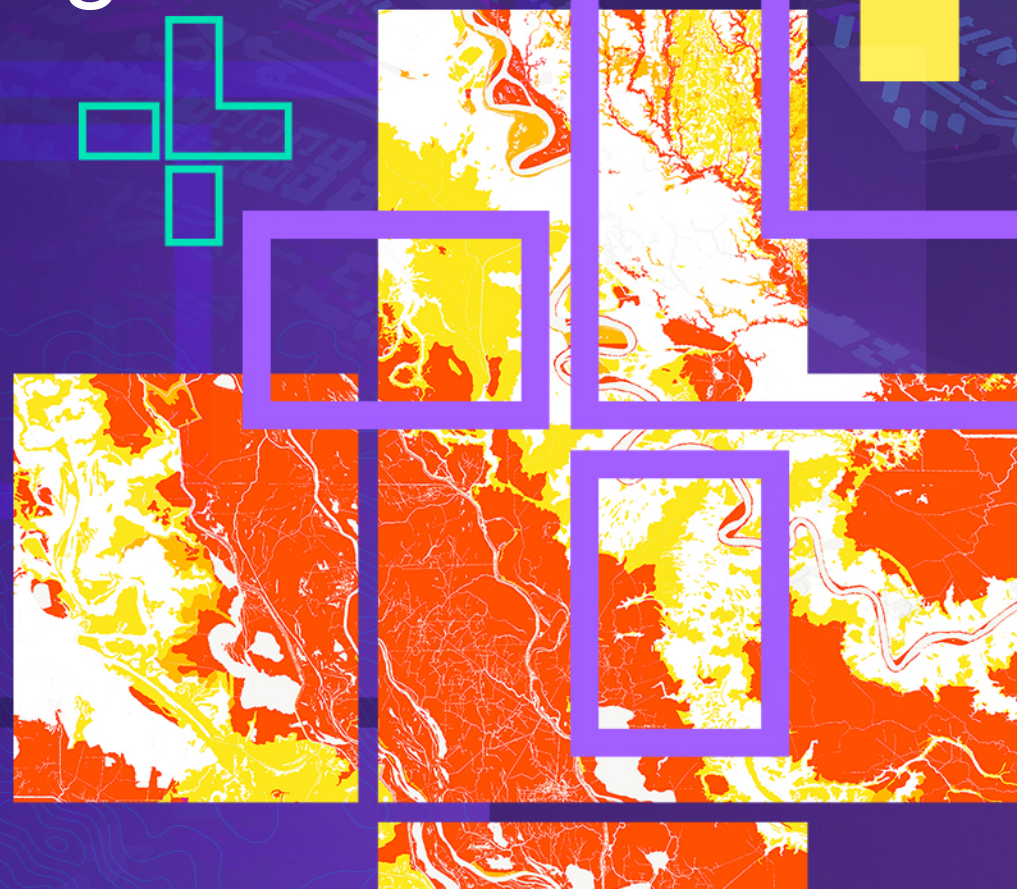
Esri Best Practices for System Design & Monitoring

Miles Phillips

2019 Esri Gulf Coast User Conference

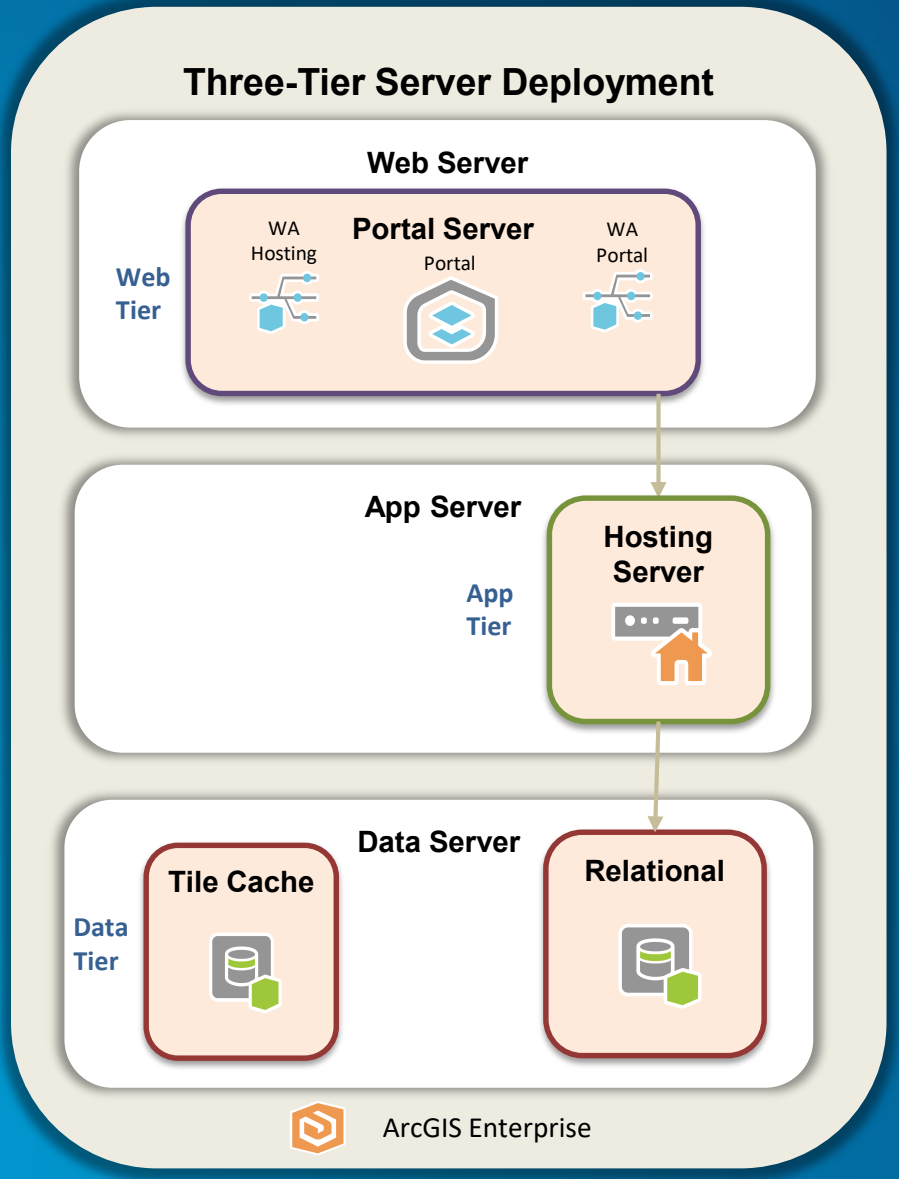


esri

Session Agenda

- Review ArcGIS Enterprise Components
- Best Practices for Design and Implementation
- Design Concepts
- ArcGIS Monitor Overview

ArcGIS Enterprise Components



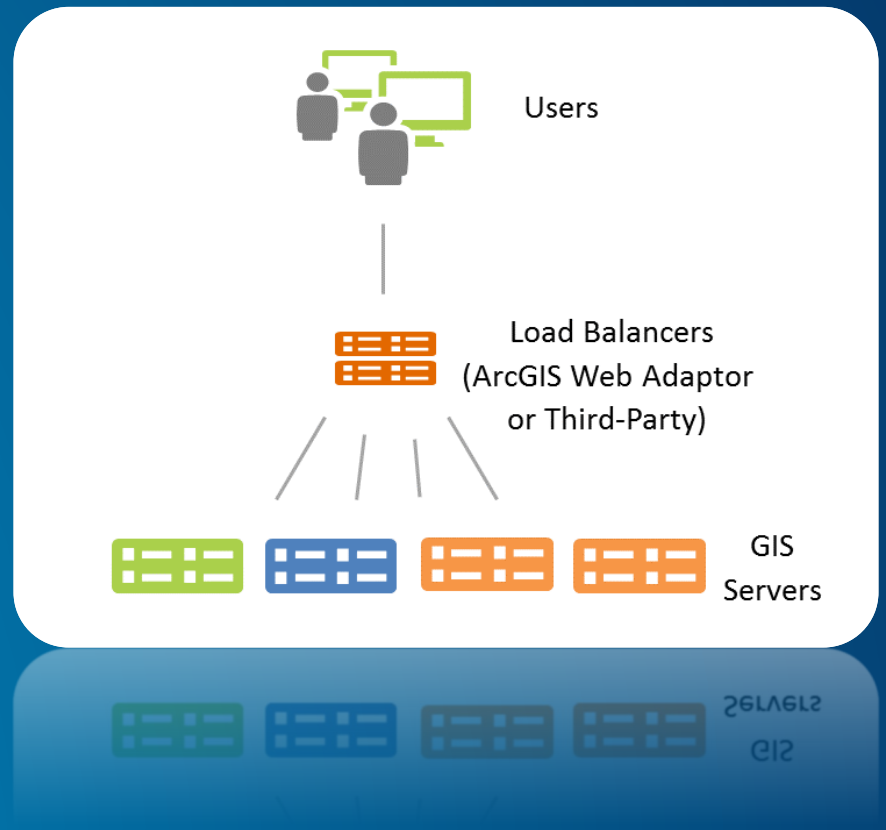
- Portal for ArcGIS
- Portal ArcGIS Web Adaptor
- ArcGIS Server
- ArcGIS Server Web Adaptor
- ArcGIS Data Store

go.esri.com/bp

Best Practice: Load Balancing

- **Distributing client workloads across multiple compute resources**

- Balance system utilization
- Reduce risks
- Simplify service delivery & growth
  - Single access point
- Secures backend servers

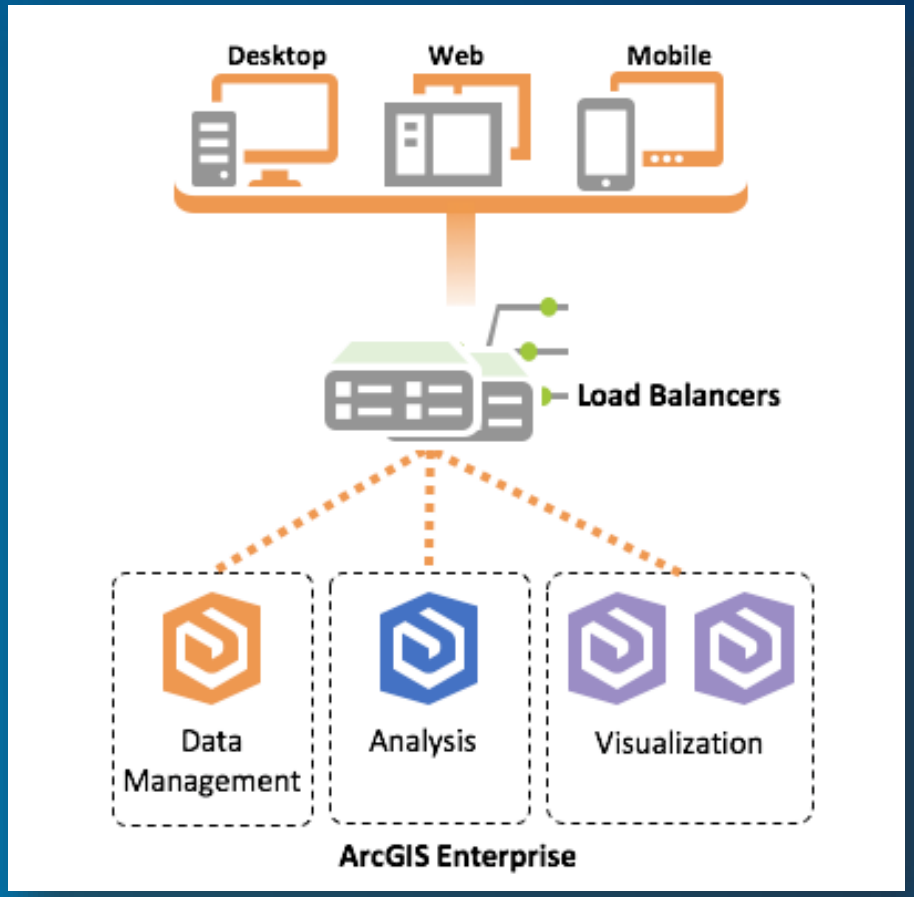


- **Implement in pairs for high availability….**

Best Practice: Workload Separation

- Separate technology deployments by solution pattern

- Improve service delivery
- Reduce risks
- Minimize system resource contention



- **Typically SLAs determine which server deployments need to be separated.**

Best Practice: High Availability

- A design approach that targets a prearranged level of operational performance during a period of time

- Improve service delivery
- Reduce risks

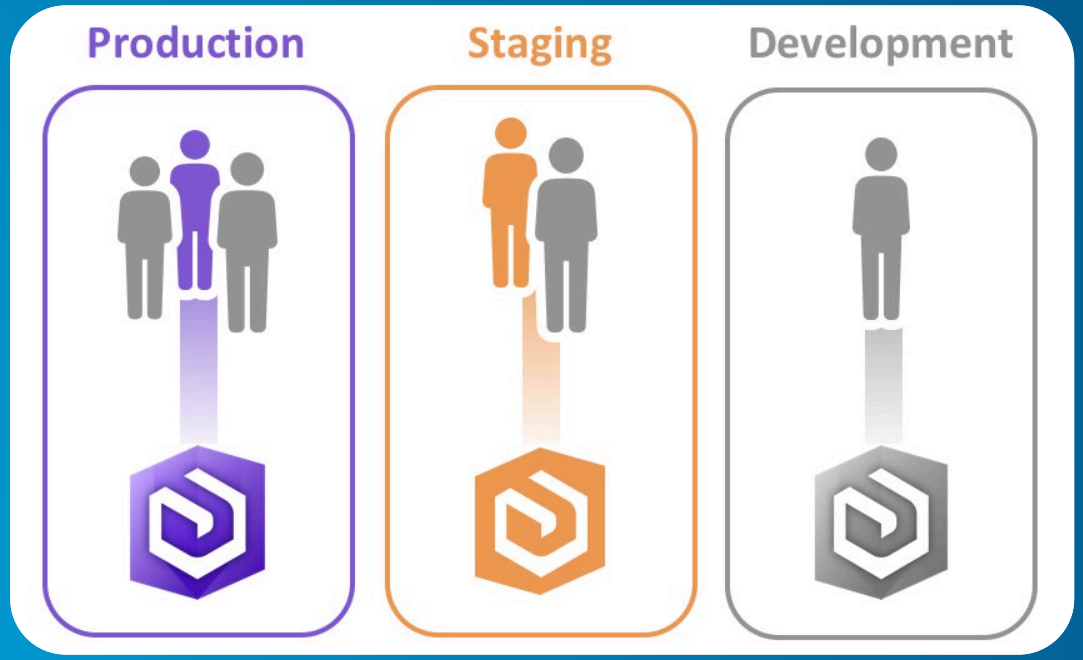
Availability (%)	Unplanned Downtime per year	Unplanned Downtime per week
95.0	18.25 days	8.4 hours
99.0	3.65 days	1.68 hours
99.9	8.76 hours	10.1 minutes
99.99	52.56 minutes	1.01 minutes
99.999	5.26 minutes	6.05 seconds

What is the acceptable downtime for your business workflows?

Best Practice: Environment Isolation

- **Separate and distinct compute environments**

  - **Production** : an operational, real-time compute environment
  - **Staging** : a separate, mirrored, pre-production environment
  - **Development** : a limited scale environment sufficient for primary code and data modeling



- **Reduce risk and protect operational systems from unintentional changes and negative business impacts**

Concepts: Performance

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

Concepts: Scalability

- The ability to increase output and maintain acceptable performance

Concepts: Capacity

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

At capacity

Over capacity

Concepts: Bottleneck

- Resource(s) limiting the performance or capacity

Not bottleneck

bottleneck

ArcGIS Monitor: enterprise.arcgis.com/en/monitor

- Introduced January 2018
- Ubiquitous system monitoring for ArcGIS
- Timely metrics and analysis
- Proactive insights, alerting, and reports
- Optimize the GIS environment

ArcGIS Monitor: Why?

- End-to-end monitoring for effective diagnostics
- Standard monitoring tools:
  - Focus on infrastructure only
  - IT controlled
  - No ArcGIS components
  - Low success of ArcGIS troubleshooting
  - Integrating “ArcGIS” has challenges and high level of effort

Average cost of IT downtime is $5,600 per minute. Source: Gartner

ArcGIS Monitor: Why?

- Support your SLA
  - Faster resolution time
  - Better performance
  - Lower cost of administration
  - End-user satisfaction

ArcGIS Monitor: Target Audience

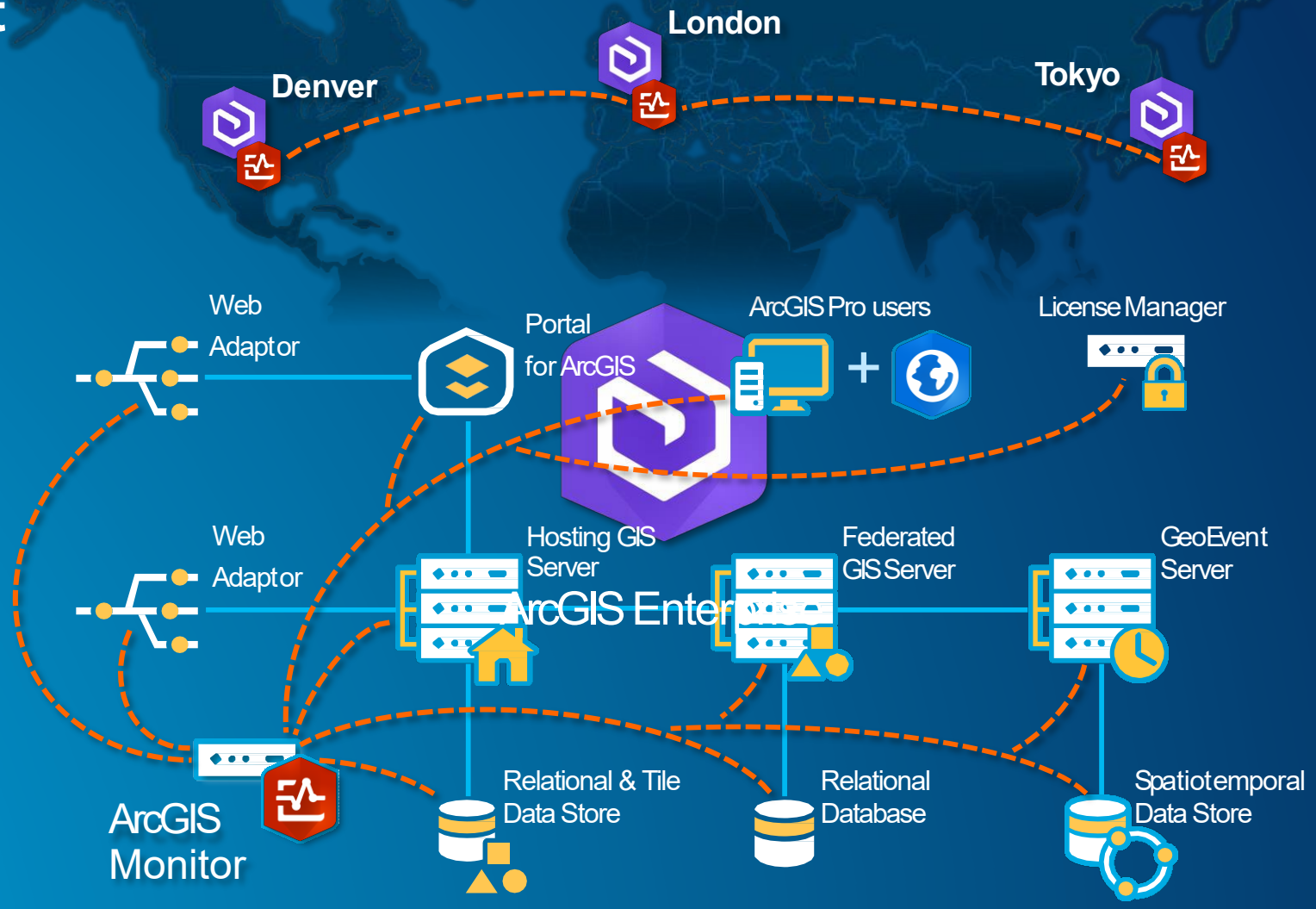
- Administrators
  - Alerts
  - Root Cause Analysis
- Managers
  - Availability
  - Performance
  - Usage
- Developers
  - Error analysis

The Monitored Environment

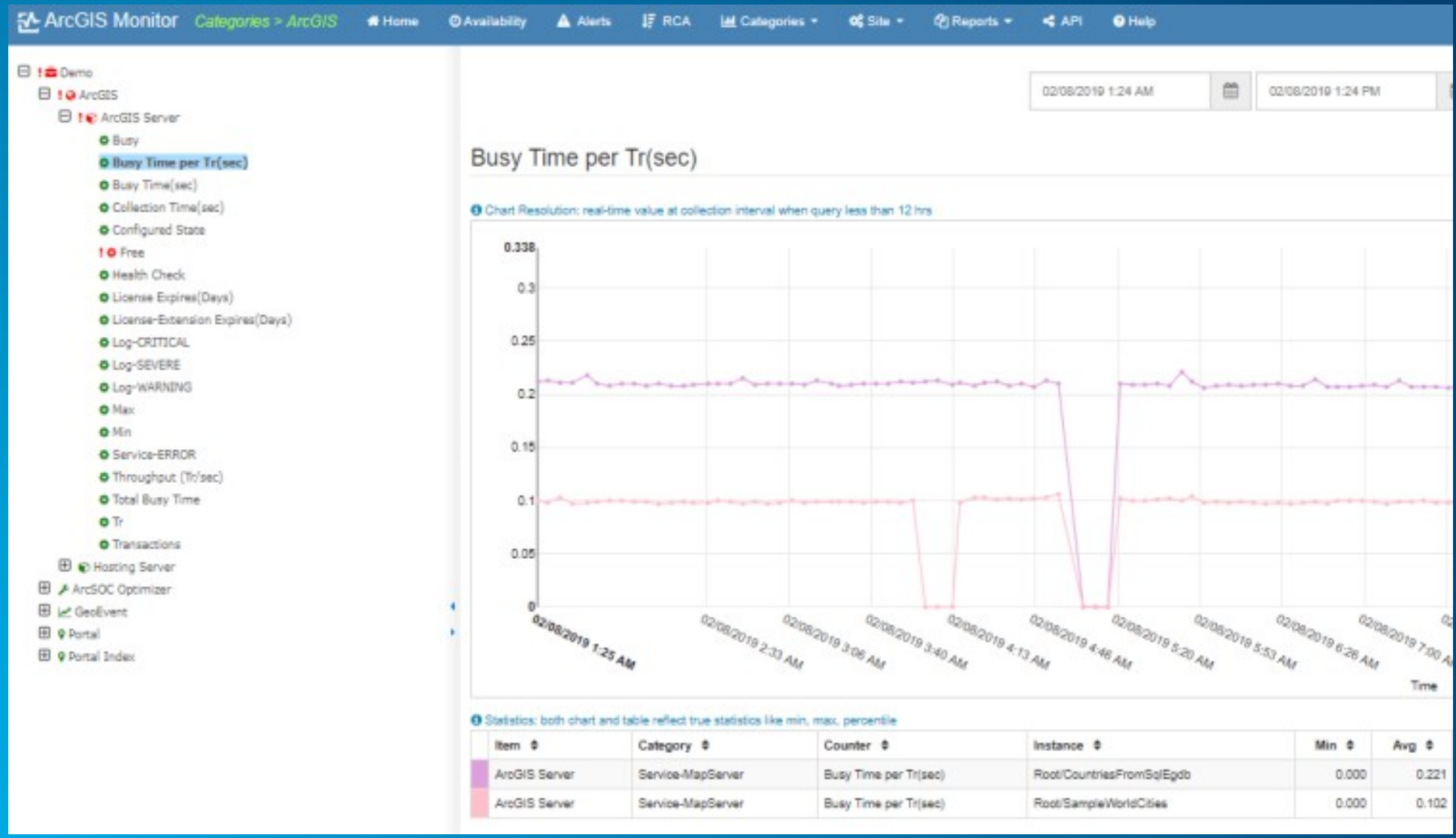
Growing in complexity

- Dozens of components
- Hundreds of discreet metrics
- Which metrics are important?
- Filter the signal from the noise

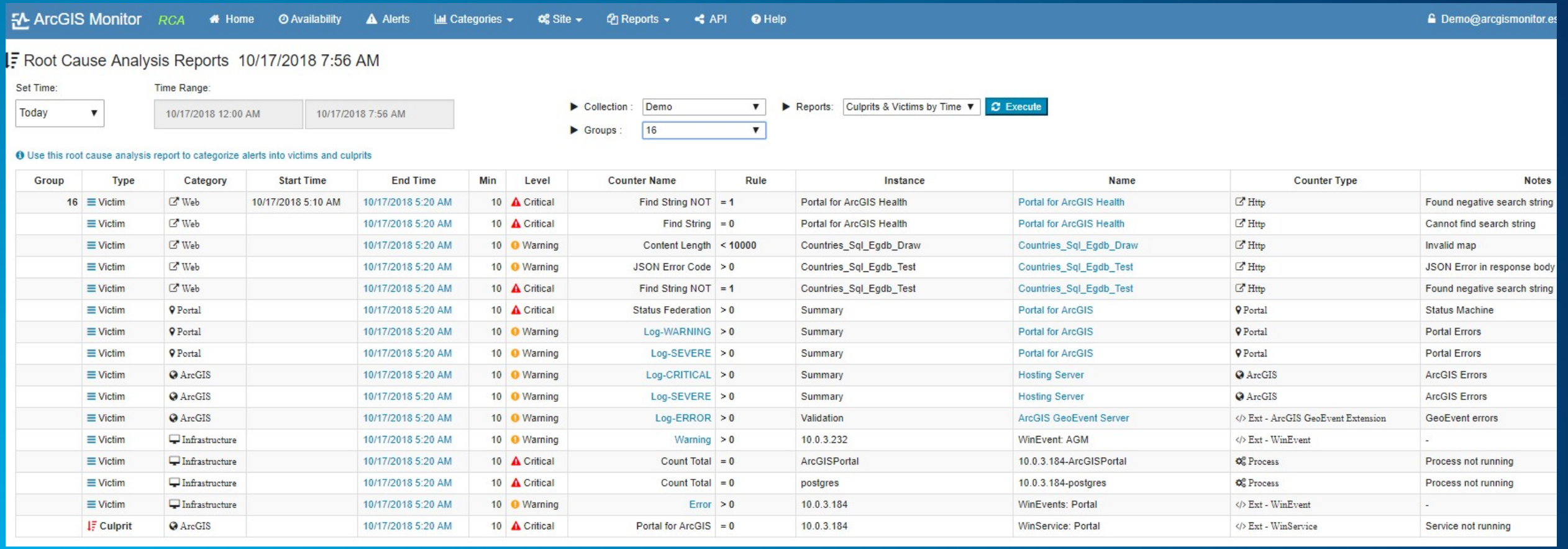
- ArcGIS Monitor
  - Tailored for ArcGIS
  - Non-invasive sampling
  - Minimal resource footprint
  - Conforms to the environment
    - Single or multi-datacenter



Monitor

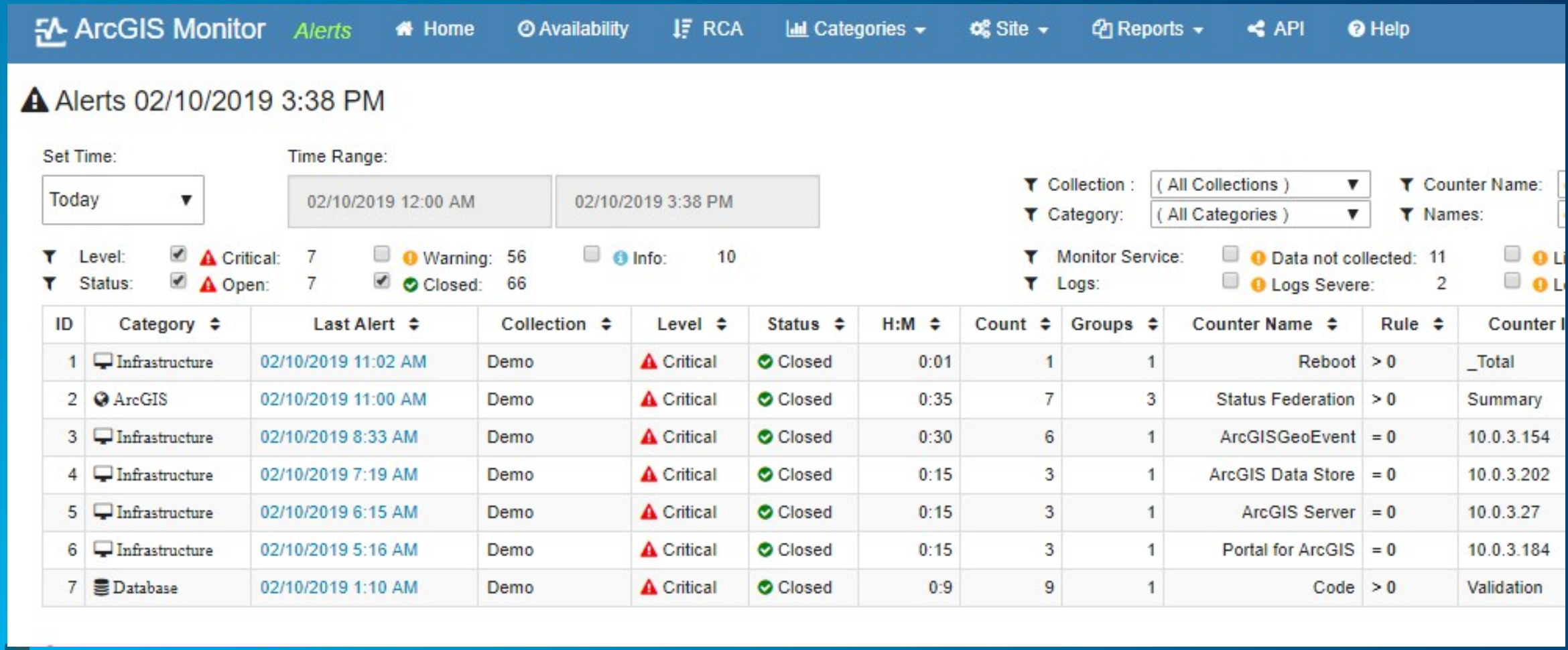

ArcGIS Monitor
Categories > ArcGIS
Home
Availability
Alerts
RCA
Categories
Site
Reports
API
Help
Demo
ArcGIS
ArcGIS Server
Busy
Busy Time per Tr(sec)
Busy Time(sec)
Collection Time(sec)
Configured State
Free
Health Check
License Expires(Days)
License-Extension Expires(Days)
Log-CRITICAL
Log-SEVERE
Log-WARNING
Max
Min
Service-ERROR
Throughput (Tr/sec)
Total Busy Time
Tr
Transactions
Hosting Server
ArcSOC Optimizer
GeoEvent
Portal
Portal Index
02/08/2019 1:24 AM
02/08/2019 1:24 PM
Busy Time per Tr(sec)
Chart Resolution: real-time value at collection interval when query less than 12 hrs
0.338
0.3
0.25
0.2
0.15
0.1
0.05
0
02/08/2019 1:25 AM
02/08/2019 2:33 AM
02/08/2019 3:06 AM
02/08/2019 3:40 AM
02/08/2019 4:13 AM
02/08/2019 4:46 AM
02/08/2019 5:20 AM
02/08/2019 5:53 AM
02/08/2019 6:26 AM
Time
Statistics: both chart and table reflect true statistics like min, max, percentile
Item
Category
Counter
Instance
Min
Avg
ArcGIS Server
Service-MapServer
Busy Time per Tr(sec)
Root/CountriesFromSqlEgdb
0.000
0.221
ArcGIS Server
Service-MapServer
Busy Time per Tr(sec)
Root/SampleWorldCities
0.000
0.102

Analyze



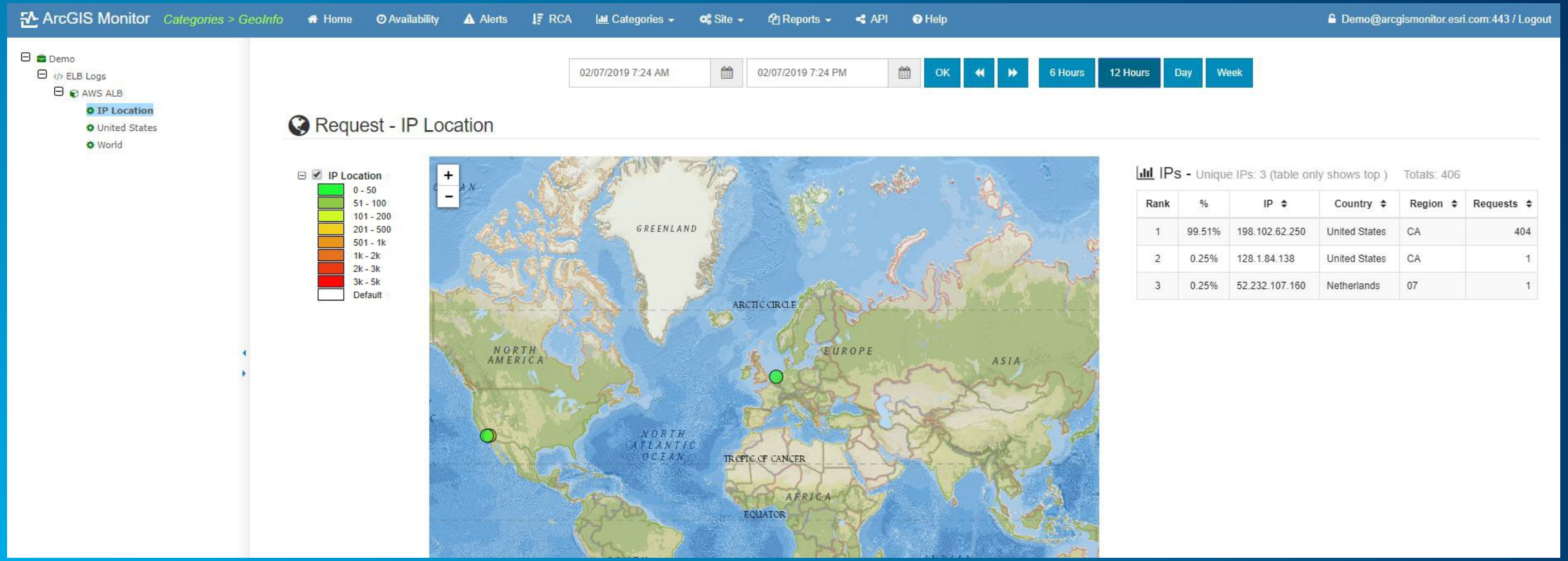
Group	Type	Category	Start Time	End Time	Min	Level	Counter Name	Rule	Instance	Name	Counter Type	Notes
16	Victim	Web	10/17/2018 5:10 AM	10/17/2018 5:20 AM	10	Critical	Find String NOT	= 1	Portal for ArcGIS Health	Portal for ArcGIS Health	Http	Found negative search string
	Victim	Web		10/17/2018 5:20 AM	10	Critical	Find String	= 0	Portal for ArcGIS Health	Portal for ArcGIS Health	Http	Cannot find search string
	Victim	Web		10/17/2018 5:20 AM	10	Warning	Content Length	< 10000	Countries_Sql_Egdb_Draw	Countries_Sql_Egdb_Draw	Http	Invalid map
	Victim	Web		10/17/2018 5:20 AM	10	Warning	JSON Error Code	> 0	Countries_Sql_Egdb_Test	Countries_Sql_Egdb_Test	Http	JSON Error in response body
	Victim	Web		10/17/2018 5:20 AM	10	Critical	Find String NOT	= 1	Countries_Sql_Egdb_Test	Countries_Sql_Egdb_Test	Http	Found negative search string
	Victim	Portal		10/17/2018 5:20 AM	10	Critical	Status Federation	> 0	Summary	Portal for ArcGIS	Portal	Status Machine
	Victim	Portal		10/17/2018 5:20 AM	10	Warning	Log-WARNING	> 0	Summary	Portal for ArcGIS	Portal	Portal Errors
	Victim	Portal		10/17/2018 5:20 AM	10	Warning	Log-SEVERE	> 0	Summary	Portal for ArcGIS	Portal	Portal Errors
	Victim	ArcGIS		10/17/2018 5:20 AM	10	Warning	Log-CRITICAL	> 0	Summary	Hosting Server	ArcGIS	ArcGIS Errors
	Victim	ArcGIS		10/17/2018 5:20 AM	10	Warning	Log-SEVERE	> 0	Summary	Hosting Server	ArcGIS	ArcGIS Errors
	Victim	ArcGIS		10/17/2018 5:20 AM	10	Warning	Log-ERROR	> 0	Validation	ArcGIS GeoEvent Server	Ext - ArcGIS GeoEvent Extension	GeoEvent errors
	Victim	Infrastructure		10/17/2018 5:20 AM	10	Warning	Warning	> 0	10.0.3.232	WinEvent: AGM	Ext - WinEvent	-
	Victim	Infrastructure		10/17/2018 5:20 AM	10	Critical	Count Total	= 0	ArcGISPortal	10.0.3.184-ArcGISPortal	Process	Process not running
	Victim	Infrastructure		10/17/2018 5:20 AM	10	Critical	Count Total	= 0	postgres	10.0.3.184-postgres	Process	Process not running
	Victim	Infrastructure		10/17/2018 5:20 AM	10	Warning	Error	> 0	10.0.3.184	WinEvents: Portal	Ext - WinEvent	-
	Culprit	ArcGIS		10/17/2018 5:20 AM	10	Critical	Portal for ArcGIS	= 0	10.0.3.184	WinService: Portal	Ext - WinService	Service not running

Alerts



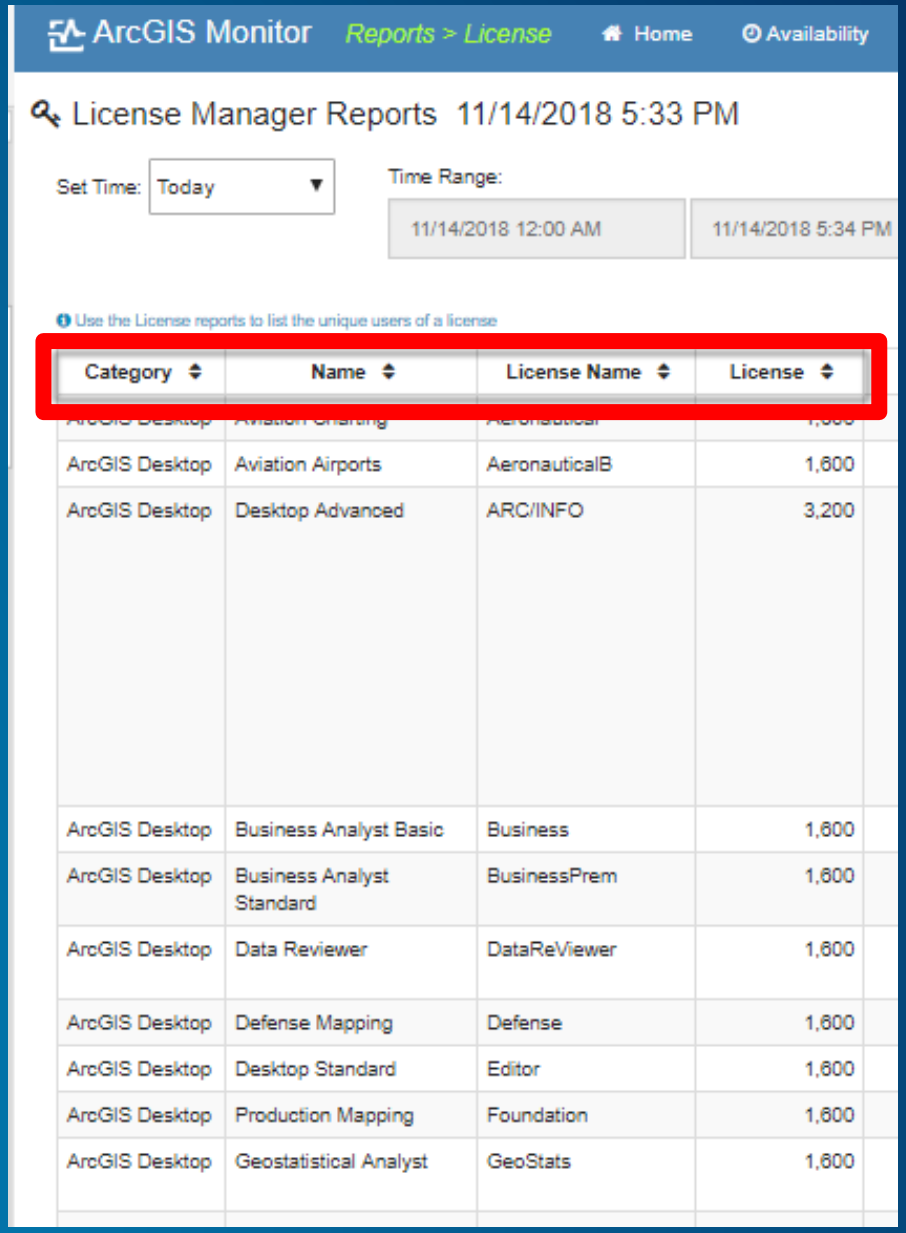
ID	Category	Last Alert	Collection	Level	Status	H:M	Count	Groups	Counter Name	Rule	Counter I
1	Infrastructure	02/10/2019 11:02 AM	Demo	Critical	Closed	0:01	1	1	Reboot	> 0	_Total
2	ArcGIS	02/10/2019 11:00 AM	Demo	Critical	Closed	0:35	7	3	Status Federation	> 0	Summary
3	Infrastructure	02/10/2019 8:33 AM	Demo	Critical	Closed	0:30	6	1	ArcGISGeoEvent	= 0	10.0.3.154
4	Infrastructure	02/10/2019 7:19 AM	Demo	Critical	Closed	0:15	3	1	ArcGIS Data Store	= 0	10.0.3.202
5	Infrastructure	02/10/2019 6:15 AM	Demo	Critical	Closed	0:15	3	1	ArcGIS Server	= 0	10.0.3.27
6	Infrastructure	02/10/2019 5:16 AM	Demo	Critical	Closed	0:15	3	1	Portal for ArcGIS	= 0	10.0.3.184
7	Database	02/10/2019 1:10 AM	Demo	Critical	Closed	0:9	9	1	Code	> 0	Validation

Report


ArcGIS Monitor
Categories > GeoInfo
Home
Availability
Alerts
RCA
Categories
Site
Reports
API
Help
Demo@arcgismonitor.esri.com:443 / Logout
Demo
ELB Logs
AWS ALB
IP Location
United States
World
02/07/2019 7:24 AM
02/07/2019 7:24 PM
OK
6 Hours
12 Hours
Day
Week
Request - IP Location
IP Location
0 - 50
51 - 100
101 - 200
201 - 500
501 - 1k
1k - 2k
2k - 3k
3k - 5k
Default
GREENLAND
ARCTIC CIRCLE
NORTH AMERICA
EUROPE
ASIA
NORTH ATLANTIC OCEAN
TROPIC OF CANCER
AFRICA
EQUATOR
IPs - Unique IPs: 3 (table only shows top) Totals: 406
Rank | % | IP | Country | Region | Requests
1 | 99.51% | 198.102.62.250 | United States | CA | 404
2 | 0.25% | 128.1.84.138 | United States | CA | 1
3 | 0.25% | 52.232.107.160 | Netherlands | 07 | 1

License Inventory

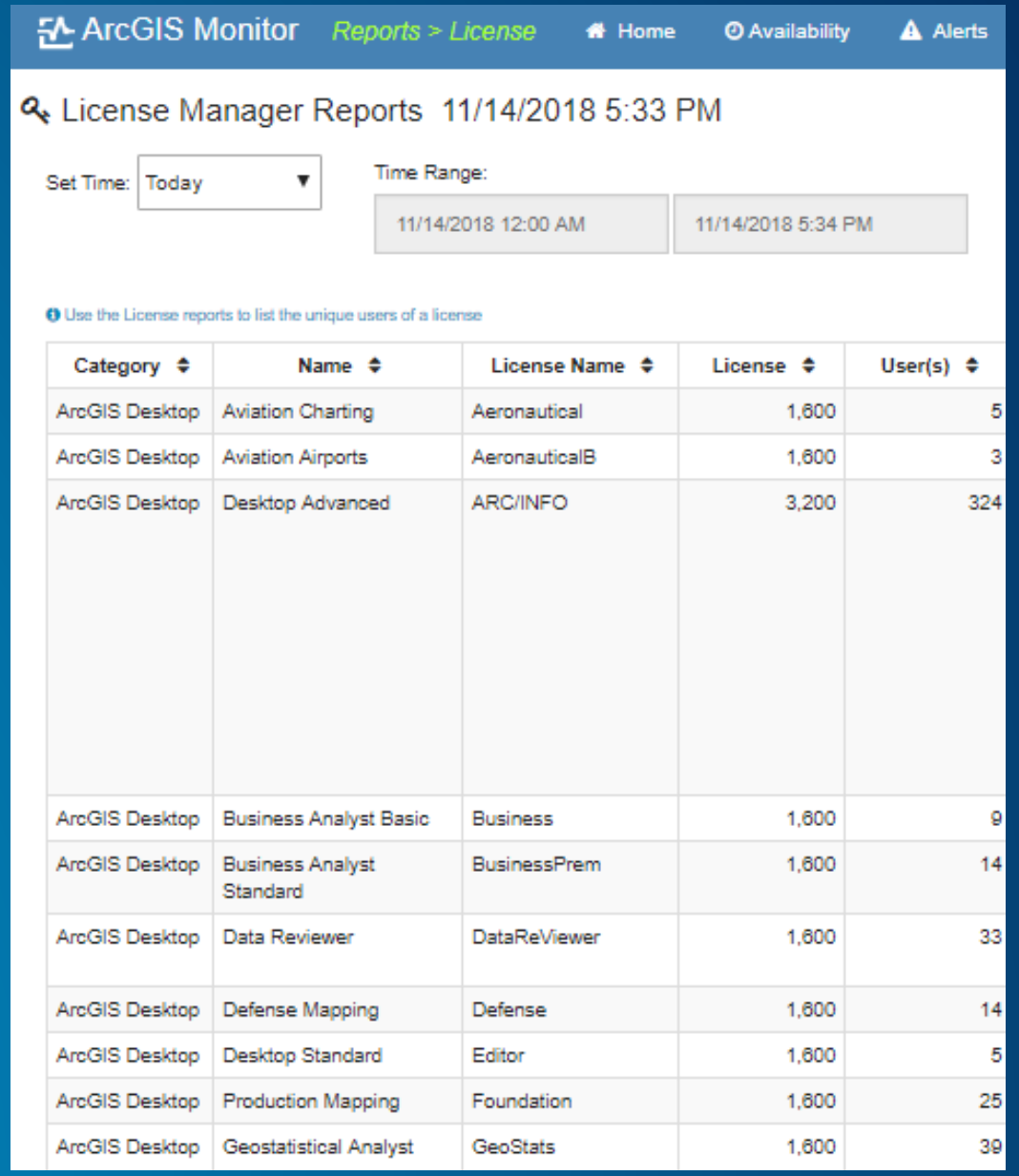
What and how many licenses do we have?



Category	Name	License Name	License
ArcGIS Desktop	Aviation Airports	AeronauticalB	1,600
ArcGIS Desktop	Desktop Advanced	ARC/INFO	3,200
ArcGIS Desktop	Business Analyst Basic	Business	1,600
ArcGIS Desktop	Business Analyst Standard	BusinessPrem	1,600
ArcGIS Desktop	Data Reviewer	DataReViewer	1,600
ArcGIS Desktop	Defense Mapping	Defense	1,600
ArcGIS Desktop	Desktop Standard	Editor	1,600
ArcGIS Desktop	Production Mapping	Foundation	1,600
ArcGIS Desktop	Geostatistical Analyst	GeoStats	1,600

Number of Users

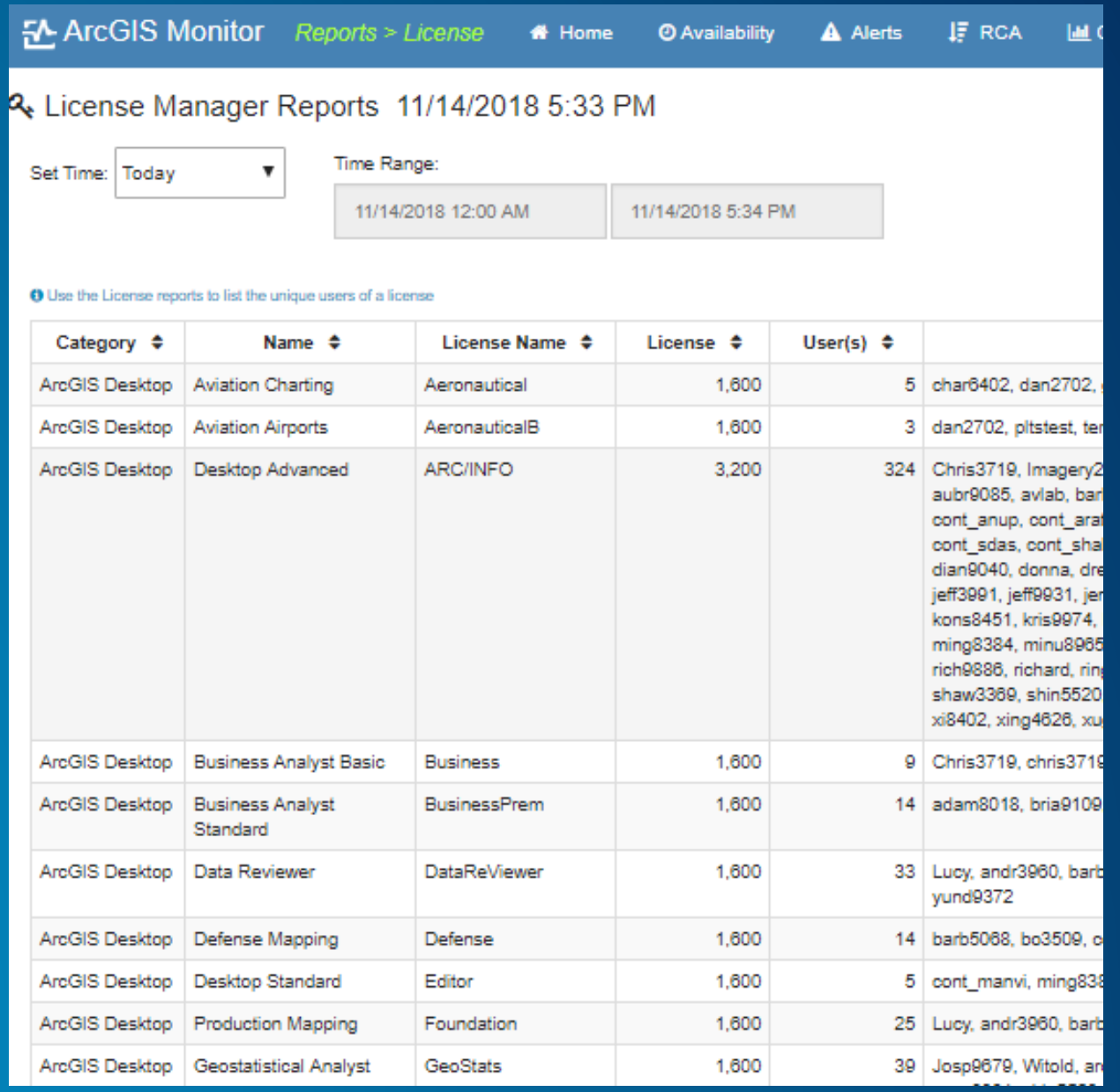
How many unique users were there during this time period?



Category	Name	License Name	License	User(s)
ArcGIS Desktop	Aviation Charting	Aeronautical	1,600	5
ArcGIS Desktop	Aviation Airports	AeronauticalB	1,600	3
ArcGIS Desktop	Desktop Advanced	ARC/INFO	3,200	324
ArcGIS Desktop	Business Analyst Basic	Business	1,600	9
ArcGIS Desktop	Business Analyst Standard	BusinessPrem	1,600	14
ArcGIS Desktop	Data Reviewer	DataReViewer	1,600	33
ArcGIS Desktop	Defense Mapping	Defense	1,600	14
ArcGIS Desktop	Desktop Standard	Editor	1,600	5
ArcGIS Desktop	Production Mapping	Foundation	1,600	25
ArcGIS Desktop	Geostatistical Analyst	GeoStats	1,600	39

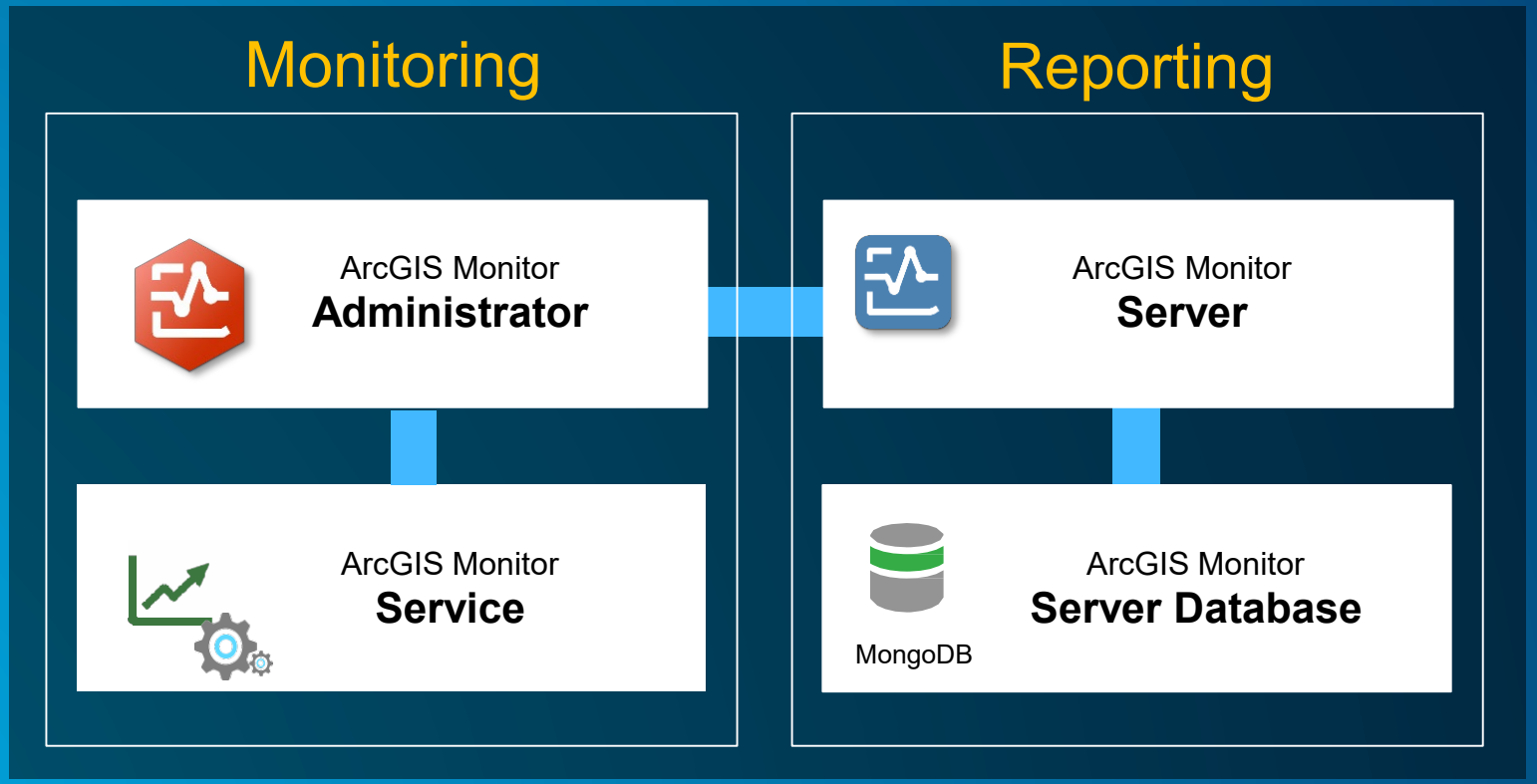
User Names

Who were the specific users during this time period?



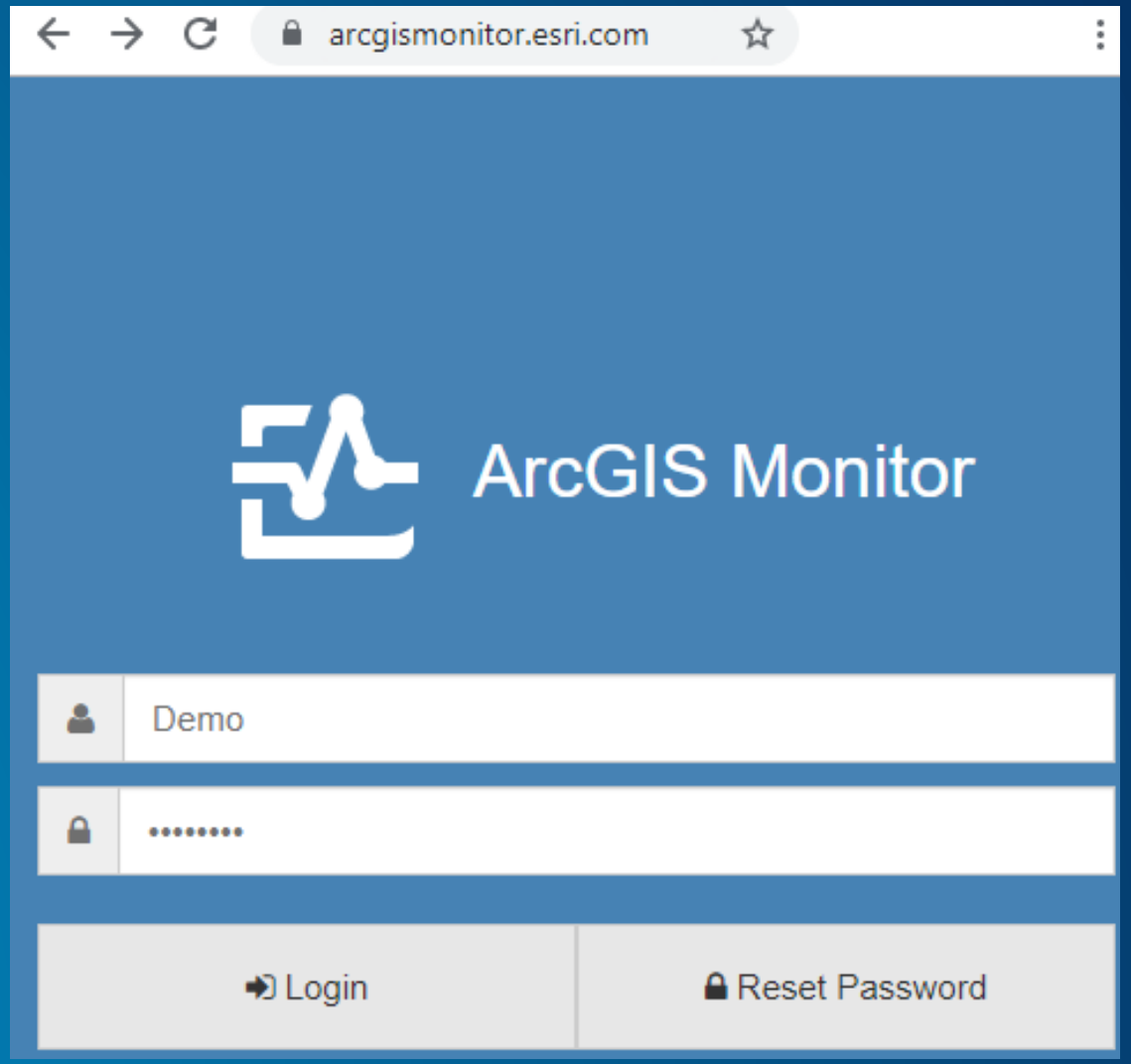
Category	Name	License Name	License	User(s)	
ArcGIS Desktop	Aviation Charting	Aeronautical	1,600	5	char6402, dan2702,
ArcGIS Desktop	Aviation Airports	AeronauticalB	1,600	3	dan2702, pltstest, te
ArcGIS Desktop	Desktop Advanced	ARC/INFO	3,200	324	Chris3719, Imagery2 aubr9085, avlab, bar cont_anup, cont_ara cont_sdas, cont_sha dian9040, donna, dre jeff3991, jeff9931, je kons8451, kris9974, ming8384, minu8965 rich9886, richard, rin shaw3369, shin5520 xi8402, xing4626, xu
ArcGIS Desktop	Business Analyst Basic	Business	1,600	9	Chris3719, chris371
ArcGIS Desktop	Business Analyst Standard	BusinessPrem	1,600	14	adam8018, bria910
ArcGIS Desktop	Data Reviewer	DataReViewer	1,600	33	Lucy, andr3960, barb yund9372
ArcGIS Desktop	Defense Mapping	Defense	1,600	14	barb5068, bo3509, c
ArcGIS Desktop	Desktop Standard	Editor	1,600	5	cont_manvi, ming83
ArcGIS Desktop	Production Mapping	Foundation	1,600	25	Lucy, andr3960, barb
ArcGIS Desktop	Geostatistical Analyst	GeoStats	1,600	39	Josp9679, Witold, ar

ArcGIS Monitor Components and Functions



ArcGIS Monitor: Test Drive

- https://arcgismonitor.esri.com
  - **Username: Demo**
  - ***Password will populate***



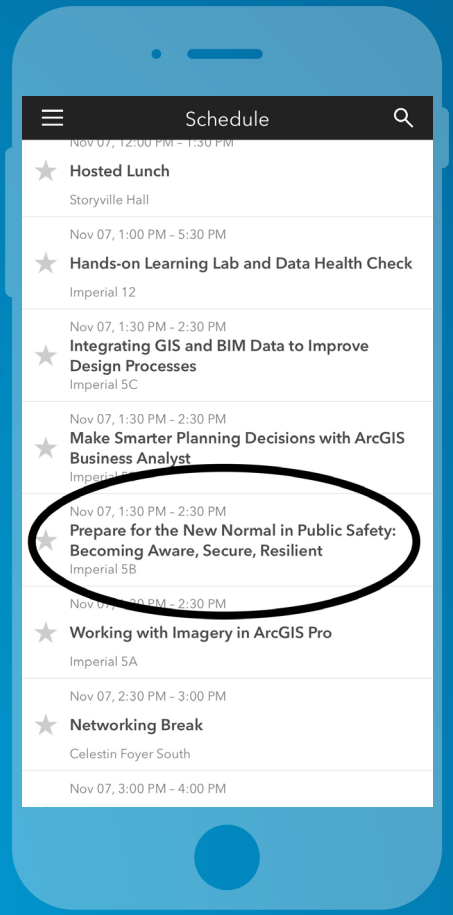
Resources

- 2019 Esri International User Conference presentation
- ArcGIS Monitor Overview
  - https://www.esri.com/en-us/arcgis/products/arcgis-monitor
  - https://enterprise.arcgis.com/en/monitor
  - How to get started
  - Tutorials
- Enterprise System Design Planning Tools
  - Capacity Planning Tool
  - System Designer
  - http://www.wiki.gis.com/wiki/index.php/Enterprise_System_Design_Planning_Tools
- Enterprise System Design Certification
- Esri Professional Services

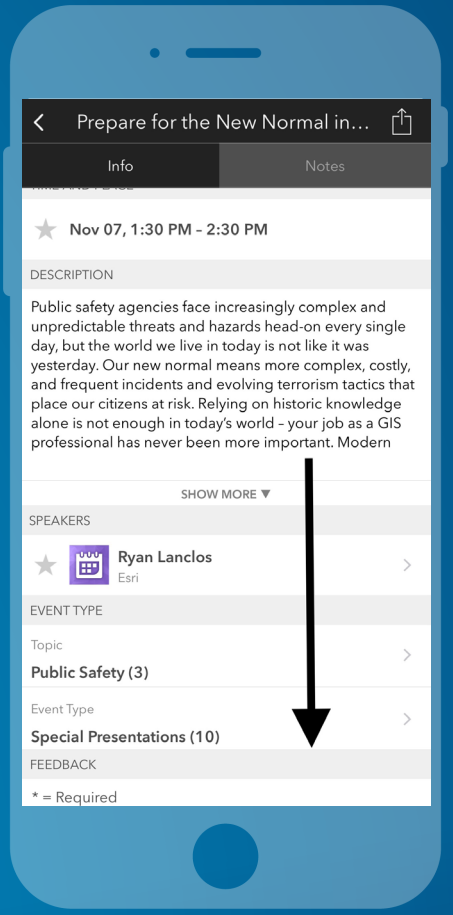
Give Us Your Feedback

Download the Esri Events app and find Gulf Coast UC

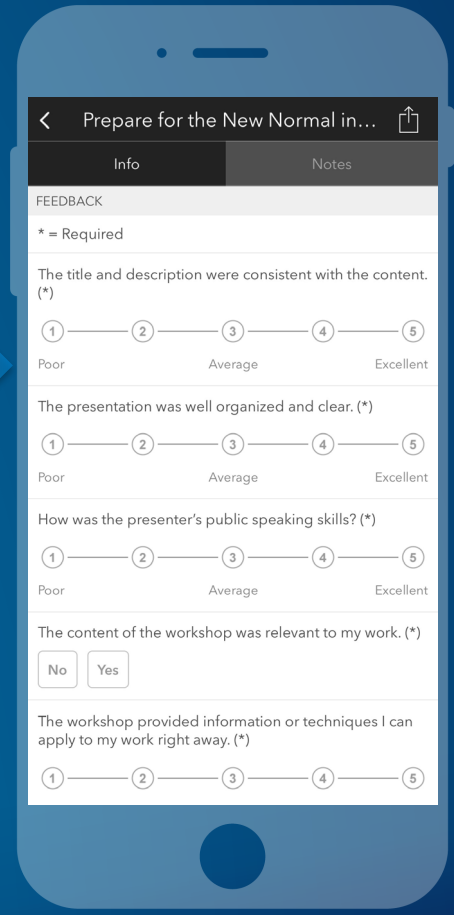
From the schedule, select the session you attended



Scroll down below the description to find the feedback section



Complete answers and select "Submit"



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THE
SCIENCE
OF
WHERE