Splunk And SCADA – Soul Mates Forever

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Enterprise Products Partners

.conf2016

splunk>

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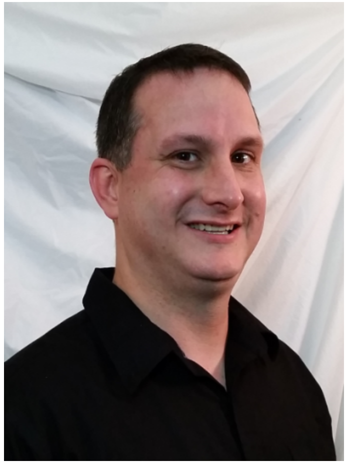
Agenda

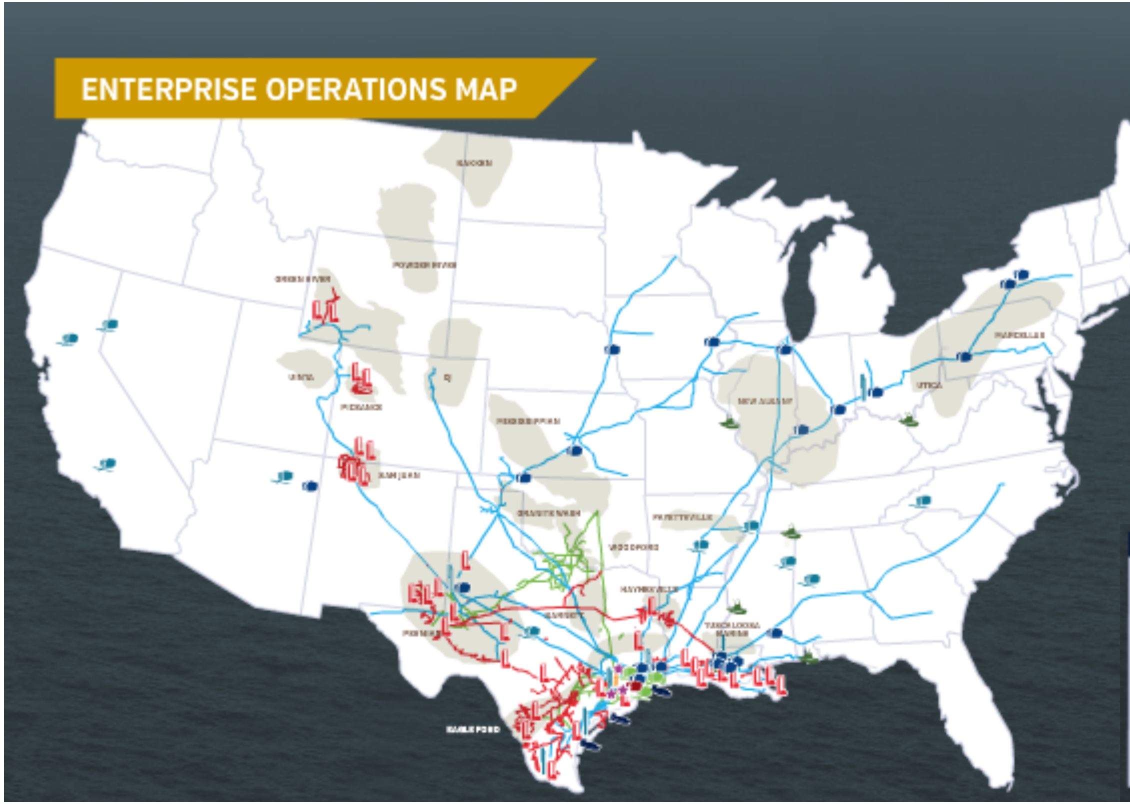
- Introduction
- Where Were We?
- Where Are We?
- Where Are We Going?

Introduction

- Chris Duffey, SCADA Coordinator at Enterprise Products
- Worked in SCADA for ~10 years
  - Internal Development on in-house SCADA system
  - System Support
  - Infrastructure & Cyber Security
- Working with Splunk for 18 months



Introduction



MAP KEY
VIEW GULF COAST
RESET MAP
NATURAL GAS PIPELINE
NGL/REFINED PRODUCTS PIPELINE
CRUDE OIL PIPELINE
CRUDE OIL TERMINAL
NGL/REFINED PRODUCTS TERMINAL
NATURAL GAS PROCESSING/TREATING PLANT
OCTANE ENHANCEMENT FACILITY
ISOMERIZATION FACILITY
NGL/REFINED PRODUCTS STORAGE
NATURAL GAS STORAGE
NGL/PROPYLENE FRACTIONATION FACILITY
IMPORT/EXPORT TERMINAL
MARINE SERVICES
MAJOR PRODUCING BASIN

Enterprise Products Partners L.P.

Introduction

OT vs IT

- Technologies
  - Proprietary
  - Legacy (30+ years) and New
  - Isolation (no Internet connection)
  - 24-7 365 Days a year (no downtime)
- Safety Culture
  - Patching and Approved Software
  - No automated “fixes”
  - “If it ain’t broke, don’t fix it” - cost

Where We Were

Where We Were

How We Got Started

- Evaluation of SEIM Products began in 2013
- Looked for Vendor Approved products
- Began looking at TCO and full value of products
- Initial system that was quoted would have cost $600+ K for initial investment
- Looked for tools that could do more with less
- In August 2014, POV "Proof Of Value" with Splunk

Where We Were

Our Story

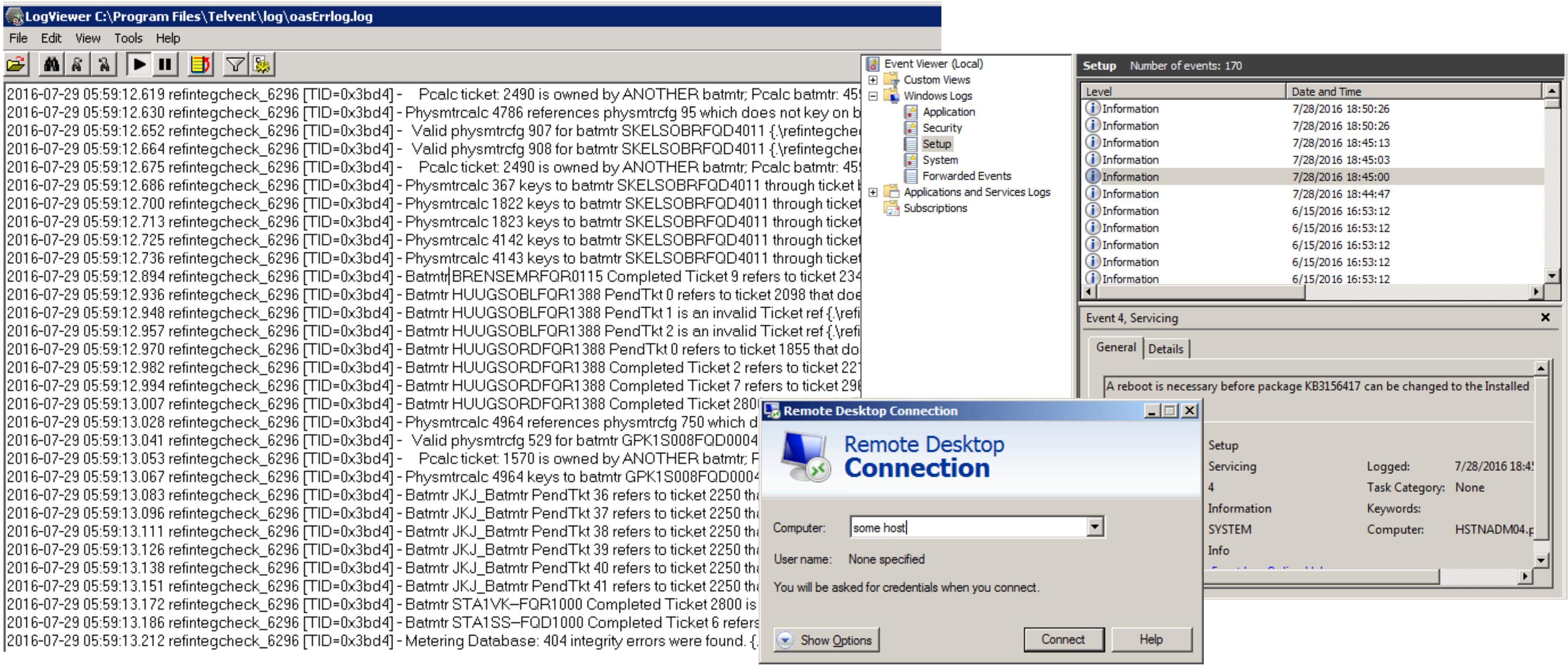
- New SCADA System Implementations
  - Legacy systems would remain for 2+ years
  - Need to support both older and new technologies
  - Need to use existing resources
- Everything was reacting after critical issues
- Difficulties meeting SLA's (Regulatory)
- Increased focus on cyber security of SCADA Systems

Where We Were

Our Tools

- Vendor provided tools limited or required a lot of time
  - Lots of time logging into server
  - Alerting capabilities were limited and not customizable
- Lots of available tools
  - Not approved by vendor
  - Not suitable for SCADA environment
- Vendor claims on system resources and sizing was not always accurate

Troubleshooting



LogViewer C:\Program Files\Telvent\log\oasErrlog.log
File Edit View Tools Help

```
2016-07-29 05:59:12.619 refintegcheck_6296 [TID=0x3bd4] -   Pcalc ticket: 2490 is owned by ANOTHER batmtr; Pcalc batmtr: 45
2016-07-29 05:59:12.630 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 4786 references physmtrcfg 95 which does not key on b
2016-07-29 05:59:12.652 refintegcheck_6296 [TID=0x3bd4] -  Valid physmtrcfg 907 for batmtr SKELSOBRFQD4011 {.\refintegche
2016-07-29 05:59:12.664 refintegcheck_6296 [TID=0x3bd4] -  Valid physmtrcfg 908 for batmtr SKELSOBRFQD4011 {.\refintegche
2016-07-29 05:59:12.675 refintegcheck_6296 [TID=0x3bd4] -   Pcalc ticket: 2490 is owned by ANOTHER batmtr; Pcalc batmtr: 45
2016-07-29 05:59:12.686 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 367 keys to batmtr SKELSOBRFQD4011 through ticket
2016-07-29 05:59:12.700 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 1822 keys to batmtr SKELSOBRFQD4011 through ticket
2016-07-29 05:59:12.713 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 1823 keys to batmtr SKELSOBRFQD4011 through ticket
2016-07-29 05:59:12.725 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 4142 keys to batmtr SKELSOBRFQD4011 through ticket
2016-07-29 05:59:12.736 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 4143 keys to batmtr SKELSOBRFQD4011 through ticket
2016-07-29 05:59:12.894 refintegcheck_6296 [TID=0x3bd4] - Batmtr BRENSEMRFQR0115 Completed Ticket 9 refers to ticket 234
2016-07-29 05:59:12.936 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSOBLFQR1388 PendTkt 0 refers to ticket 2098 that doe
2016-07-29 05:59:12.948 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSOBLFQR1388 PendTkt 1 is an invalid Ticket ref {.\refi
2016-07-29 05:59:12.957 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSOBLFQR1388 PendTkt 2 is an invalid Ticket ref {.\refi
2016-07-29 05:59:12.970 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSORDFQR1388 PendTkt 0 refers to ticket 1855 that do
2016-07-29 05:59:12.982 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSORDFQR1388 Completed Ticket 2 refers to ticket 22
2016-07-29 05:59:12.994 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSORDFQR1388 Completed Ticket 7 refers to ticket 29
2016-07-29 05:59:13.007 refintegcheck_6296 [TID=0x3bd4] - Batmtr HUUGSORDFQR1388 Completed Ticket 280
2016-07-29 05:59:13.028 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 4964 references physmtrcfg 750 which d
2016-07-29 05:59:13.041 refintegcheck_6296 [TID=0x3bd4] -  Valid physmtrcfg 529 for batmtr GPK1S008FQD0004
2016-07-29 05:59:13.053 refintegcheck_6296 [TID=0x3bd4] -   Pcalc ticket: 1570 is owned by ANOTHER batmtr; P
2016-07-29 05:59:13.067 refintegcheck_6296 [TID=0x3bd4] - Physmtrcalc 4964 keys to batmtr GPK1S008FQD0004
2016-07-29 05:59:13.083 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 36 refers to ticket 2250 th
2016-07-29 05:59:13.096 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 37 refers to ticket 2250 th
2016-07-29 05:59:13.111 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 38 refers to ticket 2250 th
2016-07-29 05:59:13.126 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 39 refers to ticket 2250 th
2016-07-29 05:59:13.138 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 40 refers to ticket 2250 th
2016-07-29 05:59:13.151 refintegcheck_6296 [TID=0x3bd4] - Batmtr JKJ_Batmtr PendTkt 41 refers to ticket 2250 th
2016-07-29 05:59:13.172 refintegcheck_6296 [TID=0x3bd4] - Batmtr STA1VK–FQR1000 Completed Ticket 2800 is
2016-07-29 05:59:13.186 refintegcheck_6296 [TID=0x3bd4] - Batmtr STA1SS–FQD1000 Completed Ticket 6 refers
2016-07-29 05:59:13.212 refintegcheck_6296 [TID=0x3bd4] - Metering Database: 404 integrity errors were found. {
```

Setup Number of events: 170

Level	Date and Time
Information	7/28/2016 18:50:26
Information	7/28/2016 18:50:26
Information	7/28/2016 18:45:13
Information	7/28/2016 18:45:03
Information	7/28/2016 18:45:00
Information	7/28/2016 18:44:47
Information	6/15/2016 16:53:12
Information	6/15/2016 16:53:12
Information	6/15/2016 16:53:12
Information	6/15/2016 16:53:12
Information	6/15/2016 16:53:12

Event 4, Servicing

A reboot is necessary before package KB3156417 can be changed to the Installed

Setup			
Servicing		Logged:	7/28/2016 18:4
4		Task Category:	None
Information		Keywords:	
SYSTEM		Computer:	HSTNADM04.p
Info			

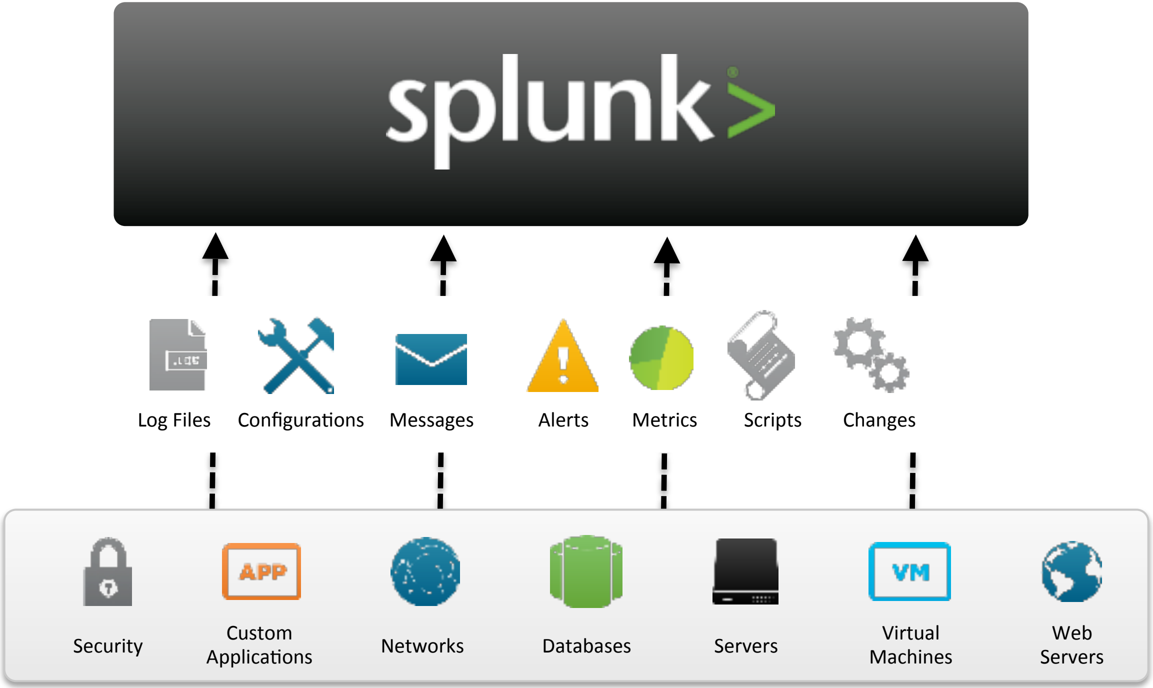
Computer: some host

User name: None specified

You will be asked for credentials when you connect.

Where We Are

Where We Are



- System Overviews and Stability
- Security
- SLA
- Reporting and Empowering other groups

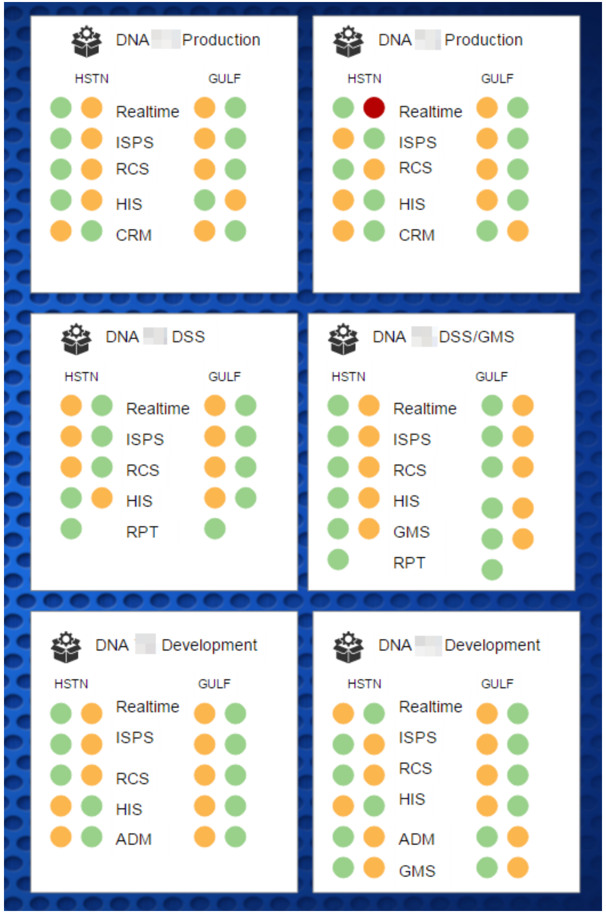
Where We Area

- Splunk Enterprise 225 GB Daily
  - Windows, Unix, Linux, SCADA Applications, Third Party Logs, Interface Logging, Environment Monitoring, etc.
- Splunk for Enterprise Security 50 GB Daily
  - Palo Alto, Active Directory, iLO, VPN, RDP, etc.
- Splunk for VMware 50 GB Daily
- Splunk IT Service Intelligence 50 GB Daily

Where We Are

System Overviews

- System States of All systems
- Ability to at a glance see abnormal results
- Correlate system events with other parts of the system
  - Network logs
  - Windows logs
  - Applications logs
  - Security logs



DNA [redacted] Production

HSTN			GULF	
🟢	🟠	Realtime	🟠	🟢
🟢	🟠	ISPS	🟠	🟢
🟢	🟠	RCS	🟠	🟢
🟢	🟠	HIS	🟢	🟠
🟠	🟢	CRM	🟠	🟢

DNA [redacted] Production

HSTN			GULF	
🟢	🔴	Realtime	🟠	🟢
🟠	🟢	ISPS	🟠	🟢
🟢	🟠	RCS	🟠	🟢
🟠	🟢	HIS	🟠	🟢
🟠	🟢	CRM	🟢	🟠

DNA [redacted] DSS

HSTN			GULF	
🟠	🟢	Realtime	🟠	🟢
🟠	🟢	ISPS	🟠	🟢
🟠	🟢	RCS	🟠	🟢
🟢	🟠	HIS	🟠	🟢
🟢		RPT	🟢	

DNA [redacted] DSS/GMS

HSTN			GULF	
🟢	🟠	Realtime	🟢	🟠
🟢	🟠	ISPS	🟢	🟠
🟢	🟠	RCS	🟢	🟠
🟢	🟠	HIS	🟢	🟠
🟢	🟠	GMS	🟢	🟠
🟢		RPT	🟢	

DNA [redacted] Development

HSTN			GULF	
🟢	🟠	Realtime	🟠	🟢
🟢	🟠	ISPS	🟠	🟢
🟢	🟠	RCS	🟠	🟢
🟠	🟢	HIS	🟠	🟢
🟠	🟢	ADM	🟠	🟢

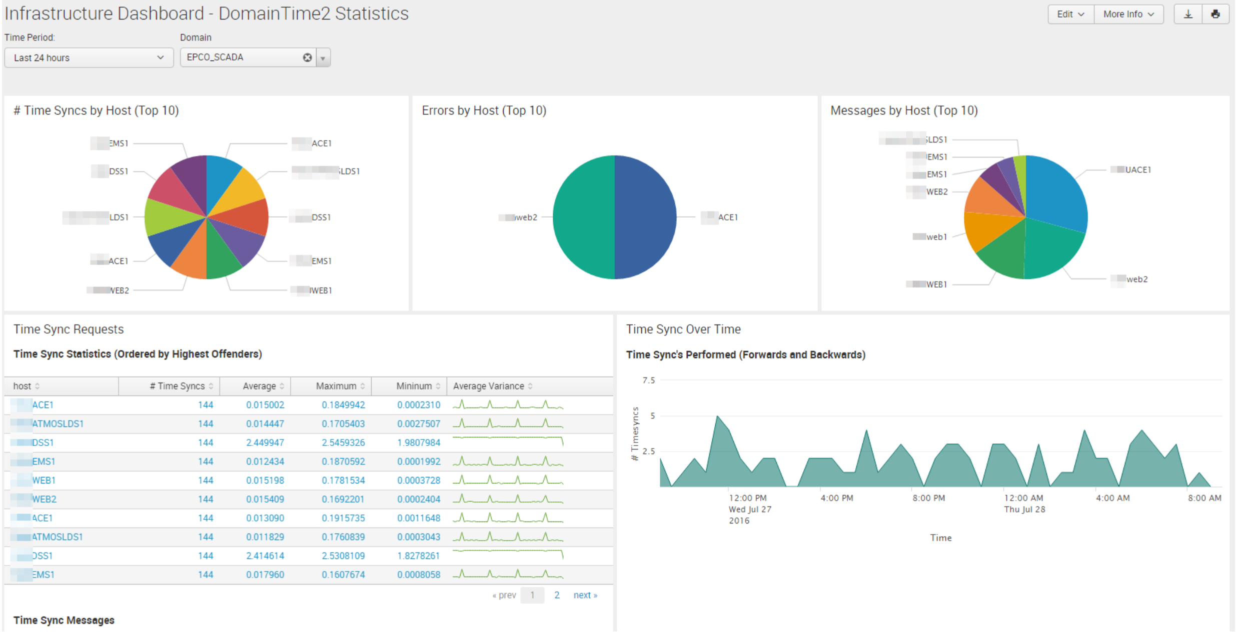
DNA [redacted] Development

HSTN			GULF	
🟠	🟢	Realtime	🟠	🟢
🟢	🟠	ISPS	🟠	🟢
🟢	🟠	RCS	🟠	🟢
🟠	🟢	HIS	🟠	🟢
🟢	🟠	ADM	🟢	🟠
🟢	🟠	GMS	🟢	🟠

Where We Are

System Stability

- Time is important in SCADA (> 5 seconds and things shut down)
- In addition field devices need to be time synched and DST can wreak havoc



Infrastructure Dashboard - DomainTime2 Statistics

Time Period: Last 24 hours

Domain: EPCO_SCADA

Time Sync Requests

Time Sync Statistics (Ordered by Highest Offenders)

host	# Time Syncs	Average	Maximum	Mininum	Average Variance
[redacted]ACE1	144	0.015002	0.1849942	0.0002310	
[redacted]ATMOSLDS1	144	0.014447	0.1705403	0.0027507	
[redacted]DSS1	144	2.449947	2.5459326	1.9807984	
[redacted]EMS1	144	0.012434	0.1870592	0.0001992	
[redacted]WEB1	144	0.015198	0.1781534	0.0003728	
[redacted]WEB2	144	0.015409	0.1692201	0.0002404	
[redacted]ACE1	144	0.013090	0.1915735	0.0011648	
[redacted]ATMOSLDS1	144	0.011829	0.1760839	0.0003043	
[redacted]DSS1	144	2.414614	2.5308109	1.8278261	
[redacted]EMS1	144	0.017960	0.1607674	0.0008058	

« prev 1 2 next »

Time Sync Messages

Time Sync Over Time

Time Sync's Performed (Forwards and Backwards)

Where We Are

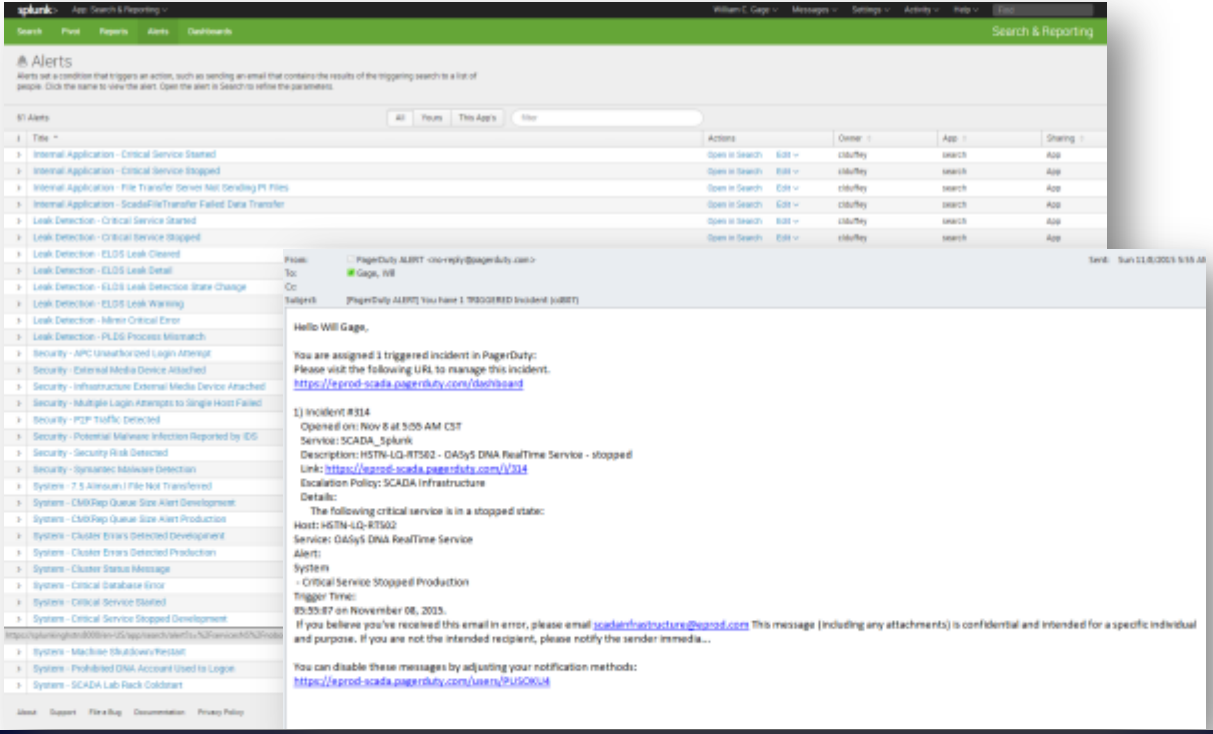
- Alerting and Reporting (SLA)

- Aware of issues within 1~ minute
- Rigorous escalations
- Prescriptive alerting
- Resolution in 4 minutes or less

NOW w/

pagerduty

(This is a legal steroid for SPLUNK!)



Alerts

Alerts set a condition that triggers an action, such as sending an email that contains the results of the triggering search to a list of people. Click the name to view the alert. Open the alert in Search to refine the parameters.

61 Alerts

Title	Actions	Owner	App	Sharing
Internal Application - Critical Service Started	Open in Search Edit	cduffey	search	App
Internal Application - Critical Service Stopped	Open in Search Edit	cduffey	search	App
Internal Application - File Transfer Server Not Sending PI Files	Open in Search Edit	cduffey	search	App
Internal Application - ScadaFileTransfer Failed Data Transfer	Open in Search Edit	cduffey	search	App
Leak Detection - Critical Service Started	Open in Search Edit	cduffey	search	App
Leak Detection - Critical Service Stopped	Open in Search Edit	cduffey	search	App
Leak Detection - ELDS Leak Cleared				
Leak Detection - ELDS Leak Detail				
Leak Detection - ELDS Leak Detection State Change				
Leak Detection - ELDS Leak Warning				
Leak Detection - Mimir Critical Error				
Leak Detection - PLDS Process Mismatch				
Security - APC Unauthorized Login Attempt				
Security - External Media Device Attached				
Security - Infrastructure External Media Device Attached				
Security - Multiple Login Attempts to Single Host Failed				
Security - P2P Traffic Detected				
Security - Potential Malware Infection Reported by IDS				
Security - Security Risk Detected				
Security - Symantec Malware Detection				
System - 7.5 Almsum I File Not Transferred				
System - CMXRep Queue Size Alert Development				
System - CMXRep Queue Size Alert Production				
System - Cluster Errors Detected Development				
System - Cluster Errors Detected Production				
System - Cluster Status Message				
System - Critical Database Error				
System - Critical Service Started				
System - Critical Service Stopped Development				
System - Machine Shutdown/Restart				
System - Prohibited DNA Account Used to Logon				
System - SCADA Lab Rack Coldstart				

From: PagerDuty ALERT <no-reply@pagerduty.com>
To: Gage, Will
Cc:
Subject: [PagerDuty ALERT] You have 1 TRIGGERED Incident (cd8BT)
Sent: Sun 11/8/2015 5:55 AM

Hello Will Gage,

You are assigned 1 triggered incident in PagerDuty:
Please visit the following URL to manage this incident.
https://eprod-scada.pagerduty.com/dashboard

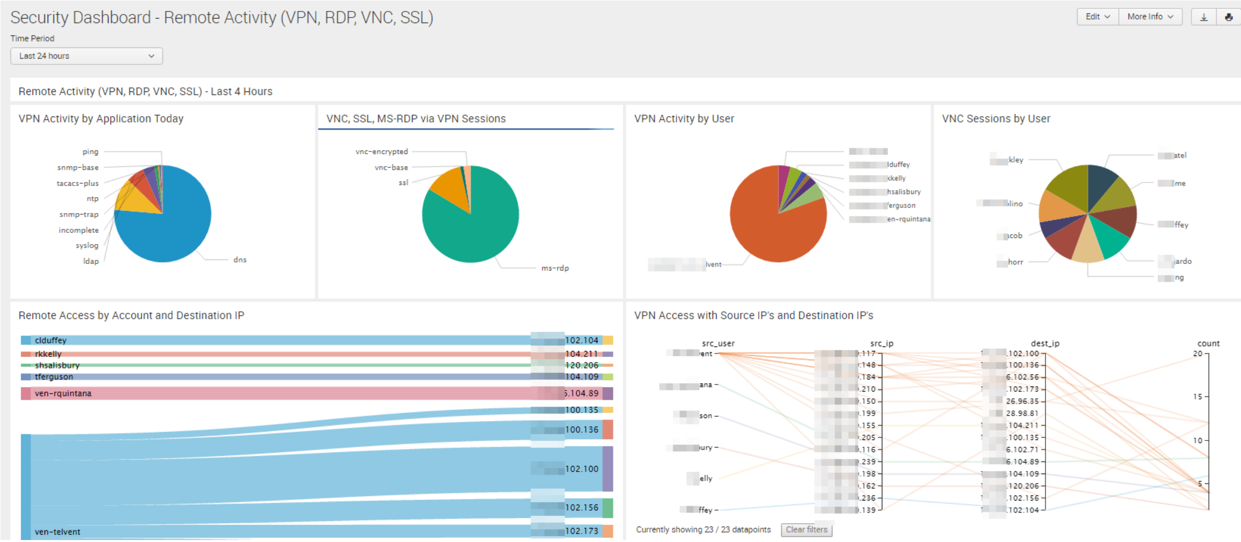
1) Incident #314
  Opened on: Nov 8 at 5:55 AM CST
  Service: SCADA_Splunk
  Description: HSTN-LQ-RT502 - OASyS DNA RealTime Service - stopped
  Link: https://eprod-scada.pagerduty.com/i/314
  Escalation Policy: SCADA Infrastructure
  Details:
    The following critical service is in a stopped state:
Host: HSTN-LQ-RT502
Service: OASyS DNA RealTime Service
Alert:
System
 - Critical Service Stopped Production
Trigger Time:
05:55:07 on November 08, 2015.
If you believe you've received this email in error, please email scadainfrastructure@eprod.com This message (including any attachments) is confidential and intended for a specific individual and purpose. If you are not the intended recipient, please notify the sender immedia...

You can disable these messages by adjusting your notification methods:
https://eprod-scada.pagerduty.com/users/PUSOKU4

Where We Are

System Security

- Perimeter monitoring for suspicious activity
- Ability to view remote access into system
- Ability to view user activity with system



Security Dashboard - Remote Activity (VPN, RDP, VNC, SSL)

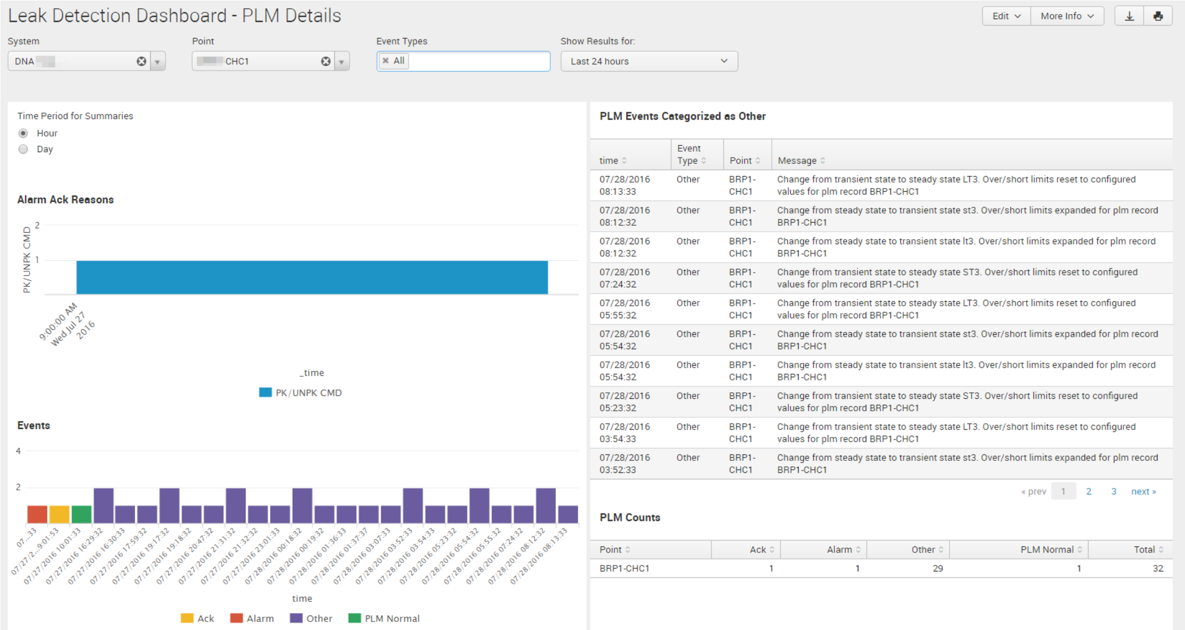
Time Period: Last 24 hours

Remote Activity (VPN, RDP, VNC, SSL) - Last 4 Hours

Where We Are

- Empowering Employees and Other Groups

- Leak Detection
  - Needed long term tracking
  - Identify priorities and track progress
  - Ability to see configurations and alerts
  - Used to influence decisions about staffing and funding



Leak Detection Dashboard - PLM Details

System: DNA [redacted]

Point: [redacted] CHC1

Event Types: × All

Show Results for: Last 24 hours

Time Period for Summaries

● Hour

○ Day

Alarm Ack Reasons

Events

PLM Events Categorized as Other

time	Event Type	Point	Message
07/28/2016 08:13:33	Other	BRP1-CHC1	Change from transient state to steady state LT3. Over/short limits reset to configured values for plm record BRP1-CHC1
07/28/2016 08:12:32	Other	BRP1-CHC1	Change from steady state to transient state st3. Over/short limits expanded for plm record BRP1-CHC1
07/28/2016 08:12:32	Other	BRP1-CHC1	Change from steady state to transient state lt3. Over/short limits expanded for plm record BRP1-CHC1
07/28/2016 07:24:32	Other	BRP1-CHC1	Change from transient state to steady state ST3. Over/short limits reset to configured values for plm record BRP1-CHC1
07/28/2016 05:55:32	Other	BRP1-CHC1	Change from transient state to steady state LT3. Over/short limits reset to configured values for plm record BRP1-CHC1
07/28/2016 05:54:32	Other	BRP1-CHC1	Change from steady state to transient state st3. Over/short limits expanded for plm record BRP1-CHC1
07/28/2016 05:54:32	Other	BRP1-CHC1	Change from steady state to transient state lt3. Over/short limits expanded for plm record BRP1-CHC1
07/28/2016 05:23:32	Other	BRP1-CHC1	Change from transient state to steady state ST3. Over/short limits reset to configured values for plm record BRP1-CHC1
07/28/2016 03:54:33	Other	BRP1-CHC1	Change from transient state to steady state LT3. Over/short limits reset to configured values for plm record BRP1-CHC1
07/28/2016 03:52:33	Other	BRP1-CHC1	Change from steady state to transient state st3. Over/short limits expanded for plm record BRP1-CHC1

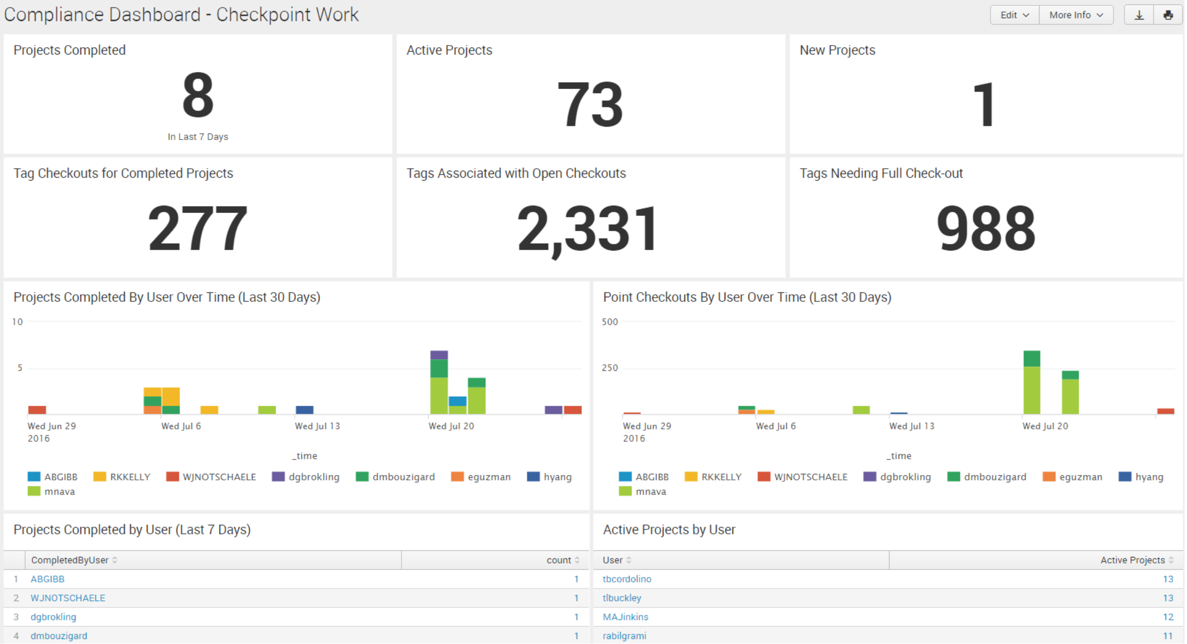
PLM Counts

Point	Ack	Alarm	Other	PLM Normal	Total
BRP1-CHC1	1	1	29	1	32

Where We Are

- Empowering Employees and Other Groups

- Compliance
  - Tracking activity with field operations
  - Providing information on work-load balance
  - Ability to investigate outages
  - Ability to view configuration changes



Compliance Dashboard - Checkpoint Work

Projects Completed

8

In Last 7 Days

Active Projects

73

New Projects

1

Tag Checkouts for Completed Projects

277

Tags Associated with Open Checkouts

2,331

Tags Needing Full Check-out

988

Projects Completed By User Over Time (Last 30 Days)

Point Checkouts By User Over Time (Last 30 Days)

Projects Completed by User (Last 7 Days)

	CompletedByUser	count
1	ABGIBB	1
2	WJNOTSCHAELE	1
3	dgbrokling	1
4	dmbouzigard	1

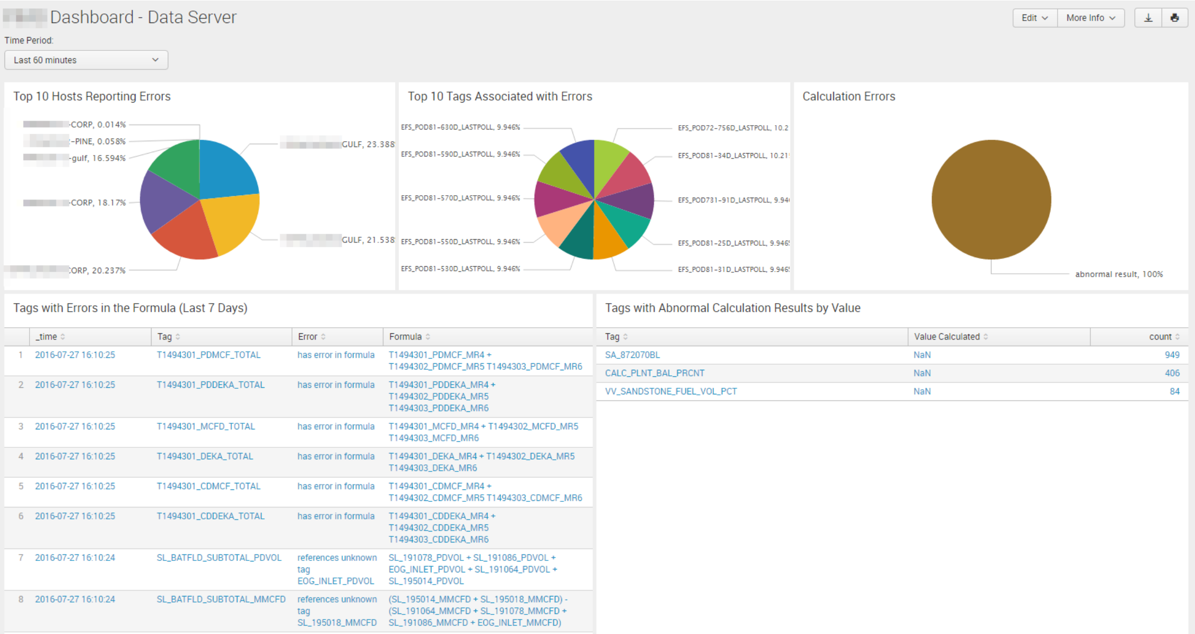
Active Projects by User

User	Active Projects
tbcordolino	13
tlbuckley	13
MAJinkins	12
rabilgrami	11

Where We Are

- Empowering Employees and Other Groups

- Internal Systems Support
  - Real performance beyond perfmon
  - See configuration problems
  - View errors in logs (worst offenders)
  - Splunk as data source



[redacted] Dashboard - Data Server

Time Period: Last 60 minutes

Top 10 Hosts Reporting Errors

[redacted]-CORP, 0.014%
[redacted]-PINE, 0.058%
[redacted]-gulf, 16.594%
[redacted]-CORP, 18.17%
[redacted]CORP, 20.237%
[redacted]GULF, 23.388
[redacted]GULF, 21.538

Top 10 Tags Associated with Errors

EFS_POD81-630D_LASTPOLL, 9.946%
EFS_POD81-590D_LASTPOLL, 9.946%
EFS_POD81-570D_LASTPOLL, 9.946%
EFS_POD81-550D_LASTPOLL, 9.946%
EFS_POD81-530D_LASTPOLL, 9.946%
EFS_POD72-756D_LASTPOLL, 10.2
EFS_POD81-34D_LASTPOLL, 10.21
EFS_POD731-91D_LASTPOLL, 9.94
EFS_POD81-25D_LASTPOLL, 9.946
EFS_POD81-31D_LASTPOLL, 9.946

Calculation Errors

Tags with Errors in the Formula (Last 7 Days)

	_time	Tag	Error	Formula
1	2016-07-27 16:10:25	T1494301_PDMCF_TOTAL	has error in formula	T1494301_PDMCF_MR4 + T1494302_PDMCF_MR5 T1494303_PDMCF_MR6
2	2016-07-27 16:10:25	T1494301_PDDEKA_TOTAL	has error in formula	T1494301_PDDEKA_MR4 + T1494302_PDDEKA_MR5 T1494303_PDDEKA_MR6
3	2016-07-27 16:10:25	T1494301_MCFD_TOTAL	has error in formula	T1494301_MCFD_MR4 + T1494302_MCFD_MR5 T1494303_MCFD_MR6
4	2016-07-27 16:10:25	T1494301_DEKA_TOTAL	has error in formula	T1494301_DEKA_MR4 + T1494302_DEKA_MR5 T1494303_DEKA_MR6
5	2016-07-27 16:10:25	T1494301_CDMCF_TOTAL	has error in formula	T1494301_CDMCF_MR4 + T1494302_CDMCF_MR5 T1494303_CDMCF_MR6
6	2016-07-27 16:10:25	T1494301_CDDEKA_TOTAL	has error in formula	T1494301_CDDEKA_MR4 + T1494302_CDDEKA_MR5 T1494303_CDDEKA_MR6
7	2016-07-27 16:10:24	SL_BATFLD_SUBTOTAL_PDVOL	references unknown tag EOG_INLET_PDVOL	SL_191078_PDVOL + SL_191086_PDVOL + EOG_INLET_PDVOL + SL_191064_PDVOL + SL_195014_PDVOL
8	2016-07-27 16:10:24	SL_BATFLD_SUBTOTAL_MMCFD	references unknown tag SL_195018_MMCFD	(SL_195014_MMCFD + SL_195018_MMCFD) - (SL_191064_MMCFD + SL_191078_MMCFD + SL_191086_MMCFD + EOG_INLET_MMCFD)

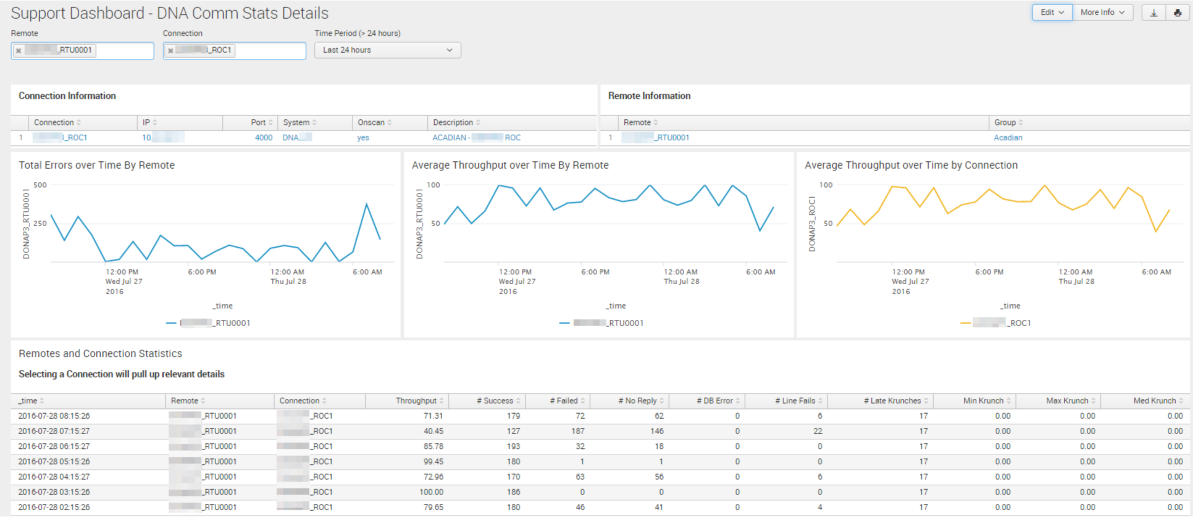
Tags with Abnormal Calculation Results by Value

Tag	Value Calculated	count
SA_872070BL	NaN	949
CALC_PLNT_BAL_PRCNT	NaN	406
VV_SANDSTONE_FUEL_VOL_PCT	NaN	84

Where We Are

- Empowering Employees and Other Groups

- Support Staff
  - View communication problems
  - Historical trending
  - Tags being sent to PI
  - Independent of system



Support Dashboard - DNA Comm Stats Details

Remote: [redacted]_RTU0001

Connection: [redacted]_ROC1

Time Period (> 24 hours): Last 24 hours

Connection Information

	Connection	IP	Port	System	Onscan	Description
1	[redacted]_ROC1	10.[redacted]	4000	DNA[redacted]	yes	ACADIAN - [redacted] ROC

Remote Information

	Remote	Group
1	[redacted]_RTU0001	Acadian

Total Errors over Time By Remote

Average Throughput over Time By Remote

Average Throughput over Time by Connection

Remotes and Connection Statistics

Selecting a Connection will pull up relevant details

_time	Remote	Connection	Throughput	# Success	# Failed	# No Reply	# DB Error	# Line Fails	# Late Krunches	Min Krunch	Max Krunch	Med Krunch
2016-07-28 08:15:26	[redacted]_RTU0001	[redacted]_ROC1	71.31	179	72	62	0	6	17	0.00	0.00	0.00
2016-07-28 07:15:27	[redacted]_RTU0001	[redacted]_ROC1	40.45	127	187	146	0	22	17	0.00	0.00	0.00
2016-07-28 06:15:27	[redacted]_RTU0001	[redacted]_ROC1	85.78	193	32	18	0	0	17	0.00	0.00	0.00
2016-07-28 05:15:26	[redacted]_RTU0001	[redacted]_ROC1	99.45	180	1	1	0	0	17	0.00	0.00	0.00
2016-07-28 04:15:27	[redacted]_RTU0001	[redacted]_ROC1	72.96	170	63	56	0	6	17	0.00	0.00	0.00
2016-07-28 03:15:26	[redacted]_RTU0001	[redacted]_ROC1	100.00	186	0	0	0	0	17	0.00	0.00	0.00
2016-07-28 02:15:26	[redacted]_RTU0001	[redacted]_ROC1	79.65	180	46	41	0	4	17	0.00	0.00	0.00

Where We Want To Be

2017 Goal

- Splunk IT Service Intelligence fully implemented for “services” and predictive system modelling
- Splunk for Enterprise Security fully implemented for SEIM in SCADA Systems/Networks
- HA for Indexers
- Increase from 225GB to 300GB of Daily Ingest for Splunk Enterprise
- Provide even more Data Analytics and Insight for SCADA Groups and Control Center

What Have We Gained

- Ability to be pro-active when responding to incidents to meet SLA's
- Dramatic reduction to investigate incidents (50%+)
- Reporting for other groups to help them do their jobs
- Troubleshoot and correlate data for root-cause-analysis
- Visibility, visibility, visibility

THANK YOU

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