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Enterprise Service Performance Tuning and Application Usage Patterns Based on Monitoring Tools

9/25/2018 / Ray Hardy, GISP & Carrie Landgraf, GISP / OKSCAUG



VIRGINIA SOUTHSIDE II CONSTRUCTION
Transco Pipeline, Southern Virginia



KENSINGTON GAS PROCESSING PLANT
Columbiana County, Ohio



SUMAS COMPRESSOR STATION
Northwest Pipeline, Washington

Agenda

- > **Introduction**
- > **Service Performance**
 - ArcGIS Monitor
 - MXD Perfstat
 - Geocortex Analytics
- > **Customer Usage Patterns**
 - Geocortex Analytics

Introduction

Williams Enterprise Custom Applications

> Web maps

- Primarily used for viewing assets
- Only a couple allow editing of features

> GeoMobile apps

- Data collection and inspections
 - Create new features
 - Edit existing features



Enterprise Custom Mobile Applications



Asset Capture

Web Mapping Application



Asset Capture Maximo

Web Mapping Application



Asset Inspection

Web Mapping Application



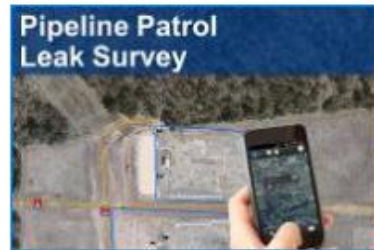
Emergency Response Planning

Web Mapping Application



Encroachments

Web Mapping Application



Pipeline Patrol & Leak Survey

Web Mapping Application



Enterprise Custom Web Maps



Asset Viewer

Web Mapping Application



Business Opportunity Viewer

Web Mapping Application



Communications Viewer

Web Mapping Application



EHS Viewer

Web Mapping Application



Operations Viewer

Web Mapping Application



Right of Way Viewer

Web Mapping Application



Risk Viewer

Web Mapping Application



Security Operations Center Viewer

Web Mapping Application



Volume Management Viewer

Web Mapping Application



Data Sources

> Vendor Data

> Williams Internal Layers

- Assets
- Base layers
 - Present in most, if not all, viewers
- Business-specific layers (Risk, Environmental, etc.)
 - Specific to one or two viewers

> External Services

- Weather, Wildfires, etc.

Service Performance

Application Use Metrics

- > Targeted Communication
- > Decommissioning
- > Performance and Tuning

Internal Services

- > **Over 1,000 services are being monitored**
- > **How to easily manage performance of all of these services?**
- > **Benefits of improved performance**
 - Reduce load on system
 - Enhance user experience

Monitoring Tools

- > **Esri's ArcGIS Monitor**
- > **Latitude Geographic's Analytics**
- > **Esri's MXDPERFSTAT**

- > **Audience Question:**
 - Who is using these tools?

ArcGIS Monitor

Current Status 09/23/2018 10:41 PM



3

(Healthy)

☒ All ☐ Alerts/Failures

Collections: 3 Samples / Hour: 15,511

ID	Alerts	Collection	Samples / Hour	Monitor
1	0	24hr Support	1,338	0
2	0	Williams Production	10,371	15
3	0	Williams Test	3,802	1

Samples/Hour is the number of ArcGIS Monitor observations per hour

Page will automatically refresh every 5 minutes

Williams Production

- ☒ ArcGIS
 - ☒ GE01
 - ☒ GP01
 - ☒ Hosted Server
 - ☒ WS01
 - ☒ Busy
 - ☒ Busy Time per Tr(sec)
 - ☒ Collection Time(sec)
 - ☒ Free
 - ☒ Health Check
 - ☒ Log-SEVERE
 - ☒ Log-WARNING
 - ☒ Max
 - ☒ Min
 - ☒ Throughput (Tr/sec)
 - ☒ Total Busy Time
 - ☒ Tr
 - ☒ Transactions
 - ☒ WS02
 - ☒ WS03
- ☒ Portal
- ☒ Williams Test

ArcGIS

[Status](#) [Alerts \(0 \)](#) [Monitor Failures\(1 \)](#)

Status 09/23/2018 10:45 PM

Items: 0 Collections / Hour: 6,236

ID	Alerting	Monitor Failures	Counter Name
1	0	0	Busy
2	0	0	Busy Time per Tr(sec)
3	0	0	Collection Time(sec)
4	0	0	Free
5	0	0	Health Check
6	0	0	Log-SEVERE
7	0	0	Log-WARNING
8	0	0	Max
9	0	0	Min
10	0	0	Throughput (Tr/sec)
11	0	0	Total Busy Time
12	0	0	Tr
13	0	0	Transactions

Hint: When editing the configuration and increasing sample interval, monitors may temporarily show a failed status.

[Configure](#)

[Execute](#)

Reports 09/23/2018 10:40 PM

Step 1 - Configure Time Range

Set Time Range:

Current Week

Time Range:

09/23/2018 12:00 AM

09/23/2018 10:00 PM

Step 2 - Configure Timezone offset

Set Target Time Zone:

GMT-05:00 US/Eastern

Selected Time Zone Details: US/Eastern

Default Time zone is relative to the client web browser. Current TimeZone: GMT-0500 (Central Daylight Time)

Selecting the correct time zone is important to generate reports relative to a time zone.

Only relevant if you have deployments in multiple time zones and you wish to see reports in a target time zone.

Step 3 - Configure Working Days

Set Working Days:

All Days

☒ Monday

☒ Friday

☒ Tuesday

☒ Saturday

☒ Wednesday

☒ Sunday

☒ Thursday

Step 4 - Configure Working Hours

Set Working Hours:

All Hours

☒ 0 12:00 AM

☒ 6 06:00 AM

☒ 12 12:00 PM

☒ 18 06:00 PM

☒ 1 01:00 AM

☒ 7 07:00 AM

☒ 13 01:00 PM

☒ 19 07:00 PM

☒ 2 02:00 AM

☒ 8 08:00 AM

☒ 14 02:00 PM

☒ 20 08:00 PM

☒ 3 03:00 AM

☒ 9 09:00 AM

☒ 15 03:00 PM

☒ 21 09:00 PM

☒ 4 04:00 AM

☒ 10 10:00 AM

☒ 16 04:00 PM

☒ 22 10:00 PM

☒ 5 05:00 AM

☒ 11 11:00 AM

☒ 17 05:00 PM

☒ 23 11:00 PM

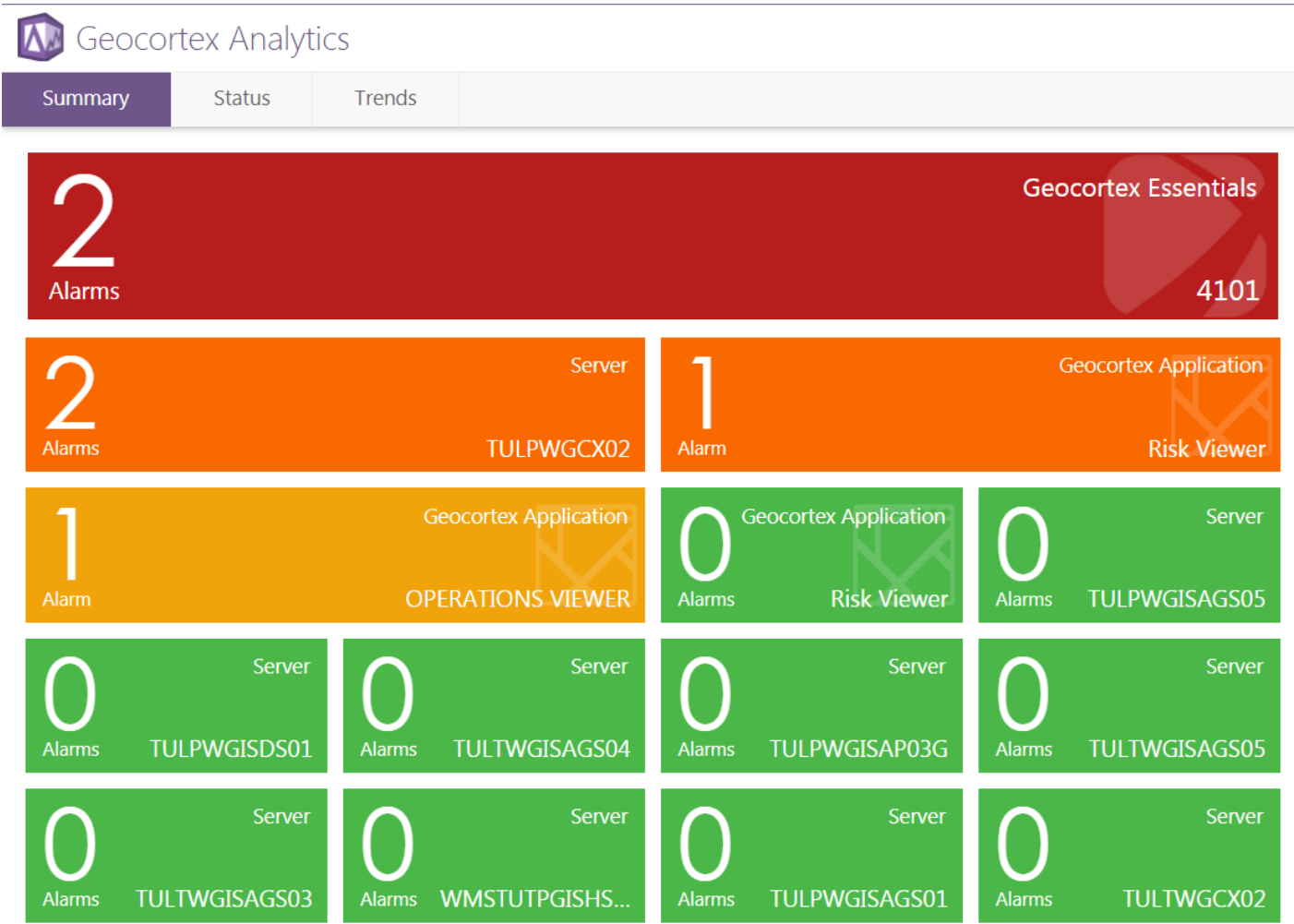
Step 5 - Select execute tab and select an account

ArcGIS Monitor

y ArcGIS, type Services, source AdminAPI, time Timespan, stat name Response Time(sec)														
3	Site	SiteUrl	folder	Service	TrSum	Min(sec)	Avg(sec)	p5(sec)	p50(sec)	p75(sec)	p95(sec)	p99(sec)	Max(sec)	Comments
22	PRD - WS01 Wil	https://TULPW/	PUBLIC	LEGACY_WILLIAMS_PIPELINE_AND	55291	0	0.78	0	0.21	0.88	1.86	2.83	78.0	Investigate sporadic slow response times.
23	PRD - WS01 Wil	https://TULPW/	PUBLIC	CORPORATE_BOUNDARIES	2203	0	0.41	0	0.09	0.19	0.57	3.81	78.32	Investigate sporadic slow response times.
24	PRD - WS01 Wil	https://TULPW/	PUBLIC	PIPELINE_AND_FACILITY_BASE_LA	77031	0	1.12	0	0.91	1.19	2.2	3.04	78.7	Investigate sporadic slow response times.
26	PRD - WS01 Wil	https://TULPW/	Gateway	REFERENCE_LAYERS	29090	0	0.81	0	0.2	0.68	3.1	4.63	75.3	Investigate slow response times.
34	PRD - WS01 Wil	https://TULPW/	Gateway	3rdPartyUtilities	1021	0	7.19	0	0.26	14.83	21.31	42.56	51.58	Investigate slow response times.
55	PRD - WS01 Wil	https://TULPW/	Gateway	EMS	1501	0	0.26	0	0.08	0.39	0.68	1.3	22.16	Investigate sporadic slow response times.
56	PRD - WS01 Wil	https://TULPW/	RISK	RISK_MAV	1587	0	0.42	0	0.03	0.04	1.17	15.35	22.0	Investigate sporadic slow response times.
62	PRD - WS01 Wil	https://TULPW/	Gateway	EnergyBoundaries	1426	0	0.46	0	0.08	0.32	1.07	11.69	19.86	Investigate sporadic slow response times.
99	PRD - WS01 Wil	https://TULPW/	Gateway	Environmental	374	0	0.4	0	0	0	3.77	7.03	8.83	Investigate slow response times.
103	PRD - WS01 Wil	https://TULPW/	Gateway	MiscBoundaries	47	0	0.21	0	0	0	0	4.74	8.42	Investigate sporadic slow response times.
111	PRD - WS01 Wil	https://TULPW/	GeoHazard	Geohazard	2111	0	0.31	0	0.03	0.1	2.27	2.99	7.69	Investigate sporadic slow response times.
117	PRD - WS01 Wil	https://TULPW/	Gateway	Hydrology	359	0	0.25	0	0	0	2.35	4.1	7.14	Investigate sporadic slow response times.
118	PRD - WS01 Wil	https://TULPW/	Gateway	HCA	42	0	0.21	0	0	0	0	5.51	6.9	Investigate sporadic slow response times.
122	PRD - WS01 Wil	https://TULPW/	Gateway	Land	391	0	0.07	0	0.02	0.04	0.15	0.79	6.55	Investigate sporadic slow response times.
123	PRD - WS01 Wil	https://TULPW/	PipelineContro	HCA	36	0	0.16	0	0	0	0	4.76	6.46	Investigate sporadic slow response times.
143	PRD - WS01 Wil	https://TULPW/	Gateway	LaunchersReceivers	210	0	0.2	0	0	0	2.66	4.58	5.47	Investigate sporadic slow response times.
145	PRD - WS01 Wil	https://TULPW/	Gateway	CustomerData	36	0	0.11	0	0	0	0	3.36	5.4	Investigate sporadic slow response times.
147	PRD - WS01 Wil	https://TULPW/	Gateway	Tees	39	0	0.14	0	0	0	0	4.7	5.26	Investigate sporadic slow response times.
148	PRD - WS01 Wil	https://TULPW/	Gateway	SurfsideLeaseholder	39	0	0.11	0	0	0	0	3.06	5.25	Investigate sporadic slow response times.
149	PRD - WS01 Wil	https://TULPW/	Gateway	Transportation	287	0	0.16	0	0	0	1.87	3.06	5.21	Investigate sporadic slow response times.
152	PRD - WS01 Wil	https://TULPW/	Gateway	Markers	36	0	0.13	0	0	0	0	4.03	5.1	Investigate sporadic slow response times.
153	PRD - WS01 Wil	https://TULPW/	LandWest	pocatello_district	55	0	0.16	0	0	0	0	3.88	5.04	Investigate sporadic slow response times.
161	PRD - WS01 Wil	https://TULPW/	Gateway	Geology	36	0	0.11	0	0	0	0	3.29	4.55	Investigate sporadic slow response times.
165	PRD - WS01 Wil	https://TULPW/	Gateway	egis	2466	0	0.08	0	0.01	0.02	0.73	1.12	4.46	Investigate sporadic slow response times.
170	PRD - WS01 Wil	https://TULPW/	Gateway	MajorOperators	42	0	0.12	0	0	0	0	3.12	4.29	Investigate sporadic slow response times.
182	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	UTM_18	42	0	0.09	0	0	0	0	2.34	4.11	Investigate sporadic slow response times.
204	PRD - WS01 Wil	https://TULPW/	Gateway	WilliamsPipelines	773	0	0.79	0	0.19	1.61	2.09	2.53	3.07	Investigate sporadic slow response times.
205	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	TX_SC	42	0	0.09	0	0	0	0	2.25	3.67	Investigate sporadic slow response times.
209	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	NC	39	0	0.09	0	0	0	0	2.43	3.69	Investigate sporadic slow response times.
219	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	ID_C	39	0	0.09	0	0	0	0	2.19	3.48	Investigate sporadic slow response times.
222	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	MD	42	0	0.1	0	0	0	0	2.1	3.46	Investigate sporadic slow response times.
232	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	GA_W	39	0	0.09	0	0	0	0	2.4	3.33	Investigate sporadic slow response times.
234	PRD - WS01 Wil	https://TULPW/	PipelineContro	BOEMOceanBlocks	36	0	0.09	0	0	0	0	2.28	3.32	Investigate sporadic slow response times.
244	PRD - WS01 Wil	https://TULPW/	Gateway	OhioSurveyBoundaries	39	0	0.08	0	0	0	0	2.29	3.26	Investigate sporadic slow response times.
276	PRD - WS01 Wil	https://TULPW/	GeoHazard	ProbabilityAnalysis	39	0	0.08	0	0	0	0	1.88	2.89	
279	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	SC	42	0	0.1	0	0	0	0	2.53	2.85	
301	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	VA_N	39	0	0.09	0	0	0	0	2.23	2.68	
303	PRD - WS01 Wil	https://TULPW/	Gateway	3rdPartyPipelines	3947	0	0.07	0	0.01	0.02	0.49	1.61	2.62	
304	PRD - WS01 Wil	https://TULPW/	Gateway	Parcels	1898	0	0.03	0	0.01	0.02	0.05	0.62	2.61	
305	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	PA_S	42	0	0.09	0	0	0	0	2.21	2.61	
308	PRD - WS01 Wil	https://TULPW/	As_Built_Photo	OR_S	36	0	0.08	0	0	0	0	2.2	2.57	

◀ ▶ ...	Summary	UrlRt	UrlRtPeakHr	UrlErrorPeakHr	AGSSite	AGSServices	AGSServiceTr	AGSTh	AGSFreeInstances	AGSPerf	AGSPerfPeal ...	⊕	⋮	◀
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Geocortex Analytics



EXAMPLE

> Service Improvements:

- Environment, Health & Safety Web Map (EHSMAP) Public Infrastructure – Elec Trans Lines (Rextag)

mxddperfstat

8/17/2018 10:05:04 AM
Z:\10.5\3rdPartyUtilities.mxd
layerCount= 2
GCS_WGS_1984
esriDecimalDegrees
X= -79.83 Y= 39.97 width= 1200 height= 1000

Map Display Performance (sec) for each scale

Scale	Refresh Time(sec)	VisibleLayers
14,714,382	40.59	1
18,489,298	32.03	1
9,244,649	27.35	1
4,622,324	13.75	1
2,311,162	6.57	1
1,155,581	2.61	1
577,791	1.44	1
288,895	.79	1
144,448	.39	1
72,224	.20	1
36,112	.30	1
18,056	.07	1
9,028	.03	1
4,514	.01	1
2,257	.01	1
1,128	.01	1
141	.01	1
282	.01	1
564	.01	1

mxddperfstat

8/17/2018 9:52:06 AM
Z:\10.5\3rdPartyUtilities.mxd
layerCount= 2
GCS_WGS_1984
esriDecimalDegrees
X= -79.83 Y= 39.97 width= 1200 height= 1000

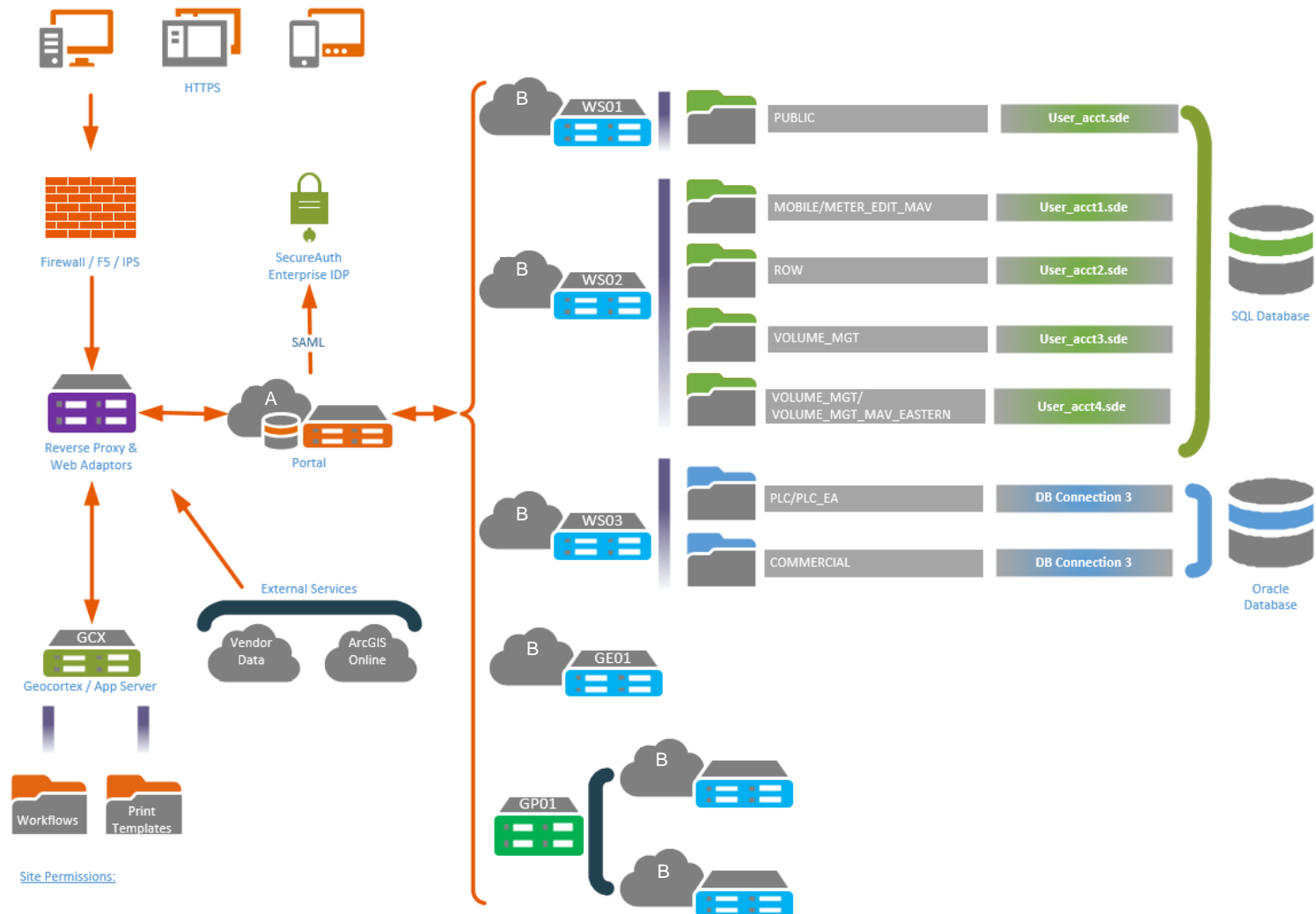
Map Display Performance (sec) for each scale

Scale	Refresh Time(sec)	VisibleLayers
14,714,382	.01	0
18,489,298	.01	0
9,244,649	.01	0
4,622,324	.02	0
2,311,162	.01	0
1,155,581	.01	0
577,791	.01	0
288,895	.01	0
144,448	.01	0
72,224	.04	0
36,112	.01	0
18,056	.01	0
9,028	.04	1
4,514	.02	1
2,257	.02	1
1,128	.02	1
141	.02	1
282	.02	1
564	.02	1

MXDPerfStat

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	DBMS PIO	Source	LayerType	Layer Spatial Reference	LayerQueryDef
1	14,714,382	Elec Trans Lines (Rextag)	31.73	set scale dependency: features fetched=172196; avoid projecting on the fly;	172,196	4,436,733	False	31.72	.00	9.68	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
2	18,489,298	Elec Trans Lines (Rextag)	31.91	set scale dependency: features fetched=199823; avoid projecting on the fly;	199,823	5,345,462	False	31.90	.00	10.89	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
3	9,244,649	Elec Trans Lines (Rextag)	27.66	set scale dependency: features fetched=133727; avoid projecting on the fly;	133,727	2,915,838	False	27.64	.01	7.07	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
4	4,622,324	Elec Trans Lines (Rextag)	18.31	set scale dependency: features fetched=35706; avoid projecting on the fly;	35,706	1,049,017	False	18.29	.01	2.08	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
5	2,311,162	Elec Trans Lines (Rextag)	6.18	set scale dependency: features fetched=7826; avoid projecting on the fly;	7,826	248,503	False	6.17	.01	.41	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
6	1,155,581	Elec Trans Lines (Rextag)	2.58	avoid projecting on the fly;	1,875	59,690	False	2.57	.01	.10	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
7	577,791	Elec Trans Lines (Rextag)	1.43	avoid projecting on the fly;	574	19,567	False	1.41	.01	.03	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
8	288,895	Elec Trans Lines (Rextag)	.77	avoid projecting on the fly;	161	5,880	False	.76	.00	.01	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	
9	144,448	Elec Trans Lines (Rextag)	.40	avoid projecting on the fly;	25	1,223	False	.39	.00	.00	.00			esriDBMS_Oracle,sde,sde:oracle@sde:oracle11g:oeutestt_gisapp_user	esriGeometryPolyline	GCS_North_American_1983	

Application Architecture Diagrams



mxdperfstat

Overview



An ArcGIS Engine command line tool to diagnose typical mxd performance problems. Supports ArcGIS 9.3, 10, 10.1, 10.2, 10.3, 10.4,, 10.4.1, 10.5, 10.6 versions.

[Desktop Application Template](#) by [EnterprisImp](#)

Created: Sep 18, 2012 Updated: Sep 5, 2018 View Count: 10,570

Download

Details

Size: 704 KB

★★★★★



Description

Mxdperfstat is a command line performance diagnostic tool for ArcMap .

Customer Usage Patterns

Application Use Metrics

- > Targeted Communication
- > Decommissioning
- > Performance and Tuning

Performance Issue Identified from Targeted Communication

> Pipeline Job Book

- Layer took 20+ seconds to draw
- Identify tool would time out

> What was found

- FME job not truncating records
- Spatial Index needed to be rebuilt

> Results

- Layer draws in about 1 second
- Identify results return in about 2 seconds

ID	141
Account	SM3
CollectorHost	SM3 Production
CollectorHostname	WMSTUTTGISLM01
Site	TST - WS01 Williams ArcGIS Server Site
SiteUrl	https://TULTWGISAP03G.williams.com:6443/arcgis
Cluster	default
folder	PUBLIC
Service	MAV_MAP_SERVICE
ServiceType	MapServer
TrSum	4613
Min(sec)	0
Avg(sec)	0.67
p5(sec)	0
p50(sec)	0.04
p75(sec)	0.09
p95(sec)	0.73
p99(sec)	15.28
Max(sec)	65.31
Uptime(%)	100.6
Samples	336
Interval(sec)	3600
Alerts(%)	0
LastUpdated	2018-07-12 17:26:00+00:00
Comments	Investigate sporadic slow response times.

Why Target Communications?

> **Gain an understanding of who uses what applications**

- Allocation of resources based on level of usage
- Communications (outages, upgrades)
- Training

> **Focus voice of the customer surveys**

- Enhancement requests
- Who to reach out to for input on enhancement requests that would affect a broad range of people

How to Target Communications?

> Geocortex Analytics

- Web-based
- Accessed through Portal
 - Permissions



To access Geocortex Analytics you need to sign in using your ArcGIS Identity. Please ensure pop-ups are enabled and use the button below to launch the sign in page.

Launch ArcGIS Identity Sign In

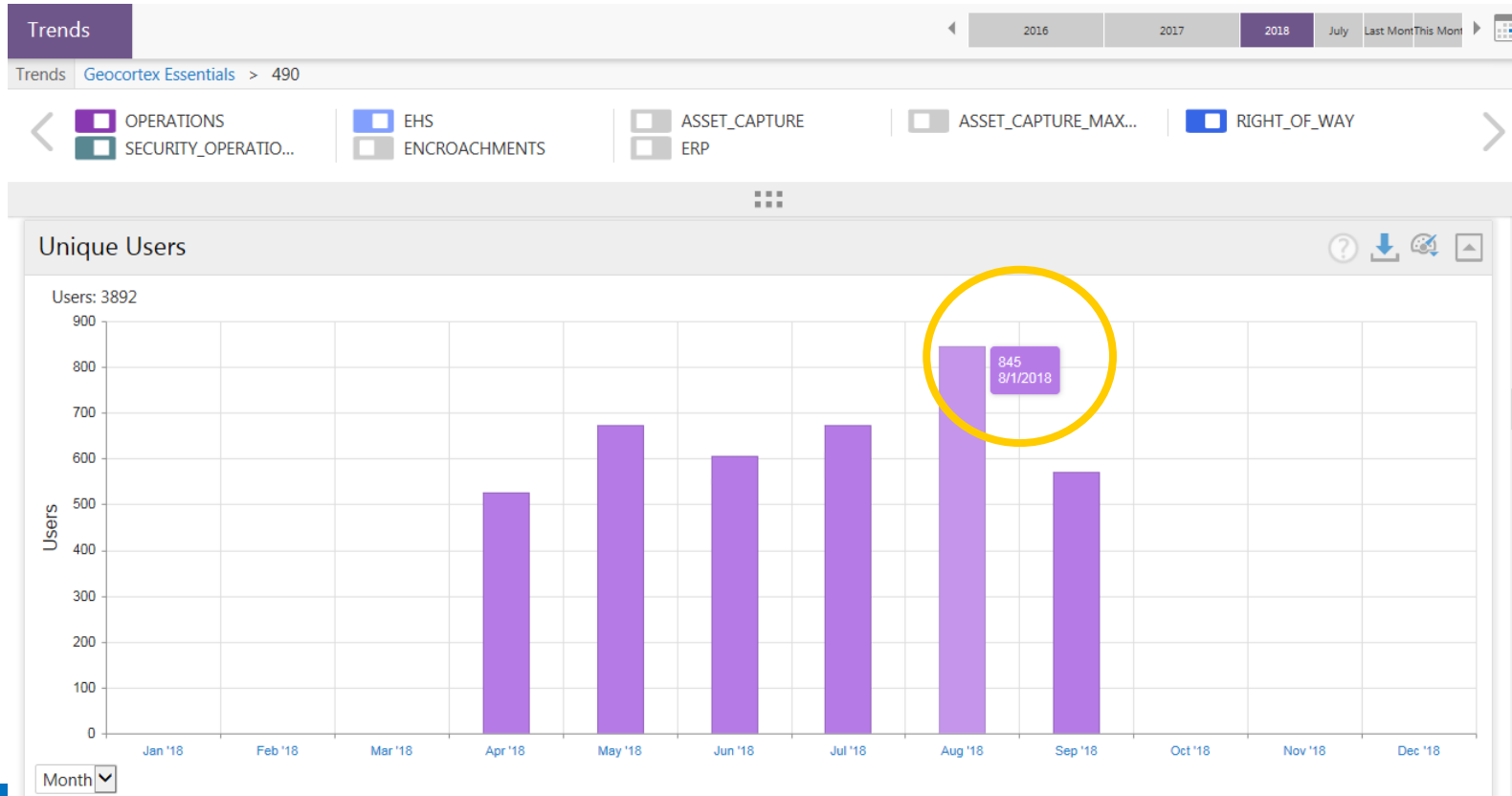


Who Uses the Enterprise Custom Apps?

> GeoMobile

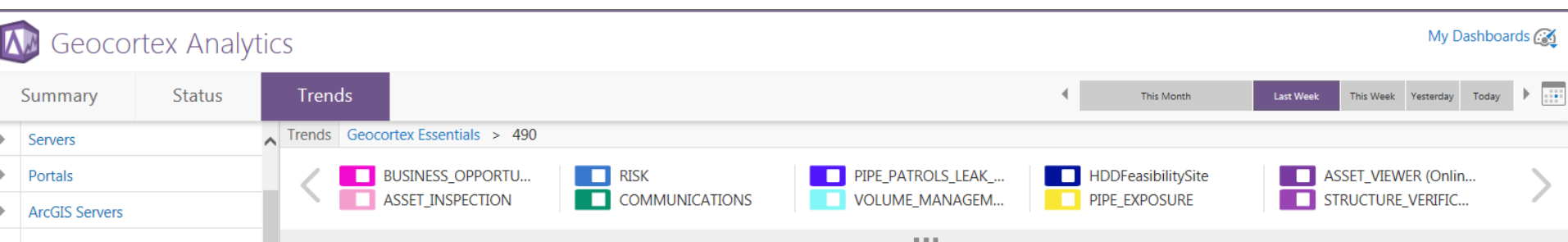
- 570 GeoMobile users

> Web Maps



Geocortex Analytics

- > Can look at trends over specific time periods
- > Can focus trends on a specific application, a set of applications, or all applications



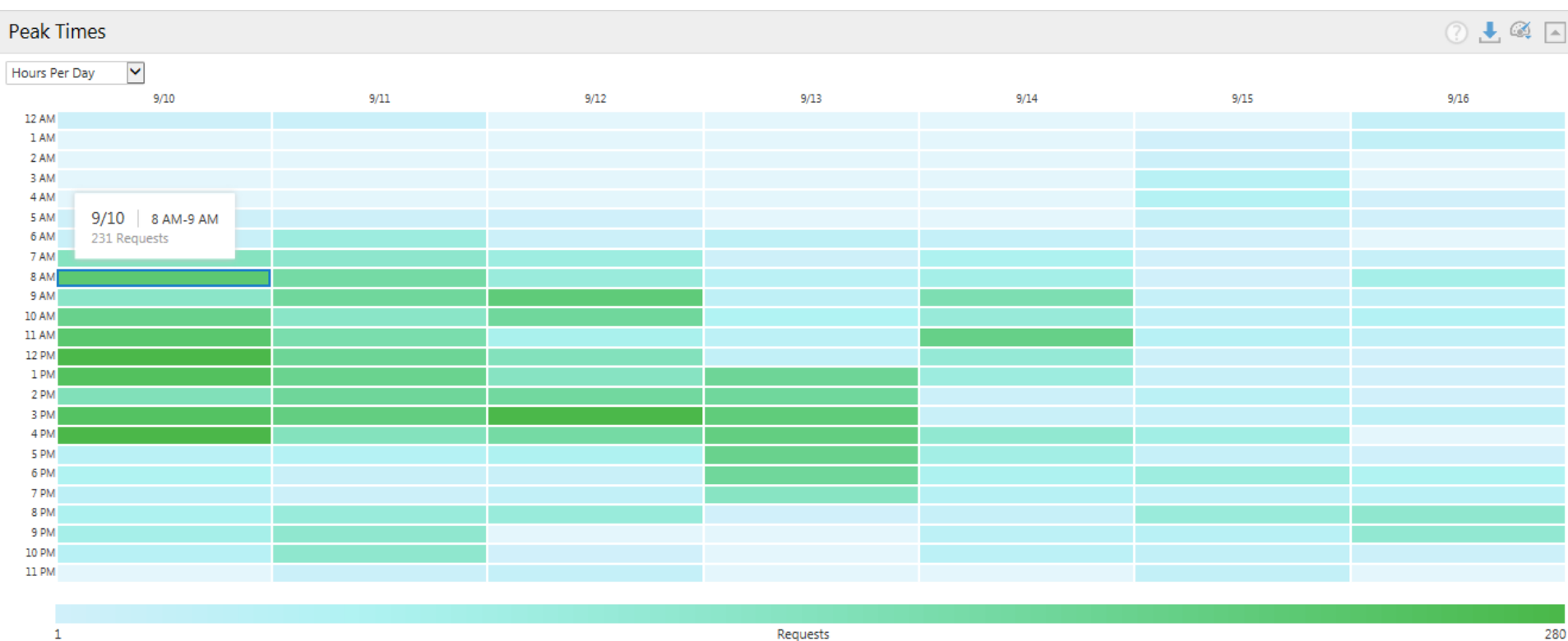
- > Can export content



Temporal Metrics

> Peak times

- Staffing support
- Ideal time frames to shut down apps for upgrades/updates



Customer Usage Metrics

> Who are the users?

- How often are they using apps?
- New versus returning customers

> What devices are being used to access apps?

> What tasks people are doing on their own?

- Freeing GIS Staff to perform other tasks

Individual Customer Details

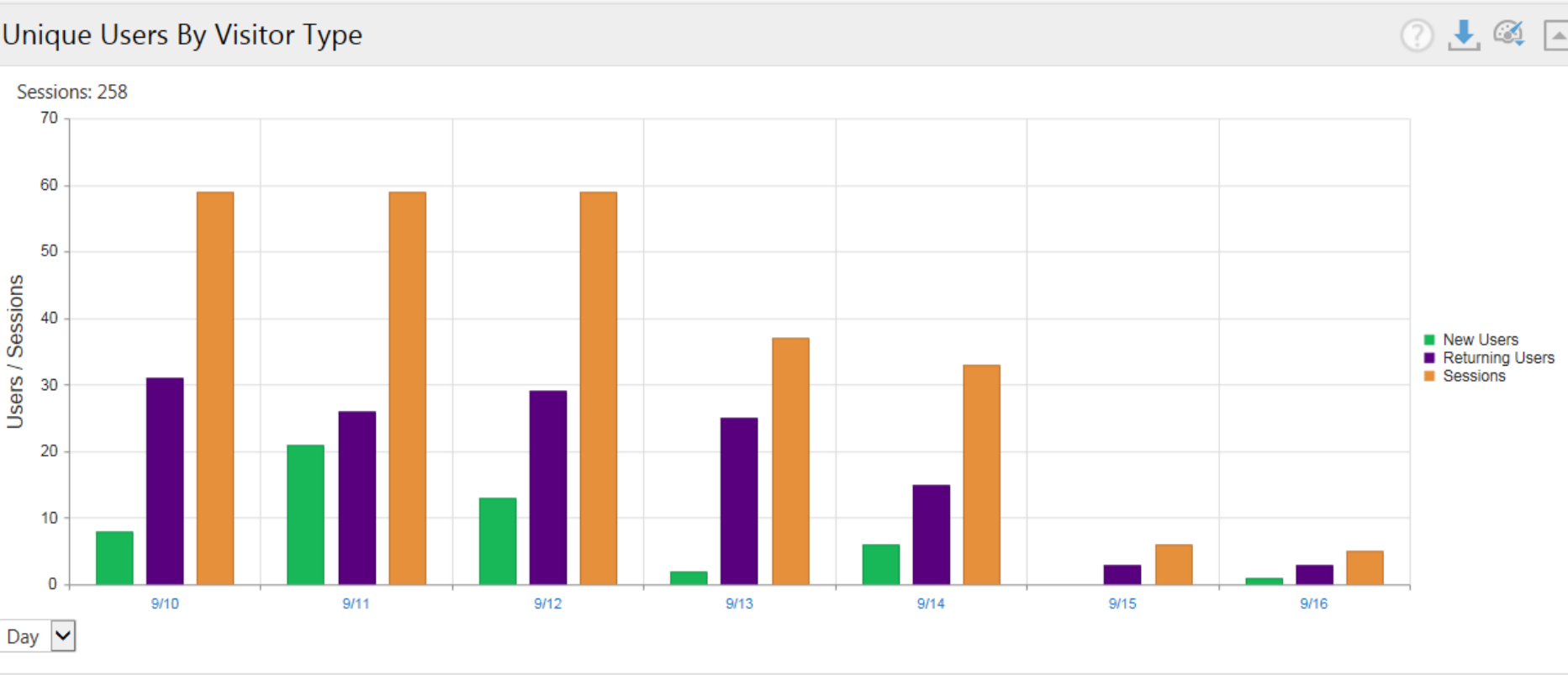
Users



Username	Identity Type	IP Address	New User	Sessions	Map Requests	Average Requests Per Session	Average Session Duration
Anonymous User →	Guest		✓	1	0	21	< 1 min
Richard →	ArcGIS Enterprise		✗	10	288	59	19m
Rik G →	ArcGIS Enterprise		✗	9	507	89	1h 36m
Carrie →	ArcGIS Enterprise		✓	9	61	45	11m
Lee →	ArcGIS Enterprise		✗	8	217	61	3h 3m
Scott →	ArcGIS Enterprise		✗	8	301	67	9h 30m
Steven →	ArcGIS Enterprise		✗	7	266	71	7m
Wesston →	ArcGIS Enterprise		✗	7	461	101	2h 35m
Eric →	ArcGIS Enterprise		✗	6	47	35	3m
Keith →	ArcGIS Enterprise		✗	6	237	85	8m

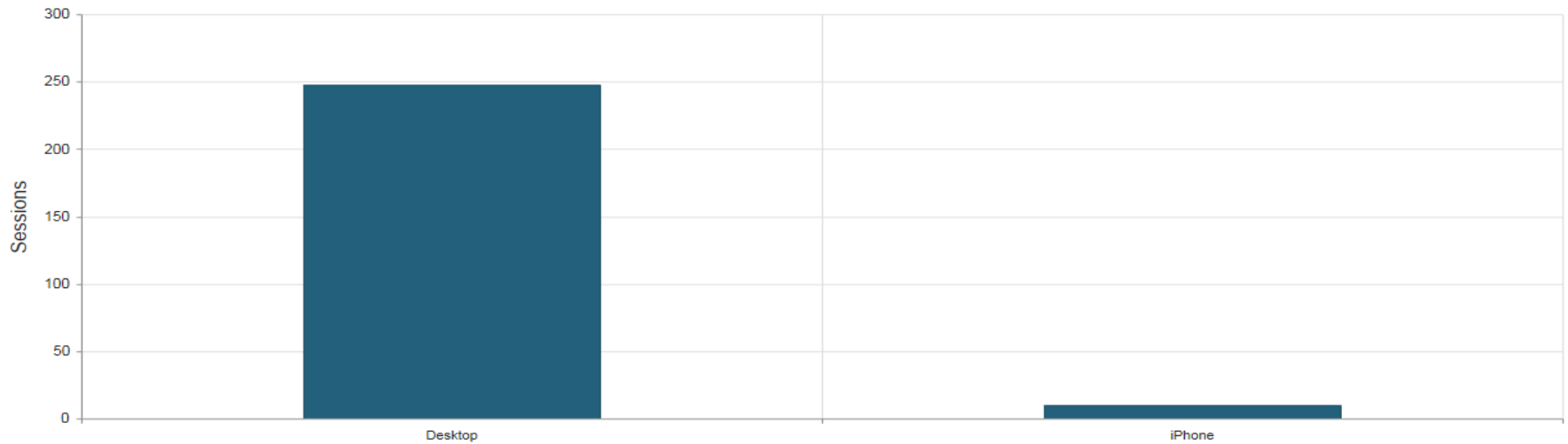
10 items per page
1 - 10 of 98 items

New Users / Returning Users

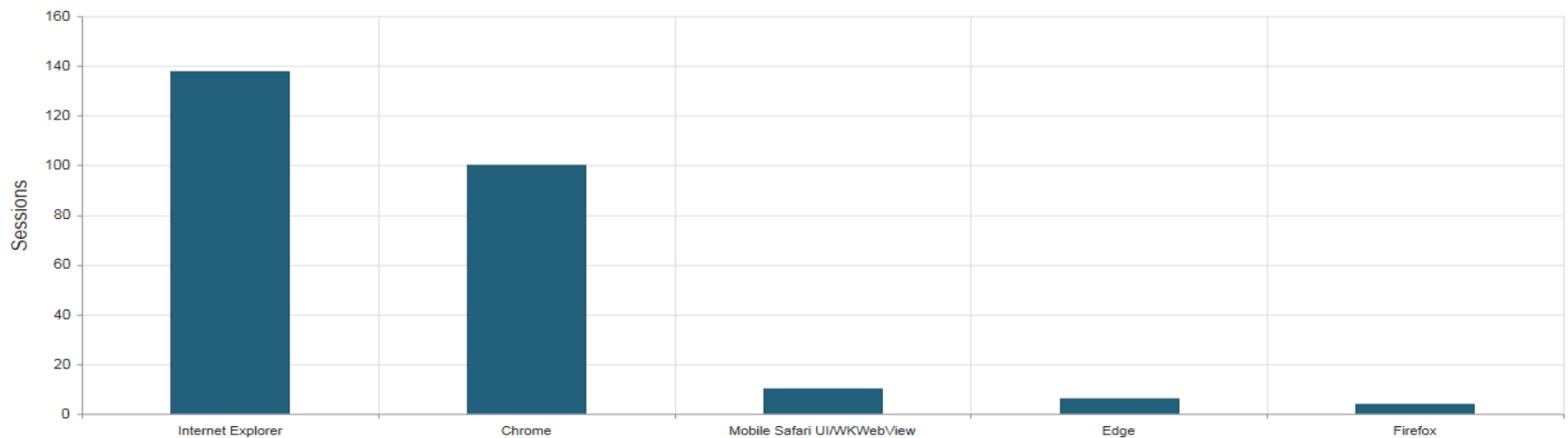


Devices and Browsers

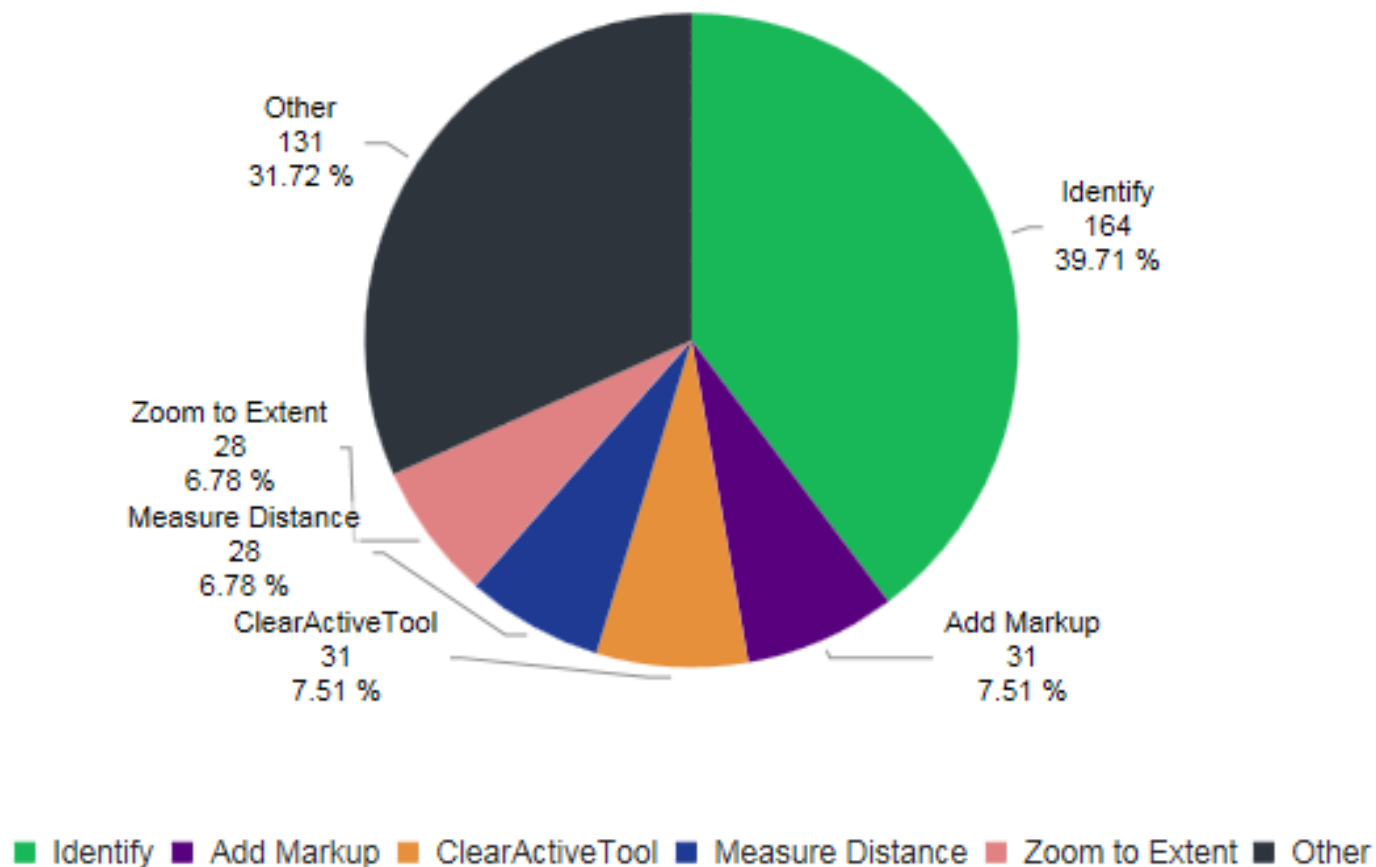
Devices



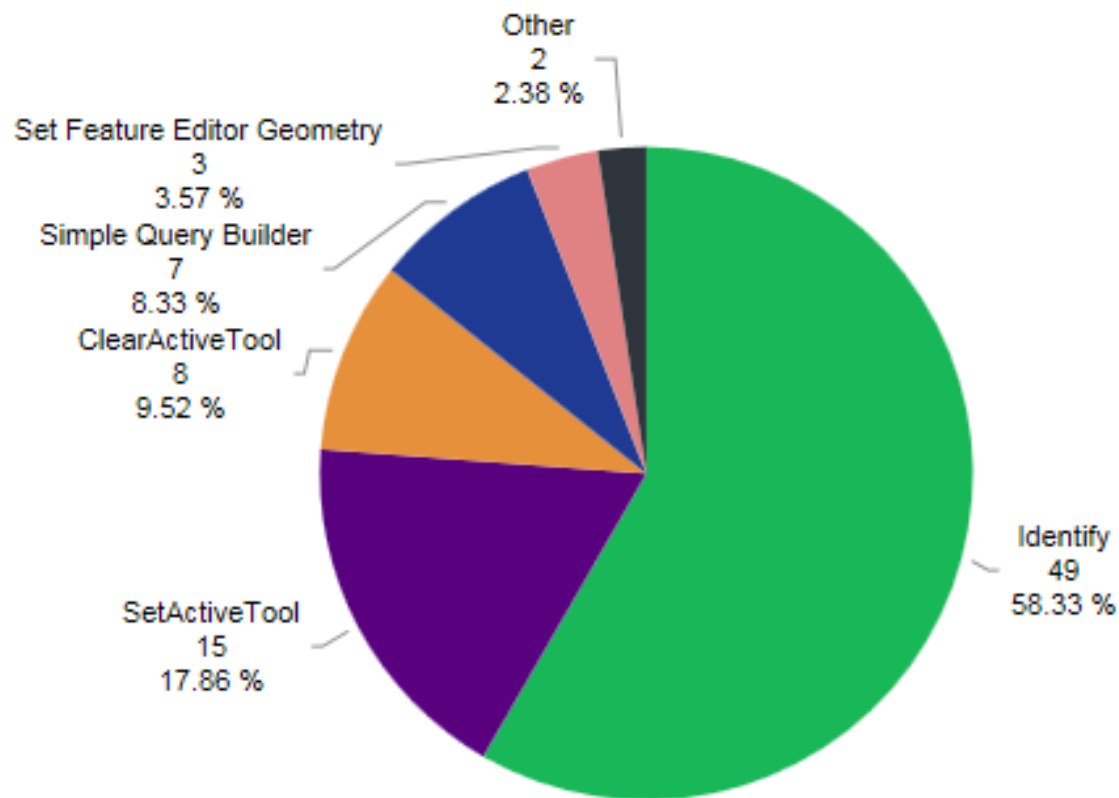
Browsers



Tasks Performed (Web Map)



Tasks Performed (Mobile)



■ Identify
 ■ SetActiveTool
 ■ ClearActiveTool
 ■ Simple Query Builder
 ■ Set Feature Editor Geometry
 ■ Other

Conclusions

Lessons Learned

- > Analyzing services and performance cannot just be done using tools**
- > Understanding and meeting customer needs keeps custom applications relevant**
- > We still have a lot to learn about Analytics!**

Questions?

