ACCELERATED WINDOWS 7/8 DEPLOYMENTS WITH 1E
## Contents

3  The Business Problem
4  Overcoming The Challenges of Windows Migration

6  Optimizing Windows Migrations
   Application Rationalization
7  Preparation - Where Do We Stand With Our Current Client Base?
   Content Distribution - Do We Have The Infrastructure to Support an OS Upgrade?
8  Scheduling and Initiating a Windows Migration - What is The Best approach?
   How Do We Deploy Our Standard Windows Image to New Systems?
9  How Are Additional One-off Software Installations Handled After a System is Migrated to Windows 7 or Windows 8?
   Optimization and Reducting Costs: Where 1E Fits In

10 Application Mapping
12 Application Mapping - 1E Style
13 Application Mapping Based on Usage

14 Content Distribution
15 Peer Backup Assistant
16 PXE Everywhere

17 Initiating The Migrations
18 Application Reinstallation

19 User State Migration
20 Temporary Data Storage
   Hard-link Data Store
21 SCCM State Migration Point (SMP)
22 Network Share
   User State Migration

24 How Can 1E Help?
25 Project Approach
28 Technical Solution
   Application Rationalization
   Application Remediation
29 Image Engineering and Automation
   Infrastructure Design and Deployment
30 Personality Migration
   Hardware Provisioning
   End-user Training

31 Summary
The Business Problem

Systems Management content (i.e. user applications, server applications, system and software updates) continues to grow in size and with many organizations now also looking to deploy Windows 7 or Windows 8 as part of their migration from XP, this problem is even bigger.

Given its sheer scale and complexity, a Windows deployment can be one of the most painful, costly and time-intensive IT projects today. There is an undeniable impact on the network, and striking the right balance between a successful and fast migration and not disrupting the flow of business data, yet ensuring that the right software applications are installed, are key considerations IT departments have to take when embarking on such a project.

Typical Operating System (OS) content includes core images, boot images, driver packages and software packages, and whereas a base Windows XP image was around 800 MB in size, after performing a system capture and including only the latest service pack, a comparable base Windows 7 Enterprise x64 image including only the service pack is around 2.6 GB in size.

The challenge is not just about moving larger volumes of data. Network speeds (WAN and LAN) are growing at a much slower rate than content and are being used for more purposes than ever, which means it takes longer than it used to in order to deploy this content in the enterprise.

Users are also becoming more sensitive to network speed/quality which means that you cannot just push data down the network as fast as you might like, as to do so risks congesting the network. Most business applications are in constant use and therefore require efficient network usage and data transfer, so these are prioritized over system management content. The network needs to adjust according to business needs, but conversely there are also many critical IT projects that enable the organization to function and move forward. The challenge is how to prioritize network usage.

The OS deployment process can also be costly and time-consuming from an application provisioning perspective when trying to transfer content to remote locations and automating the migration process. You do not want to have to back up user data across the network during the migration process or deal with network configuration and traffic when making Preboot eXecution Environment (PXE) requests for bare metal system builds. You also don’t want to be provisioning applications where they are not needed.

The 1E approach is to extend and enhance Microsoft System Center Configuration Manager (SCCM) and at the same time reduce and simplify its infrastructure and operational costs. This approach pays instant dividends, in reducing the time and business disruption created by a mass OS migration project, and also in building an optimized on-going systems management platform to serve the business IT needs into the future.
Overcoming The Challenges of Windows Migration

The biggest single concern raised during any OS migration project is the elapsed time it takes and the associated impact and cost to the business. 1E’s Zero-Touch Windows Migration solution suite has helped some of our largest customers achieve phenomenal deployment statistics.

For example, in early 2012, a large telecommunications provider was able to:

- Migrate approximately 80,000 systems in only four months
- 30,500 of those systems were migrated in just one month
- This was an average of 1,000 to 1,500 systems per day

Traditional Migration
90% of OSD tasks automated on all PCs requires 100% desk side visits

1E Migration
100% of OSD tasks automated on 90% of PCs and 90% of OSD tasks automated on the remaining 10% only requires 10% desk side visits

TYPICAL AUTOMATED TASKS
• Backing up and restoring user data
• Pulling over previously used applications
• Customizing system depending on user role

= 100% Desk side visits

$100+ Per visit

= 90% Desk side visits

90% Quicker
90% Cheaper
The 1E solution suite uniquely has the ability to achieve this sort of rapid, highly-optimized OS deployment because of the following main features:

- **Flexibility and agility**: to cope with the increasingly complex and diverse infrastructure scenarios, such as smaller satellite and server-less office locations as well as maintaining systems after hours.
- **Speed**: the deployment toolset needs the ability to deliver extremely large amounts of content and data, without disruption to business applications. This is practically impossible without the Reverse QoS technology built into 1E’s technology.
- **End-user empowerment**: 1E’s web portal allows end users to drive and control their own migration at a time and day of their choosing. This minimizes disruption to the working day and removes administrative overhead from the IT team.
- **Cost optimization**: accelerating the deployment timeline reduces impact and therefore the inherent disruption and cost to the business. A streamlined infrastructure and fully automated deployment technology and process, reduces direct IT costs and software waste. 1E’s ability to provide instant visibility into software usage can bring immediate value.
- **Risk mitigation**: the extended time and manual effort involved in an OS migration inevitably introduce more risk and potential pain. 1E has the process and toolset needed to be able to mitigate these. 1E’s content distribution can also be used to increase the security of users’ data.
ACCELERATED WINDOWS 7/8 DEPLOYMENTS WITH 1E

Combining different 1E solutions – AppClarity, Nomad, Shopping and WakeUp – provides organizations with a toolset that will optimize Windows 7 or Windows 8 deployments in the most cost-effective way and ensure there is no disruption to the business. Below we look at a typical OS deployment process, the issues you need to consider at each stage, and how these 1E solutions address those issues.

Application Rationalization
Many organizations struggle with the question of which applications to include on the base system they are deploying.

• Do we deploy what was there before? If so, do we upgrade to the latest version and how do we map each of the old versions to the new one?
• Should we deploy every line of business application a department typically uses, and do we have the licenses to cover all of them? If not, how do we determine who is actually using which application so that we don’t have to purchase additional licenses?

Each of these questions can require extensive research and gathering of data so an accurate assessment can be made. The amount of time to gather and analyze this data can be extensive.

Many organizations are faced with having to spend far more than was originally planned on additional software licenses to avoid the risk of lost user productivity or license violations, because they do not have an effective way of determining what software they need to deploy to each system.

1E’s AppClarity makes the extensive data available in your SCCM database consistent and usable, providing actionable reports with the answers you need. This includes not only which products are deployed and where, but how they are used (or not).
Preparation – Where Do We Stand With Our Current Client Base?
Many organizations have desktop management systems in place, but do we know if those systems are reporting accurately? Are we actually seeing all of the workstations in our inventory? How do we know if a workstation isn’t reporting properly? Are all of my systems capable of supporting Windows 7 or Windows 8?

Not having accurate information about your environment could mean that a number of systems are being overlooked or having problems accepting the upgrade. This could lead to a workstation not being upgraded with the others in a department on schedule. As a result of even just a few systems being overlooked, a department or office could experience a loss in productivity until the situation is rectified.

Content Distribution – Do We Have The Infrastructure to Support an OS Upgrade?
With the increase in data connectivity options, many organizations have opted not to place servers in remote offices, since users can access resources in the data center with reasonable latency or delay. However, when it comes to upgrading the OS and applications on multiple remote PCs, the volume of data that needs to be transferred could easily saturate an otherwise robust WAN link for days. The result is limited connectivity to the data center which could impact productivity at the remote office.

1E’s Nomad runs on client computers, intelligently pulling content only once over the WAN link and then providing this content to peer computers. The large Operating System content is downloaded ahead of time so that it’s ready when the OS migration process is initiated. The content is available on multiple user computers and dynamically served from whichever computers are available when the process is executed.
Scheduling and Initiating a Windows Migration – What is The Best Approach?
An OS deployment can take some time to complete. Trying to schedule a deployment to a department or office while minimizing the impact to end-user productivity can be a challenge.

Desktop systems are typically migrated after hours, but this can present another challenge. How can we ensure that end users leave the workstations switched on so we don’t miss anyone? How do we handle laptops that may not be in the office overnight? Can we give our users more control so they can initiate the upgrade when it fits their schedule?

1E’s Shopping is a web portal that allows the users to schedule the migration of their computer at the time that is right for them. No administrator intervention is required, although you can easily enable an approval process if needed. The user can not only provision the Operating System but also a selection of relevant applications and other resources for their upgraded system.

How Do We Deploy Our Standard Windows Image to New Systems?
Many organizations will have new systems shipped to a depot location, unpack them, apply the new OS image, then repackage and ship them out to a remote office. This requires additional time, resources and shipping expense. Other methods include shipping stand-alone bootable media out to remote server-less offices, but this can quickly turn into a management headache – tracking and keeping the media up to date. The ability to ship systems directly to remote offices and deploy them with minimal IT staff and skillsets on site could provide significant savings.

Automatic installation of a new Operating System on new hardware is readily enabled by ordering the new computers with the setting to boot via PXE to a network provisioning service. However, the infrastructure to support booting such “bare metal” out-of-the-box systems is not normally available in remote offices and requires a PXE server infrastructure to be in place on site.

PXE Everywhere, included with Nomad, dynamically provides PXE services from peer clients on the same network. The Operating System installation process is automatically initiated without any local servers or complex network router changes.
How Are Additional One-off Software Installations Handled After a System is Migrated to Windows 7 or Windows 8?

Often there are several software packages that end users use day to day that are not business critical but improve productivity. Many times these products were installed over the course of time through individual service desk requests and are not typically included in a Windows migration.

However, they do play a role in end-user productivity. How do we allow users to request these one-off software packages without overwhelming the service desk after a department or office is migrated to the new version of Windows?

Shopping can also allow the users to initiate the installation of these applications as needed, whether it’s minutes or months after the upgrade. And the installations often start within minutes, ensuring that users have the software they need when they need it.

Optimization and Reducing Costs: Where 1E Fits In

All of the 1E product solutions reduce deployment time as well as direct costs. Nomad content distribution reduces the number of servers and desk-side visits, while Shopping accelerates the deployment schedule and helps reduce the burden on the IT help desk. AppClarity immediately identifies and accurately quantifies software waste. As part of an OS migration, AppClarity provides the accurate information to allow you to retire, replace or upgrade additional software applications, streamlining the environment and reducing software waste and costs.

The Solution Set

<table>
<thead>
<tr>
<th>SERVICES</th>
<th>SHOPPING</th>
<th>APPCLARITY</th>
<th>NOMAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automation:</td>
<td>Collapse the deployment timeline</td>
<td>Consumers select the apps they need</td>
<td>Fewer servers needed</td>
</tr>
<tr>
<td>Eliminate desk visits</td>
<td>Then decide when to start the OS migration and app delivery</td>
<td>Only migrate apps that are required now</td>
<td></td>
</tr>
<tr>
<td>Reduce the burden of IT Help Desk</td>
<td>Remove legacy apps</td>
<td>Rapidly deliver larger amounts of content</td>
<td></td>
</tr>
</tbody>
</table>

Automation
- Fewer servers needed
- No disruption of business traffic
- Rapidly deliver larger amounts of content
ACCELERATED WINDOWS 7/8 DEPLOYMENTS WITH 1E

Application Mapping

The process of identifying and reinstalling the user’s application set can be automated. Conceptually, this is accomplished by identifying relevant applications in the old system’s inventory and translating, or “mapping”, them to an SCCM package and program. This process is often referred to as “Package Mapping” or “Application Mapping”.

In fact, the Microsoft Deployment Toolkit has included a little-known application mapping solution since it original release (BDD 2.5). Variations of the original solution can be found on various public internet blogs; all use some form of string comparison to match Add/Remove Program entries to SCCM packages and programs.

At the center of the process is a custom table, populated by an administrator, containing inventoried applications display names in one column and SCCM package IDs in another. A sample of what this Package Mapping table may look like is below.

The potential time savings from automating this aspect of personality migration has an obvious appeal, especially when planning a large-scale migration; but application mapping can do more than save time. Firstly, application mapping can be used to install the latest version of a particular application.

In the following example, installations of Project Professional 2007 are automatically upgraded to Project Professional 2010 during the migration. Secondly, this process can rationalize and reduce the size of the organization’s software portfolio. Again referring to the following table, installations of WinZip and jZip will be replaced with 7-Zip at deployment.

Sample Package Mapping (Table 1)

<table>
<thead>
<tr>
<th>ARPName</th>
<th>Packages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Office Project Professional 2007</td>
<td>CEN00011:Install Project Pro 2010</td>
</tr>
<tr>
<td>Microsoft Project Professional 2010</td>
<td>CEN00011:Install Project Pro 2010</td>
</tr>
<tr>
<td>Microsoft Office Project Professional 2010</td>
<td>CEN00011:Install Project Pro 2010</td>
</tr>
<tr>
<td>Microsoft Office Visio Professional 2007</td>
<td>CEN00022:Install Visio Pro 2010</td>
</tr>
<tr>
<td>Microsoft Visio Professional 2010</td>
<td>CEN00022:Install Visio Pro 2010</td>
</tr>
<tr>
<td>7-Zip 9.20</td>
<td>CEN00033:Install 7zip 9.20</td>
</tr>
<tr>
<td>WinZip 10.0</td>
<td>CEN00033:Install 7zip 9.20</td>
</tr>
<tr>
<td>WinZip 12.0</td>
<td>CEN00033:Install 7zip 9.20</td>
</tr>
<tr>
<td>jZip</td>
<td>CEN00033:Install 7zip 9.20</td>
</tr>
<tr>
<td>Adobe Acrobat 8.1.3 Professional</td>
<td>CEN00044:Install Acrobat Pro 8</td>
</tr>
<tr>
<td>Adobe Acrobat 8.1.4 Professional</td>
<td>CEN00044:Install Acrobat Pro 8</td>
</tr>
<tr>
<td>Adobe Acrobat 8.1.5 Professional</td>
<td>CEN00044:Install Acrobat Pro 8</td>
</tr>
<tr>
<td>Adobe Acrobat 8.1.6 Professional</td>
<td>CEN00044:Install Acrobat Pro 8</td>
</tr>
<tr>
<td>Adobe Acrobat 8.1.7 Professional</td>
<td>CEN00044:Install Acrobat Pro 8</td>
</tr>
<tr>
<td>Adobe Acrobat 9 Pro - English, Français, Deutsch</td>
<td>CEN00055:Install Acrobat Pro 9</td>
</tr>
</tbody>
</table>
Application mapping can add significant value to a Win7 migration, but this approach to the problem can introduce new challenges and complexities. The default application mapping rule is to install nothing, meaning that every application to be reinstalled during deployment requires an entry in the PackageMapping table. Any product that does not match a PackageMapping table entry will not be reinstalled.

For an enterprise managing hundreds or thousands of software titles, populating and maintaining the PackageMapping table may be a daunting and lengthy task. Also, the process relies on raw, un-normalized SCCM inventory data. Any variation in display name for a particular product must be identified and manually added to the PackageMapping table.

In the preceding PackageMapping table, five variations in the display name for Adobe Acrobat Professional 8 exist in the environment, therefore requiring five separate Table entries. Any overlooked display name variants for this product not listed in the Table will not be reinstalled at deployment. By far, the most significant drawback with this solution is that, by implementing it, the organization implicitly forgoes a rare and prime opportunity to rationalize software usage and reduce software maintenance costs.

When applications are automatically reinstalled based on their presence in the system’s inventory, there is no opportunity to question if the user still needs the application, or consider if a less expensive alternative may suit the user’s needs. The result is a costly, inefficient allocation of licenses and unnecessary application bloat.

Lastly, all the SCCM packages mapped using this process must be installed during task sequence execution. This prevents the use of application mapping to install software with interactive installation programs and those packaged to install via a task sequence.
Application Mapping - 1E Style

1E consultants bring a powerful application mapping solution that combines AppClarity’s application inventory and normalization capabilities with Shopping’s OSD features (see Table 2). Here applications are identified in AppClarity’s inventory by their ID and mapped to software titles available in Shopping’s software catalog. How applications are mapped is controlled via an administrator-defined rule set.

The default mapping rule is to reinstall the same version of an application. Items in Shopping’s software catalog that have been linked to items in AppClarity do not require mapping rules to have the application automatically reinstalled. In the following example, installations of Project 2010 are automatically reinstalled, even though Project 2010 is not referenced in the mapping table. Creating and maintaining custom mapping rules is also more precise, simpler and less prone to oversight. The example in table 2 produces the same result as the example in table 1, but with fewer entries. Instead of matching products by name, they are matched to the AppClarity ID number. Furthermore, products are linked to normalized data in AppClarity; meaning that a single ID number represents any subtle variants in the product’s display name to a single release. For example, where the traditional application mapping solution requires five table entries for Adobe Acrobat 8 (one for each of the variants in its display name), the 1E solution only requires one.

<table>
<thead>
<tr>
<th>AppClarity ID</th>
<th>Source Product Name</th>
<th>Release</th>
<th>Usage</th>
<th>Target AppID</th>
<th>Target Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>16543</td>
<td>Project Professional</td>
<td>2007</td>
<td>Used</td>
<td>55</td>
<td>Project Pro 2010</td>
</tr>
<tr>
<td>16543</td>
<td>Project Professional</td>
<td>2007</td>
<td>Potentially Unused</td>
<td>68</td>
<td>Project Viewer</td>
</tr>
<tr>
<td>16543</td>
<td>Project Professional</td>
<td>2007</td>
<td>Unused</td>
<td>NULL</td>
<td>NULL</td>
</tr>
<tr>
<td>27654</td>
<td>WinZip</td>
<td>10</td>
<td>--</td>
<td>77</td>
<td>7-Zip 9.20</td>
</tr>
<tr>
<td>27518</td>
<td>WinZip</td>
<td>12</td>
<td>--</td>
<td>77</td>
<td>7-Zip 9.20</td>
</tr>
<tr>
<td>42140</td>
<td>JZip</td>
<td>1</td>
<td>--</td>
<td>77</td>
<td>7-Zip 9.20</td>
</tr>
<tr>
<td>11877</td>
<td>Acrobat Professional</td>
<td>8</td>
<td>Unused</td>
<td>NULL</td>
<td>Do not reinstall</td>
</tr>
<tr>
<td>11932</td>
<td>Acrobat Professional</td>
<td>9</td>
<td>Unused</td>
<td>NULL</td>
<td>Do not reinstall</td>
</tr>
</tbody>
</table>
Application Mapping Based on Usage
The ability to reinstall an application, or not, based on its usage is what really sets the 1E solution apart. Adding usage to the mapping criteria offers the organization an opportunity to reclaim or clean up licenses that may not be in use. Referring to the example above, on client systems where Acrobat Professional 8 and 9 are installed but not used (“Unused”), the software is not reinstalled during the migration and these unused licenses are reclaimed.

AppClarity identifies three categories of usage for every application: used, potentially unused and unused. 1E’s application mapping solution gives administrators the opportunity to create rules specific to each usage category.

For example, frequent users of Project Professional 2007 would receive an upgrade to Project Professional 2010, while occasional Project users receive a free Project viewer. Finally, for those who haven’t used Project in quite some time, no application is installed. Not only can the organization save time and improve end-user satisfaction by automatically reinstalling user applications for them, software can be systematically rationalized and reduced in the process.

Applications the user no longer needs, as determined by usage, are removed during the OS migration. License upgrades costs are reduced, as is the annual license maintenance fee and existing licenses are efficiently allocated to those who need them. For many, this type of internal software audit could take years of effort to complete, but with the 1E approach to OS migration, it is just part of the migration.

LEGACY OS BUILD | 1E ANALYTICS | NEW WIN 7 STANDARD
---|---|---
Adobe Photoshop CS5 | Adobe Photoshop CS6 ($500) | Used
Do not install | Paint.NET (Free) | Rarely used
AppClarity & Shopping | Windows 7 | Unused
Windows 8
ACCELERATED WINDOWS 7/8 DEPLOYMENTS WITH 1E

Content Distribution

There are several ways to go about solving the problem of deploying large volumes of content. One way is to simply increase the network bandwidth to the maximum that is available, however this is a very costly approach and often not very practical (i.e. satellite networks). Another way is to place content distribution servers, known as Distribution Points, at every location throughout the network. This approach is also very costly in terms of hardware, software, power consumption and ongoing support and management. Nomad overcomes these limitations and costly approaches and provides several additional benefits.

An OSD process itself can be very costly and time consuming not only from an application compatibility perspective but also when trying to transfer the content to remote locations and automating the migration process. This includes having to back up user data across the WAN during the migration process but also having to deal with network configuration or traffic when doing PXE requests for bare metal system builds.

Nomad 2012 reduces the network impact by automatically prioritizing business applications and backing off through its unique Reverse QoS™ networking technology. Reverse QoS ensures that IT traffic automatically backs off content distributions – for instance in an OSD scenario – when business applications need network resources. It does this by looking at how packets of data traverse the WAN and regulates the bandwidth to remote branch locations via an autonomic throttling system.

Nomad also eliminates the need for servers as client systems can automatically hold local elections to determine a single representative to pull this data across the WAN and has dynamic failback methods built in to ensure successful deployments. This can be done on each subnet at a location or the Nomad clients can coordinate across subnets.

Combined with eliminating the need for more network bandwidth or traditional QoS configurations, Nomad 2012 lessens the overall administration for SCCM tasks. In addition to the network throttling that Nomad 2012 controls, it also has automation tools integrated into the Task Sequence engine of the OSD process to allow for less administration and more success around keeping data local to branches so that the network isn’t impacted when user data needs to be backed up during the migration process.

Nomad 2012 contains a Peer Backup Assistant which seamlessly offloads user data locally and securely without crossing the WAN link so that OS migrations complete faster and do not take down the network.

Finally the PXE Everywhere component of Nomad 2012 allows any client system to boot from another without any network configuration, traffic or impact as it allows peer PXE-booting locally on client subnets without servers and without external network communications.
Peer Backup Assistant is a feature of the Nomad 2012 client by which clients can provide a temporary migration storage location for their Nomad peers. Leveraging the available storage on peer computers avoids the need for additional server infrastructure or storage while minimizing local network traffic and possibly WAN usage. Again, 1E consultants recommend the use of hard-link storage whenever possible, but for those scenarios that preclude hard-link data migration, Peer Backup Assistant offers a viable and manageable alternative.

We typically recommend Peer Backup Assistant to:

- Support user state migration at locations with no server infrastructure
- Avoid provisioning additional servers or server storage to support user state migration
- Eliminate the need for temporary deployment infrastructure
- Avoid the additional overhead of managing network share storage and security (see the proceeding section).

Peer Backup Assistant integrates with existing OSD task sequences. The source computer locates peer computers by broadcasting a request to the local subnet. Peer clients can broadcast on their subnets for additional peer computers. Peer Backup Assistant-enabled hosts respond to the request and elect the most suitable candidate based on a number of relevant factors. The elected peer host then creates a share to store the user state data and informs the requesting client of its location. User and state data is then captured and transferred to the peer share and secured. If desired, the elected peer can also push the backed up user and state data to additional peer clients in order to provide redundancy. Later, when deploying the target system, the user and state data is restored from one of the Peer Backup Assistant hosts.

The Peer Backup Assistant feature provides administrative controls similar to an SCCM State Migration Point including:

- Peer Backup storage allocation
- Automatic selection of suitable Peer Backup host based on available disk space and current Peer Backup storage consumption
- Data retention period
- Limit the number of concurrent peer backup shares in use (to prevent any impact to the user of the peer computer).

SCCM computer associations can be used to define and manage the association between old and new systems, but their use is not required. When created, the Peer Backup Assistant store is simply assigned a name. The same Peer Backup Assistant name is used later to locate the share. This eases the process of associating old and new computer hardware.
PXE Everywhere
Nomad’s PXE Everywhere capabilities allow peer systems to bare metal boot to each other and install an Operating System with no network configuration and no administrative effort. This can be done by enabling PXE Everywhere on the Nomad clients, allowing dynamic elections to take place to determine the best system to host the PXE process.

Additionally Nomad has full WinPE support which means that all the dynamic capabilities of Nomad for content location are part of your build process. With the WinPE support, Nomad can multicast in WinPE allowing for fast and/or large scale migrations to take place.

All of these OSD features, including the pre-staging of content at branch locations, are completed inside the native SCCM console as Nomad leverages the existing infrastructure completely.
Initiating the Migrations

The vast majority of companies will have some staff that may want to initiate their own Operating System deployments, while other organizations will have their OSDs scheduled by the IT department.

For the self-service option we recommend Shopping.

As described earlier, the installed application information can be sourced from AppClarity or via their previous Shopping history. The information is shown in the wizard and applications that are not compatible with the new OS can be filtered out or alternatives and supported versions provided. Shopping can provide true application license and lifecycle control from the point of migration.

Scheduling the time and date of the migration is extremely flexible. The available slots are set by an administrator who sets the start and end dates of the OS deployment project and the time blocks users can choose. This enables the administrator to control the migration as well as allowing users to select a time and date when it is convenient for them to upgrade.

Once the wizard is completed the migration is scheduled and the banner changes to display the migration time and three links, to edit or cancel the migration and download a reminder to their calendar. When the scheduled time arrives, an SCCM task sequence is activated and the user’s machine is effortlessly and automatically migrated to Windows 7 or Windows 8.
Application Reinstallation
Without software, a new Windows workstation offers little business value. The core build may include many core applications, but many users require specialty and line-of-business software to do their jobs. Ensuring the user’s important applications are available on day one prevents business disruption, maintains productivity and ensures end-user satisfaction. Despite its importance, this aspect of personality migration is often poorly addressed in many migrations.

Often user applications are manually installed post-deployment by a deployment technician. In some cases, the technician analyzes the inventory of the old computer, identifies the relevant applications and re-installs them one by one. In other cases, the deployment technician “interviews” the end user to identify the applications required. Even when applications are packaged for distribution with SCCM, such manual processes are time-consuming, inefficient, and prone to oversight and inconsistency.
In an enterprise client environment, rarely are any two client systems exactly alike. A user’s data, settings and installed applications will differ from its peers. In the hands of the user, the computer develops a unique configuration, or personality. This personality may be tied to the system’s primary user, multiple users or a specific business role. At the system level, the personality consists of files, registry entries and installed applications that deviate from the organization’s core build. Typically, personality is layered on top of the core Operating System, drivers and application layers.

Construction of this personality may be the result of significant effort from both the system’s user(s) and the IT support organization. Critical to user productivity and the organization as a whole, the OS migration must ensure the relevant aspects of this personality survive the migration intact.

Efficient, effective and automated personality migration requires the convergence of three distinct processes. The details of these processes will vary by the needs of the organization but nearly always center around the Microsoft Deployment Toolkit (MDT), User State Migration Tool (USMT) and one or more 1E technologies. 1E Professional Services consultants bring experience and best-practice guidance around each of the technologies employed in the process.

1E recommends the use of the hard-link migration data storage feature whenever possible. Eliminating the need to provision or manage intermediate storage coupled with significant time and network bandwidth savings make it an obvious and preferred choice.
Temporary Data Storage
User state migration with USMT requires a temporary storage location, or “State Store”. The requisite intermediate storage can be located on any local directory or remote file share where the system has write privileges. In a large-scale migration, rarely can a single intermediate storage strategy adequately address every deployment scenario. A typical OS migration will likely leverage a combination of one or more of the following locations:

- Hard-link migration store
- SCCM State Migration Point (SMP)
- Nomad Peer Backup Assistant (PBA)
- Network Share

Given the limitations of the alternatives, as outlined below, PBA is often a very attractive option. All the functionality and security that user state migration requires is available but not servers or complex setup, or the administration required.

Hard-link Data Store
The hard-link data store is a feature of USMT 4.0 that saves both time and disk space by creating a directory of hard links to the user files selected for capture. Rather than copying files selected for capture, USMT creates a hard-link to original files. Because files are not duplicated on the disk, the process consumes significantly less space and completes much faster.

Unfortunately, a hard-link data store can only be used when:

- The new Operating System is deployed to existing hardware, as with an in-place refresh migration.
- The new Operating System is to be deployed to the same volume as the existing Operating System.

Furthermore, the use of hard-link intermediate storage is further limited as it cannot be used in any of the following scenarios:

- User data needs to be migrated from one computer to another (such as in the Replace or a Side-by-Side deployment scenario).
- The disk must be repartitioned or reformatted during the migration.
- User data needs to be migrated from one volume to another.
- Where the hard disk is encrypted with a hard disk encryption system that does not support hard-links.
SCCM State Migration Point (SMP)
The State Migration Point (SMP) SCCM site role is designed to provide intermediate storage during OS deployment. During execution of the task sequence, an available SMP location where user state data will be stored is identified. Once the new OS is installed, the user state data is retrieved and restored from the same location. The state migration point offers an option for deployment scenarios that prevent the use of hard-link data storage.

More than just a file share, the SMP adds several features to improve the manageability and security of intermediate storage such as:

• Integration with SCCM task sequences using built-in actions
• Automated SMP selection based on SCCM site-system boundaries and available storage.
• Protects the privacy of user data by:
  - Encrypting the user state data during transmission and storage
  - Restricting access to state store
  - Automatic removal or “clean-up” of old and/ or “expired” state store
  - Additional controls to manage the amount of storage available for user state storage.

State Migration Points can perform their intended role well, but do introduce some inherent limitations and challenges:

• Requires the creation of a computer association between the source and destination systems prior to capturing user state.
  - In an SCCM 2007 multi-site hierarchy, this computer association must be created at the clients’ assigned site (not at the central site).
• User state cannot be migrated across primary sites (with SCCM 2007).
• Precludes the use of unknown computer support for replace deployments.
• May require additional server storage or additional site systems.
• The transfer of data to the SMP does not leverage any bandwidth throttling mechanisms such as BITS. To avoid WAN saturation, the SMP should be located near the target systems.
• Removing a computer association also removes the store’s encryption key and may result in loss of user data.

Please note: Depending upon its configuration, the presence of third party whole disk encryption may also prevent the use of the hard-link data store.
Network Share
A basic network can also provide intermediate user state storage by simply assigning a UNC path value to the OSDStateStorePath task sequence variable. Network share requires only provisioning the share with ample storage and properly configuring its permissions.

While simple to set up, this option can be the most difficult to administer and maintain. 1E consultants typically recommend this option only as last resort because it adds the following challenges:

- No method to automatically identify available network shares during task sequence execution
- In a distributed network, the provisioning and maintenance of multiple network shares is required
- The removal of aged and orphaned state stores requires development and maintenance of a separate process
- No method to identify when or if particular data stores were restored
- Potential privacy issues and challenges in restricting access to user state data
- No control of storage allocation.

Clients may attempt to store user data in a location that lacks sufficient storage.

User State Migration
User state migration is a two-step process by which the important files and settings present within the old OS are captured and saved to an intermediate storage location. Once the new operating system is installed, be it on existing or new hardware, the files and settings are restored to the new Operating System.

1E consultants use the User State Migration Tool (USMT) to accomplish this task. USMT integrates into the standard MDT task sequence template and includes the required logic to migrate the most commonly required items such as:

- My Documents
- Favorites
- Outlook profiles
- Network printer and drive mappings
- Office Settings
- And more.

USMT can significantly accelerate development and testing of the user state migration process. Migrating from Windows XP to Windows 7 or Windows 8 requires more than copying files and registry entries from one system to another as the location and configuration of these files and settings changes dramatically. USMT understands these differences and restores files and settings to their appropriate location. Also, the migration to Windows 7 or Windows 8 likely includes an upgrade to Office 2013. USMT understands the differences between Office versions and restores files, registry entries and application data as appropriate.
By default, USMT migrates a significant amount of data and settings from the old Operating System to the new. Configuring USMT requires a degree of diligence and caution to prevent migration of system settings that may overwrite those configured with Unattend.xml or Group Policy Preferences. (This problem may be especially acute in an environment where users have administrator privileges to their XP workstation.)

Also, the USMT rule set needs to be limited and managed to prevent the migration of irrelevant files that may unnecessarily bloat the size of the user state and increase overall deployment times.

Lastly, if any applications that require migration of user settings and/or data were identified during the application rationalization and remediation phase, custom rules will need to be authored and tested.

1E consultants bring the expertise and experience with USMT needed to maximize the efficiency of the user state migration process by offering best practice guidance as well as foresight into potential problems, pitfalls and issues involving the use of USMT. 1E consultants can assist in interpreting the default rule set, developing a customized rule set and developing a comprehensive USMT test plan that ensures the desired result is achieved in pilot and production.

Although USMT migrates the settings and data associated with some applications, it does not migrate the application itself. Additionally, in order to migrate application settings, such as those for Microsoft Office suite, the application must be installed prior to restoring user state.
How can 1E help?

In order to overcome the aforementioned challenges while meeting business and technical requirements, it is critical that a structured approach is used to manage the lifecycle of the migration. This can be achieved using defined project phases with checks and balances to ensure that the migration project delivers what it set out to do.

Using project management methodologies adds an additional layer of control which enables progress to be monitored against planned timescales, quality to be maintained and early resolution of issues.

Of equal importance is the overall technical quality of the solution which should be focused on requirements and designed to reliably migrate users to the new OS with the minimum of disruption to the business. However, underpinning everything, and ultimately the most important factor, is the need to do all of this while reducing deployment and operational costs.

1E consulting engagements adhere to the project framework described above and are targeted to reduce costs where possible. This is primarily achieved by increasing automation of the migration process to the maximum number of endpoints, thus, reducing the operational and administrative burden so that fewer manual tasks are required.

1E consultants use their technical knowledge and experience to obtain requirements and identify areas where infrastructure, planned migration tasks and expected disruption can be reduced. Solutions are then designed and engineered using best practice tools and techniques i.e. SCCM and MDT but also using 1E solutions to add further value.
Project Approach
In terms of the 1E engagement approach, the distinct project phases are: Assessment, Preparation, Pilot and Deployment. Each element can be delivered standalone, to give organizations complete freedom and flexibility, or delivered together to build into a comprehensive migration solution for the entire deployment project lifecycle.

Project management is required and used throughout all phases to control the complex nature of the tasks and includes activities such as: managing risks, ensuring resources are available when needed, progress tracking against milestones, ensuring quality, managing budget and reporting on status.

Assessment: The Assessment phase builds an initial justification, reviewing current Operating System deployment processes in addition to those focused around the migration project. Assessment components include: hardware readiness, current application usage, application compatibility testing, a technical infrastructure analysis, migration planning and training expectations.

Business and technical requirements will be gathered along with any pre-determined timescales, dependencies and known issues. The assessment concludes with a report detailing the key components for the Operating System migration, the timescales and likely costs involved and 1E’s recommendations.
**Preparation:** The Preparation phase commences with a bespoke design document built around the requirements gathered in the Assessment phase and focused on the infrastructure configuration of SCCM and MDT, along with a test plan to validate that the solution components meet these requirements.

The technical tasks are specific to the required deployment scenarios such as Bare Metal, Refresh and Replace. Such tasks may include: image engineering, driver management, user state migration; creation of processes to accommodate hardware, location or role specific configurations and definition of task sequences to capture and deploy the new Operating System build along with any line of business applications.

In addition, this may also incorporate 1E solutions where they add value, increase automation or reduce cost, e.g. to simplify the infrastructure requirements, identify unused applications and therefore reduce application compatibility testing or to empower the end user to control the time and components that are migrated across. By using automation to help ensure consistency, efficiency and accuracy, it is possible to minimize manual intervention, reduce costs and dramatically accelerate deployment timescales.

As best practice, all aspects of the solution should be validated in a test environment before proceeding to the pilot phase to enable knowledge to be transferred to internal technical teams and provide confidence to the business. A deployment plan should also be agreed for the Pilot and Deployment phases.
Pilot: The Pilot allows early adopters and defined areas of the business to be targeted with the new Operating System and provide feedback into the end-to-end process. The pilot group should be representative of the overall organization and include different types of users, in different types of locations using a diverse range of hardware.

The Pilot phase will repeat all of the required implementation tasks from the Preparation phase in order to build out and configure the technical infrastructure in the production environment. The test plan will again be used to validate the overall solution against the original requirements before moving onto the Deployment phase.

The final phase of the pilot is an in-depth review of the pilot migration, to ensure that the planned migration process worked as expected and that there were no unexpected scenarios. If required, the migration plan should be revisited with amendments made and further validation performed.

Deployment: The Deployment phase of the project extends the solution out to the entire organization. It is typical for 1E consulting to work as advisors during this phase to enable the customer’s technical personnel to become owners of the process whilst ensuring that the deployment goes smoothly.

In order to support the handover, training can be delivered to the customer’s administration and support staff based on the requirements originally identified in the assessment phase, complementing the technical skills transfer that has taken place throughout each of the previous phases.

Finally a joint project review is arranged to ensure that the migration project has met the technical and business requirements that were identified in the original assessment.
Technical Solution
In terms of the technical components of the project, 1E Consulting can help directly with these tasks or recommend partners to undertake specific elements. The level of technical work can vary significantly based on environment size and complexity; however the following categories provide a high level overview of expected work.

Application Rationalization
This activity provides an understanding of the effort and cost required to migrate existing applications to the new Operating System. All existing applications are reviewed and an assessment made as to whether they need to be deployed in the new environment or if cheaper alternatives are more appropriate.

At a high level, the typical tasks should include: identifying distinct applications including versions, filtering and removal of unwanted applications based on business needs, application categorization and application licensing status.

This activity can be daunting for even the smallest organization as information is often duplicated and in disparate systems.

1E Consulting engagements recommend the inclusion of AppClarity which is able to normalize this data and provide application usage information. This provides the ability to make decisions faster and reduce application compatibility tasks and licensing costs (as applications that are not currently being used will not be migrated to the new environment).

Application Remediation
This phase involves validation of all rationalized applications in a test environment for compatibility with the new Operating System. Applications are typically categorized as to their value to the business and prioritized accordingly.

Remediation tasks start with compatibility testing and include follow on activities if the application fails during validation. Depending on the importance to the business, remediation tasks may include application virtualization, hosting on a terminal server with optional thin client or virtual desktop infrastructure or legacy Operating System virtualization. 1E Consulting can recommend partners to perform these activities if required.
Image Engineering and Automation
Activities in this phase focus on the new Operating System image and layering the required applications and user settings. Building automation into these processes to deal with different deployment scenarios, types of users and computers will increase automation and reduce costs associated with manual tasks in deployment and operations.

Technical tasks focus on SCCM OSD functionality and include the creation of a boot image and reference image along with drivers for different hardware types. Task sequences are created for:

- The automated capture of the reference image
- The automated deployment of the image along with applications and user settings to target computers.

MDT can be used to determine what software and settings are installed and configured based on role, location or other defined variables and to provide a richer feature set for improved automation capabilities.

Infrastructure Design and Deployment
Infrastructure design and deployment focuses on the mechanics of deploying the new Operating System to improve success rates and reliability (and therefore reduce failures and the requirements for manual rework or site visits).

Typically this will include:

- Preparation tasks to ensure that the target computers are compatible with the new Operating System, including automated proactive client checks and administrative reporting.
- Management of content to ensure that all required source software is available in all locations. This may include methods for pre-staging critical content such as the Operating System image, boot image and drivers using the most reliable and efficient means, as well as creating logic in the deployment task sequence to control the migration based on the availability of critical content.
- Methods for initiating the deployment to cater for the required migration scenarios. Refresh and Replace are initiated via the SCCM client whereas Bare Metal requires PXE functionality to provide network boot capabilities.
- Configuration of tools to enable end-users to self-serve the migration, select the applications to migrate across and schedule when convenient for the end-user.

1E Consulting engagements recommend the inclusion of Shopping, AppClarity, Nomad and WakeUp to further increase automation, reduce administration and simplify the SCCM hierarchy through removal of specific site roles.
**Personality Migration**
Moving user data from the old to the new Operating System is often a high priority requirement. The ability to identify relevant business and personal settings in an efficient and highly automated manner and then apply for the different migration scenarios provides automation and flexibility.

Typically the technical activities in this phase use the User State Migration Tool (USMT) with additional settings defined in custom configuration files. Data is saved either to the local disk or to a server network location (depending on migration scenario) so that users do not need to carry out manual steps post migration.

1E Consulting engagements recommend the inclusion of Nomad, (where business value is defined), to enable user data to be saved to a local workstation peer instead of a managed server.

If Shopping and AppClarity are also used, this provides the ability for end-users to self-serve and map installed applications to the new Operating System based on current usage levels, e.g. used applications are automatically mapped however unused applications are not, with free or cheaper alternatives preferred.

**Hardware Provisioning**
Where new hardware is being deployed, activities are focused on a process that requires the minimum amount of desk-side administrative configuration. Zero-touch or light-touch processes are used depending on the requirements and technical infrastructure of the organization.

Technical tasks typically include provision of network booting and configuration of SCCM and MDT for inclusion of unknown computer support or a database of unique constants such as MAC address.

Task sequences used for replace scenarios may also include mapping functionality to link the old computer to the new in order to install applications and migrate user settings.

1E Consulting can assist with configuration of all OSD software elements and recommend partners to supply and provision hardware on the network.

**End-User Training**
The main objective in providing software training for end-users is to minimize productivity losses associated with the software transition.

In order to develop and target training effectively, it is necessary to assess the training needs of all users and select the most appropriate delivery methods and tools.

Typically the training program will consist of a combination of instructor-led and self-learning computer based training with product guides and videos. 1E Consulting can recommend partners to perform end-user training activities if required.
Summary

The 1E solution suite is proven to accelerate, automate and reduce risks for large scale Windows migrations. Our approach is to extend and enhance Microsoft System Center Configuration Manager (SCCM), as well as reduce and simplify its infrastructure and operational costs.

Success is achieved by the high level of automation and optimization of the software delivery process. This means a Windows migration project can be considered as Business As Usual, as it will not impact the business or need extra resource working on it. With the right preparation, companies can approach an OS migration project with confidence: from rationalizing and mapping applications to optimizing content distribution and empowering users to re-install applications and initiating their own deployments.

This approach pays instant dividends both in reducing the time and business disruption created by a mass Operating System migration project, but also in building an optimized, on-going systems management platform to serve the business IT needs into the future.

It’s also proven – we have helped a number of customers achieve impressive numbers, averaging 1000-1500 deployments in a single day.