Introduction
UM Flint IT asked UM Ann Arbor ITCS to provide assistance in answering a specific set of questions pertaining to migration from Novell Netware NOS to Windows 2000 NOS. These questions are addressed individually below in tabular format. Specific areas are broken out into their own tabular descriptions where appropriate to discuss them in greater detail. Discussions are limited to a pro/con presentation rather than recommending any one specific option over another. We do not make a recommendation for one NOS over the other. It is possible for UM Flint to migrate from Netware to Windows 2000. All current Netware functionality questioned by UM Flint IT can be duplicated in a Windows 2000 Active Directory environment with the addition of third party tools. This document addresses all of the questions posed regarding specific service compatibility between Netware and Microsoft Windows 2000.

Current Environment
Both Netware NDS and Microsoft AD are currently running. Netware is providing Directory, File, and print services. Active Directory is running to support Exchange environment.

UM Flint Initial Questions and discussion

<table>
<thead>
<tr>
<th>Question/Issue</th>
<th>Current Status/Detail</th>
<th>Potential Resolutions</th>
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<tbody>
<tr>
<td>Is Netware worth the continued cost?</td>
<td>$5000.00 annual</td>
<td>It is possible for UM Flint to replace it’s Netware infrastructure with a Windows 2000/Active Directory infrastructure. Windows 2000 Will do everything that Netware does in the current environment with the addition of third party tools. This is not going to be a straight up cost of NOS licensing decision. You must factor in:</td>
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<tr>
<td>Netware Pro</td>
<td>Netware Con</td>
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<td>• Training costs: already familiar with Novell.</td>
<td>• At this time there are fewer known security compromises of Netware servers.</td>
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<td>• Heterogeneous environment. Forced to manage and maintain two NOS infrastructures and their associated directories.</td>
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<td>• If Exchange remains as the MTA, a Directory synchronization mechanism is desirable. This is added complexity and overhead.</td>
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<td>Windows 2000 Pro</td>
<td>Windows 2000 Con</td>
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<td>• Provides unified homogeneous environment. Simplified management from a ‘parts count’ reduction standpoint.</td>
<td>• Maintenance and patching of Windows environments. A trained person must check regularly for security patch releases. They must then be applied in a timely fashion.</td>
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<td>• Windows 2000 has been subjected to numerous successful security exploits in recent history.</td>
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<td>• Cost of 3rd party tools to replace desired functionality not found in native Windows 2000.</td>
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<td>• Potential increase in cost</td>
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Will Netware Licensing continue and at what cost?  
Current fee $5000.00 annually.  
Licensing will continue for the foreseeable future. No changes are known at the time of this document for pricing.

| Initial list of Questions/issues with Windows 2000 from Flint IT |
|---|---|---|
| **Question** | **Detail** | **Discussion and Potential Solutions** |
| How to assign directory rights/permissions in an automated batch user creation process? | Flint uses a proprietary application that creates their Novell NDS user objects with correct group memberships and some communication with HR databases. They would like to know how to perform the same tasks in a Windows 2000 Active Directory environment. | There are several batch or automated user creation tools. See table *Directory synchronization and batch user management for Windows 2000.* |
| How does one use login scripts or the equivalent in a windows 2000 environment? | The are looking for a matching functionality to the Novell container login script. | Login scripts are associated via Group Policy. Login scripts can also be associated at the OU level. Additional tools like Kixstart can be used to add better control of command execution. [http://www.kixtart.org/](http://www.kixtart.org/) |
| Data migration assistance and planning. | Detail a plan for migration of data from the existing Novell file system to Windows 2000. Of primary Windows 2000 does not support native quotas as does Netware. You cannot limit a directory to a maximum size. Third party tools provide the ability to assign, maintain, and audit quotas. | • Wqinn Quota Advisor [http://www.wquinn.com/](http://www.wquinn.com/) (The college of LS&A on the Ann Arbor campus is using this solution in a manner similar to Novell’s folder limit.) |
| **Firewall replacement** | Currently run Novell Border Manager. Not functioning as a firewall per se. Rather it is used to force authentication to the NDS in order to use IP (http) services. Want to replace this in a Windows tool. | Microsoft produces the Windows ISA, Internet Security and Acceleration, server which may provide a direct substitute. You may also be able to prevent users from obtaining a DHCP assigned IP address if they fail to login to the AD Forrest. This accomplishes the same function as the existing firewall.
Consider using the firewall or perhaps multiple firewalls in a more stringent manner. For instance a correctly restrictive firewall could allow you to safely install and configure new machines online rather than offline.
Other choices for a firewall include
- **Open source**
  - OpenBSD running ipf or pf
  - Linux running ipf and ipchains
- **Commercial firewalls**
  - Checkpoint Firewall 1, Gauntlet, Nokia appliances, and a myriad of others.
Note any open source or commercial package may require modification in order to support the current port blocking strategy for non-authenticated users. |
| **Printing Issues** | No real concern on the part of Flint IT. Its an environmental change from the current Netware QMS system to Windows style printers. | NDPS, Novell Distributed Printing Services, are very similar to Windows shared printers in function. Both maintain and distribute drivers with only one associated printer object.
Flint currently uses a Windows NT based solution by Phaero to manage ‘for fee’ printing. This service can exist in either an NDPS or a Windows 2000 environment. |
Novell NDPS printing is very similar in function to Windows 2000 printing.

**Rollout strategy**
Flint IT would like assistance in developing a roll out strategy for deployment of the new OS. We can discuss this in short in the scope of this document but a complete plan is a project unto itself. See the *Imaging Strategy* table for reference on workstation image deployment.
- Choose an image deployment strategy
- Choose an application distribution/management mechanism.
- Build a test image inclusive of desired applications.
- Identify a pilot group for each different image.
- Deploy to the pilot group.
- Refine image and delivery mechanism based on feedback and experience.
- Rollout to logical groups in a managed fashion.

**Recover Deleted Files: replace Netware Salvage**
Flint IT is looking for a replacement to Netware Salvage. No good Windows Native tool. These are possible candidates but none of them are known directly by this group. They bear further examination:
- Undelete by Btsoftware [http://www.btsoftware.com/](http://www.btsoftware.com/)
- Rstudio Product Suite [http://www.r-studio.ca](http://www.r-studio.ca)
- FileRestore by Winternals [http://www.winternals.com](http://www.winternals.com)
- Undelete 2.0 by Executive Software [http://www.execsoft.com](http://www.execsoft.com) (Note this is a different product than the Btsoftware product.)

**Auditing**
Predominantly File system auditing. Currently use Netware filer to determine who created and who deleted files. See list of Recover Deleted Files above. These products provide information similar to Netware Salvage.

**Profiles/Policies**
Flint IT is interested in determining how best to Policies have changed markedly in Windows 2000. Either Active Directory or Zenworks 3.2+ can be used to administer policies and profiles.
There is no one answer to configuring profiles and policies. It will most likely be a mix of mandatory profiles in laboratory situations and potentially roaming profiles for staff users. The directory mechanisms differ in their management mechanism but either can be configured to work.

**Active Directory**
Group policies can be used to manage policy assignment by AD group membership.

**Zenworks**
Zen can administer both Group and local policies. Zen can also be configured to automatically remove all profile information on logout on a workstation running Workstation management.

We can discuss this at length in order to develop a reasonable strategy for UM Flint.

### Macintosh support for smb file service
Flint IT is interested in how to support Macintosh computers access to Windows 2000 file shares.

This is somewhat MacOS version dependent. If you are using MacOS 9.x or earlier:
- DAVE by Thursby Software is a Macintosh client application allowing access to Windows SMB Shares. [http://www.thursday.com](http://www.thursday.com)

MacOS X
- MacOS X supports some native smb access. See [http://docs.info.apple.com/article.html?artnum=106471](http://docs.info.apple.com/article.html?artnum=106471)

### Active Directory Layout
Flint is interested in how best to architect their AD Forrest.

DNS naming is critical in laying out the forest. ITCS Lan/NOS Services is able to discuss directory architecture with Flint IT.

Specific AD architecture references:

### Workstation Imaging Strategy

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<tr>
<th>Method/Tool</th>
<th>Description</th>
<th>Pro/con</th>
<th>Cost</th>
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</table>
| Ghost Drive Image Pro   | Hard Drive imaging solutions used in a standalone fashion.        | Pro
  - Simple
  - Fast
Con
  - Will require multiple images for                                    | Ghost by Symantec
Free for campus use via ITCS licensing. Version 5.1c
[http://www.itd.umich.edu/sw-](http://www.itd.umich.edu/sw-)|


| **Novell Zenworks for Desktops (ZFD) 3.x** | Different controller chipsets.  
- Not very efficient for image storage. | Drive Image Pro by Powerquest  
$20.00 per CDROM  
http://www.itd.umich.edu/sw-info/misc/powerquest.html  
See Licensing restrictions and requirements at the listed URL’s. |
|---|---|---|
| Novell workstation imaging product. Relies on NDS policies to control workstation imaging. | **Pro**  
- Tightly integrated w/ Novell NDS.  
- Can be hosted on both Netware and Windows based NDS installations.  
- Bundled with UM Netware license. | Included in Netware licensing agreement.  
http://www.itd.umich.edu/~lannos/novell/license.html |
| **Con**  
- Slower in local evaluation than Ghost imaging.  
- Server centric: service must run on defined servers. | --- | --- |
| **Sysprep by Microsoft** | Sysprep is a Microsoft utility used to run a mini-installer on a system that has been pre-imaged with Ghost, Drive Image Pro, or ZFD imaging. This tool integrates specific drivers into a generic build set allowing | Free Microsoft product. Available at  
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| **Pro**  
- Relatively small footprint. Small space requirements with no special services above file service.  
- Works from both Netware and Windows 2000 file service: no platform | --- | --- |
| **Microsoft RIS server (Remote Installation Services)** | one base image to function across several different hardware platforms. | dependance.  
- Straightforward and relatively easy to maintain.  
- Affords good flexibility in platform support.  
- Broad knowledge base at the UM. Many groups are using this product. | **Con**  
- Will not cross HAL types. An image made for ACPI compliant machines will not work on non-ACPI compliant hardware. |
| **Microsoft Unattended Installation (This is based on slip streamed installations.)**  
Microsoft Setup Manager | Technically elegant imaging solution. Runs only on a Microsoft Windows 2000 server. Manages images and conserves space by retaining pointers in images for duplicate files. It is of note that we have not used this service. We have only explored its capability from a reference standpoint. Technically it is appealing. | Free Microsoft Product. Requires a Windows 2000 Advanced Server with adequate storage.  
- Provides an efficient image storage platform. Pointers to like files reduce storage duplication. | **Pro**  
- Extreme flexibility in hardware support.  
- Excellent installation specific configuration information can be |
allow custom installation to accommodate nearly any hardware and software combination. ITCS LAN/NOS and the College of LS&A both use a mechanism based on this service on the Ann Arbor Campus.

| PC Rdist | http://www.pyzzo.com/pcrdist/ | Differential Windows platform management. Affords efficient maintenance of laboratory type machines. Rather than re-applying an entire image, it differentiates the existing load against a known standard image. PC Rdist in turn alters the installed image to match the master. Only the changed files are copied. | Pro | • Efficient differential maintenance copies or removes differences from a machine relative to a defined image. | Con | • Labor intensive. • Complicated system to maintain | http://www.pyzzo.com/purchase/t1price.shtml | 500 Node academic pricing: $4500.00 |

Directory Synchronization and Batch User management

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<tr>
<th>Product</th>
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<th>Pro/Con</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Novell DirXML</td>
<td><a href="http://www.novell.com/products/edirectory/dirxml/">http://www.novell.com/products/edirectory/dirxml/</a></td>
<td>Novell Directory synchronization tool. Affords extremely flexible rule based directory integration inclusive of MS Active Directory, Novell NDS, LDAP, and has an additional Peoplesoft module. This is the only tool with which UM ITCS has direct experience.</td>
<td>Pro</td>
</tr>
<tr>
<td>Tool</td>
<td>Description</td>
<td>Pro</td>
<td>Con</td>
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<tr>
<td>Fast Lane NDS Migrator</td>
<td>This is a directory migration tool. Based on available literature it is intended as a migration tool rather than a real time synchronization mechanism.</td>
<td>This tool is not currently well known to ITCS. It is included for reference.</td>
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<tr>
<td>NetIQ Netware Migrator</td>
<td>This is primarily an NDS to Active Directory Migration tool. It is not intended to maintain a synchronous state among directories.</td>
<td>This tool is not currently well known to ITCS. It is included for reference.</td>
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<tr>
<td>Aelita</td>
<td>This is primarily an NDS to Active Directory Migration tool. It is not intended to maintain a synchronous state among directories.</td>
<td>This tool is not currently well known to ITCS. It is included for reference.</td>
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<tr>
<td>addusers.exe by Microsoft Windows 2000 Resource Kit</td>
<td>Command line batch user creation utility. Can be used to create both local and remote accounts.</td>
<td>Simple tool for batch user creation from csv files.</td>
<td>Requires generation of csv file: not direct poll of HR database etc.</td>
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<tr>
<td>LDIFDE by Microsoft</td>
<td>Command line impor/export directory tool which may be used for batch updates to the directory.</td>
<td>Included in Windows 2000 Advanced Server</td>
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This tool was used in part to perform LDAP directory synchronizations to the MICHIGAN Forest in Ann Arbor.

| KB:EN-US:Q237677& | • Command line allowing for script implementation  
| | Con  
| | • Requires csv files for import. No direct database interaction with HR data.  
| | • Static requiring periodic nominally semi-manual updates.  

| Csvde.exe by Microsoft | Command line import/export utility provided for directory manipulation by Microsoft.  
| | See LDIFDE above.  
| | Included in Windows 2000 Advanced Server  