IDCE 30262 Web Mapping and Open-Source GIS

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ArcGIS JavaScript API

Outline

- Review: What do you need to know about Dojo?
- ArcGIS API for JavaScript: An Overview
- ArcGIS API for JavaScript: Details
- ArcGIS Server Resource Center

A quick review of Dojo

- A JavaScript toolkit that saves you time and scales with your development process.

Dojo for ArcGIS Javascript API

https://developers.arcgis.com/javascript/3/jshelp/inside_dojo.html

- How much to know about Dojo is up to you, but at the minimum level you should know some common functions:

```
require(["esri/map", ... ], function(Map, ... ){ ... });
```

  - A **callback function**, also known as a higher-order **function**, is a **function** that is passed to another **function** (let's call this other **function** “otherFunction”) as a parameter, and the **callback function** is called (or executed) inside the other Function
  - Call back parameters (You name them by yourself)

Dojo for ArcGIS Javascript API

- dojo.connect: Similar to Element.addEventListener
  - registers a listener to listen to specific events on an Object or element on the page and returns results from a function.
    - Example 1: http://www.w3schools.com/jsref/tryit.asp?filename=tryjsref_element_addeventlistener_param

- dojo.on: does the same thing – a newer way

```
var mapExtentChange = map.on("extent-change", changeHandler);

function changeHandler(evt){
  var extent = evt.extent,
      zoomed = evt.levelChange;
  // ... Do something ...

  // in some cases, you may want to disconnect the event listener
  mapExtentChange.remove();
}
```

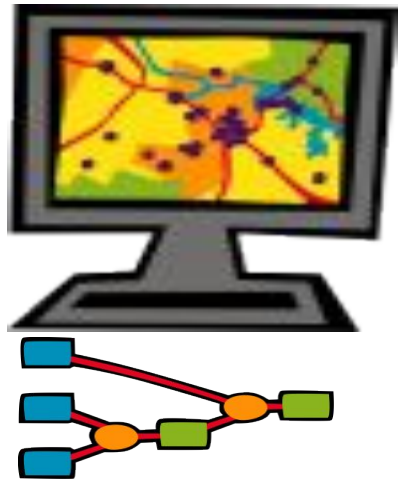
```
require(["dojo/_base/connect", "esri/map"],function(connect, Map) {
  ...
  var mapExtentChange_connect = connect.connect(map, "onExtentChange", changeHandler_connect);
  function changeHandler_connect(extent, delta, levelChange, lod){
    // ... Do something ...

    // in some cases, you may want to disconnect the event listener
    connect.disconnect(mapExtentChange_connect);
  }
}
```

Web mapping technologies

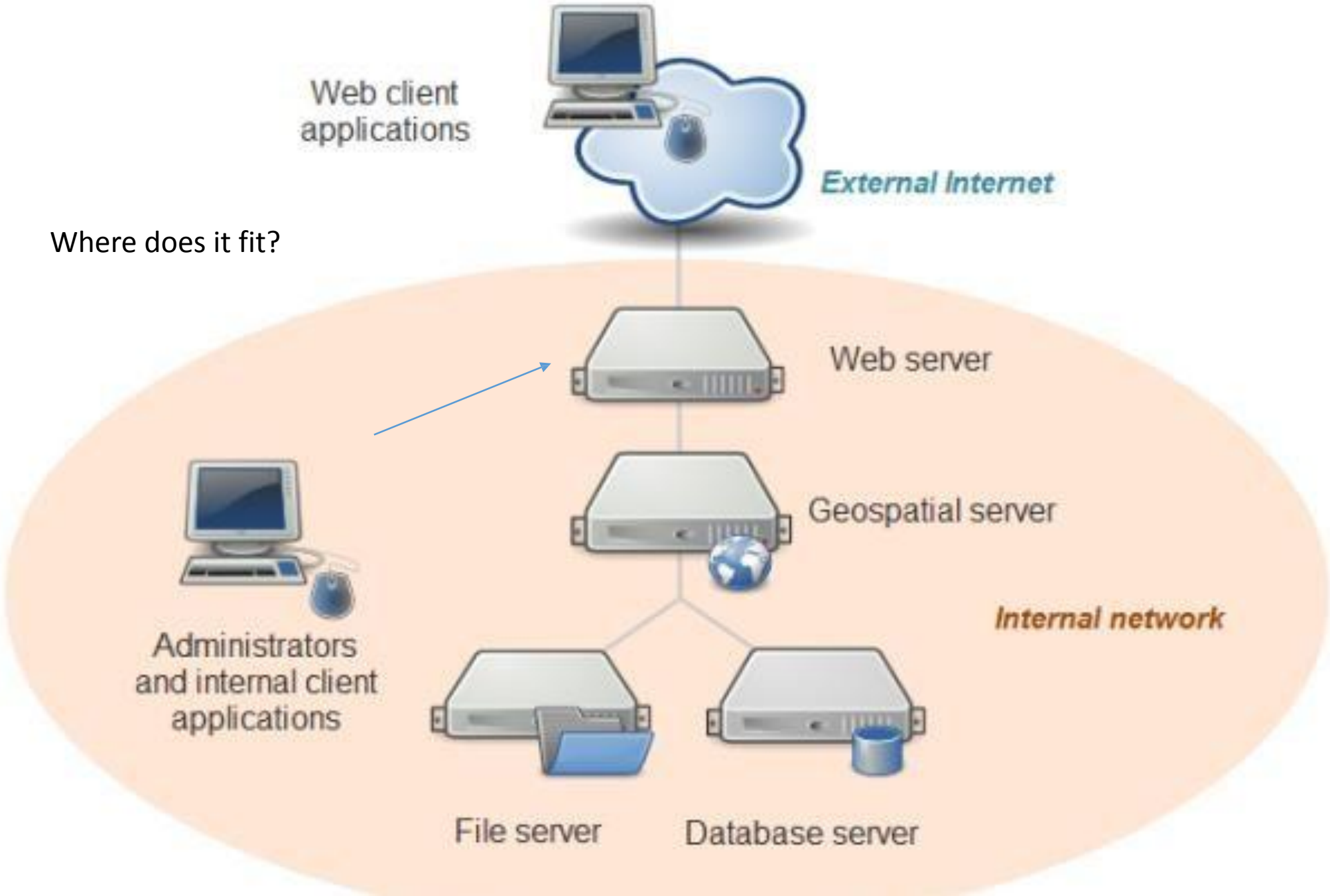
- **ArcGIS API for JavaScript**
  - Simplest ESRI API (lightweight scripting model) (not like ArcGIS Web ADF SDKs (.NET or Java))
    - Now you already know HTML, CSS, JavaScript, and Google Maps API
  - Create HTML code and JavaScript to make your own Web mapping application
    - Data sources are limited to ArcGIS Server services
    - Use content provided by ESRI or use your own content as a basemap
    - Access to geoprocessing and geolocators
  - Easily embeddable into any website
  - JS Frameworks abstract away the browser complexity
    - Dojo

Creating JavaScript mapping Web pages

Build web services, IIS for GIS Data



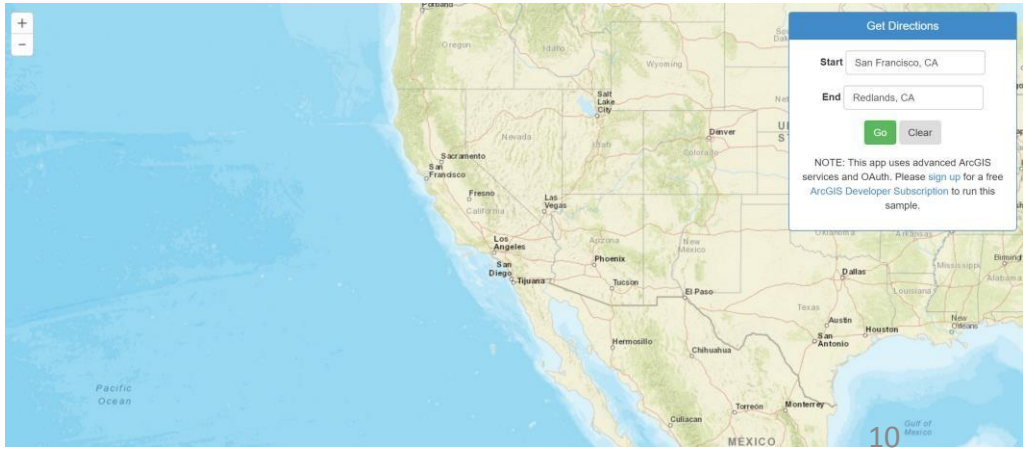
Where does it fit?



ArcGIS API for JavaScript: examples

- Display an interactive map of your own data
  - Execute a GIS model on the server and display results
- Display your data on ArcGIS Online basemap
- Search for features or attributes in your GIS data and display results
- Simple spatial analysis
- ……

- Search Widget
- More examples



The transition between version 3 and version 4

- A table to compare their functions
- 3D
- Analytics function
- Geocoding is not available
- Syntax differences

Capability	3.26	4.9
3D	Not available	Released
2D	Released	Released (partial support)
Vector Tile Layer	Released	Released
Raster Tile Layer	Released	Released
Imagery Layer	Released	Released
Map Image Layer	Released	Released
Feature Layer	Released	Released (currently supports query and visualization)
Geometry Engine	Released	Released
Printing	Released	Released
Routing & Directions	Released	Released
Web Map	Released	Released (partial support)
Web Scene	Not available	Released
Directly consume layers from your portal items	Not available	Released (partial support)
Editing and Sketching	Released	Released (partial support)
OGC Layers (WMS, WMTS, KML)	Released	Released
More OGC Layers (WFS)	Released	Coming soon
Time	Released	Coming soon
More GIS functionality widgets (Analysis, Measurement)	Released	Coming soon

https://developers.arcgis.com/sign-up/

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We will require you to share your email address with us, learn why.

OR

First name

Last name

Email

You will be required to confirm your email after signing up.

Organization name (optional)

Username

6 to 24 characters. Letters, numbers and '@._' only.

Password

At least 8 characters. At least 1 letter and 1 number. Cannot match username.

Confirm password

Security question

Security answer

Start building with ArcGIS Platform.

Signing up gives you an ArcGIS Developer Subscription (Essentials Plan) with free tiers of services:

- 2,000,000 map tiles per month
- 20,000 geocode searches (not stored) per month
- 20,000 simple routes per month
- 5,000 service areas per month
- 5 GB tile and data storage
- 100 MB feature service storage

Learn more about pricing.

Do I need to use my API always?

- Map View

Create the HTML file

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8" />
    <meta name="viewport" content="initial-scale=1, maximum-scale=1, user-scalable=no" />
    <title>Intro to MapView - Create a 2D map</title>
  </head>
</html>
```

Build your first app

- What did we do with Google maps API?
  - **Create an application from a sample**

```
<link rel="stylesheet" href="https://js.arcgis.com/4.9/esri/css/main.css">
<script src="https://js.arcgis.com/4.9/"></script>
```

1. Reference the API (and CSS)
2. Create a mapview or a sceneview
3. Add a basemap

…..Add other data

Old syntax in 3.26:

```
var map;

require(["esri/map", "dojo/domReady!"], function(Map) {
  map = new Map("map", {
    basemap: "topo",  //For full list of pre-defined basemaps, navigate to http
      ://arcg.is/1JVo6Wd
    center: [-122.45, 37.75], // longitude, latitude
    zoom: 13
  });
});
```

Note the difference of version number

```
<link rel="stylesheet"
href="https://js.arcgis.com/4.21/esri/themes/light/main.css" />
<script src="https://js.arcgis.com/4.21/"></script>
```

Load the modules

```
<script>
  require([ "esri/Map", "esri/views/MapView" ], (Map,
MapView) => {
    // Code to create the map and view will go here
  });
</script>
```

Create the map ArcGIS API

```
require(["esri/Map", "esri/views/MapView"], (Map, MapView) => {
  const map = new Map({
    basemap: "topo-vector"
  });
});
```

Create 2D view

```
require(["esri/Map", "esri/views/MapView"], (Map, MapView) => {
  const map = new Map({
    basemap: "topo-vector"
  });

  const view = new MapView({
    container: "viewDiv", // Reference to the DOM node that will contain the
view
    map: map // References the map object created in step 3
  });
});
```

Page Content

```
<body>
  <div id="viewDiv"></div>
</body>
```

Some Styling

```
<style>
  html,
  body,
  #viewDiv {
    padding: 0;
    margin: 0;
    height: 100%;
    width: 100%;
  }
</style>
```

Map, Mapview, Sceneview

Basemap versus how you want the basemap to be displayed

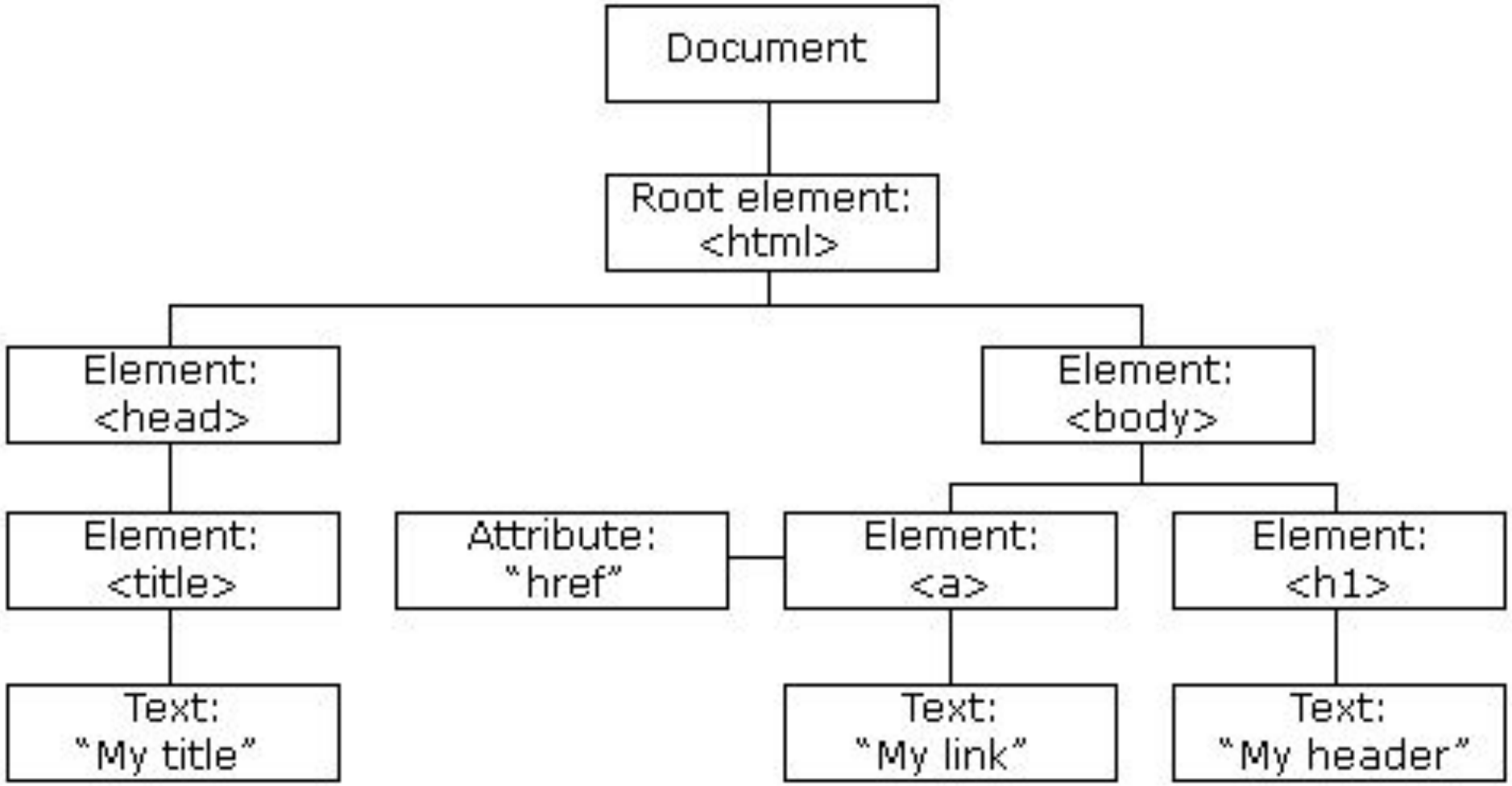
```
require([
  "esri/Map",
  "esri/views/MapView"
], function(Map, MapView) {
  var map = new Map({
    basemap: "streets"
  });

  var view = new MapView({
    container: "viewDiv",
    map: map
  });
});
```

```
<script>
  require([
    "esri/Map",
    "esri/views/SceneView"
  ], function(Map, SceneView) {

    var map = new Map({
      basemap: "streets",
      ground: "world-elevation"
    });

    var view = new SceneView({
      container: "viewDiv",
      map: map,
      scale: 50000000,
      center: [-101.17, 21.78]
    });

  });
</script>
```

Let’s Create a 3D Map-But I want you to find the right place for the code!

```
require(["esri/Map", "esri/views/SceneView"], (Map, SceneView)
=> {
  const map = new Map({
    basemap: "topo-vector",
    ground: "world-elevation"
  });
  const view = new SceneView({
    container: "viewDiv", // Reference to the DOM node that will
contain the view
    map: map // References the map object created in step 3
  });
});
```

DOM


Document
Root element:
<html>
Element:
<head>
Element:
<body>
Element:
<title>
Attribute:
"href"
Element:
<a>
Element:
<h1>
Text:
"My title"
Text:
"My link"
Text:
"My header"

Now let’s use API Key (MapView)

```
<html>
 <head>
  <meta charset="utf-8" />
  <meta name="viewport" content="initial-scale=1, maximum-scale=1, user-scalable=no" />
  <title>ArcGIS API for JavaScript Tutorials: Display a map</title>

  <style>
   html,
   body,
   #viewDiv {
    padding: 0;
    margin: 0;
    height: 100%;
    width: 100%;
   }
  </style>

  <link rel="stylesheet" href="https://js.arcgis.com/4.21/esri/themes/light/main.css">
  <script src="https://js.arcgis.com/4.21/"></script>

  <script>
   require(["esri/config","esri/Map", "esri/views/MapView"], function (esriConfig,Map, MapView) {

    esriConfig.apiKey = "YOUR_API_KEY";

    const map = new Map({
     basemap: "arcgis-topographic" // Basemap layer service
    });

    const view = new MapView({
     map: map,
     center: [-118.805, 34.027], // Longitude, latitude
     zoom: 13, // Zoom level
     container: "viewDiv" // Div element
    });

   });
  </script>

 </head>
 <body>
  <div id="viewDiv"></div>
 </body>
</html>
```

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