Windows CE 6.0
Bare Essentials

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Where do we start?

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- “Systems” has to do with the software that is in between the user programs and computer hardware.
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User Application
(ex: Word Processor)
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Systems software provides a standard environment that application writers can depend on.
what does Windows CE do for me?

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**What does Windows CE do for me?**

- A Windows CE Operating system “Image” is a collection of systems software.
- Microsoft includes in Windows CE 6.0 a choice of four possible CPU “architectures” that can be used to base your computer hardware on.
What does Windows CE do for me?

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- Microsoft includes in Windows CE 6.0 a choice of four possible CPU “architectures” that can be used to base your computer hardware on.
- An architecture is the structure behind a way of computing - adding, subtracting and multiplying bits, and loading them from or storing them to memory.
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```assembly
ldr r0, [r1, #8]
mov eax, dword ptr edx+8
```
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- An architecture is the structure behind a way of computing - adding, subtracting and multiplying bits, and loading them from or storing them to memory.

- The choice of an architecture is the starting point for the design of a computer system.
CPU – Genus and Species

An architecture isn’t a physical thing. It’s a specification of how a CPU core should work.
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A CPU core is typically built into a ‘SoC’ or System-On-Chip. This is a combination of a CPU Core and some support logic and peripherals highly tuned to work with that core.
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A CPU core is typically built in to a ‘SoC’ or System-On-Chip. This is a combination of a CPU Core and some support logic and peripherals highly tuned to work with that core.

The ‘SoC’ is sold as a product.
"Boards" – making a product

ARCH
X86
MIPS
ARM
SH
"Boards" – making a product
"Boards" – making a product
"Boards" – making a product

- ARCH
  - X86
  - MIPS
  - ARM
  - SH

- CPU CORE
  - 80486
  - Pentium
  - ARMv5TE
  - ARM11EJ-S

- CPU / SoC
  - MARVELL PXA27x
  - QUALCOMM 7X00
  - TI OMAP 3430
"Boards" – making a product
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- Board
  - phyCore270
  - EM-X270
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"Boards" – making a product

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"Boards" – making a product

Board

phyCore270
EM-X270
Mainstone II
Software for a “Board”

A Board needs systems software to adapt it to the applications.

We call the collection of systems software that is used an operating system.
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An operating system like Windows CE is a choice.
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Usually a choice is made based on a number of factors.
Software for a “Board”

- A Board needs systems software to adapt it to the applications.
- We call the collection of systems software that is used an operating system.
- An operating system like Windows CE is a choice.
- Usually a choice is made based on a number of factors.
  - Existing applications for the OS
  - Difficulty of application development
  - Cost of licensing
  - Many other reasons
In order for the Board to be useful, the systems software must adapt its hardware so the applications can use it.
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- Display
- Input
- Sound
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To support the variety of needs of the systems software for a board, typically a large variety of ‘components’ are available.
Software Componentization

Board
- phyCore270
- EM-X270
- Mainstone II

OS Components
- USB HOST
- WINDOW MANAGER
- DEBUG SHELL
Software Componentization

Board
phyCore270
EM-X270
Mainstone II

OS Components
DISPLAY SYSTEM
USB HOST
WINDOW MANAGER
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Defining the systems software

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Window CE “Project” (VS Solution)

OS Components
- DEVICE MANAGER
- DISPLAY SYSTEM
- WINDOW MANAGER
- DEBUG SHELL
Defining the systems software

- **Board**
  - phyCore270
  - EM-X270
  - Mainstone II

- **Window CE “Project” (VS Solution)**
  - COLLECTION OF OS COMPONENTS

- **OS Components**
  - DEVICE MANAGER
  - DISPLAY SYSTEM
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Defining the systems software

- **Board**
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- **Window CE “Project” (VS Solution)**
  - INDUSTRIAL APPLIANCE

- **OS Components**
  - DEVICE MANAGER
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Defining the systems software

Board
phyCore270
EM-X270
Mainstone II

Window CE “Project” (VS Solution)
INDUSTRIAL APPLIANCE
ENTERPRISE WEB PAD

OS Components
DEVICE MANAGER
DISPLAY SYSTEM
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Defining the systems software

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Window CE “Project” (VS Solution)
- INDUSTRIAL APPLIANCE
- ENTERPRISE WEB PAD
- MY COOL WINDOWS CE PROJECT

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OS Components
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- **OS Components**
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For CE – what is provided?

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For CE – what is provided?

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OS Components
- DEVICE MANAGER
- DISPLAY SYSTEM
- WINDOW MANAGER
- DEBUG SHELL
Defining a CE-based product

- ARM KERNEL
- BOARD
- HARDWARE

- OS COMPONENTS
  - DEVICE MANAGER
  - DISPLAY SYSTEM
  - WINDOW MANAGER
  - DEBUG SHELL
Defining a CE-based product
Defining a CE-based product

ARM KERNEL

Board Support Package

Hardware

OS Components
- DEVICE MANAGER
- DISPLAY SYSTEM
- WINDOW MANAGER
- DEBUG SHELL
The board support package
The board support package

Board Support Package

- ARM KERNEL
- OAL
- ARM Core
- Hardware

OS Components
- DEVICE MANAGER
- DISPLAY SYSTEM
- WINDOW MANAGER
- DEBUG SHELL
The board support package

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- OAL
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OS Components
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The board support package
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- Driver
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- Driver

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- OAL
- ARM Core
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The board support package

- ARM KERNEL
- OAL
So the bare bones are...

- An Architecture-Specific Kernel
- Systems software components
- A Board-Specific BSP (OAL and drivers)
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The BSP must abstract everything else.
Summary

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- Microsoft provides a kernel for any of the four supported architectures.
- A board support package (BSP) is the bridge between the high-level components and the specific hardware that is used.
- Many OS components are available for you to select from, to fulfill the needs of your customized product.