Enabling Digital Transformation

INDUSTRIAL INTERNET OF THINGS
Enabling Digital Transformation
Evolution of Industrial Internet of Things

1970s
- Distributed Control System Introduced

1980s
- Internet of content
  - WWW
  - E-mail
  - Information
  - Entertainment

1990s
- Adoption of Windows in Process Control
- Internet of services
  - Web 2.0
  - E-productivity
  - E-commerce

2000s
- Adoption of Virtualization
- Internet of people
  - Social media
    - Skype
    - Facebook
    - YouTube

2010s
- Internet of things
  - Machine to machine
    - Identification, tracking, monitoring, etc.
Challenges

- Engineers spending too much time extracting and aligning data from various sources
- Different tools needed for each type of data; different users have access to different tools
- Users constructing isolated and inconsistent analysis tools
- Lack of visibility to real-time performance against business metrics
Needs

Collecting and storing all relevant data in the organization

Predicting and detecting issues and opportunities

Visualizing information anytime anywhere to gain valuable insights

Making right decisions at the right time with the right information
Addressing Core Industry Problems

Production Efficiency
- Maximize production throughput
- Reduce OpEx costs

Process Reliability
- Run the plant at peak performance
- Eliminate unplanned downtime

Safety
- Reduce risks and direct costs of plant incidents
- Regulatory compliance

Gains not possible with conventional methods used today

Proven impact $5-15M per site per year

Typical savings of $7-20M per year

Cost savings $1.6B per site per year

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How Does IIoT Work?

IioT Elements

1. Smart & Connected Assets and Devices
2. Data Management and Onsite Control
3. Predictive Analytics
4. Smart and Secure Collaboration

IioT Architecture

- Predictive Analytics
- Prescriptive Decision Making
- Smart Collaboration

Private, Public or Honeywell Secure Cloud

OEMs
Licensors
COEs

• Enterprise History
• Asset Management
• Operations Management
• Planning & Scheduling
• Mobility Solutions
• Enterprise Dashboards

OPC UA
 Automation & Control
 Site #1

OPC UA
 Automation & Control
 Site #2

OPC UA
 Automation & Control
 Site #3

OPC UA
 Automation & Control
 Site #4
## Edge Devices – Functional Model

<table>
<thead>
<tr>
<th>Data Consumption</th>
<th>Local User Access &amp; Control</th>
<th>Remote User Access &amp; Control</th>
<th>Data Access for Complex OEM Analytics</th>
<th>Data Access for Complex End-User Analytics</th>
<th>Data Access for Compliance, Commerce, or Environmental Reporting</th>
<th>Ancillary Data for Improved Analytics</th>
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<tbody>
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<td>Stranded Asset Data Acquisition Edge Device</td>
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New “Edge” Devices Expand IIoT Capabilities of Existing Infrastructure
Use Case | Connected Performance Services

CPS Architecture and Predictive Analytics

Secure Cloud Collaboration

Customer’s Enterprise

Control Room

HPS Controls & Process Data

CPS Dashboard
Solution per Process

Plant

UOP Process

Connected Devices

Big Data

Analytical Models

UOP Remote Expert CPS Services

- Optimize process yields
- Maximize mix of feeds to convert
- Lower energy utilization
- Extend useful catalyst lifetime
- Prevent process downtime
- Benchmark site-to-site operations

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Use Case | **User Driven Analytics**

### The Opportunity

1. **Customers** want to get more value out of their data without expensive and time-consuming Big Data projects.
2. Analysis tools integrated with Honeywell solutions allow users to easily identify abnormal patterns and set up automated monitoring for them.

- **Customer** can do more timely analysis and monitor their assets and production more effectively leading to improved quality, increased uptime, lower maintenance costs.
- End-user focus maximizes the value of Engineers and Specialists without requiring complex IT projects.

### Why Honeywell

- Honeywell’s integrated suite of applications supports end-to-end automation of asset and process monitoring.
- Honeywell’s solution works with the customers’ existing systems and data.

### Value

- Customer can do more timely analysis and monitor their assets and production more effectively leading to improved quality, increased uptime, lower maintenance costs.
- End-user focus maximizes the value of Engineers and Specialists without requiring complex IT projects.

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Use Case | Equipment Vendor

The Opportunity

1. Customers need better insight on how to manage their equipment to maximize performance and lifespan
2. Vendors need to benchmark equipment data & tools performance and offer advisory services to their customers

- **Customer** gets better performance and/or lifecycle out of their equipment
  - More production, less downtime
  - Lower maintenance cost, reduced capital cost for replacement and spares
- **Vendor** gets increased customer satisfaction | Subscription revenue for enhanced support services | Product improvement feedback

Why Honeywell

- Honeywell has significant experience offering world-class remote services to the process industries
- Equip vendors don’t need to be IoT system integrators or manage IT – Honeywell has the IIoT platform, tools and integration experience
- Mutual customers unlock potential for broader collaboration

The Solution

- IloT by Honeywell
- Data sharing
- Benchmarking & Analytics
- Recommendations
- Collaboration

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Vendor-Specific IIoT Framework

- **Vendor “A”** Analytics
- **Vendor “A”** Data Lake
- **Vendor “A”** Secure Data Transfer
- **Data Aggregation “A”**
- **DAQ “A”**
- **Maintenance Management Platform**
- **Analysis Dashboard**
- **Vendor “A”**
- **Process Data DCS**
- **Process Data PLC**
- **Process Data Asynchronous Data**

**Vendor “A”** Prevention/Resolution Workflow

**Vendor “A”** Analytics

**Analysis Dashboard**

**Vendor “A”**

**Maintenance Management Platform**

**Data Aggregation “A”**

**DAQ “A”**

**Process Equipment Vendor “A”**
Unified Honeywell IIoT Framework

- Common Data Lake
- Single secure data transport path
- Single dashboard (Experion HMI Integration)
- Single data aggregation module shares common DCS/PLS/etc data links
- Common edge devices (by Honeywell)
- Simplified collaboration between site, remote SMEs, OEMs
IIOt by Honeywell Ecosystem

Leveraging IIOt to solve key customer challenges

1. Operating without unplanned shutdowns
2. Reaching plant peak performance… and staying there
3. 100% HSE performance, people, plant & environment
4. Data Driven Optimization of enterprise supply chains

Secure Ecosystem Adds Domain Knowledge to Solve Challenging Problems

Honeywell Hub and Spoke Architecture

Honeywell App Store

INspire Programs

External App Developers

Knowledge Vendors
- EPCs
- OEMs
- SIs
- Process Licensors

Data Scientists

Honeywell HUB

Cloud Analytics

Honeywell Sentience™

Cloud Data Consolidation

3rd Party Equ. Vendors

DCS Process Data

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The Vision
To solve customer problems, previously thought unsolvable:
• Enable enterprise-wide supply chain optimization
• Allow you to operate at optimum capacity
• Avert unplanned shutdowns at your plants
• Improve safety and security throughout your enterprise

The Solution
• An ecosystem based on our secure, cloud-based platform designed to handle industrial data
• The power of your data unlocked, making actionable insights available in the palm of your hand – easy to use enterprise apps
The Most Complete Set of Secure, IIoT-Ready Solutions

Smart & Secure Collaboration
- Honeywell™ Pulse (Mobility Solutions)
- Intuition® Executive
- LEAP™
- Industrial Cyber Security Risk Manager
- Big Data & Collaboration
- Digital Suites for Oil & Gas
- Experion® Collaboration Station

Analytics
- Uniformal® Asset Sentinel
- DynAMo® Alarm and Operations
- Lifecycle Services & Dashboards/Assurance 360
- Uniformal® KPI
- Uniformal® Insight
- UniSim®

Data Management & Onsite Control
- DCS Experion® / RTU 2020
- Uniformal® PHD
- IIoT-enabled SCADA systems
- Experion® Orion Console
- Cloud Engineering
- Virtualization
- Safety Systems
- Optimization – Profit®

Smart, Connected Assets & Devices
- SmartLine® Transmitters
- Gas Flow Measurement
- Matrikon® OPC UA / Classic
- OneWireless™
- Universal IO
- Tank Level Measurements
- C300 Controllers

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Innovation to Drive New and More Profitable Ways to Operate