ArcGIS Enterprise Performance and Scalability Best Practices

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Agenda

- Definitions
- Design workload separation
- Provide adequate infrastructure capacity
- Configure
- Tune
- Test
- Monitor

Definitions

Performance

- Speed, e.g. response time (seconds)

Scalability

- The ability to increase output and maintain acceptable performance

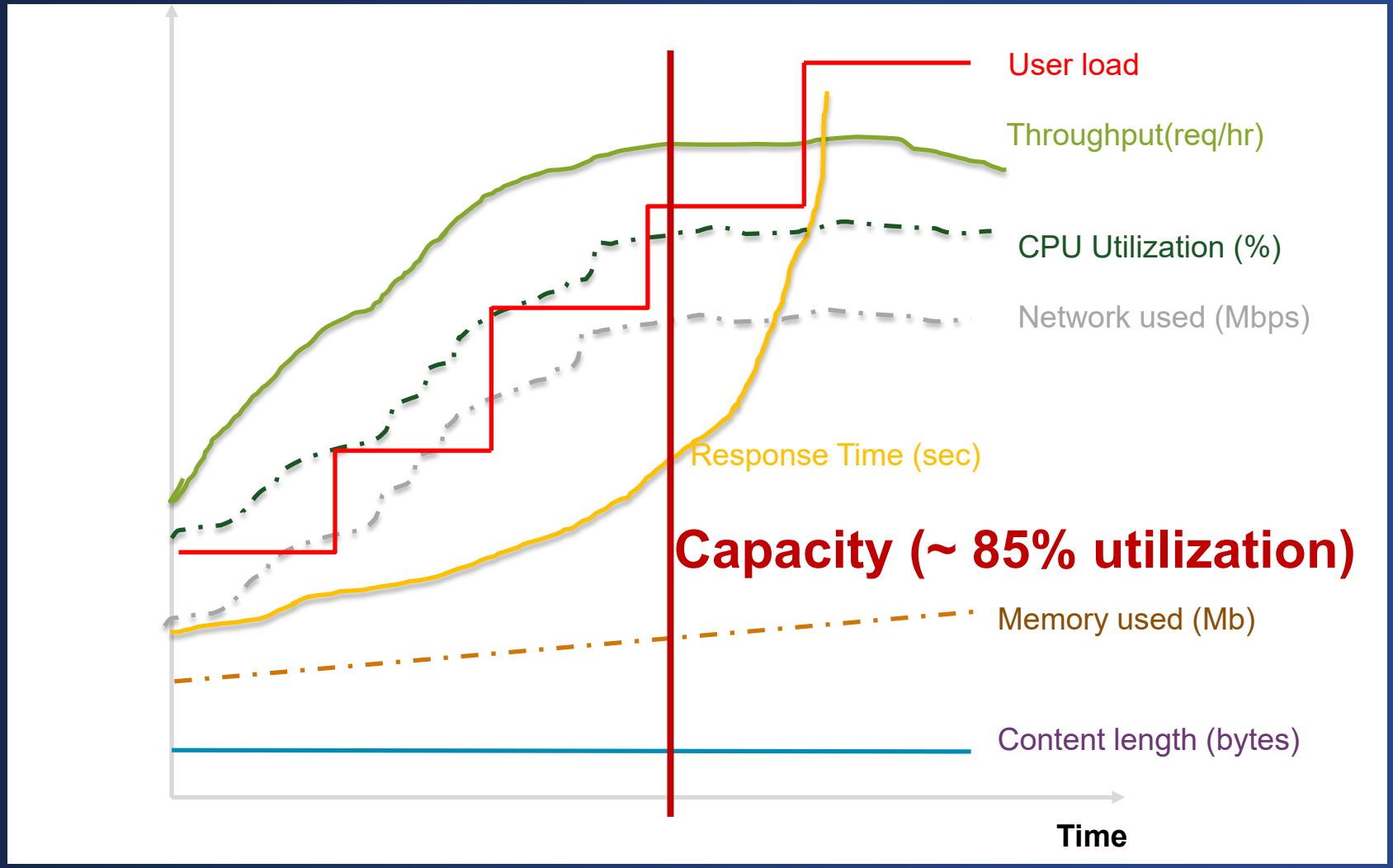
Capacity

- The maximum level of output the system can produce, e.g.
- X cars/sec
- X maps/sec

At capacity

Over capacity

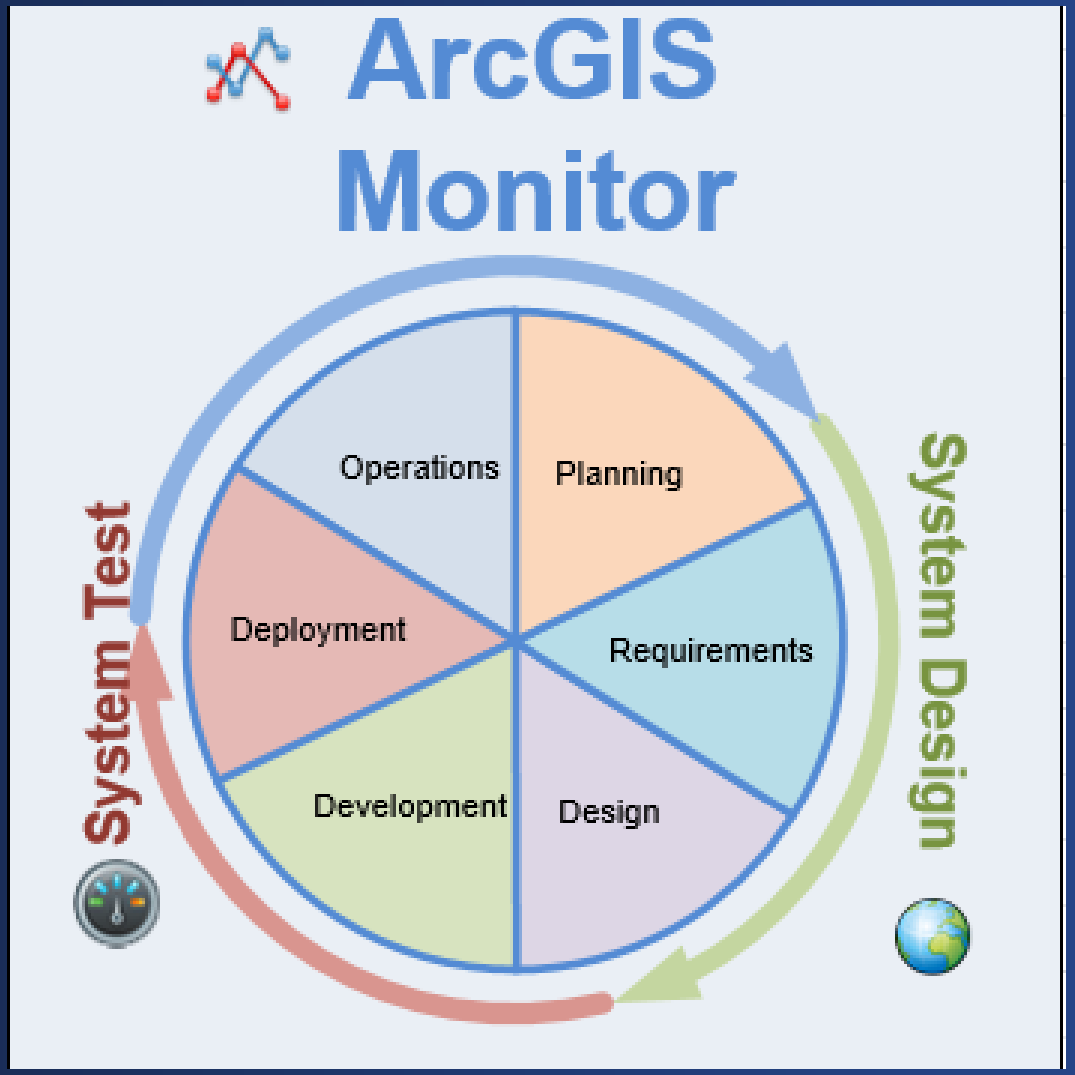
Capacity


User load
Throughput(req/hr)
CPU Utilization (%)
Network used (Mbps)
Response Time (sec)
Capacity (~ 85% utilization)
Memory used (Mb)
Content length (bytes)
Time

Process, Tools, Value

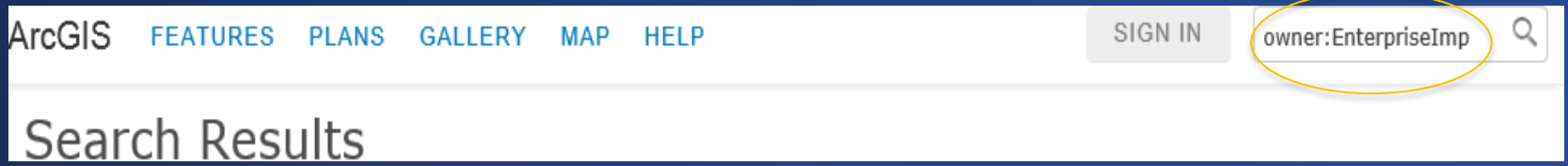
Process and tools

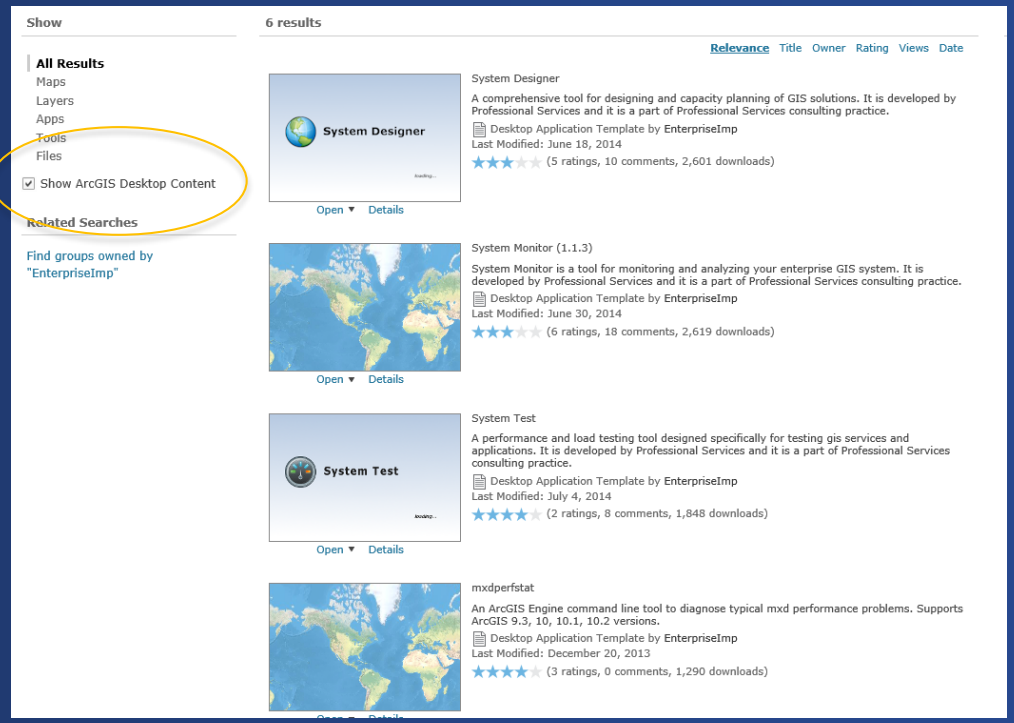
Esri tools



Tools download location

- **ArcGIS Monitor**
  - https://my.esri.com/
- **Others**
  - **http://www.arcgis.com**
  - **owner:EnterpriseImp**
  - **Show ArcGIS Desktop Content**





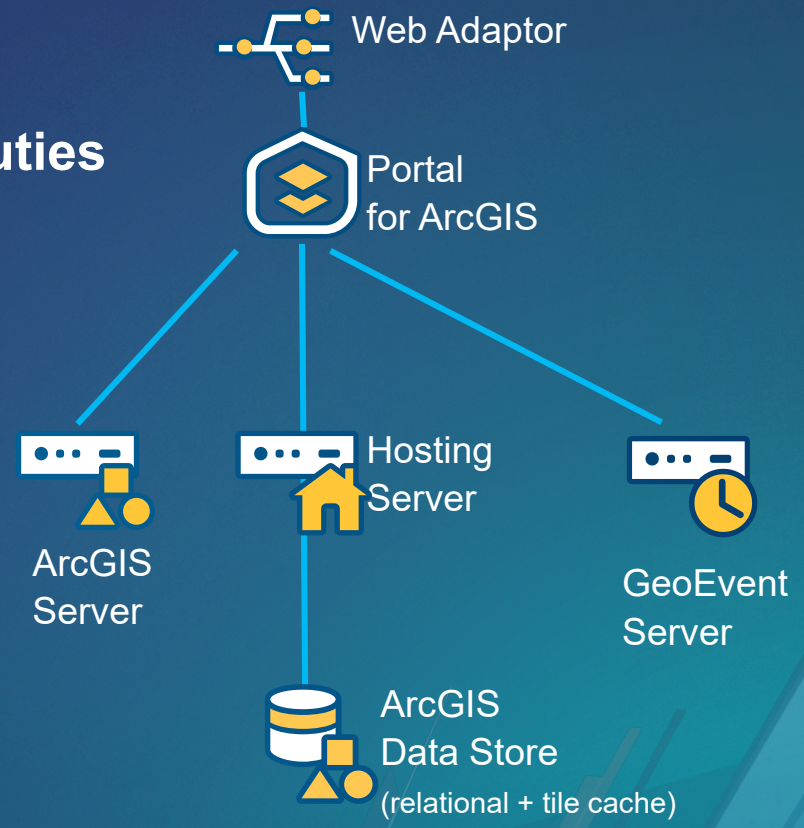
Enterprise Implementation Maturity Model

Level	Architectural Design and Capacity Planning	Performance and Scalability Testing	Monitoring	Trend Analysis and Quantification
0	No	No	No	No
1	Yes	No	No	No
2	Yes	Yes	No	No
3	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes

Design workload separation

ArcGIS Server sites

- Pre-planning is important
- Isolate hosting server site from traditional GIS Server duties
- Have dedicated GIS Server sites for various purposes:
- heavily used map services, geoprocessing services, …



Provide adequate infrastructure capacity

Provide sufficient hardware resources

Most systems are CPU bound

GIS Systems are bound by:

1. CPU - typically
2. Memory – when large number of services
3. Disk – Image Service, Synchronization
4. Network – low bandwidth deployment
5. Poorly configured virtualization can result in 30% or higher performance degradation

Most well-configured and tuned GIS systems are CPU bound.

Infrastructure

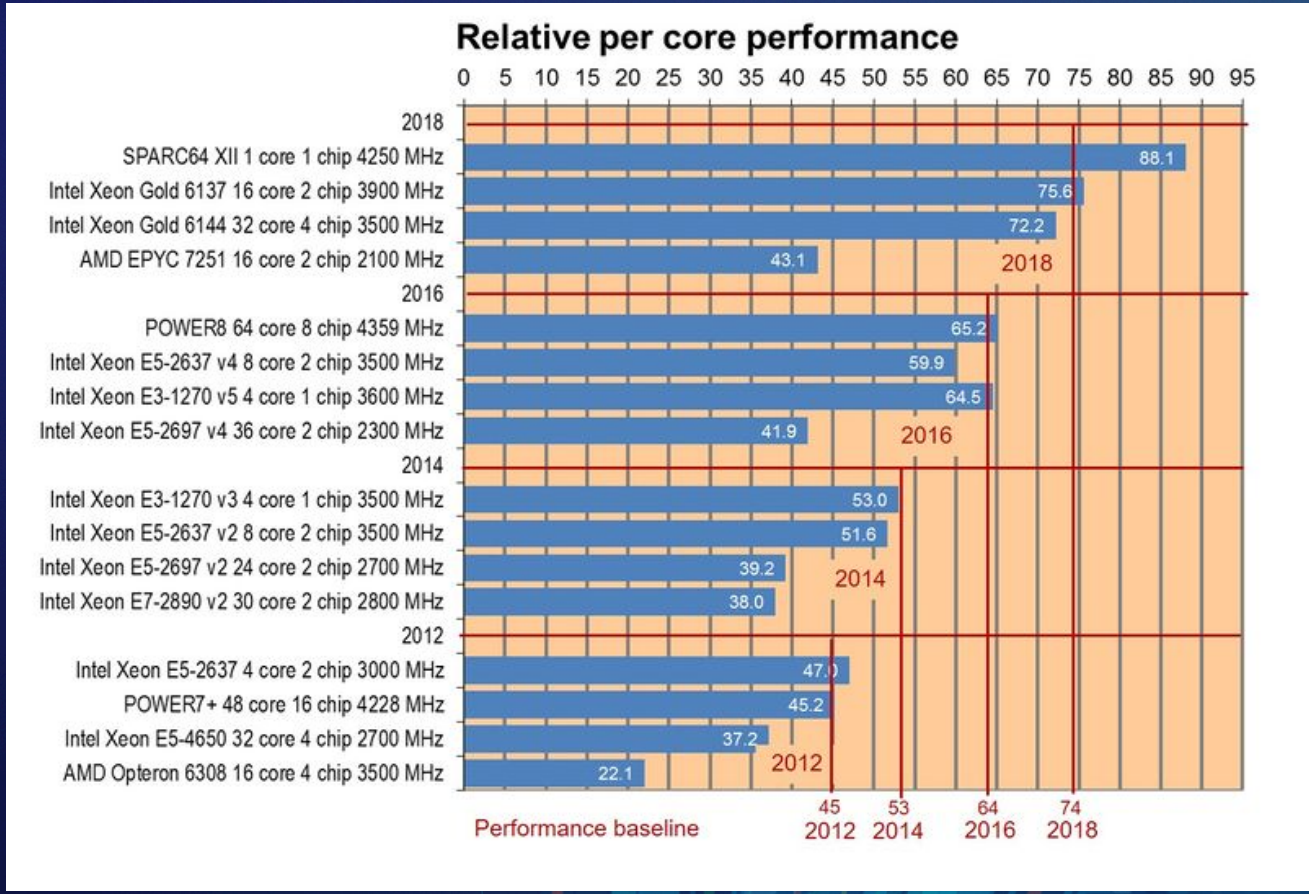
Memory requirements

Item	Low	High
ArcSOC Map	50 MB	500 MB
ArcSOC Image	20 MB	1,024 MB
ArcSOC GP	100 MB	2,000 MB
XenApp Session	500 MB	1.2 GB
Database Session	10 MB	75 MB
Database Cache	200 MB	200 GB

Wide ranges of memory consumptions

Server CPU Spec

- Performance is impacted by SPEC Rate Per Core
- Scalability is impacted by number of cores and SPEC Rate Per Core



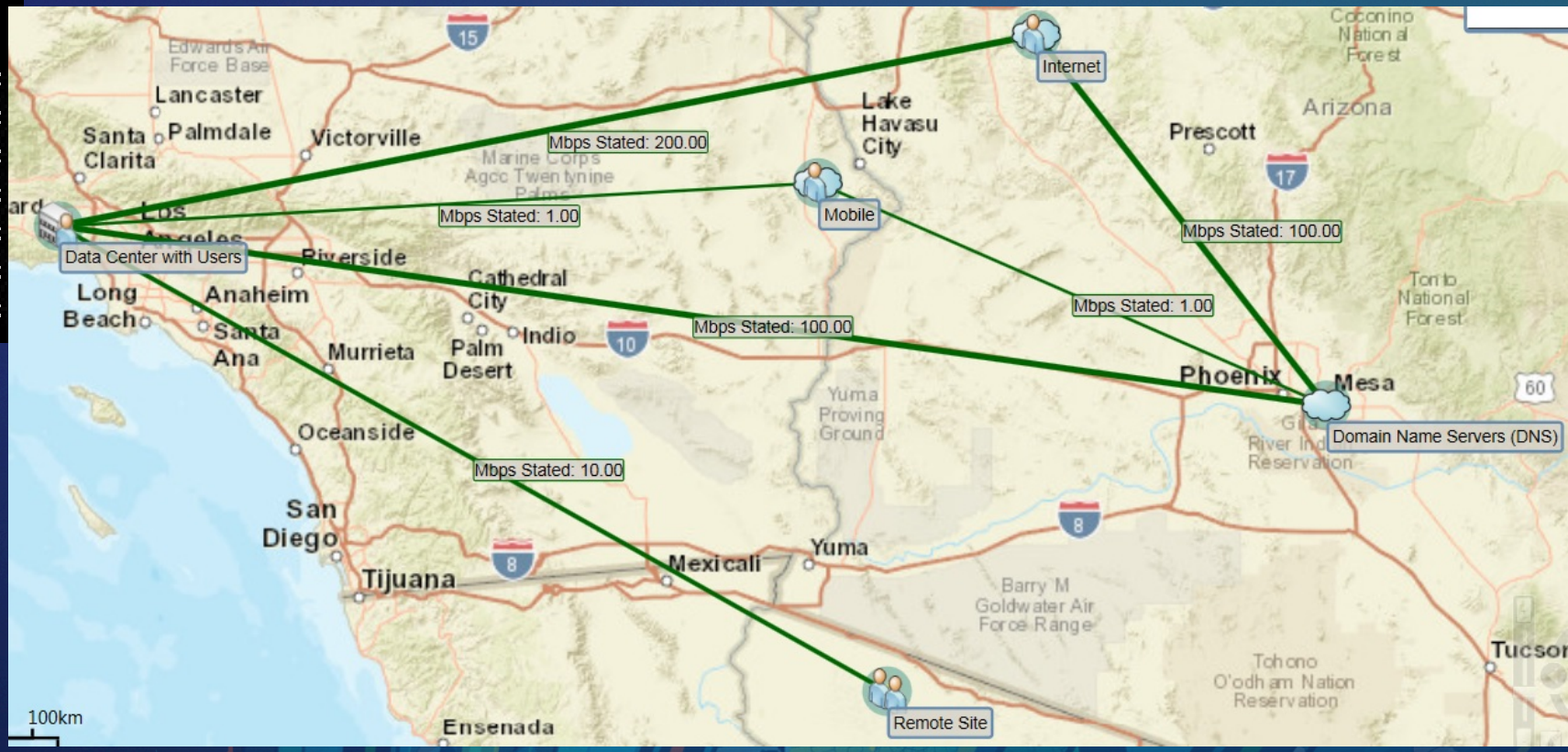
Network Planning

Establish and Configure DNS Appropriately!

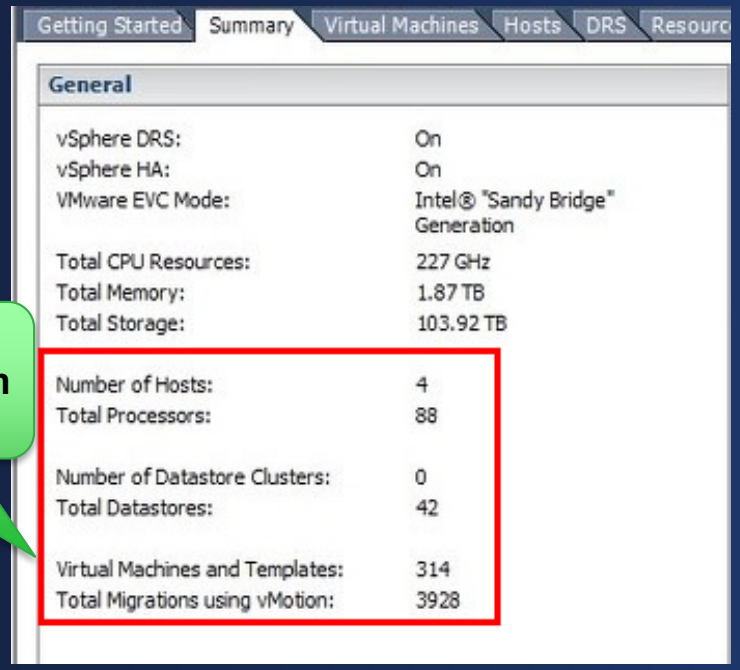
```
C:\Users\          >tracert

Tracing route to
over a maximum of 30 hops:

  1     55 ms     55 ms     55 ms
  2     55 ms     55 ms     55 ms
  3    115 ms     58 ms     62 ms
  4    111 ms    111 ms    112 ms
  5    110 ms    109 ms    110 ms
  6    110 ms    113 ms    110 ms
  7    109 ms    109 ms    109 ms
```

Trace Route: LA Workstation → Phoenix DNS

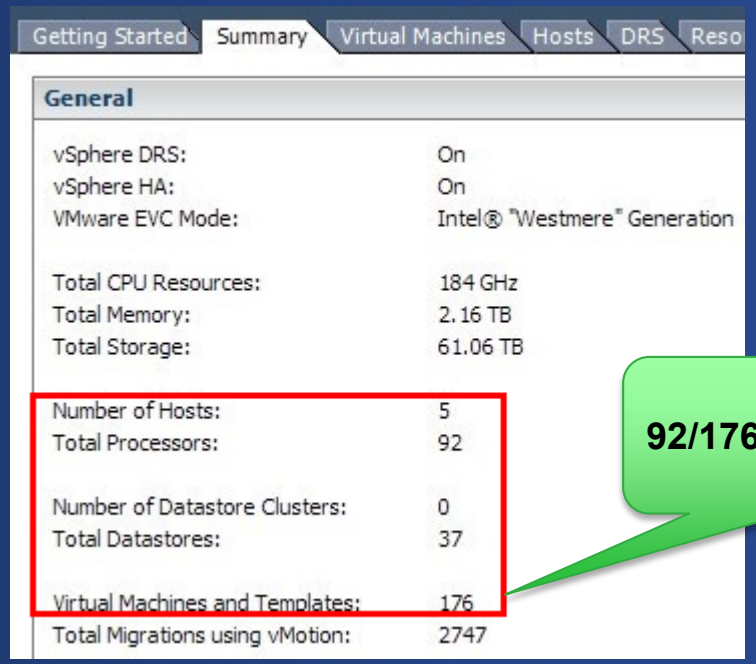
LA Database Server



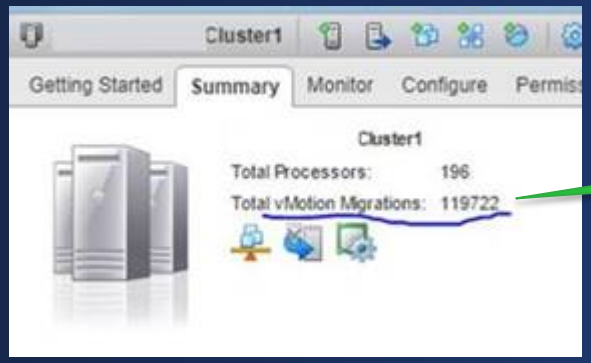
VM – watch out for overallocations



88/314=0.28 cpu/vm



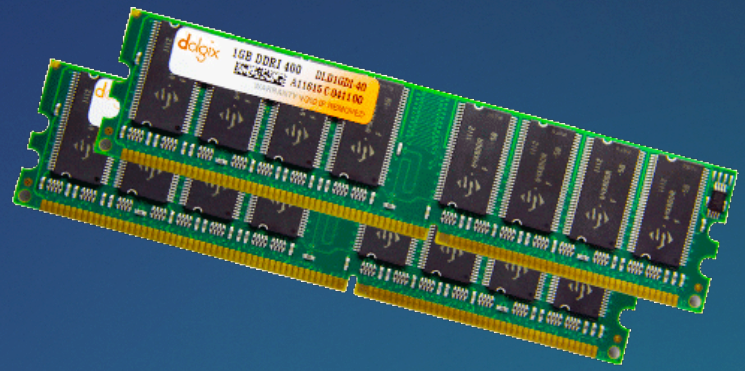
92/176=0.52 cpu/vm



119722 vMotion Migrations

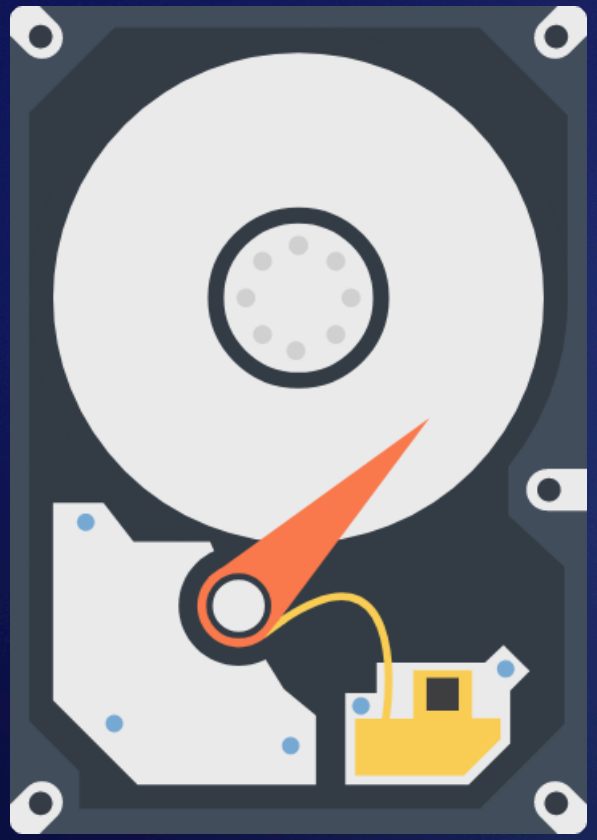
Scaling Direction

- Scaling up
  - Adding resources to your existing machine
  - Usually RAM
  - Commonly, due to lots of service instances
- Scaling out
  - Add more machines
  - Usually to get more compute power, sometimes for high availability
  - Commonly, due to increased user demand



Configure

File Geodatabase



- Local file geodatabase data
  - Better than shapefiles
  - Fastest
  - Scales with hardware
  - Best with static data
  - Make your FGDB read-only

Enterprise Geodatabase

Enterprise Geodatabase

- Fast
- Live data
- Requires database expert
- Traditional Versioning
  - fine for desktop editing, may be problematic for server
- Branch Versioning
  - New with Pro 2.1 and Enterprise 10.6. Not supported with ArcMap.
  - Designed for better scalability with many concurrent users and a web editing model

Keep statistics up-to-date

Index fields that will be queried

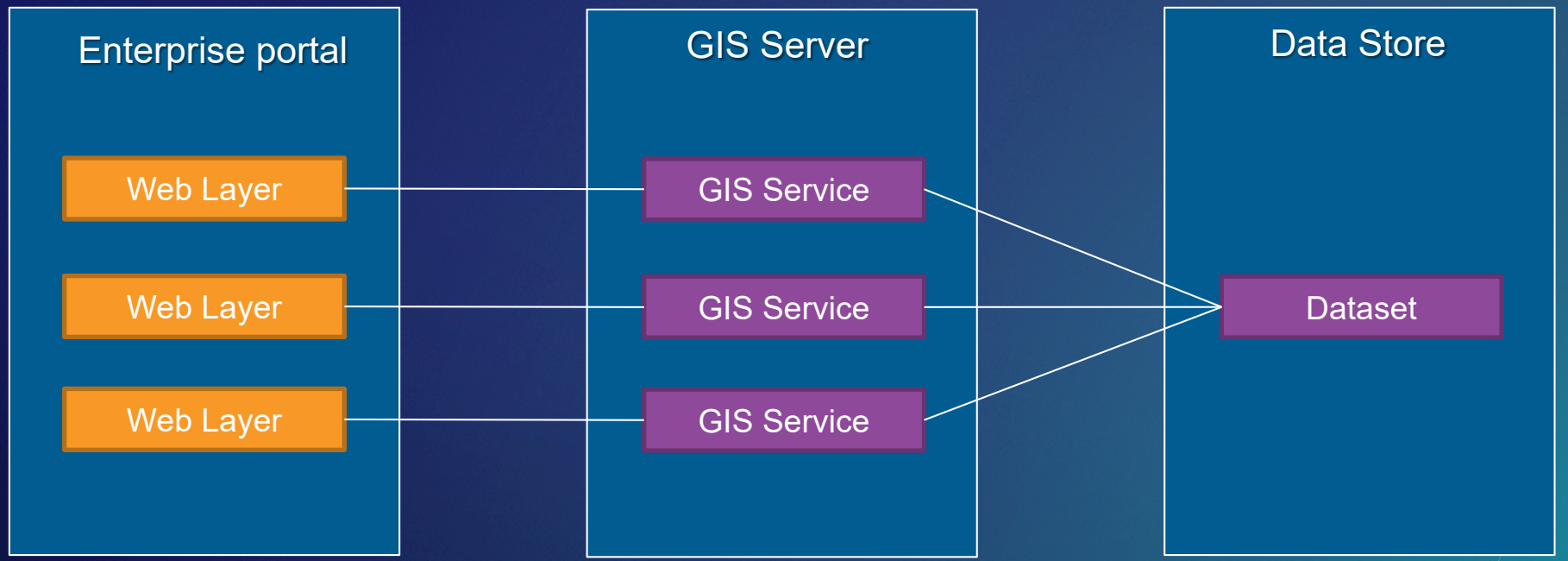
Configure Web Map

Cache and generalize data

- Use generalized data if applicable
- Cache (tiles) may reduce the amount of traffic
- Large amounts of data can be slow and overwhelming
  - Aggregate data using smart mapping
  - on-the-fly generalization and smaller data transfer (quantization)

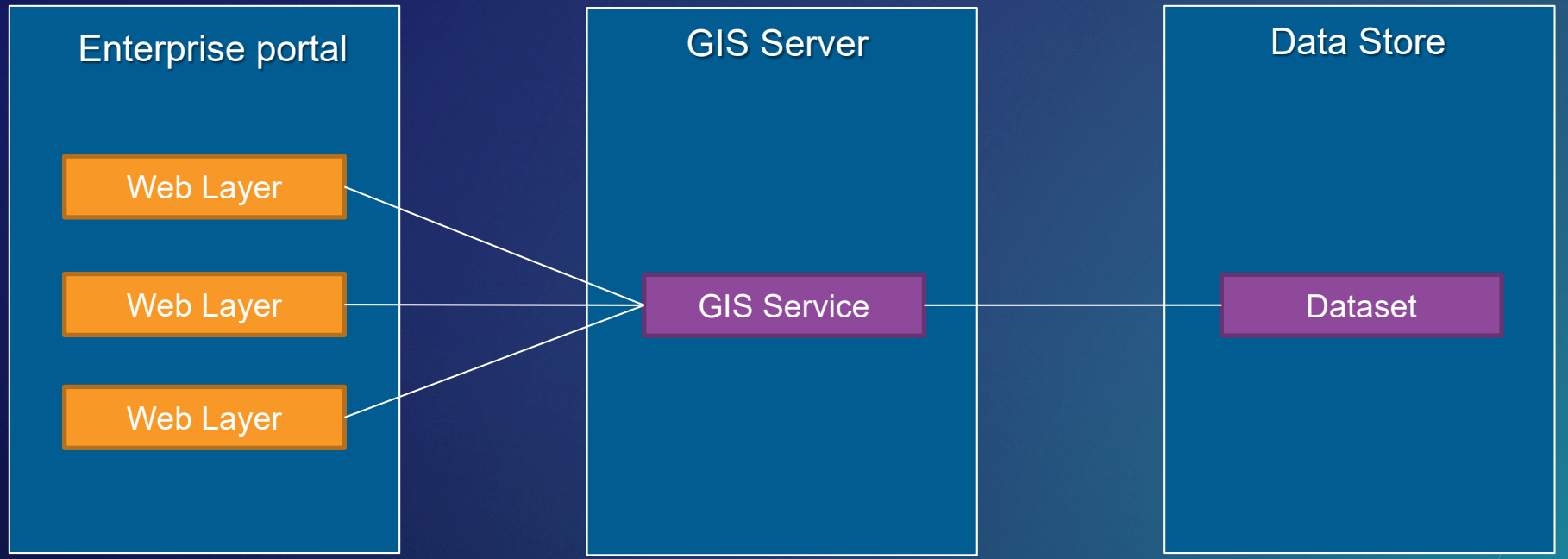
Consolidate and reduce number of services

- **Common setup today:**

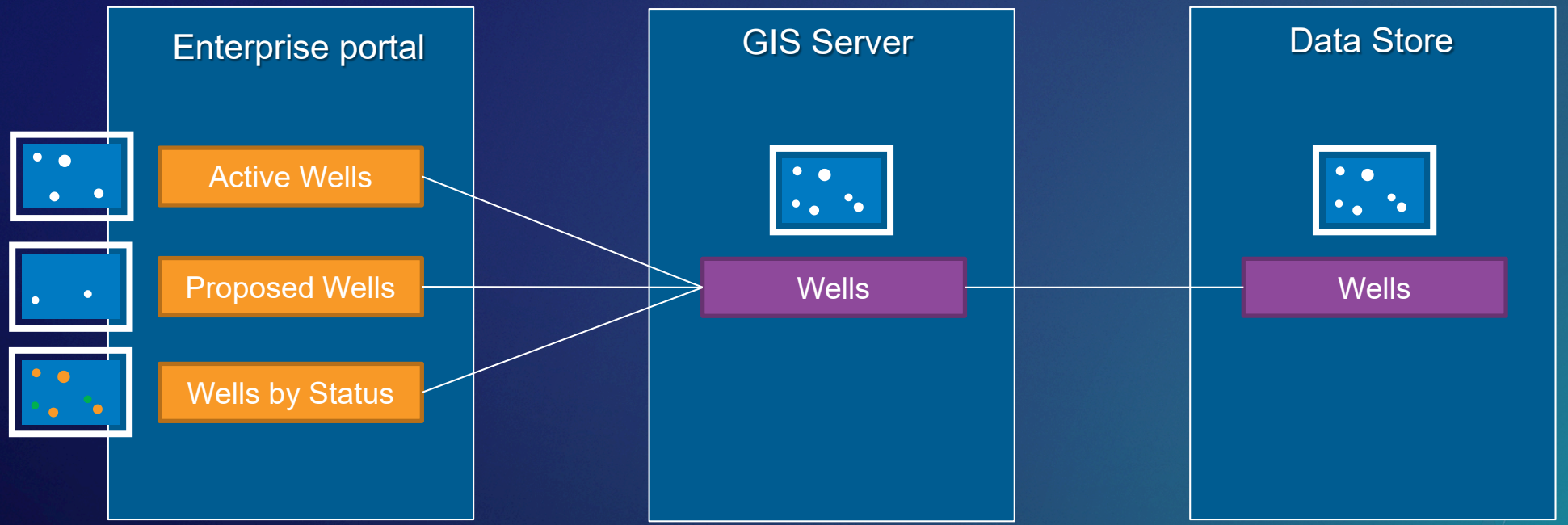


Consolidate and reduce number of services

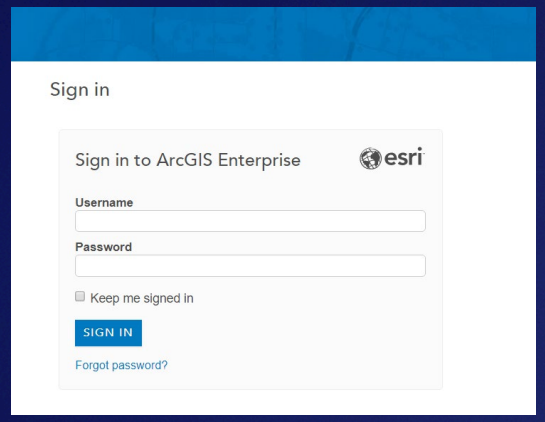
- **More efficient: consolidate layers with like security into a single service**



Consolidate and reduce number of services



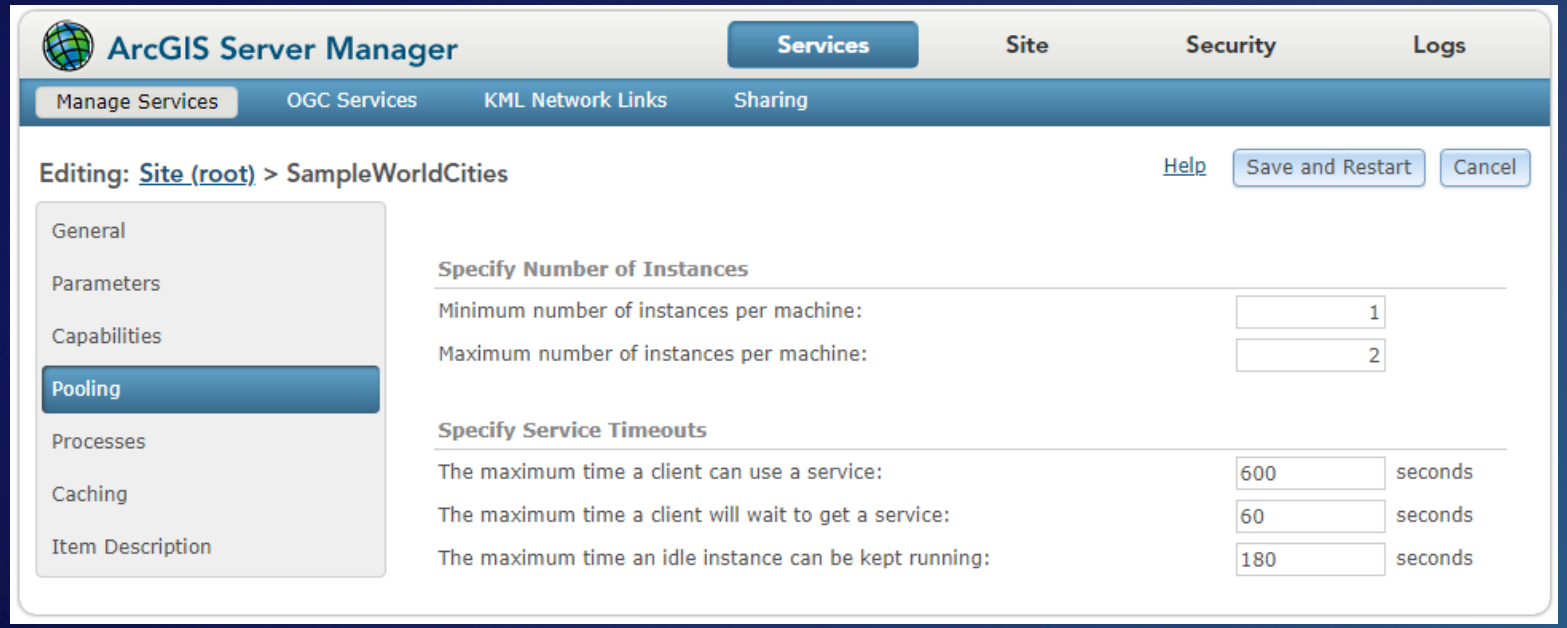
Configure login for your Enterprise portal



Login settings

- Identity and group stores can affect login performance significantly
- Example: Active Directory where users are in many groups can affect performance (newer releases handle this better)

Configure ArcGIS Server- instance tuning



- For predictable performance use *min* = *max*
- Default is *min* = 1, *max* = 2. Consider changing this!
- Allocate required swap space/page file
- Cached service : set *max* = 1 to conserve memory. Individual tile requests not serviced by the SOC process.

New ArcGIS Server 10.7 shared instances

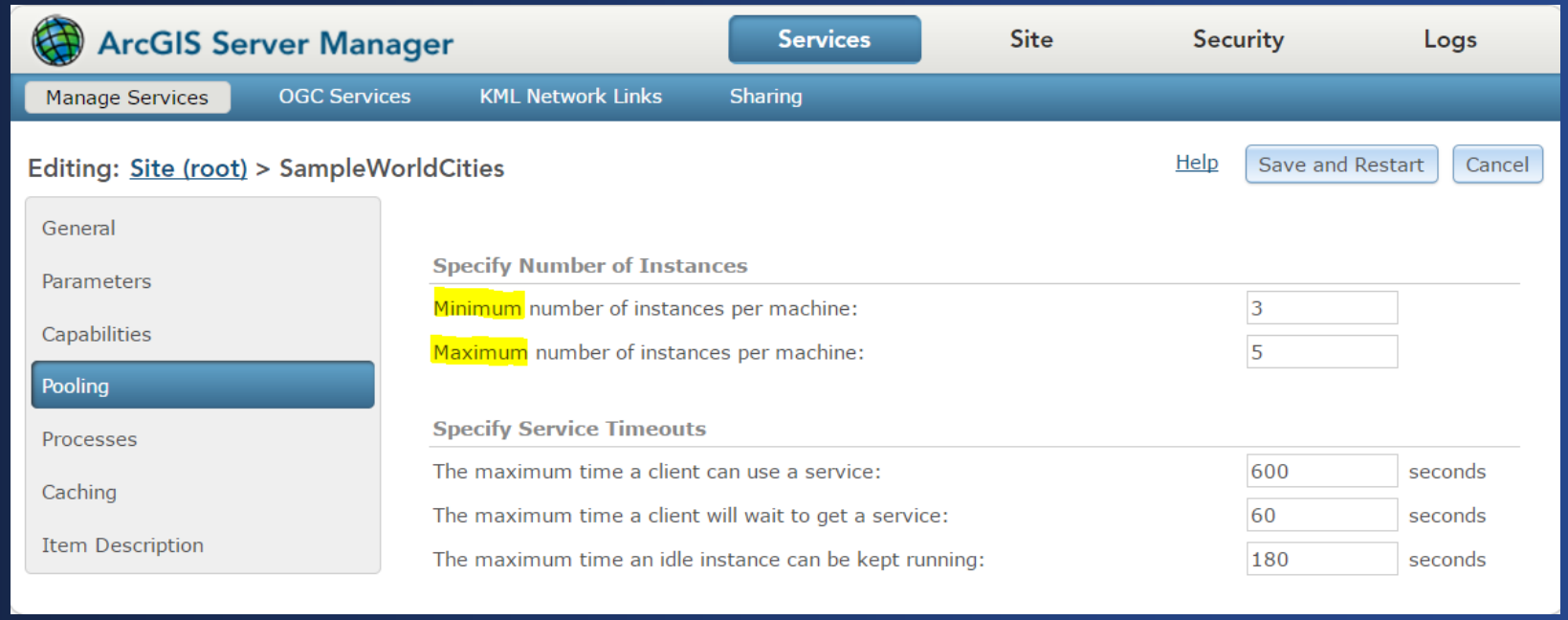
- Recommended for services that receive infrequent requests, particularly when the server site hosts many services
- Pool of processes supporting multiple services
- Conserves memory

*Currently supports only **map services** published from **ArcGIS Pro***

Use Case: Implementing ArcSOC Optimizer at ExxonMobil

ArcSOC Optimizer is an ArcGIS Monitor extension

- Decrease or increase instances, based on:
- 1. historical usage
- 2. available memory and process count



ArcSOC Optimizer

30 day decreases instances

config30days.json

```
    "SLA" : {
      "ArcSOCSLA": 200,
      "processesComment" : "http://sup
      "MemFreeSLA(GB)": 4,
      "arcSOCGB": 0.25
    },
  "LowUsageGroup": {
    "usageSecLT": 40,
    "minInstancesPerNode": 0,
    "maxInstancesPerNode": 2,
    "execute": "True"
  },
  "StandardUsageGroup": {
    "maxInstancesPerNodeIncrement": 2,
    "minStat": "p95",
    "maxStat": "max",
    "execute": "True"
```

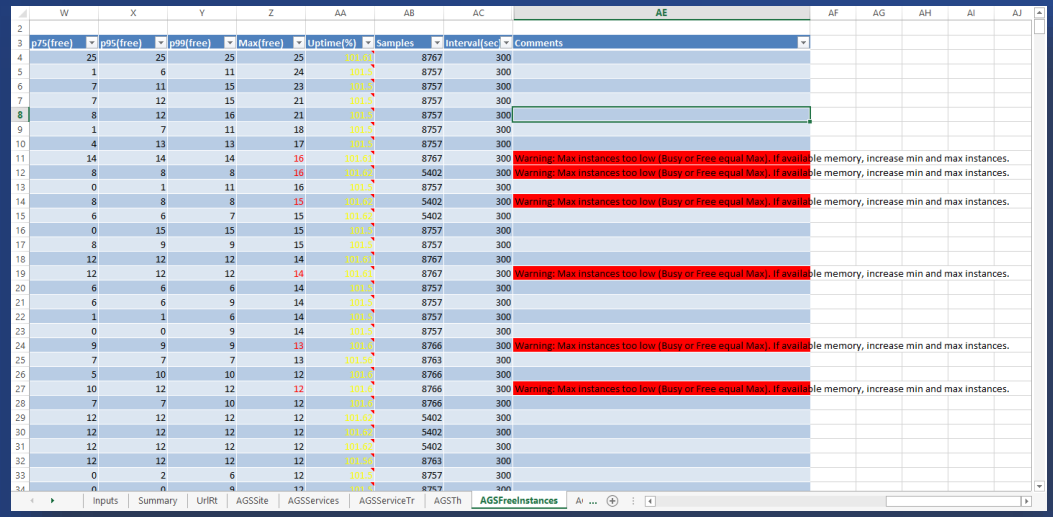
1 day increases instances

config1day.json

```
    "SLA" : {
      "ArcSOCSLA": 200,
      "processesComment" : "http://sup
      "MemFreeSLA(GB)": 4,
      "arcSOCGB": 0.25
    },
  "LowUsageGroup": {
    "usageSecLT": 20,
    "minInstancesPerNode": 0,
    "maxInstancesPerNode": 2,
    "execute": "False"
  },
  "StandardUsageGroup": {
    "maxInstancesPerNodeIncrement": 2,
    "minStat": "p95",
    "maxStat": "max",
    "execute": "True"
  },
```

The Issue

- What
  - ArcGIS Server instability & frequent outages
- Why
  - Rapid growth of WebGIS
  - Time required to increase server capacity
  - Manual adjustment of ArcSOC processes
- The bottom line
  - Reactive & unsustainable service management paradigm
  - Unhappy WebGIS users

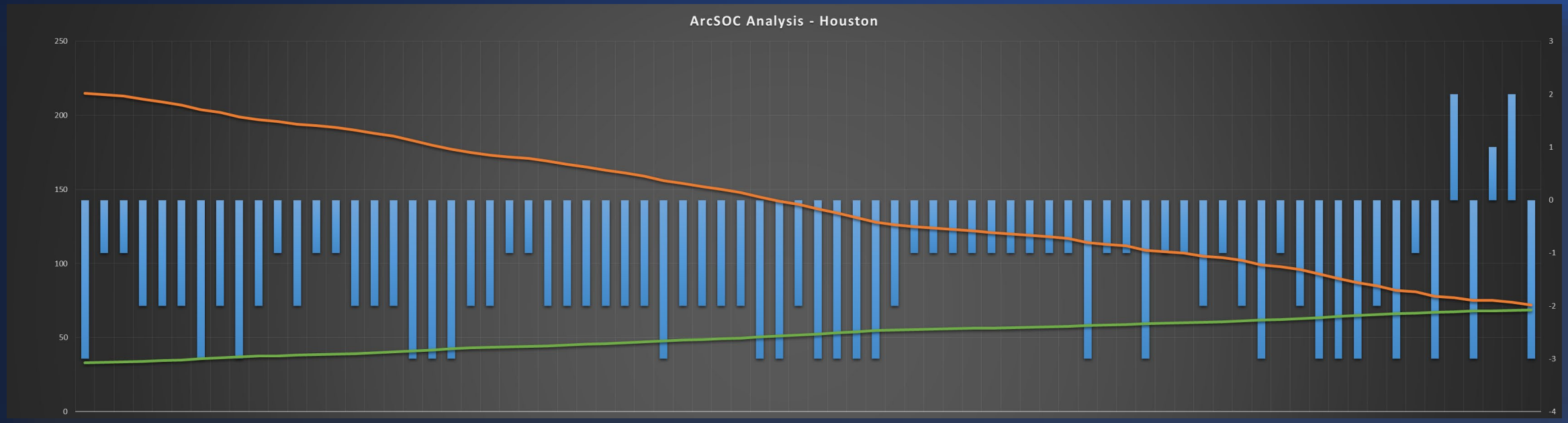


p75(free)	p95(free)	p99(free)	Max(free)	Uptime(%)	Samples	Interval(sec	Comments
25	25	25	25	101.67	8767	300	
1	6	11	24	101.67	8757	300	
7	11	15	23	101.67	8757	300	
7	12	15	21	101.67	8757	300	
8	12	16	21	101.67	8757	300	
1	7	11	18	101.67	8757	300	
4	13	13	17	101.67	8757	300	
14	14	14	16	101.67	8767	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
8	8	8	16	101.67	5402	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
0	1	11	16	101.67	8757	300	
8	8	8	15	101.67	5402	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
6	6	7	15	101.67	5402	300	
0	15	15	15	101.67	8757	300	
8	9	9	15	101.67	8757	300	
12	12	12	14	101.67	8767	300	
12	12	12	14	101.67	8767	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
6	6	6	14	101.67	8757	300	
6	6	9	14	101.67	8757	300	
1	1	6	14	101.67	8757	300	
0	0	9	14	101.67	8757	300	
9	9	9	13	101.67	8766	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
7	7	7	13	101.67	8763	300	
5	10	10	12	101.67	8766	300	
10	12	12	12	101.67	8766	300	Warning: Max instances too low (Busy or Free equal Max). If available memory, increase min and max instances.
7	7	10	12	101.67	8766	300	
12	12	12	12	101.67	5402	300	
12	12	12	12	101.67	5402	300	
12	12	12	12	101.67	5402	300	
12	12	12	12	101.67	8763	300	
0	2	6	12	101.67	8757	300	

Inputs | Summary | UrlRt | AGSSite | AGSServices | AGSServiceTr | AGSTh | AGSFreeInstances

Results & Benefits

- Initial run
  - Significant reduction of total number of SOCs
  - Increase in free memory
  - Identification of over utilized services



Orange – total SOCs, Green – free memory

Blue – change in SOCs for individual services

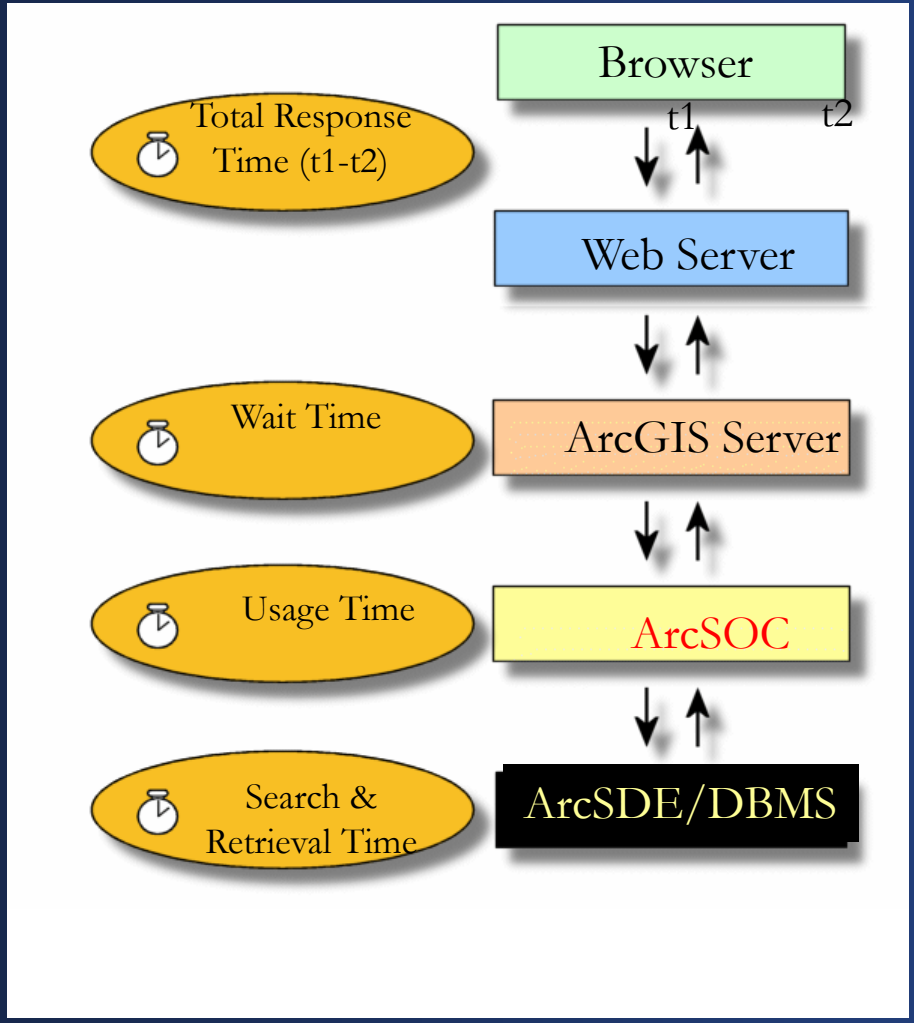
Results & Benefits

- The results speak for themselves
  - Vastly improved stability of ArcGIS Server
  - Improved response times of services
  - Staff time freed for other activities
  - Happy WebGIS users!!!

Tune

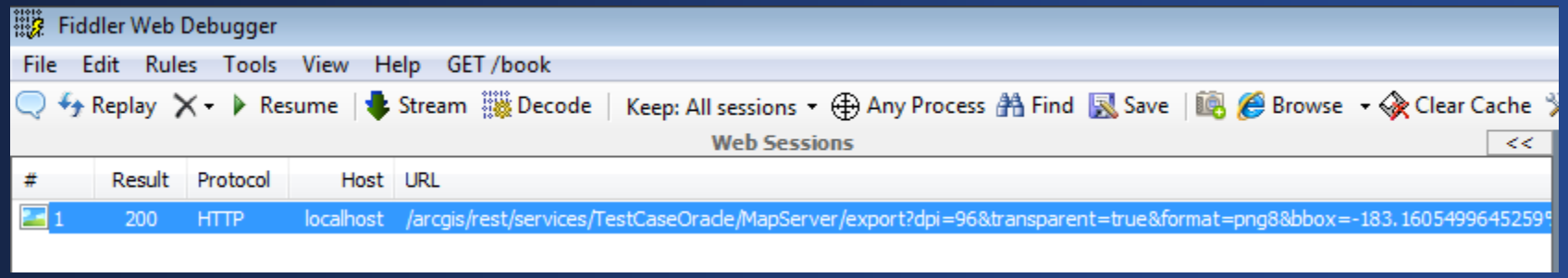
Tuning methodology

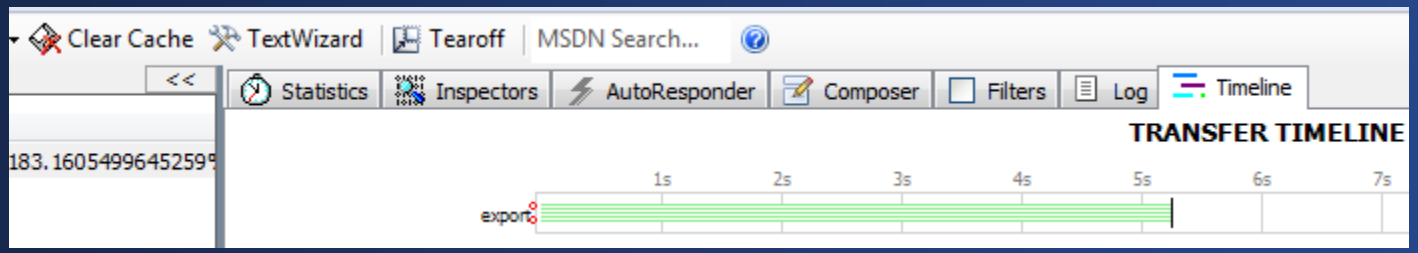
Profile each tier starting from the top



Fiddler

Fiddler measurement approximately 5.2 seconds





Mxdperfstat

http://www.arcgis.com/home/item.html?id=a269d03aa1c840638680e2902dadecac

Item	At Scale	Layer Name	Refresh Time (sec)	Recommendations	Features	Vertices	Labeling	Geography Phase (sec)	Graphics Phase (sec)	Cursor Phase (sec)	DBMS CPU	DBMS LIO
1	167,935,665	SDE.GridPoint	4.75	run DBMS trace: oraCPU=4.74; run DBMS trace, check oracle execution plan: oraLIO=130936; check if index exist for query def attributes;	1,998		False	4.74	.00	4.56	4.74	130,936

DBMS LIO	DBMS PIO	Source	LayerType	Layer Spatial Reference	LayerQueryDef
130,936		esriDBMS_Oracle,asakowicz,sde:oracle$asakowicz:1521/gis2,sde	esriGeometryPoint	GCS_WGS_1984	ID<1000

Oracle Trace

Compare elapsed time

```
SQL ID: 6p20xrg10fw4n Plan Hash: 569628948

SELECT  V__45.st_SHAPE$, V__45.OID,  V__45.st_points,V__45.st_numpts,
  V__45.st_entity,V__45.st_minx,V__45.st_miny,V__45.st_maxx,V__45.st_maxy,
  V__45.st_minz,V__45.st_maxz,V__45.st_minm,V__45.st_maxm,V__45.st_area$,
  V__45.st_len$,V__45.st_rowid
FROM
 (SELECT b.OID,b.GX,b.GY,b.ID,1 st_SHAPE$ ,b.SHAPE.points as st_points,
  b.SHAPE.numpts as st_numpts,b.SHAPE.entity as st_entity,b.SHAPE.minx as
  st_minx,b.SHAPE.miny as st_miny,b.SHAPE.maxx as st_maxx,b.SHAPE.maxy as
  st_maxy,b.SHAPE.minz as st_minz,b.SHAPE.maxz as st_maxz,b.SHAPE.minm as
  st_minm,b.SHAPE.maxm as st_maxm,b.SHAPE.area as st_area$,b.SHAPE.len as
  st_len$,b.rowid as st_rowid FROM SDE.GridPoint b WHERE
  SDE.ST_EnvIntersects(b.SHAPE,:1,:2,:3,:4) = 1  AND b.OID NOT IN (SELECT /*+
  HASH_AJ */ SDE_DELETES_ROW_ID FROM SDE.D45 WHERE DELETED_AT IN (SELECT
  l.lineage_id FROM SDE.state_lineages l WHERE l.lineage_name =
  :lineage_name1 AND l.lineage_id <= :state_id1) AND SDE_STATE_ID = 0) UNION
  ALL SELECT a.OID,a.GX,a.GY,a.ID,2 st_SHAPE$ ,a.SHAPE.points as st_points,
  a.SHAPE.numpts as st_numpts,a.SHAPE.entity as st_entity,a.SHAPE.minx as
  st_minx,a.SHAPE.miny as st_miny,a.SHAPE.maxx as st_maxx,a.SHAPE.maxy as
  st_maxy,a.SHAPE.minz as st_minz,a.SHAPE.maxz as st_maxz,a.SHAPE.minm as
  st_minm,a.SHAPE.maxm as st_maxm,a.SHAPE.area as st_area$,a.SHAPE.len as
  st_len$,a.rowid as st_rowid FROM SDE.A45 a,SDE.state_lineages SL WHERE
  SDE.ST_EnvIntersects(a.SHAPE,:5,:6,:7,:8) = 1  AND (a.OID, a.SDE_STATE_ID)
  NOT IN (SELECT /*+ HASH_AJ */ SDE_DELETES_ROW_ID, SDE_STATE_ID FROM SDE.D45
  WHERE DELETED_AT IN (SELECT  l.lineage_id FROM SDE.state_lineages l WHERE
  l.lineage_name = :lineage_name2 AND l.lineage_id <= :state_id2) AND
  SDE_STATE_ID > 0) AND a.SDE_STATE_ID = SL.lineage_id AND SL.lineage_name =
  :lineage_name3 AND SL.lineage_id <= :state_id3) V__45 WHERE  (ID<1000)


call     count       cpu    elapsed       disk      query    current        rows
------- ------  -------- ---------- ---------- ---------- ----------  ----------
Parse        0      0.00       0.00          0          0          0           0
Execute      1      0.03       0.02          0          0          0           0
Fetch       20      9.67       9.64          0     129581          0        1998
------- ------  -------- ---------- ---------- ---------- ----------  ----------
total       21      9.70       9.66          0     129581          0        1998
```

- Elapsed time slightly changed due to different test runs

Oracle Execution plan

Inefficient spatial index

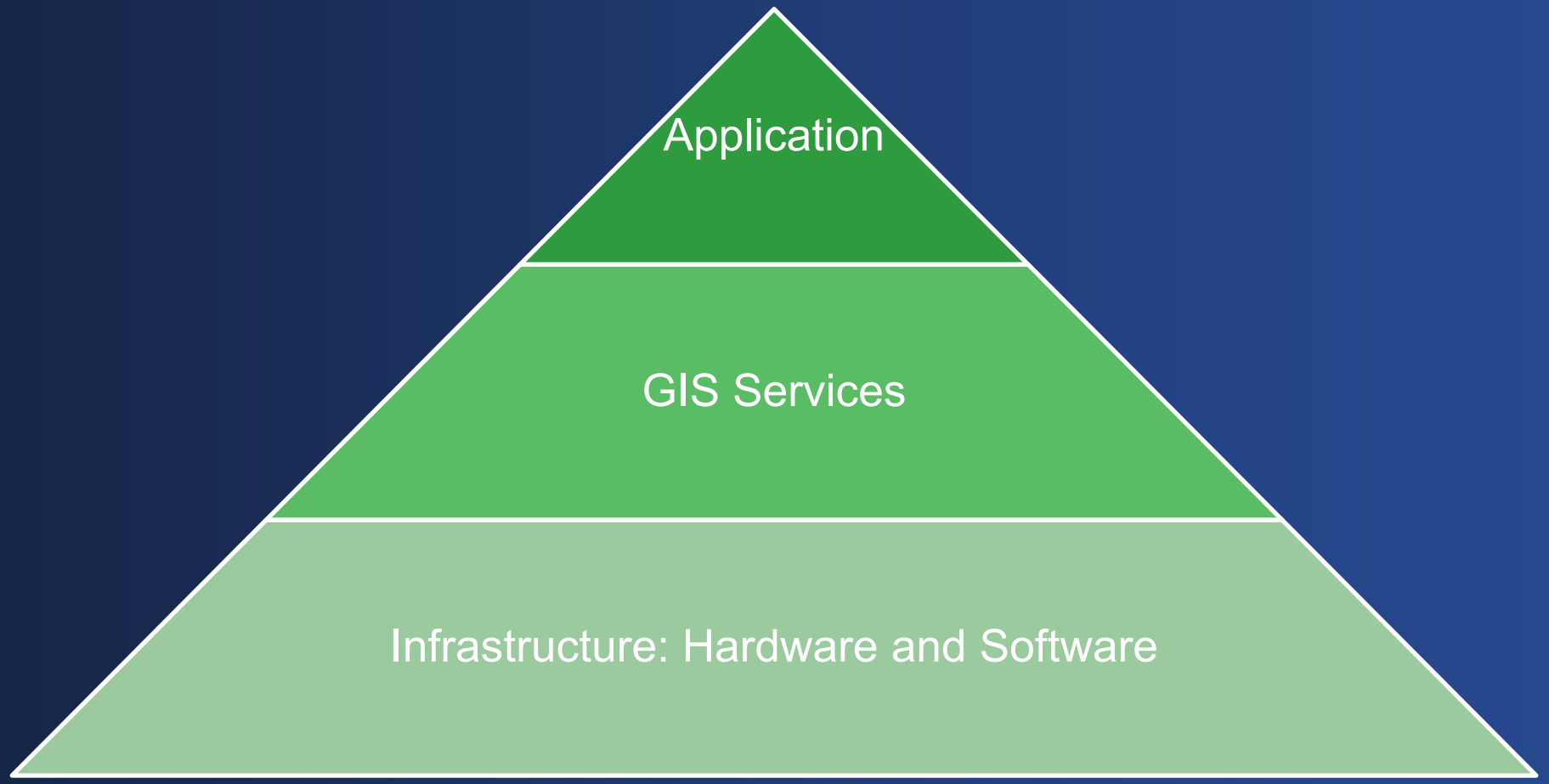
```
Misses in library cache during parse: 1
Misses in library cache during execute: 1
Optimizer mode: ALL_ROWS
Parsing user id: 84
Number of plan statistics captured: 1

Rows (1st) Rows (avg) Rows (max)  Row Source Operation
---------- ---------- ----------  ---------------------------------------------------
      1998       1998       1998  VIEW  (cr=131605 pr=0 pw=0 time=512477 us cost=8 size=45906 card=21)
      1998       1998       1998   UNION-ALL  (cr=131605 pr=0 pw=0 time=511602 us)
      1998       1998       1998    FILTER  (cr=131451 pr=0 pw=0 time=508349 us)
      1998       1998       1998     TABLE ACCESS BY INDEX ROWID GRIDPOINT (cr=131451 pr=0 pw=0 time=4
    129600     129600     129600      DOMAIN INDEX (Sel: Default - Undefined) A29_IX1 (cr=2017 pr=0 pw
         0          0          0     NESTED LOOPS  (cr=0 pr=0 pw=0 time=4456 us cost=0 size=44 card=1)
         0          0          0      INDEX RANGE SCAN D45_PK (cr=0 pr=0 pw=0 time=2101 us cost=0 size
         0          0          0      INDEX UNIQUE SCAN LINEAGES_PK (cr=0 pr=0 pw=0 time=0 us cost=0 s
         0          0          0    NESTED LOOPS ANTI (cr=154 pr=0 pw=0 time=2247 us cost=5 size=2367
         0          0          0     NESTED LOOPS  (cr=154 pr=0 pw=0 time=2243 us cost=5 size=2367 car
         0          0          0      TABLE ACCESS BY INDEX ROWID A45 (cr=154 pr=0 pw=0 time=2242 us c
         0          0          0       BITMAP CONVERSION TO ROWIDS (cr=154 pr=0 pw=0 time=2236 us)
         0          0          0        BITMAP AND  (cr=154 pr=0 pw=0 time=2232 us)
         0          0          0         BITMAP CONVERSION FROM ROWIDS (cr=147 pr=0 pw=0 time=455 us)
         0          0          0          SORT ORDER BY (cr=147 pr=0 pw=0 time=454 us)
         0          0          0           INDEX RANGE SCAN A45_STATEID_IX1 (cr=147 pr=0 pw=0 time=439
         0          0          0         BITMAP CONVERSION FROM ROWIDS (cr=7 pr=0 pw=0 time=1768 us)
         0          0          0          SORT ORDER BY (cr=7 pr=0 pw=0 time=1768 us)
         0          0          0           DOMAIN INDEX (Sel: Default - Undefined) A29_IX1_A (cr=7 pr=
         0          0          0      INDEX UNIQUE SCAN LINEAGES_PK (cr=0 pr=0 pw=0 time=0 us cost=0 s
         0          0          0     VIEW PUSHED PREDICATE  VW_NSO_1 (cr=0 pr=0 pw=0 time=0 us cost=0
         0          0          0      FILTER  (cr=0 pr=0 pw=0 time=0 us)
         0          0          0       NESTED LOOPS  (cr=0 pr=0 pw=0 time=0 us cost=0 size=44 card=1)
         0          0          0        INDEX RANGE SCAN D45_PK (cr=0 pr=0 pw=0 time=0 us cost=0 size=
         0          0          0        INDEX UNIQUE SCAN LINEAGES_PK (cr=0 pr=0 pw=0 time=0 us cost=0
```

Test

Testing Objectives

- Meet Service-Level Agreement (SLA)
- Bottlenecks analysis
- Capacity planning
- Benchmarking different alternatives

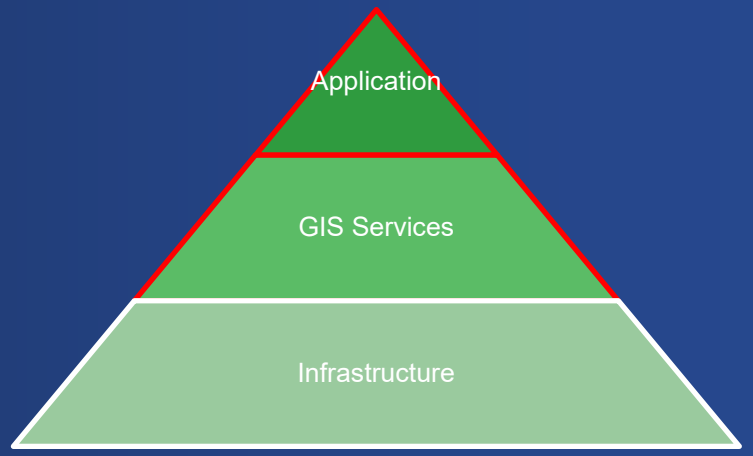
Testing process



System Test for Web

GIS Test Automation

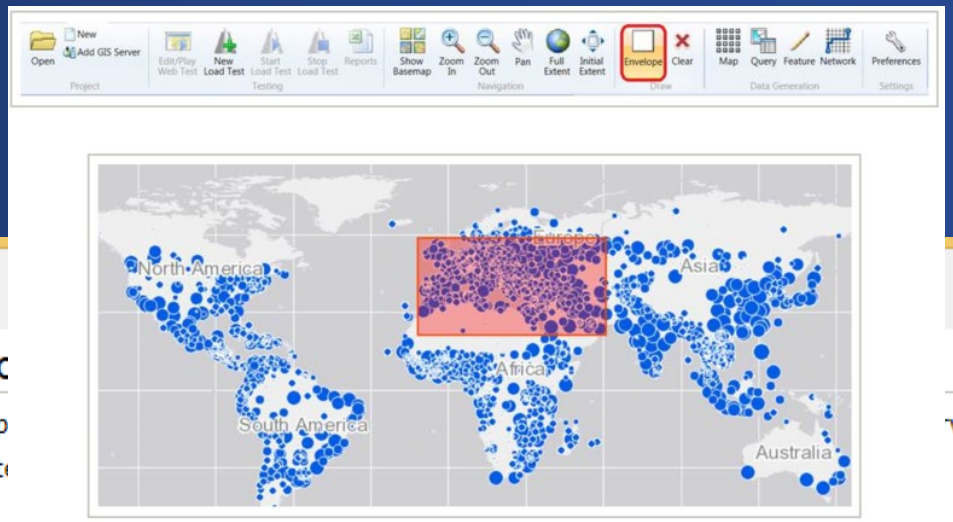
- ArcGIS Services
  - Mapping
  - Feature Service
  - OGC
  - Geocoding
  - Image Service
  - Network Analyst
  - Geoprocessing
  - Tile Cache
- Application Testing
- Discipline relevant report



Web test tools feature comparison

Tool	Cost	Learning Curve	OS Metrics	GIS Data Generation	GIS Test Automation
Load Runner	High	High	Windows/Linux	No	No
Visual Studio	Medium	High	Windows	No	No
JMeter	Free	High	Requires additional plugin	No	No
System Test	Free	Low	Windows/Linux	Yes	Yes

System Test for Web



Hide Back Print Options

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- Welcome
  - Getting Started
    - Introducing System Test Tool
  - Testing ArcGIS Services
    - Dynamic Map Services Benchr
    - Query Map
    - Feature Access (Editing)
    - Identify
    - WFS
    - WCS
    - WMS
    - Geocoding
    - Image Services
    - Network Analyst
    - Geoprocessing
    - Tile Cache
    - Rerun a Previous Load Test
  - Testing Application
  - Validate Results
  - Application Concepts and Compone
  - Technical Concepts
  - Command Line Tool
- Glossary

Dynamic Map Services Benchmark: Perfo

A load test is defined by a given map service and during this typ

1. Learn how to add ArcGIS Server services and a data to t
2. Create a web test and a load test.
3. Run test and validate results.

In this tutorial, you locate a map service that is sourced to the SampleWorldCities dataset that comes included with ArcGIS Server. You identif
be able to run the load test.

Important: ArcGIS Server 10.1 or higher is required. Make sure the SampleWorldCities default map service that comes with ArcGIS Server is

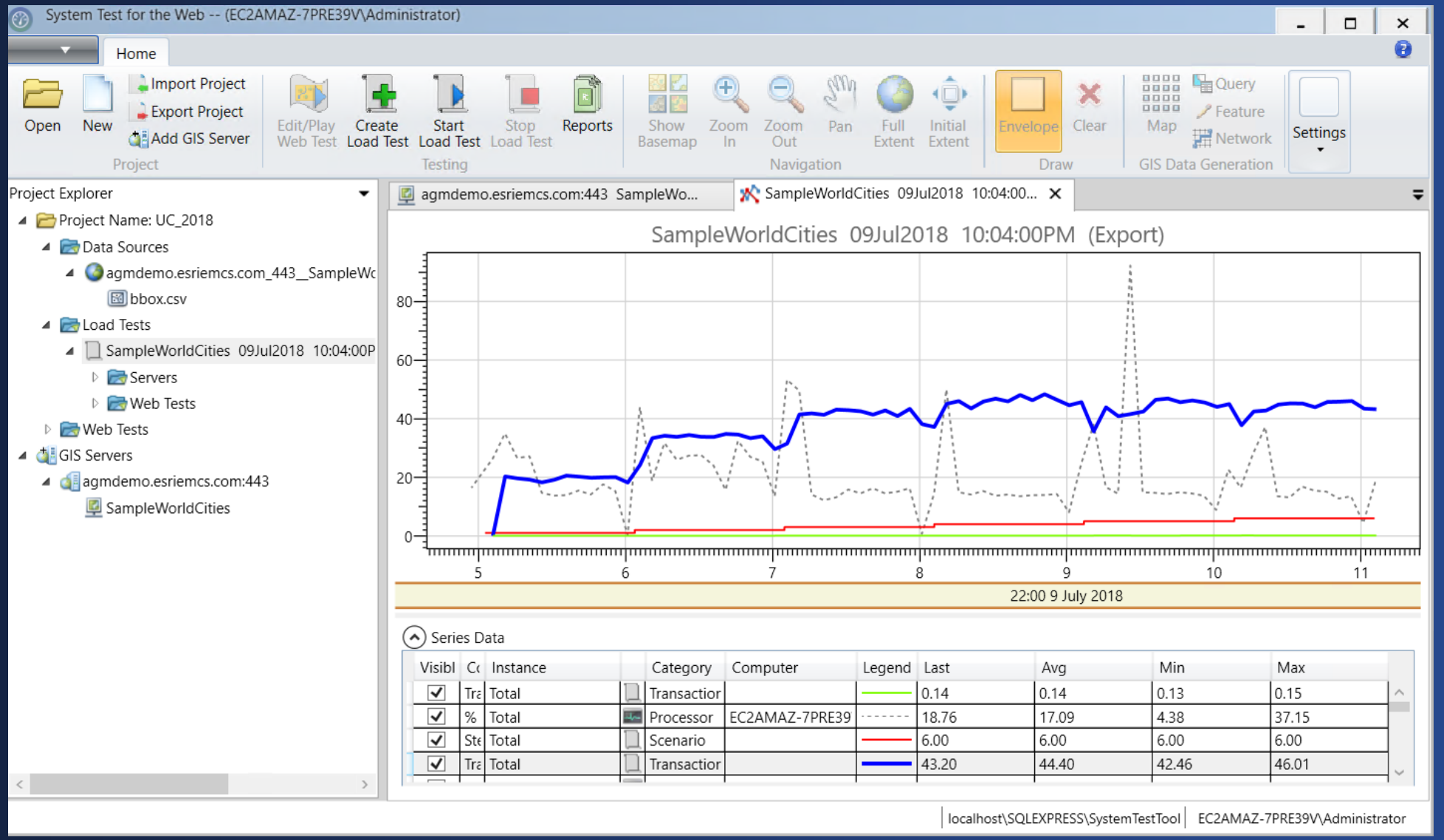
Scenario

Your supervisor is planning to publish a world map that allows users to view cities. They would like to know what performance metrics to expec

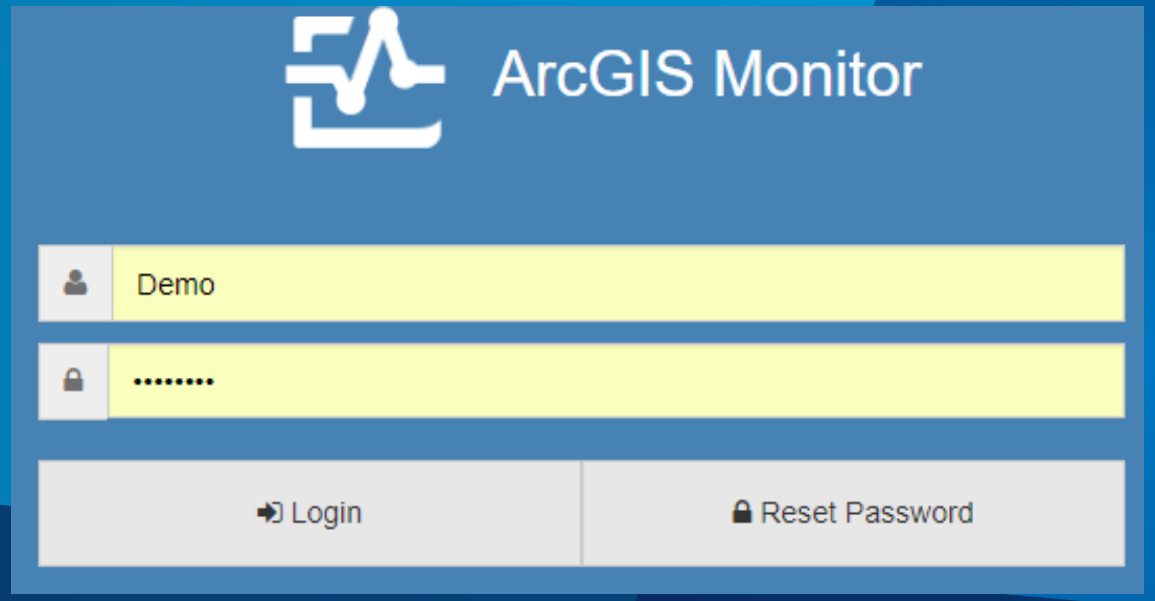
High Level Steps:

1. Create a project.
2. Add ArcGIS Server services.
3. Create test data.
4. Create web test.
5. Start load test.
6. Validate results.

System Test for Web



Monitor

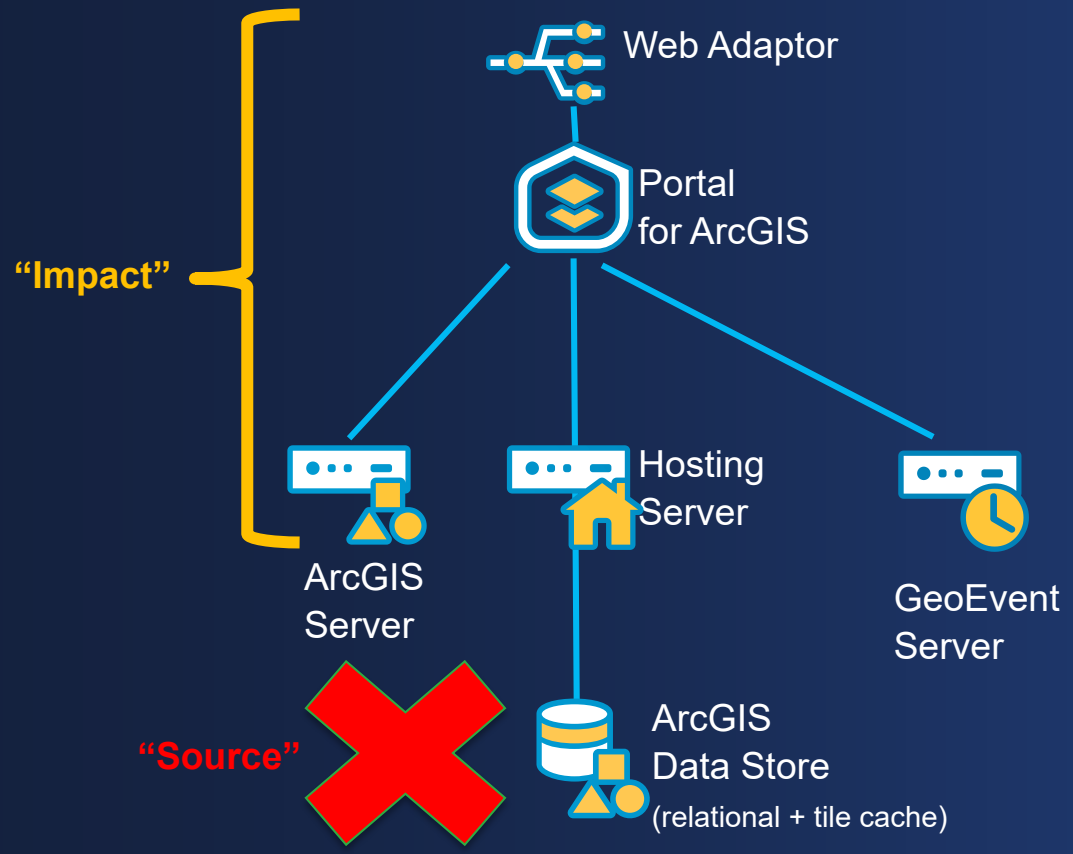


ArcGIS Monitor Demo Site

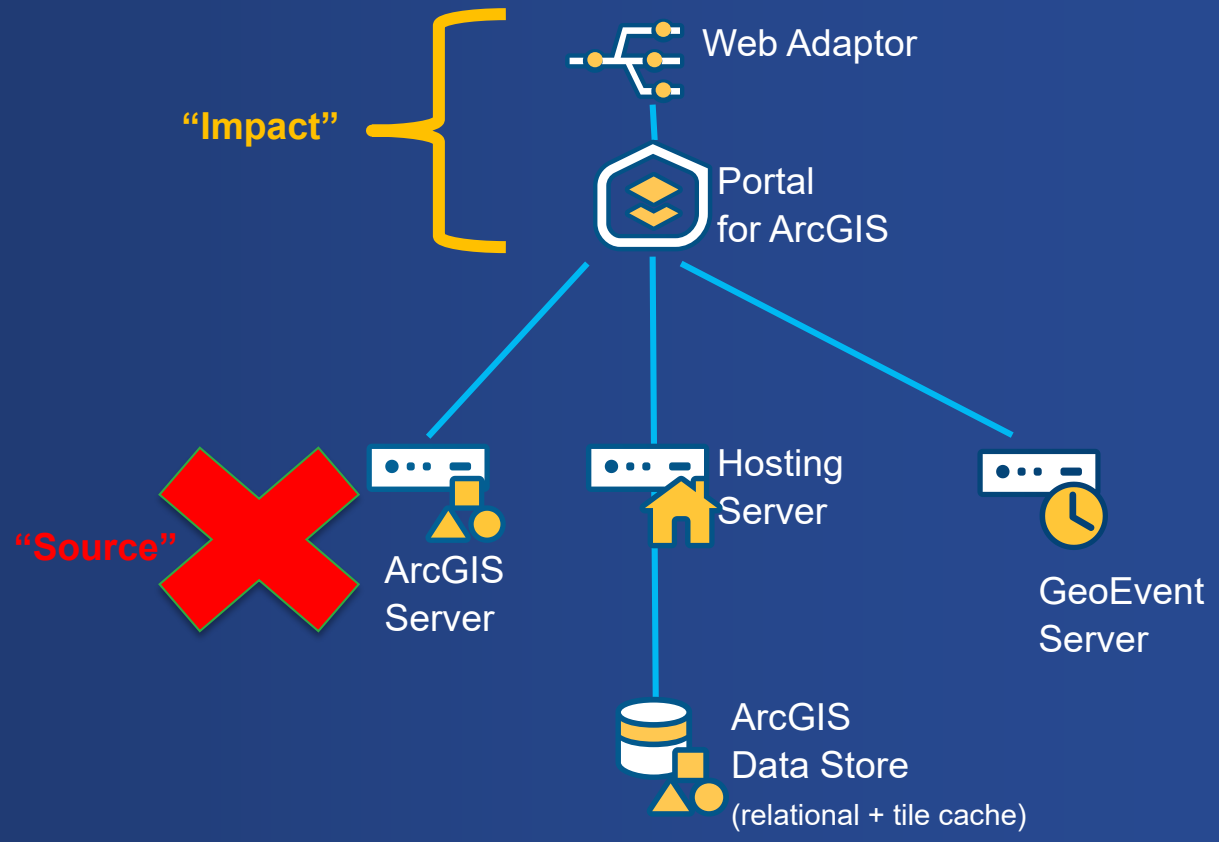
https://arcgismonitor.esri.com/

Root Cause Analysis (RCA)

"Source" - the most downstream failing component
"Impact" – all upstream failing components



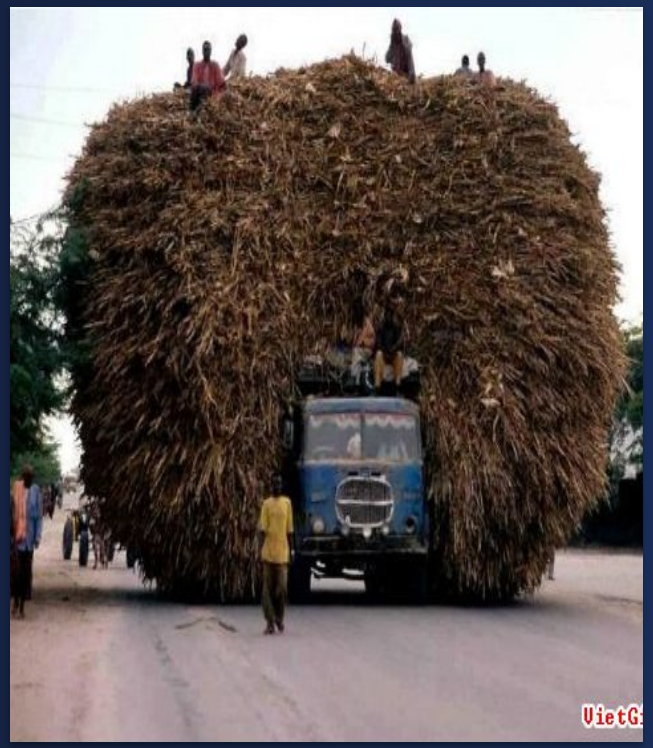
Example 1

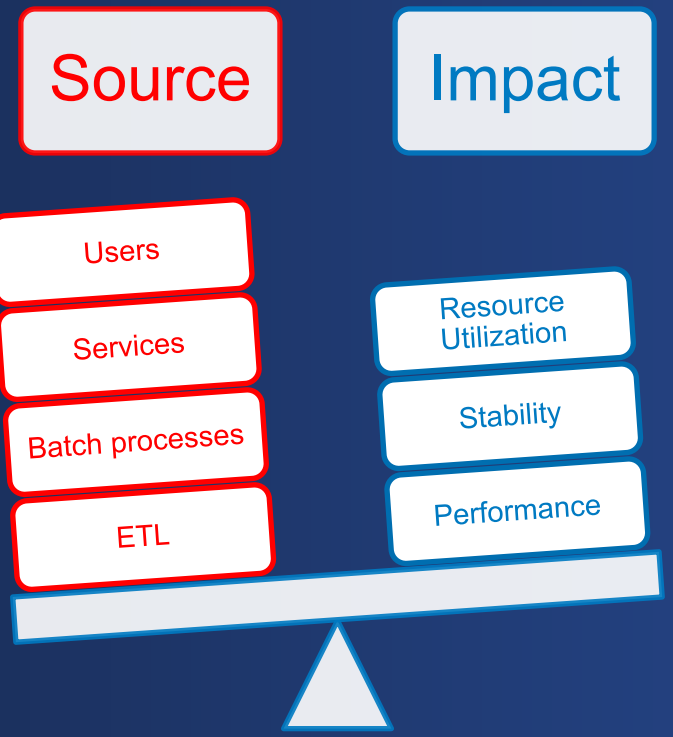


Example 2

Overloaded system

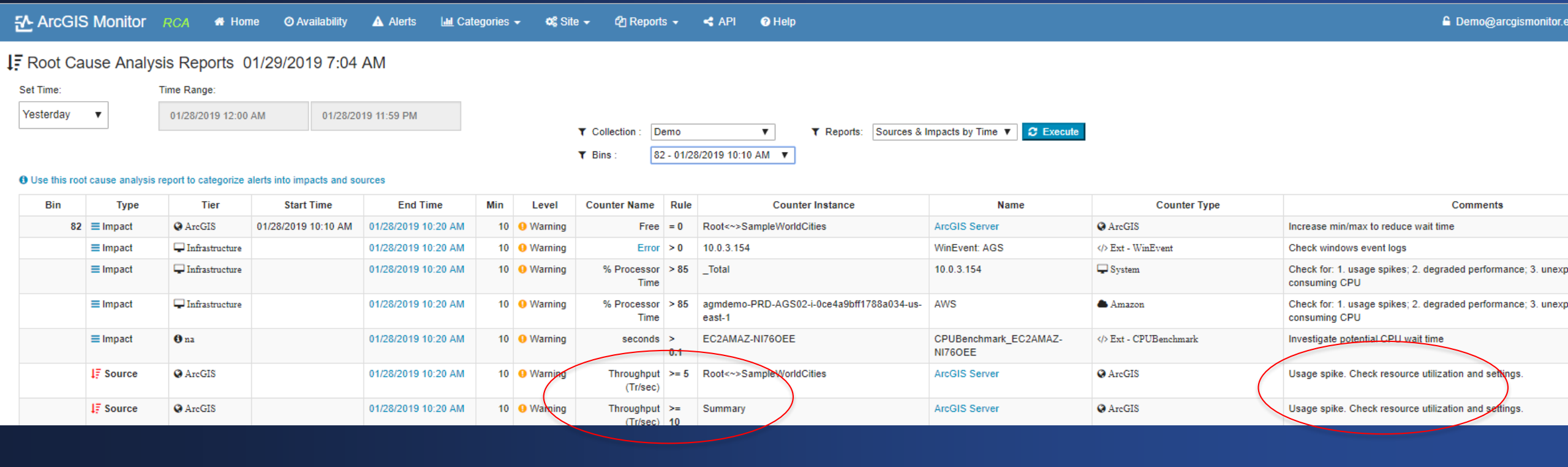
Load exceeds the designed capacity





Example: ArcGIS Monitor usage spike

Throughput (tr/s)



Bin	Type	Tier	Start Time	End Time	Min	Level	Counter Name	Rule	Counter Instance	Name	Counter Type	Comments
82	Impact	ArcGIS	01/28/2019 10:10 AM	01/28/2019 10:20 AM	10	Warning	Free	= 0	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Increase min/max to reduce wait time
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	Error	> 0	10.0.3.154	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	% Processor Time	> 85	_Total	10.0.3.154	System	Check for: 1. usage spikes; 2. degraded performance; 3. unexp consuming CPU
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	% Processor Time	> 85	agmdemo-PRD-AGS02-i-0ce4a9bff1788a034-us-east-1	AWS	Amazon	Check for: 1. usage spikes; 2. degraded performance; 3. unexp consuming CPU
	Impact	na		01/28/2019 10:20 AM	10	Warning	seconds	> 0.1	EC2AMAZ-NI76OEE	CPUBenchmark_EC2AMAZ-NI76OEE	Ext - CPUBenchmark	Investigate potential CPU wait time
	Source	ArcGIS		01/28/2019 10:20 AM	10	Warning	Throughput (Tr/sec)	>= 5	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.
	Source	ArcGIS		01/28/2019 10:20 AM	10	Warning	Throughput (Tr/sec)	>= 10	Summary	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.

Bottleneck

Source

Network

ArcSOC min/max

Connection Pooling

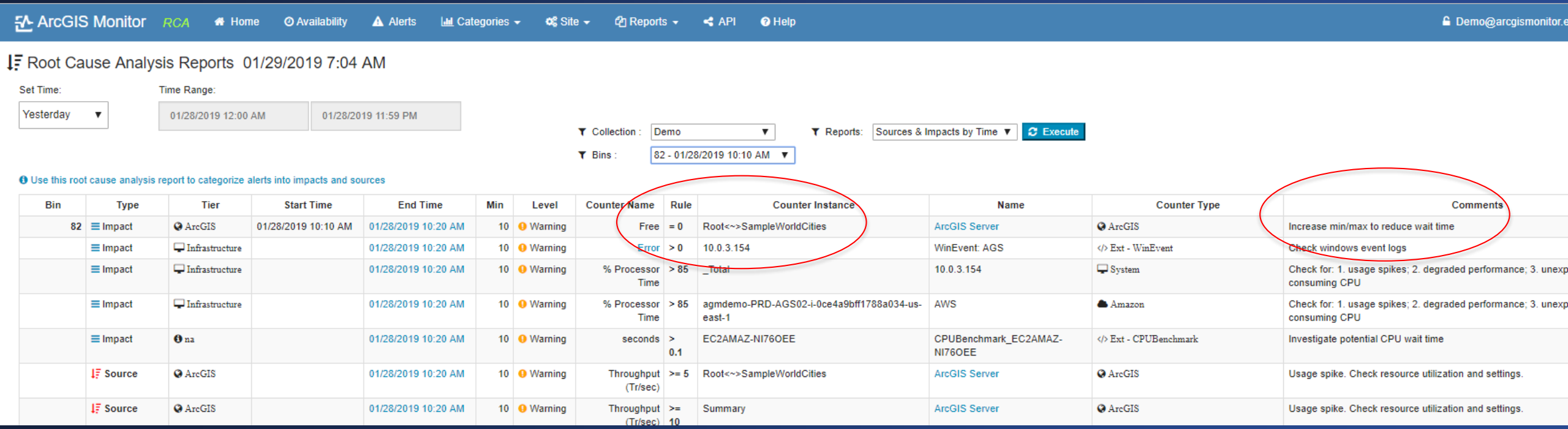
Impact

Performance

Stability

Example: ArcGIS Monitor free instances = 0

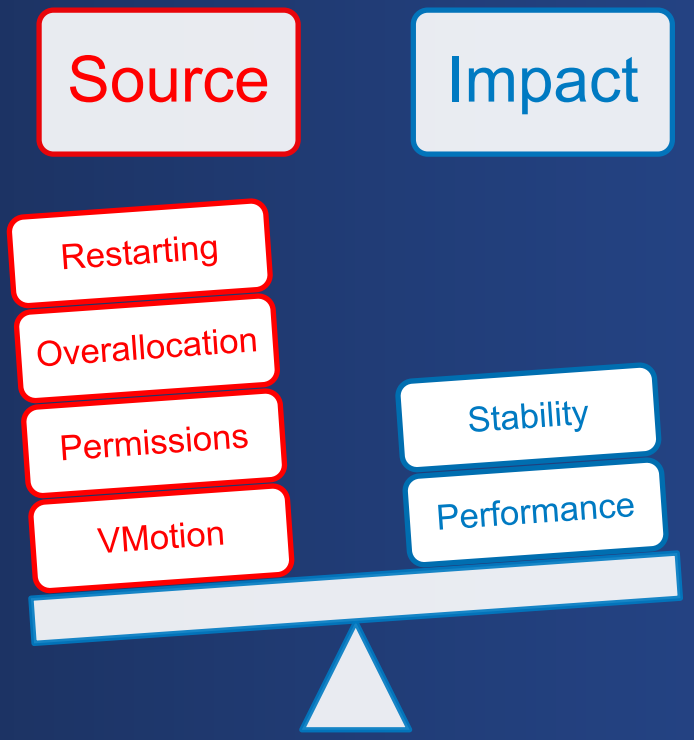
Bottleneck are often created by increased load



Bin	Type	Tier	Start Time	End Time	Min	Level	Counter Name	Rule	Counter Instance	Name	Counter Type	Comments
82	Impact	ArcGIS	01/28/2019 10:10 AM	01/28/2019 10:20 AM	10	Warning	Free	= 0	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Increase min/max to reduce wait time
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	Error	> 0	10.0.3.154	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	% Processor Time	> 85	_Total	10.0.3.154	System	Check for: 1. usage spikes; 2. degraded performance; 3. unexp consuming CPU
	Impact	Infrastructure		01/28/2019 10:20 AM	10	Warning	% Processor Time	> 85	agmdemo-PRD-AGS02-i-0ce4a9bff1788a034-us-east-1	AWS	Amazon	Check for: 1. usage spikes; 2. degraded performance; 3. unexp consuming CPU
	Impact	na		01/28/2019 10:20 AM	10	Warning	seconds	> 0.1	EC2AMAZ-NI76OEE	CPUBenchmark_EC2AMAZ-NI76OEE	Ext - CPUBenchmark	Investigate potential CPU wait time
	Source	ArcGIS		01/28/2019 10:20 AM	10	Warning	Throughput (Tr/sec)	>= 5	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.
	Source	ArcGIS		01/28/2019 10:20 AM	10	Warning	Throughput (Tr/sec)	>= 10	Summary	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.

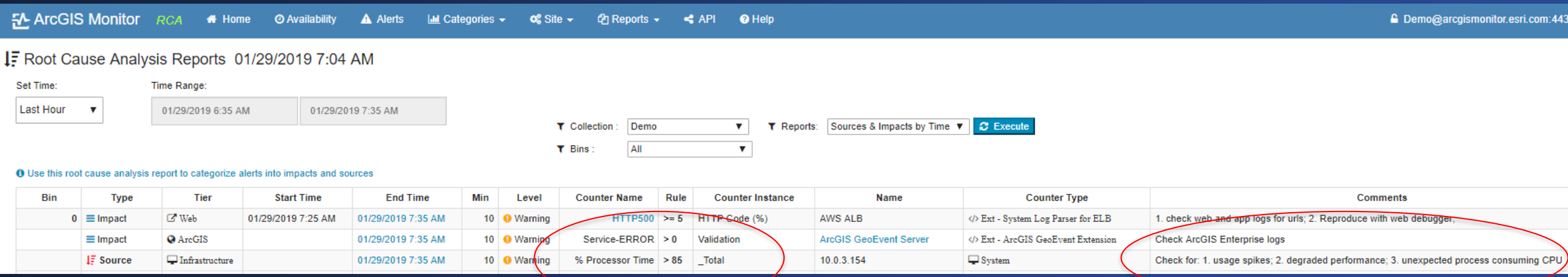
Unstable Infrastructure

Interruption to the underlying resources

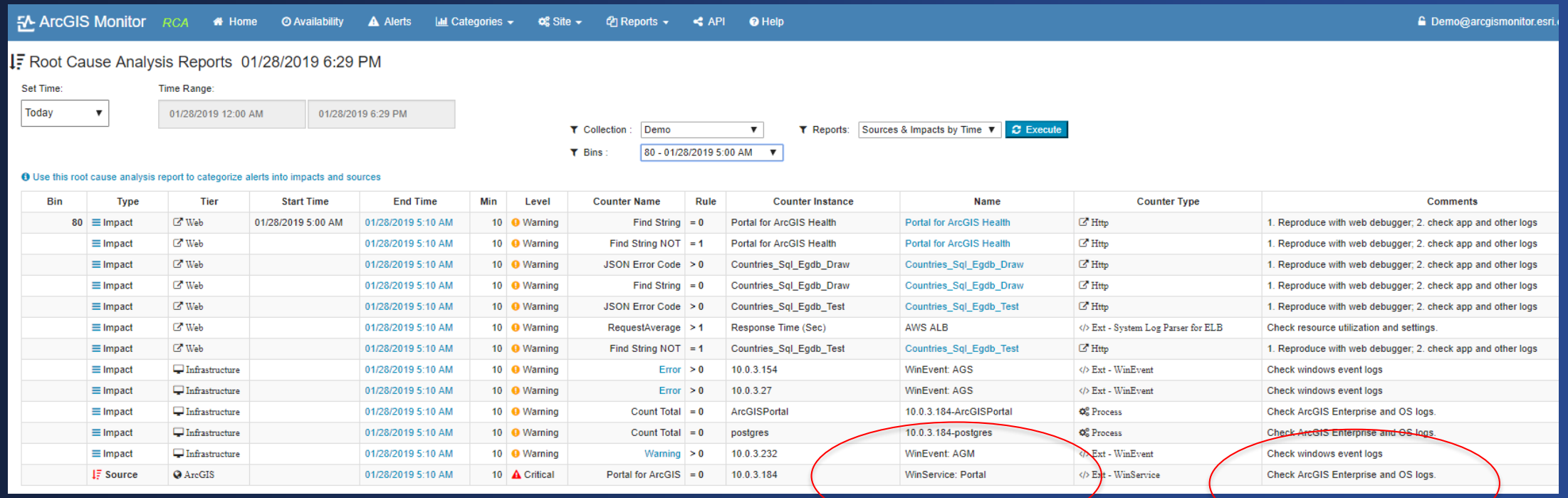


Example: ArcGIS Monitor CPU spike by unexpected process

e.g. virous scan



Example: ArcGIS Monitor CPU Portal for ArcGIS Server service stopped



ArcGIS Monitor RCA | Home | Availability | Alerts | Categories | Site | Reports | API | Help | Demo@arcgismonitor.esri.

Root Cause Analysis Reports 01/28/2019 6:29 PM

Set Time: Today

Time Range: 01/28/2019 12:00 AM – 01/28/2019 6:29 PM

Collection : Demo | Reports: Sources & Impacts by Time | Execute

Bins : 80 - 01/28/2019 5:00 AM

Use this root cause analysis report to categorize alerts into impacts and sources

Bin	Type	Tier	Start Time	End Time	Min	Level	Counter Name	Rule	Counter Instance	Name	Counter Type	Comments
80	Impact	Web	01/28/2019 5:00 AM	01/28/2019 5:10 AM	10	Warning	Find String	= 0	Portal for ArcGIS Health	Portal for ArcGIS Health	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 5:10 AM	10	Warning	Find String NOT	= 1	Portal for ArcGIS Health	Portal for ArcGIS Health	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 5:10 AM	10	Warning	JSON Error Code	> 0	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 5:10 AM	10	Warning	Find String	= 0	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 5:10 AM	10	Warning	JSON Error Code	> 0	Countries_Sql_Egdb_Test	Countries_Sql_Egdb_Test	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 5:10 AM	10	Warning	RequestAverage	> 1	Response Time (Sec)	AWS ALB	Ext - System Log Parser for ELB	Check resource utilization and settings.
	Impact	Web		01/28/2019 5:10 AM	10	Warning	Find String NOT	= 1	Countries_Sql_Egdb_Test	Countries_Sql_Egdb_Test	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Infrastructure		01/28/2019 5:10 AM	10	Warning	Error	> 0	10.0.3.154	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Impact	Infrastructure		01/28/2019 5:10 AM	10	Warning	Error	> 0	10.0.3.27	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Impact	Infrastructure		01/28/2019 5:10 AM	10	Warning	Count Total	= 0	ArcGISPortal	10.0.3.184-ArcGISPortal	Process	Check ArcGIS Enterprise and OS logs.
	Impact	Infrastructure		01/28/2019 5:10 AM	10	Warning	Count Total	= 0	postgres	10.0.3.184-postgres	Process	Check ArcGIS Enterprise and OS logs.
	Impact	Infrastructure		01/28/2019 5:10 AM	10	Warning	Warning	> 0	10.0.3.232	WinEvent: AGM	Ext - WinEvent	Check windows event logs
	Source	ArcGIS		01/28/2019 5:10 AM	10	Critical	Portal for ArcGIS	= 0	10.0.3.184	WinService: Portal	Ext - WinService	Check ArcGIS Enterprise and OS logs.

Example: ArcGIS Monitor CPU ArcGIS Server machine rebooted

ArcGIS Monitor RCA | Home | Availability | Alerts | Categories | Site | Reports | API | Help | Demo@arcgismonitor.esri.com:44

Root Cause Analysis Reports 01/28/2019 6:29 PM

Set Time: Today

Time Range: 01/28/2019 12:00 AM – 01/28/2019 6:29 PM

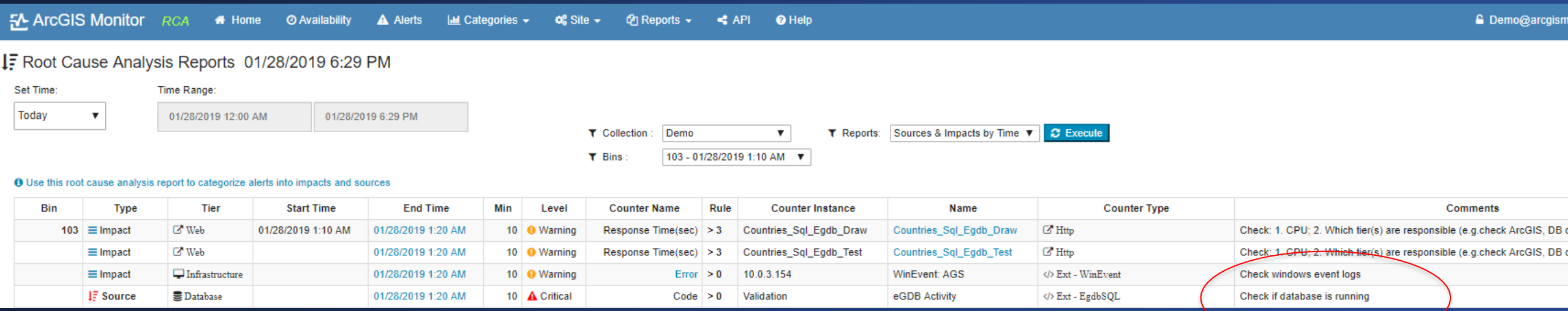
Collection : Demo | Reports: Sources & Impacts by Time | Execute

Bins : 45 - 01/28/2019 10:50 AM

Use this root cause analysis report to categorize alerts into impacts and sources

Bin	Type	Tier	Start Time	End Time	Min	Level	Counter Name	Rule	Counter Instance	Name	Counter Type	Comments
45	Impact	Web	01/28/2019 10:50 AM	01/28/2019 11:00 AM	10	Warning	Response Time(sec)	> 3	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	Check: 1. CPU; 2. Which tier(s) are responsible (e.g.check ArcGIS, DB coun logs)?
	Impact	Web		01/28/2019 11:00 AM	10	Warning	Find String	= 0	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 11:00 AM	10	Warning	Find String	= 0	SampleWorldCities	SampleWorldCities	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	Web		01/28/2019 11:00 AM	10	Warning	Find String NOT	= 1	SampleWorldCities	SampleWorldCities	Http	1. Reproduce with web debugger; 2. check app and other logs
	Impact	ArcGIS		01/28/2019 11:00 AM	10	Warning	Throughput (Tr/sec)	>= 5	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.
	Impact	ArcGIS		01/28/2019 11:00 AM	10	Warning	Throughput (Tr/sec)	>= 10	Summary	ArcGIS Server	ArcGIS	Usage spike. Check resource utilization and settings.
	Impact	ArcGIS		01/28/2019 11:00 AM	10	Warning	Free	= 0	Root<~>SampleWorldCities	ArcGIS Server	ArcGIS	Increase min/max to reduce wait time
	Impact	Infrastructure		01/28/2019 11:00 AM	10	Warning	Error	> 0	10.0.3.154	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Impact	Infrastructure		01/28/2019 11:00 AM	10	Warning	% Processor Time	> 85	_Total	10.0.3.154	System	Check for: 1. usage spikes; 2. degraded performance; 3. unexpected process consuming CPU
	Impact	Infrastructure		01/28/2019 11:00 AM	10	Warning	% Processor Time	> 85	agmdemo-PRD-AGS02-i-0ce4a9bff1788a034-us-east-1	AWS	Amazon	Check for: 1. usage spikes; 2. degraded performance; 3. unexpected process consuming CPU
	Source	Infrastructure		01/28/2019 11:00 AM	10	Critical	Reboot	> 0	_Total	10.0.3.154	System	If reboot not planned, check OS event logs for details

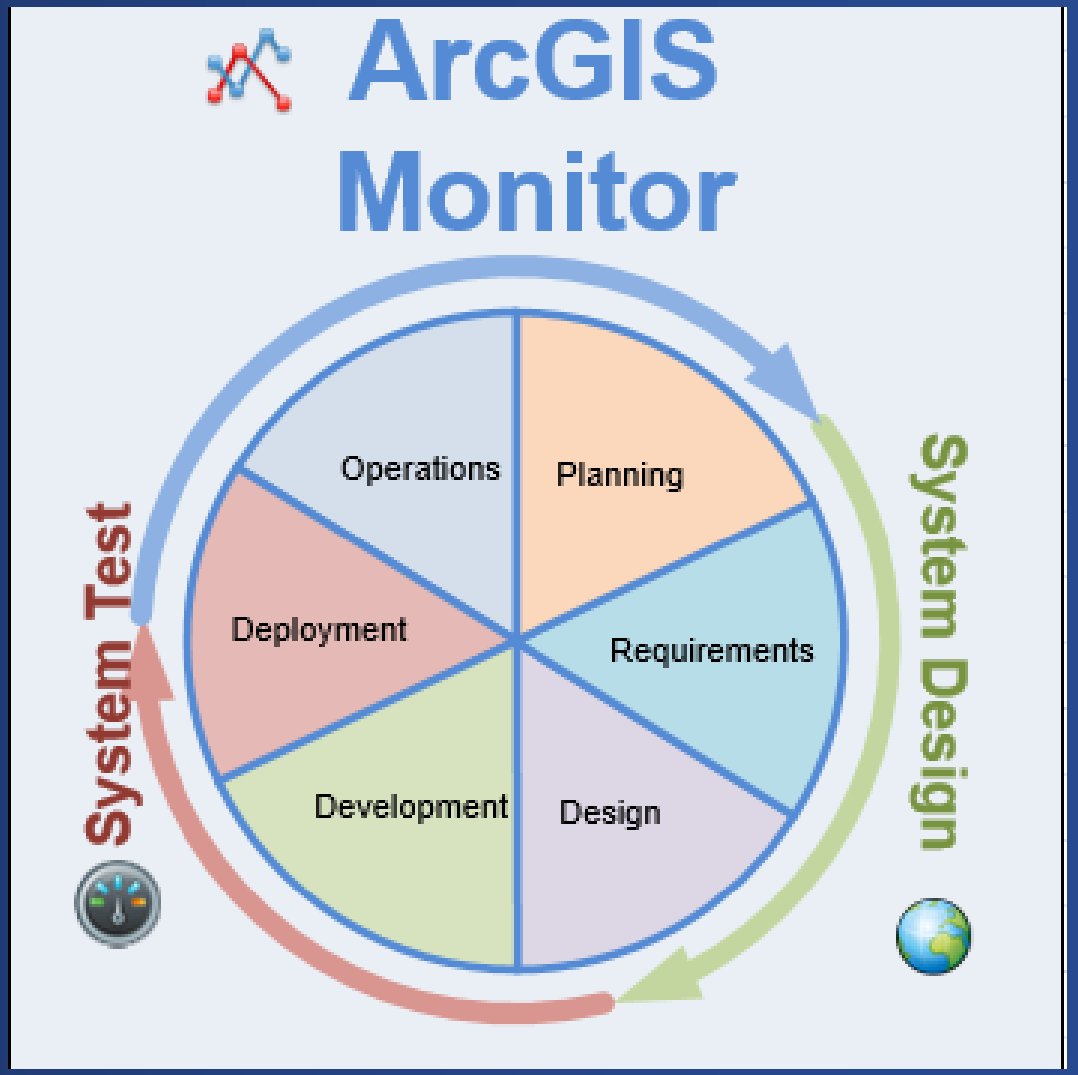
Example: ArcGIS Monitor CPU Database not running



Bin	Type	Tier	Start Time	End Time	Min	Level	Counter Name	Rule	Counter Instance	Name	Counter Type	Comments
103	Impact	Web	01/28/2019 1:10 AM	01/28/2019 1:20 AM	10	Warning	Response Time(sec)	> 3	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	Check: 1. CPU; 2. Which tier(s) are responsible (e.g.check ArcGIS, DB c
	Impact	Web		01/28/2019 1:20 AM	10	Warning	Response Time(sec)	> 3	Countries_Sql_Egdb_Test	Countries_Sql_Egdb_Test	Http	Check: 1. CPU; 2. Which tier(s) are responsible (e.g.check ArcGIS, DB c
	Impact	Infrastructure		01/28/2019 1:20 AM	10	Warning	Error	> 0	10.0.3.154	WinEvent: AGS	Ext - WinEvent	Check windows event logs
	Source	Database		01/28/2019 1:20 AM	10	Critical	Code	> 0	Validation	eGDB Activity	Ext - EgdbSQL	Check if database is running

Summary

- Design workload separation
- Provide adequate infrastructure capacity
- Configure
- Tune
- Test
- Monitor



Print Your Certificate of Attendance

Print Stations Located at L Street Bridge

Tuesday

12:30 pm – 6:30 pm
GIS Solutions Expo
Hall D

5:15 pm – 6:30 pm
GIS Solutions Expo Social
Hall D

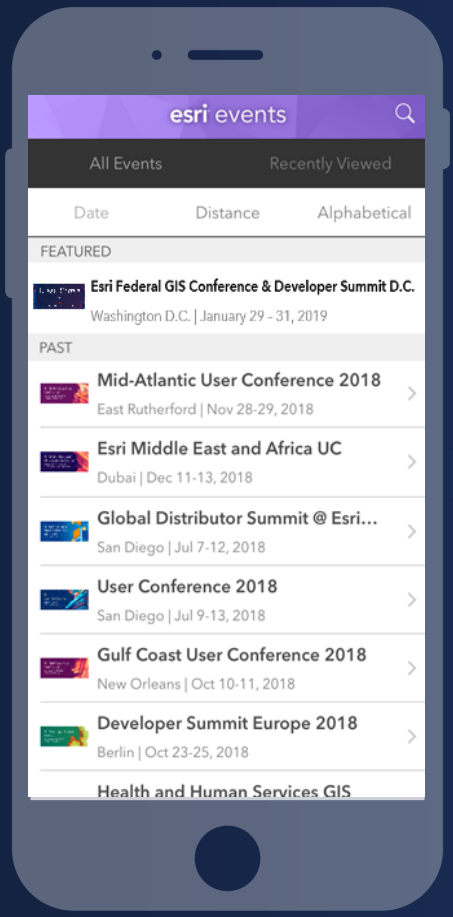
Wednesday

10:45 am – 5:15 pm
GIS Solutions Expo
Hall D

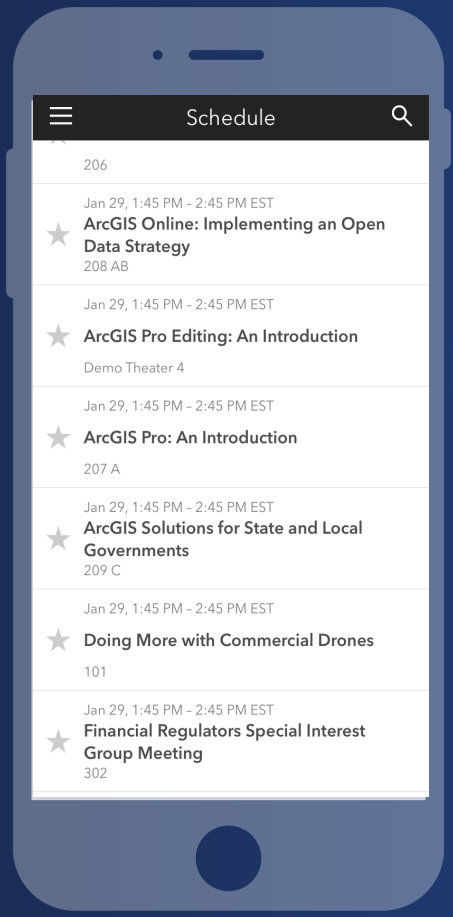
6:30 pm – 9:00 pm
Networking Reception
National Museum of Natural History

Please Take Our Survey on the App

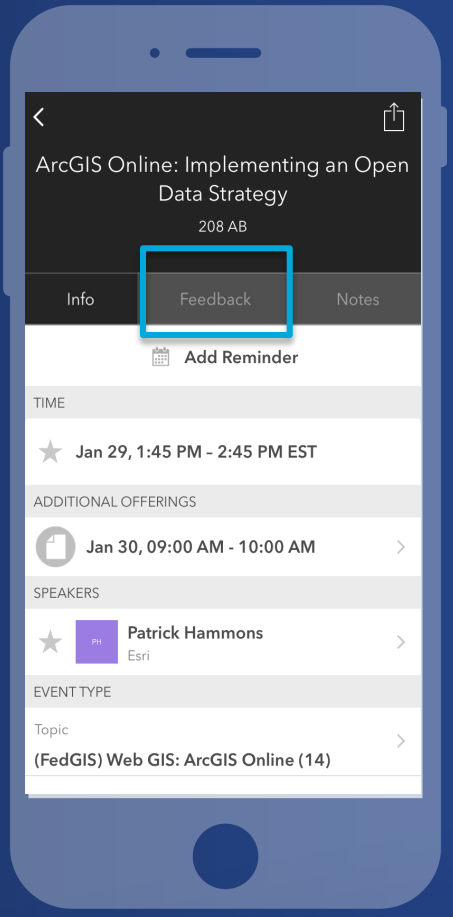
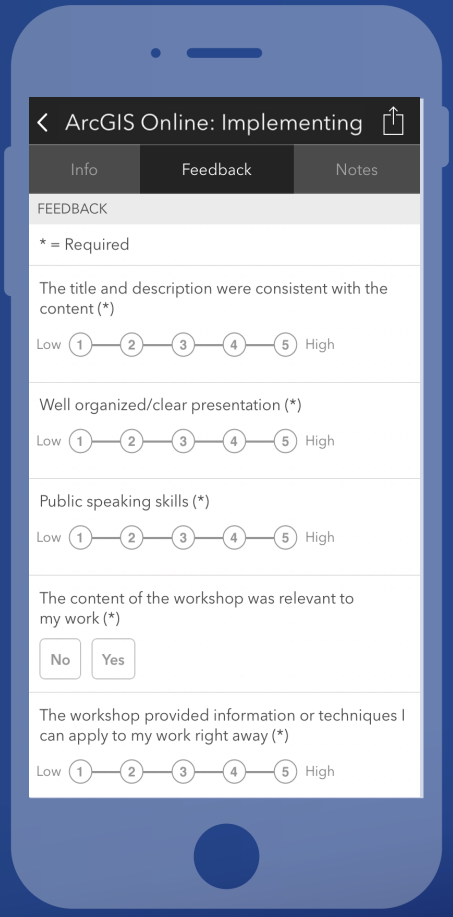
Download the Esri Events app and find your event



Select the session you attended



Scroll down to find the feedback section



Complete answers and select “Submit”