IT@Intel White Paper

Intel IT
IT Best Practices
Enterprise Mobility and IT Consumerization
August 2012

Evaluating Ultrabook™ Devices for the Enterprise

Our evaluation shows that enterprise Ultrabook™ devices include features that strongly support business usage models, especially in cases where employees need to constantly carry their computing device with them.

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Executive Overview

Intel IT is proactively gathering data about Ultrabook™ devices and how they fit into the enterprise, in anticipation of a wave of new devices and form factors, and the associated expectations from employees who want to buy and use these devices at work.

We recognize the strong connections between the consumerization of IT and the evolving concept of mobility as a way of working. However, our research has shown that not all devices are well suited for secure, productive business usage. We have evaluated both consumer-level Ultrabook devices and enterprise-level Ultrabook devices to help determine the business value they may bring to the IT environment. We continue to explore use cases and device capabilities to determine which devices best balance employees' needs for convenience and productivity.

As a result of our evaluations, we have determined that consumer Ultrabook devices, while comfortable and appropriate for use in an employee's day-to-day personal life, can pose security, capability, and integration issues for Intel IT.

In contrast, our evaluation has shown that enterprise Ultrabook devices include features that strongly support business usage models, especially in situations where employees need to constantly carry their computing device with them. These features include:

- Durable chassis and component designs
- Intel® vPro™ platform for security and manageability
- High-speed Internet and WLAN connectivity

Our evaluation included the physical testing of many consumer models and a limited number of enterprise models. As more enterprise Ultrabook devices become available later this year, we will continue to evaluate and test them using proofs of concept and pilot projects. We anticipate that enterprise Ultrabook devices will become the primary PC for many employees and may be an excellent bring-your-own PC choice for robust access to a wide range of enterprise workloads, applications, and data.

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Ultrabook™ Definition

Ultrabook™ is the name trademarked by Intel to describe a new category of thin and light mobile computers that have a new level of responsiveness, long battery life, are built on Intel's newest platform security technologies, and are less than three-quarters of an inch (21 mm) thick.

Featuring low-power Intel® Core™ processors, enterprise Ultrabook devices have great responsiveness using features such as Intel® Smart Connect Technology and Intel® Rapid Start Technology to quickly get the system running. Typical battery life is five hours or more. Enterprise Ultrabook devices also offer security features, including Intel® Anti-Theft Technology and Intel® Identity Protection Technology.

BACKGROUND

Intel IT recognizes that the consumerization of IT is a reality and is inextricably linked to the evolving concept of mobility as a way of working. From mobile business PCs to smartphones and tablets, to bring-your own (BYO) computers, Intel IT has studied a variety of devices and their impact on the IT environment.

As consumer-driven innovation continues to accelerate and as IT consumerization trends become more prevalent, our research indicates that certain devices are better suited for secure, productive business usage. Most consumer devices are not designed for use in the enterprise and can create unexpected challenges for both IT and employees.

- Many of these devices and technologies, while comfortable and appropriate for an employee to use in his or her personal life, can pose security, capability, and integration issues for Intel IT.
- Beyond integration, we must also consider usage models; requirements differ between corporate usage models and personal usage models. The experience designed around consumer devices isn't always appropriate for enterprise use.

In the last two to three years, we have evaluated several types of devices for use in the enterprise, exploring usage models and use cases, as well as device capabilities. From our device evaluations, we have developed best practices and key learnings that will help us continue to keep abreast of changing technology and IT consumerization.

Both IT and employees benefit from our analyses. We can use this data to help plan for improved integration of technologies and trends that make sense on a usage model basis. We can also communicate with employees to help them understand our requirements for devices used in the enterprise. This information helps employees make informed purchasing decisions, choosing a device that fits their personal use-case scenario and balances their needs for convenience and productivity.

Our evaluation and implementation efforts for various device types include the following:

- **Smartphones.** Because of the increased employee demand for using smartphones at work, we have evaluated and tested multiple models, and have implemented support for several of them. To date, about 25 percent of Intel employees use smartphones to access corporate data and services.

- **Tablets.** We currently enable tablets using the same small form factor ecosystem that we use for personally owned smartphones. Because mobile business PCs provide the performance and mobility our employees currently need, we have not experienced a large employee demand for more BYO tablets—only about 2,000 employees are currently using tablets. However, we are looking for opportunities for tablets to supplement primary PC use at Intel,[1] and as platform capabilities evolve, we do expect demand and opportunities for Intel® architecture-based tablets to increase.
- **BYO PCs.** As with tablets, we have not experienced significant employee demand for using personally owned PCs (other than for Apple Mac* computers) at work, because our standard computing platform provides optimal performance and user experience. However, we have explored, and implemented in certain cases, various BYO PC usage models, such as use in offshore development centers and use by contractors and contingent workers. Currently, only a few hundred employees use BYO PCs.

Although we continue to analyze new devices and form factors for their business benefit, we remain committed to innovating around a standardized computing platform that increases employee mobility and productivity, and decreases the high cost of supporting PCs. We have learned through a decade of experience that regular refresh delivers an extremely low total cost of ownership. Important components of our standard computing platform include:

- Intel® Core™ vPro™ processors, a combination of processor technologies, hardware enhancements, management features, and security technologies that allow remote access to the PC—including monitoring, maintenance, and management—independent of the PC's OS or power state
- Intel® Solid-State Drives (Intel® SSDs), which provide rugged reliability, responsive performance, long battery life, and flexibility and scalability of storage
- Higher-end CPUs that can perform compute- and graphics-intensive operations efficiently
- Network connectivity components that support reliable, high-bandwidth network connections

Throughout our evaluation of new form factors, we have learned that allowing employees to use the device of their choice could compromise consistent, standard capabilities, and could negatively impact core productivity. We have determined that consumer devices may fit some niches, but they do not offer the same level of benefits as our standard computing platform.

ULTRABOOK™ DEVICE EVALUATION

In anticipation of a wave of new devices and form factors, Ultrabook devices in particular, and the associated expectations from employees who want to purchase and use these devices at work, we are proactively gathering data pertaining to Ultrabook devices and how they fit into the enterprise.

Like PCs, Ultrabook devices are available in two classes: consumer-level devices and enterprise-level systems. During the last seven months, we have been evaluating both classes to determine their business value. We have determined that enterprise Ultrabook devices may provide an excellent mobility platform for a significant percentage of Intel employees—either as corporate-provided PCs or as BYO PCs—because they support the necessary levels of productivity, reliability, and security in our enterprise environment.

Bring-Your-Own Stipend Not Cost Effective

We investigated the idea of implementing a stipend program for our bring-your-own (BYO) PC initiatives, including BYO Ultrabook™ devices. Our initial thought was that such a stipend might offer a return on investment by optimizing the IT PC refresh budget and enabling additional platform choice and flexibility.

We conducted an employee survey, the results of which showed that providing an employee-viable stipend model that promotes BYO and incentivizes participation would create a significant cost increase to Intel. A cost-neutral stipend appeared unlikely to yield participation that was high enough to justify an investment in stipend program management and administration costs.

Therefore after careful investigation and analysis, we determined that a stipend program for BYO PCs would not be cost effective for Intel or our employees, and we will not offer a BYO stipend-funded PC program for Intel employees at this time.

[1] For examples, see "Improving Facility Operations with Intel® Architecture-based Tablets."

Intel IT: Continuously Exploring New Technologies

We continually research new technological developments and evaluate their fit into our enterprise environment. Our goal is to integrate and support those devices and technologies that provide business value.

Common consumer devices and technologies that Intel IT is exploring include laptops and Ultrabook™ devices; desktops and all-in-one systems; tablets; phones and other small form factor devices; consumer peripheral devices such as TV appliances, Intel® Wireless Display, and streaming entertainment devices; and solid-state drives.

We also continue to explore several consumer software and service offerings, such as content synchronization and device continuum services, social media, and online collaboration and communication tools.

Intel IT supports several programs that are studying consumerization, such as our bring-your-own-device initiatives, an IT Consumerization focus group, and the Intel Compute Continuum program. In addition, we are looking into the use of virtualization to deliver content to non-Intel managed devices.

IT Labs partners with many Intel product groups to test consumer technology in the enterprise ecosystem and to test enterprise technology in consumer settings. The IT Labs Client team researches many areas of client technology, both consumer and enterprise. Intel's innovation centers in the United States and in countries worldwide support these research efforts.

Usage Models

The remote management and security features of Intel vPro technology, combined with the thin and light Ultrabook device form factor, provide a tremendous value proposition in certain usage models—especially in situations where employees need to carry their computing device with them. This is becoming more common as the work environment for Intel employees continues to shift toward increased mobility. Often, employees share an office and common collaborative areas. In these scenarios, power outlets may not be available or may be in use by someone else. In many cases, an employee may not have his or her own office with a docking station.

Here are just a few early-adoption use cases in which an enterprise Ultrabook device could be valuable (Figure 1):

- **Sales representative.** With multiple customer meetings in a single day, there is no time to plug into a power outlet. Extended battery life, high-speed connectivity, and information security are critical.
- **Highly mobile telecommuter.** Some employees use a work/life balance compute model, where they commonly work from multiple locations at different time schedules. Wherever and whenever they are working, they need a device that is reliable, durable, and lightweight, with long battery life and powerful computing capabilities.
- **Facility technician.** Working in the field, away from power outlets, a comfortable desk, or a LAN connection, factory workers need to be able to access enterprise applications and data in real time, using a reliable, responsive device that is easy to carry.

We anticipate that the set of use cases for enterprise Ultrabook devices could be much broader and that enterprise Ultrabook devices may become part of the refresh cycle for approximately 20 percent of Intel employees.

Features, Form, and Function

As shown in Table 1, our evaluation of consumer Ultrabook devices, which became available in late 2011, revealed that many consumer Ultrabook devices lack the core capabilities and features that Intel IT requires in order to deliver secure and consistent services to end-point devices. Enterprise Ultrabook devices, which should be generally available starting in late 2012, will include features that support corporate usage models.

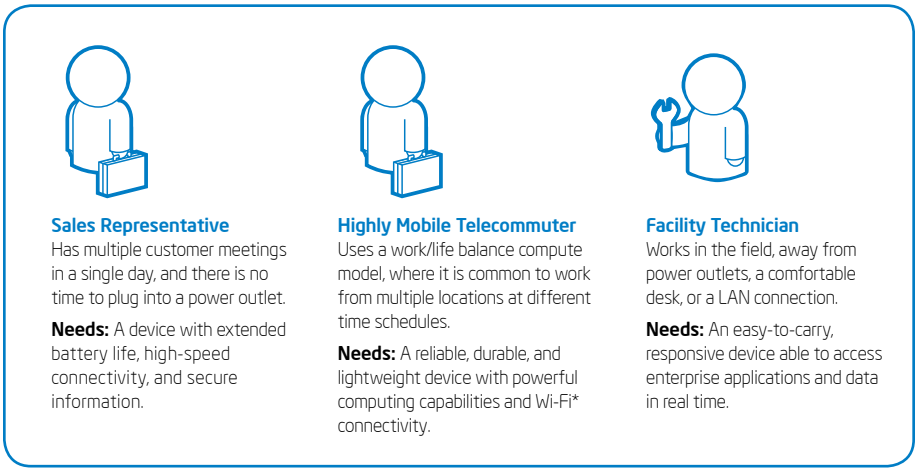

Figure 1. Examples of early-adoption use cases for enterprise-level Ultrabook™ devices.

Table 1. Comparison of Enterprise-level and Consumer-level Ultrabook™ Devices

Business Need	Enterprise Ultrabook™ Device	Consumer Ultrabook™ Device
Remote management capabilities to support our highly mobile workforce	▪ Intel® vPro™ platform supports remote management and information security. ▪ Keyboard, Video, and Mouse (KVM) remote control and remote encryption management capabilities help to quickly remediate systems, even with encrypted hard drives and solid-state drives, any time and anywhere.	▪ No hardware-based management capabilities.
Consistent platform and components	▪ Intel® Stable Image Platform Program provides consistency and reliability.	▪ Inconsistent platform and no reliable global footprint. The same configuration is not available worldwide, and components change often, generating an increased need for testing and integration.
Virtualization capabilities	▪ Intel® Virtualization Technology for Directed I/O allows support for newer virtual client models, such as Type 1 hypervisors.	▪ Directed I/O virtualization support is missing or inadequate.
Flexible, reliable high-performance connectivity, available anywhere, any time	▪ Reliable, higher performance dual-band (2.4/5 GHz), multi-stream (2x2) Intel® Wi-Fi adapters supporting Intel vPro technology and Intel® Smart Connect Technology. ▪ Intel® Wireless Display (Intel® WiDi) provides full, secure 1080p video transmission to any other Intel WiDi receiver. ▪ Thunderbolt™ technology and USB 3.0 provide high-speed connections to peripheral devices.	▪ Limited wireless support with single-band (2.4 GHz), single-stream (1x1) Wi-Fi* adapters. ▪ Focus on single access point home and public hotspots instead of reliable campus roaming.
Security capabilities that meet Intel's requirements	▪ Intel® Identity Protection with public key infrastructure certificate authentication adds protection against identity theft and unauthorized data access. ▪ Intel® Anti-Theft Technology helps protect against data and asset loss from theft with S3 resume authentication protection. ▪ Intel® Trusted Platform Module helps store and protect information.	▪ Fewer security controls.
Support for data synchronization	▪ With capabilities such as Smart Connect, the platform can keep information, such as data stores and emails, in constant synchronization on the end-point device.	▪ Limited support for docking or docking-type scenarios requires end users to use several plugs every time they get to a workstation, making data synchronization more difficult.
Support for a wide variety of peripheral devices and use cases	▪ External standard monitor ports can connect to conference room projectors. ▪ Additional USB ports can connect external keyboards and mice.	▪ Many require multiple custom monitor cables and display adapters. ▪ A limited number of ports are available on the platform, and users may require USB hubs to enable all their devices.
Design that provides for reliability and multiyear refresh cycles	▪ Higher-end components contribute to longer battery life, more rugged construction, and ease of use; built for heavy day-to-day business use.	▪ Components for displays, hinges, chassis, keyboards, and storage are either missing or inadequate.
Consistent warranty support and ordering processes	▪ Can leverage standard purchasing and support processes.	▪ Difficult to secure support and extended downtime of the PC if something breaks. ▪ Harder to procure using normal purchasing channels.

NEXT STEPS

Enterprise models began shipping from Ultrabook device manufacturers in July 2012. Our earlier evaluations were based on platform design specifications; as models become physically available, we will test the various features listed in Table 1, such as durability of design, the manageability and security features of Intel vPro technology, and connectivity capabilities. We plan to make enterprise Ultrabook devices available in early 2013 to specific groups of employees who have a strong business need for this type of PC.

Because Ultrabook devices are a new form factor, innovation is occurring at a rapid pace. Input methods are extending beyond traditional keyboard and mouse to include gesture, voice, and touch. Also innovative designs are moving beyond the simple clamshell. Convertible models have screens that can swivel, roll, or pull back over the keyboard. Some screens are

detachable from the keyboard, so an employee can carry just the screen and use it as a tablet. Other screens can fold over 360 degrees, so that the display is on the back, with an open keyboard on the other side. We will continue to monitor and evaluate these new models.

Although we are focusing on enterprise-level Ultrabook devices, we also plan to allow employees to use personally owned, consumer-level Ultrabook devices as part of our BYO device initiative. One concern we have with BYO Ultrabook devices is that while employees with BYO smartphones are typically willing to provide their own technical support, employees with BYO Ultrabook devices are likely to expect Intel IT to provide technical support for these devices, because they are, in essence, a PC.

As with other device types that are part of our BYO device initiative, we plan to educate employees about corporate capability requirements and how various models compare. These education efforts will be an integral part of our testing and deployment phases for Ultrabook devices.

CONCLUSION

Like many IT shops, Intel IT is experiencing a strong push from employees throughout the enterprise for support of many consumer devices, technologies, and services. Many of these devices and technologies, while comfortable for use in day-to-day personal setting, pose security, capability, and integration issues in the corporate setting. Intel IT has studied the impact on the IT environment of a variety of devices, including mobile business PCs, smartphones, tablets, BYO computers—and most recently—Ultrabook devices.

Like PCs, Ultrabook devices are available in two classes—consumer-level and enterprise-level. We have been evaluating consumer Ultrabook devices for the last seven months and have determined that, in general, consumer Ultrabook devices do not have the features that we require to support productivity, reliability, and security in our enterprise environment.

On the other hand, enterprise Ultrabook devices are a good fit for many current enterprise client usage models, especially in situations where employees need to carry their computing device with them. Some of the important features of enterprise Ultrabook devices include the following:

- Remote management and security enabled by Intel processors with Intel vPro technology
- Reliable and responsive storage using Intel SSDs
- Flexible, reliable Wi-Fi* connectivity, anywhere and at any time
- A design that provides for durability, reliability, and multiyear refresh cycles

Our testing and analysis has shown that consumer Ultrabook devices do not offer the same level of benefits as our standard computing platform. Therefore, consumer Ultrabook devices are not a viable replacement for the enterprise PCs our employees use today as their primary compute device. We plan to continue testing and conduct proofs of concept to validate the business value of enterprise Ultrabook devices; based on the results of those activities, we expect to deploy enterprise Ultrabook devices to a subset of employees as their primary enterprise PC.

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Visit www.intel.com/it to find white papers on related topics:

- "The Future of Enterprise Computing: Preparing for the Compute Continuum"
- "Improving Security and Mobility for Personally Owned Devices"
- "Preparing the Enterprise for the Impact of Alternative Form Factors"
- "Using TCO to Determine PC Upgrade Cycles"

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SSD	solid-state drive

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