NOVEMBER 10TH, 2020

Scaling Digitization for Your Industrial Operations

ZEDEDA

inductive automation.

ADVANTECH

ARROW

Today's Speakers

Jason Shepherd
VP Ecosystem

Travis Cox
Co-director, Sales Engineering

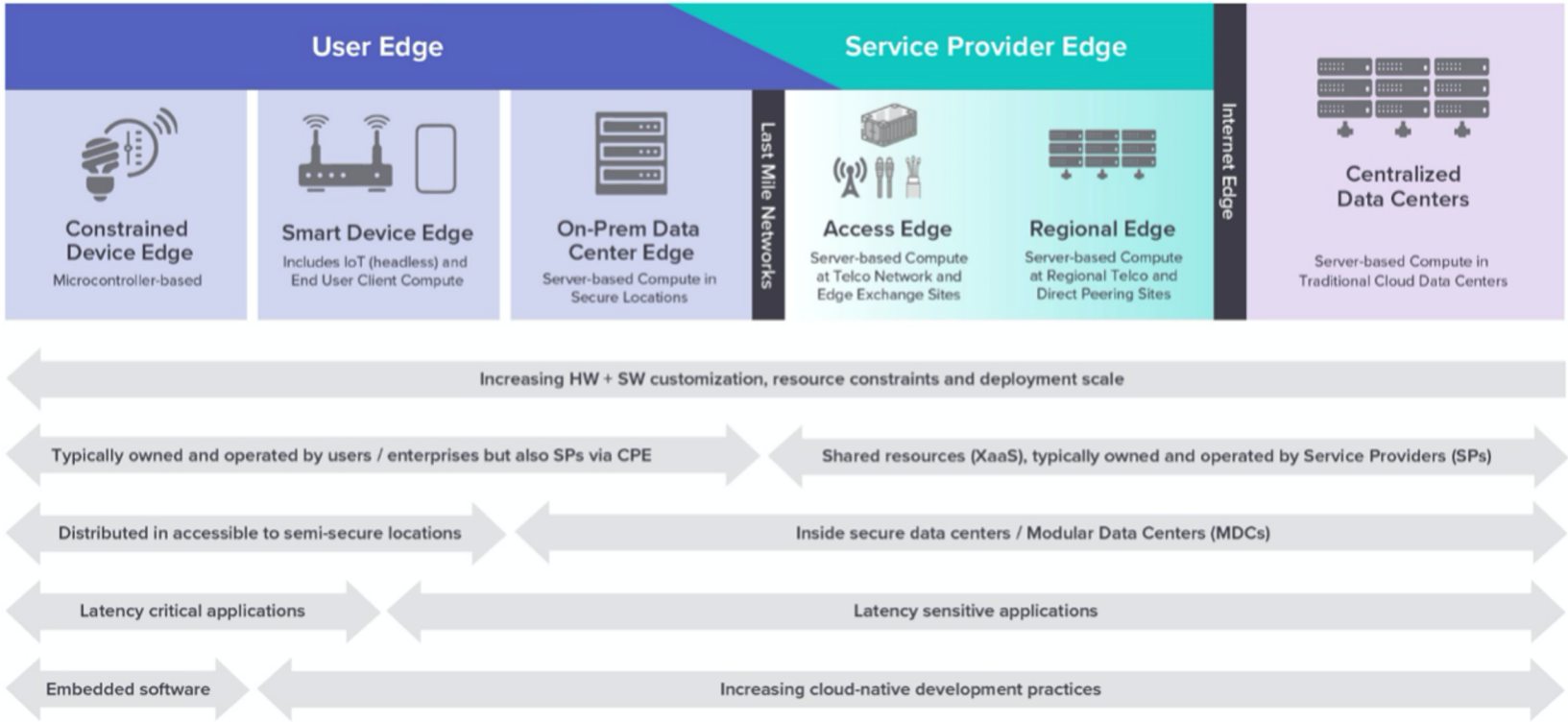
David Liu
Director, IoT Solutions and Alliances

Sam Oliver
IoT Business Development

Agenda

- Defining the “Edge” and Key Considerations
- Intro to Inductive Automation
- Intro to ZEDEDA
- Intro to Advantech
- Intro to Arrow
- Summary of Joint Solution
- Q&A

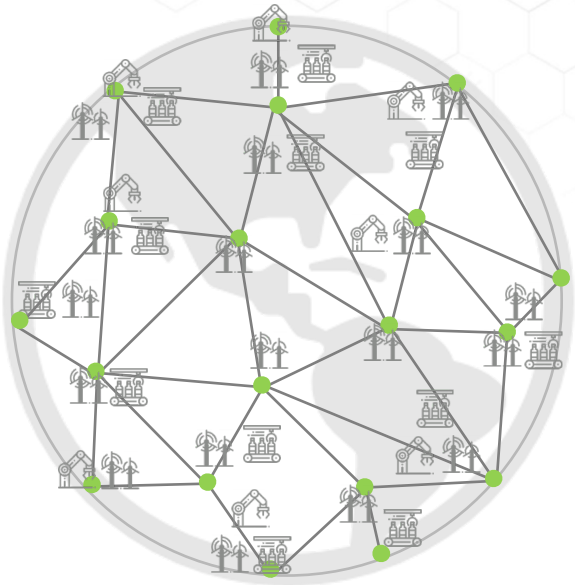
Defining the Edge



Source: [June 2020 LF Edge Taxonomy White Paper]

Key Considerations for the Industrial IoT Edge

- Diversity of hardware, apps and protocols
  - New edge infrastructure going in legacy environments
  - Data integration and orchestration of hardware, apps, systems and networks
- New security threat vectors
  - Remote non-trustable networks
  - No physical or cyber security perimeter
- Unprecedented scale of nodes and locations
  - Geographically dispersed locations
  - High cost of deployment and maintenance



DREAM IT
DO IT

About Inductive Automation

inductive automation

- Founded in 2003
- Founded by experienced system integrator
- HMI, SCADA, MES, and IIoT software
- Highly diversified customer base across many industries
- Over 2,200 integrators
- Used by 48% of Fortune 100 companies

Learn more at: *inductiveautomation.com/about*

About Inductive Automation

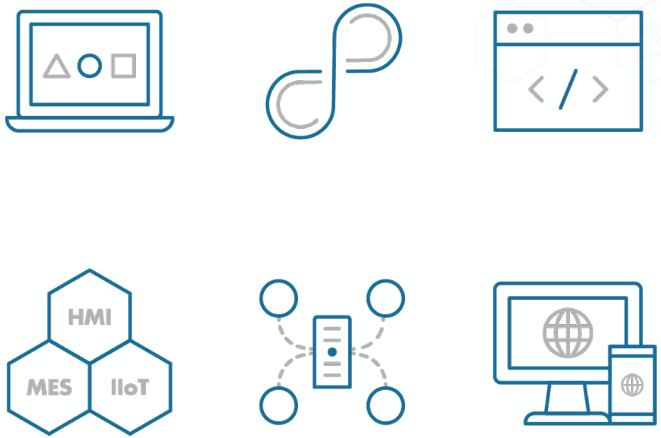
Mission Statement:

Our mission is to create industrial software that empowers our customers to swiftly turn great ideas into reality by removing all technological and economic obstacles.

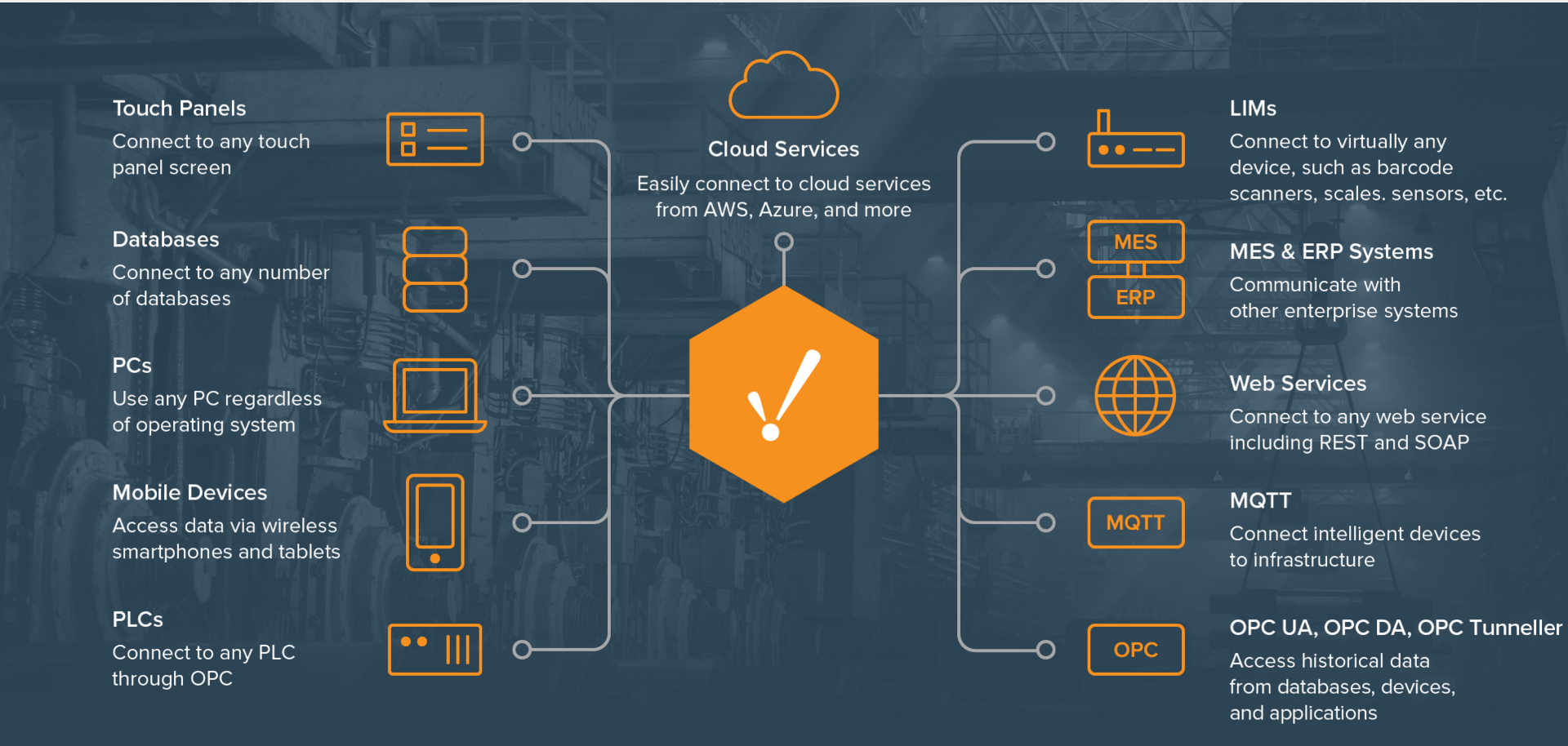
Ignition: Industrial Application Platform

One Universal Platform for SCADA, MES & IIoT

- Unlimited licensing model
- Cross-platform compatibility
- Supports containers
- Based on IT-standard technologies
- Scalable server-client architecture
- Web-managed
- Web-launched on desktop or mobile
- Modular configurability



Ignition: Industrial Application Platform



Common Steps to Digital Transformation Enablement

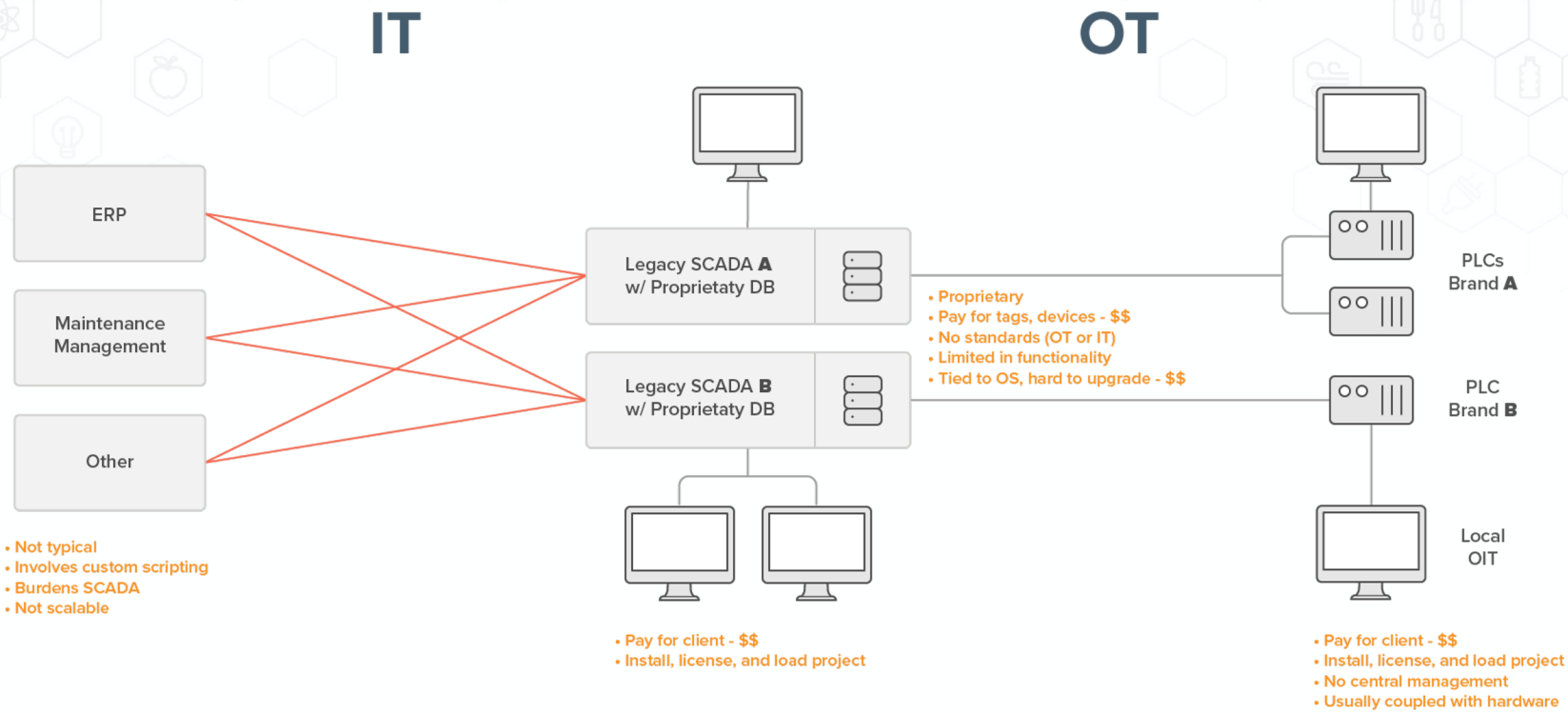
1. Decouple Devices from Applications

2. Add Edge Computing

3. Get Data to More People

4. Scale With Unlimited Licensing & the Cloud

Legacy HMI/SCADA System Architecture



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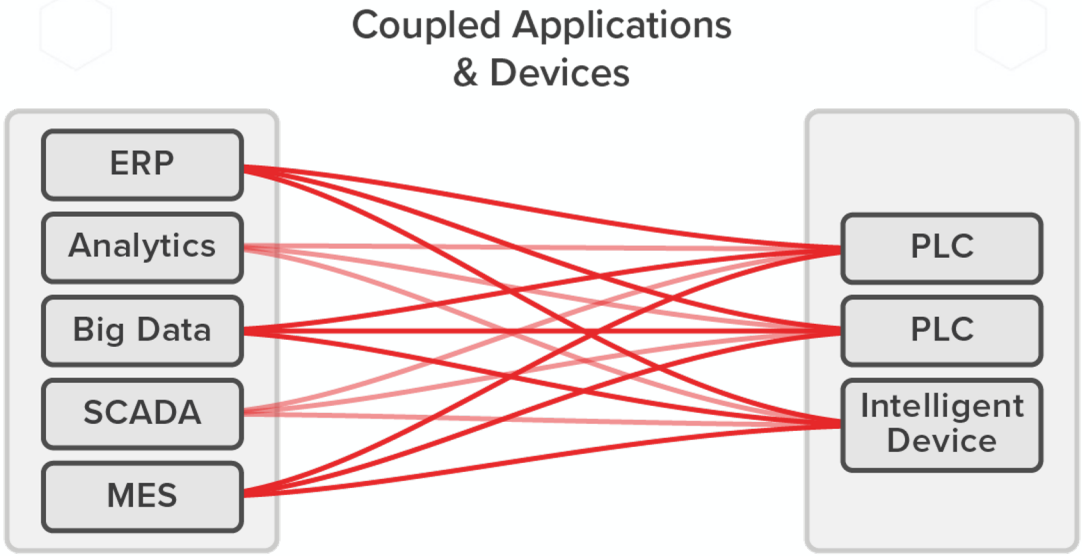
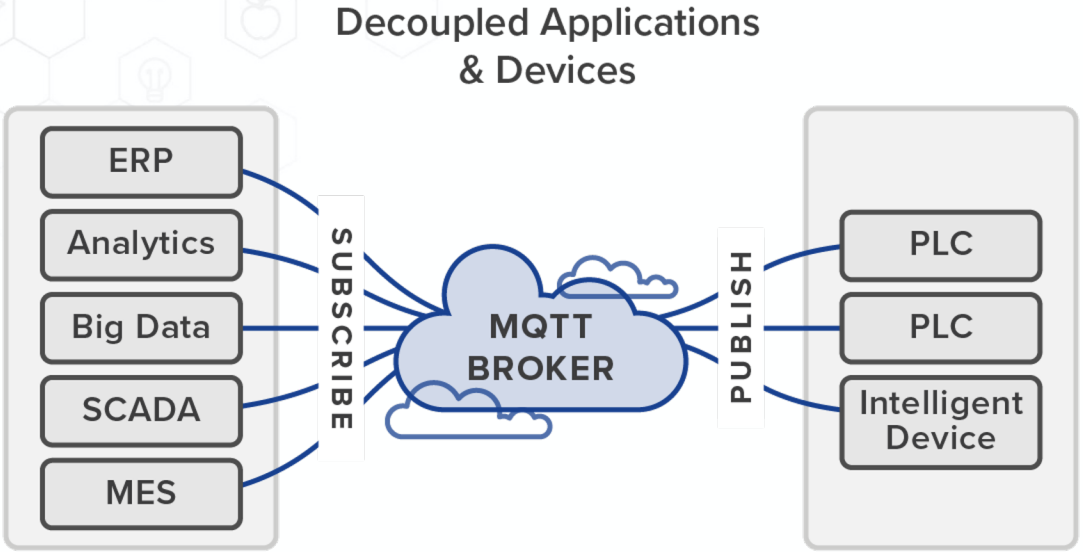
Conventional Architecture



Implement an MQTT Architecture

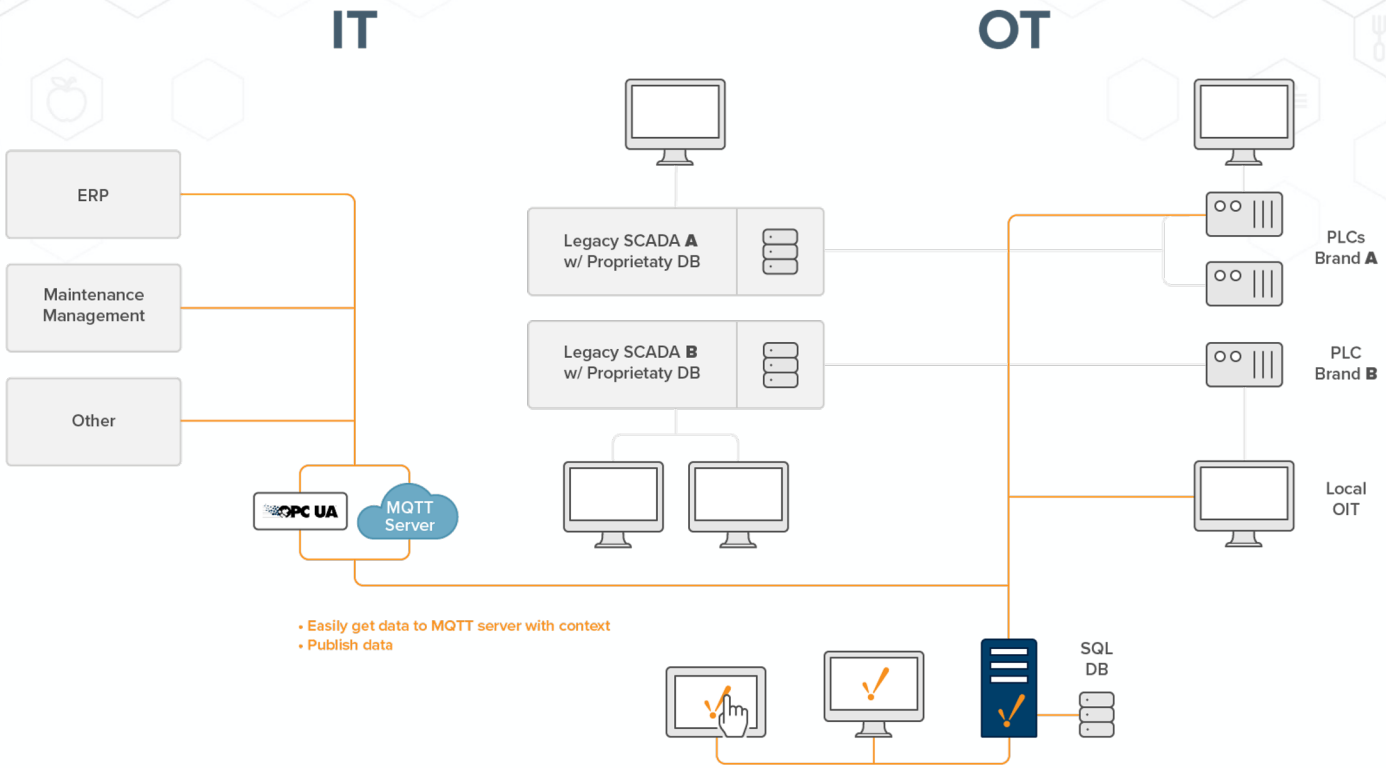


MQTT.ORG

OASIS
Open standards. Open source.

TAHU

MQTT Architecture



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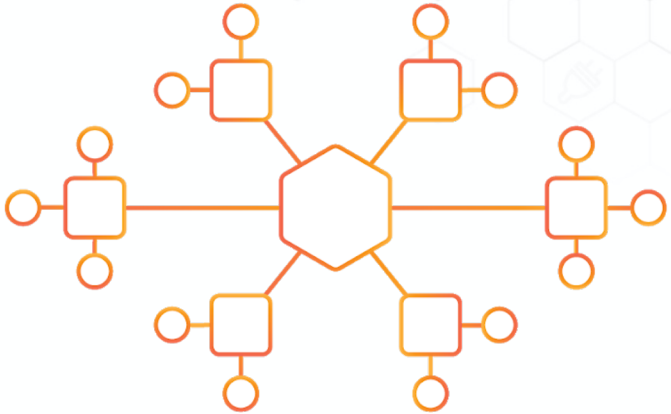
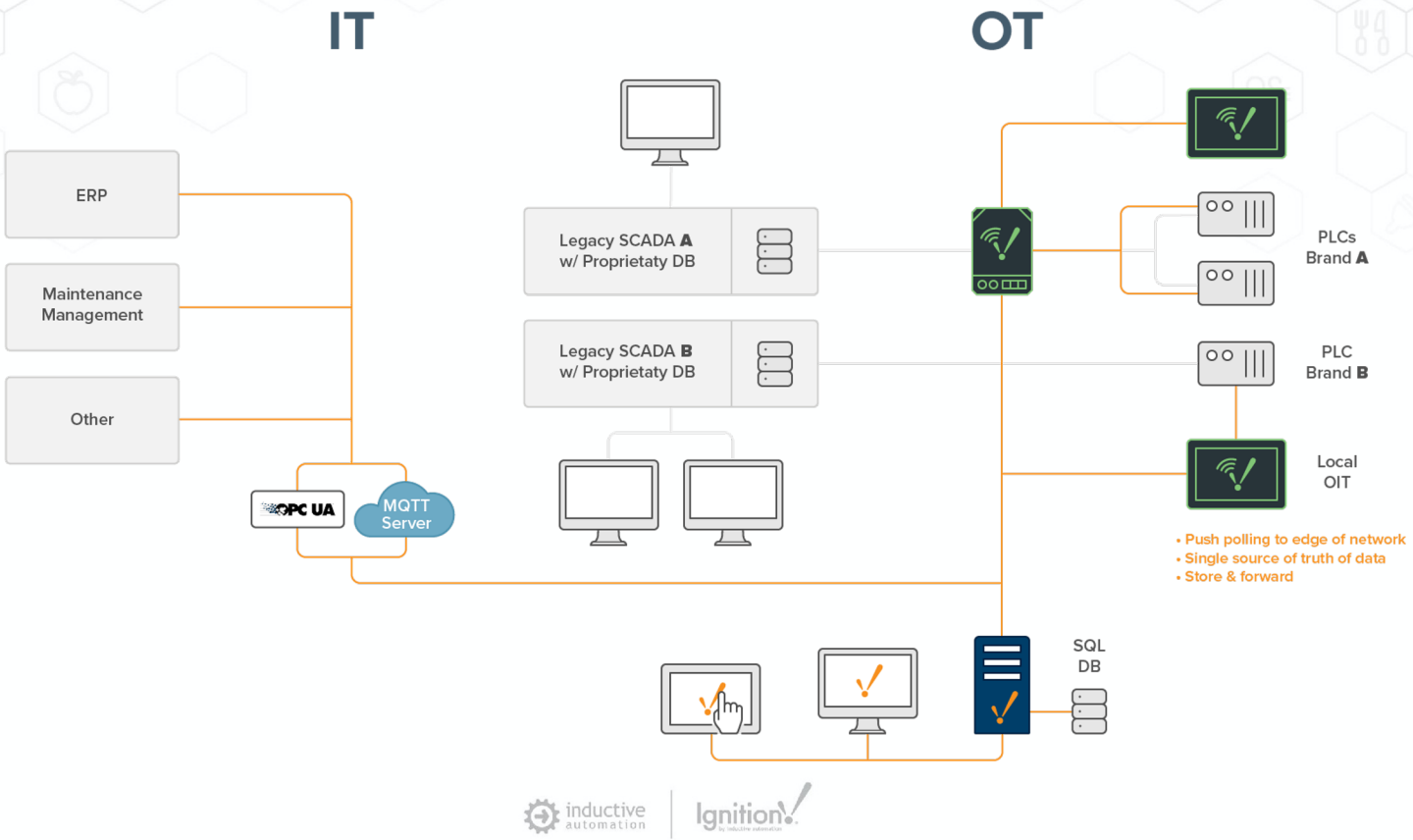
Add Edge Computing

Advantages of Edge

- Poll data at the source
- Poll at faster rates
- Get access to more data
- Efficiently provide data to infrastructure
- Add computing at the source (machine learning)
- More security
- True scalability



Edge Computing Architecture



Access to Data / Application

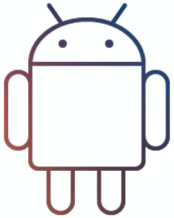
See and Control Your Process Anywhere

- Most important aspect
- On-premise, remote, over VPN
  - Plant floor, office, home, remote
- Access on any device
  - PC, Panel PC, TV, smartphone, tablet, etc.
- No installation
- No restoring backups
- No licensing

Leverage Modern Browsers

Access Anywhere

- Leverage HTML5 & CSS3
- High level of security
- Run anywhere
- No plugins, native
- Modern browsers (Chrome, Firefox, Safari, Edge)
- Phones & tablets (iOS, Android)
- Harness power of mobile device
- Send secure web links
- Familiar experience (Google Drive, Microsoft Office 365, AWS, etc.)
- Ignition Perspective



Enhance Security

Modern cybersecurity protocols & infrastructure

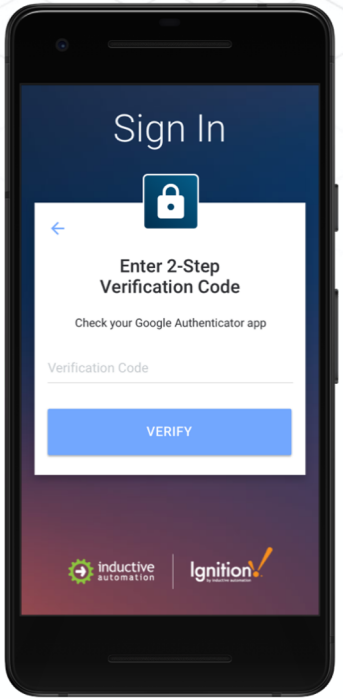
- Tried and true standards
  - HTTPS / TLS
- Role and zone-based security
- Auditing
- Centralize identity management
  - Industry leading encryption protocol
    - SAML, OpenID Connect
  - Integration with 2FA systems
    - Extra layer, verify identity of use
  - Use existing corporate credentials
  - Supported by IT

PingID

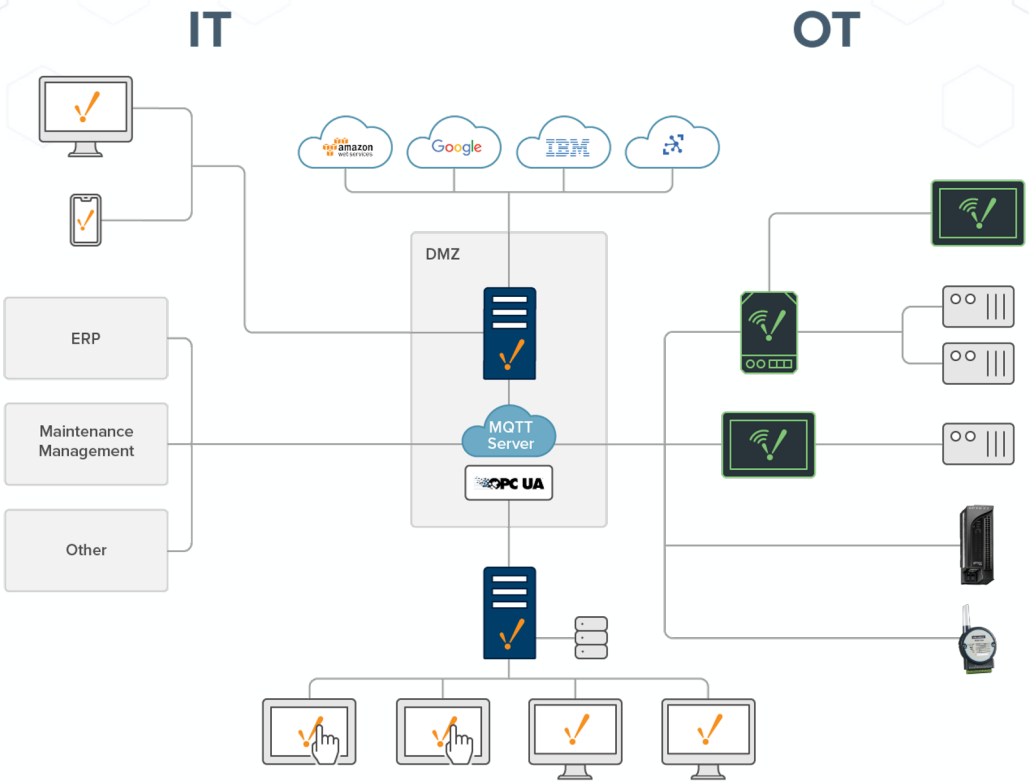
okta

DUO

ADFS



Ignition Architecture



inductive automation | Ignition

Cloud Agility at the Edge.

Visibility, Control and Security for the Enterprise and Industrial IoT Edge

Making Edge Computing a Reality for Enterprise & Industrial IoT

- ZEDEDA Edge Orchestration Solution
  - Software solution designed for the IoT edge
  - Delivers edge visibility, control and security
  - Builds on Linux Foundation's Project EVE
- Company founded late 2016
  - Founding team: 300 patents, 75 IETF RFCs
  - Headquarters – San Jose, Silicon Valley
- Venture-backed private company
  - Lux Capital
  - Energize Ventures (GE and Invenergy)
- In Deployment with large F500's
  - Energy, Industrial, Retail and Healthcare

ZEDEDA

Founders

Said Ouissal
CEO

Erik Nordmark
Lead Architect

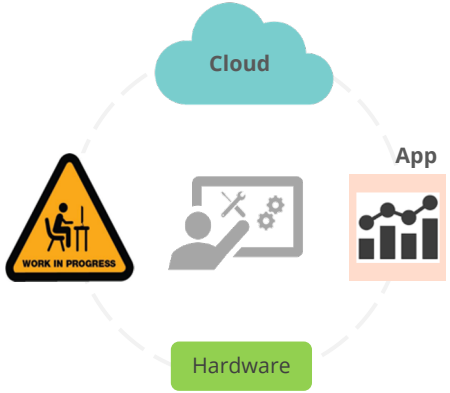
Roman Shaposhnik
Product & Strategy

Vijay Tapaskar
Engineering & Operations

Juniper Networks · Ericsson · Redback Networks · Arista · IETF · Sun Microsystems · Cloudera · Pivotal · Apache Software Foundation · Skyport Systems · Cisco · Juniper Networks

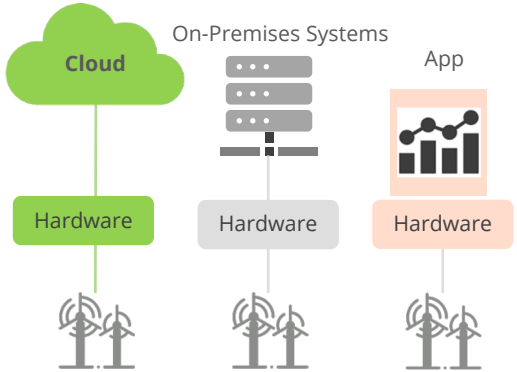
Current IoT Edge Orchestration Pain Points

Do-It-Yourself (DIY)



- Prototype works in the lab
- Manually managed per device (per site)
- **Fails** for large scale deployments

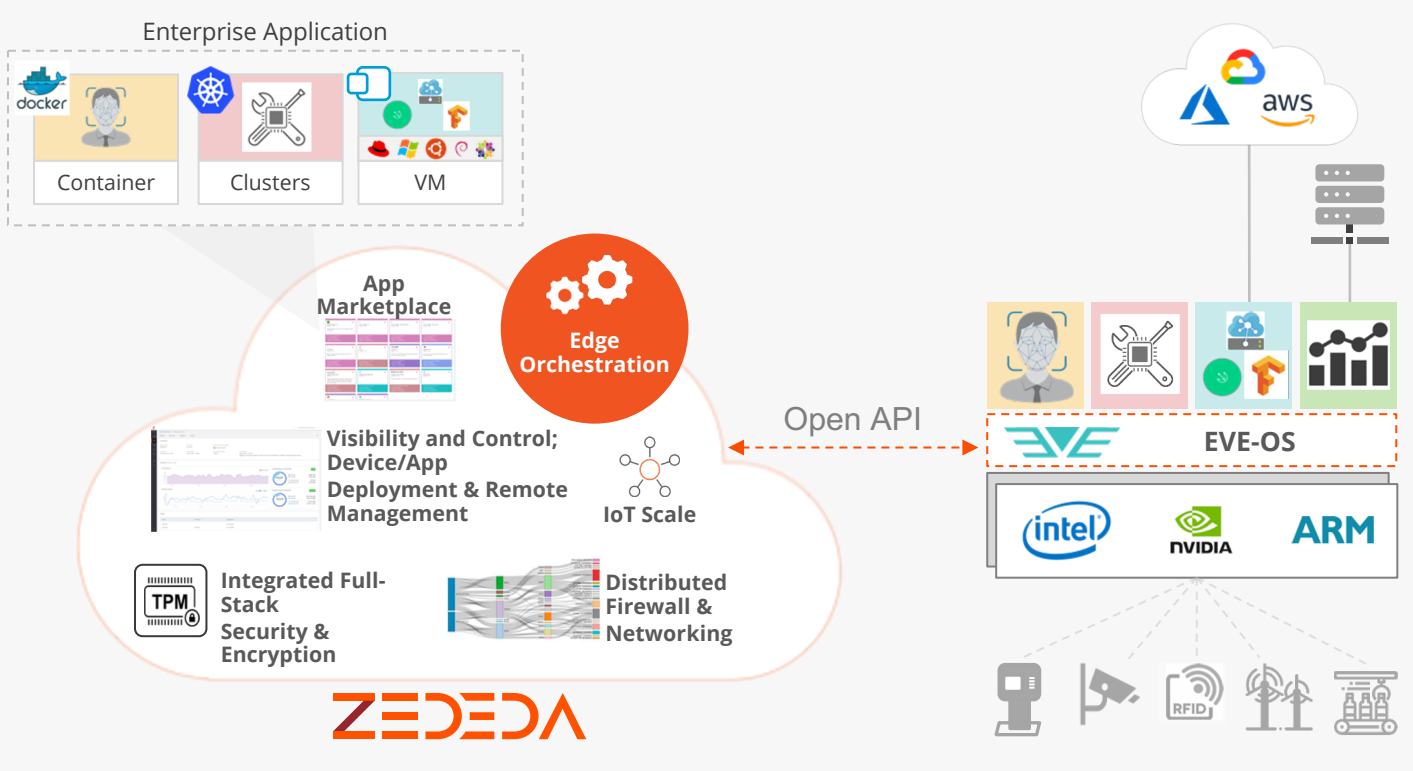
Siloed Platforms



- Dark data and vendor lock-in
- Managed separately
- No flexibility and agility

High Costs and Complexity

Automated IoT Edge Orchestration at Scale



Any Cloud

Any On-Prem System

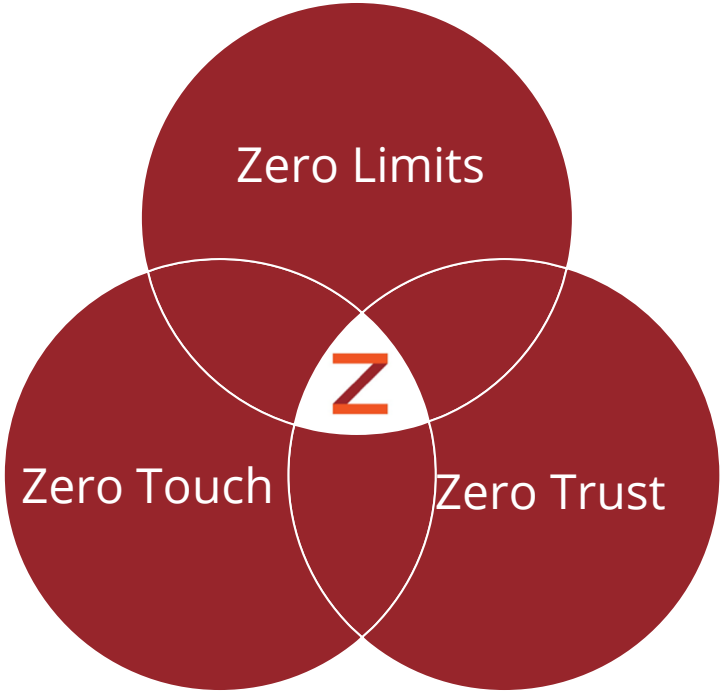
Any App
(VM, Containers, Clusters)

Open Foundation
(Part of Linux Foundation)

Any Hardware
(e.g. CPU, GPU, FPGA)

Any IoT Edge
(Deploy Anywhere)

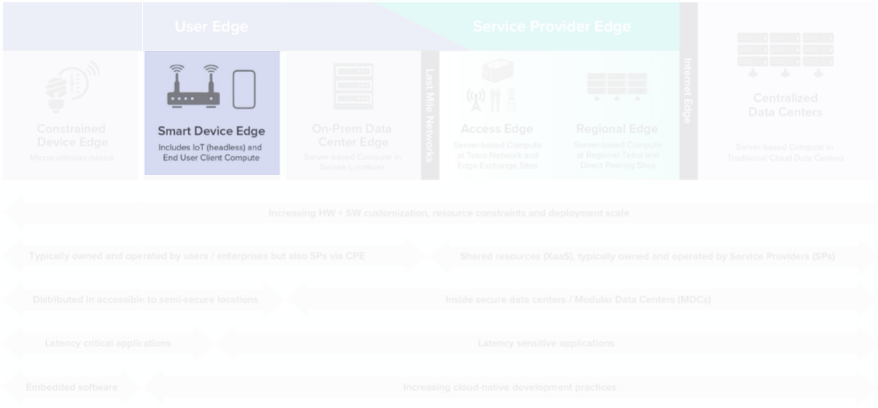
ZEDEDA Advantage

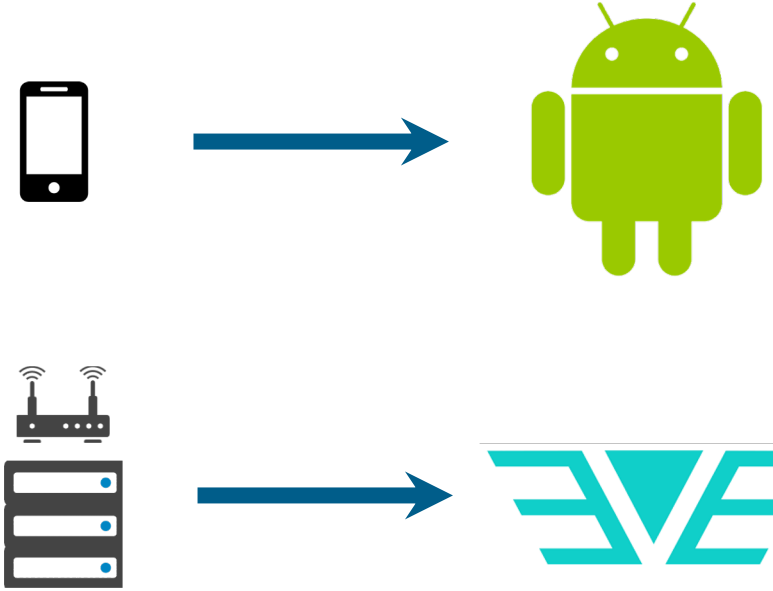


- Zero Limits
  - No vendor lock-in, any hardware or cloud
  - Any app deployment model, legacy and cloud-native
  - IoT scale - cloud powered scale-out orchestration
- Zero Touch
  - Automated on-boarding and deployment
  - Remote and centralized full-stack orchestration
  - Roll-forward and roll-back any changes - risk free!
- Zero Trust
  - Crypto-based identification - no username/pwd
  - Data encryption at rest and in-flight
  - Device integrity, attestation and anomaly detection

Think of EVE as the “Android of the IoT Edge”

One open, ubiquitous foundation to facilitate ecosystem scale for IoT/Embedded Compute

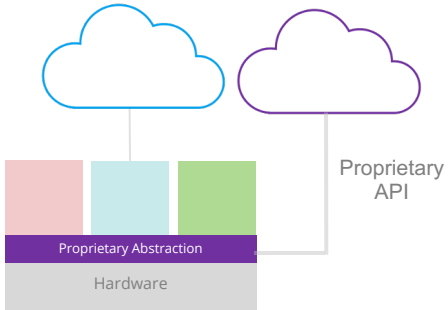




Comparison of Architectural Approaches

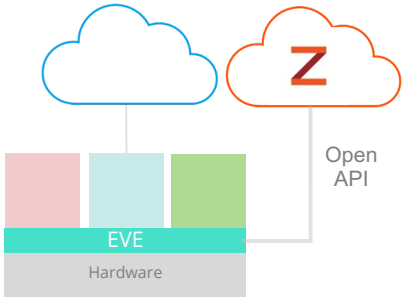
Proprietary Bare-metal

- May have similar benefits for security and networking, but comes with API lock-in
- Current solutions support either containers or VMs, not both



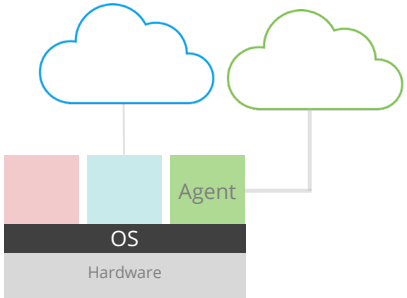
EVE

- Deep security story with root of trust and policy-based management of Apps, CPU, GPU, IO and networking
- No risk of bricking
- 100% open APIs with vendor-neutral open source governance (via LF Edge)
- Can support VMs with customers' preferred guest OS'es

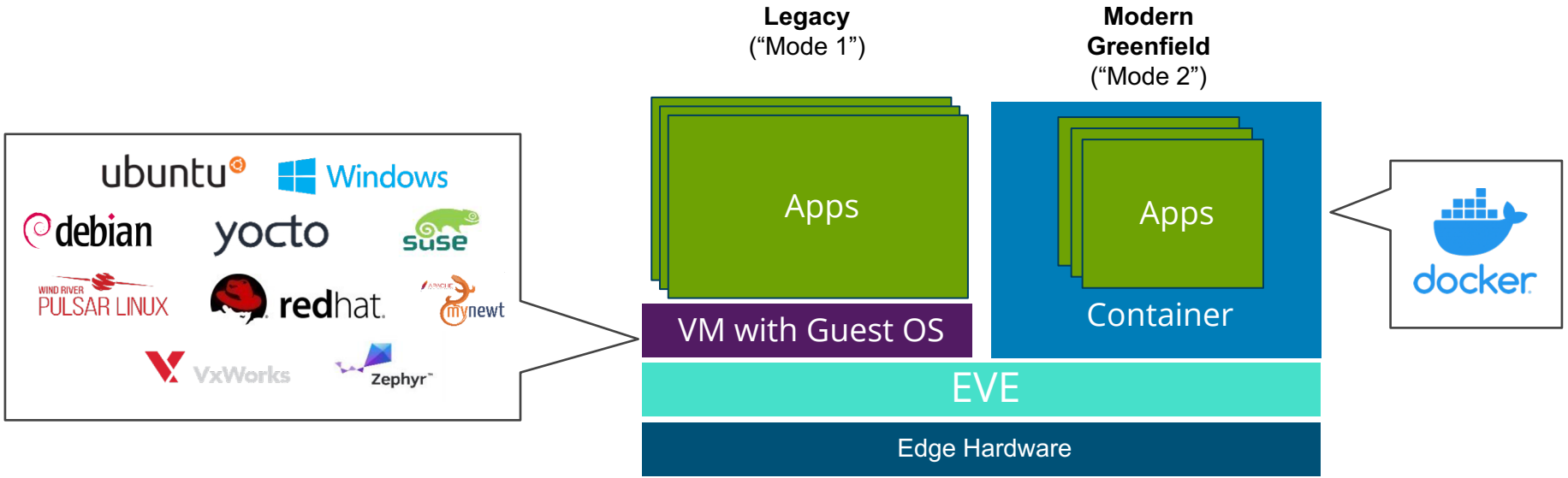


Agent-based

- Risk of bricking during updates
- Inconsistent security story without investment in OS integration and hardening



EVE provides a transition path from legacy to modern apps



Security Approach

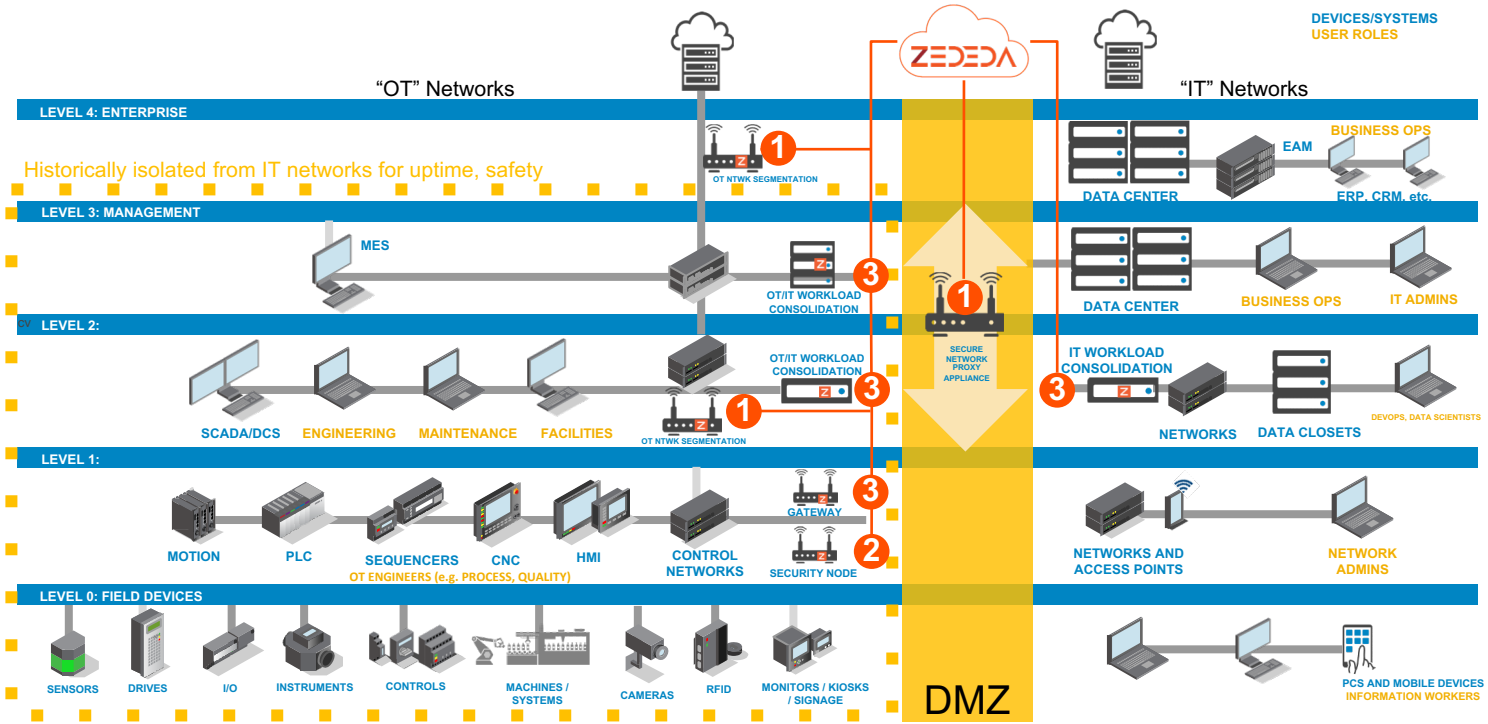
- People
  - Remove need for device usernames/passwords
  - Use cryptographic device identity and APIs for control
  - RBAC and multi-tenancy in cloud controller
- Processes - handle 7+ year lifetime at edge
  - Secure, scalable distribution of updates
  - Anomaly detection across edge fleet in controller

- Technologies for the IoT edge
  - Hardware root of trust (e.g., TPM)
  - Measured boot and remote attestation
  - Crypto-based identification (no device username/password)
  - Data encryption at rest and in-flight (TLS)
  - Distributed firewall for every app/node
  - Physical security—port isolation
  - Role-based access control (RBAC)

Typical Deployment Scenarios

Deployment Scenarios

1. Nodes for Network Segmentation and Proxy
2. Appliances for Protocol Inspection
3. Compute for Edge Workload Consolidation



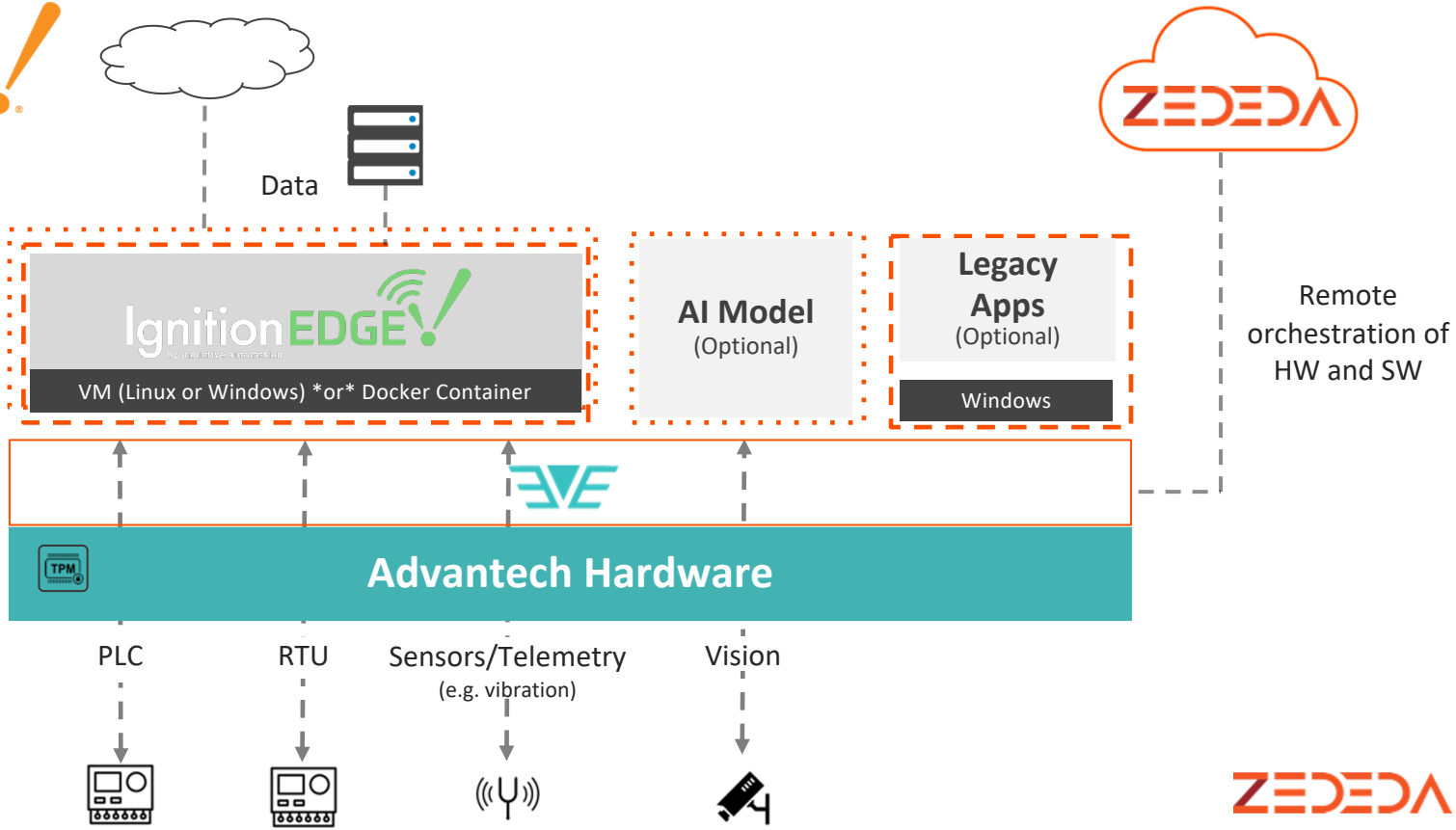
Example Deployment of Ignition Edge

Virtual Machine (VM)

Container

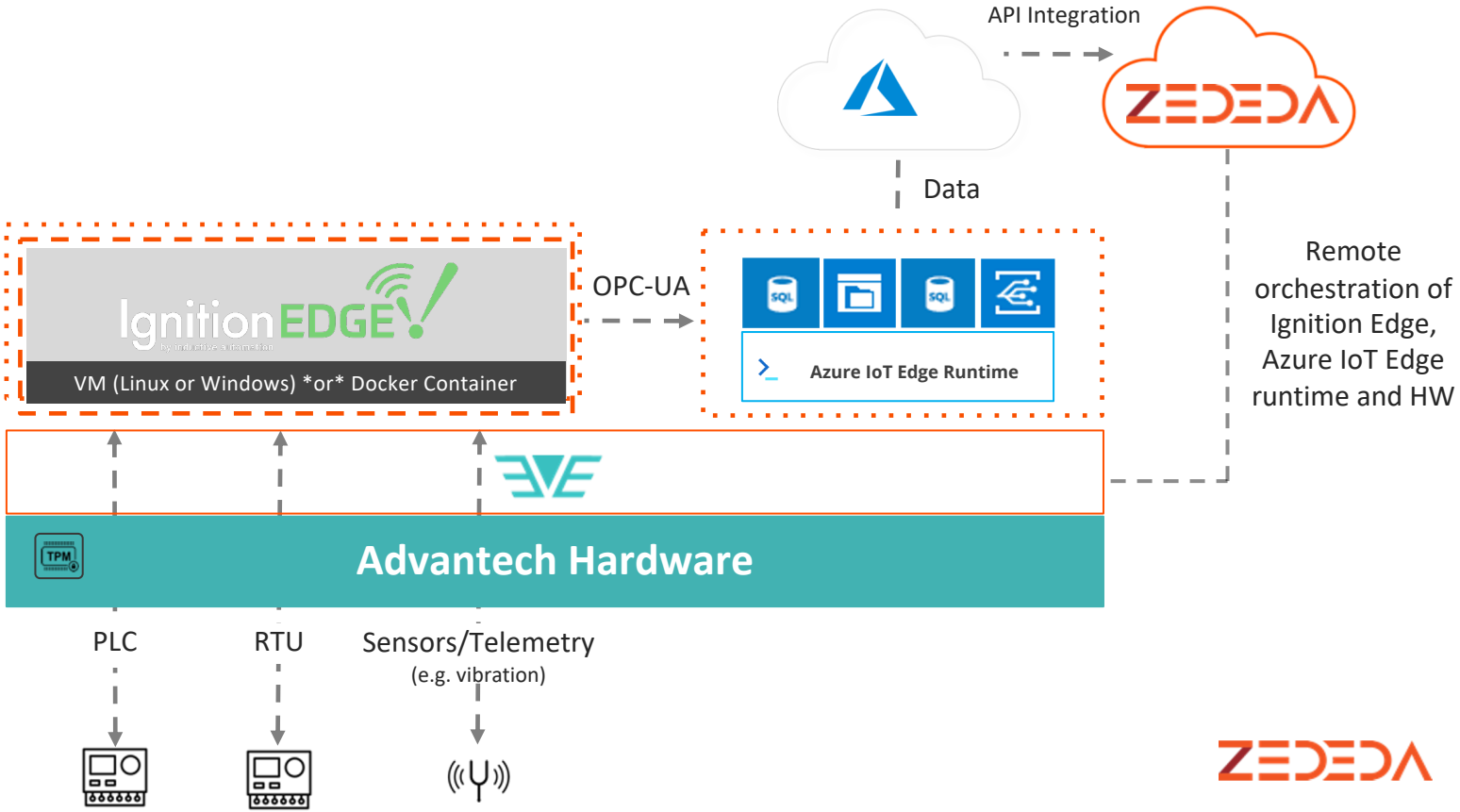
Ignition by inductive automation

Deployed on-prem or in the cloud



ZEDEDA

Example Deployment with Azure IoT Edge



Simple deployment with no IT skills required

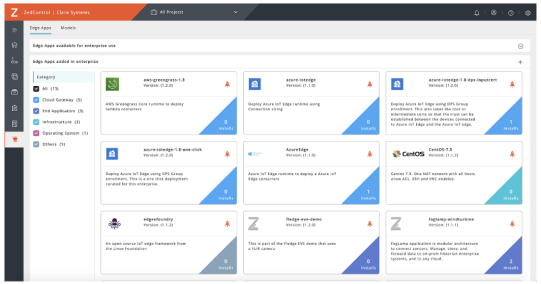
1

Connect hardware with pre-installed EVE-OS to power and network

2

Use ZEDEDA mobile app to onboard hardware to ZEDEDA cloud

3



Deploy Ignition Edge and other desired apps from the ZEDEDA marketplace. Deployment can be templated for larger jobs.

ZEDEDA

Unleashing Industrial IoT with Edge Intelligence

David Liu
Director, Business Acceleration
Strategic Alliance
Industrial IoT Group
Advantech Corporation
M: 949-302-7196
E: david.liu@advantech.com

ADVANTECH

Founded: 1983
Founder and CEO: K.C Liu
Headquarter: Taipei, Taiwan

INDUSTRY SERVED

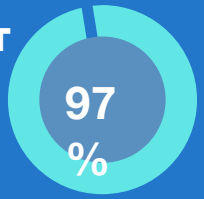
Telecom, Industry 4.0, IoT, Gaming, Retail, iLogistics, Mil/Aero, Broadcasting, Agriculture, Healthcare (We work with 27 of the top 30 healthcare companies worldwide)

1500 STANDARD PRODUCT OFFERINGS

Largest product offering of any IPC vendor

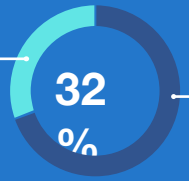
CUSTOM PRODUCT CAPABILITY

97% of what we build is "the brand behind the brand" for our partners



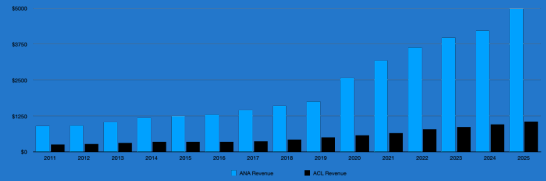
ADVANTECH

Worlds largest IPC company with 32% market share



Other IPC Companies

$1.8B 2019 REVENUE



QUALITY SYSTEMS IN PLACE

TL9000 FDA CCC IEC UL LISTED CSA ISO 14001 ISO

OHSAS 81001, ISO-170256, IECQ QC 080000, Sony GP, IECEx QAR

KEY ECO-SYSTEM PARTNERS

Intel Premier Partner (Only 1 of 5), Microsoft Gold Partner

intel IoT Solutions Alliance Premier

Gold Microsoft Partner Microsoft

AMD EMBEDDED SOLUTIONS Partner Program ELITE

NVIDIA ELITE PARTNER

MANUFACTURING PLANTS

Vertically Integrated manufacturing (Self contained)
Full Manufacturing redundancy (Risk Mitigation)
Full BOM and lifecycle control (End-to-End control over quality)

Linkou, Taiwan

Kunshan, China

Over 1Million sq. ft.

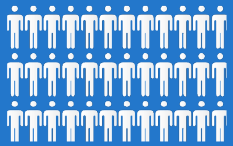
In-house manufacturing in Kunshan, China, Ten SMT Lines

WORLDWIDE OFFICES

Design Centers	6
Manufacturing Centers	2
CTOS Centers	13
Logistics Centers	10
On-Site Service	2
Repair Centers	13
Sales Offices	19

8000+

Worldwide Employees



Advantech Industrial IoT Solution Architecture

Focused Sectors

iFactory

IEM

Energy & Environment

Transportation

Edge computing

Server and IPC

Industrial Panel PC

Fanless Embedded PC

PC-based Controller

Domain-focused IPC

Industrial communication

Industrial Ethernet Switch

Protocol Gateway and Device Server

Fiber Optics and Media Converter

Wireless Router and Gateway

Wireless AP/ Client/ Bridge

Edge Sensing

Wireless I/O and Sensor

IIoT Gateway

DAQ and Remote I/O

I/O System

ADVANTECH
WISE-PaaS
AIoT Solutions & Marketplace

WISE-PaaS/WISE.M+

WebAccess

WebAccess/CNC
WebAccess/NMS
WebAccess/DMP

XNavi

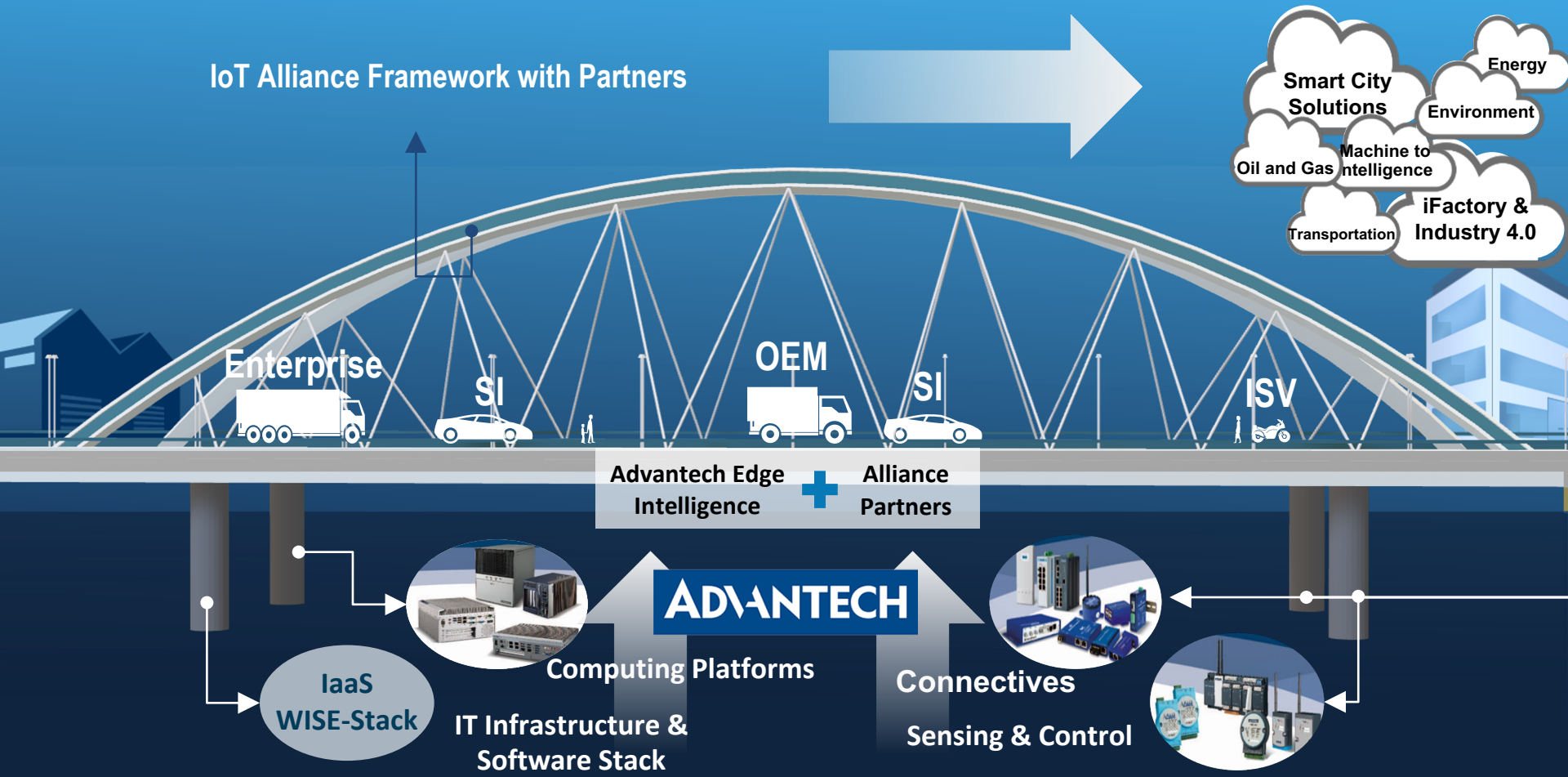
AINavi
VisionNavi
HMINavi
DAQNavi
MotionNavi

WISE-PaaS/DeviceOn

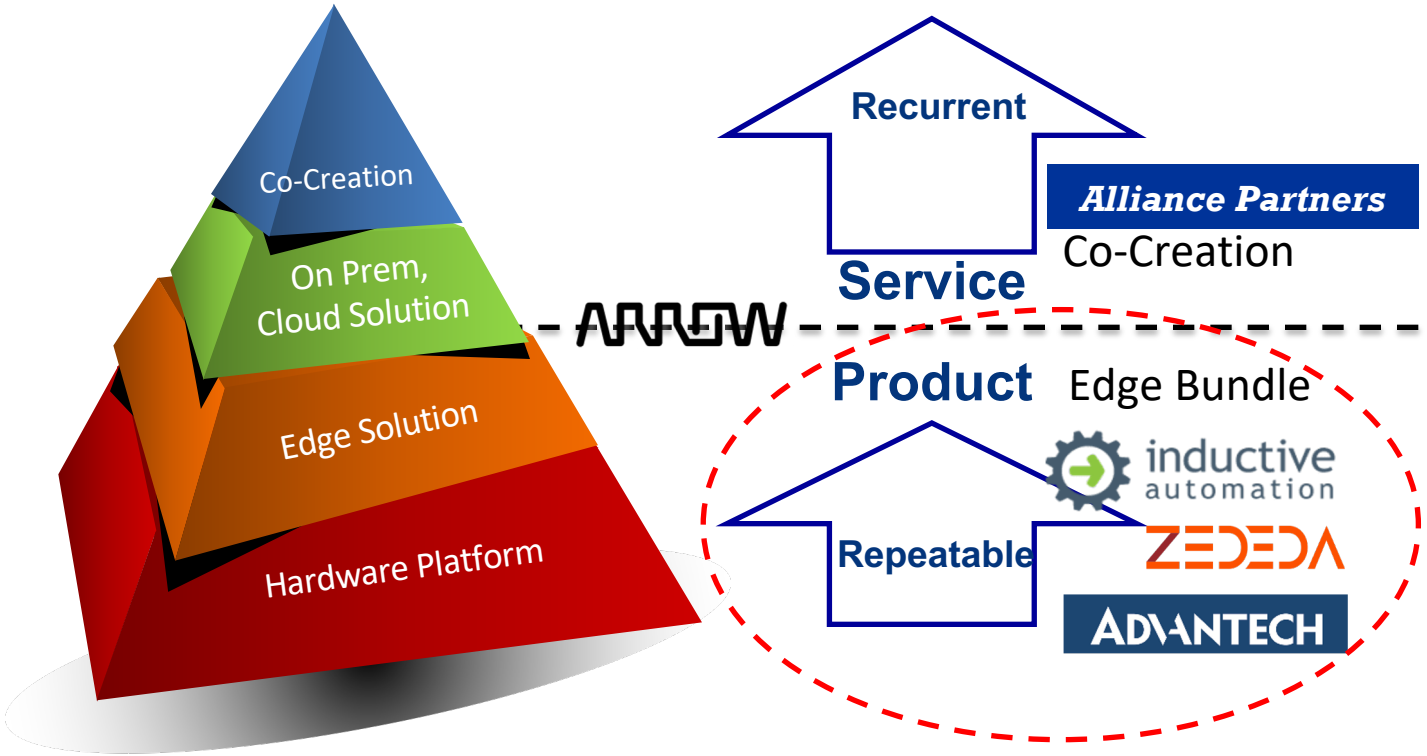
WISE-PaaS/EdgeLink

ADVANTECH

Digital Transformation – Building the IoT Highway



Targeting the Sweet Spot



Quick Introduction of Advantech Edge Platforms

1. Embedded fanless design for harsh environment

- shock, vibration, IP protection, EMI, isolation protection
- Low/high temperature (-20~60C), extended temp (-40~70C)
- UL C1D2/ATEX certified for hazardous area
- Optimized dimension for limited space in enclosure

2. Product longevity starts from 5-7 yrs

- Intel IOTG CPU selection (7th Gen SkyLake and some Bay Trail Celeron extends to 15yrs)
- Commit to Last-time-buy & Replacement

3. Automation Applications

- Digital/ Analog IO
- Fieldbus *e.g. EtherCAT, PROFINET, EtherNet/IP, CANOpen, Modbus*
- SoftPLC, HMI, protocol conversion (Modbus, OPC UA, MQTT)
- DC Power input
- PoE Input/ Output
- TPM, Secure Boot
- Wireless connectivity, e.g. WIFI/BT, LTE

Ignition Edge Bundled Devices

Simplify deployment of Ignition projects with pre-installed Ignition Edge bundles

Embedded Gateway

- Smallest edge gateway (4x3x1")
- From Atom to Core i7
- Wireless connectivity (Wi-Fi/BT, LTE for AT&T/Verizon)

Industrial HMI

- More than 10 screen size options
- IP66/IP69K protection
- Stainless steel design for Food &Bev, pharmaceutical industry

Class I, Div. 2 Devices

- Industrial grade thermal design
- Spark-free design
- Widely deployed in major O&G enterprises

ZEDEDA Bundled Devices

Simplify cloud agility at the IoT Edge with Advantech's ZEDEDA-ready bundles

Basic

- **From ARM to Intel Atom**

Standard

- **Intel Celeron Grade**

Premium

- **Intel Core-i and above**

All bundles come with EVE-OS pre-installed and one year of ZEDEDA cloud subscription
Simplifies onboarding and deployment of apps like Ignition Edge from ZEDEDA marketplace
Available wireless connectivity options (Wi-Fi/BT, LTE for AT&T/Verizon)

Advantages of Buying Bundles from Advantech

Worry-Free

All bundled models have been verified by Advantech, Inductive Automation and ZEDEDA. No worries about the software compatibility.

Hands-Free

All peripherals like storage, Ignition Edge license or ZEDEDA EVE-OS will be installed and activated via CTOS service. The unit customer receives is ready to deploy.

Great-Value

Bundles provide customers with higher discounts for Ignition Edge and ZEDEDA licenses!

ADVANTECH

Arrow Global Services Inc.
OT/SI Enablement Strategy

Sam Oliver – Partner Alliances
Sam.Oliver@Arrow.com

Sam Oliver – Business Development
IoT and Partner Alliances
Arrow Electronics
Sam.Oliver@Arrow.com
C: 303-579-0484

Arrow Electronics Inc.

FOUNDED
1935

HEADQUARTERS
Centennial,
CO, USA

LOCATIONS
345 Serving
80+ Countries

EMPLOYEES
18,800

CUSTOMERS
200,000+

FORTUNE 500
Ranked 113

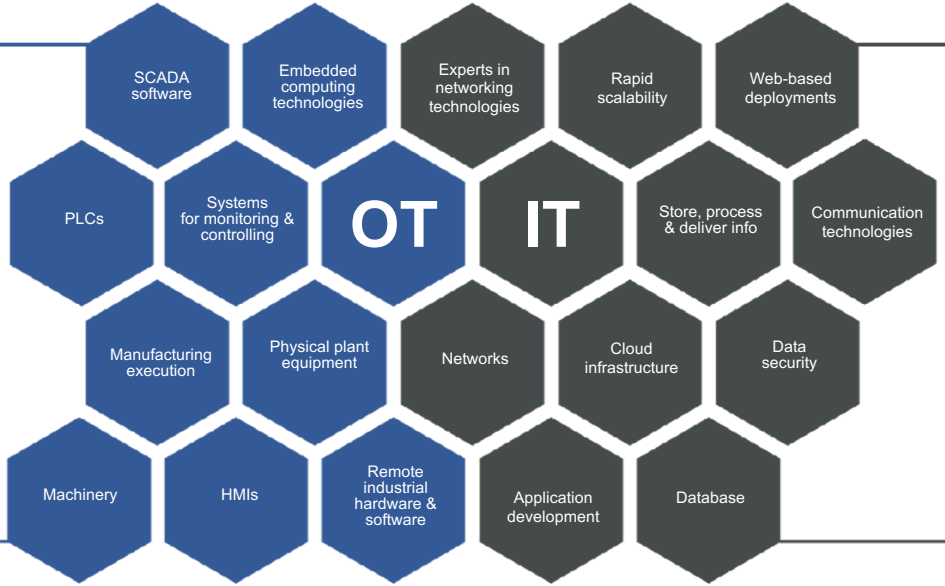
2018 SALES
$29.7 B

TICKER SYMBOL
ARW (NYSE)

OT / IT Convergence

OT and IT continue to converge to take advantage of developments in IoT.

Operational Technology (OT) systems are used to monitor processes and to make adjustments in enterprise and industrial operations…

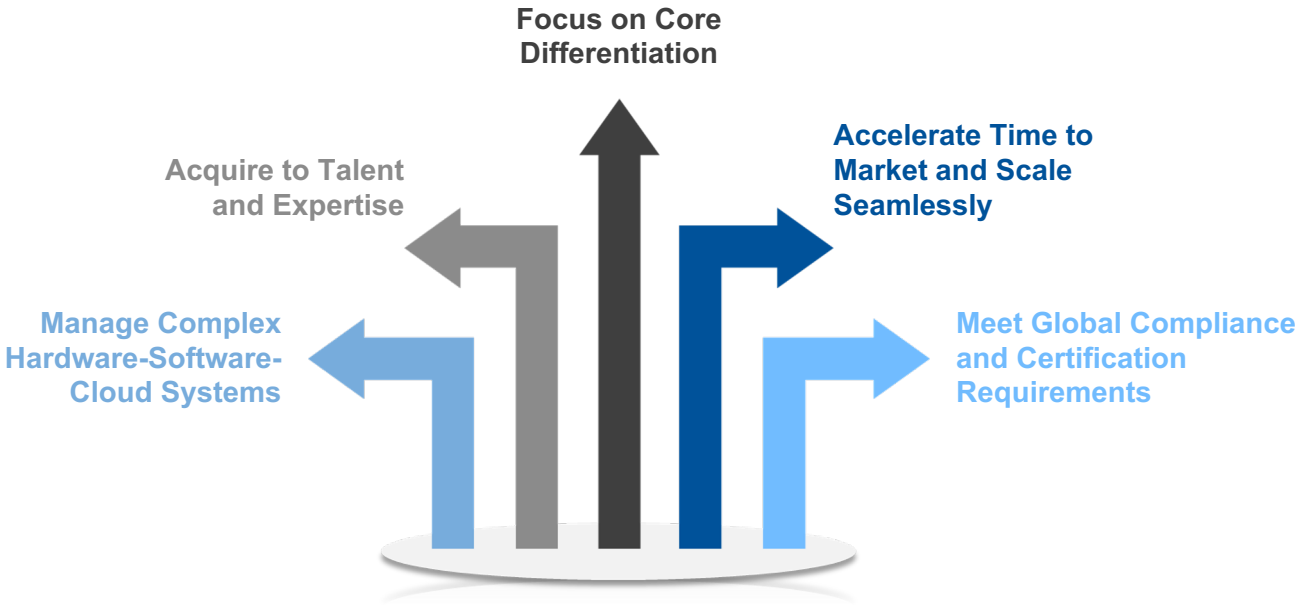


…while integration of **Information Technology (IT)** systems are used for data-centric computing.

"Embracing software defined-OT and IT–OT convergence with converged Edge systems as a part of an intelligent Edge strategy accelerates IoT readiness." — IDC

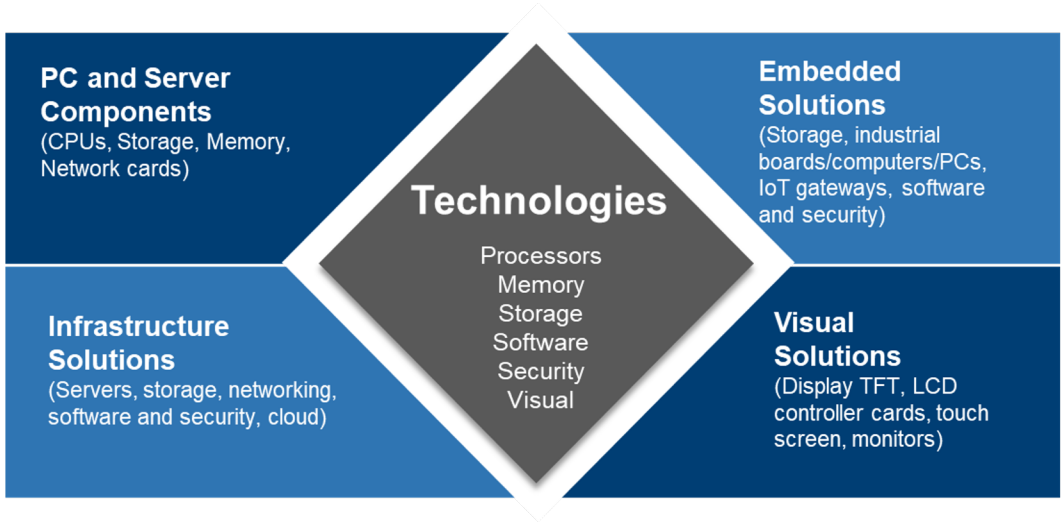
Solution Development Needs for System Integrators

Innovate continuously, cost-effectively, and adjust quickly to market needs



Innovate with Leading Technologies

Arrow can help bring together the vast ecosystem in IIoT. Our partner network includes leaders in hardware, software, cloud and visual solutions that can enhance rapid deployment for your solutions



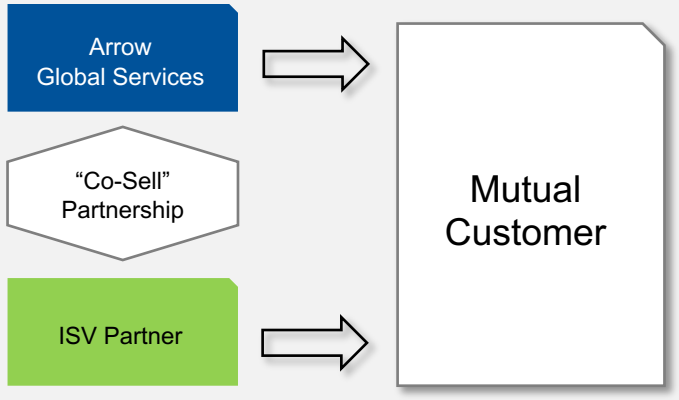
Featured technology suppliers

ADVANTECH · intel · Microsoft · Lenovo · CISCO · SIEMENS · NVIDIA · Lenovo OEM · ZEDEDA · Hewlett Packard Enterprise · DELL · inductive automation · IBM · :Seneca · ADLINK TECHNOLOGY INC.

Partnerships with over 600 technology suppliers to drive innovation for System Integrators

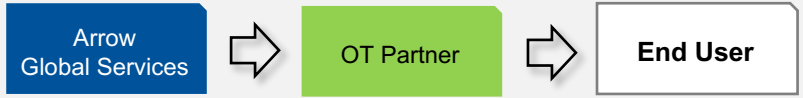
Partner Go To Market Scenarios

Co-Sell ISV Partner



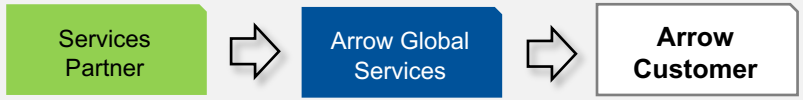
> Typically an **ISV** with market specific IP
> The partner has competence, domain expertise, or IP that Arrow does not have, and that we know our customers appreciate

Sell Through OT Partner



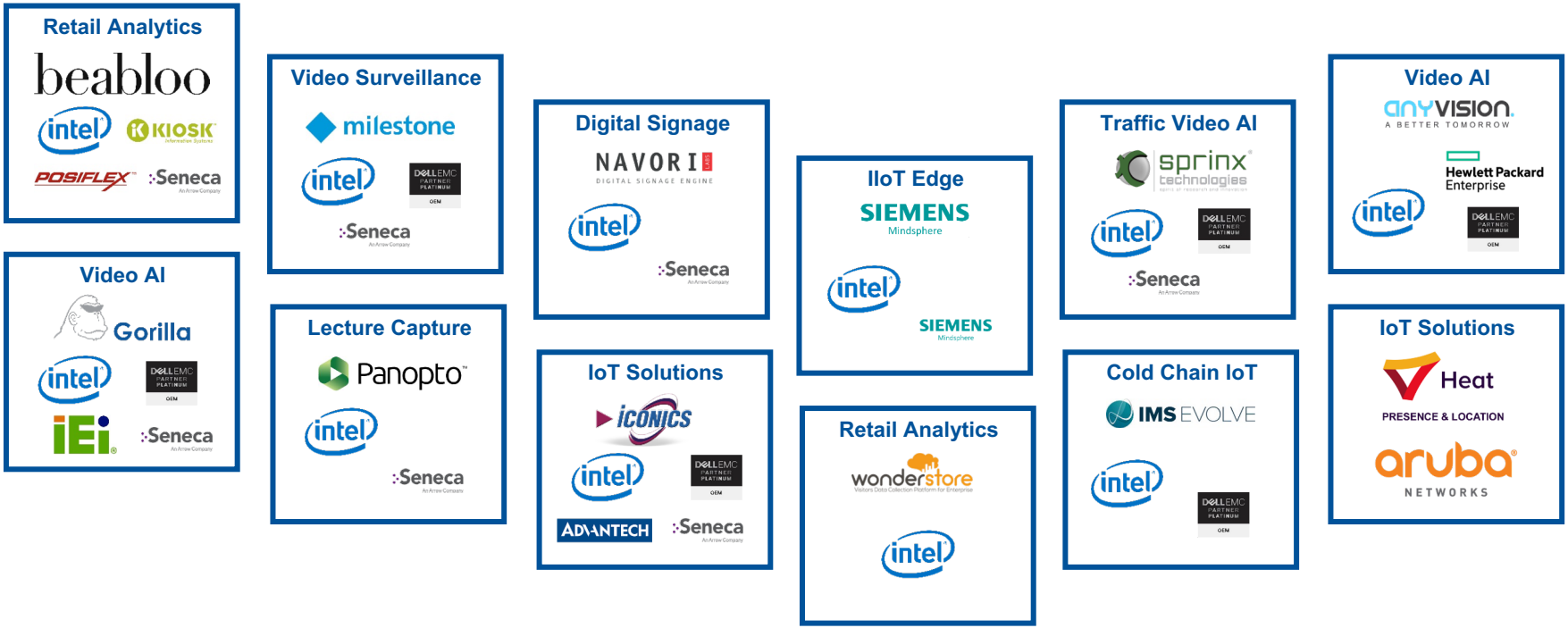
> Typically an **SI** or **Services Partner** who can provide what an end user needs
> The partner becomes a channel for us to Sell Through

Resell Services & Consulting Partner



> Typically a **Services or Consulting Partner** needed for an end user project

Orchestrating Solutions - Examples



Arrow Capital Solutions – Finance IoT

ACS has a broad range of financial tools to accommodate many opportunities

BASICS

ACS funds the entire deal up front at the time of solution delivery and acceptance.

Arrow Capital has the responsibility, and risk, for the invoicing and collecting over the term.

WHO WE SERVE

Commercial and public sector clients

Non-appropriations
FAR compliant
Muni rates in all 50 states

HOW WE DELIVER

OpEx/CapEx
FMV lease
$1BO
Cloud/subscription Solutions
Installment payments
Managed services
Embedded terms
SPA/LOAN
Sale Leaseback

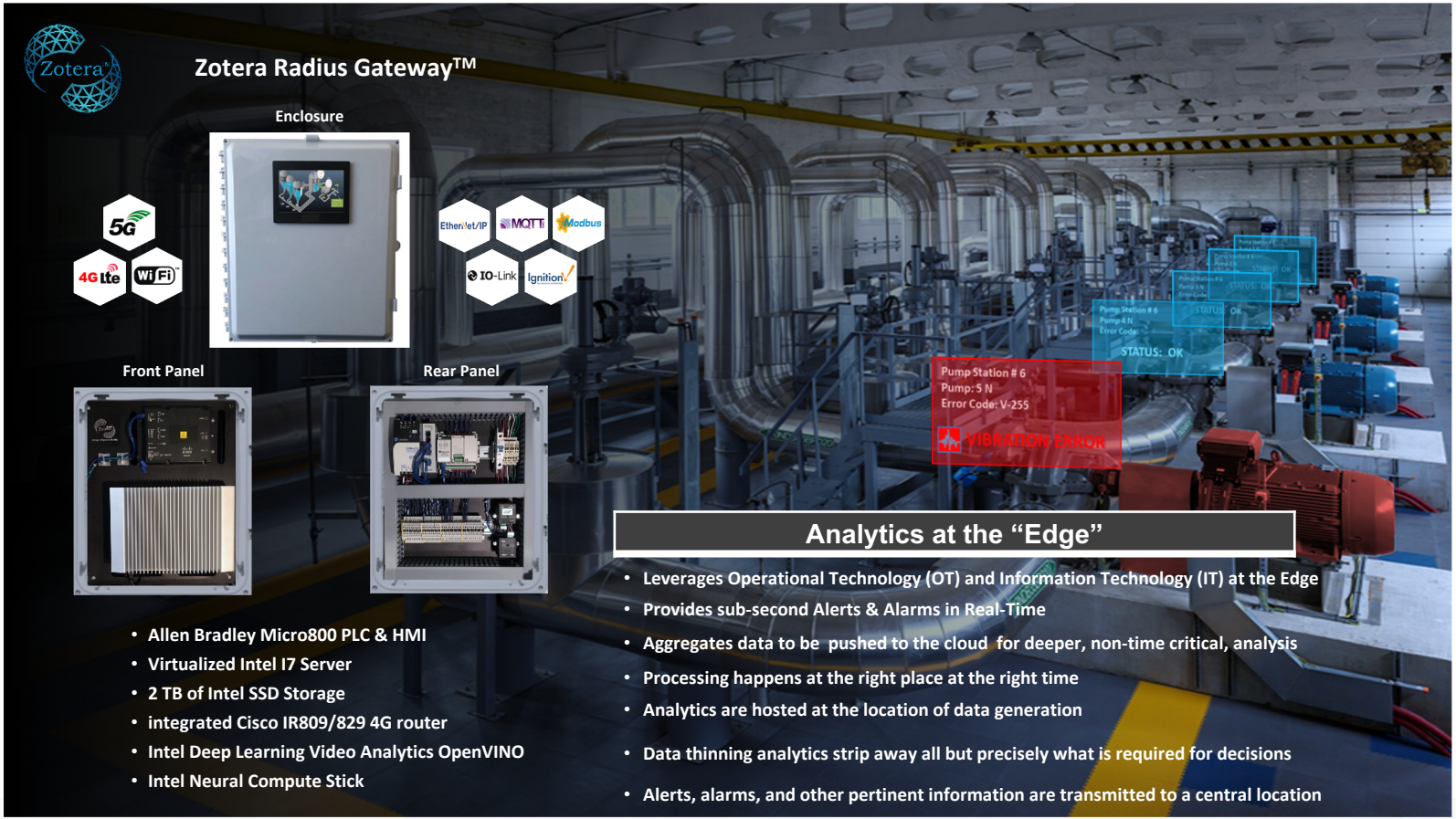
WHAT WE FEATURE

Monthly/Quarterly/ Annual Payments

Deferrals
White label
Step structures

All products and solutions, regardless of where acquired

Example of Arrow Solution Enablement - Zotera



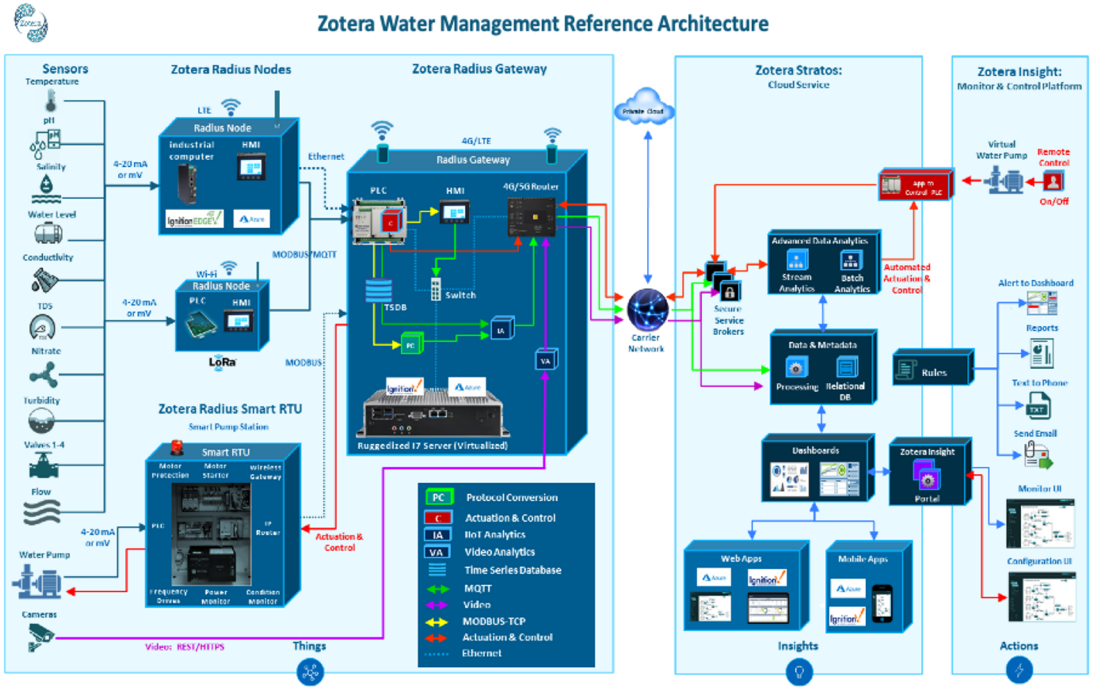
- Allen Bradley Micro800 PLC & HMI
- Virtualized Intel I7 Server
- 2 TB of Intel SSD Storage
- integrated Cisco IR809/829 4G router
- Intel Deep Learning Video Analytics OpenVINO
- Intel Neural Compute Stick

Analytics at the "Edge"

- Leverages Operational Technology (OT) and Information Technology (IT) at the Edge
- Provides sub-second Alerts & Alarms in Real-Time
- Aggregates data to be pushed to the cloud for deeper, non-time critical, analysis
- Processing happens at the right place at the right time
- Analytics are hosted at the location of data generation
- Data thinning analytics strip away all but precisely what is required for decisions
- Alerts, alarms, and other pertinent information are transmitted to a central location

Water Management Reference Architecture

Arrow enabling an IA SI IoT solution - Zotera



Zotera Radius: Edge Computing Platform

- Radius Gateway
  - Leverages Operational Technology(OT)and Information Technology(IT)at the Edge
  - Alerts and specific data pushed to the cloud
  - The aggregation point for cameras, sensors and actuators.
  - Coordinates the connectivity of devices to each other and to an external network.
  - Enables a Secure WIFI hotspot, and the ability to extend the enterprise network to remote locations without infrastructure and power.
- The Radius Gateway is equipped with:
  - Ignition Edge
  - Allen Bradley Micro800 PLC & HMI
  - Virtualized Advantech Intel I7 Gateway
  - 2TB of Intel SSD Storage
  - Integrated Cisco IR809/829 4G router
  - Intel Deep Learning Video Analytics OpenVINO
  - Intel Neural Compute Stick
  - Microsoft Azure

Five Years Out

Contact Information

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Summary

- Comprehensive solution for scaling Industrial IoT deployments
  - Inductive Automation's industry-leading SCADA solution
  - ZEDEDA's simplified, secure deployment and management
  - Advantech's broad Industrial IoT portfolio and ready-to-go bundles
  - Arrow's global distribution, services and financing
- Support for legacy applications alongside Ignition Edge and other cloud-native innovations
- Zero trust security model
  - HW root of trust with crypto-based ID
  - No local device username and password; ability to disable I/O
  - Distributed firewall for secure connections over segmented networks
- Simple deployment with mobile app and pre-installed EVE-OS
- Open EVE orchestration APIs prevent lock-in

Q&A

Learn More

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