



Strategies for Managing Web Application State

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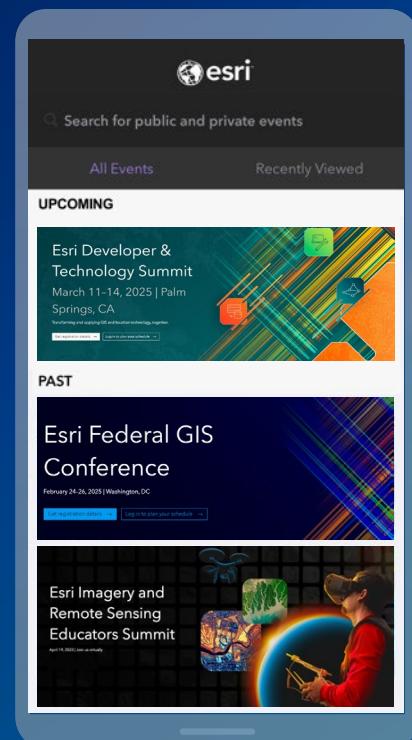
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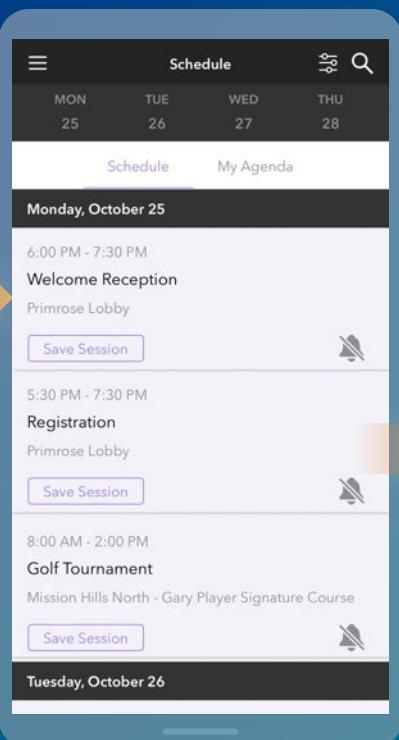
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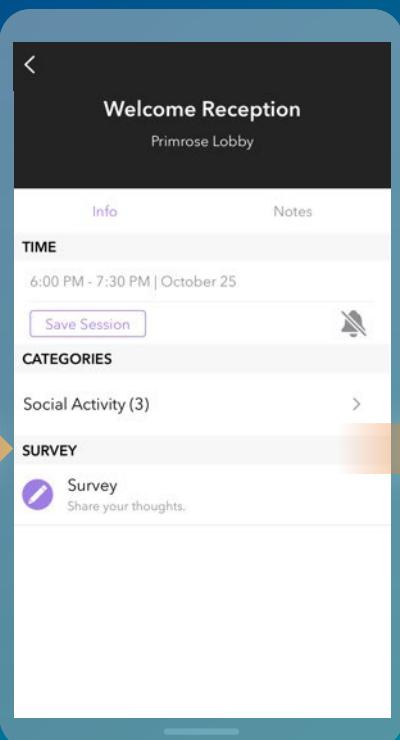
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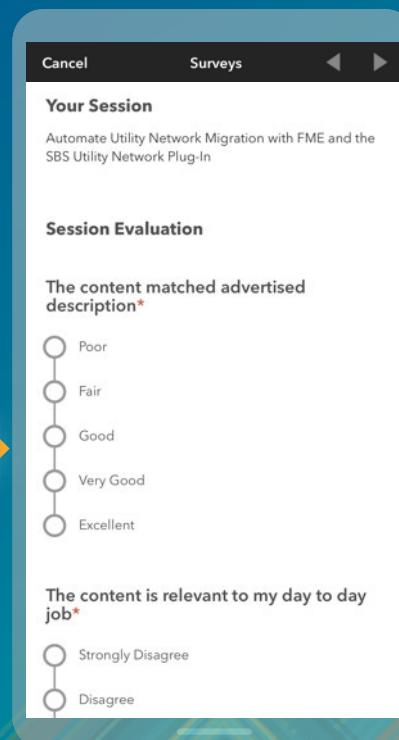
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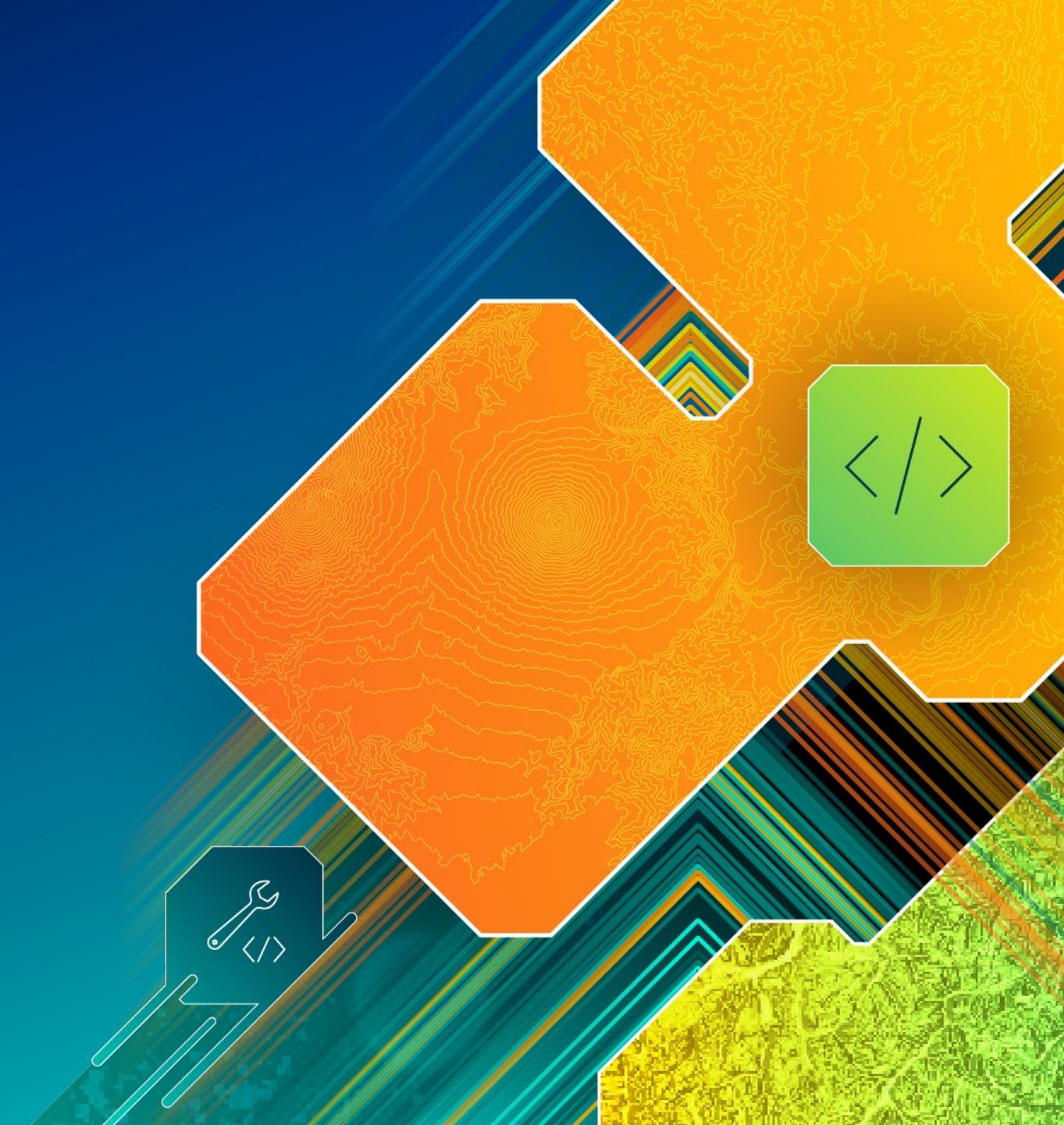
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Agenda

- Introduction
- State Management Frameworks and Strategies
- Redux Concepts
- Demo
- Questions
- Key Takeaways

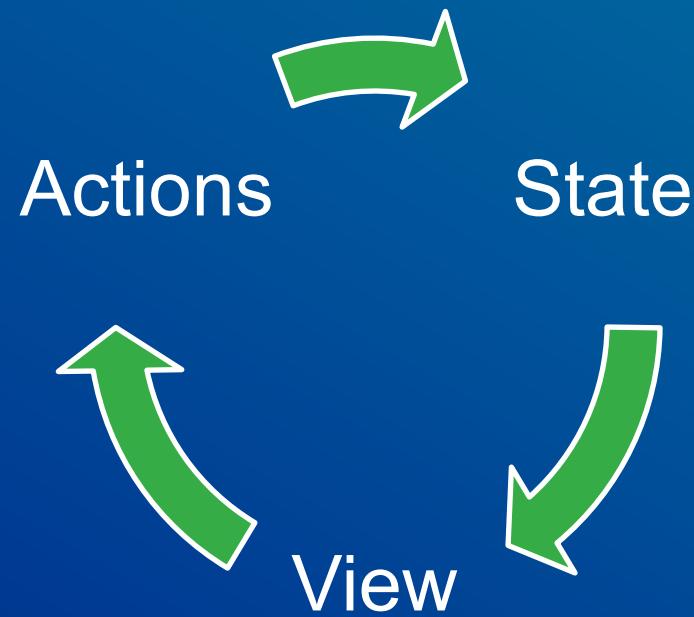
Introduction



Web Application State

- Information that the application needs to keep track of
- User interactions that the application should “remember”

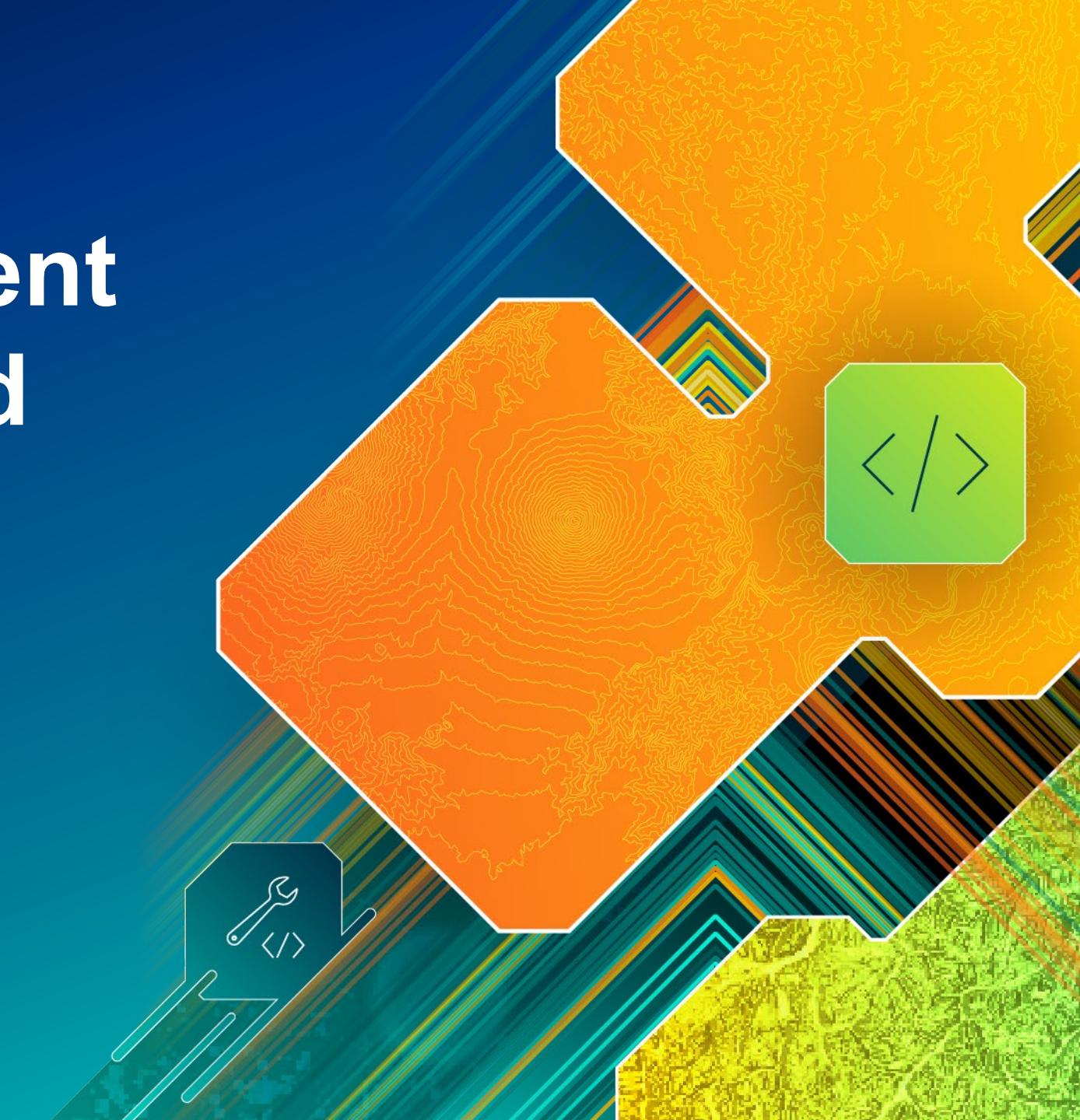
Data Flow in a Simple Web Application



State Management Considerations

- How much data does your entire application need to keep track of?
- How much does the data change over time?
- How many user interface components are contained in your application?

State Management Frameworks and Strategies



State Management Frameworks

- React
- Zustand
- Recoil
- MobX
- Redux

Managing State with React

- Hook: special function to access React features inside your components
- Reacting to input with useState
- Consolidating state update logic with useReducer
- Passing data deeply with useContext



Example ArcGIS Maps SDK for JS element with useState

```
const [webmapPortalItem, setWebmapPortalItem] =  
  useState<__esri.PortalItem>();  
  
const [map, setMap] = useState<__esri.WebMap>();  
const [mapView, setMapView] = useState<__esri.MapView>();
```

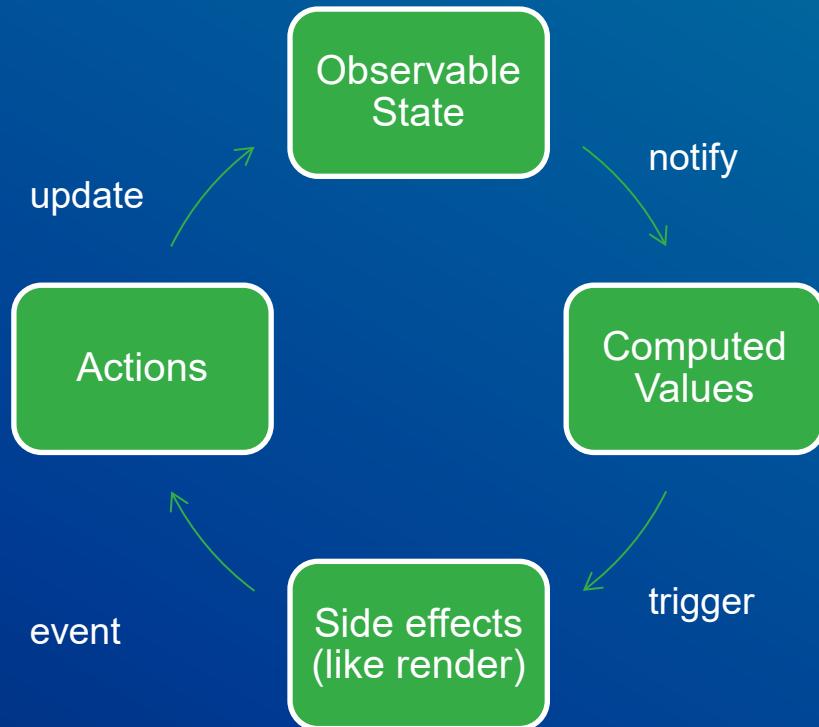
Zustand

- Minimal and lightweight
- Fast performance (minimal re-renders)
- Best for small to medium sized apps

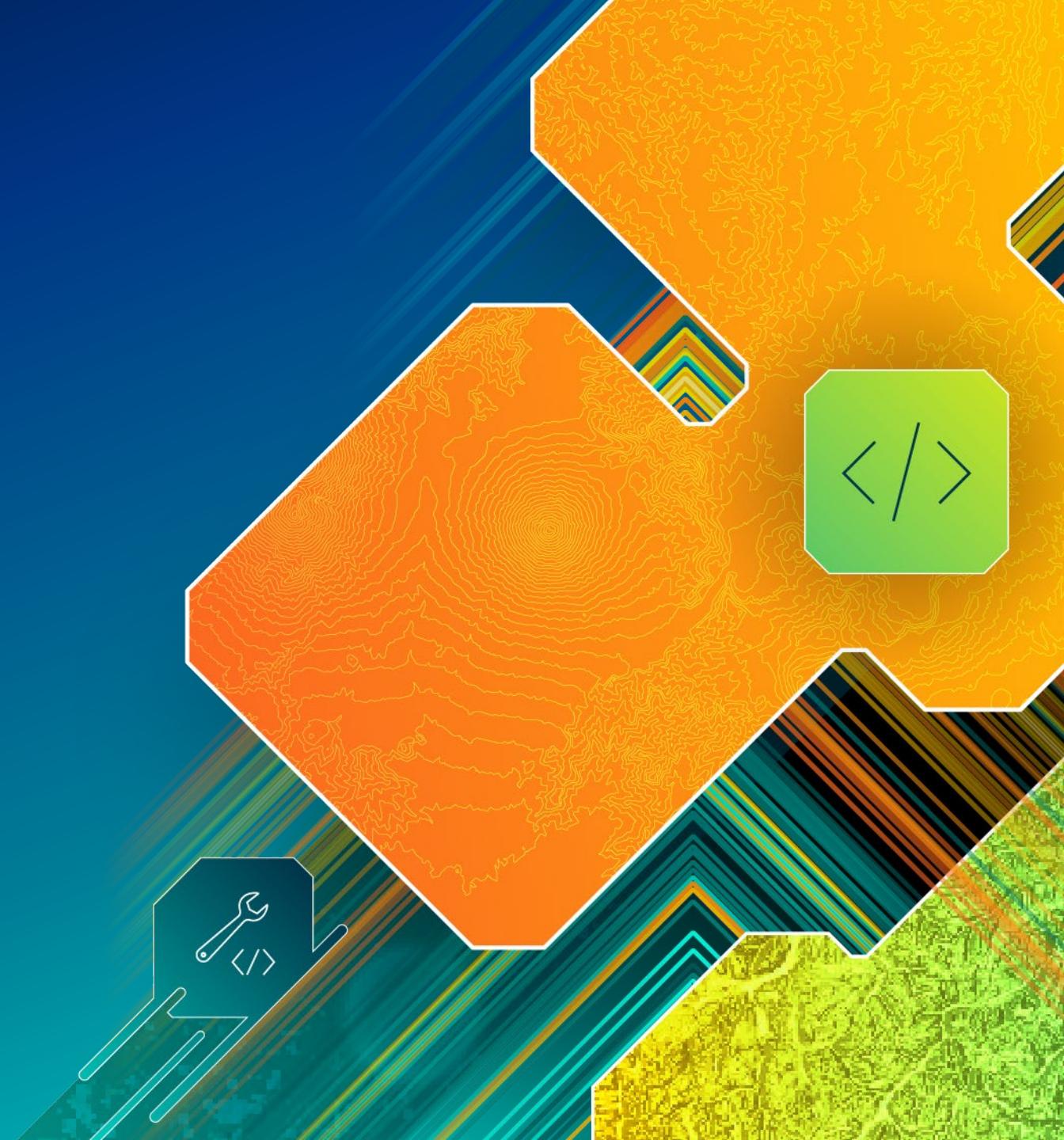
Recoil

- Uses atoms (shared state) and selectors (derived state)
- Fine-grained re-rendering
- Tight integration with React features

MobX



Redux Concepts



Redux Principles

- Single source of truth
- State is read-only
- Changes are made with pure functions

Store

Object that stores the current application state

Slice: a piece of state



Action

- Object that describes something that happened in the application
- **Action creator** is a function that creates and returns an action object

Reducer

(state, action) => newState

- Can only make immutable updates to the state
- No asynchronous logic or other side effects

Selector

- Function that knows how to extract specific pieces of information from the state
- Updates and causes the current component to re-render every time that piece of state changes

Thunk

- A type of middleware that allows you to dispatch asynchronous actions
- Example usages with the ArcGIS Maps SDK for JavaScript:
 - Update Portal item
 - Apply edits to a feature layer
 - Load a web map

Useful Redux Toolkit Utilities

- *configureStore()* for simplified store setup
- *createSlice()* for defining reducers
- *createAsyncThunk()* for handling state updates related to asynchronous actions

Example Redux slice with ArcGIS Maps SDK for JS

```
const defaultState = {  
  portalUrl: ""  
};  
  
const portalSlice = createSlice({  
  name: "portal",  
  initialState: defaultState,  
  reducers: {  
    updatePortalConfig: (portalState, action) => {  
      portalState.portalUrl = action.payload;  
    }  
  ...  
});
```

Demo

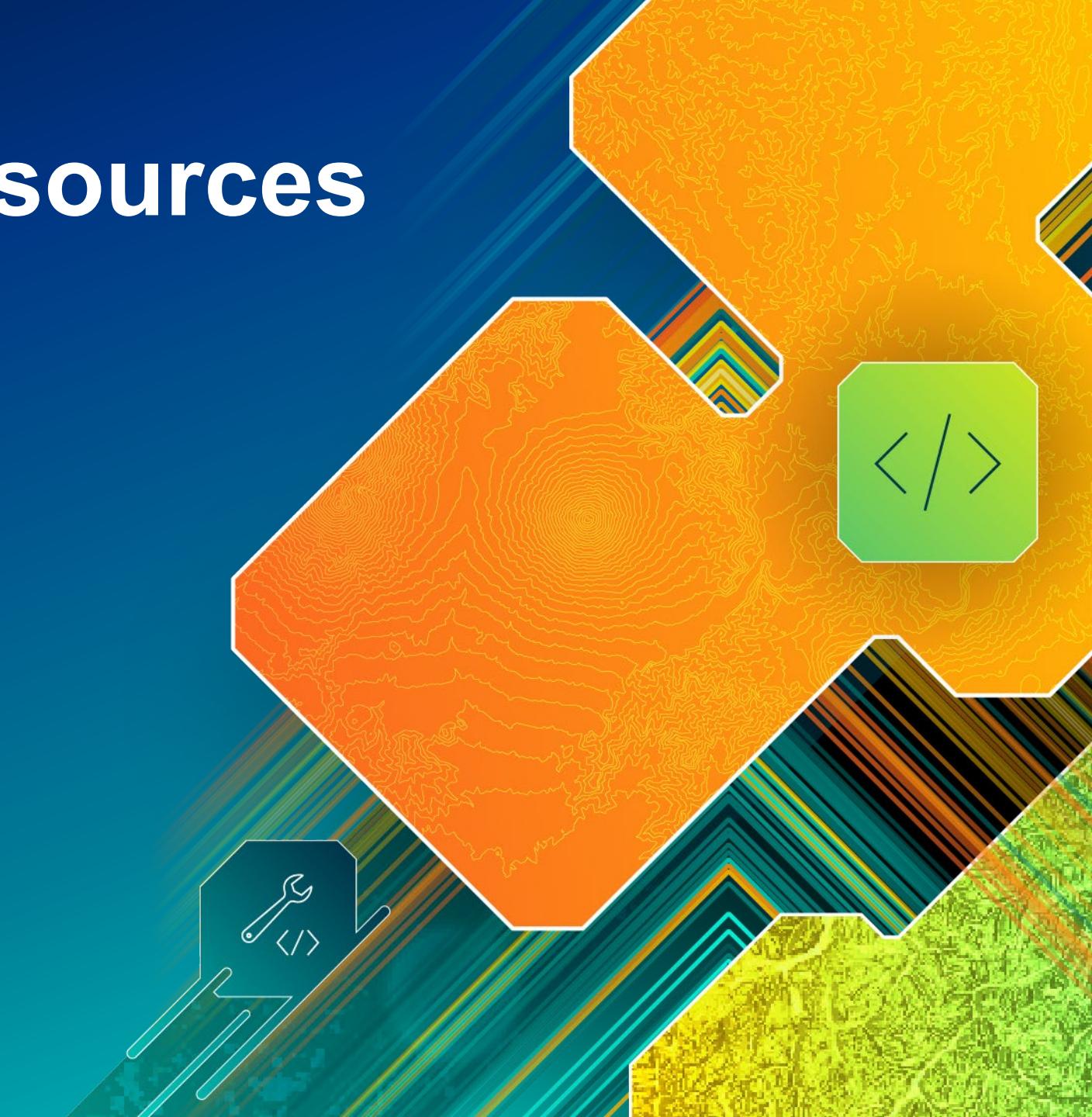
Additional Resource Links

- [ArcGIS Maps SDK for JavaScript](#)
- [Managing State with React](#)
- [ArcGIS Maps SDK for JavaScript: Samples](#)
- [React and ArcGIS Maps SDK for JavaScript](#)
- [Zustand Introduction](#)
- [Recoil](#)
- [About MobX](#)
- [Redux](#)

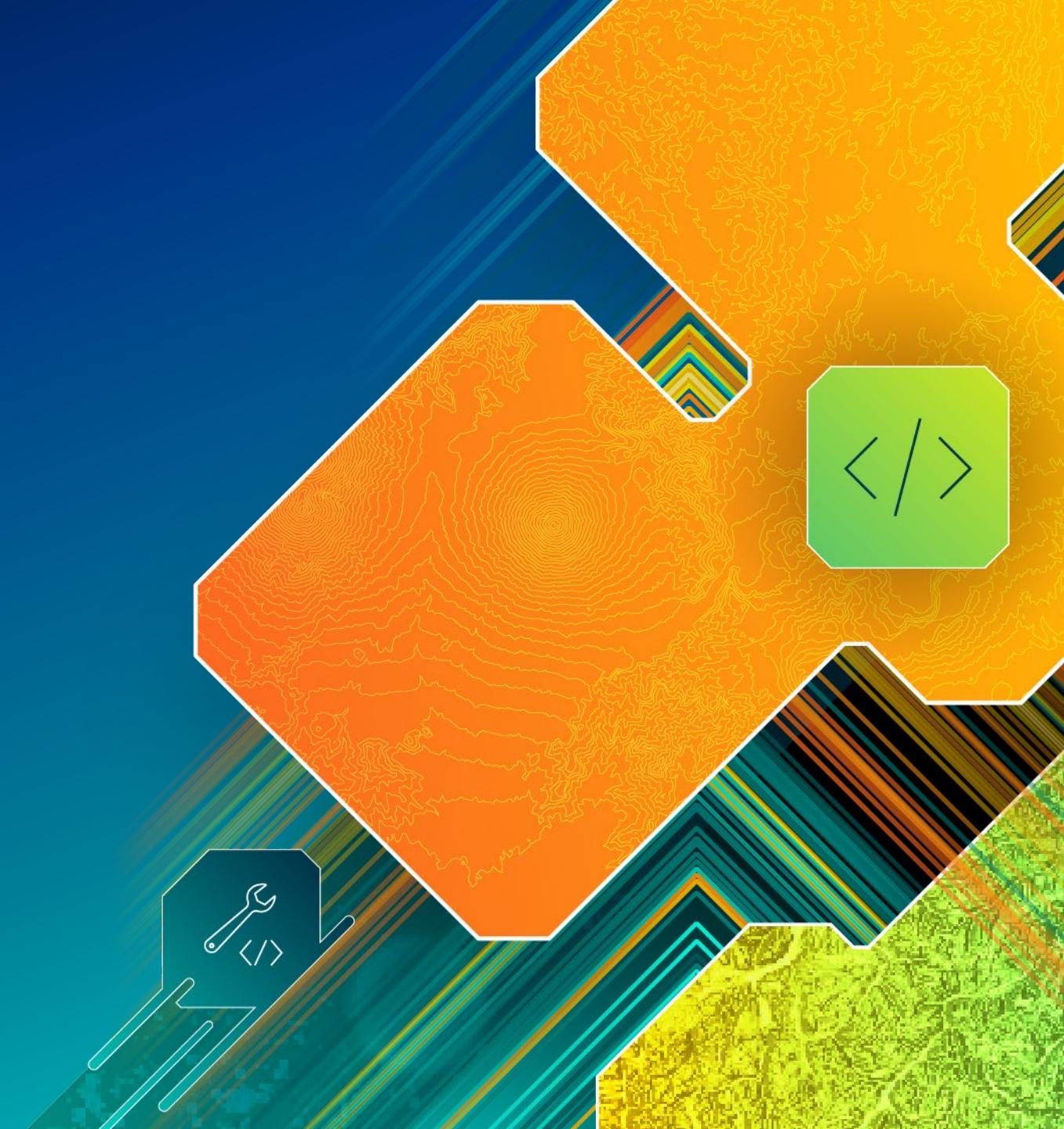
Presentation Resources



SCAN ME



Questions

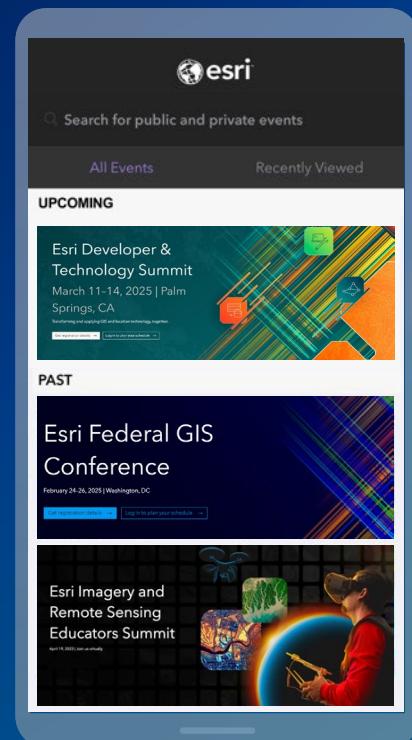


Key Takeaways

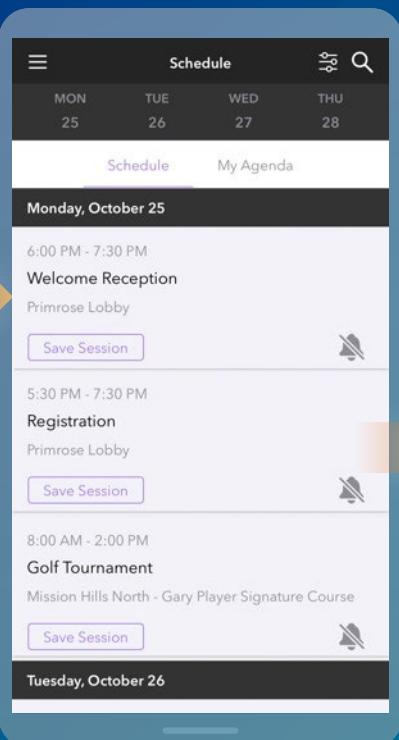
- Come up with a plan for how to best handle state in your web application
- Choose a state management solution based on your application's complexity:
 - Number of components
 - Level of interaction between components
 - How much data changes over time

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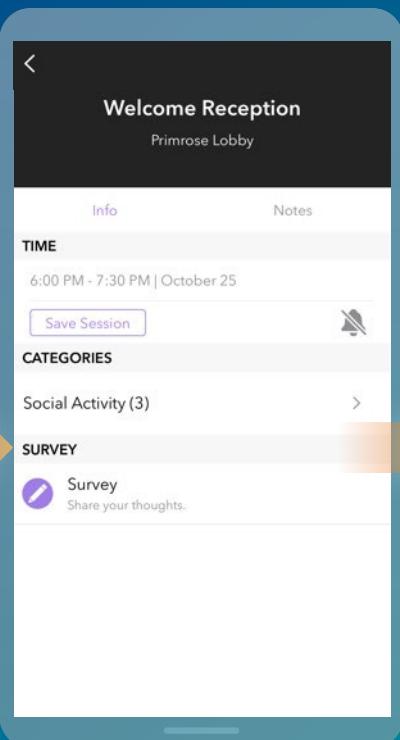
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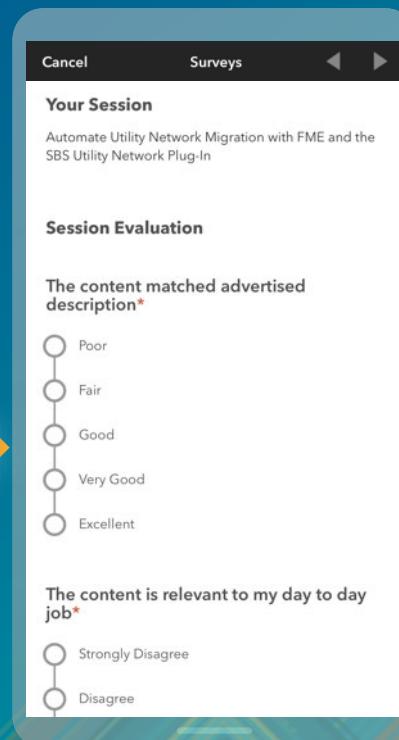
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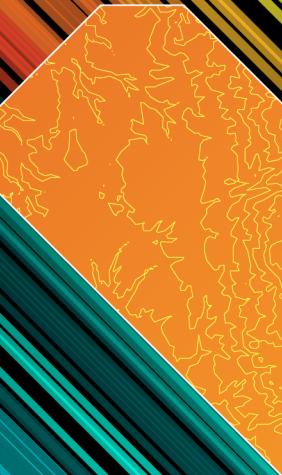
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