



ArcGIS Online: Best Practices for High-Demand Web Applications


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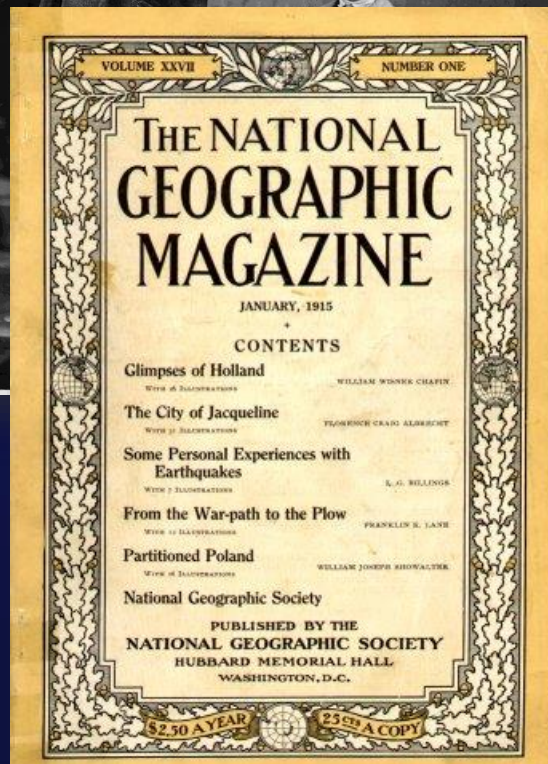
Beth Romero

GIS
INSPIRING
WHAT'S
NEXT

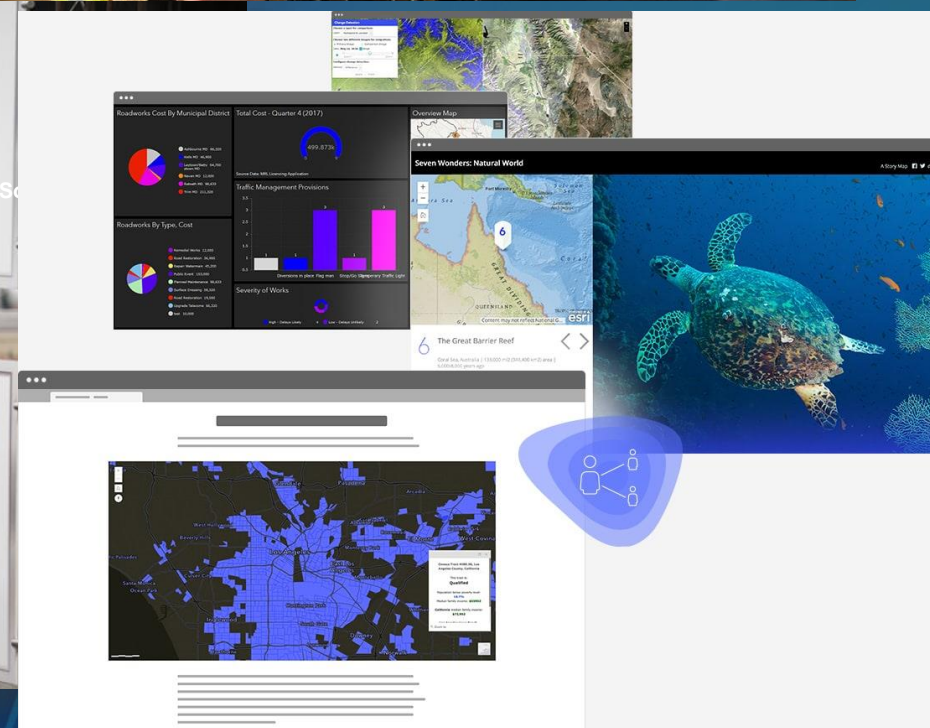
Agenda

- **Communicating with Maps**
 - **Who do you build your apps for?**
 - **Layer Types**
 - **Scalability and Response Caching**
 - **Visualization Strategies**
 - **Sharing with the Public**
- 
- An abstract graphic in the bottom right corner of the slide. It consists of numerous overlapping, semi-transparent rectangular and polygonal shapes in various shades of blue, teal, and green. These shapes are arranged in a way that creates a sense of depth and movement, resembling a stylized cityscape or a complex architectural structure. The overall effect is a modern, geometric design element.

Communication with Maps



Source: [Wikimedia Commons](#)



Mapping on the Web

- Web Mapping Application
- Static Image
- Interactive (they do something)
- Easily Accessible by Audience on any device
- Integrated into existing media
- Create Spatial Dialog with Audience
- Fast to Build and Distribute

Interactive Web App Architecture



Who do you build your Web Apps for?

Consider your Audience

- A few select viewers
- GIS Analysts
- The entire world
- Local citizens
- Emergency Responders



What is the intended experience

- What is being communicated?
- What data and visualization are important?
- Do they need to have a login?
- What is the desired user interaction
 - Pop-ups
 - Routing
 - Compare data
 - Change basemaps
 - Explore data

What is the Performance expectation?

- **How long should it take for a layer to load?**
 - Immediate
 - 3 seconds
 - 10 seconds
- **How long should a user wait for results?**
 - Immediate
 - 10 seconds
 - It depends
- **Does the user need to navigate to a new application or is it embedded in familiar media like a website?**

Apps in High Demand (Viral)

Assumptions:

Audience: **The entire world**

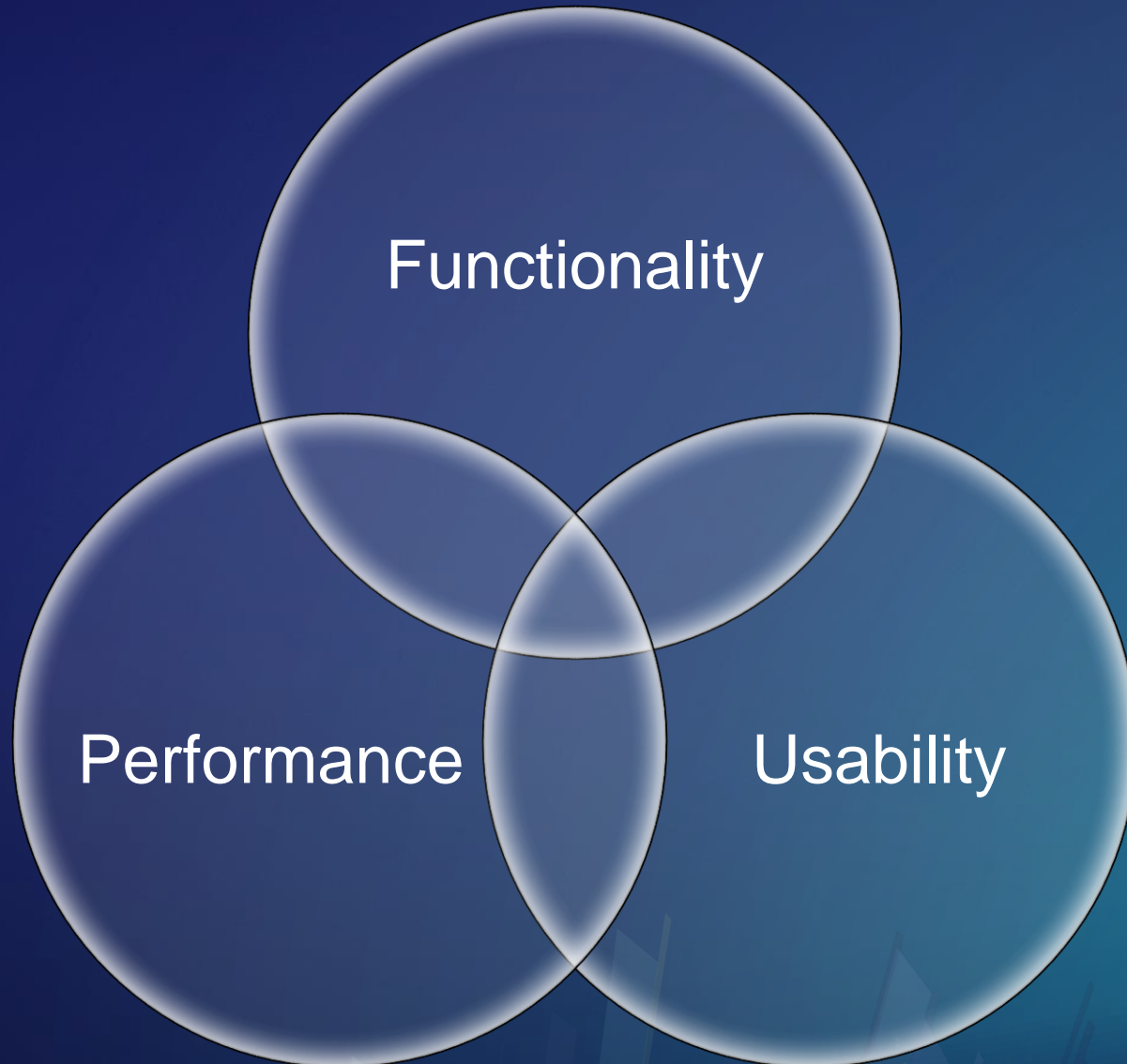
Performance: App loads quickly (no more than 3 seconds)

All components need to withstand up to 1000 req/s

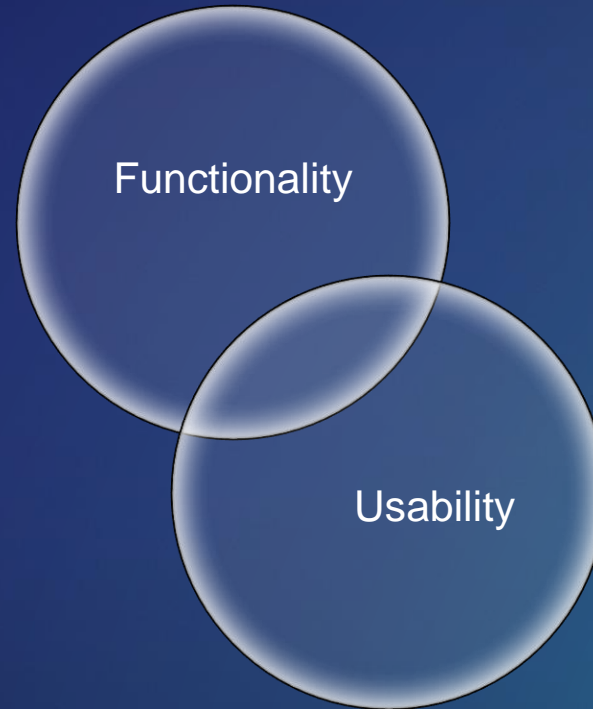
Functionality: User can figure out tools without instructions

No more than 3 clicks to complete interaction

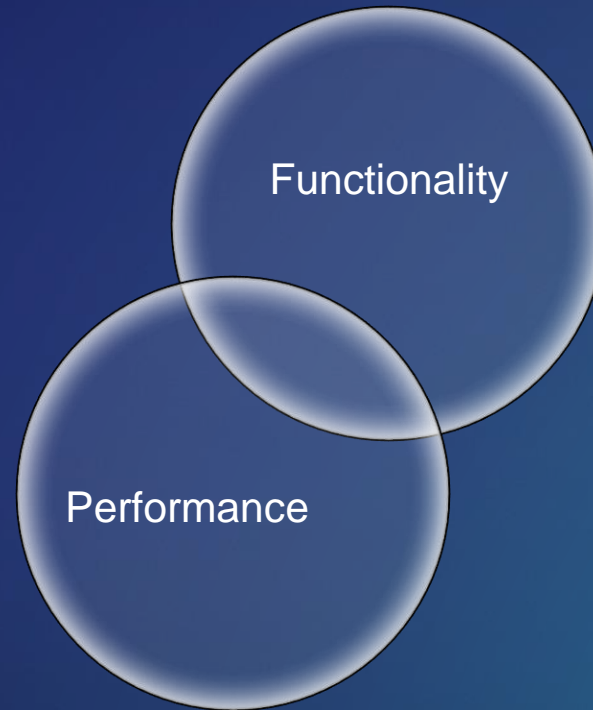
Web Mapping Application Considerations



Design Choice



Performance Choice



Layer Types

The background is a solid dark blue gradient. In the top-left corner, there are several thin, parallel diagonal lines in shades of teal, green, and red. In the bottom-right corner, there is a complex arrangement of overlapping geometric shapes, including rectangles and polygons in various colors like orange, yellow, green, and dark blue, creating a sense of depth and movement.

Tile Layers

- Tile Layers (Raster)
 - Always optimal if data isn't changing frequently
 - Tiles can be generated automatically, efficiently creating new tiles when data is updated or a new area is requested.
- Tile Layers (Vector)
 - Support custom styling
 - Great for offline mobile workflows



Hosted Tile Layers – Best Practices

- Use when drawing complex geometry is not responding fast enough
- Publish from hosted feature layer or pre-creating a tile package
- Set desired symbology prior to publishing
- Choose to create tiles automatically
- Enable pop-ups using a feature layer as source data





Demo: Hosted Tile Layers

Feature Layers

- Feature layers (Hosted)
 - Supports editing, Visualization and can be used as input for analysis
 - Support feature layers views that allow different layers to be created from the same dataset
 - Hosted in the ArcGIS Online Cloud
 - Can be source data for tile layers
- Feature layers
 - Layers drawn from features hosted from a variety of sources including ArcGIS Enterprise feature layers, map layers and files.
 - Can support editing, display and can be used as input for analysis
- Feature collections (Map Notes)
 - Can be used for small datasets, where mapping features can be stored as text. (< 1,000 features)
 - Easy to create for simple mapping
- Combination



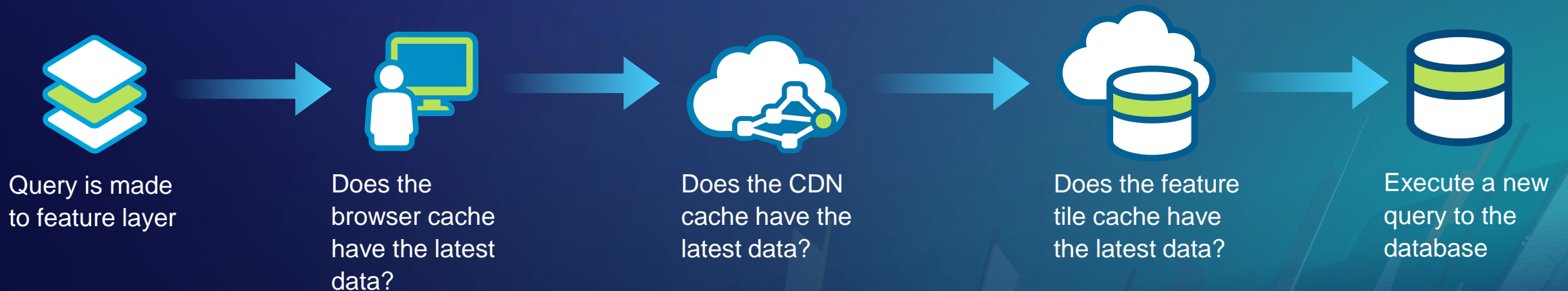
Feature Layers – Best Practices

- Publish public layers to ArcGIS Online (Let ArcGIS Online manage the infrastructure)
- Ensure that **Editing is Disabled** on the layer, even if there is no editing tool in your App
- Use Feature Layer Views where appropriate

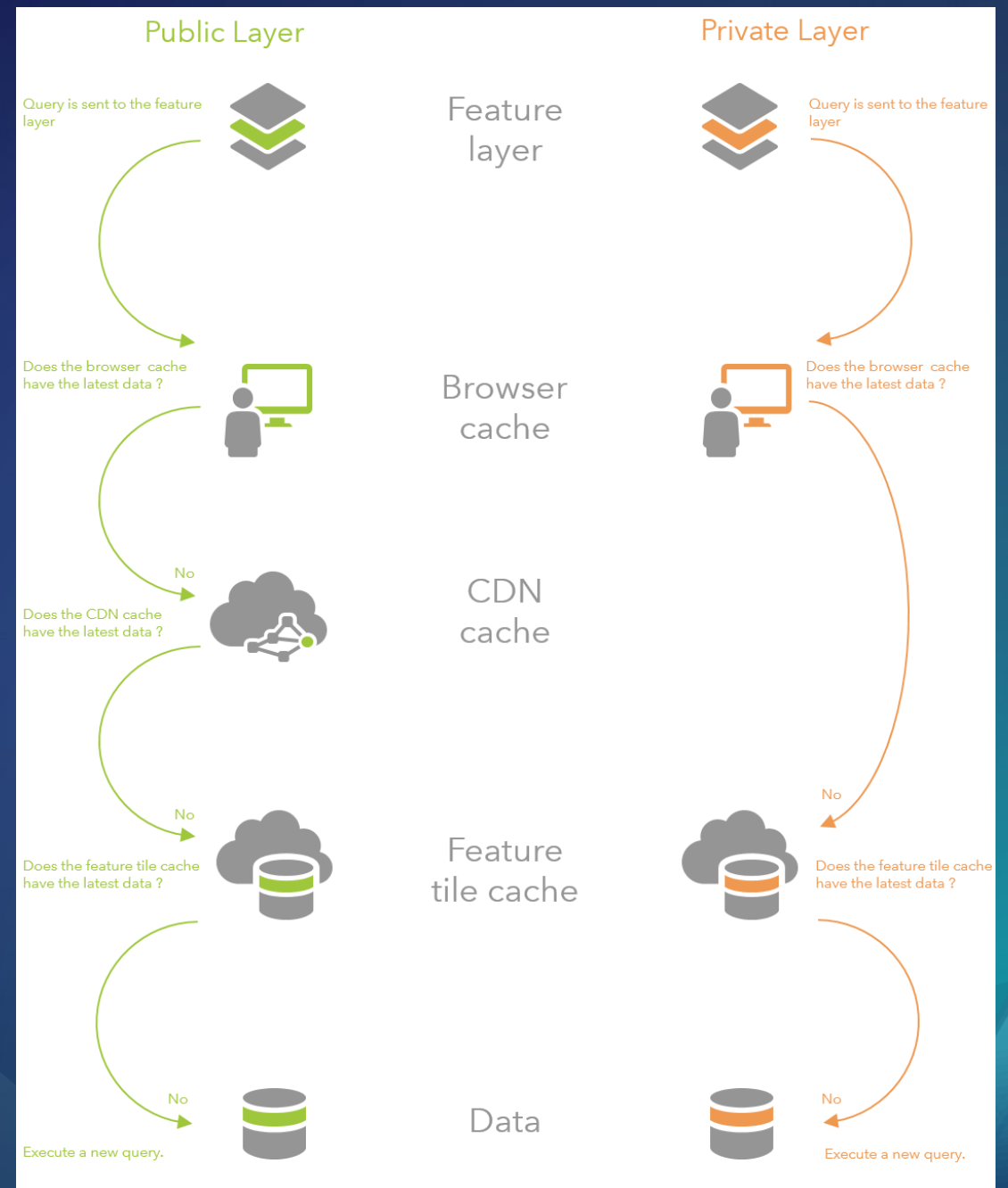


ArcGIS Online Scalability: Tile queries and response caching

- ArcGIS Online Scales to meet demand
- Queries to large datasets are sent as tiled requests whose responses can be cached
- Response caching levels:
 - Browser cache (client-side)
 - Content Delivery Network cache
 - Feature tile cache (server-side)

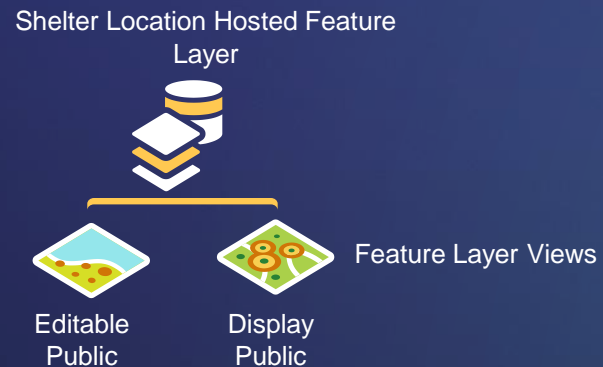
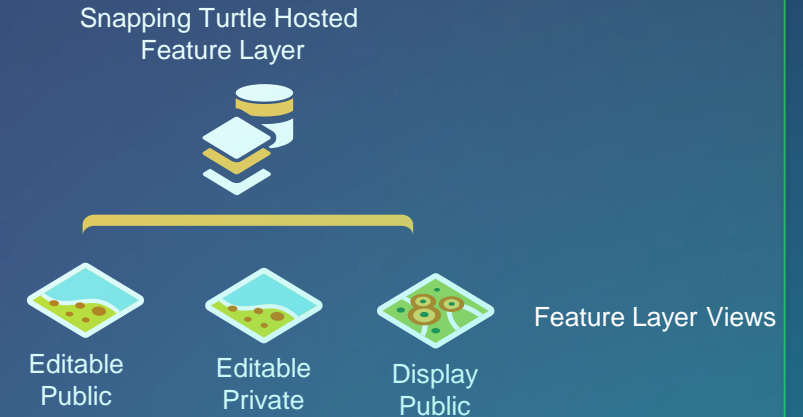


Public VS. Private Response Caching



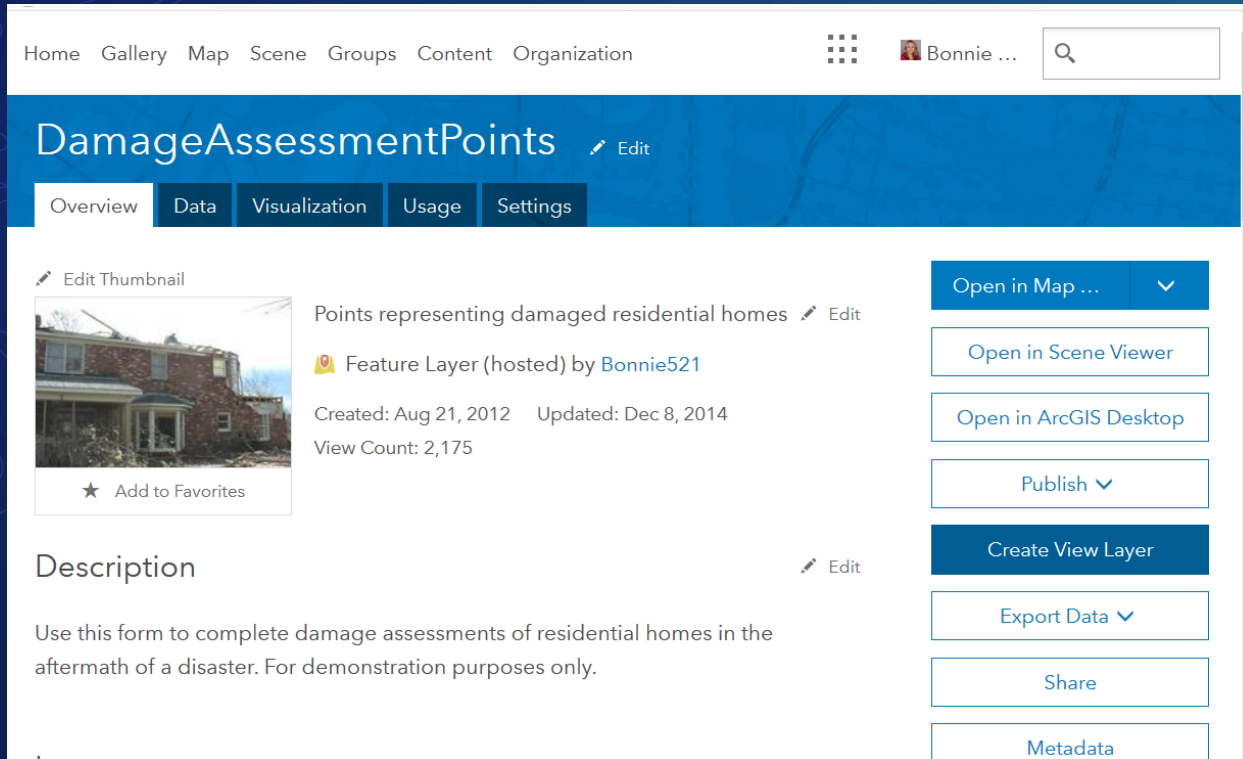
Editing Data for Public Layers

- Crowdsourcing/ Citizen Science
 - Set editing capabilities (add only)
 - Have a curation process
 - Hide identifying information in public view



- Update Public Layers
 - Private Editable Layer
 - Public Display Layer
 - Any edits invalidate response cache

Demo: Hosted Feature Layer View



The screenshot displays the ArcGIS Online interface for a feature layer view titled "DamageAssessmentPoints". The top navigation bar includes links for Home, Gallery, Map, Scene, Groups, Content, and Organization, along with a user profile for Bonnie and a search bar. The main header shows the title "DamageAssessmentPoints" with an "Edit" link. Below the header, a tabbed interface includes "Overview" (selected), "Data", "Visualization", "Usage", and "Settings".

On the left side of the "Overview" tab, there is a thumbnail image of a damaged house, an "Edit Thumbnail" link, and an "Add to Favorites" button. The main content area displays the following information:

- Title: Points representing damaged residential homes (with an "Edit" link)
- Type: Feature Layer (hosted) by Bonnie521
- Metadata: Created: Aug 21, 2012 Updated: Dec 8, 2014
- View Count: 2,175

On the right side, a vertical menu contains the following options:

- Open in Map ... (with a dropdown arrow)
- Open in Scene Viewer
- Open in ArcGIS Desktop
- Publish (with a dropdown arrow)
- Create View Layer (highlighted in dark blue)
- Export Data (with a dropdown arrow)
- Share
- Metadata

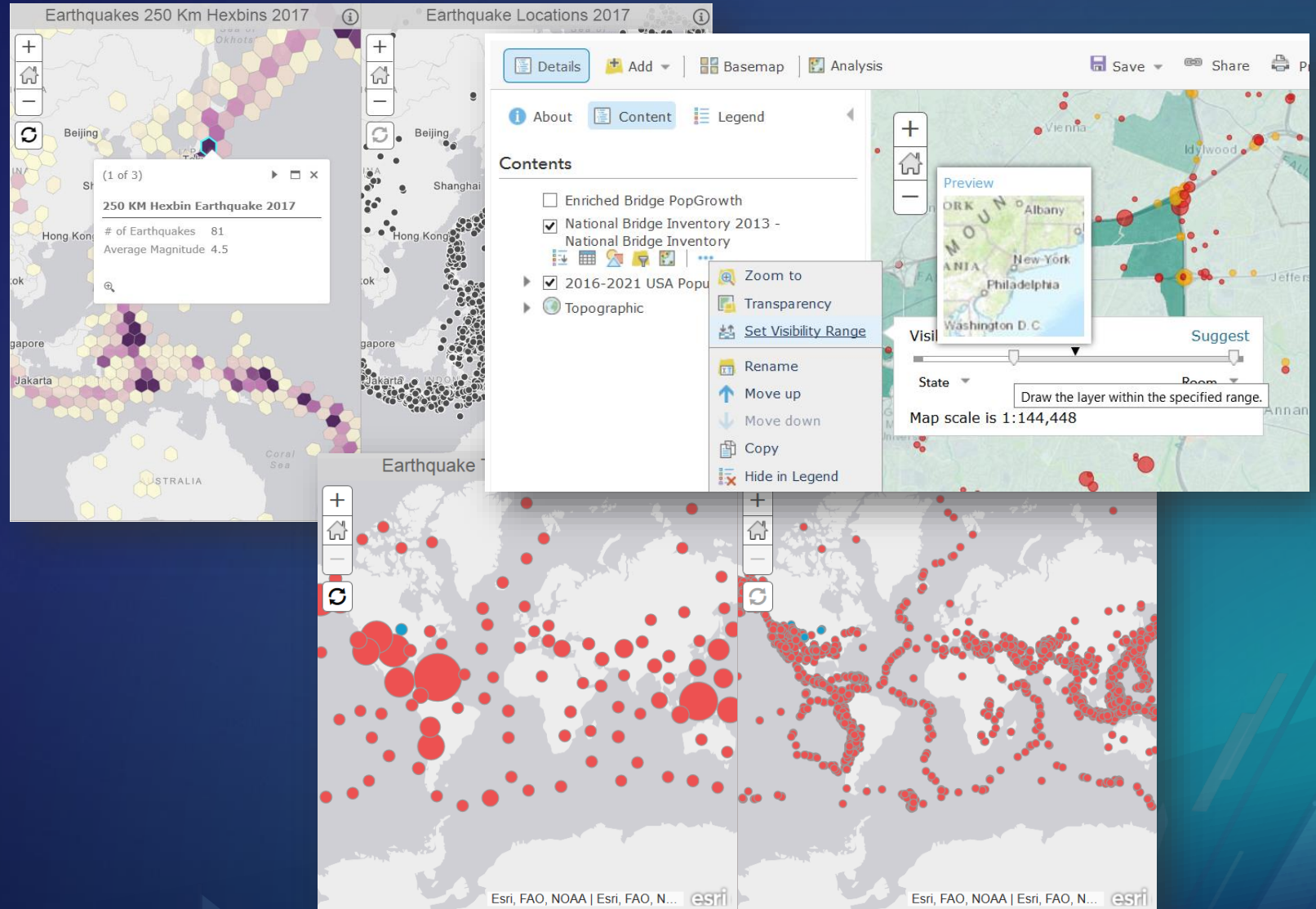
Below the main content area, there is a "Description" section with an "Edit" link. The description text reads: "Use this form to complete damage assessments of residential homes in the aftermath of a disaster. For demonstration purposes only."

Visualization Strategies

The background is a deep blue gradient. In the top-left corner, there are several diagonal lines in shades of teal and red. A faint, light blue outline of a map is visible on the left side. In the bottom-right corner, there are several overlapping geometric shapes, including rectangles and lines, in colors like orange, teal, and dark blue. A faint, light blue grid pattern is also visible in the bottom-right area.

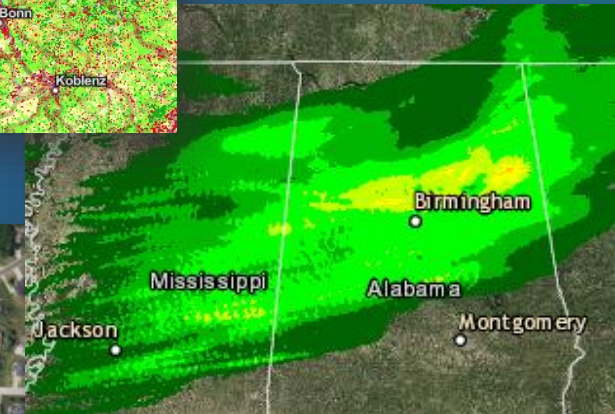
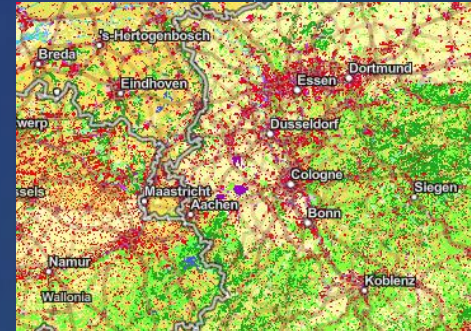
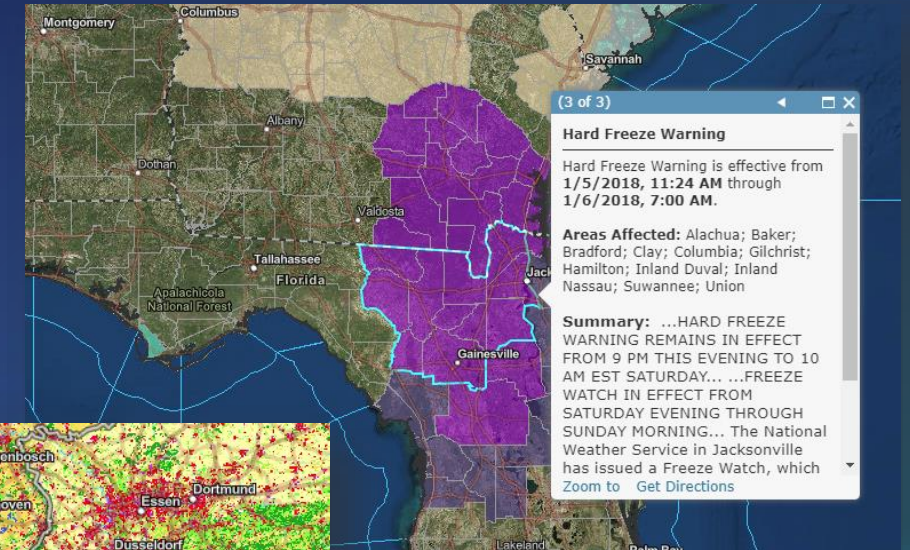
Strategies for showing large amounts of data

- Filter
- Aggregate
- Visibility ranges
- Generalize
- Tile layers
- Cluster



Sharing with the Public

- Subscription and Premium Content
- App and source data



Best Practices for Layers under High Demand

- Think about your map's audience and purpose
- Choose the right layer types
- Optimize feature layers for server-side response caching and editing workflows
- Get creative with visualization techniques

Resources

- Blogs:

- <https://blogs.esri.com/esri/arcgis/2017/03/02/best-practices-for-high-demandviral-apps/>
- <https://blogs.esri.com/esri/arcgis/2017/10/17/strategies-to-effectively-display-large-amounts-of-data-in-web-apps/>
- <https://blogs.esri.com/esri/arcgis/2017/04/30/best-practices-for-using-tile-layers-as-operational-layers/>

- Subscribe to RSS feed:

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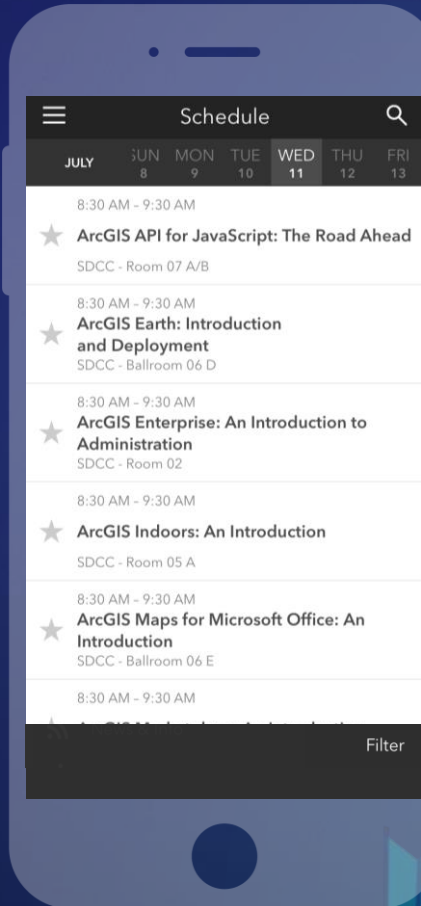


Please Take Our Survey on the App

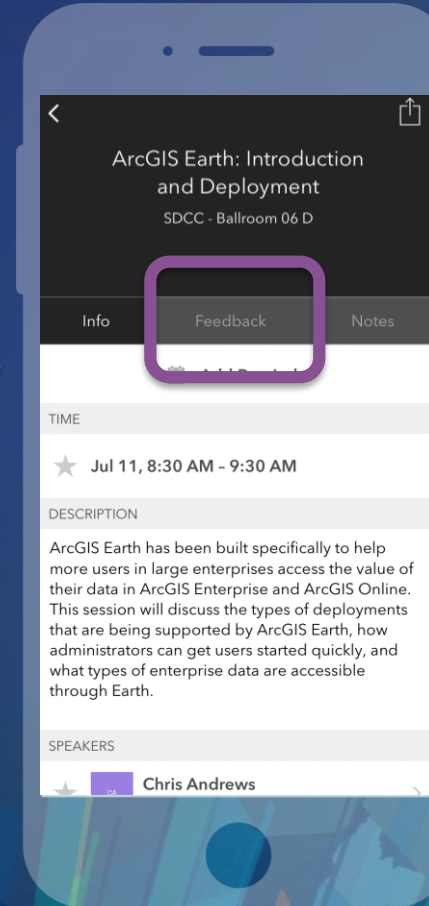
Download the Esri Events app and find your event



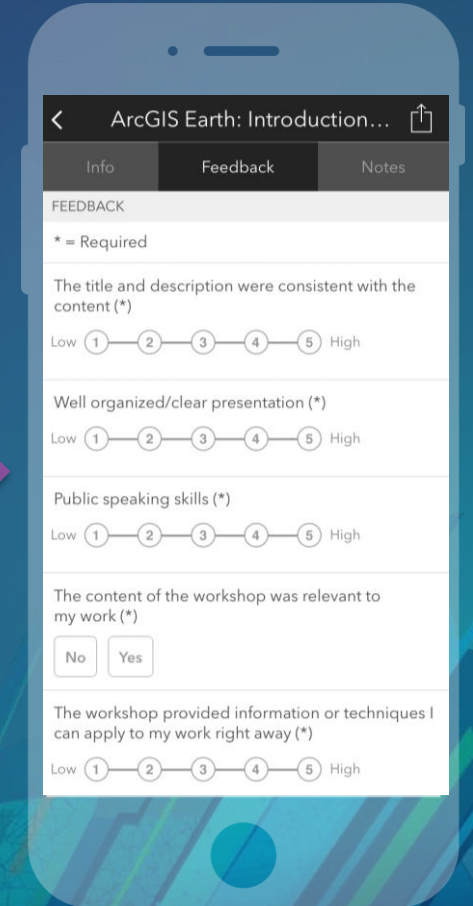
Select the session you attended



Scroll down to find the feedback section



Complete answers and select "Submit"





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