

## IT@Intel Brief

Intel Information Technology

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# Evaluating Netbooks for Enterprise Use

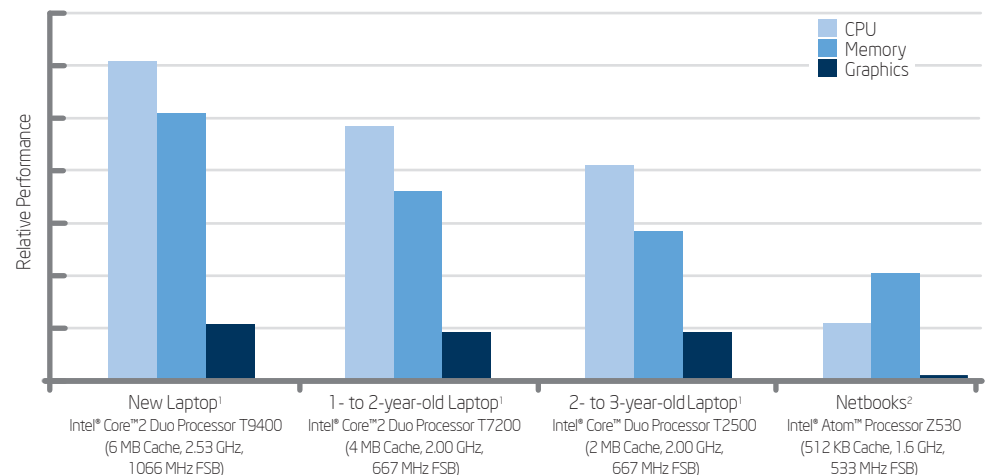
Intel IT performed a technology evaluation and verified that netbooks cannot replace our users' laptop and desktop PCs due to several factors, including ergonomics and performance when running a full set of IT applications. Figure 1 shows performance test results.

Netbooks are lightweight computers designed for accessing the Internet. The appeal of netbooks is due largely to their compact size, which makes them easy to carry and to use in tight spaces; however, the form factor also creates usability challenges.

Our study suggests that netbooks potentially could become companion devices that employees use while traveling, in meetings, and at home. They could also perform specialized roles in Intel's factories and in conference rooms. We plan to continue investigating these usage models to determine the potential for enterprise deployment.

### Profile: Netbooks in the Enterprise

- Cannot replace laptop or desktop PCs
- Potential roles as specialized companion devices



**Figure 1. Laptops were much faster than netbooks for processor- or graphics-intensive applications.** Intel internal measurements, March 2009.

## Background

Netbooks are a new category of ultra portable computers designed for accessing the Internet. They are smaller and lighter than laptop computers, but also significantly less powerful.

Intel's users are interested in netbooks because they are lightweight and compact. Most of Intel's workforce is highly mobile; about 83 percent of our users already have laptop computers.

Intel IT decided to evaluate how netbooks might fit into our enterprise environment. Our goal was to understand whether netbooks are suitable for enterprise use—and if so, whether they can replace laptops and desktops, or should be used in other ways.

Accordingly, we performed a technology evaluation to assess capabilities essential for enterprise use, such as compatibility with our standard IT applications, manageability, connectivity, security, performance, and ergonomics. Based on our findings, we identified potential enterprise usage models.

## Technology Evaluation

For our evaluation, we focused on netbooks based on Intel® Atom™ processors with 7-inch to 10-inch displays, 1 GB of RAM, solid-state or hard-drive storage, and standard OSs such as Microsoft Windows XP\*. We tested netbooks from five different manufacturers.

Our evaluation included performance, ergonomics and usability, battery life, manageability and security, and connectivity.

### Performance

The netbooks generally delivered good performance when running a small number of applications, such as a Web browser or videoconferencing software. However, when we loaded a full IT OS build, boot times increased significantly. Productivity applications took longer to load and launch, and performance of some Intel IT Java\*-based applications was much slower.

In general, we found that netbooks are good for viewing and reviewing information but less than optimal for content creation. Our testing showed that netbooks are prohibitively slow for

applications that are processor- or graphics-intensive such as statistical analysis programs, business modeling tools, or photo-rendering software, as shown in Figure 1. This would seriously impact user productivity.

### Ergonomics and Usability

The appeal of netbooks is due largely to their compact size, which makes them easy to carry and use in tight spaces—such as Intel's factories. However, the form factor also creates usability challenges.

We found that the keyboards were cramped, relative to laptop keyboards, and that keys were not always in the same position as on a traditional QWERTY keyboard. This made typing difficult. We also found that because of the small screen and relatively low resolution, we often needed to zoom and scroll to view documents—much more so than with a laptop. In addition, most netbooks, including the models we tested, do not include optical drives.

These limitations suggest that netbooks would not be suitable for all-day intensive use.

### Battery Life

We found that in enterprise use, netbook battery life was about 2.5 to 3 hours—similar to laptops.

### Manageability and Security

Unlike laptop PCs, netbooks do not include Intel® vPro™ technology. We are increasingly using Intel vPro technology to secure and manage our laptop and desktop PCs; the technology allows us to reduce management costs and increases our ability to remotely diagnose, repair, secure, and configure PCs. Because netbooks do not include Intel vPro technology, they are not as remotely manageable as laptops and therefore might require a different service-level agreement (SLA).

We were able to install our standard Intel IT manageability software for software distribution and configuration management. We also installed our standard antivirus and antispyware tools as well as disk encryption software. The ability to run this software means we can manage and secure netbooks as part of our enterprise environment.

## Connectivity

We installed our standard connection management software and were able to connect wirelessly to the enterprise network. We were also able to provide standard remote connectivity through our virtual private network (VPN). We successfully tested the use of cellular data cards for mobile Internet access.

## Technology Evaluation Summary

Based on our evaluation, we determined that netbooks cannot replace our users' laptop or desktop PCs for several reasons. They do not provide the performance required to run a full stack of applications and IT tools, and they are not ergonomically suitable for intensive all-day use. Most netbooks do not include optical drives. They are not as manageable as PCs with Intel vPro technology. However, netbooks are suitable as companion devices and for specialized uses. Results of our evaluation are summarized in Table 1.

## Netbook Usage Models

We used the results of our evaluation, together with analysis of Intel users' requirements and our existing environment, to identify potential enterprise usage models, outlined in Table 2.

### Companion Devices

We identified a number of usage models in which netbooks can act as a companion to employees' laptops or desktops. In these uses, the benefits of light weight and compact size outweigh considerations of functionality or ergonomics.

In these usage models, a netbook might be permanently assigned to a specific employee as a second computer. Alternatively, we might have a pool of netbooks; employees could check out a netbook when they need one.

### Meetings

Some employees spend significant portions of their days moving from one meeting to the next and would value a netbook because it is so easy to carry with them. While in meetings, users often need only a limited set of features—to enable them to take notes, read documents, or access the Internet, for example. Netbooks can easily provide this level of functionality. Because netbooks can run standard productivity applications, users can be more productive than when using handheld devices such as smart phones, which are not based on Intel® architecture.

**Table 1. Netbook Evaluation Summary**

<b>Performance</b>	Multitasking performance is not adequate for running our full IT software stack or for demanding content-creation tasks. Good performance for Internet access and when running a few applications.
<b>Mobility</b>	Compact and lightweight.
<b>Ergonomics</b>	Not suitable for all-day use due to small screen and keyboard.
<b>Compatibility</b>	Compatible with PCs; can run standard IT applications, including security and connectivity software.
<b>Manageability</b>	Manageable within our IT environment, but not as manageable as laptop PCs with Intel® vPro™ technology.

**Table 2. Potential Uses for Netbooks in the Enterprise**

<b>Potential Enterprise Companion Uses</b>	
<b>Meetings</b>	Highly portable, easy to carry to meetings. Runs standard productivity applications so users can take notes or read documents.
<b>Personal Travel, Vacation, or Leave</b>	Users can check out corporate netbooks so they can access e-mail and review documents if needed.
<b>Dedicated Video-conferencing Device</b>	Frees screen space on the employee's main PC, so the PC can be used to display other collaboration applications.
<b>Portable Computer for Desktop PC Users</b>	Provides users with a device they can carry with them.
<b>Potential Enterprise Specialized Uses</b>	
<b>Conference Rooms</b>	Dedicated device connected to projector, used to display presentations and for videoconferencing.
<b>Factories</b>	Compact, portable device suitable for use on the factory floor.

## Personal travel, vacation, or other leave of absence

Employees who are on vacation, sabbatical, or other personal leave often still want to check e-mail or review documents. It could make sense for them to check out a netbook, rather than taking their laptop PCs with them. A netbook would provide the functionality they need, while minimizing the risk of intellectual property loss if the device is lost. The potential impact of compromise due to malware would also be minimized, because a netbook would contain fewer applications and little or no corporate data, and could be wiped and rebuilt when returned to the pool.

## Dedicated videoconferencing device

Many Intel employees work in teams that include colleagues located at other offices. Employees increasingly use videoconferencing software to communicate with team members. While doing so, they may also be collaboratively working on the same documents or designs, or viewing the same presentation. We have been piloting the use of netbooks as dedicated videoconferencing devices. This frees screen space on each employee's main PC, so that the full screen area can be used to display other collaboration applications.

## Portable computer for desktop PC users

Many of our design engineers and some other users use desktop PC workstations that deliver the high-end performance they need. With a companion netbook, they would gain a highly portable device that they could take home or use when traveling.

## Specialized Uses

We also identified specialized uses in which netbooks could perform valuable new enterprise roles.

### Conference rooms

We could install netbooks permanently in conference rooms. They could be connected to the conference room projector and used to display presentations or for videoconferencing. This would eliminate the need for employees to use their own PCs as a dedicated presentation device, which in turn would enable them to use the PCs for other purposes such as taking notes. Alternatively, employees could bring in presentations on a USB drive for display on the netbook.

## Factories

In many of our factories, space is tight. Employees need to walk around machinery as they navigate the factory floor to gather information, troubleshoot, or repair equipment. Because of this, they need an extremely compact portable device. We are evaluating netbooks for this purpose.

## Conclusion

Netbooks cannot replace our users' laptop and desktop PCs, but we have identified several usage models in which netbooks could act as companion or specialized devices within our enterprise environment. We plan to continue investigating potential uses to determine their suitability for enterprise deployment.

**Learn more about Intel IT's best practices at [www.intel.com/IT](http://www.intel.com/IT).**

## Author

Alan Ross is a principal engineer with Intel IT.

<sup>1</sup> All laptops included Mobile Intel® 945 Express chipset family and 2 GB of RAM, and ran Intel IT's 32-bit build of Microsoft Windows\*.

<sup>2</sup> Netbooks included the Intel® Graphics Media Accelerator 950 graphics core built into the Mobile Intel® 945G Express chipset and 1 GB of RAM, and ran Intel IT's 32-bit build of Microsoft Windows.

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