

# Introduction to Dashboards - Lab Exercises

## Overview

Welcome to the Splunk Education lab environment. These lab exercises will guide you through the process of creating basic dashboards in Splunk's Dashboard Studio.

**IMPORTANT:** Save dashboards you create to the Introduction to Dashboards app with permissions set to Private. If you copy text from this document, please note that character formatting and artifacts created by the PDF generation process can cause errors in the dashboard source (XML or JSON). Consider using a text editor as an interim step.

## Typographical Conventions

- **Blue** text indicates text to **add**
  - **Red** text indicates text to **remove**
  - **Grey** text provides context for edits

# Track Your Progress

Each step in the lab exercises has an active checkbox next to it. Check off your steps as you progress through the tasks. If you get distracted, these will help you locate where you left off.

## Lab Connection Information

Access labs using the server URL, user name and password shown in your lab environment.

Servers	Lab Document	Check My Work	Help
Lab Server Info:			
Server URL	Public IP	Splunk User Name	Password
<a href="https://11-195-15-aio.class.splunk.com">https://11-195-15-aio.class.splunk.com</a>	3.23.114.109	powerUser	password1234567890
Status			DEPLOYED

## Source Types

The source types used in these exercises are referred to by the type of data they represent.

Index	Type	Source type	Interesting Fields
cafefood	Cafe Food	access_combined_cf	action, bytes, categoryId, clientip, itemId, JSESSIONID, price_large, price_med, productName, productId, referer, referer_domain, roast, status, user, useragent
cafegames	Cafe Games	access_combined_cg	action, categoryId, bytes, clientip, JSESSIONID, player1name, player1score, player2name, player2score, price, productName, productId, referer, referer_domain, sale_price, status, user, useragent
webapp	Annotations	app_monitoring	message

## Lab Exercise 1 – Create a Prototype

### Description

When you create a dashboard, it is best to start with a prototype. After stakeholders review the prototype, add more functionality. In this lab exercise, you will create a prototype for the Buttercup Games Cafe operations team.

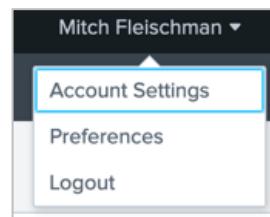
### Wireframe



### Task 1: Change the account name and time zone.

Set up your lab environment to fit your time zone and the app you will be working in. This also allows the instructor to track your progress and assist you if necessary.

- 1. Navigate to **User Menu > Account Settings**.
- 2. In the Full Name box, enter your name: <[Firstname Lastname](#)>  
For example: Mitch Fleischman
- 3. Click **Save** and reload your browser.
- 4. Navigate to **User Menu > Preferences**.
- 5. Enter the following settings:
  - Time zone: <[your local time zone](#)>
  - Default application: Introduction to Dashboards
- 6. Click **Apply**.

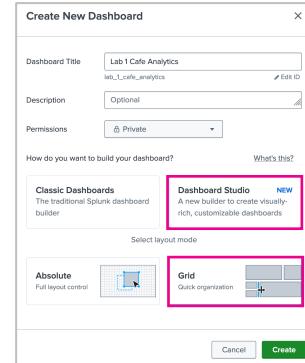


**NOTE:** Since your default application is now Introduction to Dashboards, clicking the Splunk logo is the same as navigating to Apps > Introduction to Dashboards.

## Task 2: Create a prototype dashboard.

In this prototype, you will use the `makeresults` command to generate sample search results.

- 7. Navigate to the Introduction to Dashboards course app.
- 8. Click **Dashboards**.
- 9. Click **Create New Dashboard**.
- 10. In the Dashboard Title box enter: **Lab 1 Cafe Analytics**
- 11. Set permissions to **Private**.
- 12. Click **Dashboard Studio**.
- 13. Select **Grid** layout.
- 14. Click **Create**.



## Task 3: Add a single-value radial visualization.

- 15. On the new dashboard, click the **Add Chart** button.
- 16. Select **Single Value Radial**.
- 17. On the Select Data side panel, under Search click **Create Search**.
- 18. In the Data Source Name box, enter: **Customers**
- 19. In the SPL query box, enter:  

```
| makeresults count=12 | streamstats count
```
- 20. Click **Apply & Close**.
- 21. On the Configuration side panel, in the Title box, enter: **Customers**
- 22. Scroll down to the Major value & trend section.
- 23. In the Trend display menu select **Percent**.
- 24. Click **Save** to save the dashboard.

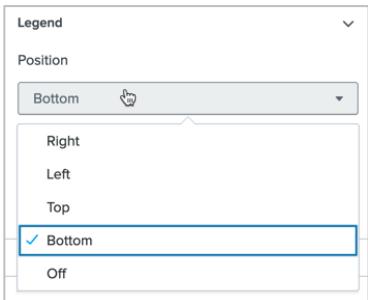
## Task 4: Add a column chart.

- 25. Click the **Add Chart** button and select **Column**.
- 26. On the Select Data side panel, under Search click **Create Search**.
- 27. In the Data Source Name box, enter: **Shopping Cart**
- 28. In the SPL query box, enter:  

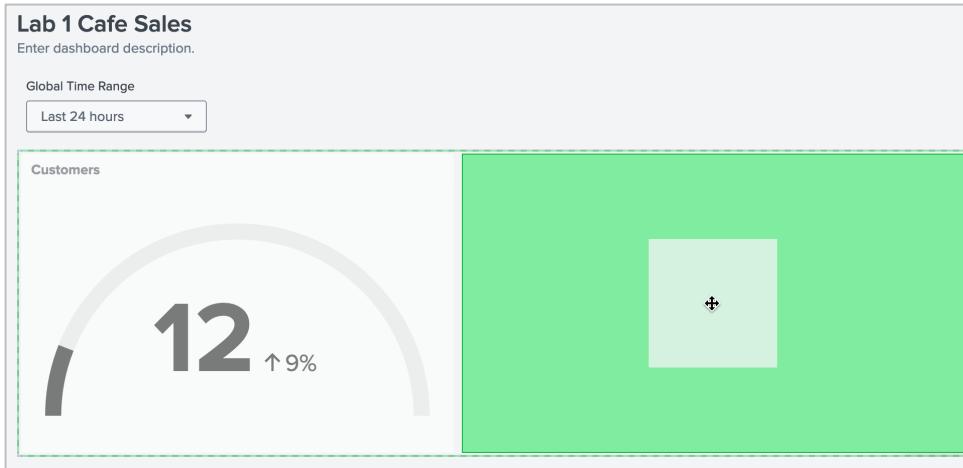
```
| makeresults count=12
| streamstats count
| eval _time=_time-(count*3600)
| eval addtocart =(random () % 3) + 1
| eval purchase =(random () % 3) + 1
| eval abandoned =(random() % 4) + 1
| fields _time addtocart purchase abandoned
```

- 29. Click **Apply & Close**.

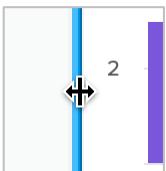
- 30. On the Configuration side panel, in the Title box, enter: [Shopping Cart](#)
- 31. Locate the Legend section.
- 32. From the Position drop-down menu, select **Bottom**.



- 33. Click and drag the column chart to the right of the single-value radial visualization.



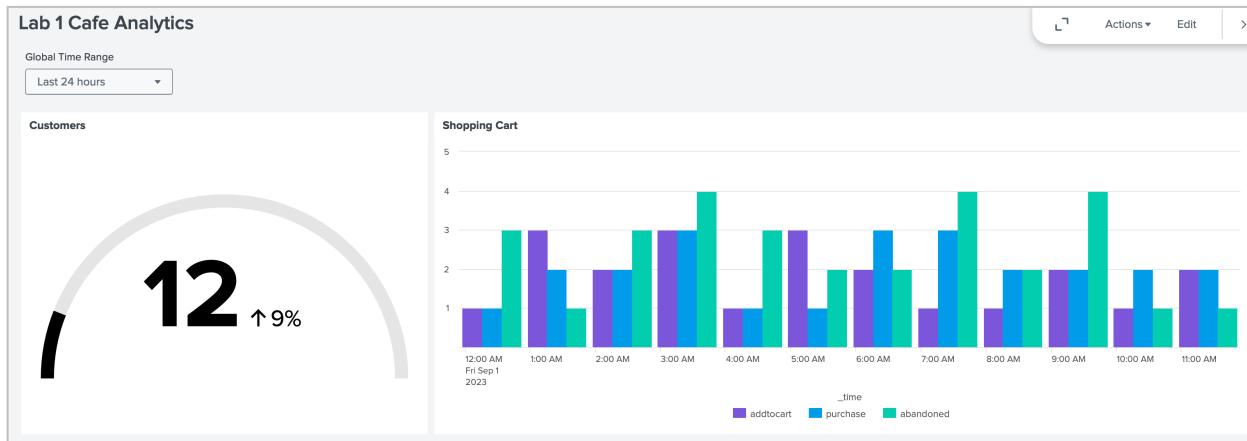
- 34. With the column chart still selected, adjust its width to be twice as wide as the single value visualization by clicking and dragging its left edge.



- 36. Click **Save** to save the dashboard.
- 37. Click **View**.

Example on next page

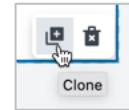
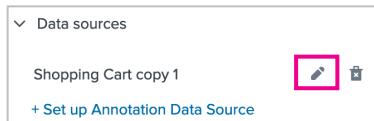
### Example:



### Task 5: Clone a visualization.

Cafe customers can make purchases using the cafe web app (android, iOS, Mac, PC) or the cafe point-of-sale system (inCafe). This chart will display purchases by the device used to make the purchase.

- 38. Click **Edit**.
- 39. Click on the **column chart**.
- 40. Click the **Clone** button on the chart's Action panel.
- 41. On the Configuration side panel, in the Title box, rename it to: **Device Used for Purchase**
- 42. In the Data Sources section, click the **pencil** button beside Shopping Cart copy 1.

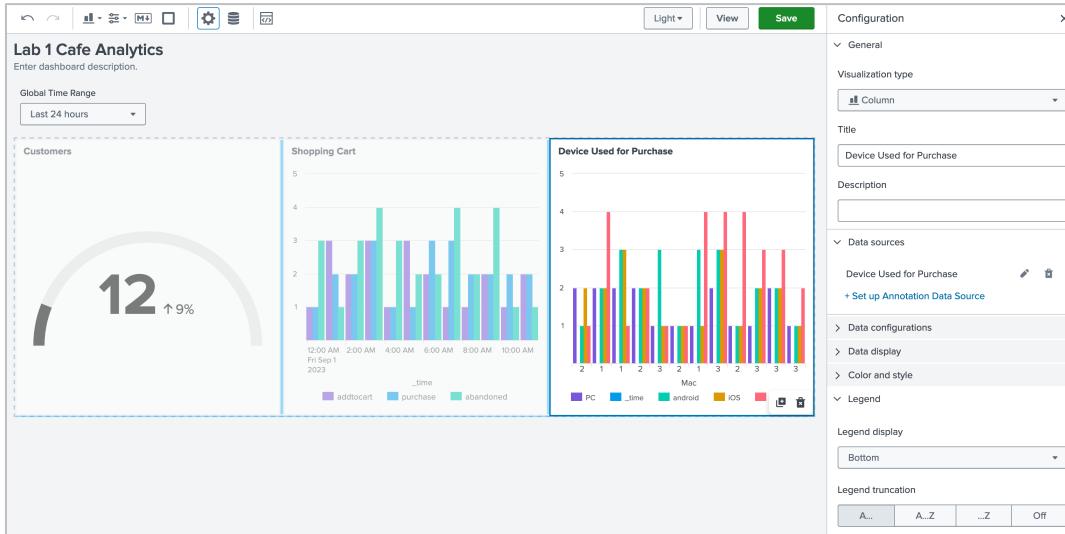



- 43. In the Data Source Name box rename it to: **Device Used for Purchase**
- 44. In the SPL query box enter:

```
| makeresults count=12
| streamstats count
| eval _time=_time-(count*3600)
| eval android =(random() % 3) + 1
| eval iOS =(random() % 3) + 1
| eval Mac =(random() % 3) + 1
| eval PC =(random() % 2) + 1
| eval inCafe =(random() % 4) + 1
| fields _time android iOS Mac PC inCafe
```

- 45. Click **Apply & Close**.
- 46. Click **Save** to save the dashboard.

## Example:



## Task 6: Add a table.

This table will display the errors by servers used for purchases at the cafe.

- 47. Click the **Add Chart** button and select **Table**.

Notice the table is added to a new row.

- 48. On the Select Data side panel, under Search, click **Create Search**.

- 49. In the Data Source Name box, enter: [Server Errors](#)

- 50. In the SPL query box enter:

```
| makeresults count=3 | streamstats count
| eval host = case(count=1, "www1", count=2, "www2", count=3, "www3", count=4, null())
| eval 404 = case(count=1, 35, count=2, 32, count=3, 31, count=4, null())
| eval 406 = case(count=1, 25, count=2, 39, count=3, 31, count=4, null())
| eval 500 = case(count=1, 25, count=2, 39, count=3, 31, count=4, null())
| eval 503 = case(count=1, 25, count=2, 39, count=3, 31, count=4, null())
| table host, 404, 406, 500, 503
```

- 51. Click **Apply & Close**.

- 52. On the Configuration side panel, in the Title box, enter: [Server Errors](#)

- 53. Select the **Device Used for Purchase** column chart and drag it to the lower row, positioning it to the left of the Server Errors table.

- 54. Make both rows a similar height by clicking and dragging the dotted line, beneath the visualizations, up or down.



- 55. Click **Save** to save the dashboard.

- 56. Click **View** and reload your browser.

- 57. Click the **Fullscreen** button.

**NOTE:** If the table columns do not fill all the way to the right, click the refresh button on its action panel.



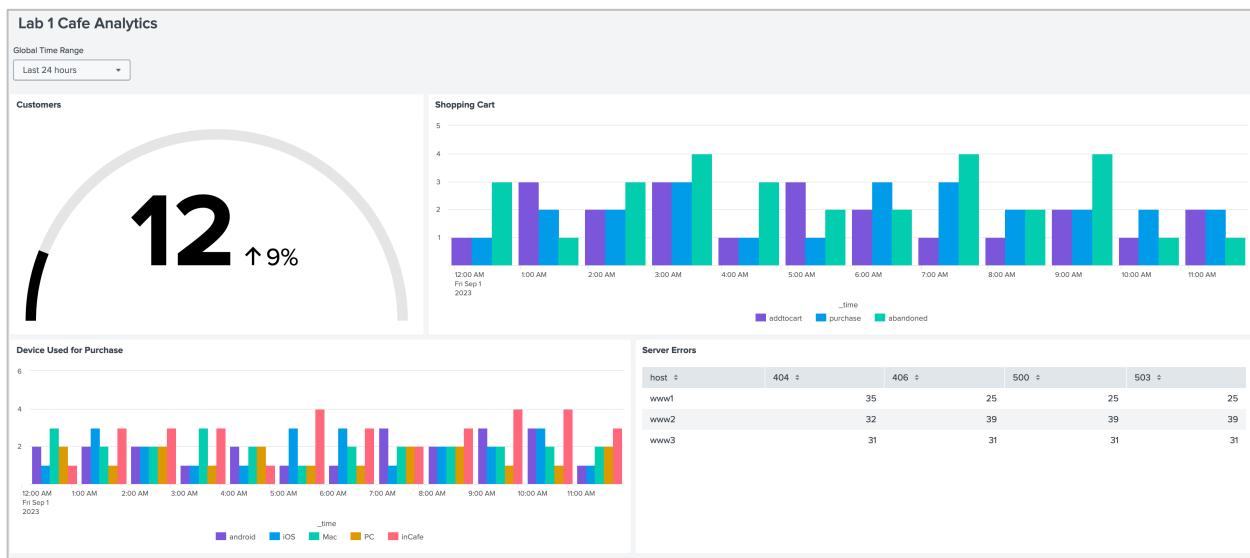
- 58. Press the Escape key (esc) to exit full screen mode.

## Congratulations

### You completed Lab Exercise 1!

#### Highlights

- Created a dashboard from the Dashboards page
- Used a grid layout
- Used the makeresults command to create sample data
- Created and configured a single-value radial visualization
- Created and configured a column chart
- Changed the height and width of visualizations on a grid layout
- Cloned a visualization
- Revised a data source
- Renamed a data source
- Created a table



## Lab Exercise 2 – Add Event Annotations

### Description

Clone a dashboard, format the single-value radial visualization, add live data, add chart annotations, change the layout type, and add a background image.

### Wireframe



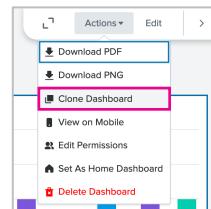
### Steps

**Scenario: The operations team likes the prototype and wants a few changes:**

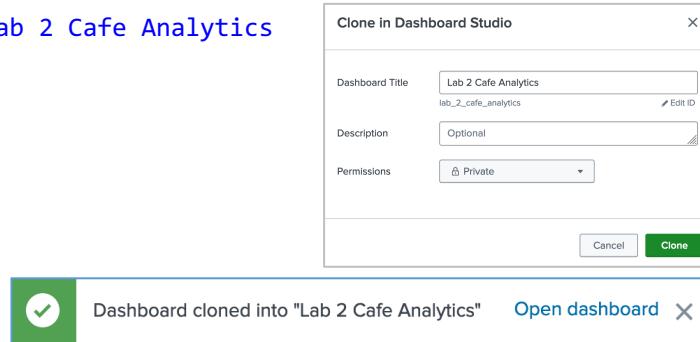
- Change the single value radial to a donut chart displaying game sales
- Change the server errors table to an area chart
- Annotate the shopping cart chart with server messages
- Add a background graphic
- Make the entire dashboard display in dark mode

#### Task 1: Clone a dashboard.

- 1. Navigate to the Lab 1 Cafe Analytics dashboard.
- 2. In the Actions menu, select **Clone Dashboard**.



- 3. In the Dashboard Title box enter: **Lab 2 Cafe Analytics**
- 4. Click **Clone**.
- 5. Click **Open dashboard**.



**NOTE:** If the pop-up window closes before you click Open dashboard, click the Dashboards tab, locate the dashboard, and click Open.

## Task 2: Revise search queries.

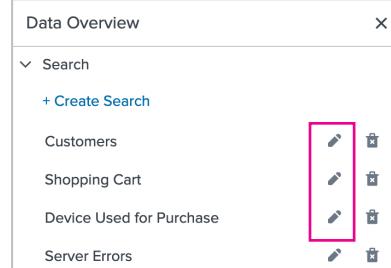
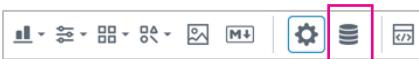
- 6. Click **Edit**.
- 7. Click the **Data Sources** button.
- 8. On the Data Overview side panel, click the **pencil** button beside Customers.
- 9. In the Data Source Name box, rename it: **Game Purchases**
- 10. Replace the query in the SPL query box with:

```
index=cafegames sourcetype=access_combined_cg
status=200
| stats count by product_name
```

- 11. Under Time Range, select **Input**.
- 12. Click **Apply & Close**.
- 13. Click the **pencil** button beside Shopping Cart.
- 14. Replace the query in the SPL query box with:

```
index=cafegames sourcetype=access_combined_cg
status=200 action IN (addtocart, purchase)
| timechart count as number by action useother=f
| eval abandoned = abs(addtocart - purchase)
```

- 15. Under Time Range, select **Input**.
- 16. Click **Apply & Close**.



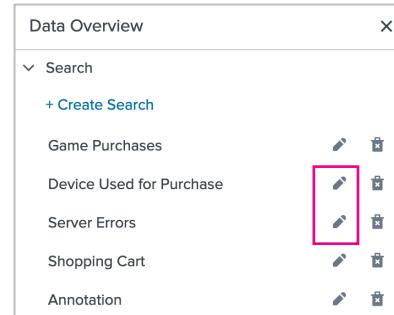
- 17. Click the **pencil** button beside Device Used for Purchase.
- 18. Replace the query in the SPL query box with:

```
index=cafegames sourcetype=access_combined_cg status=200
| eval useragent = case(
    like(useragent, "%iPad%"), "iPad",
    like(useragent, "%iPhone%"), "iPhone",
    like(useragent, "%Android%"), "Android",
    like(useragent, "%Macintosh%"), "Mac",
    like(useragent, "%Windows%"), "Windows",
    like(useragent, "%compatible%"), "Windows",
    like(useragent, "%POS%"), "inCafe",
    like(useragent, "%WeatherReport%"), "iPad",
    true(), useragent)
| fields useragent
| timechart count by useragent
```

- 19. Under Time Range, select **Input**.
- 20. Click **Apply & Close**.
- 21. Click the **pencil** button beside Server Errors.
- 22. Replace the query in the SPL query box with:

```
index=cafegames sourcetype=access_combined_cg status>399
| timechart count by status useother=f
```

- 23. Under Time Range, select **Input**.
- 24. Click **Apply & Close**.



### Task 3: Change visualizations.

---

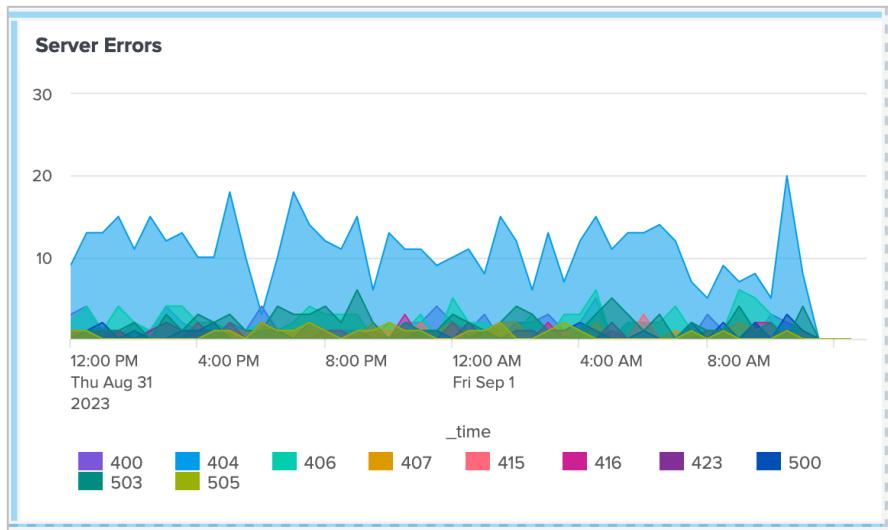
- 25. Click on the **Customers** visualization.
- 26. In the Configuration side panel, in the Visualization type menu, select **Pie**.
- 27. In the Title box, rename it: **Game Purchases**
- 28. In the Data display section, under Display type, click **Donut**.

#### Example:



- 29. Click on the **Server Errors** visualization.
- 30. In the Configuration side panel, in the Visualization type menu, select **Area**.
- 31. Locate the Legend section, in the Legend display menu, select **Bottom**.
- 32. Save the dashboard and reload your browser.

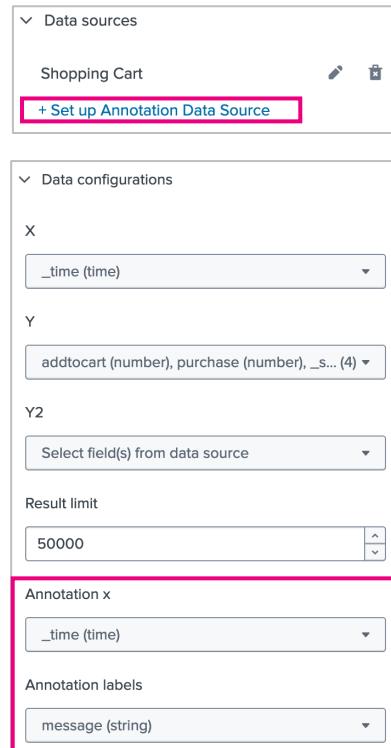
**Example:**



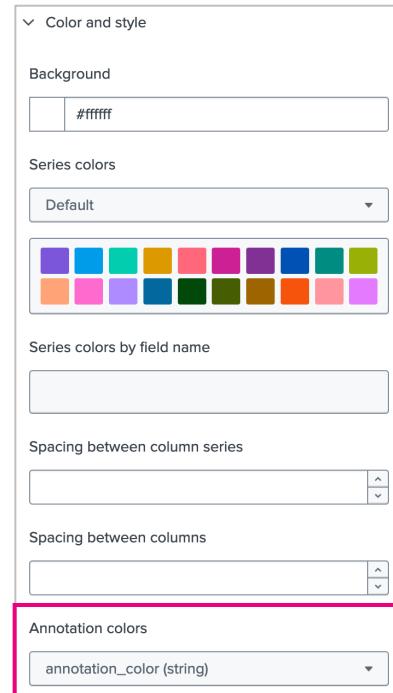
**Task 4: Add an annotation search.**

- 33. Click on the **Shopping Cart column chart**.
- 34. In the Configuration side panel, under Data sources, click **Set up Annotation Data Source**.
- 35. In the Select Data side panel, click **Create Search**.
- 36. In the Data Source Name box, enter: [Annotation](#)
- 37. In the SPL query box, enter:
 

```
index=webapp sourcetype=app_monitoring
| eval annotation_color = case(message like "INFO
maintenance operation", "#75C5F0",
message like "CRITICAL security issue", "#FF4747",
message like "WARNING network issue", "#F3CC17")
```
- 38. Under Time Range, select **Input**.
- 39. Click **Apply & Close**.
- 40. Under Data Configurations, in the Annotation x menu, select **\_time (time)**.
- 41. In the Annotation labels menu, select **message (string)**.



- 42. Under Color and Style, in the Annotation colors menu, select **annotation\_color (string)**.
- 43. Save the dashboard.
- 44. Click **View**.  
If you are not seeing the annotations, retrace your steps, and check your edits for typos.
- 45. Test the dashboard:
  - Move your mouse pointer over an annotation
  - Select a different time range.



## Task 5: Change the layout type.

Changing the layout type to absolute allows adding a background image to the dashboard.

- 46. Click **Edit**.
- 47. Click the **Source Editor** button.
- 48. Scroll down to locate the layout section of the dashboard definition.



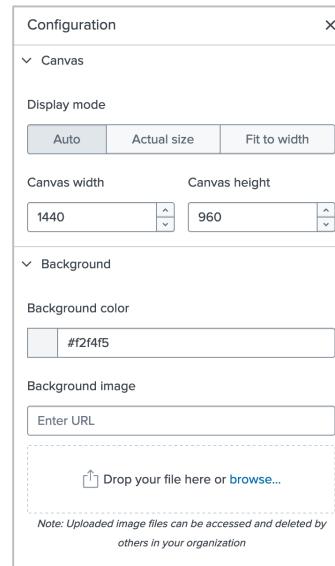
**TIP:** Instead of scrolling through the source code, you can also use the search feature of the source editor. In your browser, select Find in the Edit menu or the keyboard shortcut: Cmd+F (Mac), Ctrl+F (Windows).



- 49. Revise the type option from grid to absolute.

```
...  
},  
    "layout": {  
        "type": "absolute",  
        "options": {  
            "width": 1440,  
            "height": 960  
        },  
        "structure": [  
            ...  
        ]  
    }  
}
```

- 50. Click **Back**.
- 51. Notice the changes to the Configuration side panel.  
The absolute layout offers three display modes, exact sizing for canvas width and height, and options for background color and background image.



## Task 6: Adjust visualization height.

In an absolute layout, the default dimensions of the canvas are 1440 pixels in width and 960 in height. This means the visualizations on this dashboard can now be scaled.

- 52. Click on the **Game Purchases** chart.
- 53. In the Configuration side panel, locate the Position & Size section.
- 54. Set X position to: **0** and Y position to: **0**
- 55. Set Width to: **480** and Height to: **380**
- 56. Click on the **Shopping Cart** chart.
- 57. Set X position to: **480** and Y position to: **0**
- 58. Set Width to: **960** and Height to: **450**
- 59. Click on the **Device Used for Purchase** chart.
- 60. Set X position to: **0** and Y position to: **450**

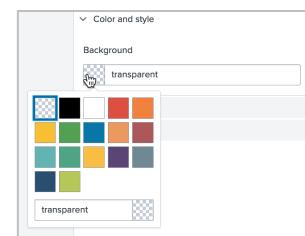
- 61. Set Width to: [720](#) and Height to: [450](#)
- 62. Click on the **Server Errors** chart.
- 63. Set X position to: [720](#) and Y position to: [450](#)
- 64. Set Width to: [720](#) and Height to: [450](#)
- 65. Save the dashboard.

## Task 7: Set visualization background to transparent.

---

Before adding a background image, set each visualization to have a transparent background. This allows a background image to be visible through the visualization

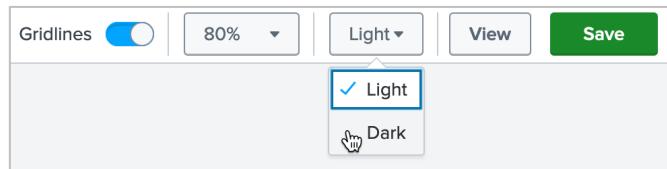
- 66. Click on the **Game Purchases** visualization.
- 67. In the Configuration side panel, locate the Color and Style section.
- 68. Click on the color square beneath Background and select transparent.
- 69. Repeat the above steps for each of the remaining visualizations.
  - Shopping Cart
  - Device Used for Purchase
  - Server Errors



## Task 8: Set the dashboard to dark mode.

---

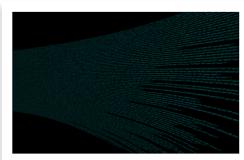
- 70. In the Mode menu, select Dark.



## Task 9: Add a background image.

---

Four different background images are available in a .zip file at the lab downloads link.



lab2\_background\_v1.png



lab2\_background\_v2.png

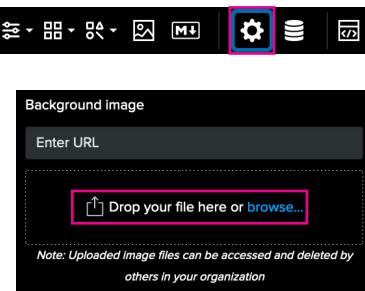


lab2\_background\_v3.png

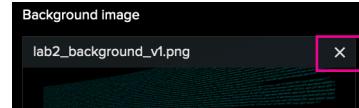


lab2\_background\_v4.png

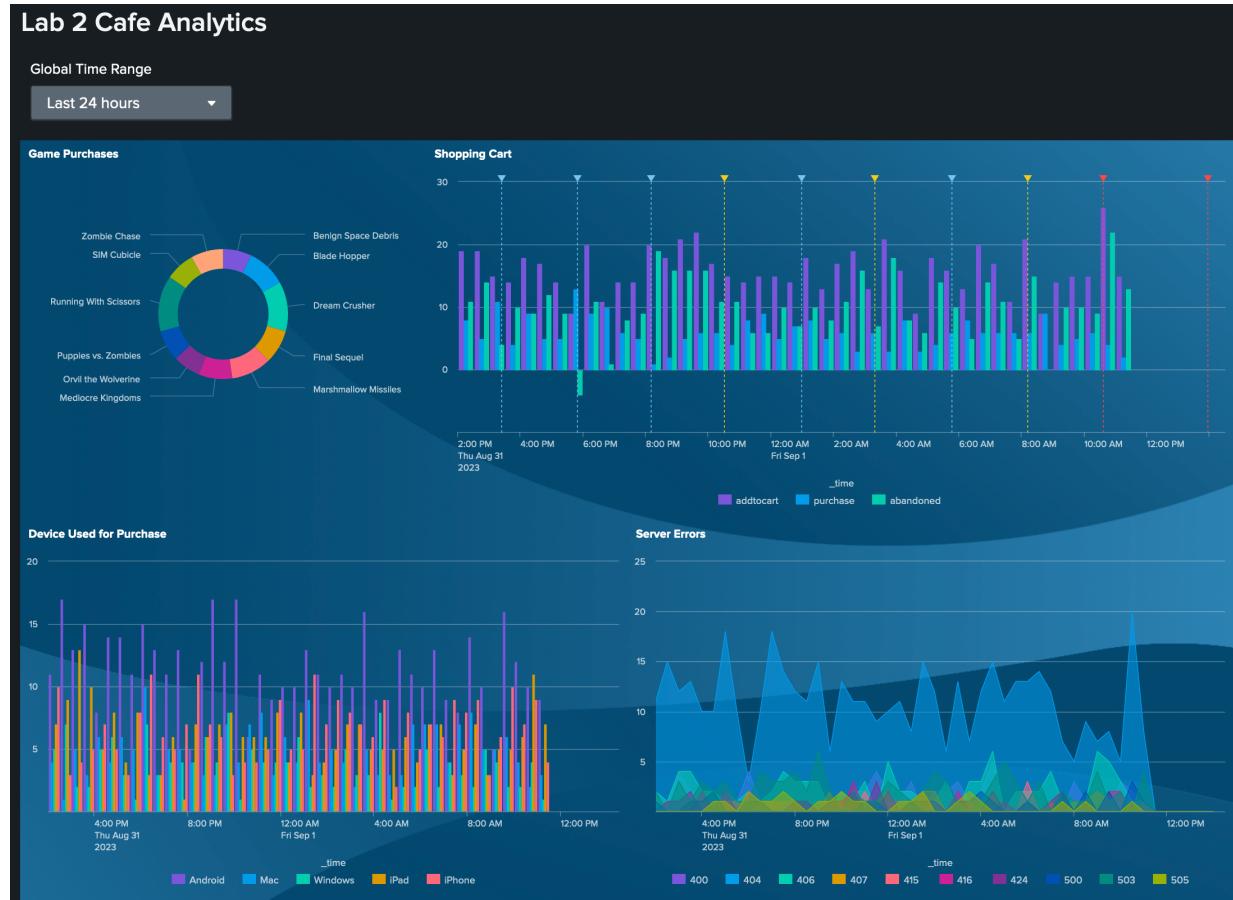
- 71. Click on the **Configuration** button.
- 72. In the Configuration side panel, locate the Background section.
- 73. Under Background image, click **browse**.
- 74. Locate the PNG files supplied in the file at the lab downloads link.
- 75. Select one and click **Open**.
- 76. Click **View** and scroll down to see how the dashboard looks.



- 77. Click **Edit**.
- 78. In the Background image section, click the **X** to the right of the background image filename.
- 79. Repeat the above steps and try a different background image.
- 80. Save the dashboard and reload your browser.
- 81. Click **View**.



**Example:**



## Congratulations

You completed Lab Exercise 2!

### Highlights

- Cloned a dashboard
- Revised data source queries
- Changed visualizations
- Added an annotation search to a chart
- Used the source editor
- Changed the layout type
- Made visualizations transparent
- Adjusted visualization height and position
- Used dark mode
- Added a background image

### Lab 2 Cafe Analytics



## Lab Exercise 3 – Improve Performance

### Description

In this exercise you will improve dashboard performance by using base and chain searches. Then, you will revise the base search to use the tstats command with an accelerated data model. Since one base search will drive all visualizations on this dashboard, this is referred to as a global search.

### Wireframe

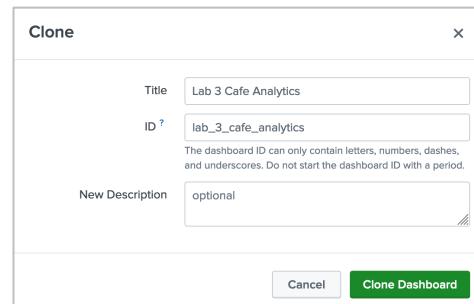


### Steps

**Scenario:** The operations team likes the latest dashboard. They want one more thing before signing off on it. They want it to load quickly with limited impact on the search head.

#### Task 1: Clone a dashboard.

- 1. Click the **Dashboards** tab.
- 2. Locate the Lab 2 Cafe Analytics dashboard.
- 3. In the Actions menu, select **Clone**.  
The Clone window appears.
- 4. In the Title box enter the following:  
**Lab 3 Cafe Analytics**
- 5. Click **Clone Dashboard**.  
The Dashboard has been cloned window appears.
- 6. Click **Edit**.



The screenshot shows the "Clone" dialog box with the following fields:

- Title:** Lab 3 Cafe Analytics
- ID:** lab\_3\_cafe\_analytics
- New Description:** optional

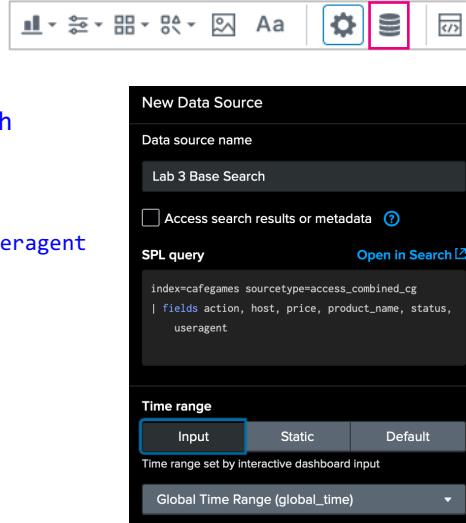
A note below the ID field states: "The dashboard ID can only contain letters, numbers, dashes, and underscores. Do not start the dashboard ID with a period."

Buttons at the bottom: **Cancel** and **Clone Dashboard**.

## Task 2: Add a base search.

- 7. Click the **Data Overview** button.
- 8. On the Data Overview side panel, click **Create Search**.
- 9. In the Data Source Name box, enter: **Lab 3 Base Search**
- 10. In the SPL query box, enter:
 

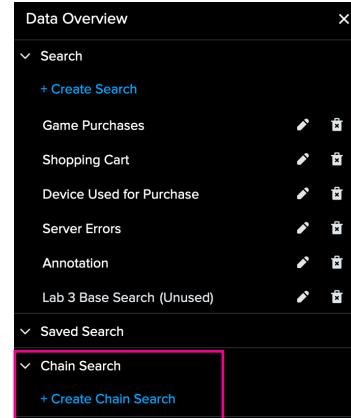
```
index=cafegames sourcetype=access_combined_cg
| fields _time, action, host, product_name, status, useragent
```
- 11. Under Time Range, select **Input**.
- 12. Click **Apply & Close**.



## Task 3: Create a chain search.

- 13. Click **Create Chain Search**.
- 14. In the Data Source Name box, enter: **Game Purchases - chain**
- 15. In the Parent Search menu, select **Lab 3 Base Search**.
- 16. In the Game Purchases - chain SPL box, enter:
 

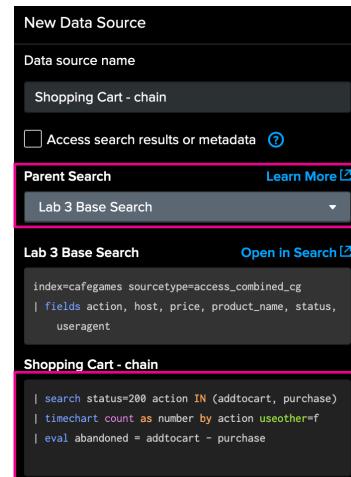
```
| search status=200 action IN (addtocart, purchase)
| eval abandoned = abs(addtocart - purchase)
| chart count as number by product_name action useother=f
```
- 17. Click **Apply & Close**.



## Task 4: Create a second chain search.

- 18. Click **Create Chain Search**.
- 19. Name the data source: **Shopping Cart - chain**
- 20. In the Parent Search menu, select **Lab 3 Base Search**.
- 21. In the Shopping Cart - chain SPL box, enter:
 

```
| search status=200 action IN (addtocart, purchase)
| timechart count as number by action span=30m useother=f
| eval abandoned = abs(addtocart - purchase)
```
- 22. Click **Apply & Close**.



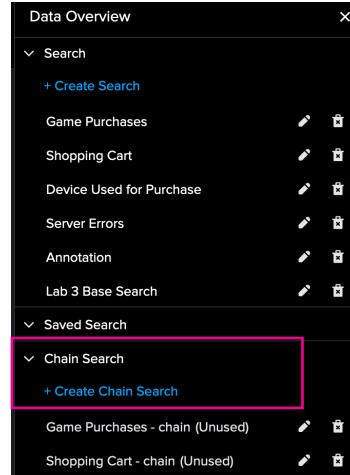
### Task 5: Create a third chain search.

- 23. Click **Create Chain Search**.
- 24. Name the data source: **Device Used for Purchase - chain**
- 25. In the Parent Search menu, select **Lab 3 Base Search**.
- 26. In the Device Used for Purchase - chain SPL box, enter:

```

| search status=200
| eval useragent = case(
    like(useragent, "%iPad%"), "iPad",
    like(useragent, "%iPhone%"), "iPhone",
    like(useragent, "%Android%"), "Android",
    like(useragent, "%Macintosh%"), "Mac",
    like(useragent, "%Windows%"), "Windows",
    like(useragent, "%compatible%"), "Windows",
    like(useragent, "%POS%"), "inCafe",
    like(useragent, "%WeatherReport%"), "iPad",
    true(), useragent)
| fields useragent
| timechart count by useragent

```



- 27. Click **Apply & Close**.

### Task 6: Create a fourth chain search.

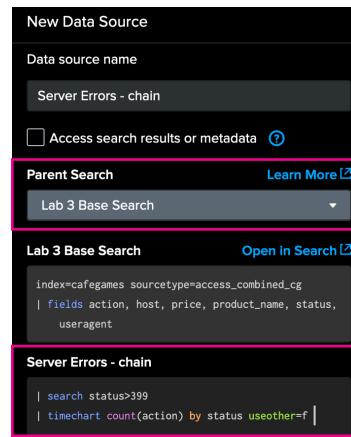
- 28. Click **Create Chain Search**.
- 29. Name the data source: **Server Errors - chain**
- 30. In the Parent Search menu, select **Lab 3 Base Search**.
- 31. In the Server Errors - chain SPL box, enter:

```

| search status>399
| timechart count by status useother=f

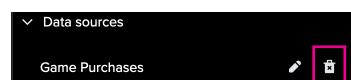
```

- 32. Click **Apply & Close**.
- 33. Save the dashboard and reload your browser.



### Task 7: Change visualization primary data sources.

- 34. Click on the **Game Purchases** visualization.
- 35. In the Configuration side panel, locate the Data sources section.
- 36. Click on the trash can icon beside Game Purchases.
- 37. Click **Set up Primary Data Source**.
- 38. Under Chain Search, click **Game Purchases - chain (Unused)**.



39. Repeat the above steps for each of the remaining visualizations assigning a chain search to each as listed below.

Visualization	Search
Shopping Cart	Shopping Cart - chain
Device Used for Purchase	Device Used for Purchase - chain
Server Errors	Server Errors - chain

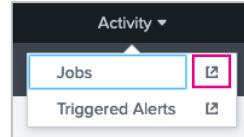
**Note:** On the Shopping Cart visualization, do not delete the Annotation search.

40. Save the dashboard.

#### Task 8: Clear search jobs.

41. Select **Activity > Jobs** and open the Jobs page in a new window.

**TIP:** Right-click the *Open in new window* button next to Jobs and select Open in New Tab.



42. On the Jobs page, make sure the App context is set to: Introduction to Dashboards (intro\_dash)

43. Make sure the Owner is set to: <your\_name> (poweruser).

44. Delete your search history.

a. Select the box beside the **Owner** column header.

b. Click **Edit Selected > Delete**.

c. Click **Delete** to confirm.

d. Repeat the above steps until all jobs have been deleted.

Edit Selected		
	Owner	Application
<input checked="" type="checkbox"/>	poweruser	dynamic_dash
<code>index=cafegames sourcetype=access_com</code>		

45. Return to the tab or window with your Lab 3 - Cafe Analytics dashboard.

46. Set the time range input to **Last 30 days** and reload your browser.

47. Return to the tab or window with the Jobs page and click **Reload Page**.

48. Make sure the App context is set to: Introduction to Dashboards (intro\_dash)

Runtime	Status
00:00:57	Done

49. Make sure the Owner is set to <your\_name> (poweruser).

50. Wait for the Status to show Done and note the runtime for the base search: \_\_\_\_\_

**NOTE:** There should be two searches visible on the Jobs page, the base search starts with `index=cafegames` and the annotation search starts with `index=webapp`.

#### Task 9: Use tstats with an accelerated base search.

51. Return to the Lab 3 - Cafe Analytics dashboard.

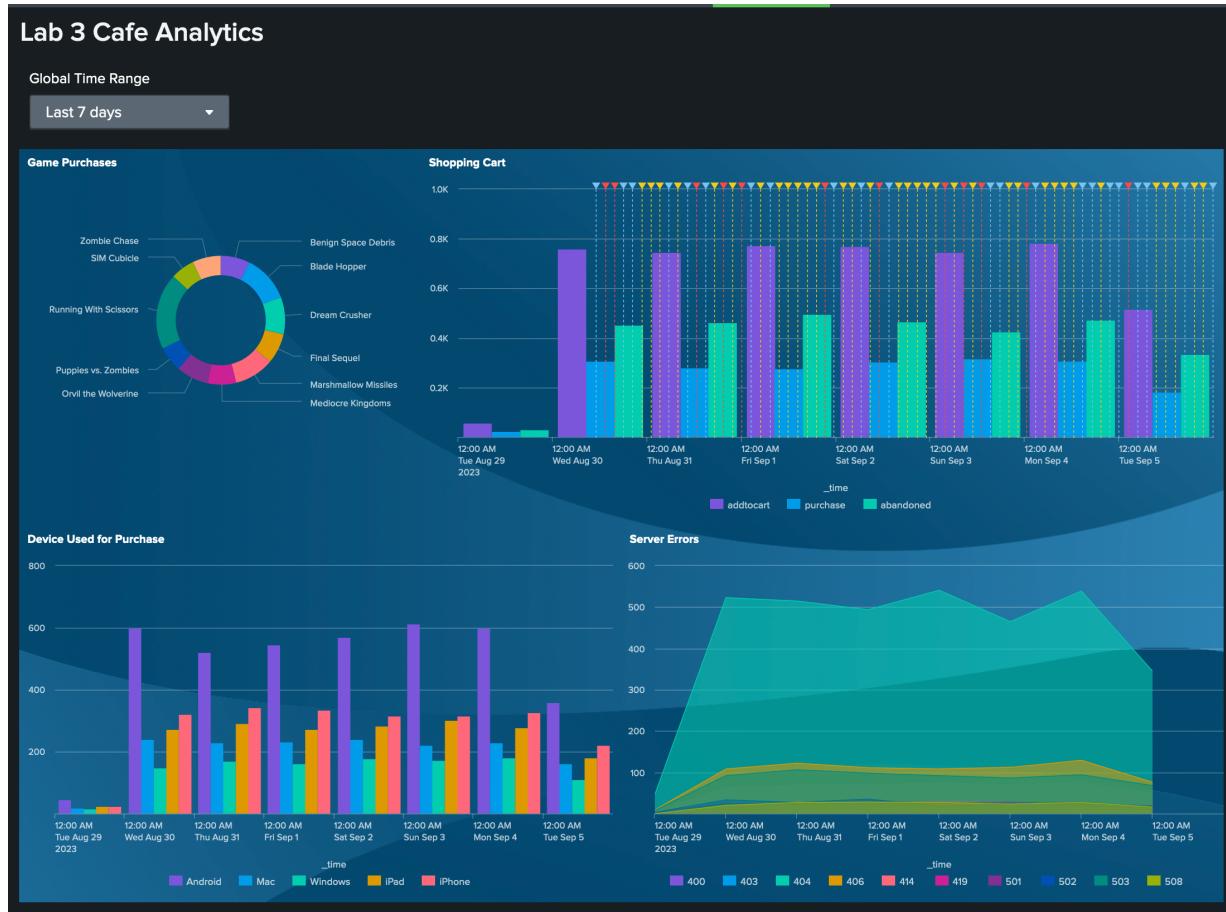
52. Click the **Data Overview** button.



- 53. On the Data Overview side panel, click the **pencil** button beside Lab 3 Base Search.
- 54. Replace the query in the Search with SPL box with:
 

```
| tstats prestats=t summariesonly=t count FROM datamodel="bccafe_x1" BY _time, host, source, sourcetype, index, bcg_ws_root_event.action, bcg_ws_root_event.product_name, bcg_ws_root_event.useragent bcg_ws_root_event.status span=30m | rename bcg_ws_root_event.* as *
```
- 55. Click **Apply & Close**.
- 56. Save the dashboard and reload your browser.
- 57. Return to the tab or window with the Jobs page and reload your browser.
- 58. Wait for the Status to show Done and note the runtime for the base search: \_\_\_\_\_
- 59. Compare the two search runtimes. Consider the *percentage* of difference in the times.

**Example:**



## Congratulations

### You completed Lab Exercise 3!

#### Highlights

- Created base and chain searches
- Used the tstats command against an accelerated data model in a base search
- Measured the speed difference between a standard search and a search using the tstats command against an accelerated data model on the Jobs page.

