TRIDIUM

NS2022

ACCELERATING INNOVATION

TRIDIUM

Advancing IoT Technology Brings a Spectrum of New Niagara Applications

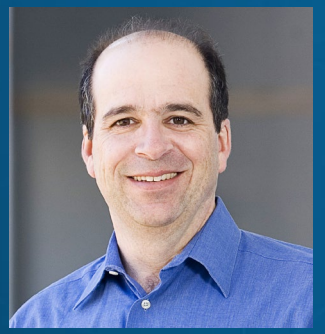
TRIDIUM

Advancing IoT Technology Brings a Spectrum of New Niagara Applications

MODERATOR

NILOTHPAUL DUTTA
Sales leader | Tridium

ALLEN SALMASI
Chairman & CEO | Veea Inc.



ANDY ABRAMS
Founder | EVauto

GED TYRRELL
CEO | Tyrrell Building Technologies Group

NS2022
ACCELERATING INNOVATION

TRIDIUM

AGENDA

- Introductions
- Veea on its 5G and Edge Computing Advancements
- EVauto on Vehicle Charging Application
- Tyrrell Products on Integrating Fire Management with BMS
- Q&A

NS2022

ACCELERATING INNOVATION

CHARLOTTE, NC | APRIL 4-6

5G & Edge Compute

veea™

TRIDIUM

Background: veea™

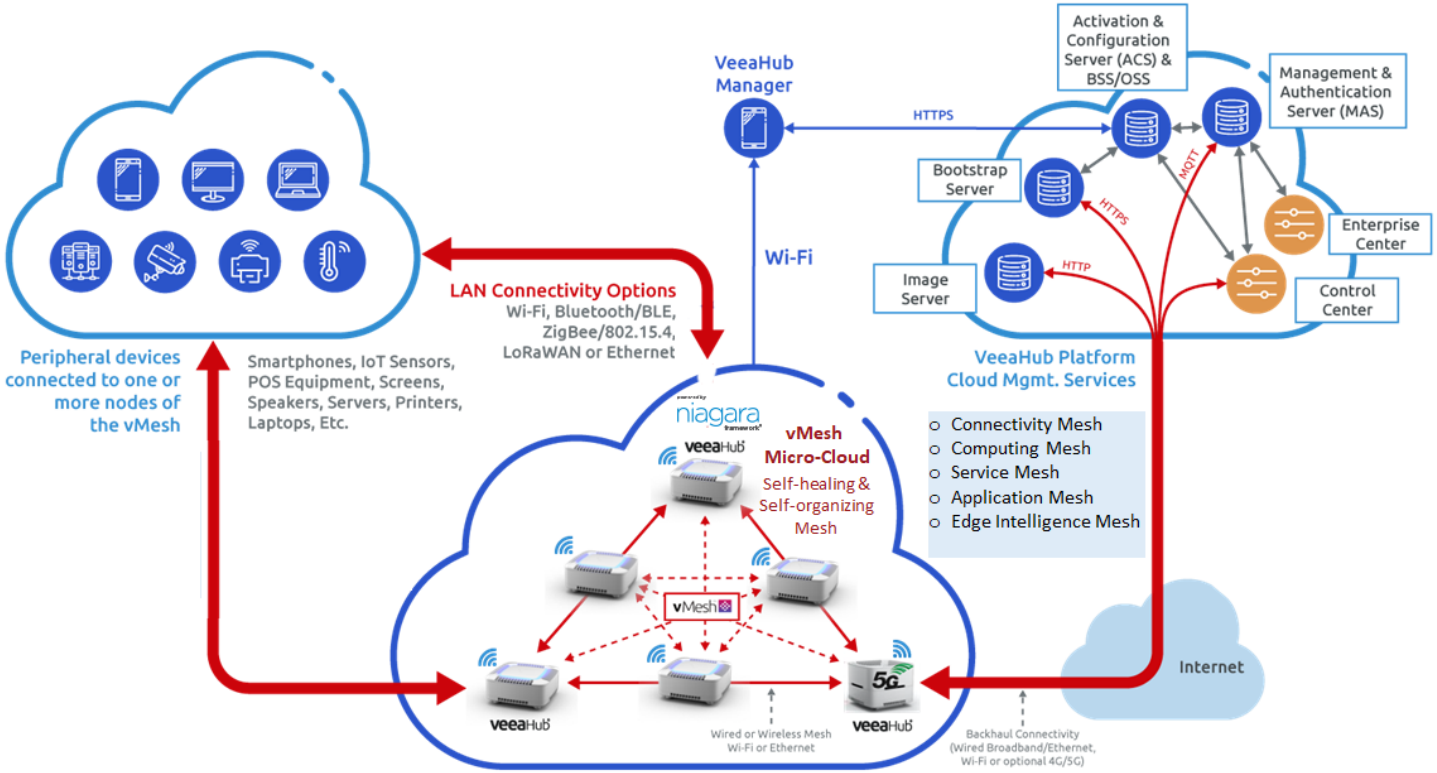
- Expert team that pioneered 2G thru 5G
  - Technology, chipsets, network and device products
- Expertise in hyperconverged networks
- Delivering industry 4.0 smart applications to enterprises

After 9/11 built NYC's largest public safety network. Still evolving technology solutions at this scale and with this pioneering vision – but now with Edge Compute & 5G!

Addressing Enterprise Requirements with Converged Private 5G Networks

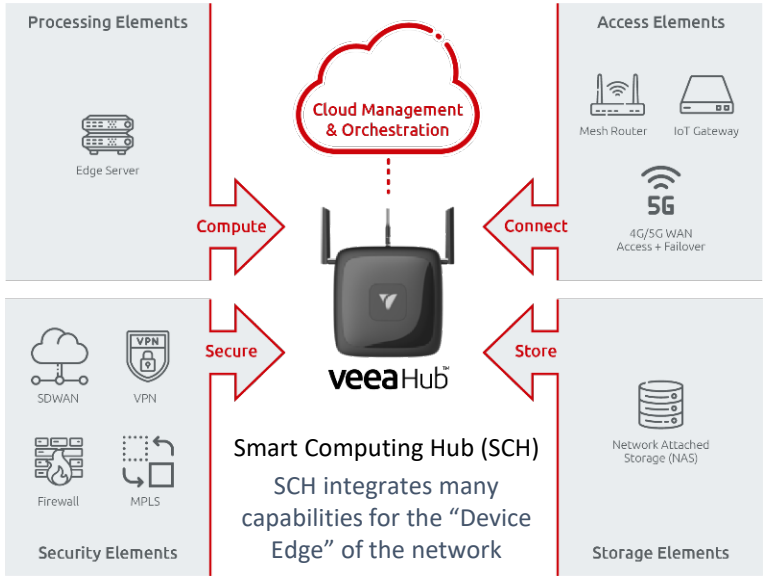
- Many enterprise applications must remain on-premises for business, legal, and technical reasons.
- Enterprise networks that connect these applications to users and devices are straining under increasing workloads.
- A platform solution that combines private 5G network solutions, with distributed edge computing and Wi-Fi / IoT connectivity at the Device Edge, can readily address the enterprise challenges.

Industrial Edge Compute



Substantially Reduced TCO

- ✓ ”Drop & Play” zero-touch installation
- ✓ Significantly less hardware & software to manage
- ✓ Less integration, complexity and maintenance
- ✓ Fewer vendors



- Multiple technologies and solutions highly integrated for the network edge
  - ✓ Full range of wireless and wired connectivity solutions
  - ✓ Distributed “data center” at the edge with virtualized software environment for apps
  - ✓ Up to 2TB Storage per device on the mesh network
- Cloud and local management, control & orchestration
- A highly integrated system that is easier to deploy, Manage, Maintain, Scale, Secure

Indoor Unit with an optional Gigabit LTE or 5G Module | Indoor Enterprise Unit | Outdoor Unit with LTE/5G and/or LoRaWAN Gateway | indoor Unit with LTE and/or LoRaWAN Gateway

End-to-End Portfolio to Enable Smart Spaces

Data Collection and Sensing

Smart Cameras

Third-Party Cameras

Wi-Fi

Infrastructure, Machine and Building IoT Sensors

Business, Social and Operational Data

Edge Processing and Analysis and 5G connectivity

Data Management

Public or Private Cloud

Archive

On-Premises

AI Applications

Video Analytics

Dash Boards

Predictive & Prescriptive Analytics

Geospatial Visualization & Automated Workflows

Data Insights

Smart Spaces

Cities

Retail

Factories

Logistics

Transit

Campus

Stadiums

Airports

Intelligent data operations: Orchestration, Governance, Security, Privacy Protection and Compliance

Significant Private 5G Network Roll-outs In-Building

- In-building 5G coverage delivered from outdoors in CBRS band and higher frequencies will be marginal at best
- Significant amount of traffic generated from inside the buildings
- VeeaHub platform architecture complements private 5G small cell networks by providing a **converged wireless broadband solution** with Wi-Fi 6, edge computing, SDN/NFV, IoT gateway, pre-processing of data for ML/AI, and networking security applications with trusted WLAN along with the following unique capabilities:
  - The Access Gateway (AGW) implementation with a virtualized Evolved Packet core (vEPC) provides for a stand-alone core network functionality at the network edge
  - Enables network services and policy enforcement for private 4G and 5G networks
  - **Network slicing under a single physical IT framework but with multiple virtual network layers to leverage, allowing divided traffic flow into few autonomous groups** while keeping a different set of attributes for each group respectively and meeting a specific set of service level requirements (SLR) pertaining to the application scenario
  - Control Plane integration across VeeaHub vBus and vEPC for a fully integrated multi-protocol implementation supporting the application / service mesh at the device edge
  - Supports Passpoint 2.0

- 5G provides for high data rates (1-20 Gbps), ultra-low latency, high security, reliability and scalability to accommodate the enormous volumes of IoT-connected sensors and devices.
- A private 5G network offers bespoke 5G coverage and greater control of the capacity and the network operations within the private operator's premises. Unlike public 5G, a private 5G network can be reconfigured by its operator to allow different levels of priority access when certain network activities are deemed more business-critical than others. Private 5G networks also allow operators to completely or partially isolate end user devices from MNOs' public networks. This is a valuable security feature that reduces threats by limiting exposure to public interfaces when necessary, such as with personal data, intellectual property, or other sensitive activities.

Addressing Enterprise Requirements with Converged Private 5G Networks

- Many enterprise applications must remain on-premises for business, legal, and technical reasons.
- Enterprise networks that connect these applications to users and devices are straining under increasing workloads.
- A platform solution that combines private 5G network solutions, with distributed edge computing and Wi-Fi / IoT connectivity at the Device Edge, can readily address the enterprise challenges.

Guaranteed Coverage

Remote and underserved areas, Indoor/In-building

Network Control

To apply configurations that are not supported in a public network

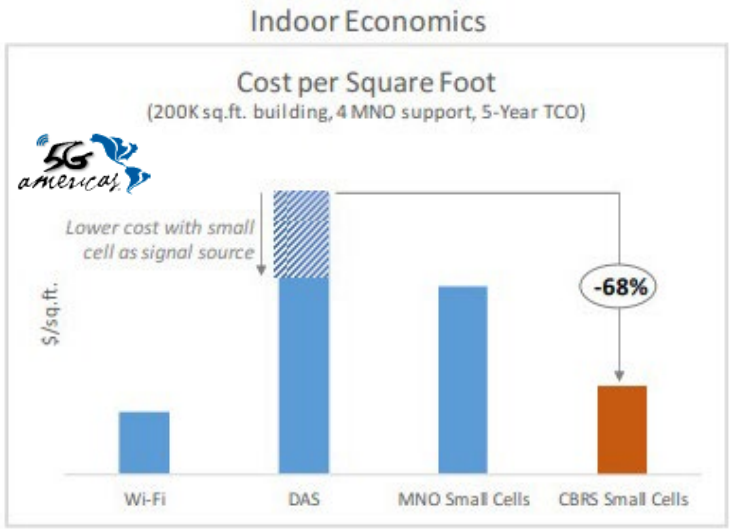
Performance

Profiles that will support demanding applications & QoS guarantees

Security

Identity & Access Management, Privacy & Data Integrity

Why Edge Computing Complements 5G in Unlicensed band?



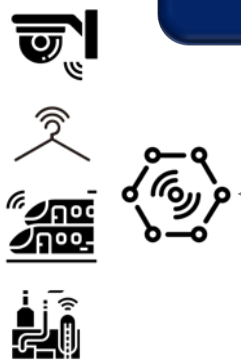
- 5G device COGS, battery life & size
- CapEx & OpEx trade-offs
- Spectrum availability & costs
- RF Coverage
- Local processing with Data privacy (e.g., user data staying local, GDPR)
- High availability for mission critical applications
- Context awareness with fusion of logic for multi-sensor multi-protocol use cases
- More!

- Private 4G/5G networks in unlicensed bands (e.g., CBRS), like Wi-Fi, are isolated from public mobile networks and their performance allows them to replace wired networks.
- In combination with Wi-Fi 6 mesh and IoT connectivity, it offers ultra-low latency, capacity, coverage, privacy and reliable network capabilities required by enterprise customers for wide range of edge device types and use cases.

VeeaHub Platform is Fully Integrated with Microsoft Azure IoT

VEEAHUB PLATFORM SOLUTION CAN BE EXTENDED AND/OR TRANSFORMED INTO THE FULL EDGE CAPABILITY FOR MICROSOFT AZUR IOT APPLICATIONS & DIGIAL TWINS

The combined capabilities of VeeaHub and Azure IoT platforms offers one of the most advanced & feature-rich IoT platforms available today. Together with Qualcomm private 5G network solutions, it offers the most comprehensive and feature rich solution in the market for industry 4.0.



VeeaHub/Azure IoT Gateway

Azure IoT Edge Runtime*

veeaHub

Microsoft Azure Certified

VeeaCloud Services

Azure IoT Hub

Azure IoT & Veea Application Cloud

VeeaHub Control Center (User Interface Dashboard)

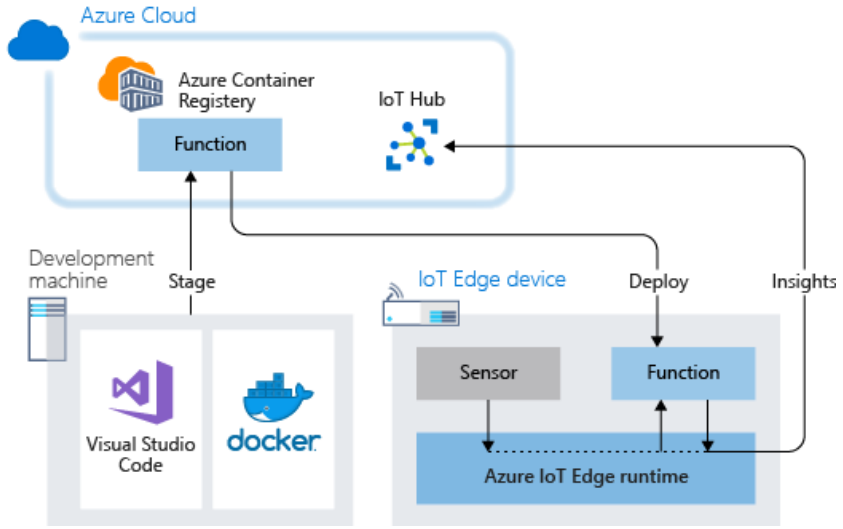
* Incorporates Azure IoT Hub Proxy

Veea IoT & Azure IoT Edge Runtimes

- Moby containers can be instantiated on VeeaHub turning it into an Azure IoT Integrated Gateway/Edge Device
- V-Bus providing connectivity to Azur IoT Moby containers over Wi-Fi, Bluetooth, LoRaWAN, ZigBee with 4G/5G
- Secure Docker container to simplify app development on VeeaHub with dependencies

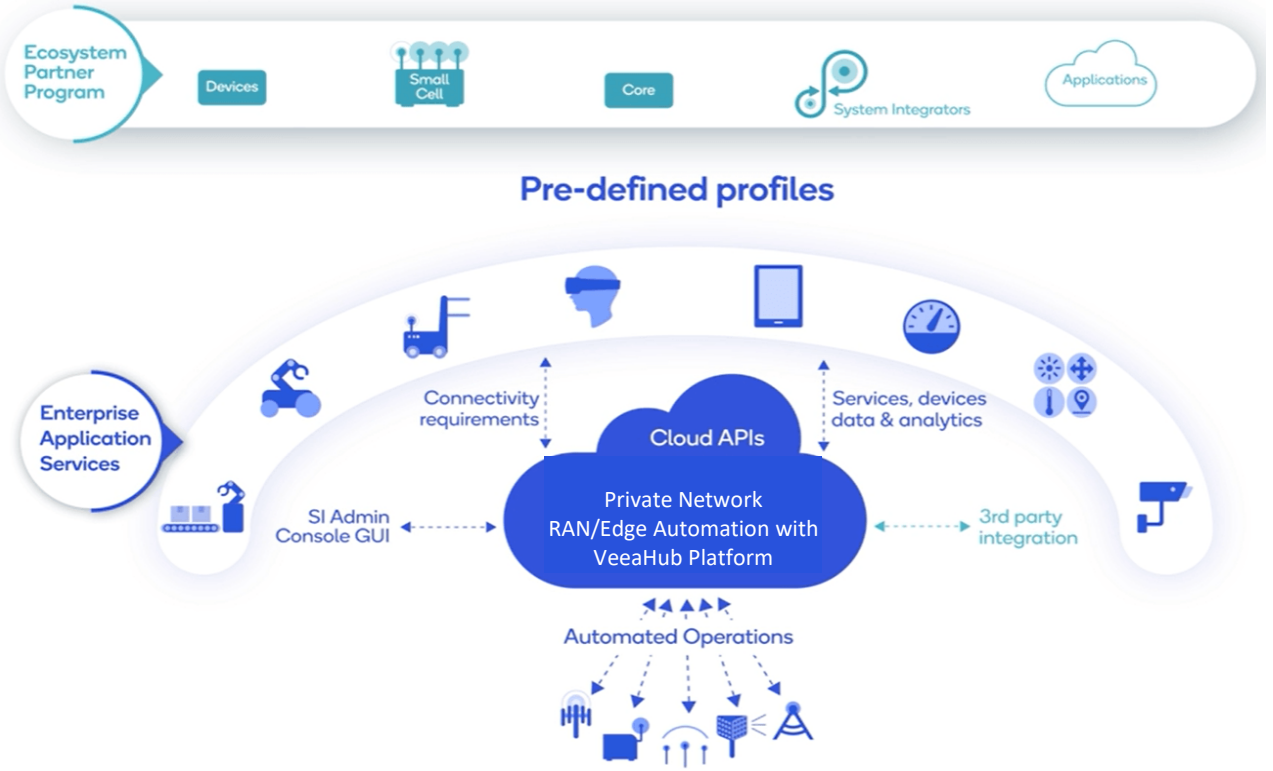
Azure IoT Moby Container on VeeaHub

- Secure provisioning and configuration (Microsoft security framework with on-device hardware security for secure boot and operations)
- Wide-range of device protocols supported
- Enrollment
- Triple-secure identity management with SSO
- Network & Edge Device (VeeaHub) management



Tridium and Veea Collaborations

- Tridium engineers containerized Niagara Framework 4 using VeeaHub Toolkit to run as an application on VeeaHub
  - Currently running full Niagara 4.11
  - Veea solutions support wrapped container with select configurations to facilitate deployment
  - New releases require minimal amount of time to rewrap
- Supporting MQTT, OPC-UA, Modbus, BACnet
- Multiple levels of security:
  - Niagara license
  - Niagara application running in Secure Docker
  - Unique workbench license for every host
  - Deployed app is password protected
  - Single sign-on



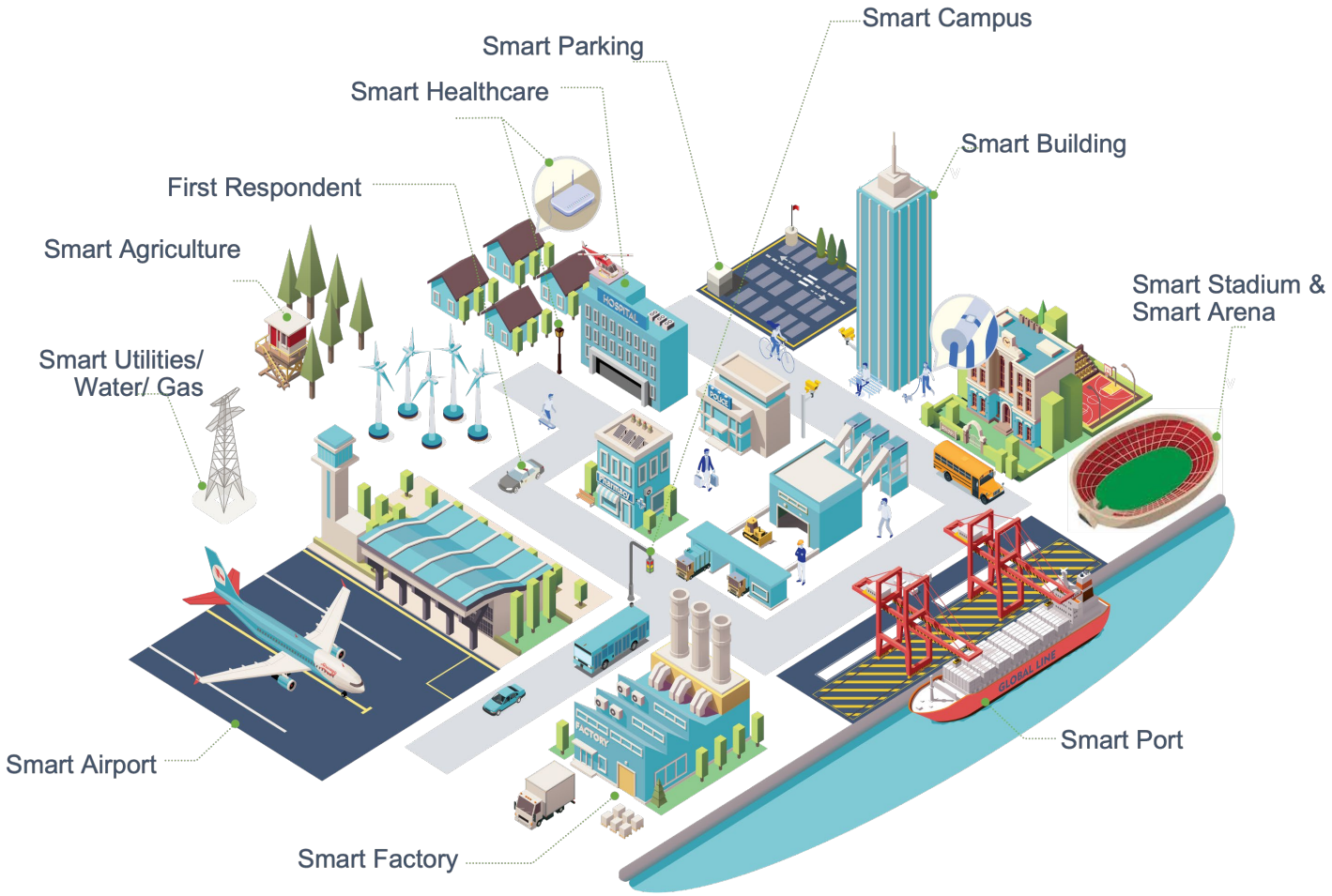
VeeaHub platform offers a one-stop solution for for integration with a multitude of public and private 5G networks

Typical deployment options for 5G networks

Public Network	Public Network with SLAs	Network Slicing (Public Network)
Public Network with Local Infrastructure	Standalone Private Network via Operator Spectrum	Standalone Private Network using Unlicensed or Private Spectrum

Current Target Verticals for Integrated VeeaHub & Niagara 4

- **Smart Campus, Stadium & Building (CRE)**
  - air quality
  - energy use & management
  - smart building controls
  - regulatory compliance
  - reporting & insurance claims
- **Smart MDU**
  - safety
  - security
  - energy efficiency
  - regulatory compliance
- **Smart Agriculture**
  - greenhouses
  - environmental sensors
  - automated real-time management & controls
- **Smart Industrial/Enterprise**
  - warehousing
  - factories
  - tunnels & mining
  - ports & transportation systems
  - large & small retail



NS2022

ACCELERATING INNOVATION

CHARLOTTE, NC | APRIL 4-6

Niagara EV Charge Control

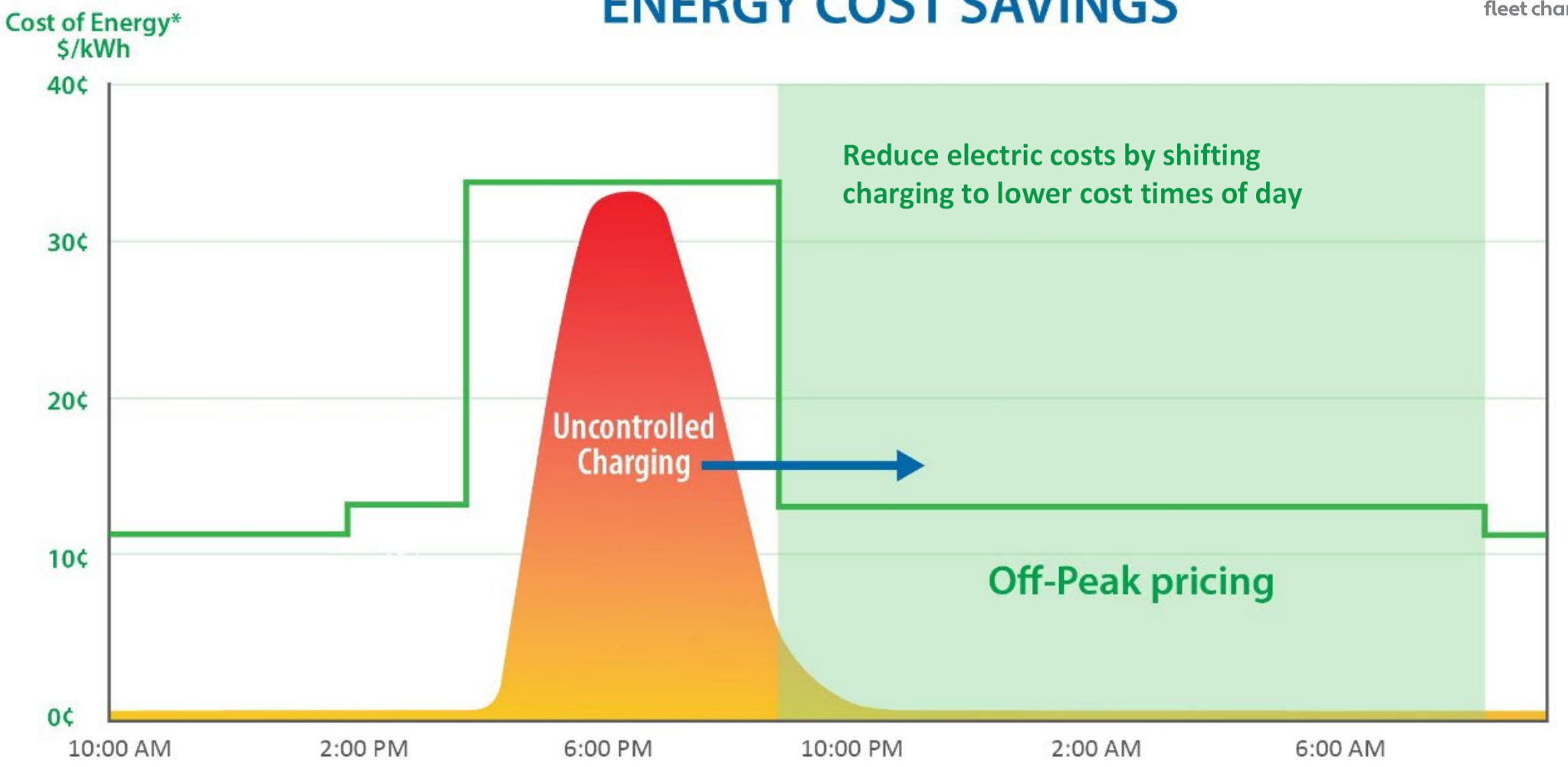
EVauto®

fleet charging control system

TRIDIUM

EVauto®
fleet charging control system

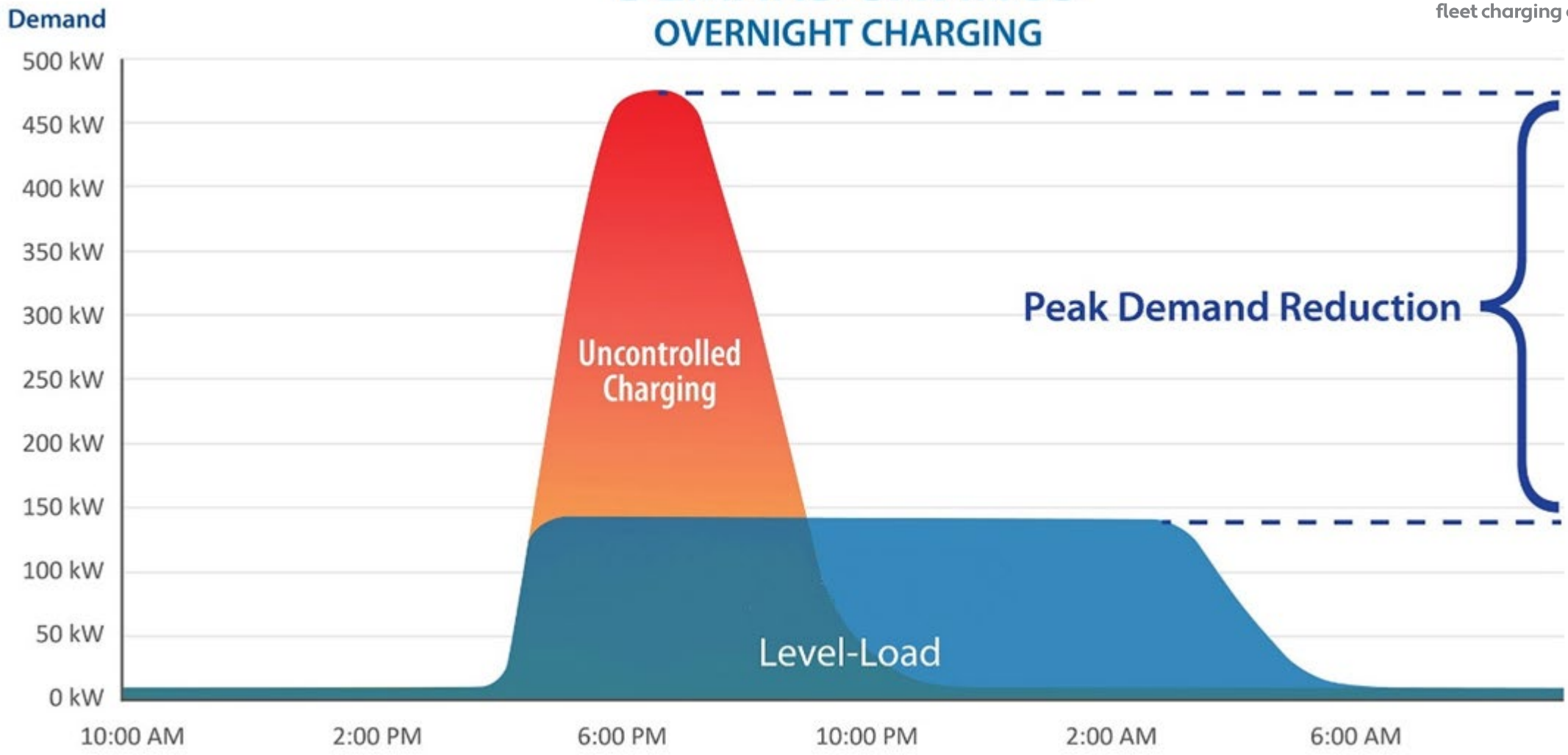
ENERGY COST SAVINGS



*Utility rates shown based on PGE BEV3 2021 rate schedule

EVauto®
fleet charging control system

DEMAND SAVINGS
OVERNIGHT CHARGING



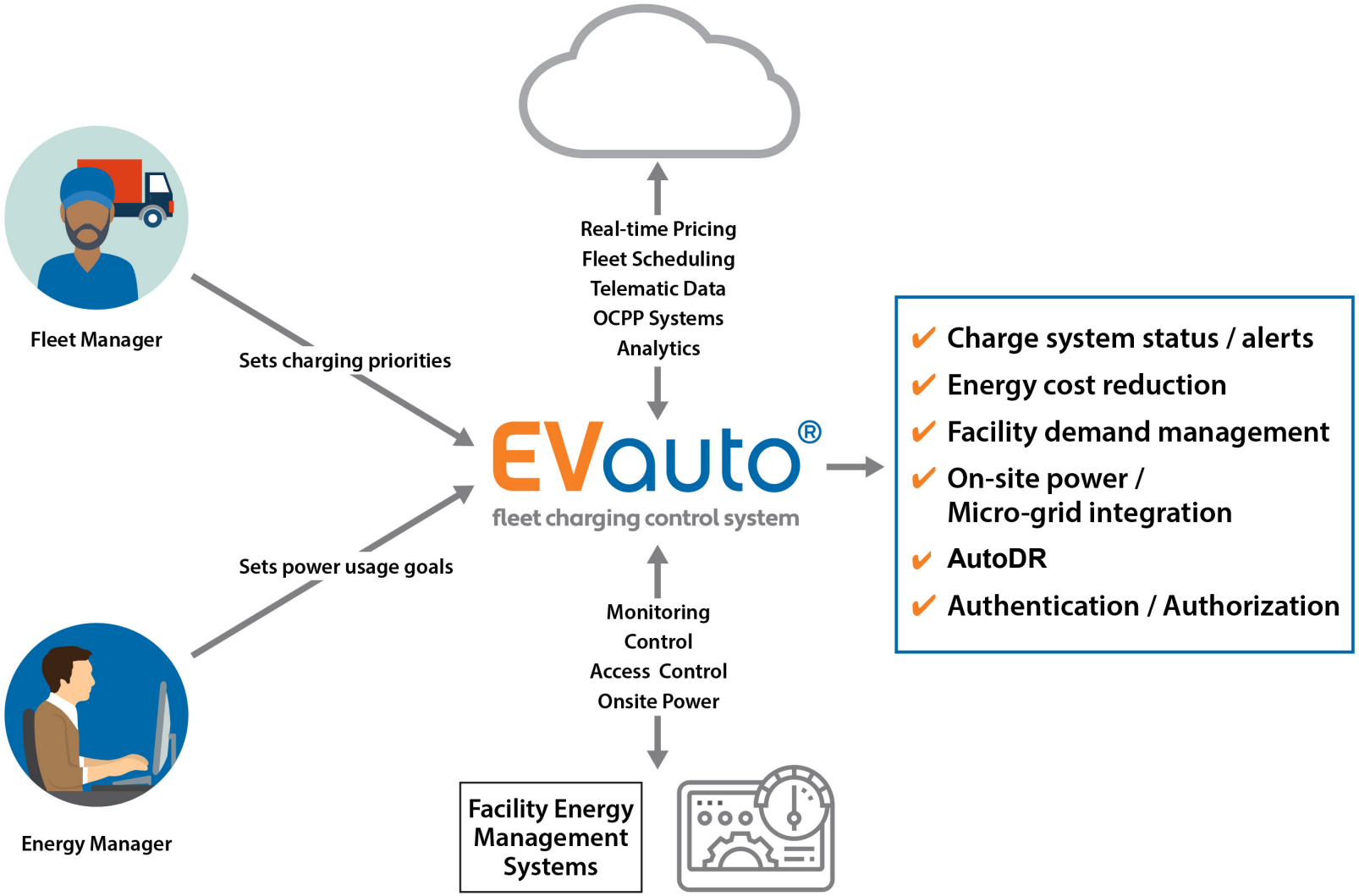
Smart Local Charge Control

Rules engine accepts:

- Managers' requirements
- Facility Metering
- EMS status and control
- User Authentication
- RTP / ADR
- Telematic Fleet Status
- External systems / data

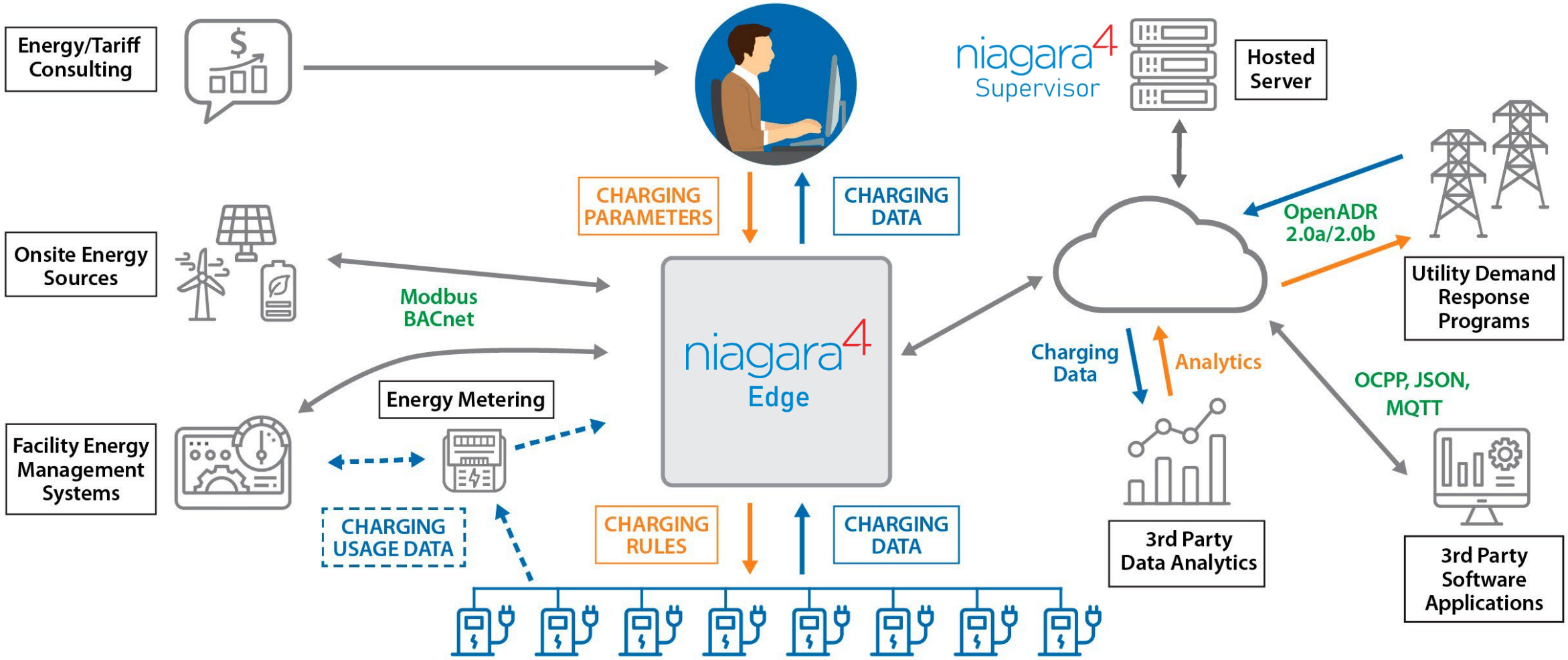
Delivers:

- Significant Electrical Cost Savings
- Control / Authentication / Alerting
- Trending / Analytic Data



Niagara Delivers

EVauto®
fleet charging control system



Opportunities

EVs are coming – soon!

From Oddity to Amenity to Requirement

Grant funds available and more coming

Adoption will expose charging costs

Onsite power / Micro-grid

Control System integrators have expertise

Friends don't let friends buy closed chargers!

NS2022

ACCELERATING INNOVATION

CHARLOTTE, NC | APRIL 4-6

From Across the Big Pond...

tyrrell

Building Technologies

TRIDIUM

NS2022

ACCELERATING INNOVATION

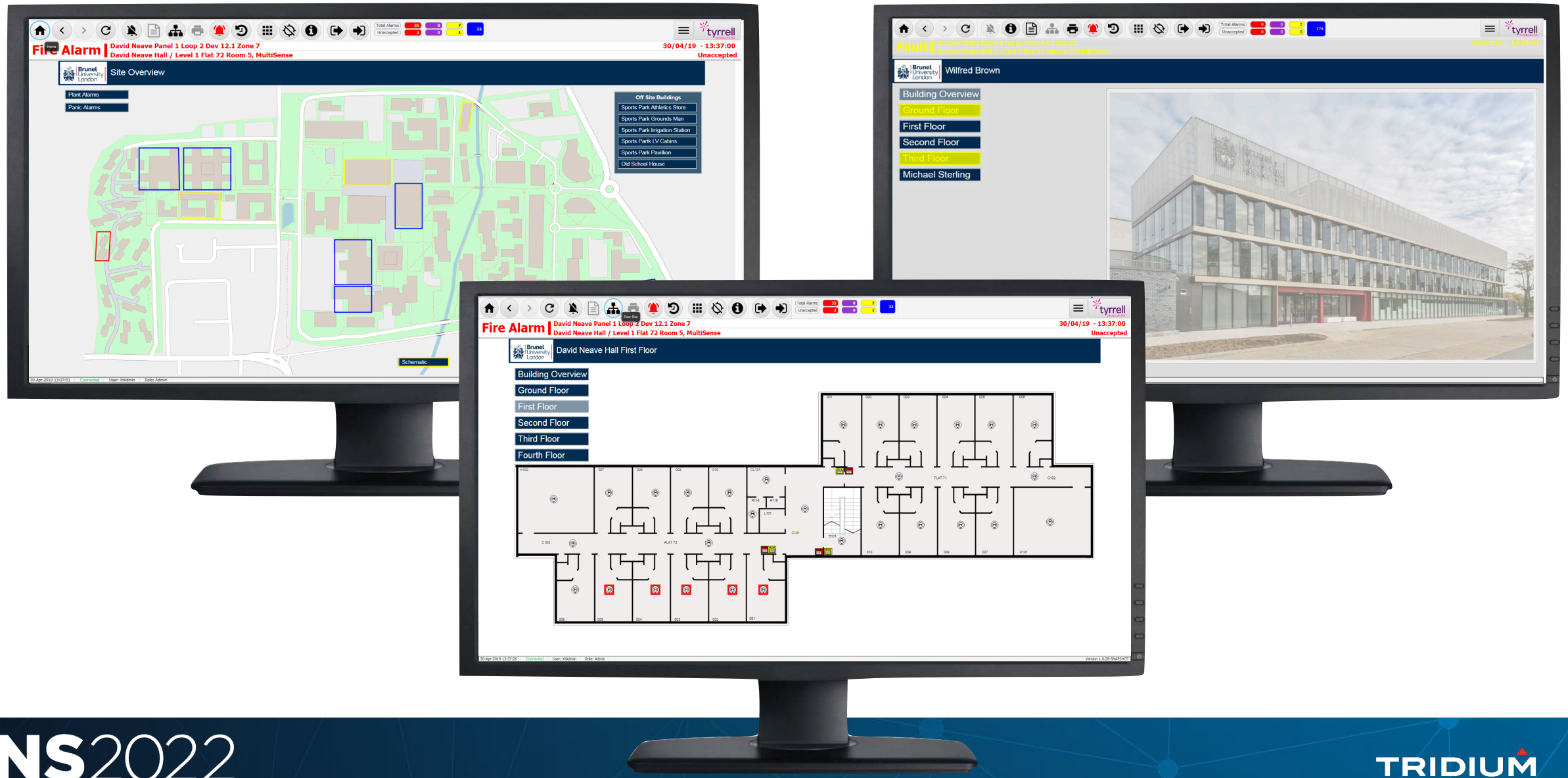
CHARLOTTE, NC | APRIL 4-6

tyrrell

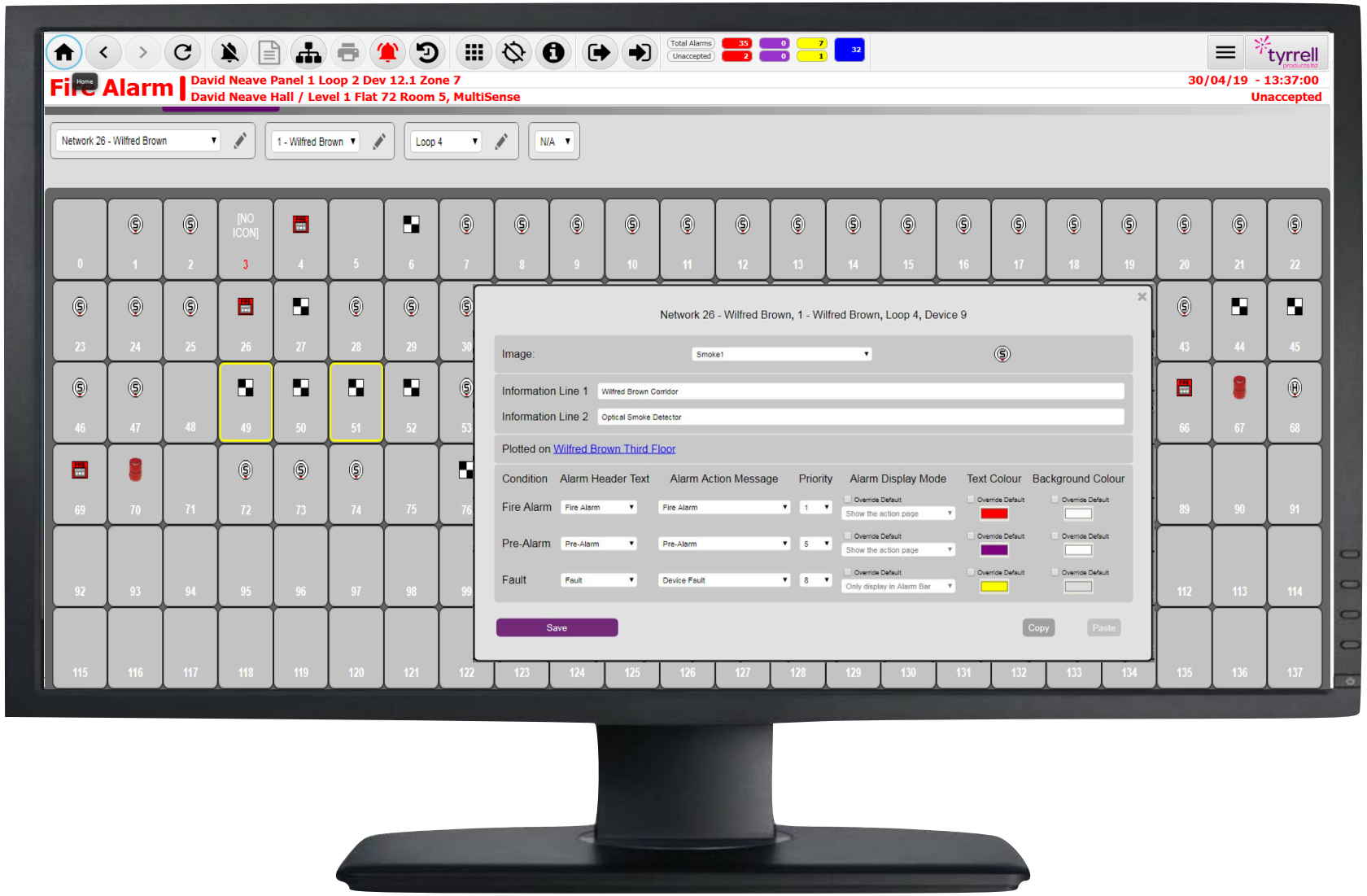
Building Technologies

Emergency Services Applications

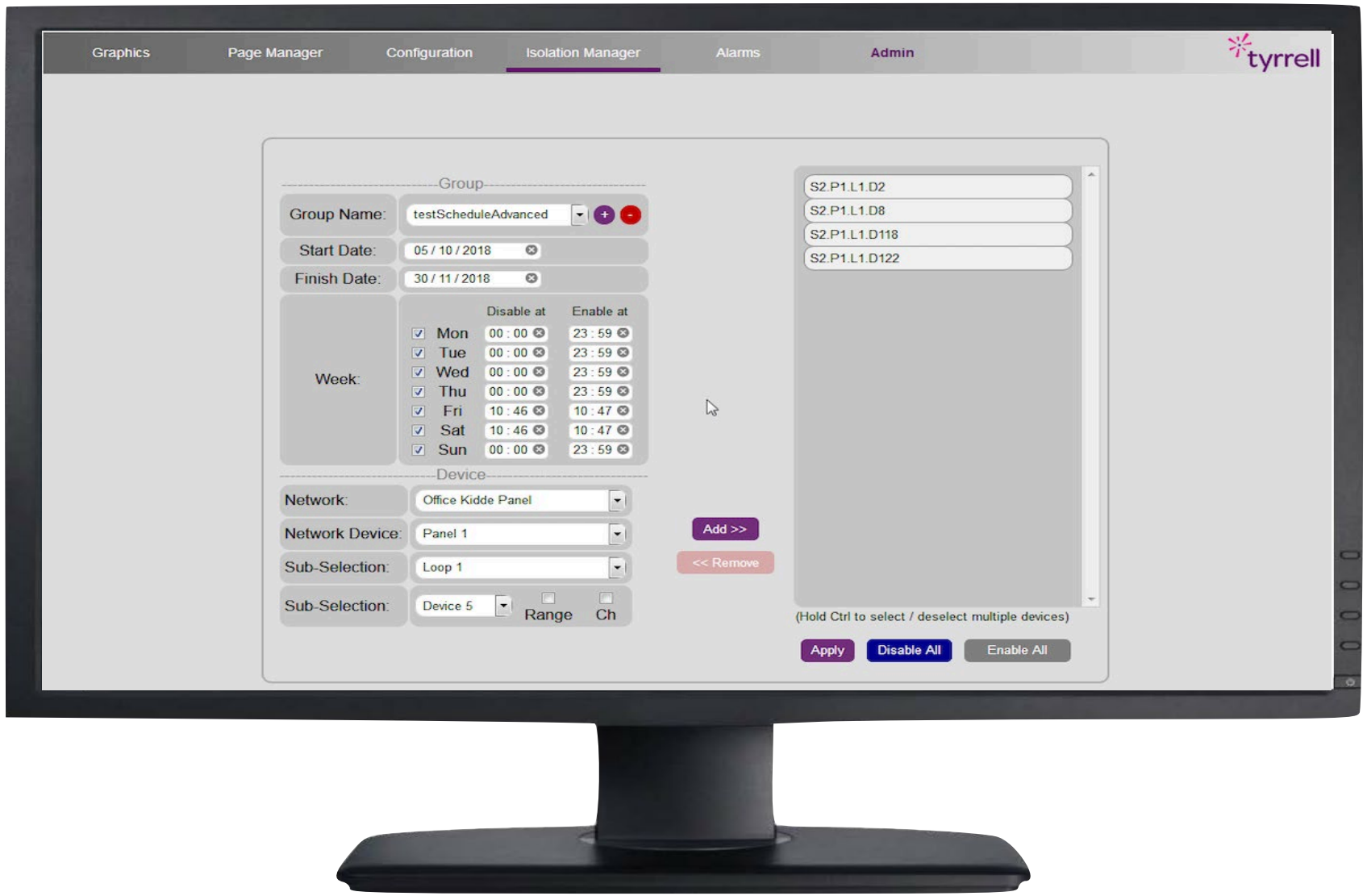
CrossTalk Fire Alarm Management & Reporting



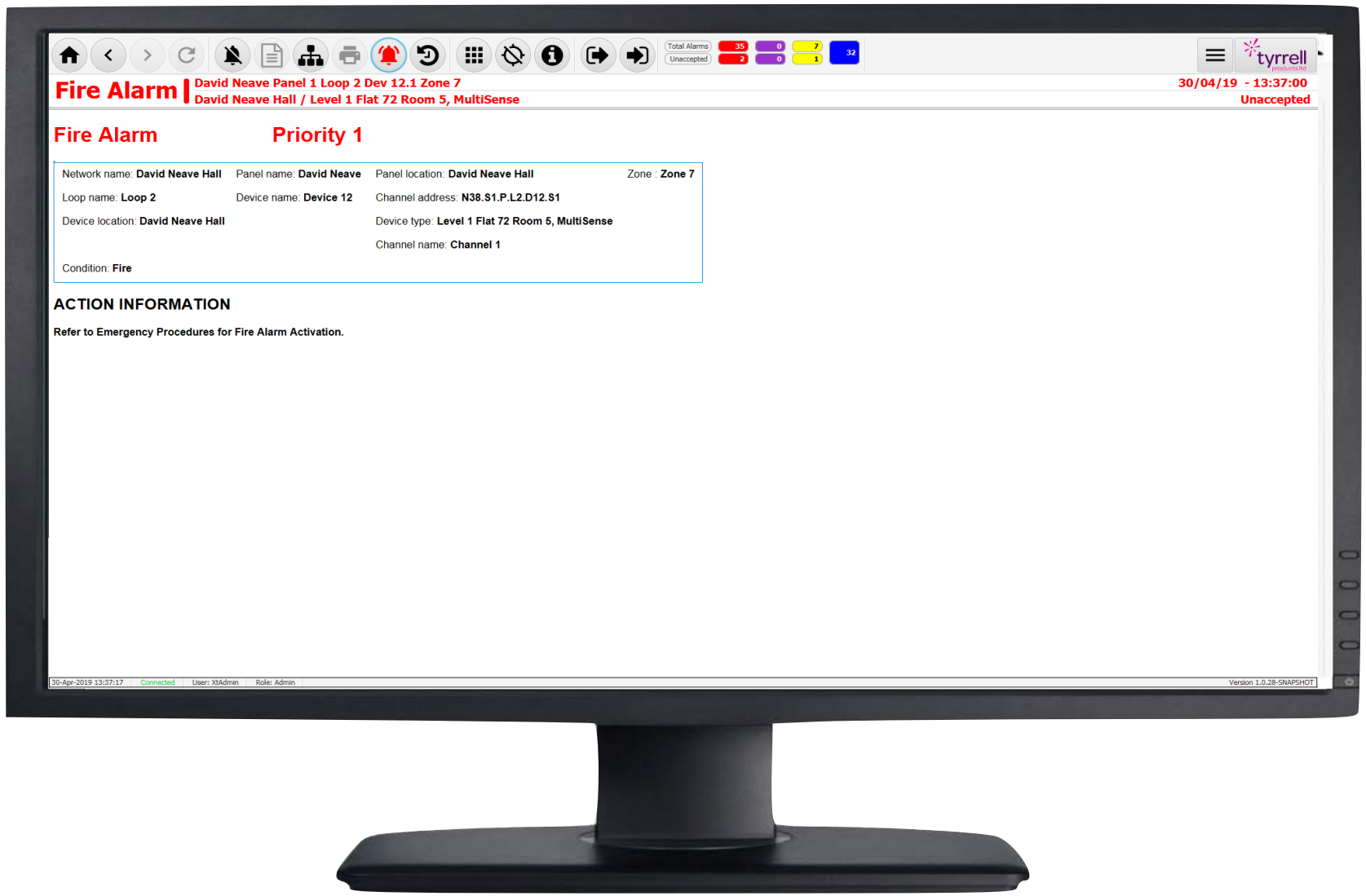
CrossTalk Fire Alarm Management & Reporting



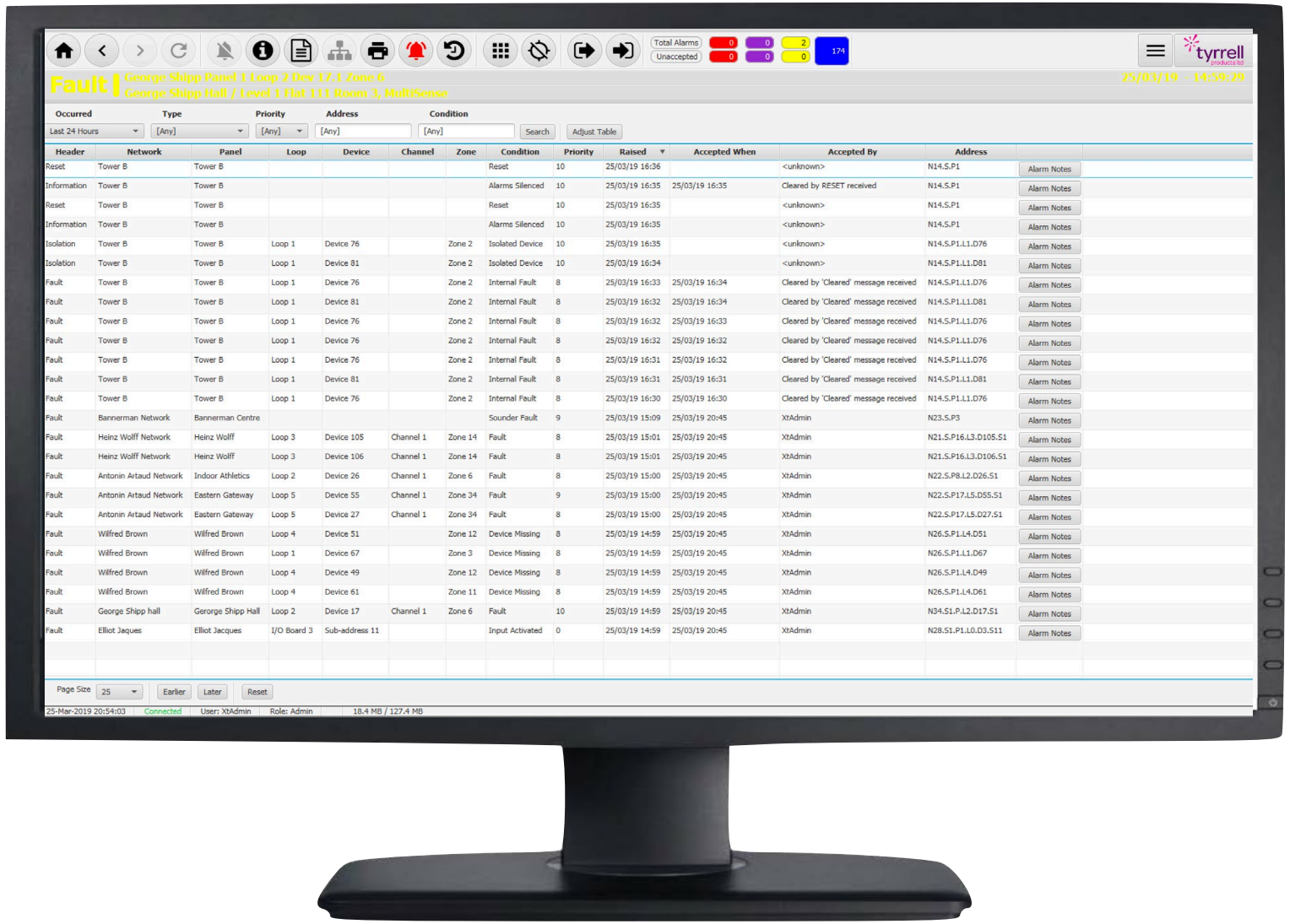
CrossTalk Fire Alarm Management & Reporting



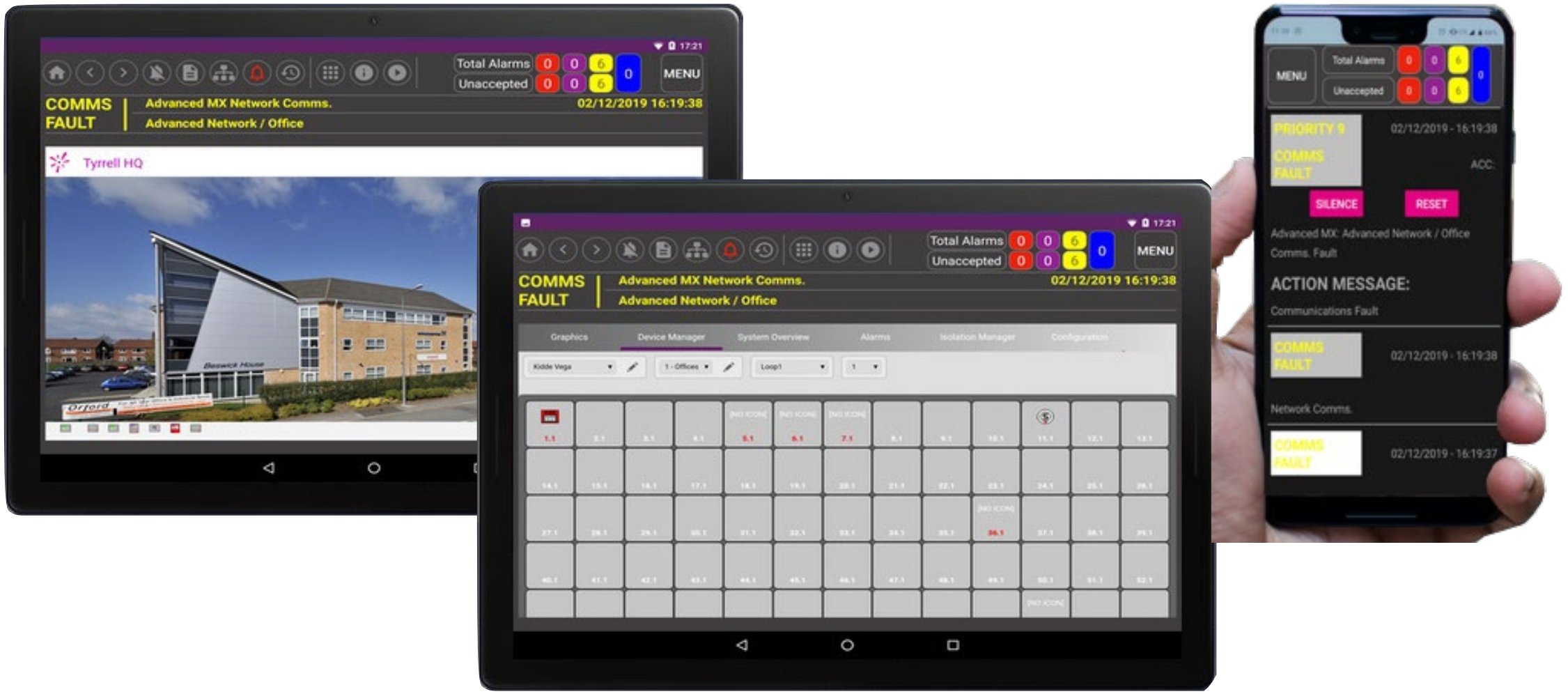
CrossTalk Fire Alarm Management & Reporting



CrossTalk Fire Alarm Management & Reporting



CrossTalk Fire Alarm Management & Reporting



CrossTalk Fire Alarm Management & Reporting

Kidde United Technologies

GENT by Honeywell

ZITON

Kentec Electronics Ltd

Advanced

MORLEY IAS FIRE SYSTEMS

Protec Protec Fire Detection plc

NOTIFIER®

CrossTalk Fire Alarm Management & Reporting

FM Integration

facilio

IBM maximo

PLANON
AIM FOR THE OPTIMUM

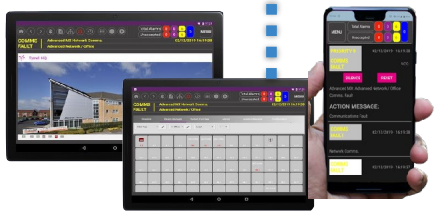
Cloud Services

powered by niagara framework®

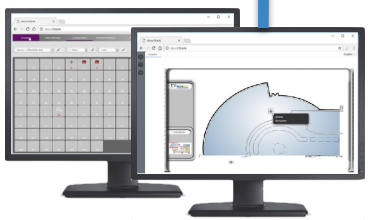
CrossTalk Server with Optional Redundancy

CONTROL ROOM
Dedicated CrossTalk Client Applications For Graphical UI, Alarm Receiving and System Management in Control Room

Local Area Network



Fully Functional Apps or iOS, iPadOS and Android (Requires WiFi Access)



Standard Browser Interface for Graphics, Alarm Review & Configuration

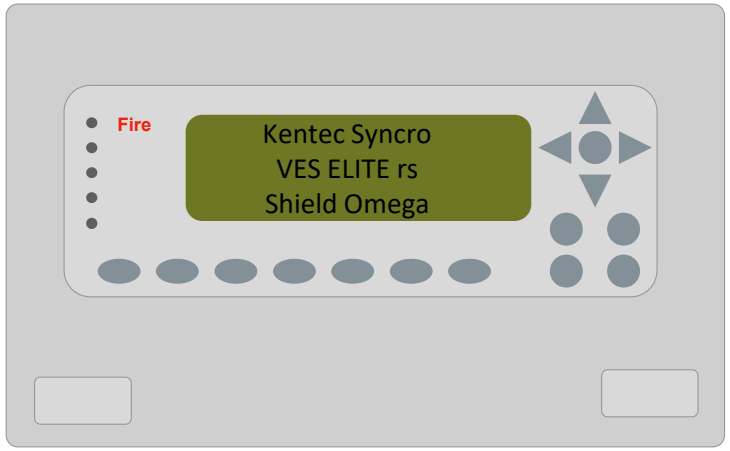
Kidde · GENT by Honeywell · ZITON · Kentec Electronics Ltd · Advanced · MORLEY IAS FIRE SYSTEMS · Protec Protec Fire Detection plc · NOTIFIER®

rEIIO v2

Hard-Wired Monitoring of Hose Reels and Fire Panels

OpenConnect Gateway

Fire Alarm Panel

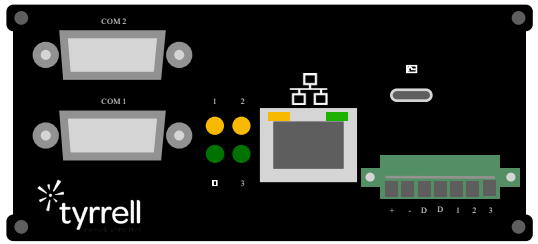


Kentec VES FIRE DETECTION SYSTEMS

SHIELD

RS232
RS485
TCP/IP

OpenConnect Gateway



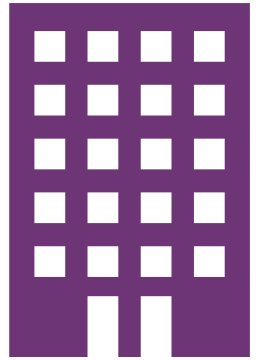
openconnect
powered by
niagara framework®

RS232 / RS485 / IP

ASHRAE BACnet™

Modbus

BMS Output



UAE Fire Monitoring Project

GULF NEWS

EMERGENCIES

October 28, 2018 | Last updated 2:22 PM

Smart fire alarm system links over 1,600 buildings a month in Abu Dhabi

UAE's smart fire alarm project picked up pace four weeks ago

Image Credit: Supplied

The Alarm Receiving Centre at Hassantuk with a giant screen ahead of them to enlarge the location of the fire incident across the country. Pictures supplied by Hassantuk.

Published: 20:16 October 25, 2018
Anwar Ahmad, Staff Reporter

GULF NEWS

Abu Dhabi: More than 1,600 commercial and residential towers are currently being connected each month in the country to the Hassantuk's smart fire alarm system, a senior official of Hassantuk project told *Gulf News*.

Each week, about 400 commercial and residential towers are connected as Hassantuk links up to 65 towers in a day.

Come November, the pace of linking up towers will be stepped up to 150 a day, totalling to 3,750 buildings a month.

So far, 850 buildings were connected to Hassantuk in the country including 250 towers in the Abu Dhabi emirate including Al Ain and Al Dhafrah.

175,000
buildings are to be connected to Hassantuk system by 2021

In October last year, the UAE Ministry of Interior represented by the Civil Defence Headquarters, in partnership with Injazat Data Systems, unveiled Hassantuk, the UAE's smart fire monitoring, alert and control system.

The Alarm Receiving Centre at Hassantuk with a giant screen ahead of them to enlarge the location of the fire incident across the country

It is the region's largest automated integrated system for accelerating both emergency responses and building system repairs to ensure 24/7 public safety. It will connect buildings and facilities across the country to an automated alarm-receiving centre that can request immediate dispatch of emergency response from Civil Defence for fire and other life-threatening incidents.

The system picks up on smoke or any glitch in the fire safety system in buildings and alerts the civil defence's nearest unit to deploy firefighters.

In an exclusive interview with Gulf News, Dr Gordon Head, Operatons Director at Hassantuk in Abu Dhabi, said, "Every day, 60 to 65 commercial and residential towers are connected to the country to the Hassantuk's smart fire alarm system. We link 350 to 400 towers each week."

"Hopefully, from next month [November], we are going to increase the output. We have to connect about 175,000 buildings and will complete it by 2021, in line with the UAE Vision 2021, which aims to make the UAE one of the safest countries in the world," he said.

Linking of buildings picked up momentum four weeks back after surveys, complexities and technical snags in buildings were fixed.

SNAGS IN BUILDINGS

Out of 11,000 buildings Hassantuk surveyed in the country so far, over 80 per cent require repairs as per the Civil Defence's standards to initiate the installation, Dr Gordon Head, Operatons Director at Hassantuk project in Abu Dhabi, told *Gulf News* in an interview.

"In last four to six weeks, we surveyed around 11,000 buildings, of out which we found 80 per cent require repairs to begin installations in them," Dr Head said.

These 80 per cent buildings have different types of issues pertaining to fire alarm panels, alarm and smokes detectors and connectivity as per the standards of the civil defence, he said.

"For this reason, we can't just go and connect any building. We have to make them ready for connections with the new smart fire alarm system. First, we survey the building and ask [the building authorities] to go to their maintenance companies to fix these issues as per the civil defence standards and provide them a snag list," he said.

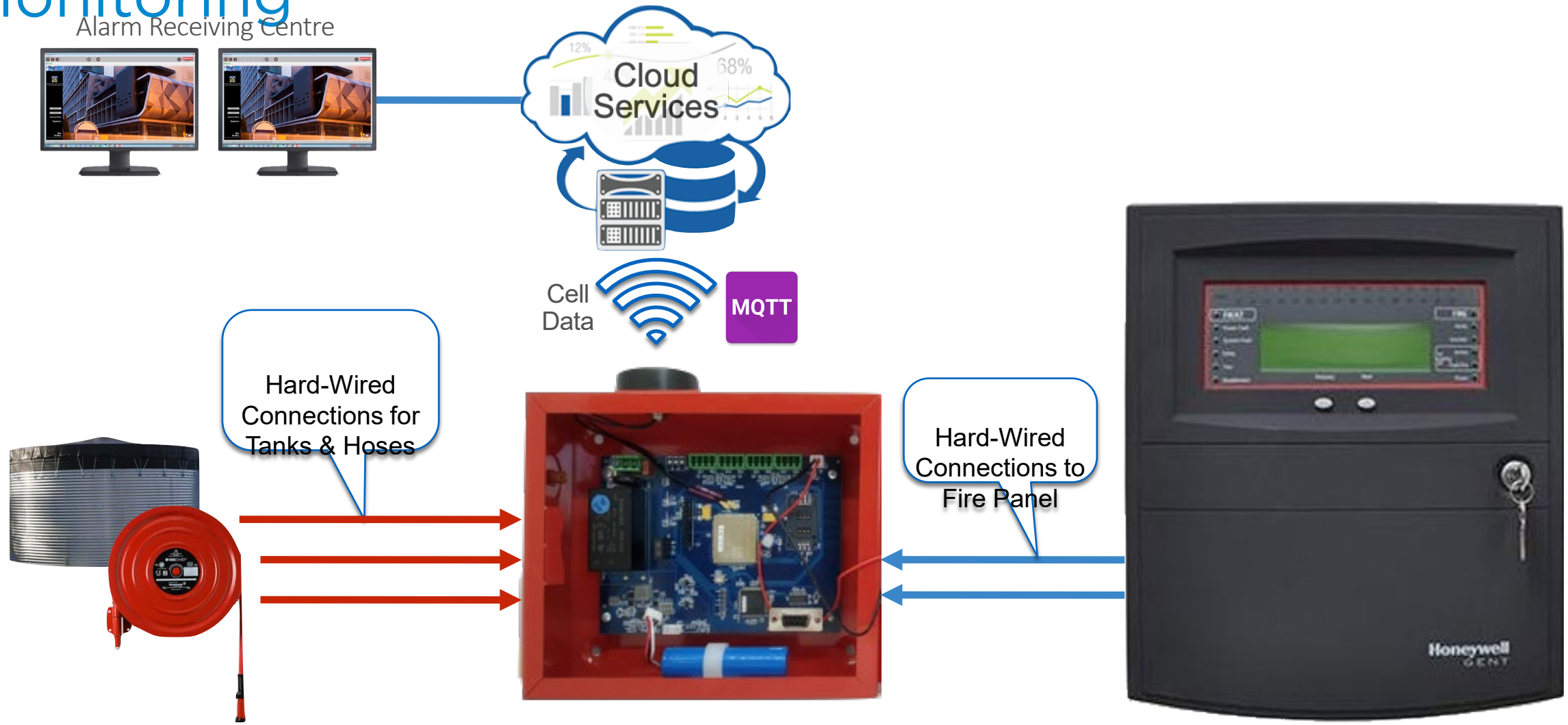
The whole idea is to bring these buildings to safe standards, he said.

Hassantuk produces more than 600 alarm transmissions boxes ready-to-install per week at Injazat. Parts of the equipment are manufactured outside the country but assembled locally.

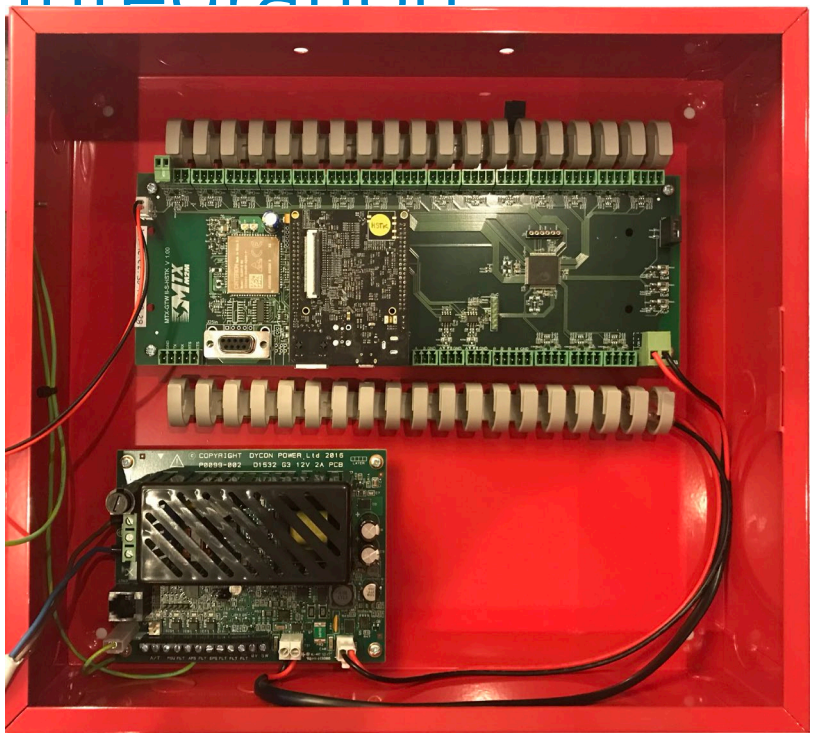
eBMS/IoT-Alert - Small Building System Monitoring

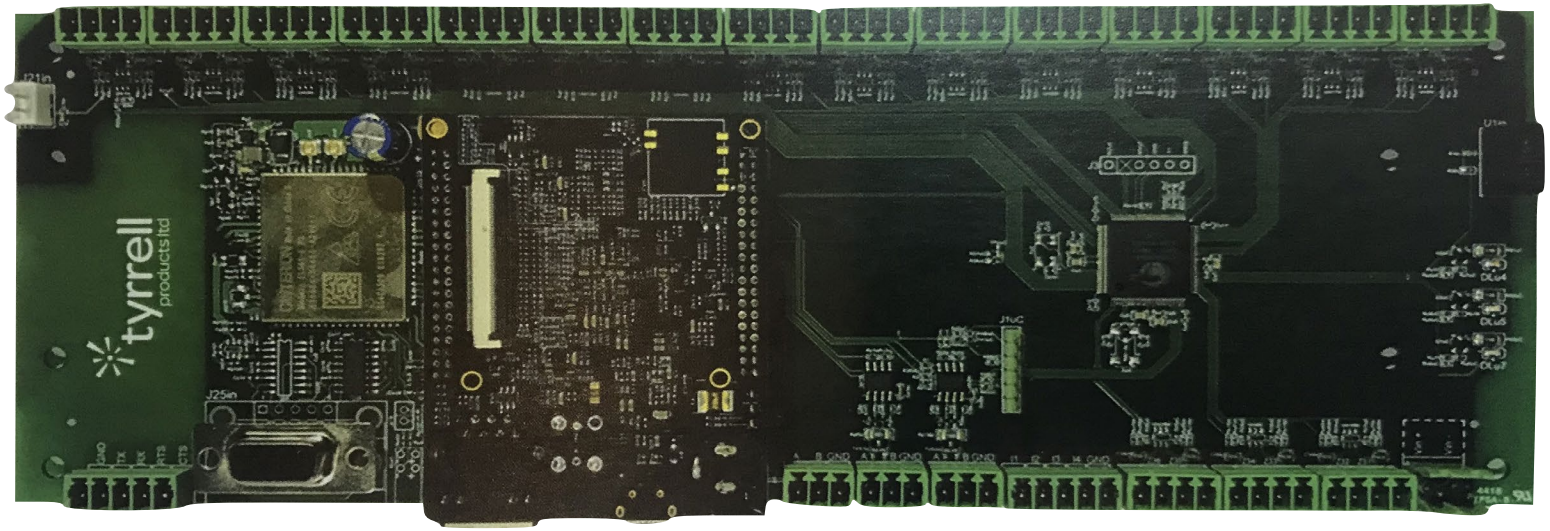
- Onboard 2G, 3G and 4G/LTE
- 8 x Isolated Monitored Inputs
- Dallas Maintenance Tag
- Optical Tamper
- 90-240VAC with 24 Hour Battery
- Steel EN54 Enclosure

eBMS/IoT-Alert - Small Building System Monitoring



eBMS/IoT-Monitor - Large Building Monitoring & Integration

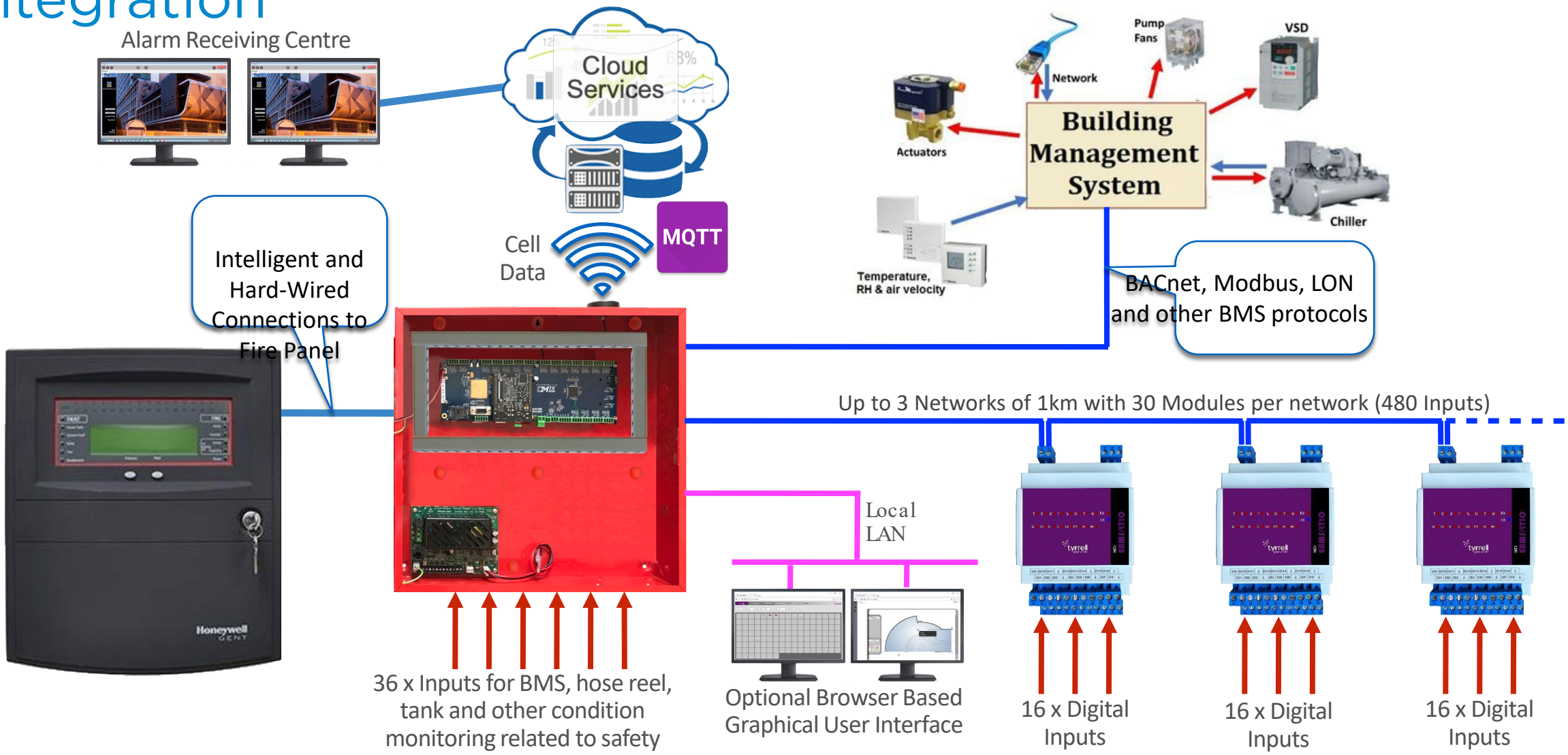




powered by niagara framework®

- Onboard Cellular 4G/LTE with Auto 2G/3G
- Industrial Temperature Support -15 to 85DegC
- Niagara 4.11 with Modem and MQTT Services
- Full BACnet MSTP and LON Support
- 36 x Monitored Inputs and 3 x PSU Monitoring DIs
- 2 x Isolated RS485 Ports, 1 x Isolated RS232
- Dallas Maintenance Tag
- Steel EN54 Enclosure

eBMS/IoT-Monitor - Large Building Monitoring & Integration



NS2022

ACCELERATING INNOVATION

CHARLOTTE, NC | APRIL 4-6

THANK YOU!

TRIDIUM