ArcGIS Online: Best Practices for High-Demand Web Applications

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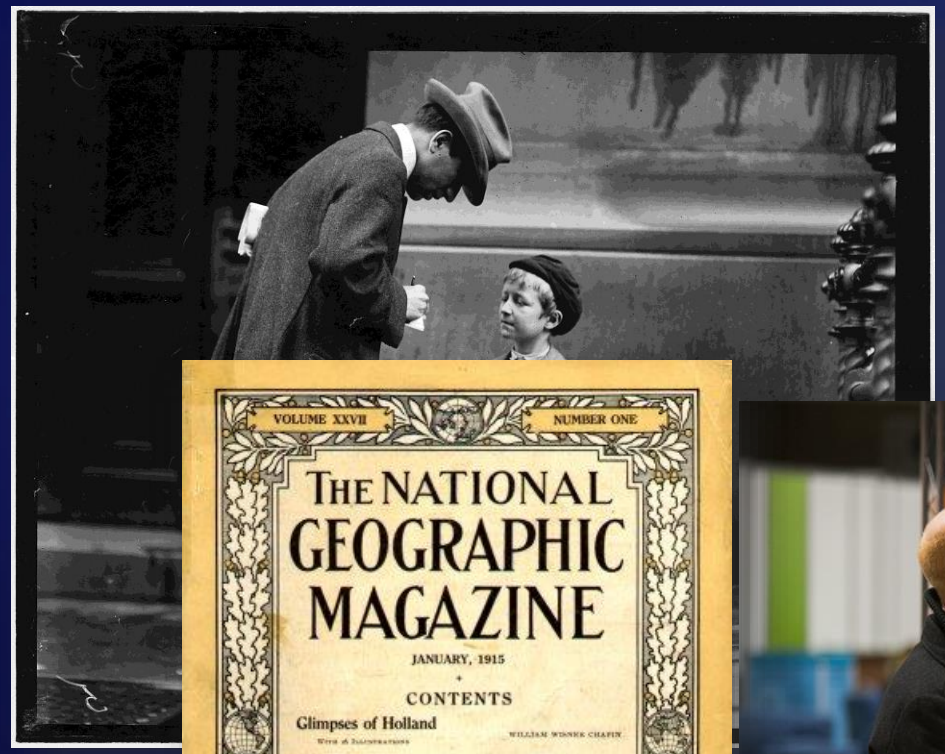
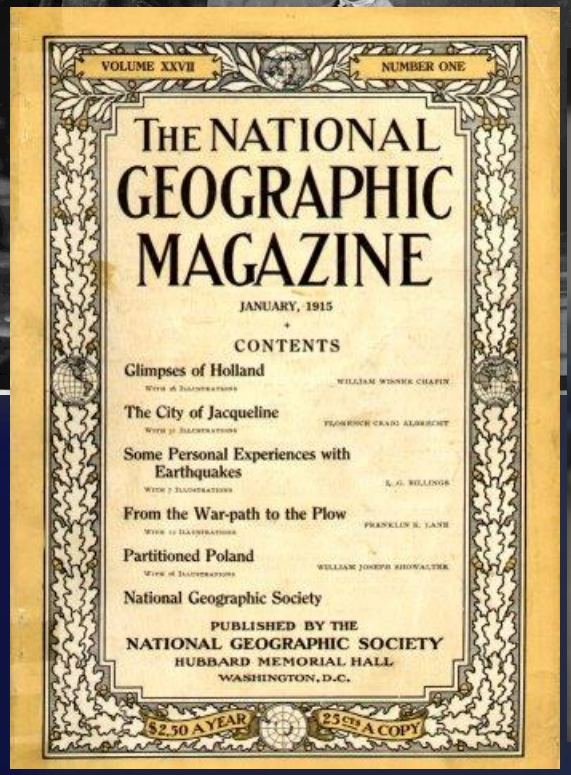
GIS INSPIRING WHAT'S NEXT

Agenda

- Communicating with Maps
- Who do you build your apps for?
- Layer Types
- Scalability and Response Caching
- Visualization Strategies
- Sharing with the Public

Communication with Maps





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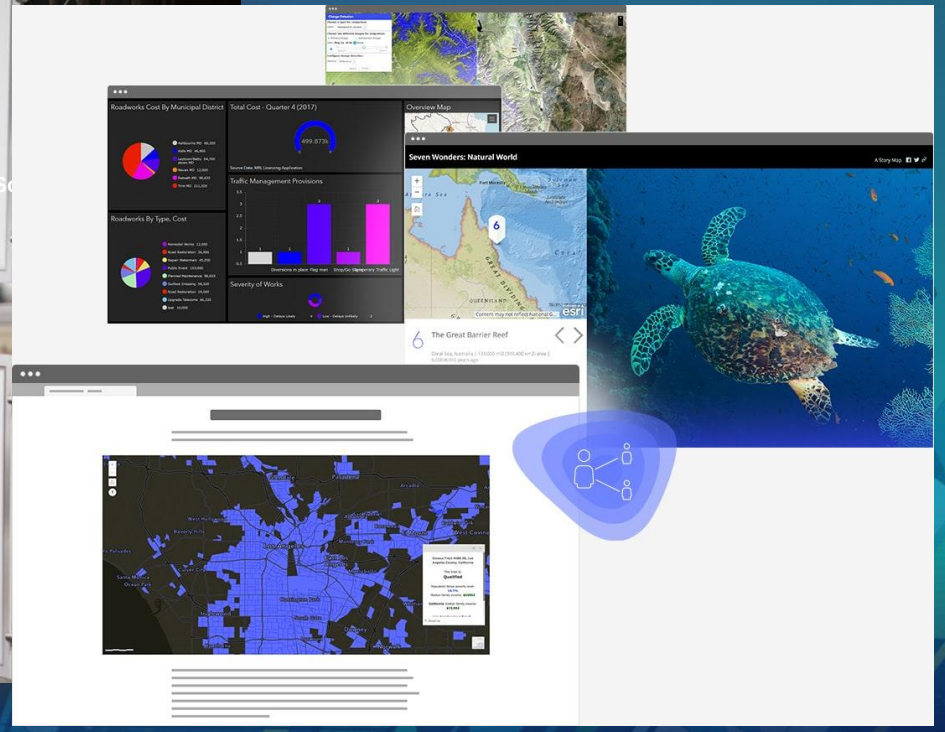


Source: Wikimedia Commons

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

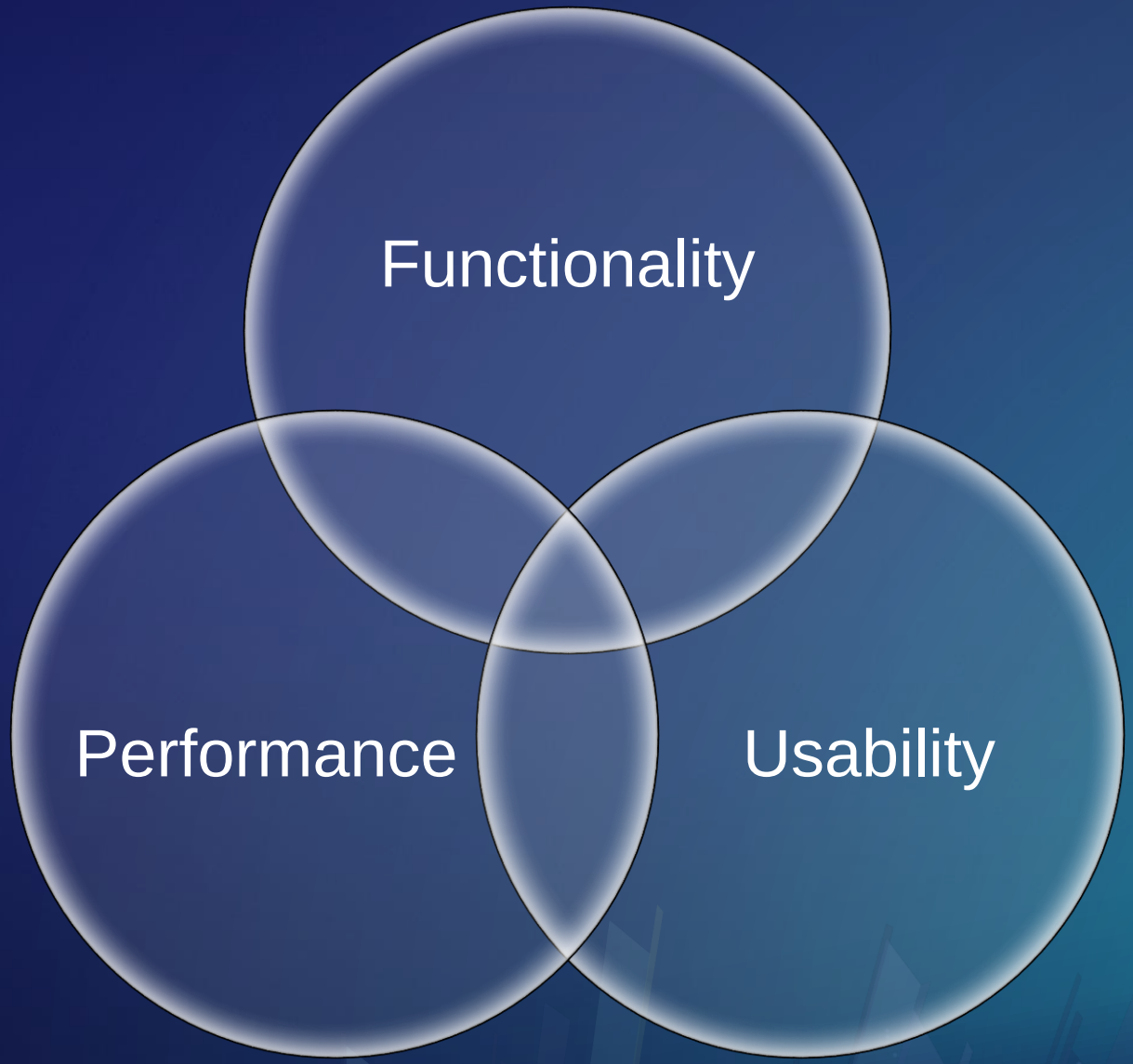
Performance: App loads quickly (no more than 3 seconds)

All components need to withstand up to 1000 req/s

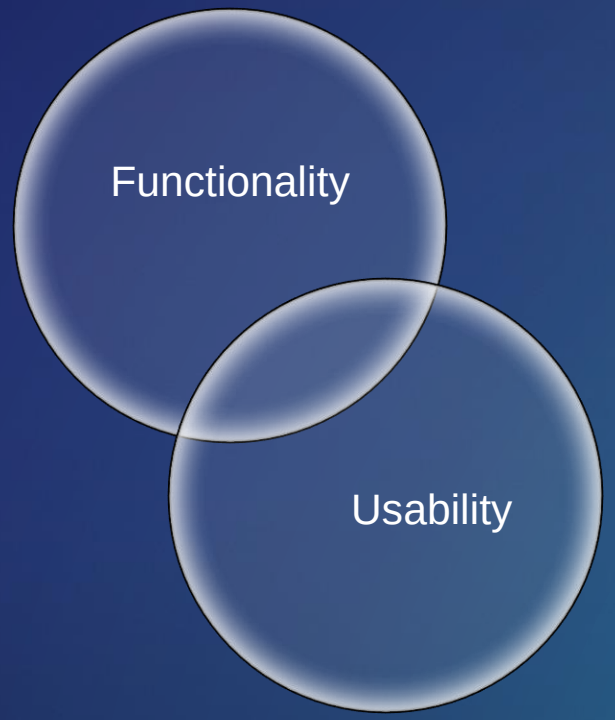
Functionality: User can figure out tools without instructions

No more than 3 clicks to complete interaction

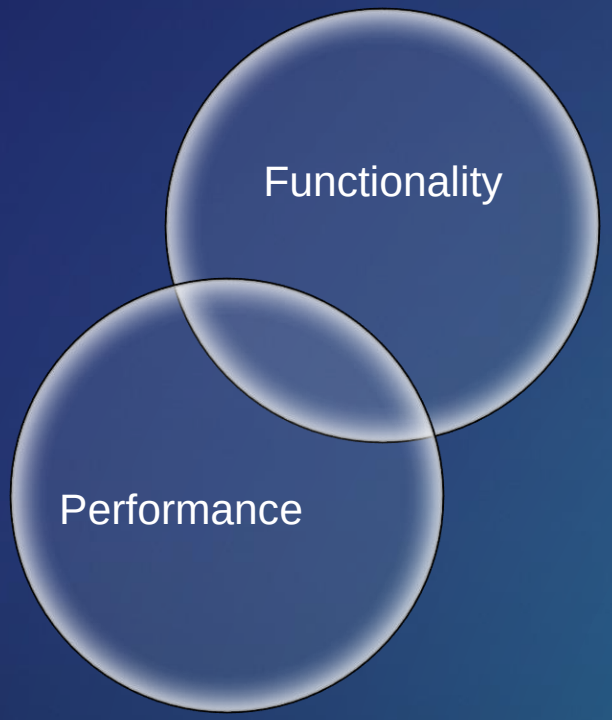
Web Mapping Application Considerations



Design Choice



Performance Choice



Layer Types

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

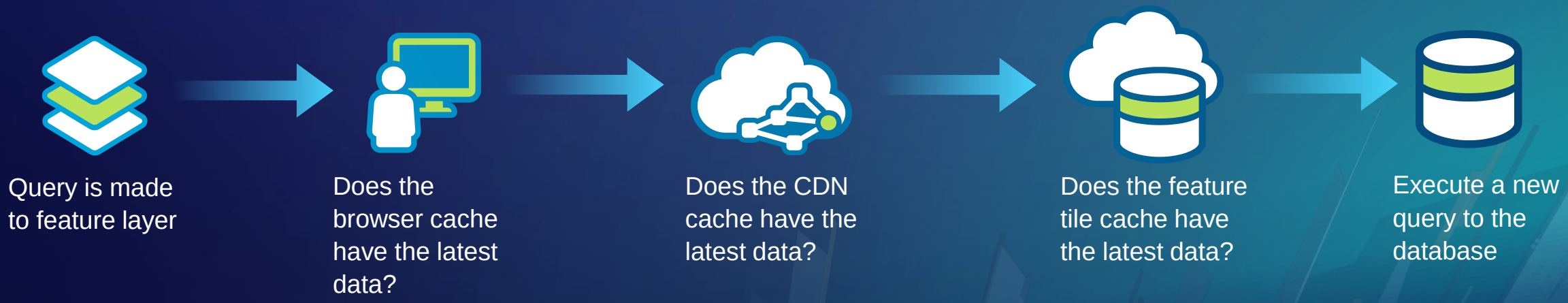
- Feature layers (Hosted)
  - Supports editing, Visualization and can be used as input for analysis
  - Support feature layers views that allow different layers to be created from the same dataset
  - Hosted in the ArcGIS Online Cloud
  - Can be source data for tile layers
- Feature layers
  - Layers 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

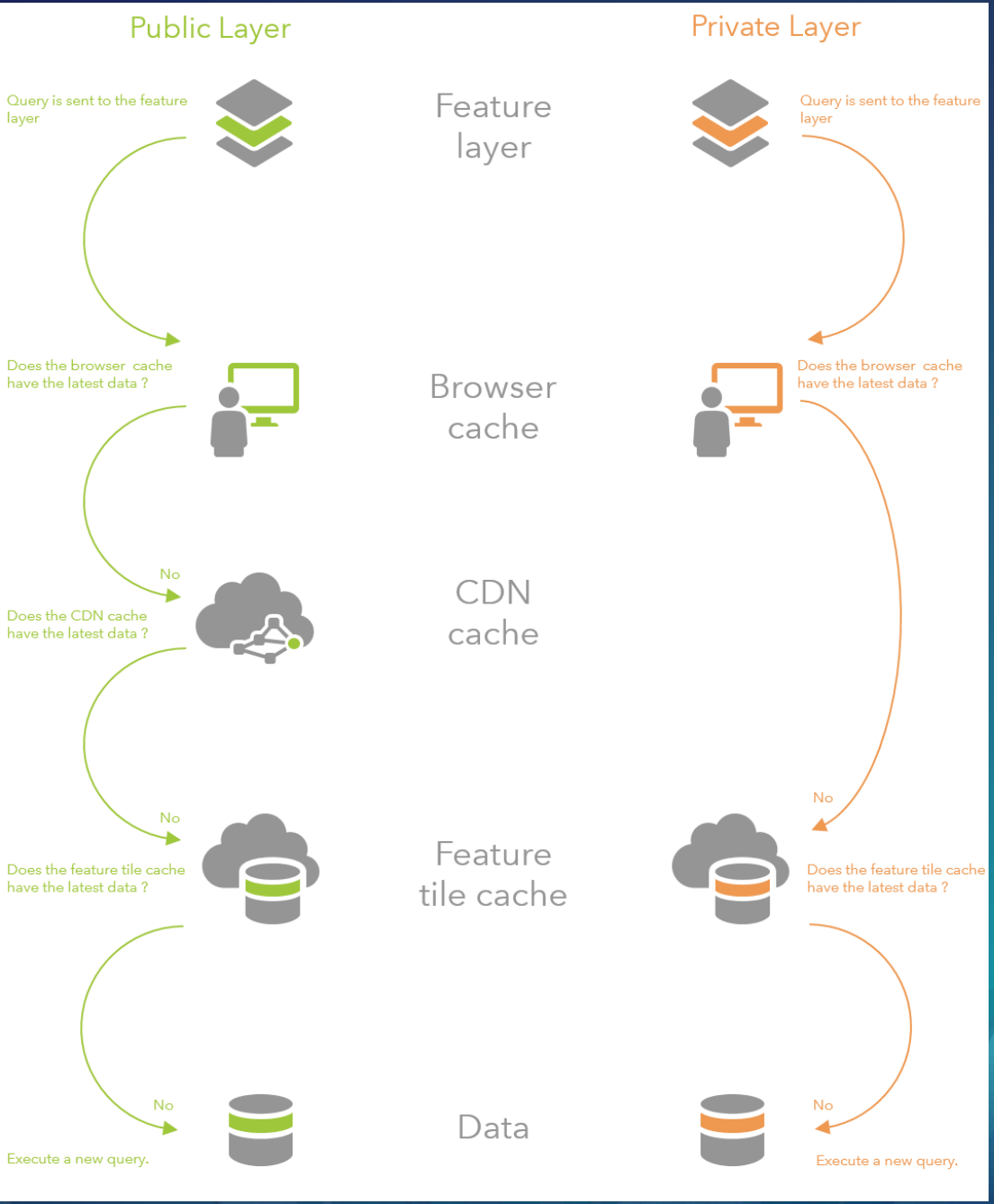
- Publish public layers to ArcGIS Online (Let ArcGIS Online manage the infrastructure)
- Ensure that **Editing is Disabled** on the layer, even if there is no editing tool in your App
- Use Feature Layer Views where appropriate

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)

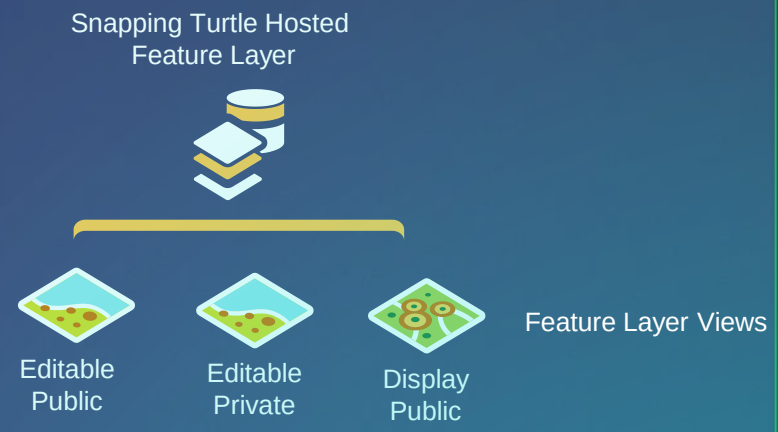


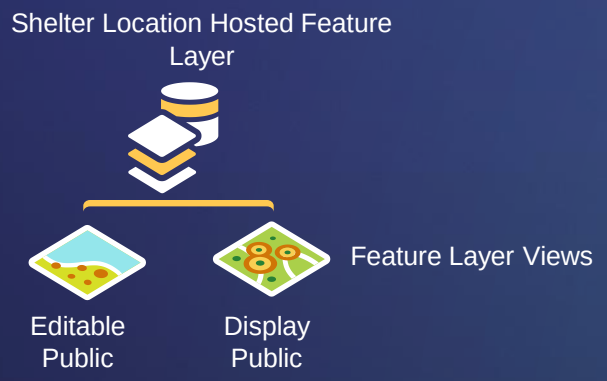
Public VS. Private Response Caching



Editing Data for Public Layers

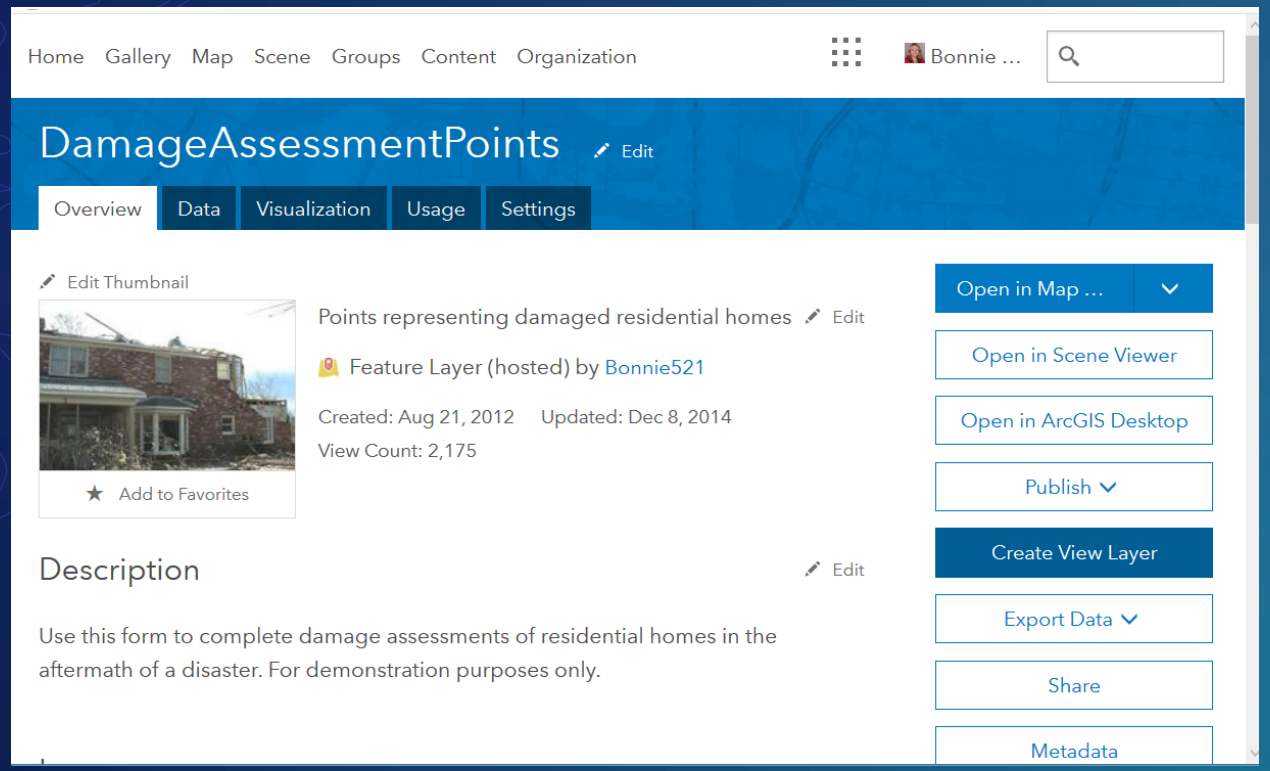
- Crowdsourcing/ Citizen Science
  - Set editing capabilities (add only)
  - Have a curation process
  - Hide identifying information in public view





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

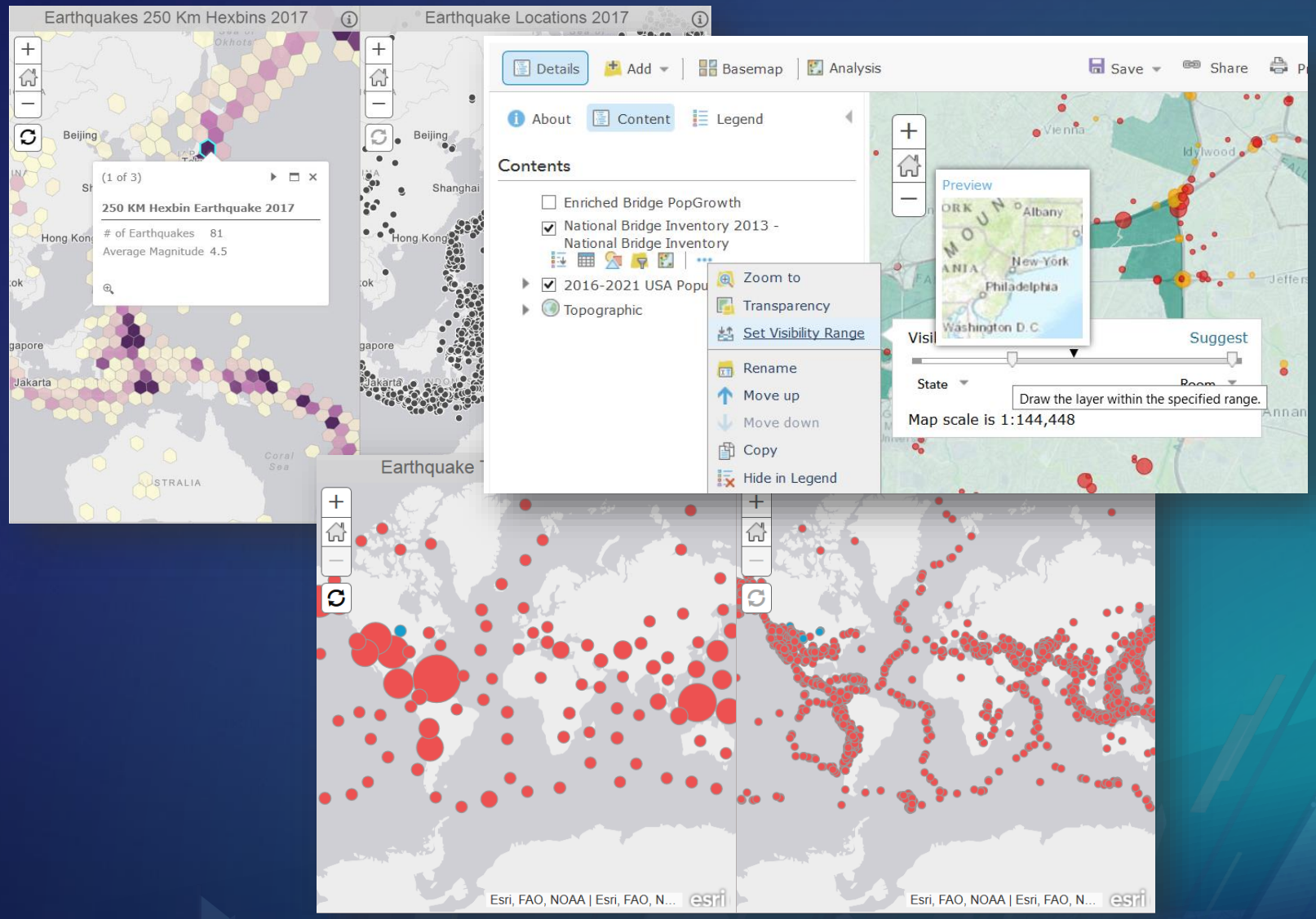
Demo: Hosted Feature Layer View



Visualization Strategies

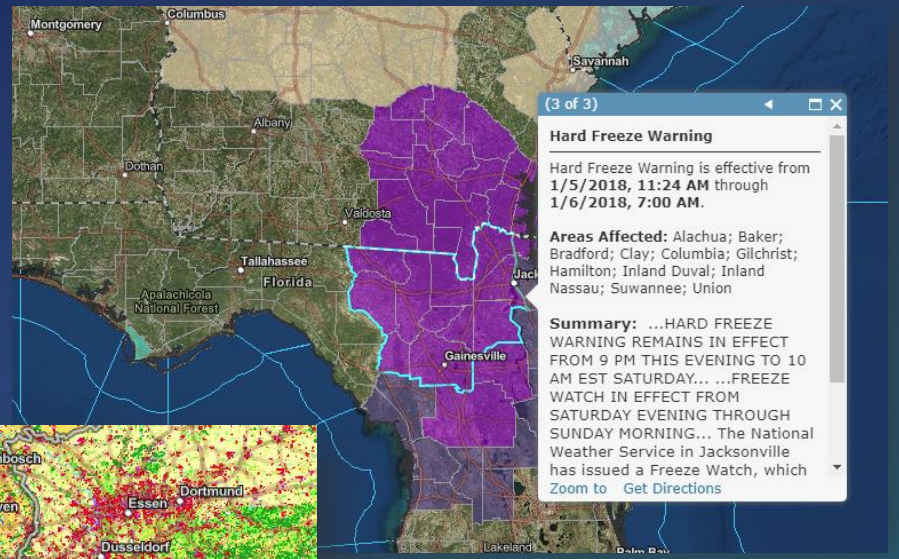
Strategies for showing large amounts of data

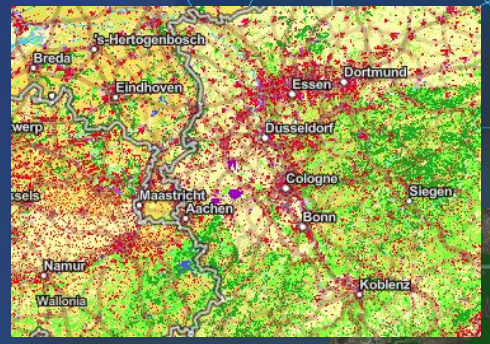
- Filter
- Aggregate
- Visibility ranges
- Generalize
- Tile layers
- Cluster

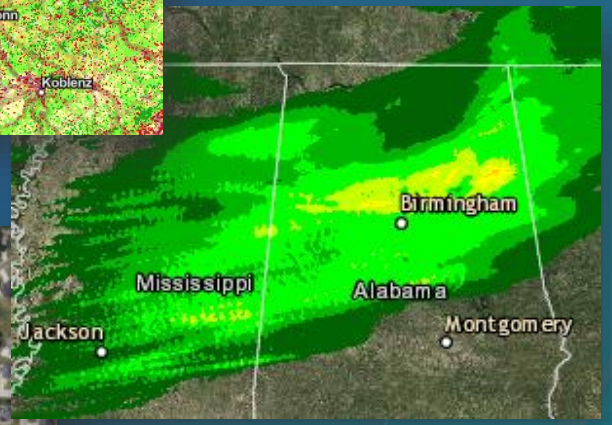


Sharing with the Public

- 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/
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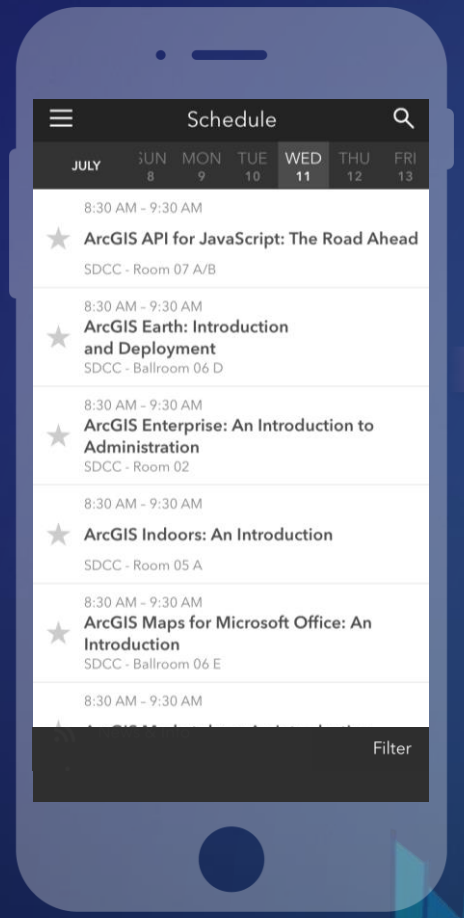
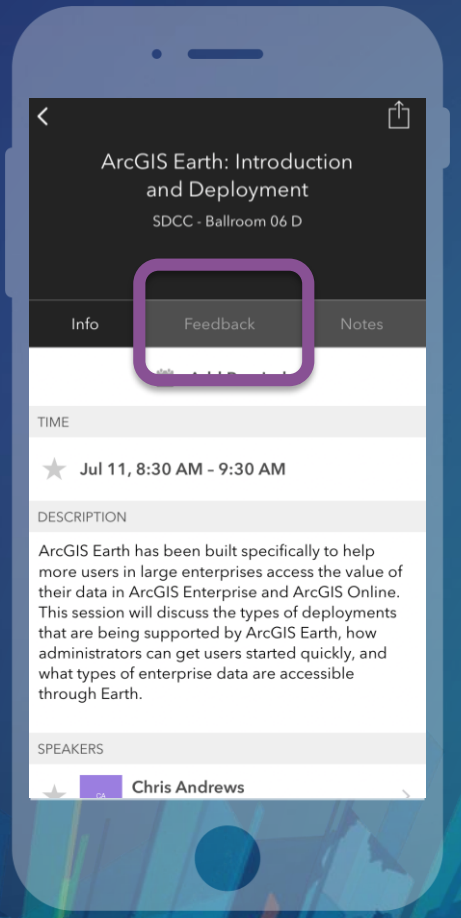
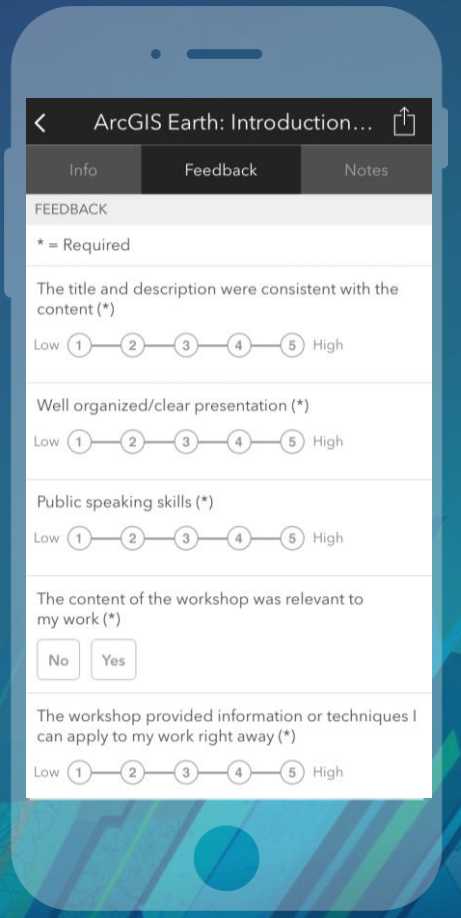


Scroll down to find the feedback section



Complete answers and select “Submit”



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