

Working with Utility Networks in ArcGIS®

STUDENT EDITION

Copyright © 2018–2024 Esri
All rights reserved.

Course version 5.1. Version release date February 2024.

Printed in the United States of America.

The information contained in this document is the exclusive property of Esri. This work is protected under United States copyright law and other international copyright treaties and conventions. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system, except as expressly permitted in writing by Esri. All requests should be sent to Attention: Director, Contracts and Legal, Esri, 380 New York Street, Redlands, CA 92373-8100, USA.

Export Notice: Use of these Materials is subject to U.S. export control laws and regulations including the U.S. Department of Commerce Export Administration Regulations (EAR). Diversion of these Materials contrary to U.S. law is prohibited.

The information contained in this document is subject to change without notice.

Commercial Training Course Agreement Terms: The Training Course and any software, documentation, course materials or data delivered with the Training Course is subject to the terms of the Master Agreement for Products and Services, which is available at <https://www.esri.com/~media/Files/Pdfs/legal/pdfs/ma-full/ma-full.pdf>. The license rights in the Master Agreement strictly govern Licensee's use, reproduction, or disclosure of the software, documentation, course materials and data. Training Course students may use the course materials for their personal use and may not copy or redistribute for any purpose. Contractor/Manufacturer is Esri, 380 New York Street, Redlands, CA 92373-8100, USA.

Esri Marks: Esri marks and product names mentioned herein are subject to the terms of use found at the following website: <https://www.esri.com/content/dam/esrisites/en-us/media/legal/copyrights-and-trademarks/esri-product-naming-guide.pdf>.

Other companies and products or services mentioned herein may be trademarks, service marks, or registered marks of their respective mark owners.

Table of Contents

Esri resources for your organization

Course introduction

- Course introduction
- Course goals
- Installing the course data
- Training Services account credentials
- Icons used in this workbook

1 Foundations of the utility network

- Lesson introduction
- Benefits of the utility network
- Discovering the software and architecture
- Elements of the utility network
- Exercise 1: Explore elements of the utility network
 - Open the ArcGIS Pro project
 - Explore the enterprise geodatabase
 - Explore layers in the map
 - Explore the network properties
- Structure networks
- Examine the structure network
- Discovering data in ArcGIS
- Exploring asset groups and asset types
- Lesson review
- Answers to Lesson 1 questions

2 Network topology management

- Lesson introduction
- Network connectivity
- Branch versioning
- Maintaining data integrity
- Understanding how feature restrictions dictate network rules
- Exercise 2A: Work with a network topology (Water)
 - Create a new version
 - Examine feature connectivity
 - Build an assembly
 - Test a network rule
- Exercise 2B: Work with a network topology (Gas)
 - Create a new version

- Examine feature connectivity
- Build an assembly
- Test a network rule
- Exercise 2C: Work with a network topology (Electric)
 - Create a new version
 - Examine feature connectivity
 - Build an assembly
 - Test a network rule
- Examine attribute rules
- Lesson review
- Answers to Lesson 2 questions

3 Managing connectivity and associations

- Lesson introduction
- Feature, group, and preset templates
- Exercise 3A: Create a group template (Water)
 - Create a production version
 - Create a group template
 - Add features using the group template
 - Reconcile and post your edits
- Exercise 3B: Create a group template (Gas)
 - Create a production version
 - Create a group template
 - Add features using the group template
 - Reconcile and post your edits
- Exercise 3C: Create a group template (Electric)
 - Create a production version
 - Create a group template
 - Add features using the group template
 - Reconcile and post your edits
- Associations
- Build a preset template with associations
- Exercise 3D: Add associations (Water)
 - Change to the working version
 - Add a template
 - Explore the associations
 - Edit the features
 - Add associations
 - Create a preset template
- Exercise 3E: Add associations (Gas)
 - Change to the working version
 - Add a template

- Explore the associations
- Edit the features
- Add associations
- Create a preset template
- Exercise 3F: Add associations (Electric)
 - Change to the working version
 - Add a template
 - Explore the associations
 - Edit the features
 - Add associations
 - Create a preset template
- Lesson review
- Answers to Lesson 3 questions

4 Network management

- Lesson introduction
- Network architecture
- Subnetworks
- Subnetwork controllers
- Adding a subnetwork controller using a preset template
- Exercise 4A: Add a subnetwork controller (Water)
 - Change to the production version
 - Explore an existing subnetwork controller
 - Add a valid subnetwork controller device
 - Add terminal connections
 - Validate topology
 - Set a subnetwork controller
 - Update subnetworks
- Exercise 4B: Add a subnetwork controller (Gas)
 - Change to the production version
 - Explore an existing subnetwork controller
 - Add a valid subnetwork controller device
 - Add terminal connections
 - Validate topology
 - Set a subnetwork controller
 - Update subnetworks
- Exercise 4C: Add a subnetwork controller (Electric)
 - Change to the production version
 - Explore an existing subnetwork controller
 - Add a valid subnetwork controller device
 - Add terminal connections
 - Validate topology

- Set a subnetwork controller
- Update subnetworks

Lesson review

5 Tracing analysis

Lesson introduction

Connectivity versus traversability

Discover the types of utility network traces

Identifying uses for the utility network traces

Tracing utility networks in ArcGIS Pro

Exercise 5A: Use the utility network traces (Water)

- Work with the analysis version
- Add a starting point for a trace
- Run a connected trace
- Run a subnetwork trace
- Run a subnetwork controller trace

Exercise 5B: Use the utility network traces (Gas)

- Work with the analysis version
- Add a starting point for a trace
- Run a connected trace
- Run a subnetwork trace
- Run a subnetwork controller trace

Exercise 5C: Use the utility network traces (Electric)

- Work with the analysis version
- Add a starting point for a trace
- Run a connected trace
- Run a subnetwork trace
- Run a subnetwork controller trace

Network categories

Network attributes

Network attributes or network categories

Exercise 5D: Use network categories and attributes in traces (Water)

- Filter a trace with a network category
- Notify residences of a service interruption
- Calculate the distance between two points

Exercise 5E: Use network categories and attributes in traces (Gas)

- Filter a trace with a network category
- Notify residences of a service interruption
- Calculate the distance between two points

Exercise 5F: Use network categories and attributes in traces (Electric)

- Filter a trace with a network category
- Notify residences of a service interruption

Calculate the distance between two points

Lesson review

Answers to Lesson 5 questions

6 Network diagrams

Lesson introduction

Network diagrams

Diagram templates

Creating a network diagram

Exercise 6A: Work with network diagrams (Water)

Create a diagram using the Basic template

Store and find a diagram

Create a diagram using the ExpandContainers template

Edit a diagram

Exercise 6B: Work with network diagrams (Gas)

Create a diagram using the Basic template

Store and find a diagram

Create a diagram using the ExpandContainers template

Edit a diagram

Exercise 6C: Work with network diagrams (Electric)

Create a diagram using the Basic template

Store and find a diagram

Create a diagram using the ExpandContainers template

Edit a diagram

Lesson review

7 Using the utility network solutions

Lesson introduction

Components of a solution

File geodatabase utility networks

Initial configuration steps in a solution

Exercise 7: Explore an ArcGIS Utility Network Foundation solution

View the file structure of a solution

Explore an asset package geodatabase

Review a script to update a map data source

Use a task to perform an editing workflow

Lesson review

Answers to Lesson 7 questions

Appendices

Appendix A: Esri data license agreement

Appendix B: Answers to lesson review questions
Appendix C: Additional resources