

AVEVA PI WORLD



Gasmed: Natural gas measurement intelligence at YPF

A Natural Gas Measurement Intelligence and real-time decision support solution

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AVEVA



YPF S.A.

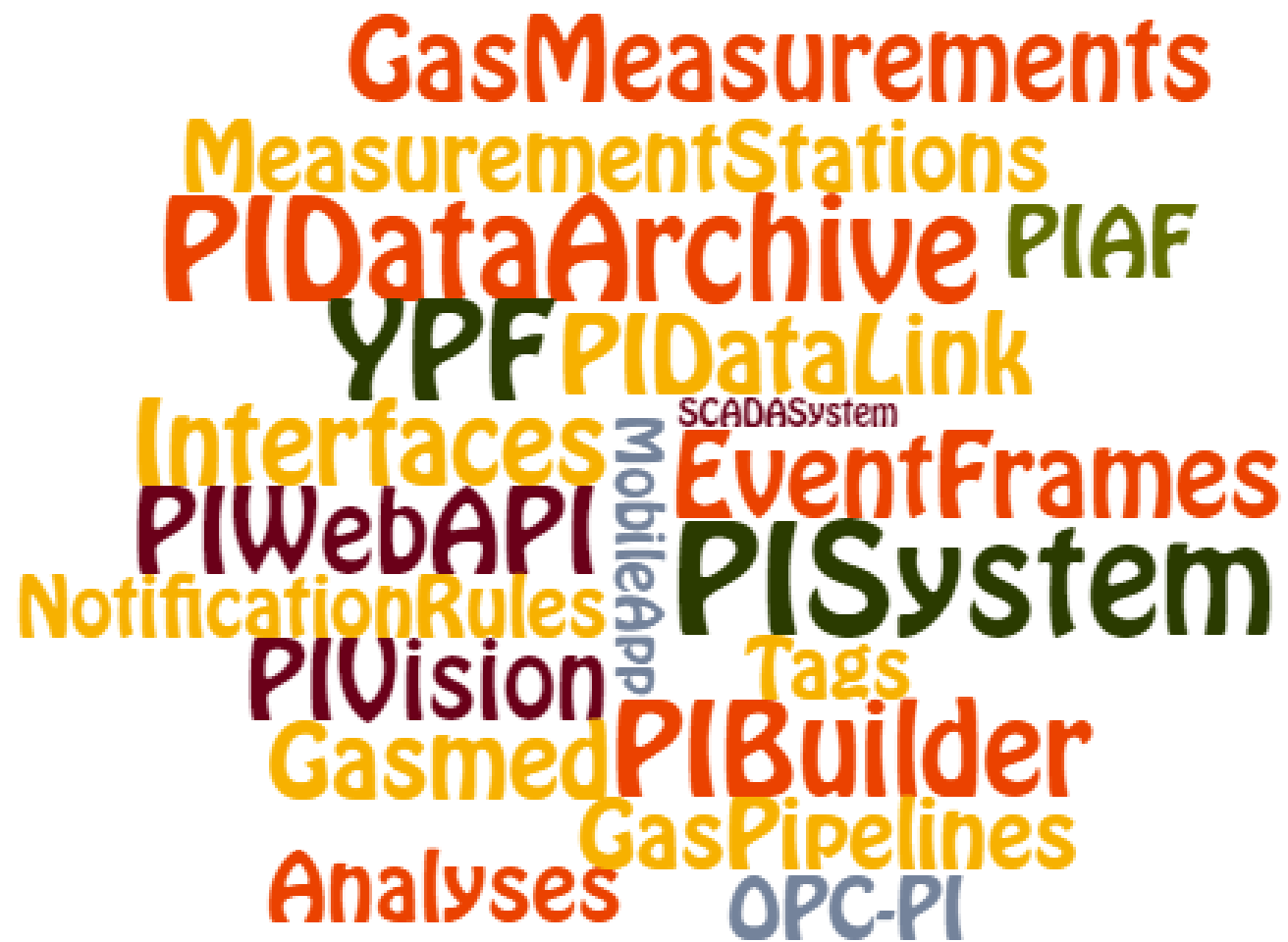
Integrated Energy Company

- Founded in 1922
- Oil & Gas Exploration, Production, Transportation, Refining
- Integrated: Upstream, Midstream, Downstream
- Electric Power Generation
- 20,000 employees
- <https://www.ypf.com/>

YPF main headquarters located in Buenos Aires City

Topics

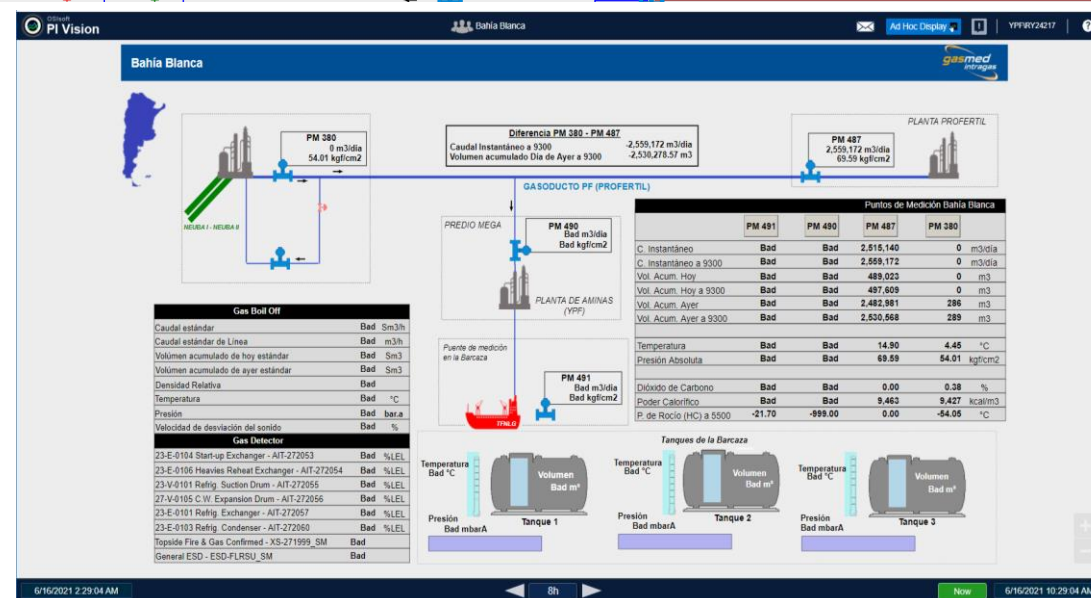
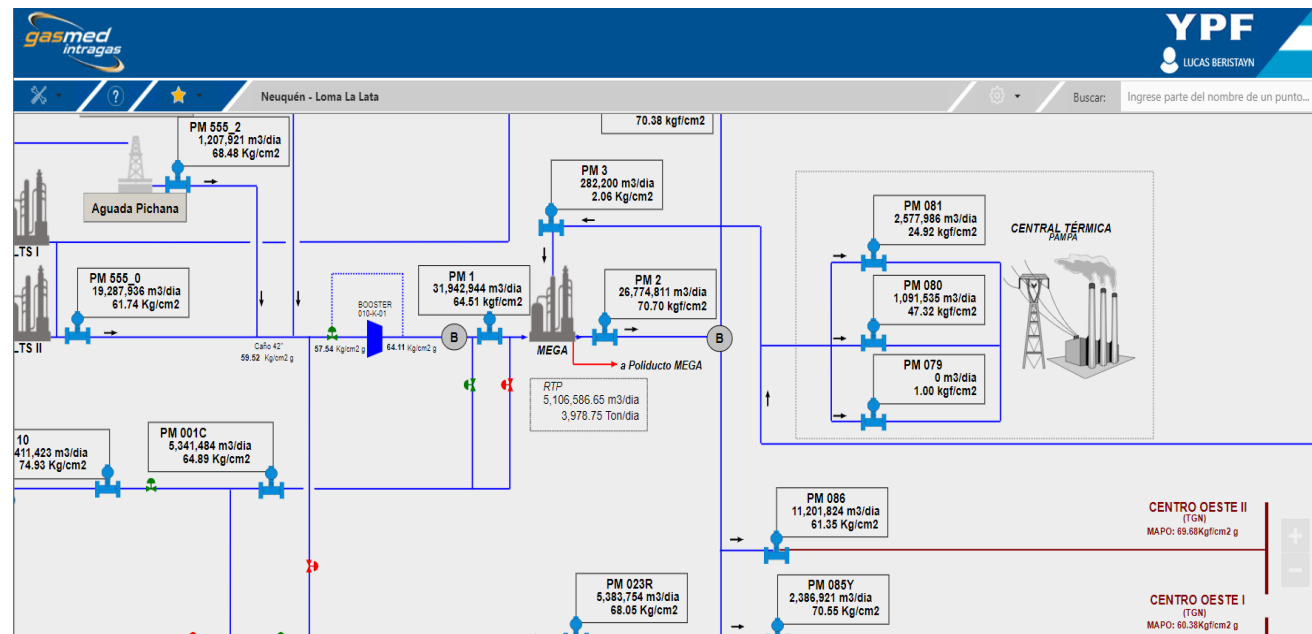
- The Business Challenge
- The Solution – Gasmed
- Results - Maintenance & Business Impact
- Next Steps
- Summary



The Business Challenge

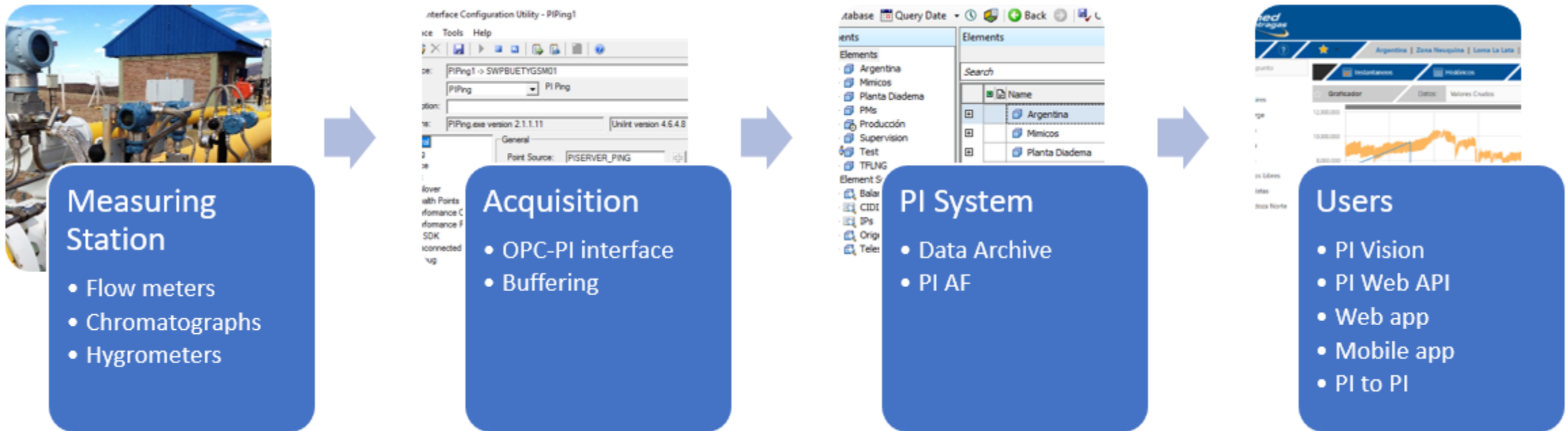
Need for Operational Intelligence

- Very large and dispersed natural gas system with over 600+ meters, 10000+ miles of pipeline, and 300+ of gas plants gathering and processing over 1 billion ft³ of gas per day.
- Portfolio of old applications that were failing to meet growing needs of the organization
- Expand and preserve the amount of gas measurement data and information available
- Turn the gas measurement data into self-serve intelligence that would enhance our decision support capabilities leveraging the PI System and our Enterprise Agreement (EA) signed in 2018
- Share this gas measurement intelligence broadly across the company



The Solution - Gasmed

Supervision and self-service information, intelligence, and decision support Solution



A Diversity of Stakeholders & Users



Results – Proactive Decision Support For all Stakeholders

PI Asset Framework (PI AF) Underpins Gasmed

\\SWPBUETYGSM01\PIGASMED - PI System Explorer

File View Go Tools Help

Database Query Date Back Check In Refresh New Template New Attribute Template

Library

- Element Templates
 - Alarmas
 - AuditablesFlujo
 - AUX PtoPI
 - Balance
 - Compresores
 - Contraste
 - Control Ácido Sulfídrico
 - Croma
 - Detectores
 - Fecha
 - Flujo
 - Grupo
 - Indicadores
 - Interruptores
 - Línea
 - Medidores de Caudal
 - MM_BASE
 - Motocompresor
 - MTG_PRESIONES
 - Paro/Shutdown
 - PerformanceMonitor
 - PID
 - PM
 - PM_bkp_20200219
 - PM2L
 - PM
- Elements
- Event Frames
- Library
- Unit of Measure
- Contacts
- Management

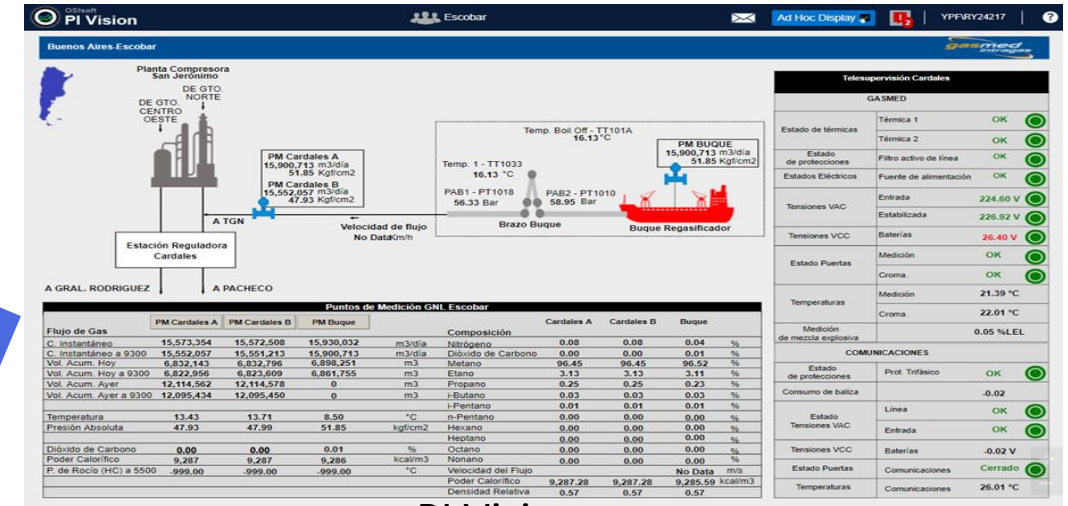
Croma

General Attribute Templates Ports Analysis Templates Notification Rule Templates

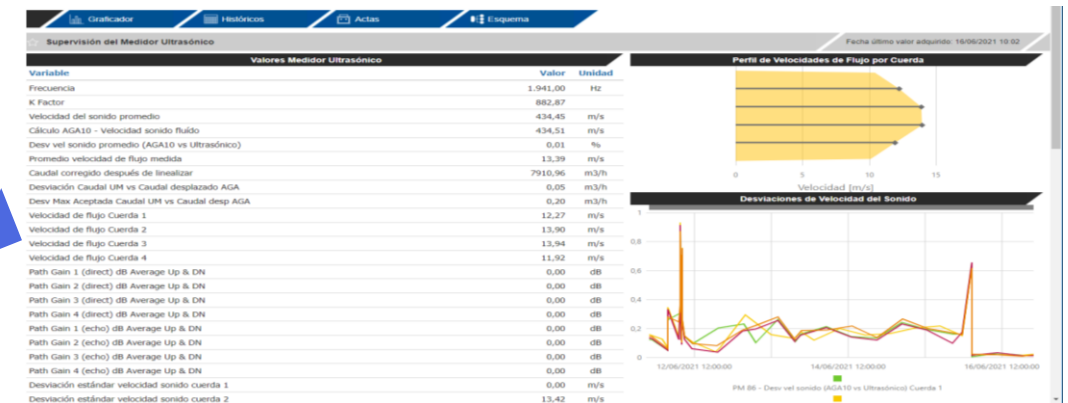
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Category: AGA		
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AccMasaMolar	Acumulador masa molar (croma normalizada)	0 k...
DensidadCorregida	Densidad relativa corregida	0
DensidadReal	Densidad real	0 k...
DensidadRelativa	Densidad relativa ideal	0
IndiceWobbe	Índice Wobbe	0 k...
PoderCalorificoCorregido	Poder calorifico corregido	0 k...
PoderCalorificoIdeal	Poder calorifico superior ideal	0 k...
SumaCroma	Suma de moles de los componentes (para normalizar)	0 kmol
Z	Factor de compresión	0
Category: Cromatografía		
C2H6	Etano	0,0...
C3H8	Propano	0,0...
C4H10-I	i-Butano	0,0...
C4H10-N	n-Butano	0,0...
C5H12-I	i-Pentano	0,0...

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PI Vision



YPF Developed Web Interface

PI Tools & Services

Flujo

General Child Elements Attributes Ports Analyses Notification Rules Version

Name Backfilling

Presión y/o Temperatura fuera de rango

Punto de rocío de HC

Temperatura/Presión Congelada

V VDF

Generation Mode: Explicit Trigger Event Frame Temp

Add...

Name	Expression	Not Set	None
StartTrigger1	Roundfrac('PAB',2)>'PAB Maximum'		
StartTrigger2	Roundfrac('PAB',2)<'PAB Minimum'		
StartTrigger3	Roundfrac('TE',2)>'TE Maximum'	Not Set	None
StartTrigger4	Roundfrac('TE',2)<'TE Minimum'	Not Set	None
End trigger			
EndTrigger	Roundfrac('PAB',2)< 0.9*'PAB Maximum' AND Roundfrac('TE',2)<		

- PI AF
- PI Web API
- PI Builder
- Event Frames
- Analyses

System
Administrators

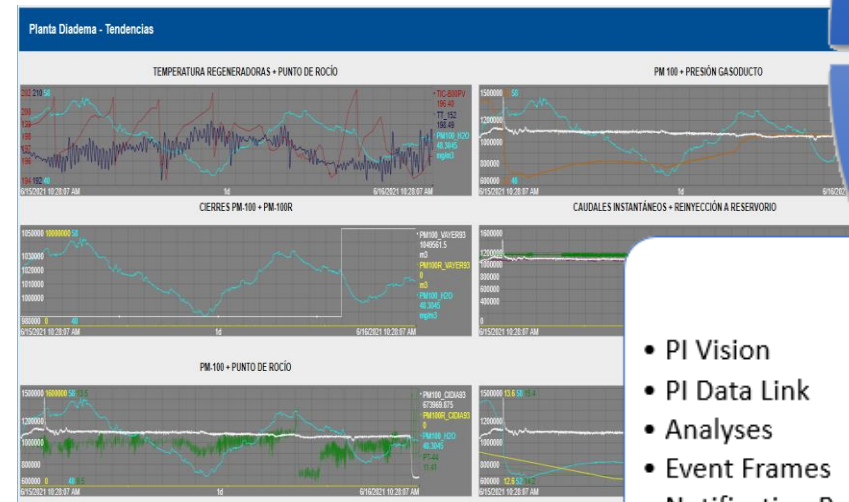
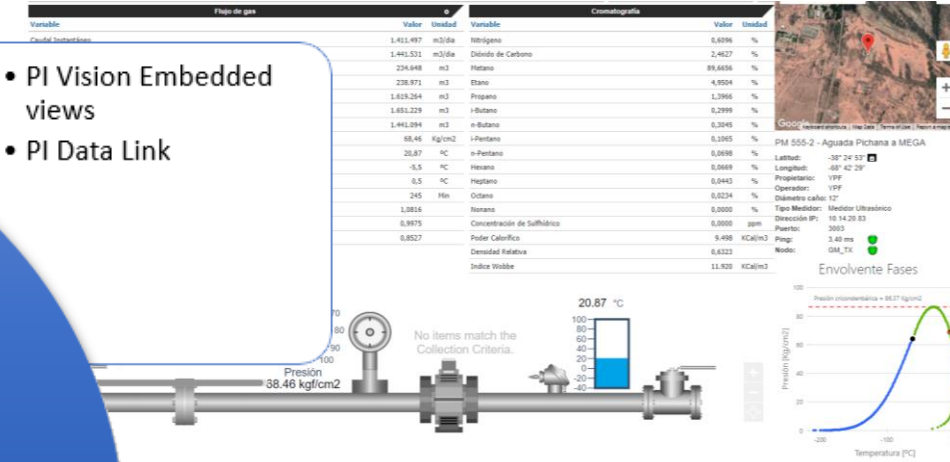
Users

Experts

Monitoring

- PI Vision
- PI Data Link
- Analyses
- Event Frames
- Notification Rules

- PI Vision Embedded views
- PI Data Link



YPF

Supervisión de Nodos

Buscar: Ingrese parte del nombre de un punto...

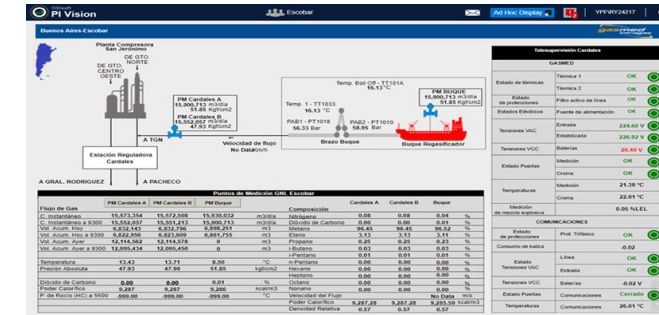
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SWPCROCKGSM01	10.15.51.98	35.20	●
SWPNQNEGSM01	10.160.11.165	32.20	●
		27.20	●
		46.00	●
		20.00	●
		35.80	●
		40.00	●
		57.60	●
		27.40	●

- PI Ping Interface
- Performance Monitor Interface
- PI RDBMS Interface

Gasmed



From Data to Gas Measurement Self-Serve Operational Intelligence



Challenge

- Need to preserve standards and naming conventions
- Large, disperse natural gas gathering and processing system
- Large volume, variety, and velocity of gas measurement data
- Existing gas measurement applications were failing to provide needed information to stakeholders
- Significant effort and reactive decision making resulting in significant lost business value

Solution

- Leveraged the PI System/PI AF using the Enterprise Agreement (EA) to gather, abstract, normalize, and contextualize gas measurement system data & meta data
- Evolved PI AF and PI Vision templates to provide self-serve access to gas measurement system
- Integrated with YPF developed web-based overlay to provide additional gas measurement system accessibility, reporting, and functionality including mobile

Benefits

- Significantly improved self-serve access to the gas measurement system operational intelligence
- Reduced system administration configuration and maintenance times
- Powerful decision support functionality for all stakeholders resulting in proactive, improved decisions across the complex gas measurement system
- Improved gas measurement decisions and accounting

Next Steps

- Deeper analysis of our data
- AI & Machine Learning algorithms
- Power BI Reports
- GIS Data





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“A journey of a thousand miles begins with a single step”

Lao Tzu

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