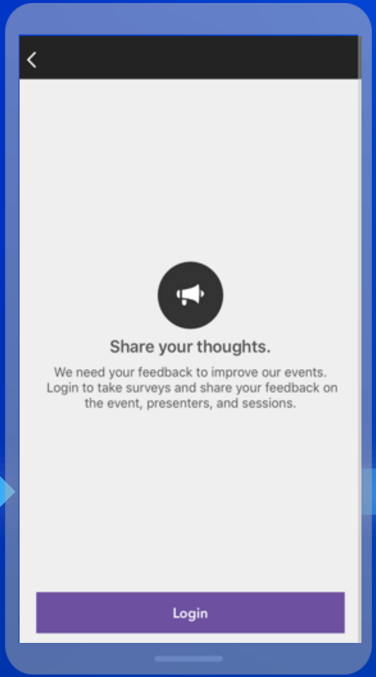
TIME
Jul 10, 8:30 AM - 9:30 AM

ADDITIONAL OFFERINGS
July 09, 08:30 AM - 09:30 AM

SURVEYS
Survey
Share your thoughts.

DESCRIPTION
Understand why quality plays a key role in every organization that uses GIS data. Learn how to use ArcGIS Data Reviewer to improve data quality and reduce costs associated with poor quality. This session will focus on using ArcGIS Data Reviewer for

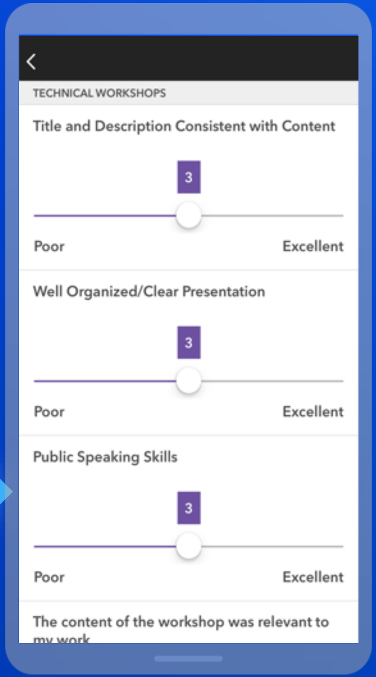
Log in to access the survey



Share your thoughts.

We need your feedback to improve our events. Login to take surveys and share your feedback on the event, presenters, and sessions.

Complete the survey and select “Submit”



TECHNICAL WORKSHOPS

Title and Description Consistent with Content
3
Poor Excellent

Well Organized/Clear Presentation
3
Poor Excellent

Public Speaking Skills
3
Poor Excellent

The content of the workshop was relevant to my work