ArcGIS for Utility Network Management for Gas

Tom DeWitte
Matt Baber
Utility Network for Gas

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

- 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

- 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

- Wellhead
- Compressor Station
- Town Border Station
- Regulator Station
- Customer Meters

Subnetworks:
- Gathering
- Transmission
- Distribution

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<th>System Tier</th>
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<th>Transmission</th>
<th>Distribution</th>
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<td>Pressure Tier</td>
<td>Pressure 1</td>
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Gas Flow:
- Wellhead to Compressor Station
- Compressor Station to Town Border Station
- Town Border Station to Regulator Station
- Regulator Station to Customer Meters
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.
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**
Meter count for a single isolation zone is the count of the number of meters within the isolation zone.
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

**UPDM Core**
- Gas network
- Structural network
- Cathodic protection

**UPDM Integrity**
- Pipeline Referencing
- Inline Inspection Data
- Integrity Compliance

**UPDM Inspections**
- Asset Inspections
- Compliance
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 are represented as single point features (Containers) and the internals of the gas facility are represented.
The Utility Network capabilities are flexible enough to support mixtures of simple facilities and detailed facilities.
Facility Features | Portion of a System Tier Subnetwork

Transmission → TB → Distribution → Critical Valve → V → Distribution → R

**Simple**

- TempSourceLocation/Town Border Station
  - System Inflow: TB
  - Terminal: Gas Pipe
  - System Outflow: Gas Pipe

**Detailed**

- TempSourceLocation/Regulator Station
  - System Inflow: Meter
  - Town Border Assembly: Gas Pipe
  - System Outflow: Gas Pipe
Facility Features

Single Pressure Tier Subnetwork

Transmission

Distribution

Critical Valve

Distribution

Simple

TempSourceLocation/Town Border Station

Gas Pipe

Regulator Low Pressure

High Pressure

Low Pressure

Reg Stn Terminal

Detailed

Regulator Assembly

Gas Pipe

Gas Pipe

Regulator

Regulator Low Pressure

High Pressure

Low Pressure

Town Border Assembly
Facility Features

Two Isolation Tier Subnetworks

- Transmission
- Distribution
- Critical Valve
- Distribution

Simple

TempSourceLocation/Town Border Station

Valve

Isolation Port 1

Isolation Port 2

Gas Pipe

Valve

Isolation Port 1

Isolation Port 2

Gas Pipe

Valve

Isolation Port 1

Isolation Port 2

Gas Pipe

Valve

Isolation Port 1

Isolation Port 2

Gas Pipe

Valve

Isolation Port 1

Isolation Port 2

Reg Stn Terminal

Detailed

TempSourceLocation/Regulator Station

Reg Stn Terminal

Terminal Assembly

Reg Stn Terminal

Reg Stn Terminal

Reg Stn Terminal

Reg Stn Terminal

Reg Stn Terminal
• **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