Windows Embedded Compact 7

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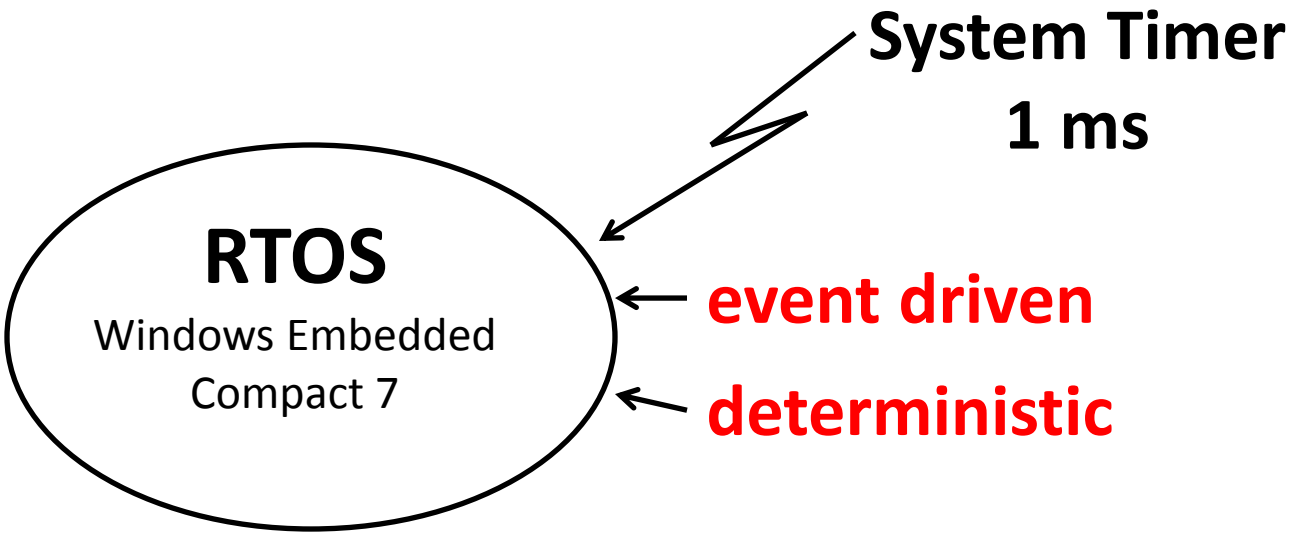
- What is Windows Embedded Compact 7?
- The Development-Tools
- Selected product highlights
- Additional resources

Windows Embedded Compact 7

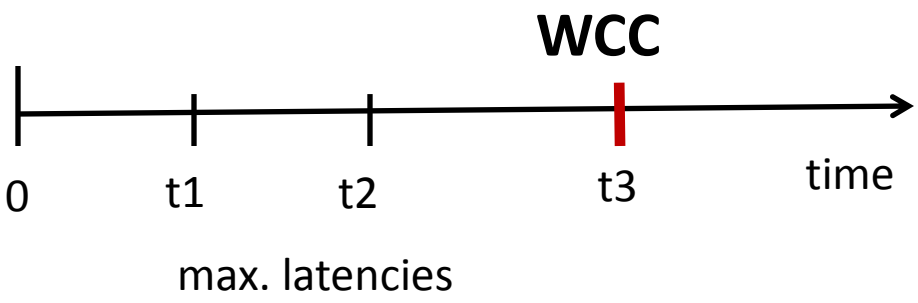
What is Windows Embedded Compact 7?

- Windows Embedded Compact 7 is a hard-real time Operating System.
- The scheduler supports 256 priority levels.
- 0 is the highest thread priority.



WinEC7 Supports:

- Shared Interrupt
- Nested Interrupt
- ISR ≈ 1µs
- IST ≈ 10µs



www.dedicated-systems.com

Windows Embedded Compact 7

Image- and Application- Developement for Target Hardware

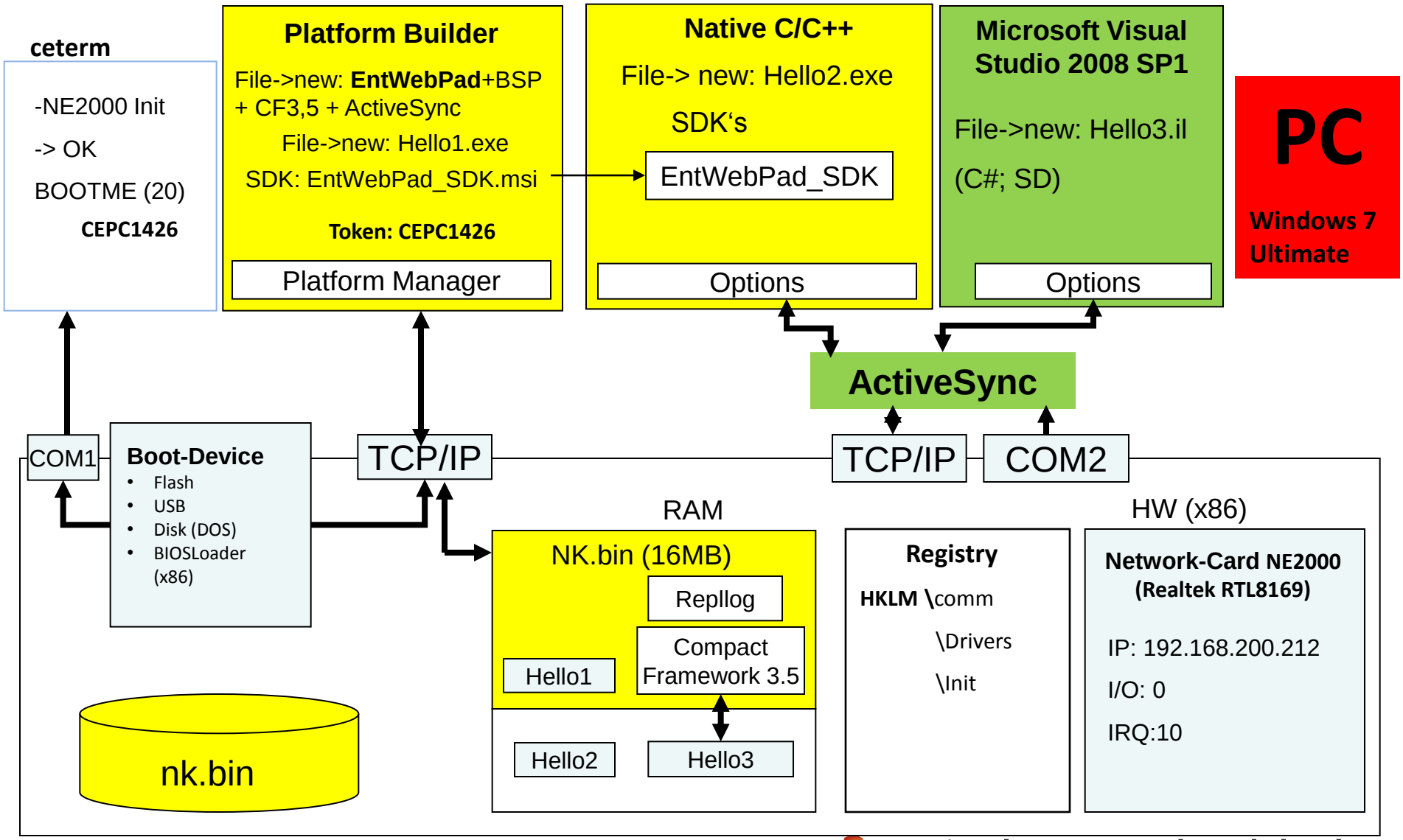


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Image- and Application- Developement for Emulation (Virtual-PC)

Platform Builder

File->new: **EntWebPad**

Subproject: SWEApp.pbpxml

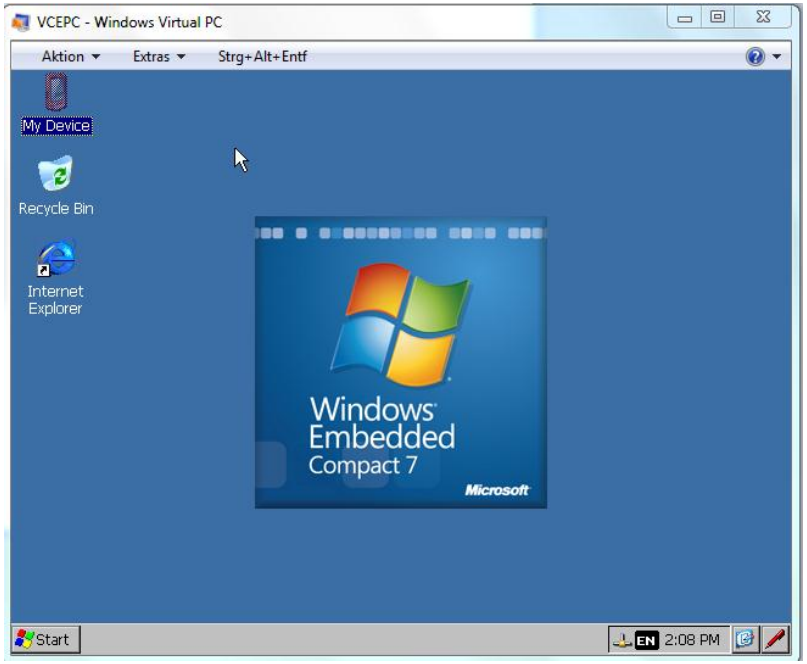
Expression Blend 3

File-> new: **SWEApp**

Microsoft Visual Studio 2008

PC

Windows 7 Ultimate



Windows Embedded Compact 7

Compact 7 product highlights

- Adds support for **ARM v7**
- New **BSPs** from TI, Freescale, Samsung and others
- New technologies for bringing specialized devices to market faster
  - New developer and designer **tools**
  - New technology for creating **user interfaces**
  - New **SMP** support for x86 & ARM, MIPS
  - New **multimedia player**, with customizable UI
  - New **Internet Explorer** with Flash 10.1
  - Updated **Office Viewers**
  - Improved **Connectivity** to PCs, servers

Windows Embedded Compact 7

Comparing CE6 and Compact 7

	Feature area	Windows Embedded CE 6.0 R3	Windows Embedded Compact "Chelan"
	CPU Support	ARM V4i, x86, MIPS, SH	**ARMv7** support - NEON, VFP, SMP, SIMD, L2. x86, MIPS
	Kernel	Max 32,000 Processes Max 2GB Virtual Memory per Process	
	Multimedia	WM-DRM 10, CODECs, WMP	WM-DRM 10.02, CODECs, WMP fully customizable XAML UI, **MPEG-4 re-architected pipe-line**, **MTP**, **Media library**, **DLNA 1.5** HTTP streaming, Buffer filter, server-side playlist
	Networking	NDIS 5.1, WiFi, Bluetooth 1.2	**NDIS** 6.1, Wifi, **Bluetooth** 2.1, Kerberos v5
	Graphics	DirectX, Win32, GDI, Open GL ES 2.0	**DirectDraw**, Win32, GDI, OpenGL ES 2.0
	UI development	Silverlight 2.0-based UI development framework	**Silverlight 3.0-based UI development** framework (3D transformations, Pixel/Shader effects), Multi-touch support
	Internet Browser	IE6, Panning/Zooming, Customizable XAML UI, Flash Lite 3.1	**New version of IE for Windows Embedded**, Panning/Zooming, Thumbnail-view, Customizable XAML UI, **Flash 10.1**, **Multi-touch**
	Tools	Platform Builder integration into VS 2005, Expression Blend 2.0	Platform Builder integration into **VS 2008**, **Expression Blend 3.0**
	Applications	.NetCF 3.5, Cellcore, Connection Manager, Office Viewer 2003 PDF Reader	.NetCF 3.5, Cellcore, Connection Manager, **Office Viewer 2007**, PDF Reader, **Active Sync, Air Sync. for OTA email**, POOM v3, Windows Device Stage

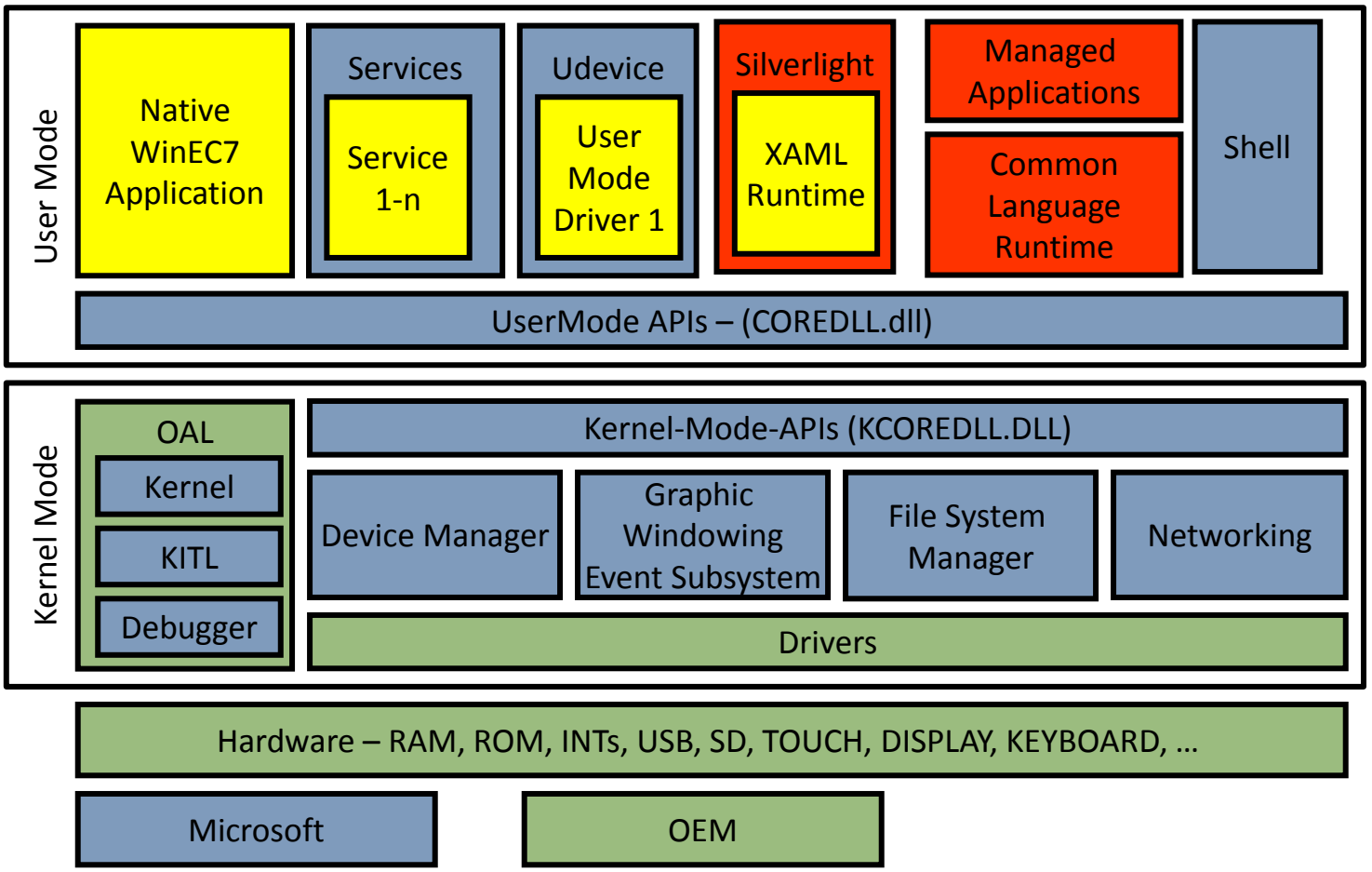
Windows® Embedded Compact 7

Technical introduction

Agenda

- New features of the Kernel
  - Architecture
  - SMP
  - New Memory Manager
  - New drivers
  - Updated network stack
- Silverlight for Windows Embedded
- Tools Improvements

Architecture

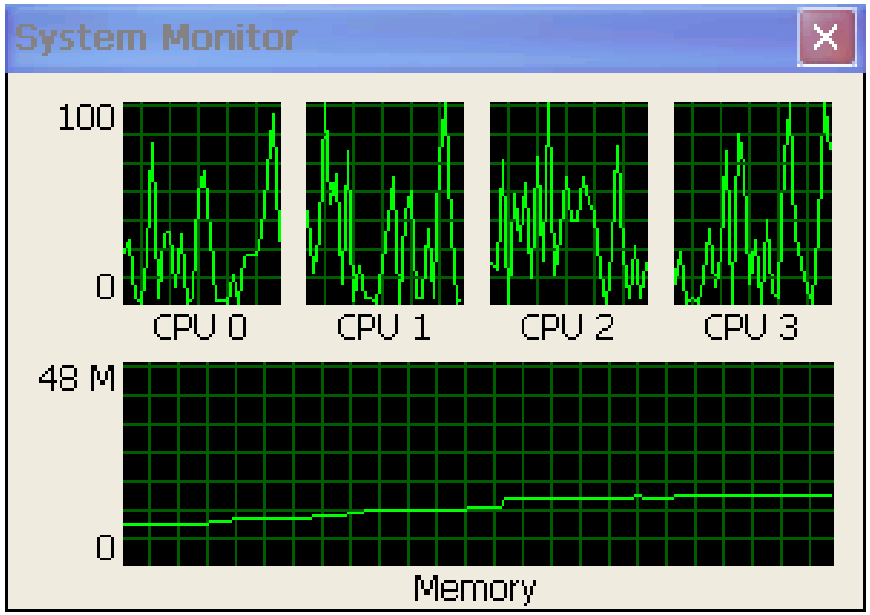


Windows Embedded Compact 7

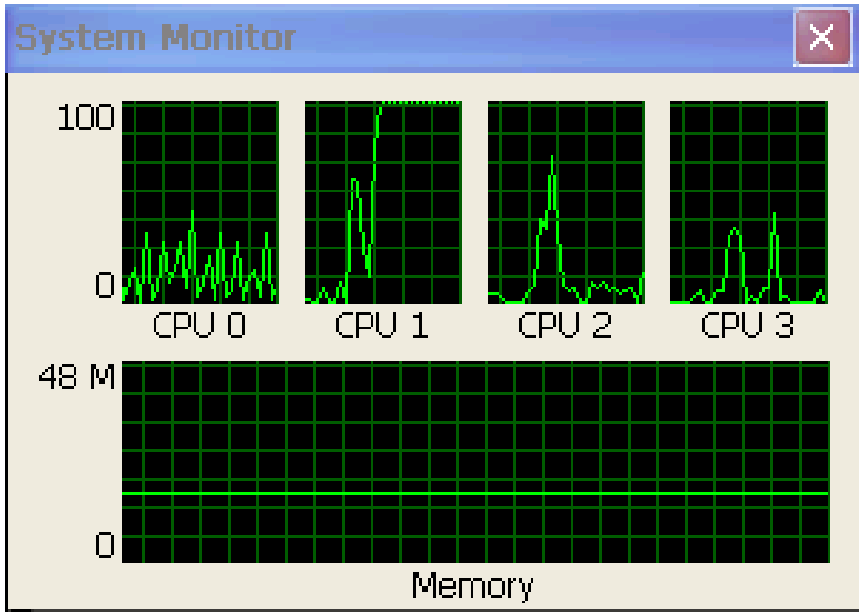
Symmetric Multiprocessing Support

- Kernel supports up to 250 cores
  - Practical limit is 8 cores
- Takes advantage of new multicore embedded CPUs
  - x86, ARM, MIPS
- CPU core management API provided

Multiple Core Demonstration



4 cores under load



One core handling a runaway thread

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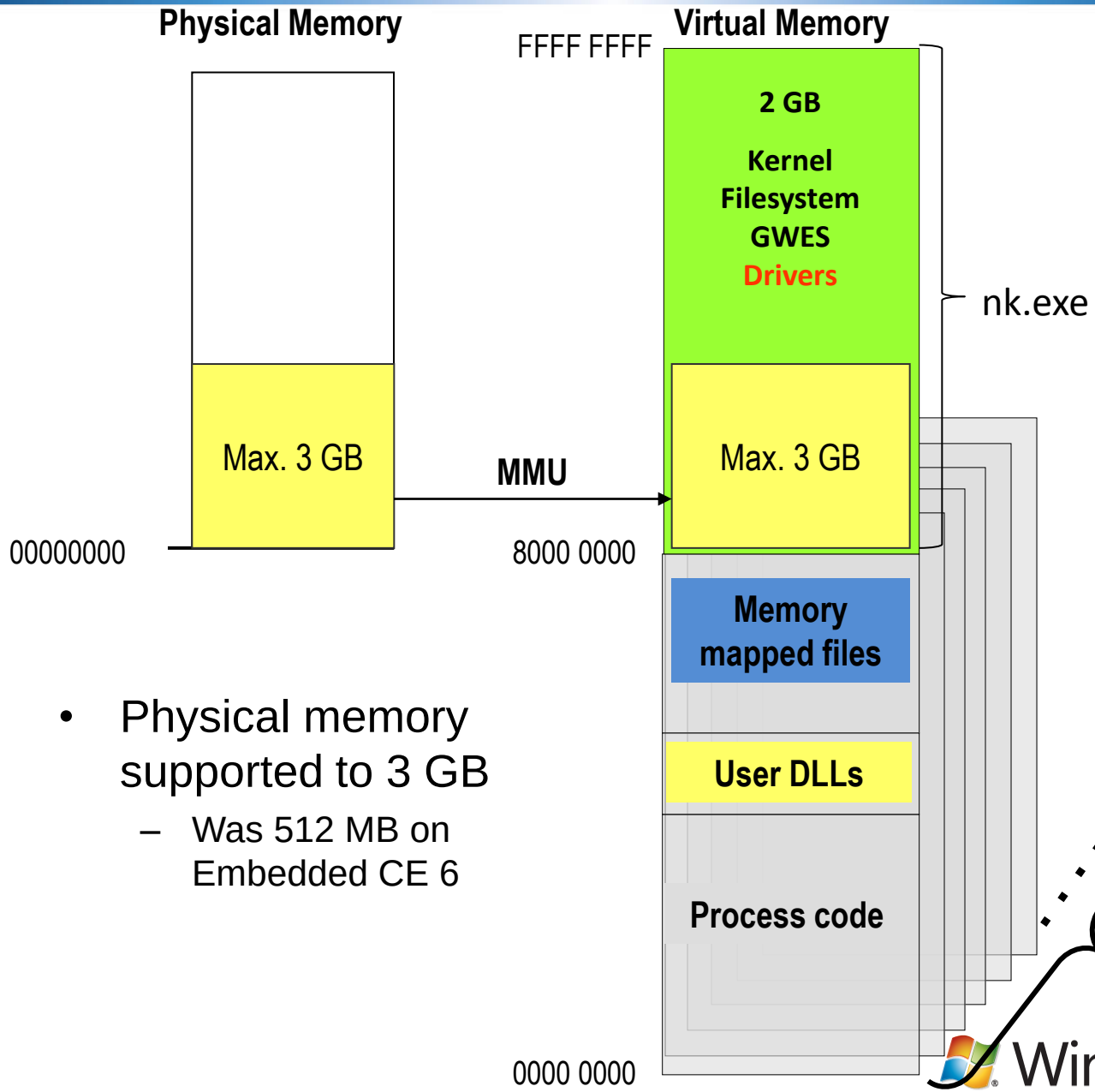
Updated Memory Manager

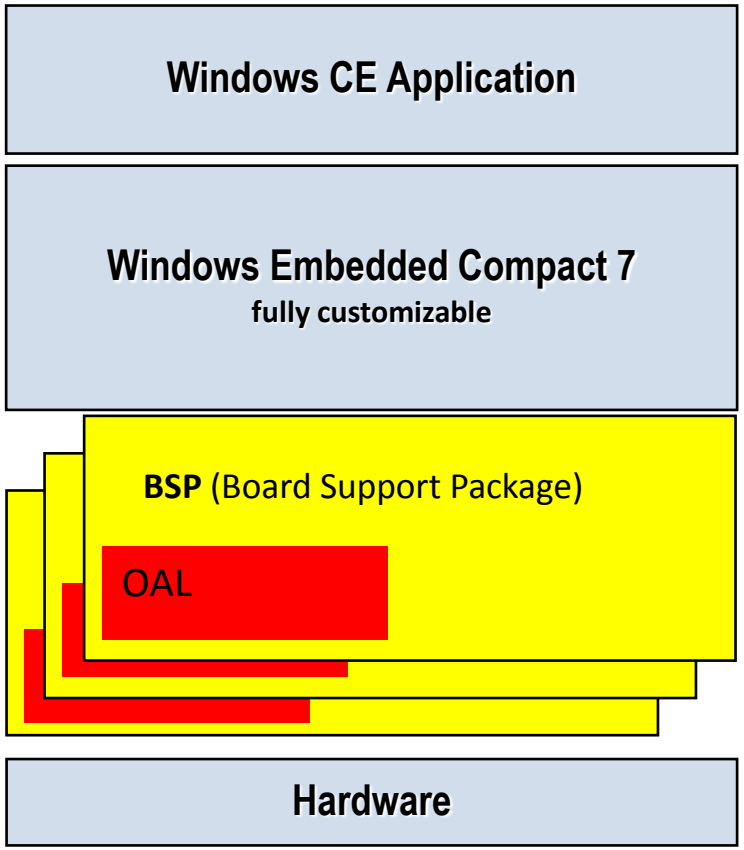


- Physical memory supported to 3 GB
  - Was 512 MB on Embedded CE 6

Windows Embedded Compact 7

Board Support Packages

- Fewer changes than from 5.0 to 6.0
- Short porting time
  - 3-5 days instead of 6-7
- Extensions for SMP/More physical RAM
  - Optional
- Project porting a bit more challenging
  - A number of updates to SYSGEN variables



Windows Embedded Compact 7

BSP Shipping “In the Box”

- x86
  - CEPC
  - iCOP eBox 3300

  Virtual PC
- ARM
  - Freescale i.MX27
  - Samsung SMDK6410
  - NEC NE1TB – 4 core ARM

  Freescale i.MX31

  TI EVM 3530
- MIPS
  - Sigma 8654
- Other BSPs are being developed

Windows Embedded Compact 7

Digital Living Network Alliance

- Group of Personal Computer, consumer electronics and mobile companies to enable products work together across a home network
- Common Tasks
  - Find movie (locally or on the home network) and play it
  - Photo slide show on TV
  - Play or download music
  - Upload photos to home PC / NAS / PC server
  - Print photos
- Common Device Types
  - TVs, PCs, Smartphones, Printers, Set Top Boxes, Stereos…

Silverlight for Embedded

- Joins the best of both worlds
  - Rich user interface defined in XAML (e**X**tensible **A**pplication **M**arkup **L**anguage)
  - Speed and power of native C++ code
- Silverlight rendering engine enables custom user interfaces free from standard Windows chrome
  - Trivial to create unique user interfaces
- Native code enables
  - Direct access to hardware
  - No garbage collect pause as in managed code

Silverlight Comparison

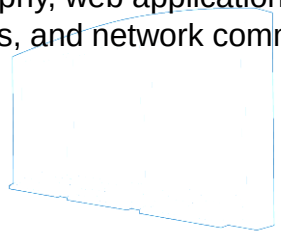
Silverlight

- Apps run in sandbox
- Rich U/I generated in Expression Blend
- Code written in C#
- Managed BCL

  The framework's **Base Class Library** provides user interface, data access, database connectivity, cryptography, web application development, numeric algorithms, and network communications.

Silverlight for Embedded

- Apps run native on box
- Rich U/I generated in Expression Blend
- Code written in C++
- Win32 API



Platform Builder 7

- Now an add-in to Visual Studio 2008
- New features
  - Alternate Release Directories
    - Searches multiple release directories for modules
  - Loadable Error Lists
    - Load a build log from another machine and see errors
  - Automation Scripts
    - Easily extend build actions with scripts

New Kernel Debugger Features

- Better Breakpoints
  - Conditional breakpoints
  - Data Breakpoints
- Thread affinity
  - Improved reliability when stepping through multithreaded code
- Improvements to support SMP

Cautions…

- PB uses Visual Studio 2008, not 2010
  - Due to development schedules
  - High cost to port to different ‘add-in’ model
- No significant functionality lost
  - Might be bothersome for companies standardizing on VS 2010
- Side by side installations of CE 6 and Compact 7 are not supported

Application Development

- Same process as CE 6 R3
  - SDKs generated by Platform Builder, exported to Visual Studio
- SDK exported to VS 2008
  - IDE experience same as today
  - No support for ARM-based emulator
- Developers can create Virtual PC build
  - Connect via CoreCon

Cautions:

- ARM application development on VS 2008
  - Supports only ARM v4i
- New ARM architecture support require:
    - Platform Builder compile
    - Platform Builder debug
- x86 and MIPs have full support on VS 2008

Managed Code

- Support for Compact Framework 3.5
  - Same as before
- Managed Silverlight support currently not in plan
  - 3rd parties hooking Silverlight for Embedded to managed code

New Remote Tools

- Tools now incorporated into Remote Tools Framework
  - Central PC-based IDE

- Kernel Tracker / Timeline Viewer
  - Dramatically improved over original Kernel Tracker
  - New Features
    - Zoom selected area
    - Switch between table and graph view
    - Analysis of logged data
    - Scanner window to provide global perspective

Remote Tools

- Resource Leak Detector
  - More powerful and easier to use Application Verifier
- Resource Consumer tool
  - Enables testing system with low system resources
    - CPU, Memory, Storage, Process resources
- Improved Performance Monitor
  - Integrated into RTF

Other Remote Tools

- Improved Registry Editor
  - Now tracks changes in real time
- Other tools remain standalone
  - Process Viewer
  - Zoom
  - Heap Walker
  - File Viewer
  - Spy

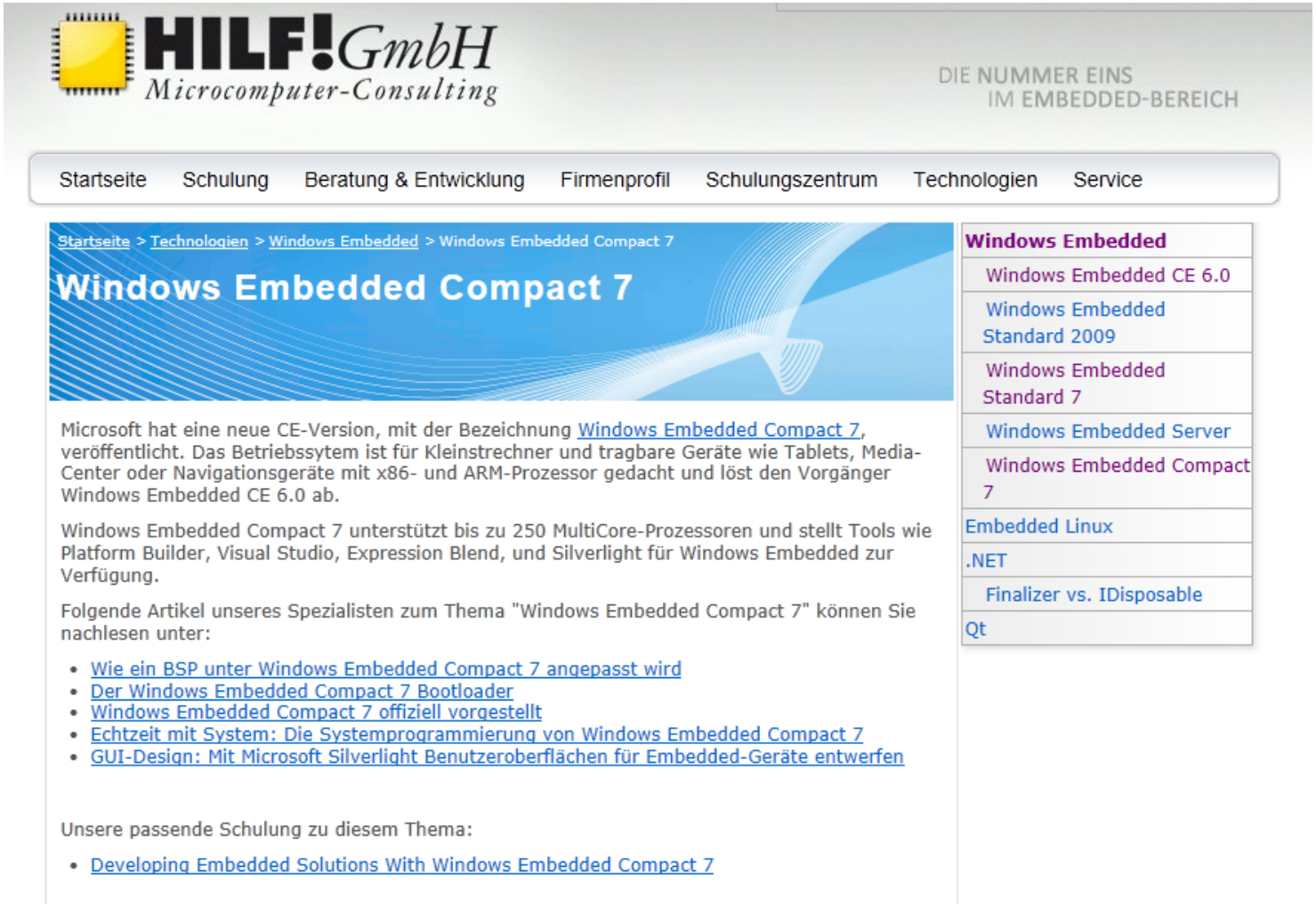
Summary

- Powerful new kernel brings Compact 7 up to date
- Silverlight for Embedded is a game changer
- Better tools, better test kit, will enable better products

Windows Embedded Compact 7

Additional resources

http://www.hilf.de/



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