Splunk4Ninjas - Common Information Model (CIM)

An introduction to Splunk CIM Data Models and making data CIM compliant

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Please introduce yourself!

- Name
- Company/organisation
- Role
- Are you currently using Splunk?
- What are you interested in using Splunk for?

Workshop Agenda

- Overview of Splunk data sources and Splunkbase add-ons roles
- What is the Splunk Common Information Model (CIM)?
- Splunk data models and data model acceleration overview
- CIM compliance process walkthrough
- Hands-on Practice lab exercises:

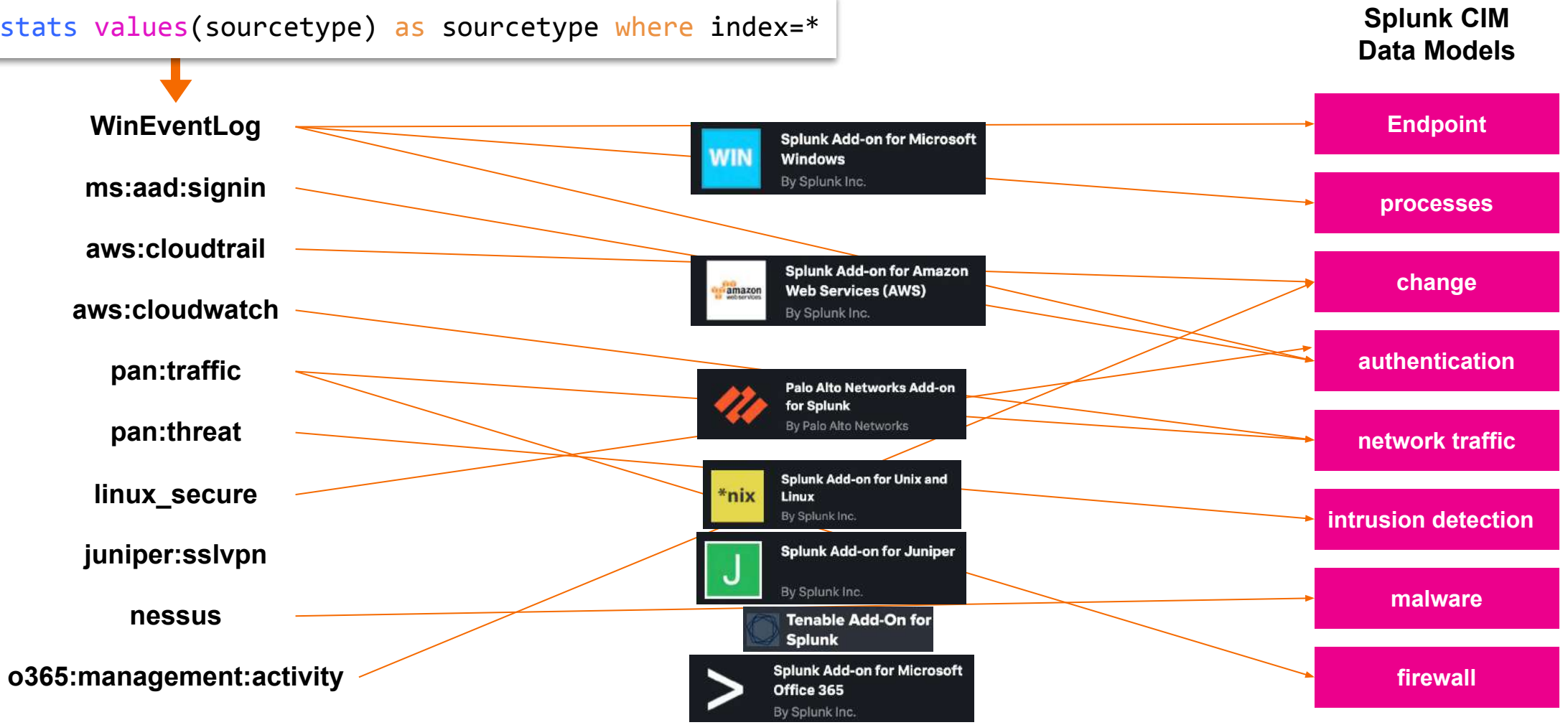
  Lab 1: Onboarding CIM compliant data (firewall traffic logs) using the FortiGate add-on

  Lab 2: Onboarding custom data (badge data) and manually mapping to the CIM Authentication data model

  Lab 3: Dashboarding CIM data using the `tstats` command

Overview of Splunk Data Sources

```
| tstats values(sourcetype) as sourcetype where index=*
```



Discover Splunk Apps: https://splunkbase.splunk.com/

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What's "CIM"?

CIM = Common Information Model

(DTMF's CIM != Splunk's CIM) = compatibility

Distributed Management Task Force
is a nonprofit industry standards organization that creates open manageability standards.

DTMF's CIM provides a **common definition** of management information for systems, networks, applications and services.

The CIM standard **includes a specification and a schema**, as well as a Metamodel

Learn more: https://www.dmtf.org/standards/cim

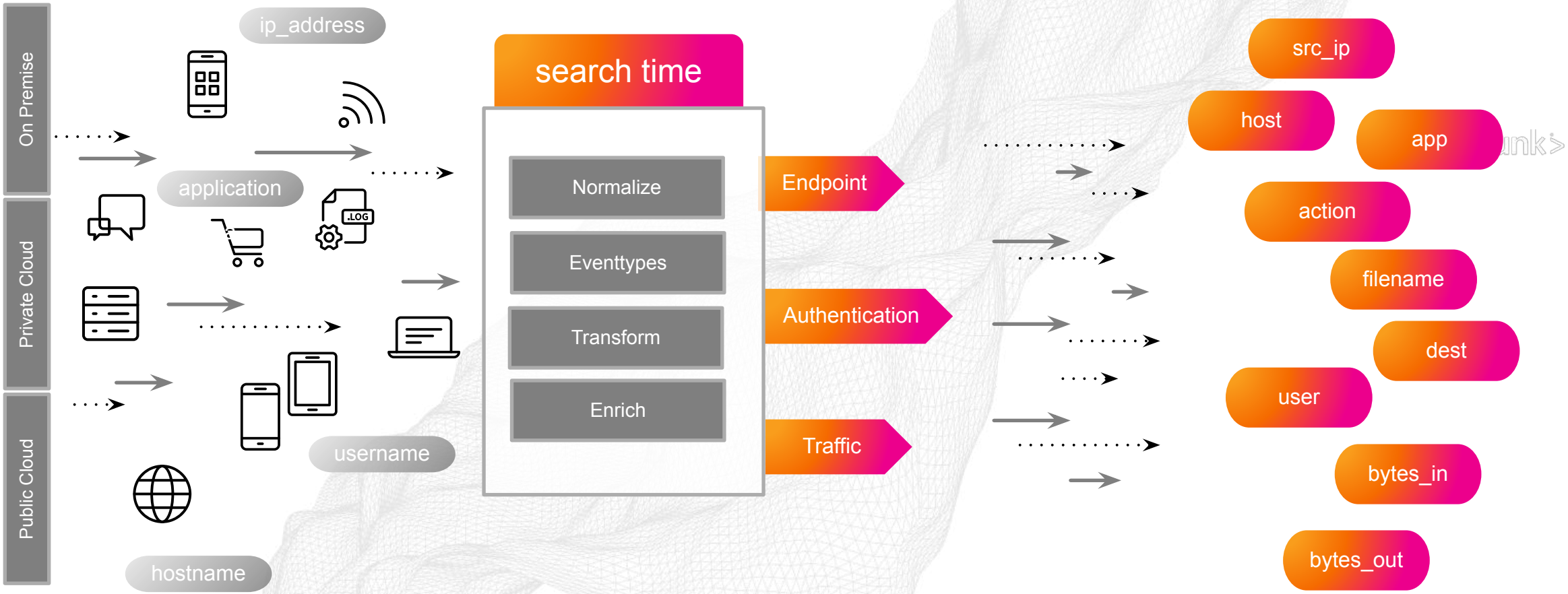
The Splunk CIM helps you to **normalize your data to match a common taxonomy** for data from multiple source vendors

The **Splunk CIM** is **packaged as an add-on** and comes with **pre-configured data models with a schema** in the form of tables that help you **parse your data at search time**

Learn more:
https://docs.splunk.com/Documentation/CIM/latest/User/Overview

Splunk Common Information Model

Normalize fields and events across all data sources



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https://youtu.be/nlf7Zjhwhgw

splunk>

Splunk Common Information Model (CIM)

The What and Why of CIM

CIM: common information model for normalizing data across disparate data sources; allows for **easy correlations**/mapping to data models
https://docs.splunk.com/Documentation/CIM/latest/User/Overview

- The CIM helps you to normalize your data to match a common standard, using the **same field names and event tags** for equivalent events from different sources or vendors. The CIM acts as a search-time schema ("schema-on-the-fly") to allow you to define relationships in the event data while leaving the raw machine data intact.
- Normalized data from multiple different source types, allows Splunk users to develop reports, correlation searches, and dashboards to present a **unified view of a data domain**.
- The Splunk Common Information Model add-on **is packaged with Splunk Enterprise Security**.
- The app can be downloaded/installed from here: https://splunkbase.splunk.com/app/1621

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Why Splunk CIM?

Common taxonomy: Simpler searches

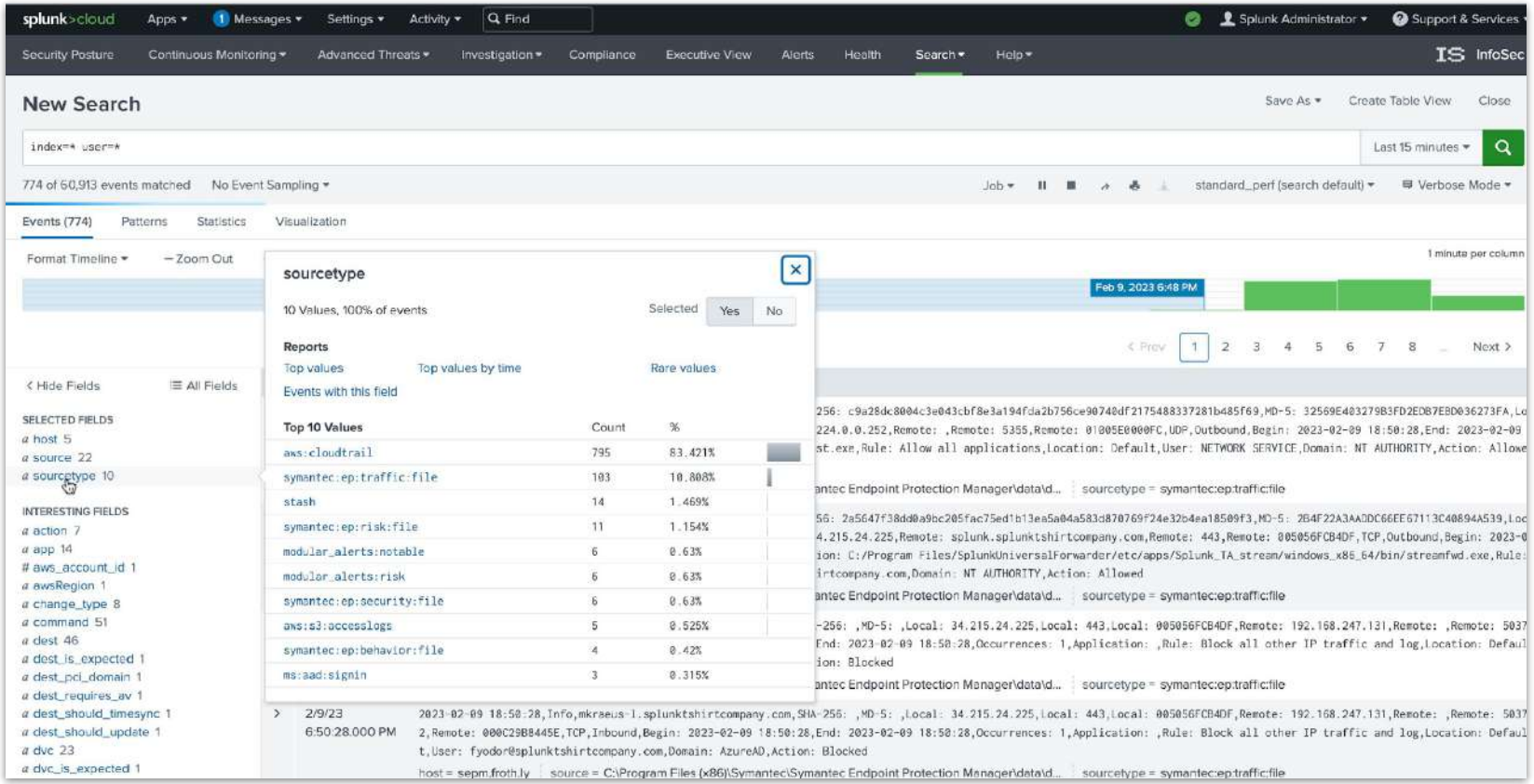
```
index=* user=*
```

vs

```
index=* (Username=* OR username=* OR user_name=* OR username=*)
```

Splunk CIM ***Authentication*** data model → ***user*** to identify an entity using a particular system, the “user.”

Cisco ASA → ***Username***
WinEventLog → ***userName***
Linux Secure → ***user_name***
Duo → ***username***



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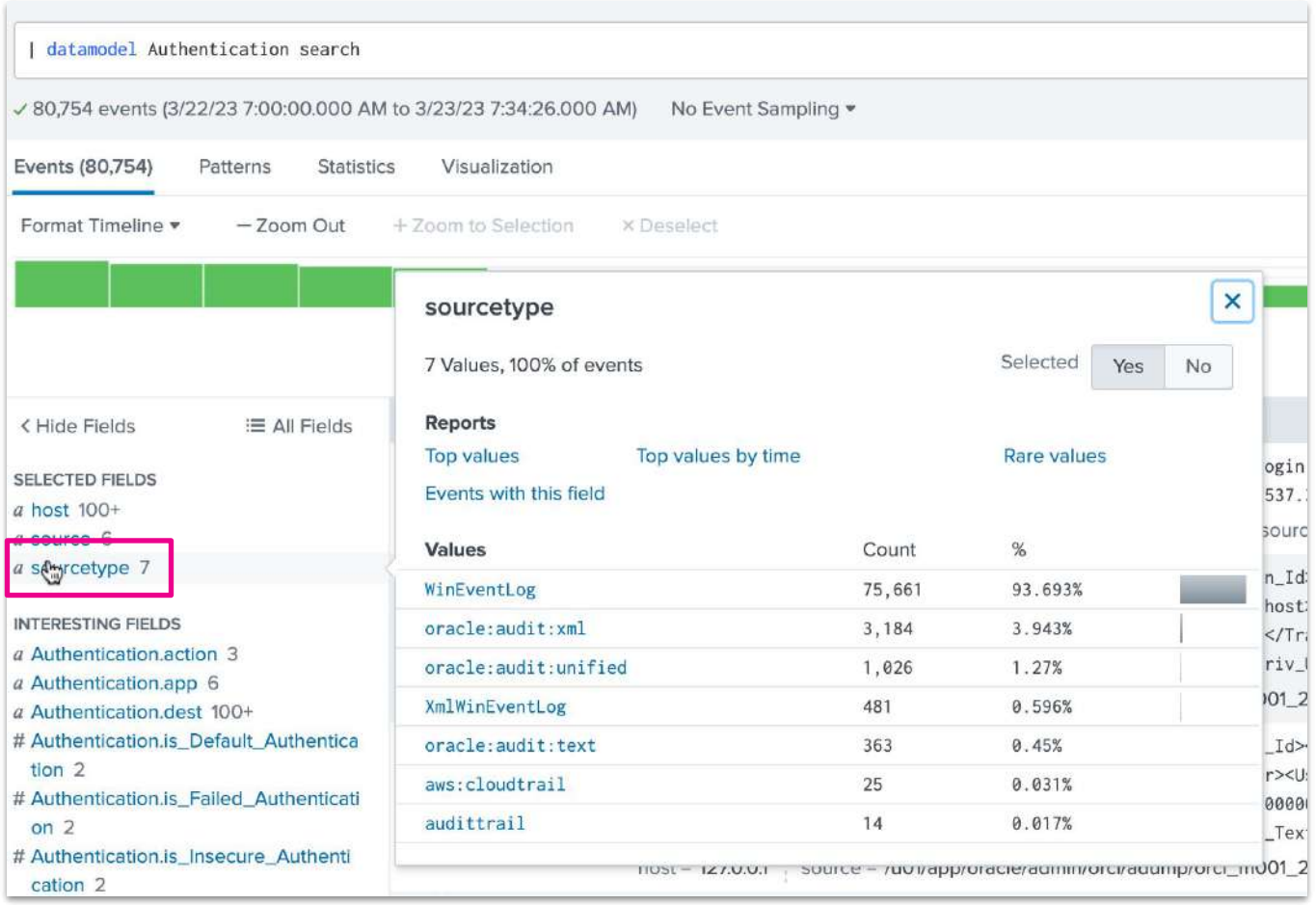
Why Splunk CIM?

Searching the data model automatically correlates multiple data sources



Why Splunk CIM?

Faster and more performant searches: data models can be accelerated

Searching against an **accelerated data model:**

```
| tstats summariesonly=true distinct_count(Authentication.user) from datamodel=Authentication by sourcetype
```

Takes **0.6 seconds** to run

vs searching against the **index:**

```
index=* sourcetype=wineventlog | stats dc(userName) as count by sourcetype
| append
  [ search index=* sourcetype=cisco:asa | stats dc(Username) as count by sourcetype
  | append
    [ search index=* sourcetype=linux_secure | stats dc(user_name) as count by sourcetype
    | append
      [search index=* sourcetype=duo | stats dc(username) as count by sourcetype ] ] ]
```

Takes **over 65 seconds** to run (<100x)

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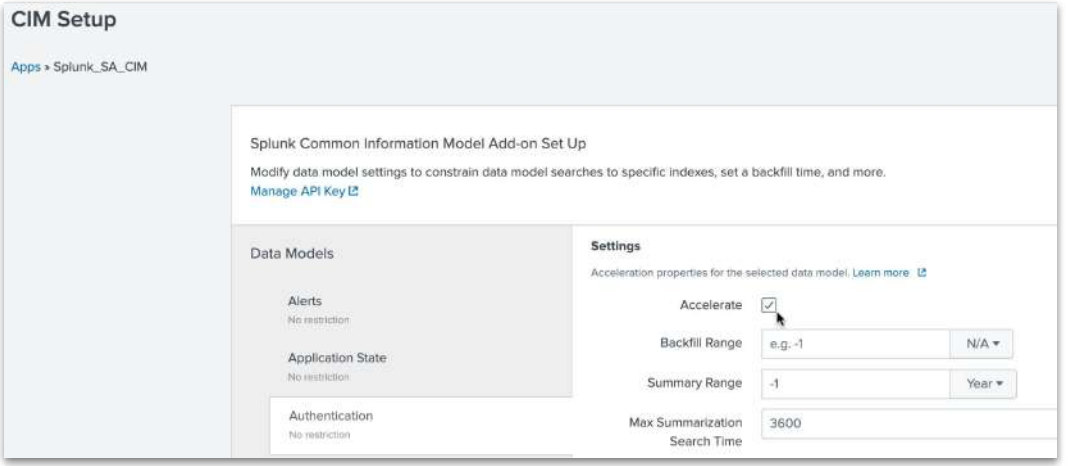
Intro to (CIM) Data Models

What is a data model?

- A data model is a **hierarchically structured search-time mapping** of your data, and can be composed by one or more datasets.

What is data model acceleration?



- It is a Splunk **feature** used to **speed up data models** that represent extremely large datasets
- Using searches that query accelerated Data Models in dashboards improves search performance
- When enabled, it will create a *summary* table with the key=value pairs
- Searches against a data model that is accelerated, e.g.

```
| tstats summariesonly=true from datamodel=Malware...
```

  will search against the *summary* table, and will run faster.
- Requires index whitelisting
- This is set up in the CIM add-on

Learn more: https://docs.splunk.com/Documentation/Splunk/latest/Knowledge/Aboutdatamodels

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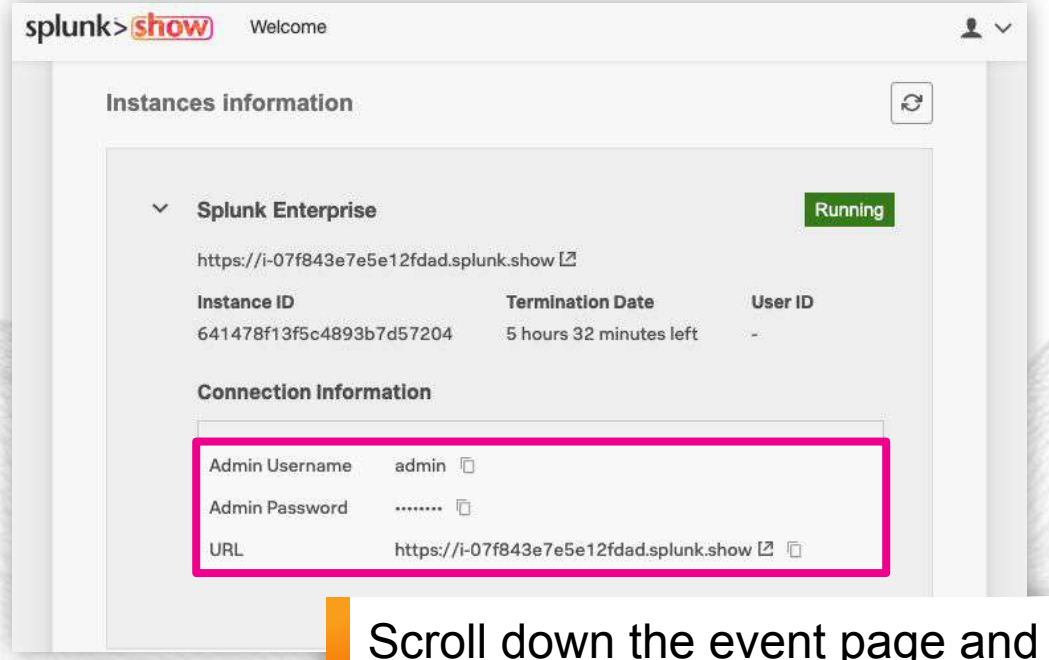
Task 2: Log in to Splunk

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

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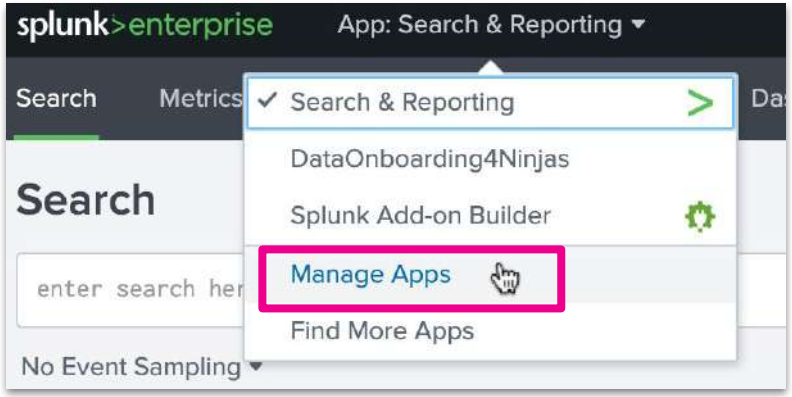
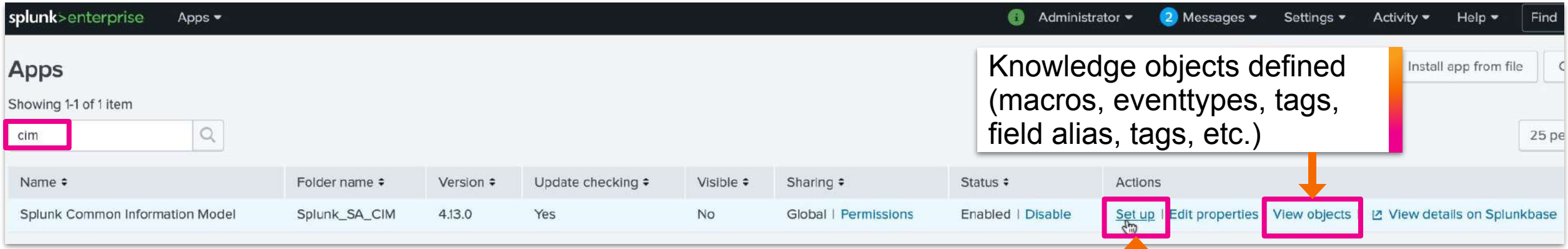
Task 3: Explore the CIM add-on

Explore CIM Set up, view objects, and explore CIM data models under settings





Learn more:
https://docs.splunk.com/Documentation/CIM/latest/User/Howtousethesereferencetables
https://docs.splunk.com/Documentation/CIM/latest/User/CIMfields
https://docs.splunk.com/Documentation/CIM/latest/User/Authentication

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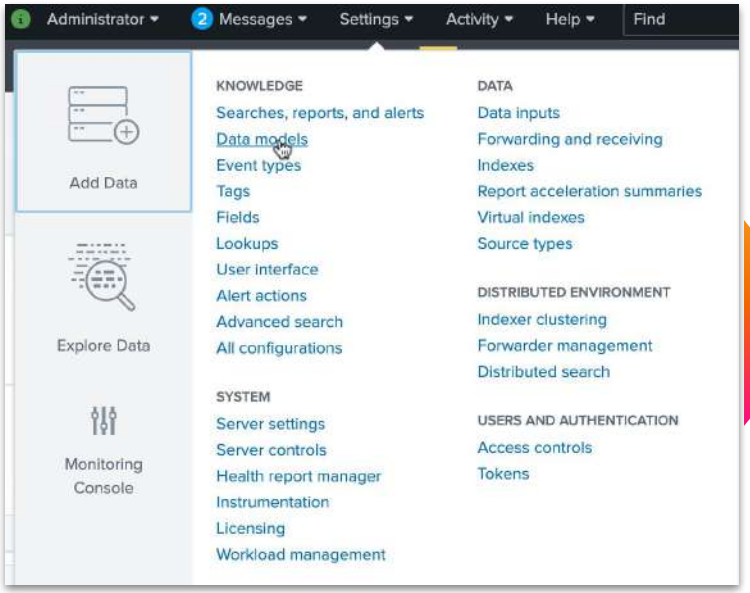
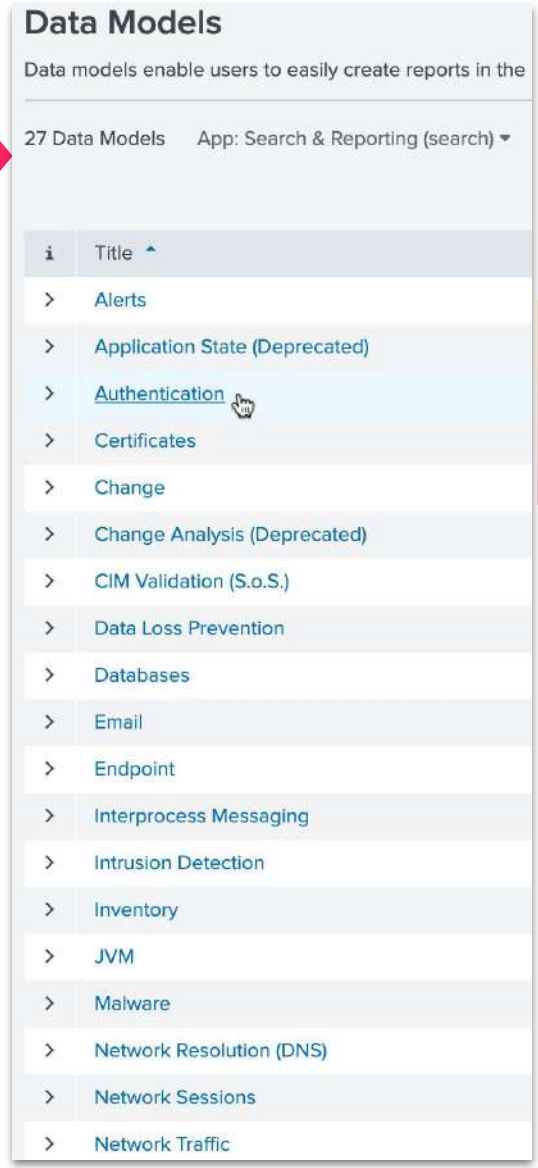
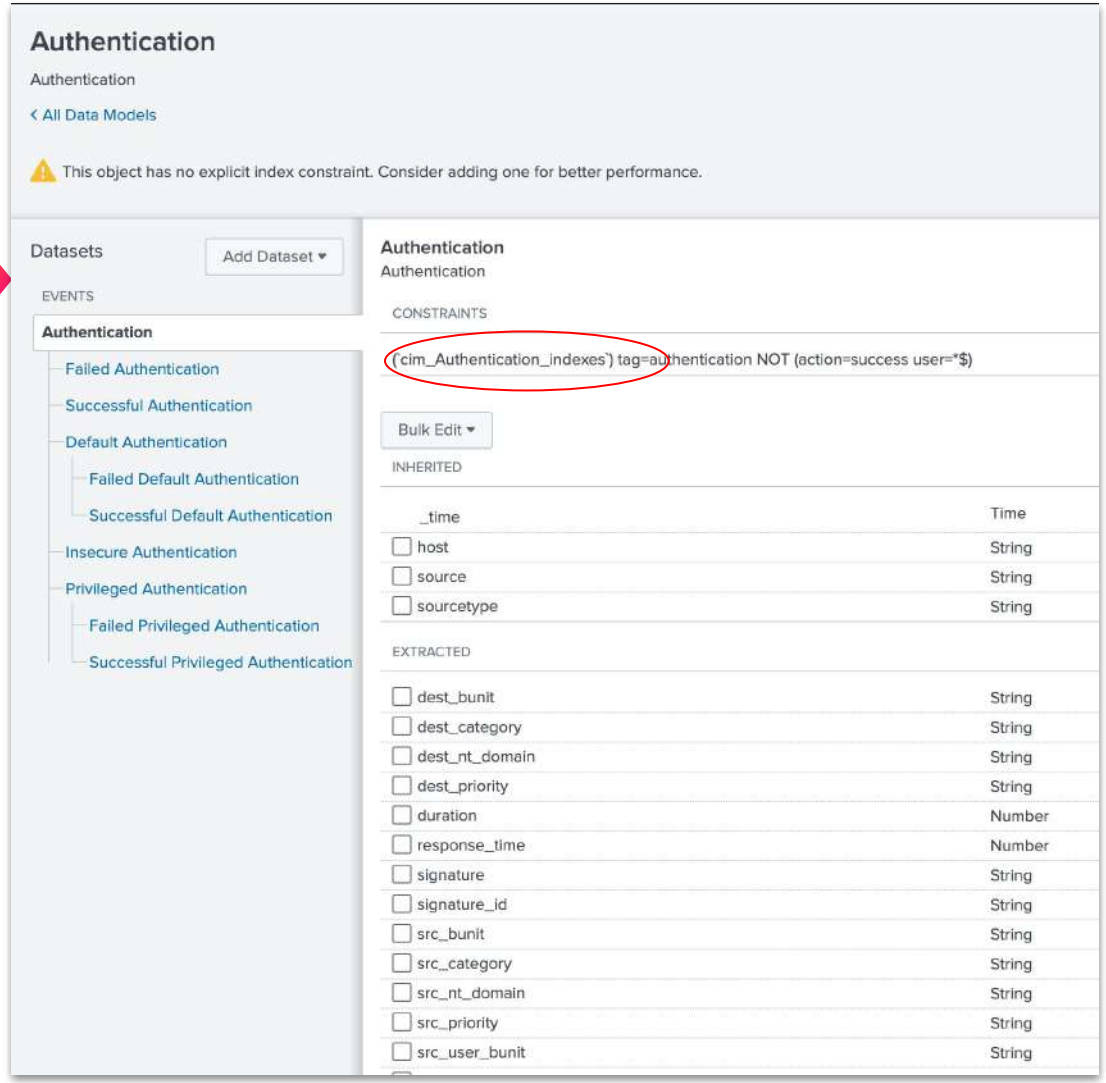


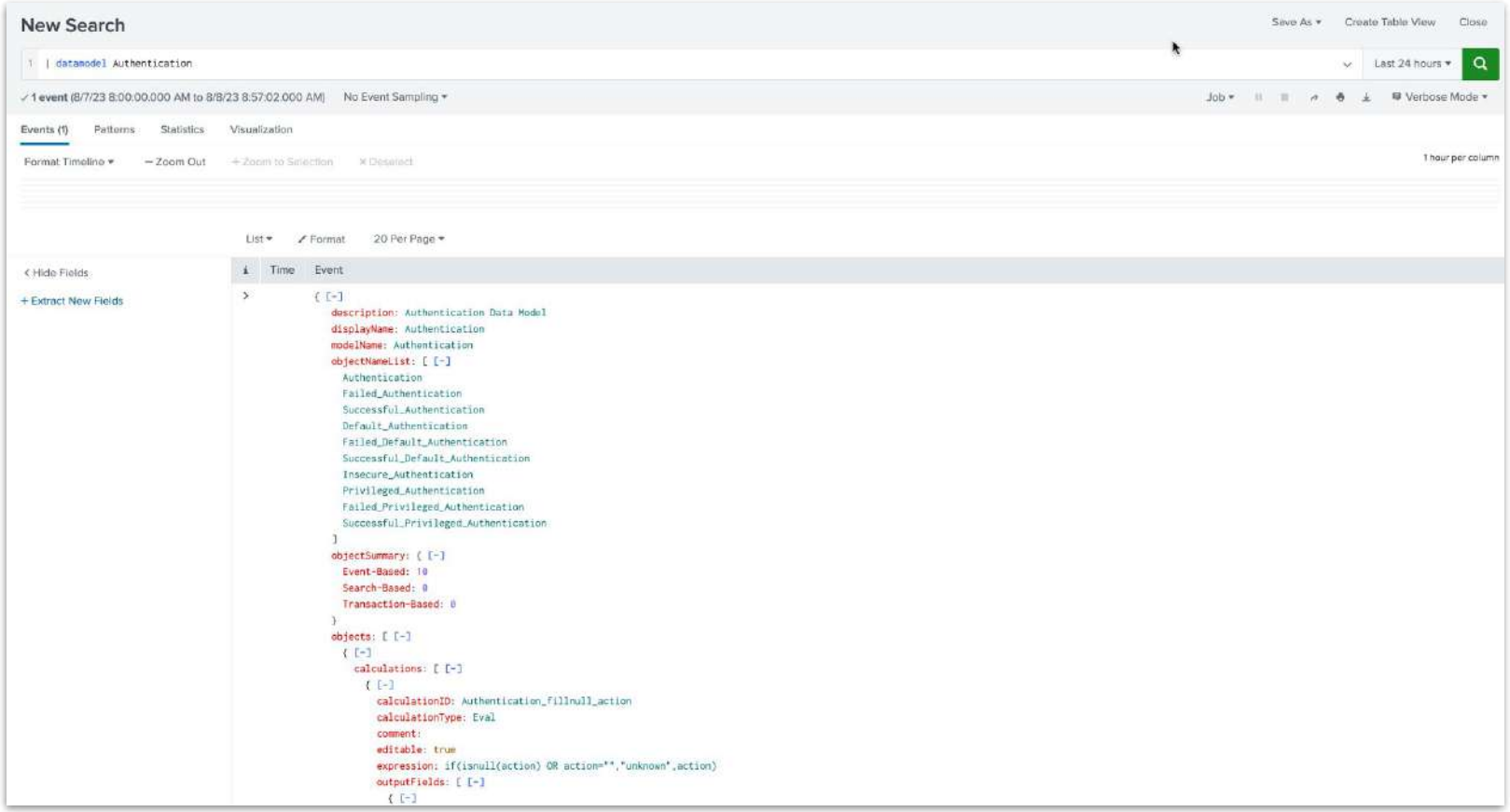




Task 4: Explore the data model using SPL

Explore the data model's data sets and schema in json format using the Search app

```
| datamodel "Authentication"
```



Learn more:
https://docs.splunk.com/Documentation/Splunk/latest/SearchReference/Datamodel

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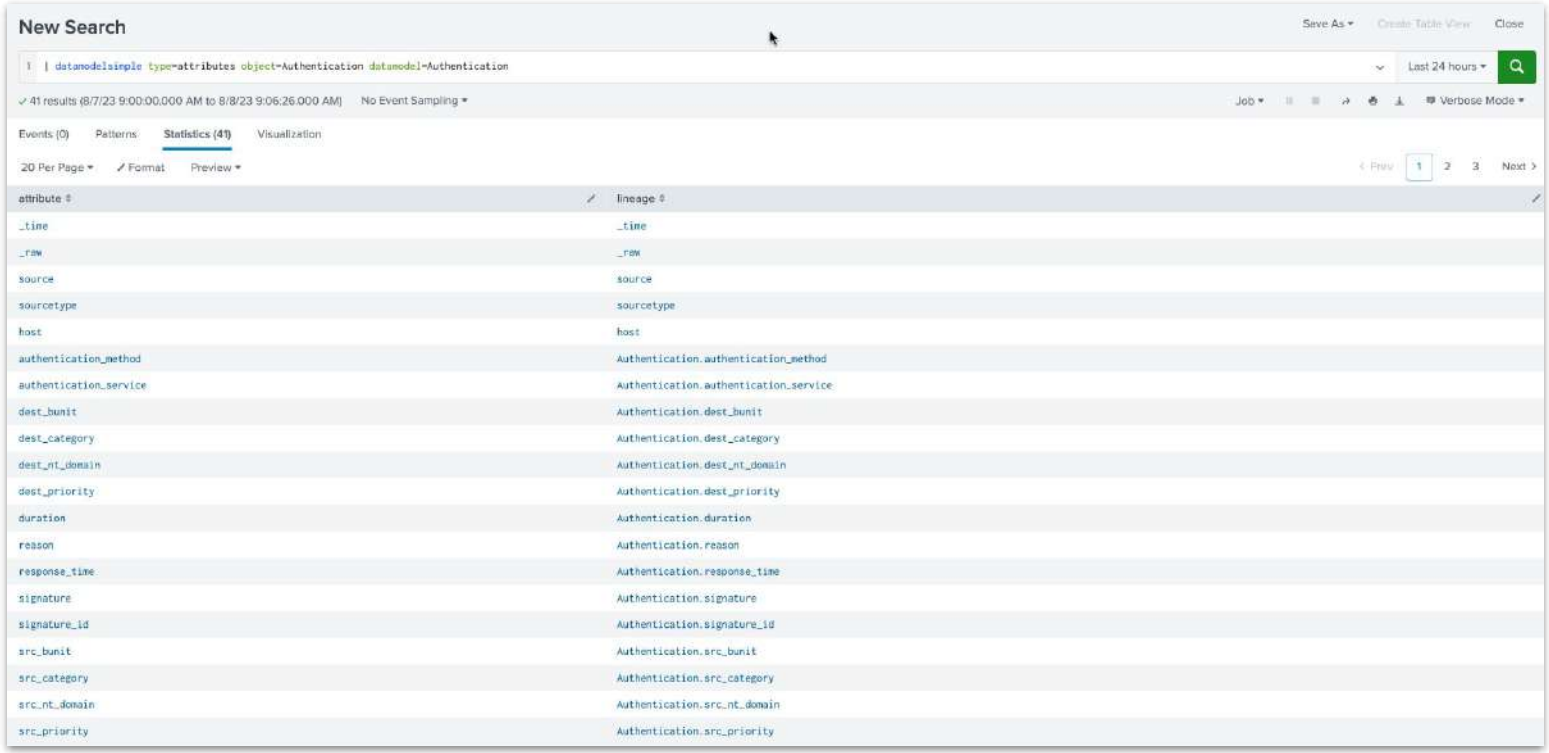
Task 4: Explore the data model using SPL

Explore the data model's data sets' fields in table view using the search app

```
| datamodelsimple type=attributes object=Authentication datamodel=Authentication
```



Learn more:
https://docs.splunk.com/Documentation/CIM/latest/User/UsetheCIMtovalidateyourdata#Use_the_datamodelsimple_command

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Practice Lab

Lab 1: GDI CIM-compliant Data

CIM-compliant Add-on from Splunkbase

Fortinet FortiGate Firewall Traffic Logs

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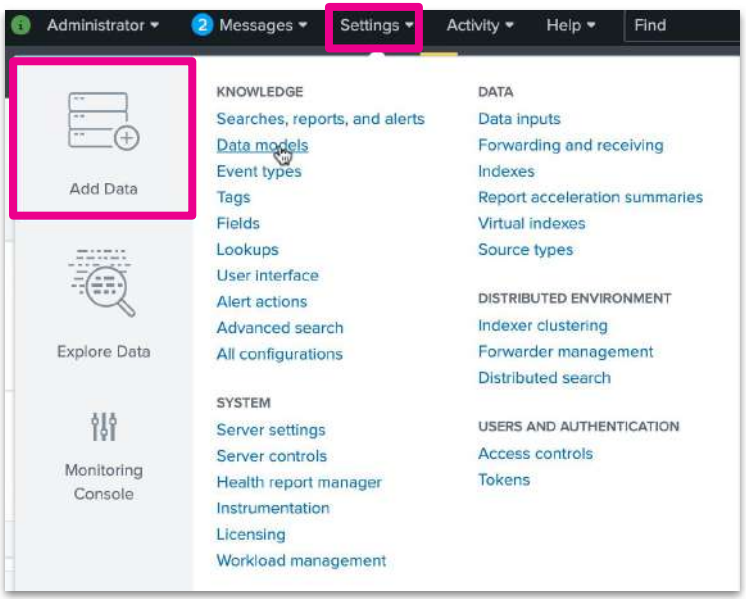
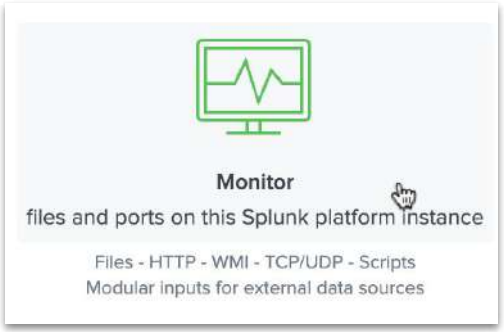
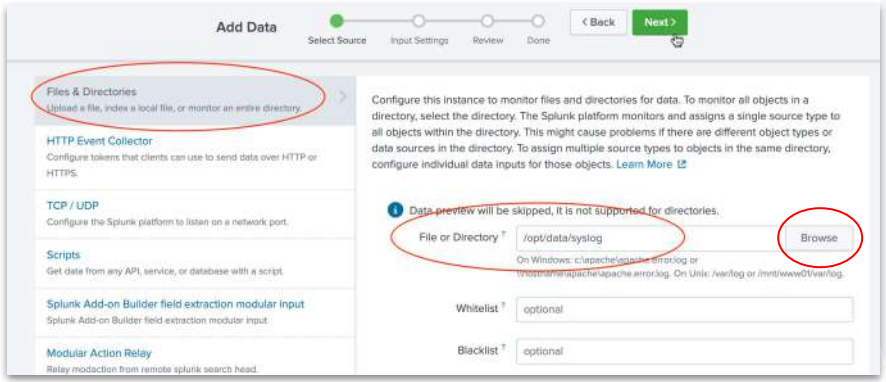
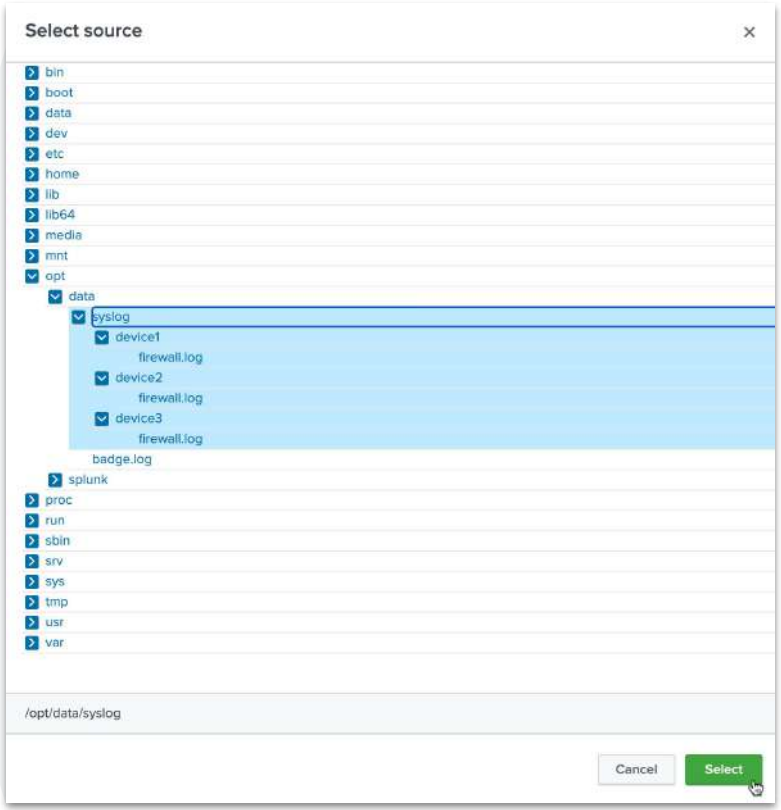
Task 5: Ingest Fortinet Traffic Logs

1. Create a monitoring input for firewall.log







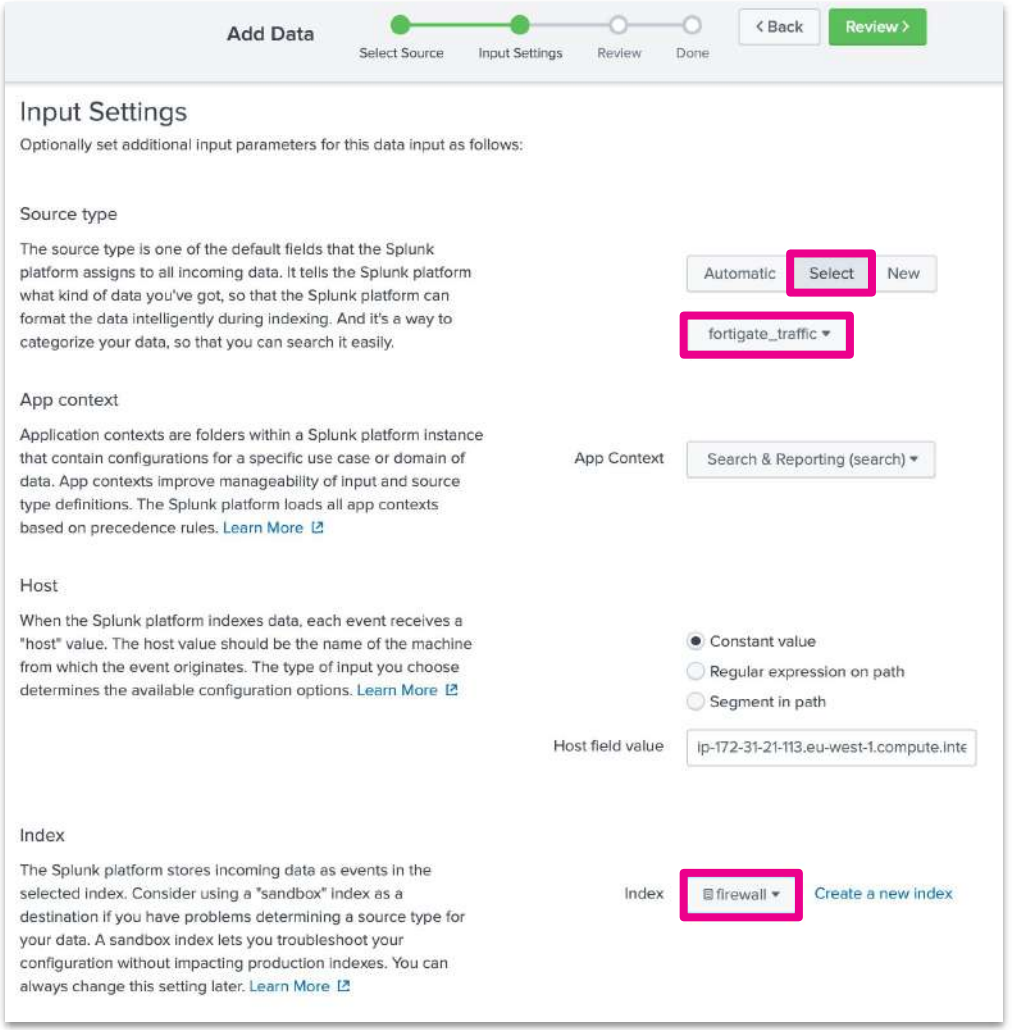


splunk>

LAB 1

Task 5: Ingest Fortinet Traffic Logs

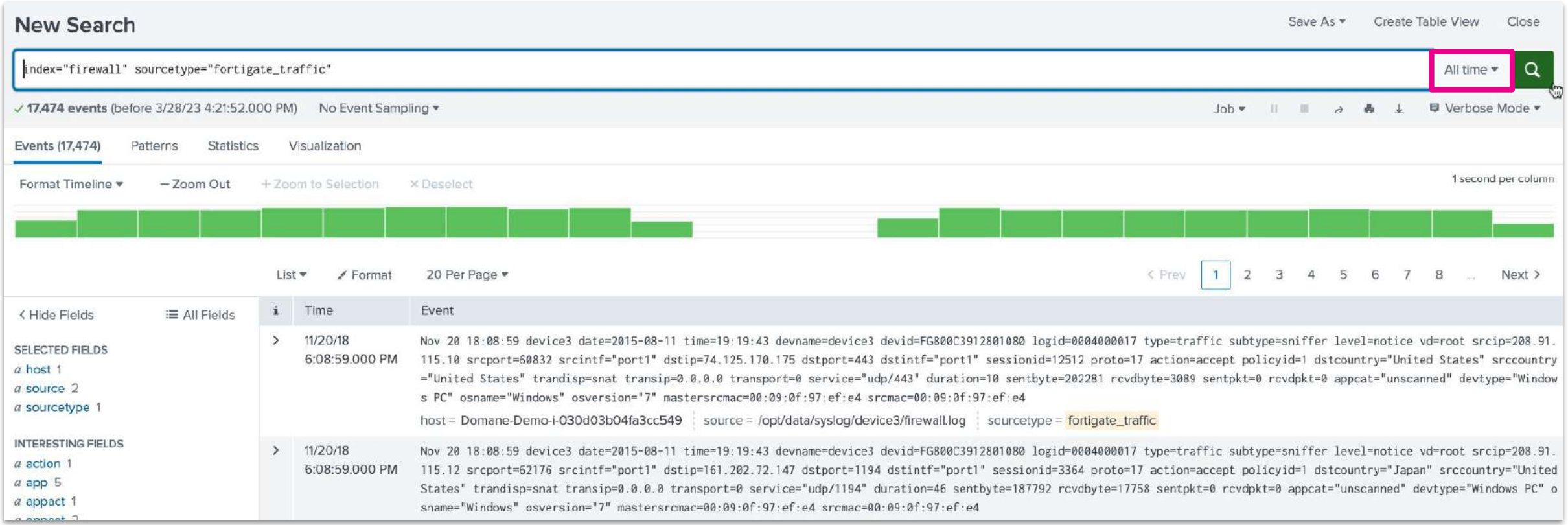
2. Create a monitoring input for firewall.log



Task 5: Ingest Fortinet Traffic Logs

3a. Check your data!

```
index="firewall"sourcetype="fortigate_traffic"
```

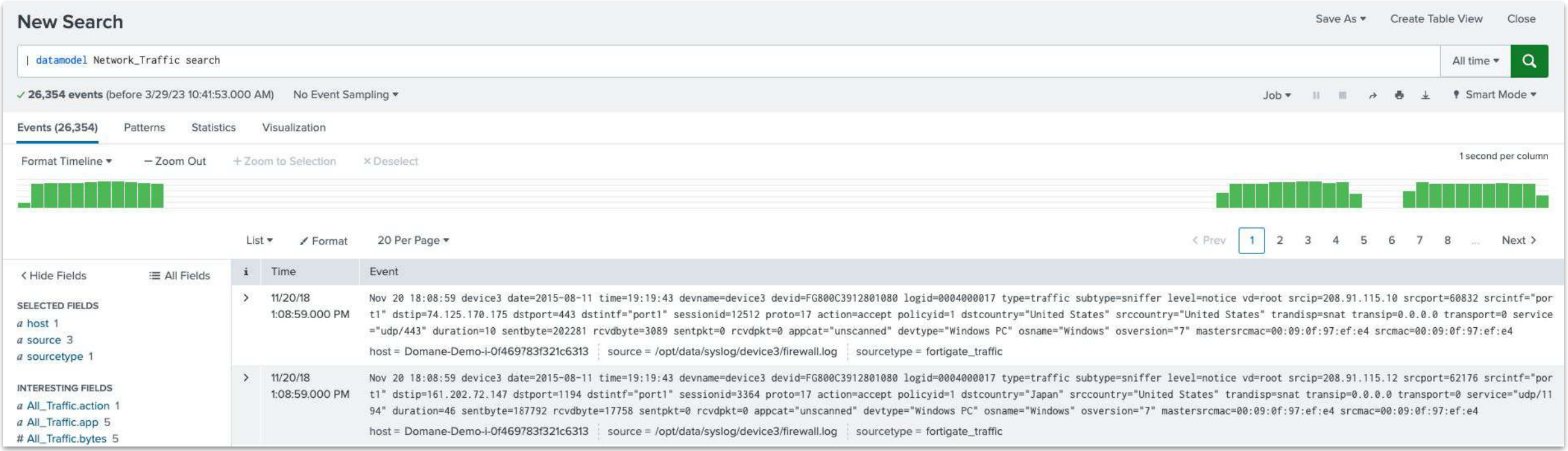


LAB 1

Task 5: Ingest Fortinet Traffic Logs

3b. Another method to check your data!

```
| datamodel Network_Traffic search
```



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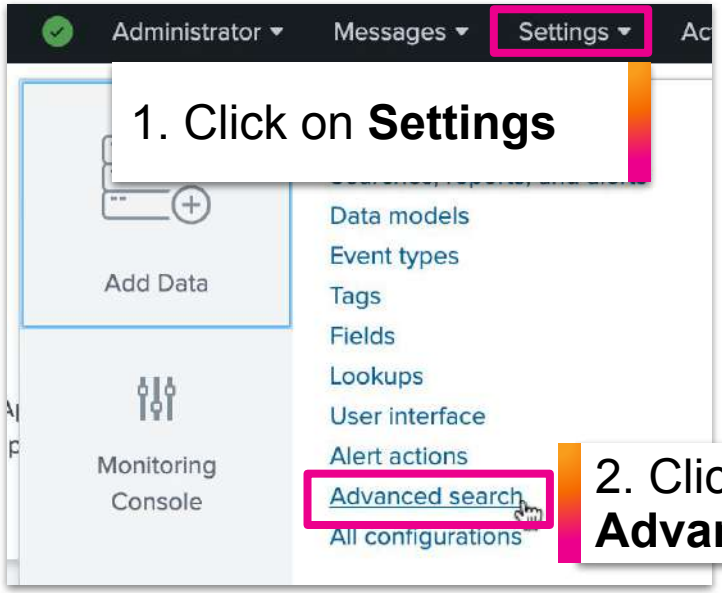
LAB 1

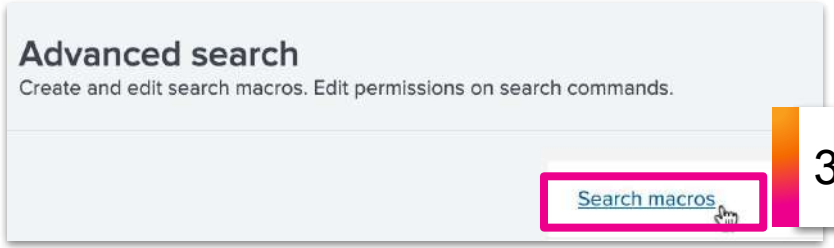
Task 6: Accelerate the Network_Traffic Data Model in CIM

1. Set the data model's indexes

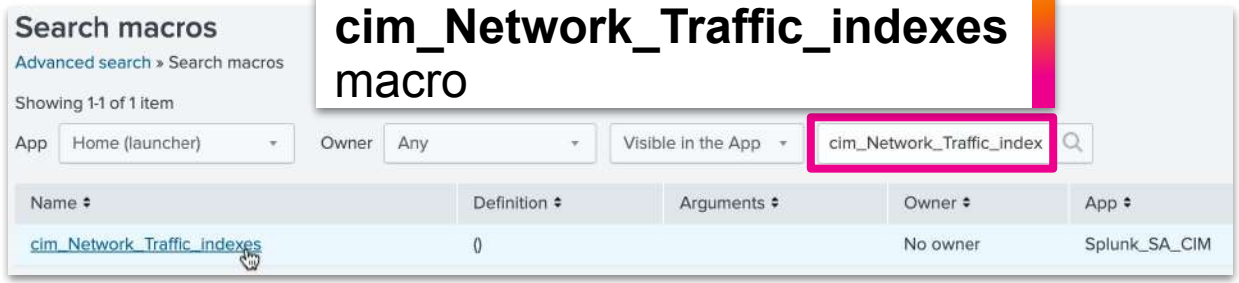


1. Click on **Settings**

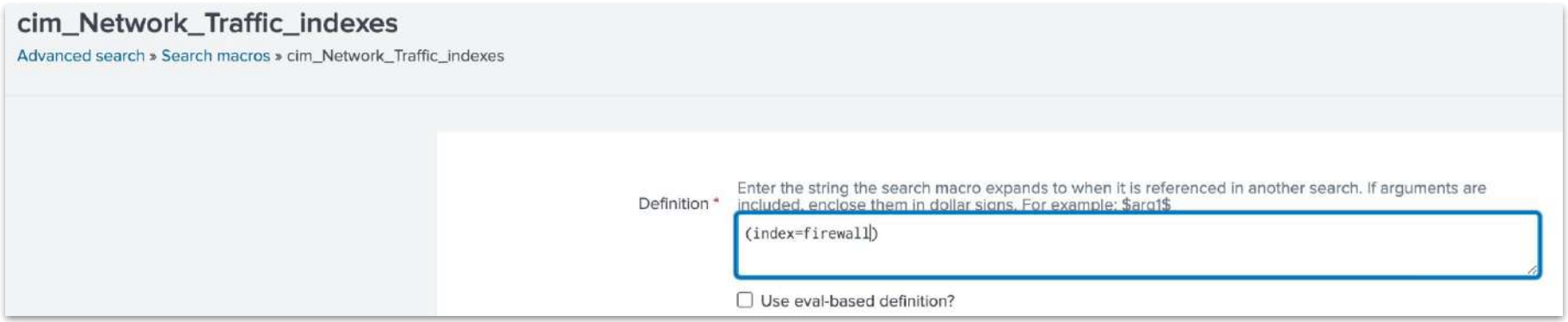
2. Click on **Advanced search**



3. Click on **Search macros**



4. Filter by the **cim_Network_Traffic_indexes** macro



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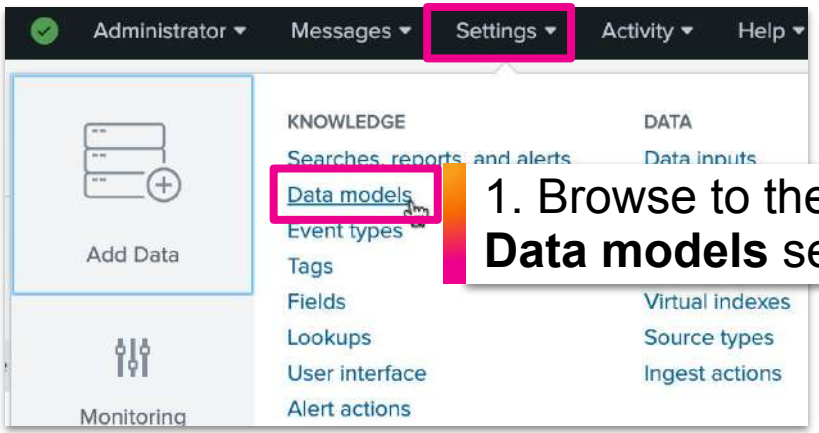
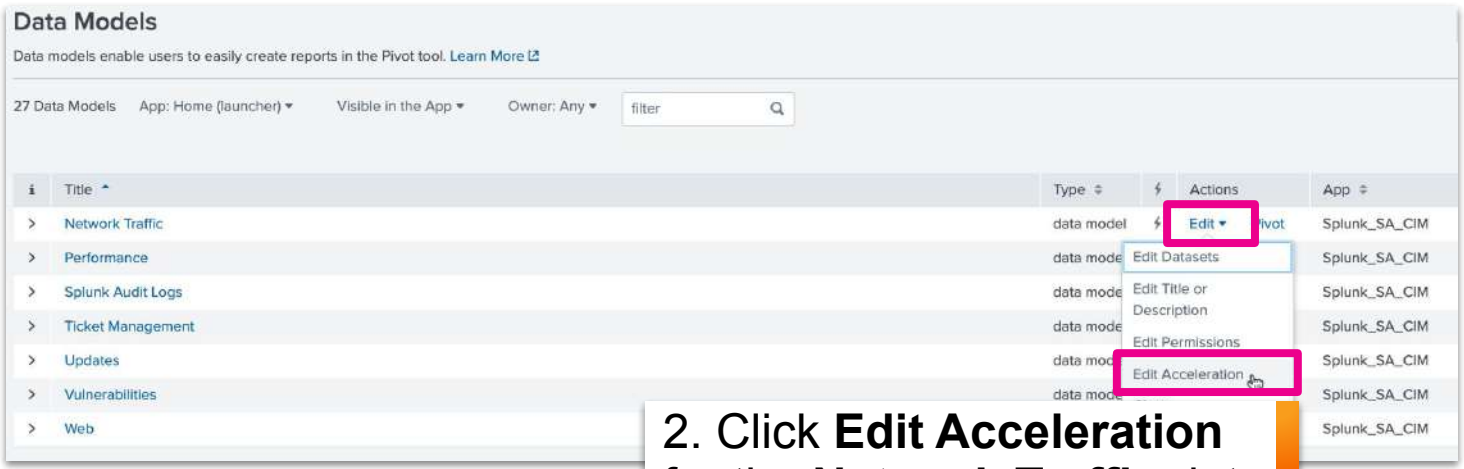
Task 6: Accelerate the Network_Traffic Data Model in CIM

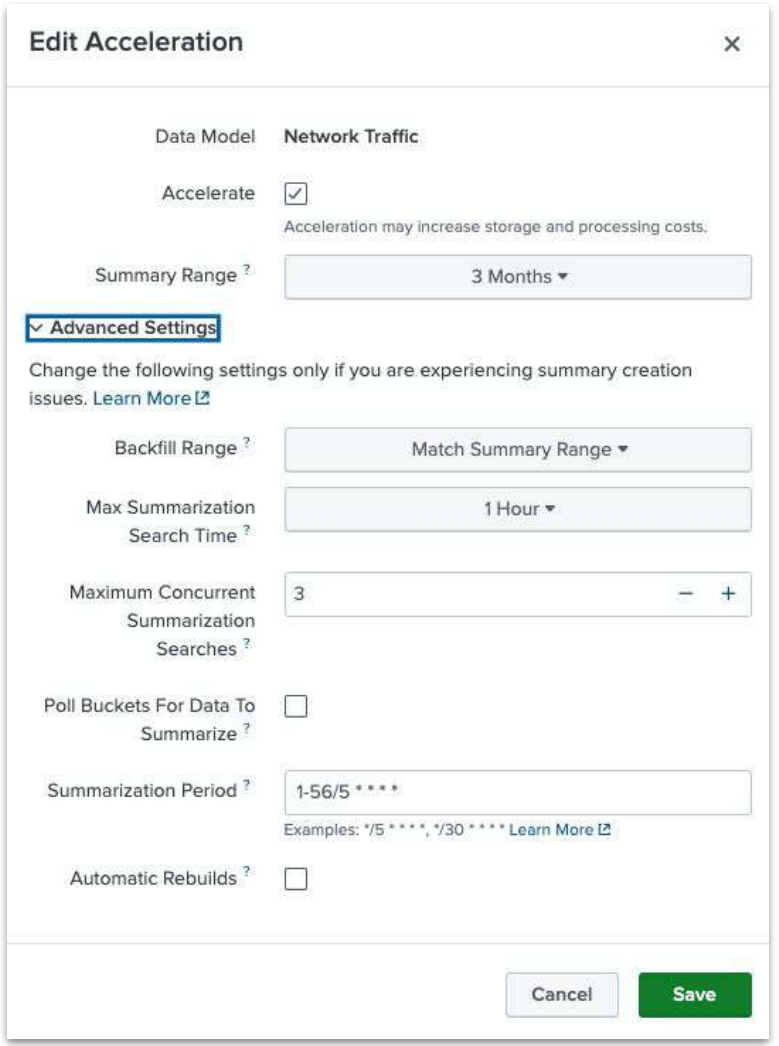
2. Edit the data model's acceleration settings



1. Browse to the **Data models** settings



2. Click **Edit Acceleration** for the **Network Traffic** data model



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LAB 1

Task 7: Search for Traffic…

So…what's the difference between…?

```
index=firewall sourcetype="fortigate_traffic" | stats count
```

```
| datamodel Network_Traffic search | stats count
```

```
| tstats count from datamodel=Network_Traffic
```

```
| tstats summariesonly=true count from datamodel=Network_Traffic
```

CIM Compliance

How do we do it ?

1

Get the right CIM fields/values

2

Create an eventtype to regroup our events

3

Tag our eventtypes

Learn more:
https://docs.splunk.com/Documentation/CIM/latest/User/UsetheCIMtonormalizedataatsearchtime

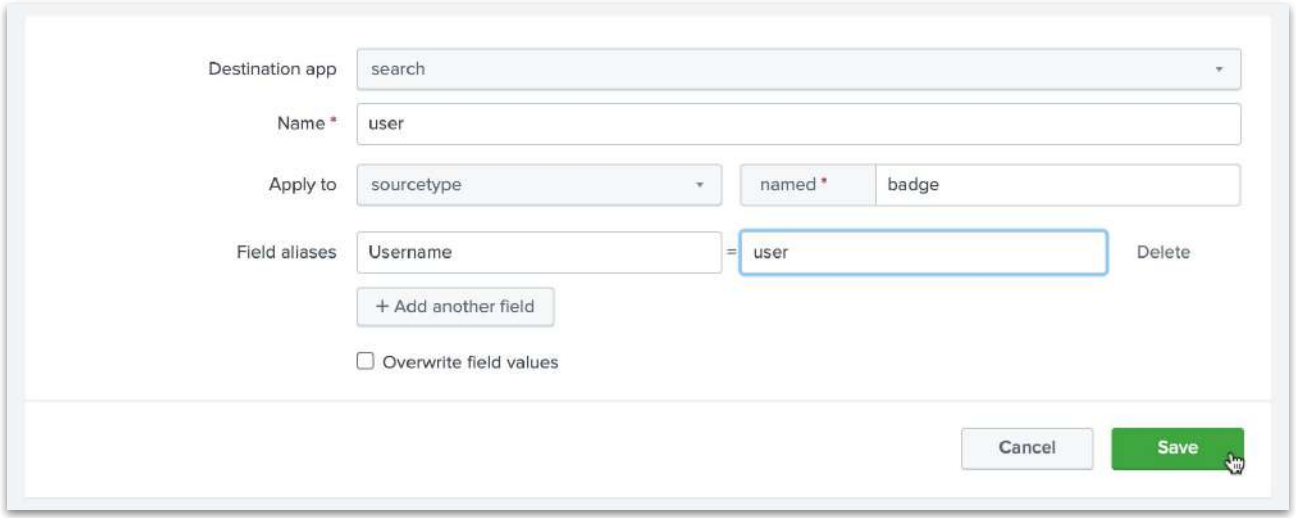
CIM Compliance

Get the right CIM fields/values

My field name is different?

My field	CIM field
Username	user

Use field alias: **Settings > Fields > Field Alias**



props.conf

```
[badge]
FIELDALIAS-user = Username as user
```

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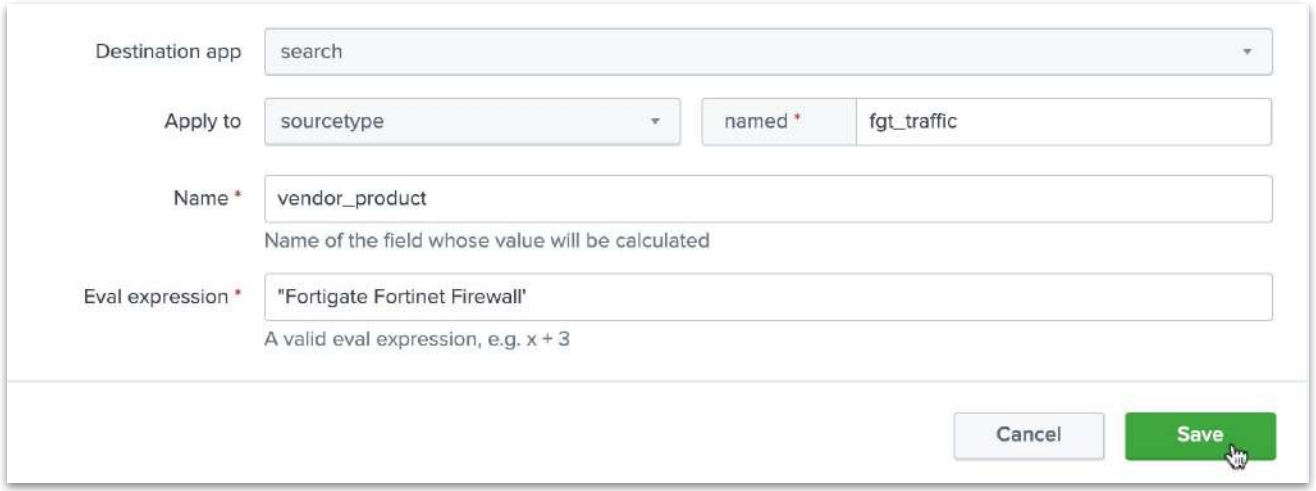
CIM Compliance

Get the right CIM fields/values

I don’t have this field in my event

My field	→	CIM field
?		vendor_product

Use calculated fields: **Settings > Fields > Calculated Field**



props.conf →

```
[fgt_traffic]
EVAL-vendor_product = “Fortinet Fortigate Firewall”
```

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CIM Compliance

Get the right CIM fields/values

My field value is not CIM compliant? Use a lookup!

Values in my data

result	action
Successful authentication	success
Wrong Password	failure
Locked Account	failure

Prescripted values in CIM


```
<your base search> | lookup result OUTPUTNEW action
```

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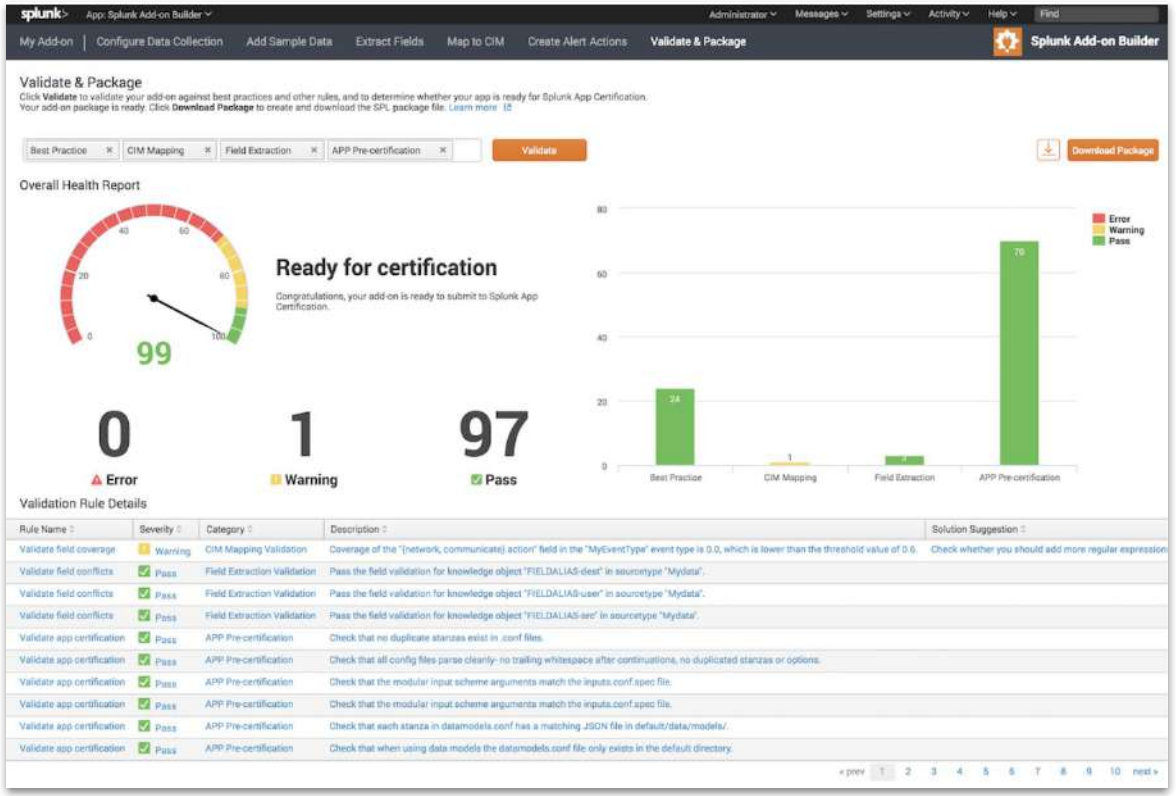
Need Help ?

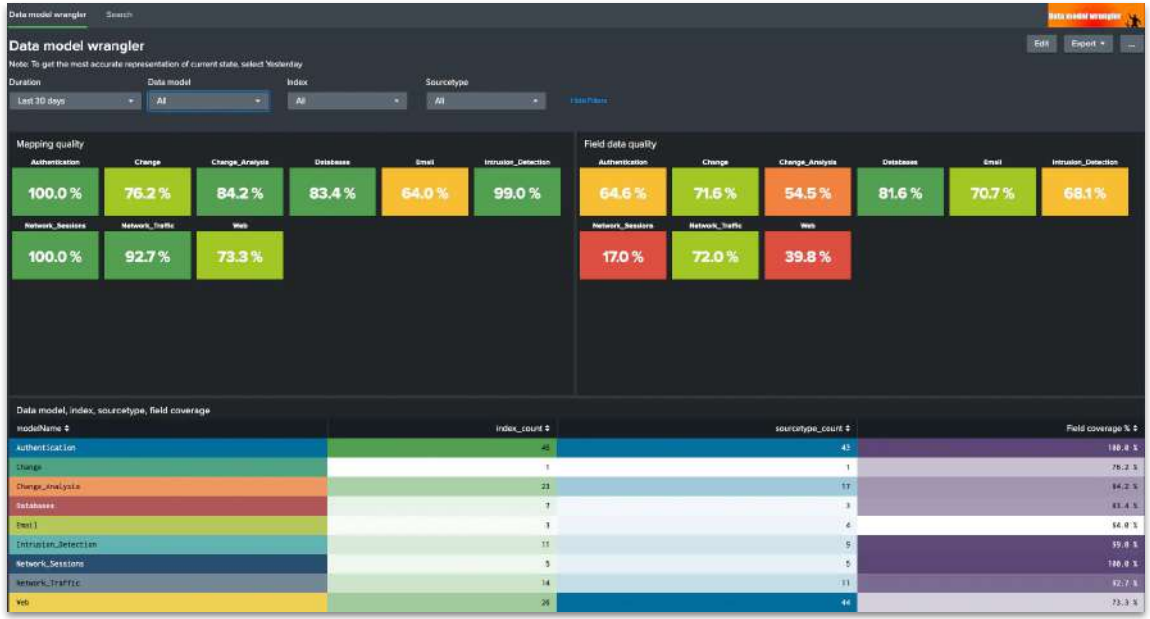
Build: Splunk Add-on Builder

https://splunkbase.splunk.com/app/2962/



Validate: Data Model Wrangler

https://splunkbase.splunk.com/app/6286



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Practice Lab

Lab 2: GDI Badge Data

Custom “badge” sourcetype

Create a custom app for the “badge” sourcetype

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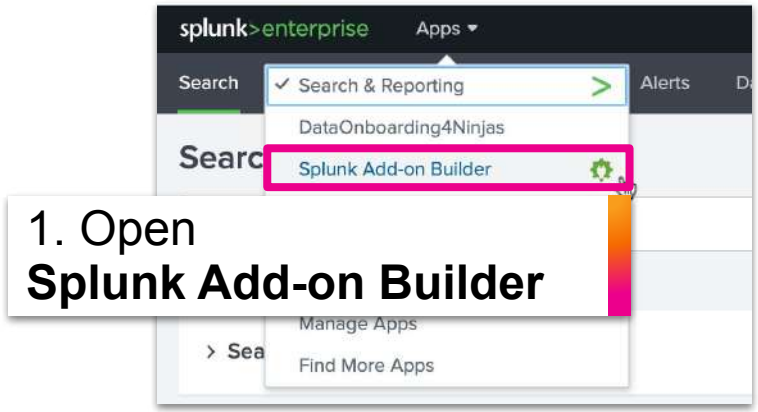
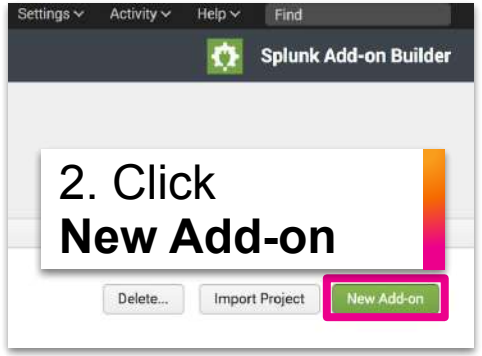
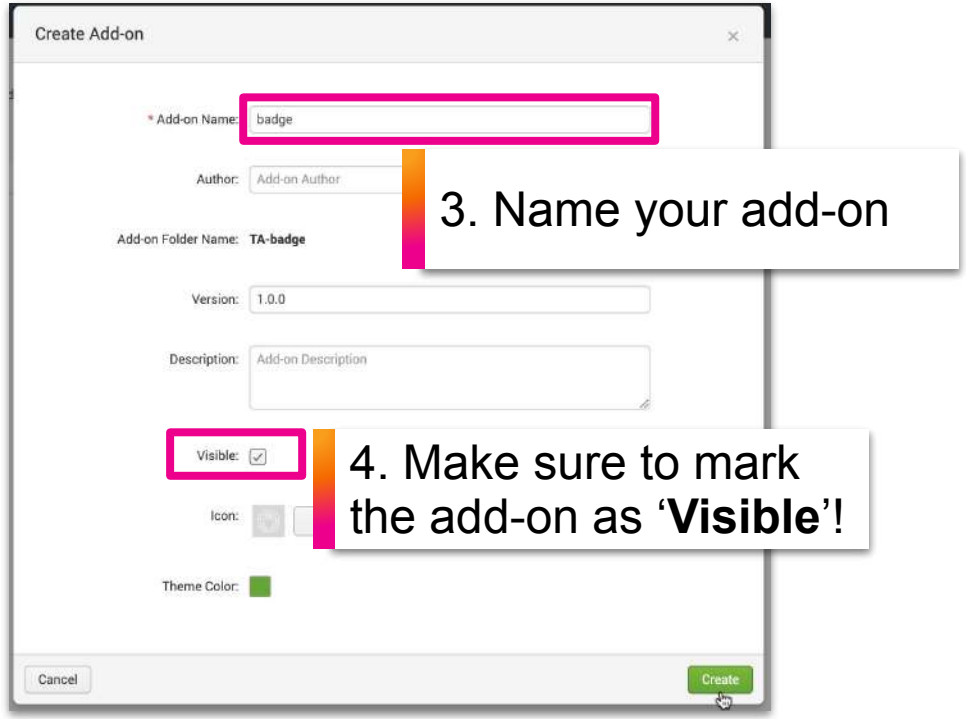
Task 8: Create a Custom Add-on

1. Go to the **Splunk Add-on Builder** app. We need to create a custom add-on for the new custom sourcetype



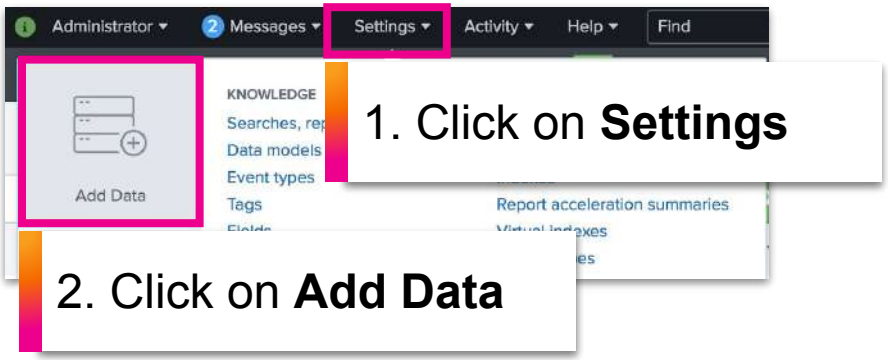


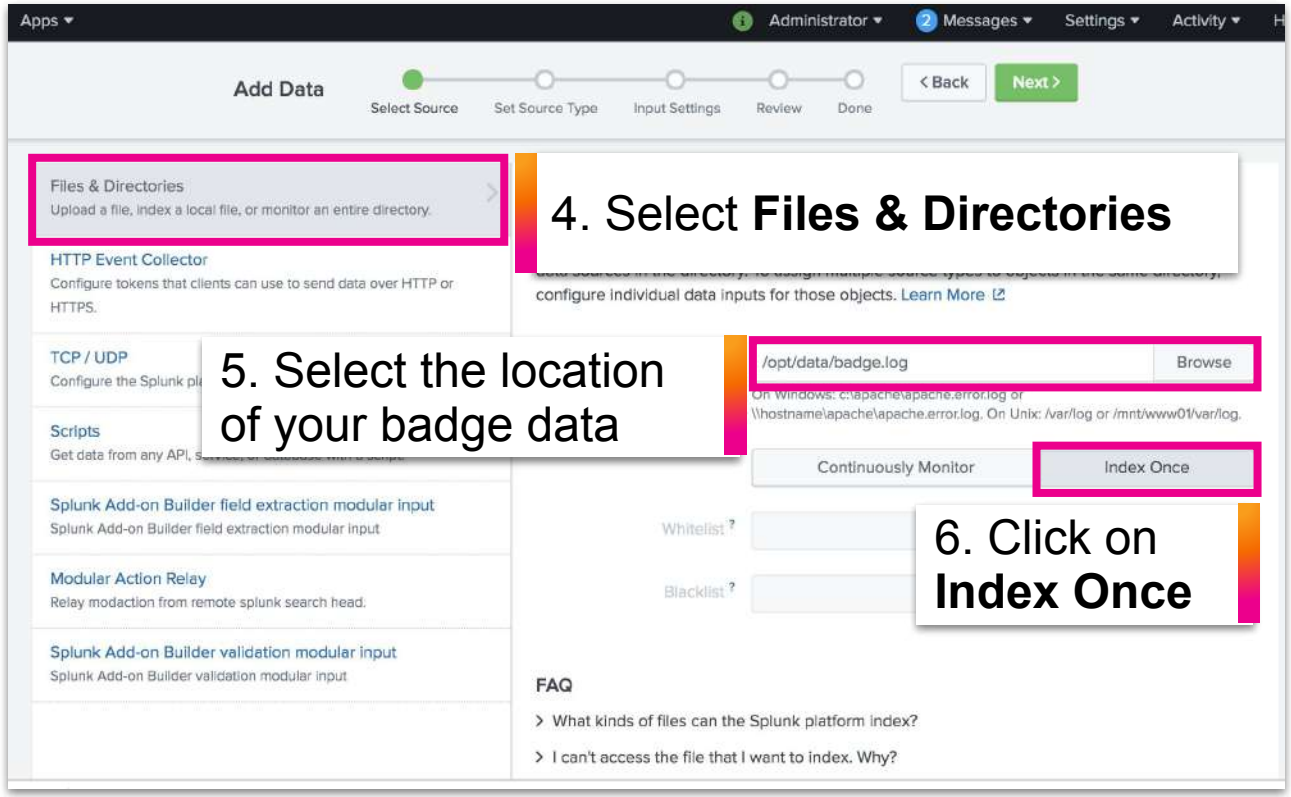


LAB 2

Task 9: Add Badge Data

2. Click on **Settings > Add Data > Monitor > File & Directories** (index once)

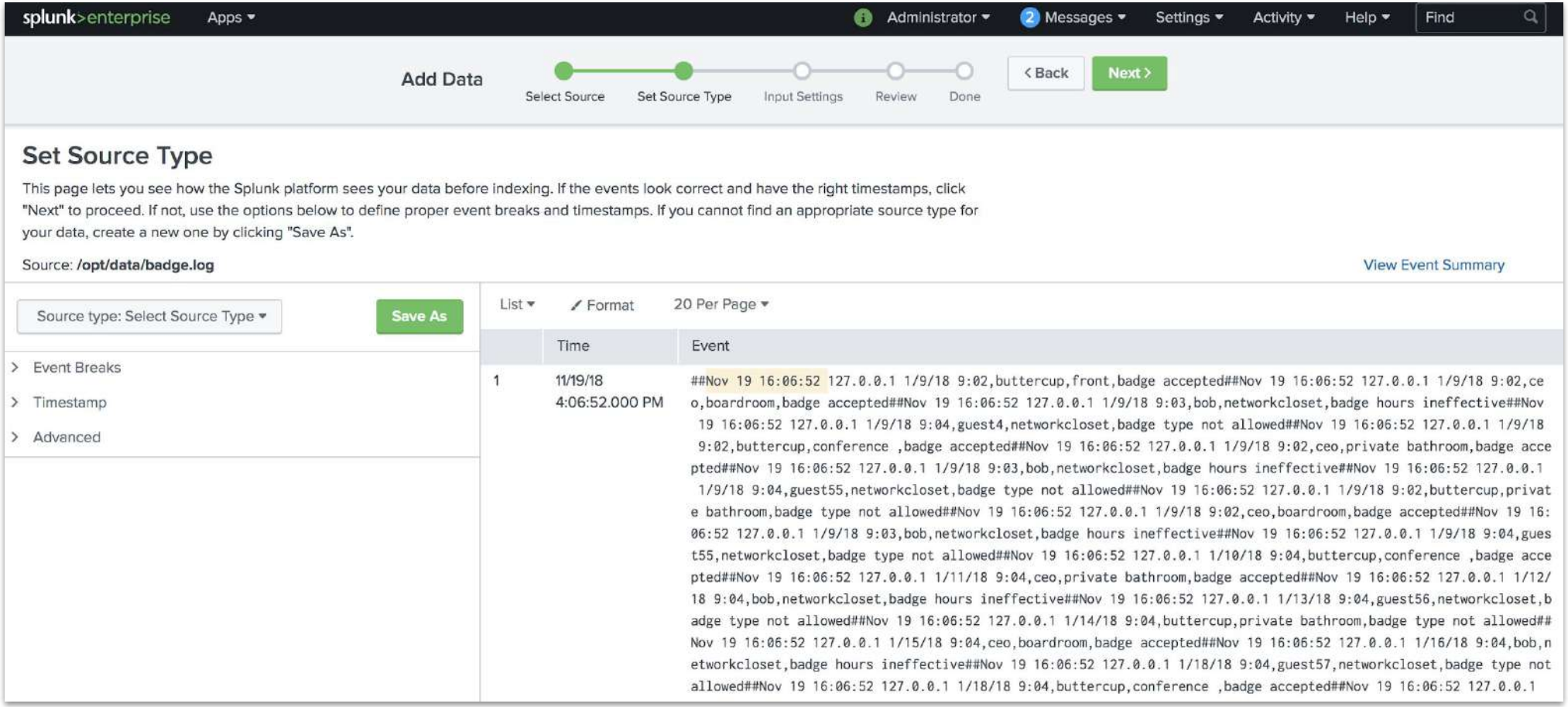




splunk>

Task 9: Add Badge Data

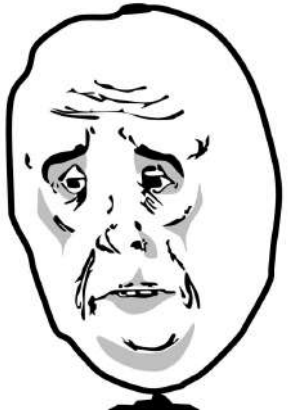
Set a Custom Source Type

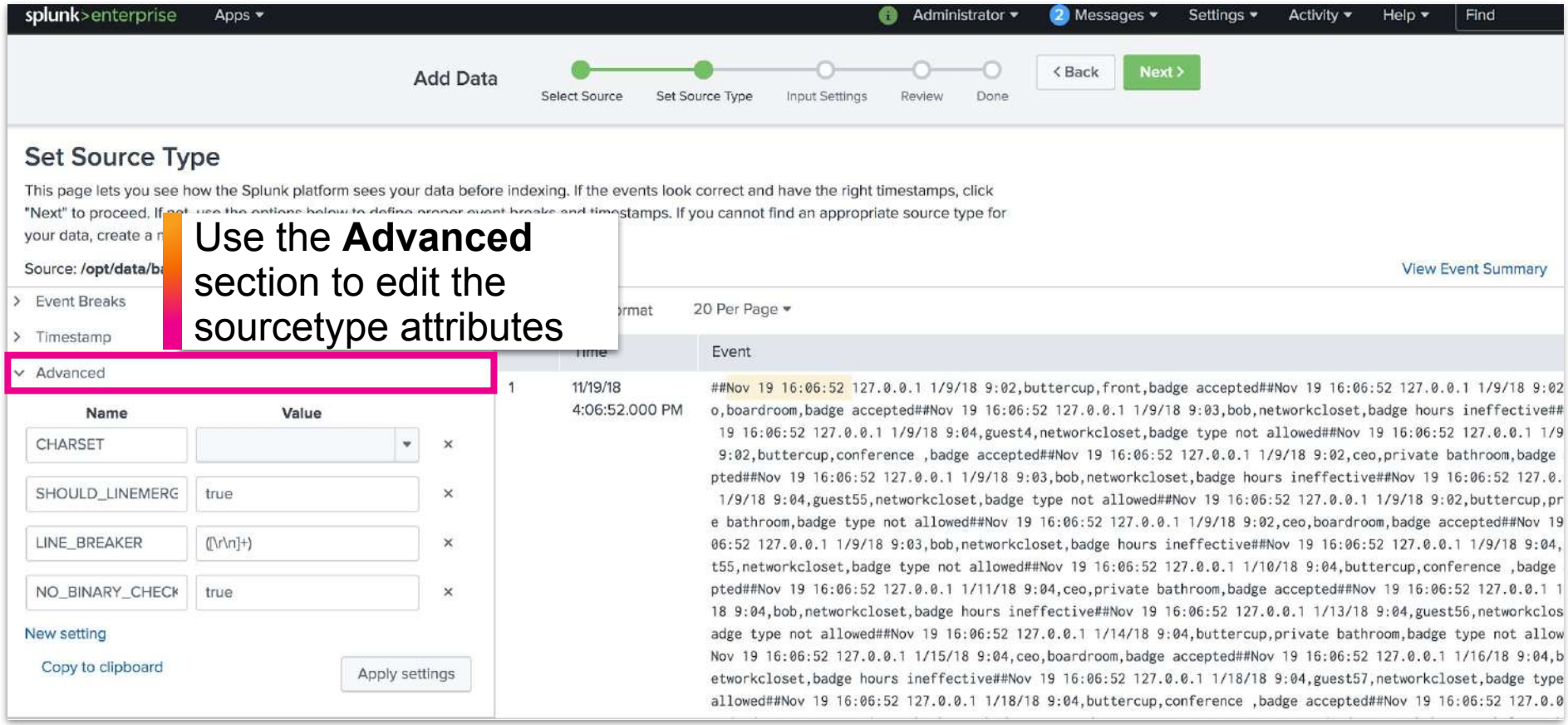


splunk>

Task 9: Add Badge Data

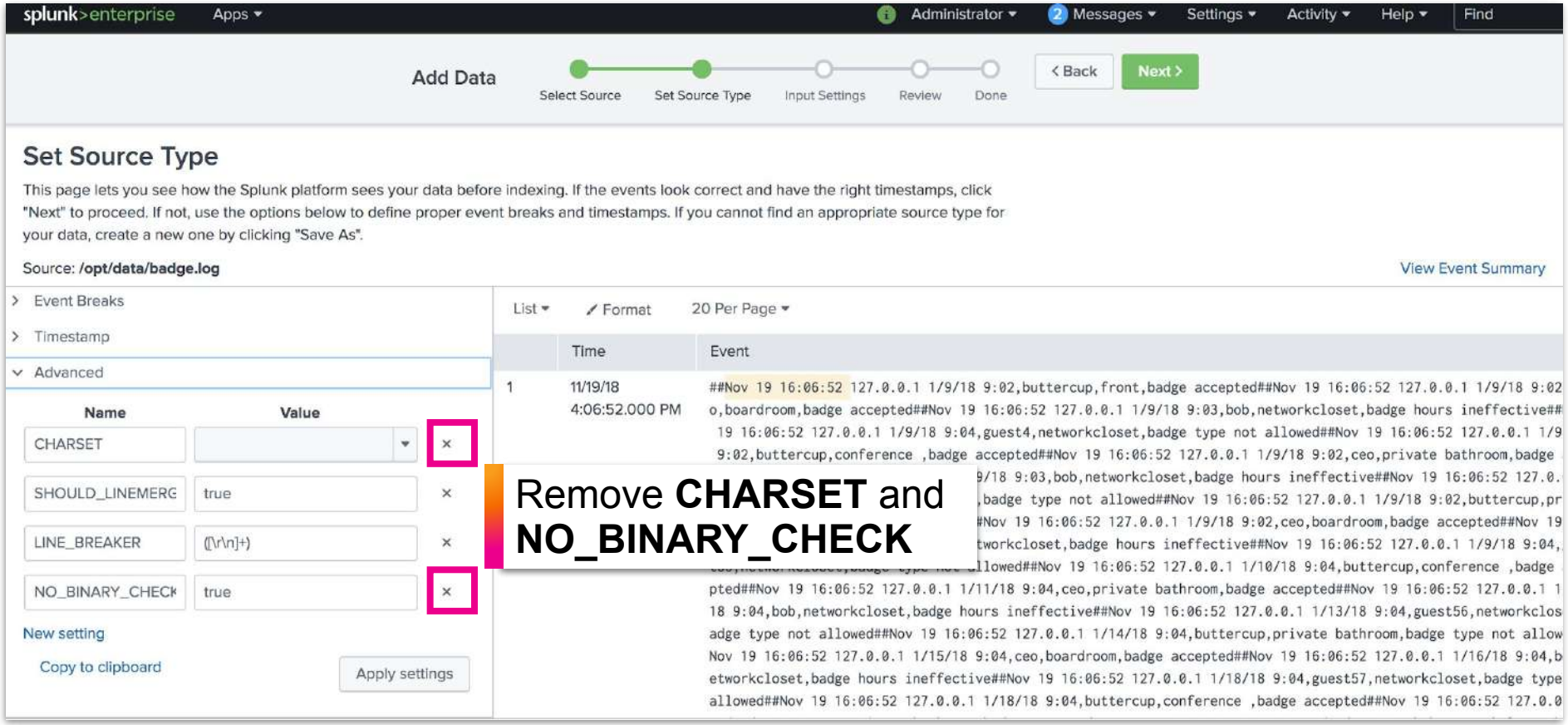
Event breaking failed… why ?





Task 9: Add Badge Data

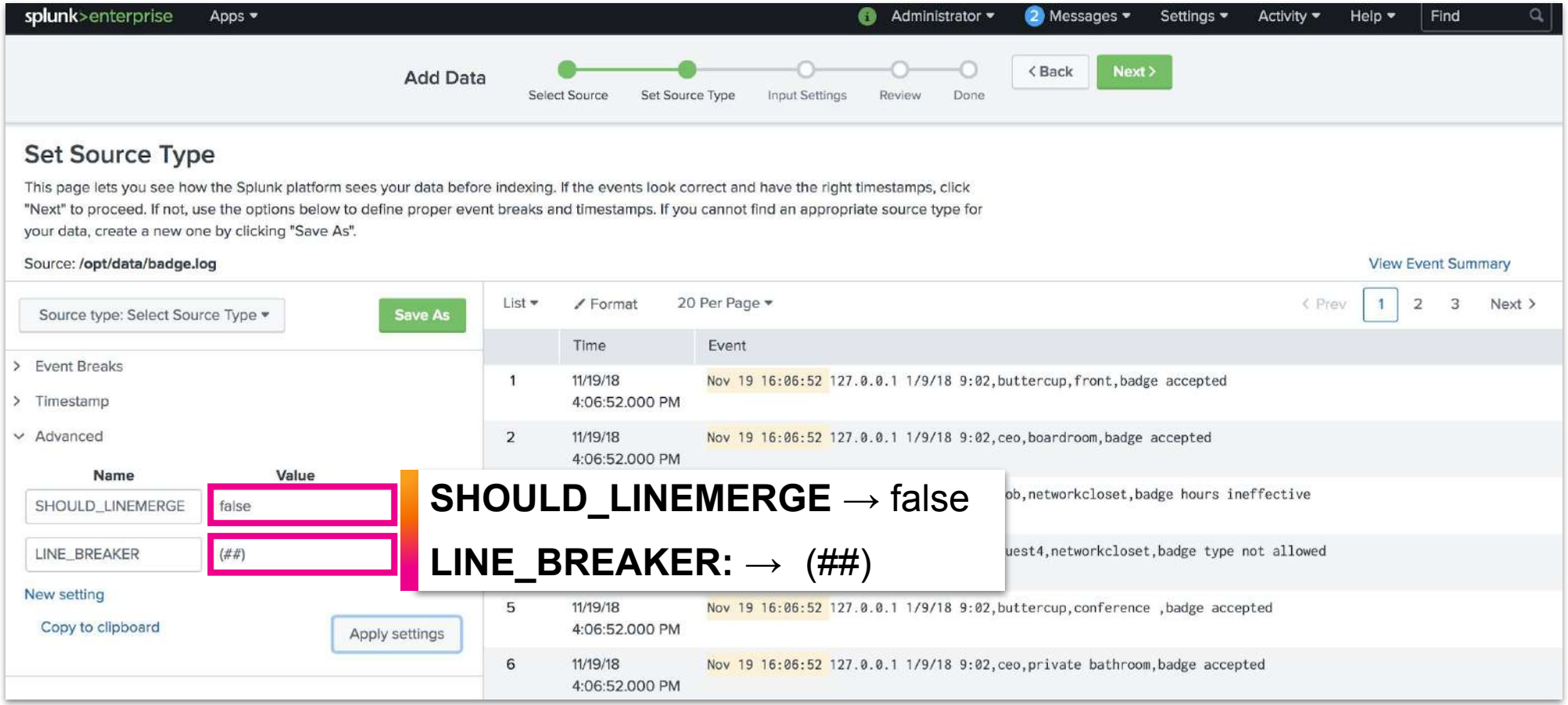
3. Set custom source type: Remove the default settings



splunk>

Task 9: Add Badge Data

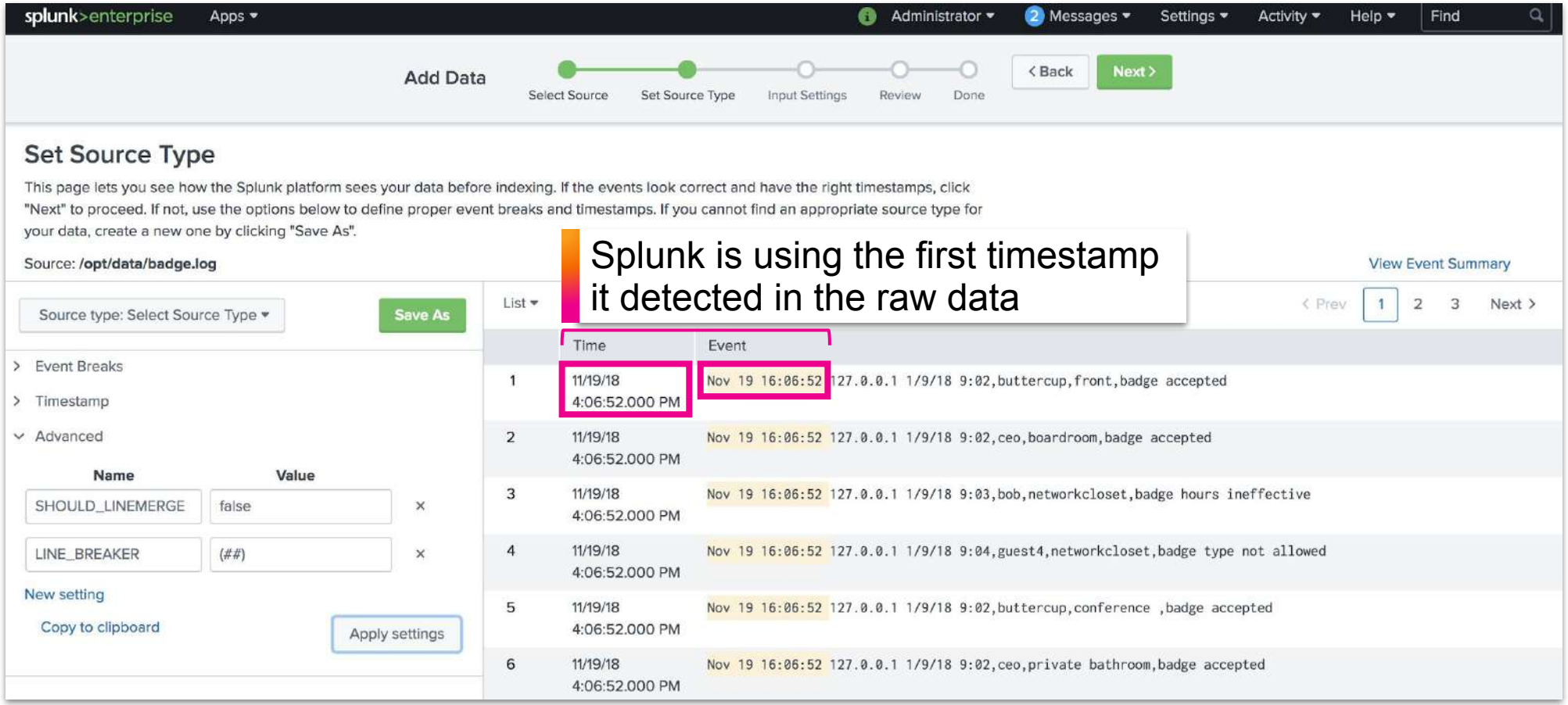
4. Set custom attributes: Edit **SHOULD_LINEMERGE** and **LINE_BREAKER**



LAB 2

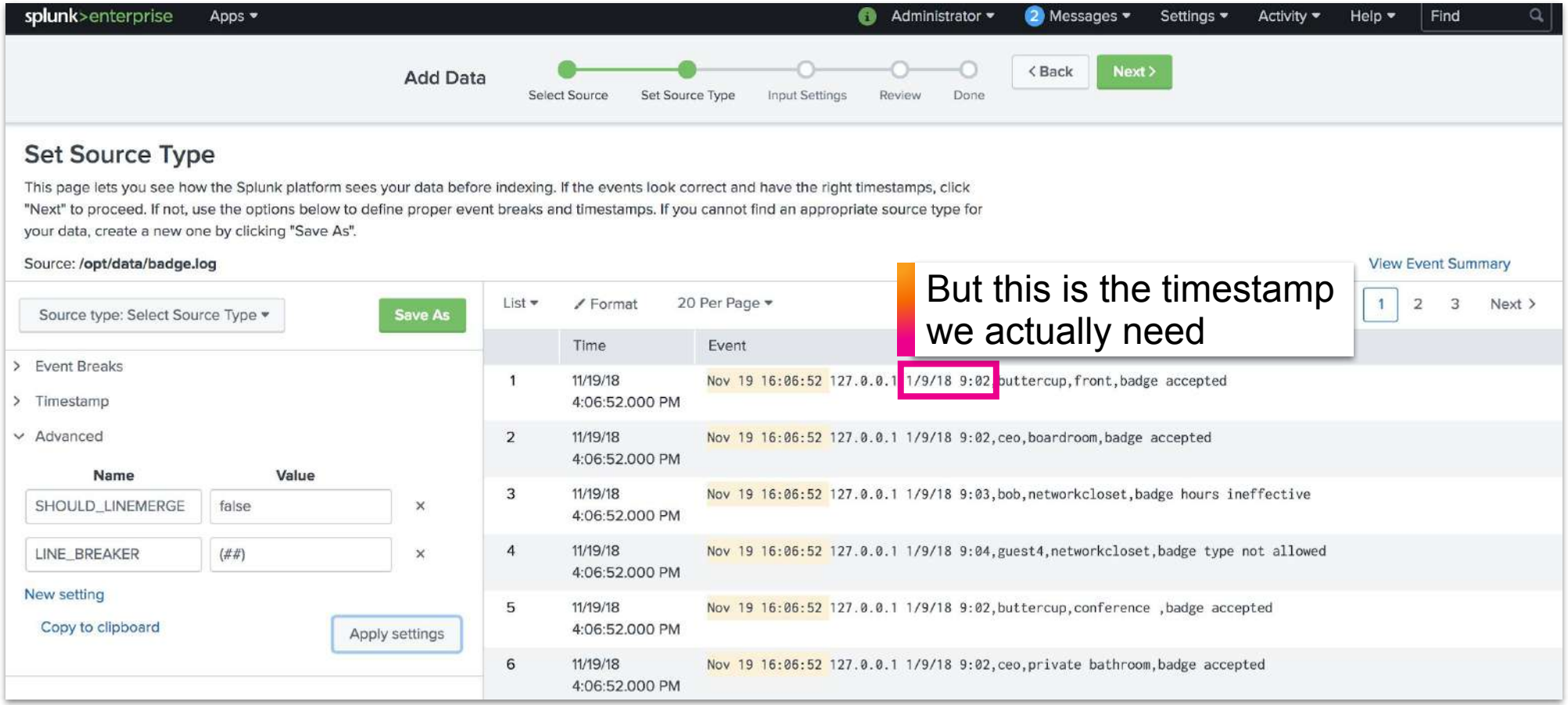
Task 9: Add Badge Data

Line breaking is ok…do you notice something weird ?



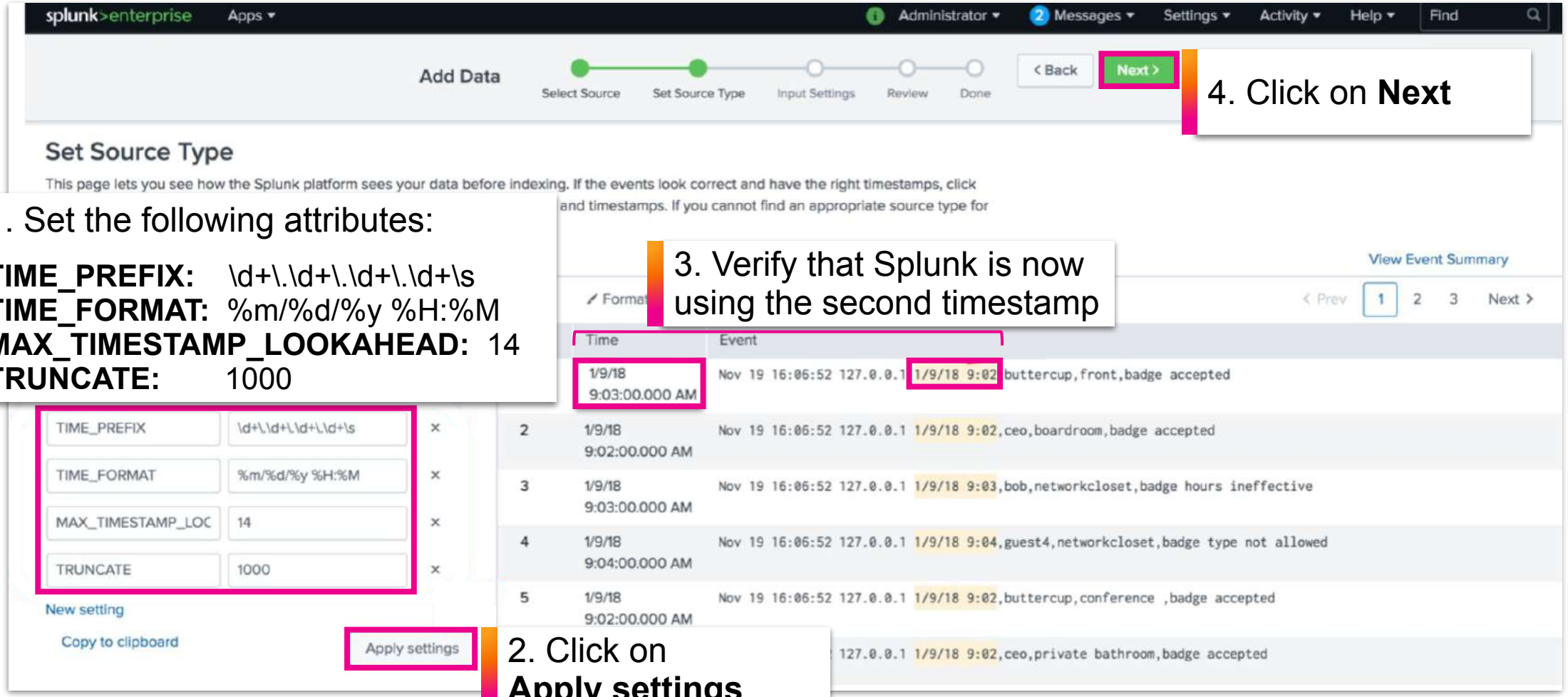
Task 9: Add Badge Data

The right timestamp is the second one



Task 9: Add Badge Data

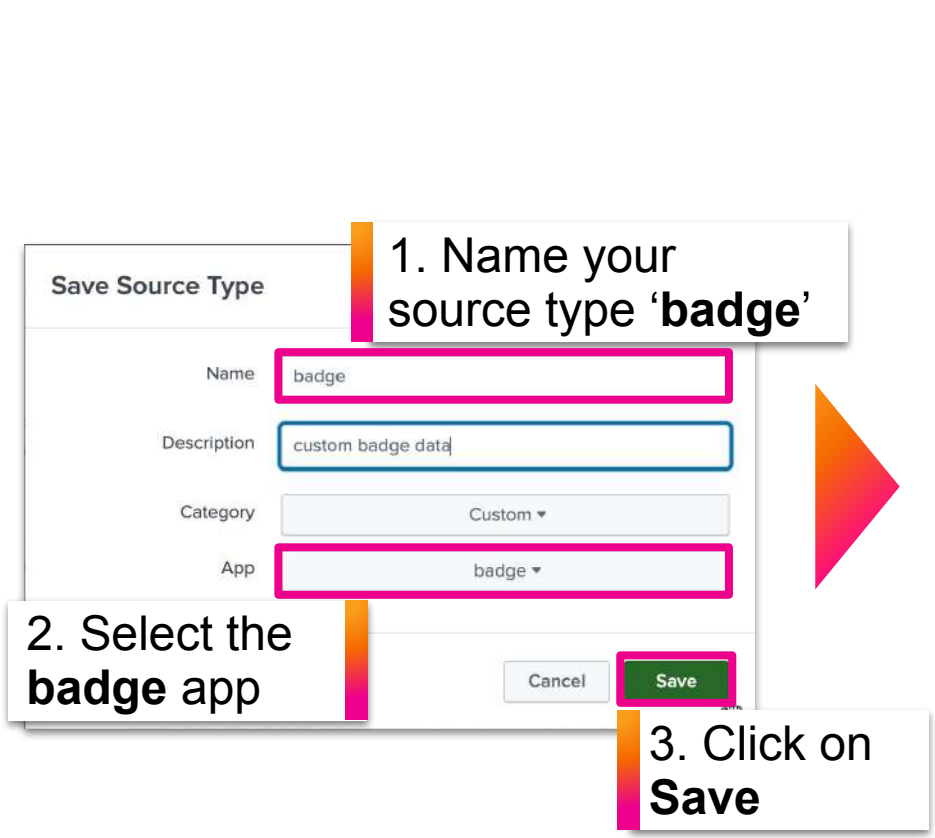
6. Set custom source type: Add best practice time stamp settings

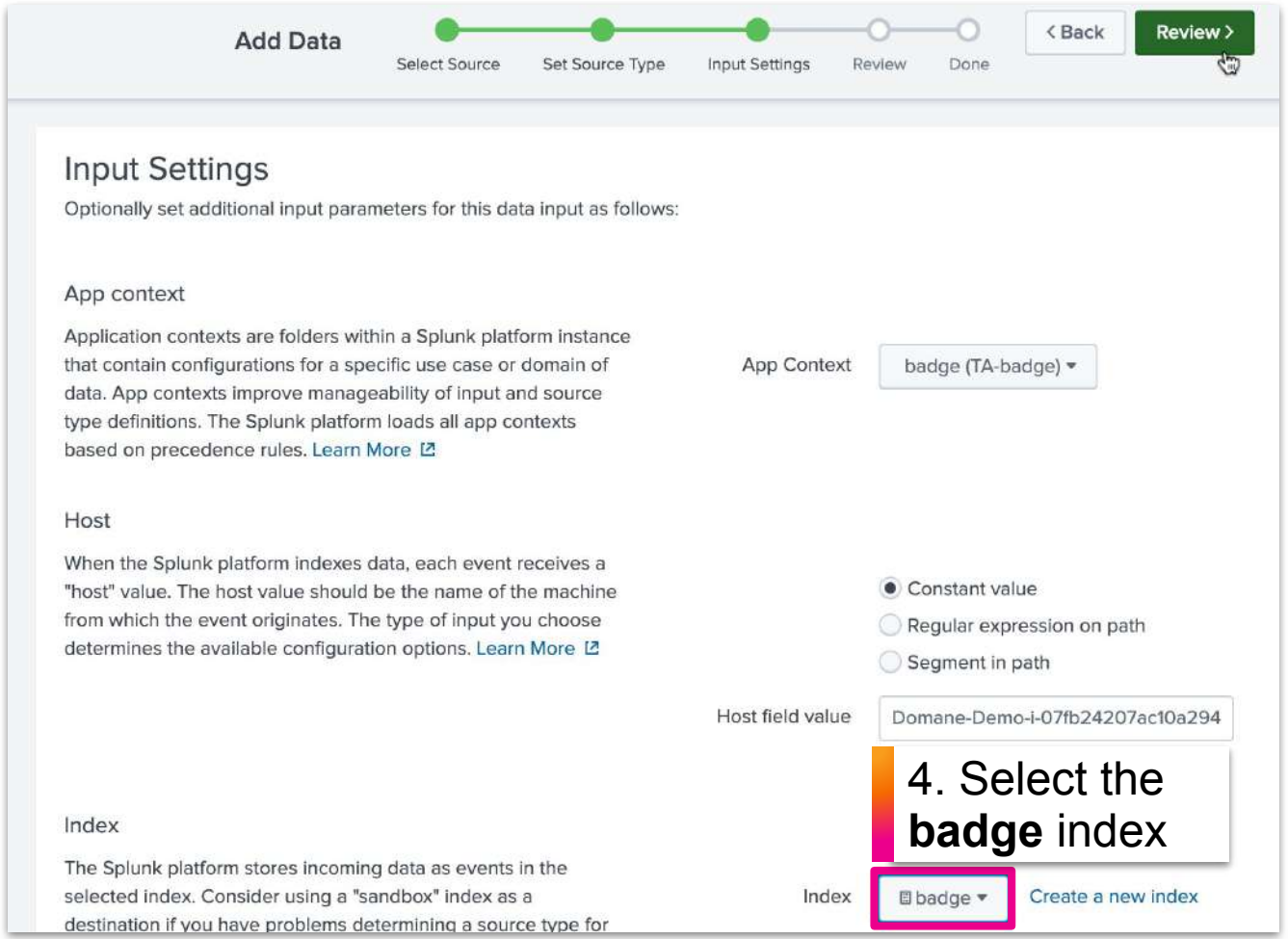


splunk>

Task 9: Add Badge Data

7. Set custom source type: Save sourcetype, pick app context & index, & review





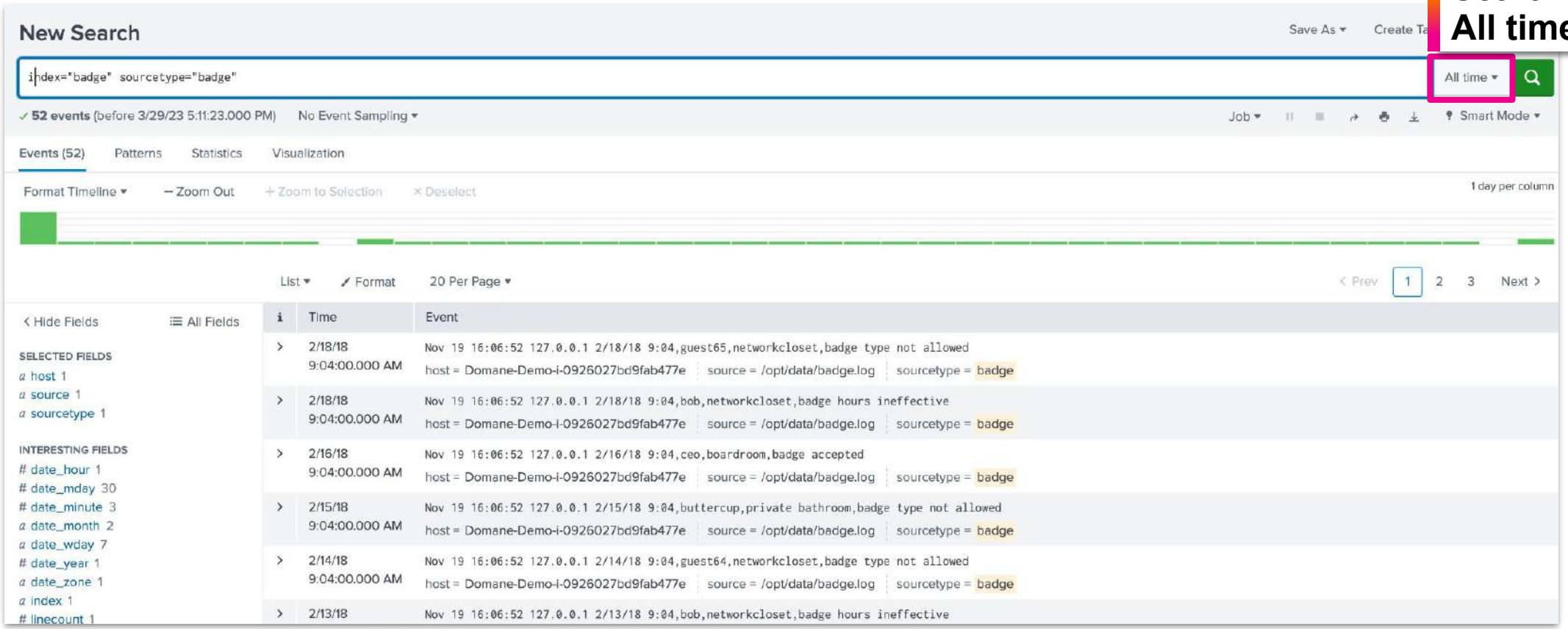
splunk>

Task 9: Add Badge Data

8. Check your data with a search:

```
index="badge" sourcetype="badge"
```

Search over **All time**



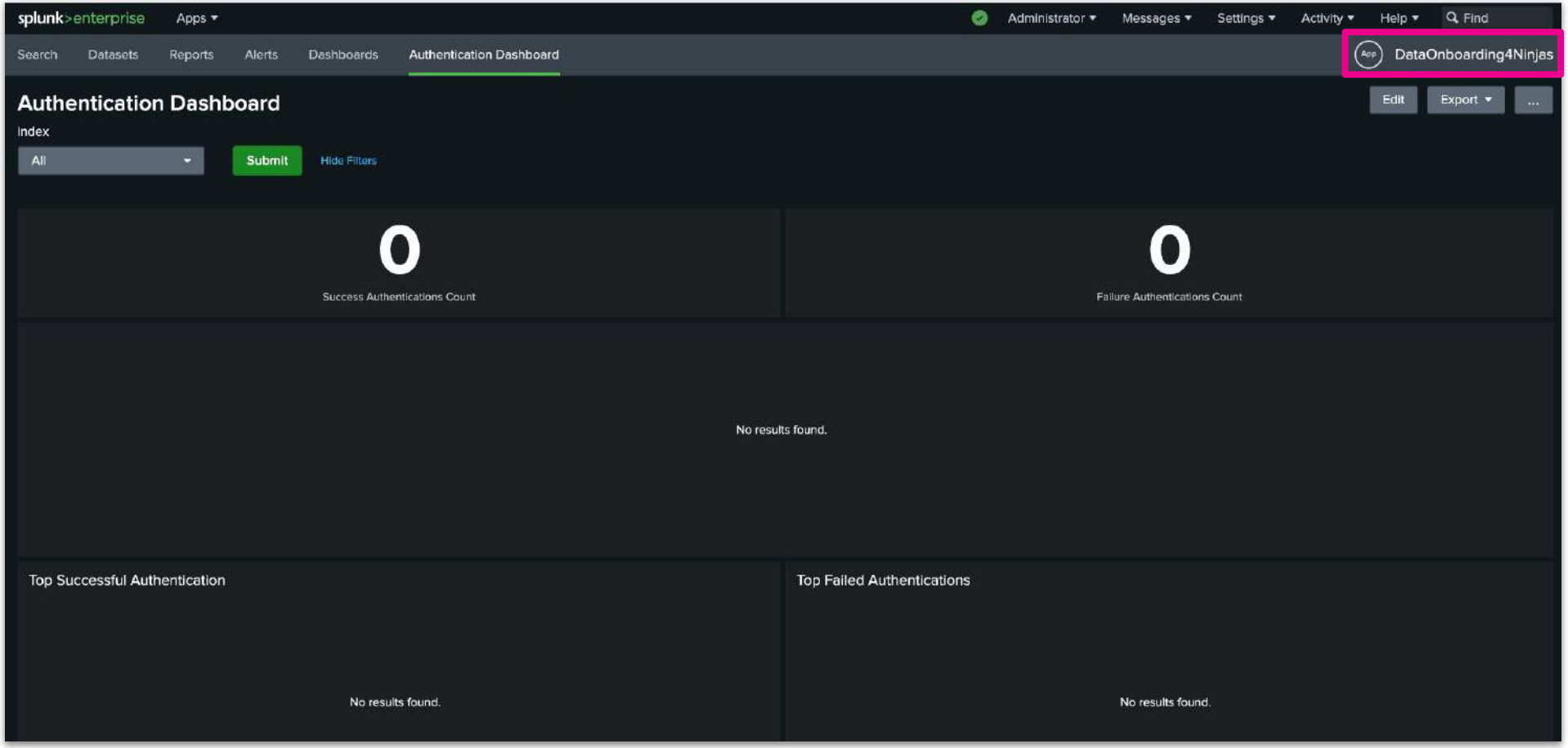
Dashboards & Reports Best Practices

Use SPL queries that search against the data models

- The goal is to understand the data (i.e. extract fields), apply some best practices and make it CIM compliant
- You have already indexed badge system data, can you do reports on it?
- Why?

Final Objective of the Day:
Display Badge Data on the Authentication Dashboard

1. Locate the Authentication Dashboard in the DataOnboarding4Ninjas app



splunk>

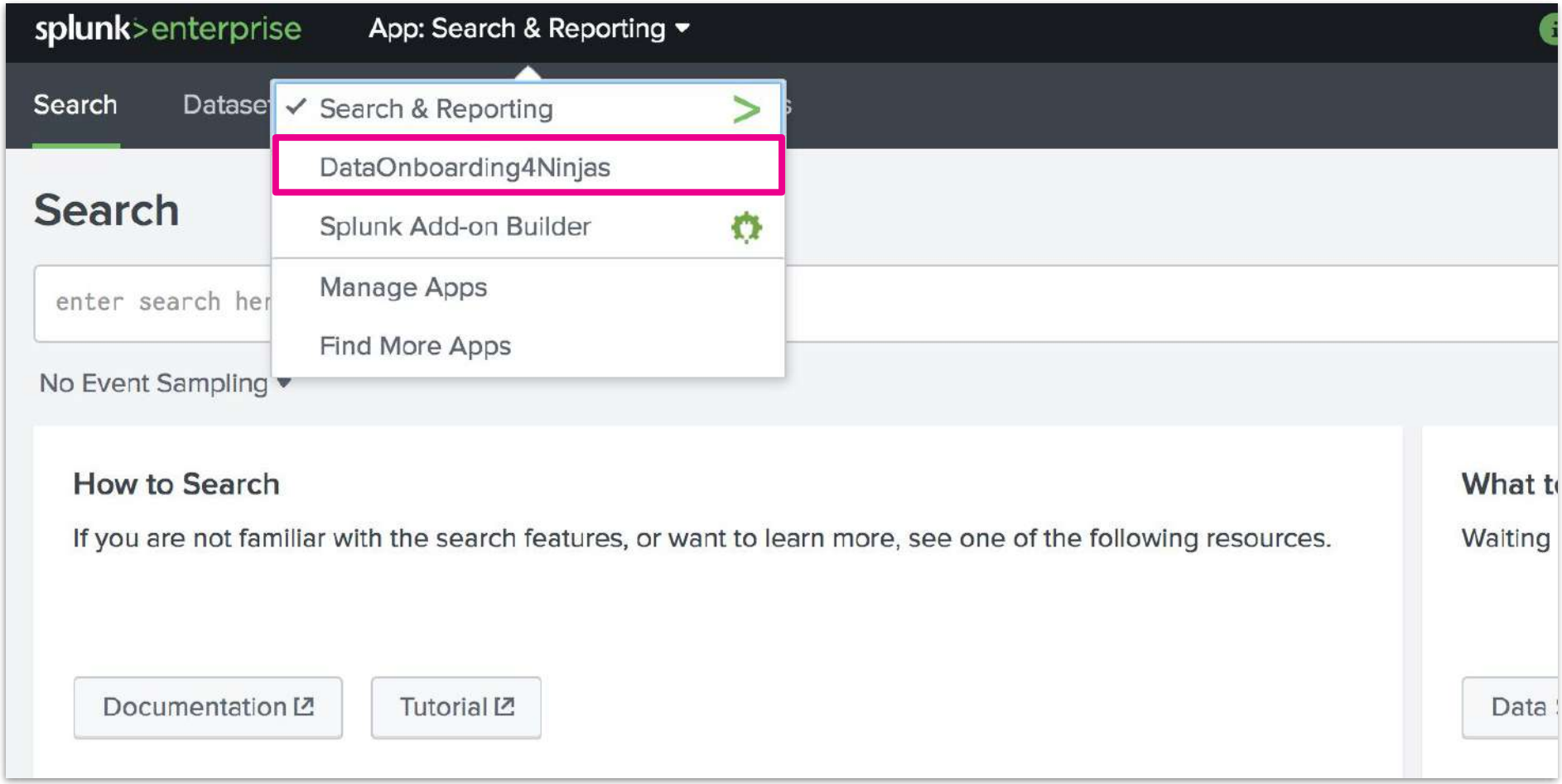
Practice Lab

Lab 3: Create Reports on Badge Data

splunk>

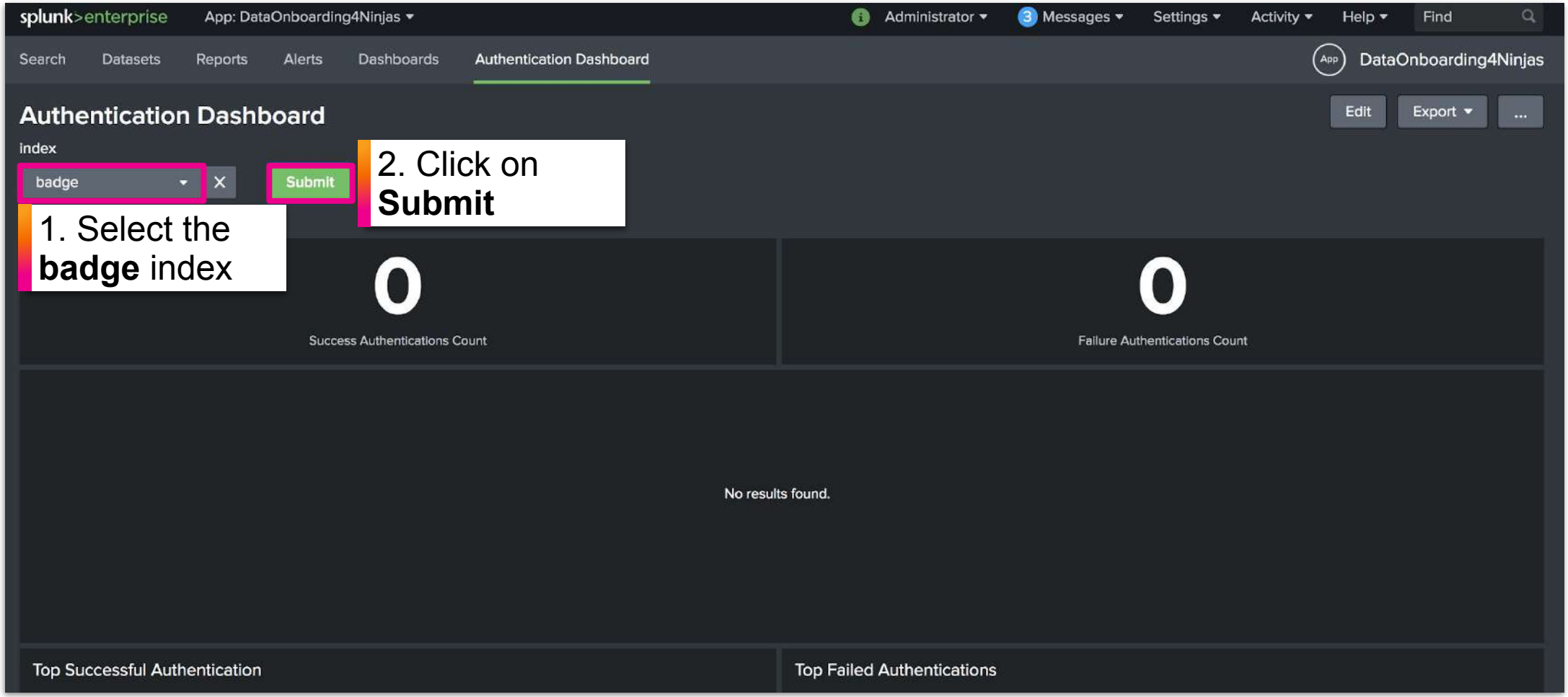
Task 10: Create Reports on Badge Data

1. Go to the **DataOnboarding4Ninjas** App



Task 10: Create Reports on Badge Data

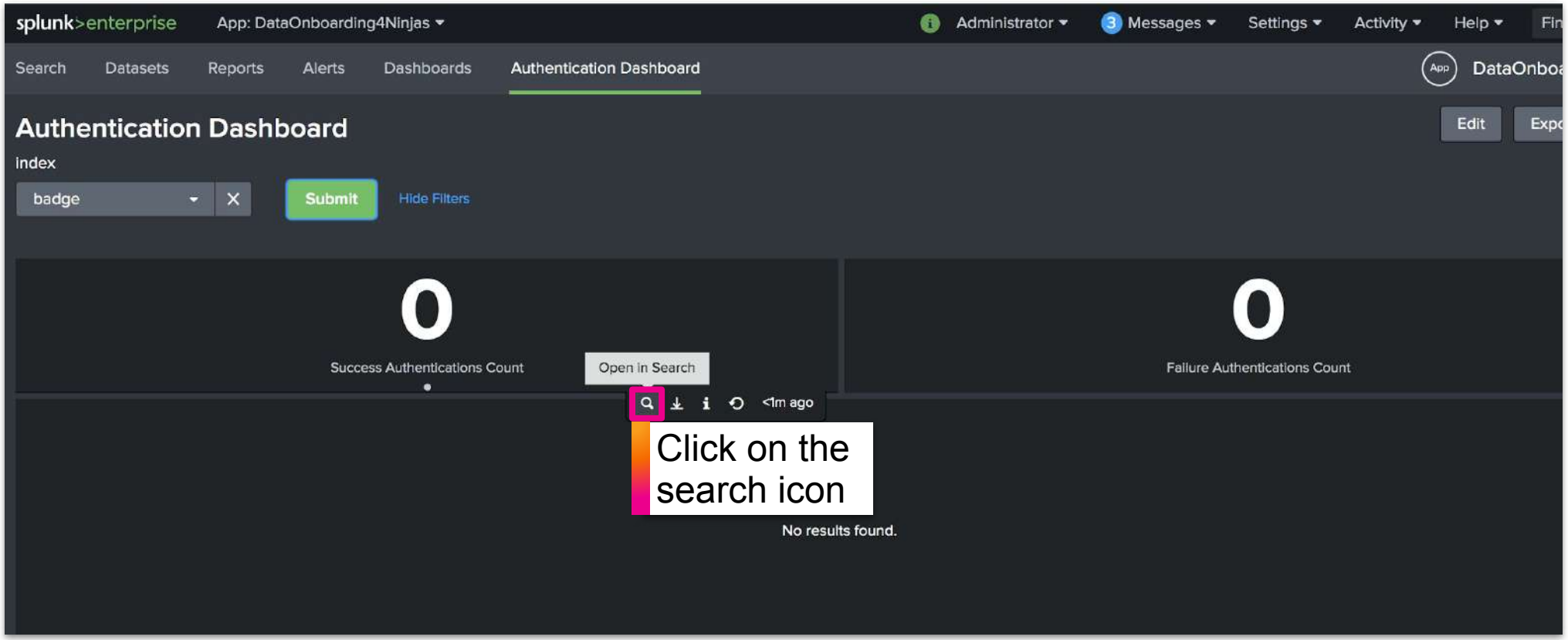
2. Check the Authentication Dashboard



Task 10: Create Reports on Badge Data

3. Choose one panel and click on the **Open in Search** icon

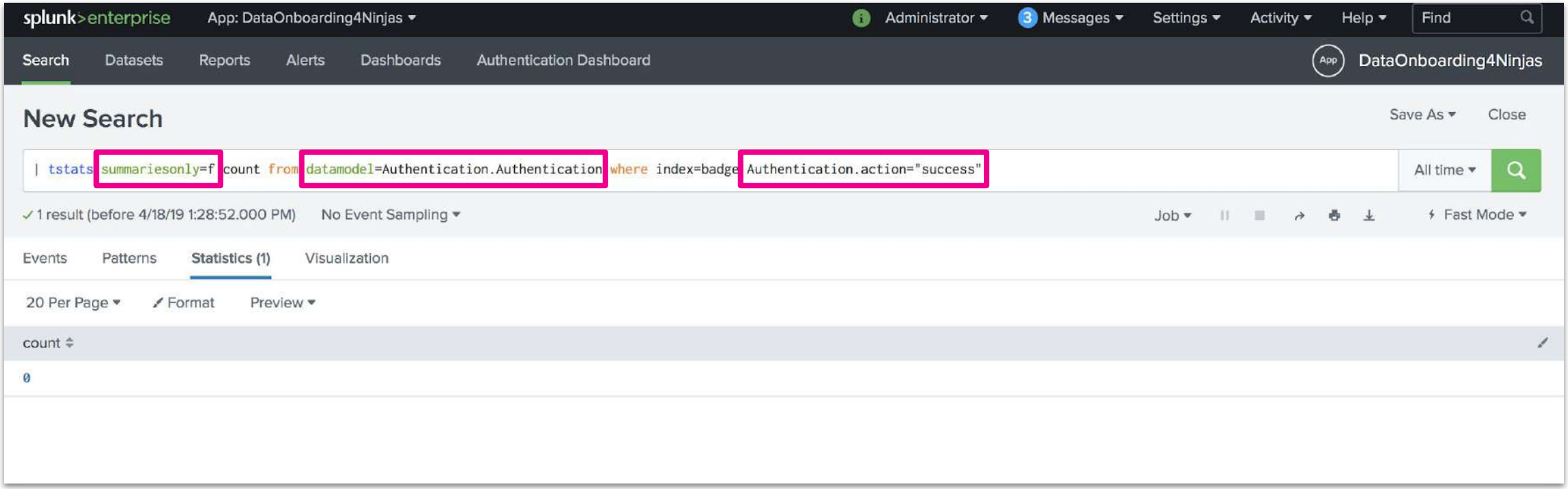
Nothing is displayed … why?



LAB 3

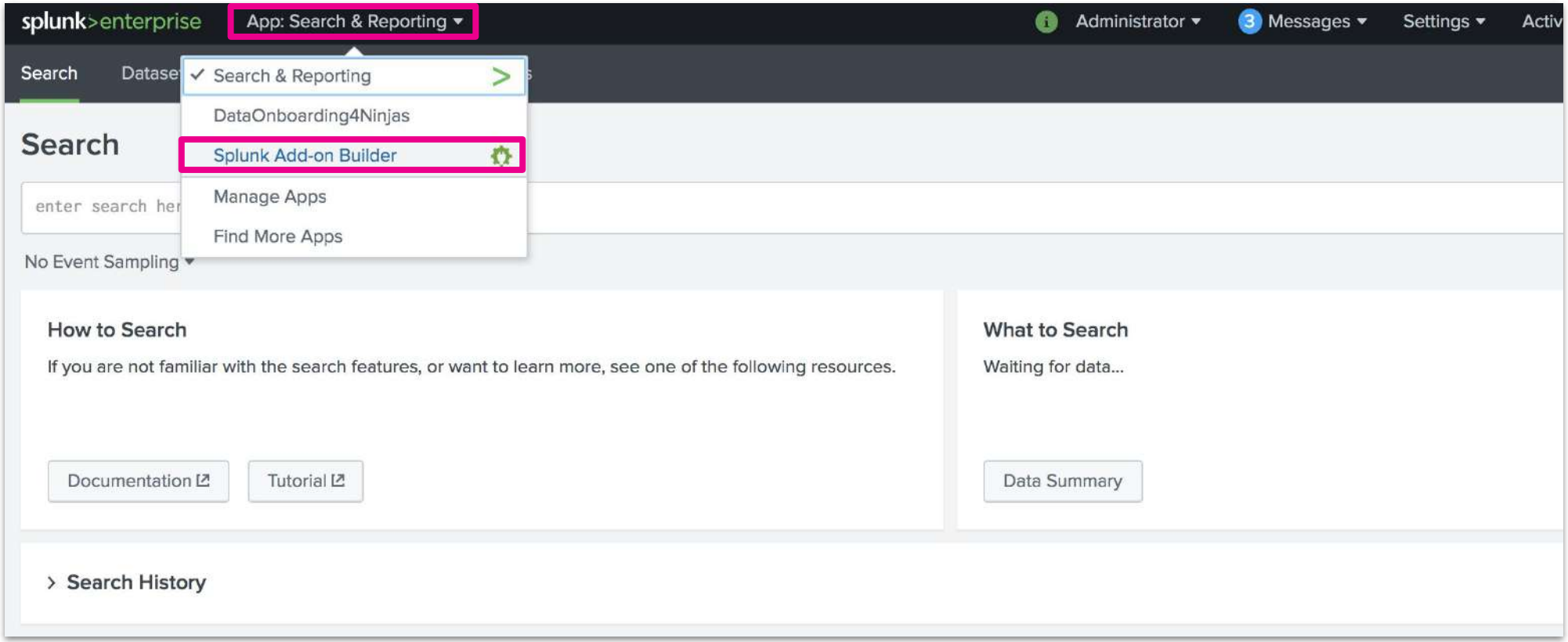
Task 10: Create Reports on Badge Data

Notice the search. We are doing a query against the Authentication data model



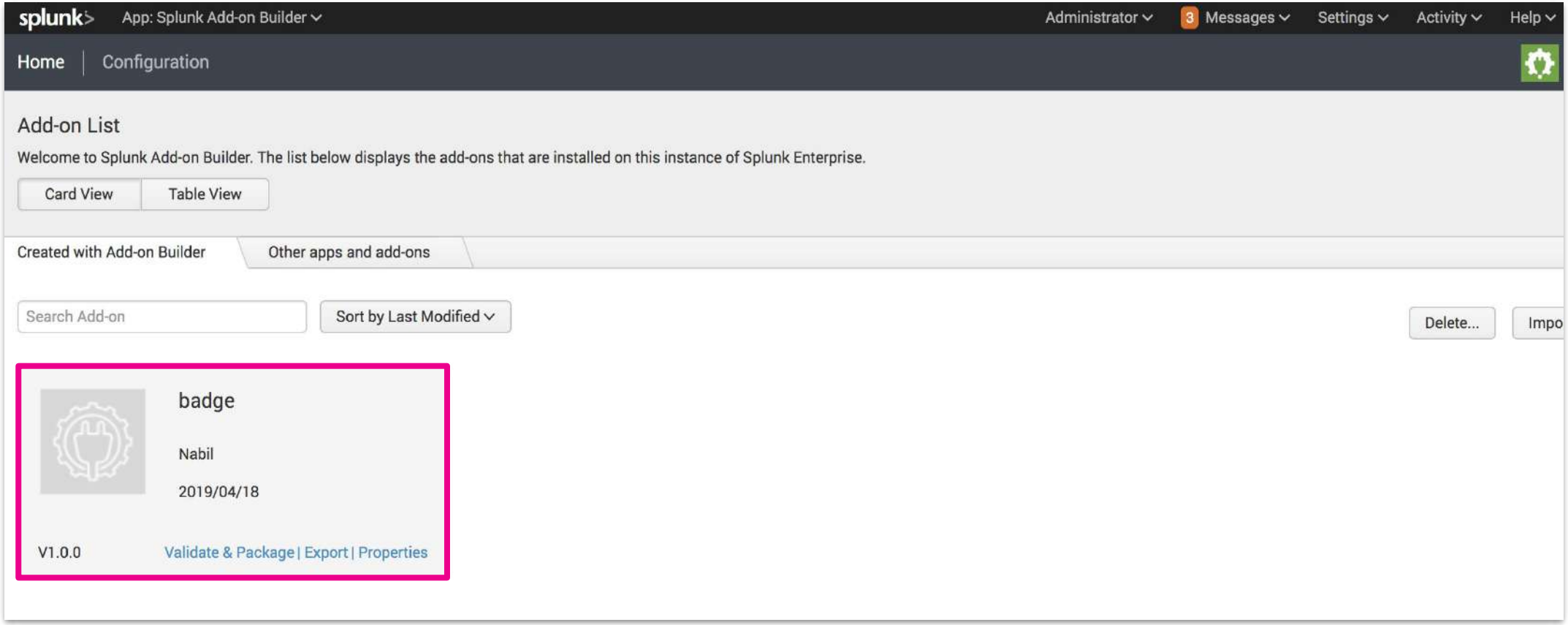
Task 10: Create Reports on Badge Data

4. Go to the **Splunk Add-on Builder** app



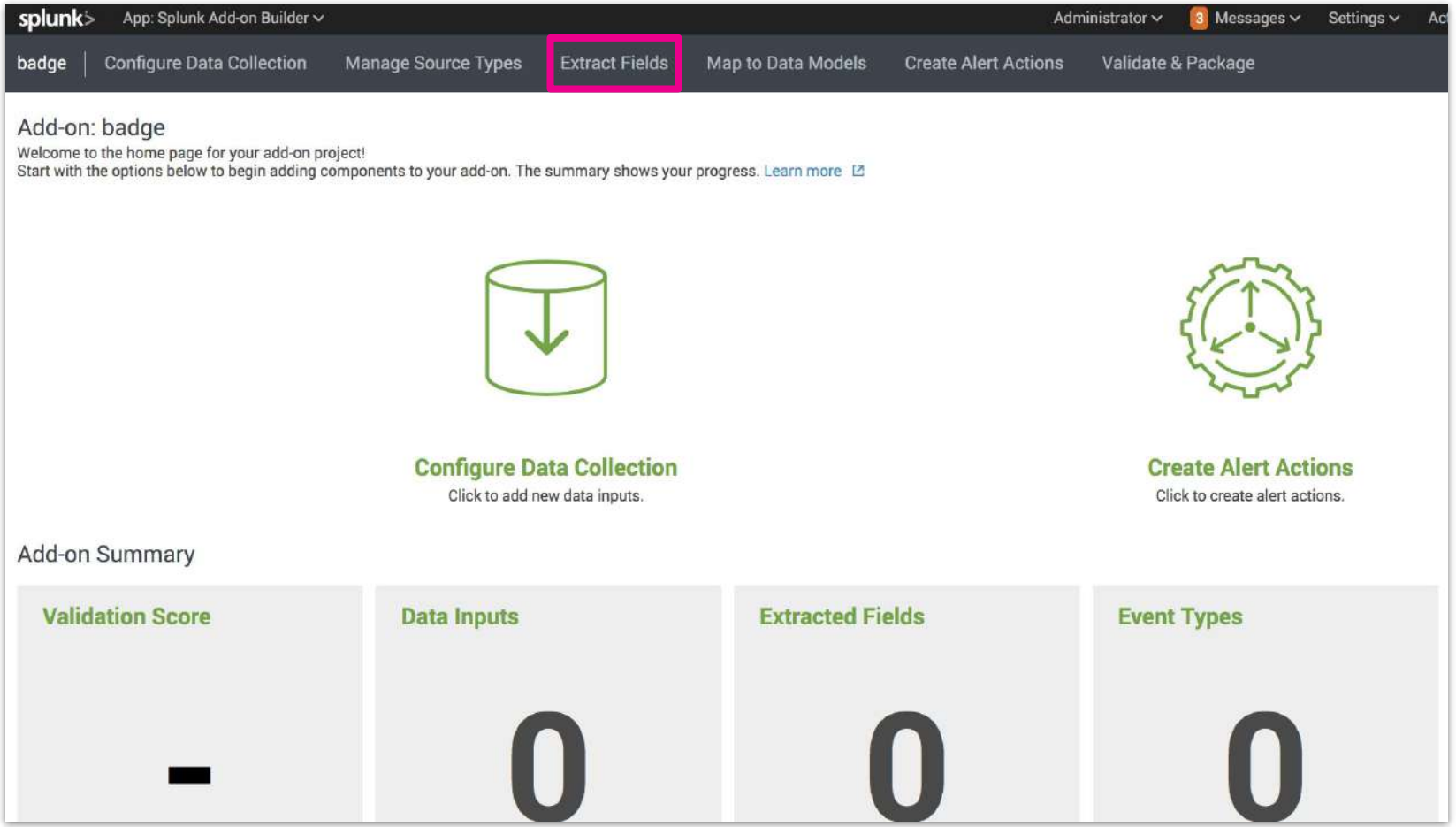
Task 10: Create Reports on Badge Data

5. Click on the add-on you created before



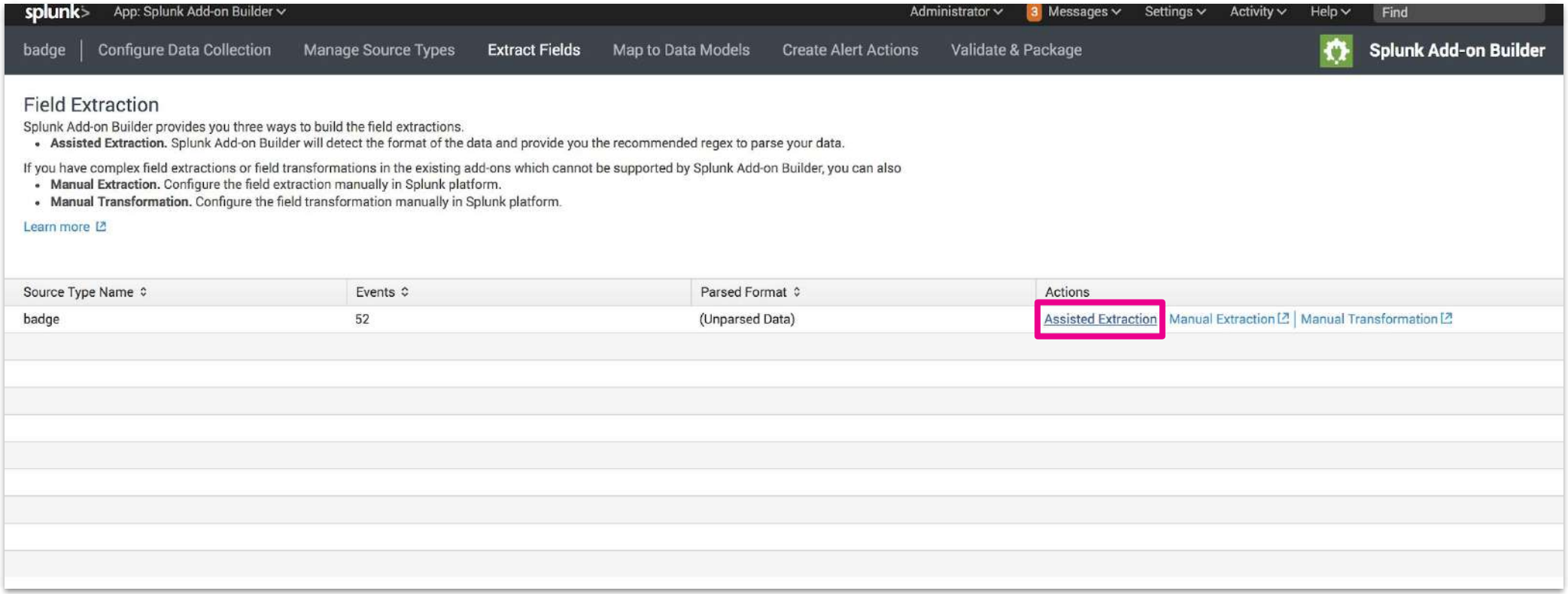
Task 10: Create Reports on Badge Data

6. Click on **Extract fields**



Task 10: Create Reports on Badge Data

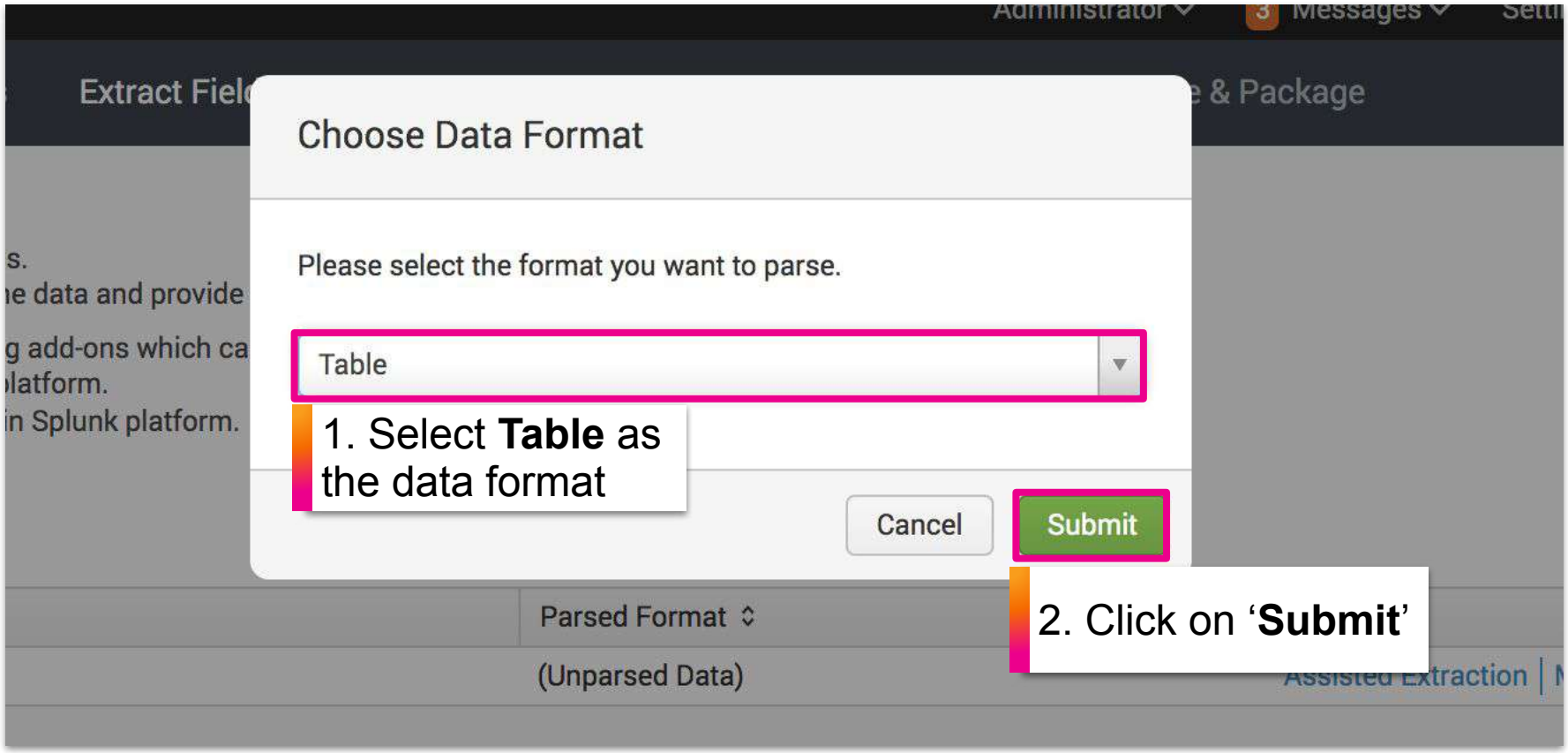
7. Click on **Assisted Extraction**



splunk>

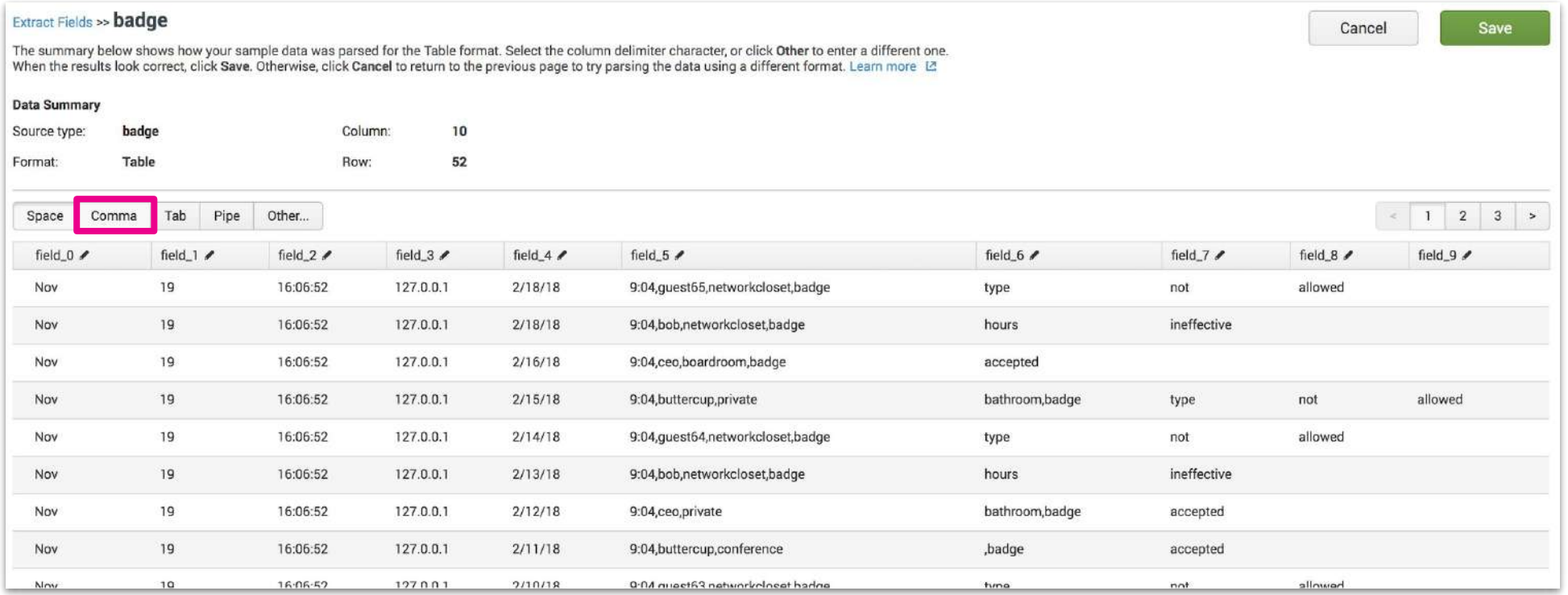
Task 10: Create Reports on Badge Data

8. Choose Table and click on **Submit**



Task 10: Create Reports on Badge Data

9. Choose **Comma** as the delimiter character



Extract Fields >> **badge**

Cancel | Save

The summary below shows how your sample data was parsed for the Table format. Select the column delimiter character, or click **Other** to enter a different one.
When the results look correct, click **Save**. Otherwise, click **Cancel** to return to the previous page to try parsing the data using a different format. Learn more

Data Summary

Source type: **badge** Column: **10**

Format: **Table** Row: **52**

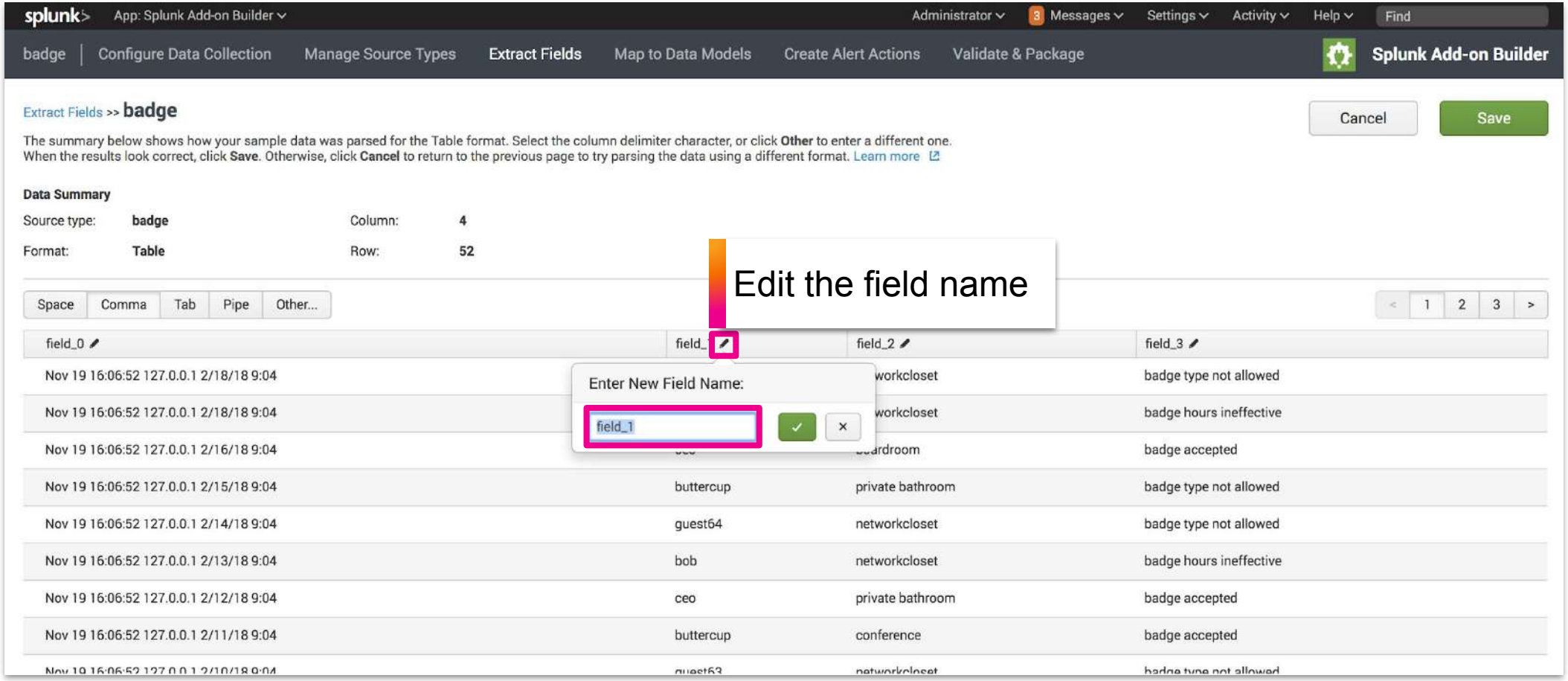
Space | Comma | Tab | Pipe | Other...

< 1 2 3 >

field_0	field_1	field_2	field_3	field_4	field_5	field_6	field_7	field_8	field_9
Nov	19	16:06:52	127.0.0.1	2/18/18	9:04,guest65,networkcloset,badge	type	not	allowed	
Nov	19	16:06:52	127.0.0.1	2/18/18	9:04,bob,networkcloset,badge	hours	ineffective		
Nov	19	16:06:52	127.0.0.1	2/16/18	9:04,ceo,boardroom,badge	accepted			
Nov	19	16:06:52	127.0.0.1	2/15/18	9:04,buttercup,private	bathroom,badge	type	not	allowed
Nov	19	16:06:52	127.0.0.1	2/14/18	9:04,guest64,networkcloset,badge	type	not	allowed	
Nov	19	16:06:52	127.0.0.1	2/13/18	9:04,bob,networkcloset,badge	hours	ineffective		
Nov	19	16:06:52	127.0.0.1	2/12/18	9:04,ceo,private	bathroom,badge	accepted		
Nov	19	16:06:52	127.0.0.1	2/11/18	9:04,buttercup,conference	,badge	accepted		
Nov	19	16:06:52	127.0.0.1	2/10/18	9:04,guest63,networkcloset,badge	type	not	allowed	

Task 10: Create Reports on Badge Data

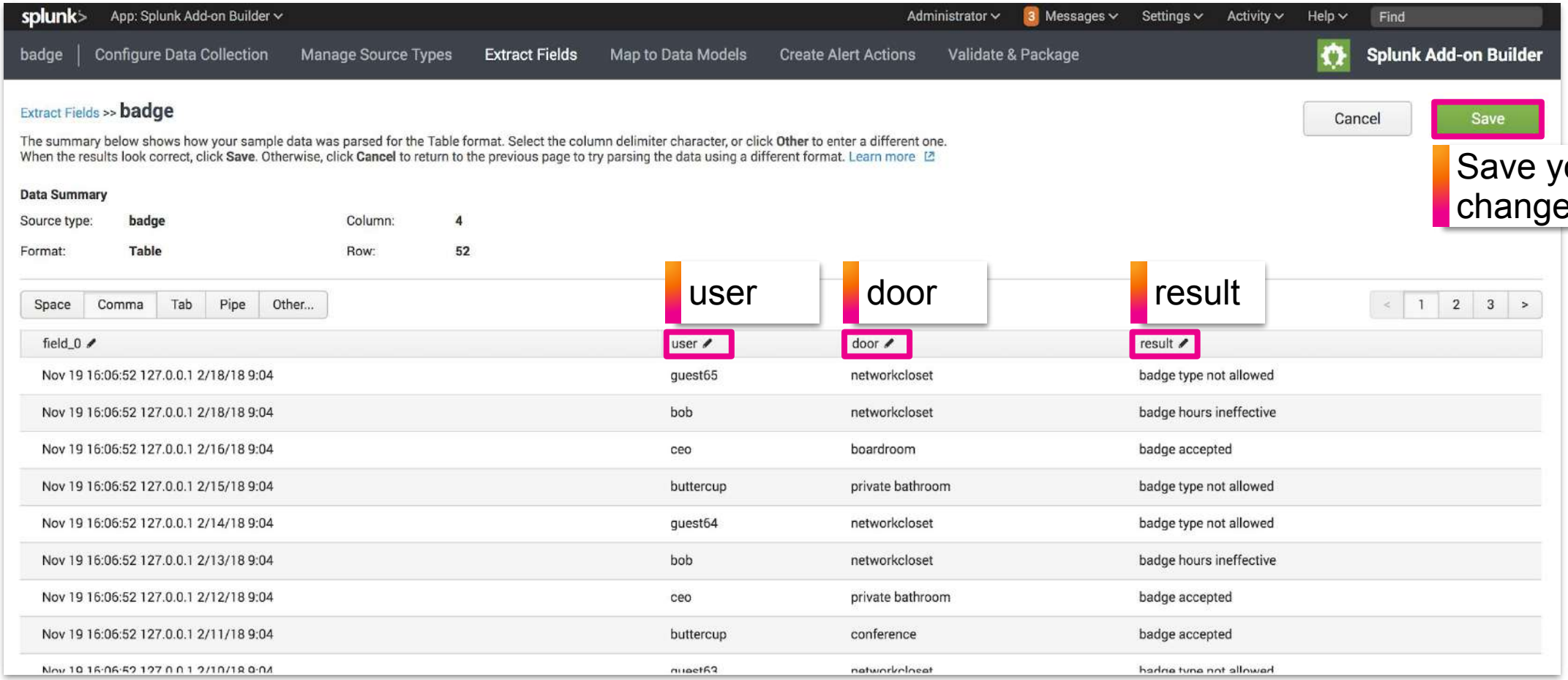
10. Rename the fields: **user**, **door**, **result**



splunk>

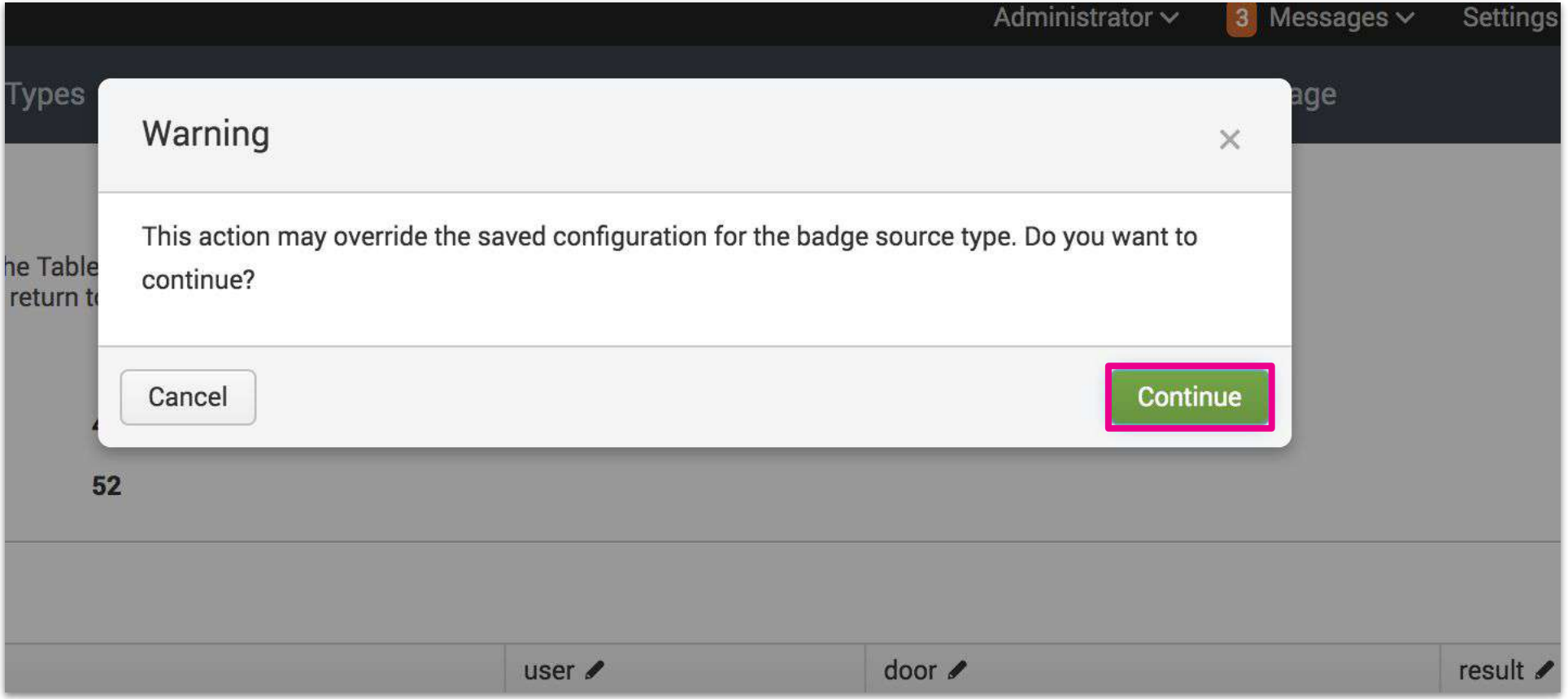
Task 10: Create Reports on Badge Data

11. Check the fields names and click **Save**



Task 10: Create Reports on Badge Data

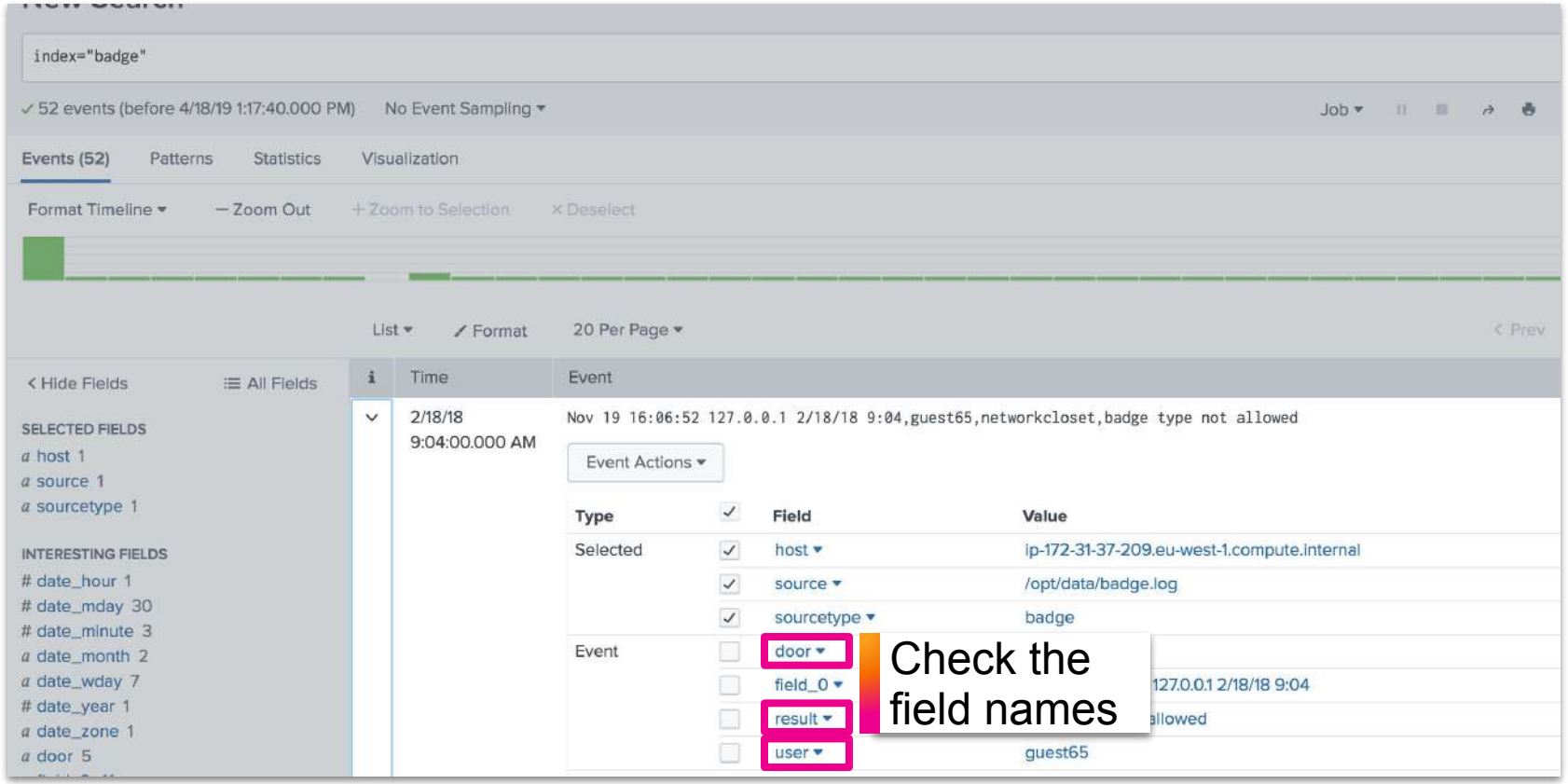
12. Click on **Continue**



Task 10: Create Reports on Badge Data

13. Check that the fields are extracted correctly

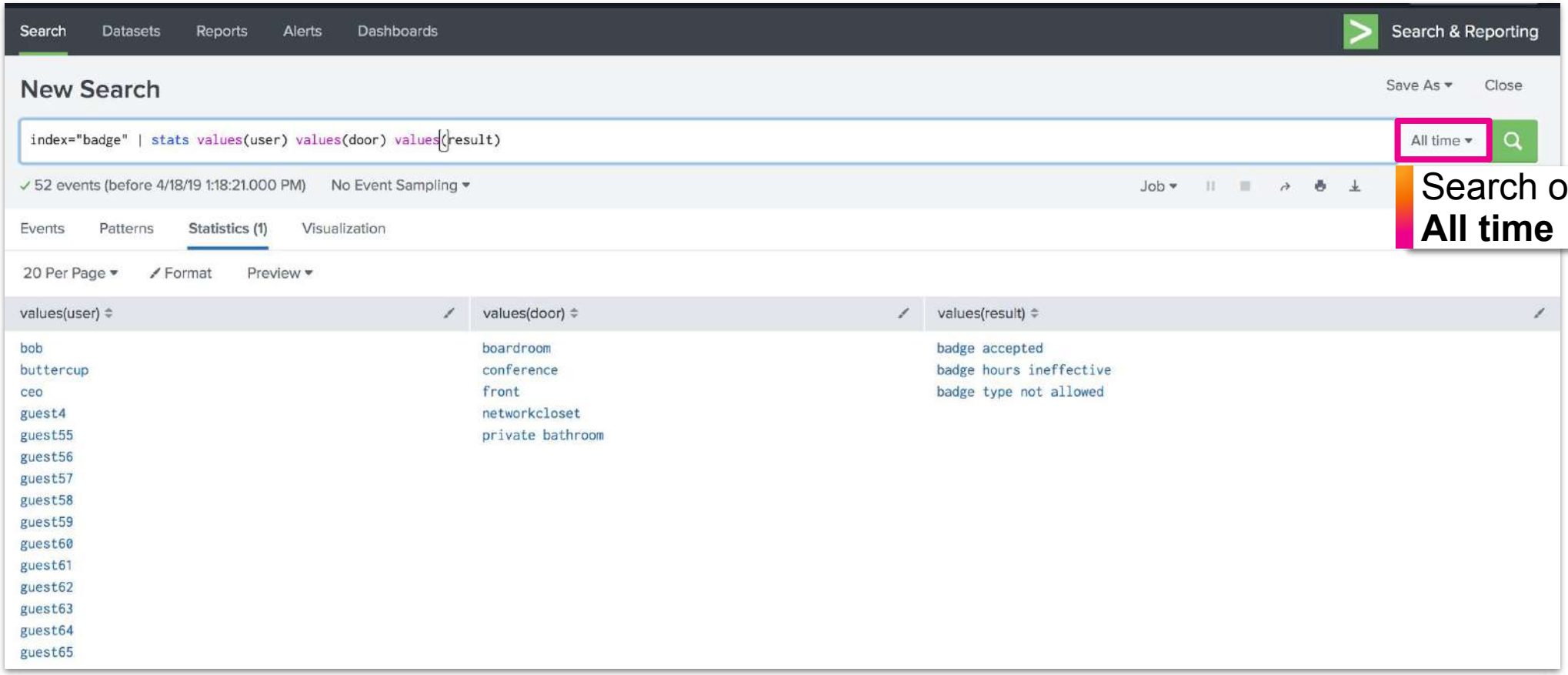
```
index="badge"
```



Task 10: Create Reports on Badge Data

14. Another way to check the fields

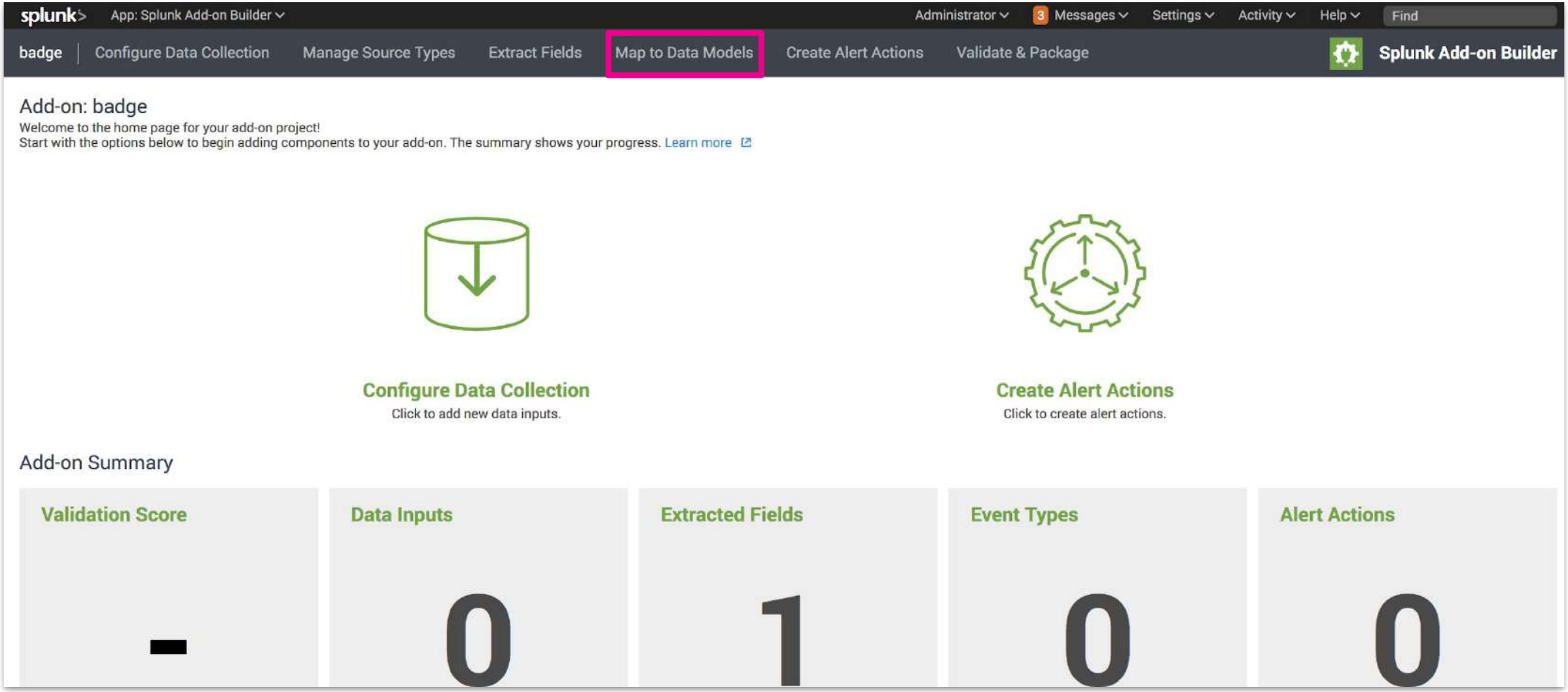
```
index=badge | stats values(user) values(door) values(result)
```



splunk>

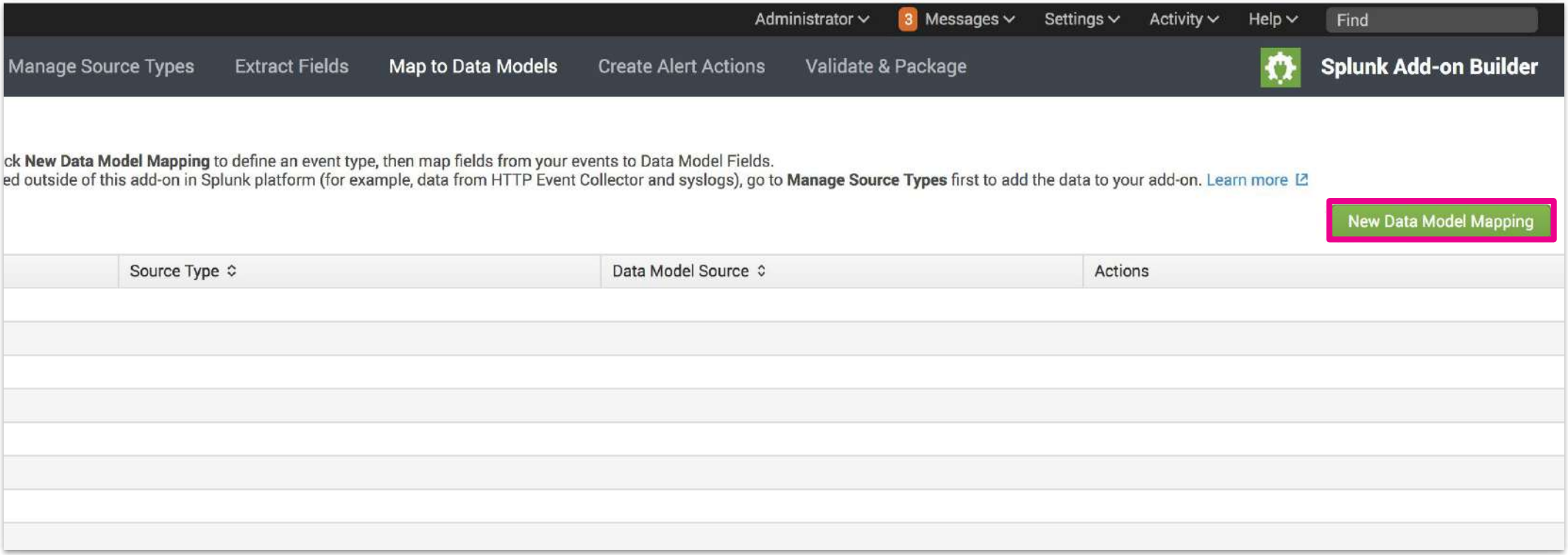
Task 10: Create Reports on Badge Data

15. Go to add on builder app and click on Map to Data Models



Task 10: Create Reports on Badge Data

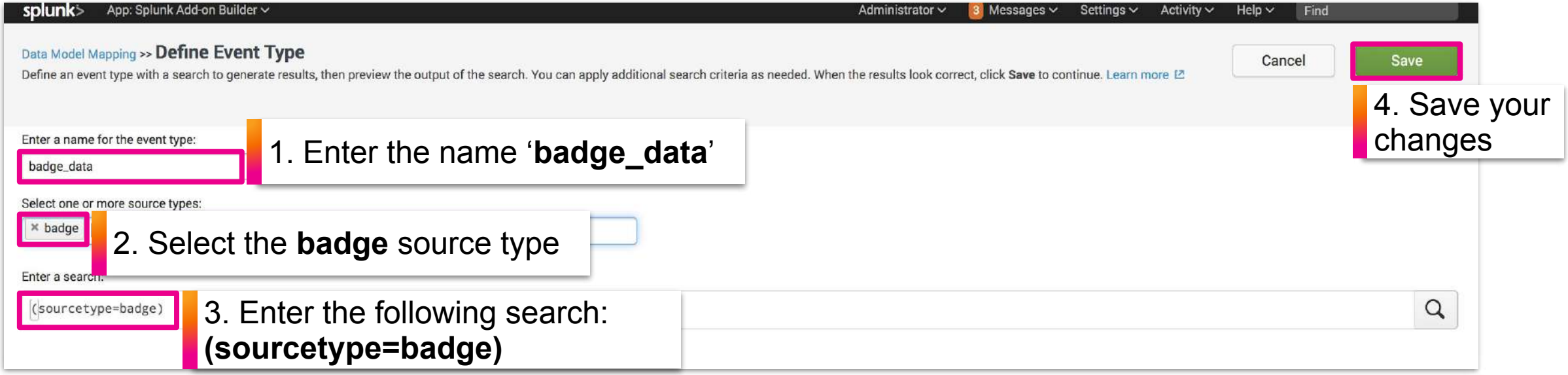
16. Click on **New Data Model Mapping**



splunk>

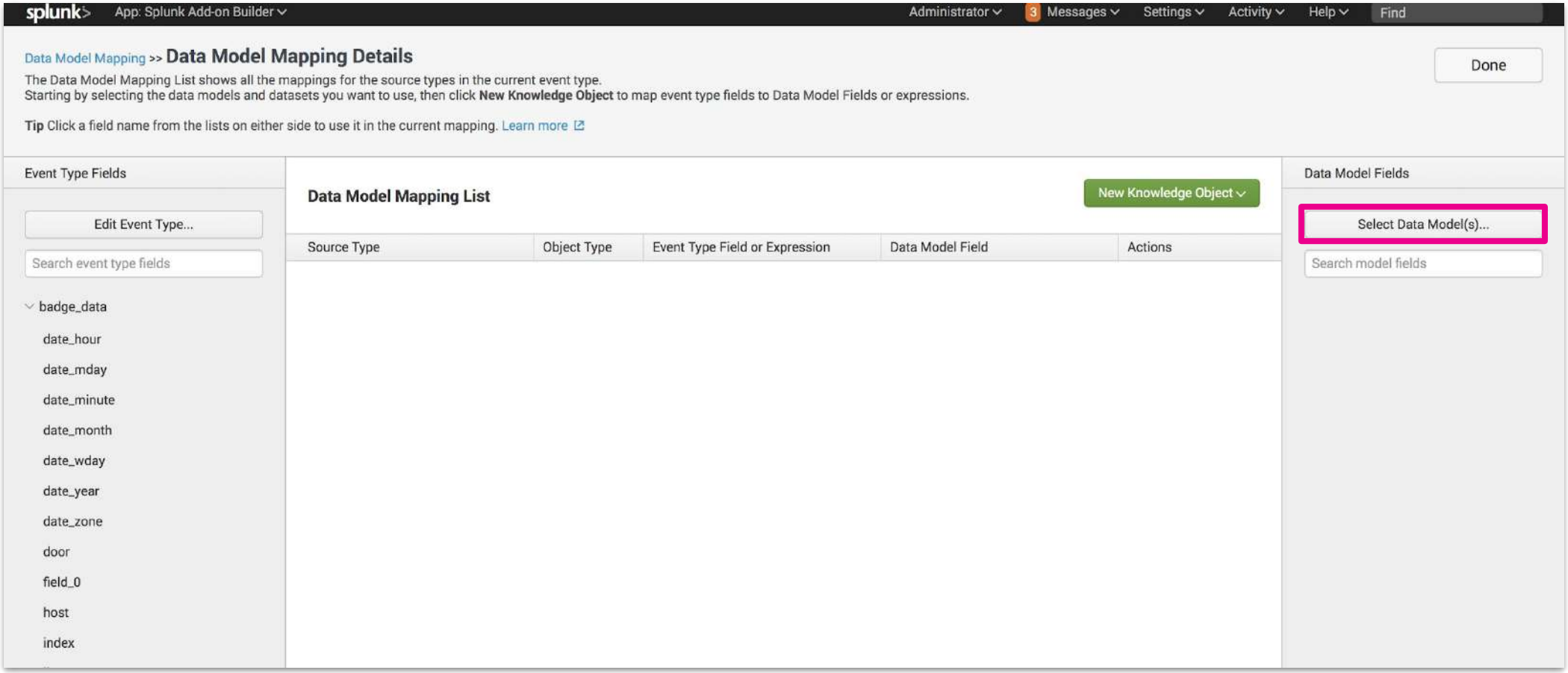
Task 10: Create Reports on Badge Data

17. Enter an event type name, select the source type and click on **Save**



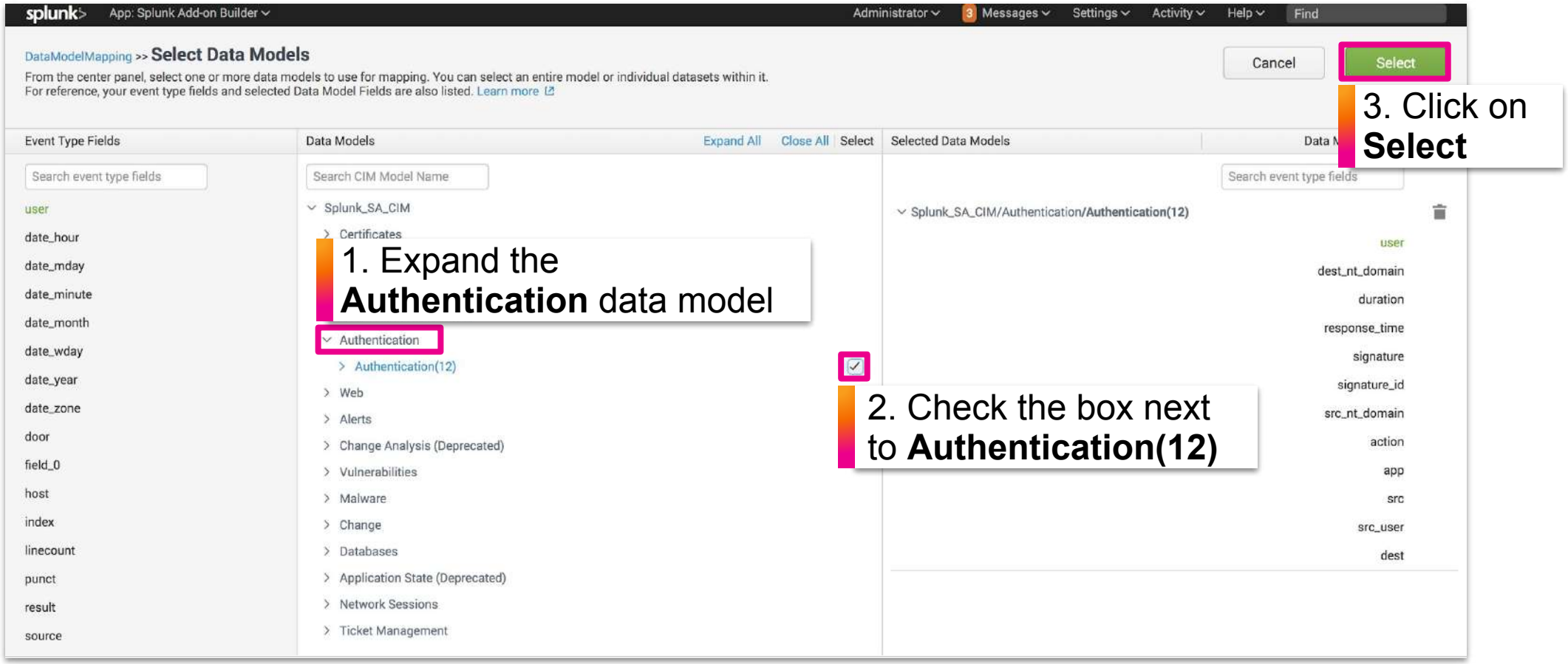
Task 10: Create Reports on Badge Data

18. Click on **Select Data Model(s)**



Task 10: Create Reports on Badge Data

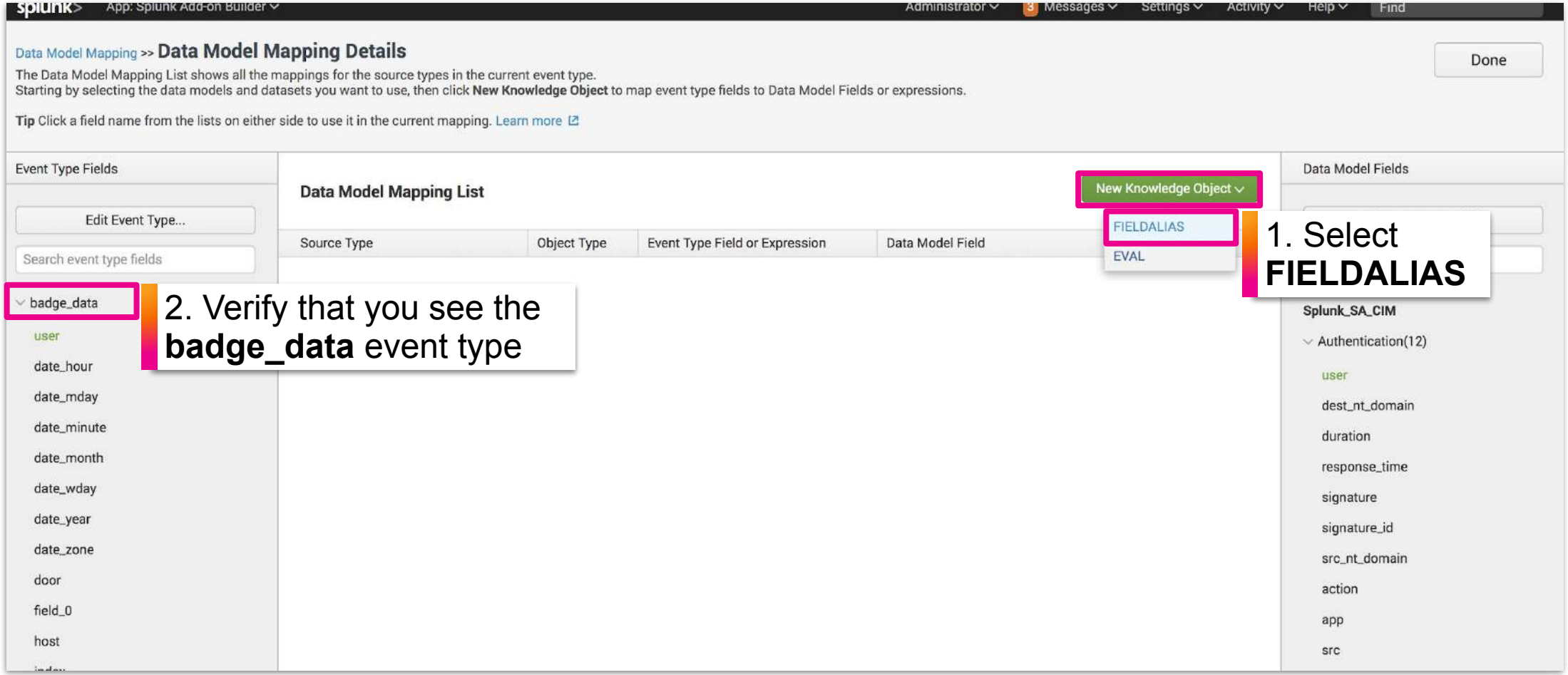
19. Select Authentication Data Model and click on **Save**



splunk>

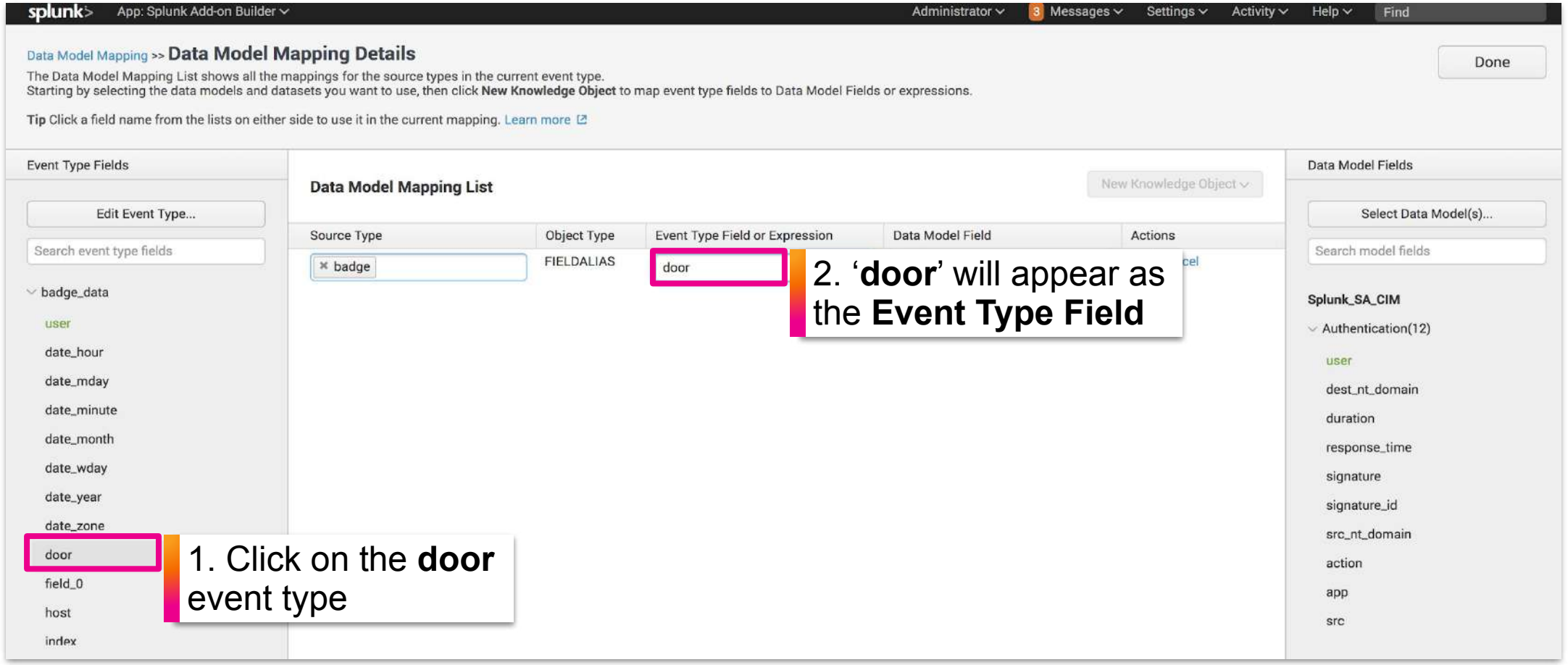
Task 10: Create Reports on Badge Data

20. Click on New Knowledge Object and select **FIELDALIAS**



Task 10: Create Reports on Badge Data

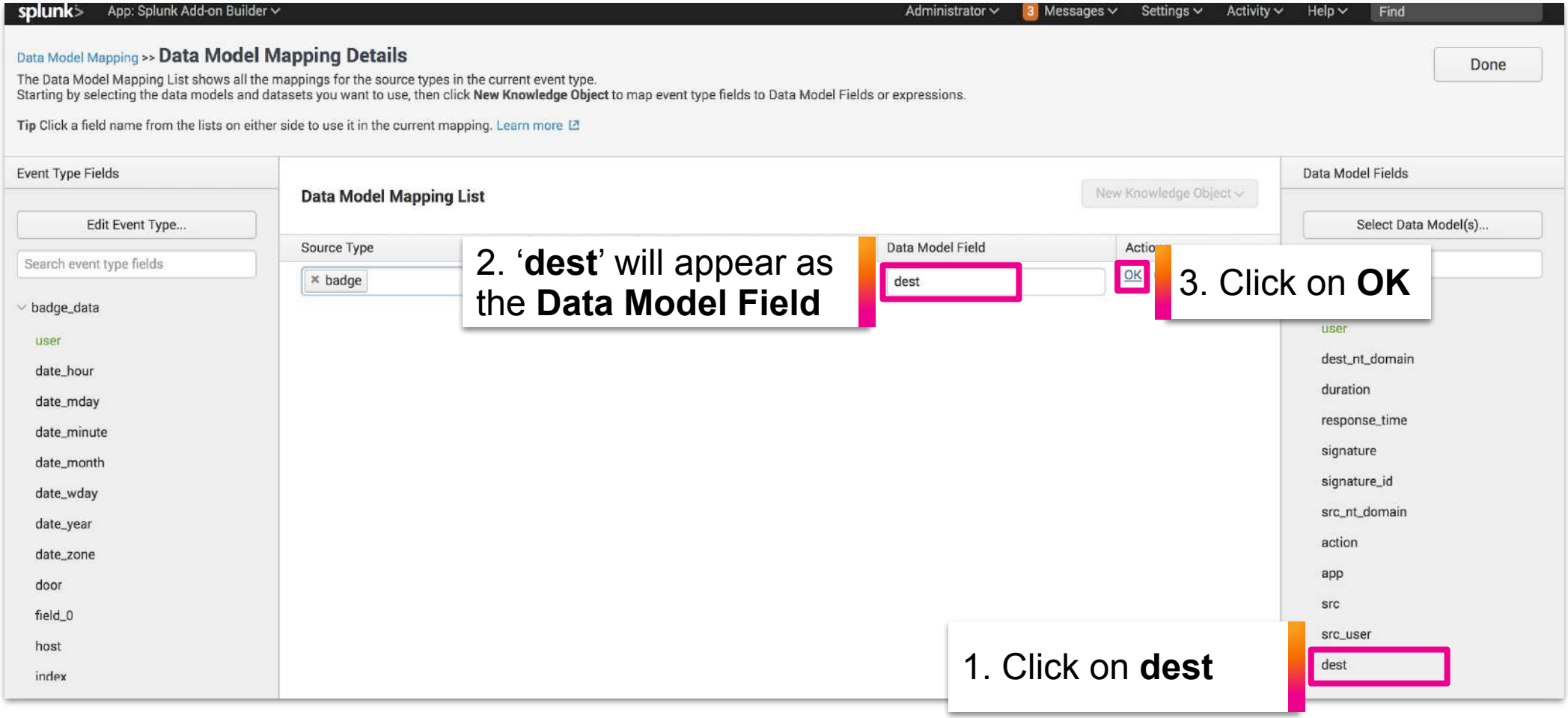
21. Click on the **door** field on the left panel



splunk>

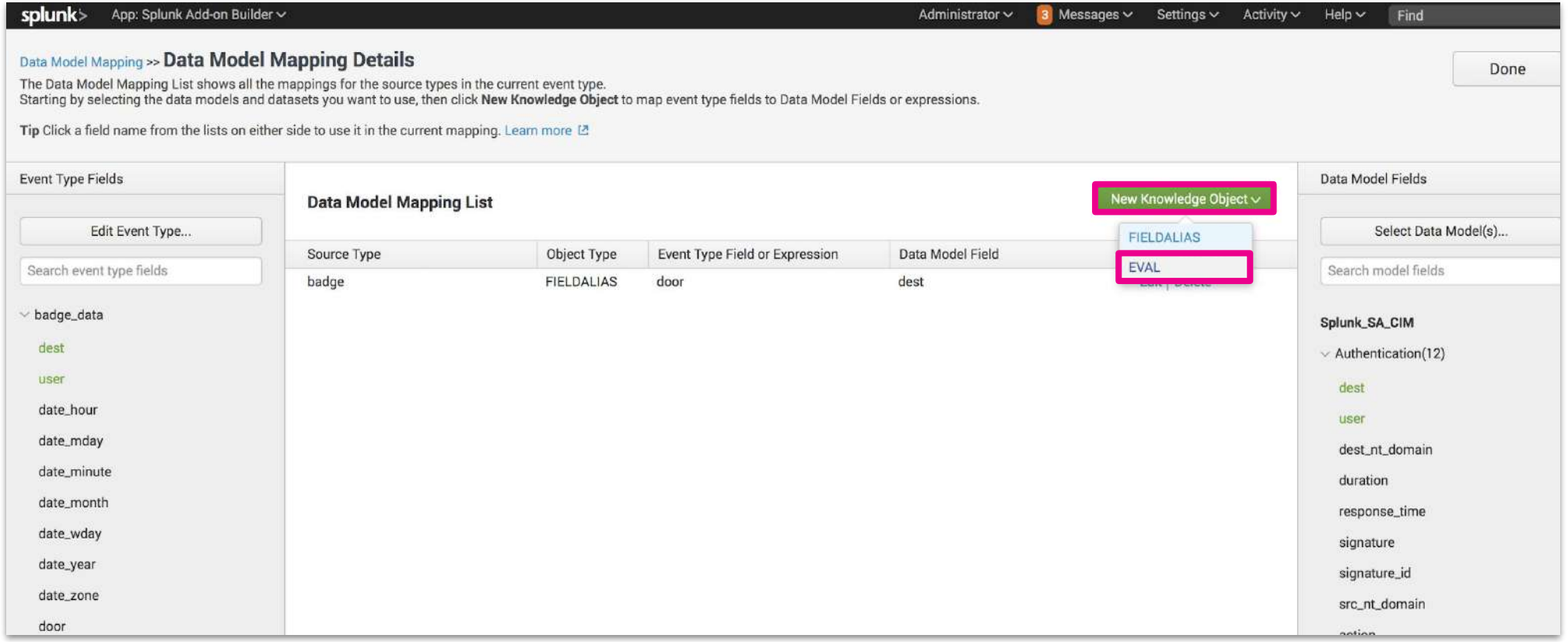
Task 10: Create Reports on Badge Data

22. Click on **dest** field on the right panel, then click on **OK**



Task 10: Create Reports on Badge Data

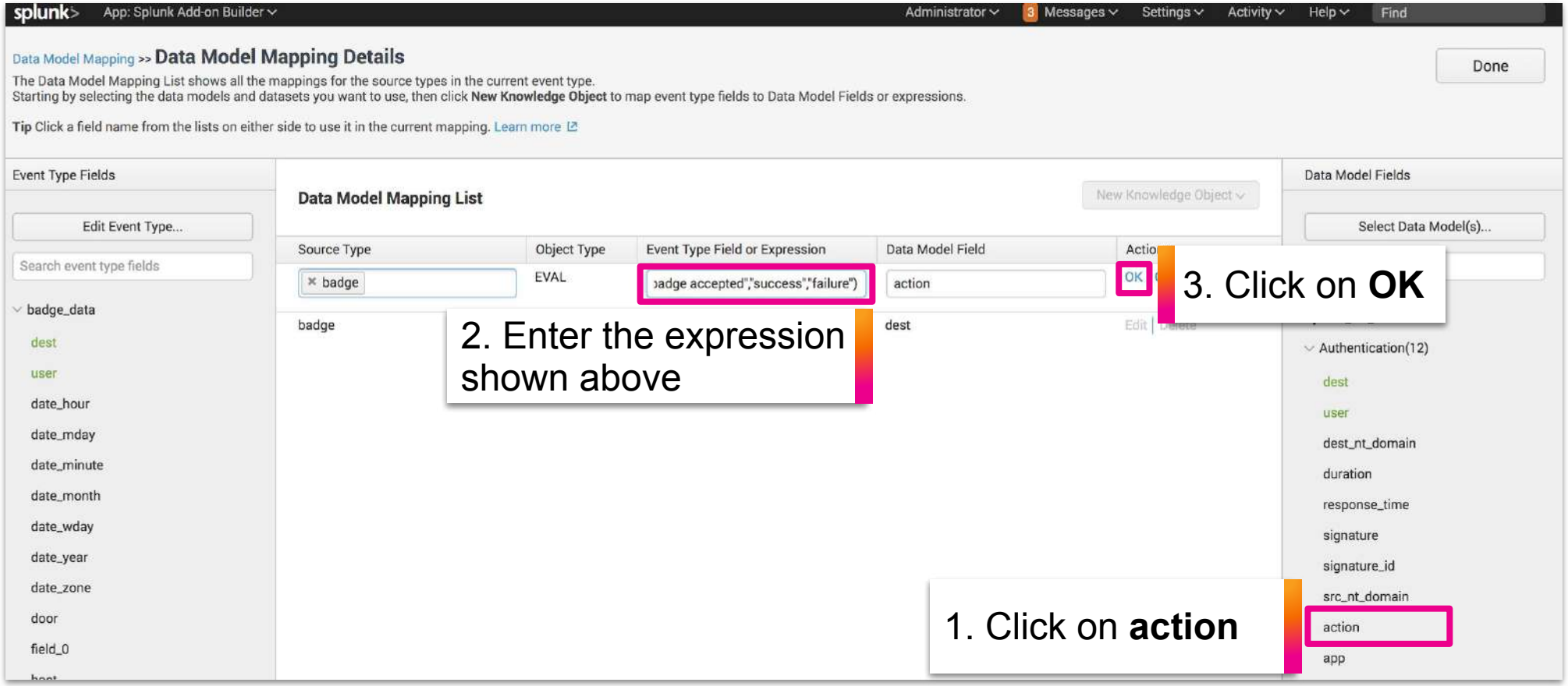
23. Click on **New Knowledge Object** and select **EVAL**



Task 10: Create Reports on Badge Data

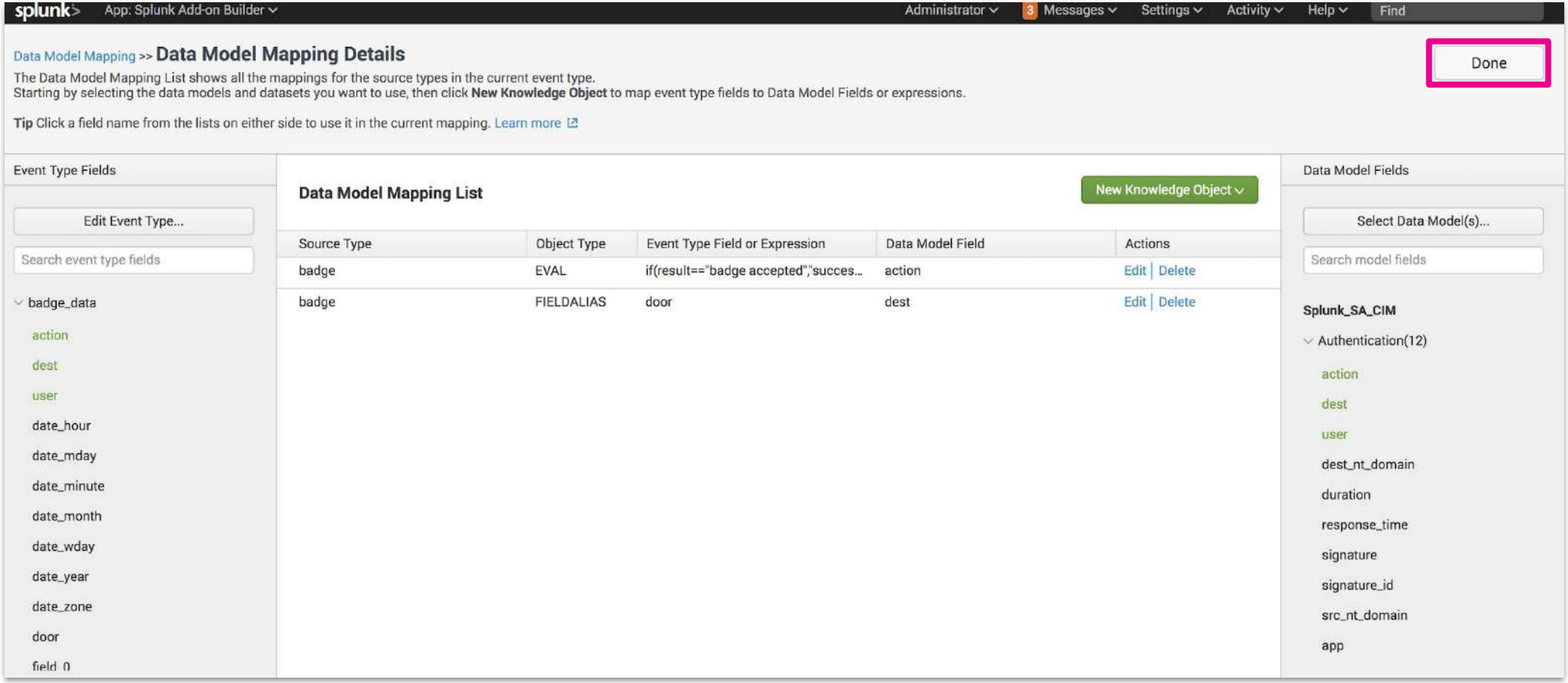
24. Select **action** on the right panel and enter the expression:

```
if(result=="badge accepted","success","failure")
```



Task 10: Create Reports on Badge Data

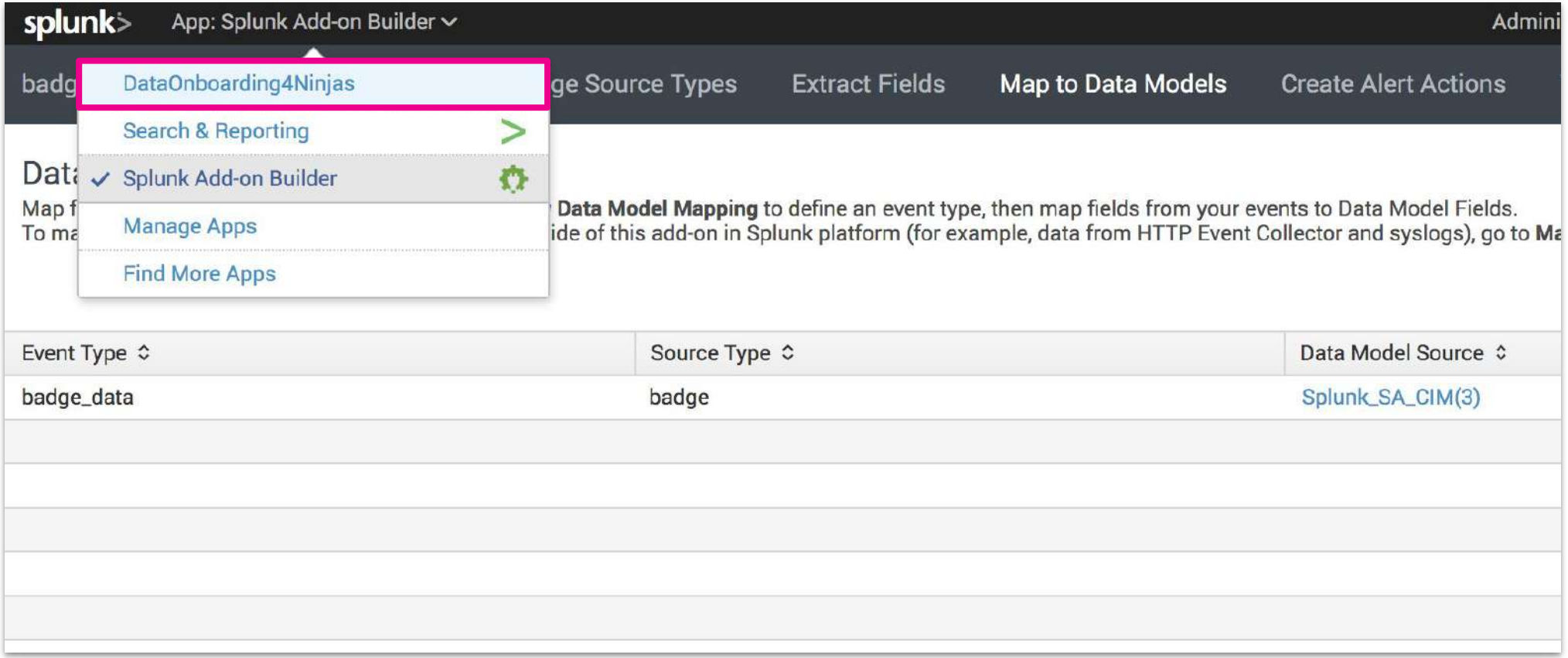
25. Click on **Done**



splunk>

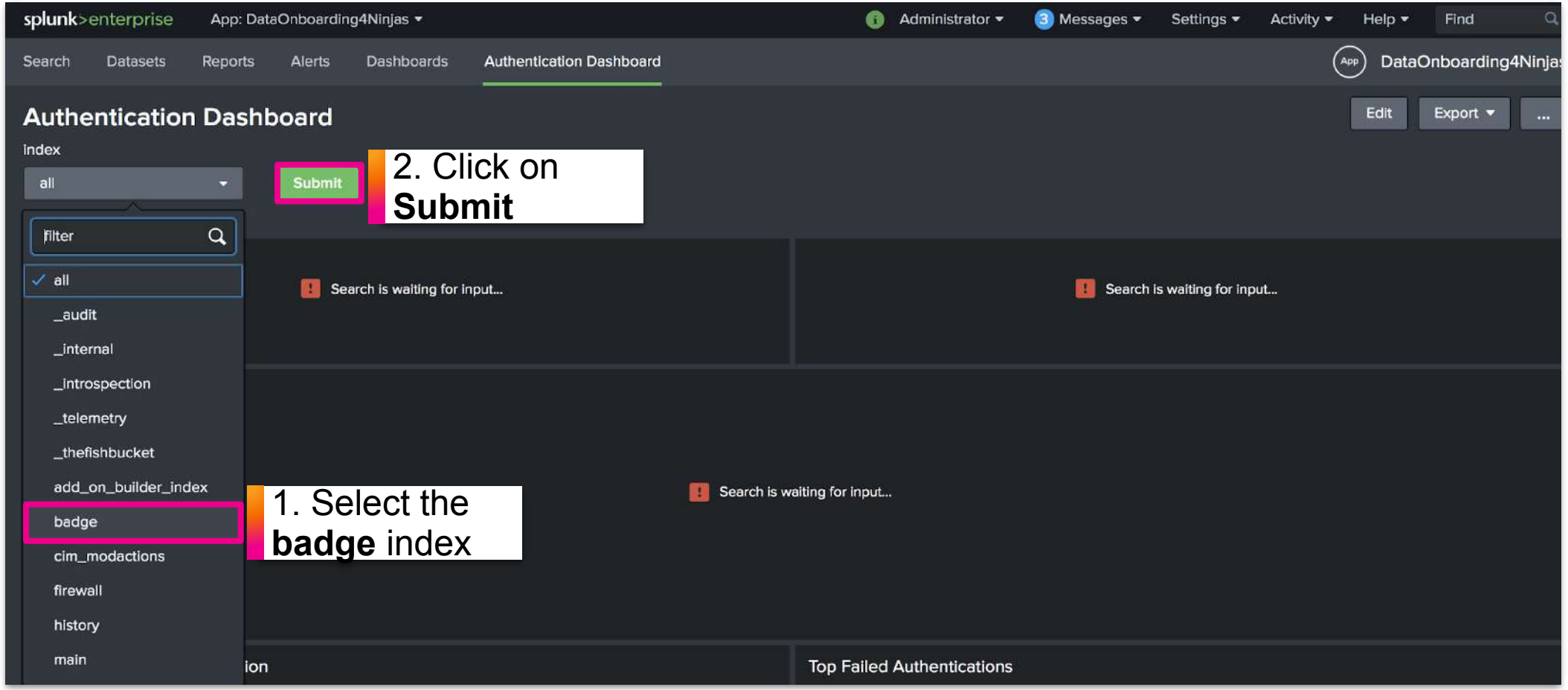
Task 10: Create Reports on Badge Data

26. Go to the **DataOnboarding4Ninjas** app



Task 10: Create Reports on Badge Data

27. Check you dashboard again



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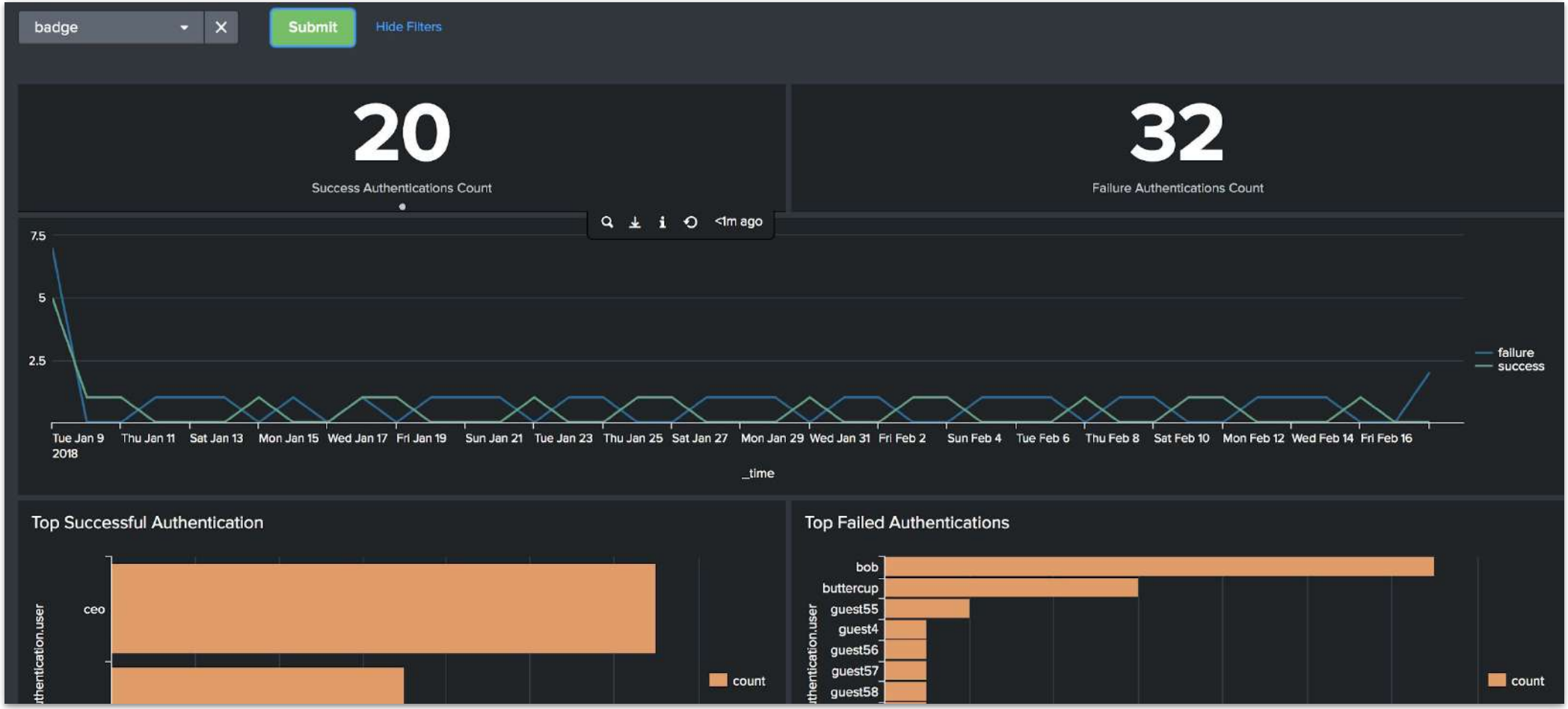
Task 10: Create Reports on Badge Data

Results should now be displayed correctly!



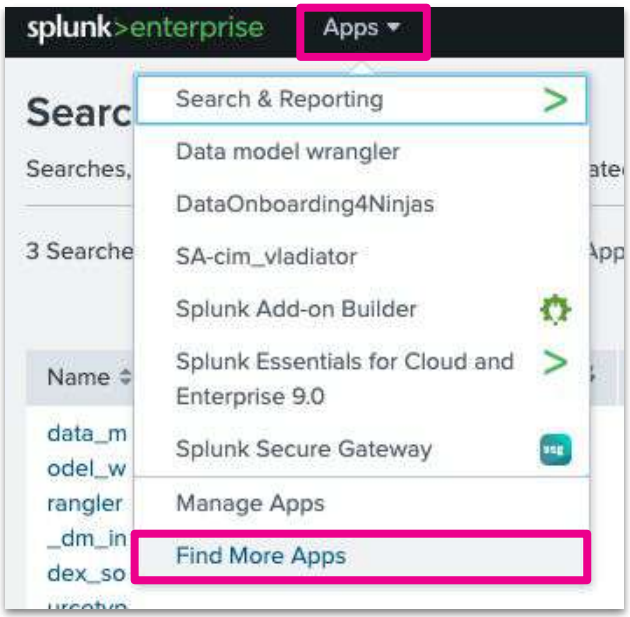
splunk>

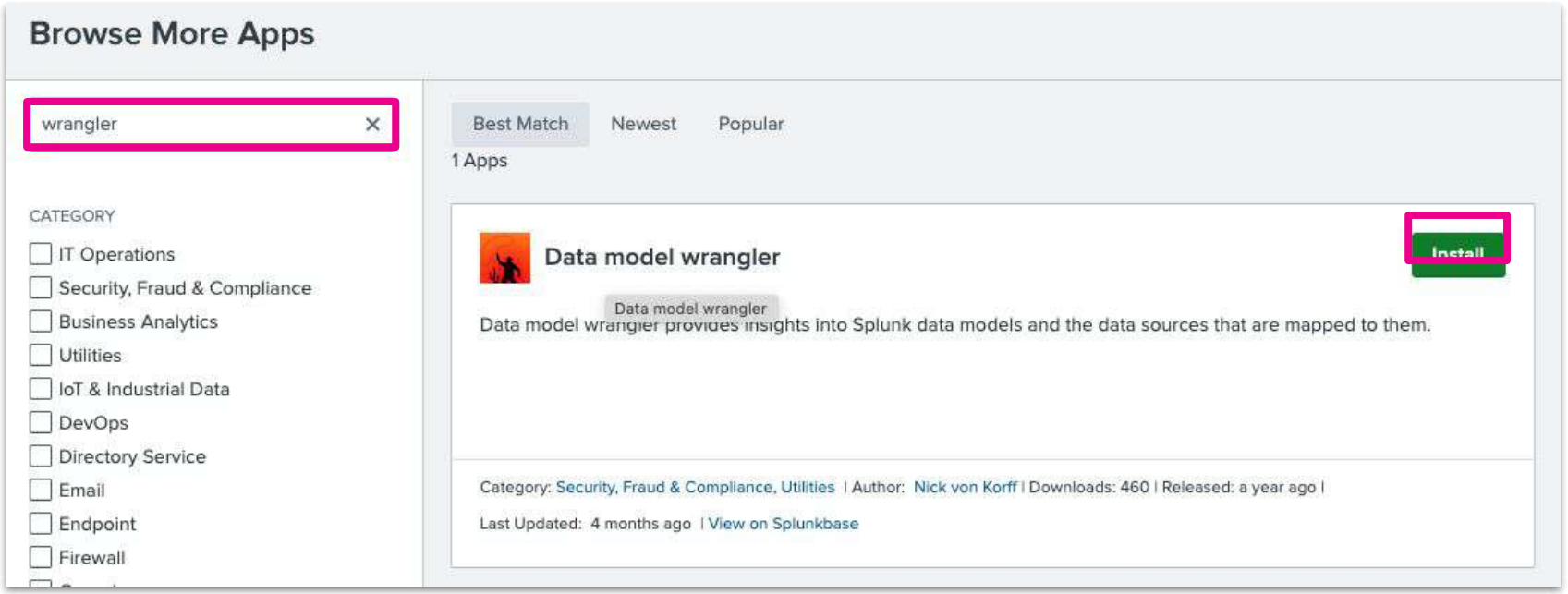
Thank You!

(Extra credit exercises below!)

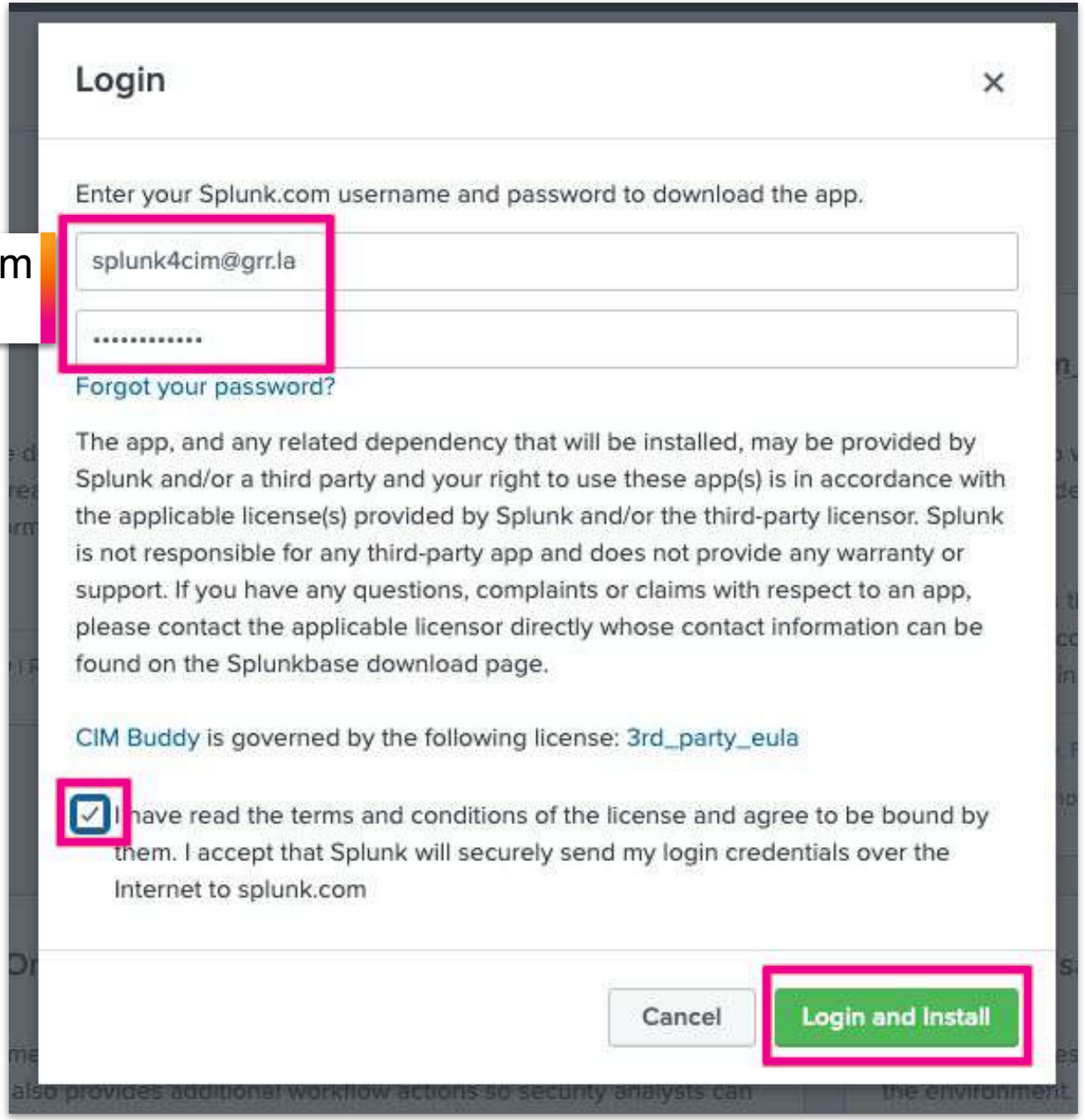
Extra Credit:
Install the Data Model Wrangler App

1. Go to **Apps > Find More Apps** and search for “**wrangler**”





Enter your splunk.com credentials



splunk>

Extra Credit: Wrangler App Pre-reqs

2. Review the prerequisites

How do I use the app?

- Ensure you have the Common Information Model app installed and up-to-date
- Install the CIM Validator app, as Data model wrangler relies on a custom search command from the CIM Validator app. There are also drill-downs from panels in the Data model wrangler to the CIM Validator.
- Create an index for the data that will be generated. Default index name is: *data_model_wrangler*
  - If you want to use a custom index name, please update the 'data_model_wrangler_index' search macro in the app with the custom index name
- Enable the below saved searches
  - data_model_wrangler_dm_index_sourcetype_field (default schedule is twice per day, once at 06:00 and again at 14:00. Time range: -4h@h to -3h@h)
  - data_model_wrangler_field_quality (default schedule is once per day at 01:00)
  - data_model_wrangler_mapping_quality (default schedule is once per day at 01:00)

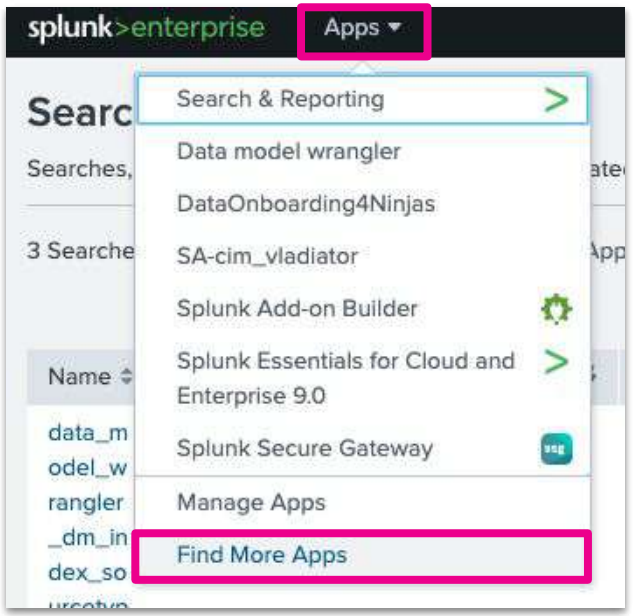
Over time this will build up a view of mapping and field data quality over time, allowing you to see the current state, find issues and measure the results.

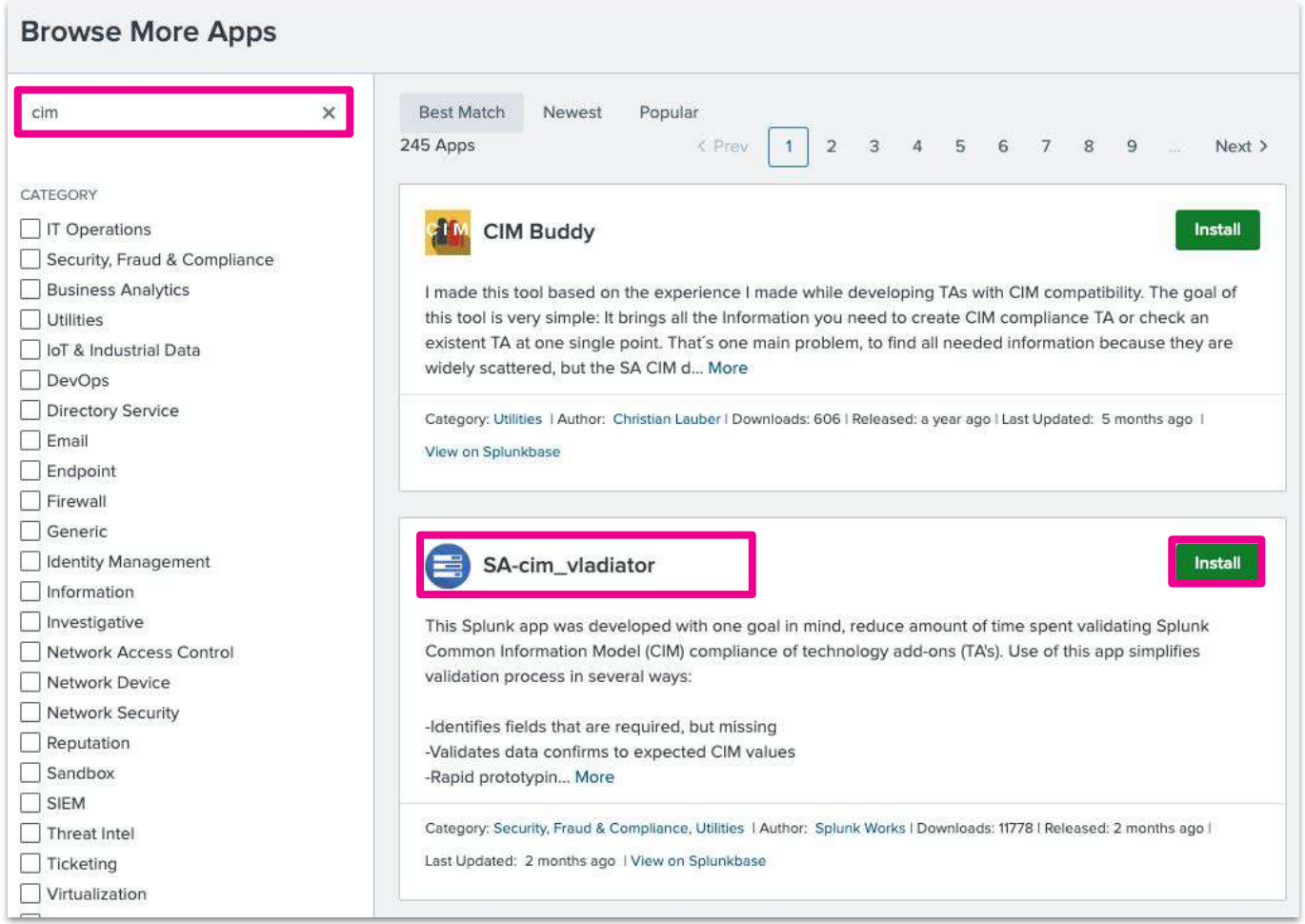
Whenever a CIM mapping requirement comes up, this dashboard provides a quick and easy way to find existing mapped data, or to verify that newly added data has been CIM mapped correctly.

splunk>

Extra Credit: Install the CIM Validator App

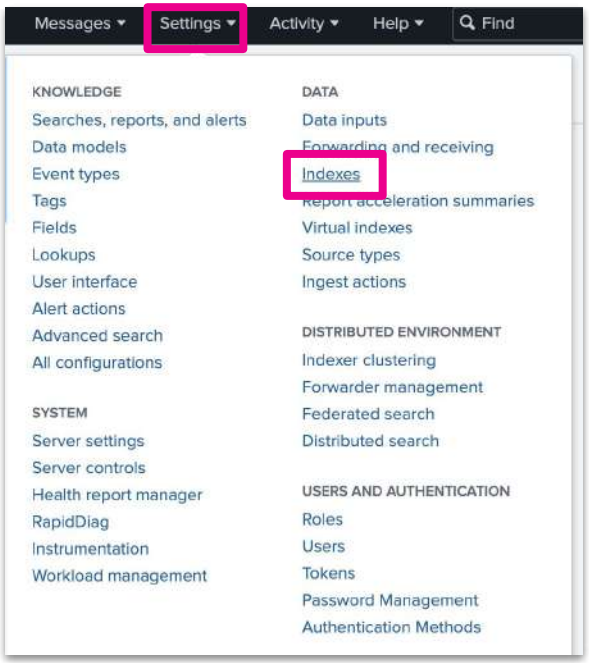
3. Install the **SA-cim_vladiator** app (search for "**cim**")

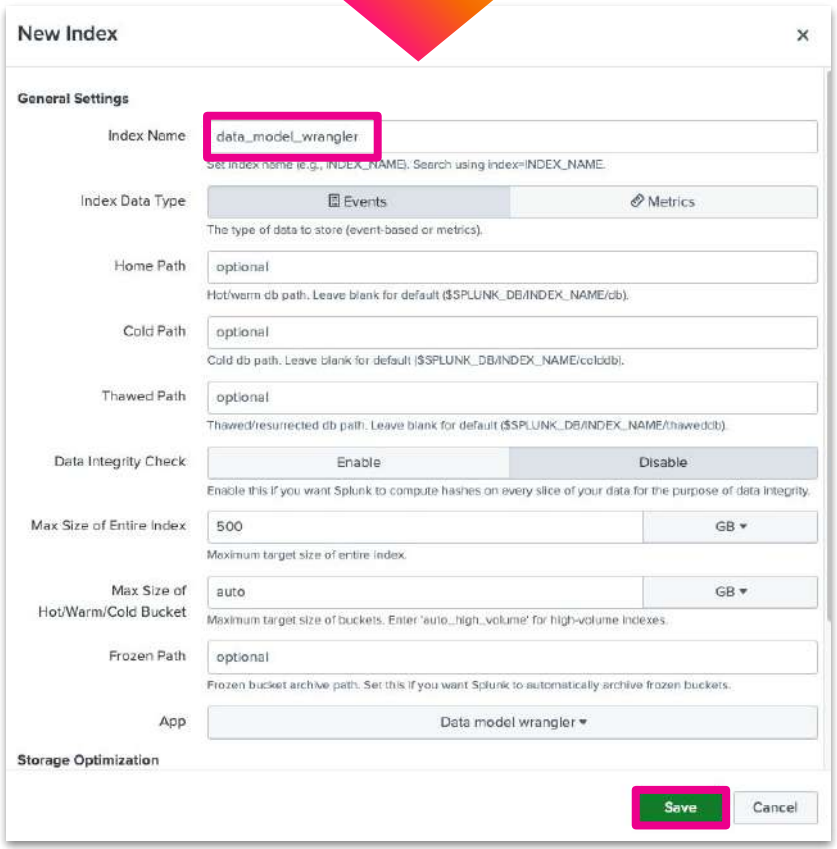


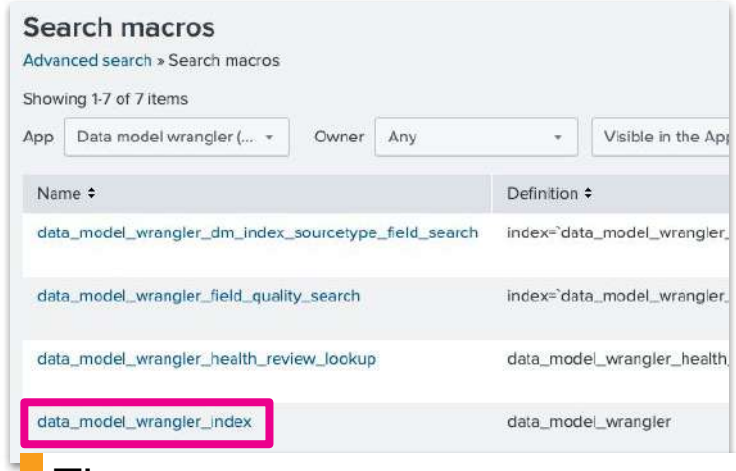


Extra Credit: Create an Index for the Data Model Wrangler App

4. Create a **data_model_wrangler** index





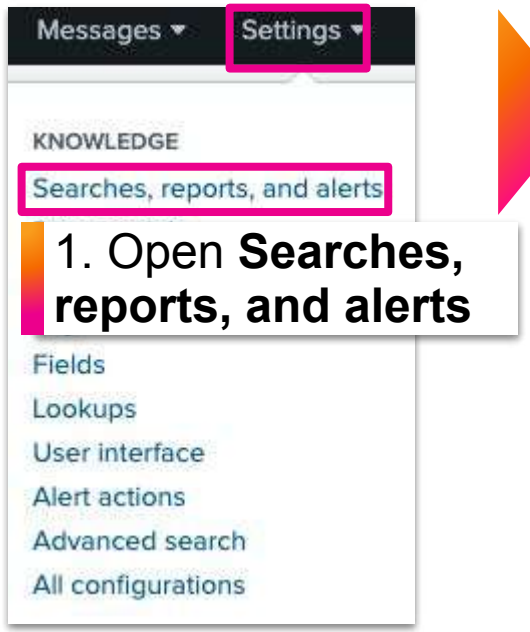


The **data_model_wrangler_index** macro is included in the Data Model Wrangler app and points to this index name

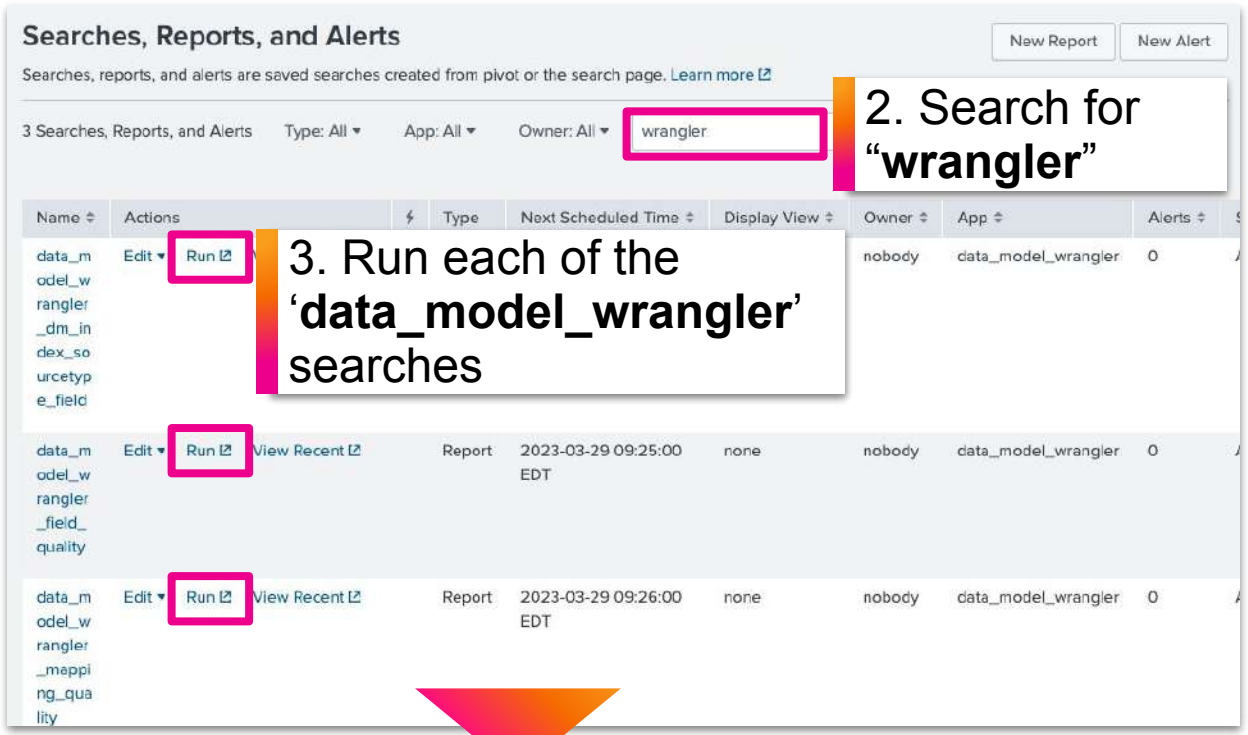
splunk>

Extra Credit: Run the Data Model Wrangler Saved Searches

5. Run the 3 saved searches (hint: set time to **All time**)

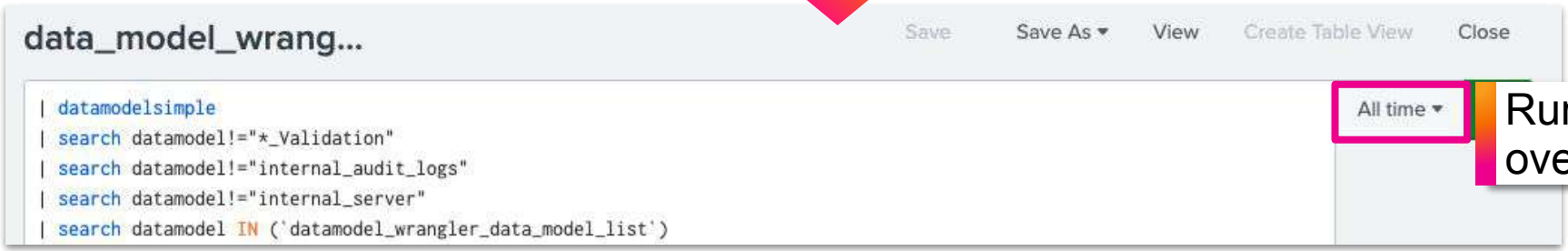


1. Open **Searches, reports, and alerts**



2. Search for "**wrangler**"

3. Run each of the '**data_model_wrangler**' searches

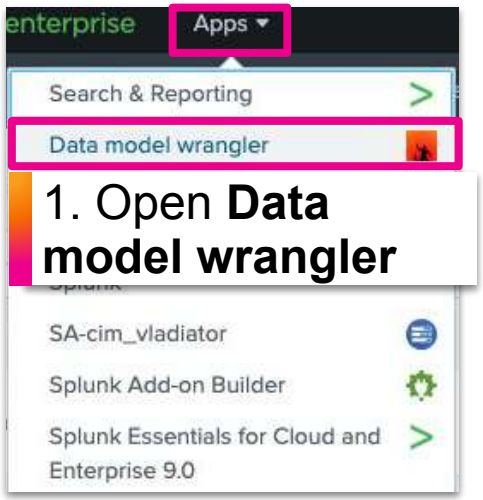


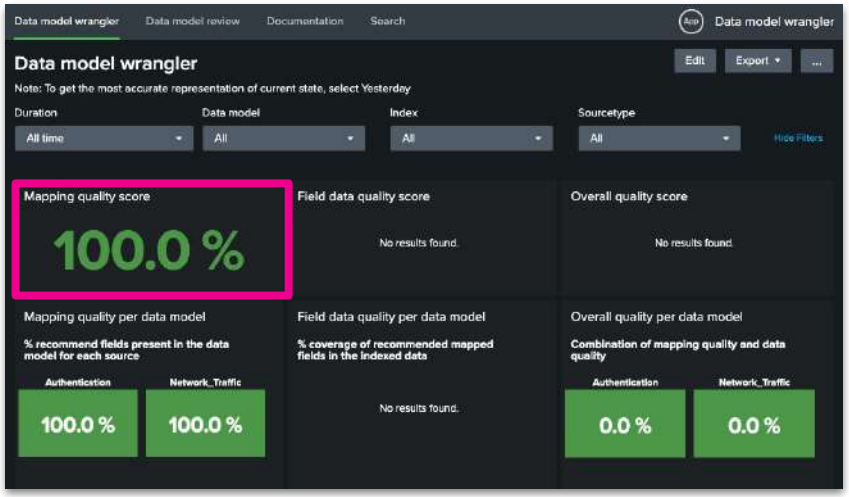
Run the searches over **All time**

splunk>

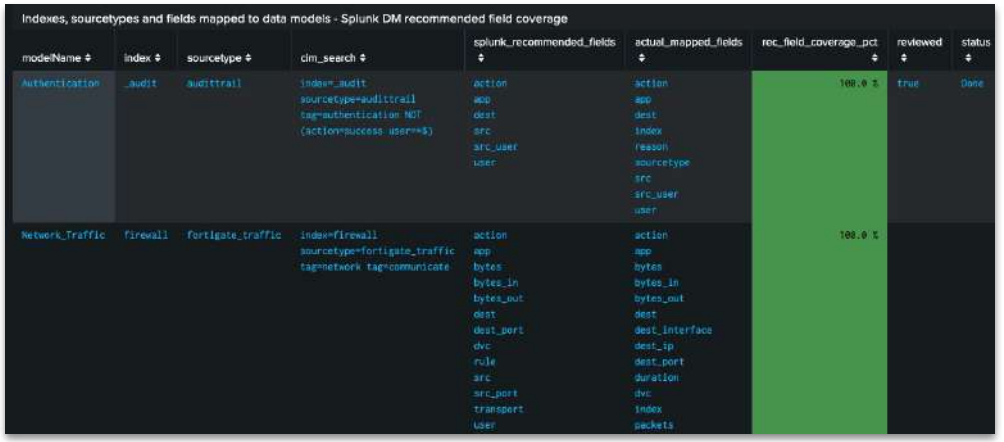
Extra Credit: Install the Data Model Wrangler App

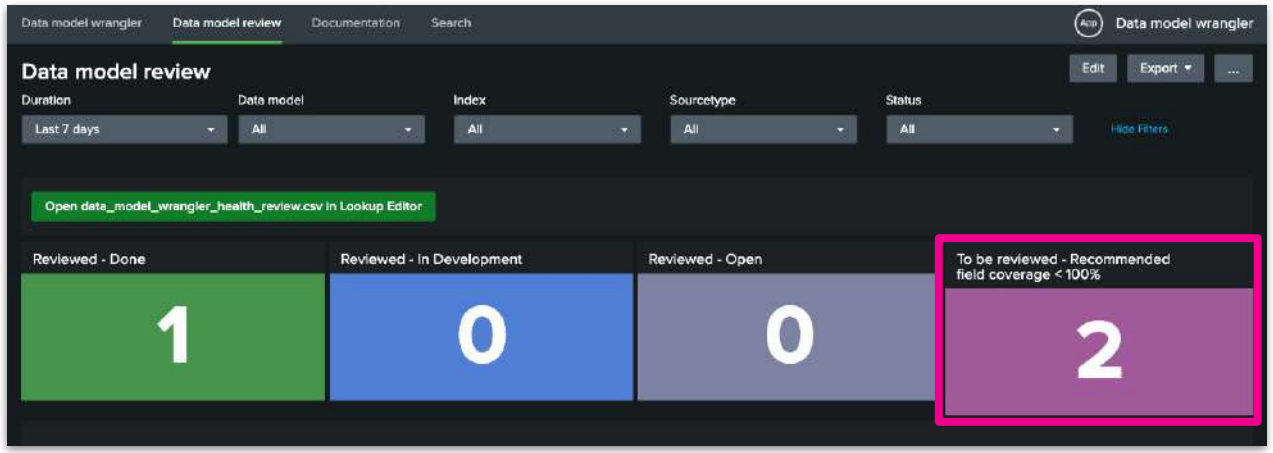
6. Review the Data Wrangler dashboards





⇩ (scroll down)





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