Accelerating digital transformation in Oil & Gas with multi-protocol industrial wireless

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Speakers

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Agenda

Cisco perspective on O&G
The Digital Enterprise, IoT and Industrial Wireless
Cisco Ecosystem – Honeywell
Cisco and Honeywell Multi-protocol Wireless
Cisco and Honeywell Use-case Examples
Summary
### Priorities in Upstream (Exploration and Production)

<table>
<thead>
<tr>
<th>Innovate with field automation</th>
<th>Optimize oilfield assets</th>
<th>Manage a changing workforce</th>
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<tbody>
<tr>
<td>Extend automation capabilities onto onshore assets for remote decision support and digital surveillance</td>
<td>Maximize recovery and production with new E&amp;P techniques + use field instrumentation to reduce costs for energy and waste</td>
<td>Attract and keep new (often younger) field workers and ensure safety and productivity remain high</td>
</tr>
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</table>
Technology Trends in Upstream (Exploration and Production)

Digital surveillance
Remote SCADA data collection from wells; remote control of instrumentation; video feeds

Well instrumentation
Critical OT data gathering for production volumes, well tests, water levels, and tank levels

Predictive maintenance
Data and edge computing to predict failures to components such as lift rods, pumps, and compressors

Digital workforce
Access to tools, data, and collaboration applications for field workers to increase productivity and safety
Priorities in Midstream (Pipeline)

Optimized operations
Digital tools for field workforce and field assets (ex: pumps, compressors) to lower costs to operate and maintain the pipeline

Reliable operations
Operational excellence by reducing unplanned downtime related to maintenance and cyber events

Safe operations
Instrumentation, sensors, and imaging to help operators detect conditions that could impact environmental and public safety
Technology Trends in Midstream (Pipeline)

**Pipeline Instrumentation**
Automated data collection and integration into the pipeline integrity and DCS systems for real-time pipeline operations visibility

**Predictive Maintenance**
Data and edge computing to predict failures to components such as pumps and compressors

**Leak Detection**
Automated and advanced capabilities to detect leaks to maintain safety and compliance

**Digital Workforce**
Access to tools, data, and collaboration applications for field workers to increase productivity and safety
The Digital Enterprise, IoT and Industrial Wireless
Cisco Platform for Oil & Gas Digital Enterprise
Supporting and Driving Digital Transformation

- Business Intent & Security Policy
- Learning
- Context
- Security
- Automation & Assurance

Digital Enterprise

- Business Operations/OT
- Data Model
- Applications
- Cisco Infrastructure Platform

Business Insight

- Analytics
- Applications
- Data Control and Exchange
- Edge Computing
- Connectivity
- Sensors/Devices

Devices & Things
An unparalleled end-to-end IoT portfolio

- Network connectivity
- Connectivity management
- Edge computing
- Data control and exchange

Cyber Security
The most comprehensive network portfolio, now expanded to meet the harshest conditions

- **Cisco Catalyst IE3400 Heavy Duty Series Switch**
  - Secure Connectivity in a Heavy Duty Design

- **Cisco Catalyst IW6300 Heavy Duty Series Access Points**
  - Extend Intent Based Networking to Hazardous Locations

- **Cisco Industrial Router 1101 with Industrial SD-WAN**
  - Visibility and Control from Enterprise to the Edge
Industrial Wireless Key Use-cases

Use cases

- Wireless Mobile Worker
- Plant Turnaround
- Remote Expert
- Personal Health & Safety by detecting and monitoring leaks
- Asset and Personnel Location Tracking enabled by Cisco wireless location-based services solution
- Wireless Bridging extend connectivity to remote site
- Physical security provided video surveillance over mesh network

Control Room

Remote Plant

Catalyst IW6300

Catalyst IW6300

Catalyst IW6300

Catalyst IW6300

Remote Location providing same wireless mobility as primary site

Device

- Gas Sensor
- Location Tag
- Wearables

Main Plant

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Catalyst IW6300 Heavy Duty Series Access Points

Hazloc certified: Class I, Division 2/Zone 2

Simpler deployment with light and more compact design

802.11AC Wave 2

IoT module for enhanced capability

Cisco® Digital Network Architecture (Cisco DNA) ready

Extend Intent-Based Networking to Hazardous Environment
IW6300 At a Glance

- 802.11 ac wave 2, 2x2 MIMO with 2 spatial streams
- Dual PoE/PoE+ out to power other devices
- Wide variety of power source: AC/DC, PoE+, UPoE
- Multiple uplink options: SFP, Ethernet and wireless
- Versatile RF coverage with external N-type antenna connectors
- Resilient WiFi Mesh architecture support to reliably extend the network
- Dust and water protection (IP67-rated)
- Operate in extended operating temperature range (-50 to +75°C)
IW6300 Series Hazardous Location Certification

- CSA certification for North America
  - Class I, Division 2, Groups A, B, C, D

- ATEX certification for EU countries
  - Class I, Zone 2, Groups IIC, IIB, IIA

- IECEx certification
  - Class I, Zone 2, Groups IIC, IIB, IIA

### Class I area classification – Flammable gases, vapors, or liquids

<table>
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<tr>
<th>North America (NEC 500)</th>
<th>ATEX / IECEx (NEC 505)</th>
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<tr>
<td>Division 2:</td>
<td>Zone 2:</td>
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<td>Where ignitable concentrations of flammable gases, vapors, or liquids are not likely to exist under normal operating conditions.</td>
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*Source: UL’s Hazardous Locations Services*
It’s a Catalyst...

Simplified operations, intent-based networking all the way to the IoT edge

• IOS XE compatible, SDA-ready
• Central network policy control
• Proactive management

Manage and monitor IoT network with the same tools that manage the IT network, such as Cisco DNA Center
Cisco Ecosystem - Honeywell
OT / IT Management Requirements for IoT Deployments

OT Requirements
- Replicable
- Simple to operate
- Reliable
- Easy to fix / restore
- Wireless: ISA100, WirelessHart

IT Requirements
- Flexibility
- Security
- Policy Driven
- Extensible
- Wireless: IEEE802.11

Customer Driven: Need the right tool for each persona
Bridging the gap between IT and OT
OT Typical Needs and Challenges

• HSE Compliance
• Improve
  - workforce efficiency
  - productivity
  - asset availability
• Reliable, cyber secure infrastructure
• Fast and cost-effective commissioning
• Tight budgets to execute projects

Zero Incidents, No Unplanned Downtime, Tight Cost Control
Introduction to industrial Wireless

Wireless typically is a Cost Efficient way to connect Field Instruments

Application examples
- Machine health monitoring
- Basic process control
- Remote process monitoring
- Leak detection monitoring
- Diagnosis of field devices
- Condition monitoring of equipment
- Environmental monitoring
- Tank level monitoring
- Gas detection
- Fuel tank gauging
- Steam trap monitoring
- Open loop control
- Safety shower monitoring
- And more

Wireless typically is a Cost Efficient way to connect Field Instruments
Honeywell OneWireless

No Hardware Change!

Software Innovation

Field Upgradable!

Delivering Best Value on CAPEX and Future Expansion

Up to 25% More Cost Effective relative to Separate Networks!

Up to 50% More Cost Effective relative to Separate Networks!
Other UNIQUE FEATURES

Special Interface Network (SIN)
- Segregate Data From PCN Network – IIOT and Asset Management solutions
- External Interfaces allowed over SIN – Modbus, Enraf, OPC, GCI, HART

Field Expandable Wireless IO (FEWIO) - a new device type
- FDAP as router can be converted to a Field Expandable Wireless IO (FEWIO)
- Data collected over RS485 & transmitted to control room over wireless
- FEWIO Supports
  - Modbus RTU
  - RS-485 serial Interface used for connecting to serial interface devices
  - Modbus TCP
Latest innovations of Honeywell OneWireless R320

• Control over wireless
• ISASecure Certification
• Secure Communications - IPsec
• SIN Redundancy
• WDM Improvements
• Virtual WDM – 3000 Wireless IO
Control over Wireless

- OW systems can be used for control applications
- ISA100 Wireless AO devices supported
- For PID loops
- Input device can be wireless

<table>
<thead>
<tr>
<th>Type</th>
<th>Class</th>
<th>Type Based on Industry</th>
<th>Recommendation</th>
</tr>
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<tbody>
<tr>
<td>Control</td>
<td>1</td>
<td>Closed loop Regulatory Control (Critical control loops)</td>
<td>Not Recommended</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Closed Loop Supervisory Control (Set Point Change, Process Optimization)</td>
<td>Recommended</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Open Loop Control (Based on Requirement/ Operator In-Person)</td>
<td>Recommended</td>
</tr>
<tr>
<td>Monitoring</td>
<td>4</td>
<td>Event Action/ Sequence based (Based on Event /Small operation task)</td>
<td>Recommended</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Uploading/Downloading (Requirement based Task/ Action)</td>
<td>Recommended</td>
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Control over wireless

Topology Example I

4 Seconds or Faster Loops
• Multi HOP network
• Input is Wireless
• Output is Wired
Control over wireless

Topology Example II

1 Second or Faster Loops
- Single HOP network
- Input is Wireless
- Output is Wireless
ISA Secure Certified

Industry First!

• Comprehensive, end-to-end integrated security system
  • Confidentiality
  • Data Integrity and Authenticity
  • Source Authentication
  • Protection to Reply Attacks
  • Advanced Key Management Service
  • Wi-Fi data goes to IT via Firewall
• Independently reconfirmed by a comprehensive hackathon
• WDM continuously and automatically logs all modifications, events, and changes
• Log file provides transparent network status end-to-end, offering additional protection and prevention of unwanted events
Secure Communications - IPsec

Secure Communication Using IPsec

- Internet Protocol Security (IPsec) is a secure network protocol

- Similar to principle of Virtual private networks (VPNs)

- Authenticates and encrypts packets of data

- IPsec enables secure communication between WDM and Windows node on Process Control Network (PCN) and Special Interface Network (SIN)
Special Interface Network (SIN) Redundancy

Instant Seamless Automatic Switchover
WDM Improvements

WDM Redundancy

• Improved redundancy switchover time to <= 4 sec between primary and secondary
• Meets control over wireless application needs

WDM Duplication or Recovery

• Easy process to generate bootable ISO file back-ups
• Enabling easy configuration duplication or recovery by USB back-up
OneWireless – Virtual WDM

Virtual Wireless Device Manage (vWDM)

- Provides highly scalable OneWireless solution
- vWDM can support up to 3000 devices
  - Single vWDM = 6 WDMY
- Capacity managed via 500-device bundles
- Increased WDM OPC performance
- Hardware options for vWDM
  - Purchase virtual appliance hosts from Honeywell
  - Source hardware based on recommended specs
  - Leverage existing virtual host capacity
- Single Sign-On (SSO) to manage network of up to 3000 wireless IO
Cisco and Honeywell Multi-protocol Wireless
Honeywell OneWireless versus sensor mesh network

Different solution ................. Different performance

Sensor mesh network
- Signal latencies of up to a minute
- Battery costs up to 30 times more

OneWireless
- Real time performance
- Maximum battery lifetime

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OneWireless (v)WDM, FDAP plus IW6300

BOM (simplified):
7 Cisco IW6300 Access Points
2 OneWireless FDAPs
2 (v)WDM

FDAP (Field Device Access Point) mounted on selected Cisco IW6300 industrial Wi-Fi APs.

Scenario: Sensor routing is allowed, retrofit to existing Wi-Fi network supported (upsell).

Characteristics: sensor routing, non-time-critical process monitoring applications only, compromised sensor battery lifetime, lower initial investment, higher TCO (frequent sensor battery replacements needed).

- Transmitter signal latencies of up to a minute
- Battery costs up to 30 times more
OneWireless (v)WDM and PCAP

BOM (simplified):
7 OneWireless PCAPs (Process Control Access Points)
2 (v)WDM
All access points are PCAPs (OneWireless Process Control Access Points) forming an OneWireless Process Control Network (OW PCN)

Scenario: "Wired-like" network performance is needed.
Characteristics: sensors in star topology connected to PCAPs, process control and time critical process monitoring applications supported, maximum sensor battery life-time, higher initial investment, lower TCO (fewer sensor battery replacements needed).

- Real time performance
- Maximum battery lifetime
OneWireless Market Comparison

**Honeywell OneWireless Network**

- True redundant mesh connections to multiple access points

**Alternative Solution**

- ISA100 Wireless
- WirelessHART
- IEEE Backhaul
- IEEE Wi-Fi

**Switch**

- Cisco IW6300 and Honeywell OneWireless Islands of sensor mesh networks. If an access point fails, all associated sensors are lost for communication.

**WLC**

- Cyber Security concern
  - Gateway communicates wirelessly to DCS

- Cisco IW6300 and alternative gateway

- Process monitoring only, Latency of up to a minute, 30x Higher battery costs

**Real time performance, Qualified for process control, Maximum battery lifetime,**

**Both ISA100 Wireless and WirelessHART connectivity**

**ISASecure certified Gateway is securely positioned in DCS rack room**

**Gateway is securely positioned in DCS rack room**

**Network 1**

**Network 2**

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<th>Honeywell OneWireless Market Comparison</th>
<th>Alternative solutions</th>
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<td>• Certified ISA100 Wireless connectivity</td>
<td>✔️</td>
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<td>• Control over wireless qualified</td>
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<tr>
<td>• Wired-like network response times</td>
<td>•</td>
</tr>
<tr>
<td>• ISASecure Level 1 Certification</td>
<td>✔️</td>
</tr>
<tr>
<td>• IPsec Secure Communications</td>
<td>•</td>
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<tr>
<td>• Up to 3000 Wireless IO in one network - vWDM</td>
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<tr>
<td>• Single Sign-On (SSO)</td>
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<td>• Truly end to end redundant</td>
<td>✔️</td>
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Cisco and Honeywell
Use-Case Examples
**Reduce Resources – Time and People**

### Challenges
- Mobile computing and CCTV required during the startup and commissioning phases.
- Constraints on the weight and footprint of the solution due to offshore platform.
- Tracking personnel movement

### Solution
- Platform wide OneWireless network OneWireless Network
- 35 Marine grade access points
- ISA100 Wireless transmitters
- Wi-Fi connected personal safety tracking devices
- Haz Loc Certified Wi-Fi tablets

### Results
- Reduced number of personnel required on the platform
- Increased efficiency by remote collaboration enabled by wireless and mobility
- Best in class Personal Safety
- Reduced the commissioning, startup and troubleshooting time.
Personnel Safety - Reduce Response Time

Challenges

- Safeguard personnel from sour gas leak
- Identify the location of personnel in case of a gas leak event / man down situation
- Early detection of smallest gas leak
- Automated calibration and bump testing of gas detectors

Solution

- Site wide OneWireless network OneWireless Network
- Wi-Fi connected personal gas detectors
- Honeywell ConneXt Loneworker
- Active Worker Personal Gas Safety Solution

Results

- Risk level brought under acceptable limits
- Emergency responds without any delay
- Immediate location identification of incident
- 2-way communication with personnel in the field

“Cisco Honeywell OneWireless enabling Personal Safety to Highest Levels”
Summary

Cisco plus Honeywell OneWireless Multiprotocol Network and Solutions

- Solve problems at half the costs relative to traditional wiring
- Wireless OT applications typically have an under 1 year ROI
- Quickest installation time - data in just 1 day
- Largest portfolio of Wireless devices by multiple vendors
- Unmatched flexibility and freedom of choice
- Cyber Secure in every aspect – ISA Secure Certified
- Truly end to end redundant
- Scalable to thousands of wireless IO for monitoring and process control

! Have your projects benefit from Cisco and Honeywell OneWireless !
For Your Attention

Contact us to discuss your specific business needs

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Follow up with us!

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