The Path to Industry 4.0, IoT, and Smart Manufacturing

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Webinar Topics

✓ Trends in Industrial Automation and Energy
✓ Tenets of IoT Solutions
✓ Industry 4.0 and Industrial IoT market trend update
✓ Insight into what two technology leaders are doing to enable Smart Manufacturing market opportunities
✓ Encouragement to examine your company’s strategy for the Industry 4.0 era
Trends in Industrial Automation and Energy

Worldwide Consumption Doubling

Productivity needs to accelerate

Rise of the Robots

Functional Safety

M2M, Big Data, Analytics

Geo-political Investments
**Economic Impact of IoT Applications in 2025**

$1.2 \text{ – } $3.1T

**IoT Opportunity in Industrial & Energy**

**Source: McKinsey Global Institute analysis**
Smart Manufacturing

Supply Chain

Manufacturing
- Predictive Maintenance to maintain uptime
- Remote monitoring of critical constraints

Consumers

Optimize E2E factory automation using IoT + Big Data Analytics
Fundamental Tenets of IOT Solutions

- Monetize HW, SW, and Data Management
- Horizontal/Scalable Analytics
- Data Normalization
- Connectivity, Device Discovery, and Provisioning
- Security as the Foundation - HW and SW

INDUSTRY DEFINED HORIZONTAL IOT BUILDING BLOCKS
Advantech at a Glance

<table>
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<tr>
<th>Headquarters</th>
<th>Taipei, Taiwan</th>
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<tbody>
<tr>
<td>Established</td>
<td>May, 1983</td>
</tr>
<tr>
<td>Employees</td>
<td>7, 300</td>
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<tr>
<td>Revenue</td>
<td>USD $1,169M (2014)</td>
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Advantech defines its brand mission as “Enabling an Intelligent Planet”, to empower innovative technologies and solutions.
Agenda

1. Advantech’s Smart Manufacturing Architecture Vision
2. Importance of Software
3. Case Study
4. Q&A
IoT Promises Huge Opportunities

Installed units

1 trillion
30bn
6bn
2bn

2010
2014
2020
2040~

IoT

Notebook PC
Smartphone

Enabling an Intelligent Planet
Enabling an Intelligent Planet
Potential Economic Impact of IoT in 2025

- Smart Factories: US$1.2~3.7 trillion
- Smart Cities & Healthcare: US$0.9~1.7 trillion
- Personal Smart Devices: US$170bn~1.6 trillion
- Intelligent Retail: US$410bn~1.16 trillion
- Intelligent Logistics & Navigation: US$560~850 billion
- Worksites: US$160~930 billion
- Connected Cars: US$210~740 billion
- Smart Home: US$200~350 billion
- Office: US$70~150 billion

Source: McKinsey & Company
Trends Changing the Future of Manufacturing

3D Printing
Intelligent Robotics
Industry 4.0

Focus of today’s Event

Source: The New Software Defined Supply Chain: Preparing for the disruptive transformation of Electronics design and manufacturing
The IBM Institute for Business Value

Enabling an Intelligent Planet
What is Industry 4.0?

1.0 Water and Steam Power
2.0 Electrical Energy
3.0 Electronic and IT Systems
4.0 Cyber-Physical

Enabling an Intelligent Planet
Paradigm Shift in Factory

From a classical 5 level factory automation pyramid

To a highly flexible connected cloud based smart factory

VRC – Virtual Robot Controller
VNC – Virtual Numeral Controller
MES – Manufacturing Execution System
CNC – Computerized Numeral Controller
ERP – Enterprise Resource Planning
SCADA – Supervisory Control and Data Acquisition
Enabling Industry 4.0 with Integrated Automation & Cloud Innovations

Internet of Services

Semiconductor
Predictive Maintenance

Food & Beverage
Product Serialization

Automotive
Enterprise Resources Planning (ERP)

Metal Processing
Manufacturing Execution System (MES)

Electronics
Mass Customization

Connected iFactory Solutions

WebAccess+IMM
Production Performance Analysis

WebAccess/SCADA
Machine Status

WebAccess+IVS
Process Optimization

WebAccess/NMS
Scheduling Management

Production Serialization

Status Assessment

Trend Analysis

Abnormality Diagnosis

Intelligent Machinery & Robotics

Platform

Motion Control

Controller

Machine Vision

Sensor Measurement

Enabling an Intelligent Planet
Enabling Industry 4.0 with Integrated Automation & Cloud Innovations

Internet of Services

Layer 1

Semiconductor
- Predictive Maintenance

Layer 2

Food & Beverage
- Product Serialization

Automotive
- Enterprise Resources Planning (ERP)

Layer 3

Metal Processing
- Manufacturing Execution System (MES)

Electronics
- Mass Customization

Connected iFactory Solutions

WebAccess+IMM
- Production Performance Analysis

WebAccess/SCADA
- Machine Status

WebAccess+IVS
- Process Optimization

WebAccess/NMS
- Scheduling Management

Platform

Motion Control

Controller

Machine Vision

Sensor Measurement

Intelligent Machinery & Robotics

Enabling an Intelligent Planet
Enabling Industry 4.0 with Integrated Automation & Cloud Innovations

Layer 1
- Internet of Services
- WebAccess Alliance
- Predictive Maintenance
- Product Serialization
- Enterprise Resources Planning (ERP)
- Manufacturing Execution System (MES)
- Mass Customization

Layer 2
- Connected iFactory Solutions
- WebAccess
  - WebAccess+IMM
  - WebAccess/SCADA
  - WebAccess+IVS
  - WebAccess/NMS
- Production Performance Analysis
- Machine Status
- Process Optimization
- Scheduling Management
- Production Serialization
- Status Assessment
- Trend Analysis
- Abnormality Diagnosis

Layer 3
- Intelligent Machinery & Robotics
- Platform
- Motion Control
- Controller
- Machine Vision
- Sensor Measurement

Enabling an Intelligent Planet
Smart Factory

Enabling an Intelligent Planet
Enabling Industry 4.0 & IoT with Intelligent Automation

WebAccess+ Alliance

Solution Ready Package

Intelligent Automation Platform & Gateway

Controller, Device & Sensor

Enabling an Intelligent Planet
Enabling Industry 4.0 with Integrated Automation & Cloud Innovations

Internet of Services

Connected iFactory Solutions

WebAccess+IMM
WebAccess/SCADA
WebAccess+IVS
WebAccess/NMS

Intelligent Machinery & Robotics

Platform
Motion Control
Controller
Machine Vision
Sensor Measurement

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Industry 4.0 Opportunities

MES & Production Profile
- Information between the front-end equipment & MES application
- Production Traceability

Production Testing Equipment
- Machine Vision
- Motion I/O Cards
- Computing Platform
- Controller

Machine Monitoring & Predictive Maintenance
- Production Performance Analysis
- Machine Status
- Abnormal Diagnosis
- Sensor Measurement

Factory Environmental Monitoring
- Electricity Monitoring
- Factory Waste Water
- Energy Management

Machine Automation
- Industrial Robots
- Automated Guided Vehicle
- Industrial Machinery

Enabling an Intelligent Planet
## Agenda

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<td>4</td>
<td>Q&amp;A and Free drawing</td>
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Advantech IoT Cloud Structure

**Domain Specific Application Cloud (SaaS & S/I)**
- UShop
- UFleet
- iShop
- iTuck & iLogistics
- iRetail
- iFleet-Management
- iParking
- iPublic-Space
- iHospital
- iBuilding
- iBus

**Intelligent Services**
- iFactory 4.0
- iPower & Energy
- iAgriculture
- iEnvironment
- iRobot & Industry 4.0
- iWater-Treatment

**Intelligent Automation**

**WISE-Cloud (PaaS)**

**RESTful APIs**
- Microsoft Azure
  - Compute, Storage, Networking
  - Big Data Analytic
  - Machine Learning
  - Business Intelligence (Google, AWS, Baidu, IBM…)
  
- SUSI ACCESS
  - Device Management
  - Data Collection
  - Notification
  - Backup & Recovery

**Standard Protocol: MQTT, CoAP, OSGi, OMA**

**3rd Party Cloud Platforms**
- WebAccess/SCADA
- WebAccess+iVS
- WebAccess+iMM
- WebAccess/NMS

**Security**
- McAfee
- OpenSSL
- TLS, DTLS

**IoT Gateway**

**IoT Devices & Sensors**
- IoT Devices/Sensors/Actuators
- ADAM Devices
- WISE Devices

**WISE IoT**

**Enabling an Intelligent Planet**
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Intelligent Factory – Advantech’s Successful Applications

OEE

MES

SPC

EMS

SCADA

WMS

AGV

ANDON

Enabling an Intelligent Planet
Successful Applications: Manufacturing Execution System (MES)

For Food & Beverage Factories

Equipment Integration

Robot Monitoring

Weighing Data Entry

Tank Temperature Monitoring

Patrol Inspection

Business Strategy Center

Enabling an Intelligent Planet
Enabling Industry 4.0 with Integrated Automation & Cloud Innovations

Internet of Services

Connected iFactory Solutions

Enabling an Intelligent Planet
Follow-up

Watch for an email from us within the next few days

- Link to download slides from today’s webinar
- Link to download a Free whitepaper on Industry 4.0
- Announcing winner of product giveaway
Join Advantech’s Smart Factory Roadshow in a North American city near you to learn how different technologies within the Device, Control, and Information layers can be applied to enable a smart factory!

Learn more: http://events.advantech.com/roadshow
Thank You!

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Mike.Berryman@advantech.com
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