Enterprise Applications and Mobile Devices

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Back in the Good Old Days

- You knew:
  - Where the terminal was located
  - Which group of people were using it
  - Who was doing things (near enough)
  - Power stayed on
- You had full Control:
  - Secure
  - Reliable operation
  - No nasty things going on
  - Could schedule off-line operations

Software = Hardware = Software

- Going Strong
  - Android ►► lots
  - iOS ►► Apple
  - Microsoft Windows ►► more devices appearing
- No Chance (my prejudice!)
  - Blackberry
  - Symbian (Nokia)
  - Chrome (Google)
  - Linux (Firefox)
  - Windows RT (Microsoft)
  - Microsoft Mobile (Nokia)

Why not?

- Existence
  - Still be around in the long term (say 4 years)
- Browser methodology unhelpful
  - Restricted to CSS box model
  - HTML5 does not provide Enterprise Characteristics
  - More of an interim solution
- Display Manager
  - Got to be integrated into the OS
    - Too easy to get into a stall otherwise
- Telephony is not prime usage for Enterprise Apps

Consumer or Staff usage

- This talk is about
  - Enterprise Apps
  - For usage within the Organisation
  - By ones own Employees/Contractors
- If deploying for Customers
  - Must put up with:
    - Unknown Devices
    - Uncontrolled Software and OS Levels
    - Potential Data Loss (Security)
    - Device going missing (Disaster!?!)
    - Malware and Attacks
    - No 'proper' User Identification

Presentation and Logic are distinct

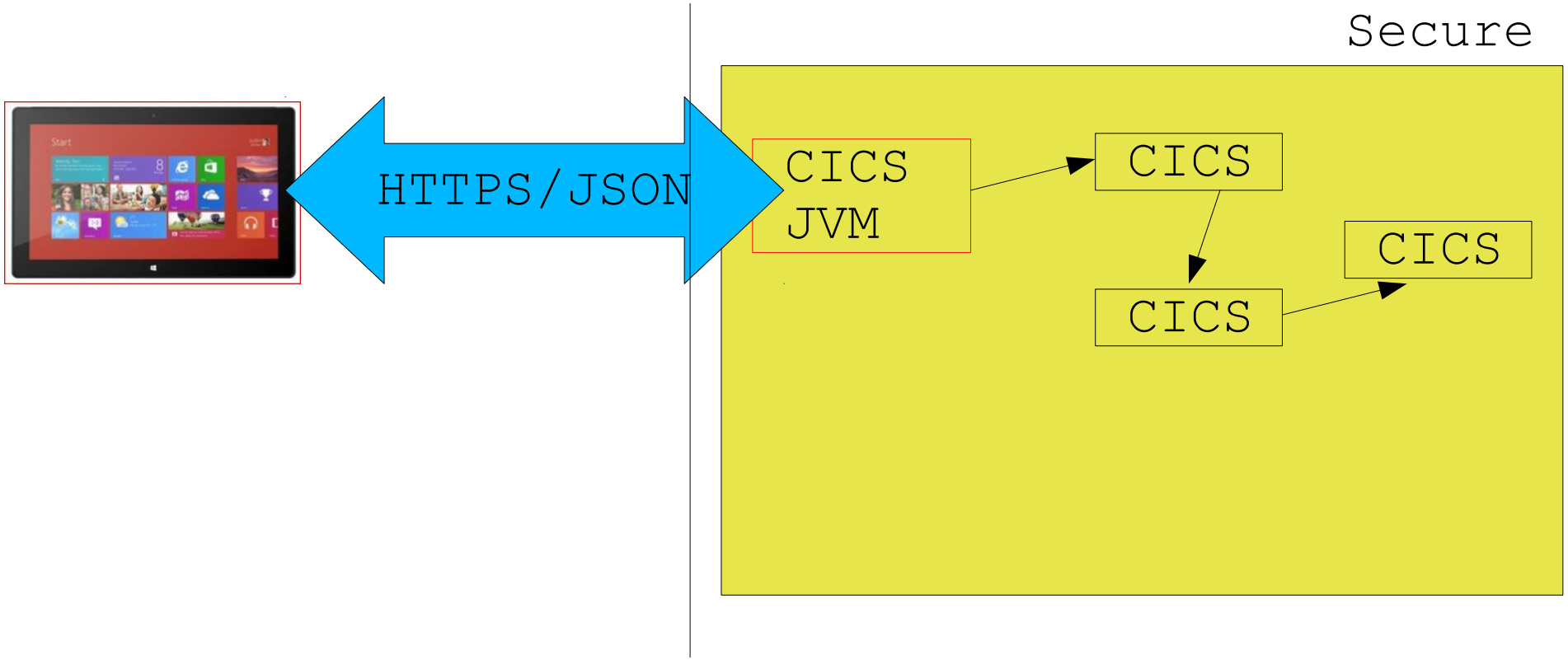
- Presentation and Business Logic must be distinctly separated
  - Mainframe Transaction Processing been saying this for 30 years!
  - Apps should ONLY be provided with this design
- OS must support proper multi-threading and co-ordination with backend processing
  - Transaction (Unit Of Work) should extend to the device
    - If not, must code for Compensation on the back-end
  - Thread and IP management required
  - Encrypted IP? Goes without saying

XML is dead, long live JSON!

Java Script Object Notation (ECMA 404, RFC 4627)

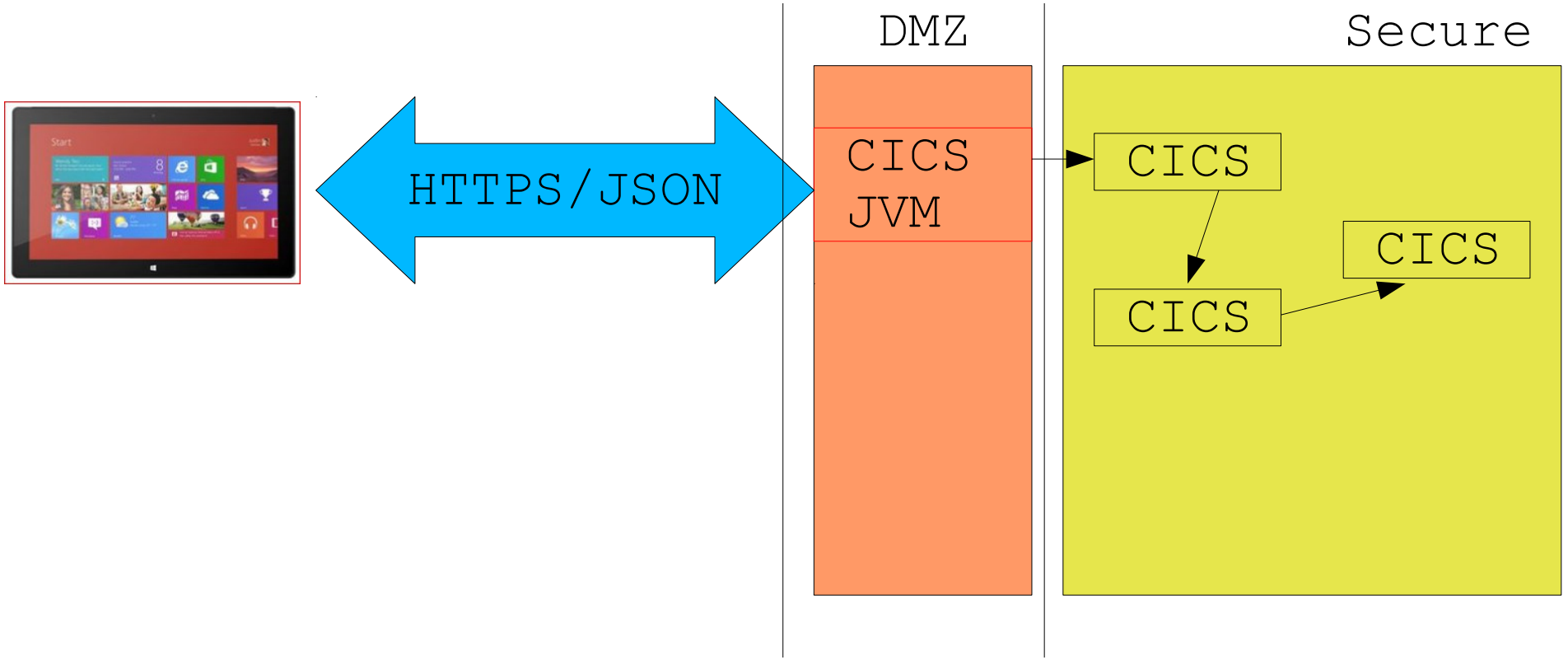
- Essentially {Key=Value} for flows instead of XML
  - Easier to verify (Structure for the flow)
  - No parsing overhead
  - Smaller flows
- Can contain:
  - Security Data (certificate)
  - Meta-data for authentication/authorisation
- Always let your Host Security Manager decide what is permitted
  - Security Code in Programs is maybe unwise

Topology for mobile access (bad)



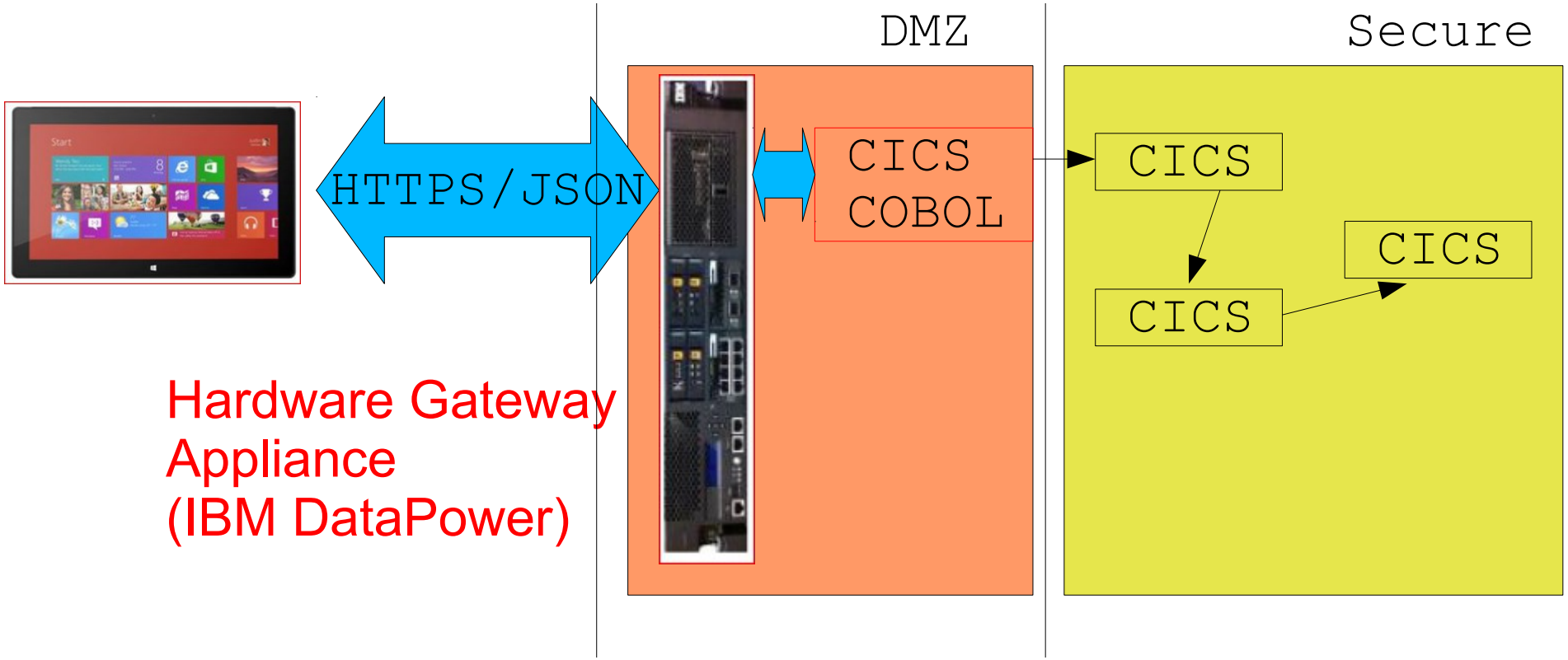
No good: lets aliens into your secure systems

Topology for mobile access (better)



Better: No nasty things can gain access to your data

Topology for mobile access (good)



Good Use of Hardware: Attack interception, Security Enforcement, Enforce Operational Characteristics, Data Filtering, Act as a Central Control Point

People

Credit to The Economist Magazine

Baby Boomers (mainframes)

Generation Y (Tablets)

Millennials = young Gen Y + always on

Generation X (PCs)

Different Generations have
Different Interface expectations

Keyboard
Mouse
Fingers

Telephony or Tablet?

The Critical Question for Enterprise App Deployment for ones own staff:

Do you need voice telephony?

Yes

- Why do you need telephone access as well as data in the SAME place?
  - Really REALLY Sure????
    - Small Devices with restricted viewports
    - Android or Apple (maybe Microsoft)
    - Must cope with insecurity

No

- Very Wise
- Tablets for you!

Identification not Passwords

- Userid/Passwords are no good
  - Too easy to crack
  - Too frequent keying for user satisfaction
- Finger Prints
  - Available on iOS
  - Only stored on the Device
- Facial Recognition
  - Front Camera
  - Can be done on the device and/or host
  - No particular user action required

IPv6

Go for IPv6, not IPv4

- Specific, known address for each device
  - Host Workload Balancing
  - Link Security
- Permits Multicast messages
- Supported on Apple, Android, Windows
- More secure
  - Fewer attacks run over IPv6
  - Use top part of IPv6 address:
    - To stay within your network
    - To block outsiders

Code or Byte Code?

- Compiled (Good)
  - Varients of C++: Microsoft, Apple
    - Secure
- Interpretative (Sad)
  - Java: Android
    - JustInTime perhaps open to attack by spoofing code

BUT: Android Kitkat (4.4) supports a sortof Compiled Java by replacing the Dalvik runtime with ART

> Quicker runtime and startup

> More secure (probably)

> First usage specific hardware Compilation penalty

Unix?

- Unix is the underlying base technology for
  - iOS
  - Android
- Windows is the base for
  - Windows!

```
From a mainframe view, Unix is not as secure as
the Enterprise Environment
   > File Permissions and ACLs for access are,
     for a mainframe person, not secure enough
```

Provisioning

- Got to have ways to:
  - Automatically update the OS
  - Automatically update your Apps
    - And ensure that this has happened to everybody
  - Update Security credentials
    - And ensure that this has happened as required
  - Wipe the Device
  - Stop your code using insecure Communications
  - Enforce Batch Windows
  - Record and Audit all activities
  - Send out vital messages with confirmed reception

Runtime Enterprise Environment

- Host Enterprise Functions are Transactional
  - But the Transaction does not commonly extend to the Mobile Device used to run the host functions
- Windows supports a Distributed Transactional Service
  - Transaction Unit-of-Work can extend to a Windows Device
    - Ensure that the user has:
      - Got Something
      - Done Something
  - Device and Enterprise systems will agree and be consistent

Development Environment

- Development Environment should:
  - Be capable of deploying Apps
    - Different Screen Sizes
    - Changing or Forced Orientation
  - Use JSON and XML protocols
  - Ensure no data is cached on the device
  - Cope with Identification techniques
  - Be able to deploy to different Devices

IBM Worklight has Development and Runtime facilities

Android/iOS Apps are not Programs

- iOS and Android are in control
  - Apps are rather like exits in mainframe environment
    - Apps implement methods which get called
  - You do not get to control things
    - Lifecycle
    - When the screen is updated
- Multi-thread support
  - Locking and race conditions
  - Runaway task
- Only Main thread can reliably update the screen
  - Some Android display APIs don't work immediately
  - Lot easier in iOS to get a real display change

What's the device doing?

- Just because the device looks like it is dormant, it does not necessarily mean it's not doing anything!
  - Channel 4 news showed things happening
    - Classic Man-In-The-Middle Attack
      - Apple and Android devices observed
      - Position and Usage info being sent to servers
  - Using your chargeable network
  - Security Violation
  - Hard to block as this is in base code
    - Could use a customised OS
    - Run things on the device to block supplied (system) functions and hope for the best
      - Probably have to run in a privileged mode

Bring Your Own Device?

- Using a company:
  - Network
  - Desk, Chair
  - Electricity, Sunlight
  - Time
- Means the company can audit your device
  - Security
  - Privacy
  - Compliance
- Company can force things onto your device!
  - Who knows what they are doing

Use an Employee Device?

- It's accessing Corporate Data
- It's inside the firewall
- How do you know the user's device:
  - is not stealing data?
  - is not corrupting data?
  - is not introducing malware?
  - is not running an attack?
  - is not probing credentials?
  - is not stealing the credentials/encryption?
  - is not caching data for later exposure?

Ban non-corporate devices!

- Only by forcing exclusive use of corporate-supplied device with vetted software can you approach a safe situation
- Lock down device
- Provide ways of:
  - Encrypting data and access
  - Updating software automatically (Provisioning)
  - Recording and auditing activity
  - Remote wipe
- Have control of display size (easier coding)

Apple Tablet

- Aimed at Social Networking
- Big Emphasis on Design type activities
- iOS is opaque
    - Difficult to customise at OS level
- Difficult to remove/control default software
- Fora suggest OS upgrades tend to be destructive
- Relatively high cost per unit

Android Tablet

- Aimed at Data Access
- Difficult to remove/control default Applications (and hidden activities)
- More Attacks now come from Android than from PCs
    - About 1 in 100k infected devices (15k worldwide)
    - Possible to replace whole OS with a customised version (Tesco Tablet)
    - Is this a good use of resource?
        - Redo for each OS upgrade
        - High Skill Level
- Lots of cheap devices

Windows Tablet

- Mature OS
  - Well known techniques
  - Large Support base and skills
  - Transactional support
- Good rollout of Fixes and Upgrades
  - As long as it is controlled
- Easy to add Firewalls/Protective functions
  - But potentially vulnerable to attacks and virii
- Hardware costs reducing
- Compatible with existing PC-based applications
- Initial screen can be customised

Remember the people?

- Don't forget the picture
  - Different 'ages' use Tablets in different ways
    - Finger Press = left click is generally acceptable
    - Long Press, somewhat more debatable
  - Icon interface is probably OK
- Fingers are of different sizes
- Left and Right Handed people use Tablets in different ways
- Got to be fully accessible
  - Disability Rights Legislation
    - So not too snazzy!

Conclusion for Enterprise Apps

- Ban all devices apart from the ones you provide
- Ensure Software is automatically provisioned
- Write Code that is usable by everybody
- Remember that Identification always is going to be imperfect (to a greater or lesser degree)
- Use Hardware and DMZ to protect Systems
- Don't cache data on the device
- Extend the Transaction Unit-Of-Work to the device
- Make sure you can remotely wipe the device
- Customise at the Operating System level

Go for a (proper) Windows Tablet!

Surprise, Surprise!

It's (proper) Windows for mobile Enterprise App Provision within an Organisation!

Something to think about

Thank you for appreciating the argument.