Schneider Electric

CISCO

The Smart Connected Pipeline

Solution highlights

- An end-to-end smart connected solution based on industry best practices for pipeline infrastructure and network architectures
- A flexible, modular approach from assessment, design, and test to deploy, install, and support
- Collaborative expertise and service from the leaders in SCADA, network connectivity, and security – resulting in cost savings and optimized operations

Helping ensure secure, efficient pipeline operations

Oil and gas pipeline operators and supervisory control and data acquisition (SCADA) engineers must ensure operational efficiency and cost-effective maintenance of pipeline assets while keeping operations running 24x7, 365 days a year.

Every day, oil and gas companies face challenges such as increased cybersecurity threats, outdated legacy infrastructures, and reduced budgets – all of which have the power to threaten optimal performance and disrupt operations.

For instance, because pipelines often span thousands of miles across regional and international borders, there is increased complexity when securing the infrastructure and operations. A threat as simple as a virus in one section could compromise the entire pipeline. Product theft and third-party interference are also concerns, particularly in emerging markets.

Many pipeline infrastructures are legacy structures that are inefficient to run, costly to maintain, and more susceptible to leakage that can go undetected and cause increased risk and damage.

Legacy pipeline control systems, which often are as old as the pipelines, require more manpower and manual interventions when problems arise.

And because the underlying systems supporting these control centers are outdated too, they can't take advantage of the latest SCADA and network technology for security, automation, asset management, and data analytics.

There are also challenges during the development of new pipelines. Design practices are often outdated and do not properly address modern security, optimal infrastructure configurations, or innovative redundancy and high availability requirements.

Solution overview

To meet these challenges, Schneider Electric and Cisco have joined forces to bring innovation to pipelines, oilfields, and processing facilities, from upstream production through operations and transport. Together we provide an architectural approach to mitigate risk, accelerate deployment of the solution, improve operational efficiencies as well as Total Cost of Ownership (TCO), and facilitate rapid resolution of critical network issues.

Smart Connected Pipeline is an open, end-to-end solution for pipeline management that provides future-ready communication architectures for integrated, automated pipeline operations through the use of modern IT technologies. For more information, contact www.schneider-electric.com.

Tested and validated by Schneider Electric and Cisco, the Smart Connected Pipeline solution features a standards-based design and industrial cybersecurity that helps:

- Lower integration costs
- Reduce project delivery risks
- Ensure predictable performance during pipeline upgrades and installation

- Enable high reliability and minimal downtime with fewer disruptions
- Increase business continuity

Schneider Electric and Cisco have teamed together to build a comprehensive reference architecture for this smart connected solution (see Figure 1). This architecture provides an end-to-end roadmap for how the key components of this solution work together.

Smart Connected Pipeline includes two key components – converged telecommunications and the baseline integrated SCADA system (BLISS) control center. Together these form a complete pipeline management solution.

Figure 1: Smart Connected Pipeline
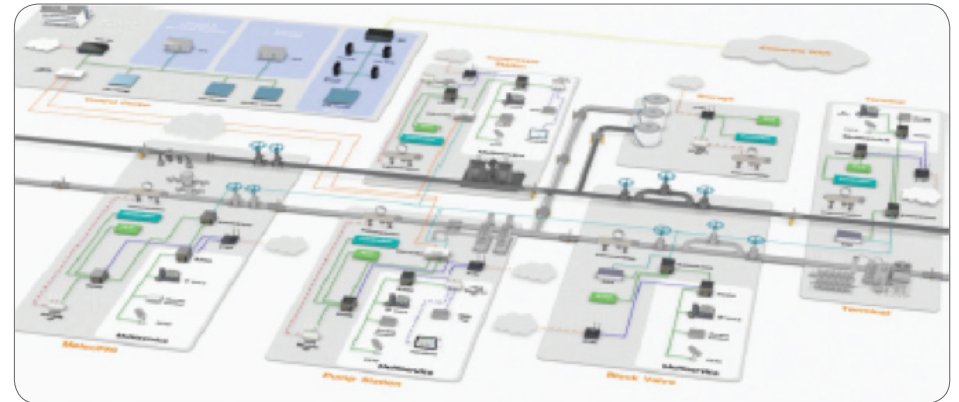
Converged telecommunications

Smart Connected Pipeline automates operations from end to end, from block valve to control rooms. It includes a validated and tested architecture and integrated industrial cybersecurity systems that provide ease of management and support, improved reliability, and reduced engineering costs. The solution includes SCADA and advanced applications such as simulation, leak detection, process, and energy automation (see Table 1).

BLISS control room

The virtualized BLISS control room provides fast, secure, and efficient deployment. It reduces design and engineering costs while increasing operational efficiency and lowering TCO. The control room solution includes IP networking, wireless, and optical communications as well as industrial cybersecurity (ISA SP99), high-availability designs, and virtualization and convergence architecture (see Table 2).

Pipeline companies can start with a control center or the converged network telecommunications based on needs and requirements – or can deploy the complete solution.

Table 1: Smart Connected Pipeline highlights

Feature	Description
Supervision and control	Gain real-time control and supervision of operations along the pipeline through a SCADA system based in one or more control centers
Measurement	Accurately measure flow, volume, and levels to help ensure correct product accounting
Leak detection	Detect and locate pipeline leakage, including time, volumes, and location distances
Physical safety and security	Integrate security systems for personnel, the environment, and infrastructure using video surveillance, access control, and intrusion detection systems
Process safety system	Achieve safe operations through instrumentation and safety systems
Energy management	Visualize, manage, and optimize energy consumption
Block valve station	Isolate a segment of the line for leaks or maintenance

Table 2: Converged telecommunications

Feature	Description
High availability and reliability	• Backup WAN services to help ensure continuation of operational services • Options for primary and failover infrastructure connectivity (Ethernet, multiprotocol label switching [MPLS], dense wavelength division multiplexing, optical transport network, cellular, or wireless), depending on project requirements
Ability to transport multiple traffic types across common infrastructure	• Differentiated quality of service (QoS) between traffic types, helping meet performance requirements of all operational traffic and multiservice traffic • Segregation capabilities (physical or logical) between services, helping ensure that one traffic type does not impact another
Open standards-based security	• Multilevel security to protect against cyberattacks and other security threats • Centralized, configurable policy-based services
Multiservice applications	Optional services to support pipeline operations, including VoIP, local Wi-Fi access, mobility, collaboration tools, and Internet access
Management	End-to-end communications network, security, and administration management, from instrumentation and sensors to the control center applications
Ruggedization	Ruggedized equipment available for harsh conditions, local regulations, or industry certifications

Smart Connected Pipeline use cases

Oil and gas companies are reaping benefits as they work with Schneider Electric and Cisco to build and implement innovative pipeline management solutions. Here is a quick overview of how customers benefit from this powerful solution.

Smart Connected Pipeline—An end-to-end solution

This implementation focused on interconnecting the company's gas pipeline with its storage facilities.

Customer challenges

- Tight project schedule
- Highly critical infrastructure
- Strict environmental requirements and a harsh climate
- Requirement for a data center solution that conforms with IT standards

Solution value proposition

- BLISS architecture with FlexPod appliance and Schneider Electric OASyS SCADA

Scope

- Electrical: UPS, electrical systems, shelters
- Control: SCADA, control center, simulation, programmable logic controller (redundant), and electrostatic discharge
- Security: Video system and intrusion detection
- Telco: Fiber optic ring and switches and Voice over IP (VoIP)
- Instrumentation: P,T,L gas quality and motorized valves (with PROFIBUS)

Benefits

- Single-source solution
- Reduced project implementation risk through end-to-end integration
- Virtualized architecture with reduced footprint and lower TCO
- Higher bandwidth for meeting OASyS SCADA requirements and scalability needs

Smart connected transport pipelines

This customer has a 1000-mile (1600-kilometer) crude oil pipeline in Eastern Europe that extends from the mountains to a marine terminal. This implementation of Smart Connected Pipeline focused on the company's export pipelines and gathering system.

Customer challenges

- Safe operation and modern leak detection
- A major upgrade of a trunk line with minimal disruption in operations

Solution value proposition

- Complete end-to-end solution with modern pipeline SCADA, leak detection, and telecommunications system

Scope

- Infrastructure: IP MPLS, optical, and Ethernet
- Control center: SCADA and leak detection systems

Benefits

- Single-source solution
- Complete modern solution from the control room, to operational software, to communications infrastructure
- Upgraded without disrupting operations

Conclusion

The combined industry-leading expertise and technologies of Schneider Electric and Cisco provide a smart, innovative, and connected solution for upgrading and building oil and gas pipelines.

The Smart Connected Pipeline solution provides an efficient way to modernize pipeline systems using the latest, most secure technology available today in a modular approach that can easily be adapted to each customer's needs. In doing so, this solution helps oil and gas companies prepare for the future while optimizing performance and delivery today.

Solution benefits

Smart Connected Pipeline can benefit oil and gas companies in each phase of the process: design, operations, and maintenance.

This results in:

- Lower TCO and reduced downtime due to faster build cycles and proactive, remote maintenance
- Increased revenue opportunities through optimized 24x7x365 run times
- Reduced risk with better safety, health, and environmental compliance and faster problem resolution and incident management

For more information

Contact your Cisco representative or visit us online at https://www.cisco.com/go/oilandgas.