

# Best Practices for Managing Processed Ortho Imagery

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*DRAFT* slides (June 2017)

# Characteristics of Processed Ortho Imagery

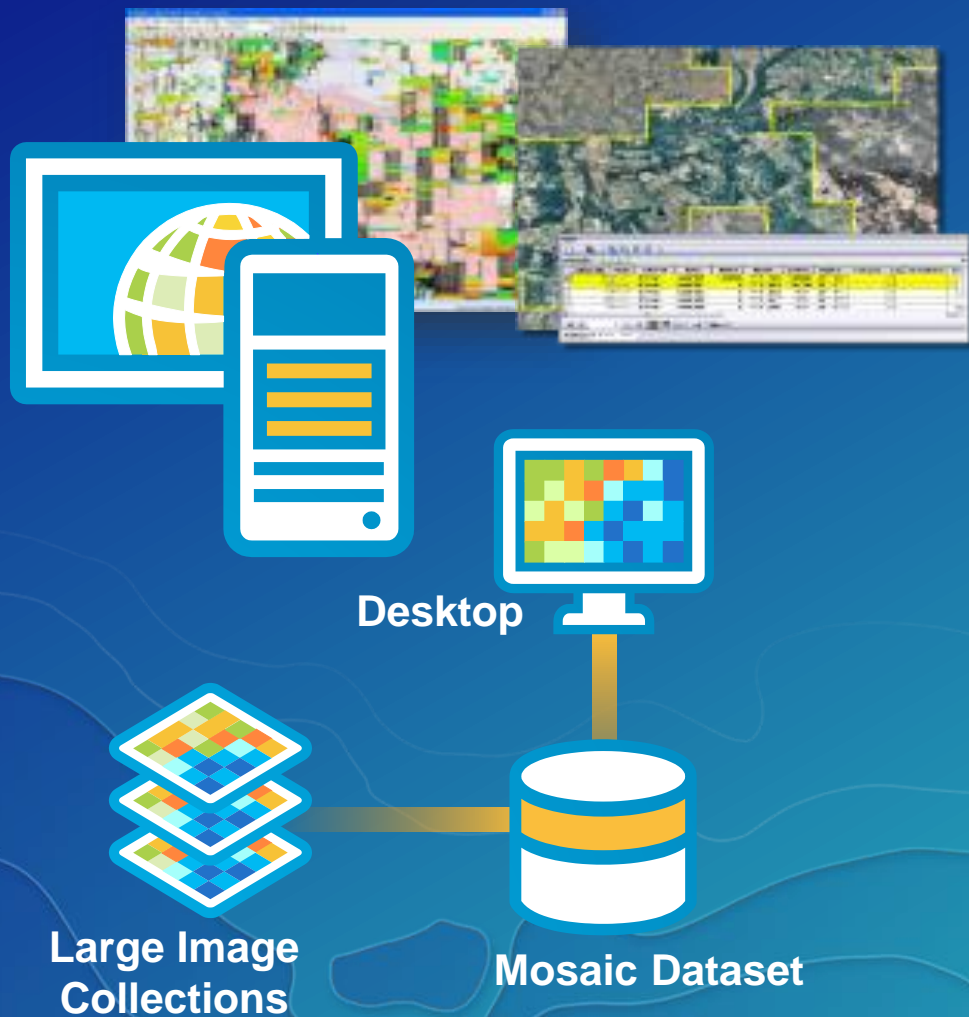
- Typically 8 bit (sometimes 16)
- Typically 3 spectral bands (sometimes 4)
  - RGB or Color IR
- May/may not have been color corrected
- File layout
  - Typically delivered as regular edge-joined tiles *OR*
  - Multi-image mosaics (e.g. NAIP “compressed county mosaics”, mosaics from UAS flights)
- Sources:
  - USDA NAIP program
  - Custom collections for state/local governments
  - Drone flights processed through Drone2Map, Pix4D, Agisoft, Simactive, Others...

# Data Management Objectives

- **Share imagery with users**
- **Manage Cost vs. Performance**
  - Implement In-house, DIY Cloud, AGOL?
- **Ensure scalability & maintainability**
  - Apply automation

# Image Management Using Mosaic Datasets

Highly Scalable, From Small to Massive Volumes of Imagery



## Create Catalog of Imagery

- Reference Sources
- Ingest & Define Metadata
- Define Processing to be Applied

## Apply:

- On-the-fly Processing
- Dynamic Mosaicking

## Access as Image or Catalog





# USDA NAIP

<http://naip.arcgis.com>

Data courtesy of:  
USDA APFO (Air Photo Field Office)

# Mosaic Dataset Design

- **Key metadata → Attribute Table**
  - Dates acquired (start, end), possibly also Date published
  - Horizontal Accuracy (CE90)
- **Handling NoData**
- **Source / Derived Model with Raster Functions**
- **Managing multiple dates**
- **Automation!**



## File Layout – one of three cases

Edge matched or overlapping  
ortho tiles



Orthorectified mosaic  
(compressed, \*SID or \*JP2)



Individual orthophotos



# Handling NoData – Build Footprints

Edge matched or overlapping  
ortho tiles



Orthorectified mosaic  
(compressed, \*SID or \*JP2)



Individual orthophotos



Build footprints → Clip to footprints to remove NoData

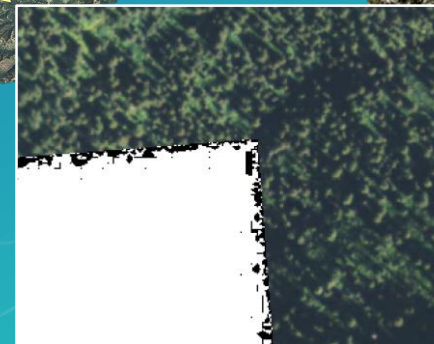


# Handling NoData – Set “NoData Value”

Edge matched or overlapping  
ortho tiles



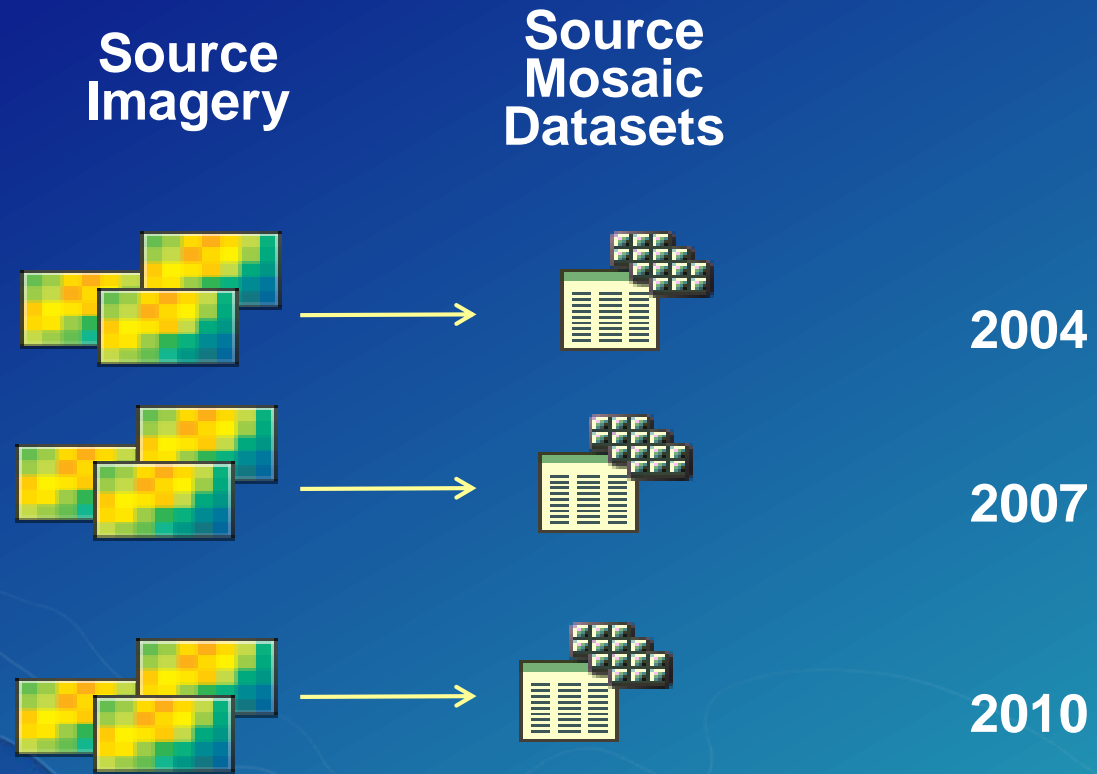
Orthorectified mosaic  
(compressed, \*SID or \*JP2)



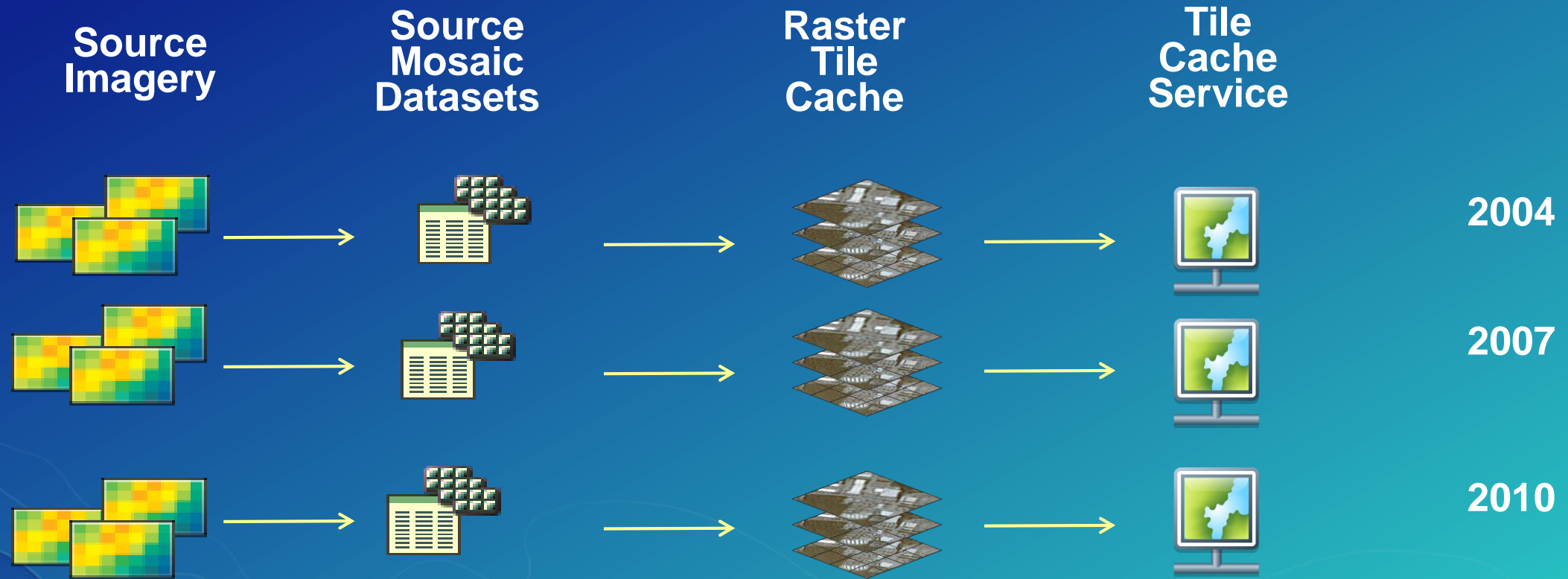
Individual orthophotos



# Source / Derived Data Model – begin with “Source” Mosaic Datasets



## Source Mosaic Datasets – Direct to Raster Tile Cache (optional)



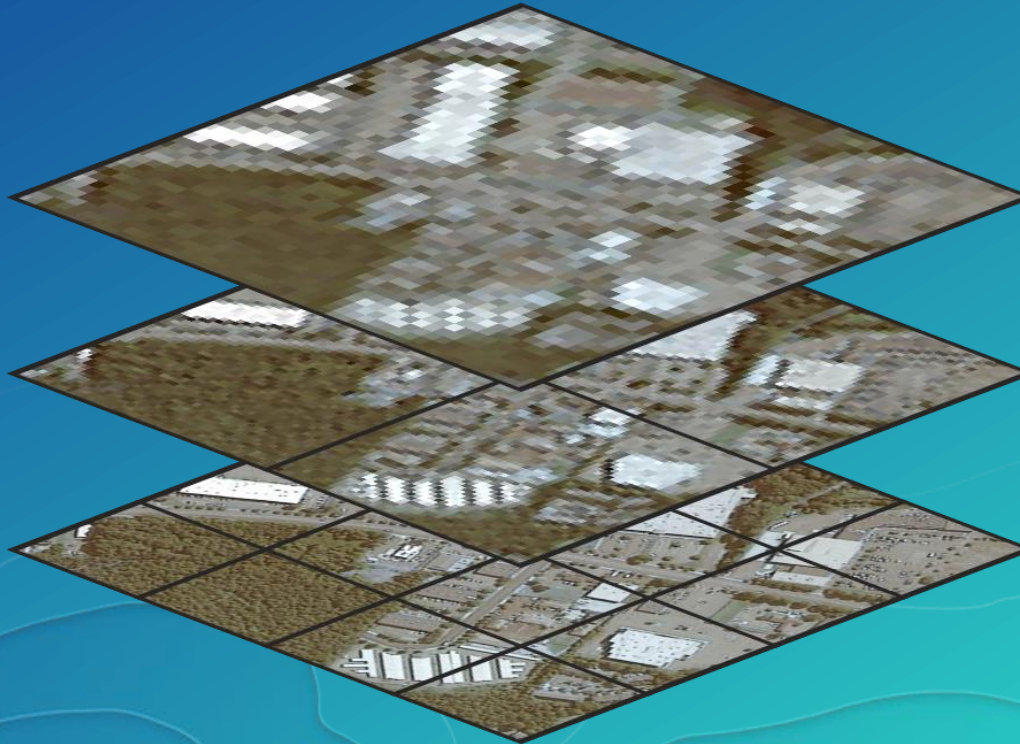


# What is a raster tile cache?

- Cut image into very large number of small tiles
- Fixed projection (*typically* Web Mercator Auxiliary Sphere)
- Multiple levels
- Typically 256x256 pixels
- 3 band RGB
- No size limit

- **Notes:**

- Duplicates data volume
- Any data in overlap is lost



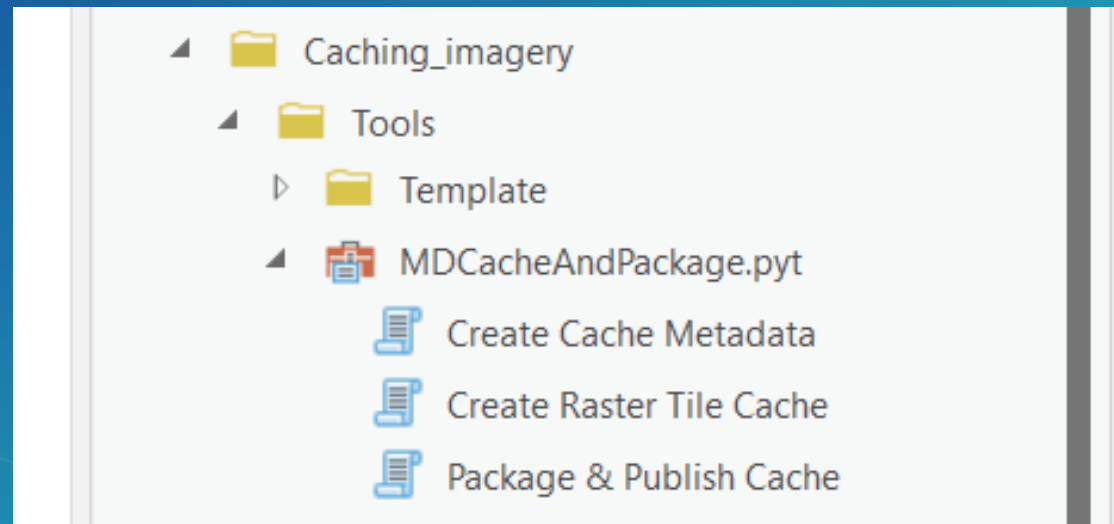
1 tile: 4 meters/pixel  
data volume 200 KB

4 tiles: 2 meters/pixel  
data volume 800 KB

16 tiles: 1 meter/pixel  
data volume 3.2 MB

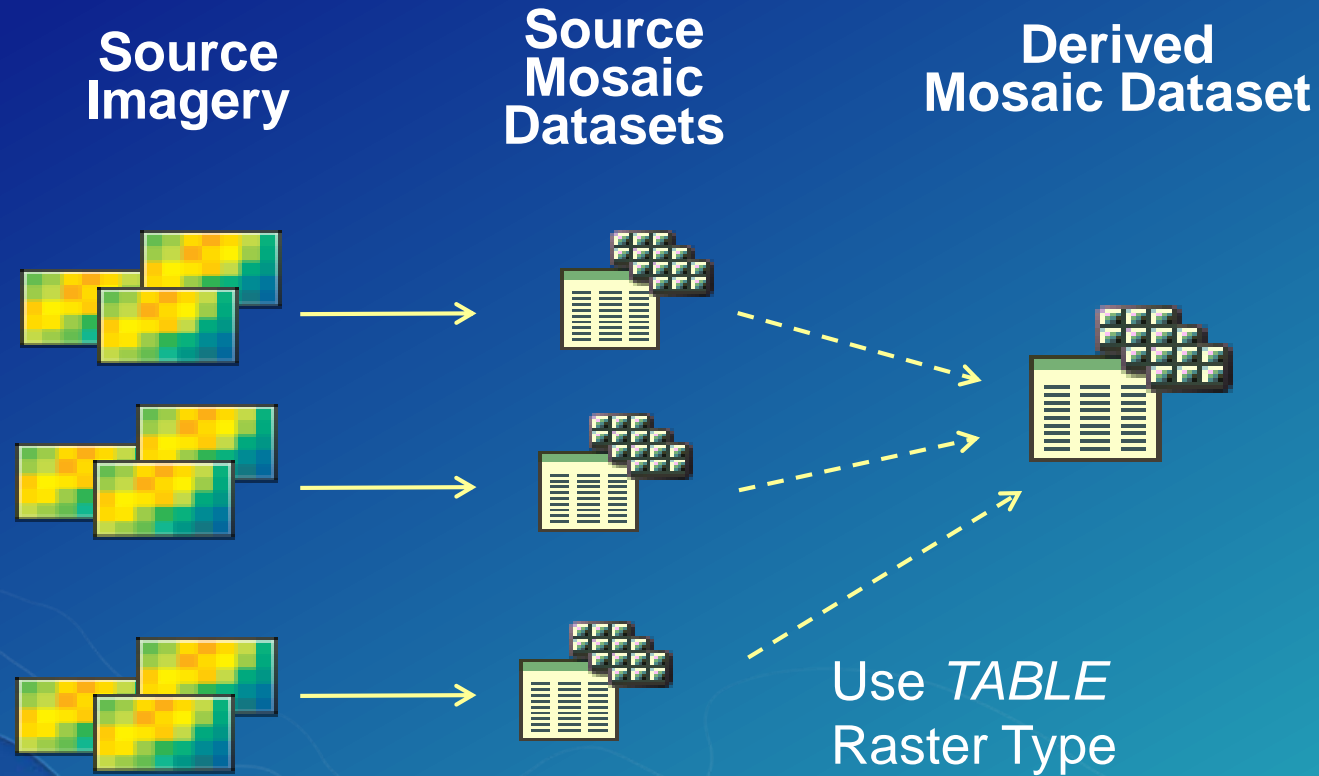
# GP Tools for generating, attributing, and publishing cache

<http://esriurl.com/RasterTileCacheTools>



**Recorded live training seminar (LTS) for image caching:**  
<http://esriurl.com/ImageCacheLTS>

# Combine into Derived Mosaic Dataset

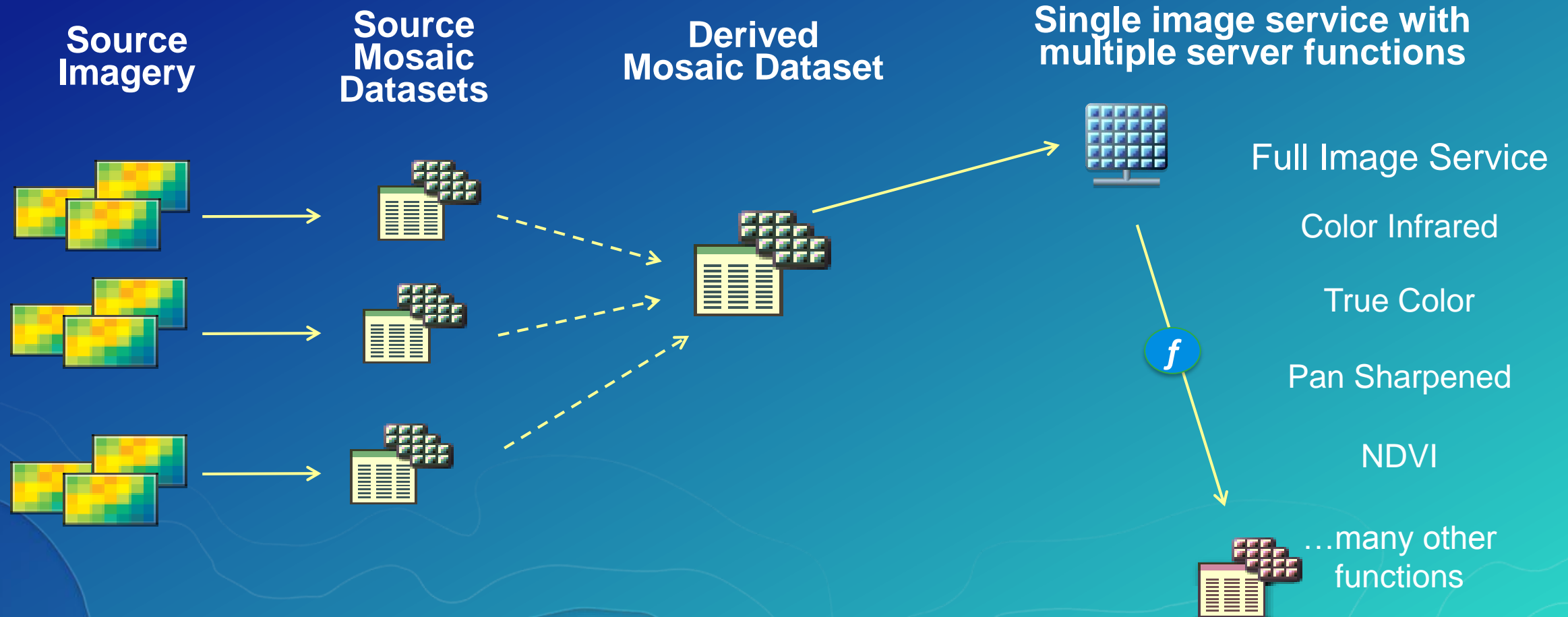


Advantage: All image data\* available in a single location

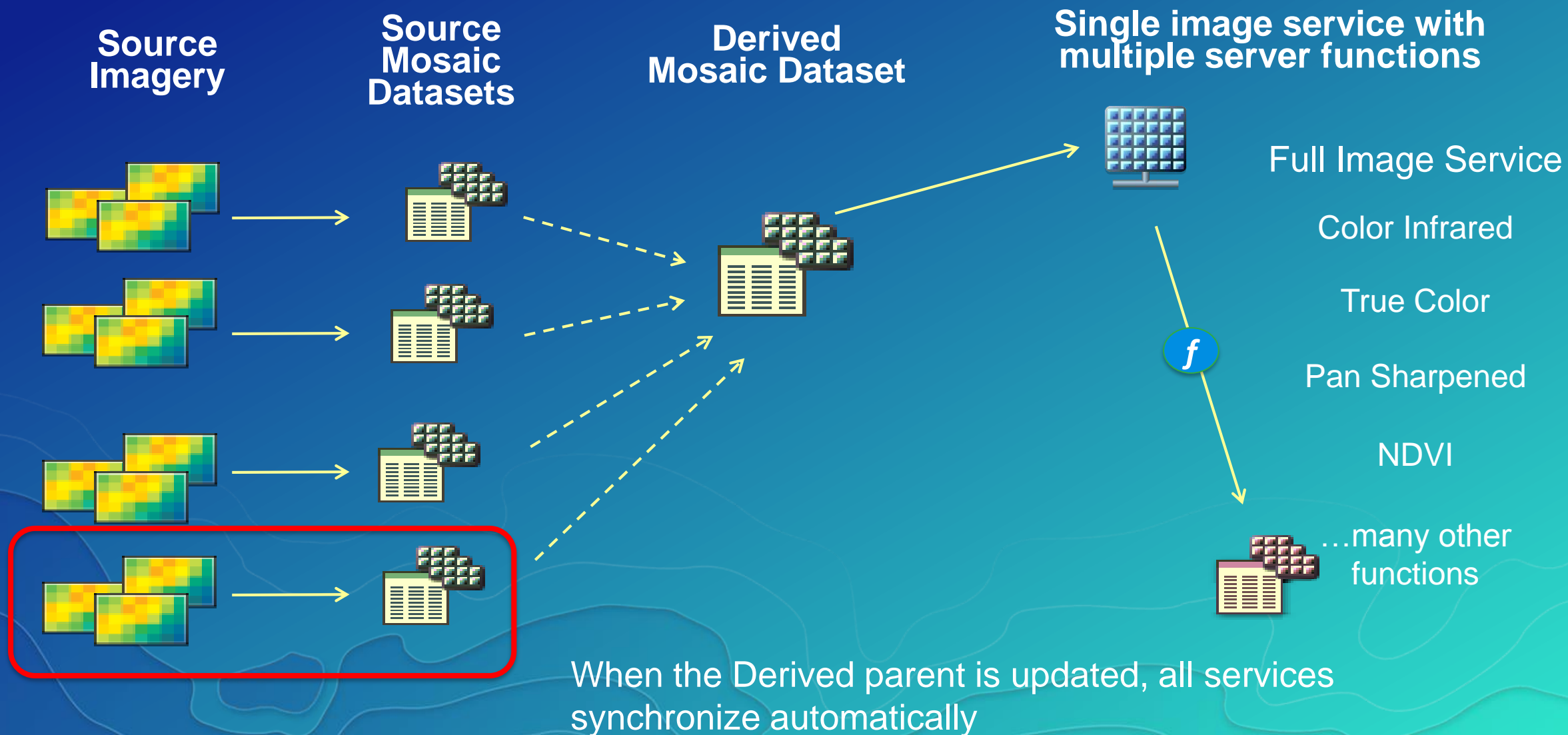
\* "All data" refers to all data that makes sense together; this should not mix elevation data, for example, with imagery



# On-the-fly Products using Server Raster Functions



# On-the-fly Products using Server Raster Functions





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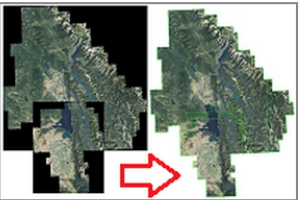
#### Preprocessed Orthos Sample Data

A ZIP archive containing multiple preprocessed orthorectified images for use with example scripts to demonstrate best practices in image management.



Geoprocessing Sample by ImageryWorkflowsTeam

Last Modified: February 7, 2015



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#### Preprocessed Orthos Sample Python Scripts

A ZIP archive containing Python scripts for building mosaic datasets to manage multiple years of preprocessed orthophotos



Code Sample by ImageryWorkflowsTeam

Last Modified: February 7, 2015

# Automation

Image Management Workflows

<http://esriurl.com/ImageManagement>



# Image Management Workflows

*Best Practice Workflows for Image Management*

- **ArcGIS Online Group** <http://esriurl.com/6539>
  - Downloadable scripts & sample data
- **Image Management landing page** <http://esriurl.com/ImageManagement>
- **Recorded webinars**
  - Image management <http://esriurl.com/LTSImgMgmt>
  - Image caching <http://esriurl.com/ImageCacheLTS>

The image shows two overlapping screenshots from the ArcGIS ecosystem. The top screenshot is the 'ArcGIS Imagery Workflows' landing page, which features a search bar and links to 'Image Management Tools', 'Image Analysis Tools', and 'Image Use Tools'. It also has a 'Manage Imagery' section with thumbnails for 'Standard Image Management Workflow' and 'Managing Preprocessed Orthophotos'. The bottom screenshot is the 'ArcGIS Online' group page for 'Image Management Workflows'. It includes a 'SHARE' button, a description of the group's purpose, and a list of group content. Two items are visible: 'Landsat 8 Script' (a ZIP archive with Python scripts) and 'Elevation Reviewer' (a Silverlight application). The group details show it is public, has 2 members, and lists tags like 'image services', 'image management', 'best practices', 'python', 'mosaic dataset', and 'workflows'.

# Summary – Key considerations

- **Raster Tile Cache vs. Dynamic Image Services**
  - Cache: fastest performance for large # of users
  - Dynamic: if > 8 bit, or > 3 bands, or need imagery in overlap
- **If cache, is metadata access important?**
- **Time enabled?**
- **Data format: Tiles, Ortho Files, or Orthomosaic**
- **Apply automation**



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