Mobile to Mainframe Integration Strategies

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Session 103-U 16-Oct @ 17:15

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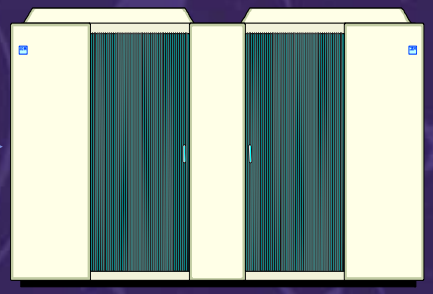
Creating architectures that enable portable applications to inter-operate with existing IT infrastructure.



M2M

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What is mobile computing ?

Exchanging information with a portable device unbounded by location.

Mobile computing scope

- Mobile computing includes :
  - Batch Devices: Infrequent connectivity, often file transfer.
  - Wireless (RF) Devices: Radio based, always connected, typically limited range
  - Cell-based Devices: Connect-on-demand, approaching universal range.
- Cell - based devices represent true “mobile” computing in today’s marketplace.

Typical Mobile applications

- Route accounting [Batch]
  - Utilities [meter reading]
  - Van sales (delivery/order taking)
- RF applications [Full time connectivity]
  - Warehouse management
  - Inventory control

- Cellular (CDPD/GSM)
  - Stock trades/quotes [connect-on-demand]
  - Electronic mail delivery

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Computing Platforms

- MS-DOS
  - Examples : Husky FS/3, Symbol 3100 series
  - Used in both Batch and Wireless applications
  - Essentially, the “old guard”

- PalmOS
  - Examples: 3COM Palm series, Symbol SPT1500
  - Moving up from PDA status

- Windows CE
  - Examples: Compaq iPAQ, Compaq Aero, Symbol PPT2700

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Mobile Architectures

- Architecture dictated by requirements
  - Connectivity requirements
    - Infrequent/Batch, On-demand, Full-time
  - Data/time sensitivity
- Integration points
  - Existing applications
  - Integration style

Peer application issues

- Existing desktop User Interfaces
- Presentation details *have* to be redone (screen limitations)
- Minimize amount of redundant business logic.
- Isolate business logic from presentation !

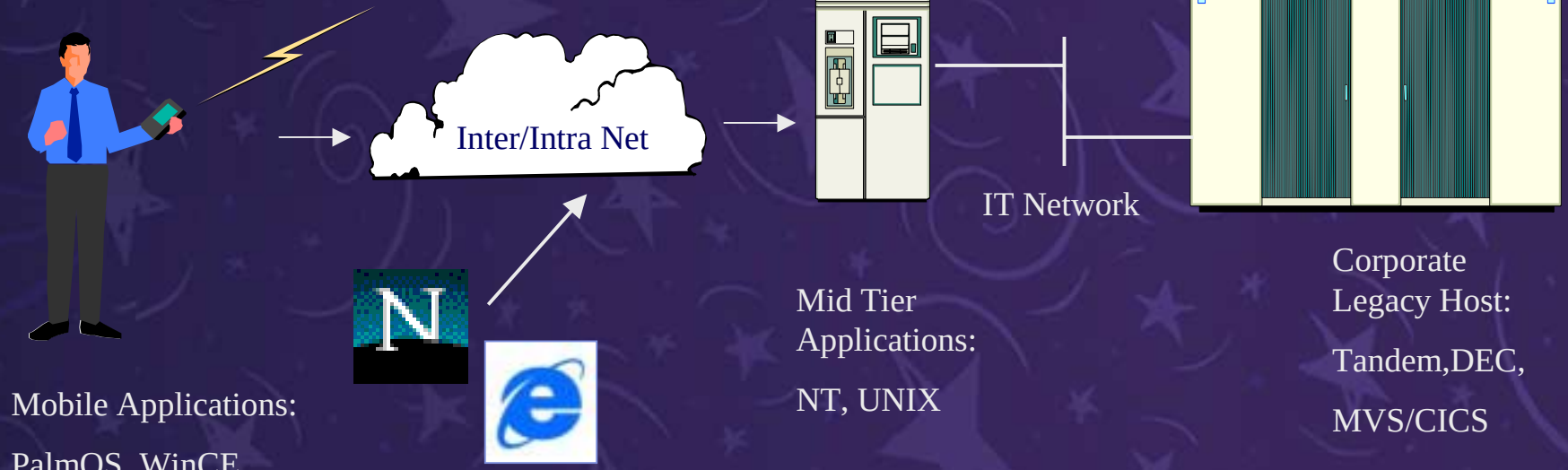
Host application issues

- Similar issues to Web to legacy integration
  - Minimize amount of interface code
    - Fragile, maintenance-intensive
  - Minimize amount of re-work on host
    - Host may be serving multiple environments.

Highlights

- Benefit from “desktop advances” to date
  - Graphical, color, point/click interfaces
  - Thin client development.
- Many mobile applications have desktop counterparts. Don’t do the same application two ways !
- Standard platforms :: PalmOS (and Java), WinCE
- Seamless integration with all network components, including middle-tier application servers, as well as corporate MIS systems.

M2M Schematic



M2M architectures *may* parallel Web 3 tier infrastructure in many ways

Mobile tiers

- Mobile networks may be two or three tiered, depending on requirements.
- Each “tier” represents a wide range of potential architectures, depending on connectivity type and requirements.

2 Tier networks (classic)

- DOS-based Batch portable device, increasingly WinCE or PalmOS platforms.
- Synchronization with server over hardwired or dial-up connection once or twice a day.
- Communication mechanism typically uni or bi-directional file transfer.
- Integration required in order to manipulate transferred file into file format of server.
- Route accounting applications

Classic Tools – Portable Devices

- Portable device development tools
  - Vendor-supplied SDK and downloading facility
    - Typically written in “C”
    - Software tied to vendor
  - Independent toolset targeting multiple vendor devices.
    - Best example: Code Warrior
    - Development/Debug on PC, download when tested
    - Provides vendor-neutral implementations for supported devices.

Classic Tools – Server side

- Server development tools
  - Application may be minimal, or may consist of database oriented screen application.
  - Powerbuilder, Visual Basic, against Oracle or SQL-Server database.
  - Increasingly, this Server application may be a 2 tier web implementation, providing a browser interface to database.

Classic -- Integration

- Integration consists of file manipulation between flat file format from portable device, to SQL format of server database.
  - text data, comma delimited, may be directly importable into database using bulkcopy-style facilities
  - Custom software may be written to filter, manipulate the file data in any meaningful way.
  - Same issues exist for data exported from the Server to be downloaded back to the device.

2 Tier Networks (RF)

- Warehouse application, I.e. Inventory picking/packing and put-away.
- Direct, full-time connection to Server.
- Two implementation types :
- terminal emulation of external systems (such as 5250, 3270, DEC VT100, or Tandem 6530 emulation
- 4GL environment for rapid application development. (Symbol's MCL product)

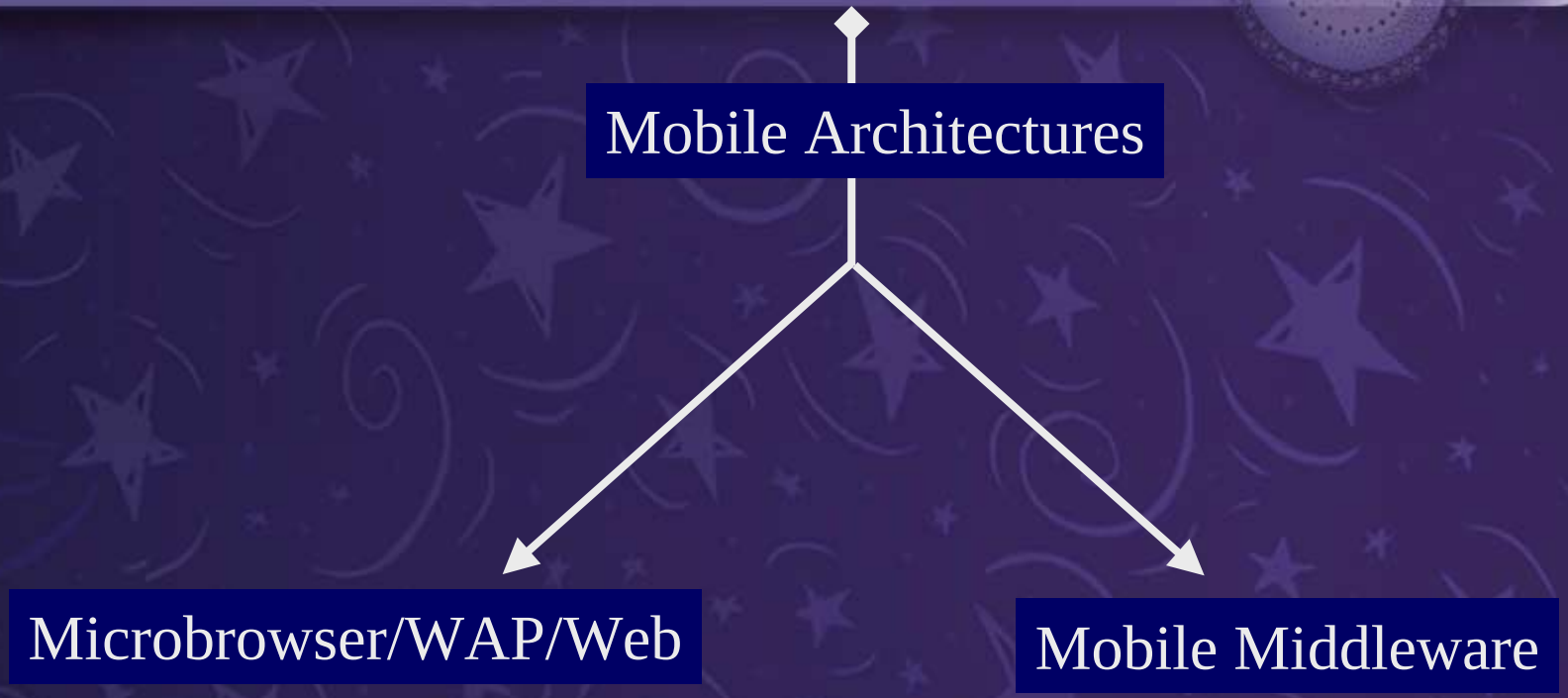
RF Integration

- Terminal Emulation
  - Limited
  - Must be done with host application that is generating screens
- 4GL tools
  - File based, either Flat or SQL
  - PB/VB/Browser applications may integrate with RF implementation through the Dataserver

The next generation

- Mobile implementation requirements
  - integration with both middle and host tiers,
  - concurrent direct and web applications performing related, but not identical transactions.
- New Tools are becoming available for aiding in these deployments.
- “Mobile Middleware”
- WAP

A fork in the road



When to use which ?

Decision factors

- Target Deployment device
  - Phone : Browser approach, since mobile middleware is targeted at PDA market, at least right now.
- Criticality of information
  - Stock quotes, flight status, etc. work fine using browser approach
  - Large funds transfers, stock trades, might require more robust facilities of mobile middleware.

Mobile Middleware

- Middleware
  - Software layer that insulates applications from the vagaries of heterogeneous computing.
- Mobile Middleware
  - Software component that insulates applications from the vagaries of mobile connectivity issues.
  - Database and messaging variants

Mobile Messaging

- Products :: IBM MQ-Everyplace
- Oriented towards application-to-application messaging
- Benefits
  - Platform transparency
  - Location and protocol transparency
  - Isolation from “when connected” vs. “when not connected”
  - Self descriptive messaging

Mobile Database

- Products ::
  - Sybase SQLAnywhere,
  - IBM DB2 Everywhere
  - Oracle 8i Lite.
- Small Footprint :: 50-70K
- Local, embedded database, with replication strategy when connected with Server.
- Most beneficial to database oriented applications.

Wireless Access Protocol

- Architecture for creating Mobile applications in a Web world.
- The WAP goal is to adapt existing technologies to working in the mobile environment.
- Focused on the wireless telephone market initially, but broadening into the PDA world as well.
- Suite of components proposing all forms of standardization, including Transport, transaction, session and application interface semantics.

WML

- Wireless Markup Language is a version of HTML/XML for the Mobile platform.
- WML forms the basis of emerging Mobile browsers, and Mobile Web servers.
- Tools for generating WML applications will be very similar to existing HTML/XML editors.
- Provides facilities for both connected and disconnected operations.
- Programming a mobile device is like creating a web site.

WBXML

- XML is the de-facto standard tool for open, self-describing messages.
- It tends to be verbose, which is problematic in a limited environment, both for transmission and storage reasons.
- The Wireless Binary XML standard is an effort to create a binary, compact representation of XML for use by mobile devices.
- WBXML is a run-time translation of XML, not a replacement or alternative.

WAP Gateway

- Heart of the architecture
- The WAP Gateway translates Wireless traffic (WML, WBXML) to standardized Web format (XML, HTML).
- From WAP Gateway, Mobile traffic can be processed like standard Web traffic.
- However, the presentation is not the same !
- Even on the Web, separating presentation from logic is paramount.

WAP Status

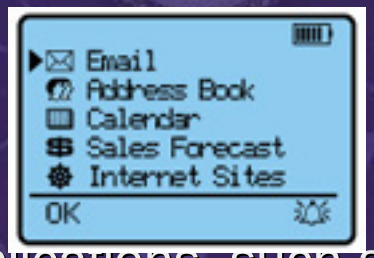
- The Wireless Access Protocol is a suite of specifications developed by a consortium of vendors.
- WAP is aligned with the World Wide Web Consortium.
- WAP compliant products are starting to emerge, but many products are yet to come.
- Definitely in the “early adopter” stage.
  - *Much* further developed in Europe than in the US

Tools

- Nokia WAP Server
  - Mobile “Web Server” for *any* WAP 1.1 compliant device.
  - Administration similar to Web server support.
  - Provides the portal to legacy applications and services !
- Nokia WAP Toolkit
  - Tools for developing WAP applications.
  - Includes composition, testing, and debugging facilities on a PC-based simulator.

Tools

- Phone.com UP Product suite
  - Wireless carrier products
    - UP.Link, UP.applications -
      - wireless internet services and applications, such as e-mail.
  - Wireless phone manufacturer products
    - UP.browser : WAP micro browser for inclusion in mobile phones.
    - Up.Smart : PDA features for mobile phones
  - Independent developer toolkits
    - UP.SDK : tools for creating and testing WAP content on standard web servers, with PC based simulators
    - Free !



Middle tier XML

- WAP approach
  - WAP Gateway will generate XML from WbXML
- Mobile Middleware
  - MQ-Everyplace will initially provide name/value tagged data pairs, which is easily converted to XML.
  - It is straightforward to generate XML from SQL.
  - Oracle 8i generates XML.

Into the Enterprise...

- Once in XML,integration opportunities abound:
  - XML messaging (is fast becoming), has become the lingua ~~franca of interop~~erable messaging.
  - Self descriptive messaging in general provides a straightforward path to both transformation and translation capabilities.

Tranformation/Translation

- Transformation
  - Filtering messages based on specified rules for the purpose of modifying the names, types, and values of individual elements.
- Translation
  - Changing the representation of a given message from one format to another. “Legacy” translation involves changing the representation to a fixed size/fixed offset message structure typically used by legacy applications.

Enterprise Tools

- XML based messages can be routed into Message brokers, such as IBM's MQSeries Integrator.
- XML based messages can be routed into transformation Engines such as Mercator.
- On a lower price scale, XML based messages can be routed through ***evolve,*** which provides both transformation and translation services.

The result...

- I can implement a mobile application that includes corporate IT host integration.
- I can implement such a configuration with a minimum of fragile context-sensitive interfacing software.
- The mobile application can share business logic with desktop and Web editions of the same application.
- The tools to implement these strategies are coming out now. *Fast*

The way forward

- Mobile device applications
  - Native applications using mobile middleware for robust, transactional applications

    - and/or -
  - WAP-WMLscript applications for lighter-weight Web-oriented applications.
- Focus on arriving at the middle tier with self describing data.
  - XML

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Thanks !

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- For a current version of this presentation, leave a business card and/or e-mail address, and we will e-mail it to you.

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