Comparison of QNX Neutrino 6.5 and RT Linux on X86 (MMX)

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1 About the RTOS evaluation project

This section describes the purpose and scope of the evaluations conducted by Dedicated Systems.

1.1 Purpose and scope of the RTOS evaluation

This document provides quantitative measures to help potential RTOS users make objective comparisons between OSs, and help them decide which OS is better for their needs. This document compares the results of the quantitative evaluations of QNX Neutrino 6.5 and RT Linux 2.6.33.7 real time operating systems (RTOSs).

Both RTOSs were evaluated on the same x86 platform (Intel Pentium MMX).

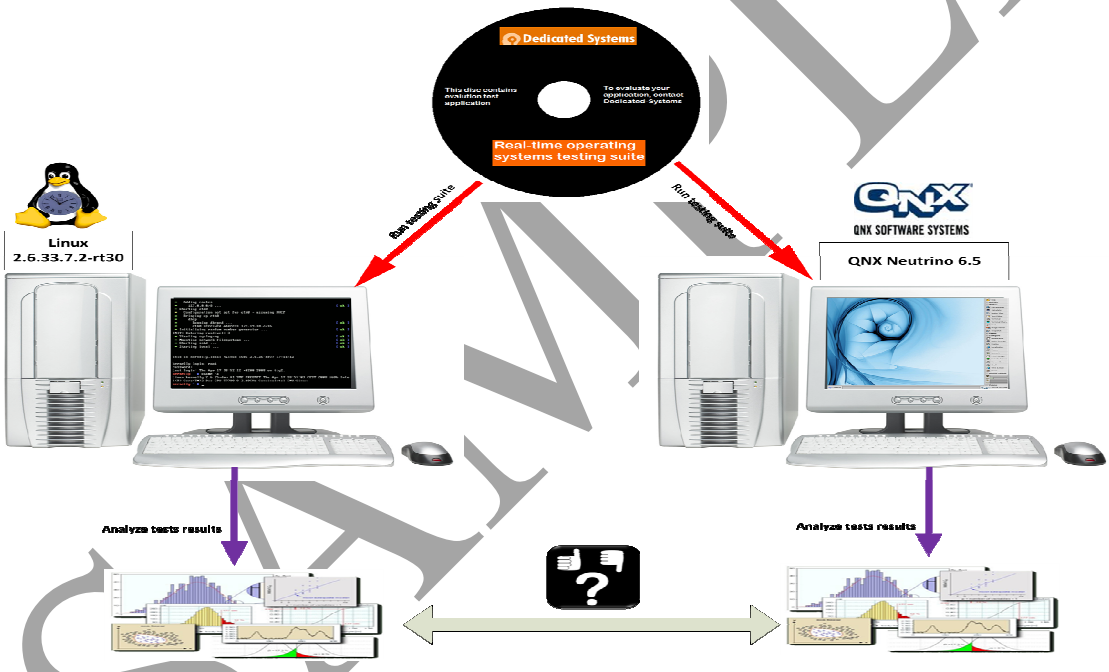


Figure 1: High level view of the evaluation procedure

1.2 Test framework used: 2.9

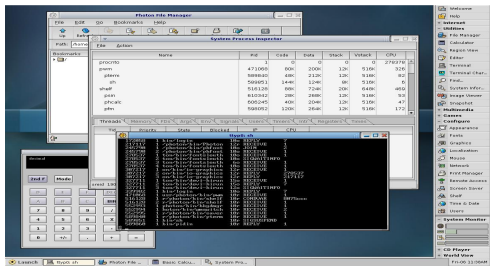
This document shows the test results in the scope of the evaluation framework 2.9. More details about this framework are found in Doc 1 (see section 6).

2 About the OSs and the testing platform

This section describes the OSs that Dedicated Systems tested using its Evaluation Testing Suite, and the hardware on which these OSs were running during the testing.

2.1 Software

The following table shows the operation systems' versions whose behavior and performance results were compared by Dedicated Systems after testing them with its evaluation testing suite on the same x86 platform (Intel Pentium MMX).



OS version	QNX NEUTRINO RTOS v6.5.0	Vanilla Linux 2.6.33.7
Applied patches	Patch 2530, from QNX Software Systems Ltd.	Real-time patch v30.

Table 1: The evaluated OSs

For **QNX Neutrino 6.5**, Patch 2530 was applied. This patch introduces a fix to the io-pkt network stack where a timer pulse implementation is used instead of attaching a handler to the timer interrupt. This patch significantly improves clock tick processing times and results in improved real time performance.

For **"Vanilla" Linux 2.6.33.7**, real-time patch rt-30 was applied to provide some real time characteristics for the Linux kernel. This RT patch was the latest version officially released by OSADL.

2.2 Hardware

We conducted our tests on the same x86 platform. This platform has the following characteristics:

- Motherboard: Chaintech 5TTMT M201 with a 33MHz PCI bus
- BIOS: Award BIOS v4.51PG
- CPU: Intel Pentium 200MHz MMX Family 5 Model 4 Stepping 3 (with 32KB L1 Cache)
- RAM: 256 MB
- Network interface card: 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.

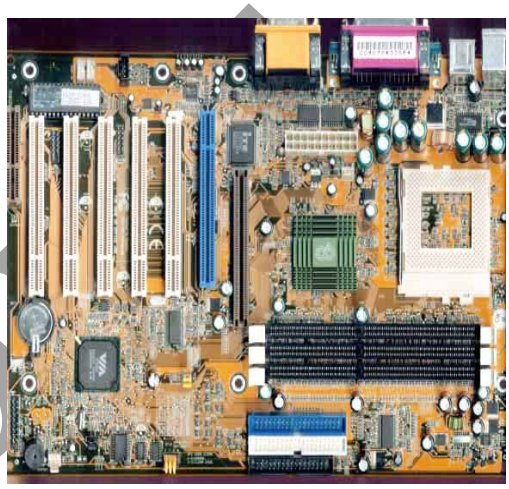


Figure 2: The hardware on which the tests were conducted

The framework 2.9 used for this report has the Pentium MMX 200 MHz as X86 reference platform. This processor has been used in a lot of X86 based systems some years ago. Although today no new designs use this processor, we continue to use it as reference in order to be capable to compare RTOS and also to compare with other (newer) platforms and see the enhancements in the field compared to 10 years ago.

This processor has only a limited cache and in this way the results are not that much influenced by the caching behaviour. As such, we are close to pure real-time behaviour. Cache is important for average performance enhancement. However it introduces a lot of uncertainty in the code execution with increased cache size. This report is about the worst case performance and we should exclude as much as possible the cache influence.

Also, the use of a slow processor will reveal more easily some behaviour aspects of the OS where otherwise these fine-grained differences would not be measurable.