INNOVATION DELIVERED AT THE EDGE
Internet of Things (IOT) Solutions from HPE, Microsoft and PTC

Barbara Couturier, PTC
Month day, year
AGENDA

- Introducing PTC: Focus and Thought Leadership
- PTC and HPE: Better Together
- Solution Offerings
- Customer Success
- Summary and Next Steps
PTC: GLOBAL TECHNOLOGY LEADER

**Verticals**
- Life Sciences: 6%
- Industrial Products: 33%
- Automotive: 14%
- Electronics & High Tech: 16%
- Federal, Aerospace & Defense: 15%
- Retail & Consumer: 8%
- Other: 8%

**Regions**
- Americas: 42%
- Europe: 39%
- Asia Pacific: 19%

**Fast Facts**
- 6K Employees
- $1.24B FY18 Revenue
- 30 Year Heritage of Innovation

Technology Partner of The Year 2019 – Edge and IoT Solutions
2019 Partner of the Year Winner Manufacturing and Resources Award
Mixed Reality Award
2019 Partner of the Year Finalist Internet of Things Award

Microsoft Partner

Hewlett Packard Enterprise

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PTC THINGWORX: INDUSTRY RECOGNITION

Clear Market Leader

IoT Platform Market

IoT Platform Market

IoT Platform Market

IoT Technology Platforms

Industry 4.0 IoT Vendor Benchmark 2016

PTC

Total market size 2015: $221M

Other 36%

PTC

Sources:
- Forrester Research
- Lux Research, Inc.
- Experton Market Insight
- IDC
- BCC Research

Challengers

Contenders

Weak

Strong

Full vendor participation

Market presence

Strategy

Current offering

Technology Strength

Product Maturity

Invengate

Engage

ThingWorx

Investigate

Watch for improvement

Monitor

Source: Forrester Research

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THOUGHT LEADERSHIP AND DIGITAL TRANSFORMATION

- PTC uniquely provides industrial companies with:
  - Deep industrial domain expertise that ensures alignment
  - Unique portfolio of technology that incorporates people
  - Solutions and partner frameworks that accelerate time-to-value
- With PTC, and its partner ecosystem, manufacturers can capitalize on the promise of digital transformation today
UNLEASH OPPORTUNITIES ACROSS THE ENTERPRISE

Customer Service
Focused on improving customer satisfaction through innovative services, increased uptime, reduce truck rolls, and quicker time-to-resolution if failure occurs.

Customer Operations
Focused on value-added services through remote intelligence, customer enabled self-service, automated replenishment, and data driven product/operator recommendations.

Corporate/CXO
Focused on creating new business models, modernizing the workforce while increasing shareholder value.

Manufacturing & Supply Chain
Focused on optimizing plant, asset and worker productivity to increase throughput, ensure quality, compliance and worker safety, and reduce operating costs.

Engineering
Focused on accelerating time to market with optimized designs, real-time simulation and virtual collaboration which will close the loop from design to production.

Sales & Marketing
Focused on giving “Voice of the Product” for customer usage and consumable replenishment while providing inspiring product demonstrations through 3D experiences.

Graphic courtesy of ptc
VIA MARKET-PROVEN INDUSTRIAL SOLUTION SUITES

Service Optimization
Improve customer success, reduce service costs, and deliver new value via product performance and world class service.

Engineering Excellence
Seamless data and model centric workflow that enables data driven decisions throughout the design and manufacturing process.

Product & Service Innovation
Develop new products, services, and business models that enable differentiation and new revenue opportunities.

Manufacturing Efficiency
Improve operational efficiency, reduce manufacturing costs, accelerate time to production, and ensure quality & compliance.

Sales & Marketing Experiences
Virtual product demonstrations, product companions, "voice of the product" feedback, and augmented experiences.

Graphic courtesy of ptc
PTC’S DIGITAL TRANSFORMATION SOLUTION SUITE

Aligning with HPE Initiatives
• Redefine Experiences at the Edge
  • ThingWorx, Kepware and Vuforia on Edgeline
• Right Mix of Hybrid Cloud
  • PTC ThingWorx for Azure and Azure Stack
• Everything as a Service
  • Thingworx, Kepware and Vuforia with Services from PointNext (Edge as a Service, Fast Start)
HYBRID DEPLOYMENT MODEL

- Azure IoT Hub
- SQL Server
- ThingWorx Kepware Server
- Additional Azure Services: Azure Functions
- Azure Functions
- Azure Stack
- Azure VM: ThingWorx
  - Accelerator Mfg Apps
  - Custom Apps
  - Tile Server
- Azure VM: ThingWorx Analytics
- Azure VM: ThingWorx Flow
- Existing Systems
  - Business Systems
  - Manufacturing Systems

Deployment and System Integration

Hewlett Packard Enterprise
- EL300
- EL1000
- EL4000
- EL 8000
- HPE SimpliVity
- HPE ProLiant

ThingWorx Kepware Server
RECORD OF SUCCESS WITH OUR JOINT CUSTOMERS

2X production capacity. Reduced quality defects by 50%

50% reduction in planned maintenance costs.

Proved success with condition monitoring and cross factory visibility, which led to the current implementation plan for >100 factories
CUBE PACKAGING

• Scenario
  • Produce High-quality, environmentally-conscious and ethically-manufactured packaging products
  • Strive to improve manufacturing operations by implementing initiatives to minimize their environmental impact
  • Continue digital transformation journey
• Results:
  • **Proactive Monitoring.** Ability to address issues before they cause downtime. Reduced quality defects by 50%.
  • **Streamline Operations.** Ability to take faster action to reduce downtime. Doubled production capacity.
  • **Faster Time to Insight.** Ability to gain insight into processes in real time.
TEXMARK: REFINERY OF THE FUTURE

- Consortium 5 IoT Projects:
  - Advanced Analytics with Predictive Maintenance
  - Advanced Video Analytics – Video as a Sensor
  - Safety and Security – Man-down and Directed Response
  - Connected Worker – Location-based and Context-aware
  - Full Asset Management – Integration with Mechanical Integrity

- Results
  - **New** business lines and **income sources**
  - **2X increase avoided** in insurance deductible through Asset Integrity Management
  - **50% Reduction** in planned downtime
MAJOR TOOLS MANUFACTURER

• Scenario
  • Journey to Industry 4.0, includes 20+ IIoT use cases, including operations optimization, predictive maintenance and inventory optimization.
  • Successful POV and early expansion led to the current plan to roll out to over 100 factories, worldwide.

• Goals
  • Operations optimization:
    – Increase productivity 10 - 25%
  • Predictive maintenance:
    – Reduce costs by 10 - 40%,
    – Reduce downtime up to 50%
    – Reduce capital investment 3 - 5%
  • Inventory optimization:
    – Save 20 -50% of carrying costs
PTC AND HPE: BETTER TOGETHER TO ACCELERATE DIGITAL TRANSFORMATION

With...

- Complementary IIoT expertise, recognized by leading analysts
- Proven, validated solutions and services for faster time to value
- Investment of $1B (PTC) and $4B (HPE)
- Proven and Tested Solutions and Customer Success

Providing...

- Pre-integrated end-to-end solutions and services for Industrial IoT use cases leveraging a hybrid cloud environment to realize unparalleled edge performance, and enable accelerated deployment, faster time to insight, and future readiness.

“...reinvent the way industrial companies design, manufacture, operate, sell and service things with the convergence of the physical and digital worlds” PTC

“...develop intelligent solutions to capture, analyze and act upon data seamlessly from edge to cloud .. to be edge-centric, data-driven and cloud-enabled.” HPE
IOT LABS & DEMO SHOWCASES

HPE EBC San Jose, US
HPE IoT Lab Houston
PTC Boston, MA
Texmark Chemicals: Refinery of The Future (Galena Park, Texas)
E4TC eLab Aachen University
HPE CEC Geneva
HPE CEC Singapore
HPE CEC / IoT lab Bangalore
SUMMARY FOR SUCCESS

- Start Small and gain tangible value.
  - Have a clear goal for your POC, with measurable outcomes.
- Create a Foundation to expand and scale.
  - Leverage a standard architecture.
- Investment in digital technologies.
  - Critical for manufacturing organizations, like Cube Packaging, Texmark and our joint customers to realize:
    - Accelerated Deployment
    - Faster Time to Insight
    - Future Readiness
### Power of PTC’s Technology Platforms

<table>
<thead>
<tr>
<th>3D</th>
<th>Lifecycle</th>
<th>Orchestration</th>
<th>Experience</th>
</tr>
</thead>
</table>
| • Associative 3D Modeling  
• Generative Design  
• IOT-Connected 3D Digital Twin  
• 3D Work Instructions  
• Configured Digital Mockup  
• 3D Spatial & Object Capture  
• Design for Additive Manufacturing  
• Multi-CAD Collaboration  
• Real-time Simulation | • Requirements Management  
• Content Management  
• Project Collaboration, Governance & Workflow  
• BOM Management  
• Change & Configuration Management/Digital Thread  
• Product Variability Management  
• Manufacturing Process Management  
• Service Process Management  
• Quality Management | • IT & OT Data Acquisition  
• Contextualization  
• Data Analytics & Visualization  
• Business Process Flow  
• UX Composition  
• Domain-specific Logic Composition  
• Domain-specific Data Models Composition  
• Industrial Protocol Translation  
• Digital Content Management & Remote Access | • Object Recognition & Tracking  
• Spatial Recognition & Tracking  
• Experience Authoring  
• Expertise Capture  
• Logical Procedure Guidance  
• Ad Hoc Collaborative Experiences  
• HMI / Experience of Things  
• Multi-Platform Device Support  
• Content Management |

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**Hewlett Packard Enterprise**

**PTC**

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THANK YOU

Speaker contact information
## HYBRID SCALABLE MODEL

### Operations, maintenance and support

<table>
<thead>
<tr>
<th>Application</th>
<th>Middleware and data layer</th>
<th>Connectivity</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTC Kepware</td>
<td>Protocol plug-in, Protocol plug-in, Protocol plug-in</td>
<td>Licensed Spectrum resources, Radio access network, Private LTE core, PLTE deployment, PLTE operations</td>
<td>Cameras, OT and sensors</td>
</tr>
<tr>
<td>PTC Thingworx Analytics</td>
<td>Data acquisition, DM and digital twin, Data persistence</td>
<td>HPE Private Cellular offering, HPE SD-WAN offering</td>
<td>HPE Edgeline GL20, Zero-touch provisioning, Edge platform management and assurance</td>
</tr>
<tr>
<td>PTC Thingworx Core</td>
<td>Data and device services exposure, DM and digital twin, Data persistence</td>
<td>Azure cloud services, Azure IaaS</td>
<td>Azure IoT edge, Azure IoT edge</td>
</tr>
</tbody>
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### Core and Cloud
- Azure cloud services: Analytics, AI services, Visualization
- Azure IaaS: Inter-factory communication, Factory-to-cloud communication
- IoT Hub: Global Data persistence services (DBaaS, Data lake)
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Product Maturity

Technology Strength

Portfolio Attractiveness

Total market size 2015: $221M

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Strategies

Challengers

Contenders

Strong Performers

Leaders

Full vendor participation

Weak

Strong

Source: PTC

Current offering

Market presence

Product Challenger Leader

Follower Market Challenger

100%

0%

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- Azure Stack
- Azure IoT Hub
- Azure VM
  - ThingWorx
    - IoT Hub
    - Connection Server
    - SQL Server
    - ThingWorx Analytics
    - Custom Apps
    - Accelerator Mfg Apps
- Azure VM
  - ThingWorx Flow
- Additional Azure Services:
  - Azure Functions
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Additional Services:
- Azure Functions

Equipment:
- EL300
- EL1000
- EL4000
- EL 8000
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- HPE ProLiant

Other:
- ThingWorx Kepware Server

Hewlett Packard Enterprise Enterprise

Deployment and System Integration

In Development
RECORD OF SUCCESS WITH OUR JOINT CUSTOMERS

Leading Tools Manufacturer

2X
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