THE NEW PIPELINE EXPERIENCE - WITH NO BLIND MOMENTS

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Abstract

The United States natural gas industry has grown and continues to grow. But can the natural gas industry support this growth? When your operational systems fail, you are exposed to safety threats, compliance violations, inaccurate gas balancing and a host of other issues. In this whitepaper, you'll learn how you can achieve "The New Pipeline Experience — With No Blind Moments." We'll discuss how you can make this new pipeline experience a reality for you with dependable gas delivery, flexible operations and uncompromised compliance with complete visibility from systems that are always on.

Introduction

The United States natural gas industry has grown due to the industry's ability to extract shale gas with hydraulic fracturing and horizontal drilling. "In 2011, the U.S. Potential Gas Committee, a nonprofit organization of highly experienced industry experts, reported that the U.S. possesses a total natural gas resource base of 2,170 trillion cubic feet (Tcf), the highest resource evaluation in the committee's 46- year history. The study estimated that the U.S. has a 100-year supply of natural gas and announced that shale, an "unconventional" gas resource that was barely a blip in previous assessments, now accounted for approximately one-third of the total resource base".[1]

Because natural gas is a clean energy source that's less expensive than oil, it's appealing to homeowners and businesses alike and eases reliance on foreign oil. But can the natural gas industry support this growth? Does it have the necessary infrastructure, skilled personnel and safety procedures in place to deliver on its promise?

State Of the Industry

Disruptions from natural gas can have major economic, safety and societal impacts when something goes wrong. Take the 2010 gas explosion in San Bruno, CA for example. Eight people dead, thirty-five homes leveled, a wall of fire more than 1,000 feet high, plunging stock prices and a law suit. Defective welds in the pipeline that could not withstand the increased pressure in the pipes to meet growing energy demand was cited as the reason for the explosion.

There are countless examples of incidents all over the country just like this. To keep everyone safe, regulators have responded with tougher legislation, stricter audits and larger fines for non-compliance. Natural Gas Pipeline system leaders are facing pressures from all sides. Not only are regulators getting tougher; but community leaders are concerned about safety and increasingly concerned about outdated infrastructure leading to near or fatal accidents. There are issues with matching supply and demand in real-time; and concerns about the insufficient number of skilled people at the locations where they are needed. Operations people feel they're being overruled by IT; IT feels they're being over tasked by operations, and worst of all, security and tampering with critical infrastructure is no longer fiction; it is now reality. All this while the importance and reliance on natural gas, both as a primary as well as a secondary source of energy, has increased tremendously during the last 10 years in North America.

"...can the natural gas industry support this growth? Does it have the necessary infrastructure, skilled personnel and safety procedures in place to deliver on its promise?

[1]   Naturalgas.org

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Stratus is hearing the same themes over and over from natural gas companies:

"We are experiencing unacceptable down time of our ever increasingly complex IT systems."

"We have to send an army of people to remote locations to monitor critical parts of the pipeline manually if the systems are down."

"We are running blind when we do not have our systems always on."

"We have to prove we are in compliance — and cannot be missing data; otherwise we can get fined."

"We do not have technical IT skills or resources to fix system issues at remote locations."

"Virtualization alone is good for saving system costs, but without always-on capabilities there is an increased risk of failure."

"We are adding more and more complexity to our pipeline systems making them more breakable."

"We have issues maintaining the accuracy of our gas imbalance sheet."

Conventional Servers Don't Solve the Problem

Many gas companies have tried but failed to solve these problem with conventional servers running critical applications such as SCADA and Historian in multiple locations. Downtime problems continued to plague this approach and it didn't scale.

For example, a large gas pipeline company running 15,000 miles of pipeline, spread across 16 states, transporting over 1 trillion cubic feet of natural gas per year to their customer base, upgraded their compressor stations to a fully redundant system. This upgrade included compressor pumps/turbines, valves and safety and control systems as mandated by CRM regulations. While it was easy to implement redundancy for Programmable Logic Controllers, power and network services, creating an always-on fully redundant computer platform to operate their SCADA, historian, HMI and related control system applications remained a challenge. Additionally, a key element in the overall operational upgrade was the use of Big Data analytics to proactively detect compressor station problems so they could be addressed before unplanned outages, or catastrophic failures occurred.

The initial solution deployed was 3 standard computer servers at each compressor station, each running one of the critical applications. Unfortunately, this solution had multiple weaknesses. The company recognized that they would eventually need 6 to 8 servers in each location for the range of applications they would need to support. Given their space and power constraints this was a significant problem and it would be even worse when the servers failed. To get a compressor station fully operational required reconfiguring its exact operating environment back at headquarters and then driving it to the location to perform the install and re-cabling. This would generally take 2 to 3 days. As for the analytics, the loss of any data from a compressor station meant sub-optimal results which defeated the objective of increasing overall operational efficiency.

Then there's the local gas company that immediately deploys personnel to watch, maintain and monitor their distribution pipeline and gate stations whenever a failure occurs. With multiple gate stations and 600 hundred pressure monitoring points, they have to send considerable resources to manually perform the task. The longer the outage, the more costly the outage becomes as each personnel shift change is replaced by the next until the problem is resolved.

To solve this costly manual labor drain, the gas company's IT department deployed Dell servers in multiple locations to run their SCADA and Historian applications. But downtime problems persisted, so they switched to HP servers which also proved to be unreliable.

When the servers failed for the sixth time, the Supervisor of Automation and Control had had enough. He demanded a continuous availability solution he could rely on to keep his operations up and running.

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Virtualization, Real-Time Analytics and Optimized Operations

Virtualization, real-time analytics and optimized operations were all key elements of both company's project goals. Virtualization and real-time analytics are technologies that have been widely adopted by enterprise businesses for quite some time but are relatively new to the Gas industry. These technologies can greatly optimize operations.

Virtualization allows you to run more applications on one platform. Instead of a 1:1 server to application ratio, virtualization supports a one to many server to application ratio saving you money in infrastructure costs.

Virtualization enabled a natural gas gathering and treating customer to go from 42 servers to 8!

This natural gas gathering and treating company was losing hundreds of thousands of dollars a month in imbalance sheet accounting due to its inability to accurately monitor data from the point of extraction through distribution. Their old technology that used RS232 communications with standalone SCADA was slow and frequently failed, crippling their systems.

To remedy this problem, the company launched a project to upgrade their old system to a modern process automation system. Because the company understood the value of having continuous accurate data at each of their locations and the expense associated with frequent technical refreshes – continuous availability with system redundancy and longevity were key requirements for the new system.

In their search for a solution to meet their needs, they attended an automation event and evaluated a storage array. The proposal they received called for 42 standard Dell servers connected to one storage array. With a non-redundant

architecture and warranty coverage that needed replacement every three years, this solution did not meet their redundancy requirement or their longevity requirement. Clearly this complex and costly method was not the answer to their problem. What they needed was a virtualization solution. But the more applications you have running on any one platform, the more important that platform becomes. That's why virtualization on its own isn't enough. The virtualized platform needs to be protected from failure.

Their automation solution provider introduced them to Stratus® Technologies always-on ftServer® platforms. Not only could this platform provide the redundancy and continuous availability the company was seeking, but it could also support virtualization reducing their server needs (and associated cost) from 42 to 8. With a long track record of proven reliability and longevity, automatic system generated replacement part ordering, real-time management and monitoring, without the need for IT expertise, it proved to be the perfect solution for the company's remote locations.

The company has not experienced any downtime since deployment. Today, with real-time accurate data, the company has saved hundreds of thousands of dollars a month in imbalance sheet reporting providing them with complete operational visibility and no more "blind moments."

"Our imbalance sheet matches up so closely with what is pumped from the producers to what is delivered to the users, that we literally save hundreds of thousands of dollars a month," according to the IT lead at this small company.

How much could you save your company with optimized operations from virtualized applications that are always-on and real-time uninterrupted data to maintain the accuracy of your imbalance sheet?

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The New Pipeline Experience

Stratus Technologies is working with your peers on a new approach to solve the problems the natural gas industry is facing. We call this approach "No Blind Moments" — a complete always-on natural gas pipeline system that eliminates downtime.

This approach consists of four steps:
1. Uncompromised Compliance
2. Dependable Gas Delivery
3. Flexible Operations
4. System Wide View

1. **Uncompromised compliance** enables you to achieve CRM compliance with systems that are always-on and easy to maintain.

Downtime and data loss are the root cause of compliance violations. The longer the downtime incident lasts; the more impactful and costly it becomes. With systems that continually stay up and running transmitting real-time accurate data and automated compliance reports to prove it – you'll always be in compliance. Next day hot swappable hardware replacement, 24/7 monitoring with automatic fault-detection prevent downtime from occurring, giving you peace of mind.

2. With **dependable gas delivery**, you'll be able to deliver natural gas consistently, safely and proactively with control room management systems that are always-on.

No more shortages, dissatisfied customers or costly manual labor to monitor and maintain distribution pipelines and gate stations when systems go down. And you'll have accurate real-time data in terms of what actually gets shipped versus arrives. With dependable gas delivery, you'll have on time gas delivery, cost savings from automated, proactive remote management and most importantly; satisfied customers.

3. **Flexible operations** enable you to run more applications on the same system without adding complexity or risk of failures.

Reduce costs by optimizing your operations with virtualization that runs on a reliable platform that typically lasts three years longer than other solutions. Easily install and manage systems remotely without the need for expensive and scarce IT resources or costly manual labor.

4.

Realize full visibility with no blind moments with a system wide view of your natural gas pipeline network. A **system wide view** of your operations that are always available will enable you to detect and prevent outages before they occur, eliminate the guess work and anxiety out of system maintenance, and maintain the accuracy of the imbalance sheet.

Stratus® Technologies™

Stratus' ftServer platform delivers on this new pipeline experience with no blind moments to ensure that compressor stations, gate stations and control rooms remain up and running at all times. This holistic approach consists of enabling elements, complementary elements and complementary services packaged in an operationally simple platform to run virtualized applications remotely without IT expertise and real-time analytics without data loss for complete operational visibility.

When fully adopted, "No Blind Moments" will eliminate your system downtime and your blind moments.

For over 30 years Stratus Technologies has been helping companies keep their systems continuously operational, and we'd love to see how we can help you.

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