

# Charting the Globe: Embedded Analytics Expedition



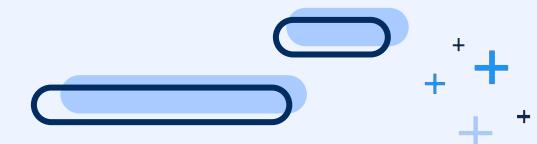
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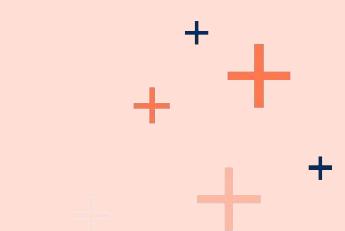
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# Agenda

- 
- 00 Setting Up Your Environment
  - 01 Simple Embedding
  - 02 Single Sign-on Authentication
  - 03 Advanced Embedding API
  - 04 Row-level Security
- 

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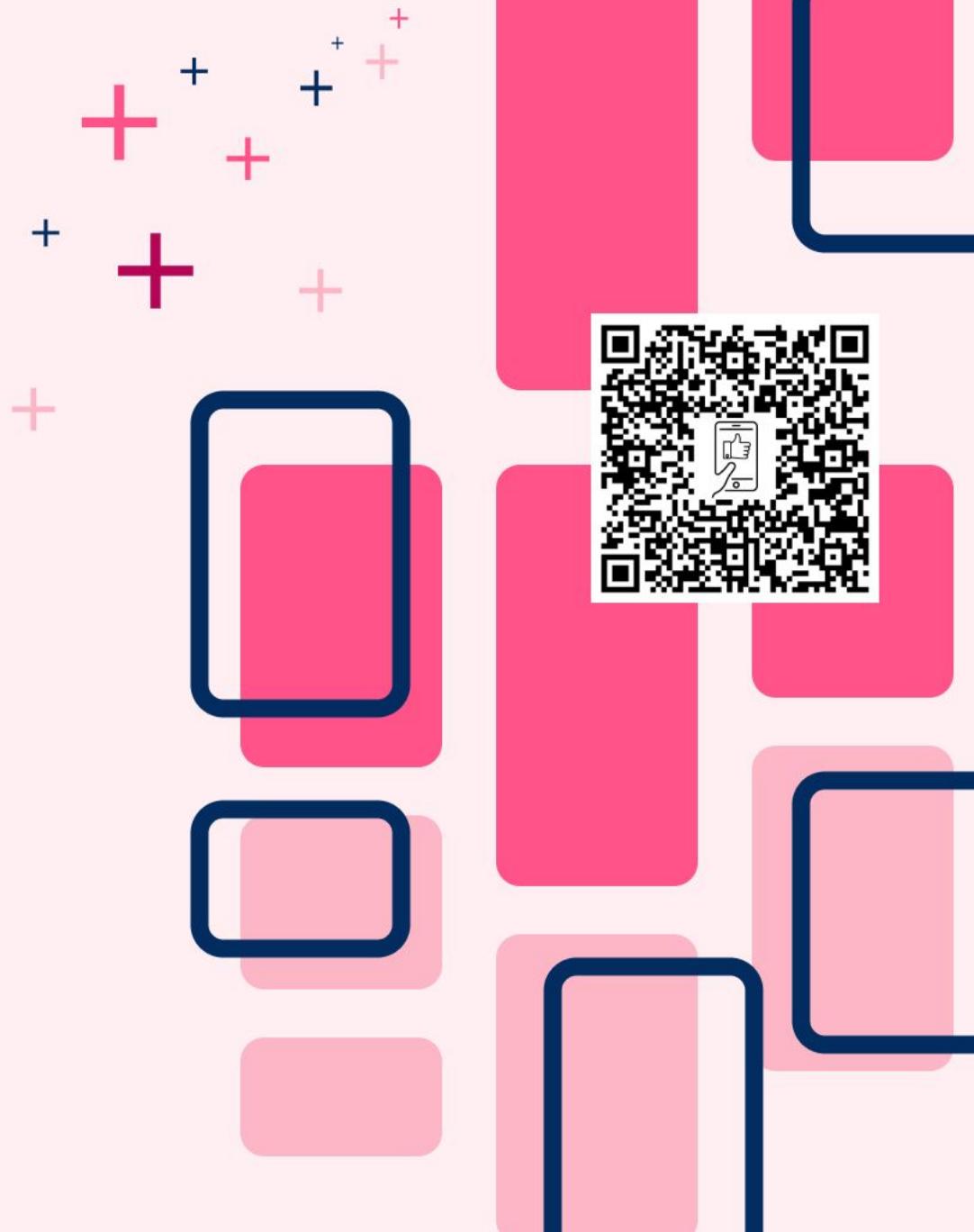
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Your thoughts and ideas are key to making our sessions even more dynamic and engaging. Plus you may even win some goodies!





# Step 0: Setting Up Your Environment

Let's make sure you prep everything needed to go on this expedition!

# What We Are Using Today

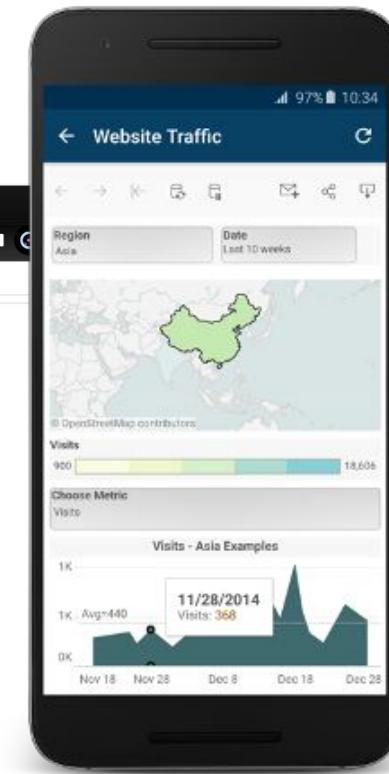
- **Tableau Cloud**
  - To host our dashboards & data
  - An individual Project, one internal admin User & one external User
- **Visual Studio Code**
  - To work with our code in an IDE (Integrated Development Environment)
  - Python Flask web server to run the TC24 app
- **Lab Manual**
  - Review the instructions manual provided with this course for step-by-step instructions



# Work through Initial Setup..

# What is Embedded Analytics (EA)?

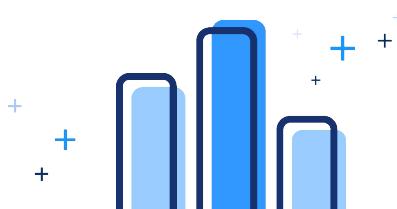
The screenshot shows a Cumulus dashboard interface. On the left, a sidebar lists categories like Interactive Analytics, Curated Analytics, and Self-Service Analytics. The main area features a title 'Portfolio Delinquency Monitoring' and a summary section with large numbers: 73,149 Customers, 28,739 Auto Loan Loans, 13,593 Mortgage Loans, 30,817 SBA Loan Loans, 249 Eligible Customers (0.34% of Customers), and \$32.3M \$ of Loan Balances. Below this is a 'Targeted SBA Loan Accounts' section. A central chart displays 'Redfin Monthly Housing Market Data' from January 2012 to February 2024, showing Median Sale Price trends across various metropolitan areas. The chart includes a legend for National and specific metro areas.



To view additional housing market data at the local level, please visit our U.S. Housing Market Overview page here:  
<https://www.redfin.com/us-housing-market>

## How it Works

- Select the tab for the type of data that you're looking for. Under each tab, you can filter results by metropolitan area, property type, month-over-month change, year-over-year change, and the time period. Each visualization will change with your selections.



# DEMO





# Lesson 1: Simple Embedding

Time to start our expedition! Let's make sure we head out on the correct trail..

# Embedding API v3

- Released Dec 2021
- Initialization via web component
- Many capabilities:
  - Seamless embedding
  - Dashboard filtering
  - Mark selections
  - Setting parameters
  - Fetching data
  - Generating visual outputs
  - Toolbar management
  - Event listeners

## 1. Enable the API:

```
<script type="module"  
src="https://public.tableau.com/javascripts/api/tableau.embeddi  
ng.3.latest.min.js">  
</script>
```

## 2. Add a <tableau-viz> Web Component:

```
<tableau-viz id='tableauViz'  
src='https://my-cloud-site/views/my-workbook/my-view'  
device='phone' toolbar='hidden' hide-tabs></tableau-viz>
```

# Work through Lesson 1..



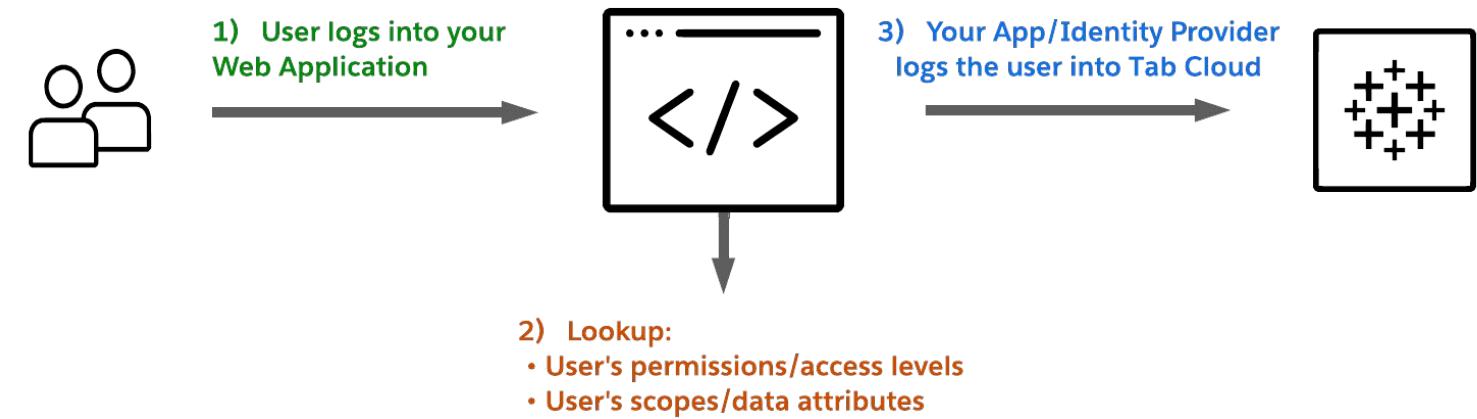
## Lesson 2: Single-Sign On Authentication

In order to go on and reach the summit, we need to give our muscles a short rest..

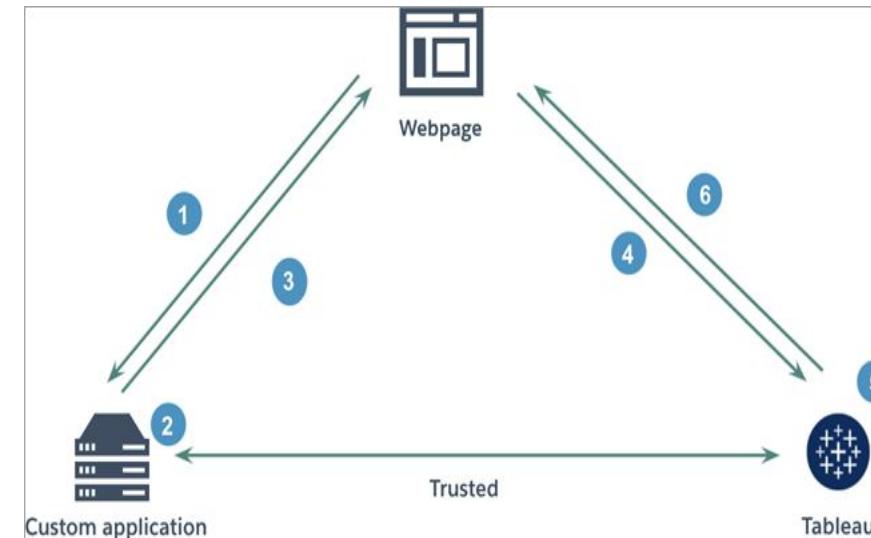
# Connected Apps

- Released Dec 2021
- Designed for EA
- Many capabilities:
  - Secure SSO by JSON Web Tokens (JWTs)
  - Support for Tab Cloud & Tab Server
  - Flexible & agnostic to app authN flows
  - Multiple scoping options
  - No required IP whitelisting

## General AuthN Flow



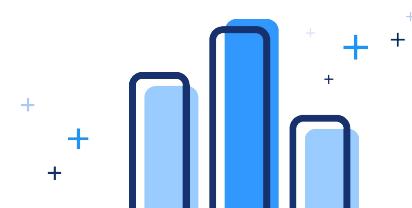
## CA-specific Flow



# Work through Lesson 2..

# Recap (So far..)

- Used Embedding API v3 to configure the web component
- Embedded a dashboard
- Removed the Tableau toolbar
- Wired up custom buttons
- Created a Connected App
- Used the CA to apply Tableau SSO to our portal integration





## Lesson 3: Advanced Embedding API

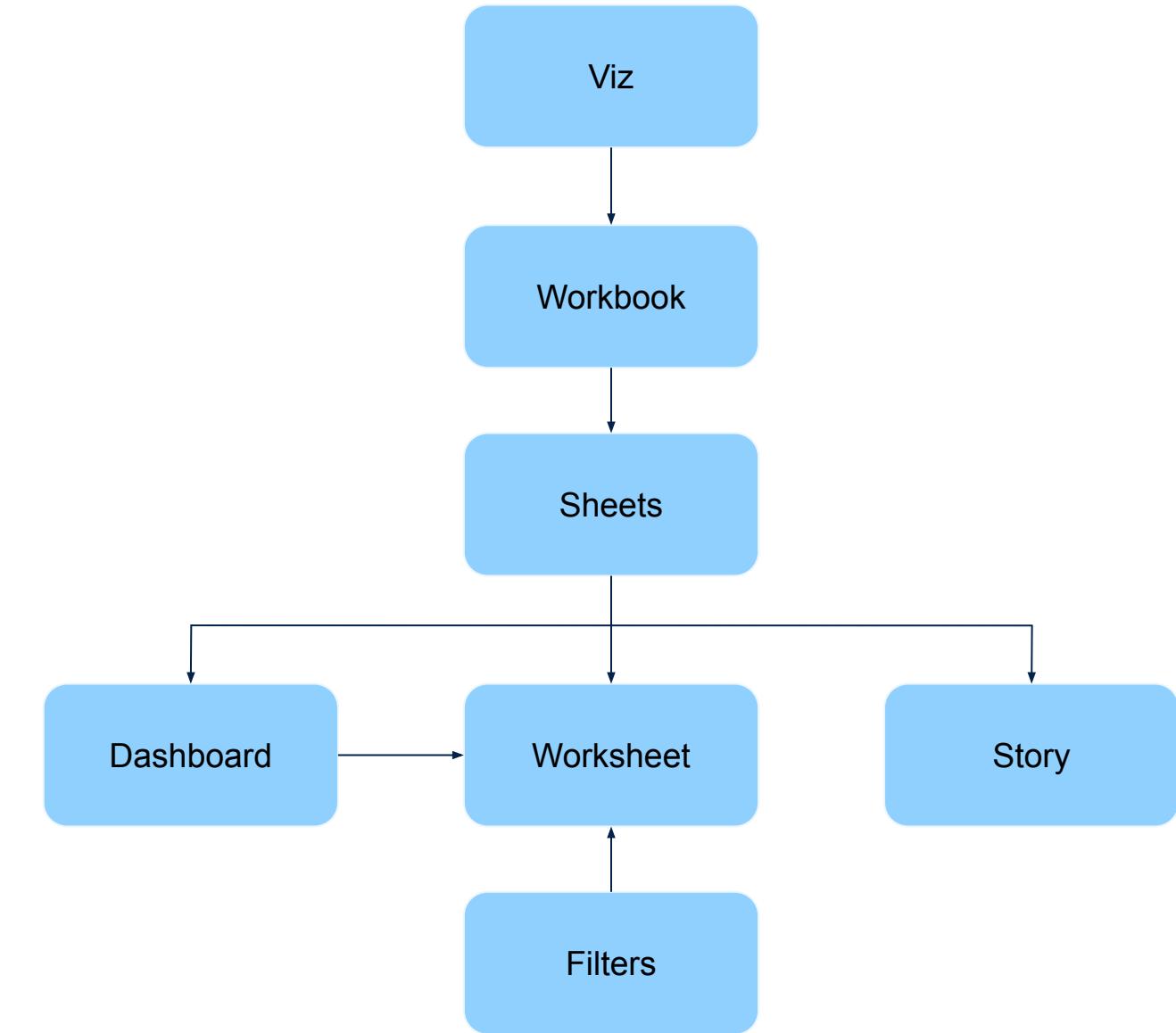
It's a tough ascent to the top! But we can't turn back now..

Time for theory...



# The Viz Object

- Contains everything about our “Embed”
- Point of entry to our Embedded content
- Can be queried for info
- Properties can be set
- Has methods so we can perform actions
- Register event handlers



# Getting the Viz Object

Seen in Lesson 1 with the Reset/Undo/Redo methods:

```
viz = document.getElementById('tableauViz');
```

Grab it when the page loads:

```
window.onload = function () {  
    viz = document.getElementById('tableauViz');
```

When Tableau loads:

```
viz.addEventListener("firstinteractive", ready);
```

# Setting Properties

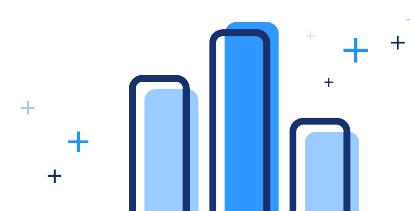
We can manually set properties:

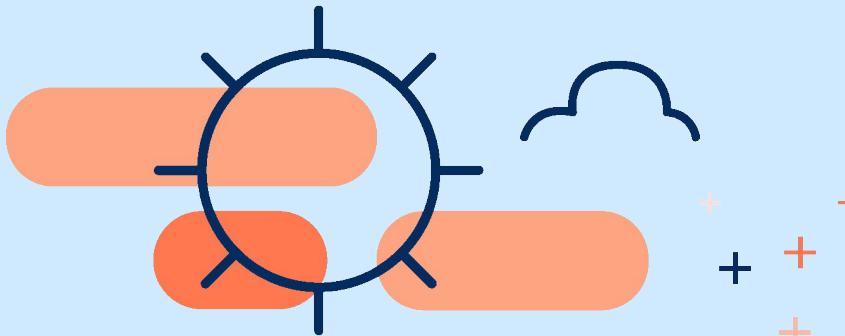
```
<tableau-viz id="tableauViz"
    src= "{{tabServer}}/t/{{tabSite}}/views/{{tabWorkbook}}/MyTCDash"
    device="mobile"
    toolbar="top"
    hide-tabs
    width=100%
</tableau-viz>
```

And, we can dynamically set properties:

```
viz.src = "http://myserver:port/views/workbook/view"
```

\*\*\* Optional [Lesson 3\\_1](#) covers this topic \*\*\*





# Agenda



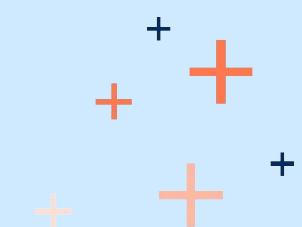
**3\_1 Viz Switching**

**3\_2\_1 Static Filters**

**3\_2\_2 Dynamic Filters**

**3\_3 Mark Selections**

**3\_4 Get Marks**



# Agenda

3\_1 Viz Switching\*

3\_2\_1 Static Filters

3\_2\_2 Dynamic Filters\*

3\_3 Mark Selections\*

3\_4 Get Marks

\*Optional Lessons

# Static Filtering

- Can be applied **initially** or **after** loading the content
- Filter types supported:
  -  - Categorical
  -  - Range
  -  - Date
- Applied to a worksheet-type “sheet”
- May need to loop around our “dashboard” 



# Work through Lesson 3\_2\_1: Static Filters..

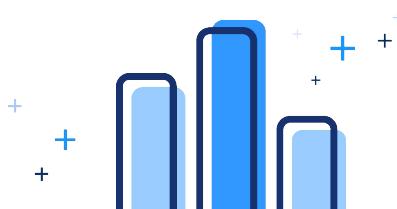


# Dynamic Filtering

- No more hardcoded values! Pull filter values directly from Tableau
- Help you create dynamically generated filters within your app
- Get the entire filter domain, not just the applied values:

```
// get all the values the filter could take to display in the web page dynamically
filter.getDomainAsync().then(domain)
```

\*\*\* Optional [Lesson 3\\_2\\_2](#) covers this topic \*\*\*

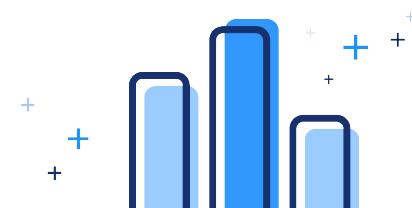


# Mark Selecting

- Mark Selection = Clicking on or dragging a data mark in a viz
- Can trigger other events to happen
- Mark selections can be applied *by* your app
- Similar to filtering, mark selections are applied to a “worksheet”

```
function selectTableau(fieldName, value, action = "select-replace") {  
  activeSelectSheet.selectMarksByValueAsync([  
    {  
      fieldName: fieldName,  
      value: value  
    }], action );  
}
```

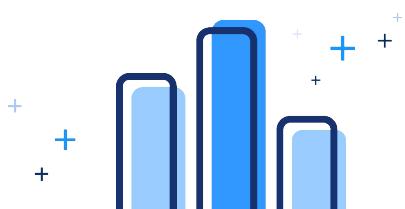
\*\*\* Optional [Lesson 3\\_3](#) covers this topic \*\*\*



# Event Listening

- App can have knowledge that something happened in Tableau
- Pull data from the event to **drive action**
- Enables bi-directional communication with Tableau
- Seen an example already: “firstinteractive”
- Multiple events supported:
  - Filter values changed
  - Mark selections
  - Parameter values changed
  - Many more!

```
viz.addEventListener("firstinteractive", ready);
```



# Work through Lesson 3\_4: Get Marks..



This is how you all look right now..





## Lesson 4: Row-level Security

Let's make our way down the mountain, but let's do it safely..

# User Attribute Functions

- Row-level security at runtime!
- Functions define filtering logic in Tableau workbooks
- Additional claims added to JWT to pass in attribute values
- No entitlements table needed



## HEADER: ALGORITHM &amp; TOKEN TYPE

```
"iss": "1d92b243-e331-4eb4-a78d-20ab84e00848",
"kid": "e4a54a9b-c20d-4b92-b613-5a5057f9d9cb",
"typ": "JWT"
}
```

## PAYLOAD: DATA

```
{
  "iss": "1d92b243-e331-4eb4-a78d-20ab84e00848",
  "exp": 1713299781,
  "jti": "c25a3b46-d3f0-47e4-8d68-9079ac3b3b95",
  "aud": "tableau",
  "sub": "mario.salvatore@demo.com",
  "scp": [
    "tableau:views:embed",
    "tableau:views:embed_authoring",
    "tableau:metrics:embed",
    "tableau:ask_data:embed"
  ],
  "Region": [
    "East",
    "Central",
    "South"
  ]
}
```

A yellow curly brace is placed around the "Region" key and its corresponding value array. A yellow arrow points from the bottom right towards the brace.

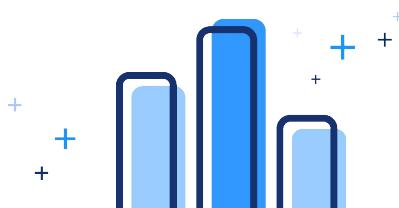
# Work through Lesson 4\_1: User Attribute Functions..



We successfully  
navigated our  
expedition!

# What We Accomplished Today

- Used ***Embedding API v3*** to:
  - Embed a dashboard
  - Remove tableau toolbar
  - Wire up custom buttons
  - Perform static filtering
  - Configure event listener to get selected marks
- Used ***Connected Apps*** to configure single-sign-on user authentication
- Used ***User Attribute Functions*** to enforce row-level security at runtime



# Resources



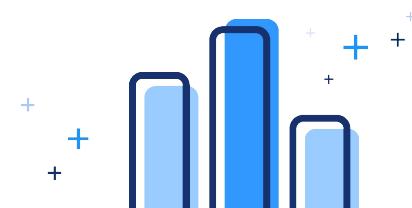
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# Full Resources

- **Course Materials**
  - [Github repo](#)
- **Embedding API v3**
  - [Reference documentation](#)
- **Connected Apps**
  - [Reference documentation](#)
- **Tableau Developer Program**
  - [Sign up for a free developer Tableau Cloud Site!](#)





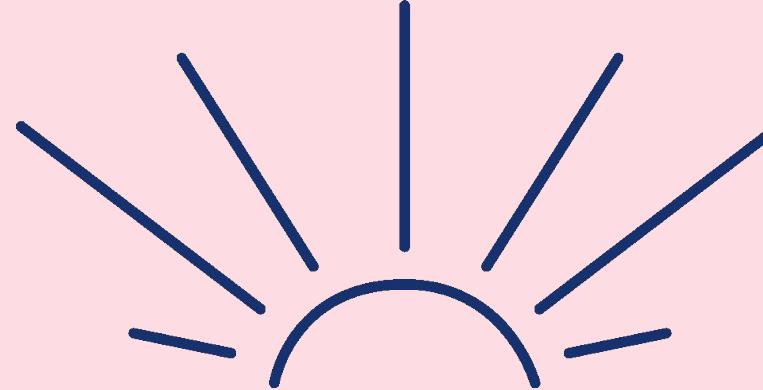
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# Thank you

