



**Accelerating OT and IT convergence  
by Normalizing Data at the Edge**

# Agenda

- Why are we talking about the Edge?
- Challenges at the Edge
- Solutions from Open Source and IOTech Systems

# Why are we talking about the Edge?





## Embedded Compute laid the foundations

- You've probably walked by embedded compute all day – its in most stores, buildings, factories, airports, airplanes
- Nearly any system with any moderate complexity has been designed with automation systems over the past decades
- Decades for vendors to specialize, lock-in and mostly make you forget about them

# The Cloud invented the edge

- Over the last 10-15 year organizations have been transforming to become cloud-centric and data-centric
- Cloud-centric: While it started with dynamic workloads and optimizing infrastructure spend, organizations have come to love the manageability and delegation of cloud compute.
  - We've seen an intentional effort from IT departments to move on-premise equipment to cloud-based deployments
- Data-centric: The other shift is that organizations are becoming more data-savvy, and after finding the easy data solving the easy problems, they are now casting a broader net, looking for ever more data
- And so it is from the view of a cloud-centric team trying to collect and analyze data that we see the "Edge" as that horizon way over there
- The edge is the place where the data comes from, or more specifically, the place where we invest in compute technology to act on the data
- And our factories, buildings, transportation, and production facilities are full of data

# Finding your Edge

- Can you simply bring all of your data to the cloud?
- How much does that cost?
- How long does it take to get an insight-based action back to the edge?
- How reliable is the communications path between the data and the compute?
- Can you deploy your analytics at the source of the data?







## Usually the edge is way over there

- It is through answering these questions that most teams will decide where their edge exists:
  - Compute that is close enough to the source of the data, where the cost of the infrastructure justifies the trade-offs from the questions and answer above
  - The edge may be in a regional warehouse, or a telco base station, or a utility pole, or even the back room of the gas station. Everybody's edge is different
- But a fun new example is a grid-scale battery farm:
  - Thousands of battery cells that need to be monitored with sub second frequencies
  - Low latency control decisions required
  - Long term historical data storage to monitor performance
  - Usually in places people don't work

The Edge is a new perspective on where and why we deploy compute

# Challenges of the Edge

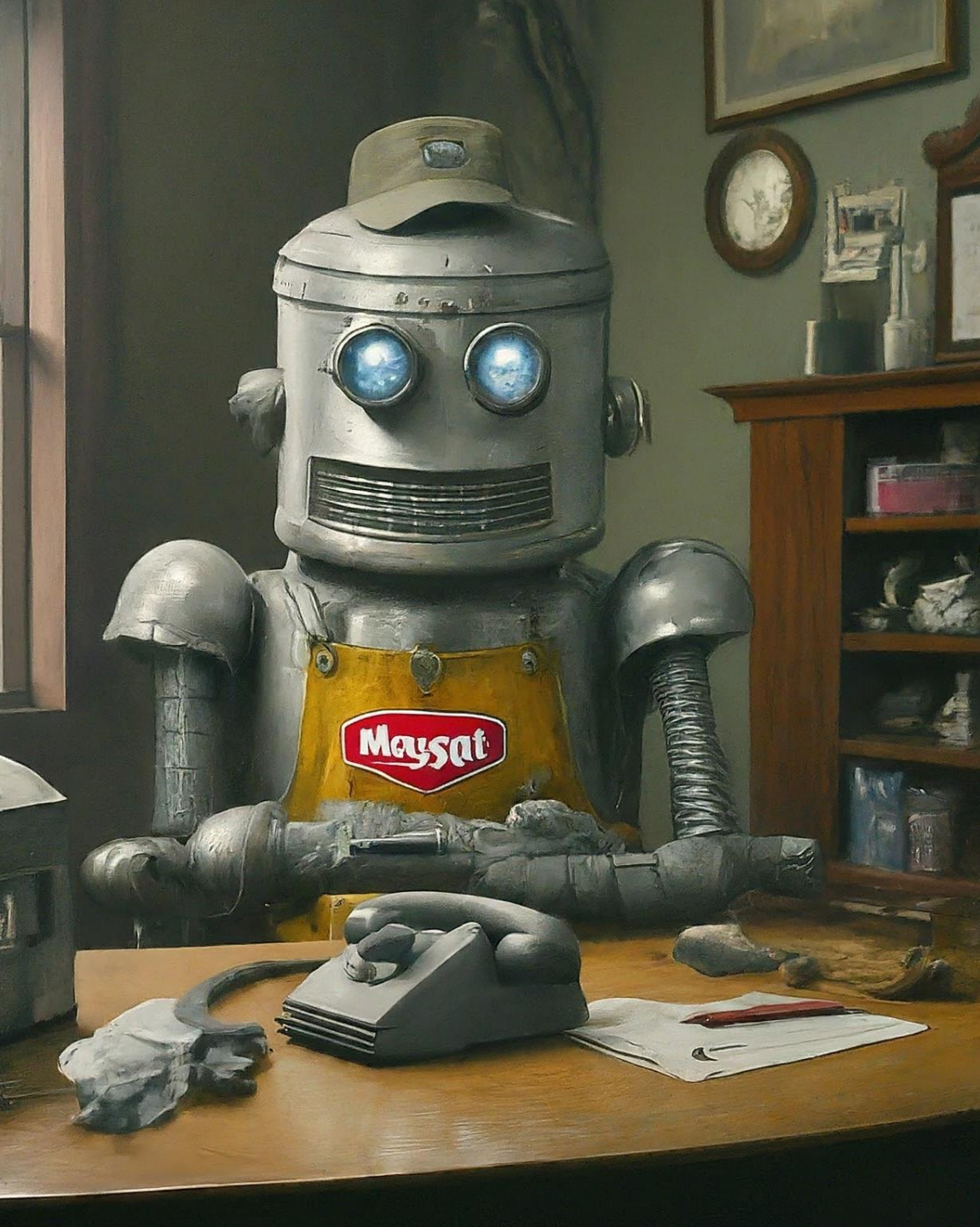




# Technology Transitions shaping IT

| From                                | To  |
|-------------------------------------|---|
| IT Assets like Servers              | Virtual Machines, Microservices, Cloud-Native |
| IT Assets Like PCs and Laptops      | Cloud managed iPads, Virtual Desktops,        |
| Productivity Applications, ERP, ERM | Cloud hosted services                         |
| Embedded Compute                    | The Edge                                      |

Wait, what? →



## The Edge is an Opportunity to Replace Embedded Compute

- It's no exaggeration that the world still runs on Windows (and often old windows)
  - ATMs, Building Management Software, Industrial Control PCs, Store Controllers, etc
- So as embedded computing first became the Internet of Things, and now becomes the Edge, there is an energy to follow the same transitions the other IT sectors are following
- For example, Cloud Native software practices like:
  - Containerization
  - DevOps Teams and continuous deployment
  - Platform Engineering
  - Orchestration (Docker and Kubernetes)
  - Event driven architectures
  - AI dataflows and data architectures

# Conflicting Needs

Cloud Native is about deploying compute infrastructure, with automation at scale, across clean virtual environments

Embedded compute is geographically distributed, each site is different, each edge has unique custom configurations, technology is varied and inconsistent

We build teams that share knowledge, move fast and break things, and play with the newest technologies

We have built entire departments and vendor relationships focused on preventing any change and never having any downtime

In fact we try to never change anything once it is installed

I don't even know if we can retain that kind of talent

## Multiple Vendors and Multiple Protocols

- Legacy deployments with 10s of vendors, well negotiated service contracts, and teams built
- Deployments have 100s to 1000s of devices *per site* that need to be connected and configured
- Plus a lack of interoperability standards leads to high integration costs, data silos and hidden data

The result:

No crossing of the data streams



The data is there, its just trapped behind decades of vendor lock-in, organizational inertia, and again technologies

# Solutions At The Edge



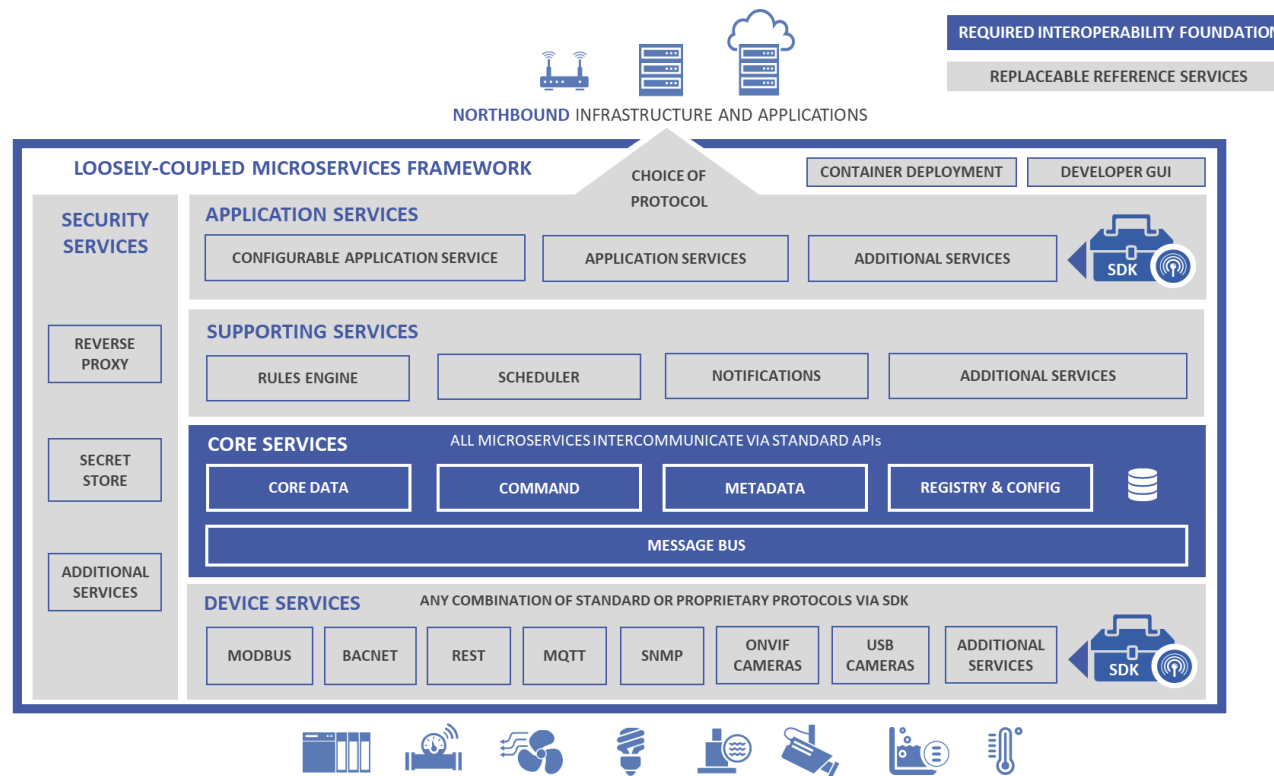


# EdgeX Foundry Snapshot

- An open source, vendor neutral project and ecosystem
- Normalizes data formats, data acquisition and device control
- Project Aim – To become the Global standard for Open Edge Computing
- A microservice, loosely coupled software framework for IoT edge computing
- Inspired by cloud and modern IT architectures



# EdgeX Architecture & Key Tenets



- **Platform agnostic** Hardware, OS, distribution/deployment, protocols/sensors, cloud and Application
- **Extremely flexible & Scalable** Plug and Play at the Edge
- Reference implementation services but **encourages best of breed solutions**
- **Data Normalization at the Edge** supports multi vendor mix and match at the edge
- **Flexible Intelligence at the edge** deploy any AI, ML or Rules
- **Supports brown and green device/sensor** field deployments
- **Must be secure and easily managed**



# EdgeX – Global Governance

Technical Steering Committee 2024-25



### 3 Adopter Patterns

Three popular adoption patterns appearing

- Adopters are using to standardize internal innovation teams
- Adopters are using to standardize how product teams deploy services into end user environments
- Adopters are using to standardize across industries and vendors

Reasons are consistent:

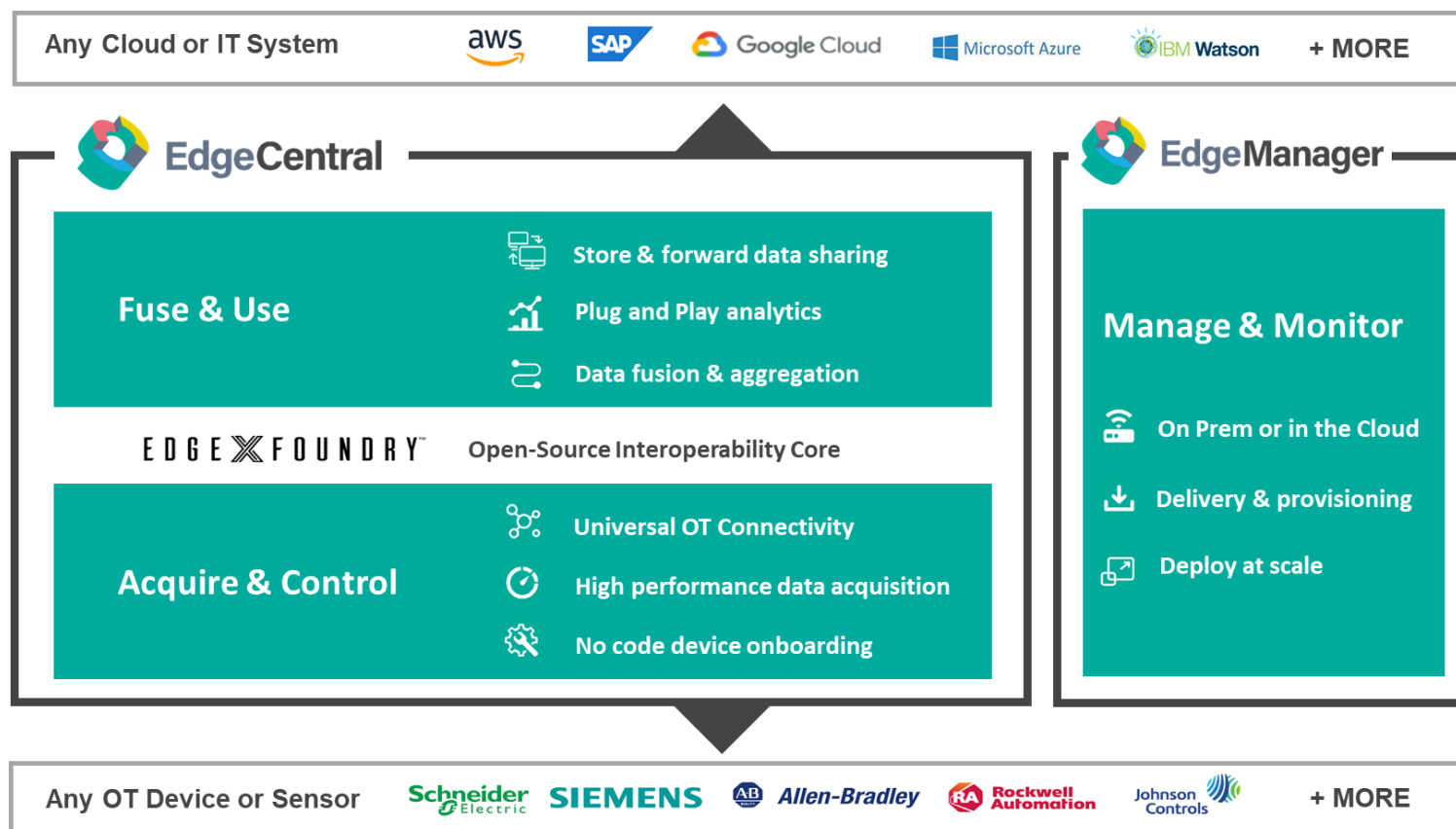
- Normalizes data structures and formats
- Creates standards for integration, APIs, services and buses
- Speeds integrations across protocols
- Reduces overall infrastructure spend and reduces technical debt





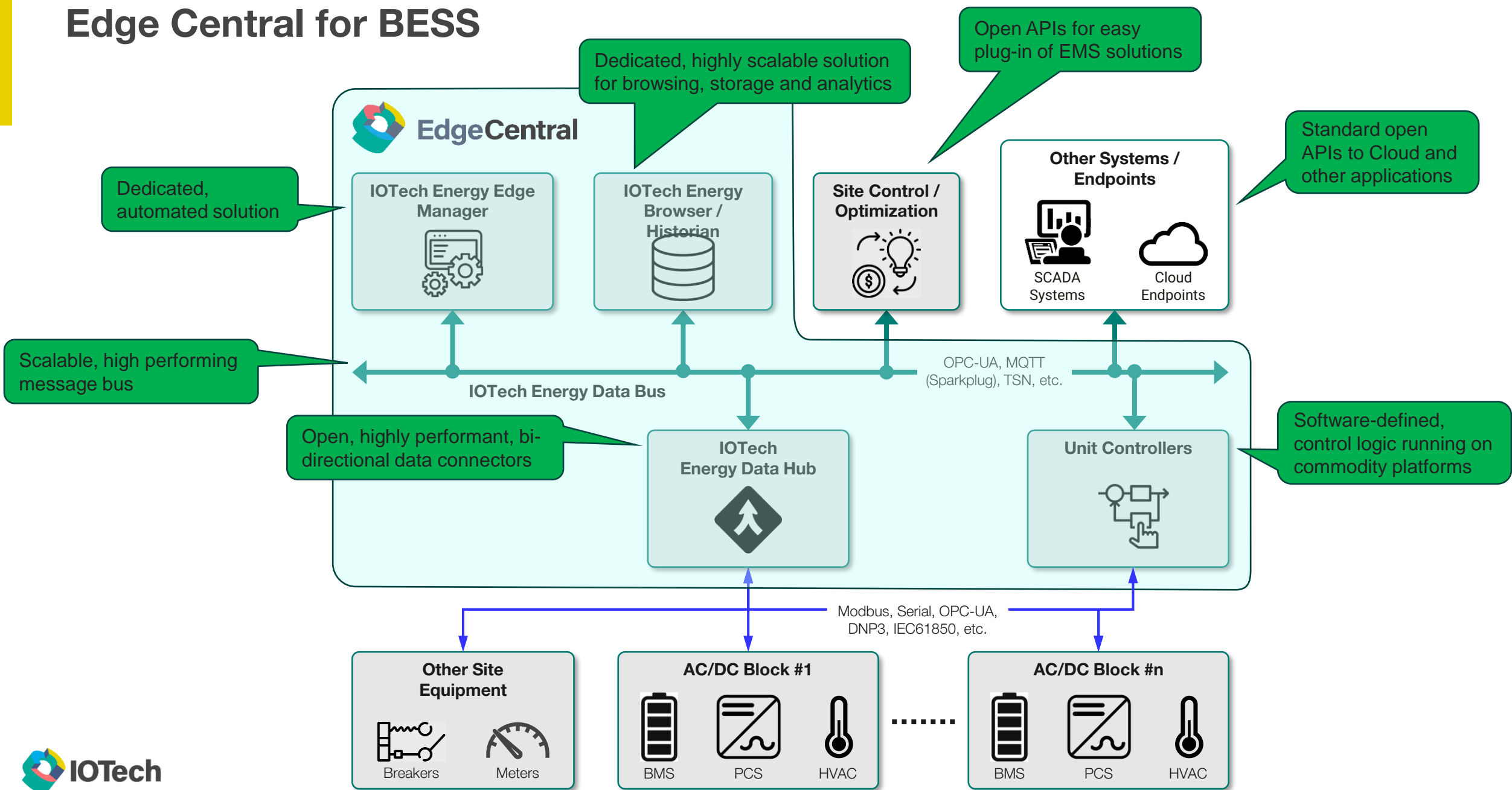
# IOtech Edge Central – Industrial Grade EdgeX (and more)

- Our Edge Central offering based on the EdgeX LTS release
- Edge Central – A range of Industrial grade fully supported EdgeX complementary OT software products
- The leading industrial grade Open Edge Platform with EdgeX at its core
- IOtech addresses the needs of major corps who want industrial grade product support for deployment at scale
- 100% compatible with EdgeX, 100% superset of LTS codebase
- Ensures application compatibility and extensibility with EdgeX API-based integrations





# Edge Central for BESS

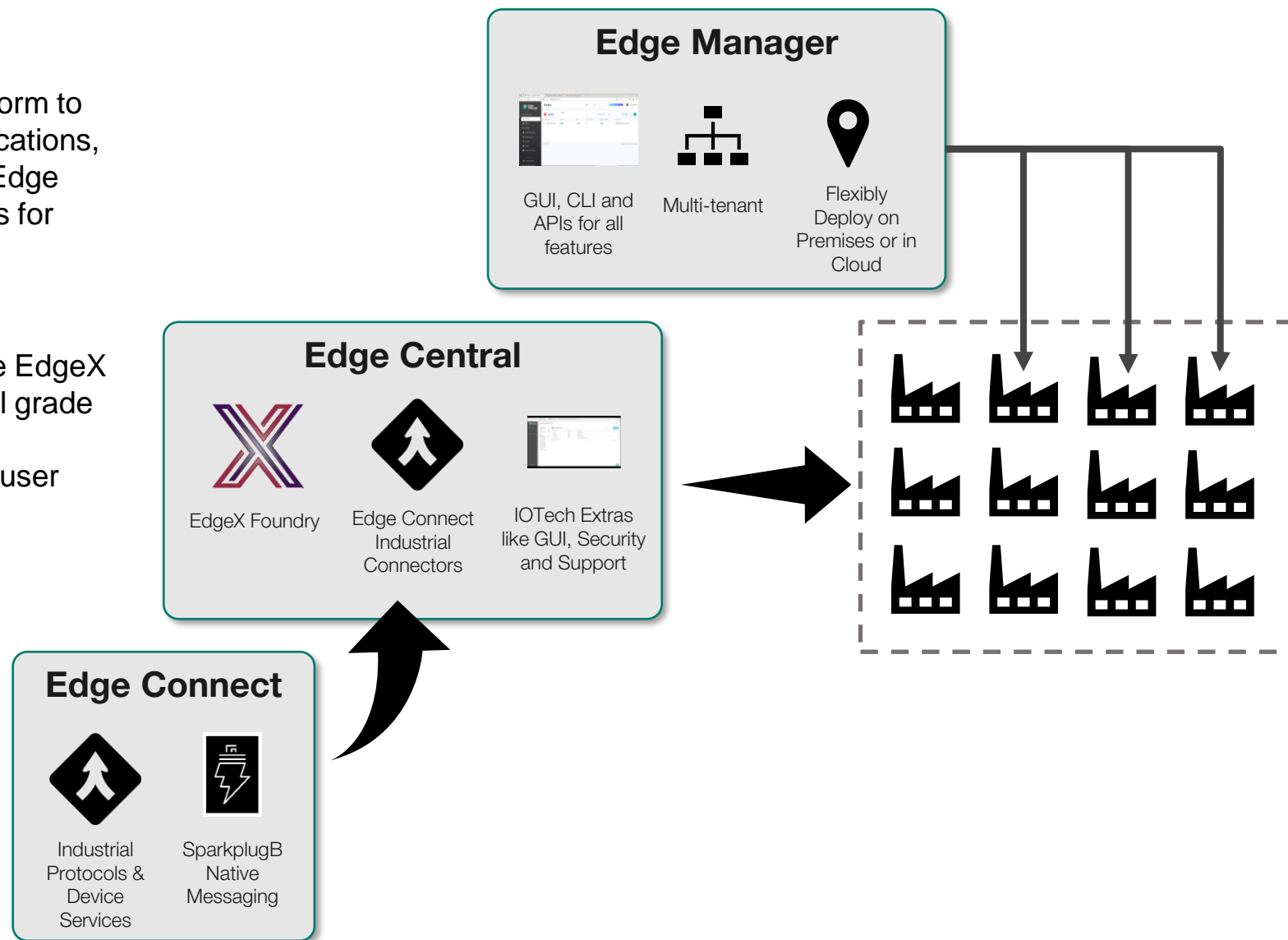


# IOTech Products from Connectivity to Management

**Edge Manager** provides a scalable platform to manage thousands of edge nodes, applications, containers and configurations. Built for Edge Native users, solves the unique problems for edge manageability with automations

**Edge Central** combines the open source EdgeX Foundry platform with IOTech's industrial grade protocol connectors, out of the box cloud connectivity, rules engines, security and user interfaces

**Edge Connect** provides the foundation for high performance connectivity for industrial and commercial protocols like modbus, BACNet, OPC/UA and SparkplugB



# Summary



# Summary

- What makes the Edge challenging is that it represents the shift from old to new
- The energy sector is chock full of Edge opportunities
- IOTech, and our friends in the open source community, are here to help



**Thank you!**

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