

The Value of PC Refresh with Microsoft Windows 7*

- 97% of test users would recommend Windows 7 to their colleagues
- Potential USD 11 million in estimated savings to Intel over three years
- Planned deployment starting in 2010

Intel IT plans to begin enterprise-wide deployment of Microsoft Windows 7* on PCs with Intel® vPro™ technology in early 2010. We conducted an extensive three-month evaluation that showed the OS meets the key requirements of Intel's business groups, giving us the ability to improve employee productivity, deliver IT cost efficiencies, and improve manageability and security.

Intel IT collaborated closely with Microsoft to perform an early evaluation of the OS. We gathered Intel business group requirements, discussed them with Microsoft, and then developed internal tests to verify whether the OS met each requirement.

Microsoft Windows 7 overwhelmingly met the requirements and showed improved performance and stability compared with Microsoft Windows XP*. In surveys, 97 percent of users of the beta release said they would recommend the OS. A conservative total cost of ownership (TCO) analysis estimated potential net present value (NPV) of USD 11 million over three years, mainly due to lower support costs.

We determined that deploying Microsoft Windows 7 on new PCs with Intel vPro technology provides the best performance and manageability. Microsoft Windows 7 includes manageability and security capabilities that strongly complement Intel vPro technology, which we are using to improve PC management across the enterprise.

After further application testing, we plan to start rollout of new PCs with Microsoft Windows 7 and Intel vPro technology to segments of Intel users as part of our standard refresh cycle.

Table 1. Key Results of Intel IT Evaluation

User Adoption	97 percent of early users said they would recommend Microsoft Windows 7* to colleagues.
Performance	More responsive for key tasks such as booting and launching productivity applications.
Stability	Fewer users experienced blue screens.
Application Readiness	No remediation required during evaluation; application readiness does not appear to be a roadblock to adoption.
Total Cost of Ownership	Initial estimate of potential USD 11 million net present value.

Background

Intel's IT environment includes more than 100,000 PCs running Microsoft Windows XP; about 83 percent of these are notebook PCs. Deploying a new client OS therefore has major implications both for Intel's business groups and for Intel IT.

During the development of Microsoft Windows 7, Intel IT identified that the new OS had the potential to deliver value to Intel, with enhancements in areas including performance, user interface, and manageability.

After a beta release became available, Intel IT led an evaluation in the second quarter of 2009 to determine whether Microsoft Windows 7 met the needs of Intel's business groups.

Evaluation

To conduct the three-month technical evaluation, Intel IT collaborated closely with Microsoft and with Intel business groups.

Working with Microsoft enabled us to perform a detailed early evaluation of the OS and to provide feedback to Microsoft from the perspective of a large enterprise.

We interviewed business groups to develop a list of their key requirements, which included performance, stability, application readiness, and user acceptance. These requirements extended beyond the OS itself to include robust training as well as access to Microsoft technical resources and in-depth information.

We discussed these requirements with Microsoft to assess how Microsoft planned to support them. We then defined tests to determine how well the OS did in fact meet each specific business group requirement. For example, we tested whether performance

and stability were at least as good as with Microsoft Windows XP.

Our evaluation included three types of data:

- **Empirical data.** Intel IT lab performance tests measuring performance with common Intel user tasks and other measures such as the number of blue screens.
- **Subjective data.** As part of our evaluation, we deployed Microsoft Windows 7 beta on notebooks to 300 early users from different Intel groups including manufacturing, marketing, product groups, human resources, and IT. We surveyed these users to assess their experience.
- **TCO data.** A conservative initial financial analysis assessed the impact of Microsoft Windows 7 on client TCO.

By the end of our evaluation, we had obtained a description of how Microsoft Windows 7 supported each requirement along with data indicating whether this support met Intel's business needs.

Evaluation Results

Microsoft Windows 7 overwhelmingly met the business needs in each evaluated area, providing us with the ability to improve employee productivity and deliver IT cost efficiencies while improving manageability and security.

PERFORMANCE

We conducted lab tests to compare the performance of Microsoft Windows 7 and Microsoft Windows XP SP3 on a notebook PC with Intel vPro technology. Microsoft Windows 7 was more responsive when performing everyday tasks such as booting and launching productivity applications, as shown in Figure 1. Microsoft Windows 7 includes new

manageability and tuning capabilities designed to optimize performance.

POWER CONSUMPTION

Microsoft Windows 7 met the requirement that power consumption should be as good as or better than Microsoft Windows XP. In our tests, notebook power consumption was similar; Microsoft Windows 7 also includes new power management controls with an emphasis on idle power management.

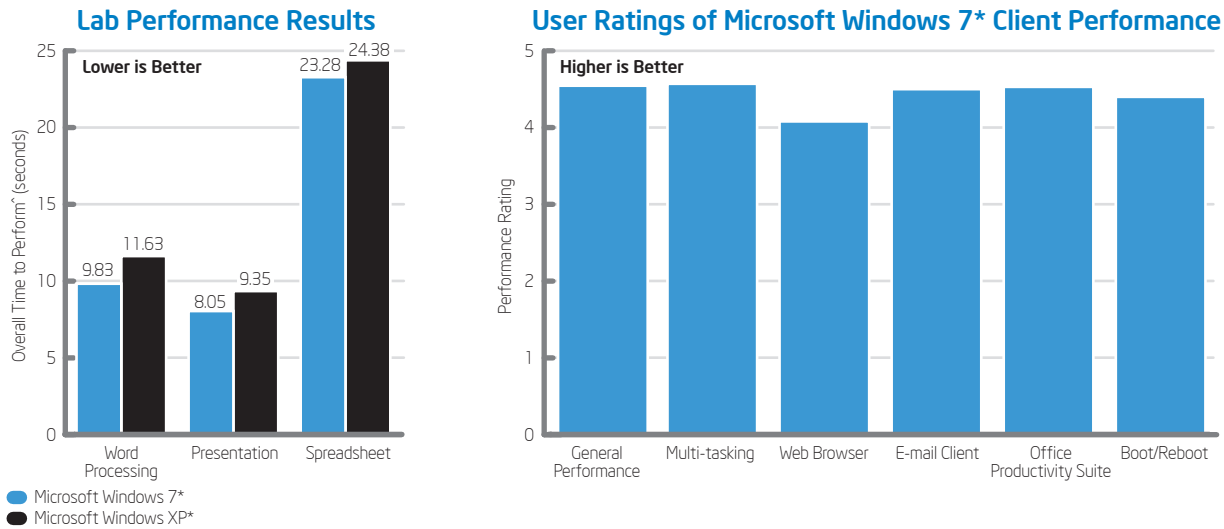
STABILITY

Even though it was a beta release, Microsoft Windows 7 was generally more stable than our production Microsoft Windows XP release, with fewer users experiencing blue screens. No blue screens were caused by user-mode drivers.

USER ACCEPTANCE

Feedback from our Microsoft Windows 7 user community was very positive:

- In surveys, about 97 percent of participants said they would recommend Microsoft Windows 7 to their colleagues.
- Ninety percent of evaluation participants did not encounter issues preventing them from using Microsoft Windows 7 for their primary machine. Participants that did encounter issues indicated that application readiness was the primary cause.
- Users perceived Microsoft Windows 7 performance as very good, as rated on a scale of one to five in Figure 1, in line with the results of our lab tests.
- Users also said the most useful features of Microsoft Windows 7 included the new user interface, including the task bar.



* Overall time to perform a series of typical tasks with each application, including opening the application, opening, editing and saving documents, and closing the application.

Figure 1. In an Intel IT technical evaluation of Microsoft Windows 7*, lab performance results and user ratings demonstrated that the OS met Intel business group requirements. Intel IT internal measurements, June 2009. Intel IT lab tests were conducted with a notebook PC with 2.53 GHz Intel® Core™2 Duo processor, 4 GB RAM, Mobile Intel® 4 Series Express Chipset, 120 GB 7200 RPM HDD.

APPLICATION READINESS

Based on our evaluation, application remediation does not appear to be a roadblock to Microsoft Windows 7 adoption.

In most cases, users did not report problems running existing applications on Microsoft Windows 7. We anticipate that the majority of applications will not require any changes, and we identified that remediation options and tools are available to handle all foreseeable compatibility issues, including the ability to leverage Intel® Virtualization Technology (Intel® VT) for compatibility mode.

OTHER FINDINGS

We assessed the training and documentation available and verified that it is adequate to support a roll-out of Microsoft Windows 7 to our users.

We encountered two issues during the evaluation, related to OS performance tuning

and user account control. Both cases were due to a lack of understanding rather than the technology itself. For example, the new user account controls improve security but caused some confusion among users. This could easily be addressed through user education.

Another of our planned tests focused on the effectiveness of application remediation. In practice, we did not test this because application compatibility during the evaluation was better than anticipated; as a result, remediation was not required.

TCO ANALYSIS

A preliminary conservative TCO analysis showed potential NPV of USD 11 million over a three-year refresh cycle. This is largely driven by lower service desk costs, due to improved OS stability as well as built-in troubleshooting tools designed to reduce calls to the service desk. It also includes savings due to reduced desktop PC energy consumption. The analysis

also predicted user productivity benefits that were not included in the NPV.

MICROSOFT WINDOWS 7 AND PCs WITH INTEL® vPRO™ TECHNOLOGY

We determined that we can deliver the best performance to users by delivering Microsoft Windows 7 on new notebook PCs with Intel vPro technology. This approach maximizes user productivity while taking advantage of the increased energy efficiency, security, and manageability of new PCs with Intel vPro technology.

Intel IT is deploying Intel vPro technology enterprise-wide to improve remote management and security. The security and manageability features of Microsoft Windows 7 and Intel vPro technology are complementary, offering additional potential enterprise benefits.

- Intel vPro technology includes capabilities that could allow PCs to be upgraded to Microsoft

Windows 7 remotely overnight, to minimize downtime-related productivity losses.

- Intel VT and Microsoft Enterprise Desktop Virtualization* (MED-V) can be used to deploy and manage virtualized desktop environments, which may be useful for running legacy applications.
- Microsoft Windows 7 includes security features for data encryption and application control. These complement Intel vPro technology security capabilities for secure remote management, isolation of infected PCs, and more effective deployment of patches.

Deployment Plans

During 2009, we plan to continue preparing for deployment by creating a Microsoft Windows 7 build and by installing the OS on systems in test labs to enable business groups to test applications and perform any necessary remediation.

In the first quarter of 2010, we plan to begin deployment of Microsoft Windows 7 on new PCs with Intel vPro technology as part of our established refresh cycle. We intend to roll out the new PCs to segments of our user community based on factors including their job role and application requirements.

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