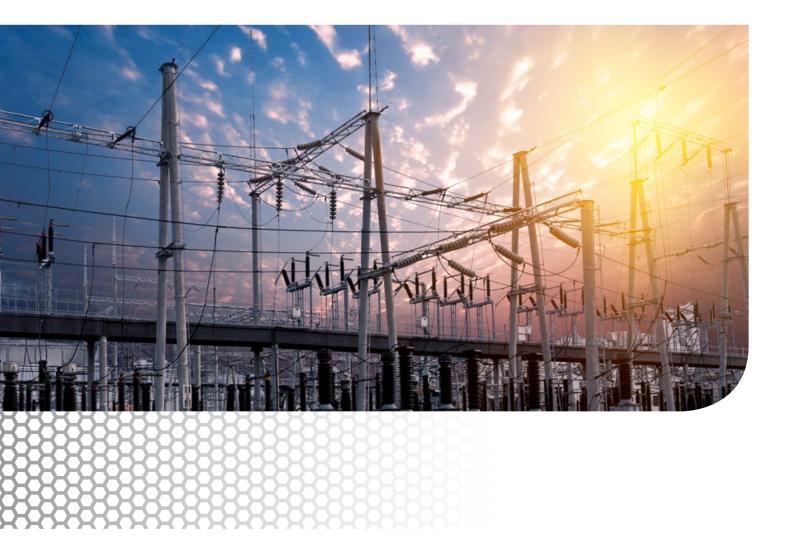# Modernizing Utilities Management

Surveillance and the Drive for Digitization

SYNECTICS

Introduction

Adapting and adopting new solutions to keep pace with the digital revolution is a process many industries have faced; some are now decades into a program of digitization aimed at improving areas such as customer relations, service provision, and production efficiency.

For others, however, digitization remains a forward focus – a challenge to face rather than review. For the utilities industry, this is certainly the case. The asset-heavy nature of utility provision, coupled with factors including historically oligopolistic operating landscapes, has meant the sector has been slow to adopt digitization.

However, that is now changing. Increasing customer demands, tight budgets and new market entrants, aligned with new forms of technology, have prompted the energy and utilities sector to start taking digitization seriously, both from an operational and customer-facing perspective.

The question is, how does a company go about achieving what can appear a daunting task? For many, the answer may well lie in surveillance and security technology.

What does digitization mean for the utilities sector?

Before examining the specific solutions that could help the sector capitalize on digitization, it is important to understand what exactly is meant by the term.

In a study on the subject by PwC, one CEO of a European Utilities firm said: "Digital must encompass all functions, all business units, and all employees." In other words, digitization is the adoption of digital technologies across every aspect of utilities provision – not simply a nod to digitized customer-facing engagement and services such as online payment and account management (though this is indeed an aspect). Digitization has to be holistic.

For example, more and more utilities businesses are now using smart metering and digital sensors to identify anomalies, from hot spots or water pressure variations to voltage surges or drop off. True digitization refers to the adoption of these 'back end' systems as well as outward-facing solutions. Importantly, for it to be truly effective, it requires a connected approach that enables digital intelligence to inform decision-making and communications.

Moving to a more connected approach

Achieving this level of system unification has presented the sector with a stumbling block – particularly for large-scale, mature utilities businesses with widespread physical infrastructure.

Though digital solutions are being adopted, investment tends to be staggered, and where new systems are adopted, they are implemented, monitored, and managed in business siloes. While this will generate organizational benefits, it will not result in the streamlined 'whole landscape' improvements that digitization promises.

It is here that surveillance technology has the greatest potential. More specifically, it is where integrated surveillance command and control solutions can play a pivotal role.

Digitization is the adoption of digital technologies across every aspect of utilities provision.

Surveillance steps up

Electricity, gas, and water are essential to national infrastructure. This critical service requirement – coupled with the fact that utilities sites are often remote, incorporate hazardous zones, and are highly secure – means the sector has historically been a heavy user and adopter of surveillance technology.

To date, however, the remit of surveillance in the sector has predominantly been focused towards security applications – cameras transmitting physical breaches and integrations – rarely going beyond access control or perimeter security.

Aligned with the growing emphasis on digitization, however, surveillance monitoring and control technology is also now being perceived and adopted in a different capacity – as a unifier of all data.

Open-architecture surveillance command and control solutions enable cameras, intruder alarms, fire/smoke detection, access control, critical asset tracking, process control, communications, and building management systems to be viewed, managed, and acted upon from a single user interface, encompassing one or multiple geographic locations.

For a sector with disparate legacy systems (installed over many years) and a high physical asset base, this is a significant step forward in itself, as it immediately offers resource efficiency benefits – managing one system is quicker and simpler than managing several.

However, perhaps the biggest advantage that this approach affords energy and utilities businesses is that it enables data to be collated and understood as a whole. Utilities companies using these solutions can detect potential threats more quickly, and with greater accuracy due to data from multiple sources providing a wider context.

Improved threat detection and response

In relation to physical assets, improved threat detection is – given the sector's heritage and structure – one of the most significant advantages of adopting an integrated approach to surveillance. Digitally unifying data from any site system and/or edge device provides organizations with unrivaled situational awareness of the locations they seek to protect.

Crucially, an open-architecture system of this nature can also be configured to detect and inform operators of single events deemed to put assets at risk, or multiple events that cumulatively warrant investigation.

These notifications may take the form of prioritized live video on-screen at a command center, or a straightforward color-coded alert system. With surveillance command and control solutions now offering integrated dynamic workflows, the alert can also be accompanied by prompts highlighting the threat (potential intruder, fence breach, leakage, equipment malfunction, etc.).

These workflows will then guide operators through what the next steps should be regarding approved incident response. The outcome is real-time threat detection that feeds directly into informed decision-making.

Importantly for the utilities sector – where vast estates incorporating multiple sites of varying function are common – achieving this holistic view is not restricted by geography.

An integrated, networked solution ensures that video, audio, PIR activations, and other alarm inputs, from any number of locations, can be easily viewed and managed locally, i.e. by the team based on site, or streamed to a central command base for remote incident detection and response.

This topic is discussed further in an interview found on our website: https://bit.ly/3ONMAqc.

SCENARIO SPOTLIGHT

Facial recognition software, integrated with surveillance cameras at a site entrance, flags up an alert that a scheduled maintenance vehicle is not manned by a 'known' driver. This alert triggers an on-screen workflow prompting the operator to call the maintenance dispatch team to verify credentials. The driver is approved but at a lower security level than usual personnel. On inputting this information to the workflow, the system updates access control parameters to ensure movement is restricted to approved zones.

Integrated surveillance command and control solutions can play a pivotal role in digitization.

Predictive maintenance

In line with digitization, many utility businesses are also now commonly deploying 'smart sensors' to ensure processes and equipment are functioning safely and efficiently. These might detect anything from heat variation, water flow or gas levels to energy flux. In some cases, organizations have also adopted robotic/drone technology to inspect pipelines, cables, flare stacks, cooling zones, etc.

The information these devices and technologies offer independently is useful. The combined information, as part of a wider digital matrix, can be invaluable.

As outlined above, data from these devices can be integrated into a central command and control solution to provide a real-time view of issues that require action. In addition to improving response times to actual (potentially catastrophic) incidents, this framework has significant implications for predicting risks before they have a chance to develop.

This is incredibly useful for asset maintenance as it allows operatives to identify failure risks and address them as part of planned works. This proactive maintenance approach can assist in preventing emergency scenarios thus avoiding the risk of longer or unscheduled downtime (potentially incurring regulatory fines), which may cause substantial customer dissatisfaction.

Pipeline hot spots (indicating pipe thinning), anomalous sensor readings that fall within set 'pre-failure' warning margins, equipment readings that indicate slowing mechanical actions – these are all datasets that suggest an issue is imminent. With the right implementation and configuration, however, an integrated command and control solution can ensure that this information is flagged up in the right way, to the right people, so that the correct remedial action is taken. Utilities providers can effectively establish their own digitized infrastructure health-check.

SCENARIO SPOTLIGHT

Power distribution organizations routinely ask the public for details of potential tree growth near to overhead lines. The technology and integration capabilities currently available could enable solutions to be developed that automatically schedule drone inspections based on customer notifications received by postcode/zip code.

Automated dispatch and reporting

It is worth noting here the 'the right way' might itself involve an automated process. For instance, on receiving data indicating that pipeline integrity is jeopardized, the system can be programmed to issue a maintenance instruction notification and geographical data (incident GPS coordinates) to the mobile devices of an inspection team. On examining the problem area, they could then use pre-agreed numerical codes to send automated system updates such as false alert, required maintenance complete, or further investigation necessary, which are automatically updated against the system incident log.

As adoption of this technology increases and unified comms integration improves, it will also be possible to automate customer updates such as website notifications or emails about maintenance issues/planned works and vice versa.

Networking human resource

According to figures released by Energy & Utility Skills, the UK power sector alone will need to recruit 35,000 new employees by 2024. Effective, efficient management of human resource is, therefore, another key challenge.

Utilities digitization is typically associated with processes, products, and services but, thanks to location aware technology and ruggedized solutions such as 'field-ready' smartphones and tablets, the 'digitization of personnel' is also now an important opportunity.

Having a real-time understanding of where workers are, their live task list, status reports and their forward schedule, is hugely beneficial regarding incident response and operational planning, particularly for a sector heavily reliant on lone workers and remote team management.

While advances in WiFi solutions and internet connectivity continue to aid the development of this particular digitization process, the reference to SMS communication in the scenario spotlight is important. In locations where WiFi coverage is limited – because of national investment levels, slower technological development or, due to geographic constraints – SMS and other message transmissions via 3G/4G technology ensure that efficiency benefits can still be achieved with an accessible and realistic mechanism.

SCENARIO SPOTLIGHT

In the aftermath of a storm where flash flooding has caused widespread infrastructure damage, a gas distribution operator can integrate live data reports – including video footage where relevant – from field teams, ensuring that any risks of leakage are graded and prioritized, and that supply is cut accordingly. Given the potentially hazardous location of inspections taking place, field personnel are also instructed to 'check in' using an SMS code, with any missed check-ins flagged and accompanied by status verification workflows for central operators to follow.

Big data integrations

In addition to ensuring the utilities sector can benefit from internally implemented digitized systems and technologies, surveillance command and control solutions increasingly facilitate 'big data' integrations from external sources to provide even broader event or incident context.

Social media feeds and government threat levels are two significant areas that fall into this category, the former having both customer service and security implications depending on application and/or key phrases searched.

In the future, it will be possible for a water company to integrate Twitter feeds or other social media tools and cross-reference customer-generated leakage/discoloration reports with network data to help identify issues and prioritize the dispatch of investigation teams.

Weather and traffic reports are also relevant sources in this context. Information acquired from these reports, when paired with data from other site/network systems, can help inform planning around supply demands, maintenance scheduling, dispatch times, and service bottlenecks.

A proactive future - system optimization

Using an integrated surveillance command and control solution to unify, monitor, and manage systems essential to utilities presents a tremendous opportunity for the sector to make digitization happen. More than that, however, it provides a mechanism for the sector to proactively improve services.

From understanding equipment failure patterns and managing maintenance, to using network-wide smart sensor deployment to predict peak demand periods and geographic variations, organizations can use systems integration – and the improved situational awareness this delivers – to thoroughly interrogate the wealth of data at their disposal. Operational decisions, with this unified understanding of the complete picture, are therefore highly informed and based on context and fact, rather than assumption.

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