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Master The Dark Arts

Demystifying Splunk Architecture

J. Cory Minton | Principal Systems Engineer @ Dell EMC

Date | Washington, DC

DELL EMC intel

Forward-Looking Statements

During the course of this presentation, we may make forward-looking statements regarding future events or the expected performance of the company. We caution you that such statements reflect our current expectations and estimates based on factors currently known to us and that actual events or results could differ materially. For important factors that may cause actual results to differ from those contained in our forward-looking statements, please review our filings with the SEC.

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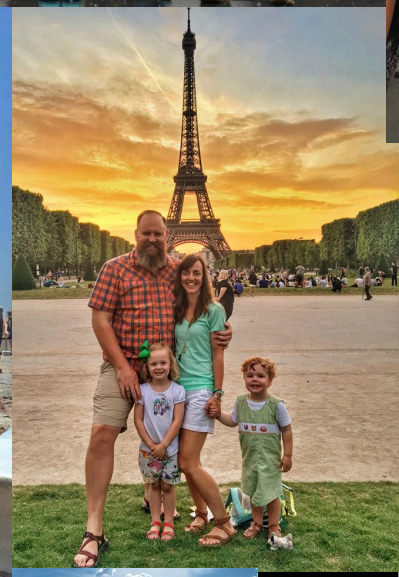
J. Cory Minton

Principal SE and Data Analytics Leader

- 7+ years at Dell EMC
- Founder: Dell EMC Splunk Ninjas
- Splunk SE Certified
- I ❤ hardware!
- Oracle and SAP background
- BS Engineering and MBA
- www.BigDataBeard.com



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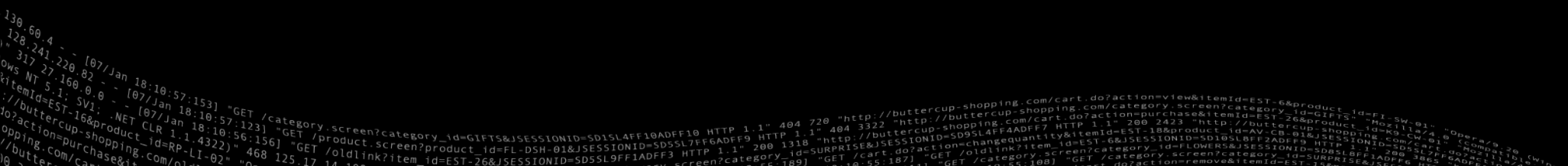
Key Takeaways

- Size the infrastructure for a Splunk deployment
- Understand infrastructure impacts from small changes in Splunk
- Learn design concepts that will scale
- Hear how Dell EMC is doing it internally
- An easier way…



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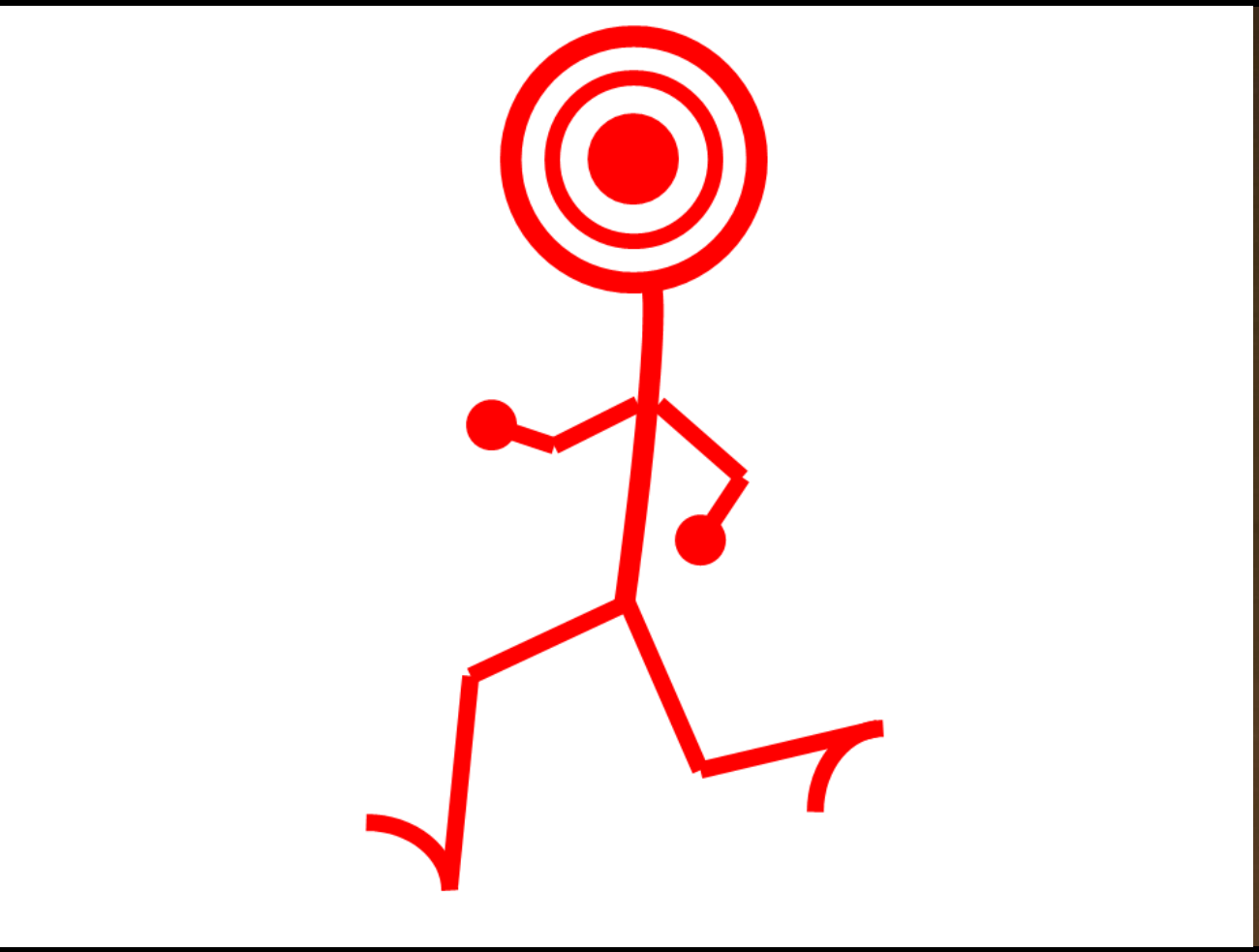
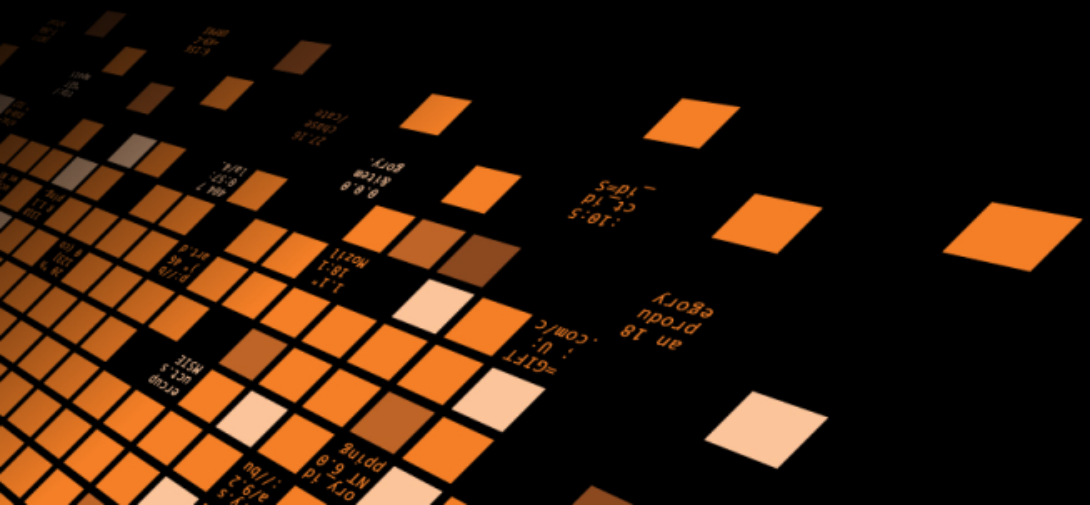
Problem…



Provide Fundamentals For Sizing A Splunk Deployment And Share Learned Best Practices.



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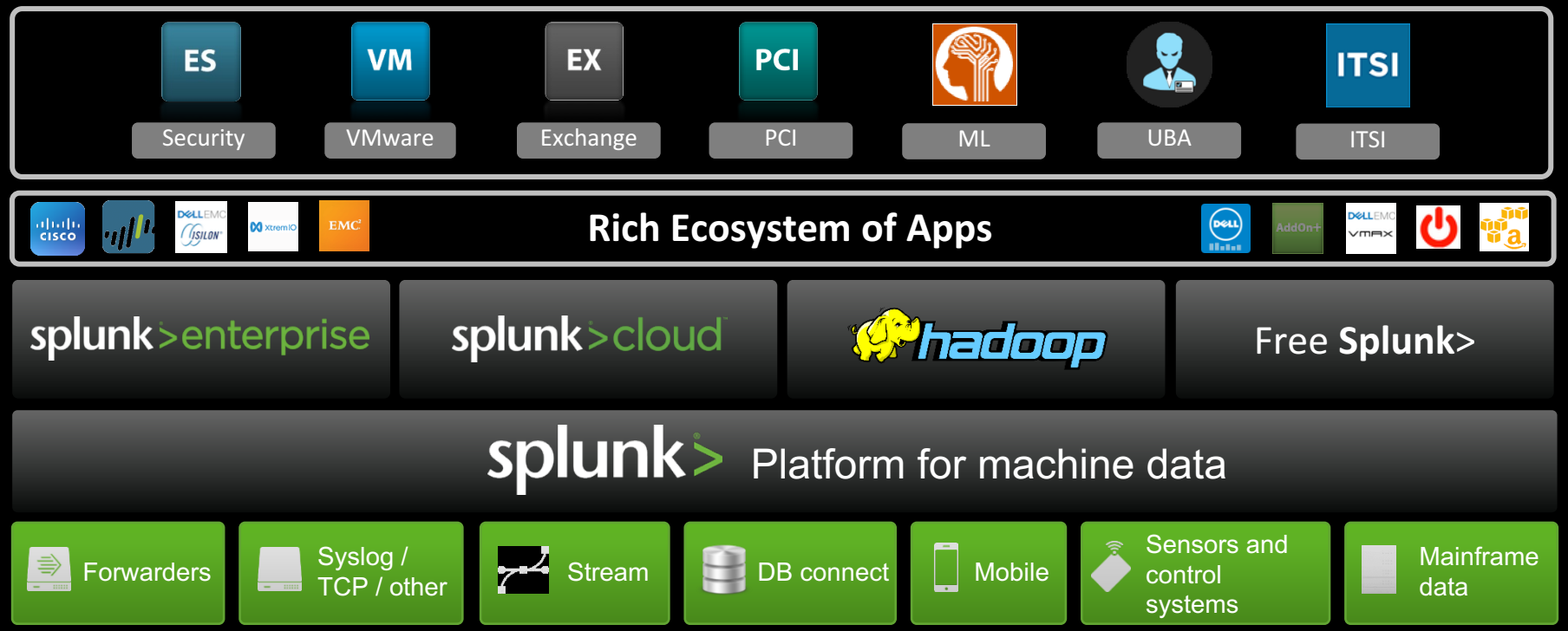
Assumption #1

General understanding of Splunk platform



Assumption #2

General understanding of Splunk infrastructure

Search Heads

Query information across indexers and are usually CPU and memory intensive.

Indexers

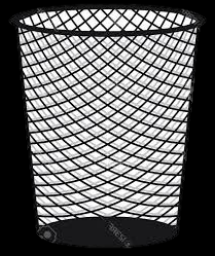
Write data to disk and are both CPU and I/O intensive.

Forwarders

Collect and forward data; usually lightweight and not resource intensive.

Assumption #3

General understanding of Splunk data management.



OR

FROZEN

HOT – Newest buckets of data that are still open for write

WARM – Recent data but closed for writing (read only)

COLD – Oldest data, commonly on cheaper, slower storage

FROZEN – No longer searchable, commonly archived or deleted data

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90% empirical

+ 10% experience

≠ 100% perfect every time

Big & Fast

What makes Splunk grow?

Performance

- ✓Volume Of Ingest
- ✓Search Performance
- ✓More Users
- ✓Big Apps

Capacity

- ✓Volume Of Ingest
- ✓Index Retention Periods
- ✓Indexer Clustering
- ✓Big Apps

Sizing Fundamentals

How many servers for I need?

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Machine Requirements

Indexers

Reference Minimum

- 12 cores
- 12GB RAM
- 800 IOPS

Mid-Range

- 24 cores
- 64GB RAM
- 800 IOPS

High-Performance

- 48 cores
- 128GB RAM
- SSD

Others

Search Head

- 16 cores
- 12GB RAM
- 300 IOPS

Heavy Forwarder

- 16 cores
- 12GB RAM
- 300 IOPS

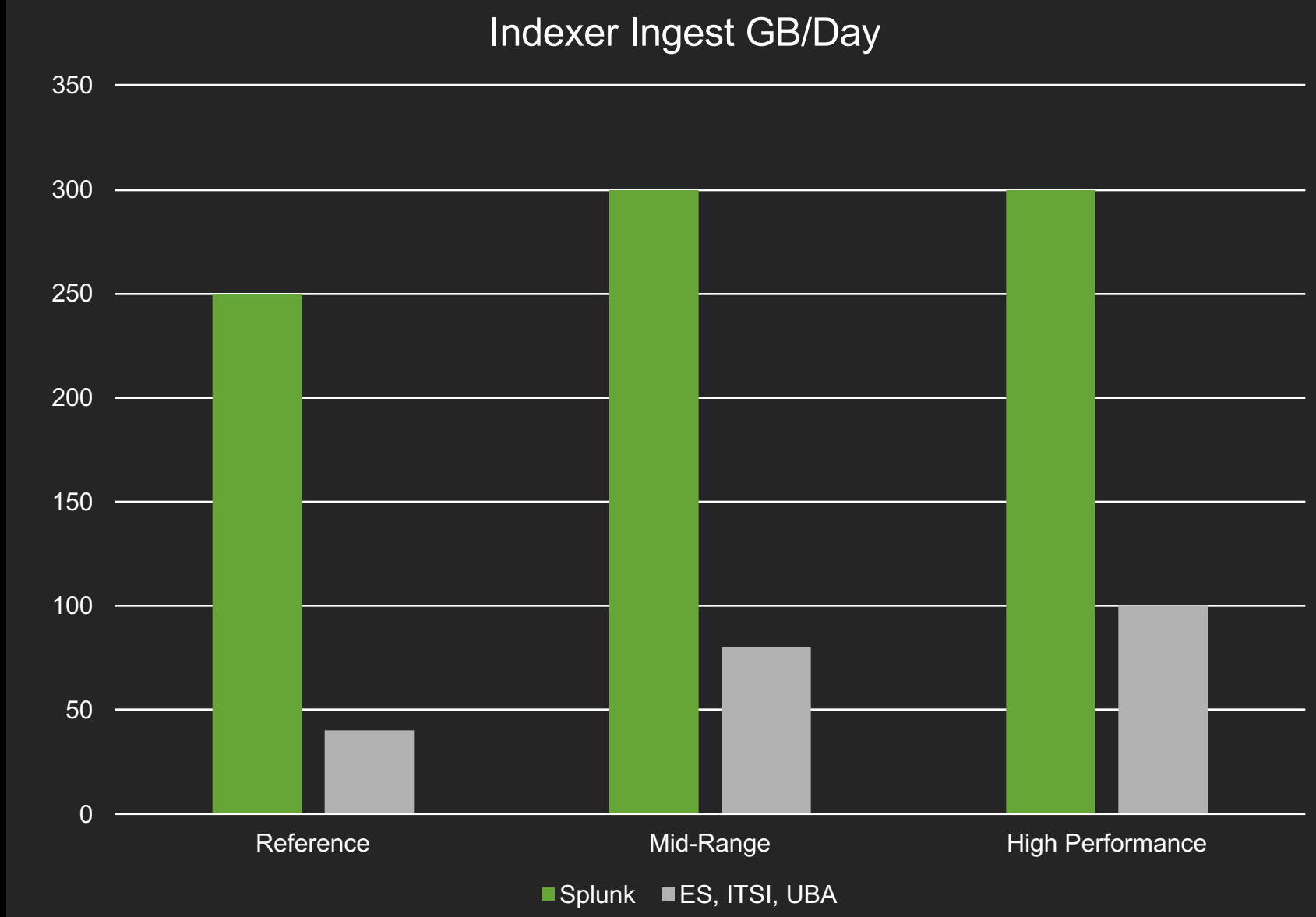
Utility

- 8 cores
- 8GB RAM
- 300 IOPS

Dark truth: Choose wisely…or scalability will suffer later.

Indexer Sizing

- vCPU = CPU
- Hyperthreading ≠ CPU
- When in doubt, 100



Search Heads

- Dedicate
- When in doubt, 1 per 8
- Indexers > Search

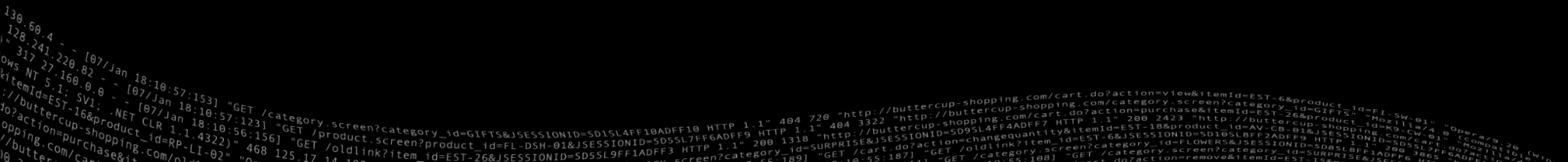
	Daily Indexing Volume					
	< 2GB/day	2 to 300 GB/day	300 to 600 GB/day	600GB to 1TB/day	1 to 2TB/day	2 to 3TB/day
Total Users: less than 4	1 combined instance	1 combined instance	1 Search Head, 2 Indexers	1 Search Head, 3 Indexers	1 Search Head, 7 Indexers	1 Search Head, 10 Indexers
Total Users: up to 8	1 combined instance	1 Search Head, 1 Indexers	1 Search Head, 2 Indexers	1 Search Head, 3 Indexers	1 Search Head, 8 Indexers	1 Search Head, 12 Indexers
Total Users: up to 16	1 Search Head, 1 Indexers	1 Search Head, 1 Indexers	1 Search Head, 3 Indexers	2 Search Heads, 4 Indexers	2 Search Heads, 10 Indexers	2 Search Heads, 15 Indexers
Total Users: up to 24	1 Search Head, 1 Indexers	1 Search Head, 2 Indexers	2 Search Heads, 3 Indexers	2 Search Heads, 6 Indexers	2 Search Heads, 12 Indexers	3 Search Heads, 18 Indexers
Total Users: up to 48	1 Search Head, 2 Indexers	1 Search Head, 2 Indexers	2 Search Heads, 4 Indexers	2 Search Heads, 7 Indexers	3 Search Heads, 14 Indexers	3 Search Heads, 21 Indexers

Utility Servers

Handy helpers…

- Heavy Forwarder
- License Master
- DMC
- Cluster Master
- Deployment

1:3



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Sizing Fundamentals

How much storage do I need?

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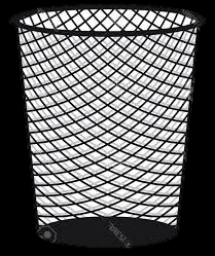
Assumption #3

General understanding of Splunk data management.



OR

FROZEN

HOT – can be DAS in server or SAN (Flash is best)

WARM – same as Hot

COLD – adds option for NAS

FROZEN – No longer searchable, so object stores are option here (last resort)

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Myth About Bucket Sizing…

- # of buckets x bucket size
- Not days…

```
indexes.conf
# volume definitions

[volume:hotwarm_cold]
path = /mnt/fast_disk
maxVolumeDataSizeMB = 3984589

# index definition (calculation is based on a single index)

[main]
homePath = volume:hotwarm_cold/defaultdb/db
coldPath = volume:hotwarm_cold/defaultdb/colddb
thawedPath = $SPLUNK_DB/defaultdb/thaweddb
homePath.maxDataSizeMB = 512000
coldPath.maxDataSizeMB = 2560000
maxWarmDBCount = 4294967295
frozenTimePeriodInSecs = 2592000
maxDataSize = auto_high_volume
coldToFrozenDir = /mnt/big_disk/defaultdb/frozendb
```

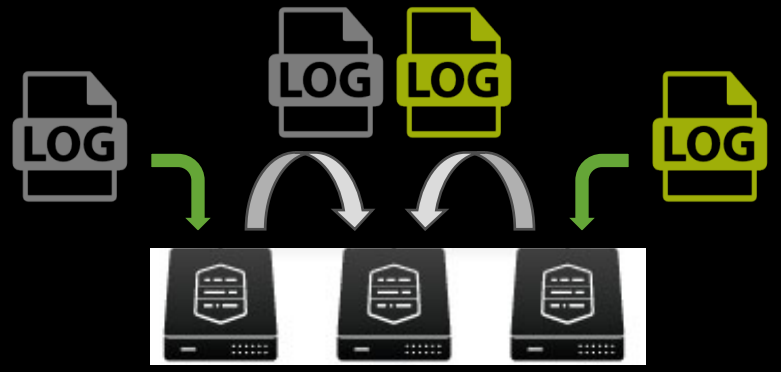
Indexer Deployment Options

Distributed Deployment

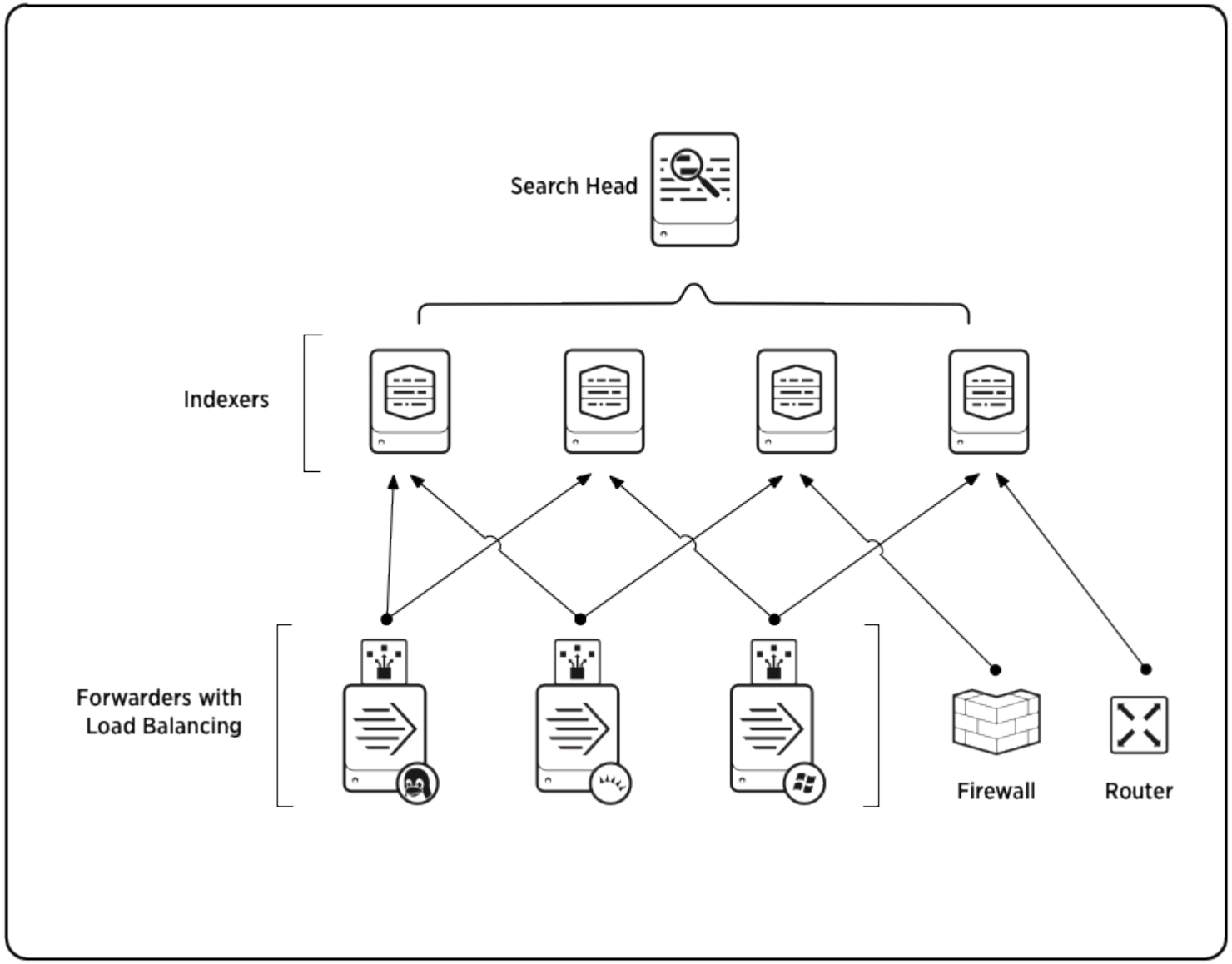
Indexer data is stored once and distributed across available indexers

Clustered Deployment

A group of indexers are configured to replicate each other's data

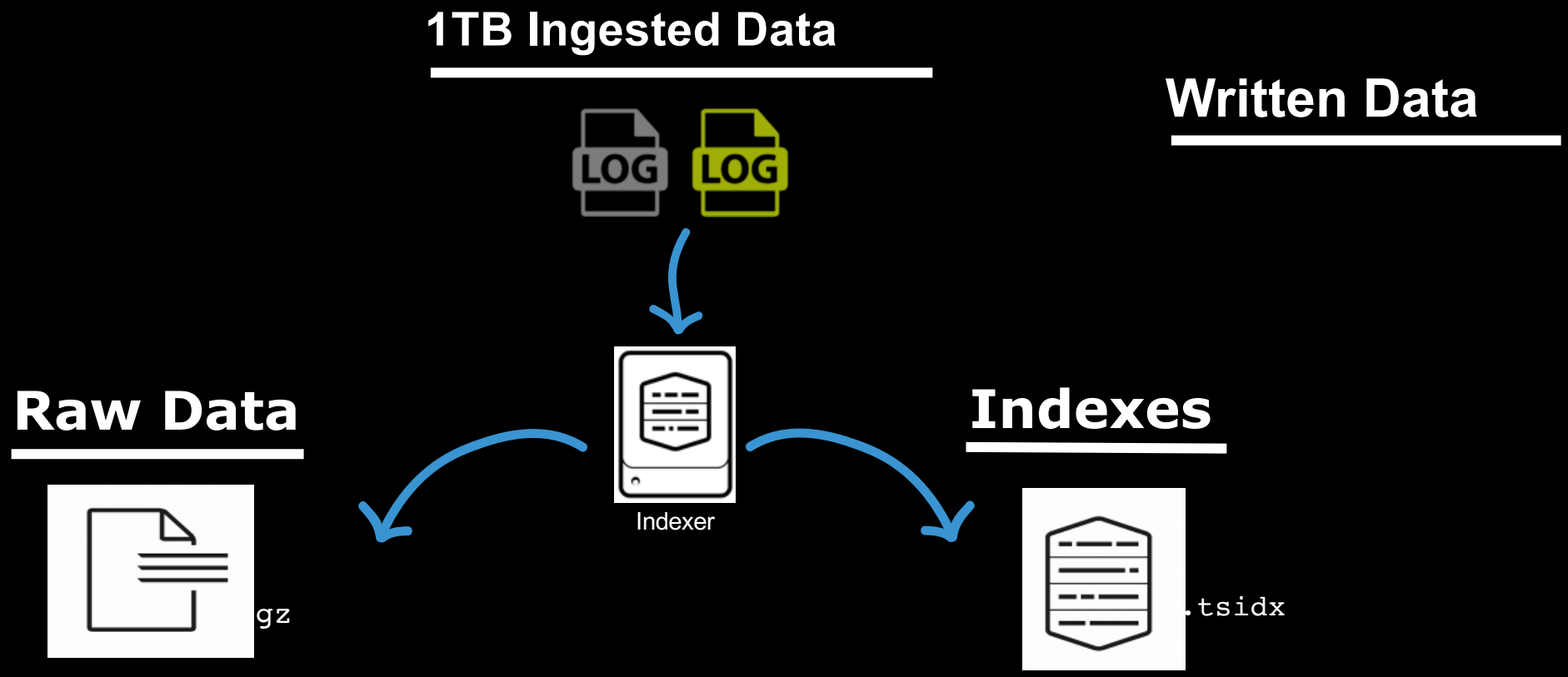


Distributed Deployment



- Single copy of data
- Small
- Starter
- Storage-bound

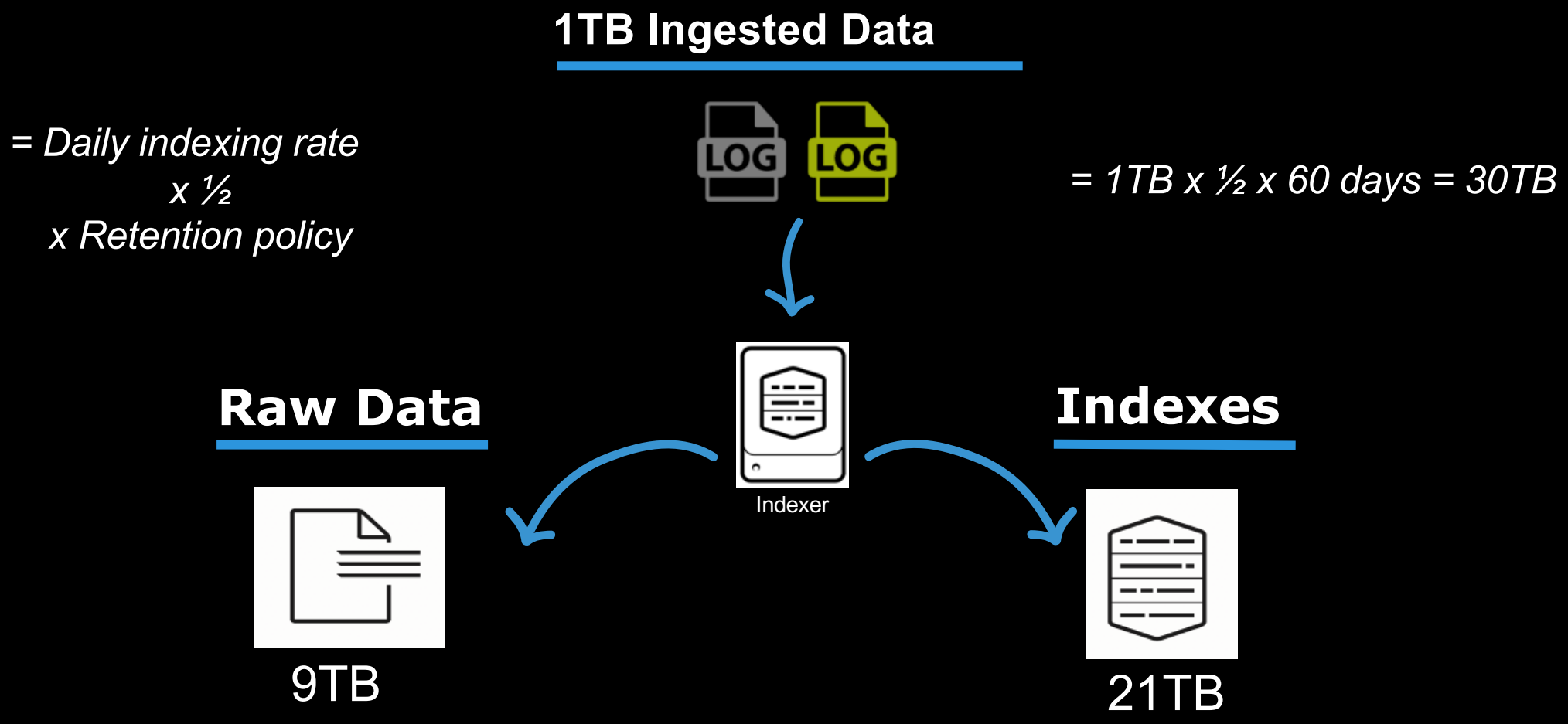
Indexer Storage Capacity



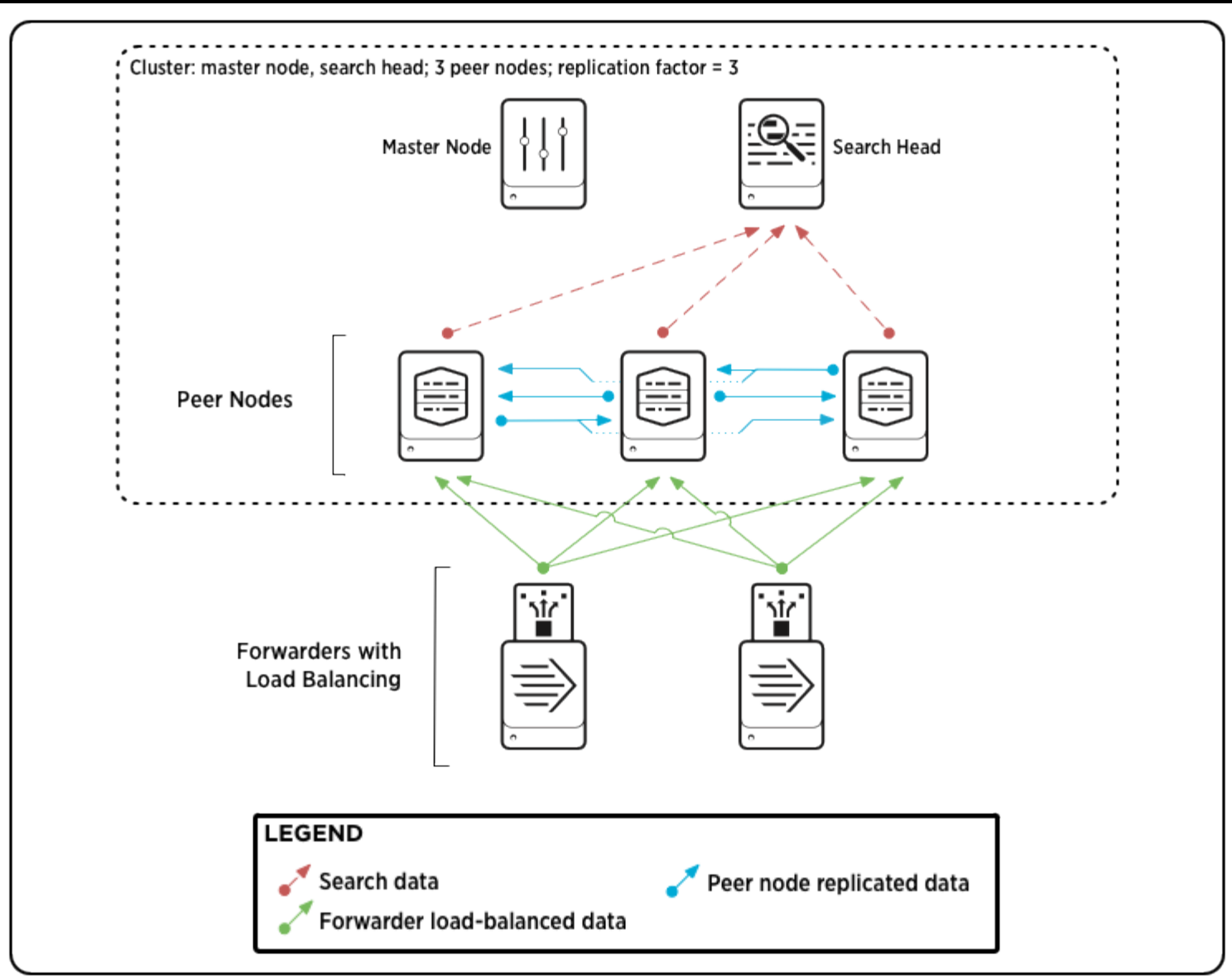
Compressed Raw data
30% of written data
→ 150GB

Uncompressed 'indexes'
70% of written data
→ 350GB

How Much Storage You Need?



Indexer Clustering

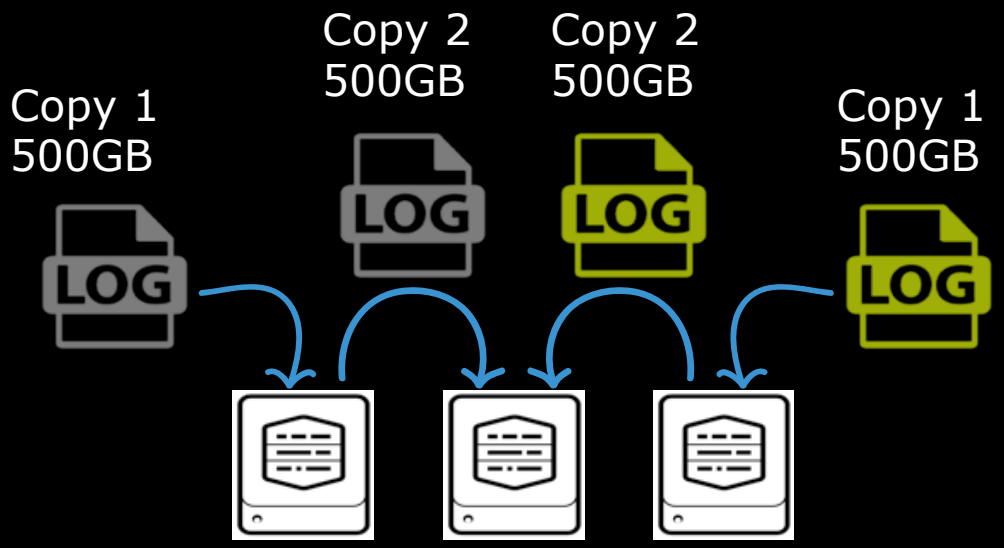


- High Availability for Indexes
- Indexer Clustering Settings
  - Replication Factor = copies of raw data
  - Search Factor = copies of indexes

Splunk Indexer Availability

Multiple copies of index and raw data

- Index → # copies of indexes → Search factor (SF)
- Raw Data -> # of of copies of raw data → Replication factor (RF)

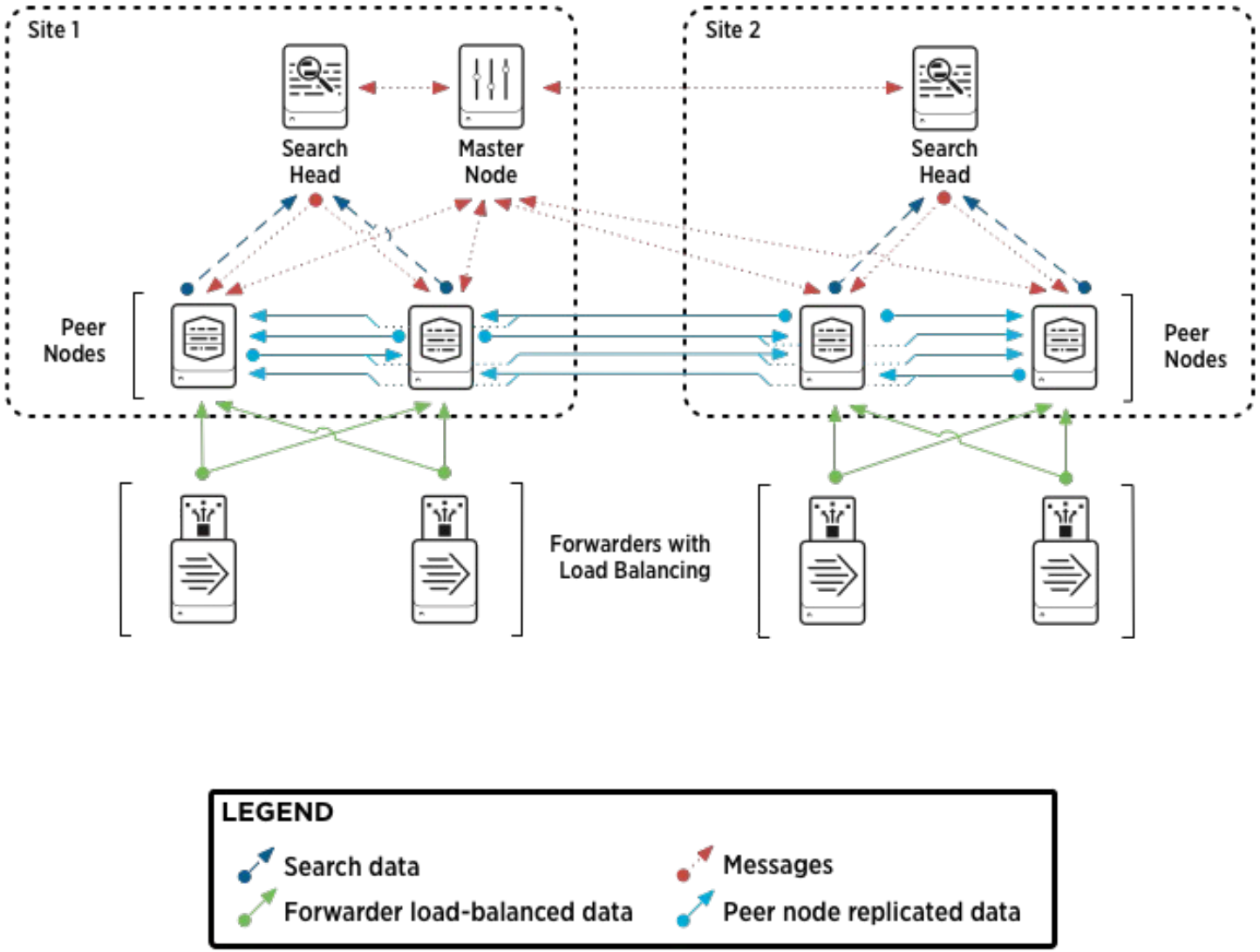


1TB Ingested Data
SF=2 / RF=2
500GB written → 500GB replicated

1TB * 60 days x ½ x
= 60TB (RF/SF=2) ** **doubled** **

1TB * 60 days x ½ x 3
= 90TB (RF/SF=3) ** **tripled** **

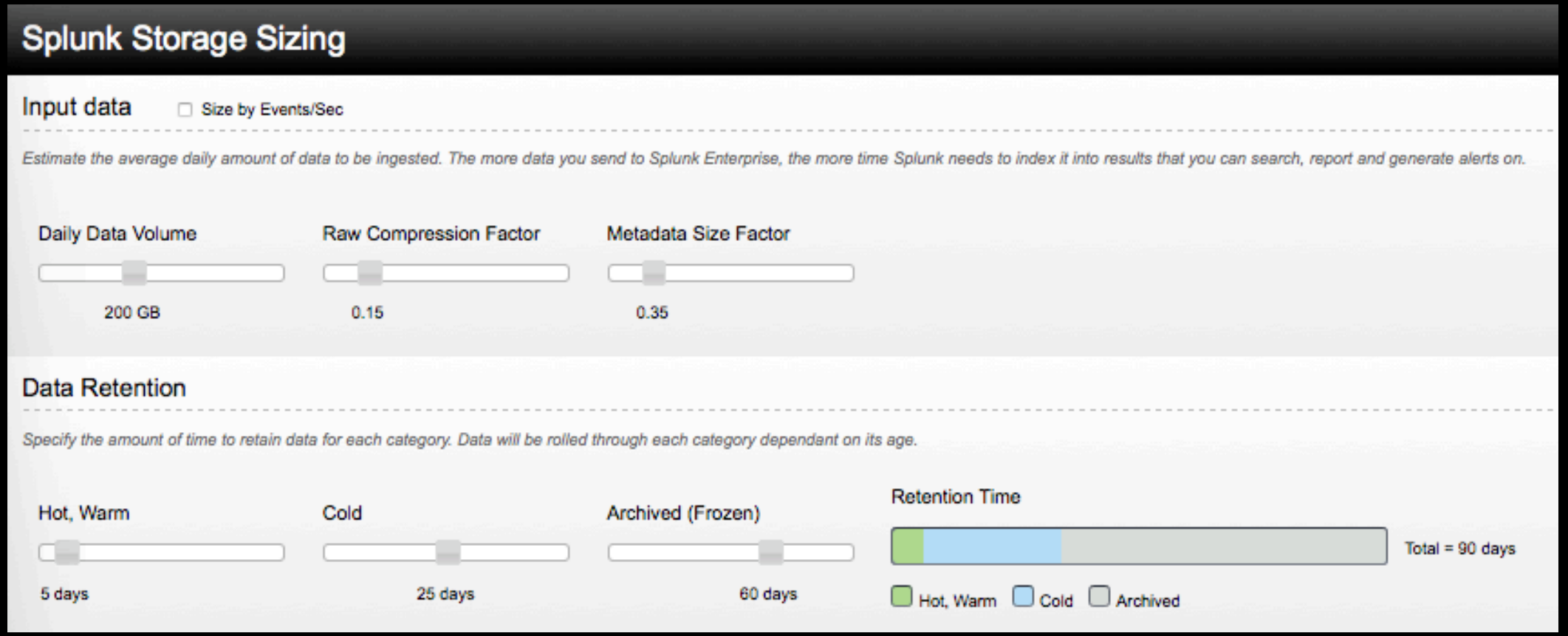
Multisite Indexer Clustering



- Protects indexes across disparate locations
- Enables Search Affinity
- Site specific RF/SF settings

- Sizing = each site + site protected

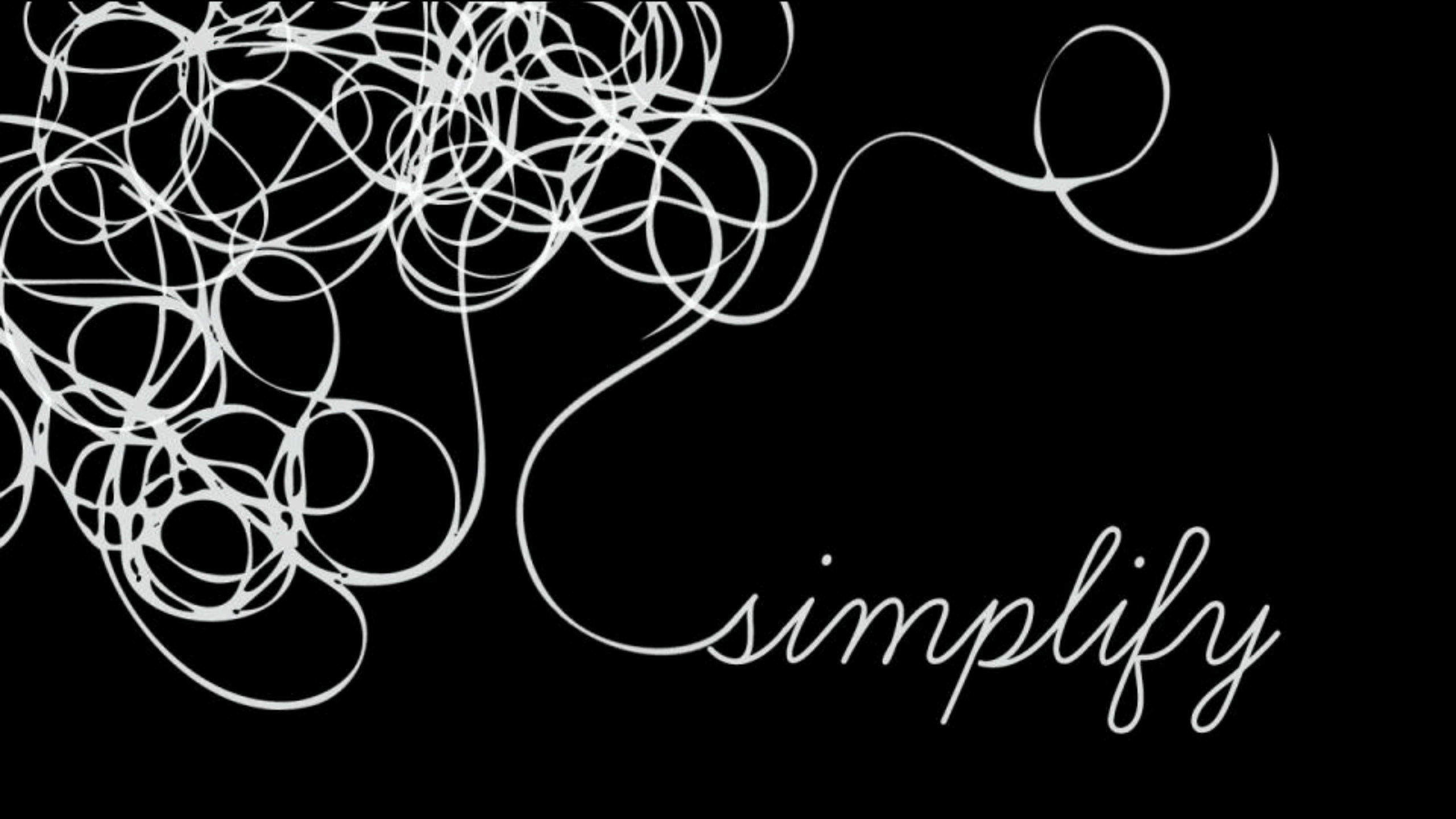
Unofficial, But Really Helpful Tool

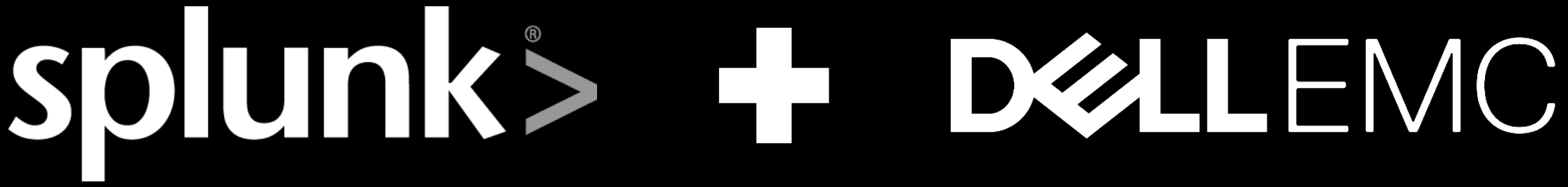


http://splunk-sizing.appspot.com/

Splunk Sizing Questionnaire

- What is the licensed daily ingest rate for Splunk (expressed in some amount of GB/Day or TB/day)?
- What is the retention period for Hot/Warm and Cold (days kept in each tier)?
- Any data being sent to frozen? If so, what is the retention period and requirement for doing so?
- Is indexer clustering being leveraged? If so, what are the settings for Replication and Search Factor?
- How many indexer and search servers are deployed? Do you have a visualization you can share of the deployment?
- Is Splunk being run as a single site or multiple sites? If multiple, is multi-site clustering being leveraged?
- Is the Enterprise Security App or ITSI for Splunk deployed?


simplify

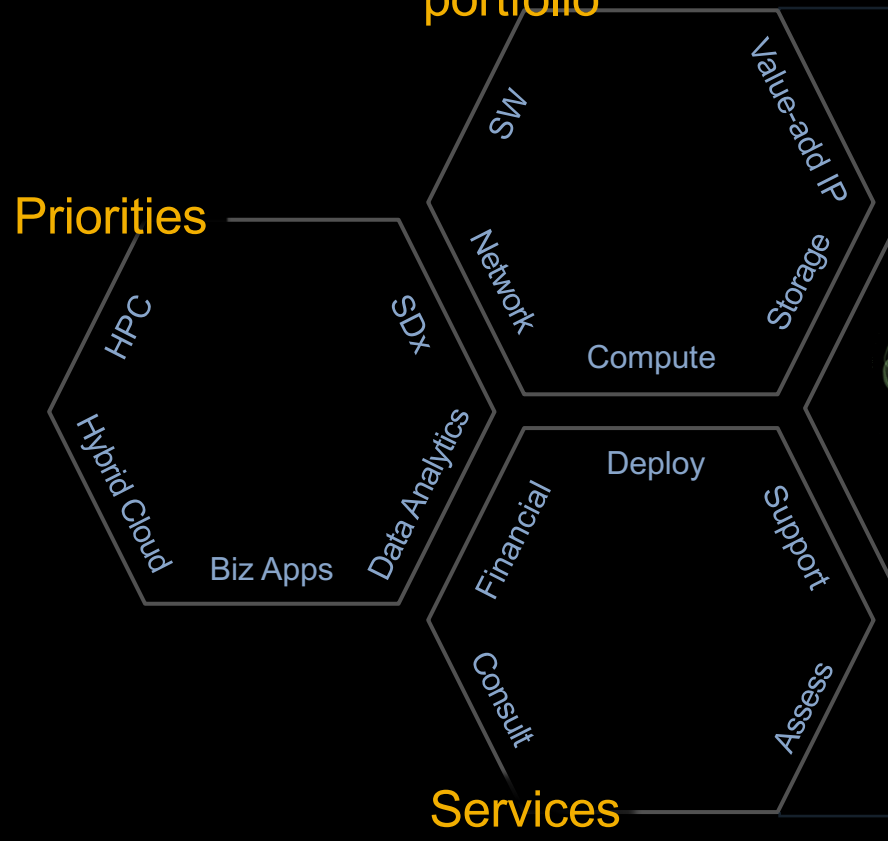


The right solutions to optimize your Splunk deployment

The Ready Solutions formula

Dell EMC portfolio

Priorities



Ready Nodes
Ready Bundles
Ready Systems

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Dell EMC Ready Solutions for Splunk

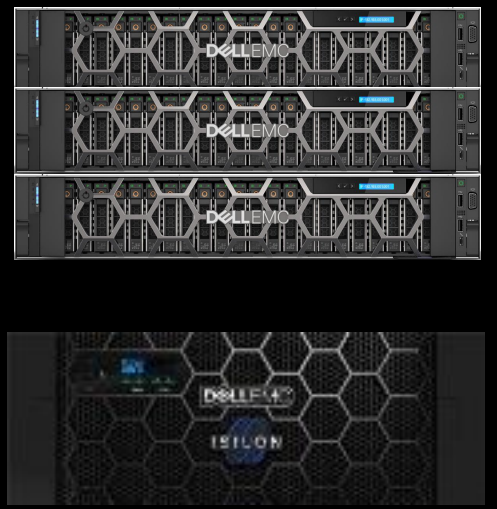
Ready System

VxRack + Isilon

VxRail + Isilon

Ready Bundle

PowerEdge + Isilon



*"Meets or **EXCEEDS** minimum hardware requirements"*

Logistics Leader

Doug called them out on Q1 earnings call…

- Simplified acquisition
- Leveraged Ninjas
- Deployed apps for all Dell EMC platforms
- Replatforming HW in near future

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Wholesale Club Retailer

- Flashed Splunk
- Bottomless cold with Isilon…over 1PB!
- Decreased floor space by 30%
- Growing to +3TB/day

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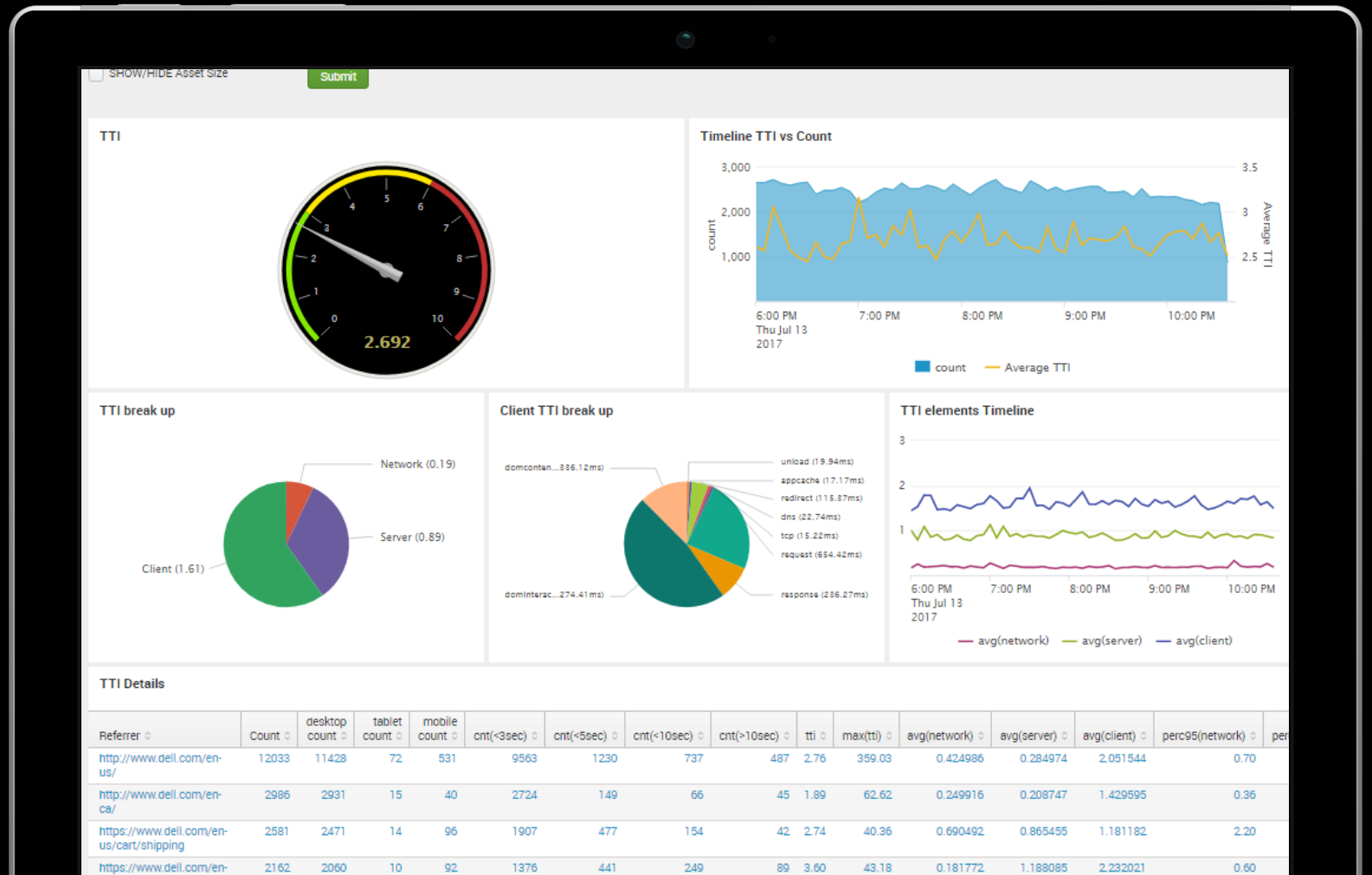
Winter is coming…

Splunk at Dell EMC

Our defense against Black Friday…



- eCommerce IT services
- Marketing effectiveness
- Security and threats
- Replatforming now

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Splunk Applications From Dell EMC

Extend the power of Splunk to Dell EMC Platforms

What are Splunk Apps?

Splunk applications and add-ons allow user to import data into Splunk from specific sources

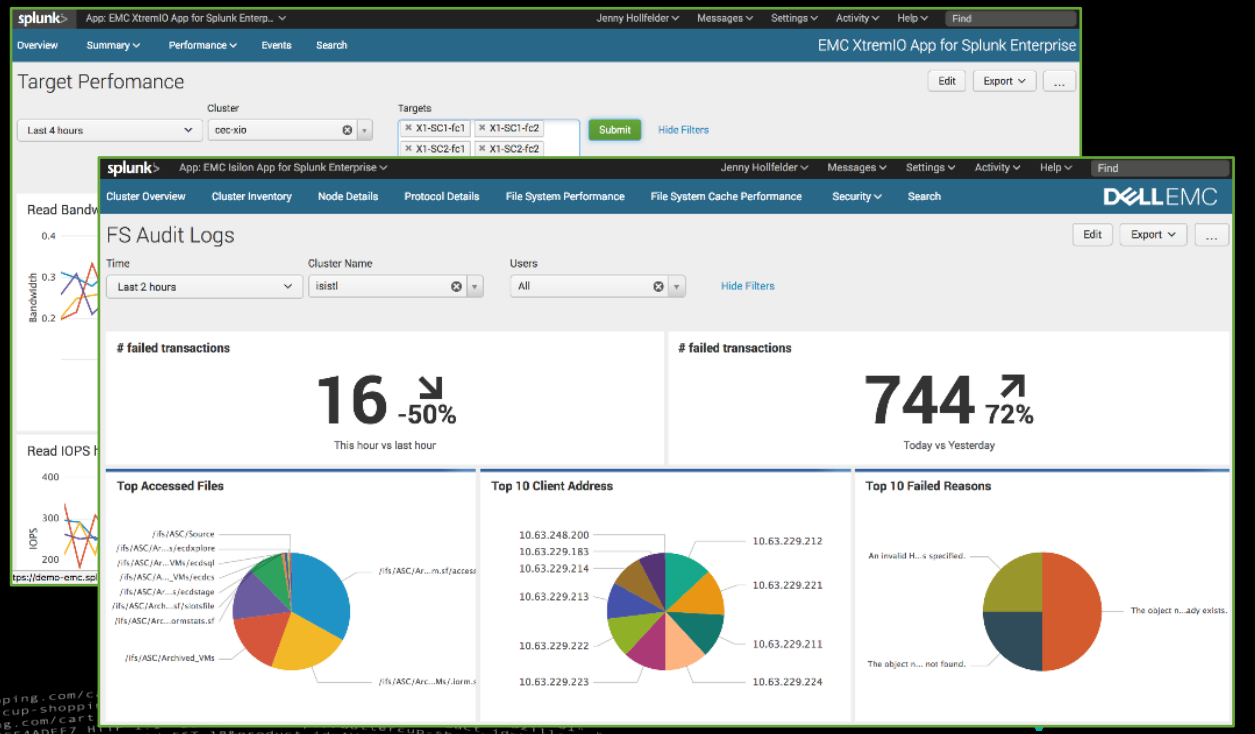
Splunk & its partners have created a rich community called SplunkBase that has 1000s+ applications

Why are Splunk Apps important?

Splunk apps and add-ons allow customers to incorporate new use cases and extend their Splunk environment. This leads to increased Splunk License needs as well as additional Hardware

Dell EMC has apps for the following:

- *VMAX*
- *XtremIO*
- *Isilon*
- *VNX*



Global Solution Centers

Validate. Evaluate. Collaborate. Innovate

Solution centers
Staffed with engineers and Blueprint solution experts

Engagements begin with your challenges

- Briefings with a team of experts
- Architectural design sessions
- Proofs of concept

Let our Splunk Ninjas help you!

- Trained by Splunk
- Splunk Architecture Experts
- Dell EMC Portfolio Experts
- Religious about Best Practices
- Available across the GLOBE!!!

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