Connecting to the Internet of Things (IoT)

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Impact to business models
- Shift from physical to digital differentiation.
- Outcome based economy.
- New Revenue Models

IoT and Mobility impact to business processes.
**OPPORTUNITY:**
- 400 production lines producing 140,000 kilometers of wire per day, 24/7 operation
- Growing concern about product liability
- Increasing costs of wasted copper, labor, and energy due to late detection
- Detection limited to only a few factors and 100 meter segments of wire

**SOLUTION:**
- Monitors dozens of quality factors in real-time against relevant order data
- Real-time intervention
- 25 millimeter segment quality detection
- Factory-floor interfaces to monitor quality and augment data manually
- Faster product introduction at lower risk
- Flawless, uninterrupted copper production

**RESULT:**

- ACHIEVED FASTER RESPONSE TO PRODUCTION ISSUES
- IMPROVED DETECTION
- GROWTH IN MARGINS

**QUALITY CONTROL**

**25 MILLIMETERS**
**OPPORTUNITY:**
- Engines provide onsite generation for power, heating, and cooling
- Support additional revenue stream through contracted engine maintenance
- Requirement to meet SLAs for uptime across multiple customers and locations
- Preventative maintenance avoids unplanned downtime and reduces costs

**SOLUTION:**
- Advance maintenance deployment before outage saves ~1K/engine/year
- 3,400+ engines are monitored using machine-to-machine feeds
- 250 data points every 30 seconds
- With 10 second latency, combines engine service diagnostics and engine application performance statistics into consolidated dashboard

**RESULT:**
**PROACTIVE MAINTENANCE**
Deployment and Performance Diagnostics

SAVES $3.4+M PER YEAR

3,400+ engines monitored using machine-to-machine feeds
**OPPORTUNITY:**

- Outcome based contracts requiring shift from shipping on time, to ensuring stock on hand
- Reduce shipping costs for normal deliveries
- Leverage increased delivery traceability through IoT within logistics

**SOLUTION:**

- Monitor on hand and consumption rates
- Plan shipments via best cost routing for normal restock
- Track deliveries and predict delays based upon known route patterns
- Expedite new shipment when needed to ensure successful outcome

**RESULT:**

- **LOWER COSTS**
- **IMPROVED SATISFACTION**
- **ENABLED NEW BUSINESS MODEL**
Connecting to IoT

Peer to Peer

Things to Server

Things to Hub to Server
Multiple Variations Combine Models

- Peer to Peer
  - RFID Cartridges so dispenser knows inventory
- Local Hub to things
  - Dispenser monitors flow rates, temperatures, etc.
- Thing to Server (Dispenser)
  - Nightly updates of inventory and usage to hub
  - Receives campaigns and other content updates
  - Servers sweeps, aggregates, analyzes
- Thing to Server (Phone)
  - Setup account on Phone
  - Create Fusion Mixes up to 3 flavors
- Peer to Peer then Thing to Server to Thing
  - Phone reads 2D barcode on machine
  - Phone talks to Server letting it know where it is
  - Server tells the dispenser who with recipes
  - User picks recipe and mix flows
Pratt & Whitney’s Geared Turbo Fan (GTF) engine – an engine that comes with 5000 sensors that generate up to 10 GB of data per second.

A single twin engine aircraft with an average of 12 hours flight-time can produce 844 TB of data.
Additional Considerations

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- Data at Rest
- Data in Motion
- Classes of Information
- Registration
- Authentication
- Scale
- Throttling
- Software Updates
• Still working on visual
Point to Point Challenges

- Direct Coupling and Dependencies
- Lifecycle Timing
- Security
- Scale
- Limited Intelligence
- Complexity
• Still working on visual
Benefits of Gateway and ESB for IoT Connectivity

- Provides Abstraction
- Consistent Security
- Registered Consumers with Onboarding
- SLA Differentiation
IoT Combined with Gateway & ESB Creates Value

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BUSINESS LOGIC

DATA (EVENTS)

INTEGRATION

DECISIONS (RULES)

TASKS (PROCESSES)
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