The United States of Digital Search

Kristerpher Henderson
Principal Engineer | Comcast

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splunk> .conf19

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Prologue

Who is this guy?

.conf19
splunk>

Kristerpher

Technology | Arts | Baseball | Photography

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NOAA

pjm

Technologist

Semi-Pro Baseball Player

Silent Actor in Opera

CODE FOR PHILLY

Open Source and Code for Philly Activist

You're friendly neighborhood splunker

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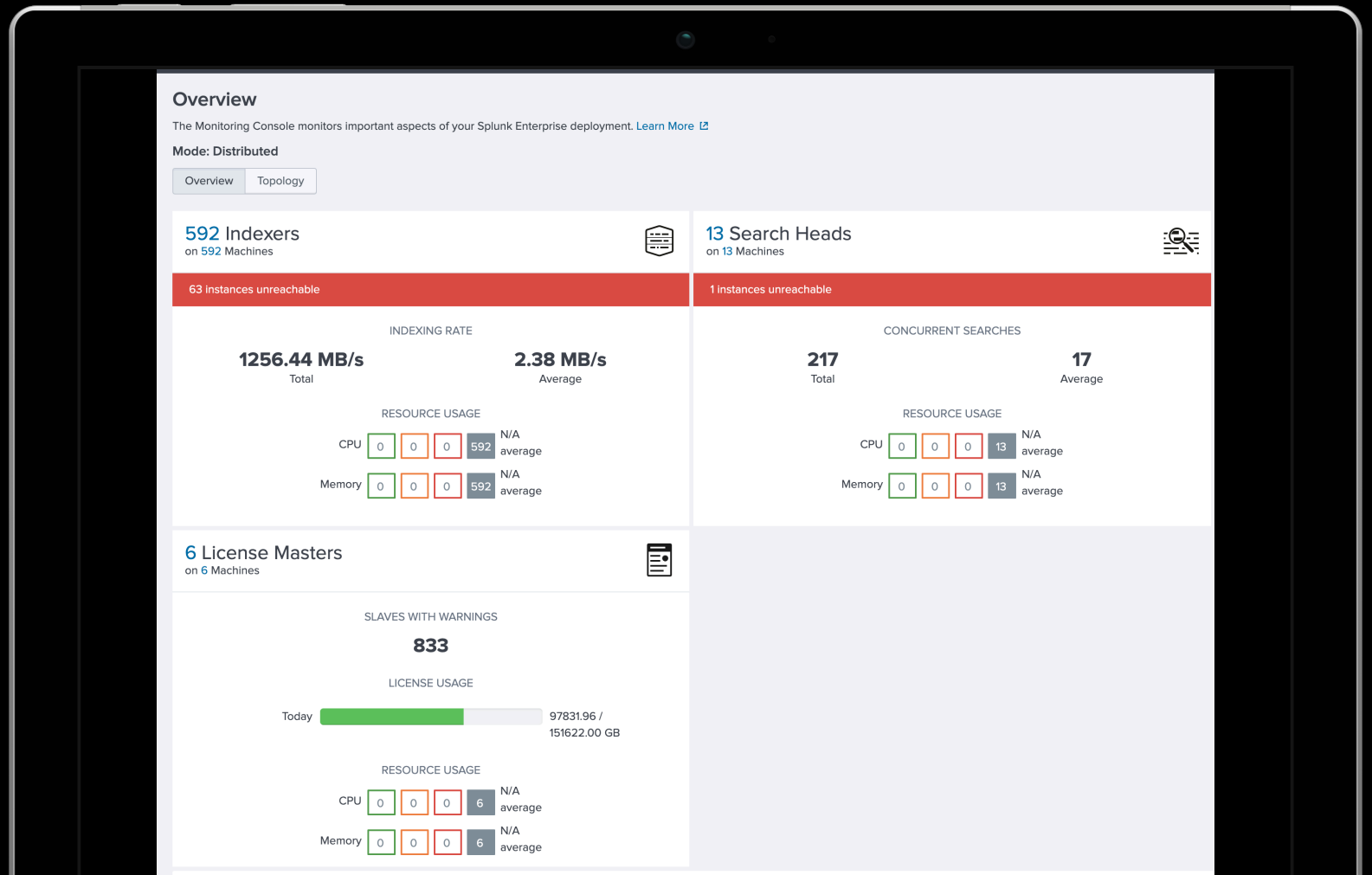
Splunk at Comcast

All the data…



- Over 750 indexers
- 12 Node SHC across multiple AWS Regions
- Few indexes but lots of sourcetypes

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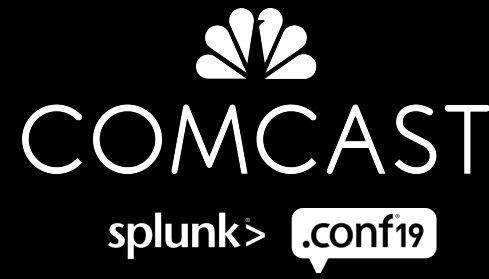
PROLOGUE



What's in there?

Technology Product and Experience

[illegible]
products respond to customer actions.

- 20+ Million Subscribers STB
- XRE + RDK
- Guide, Voice and Home
- Support Services

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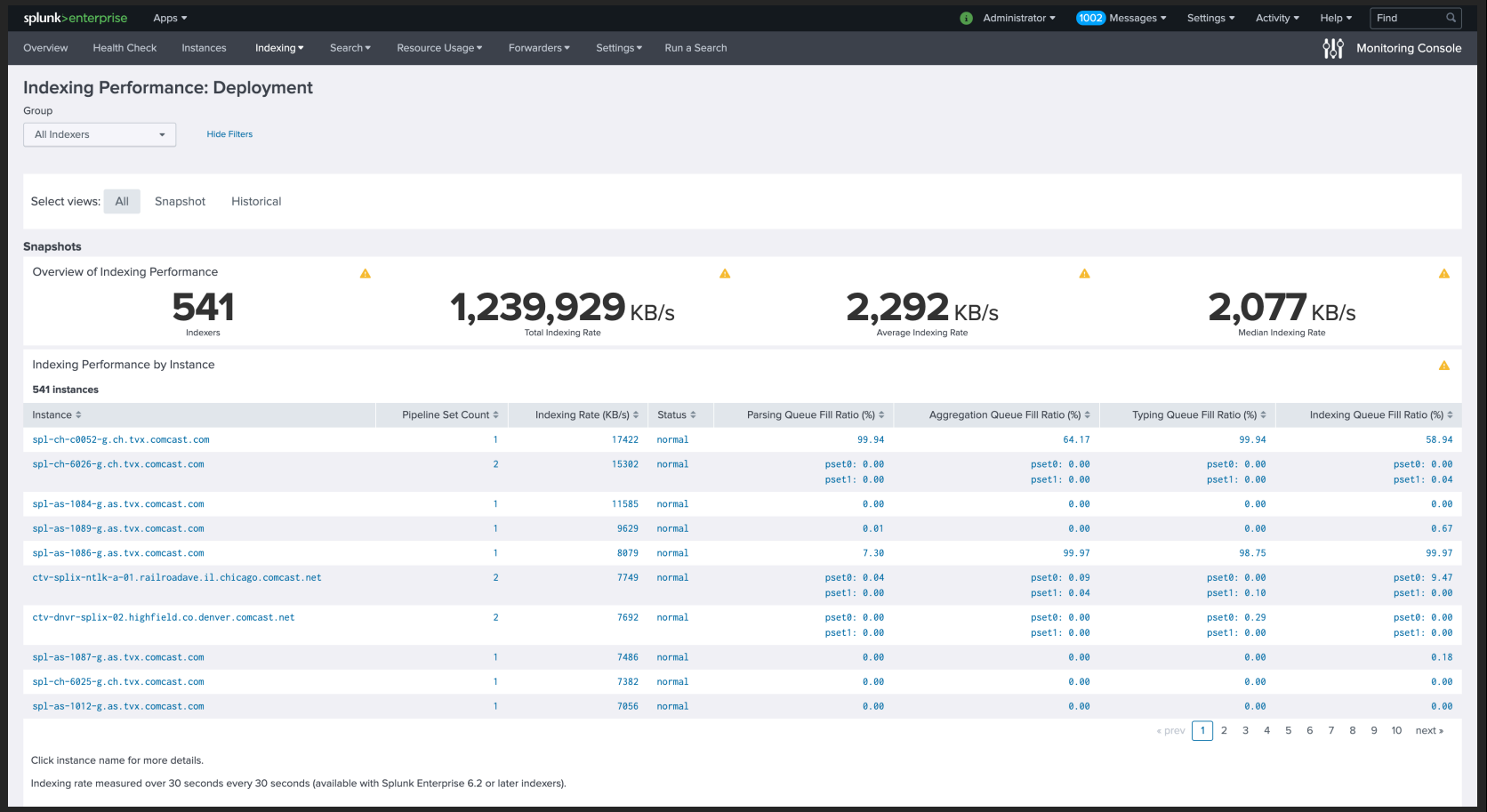
Our biggest failures have lead to our greatest successes:

How we learn and scale



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How we learn and scale

- Ensure hardware is spec'd for ingest, not search.
- Buy for growth, not requirements.
- Automation…
- …Automation
- AUTOMATION
- Locality matters
- Do not support the forwarders…
- …support the process to enable the forwarders.

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How we learn and scale

- Welcome new data…
- …but how do we handle all of it.
- IMPOSTER

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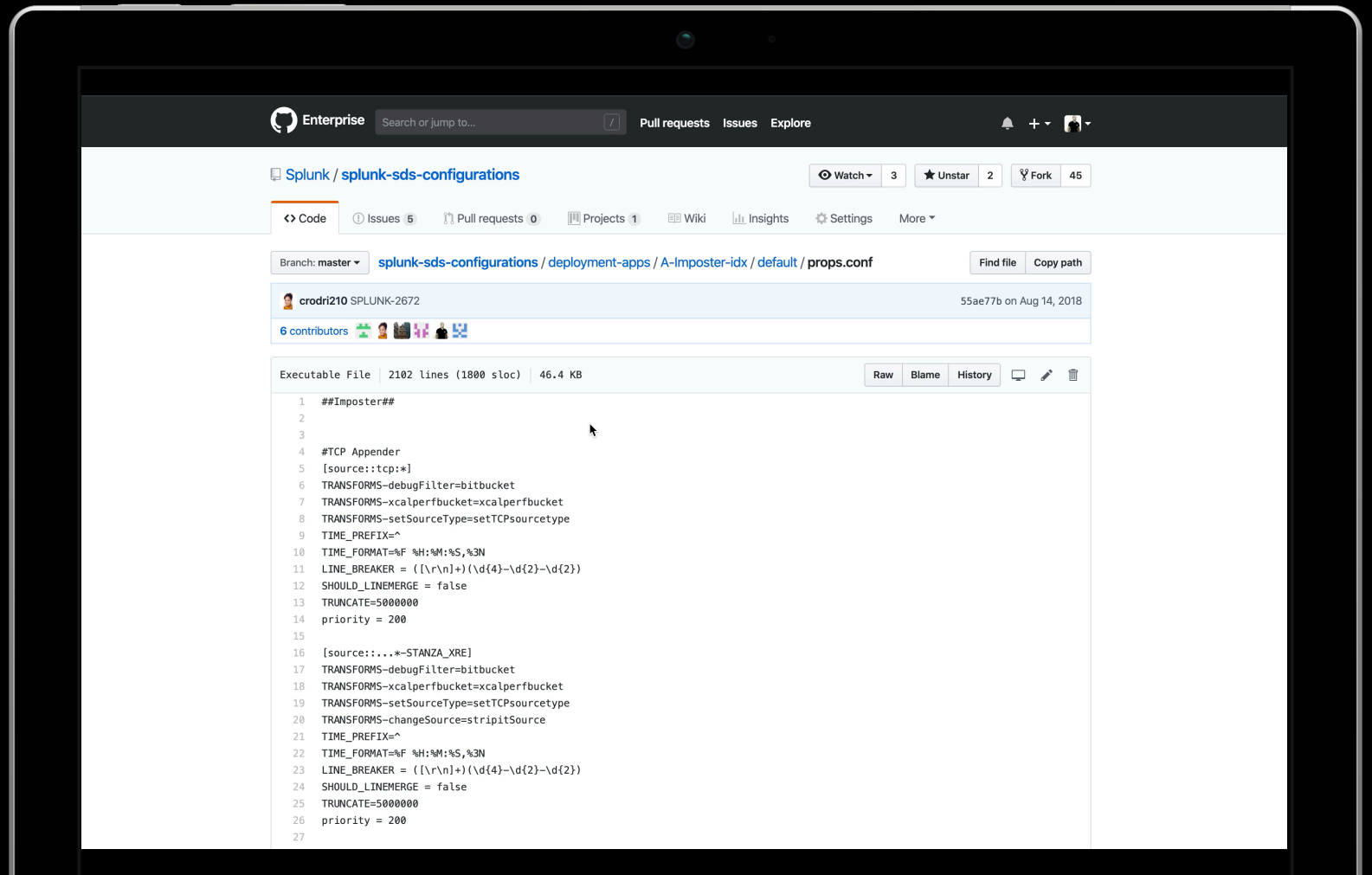
Imposter



- An Imposter App is deployed to all Indexers.
- It allows for us to match specific data formats without needing to restart the indexers.

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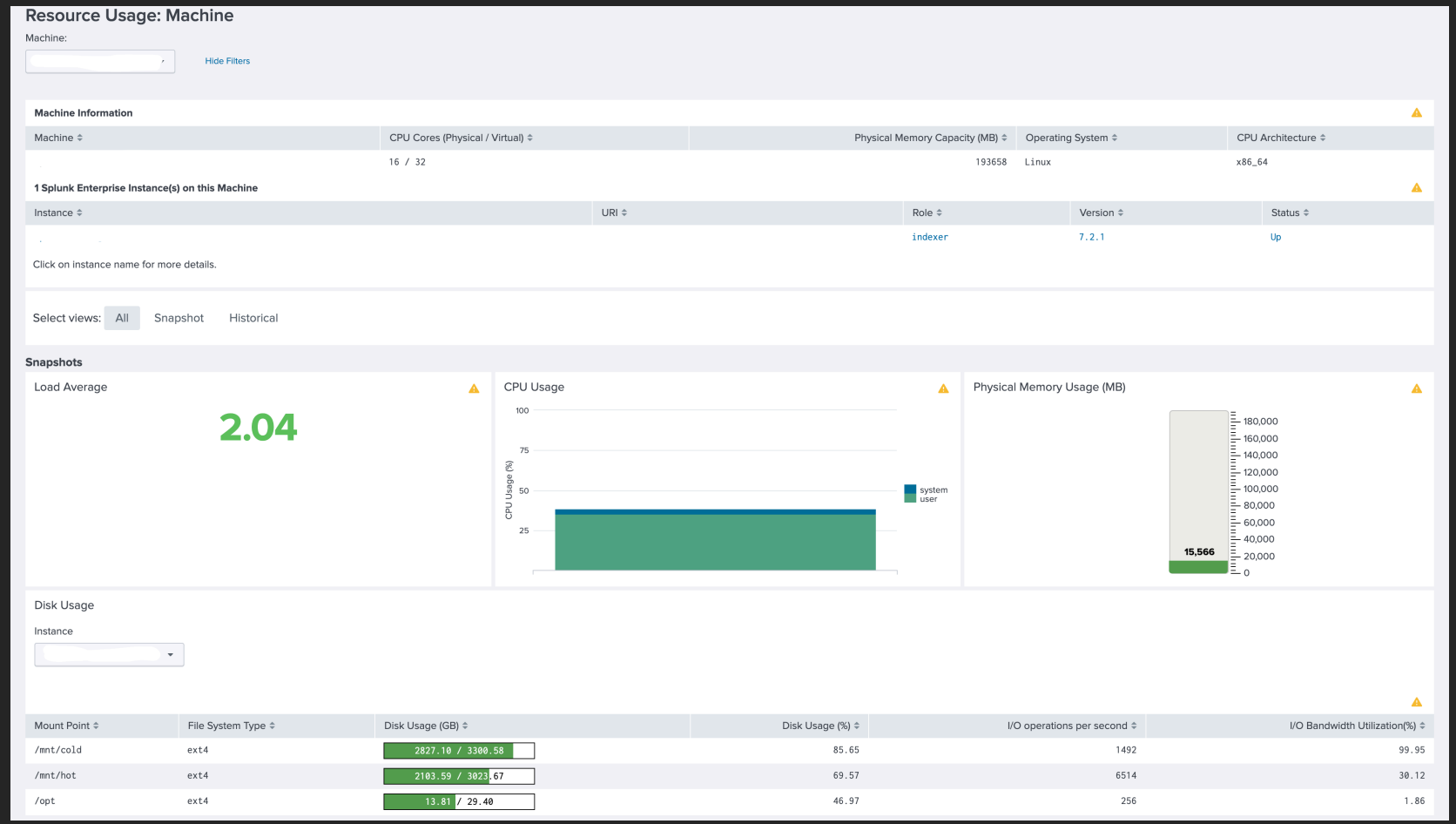
What's under the hood?

Check the headlight fluid



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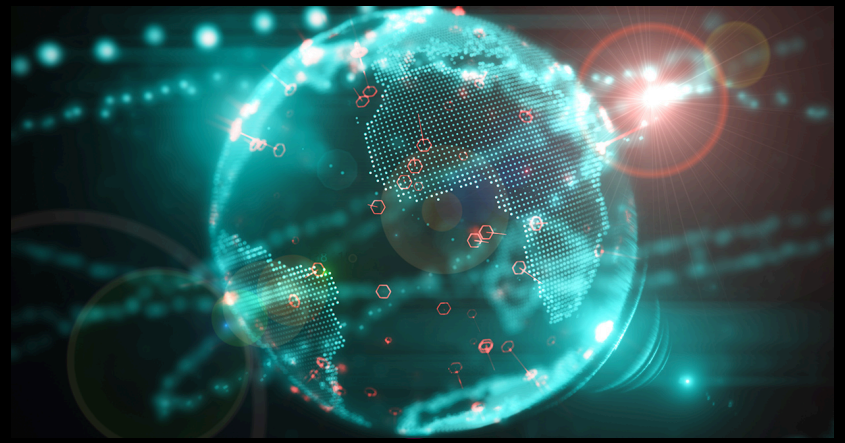
How fast really is fast…

- Direct Attached Storage
- IOPS over 3000 on multiple channels
- Spec'd for 250GB of ingest per day.
- Total install may approach over 1.5GB/sec at any given point…
  - ~140 TB (with a T)

But where is your data?

All over the place…



National Data Centers

Regional Data Centers

AWS… kind of…

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Types? You got them?

Yes.

- Unstructured
- Structured
- Lambda/Kinesis
- The entire TV Guide…

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Other cool things?

Of course.

- Real-time monitoring
- Customer Experience Dashboard
- Ingest Automation (more on that later…)
- End-to-End view of customer's experience on the X1 Platform

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THE FOLLOWING SCREENS ARE INTERNAL EXPERIMENTAION THAT ARE NOT RELATED TO COMCAST BUISNESS, BUT SOLELY REPRESENTED FOR DEMONSTRATION ON WHAT SPLUNK CAN DO WITH DATA.

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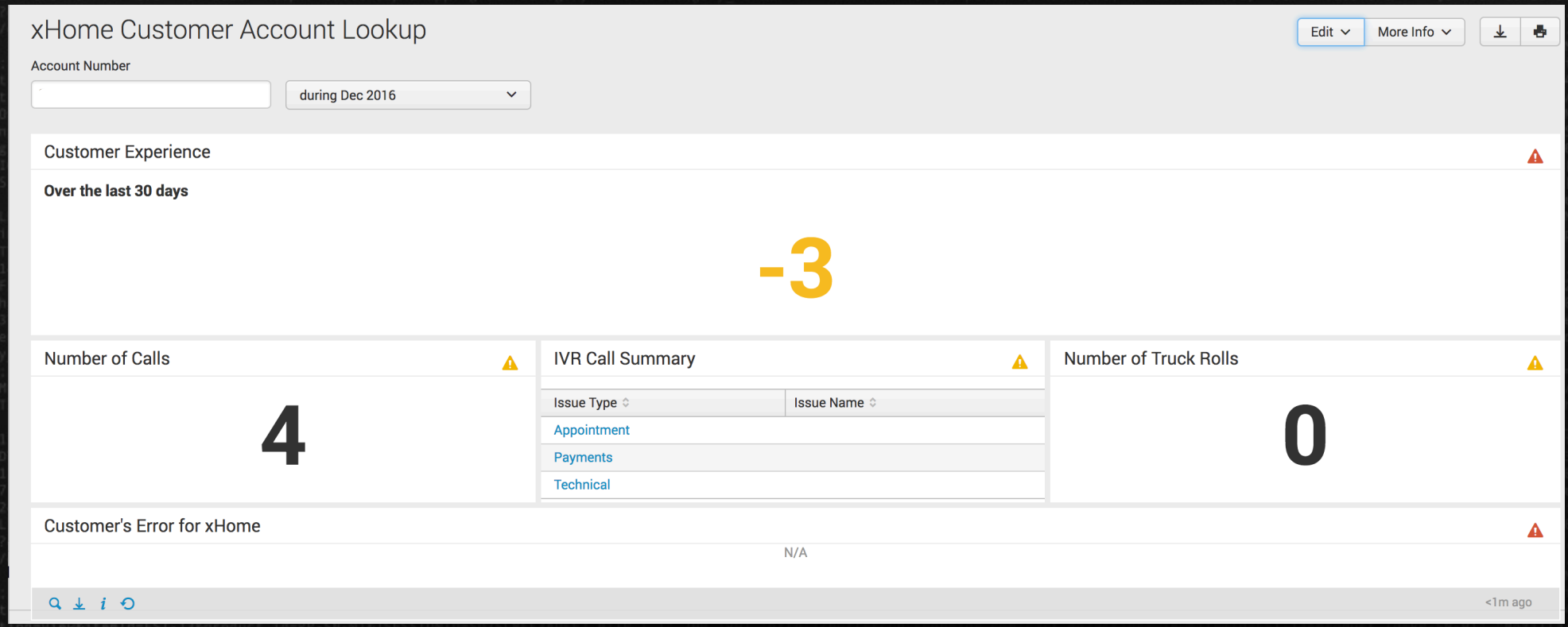

Scoring:

Did they call (-3)

Did they have an error (-1)

Did we visit them (-6)

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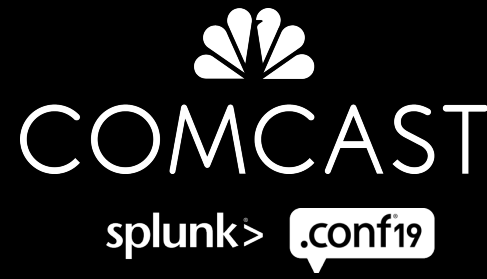

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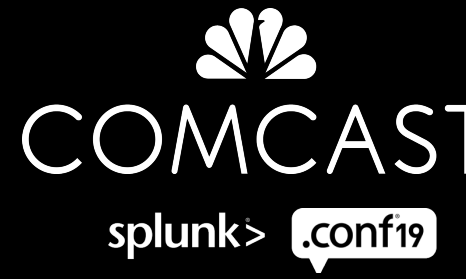
ACT I



Indexer and SHC Cluster Architecture

Distributed Search on a National Scale

When automation doesn't handle a server's problem we are alerted in many different ways.

- 12 Node Search Head Cluster
- Distributed Search
- Splunk Deployment Server (Cluster)
- Monitoring via OP5/Zabbix

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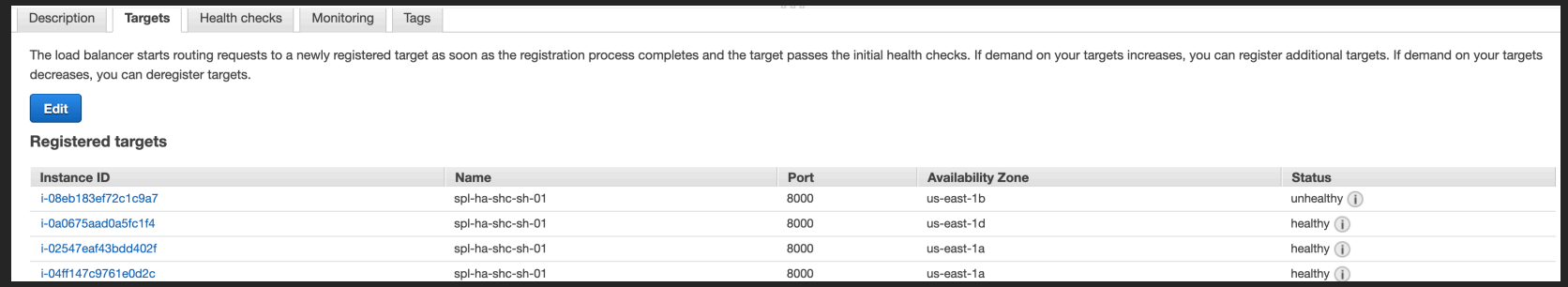
Multi-Region Search Head Cluster

Spec'd to survive a complete data center outage.



Description | **Targets** | Health checks | Monitoring | Tags

The load balancer starts routing requests to a newly registered target as soon as the registration process completes and the target passes the initial health checks. If demand on your targets increases, you can register additional targets. If demand on your targets decreases, you can deregister targets.

Edit

Registered targets

Instance ID	Name	Port	Availability Zone	Status
i-08eb183ef72c1c9a7	spl-ha-shc-sh-01	8000	us-east-1b	unhealthy
i-0a0675aad0a5fc1f4	spl-ha-shc-sh-01	8000	us-east-1d	healthy
i-02547eaf43bdd402f	spl-ha-shc-sh-01	8000	us-east-1a	healthy
i-04ff147c9761e0d2c	spl-ha-shc-sh-01	8000	us-east-1a	healthy

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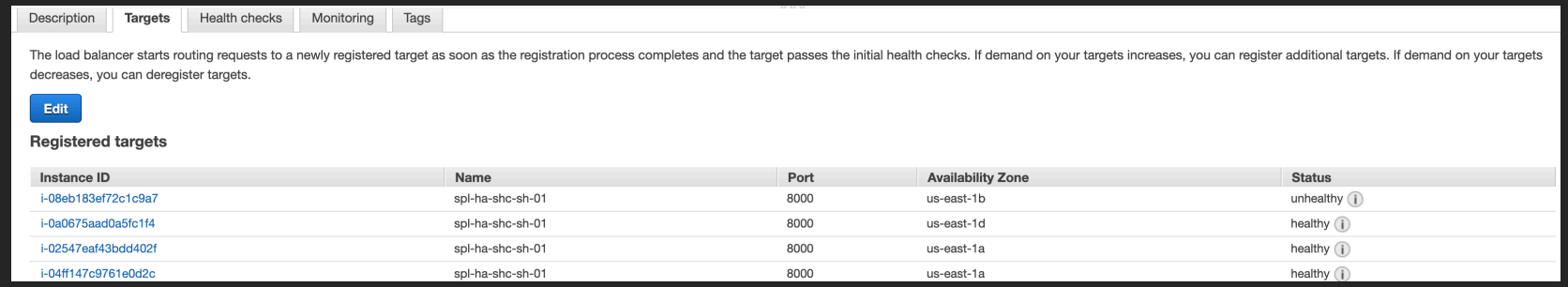
3 AWS Regions

US-EAST-1 (4)

US-EAST-2 (Waiting on DX)

US-WEST-2 (8)



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i-0a0675aad0a5fc1f4	spl-ha-shc-sh-01	8000	us-east-1d	healthy
i-02547eaf43bdd402f	spl-ha-shc-sh-01	8000	us-east-1a	healthy
i-04ff147c9761e0d2c	spl-ha-shc-sh-01	8000	us-east-1a	healthy

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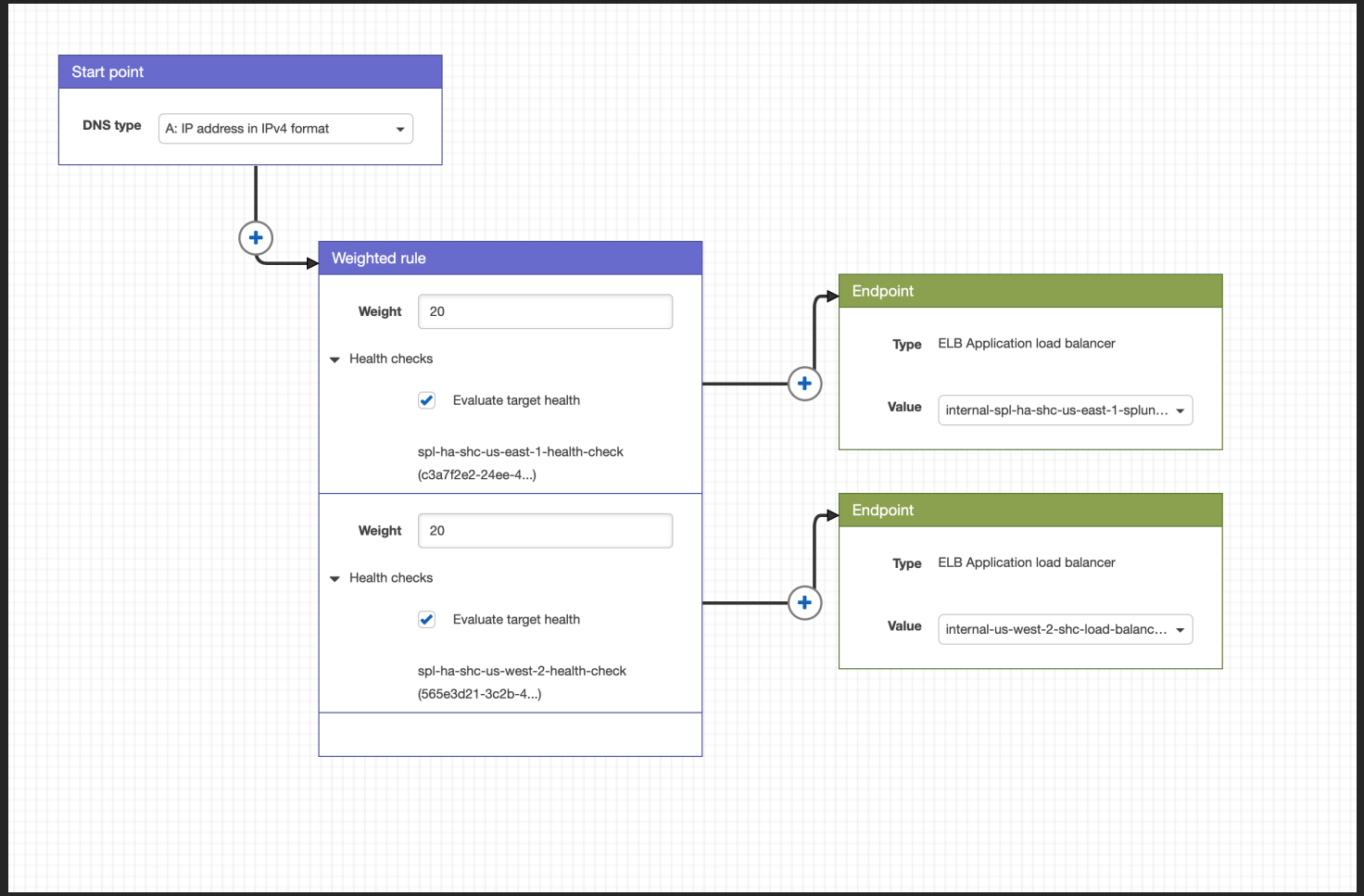
Routing Policy

Zone Records are controlled via AWS



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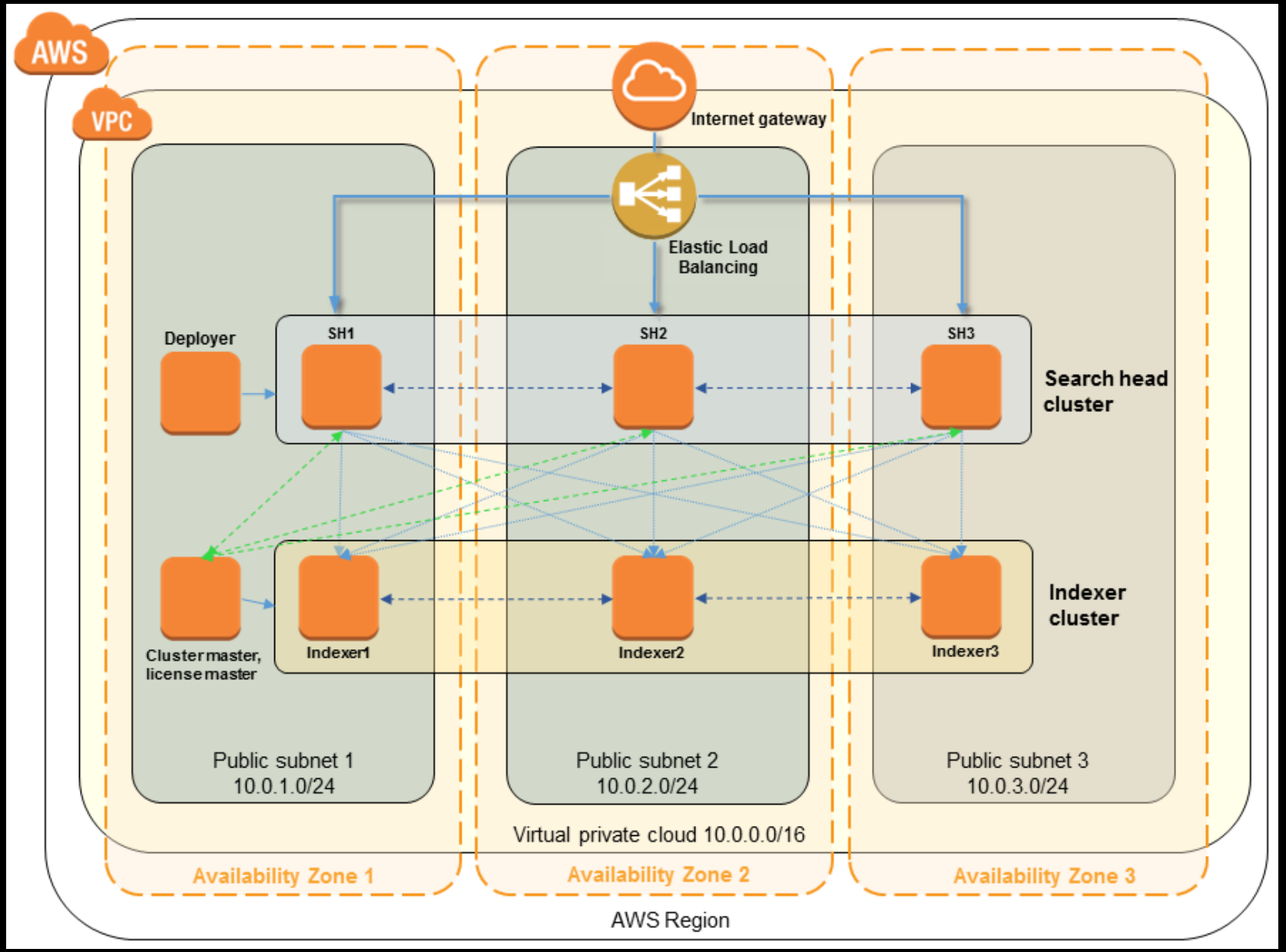

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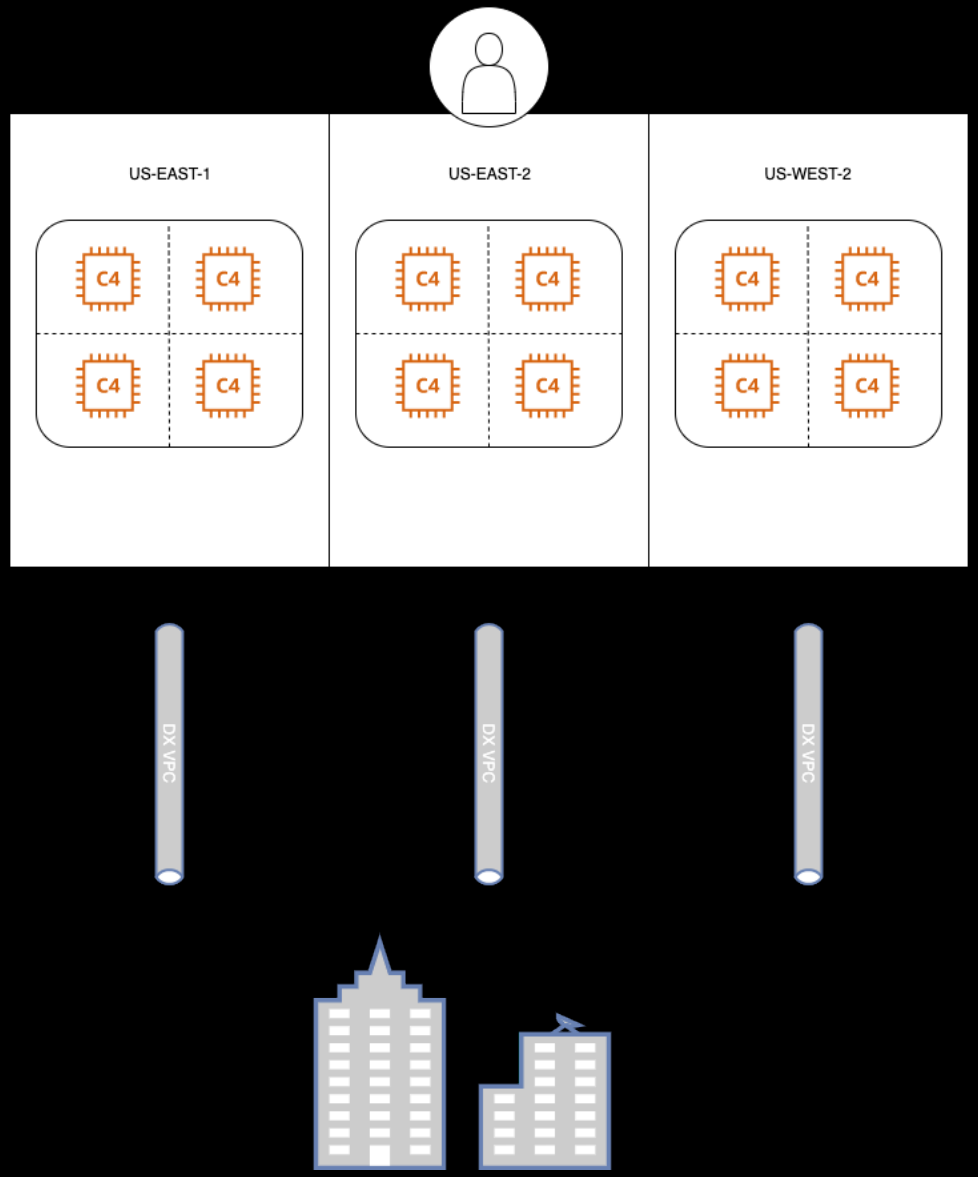

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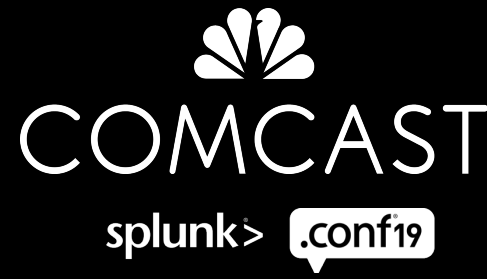
SHC Connectivity Workflow

- Users use one URL for UI, one for API
- AWS Routes them based on the geographic location.
- Private DX VPC will allow connectivity between the indexers and the search heads.
- Data that needs to use cross region connectivity, will use the Comcast Backbone to travel (~78ms Latency)



DOES IT WORK?

Sure, you just need to fine tune it…

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Timeouts and Connectivity

The Presentation Layer and The Splunk Layer

- The presentation layer has shorter timeouts.

Timeouts and Connectivity

The Presentation Layer and The Splunk Layer

- Shorter timeouts means, less abuse from cURL

Timeouts and Connectivity

The Presentation Layer and The Splunk Layer

- Splunk needs longer timeouts

Timeouts and Connectivity

The Presentation Layer and The Splunk Layer

- Snapshots and Bundles…

The Problems

The Quick…

- Long running searches keep connections open too long.
- Tune them to be shorter, but use search policy to help.

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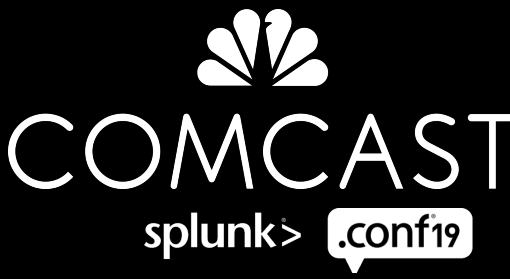
The Problems

…and the dirty…

```
[splunker@deployer default]# cat distsearch.conf
[replicationSettings]
replicationThreads = auto
connectionTimeout = 120
sendRcvTimeout = 120
concerningReplicatedFileSize = 90

[distributedSearch]
#peerResolutionThreads = 32 - no longer supported
#trySSLFirst = false - no longer supported
statusTimeout = 120
authTokenConnectionTimeout = 120
authTokenReceiveTimeout = 120
authTokenSendTimeout = 120
bestEffortSearch = true
connectionTimeout = 120
sendTimeout = 120

[replicationBlacklist]
userApps = users/*/*/lookups/*.csv
```

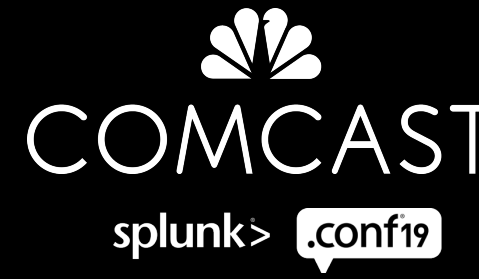


Lessons…

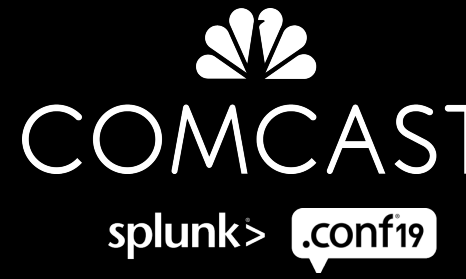
Learned?

- Sometimes networking doesn’t notify you of outages.
- Users are going to beat you to problems, let it be.
- Don’t be a hero, be part of the community and focus on the hotspots.

INTERMISSION



ACT II



Automation

I'm a REALLY Lazy Engineer

With over 3000+ unique users, we need to be sure that Splunk has their data. Looking for more ways to self-heal is part of the mission. It's a shared resource.

- Let them eat cake: Self-Service Ingestion
- Bots!
- RBAC and Power Users
- Community First Goals

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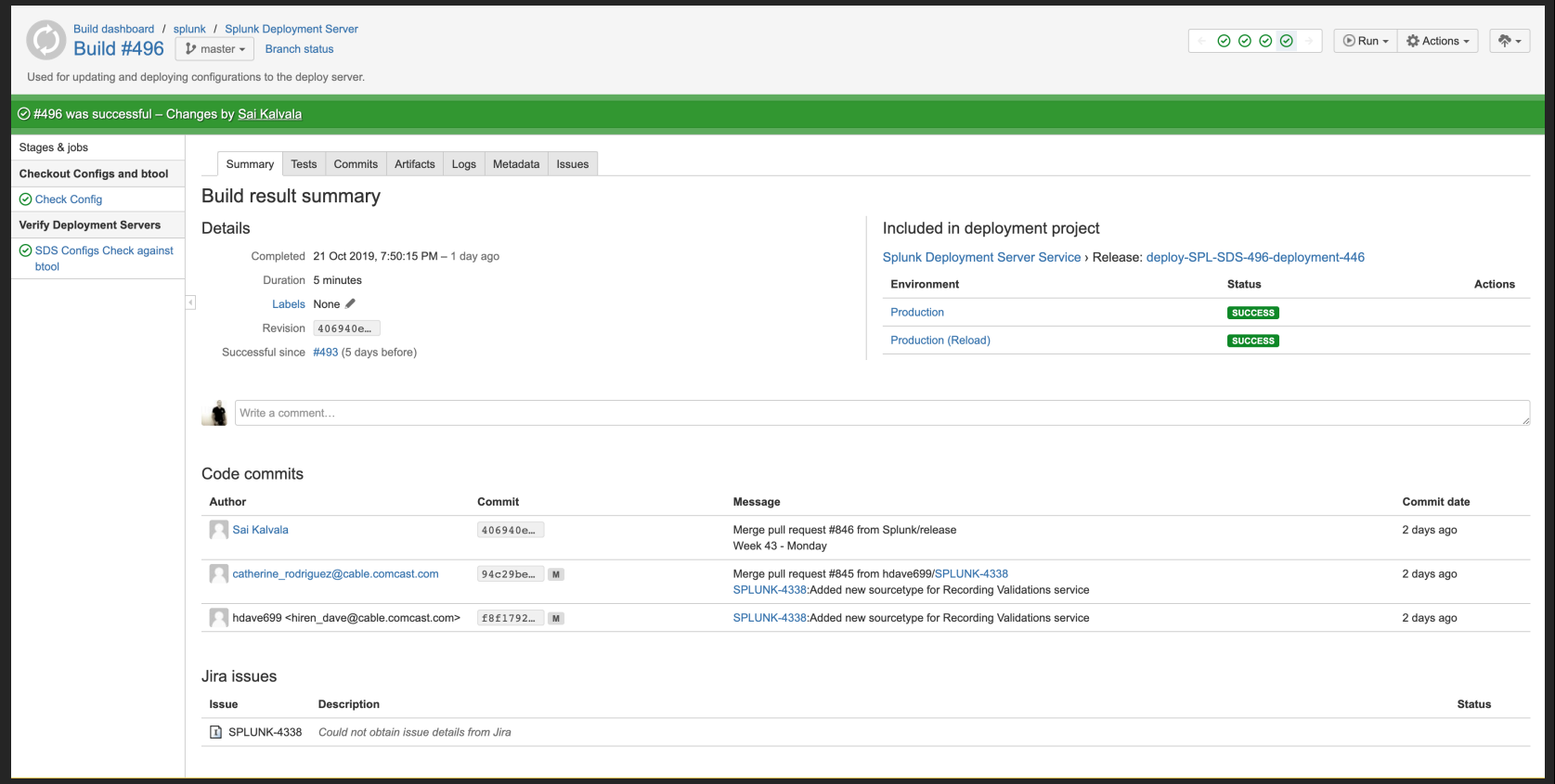
Splunk Deployment Server end-to-end Configuration Management

git push and PR



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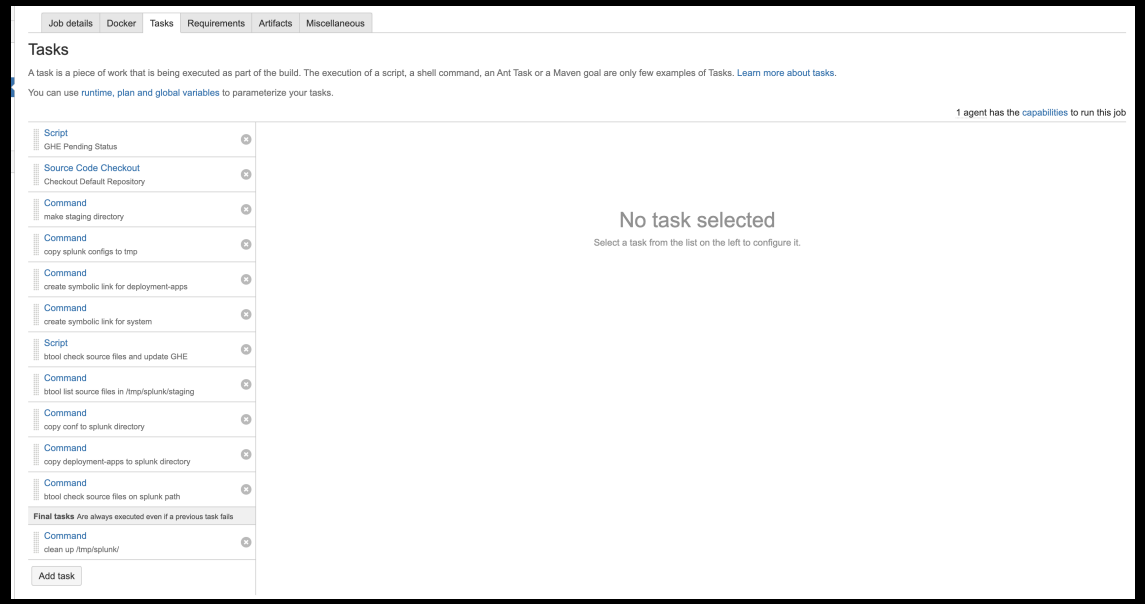
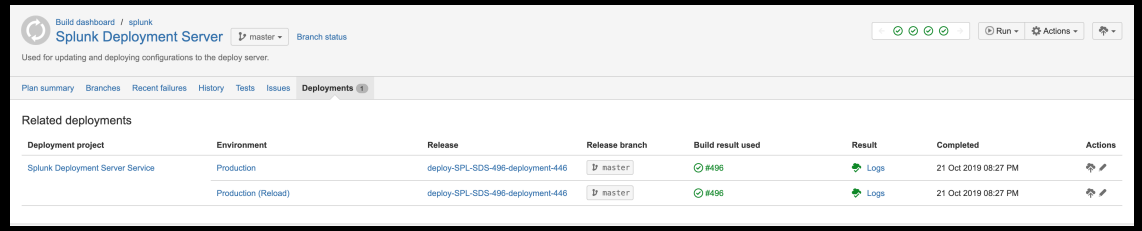
SDS Deployment

Fully Automatic Baby!





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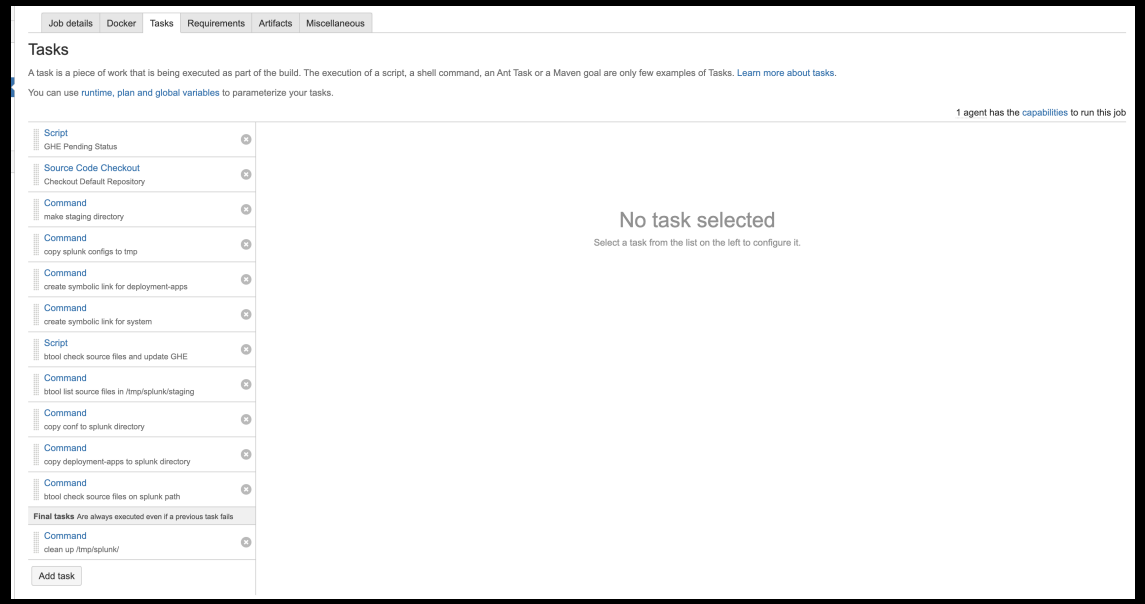
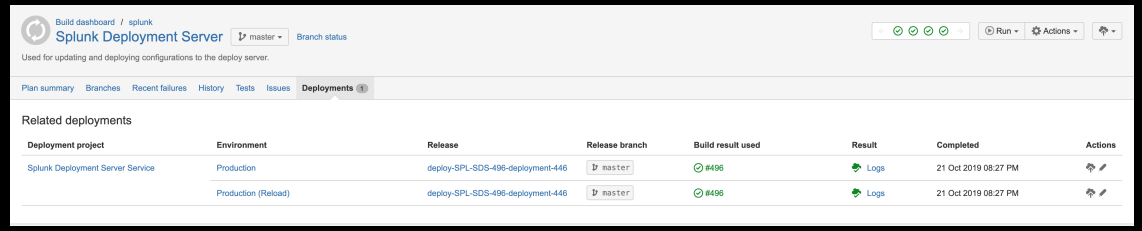
SDS Deployment

Fully Automatic Baby!





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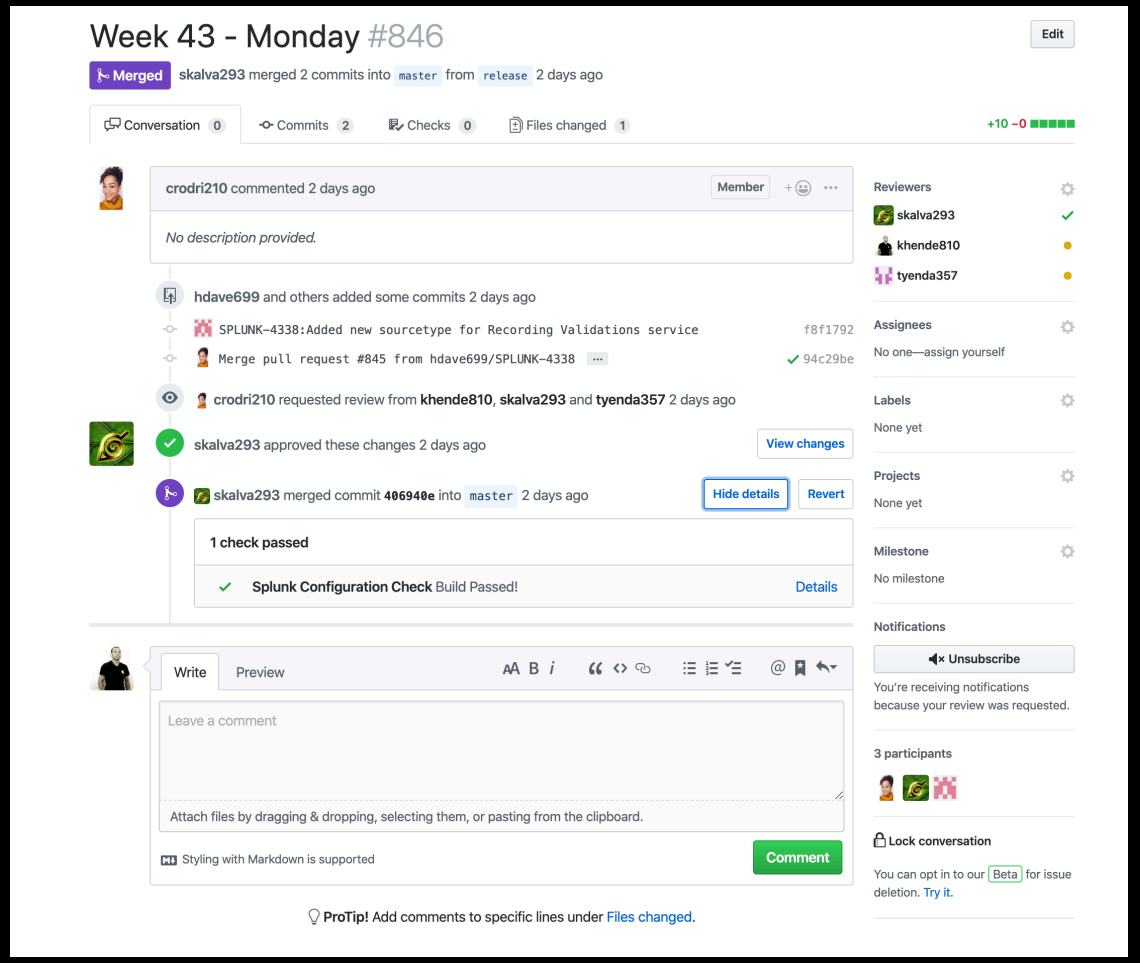
Can you approve my PR?

Sure, it's green for all checks!



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Making the Community Responsible

You do it, you own it.

- Users can ingest on their own time frame.
  - Errors can be easily tracked.
- 12 Node Deployment Server Cluster can handle the nodes.

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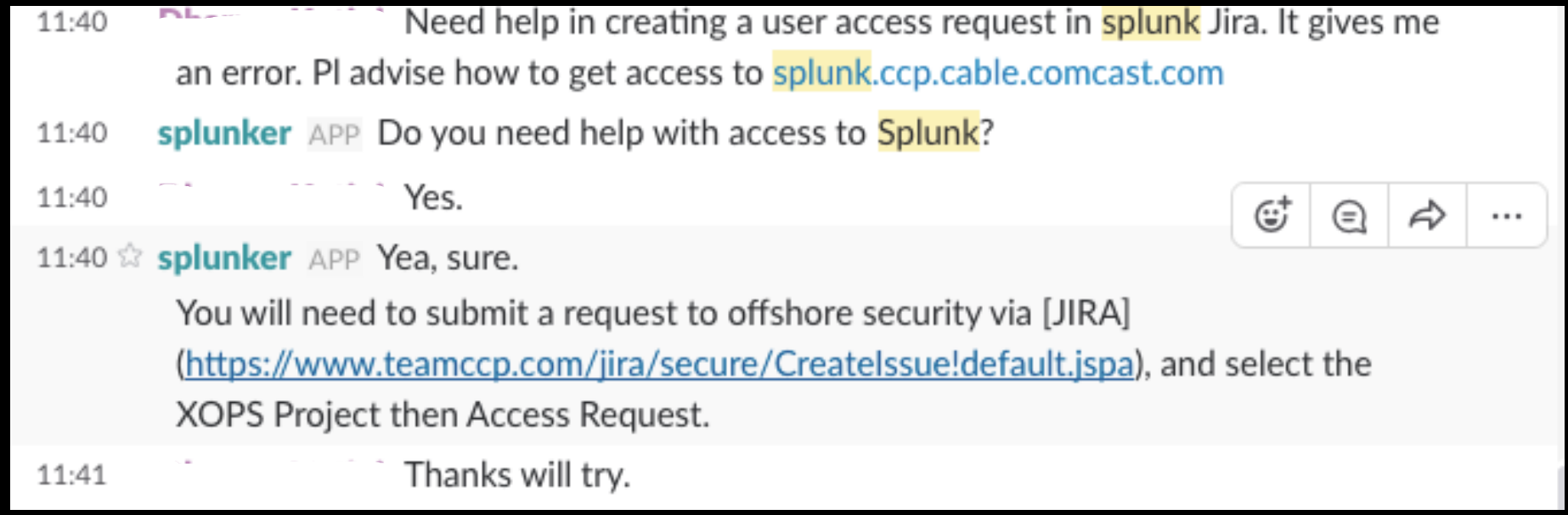
Bots

Slack lets you interact…



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Bots

Slack lets you interact…

14:19 **SDS Bamboo** APP

> splunk › Splunk Deployment Server › release › #118 passed. Changes by Vaneet Singla and Atlassian Bamboo <bamboo@example.com> Responsible Users: Vaneet Singla, Atlassian Bamboo

14:52 **Kristerpher Henderson** @vaneet_singla Sorry was in dispose. Checking it now :)

14:55 **github** APP

[splunk-sds-configurations:master] 7 new commits by Vaneet Singla and 2 others:

> `77b23d0` SPLUNK-744 - Vaneet Singla
> `6bdf5ca` [bamboo] Automated branch merge (from develop:77b23d011f50828eeea16362448ad72af351ee55) - Atlassian Bamboo
> `aae345b` SPLUNK-748 & SPLUNK-749 - Vaneet Singla
> `f6c729d` [bamboo] Automated branch merge (from develop:aae345b8f0b920b81a46218d673eed685f117bd3) - Atlassian Bamboo
> `8128ff0` SPLUNK-748 & SPLUNK-749 - Vaneet Singla Show more...

14:55 **splunker** APP

> SPLUNK-744
> **Onecloud cluster logs adding into Splunk**
> **Status** IN PROGRESS — **Assignee** Singla, Vaneet
> **Reporter** Chandra Pisati — **Watchers** Nazareth, Binoy, Chandra Pisati, Sasmita, Daniar, Singla, Vaneet
> Watch | Assign to me | Dev Ready | In Progress | Rank Top
>
> SPLUNK-748
> **Need Splunk configured to ingest files for the xh_storm cluster. storm_nimbus**
> **Status** Needs more information — **Assignee** Singla, Vaneet
> **Reporter** Bender, Kyle — **Watchers** Cramasta, Joe, Bender, Kyle, Singla, Vaneet
> Watch | Assign to me | Dev Ready | In Progress | Rank Top
>
> SPLUNK-749
> **Need Splunk configured to ingest files for the xh_storm cluster. storm_supervisor**
> **Status** Needs more information — **Assignee** Singla, Vaneet
> **Reporter** Bender, Kyle — **Watchers** Cramasta, Joe, Bender, Kyle
> Watch | Assign to me | Dev Ready | In Progress | Rank Top

14:55 **Kristerpher Henderson** ^ so boss...

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Security and RBAC

Program Groups get indexes.

- Each role in Splunk has an AD Group
- There are even groups for function, like Login
- Apps have roles too, and continue the hierarchy

Nesting Groups

Streamlines onboarding.

- Login
- -> User is part of Login
- -> Admin is part of User

Community First

Things we do to help.

- Publish Root Cause Analyses quickly.
- Help users “graduate” into better searches.
  - Guard Rails
  - Office Hours

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Fin!

Thank You!

splunk> .conf19