# Best Practices for Migrating a Large Enterprise to Microsoft Windows 7*

Due to strong demand and the proven success of the program, we are accelerating deployment with the goal of migrating the majority of our users by the end of 2011.

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## Executive Overview

**Intel IT is implementing a program to rapidly deploy Microsoft Windows 7\* across our large enterprise environment, in order to realize benefits such as increased user productivity and enterprise security. The program has already enabled us to deploy the OS to 30 percent of Intel's 100,000 PCs in nine months, with a 95-percent user satisfaction rating.**

Deploying the OS across Intel's environment is a major initiative requiring focus on key areas ranging from applications readiness and remediation techniques to OS build engineering, deployment methods, training, change management, and support. To achieve our goals, we:

- Decentralized the application compatibility testing to business units. This allowed Intel IT to focus more on enabling rather than testing, and on providing remediation consulting as an IT service. This strategy enabled the certification of about 2,000 applications in just 20 weeks.

- Conducted an extensive early adopter pilot phase that enabled us to optimize IT processes and confirm user acceptance before undertaking a wider deployment.

- Maximized performance gains by deploying Microsoft Windows 7 on new PCs with Intel® Core™ i5 vPro™ and Intel® Core™ i7 vPro™ processors to eligible employees. All Microsoft Windows 7 deployments also include a hardware upgrade to an Intel® Mainstream SATA Solid-State Drive.

Due to strong demand and the proven success of the program, we are accelerating deployment with the goal of migrating the majority of our users by the end of 2011. To achieve this, we will apply additional delivery methods, using Intel® vPro™ technology to install the OS remotely and empowering users to upgrade their own OS.

## Contents

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## BUSINESS CHALLENGE

**Intel IT manages a worldwide IT environment that includes about 100,000 PCs. Intel's workforce is highly mobile, and about 80 percent of the systems are mobile business PCs. Our business goals in managing this environment are to maximize employee productivity while minimizing support costs.**

During the development of Microsoft Windows 7*, we conducted an extensive technical evaluation that indicated the new OS could help achieve these goals. The evaluation indicated that deploying Microsoft Windows 7 could provide significant productivity improvements for employees, particularly when deployed on PCs based on the latest Intel® processors and with Intel® solid-state drives (SSDs). We identified several IT benefits including improved manageability, enhanced security, and reduced total cost of ownership.

Intel therefore made a strategic decision to deploy Windows 7 across our enterprise environment. This major migration presented several challenges:

- Quickly and cost-effectively delivering the new OS across a very large environment.

- Making sure that all critical applications worked with Microsoft Windows 7 so that application readiness was not an obstacle to deployment.

- Migrating employees to the new OS with minimal disruption.

- Maximizing productivity gains by providing new PCs, where applicable, and hardware upgrades along with the OS.

## MIGRATING TO MICROSOFT WINDOWS 7*

**As with any large-scale new technology implementation, this substantial program required careful planning and setup. We then adopted a phased implementation approach, providing the OS to early adopters and helping to ensure application readiness before proceeding to enterprise-wide deployment.**

### Program Structure

To reach a state of migration readiness and then deploy the OS across the enterprise, we needed to drive a number of activities in parallel while managing the interdependencies between them. We created a core team to manage these activities, which are shown in Figure 1 and described below.

#### OPERATIONAL READINESS

We needed to make sure that we had all the capabilities required to deploy and support Microsoft Windows 7 within our production environment. Key areas included:

- **Delivery.** The ability to deliver the OS in all deployment scenarios, including OS upgrades and installation on new PCs, to help ensure that we could take advantage of every opportunity to provide the OS to employees.

- **Support.** This included putting in place first-line and second-line support as well as the required tools, such as support scripts and incident management system configuration.

#### APPLICATION READINESS

Our goal was to help ensure compatibility of all applications with Microsoft Windows 7. This involved creating an inventory of applications, prioritizing them, and driving compatibility testing and remediation activities. We devised an approach that enabled very rapid completion of this process—testing 2,000 applications within 20 weeks.

We anticipated that not all applications would be able to run natively on Microsoft Windows 7 by the time of our planned deployment. We therefore needed a "safety net" that allowed these applications to run in compatibility mode. We used two methods that allowed applications to run in virtual environments, executing either on a remote server or on the user's machine.

#### OS BUILD

We needed to create an Intel IT OS build ready to deploy on all eligible PCs. An engineering and quality assurance group was responsible for creating this build, which included the OS, signed drivers, and core applications. The group also was responsible for certifying compatibility with all supported hardware platforms.
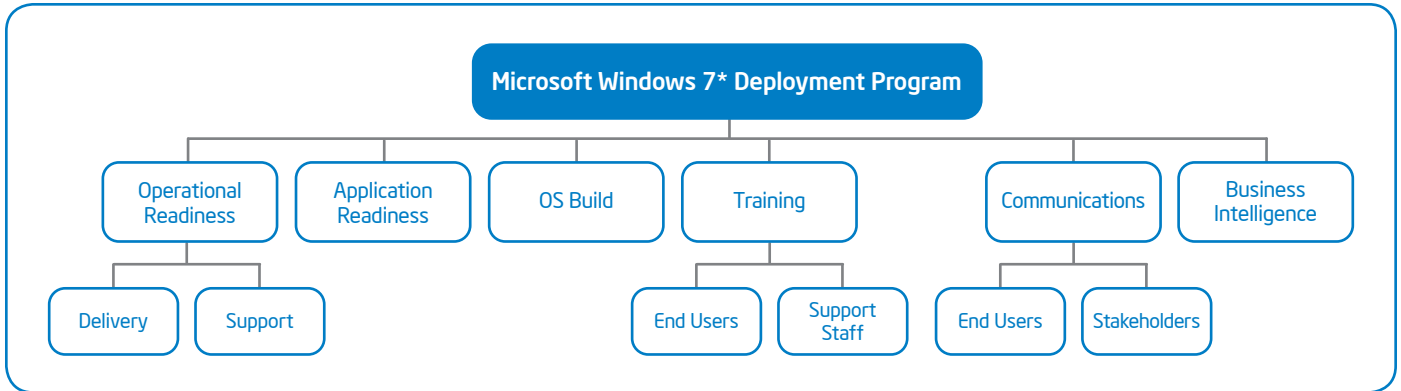
Figure 1. Program structure for managing Intel's deployment of Microsoft Windows 7*.

## TRAINING

We needed to make sure users and support staff had access to all relevant training materials. For users, our goal was to help them quickly start using the OS capabilities relevant to their jobs after migrating to the new OS. We focused on just-in-time training including an interactive quiz to make the learning process more engaging as well as an online knowledge base and other tools. For support staff, our goal was to provide the training materials needed to enable smooth OS delivery and support.

## COMMUNICATIONS

A key goal was to provide relevant, timely information to employees to create enthusiasm and positive momentum for our enterprise-wide deployment strategy, and to stakeholders to help ensure their continued buy-in and support.

### Employee Communications

We appointed a lead person responsible for employee communications and channeled all communications through that person. This helped ensure a measured flow of communications with a consistent look, feel, and voice, while avoiding the pitfall of issuing too many messages. We delivered updates through Intel's employee portal and targeted e-mails, and provided hands-on experience with the OS through road shows and other activities.

### Internal Customer and Stakeholder Management

Our CIO communicated directly with senior executives at Intel's primary business groups to provide information about the forthcoming migration and the need to help ensure application readiness. Executives then communicated these needs to the application owners and other employees within their own organizations. This approach helped ensure that application owners received direction from their own managers rather than from Intel IT. We kept stakeholders up to date with weekly reports and bi-weekly presentations.

We created a team of customer representatives, including sub-teams dedicated to managing relationships with each business group. These representatives coordinated activities with the business groups, including deployment schedules.

## BUSINESS INTELLIGENCE

We needed tools to provide timely and relevant information that could help us track progress and make data-driven decisions during the program phases. These included dashboards and critical success indicators (CSIs).

# Early Adopter Phase

We deployed the new OS to early adopters concurrently with the extensive application readiness program. These users assessed and drove user acceptance of the OS, and also helped us fine-tune the IT processes required for full enterprise deployment.

## SELECTING USERS FOR EARLY DEPLOYMENT

We initially targeted 3,000 users in our early adopter phase; we later increased this number to 4,500 due to strong demand. With successful deployment experience, we rapidly developed confidence in our delivery methods.

We looked for users who had a business-critical requirement for the OS, such as developers who needed to help ensure application compatibility and sales people who needed to showcase the latest Intel processors on a system running the new OS. To find these users, our customer management team asked business units to identify appropriate employees within their own organizations. This approach proved successful, and we have continued to use it to prioritize users during the subsequent enterprise-wide deployment.

We also used a variety of communications to generate enthusiasm and drive demand among users. For example, we publicized the program on Intel's employee portal; we created an interactive open forum for new users, in which they could ask questions of IT experts; and we published tips about using Microsoft Windows 7.

To help ensure the early adopter program remained manageable, we supported only two deployment use cases:

- **PC refresh.** Users with older PCs were eligible to receive new PCs running Microsoft Windows 7, in accordance with Intel's three-year PC refresh policy. We provided these users with PCs based on Intel® Core™ i5 vPro™ and Intel® Core™ i7 vPro™ processors. Each PC included an Intel® Mainstream SATA Solid-State Drive; our initial testing showed that the combination of the new Intel processors, SSDs, and Microsoft Windows 7 delivered significant performance improvements.

- **OS upgrades.** We provided OS upgrades to users with newer PCs who were not eligible for PC refresh.

To track the progress and success of the program, we developed a series of CSIs, as shown in Table 1. We monitored the progress against specific targets as the program proceeded. Achieving these targets was a factor in determining when to move to enterprise-wide deployment.

## APPLICATION READINESS

To help ensure application readiness was not an obstacle to enterprise-wide deployment, we faced a significant task: We needed to test and certify approximately 2,000 applications within a 20-week window. To achieve this ambitious goal, we adopted a new approach with several key features.

**Prioritizing widely used applications.** As part of our planning process, we identified all applications in our environment and created a list of applications with a large number of users. We placed the greatest emphasis on these widely used applications.

To identify all applications in the environment, we relied largely on business groups and the application owners within them. We already maintained an applications repository, which provided a starting point; however, the repository did not include all applications used within the business groups.

We identified 850 applications that each had more than 5,000 users and categorized them

as "must-do" applications. We tracked these very closely and certified them as capatible before we signaled readiness to deploy Microsoft Windows 7 enterprise-wide. We also pursued the remaining 1,150 applications in our environment in parallel, but these were not considered potential obstacles to enterprise-wide deployment.

Aside from our focus on the 850 most widely used applications, Intel IT did not enforce testing or prioritize testing of individual applications. We relied on application owners to test their own applications.

**Decentralized testing.** We used a decentralized approach to testing applications, rather than building a large test team within Intel IT as in previous migrations. Business groups and application owners took responsibility for testing their applications; Intel IT provided help as necessary, including information, test systems running Microsoft Windows 7, and remediation consulting to address compatibility issues encountered with individual applications. We also tracked progress in a central repository.

**Highlighting uncertified applications.** We created a list that highlighted applications not yet certified for Microsoft Windows 7. While the application owners were still responsible for communicating readiness information with their user base, this list allowed users to verify all required applications would function

as expected on Microsoft Windows 7. This minimized erroneous migrations and the need to roll back OS installations.

**Accelerating application release schedules.** Some suppliers were not scheduled to release software compatible with Microsoft Windows 7 until the second half of 2010. The program team took proactive measures and invoked management support to successfully pull in supplier delivery dates, which minimized the impact on our schedule.

### Applications Testing and Remediation Process

First, we selected a sample of 100 applications listed in our existing applications repository and ran them through a compatibility checklist provided by Microsoft. This provided us with preliminary data that we used to quantify the resources we would need and identify areas likely to be problematic.

Then, for each application, we implemented a process that included the following steps:

1. Application owners registered their application in the repository, if it was not already registered. They also indicated their preferred test environment; we provided several ways for application owners to gain access to Microsoft Windows 7 in order to test their applications, as shown in Figure 2.

Table 1. Early Adopter Phase – Critical Success Indicators

| Critical Success Indicators | Description | Target |
|---|---|---|
| **Process and Tools** | | |
| Streamline and harden migration methods | Minimize end user productivity hit with consistent, repeatable process | <= 2 hrs |
| User satisfaction with migration process | | > 90% |
| End user training satisfaction | | > 90% |
| Number of upgrades | Validate refresh capacity, migration process and tools | => 3,000 users |
| Safety net success rate | Viability of safety net methods | > 97% |
| **Platform Acceptance** | | |
| User satisfaction with OS (3 weeks after migration) | Value perceived by user | > 90% |
| Rollbacks to Microsoft Windows XP* | Stability, usability, and performance | < 3% of deployed base |
| Service Desk contact rate (OS issues only) | Stability, usability, and performance | < 8 % of deployed base |

## Troubleshooting Packages

To help users transition to Microsoft Windows 7*, we created a repository of automated solutions developed by Intel IT and made it available on an internal Web site. It is similar in concept to troubleshooting solutions provided by Microsoft for its own products.

Our repository includes solutions collected from our IT service desk, PC center, and engineering groups. It provides two benefits: It empowers users to fix their own issues, and it avoids IT costs by reducing ticket submissions.

The current release includes solutions to help with a variety of common issues including adding desktop icons and launching the Microsoft Office 2007* diagnosis tool. To date, more than 3,000 users have used the solutions.

2. A scheduler on the applications readiness team responded with instructions and testing timelines along with details of the available test environment. We found that involving a human scheduler, rather than making process completely automated, provided additional flexibility to accommodate business group needs.

3. As application owners proceeded through the testing process, they provided status updates in the central application repository. This enabled us to more easily generate progress reports and track progress of individual applications; we sent reminders if we did not receive updates as expected.

About 90 percent of application owners were able to complete testing without remediation assistance from Intel IT. Application testing was facilitated by the fact that even the beta releases of the OS proved relatively stable, providing a solid test foundation.

### Remediation

To help application owners who encountered compatibility problems, we provided centralized remediation consulting. Centralizing this function enabled IT engineers to gain a broad view of typical problems, which helped them suggest solutions for individual applications.

We published common problems and best-known methods on Intel's enterprise wiki so that application owners could take advantage of them; this also reduced the need for them to contact Intel IT for help.

We developed a process to determine the best approach for solving each problem encountered and for how much remediation effort was justified. For internal applications, choices

included continuing to attempt to fix the application or opting to run it using the safety net. For externally produced applications, the options might be to require the supplier to produce a version compatible with Microsoft Windows 7 or to run it using the safety net.

### Results

Our applications readiness approach was extremely successful. It enabled certification of the required applications across Intel's entire environment within our target deadline, using only a very small IT team. This helped ensured that application readiness was not an obstacle to enterprise-wide deployment.

### MAKING THE DECISION TO MOVE TO ENTERPRISE-WIDE DEPLOYMENT

We based our decision about when to move to enterprise-wide deployment on achieving our early adopter CSI targets and meeting the following release criteria:

- **Application readiness,** with "must-do" applications certified and impact assessments for other applications completed.

- **Safety net** hardened and scalable for enterprise use. We found that many fewer applications required the safety net than we had initially anticipated; through our applications readiness process, we were able to certify the vast majority of applications to run natively on Microsoft Windows 7.

- **Service desk** and on-site support technicians ready and equipped to support enterprise-wide deployment.

- **Delivery methods** in place for all enterprise deployment use cases.



**Methods for Applications Readiness Testing**

- 50%
- 35%
- 15%

■ Application owner uses loaner PC running Microsoft Windows 7*

■ Migrate application owner's primary system to Microsoft Windows 7
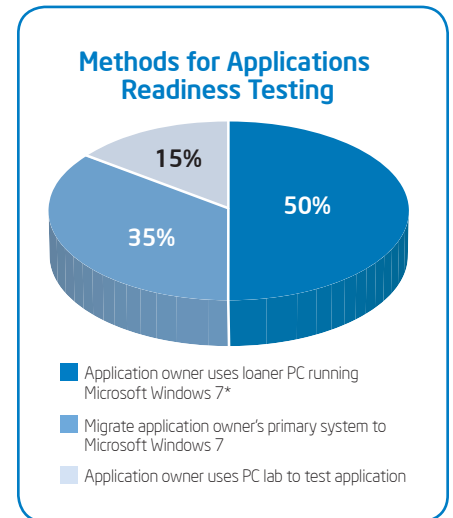
■ Application owner uses PC lab to test application

Figure 2. Intel IT used various methods to provide a Microsoft Windows 7* environment for applications readiness testing.

- **Release documentation** updated and available for technicians.

- **Communications** updated and available for use.

- **Training** available and integrated into our migration processes.

- **Reporting,** with a dashboard that enabled us to track key deployment statistics.

- **PC refresh and OS upgrade processes** optimized.

- **Troubleshooting packages** complete and available for use (see sidebar "Troubleshooting Packages").

Once these criteria were met, we moved to enterprise-wide deployment.

## Gadget Store

Desktop gadgets are small client applications that can be used to deliver information such as weather and news updates or to streamline interaction with other applications. They are produced by a variety of developers and are usually available online.

Intel IT took this concept one step further by launching a "gadget store"—a repository of Microsoft Windows 7* productivity gadgets developed by Intel employees for Intel employees.

All Intel users of Microsoft Windows 7 can submit, download, rate, and review gadgets. Each submitted gadget goes through a quick quality assurance and governance process to make sure it meets minimum requirements before being posted.

Users have already created productivity gadgets for many purposes, including delivering corporate news, searching for software, viewing Intel videos, finding Intel acronyms, and setting up conference calls. Thousands of users have downloaded gadgets.

## Enterprise-wide Deployment

We began enterprise-wide deployment in the second quarter of 2010, with an initial goal to complete deployment by the end of 2012. However, we subsequently pulled in this target to the end of 2011 due to strong user demand, positive return on investment data, and the fact that we were delivering the OS faster than originally expected.

To achieve our goal of deployment to all employees within our timeframe, we broadened the number of migration methods we supported. To maximize productivity gains, we also installed an Intel SSD in each PC when we deployed the OS.

### MIGRATION METHODS

We developed effective migration methods and scenarios that took advantage of every opportunity to deliver Microsoft Windows 7 to employees, while minimizing employee downtime.

### Full Service PC and OS Upgrade

In this commonly used delivery method, users leave their old PC in our migration lab the day before the migration. They receive a loaner system to use until they get their new system running Microsoft Windows 7 and Microsoft Office 2007. Intel IT support staff prepare the new system, migrating data and reinstalling applications. The following morning, users take a one-hour training class in which they receive their new system with Microsoft Windows 7 and an Intel SSD. The class is designed to help ensure that users quickly obtain the benefits of the new OS and associated software, including Microsoft Internet Explorer 8* and Microsoft Office 2007.

### Migration Fairs

We use this method mainly in large sites to migrate massive numbers of employees in a limited time. We prepare a location, such as the facility's café, with the ability to accommodate up to 100 simultaneous migrations. We invite users to register for the event in advance, and ask them to do some preparatory work that enables us to capture their data and settings. On the day of the event, users come to the location, attach their old PCs to a network cable, and follow instructions. After completing the migration, they return to work with their new system, including the new OS and productivity software.

Users carry out the instructions at their own pace; the process typically takes up to two hours. Intel IT support staff are available to help if needed. This process achieves efficiencies by enabling us to migrate large numbers of users with a low ratio of support staff to users.

### Self-directed Migration

This capability offers the key advantages of empowering users to determine when their upgrade will take place and requiring minimum downtime. We initially used this delivery method with more sophisticated users during the early adopter phase. We are currently enhancing and simplifying this method. Our goal is to provide two options:

- Users initiate the upgrade with a simple double click that begins OS installation, data migration, and application reinstallation. We are currently conducting a proof of concept of this method, with plans to make it available to all users in 2011.

- For desktop systems, the Service Desk can remotely initiate an upgrade to Microsoft Windows 7, or a rebuild of an existing Microsoft Windows 7 OS, using Intel vPro technology.

### Remote Site Migration

This is for users at remote sites that do not have on-site IT support. Typically, employees working in sales and marketing are located in these sites; these users often have a critical need for the new OS, which generates a requirement to prioritize their migration. Currently, we either send them a new system with self-migration instructions or ask them to send us their old system so we can do it for them.

### Site-wide Migration

In this scenario, we identify sites that can fully migrate to Microsoft Windows 7 and upgrade all users as described in the methods above. This helps us to effectively synchronize OS upgrades with hardware refresh. We publicize the migration in advance to prepare users.

### Intact Team Migrations

We identify specific teams, such as sales and marketing groups or application developers, with a need for early migration, and migrate them using the methods above.

## Current Status

The deployment of Microsoft Windows 7 to date has been extremely successful. The number of users has increased to more than 30,000, as shown in Figure 3, with user satisfaction running at 95 percent.
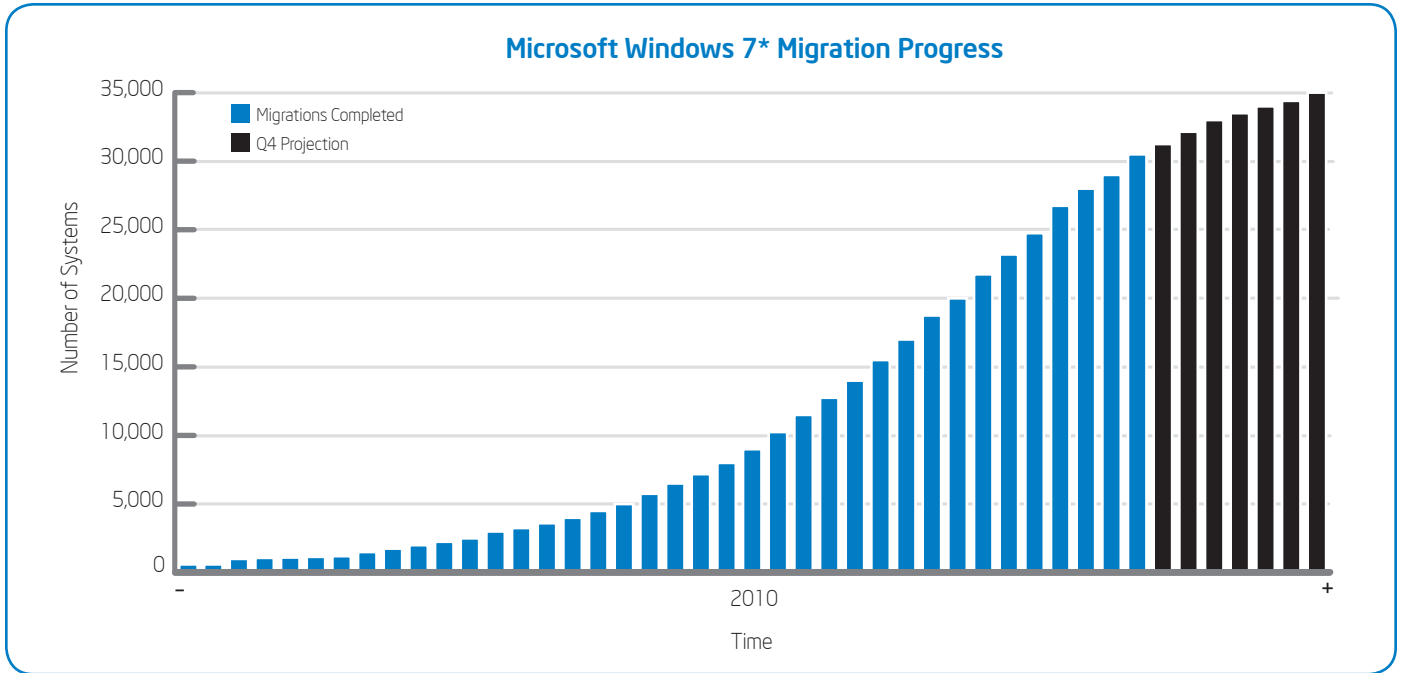
Figure 3. Enterprise-wide deployment progress.

We are using a number of approaches to further increase success and user satisfaction, including follow-up surveys. If users are experiencing issues, we take steps to fix the problems and contact users where applicable workarounds are in place.

## Next Steps

Our biggest challenge is meeting demand from business units. We expect to end 2010 with approximately 35,000 users on Microsoft Windows 7; however, user demand and supporting productivity data have resulted in a decision to accelerate enterprise deployment with the goal of completing it in 2011, a year earlier than originally planned. To achieve this goal, we need to upgrade about 40,000 mobile business PCs and 15,000 desktop systems in 2011.

### 2011 MIGRATION STRATEGY

Our goal is to drive greater efficiency, enabling us to do more with less, while continuing to focus on the user experience.

**Mobile Business PCs**

Planned delivery methods and scenarios are described below. In 2011, we are planning to migrate a significant number of users with each method, as shown in Figure 4.

- **Full-service PC refresh and OS migration.** We plan to migrate a significant number of users by combining PC refresh with Microsoft Windows 7 upgrade. This is the most efficient delivery method and generates the greatest value for users by providing them with a new PC with an Intel SSD as well as Microsoft Windows 7.

- **Self-directed migration.** We anticipate that many users will either take advantage of the self-build capability or have the support desk initiate a build on their behalf

- **Site-wide and intact team migrations.** We expect to apply these methods to migrate a substantial number of users.

- **Upgrade during PC repair.** When users come into on-site labs, we can take the opportunity to upgrade them to Microsoft Windows 7.
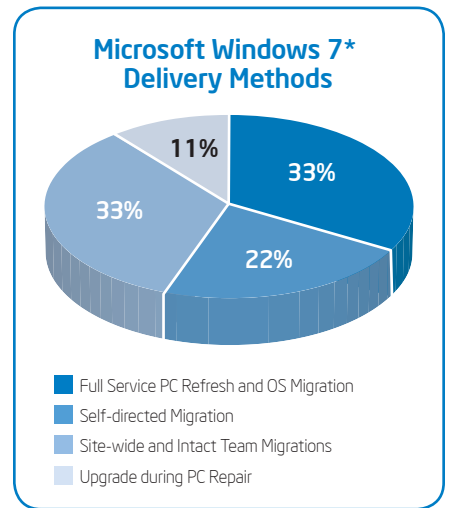
## Desktop PCs

We will be exploring the opportunity to migrate all desktop PCs remotely using Intel vPro technology. For shared PCs, such as those used by technicians in clean rooms, we will be looking into initiating builds remotely and simultaneously migrating all desktop PCs within the designated area. Users who have dedicated desktop PCs will initiate the upgrades themselves.



Figure 4. In 2011, we expect to migrate approximately 55,000 systems using a number of successful delivery methods.

## CONCLUSION

**We developed processes to enable rapid deployment of Microsoft Windows 7 across a very large enterprise environment.**

Our experience has provided several best practices, including:

- Application readiness is typically the critical factor determining when migration can take place. Appropriate planning, prioritization, and allocation of resources and time are essential.

- Deploying PCs that include Intel vPro technology, Intel SSDs, and Microsoft Windows 7 provide complementary benefits, including significant productivity gains.

- One size does not fit all. Multiple migration methods are required to successfully execute a large enterprise migration plan.

To date, our approach has proven extremely successful, resulting in high user satisfaction and measurable productivity benefits. A key success factor has been deployment of Microsoft Windows 7 on new PCs with Intel Core i5 and Intel Core i7 vPro processors and SSDs. Strong user and business unit demand, as well as the benefits to date, are compelling us to accelerate migration with the goal of deploying to the majority of users by end of 2011.

## FOR MORE INFORMATION

**Discover other white papers and briefs about Intel's migration to Microsoft Windows 7.**

- "The Value of PC Refresh with Microsoft Windows 7*." http://download.intel.com/it/pdf/The_Value_of_PC_Refresh_with_Microsoft_Windows_7.pdf

- "Enterprise Security Benefits of Microsoft Windows 7*." http://download.intel.com/it/pdf/Enterprise_Security_Benefits_of_Microsoft_Windows_7.pdf

- "Remediating Applications When Migrating from Microsoft Windows XP* to Microsoft Windows 7*." http://download.intel.com/it/pdf/Remediating_Applications_When_Migrating_From_Microsoft_WindowsXP_to_Microsoft_Windows7.pdf

### ACRONYMS

| | |
|---|---|
| CSI | critical success indicator |
| SSD | solid-state drive |

**For more information on Intel IT best practices, visit www.intel.com/it.**