SIMPLIFIED CONVERGENCE WITH SCALABLE EDGE TO CLOUD IT INFRASTRUCTURE

Tripp Partain, CTO – Converged Servers, Edge, and IoT Systems
November XX, 2019
THE EDGE IS A SPECTRUM OF USE CASES – VERSATILITY IS KEY

Manufacturing
Legacy Interworking/PLC bridging, Asset Management, Condition Monitoring/Predictive, Augmented Reality, **Edge Video Analytics**

Energy & Utilities
Asset Management, Condition Monitoring/Predictive, Augmented Reality, **AI/Deep-Learning**

Transportation & Automotive
Connected Vehicles, Asset Management, Condition Monitoring/Predictive, **Edge Video Analytics**

Campus, Branch, Retail
Edge Workspace Appliance for Workstation/Desktop/App delivery, **Edge Video Analytics (Campus Surveillance/CCTV)**

Oil & Gas
Asset Management, Condition Monitoring/Predictive, Augmented Reality, **Edge Video Analytics, AI/Deep-Learning**

Defense & Intelligence
Connected Battlefield, Signals Intelligence, **Edge Video Analytics, AI/Deep-Learning**

Distributed Telco, Media, Comms
Multi-Access Edge Computing (MEC), 5G, vRAN, vCPE, Edge CDN/Caching, Video Transcoding

* OT = Operational Technology
HPE CREATED A NEW PRODUCT SPACE: “CONVERGED EDGE SYSTEMS”

The first marriage of OT* and Enterprise IT, expressly designed for the IoT

HPE Edgeline Converged Edge Systems
3 Points of Convergence all in one box: Edge compute, Converged OT*, Remote systems management

1. Unprecedented Edge Compute
   Powerful open-standards performance
   - Up to 112 Intel Xeon cores
   - Up to 6TB Memory
   - GPU, FPGA and VPU Accelerators
   - Up to 96 TB SSD storage
   - 100GbE & iB networks

2. Unique integration of Operational Technology (OT)
   Data Acquisition, Control Systems Industrial NWs
   HPE OTLink HW & SW

3. Data center-class security, reliability & systems management
   Remote monitoring and maintenance over wired or wireless networks
   HPE Integrated Lights Out (iLO) and edge-optimized Integrated System Manager (iSM)

Engineered for the harsh edge environment:
Compact, low energy, rugged – shock, vibration, temperature, various mounting options

* OT = Operational Technology = Control systems, data acquisition systems, industrial networks
IIoT FRAMEWORK: EDGE TO CORE TO CLOUD

Operations, maintenance and support

**Things**
- Protocol conversion and data mapping

**Edge**
- Edge analytics
- Edge ML/DL inference
- Edge Control loopback
- Edge ERP/CRM integration
- Edge AR experience

**Core and Cloud**
- Cloud analytics
- ML/DL training and inference
- Global ERP/CRM integration
- AR studio

**Middleware and data layer**
- Protocol plug-in
- Protocol plug-in
- Protocol plug-in
- Device firmware and management

**Data ingest**
- Edge data exposure and APIs
- Edge device management and digital twin
- Data edge persistence

**Data outgress**
- Cloud data exposure and APIs
- Global device management
- Data core/cloud persistence

**Connectivity**
- Private Cellular
- WiFi
- Public Cellular
- Wired

**Deployment and system integration**
- WAN and DC networking

**Infrastructure**
- Cameras
- OT and sensors
- Workforce devices
- Gateways

- Edge infrastructure abstraction and services exposure
- Edge infrastructure automation and management
- Edge Converged hardware platform

- DC abstraction and services exposure
- DC automation and management
- DC hardware platform
- Public cloud IaaS
## IIOT FRAMEWORK: PARTNER MAP

### Things
- Protocol conversion and data mapping

### Edge
- Edge analytics
- Edge ML/DL inference
- Edge Control loop
- Edge ERP/CRM integration
- Edge AR experience

### Core and Cloud
- Cloud analytics
- ML/DL training and inference
- Global ERP/CRM integration
- AR studio

### Middleware and data layer
- Protocol plug-in
- Protocol plug-in
- Protocol plug-in
- Device firmware and management
- Edge data exposure and APIs
- Edge device management and digital twin
- Data edge persistence
- Data ingest/outgress

### Connectivity
- Private Cellular
- WiFi
- Public Cellular
- Wired
- WAN and DC networking

### Infrastructure
- Cameras
- OT and sensors
- Workforce devices
- Gateways
- Edge infrastructure abstraction and services exposure
- Edge infrastructure automation and management
- Edge Converged hardware platform
- DC abstraction and services exposure
- DC automation and management
- DC hardware platform
- Public cloud IaaS
IIoT Joint Architecture

Operations, maintenance and support

Things
- PTC Kepware
- OTLink Platform
- Protocol conversion and data mapping
- Protocol plug-in
- Device Drivers
- Protocols

Edge
- PTC Thingworx Analytics
- PTC Thingworx Core
- Data and device services exposure
- Data acquisition
- DM and digital twin
- Data persistence

Core and Cloud
- Azure cloud services
- Analytics
- AI services
- Visualization
- IoT Hub
- Global Data persistence services (DBaaS, Data lake)

Deployment and system integration

Connectivity
- HPE Private Cellular offering and WiFi
  - Aruba WiFi
  - Radio access network
  - Private LTE core
  - PLTE deployment
  - PLTE operations

Infrastructure
- Hewlett Packard Enterprise
- HPE Edgeline
  - Zero-touch provisioning
  - Edge platform management and assurance
- Cameras
- OT and sensors

- EL300
- Edgeline EL1000
- Edgeline EL4000
- OTLink SW
“What we get from this combination of OT and IT that HPE has done, is the ability to have central control of OT resources in our factories, as though they were IT data center resources. Data has its most decision value in real time”.

– Bruce King, Senior Principal Data Scientist, Seagate Technology
The Texmark team refers to Refinery of the Future as ROTF. They use ROTF as a verb. ‘How can we ROTF this?’ So it has changed the mindset and allowed them to think about how to do jobs in the real world more efficiently, more safely, more profitably”.

– Doug Smith, Chief Executive Officer, Texmark
“We get data all the time. From all the different simulation tools that we have. At the track, obviously we generate data as well. From that information we have at the track, we'll be turning around and always evolving our product.”

– Matt Harris, Head of IT, Mercedes-AMG Petronas Motorsport
THANK YOU

Tripp Partain
tripp@hpe.com
@tripppartain