Behavior and performance evaluation of Windows Embedded Compact 7 on x86

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1 Document Intention

1.1 Purpose and scope

This document presents the quantitative evaluation results of the **Windows Embedded Compact 7** OS on x86-based platform.

The layout of this report follows the one depicted in "The OS evaluation template" [Doc. 4]. The test specifications can be found in "The evaluation test report definition" [Doc. 3]. For more detailed references, See section "Related documents" of this document. These documents have to be seen as an integral part of this report!

Due to the tightly coupling between these documents, the framework version of "The evaluation test report definition" has to match the framework version of this evaluation report (which is 2.9). More information about the documents and tests versions together with their corresponding relation between both can be found in "The evaluation framework", see [Doc. 1] in section "Related documents" of this document.

The generic test code used to perform these tests can be downloaded on our website by using the link in the "related documents" section.

1.2 Test framework used: 2.9

This document shows the test results in the scope of the evaluation framework 2.9. More details about this framework are found in Doc 1 (see section "Related documents").

1.3 Conventions

Throughout this document, we use certain typographical conventions to distinguish technical terms. Our used conventions are the following:

- ***Bold Italic*** for OS Objects
- **Bold** for Libraries, packets, directories, software, OSs...
- `Courier New` for system calls (APIs...)

2 Introduction

This chapter talks about the OS that we are going to test and evaluate, and the hardware on which the under testing OS will be employed to be tested.

For a more in depth discussion about the positive and negative points, the reader should also read the theoretical evaluation report.

2.1 Overview

Releasing a new OS with a different name (changed from **Windows CE** to **Windows Embedded Compact 7**) does not mean that we are up with a new OS! Such naming change was mainly done for marketing purposes, as there were no fundamental changes in the OS itself!

Further in the document, the full name "**Windows Embedded Compact 7**" or the short names "**Compact 7**" and "**CE7**" will be used.

2.2 Evaluated (RTOS) Product

This section describes the OS that Dedicated Systems tested using their Evaluation Testing Suite, and the hardware on which this OS was running during the testing.

2.2.1 Software

The RTOS that will be evaluated and tested is **Windows Embedded Compact 7**. This OS was launched by Microsoft Corporation at the beginning of 2011. In fact, this OS "**Windows Embedded Compact**" is the successor of **Windows CE6R3**.

The tests for evaluating this OS were done in March 2011 which is the date when this OS was released as a manufacture release.

2.2.2 Hardware

The hardware used for testing this OS version is Pentium MMX 200MHz platform. Indeed, it is an old platform but with such platform, the performance can be compared for over a decade.

As **Compact7** does not run anymore on the Pentium MMX, we had to choose a more recent CPU for our tests. Pentium II running at 233MHz was chosen. Besides that it has a little higher clock frequency, it has also a 512KB L2 cache compared with the previous generation Pentium MMX (which has none).

All the tests were executed on hardware with the following characteristics:

- Motherboard: Intel AL440LX with a 66MHz PCI bus
- BIOS: 4A4LL0X0.86A.0031.P14
- CPU: Intel Pentium II 233 MHz (with 16KB Data and 16KB Instruction L1 Cache). 512KB L2 Cache.
- RAM: 192 MB
- Network interface card: The Realtek RTL8139C(L)
- VMETRO PCI exerciser in PCI slot 3 (PCI interrupt level D, local bus interrupt level 10)
- VMETRO PBT-315 PCI analyser in PCI slot 4.
- External and CPU internal cache was enabled during the tests.

3 Evaluation results summary

Following is a summary of the results of evaluating **Windows Embedded Compact 7**, released by Microsoft Corporation, Inc.

3.1 Positive points

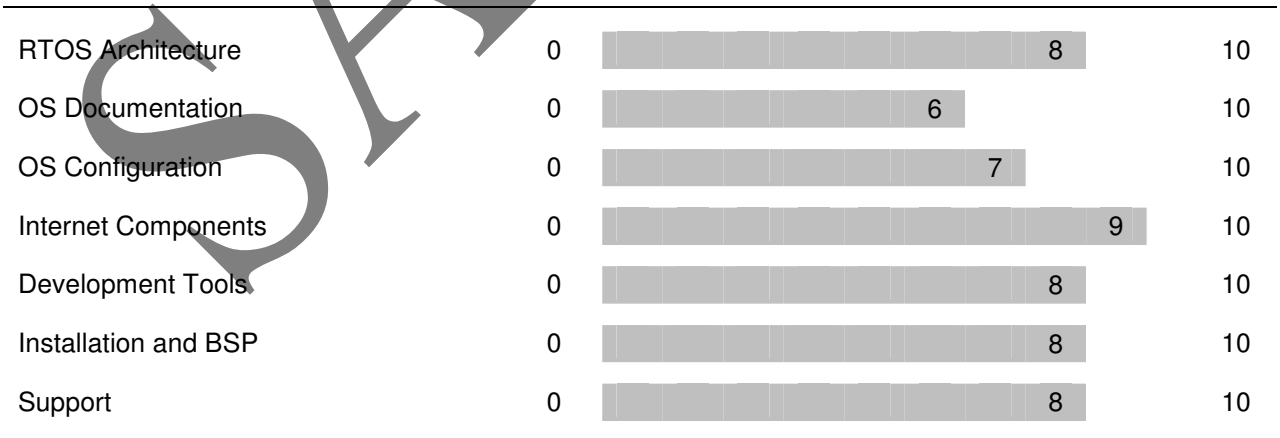
1) All protection primitives use priority inheritance, which is a major plus for achieving real-time behavior
2) Good debugging tools: Available also for kernel/driver debugging.
3) Very easy to install and to set-up a target (from templates).
4) Provides the same flexibility as a 32-bit general purpose OS

3.2 Negative points (see Microsoft's comments in section 3.4)

1) The operating system documentation has taken a step backwards compared with the previous versions. A lot of background information is removed (***see MS comments***).
2) Customizing the kernel and adding custom drivers (BSP) stays a daunting task once you go away from the default configurations.
3) The remote tool has been changed since last version. We noticed two issues, the more important of which is that there is no officially-supported method to include the remote tools within a device image using Platform Builder. Additionally, we noticed during our testing that establishing a connection between the tools and the target took in excess of a minute, which was longer than our expectation (***see MS comments***).

3.3 Ratings

For a description of the ratings, see [Doc. 3].



3.4 Vendor Comments

Following are the comments of Microsoft on the negative points:

- **For point 1** Microsoft notes that documentation is a focus for the next release, and the product team plans to bring forward any relevant content from earlier releases, which will be identified as still applicable to the current release.
- **For point 3** Microsoft notes that the ability to add the remote tools to a device image using Platform Builder is by design, as generally a finished device's final image would not normally include debug support. Additionally, because some devices won't have a .CAB installer, making installation of the remote tools a challenge. They are investigating now how to provide this support in a future release of Platform Builder. Microsoft also notes that the Compact Product Team was unable to reproduce the delayed connection time experienced by Dedicated Systems but will continue to investigate whether connection time is a persistent issue.