

2015

Global Azure **BOOTCAMP**

Azure Enabled IoT Development

Samuel Phung, VP Sales & Marketing
ICOP Technology Inc.

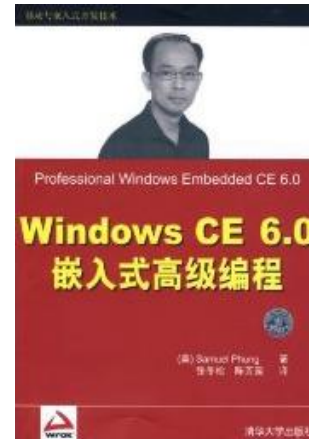
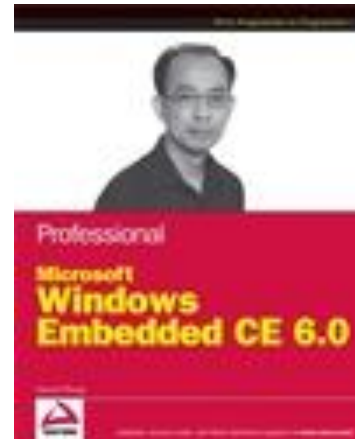
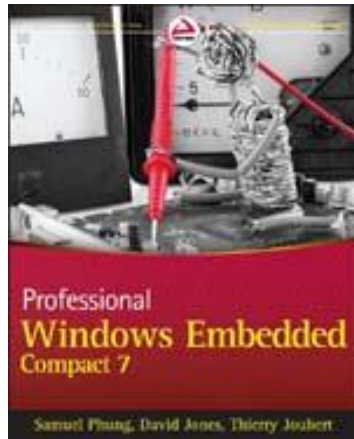


Samuel Phung

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Book Author:



Today's Sessions

	Room: B102	Room: B106
9:00 – 9:15 AM	Key note	
9:15 – 9:45 AM	Azure Enabled IoT Development	
10:00 – 11:00 AM	Azure Event Hub Paolo Patierno (Italy)	Azure Fundamentals (Vishal Saxena)
11:15 – 12:15 PM	Azure Enabled IoT development landscape	
12:15 – 1:30 PM	Lunch breach	
1:30 – 2:30 PM	Azure Mobile Services for IoT devices & demo	DevOps with Azure on Day Zero (Vishal Saxena)
2:30 – 4:30 PM	Hands on Lab sessions	
4:30 – 5:00 PM	Azure resources, wrap up, prizes and drawing	

Azure Event Hub



Paolo Patierno from Naples, Italy

- Windows Embedded MVP since 2014
- Created the M2Mqtt.Codeplex.com project, a .NET library for MQTT.
- M2Mqtt is part of Eclipse's paho project.

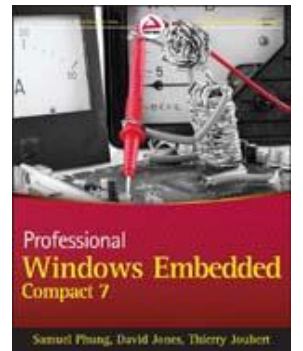


Azure Enabled IoT Development



Thierry Joubert from Paris

- Windows Embedded MVP since 2007.
- Co-author: Professional Windows Embedded Compact 7.
- CTO for Theoris

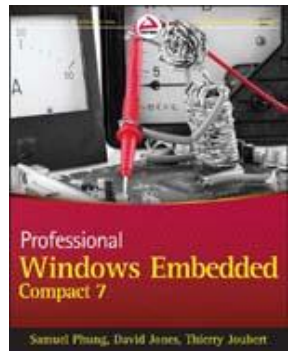


Azure Mobile Services for IoT Devices



David Jones from Australia

- Windows Embedded MVP since 2013.
- Co-author: Professional Windows Embedded Compact 7.
- Teach computer science for 17 years.
- Currently provides software consulting services.



Azure Fundamentals & DevOps



Vishal Saxena from SoCal

- Microsoft Azure MVP since 2014
- SoCal Microsoft Azure User Group Organizer.



Agenda

- Azure Enabled IoT Development.
- Internet of Things – Embedded vNext.
- Windows 10 for IoT Devices.
- IoT Device Development.

Azure Enabled IoT Development



Internet of Things (IoT)
Industrial IoT
Internet of Everything
Internet of Your Things
Internet of Very Different Thing



Connectivity & Protocols
Bluetooth, WiFi, Ethernet
Zigbee, Zwave
HTTP, TCP/IP
Alljoyn, MQTT, AMQT, etc.



Azure IaaS, PaaS & SaaS
Azure Mobile Services
Service Bus, Event Hub
Big Data, Machine Learning

Azure Enabled IoT Development

- Big Data – Key factor that drive Cloud business.
- More than 50 Billion connected devices by 2020.
- There will be much more data generated by devices than human.
- Analytics – Comparison, Trend and Realtime.

Azure Enabled IoT Development

“Development that target Internet of Things (IoT) devices to harvest, consume and analyze data, to derive actionable insights.”

Azure in a Nutshell

- Microsoft's cloud platform.
- Enables you to deploy scalable Database, File and Web servers with minimal resources and risks.
- Enables you to maintain large scale Database, File and Web services with minimal resources, while maintain high level of security and control.
- Enables you to develop mobile application to interact with large pool of user.

Azure in a Nutshell

- Azure is not limited to support Microsoft platforms.
- Different derivative of Linux Workstation and Server distro are supported.
- Redundancy – Azure resources are replicated on multiple separate hardware, in different data center.
- Flexible platform enables you to start small. Yet, able to scale as needed.
- Best of all: It's FREE to try, no string attached.

Internet of Things (IoT) Device

- IoT devices are essential components within an IoT development project.
 - Input devices: Sensor and data-collection devices.
 - Output devices: Actuator devices.

Internet of Things (IoT) Device

- IoT devices are essential components within an IoT development project.
 - Gateway devices: Intelligent devices, typically placed between the resource constrained IoT devices and the Internet, to facilitate communication, resolve interoperability issues, provide security and additional resources.

IoT vs Embedded

- Many legacy embedded devices do not have Internet connectivity.
- An IoT device is an embedded device built with Internet connectivity.

Embedded Device Development

- Human to machine interface.
- Machine to machine interface.
- Data mining & analytics.
- Input, output & connectivity.
- Security.



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IoT Device Development

- Human to device interface.
- Device to device interface.
- Data mining & analytics.
- Input, output & connectivity.
- Security



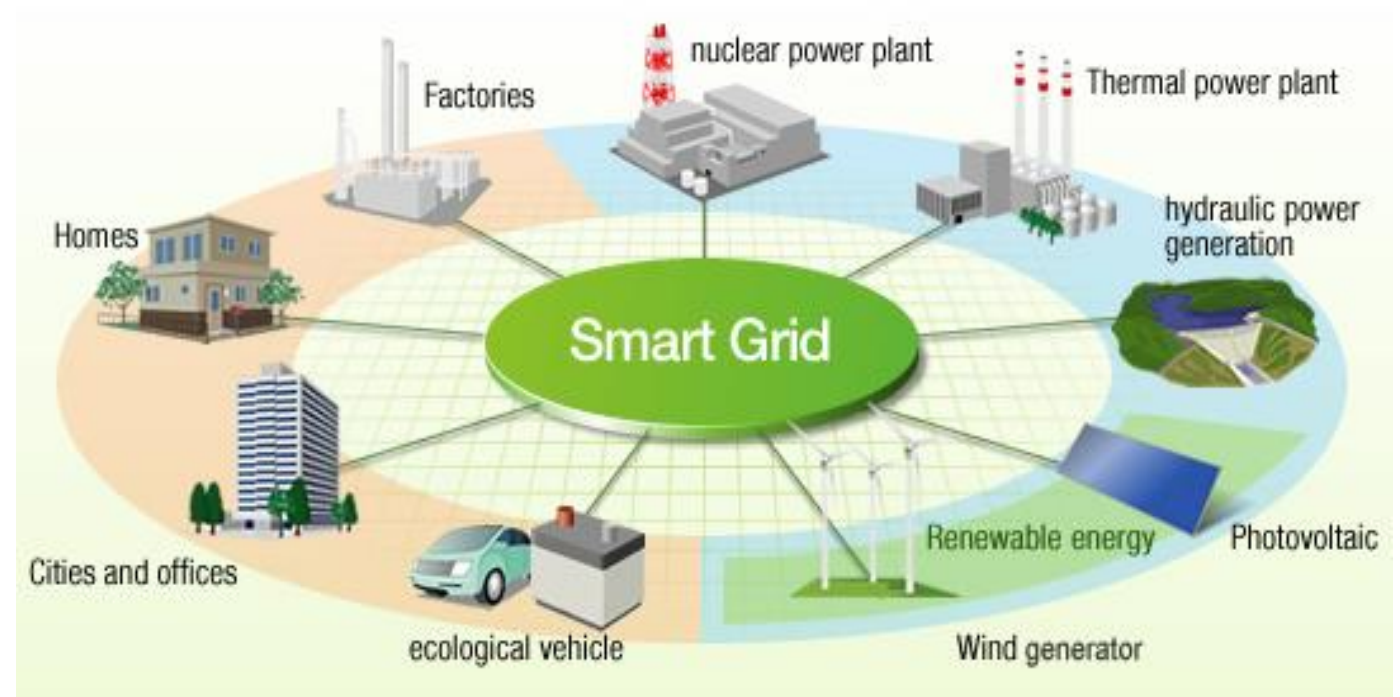
IoT vs Embedded

- Many legacy embedded devices do not have Internet connectivity.
- An IoT device is an embedded device built with Internet connectivity.

IoT = Embedded vNext

Azure Enabled IoT Development

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- More than 50 Billion connected devices by 2020.
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Source: <http://www.hitachi.com/environment/showcase/solution/energy/smartgrid.html>

Azure Enabled IoT Development

- It's a mindset more so than technology – Device and Machine oriented.
- Today, modern development tools such as Visual Studio help simplify complex development task, enable developer to achieve result without the need to know all the details.

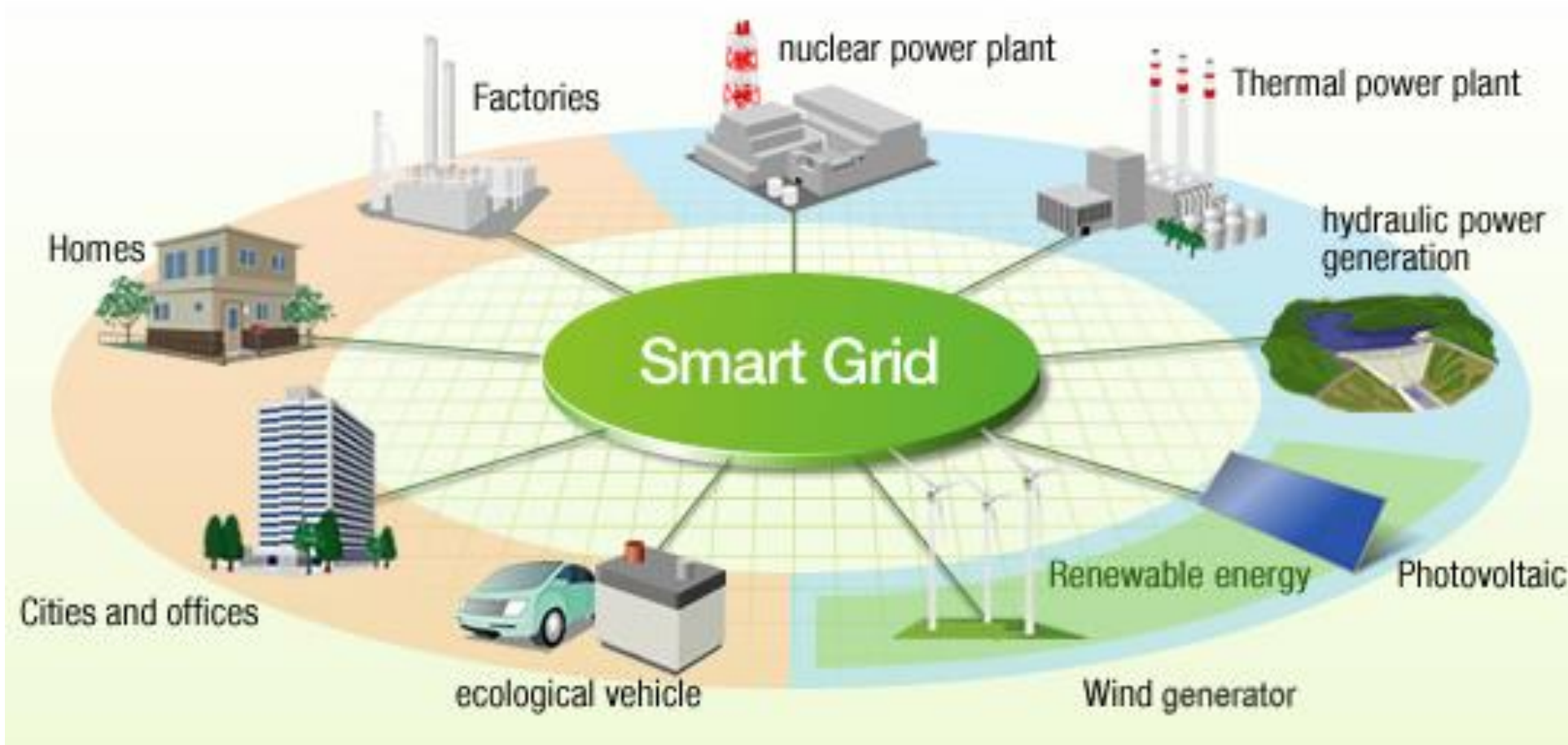
Azure Enabled IoT Development

- Microsoft Azure platforms help simplify efforts and complexity to deploy scalable systems
- Microsoft Azure platforms enable average developer to handle data and perform data analytics without help from data scientist

IoT Development Scenario

- Application for headless IoT device (without user interface).
- Leverage Azure Mobile Services for web and data services.
- Windows Phone, Windows desktop (Win32), WinRT and Browser application as remote user interface
- Leverage Azure to scale out as needed

IoT Development Scenario



Source: <http://www.hitachi.com/environment/showcase/solution/energy/smartgrid.html>

IoT Hardware Resources

Some of the hardware platforms that help drive IoT Development:

- Arduino, Netduino, 86Duino and etc.
- Raspberry Pi
- Beagle Bone
- Intel Galileo, MinnowBoard and Edison
- 3D Printer



<http://www.86duino.com>



IoT Development Challenges

- Follow the IoT trend (moving target) to learn, identify needs and create innovative solution.
- Need to get devices from different vendors, on different platforms, to communicate and work together.
- Identify resources to help solve interoperability problem.

IoT Development Challenges

- Developers need a comprehensive platform to support the rapidly evolving IoT development environment.
- We like to show how you can adopt Microsoft Azure, Visual Studio and Windows Embedded platforms to simplify IoT development challenges.

Azure Enabled IoT Development

- Visual Studio 2013 Professional or Community.
- Windows Embedded Standard.
- Windows Embedded Compact.
- .NET Micro Framework.
- Windows 10 IoT

Windows 10 IoT

Windows 10 IoT

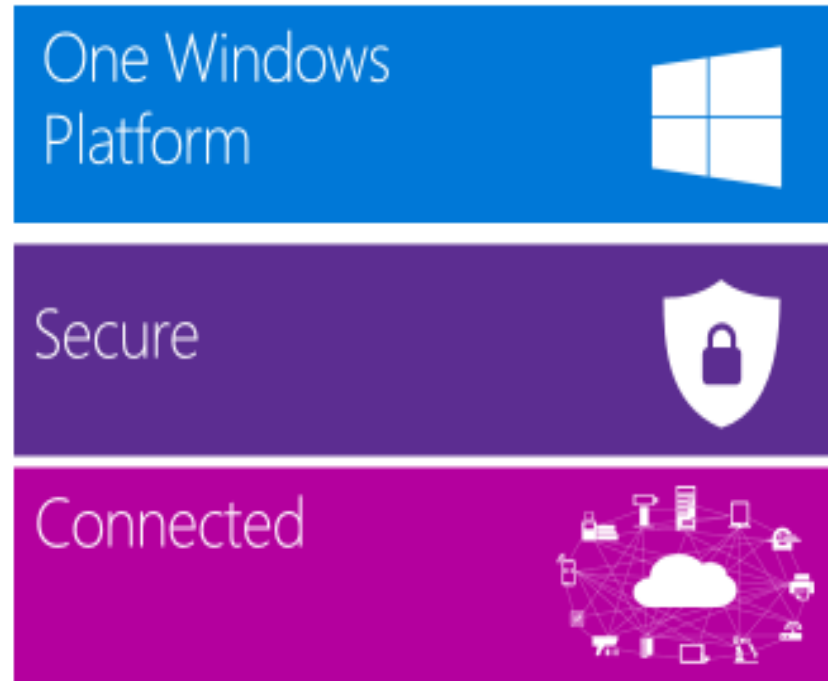


The image shows three stacked cards for Windows 10 IoT. The top card is dark blue and titled 'Windows 10 IoT for industry devices', listing 'Desktop Shell, Win32 apps, Universal Apps and Drivers', '1 GB RAM, 16 GB Storage', and 'XB6'. The middle card is a medium blue and titled 'Windows 10 IoT for mobile devices', listing 'Modern Shell, Universal Apps and Drivers', '512 MB RAM, 4 GB storage', and 'ARM'. The bottom card is a light blue and titled 'Windows 10 IoT for small devices', listing 'No Shell, Universal Apps and Drivers', '256MB RAM, 2GB storage', and 'XB6 or ARM'. A small Windows logo is at the bottom left of the stack.

Windows 10 IoT for industry devices
Desktop Shell, Win32 apps, Universal Apps and Drivers
1 GB RAM, 16 GB Storage
XB6

Windows 10 IoT for mobile devices
Modern Shell, Universal Apps and Drivers
512 MB RAM, 4 GB storage
ARM

Windows 10 IoT for small devices
No Shell, Universal Apps and Drivers
256MB RAM, 2GB storage
XB6 or ARM



The image shows three stacked rectangular blocks representing the platform pillars. The top block is blue with the text 'One Windows Platform' and the Windows logo. The middle block is purple with the text 'Secure' and a shield icon with a lock. The bottom block is magenta with the text 'Connected' and an icon of various IoT devices connected to a central cloud.

One Windows Platform

Secure

Connected

Source:

<http://blogs.windows.com/bloggingwindows/2015/03/18/windows-10-iot-powering-the-internet-of-things/>

Universal App for Windows Devices



Available for Download

- Presentation slides.
- Hands on labs.
- URL to Microsoft Azure and IoT related information & development resources.

<https://github.com/embedded101/GAB2015>

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Thank You!