

### Data Onboarding Where Do I Begin?

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splunk> .conf

## Who Are You?

You have Splunk installed, either in your datacenter or on your laptop

You have data you want to onboard into Splunk

Your data comes from syslog, wineventlog, custom modular inputs, and/or flat files such as .csv | .log | .json | .txt



## Who Am I?

5+ years of Splunk experience

10+ years of systems engineering

7+ years of data analytics

systems engineering + data analytics = **Splunk**>



## Agenda

Why is this important?

**Basic Splunk overview** 

What do I ask before I onboard data?

How Splunk makes it easier & faster

Creating your own sourcetype

Onboarding data (inputs.conf/props.conf)

The importance of normalizing (props.conf/eventtypes.conf/tags.conf)



### Why is This Important? Many Reasons!

- 1. Your organization wants to become data-driven
- 2. Data needs to be collected, accessible, and queryable
- **3**. Decisions without **quality** data is simply guessing



In Data Science, 80% of time spent prepare data, 20% of time spent complain about need for prepare data."

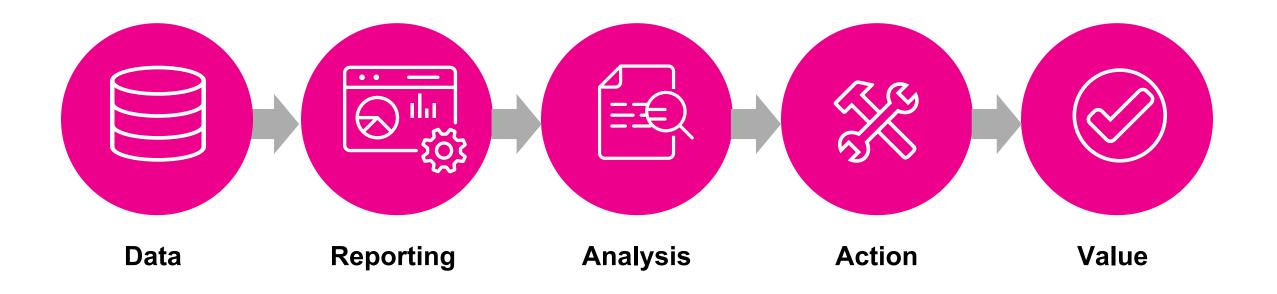
@BigDataBorat

https://twitter.com/bigdataborat/status/306596352991830016

splunk> .conf19

## Data Life Cycle

What your executives want



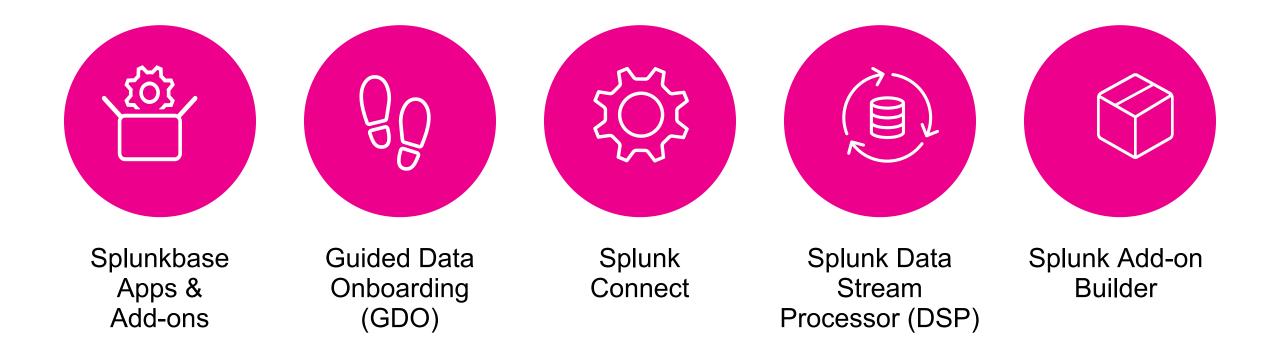


# Making Machine Data Accessible, Usable and Valuable to Everyone.



## **Reducing That 80%**

#### How Splunk is helping you!







## **Splunk's Data Collection**

**Basic Architecture Refresher** 

Munk

Log, I am your father



## **Basic Architecture**

#### How Splunk works at a high level



Offload search load to Splunk Search Heads

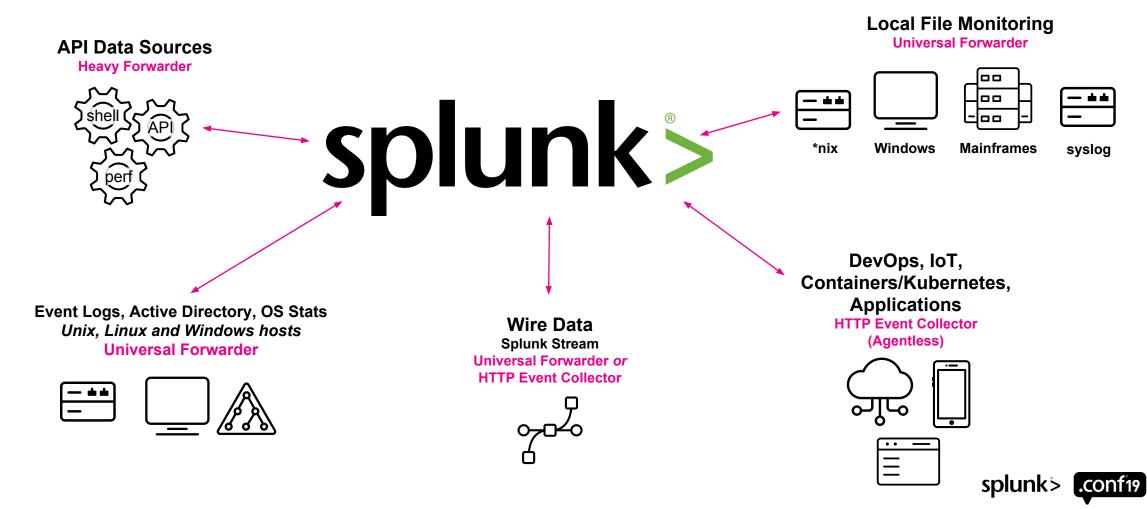


Send data from thousands of servers using any combination of Splunk forwarders



## What Can Splunk Ingest?

#### Data from anything!







## Let's Begin

Index Time



### Metadata Your Data's Data

- Index
- Host
- Source
- Sourcetype
- Date/Timestamp
- Event Boundary/Line Breaker



## Index

The repository for data

When the Splunk platform indexes raw data, it transforms the data into searchable events

Indexes reside in flat files on the indexer

Used to organize your data, role-based access control (RBAC), and retention

- winlog, winlogsec, winperf, nixlog, nixlogsec, nixperf
- firewall, proxy, dhcp, dns, dblog, web, app



## Host

A default field that contains the hostname or IP address of the device that generated the event

Use the host field in searches to narrow the search results to events that originate from a specific device

Allows you to locate the originating device

If you are forwarding data from many hosts through a single host, you may need to create a new "indexed field" called orig\_host or something similar



## Source

A default field that identifies the source of an event (where the event originated)

For data monitored from files and directories, the source consists of the full pathname of the file or directory

- /var/log/messages
- /var/log/messages.1
- /var/log/secure

For network-based sources, the source field consists of the protocol and port

- UDP:514
- TCP:1514
- HTTP:<token name>



## Timestamp

#### Splunk uses timestamps to

- correlate events by time
- create the timeline histogram in Splunk Web
- set time ranges for searches

Usually automatic or defined by sourcetype (recommended)



## **Event Boundary/Line Breaker**

Allows Splunk to break the incoming stream of bytes into separate events

Supports single-line and multi-line

Splunk can usually do this automatically or it can be defined by sourcetype (recommended)



#### **Sourcetype** Defining your data's data

A default field that identifies the data structure of an event including datetime extraction and linebreaking

Determines how Splunk extracts & calculates fields during search time

Use the sourcetype field in searches to find all data of a certain type (as opposed to all data from a certain source)

Important – syslog, csv, json, xml are not sourcetypes!

Examples: cisco:asa, cisco:ios, pan:firewall, wineventlog, linux\_secure



## Source vs. Sourcetype

Events with the same sourcetype can come from different sources

- /var/log/messages
- /var/log/messages.1
- udp:514

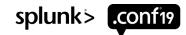
sourcetype=linux\_messages\_syslog may retrieve events from both of those sources



## What Happens with Bad Sourcetypes

Same regex, same sourcetype, bad results ©

	REGULAR EXPRESSION	2 matches, 145 steps (~2ms)
	<pre>EFT\s.+?\s"*(?P<user>.+?)\s</user></pre>	/ gm 🎮
	TEST STRING	SWITCH TO UNIT TESTS >
Squid	1503884030.208725 49 172.20.14.112 TCP_REFRESH_HIT/200 10635 GET	
Proxy	<pre>http://www.cambridgestatebank.com/images/bankfplow.jpg "brooks@d DIRECT/www.cambridgestatebank.com image/jpeg DEFAULT_CASE-Defaul Demo_Clients-NONE-NONE-DefaultRouting <iw_fnnc,5.0,0,-,-,-,0,-,-,-,-,-,iw_fnnc,-> - "SonyEricsso Browser/NetFront/3.3 Profile/MIDP-2.0 Configuration/CLDC-1.1 UP. http://www.cambridgestatebank.com/ "Finance"</iw_fnnc,5.0,0,-,-,-,0,-,-,-,-,-,iw_fnnc,-></pre>	tGroup- nW810i/R4EA
Blue Coat ProxySG	2017-08-27 20:31:52 10.180.6.76 64507 465 TCP_MISS 200 200 64445 OBSERVED GET boostifun.cellmania.com HTTP/1.1 291 http://boostifun.cellmania.com/ifuncb/ContentDownload? orderid=56660425&itemid=222067&fromProd=true - ringtone/mp3;char "Java/1.4.2_08" -	



## With Correct Sourcetypes

Same regex, different sourcetypes, good results ③

REGULAR EXPRESSION Cisco Squid	1 match, 95 steps (~3ms)		
<pre># GET\s.+?\s"*(?P<user>.+?)\s</user></pre>	/ gm 🎮		
TEST STRING	SWITCH TO UNIT TESTS >		
1503884030.208725 49 172.20.14.112 TCP_REFRESH	I_HIT/200 10635 GET		
http://www.cambridgestatebank.com/images/bankf			
"brooks@demo.com" DIRECT/www.cambridgestatebar			
DEFAULT_CASE-DefaultGroup-Demo_Clients-NONE-NC	Bluecoat	1 match, 48 steps (~1ms)	
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"SonyEricssonW810i/R4EA Browser/NetFront/3.3 F	<pre>GET\s.+?\s"*(?P<protoco< pre=""></protoco<></pre>	l_version>.+?)\s	/ gm 🍽
Configuration/CLDC-1.1 UP.Link/6.3.0.0.0" http://www.cambridgestatebank.com/ "Finance"	TEST STRING	SV	WITCH TO UNIT TESTS >
	- OBSERVED GET boostifun.ce	.com/ifuncb/ContentDownload? 2067&fromProd=true -	200 64445 326 -



## **Configuring the Metadata**

props.conf

[your:sourcetype] TIME\_PREFIX = MAX\_TIMESTAMP\_LOOKAHEAD = TIME\_FORMAT =

SHOULD\_LINEMERGE = false LINE\_BREAKER = EVENT\_BREAKER\_ENABLE = true EVENT\_BREAKER = inputs.conf

[monitor:///your/logs] host = <optional/depends> index = <your index> sourcetype = your:sourcetype source = <optional/depends>

#### host & source are usually automagically set

TRUNCATE = 10000



## Time to Explore!

Everything else happens at search!

Start exploring and understanding your data

Apply different lenses to your data for use cases not yet discovered

Maintaining the original log ensures integrity



## **Data Discovery**

Sensor Sensei

Using what we now know, what should we ask before data onboarding?



## Find the Data

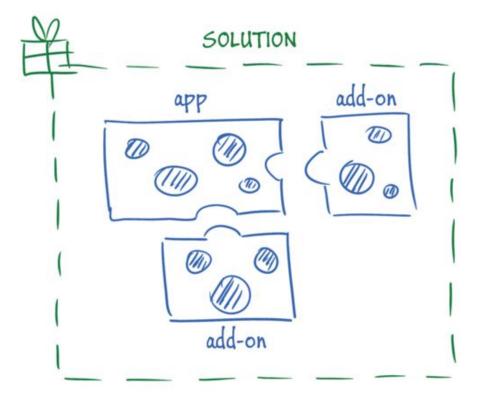
What is producing the data?

- Appliance
- Application
- Where is the data?
- Flat file
- Network/Syslog feed
- REST API
- Database
- Wineventlog
- Can you get a sample?

Is there a logging document or manual? - these sometimes do exist!



## Apps & Add-Ons (TA's)



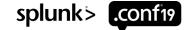
Your first choice when onboarding new data

Includes relevant config files (props/transforms) and ancillary scripts & binaries



## Where Do You Get Apps? Splunkbase!

Browse by Catego	ory				
CC/> DevOps 41 Apps		634 Apps		Security, Fraud & Compliance 572 Apps	
Business Analytics 94 Apps		IoT & Industriel Data 75 Apps		Utilities 565 Apps	
Browse by Techno	ology				See all Cisco apps >
cisco	D	<b>ELL</b> EMC	amazon	· <i>ul</i> /	paloalto
$\succ$	AddOn+	Cisco Meraki TA		uludu. cisco	
Cisco Networks App for Splunk Enterprise	AddOn+ Splunk Add-on for Cisco UCS	Meraki	Cisco ACI Add-on for Splunk Enterprise	Cisco AnyConnect Network Visibility	Cisco ACI App for Splunk Enterprise
	Splunk Add-on for	Meraki TA	CISCO Cisco ACI Add-on for	CISCO Cisco AnyConnect	CISCO Cisco ACI App for
for Splunk Enterprise	Splunk Add-on for Cisco UCS 223 Installs	TA-meraki	Cisco ACI Add-on for Splunk Enterprise	CISCO Cisco AnyConnect Network Visibility	CISCO Cisco ACI App for Splunk Enterprise
for Splunk Enterprise 1661 Installs	Splunk Add-on for Cisco UCS 223 Installs	TA-meraki	Cisco ACI Add-on for Splunk Enterprise	CISCO Cisco AnyConnect Network Visibility	CISCO Cisco ACI App for Splunk Enterprise 83 Installs
for Splunk Enterprise 1661 Installs	Splunk Add-on for Cisco UCS 223 Installs	TA-meraki 183 Installs	Cisco ACI Add-on for Splunk Enterprise	CISCO Cisco AnyConnect Network Visibility	CISCO Cisco ACI App for Splunk Enterprise 83 Installs See all apps >



### What If There is No App/Add-On?





## Let's Do It

Getting Data In!

Nore brain, Surgery

311



## **Data Discovery**

Understand the data source

Your networking organization wants to bring their firewall logs into Splunk

Ask yourself...

- Are the logs coming from an appliance or application?
- How will I access the logs?
- Who needs access to the logs in Splunk?
- How long do I need to retain the logs?
- Can I get a log sample?



## Data Discovery

Our answers...

Your network team uses Cisco ASA and Palo Alto firewalls

Both firewalls are appliances, outputting their logs using syslog

The networking team also has a syslog server

Your networking team is the only team that needs access until your security team becomes aware of the data in Splunk (same data, difference lenses, multiple use-cases)

Your organization would like 12 months of logs for any network related equipment for compliance purposes

A log sample has been provided



## **Questions For Us**

What index do I use?

Do you have any existing indexes for the network team?

• Yes, but all of their other data is in there and security will probably want to see the firewall logs

Do their existing indexes have the required retention?

• No, we keep their other logs for only 90 days

Sounds like we need a new index...maybe "firewall"?



## **Questions For Us**

How am I going to receive the data?

Leverage the networking team's existing syslog server?

Use my own syslog server?

Use Splunk Connect for Syslog?

#### Any answer is acceptable!



### **Questions For Us**

#### What sourcetype do I use?

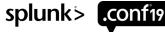
Are there any existing apps on Splunkbase? YES!

AddOnt Splunk Add-on for Cisco ASA						
Source type	Description					
cisco:asa	The system logs of Cisco ASA record user authentication, user session, VPN, and intrusion messages.					
cisco:fwsm	The system logs of Cisco FWSM record user authentication, user session, and firewall messages.					
cisco:pix	The system logs of Cisco PIX record user authentication, user session, and intrusion messages.					

#### Palo Alto Networks Add-on for Splunk

Log source	SourceType
Only Firewall logs	pan:firewall
Only Traps Management Service logs	pan:traps
Only Traps 4.x logs	pan:traps4
This input receives Firewall and Traps logs	pan:log

Read the docs, we did most of the 80% already for you!



### What Are Our Inputs?

Making some assumptions here...

[monitor:///var/log/cisco\_asa/<host>]

index = firewall

sourcetype = cisco:asa

disabled = false

host\_segment = 4

[monitor:///var/log/pan\_firewall/<host>]

index = firewall

sourcetype = pan:firewall

disabled = false

host\_segment = 4



### **Value Extraction**

Exploring Our Data!

Looking for trouble.



### If We Used the Incorrect Sourcetype

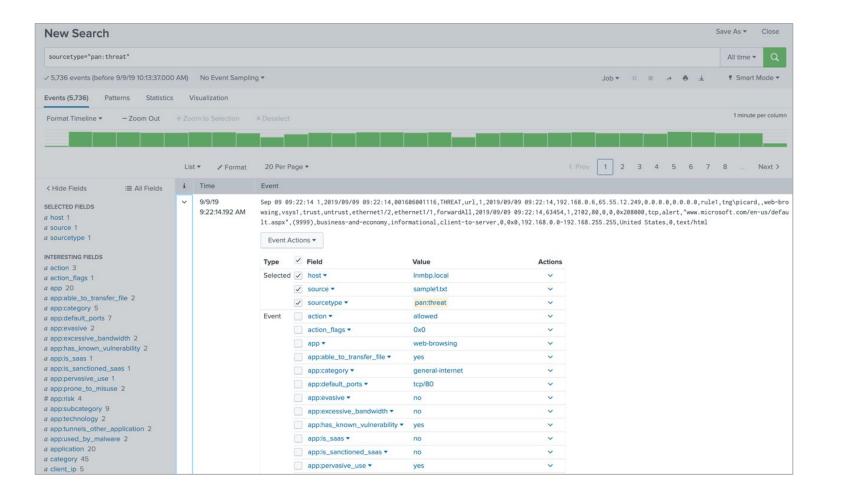
We would have a lot of work ahead of us 🔅

New Search									Sa	ave As 🔻	Close
sourcetype="syslog"										All time 🔻	Q
✓ 9,961 events (before 9/9/19 10:11:15.000)	AM) No Event Samplin	g 🔻			Job 🔻		ð	ð	¥	🕈 Smart	Mode •
Events (9,961) Patterns Statistics	Visualization										
Format Timeline 👻 — Zoom Out	+ Zoom to Selection	× Deselect								1 minute	per colun
	List 🔻 🖌 Format	20 Per Pa	age 🔻		< Prev 1	2 3	4 5	6	7	8	Next >
K Hide Fields     i     i     ≡ All Fields     i	i Time	Event									
	✓ 9/9/19	Sep 09 09	1:22:14 1,2019/09/0	9 09:22:14,001606001116,TRAFFI	C,end,1,2019/09/	09 09:22:1	4,192.	168.0.3	2,205.1	71.2.25,0	.0.0.0,0
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SELECTED FIELDS a host 14 a source 2 a sourcetype 1 INTERESTING FIELDS # date_hour 2 # date_mday 1 # date_minute 49 a date_month 1 # date_second 60 a date_wday 1 # date_year 1 a date_zone 1	✓ 9/9/19	0.0.0,rul 0,0,0x200 Event A Type Selected	e1, tng\crusher, dn 000, udp, allow, 326, ctions ▼ ✓ Field ✓ host ▼ ✓ source ▼ ↓ source ↓ ↓ ime ▼ ↓ index ▼	<pre>xy xys1, trust, untrust, ethernet 75, 251, 2, 2019/09/09 09: 22: 14, 0  Value Inmbp.local sample1.txt syslog 2019-09-09T09:22:14.000+01:00 main 1/</pre>	Actions Actions 0 0	forwardAll	,2019/	09/09	09:22:1	4,38090,1	,61910,



### **Using the Add-On: Palo Alto**

https://splunkbase.splunk.com/app/2757/



splunk> .conf19

### Using the App: Palo Alto

#### https://splunkbase.splunk.com/app/491/

Palo Alto Networks 🕶	Activity 👻 Threats 👻	Operations ▼ Search							🐙 paloalto
All Incidents 0									Edit Export •
	Product	Vsys		Client IP		Server IP	Lo	og Subtype	
Last 4 hours	- ANY	•							
Severity	Action	AutoFocus T	ag						
ANY	- All	- ANY		Submit	Hide Filters				
		Search produce	d no results.						
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O	)	07		0		C	)		52 29
Correlated Incider	nts Per Hour	Network Incidents Per Hour		Endpoint Incidents Pe	er Hour	Aperture SaaS Inc	idents Per Hour		us WildFire Submissions Per Hour
		/	**						
Threat Subtypes Over	Time			Thre	eat Severity Over T	ïme			
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				10					
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10							_		
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8:00 AM Mon Sep 9 2019 Incident Investigation	Feed log_subtype \$	yware ∎ wildfire threat_name ≎	severity ¢ ¢ medium alle	on app \$	Mon Sep 9 2019 client_ip ≎ ing 192.168.0.3	critical high	medium 📕	low informa user ≑	tional file_name ≑

splunk > .conf19

### Using the Add-On: Cisco ASA

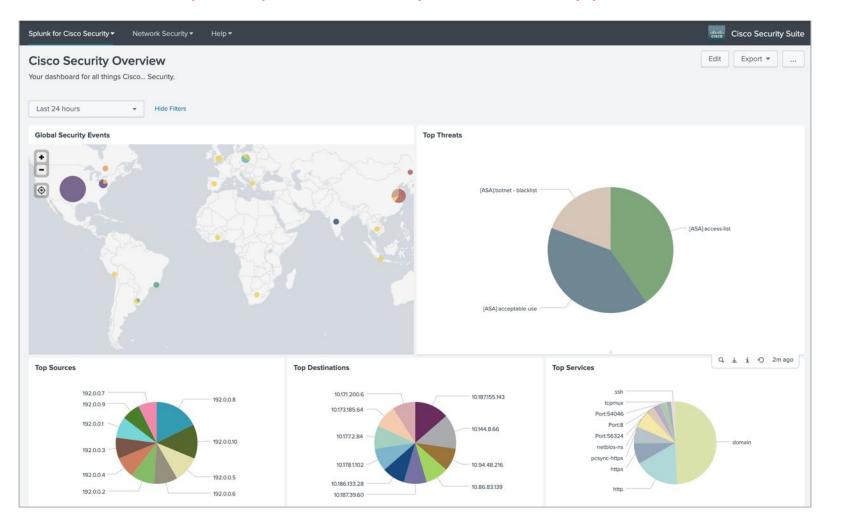
https://splunkbase.splunk.com/app/1620/

New Search						Save As  Close	
sourcetype="cisco:asa"						All time 👻 🔍	
✓ 7,322 events (before 9/9/19 10:14:46.00)	0 AM)	No Event Samplin	ng 👻		± ⊕ < ≡ II ▼doL	🕈 Smart Mode 👻	
Events (7,322) Patterns Statistics	s \	Visualization					
Format Timeline - Zoom Out	+ Zo		× Deselec			1 minute per column	
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< Hide Fields i≣ All Fields	i	Time	Event				
SELECTED FIELDS <i>a</i> host 100+ <i>a</i> source 1 <i>a</i> sourcetype 1	~	9/9/19 9:19:44.000 AM	vascript Event	09 09:19:44 98.41.150.80 :/searchConstantsJS.jsp?country=			
INTERESTING FIELDS			Туре	✓ Field	Value	Actions	
a action 7			Selecter	d 🗹 host 🕶	Inmbp.local	~	
a app 1 a Cisco_ASA_action 7				✓ source ▼	sample2.txt	~	
# Cisco_ASA_action 7 # Cisco_ASA_message_id 53				✓ sourcetype ▼	cisco:asa	~	
a Cisco_ASA_user 100+			Event	Cisco_ASA_action •	allowed	~	
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# date_hour 2				Cisco_ASA_vendor_action •	Accessed	~	
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a date_month 1				app 💌	AAA	~	
# date_second 60				c.•	TL .	~	
a date_wday 1				country •	DK	~	
# date_year 1 a date_zone 1							
a description 5				description *	Normal but significant conditions	~	
a dest 100+				dest •	98.41.150.80	~	
a dest_ip 100+				dest_ip ▼	98.41.150.80	~	
# dest_port 100+ a dest_zone 17				dvc 🕶	98.41.150.80	~	
a dvc 100+				eventtype •	cisco_connection ( communicate network )	~	
a eventtype 8				ids_type •	network	~	



### **Using the App: Cisco Security Suite**

https://splunkbase.splunk.com/app/525/





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## What If There is No Add-on?

That's OK!

Can you SPL?



### **Data Discovery**

Understand the data source

Your networking organization wants another set of logs into Splunk

Ask yourself...

- Are the logs coming from an appliance or application?
- How will I access the logs?
- Who needs access to the logs in Splunk?
- How long do I need to retain the logs?
- Can I get a log sample?



### Data Discovery

Our answers...

You discovered these are logs from a new application called "Acme Photon" The logs are written to a directory on the application server There is no add-on available on Splunkbase (yet) Sample logs and the complete file path have been provided

/opt/acme/photon/audit.log
/opt/acme/photon/db.log
/opt/acme/photon/scan.log
/opt/acme/photon/web.log



### What Are the Sourcetypes?

https://docs.splunk.com/Documentation/AddOns/released/Overview/Sourcetypes

Naming format: vendor:product:technology:format

/opt/acme/photon/audit.log

acme:photon:audit

/opt/acme/photon/db.log

acme:photon:db

/opt/acme/photon/scan.log

- acme:photon:scan
- /opt/acme/photon/web.log
- acme:photon:web



### Sample Logs

2019-09-24 13:04:04 device=something1 user login (paynealbert) result="<code>1</code>" from 192.168.1.10.136:51750 to 192.168.10.1:443 uri="https://acme.com/"

2019-09-24 13:04:06 device=something2 user login (steven81) result="<code>2</code>" from 192.168.1.14:10607 to 192.168.10.2:443 uri="https://acme.com/"



### **Configuring the Metadata**

props.conf

[acme:photon:audit]

TIME PREFIX = ^

MAX\_TIMESTAMP\_LOOKAHEAD = 19

TIME\_FORMAT = %Y-%m-%d %H:%M:%S

```
SHOULD_LINEMERGE = false
LINE_BREAKER = ([\r\n]+)
EVENT_BREAKER_ENABLE = true
EVENT_BREAKER = ([\r\n]+)
```

inputs.conf

[monitor:///opt/acme/photon/audit.log] index = myindex sourcetype = acme:photon:audit

#### host & source are usually automagically set

TRUNCATE = 10000



### Where are the Fields?

#### auto vs custom

2019-09-24 13:04:04 device=something1 user login (paynealbert) result="<code>1</code>" from 192.168.1.10.136:51750 to 192.168.10.1:443 uri="https://acme.com/"

- \_time = 2019-09-24 13:04:04 TIME\_PREFIX, TIME\_FORMAT, etc.
- device = something1 auto extracted
- user = paynealbert ???
- result = <code>1</code> auto extracted
- result\_code = 1 ???
- src\_ip = 192.168.1.10.136 ???
- src\_port = 51750 ???
- dest\_ip = 192.168.10.1 ???
- dest\_port = 443 ???



### Where are the Fields?

**Custom extractions** 

[acme:photon:audit]

# continued...

EXTRACT-username = user\slogin\s\((?P<username>[^\)]+)\)

EXTRACT-result\_code = result="<code>(?P<result\_code>\d+)\<

EXTRACT-src\_ip\_port = from\s(?P<src\_ip>.+?):(?P<src\_port>\d+)\s

EXTRACT-dest\_ip\_port = to\s(?P<dest\_ip>.+?):(?P<dest\_port>\d+)\s



### **Common Information Model (CIM)**

http://docs.splunk.com/Documentation/CIM/latest/User/Overview

A way of normalizing your data for maximum efficiency at search time

Splunk Certified TA's typically include necessary normalizations

Allows end-users to search using common fields such as "user" across many sourcetypes

Extract your fields, normalize, then tag your data



### **CIM Data Models**

- Alerts
- Application State
- Authentication
- Certificates
- Databases
- Data Loss Prevention
- Email
- Interprocess Messaging
- Intrusion Detection
- Inventory

- Java Virtual Machines
- Malware
- Network Resolution (DNS)
- Network Sessions
- Network Traffic
- Performance
- Ticket Management
- Updates
- Vulnerabilities
- Web



### What Do You Do?

Making your data usable

Already have a proper sourcetype

Extract your fields

Create field aliases

- username AS user
- src\_ip as src, dest\_ip as dest

**Create calculations** 

action=if(action="OK","success","failure")

Create tags

Use the Data Models as a guide

#### **Fields for Authentication event datasets**

The following table lists the extracted and calculated fields for the event datasets in the model. The table does not include any inherited fields. For more information, see How to use these reference tables.

Dataset name	Field name	Data type	Description	Expected values
Authentication	action	string	The action performed on the resource.	success, failure
Authentication	арр	string	The application involved in the event (such as ssh, splunk, win:local).	
Authentication	dest	string	The target involved in the authentication. You can <b>alias</b> this from more specific fields, such as <b>dest_host</b> , <b>dest_ip</b> , or <b>dest_nt_host</b> .	

#### **Tags used with Authentication event datasets**

The following tags act as constraints to identify your events as being relevant to this data model. For more information, see How to use these reference tables.

Dataset name	Tag name
Authentication	authentication
I Default_Authentication	default
I Insecure_Authentication	cleartext OR insecure
I Privileged_Authentication	privileged



#### Applying CIM Normalizing your fields

[acme:photon:audit]

# continued...

FIELDALIAS-user = username AS user

```
FIELDALIAS-src = src_ip AS src
```

```
FIELDALIAS-dest = dest_ip AS dest
```

```
EVAL-action = case(result_code==1,"success",result_code==2,"failure",1=1,null())
```



### **Tagging Your Data**

• eventtypes.conf

[acme\_photon\_audit\_authentication]

search = sourcetype=acme:photon:audit "user login"

• tags.conf

[eventtype=acme\_photon\_audit\_authentication]

```
authentication = enabled
```



### **Become Famous**

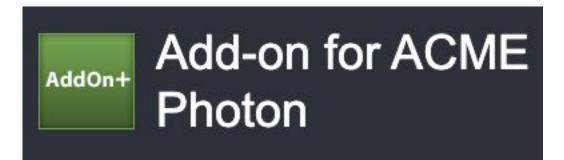
Submit your TA to Splunkbase ③

#### Submit content to Splunkbase with the web UI

The user account that you use to submit your content becomes the account that owns the app. Log in to that user account to respond to questions and manage Splunkbase content.

- 1. Navigate to https://splunkbase.splunk.com/develop/ and click Submit Your App.
- 2. Review and agree to the Splunk Apps Developer Distribution License.

You are now on the Hosting page.



BUILT BY Your Name Here





### Recap

Don't Forget!



### Recap

Always set a sourcetype!

Don't use syslog as a sourcetype!

Don't use csv, json, xml as a sourcetype!

Use Splunkbase as a starting point!

Make your own sourcetype if you must, but use the naming format: vendor:product:technology:format

Make the data usable – CIM!



### **Do You Have Bad Sourcetypes?**

inputs.conf without a sourcetype defined

 I tstats count where index=\* (sourcetype=\*-\* OR sourcetype=\*too\_small) by sourcetype

Don't make the puppy sad ☺...

...so you can sleep good at night  $\odot$ 







### What's Next?

Splunk Enterprise Data Administrationhttps://www.splunk.com/view/SP-CAAAPSE

Go see these sessions....

- SEC2280: Break Down Silos By Ingesting Multi-Purpose Data Sources into Splunk
- BA2766: Machine Data Alchemy: Transforming Digital Exhaust into Campus Gold
- FN2103: Exploratory Data Analysis on Aviation Safety Data
- FN1921: Saving the Nation's Food Supply with Data-Driven Analytics
- DEV1140: Next Generation Data Ingestion and Preparation with Splunk



### Resources

https://docs.splunk.com/Documentation/Splunk/latest/Data/Whysourcetypesmatter

https://docs.splunk.com/Documentation/AddOns/released/Overview/Sourcetypes

https://www.splunk.com/blog/2012/08/10/sourcetypes-whats-in-name.html

https://www.splunk.com/blog/2010/02/11/sourcetypes-gone-wild.html



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# Thank



Go to the .conf19 mobile app to

**RATE THIS SESSION**