

UC



Network Analysis Services in ArcGIS Enterprise

Deelesh Mandloi

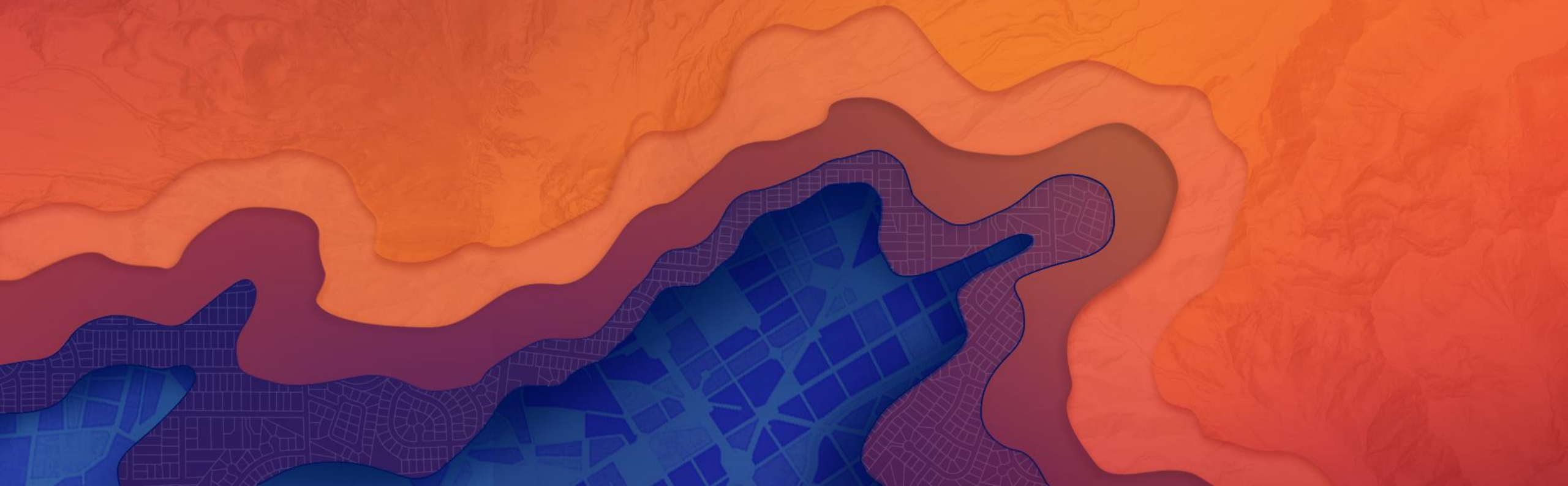
Slides from this demo theater

<http://esriurl.com/uc17nas>

Agenda

- Network Analyst concepts
- ArcGIS Enterprise publishing workflow
 - Geoprocessing services
 - Network Analysis services
- Using network analysis services

Network Analyst Concepts



ArcGIS Network Analyst

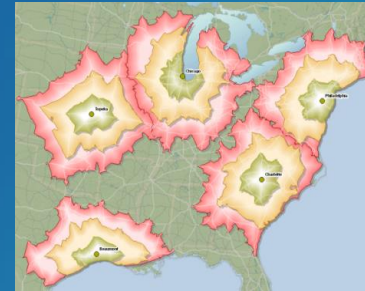
Solve Transportation Problems



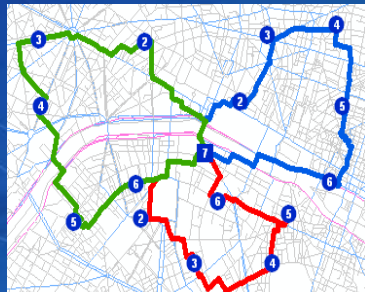
Route



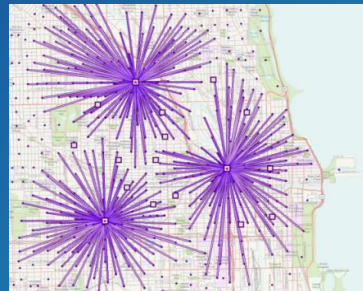
Closest Facility



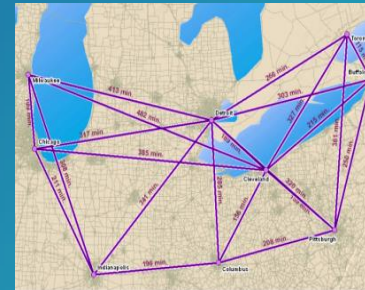
Service Area



Vehicle Routing Problem

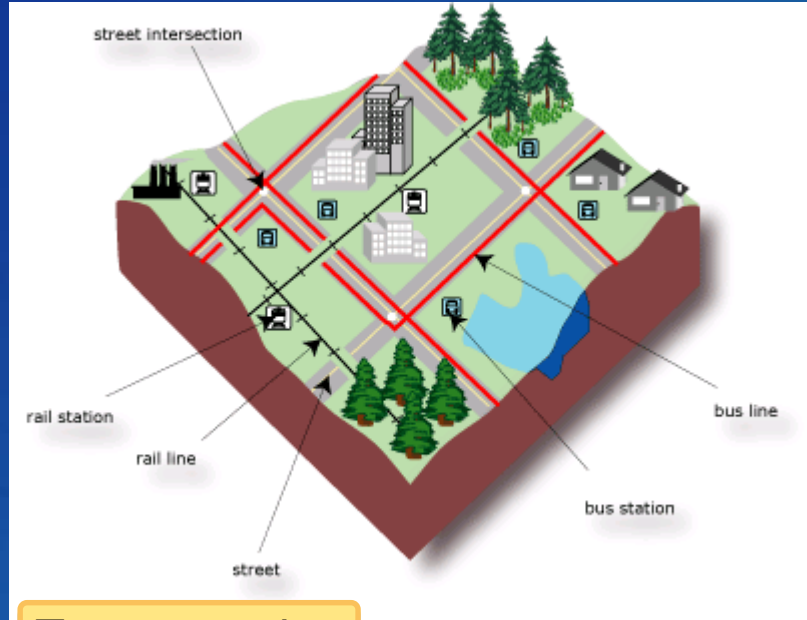


Location-Allocation



Origin-Destination Cost Matrix

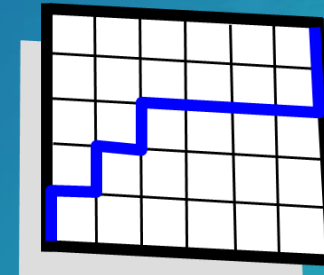
Analysis is performed on a network dataset



Transportation Network

Data Model

Network Dataset



Geodatabase



Where do I get a network dataset?

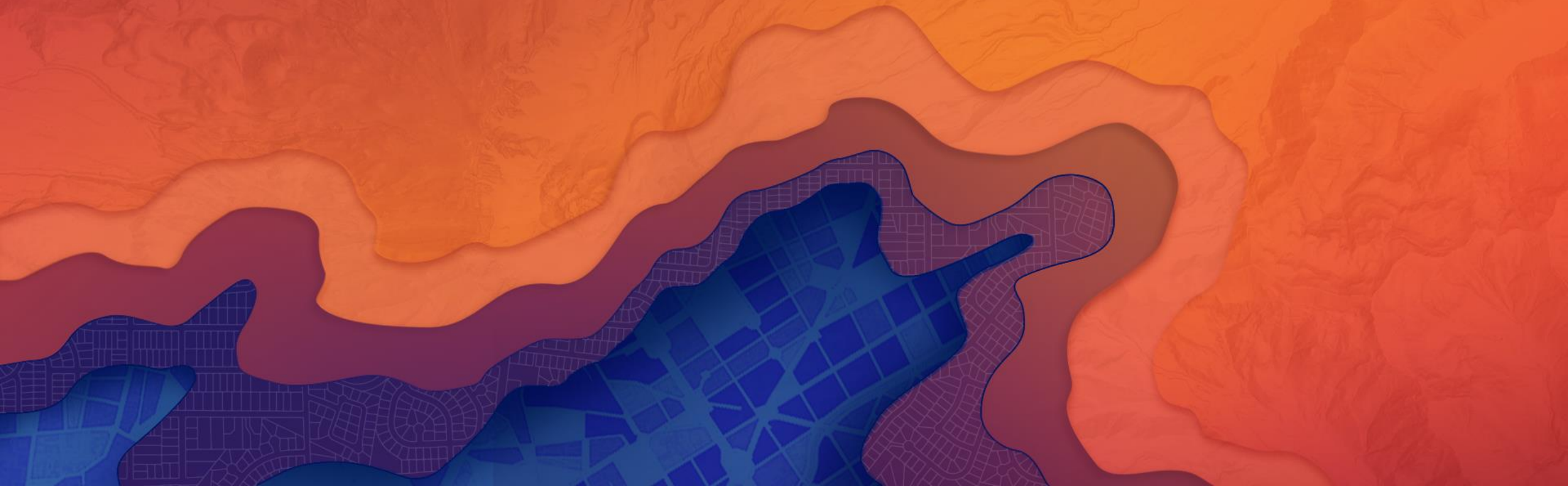
- Purchase StreetMap Premium for ArcGIS
 - High quality ready-to-use network dataset
 - Can add your own street data as well

OR

- Build your own network dataset from:
 - Your organization's data
 - TIGER
 - OpenStreetMap (try ArcGIS Editor for OpenStreetMap)

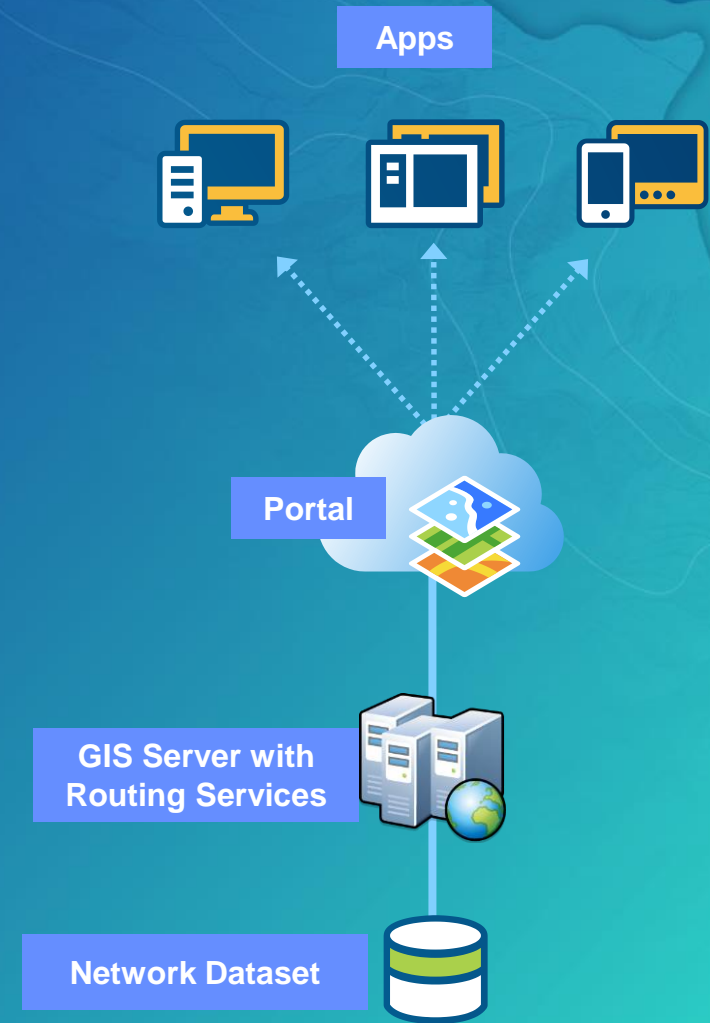


ArcGIS Enterprise



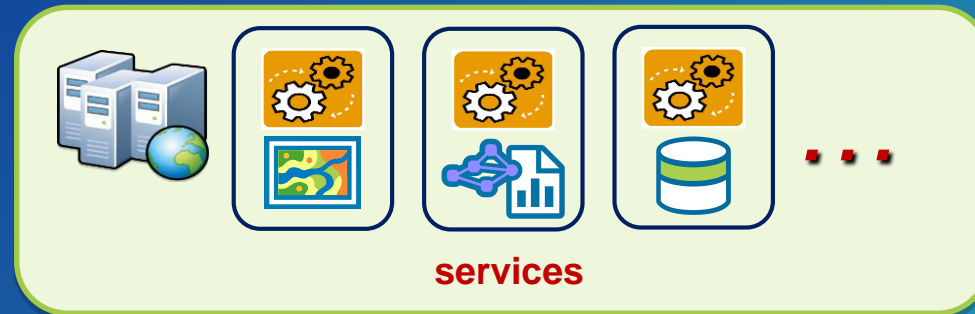
What is ArcGIS Enterprise?

- Enables “Web GIS” in your infrastructure
 - On-premises or in your own cloud
- Formerly known as ArcGIS for Server



What are GIS services?

- **GIS service** → GIS resource running on a server
 - vs. GIS application on your local computer



- Share GIS resources to the web



Map



Feature



Network



Geodata



Geoprocessing



Image

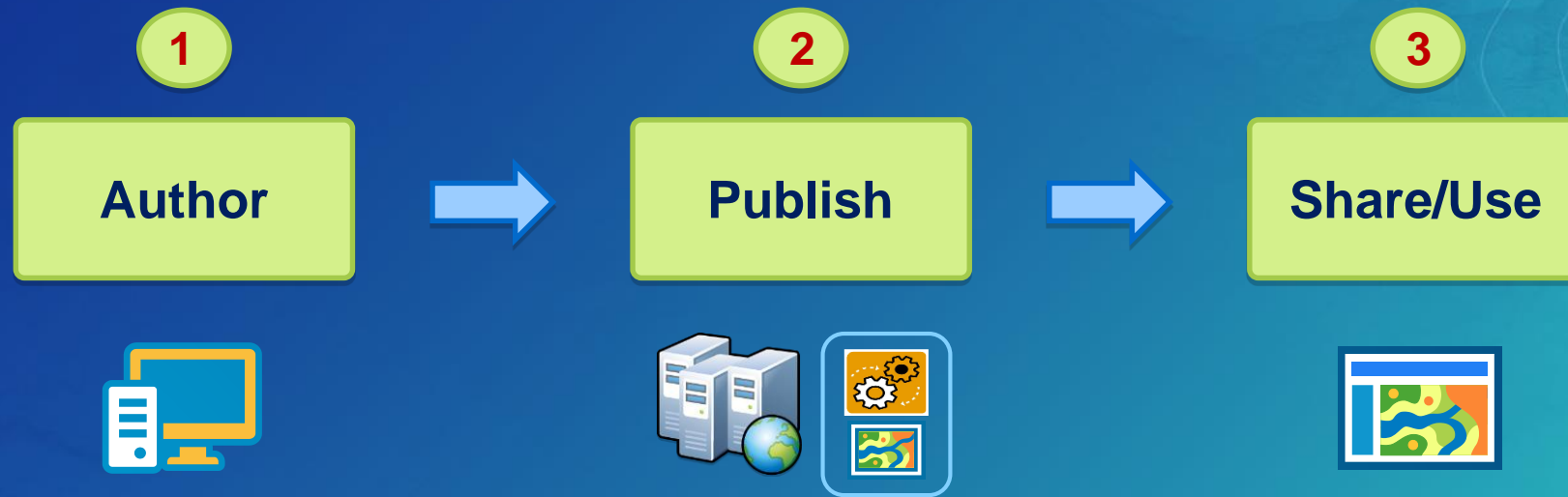


Locator



Schematics

Publishing workflow for GIS services

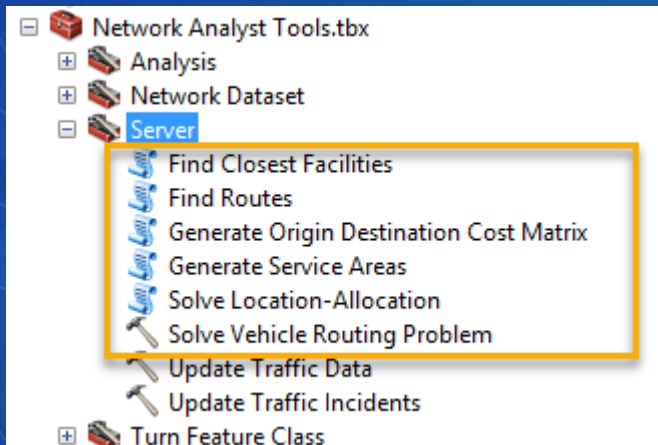


Publishing network analysis services

Can be published as two different service types

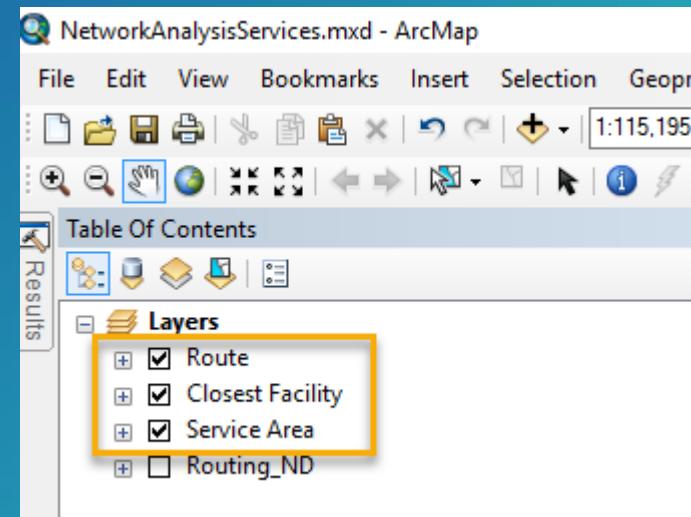
Geoprocessing Service

- 1 Author using geoprocessing tools from the Server toolset
- 2 Run the tools and publish the result as a service
- 3 Use from Map Viewer, ArcGIS Pro and ArcMap



Network Analysis Service

- 1 Author using a map document with network analysis layers
- 2 Publish the map document as a service
- 3 Use from Map Viewer and ArcMap (Route solver only)



Geoprocessing or network analysis services?

Choosing the correct service type

- Both geoprocessing and network analysis service support the full network analysis capabilities

Select geoprocessing service if

- Analysis runs for long duration (greater than 60 seconds)
- Out-of-the box app support is important
- Network analysis is just one part of a larger analysis
- Need to access the traversal result for further analysis
- Need to access OD Cost Matrix, Vehicle Routing Problem, or Location Allocation Solvers from REST based Web APIs

Select network analysis service if

- Analysis runs for short duration (less than 60 seconds)
- Need very fast execution

Publishing Services

The background features a gradient from dark red at the top to light orange at the bottom. In the lower half, there are layered, wavy shapes in shades of orange and blue. The blue shapes contain a white grid pattern, resembling a map or a technical drawing.

Single tool to publish all network analysis services

I have a network dataset and want to publish all network analysis services. Is there a single tool that can perform the authoring and publishing of these services?



YES

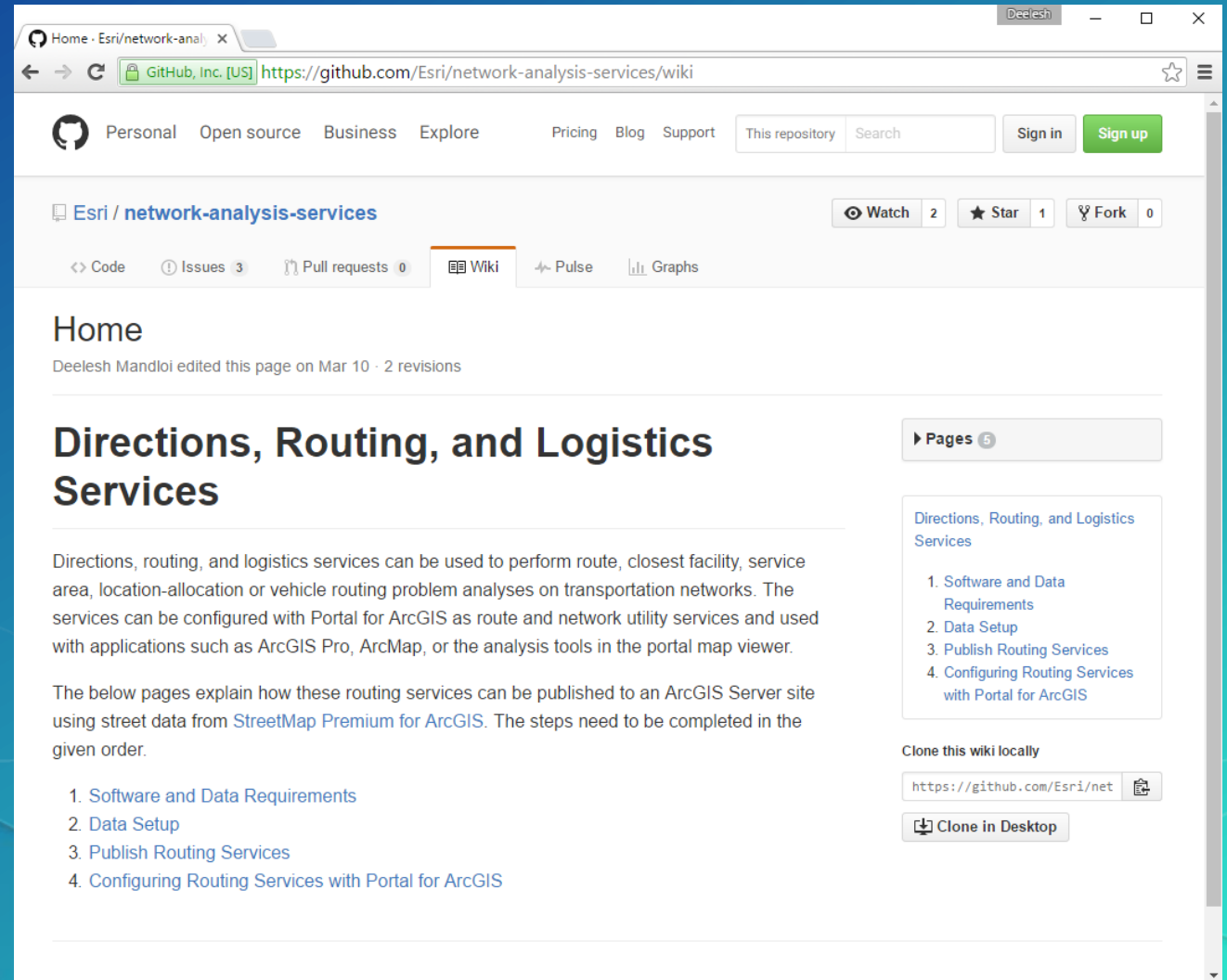
Publish Routing Services

- Network Dataset
- Service Definition Folder
- Server Data Folder Path
- Server URL: http://localhost:6080/arcgis
- User Name (optional)
- Password (optional)

OK Cancel Environments... Show Help >>

Publish Routing Services tool

- Setup instructions and tool available on [GitHub](#)
- Requires ArcMap and Network Analyst extension to publish services
- If publishing to a federated GIS Server, the tool registers the network analysis services as portal utility services
- **New at 10.5: Use any network dataset and not just StreetMap Premium**



The screenshot shows a web browser window displaying the GitHub repository page for Esri/network-analysis-services/wiki. The browser address bar shows the URL https://github.com/Esri/network-analysis-services/wiki. The page header includes navigation links for Personal, Open source, Business, Explore, Pricing, Blog, and Support, along with a search bar and Sign in/Sign up buttons. The repository name is Esri/network-analysis-services, with 2 watchers, 1 star, and 0 forks. The page title is Home, and it indicates that Deelesh Mandloi edited this page on Mar 10 with 2 revisions. The main content area is titled "Directions, Routing, and Logistics Services" and contains a paragraph explaining that these services can be used for route, closest facility, service area, location-allocation, or vehicle routing problem analyses on transportation networks. It also mentions that the services can be configured with Portal for ArcGIS and used with applications like ArcGIS Pro, ArcMap, or the analysis tools in the portal map viewer. Below this, it states that the following pages explain how to publish these services to an ArcGIS Server site using street data from StreetMap Premium for ArcGIS, and lists the steps to be completed in a given order:

1. Software and Data Requirements
2. Data Setup
3. Publish Routing Services
4. Configuring Routing Services with Portal for ArcGIS

On the right side of the page, there is a "Pages" section with 5 pages listed:

1. Software and Data Requirements
2. Data Setup
3. Publish Routing Services
4. Configuring Routing Services with Portal for ArcGIS

At the bottom right, there is a "Clone this wiki locally" section with a text input field containing the URL https://github.com/Esri/net and a "Clone in Desktop" button.

Services created by publish routing services tool

ArcGIS Server Manager interface showing the Routing folder. The folder contains four services:

- NetworkAnalysis (Geoprocessing Service)**: Performs route, closest facility, service area, location-allocation, and vehicle routing problem analyses in asynchronous execution mode.
- NetworkAnalysis (Map Service)**: Supports visualizing historical traffic and performs route, closest facility and service area network analysis in synchronous execution mode.
- NetworkAnalysisSync (Geoprocessing Service)**: Performs vehicle routing problem analysis in synchronous execution mode.
- NetworkAnalysisUtilities (Geoprocessing Service)**: Contains tools that provide auxiliary information for working with network analysis services available with your portal.

ArcGIS REST Services Directory
Home > services > Routing > NetworkAnalysis (GPService)

Routing/NetworkAnalysis (GPService)

Service Description: Performs route, closest facility, service area, location-allocation,

Tasks:

- FindRoutes
- FindClosestFacilities
- GenerateServiceAreas
- SolveLocationAllocation
- SolveVehicleRoutingProblem
- GenerateOriginDestinationCostMatrix

Execution Type: esriExecutionTypeAsynchronous

Result Map Server Name:

MaximumRecords: 1000

Child Resources: Info

ArcGIS REST Services Directory
Home > services > Routing > NetworkAnalysis (NAServer)

Routing/NetworkAnalysis (NAServer)

Service Description :

Route Layers:

- Route

Closest Facility Layers:

- ClosestFacility

Service Area Layers:

- ServiceArea

Child Resources: Info

ArcGIS REST Services Directory
Home > services > Routing > NetworkAnalysisSync (GPService)

Routing/NetworkAnalysisSync (GPService)

Service Description: Performs vehicle routing problem analysis in synchronous

Tasks:

- EditVehicleRoutingProblem

Execution Type: esriExecutionTypeSynchronous

Result Map Server Name:

MaximumRecords: 1000

Child Resources: Info

ArcGIS REST Services Directory
Home > services > Routing > NetworkAnalysisUtilities (GPService)

Routing/NetworkAnalysisUtilities (GPService)

Service Description: Contains tools that provide auxiliary information for

Tasks:

- GetToolInfo
- GetTravelModes

Execution Type: esriExecutionTypeSynchronous

Result Map Server Name:

MaximumRecords: 1000

Child Resources: Info

Asynchronous geoprocessing service

Network analysis service

Synchronous geoprocessing service

Service to get travel modes

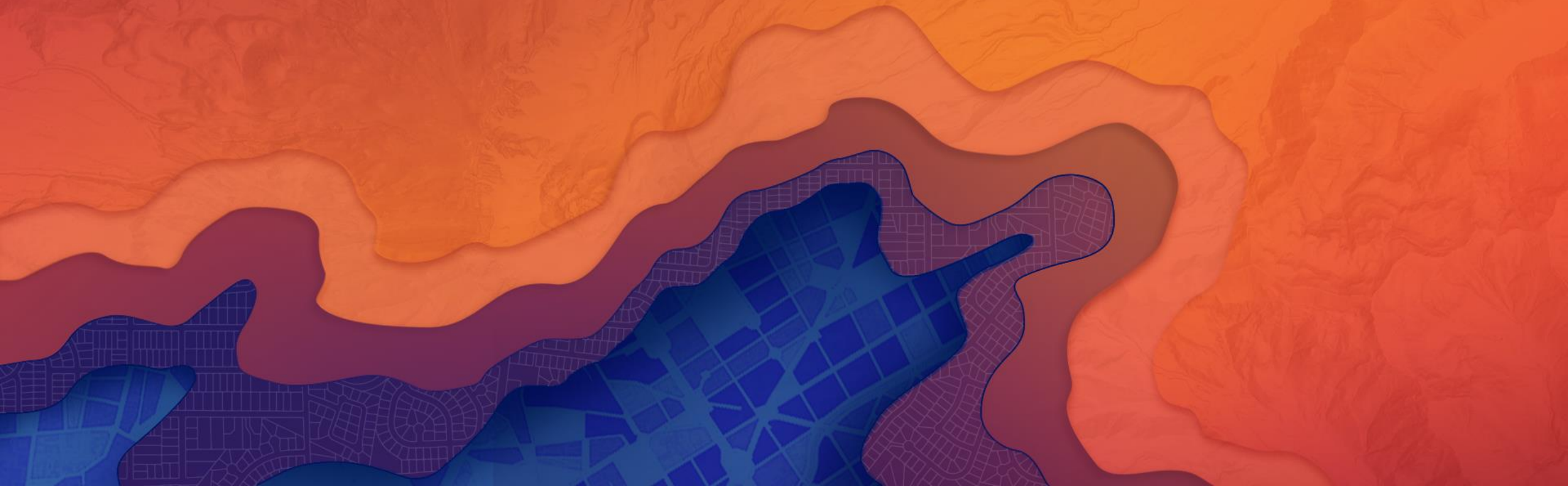
Registering services with your portal

- Configure as Directions and Routing utility services in your portal
- Allows all apps to discover the network analysis services
- Required by many apps in order to use the services
- Configured by Publish Routing Services tool if publishing services to a federated GIS Server

The screenshot shows the 'User Conference Portal' interface. At the top, there is a navigation bar with links for Home, Gallery, Map, Scene, Groups, My Content, and My Organization. A search bar on the right contains 'UC2017'. Below the navigation bar is a blue header with the 'UC' logo and the text 'User Conference Portal'. The main content area is titled 'Utility Services' and contains a sidebar on the left with a list of categories: General, Home Page, Gallery, Map, Item Details, Groups, Utility Services (highlighted with a yellow box), ArcGIS Online, Servers, Roles, Collaborations, and Security. The 'Utility Services' section is active, showing a 'Directions and Routing' sub-section highlighted with a yellow box. This sub-section includes a description: 'Configure the utility services for your portal. To configure your portal to use utility services from ArcGIS Online, open the ArcGIS Online tab.' Below this is a 'Route' dropdown menu with a list of options: Route, Route (Asynchronous), Closest Facility, Closest Facility (Asynchronous), Service Area, Service Area (Asynchronous), Vehicle Routing Problem, Vehicle Routing Problem (Asynchronous), Location Allocation (Asynchronous), Routing Utilities, Traffic, and Origin Destination Cost Matrix (Asynchronous). A text input field contains the URL 'services/Routing/NetworkAnalysis/NAserver/Route' and a 'CONFIGURE TRAVEL MODES' button is visible to the right.

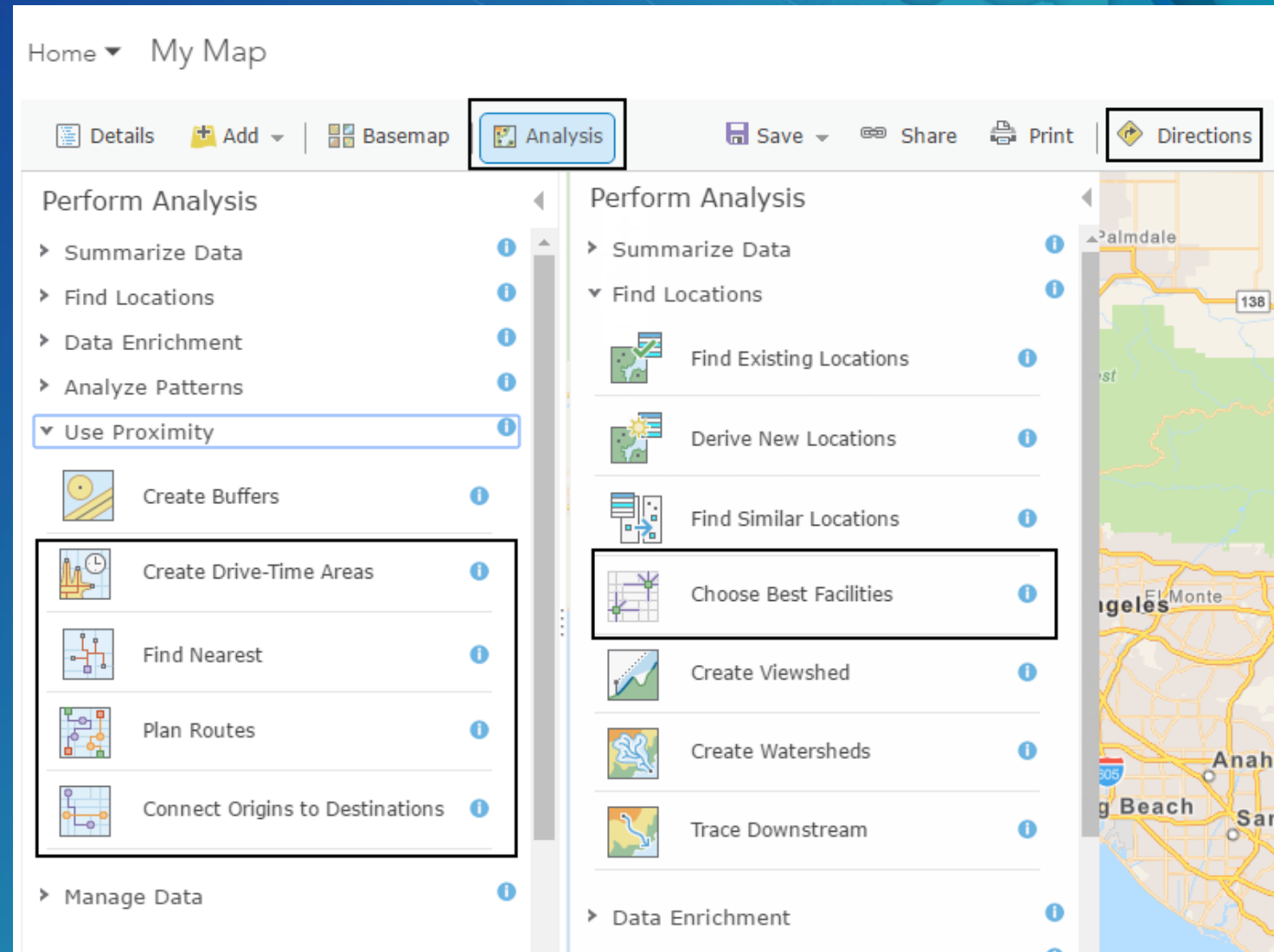
Using Services

Map Viewer, ArcGIS Pro, and ArcMap



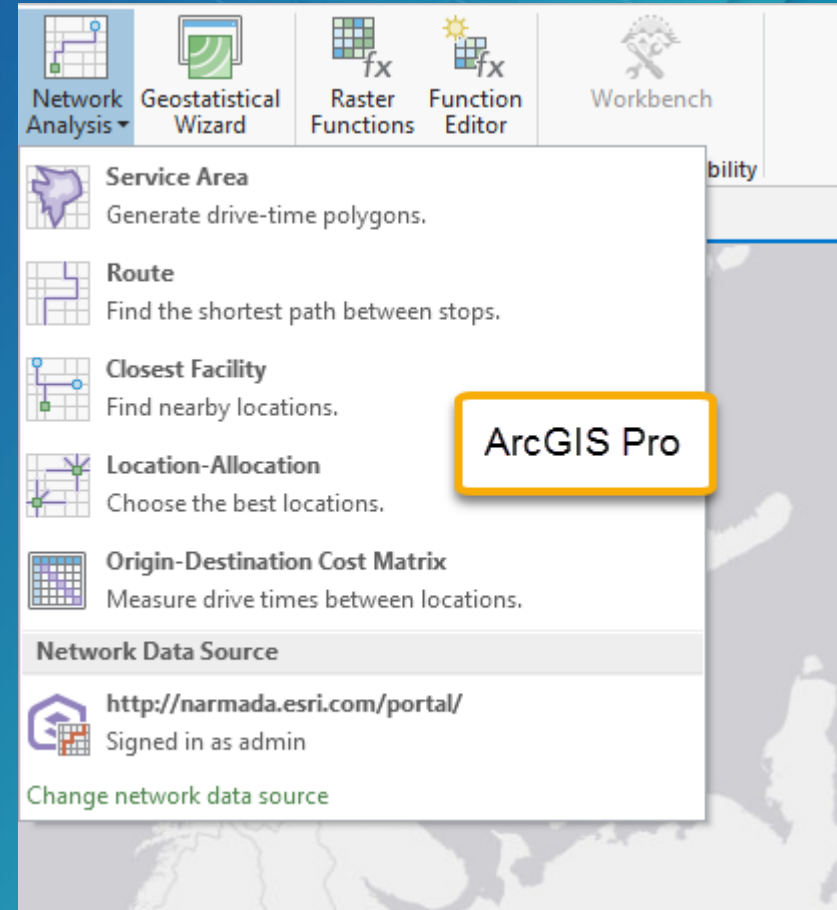
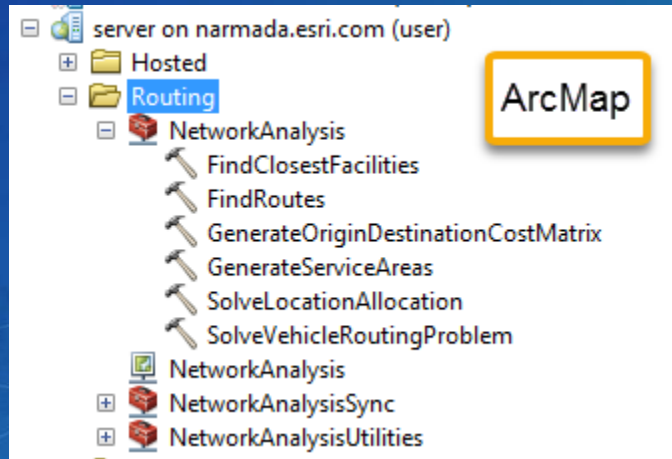
Using services in Map Viewer

- Directions button
- Analysis tools
 - Most tools in the Use Proximity toolset
 - Choose Best Facilities tool in Find Locations toolset
 - Summarize Nearby tool in Summarize Data toolset



Using services in ArcGIS Desktop

- Use from Network Analysis gallery in the Analysis tab within ArcGIS Pro
- Use from a ArcGIS Server connection in ArcMap



Publish Routing Services

- ◆ Network Dataset
- ◆ Service Definition Folder
- ◆ Server Data Folder Path
- Server URL
- ◆ User Name (optional)
- ◆ Password (optional)

OK Cancel Environments... Show Help >>

Demo

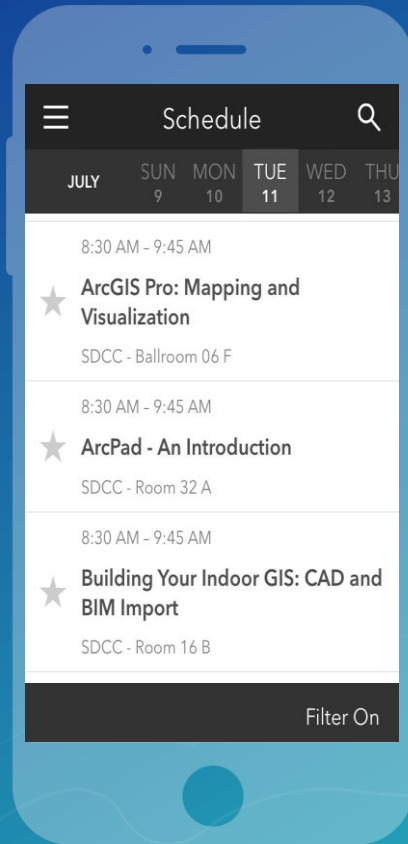
Publish and use network analysis services

Please Take Our Survey on the Esri Events App!

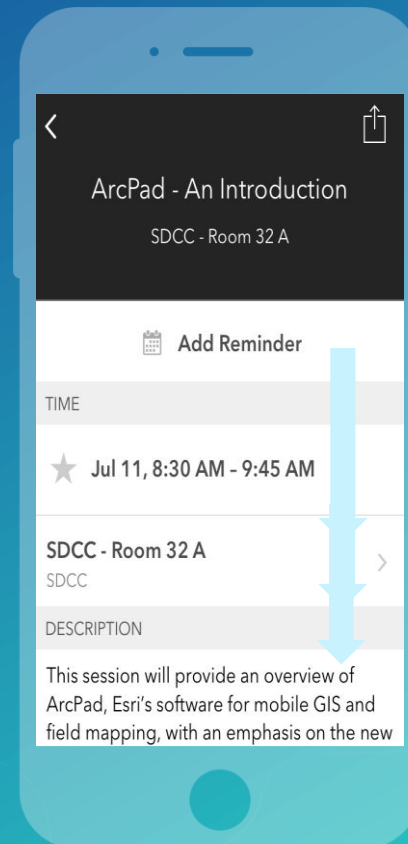
Download the Esri Events app and find your event



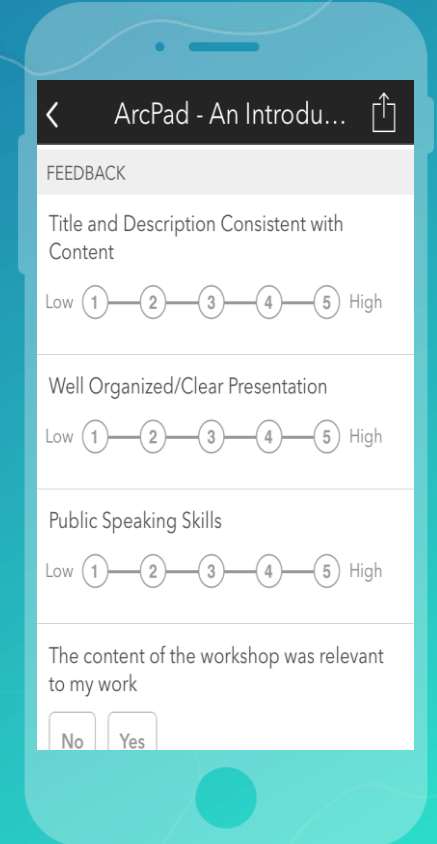
Select the session you attended



Scroll down to find the survey



Complete Answers and Select "Submit"



Questions?

Slides from this demo theater

<http://esriurl.com/uc17nas>



esri

THE
SCIENCE
OF
WHERE