Migrating a UPDM-PODS7 Implementation (w/APR) to a Utility Network (UN)

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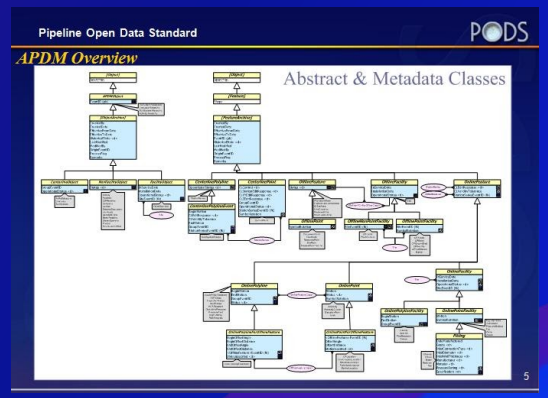
Review of existing UPDM / PODS-7 Implementations

Pipeline Data Models - Overview

- Foundation Models:
  - ISAT
  - PODS
  - PODS Spatial
  - APDM

- Pipeline data models have continued to evolve over the years
  - PODS-7
  - UPDM



Reasons for not implementing UN during initial UPDM/PODS-7 migration?

- Various pipeline companies have already upgraded to UPDM and/or PODS-7, but did not implement a full Utility Network (UN). Why?
- The decision is often tied to a couple primary reasons:
  - An integrated UN supporting the LRS events wasn't yet available when the decision to move to ArcGIS Pipeline Referencing (APR) occurred
  - The implementation requirements (data gathering, data clean-up, QA/QC, etc.) necessary to take full advantage of a UN were deemed too excessive.
- Some additional items contributing to not implementing UN:
  - Traditional versioning vs. Branched versioning
  - Dependencies (3rd party apps, views, reports, ETL's, etc.) working against traditional versioning

How far must a midstream operator go to leverage UN technology?

What UN configuration options are available for midstream operators?

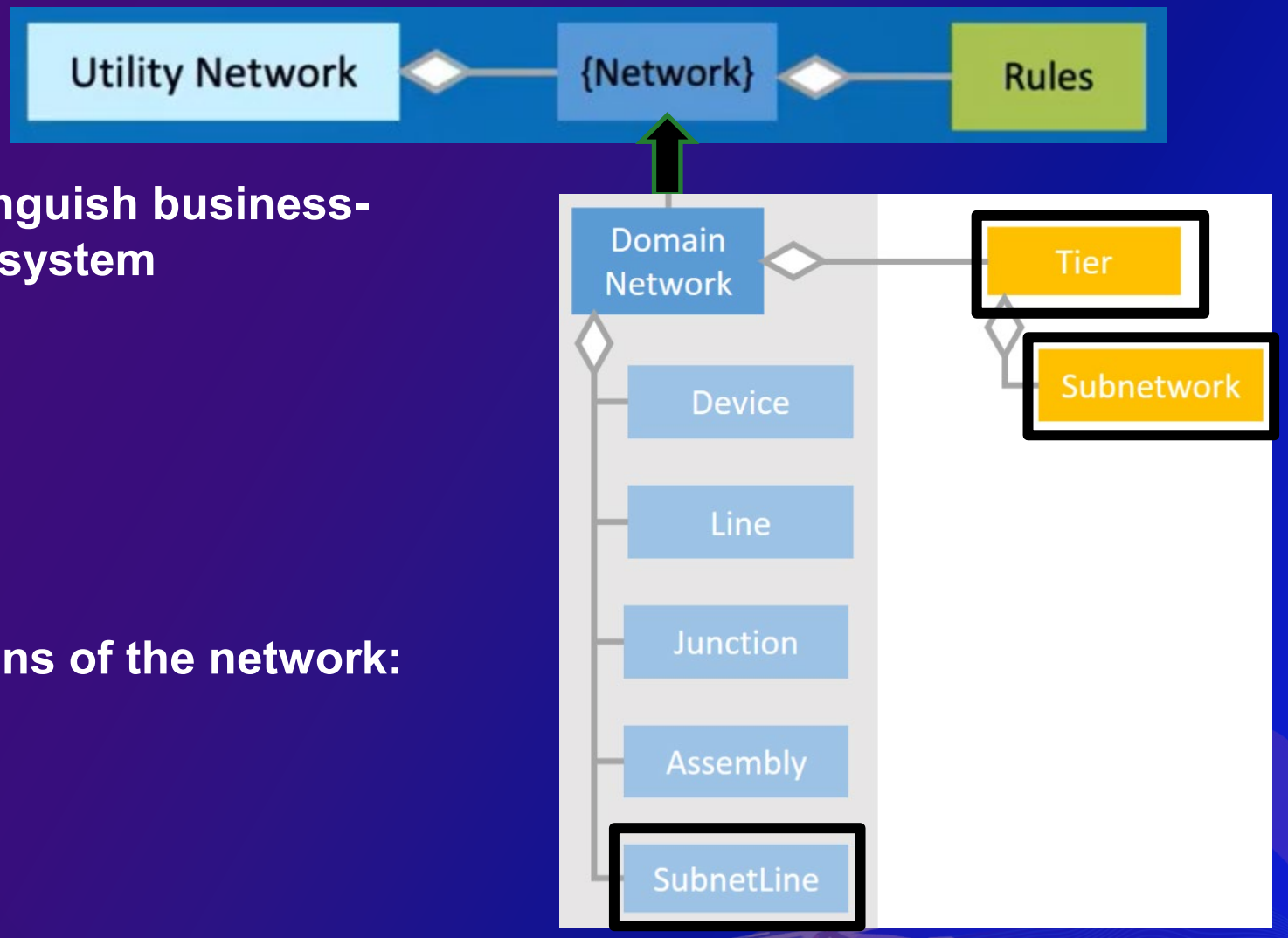
Option #1:

- Staged Approach – (UN Prepared)
- Advantages:
  - Validation of Network Topology
  - Define Network Rules
  - Develop Connected Network
  - Enable Branched Versioning
  - Enable OOTB Tracing Capabilities
  - APR & Feature Service Editing

Option #2:

- Full Utility Network (UN) Deployment
- Advantages:
  - Tiers
  - Subnetwork Configuration Capability
  - Full Engineering Based and Combined APR/UN Editing
  - Tracing & Network Management

UN Configuration: Tiers & Subnetworks



- Tiers: provide the ability to further distinguish business-oriented levels with a Pipeline or Utility system
  - System zones
  - Pressure zones
  - Isolation zones
  - CP zones

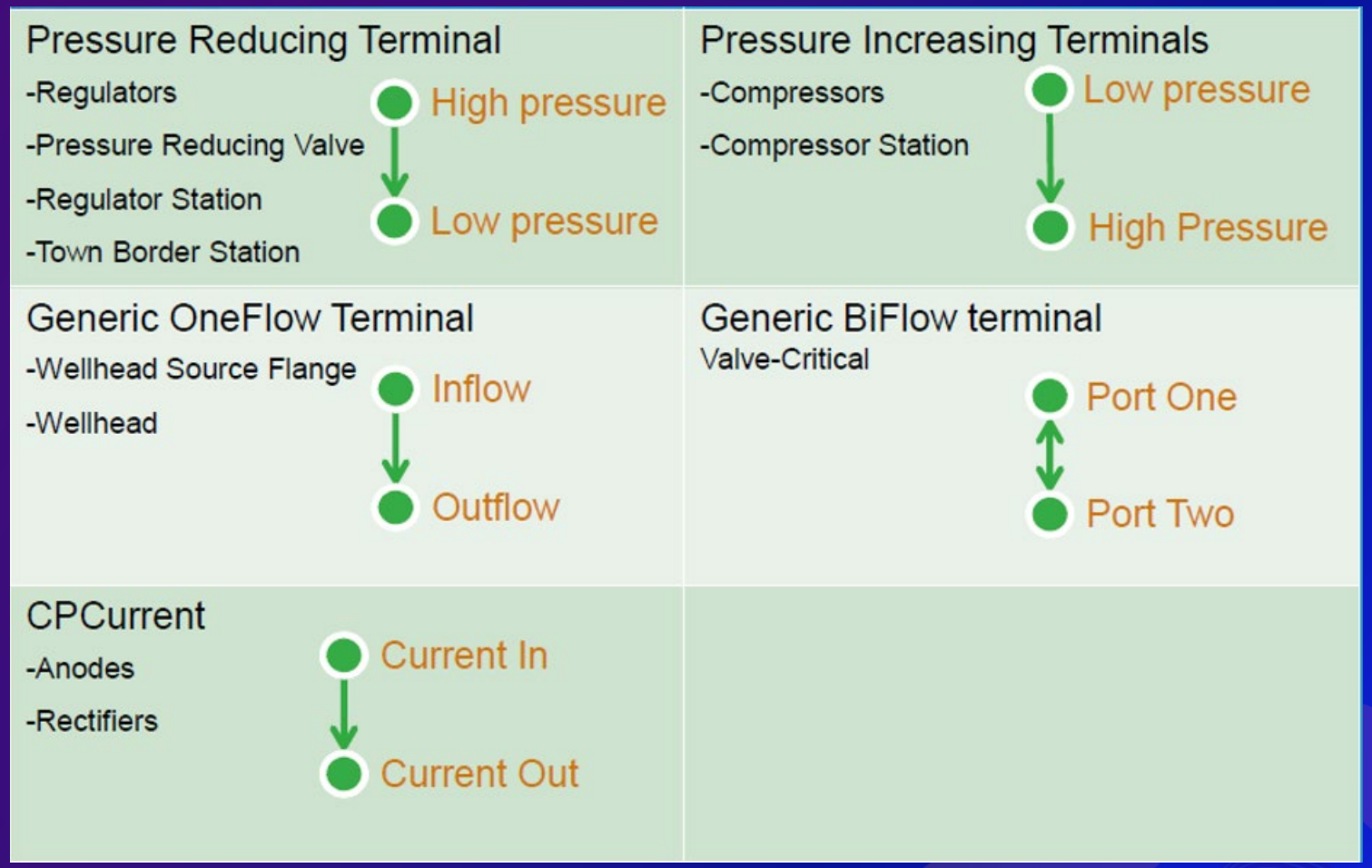
- Subnetworks: are connected sub-portions of the network:
  - Driving analytic operations
  - Labeling and map production
  - Visualization (pressure zone, CP area)
  - Summarization of asset attributes
  - Exporting subset network to external systems

UN Configuration: Network Rules

- Junction – Junction Connectivity
- Junction – Edge Connectivity
- Edge – Junction – Edge Connectivity
- Containment
- Structural Attachment

UN Configuration: Terminals

- **The Utility Network will support, at most, eight terminals on a device!**



Implementing a full UN solution

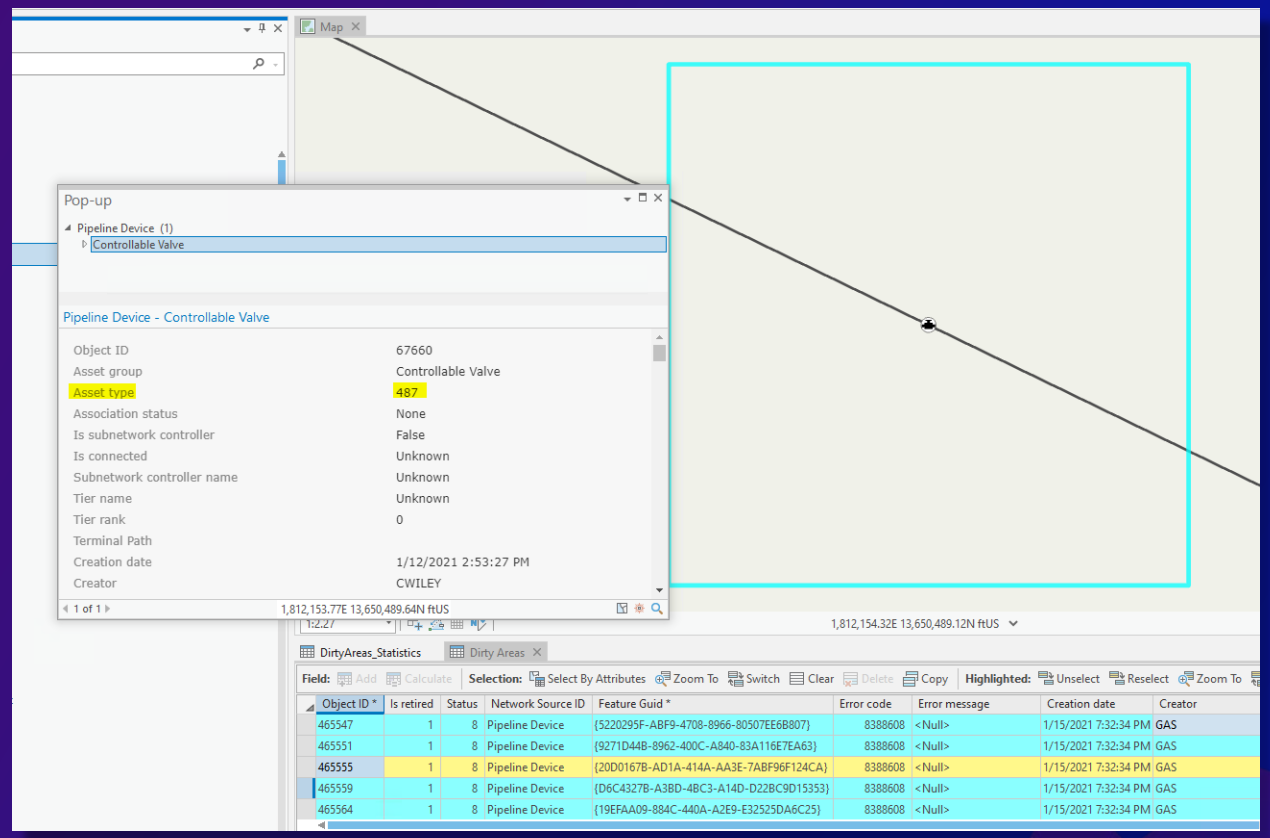
General UN Implementation Steps

- Application of the UPDM/PODS-7 Asset Package against UN enabled database
- Database extensions – Features, Asset Groups/Types, Attributes & Domains
- Utility Network Rules
- Perform database migration passes from the source database to destination
- Test and validation of UPDM/PODS-7 output
- Error & Data evaluation
  - Updates to UN rules
  - Source Data Updates
  - Creation of New Data in Destination
- Attribute Rules, APR configuration, Core GIS application customization and configuration (UN)

Utility Network: Data Preparedness

UN Data Validation Tests:

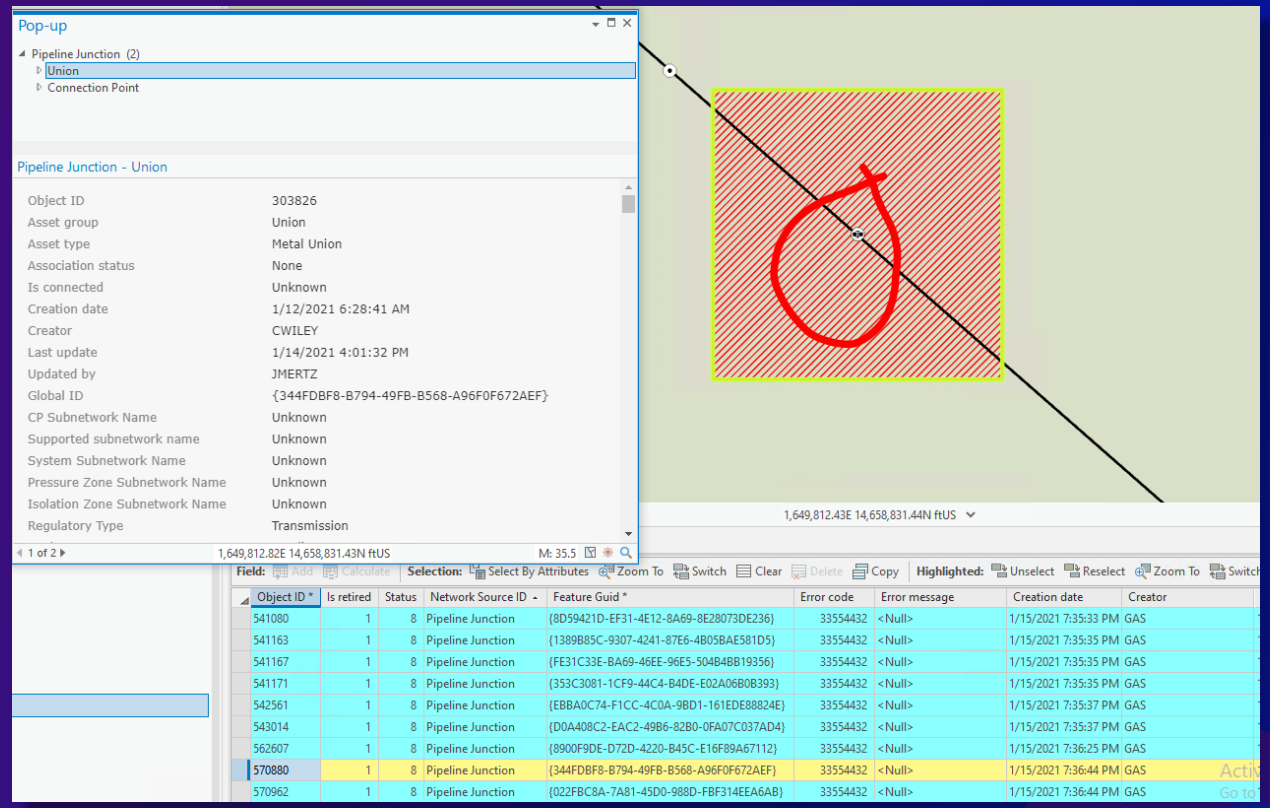
- Key Checks
- Attribute Checks
- Spatial Checks
- Utility Network Analysis
- Visual QA for Utility Network



Utility Network: Data Preparedness

UN Data Validation Tests (cont'd):

- Data Reviewer Checks
  - Database Validation Checks
  - Table Checks
  - Default Checks
  - Duplicate Geometry Checks
  - Topology Related Checks
  - Feature on Feature Checks
  - Advanced Checks



Other UN implementation items to consider…

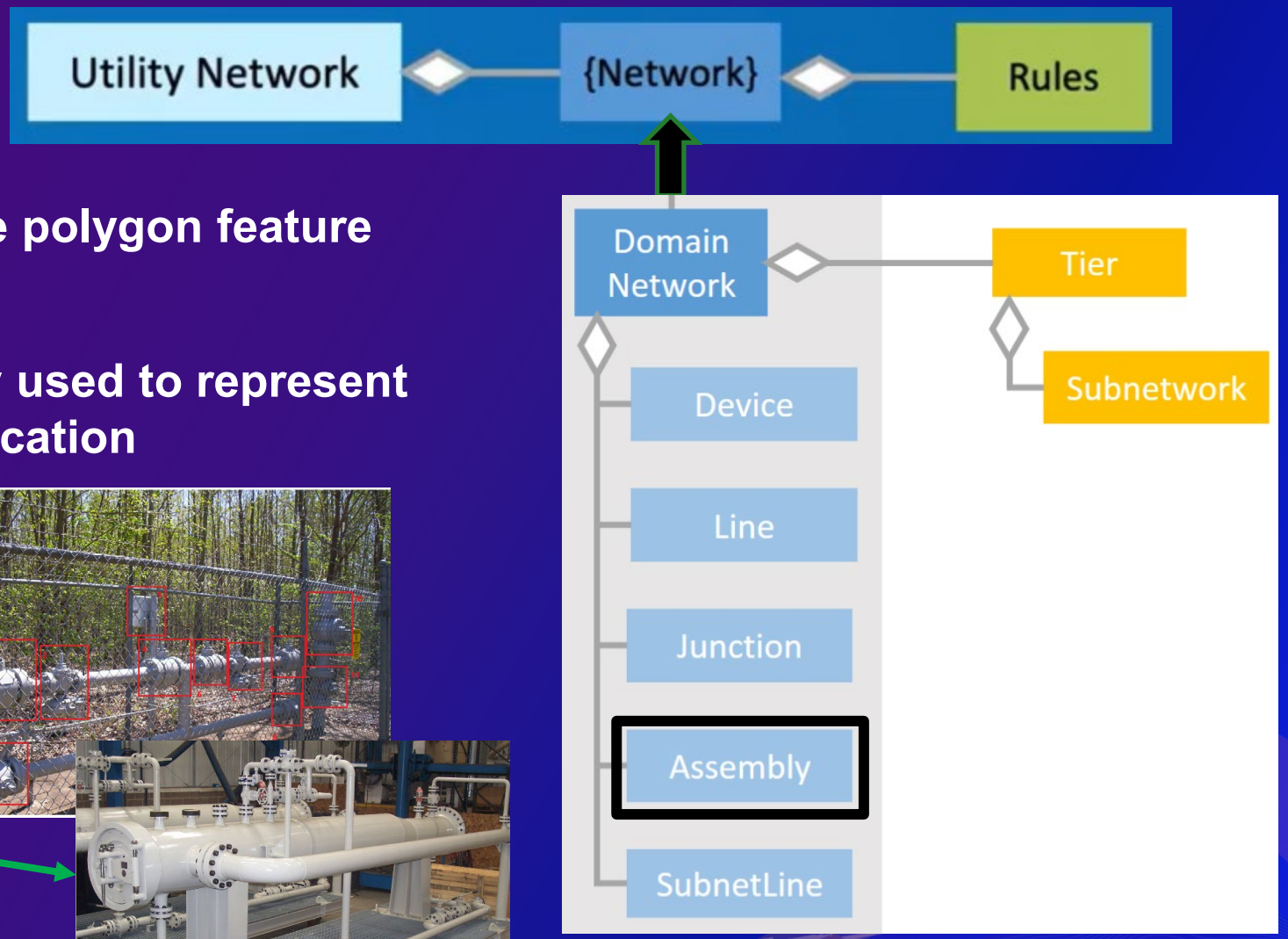
- Centerline needs to be switched to PipelineLine (as the Centerline)
- Update Measure tool for UN features versus the Event Responses or Event Editor
- Event Editor is used for all other LRS Event Management
- What are the affects on external tools, systems? (branched versioning, feature services, etc.)?

Utility Network Advantages

Advantages of moving to UN-enabled or Full-UN Implementations

- A natively spatial environment leveraging branched versioning, feature services and eliminating direct connections
- Ability to use geospatial coordinates and measures in the same environment
- The UN is part of the core Esri platform (easier version upgrades)
- Web Centric Technology: access data on any device, anywhere, at any time
- Engineering based editing with intelligent network rule base
  - Midstream Specific Rule Base
  - Lateral connectivity to a mid point on the mainline w/ out a Junction or Device
  - Change in Nominal Diameter without a reducer, reducing valve or other junction/device
- Network Tracing, Incident Planning
- Native 3D capabilities built directly into ArcGIS Pro/UN
- Integrated Network Schematic Diagrams
- Station Modeling
  - Containment
  - Assemblies

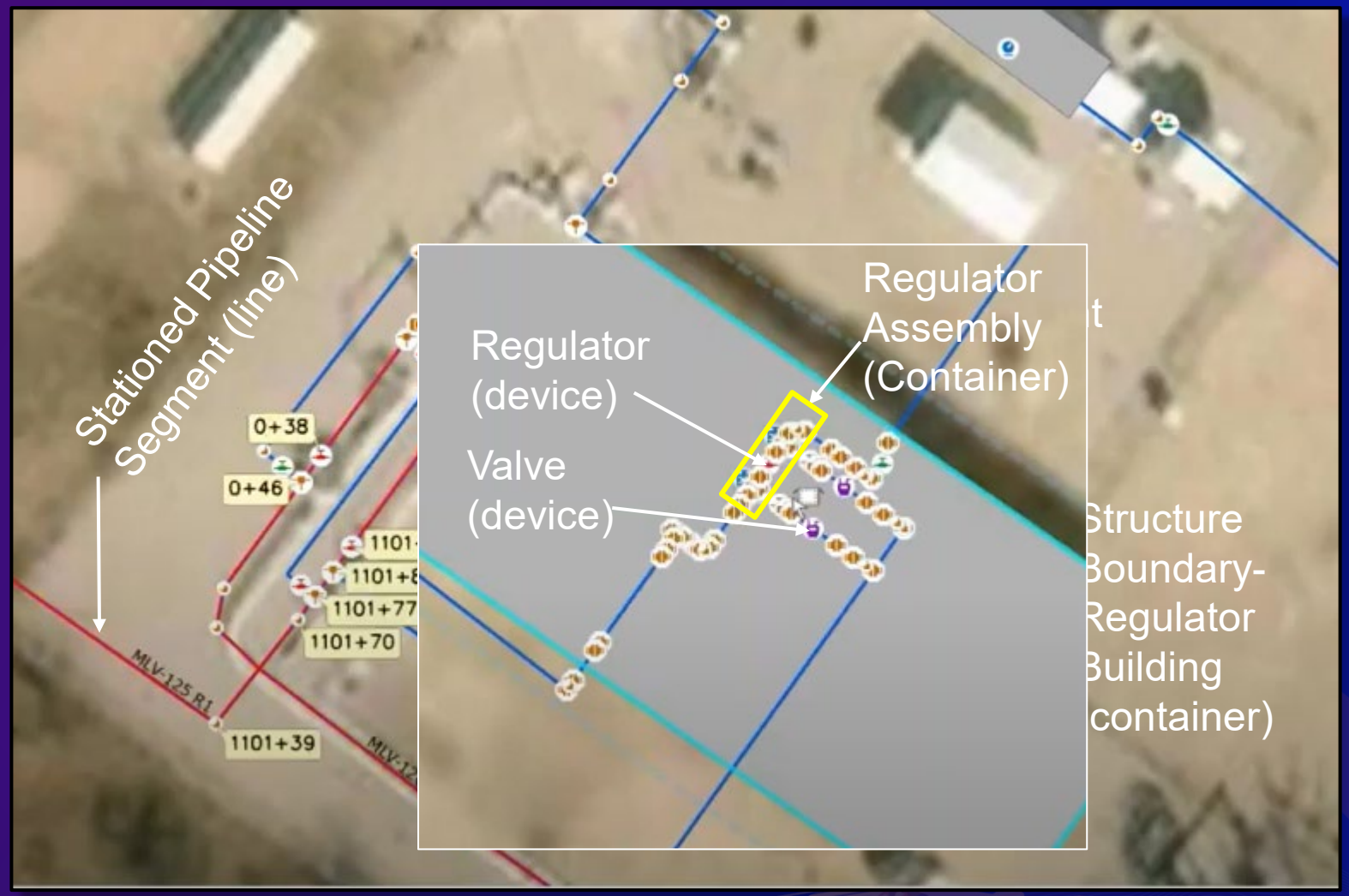
Advantages of moving to UN-enabled or Full-UN Implementations



- Containers allow a dense collection of features to be represented as a single polygon feature
- The Assembly feature class is generally used to represent multiple devices/junctions at a single location
  - Distribution:
    - RegulatorStation
  - Transmission:
    - PigLauncher
    - ValveAssembly

Advantages of moving to UN-enabled or Full-UN Implementations

- **Structure Boundary (Container)**
  - Regulator Building
  - Acts as containment/parent to child assemblies/assets (polygon)
- **Assembly (Container)**
  - Regulator Assembly
  - Acts as containment/parent to child assemblies/assets (point)
- **Line**
  - Pipeline segments
- **Device**
  - Valves
  - Regulators



Advantages of moving to UN-enabled or Full-UN Implementations

- Ability to finally move to a single enterprise geodatabase
- Digital-Twin - Allows you to create a real-world model for the entire pipeline network
  - Digital visualizations of real-world representations
  - Can come from many sources – but requires ability to interact
  - Encompass everything
- System of Record, Insight and Engagement
- Ability to leverage a ‘complete’ GIS

FInal items to consider…

- Esri has recently announced that there are no future plans for ArcMap for 10.9
  - Unlike the UN, which is “Server” based, this effectively also represents the end of the Geometric network as well

- Mature support ends 2/2026
  - ArcGIS Pro replacing ArcMap
  - Software will continue to run while licensed

Product Life Cycle

Product Lifecycle Policy

Product: ArcGIS Desktop 10.8.1
Release Date: July 28, 2020
Support status: General Availability

		General Availability Jul 2020 - Feb 2022	Extended Support Mar 2022 - Feb 2024	Mature Support Mar 2024 - Feb 2026	Retired March 01, 2026
Technical Support	Request Case	✓	✓	✓	
	Phone and Chat	✓	✓	✓	
	Online support resources	✓	✓	✓	✓

THANK YOU!!!

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