

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.

The forward-looking statements made in this presentation are being made as of the time and date of its live presentation. If reviewed after its live presentation, this presentation may not contain current or accurate information. We do not assume any obligation to update any forward-looking statements we may make. In addition, any information about our roadmap outlines our general product direction and is subject to change at any time without notice. It is for informational purposes only and shall not be incorporated into any contract or other commitment. Splunk undertakes no obligation either to develop the features or functionality described or to include any such feature or functionality in a future release.

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"Our partnership with Splunk is incredibly important for our customers. Customers love AWS agility with Splunk visibility."

Andy Jassy, CEO, Amazon Web Services

Splunk's AWS Credentials



- amazon Partner Network

 ADVANCED TECHNOLOGY PARTNER
- amazon Partner Network

 TECHNOLOGY PARTNER









- SOFTWARE AS A SERVICE PARTNER

 THE AMOUNT OF THE AMOUNT OF
- SECURITY COMPETENCY

- AWS Advanced Technology Partner
- AWS Big Data Competency
- AWS Security Competency
- AWS DevOps Competency
- AWS Government Competency
- AWS Education Competency
- AWS IoT Competency
- AWS MSP Technology Provider
- AWS Marketplace Partner
- AWS Security by Design Program Partner

Why is Splunk Important for AWS Customers?

"You can't protect what you can't see."

"Security
monitoring will
make or break a
technology risk
management
program."



Best Practices for Securing Workloads in Amazon Web Services

Gartner, Neil MacDonald, Greg Young Assessing the Risk: Yes, the Cloud Can Be More Secure Than Your On-Premises Environment

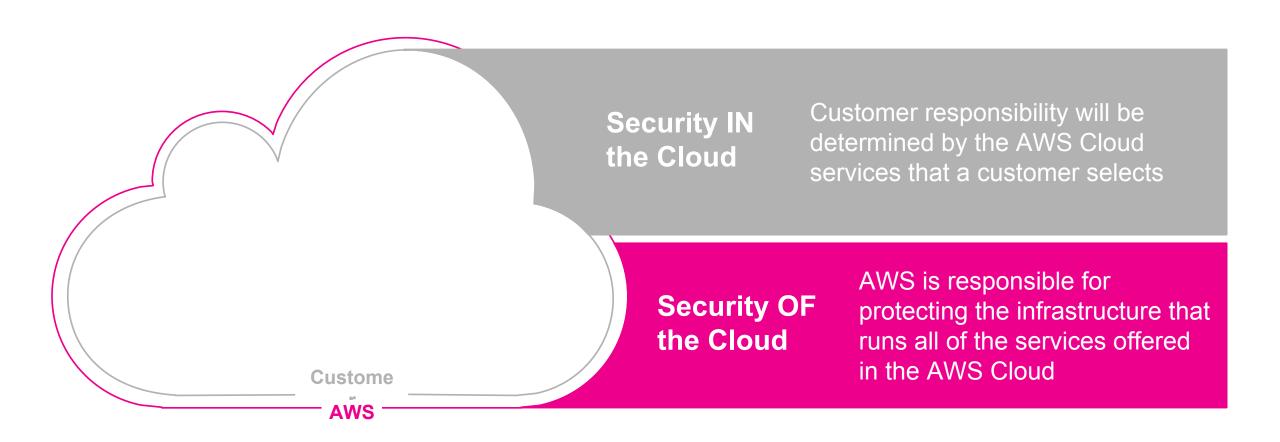
IDC, Pete Lindstrom

Amazon Web Services "Intro to AWS Security"

AWS Summit Series

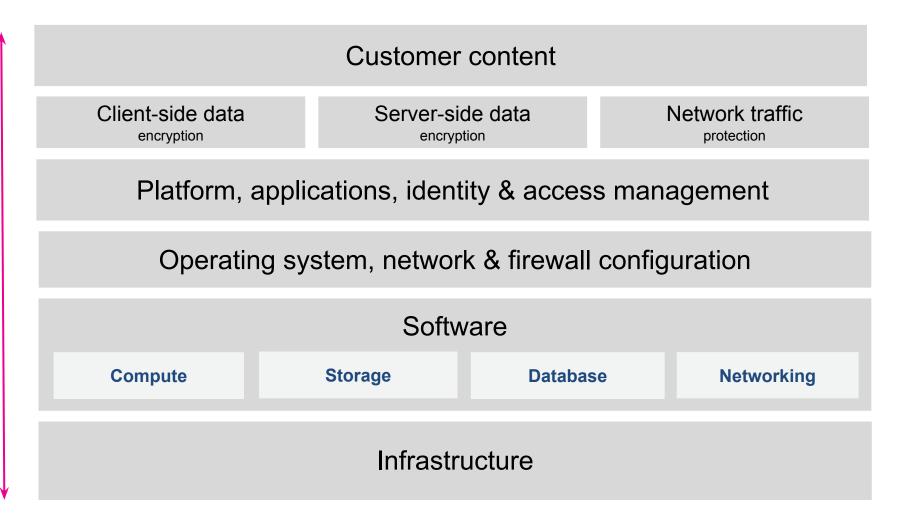


Shared responsibility model



Traditional on-premises security model

Customers are responsible for end-to-end security in their on-premises data centers

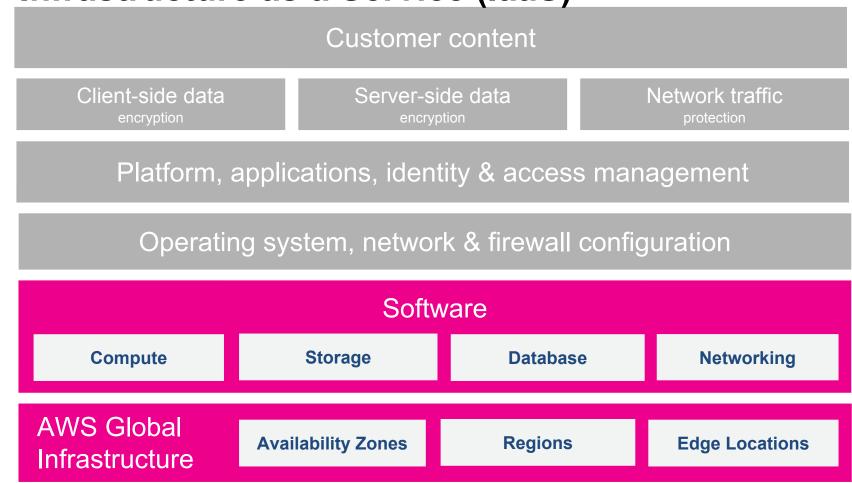




AWS / Customer shared responsibility Infrastructure as a Service (laaS)

Customer's responsibility

AWS takes over responsibility from customers





Splunk's Approach to Cloud Monitoring



Cloud Migration

Get visibility at all stages of the migration process – whether before, during or long after.



Manage Hybrid Infrastructure

Hybrid infrastructure creates a complex monitoring environment. Legacy tools can't keep up. Splunk can.



One Consolidated Solution

Splunk takes the place of the multitude of monitoring tools because sometimes one is better than many.



Cost, Capacity, and Resource Management

Understand how your resources are performing – and how many are being used – then optimize utilization and billing

Migrate securely to AWS with Splunk

An REI case study





Company overview

REI is a national outdoor retail co-op dedicated to inspiring, educating, and outfitting its members and the community for a lifetime of outdoor adventure and stewardship.

\$2.6B

2016 Revenue

17M

Co-op members

154

Retail stores in 36 states

Challenges

REI needed to extend its security posture to include edge protection of its Amazon Virtual Private Clouds (VPCs) as it migrated application to AWS.

It was determined that REI previously lacked:

- A solid investigation workflow that included its AWS deployment
- A secure ingress path for migrating applications to AWS
- A clear path for implementing a DevSecOps practice across all REI accounts and VPCs

Splunk is available in AWS Marketplace

Options for Splunk Cloud & Splunk Enterprise

AWS Marketplace Ease of Sale

- Easily discover & deploy software & SaaS
- Simplified buying process and consolidated AWS Billing reduces time to procure
- Automatic renewals
- One consolidated AWS bill
- Potential impact and "draw-down" on AWS EDP (Enterprise Discount Program) Contracts



Explore AWS Marketplace

Splunk Specifics

- Annual contract subscriptions & automatic discount for multi-annual options
- Buy Splunk Cloud in increments of 5GB to 100GB across all supported regions
- Easily upgrade Splunk license
- Marketplace seller private offers available for larger index volumes, apps and add-ons
- Splunk Enterprise licensing available via AWS Marketplace seller private offers

New! Splunk Insights for Infrastructure Pay-as-You-Go

The AWS & Splunk solution

AWS Services Used:

- Amazon Virtual Private Cloud
- AWS Application Load Balancer (ALB)
- Amazon GuardDuty
- AWS Config
- Amazon CloudWatch

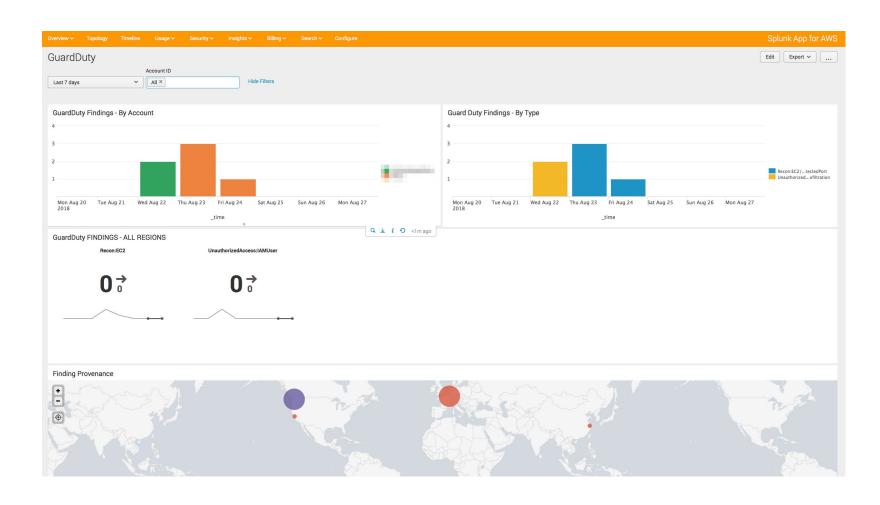
Splunk Products Used:

- Splunk Cloud
- Splunk Enterprise Security
- Amazon GuardDuty Add-on for Splunk
- Splunk App for AWS
- Splunk Add-on for Amazon Web Services

"The largest gain was through securing at the edge. This removed the need for individual dev teams to come up with edge protection models for public-facing endpoints. Splunk is helping us aggregate the Amazon VPC flow logs, AWS Application Load Balancer logs and Amazon GuardDuty logs for easy correlation, visualization and alerting."

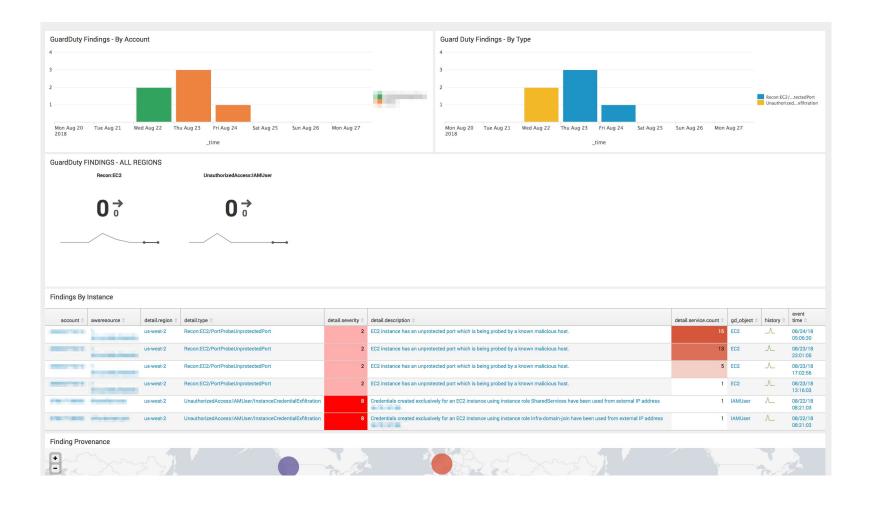
David Bell, Manager, Infrastructure and Cloud Services, REI

Splunk GuardDuty dashboard



- Moved Amazon GuardDuty findings to Splunk App for AWS to give security engineers a single source of information.
- Created panels to quickly see number of findings per account and overall numbers per finding type.
- Implemented dropdowns for time frame and to select individual AWS accounts

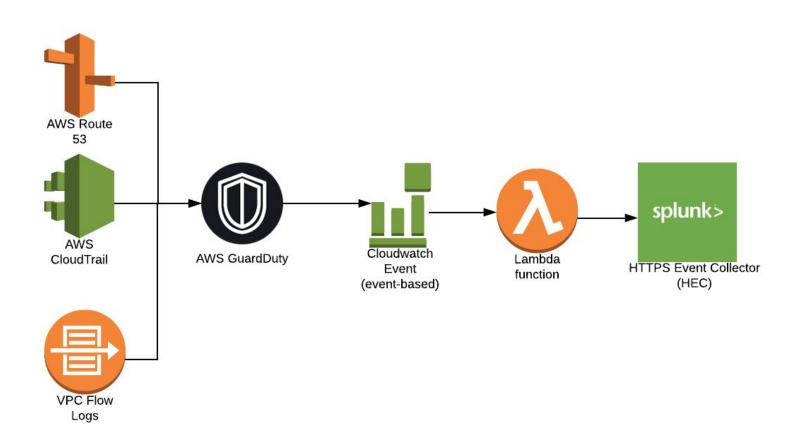
Splunk GuardDuty dashboard



- Updated hidden drill down panel to work with new custom panels.
- Quickly gives security engineers information concerning AWS accounts, Amazon EC2 instances, and AWS IAM roles.



Splunk GuardDuty data flow



- AWS GuardDuty analyzes information from Route 53, CloudTrail, and VPC Flow Logs.
- AWS Cloudwatch Event triggers a Lambda.
 Immediately for the first alert, every six hours afterwards.
- Lambda function sends
 CloudWatch data to a Splunk
 HTTPS Event Collector.
- Note: The Splunk Lambda blueprints and video was extremely helpful in getting this configured.

Business benefits

REI gained:



Real-time visibility across applications, services, and security infrastructure



Threat intelligence, alerting, security monitoring, and troubleshooting

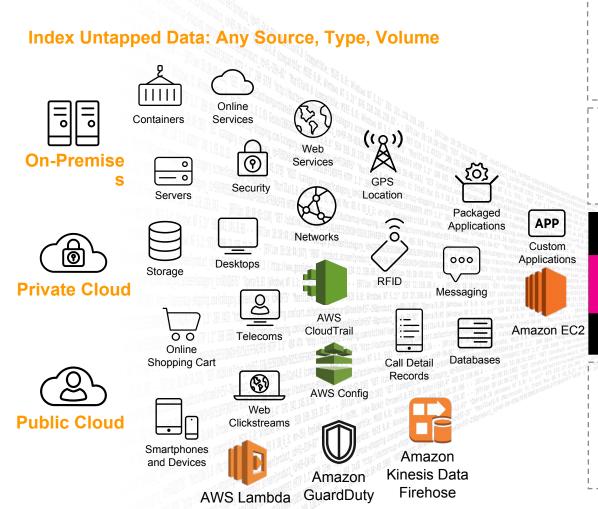


Enhanced edge security as applications migrate to AWS



Faster time-to-value and ease of use which reduces staffing challenges

Splunk and AWS













Ad hoc search

Monitor and alert

Report and analyze

Custom dashboards

Developer Platform

AWS App & Add-on

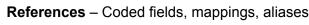
Real-Time Machine Data





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Dynamic information – Stored in non-traditional formats

Environmental context – Human maintained files, documents

System/application – Available only using application request

Intelligence/analytics – Indicators, anomaly, research, white/blacklist

Splunk's approach to AWS migration



AWS Migration

Get visibility at all stages of the migration process – before, during, and after. Baseline performance and cost metrics.



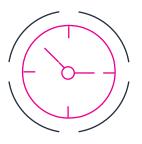
Manage Hybrid Infrastructure

Hybrid infrastructure creates a complex monitoring environment. Splunk enables you to keep up.



One Consolidated Solution

Manage security and IT Ops. Monitor service-level down to system-level in a single view.



Cost, Capacity, and Resource Management

Understand how resources are performing – measure against baselines – then optimize utilization and billing.

Splunk Portfolio of AWS Solutions

End-to-End AWS Visibility

splunk>
App for AWS

Available on Splunk
Enterprise, Splunk Cloud and
Splunk Light

Integrates with AWS
CloudTrail, Config, Config
Rules, VPC Flow Logs,
Inspector, Billing, CloudFront,
ELB Access Logs, S3 Access
Logs, Personal Health, &
CloudWatch



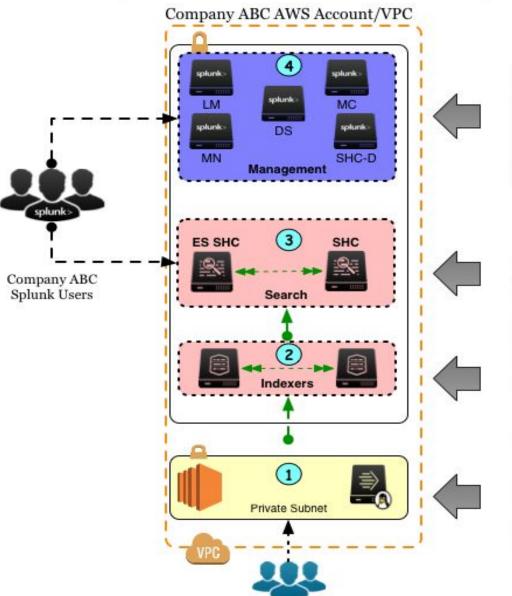


Architecture Layers

3 Primary Components

- Ingestion (Data Acquisition)
- Index/Search (Map Reduce/Query)
- Management

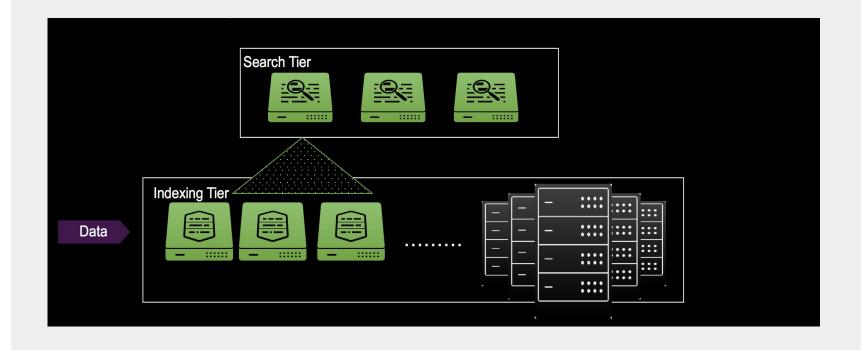




Company ABC Users

Architecture Tips

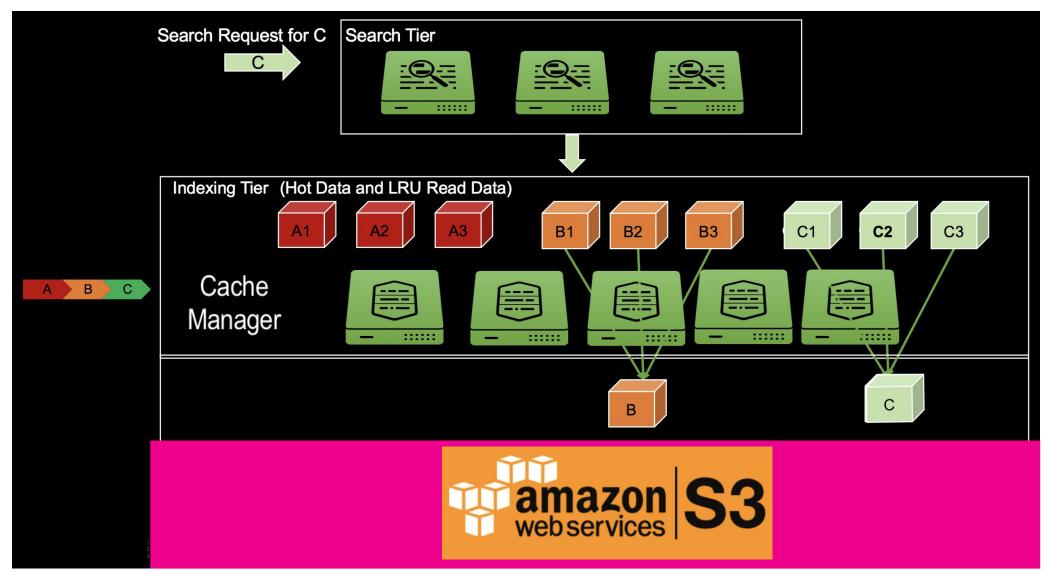
Splunk – Indexer Data Replication (IDR)



Adding new indexers in response to data growth is expensive \square High cost Searches typically run over only on a partial subset of data \square Inefficient utilization

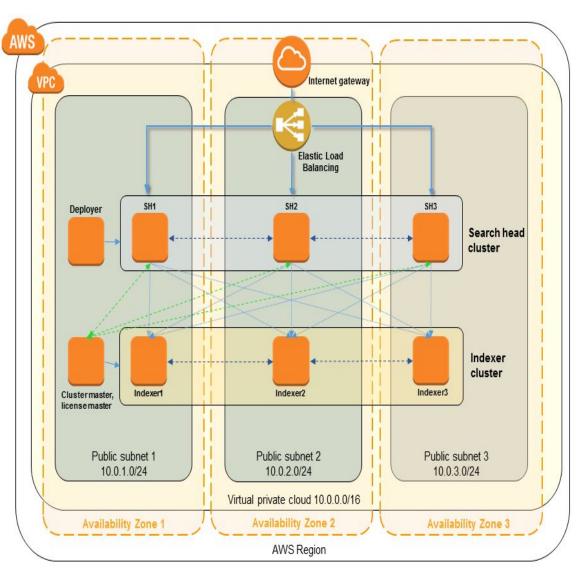


Splunk - Smart Store (S2) (Only available for Splunk 7.2 and above)



Splunk AWS QuickStart (IDR only) – Splunk in 45 mins

- Splunk indexer cluster with the number of indexers you specify (3-10)
- Splunk search heads, either stand-alone or in a cluster
- Splunk license server and indexer cluster master
- Splunk search head deployer
- (Optional) User-provided Splunk apps and/or add-ons

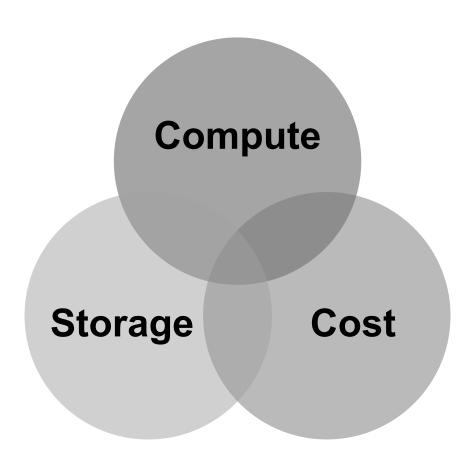


HA & DR Strategy

- Determine required level of failure tolerance:
- AZ | Region | Combination thereof

Instance Type Selection Strategy

- Selecting a base instance type is a **balancing act between compute**, **storage and cost**.
- C5, M5 and I3 types are good choices for Indexers and Search Heads.
- EBS, though redundant in the backend, cannot replace indexer clustering and for some instance types is mandatory
- SSD ephemeral storage for D and I instance types performs very well but should be used only in clustered deployments



Instance Selection Examples

Instance Type (Indexer)	Daily Index Volume in GB	
c5.9xlarge (IDR) or i3.4xlarge (S2)	Up to 100	
c5.9xlarge (IDR) or i3.8xlarge (S2)	Up to 300/250 – 1TB -> 4 IDX	

Instance Type (Search Head)	Concurrent Users
c5.9xlarge – Core, ES	Up to 16

When using Splunk premium solutions, such as Splunk® Enterprise Security (ES) or Splunk® IT Service Intelligence (ITSI), we recommend indexer instance types with a larger memory footprint.

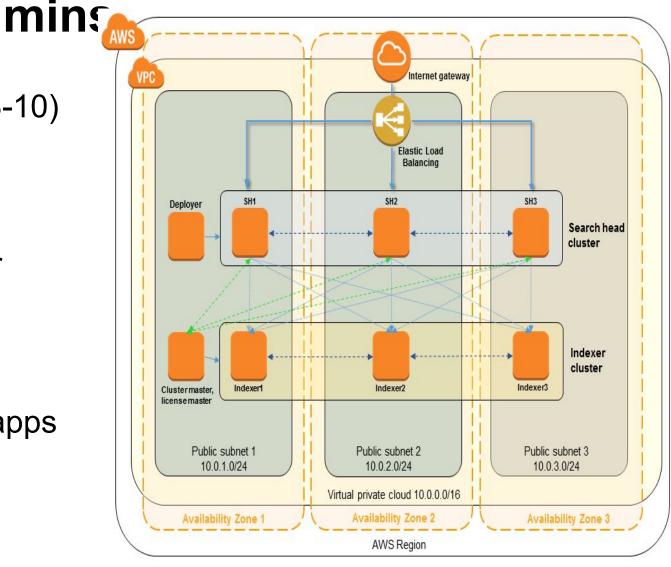
Storage Selection Examples

SPLUNK			AWS
Bucket Stage	Description	Searchable	Storage Option
Hot	Contains newly indexed data. Open for writing. One or more hot buckets for each index.	Yes	EBS gp2 Instance Storage*
Warm	Data rolled from hot. There are many warm buckets. Warm buckets are readonly.	Yes	EBS gp2 Instance Storage*
Cold	Data rolled from warm. There are many cold buckets. Cold buckets are read-only.	Yes	EBS gp2 EBS st1 or sc1
Frozen	Data rolled from cold. The indexer deletes frozen data by default, but you can also archive it. Archived data can later be thawed.	No	S3 Glacier

Splunk AWS QuickStart (IDR only) – Splunk in 45

 Splunk indexer cluster with the number of indexers you specify (3-10)

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Real-Time Data Analytics, IT Monitoring & Troubleshooting

A FINRA case study





Company overview

FINRA - the Financial Industry Regulatory Authority - is the largest independent regulator for all securities firms doing business in the United States. FINRA's mission is to protect investors by making sure the US securities industry operates fairly and honestly.

Up to 99B

Financial transactions monitored every day

1,369

Fraud cases referred to the SEC (U.S. Securities and Exchange Commission) in 2017 \$66.8M

Restituted to harmed investors in 2017

Challenges

FINRA needed to integrate its processes into a DevSecOps workflow in order to keep up with the constantly evolving security industry.

It was determined that FINRA previously lacked:

- An automation pipeline for both its operational workflow and security posture
- A way to effectively stay ahead of compliance guidelines and security best practices
- The ability to scale up and down at any time, to match surges in compute and storage capacity needs

More data & analytics on AWS than anywhere else





































































































































































Splunk is available in AWS Marketplace

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Explore AWS Marketplace

Splunk Specifics

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New! Splunk Insights for Infrastructure Pay-as-You-Go

The AWS & Splunk solution

FINRA has been able to bridge the gap between its security and operations teams.

FINRA:

- Moved into serverless computing environment on AWS
- Started leveraging AWS Lambda to run code without provisioning or managing servers
- Began ingesting and logging more data than ever from over 170 applications
- Integrated Amazon Kinesis Data Firehose to deliver real-time streaming data to Splunk

"The insights from Splunk allow us to use more AWS services. We are putting our crown jewels — our ability to take every transaction every day on almost every U.S. stock and options market and analyze that data in the cloud — and we are using Splunk to assure that it is secure. Splunk and AWS together give us an unparalleled ability to protect investors."

Gary Mikula, Director, Cyber and Information Security, FINRA



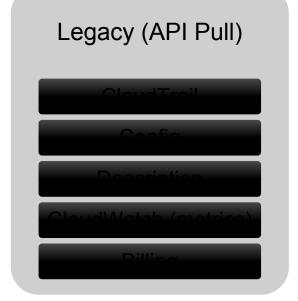
Getting Data from AWS



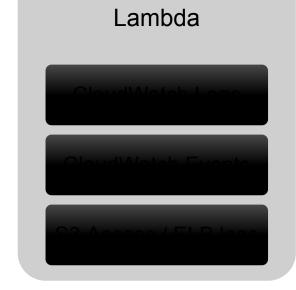




Heavy Forwarder









Server

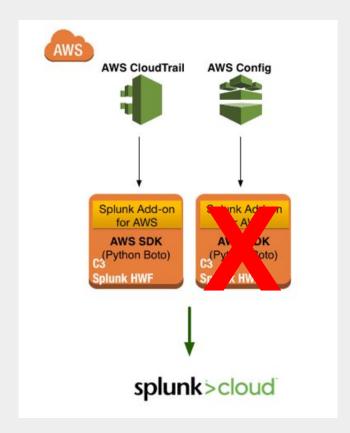
Serverless



Architecture Tips

Splunk – SQS based S3 vs. Legacy Modular Input

- Legacy Modular Input does not have fault tolerance. If one HWF goes down, then it can no longer collect the data and send it to get indexed
- Each HWF must maintain state, which means that upon failure you will have to move the input to another working node
- The data collection cannot be load balanced across tiers

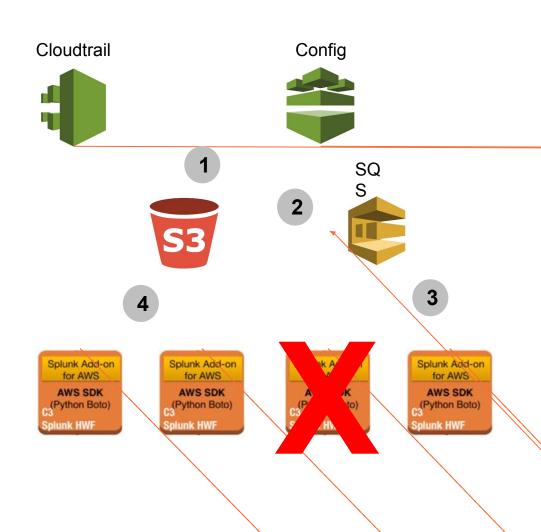


splunk> .config

SQS Based S3 vs. Legacy Modular Input

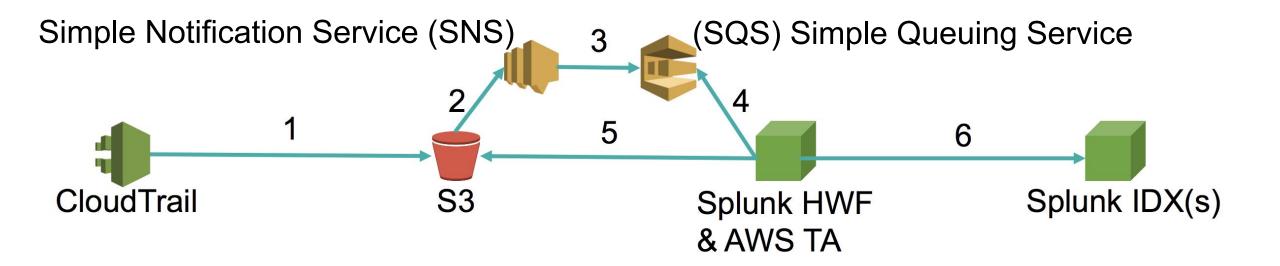
SQS Based S3 input is a more scalable approach to collect AWS Data

- Fault tolerant data collection. If one node fails, another node will collect the data.
- Once data is in S3, event is posted to SQS. Any of HWF can then pickup SQS Msg and get data.
- Each HWF is stateless and will not impact the data collection from any other node.
- Data collection can be load balanced across multiple heavy forwarder nodes.



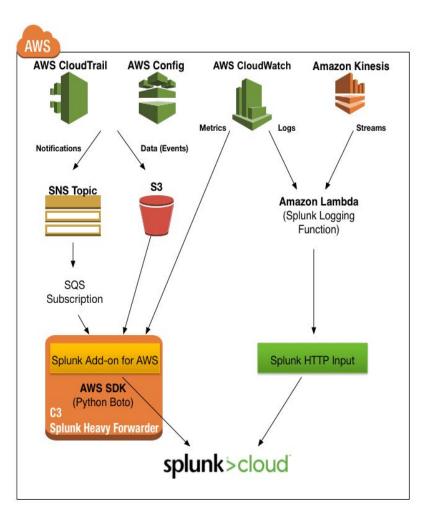
SQS-Based S3

Example Flow



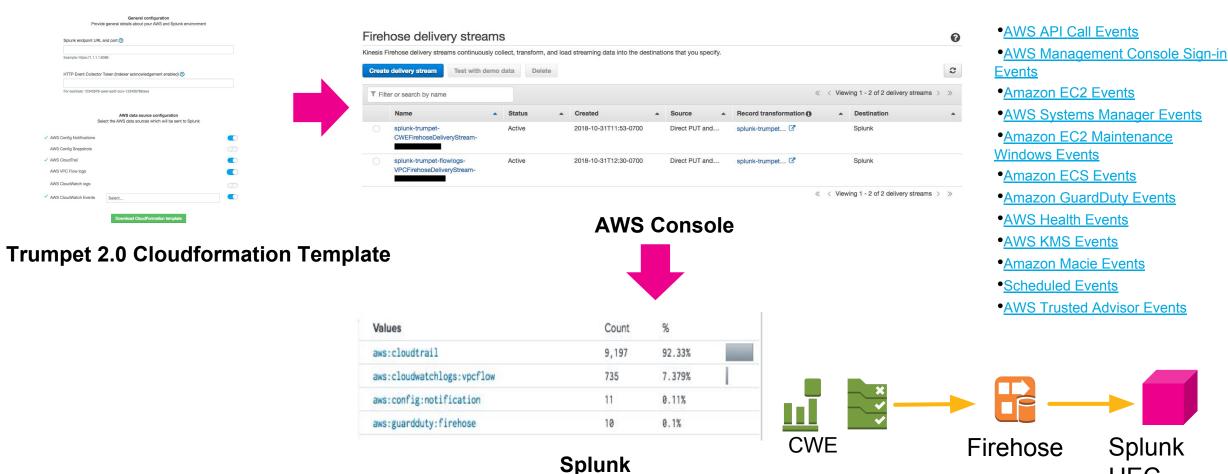
General guidance when collecting AWS Data

- Collect AWS data using a Splunk Heavy
 Forwarder for SQS Based S3 and other modular
 inputs (Billing, Inspector, Config Rules,
 Description etc.) (Managed in Splunk Cloud)
- Collect high volume data using Lambda Function to Splunk HTTP Event Collector (HEC)
- Kinesis Firehose can collect data in real-time with a built in buffer plus a "splash back" to an S3 bucket.



Trumpet 2.0

Automated AWS Configuration for Splunk Add-On



Dynamically generated CloudFormation sets up customized Firehose transport to Splunk



End-to-end visibility with Splunk Cloud and AWS

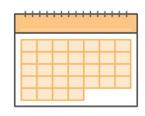
A PagerDuty case study





pagerduty

PagerDuty-at-a-Glance



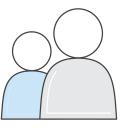
Founded in 2009



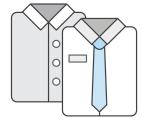
Cloud-based incident resolution



Based in San Francisco



200,000+ Users



9,000+ customers Startups to Fortune 500



Advanced Technology Partner



Quarter million incidents per day



200+ Native Integrations

PagerDuty's Security Challenge

PagerDuty needed to take a more elastic security stance to investigate and respond quickly in order to:

- Monitor and triage threats
- Maintain security posture
- Mitigate risk
- Ensure optimal customer experience and minimize service interruption
- Meet operational analysis needs

PagerDuty had previously relied on a logging solution that output data—not answers, and couldn't scale to meet the growing business needs.

The Solution – Why Splunk?

PagerDuty adopted **Splunk Cloud** running on **AWS** in order to:

- Speed incident investigations and response times
- Provide analysts with rich contextual info for informed decision-making
- Mitigate risk
- Provide high availability of its services
- Scale to meet customer demand as needed
- Reduce cost by 30% over previous solution

Splunk is available in AWS Marketplace

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New! Splunk Insights for Infrastructure Pay-as-You-Go

Enterprise-wide Visibility and High Availability

Security

Ensures product security; fast time to investigate, minimizes risk and downtime

Compliance

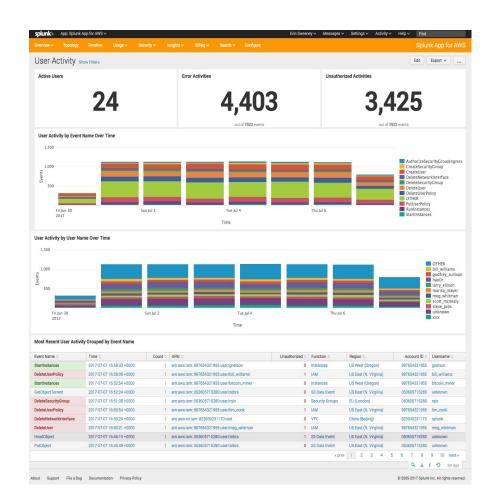
Automated daily searches ensure compliance across a range requirements with no manual intervention

Operations

Delivers on goal of being one of most highly available services worldwide

Application Development

Enables DevOps/ Distributed Operations with real time visibility into production environments



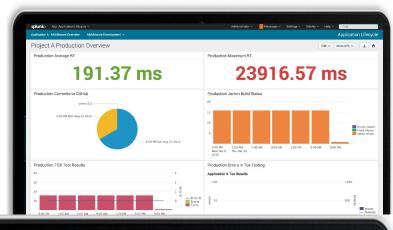


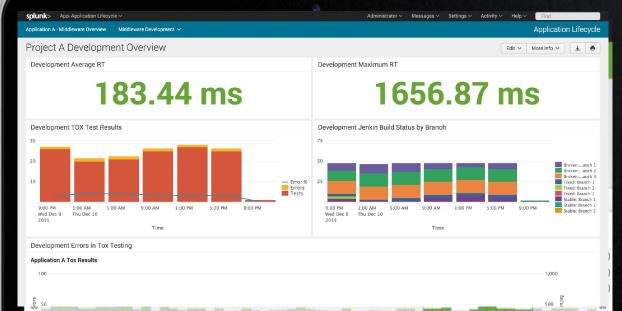
Enhancing Security and Compliance

- Prior solution provided data...but not answers
- Made our security program more effective and easier to run
- Threshold-based alerts helps minimize alert fatigue, prioritize investigations
- Dashboards quickly pinpoint anomalies warranting further investigation
- Eliminates need for disparate tools
- AWS App provides change mgt./change tracking audit trail for compliance

Powering Engineering and Distributed Operations

- Delivering new product securely with speed and agility
- Historical trending helps team understand where to invest energy
- Keep engineering resources focused on running the business and customer satisfaction versus tools maintenance

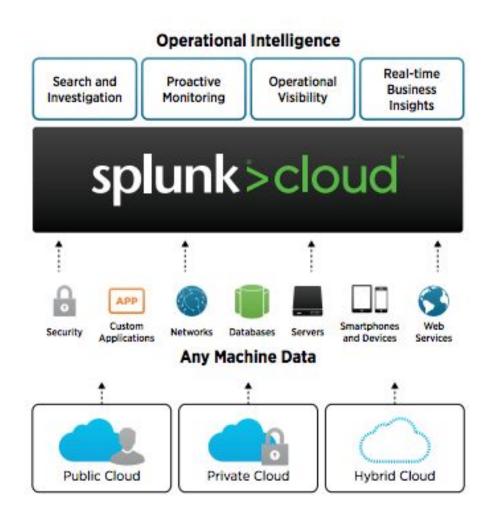




Business Analytics and Beyond

- Finance team using platform for visibility into customer usage trends
 - Leading indicator of renewals/ at-risk accounts

 Execs and Product Management use Splunk for view into overall business health





Summary of Results

PagerDuty deployed **Splunk Cloud** as its platform for operational visibility and triage across the business—from IT operations monitoring to security and compliance.

With Splunk Cloud, Engineering has a solution for monitoring and alerting, and then can dig deeper into the source of issues and resolve them quickly.

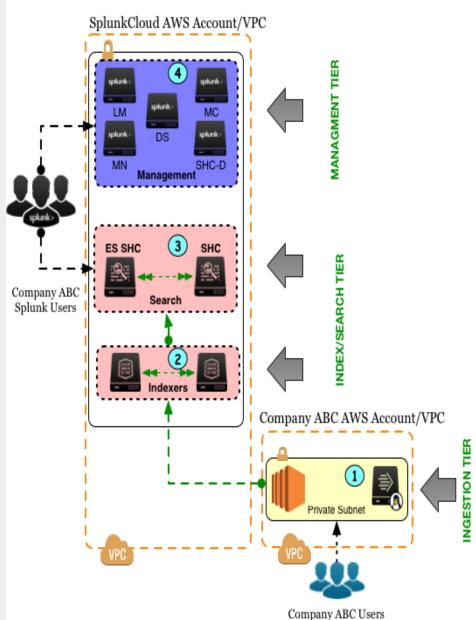
- Ensured customer satisfaction and highly available cloud services
- Reduced IT & security incident resolution from hours to minutes & seconds
- Realized 30% cost savings over prior service

Architecture Tips

SplunkCloud - SaaS

- You only have one Primary Concern: Send data to SplunkCloud which runs in Splunk's AWS Account.
- Data can be sent to Splunk Cloud using a Splunk forwarder (Universal Forwarder).
- You can use the REST API, HEC, and SDKs with Splunk Cloud.





Managing Splunk Is More Than Just Software

	Responsibility	Splunk Ent Deployed On-Premises	Splunk Ent BYOL Deployed on AWS	Splunk Cloud
Admin tasks: One-time setup	Purchase/rent HW	Customer	AWS	Splunk
	Rack and stack, cable, network all HW	Customer	AWS	Splunk
	Install Splunk	Customer	Customer	Splunk
	Install OS	Customer	AWS*	Splunk
	Configure Splunk (create users, load apps, configure	Customer	Customer	Splunk
	Configure indexes	Customer	Customer	Splunk
	Setup HA/clustering	Customer	Customer	Splunk
	Setup disaster and recovery	Customer	Customer	Splunk
	Configure forwarders	Customer	Customer	Joint
	Onboard data	Customer	Customer	Joint
	Integrate with LDAP/AD	Customer	Customer	Joint
Admin tasks: ongoing	Scale up HW	Customer	Customer	Splunk
	Install Splunk patches / upgrades	Customer	Customer	Splunk
	Install OS patches / upgrades	Customer	Customer	Splunk
	Monitor deployment / health checks	Customer	Customer	Splunk
	Manage forwarders	Customer	Customer	Customer
	Create users / roles	Customer	Customer	Customer
	Manage indexes	Customer	Customer	Customer
	Onboard additional data	Customer	Customer	Customer
	Load search head only apps	Customer	Customer	Splunk
	Load distributed apps	Customer	Customer	Splunk
	Load premium apps	Customer	Customer	Splunk
	Export data	Customer	Customer	Splunk
User tasks	Search, alerts, reports, dashboards	Customer	Customer	Customer

AWS Marketplace

A brief overview

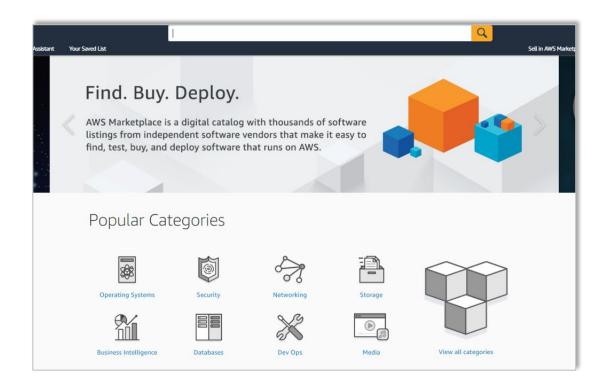




A growing digital software catalog

aws marketplace

- Deploy software on demand
- 1,400+ ISVs
- 300 Security ISV's
- Over 4,800 product listings
- 200,000 active customers
- 100,000 + active security subscriptions
- Over 650 million hours of EC2 deployed monthly
- Deployed in 18 regions
- Offers 39 categories
- Flexible consumption and contract models
- Easy and secure deployment, almost instantly
- · One consolidated bill
- Always evolving





Largest ecosystem of security partners and solutions

Infrastructure security







ALERT LOGIC













Identity & access control







Data protection





Configuration & vulnerability analysis

























Logging & monitoring



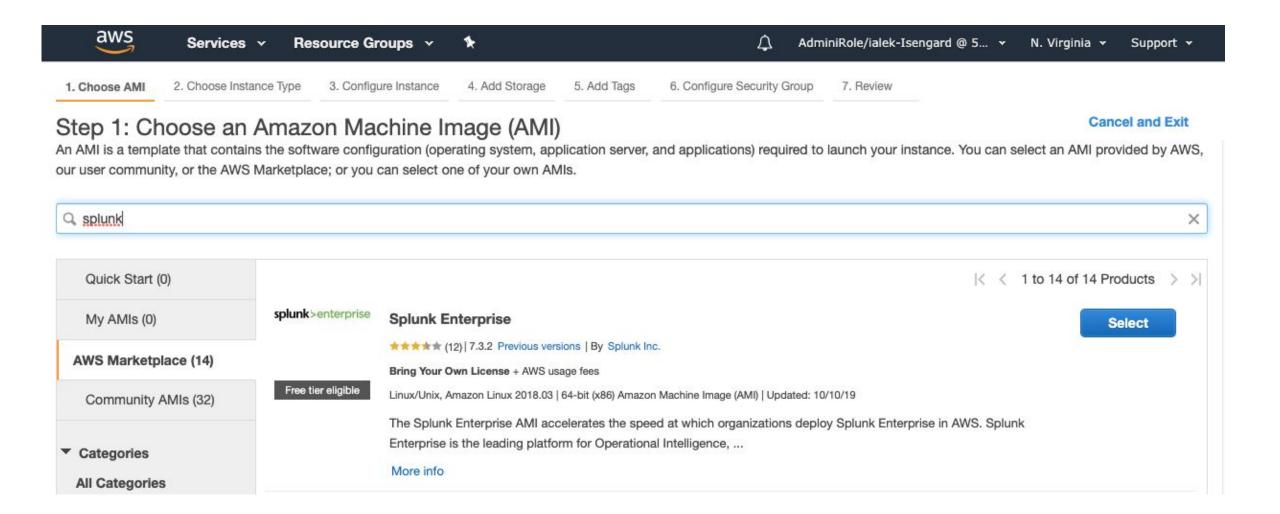








Demo





Flexible software build and delivery

AWS Marketplace deployment options

Amazon Machine Image



 Ideal for single instance solutions deployed directly into customer's VPC

 You can offer customers maximum flexibility with BYOL, pay-for-what-you-use, free trials and curated Open Source options

CloudFormation Template



 Third-party software combined with AWS services

 You can offer complete solution implementation, including multi-instance, tie-ins to AWS Services and high-availability cluster architectures

SaaS



- Your SaaS solution with subscription and tiered contract options, including annual and multi-year contracts
- Enables you to integrate AWS Marketplace discovery and procurement directly to your SaaS solution

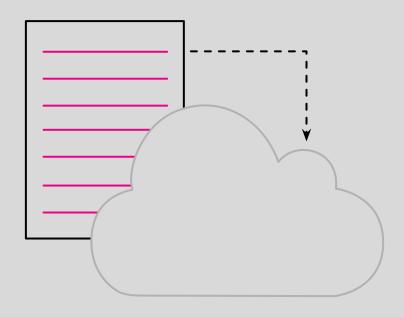
API



 Designed to integrate directly to an application

 You can offer customers high-consumption API products with simple pay-as-you-go pricing

AWS Marketplace Migration Mapping Assistant



Accelerate your migration to AWS by finding matching software in AWS Marketplace

Run a bulk search and find matching software from existing inventory of on-premises applications

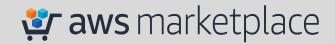
Software is available to purchase and deploy from AWS Marketplace

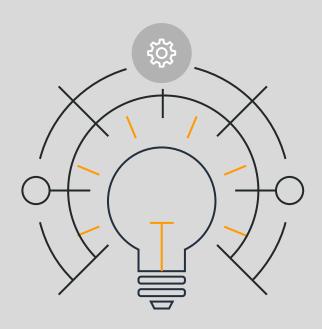
Find alternative products in the same category if matching software is not available



Always evolving

Recent innovations from







Machine Learning for AWS Marketplace



AWS Marketplace for Containers



Private Marketplace



Enterprise Contract for AWS Marketplace



AWS Marketplace Seller Private Offers



AWS Marketplace Migration Mapping Assistant



Consulting Partner Private Offers



AWS Marketplace Private Image Build (Public Beta)



AWS Marketplace Flexible Payment Scheduler



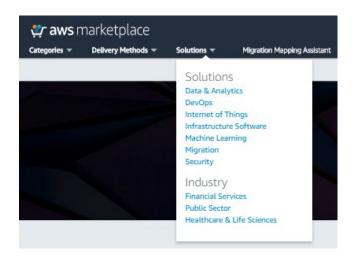
Subscribe > Configure > Launch

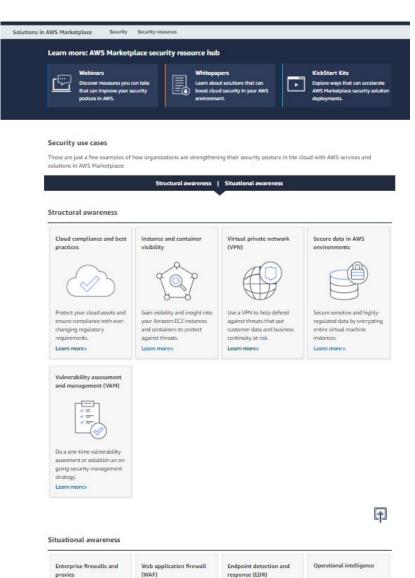


SaaS Contracts with Consumption



AWS Marketplace Solutions Finder







for superior threat protection



Key Takeaways

It's all about choice

Performance-oriented
Cost-oriented

- Splunk and AWS partner across data ingestion, cloud migration and AWS best practices to ensure joint customer success
- Splunk provides both poll-based and streaming data ingestion options to derive IT, Security, Cost Management and IoT insights
- 3. You can get started with Splunk Cloud or Splunk Enterprise on AWS Marketplace.
- 4. Using QuickStart you can deploy reference architecture in less than an hour

conf19 splunk>

Thank You!