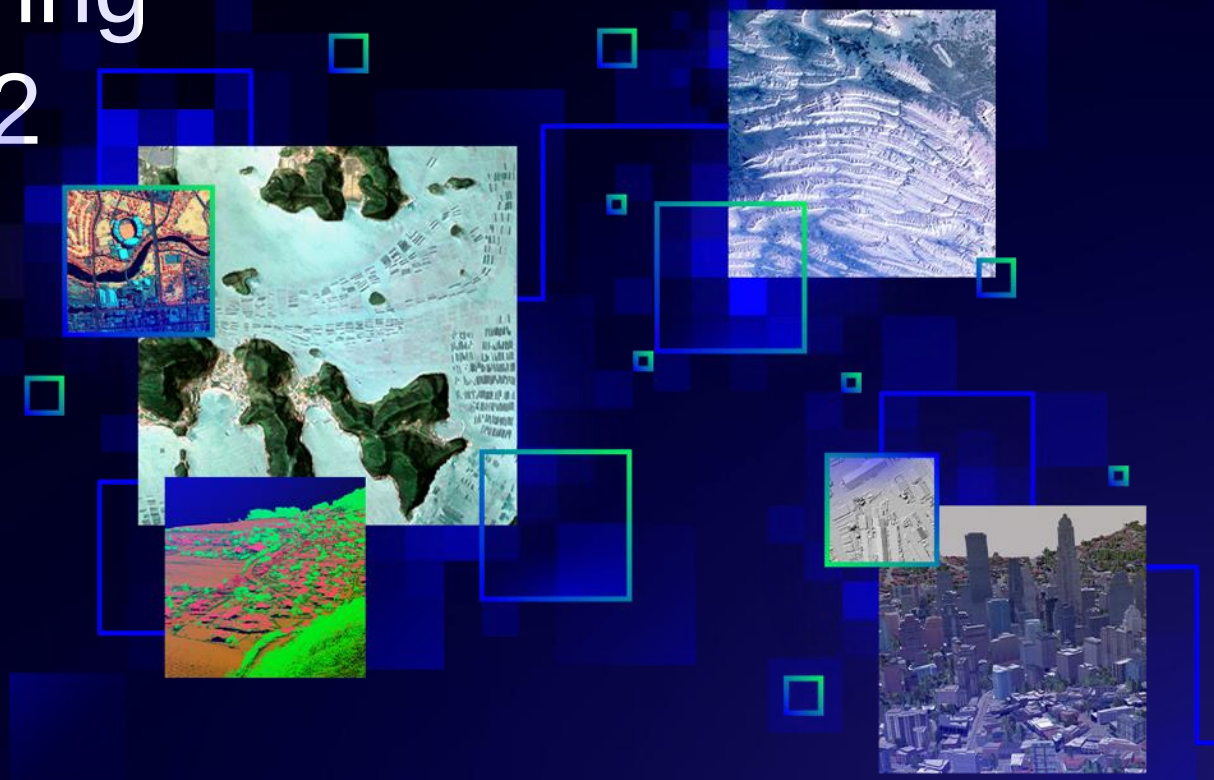
Automate Change Monitoring with ArcGIS and Sentinel-2

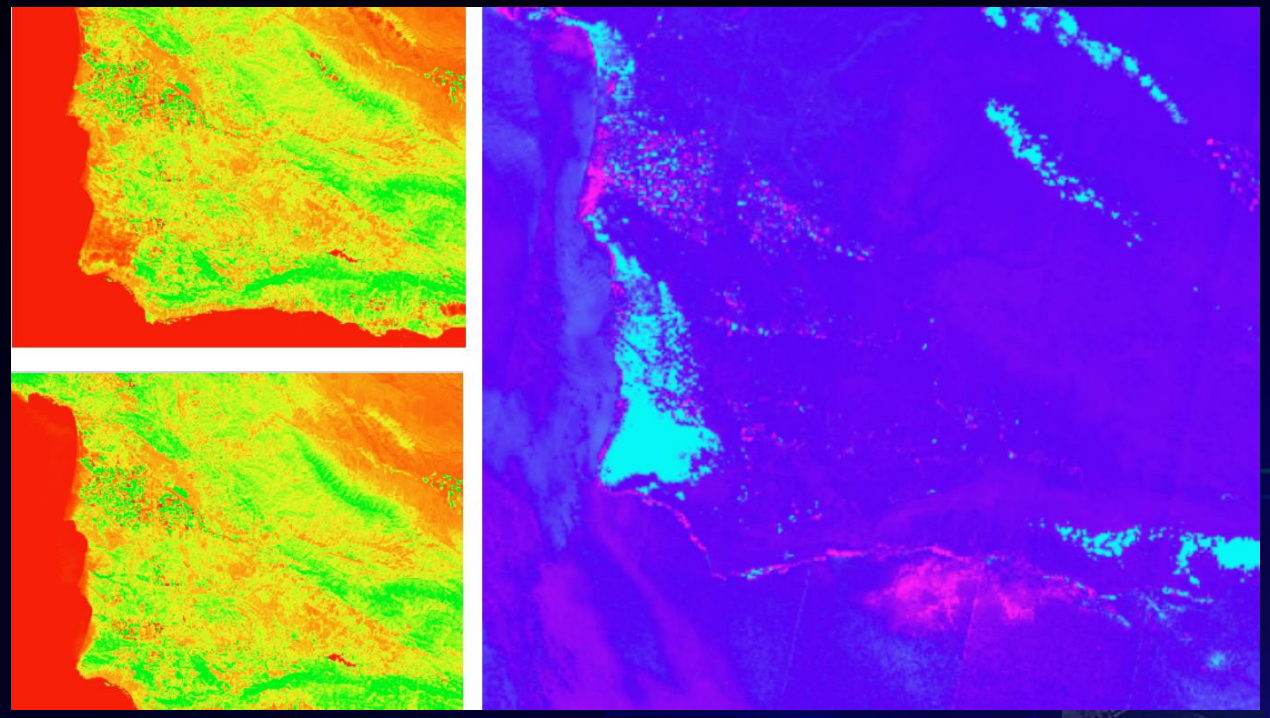
Dave Wright



Imagery Summit @ Esri UC

Overview

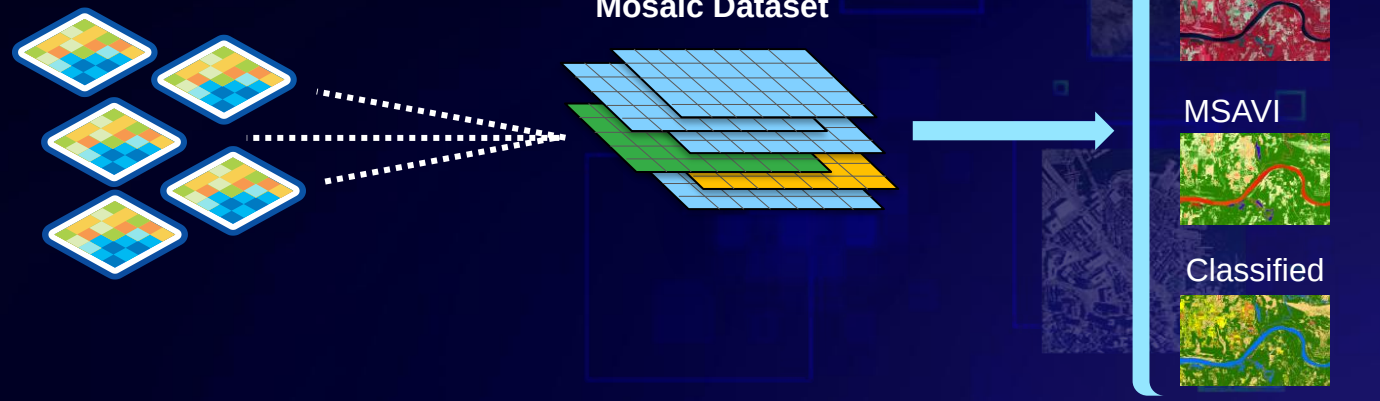
- Demand
- Technology
- Use Cases
- Workflow stages
  - 01-manage-mosaic-datasets
  - 02-manage-image-services
  - 03-analyze-change
- Results
- Invitation



Demand

Trends in customer projects and applications

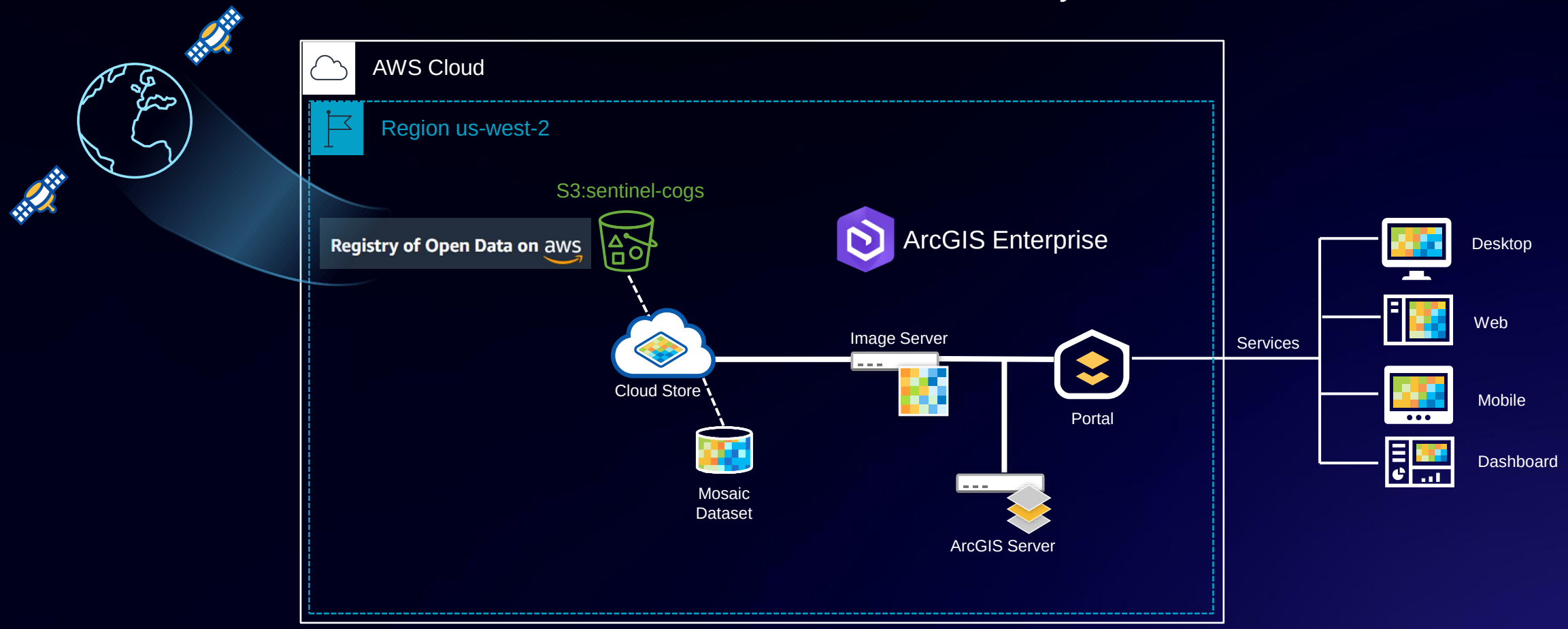
- Inform acquisition strategy
- Deep Learning
  - Creating training samples
  - Exporting image chips
- Accessing the right images
  - Spatial
  - Temporal
- Automation
  - Creating / updating Mosaic Dataset
  - Creating / updating Image Services



Technology

Connecting the stages with COTS components

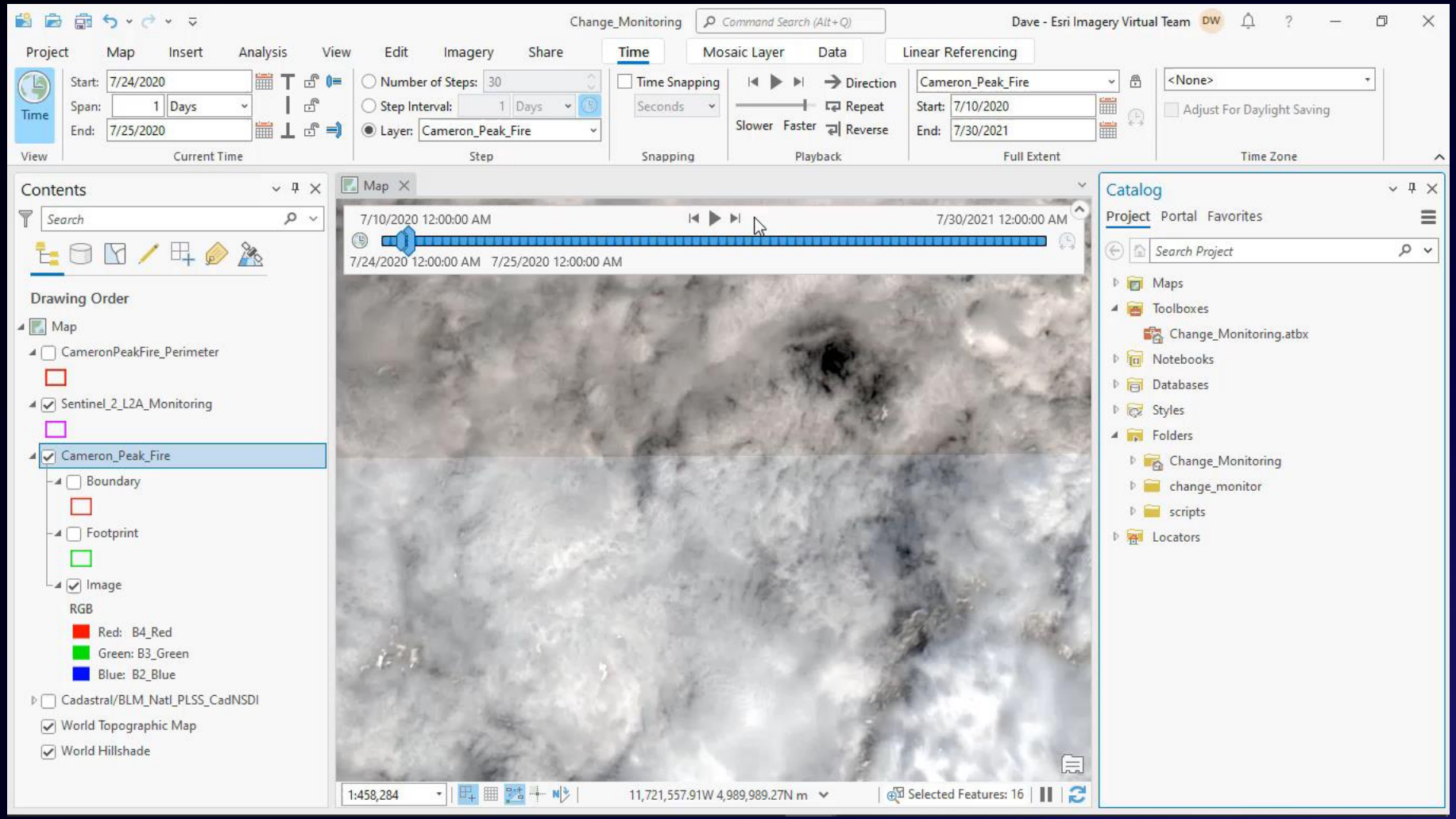
- ArcGIS Enterprise / ArcGIS Image Server
- Mosaic Dataset Configuration Script (MDCS)
  - Arcpy
  - Digital Earth Africa project
- ArcGIS API for Python



Use Case 1

Natural Disaster Assessments – In Webmaps, Webapps, ArcGIS Pro…

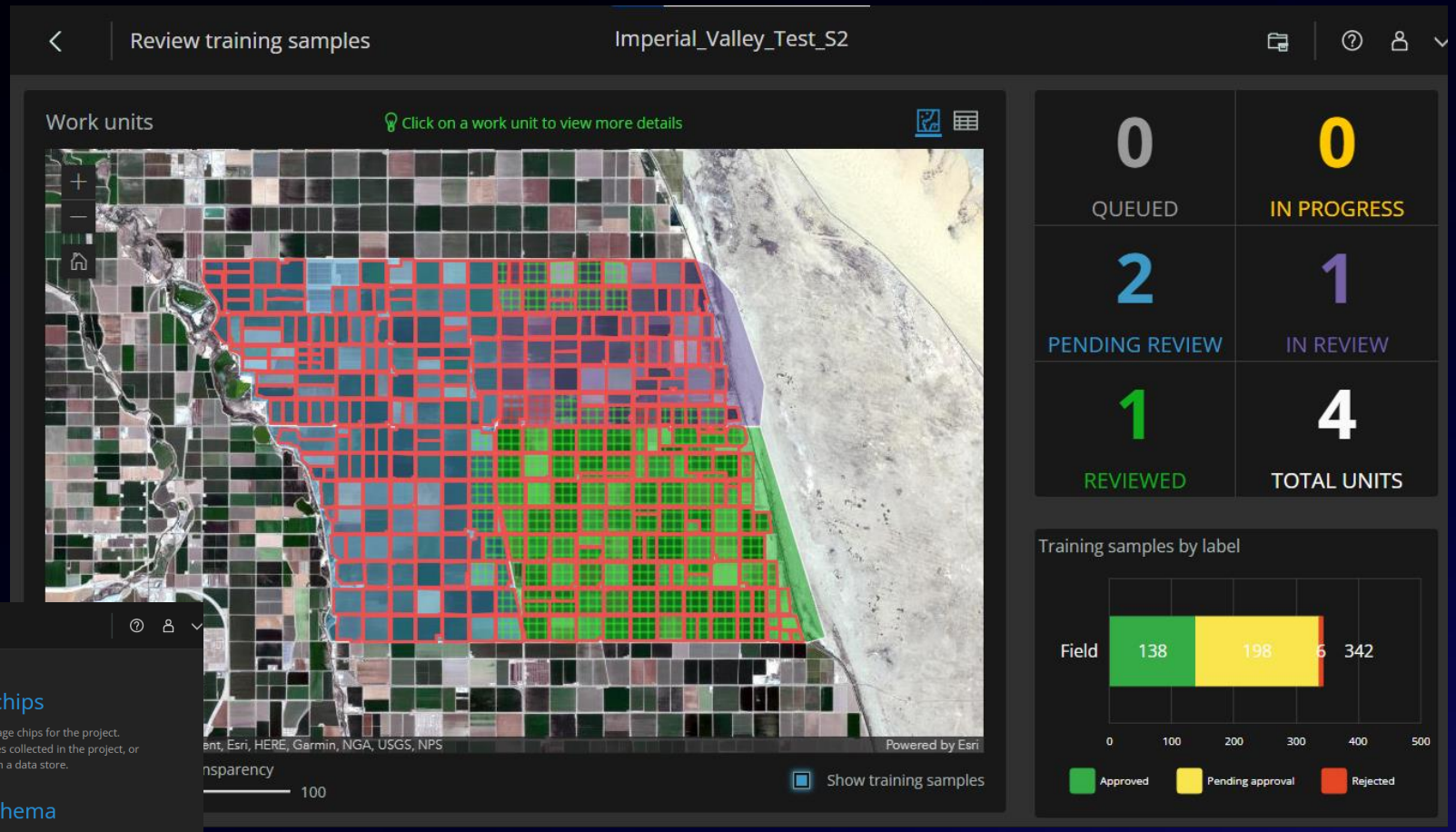
- Pre and post
  - Inspect to select best images
- Analysis to explore
  - Impacts
  - Secondary disaster risks

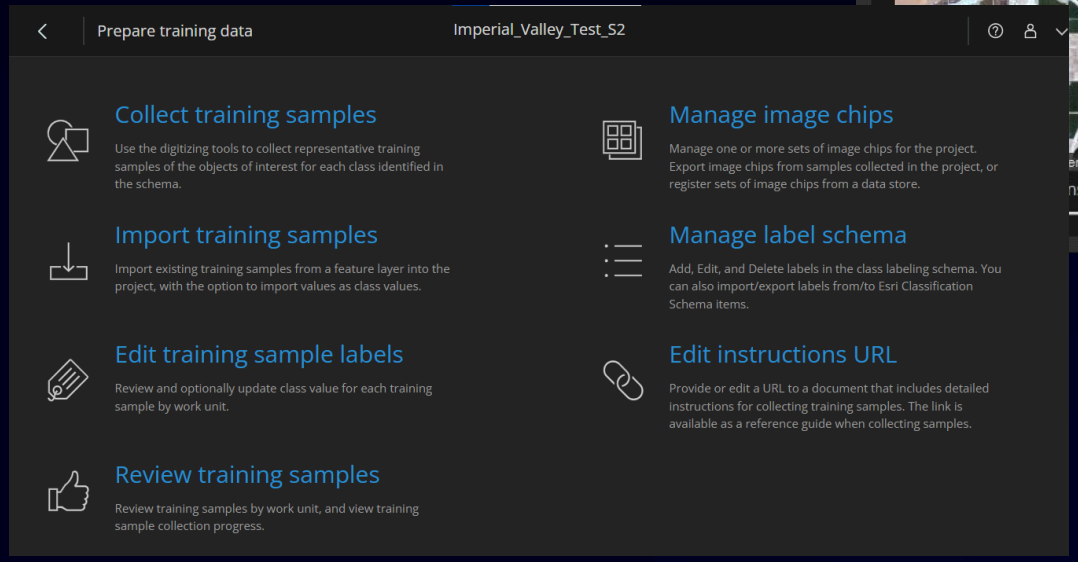


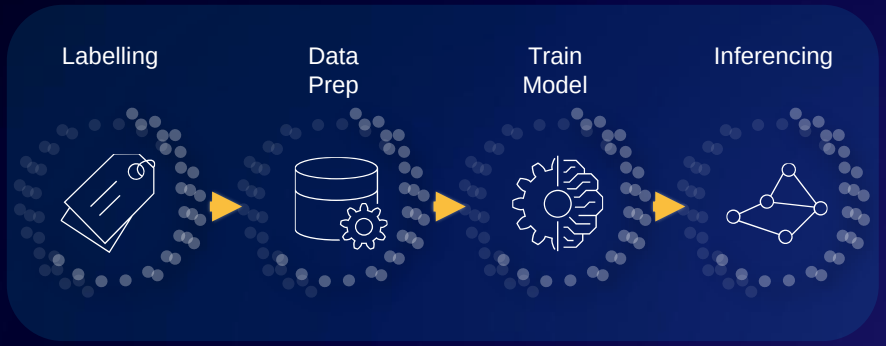
Use Case 2

Training models for deep learning

- Full control of imagery
- Team-source sample creation
- Create image chips
- Train models (and tune)







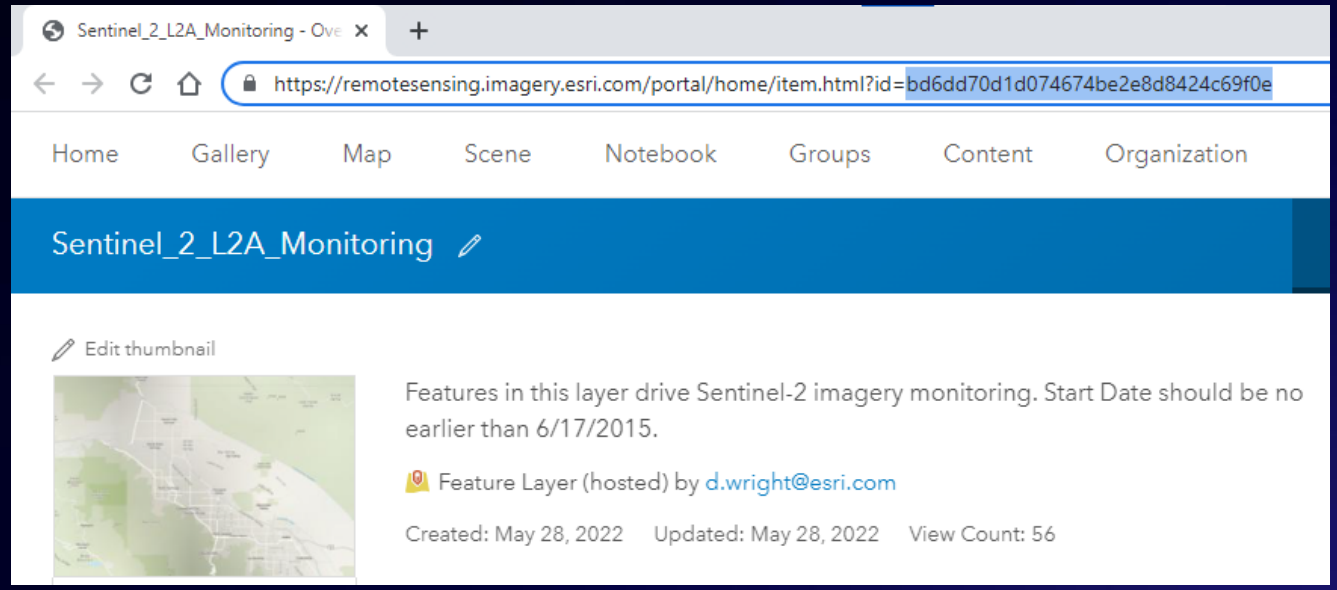
Workflow Stages

Section Subhead

Create Feature Service

ArcGIS Enterprise

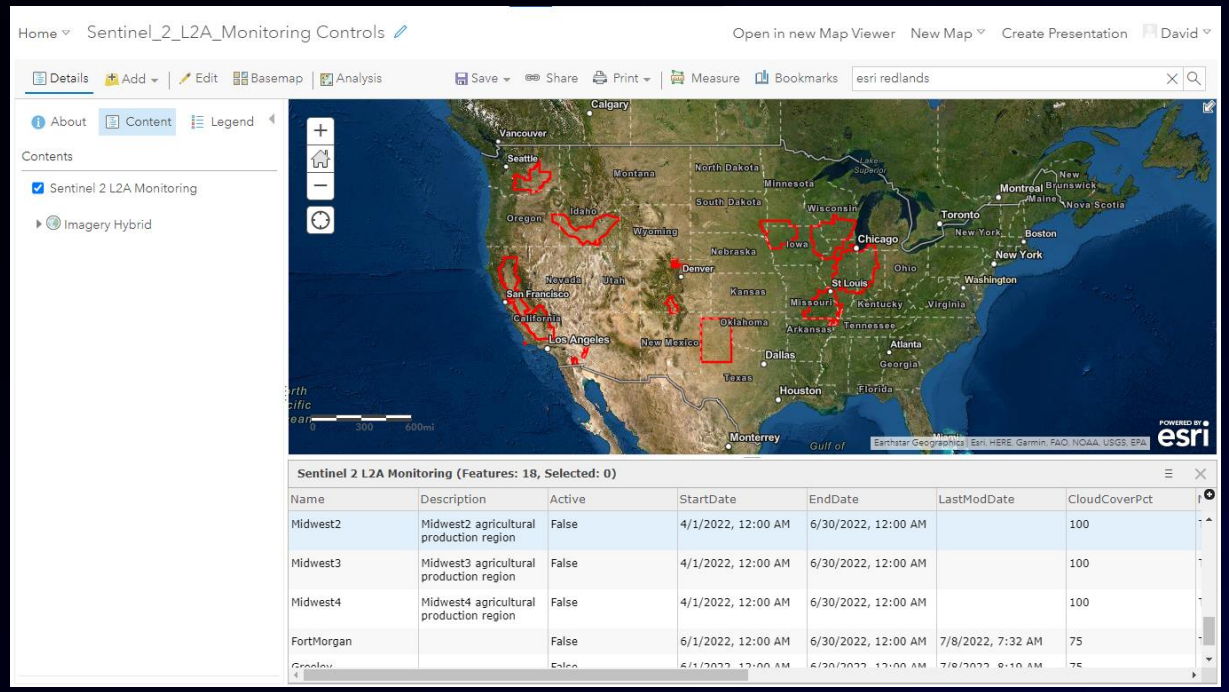
- Repo includes File GeoDataBase
  ../ChangeMonitoringControls_FC/Sentinel_2_L2A_Monitoring.gdb
- Publish as editable Feature Service to your ArcGIS Enterprise Portal
  - Share with collaborators (Editor user type)
- Record the guid
  - bd6dd70d1d074674be2e8d8424c69f0e

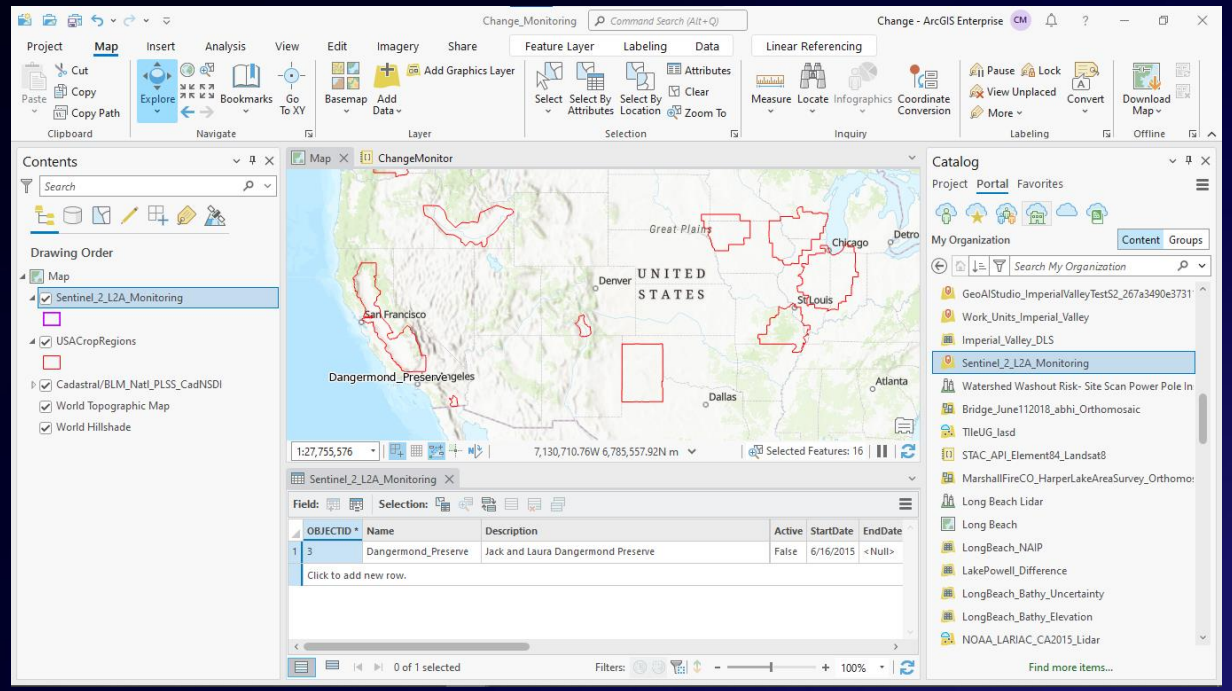


Setup monitoring areas

Worldwide - using a Map!

- Load Feature Service
  - In a Webmap, or ArcGIS Pro
- Create polygon
- Set attributes
  - Name
  - Active
  - StartDate
  - CloudCover
  - *EndDate (if null will run into future)*





Open notebooks

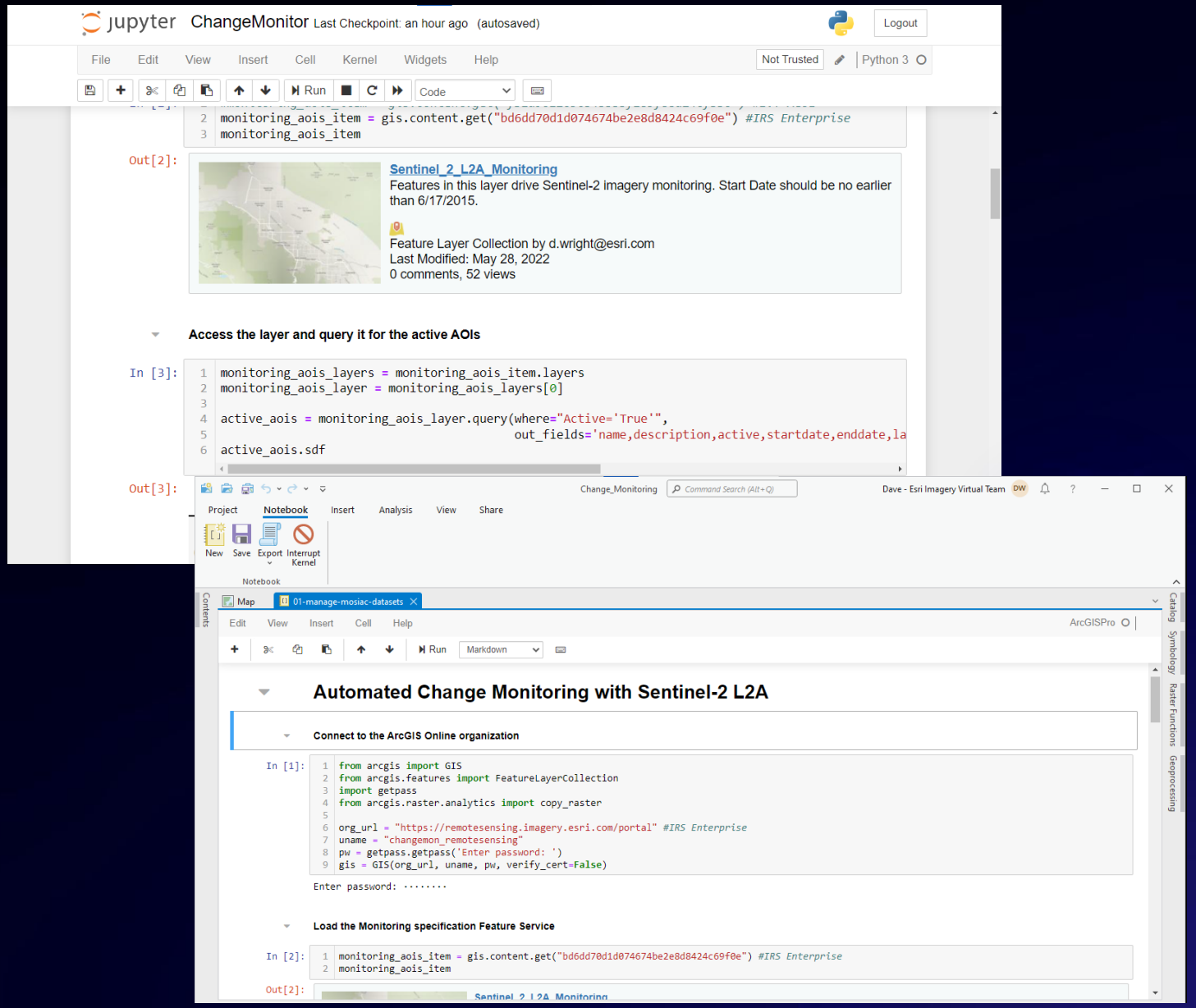
Jupyter

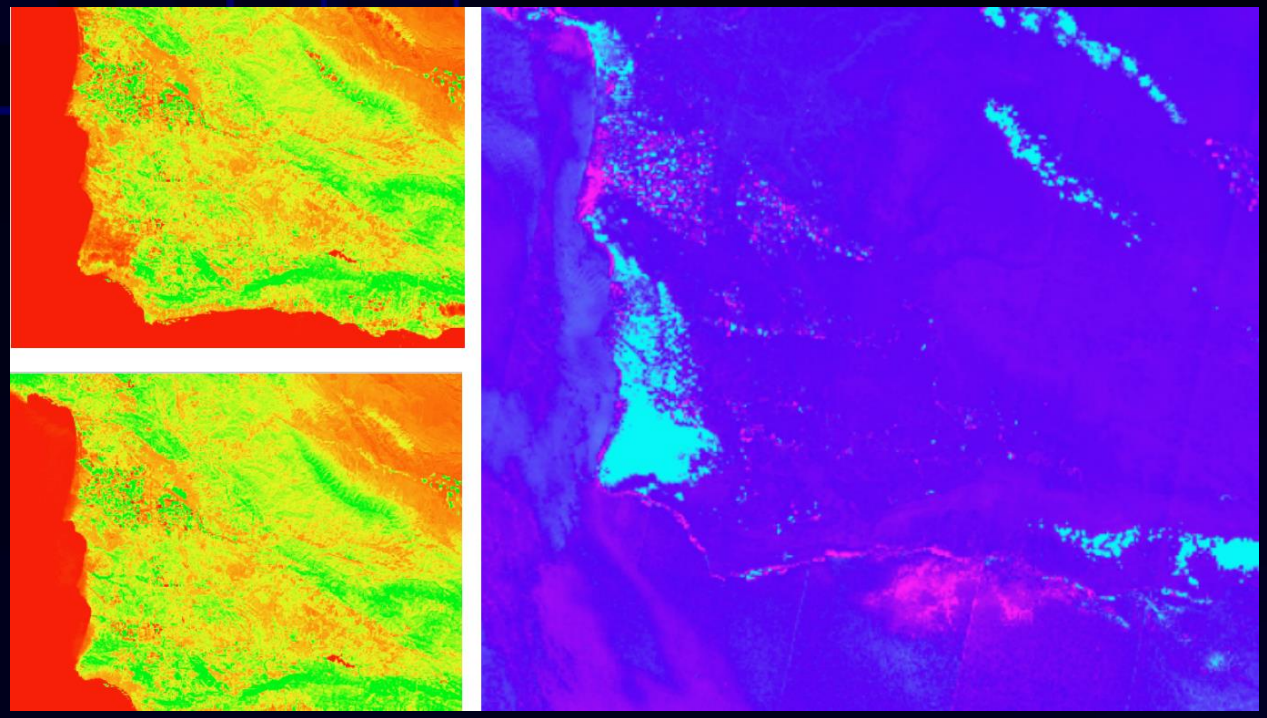
- 01-manage-mosaic-datasets
- 02-manage-image-services

  - Organization URL
  - Username
  - Password

  - Run cells
  - Shutdown kernel

- 03-analyze-change





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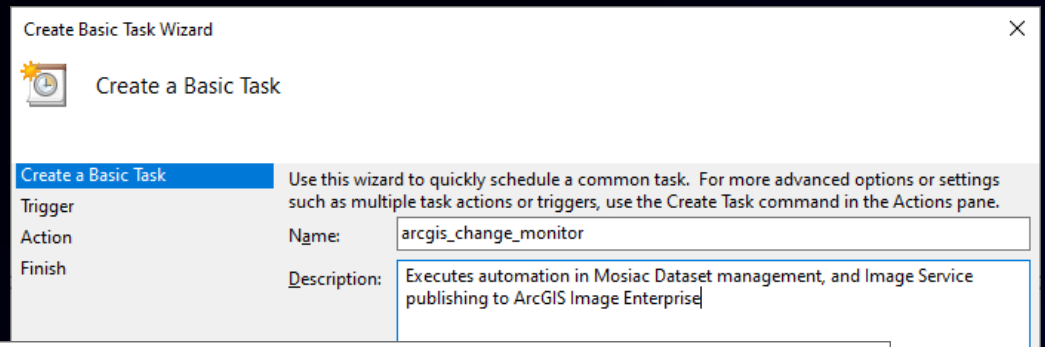
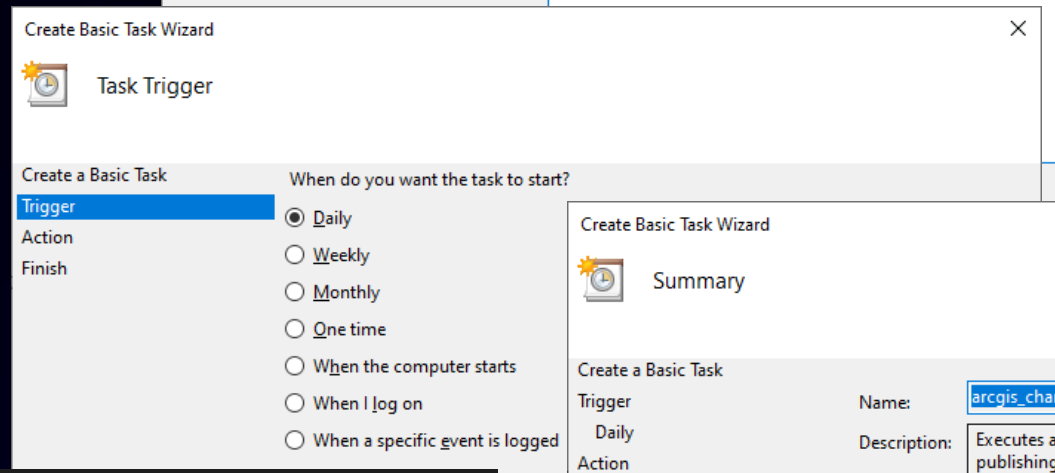
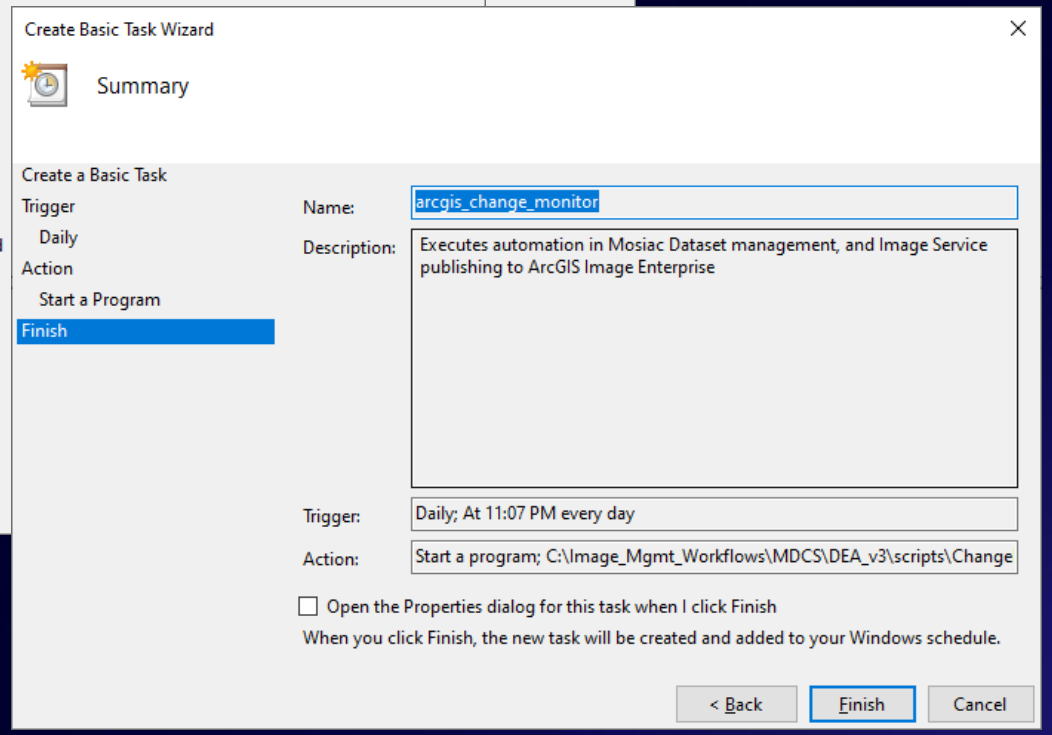
Scheduling

Automate the processing

- Script form of notebook code
- Windows Scheduled Task
- Linux cron job
- At specified interval
- At specified time







scripts > change-monitor-windows-task.bat

```
1  REM ********* Set Variable Values **************
2  set pPath="C:\Program Files\ArcGIS\Pro\bin\Python\envs\arcgispro-py3\python.exe"
3  set mdcsPath=C:\Image_Mgmt_Workflows\MDCS\arcgis-sentinel-2-change-monitor
4
5  echo Creating MDs...
6  %pPath%  "%mdcsPath%\scripts\01-manage-mosaic-datasets.py"
7  echo Mosaic Dataset management script is finished.
8
9  echo Copying MDs to Image Hosting fileserver...
10 %pPath%  "%mdcsPath%\scripts\02-manage-image-services.py"
11 echo Image Service management script is finished.
```

Resources and invitation

Automate Change Monitoring with ArcGIS and Sentinel-2

- Code from demonstration – https://github.com/dkwright/arcgis-sentinel-2-change-monitor
  - Download, use, extend and contribute
    - Additional sensors
    - Commercial API connections
    - Customize analyses
    - Persisting analyses as additional services
    - Notifications
- Mosaic Dataset Configuration Script (MDCS) – https://github.com/Esri/mdcs-py
- ArcGIS API for Python - https://developers.arcgis.com/python/

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