



# User Experience Performance Testing With Splunk at Paychex

**Monitoring application performance across multiple architecture components**

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# Our Speakers



**BRIAN DUDIAK**

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**Manager, Performance Engineering**



**DR. KENNETH TUPPER**

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**Lead Performance Engineer**

**MODERATED BY GREEN TRACKSUIT**

# Agenda

- ▶ Paychex Inc.
- ▶ Splunk infrastructure at Paychex
- ▶ Data collection process across technologies
- ▶ Who uses the data and how?
- ▶ Full-stack Splunk dashboard demo
- ▶ Behind the scenes of the dashboard
- ▶ Looking to the future with Splunk at Paychex

```
130.60.4 - - [07/Jun 18:10:57:153] "GET /category.screen?category_id=GIFTS&JSESSIONID=SD5SL4FF10ADFF10 HTTP/1.1" 404 720 "http://buttercup-shopping.com/cart.do?action=view&itemId=EST-6&product_id=FL-SW-01"
128.241.220.82 - - [07/Jun 18:10:57:123] "GET /product.screen?product_id=FL-DSH-01&JSESSIONID=SD5SL7FF6ADFF9 HTTP/1.1" 404 3322 "http://buttercup-shopping.com/cart.do?action=purchase&itemId=EST-26&product_id=K9-CU-01"
317.27.160.0.0 - - [07/Jun 18:10:56:156] "GET /oldlink?item_id=EST-26&JSESSIONID=SD5SL9FF1ADFF3 HTTP/1.1" 200 1316 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD10SL0FF2ADFF9 HTTP/1.1" 200 2423 "http://buttercup-shopping.com/cart.do?action=remove&itemId=EST-6&product_id=FL-SW-01"
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```

# Paychex Inc.

Payroll – HR – Retirement – Insurance

## Then

- ▶ Founded in 1971 by B. Thomas Golisano
- ▶ \$3,000 and a credit card
- ▶ Payroll for small businesses
- ▶ One employee

## Now

- ▶ 46+ years industry experience
- ▶ 14,300+ employees\*
- ▶ Serves 650,000 payroll clients\*
- ▶ 1M worksite employees served\*
- ▶ #20 largest insurance agency in the U.S.
- ▶ #1 401(k) plan recordkeeper

*\*figures as of May 31, 2018*



## Some quick stats on the scale of Splunk at Paychex

# 250

# Unique users per day



# Data Collection Across Technology and Infrastructure Stacks

**Splunk solution across multiple technology stacks**

# Technologies Supporting Paychex

How to centralize data across technologies

- ▶ Difficult to find a centralized data source across many different technologies
  - Higher MTTR
  - Higher costs to implement, support and use multiple tools
  - Unable to stitch data together across toolsets and technologies
  - Eight days locked in a room to triage an issue turned into an hour
- ▶ How do we get multiple groups to consume this data?
- ▶ Require a tool to feed cross-functional groups across our IT organization



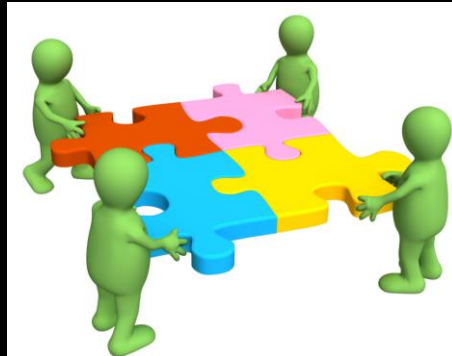


# Data Collection Standardization

Solution to collect and correlate data

## Traceability

- ▶ A standard for transaction logging in critical applications
  - Enables us to stitch events together
  - Improve problem resolution and MTTR
- ▶ Implemented across application and technology stacks
- ▶ Stopped at database tier



## Marks and Measures

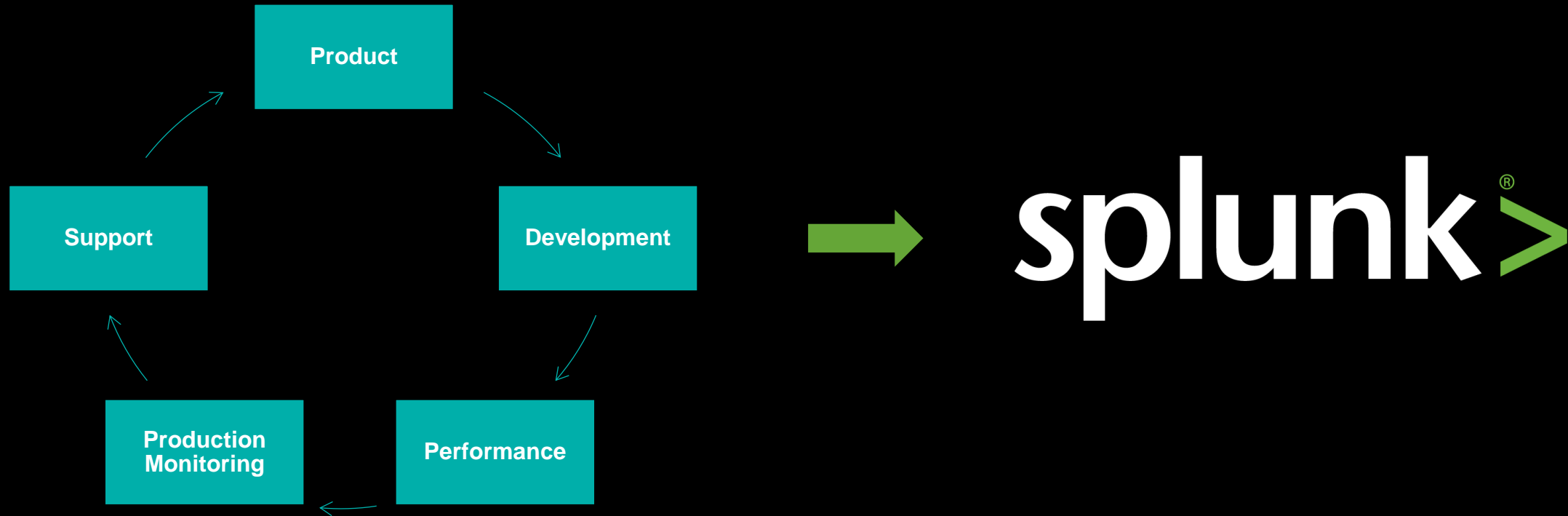
- ▶ Four primary targets for marks and measures
  - Web application tier
  - Business service tier
  - Storage/database tier
  - Network appliances
    - Routers, proxies, etc...

**Without Splunk, correlating this data would take days**

# Consumable Throughout SDLC

Different levels of users need access to information

- ▶ People from all areas of our IT organization need to be able to access and consume the information





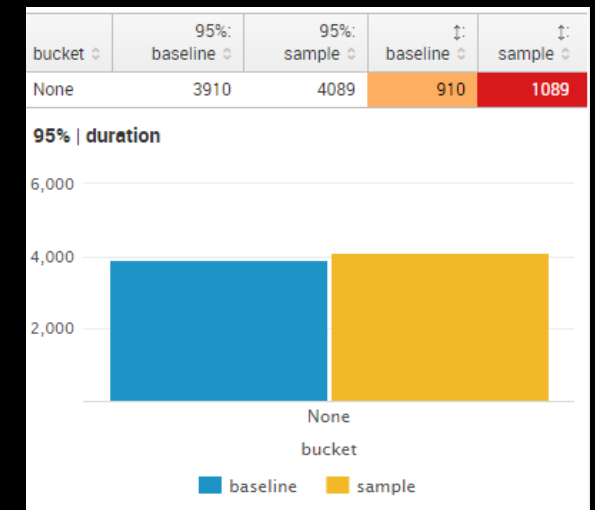
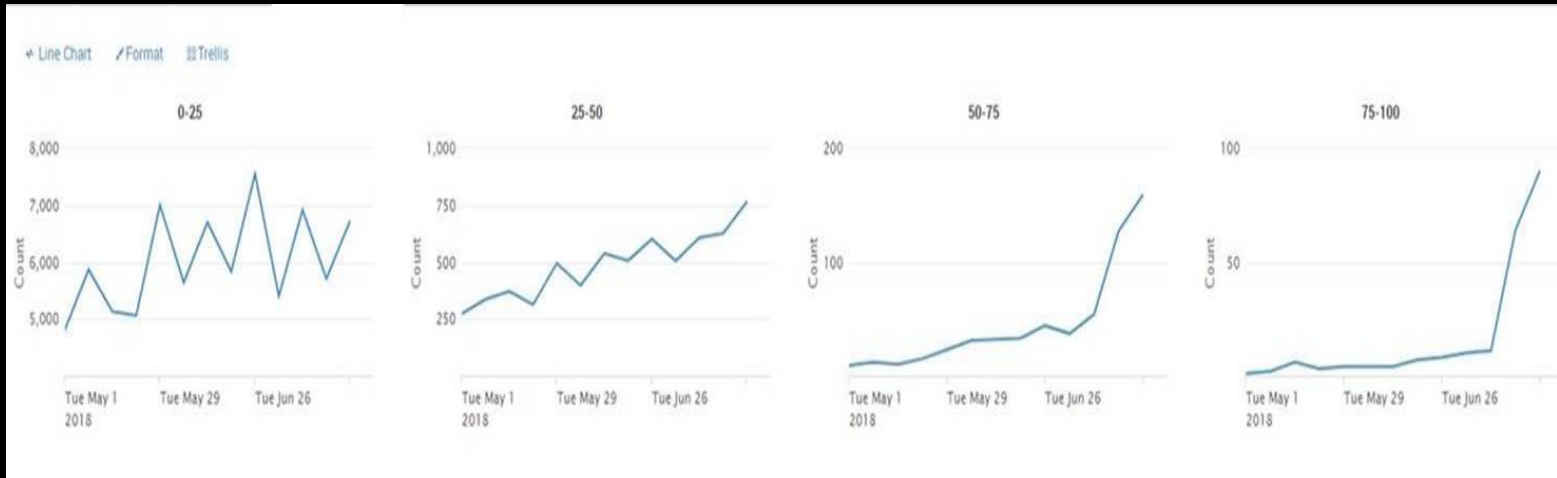
# Who Uses This Data?

## Product

- ▶ Client workflows by demographic
- ▶ Usage patterns
- ▶ New feature adoption
- ▶ A complement to Google Analytics

## Development

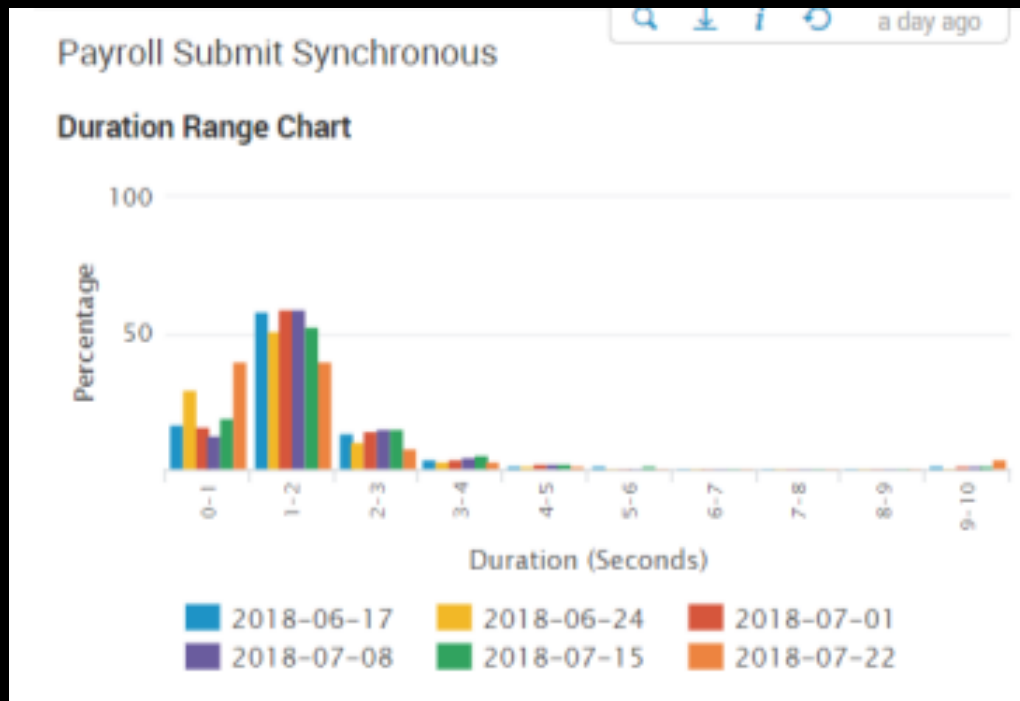
- ▶ Faster triage of bugs and root cause analysis
- ▶ Same base queries used throughout SDLC
- ▶ Enables performance testing to push left



# Who Uses This Data?

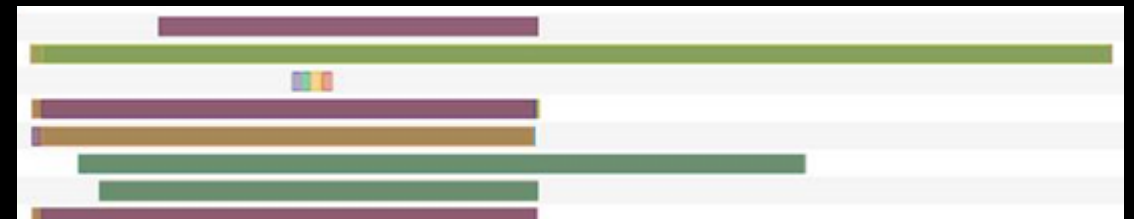
## SHO / Capacity

- Provides performance views weekly to senior and executive management



## Development

- Understand client impact of issues and be proactive in reaching out to clients
  - Reduced error rate by 41% in FY18
- Faster MTTR
  - ~40% reduction in MTTR between FY16 and FY19



WebLogic code release timeline



# User Experience Reporting/ Dashboard Demo

**Splunk dashboards for monitoring user experience  
across the architecture stack**

# User Experience Reporting

How the dashboards work

- Common traceability log format used for all data collected, regardless of originating application tier (web servers, application servers, database)

```
2018-06-13T07:21:00.223-0400, severity=INFO, logger=traceability, bizpn=Transaction1, sid=16a8299d, txid=828fccfe, subtxnbr=unk, user=username, sts=PASS, mark=txend, duration=341, clientId=testClient
```

- Multisearch used to compare two periods of time in the dashboard

```
| multisearch
[ search index=perfIndex sourcetype=traceability sts="PASS" mark="txend" "clientId=test*"
  earliest=1528108800 latest=1528112400 | eval timeBase=duration/1000 | eval testCase="Baseline"]
[ search index=perfIndex sourcetype=traceability sts="PASS" mark="txend" "clientId=test*"
  earliest=1528886400 latest=1528890000 | eval timeTest=duration/1000 | eval testCase="Current"]
| stats avg(timeBase) as avgBase avg(timeTest) as avgTest by bizpn
| eval avgDiff = avgTest - avgBase
| table bizpn avgBase avgTest avgDiff
```

- This allows a single dashboard to be used to compare the user experience for two periods of time across the entire application architecture

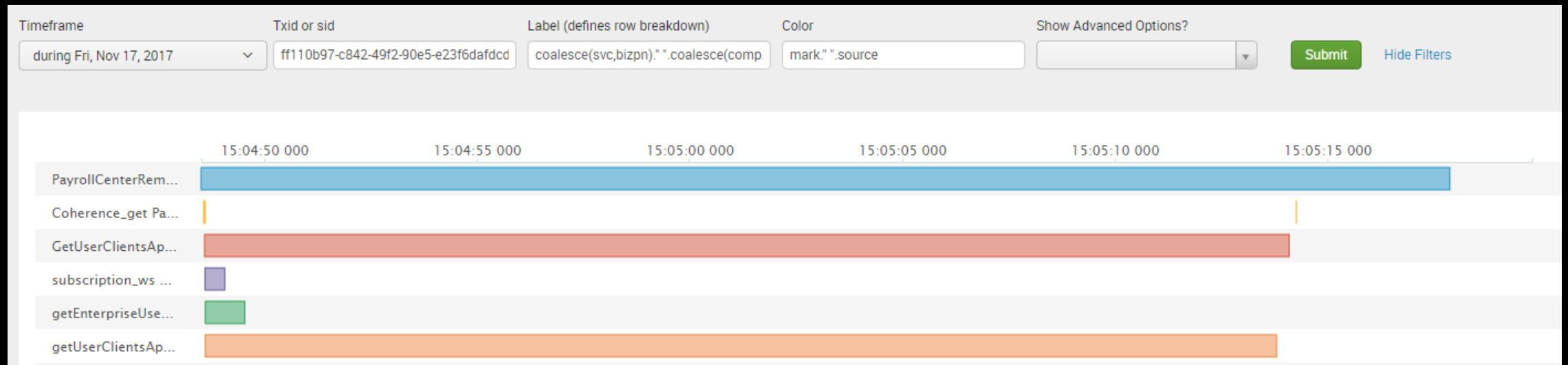
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ows NT 5.1; SV1: - - [07/Jun 18:10:56:150] "GET /oldlink?item_id=EST-26&JSESSIONID=SD5SL9FF1ADFF3 HTTP 1.1" 200 1318 "http://buttercup-shopping.com/cart.do?action=changequantity&itemId=EST-18&product_id=AV-CB-01&JSESSIONID=SD18SL9FF2ADFF9 HTTP 1.1" 200 2423 "http://buttercup-shopping.com/cart.do?action=purchase&itemId=EST-26&product_id=K9-CU-0" "Comp
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# User Experience Reporting

How the dashboards work

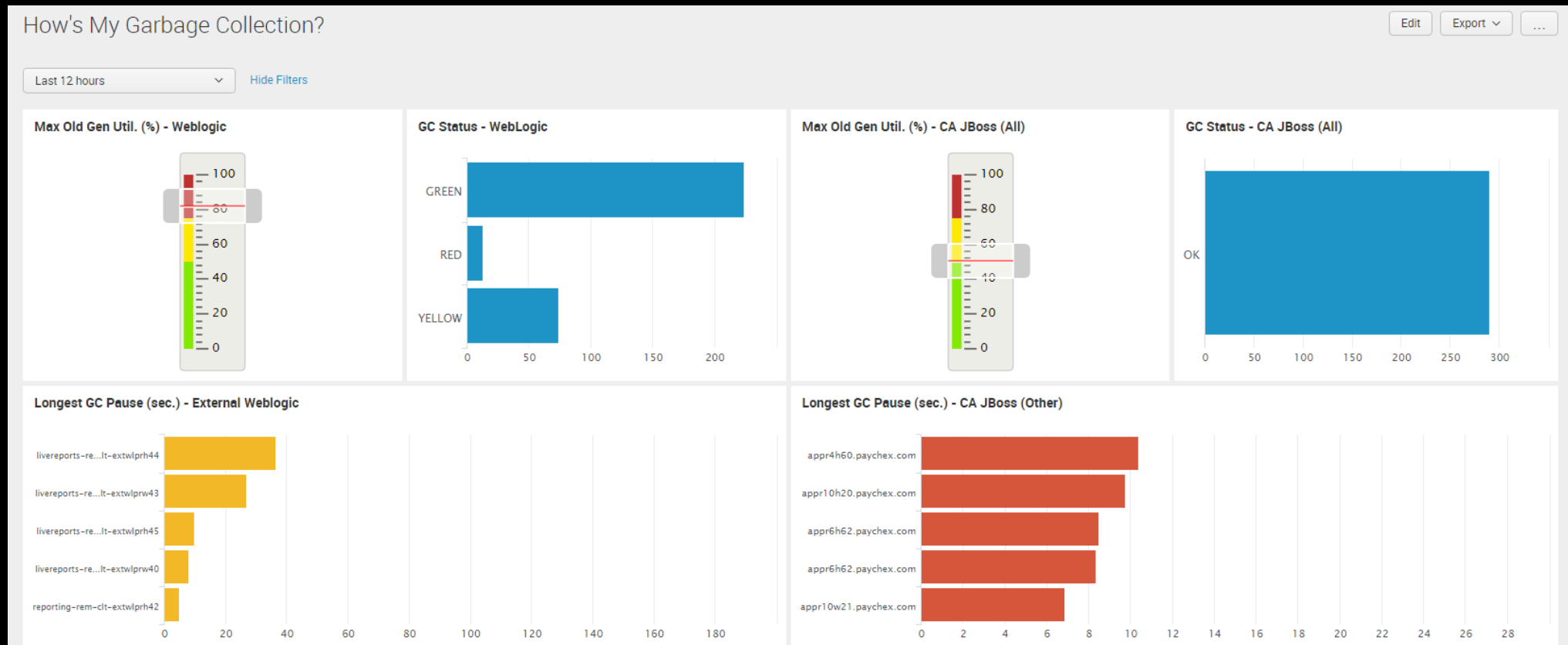
- ▶ The transaction ID (txid) can be used to look further into the application stack to see where time is spent at each layer of the application.

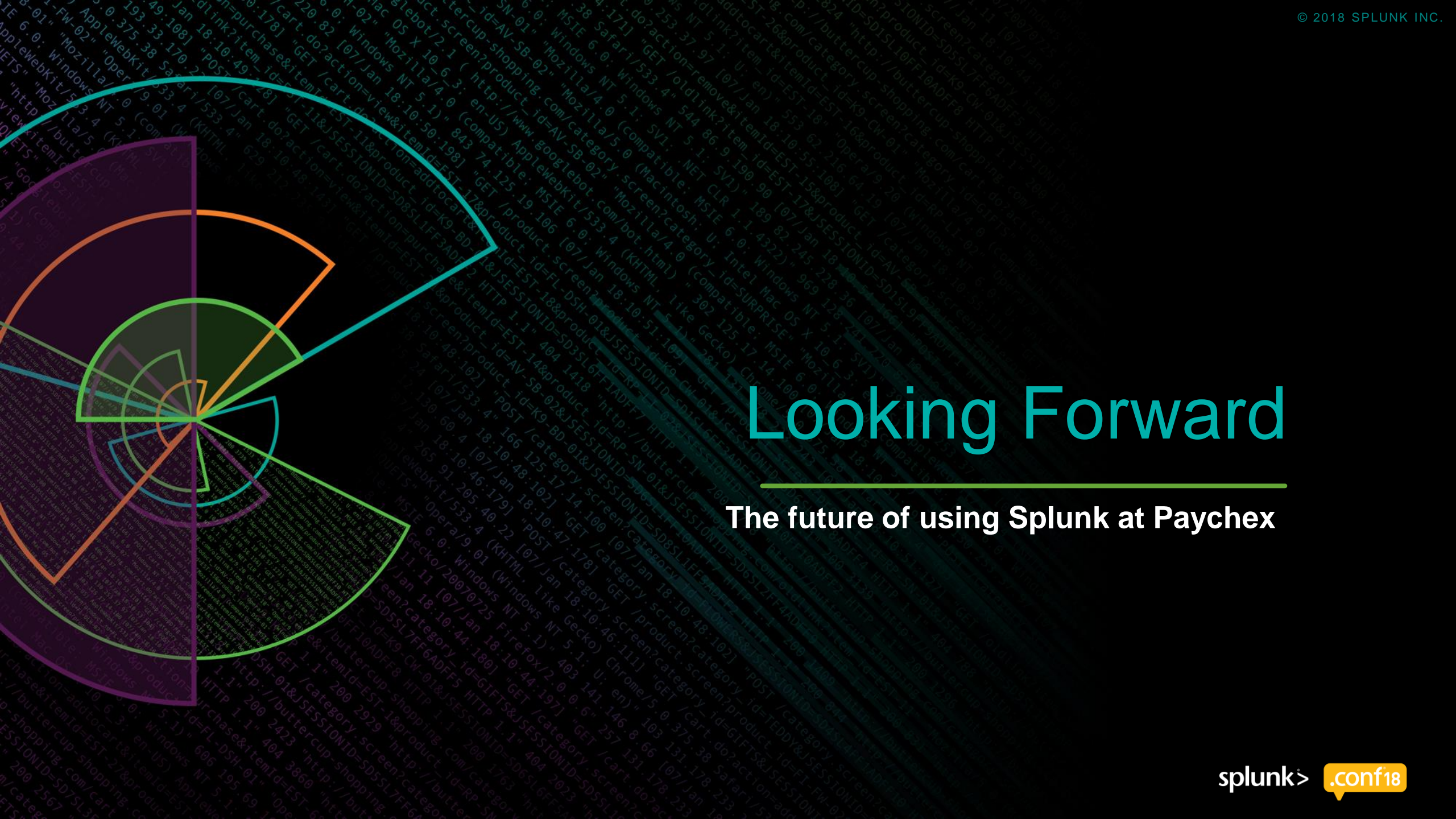


# User Experience Reporting

How the dashboards work

- Other information about the infrastructure (for example, time spent in garbage collection on the servers) can be correlated to performance test results.










# Looking Forward

The future of using Splunk at Paychex



- ▶ Automated result analysis with alerting

-  **Add to Triggered Alerts**  
Add this alert to Triggered Alerts list
  -  **Log Event**  
Send log event to Splunk receiver endpoint
  -  **Run a script**  
Invoke a custom script
  -  **Send email**  
Send an email notification to specified recipients
  -  **Webhook**  
Generic HTTP POST to a specified URL

[Manage Alert Actions](#)

Manage available actions and browse more actions



- Using new Splunk functionality to predict issues proactively

# Summary

- ▶ Saved time and money in the SDLC
- ▶ Allowed testing to push left
- ▶ Better end user experience with faster resolution to issues
- ▶ The ability to be proactive in reaching out to customers
- ▶ A better understanding of our client workflows and usage patterns



# Q&A

**Brian Dudiak | Manager, Performance Engineering**  
**Dr. Kenneth Tupper | Performance Engineering Lead**





# Thank You

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