# Best Practices for Managing Processed Ortho Imagery

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***DRAFT*** slides (June 2017)

# Characteristics of Processed Ortho Imagery

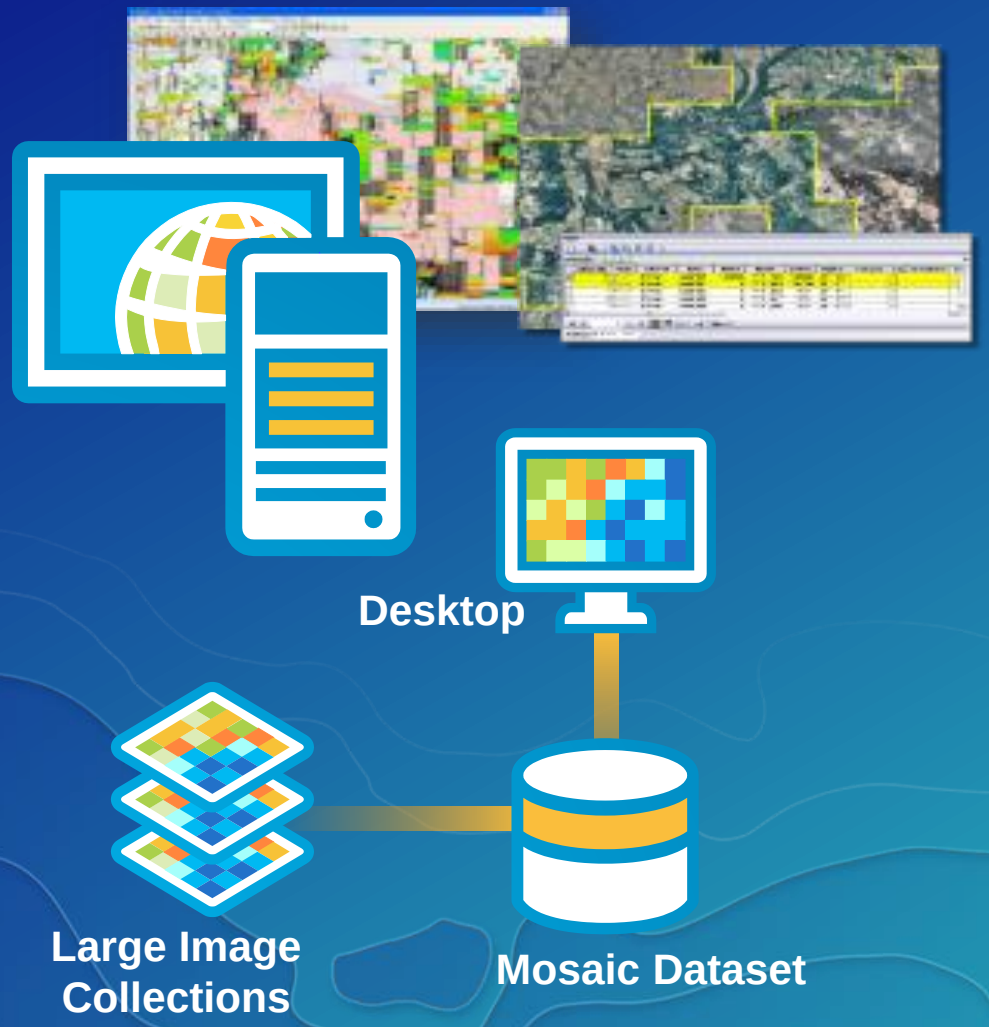
- Typically 8 bit (sometimes 16)
- Typically 3 spectral bands (sometimes 4)
  - RGB or Color IR
- May/may not have been color corrected
- File layout
  - Typically delivered as regular edge-joined tiles *OR*
  - Multi-image mosaics (e.g. NAIP “compressed county mosaics”, mosaics from UAS flights)
- Sources:
  - 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**

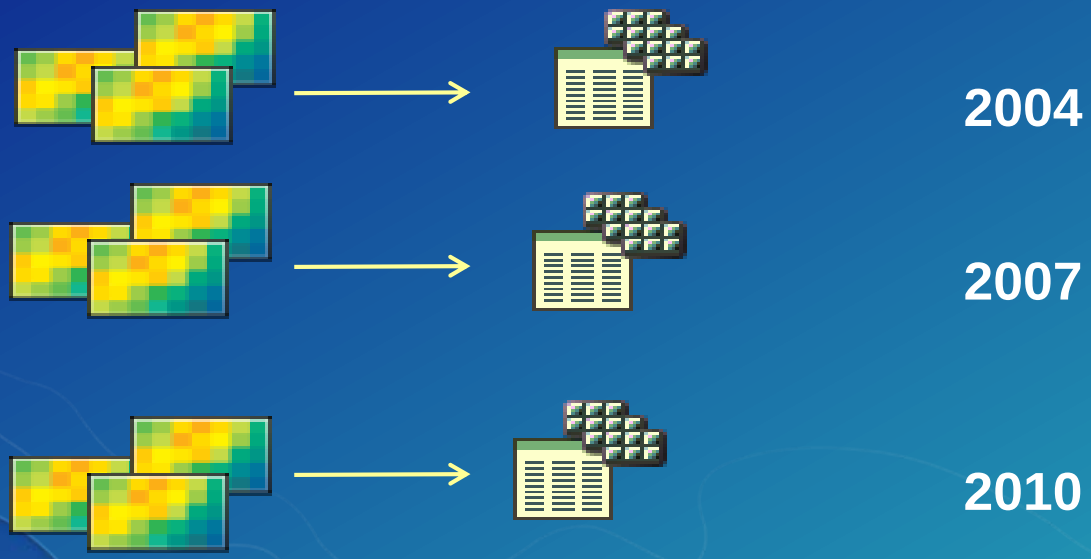
**Orthorectified mosaic (compressed, *SID or *JP2)**

**Individual orthophotos**

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

Source Imagery

Source Mosaic Datasets

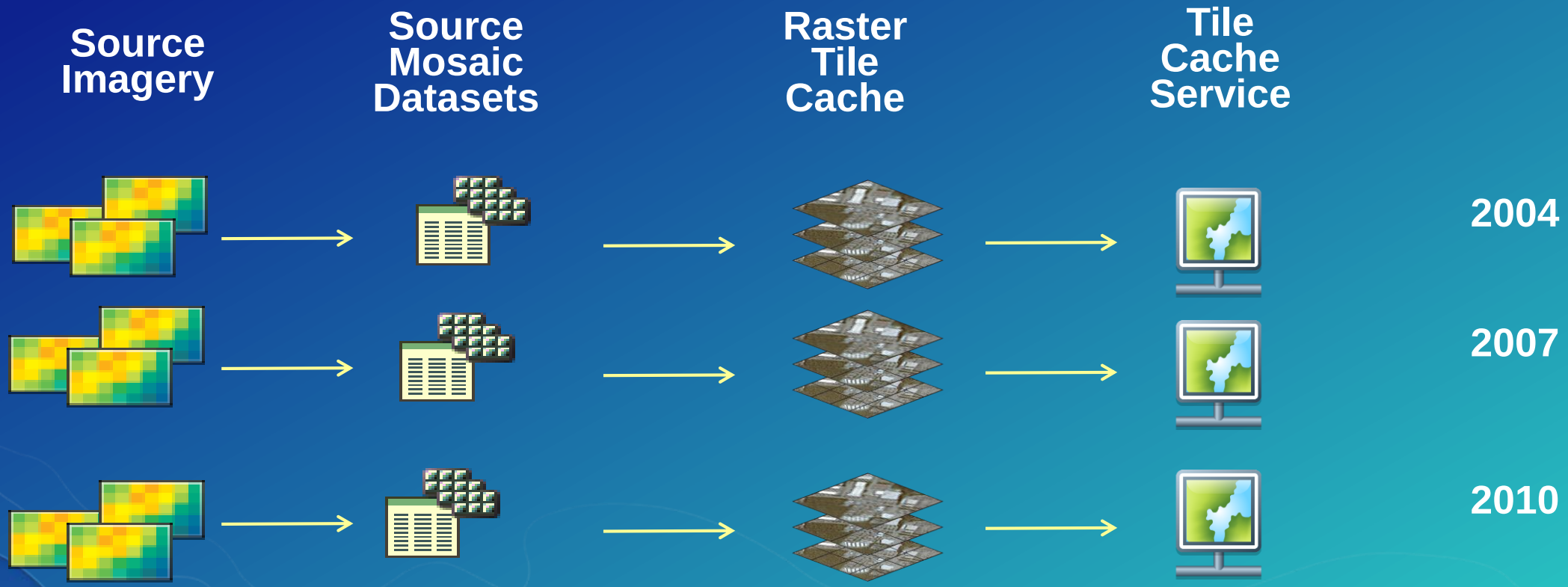


2004

2007

2010

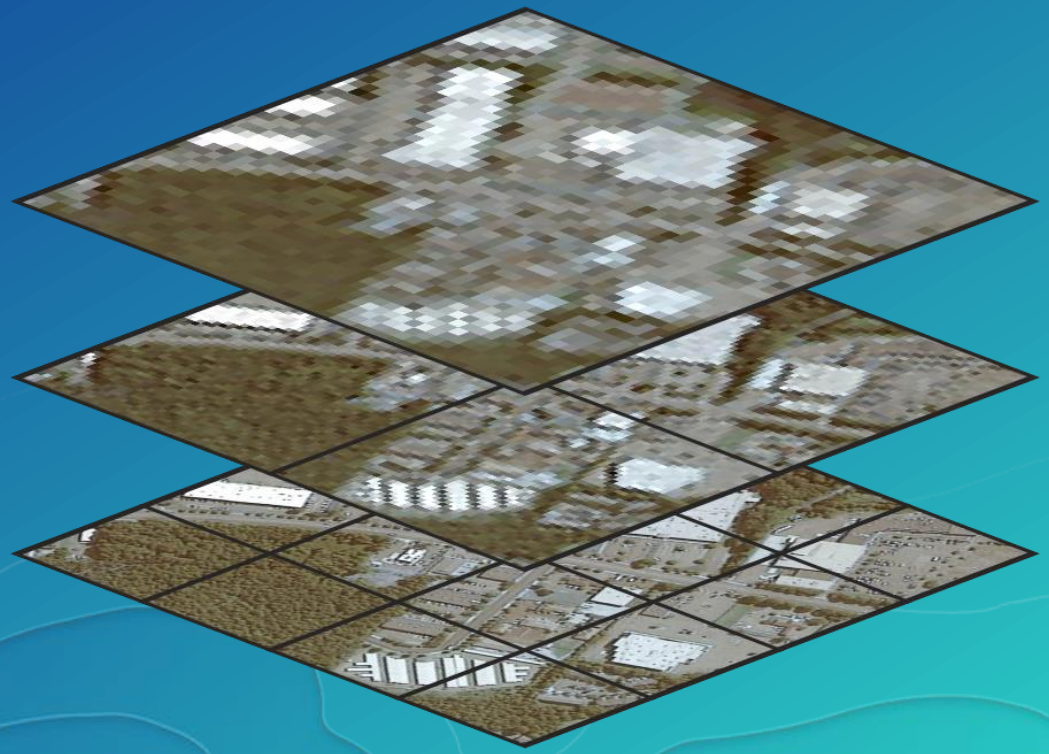
# Source Mosaic Datasets – Direct to Raster Tile Cache (optional)



# 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



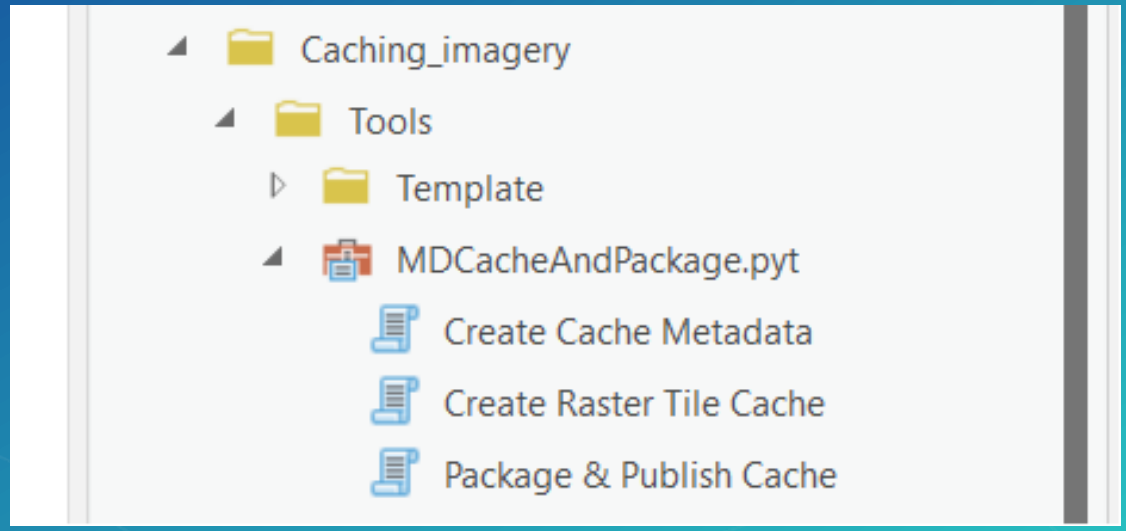
1 tile: 4 meters/pixel
data volume 200 KB

4 tiles: 2 meters/pixel
data volume 800 KB

16 tiles: 1 meter/pixel
data volume 3.2 MB

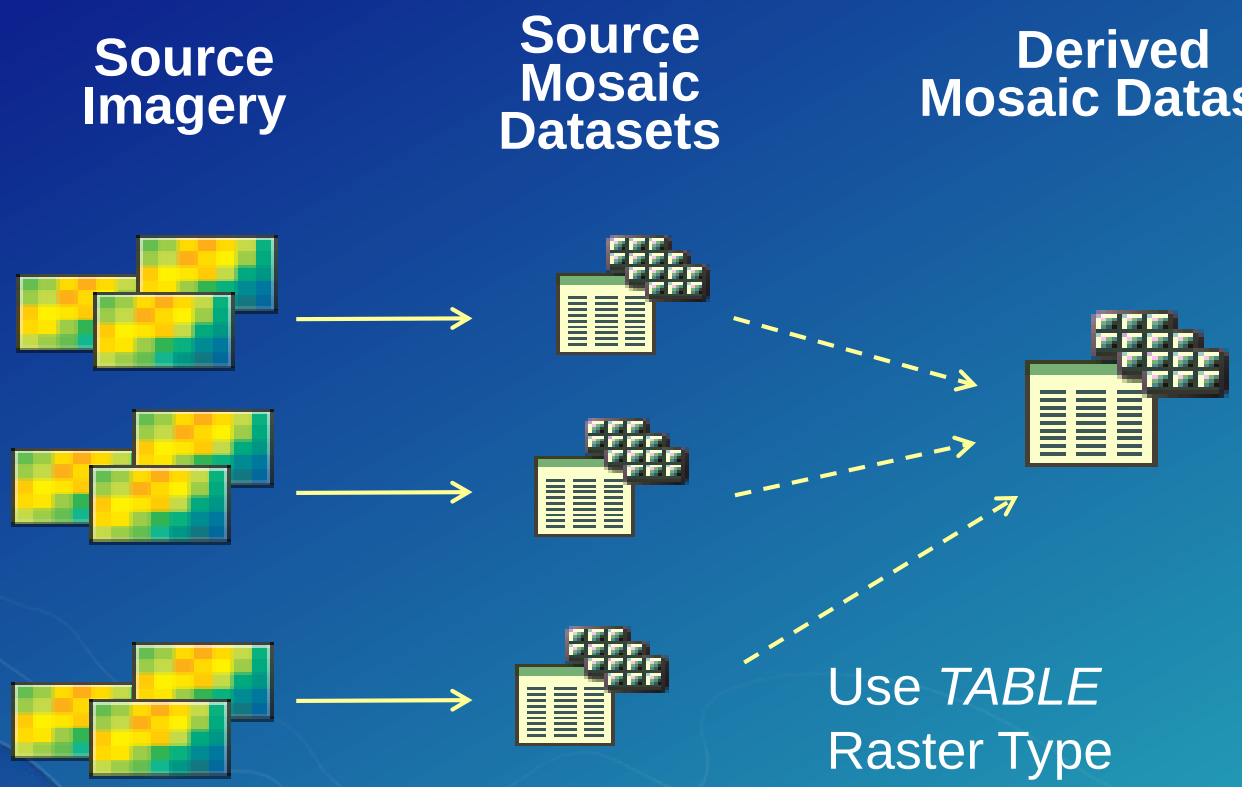
# GP Tools for generating, attributing, and publishing cache

http://esriurl.com/RasterTileCacheTools




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

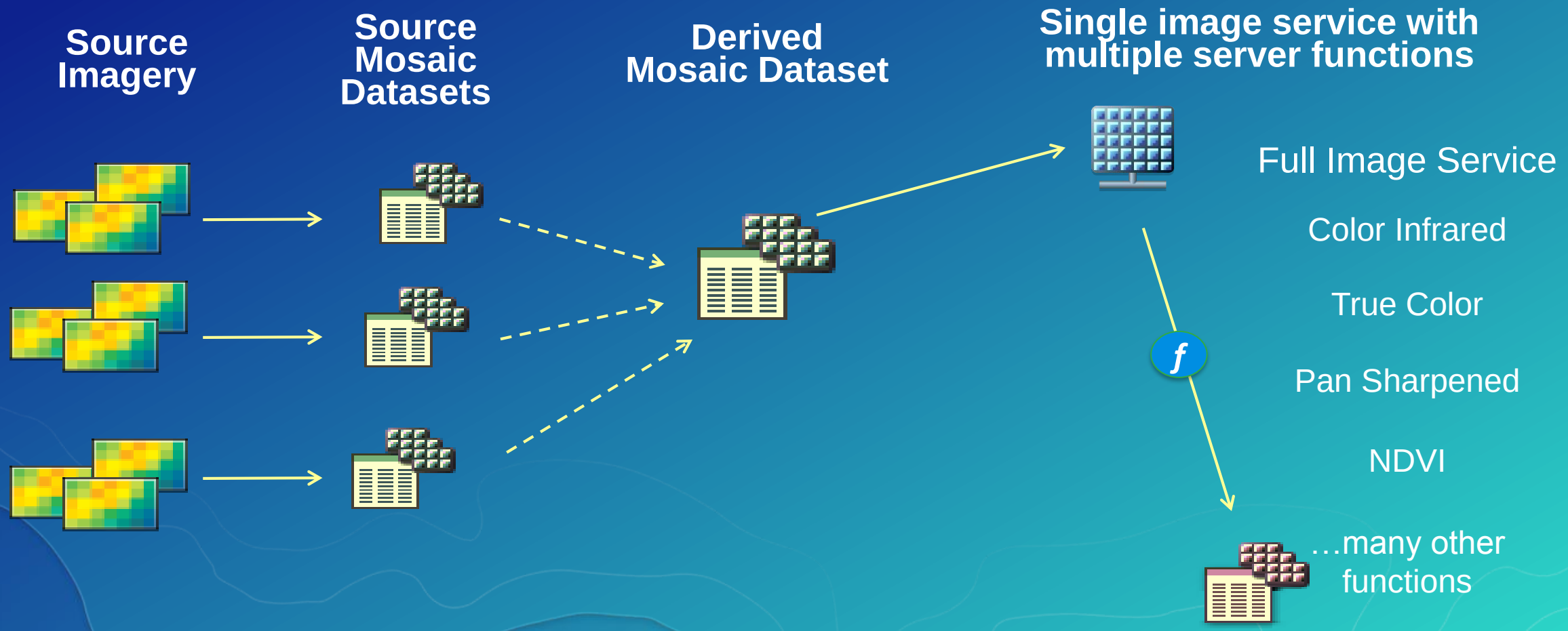
# Combine into Derived Mosaic Dataset




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



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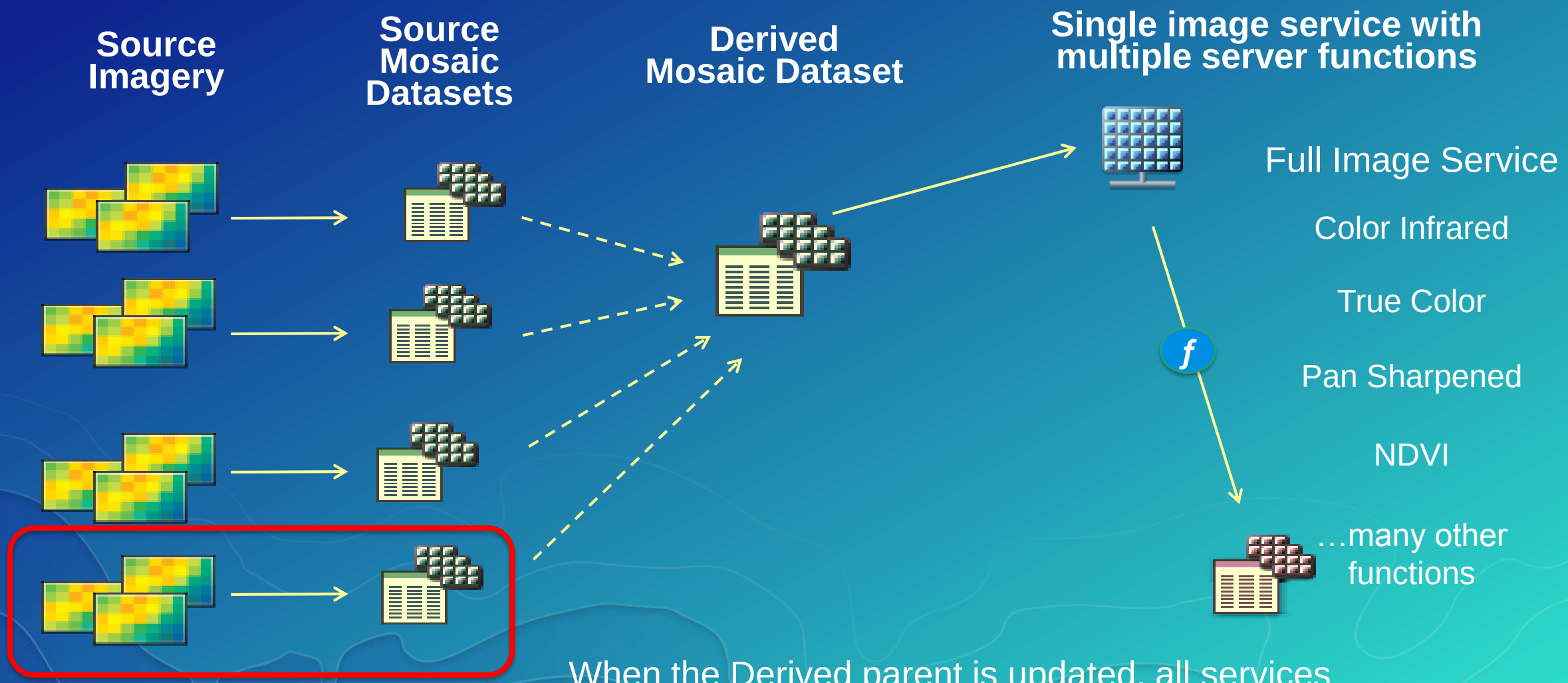
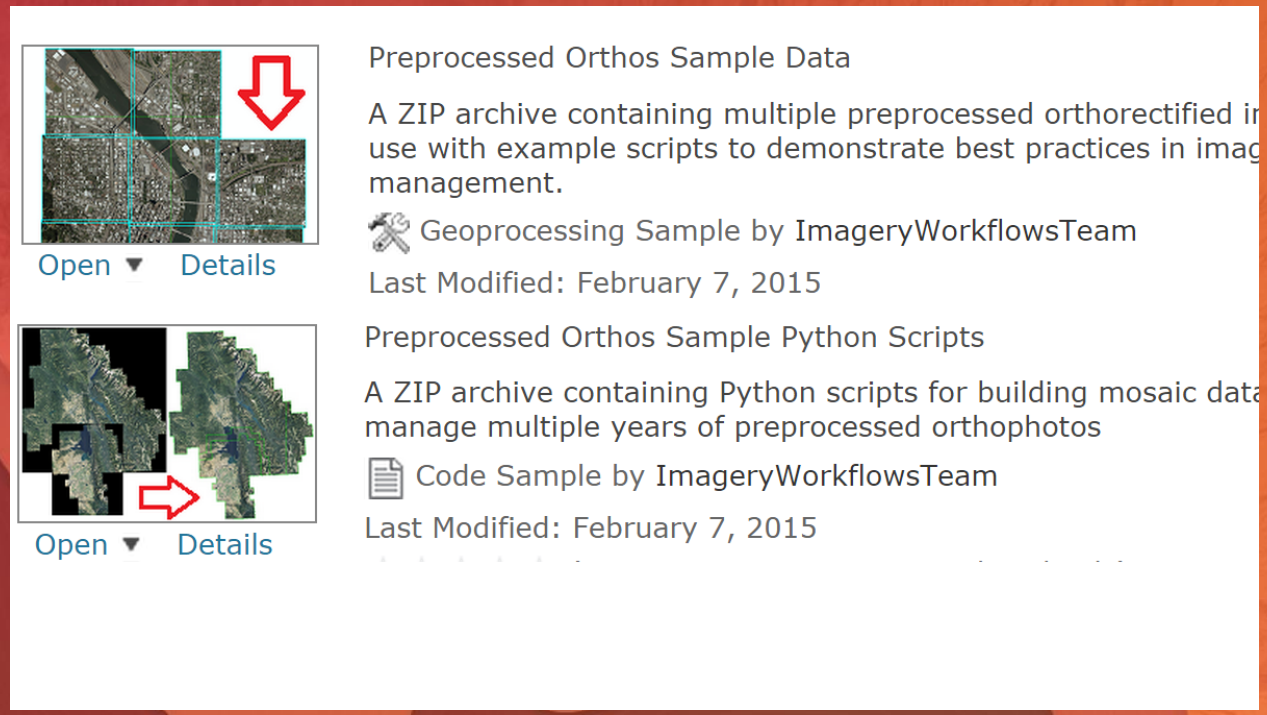





# Automation

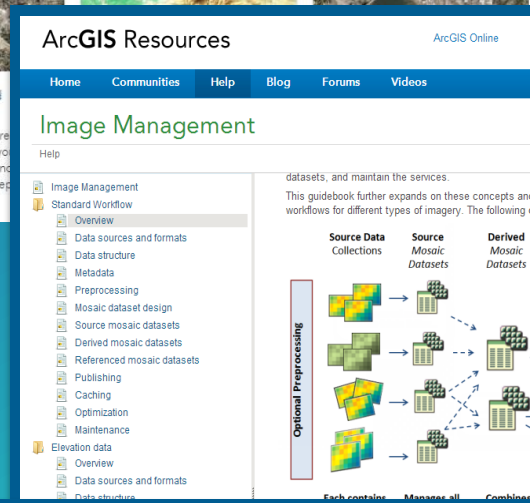
Image Management Workflows

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



# 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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