Splunk4Industry: Manufacturing

Hands-On Workshop

#Splunk4Industry

splunk>

Forward-looking statements

This presentation may contain forward-looking statements regarding future events, plans or the expected financial performance of our company, including our expectations regarding our products, technology, strategy, customers, markets, acquisitions and investments. These statements reflect management's current expectations, estimates and assumptions based on the information currently available to us. These forward-looking statements are not guarantees of future performance and involve significant risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from results, performance or achievements expressed or implied by the forward-looking statements contained in this presentation.

For additional information about factors that could cause actual results to differ materially from those described in the forward-looking statements made in this presentation, please refer to our periodic reports and other filings with the SEC, including the risk factors identified in our most recent quarterly reports on Form 10-Q and annual reports on Form 10-K, copies of which may be obtained by visiting the Splunk Investor Relations website at www.investors.splunk.com or the SEC's website at www.sec.gov. The forward-looking statements made in this presentation are made as of the time and date of this presentation. If reviewed after the initial presentation, even if made available by us, on our website or otherwise, it may not contain current or accurate information. We disclaim any obligation to update or revise any forward-looking statement based on new information, future events or otherwise, except as required by applicable law.

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. We undertake no obligation either to develop the features or functionalities described, in beta or in preview (used interchangeably), or to include any such feature or functionality in a future release.

splunk>

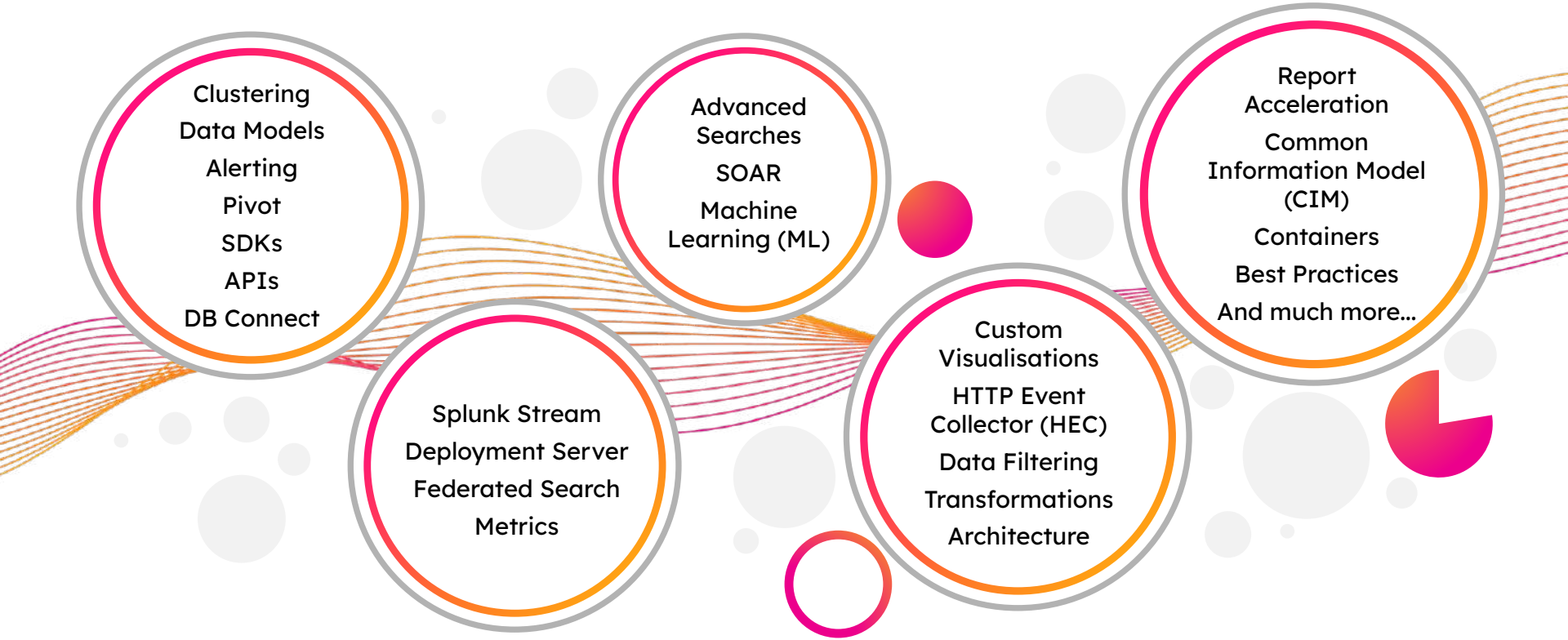
Please introduce yourself!

- Name
- Company/organisation
- Role
- Are you currently using Splunk?
- What does monitoring in Manufacturing mean to you?

Workshop Agenda

- Introduction to Splunk: Building digital resilience
- Splunk in the Manufacturing Industry
- Navigating Splunk, exploring data, building dashboards
- Exploring an IIoT use case
- Security in Operational Technology
- Business Service Intelligence

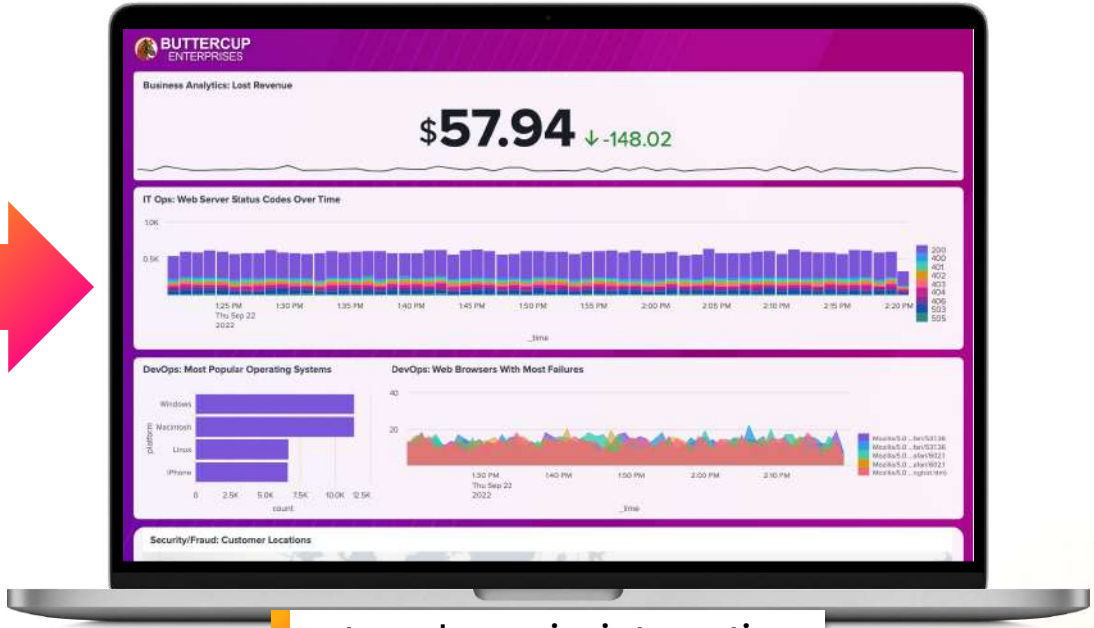
There’s a lot to learning Splunk!



Visit https://splunk.com/training to learn more!

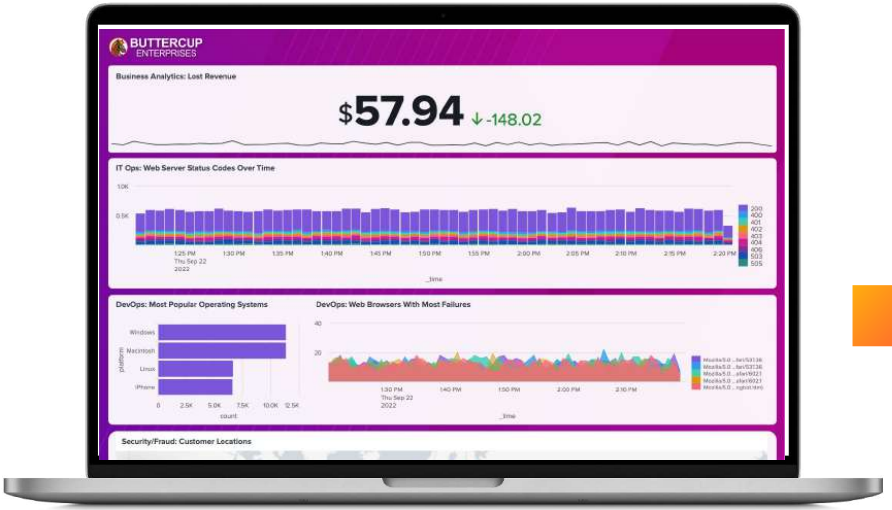
1st Objective for Today

Go from messy machine data…



…to a dynamic, interactive dashboard!

2nd Objective for Today



Dynamic, interactive dashboard

…to Business Service Insights

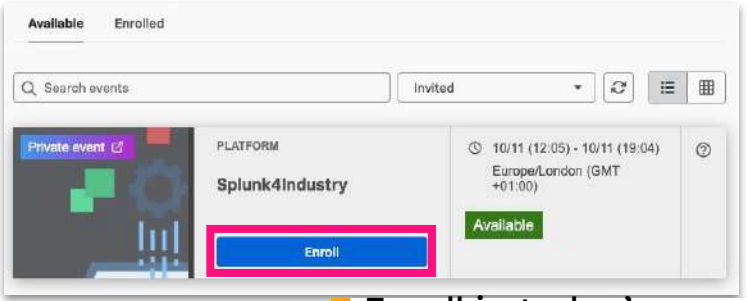
Enroll in Today's Workshop

Tasks

1. Get a splunk.com account if you don't have one yet:
   https://splk.it/SignUp
2. Enroll in the Splunk Show workshop event:
   https://show.splunk.com/event/<eventID>
3. Download the hands-on lab guide:
   https://splk.it/Manu-Lab-Guide

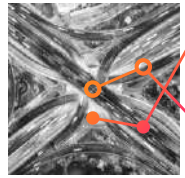
   Contains step-by-step instructions for all of today's exercises!
4. Download a copy of today's slide deck:
   https://splk.it/Manu-Attendee

Goal



Enroll in today's event

What is Splunk?



Data is your Competitive Advantage

Data isn't just a record.
Data makes things happen.
Splunk makes it possible.

splunk> turn data into doing

Turning Real-time Data Into Action is Hard

Data Silos

Hybrid Environments

Legacy Systems

Fragmented Cloud Services

New Cloud Native Apps

Point Data Management Solutions

The Power of Splunk

Delivering Unified Security and Observability

See

End-to-end visibility

No sampling or blind spots

Act

Investigate across massive data sets and take **action** fast

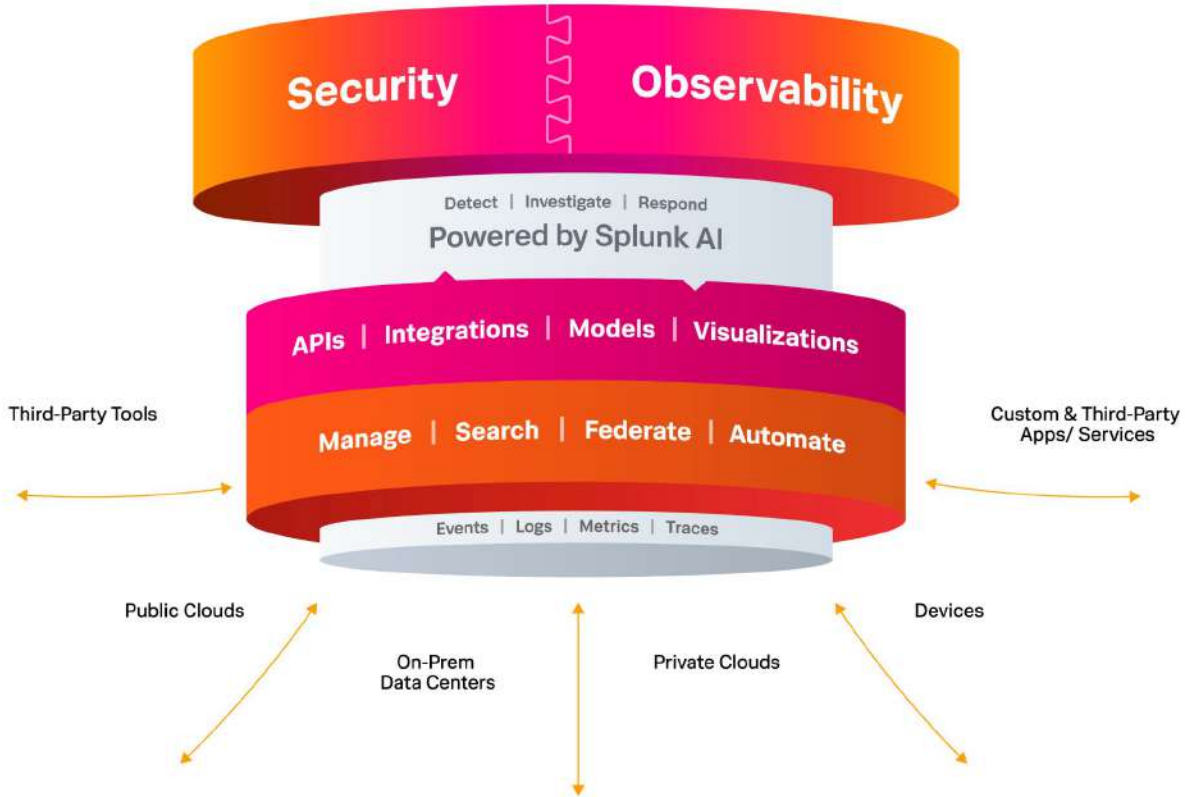
Extend

Extend the **platform** to use data to solve problems across the business

Splunk enables faster detection, investigation and response

- ✓ Hybrid
- ✓ Scalable
- ✓ Interoperable

The Unified Security and Observability Platform



Splunk as a Service

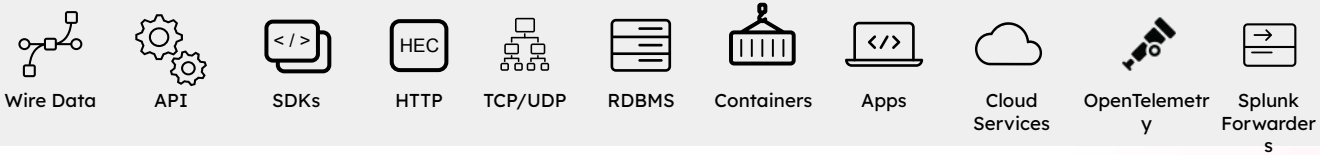
Fastest time to value | Minimum Infrastructure | Maximum Value

3 Simple Steps:

1. Onboard data
2. Onboard users
3. Get value from your data

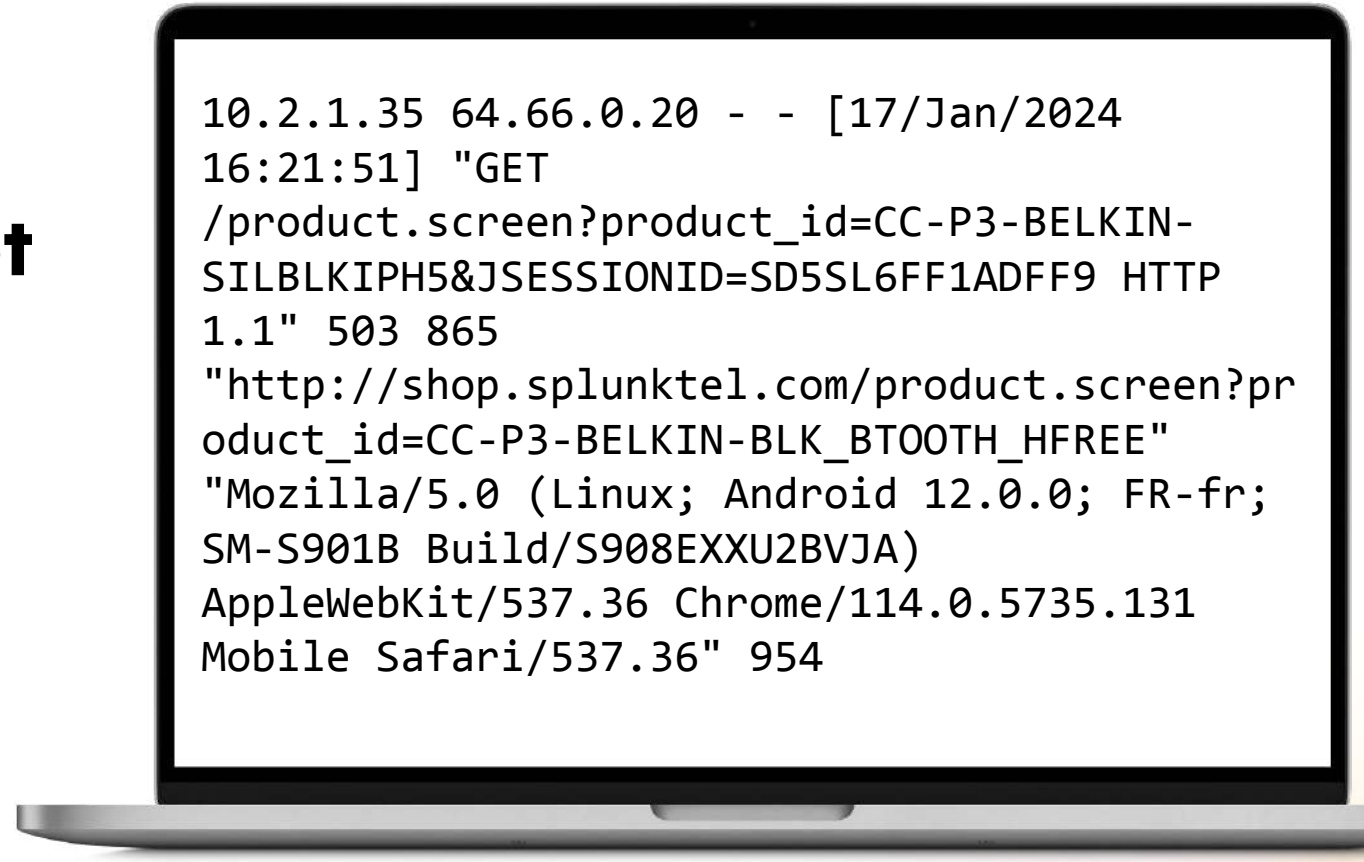
- **Fastest time to value**
- **Software as a service** - AWS or GCP
- **Secure** - ISO 27001, SOC 2 Type II, PCI DSS, HIPAA, FedRAMP Moderate, DoD IL5, IRAP
- **Encryption-in-transit** - plus optional encryption-at-rest
- **Resilient infrastructure**
- **100% uptime guarantee**
- **24/7 NOC/SOC support team**

Flexible options for data collection and forwarding



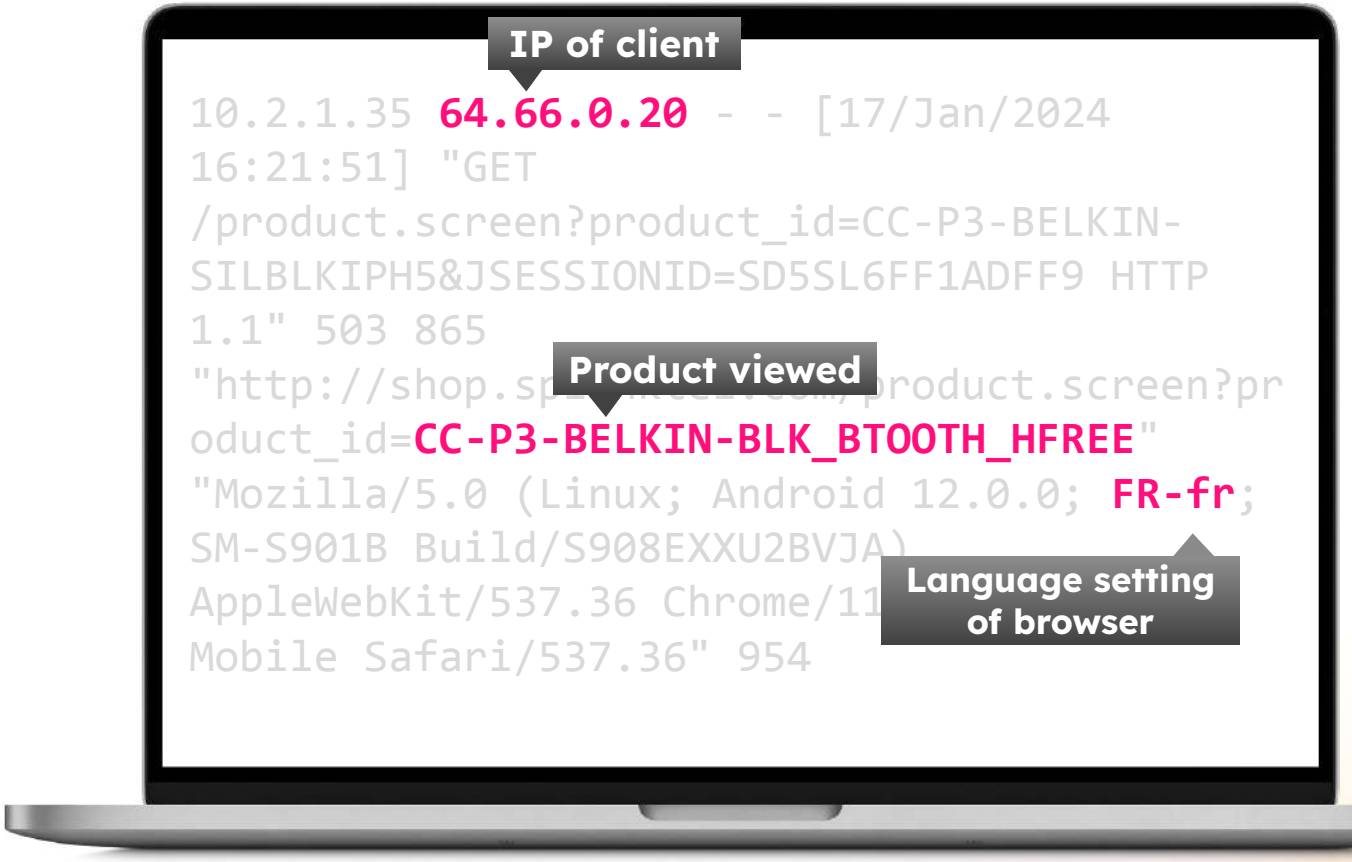
Splunk Cloud Service Description: https://splk.it/SplunkCloudServDesc

Machine data is valuable not complex!



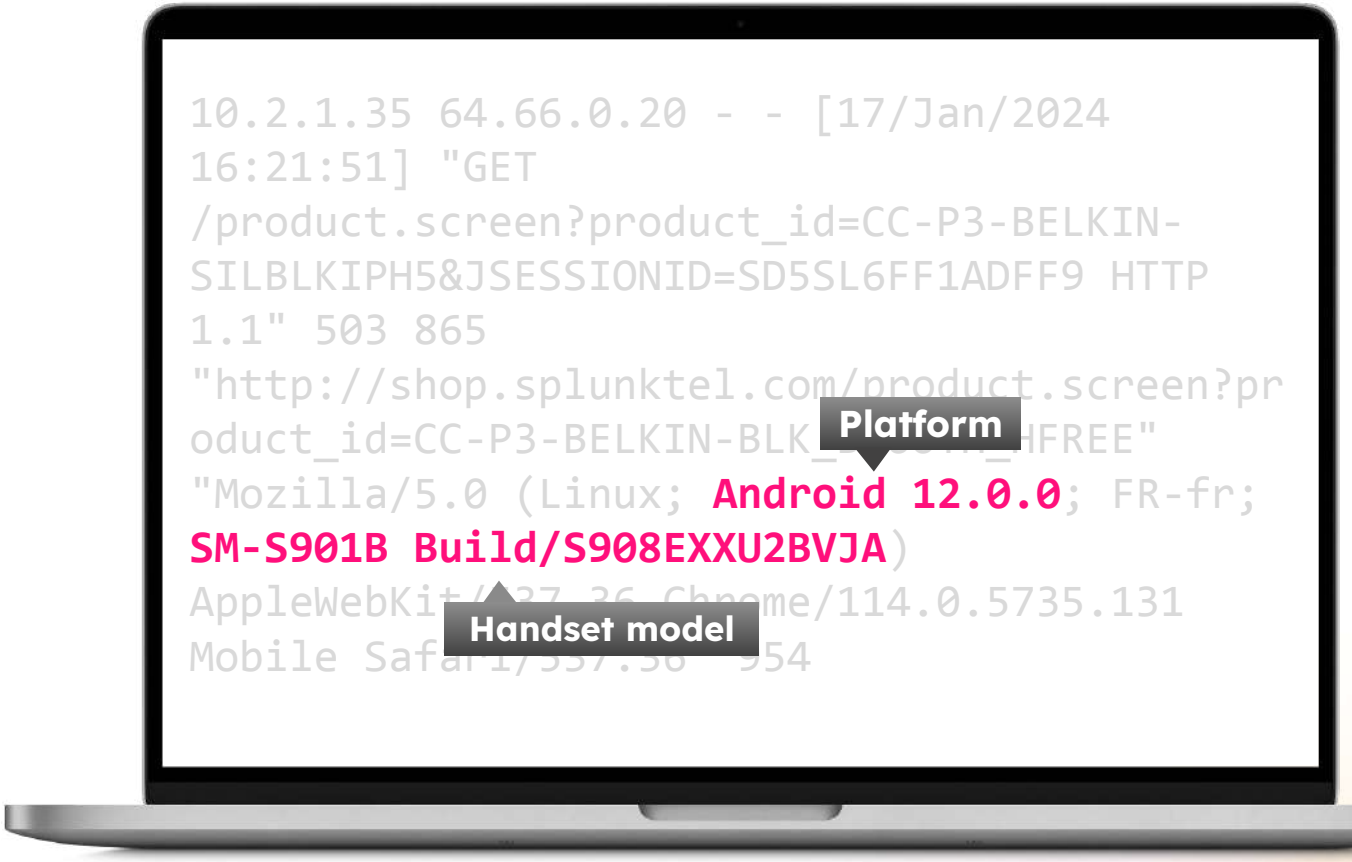
Marketing Use Case

Show the top products viewed by language



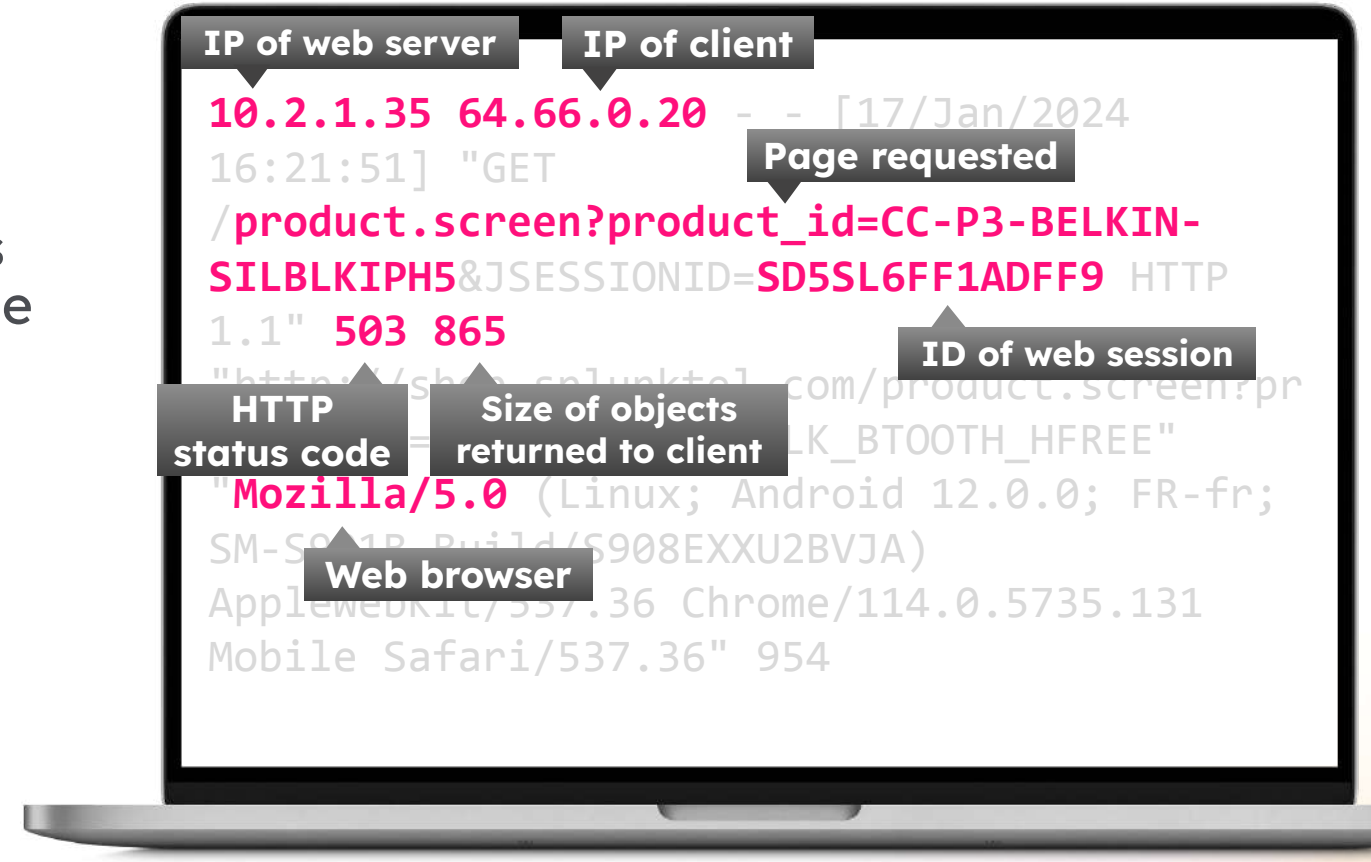
DevOps Use Case

Which mobile handsets should I test the most before releasing my new app?



IT Ops Use Case

Which web pages are generating the most errors?



Splunk in Manufacturing

Industrial Data Contains Critical Insights

SOURCES

Alarms and Events

05/27/2014T10:24:17GMT applicationId="safetyObs" eventType="safety" assetID="CV1002384-1045" employeeId="114635" jobSite="PLEC-2014-GC" observationId="184568-451124-256" observation="Control Valve handle extracted to manual position. No lockout/tagout or other tag visible. Process is running." observationCriticality="5" imageId="PLEC-2014-GC-184568-451124-256" imageUri="https://mybucket.s3.amazonaws.com/PLEC-2014-GC-184568-451124-256.png"

Work Order

1543541, workorder, basic, 78544, pipefitting, CV1002384, "install manual bleed bypass", 04/13/2014, 05/21/2014, 25663, complete

Sensor Data

05/22/2014 03:17:31 Tag="CV1002384.ValvePos" Value=”50" Quality=“Good”
05/22/2014 03:17:46 Tag="CV1002384.ValveCmd" Value=”100" Quality=“Good”
05/22/2014 03:19:22 Tag="CV1002384.ValveCmd" Value=”100" Quality=“Good”
05/22/2014 03:19:27 Tag="CV1002384.ValvePos" Value=”50" Quality=“Bad”

Industrial Data Contains Critical Insights

SOURCES

Alarms and Events

Work Order

Sensor Data

Alarm Date **Alarm Type** **Asset ID**

05/27/2014T10:24:17GMT applicationId="safetyObs" eventType="safety" assetID="CV1002384-1045" employeeId="114635" jobSite="PLEC-2014-GC" observationId="184568-451124-256" observation="Control Valve handle extracted to manual position. No lockout/tagout or other tag visible. Process is running." observationCriticality="5" imageId="PLEC-2014-GC-184568-451124-256" imageUri="https://mybucket.s3.amazonaws.com/PLEC-2014-GC-184568-451124-256.png"

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Industrial Data Contains Critical Insights

SOURCES

Alarms and Events

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Sensor Data

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05/27/2014T10:24:17GMT applicationId="safetyObs" eventType="safety" assetID="CV1002384-1045" employeeId="114635" jobSite="PLEC-2014-GC" observationId="184568-451124-256" observation="Control Valve handle extracted to manual position. No lockout/tagout or other tag visible. Process is running." observationCriticality="5" imageId="PLEC-2014-GC-184568-451124-256" imageUri="https://mybucket.s3.amazonaws.com/PLEC-2014-GC-184568-451124-256.png"

Technician | Asset ID | Completed

1543541, workorder, basic, 78544, pipefitting, CV1002384, "install manual bleed bypass", 04/13/2014, 05/21/2014, 25663, complete

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05/22/2014 03:17:31 Tag="CV1002384.ValvePos" Value=”50" Quality=“Good”

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05/22/2014 03:19:22 Tag="CV1002384.ValveCmd" Value=”100" Quality=“Good”

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Industrial Data Contains Critical Insights

SOURCES

Alarms and Events

Work Order

Sensor Data

Alarm Date **Alarm Type** **Asset ID**

05/27/2014T10:24:17GMT applicationId="safetyObs" eventType="safety" assetID="CV1002384-1045" employeeId="114635" jobSite="PLEC-2014-GC" observationId="184568-451124-256" observation="Control Valve handle extracted to manual position. No lockout/tagout or other tag visible. Process is running." observationCriticality="5" imageId="PLEC-2014-GC-184568-451124-256" imageUri="https://mybucket.s3.amazonaws.com/PLEC-2014-GC-184568-451124-256.png"

Technician **Asset ID** **Completed**

1543541, workorder, basic, 78544, pipefitting, CV1002384, "install manual bleed bypass", 04/13/2014, 05/21/2014, 25663, complete

MTBF **Asset ID** **Quality**

05/22/2014 03:17:31 Tag="CV1002384.ValvePos" Value="50" Quality="Good"
05/22/2014 03:17:46 Tag="CV1002384.ValveCmd" Value="100" Quality="Good"
05/22/2014 03:19:22 Tag="CV1002384.ValveCmd" Value="100" Quality="Good"
05/22/2014 03:19:27 Tag="CV1002384.ValvePos" Value="50" Quality="Bad"

Honda's journey to end-to-end visibility

Honda of Alabama lacked insights from parts, equipment and machines on the assembly floor – forcing the team to take a reactive approach to troubleshooting.

HONDA

"We'd go into crisis mode with infrastructure, network and development all working in their silos to figure out what's going on."

Jonathan Murphy
IT Operations Manager, Honda Manufacturing of Alabama

Honda drives production efficiencies with Splunk

"Splunk allows us to act on [our] data, providing insights, answering questions and solving problems we may not have even known we had."

– Charlie Studdard, Staff Engineer, IT Innovation Team, Honda Manufacturing of Alabama

Exceeded
environmental standards

Increased
profitability and efficiency

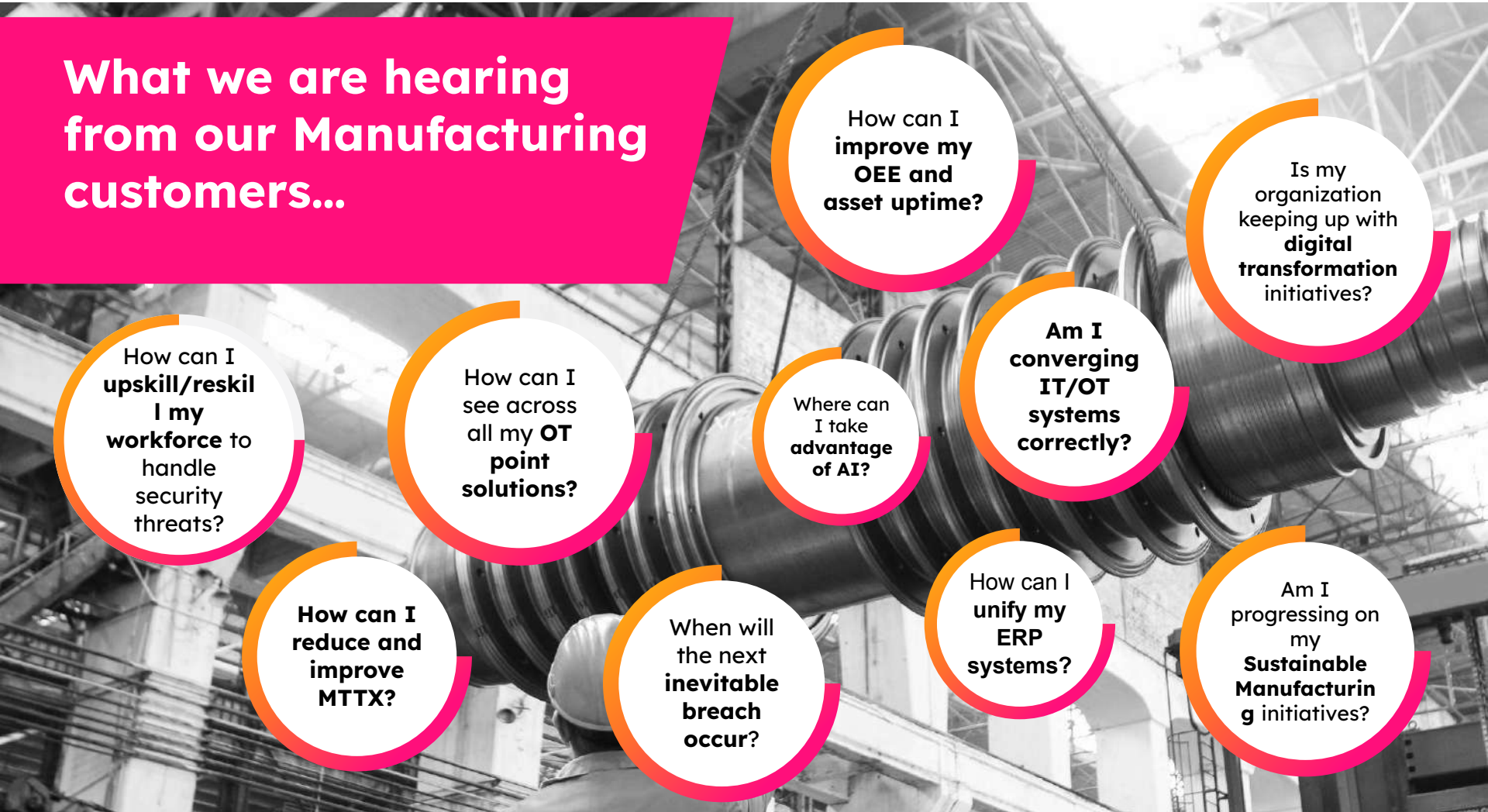
70%
faster mean time to resolution



Your systems need to be secure and reliable



What we are hearing from our Manufacturing customers...



It’s especially hard for manufacturing organizations to be resilient today

- Complex cybersecurity threats
- Digital disruptions that impact IT systems
- Siloed processes, tools, and expertise
- Pressure to digitally transform

Build digital resilience with Splunk

Edge to Enterprise Visibility at Your Fingertips

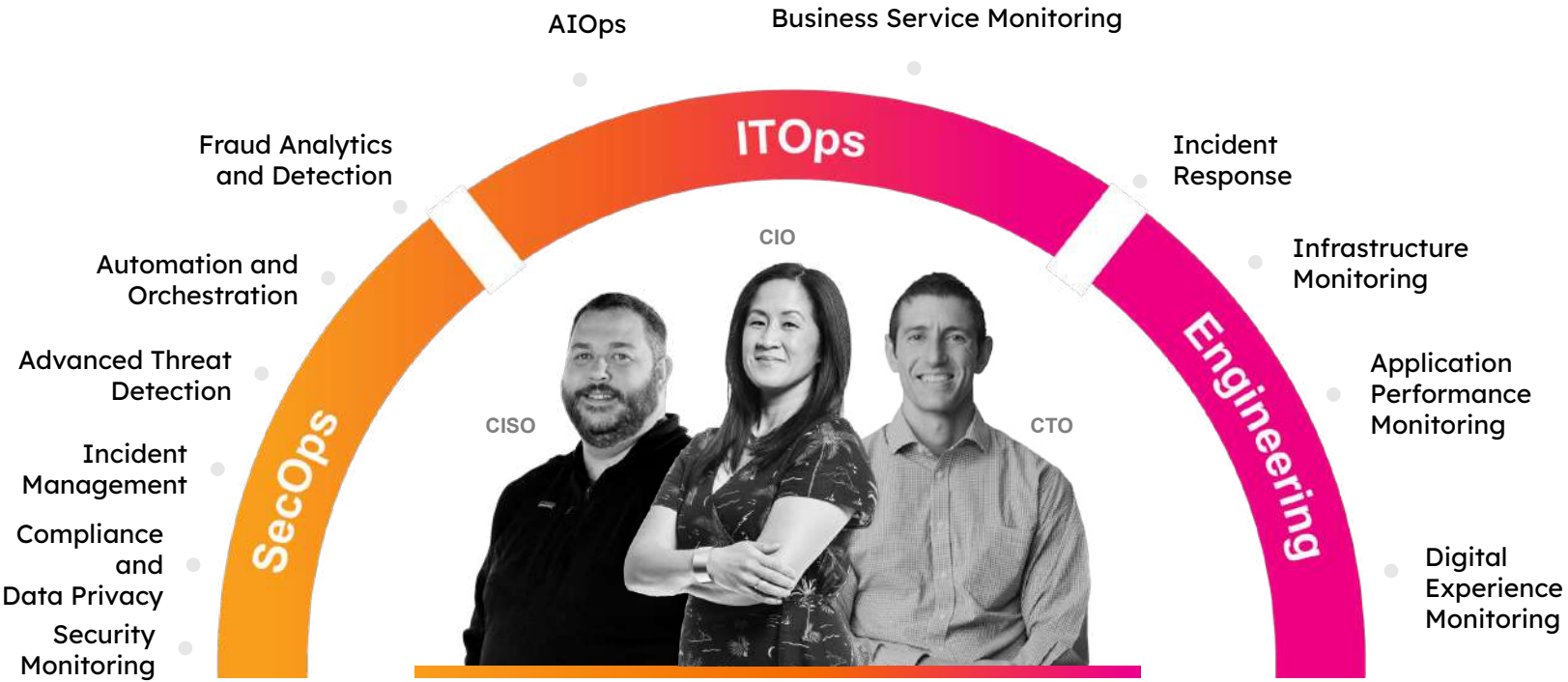
Detect, investigate and respond faster to IT/OT Cybersecurity threats

Improve data centric computing **and integration of IT/OT systems**

Keep operational systems up and running with **end-to-end business, process and service monitoring**

Transform operations from reactive to proactive and adapt to new opportunities

Bringing SecOps, ITOps and Engineering together for greater digital resilience



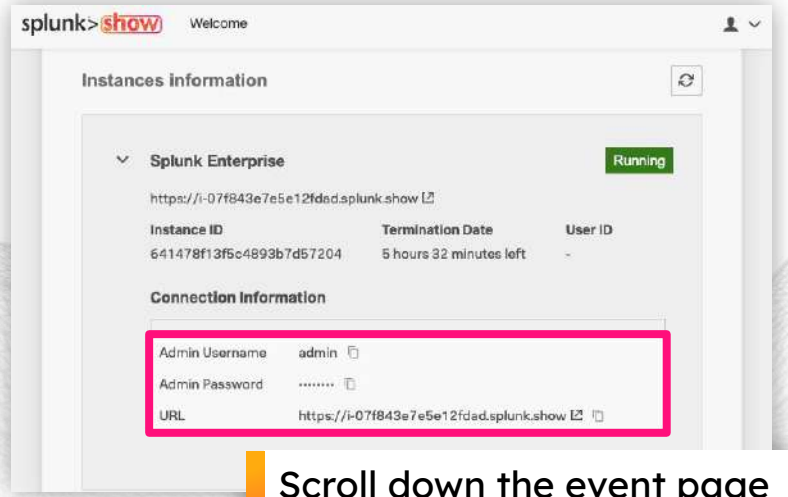
The Unified Security and Observability Platform

Let’s get started

splunk>

Login to Splunk

Locate your instance URL and credentials in the Splunk Show event
https://show.splunk.com



Scroll down the event page and expand the **Splunk Enterprise** section to view your login details

Log in to your Splunk instance

Login using the credentials from Splunk Show

Apps and Add-ons

- 3100+ free apps and add-ons available from https://splunkbase.splunk.com/
- Built either by Splunk, our technology partners or members of our user community
- Prebuilt packages that help to enhance and extend the Splunk platform
- Provide content and capabilities – such as reports, dashboards and integrations – for a specific technology, purpose or use case, with the flexibility to customise for your own needs

Apps

Content designed to bring fast time-to-value from your data in Splunk, including pre-built dashboards, reports, alerts, visualisations and workflows

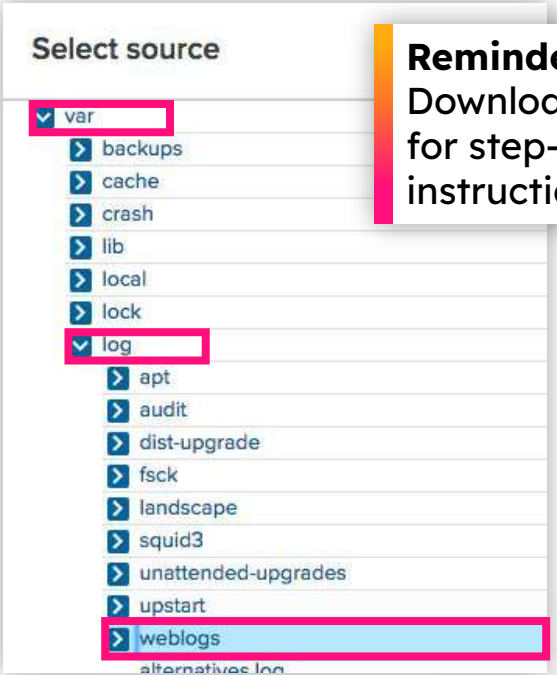
Add-ons

Provide specific capabilities to Splunk, such as getting data in, mapping data, or providing saved searches and macros

Create an App and Add Some Data

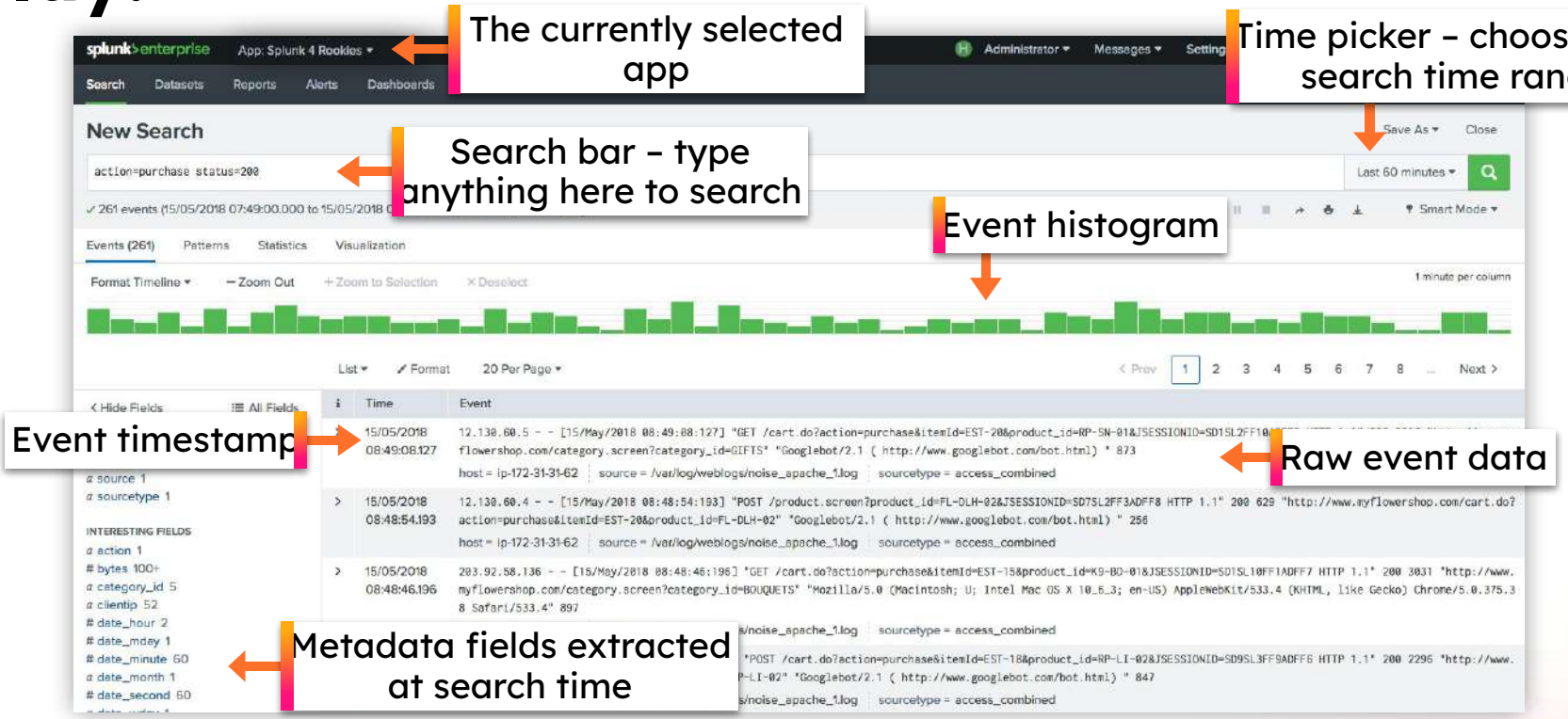
Tasks

1. Create a new app
2. Monitor a directory: /var/log/weblogs
3. Select a source type: access_combined
4. View your data in Splunk



Reminder
Download the lab guide for step-by-step instructions!

Open your app and have a play!



Start Exploring Your Data

Example searches:

`503 purchase`	Find all events that contain the words “503” and “purchase”
`503 pur*`	Find all events containing “503” and words beginning with “pur”
`503 (purchase OR addtocart)`	Boolean operators (`AND`/`OR`/`NOT`) – must be UPPERCASE!
`status=503 action=purchase`	Use *fieldname* = *value* to ensure accurate search results

How would you find events with a status code of 200 that are NOT purchase events?

```
status=200 NOT action=purchase

status=200 action!=purchase
```

Splunk's Search Processing Language (SPL)

Search Terms — **Commands**

```
index=main action=purchase | stats count by status | rename count as "number of events"
```

Pipe character: Output of left is input to right — **Functions**

e.g. `index=main action=purchase` `| stats count by status` `| rename count as "number of events"`

status	count
200	850
400	81
401	76
402	50
403	57

status	number of events
200	850
400	81
401	76
402	50
403	57

Want to know more? Check out:
Splunk Quick Reference Guide: https://splk.it/SplunkQuickRef
Search manual: https://splk.it/SplunkSearchManual

Today’s 1st Scenario

Your Company

- Buttercup Enterprises is a large national online retailer operating in the US, which sells a variety of books, clothing and other gifts through its online webstore
- Buttercup Enterprises have recently invested in Splunk and now they want to start making use of it across the business

Your Role

- You are one of the chosen few: a Splunk power user!
- Your responsibility is to provide insights to users throughout the company
- The teams you support include:
  - **IT Operations**
  - **DevOps**
  - **Business Analytics**
  - **Security and Fraud**

What Does the Business Want to See?

We Need to Create a Dashboard With Two Views

IT Operations team: Investigate successful vs unsuccessful web server requests over time

DevOps team: Show the most common customer operating systems and which web browsers are experiencing the most failures

Business Analytics team: Show lost revenue from the Buttercup Enterprises website

Security/Fraud team: Show website activity by geographic location

Buttercup Enterprises: Add all of this to a single dashboard with a custom background image

This is the dashboard we're aiming for!

*Join Splunk4Rookies to take part in all of these tasks

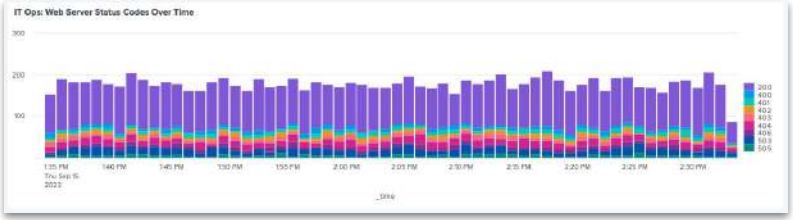
IT Operations Team

Investigate Successful Versus Unsuccessful Web Server Requests Over Time

Tasks

1. Show successful vs unsuccessful web server requests over time
2. Use a stacked column chart visualisation
3. Add your chart to a new dashboard
4. Choose ‘Dashboard Studio’ and use ‘Absolute’ layout mode to allow for future dashboard customisation!

Goal



Splunk Dashboards

Classic Dashboards (Simple XML)

- Easy to deploy a **wide variety of visualisations**, but **hard to craft a story**
- **Flexible and extensible**, but **time consuming** to build something truly beautiful (e.g. custom JS, CSS)
- **PDF export loses look/feel** of dashboard

Dashboard Studio

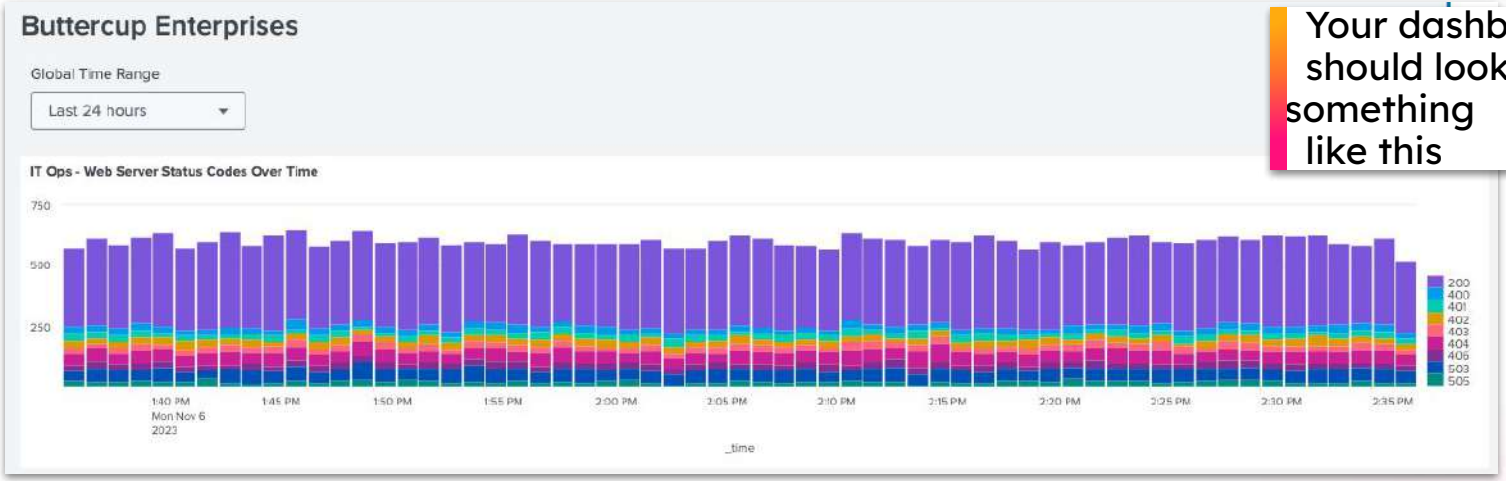
- Create **powerful, story-telling dashboards** with **advanced visualisation tools**
- **Streamlined editing experience** with **flexible layouts**
- Support for **images**, **text boxes**, **shapes**, **lines** and **icons**, with **intact PDF export**
- **No custom code** required

IT Operations Team

Investigate successful versus unsuccessful web server requests over time

Solution:

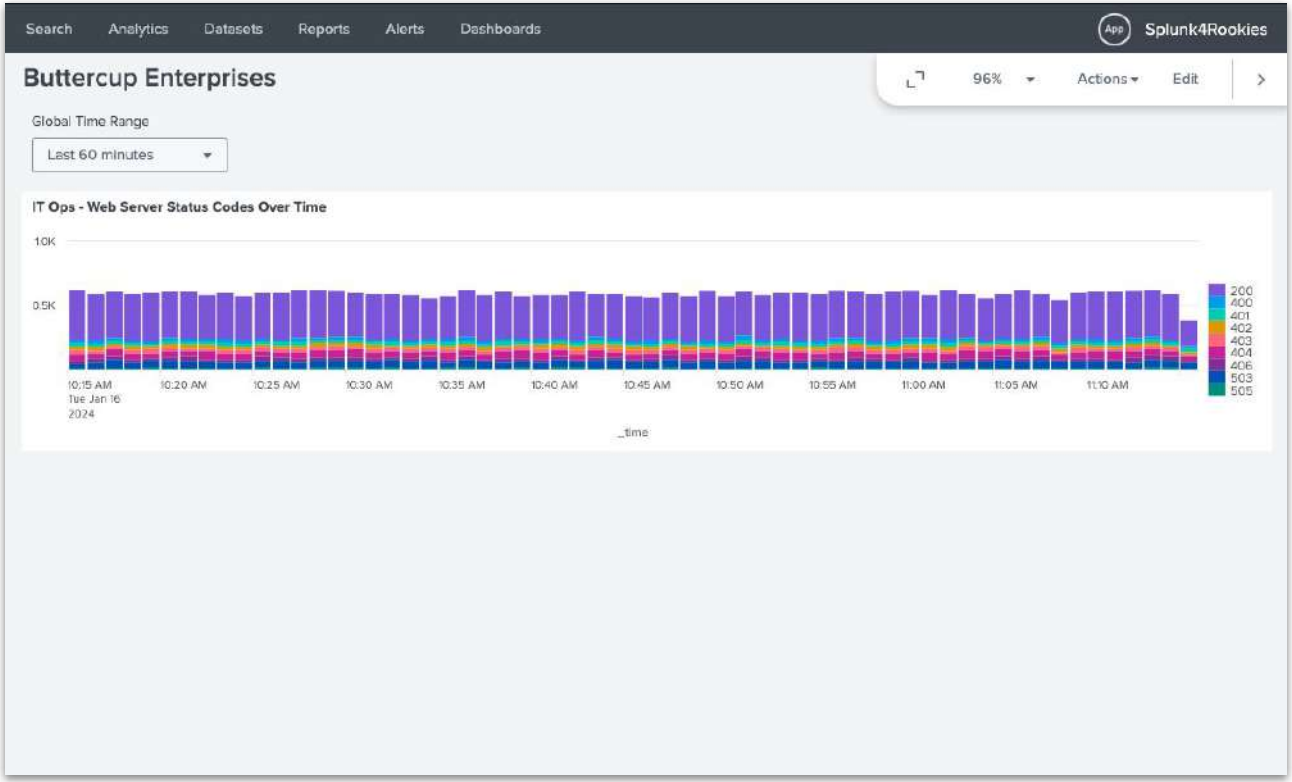
```
index=main sourcetype=access_combined | timechart count by status limit=10
```



Your dashboard panel should look something like this

Your dashboard so far...

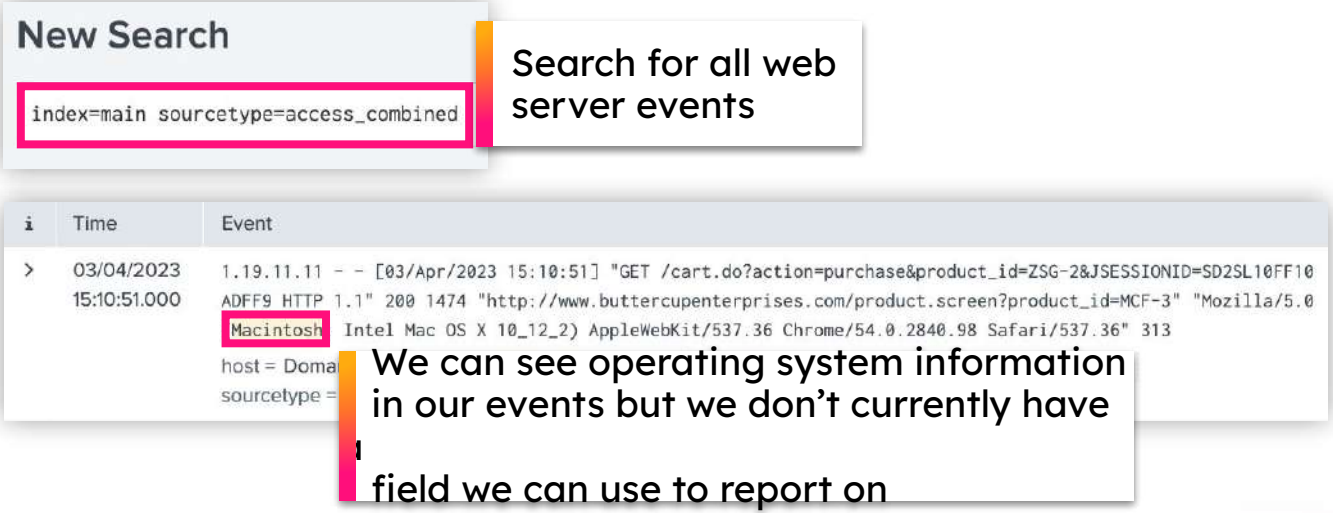
- IT Operations team ✓



DevOps Team

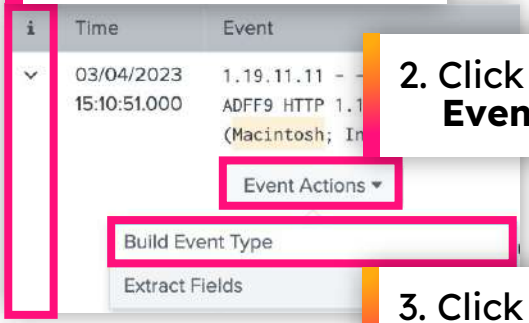
Show the most common customer operating systems and which web browsers are experiencing the most failures

Step 1: Show the most common customer operating systems



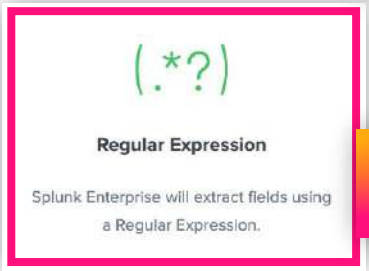
Extracting a New Field

1. Click on the arrow to expand an event



2. Click on **Event Actions**

3. Click on **Extract Fields**



4. Click on **Regular Expression**

5. Click **Next**

6. Highlight the part of the event that is of interest

7. Give the new field a name, lowercase is recommended

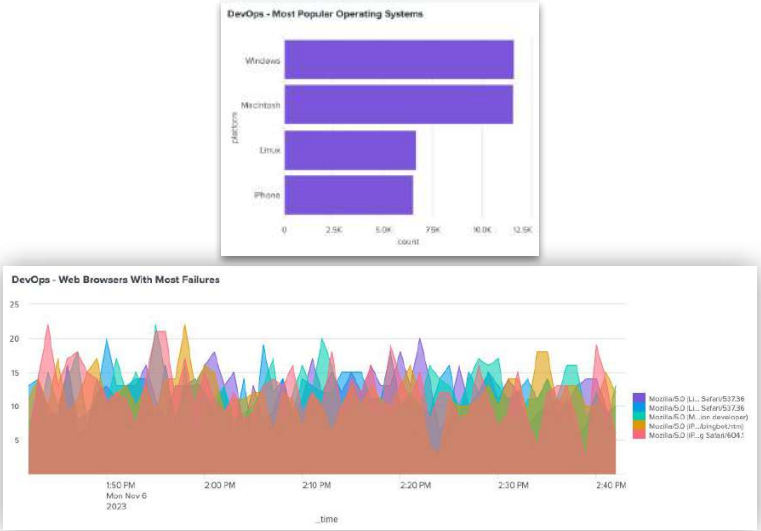
DevOps Team

Show the most common customer operating systems and which web browsers are experiencing the most failures

Tasks

1. Extract a new platform field
2. Show the top values using a bar chart visualisation
3. Create an area chart showing the top 5 web browsers that are experiencing the most failures over time
4. Add your charts to your existing dashboard

Goal

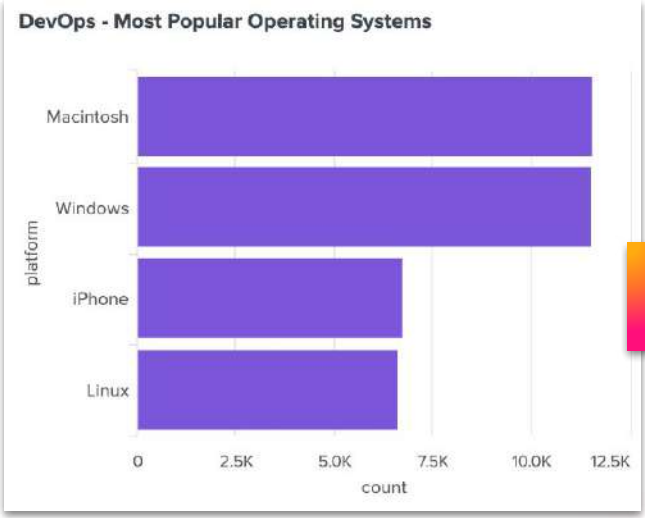


DevOps Team

Show the most common customer operating systems

Solution:

```
index=main sourcetype=access_combined | top limit=20 platform showperc=f
```



When you're happy with your chart add it to your dashboard!

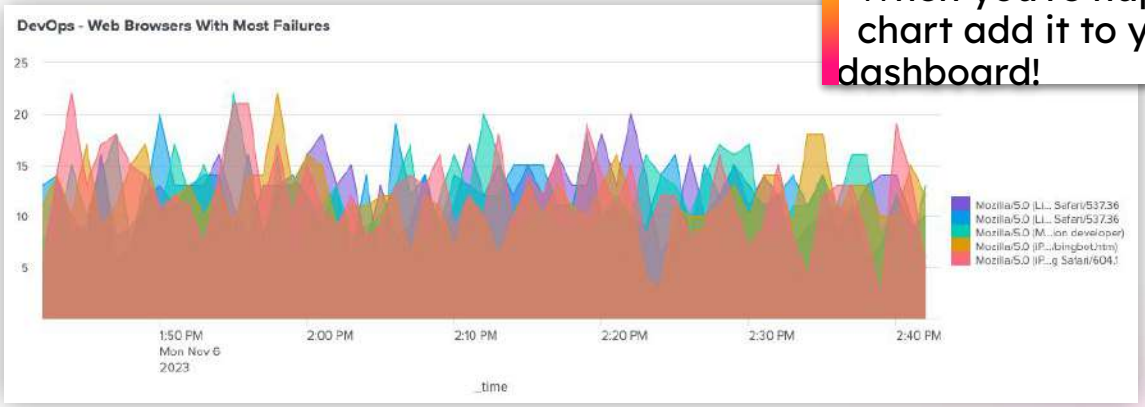
DevOps Team

Create a graph showing the top 5 web browsers that are experiencing the most failures over time

Solution:

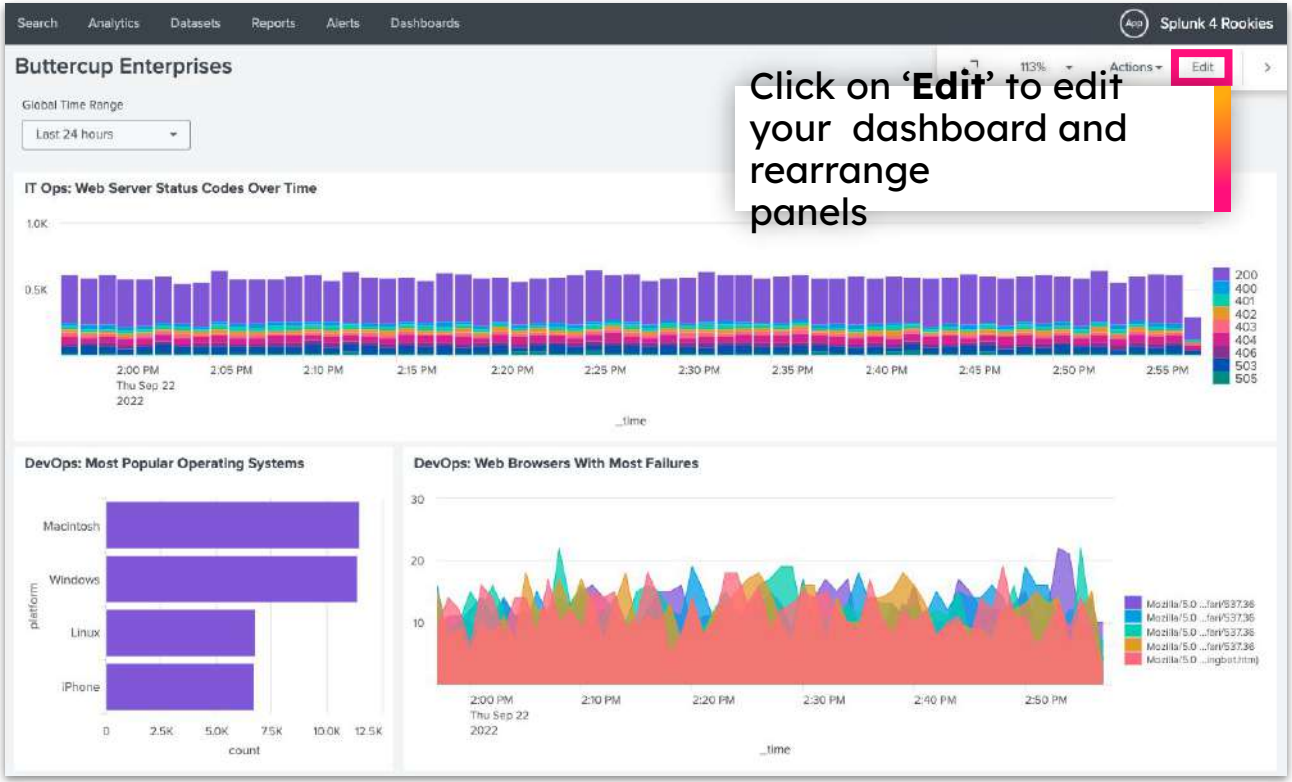
```
index=main sourcetype=access_combined status>=400
| timechart count by useragent limit=5 useother=f
```

When you're happy with your chart add it to your dashboard!



Your dashboard so far…

- IT Operations team ✓
- DevOps team ✓



Click on '**Edit**' to edit your dashboard and rearrange panels

Working with statistics? Use stats and timechart

Usage:

```
<your search> | stats <function> <by clause>
<your search> | timechart <function> <by clause>
```

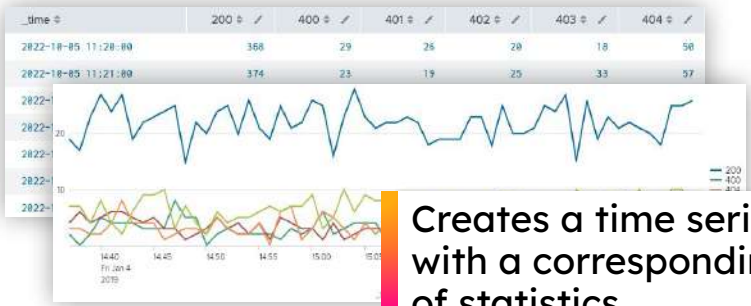
Examples:

```
index=main sourcetype=access_combined
| stats distinct_count(clientip) by status
```

status	distinct_count(clientip)
200	67
400	67
401	67
402	

Calculates statistics based on fields in your events

```
index=main sourcetype=access_combined
| timechart count by status
```



Creates a time series chart with a corresponding table of statistics

Want to know more? Check out:
Splunk Quick Reference Guide: https://splk.it/SplunkQuickRef

Obtaining Location Information with the `iplocation` and `geostats` Commands

Usage:

The name of a field in your data that contains IP addresses

Generates the 'tiles' that will be rendered on the map when visualised

Split your results by a specific field for more detailed analysis

```
<your search> | iplocation clientip | geostats count by <field>
```

Enriches IP data on-the-fly with location data

- a City 54
- a Country 23
- # lat 56
- # lon 56
- a Region 41

The `iplocation` command produces additional fields containing geographic data

Additional Case Studies

Manufacturing

splunk>

Heineken becomes the world's most resilient brewer with Splunk

"For the first time we can see all the performance of our middleware systems and each of the integrations running on them, in one single view."

25M
monthly app messages in one view

100%
visibility into 3000+ systems

<20
invoices with errors per day in one location

★ Heineken®

Guus Groeneweg
Global Product Owner for Digital Integration
Heineken

Megitt Enhances Security with Splunk

“Splunk reveals where our security has potential to improve and, when there are issues, helps us figure out what went wrong so we can prevent it from happening again. It's been an absolute game changer for us.”

1 Day
to create dashboards to enable secure remote working

100%
increase in security coverage for staff workstations

40
global sites secured with the help of AI

MEGGiTT

James Steel
Detection and Response Team Manager
Meggitt

Bosch Improves Their Digital Resilience at the Plant Level

"Splunk technology helps us to decide measures faster and with better results. Across the organization, it's creating a higher quality of work."

80+
critical alerts implemented by Bosch Manufacturing Solutions

All
employees can now query data

20s
to run a query, versus 15 minutes prior to Splunk

BOSCH

Claus Giehl
Industry 4.0 Innovation and Product Manager, Bosch Manufacturing Solutions

Today’s 2nd Scenario

Your Company

- **Buttercup Manufacturing** is a large national producer of widgets that involves a complex product assembly line process
- The company is also responsible for supplying parts to a wind turbine manufacturer “Splunk Turbines”

Your Roles

- You will help **Splunk Turbines Co.** to generate some dashboards based on wind turbine metrics
- You will also use Splunk to build out a view of the production line assembly so that issues and performance can be closely monitored

Experimenting with IIoT data

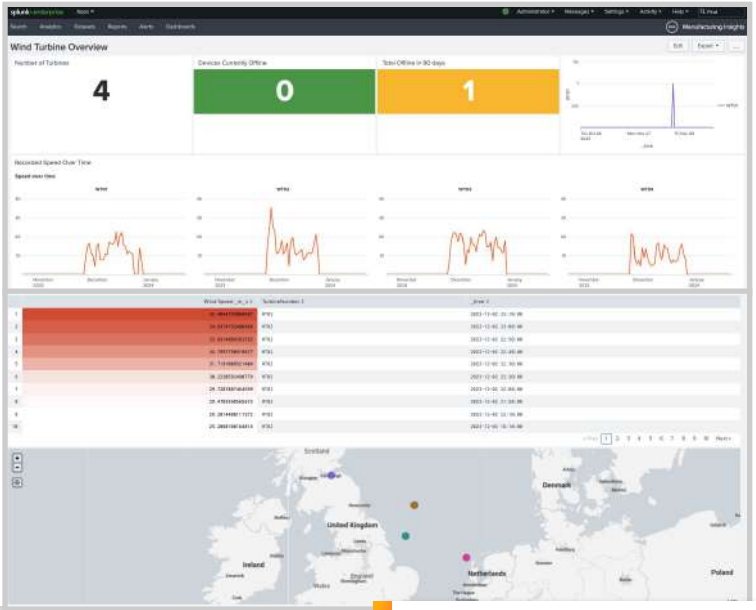
splunk>

Example searches across IIoT data

Tasks

1. Create a custom app for IIoT data exploration
2. Practice using queries and commands learnt earlier
3. Build a “Wind Turbine Overview” dashboard
4. Answer the lab questions

Goal



Final Dashboard

Operational Technology Security

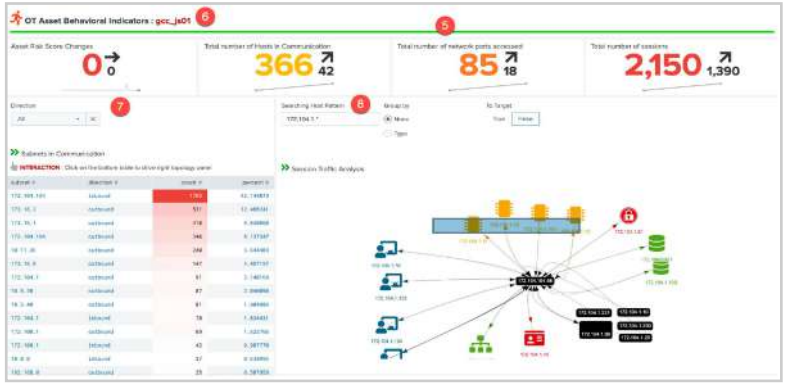
splunk>

Operational Technology: Security

Tasks

1. Explore the “OT Security” add-on to Splunk Enterprise Security
2. Answer the lab questions

Goal



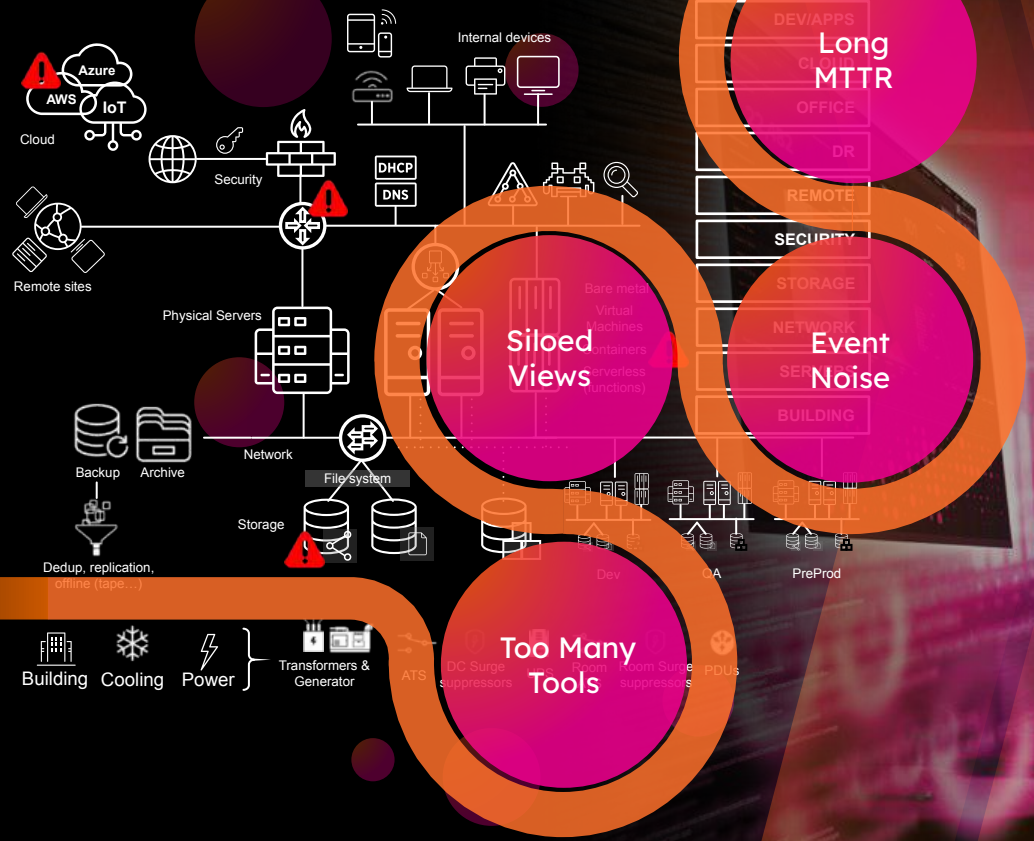
Explore the app

Service Intelligence

Gaining insight into health across the business

Complexity obscures the data you need

IT Ops teams continue to struggle to monitor, investigate, analyze & act



Long MTTR

Siloed Views

Event Noise

Too Many Tools

The impact can be significant

Putting revenue, customer experience, employee effectiveness & innovation at risk

Lost Revenue

Outages and incidents impact the services and apps driving revenues

Poor Customer Experiences

Customers click away and brand reputation is damaged

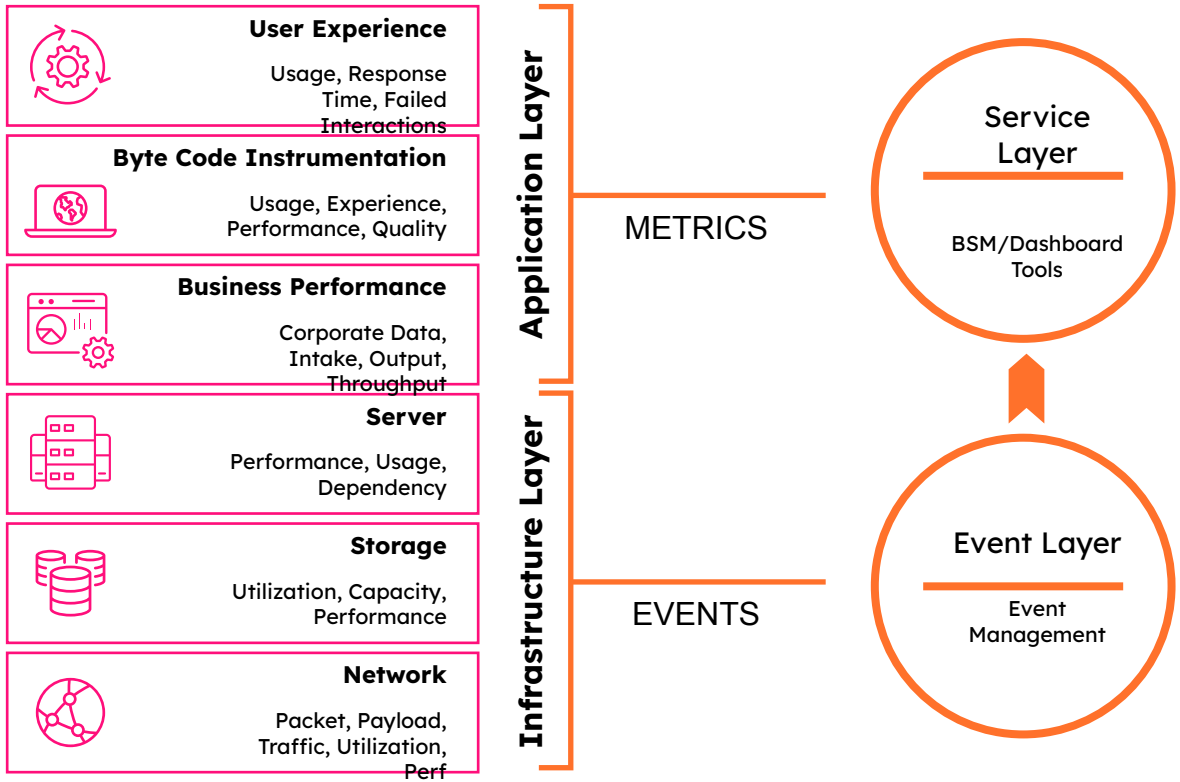
Decreased Employee Effectiveness

Teams thrash, finger-point, and key employees leave

Struggle to Innovate

IT spends too much time fixing problems instead of innovating and transforming

The Old Ways Disappoint



Challenges

- Many disparate components
- Brittle integrations
- Data is summarized and lost
- Longer root-cause identification
- End-to-end view challenging
- Labor-intensive to manage
- Not agile for digital business

Splunk IT Service Intelligence Platform Approach

Application Layer

User Experience

Usage, Response Time, Failed Interactions

Byte Code Instrumentation

Usage, Experience, Performance, Quality

Business Performance

Corporate Data, Intake, Output, Throughput

Infrastructure Layer

Server

Performance, Usage, Dependency

Storage

Utilization, Capacity, Performance

Network

Packet, Payload, Traffic, Utilization, Perf

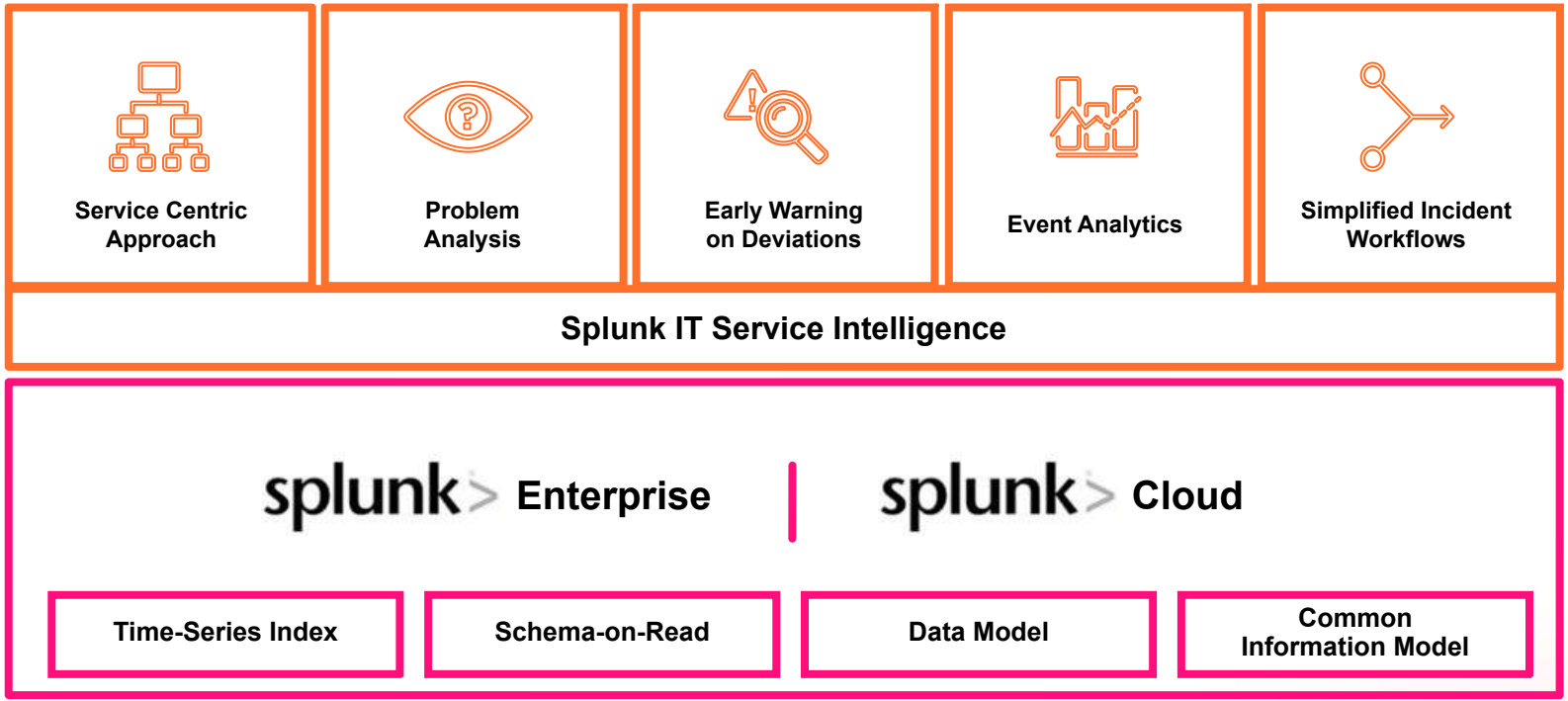
Machine Data

Splunk Approach:

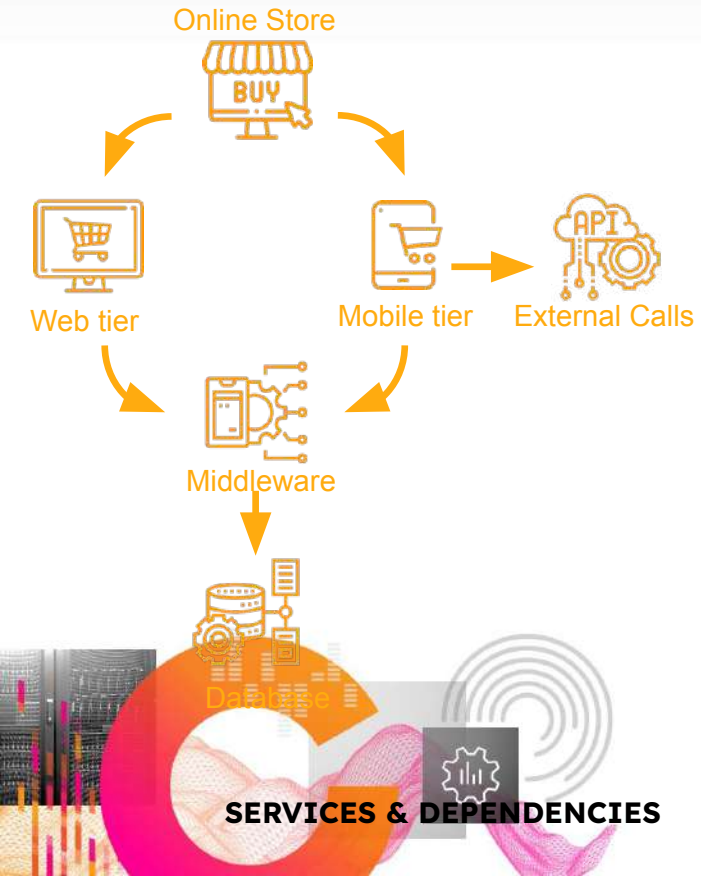
- Repository for **ALL** data
- Data in original raw format
- Machine learning
- Simplified architecture
- Fewer resources to manage
- Collaborative approach

Splunk IT Service Intelligence

Data-driven service monitoring and analytics



Splunk IT Service Intelligence Key Concepts



SERVICES & DEPENDENCIES

Number of visitors

Revenue

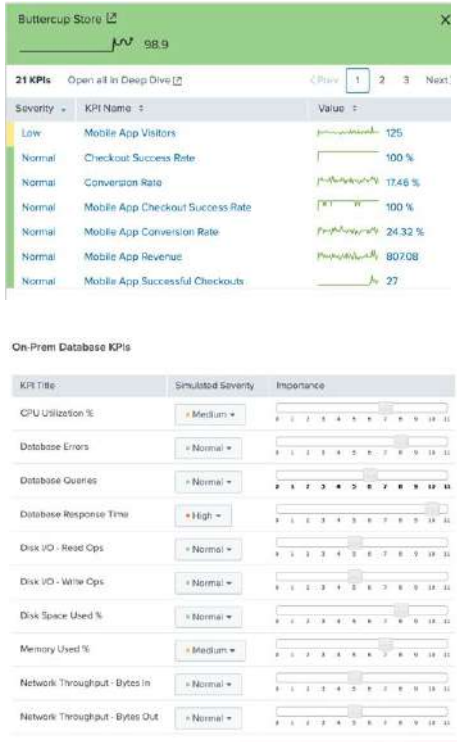
Transactions per day

CPU Utilisation

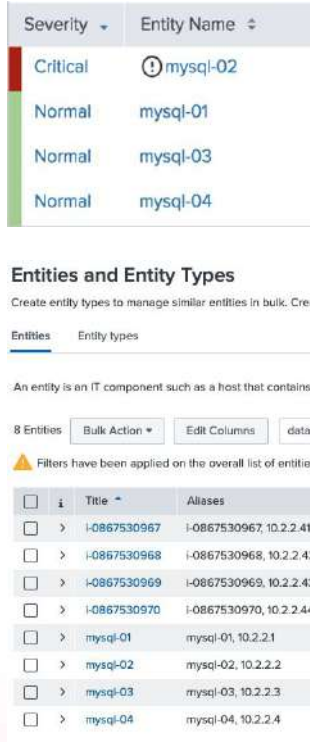
Query Response Time

Storage Free

KPIs



SERVICE HEALTH SCORES

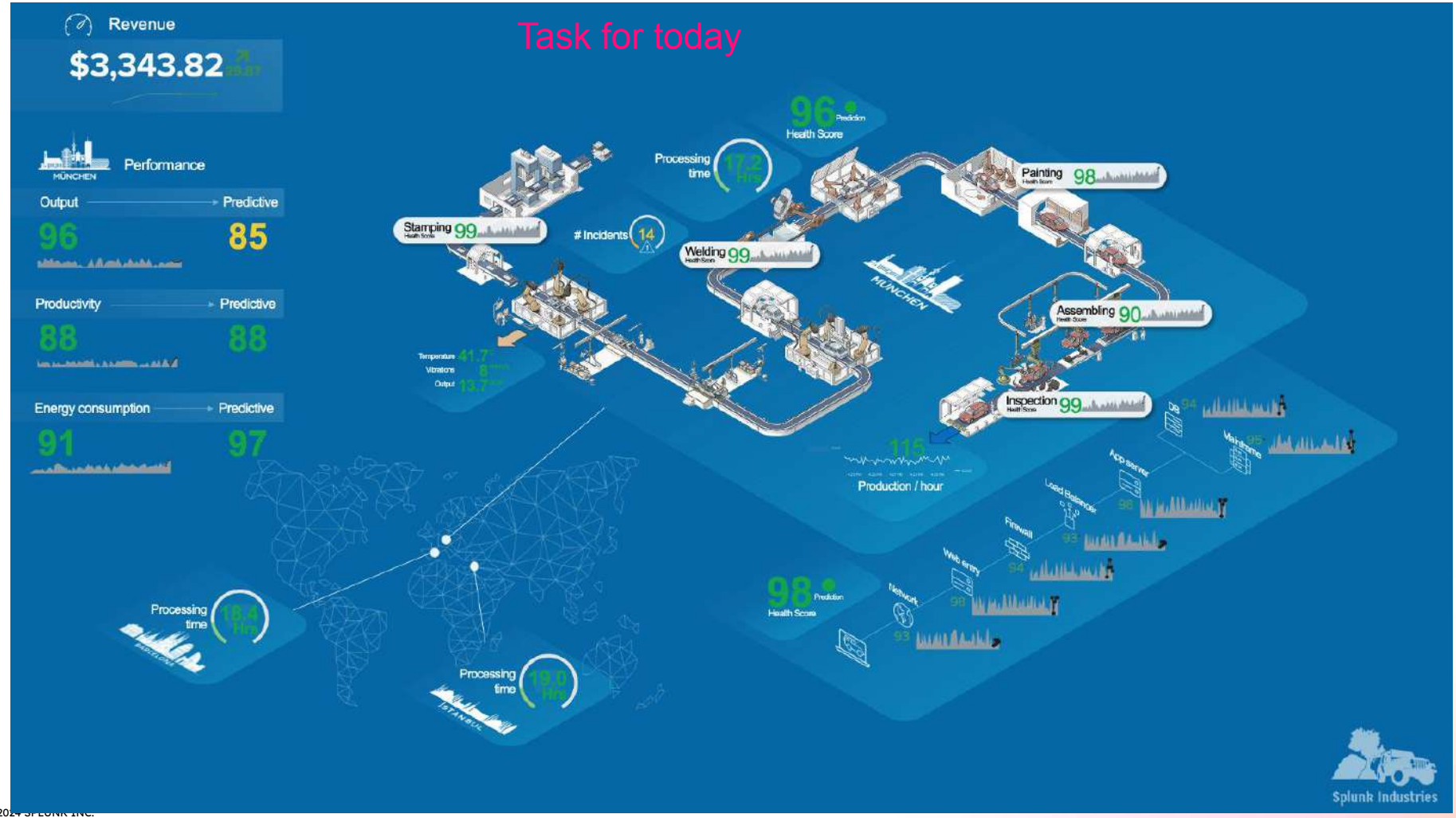


ENTITIES

Service Intelligence

Demo

Task for today



Robot 1

Health Score

93

Temperature

41.9C

Vibrations

6mm/s

Output

12.8pcs

Robot 2

Health Score

92

Temperature

41.7C

Vibrations

8mm/s

Output

13.7pcs

Robot 3

Health Score

71

Temperature

33.6C

Vibrations

15mm/s

Output

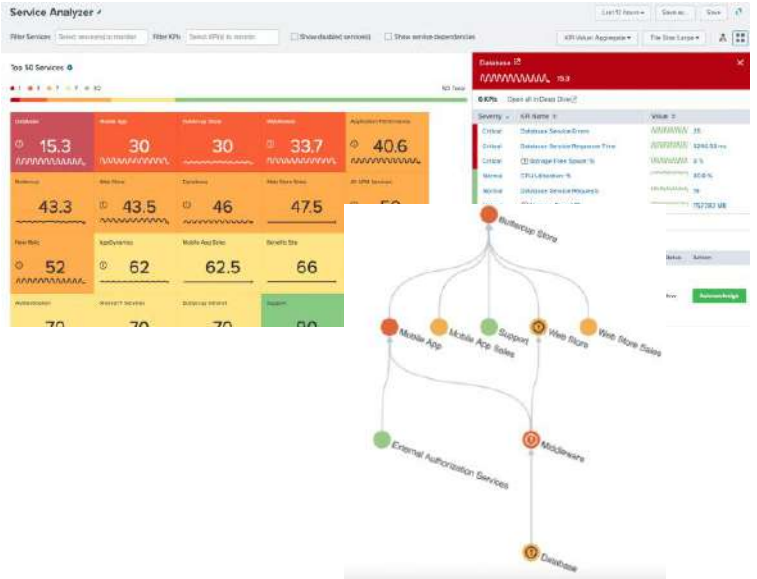
8.9pcs

Explore the ITSI capability

Tasks

1. Switch to the ITSI demo instance
2. Investigate Glass Tables
3. Investigate the Service Analyzer
4. Explore Deep Dives
5. View Alerting capabilities

Goal



Building a new service view

Tasks

1. Build a service view based on “Product Line Assembly”
2. Add some KPIs to be monitored
3. Build a custom Glass Table for CxO & Line of Business

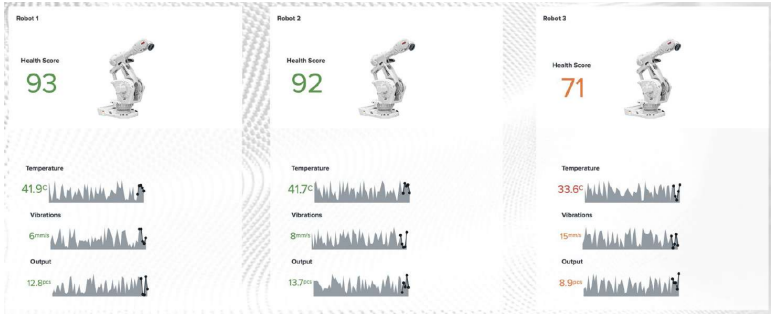
Goal

Build your own service!

Tasks

1. With the time left, see if you can build a service that represents something you'd like to see for your organisation

Goal



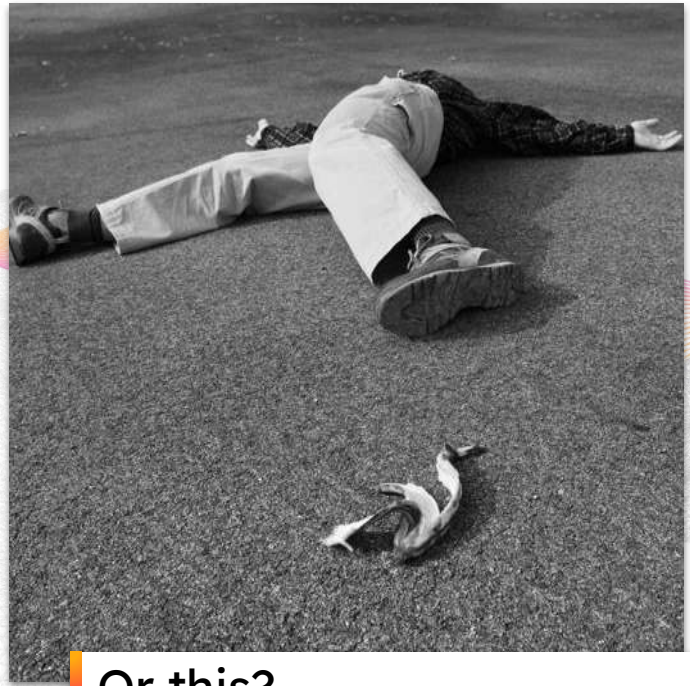
You Finished the Hands-on Exercises!

You made it!

splunk>

How Did You Do?

Did you end up like this?...



Or this?

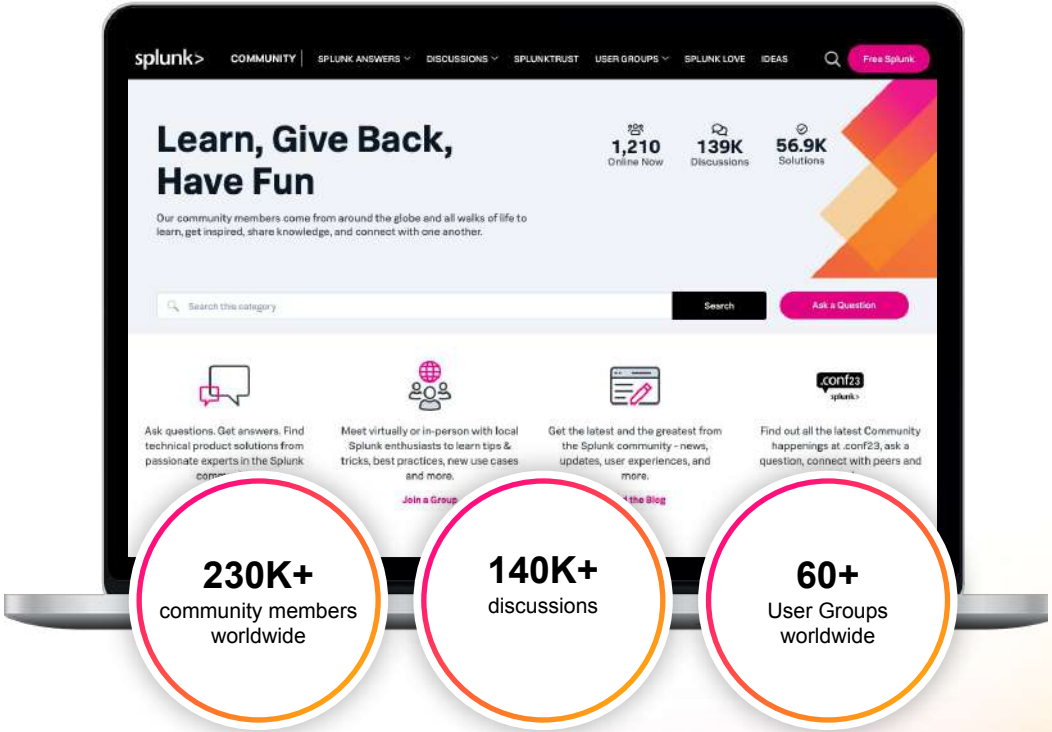
Splunk Resources

Where to go after today's workshop

Splunk Community

https://community.splunk.com

- A free way to connect, learn, have fun, and find success with Splunk
- Ask questions, get answers, and find solutions from passionate experts in the community
- Meet in-person or virtually with like-minded enthusiasts, in your area or by interest
- Search for, vote on, or submit your own ideas for new enhancements for any product or solution



Splunk Events

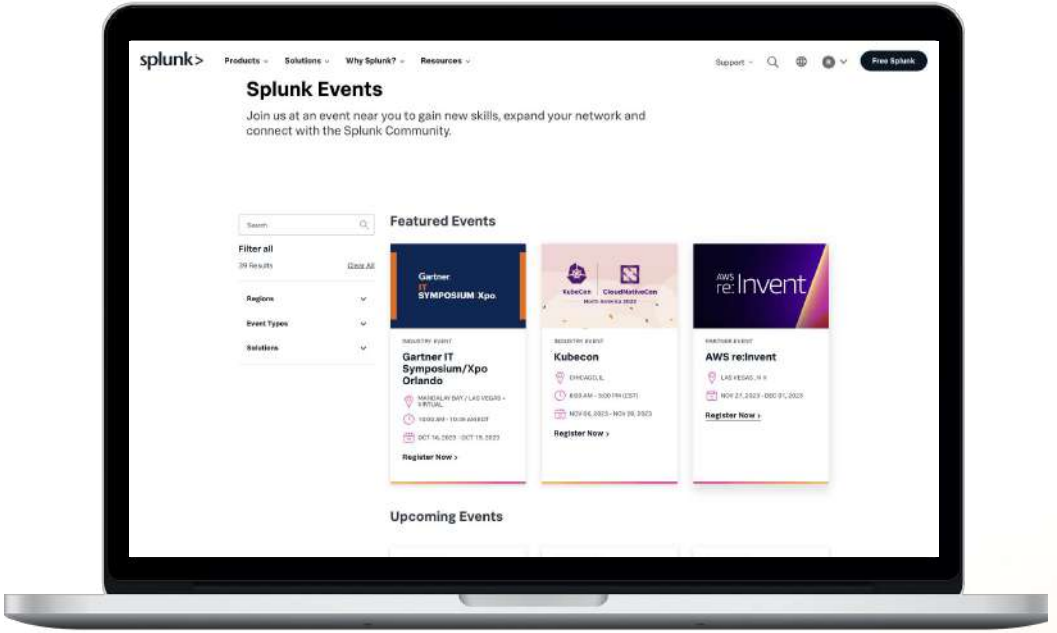
https://splunk.com/events

- Expand your network and connect with the global and local Splunk community

.conf

https://conf.splunk.com

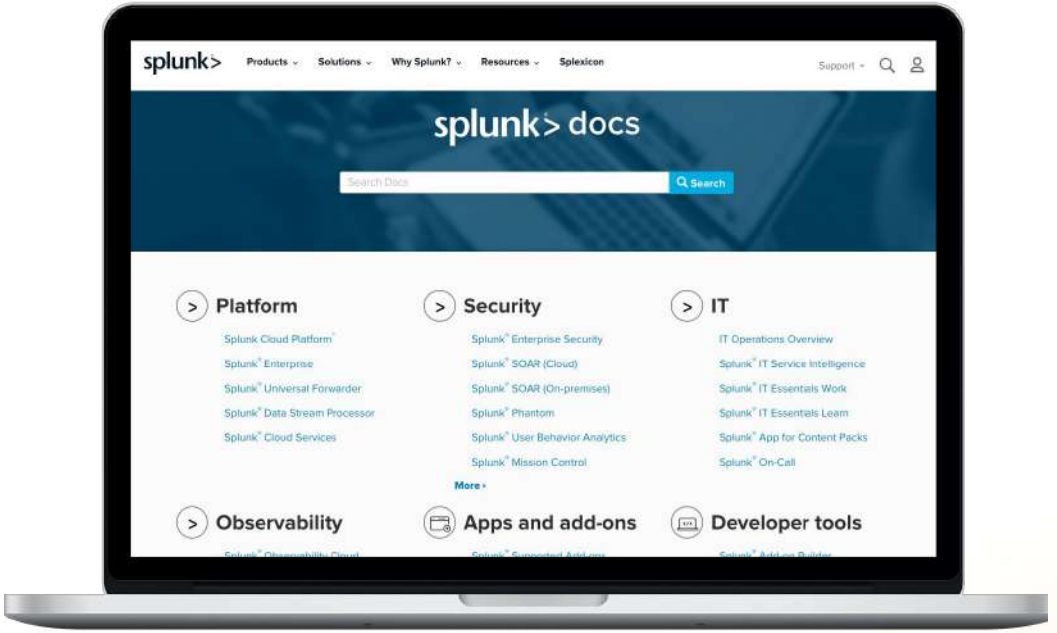
- Join us at .conf24!
- Hundreds of on-demand sessions from product updates to learning new Splunk skills!



Documentation

https://docs.splunk.com

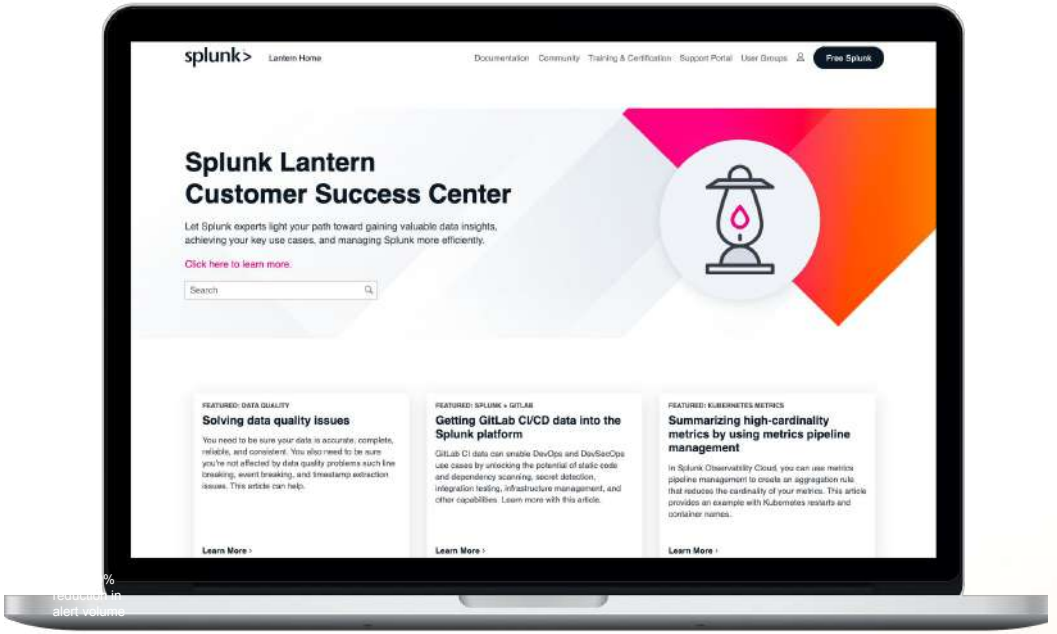
- Search reference for SPL
- Step-by-step tutorials
  Search:
  https://splk.it/SplunkSearchTutorial
  Dashboard Studio:
  https://splk.it/SplunkDashStudioTutorial
- Product references
- Procedures/guides
- And more!



Splunk Lantern

https://lantern.splunk.com

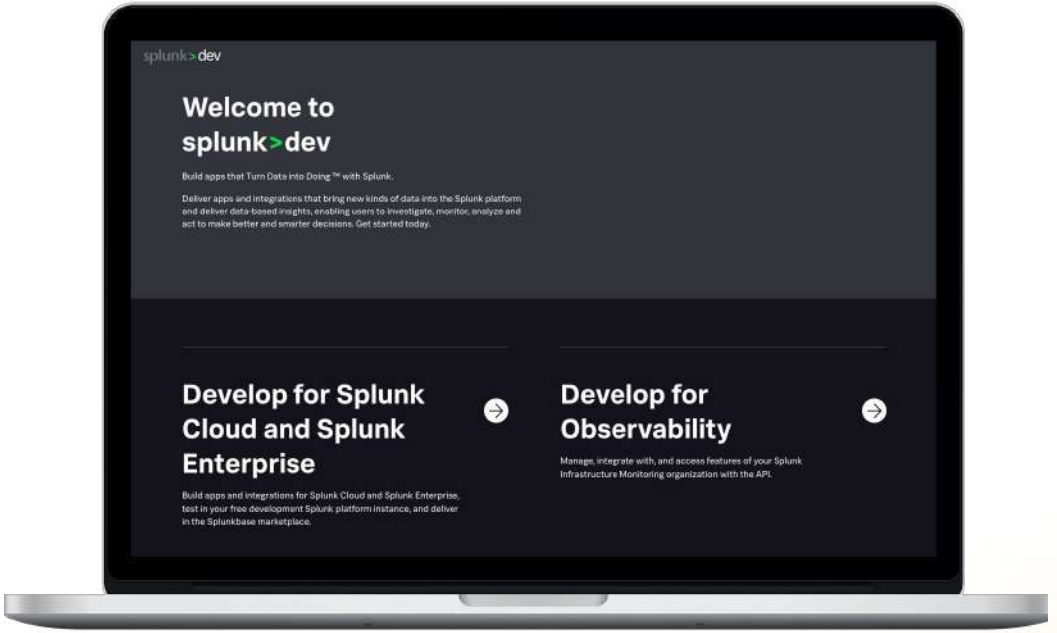
- Use case library
- Step-by-step procedures
- Map use cases to data sources
- Splunk Success Framework to realize value across your organisation



Developer Resources

https://dev.splunk.com

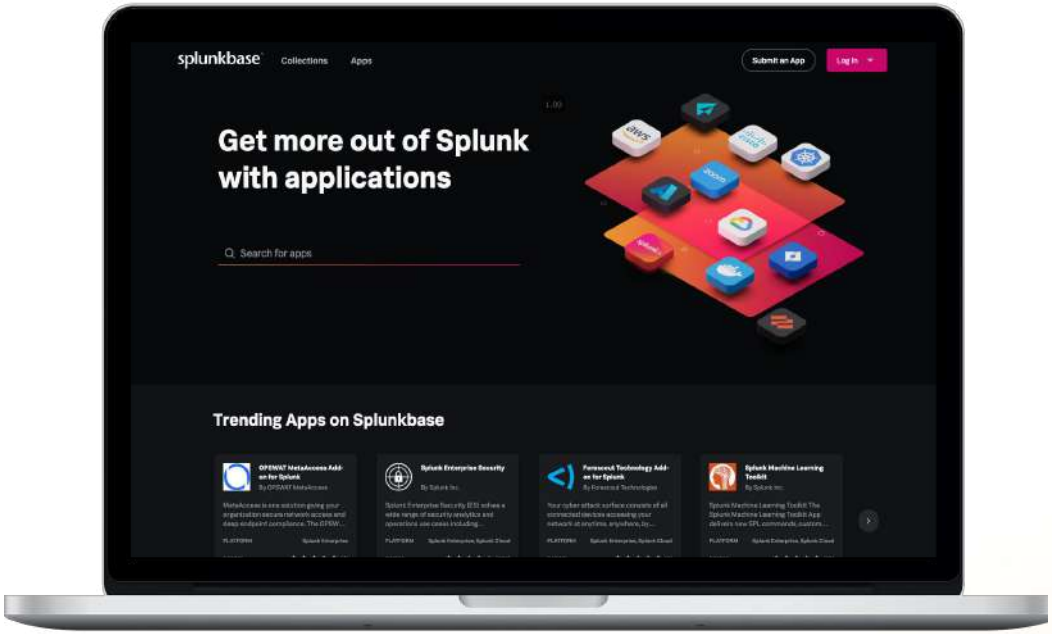
- Developer Guide
- API Reference
- Tutorials
- Downloads
  APIs, libraries, tools
- Code examples
- Free Developer licence



Splunk Apps & Add-ons

https://splunkbase.splunk.com

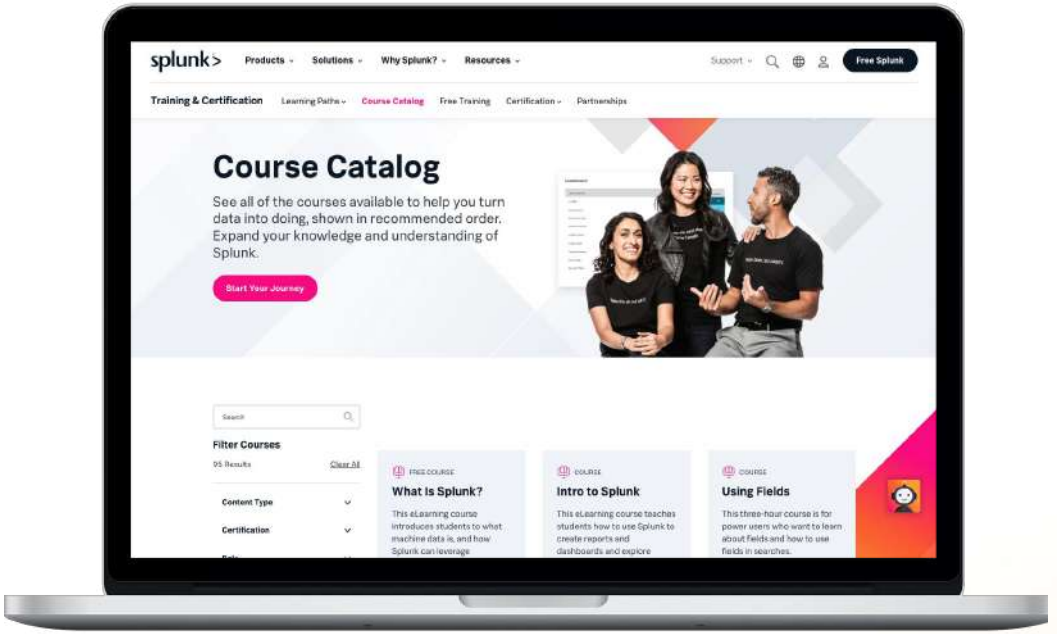
- 3100+ apps and add-ons
- Pre-built searches, reports, visualisations and integrations for specific use cases and technologies
- Download apps and customise them based on your requirements
- Fast time to value from your data
- Build and contribute your own apps!



Training & Certification

https://splunk.com/training

- **Online education classes**
  Instructor-led and self-paced eLearning
- **Certification tracks for different roles**
  User, Power User, Admin, Architect and Developer
- **Splunk Education Rewards**
  Complete training and receive points that you can redeem for Splunk swag!
- **Free education!**
  Free single-subject eLearning courses to kick start your Splunk learning



Thank you

splunk>