Agenda

- Gaining Insight from the Internet of Things
- IBM Watson IoT Platform and Analytics
- Deep Dive
- Demo
- Summary & Questions
A Couple of Questions to Help Set Context

1. How many of you are in the process or have instrumented your assets with IoT sensors?
   - Are you adding sensors to your assets and connecting to your network?

2. How many of you have assets that are already instrumented?
   - Are you currently using the information coming off the assets?
   - Are you planning to use or looking for ways to use the information better?

- The reason for asking is to help understand how the FMMUG members are using or thinking about IoT data for asset management
Gaining Insight from the Internet of Things
IoT is Driving Digital Disruption Into the Physical World

**Accelerating Advancements in Technology…**

- Advanced Analytics
- Product Lifecycle Mgmt
- Cloud Computing
- Pervasive Connectivity
- Embedded Sensors

**Are transforming every part of business…**

**Improving Operations and Lowering Costs**
- Predictive maintenance
- Analyze and reduce risk
- Factory automation

**Creating New Products and Business Models**
- Smarter, safer cars
- Health and fitness
- Home and building automation

**Driving Engagement and Customer Experience**
- Smarter, more profitable retail
- Engaged events and venues
- Apps that link the digital and physical world around a brand
Customers struggle to gain meaningful insights from their assets

What is going on with all the assets which are critical to my business?

If I have an issue with one of my assets, how can I get an early warning so I can optimize maintenance schedules?

How can I minimize repairs that are not needed?

Can I avoid problems before they occur?
Customers struggle to gain meaningful insights from their assets

- What is going on with all the assets which are critical to my business?
- I need to monitor device behaviors to understand anything that isn’t working as expected in real-time.
- If I have an issue with one of my assets, how can I get an early warning so I can optimize maintenance schedules?
- I need to detect that something is wrong and schedule maintenance before failure.
- Can I avoid problems before they occur?
- I need insights from devices in the field to schedule repair only when needed.
- How can I minimize repairs that are not needed?
- I need to forecast problems or situations and initiate appropriate response(s) to avoid unplanned down time.
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How Can IoT and Analytics Help You?

- If you answered “yes” to any of the earlier questions
  - IoT Data and Analytics can provide additional data that can help you answer the age old question – Does the thing need maintaining or not?

- What we will do in this presentation is show you how that data can be used and analyzed
  - Without requiring a Data Scientist
  - YOU can define and maintain your own analytics
IBM Watson IoT Platform
IoT value is realized in four foundational areas

1. **Industry Transformation**
   - Evolving new business models

2. **Applications & Solutions**
   - Optimizing operations and enhancing performance

3. **Platforms**
   - Building and managing IoT solutions

4. **Devices & Networks**
   - Connecting what matters

**Representative Offerings**

- IoT for Automotive, IoT for Electronics, IoT for Insurance
- Asset Management, Facilities Management, Predictive maintenance
- IBM Watson IoT Platform Continuous Engineering
- IBM Ecosystem partners
The IBM Watson IoT Platform
Everything you need to Innovate with IoT

Offerings

IBM Watson IoT Platform Connect
Attach, Collect & Organize, Device Management, Secure Connectivity, Visualization

IBM Watson IoT Platform Information Management
Storage & Archive, Metadata Management, Reporting, Streaming data, Parsing and Transformation, Manage unstructured data

IBM Watson IoT Platform Analytics
Predictive, Cognitive, Real-time, and Contextual

IBM Watson IoT Platform Risk Management
Security Analytics, Data Protection, Auditing/Logging, Firmware Updates, Key/Cert Mgmt, Org Specific Security
Your device or gateway

We start with your device, be it a sensor, a gateway or something else.
To find out how to get it connected, search our recipes.

IBM Watson IoT Platform Connect

This is the hub of all things IBM IoT. This is where you can setup and manage your connected devices so that your apps can access their and historical data.

Your application and analytics

Create applications within IBM Bluemix, another cloud, or your own servers to interpret the data you now have access to!

REST & Real-time APIs

Use our secure APIs to connect your apps with the data coming from your devices.

MQTT

Your device data is sent securely up to the cloud using the open, lightweight MQTT messaging protocol.
IBM Watson IoT Platform Analytics
Watson IoT Platform Analytics
IoT Real-Time Insights

Connect

Sensors provide information about the device

Monitor

Monitor real-time data flow for issues

Act

Act on insights and automate responses
**Watson IoT Platform Analytics**

**IoT Real-Time Insights**

- **Contextualizes** device data
- **Monitors** streaming data to detect situations
- **Acts** on insights from the data

1. **Sensors provide information about the device**
   - Device
   - SCADA, historians

2. **Data comes in through IoT Foundation Connect**

3. **Data drives real-time analytics and business rules**
   - Real-time data

3a. **Data is enriched with external data such as Weather or asset master data**

4. **Rules trigger an action, such as an alert, email, text message or a work order in Maximo**

5. **Recommendations drive response in Maximo**

IBM Watson Internet of Things
Real-Time Insights use case patterns

- Monitoring of devices, processes, and people

- Devices
  - Device monitoring & alerting, e.g. tell me when the battery is below 5%
  - Condition Based Maintenance, e.g. trigger a maintenance work order in my EAM system when the temperature exceeds 100°C and RPMs are below 2,500

- Processes
  - Situational awareness, e.g. visualize devices in a map based view, showing me current status and alerts
  - Energy monitoring across a collection of devices

- People
  - Safety monitoring for hazardous conditions
  - Elderly monitoring, e.g. alert me if the house door has been open more than 15 minutes.
IoT Real-Time Insights Deep Dive
Defining the IoT Data Message Content

- To perform analytics on IoT messages the format of the IoT message must be defined
- RTI provides UI for defining IoT message content per class of device
- RTI automatically inspects message content provides a pre-populated schema
- Virtual data points, e.g. temp value that comes in Fahrenheit, but you need to convert to Celsius – \((F - 32) \times \frac{5}{9} = C\)
Example of Simple Rule Definition

- Simple analytic rule defined with one predicate
- Examines IoT message and looks for a GForce value > 30
- If analytic finds GForce value > 30, action is driven
Example of Complex Rule Definition

- Analytic rule defined with multiple predicates
- Complexity can be controlled by the user to suit their needs
Drive automated handling of analytic results

- Rules drive user defined automation to handle issues
- Single or multiple actions can be defined
- Context about the analytic and the data which triggered it are available to the action processing
- Action handling can invoke IFTTT, Node-RED, and arbitrary RESTful APIs
Action Management – shared, reusable actions

- Actions are defined outside the rule definition but are used by the rules
- Allows actions to be updated without having to touch the rules that use the actions
- Actions can be reused across multiple rules
Action Examples

- Create a service request in your Enterprise Asset Management system when an asset has an issue
- Notify your sales team when a customer needs new supplies for your product
- Send a text message to personnel and alert your Safety Team when unsafe conditions exist
- Or closer to home, remind yourself when you’ve left the garage door open at night
IFTTT Action

- Uses the IFTTT Maker channel
- Enter the key and event name
- Use variable substitution to enter values 1-3
Node-RED Action

- Call into a Node-RED flow
- Specify the URL end point
- Optionally provide ID and PW
- Define Node-RED flow to match using ‘HTTP in’ node
Webhook Action

- Call an arbitrary URL endpoint – RESTful API
- Specify URL and http method (POST, GET)
- Optionally provide ID and PW
- Add header name/value pairs to pass to the URL
Alert filtering in the Dashboard

Filter alerts by date range, last NN days, hours, minutes
What’s Next - Analytics Scenarios

Real-Time
High speed, ‘perishable’ data require scalable contextualization and processing to gain insight and react in near real time

Discovery
Huge volumes of data are incredibly hard to make sense of, you need to find the patterns and correlations to gain insight

Trending
Data is filled with trends, such as rising temperature or cyclical patterns in a motor’s RPMs, you need to understand norms and forecast issues

Edge Processing
The flood of data will become unmanageable and cost prohibitive, data needs to be evaluated and processed closer to the source to react, filter, summarize, etc. data at the edge

Unstructured data
Unstructured data is also proliferating in the form of video/image/audio data, text log files, maintenance logs, medical logs, etc., this data needs to be correlated with other sources of machine data and processed for insights

Predictive
Mission critical equipment and processes need to run smoothly, and you need advance warning of issues in order to avoid down time, business disruption, and safety issues

Cognitive
IBM Watson Internet of Things
Summary
Summary

• Analytics are a key to gaining insights from IoT data
• IoT Real-Time Insights is part of the IBM Watson IoT Platform
• Real-Time Insights will help you solve real-world monitoring problems – QUICKLY
• Go try out the RTI mobile phone demo – it’s super easy!

➢ stay tuned – We will leverage additional IBM analytics capabilities in the IoT Platform including Cognitive, Predictive…
IoT Platform Pricing

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<th>Plan</th>
<th>Features</th>
<th>Monthly price</th>
<th>Multi-Tiered</th>
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<td>Lite includes 25 MB of data analyzed per month 25 MB of data stored per month</td>
<td>Free</td>
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Monthly prices shown are for country or region: United States

With the Lite IoT Real-Time Insights plan, you can deploy only one instance of the service per organization. The Lite service plan includes up to 25 MB of data analyzed and 25 MB of data storage per month.
IBM IoT – Get started today

Learn more about IBM’s point of view on the Internet of Things
ibm.com/IoT

Try out Internet of Things on Bluemix
ibm.biz/try_iot

Try out Real-Time Insights
ibm.biz/try_rti

Getting Started video for Real-Time Insights
youtu.be/_Q4GlqAf2m4

Join us in our IoT conversations
@IBMloT
Please Contact For Additional Information

- Gregory Knowles – IoT Analytics Product Manager
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- Wayne Riley – IoT Analytics Lead Architect
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- Both are willing to engage with you for a deeper discussion on IoT Analytics around your specific use cases
Cognitive IoT

Natural Language Processing
Enables interaction through natural human language and dialog

Example:
A technician asks about symptoms an asset is displaying. The system uses additional context including location and asset data to understand the intent of the query and returns suggestions for possible causes and repairs.

Machine Learning
Automates data processing and continuously monitors new data to learn and improve results

Example:
The system monitors incoming data from a fleet of equipment to learn both normal and abnormal conditions taking into account environment and production processes which are often unique to each piece of equipment and location.

Textual Analytics
Enables mining of textual sources to find correlations and patterns in these vast amounts of untapped data

Example:
An asset analyst uncovers emerging problems and identifies possible root causes by analyzing the unstructured text found in customer problem reports and maintenance logs.

Video/Image Analytics
Enables monitoring of unstructured data from video feeds and image snapshots to identify scenes and patterns

Example:
Production environments are monitored with video cameras and sensors, and a worker entering a hazardous area without the proper safety equipment is automatically notified and a safety incident is logged.
Harman Kardon – Smart Speakers
Natural Language Processing

Harman uses Cognitive APIs to build interactive system for the home

Demo will be live at Interconnect!
Cognitive analytics patterns

- **Natural Language Processing**
  - Enables users to interact with systems and devices using simple, human language – voice & text
  - Understands human intent through correlation, context, and language constructs
  - Hands free interfaces, quicker insights and understanding

- **Machine Learning**
  - Enables understanding of current conditions, normal/abnormal, trends, properties to monitor, and even suggested actions
  - Continuous monitoring of new information, learns priorities and ranks accordingly based on interaction with end users
  - Necessary to process and understand large volumes of data

- **Video/Image Analytics**
  - Enables analysis and correlation of unstructured video and image content
  - Recognizes scenes and patterns and can alert for anomalous conditions

- **Text Analytics**
  - Enables analysis and mining of unstructured textual content, including maintenance logs, call center logs, problem reports, etc.
Analytics on IoT Data as it Arrives at the Platform

- Analytics platform designed and built to process large volumes of IoT data
- Segmentation of critical processing allows analytics to be applied rapidly to the arriving IoT Data
Add Context to IoT Devices as Needed

- Customers can instrument existing assets by adding sensors to the device
- Those IoT devices (sensors) don’t know the context in which they are reporting information
- RTI allows IoT devices to be associated with asset information imported from asset management system

Logical Relationship Defined
IoT requires the right capabilities applied to the right data for the right results

**Real-Time**
Most machine data is worthless about 1 second after it is generated

Real-Time analytics enables monitoring and processing of streaming data to enable "perishable insights" and automated decisions in near real-time

**Predictive**
70% of the most profitable companies will leverage predictive analytics in 2016

Predictive models are created from historical data to generate insight and recommend actions before situations cause business disruptions

**Cognitive**
IoT will rapidly change our ability to interact with machines and engage customers

Cognitive technology enables deeper customer engagement through enhanced interactions and automated discovery and insights using machine learning techniques

*In the cloud & at the edge*
Questions