Realizing the IoE Opportunity with IoT
ASEAN Internet of Things Forum
Delivering Business Outcomes in Oil and Gas Through the Internet of Everything

ASEAN Internet of Things Forum 2015

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Opportunities of the Internet of Everything (IoE)

Enabling IoE-Based Business Outcomes

Examples of IoE Value in Action

Why Cisco?

Interesting slides… but have to skip to examples…
Evolving Oil and Gas Industry
Challenges in the Oil and Gas Industry

- Revenue and Growth
  - Holding and improving production rate and reservoir recovery
  - New projects on time/budget
  - Improving return on capital
  - Partner ecosystem

- Cost and Asset Integrity
  - Operational excellence, zero downtime, improved productivity
  - Extending the life of field, unit cost optimization
  - Contractor accountability

- Risk and HSE
  - Reduced accidents, improved regulatory compliance
  - Protect workers and environment
  - Cybersecurity
  - Secure sites and equipment
New Capabilities

Revenue and Growth
- Reduce number of people on site
- Increase availability of experts in shrinking expert pool
- Reduce travel time and risk
- Knowledge, Education and Entertainment
- Physical and Cyber Security

Cost and Asset Integrity
- Real-time tracking, location / auto-alert
- Increase First Time Right Resolution
- Project and Operations Integration from Field to Board Room
- Real-time Analytics and Actionable Information

Risk and HSE
- Increase speed of resolution
- Contractor / Project Teams Alignment
- Real-time visibility
- Eco-System Partner Communication

- Any Device; Any Where; Any Time
- Connecting People to People; Data to Data; People to Data
Trends in the Oil and Gas Industry

- Regulations, including HSE, force energy companies to balance risk, cost and operational efficiencies to stay compliant.
- Third-party intrusion, cyber and physical, driving security and asset integrity with a ‘reputation’ impact aspect involved as well.
- Energy demand increase in next 25 years, shifting supply chains, and challenges to increase return on capital employed (ROCE).
- The ‘great crew change’: 50% of experienced staff will retire in next 10 years with little new inflow of ‘experts to be’.
- Internet of Things, the tsunami of new technology and data, and real-time intelligence driving integrated operations.
Industry Moving from Digital Oilfield to Integrated Operations to Dynamic Oilfield Operations

Drilling efficiency and production optimization will drive further adoption of big data and analytics, machine-to-machine connectivity, and field mobility.
Opportunities with the Internet of Everything
50 Billion New Opportunities

Timeline
2010 2015 2020
Billions of Devices
World Population

Inflection Point
Billions of Devices
World Population

50 Billion Smart Objects

0 6.8 7.2 7.6
Billion New
Opportunities

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Is IoE in Your Strategic Planning?

“In the oil and gas industry, for instance, the next phase of exploration and development could rely on extensive [IoE] sensor networks placed in the earth’s crust to produce more accurate readings of the location, structure, and dimensions of potential fields than current data-driven methods allow. The payoff: lower development costs and improved oil flows.”

— McKinsey “The Internet of Things”

“About 3 or 4 years ago we saw the internet of everything coming and we decided to set up a unique differentiated technology outfit and we put it right next to research and development and that actually pushes the technology advances as close as possible to the business outcomes that we’re trying to drive.”

— Alan Matula
CIO and EVP, Royal Dutch Shell
IoE Opportunity: Revenue and Growth

- Achieve rapid deployment of secure connectivity and services for both IT and OT in two separate flight cases with small footprint
- Make corporate wide expertise available with enterprise-class secure video to use all of the collective knowledge available
- Improve integrated E&P operations with collaboration between field sites and offices for better efficiency
- Integrate seismologic survey and seismic real-time data for the exploration phase and moving into production of wells
- Local and real-time analytics / fog computing to interpret the set of data points locally to be able to decide the best approach in real-time
IoE Opportunity: Cost and Asset Integrity

- Optimize field deployment, reservoir management, and production with remote management to lower OPEX
- Reduce travel time and expenses, especially for the remote and difficult to reach locations by deploying remote management
- Support on-demand remote expert guidance to minimize time to resolve and to improve quality of solution
- Increase uptime with remote support for workflows and critical operations by implementing predictive maintenance
- Enhance interaction and effectiveness between central support organization and remote operating team by integrating management
IoE Opportunity: Risk and HSE

- Accurately locate and monitor people and assets in real time, so that in case of danger the location of the person or asset is known.
- Support video and video analytics for better monitoring and inspections by automatically detect possible breaches.
- Enable mobility and ‘track and trace’ capabilities by installing future-proof wireless plant canopy.
- Product theft and leak detection, by deploying LDS – Leak Detection Systems time to detection is significantly reduced.
- Deploying TPI – Third Party Intrusion solutions time to detection is significantly reduced and interference might even be prevented.
Keys to Enabling IoE Business Outcomes in Oil and Gas

Agile

Reliable

Predictive

Safer

Secure
Where Are Oil and Gas Companies Using IoE to Generate Business Outcomes?

- Life Safety/Man-Down
  - Finding people in real time and safeguarding assets with industrial wireless everywhere
  - Making faster, better decisions with on-demand experts and improving equipment visibility and uptime.

- Connected Pipeline Operations
  - Preventing pipeline accidents, sabotage, and theft with real time insights and video analytics
  - Offloading offshore/on-location operations and speeding “first time to oil”
  - Diagnosing remotely to reduce downtime and improve staff safety
  - Geophysicists can receive and view 3D images of rock formations or fluid reservoirs in minutes

- Drilling and Production
  - Preventing pipeline accidents, sabotage, and theft with real time insights and video analytics
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- Scale Expertise
- Remote Site Management
- Remote Graphics visualization
How Cisco Is Enabling IoE Business Outcomes
Cisco in the Business of Connecting Oil and Gas

Connected Oil and Gas Customer Snapshot

Standards and Protocols

# 24 Existing ISGE-led Partners as of Q3FY15
(Some partners engage in multiple markets)

- **Healthcare**
  - UnitedHealthcare
  - OPTUM
  - Covisint

- **Utilities**
  - ABB
  - Eaton
  - Cooper
  - Black & Veatch
  - Alstom
  - Emerson
  - Itron
  - Schneider Electric
  - Siemens

- **Sports & Entertainment**
  - boingo
  - Baitone
  - EVE
  - Daktronics
  - Johnson Controls
  - TELUS

- **S+CC & S+CRE**
  - Honeywell
  - AECOM
  - United Technologies
  - Johnson Controls
  - Schneider Electric
  - ACT
  - Sensity

- **Connected Industries**
  - Rockwell Automation
  - Honeywell
  - ABB
  - Emerson
  - Schneider Electric
  - Yokogawa

- **Transportation**
Relationships Being Explored

- Connected Healthcare
- Utilities
- Sports & Entertainment & Retail
- Smart & Connected Communities, Real Estate
- Connected Industries
- Connected Transportation

Connected Healthcare: Cerner, Toshiba
Utilities: General Electric
Sports & Entertainment & Retail: ATOS, Externet Systems, Samsung
Smart & Connected Communities, Real Estate: Cree/Molex, Acuity, GDF Suez, Mobile-Sensing
Connected Industries: Mitsubishi, Siemens, Omron
Connected Transportation: Alstom, Bombardier, Thales
Oil and Gas Integrated Operations
Remote Operations and Faster Better Decisions

People and Process
- Law, Regulations and Principles
- Corporate Values and Culture
- Organization, Roles, and Responsibilities

People, Process, Data, and Things
- Remote Expert – Effective Field Collaboration
- Remote Monitoring and Operations – Information Availability

Data and Things
- Data Management and Real-Time Analytics
- Data and Communication Infrastructure
- Industrial Data and Connectivity
How Is Cisco Enabling IoE in Oil and Gas?

>US$5.9 billion spent annually in R&D
Cisco IoE Energy Solutions: Oil Rig

Industrial Wireless for secure and agile process data, collaboration, video, RFID and location services.

More Effective Field Collaboration with Integration of (Mobile) Phone, Radio and Video

Detailed situational video for Remote Expert support

Faster and Better Expert Decisions supported by Real-time Analytics and Rich Media Collaboration

Converged Ethernet with Intelligence@Edge

Industrial Control Information and Equipment Location

Long Range Wireless

Crew Internet Access

Crew Entertainment and Social Media

Personnel Safety with real-time tracking and alert

Security, Safety and Process optimization enabled by Video Analytics

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Cisco IoE Energy Solutions: Refinery

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Industrial Control Information ISA100, wHART, CIP

Personnel Safety with real-time tracking and alert

Security, Safety and Process optimization enabled by Video Analytics

Process Optimization: Truck Identification Check-in / -Out and Loading process

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Examples of IOE in Action
Customer-Validated Business Outcomes
Royal Dutch Shell
Next-Generation cyber security risk management and perimeter security for industrial automation and control systems.

"We are systematically interacting with, and make modifications to, the bulk of the Shell systems that keep billions of pounds of flammable and toxic material under control."

Bert C. Natalicchio
Vice President Engineering & SMART Technical

Challenge
- Process Control Domain and access to it, is prime target for cyber threats
- Compliance requires regular audits and investment decisions
- Hundreds of locations, geographically remote, costly and operationally challenging

Solution
- Shell, Cisco & Yokogawa collaborate to bring next generation cyber security and compliance solution
- Cisco Secure Ops Solution designed to support implementation & maintenance of security controls
- Service-based Solution lead by Cisco, collaborating with partners fulfilling established SLAs

Results
- Significant cost reduction in the PCD Security Technology over 5 years
- Audit process improvements through standardization and centralization of monitoring, management & reporting
- Implementation of agility and flexibility in the security process

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### Risk Control Framework for Process Control Networks

Addresses the most significant attack vectors within Process Control Network by establishing required controls associated with best of breed security practices.

#### Organize
- Security Policy
- Process Inventory
- Asset Inventory & Management
- Assessments
- Change Management
- Education & Awareness
- Dashboards & Reporting

#### Harden
- Network Segmentation
- PCN Access & Control
- Anti-virus
- System Patches
- Encryption
- Virtualization
- Secure Storage
- IPS / Signatures
- White & Blacklisting
- Portable Media Security
- Industrial Wireless
- Physical Security

#### Defend
- Security Log Collection and Management
- Proactive Monitoring
- Anomaly Detection
- KPI’s and Analytics
- Threat Defense
- Intrusion Detection
- Location Awareness
- Disaster Recovery
- Incident Response
- Continuous Improvement

#### Detect
- Security Monitoring
- Malware Detection
- Backup and Restore

#### Respond
- Dashboards & Reporting
- PLAN
- BUILD
- RUN
- MONITOR
- MANAGE
Secure Ops: Reducing Complexity of PCN Security
Secure Ops: Situational Awareness for Process Control

Before

Annual Auditors Reports and Self-Assessments

Cyber Security Expert at Each Location

After

Automated Real-Time Security Risk Management and Reporting

Security Automation with “Secure Site”
Secure Operations – Summary

O&G, Mining and Power Utilities

- Effective Risk Management
- Significant operational costs savings per site over 5 years
- Less facility down time
- Increased site productivity
- Increased business agility and reduced management complexity
### Challenge

- Delivery of the Top-Side of Edvard Grieg Platform, high quality, in Budget, on time
- Design and Architecture for Integrated Operations for Johan Sverdrup Oil Field to Statoil (Aker Solutions)
- Statoil wanted a showcase for the “oilrigs of the future”

### Solution

- Thought Leadership for business and IT imperatives and the Oil Rig of the Future
- **Converged Industrial Network Architecture** for Integrated Operations Use Cases
- Advanced Services for High-level and Low-level Architecture for first four rigs

### Results

- Aker Solutions won EPC Contract in Johan Sverdrup Oilfield
- Cost reduction for Off-shore Rig both Capital Project and Operations going from 34 networks to 3 networks (Lundin)
- Customer FEED Blue Print for true implementation of Integrated Operations
Marathon Oil

Improve Worker Safety with Life Safety Solution from Accenture, Cisco, AeroScout (Stanley Industrial) and Industrial Scientific Corporation

“The solution gives our workers a greater sense of confidence that their safety is being monitored in ways that have never been possible before in our industry.”

Don McCord
Operations Manager, Illinois Refining Division, MPC

**Challenge**
- Monitor worker safety in real-time
- Detect dangerous gas levels to alert workers to move to safe areas

**Solution**
- Deploy Accenture Life Safety Solution enabled by Cisco, Industrial Scientific and AeroScout based on Cisco Wireless Infrastructure
- Real-time holistic visibility of worker environment detecting threats and providing worker awareness of immediate health and safety danger

**Results**
- Lowered exposure risk to personnel of dangerous gasses and other hazards
- Reduced number of people needed in dangerous locations because of real-time monitoring.
- Improved incident response and resolution time because of pinpoint location accuracy.
Customer Case Studies

In order:
9 → 3 → 2 → 10
1. Rapid Deployment Local Data Center

Leading Energy Infrastructure Company

**Challenges**
- Pipeline services are expected to grow in the next 10 years
- Acquisitions and preparation for growth require an enterprisewide converged system
- Existing infrastructure is not scalable and is disjointed, not able to support SAP to speed deployment of critical intelligent applications

**Solutions**
- Increasing agility, rapid growth by deploying converged infrastructure that can deploy business-critical applications: e.g., SAP, SAP HANA

**Outcomes**
- Real-time information pipeline operations
- Time to market is reduced from days to months
- Great success in meeting scheduled deadlines

**Technology Enablers**
- FlexPod integrated computing, storage, and management
- Cisco UCS® 6248UP 48-Port Fabric Interconnects
- Cisco Nexus® switches and Cisco® Adaptive Security Appliances (ASA) security
- SAP ERP and SAP HANA

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2. Life Safety, Man-Down, and HSE

Challenges
- People working in hazardous and dangerous environments
- Having to send multiple people into the environment to help each other
- Need to monitor health and safety in real time without sending more people into danger

Solutions
- Accurately locate people and assets
- Real-time monitoring of environmental conditions and people’s vital signs

Outcomes
- Real-time location of people and assets from a web interface
- Automated alerting and notification
- Manage distributed sites, control emergency situations through real-time reports
- Location and status information to existing enterprise applications

Technology Enablers
- Cisco® Industrial Wireless Network
- AeroScout Tags, Industrial Scientific Gas Detector
- Accenture System Integration
3. Remote-Site Management

**Challenges**
- Complementary operations needed for small and unstaffed remote sites
- Rapid deployment, “first time to oil”
- Optimize field development, reservoir management, and production

**Solutions**
- Deploying secure connectivity and services in two separate site cases, small footprint
- Rapid deployment, can be handled by two people and installed in hours

**Outcomes**
- Offload offshore/on-location operations
- Secure and reliable separation of PCN and office
- Better interaction between central support organizations and remote operating team

**Technology Enablers**
- Cisco® computing and service engines provide scalable services
- Cisco security for network segmentation and encryption
- Physically separated environments for security

Super Major Oil Company
4. Drilling and Production Enhancement

**Challenges**
- Labor-intensive production enhancement monitoring
- Bandwidth and latency issues on VSAT comms
- Extensive cabling throughout rig, frac, and PPS sites
- Limited local skills require zero-touch configuration and self-healing systems
- 24/7 on-demand collaboration is mandatory

**Solutions**
- Ruggedized, fail-safe redundant solution architectures
- Remote diagnostics reduces physical visits
- Remote support for workflows and critical ops

**Outcomes**
- Reduction of downtime and multiple site visits
- Increased personnel safety due to reduction in need to visit field assets
- Real-time decision making and processes

**Technology Enablers**
- Cisco® wireless mesh and access techniques
- Cisco IP video cameras for monitoring and visual inspection
- Cisco ISP-based session continuity
5. Connected Graphics

U.S. Oil Company POC; Oil Field Services Company Alliance POC

Challenges
- Delivering large-scale data sets (TB+) for interactive analysis
- Copying data to remote locations/data centers for local analysis
- Physical protection of critical data assets
- Local and remote access to a diverse set of applications

Solutions
- Secure access to data and 3D applications, anywhere and anytime
- Eliminating the need for users to copy and store data locally
- Share data and simulations across disciplines and geographies
- Scale number of applications/workstations easily

Outcomes
- Reduced capital and operational costs by centralizing application hosting, data licenses, updates and replacing expensive desktop workstations
- Improved knowledge worker productivity and IP security
- Scale number of applications/workstations quickly and easily as business dictates

Technology Enablers
- Cisco Unified Computing System™ (Cisco UCS®) and Cisco Nexus® switches
- Citrix XenServer + XenDesktop
- NVIDIA’s Kepler-based GRID K2 cards
- NetApp FAS with clustered Data ONTAP
6. Collaborative Operations

**Challenges**
- Use of advanced drilling techniques that are service intensive and require specific expertise
- Increased customer risk aversion and increasing demand to be intimately involved in day-to-day decision making
- Increased technical complexity and service intensity increasing flat-time and using distributed resources
- Expert availability, millennial-generation staff retention, and travel risks and restrictions

**Solutions**
- Remote experts and effective field collaboration
- Multisource, content-rich voice, video, and process data
- Flexible and supporting oil field services field and office equipment

**Outcomes**
- On-demand expert guidance
- Holistic operational overview
- Increased 1st-pass resolution
- Centralization of information and tools
- Simplification for field engineers

**Technology Enablers**
- Cisco® collaborative operations
- Data center: Cisco UCS® server running virtualized applications: Cisco® VSOM, IPICS, and ISR G2
- Cisco VSOM, IPICS, Cisco Jabber®, and Cisco WebEx®
7. Connected Pipeline Operations

**Challenges**
- Real-time visibility and control of pipeline operations
- Integrity and reliability of pipeline assets
- Environmental and regulatory compliance
- Security, risk management, and safety concerns

**Solutions**
- Product theft and leak detection system (LDS)
- Third-party interference (TPI) early detection
- Emergency shutdown (ESD)

**Outcomes**
- Real-time information pipeline operations
- Improve compliance with safety, security, and environmental regulations
- Asset lifecycle management
- Predictive asset maintenance

**Technology Enablers**
- Cisco® IE 2000 and IE3000 at valve stations, L2 ring, maximum 40-km links
- Cisco 2010 Connected Grid™ Router at pump stations, L3
8. Truck Monitoring Data on Any Device

**Challenges**

- Follow trucks in real time
- Have real-time information about truck and load conditions
- Reduce cost and increase efficiency
- Collection of data from the field using any device

**Solutions**

- GPS tracking of trucks during their journeys
- Real-time sensor information from trucks
- Real-time analytics and information
- Any devices endpoints (e.g., smartphones, iPads)

**Outcomes**

- Increase in production efficiency
- Reduction of unplanned downtime

**Technology Enablers**

- Cisco® industrial machine-to-machine communication (Wi-Fi, 3G, 4G)
- Cisco industrial wireless mesh network
- Leica Geosystems integrated mining systems provides production monitoring information for operators via GPS navigation systems
- Cisco UCS®, FlexPod, and Vblock™ Systems for data analytics with SAP HANA
9. Secure Ops (Process-Control Domain)

### Challenges
- Process-control domain (PCD) and access to it is prime target for cyberthreats
- Compliance requires regular audits and investment decisions
- Many locations, geographically remote, costly and operationally challenging

### Solutions
- Secure access, cybersecurity, and compliance for critical infrastructure
- Security controls that allow central leadership to understand risks and make informed investment decisions
- Proactive performance and fault monitoring; global security incident response and monitoring services

### Outcomes
- Reduced risk to industrial automation and control system (IACS)
- Reduced cost of delivering process control network (PCN) security
- New services that improve productivity and reduce cost of production
- Security maturity and compliance improved significantly

### Technology Enablers
- **Cisco® SecureCenter** – Cisco Secure Ops Solution architecture, products, software, and services
- **Cisco SecureSite** – Local architecture, products, software, and services
- **Cisco data center, virtualization, security, and network technology**
- **Cisco Asset inventory and management**, security monitoring, and incident response
10. Ubiquitous Industrial Wireless Connectivity

Super Major Oil Company

Challenges

- Creation of a wireless canopy to meet future communication requirements and enable the digital oil field strategies

Solutions

- Install future-proof wireless plantwide canopy
- Partnership with industry MACs

Outcomes

- Reduce time to deploy and OpEx
- Improve flexibility and mobility
- Enable “digital oil field” strategy
  - Sensor and video networks
  - HSSE and risk management
  - Asset management
  - Maintenance and incident management

Technology Enablers

- Cisco® industrial wireless access point with Cisco CleanAir® technology
- Cisco wireless mesh, Wi-Fi, and ISA100 support
- Cisco security and management

EMERSON
Honeywell
YOKOGAWA
THANK YOU
Why Cisco?
Why Cisco?

- Ranked no. 7 in FinTech Top 25 Enterprise Companies
- Strong understanding and commitment to financial services
- Extensive experience in designing and implementing industry-leading, interoperable, standards-based solutions
- World-class ecosystem of partners, services, and expertise
  - Technical services
  - Professional services
  - Remote management services
- Cisco Capital® finance programs that enable financial institutions to defray investment costs
- Global financial services best practices

Cisco is unique in our proven capabilities, investment, and focus on enabling financial institutions to capture opportunities with the Internet of Everything.
Cisco is uniquely positioned to help you solve your business problems

- **Reduce health and safety risks** and scale scarce resources with collaboration
- **Increase integrity** with remote operations, remote expert collaboration, and security
- **Support cost reduction and growth** with real-time analysis, expert collaboration, and integrated operations
Cisco
Changing the Way We Work, Live, Play, and Learn

Strategy
We create solutions built on intelligent networks that solve our customers’ challenges

- 24% Sales
- 39% Engineering
- 20% Service
- 17% Other

71K+ Employees 165+ Countries 380+ Offices US$47.1B+ Revenue US$6.3B+ R&D

Source: FY14 Annual Results Announcement August 2014

(13.35% of Cisco revenue)
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