Sweet Dreams
ATT Online Training: Almost As Good As Being There

Novell online training is designed to help with a changing and challenging market. Our training is among the best in the field, and of our training options, the in-class experience is unrivaled. But given current economic conditions, traveling to one of the many training sites may not be feasible. Now with Novell Advanced Technical Training (ATT) Online, we bring our teachers, labs, equipment and even fellow students to you, all through a virtual environment that mirrors the classroom.

Through this training option, Novell brings classes to organizations and students that might have limited training and travel budgets. If your Internet connection allows, you can have the full training of one of the Novell on-site courses, even in the comfort and convenience of your own home. ATT Online Training is as good as being there!

At-A-Glance
Check out the downloads and links of additional resources that relate to this article.

- Click here to see the current listing of available ATT Online classes.
- Click here to get the latest information about the free multi-city Advanced Technical Training tours.
- Click here to install and launch the Elluminate tool. Click here to request a certain ATT Online class to be taught that is not on our current calendar.
- Click here to download the Novell Online Training Quickstart Guide.
- Click here to download the Elluminate Access Guide.
- Click here to download the ElluminateLive Student Guide.

> The Online Classroom
Novell has made tremendous strides over the past couple of years to mirror the classroom in a virtual world. We started with the goals of eliminating the need for costly travel, increasing our flexibility and extending the reach of our online training. Now you can have at home or work the same experience you would have if you attend a Novell training class in any city, or even on the Novell campus in Provo, Utah.

Much of the success of the online experience comes from using the ElluminateLive product to deliver our online courses. This program creates a virtual classroom that allows you to follow along as the instructors guide you through lectures, slide presentations and demos just as they would in a real-time classroom.

> Costs that Can't be Beat
Our online training makes particular sense in today’s challenging economic climate. As everyone is seeking to reduce expenses, you might find that traveling to Provo or to another onsite training seminar includes “added costs” such as airfare, lodging, food costs and car rental that might make this valuable experience cost-prohibitive for now. But you can have this training without the planning and external costs of traveling.

What began as shortened, half-day online training sessions has expanded to our offering full length ATT classes over the Internet. By clicking on the online tab at http://register.novell.com/listings/?id=60, you can review the classes currently on the calendar. For less than $600
a day, you can enjoy the full training experience without any extra costs—which is an incredible deal!

<table>
<thead>
<tr>
<th>Information</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online Half Day</td>
<td>$350</td>
</tr>
<tr>
<td>Online Full Day</td>
<td>$595</td>
</tr>
<tr>
<td>Online 2 Day</td>
<td>$1,195</td>
</tr>
<tr>
<td>Online 3 Day</td>
<td>$1,795</td>
</tr>
<tr>
<td>Online 4 Day</td>
<td>$2,395</td>
</tr>
</tbody>
</table>

Novell Online Training provides a convenient way to get a flexible solution for those of you who need nontraditional training. The training options can also be modular, which means that you can take just what you need to when you can fit it into your work schedule rather than having to take multiple days at once to make it cost-effective. Carefully planned online training sessions can also reduce the number of training days that might take you away from other important on-the-job work, so you can maintain your productivity while you’re in training. For example, it eliminates travel time to and from onsite training classes, which can often be two full days of minimal—if any—productivity.

As a result, the Novell ATT Online offering is flexible enough to meet your unique needs and schedules while at the same time allowing you to control—indeed lower—your training and travel budget.

> Other Online Training Benefits

In addition to the obvious cost benefits of online training, this training option also results in several other valuable benefits such as:

- **The best training available:** With ATT Online Training, you receive the same Novell ATT classes, the same instructors and the same content that is delivered live in the classroom on the Novell Provo campus or at another onsite training seminar. Our teachers are among the best in the field with plenty of first-hand experience “in the trenches.”

- **Flexibility:** Our classes are accessible anywhere you have a broadband connection, and we can accommodate any time zone and nearly every situation. Whether used for full-length classes or specific, shorter training sessions, ATT Online offers the same sessions online that are taught.
at ATT Live on the Novell Provo campus each December and at BrainShare. (Stay tuned for more information about the new city-to-city tours coming in the March issue of Novell Connection. Also, visit novell.com/tours to get the latest scoop.)

- **Extended reach**: Because an on-line class draws from students across the country and even across the world rather than a specific geographic region, there are fewer cancellations of scheduled classes because low registration numbers. For example, to hold an onsite training, say in Chicago, at least five students need to register for the class. Those students normally would come from that geographic region, which sometimes poses the problem of reaching the registration minimum. But with ATT Online classes, students from across the globe can register making it much easier to fill the minimum number of students for any given class.

- **Scalable class sizes**: While the extended reach around the world usually results in a typical class size of 18 students, we can scale them to fit your need. We keep the size small enough to have individual interaction with the instructor as well as with other students.

- **Specialization**: Because this training option draws upon students from many locations, it allows custom training for which Novell might not have sufficient numbers to offer training in a single geographic location. Conversely, because of the cost benefits noted above, this option can make specialized training that might not otherwise justify travel in this economy attractive to you or others in your company.

- **Custom Training**: In the past, Novell Training Services has always delivered high-quality, custom training for individual organizations at the customer's site. Without the need to send our specialists to you, anyone in your organization can now have the same individualized training that Novell has always delivered. Now it is just over the Internet rather than in a physical classroom.

These additional benefits, together with the cost-effectiveness of ATT Online, make it the most profitable delivery method for Novell training. Not surprisingly, this training option is resulting in sustained growth and
profitability as student numbers have increased and the costs—for Novell and you—are reduced.

Watch a short interview with the Director of ATT online. Click here to watch.

> Making the Most of Your Online Training
Check out the look and feel of the Novell ATT Online Training by viewing one of our recorded online classes at https://sas.elluminate.com/mr.inlp? suid=M.292DA538ECC01CD658A8234DE5787B.

Once you're convinced that ATT Online Training is for you, sign up and prepare for a great learning experience. Get ready by reviewing the electronic manuals that are made available prior to the class start date. Become familiar with the Elluminate tool so you can check your Internet connection, screen resolutions and other factors. Also prepare your personal learning environment so colleagues don't disturb your experience if taking the class at work or family members if you are taking the training at home.

With this modest prep, Novell is confident that ATT Online will give you one of your best, let alone one of your most affordable, training experiences ever!
Cheat Sheet
Get Your Training Tips from the Experts

If you've been keeping up on Novell news, you know that GroupWise 8 is now available, and it's worth the upgrade! eWeek.com recently highlighted the new release as one of its 2009 Products to Watch, noting its multi-platform support, user-customizable dashboards, and integration of e-mail, calendaring, contacts and task management with Web 2.0 collaboration tools to enhance user productivity. While the new installation program makes it easy to upgrade existing systems, you might want to bookmark the following tips from the Novell team that recently finished migrating its own 4,100 worldwide users.

Tip #1: Always update your primary domain first. This may seem obvious, but as the main administrative unit for the GroupWise system, the primary domain logically organizes all system post offices for addressing and routing purposes. And its database handles eDirectory user synchronization for the entire system. All updates must begin here.

Begin your update process by backing up the primary domain database. Next, run the GroupWise installation program and follow the prompts through the agent update. If installing on NetWare or Linux, the agents can remain running while the update is installed, but when updating a Windows system, the agents need to be shutdown first.

When the install has completed, restart the message transfer agent (MTA), which will use the newly installed data dictionary files to restructure the primary domain database. When the primary domain recovers, you can proceed with updating post offices under the primary domain or begin updating secondary domains. Note: You must update a post office's own domain before the post office itself.

When a post office is updated and its post office agent (POA) is restarted, the agent will use the new post office dictionary files to update the post office database. Like the domain, a post office update is not complete until you update the database and have completed the recovery process. Remember that users cannot access the post office while the POA is shut down.

When updating GroupWise on a Windows platform, take the POA down during a new code installation. The agent need not remain down, however, on any platform while the post office database recovers. Existing GroupWise clients can still access their accounts during this process, but you must complete the recovery before any GroupWise 8 clients can connect.

Tip #2: Don't sweat the Internet Agent update. Your existing GroupWise Internet Agent (GWIA) from GroupWise versions 5.x, 6.x and 7 will run successfully against a GroupWise 8 domain and post office. This means that you can continue to use it until all domains and post offices have been updated to version 8.

You can also update your GWIA to GroupWise 8 before the rest of the system as long as you don't use POP/IMAP to access mailboxes through the GWIA. If you do use POP/IMAP through the GWIA, you'll need to update all post offices first, as the agent in version 8 cannot talk to post offices in earlier releases.

Tip #3: Synchronize your domain, post office and WebAccess updates. Like the GWIA, the GroupWise 8 WebAccess Agent can't access earlier domains and post offices, and existing agents older than version 5.5 SP3 won't be able to access GroupWise 8 domains and post offices. In order to preserve WebAccess service while you update your system, keep the current version of WebAccess running until all post offices have been updated. If your domain and WebAccess services are on the same server, which is the recommended configuration, update the domain first. When the database recovery is complete, update the WebAccess Agent and Application.

You must update the WebAccess Application and Agent at the same time when starting with GroupWise 8. With previous GroupWise releases you could successfully run different versions of the WebAccess Agent and Application together, such as running a new version of the WebAccess Application on your Web server with the previous version of the WebAccess Agent for the domain. In GroupWise 8, the recommended procedure is to first update all WebAccess Agents in your system, then immediately update all WebAccess Applications. Long-term use of the mixed-version configuration is not supported and can result in time zone problems. Update both the WebAccess Agent and the WebAccess Application to the same version to ensure proper functioning of GroupWise 8 WebAccess.

Tip #4: The update sequence for MTAs and post offices is platform-dependent. If you have MTAs and post offices running on the same server, the update sequence depends on your operating environment. In Linux, you can update the MTA without taking down the post office. You can do the same in NetWare if you're running in protected memory. If not—or if you run GroupWise in a Windows environment—take down both agents. Bring up the GroupWise 8 MTA first and let it recover fully before starting the new POA. In all cases be sure to back up both databases before you begin.

If you have a large database that will take a long time to recover, use this workaround to expedite the process:
After updating, start both the MTA and POA. When the MTA has finished bumping to GroupWise 8, manually start the post office recovery by going into Options > Admin Status > Perform DB Recovery Now > Yes. This allows users to access their GroupWise accounts while the domain recovers.

**Tip #5: Don’t update clients until the post offices are done.** GroupWise 8 clients can’t access a post office that still uses an earlier version of GroupWise. Users who update to the GroupWise 8 client before their post office has been updated will not be able to access their post office.

**Tip #6: The ConsoleOne update process now varies by platform.** To administer GroupWise 8, you’ll need the new snap-ins for ConsoleOne. For a GroupWise system on NetWare or Windows, you can install ConsoleOne and run it either on a network server or on a local workstation. If you plan to use ConsoleOne on a local workstation, perform the GroupWise installation from that workstation.

For your convenience, ConsoleOne is included on the GroupWise 8 DVD and the downloaded GroupWise 8 image. The GroupWise Installation program lets you install ConsoleOne if needed. You can also use the GroupWise Installation program at a later time to install ConsoleOne and the GroupWise Administrator snap-ins on additional locations.

It’s important to note that for a GroupWise system on NetWare, you cannot run ConsoleOne to administer GroupWise at the NetWare server console. The GroupWise Administrator snap-ins to ConsoleOne do not run in that environment.

For a GroupWise system on Linux, ConsoleOne must already be installed before you set up your GroupWise system, and a separate installation process is required to update the ConsoleOne snap-ins on that machine.

> **See the Complete Documentation Online**

For detailed directions on upgrading your GroupWise system to version 8, see the online documentation at: http://www.novell.com/documentation/gw8/gw8_install/index.html?page=/documentation/gw8/gw8_install/data/a8sdpxb.html.

Good luck, and welcome to GroupWise 8!
SB storage devices have become as commonplace as car keys. In fact, many of you reading this article likely have a thumb drive hanging on your key ring. Of course, it doesn’t stop there. MP3 players, PDAs, DVD/CD burners, mobile phones and digital cameras all provide digital storage that makes life easier and more enjoyable for the masses, while at the same time creating a security nightmare for organizations.

By tying security policies to identity, ZENworks Endpoint Security Management gives you the flexibility to make sure that users have the access they need with the proper controls in place, no matter what endpoint they are logged into.

Businesses lose billions of dollars a year as a result of data theft, data loss and the accompanying costs associated with clean up and recovery. A major contributor to this liability is inadequate endpoint protection, especially as it relates to mobile devices and intentional and unintentional misuse of mobile storage technologies. As an administrator, you face a difficult dilemma: how do you implement the appropriate levels of security and control without impacting the productivity and agility your users need in regard to mobility and removable storage? Too often, endpoint security solutions sacrifice productivity for security, or vice versa.

To help you strike the optimum balance in protecting your organization's digital assets, while enabling the agility and mobility of your users, Novell ZENworks Endpoint Security Management differentiates itself in two key areas: how it implements and manages protection, and the multiple levels of protection it provides.

> Endpoint Protection Implementation and Management

A key differentiator for ZENworks Endpoint Security Management is that it lets you implement and manage your endpoint security policies based on user identities. The device-based management implementations other solutions rely on lack the flexibility you need to strike the balance between data security and user agility. For example, you might want to allow certain executives or managers to copy data to thumb drives, while prohibiting rank and file users from doing so—regardless of what device they’re on.

Extending this idea further, since you know your...
executives deal with sensitive information, you might want to make sure that all data they copy to USB devices is always encrypted. By tying security policies to identity, ZENworks Endpoint Security Management gives you the flexibility to make sure that users have the access they need with the proper controls in place, no matter what endpoint they are logged into.

Also, instead of putting endpoint security decisions in the hands of end users—like some solutions do through pop-ups or local settings—ZENworks Endpoint Security Management gives you and your IT security specialists complete, centralized security management for all the endpoints in your enterprise. You govern security enforcement through the creation of identity-based security policies that get pushed out to every endpoint in your enterprise. Also, by using the solution’s location awareness capabilities, you can have security policies dynamically change depending on what network environment an endpoint currently finds itself connected to, such as the office, home, airport, a WiFi zone or some unknown location. (See Figure 1.)

Even though the solution is centrally managed, all policies are enforced locally, regardless of whether or not the endpoint is connected to the network. The agent has built-in self-defense that prevents users from turning off or circumventing security settings even if they have administrator privileges for their workstations. It also protects itself from being intentionally or unintentionally uninstalled, shut down, disabled or tampered with in any way that would expose sensitive data to unauthorized users.

The inherent flexibility in the solution’s design enables you to implement it in the way that makes the most sense for your organization. If you have the immediate need to comply with strict regulatory requirements, you can roll out the level of enforcement you need on day one. You can also take a more phased approached, perhaps

Figure 2: ZENworks Endpoint Security Management has built in encryption key management to give you greater flexibility and control over mobile and removable storage security.
ZENworks Endpoint Security Management utilizes a storage device security driver that can, based on policy, enable, disable or configure as read-only any device that dynamically enumerates onto the system. Starting out with more lenient policies to ensure they don’t impact your operations, and then leverage the solution’s auditing and reporting capabilities to decide how, where and when you need to modify and tailor policy to meet your organization’s endpoint security strategy.

The following represent the main components that you install when deploying a ZENworks Endpoint Security Management solution:

- **Policy Distribution Service** - Distributes security policies to the Endpoint Security Client (agent) and retrieves reporting data from the agent.
- **Management Service** - Manages user policy assignment and component authentication, reporting data retrieval, creation and dissemination of reports, and security policy creation and storage.
- **Management Console** - The graphic interface you use to both configure the Management Service and to create and manage user and group security policies.
- **Client Location Assurance Service** – Provides a real-time cryptographic guarantee of the current location of your endpoints by leveraging network environment parameters that you define.
- **Endpoint Security Client (Agent)** – Enforces the security on each endpoint where it is installed. A client agent for Windows XP and Windows 2000 enterprise computers is available, as well as one for computers running 32-bit versions of Microsoft Windows Vista with Support Pack 1 and Windows Server 2008.

**> Multi-Level Protection**

As a comprehensive endpoint security solution, ZENWorks Endpoint Security Management provides a wide array of protections and controls. Specific to USB security, the solution focuses on four main areas of protection:

- Storage device enumeration
- USB bus enumeration
- White list device ID and serial number control
- Device encryption

Storage device enumeration determines if a storage device is even allowed to register with the endpoint’s file system. To do this, ZENWorks Endpoint Security Management utilizes a storage device security driver that can, based on policy, enable, disable or configure as read-only any device that dynamically enumerates onto the system. The storage device security driver sits in the kernel-level storage stack of all your endpoint devices, so it can control access to CD/DVD writers, thumb drives, floppy drives, flash memory cards, ZIP drives, PCMCIA cards and other types of removable media. The driver not only works to protect against data theft, but can stop harmful files—such as viruses, spyware and malware—from infecting your endpoints.

ZENworks Endpoint Security Management also gives you control at an access layer even closer to the USB bus. When a USB device tries to enumerate, it lets you configure policies that utilize device classes or device-friendly names to determine whether it will be enabled, disabled or configured as read-only.

The white list device ID and serial number controls in the solution give you even more granular control over which devices are allowed, blocked or set to read only. By leveraging the device IDs and unique serial numbers of your approved USB devices, this control allows you to ensure that only the USB devices you know about can be used—and only in the manner you dictate.

But perhaps the most powerful and flexible control provided by ZENWorks Endpoint Security Management is its encryption control. The solution utilizes AES 256-bit encryption to not only make sure that unauthorized copying of data to USB devices is unreadable, but to ensure that data on lost or stolen thumb drives can’t be read by those outside your organization. (See Figure 2.)

In addition to protecting your valuable data, a primary goal of the solution’s encryption capabilities is to facilitate the interaction of the users within your organization. If you hand one of your co-workers a thumb drive containing information they need to do their job, you want them to be able to read it. However, if they happen to lose that thumb drive on an airplane or a cab, you don’t want whoever finds it to be able to read that data. The way ZENworks Endpoint Security Management implements data encryption on removable drives delivers this capability.

In addition to protecting your valuable data, a primary goal of the solution’s encryption capabilities is to facilitate the interaction of the users within your organization.
The encryption solution also allows you to give users one-time, temporary emergency override capabilities to read encrypted data on a removable drive that is inserted into a non-managed endpoint. This is extremely helpful in situations where your sales people or executives are on the road and need to use a thumb drive on a machine that doesn’t have the agent. Perhaps, they’re at a customer site giving a presentation on a customer computer. In these cases, you can generate a user-specific, time-sensitive, one-time hash based on your encryption key that enables them to temporarily read that encrypted data. (See Figure 3.)

**Comprehensive Endpoint Security**

In addition to USB and removable storage security, ZENworks Endpoint Security Management is a comprehensive endpoint security solution that gives you centralized management and control over your endpoints’ personal firewalls, wireless security, data encryption, VPN enforcement, antivirus management and remediation, application control, hardware communication control and integration with network access controls. (See Flipside of Mobile Security.) All of these capabilities combine to help you strike the ideal balance between complete endpoint security and user agility.

**Flip Side of Mobile Security**

While ZENworks Endpoint Security Management helps you safeguard the security, health and productivity of your organization’s endpoints, ZENworks Network Access Control delivers on the flipside of the mobile security equation: protecting your organization from mobile devices you do not own or manage that enter your environment. To learn more about ZENworks Network Access Control, visit www.novell.com/products/zenworks/networkaccesscontrol/.
Do you feel like you’re always under pressure? Pressure to keep systems running smoothly? Pressure to facilitate more efficient collaboration between your users, partners and customers? Pressure to keep your infrastructure secure? Fortunately, GroupWise has a proven track record of simplifying your life in all those high-pressure areas. Even so, there still might be some in your organization pressuring you, against your better judgment, to switch to Exchange.

However, with the current state of the economy, you’re likely receiving even greater pressure to streamline your budget and cut costs, which means it makes more sense than ever before to stay with GroupWise. According to a GroupWise white paper, organizations can enjoy considerably lower total cost of ownership with GroupWise than they can with Exchange. (See Novell GroupWise v. Microsoft Exchange.)

> **Hardware Savings**
The first area where GroupWise helps you cut costs over Exchange is in the area of supporting infrastructure. With the Microsoft solution’s dependency on Active Directory, Microsoft Exchange 2007 requires the deployment and maintenance of more servers—with their associated software licenses—than Novell GroupWise 7 or GroupWise 8.

Microsoft Exchange 2007 requires that all users exist in Active Directory before they can become Exchange users. Therefore, if you do not have Active Directory fully deployed with all your users in it, you will need to build a new Active Directory infrastructure. This will require new servers, the number of which will depend upon the size of your organization. Additionally, Microsoft recommends that dedicated servers be used to support the Active Directory infrastructure.

GroupWise 7 and GroupWise 8 use Novell eDirectory, but only for management purposes. Users do not need to exist in eDirectory before they can be GroupWise users. Also, unlike the case for Microsoft Active Directory and Exchange, you do not need to have dedicated servers for eDirectory in your GroupWise implementation.

Novell GroupWise also lets you get the most out of your current hardware investment. It has no requirements for 64-bit hardware, allowing you to upgrade from an older version of GroupWise—or migrate from Exchange—to GroupWise 8 without typically having to buy new hardware.

However, Microsoft Exchange 2007 requires 64-bit hardware. If you move from earlier versions of Exchange or GroupWise to Exchange 2007 you’ll have to migrate from your old hardware platform to a new platform, which can be an expensive and time consuming effort by itself. Even if you are already running on 64-bit servers, you might need to purchase higher performing hardware to adequately service Exchange.

Compared to GroupWise, Exchange 2007 has higher hardware requirements in other areas as well. For example, a typical Exchange 2007 environment with 5,000 users would require a minimum of seven servers; two Active Directory servers, one Exchange Client Access server, one Exchange Hub Transport server, and three Exchange Mailbox servers.

![Figure 1: With the fewer number of servers required for GroupWise compared to Exchange, you can easily save more than $35,000 in hardware costs with GroupWise.](image)

---

**GroupWise 8 and Exchange 7 Hardware Cost Comparison**

<table>
<thead>
<tr>
<th>Hardware Cost for Exchange 2007</th>
<th>$77,016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Cost for GroupWise 8</td>
<td>$41,815</td>
</tr>
</tbody>
</table>

* Based on 5,000 user environment
In a similar GroupWise environment only five servers are needed; one server for the primary domain and one post office, one server for the post office domain and one post office, two servers for one more post office, and one server for a gateway domain, Internet access gateway and WebAccess Gateway.

With the additional number of servers required, along with the requirements for higher performing platforms in Exchange, the investment in hardware alone for such an environment could easily cost more than $35,000 than it would for GroupWise. (See Figure 1 and Table 1.) But the hardware costs are just the tip of the iceberg.

> Software Savings

The interoperability inherent to GroupWise provides you a wide variety of benefits. If you're using GroupWise v6.5, v7 or v8, you can run your infrastructure on a number of different operating systems. You can even mix operating systems within a single GroupWise system.

GroupWise supports NetWare 5.1, NetWare 6, NetWare 6.5, Open Enterprise Server 1, Open Enterprise Server 2, SUSE Linux Enterprise Server 9, SUSE Linux Enterprise Server 10, Windows Server 2000, Windows Server 2003 and Windows Server 2003 R2. GroupWise 8 adds support for Windows Server 2008 to the already-long list.

The ability to run GroupWise on your platforms of choice helps you recognize significant savings on your OS investments. To add even more to your savings, if you're a GroupWise customer, Novell offers SUSE Linux Enterprise Server 10 for free for as many servers as you need to run your GroupWise system. This can result in enormous cost savings for most organizations.

However, Microsoft Exchange 2007 has very strict OS requirements that result in very significant additional expenses. It requires Windows 2003 R2 Server x64 for each server role. Additionally, for all midsize to large environments, you'll need the Enterprise Edition for Mailbox Server roles and any server roles that you want to cluster. The Standard Edition only supports up to 4GB of RAM, along with 4-way symmetrical multiprocessing.

In addition to the OS dependencies in Exchange, you'll face complex and expensive licensing issues if you move to Exchange. Every Windows server that you deploy will require its own license based on its role, resulting in a likely mix of Standard Edition licenses and Enterprise Edition licenses. For example, Exchange 2007 Standard server edition is designed for small to medium-sized organizations, allowing up to five storage groups and five databases per server. Exchange 2007 Enterprise server edition is designed for large organizations, providing up to 50 storage groups and 50 databases per server.

In addition to the licenses for Exchange servers, you'll also need server licenses for all of your Active Directory servers that support the Exchange infrastructure. Additionally, you'll need Client Access Licenses (CAL) for every Active Directory user. This means that to support 5000 Exchange users, you would need 5000 Windows CALs. Finally, if you want to use all the features in Exchange, you'll also have to purchase the Outlook client for all of your users.

GroupWise makes things much simpler in terms of licensing, and much less expensive. GroupWise has a single cost—the cost of the GroupWise license itself. This license includes all of the server roles (in GroupWise these are domains, post offices and gateways), the ability to cluster GroupWise features and the client license. As mentioned before, any customer that has purchased GroupWise 7 or GroupWise 8 receives as many SUSE Linux Enterprise Server 10 licenses as they need to run GroupWise—for free! Also, if you have purchased Novell Open Enterprise Server 2, you are entitled to run as many two-node clusters as you want for no additional charge.
When you compare the software costs between the two solutions, in a 5,000 user Windows server environment you can save about $300,000 or more with GroupWise over Exchange 2007. (See Table 2.)

You can recognize even greater savings when you run your GroupWise system on SUSE Linux Enterprise Server 10, lowering your total acquisition costs even more. (See Figure 2 and Table 3.)

In addition to the savings you get by staying with GroupWise, you can recognize even more savings by taking advantage of the Novell Open Workgroup Suite, which includes Novell Open Enterprise Server, Novell GroupWise, SUSE Linux Enterprise Desktop, OpenOffice.org and Novell ZENworks Suite. Depending on your implementation, you can save up to 70 percent in licensing costs compared to similar Microsoft workgroup offerings.

> Easier than Ever to Save
There will always be those who will put the pressure on for a move to Exchange, ignoring the proven reliability, productivity and security offered by GroupWise. But even when that pressure is on, it’s hard to ignore the significant hardware and software cost savings that GroupWise delivers. With the many tough decisions that companies are having to make in order to save money, more than ever, staying with GroupWise should be one of the easiest decisions you have to make.

### Table 1: Exchange and GroupWise Hardware Costs Comparison

<table>
<thead>
<tr>
<th></th>
<th>Servers Needed</th>
<th>Hardware Unit Price</th>
<th>Hardware Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exchange 2007</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Directory Server</td>
<td>2</td>
<td>$8,712</td>
<td>$17,424</td>
</tr>
<tr>
<td>Exchange Client Access Server</td>
<td>1</td>
<td>$8,712</td>
<td>$8,712</td>
</tr>
<tr>
<td>Exchange Hub Transport Server</td>
<td>1</td>
<td>$8,712</td>
<td>$8,712</td>
</tr>
<tr>
<td>Exchange Mailbox Server</td>
<td>3</td>
<td>$14,056</td>
<td>$42,168</td>
</tr>
<tr>
<td><strong>Total Hardware Price for Exchange 2007</strong></td>
<td></td>
<td></td>
<td>$77,018</td>
</tr>
<tr>
<td><strong>GroupWise 8</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Domain and One Post Office (eDirectory for Management of GroupWise)</td>
<td>1</td>
<td>$8,363</td>
<td>$8,363</td>
</tr>
<tr>
<td>Post Office Domain and One Post Office</td>
<td>1</td>
<td>$8,363</td>
<td>$8,363</td>
</tr>
<tr>
<td>One Post Office</td>
<td>2</td>
<td>$8,363</td>
<td>$16,726</td>
</tr>
<tr>
<td>Gateway Domain and One Internet Access and One WebAccess Gateway</td>
<td>1</td>
<td>$8,363</td>
<td>$8,363</td>
</tr>
<tr>
<td><strong>Total Hardware Price for GroupWise 8</strong></td>
<td></td>
<td></td>
<td>$41,815</td>
</tr>
<tr>
<td><strong>Total Hardware Savings with GroupWise 8</strong></td>
<td></td>
<td></td>
<td>$35,201</td>
</tr>
</tbody>
</table>

*Comparison is based on the costs associated with 5000 users. Prices are based on advertised prices of major distributors and do not take into account any discount pricing.*
Table 2: Exchange and GroupWise Software Costs Comparison

<table>
<thead>
<tr>
<th></th>
<th>Number of Licenses Required</th>
<th>MSRP Per Unit Cost/Total Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exchange 2007</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange 2007 Enterprise Server Edition License</td>
<td>5</td>
<td>$3,999/$19,995</td>
</tr>
<tr>
<td>Exchange Standard CAL User License</td>
<td>6000</td>
<td>$67/$335,000</td>
</tr>
<tr>
<td>Outlook 2007 Client License</td>
<td>5000</td>
<td>$109.95/$549,750</td>
</tr>
<tr>
<td>Windows 2003 Server R2 Standard (x64) Edition License (+5 CAL's, 20 CAL's Total)</td>
<td>4</td>
<td>$999/$3,996</td>
</tr>
<tr>
<td>Windows 2003 Server R2 Enterprise (x64) Edition License (+25 CAL's, 75 CAL's Total)</td>
<td>3</td>
<td>$3,999/$11,997</td>
</tr>
<tr>
<td>Windows Server CAL's License (5000 CAL's needed minus 95 CAL's from server licenses)</td>
<td>4905</td>
<td>$39.95/$195,954.75</td>
</tr>
<tr>
<td>Total Licensing Costs for Exchange 2007</td>
<td></td>
<td>$1,116,592.70</td>
</tr>
<tr>
<td><strong>GroupWise 8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GroupWise 8 Full License</td>
<td>6000</td>
<td>$143/$715,000</td>
</tr>
<tr>
<td>Windows 2003 Server R2 Standard Edition License (+5 CAL's, 20 CAL's Total)</td>
<td>6</td>
<td>$999/$4,995</td>
</tr>
<tr>
<td>Total Licensing Costs for GroupWise 8 on Windows servers</td>
<td></td>
<td>$719,995</td>
</tr>
</tbody>
</table>

* Comparison is based on the costs associated with 5000 users. Prices are based on advertised MSRP prices and do not take into account any discount pricing.

Table 3: Licensing Costs for GroupWise 8 on Linux

<table>
<thead>
<tr>
<th></th>
<th>Number of Licenses Required</th>
<th>MSRP Per Unit Cost/Total Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GroupWise 8</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GroupWise 8 Full License</td>
<td>6000</td>
<td>$143/$715,000</td>
</tr>
<tr>
<td>SUSE 10 Server License</td>
<td>6</td>
<td>$0</td>
</tr>
<tr>
<td>Total Licensing Costs for GroupWise 8 on Linux servers</td>
<td></td>
<td>$715,000</td>
</tr>
</tbody>
</table>
Maintaining the security of U.S. Navy networks is critical to the security of the country. Using Novell Sentinel as part of its PROMETHEUS system, NCDOC has automated and centralized security monitoring across hundreds of diverse locations worldwide. NCDOC personnel now have a real-time, holistic view of all network activities and can prioritize them to focus on what is most critical.

> **Overview**
The Navy Cyber Defense Operations Command (NCDOC) is one of several military cyber defense teams in the Department of Defense (DOD) which maintains the largest computer network in the world. Based in Norfolk, Va., NCDOC is responsible for around-the-clock protection of the Navy’s computer networks, with more than 700,000 users worldwide. NCDOC is the first and only certified computer network defense provider within the DOD to be awarded top-level accreditation.

“Our job 24/7 is to secure and defend Navy networks worldwide against a persistent and adaptive threat. Novell Sentinel helps us accomplish that.”

-Jim Granger

**Director of Capabilities and Readiness**

**Navy Cyber Defense Operations Command**

> **Challenge**
The 180 personnel at the NCDOC are responsible for analyzing huge volumes of network information gathered from hundreds of locations worldwide including ships, medical clinics, headquarter offices and research facilities. NCDOC personnel monitor these networks 24/7, 365 days a year.

NCDOC was experiencing data overload from an increasing number of cyber security sensors and corresponding alerts, but had insufficient personnel to monitor them. Because all network activity needs to be carefully evaluated, NCDOC wanted to automate the monitoring across hundreds of security sensors, including firewalls, intrusion protection systems and other security-related systems. The solution needed to be vendor-independent to accommodate a variety of platforms and systems, as well as scalable enough to handle continued growth in the number of sensors.

> **Solution**
NCDOC created PROMETHEUS, a suite of tools that monitors, reports and thwarts malicious network activity. PROMETHEUS uses the SAS Intelligence Platform as the data warehouse back end, and Novell Sentinel as the security event management front end to monitor tens of thousands of network events per day.

“We always choose the top tools in the industry and Novell Sentinel is a market leader,” said Jim Granger, Director of Capabilities and Readiness at NCDOC. “The product works well with SAS and met our requirements of being open and scalable.”

The PROMETHEUS system accesses and aggregates data from all portions of the network—including system logs, Web logs, e-mail logs, firewall logs and router logs—and prepares and stores the data for analysis and reporting. Novell Sentinel presents and prioritizes all security events in a centralized dashboard for security operators.

“With Novell Sentinel, we have a unified, real-time view of security activity across our diverse global environment from a central console,” said Keith Rohwer, NCDOC director of Research, Development, Testing and Evaluation. “We can customize what we want to see and prioritize everything according to the seven standard security levels of the DOD.”

NCDOC can easily customize information, such as by region or type of system, and scale to meet increasing volumes of data. The Novell Sentinel interface remains consistent, despite the addition of more sensors. The NCDOC team can also operate the Sentinel system from other locations, so that there is no central point of failure.

“It would have been impossible to keep up with the dramatic increase in network security activity without at least 10,000 personnel,” said Granger. “Novell Sentinel gives our centralized monitoring team a comprehensive and holistic view of security events so we can immediately act on what is most critical.”

Novell Sentinel also simplifies daily reporting with the ability to generate reports in all levels of detail for different audiences, whether commanders, other agency partners or a joint security task force.

“As a government entity, we have high expectations as a customer,” said Rohwer. “We have an outstanding business relationship with Novell.
“With Novell Sentinel, we have a unified, real-time view of security activity across our diverse global environment from a central console.”

-Keith Rohwer
Director of Research, Development, Testing and Evaluation
Navy Cyber Defense Operations Command

Results

With Novell Sentinel as part of its PROMETHEUS system, NCDOC has automated and centralized security monitoring for thousands of sensors and corresponding alerts across multiple geographically dispersed networks. The ability to prioritize security events allows the command to focus on those that require the most attention, such as the network aboard a ship entering a battle zone.

NCDOC can now create real-time reports in minutes or hours, instead of weeks or months. As network security is vital to the nation’s defense, this information is a top priority for military leaders at the highest levels.

“Our job 24/7 is to secure and defend Navy networks worldwide against a persistent and adaptive threat. Novell Sentinel helps us accomplish that,” said Granger. “The biggest military advantage is the power of information. We rely on the security of our networks to get the right information to the right people quickly.”

Products and Services:
Novell Sentinel

Results:
- Centralized and automated security monitoring for thousands of sensors and alerts across geographically dispersed networks
- Increased ability to prioritize security events and focus on most critical
- Can create customized reports and prioritize according to the seven DOD standard security event classifications
Everyone with a data center has at least one common goal: making or saving money for the company. They're trying to lower total cost of ownership (TCO), increase business agility and simplify the complexity. One obvious way to do this is with server virtualization; that is, consolidating workloads running on several servers onto one generally more powerful server. Once you agree that server virtualization is a great solution, you start wondering which workloads to consolidate and what virtualization infrastructure to use.

Often, those who accept server virtualization as a solution start the virtualization process by selecting a hypervisor and then the work of consolidating workloads running on physical servers onto virtual machines created by the hypervisor. Don't take this approach. Rather, start with an analysis of your data center workloads to determine which are good candidates for consolidating.

Eventually, you'll have to select virtualization software to create your virtualization environment. Most of the options are x86-based. Yet, another choice—consolidating workloads onto mainframes1—is often overlooked, but now is becoming more popular. Often, you'll find it can be the most cost-effective approach to server virtualization because mainframes aren't as expensive as they previously were, and they've gotten much more powerful over the years. In addition, they require a fraction of the floor space and power that comparable-capacity x86 servers need. And you get the benefits of a mainframe such as increased hardware reliability, extreme I/O throughput, and less downtime. Those benefits just come with mainframes and you won't automatically get them from server virtualization on x86 servers or any other architectures.

To use Linux on a mainframe as a server virtualization technology, make sure the workloads that you'll consolidate run on Linux or at least can be ported to Linux.

Two flavors of commercial Linux distributions run on mainframes: SUSE Linux Enterprise Server for System z from Novell and Red Hat Enterprise Linux for System z for Red Hat. You choose which to use, but know that Novell has an 80+ percent market share.

Virtualization with Linux on the Mainframe: How It Works

Mainframes are about 40 years old. And as you probably know, several years ago mainframes were being written off as expensive, dated computers that were capable of running only large business applications. Not anymore.

Mainframes have evolved rapidly during the past few years with Linux and innovation from IBM. But, innovation has maintained the benefits of mainframes that have always made them desirable:

- high utilization rates: 80–95 percent over a 24-hour period
- ability to run mixed workloads without user intervention
- efficient use of floor space and power
- virtually zero downtime

Today, mainframes are faster, smaller, and far less expensive than their ancestors. Take for example, the IBM System z10 Business Class server. The z10 BC gives you usable capacity equivalent to 232 x86-based servers, while using 83 percent less floor space, and up to 93 percent less energy. The cost per millions of instructions executed per second (MIPS) is one way that IBM compares the cost of mainframes. Today, the cost per MIPS for the System z10 is a very small fraction of the cost per MIPS for mainframes sold in 1980. This means that you get significantly more speed and capacity for your dollar than with older mainframes. You can get an IBM z10 BC for around $100,000, and it gives you significant capacity with its new 3.7GHz quad-core processors. Plus, you get all the benefits of newer, more innovative technologies. Not bad at all when compared to the specs and pricing of your grandpa's mainframes.

Creating virtual machines to run Linux workloads on the mainframe begins with z/VM, IBM’s mainframe hypervisor operating system. z/VM runs in a logical partition (LPAR). When it creates Linux virtual machines, it shares CPUs, memory and network resources among the Linux virtual machines. It also manages Linux virtual machines. Linux virtual machines created using z/VM are run using standard mainframe processors, also known as Cps, or an Integrated Facility for Linux (IFL). An IFL is a specialty engine that IBM created to make running Linux-based software more economical. For example, when you buy software, say an expensive app such as an Oracle database, Cps and IFLs are treated as a single processor, so the app can be used relatively inexpensively by all the workloads running in the Linux virtual machines. (See Figure 1.) More on that later.

To use Linux under z/VM, you'll need to buy enough CPU and memory capacity, and a Linux for mainframe subscription from Novell or Red Hat. With the use of z/VM functionality, you can begin creating Linux virtual machines in minutes and hours compared to days or weeks for distributed hardware. Today, there are more than 4,000 IFLs installed and more than 1,300 customers running Linux on the mainframe.

---

1 Herein, the word “mainframe” is synonymous with IBM S/390, IBM zSeries (z990, z890, z900, z800) and IBM System z9 and z10 servers.

Linux for System z
Typical Architecture with z/VM and z/OS

Linux on mainframe distributions aren't much different than their x86-based counterparts. Differences involve the implementation of features that take advantage of mainframe hardware and mainframe operating systems such as z/VM. These features aren't generally visible to application developers so they don't need much, if any, training to be productive.

With Linux on mainframe distributions you can generally run the same applications that run on Linux on x86-based architectures. Of course, this requires software vendors to support the architecture, which not all do. If your vendor says that they have a version of their product for Linux, make sure that they have one for Linux on System z.

Novell makes it easy for you to try out SUSE Linux Enterprise Server for System z, even the new release 11, on a mainframe for free. Just download SUSE Linux Enterprise Server Starter System for System z and install it in less than 90 minutes. If you don't have the z/VM operating system running on your mainframe, you can get a free eval from IBM. The Starter System doesn't require much experience with Linux and it gives you the chance to do proof of concept evaluations for free.

> Reasons to Consider Linux on the Mainframe for Server Virtualization

TCO for using Linux on mainframes includes the costs of:
- servers
- software licenses
- floor space
- power
- system management tools
- system administrators
- network hardware (and administrators)
- backup and restores
- downtime
- and so on.

Following are several reasons why Linux on the mainframe is an excellent way to meet your data center challenges and reduce costs.

> Owning a Mainframe Isn't Costly

As stated earlier, mainframes used to be expensive. But not anymore when compared with old prices, the power you get and how you can use them to save money, time and space in your data center.
Main Man  TREND TALK by Bill Claybrook  continued

You can also save on Linux on the mainframe subscriptions from Novell. In 2008, Novell created a pricing promotion for SUSE Linux Enterprise Server for System z that gives you a three-year subscription for the price of two years and a five-year subscription for the price of three; that alone saves you thousands of dollars on subscription fees.

Then in late 2008, Novell and IBM created new pricing for the new System z10 Business Class mainframe to make it more economical for you to use the mainframe. This amounts to about a 40 percent discount on SUSE Linux Enterprise Server for System z subscriptions for the System z10 Business Class servers. IBM also dropped its prices for IFLs by more than 50 percent. These pricing promotions make server virtualization on System z servers even more attractive when compared to server virtualization on x86-based servers because it can be much more cost effective on a mainframe.

For example, Nationwide Insurance, a Novell customer, uses SUSE Linux Enterprise Server for System z and has improved server utilization by 70 percent, projected savings of $15 million over a three-year period. They've reduced floor space and power usage by 80 percent by migrating workloads to the mainframe.

Another Novell customer, First National Bank of Omaha, consolidated 40 Sun Solaris servers to five virtual SUSE Linux Enterprise Server for System z servers; reduced administrative costs by nearly 70 percent and software licensing costs by more than 90 percent, and realized a $1.8 million savings the first year. Novell has many customer success stories similar to these for customers that have moved combinations of Linux, UNIX and Windows workloads to Linux on the mainframe running in a z/VM virtualization environment.

> Save a Load of Money on Software Licensing

Many large ISVs such as Oracle, have per-processor licensing models for at least some of their software applications. This means you're charged for the software based on the number of processors on the server on which the software runs. For example, Oracle Database, Enterprise Edition is US$47,500 per processor. Generally, you pay that price regardless of the architecture.

Linux virtual machines share the cost of a single processor license. Remember, CPs and IFLs count as a single processor engine with respect to software licensing; that is, one IFL equals one core. Not only do you get a break on software licensing, but the capacity in a System z10 Business Class machine is many times that of an x86 server.

> Many Applications are Available on Linux on the Mainframe

Many of the 2,500+ applications that run on Linux on x86 are available on Linux on the mainframe. In fact, you can run more than 1,600 certified applications on SUSE Linux Enterprise Server for System z. More than 400 ISVs have certified applications running on Linux on the mainframe, including more than 280 IBM middleware applications. These applications range from data-intensive, high-I/O applications to CPU-intensive applications, including applications from BEA, CA, IBM, Oracle, SAP and Veritas. You can also run many of the important open source applications such as Apache, MySQL and SAMBA on Linux on the mainframe.

With the new IBM System z10 server and its new quad-core processors, 70 percent more capacity and three times the available memory of the largest System z9 server, you can run CPU-intensive workloads that you couldn't run with any degree of efficiency on mainframes before. This greatly broadens the scope of applications that are good fits for the mainframe.

> Get the Benefits of the Mainframe

You get considerable benefits when you virtualize servers onto a mainframe. We've already listed some, but others include:

- **Increased security.** When you move workloads from front-end servers that were accessing databases on a mainframe onto that mainframe, security increases because you're not using an external network.

- **Increased communication.** When workloads are running on a mainframe, the mainframe HiperSocket technology permits interaction among operating systems running in LPARs at internal memory speeds. This is especially useful when you have front-end applications running in Linux virtual machines under z/VM while accessing data in a database such as DB2 running on z/OS in another LPAR on the same mainframe.

- **Disaster recovery.** Disaster recovery is generally seen as a huge and expensive problem. But mainframe ease of disaster recovery is inherited by Linux on the mainframe with no additional set up or cost. That gives you virtualization on the mainframe with a huge advantage over virtualization on x86 servers. For example, you pay well over $2,000 per processor for VMware vCenter Site Recovery Manager, which requires you to install VMware vCenter Server (formerly VirtualCenter). VMware vCenter Server costs between $6,044 and $8,180 depending on the support purchased. If you're virtualizing a two-processor x86 server running VMware virtualization software, you'd spend well over $10,000 to get disaster recovery with one year, 12x5 support. But you won't pay extra for high-quality mainframe disaster recovery.

---

3 HiperSocket is an IBM technology for high-speed communications between partitions such as LPARs. It can provide in-memory TCP/IP connections between and among LPARs running various operating systems such as Linux on the mainframe.
Summary

Linux on the mainframe used for server virtualization is growing rapidly. You should seriously consider the mainframe as a server virtualization platform when you're thinking about consolidating Linux, UNIX and/or Windows workloads to reduce costs and increase business agility. It's also a good platform if you're migrating from UNIX to Linux. You don't always have to migrate a RISC/UNIX workload to an x86 server running Linux. You can migrate the RISC/UNIX workloads to Linux on the mainframe and keep the positive features of RISC/UNIX, such as security.

To determine whether or not Linux on the mainframe is a good choice for your server virtualization project, take a look at how well the workloads you're considering consolidating fit the mainframe. The best fitting applications are those that leverage the classic strengths of System z servers: high availability, high-I/O bandwidth capacity, etc. Example workloads you might already be running include Oracle and SAP. Other applications that are good fits include DB2, Informix, WebSphere Application Server and Apache.

The breadth of good-fit apps has increased to include those with serious computational needs with the advent of the IBM System z10 server. But question some workloads for the mainframe, such as apps that haven't yet been ported to Linux, apps such as geological mapping animation rendering that are optimized for throughput, and apps that are too internally sensitive to try and migrate due to political issues.

As part of your quest to virtualize your servers, use IBM's vRACE tool (Rehosting Applications from Competitive Environments) to evaluate your workloads and see if they're a fit for Linux on the mainframe. The vRACE tool utilizes a set of 10 workload categories, ranked according to how well they fit the mainframe. A vRACE evaluation tells you the cost savings you can expect to get by consolidating workloads onto Linux on the mainframe versus other server virtualization technologies such as VMware. It's a sophisticated tool that will give you a much-needed hand in helping you decide what server virtualization technology is right for your data center so you can make even more money for your company.

Customers wishing to understand RACE and/or vRACE and/or wish to participate in a vRACE Workshop (an engagement with the vRACE tool) can contact Montgomery Bauman at IBM (mbauman@us.ibm.com).