



# Visibility Into a High Performance Compute (HPC) Grid

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# Qualcomm

## #1

Fabless semiconductor company

## #1

In 3G/4G LTE modem

## 30+

Years of driving the evolution of wireless

## 804M

MSM™ chipsets shipped FY '17

Sources: Qualcomm Incorporated data, as of Q4 FY17; IHS, May '18; Strategy Analytics, Mar. '18. MSM is a product of Qualcomm Technologies, Inc. and/or its subsidiaries.

# Leading mobile innovation for over 30 years

Digitized mobile communications



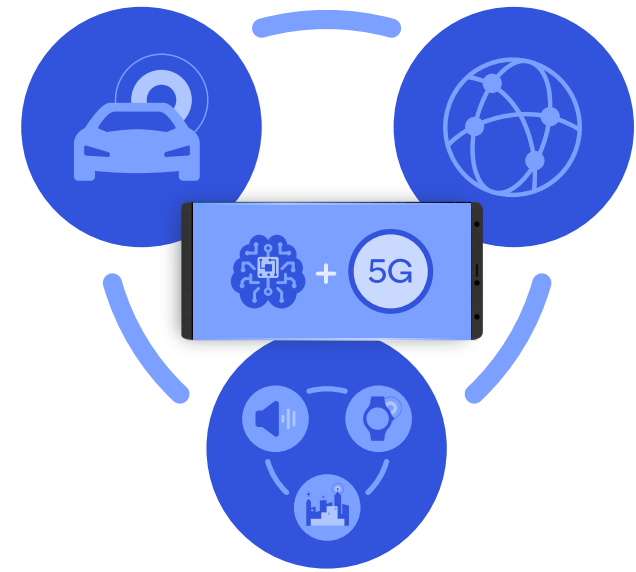
Analog to digital

Redefined computing



Desktop to smartphones

Transforming industries



Connecting virtually everything

Redefining how the world connects, computes and communicates

# Engineering Design Center Infrastructure Overview

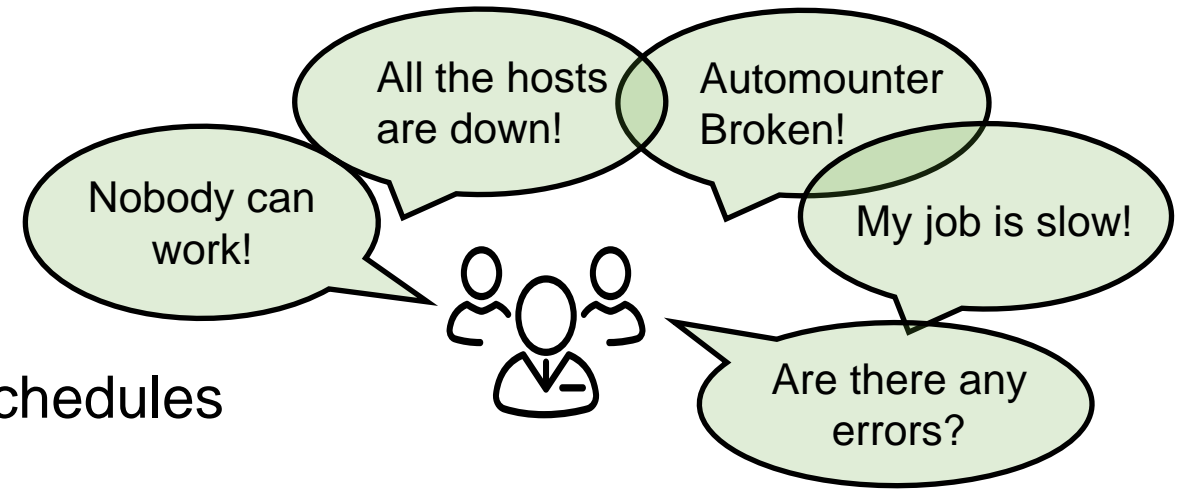
Large and complex



- ▶ Large numbers of just about everything
  - Storage (thousands of mount points/volumes)
  - Globally Deployed Interconnected Compute Clusters
  - Directory Services (LDAP and AD)
  - Job Scheduling software
  - Revision Control Systems
  - Tool License Servers
  - Virtual Desktop Infrastructure

## “Do we Even Have a Problem?”

- Where is it happening?
- Who is it affecting?
- What is business impact to project schedules
- Is this a new issue?
- Is it getting better/worse?
- Was it related to a change?
- When did it start/end?





# Splunk to the Rescue

## Comprehensive visibility into machine data

### ► Obtained logs from Entire Grid

- **Lots of sourcetypes**
- Linux OS/App/storage/web/database/firewall/ldap/AD – and many more!
- Storage NFS access logs – improves security *and* operations
- “Lights Out” management server logs
- Linux server data (enhanced \*nix Technology Add On)

### ► Log user tickets

- User Trouble Tickets
- Change Requests
- Major Outages

### ► Add metrics

- Trending events – server connects, load, memory, cpu, network, df, process etc.

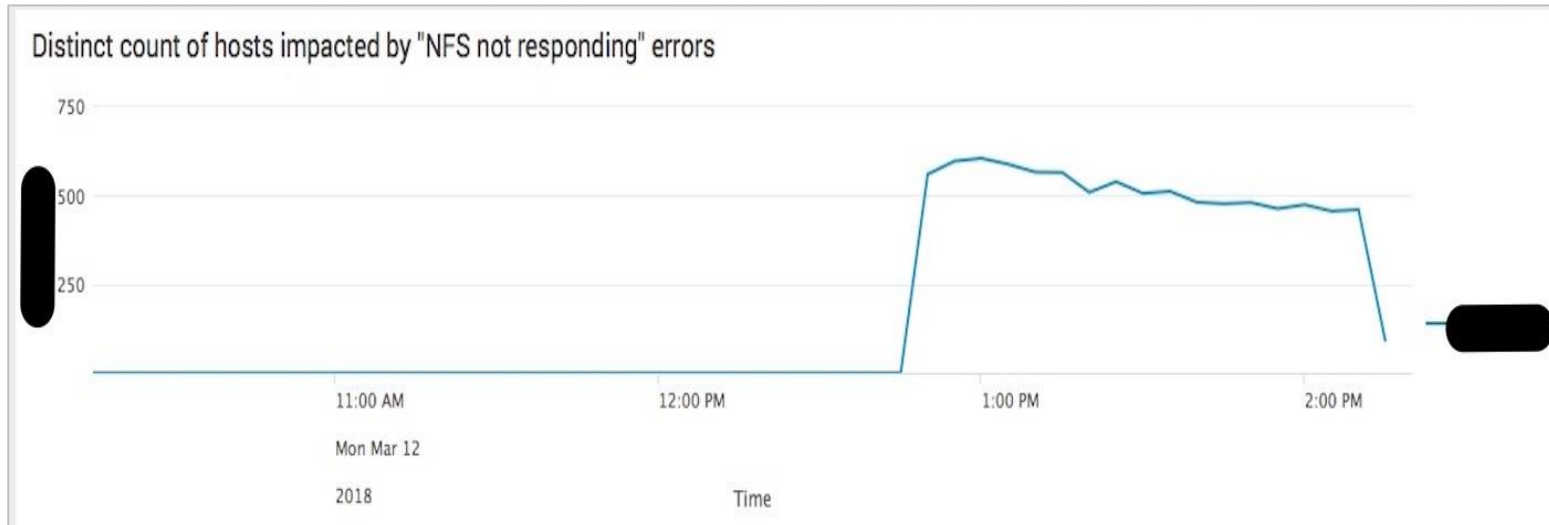
A person is shown climbing a towering, precarious stack of papers or documents. The stack is so high that it reaches the top of the frame. The person is positioned near the base, looking up at the vast expanse of paper. A speech bubble from the person says, "Error is right here!". This image serves as a metaphor for the overwhelming volume of machine data that Splunk helps manage.

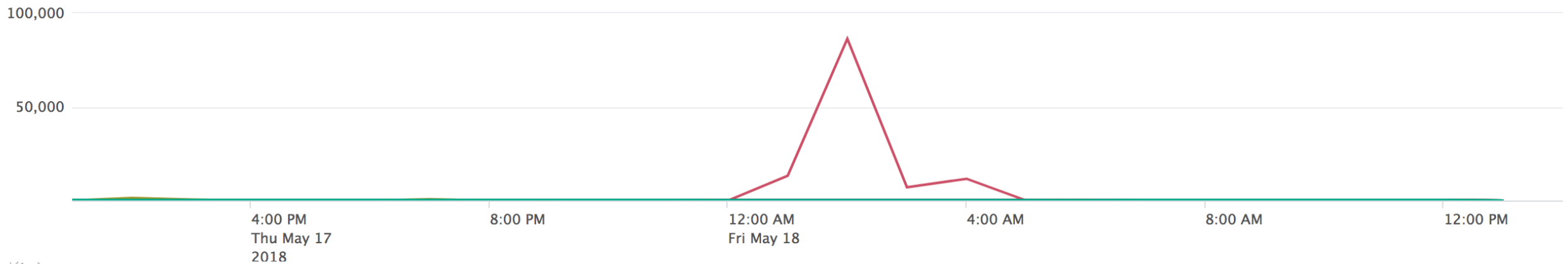
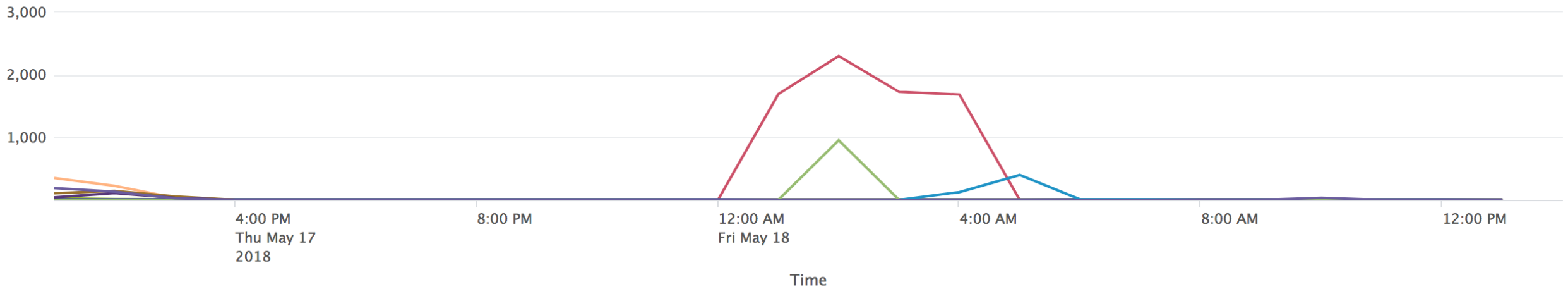
Error is right here!





# Data Aggregation – NFS Not Responding

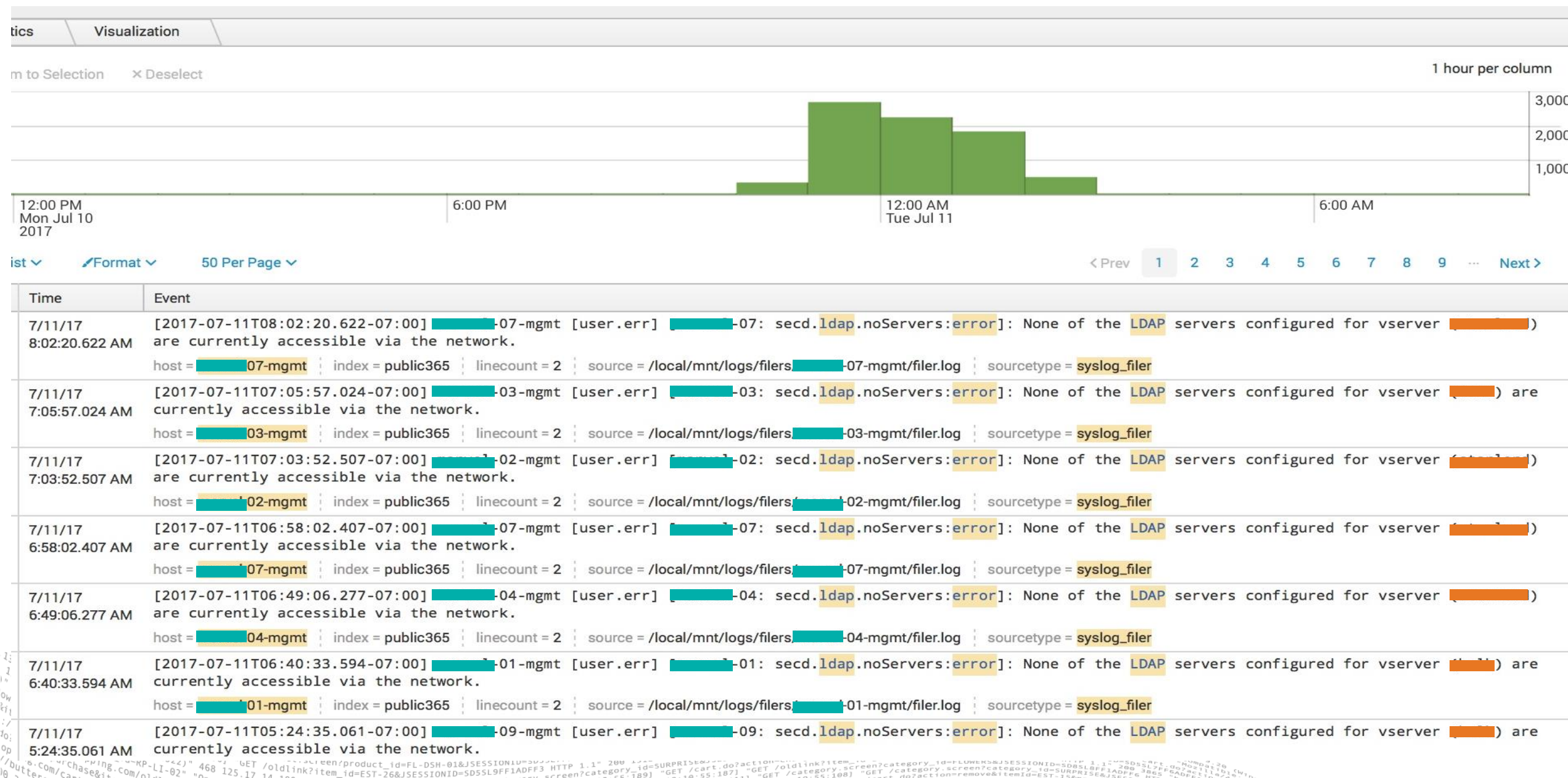








# Data Aggregation – Filer syslogs – LDAP Error





# Workflow Insight – File Removal

Confirm via filer access logs - provides userid, hostname, time, path

Event	Timestamp	Fileserver	NFS.Operation	Type	Path	Client IP address	USER ID	Fileserver	NFS Server	Exported Filer	Full path
	14809	BAT	18299	Del	FOLD		18299	NFS	MAN:/	s/	test
action = Del   eventtype = fileraccess   host = sb-fam-encnad05   linecount = 1											

Find cause – ps\_extended data – provides matching pid on compute server for “rm” operation

Timestamp	source = ps_extended	sourcetype = ps_extended	USER ID
11:55:52			pts/7
		Process ID, Parent Process ID	
		COMMAND	PATH
		PID = 11176	PTIME = 752
		host =	
		COMMAND = rm -i -rf /prj	PATH =
		sourcetype = ps_extended	

Use job scheduler logs to track process tree to jobid and workflow.

130.60.4 - - [07/Jan 18:10:57:153] "GET /category.screen?category\_id=GIFTS&JSESSIONID=5D1SLAFF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product\_id=FI-SW-01" "Opera/9.20 (Win  
128.241.220.82 - - [07/Jan 18:10:57:123] "GET /product.screen?product\_id=FL-DSH-01&JSESSIONID=5D5SL7FF6ADFF9 HTTP 1.1" 404 3322 "http://buttercup-shopping.com/cart.do?action=purchase&itemId=EST-26&product\_id=K9-CW-01" "Mozilla/4.0 (Compaq i1101 Win  
ows NT 5.1; SV1; .NET CLR 1.1.4322)" "GET /oldlink?item\_id=EST-26&JSESSIONID=5D5SL9FF1ADFF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-1B&product\_id=AV-CB-01&JSESSIONID=5D1B5LBFF2ADFF9 HTTP 1.1" 200 3885 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-6&product\_id=FI-SW-01" "Opera/9.20 (Win  
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# Summary

## Wins with Splunk

1. Break down IT silos
2. Improved IT operations and security posture
3. Gain engineering workflow insights
4. Democratize data

## Where Qualcomm is going next with Splunk

- ▶ Additional log and event sources
- ▶ Additional metrics (using Splunk metric storage)
- ▶ Splunk ITSI
- ▶ Splunk dashboards combining “user” application data and “IT” datasources
- ▶ Telemetry
- ▶ Splunk infrastructure upgrades



# Thank You

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**splunk>**