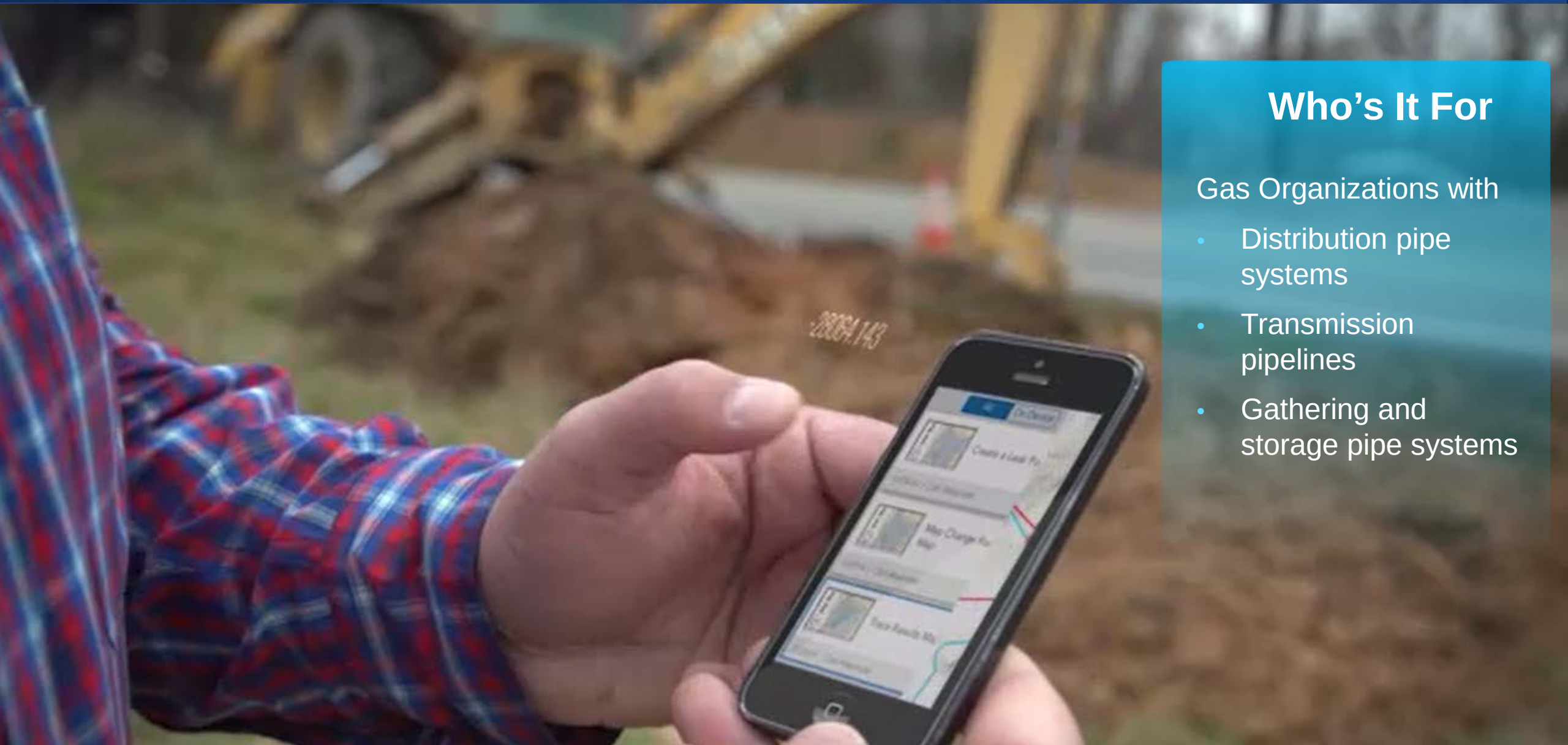
ArcGIS for Utility Network Management for Gas

Tom DeWitte

Matt Baber

Utility Network for Gas | Who’s It For

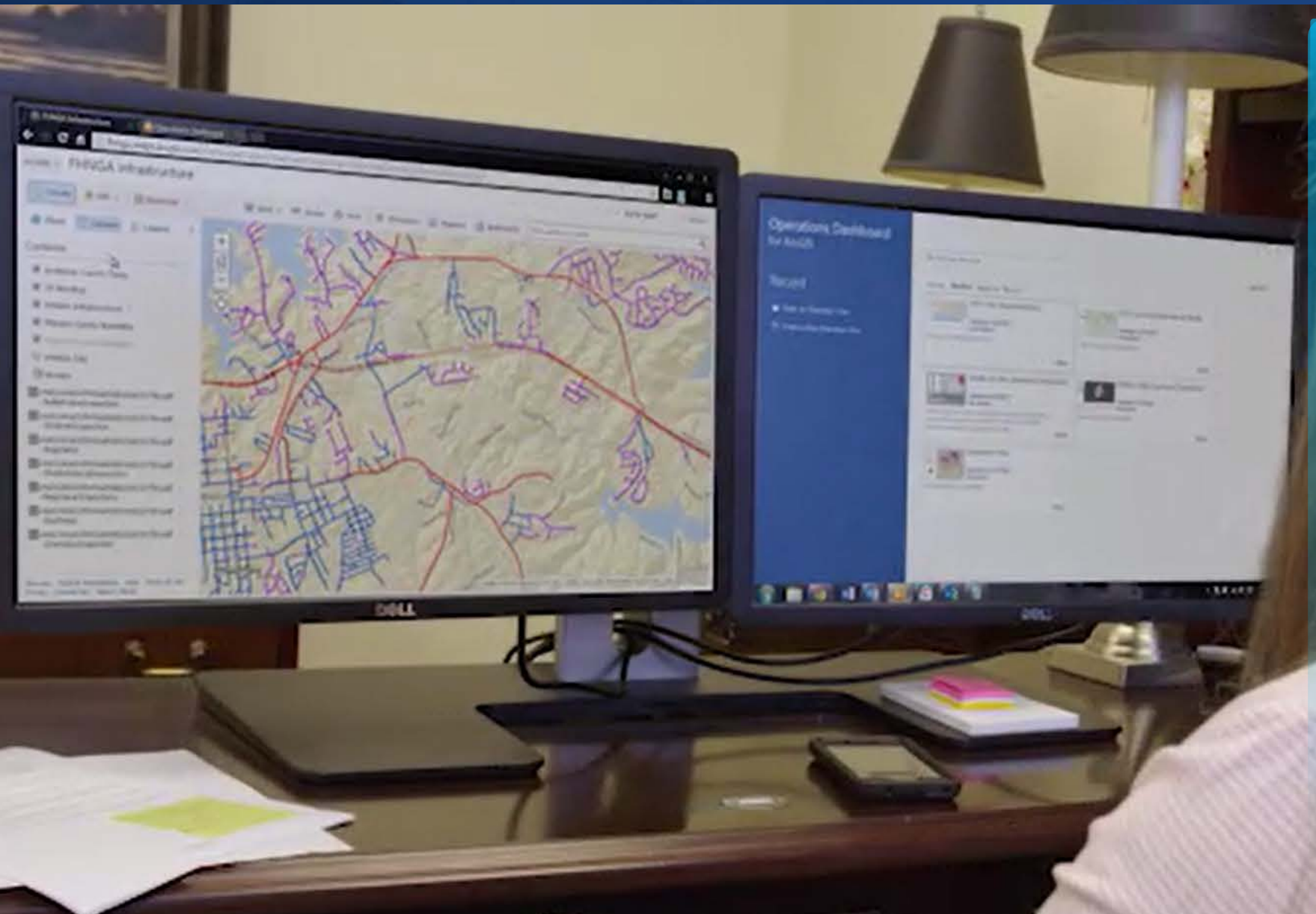


Who’s It For

Gas Organizations with

- Distribution pipe systems
- Transmission pipelines
- Gathering and storage pipe systems

Utility Network for Gas | What Does It Do

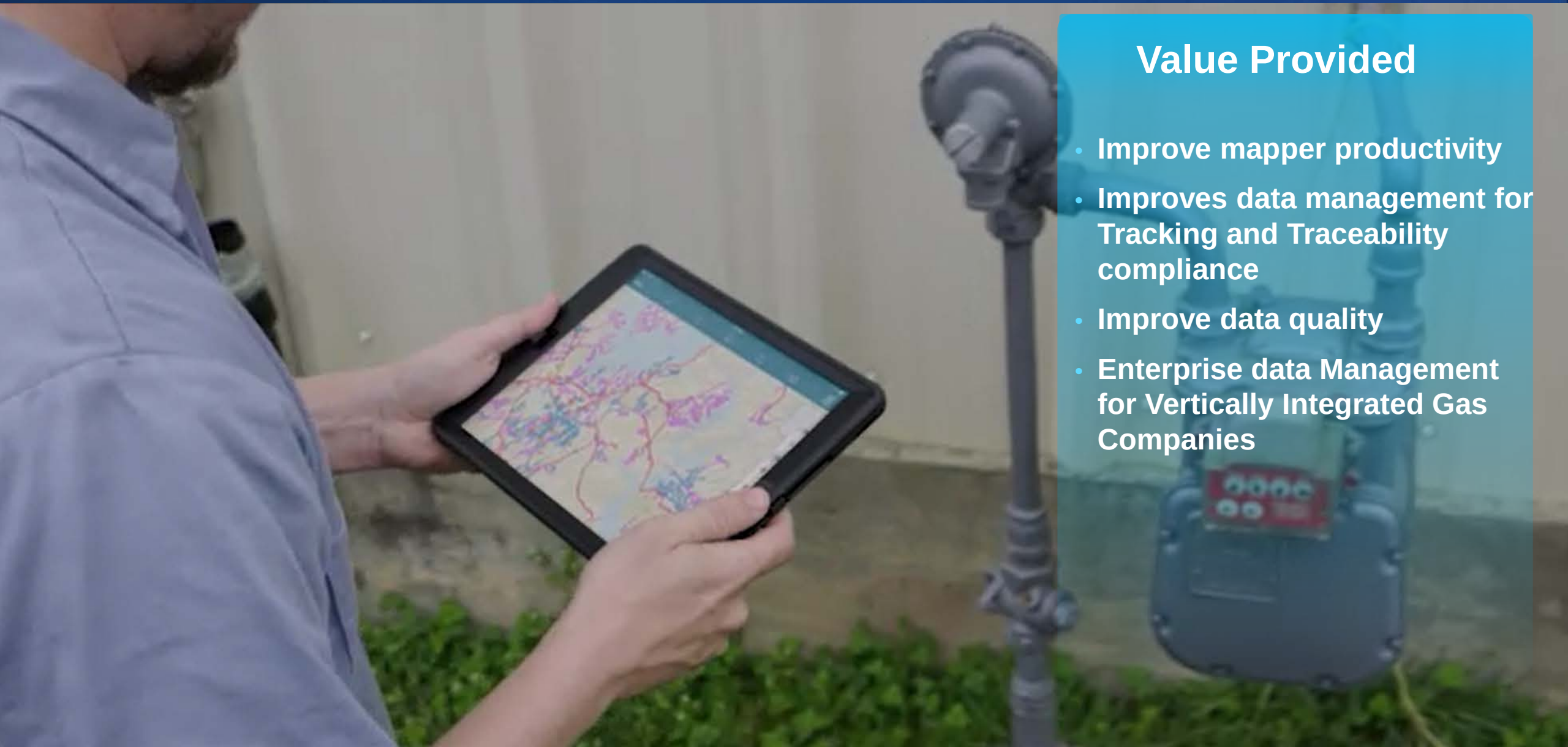


What Does It Do

System of Record:

- Tools for maintaining the “As-Built” representation of a gas pipeline
- Modeling of facility internals
- Tracing of gas and CP systems
- Advanced management of system, pressure, isolation and CP Zones

Utility Network for Gas | What Value Does It Provide



Value Provided

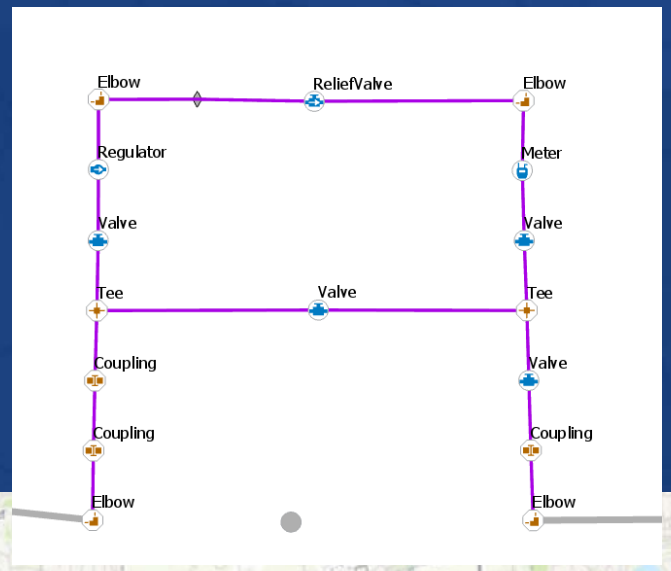
- Improve mapper productivity
- Improves data management for Tracking and Traceability compliance
- Improve data quality
- Enterprise data Management for Vertically Integrated Gas Companies

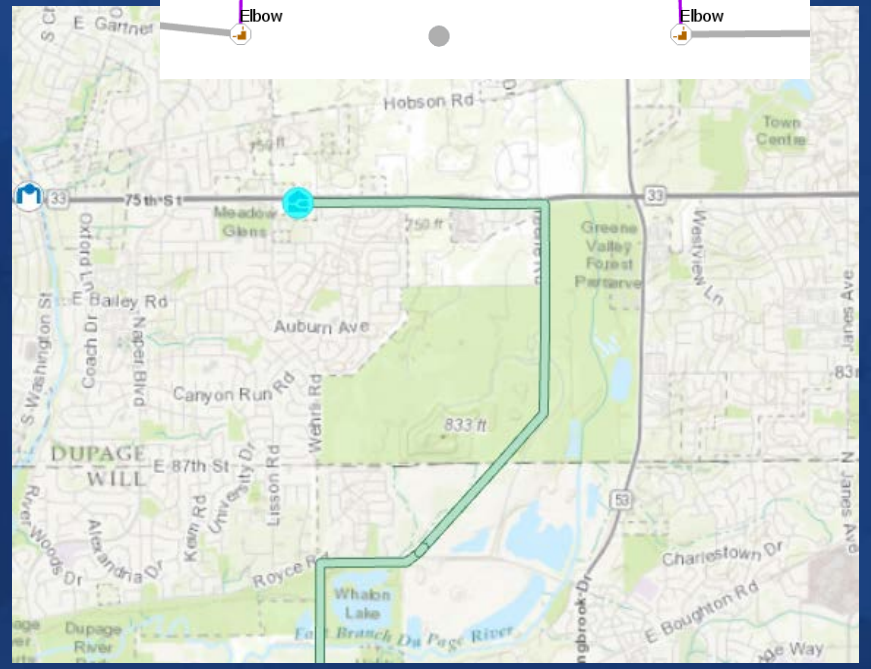
Utility Network for Gas | Key Differentiators

- **Cross platform support** (View, Query, Edit across Desktop, Web and Mobile)
- **Services based architecture**
- **Built within Utility and Pipeline Data Model (UPDM)**
- **Modeling the internals of Stations**
- **Expanded tracing framework**
- **Dynamically generated network diagrams**
- **Subnetwork Management**
  - **Automated management of MAOP for Pressure zones**
  - **Automated management of Surface Area for CP zones**
  - **Automated management of meter counts for Isolation zones**

Modeling the Internals of Stations | Containers

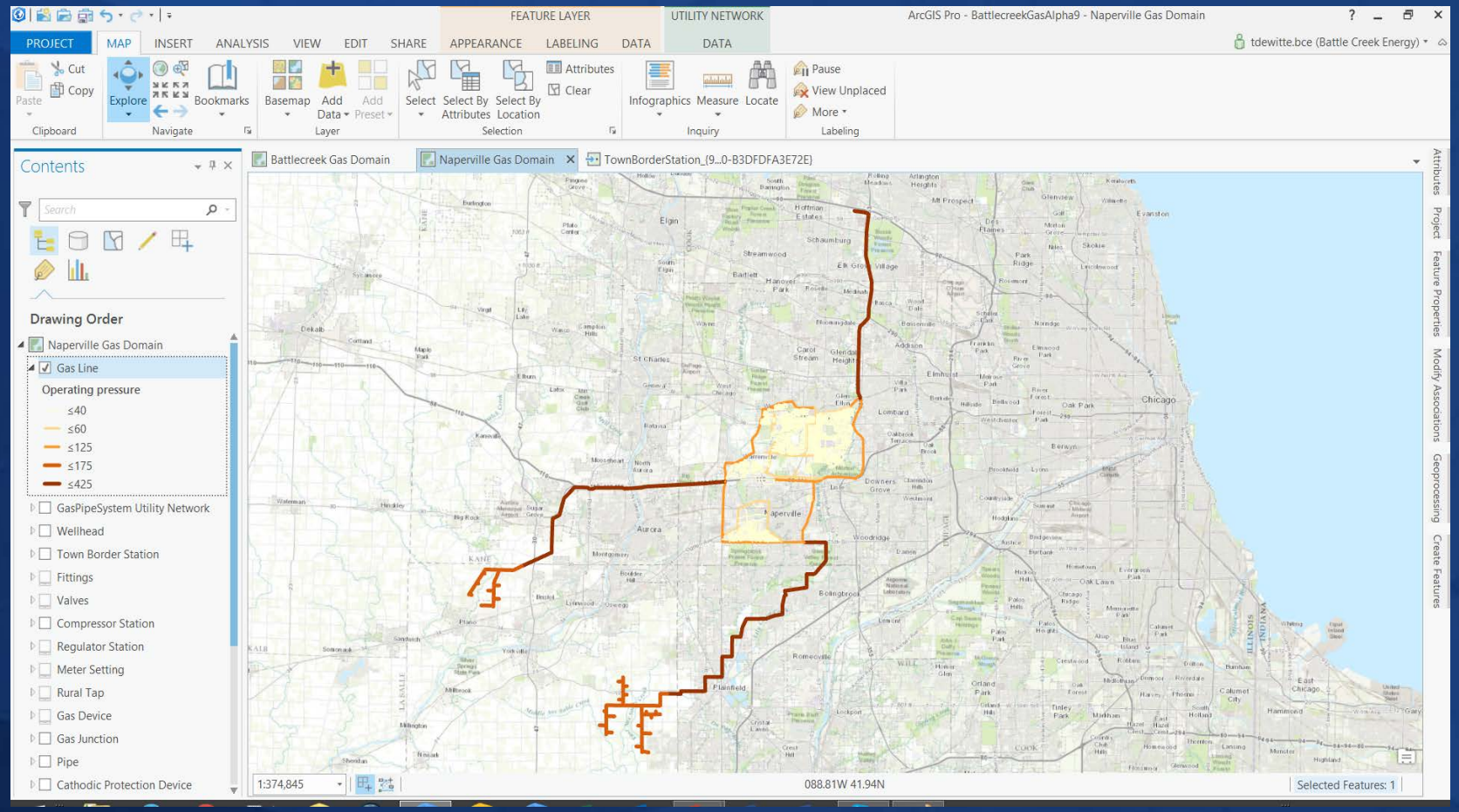
- **Providing enhanced granularity of geospatial data management**
  - E.g., a valve inside a pump station, or transformer inside a substation
- **Supports Tracking and Traceability requirements**
- **Internal components participate in traces and diagrams**



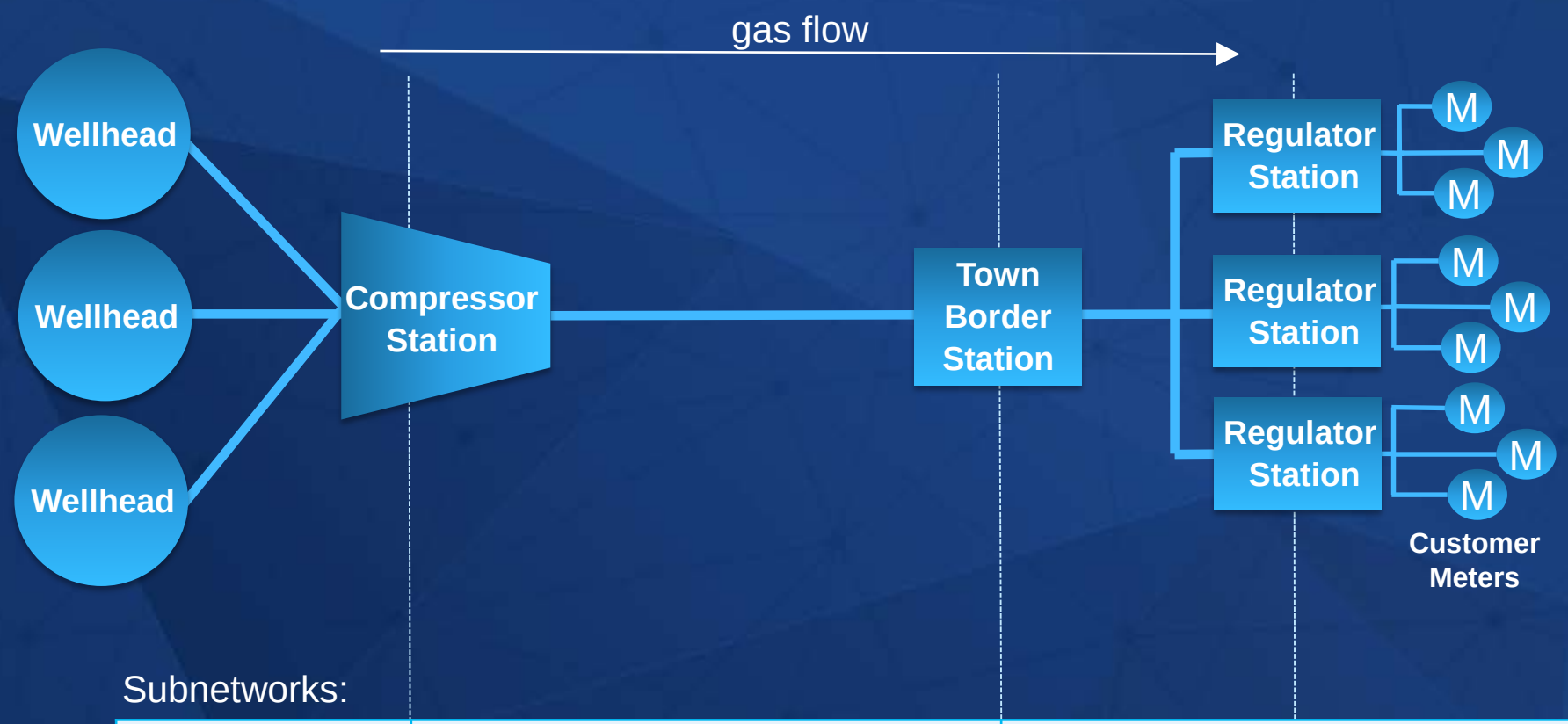


Modeling Gas Subsystems | Subnetworks

- **Automated representations of Gas system**
  - **System zones**
  - **Pressure zones**
  - **Isolation zones**
  - **CP Zones**
- **Automated summary values:**
  - **MAOP**
  - **Total Surface Area (CP)**
  - **Total Length**
  - **Number of Valves**



Utility Network for Gas | Subnetwork Management



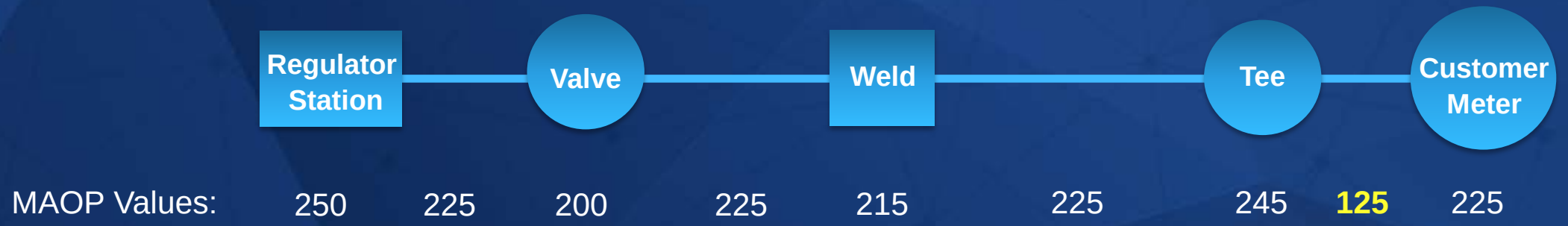
Subnetworks:

System Tier	Gathering		Transmission				Distribution			
Pressure Tier	Pressure 1		Pressure 2		Pressure 3		Pressure 4		Pressure 5	
Isolation Tier	Iso 1	Iso 2	Iso 3	Iso 4	Iso 5	Iso 6	Iso 7	Iso 8	Iso 9	Iso10

Pressure Subnetwork - MAOP

Network Attributes

Maximum Allowable Operating Pressure (MAOP) for a single pressure zone is the MAOP of the asset in the pressure zone with the lowest MAOP value.



A pressure zone is only as strong as its weakest component

CP Subnetwork – Metallic Surface Area

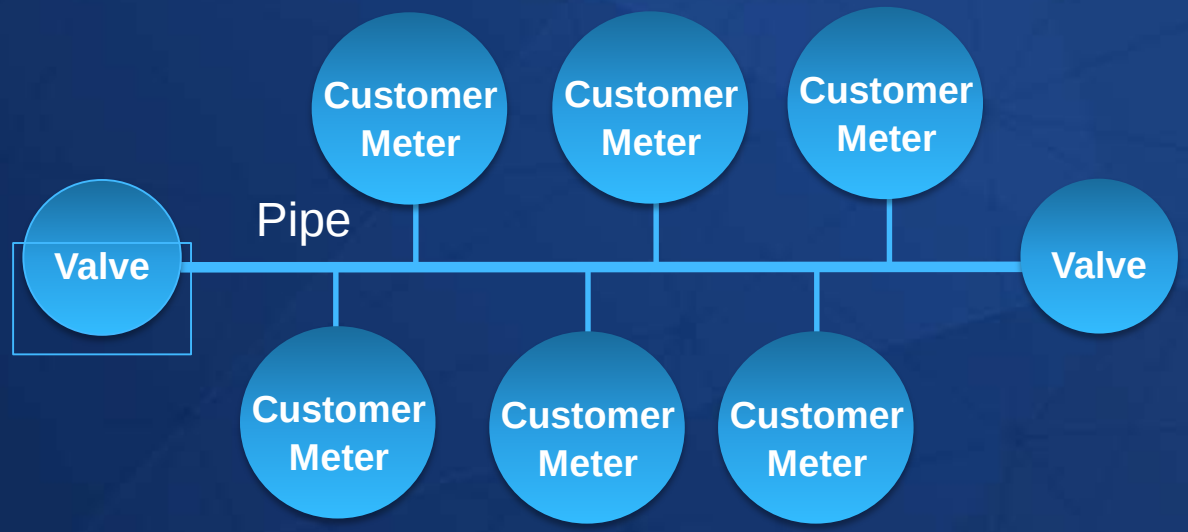
Network Attributes

Total Surface Area for a single cathodic protection zone is the summation of the surface area of all metallic pipe participating in the zone.

Total Surface Area: **1295.9**

Isolation Subnetworks – Meter Count

Meter count for a single isolation zone is the count of the number of meters within the isolation zone.

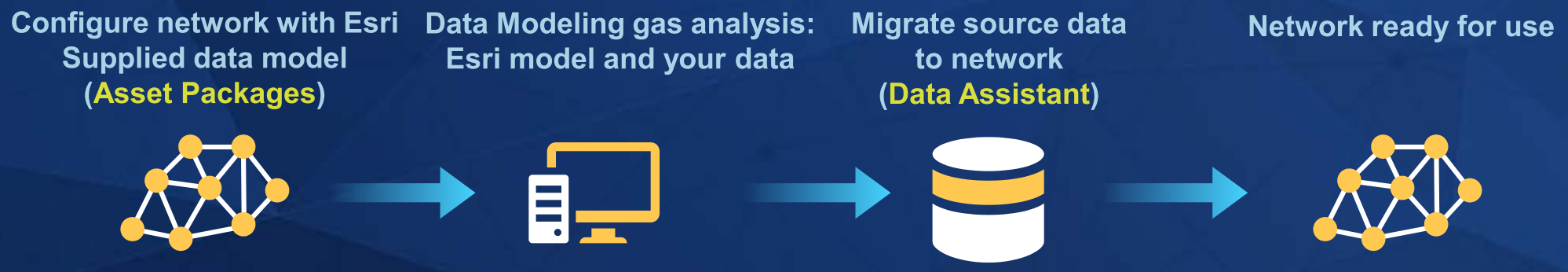


Meter Count: 1 1 1 1 1 1 Total Meter Count: **6**

Demonstration

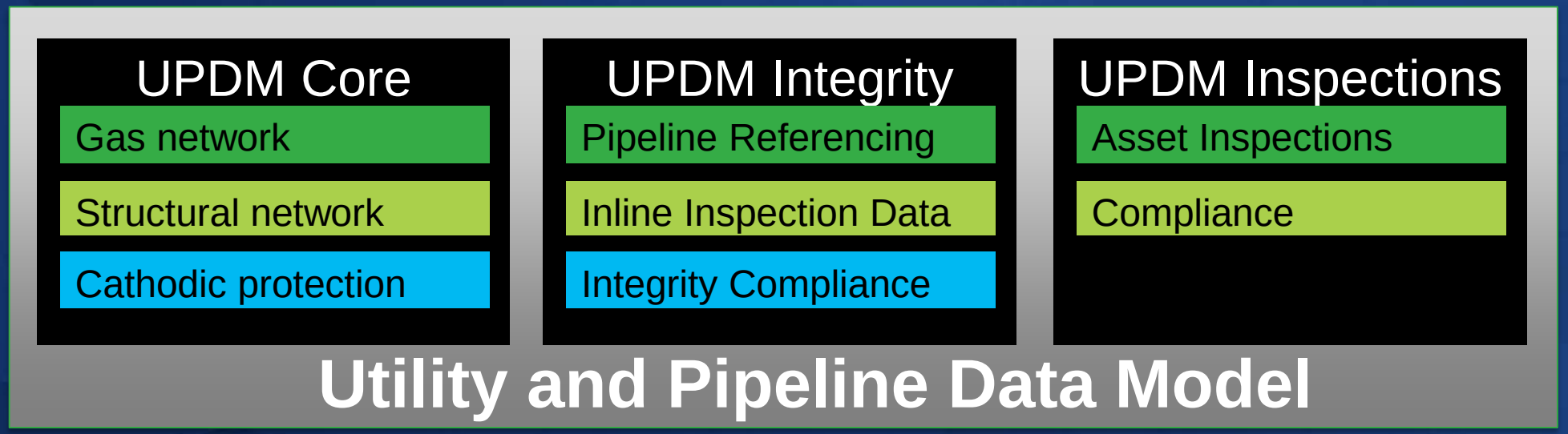
Data Migration

- **To simplify migration, Esri is working to provide additional tools and models:**
  - **Industry models**
  - **Maps**
  - **Tools to get started**
  - **App configurations**



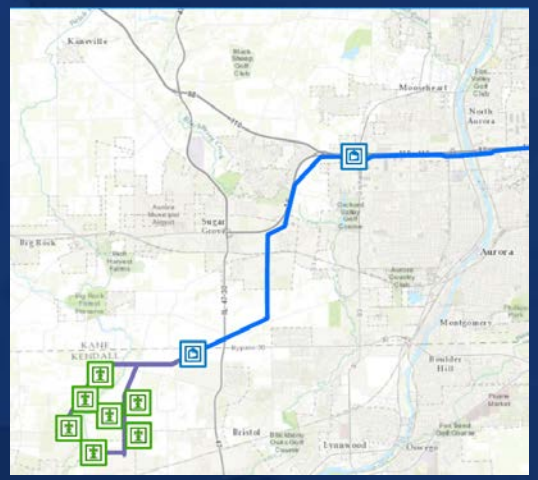
Utility and Pipeline Data Model (UPDM)

- **Method for managing physical assets of gas or oil pipe system**
- **A best practice for organizing gas or oil pipe data**

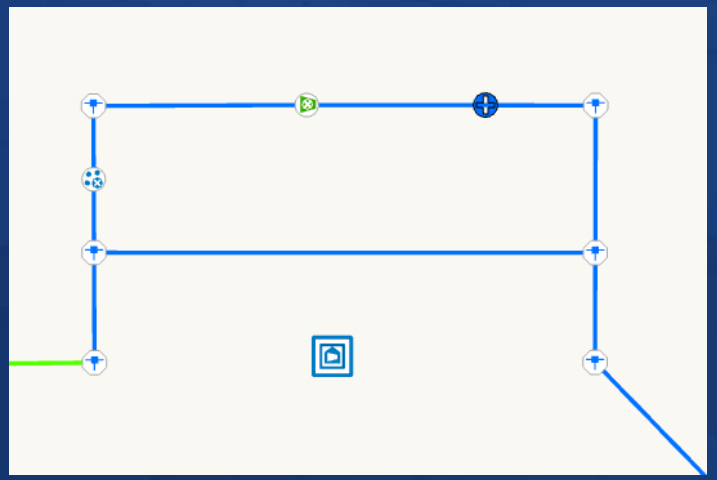


Modeling Gas Networks – Simple vs. Detailed

- **The level of detail used to model gas systems varies significantly across the industry**
  - **Simple: Gas facilities such as compressor stations and regulator stations are represented as single point features**
  - **Detailed: Gas facilities such as compressor stations and regulator stations ae represented as single point features (Containers) and the internals of the gas facility are represented.**



SIMPLE

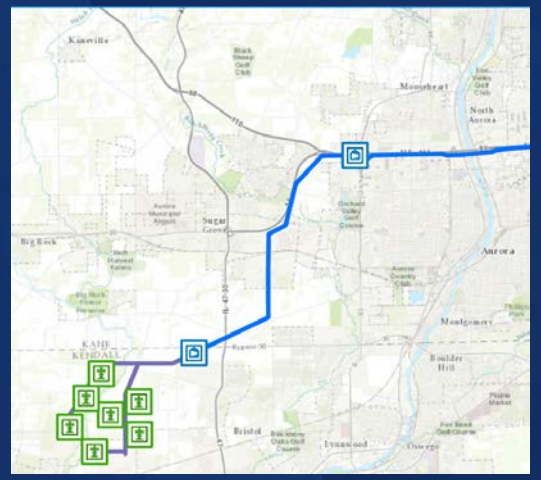


DETAILED

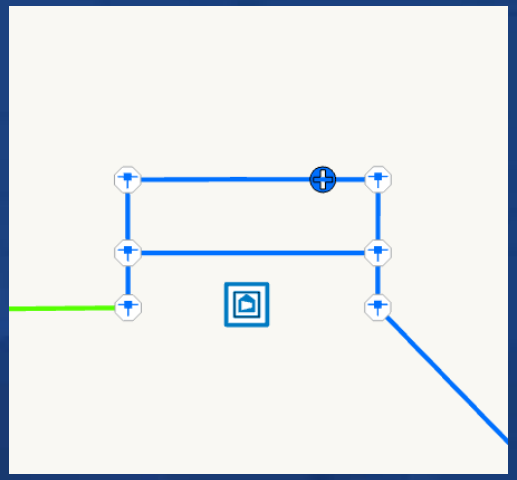
Modeling Gas Assets

Infinite Degrees

The Utility Network capabilities are flexible enough to support mixtures of simple facilities and detailed facilities



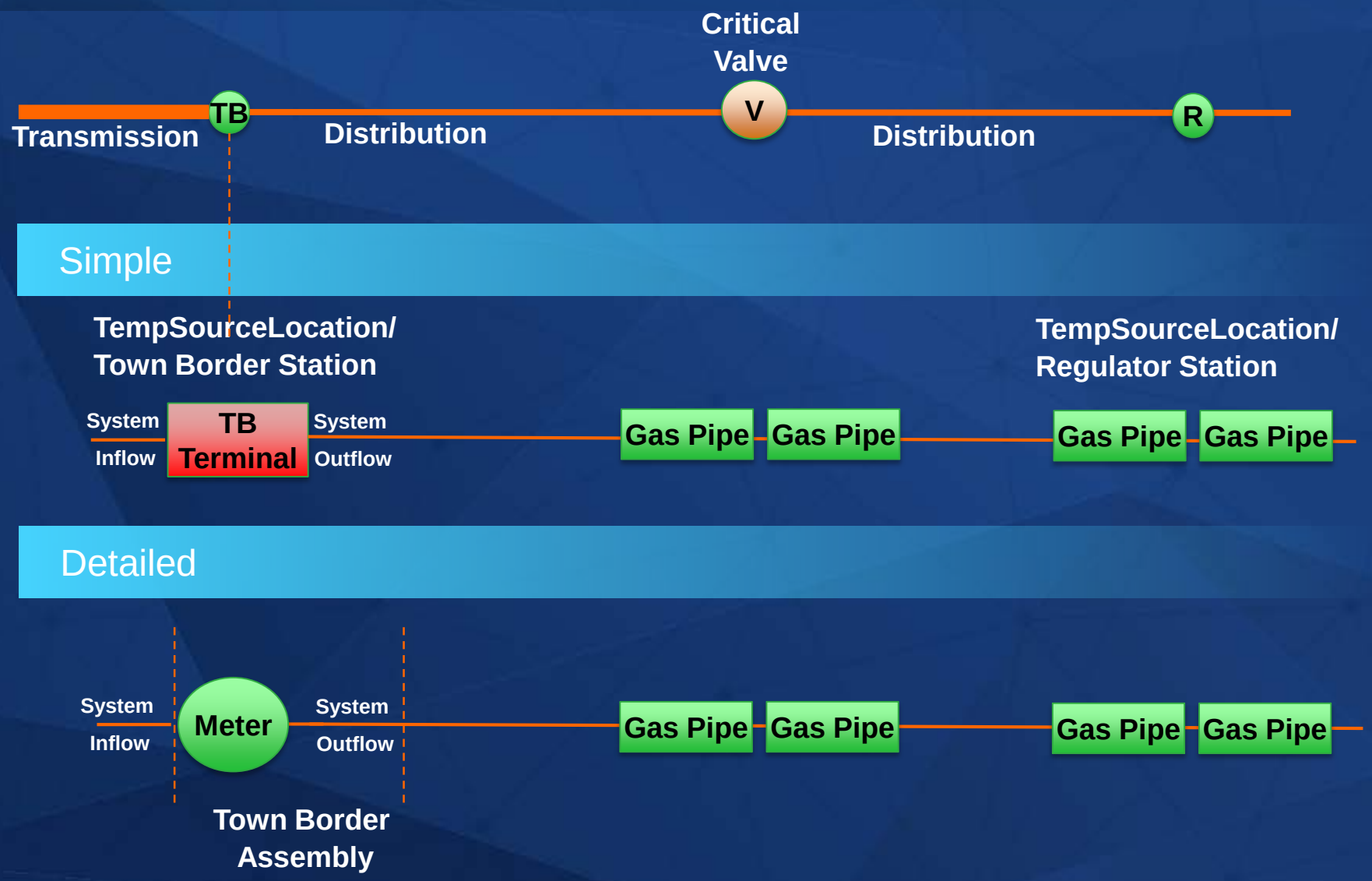
Your Gas System



SIMPLE — **DETAILED**

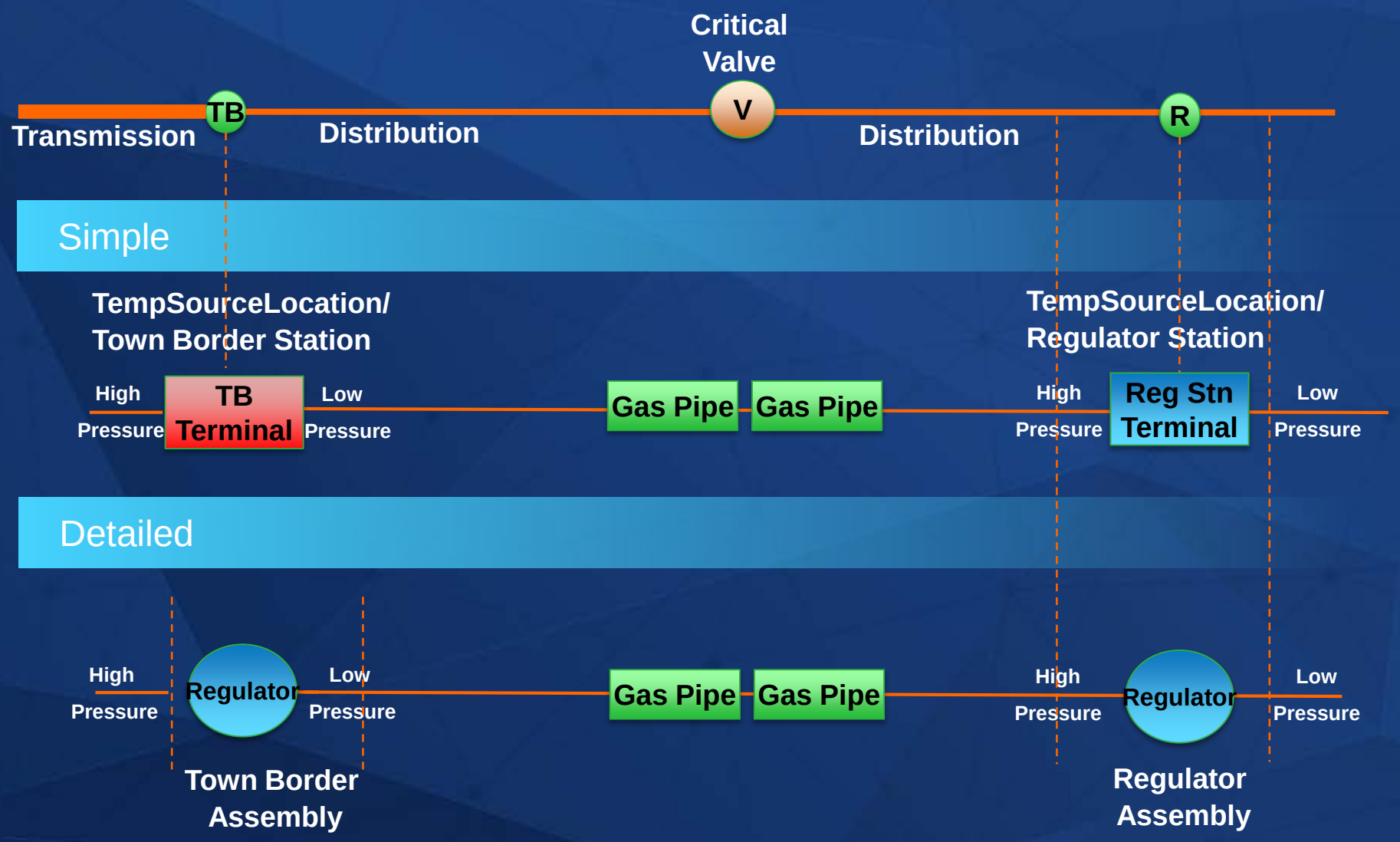
Facility Features

Portion of a System Tier Subnetwork



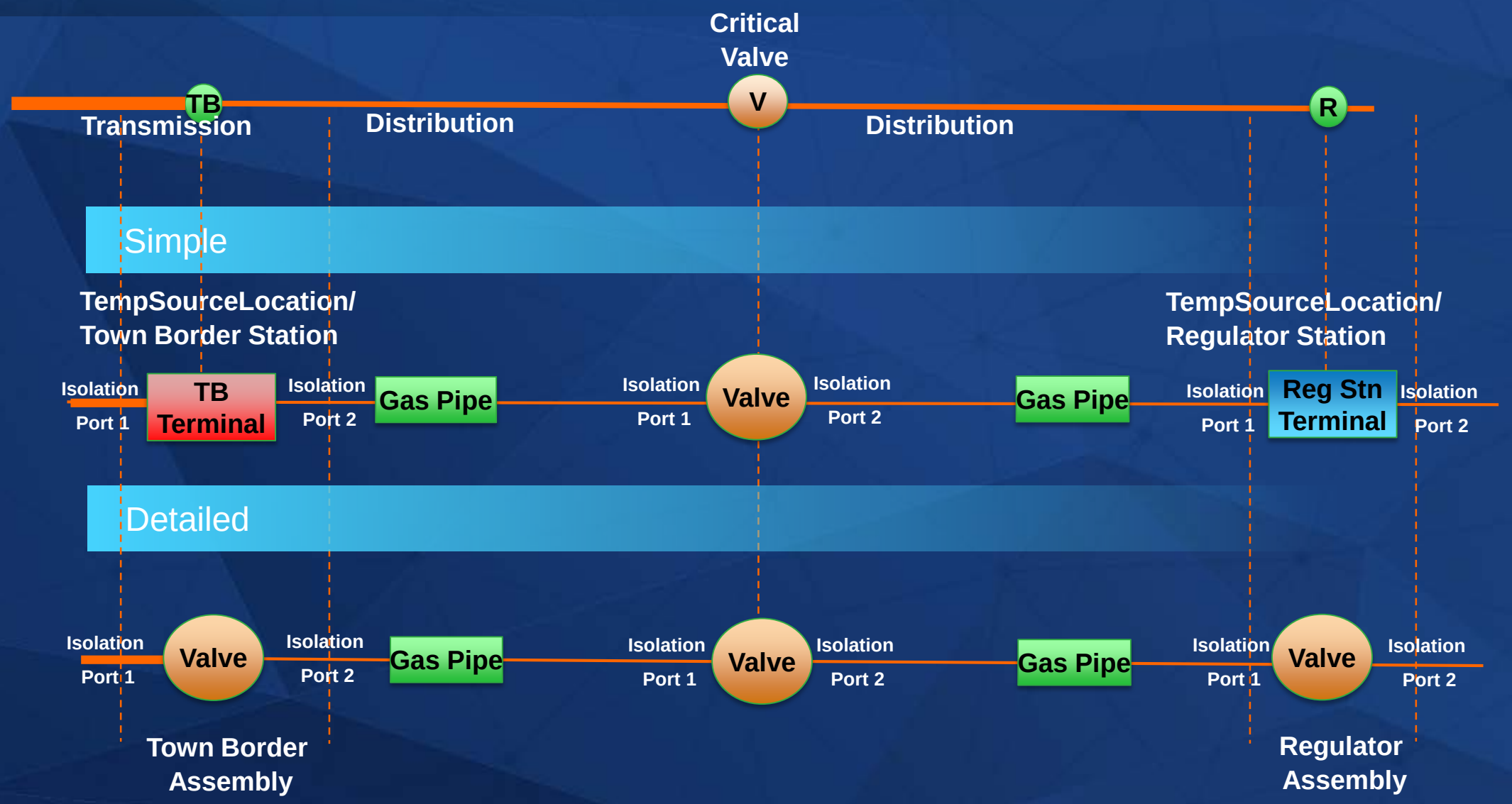
Facility Features

Single Pressure Tier Subnetwork



Facility Features

Two Isolation Tier Subnetworks



Modeling Gas Assets

Implementing Simple Features

- **Assembly features do not participate in the Network Topology**
  - Assembly features cannot be a network source
- **All simple gas facilities must be loaded twice**
  - Device / TempSourceLocation features are the duplicate of simple gas facilities
  - Device / TempSourceLocation features are the source features for subnetworks
- **Once a simple gas facility is replaced by a detailed gas facility the Device / TempSourceLocation feature is removed**
  - This allows for incremental transition from simple to detailed gas facilities without losing utility network functionality

esri

THE SCIENCE OF WHERE