IoT in Oil & Gas

Peter Hoffmeister
Sr. Director – IoT Technical Sales
“The very thing that you produce, that you manufacture, for the first time is connected to the web of activity around it. It's not just the connection with everything, it's the ability to reason about that activity, that data that's being generated, continuously.

“When you change the way you see the world, you change the world you see.”

Satya Nadella
McKinsey: After studying sensors on rigs around the world, found that less than 1% of the information gathered was being made available to the decision makers.

CISCO: By fully optimizing the IoT solutions available, an oil and gas company with $50 billion in annual revenue could increase its profits by nearly $1 billion.

SHELL: A relatively small increase in recovery of just 1% globally would equate to three years’ production at current levels.

BHP OIL: Crunching exploration data is cutting the time needed to produce oil from remote sites from seven years to three years.
Billions of Devices

- 70% of value enabled by IoT will come from B2B scenarios
- 22 billion Connected “things” by 2020
- $1.3 trillion Market for IoT by 2020

IoT Opportunity

- SaaS/PaaS: $23.4B
- SI/Consulting: $25.4B
- OS: $4.6B
- Analytics: $16.6B

Be the platform and service of choice for all device builders

- SKANSKA – Manufacturing
- CSU – Smart energy
- CROKE PARK – Smart City
With IoT, the meaning of “possible” changes

- Boost production from the ground up
- Create new business models
- Innovate faster
- Improve product availability and usage
- Give customers what they want before they know they want it
- Better predict customer behavior
- Spend less time wondering and more time knowing
- Identify and prepare for new opportunities
- Open new revenue streams
- Respond to changes in the market faster
- Provide better service and improve customer experiences

Microsoft
IoT means business model change

IoT is no longer just for early adopters

Change offers tremendous opportunity

- $130B: New monetization avenues due to IoT-related services
- 40%: Top 100 manufacturers will provide product-as-a-service by 2018
- 80%: Companies that increased revenue as a result of IoT implementation
IoT technologies have reached an inflection point

- Hardware is adaptable
- Connectivity is pervasive
- The state of the art is maturing
- Efficiencies fuel investment
- Analysis enables new businesses
Technology is no longer holding back creativity
Foundation of IoT
Microsoft’s Internet of Things strategy

 Intelligent Edge Computing

- Real-time insights
- Interoperability
- Data aggregation

 Intelligent Cloud Computing

- Hyper scale
- Advanced analytics
- Flexibility
Easier to build secure, scalable solutions from device to cloud

<table>
<thead>
<tr>
<th>Azure IoT Hub</th>
<th>Azure IoT Suite</th>
<th>Microsoft IoT Central</th>
<th>Windows 10 IoT Core</th>
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<tbody>
<tr>
<td>Secure, scalable PaaS</td>
<td>Pre-configured solutions</td>
<td>SaaS offering fully managed and hosted by Microsoft</td>
<td>Supports the languages &amp; frameworks you already know</td>
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| For connecting any device running any OS | • Remote monitoring  
• Predictive maintenance  
• Connected factory | *Coming soon* | Management |
|                           |                 |                       | NUI |
|                           |                 |                       | Edge compute |
|                           |                 |                       | Security and servicing |
1.6 million miles of fiber

- Datacenter
- CDN Locations
- Edge Node
- Internet Exchange
- Terrestrial Network
- Subsea Network
# Compliance audits and certifications

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IoT is already delivering tangible results

- **Johnson Controls**: Chillers now run 9x faster than unconnected equipment, avoiding more than $300,000 in hourly downtime costs.
- **Liebherr**: Cutting fuel usage by 1% could save $250,000 per plane per year.
- **thyssenkrupp**: Gathers data from sensors and systems to create valuable business intelligence and reduce downtime by 50%.
- **Rolls-Royce**: Improves access to production and supply chain data worldwide, reducing downtime costs by as much as $300,000 per day.
Oil & Gas Lifecycle | Upstream

1. Exploration
2. Development
3. Drilling
4. Production

Operations Control Center

Production Manager
Geologist
Onsite personnel
Vision for Connected Oil Field
Optimize the oil and gas lifecycle using the power of the cloud

**Connected oil fields**
- Accelerate time to oil and extend reservoir lifetime
- Enhance recovery techniques to recover more oil and optimize production
- Quickly alter recovery methods based on real-time data

**Connected workforce**
- Unify access to data and solutions and support mobility
- Accelerate onboarding and knowledge transfer
- Increase collaboration and productivity of field workers

**Predictive analytics and insights**
- Create more accurate reservoir models, optimize drilling and identify risks
- Evaluate production data to update models
- Optimize equipment and enable predictive maintenance

Optimize the oil and gas lifecycle using the power of the cloud.
Drivers for Oil & Gas

Drivers
- Increasing complexity and volume of data
- Low hydrocarbon pricing
- Safety and the environment; regulatory pressure
- Growth and competition in emerging markets
- Dynamic workforce

Focus Areas for Investment
- Efficient recovery planning
- Asset longevity
- Better supply chain management and logistics
- Better use of talent anywhere at anytime
- Resource sustainability

Benefits
- Increase in production per reservoir
- Improve predictive capabilities
- Reduce supply chain costs
- Reduce safety and environmental incidents
- Improve workforce responsiveness
Microsoft Ecosystem
Leveraging our Global Partners
Customer Examples
Real-time production monitoring and model-based predictive analytics for the digital oilfield

**Challenge**
- Improve well performance
- Increase operational efficiency
- Reduce lift costs

**Solution**
- Model based management by exception approach and predictive analytics
- Automates well centric workflows by seamlessly integrating field data, well models and predictive analytics

**Benefits**
- Gain line of sight to 1,000’s of wells
- Predict and mitigate problems before they happen
- Utilize your existing investments
- Realize value immediately

"It takes minutes to set up a well within FieldPulse and value can be realized within hours. FieldPulse supports all OPC compatible data historians, well models from most major vendors and each installation can be scaled to over 1000 wells."
Predictive Maintenance of Electric Submersible Pumps on Azure Machine Learning

Challenge
- Revenue loss due to well downtime after ESP failures.
- Pumps take 30 days to replace.
- Lack of time to failure insight and predictive alerts for failure.

Solution
- Semi-automatically mapped 74,000+ tags in 3.5 hours (previously took months)
- Created predictive model to predict ESP failures 60 days in advance across 1,100 wells in a single production unit.

Benefits
- Failure predictions enabled targeted maintenance scheduling.
- Reduced outage from 30 to 21 days, avoiding hundreds of down days, recapturing $Millions in annual revenue

“PI Integrator for Microsoft Azure and Cortana Intelligence enable customers to derive insight from the operational data and turn it into intelligent action, using a trusted, secured infrastructure, in their journey towards digital transformation.”

Martin Otterson, Senior Vice President of Sales, Marketing and Partners at OSIsoft.
PI Integrator for Azure

Devices & Gateways

PI Connectors | Interfaces
OSIsoft Open Message Format (OMF) *4Q

PI Server(s)

PI Integrator for Azure

PI Notifications
PI Event Frames
Analytics
PI Asset Framework
PI Data Archive

BI Ready Data

Cortana Ready Data

IoT Ready Data

Cortana SQL Data Warehouse

Azure Data Lake Store

Azure IoT Hub

Azure IoT Suite

Windows

iOS

Android

HTML5
Solving global water challenges with Microsoft cloud technologies

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<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
<th>Benefits</th>
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<td>• Collect real-time data from more than 36,000 customer water systems worldwide</td>
<td>• Ecolab is using cloud services including the Microsoft Azure IoT Suite and Microsoft Dynamics CRM to seamlessly collect, analyze, and share data</td>
<td>• Provides actionable intelligence that drives continuous improvement</td>
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<td>• Help optimize performance to achieve net zero water usage</td>
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<td>• Enables more proactive customer engagement</td>
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<td>• Cuts water, energy, and operational costs</td>
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“It’s really a ‘virtuous cycle’ with less water, better results, and much lower operating costs. Because ultimately, our customers want to be good corporate citizens.”
— Christophe Beck, Nalco Water, an Ecolab company President
Call to Action

• Change the World you See

• Leverage IoT technology to transform

• Lead with transformation and get a head-start on your competition

• Make sure your tech partners get the basics right: Security, Data Privacy & Compliance
THANK YOU!

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Partner Devices & Solutions

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