ArcGIS API 4.0 for JavaScript: Patterns and Best Practices

Short URL: esriurl.com/4xpatterns2017

Presenters

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Agenda

- 4x: What do I get?
- 4x What are my options?
- Working with Widgets
- Getting responsive with Views
- Using Existing Apps + Tools
- Resources

What do I get with the 4x JSAPI?

- Simplified and consistent API
- Write apps in ES6 or TypeScript
- Modern browser support (IE11+)

What are my options?

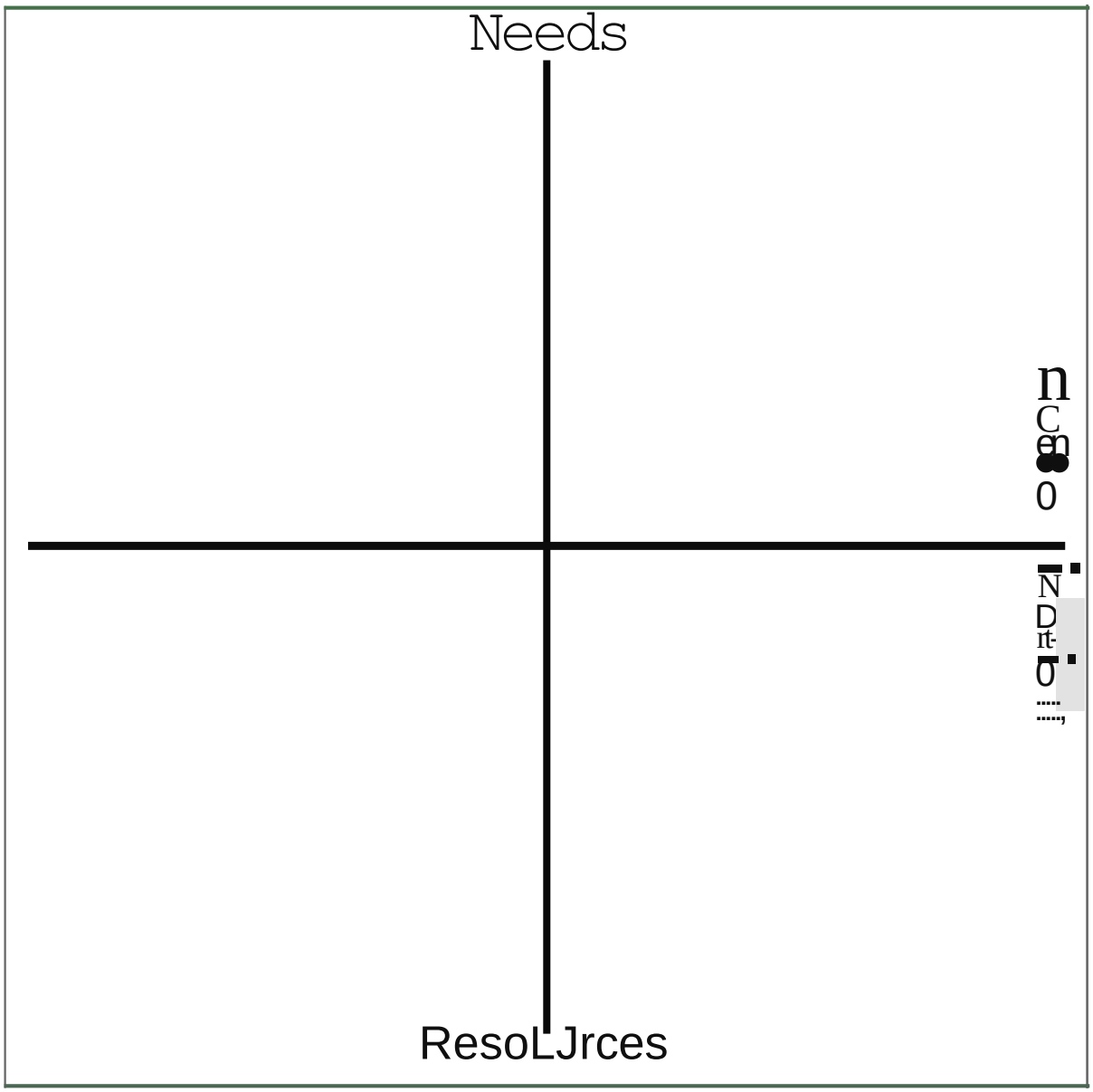
- Needs?
- Resources?
- Time?
- Customizations?

What do you need?

- Charts and operational monitoring
  - Dashboard, Insights (data exploration)
- Mobile and offline
  - Native app

What can you get with the JavaScript API?

- Suite of templates and configurable apps
- Out-of-the-box widgets
- Integration with various frameworks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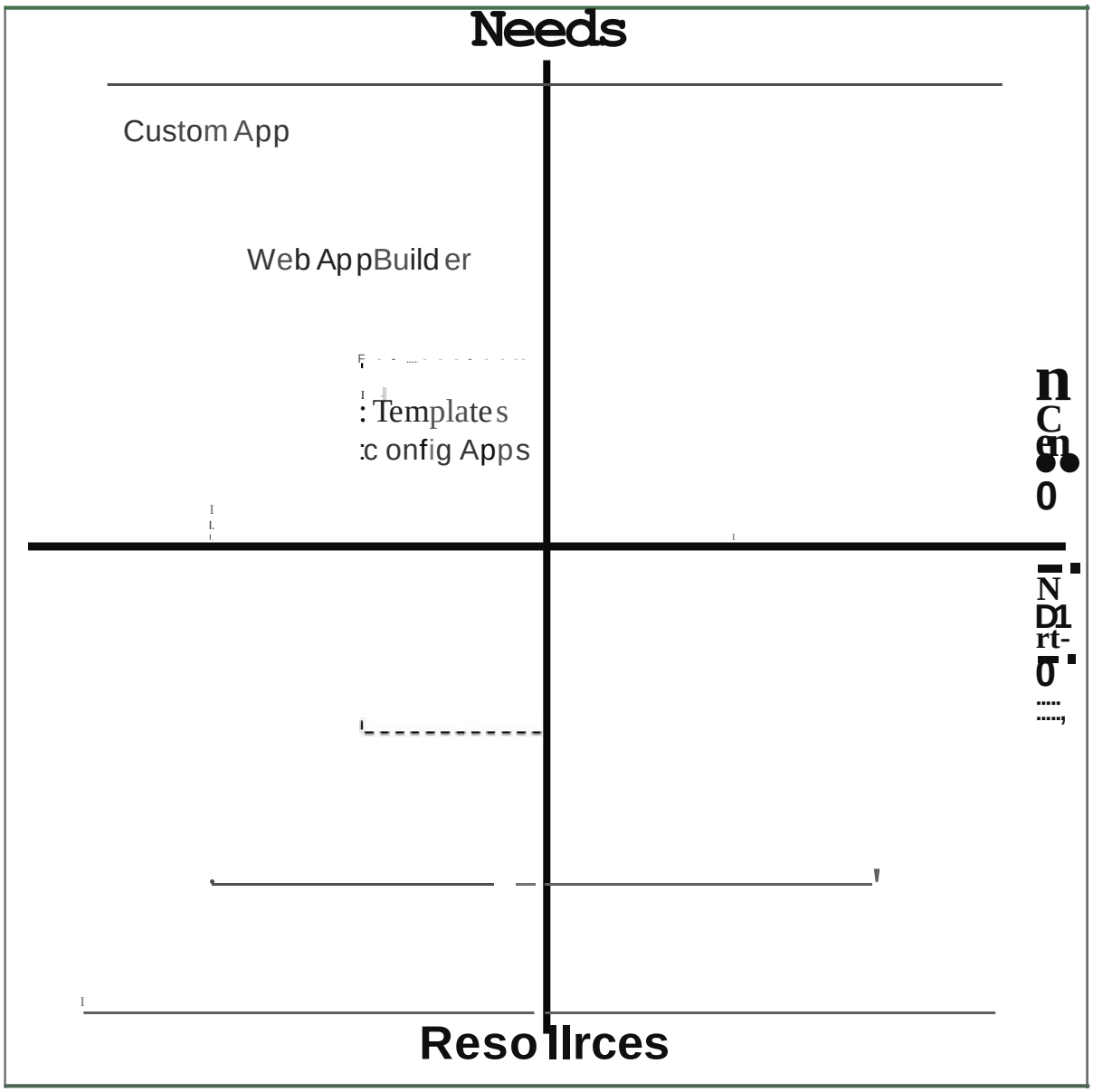
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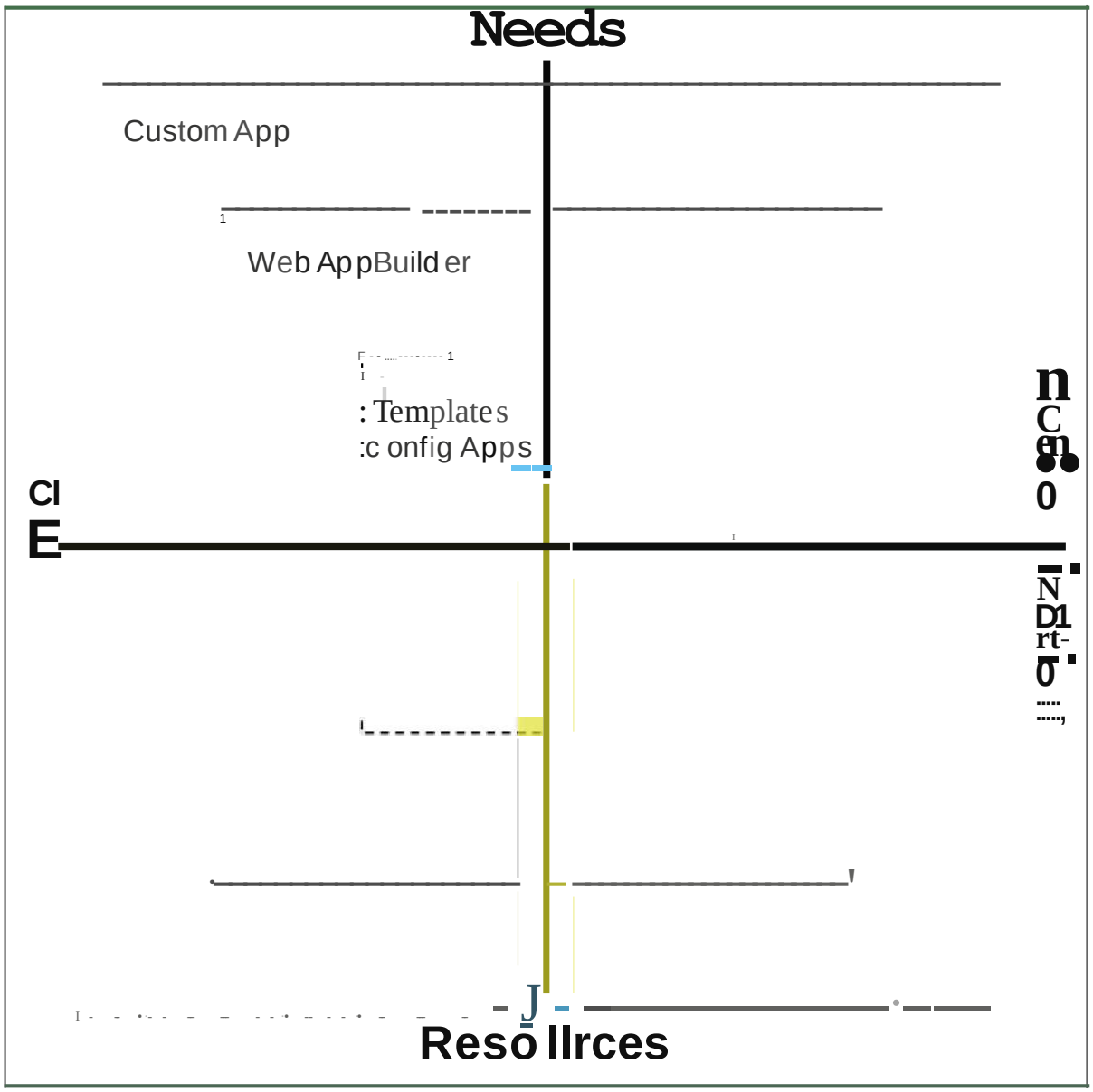
Custom App
Web AppBuilder
: Templates
:c onfig Apps
Resources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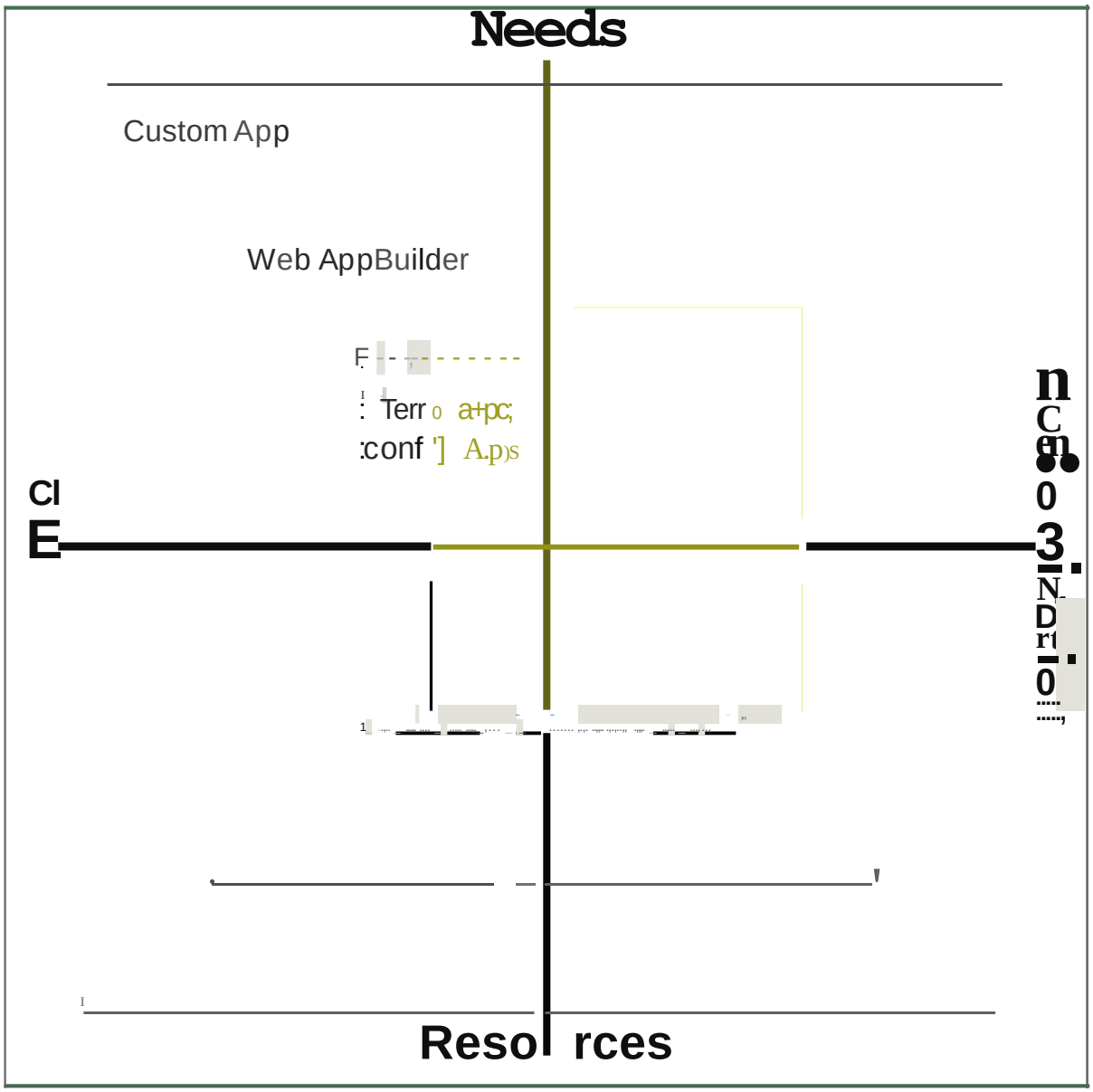
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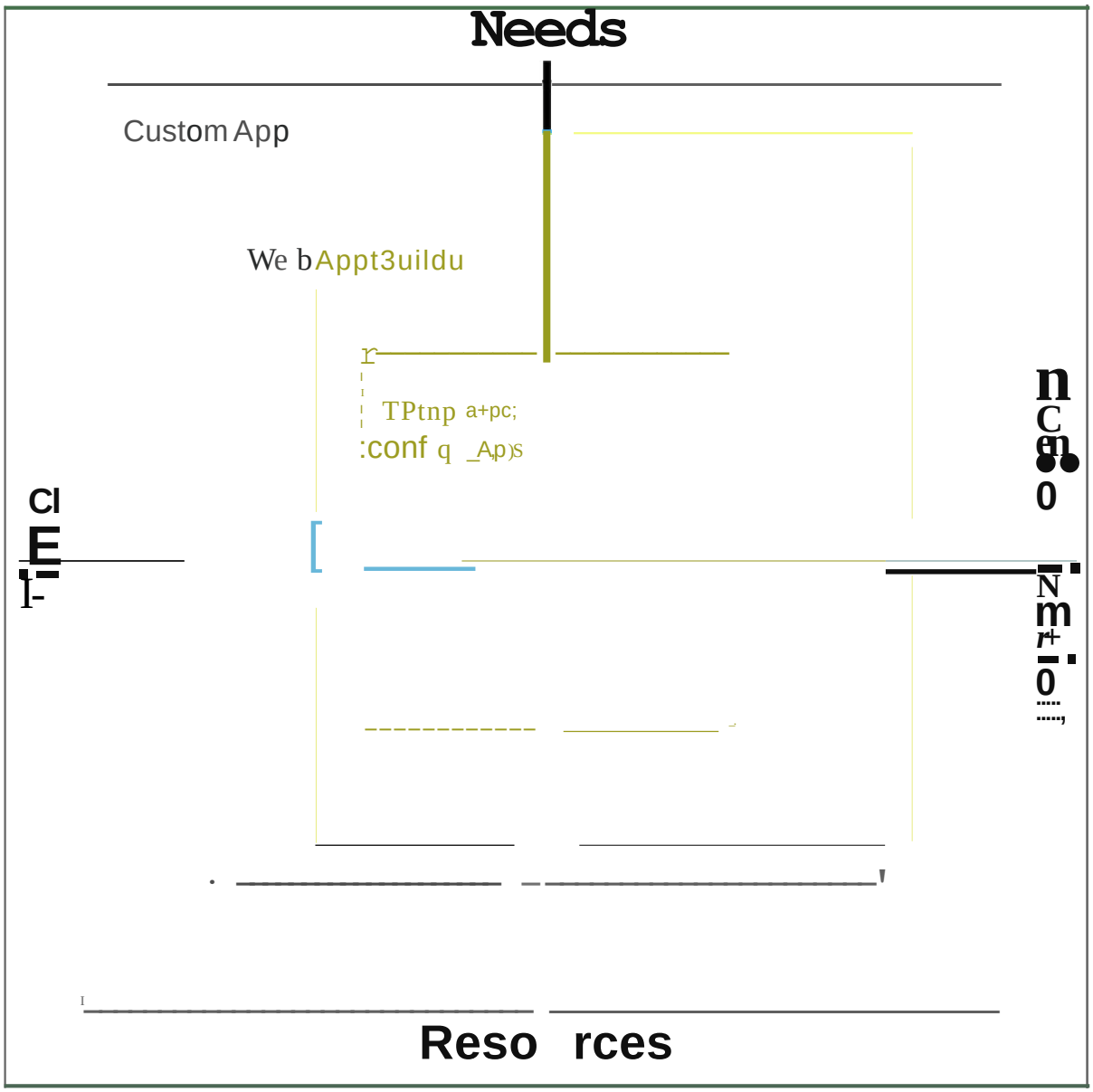
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Widgets!

- ~20 Widgets out of the box
- Widgets help make great apps
- Less code for you to write
- Designed with responsive apps in mind
- We'll look at a few key widgets

Default Widgets

- MapView & SceneView
  - Popup
  - Attribution
  - Zoom
- SceneView
  - NavigationToggle
  - Compass

Widgets: SDK

Widgets in SDK

Widgets: Popup

- Responsive Design
- Size changes depending on size of view
- Can be docked to top, bottom, center and sides

Demo

- **Popup Demo**

Widgets: Expand

- Collapsable button/panel
- Can be used with widgets, dom node, HTML
- Designed for view component use

Widgets: Expand Sample

- **Expand Sample**

```
var htmlString = "<div style='background:red; color: white;'>H

var node = document.createElement("div");
node.innerHTML = "Hello World";
node.style.backgroundColor = "blue";
node.style.color = "white";

var bgExpand = new Expand({
  view: view,
  //content: htmlString,
  //content: node,
  //content: basemapGallery,
  expandIconClass: "esri-icon-basemap"
});
```

View

Useful **view properties** for building apps

- height
- width
- heightBreakpoint
- widthBreakpoint
- orientation
- size
- padding
- ui
  - components

View UI

- View has `ui` property => class for user interface
- Can has `components` that can hold...
  - Widget, DOM node, text, html string
- **Default UI**

View UI: Components

- Provide easy way to add/position widgets on a view
- **SDK**

```
var myWidget = new MyWidget();

view.ui.add(myWidget, "top-right");
```

Demo

- **Components Demo**
- **UI Positions Demo**

View: Padding

- View will work off a subsection of the full view
- Useful when UI covers portion of the view
- **SDK**

Demo

- **View Padding Demo**

View: Sizing

Useful view sizing properties for responsive apps

- height
- width
- heightBreakpoint
- widthBreakpoint
- orientation
- size

View: Breakpoints

- **Breakpoints SDK**

View UI: CSS

- Breakpoints also add classes on view

```
.esri-view esri-view-height-xsmall,
.esri-view-height-less-than-small,
.esri-view-height-less-than-medium,
.esri-view-height-less-than-large,
.esri-view-height-less-than-xlarge,
.esri-view-width-xlarge,
.esri-view-width-greater-than-xsmall,
.esri-view-width-greater-than-small,
.esri-view-width-greater-than-medium,
.esri-view-width-greater-than-large,
.esri-view-orientation-landscape {}
```

Demo

- **View UI Sizes**

Apps

- Lots of existing apps
- Use as starting point
- Customize
- Code on **Esri Github**

Apps: Configurable AGOL

- **Configurable Apps Gallery**
- **Choose an app**

Apps: Boilerplates & Examples

- 3x
  - **Creating App Templates**
  - **Application Boilerplate**
- 4x
  - **Application Base**
  - **Configurable App Examples**

Apps: Calcite Maps

Bootstrap theme made with ArcGIS Maps in mind

- **Calcite Maps GitHub**
- **Live Examples**

Web AppBuilder

Apps: Web AppBuilder

- Two Options
  - Online
  - Developer Edition

Web AppBuilder - Online

- Easy to set up
- Hosted on ArcGIS.com
- Share settings
- Custom widgets in Portal
  - **blog post**

Web AppBuilder - Developer Edition

- Deploy on your own site
- Use custom widgets
- **Download the SDK**

Web AppBuilder - Developer Edition

- Custom Widgets
  - **Solutions Widgets**
  - **Widget Generator**

Apps: Scaffolding app

Architect your app

- TypeScript (widgets)
- Modular
- Tests
- Performance (don't over-optimize)

TypeScript

- **Typings** `npm install --save @types/arcgis-js-api`
- **Widget Development Guide**
- **Implementing Accessor**

Structure your app

- Keep it modular

```
src/
  app/
    interfaces/ <-- TypeScript Interfaces used in app
    sources/    <-- external APIs
    stores/     <-- manage application state
    styles/     <-- css files
    widgets/    <-- custom widget code
    main.ts     <-- entry point for application
  tests/        <-- unit and functional tests
```

Take it further

```
dist/                  <-- compiled and runnable application
public/                <-- non-code resources
  assets/              <-- images, fonts, icons
  favicon.ico          <-- page icon
  index.html           <-- HTML for application
  manifest.appcache    <-- application cache (fallback)
  manifest.json        <-- installable app
  oauth-callback.html  <-- authentication
  service-worker.js    <-- any service worker caching you want
src/                   <-- application code
typings/
  extensions.d.ts      <-- any custom typings you need
package.json           <-- package file
postcss.config.js      <-- Optional PostCSS configurations
tsconfig.json          <-- TypeScript compilation configuration
tslint.json            <-- Linting for your TypeScript code
```

TypeScript Best Practices

- Use `interface` over `type`
- For JSAPI modules, `import WebMap = require("esri/WebMap")`
  - We don't use default exports (need to support vanilla JS users)
  - Or JS users would need to do `var webmap = new WebMap.default()`
- Use provided decorators (Accessor and Widget)

Progressive Web Apps

- *Tough with a mapping library*
- Avoid starting with a white page (application shell)
- Cache all images/css/js (appcache or service worker)
- Offline is sketchy, tricky and all around tough for mapping
- **Learn more**

Sample `manifest.appcache`

```
CACHE MANIFEST
# v0.1
index.html
oauth-callback.html
app/main.js
assets/icons/icon-256x256.png

http://js.arcgis.com/4.4/dojo/nls/dojo_en-us.js
http://js.arcgis.com/4.4/esri/views/MapView.js
http://js.arcgis.com/4.4/esri/WebMap.js

app/styles/main.css
https://s3-us-west-1.amazonaws.com/patterns.esri.com/files/cal

https://s3-us-west-1.amazonaws.com/patterns.esri.com/files/cal
https://js.arcgis.com/4.4/esri/themes/base/icons/fonts/Calcite
https://js.arcgis.com/4.4/esri/themes/base/fonts/avenir-next/A
https://js.arcgis.com/4.4/esri/themes/base/fonts/avenir-next/A

NETWORK:
*
```

Sample Service Worker

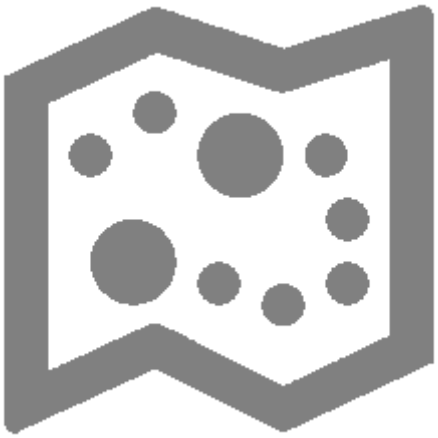
```
var filesToCache = [
  "./",
  "./index.html",
  "./oauth-callback.html",
  "./app/main.js",
  "http://js.arcgis.com/4.4/dojo/nls/dojo_en-us.js",
  "http://js.arcgis.com/4.4/esri/views/MapView.js",
  "http://js.arcgis.com/4.4/esri/WebMap.js",
  "./app/styles/main.css",
  "./assets/icons/icon-256x256.png",
  "https://s3-us-west-
  1.amazonaws.com/patterns.esri.com/files/
  "https://js.arcgis.com/4.4/esri/themes/base/icons/fonts/Cal
  c
  "https://js.arcgis.com/4.4/esri/themes/base/fonts/avenir-
  nex
  "https://js.arcgis.com/4.4/esri/themes/base/fonts/avenir-
  nex
];
self.addEventListener("install", function(e) {
  e.waitUntil(
    caches.open(cacheName).then(function(cache) {
      return cache.addAll(filesToCache);
```

Take advantage of some modern tooling

- **PostCSS** - plugin based CSS processing
- **Prettier** - automatically beautify code
- Use Grunt, Gulp, or even just npm scripts

Review an app

JSAPI DEMO SIGN IN



Lets Recap

- What you get in 4x
- Options for creating apps
- Widgets you can use
- View properties, components, responsiveness
- Existing apps available to customize
  - Configurable
  - Boilerplates
  - Calcite Maps
  - WebAppBuilder
- App tools, building good apps

Additional Resources

- **Documentation**
- **4x What's new**
- **4x FAQ**

JSAPI Resources

- TypeScript definition files
- Bower
- JSHint

esriurl.com/resources

Geonet

Blogs

- **ArcGIS Blog**
- **odoe.net**

Get The Code

esriurl.com/4xpatterns2017

Related Sessions

- **ArcGIS API for JavaScript: What's New**
- **Getting Started with ArcGIS API for JavaScript Building 3D GIS**
- **Applications with JavaScript Optimizing Your JavaScript App for**
- **Performance ArcGIS API for JavaScript: Customizing Widgets**
- **Strategies for Building Mobile Apps Using ArcGIS API for JavaScript**
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Questions?

Thank you!