Overview of ArcGIS Enterprise

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ESRI

Sharing to a “portal”

ArcGIS 10.3

- “portal” → Central destination for all of your geospatial assets in Web GIS
  - ArcGIS Online organization and/or Portal for ArcGIS

- Within your portal, you can own content:
  - Web maps (2D data)
  - Web scenes (3D data)
  - Web layers
    - Many different types

Web map

Web scene

Feature

Tile

Scene

Elevation

Map Image

Image

The ArcGIS Platform enables Web GIS

ArcGIS 10.4

Simple

Integrated

Open

Available in the Cloud . . .

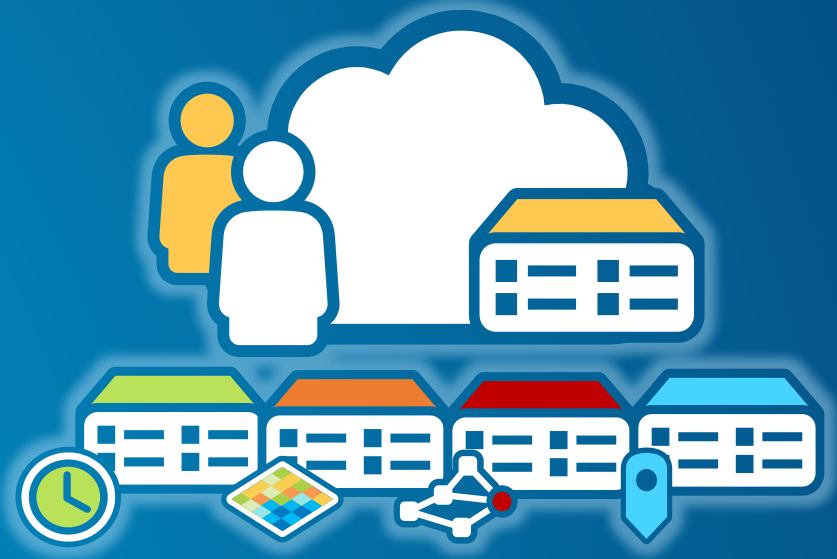
. . . and In Your Own Infrastructure

The ArcGIS Platform Enables Distributed GIS

ArcGIS 10.5

ArcGIS for Server

ArcGIS Enterprise



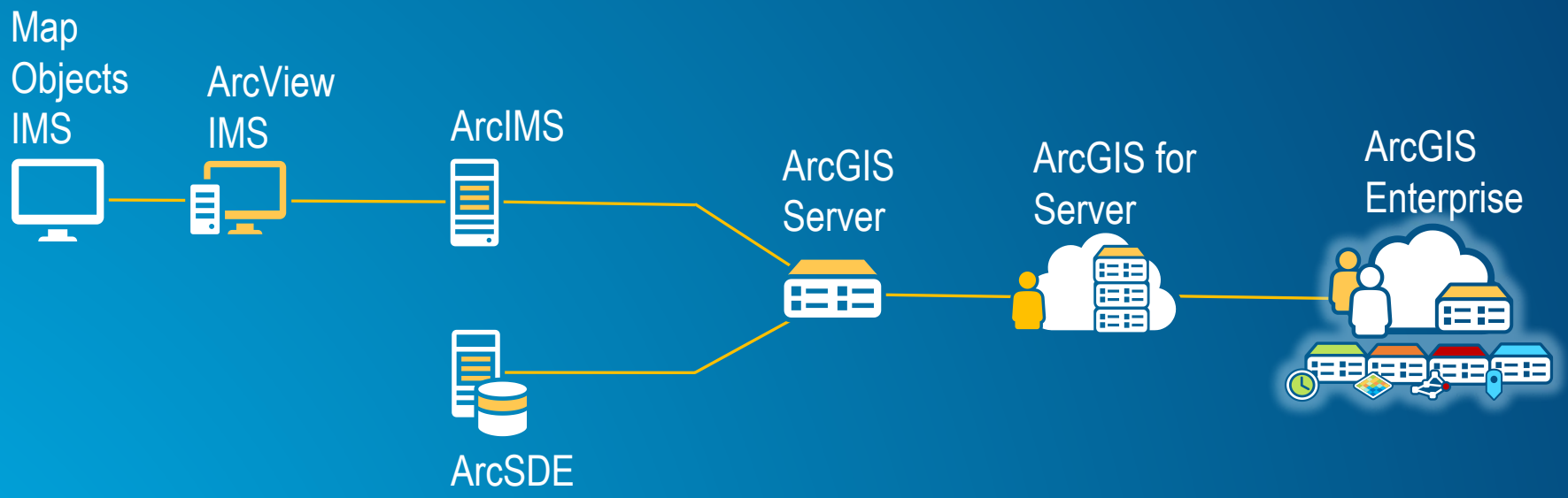
ArcGIS Enterprise 10.5

- ArcGIS for Server becomes ArcGIS Enterprise at 10.5
- A complete distributed GIS in your own infrastructure
  - on premises or in the cloud
- Straightforward upgrade process from previous versions of ArcGIS for Server
- Additional capabilities available as specialized GIS Servers
  - GeoAnalytics Server, GeoEvent Server, Image Server

The 10.5 things you need to know about What's New in ArcGIS Enterprise

1

Starting at 10.5, ArcGIS Enterprise is the new name for the ArcGIS for Server product line.



That said, we are leaving the names of the products pre-10.5 exactly as they have always been.

2

ArcGIS Enterprise is comprised of 4 software components.

ArcGIS Server

Portal for ArcGIS

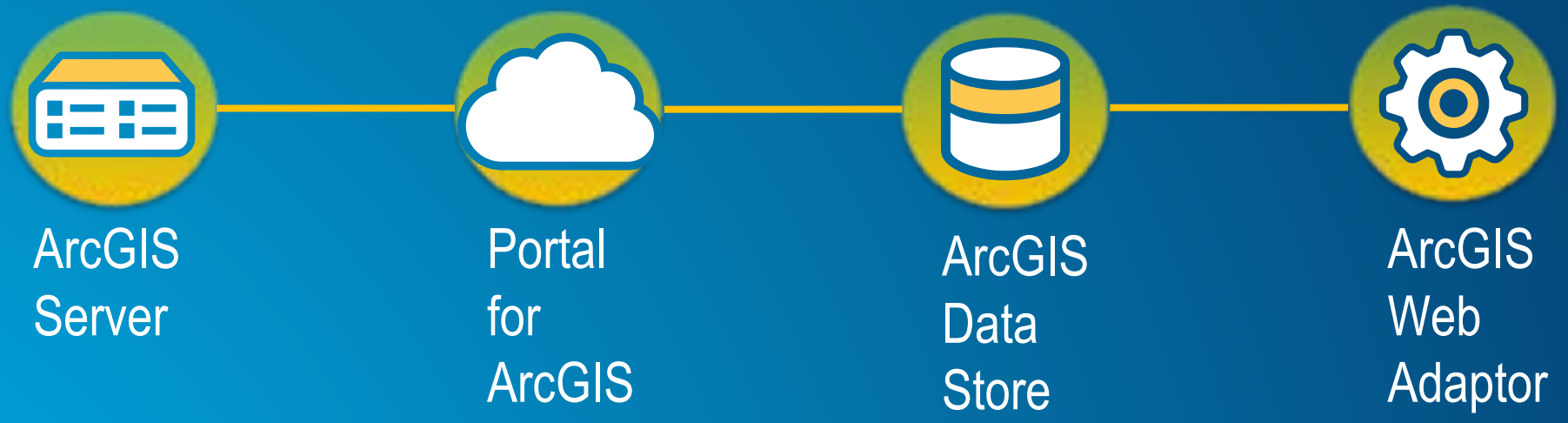
ArcGIS Data Store

ArcGIS Web Adaptor

All of these components existed in the software pre-10.5

2

These 4 components configured together create what is called the base ArcGIS Enterprise deployment.



The base ArcGIS Enterprise deployment is how you deploy Web GIS in your infrastructure.

ArcGIS Enterprise | Anatomy of Web GIS in Your Infrastructure

ArcGIS Server

Set up as a GIS Server and configured as the hosting server, ArcGIS Server provides the layers, services, and horsepower required to power your Web GIS.

Portal for ArcGIS

ArcGIS Data Store

ArcGIS Web Adaptor

ArcGIS Enterprise | Anatomy of Web GIS in Your Infrastructure

ArcGIS Server

Portal for ArcGIS

ArcGIS Data Store

ArcGIS Web Adaptor

The web frontend and infrastructure backend that supports a user's interaction and overall experience with your Web GIS.

ArcGIS Enterprise | Anatomy of Web GIS in Your Infrastructure

ArcGIS Server

Portal for ArcGIS

ArcGIS Data Store

ArcGIS Web Adaptor

The Esri managed data repository that stores the spatial content that has been shared to Portal.

ArcGIS Enterprise | Anatomy of Web GIS in Your Infrastructure

ArcGIS Server

Portal for ArcGIS

ArcGIS Data Store

- Relational
- Tile Cache
- Spatiotemporal

ArcGIS Web Adaptor

ArcGIS Enterprise | Anatomy of Web GIS in Your Infrastructure

ArcGIS Server

Portal for ArcGIS

ArcGIS Data Store

ArcGIS Web Adaptor

An Esri built software load balancer that appropriately directs network traffic and serves as a reverse proxy for Web GIS access.

2 A base ArcGIS Enterprise deployment can be configured:

With all components on a single machine

With components configured on different machines in a multitier configuration

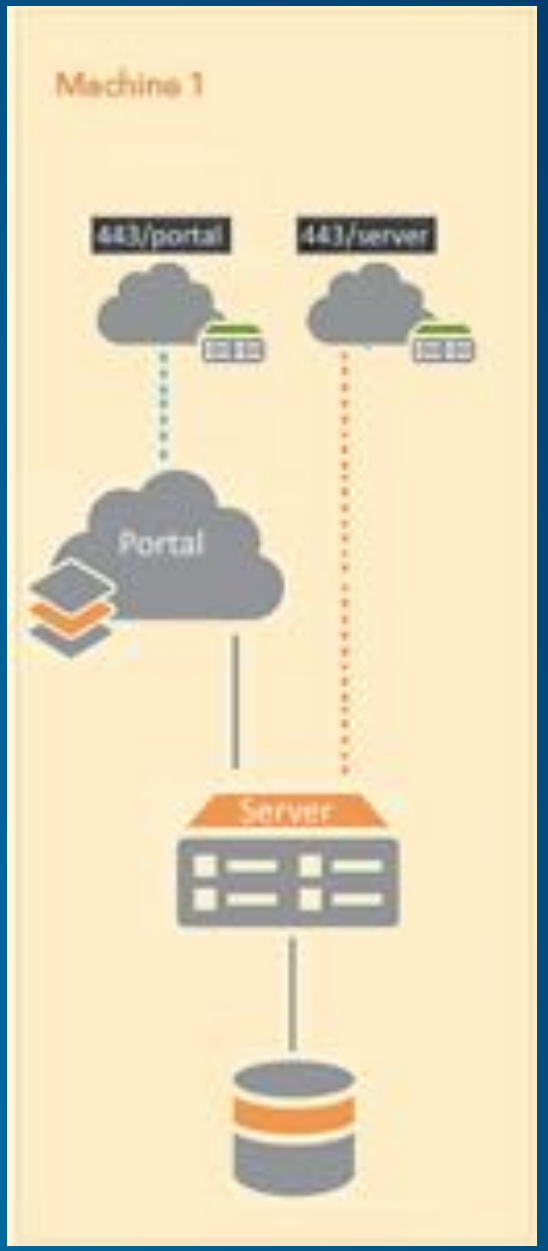
With high availability

Use Chef to Create your base deployment of ArcGIS 10.5 Enterprise

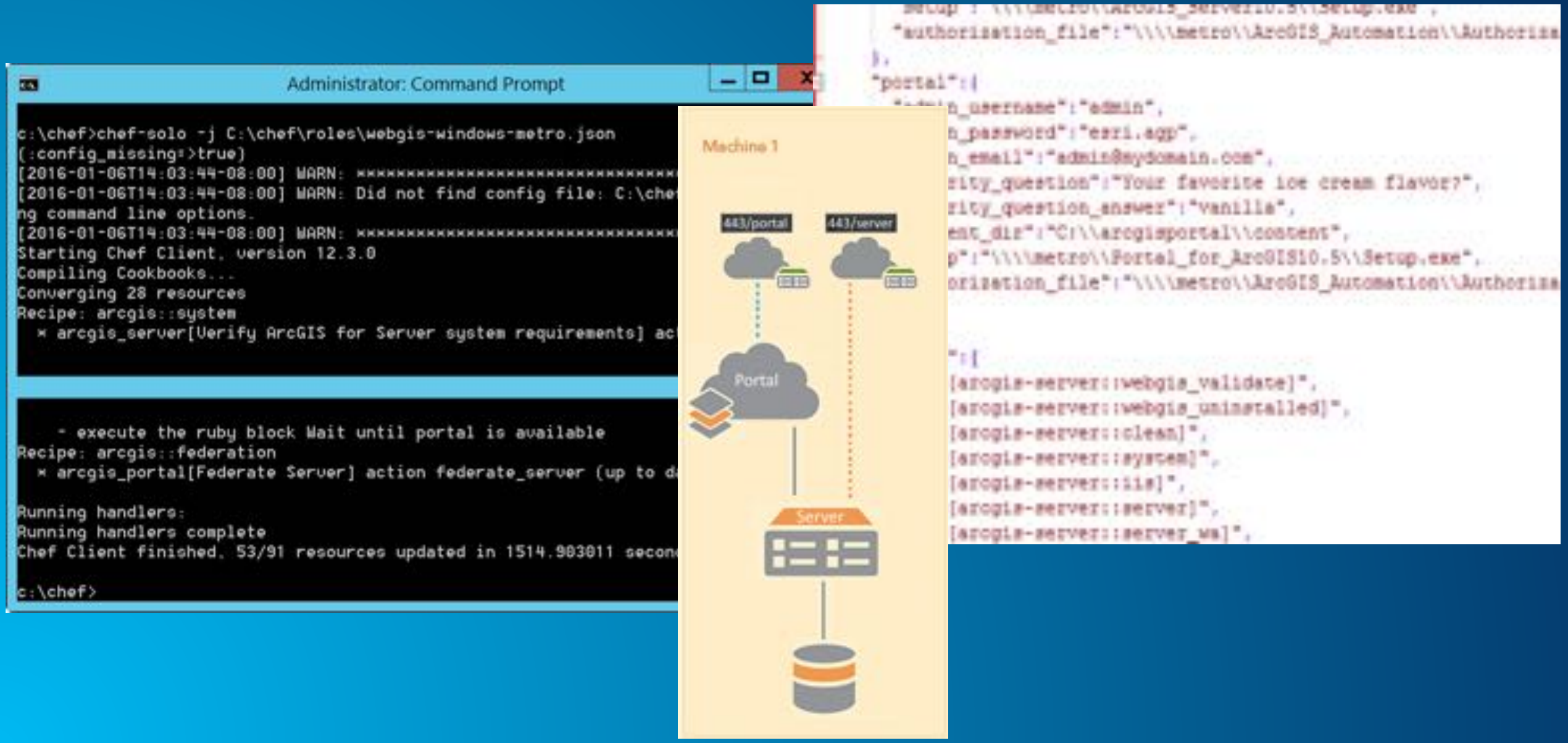
- **Chef**
  - One of the most popular IT automation platforms
  - Supported on Windows and Linux
  - Provide tools to take on configuration files
- **Chef Components**
  - Cookbook
  - Attribute
  - Chef-Server vs. Client
- **How it works**
  - Install ready-to-use cookbooks and define the configuration
  - Run chef with the configuration file

ArcGIS and Chef

- **New at 10.3.1**
  - GitHub Chef cookbook for ArcGIS
  - AWS CloudFormation templates that use Chef for deployments
- **Esri Provided components**
  - ArcGIS cookbook
  - Samples
  - Help
- **Support ArcGIS Software & Platforms**
  - Server, Portal, Data Store, Web Adaptor, Desktop, GeoEvent, etc.
  - Windows Server platforms, RHEL 6.5, RHEL 7, Ubuntu LTS 14.04 & 16.04
- **How it works**
  - We write the code and you define the configuration
  - Edit sample configuration file
  - "*chef-client -z -j D:\chef\roles\arcgis-server-windows.json*"



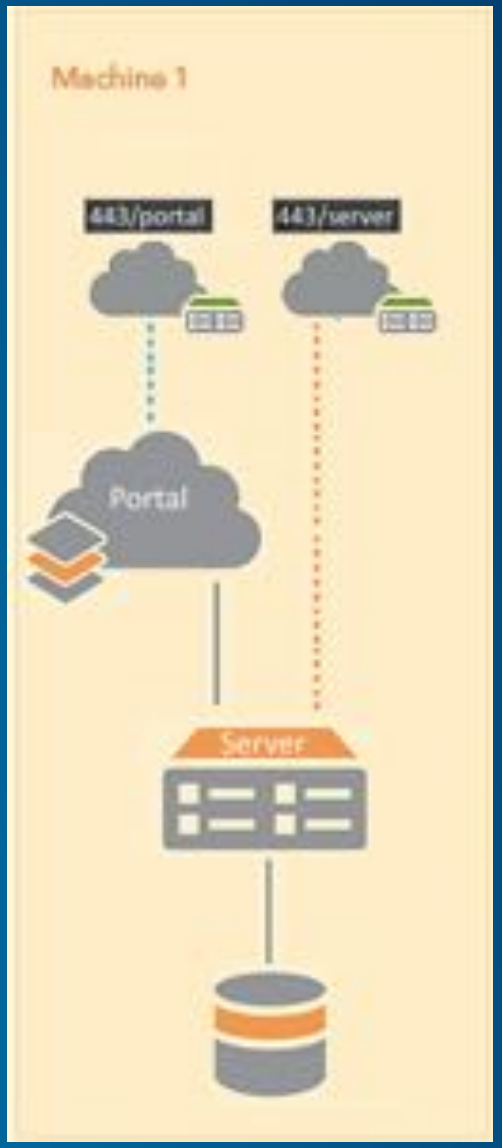
ArcGIS Enterprise Base Deployment on one single machine



Base ArcGIS Enterprise Deployment on one single machine

- **What chef does:**

1. ***Uninstall and cleanup your machine if needed.***
2. ***ArcGIS Server: Install; Authorize; Create site.***
3. ***WA: Install; Configure to IIS; Configure for ArcGIS Server.***
4. ***Data Store: Install; Register it with ArcGIS Server.***
5. ***Portal for ArcGIS: Install; Authorize; Create Portal.***
6. ***WA: Install; Configure for Portal.***
7. ***Federate ArcGIS Server with Portal.***
8. ***Set the ArcGIS Server as the hosting Server.***



3

We are introducing 5 capability based server licensing roles for the ArcGIS Server component of ArcGIS Enterprise.

ArcGIS Server

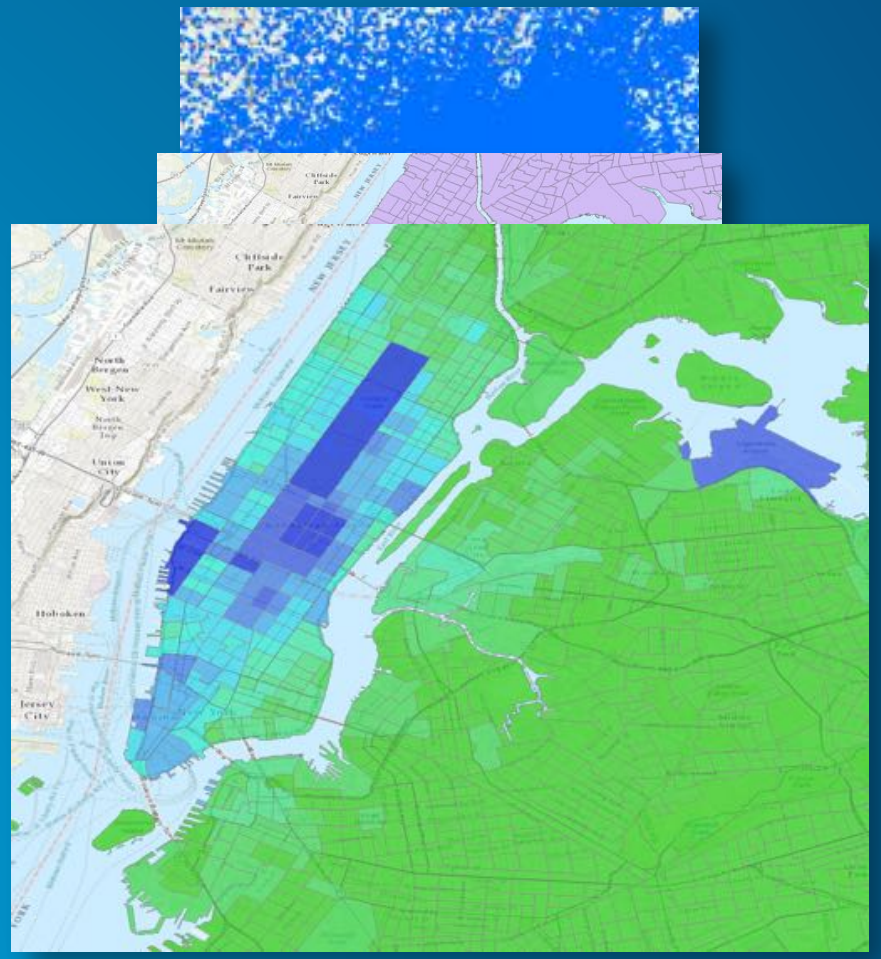
- ArcGIS GIS Server
- ArcGIS Image Server
- ArcGIS GeoAnalytics Server
- ArcGIS GeoEvent Server
- ArcGIS Business Analyst Server

GeoAnalytics Server

GeoAnalytics Server

*ArcGIS has a new way of processing **vector and tabular data** with both spatial (location) and temporal (time) components that is designed **fast distributed analytics** and storage*

GeoAnalytics Server | From Noise to Intelligence



GeoAnalytics Server | Adding to ArcGIS

- GeoAnalytics adds to existing ArcGIS analysis capabilities

Geoprocessing

\+

GeoAnalytics

\+

Web GIS Layers

Powerful analytics

more

Distributed analytics and storage

new

Rich geoinformation model

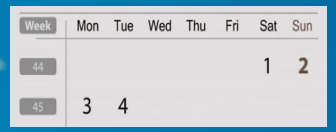
extends

GeoAnalytics Server | Solve New Problems and Old Problems Faster

Run analytics against data that is too big for a single desktop machine

months

weeks



days

hours

minutes

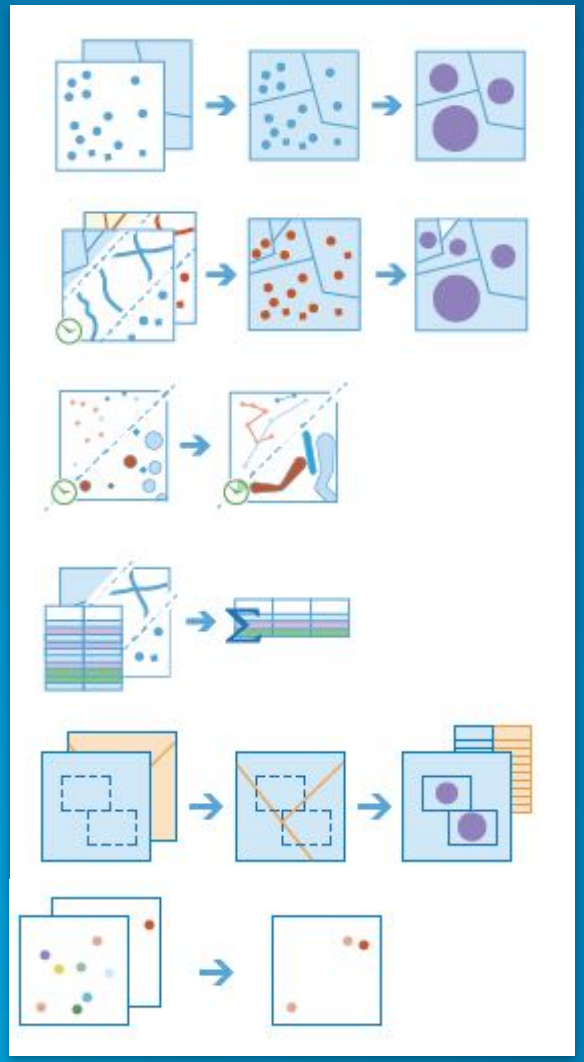
GeoAnalytics Server | Rich Collection of Analysis Tools

Summarize Data

- Aggregate Points
- Join Features
- Reconstruct Tracks
- Summarize Attributes
- Summarize Within

Find Locations

- Find Similar Locations



Analyze Patterns

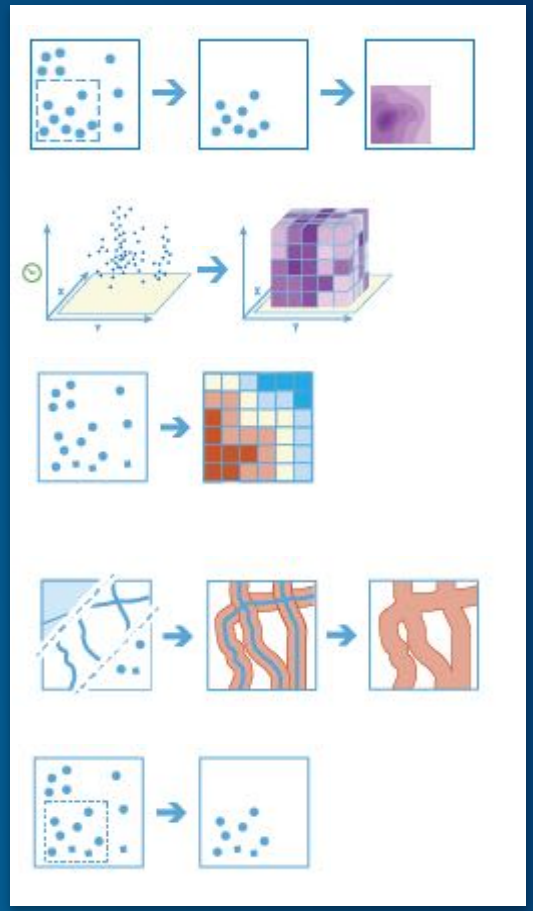
- Calculate Density
- Create Space Time Cube
- Find Hot Spots

Use Proximity

- Create Buffers

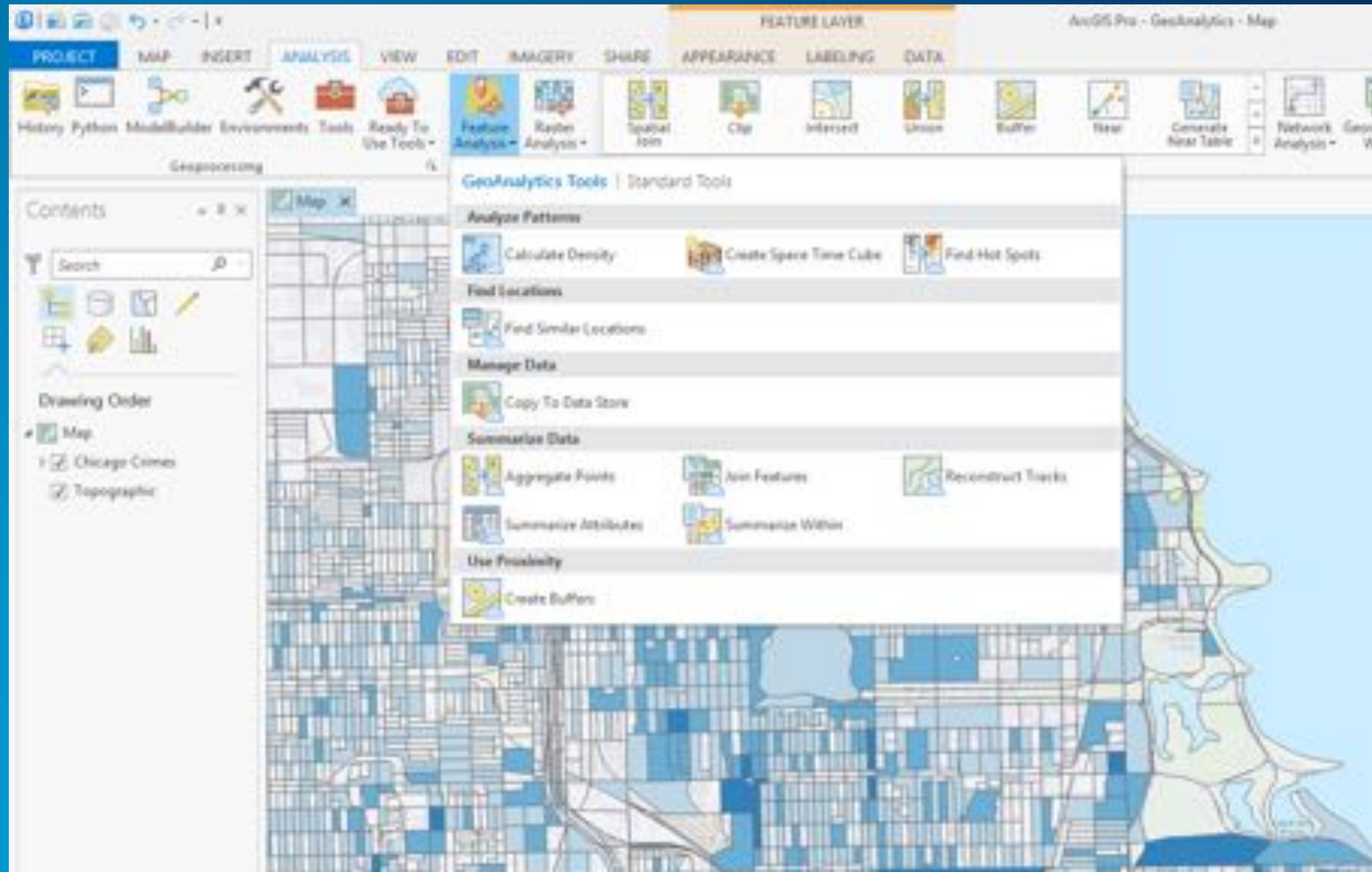
Manage Data

- Copy to Data Store



GeoAnalytics Server | Familiar User Interfaces

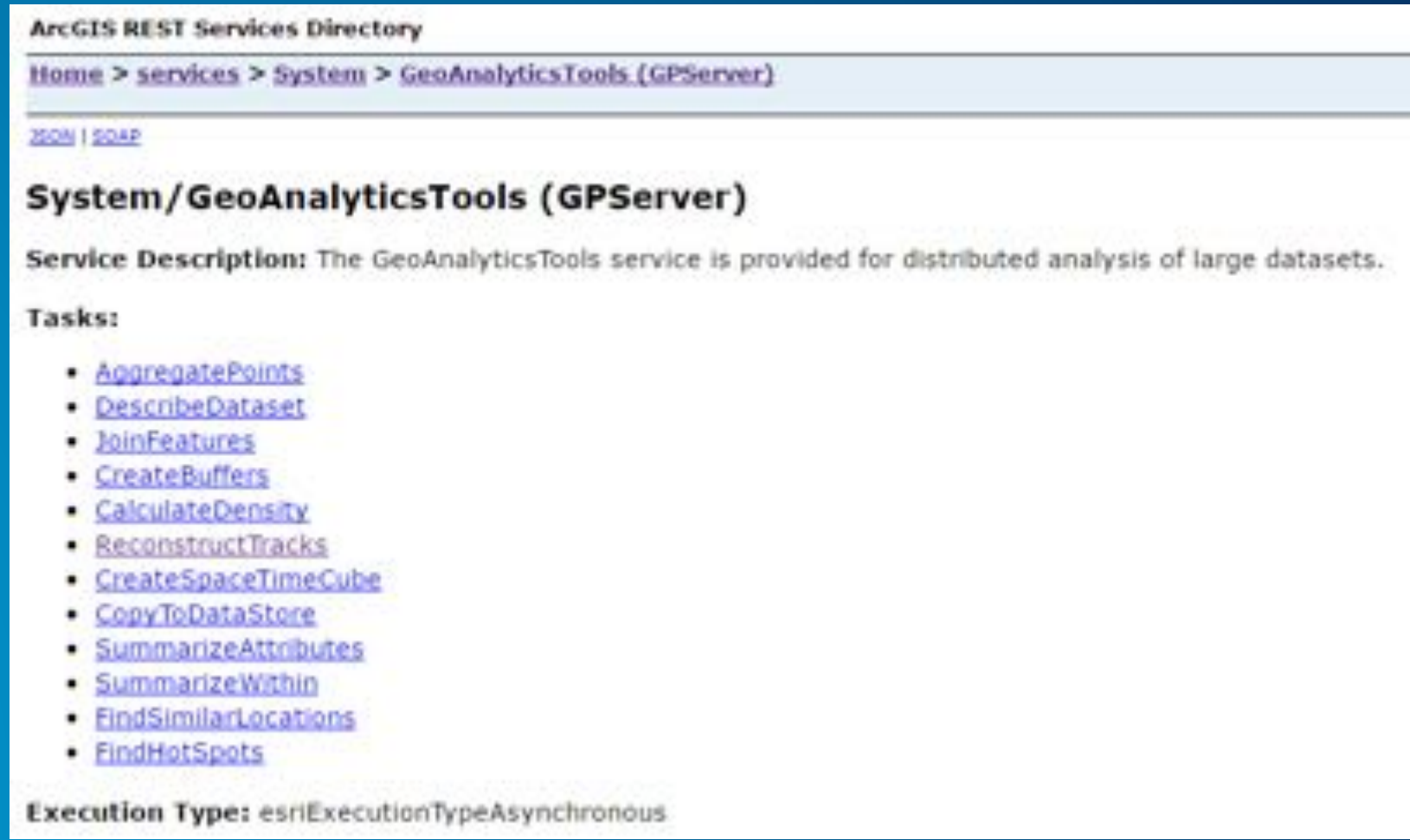
ArcGIS Pro Map Viewer



GeoAnalytics Server | Developer Interfaces

Geoprocessing Service

- REST API
- ArcGIS Python API



GeoAnalytics Server | Why?

- Applicable to anyone with ArcGIS Desktop
  - Helps you get “big jobs” done faster
  - Example: aggregate 6 million points into 44,000 polygons in 1.5 minutes on a single server
- Applicable to anyone performing automated regular analysis on large datasets
  - Fully scriptable in custom solutions
- GeoAnalytics is *out of the box* and *ready to use* within your ArcGIS system
  - familiar and simple interfaces
  - integrated with the rest of the platform so results cab be instantly visualized and refined
  - faster prototyping, R&D, and insight into your data

Image Server

with Raster Analytics

Image Server

An ArcGIS Server licensing role dedicated to the efficient processing, analysis and dissemination of imagery and rasters

- **Dynamic Image Services – 'Making your imagery accessible'**
  - Serve large collections of imagery and rasters with dynamic mosaicking and on-the-fly processing
- **Raster Analytics – 'Extracting information from imagery'**
  - Enabling massive distributed processing and analysis of imagery and rasters

Image Server | Raster Analytics

ArcGIS has a new way to create and execute
spatial analysis models and raster processing chains
which leverages distributed storage and analytics

Image Server | Raster Analytics: Adding to ArcGIS

Raster Analytics adds to existing ArcGIS concepts

Dynamic Raster Models

on-the-fly processing

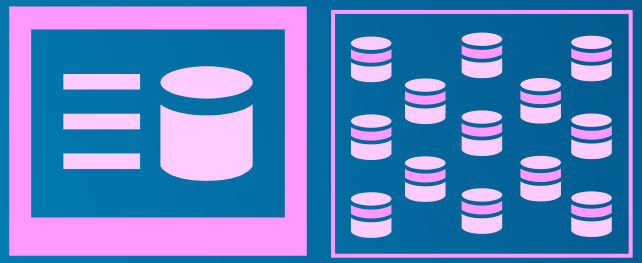
more

Geoprocessing Models / spatial analysis

powerful analytics

more

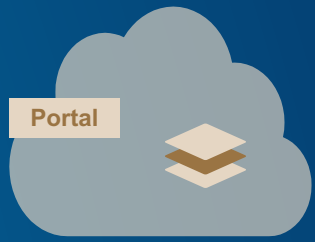
Server-based distributed processing and storage



Scalable distributed analytics with persisted storage

new

Web GIS Layers



Rich geoinformation model

extends

Image Server | Solve New Problems with Raster Analytics

- **Run models against data that is too big for single desktop**
  - Global rasters (big geography)
  - Large Scale (high resolution)
  - Large Collections (many)

- **Run models and meet time constraints**

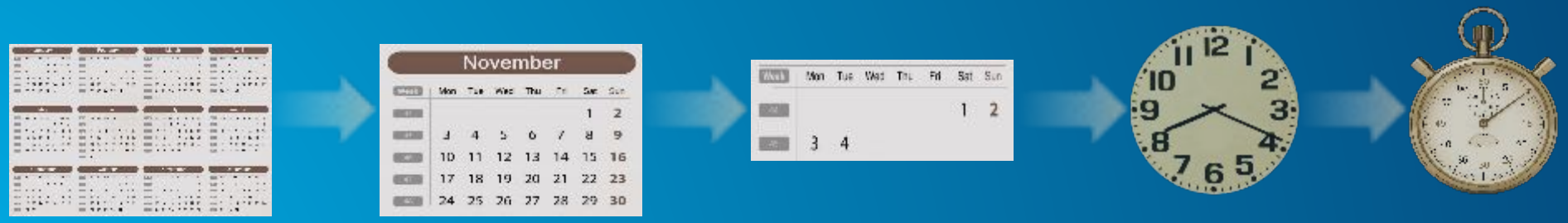


Image Server | Large and Powerful Collection of Raster Functions

Math

Abs
Arithmetic
Band Arithmetic
Calculator
Divide
Exp
Exp10
Exp2
Float
Int
Ln
Log10
Log2
Minus
Mod
Negate
Plus
Power
Round Down
Round Up
Square
Square Root
Times
Bitwise And
Bitwise Left Shift
Bitwise Not
Bitwise Or
Bitwise Right Shift
Bitwise Xor
Boolean And
BooleanNot
Boolean Or
Boolean Xor
Equal To
Greater Than
Greater Than Equal
Is Null
Less Than
Less Than Equal
Not Equal
ArgStatistics
Cell Statistics
Statistics
ACos
ACosH
ASin
ASinH
ATan
ATan2
ATanH
Cos
CosH
Sin
SinH
Tan
TanH

Conditionals

Con
Set Null

Correction

Apparent Reflectance
Geometric Correction
Speckle Filtering (Lee,Frost,Kuan)

Data Management & Conversion

Raster to Vector
Vector to Raster
Colormap
Colormap To RGB
Complex
Grayscale
Remap / Reclass
Spectral Conversion
Unit Conversion
Vector Field
LAS to Raster
LAS Dataset to Raster
Clip
Composite
Extract Bands
Mask
Mosaic Rasters
Rasterize Features
Reproject

Visualization & Appearance

Contrast and Brightness
Convolution
Pansharpening
Resample
Statistics and Histogram
Stretch

Interpolation

Interpolate Irregular Data
Nearest Neighbor
IDW
EBK
Swath

Surface Generation & Analysis

Aspect
Curvature
Elevation Void Fill
Hillshade
Shaded Relief
Slope
Viewshed

Analysis: Distance & Density

Euclidean Distance
Cost Distance
Least Cost Path
Kernel Density

Analysis: Overlay

Weighted Sum
Weighted Overlay

Analysis: Band Math & Indices

NDVI / NDVI Colorized
SAVI / MSAVI / TSAVI
GEMI
GVI (Landsat TM)
PVI
Tasseled Cap (Kauth-Thomas)
Binary Thresholding

Analysis: Zonal

Zonal Statistics

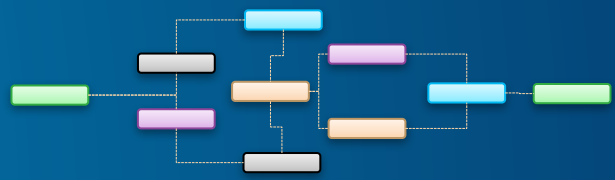
Analysis: Image Segmentation & Classification

Segmentation (Mean Shift)
Training (ISO, SVM, ML)
Supervised Classification

Python

Custom Algorithms

** Does not contain all capability of Spatial Analyst*



Chain functions together into Raster Models and apply them to answer complex questions

Image Server | ArcGIS is a comprehensive imagery platform

4

A base ArcGIS Enterprise deployment is required to utilize many of the new server capabilities such as:

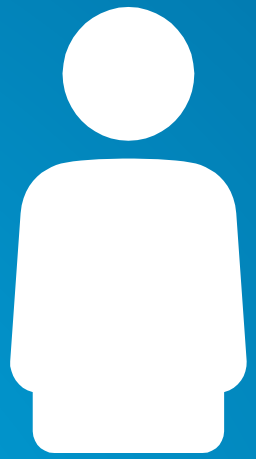
- GeoAnalytics Server
- Business Analyst Server
- Raster Analytics within the Image Server
- Using the spatiotemporal data store with GeoEvent Server

5 Living Atlas content is now available within Portal for ArcGIS.

This content can be accessed by applications that are connected to your portal, such as Insights for ArcGIS.

6

There is a new named user level available -- the Level 1.



- Equivalent to the Esri built-in role of Viewer
- Can view portal content including maps, apps, and data.
- Cannot create or own content.

ArcGIS Enterprise | Named Users

A named user is your identity within Web GIS.

ArcGIS Enterprise | Named Users

Level 1

Equivalent built-in roles: Viewer

Can view content, including maps, apps, and data.

Cannot create or own content.

Level 2

Equivalent built-in roles: Viewer, User, Publisher, Administrator

Can create, view, share, and own content, including maps, apps, and data. Specific permissions will vary depending on privileges granted.

7 Distributed Web GIS is introduced.

Roadmap

Portal to Portal Collaboration

Portal to ArcGIS Online Collaboration

ArcGIS Online Org to Org Collaboration

Dev – Staging – Production Workflows

7 Distributed Web GIS is introduced.

Roadmap

Portal to Portal Collaboration available at 10.5

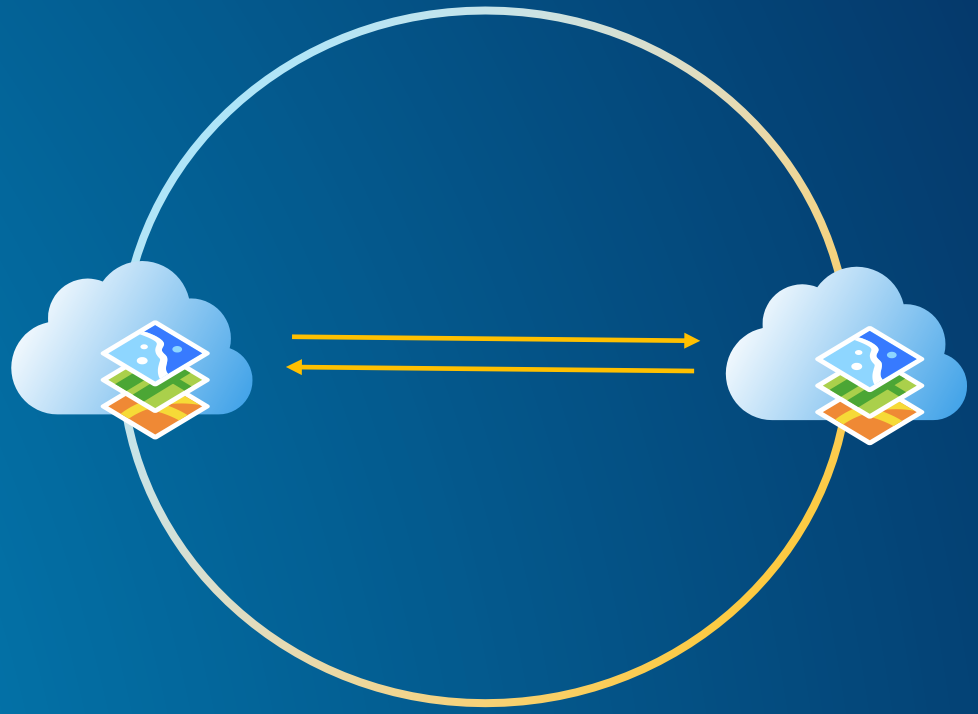
Portal to ArcGIS Online Collaboration

ArcGIS Online Org to Org Collaboration

Dev – Staging – Production Workflows

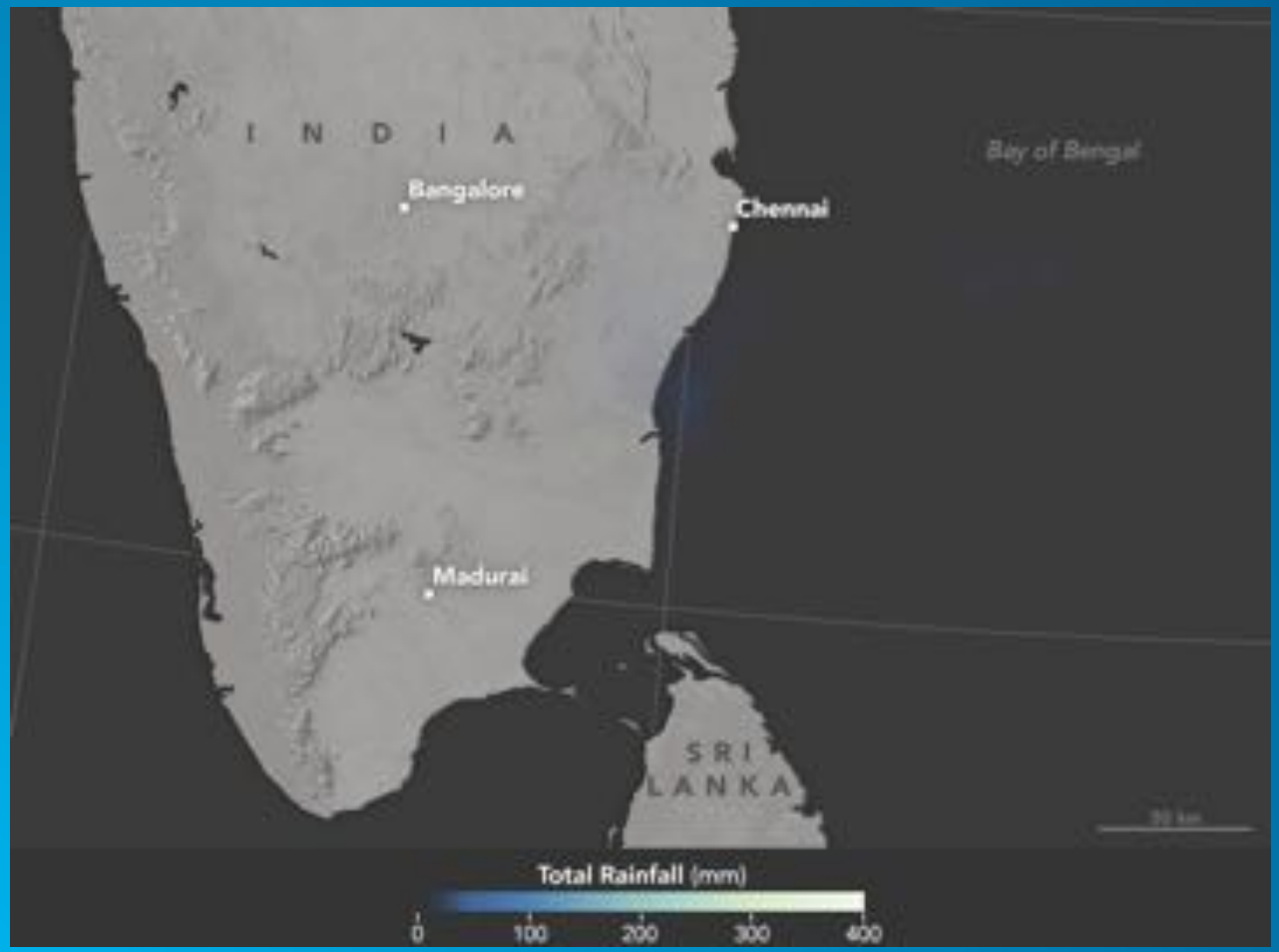
7 Distributed Web GIS is introduced.

Portal to Portal
Centralized
Collaboration Hub



Portal to Portal
Interdepartmental
Collaboration

8 Script your Web GIS with the ArcGIS Python API.



The ArcGIS Python API integrates well with the Jupyter Notebook and SciPy stack. It enables academics, data scientists, and GIS analysts to share programs and reproducible research with others.

- Automate workflows and perform repetitive tasks using scripts
- Perform analysis and big data analytics
- Update content
- Script ArcGIS for Portal Administration

9

We have continued to upgrade and improve the Web GIS experience:

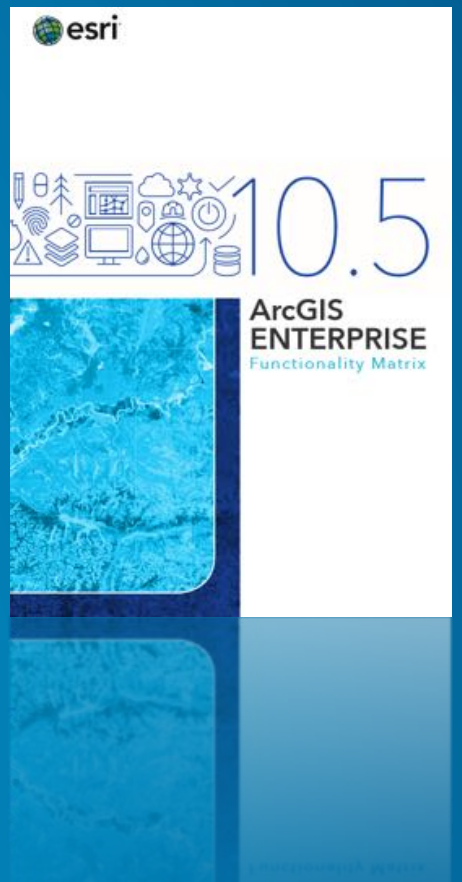
- Enhanced smart mapping
- New configurable app templates
- Redesigned item details pages incl. Data view
- New features in story maps
- New themes for Web App Builder

10

When you upgrade your existing ArcGIS for Server software to ArcGIS Enterprise 10.5 you must visit My Esri for a new software authorization file.

10.5

For more information on ArcGIS Enterprise including the Functionality Matrix, architecture recommendations, tutorials, and more; check out the ArcGIS Enterprise documentation available through the Esri website.



Understanding our world.