Elevating Fire Alarm System Management To The Next Level With IoT Services

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Over the last decade, fire protection has been transformed by the rise of addressable, IP-based devices embedded in networked fire alarm system infrastructure. The scalability and modular architecture of digital fire alarm systems has unlocked a new level of fire safety, for instance by pinpointing the exact location of a triggered smoke detector in an alarm, or by interfacing with public address systems for phased building evacuations. For system integrators, installation and maintenance of alarm systems have reached new levels of efficiency – including automated service alerts and far fewer false alarms – with unprecedented cost savings.

Accordingly, the world market for fire alarm systems has seen significant growth, driven by the digitization of existing systems to meet higher safety standards and legislation. Experts at Grand View Research expect the market to increase from $52.2 billion in 2016 to $93.5 billion by 2022. Addressable systems – including IP-networked smoke detectors and fire
panels – already account for more than two-thirds of the alarm technologies segment. And, as analog systems are being phased out, their share will soon be 100 percent.

Networked fire alarm systems

With that said, all elements are in place for the second, even more fundamental transformation in fire protection: In the near future, a growing amount of networked fire alarm systems will be connected to the Internet of Things (IoT).

“In the near future, a growing amount of networked fire alarm systems will be connected to the IoT”

This is part of a larger trend across industries, including smart homes and smart buildings automated by a mixture of sensor data and artificial intelligence (AI). The number of IoT-connected devices worldwide is expected to exceed 14 billion by 2022, more than half of the world’s 28.5 billion connected devices.

For technology providers like Bosch, the IoT’s level of networked intelligence calls for a strategic response. “Our strategic target for all of our electronic product categories is to be IoT-enabled by 2020,” said Volkmar Denner, CEO of Bosch. This vision is supported by “3S’s” in Bosch’s connectivity business: sensors, software, and services. In developing and implementing services and solutions for the connected world, Bosch benefits from its expertise in software and sensor technology as well as, in particular, its broad business portfolio.

Remote Services lead the way

When it comes to bringing the IoT into the fire safety segment, Bosch envisions a future in which connected devices – and their data – open up new kinds of services that offer significant benefits to end customers and system integrators. This digital transformation
journey is already well underway, as IoT-based applications are already enhancing the fire safety service offering on several levels. As a prerequisite, networked system architecture such as fire panels and sensors need to connect to the internet via nodes, hubs, and gateways in a secure manner. With this connection in place, the system can communicate with a cloud application server via IP protocol to send real-time data such as device health, battery status, and event history.

Because system integrators can access these data points from any location without physically visiting the installation on-site, the impact of the IoT so far has been most pronounced in the Remote Services segment with the following three focus areas:

**Remote Connect.** Allows for the remote set-up of a system and programming to customer specifications. Offers cost savings, as set-up can be handled practically without leaving the office for each new installation. Requests for changes can also be implemented at faster turnaround.

**Remote Alert.** In case of fire, the system sends an alert via the remote portal, which can be integrated with messaging systems. Integrators also receive alerts for device outages and malfunctions.

**Remote Maintenance.** The system performs regular health checks and condition monitoring, sent at user-specified intervals. Smart fire detectors also ping administrators for electromagnetic pollution or contamination with dust.

**Major efficiency gains for system integrators**

While IoT-based Remote Services already provide major efficiency gains for system integrators, we’re only just scratching the surface of what is possible. At the same time, the foundation for next-generation IoT-connected services is already created today, as the
integration between sensors, software, and services increases.

It will not only be crucial for devices to work together within the same network.

In the process of building end-to-end fire safety systems that are ready to connect with the IoT, seamless interfaces with third-party apps and platforms via APIs (Application Programming Interfaces) will be a competitive advantage for system technology providers. It will not only be crucial for devices to work together within the same network. It will be even more important that systems can communicate with apps or building management software.

On the same note, the ability to provide integrated, IoT-connected services on a secure backbone – safe from hackers and malicious attacks – will be indispensable, because system data is the most valuable resource moving forward. Analyzed correctly, this data holds the key to what comes next.

Smart data instead of Big Data

Needless to say, the rise of IoT-connected fire alarm systems will create massive amounts of data. This new ‘Big Data’ reality will call for improved data processing capabilities. Not just in terms of quantity: The most relevant services will be derived from smart data provided by IoT solutions in fire safety. The focus lies with data points that matter and making this data actionable by practice-oriented analysis.

For a quick glimpse into the process, our IoT data scientists are currently running comparative analyses of several fire alarm systems to gain visibility on problematic incidents, for instance when devices trigger false alarms.

New services will have the potential to transform the way in which fire
alarm systems are maintained

In the next step, categorizing all systems that report such incidents into clusters would allow to give system integrators a big picture overview pinpointing exactly those among their managed systems that are at risk and need inspection, repairs, or upgrades. On the technical level, Bosch is using Mongo DB, a universal, document-based database for apps, to perform these quantitative analyses, always with a focus on new services and benefits for customers.

As our understanding of this data increases, new services will become possible that have the potential to transform the way in which fire alarm systems are maintained and managed. Whereas today, system integrators can view data points such as device status in their Remote Portal and offer basic maintenance support via cloud-connected apps, tomorrow their service approach will be much more proactive, again thanks to smart data.

The next level of IoT-powered services

In the future, data from IoT-connected systems can be leveraged to predict automatically at what exact point in time a system component is going to fail. Instead of replacing said component ahead of time, as is the case in today's preventive maintenance approach, this new predictive service protocol allows to save cost by making maximum usage of the device's lifespan.

In the bigger picture, the data log of a particular fire alarm installation's data can provide the basis for targeted system optimization efforts. For instance, if long-term data indicates that sensors in a particular area tend to trigger false alarms because of signal interference, the integrators can perform a deep dive into whether nearby high-voltage cabling is the cause
and make adjustments to system architecture accordingly. In the same vein, integrators gain transparency on whether detectors in a certain location tend to need replacement due to dust and contamination, or if electromagnetic compatibility (EMC) with other systems like voice broadcast is causing issues – and take preventative measures.

**Self-monitoring Fire alarm systems**

Overall, these data points, together with constant real-time information on system health, will provide system administrators with the tools for planning and maintaining fire alarm systems in a more efficient manner. They can design and install new systems based on the data-powered learnings from previous installations. And they can provide a more customer-centric response to information requests or inquiries for system updates.

Most of all, the connection to IoT-based services will provide a new peace of mind: These upgraded fire alarm systems will quietly monitor and secure themselves, and only trigger alarms or notifications when service is needed, while system integrators can focus on more important tasks. Right now, we are building the foundation for making these new IoT-driven services a reality. But compared to what the IoT has is store for the future design of fire alarm systems in buildings, we have only seen the beginning. The biggest benefits are still to come.

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