

splunk® **.conf2017**

Splunk at Genesco

How we achieved a rapid ROI using Splunk to monitor application logs



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<http://ponypoll.com/Genesco>**



Splunk at Genesco

How we achieved a rapid ROI using Splunk to monitor application logs

Jeremy Haggard | Manager Platform Systems & Certified Splunk Admin
Michael Nobles | Senior Sales Engineer & Splunker

2017 | Washington, DC

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Speaker Intro

Who are we and why are we here?



Jeremy Haggard

Manager Platform Systems

Genesco, Inc.

Nashville Splunk User Group Leader

Husband to my wife Misty and Dad to my daughter Allison.



Michael Nobles

Senior Sales Engineer

Splunk (based out of Atlanta)

Happily married to my wife Janelle for 26 years.

Four kids, two grown and married, two still at home.



You will learn..

...new exploration techniques
for various areas within your
machine data.

Today's Agenda



Forensics
Domain Admins



App Monitoring
Point of Sale



Splunk Apps
Free and Custom



Q & A



Join the Pony Poll, win some schwag!



ponypoll.com/Genesco



Who is Genesco?

We are an international, retail company based in Nashville TN

LUCKY BRAND

EST. 1990



Licensed Brands



130.60.4 - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD15L9FF10ADFF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01" "Opera/9.80.20
128.241.220.82 - [07/Jan 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=SD55L7FF6ADFF9 HTTP 1.1" 404 3322 "http://buttercup-shopping.com/category.screen?category_id=GIFTS" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_2; rv:53.0) Gecko/2010089 Firefox/53.0
ows NT 5.1; SV1; .NET CLR 1.1.4322" 468 125.17.14.11link?item_id=EST-26&JSESSIONID=SD55L9FF1ADFF3 HTTP 1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD10SL9FF2ADFF9 HTTP 1.1" 200 2423 "http://buttercup-shopping.com/category.screen?category_id=K9-CU-01" "Comput
/buttercup-shopping_id=RP-LI-02" "Opera/9.80.20
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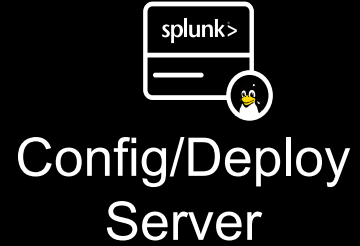
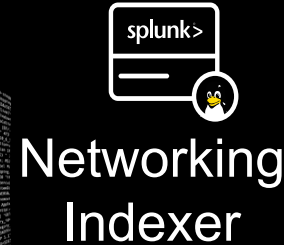
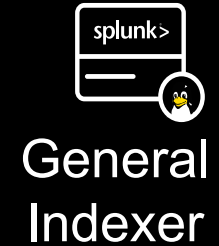
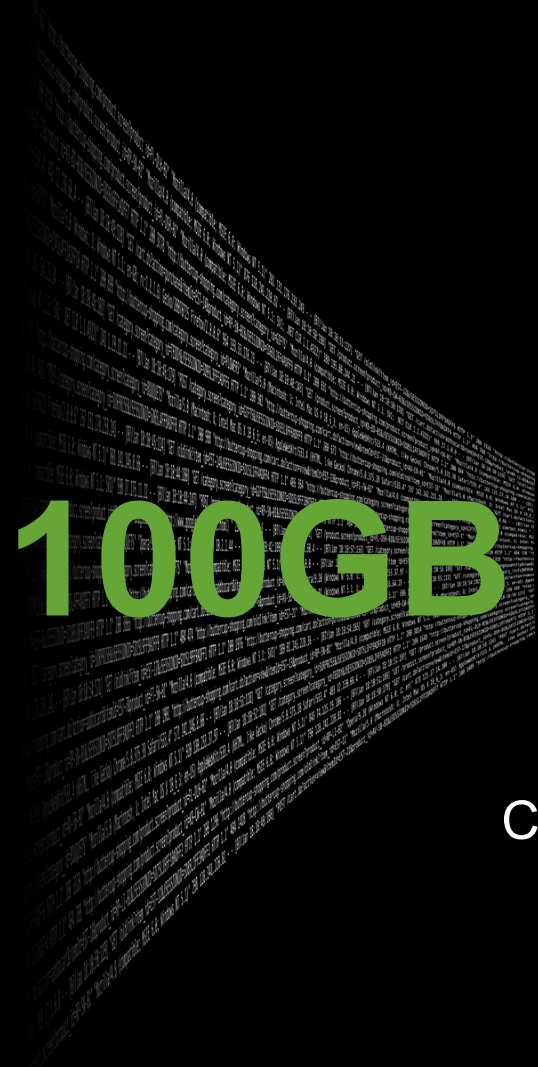
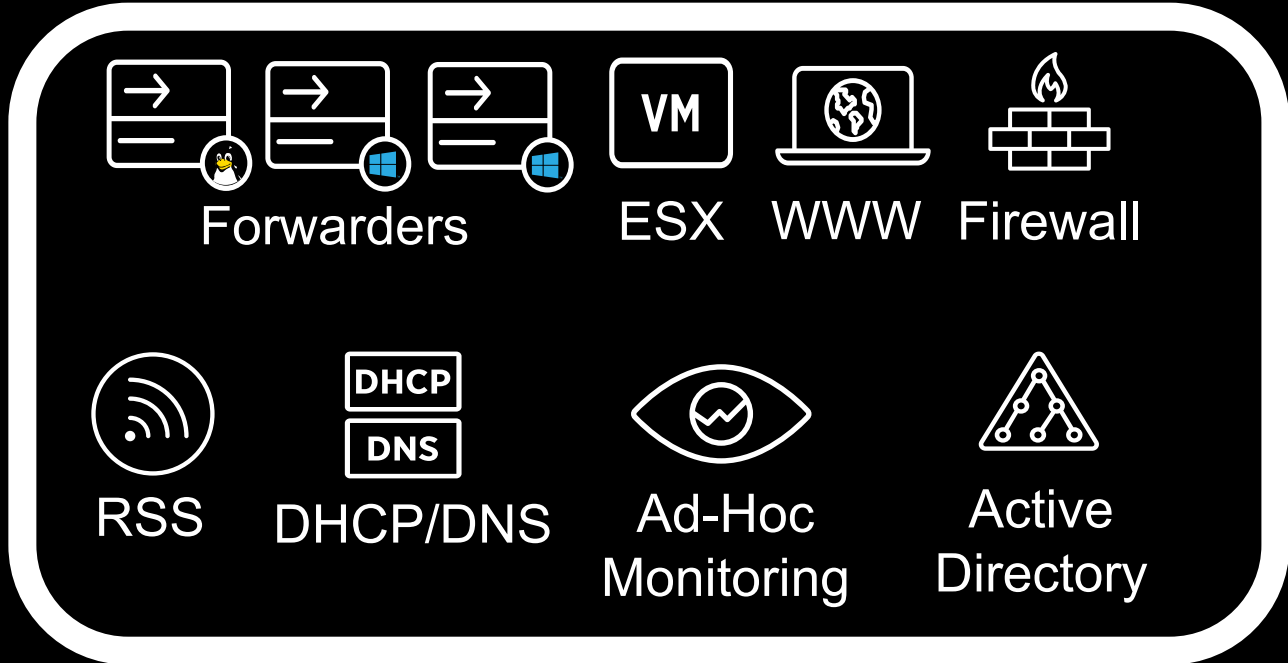
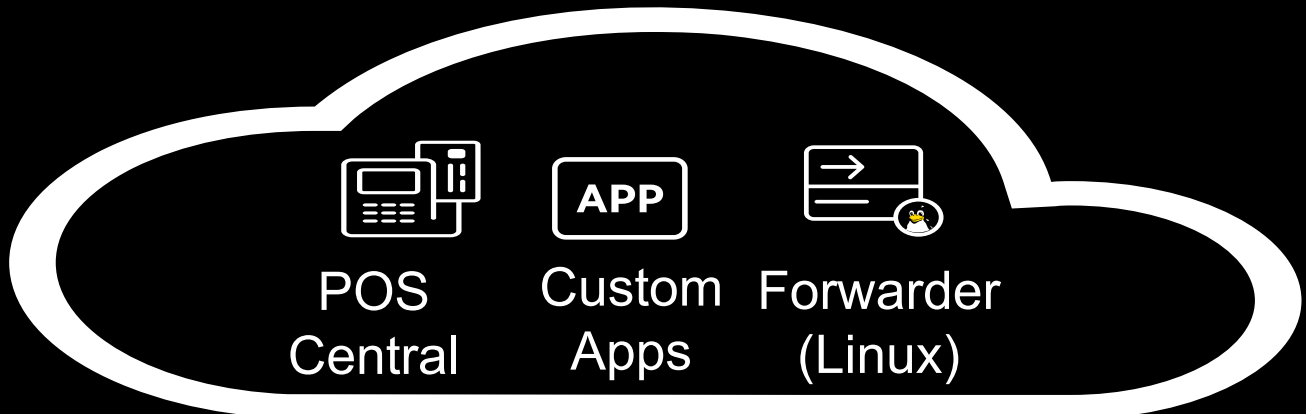


Splunk Environment

What does Splunk machinery look like at Genesco?

Data Flows and Splunk Architecture

High-level Environment Overview



Splunk Usage

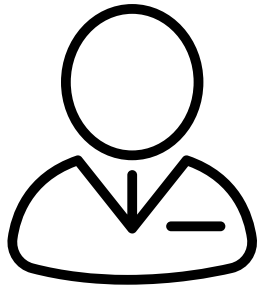
High Level Summary

- ▶ 167,724,610 Events Per Day
- ▶ 5,031,738,300 Events Per Month
- ▶ 60,380,859,600 Events Per Year

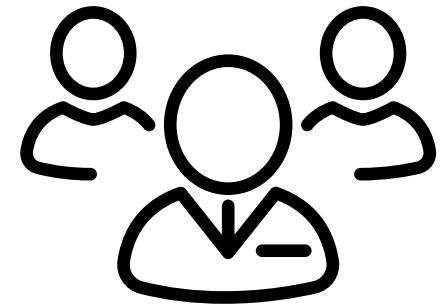
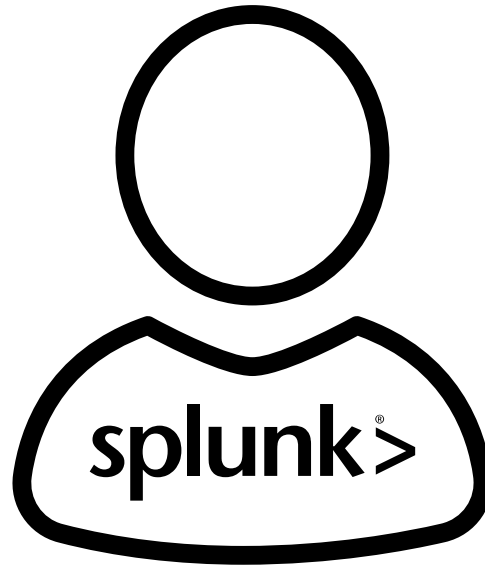
- ▶ 83 Hosts
- ▶ 1,226 Sources
- ▶ 60 Source Types

Splunk Team @ Genesco

You don't need a full time Splunk team to get a ROI



Tools & Automation Administrator



Splunk Userbase



Genesco's Journey

Forensics, POS (point of sale) and Useful Apps

Monitoring Active Directory

Where's Waldo... And what's he doing?

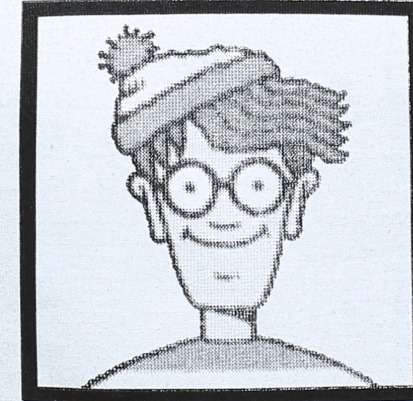
► The Problem:

- We had a legacy account enabled on our network.
 - It was used for an old application service years ago, but was never disabled.
 - Last activity time on account was < 2 weeks.
 - Active timestamp would update approx every 2 weeks.
 - No leads when looking at Palo Alto logging.

► The question:

- What would break if we just disabled this old account?
- What services/applications were hardcoded to use it that we didn't know?

HAVE YOU SEEN ME?



WALDO

Last seen wearing red and white striped hat and sweater with blue jeans

REWARD FOR ANY INFORMATION
CONTACT WENDA AT 1-800-WALDO

1-800-WALDO

1-800-WALDO

1-800-WALDO

1-800-WALDO

1-800-WALDO

1-800-WALDO

```
130.60.4 - - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD5L9FF1ADFF3 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01"
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317.27.160.0 - - [07/Jan 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=SD5SL9FF1ADFF3 HTTP 1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=purchase&itemId=EST-26&product_id=AV-CB-01&JSESSIONID=SD19SL7FFADFF9"
[07/Jan 18:10:56:156] "GET /product.screen?product_id=FL-DISH-01&JSESSIONID=SD5SL7FF6ADFF9 HTTP 1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD19SL7FFADFF9"
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[07/Jan 18:10:56:189] "GET /category.screen?category_id=FLOWERS&JSESSIONID=SD5SL7FF6ADFF9 HTTP 1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD19SL7FFADFF9"
[07/Jan 18:10:56:189] "GET /category.screen?category_id=FLOWERS&JSESSIONID=SD5SL7FF6ADFF9 HTTP 1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD19SL7FFADFF9"
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```


Splunk Trials – Value in 15 Days

Knowing **WHERE** to look was the key Splunk provided.

Research started

May 4, 2016
Manual Process for 5 days.



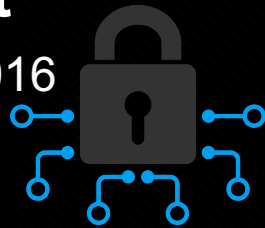
Splunk Alerts Triggered – Event Analyzed

May 16, 2016 – May 23, 2016
Real-Time searches prove value.
Index=UserActivity “username”



All Clear to disable the account

May 25, 2016



Splunk Trial Installed

May 9, 2016
Data Ingest Started on Domain Controllers



Last remnants removed

May 24, 2016



130.60.4 - - [07/Jan 18:10:57:123] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD15LAF10ADFF10 HTTP/1.1" 404 720 "http://butte...

57action=view&itemId=EST-6&product_id=FL-SW-01 "Opera...
/category.screen?category_id=GIFTS "Mozilla/5.0 (MacIntos...
ction=purchase&itemId=EST-20&product_id=K9-CU-01 "Opera...
1" 200 2423 "http://buttercup-shopping.com/cart.do?actio...
id=EST-18&product_id=AV-CB-01&JSESSIONID=SD65L7F6ADFF9...
&JSESSIONID=SD105L1F12ADFF9 HTTP/1.1" 200 3865 "http://b...
category_id=FLOWERS&JSESSIONID=SD18F1ADFF3 HTTP/1.1" 200 1316
category.screen?category_id=SD18F1ADFF3 HTTP/1.1" 200 1316
category_id=FLOWERS&JSESSIONID=SD18F1ADFF3 HTTP/1.1" 200 1316
do?action=remove&itemId=EST-189] "GET /cart.do?actio...

“For a moment, **nothing happened.**
Then, after a second or so,
nothing continued to happen.”

“The Hitchhiker’s Guide to the Galaxy” - Douglas Adams

“Big things have **small** beginnings.”

T.E. Lawrence (Lawrence of Arabia) / Michael Fassbender (Prometheus)

We have many thousands of errors in the logs in dev. Someone needs to look at all of these. Inside the file "errors.tgz" is where I was just pulling out the word "ERROR" from the logs and ended up getting 63,356 lines worth of data.

The errors themselves are in the log files and need immediate attention

There is no way to know what is working and what is not with this many errors.

Challenge Accepted

Still growing, now at 133,247 lines of errors...

I think Joe should be looking at this instead of scanner upgrades.

Still many errors out there getting generated... Logs attached.

I got this.



What the machine data looks like

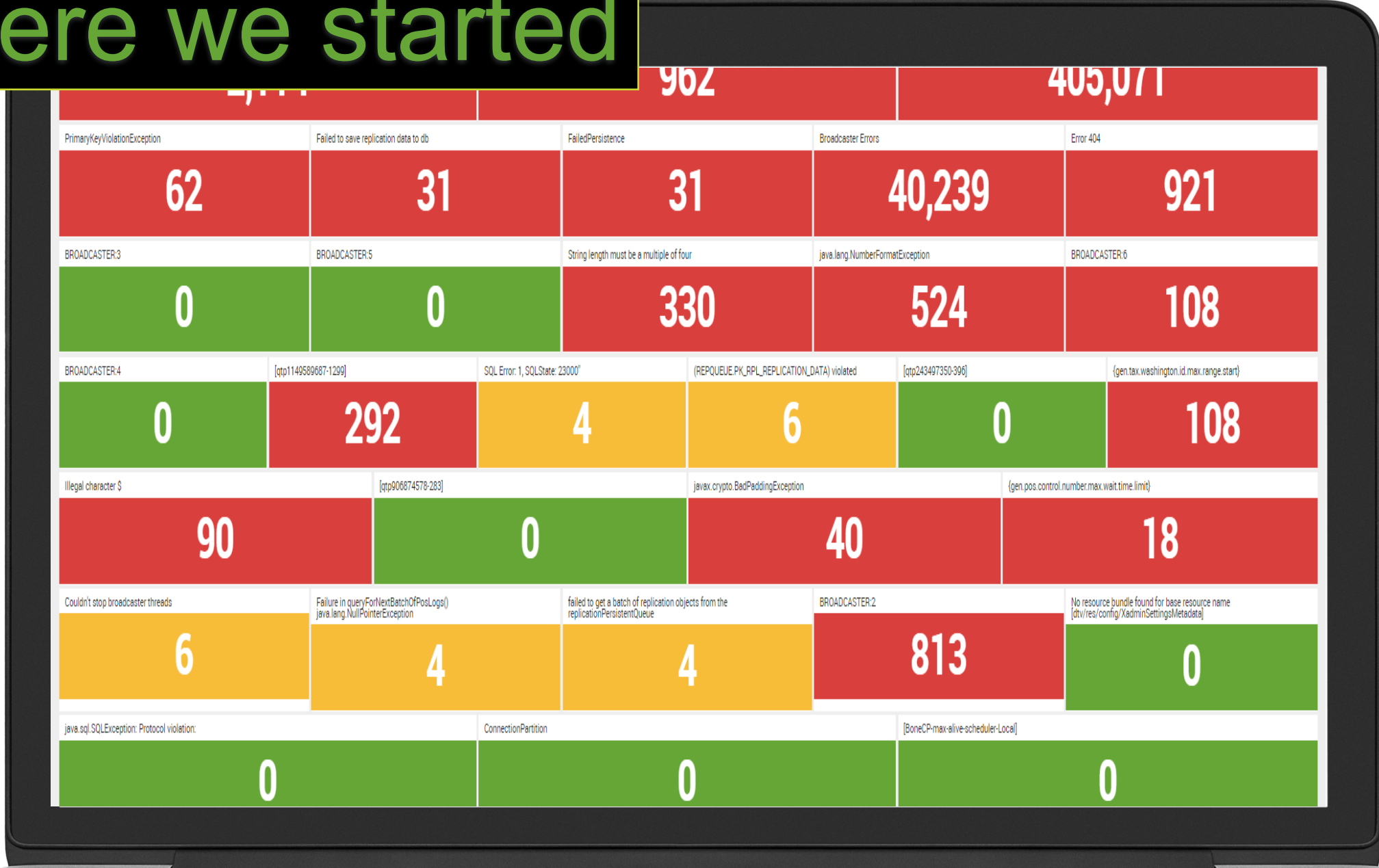


central.log

Publisher
2017-08-08 16:27:25,250 ERROR [ReplicationResequencingPublisher_6::0{549}..<1234] [FAILED_PERSISTENCE_LOG] Persistence Failed: dtv.data2.access.exception.PrimaryKeyViolationException: java.sql.SQLIntegrityConstraintViolationException: ORA-00001: unique constraint (DTV.PK_INV_INVCTL_TRANS_DETAIL) violated Caused by --> java.sql.SQLException: ORA-00001: unique constraint (DTV.PK_INV_INVCTL_TRANS_DETAIL) violated 2017-08-08 16:27:28,414 ERROR [ReplicationResequencingPublisher_6::0{549}..<1234] [dtv.data2.access.pm.PersistenceManager] Primary Key Violation while persisting object: **Store #** [dtv.xst.dao.inv.impl.InventoryDocumentDAO@9df1254Object Id: [98765432::SHIPPING::6::5555] DaoState: [UPDATE] Id: 98765432::SHIPPING::6::1234 Values: documentId=5851452 documentTypeCode=SHIPPING organizationId=6 retailLocationId=**User** createDate=2017-08-07 17:58:00.545 createUserId=0 updateDate=2017-08-08 16:32:54.139 updateUserId=989898 createDateTime=2017-08-07 00:00:00.0 originatorId=4444 statusCode=CLOSED documentSubtypeCode=FOUND originatorName=DIVISION NAME lastActivityDate=2017-08-08 12:32:54.139 recordCreationType=HOME_OFFICE originatorAddressId=99999999999 , **Store #** dtv.xst.dao.inv.impl.InventoryDocumentLineItemDAO@55551452Object Id: [642465842::SHIPPING::1::6::5555] DaoState: [UPDATE] Id: 989898::SHIPPING::104::6::5555 Values: documentId=647852 documentTypeCode=SHIPPING inventoryDocumentLineNumber=1 organizationId=6 retailLocationId=5555 createDate=2017-08-07 17:58:00.548 createUserId=0 updateDate=2017-08-08 16:32:54.139 updateUserId=222333 inventoryItemId=9879871 lineItemTypeCode=ITEM statusCode=OPEN unitCount=0 unitCost=21 expectedCount=1 postedCount=0 postedCost=0 recordCreationType=STORE controlNumber=0 , dtv.xst.dao.inv.impl.InventoryDocumentLineItemDAO@af12345Object Id: [6::5555::646652484::SHIPPING::1::6::5555] DaoState: [UPDATE] Id: 6::5555::99988887::SHIPPING::1::1 Values: organizationId=6 retailLocationId=5555 documentId=55559999 documentTypeCode=SHIPPING shipmentId=**User** 1 lineItemSequence=1 createDate=2017-08-08 16:32:54.139 updateUserId=989898 inventoryDocumentLineNumber=1 shipQuantity=0 , dtv.xst.dao.inv.impl.InventoryTransactionDetailDAO@9999999cObject Id: [6::5555::1502150400000::2::4184::1} DaoState: [INSERT] Id: 6::5555::987987900000 **Store #** 1 Values: organizationId=6 retailLocationId=5555 businessDate=2017-08-08 00:00:00.0 workstationId=1 transactionSequence=6543

130.60.4 - - [07/Jun 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=5D15LAF10ADF10 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FI-SW-03" "989898" 20
128.241.220.82 - - [07/Jun 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=5D55L9FF1A0FF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-26&JSESSIONID=5D55L9FF1A0FF3" "989898" 20
ows NT 5.1; SV1: - - [07/Jun 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=5D55L9FF1A0FF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-26&JSESSIONID=5D55L9FF1A0FF3" "989898" 20
://buttercup-shopping.com/cart.do?action=purchase&product_id=RP-LI-02" 468 125.17 14. - - [07/Jun 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=5D55L9FF1A0FF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-26&JSESSIONID=5D55L9FF1A0FF3" "989898" 20
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://buttercup-shopping.com/cart.do?action=purchase&product_id=RP-LI-02" 468 125.17 14. - - [07/Jun 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=5D55L9FF1A0FF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-26&JSESSIONID=5D55L9FF1A0FF3" "989898" 20

Where we started



Where we ended

0		0		ALL OTHER ERRORS	0	DEBUG Messages	0
PrimaryKeyViolationException	Failed to save replication data to db	FailedPersistence	Broadcaster Errors	Error 404			
0	0	0	0	0			
BROADCASTER.3	BROADCASTER.5	String length must be a multiple of four	java.lang.NumberFormatException	BROADCASTER.6			
0	0	0	0	0			
BROADCASTER.4	[qtp1149689687-1299]	SQL Error 1, SQLState: 23000*	(REPQUEUE.PK_RPL_REPLICATION_DATA) violated	[qtp243497350-396]	(gen.tax.washington.id.max.range.start)		
0	0	0	0	0	0		
Illegal character \$	[qtp906874578-283]	javax.crypto.BadPaddingException	(gen.pos.control.number.max.wait.time.limit)				
0	0	0	0	0			
Couldn't stop broadcaster threads	Failure in queryForNextBatchOfPosLogs() java.lang.NullPointerException	failed to get a batch of replication objects from the replicationPersistentQueue	BROADCASTER.2	No resource bundle found for base resource name [qtv/res/config/XadminSettingsMetadata]			
0	0	0	0	0			
java.sql.SQLException: Protocol violation:	ConnectionPartition	[BoneCP-max-alive-scheduler-Local]					
0	0	0					

Building the Dashboard



1. Identify the specific error you want to find
 - look at raw logs, events or Splunk statistics tab.
2. Build the SPL for that error
 - `Index=AWSPROD "ERROR" "primarykeyexception"`
3. Save the result as a dashboard widget.
4. Repeat.

Tip!

Easily move through your events by adding exclusions.

Even if you are starting with **millions** of events.



Build your SPL and each time you make a new widget add the error to a master SPL to help you drill down to quickly get through every error.

Example:

```
index=AWSPROD "ERROR"
```

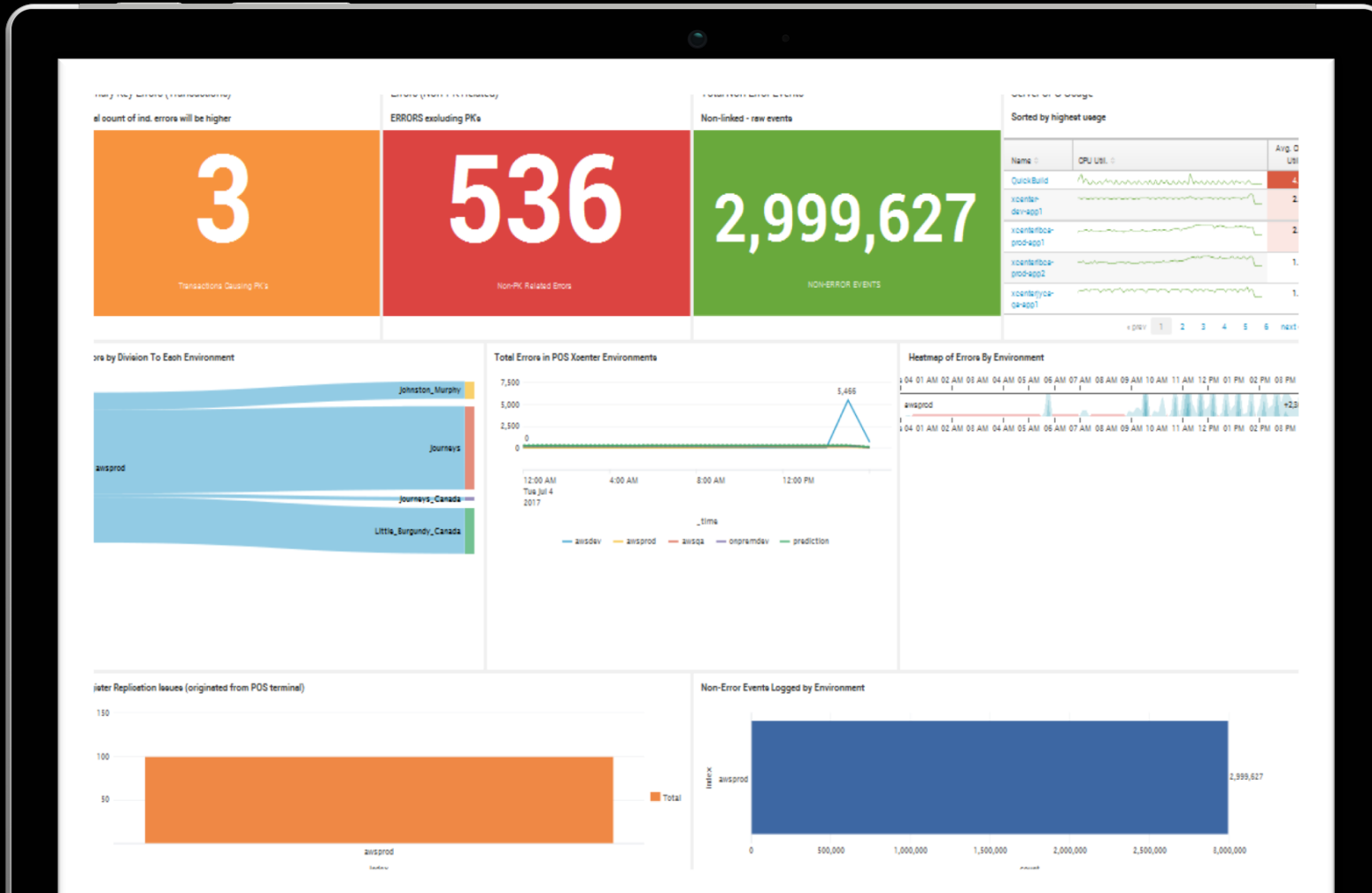
- NOT "The server sent HTTP status code 404"
- NOT "Failed to save replication data to db"
- NOT "FailedPersistence"
- NOT "PrimaryKeyViolationException"
- NOT "{gen.tax.washington.id}"
- NOT "\${gen.pos.control.number.max.wait.time.limit}"
- NOT "[qtp243497350-396]"
- NOT "String length must be a multiple of four"
- NOT "(REPQUEUE.PK_RPL_REPLICATION_DATA) violated"
- Etc.....

Pinpointing Error Origination

“This always happens” – Every end user ever

▶ TRUTHS:

- Sometimes we don't get the whole truth.
- Emotions get in the way when going across teams/depts.
- With data in hand
 - Quickly gets you to the issue.
 - Allows you to focus on the problem and not the perception.
 - It's hard to argue **FACTUAL DATA**.

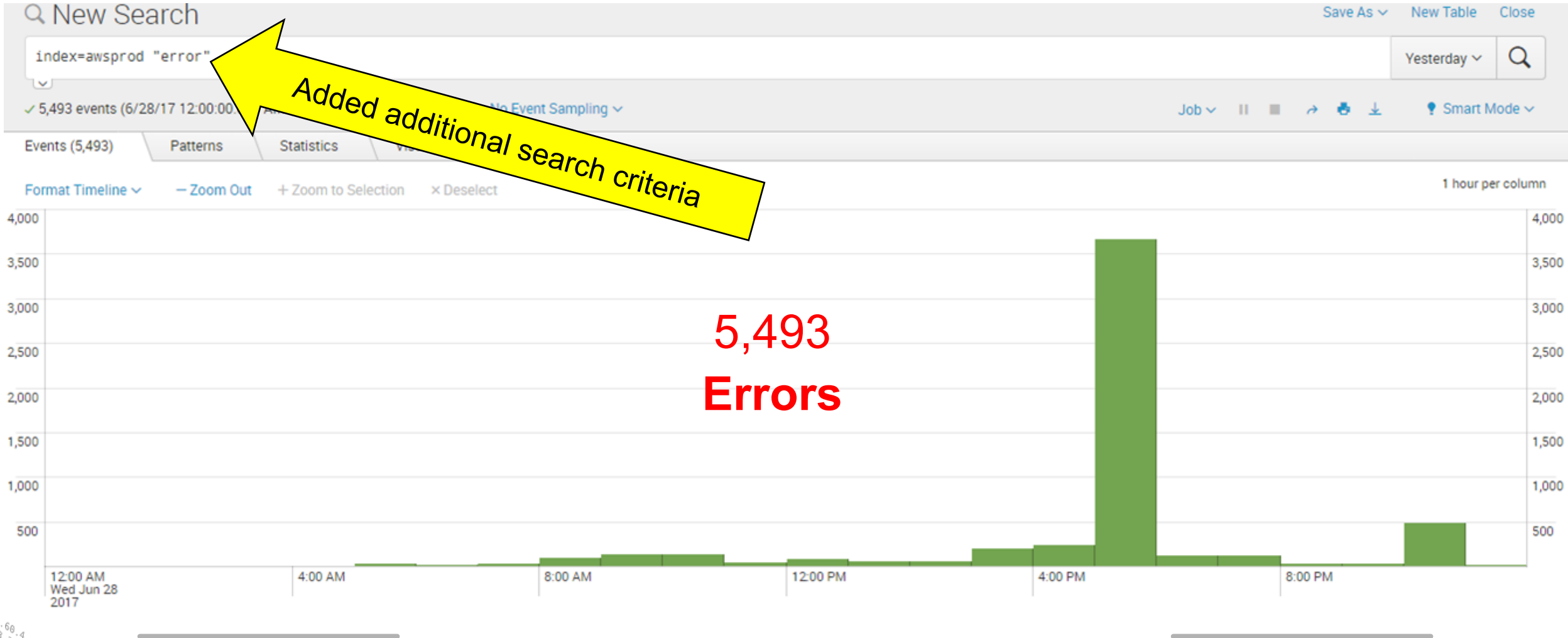


“The system **never** works.”

An example scenario

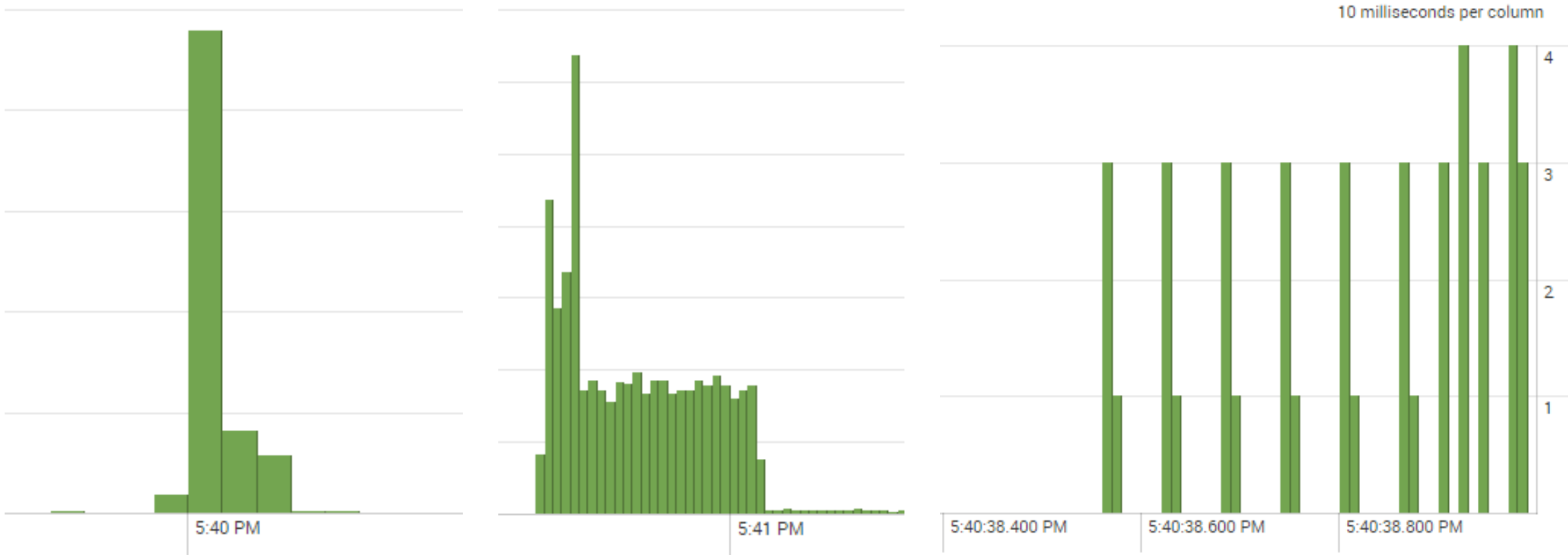
POS Server Data Captured

The timeline tells a story and reduces time to resolve



POS Server Data Captured

Drill down further to capture the minute and second in time this started.

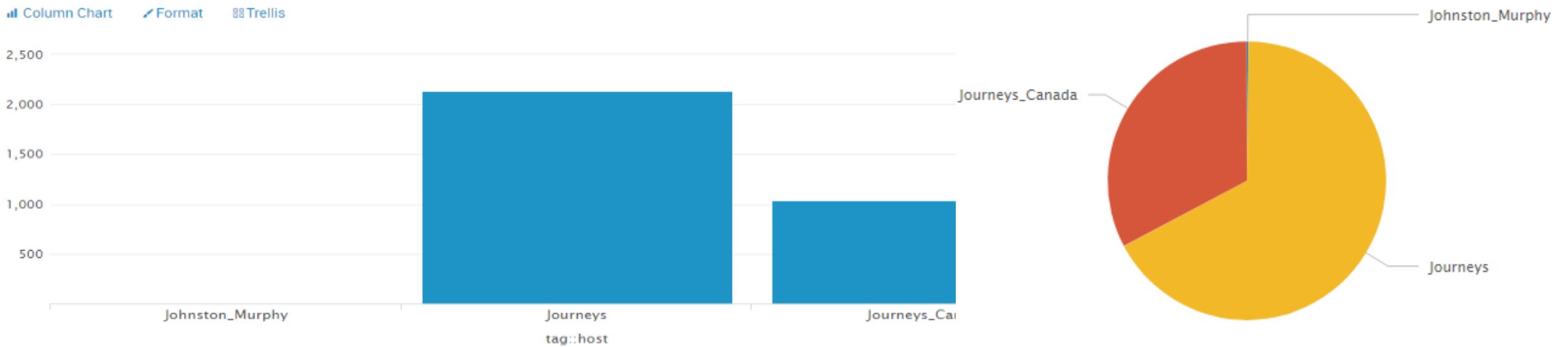


“Factual data **is** actionable data.”

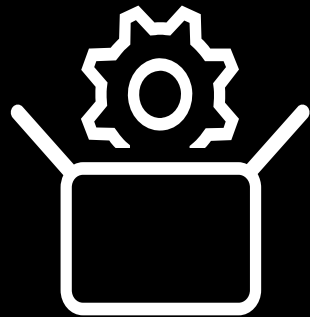
POS Server Data Captured

And see who is impacted using a number of views

Example SPL: index=awsprod error| stats count by tag::host



130.60.4 - - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=5D55L9FF1ADFF3 HTTP 1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FI-5W-03"
128.241.220.82 - - [07/Jan 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=5D55L7FF6ADFF9 HTTP 1.1" 404 3322 "http://buttercup-shopping.com/category.screen?category_id=GIFTS"
317.27.160.0.0 - - [07/Jan 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=5D55L9FF1ADFF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=purchase&itemId=EST-16&product_id=RP-LI-02"
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APPS

SPLUNKBASE & CUSTOM

130.60.4 - - [07/Jan 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD15L4FF10ADFF10 HTTP/1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01" "Opera/9.80.2013.10 (Windows NT 5.1; SV1; .NET CLR 1.1.4322) "0
128.241.220.82 - - [07/Jan 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=SD55L7FF6ADFF9 HTTP/1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD10SL9FF1ADFF9 HTTP/1.1" 200 3865 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-11&product_id=FL-SW-01" "Opera/9.80.2013.10 (Windows NT 5.1; SV1; .NET CLR 1.1.4322) "0
317.27.160.0 - - [07/Jan 18:10:56:150] "GET /oldlink?item_id=EST-26&JSESSIONID=SD55L9FF1ADFF3 HTTP/1.1" 200 189 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-11&product_id=FL-SW-01" "Opera/9.80.2013.10 (Windows NT 5.1; SV1; .NET CLR 1.1.4322) "0
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Splunkbase Apps = Time Saver

Secret sauce to a fast ROI

SplunkBase:

- ▶ Splunk App for AWS
- ▶ NMON Performance by Octamis
- ▶ Splunk App for Windows Infrastructure
- ▶ Website Monitoring
- ▶ Template for Citrix XenApp
- ▶ Template for Citrix XenDesktop 7
- ▶ Palo Alto
- ▶ Detailed License Monitoring and Alerting for Splunk



Tip!

Be sure to research
best practices

1. Setup and maintain a “sandbox”/Splunk Development area (obtain your own free, 50 GB/day Personal Developer license)
2. Feel free to run Splunk on your own machine to quickly explore new data and new Apps from the Splunkbase app “store”
3. Sign up for Splunk “Answers” and become part of the community
4. Google is your friend
5. Run Splunk (free version) at home to get even more value and more comfort

Custom Apps

Easier than you think to get your data.

We currently use 10 custom apps to monitor our POS environment.

- ▶ These custom apps mostly run scripts on our linux environment to pull specific data.
 - count of files, file permissions, md5sum, etc...

▶ App/bin directory

- sample_script.sh

▶ App/local directory

- Inputs.conf
 - [script://opt/splunkforwarder/etc/apps/sample_scripts/bin/sample_script.sh]
 - interval = 900
 - [monitor://opt/sample/logs/]

sourcetype = sample_script

Summary



Forensics
Domain Admins



App Monitoring
Point of Sale



Splunk Apps
Free and Custom



Q & A



Q&A

Jeremy Haggard | Genesco

Mike Nobles | Splunk

Explore

Explore your data without fear
of the great unknown!

Thank You

Don't forget to **rate this session** in the
.conf2017 mobile app

Jeremy@SplunkNashville.com

splunk> **.conf2017**