

# ArcGIS Platform Best Practices

Eric Rodenberg

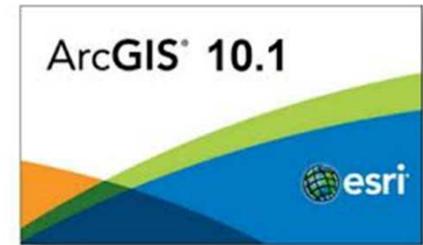
2013 Ohio GIS Conference  
Designing for the Future  
September 11-13, 2013



# Agenda

1. ArcGIS
2. Service Level Agreements
3. Geodata Management
4. Isolating Environments
5. Development Environments
6. Staging Environments
7. Disaster Recovery
8. Production Architectures
9. Virtualization
10. Esri Licensing
11. Configuring Services
12. Capacity and Load Testing
13. Cloud Computing
14. ArcGIS Online
15. Web Development Trends
16. Questions

# ArcGIS



# ArcGIS 10 - A Complete System

- Easier
- More Powerful
- Everywhere



# Service Level Agreements



SLA ?

# Service Level Agreements

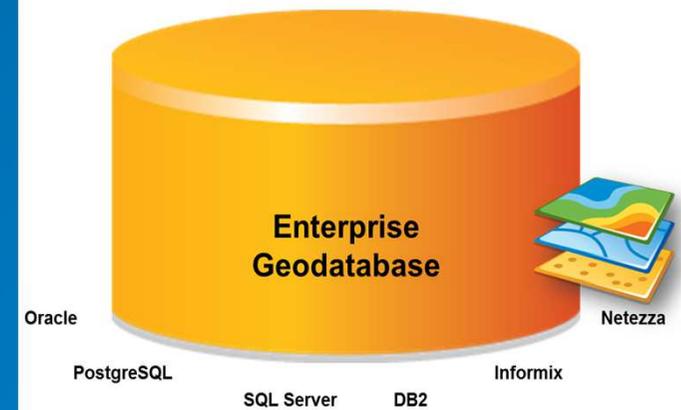
Level	Application	Measure
SLA 1	<p><b>Core Operations: e.g. public safety &amp; critical infrastructure</b>                      Participates in regulatory, legal, contractual workflows                      Contains sensitive customer (citizen) information                      Participates in portion of revenue stream</p>	<p>99.999%                      5.25 Min/Year                      25.9 Sec/Month                      6.05 Sec/Week</p>
SLA 2	<p><b>Directly effects the ability to operate workflow on an enterprise scale. Has the potential for near term revenue stream interruption if unavailable to disaster recovery system</b></p>	<p>95%                      18.25 days/year                      36 hours/month                      8.4 hours/week</p>
SLA 3	<p><b>Administrative Tools</b>                      Planning tools supporting local workflow                      Staging Systems</p>	<p>90%                      36.5 days/year                      72 hours/month                      16.8 hours/week</p>
SLA 4	<p><b>Prototype/Lab</b>                      Development Systems                      Supported by owner                      Does not participate in workflow but supports development</p>	<p>As Needed</p>

# What is High Availability

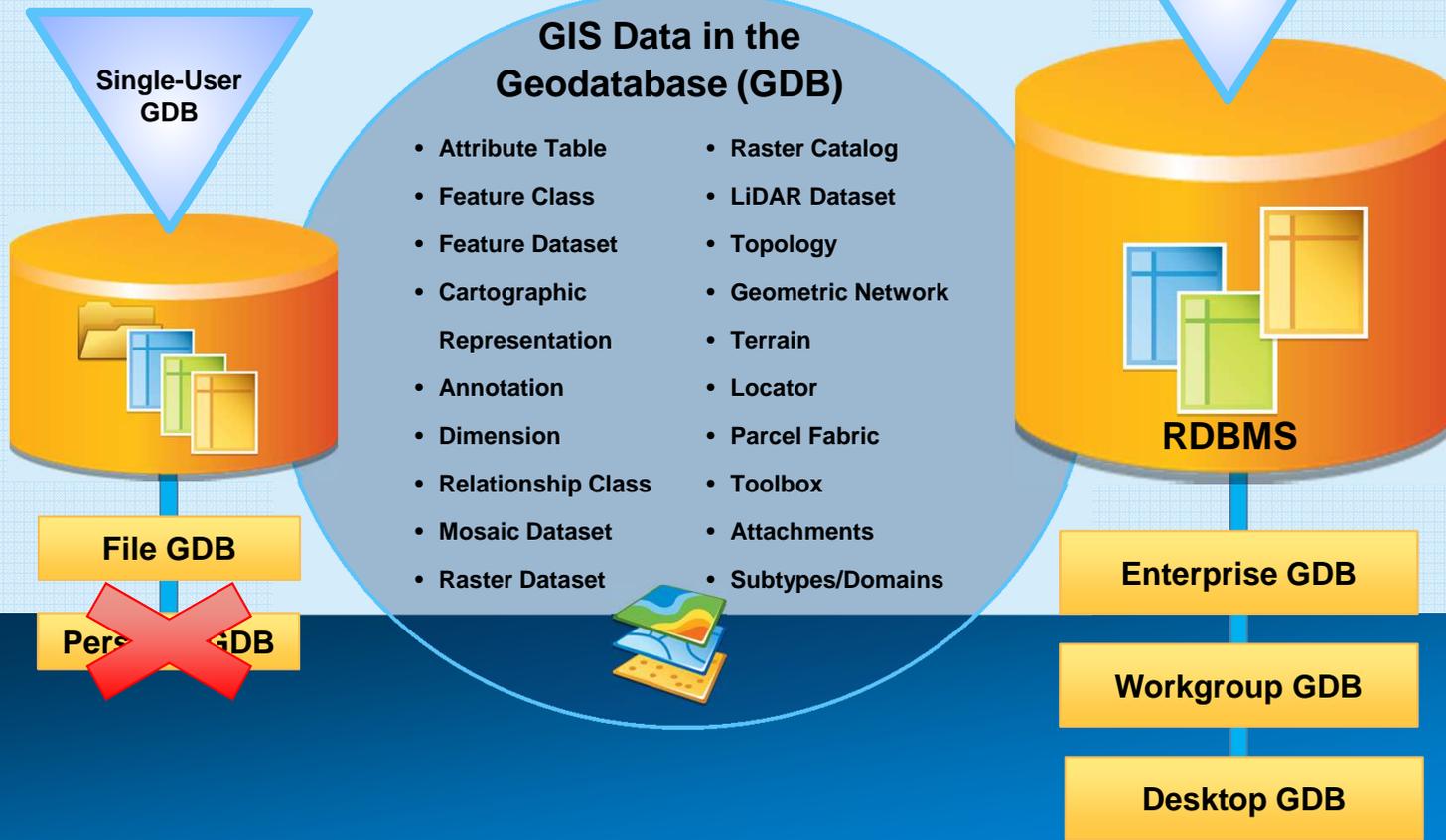
- Amazon EC2 provides 99.95% uptime
- ArcGIS Online provides 99.9% uptime

Availability	Downtime Per Week	Downtime Per Month	Downtime Per Year
99.999%	6.05 seconds	25.9 seconds	00:5:15
99.99%	1.01 minutes	4.32 minutes	00:52:33
99.95%	5.04 minutes	21.56 minutes	4:19:00
99.9%	10.1 minutes	43.2 minutes	8:45:00
99%	1.68 hours	7.2 hours	3:15:36:00

# Geodata Management

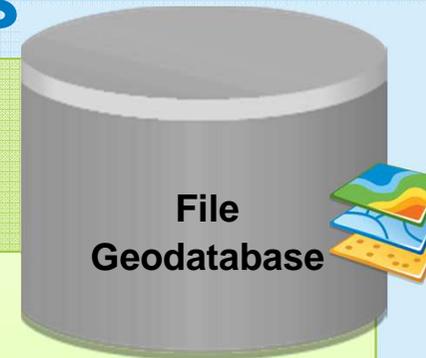


# Geodatabase Basics



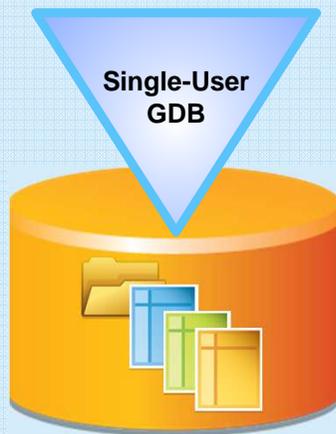
# File Geodatabase Benefits

Structural	<ol style="list-style-type: none"><li>1. Cross Platform</li><li>2. Optimized performance</li><li>3. Few Size Limitations</li></ol>
Performance	<ol style="list-style-type: none"><li>4. Easy data migration...</li><li>5. Improved editing model</li><li>6. Store raster and vector... together</li></ol>
Data Management	<ol style="list-style-type: none"><li>7. Customizable storage configuration</li><li>8. Allows updates to spatial indexes</li><li>9. Allows the use of data compression</li></ol>



# ArcGIS for Server & Databases

*File Geodatabase or SDE...?*



## Use File GDB if...

- No DBA
- Static Data
- Read Only applications
- Map Caching
- Can participate in 1 way replication

**\*File Geodatabase should reside on ArcGIS Server or SAN.**

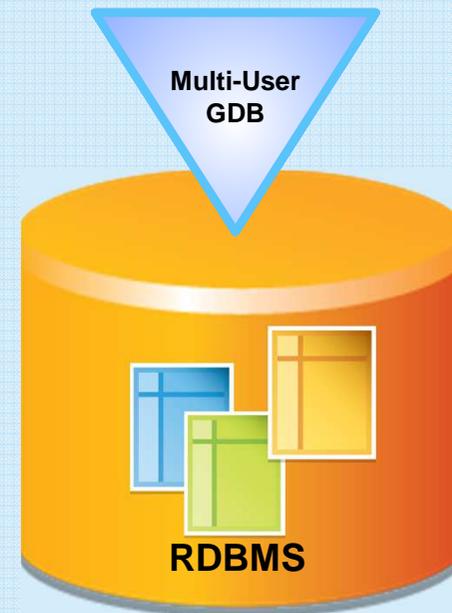
# ArcGIS for Server & Databases

*File Geodatabase or SDE...?*

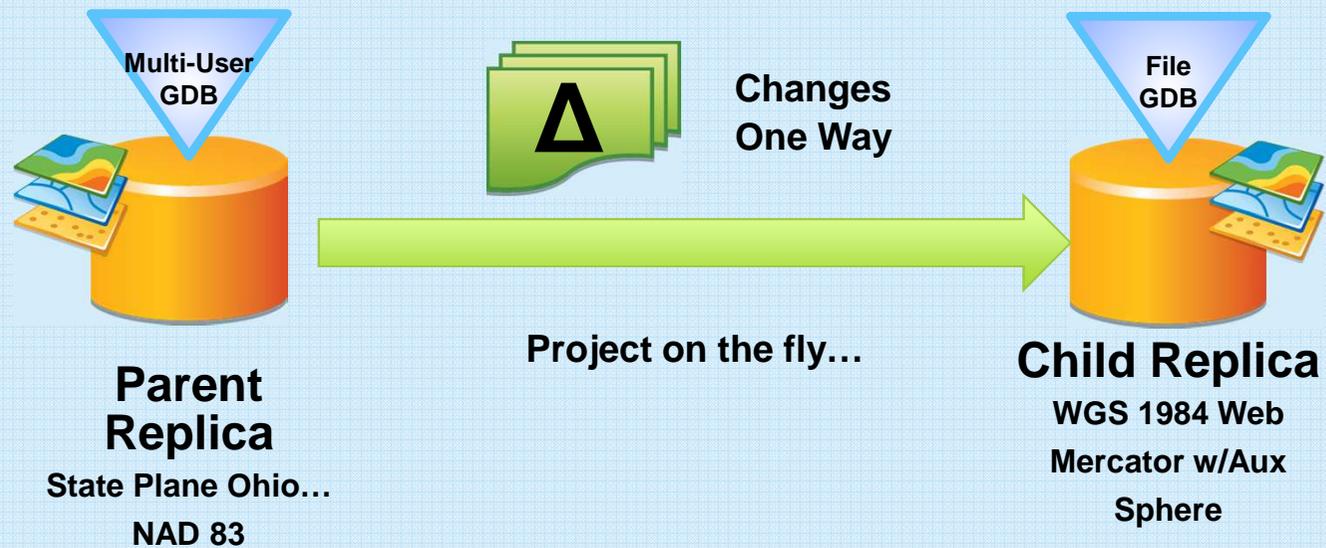
## Use Enterprise GDB if...

- DBA manages data
- Require Versioning
- Web Editing required
- 2 Way Replication workflows

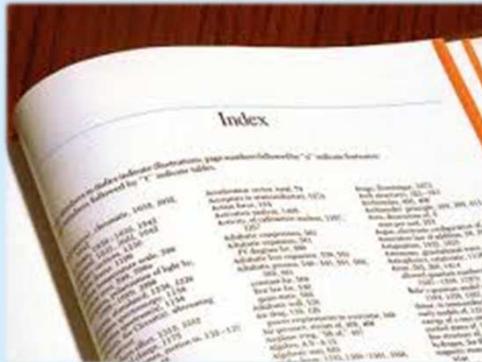
\*SDE should be deployed on a separate “publication” database server.



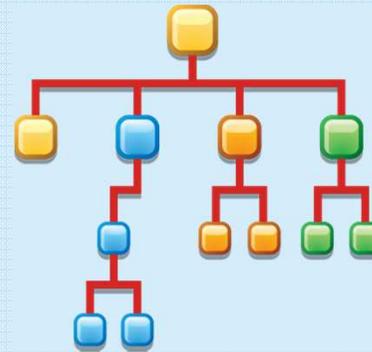
# Caching and GDB Replication



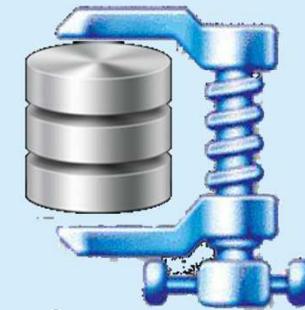
# SDE Best Practices



Rebuild Indexes Regularly

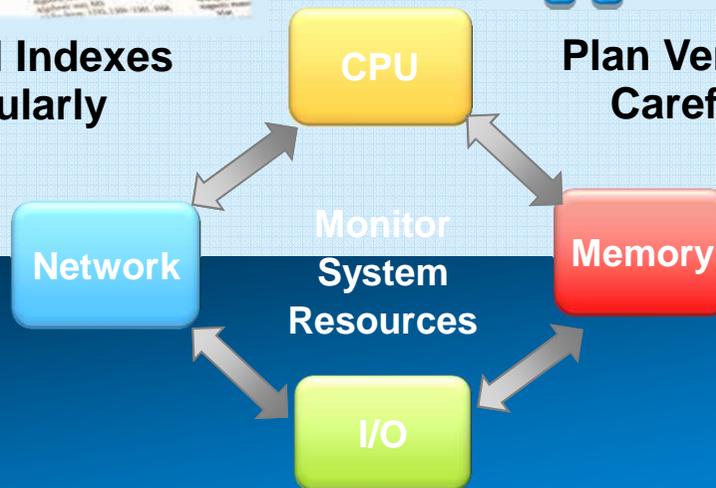


Plan Versions Carefully



Compress Geodatabase Often

$\Sigma$   
Update Statistics Frequently



# Isolating Environments



Isolation  
We'll dig

# When Do You Isolate Servers



**Availability**



**3<sup>rd</sup> Party Integration**

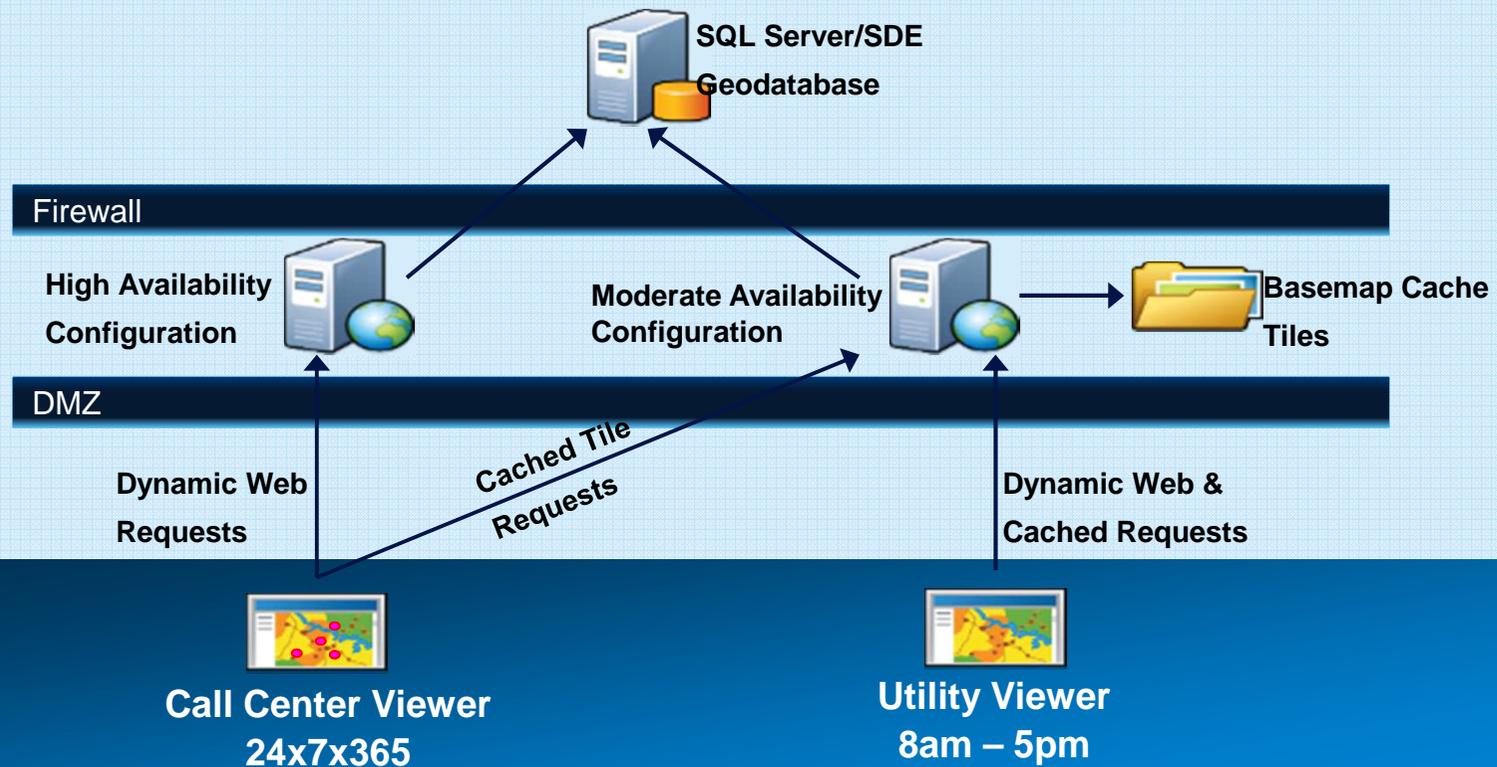


**Security**

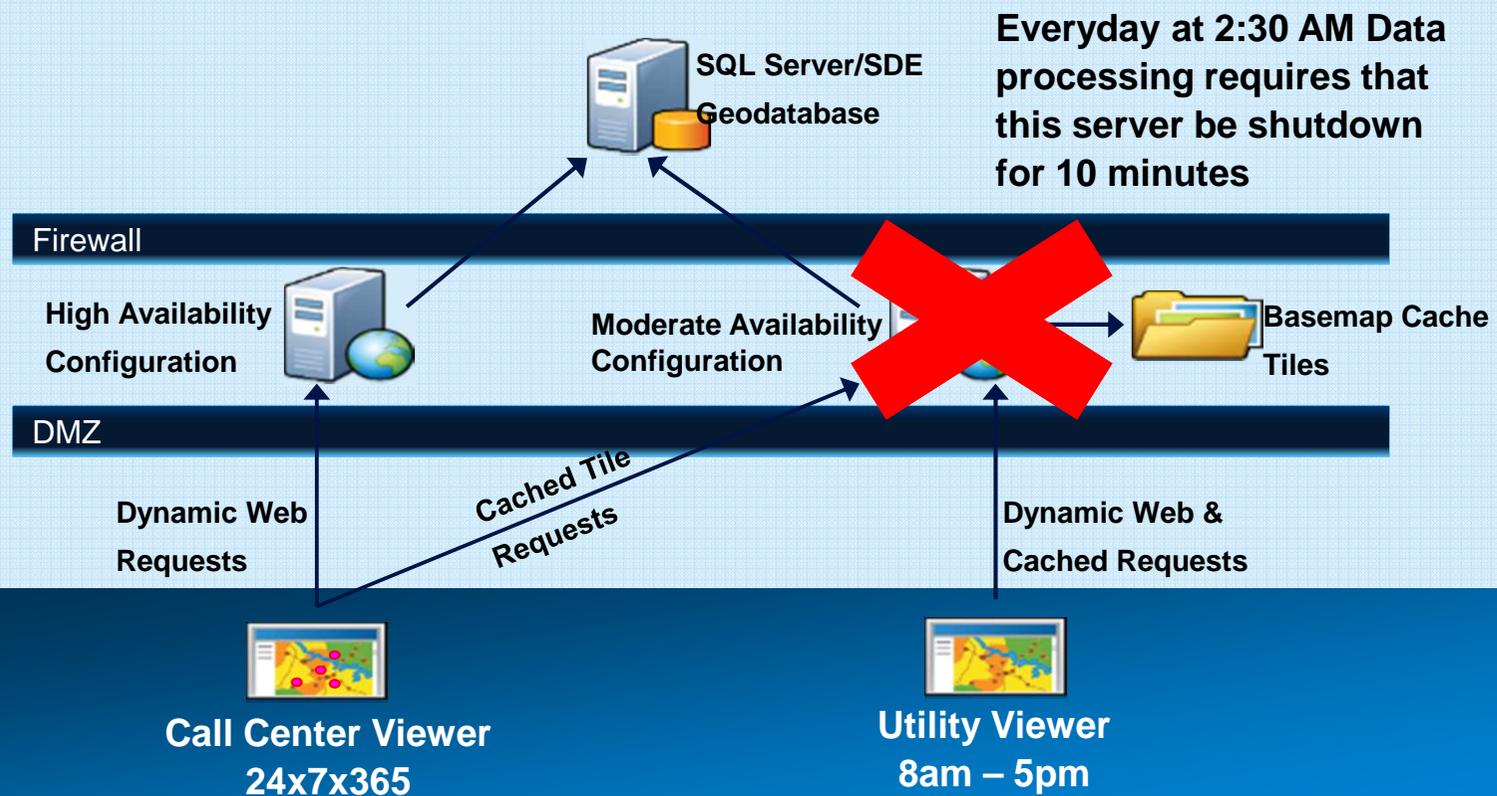


**Server Management**

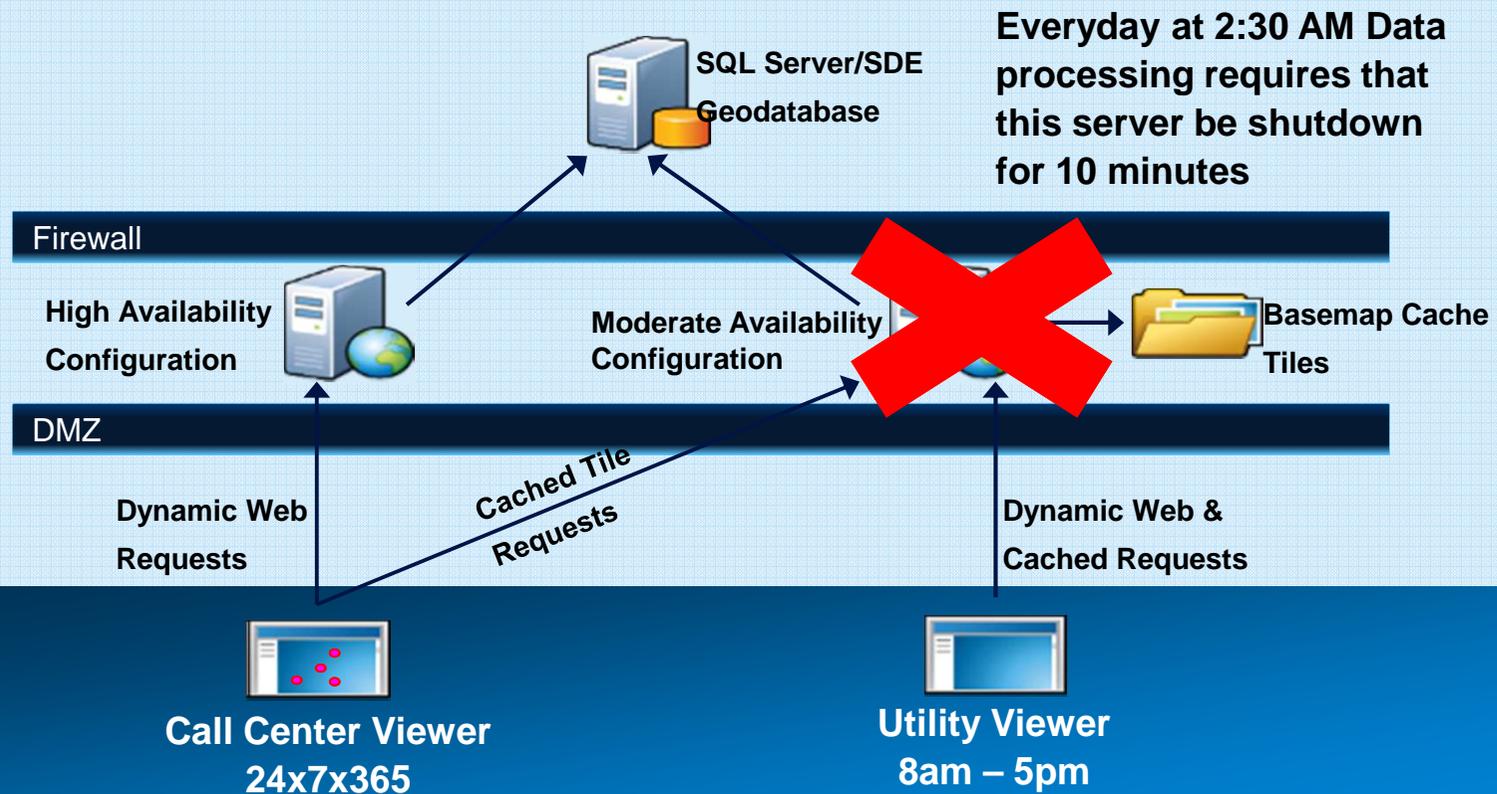
# Why Isolate Services & Applications



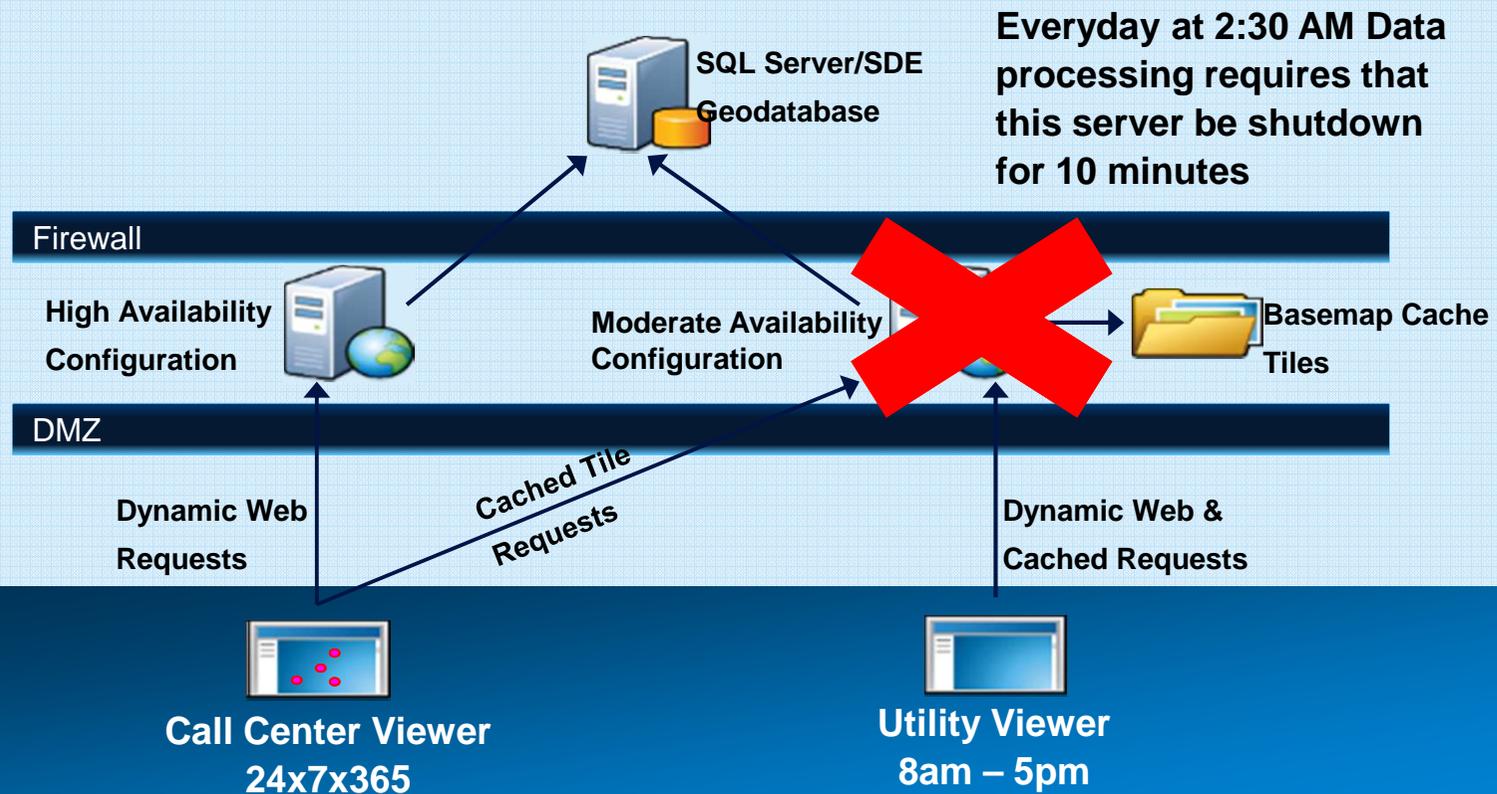
# Why Isolate Services & Applications



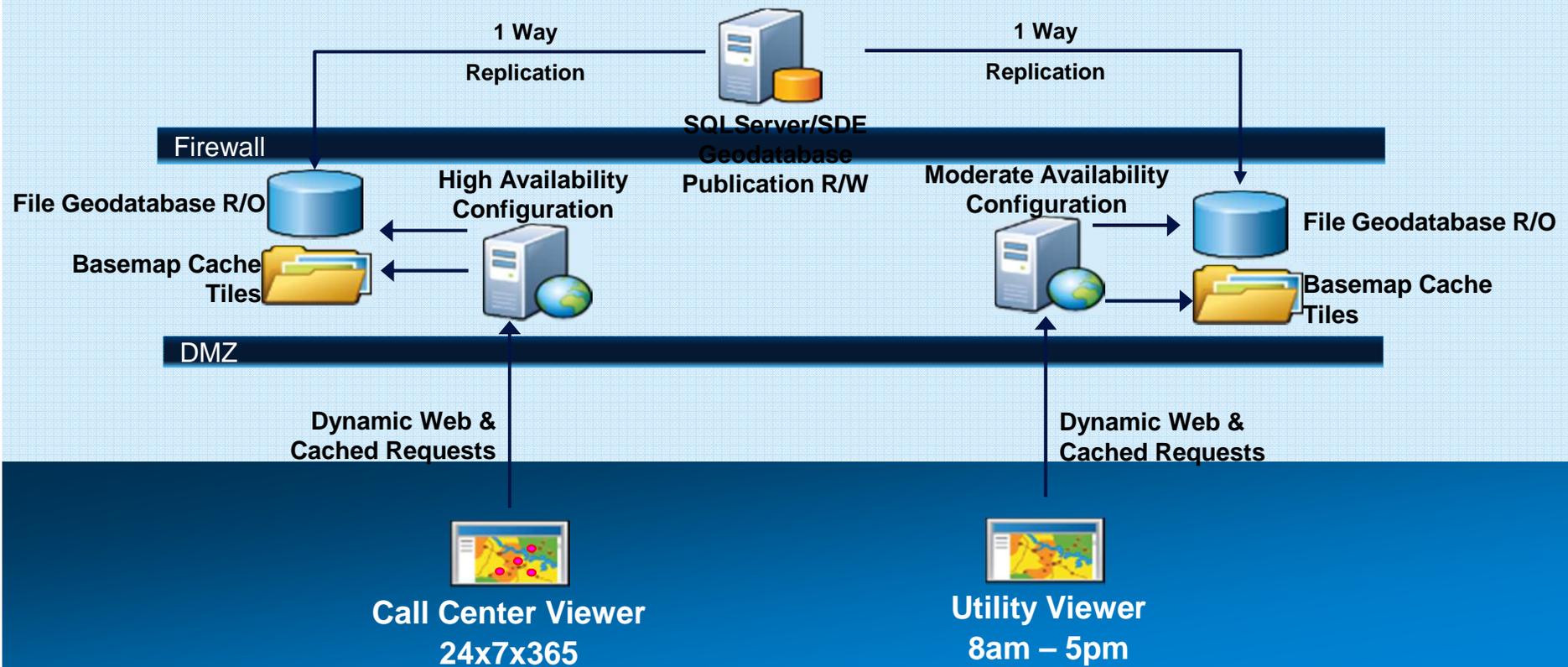
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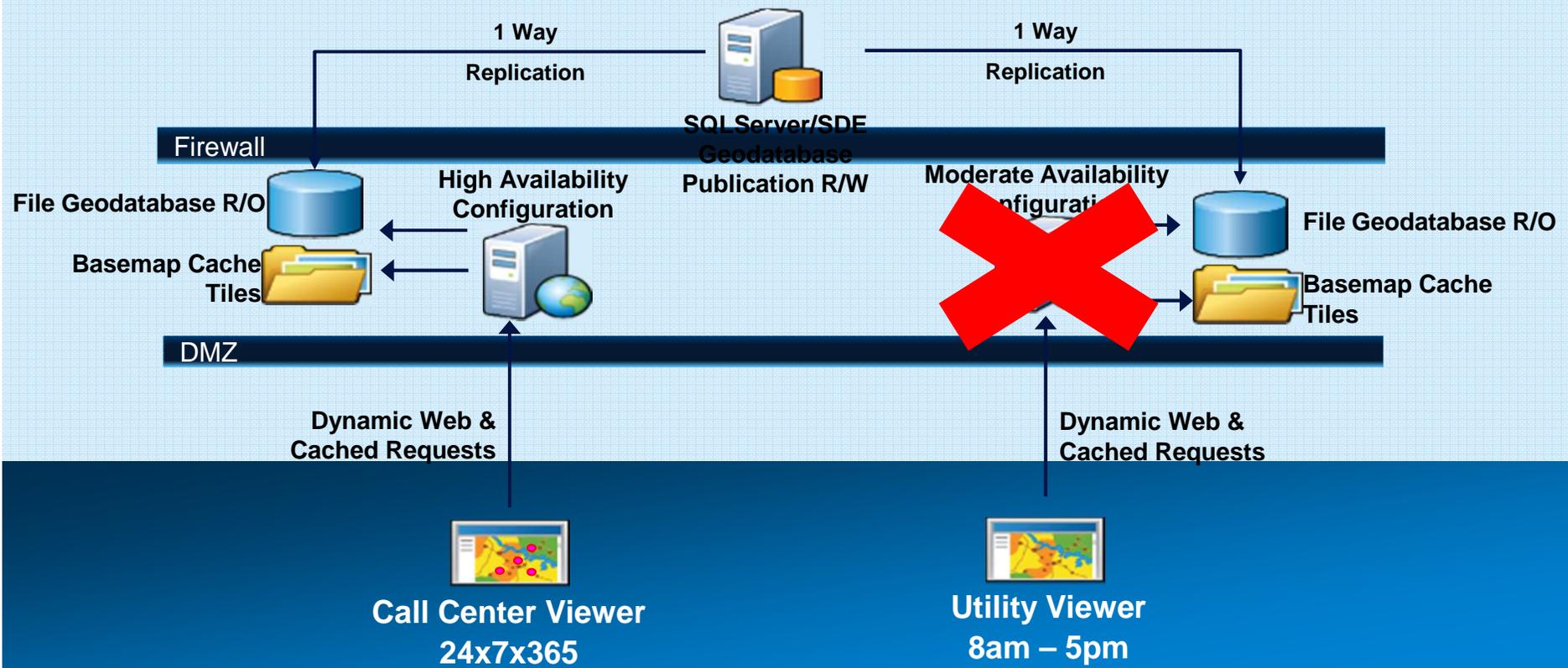
# Why Isolate Services & Applications



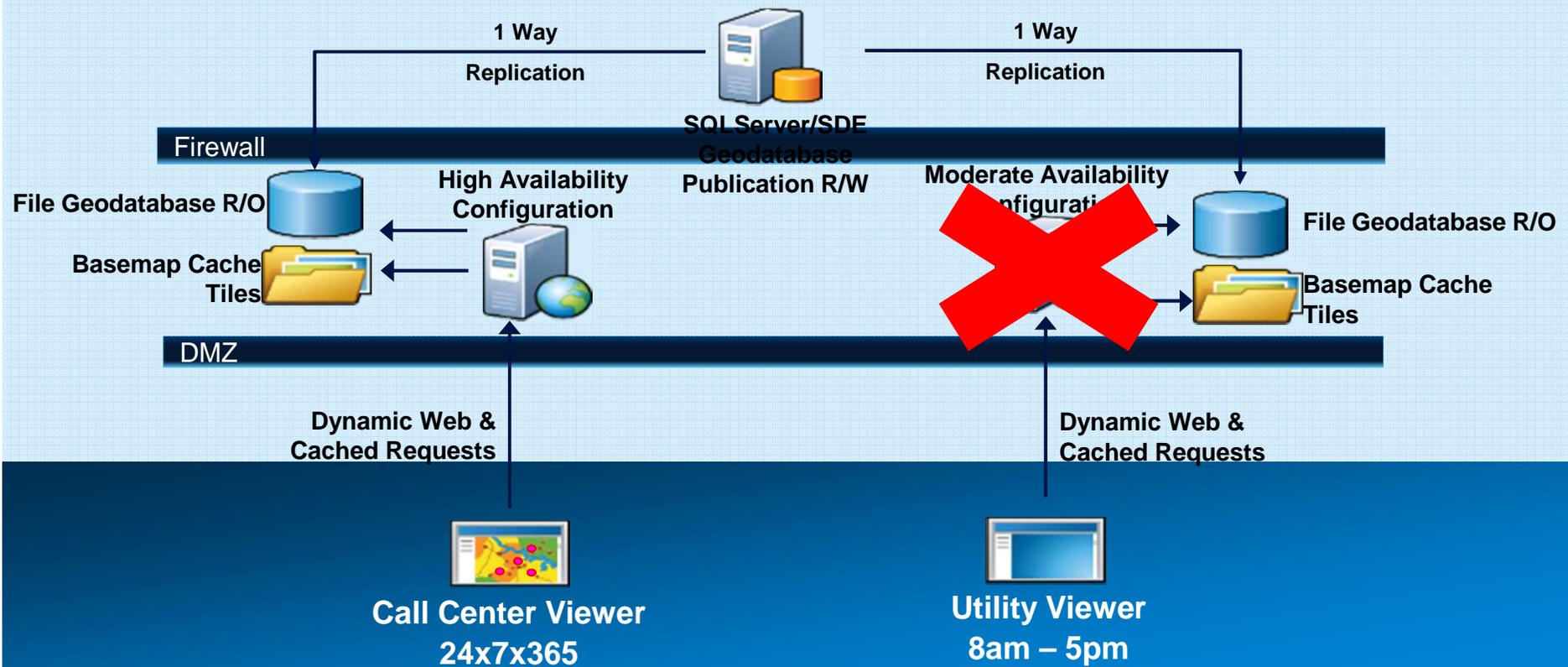
# Why Isolate Services & Applications



# Why Isolate Services & Applications

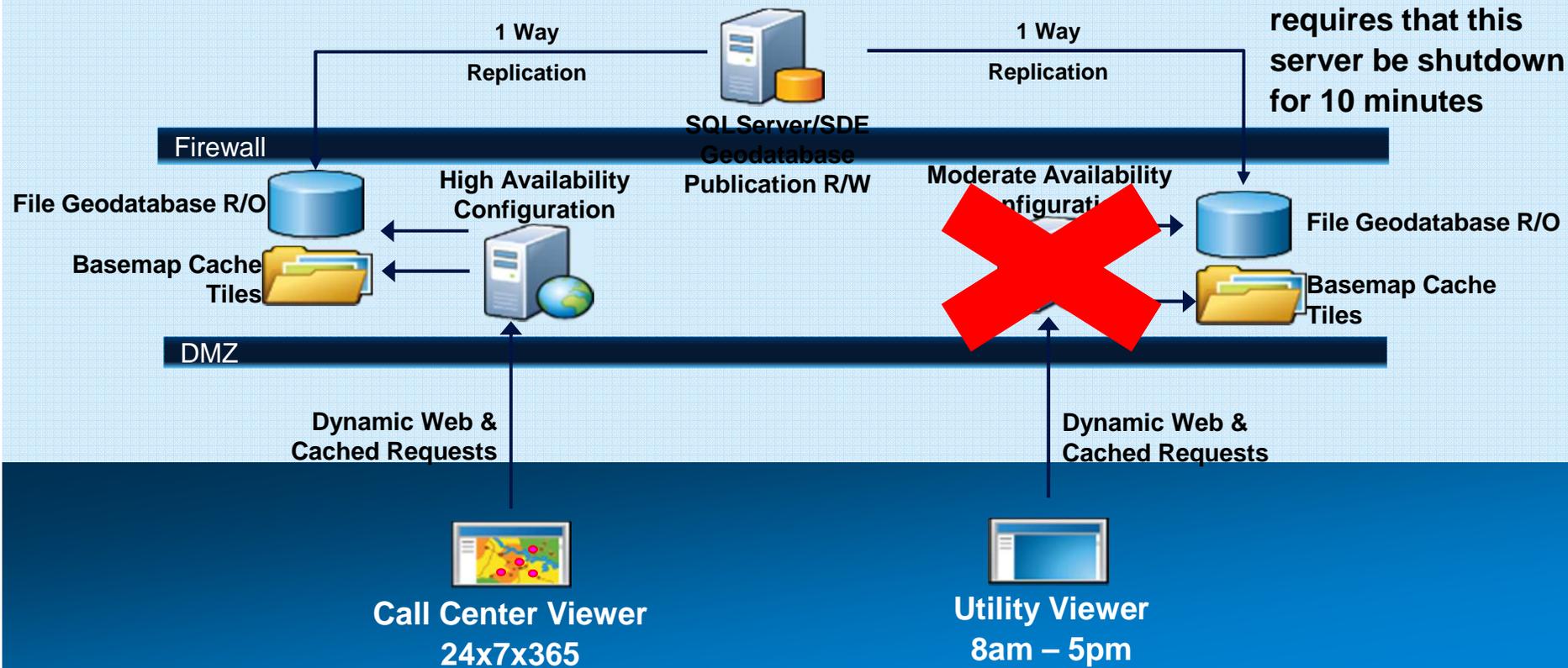


# Why Isolate Services & Applications



# Why Isolate Services & Applications

Everyday at 2:30 AM  
Data processing  
requires that this  
server be shutdown  
for 10 minutes



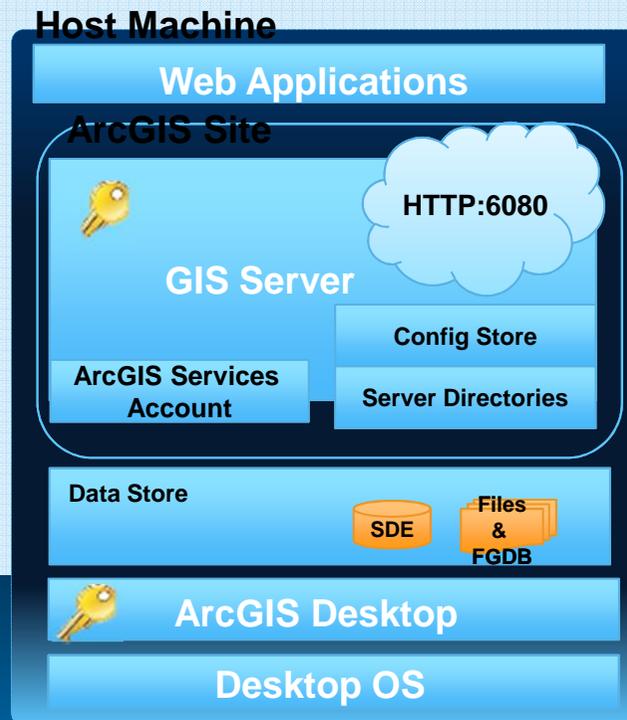
# Development Environment



# Development Environment



# Single Machine Deployment (Development Only)



Components requiring licensing

# Staging Environments

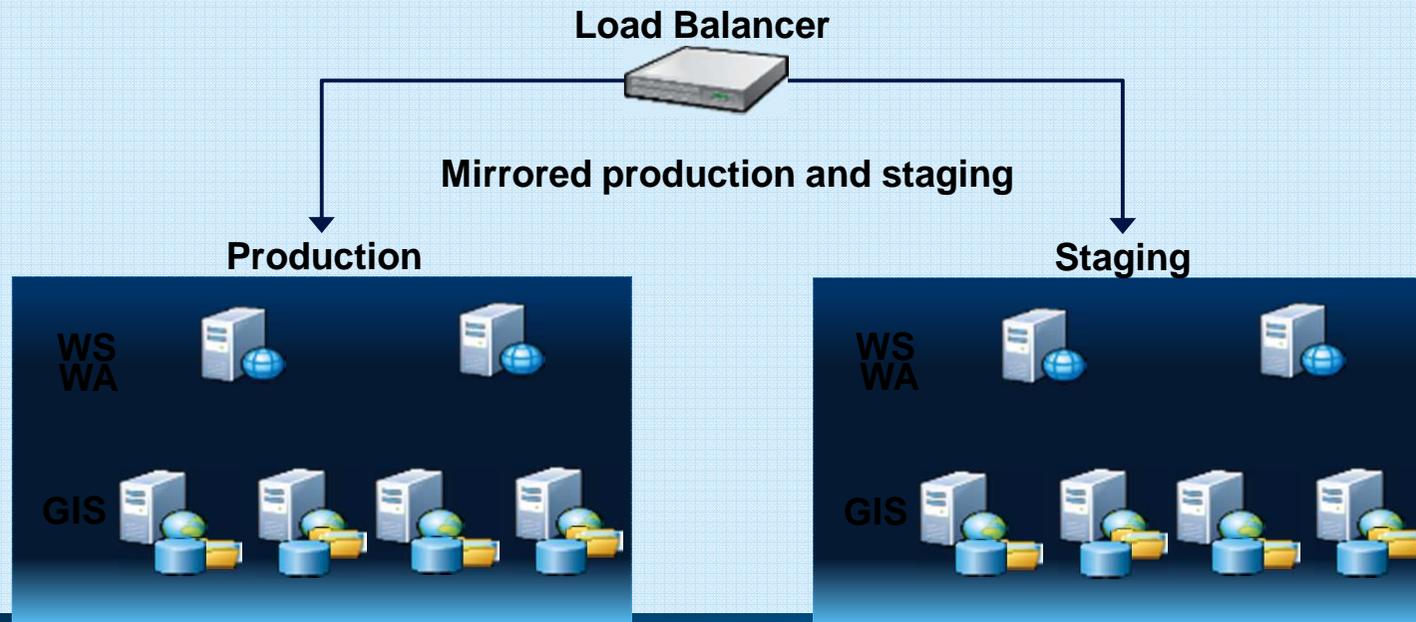


# I Need a Staging Environment?

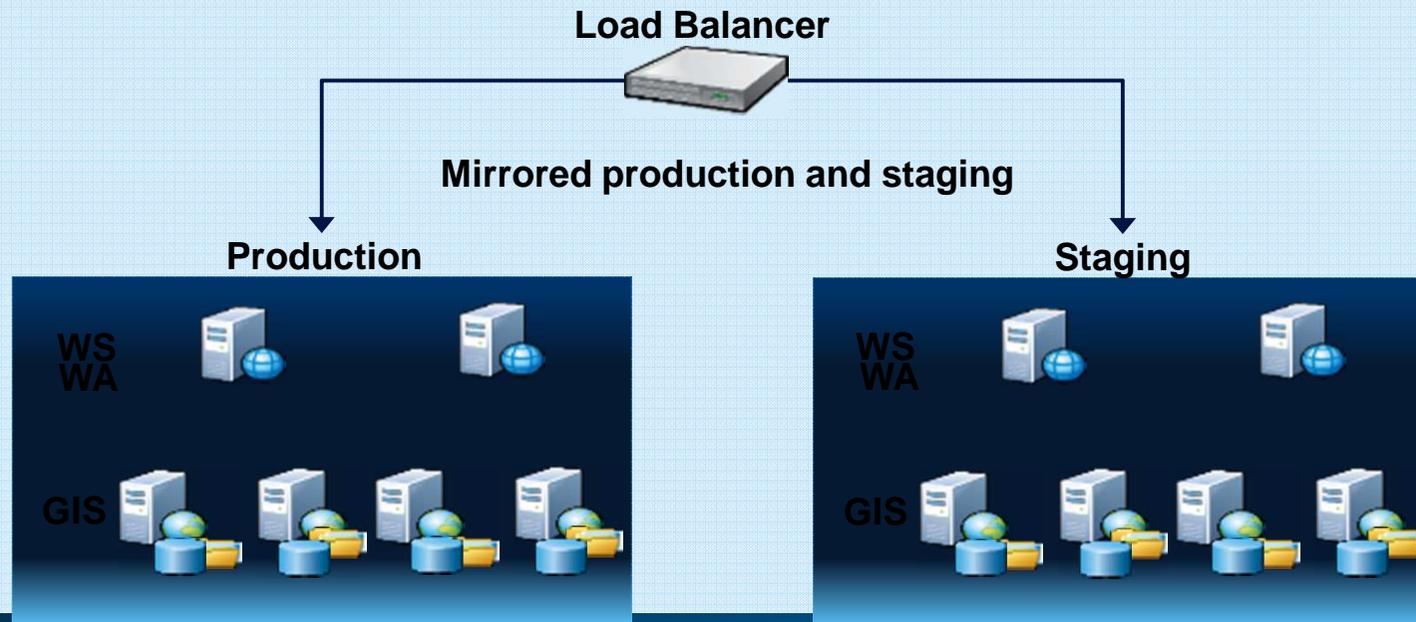
*Benefits of Staging Environment...*



# Reroute DNS: Staging and Production

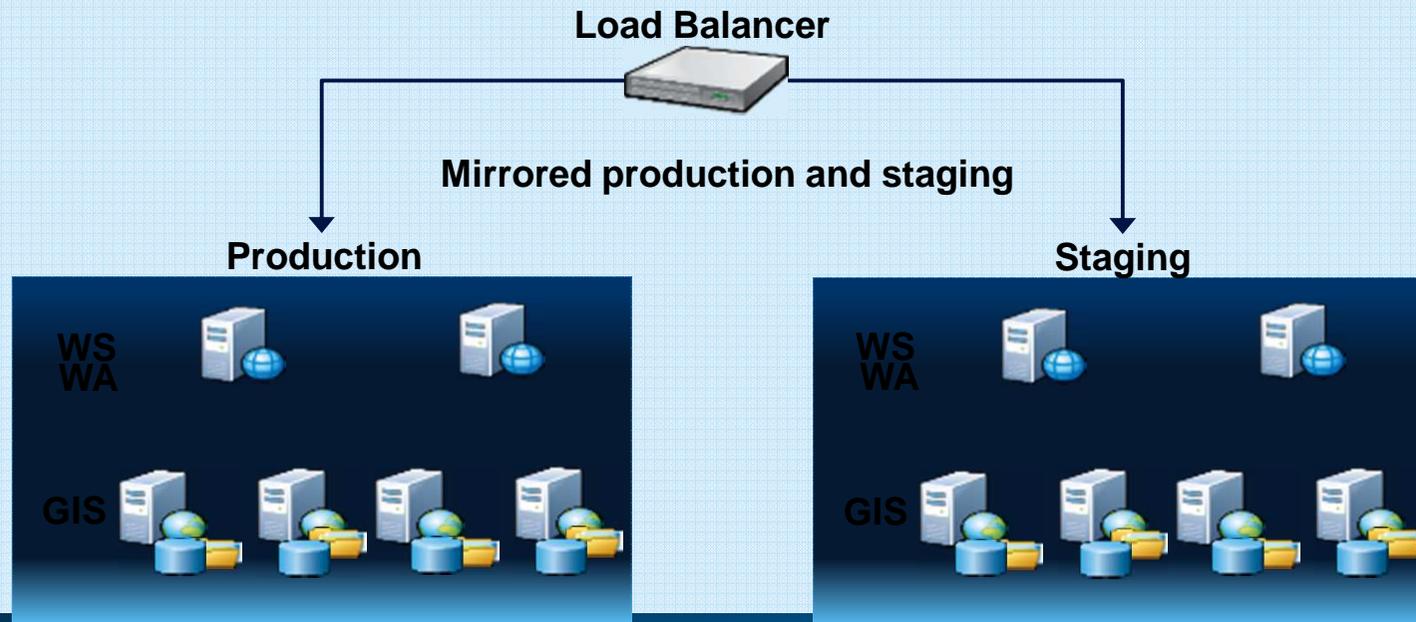


# Reroute DNS: Staging and Production



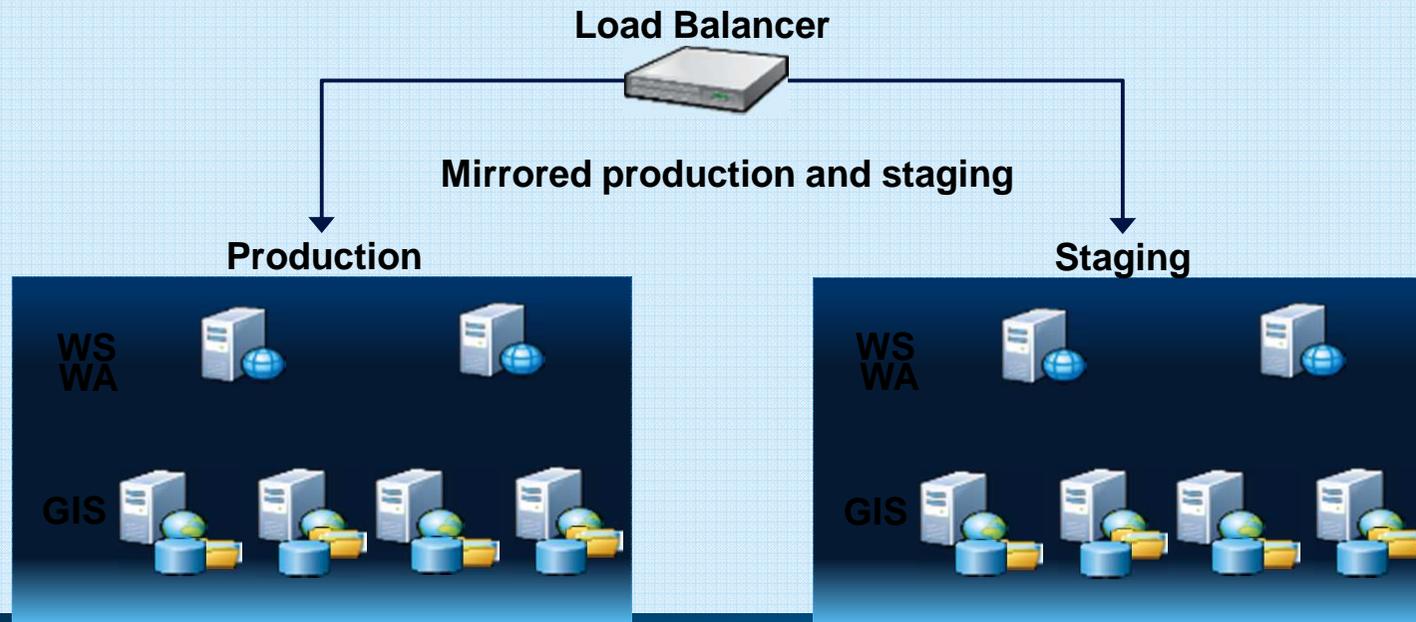
Every Night at 2:30 AM Cache Tiles are updated based on changes made during the day.

# Reroute DNS: Staging and Production



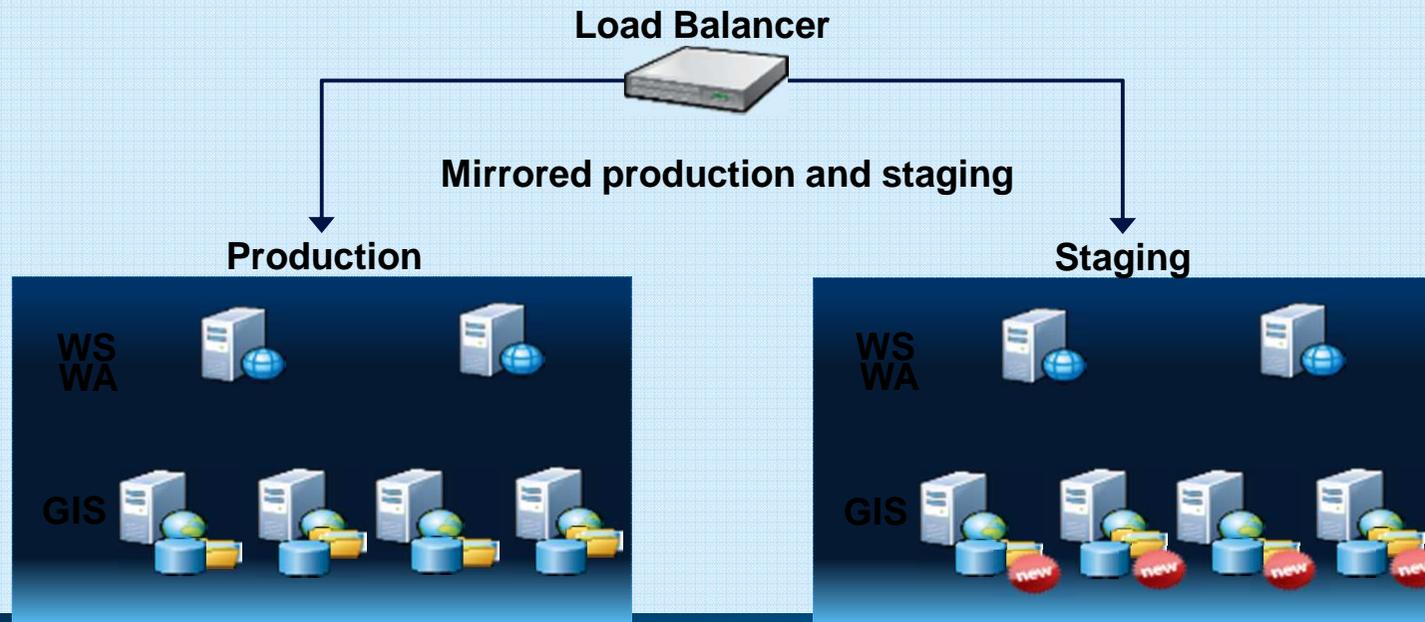
Changed tiles are pushed to the staging system causing no disruption of service to the production environment.

# Reroute DNS: Staging and Production



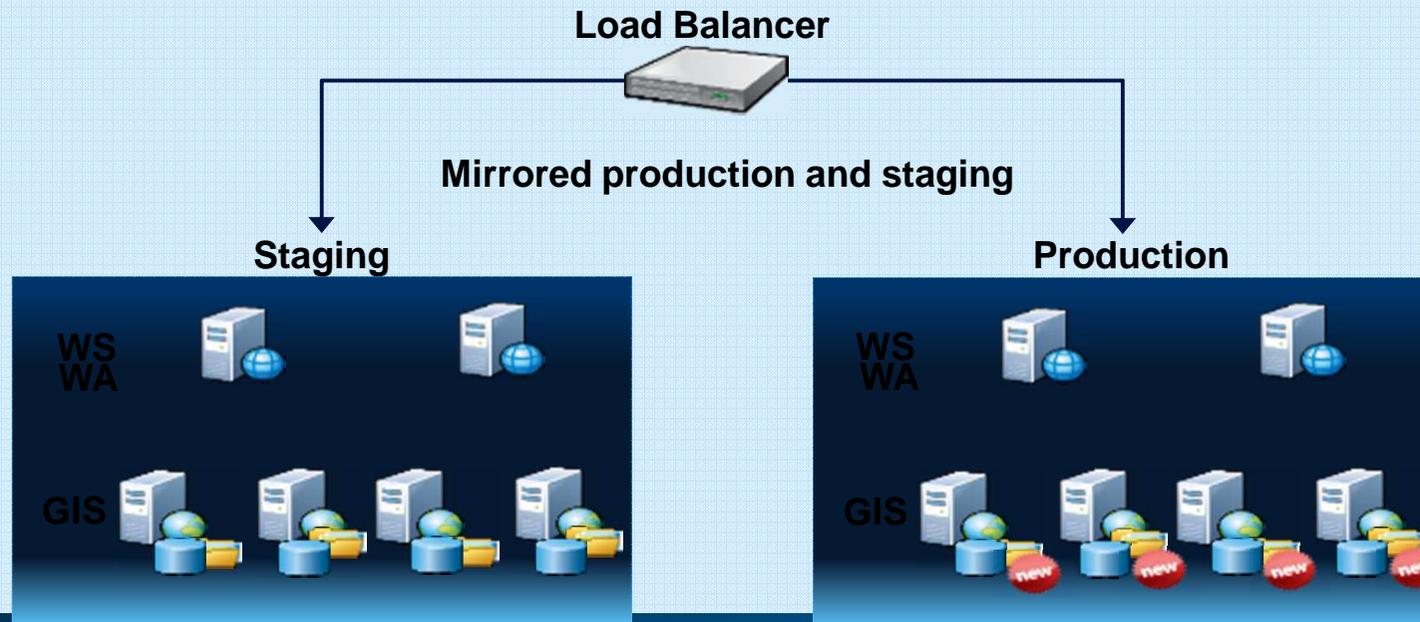
Staging Server is now more current than Production.

# Reroute DNS: Staging and Production



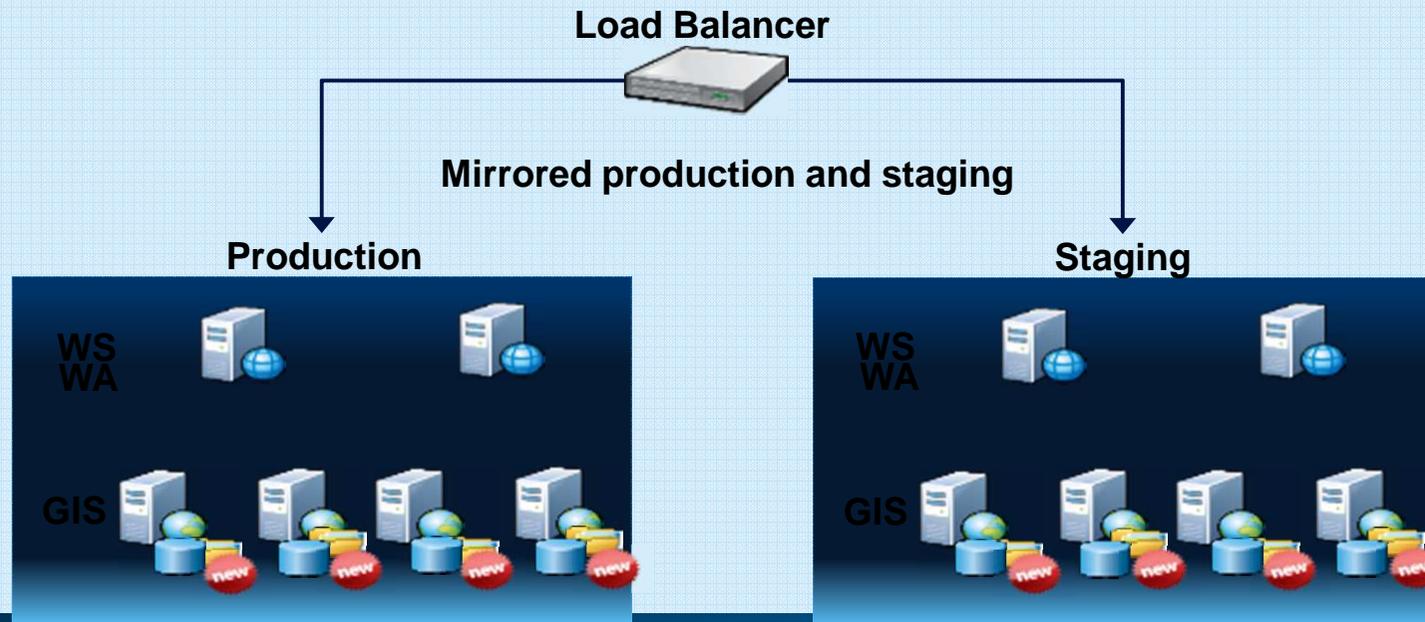
Staging Server is now more current than Production.

# Reroute DNS: Staging and Production



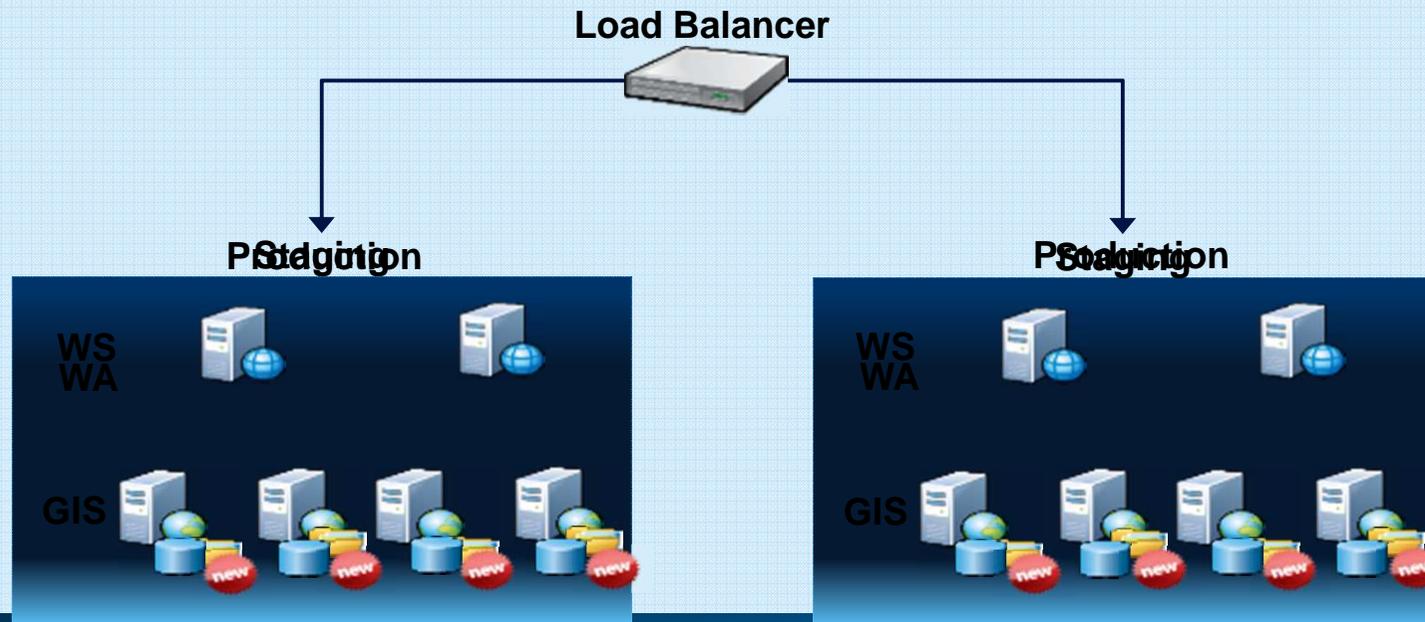
**Redirect Load Balancer to point all incoming traffic to what was staging and is now the production environment. This is assuming you are NOT performing user acceptance testing.**

# Reroute DNS: Staging and Production



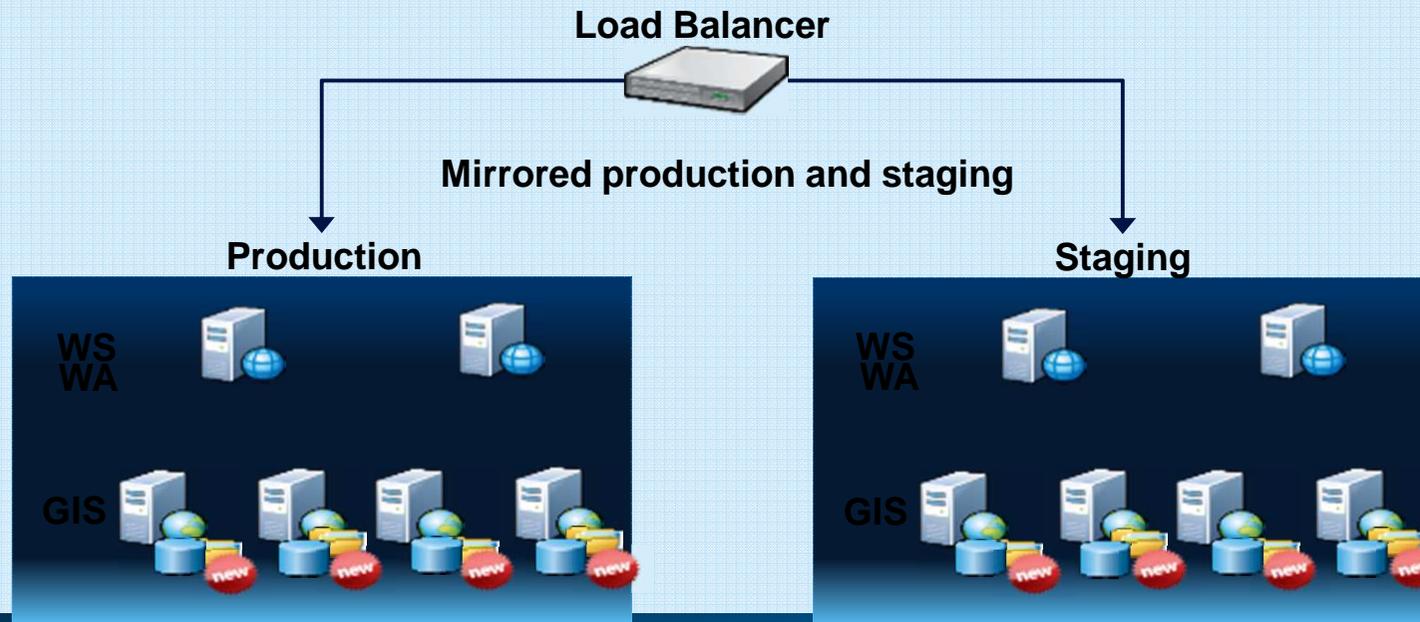
Update your new staging environment with the updated cache tiles.

# Reroute DNS: Staging and Production



Update your new staging environment with the updated cache tiles.

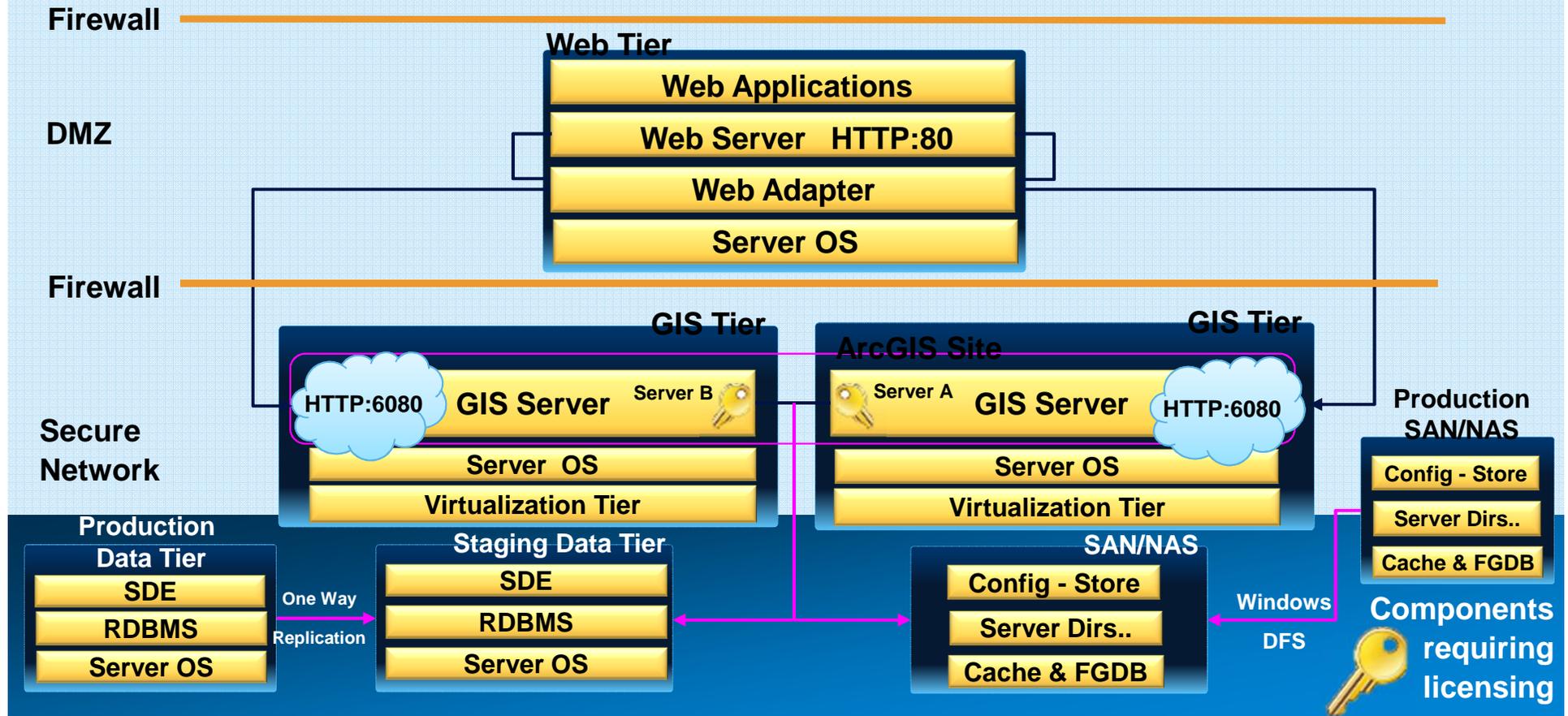
# Reroute DNS: Staging and Production



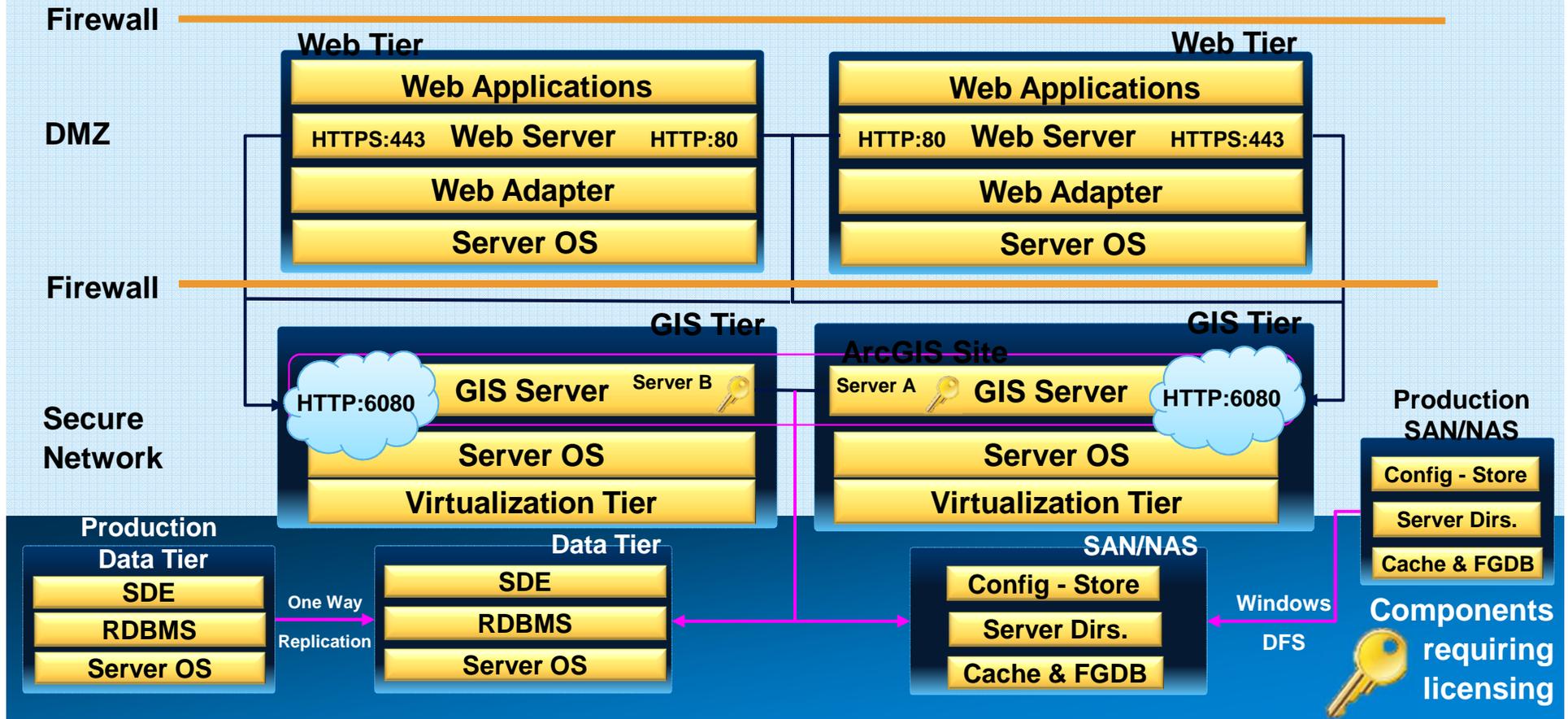
This Architecture requires both production and staging licenses of ArcGIS Server  
ELA's also are another licensing mechanism that makes this architecture possible.

# Multi Machine Site

(moderate availability)

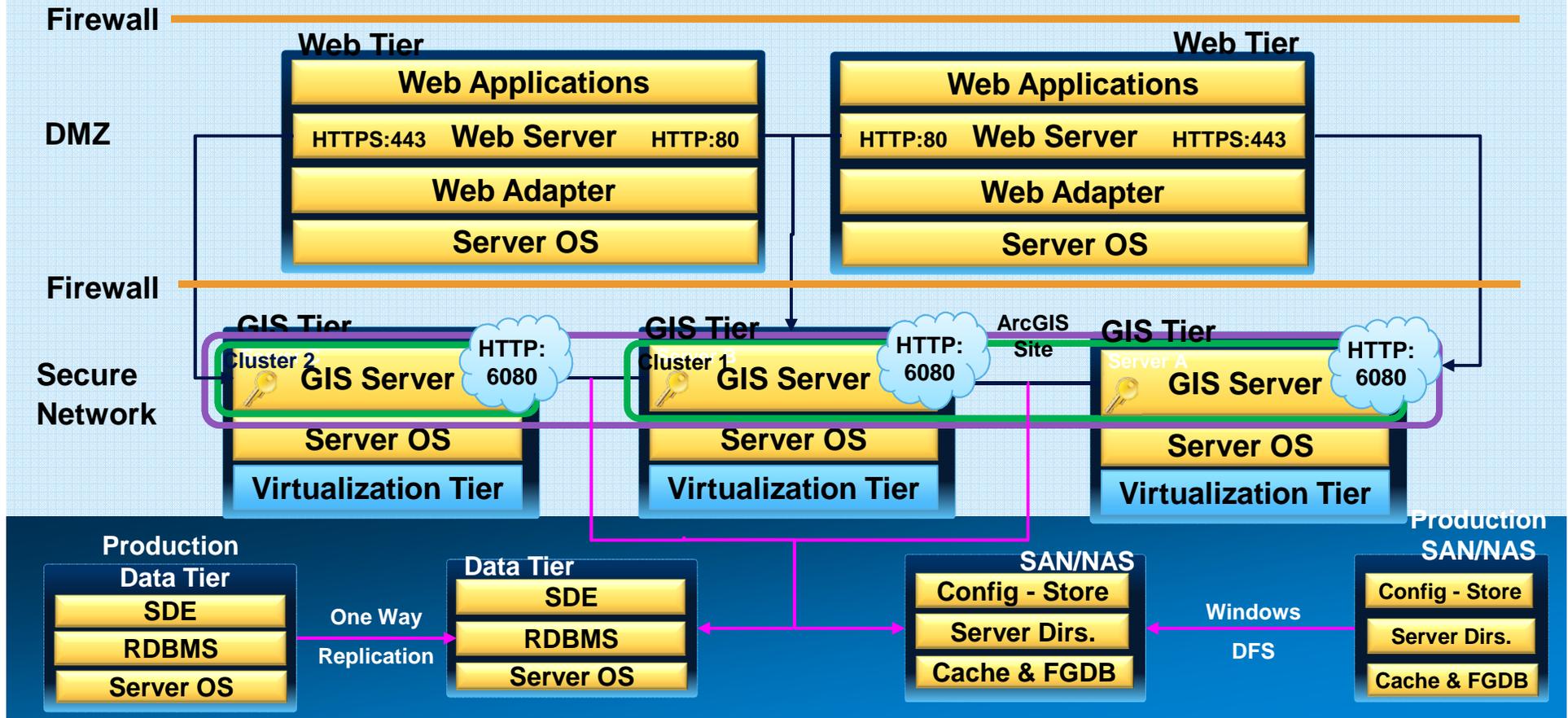


# Multi Machine Site (High Availability) with SSL



# Multi Machine Site (High Availability with Clusters)

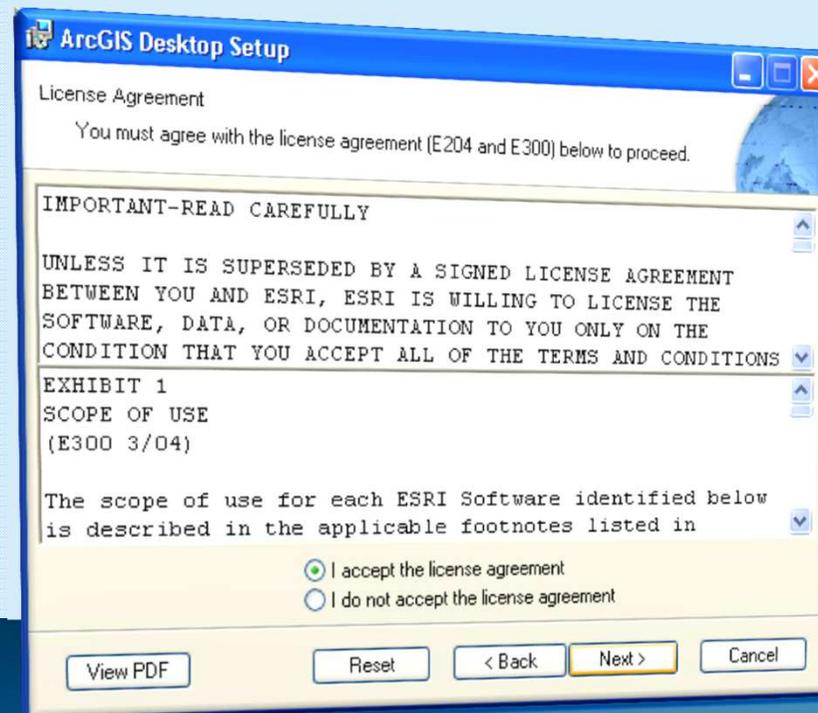
Components requiring licensing 



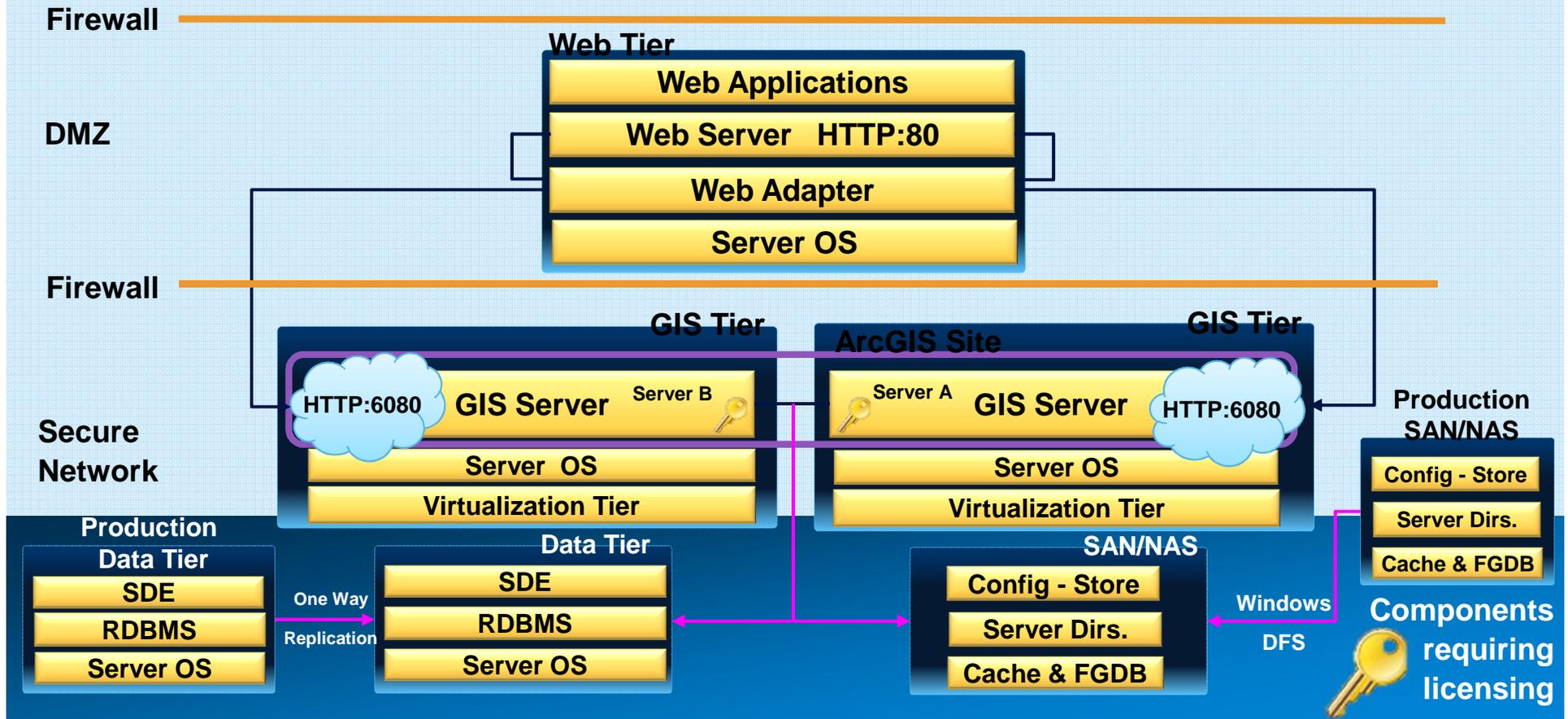
# Disaster Recovery



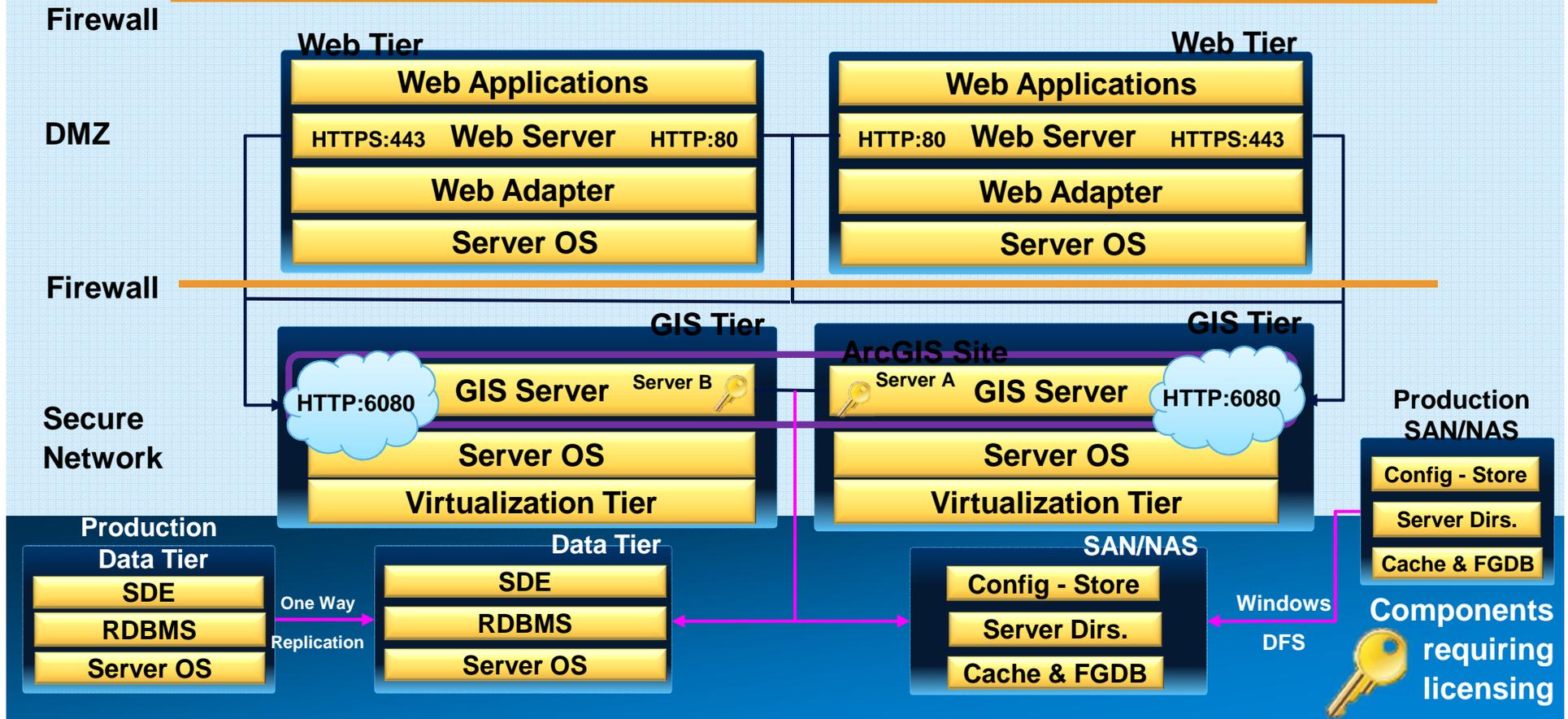
# Disaster Recovery



# Multi Machine Site (moderate availability)

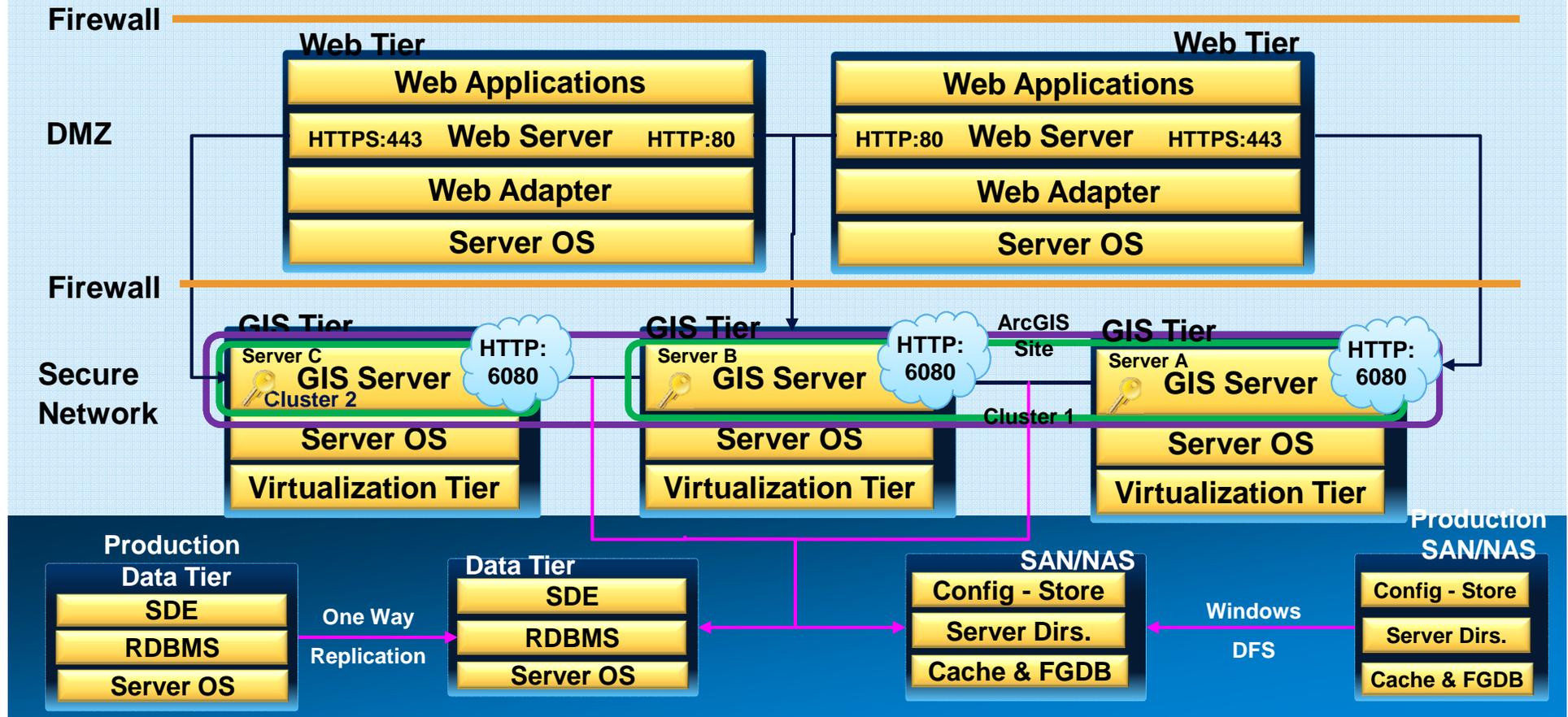


# Multi Machine Site (High Availability) with SSL



# Multi Machine Site (High Availability with Clusters)

Components requiring licensing 



# Production Architectures



# Moderate Availability Architecture

**SLA 2**

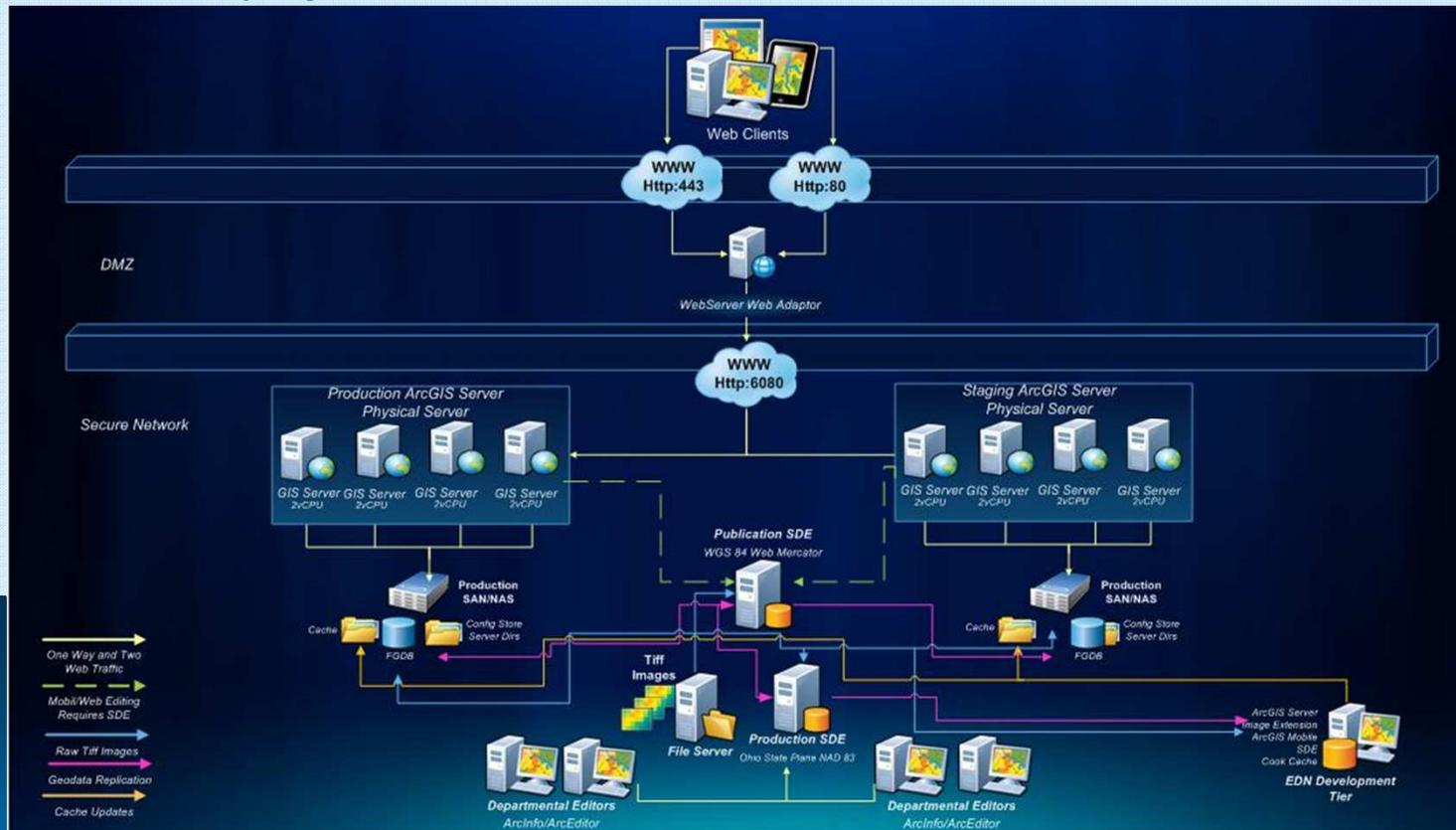
Directly effects the ability to operate workflow on an enterprise scale. Has the potential for near term revenue stream interruption if unavailable to disaster recovery system

**95%**  
**18.25 days/year**  
**36 hours/month**  
**8.4 hours/week**



# Moderate Availability Architecture

Baseline Deployment...



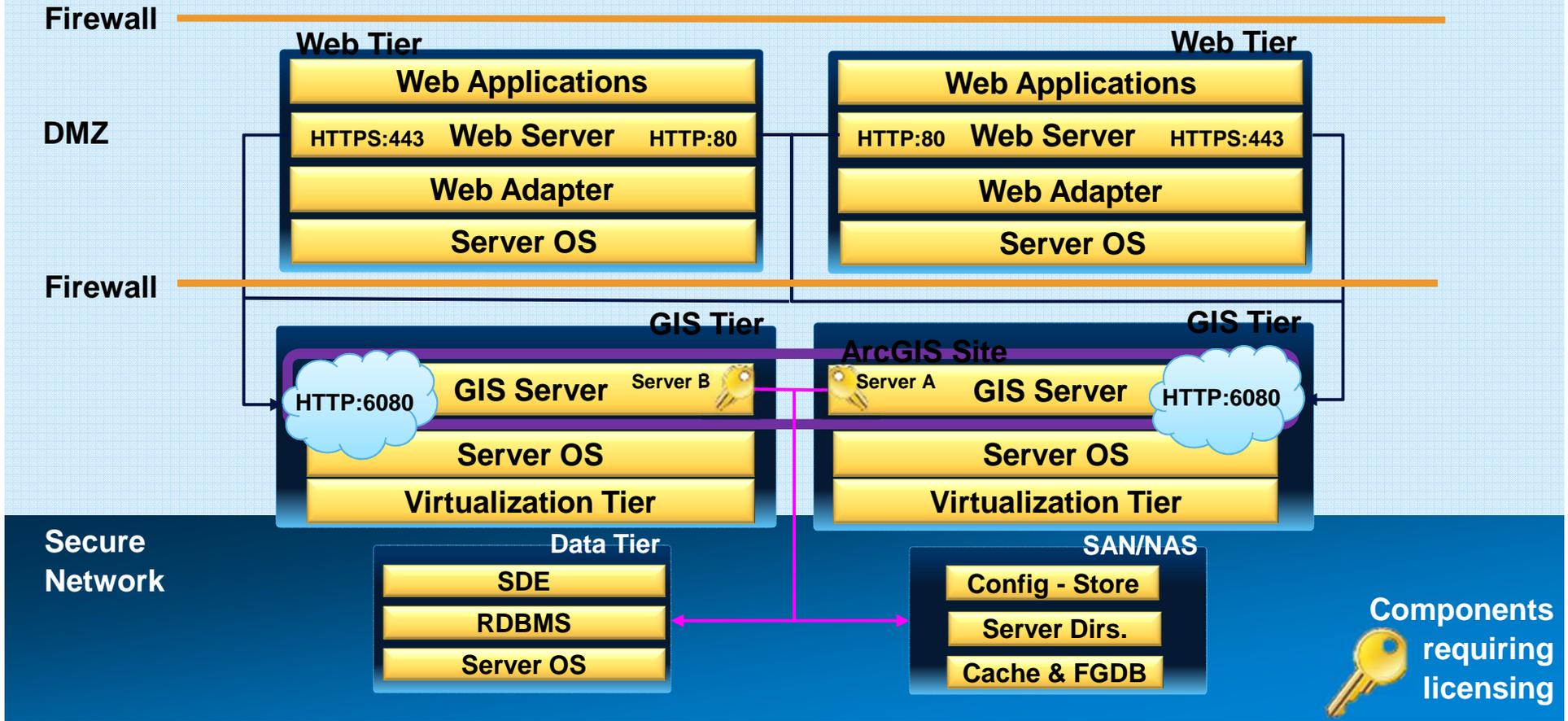
# High Availability Deployment

**SLA 1**

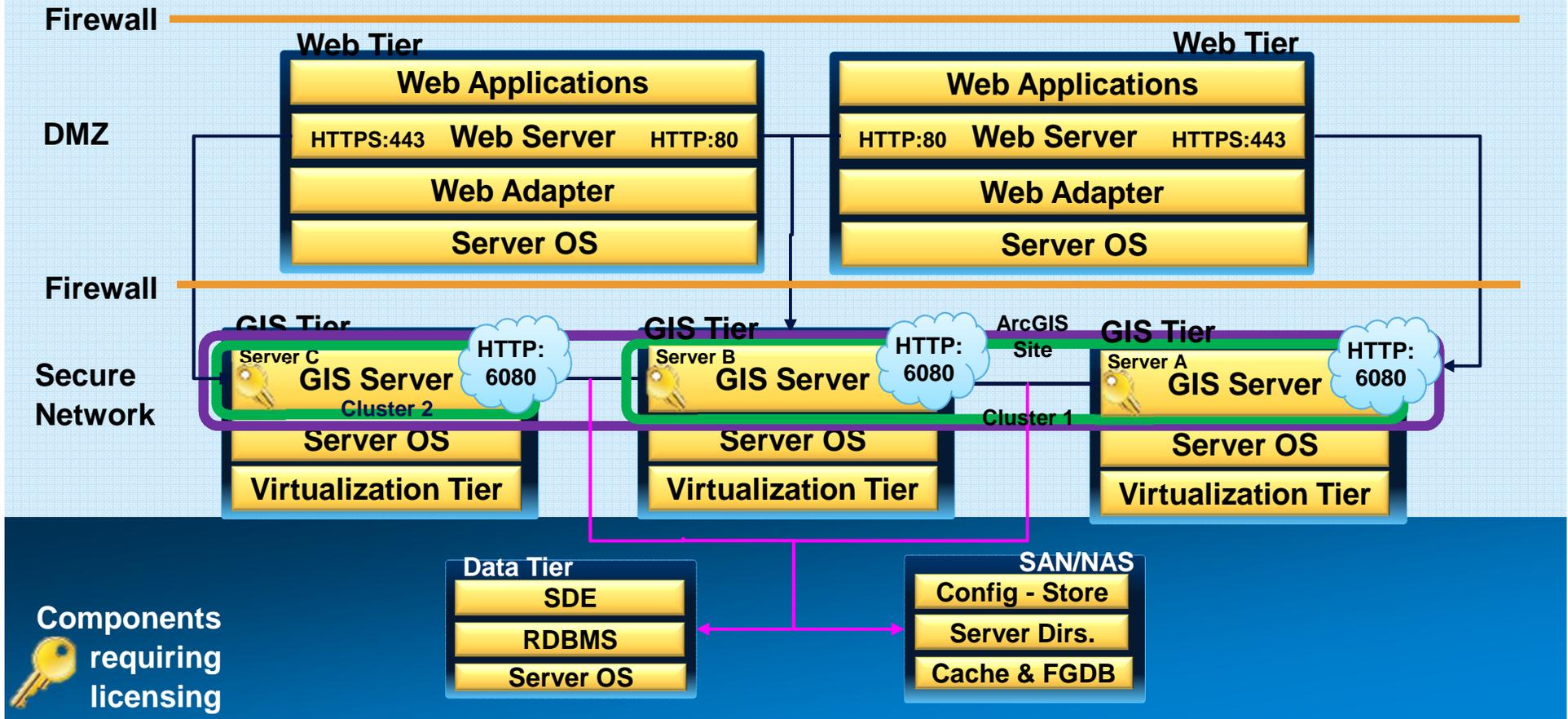
**Core Operations: e.g. effecting public safety & critical infrastructure**  
**Participates in regulatory, legal, contractual workflows**  
**Contains sensitive customer (citizen) information**  
**Participates in portion of revenue stream**

**99.999%**  
**5.25 Minutes/Year**  
**25.9 Seconds/Month**  
**6.05 Seconds/Week**

# Multi Machine Site (High Availability) with SSL

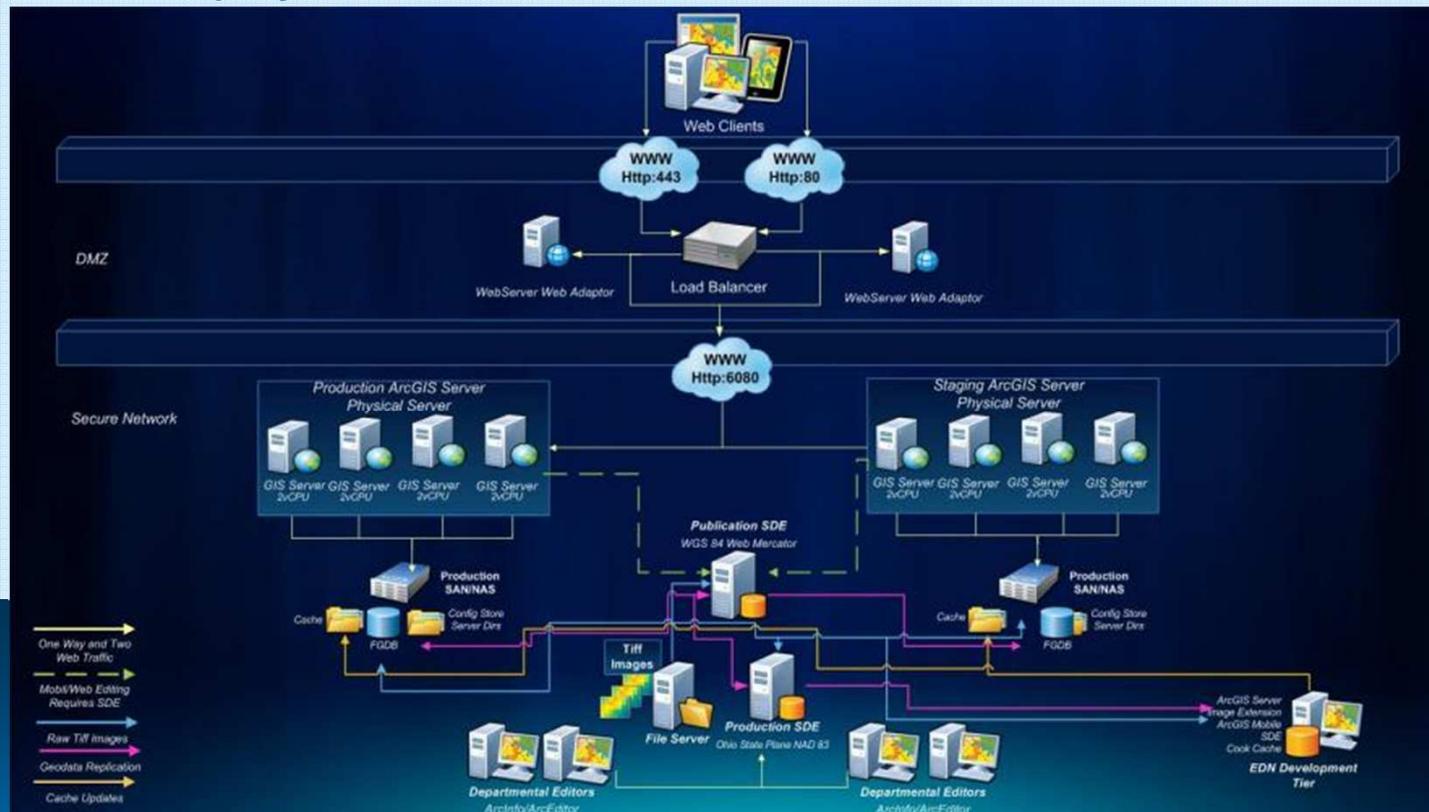


# Multi Machine Site (High Availability with Clusters)

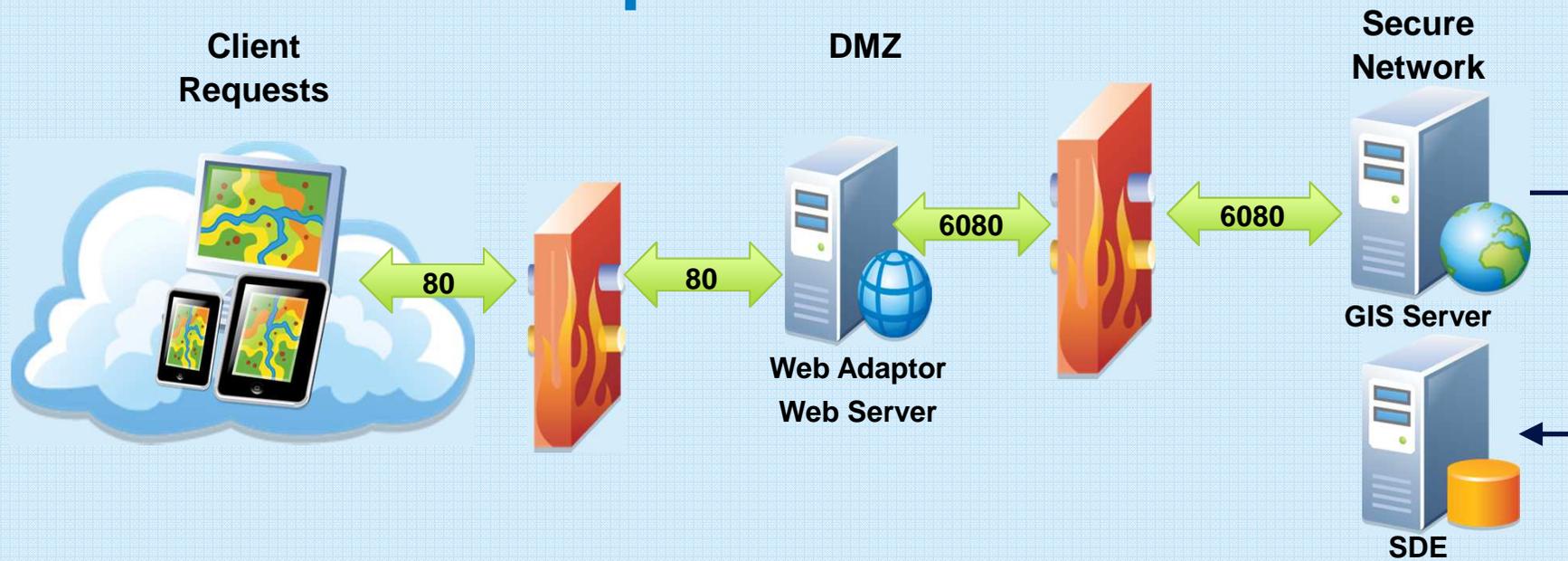


# High Availability Architecture

Baseline Deployment...

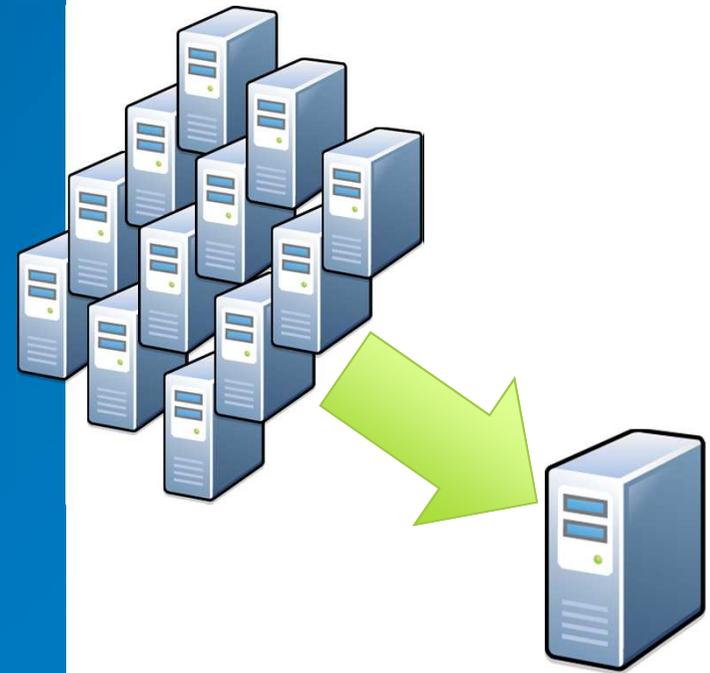


# Esri Web Adaptor





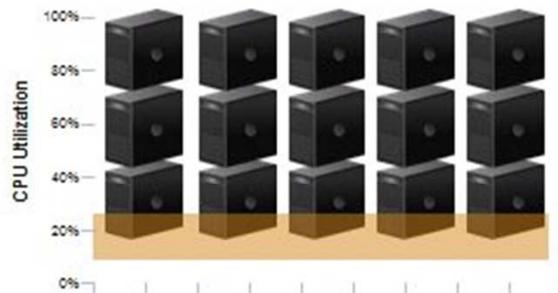
# Virtualization



# ArcGIS & Virtualization

## OLD PARADIGM

Physical: Low overall server utilization



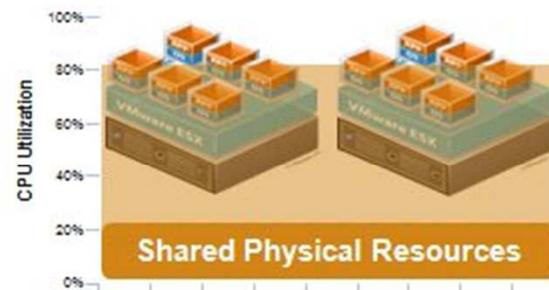
20 TB



25% utilization

## NEW PARADIGM

Virtual: High overall server utilization and little bandwidth for backup



Shared Physical Resources

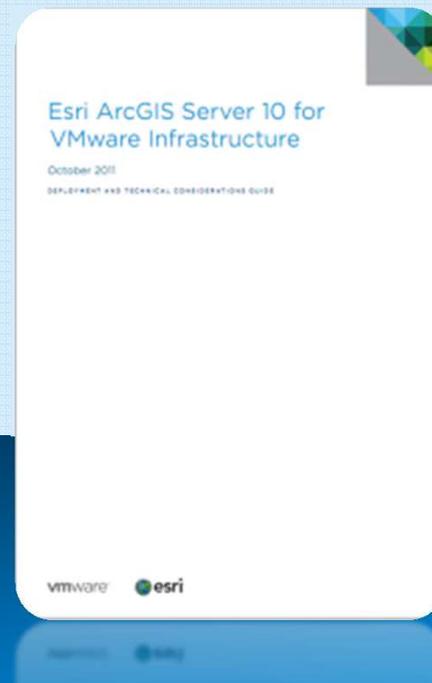
20 TB



>80% utilization

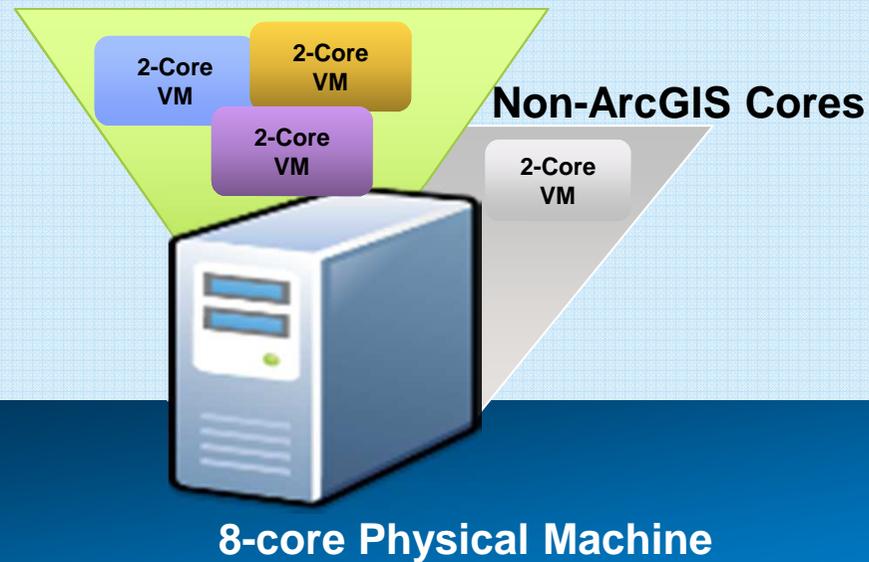
# VMware and Esri

## VMware Deployment and Technical Considerations Guide

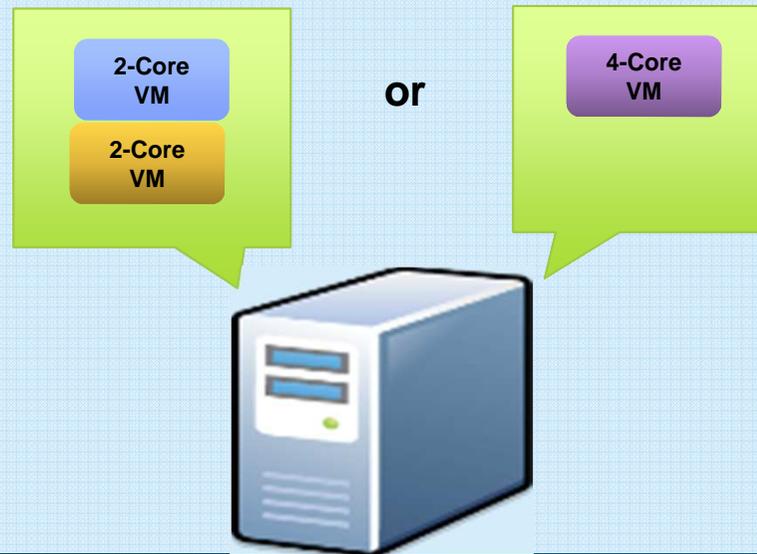


# Licensing of ArcGIS Server

**ArcGIS Server on 6 Virtual Cores**  
**License = 4-Core ArcGIS Server license**  
**+ 2 additional Cores**



# Licensing of ArcGIS Server

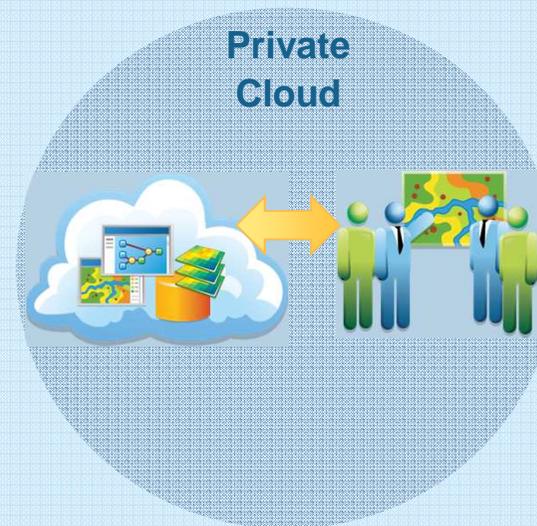
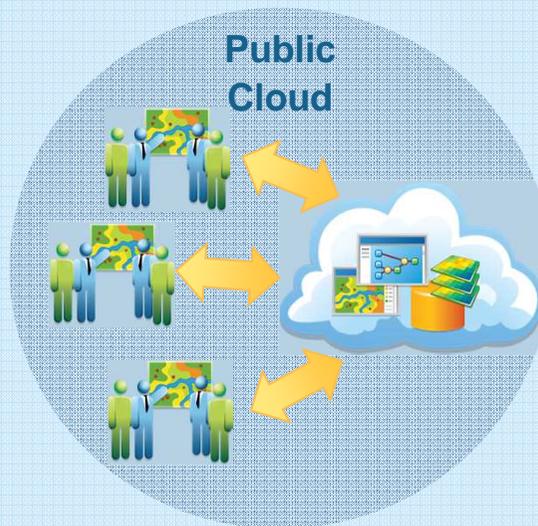


**4-Core  
Physical Machine  
w/ArcGIS Server  
4-Core License**

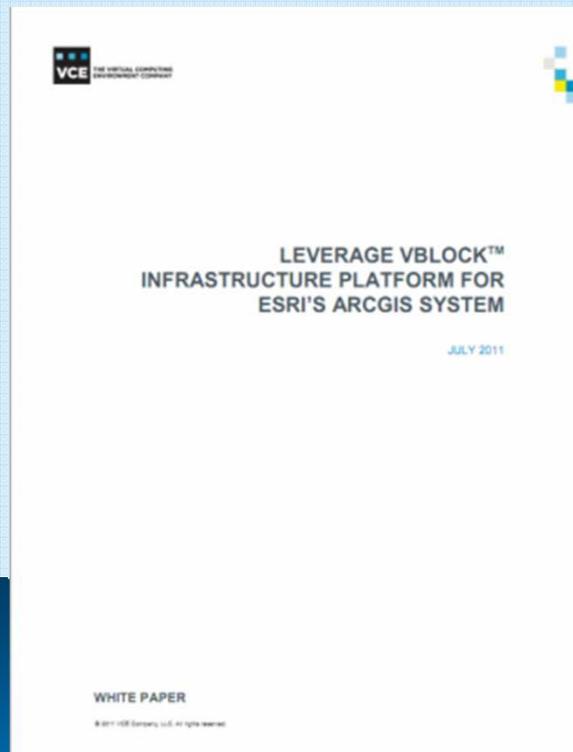
# Licensing of ArcGIS Server

Server Configuration	ArcGIS Server Licenses
One 4-core machine, uses no VM's	One 4-core license
One 4-core machine, uses two 2-core VM's	One 4-core license
One 8-core machine, uses 4 virtual cores for ArcGIS Server	One 4-core license
One 8-core machine, uses three 2-core VM's	One 4-core license + 2 additional cores
Two 4-core machines in same environment	One 4-core license + 4 additional cores
Two 4-core machines in separate environments	Two 4-core licenses
One 8-core machine with hyper-threading (equivalent to 16 cores)	Only up to 8 cores need to be licensed (hyper-threading is not taken under consideration)

# Esri & Private Cloud Solutions



# Esri & VBLOCK Infrastructure Platform



# Esri Licensing



# Esri Licensing Considerations

Licensing Required	Licensing Not Required
GIS Server	Web Adapter
Extensions	Web application(s)
Staging GIS Server	SDE
Staging Extensions	
EDN-named user only	

# Configuring Services



# Map Service Instance Configuration

Service Editor

Connection: arcgis on localhost\_6080 (admin) Service Name: AssetMonitor

General  
Parameters  
Capabilities  
Mapping  
Feature Access  
**Pooling**  
Processes  
Caching  
Item Description

### Pooling

Specify the number of instances \_\_\_\_\_

Minimum number of instances per machine:

Maximum number of instances per machine:

Timeouts \_\_\_\_\_

The maximum time a client can use a service:  seconds

The maximum time a client will wait to get a service:  seconds

The maximum time an idle instance can be kept running:  seconds

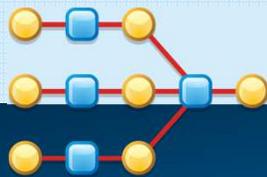
OK Cancel

# Map Service Instance Configuration

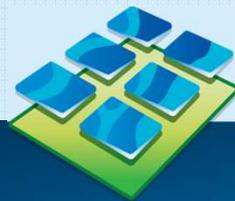
- Minimum Instance = 0
  - Less popular services
  - Slower response first access
  - Reserve memory capacity for other services
- Minimum Instance = 1
  - Popular services
  - Rapid response first access
  - Service Instances can grow to max setting
- Maximum Instance = 3 - 5
  - Instances per Server Machine Core
  - Optimum throughput during peak load
  - Optimizes display response time during peak loads

# Batch Service Instance Configuration

- Minimum Instance = 0
  - Start up time short
  - Reserve memory capacity for other services
  - Service Instances can grow
- Maximum Instance =  $N + 1^*$  (N = number of server cores)
  - Optimum throughput during peak load
  - Optimizes display response time during peak loads



Large GeoProcessing  
Services



Map Caching



Printing  
Services

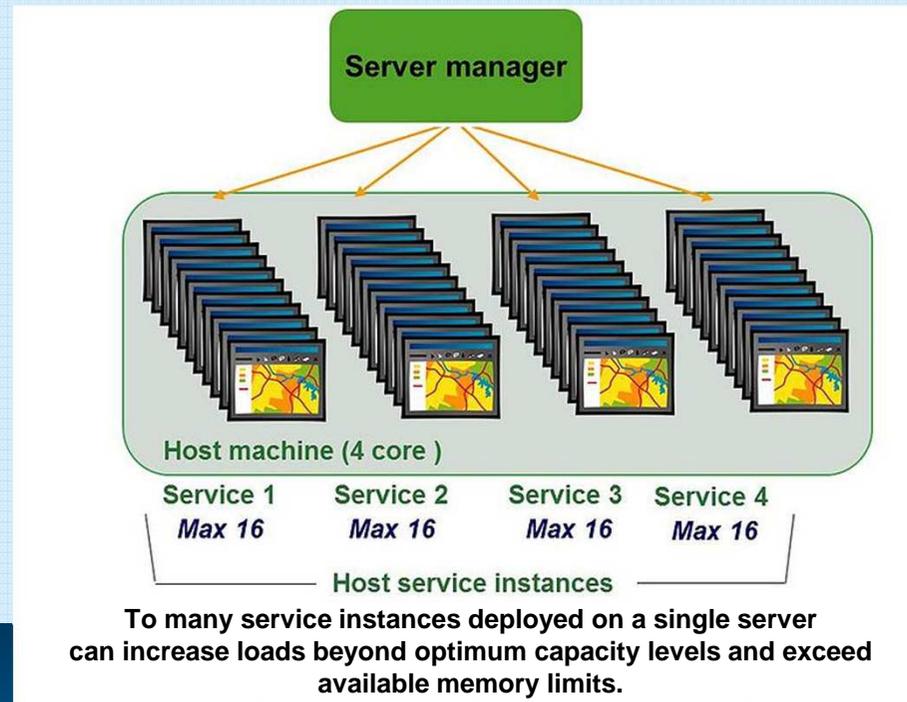


Network Routing  
Services



Imagery Processing  
Services

# Indicators of degraded performance?



# Indicators of degraded performance?

If sufficient memory is not available.

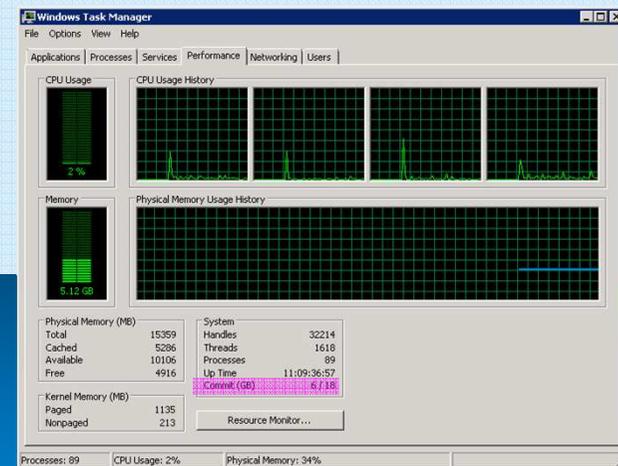
- Inactive processes
  - Swapped to memory cache for active processes
  - Active processes can crash during execution

To many instances can exhaust memory.

- Increased paging
- Not enough memory
- Shared computing slows

To few instances per server

- Limits utilization of host hardware
- Minimum of three instances per core



# How many services can I deploy?

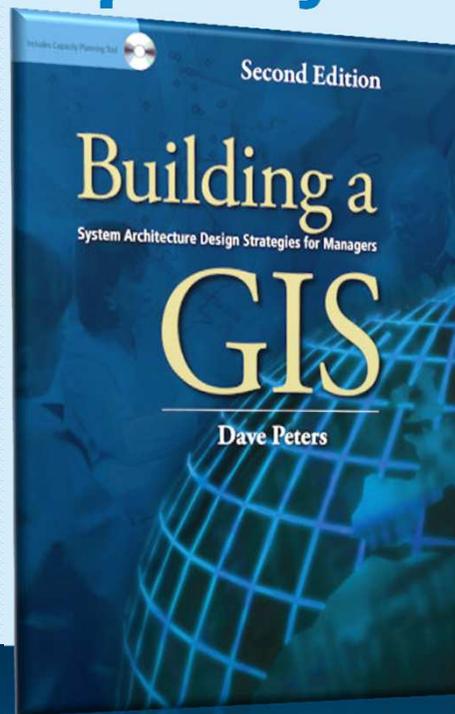
- Trial and Error
- Every environment is different
  - Monitor CPU
    - 10 Instance per core for map services
    - Minimum 3 instances per core
  - Monitor Memory
    - Minimum 3GB per core
      - Some services need more, i.e. imagery, GP, etc.
    - 2 GB per Service is a good starting point
- Popularity of services
- How do people access your site?

*“...there is no simple recipe for getting it right.”*

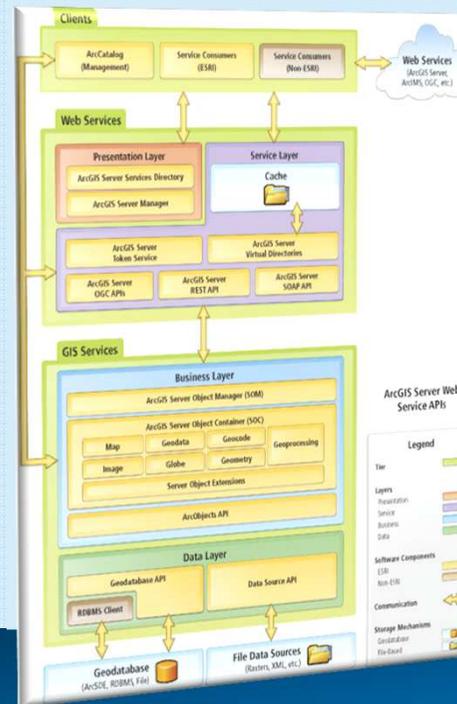
# Capacity Planning & Load Testing



# Capacity and Load Testing



Capacity Planning Tools



Professional Services Enterprise Architecture Design

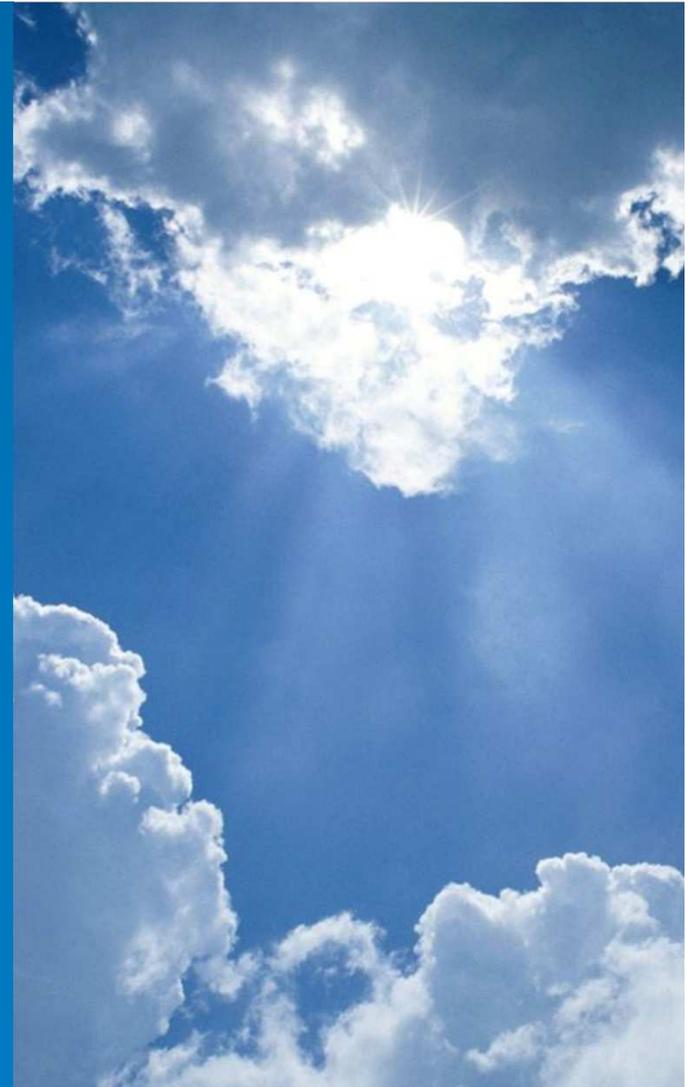


Performance & Scalability

# Esri Professional Services

- Enterprise Advantage Program
  - Use service credits
  - Ohio State Term Schedule
- System Design and Architecture Review Jumpstart
  - Capacity planning
  - Server install and optimization

# Cloud Computing



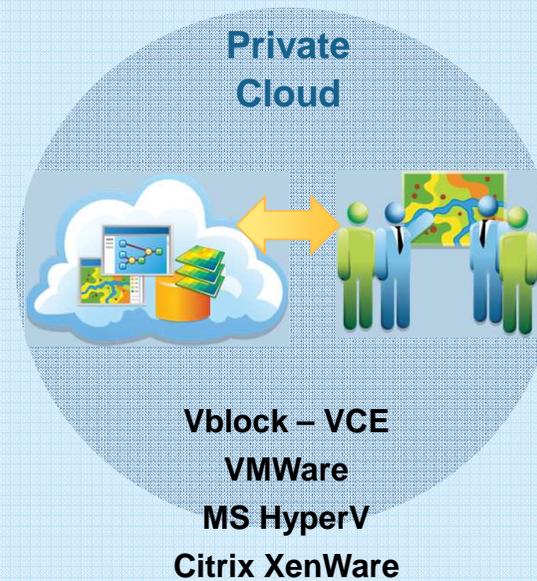
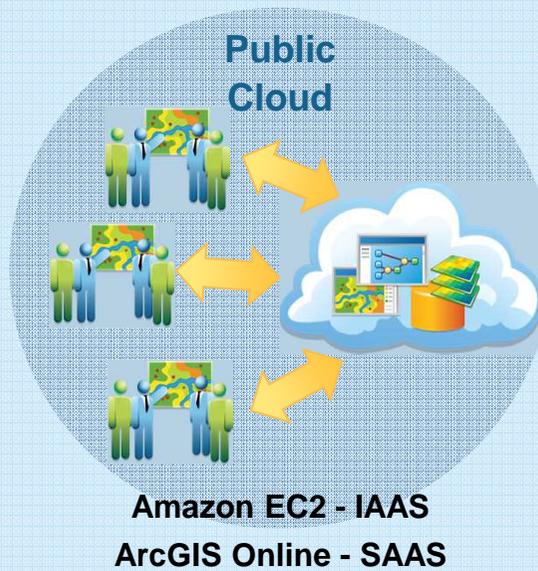
# What is the Cloud?

The cloud is disposable computing



*... You should only pay for what you use*

# What are the options



Less

Security & Control

More

# ArcGIS Online



# ArcGIS Online is a New GIS Pattern



# What is ArcGIS Online?

- Part of the ArcGIS system
- Working with maps & geographic information
  - Create
  - Share
  - Manage
  - Analyze
  - Visualize



- Organize authoritative content
- Simple, useful maps & info for organizations

*Geographic content management system...*



## More Top News Will Breadfruit Solve the World Hunger Crisis?

New Developments in an Innovative Food Crop

By Matthew P. Lucas and Diane Ragnone, National Tropical Botanical Garden

NGO Non-Governmental Organization

### Highlights

- Using A-GIS, exactly rainfall and temperature data were represented on a map.
- A-GIS were used to create a map indicating areas suitable for growing breadfruit.
- Local food-growing communities in planning and implementing planting projects.

A map can be a powerful visual tool. But can a map help solve the world's hunger crisis?

Can a map help identify areas suitable for growing breadfruit? Can a map help identify areas suitable for growing breadfruit?

Can a map help identify areas suitable for growing breadfruit? Can a map help identify areas suitable for growing breadfruit?

Can a map help identify areas suitable for growing breadfruit? Can a map help identify areas suitable for growing breadfruit?

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Can a map help identify areas suitable for growing breadfruit? Can a map help identify areas suitable for growing breadfruit?



Different varieties of breadfruit are cultivated in the world's largest cultivation of breadfruit at the National Tropical Botanical Garden in Hawaii. (Photo credit: © Jim Wozniak, courtesy of the Breadfruit Institute)

Different varieties of breadfruit are cultivated in the world's largest cultivation of breadfruit at the National Tropical Botanical Garden in Hawaii. (Photo credit: © Jim Wozniak, courtesy of the Breadfruit Institute)

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# Break

# ArcGIS Online Steps for Success



## **Vision & Governance**

What is the mission and vision?

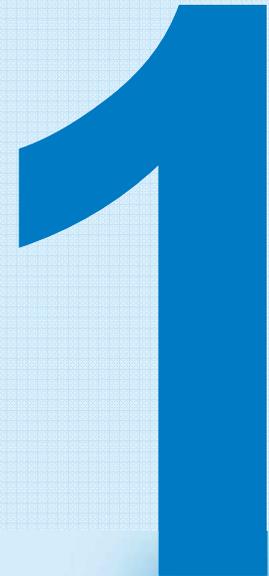
What problems will it solve?

What are the deliverables?

Who is the audience?

Establish a curator, or group of curators

Form a governance committee



# Configure Portal

Brand your site to your user

- Add Logos
- Text



2

*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

- Add Logos
- Text



2

*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

- Add Logos
- Text

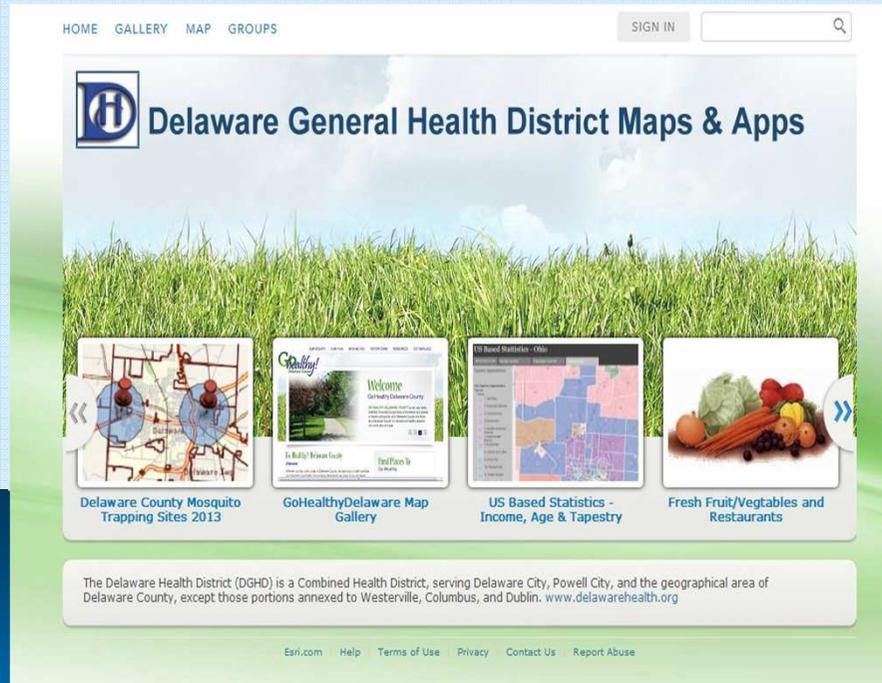


*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

- Add Logos
- Text



# 2

*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

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- Text



2

*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

- Add Logos
- Text



# 2

*...Not necessarily a public destination!*

# Configure Portal

Brand your site to your user

- Add Logos
- Text



2

*...Not necessarily a public destination!*

# Configuration & Settings

- URL and logo
- Home page (banner and background)
- Featured content (gallery ribbon)
- Gallery
- Map
- Security Settings



## Create Groups

### Establish System Groups

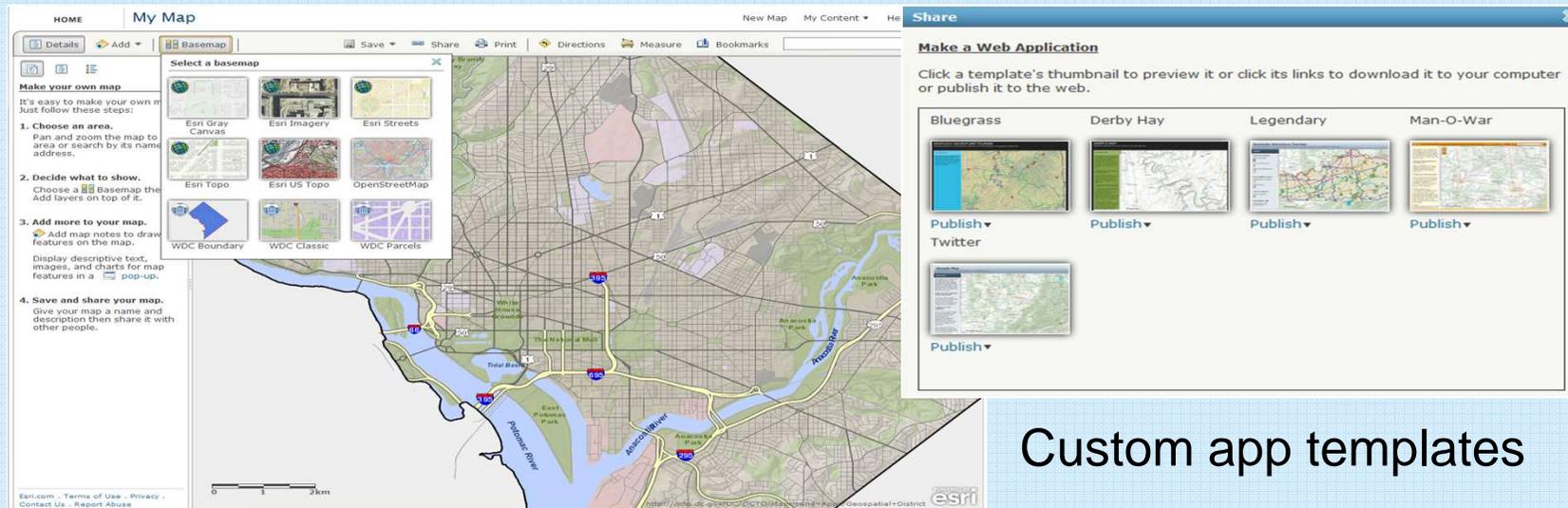
- Feature Content
- Site Gallery
- Basemaps

### Create Organization Groups

- Mimic organizational structure
- Mimic crosscutting activity



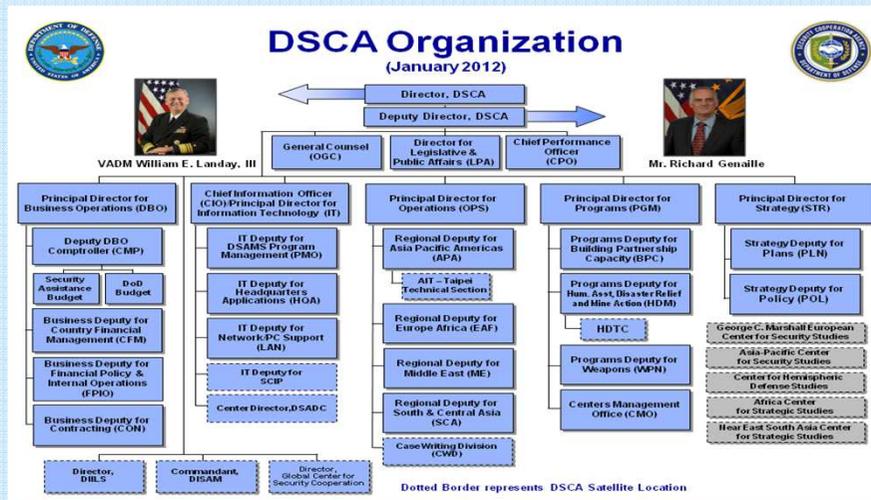
# Basemap and App Galleries



Custom app templates

Custom basemap and basemap gallery

# Organization or Project Chart



## Commonwealth App Templates

Application templates used by the Commonwealth, created by bws02\_admin on January 6, 2013

Details



## Commonwealth Basemaps

Commonwealth Basemap Gallery created by bws02\_admin on April 22, 2013

Details



## Commonwealth Collaboration Group

A group intended for sharing maps and apps with others outside the Commonwealth organizational members, created by bws02\_admin on January 6, 2013

Details



## Commonwealth Featured Maps

Featured maps from the Commonwealth that appear on the portal ribbon gallery, created by bws02\_admin on April 20, 2013

Details



## Commonwealth Gallery

Group containing layer featured on the Commonwealth Gallery, created by bws02\_admin on April 9, 2013

Details



## Commonwealth Public Gallery

Public gallery maps for use in the public gallery template, created by bws02\_admin on December 6, 2012

Details



## Current Priority Projects

A group supporting current priority project information and collaboration, created by bws02\_admin on February 25, 2012

Details



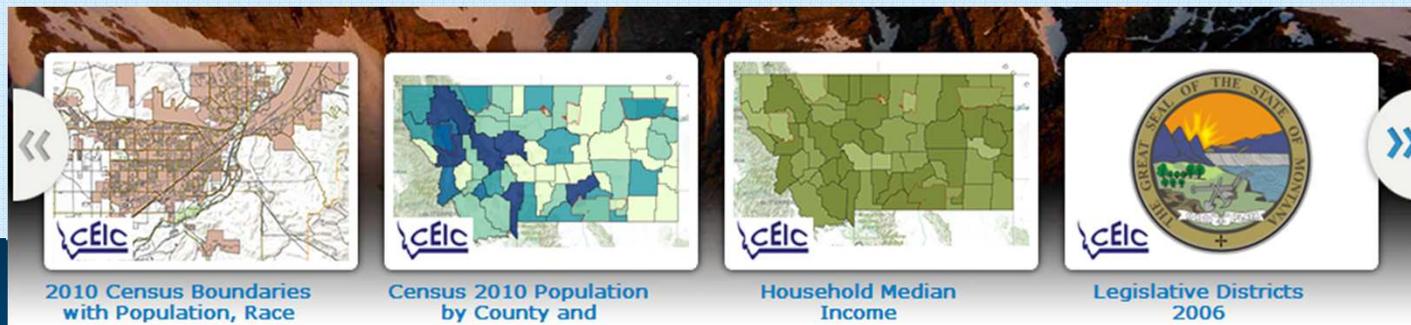
# Thumbnail Graphics

- Thumbnails offer visual clues
- Thumbnails brand what your organization publishes
- Thumbnails identify items and sources of information



# Thumbnail Graphics

- Thumbnails offer visual clues
- Thumbnails brand what your organization publishes
- Thumbnails identify items and sources of information



# Easily Identifiable Group Logos

Use common naming conventions

Provide visual conventions

- Blue outline: internal groups/content
- Green Outline: Public groups/content



**Commonwealth Featured Maps**  
Featured maps from the Commonwealth that appear on the portal ribbon gallery.  
created by bws02\_admin on January 6, 2013  
Details

**Commonwealth Gallery**  
Group containing layer featured on the Commonwealth Gallery.  
created by bws02\_admin on December 6, 2012  
Details

**Commonwealth Public Gallery**  
Public gallery maps for use in the public gallery template.  
created by bws02\_admin on December 6, 2012  
Details

# Provision Users

Invite users to the organization

Establish Roles

Privileges	User	Publisher	Administrator
Add items	•	•	•
Create web maps	•	•	•
Share content	•	•	•
Participate in and create groups	•	•	•
Publish hosted services (tile, feature)		•	•
Manage Organization			•
Manage Users			•

# 4

# Invite organizational members

## Invite Users to Bern's Maps & Apps

### Step 1 of 3

How would you like to invite users to your organization?

- Pre-establish logins for the users to be invited
- Have invited users join using either their existing logins or by creating their own logins

Next

Invite users via pre-established logins (recommended)  
or by using existing account

### Enterprise Logins (Beta)



You can set up your Organization so that your users will be able to sign in to ArcGIS using the same username and password that they use with your existing on-premises systems.

The key to this is through a technology known as identity federation that this section will help you set up through two actions.

Set Identity Provider

Get Service Provider

Enterprise logins (beta)

# Roles

Member name

Role / Privileges

Mem

View: Current Members Search for: e...

Name	Username	Date Joined	Role			
Abraham Lincoln	jeremy.lincoln	Mar 24, 2012	User			
Anthony Puzzo	knights00	Sep 23, 2011	Administrator			
Barack Obama	bws01_guest	May 11, 2012	User			
Calvin Coolidge	bws01_user6	Aug 27, 2011	User			
Dick Nixon	dnixon	May 24, 2012	User			
Dwight Eisenhower	bws01_user5	Aug 27, 2011	Publisher			
Franklin Delano Roosevelt	bws01_user4	Aug 15, 2011	User			

Manage items

# Organization Persona

- Establish organization persona for authoritative shared content



The image displays three overlapping organization persona cards. Each card features a profile picture on the left and a text box on the right. The top card is for Joseph Field, the middle for Matt Crossett, and the bottom for Esri, Inc. Each card has a close button (an 'x' icon) in the top right corner.

**Joseph Field**  
This user has not provided any personal information.

**Matt Crossett**  
Matt Crossett Project Manager OCTO GIS District of Columbia Government matthew.crossett@dc.gov 202.442.7100 (desk) 202.701.6909 (cell)

**Esri, Inc.**  
Esri develops geographic information systems (GIS) solutions that function as an integral component in nearly every type of organization. On any given day, more than a million people around the world use Esri's GIS to improve the way their organizations conduct business. Esri is headquartered in Redlands, California and maintains offices throughout the United States.  
Profile Items Groups

# Organize Useful Content

Register map services

Register web maps

Register apps

- Internal
- External



# Quickly Identify Content

Thumbnails should provide visual indicators of map contents

## Medical Facility Locations



**Vague**

**Specific**

**Specific**

# Identify How Content is to be Used

Thumbnails can offer visual cues as to how to use content



Web Map Layer

Ready to use map

Geoprocessing Tool

# ArcGIS Services

- Great documentation starts at the source

Demographics/USA\_Tapestry (MapServer)

**View In:** [ArcMap](#) [ArcGIS Explorer](#) [ArcGIS JavaScript](#) [Google Earth](#) [ArcGIS.com Map](#) [Ring Maps](#) [\(terms of use\)](#) [Go Maps](#) [\(terms of use\)](#)

**View Footprint In:** [Google Earth](#)

**Service Description:** This thematic map presents Tapestry segmentation in the United States in 2010. Tapestry, ESRI's market segmentation system, classifies U.S. neighborhoods into 65 segments [PDF] based on their socioeconomic and demographic composition [PDF]. For a broader view of markets, segments are divided into 12 LifeMode Summary Groups that reflect lifestyles/life stages and 11 Urbanization Summary Groups that show levels of affluence and population density. The map is designed to be displayed with semi-transparency of about 50% for overlay on other basemaps, which is reflected in the legend for the map. For more information on this map, including the terms of use, visit us [online](#).

**Map Name:** Layers

**Legend**

**All Layers and Tables**

**Layers:**

- **Tapestry** (0)
  - **Block Groups** (1)
  - **Tracts** (2)
  - **Counties** (3)
  - **States** (4)

**Tables:**

**Description:** This thematic map presents Tapestry segmentation in the United States in 2010. Tapestry, ESRI's market segmentation system, classifies U.S. neighborhoods into 65 segments based on their socioeconomic and demographic composition. For a broader view of markets, segments are divided into 12 LifeMode Summary Groups that reflect lifestyles/life stages and 11 Urbanization Summary Groups that show levels of affluence and population density. This map displays the demographic LifeMode groups color-coded by all regions, but at the finest level block groups level, the individual counties are identified by...

**Add Item**

Add an item from your computer or reference an item on the Web.

The item is: **On the web**

ArcGIS Server web service  KML  
 OGC (WMS)  Document

URL:

**Supported Items**

Title:  **USA\_Tapestry**

Tags:  **United St**

Choose from

**Description**

This thematic map presents Tapestry segmentation in the United States in 2010. Tapestry, ESRI's market segmentation system, classifies U.S. neighborhoods into 65 segments [PDF] based on their socioeconomic and demographic composition [PDF]. For a broader view of markets, segments are divided into 12 LifeMode Summary Groups that reflect lifestyles/life stages and 11 Urbanization Summary Groups that show levels of affluence and population density. The map is designed to be displayed with semi-transparency of about 50% for overlay on other basemaps, which is reflected in the legend for the map. For more information on this map, including the terms of use, visit us [online](#).

**Access and Use Constraints**

**Map Contents**

USA\_Tapestry  
[http://services.arcgisonline.com/ArcGIS/rest/services/Demographics/USA\\_Tapestry/MapServer](http://services.arcgisonline.com/ArcGIS/rest/services/Demographics/USA_Tapestry/MapServer)

**Properties**

Shared with	The item is not shared.	
Tags	United States, 2010, market, segmentation	
Credits	Copyright:© 2013 ESRI	
Size	1 KB	
Extent	Left: 175.98	Right: -61.38

Services Directory

# Maps vs. Layers

Maps   Web Apps   Mobile Apps



Bicycle Routes



City & County Information



Commonwealth of Kentucky



Critical Sites



DOW Priority Watersheds



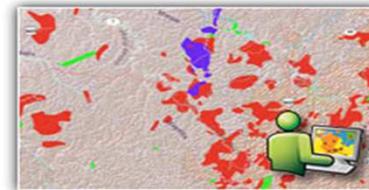
Fish & Wildlife Facilities



Flood and Topographic  
Basemap



Louisville Critical Sites



Oil & Gas Fields

# Build Useful Information Products

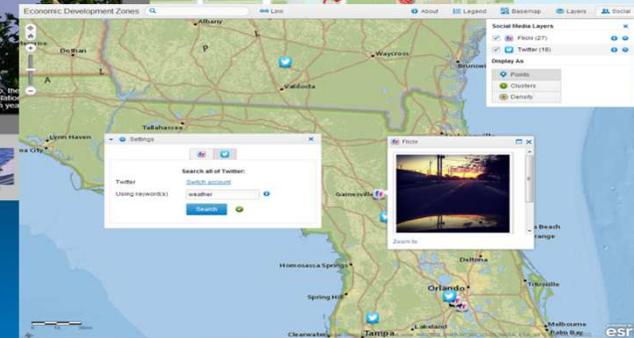
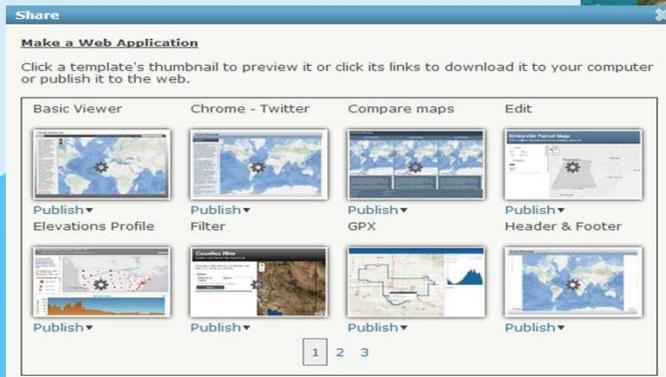
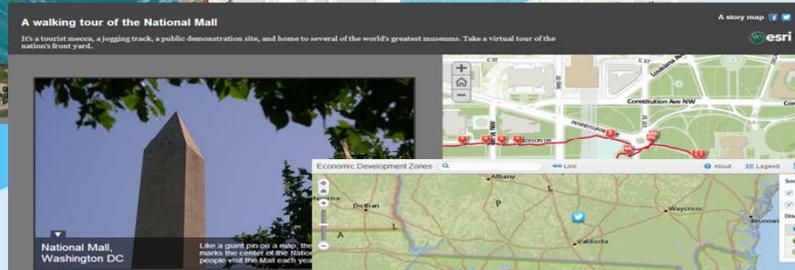
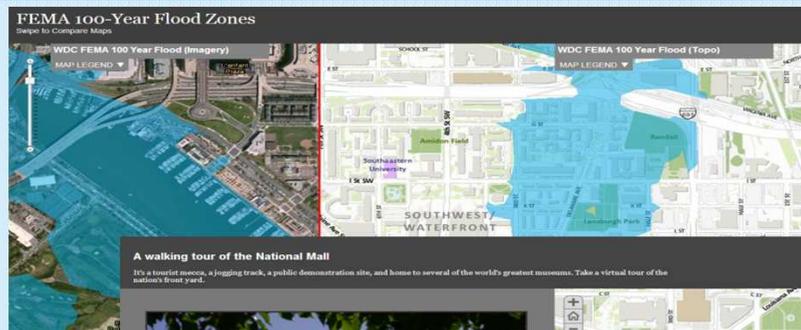
Build maps that interest and engage

- Internal
- External

A large, bold, blue number '6' is positioned on the right side of the slide. It is set against a light blue background with a fine grid pattern. The number has a slight drop shadow, giving it a three-dimensional appearance as if it is resting on a dark blue horizontal bar at the bottom of the slide.

# ArcGIS Online Configurable Web Apps

- Easy to configure
- No programming
- Hosted
- Source download



# Map Stories

## Storytelling with Maps

A gallery of Esri story maps

Esri publishes story maps with three goals: To showcase interesting and important topics; to explore techniques and best practices for map-based storytelling; and to help enable people to make their own story maps.

Search maps

- World of Story Maps
- Crisis in Syria
- Santa's Dashboard
- Bats Under Threat
- Fifty Largest Malls
- Thanksgiving Dinner
- Geography of Gaza Strip
- Treasure Hunt: Mountains
- Treasure Hunt: Cities

### About story maps

Story maps combine intelligent Web maps with Web applications and templates that incorporate text, multimedia, and interactive functions. Story maps inform, educate, entertain, and inspire people about a wide variety of topics.

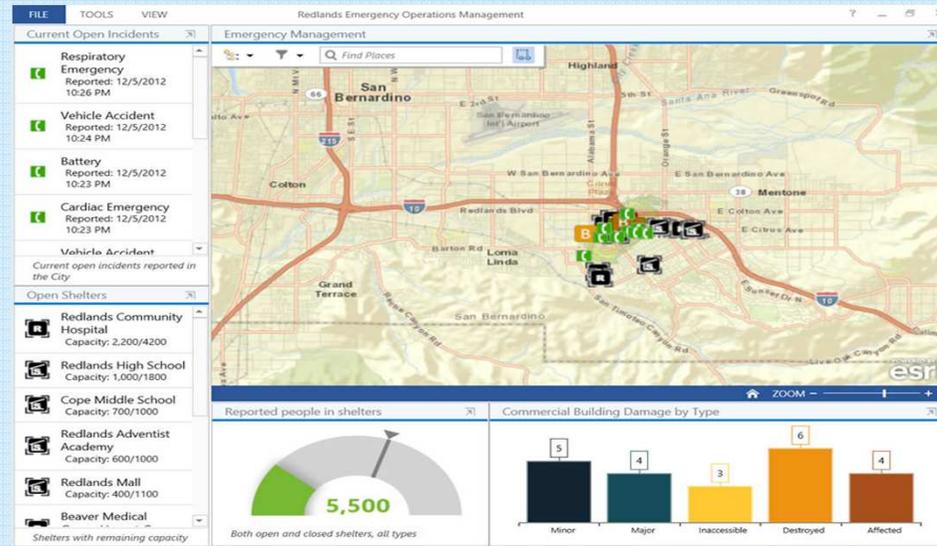
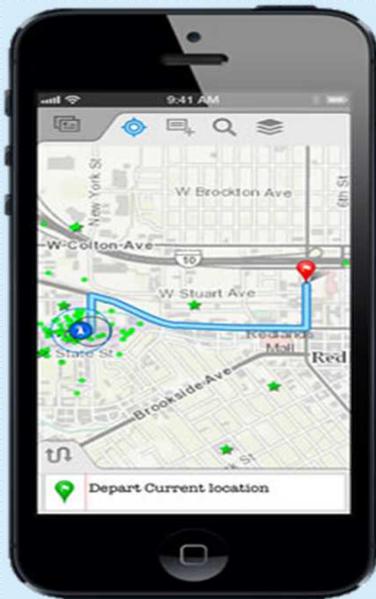
### Resources & links

- > Storytelling with Maps Blog
- > Download story templates
- > Maps by the Esri community
- > Workflows & Best Practices
- > Storytelling white paper
- > Designing Pop-ups
- > Video: A map for every story
- > About the Story Maps team
- > Follow us on Twitter

### Contact us

Email us at [storymaps@esri.com](mailto:storymaps@esri.com)

# Apps for ArcGIS



# Connect to Enterprise Systems

- Extract and map information
- Use hyperlinks to interconnect systems
- Leverage web services
- Use map application templates



# Esri Maps for Office

- Support Office workflows and users



*Mapping, discovery, enrichment, participation*

# Extend your reach through apps



## Promote your Organization

- Evangelize and promote your value
- Use real examples
- Show real value propositions
  - On map any device
  - Self service mapping
  - Configure don't code
  - Collaboration and sharing



# Web Development Trends



# IT Trends Driving Development

**More mobile devices access  
the internet than PCs in 2013**

**Gartner**

# IT Trends Driving Development

**By 2014, there will be more than 70 billion mobile app downloads from app stores every year.**

**Gartner**

# IT Trends Driving Development

**By 2014, most organizations  
will deliver mobile apps to  
workers via private  
application stores.**

**Gartner**

# IT Trends Driving Development

**Cloud Computing: Changes role of IT. IT departments must play more roles in coordinating IT related activities.**

**Gartner**

# IT Trends Driving Development

**“We’re going to witness a process of transformation for most desktop websites, which will increasingly imitate the style and interfaces of mobile apps.”** [Spyderweb.com](http://Spyderweb.com)

# How do you find your maps

Address Owner Name Parcel Advanced Land Use Codes

PARID: A01 00109 0012  
PARCEL LOCATION: 9800 MEEKER RD NBHD CODE: 48150000 Tax Year: 2012

**Owner**

Name: SMITH JUDITH SARLES AND LARRY A

**Mailing**

Name: SMITH JUDITH SARLES AND LARRY A  
Mailing Address: 9800 MEEKER RD  
City, State, Zip: DAYTON, OH 45414

**Legal**

Legal Description: 5-5-24  
TOD TO LARRY A SMITH  
1-9-13  
A- CASH GRAIN OR GENERAL FARM  
Acres: 15.505  
Deed: DEED-07-060300  
Tax District Name: BUTLER TWP-VAN BUTLER CSD

**Sales**

Date	Sale Price	Deed Reference	Seller	Buyer
04-OCT-05		200500101830	SMITH JUDITH SARLES	SMITH JUDITH SARLES
13-JUL-07		200700060300	SMITH JUDITH SARLES	SMITH JUDITH SARLES AND

**Values**

Assessed Values	100%	35%
Land	\$92,390	\$32,340
Improvements	\$210,860	\$73,800
CAUV	\$51,620	\$18,070
<b>Total</b>	<b>\$262,480</b>	<b>\$91,870</b>

**Residential Dwelling**

Building Style: CAPE COD  
Exterior Wall Material: BRICK  
Number of Stories: 1.5  
Year Built: 2002  
Total Rms/Bedrms/Baths/Half Baths: 9/4/2/1  
Total Square Feet of Living Area: 3104  
Basement: FULL  
Finished Basemt Living Area (Sq. Ft.): 0  
Bas. Room (Sq. Ft.): 0

**CURRENT RECORD**  
1 of 500  
Return to Search Results

Maps  
Pay Taxes  
Printable Version

Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief Blog. 1 August 2012.  
<<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Single Topic Maps or Portals



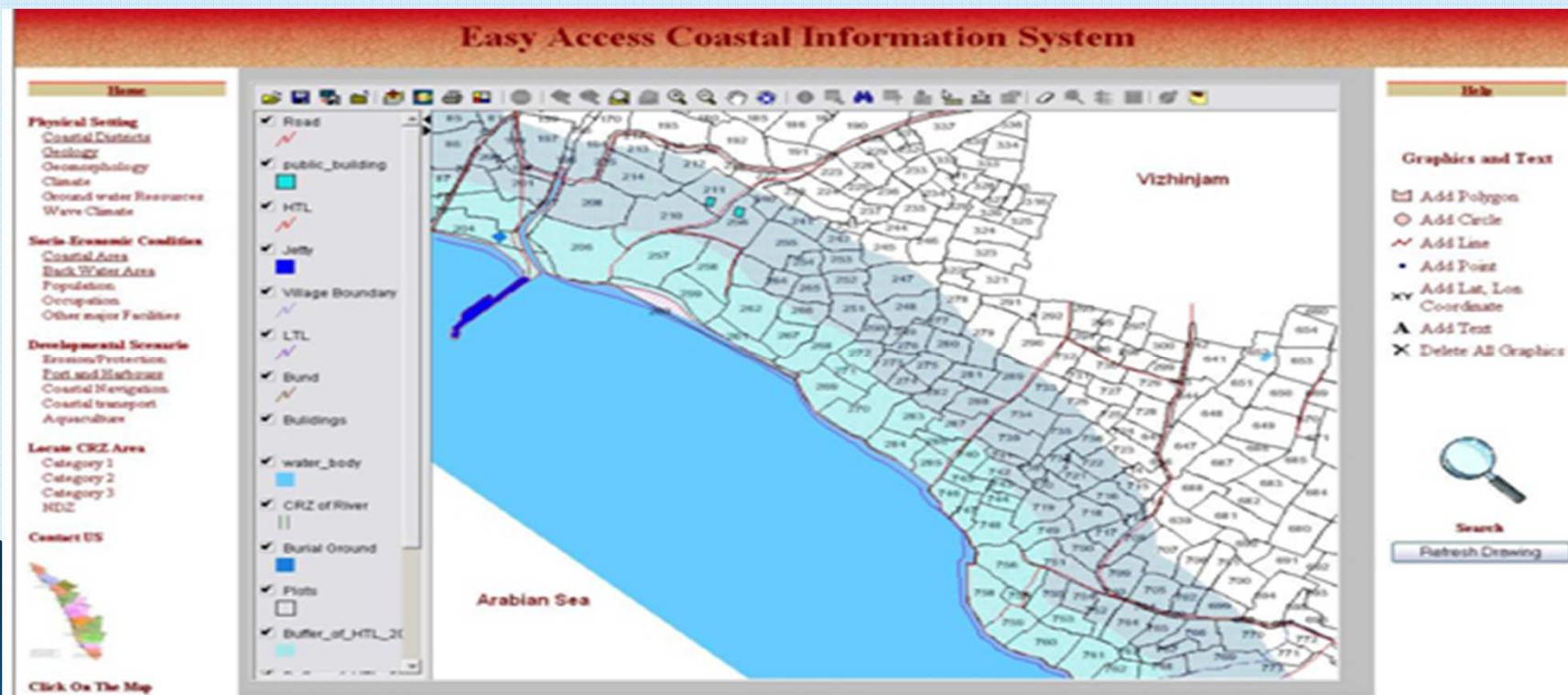
Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012.  
<<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Single Topic Maps or Portals



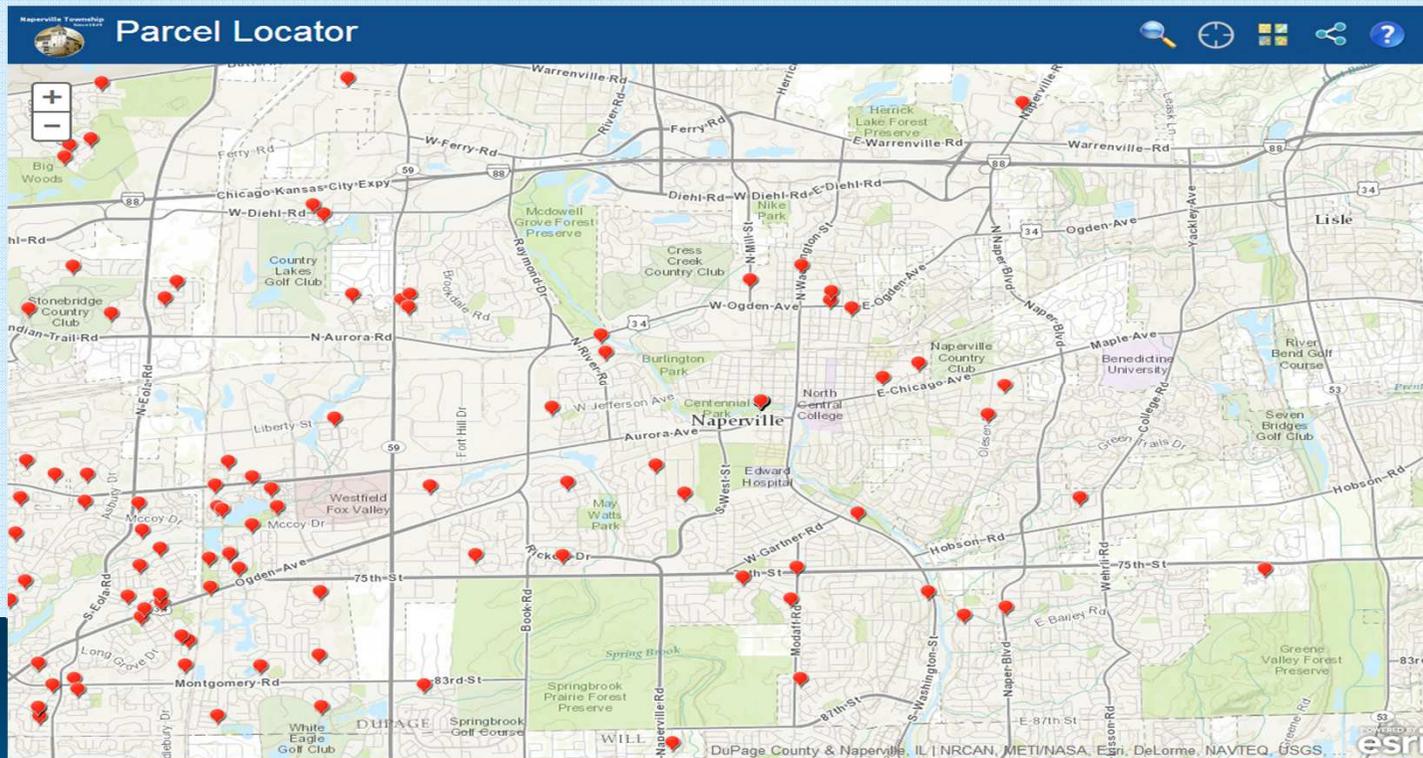
Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012.  
<<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Single topic maps or portals



Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Single topic maps or portals

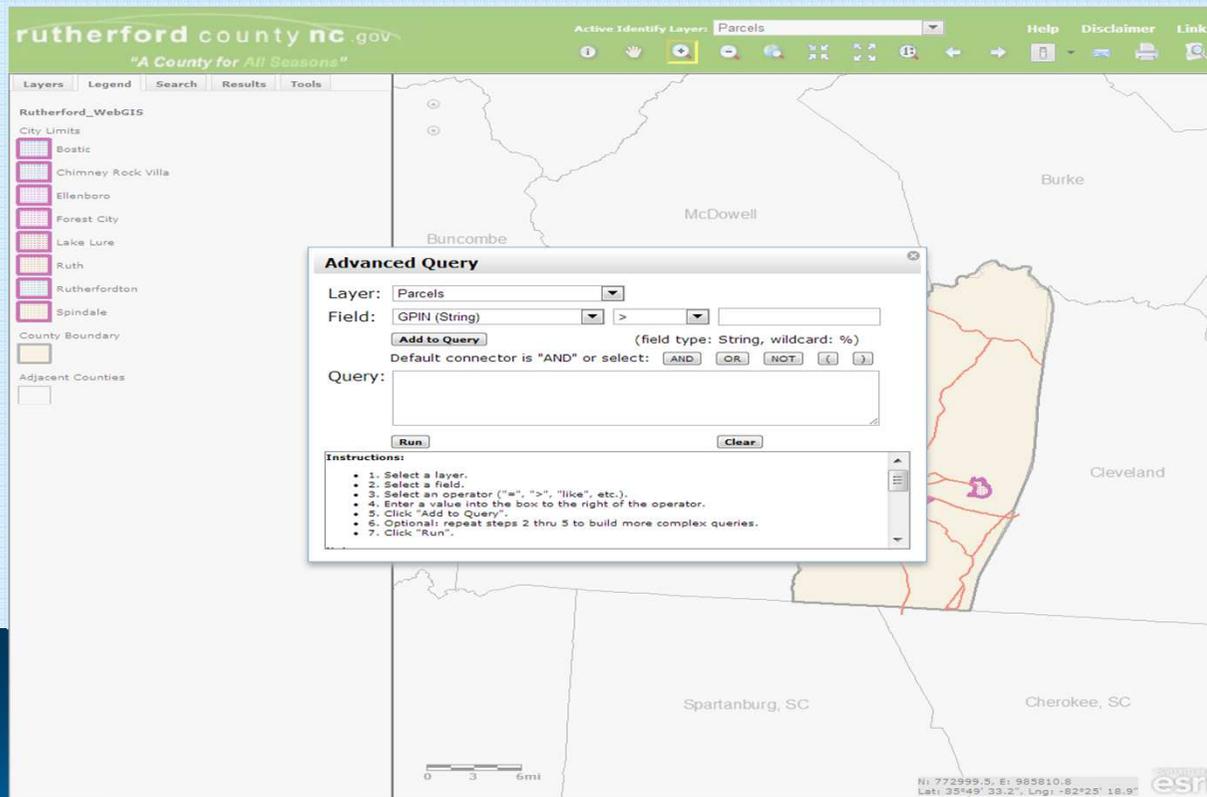


Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Single topic maps or portals

Single topic = More Traffic (3x)\*

# Is content search easy?

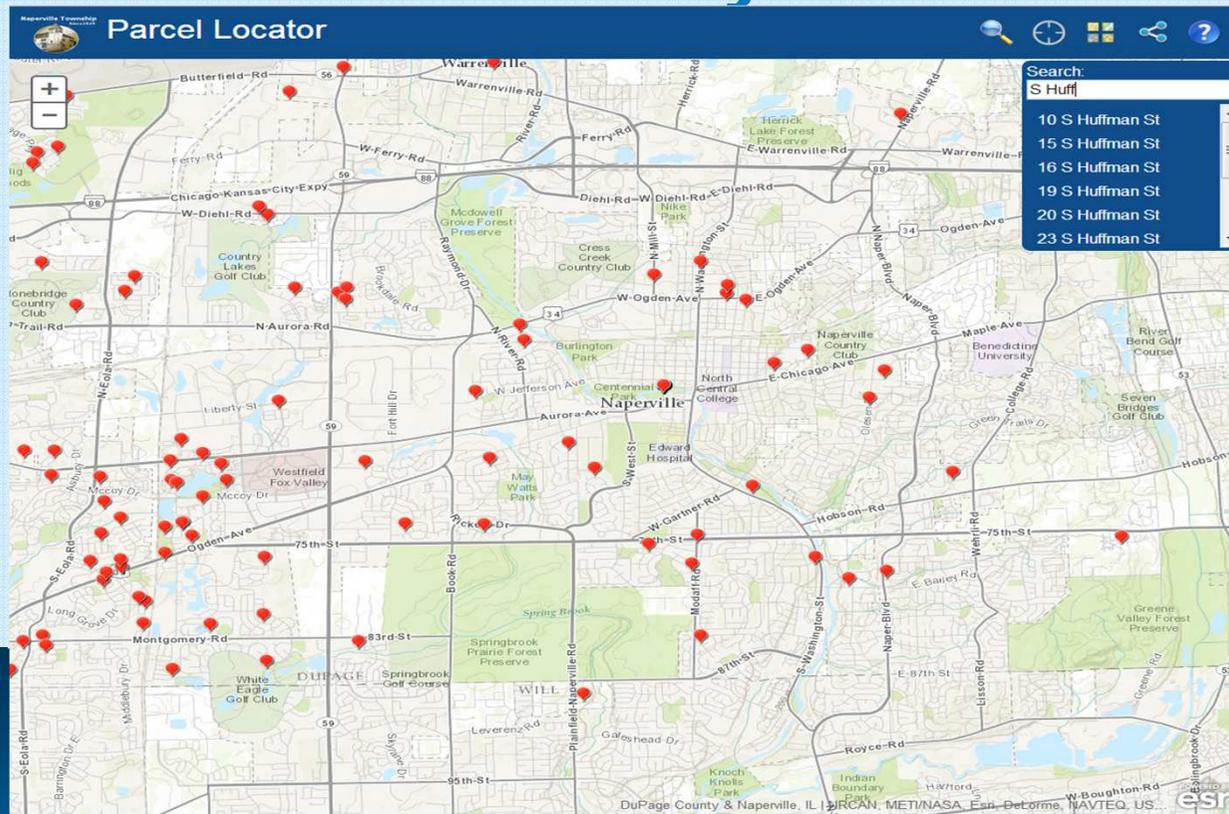


Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief Blog. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Is content search easy?

SQL search is never ok...

# Is content search easy?



Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

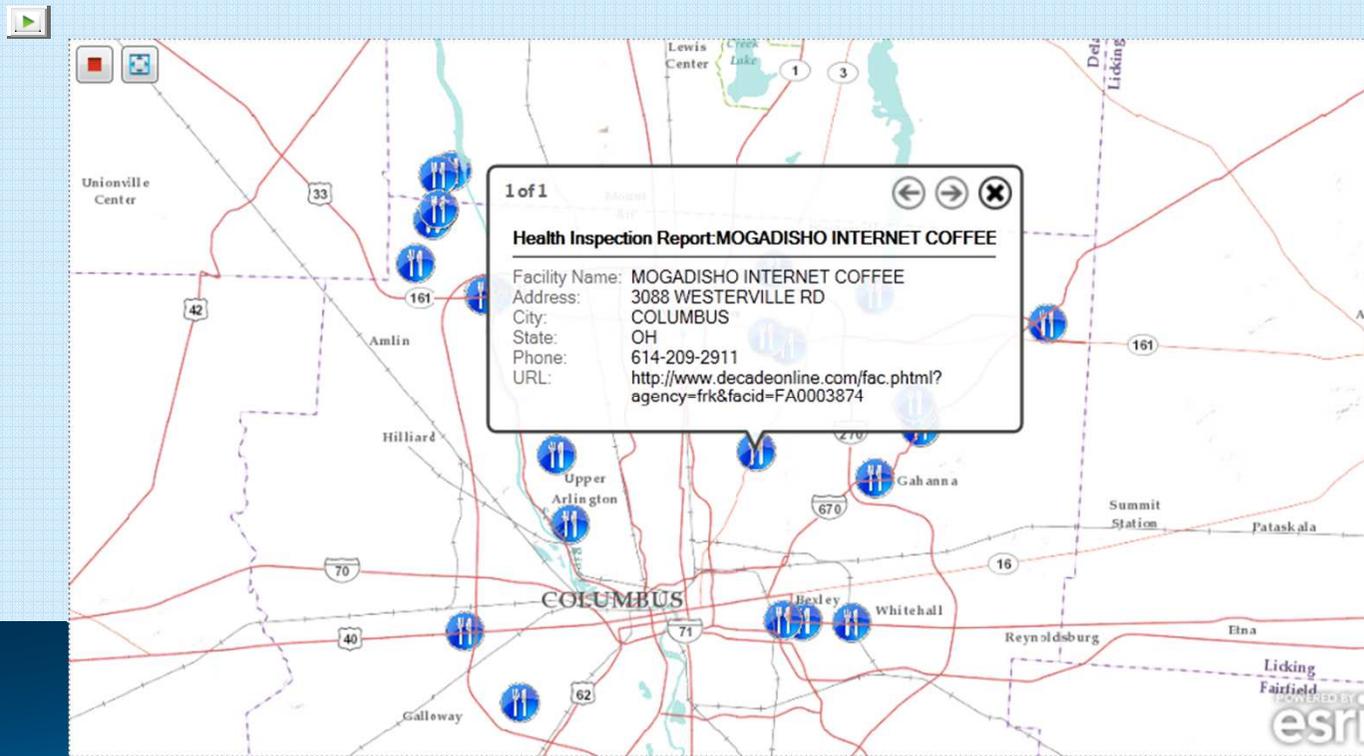
# Is content search easy?

Auto Complete is more user friendly

**People don't pay attention to boring**

**1:43**

# People like popups



Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief Blog. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

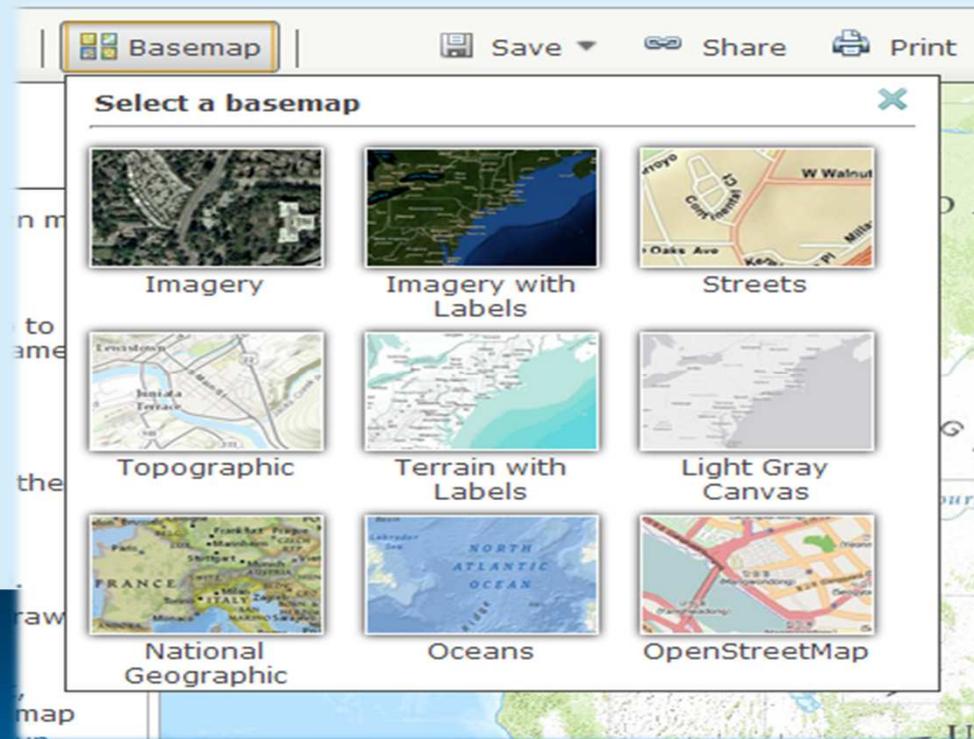
# People like popups



***...and don't like identify tools***

Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012.  
<<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# 2% change basemaps



Timoney, Brian. How the Public Actually Uses Local Government Web Maps: Metrics from Denver MapBrief *Blog*. 1 August 2012. <<http://mapbrief.com/2012/08/01/how-the-public-actually-uses-local-government-web-maps-metrics-from-denver/>>.

# Decisions, Decisions...



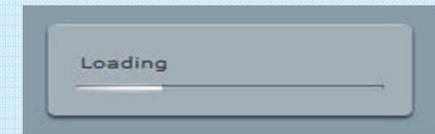
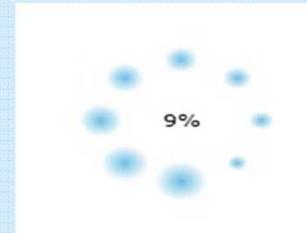
**Layers** Legend Quick Start

- Oil and Gas**
  - Lease Sale Parcels
  - Lease Sale Parcels Labels
- Solar Energy**
  - Solar Energy Zones
  - Solar Energy Zones - Labels
- Sec 368 Energy Corridors**
  - Energy Corridor Centerlines
    - All Uses
    - Electric Trans.
    - Upgrade Existing Electrical Trans.
    - Underground Energy Infrastructure
  - Energy Corridor Centerlines - Labels
  - Energy Corridor Zones
    - All Uses
    - Electric Trans.
    - Upgrade Existing Electrical Trans.
    - Underground Energy Infrastructure
  - Energy Corridor Zones - Labels
- Reference**
  - Urban Areas
  - Urban Areas Labels
  - State Boundaries
  - State Labels
  - County Boundaries
  - County Labels
  - UTM
- PLSS**
  - Township Labels
  - T4S R71W**
    - Townships
    - BLM
    - Alternate Source
    - N/A
  - Sections
    - BLM
    - Alternate Source
  - Section Labels
  - Quarter-Quarters
  - Quarter-Quarter Labels
  - Quarter-Quarter Labels - Acreage
  - Quarter-Quarter Labels - Survey Type
  - Special Surveys
  - Special Surveys Labels
  - Special Surveys Labels - Acreage
  - Special Surveys Labels - Survey Type
  - Minor Subdivision
  - Minor Sub. Labels
  - Minor Sub. Labels - Acreage
  - Minor Sub. Labels - Survey Type
  - PLSS Principal Meridians
- Rangeland**
  - Allotments
  - Allotment Labels
  - Herd Management Areas
  - Herd Management Areas Labels
  - Herd Areas
  - Herd Areas Labels
- ACEC**
  - Areas of Critical Environmental Concern
  - ACEC Labels
- Surface Management Agency**
  - BLM National Conservation Areas
  - BLM National Conservation Areas Labels
  - BLM National Monuments
  - BLM National Monuments Labels
  - BLM Wilderness Areas
  - BLM Wilderness Areas Labels
  - BLM
  - Bankhead Jones
- Roads**
  - Major Roads
  - Major Road Labels
  - Interstates
    - 
    - 
    -
  - US Highways
    - 
    -
  - Major Roads
    -
  - Other Roads
    - Other Road Labels
- BLM Administrative Areas**
  - Admin Unit Office Points
    - State Office
    - District Office
    - Field Office
    - Field Stations and Other Types
  - Admin Unit Office Points - Labels
  - Admin Unit Boundaries
    - International Level Boundary
    - State Office Boundary
    - District Office Boundary
    - Field Office Boundary
    - Sub Field Office Boundary
  - Admin Unit Boundaries - Labels
- Base Maps**
  - No Base Map
  - Topo Map NGS
  - World Street Map ESRI
  - Digital Ortho Imagery Color

Timoney, Brian. Paralysis of Choice: Why Map Portals Don't Work, Part II MapBrief Blog. 07 February 2013. <http://mapbrief.com/2013/02/07/paralysis-of-choice-why-map-portals-dont-work-part-ii/>.

# “If you wait...

...all that happens is that you get older.” - Mario Andretti



# Pareto's Principal

<b>Locate Address</b>			<b>More Information</b>
<b>Layer/Legend Toggle</b>			<b>Overview Map Toggle</b>
<b>Zoom In</b>			<b>Zoom Out</b>
<b>Zoom to Full Extent</b>			<b>Zoom to Extent of Active Layer</b>
<b>Return to Previous Extent</b>			<b>Pan</b>
<b>Pan Up</b>			<b>Pan Down</b>
<b>Pan Left</b>			<b>Pan Right</b>
<b>Identify Feature Attributes</b>			<b>Query Feature Attributes</b>
<b>Find Text String Tool</b>			<b>Measure Tool</b>
<b>Set Units</b>			<b>Buffer Tool (if active)</b>
<b>Select an Area</b>			<b>Select by Line/Polygon</b>
<b>Clear all Selections</b>			<b>Creates Map Layout for Printing</b>

# Pareto's Principal



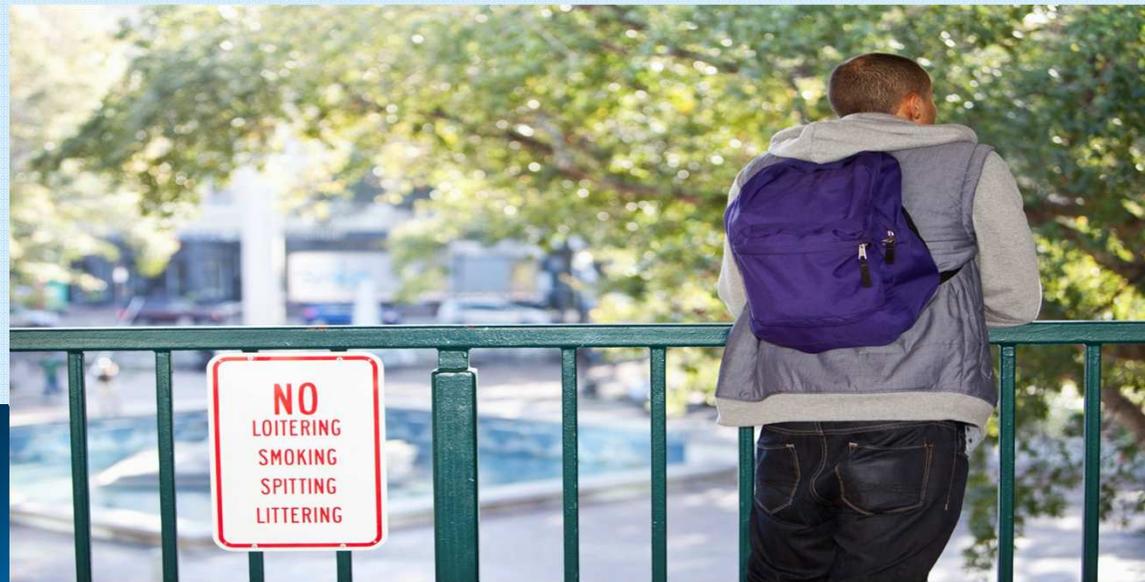
# Pareto's Principal



# Requirements

The most important rule for web developers...

“On the internet you don’t get to set the rules”



Timoney, Brian. "The Tyranny of "Requirements": Why Map Portals Don't Work, Part III MapBrief *Blog*. 11 February 2013. <<http://mapbrief.com/2013/02/11/the-tyranny-of-requirements-why-map-portals-dont-work-part-iii/>>.



