Windows Mobile Development With Compact Framework 3.5 and Windows Mobile 6

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Agenda

- Introduction
- What is Windows Mobile?
- Architecture & Design Issues
- Compact Framework 3.5 features
- Development Issues
- Tools & Best Practice
- Resources
- Questions

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Disclaimer ☺

- The code in this session is…
  - For demonstration and teaching purposes
  - NOT production level code ☺

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Mobility platforms

Smart Personal Objects

- One-way network
- Information consumption

Smartphone

- Information consumption
- Primarily data viewing
- Integrated phone with PDA
- Interoperability with Exchange
- .NET Compact Framework
- ASP.NET mobile controls

Pocket PC Phone

- Information consumption
- View and enter data
- Integrated with phone
- Interoperability with Office, Exchange and SQL Server
- .NET Compact Framework
- ASP.NET mobile controls

Notebook PC

- Complex document authoring, editing and reading
- Keyboard centric at the desk
- Keyboard and mouse input methods
- Full .NET framework available

Tablet PC

- Complex document authoring, editing and active reading
- Note taking and ink annotating
- Keyboard centric at the desk, pen & keyboard away from the desk
- Keyboard, mouse plus pen, ink, and speech input methods
- Full .NET framework preinstalled

Windows CE

Windows CE + Windows Mobile

Windows XP

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What is Microsoft Windows Mobile?

- Complete operating system platform
- Modular - built on Windows CE
- Designed specifically for mobile usage
- Platform Specific implementation
- Extensible by OEMs
- It is NOT Windows Forms on a small screen

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Software Platforms

Common Device Usage Scenarios

Integrated Application And Service Experience Platform	Pocket PC Smartphone Portable Media Center
Vertical Handhelds VoIP Phones Thin Clients Medical Devices	Set-top Boxes Consumer Electronics In-vehicle Navigation Industrial Automation
Retail POS/Kiosk ATM Advanced STB LOB Thin Clients	Test and Measurement Office Automation Home Media Gateways Medical Systems

Windows Mobile 6.0 – Version Names

Windows Mobile 5	Windows Mobile 6
Windows Mobile 5.0 SmartPhone	Windows Mobile 6 Standard
Windows Mobile 5.0 Pocket PC	Windows Mobile 6 Classic
Windows Mobile 5.0 Pocket PC Phone Edition	Windows Mobile 6 Professional

- Trend is towards Windows Mobile 6 Standard & Professional
- Windows Mobile 6 Classic in decline

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Windows Mobile 5.0 /6.x Products

Classic & Professional

Data-centric device

- Touch screen and stylus
- Integrated QWERTY
- Applications Platform

Standard

Phone-centric device

- One handed navigation
- Keypad and joystick
- Applications Platform

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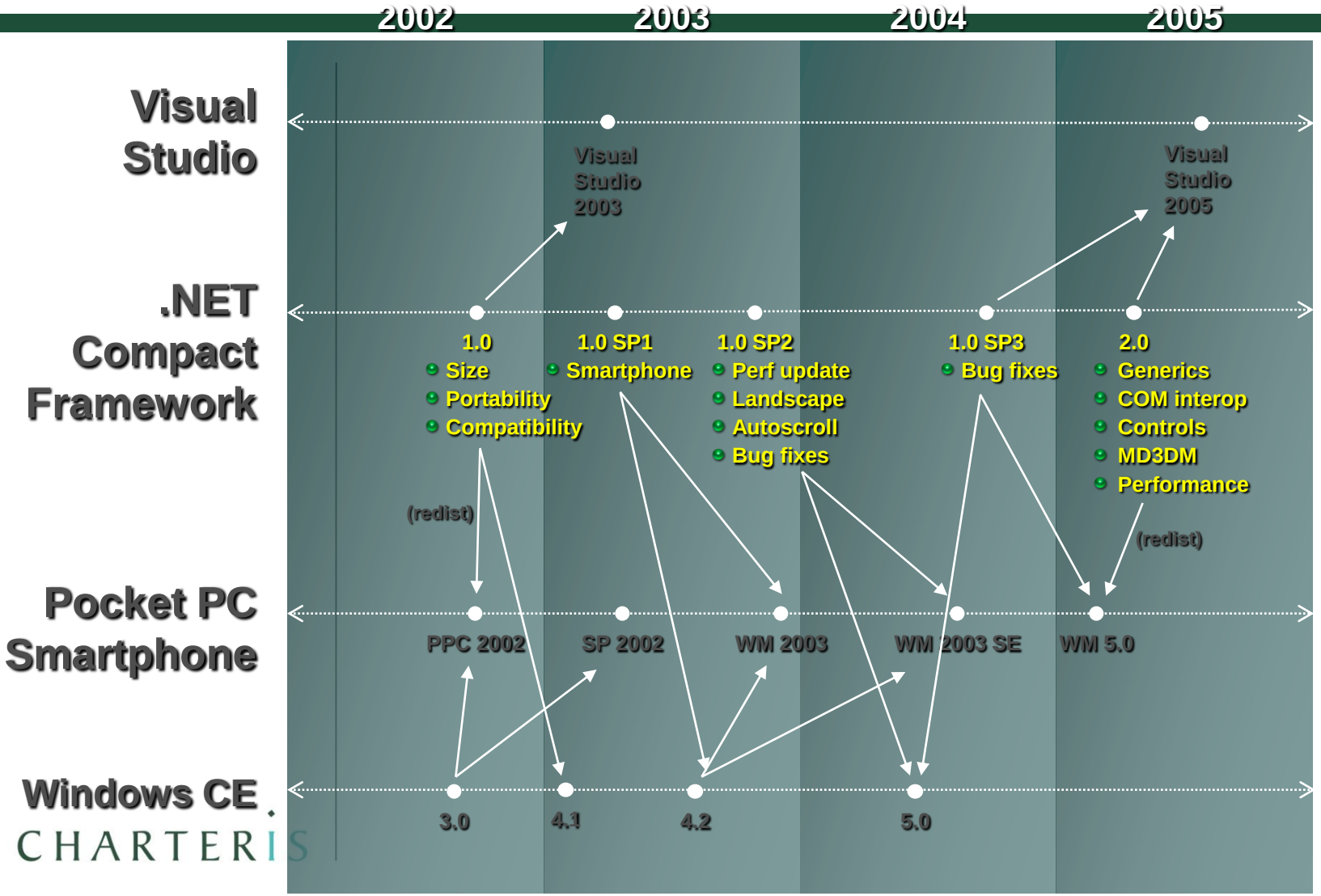
Release Roadmap



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Compact Framework Defined

- Targets mobile and embedded devices
- Portable subset of .NET Framework
  - 8% of full framework
  - C# and Visual Basic .NET compiler support
- Leverage Visual Studio .NET
  - Run managed .EXEs and .DLLs directly
  - Debug with Visual Studio .NET
- Peacefully co-exist with host OS
  - Uses CE for core functionality and device specific features.
  - Run on native threads, P/Invoke to native code

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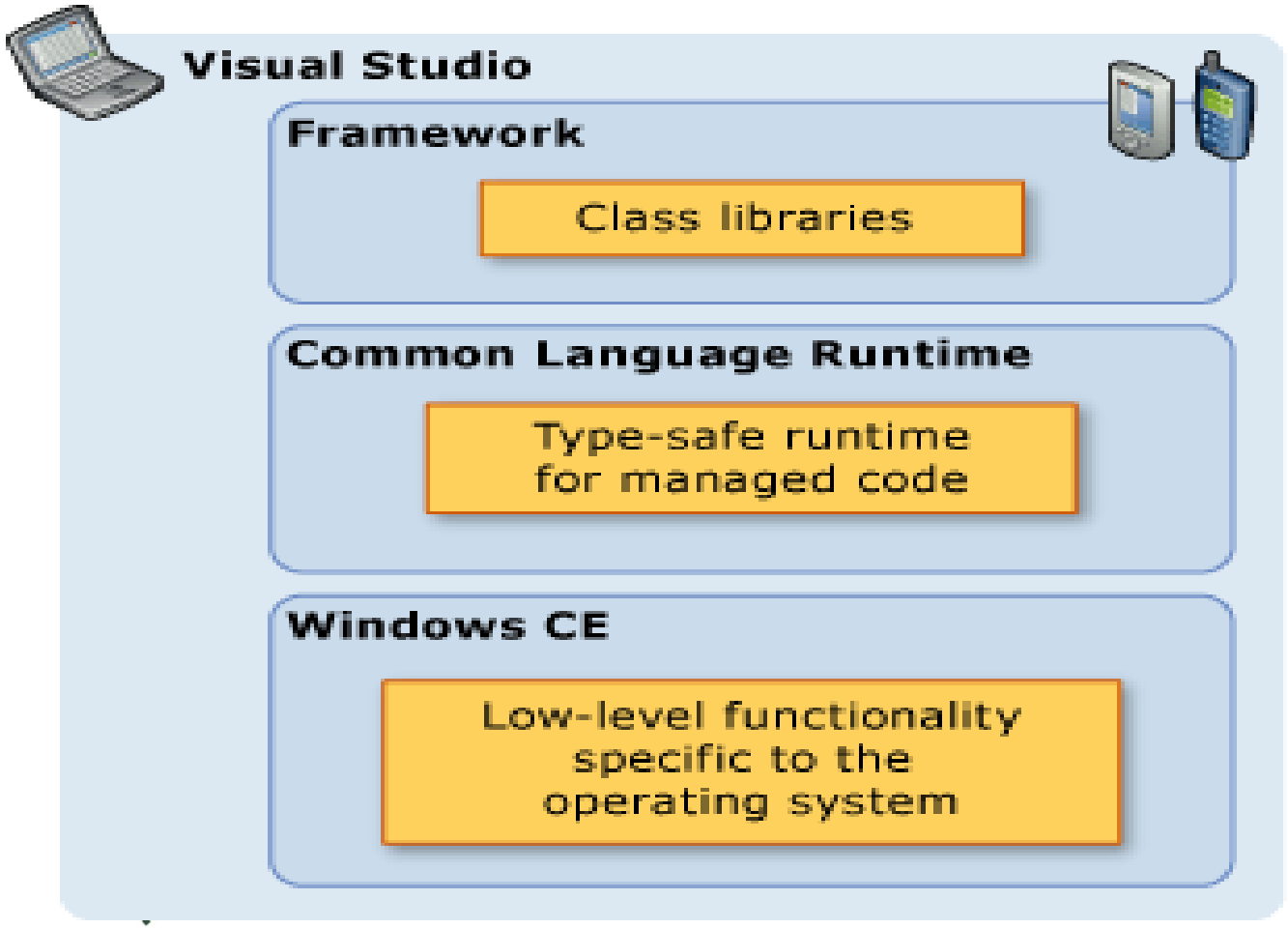
Architecture – Simplified



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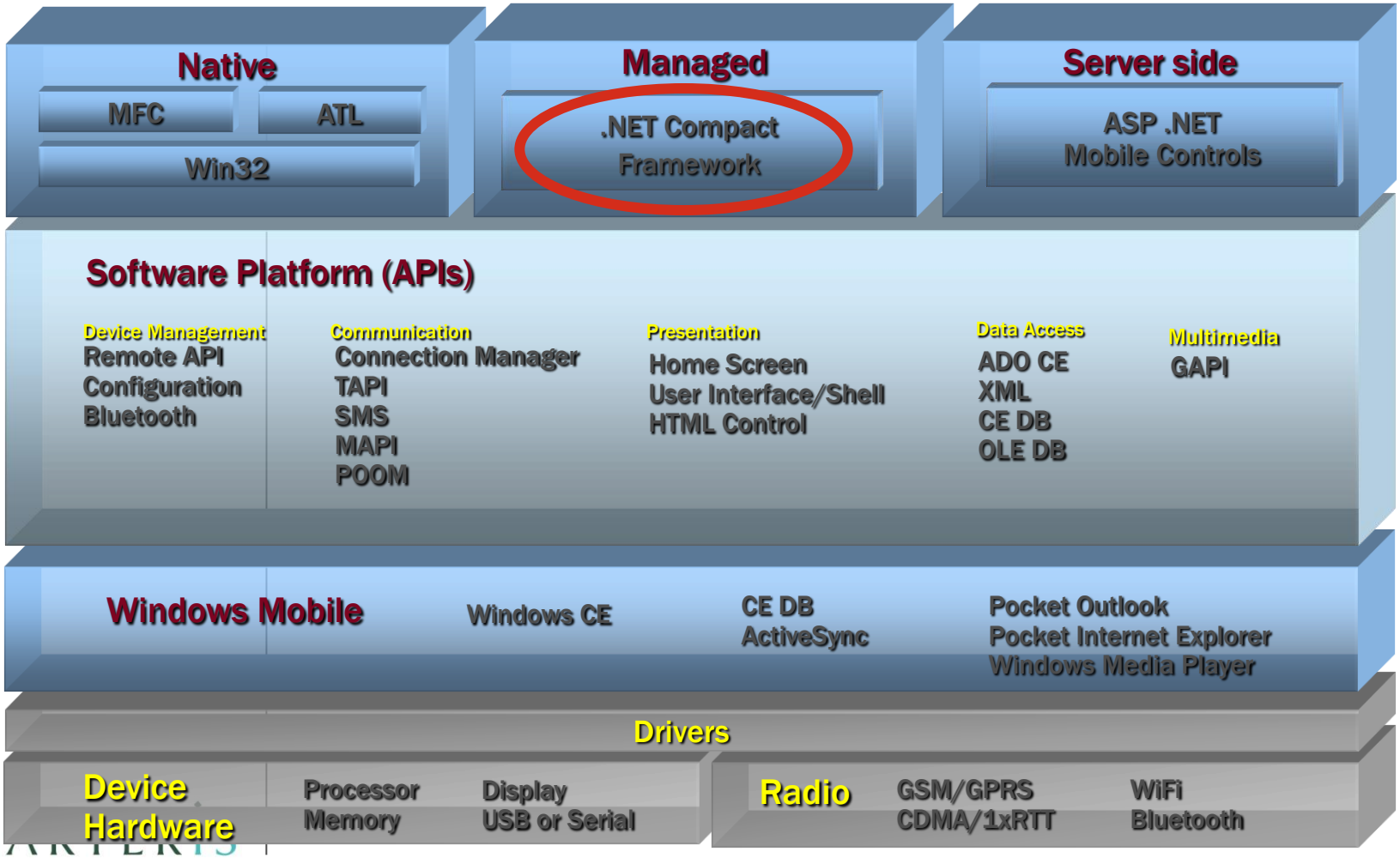
Compact Framework – Detailed Anatomy and Context



Compact Framework Restrictions

- No BinarySerialization or SOAPFormatter
  - Can serialize datasets to XML and objects for Web Services
- No support for System.Reflection.Emit
- No Remoting
- No support for localhost in Web Services
- Only 4 threads (Main, timers etc)
- Limited WCF support

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Compact CLR Common Features

- Verifiable type safe execution
  - No uninitialised variables, unsafe casts, bad array indexing or bad pointer arithmetic
- Garbage collection
  - No reference counting and no leaks
- JIT compilation
- Error handling with exceptions
- Common type system
  - Call, inherit, and source-level debug across different languages

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Mobile Applications Demos

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Design Issues

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Design & Architecture Issues

- User Profiles
- User Context & Usage Pattern
- Security
- Connectivity Issues = Smart Client
- Power Management
- Synchronisation
- Remote Interactions
- Patterns and Best Practice
- Regulatory Issues

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Design Issues – User Navigation

- Stylus vs Soft button vs Menu
- Gloved & Finger Usage = Large Buttons
- Design for Read Only
- Design for minimal input
  - SIP – Soft Input Panel
  - Voice Control – Microsoft Voice Command
- Pre-populate data
- Design for minor data change
- Pessimistic data preservation policy
- Design for power conservation

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Regulatory & Government Issues

- Health & Safety restrictions
- Communication regulation – international variations.
- Occupational restrictions
- Usage context – hands-free in car
- Government restrictions – intelligence agency, armed forces.
- Wireless and Electrical standards.

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Mobile Development Approaches

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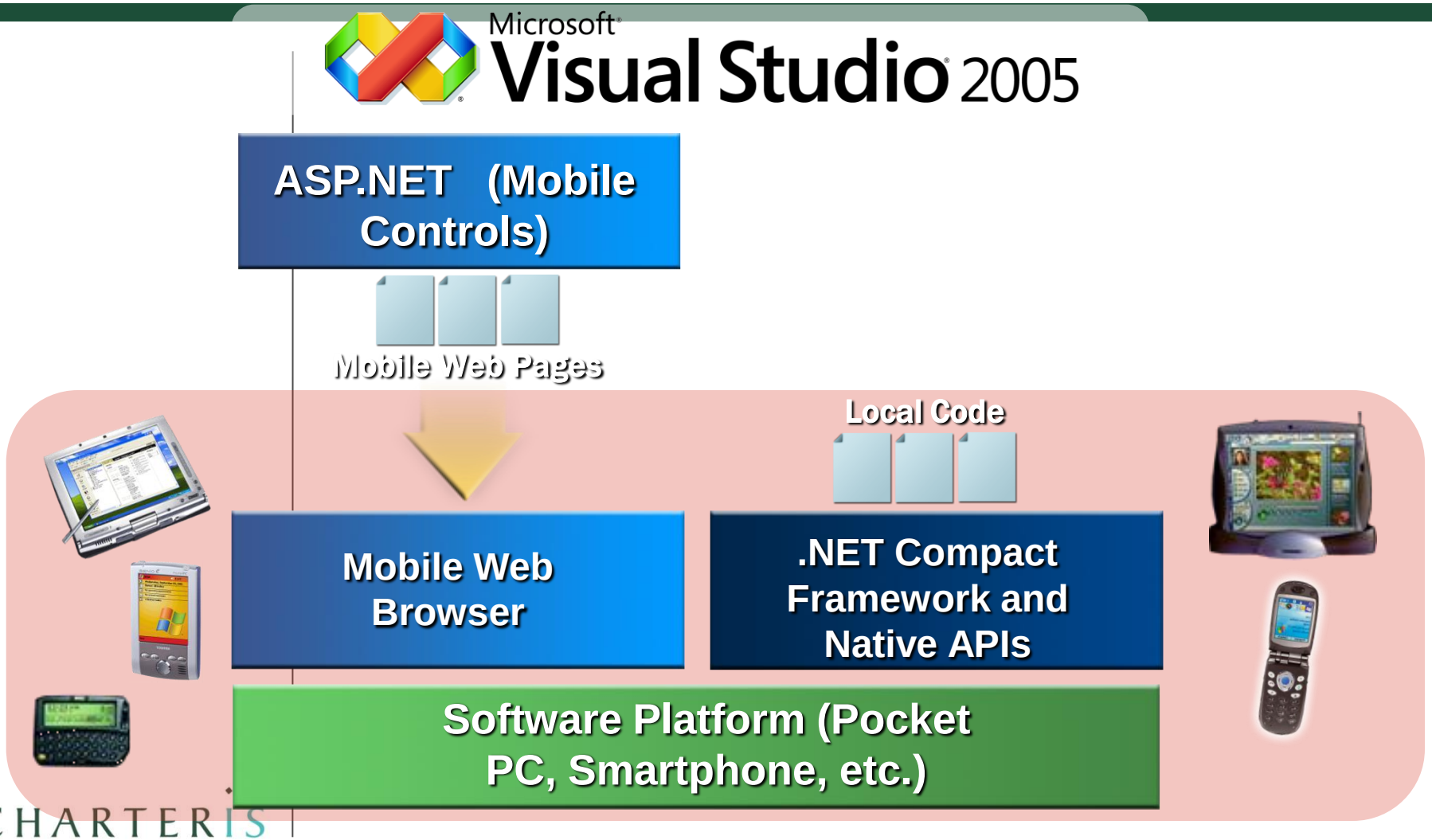
Mobile Web Development



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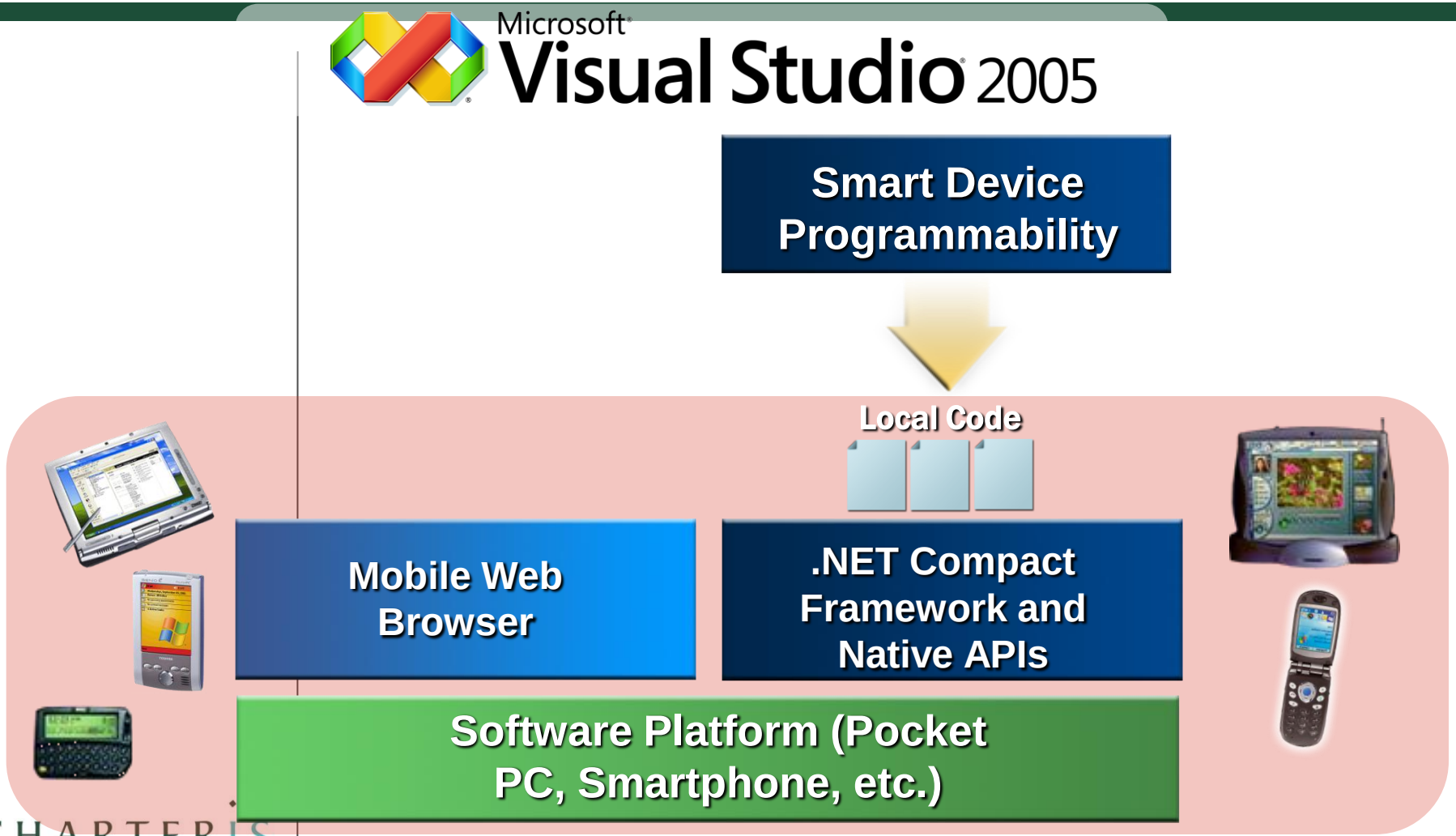
Smart Device Development



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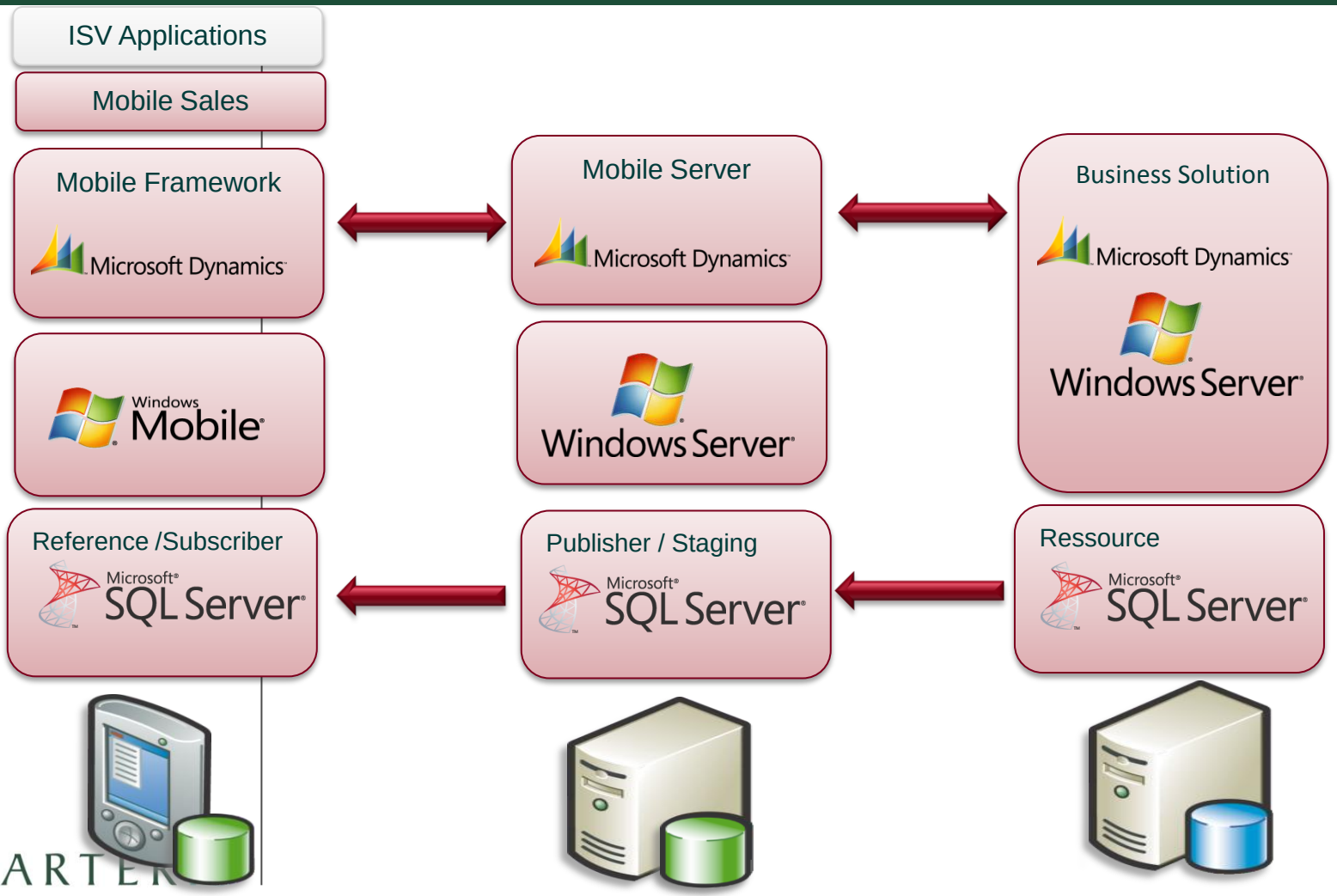
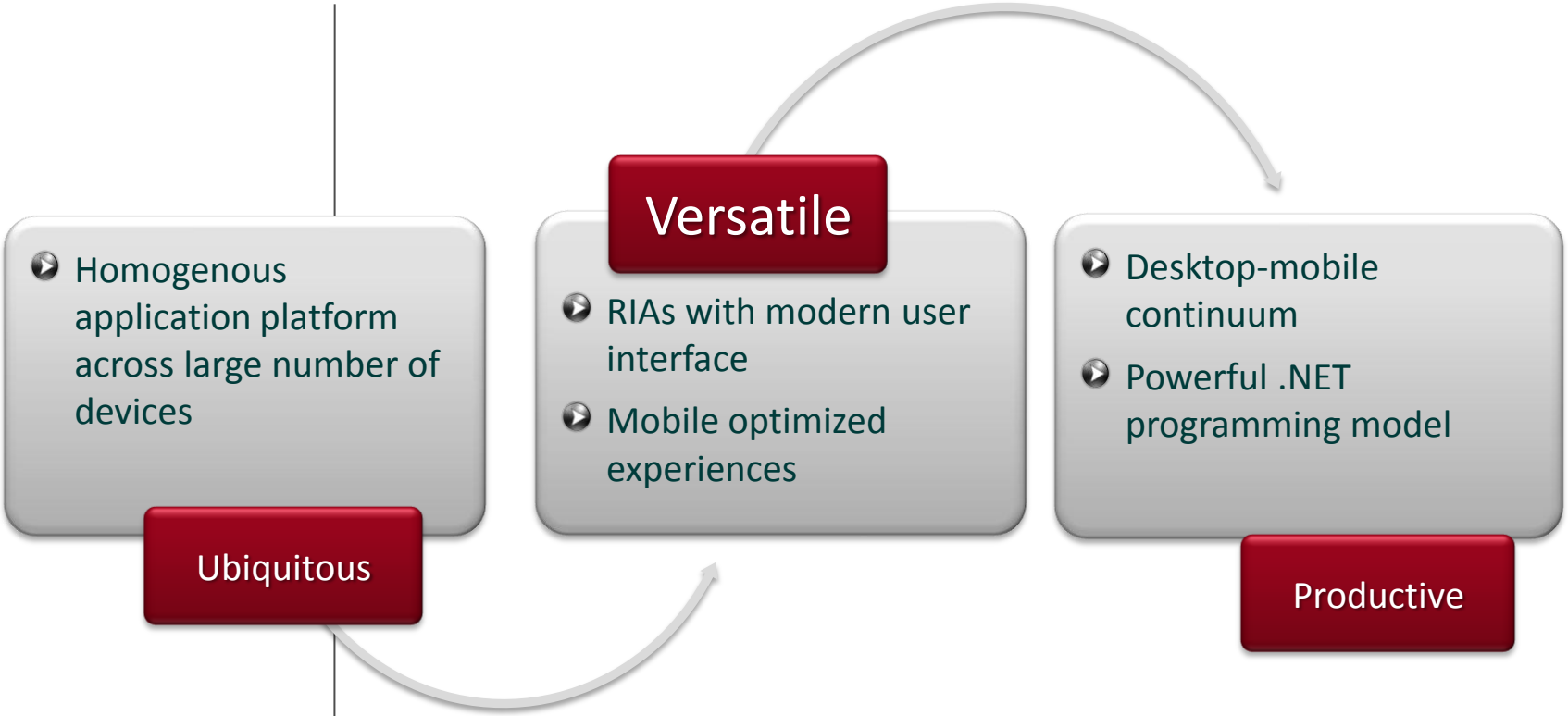
Microsoft Dynamics Mobile



Silverlight 2 for Mobile



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Silverlight 2.0 for Mobile

- Great potential for cross- platform use
- Constrained by graphic capabilities of device.
- Highly dependent on codec support
- Some restrictions on .net integration.
- Requires WM 6.0 onwards

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What You Need?

- Visual Studio 2005 / Visual Studio 2008
- Windows Mobile 5/6 SDKs Refresh
- SQL Server Mobile Edition
- ActiveSync/Mobile Device Center – at least 4.1 but version issues
- VS 2005 on Vista also need SPs
- VS 2008 ships with Device Emulator 3.0

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Visual Studio 2008 Features For Mobile

- Multi-targeting of different frameworks
- Auto-conversion of Visual Studio 2005 Compact Framework 1.0 projects to Compact Framework 2.0
- Unit Testing For Mobile Device Projects
- Remote Performance Monitor (first shipped with CF 2.0 Sp1) now built in
- CLR Heap Profiler from full .NET SDK built-in.

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Windows Mobile 6.0 / 6.1

- Currently 6.0 / 6.1 – 6.5 just emerging.
- .NET CF 2.0 SP1 in ROM
- SQL Server Mobile Edition in ROM
- Based on Windows CE 5.x kernel and memory architecture – 32 processes 32 MB address space.
- AJAX support
- "Click Once"URL Deployment Support
- Updated APIs e.g. WISPLite

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Compact Framework 3.5 – What's New?

- Skipped straight to 3.5 – same as .Net 3.0
- Compiles to same CLR as 2.0
- Features
  - Mobile WCF
    - - Reliable Messaging via Http
    - - Store & Forward via email (Exchange 2007) on unreliable networks
    - WS-Security – secure messaging
    - SOAP only!
- Compact LINQ – supports datasets + XML but not SQL
- String.Contains support
- System.Diagnostics.TraceListener support

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CF 3.5 – What's New?

- System.Text.StringBuilder support!
- System.IO.Compression - reduce GSM costs
- Client certificates - authenticate web service calls.
- SystemSettings.WinCEPlatform setting.
- Runtime redirection - device.config file in Windows folder - redirects all devices to use specified version of framework
- Type inference,
- Anonymous methods

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Device Runtime Redirection

```
<configuration>
    <startup>
     <supportedRuntime  version="v3.5.xxxx"
      />
    </startup>
 </configuration>
```

- Need to pre-install the chosen framework in your install!

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Questions

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Getting Started

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Building an Application

- Understanding Form Management & Navigation – minimise versus close.
- Application Control
- Adapt your App!
- Compiling and debugging.
- Testing and Deployment
- Data Access
- Internationalization

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Tools - Mobile Development Emulators

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GPS Tools

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GPS Intermediate Driver (GPSID)

- Uses “parsed” > WM 5 API for ‘high level’ GPS Hardware access
- No need to parse NMEA strings
- Applications – GPSID looks same as physical GPS hardware
- GPS hardware - GPS Intermediate Driver is the single client – no legacy issues.
- Location changes - event driven – notified on a separate thread

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Testing GPS Applications
FakeGPS

- Allows testing without having GPS hardware on the device
- Ideal for poor satellite reception – indoors
- No changes to your application
- Contains NMEA data
- Fakes data received by the GPS APIs
- \Program Files\FakeGPS\GPSFiles
- You can record your own NMEA data and read back

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Questions

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Demo: Getting Started

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Testing Issues

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Testing your application

- MS Test support built in
- High variety of test scenarios to simulate:
  - Low battery
  - Network connectivity
  - Screen orientation & platforms
  - Keyboard / touch input
  - Environmental factors
  - OS version issues
- New emulator supports these

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Testing Issues

- UI testing not always straight forward.
- Hopper utility from SDK for load & stress testing.
- Check our wMobinium.net on Codeplex
  - http://www.codeplex.com/wMobinium

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Deployment Issues

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Deploying your application

- Support for ClickOnce
- Deploy by CAB file
- On removable storage or over the air
- Need connectivity to deploy large cab files or download framework over the air etc
- Check out System Center Mobile Device Manager 2008 – automates deployment over the air.

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Other Technology Areas

- If using VS2005 consider Mobile Client Software Factory
- Can subclass in VS2008 just no IDE support for guidance.
- Look at OrientationAware Control
- Also consider using WCF
  - Disconnected environments
  - Multiple protocol support
  - "Store and forward"
- Good MSDN Article in Launch 2008 edition

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Other Technology Areas - WCF

- Solution for Distributed Computing
  - Disconnected environments
  - Multiple protocol support – transport agnositc
  - "Store and forward"
- Only supports SOAP – gotchas!
- Good MSDN Article on Mobile apps with WCF in Launch 2008 edition

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Other Technologies - Compression

- Now built-in to Compact Framework
  - System.IO.Compression
- Uses Gzip and Deflate algorithms
- No need for third party tools
- GTZipStream and DeflateStream objects
- Also set on WebRequest via WebRequest.AutomaticDecompression set to DecompresssionMethods.GZip or DecompressionMethods.Deflate

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Best Practice

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Microsoft Patterns & Practice

- Microsoft Patterns & Practice group
  - Guidance
  - Mobile Architecture Guide
  - Mobile application blocks
- "Windows Mobile Client Software Factory" – now on CodePlex
  - Mobile Configuration Block
  - Microsoft Composite UI Application Block
  - Password Authentication Block
- http://www.codeplex.com/smartclient

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Windows Mobile – Online Resources

- Windows Mobile Developer Tools and Resources
  - http://msdn2.microsoft.com/en-gb/windowsmobile/default.aspx
- Mobile Line Of Business Accelerator
- Newsgroups

  microsoft.public.
  - pocketpc.developer
  - smartphone.developer
  - dotnet.framework.compactframework

  Blogs
  - blogs.msdn.com/
    - windowsmobile
    - vsdteam
    - netcfteam
- Visual Studio VS 2008 Learning Kit

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What we covered:

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Questions

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