Extend your WebSphere MQ messaging backbone to the world of mobile

24th January 2013

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Peter Niblett

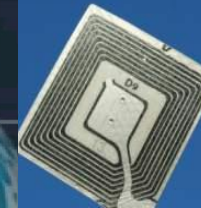# Internet of Things

Billions of smart devices instrument our world today

The world is becoming more interconnected and more complex …

33 billion
RFID tags embedded into our world

24 billion
Devices connected to the internet by 2020

534 billion
Dollars in mobile transactions by 2015

50%
Of businesses plan to adopt more collaborative sourcing models

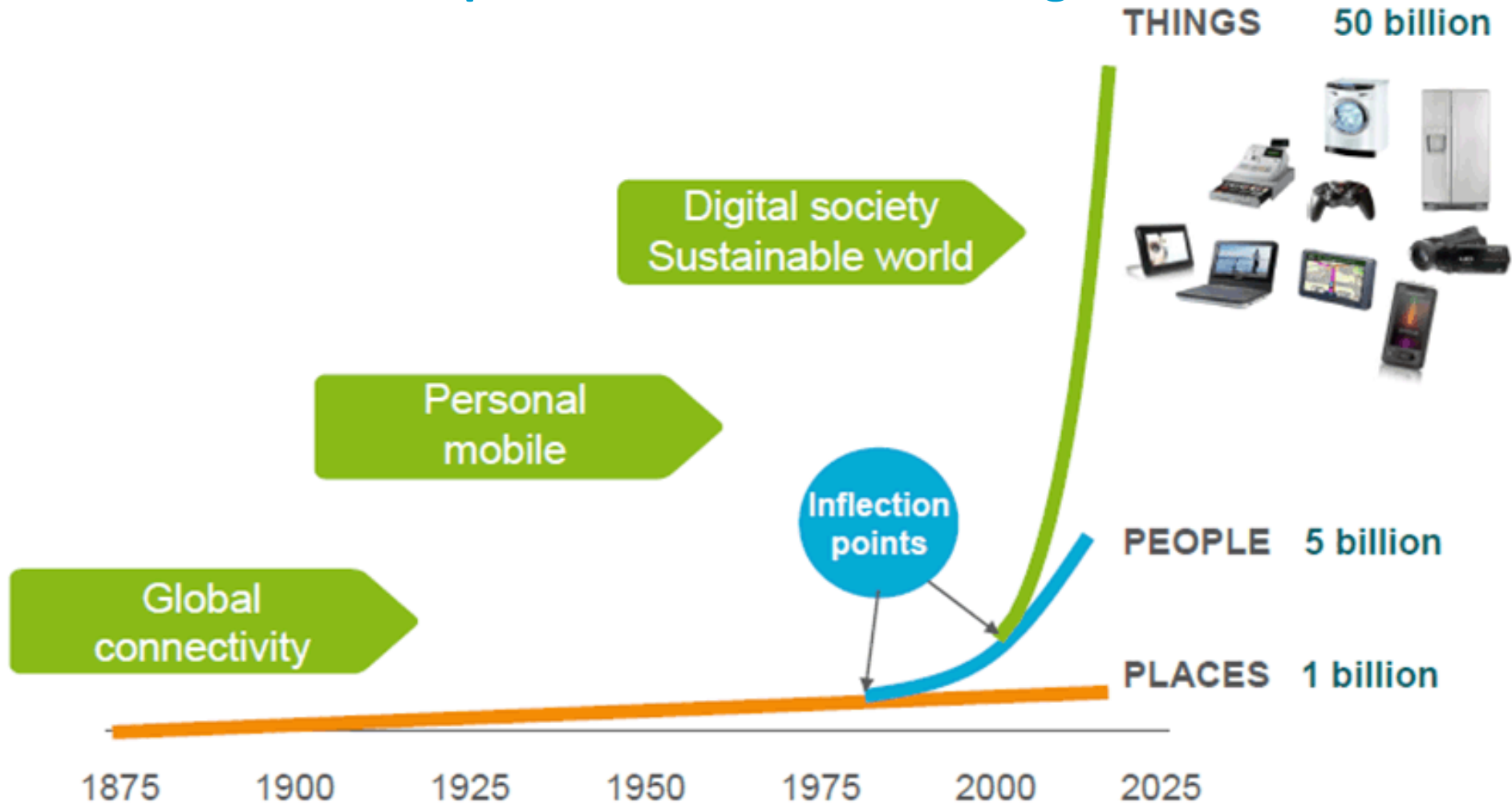**Interconnecting** these smart devices creates a **Central Nervous System**

Mobile is a first step to the "Internet of Things"

THINGS — 50 billion

Digital society
Sustainable world

Personal
mobile

Inflection
points

PEOPLE — 5 billion

Global
connectivity

PLACES — 1 billion

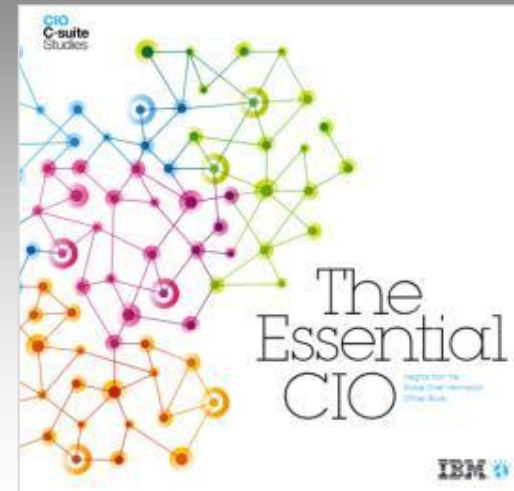1875 1900 1925 1950 1975 2000 2025

Source: Ericsson AB, "Infrastructure Innovation - Can the Challenge be met?," Sept 2010

Mobile is an enterprise priority

Growth in Internet Connected Devices

Legend:
- WW Media Tablets (purple)
- WW Notebooks (green)
- WW PCs (orange)
- WW Smartphones (blue)

Y-axis: Unit Volumes (Millions) — 0, 600, 1200

X-axis: 2010, 2011, 2012E, 2013E, 2014E, 2015E
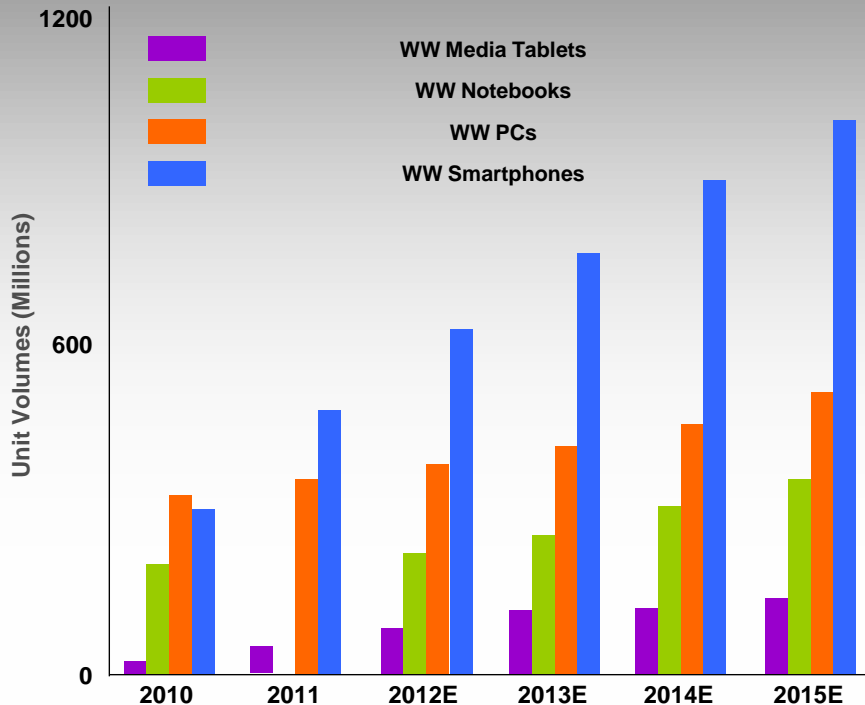
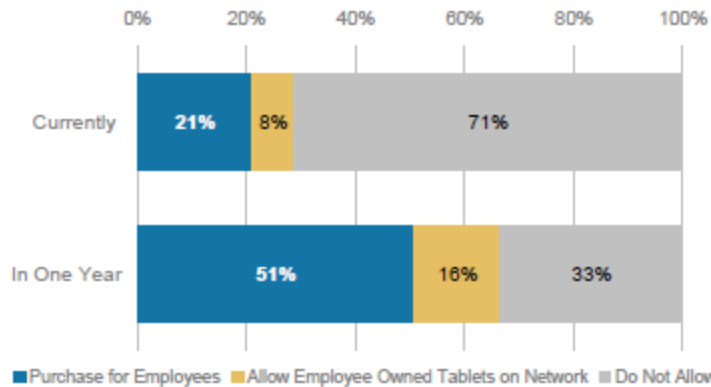## Mobile and Cloud are top spending priorities for CIOs[1]

Dramatic Growth in Mobile Devices

- Mobile data traffic exceeded voice in 2010[2]

- Shipments of Smartphones exceeded total PC shipments for the first time in 2011[3]

- 10 Billion mobile connected devices are expected to be in use by 2020[3]

[1] 2011 IBM Global CIO Study
[2] Wireless Industry News, August 26, 2010
[3] 2011 Economist

Source: Wells Fargo Securities, January 23, 2012
"Fostering the People: The Shift to Engagement Apps"

Mobile is Hot, but our Clients have Key Concerns Inhibiting Adoption

More Than 50% of Large Enterprises Expect to Purchase Tablets for Employees Over the Next Year

Tablet Usage in the Enterprise

	Purchase for Employees	Allow Employee Owned Tablets on Network	Do Not Allow
Currently	21%	8%	71%
In One Year	51%	16%	33%

■ Purchase for Employees ■ Allow Employee Owned Tablets on Network ■ Do Not Allow

Source: Morgan Stanley Research, AlphaWise℠

Top mobile adoption concerns:

- Security/privacy (53%)
- Cost of developing for multiple mobile platforms (52%)
- Integrating cloud services to mobile devices (51%)

Source: 2011 IBM Tech Trends Report, https://www.ibm.com/developer-works/mydeveloperworks/blogs/techtrends/entry/home?lang=en

Focus areas for mobile computing adoption (n=3885)

- 34% Enterprise apps (cross-industry)
- 33% Industry-specific apps
- 31% Extending mobile to core applications
- 27% Commerce
- 24% Social
- 16% Global positioning-enabled capabilities
- 13% Entertainment
- 10% Gaming

Mobile is Different from Desktop

| **Desktop**		**Mobile**
Sit back and read	→	Read while moving
Document-oriented	→	Message-oriented
Large complex apps	→	Purpose-built mini-apps
Context-neutral	→	Context-aware
Task-driven	→	Notification-driven
Mains powered	→	Battery-powered
Predictable network response	→	Unpredictable network response

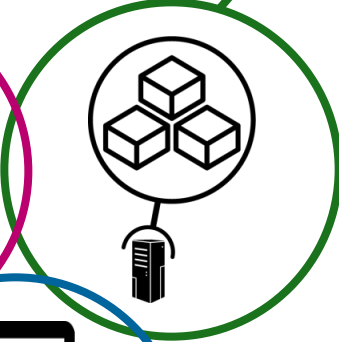# IBM Strategy Addresses IBM Client Mobile Initiatives

Extend & Transform

Extend *existing business capabilities to mobile devices*

Transform *the business by creating new opportunities*
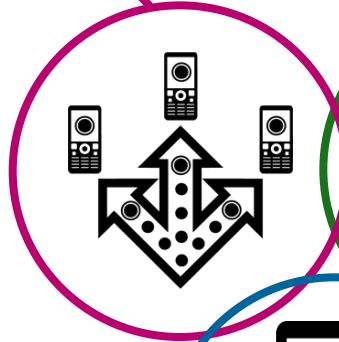
Build & Connect

Build *mobile apps*

Connect *to, and* ***run*** *backend systems in support of mobile*

Manage & Secure

Manage *mobile devices and apps*

Secure *my mobile business*

What's Unique about Mobile Applications?

- **Expectations are high, loyalty is low**
  - Reliability and usability matter! If your application doesn't function reliably each & every time users invoke it and it's easy to use, they will find another app & another business to deal with

- **Access patterns and volumes are less predictable**
  - More service calls from mobile devices, potentially more users, at anytime
  - Short & focused interactions, interruptions are common
  - Apps still need to be usable when out of wireless coverage

- **Rapid refresh rates**
  - Mobile apps are written, used & replaced at a far higher rate than traditional enterprise applications
  - Mobile devices & platforms themselves evolve rapidly

- **Provide unique context insights and thereby unique opportunities**
  - For example user location information is available to potentially be utilised

- **Performance expectation**
  - Immediate response expected from mobile applications

- **Security is a paramount concern**
  - Mobility of devices makes them easier to steal or spoof

- **Bandwidth and battery life are at a premium**
 - Need to minimize back and forth communications

You need to connect using more than just HTTP

- **The HTTP standard revolutionized how *we* consume data**
  - A single simple model: Send a request, read the response
  - Available via any tablet, laptop, phone, PC etc.

- **Mobile and the Internet of Things applications have additional challenges**
  - HTTP remains ideal for requesting data from a known source
    - Mobile user *requesting* info
  - But we also need an event-oriented paradigm:
    - Emitting information *one to many*
    - Listening for events *whenever they happen*
    - Distributing minimal packets of data in *huge volumes*
    - *Pushing* information over *unreliable networks*
    - Reliably completing *mobile business transactions*
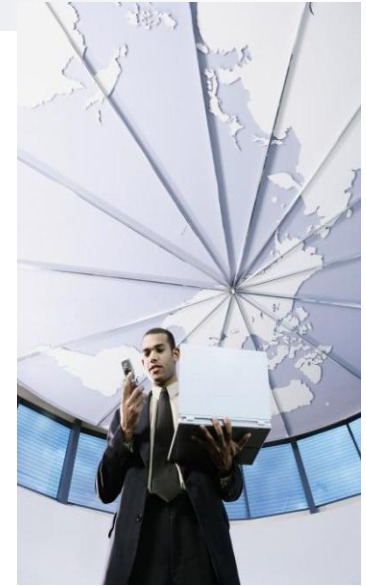
IBM WebSphere MQ provides Universal Messaging

Mobile devices

Sensors

Services

Applications

Files
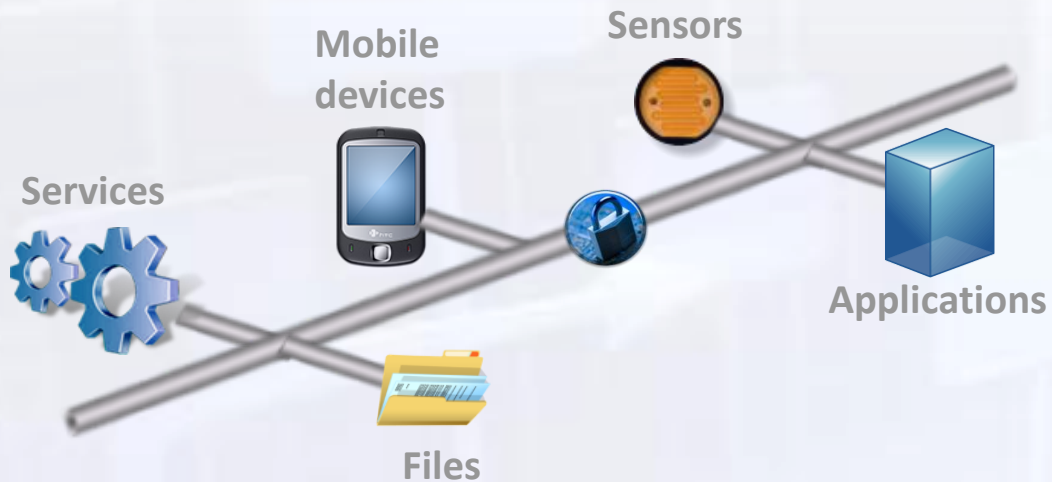
- **Industry's most widely deployed messaging middleware**

- **Inherent reliable delivery and transaction control**

- **High-speed handling of any type of message or file**

- **Native lightweight capabilities for supporting mobile devices, remote devices & sensors**

- **End-to-end advanced security**

- **Extremely prominent skill base – over 10,000 customers**

IBM now provides reliable Mobile access to the Enterprise

- **Reliably extend your business to mobile devices**, building on the value of your MQ messaging infrastructure
- With our **new Mobile client pack** available from the Messaging community on developerWorks
  - Introduces a new **Javascript messaging API**
  - Provides clients for native Android and iOS developers
  - Helps you design & deploy a **hybrid mobile app** for the Android platform using Worklight Studio
- Underpinned by IBM **WebSphere MQ Telemetry Transport (MQTT)** providing
  - Ease of integration with enterprise applications
  - One-to-many message delivery (publish/subscribe)
  - Reliable delivery over fragile connections
  - Near realtime push of data from the server
 - Low power consumption & scalability

Mobile apps

Enterprise Apps and Data
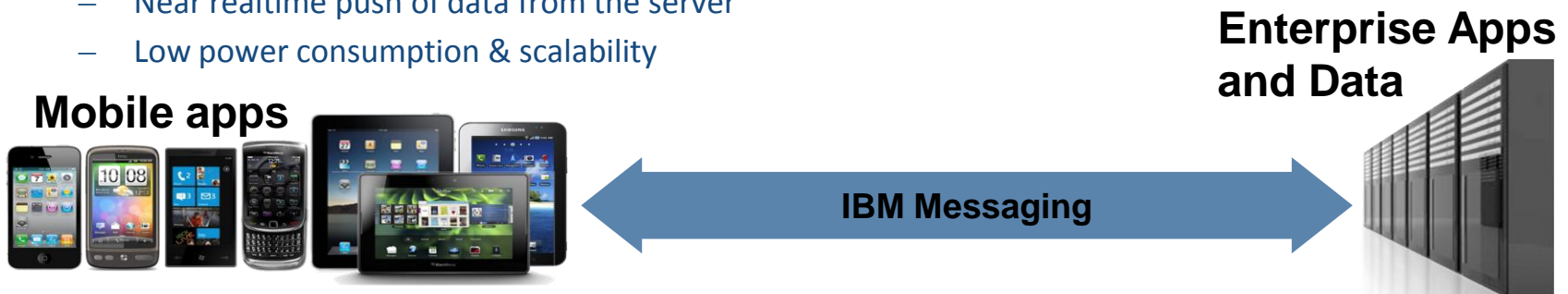
IBM Messaging

How do we attach Mobile devices to the Enterprise?

MQTT is the transport for the Smarter Planet

- **WebSphere MQ Telemetry Transport (MQTT)**
  - Messaging optimized for mobile, smart sensors and telemetry devices
  - Enables intelligent decision-making based on remote real-world events
  - Remote resource management of static or moving assets, people, locations

- **An open standard with Industry leadership & mindshare**
  - MQTT Protocol and client code contributed to open source effort
  - see MQTT.org and Eclipse Paho
  - allows development communities to provide further client code & device support
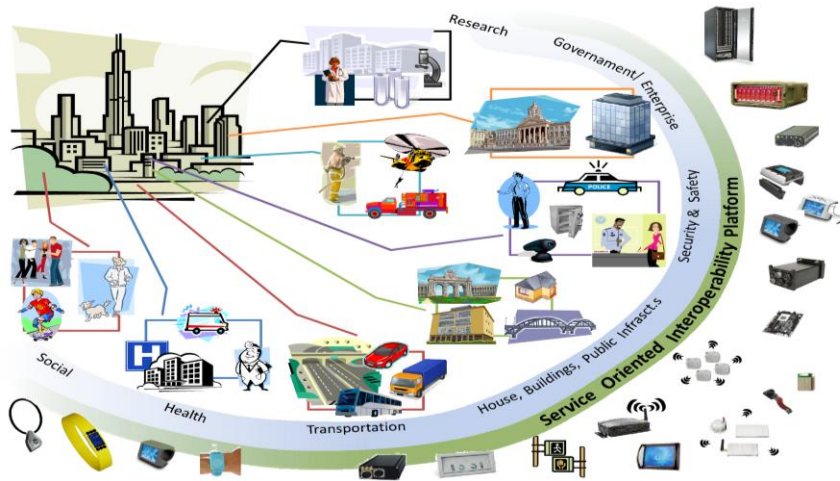
Internet of Things

**Smarter Planet**

Social business

What role does MQTT fulfill in Mobile Messaging?

- **Provides a reliable transport**
  - to convey messages from mobile apps to and from your enterprise applications, services and data

- **Provides a Push notification mechanism**
  - No polling required

- **Publish/subscribe paradigm support**
  - A single message can go to multiple devices
  - Great for push notifications and a big advantage over use of HTTP

- **Helps conserve battery & bandwidth**
  - Very light footprint from a client code perspective
  - Less chatty protocol than HTTP solutions so conserves valuable network bandwidth

- **Eases application development costs & speeds time to value**
  - great integration to products such as WebSphere Message Broker to easily enable access to enterprise services

Techniques for Creating Exceptional Mobile Experiences

Native

- Able to make use of phone's native features such as camera, GPS, accelerometer, calendar, etc..

- Supports the richest of user experiences (e.g., gaming applications)
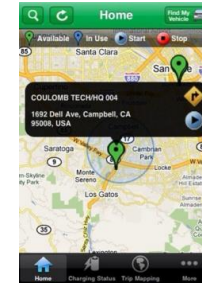
Browser Based, Web Applications

- Accessible over the internet without need to download software

- Uses device browser to display content

Hybrid – Both Web and Native Components

- Native looking applications which utilize the browser interface to deliver content

- Provide the ability to use native device features without writing code for each device

Using Worklight Studio to create Mobile Apps

Eclipse Based IDE
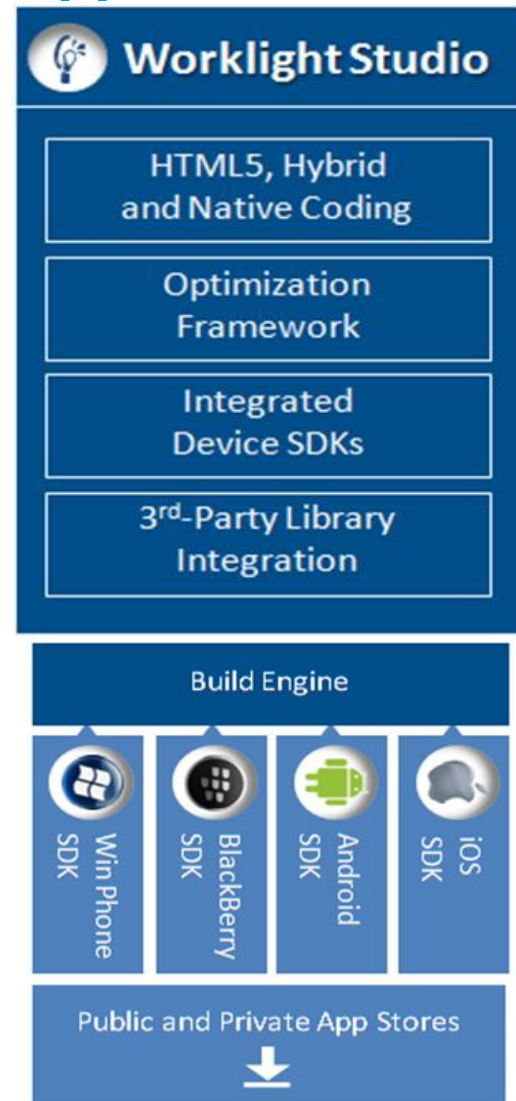- Native, hybrid and standard web development

Environment-specific optimization
- Common code with overrides/extensions
- Native development options
- Runtime skins

3rd-party library integration

Device SDK integration
- Access to emulators and debugging tools

Supports auto-complete and validation
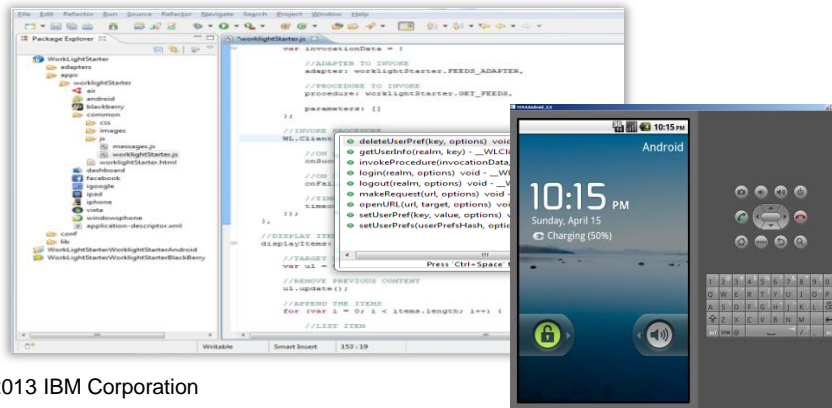
Where do the Mobile Messaging Clients fit?

Java Scripters
Messaging for **Hybrid apps**

Apple iOS
Messaging for native iOS apps

Android
Messaging for native Android apps

Internet

APP
DB DB APP
Service
Service APP
DB APP
APP

Worklight developers
Developer experience augmented with mobile messaging

Mobile Messaging Clients
•Simple Javascript Messaging API

MQTT
•Reliable messaging protocol
•Access to enterprise
•Reliable delivery
•Conserve device power
•Reduce network traffic

WebSphere MQ
•Universal Enterprise Messaging
•Provide access to enterprise apps and data already connected by MQ
•Pub/sub model to enable dynamic distribution of notifications

Putting it all together

IBM

Worklight Server

Client-side App Resources
- Direct Update
- Mobile Web Apps

Unified Push Notifications

Stats Aggregation

Server-side Application Code

JSON Translation

Authentication

Adapters

HTTP

Platform Specific Notification

APNS or GCM

SQL or HTTP

MQ

MQ Queue Manager

MQTT

Device Runtime

PhoneGap

Worklight
- Security & Authentication
- Back-end Data Integration
- Post-deployment control and Diagnostics

Application Code

MQTT client

Worklight Studio

MQTT client

MQTT clients augment Worklight capabilities:
- Reliable messaging that conserves battery power and reduces network traffic
- Clients are linked into the app by the app developer

Worklight Server provides security, app management, statistics gathering etc.s

Example use cases for Mobile Messaging client pack

Context / Location-aware
- Real-time view of where mobile users are, how they move and interact with the world around them
- Efficient way to getting real-time updates from mobile devices

Examples
- **Utilities** engineers reporting grid defects
- **Government** sending localised warnings of flooding
- **Automotive** locating nearest rental car
- **Logistics** notifications of deliveries, delays, changes

> Package delivery expected in 2 hrs

> Don't deliver my package today

> Customer is now near pick up point

Mobile transactions
- Reliable delivery of data between mobile devices and enterprise
- Doesn't have to be connected to complete business activity
- No need to develop complex retry logic in mobile apps

Examples
- **Social networking** coupons
- **Gaming** micropayments
- **Electronic auctions** micropayments
- **Retail Banking** micropayments e.g. in-store payments

> Registered customer near chain

> Send special Offer: 2 for 1 Coffees

> Pay: $7.25c

> Voucher for $1 off biscotti

Other Mobile Connectivity capabilities to consider

Enterprise Connectivity
- **WebSphere Message Broker** to quickly expose enterprise data, processes and applications for mobile app access

Cloud connectivity
- **CastIron** to synch mobile apps with SaaS data

Mobile

Edge Security
- **DataPower** to secure perimeter

Building Mobile Apps
- **IBM Worklight** for productive multi-device development, mobile app serving and mgmt

Reliable Mobile Communications
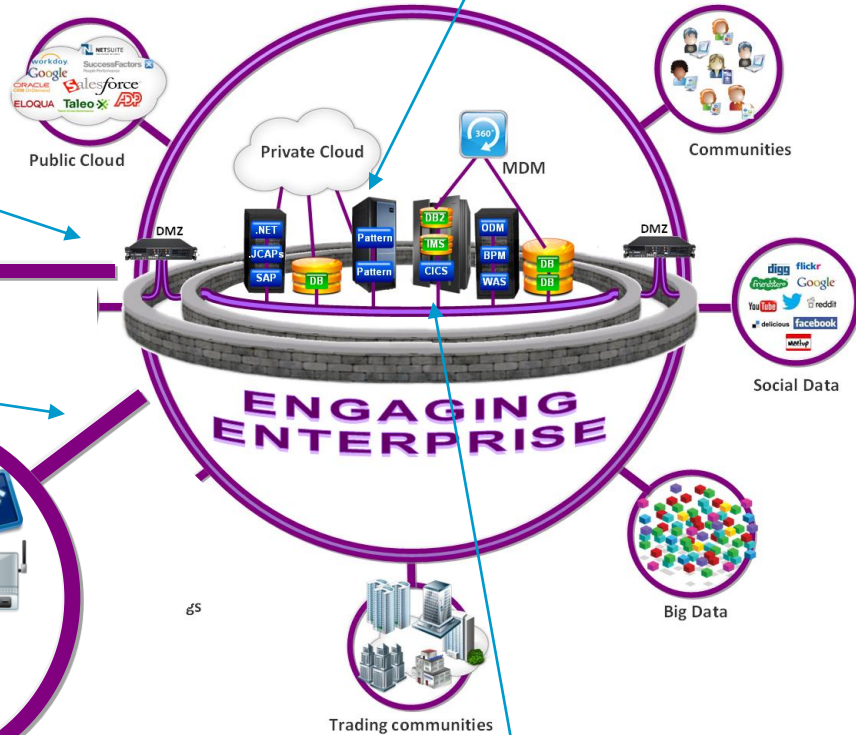- **IBM WebSphere MQ Telemetry** for reliable, efficient mobile messaging

Devices

Universal Messaging backbone
- **IBM WebSphere MQ** for reliable, efficient enterprise messaging

Public Cloud

Private Cloud

MDM

Communities

DMZ

DMZ

Social Data

ENGAGING ENTERPRISE

Big Data

Trading communities

Summary for Extending WebSphere MQ to Mobile

- **So with IBM WebSphere MQ**
  - providing your Enterprise Messaging backbone

- **and its WebSphere MQ Telemetry Transport capabilities**
  - providing reliable messaging to <u>both</u> mobile devices and sensor & telemetry solutions

- **your business applications can be accessed on the move**
  - Ensuring you don't lose any data, and keep your transactions flowing

- **and your customers can have a more dynamic and rewarding interaction with you**
  - Without draining their batteries or chewing through their data contract
  - Keeping them informed wherever they are

How to use MQTT for your Hybrid Mobile App Messaging
Register now for the 2nd webcast in this series!

Date: **January 31, 2013**
Title: **How to use MQTT For Your Hybrid Mobile App Messaging**
Time: **11AM EST**

Learn how to use IBM Worklight to develop a hybrid Android app that sends and receives messages using MQTT.

In this webcast you will:
- Understand when to use MQTT for your mobile messaging and its advantages over HTTP
- See a live coding session on how to develop the app itself in HTML and Javascript, and to use the Cordova (PhoneGap) libraries provided with Worklight to interface to native code that implements the MQTT protocol
- See a demo of a real world scenario that uses these technologies

After this webcast you will have all the tools and sample code to start building your very own lightweight messaging mobile apps!

Go to: http://webspohereusergroup.org/go/browse/webcasts

Links & Resources

More information for you

- **Mobile Messaging Client Pack –** http://ibm.co/145uanz
- **Join our Messaging community –** http://ibm.co/XI5JvM
- **MQTT Specification** http://ibm.co/a6jyCx
- **MQTT Open Source Community** http://mqtt.org/
- **WebSphere MQ & Telemetry –** http://ibm.co/dj15lW
- **WebSphere MQ Advanced Podcast –** http://ibm.co/T2CRX5
- **WebSphere MQ Podcast Series –** http://ibm.co/ix7Wlv
- **WebSphere MQ Technical Whitepaper –** http://ibm.co/OYr9Ly
- **MQ Trial download –** http://ibm.co/NSmKJe
- **MQ Sandbox –** http://ibm.co/gvDEfY
- **Robust Mission Critical Messaging --** http://ibm.co/n0nOyG
- **Friend us on Facebook –** http://on.fb.me/SuFGRX
- **Follow us on Twitter -- @IBMMessaging**
- **Watch us on youtube –** http://bit.ly/cCt6dH
- **What's New In MQ Overview WebCast 10/25 --** http://bit.ly/Qt1GyD
- **MQ Advanced Announcement –** http://ibm.co/UDTPAN

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IBM

BACKUP

Guiding Principles in the creation of MQTT as a standard

WebSphere MQTT was designed with the following primary intentions

- Minimize the "on-the-wire" footprint
- Expect frequent network disruptions
- Deal with slow, poor quality or expensive networks
- Expect client applications to have limited processing resources available
- Exploit publish/subscribe
- Provide several qualities of service
- Provide an "open published protocol"
  - ease of adoption by device vendors and third-party client software
- Provide secure connections
  - SSL provides authentication and encryption
  - JAAS provides pluggable authentication
  - MQ Object Authority Manager (OAM) gives resource level authorisation
- Simple API for quick development