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splunk> .conf24

Splunk App Building 101: Learn, Create and Navigate the Ecosystem

DEV1885B

.conf24

splunk>

Bring on the future.

- Dad | Husband | Geek
- Innovative Product Leadership, Stanford GSB
- Masters in Cybersecurity, Saint Peter's University
- Photographer | help people see the world through my lens! 📸
- Cooking + Meal Prep Hacks | Designated vegetable chopper 👨‍🍳
- Occasionally helping build homes | Habitat for Humanity 🏡
- Fine tuning music on 7.2.4 🎵

"Love being in the intersection of customer-led product innovation and growing people/organization "

#MillionDataPoints

Mayur Pipaliya

Sr. Manager, GSS FDSE

Years at Splunk: 6 years 2 months

Located: San Francisco Bay Area

Patents filed: 4+

mayur@splunk.com | #team-fdse

Last 17 years: Entrepreneur → Startup Advisor / Building Products → Splunk Partner Hackathons → SOC Leader → Splunk

<link href ="
minding.my.own.
business.com">

COMARCH

Life

Also Life

Brown Brothers Harriman

#MillionDataPoints

Rafał Piekarz

Leader, GSS FDSE

Years at Splunk: 1 year 4 months

Located: Kraków. Poland

Solution designer, problem solver, ITSM trainer and practitioner, overthinker, astrophysics and general science fan 🔭

rpiekarz@splunk.com | #team-fdse

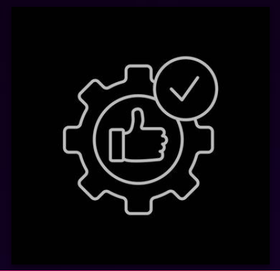
My path: App Developer → System Integrator → Project Manager → Service Manager → Tools and Automation Manager → Engineering Manager at Splunk

Splunk App Building 101

Learn, Create and Navigate the Ecosystem

Session objectives.

Understand App Development Ecosystem.



Learn best practices around Splunk App development.

Open you Apps for contributions.

Think of your next app!

Milestones

- ➔ Developer Landscape : Splunk Products
- ➔ Hands-on (GDI) : Building Splunk Add-on
- ➔ Hands-on (Visualize) : Building Splunk Dashboard App
- ➔ Best Practices : Building Apps
- ➔ Giveaways
- ➔ Q&A

Splunk Developer Landscape

Forest View: Splunk Core | SOAR | O11y

Why? Because you can!

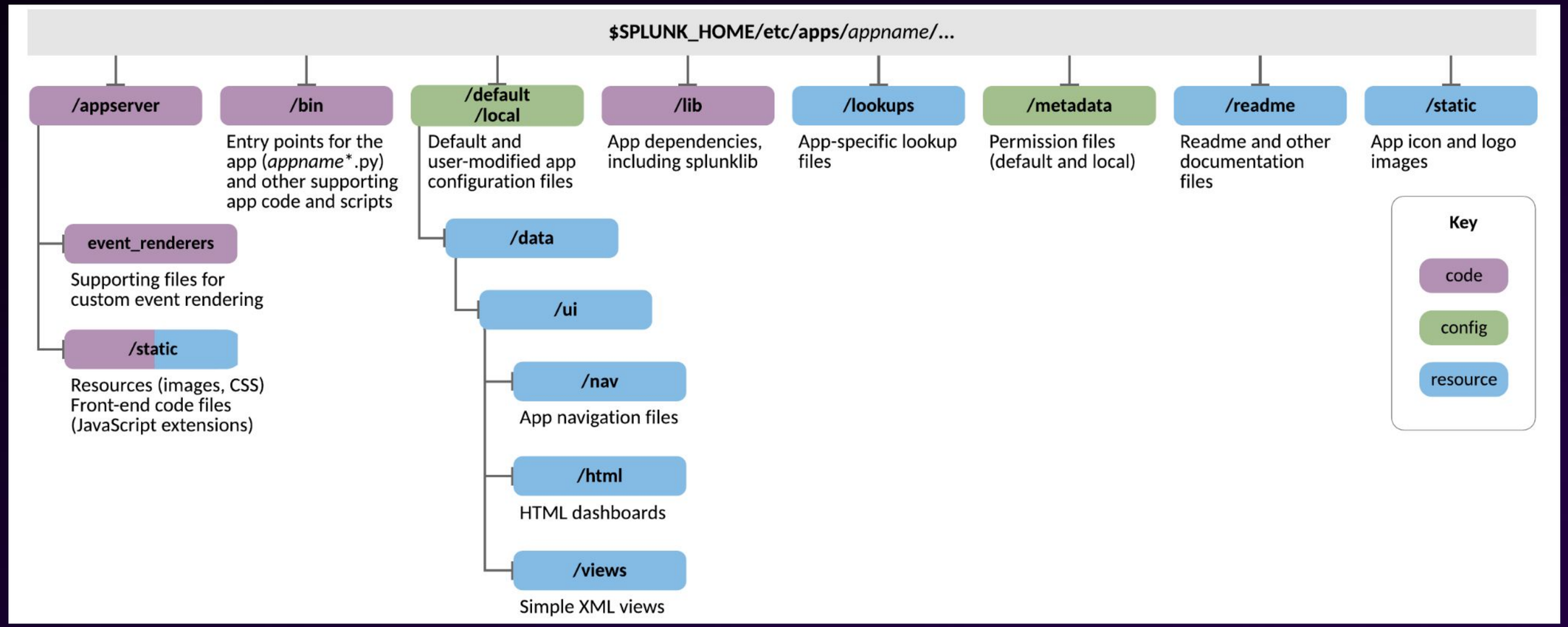
Build Custom Apps, Add-ons, Connector, and Collector.

➜ Full Stack Development

Gain insights and value from data	- Knowledge Objects
Get data into	- Modular Inputs, HEC, OTEL Collector
Create new way to visualize data	- Modular Visualizations, Splunk UI Toolkit
Manipulate data when searching	- Custom Search Commands
Integrate and extend to other software	- REST Endpoints
Take action/alert on data	- Modular Alerts
Dispatch Alerts to worker nodes	- Adaptive Response Relay
SOAR Connectors and Playbooks	- Epitome of Automation

Structure of an App

Right Files in the Right Locations



https://dev.splunk.com/enterprise/docs/developapps/createapps/appanatom

Apps vs Add-ons
(a.k.a. TAs)

Splunk Apps

- Designed to visualize and analyze data by users
- Operated primarily from search heads
- Usually include:
  - dashboards
  - reports
  - alerts
  - access management
  - navigation
  - custom search commands
  - alert actions

Splunk Add-ons

- Designed to provide specific capabilities around getting data in (GDI), data transformation, normalization and enrichment.
- Often deployed on universal/heavy forwarders, indexers
- Usually include:
  - input configuration
  - parsing and transformation
  - lookup files for data enrichment
  - scripts for modular inputs

Hands-on Ahead!

.conf24

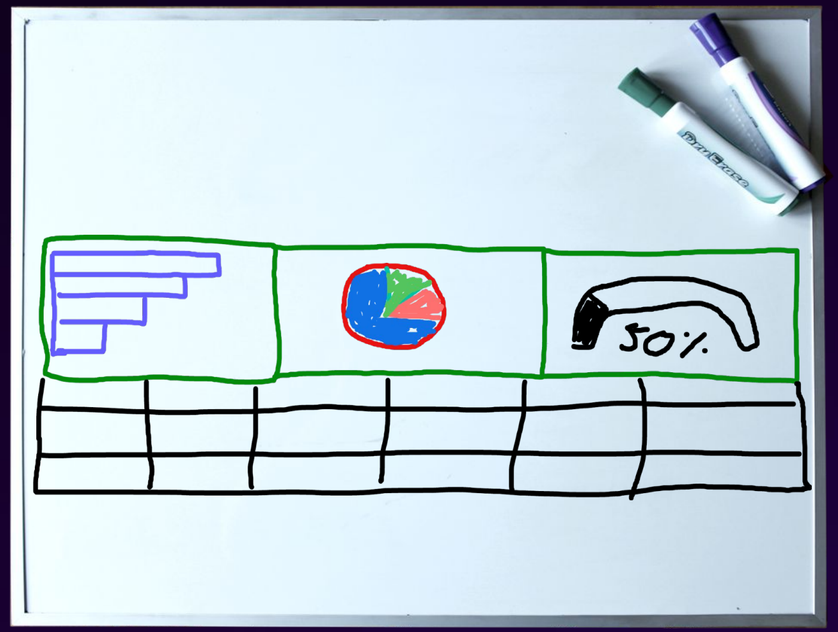
splunk>

Bring on the future.

Scenario - activities for bored people


```
{
    "accessibility": "0.1",
    "activity": "Study a foreign language",
    "key": 12312123,
    "link": "",
    "participants": 1,
    "price": 0,
    "type": "education"
}
```


Get data in - API endpoint



Visualize data for the analysis

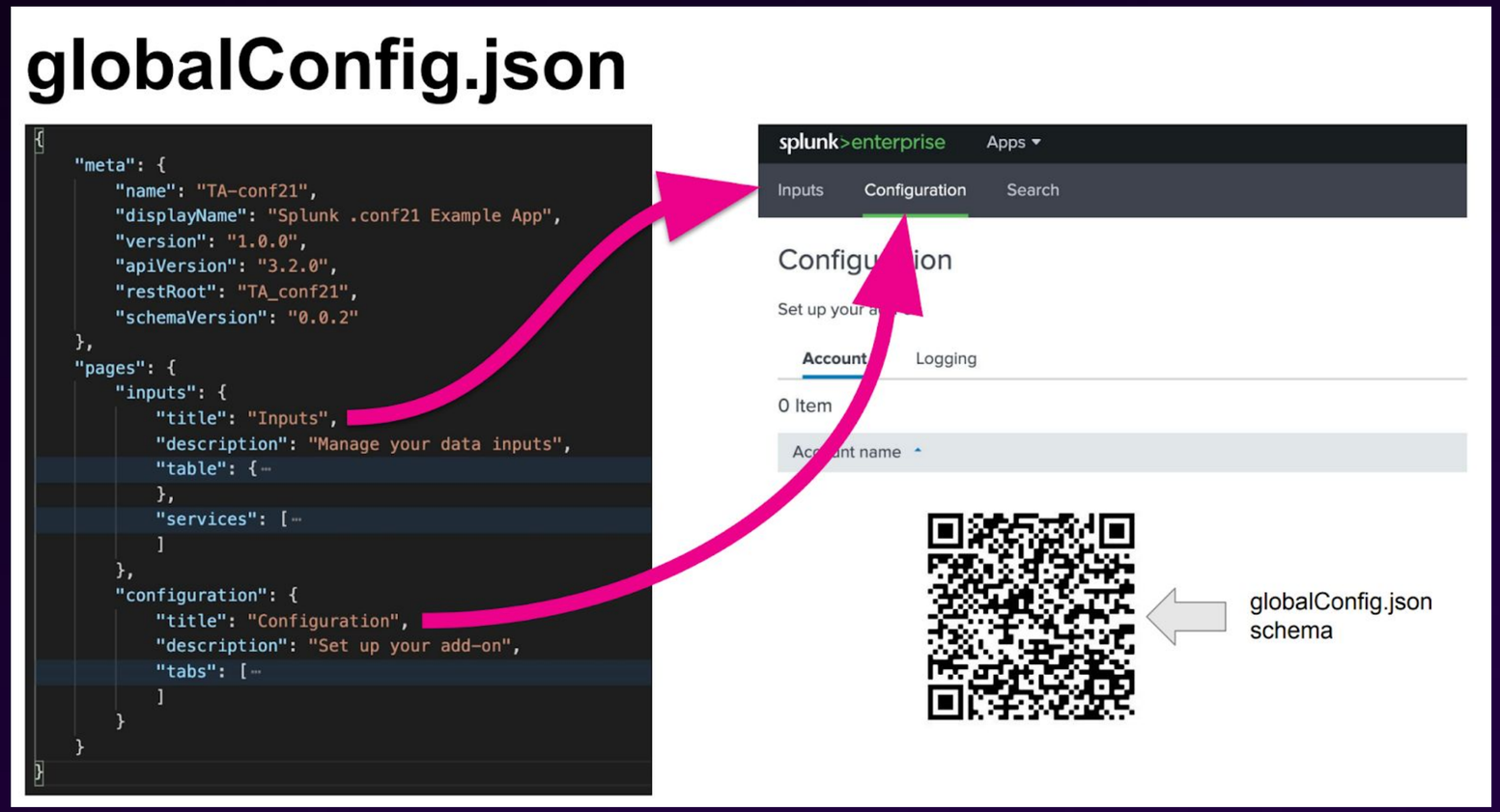
https://pixabay.com/photos/whiteboard-dry-erase-marker-blank-2903269/

Universal Configuration Console

(a.k.a. **UCC**)

- A framework for add-on generation
- UI framework based on React
- Powered by Splunk libraries:

  solnlib and **splunktaucclib**



Add-on Building Checklist

To make your building experience easier, use **Splunk Web UI** and **Online IDE**!

Web-based development
(recommended)

- Web browser
  - Splunk Web UI
  - code-server

Local development

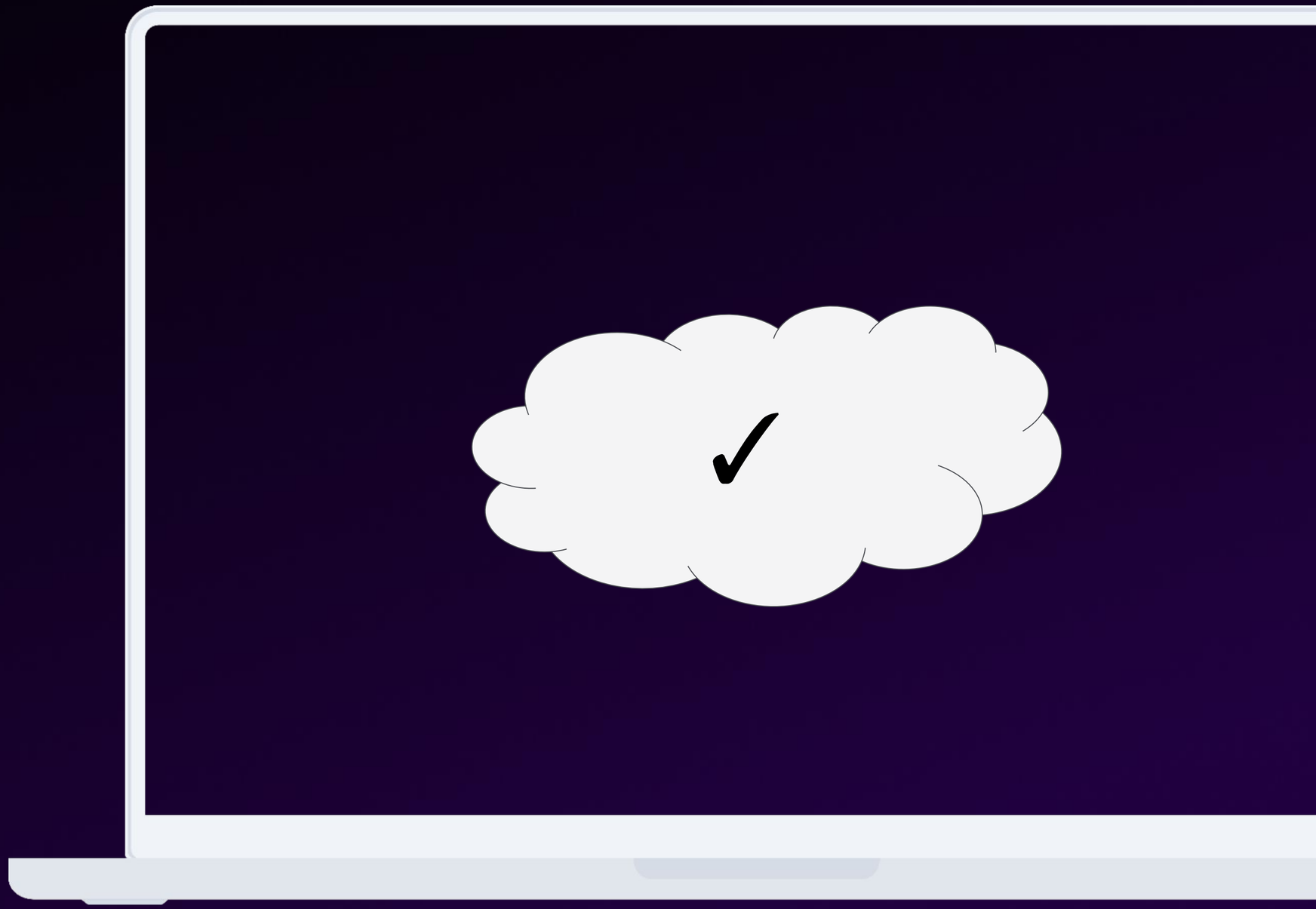
- Web browser
  - Splunk Web UI (SHOW)
- Python 3.8+
- Python venv
- Ability to install software on your PC
- IDE (e.g. VSCode) or text file editor
- (optional) Splunk Extension for VSCode

Lab Guide and Supplementary Materials

https://splk.it/dev1885b-resources

Exercise 1+2

Check your environment

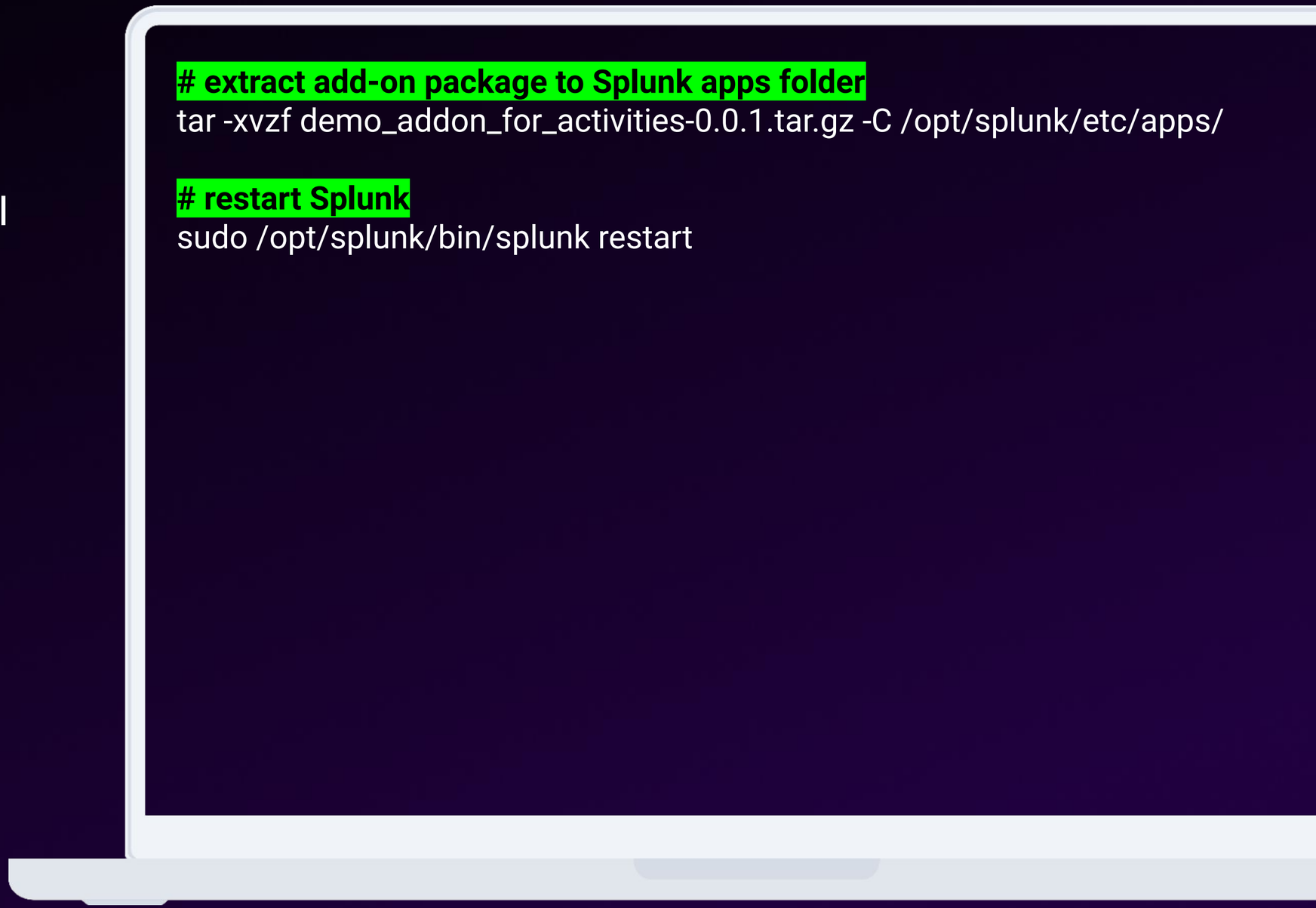


Initialize and Build Your Add-on

```
# create and activate venv for your app development
python3 -m venv .venv
source .venv/bin/activate

# install UCC Framework on you venv
pip install splunk-add-on-ucc-framework=="5.43.0"

# initialize your add-on
ucc-gen init --addon-name "demo_addon_for_activities" --addon-display-name
"Demo Add-on for Activities" --addon-input-name activities

# initial build
cd demo_addon_for_activities
ucc-gen build --ta-version "0.0.1"

# package the add-on to be able to install it
ucc-gen package --path ./output/demo_addon_for_activities
```

Install Add-on

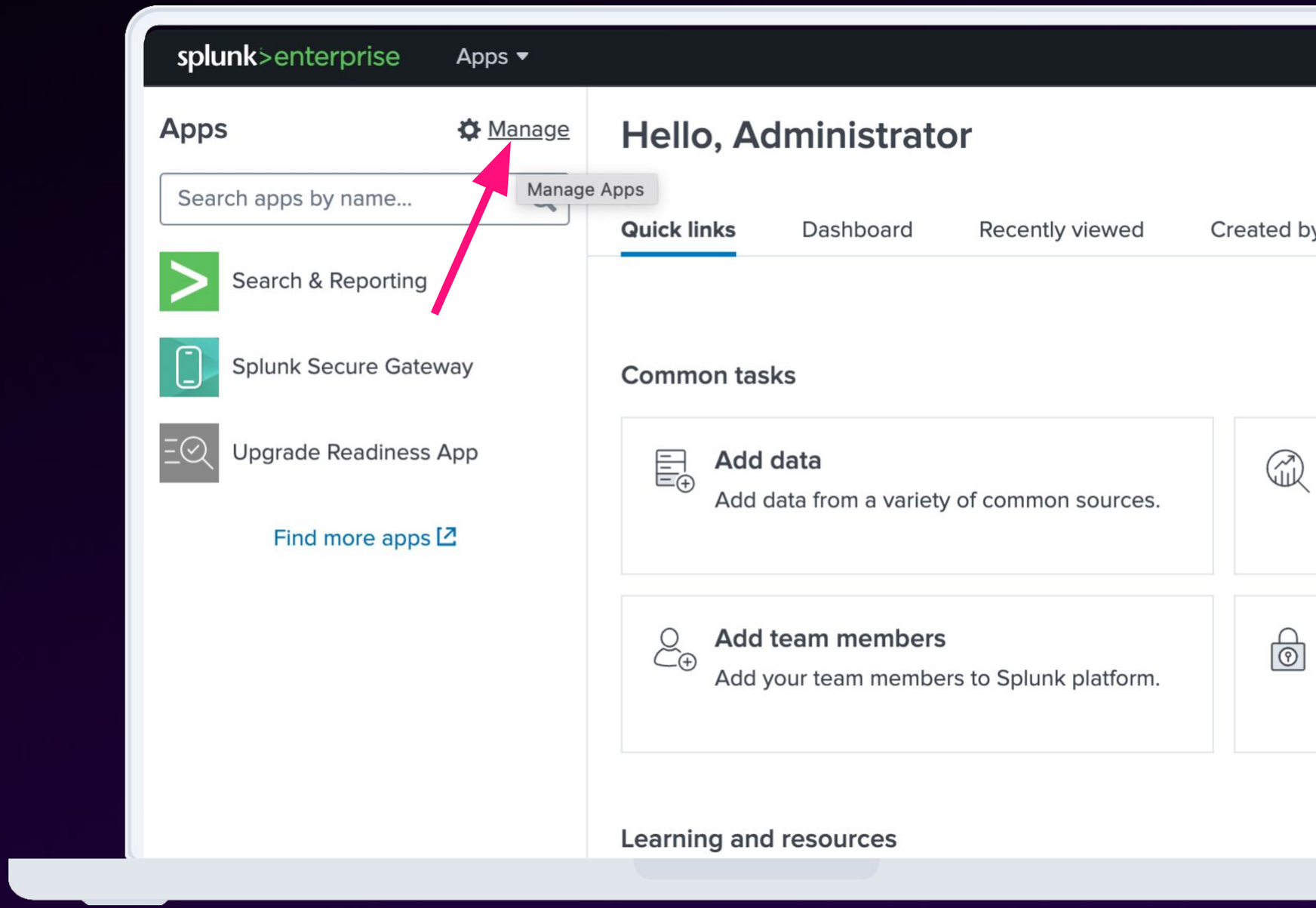
Code Server IDE > Terminal



Install Add-on

Splunk UI - Step 1

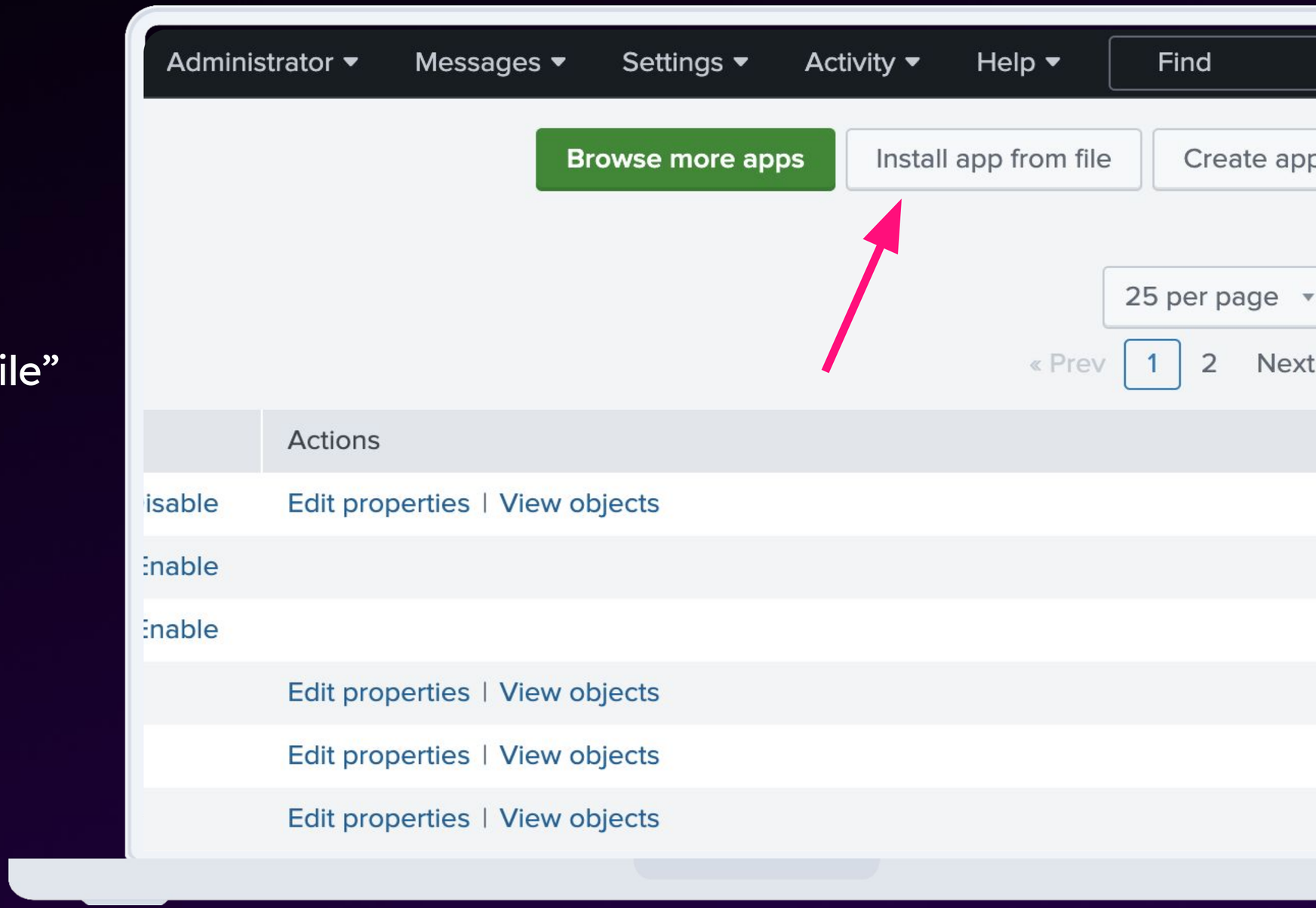
Let’s click on “Manage”.



Install Add-on

Splunk UI - Step 2

Click on “Install app from file” button.

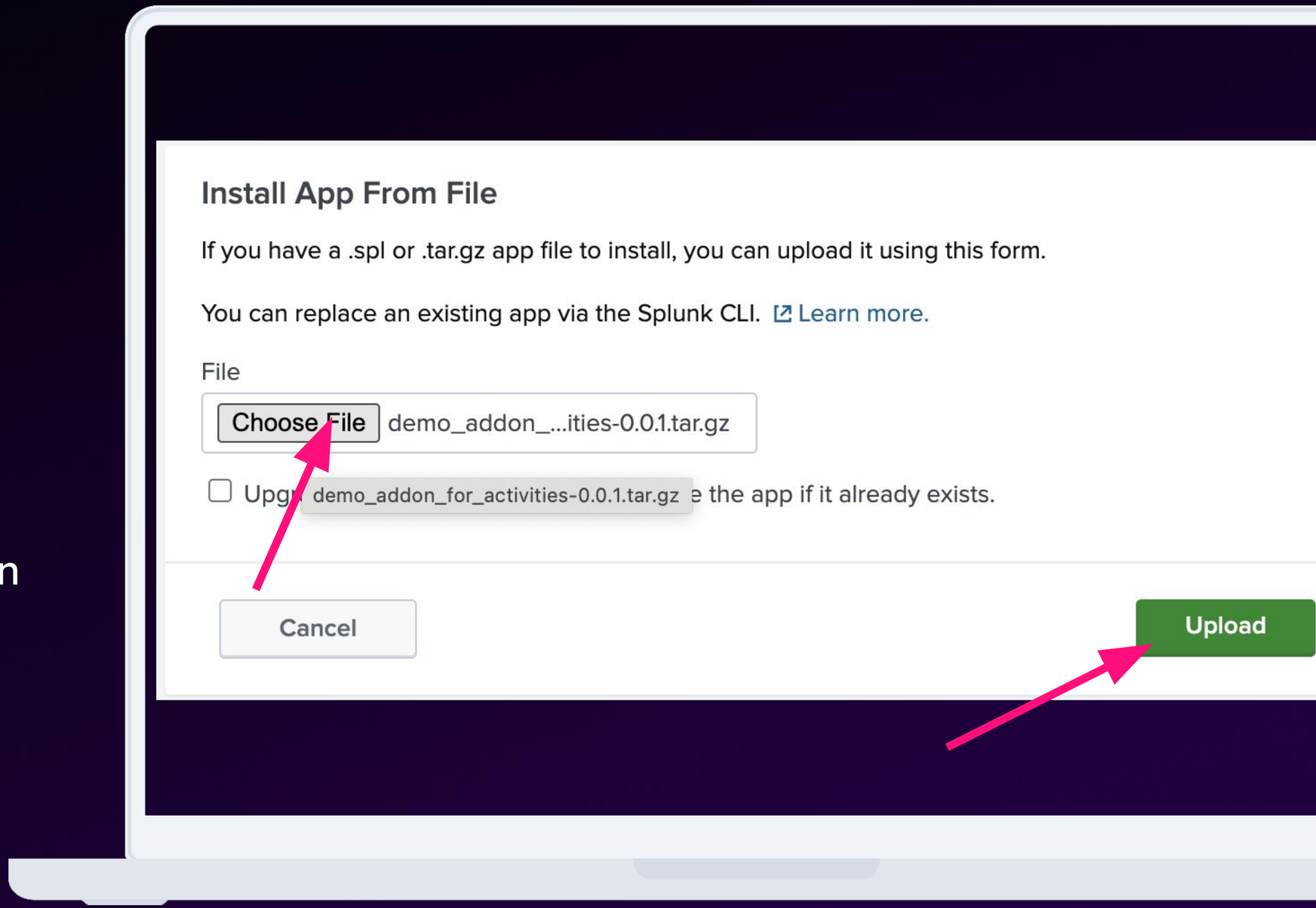


Install Add-on

Splunk UI - Step 3

Click on “Choose File” to browse TAR.GZ file.

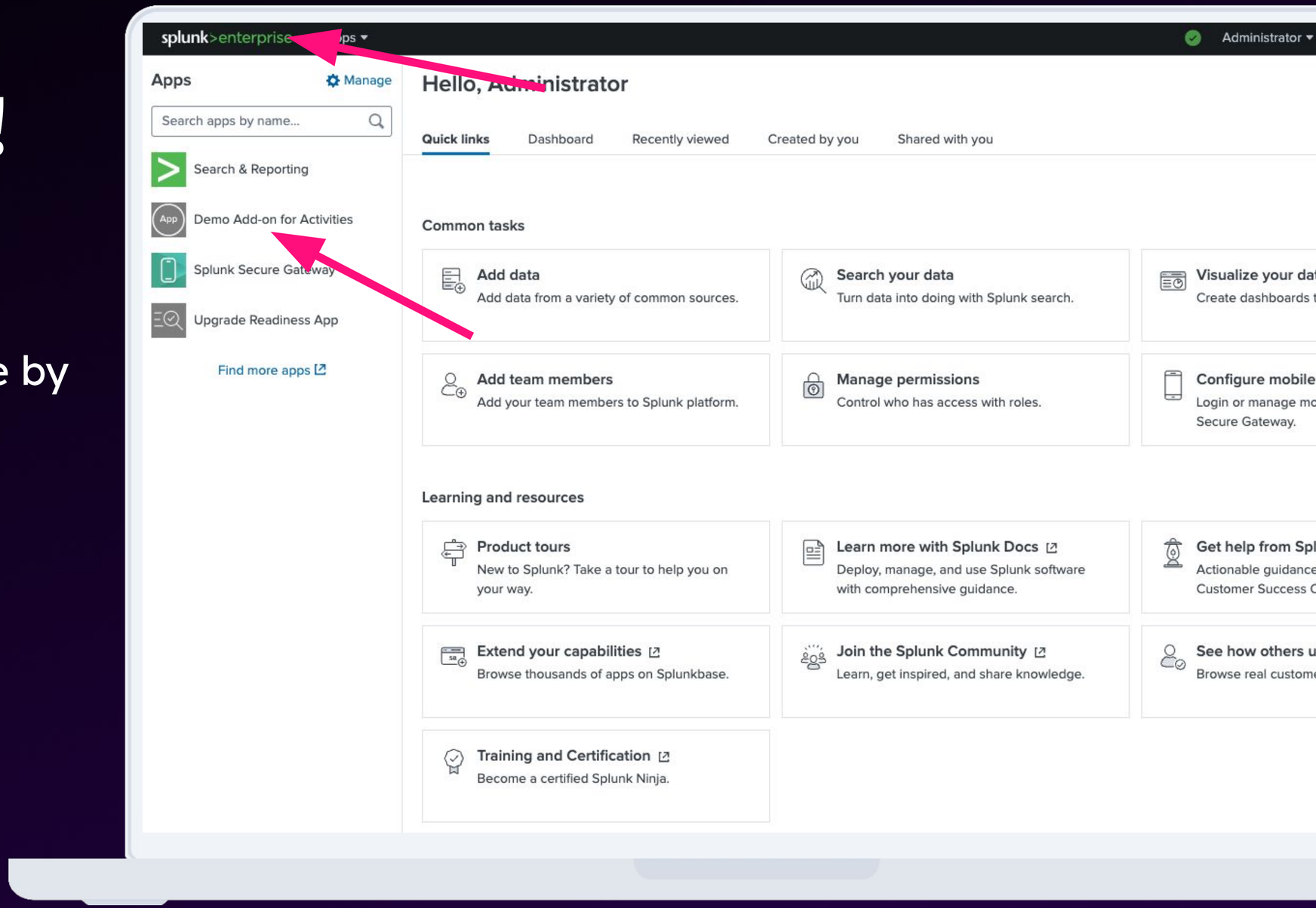
Once app is chosen, click on “Upload” button.



Let’s Check the Progress!

Let’s Go back to main page by clicking on **top-left Splunk logo.**

Add-on should be installed!



Add-on TODO

➜ Configuration

- We want to:
  - Set up account for an endpoint
- We need:
  - URL field (with validation)

Inputs

- We want to:
  - Get the data from activities endpoint
  - Ingest to a specified index
  - sourcetype = activities
- We need:
  - Account field (list of configured accounts)
  - Index field (selection from available indexes)
  - Sourcetype field (free text with validation)

Python

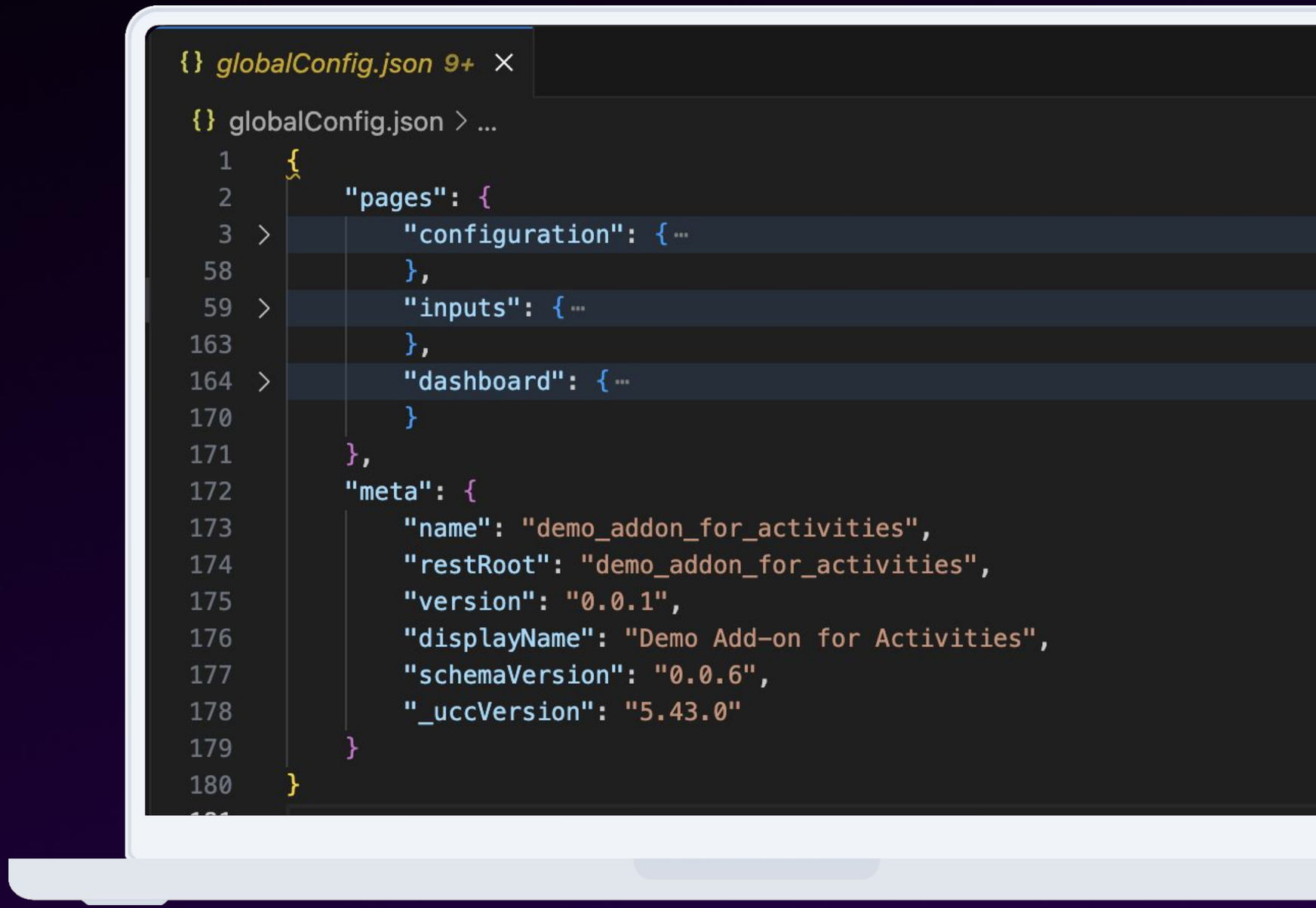
- We want to:
  - Collect data from an endpoint
  - Ingest data to Splunk
- We need:
  - read configuration data from account and inputs
  - handle request to the endpoint
  - handle writing events to Splunk

Exercise 3

Edit

globalConfig.json

3 main elements of globalConfig schema.

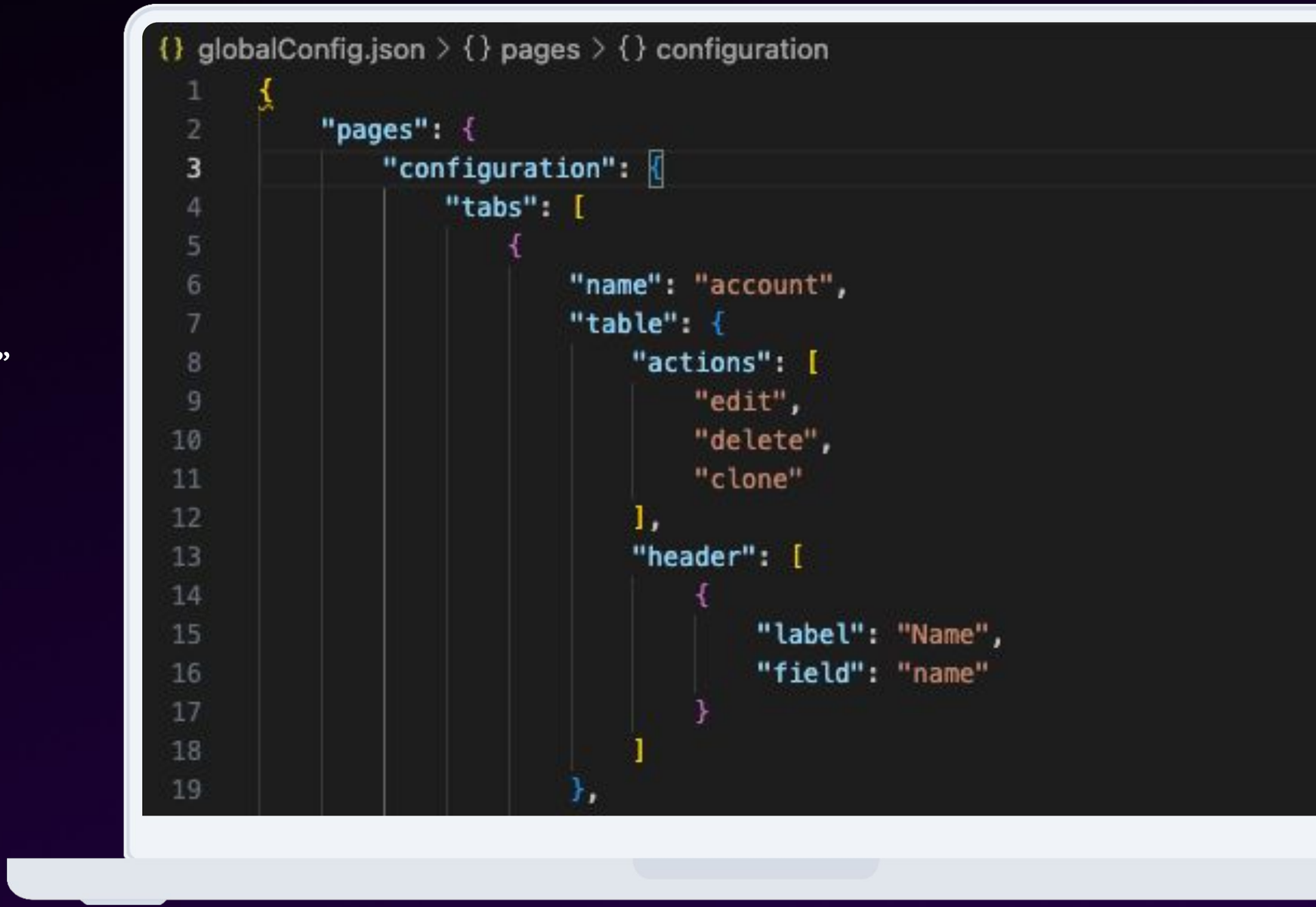


Edit

globalConfig.json

Observe “pages” > “configuration” > “tabs” > “accounts”

(no change!)



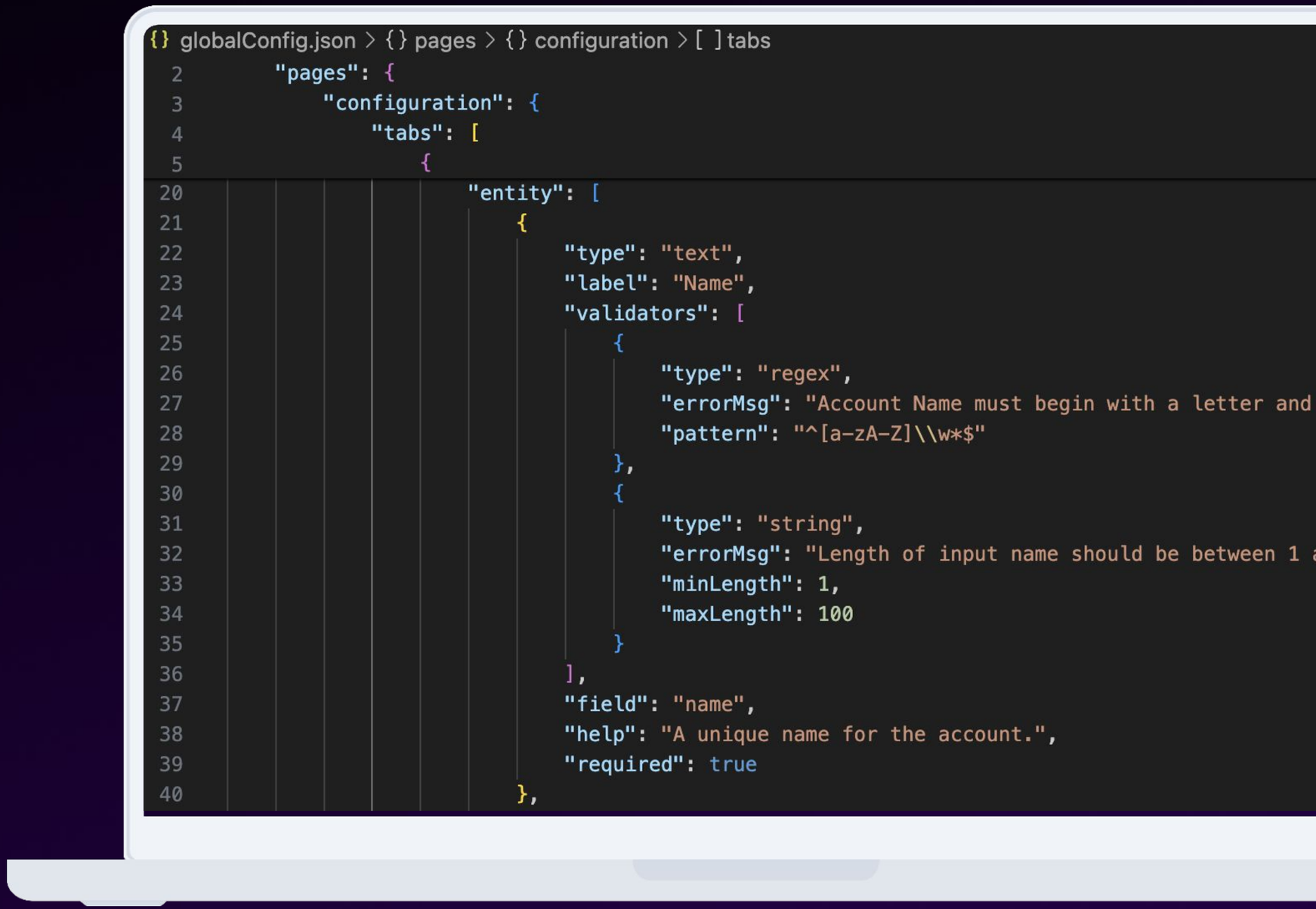
Edit

globalConfig.json

Configure entities

- Account Name field

(no change!)



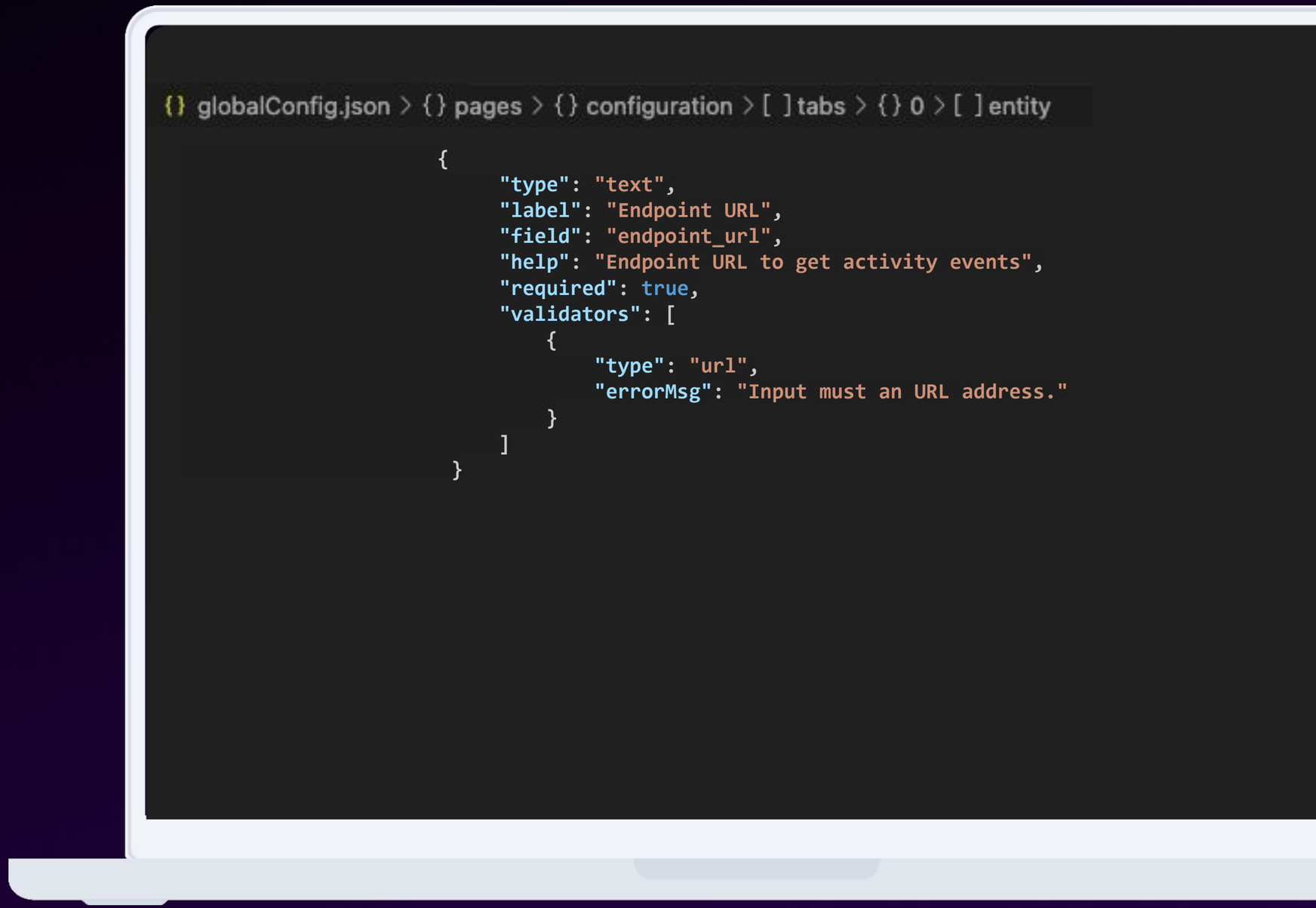
Edit

globalConfig.json

Configure entities

- Endpoint URL field

(replacing API Key field)



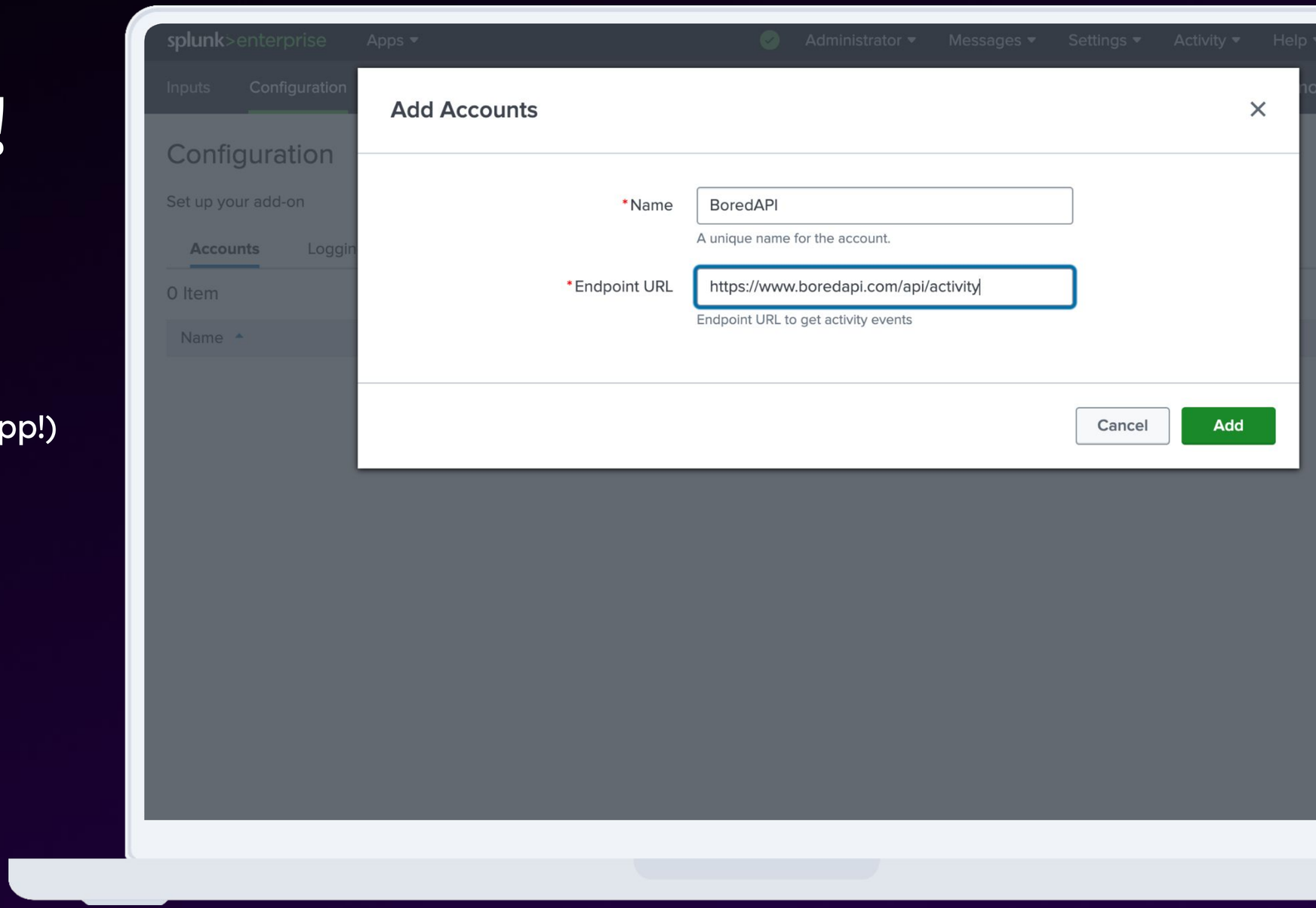
Exercise 3 | Follow the lab guide

Let’s Check the Progress!

Build new version 0.0.2

Package and reinstall (Upgrade app!)

Create an account ->



Add-on TODO

✅ Configuration

- We want to:
  - Set up account for an endpoint
- We need:
  - URL field (with validation)

Inputs

- We want to:
  - Get the data from activities endpoint
  - Ingest to a specified index
  - sourcetype = activities
- We need:
  - Account field (list of configured accounts)
  - Index field (selection from available indexes)
  - Sourcetype field (free text with validation)

Python

- We want to:
  - Collect data from an endpoint
  - Ingest data to Splunk
- We need:
  - read configuration data from account and inputs
  - handle request to the endpoint
  - handle writing events to Splunk

Exercise 4

Exercise 4 | Follow the lab guide

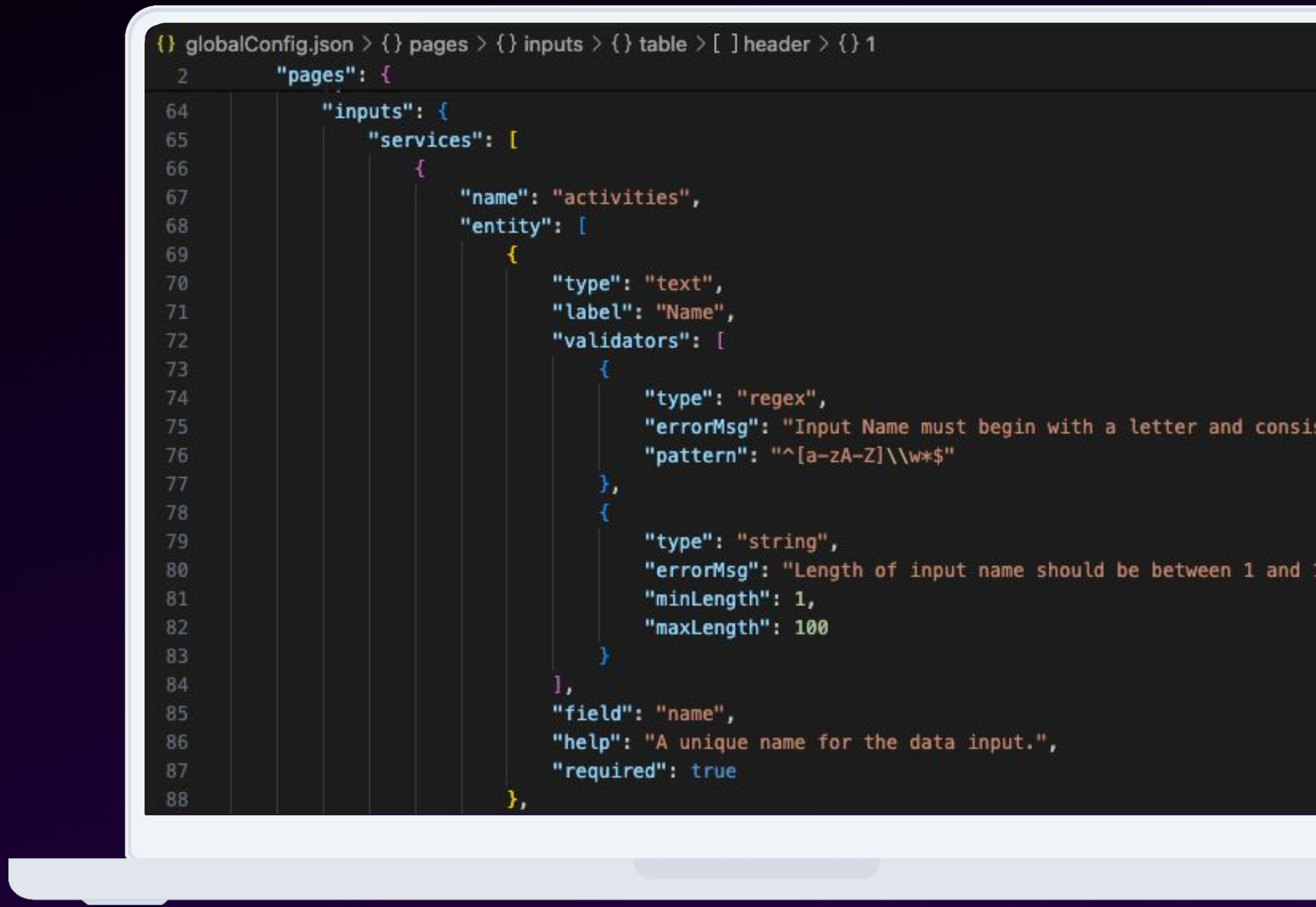
Observe

globalConfig.json

Configure inputs for activities

- Input Name field

(no changes!)



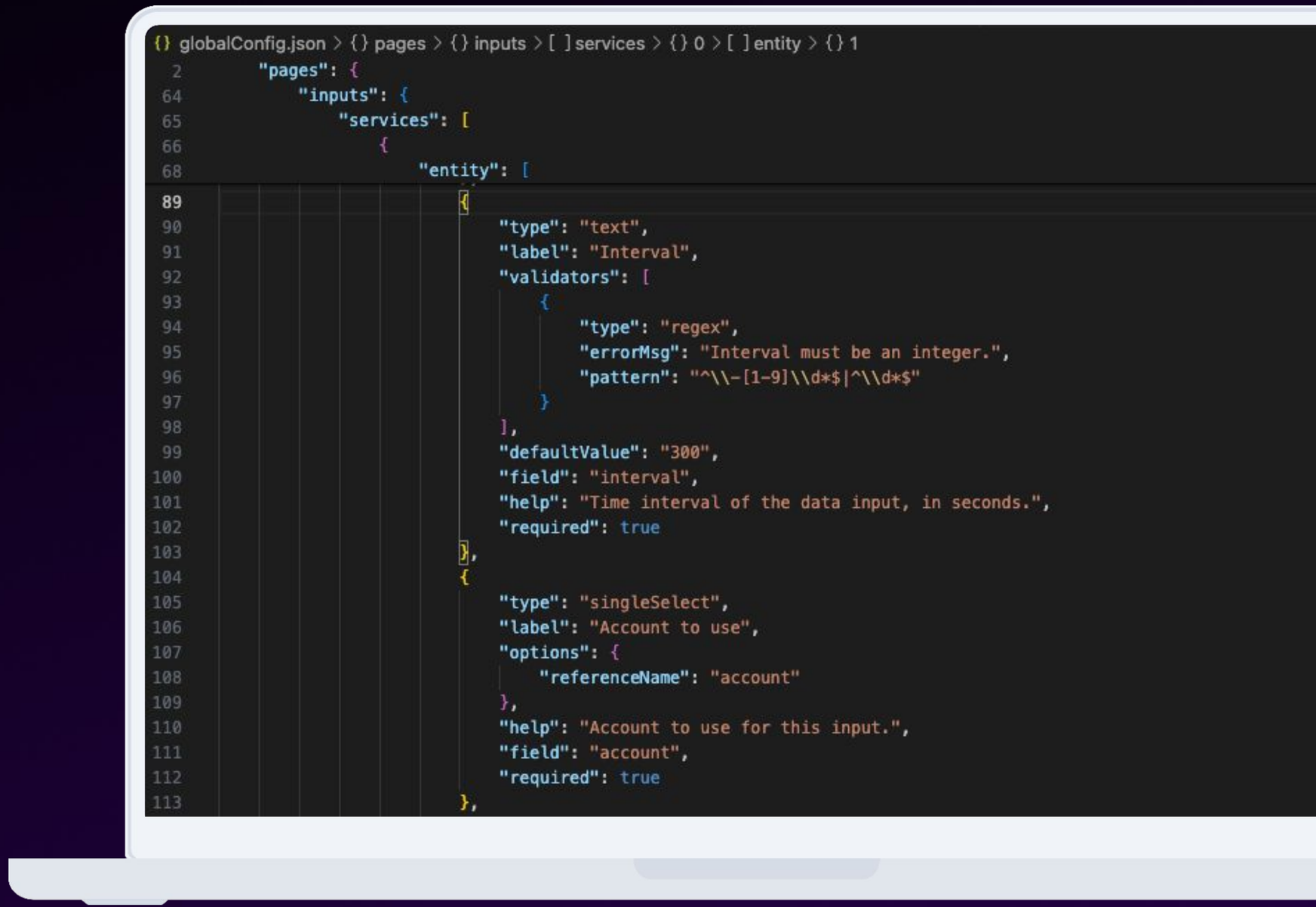
Observe

globalConfig.json

Configure inputs for activities

- Interval field
- Account to use field

(no changes!)



Edit

globalConfig.json

Configure inputs for activities

- Index field

(singleSelect element)

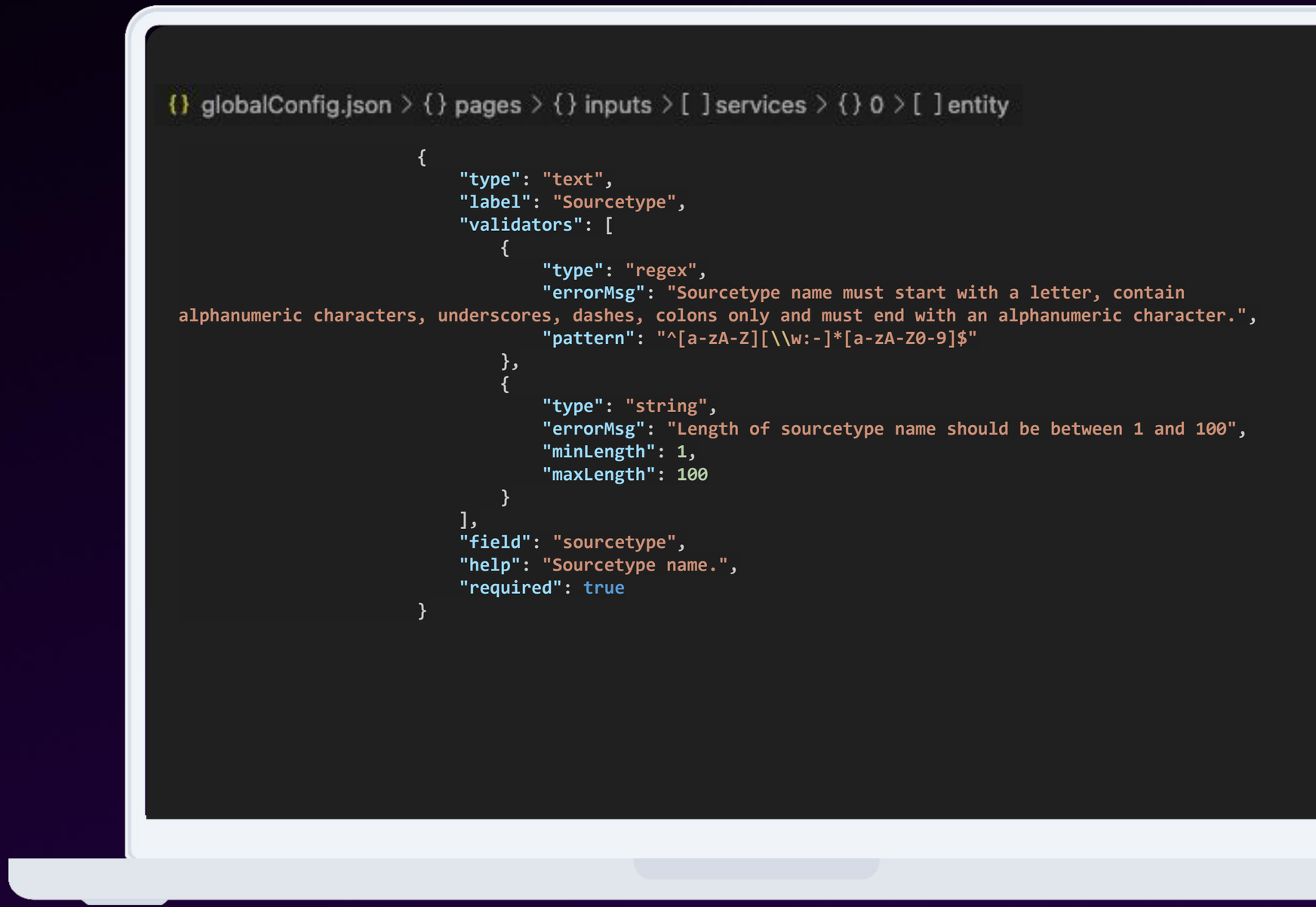
Edit

globalConfig.json

Configure inputs for activities

- Sourcetype field

(text element with validators)



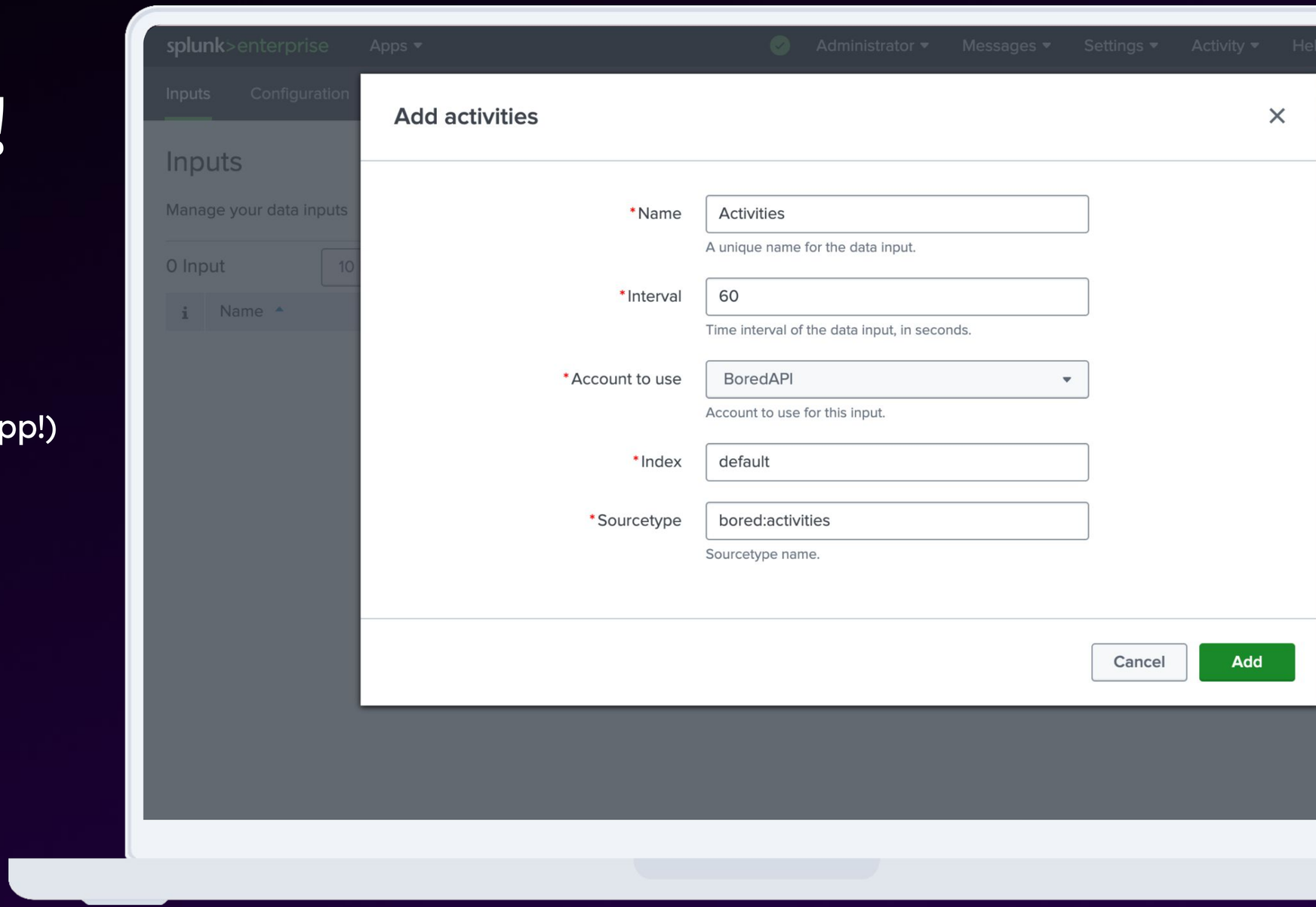
Exercise 4 | Follow the lab guide

Let’s Check the Progress!

Build new version 0.0.3

Package and reinstall (Upgrade app!)

Create an input ->



Add-on TODO

✅ Configuration

- We want to:
  - Set up account for an endpoint
- We need:
  - URL field (with validation)

✅ Inputs

- We want to:
  - Get the data from activities endpoint
  - Ingest to a specified index
  - sourcetype = activities
- We need:
  - Account field (list of configured accounts)
  - Index field (selection from available indexes)
  - Sourcetype field (free text with validation)

➜ Python

- We want to:
  - Collect data from an endpoint
  - Ingest data to Splunk
- We need:
  - read configuration data from account and inputs
  - handle request to the endpoint
  - handle writing events to Splunk

Exercise 5

Edit

package/bin/activities.py

`import requests`

Create `get_account_property` function

Replace `get_data_from_api` function

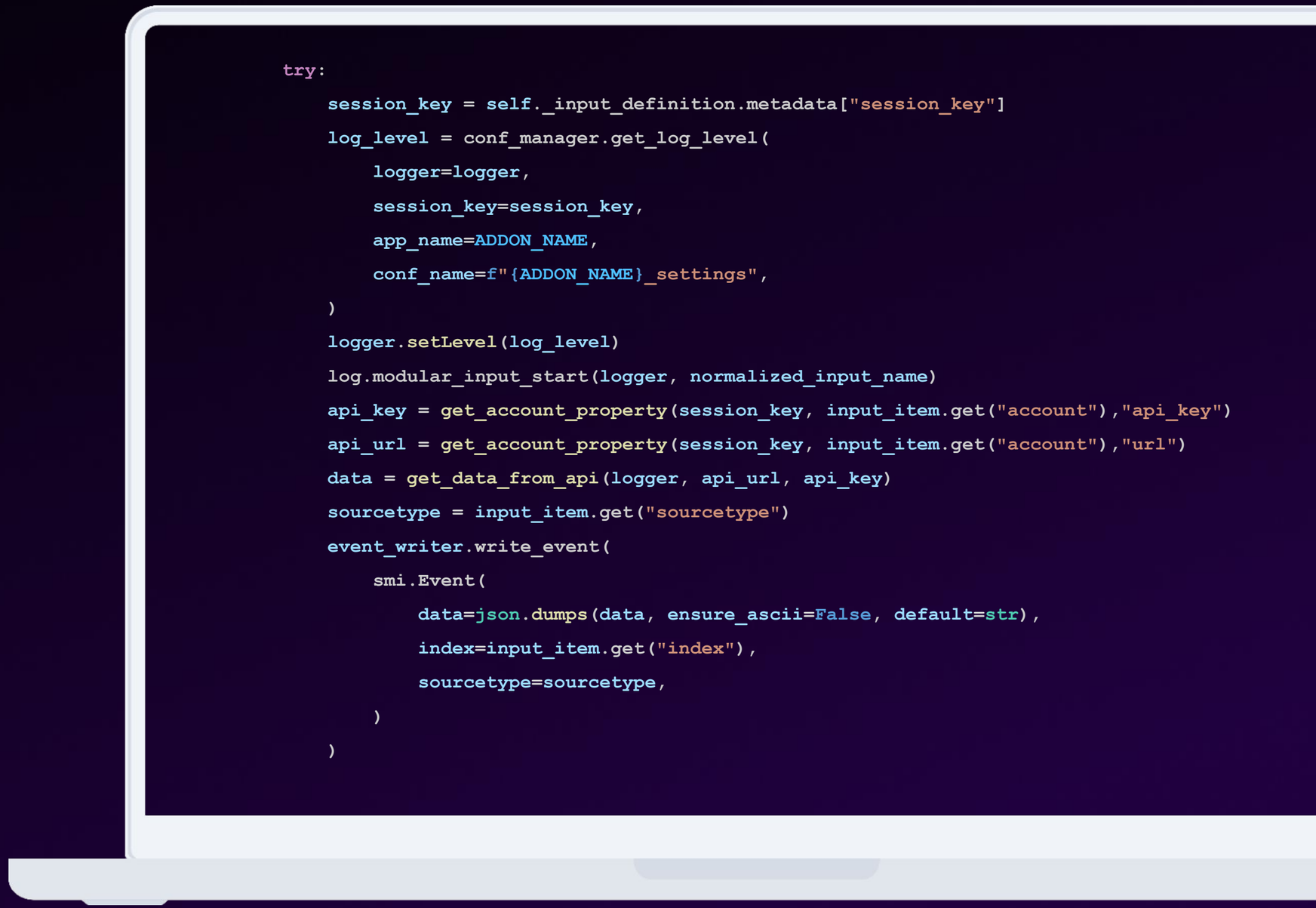
```
def get_account_property(session_key: str, account_name: str, property_name: str):
    cfm = conf_manager.ConfManager(
        session_key,
        ADDON_NAME,
        realm=f"__REST_CREDENTIAL__#{ADDON_NAME}#configs/conf-demo_addon_for_activities_account",
    )
    account_conf_file = cfm.get_conf("demo_addon_for_activities_account")
    return account_conf_file.get(account_name).get(property_name)

def get_data_from_api(logger: logging.Logger, url: str, api_key: str):
    logger.info("Getting data from an external API")
    if url == None:
        raise Exception("Empty URL. Check configuration.")
    data_from_api = requests.get(url=url).json()
    return data_from_api
```

Edit

package/bin/activities.py

Modify `stream_events` function

- get `api_url` property
- get `data` from url
- get `sourcetype` property
- write event to `index`



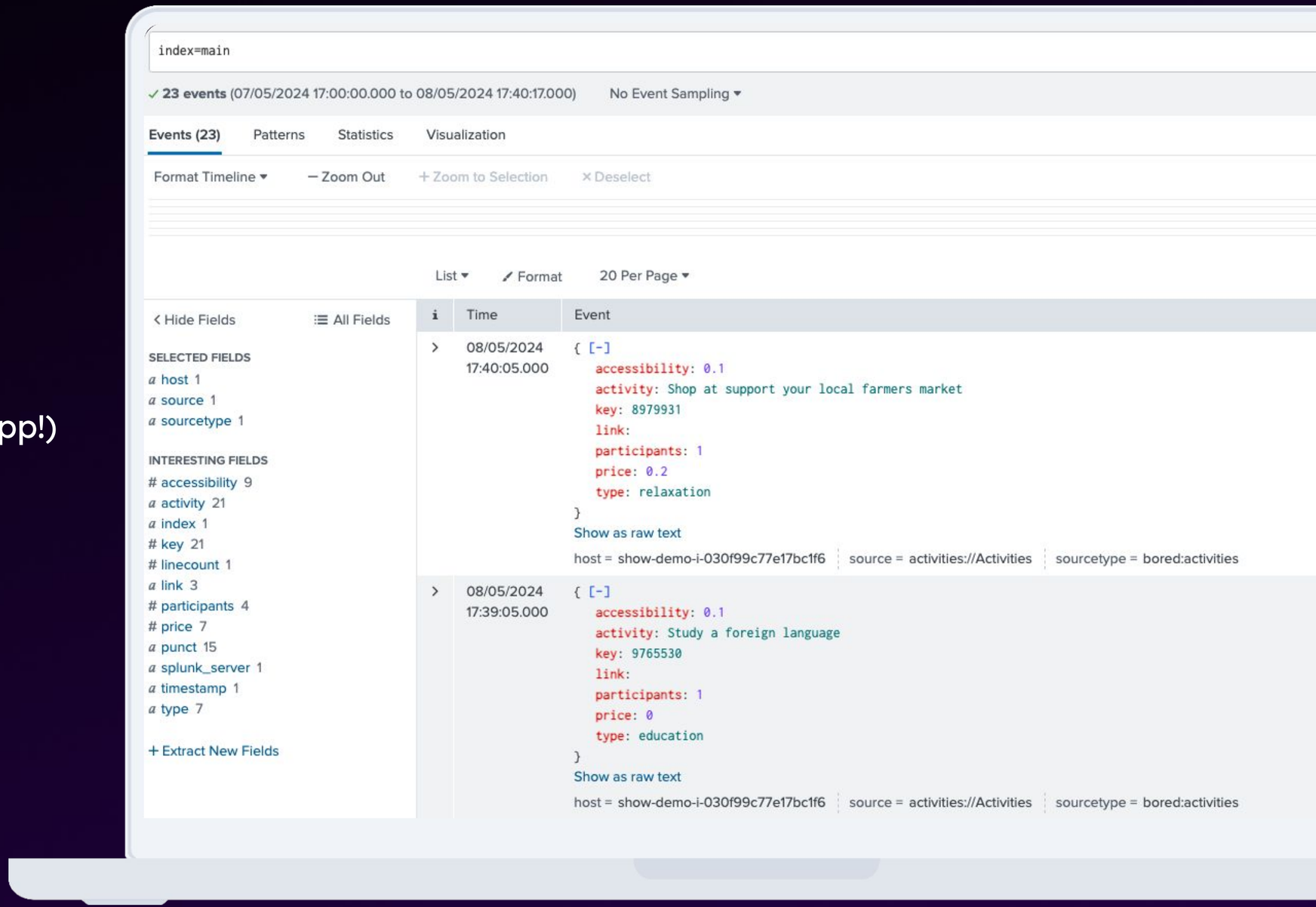
```
try:
    session_key = self._input_definition.metadata["session_key"]
    log_level = conf_manager.get_log_level(
        logger=logger,
        session_key=session_key,
        app_name=ADDON_NAME,
        conf_name=f"{ADDON_NAME}_settings",
    )
    logger.setLevel(log_level)
    log.modular_input_start(logger, normalized_input_name)
    api_key = get_account_property(session_key, input_item.get("account"),"api_key")
    api_url = get_account_property(session_key, input_item.get("account"),"url")
    data = get_data_from_api(logger, api_url, api_key)
    sourcetype = input_item.get("sourcetype")
    event_writer.write_event(
        smi.Event(
            data=json.dumps(data, ensure_ascii=False, default=str),
            index=input_item.get("index"),
            sourcetype=sourcetype,
        )
    )
```

Checking Progress... Again!

Build new version 0.0.4

Package and reinstall (Upgrade app!)

Search for data in index=main



Add-on TODO

✅ Configuration

- We want to:
  - Set up account for an endpoint
- We need:
  - URL field (with validation)

✅ Inputs

- We want to:
  - Get the data from activities endpoint
  - Ingest to a specified index
  - sourcetype = activities
- We need:
  - Account field (list of configured accounts)
  - Index field (selection from available indexes)
  - Sourcetype field (free text with validation)

✅ Python

- We want to:
  - Collect data from an endpoint
  - Ingest data to Splunk
- We need:
  - read configuration data from account and inputs
  - handle request to the endpoint
  - handle writing events to Splunk

Splunk App development - summary

- Use UCC Framework to speed-up the development and for aesy code management
- Bring any data from a web endpoint or other sources to Splunk
- Customize configuration elements to adapt to your specific needs

Create an App

Splunk Core | Splunk® SOAR | O11y

.conf24

splunk>

Bring on the future.

“If you torture the data long enough, it will confess to anything…”

Ronald H. Coase,
Essays on Economics and Economists, 1994

Dashboard App TODO

➜ Create an Empty App

- We want to:
  - Build a dedicated app for activities
- We need:
  - Splunk app to manage our knowledge objects

Build a Dashboard

- We want to:
  - Create a dashboard to visualize data on activities
- We need:
  - Splunk searches to query data (SPL)
  - Splunk dashboard with diagrams and tables to present data

Customize Navigation

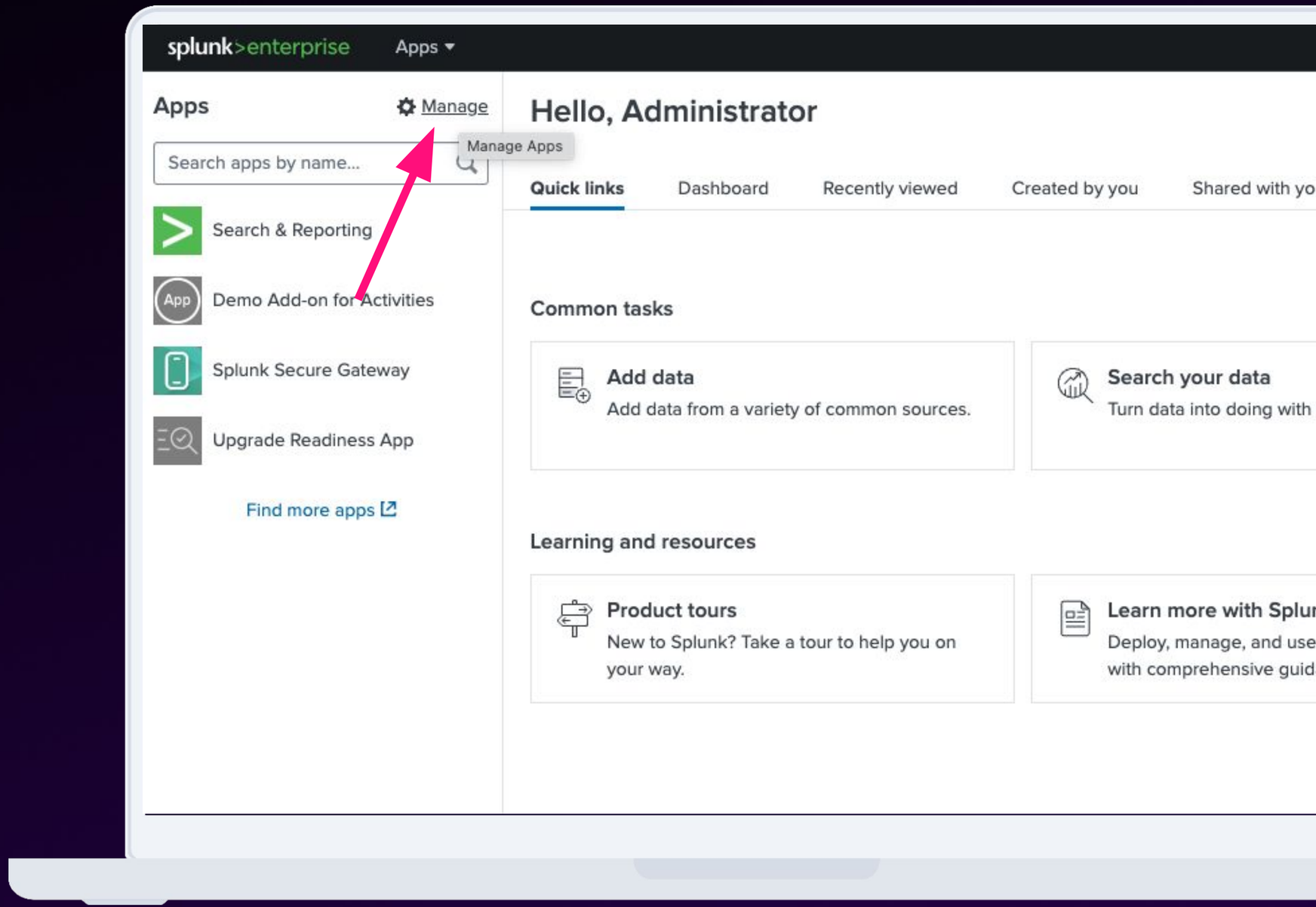
- We want to:
  - Show dashboard on a default view in this app
- We need to:
  - Change default view for the app

Exercise 6+7

Configure

Create new app

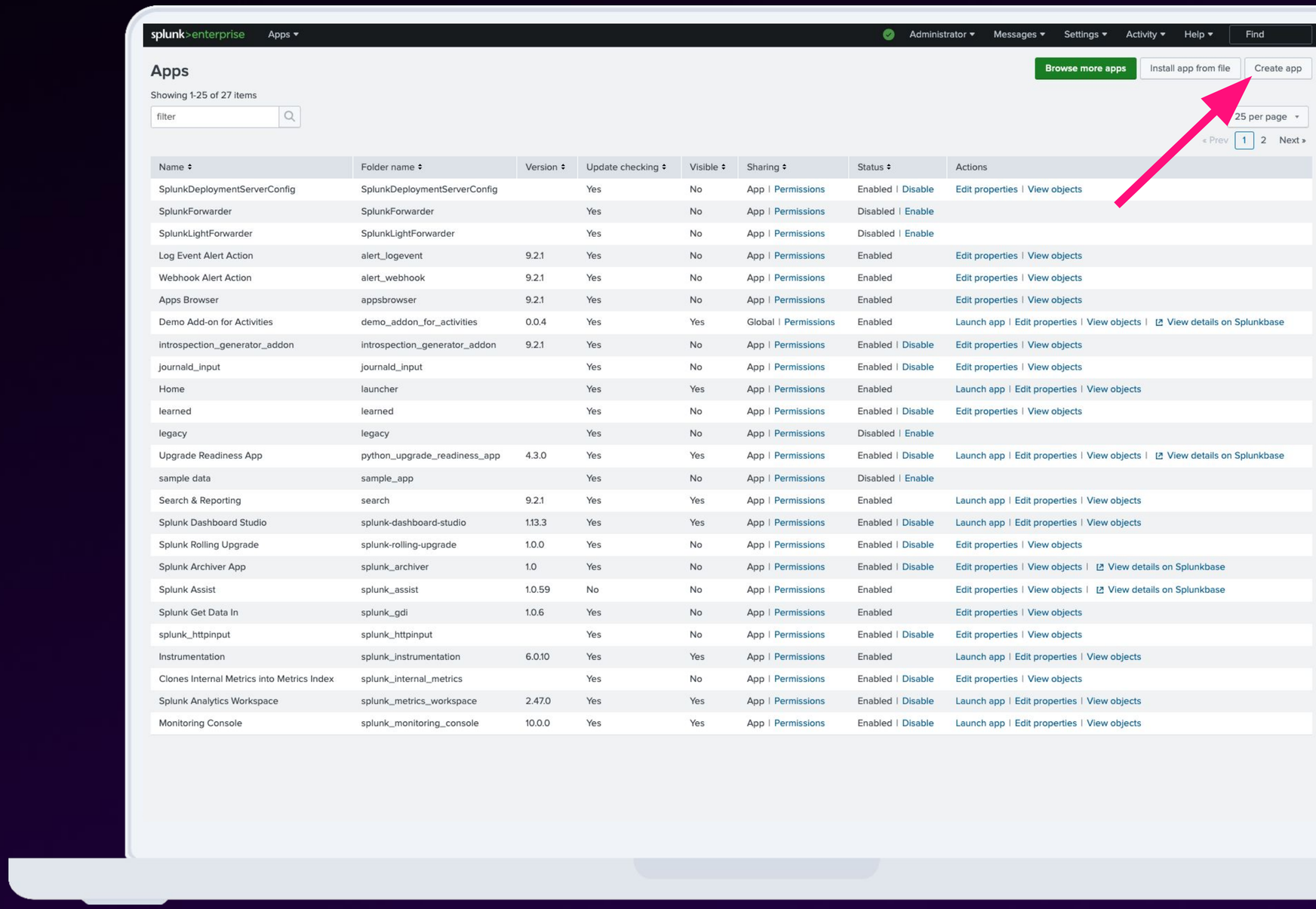
Click on “Manage: button



Configure

Create new app

Click on “Create app”

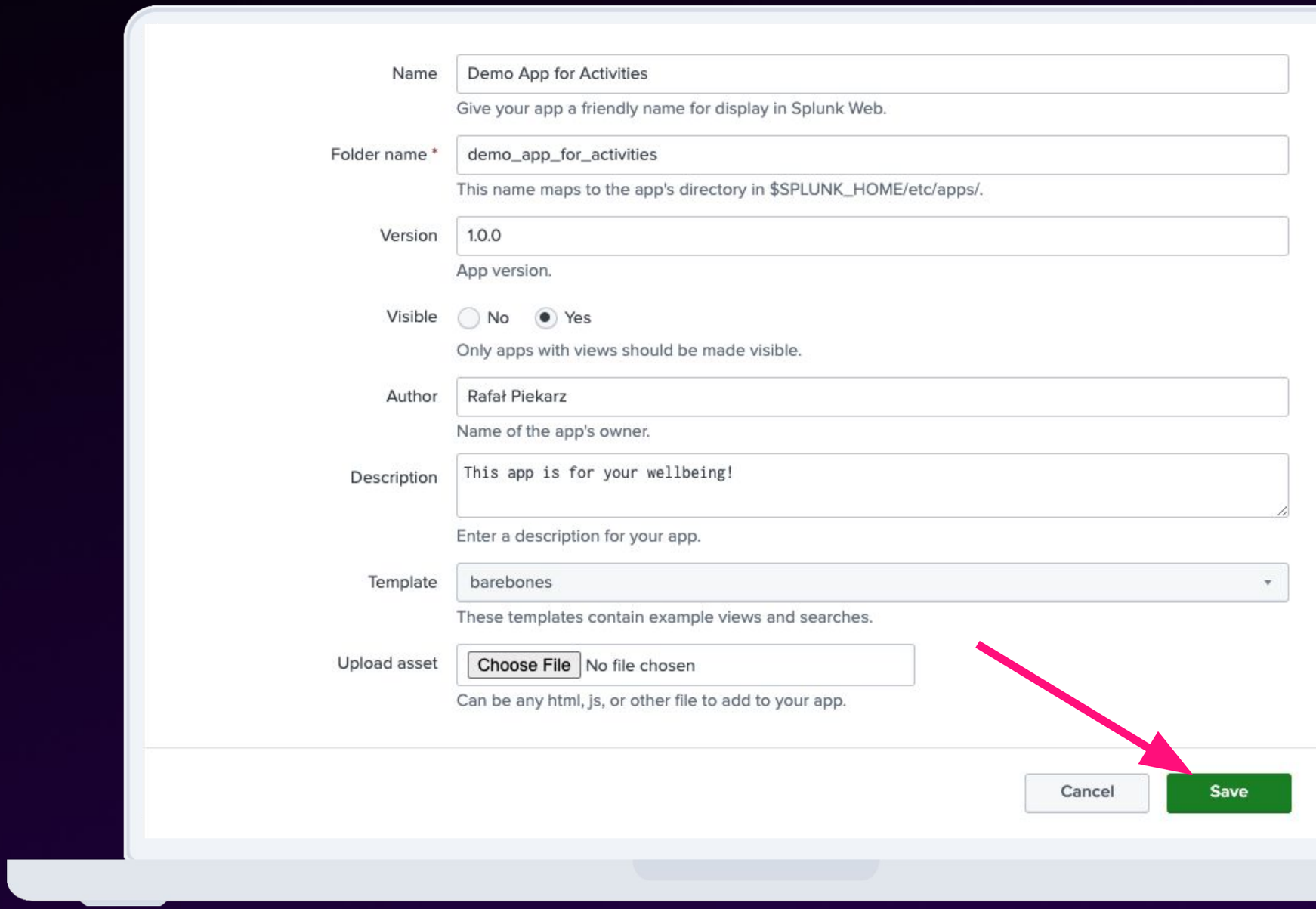


Name	Folder name	Version	Update checking	Visible	Sharing	Status	Actions
SplunkDeploymentServerConfig	SplunkDeploymentServerConfig		Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
SplunkForwarder	SplunkForwarder		Yes	No	App | Permissions	Disabled | Enable	
SplunkLightForwarder	SplunkLightForwarder		Yes	No	App | Permissions	Disabled | Enable	
Log Event Alert Action	alert_logevent	9.2.1	Yes	No	App | Permissions	Enabled	Edit properties | View objects
Webhook Alert Action	alert_webhook	9.2.1	Yes	No	App | Permissions	Enabled	Edit properties | View objects
Apps Browser	appsbrowser	9.2.1	Yes	No	App | Permissions	Enabled	Edit properties | View objects
Demo Add-on for Activities	demo_addon_for_activities	0.0.4	Yes	Yes	Global | Permissions	Enabled	Launch app | Edit properties | View objects | View details on Splunkbase
introspection_generator_addon	introspection_generator_addon	9.2.1	Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
journald_input	journald_input		Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
Home	launcher		Yes	Yes	App | Permissions	Enabled	Launch app | Edit properties | View objects
learned	learned		Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
legacy	legacy		Yes	No	App | Permissions	Disabled | Enable	
Upgrade Readiness App	python_upgrade_readiness_app	4.3.0	Yes	Yes	App | Permissions	Enabled | Disable	Launch app | Edit properties | View objects | View details on Splunkbase
sample data	sample_app		Yes	No	App | Permissions	Disabled | Enable	
Search & Reporting	search	9.2.1	Yes	Yes	App | Permissions	Enabled	Launch app | Edit properties | View objects
Splunk Dashboard Studio	splunk-dashboard-studio	1.13.3	Yes	Yes	App | Permissions	Enabled | Disable	Launch app | Edit properties | View objects
Splunk Rolling Upgrade	splunk-rolling-upgrade	1.0.0	Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
Splunk Archiver App	splunk_archiver	1.0	Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects | View details on Splunkbase
Splunk Assist	splunk_assist	1.0.59	No	No	App | Permissions	Enabled	Edit properties | View objects | View details on Splunkbase
Splunk Get Data In	splunk_gdi	1.0.6	Yes	No	App | Permissions	Enabled	Edit properties | View objects
splunk_httpinput	splunk_httpinput		Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
Instrumentation	splunk_instrumentation	6.0.10	Yes	Yes	App | Permissions	Enabled	Launch app | Edit properties | View objects
Clones Internal Metrics into Metrics Index	splunk_internal_metrics		Yes	No	App | Permissions	Enabled | Disable	Edit properties | View objects
Splunk Analytics Workspace	splunk_metrics_workspace	2.47.0	Yes	Yes	App | Permissions	Enabled | Disable	Launch app | Edit properties | View objects
Monitoring Console	splunk_monitoring_console	10.0.0	Yes	Yes	App | Permissions	Enabled | Disable	Launch app | Edit properties | View objects

Configure

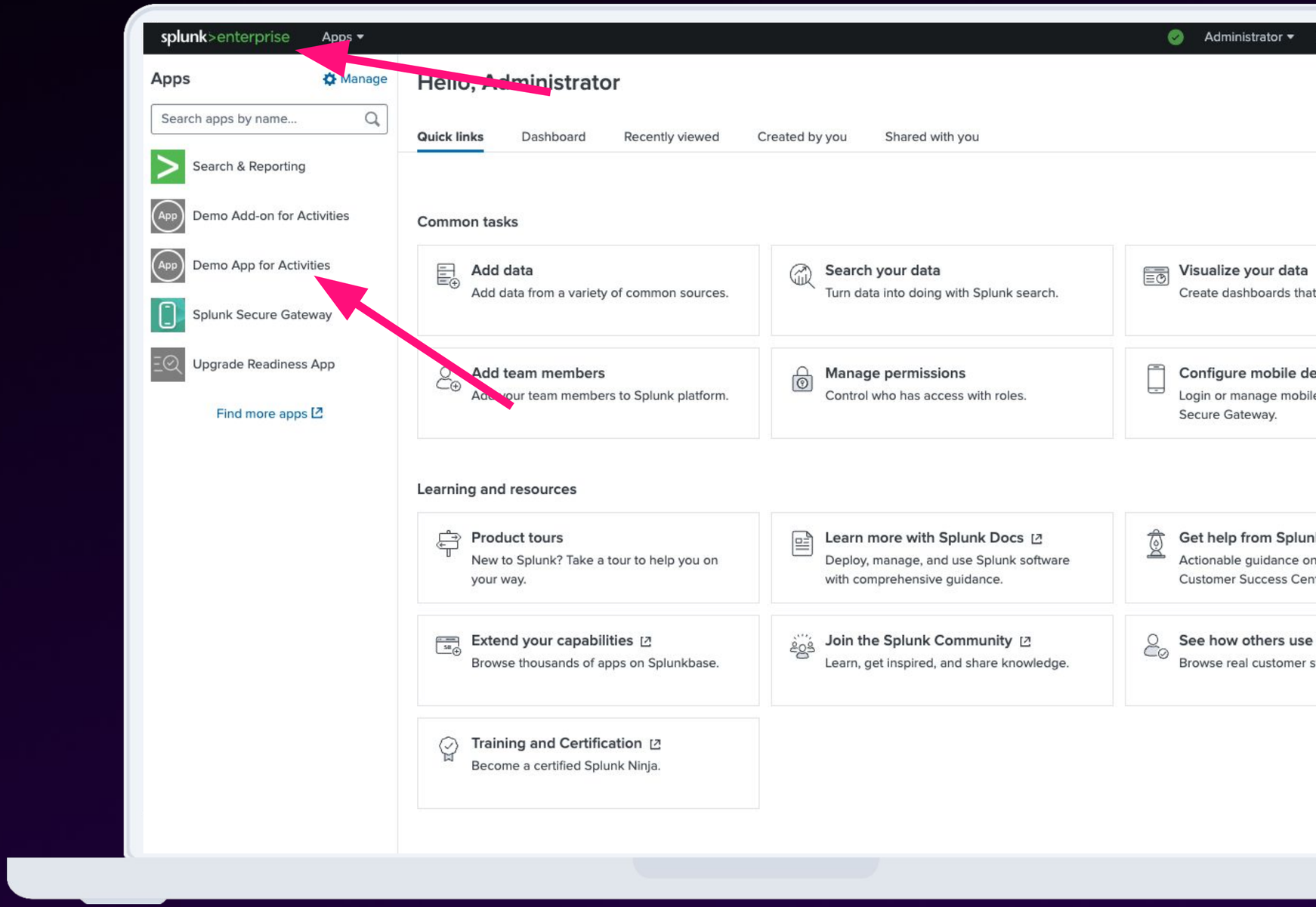
Create new app

- Name: **Demo App for Activities**
- Folder name: **demo_app_for_activities**
- Version: **1.0.0**
- Template: **barebones**
- Click on “Save”



Progress Check!

Go back to main page
Your app is on the list!



Dashboard App TODO

✅Create an Empty App

- We want to:
  - Build a dedicated app for activities
- We need:
  - Splunk app to manage our knowledge objects

➜ Build a Dashboard

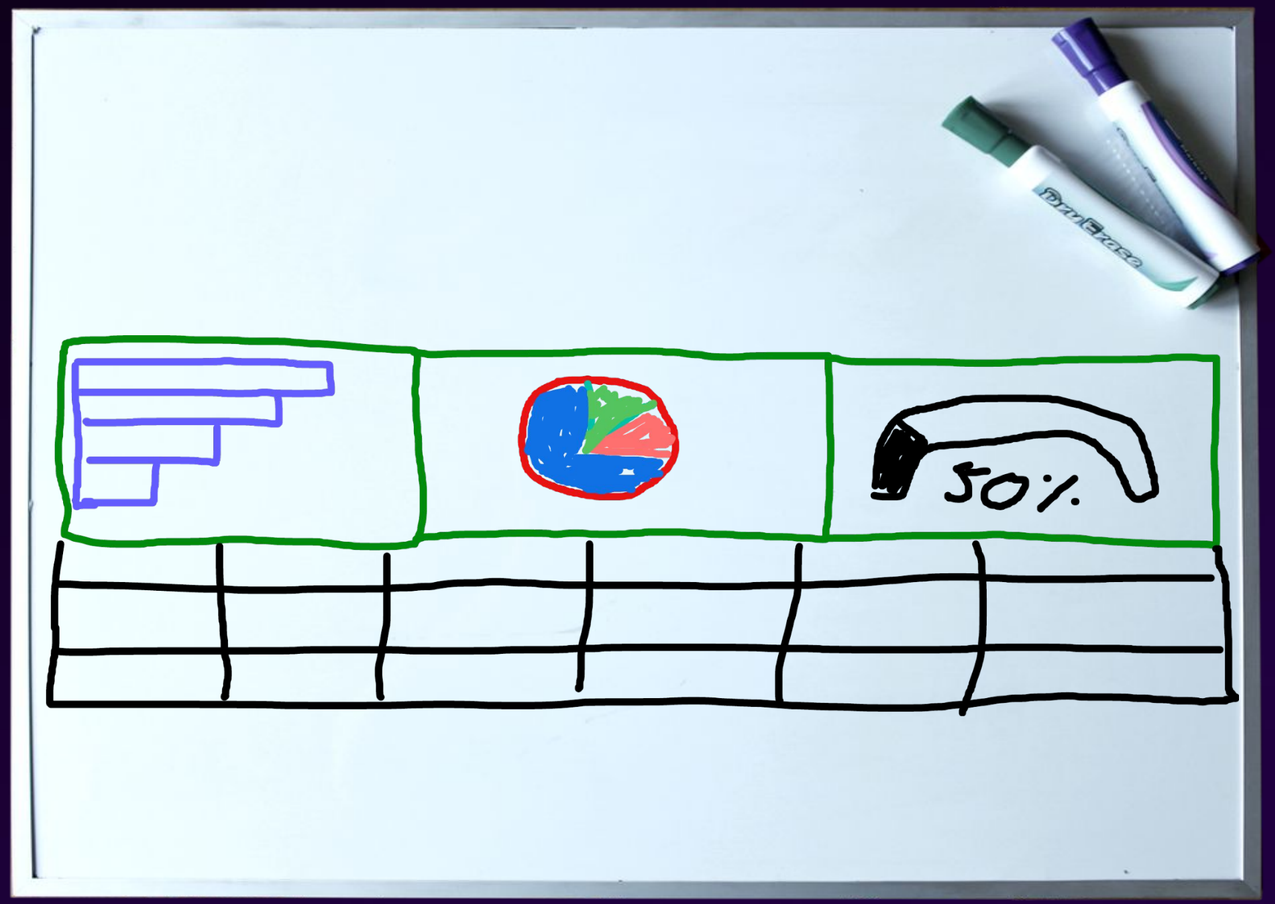
- We want to:
  - Create a dashboard to visualize data on activities
- We need:
  - Splunk searches to query data (SPL)
  - Splunk dashboard with diagrams and tables to present data

Customize Navigation

- We want to:
  - Show dashboard on a default view in this app
- We need to:
  - Change default view for the app

Dashboard Design

- Panel 1: Number of activities by number of participants
- Panel 2: Activities by type
- Panel 3: Free of charge activities
- Panel 4: Latest 10 activities



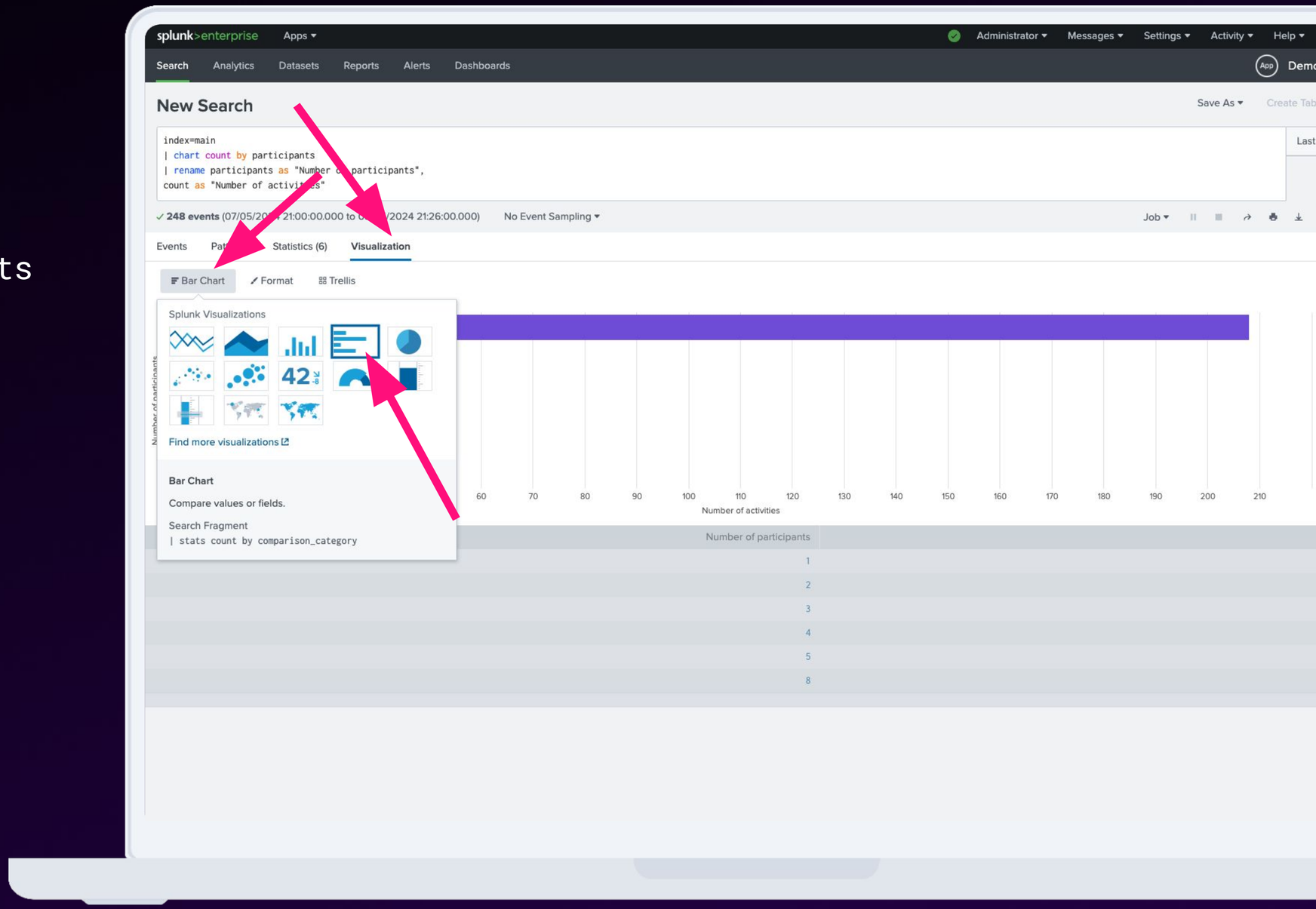
https://pixabay.com/photos/whiteboard-dry-erase-marker-blank-2903269/

Exercise 7 | Follow the lab guide

Search

```
index=main
| chart count by participants
| rename participants as
"Number of participants",
count as "Number of
activities"
```

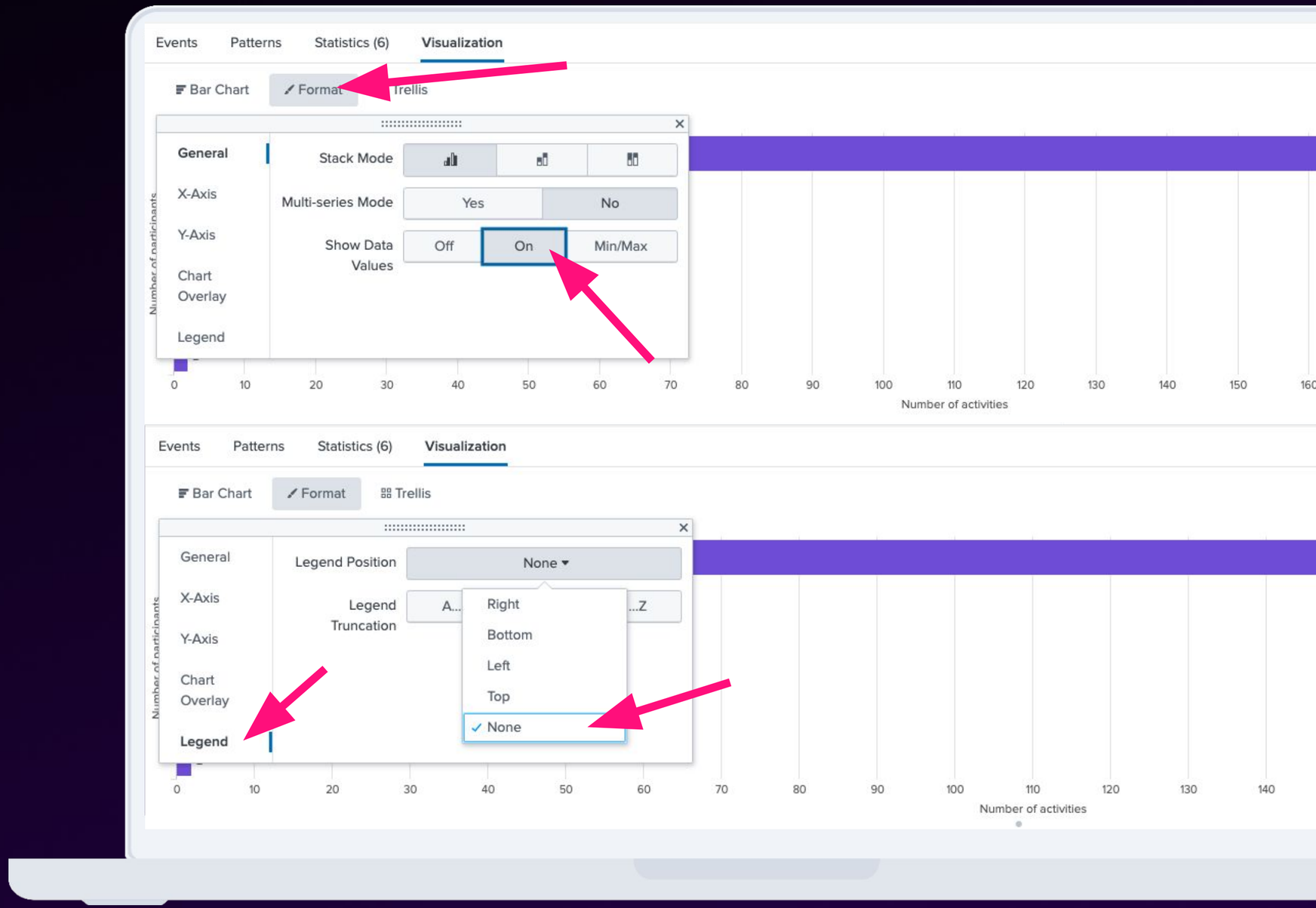
Go to Visualization
Change visualization
to Bar Chart



Configure

Go to “Format”

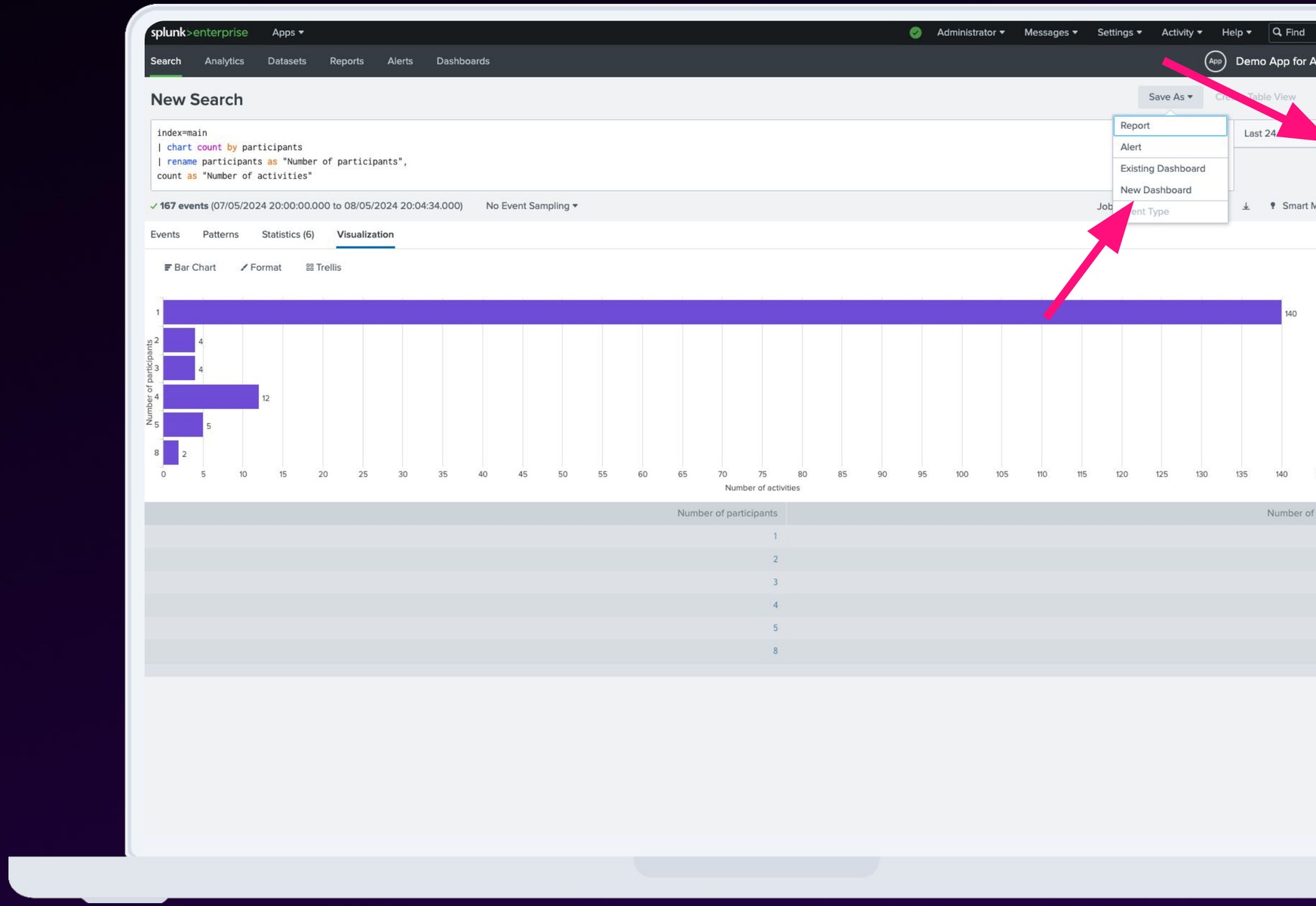
- General / Show Data Values: **On**
- Legend / Legend Position: **None**



Create Dashboard

Click on “**Save As**” on top-right.

Click on “**New Dashboard**” from drop down.



Configure

Dashboard Title: **Activities Dashboard**

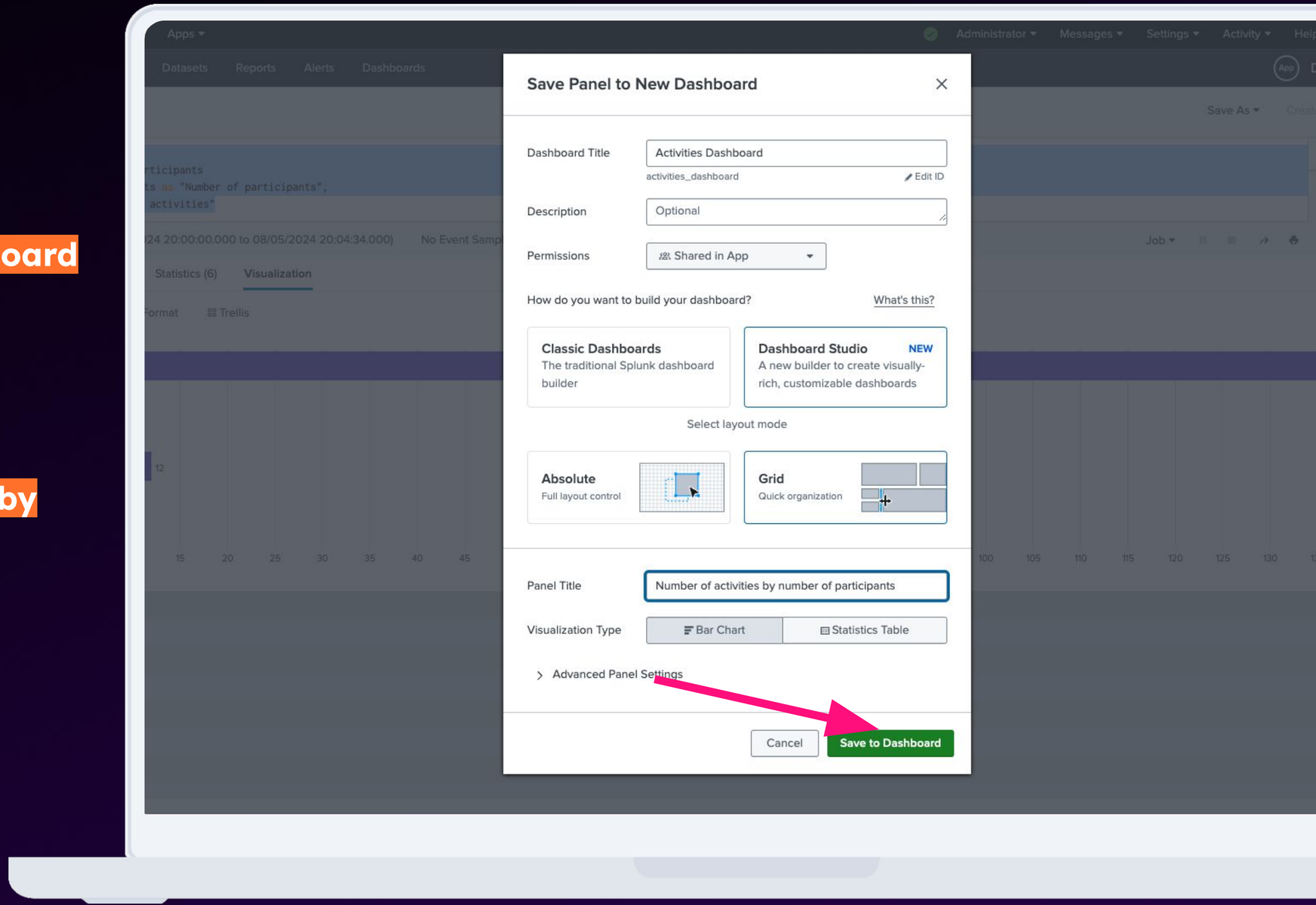
Permissions: **Shared in App**

Type: **Dashboard Studio**

Layout mode: **Grid**

Panel Title: **Number of activities by number of participants**

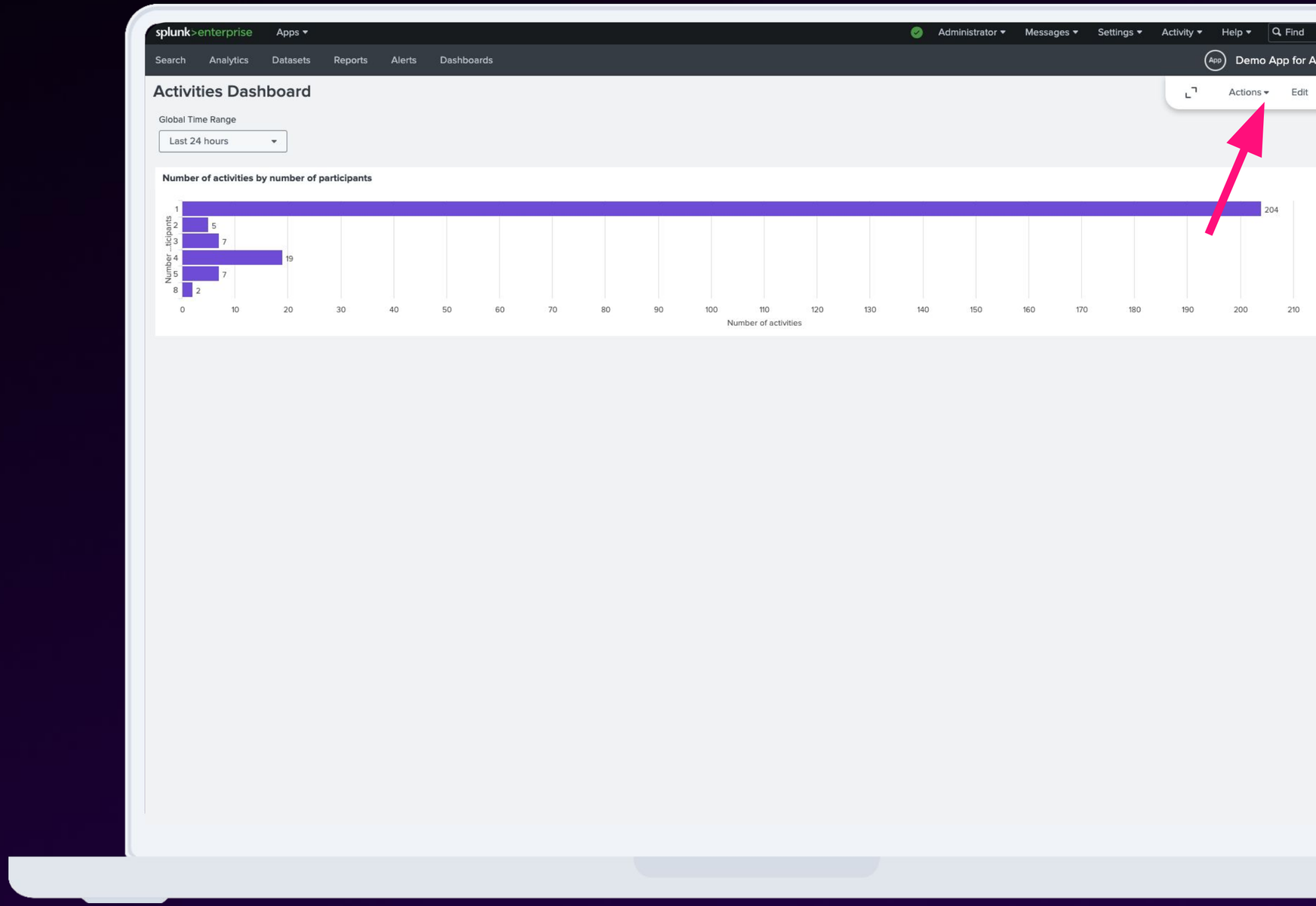
Click on “**Save to Dashboard**”



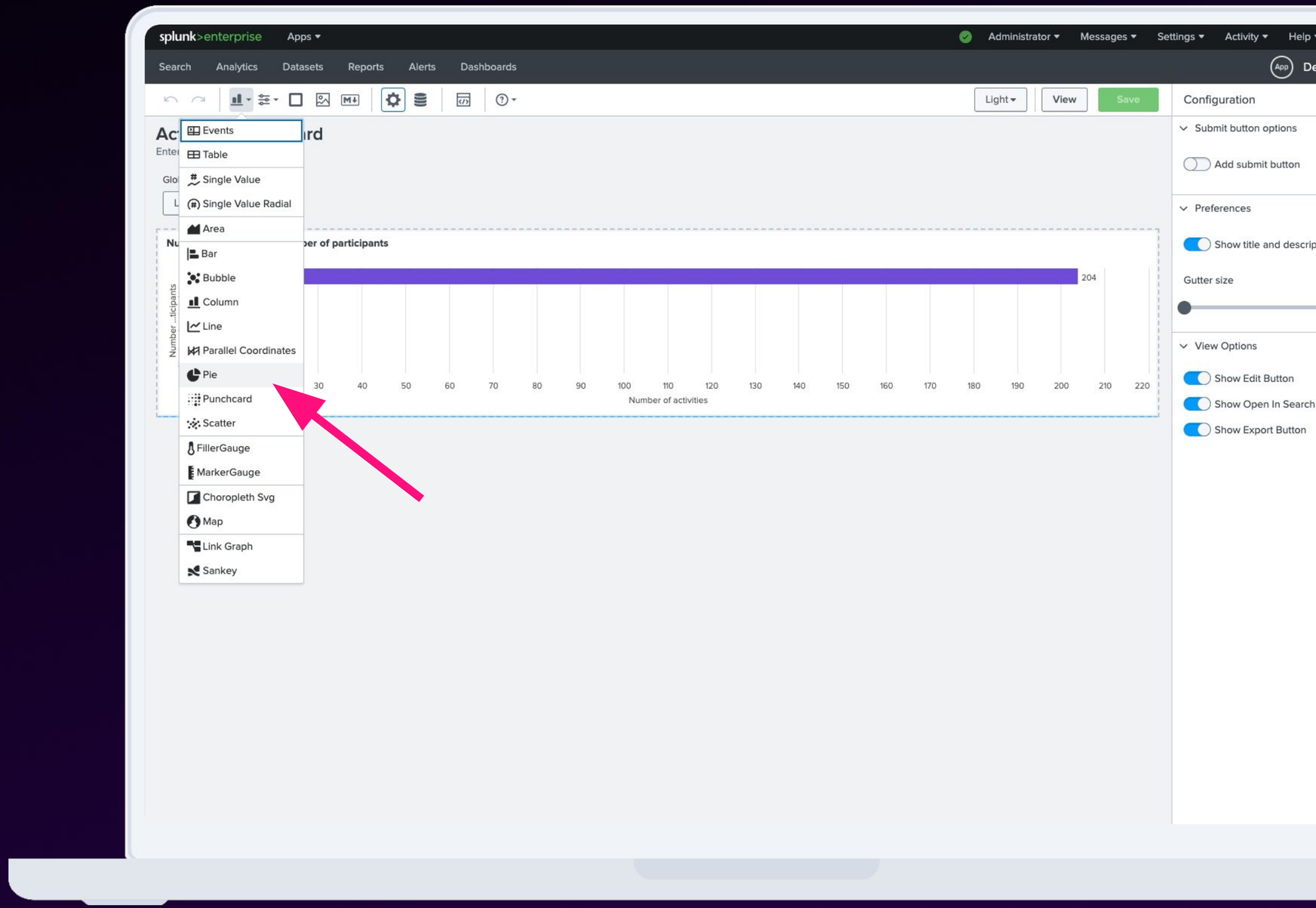
Exercise 8+9+10

Add Another Panel

Click on “Edit” button on your top right!

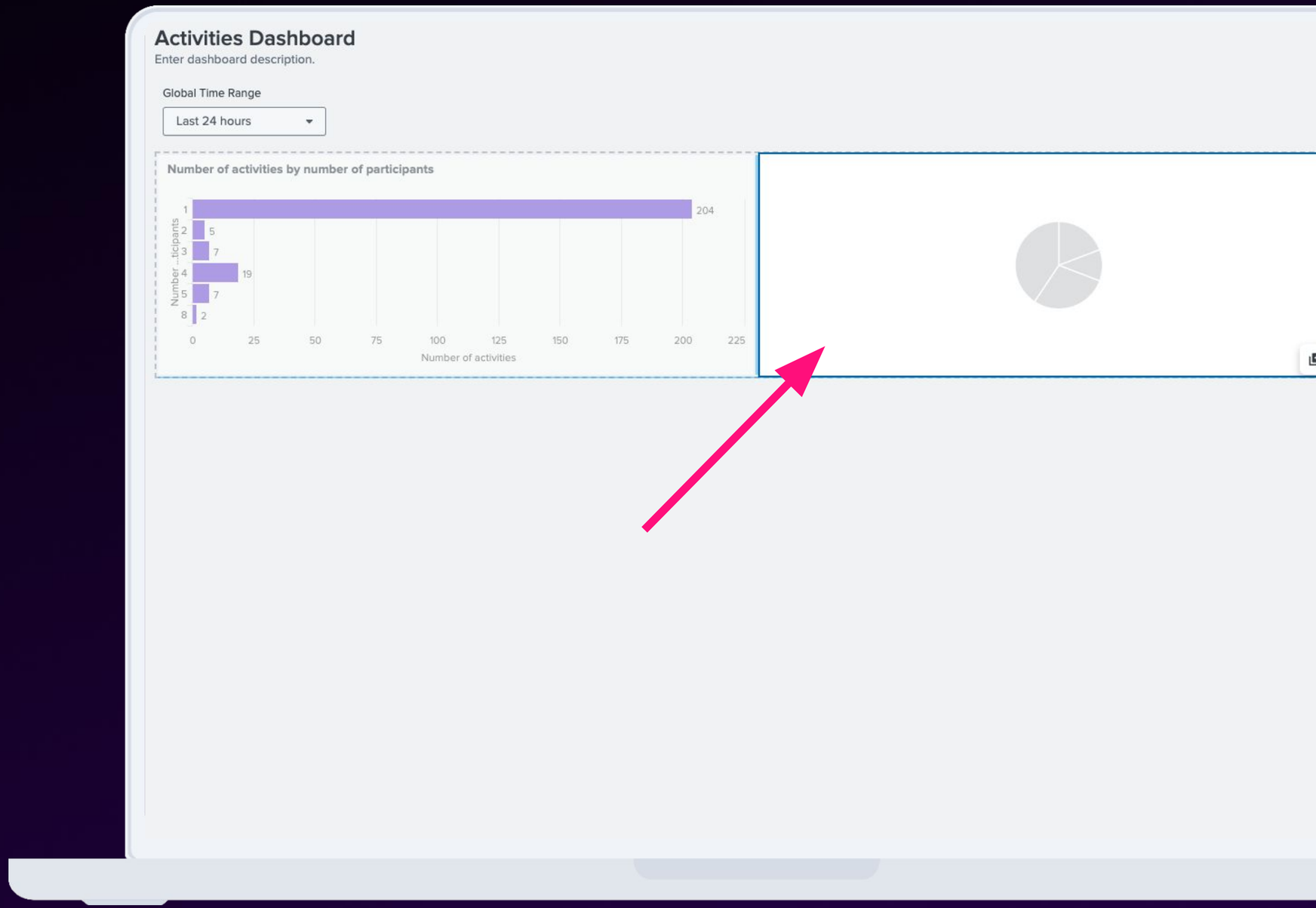


Choose Pie



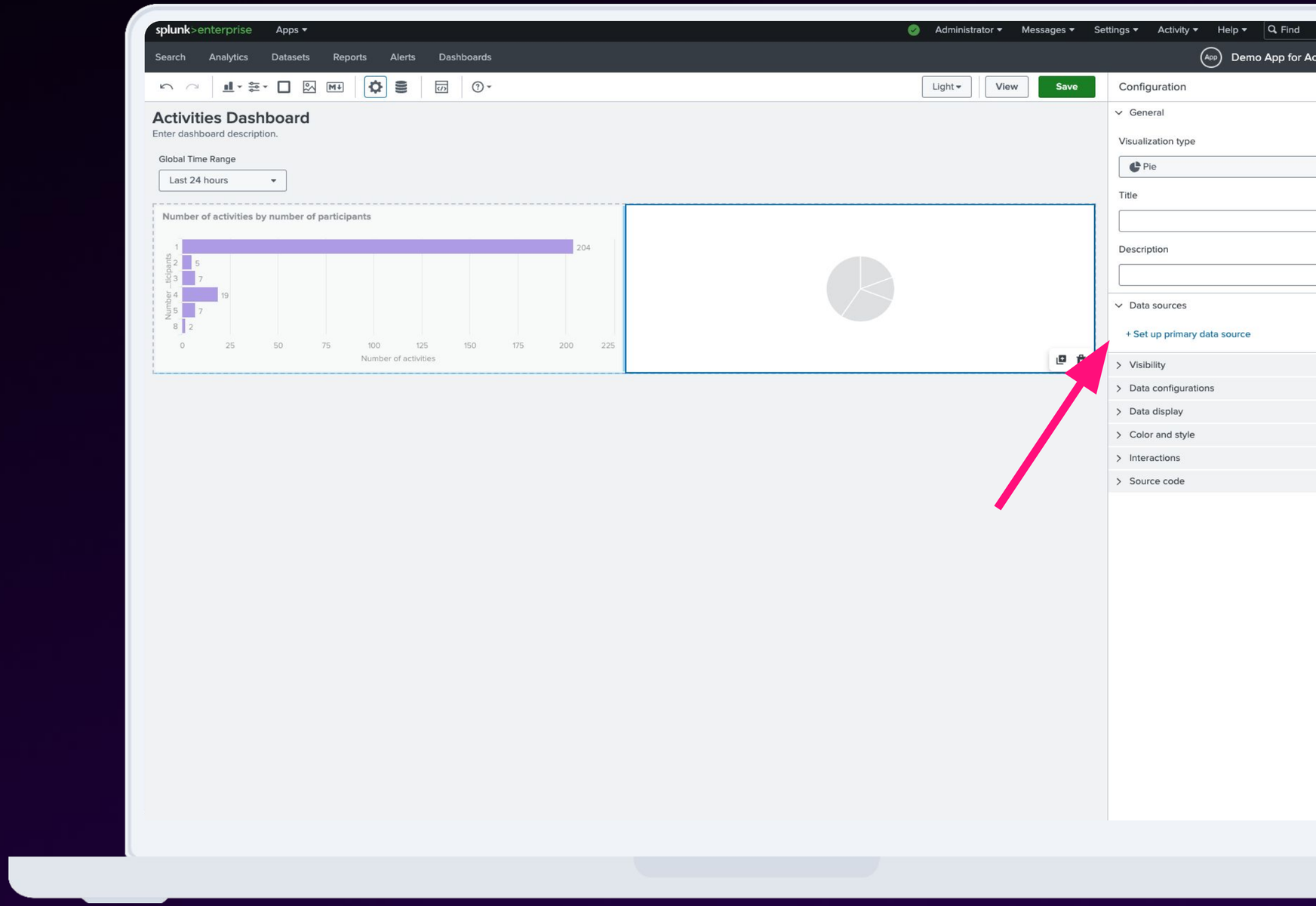
Move Panel to the 1st Row

Drag it to this position



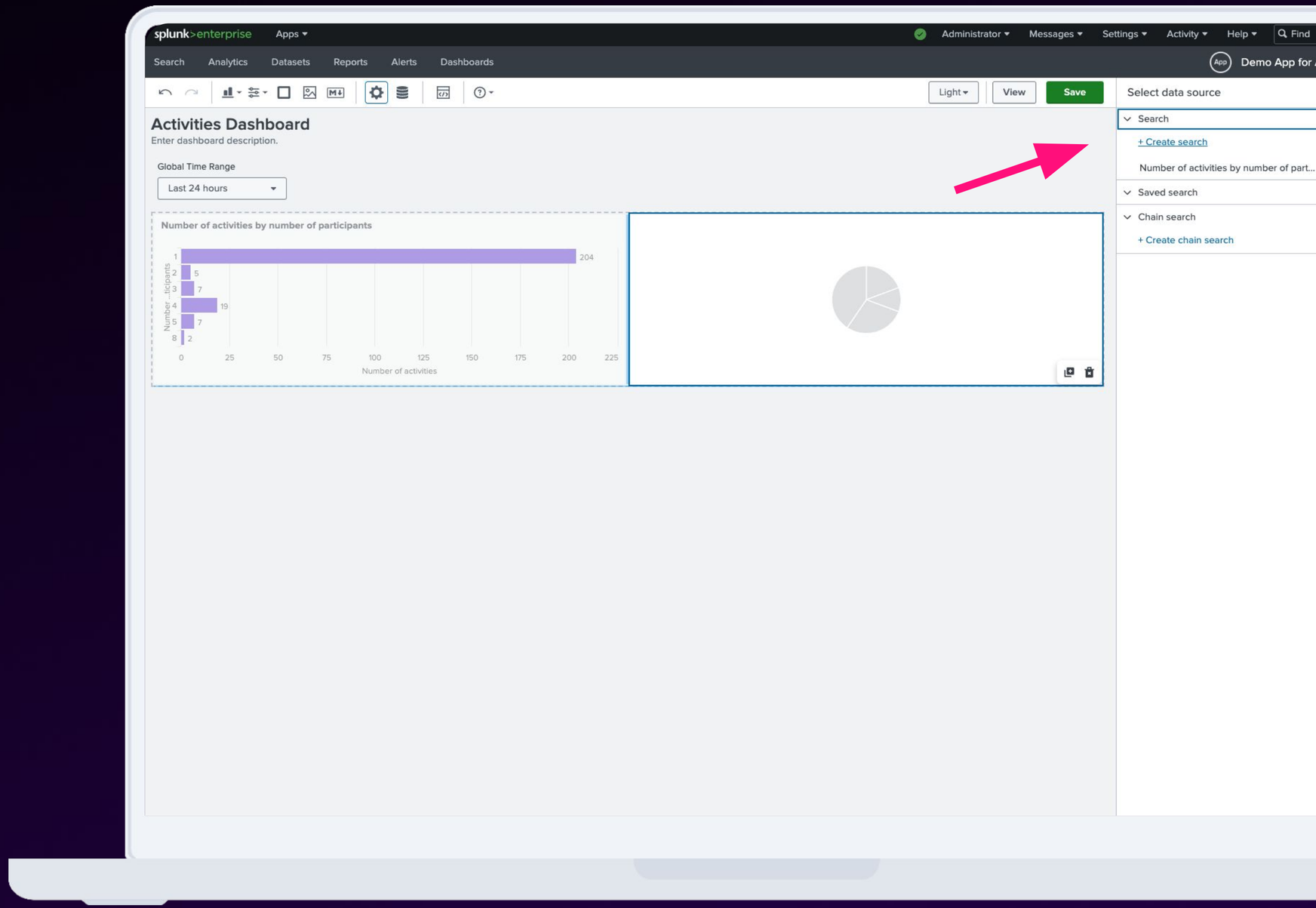
Set Up Data Source

Click on “Set up primary data source”



Set Up Data Source

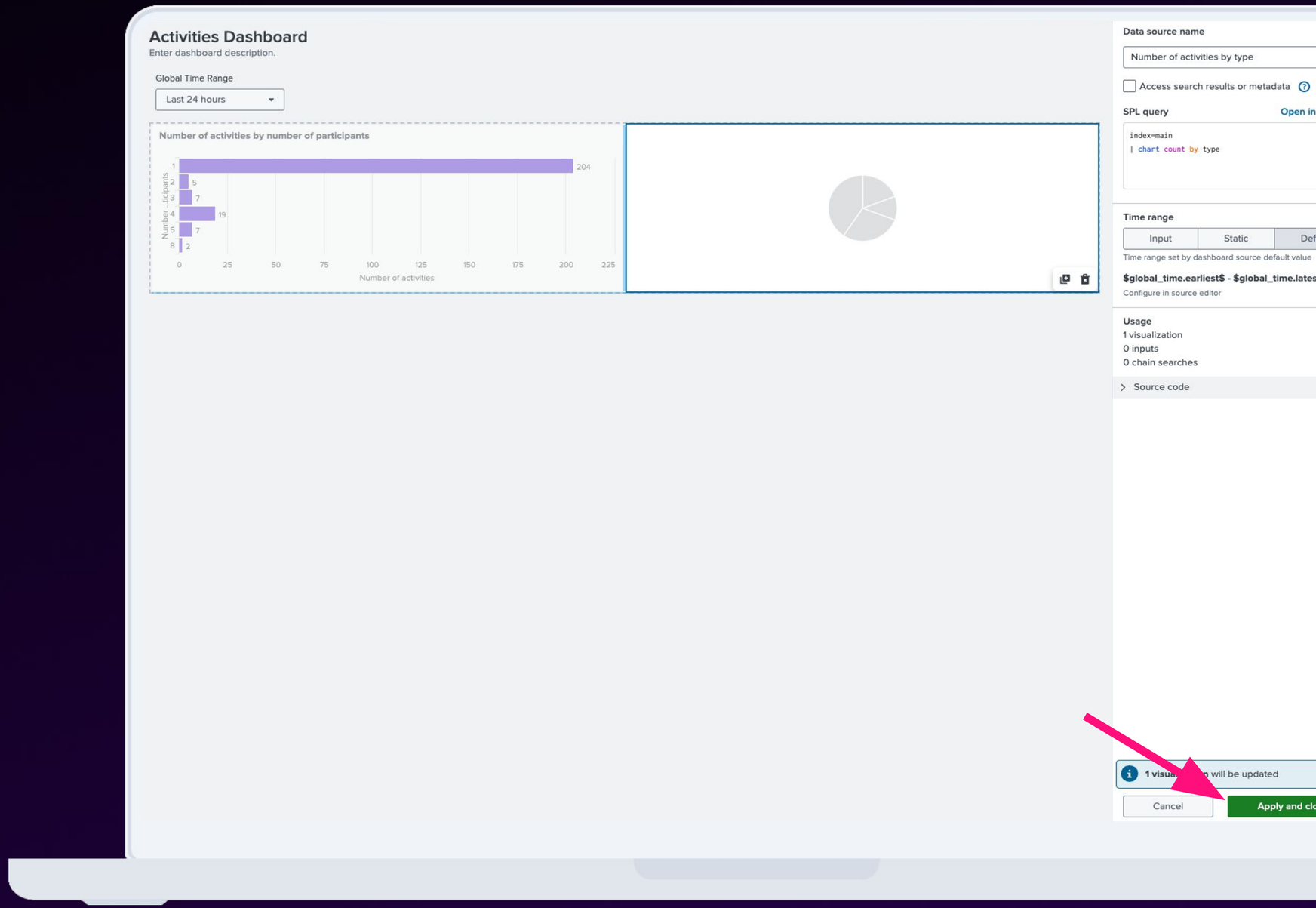
Click on “Create search”



Configure Data Source

Data source name: **Number of activities by type**
SPL query: index=main
| chart count by type

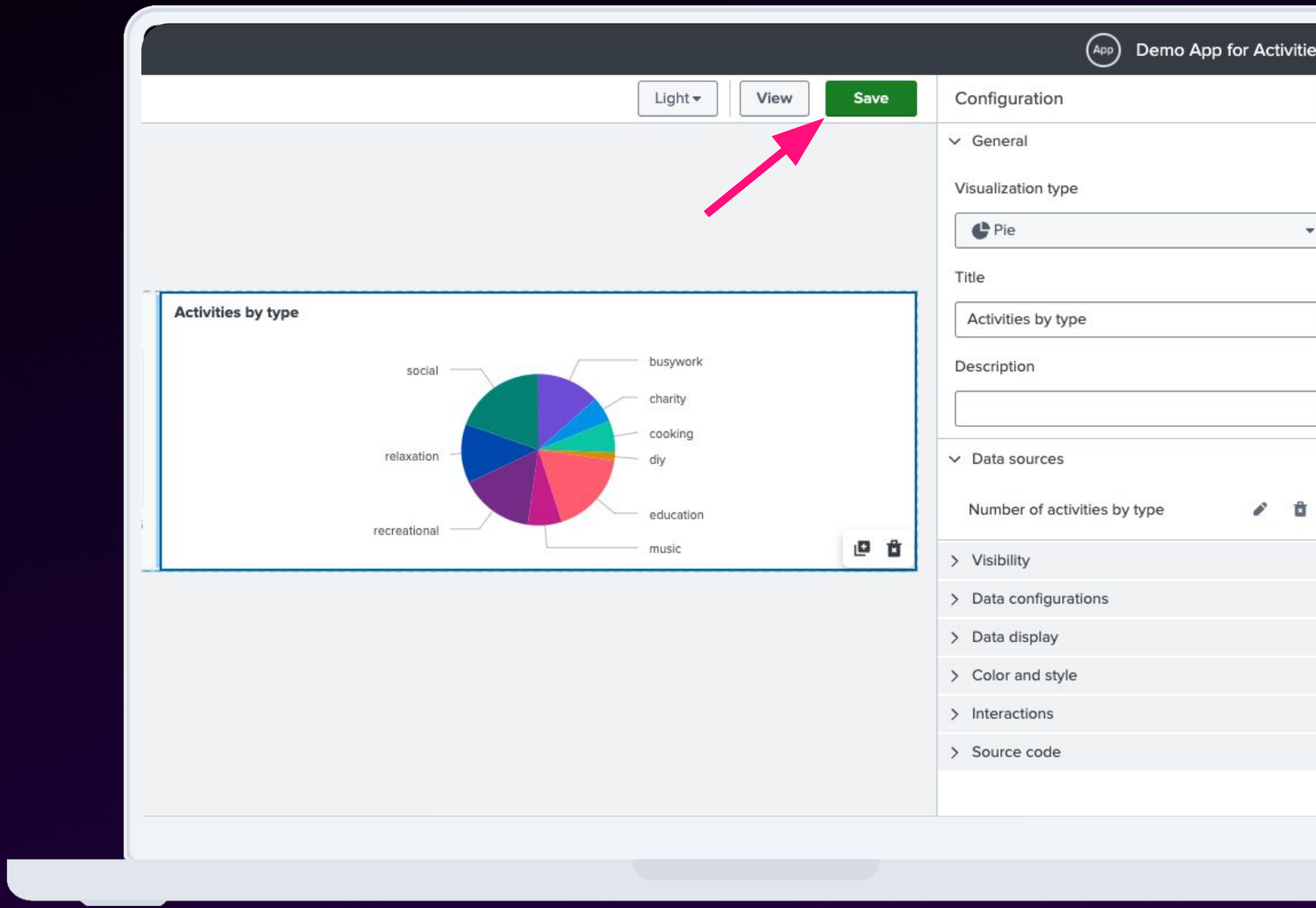
Click Apply and close



Configure Graph

Title: **Activities by type**

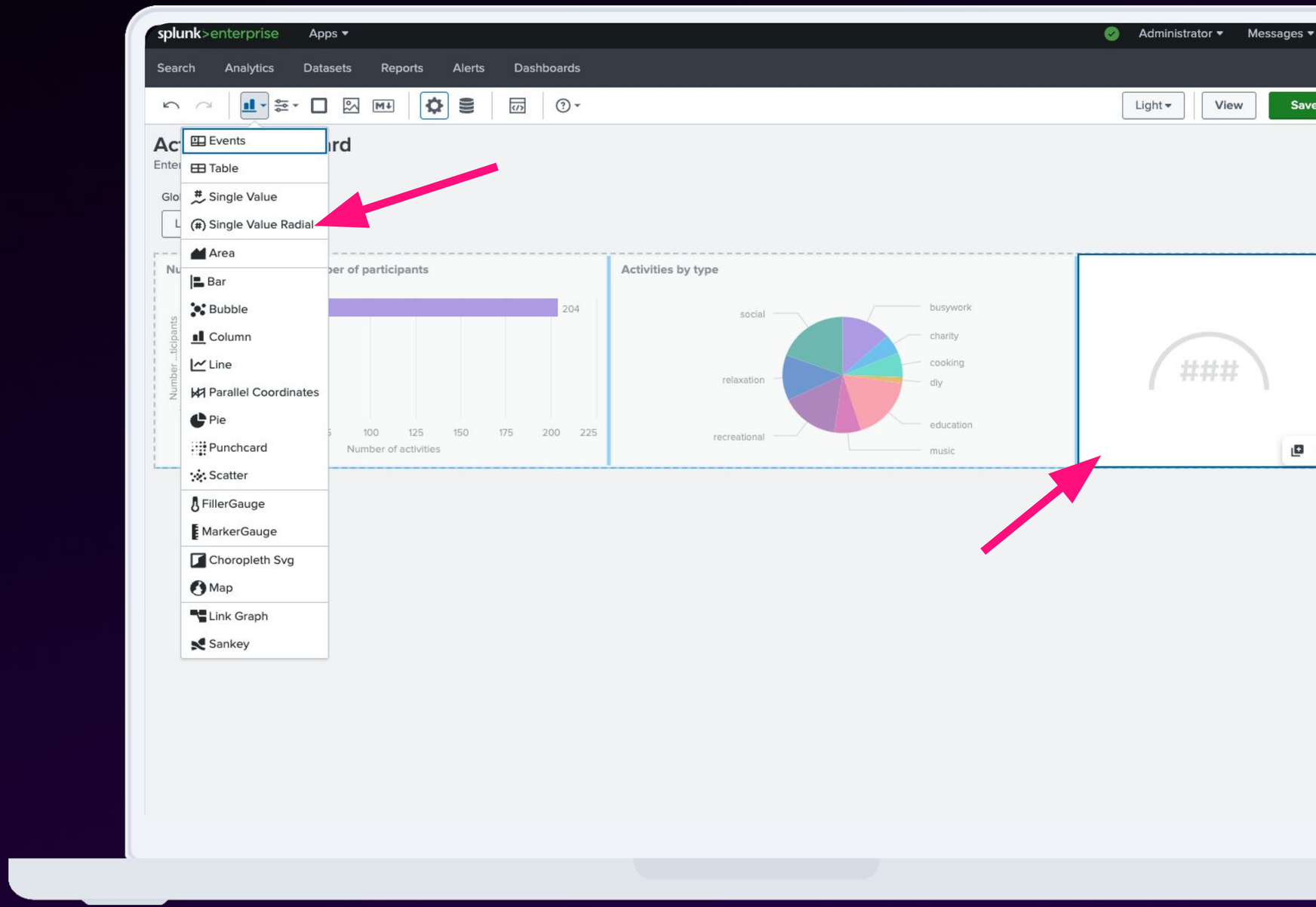
Click on “Save”



Add Next Panel

Choose **Single Value Radial**

Move the panel to the 1st row



Configure Data Source

Data source name: **Percentage of free of charge activities**

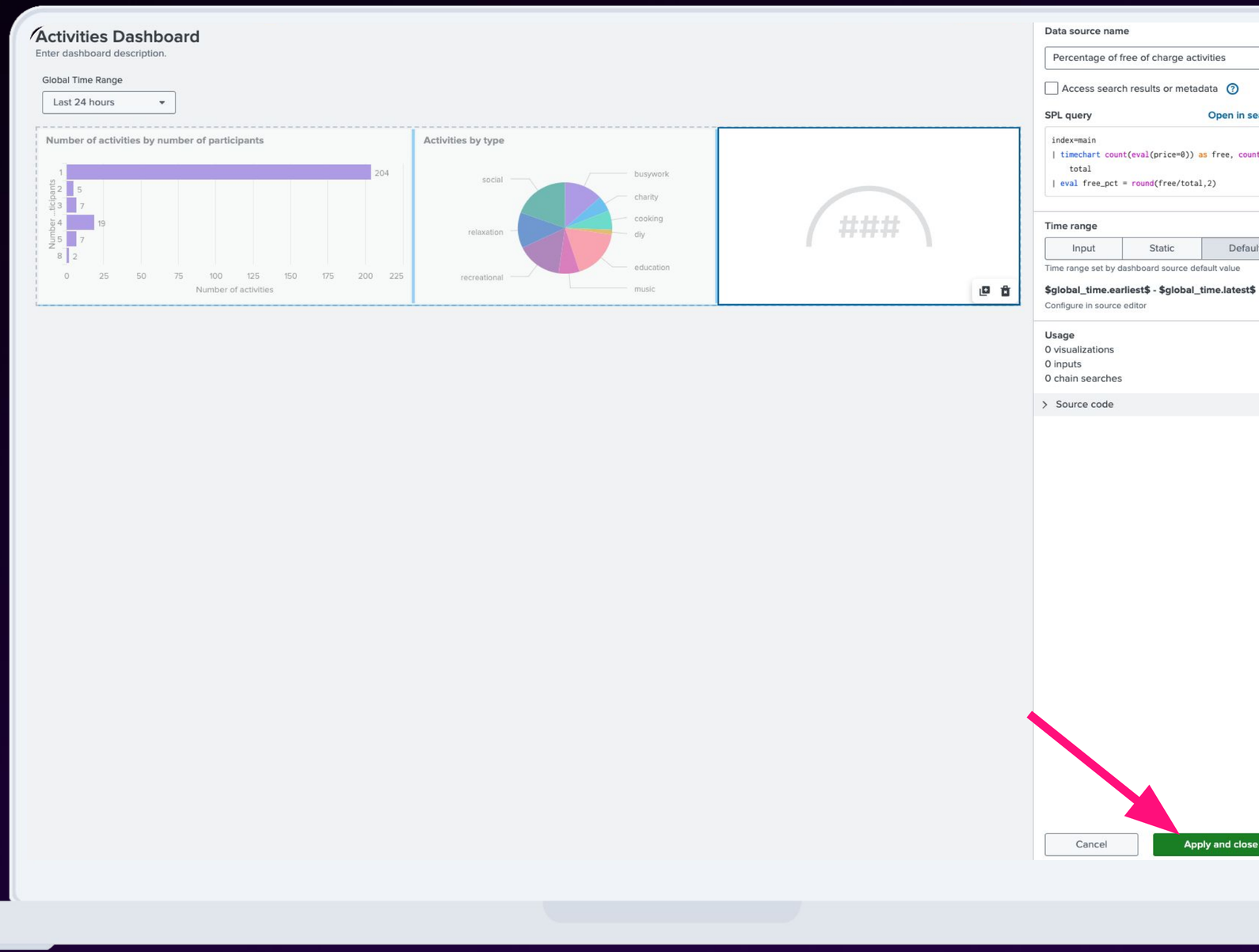
SPL query: index=main

| timechart count(eval(price=0)) as free, count as total

| eval free_pct = round(free/total,2)*100

| fields free_pct

Click on “Apply and close”



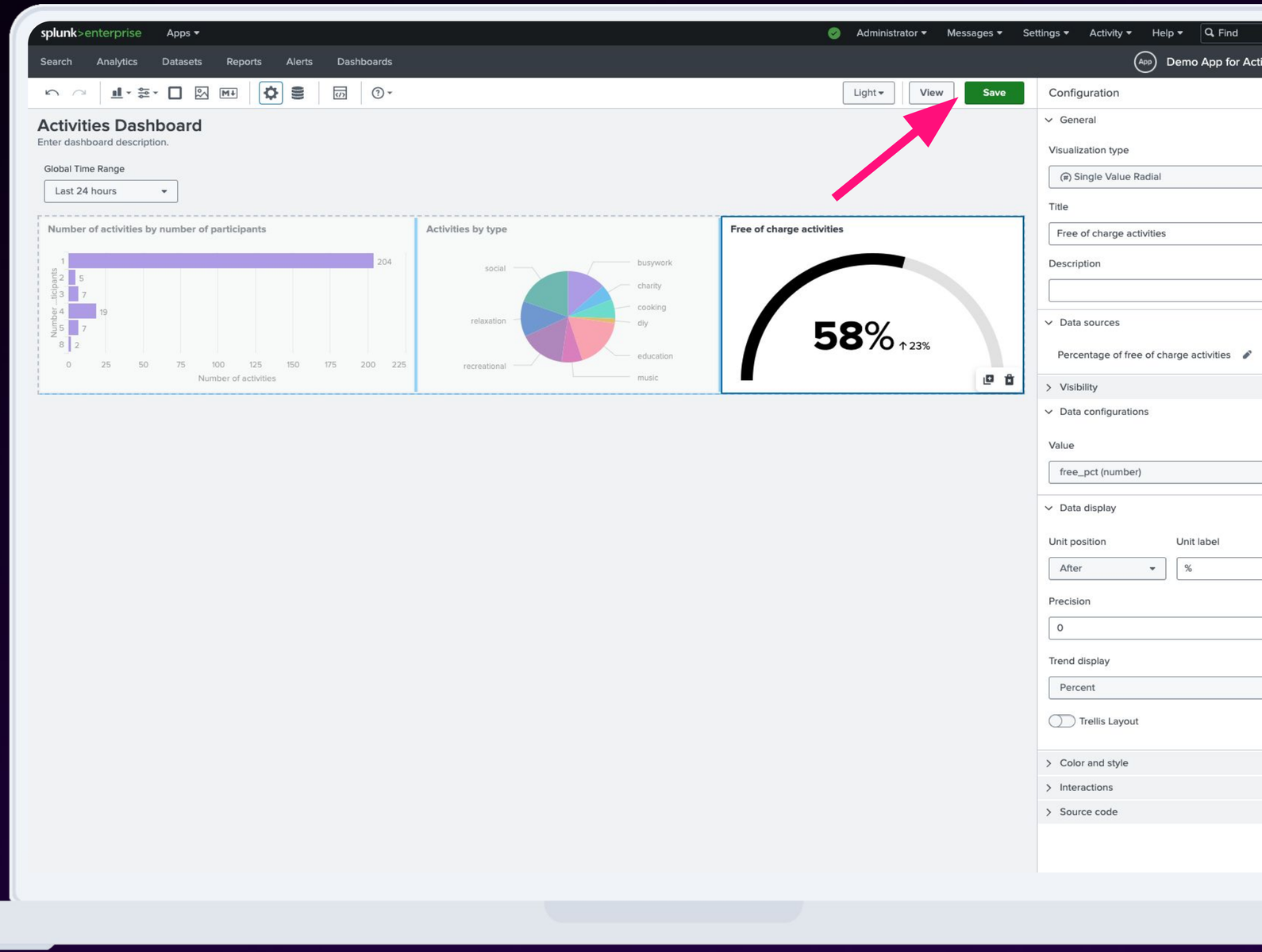
Configure Graph

On the left **Configuration** panel, enter Title: **Free of charge activities**

Under Data configurations **>** Value: select **free_pct(number)**

Under Data display > Unit label: **%**

Click on “Save” button!



Add Last Panel and Configure Data Source

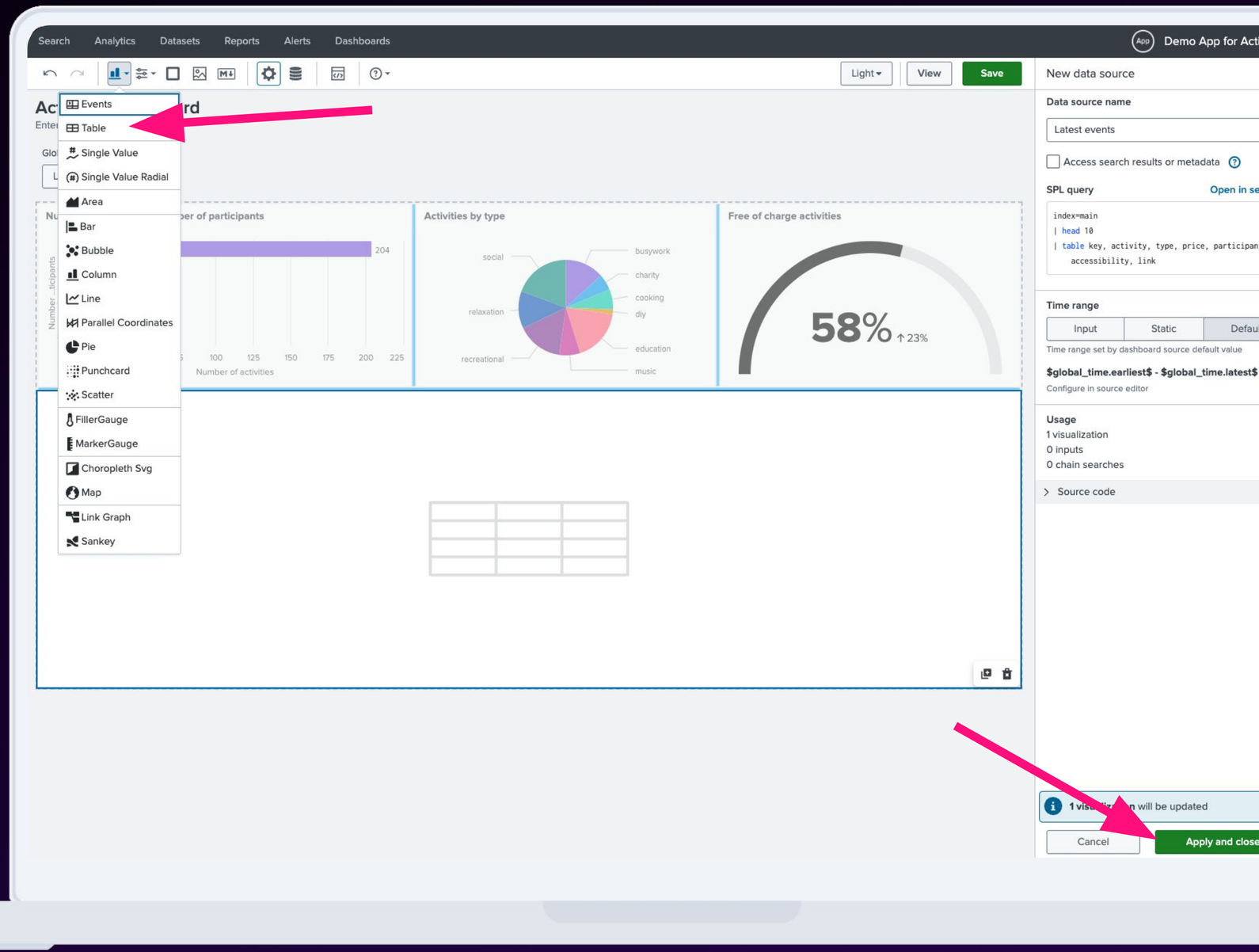
Choose “Table”

Data source name: **Latest events**

Search:

```
index=main
| head 10
| table key, activity, type,
price, participants,
accessibility, link
```

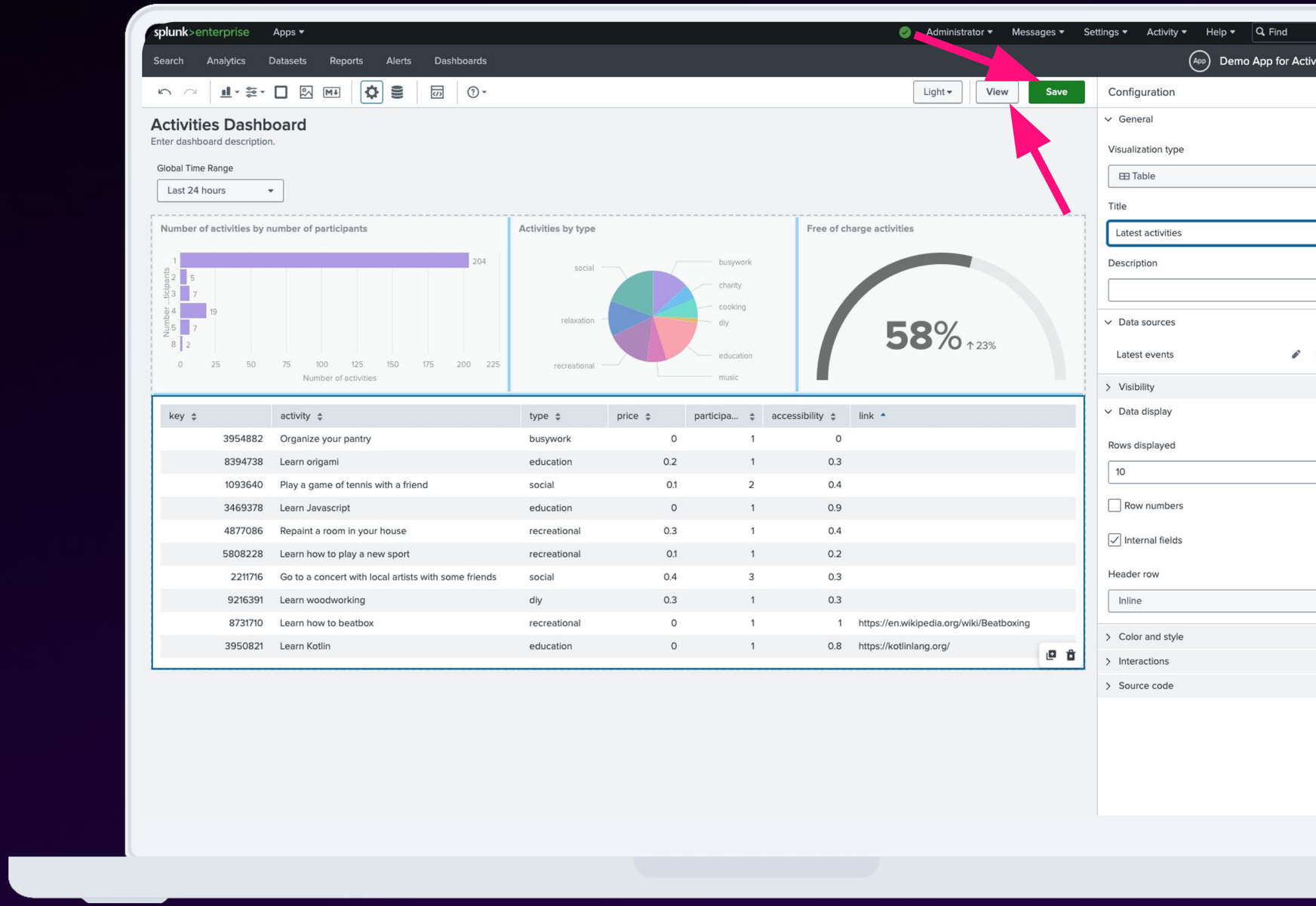
Apply and close



Configure Table

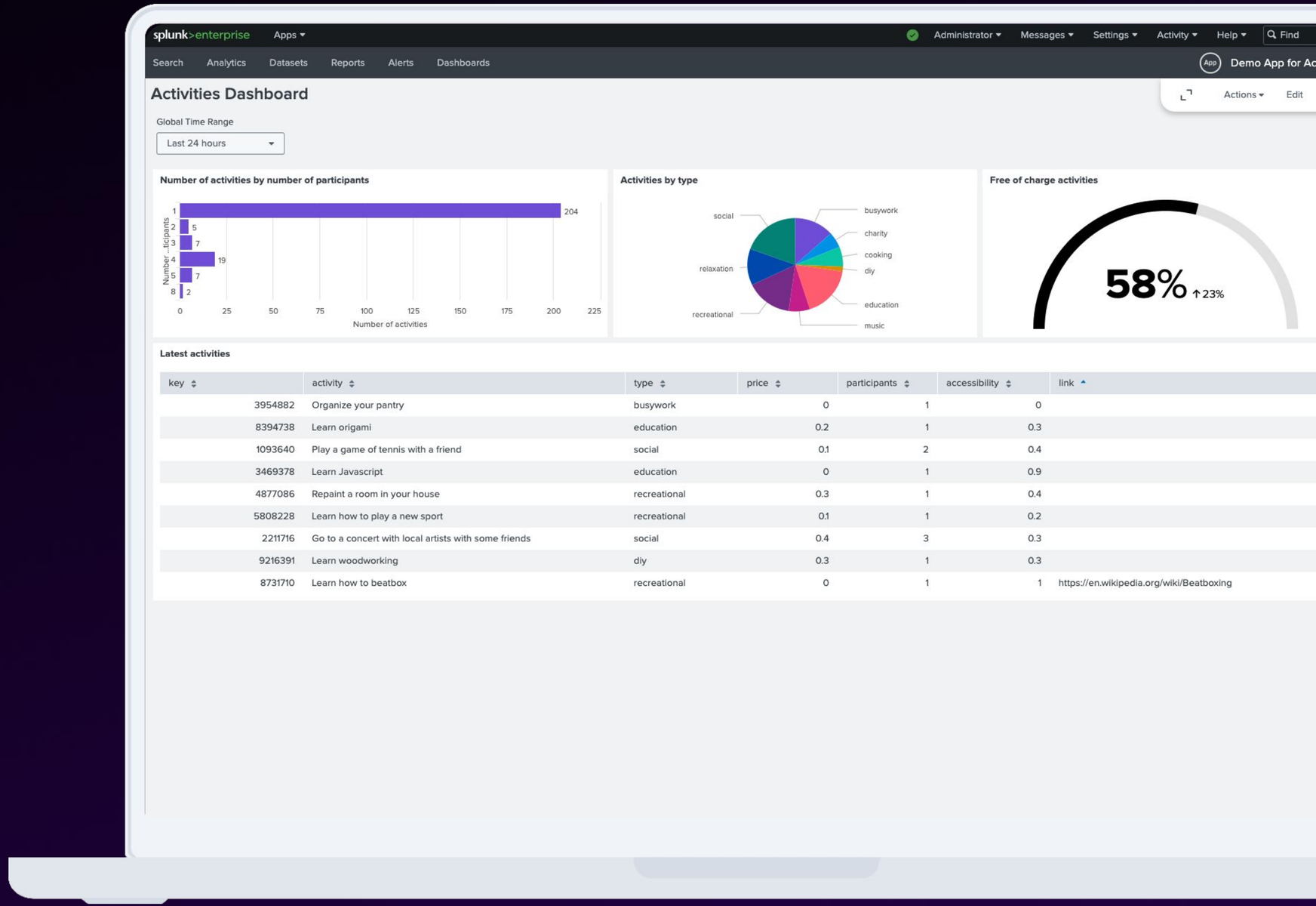
Title: **Latest activities**

Click on “Save” and “View”



Let’s Check Our Work!

The App is ready!



key	activity	type	price	participants	accessibility	link
3954882	Organize your pantry	busywork	0	1	0	
8394738	Learn origami	education	0.2	1	0.3	
1093640	Play a game of tennis with a friend	social	0.1	2	0.4	
3469378	Learn Javascript	education	0	1	0.9	
4877086	Repaint a room in your house	recreational	0.3	1	0.4	
5808228	Learn how to play a new sport	recreational	0.1	1	0.2	
2211716	Go to a concert with local artists with some friends	social	0.4	3	0.3	
9216391	Learn woodworking	diy	0.3	1	0.3	
8731710	Learn how to beatbox	recreational	0	1	1	https://en.wikipedia.org/wiki/Beatboxing

Dashboard App TODO

✅ Create an Empty App

- We want to:
  - Build a dedicated app for activities
- We need:
  - Splunk app to manage our knowledge objects

✅ Build a Dashboard

- We want to:
  - Create a dashboard to visualize data on activities
- We need:
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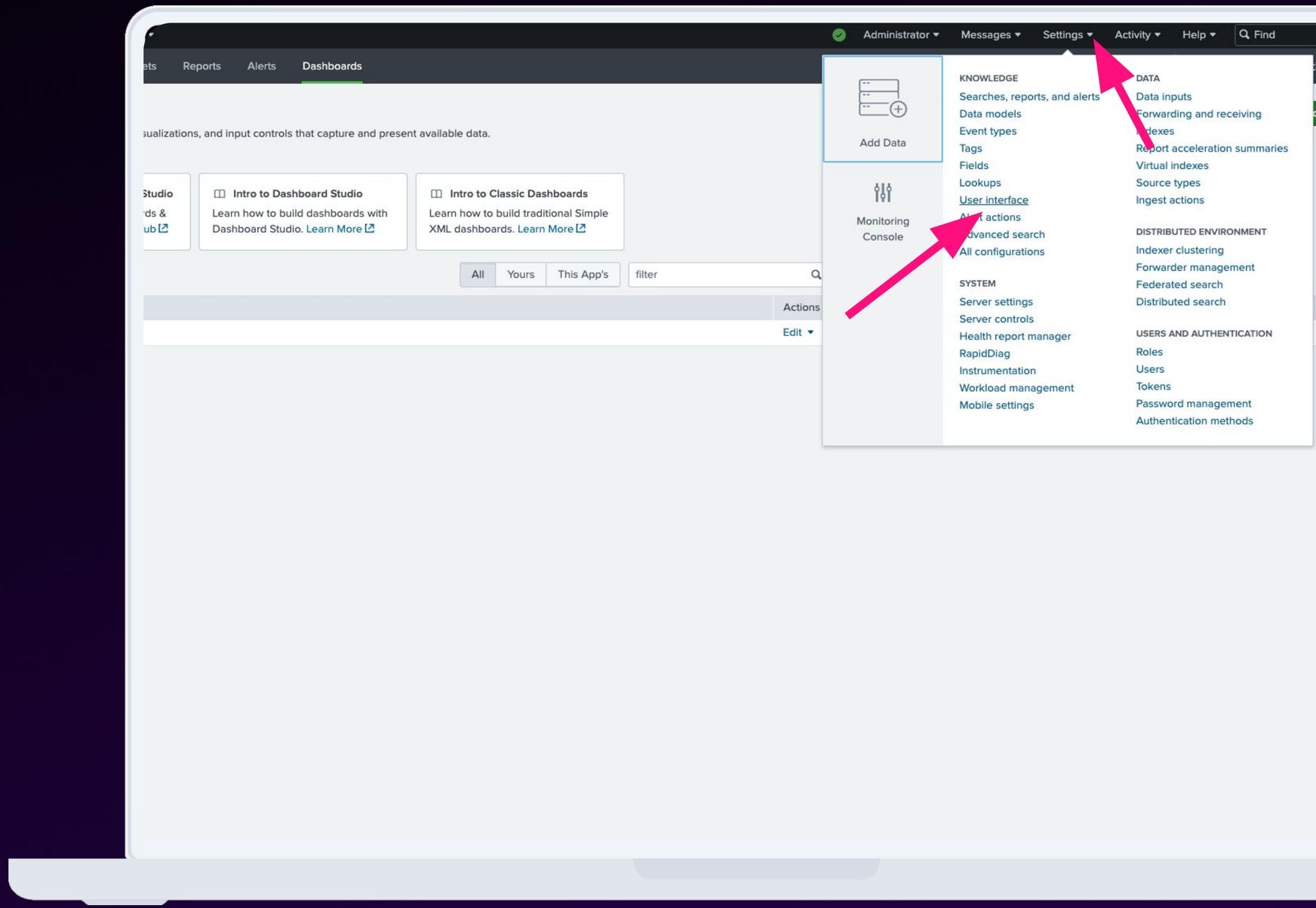
➜ Customize Navigation

- We want to:
  - Show dashboard on a default view in this app
- We need to:
  - Change default view for the app

Exercise 11

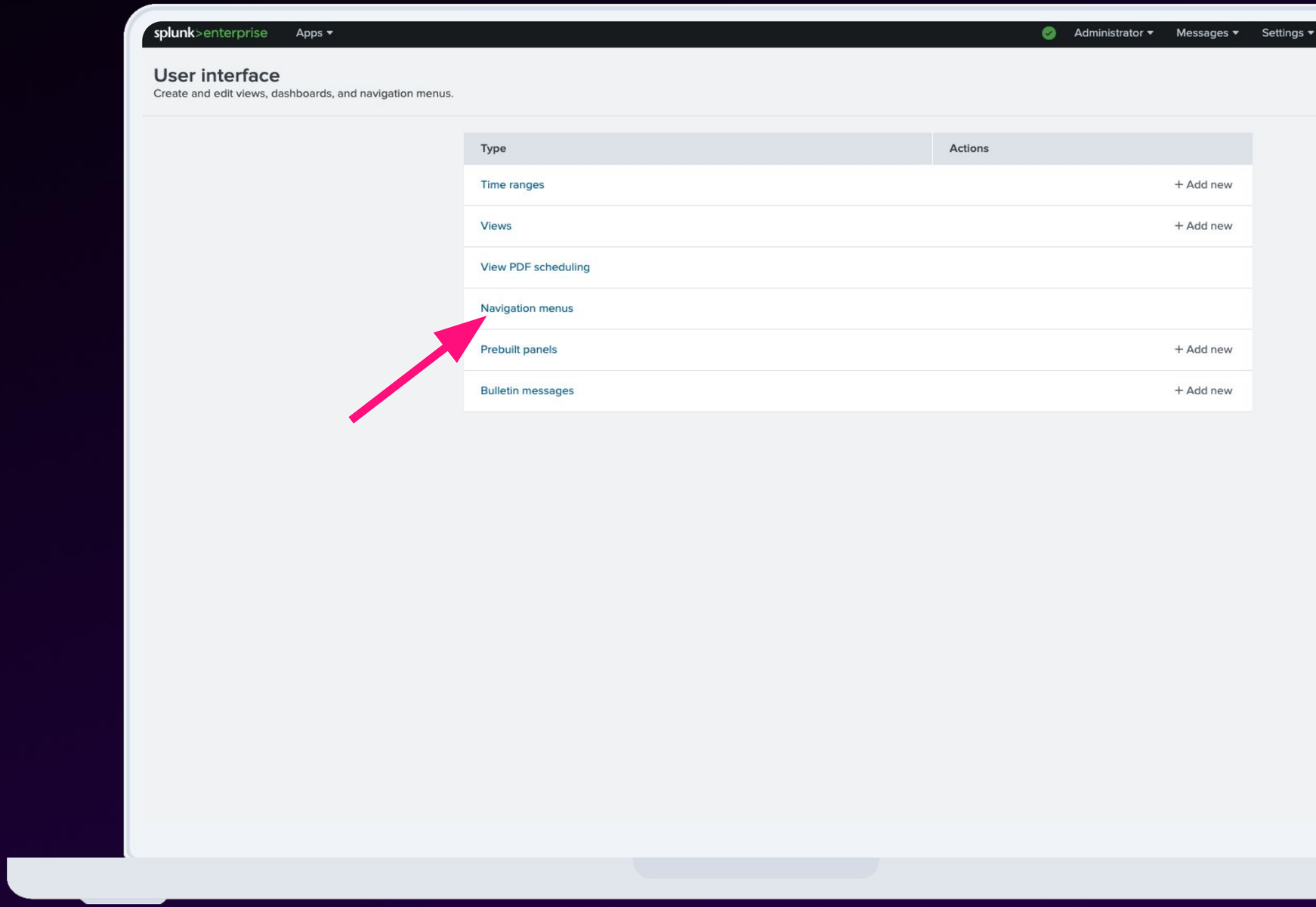
Go to Settings

Settings
User interface



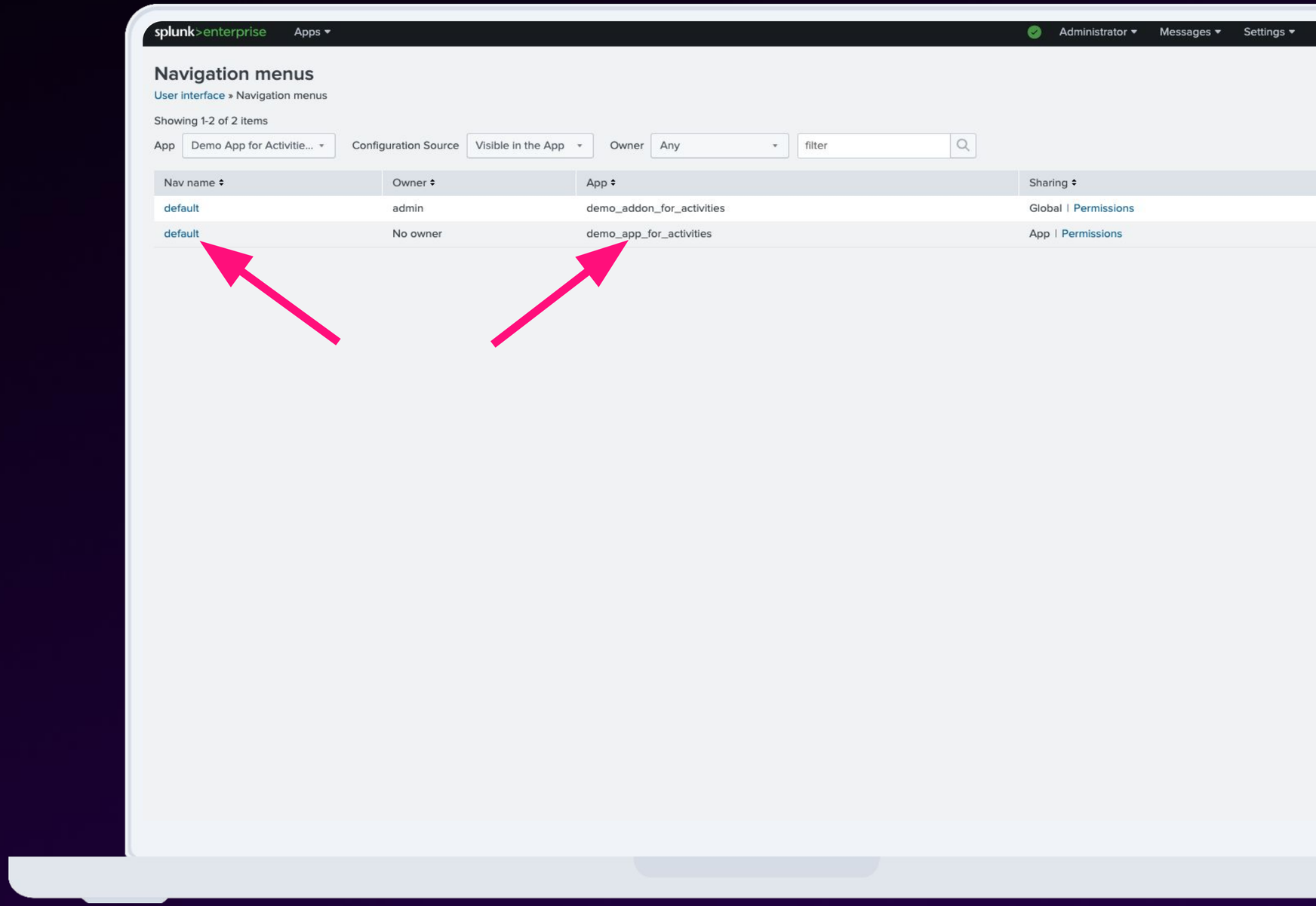
Go to Settings

Navigation menus



Go to Settings

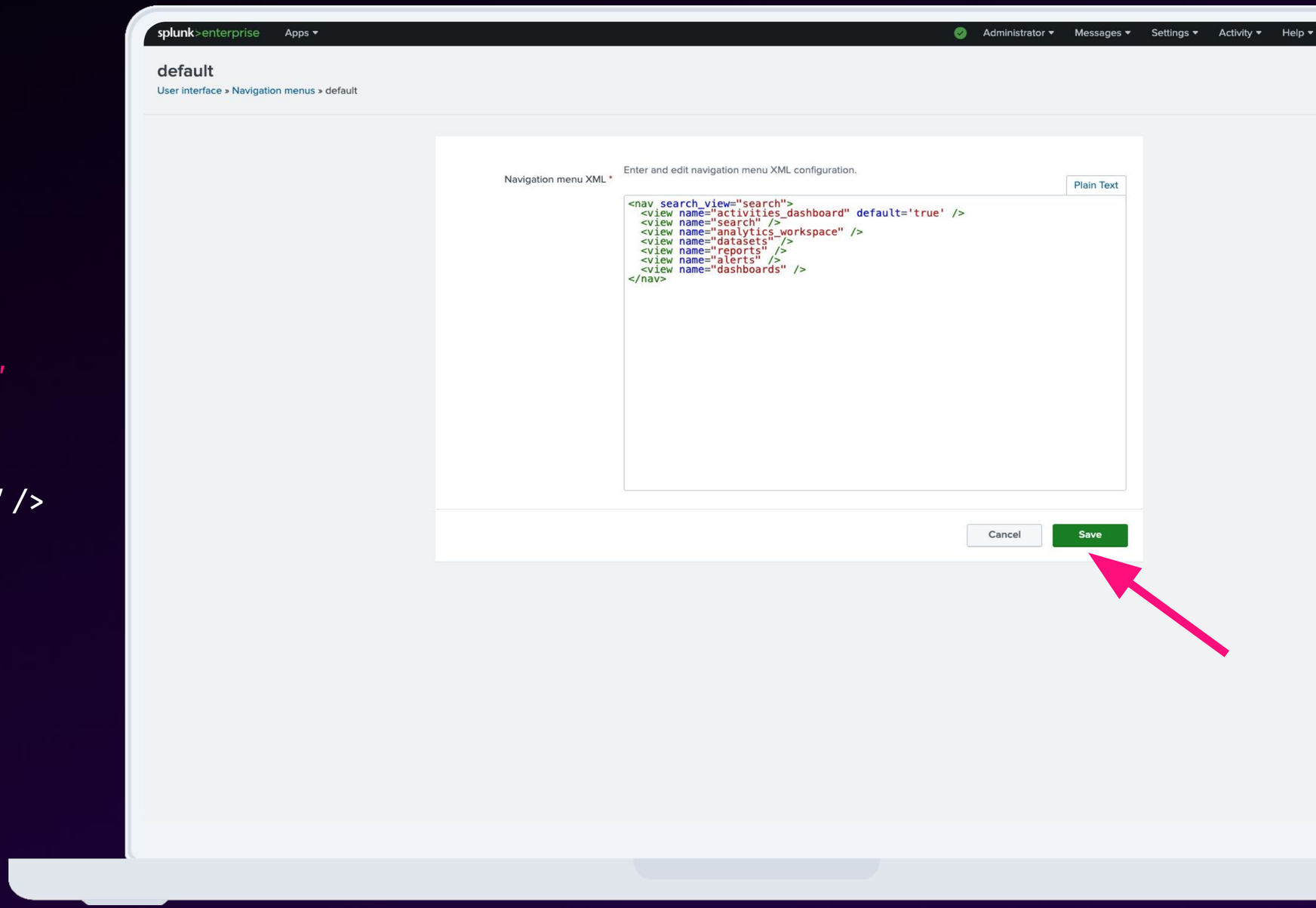
Click on “default” for demo_app_for_activities



Go to Settings

```
<nav search_view="search">
  <view name="activities_dashboard"
default='true' />
  <view name="search" />
  <view name="analytics_workspace" />
  <view name="datasets" />
  <view name="reports" />
  <view name="alerts" />
  <view name="dashboards" />
</nav>
```

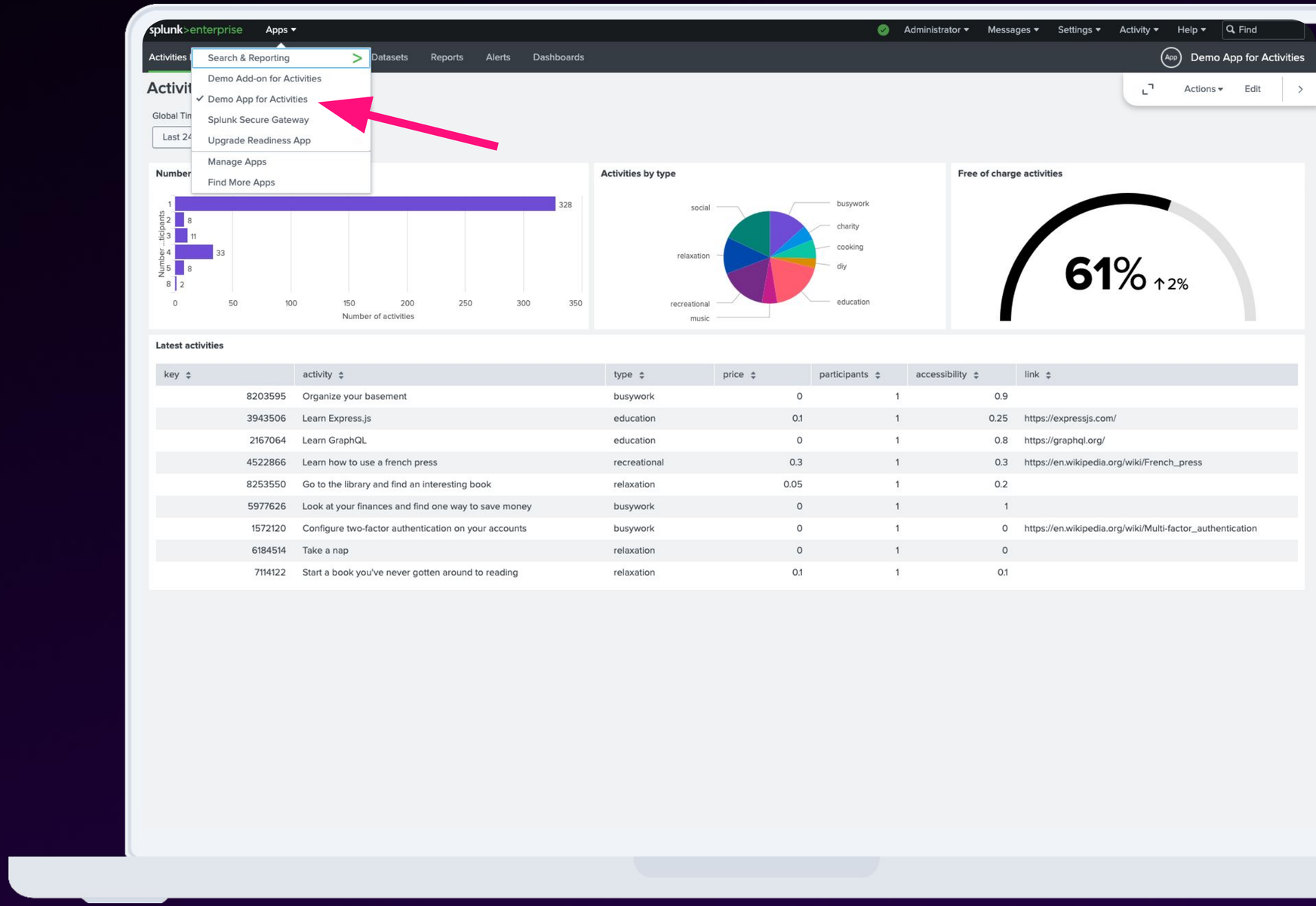
Click on “Save”



Let's Check Our Work!

Select Demo App for Activities from Apps menu

The app displays our new dashboard!



Dashboard App TODO

✅ Create an Empty App

- We want to:
  - Build a dedicated app for activities
- We need:
  - Splunk app to manage our knowledge objects

✅ Build a Dashboard

- We want to:
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  - Splunk dashboard with diagrams and tables to present data

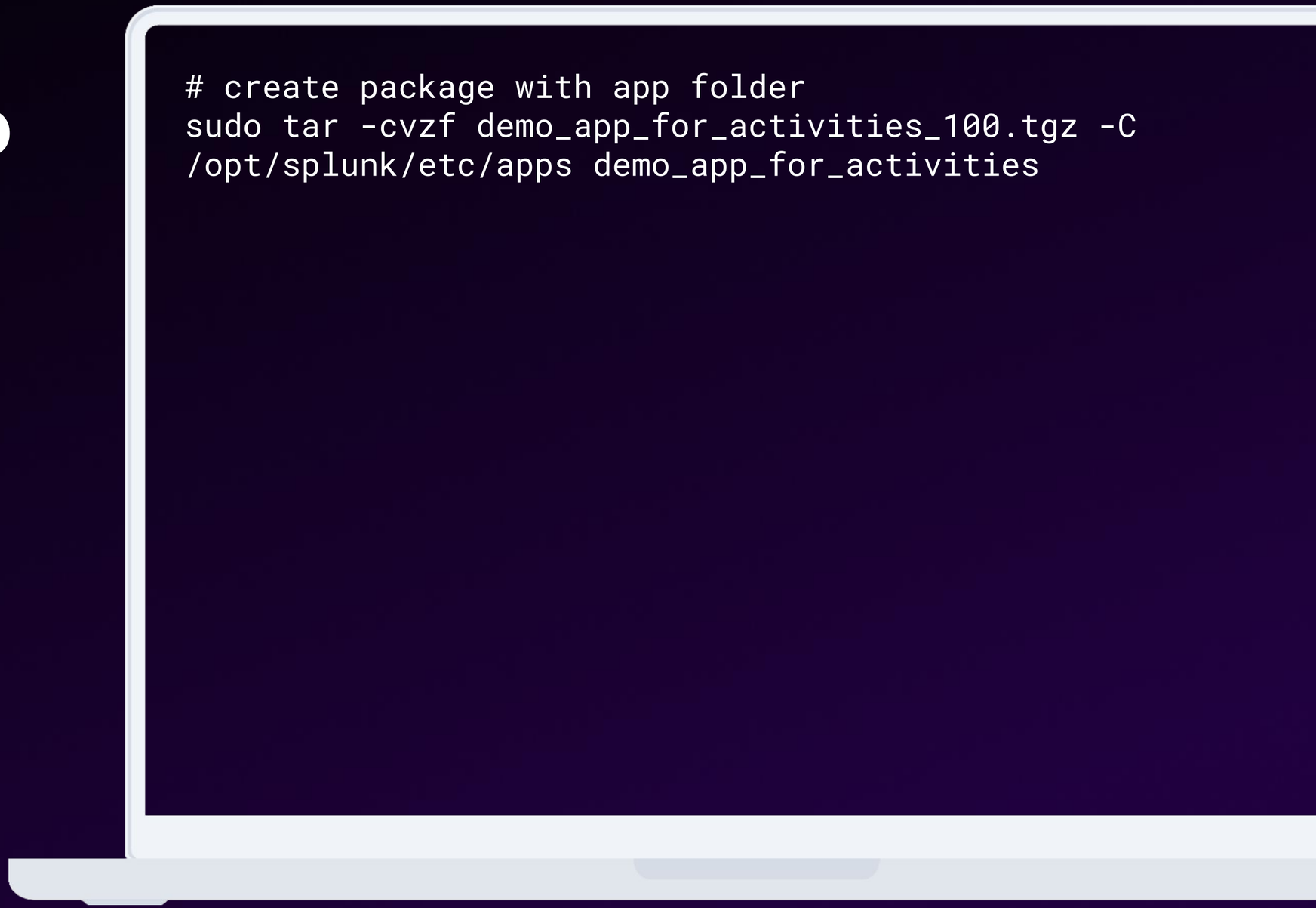
✅ Customize Navigation

- We want to:
  - Show dashboard on a default view in this app
- We need to:
  - Change default view for the app

Package App

SHOW CLI

Package your app for installation on other instances or for staging



Splunk App development - summary

- Visualize any types of data
- Customize navigation and other elements of the app
- Package app for distribution or installation on other environments

Splunk Apps Best Practices

.conf24

splunk>

Bring on the future.

Before You Start 🛑🚦

- Review product documentation and product release notes for the latest features that might resolve your problem
- Always check Splunkbase and Splunk Github for existing solutions
- Use knowledge articles published by Splunk experts:
  - Splunk Blogs
  - Splunk Lantern
- Use Splunk Community resources to see if other Splunk users tried to solve a similar problem:
  - Splunk Answers
  - splunk-usergroups Slack channels
- Request new features for officially supported apps and add-ons via Splunk Ideas portal

Apps and Add-ons Best Practices

Splunk Add-ons 🟢🚦

- Use UCC Framework for a quick start and code shareability
- Leverage SDKs (e.g. Splunk SDK for Python) to abstract code for basic operations
- Leverage logging best practices to manage exceptions
- Use json format, when feasible, to write data into index
- Follow Python best practices and coding standards
- Mock input data for development:
  - API - e.g.: Postman, Mockon
  - Event generation - e.g.: Eventgen

Apps and Add-ons Best Practices

Splunk Apps 🟢🚦

Check Splunk Dashboard Examples for design inspirations

Use Dashboard Studio to build future proof dashboards

Learn Splunk Processing Language well! Optimize your SPLs.

Customize app navigation for your users

Secure data with access control configuration

Expand user experience with Splunk UI Toolkit

Apps and Add-ons Best Practices

When You’re Done 🏁

- 📦 **PACKAGE** your apps and add-ons for distribution
- 🚀 **PUBLISH** your work on Splunkbase to help others solve their problems
-  **SHARE** your code via Github to allow others contribute to your work
-  CONTRIBUTE to others’ work to practice your amazing skills!

Apps and Add-ons Best Practices

Giveaways

Splunk Product Ecosystem

Apps & Integration

.conf24

splunk>

Bring on the future.

Giveaways 🎉

Github links

Splunk Product Landscape

SCAN ME

Cisco + Splunk Integrations

SCAN ME

DEVeloper activations at .conf24

Meet us at the **Builder Bar** in source=*Pavillion

What's the Builder Bar?

- Interactive space for anyone who builds custom SPLs, dashboards, apps and integrations to extend Splunk capabilities.

Key Sessions

- **DEV Breakout Sessions:** 11 sessions and workshops to dive deep into development topics.
- **Builder Bar Theater Sessions:** 14 sessions showcasing app building and best practices.
- **DEV Roundtable Sessions:** 8 Sessions focused on feedback, new features and more (there might be a surprise in store!)

Special Features

- 'What's on your mind?': Share your ideas and feedback on note cards!
- Collaboration stations: Network and engage with experts on SPL2, GDI and all things app dev.
- Fun swag: Builder pins, Jenga tower and LEGO mug build!

Q/A

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splunk>

Bring on
the future.

Thank you