Opgradering af Novell

Chefgruppemøde den 26/10.98
Dagsordenspkt. 5.4.

I december 1997 fik vi leveret en rapport om valg af Novell eller NT.

Konklusionen var klar: Der var ingen gode begrundelser for at DBC skulle skifte ensidigt til NT, og ikke mindst blev det påpeget, at der er mange arkitekturbetingede mangler i NT, som først vil være løst i version 5, som kommer engang i 1999.
Samme udsagn fremgår af udenlandske anmeldelser: ingen tvivl om, at Novell-installationer har fordele ved at opgradere. Den nye version roses også for langt enklere administration.
Novell's seneste version er Netware 5.0 som indeholder en lang række forbedringer, herunder ikke mindst at den specielle IPX-protokol er kan erstattes af TCP/IP. understøtter lange filnavne

Nedenstående er fra *Aberdeen Groups* vurdering:

	Microsoft NT Server 4.0	Novell's NetWare 5
Directory	No directory	Proven technology for almost 6 years
Manageability	Different management interface for each network service or function	Store and manage network data, users, resources, and services from one location
Security	Lack of strength and availability of Microsoft developed security features. NT 4.0 has single sign-on capabilities, but weak encryption and no Public Key Infrastructure Service (PKIS) support	Directory-based, security enhancements support high-level encryption, Public Key Infrastructure Service (PKIS) support, Secure Authentication Service, and Single Sign-On (available in early 1999)
Scalability	Comparable SMP support, known kernel instability, difficult to scale flat-file architecture used to manage users, resources, and server services	Comparable SMP support, new more stable kernel (proven at beta test sites), easy to scale directory. Novell Storage Services (NSS) also adds scalability options.
Application Support	Good application server with strong support from software developers. Lack of a management tools to manage multiple applications	NDS seamlessly manages NT's applications, to provide optimal management efficiency. Novell currently trails behind Microsoft in application support

Endvidere er det vores synspunkt, at håndteringen af de mange brugere ville nødvendiggøre anskaffelse af at antal NT-servere, hvor Novell ikke har problemer med at håndtere det antal brugere, vi har.

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Opgradering af Novell

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Opgraderingen vil kunne foregå ???

Jørgen Rishøj

NOVELL

From: Grith.GladLarsen@gecits-eu.com
Sent: 12. august 1998 13:23
To: JR@dbc.dk
Subject: Re: SV: 3Com PalmIII til DBC

Hej igen

Det var trist, - det lyder som om det er "distributør"-priser du har fået.....Nå men ikke desto mindre, så vil jeg også hellere sælge dig Novell opgraderingen og den "manpower" der skal til.

Og jeg har faktisk lige fået priserne, - for det første skal du opgradere fra din 250 br. til en 250br., og da I har en version 4.10 skal I først opgradere til en 4.11 Intranetware. Derudover skal I købe en Netware First Look til 250 br., der er et stykke papir, der giver ret til at opgradere til verion 5.0, når den frigives, og det forventes den at gøre omkring d. 22. september.

Selve installationen af disse opgraderinger vil vi foreslå sker til timepris, da det kan være svært at estimere. Måske har I nogle ting der skal ændres i setup´et når nu I er igang ?? Jeg kan anbefale at I investerer i et klippekort, der jo giver en reduceret timepris, specielt hvis der også er andre opgaver I vil have os til at udføre.

Priserne er som følger:

Novell 4.10 250br. --> 4.11 Intranetware 250br.	kr. 28.883,-
Novell First Look 250 br.	kr. 17.216,-
.	
Novell Systemkonsulent timepris	kr. 990,-/time
Klippekort 12 timer (24 klip)	kr. 10.620,-
Klippekort 24 timer (48 klip)	kr. 20.760,-

priser er excl. moms.

Håber at det er tilstrækkeligt.

Venlig hilsen - Best regards

Grith Glad Larsen / Grith.GladLarsen , DKCPH Account Management
GE Capital IT Solutions A/S, Blokken 11-15, DK-3460 Birkeroed, Denmark
Phone: +4545945317, Fax: +4545945355, Mobile: +4520815353
Internet: Grith.GladLarsen@GECITS-EU.COM

JR@dbc.dk on 08/12/98 10:32:37 AM

To: Grith Glad Larsen/Copenhagen/GECITS-EU
cc:
Subject: SV: 3Com PalmIII til DBC

Da du er 170.- kr. for dyr pr. stk. i forhold til min anden leverandør, så blev ordren ikke din. Men vi prøver en anden gang...
> -----Oprindelig meddelelse-----
> Fra: Grith.GladLarsen@gecits-eu.com

> [SMTP:Grith.GladLarsen@gecits-eu.com]
> Sendt: 12. august 1998 11:05
> Til: JR@dbc.dk
> Emne: Re: 3Com PalmIII til DBC
>
>
>
>
>
> Hej Rishøj
>
> Velkommen fra ferie, - du stod faktisk på min liste, men kom mig i
> forekøbet, så du får lige de ønskede priser først:
>
> 3COM PalmIII ved 5 stk. kr. 2.513,-
> - " - - " - ved 10 stk. kr. 2.495,-
>
> Som du kan se er der ikke den store prisforskel, - da prisen efter
> sigende
> skulle være presset meget i bund. Leveringstiden er god, dvs. 1-2
> dage. Lad
> mig vide om jeg skal bestille.
>
> Det jeg ville snakke med dig om var først og fremmest at jeg er glad
> for at
> I har indgået en MicroSoft Select Aftale med os (og så endda helt uden
> min
> indblanden), - Charlotte Lyngaa kom tilbage fra ferie i mandags, og
> følger
> lige op på aftalen. Endelig har min nye chef Jim, som du jo har mødt,
> sendt mig en lille mail om at vi skal give et tilbud på opdatering af
> jeres
> Novell 4.10 til 5.0, - Jeg har endnu ikke haft mulighed for at
> diskutere
> det nærmere med ham, - men har han mon alle oplysninger ??? Hvormange
> klienter, og er det en enkelt server, osv. ????
>
> Hvis Jim har oplysningerne, så skal jeg nok få nogle priser til dig
> hurtigst muligt.
>
>
> Venlig hilsen - Best regards
>
> Grith Glad Larsen / Grith.GladLarsen , DKCPH Account Management
> GE Capital IT Solutions A/S, Blokken 11-15, DK-3460 Birkeroed, Denmark
> Phone: +4545945317, Fax: +4545945355, Mobile: +4520815353
> Internet: Grith.GladLarsen@GECITS-EU.COM
>
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>
>
> JR@dbc.dk on 08/11/98 01:46:36 PM
>
> To: Grith Glad Larsen/Copenhagen/GECITS-EU
> cc:
> Subject: 3Com PalmIII til DBC
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> ----------
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>
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>
>
>
> Kan du give mig en pris på, hvad det vil koste at købe henholdsvis 5
> eller 10 stk. 3Com PalmIII (stk-pris)
> Med venlig hilsen / Yours sincerely
> Jørgen Rishøj
> System Manager
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NetWare 5.0: Labs-eye view

By Michael Surkan, PC Week Online

September 14, 1998

Novell's NetWare 5.0 is an important upgrade, but it is too little, and too late, to generate any converts. Novell has rested on the laurels of its advanced NDS for too long and has only now begun to address its inadequacies in the all-important area of application support with an overhauled SMP kernel, Ring 3 crash protection and a Java virtual machine. These are all features that Unix variants and Microsoft's Windows NT have had for years.

IN THIS REPORT:
1 Novell hears administrators' prayers
▶ NetWare 5.0: Labs-eye view
3 NetWare 5.0: Business sense

NetWare has long excelled at file-and-print and directory services, but the recent release of Windows NT 5.0 Beta 2 shows that NetWare isn't the only NOS that can provide these capabilities.

Novell executives have said that they never intended to compete in the application arena, showing that Novell is resigned to becoming a niche player on the network periphery.

Advice: If you've got NetWare already, don't hesitate to upgrade to NetWare 5.0. However, there's little reason to switch to it if you're not already committed.

Michael Surkan, the West Coast technical director of PC Week Labs, is at michael_surkan@zd.com.

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NetWare 5.0: Business sense

By PC Week Labs staff, PC Week Online

September 11, 1998

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NetWare 5.0: Business sense

There aren't too many no-brainer decisions these days, but upgrading to NetWare 5.0 is one of them. Novell has significantly improved support for standards such as TCP/IP and Java, which makes NetWare 5.0 a much better and more capable fit in heterogeneous networks. Simpler installation, automatic hardware detection and Java-based administration tools go a long way toward reducing the hassles of working with NetWare--paying dividends in earned IS time and lower total cost of ownership.

Short-term impact: Companies will see immediate benefits from NetWare 5.0, but time and careful planning are necessary to migrate older NetWare 4.x networks to NetWare 5.0 and IP. Companies should finish upgrading all servers and clients to the latest software before making the move to IP from IPX.

Long-term impact: Cost of network management will be reduced once NetWare servers are running the same network protocol--IP--as other network systems. And IS departments can write applications that take advantage of new built-in NetWare Java technology.

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Novell hears administrators' prayers

NetWare 5.0 is easy to use, and ZENworks lowers TCO, but stakes have risen in NOS game

By Henry Baltazar, PC Week Labs
September 10, 1998 9:00 AM ET

Novell Inc. scores with the latest version of NetWare. PC Week Labs can say, without qualification, that Version 5.0 of the venerable NOS will make NetWare networks more capable and easier to manage--businesses should waste no time in upgrading their servers.

Casting its long shadow on the Novell upgrade is the recent Beta 2 release of Windows NT 5.0, which brings the Microsoft Corp. network operating system more in line with NetWare for the first time. However, NetWare 5.0 boasts revolutionary management capabilities that are a full year and a half ahead of those in NT 5.0, which is not expected to be released until the end of next year.

This, in addition to standards-compliant IP support, bundled applications such as Netscape Communications Corp.'s Enterprise Web server and Oracle Corp.'s Oracle8 database, and a multitude of other significant enhancements, makes NetWare 5.0 an upgrade that all Novell shops should implement.

One area in which Windows NT has a distinct advantage over NetWare is application support. As file and print services become commodities, Novell will need a lot more than its new Java virtual machine to win over developers. The emergence of directory-enabled applications, such as the bundled ZENworks management tool, is a step in the right direction, but more applications of this caliber must be built to secure NetWare's future. Other important improvements to NetWare include broader compiler support and Ring 3 crash protection.

IN THIS REPORT:

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The Zen of policy-based management

The ZENworks policy-based management utility is the most useful, innovative and cost-saving new feature in NetWare 5.0.

Using the NWADMIN utility, we were able to easily create desktop management policies to lock down the environments of our clients and distribute these policies globally through NDS.

ZENworks also includes an application launcher utility, which we used to ensure that end users were able to access their favorite applications regardless of the workstation they logged in to. The application launcher also can repair applications with corrupt or missing dynamic link library files.

IntelliMirror is Microsoft's answer to ZENworks. Our recent tests of NT 5.0 Beta 2 show that IntelliMirror is a capable application but lags behind ZENworks in its capability to manage legacy systems, since IntelliMirror will work only with Windows NT 5.0 Workstation clients.

The addition in NetWare 5.0 of standards-compliant native IP support, which will allow administrators to migrate away from Novell's proprietary IPX protocol, will also go a long way toward lowering the total cost of ownership of NetWare networks.

Novell has ported all of its IPX services to run on IP only. The most dramatic example of the benefits of this migration is the new IP-based RCONSOLE remote management feature, which has been rewritten in Java. After enabling an agent on our servers and issuing an access password, we were able to manage our server from a Windows 95 machine. The performance of the new RCONSOLE could be better, but it was acceptable even on low-end Pentium Pro servers.

NetWare 5.0 also includes an IPX/IP gateway service that will allow administrators to gradually roll out NetWare 5.0 upgrades without sacrificing connectivity with legacy IPX servers and clients.

Novell's beefed-up directory services include the ability to manage Domain Name System/Dynamic Host Configuration Protocol services through NDS. In tests, we could easily add DHCP services to a NetWare 5.0 server and configure subnet pools from which clients could acquire IP addresses.

PC Week Labs recommends NetWare 5.0 migration

- The old Client32 is incompatible with NetWare 5.0, so servers must be upgraded before enabling the IP option.
- Administrators working in mixed IP and IPX LANs will need to set up Service Location Protocol servers and gateways for lookups.
- Before merging directory trees, administrators should run DSREPAIR to confirm schema integrity and ensure that time synchronization is working.
- The new Java GUI is slow, so older 486 and Pentium servers should choose the text-only console option.
- To benefit from Ring 3 crash protection, administrators must rewrite all NLMs.

Installation of NetWare 5.0 was remarkably easy. Its bootable CD-ROM automatically created a DOS partition and formatted hard drives, tasks we had to perform manually in previous NetWare releases. NetWare 5.0 found and loaded the drivers for all of our test servers, ranging from old dual Pentium Pro-based servers to the newest Compaq Computer Corp. Proliant 7000 Xeon server.

Novell's new Java GUI installation program walked us through network and NDS configuration and let us install only the elements we needed. Once installation was complete, we could create and modify users from the new Java-based ConsoleOne.

However, ConsoleOne was virtually unusable on low-end servers, many of which are in use in corporate nets. More disappointing is the fact that most management chores still need to be performed through NWADMIN and archaic tools such as NWCONFIG and Monitor.

File and print services have long been the bread and butter of NetWare, and our benchmark testing shows that NetWare 5.0 will continue Novell's dominance in this area.

We ran the Ziff-Davis Benchmark Operation's NetBench on a Compaq 400MHz Xeon-based Proliant with 1GB of RAM and found that, even when using a single processor, NetWare 5.0 blew away performance turned in by NetWare 4.0 on a system with four Xeon processors.

NetWare 5.0 finally brings virtual memory and protected memory to the core operating system, competitive advantages NT has held over the Novell network operating system for years. Using the Monitor utility, we were able to easily set the maximum and minimum ranges for virtual memory size.

In the past, a misbehaving NLM (NetWare Loadable Module) could easily eat up memory resources and cause servers to crash, but NetWare 5.0's memory protection let us load NLMs into protected memory spaces. Administrators should be careful about which NLMs they load into protected memory because the NLMs will automatically run in slow virtual memory.

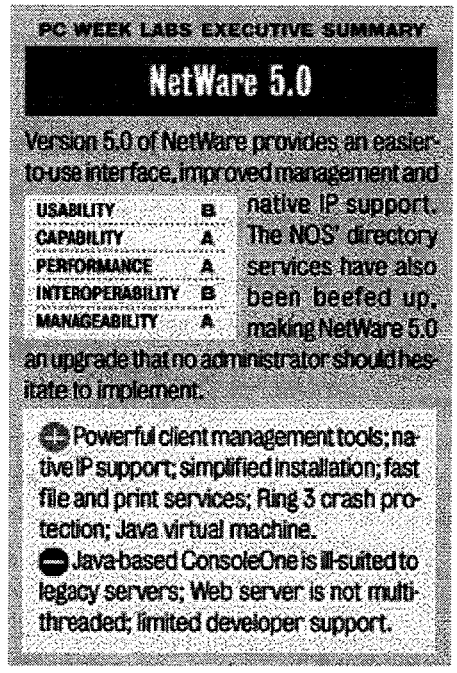
Novell's new NSS (Novell Storage Services) will allow administrators to store files as large as 8 terabytes. In the past, NetWare required up to 0.008MB RAM per megabyte of storage loaded, but with NSS, 4MB of RAM is sufficient to bring up a 500GB volume.

Novell's new WAN manager, which is integrated into Novell's NWADMIN management utility, uses policy-based management to control the use of expensive WAN links to do NDS replication to remote offices. We used the WAN manager to limit NDS replications to specific hours late at night, so as not to interrupt end users' work. We were easily able to distribute WAN utilization policies using NDS.

The Web server that shipped with NetWare 4.x had performance

problems and was incompatible with some standard Web development tools. The Netscape Enterprise Web server included with NetWare 5.0 is faster, although it is not multithreaded.

Also included with Version 5.0 is the Oracle8 database, which is infinitely more robust than NetWare's old Btrieve database.



How to reach Novell:
Novell Inc.
Provo, Utah
www.novell.com

PC Week Labs' scoring methodology can be found at www.pcweek.com/reviews/meth.html

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PRODUCT VIEWPOINT

AberdeenGroup

Volume 11 / Number 13
September 14, 1998

Novell's NetWare 5: An Elegant Interoperability Solution

The battle for mind-share in the Operating Systems market - especially between Unix and NT Server - is overshadowing and confusing a concurrent debate about the choice of a Network Operating System (NOS). Contrary to the inaccurate belief that the "NOS is dead," the massive move toward network computing is increasing the role NOSes play in the enterprise. In this Product Viewpoint, Aberdeen analyzes why Novell's recently released NetWare 5 provides NOS unique functionality IS executives truly need for optimizing their networks.

Executive Summary

The September 1998 introduction of NetWare 5 provides IS executives with the opportunity to significantly improve the way they manage their numerous and heterogeneous network components. Novell's Directory Services (NDS) is the unique technology that advances NetWare 5 beyond being merely a superior network operating system for file and print services. Any enterprise executive wanting to harness the power of the `net - Inter-, Intra-, Virtual or Private - for competitive advantage cannot do so without a powerful directory to manage all the connections. In Aberdeen's opinion, NDS is the most powerful directory available today.

Very importantly, according to beta users interviewed by Aberdeen, there is a measurable return on investment from using NetWare 5 in conjunction with Microsoft's NT 4.0 - where NT is the application operating system and NetWare 5 the network operating system. To them, NetWare 5 significantly improves the manageability and security of a mixed network environment.

Novell's NetWare product line is time-proven and embodies enterprise-quality technology. NetWare operates effectively in both all NetWare environments and across heterogeneous operating system (Unix, OS/390, NetWare and NT) environments. By identifying its own strengths and the leading operating systems' weaknesses - NT, Unix, and OS/390 - Novell has created a network operating system platform that can seamlessly integrate technology components and applications supplied by numerous, different vendors. NetWare 5's interoperability capabilities contain the functionality to allow IS executives to deploy, maintain, and upgrade best-in-their-industry information infrastructures. The supreme benefit to implementing NetWare 5 is that it will significantly lessen enterprise executives' - both business and IS - fears that their network will be a business's point of failure.

Based on both our review of NetWare 5 and IS decision makers as-of-yet-unmet requirements, Aberdeen finds enough benefits to recommend it in a number of situations:

- Those with NetWare 4.x installed who want to broaden the effectiveness of already installed Novell Directory Services. (Note that while some NetWare 4.x users are concerned about the potential difficulties in upgrading from IPX, Aberdeen believes that the move to the pure IP environment embodied in NetWare 5 will be worth the effort.)
- Those who are adding multiple application servers running Microsoft's NT Server 4.0 and want to be able to easily manage them from a single platform at a centralized professional IS site will obtain substantial benefits from acquiring and deploying both NetWare 5 and the complementary product, NDS for NT;
- Those who have selected NT Server 4.0 as their primary operating system and now need to lower their IT management costs as well as better utilize their available IT resources. (As it

is well acknowledged in the industry, NT Server increases demands for IT resources beyond a level that most executives feel are reasonable. These costs can be lowered significantly with the deployment of NetWare 5, Novell Directory Services, and Z.E.N.works.
- Those who have older versions of NetWare installed on standalone servers dedicated to departmental users and who would like to move into the era of network computing.

Network Operating Systems Are Key To Business Success

Executives - both those responsible for daily business processes and technical support - need to understand the role that a NOS currently plays in enterprise-level, distributed computing environments. Once centered solely on file and print services, network operating systems must now seamlessly integrate many far-flung components of internal and external networks, in order to provide a full-service, highly manageable solution. Directory services act as the glue that holds together networks by managing numerous network components from one central location staffed by IS professionals.

Many Line of Business (LOB) and senior Information System (IS) executives are facing the choice between keeping their reliable, installed departmental NetWare servers or replacing them with Microsoft's NT Server as their enterprise-wide NOS. However, Aberdeen contends that when the question is asked: "Which one, NetWare or NT Server?" the correct answer is "Yes!" The solution is neither NT Server *nor* NetWare alone, but NT Server *and* NetWare operating in conjunction with each other.

NT Server is a well-accepted operating system for small businesses, workgroups and departments for deploying non-mission-critical applications. However, Aberdeen has found that in most instances, NT Server cannot move beyond this isolated role without a NOS to manage a wider-scale deployment.

Rather than wasting unnecessary monies, losing precious time, and countless IS resources trying to implement NT Server as both an application server and network operating system, Aberdeen strongly advises IS decision makers to deploy a more mature NOS that is capable of leveraging NT's strengths and minimizing its weaknesses. While Microsoft's Windows NT Server has won the hearts and minds of many IS managers and LOB executives, the technical realities of NT Server present numerous challenges when it is attempted to be deployed in the role of an enterprise-encompassing network operating system.

NetWare 5 Launched September 1998

Novell has been providing IS organizations with proven NOS solutions for over 15 years. Novell's NetWare 5, released September 1998, includes technology enhancements that further strengthen Novell's ability to meet enterprise-networking requirements. The key to Novell's acceptance and endorsement by enterprise IS executives is its extensive directory-based services within its suite of network operating system products that tie together all network-critical technologies - whether NetWare or NT or Unix or OS/390.

NetWare 5 will be directly compared to Microsoft's NT offering. Aberdeen is concerned that many will compare the functionality being delivered today by NetWare 5 with that promised by Microsoft in its upcoming NT 5.0 release. (Obviously, NT 4.0's directory services are too rudimentary to even be appropriately compared to NetWare 5.) While many of the features planned for NT 5.0 sound similar to those in NetWare 5, it is not realistic or pragmatic to compare and contrast promised future features - especially considering Microsoft's dismal past record in delivering future software when and as promised - with Novell's current deliverable. Unless decision makers want to put significant improvements for their IS infrastructure on hold for the next two years, they need to embrace the reality that NT 5.0, with necessary Service Patches, is at best a mid-year 2000 product. Aberdeen advises IS executives to deal with the planning, deployment, and manageability implications that NetWare 5 is here today and NT 5.0 is at least 2 years out, and get on with life.

From Aberdeen's perspective, Novell and Microsoft are no longer positioned as direct competitors in the NOS arena. The two should be seen as having complementary roles. In most organizations, the solution should not be all NT or all NetWare. Most organizations need both Microsoft *and* Novell.

Directories Really are Critical

Novell Directory Services (NDS) is central to NetWare 5 - and for that matter to all of Novell's products. This is highly important for IS executives charged with managing their enterprise's network infrastructure, since a solid directory service is key to any organization's ability to manage its internal and external networks.

Enterprise networks are expanding rapidly. This growth includes the number of internal users, devices, applications, and other resources; and external connections to suppliers and customers through public and private networks. As a result, IS managers need the benefits of a comprehensive, mature directory service to securely manage rapidly scaling network-wide information about users, events, data, resources, and status.

In fact, mid- to large-sized enterprises should not give a network operating system serious consideration until it has a strong set of directory services. Note that, by Microsoft's own admission, NT 4.0 does not have this capability and will not until NT 5.0.

Countless interviews with IS managers have convinced Aberdeen of the criticality of a directory service which is extensible, scalable, portable and available.

NetWare 5 Manageability Advantages

NDS in NetWare 5 uses objects to create user and resource profiles. For instance, each user object has information about a person, including access rights, location, and other vital information. Printer objects, for example, have information on location, type, and speed. Anyone on the network - with the proper authority - has access to any other "object" (such as a printer) on the network without having to know where it is located or how it works.

Beyond managing people and devices on the NetWare-based network, various versions of NDS can be used to manage applications on other platforms, including NT Server, SCO Unix, Sun Solaris, and IBM's OS/390. This is a critical feature for organizations seeking wide-scale deployment of NT-based applications, such as Exchange.

Novell has made its directory services a site from which IS can manage all business processes across its networks. The network links developing between enterprises and their business partners, customers, employees and others is slowly becoming a reality for many. However, there is a concurrent rise in the worries about how to manage all these internal and external connections. NetWare 5, the incorporated new version of NDS and the availability of Z.E.N.works (described below), now provides administrators with a viable set of solutions that can interoperate with other management packages being used.

NDS now allows for the selective assignment of administrative privileges rather than an all-or-nothing assignment. For instance, an IS executive may want to grant a specific workgroup-level administrator the right to assign user passwords for access to a financial package without also giving that same administrator access to company's sensitive financial data itself. The NT Server 4.0 directory service does not allow this choice - administrative rights are not granular.

NetWare 5 provides dynamic inheritance. With dynamic inheritance, any changes made in company policy flow down automatically to the appropriate related objects. Note that the alternative to dynamic inheritance is an administrative nightmare. Each change has to be done manually. The changes must then be replicated across the network "all at once" when the main directory copy is resynchronized. Thus, a directory with manual, static inheritance has the ironic impact of slowing down implementation of changes and then increasing network traffic.

In response to the legitimate complaints that NDS was difficult to implement and operate, a more simplified administration and setup front-end has been included. NetWare 5 and its various complementary optional products can now be managed from one workstation, called ConsoleOne, from anywhere on the network.

ConsoleOne is a Java-based GUI management console integrated with NDS. This allows developers to build network management solutions with a common look and feel. ConsoleOne is not a bolted-down workstation - any PC from which the administrator can log-on to can run ConsoleOne, including the NetWare server.

One of the major challenges that face companies that use TCP/IP, regardless of size, is the management of IP addresses. Further upholding its commitment to centralized, directory-based management, Novell has integrated both Dynamic Host Configuration Protocol (DHCP) and Domain Name Server (DNS) management into NDS in NetWare 5. By incorporating these services into NDS, Novell has made DHCP and DNS services fault tolerant.

Table 1: NetWare 5 and NT Server 4.0 Comparisons

	Microsoft NT Server 4.0	Novell's NetWare 5
Directory	No directory	Proven technology for almost 6 years
Manageability	Different management interface for each network service or function	Store and manage network data, users, resources, and services from one location
Security	Lack of strength and availability of Microsoft developed security features. NT 4.0 has single sign-on capabilities, but weak encryption and no Public Key Infrastructure Service (PKIS) support	Directory-based, security enhancements support high-level encryption, Public Key Infrastructure Service (PKIS) support, Secure Authentication Service, and Single Sign-On (available in early 1999)
Scalability	Comparable SMP support, known kernel instability, difficult to scale flat-file architecture used to manage users, resources, and server services	Comparable SMP support, new more stable kernel (proven at beta test sites), easy to scale directory. Novell Storage Services (NSS) also adds scalability options.
Application Support	Good application server with strong support from software developers. Lack of a management tools to manage multiple applications	NDS seamlessly manages NT's applications, to provide optimal management efficiency. Novell currently trails behind Microsoft in application support

Source: AberdeenGroup, September 1998

Z.E.N.works For PC Management

Z.E.N.works (Zero Effort Networking), a function included in NetWare 5, is an automatic network setup and management tool which has captured the imagination of every IS manager who has seen it. It leverages the maturity of NDS by allowing administrators to create and manage images of the desktops on the network. Z.E.N.works allows users to log-on anywhere in the network to get their own desktop loaded on that PC. It provides the ability to heal programs that have some of their required files deleted. It can also be used to inventory PCs on the network and generate reports on the hardware specifications. Moreover, it can automatically upgrade packaged and homegrown applications - including year 2000 updates - from the server.

The simplicity of implementing Z.E.N.works belies the impact this utility can have on the bottom

life. Novell's internal studies claim that enterprises can lower their current desktop management costs by up to 32% through the use of Z.E.N.works.

Security That Is Flexible and Practical

Novell has identified and incorporated four security enhancements in NetWare 5 - Novell International Cryptographic Infrastructure (NICI), Secure Authentication Service (SAS), Public Key Infrastructure services (PKIS), and Single Sign-On (SSO) (which will be available in 1999). These improvements offer businesses the ability to easily carry out more complex data processing and transactions with the benefits of directory-based security management.

NICI, an infrastructure that controls encryption levels, is the foundation on which all the new security services in NetWare 5 are built. The underlying functionality of NICI lets application developers bypass cryptographic code in their products.

Built entirely on NICI, Secure Authentication Service (SAS) provides enterprises with highly secure network authentication - secure access between applications and the security database. By supporting multiple authentication methods, SAS provides investment protection and integration capabilities with additional authentication methods.

PKIS is a method of making sure that companies are communicating with other trusted and authorized companies. PKIS is a standards-based technology that uses a trusted certificate authority to verify and sign certificates to validate an identity. Overall, PKIS is considered to be a complex and weighty process that relies on external providers and third party certificate authorities (CAs).

However, Novell has simplified the certificate authentication process by providing NetWare 5 servers the ability to act as an enterprise's own certificate authority. NDS lets a company provide validation to their internal users, shortening the users validation and verification process. Novell initially supports server-side certificates. However, until the client side certificate support is released, NDS with LDAP version 3 support can be used to store the certificates for other third-party servers - Entrust or Netscape certificate servers - right out of the box. Most applications are moving to support the PKIS method of securing business transactions.

Finally, in an effort to simplify user access, reduce application administration cost, and increase productivity, Novell will integrate PKIS with NDS to provide users with single sign-on capabilities. A feature to be made available in early 1999 will ensure that users will not have to sign on more than one time in order to access multiple applications in the NetWare environment. The applications store all of the security information associated with a user's authentication files, user rights and policies.

Another benefit of NDS that companies will be taking advantage of is the single sign-on function. The user "object" contains information about access rights to a range of servers and applications, each of which might have its own unique password and access controls. Administrators will be able to allow users to gain access to authorized servers and applications without requiring them to go through each individual log-on process. This will particularly benefit mobile users - allowing worldwide access to their network from any server on the network without having to authenticate back to the home server.

In comparing the security offerings that are available to enterprises today, Windows NT 4.0 lags far behind NetWare 5. While NT currently offers single sign-on capabilities, it does not support PKIS, and its encryption capabilities are weak at best.

In addition, domain administration security gives anyone that has administrator capabilities full access to any resource in the domain, including applications and client desktops. NetWare's directory-based security supports the ability to assign specific access rights to specific resources.

Scalability and Reliability

The scalability of a NOS is not necessarily directly measurable by support for symmetrical multi-processing (SMP). More important is its level of robustness and efficiency at the kernel level. A poorly designed operating system running on a four-processor system is by no means more scalable than a well-designed operating system running on a single processor.

In the data center, mature mainframe and Unix operating systems scale well - little operating system overhead is needed as processors are added. Doubling the number of processors in a Unix system usually translates into a 1.8 to 1.9 times increase in processing power.

For NT 4.0 Server, moving from 2 to 4 processors leads to no more than a 1.5X to 1.7X increase in processing power. And, NT effectively maxes out at 4 processors, even though some marketing literature states it can go up to 32.

Novell has developed a reliable and scalable kernel for NetWare 5 that is optimized to scale for *networking* services. Novell's NDS directory allows for much better *networking* scalability than Microsoft NT 4.0's flat-file, immature directory architecture.

To evaluate Microsoft's Windows NT 4.0's scalability and reliability, Aberdeen has conducted numerous end-user interviews. These studies indicate that Microsoft NT 4.0, when implemented as a NOS, leads to countless reliability issues requiring server reboots due to frequent crashes. Aberdeen has found that scalability is also an issue. While NT 4.0 works fine when deployed in small workgroup or departmental implementations, when deployed in a larger networked environment, the NOS is unable to handle the challenge.

Finally, Novell Storage Services (NSS) in NetWare 5 provides an improved level of storage capabilities that support high availability and clustering capabilities. The benefits of using NSS are enhanced reliability, speed, and infrastructure for distributed file systems. Shattering the existing file limitations for 4GB to 8 TB on NetWare 5, NSS will do 8 ZetaBytes on a 64-bit Merced making it a world-class data storage management utility.

The need to have scalable and reliable NOS technology is critical to any distributed computer environment. However, regardless of the enhanced scalability and reliability features that are included, if the underpinning of the core technology is not built well, the product itself will be the point of failure- despite the additional feature capabilities.

Delivering IP Open Standards

Building solutions on open standards offers businesses investment protection, a higher level of manageability, and greater interoperability with both current and future technologies.

Based on open standards, NetWare 5 can support pure IP-only networks, resulting in a fully connected networked environment with only one protocol to manage. Pure IP is a large improvement from previous versions of NetWare that had to either encapsulate IP packets in IPX or use gateways to translate one to the other - both of which slowed down data transfer.

While Microsoft offers native IP, Aberdeen has found that in most situations Microsoft's IP needs to be supported by additional protocols - such as NetBEUI - to provide full connectivity between various server and client types - even if they are all Windows-based. Multiple protocols can cause management inefficiencies as well as increased network traffic.

The business benefits of pure IP are greater bandwidth availability, faster network performance, more secure data communications, and closer integration between a business's network and the Internet. As network computing increasingly relies on the Internet, the need for more seamless and higher performance interoperability is critical for optimal computing efficiency.

Underlying Future Application Support

Most ISVs have followed the demand curve, and have ported their applications to NT Server. While NetWare can run or launch many applications, the way that applications are currently developed for NetWare is cumbersome. Historically, NetWare has been tuned for network services, just as NT has been tuned as an application server.

However, Novell is jumping on the Java bandwagon. NetWare 5 has a Java Virtual Machine (JVM) inserted in the operating system, allowing developers to more easily create network applications in Java. Offering greater flexibility for programmers, the JVM also supports CORBA object architecture, as well as VBScript-compatible JavaBeans for NetWare, JavaScript, and Perl 5.

At launch, NetWare 5 will have 200 certified NLM applications and 80 Java applications available. Novell is appealing to young Java start-ups - because of the draw of NetWare's huge installed base - with the rationale that it requires less expensive hardware upgrades than Windows NT. As a result, the number of Java Applications written for NetWare 5 is steadily growing.

NetWare 5 now also offers memory protection for applications, which provides applications crash protection. If one application crashes, it will not bring down all of the other applications that are running on that same platform. Finally, Novell has written and tightly integrated the Oracle 8 database with NetWare 5 and NDS.

Corporate Viability of Novell

The combination of unfavorable marketing conditions, a major increase in competition, and a series of disastrous business, management and marketing decisions has done severe damage to Novell's image over the past three years.

Managers will often buy mediocre but key products from a company that is seen as a long-term financial and marketing winner rather than superior products from a company that is behaving like a loser.

Thus, the shoring up of Novell's management team and its balance sheet over the past year has been as important as improving the company's product set. The most recent financial results have been quite positive, and with almost $1 billion in cash on hand - capable of meeting a year's cash flow requirements - Novell's financial health is good and improving. A new management team was put in place 18 months ago, and a new strategy has been in place for a year. How well this team is executing on its new plan will be seen with the roll-out and market acceptance of NetWare 5. But, to date the signals have been very positive.

Conclusions

The health of an enterprise's IT infrastructure is a key factor in determining corporate viability and competitiveness. Increasingly, the Network Operating System is being used as the glue that appends all of networks' disparate technologies. The NOS dictates the potential level of performance, productivity, management efficiency, connectivity, security, scalability, and reliability a network and enterprise can achieve.

Marketing and supplier branding are driving forces behind buying trends in the NOS market, with very little attention being paid to the NOS technology itself. Aberdeen has found that Microsoft NT Server 4.0 has done a satisfactory job functioning as a departmental application server and as a NOS for isolated workgroup environments. But the reality is that it does not live up to its marketing portrayal as the enterprise-wide network operating system IS executives should bet their careers on.

In addition, Aberdeen's end-user research shows that NT 4.0 is just not mature enough to handle the load of large-scale, enterprise computing. Contrary to popular belief, NT is not ready to replace all other NOSs at the enterprise level. In fact, because NT Server does not have a proven

track record of being able to function alone without incident, Aberdeen views NT as a child that has potential, but that still needs adult supervision.

As more applications move from just being Java enabled to being Java based, NetWare's underlying superior features will put it back in high demand as an application server.

While Novell's time-proven, enterprise-quality technology functions successfully in an all NetWare environment, it also provides the support and guidance needed to manage and administer NT solutions. NDS, along with additional management components integrated into NDS, has set Novell far ahead of its competition. By identifying its own strengths and the other operating systems' weaknesses, Novell has created a platform that can seamlessly integrate technologies from other vendors, allowing companies to deploy best-of-breed solutions.

Scores of interviews with IS managers by Aberdeen analysts over the past year have shown time and again that the enterprise's key IS professionals want to expand NetWare's role as the enterprise's primary NOS. These same grizzled veterans describe the pressure they are under by their business counterparts to move to NT Server as the NOS.

NetWare 5 is not the universal panacea needed to cure all of the enterprise's networking ills. But, it should play a major role in IT operations over the next several years.

Aberdeen's message to Line of Business managers is quite simple. If your wide-scale implementation of application servers, along with the growing use of networks for business purposes, is to be successful in the long run, it will do so only in a heterogeneous environment. This is a fact of life. It is dysfunctional to think that any one product or firm is capable of meeting all the myriad demands being placed on the IT network infrastructure.

But the key strength of NetWare 5 remains its ability to manage heterogeneous networked technology components. IS buyers can choose the best-of-breed application server, and Novell will integrate with it.

[Aberdeen]

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The NetWare 5 Advantage

NetWare 5 made high marks in beta as a solid product. Now major companies have already installed it as their primary network Operating System.

Unlike NT 4.0 (or even NT 5.0 when it arrives) it provides true competitive edge for those companies than cannot wait to grow.

THE NOVELL ADVANTAGE

Novell Advantage Home
Platform Page
NetWare 5

Snap Shot
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Reality Checks
What About Windows NT 5.0?

Did You Know?

"...Don't just think of NetWare as a great file and print NOS. Now, you can use NetWare to run server-based applications, manage all of your client PCs, keep track of every system and user in the entire network and set up a corporate intranet....."

PRESS PC Week

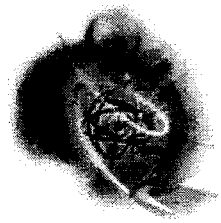
"Novell Inc. scores with the latest version of NetWare. PC Week Labs can say, without qualification, that Version 5.0 of the venerable NOS will make NetWare networks more capable and easier to manage--businesses should waste no time in upgrading their servers."

PRESS PC Week

Internet Computing says NetWare 5 puts Novell well ahead of the game when it comes to building corporate intranets. Long-standing NetWare advantages just can't be ignored. The red box is back!

PRESS ZD Net

The
NetWare 5 Advantage



Snap Shot

Novell®

- Novell supports mixed networks and manages those mixed environments better than anyone else.
- NetWare 5 is designed and optimized to run networks, manage networking services including application servers such as including NetWare, Windows NT, UNIX and other host systems.
- NetWare 5 is up to 69 percent less expensive to manage and administer than Windows NT, based on the directory-enabled management approach to server, services and desktop administration.
- Novell Directory Services™ (NDS™) is market proven, with over 46 million users and four years of real-world experience.
- NetWare 5 is based on open standards including a pure implementation of IP.
- NetWare 5's multiprocessing kernel provided unprecedented scalability and reliability.
- NetWare 5 integrates the fastest Java execution environment, a quick development environment and the next generation of Internet-based distributed applications.
- NetWare 5 includes the world's leading database, Oracle8 providing single sign-on and centralized management.
- NetWare 5 sets new standards for storage with Novell Storage Services.
- NetWare 5 sets new printing standards with Novell Distributed Print Services significantly reducing the cost of managing print services and increasing end-user productivity.
- NetWare 5 has enhanced our security services beyond the industry leading NetWare 4.
- Novell is currently shipping products that provide real and tangible business benefits to customers that cannot wait to grow.

Microsoft

- Microsoft's philosophy on reducing the cost of owning a network is to rip out existing mixed environments and replace with homogeneous Microsoft solutions at whatever cost.
- Initially, Microsoft has made very strong insinuations that NT Server 5.0 will solve all of the world ills in order to stall the market. Recently, Microsoft has started to reset marketing expectations regarding the actual deliverables for NT Server 5.0.
- Windows NT was developed as a general-purpose or multi-purpose operating system for both desktops and servers. Ironically, Microsoft recommends that NT Servers are deployed as single purpose machines in order to eliminate the scalability and reliability issues.
- NT Server 4.0 is approximately 16 million lines of code

and NT Server 5.0 is projected to explode to nearly 40 million lines of code, of which 80% is new. At 40 million lines of code, NT Server 5.0 will be bigger than MVS.

- NT does not provide a cross-platform directory or management infrastructure.
- Microsoft Windows NT Server does not provide a true directory, but rather provides a flat file domain based multiple listing approach to manage network resources.
- NT Server networks requires larger IS budgets and staffing to accommodate the increased cost of managing multiple domains, domain relationships, and additional hardware.
- NT Server has dependencies on NetBIOS, in their protocol and naming (Domain) services. In fact, Microsoft has published their unique NetBOIS based IP protocol implementation with RFC #1001 and 1002.
- NT Server requires substantially greater hardware investments.
- Migrating to NT can result in a one-third decrease in performance, and a 50 percent increase in management costs, workstation freezes, transmission drops and constant rebooting. (Aberdeen Group)
- Active Directory is still in its early beta stages, and when it is available, it will not provide the level of functionality that NDS offers right now.
- Microsoft is not committed to Java and ships a Java execution environment that is not 100% Java certified.
- Microsoft continues to promise functionality that Novell is currently shipping in order to freeze the market and force server and workstation upgrades regardless of the actual cost to customers.

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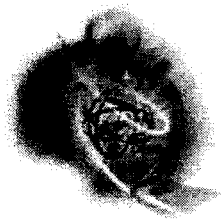
The
NetWare 5 Advantage



Executive Summary

NetWare 5 Executive Summary Both Novell and Microsoft provide software that run networks. Customers need to know the essential differences between NetWare 5 and Windows NT Server in order to make critical decisions regarding their increasingly business dependent networks. Novell fundamentally believes that the best operating system to run those mission critical networks is one that was designed from the ground up, to run networks - not a general purpose operating system that was designed to run desktops. While there is a place in networks for general purpose application servers, operating systems that are specifically designed to run networks are focused on delivering the highest levels of manageability and networking services without any conflicting priorities.

Summary

Customers must choose networking software based on their needs, both present and future, and compare the capabilities of existing products and the vendor's capabilities to deliver future enhancements. Novell's networking roots have produced the only true directory service and the best networking software to meet today's increasing network demands. Microsoft is focused on desktop operating systems, productivity suites, consumer software, encyclopedias, on-line news services, mice and joysticks, and various other computing paraphernalia - but not focused on networking. Novell is focused on networks and delivering the networking services required for both today's and tomorrow's networking needs. As the networking specialists, Novell will continue to provide the best networking solutions for business' expanding needs and environments.

NetWare 5 is the best choice of networking software for today's mission-critical business needs. NetWare 5 leverages the industry-leading directory, Novell Directory Services, like never before, delivering solid management and administrative efficiencies that are still dreams at Microsoft. NetWare 5 delivers scalable networking services truly based on open standards - we have not hidden any proprietary protocols under the covers. Novell firmly believes that customers who implement open standards-based solutions will protect their investments, interoperate better with other best-of-breed solutions, and avoid the pitfalls of proprietary systems, including forced upgrades. Additionally, NetWare 5 delivers scalable native applications, the world's leading database with Oracle8, and the fastest Java execution environment for the next generation of networked applications. Finally, NetWare 5 raises core networking services such as file and print to new performance, reliability and security standards that will broaden the gaps with Windows NT Server's multi-purpose services.

Microsoft's Windows NT Workstation and Windows NT Server products are useful at running desktops and Windows-based applications. Novell's shipping products such as NDS for NT and Z.E.N.works (Z.E.N.works Starter Pack included with NetWare 5) will extend and manage those environments better than Microsoft. Additionally, these Novell products work with previous NetWare versions and will not require or force expensive and corporate-wide upgrades to deliver their benefits. Microsoft's corporate strategy is to lock in the market with single-sourced technology and the promise of a homogeneous utopia; thus forcing upgrades. Novell's strategy is to manage the mixed environments that exist in corporate networks and make those networks more reliable, scalable and secure than anyone else.

Companies must make decisions on both the current product set and future promises of enhancements. Microsoft takes the promotion of potential features to new heights and openly will sell future products and features without firmly committing to those features. Let's take a quick look at Microsoft's own very general statements regarding NT Server 5.0 expectations:

"It's a massive release, the most comprehensive release we've ever tried to do.....Windows NT [5.0] is so strategic that Microsoft is going to bet the company on it." - Jim Allchin, September 23, 1997

Microsoft backpedals on NT 5.0, by Sharon Gaudin, Computerworld, August 24, 1998

"Microsoft Corp.'s main evangelist for its highly anticipated Windows NT 5.0 operating system is now taking a step back and trying to rein in user expectations.

Even as Microsoft was unveiling the second beta release of NT 5.0 last Week, Jim Allchin, Microsoft's senior vice president of personal and business systems and chief NT executive, was beating a hasty retreat from some of the company's previous lofty proclamations.

In front of an audience of about 200 analysts at an NT workshop in Redmond, Wash., Allchin said NT 5.0 'was not perfect' and called it 'a work in progress' in a bid to lower expectations about the quality of some of its features and functions. In short, 'NT 5.0 is not the be-all, end-all,' he cautioned the attendees.

Novell certainly understands the complexities and dynamics of large software projects and thus recommends customers strongly consider the value of shipping products, their features, and their business benefits over any promises of future deliverables.

However, Novell does understand the need for customers to understand future product directions. Therefore, Novell will compare NetWare 5 with both NT Server 4.0 and do our best to compare against the shifting sands of the NT Server 5.0 promises.

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Ware 5

ral new features—some of which might surprise you.

	Description
	NetWare 5 adds support for TCP/IP while maintaining support for IPX/SPX. As a result, you can implement a pure TCP/IP environment, or you can keep using IPX/SPX, either alone or as part of a mixed TCP/IP and IPX/SPX environment.
	NetWare 5 includes a Java Virtual Machine (JVM), which is embedded in the NetWare 5 kernel. NetWare 5 also includes ConsoleOne, a Java-based server console, and several Java-based utilities, such as a GUI installation utility and a Dynamic Host Configuration Protocol (DHCP)/Domain Name System (DNS) management utility. In addition, NetWare 5 includes the Open Solutions Architecture (OSA) software developer's kit (SDK), which enables developers to write Java-based applications that run on any server with a JVM, such as a NetWare 5 server.
	NetWare 5 has been enhanced to provide an optimal environment for running applications. For example, the NetWare 5 kernel offers memory protection, virtual memory, application prioritization, and support for both uniprocessing and multiprocessing.
	NetWare 5 includes NSS, Novell's new high-performance storage and retrieval system, which is backward compatible with the existing NetWare file system.
	NetWare 5 offers a Compatibility Mode option, which enables you to control the rate and the degree of change on your company's network as you migrate from IPX/SPX to TCP/IP.
on ices	NetWare 5 allows DHCP and DNS servers to store information in the NDS database. As a result, you can manage DHCP and DNS services, such as IP addresses, just as you manage the other network resources in your company's NDS tree.

NetWare 5 uses NDPS as its default print service. NDPS allows you to install, configure, and manage printers from a central location. NDPS also offers improved bidirectional print communications, improved job scheduling, and automated print driver installation.

NetWare 5 includes a new GUI backup utility that offers multiple and repetitive job scheduling. This utility, which is protocol independent, also takes full advantage of NDS, enabling you to manage the backup process from a central location.

NetWare 5 includes support for SLP, an industry-standard Internet protocol. In NetWare 5, SLP discovers network services for IP clients in a pure TCP/IP environment and in a mixed IPX and IP environment.

NetWare 5 includes support for an emerging technology known as I_2O. I_2O is an intelligent I/O technology that vastly improves I/O throughput and overall system performance by relieving host resources (such as the processor, memory, and system bus) of interrupt-intensive I/O tasks.

NetWare 5 includes a five-user version of Oracle8 for NetWare, which has been integrated with NDS. As a result, you can use NDS to control access to your company's database. (For more information about Oracle8 for NetWare, see the related article on p. 24.)

NetWare 5 includes Netscape FastTrack Server for NetWare, which is World-Wide Web server software based on open Internet standards. Netscape FastTrack Server for NetWare provides a cross-platform environment for creating and posting web pages and for developing and deploying web and database applications.

NetWare 5 includes the Z.E.N.works Starter Pack, which offers all of the functionality currently available in Novell Application Launcher (NAL) 2.5 and Novell Workstation Manager 1.1. The Z.E.N.works Starter Pack is a desktop management tool that uses NDS to simplify the process of managing Windows-based workstations. The Z.E.N.works Starter Pack also makes the network easier for users to use. If you like the Z.E.N.works Starter Pack, you can purchase the complete Z.E.N.works product, which offers even more functionality. For example, this product allows you to take control of workstations from a remote location and to conduct an inventory of these workstations. (For more information about Z.E.N.works, see "Z.E.N.works Zeroes in on Workstations," *NetWare Connection*, Apr. 1998, pp. 28–34. You can download this article from http://www.novell.com/nwc/apr.98/zen48.)

Afskriv ikke Novell

Novells vice president Tom Shuster har været i København, og PC Magazine fik en snak med ham om Novells syn på verden lige nu og i fremtiden.

Et spørgsmål, der må stilles, inden vi kommer for godt i gang, er, hvem er egentlig Novell? Når det skal stilles – de fleste har hørt om Novell NetWare, det kendte netværksoperativsystem med den store markedsandel – er det på grund af de store omvæltninger, Novell har gennemlevet.

Novell har altid stået for kvalitet og høj ydelse med sit Novell NetWare-produkt, men så gik det løs: Digital Research blev købt, og med det kom DR-DOS (siden Novell-DOS), WordPerfect blev opkøbt, og Novell havde også et side-eventyr med en Unix-variant. Det hele er nu solgt igen, noget af det med tab i millionklassen, og det har naturligvis ført til bekymring over, hvad Novell egentlig ville, respektivt hvem firmaet ville være.

Novell har yderligere haft en periode, efter at stifteren, Ray Noorda, forlod firmaet, hvor virksomheden har stået uden en helt troværdig leder.

Imens har konkurrenten Microsoft fået Windows NT på markedet – et produkt, der på flere planer sigter direkte på at overtage arbejde fra Novell-servere og integere sig med disse.

Et nyt Novell

Men på et tidspunkt tog man fat. Dr. Eric Schmidt, måske kendt af nogen som en af nøglepersonerne bag udbredelsen af Java-sproget, kom over fra Sun i april 1997, og han fik overdraget posten som øverste chef. Deraf fulgte en skrap reorganisering af firmaet: 46% af alle vice presidents blev afskediget, og arbejdsstyrken blev totalt set reduceret med 18%.

Med en visionær herre som Schmidt på posten tog det ikke lang tid at få formuleret en strategi, der bygger på åbne standarder, og som skulle integrere Internet-teknologierne fuldstændig i Novells produkter. Novell står stadig med et produkt, nu kaldet Novell IntranetWare, der har mere end 50% af markedet for serversoftware på verdensplan, og det er den markedsandel, som Microsoft er meget interesseret i at overtage. Men Novell sidder ikke bare og ser på; de arbejder selv af al magt på at forøge deres markedsandel.

Skal man med få ord omtale, hvad der gør Novells måde at bestyre netværk på speciel, kommer man ikke uden om NDS, Novell Directory Services, som særdeles forenklet fortalt er en brugerfortegnelse, hvor administratoren ud fra egenskaber tilknyttet hver enkelt bruger kan styre, hvad netværket skal give adgang til, for eksempel hvilke ikoner den enkelte skal kunne se på sin arbejdsplads, og hvilke servere brugeren i virkeligheden logger på. Set fra brugerens synspunkt logger man nemlig nu på netværket, ikke på en bestemt server, som jo kunne være nede. Det er ved at være tæt på, at netværket er computeren!

Administrér alt

Med udgangspunkt i NDS kan Novells mange tilbehørsprogrammer styre stort set alt omkring en distribueret arbejdsform, og Novells GroupWise – en groupware-applikation med mange facetter – drives også ud fra NDS.

Groupware og NDS tillader for eksempel, at en gruppe af brugere publicerer til samme Web-server. Skriver en medarbejder et memo eller et dokument, ville den typiske måde at dele det med andre på være at sende filen rundt som vedhæftet fil til en e-mail. På GroupWise kan man blot publicere den til gruppens Web-server og så blot i stedet fremsende pegepinden til dokumentet i en e-mail. Det sparer mængder af netværksressourcer uden at mindske funktionalitet!

Men NDS kunne være så snedigt det ville, hvis det kun duede på Novells eget netoperativsystem. Bevares, Novell-administratorer ville have noget at blære sig med, men det ville ikke være noget afgørende argument. Men Novell har klaret at udbrede NDS til en stribe af platforme og operativsystemer, og med tilkomsten af Windows NT (der er her plads til en pause for den forbavsede læser), IBM S/390 og en række signifikante UNIX-dialekter begynder der at tegne sig et billede af ét samlet netværk, der alt sammen kan administreres fra én administrators skærm og alligevel omfavne en virksomhed af vilkårlig størrelse.

Ud med IPX

Novell har altid stået fast på sin IPX-protokol som det, der drev netværket. Andre protokoller skulle "tunneles" igennem IPX, på samme måde som NT egentlig er en NetBIOS-server.

Men med Schmidts ankomst skulle det være anderledes, og fra næste version af Novell IntranetWare – med kodenavnet Moab – arbejder og tænker Novells netoperativsystem rent IP.

Grænsekontrollen

Et af Novells seneste tilbehørsprodukter tegner et billede af, hvad vi skal se fremover. Produktet hedder BorderManager og er en ren perle, hvad angår indpasning af netværk i vanskelige omgivelser. Produktet kan for eksempel oprette og vedligeholde virtuelle netværk, således at grupper af pc'er på ét stort fælles kabelnet kan opdeles i grupper, der ikke kan se hinanden.

Det kan være til stor nytte for eksempel i kontorbygninger med fælles kabling, hvor man ikke blot kan klippe over, hvor det næste firmas kontorer begynder – eller til at skille det interne net fra masserne af eksterne.

De virtuelle netværk kan også strække sig over WAN-forbindelser, men det er ikke alt: BorderManager byder på alle de opgaver, der traditionelt skal løses dér, hvor netværk skal mødes: Proxy-service, Web-server og forskellige gateways.

BorderManager tillader endda de fleste organisationer at sætte turbo på deres netværk igennem en meget avanceret cache-politik, som bevirker, at der holdes check på, hvilke Web-sider Web-serverne i netlandskabet har i cachen. Haves en ønsket side i cachen i en af serverne, sendes den derfra i stedet for at blive indlæst fra disk, hvilket naturligvis bevirker en acceleration af svaret til browseren.

Novell vil heller ikke stå tilbage for Microsoft, når talen kommer på at arrangere Inteleknologi i klynger, der kan arbejde sammen. Således har Novell annonceret tilbehøret "Orion" til Moab, der understøtter klynger af op til 16 servere.

Og Java

Selvfølgelig kunne man ikke sige Eric Schmidt uden også at sige Java. I gamle dage kunne man udelukkende afvikle såkaldte NLM'er, Netware Loadable Modules, på Novell NetWare – altså programmer, der faktisk kørte på selve serveren. Disse var svære at skrive og forstå.

Nu gør Novell, hvad de kan for at gøre deres netstyresystem til den perfekte platform at afvikle Java-kode på, og faktisk har de gjort meget for at sætte Java i "voksne" rammer. Der er således indarbejdet støtte for logiske fil-og ressourcenavne (goddag testmiljø!) og databasetilgang fra Java.

Men det er ikke alt. Der kan nu ikke blot køres NLM'er på serveren, men også programmer, der er skrevet i C++. Dermed er Novell også parat til en stærkere rolle som applikationsserver.

Stærkt overdrevne

Novell, verdens fjerdestørste softwarehus, har altid haft en markedsandel i omegnen af de 50%. Den tegner ikke ligefrem til at falde i disse dage. Novell rapporterer, at de har solgt 500.000 serverlicenser på de første 2 kvartaler af 97, hvilket svarer til en vækst på 20%. Der kommer 35% flere brugere på Novell-drevne netværk om året, og Novells Website rammes 38 millioner gange om måneden.

Man må nok mene, at rygterne om Novells død er overdrevne! Se mere på http://www.novell.com.

Henrik Paludan-Mørk

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17. december 1997

Vor ref: NAN

Vedr. Novell/NT rapport

Kære Jørgen

Hermed sender jeg et papireksemplar af den bestilte rapport, som jeg har kaldt "Overvejelser vedrørende fremtidig serverplatform".

Jeg håber naturligvis, at rapporten tilfredsstiller forventningerne. For afslutte projektet ved årsskiftet som det var planlagt vil jeg foreslå, at vi snarest afholder et møde for at afklare eventuelle kommentarer/spørgsmål til rapporten.

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Overvejelser vedrørende fremtidig serverplatform

Dansk Biblioteks Center

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0. RESUME

0.1 Problemstilling

DBC har i dag et blandet edb-miljø bestående af bl.a. Unix, Windows NT og Novell NetWare platforme. Traditionelt har Unix platformene afviklet applikationer og huset databaser, mens Novell NetWare er blevet benyttet til fil- og print-services. I forbindelse med Windows NT's voksende popularitet og markedsdominans har DBC valgt at teste/benytte Windows NT til visse mindre "mission critical" services, hvoraf nogle eksempler er databaser og fil/print.

Selv om platformen endnu ikke gennemgribende har vundet indpas som applikations- og database-platform, stiger antallet af Windows NT-baserede servere i DBC støt. Derfor har det været naturligt for DBC at overveje den fremtidige anvendelse af traditionelle IntranetWare fil- og print-services mod Windows NT's tilsvarende services. Et af argumenterne er at nedskære det administrative overhead med at skulle servicere flere forskellige platforme og teknologier.

0.2 Analyse

DBC's overvejende krav i diskussionen IntranetWare contra Windows NT bør være (i prioriteret rækkefølge):

- Samme eller forbedret funktionalitet for brugerne
- Overholdelse af markedets (de facto) standarder
- Bedst udnyttelse af intern ekspertise

Når man i dag vælger et IT-redskab, mener Network Consult, at redskabet skal være modent på følgende punkter (vi kalder det IT-afdelingens *Survival Kit*):

- *Manageability*
- *Scalability*
- *Security*

DBC's afvejninger bør derfor være:

- Kan vi retfærdiggøre at beholde IntranetWare ud fra ovenstående krav?
- Gøres der "køb" på ovenstående krav ved at migrere til Windows NT?

0.3 Anbefaling

Både IntranetWare og Windows NT løser i dag de basale behov i en virksomhed. Alle er "født" med "must have" funktionaliter såsom deling af fil og print, web- og ftp-services, DHCP, DNS og kommunikation via TCP/IP.

På det tekniske tekniske plan er funktionalitetsforskellene minimale, hvad angår de basale net-services.

Windows NT har indlysende fordele, når det kommer til applikations- og database-services. Novell IntranetWare er markant bedre på administrationssiden i kraft af Novell Directory Services (NDS™).

DBC bør i deres valg basere sig på standarder. Ved standardisering vælger man systemer, der overholder og anvender åbne standarder. Dette indebærer ikke nødvendigvis ensidig satsning på een producent, idet man da risikerer at gøre køb på *scalability* og *security*.

På det foreliggende grundlag finder Network Consult, at gevinsten ved at ændre NOS på nuværende tidspunkt er til at overse. Skulle DBC dog vælge at migrere fra Novell til NT, er det Network Consult's opfattelse, at DBC ikke løber nogen særlig risiko for uforudsete tekniske eller funktionelle problemer.

Det tyder på, at DBC i ansættelses- og uddannelses-processen (bevidst eller ubevidst) ikke vælger at lægge vægt på NetWare-viden hos medarbejderne. Hvis dette er korrekt, har man altså allerede (bevidst eller ubevidst) taget en beslutning om at nedprioritere/udfase denne platform.

DBC bør under alle omstændigheder gøre en indsats for at få det eksisterende NOS til at fungere stabilt. Alternativt kan man risikere at stå i en situation, hvor IT-afdelingen ikke selv bestemmer hastigheden af en eventuel migration. Konsekvenserne af en hastig og uigennemtænkt migration kan være ubehagelige.

Slutteligt skal man huske, at det overordnede mål er og bliver, at IT-afdelingen kan stille ønskede services til rådighed for brugerne. Ud fra denne betragtning er virksomhedens NOS en usynlig størrelse, hvis navn og kulør er underordnet.

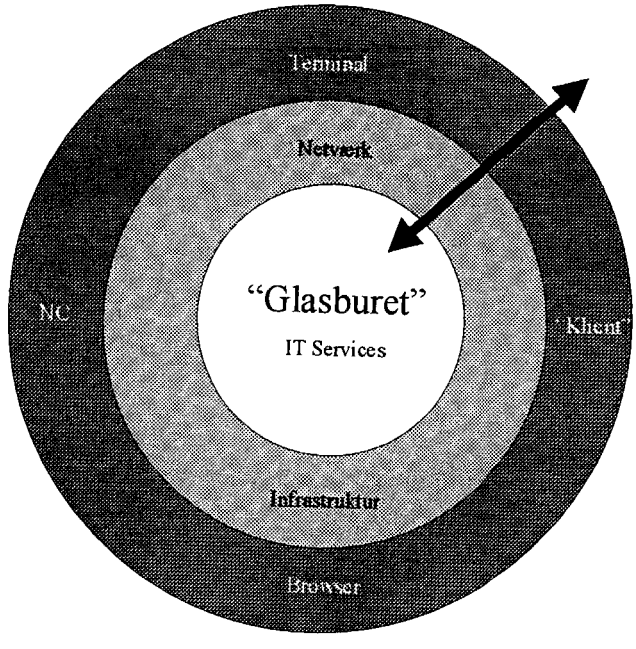
1. INDLEDNING

Denne rapport er resultatet af et analysearbejde, som Network Consult (i det følgende kaldet NWC) har udført for Dansk Biblioteks Center (i det følgende kaldet DBC) i december 1997. Formålet er at belyse, hvilke argumenter DBC bør benytte i valget mellem Novell IntranetWare® og Microsoft® Windows NT® netoperativsystemerne som strategiske platforme for DBC's fortsatte behov for fil- og print-services.

Konklusionerne i rapporten er baseret på offentligt tilgængelige markedsanalyser, information fra producenter samt egne indtryk. Rapporten belyser problemstillinger på både teknisk og strategisk niveau.

1.1 Et kig i glaskuglen

IT-arbejdsområdet udgør ikke længere kun det lokale netværk, men spænder derimod over "global" arbejdsplads, lokalt, globalt og mobilt.



Figur 1 IT-afdelingen og brugerne

Samspillet mellem IT-afdeling og IT-brugere kan beskrives med ovenstående tegning.

I mainframens tid bestod IT-afdelingen af højt specialiserede medarbejdere, som servicerede maskinel og programmel fra een bestemt leverandør. De isolerede sig selv inde i "*glasburet*". Brugerne udefra måtte handle ud fra den funktionalitet, som IT-afdelingen og teknikken fastlagde. Pilen på tegningen vendte altså i høj grad indefra og ud. Derved var det muligt at have en centraliseret administration med en deraf følgende lavere driftsomkostning.

I dag er pilens retning i høj grad vendt indad. Der bliver fra brugernes side stillet krav til funktionalitet og fleksibilitet, hvilket influerer på og dominerer IT-afdelingens arbejde. Funktionaliteten er mere decentralt placeret med workgroup servere, pc'er med lokalt installerede programpakker og peer-to-peer adgang på netværket. Investeringerne i udstyr er faldet drastisk i denne periode. Driftsomkostningerne er tilsvarende eksploderet. De løbende driftsomkostninger udgør typisk ¾ af det samlede driftsbudget.

Prognoser for de kommene år viser, at brugerne i stigende omfang vil kræve adgang til netværkets ressourcer uanset deres placering. De vil kræve høj tilgængelighed af alle ressourcer, og samarbejdet med andre brugere spænder ud over den enkeltes organisation. Som reaktion på disse krav og behov må IT-afdelingen tage metoder i anvendelse, som sikrer, at systemerne fortsat kan administreres, uden at omkostningerne eksploderer.

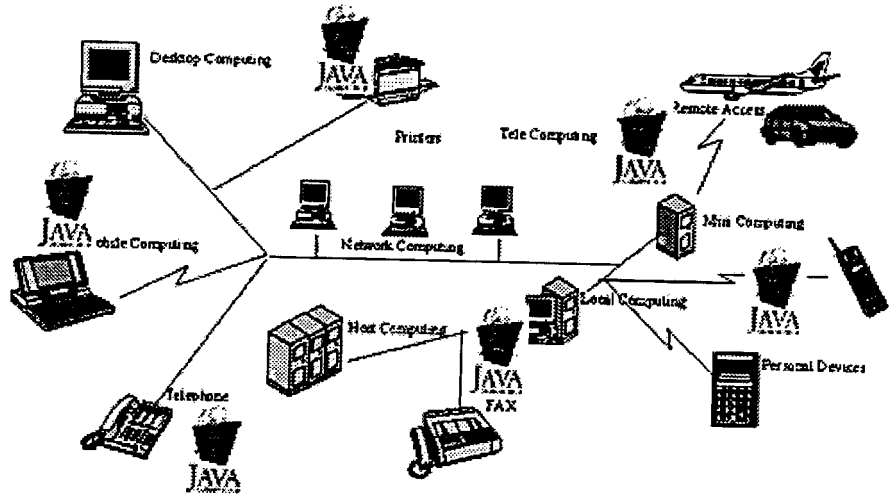
IT-brugerne	IT-afdelingen
Nomadiske brugere	Manageability
Performance	Scalability
Samarbejde på tværs af organisationer	Security

Tabel 1 Brugernes behov contra IT-organisationens værktøjer

I relation til tabel 1 har vi derfor opstillet *"de tre bud"* for IT-afdelingen (også kaldet IT-afdelingens *Survival Kit*):

- *Manageability*
- *Scalability*
- *Security*

NWC's bud er derfor, at IT-afdelingens succes med det "globale" netværk kan sikres ved, at de værktøjer og systemer, som vælges, passer ind i modellen med de tre bud.



Figur 2 Det "globale" netværk

I beslutningsprocessen kan man let lade sig friste til udelukkende at betragte funktionalitet ud fra en rent teknisk betragtning. Formålet med denne rapport er danne et bedre grundlag for at kunne tage den "korrekte" beslutning ud fra en helhedsvurdering.

2. DBC'S SITUATION

2.1 Nuværende forhold

DBC er placeret på een geografisk adresse i Ballerup. DBC har et antal samarbejdspartnere (f.eks. biblioteker), som har adgang til DBC's netværk, men kun via terminal og web.

DBC har ca. 160 brugere på netværket, som består af et switched ethernet med 10/100 Mbps tilslutning via struktureret kabling.

På serverne benyttes mange forskellige operativsystemer på lige så mange forskellige hardware platforme. Således kan nævnes

- IBM AIX
- S/5
- SCO UnixWare
- Sun Solaris
- Novell NetWare 4.1
- Microsoft Windows NT

Medarbejderne på netværket anvender Windows95 og Windows NT. Desuden benytter et antal medarbejdere ISDN-opkobling til netværket.

Der benyttes CA Unicenter som administrationsværktøj.

De grundlæggende daglige netværksbehov udgør adgang til Unix-baserede databaser/applikationer (fortrinsvist Oracle), fildeling, printdeling samt elektronisk post.

I den seneste tid er der blevet installeret Windows NT servere til bl.a. afvikling af Microsoft Exchange, implementering af et Intranet samt test af Oracle databaser.

2.2 Forventninger til fremtidig anvendelse

DBC forventer fortsat at have et heterogent driftsmiljø. Bl.a. ønsker man at fastholde Unix-platformen i sit *mission-critial* database-miljø. Det er ikke tanken på kort eller længere sigt at erstatte dette miljø med Windows NT, bl.a. p.g.a. manglende skalerbarhed og driftsstabilitet på Windows NT platformen.

Når valget vedrørende NetWare/Windows NT er bragt på bane, skyldes det derfor ikke primært, at man ønsker at "standardisere" eller homogenisere sin netværksservices på Windows NT platformen, men snarere grundet en akut situation bestående af

- hardwareproblemer på NetWare-platformen med ustabilitet i driften til følge
- fratrædelse af IT-afdelingens mest Novell-kyndige medarbejder
- forespørgsler fra ledelsen grundet Microsofts øgede markedsdominans (i hvert fald på marketing-siden)

3. FUNKTIONELLE OG TEKNISKE OVERVEJELSER

3.1 En hel løsning i dag?

De fleste Microsoft-promoveringer af Windows NT som et *multi-purpose* operativsystem inkluderer en graf, der ad X-aksen har *fil/print services* og ad Y-aksen har *application services*. Novell ligger langt ude af X-aksen, mens Unix ligger langt oppe af Y-aksen. Langt ude af en ret linie med en hældning på 45 grader ligger Windows NT.

Selv om placeringen på kurven nok skal tages med en skovfuld salt er det et ubestrideligt faktum, at antallet af Windows NT installationer stiger med rasende fart. Een væsentlig faktor sætter dog en stopper for glæden, specielt i større og geografisk spredte virksomheder: *Domain*-arkitekturen lægger ganske enkelt en grænse for, hvor stor en Windows NT installation kan vokse i dag. Administrativt bliver det et helvede at skulle holde styr på *n* domains, når antallet af *domain-trusts* (en metode til at delegere rettigheder på tværs af domains) udgør en faktor *n*(n-1)*. Samtidig udgør domain-strukturen en *single point of failure*. Ganske vist kan man replikere sin primære *domain controller* (PDC) med en backup *domain controller* (BDC), men ændringer kan kun udføres med en tilgængelig PDC.

Derfor arbejder Microsoft intensivt med en *directory service* til Windows NT.

Da Novell introducerede NetWare 4, var den bagvedliggende kerne stort set uforandret, hvorimod administrationen tog et tigerspring med introduktionen af *Novell Directory Services* (NDS). NDS er en global database over ressourcer i netværket, og databasen er fælles for alle servere. Man logger altså ind på *netværket* istedet for at logge ind på *serverne*. NDS skalerer effektivt i store og distribuerede miljøer, da den underliggende (proprietære) database har effektive replikeringsmekanismer, som begrænser kravet til båndbredde mellem serverne.

Kort tid efter omdøbte Microsoft i øvrigt *NT Domain* begrebet til *NT Directory Services*.

Siden er NetWare blevet omdøbt til IntranetWare, idet Novell ved en mindre versionændring fra 4.10 til 4.11 tilføjede bl.a. Intranet-funktionalitet. Denne version indeholder *tillige Novell Application Launcher*, som giver mulighed for *networked applications*, samt understøttelse af Windows NT workstation *roaming profiles*. Derved kan man helt undgå at installere en Windows NT server til at administrere Windows NT klienter i et ellers rent Novell-miljø.

Novell har for nyligt introduceret NDS på andre platforme end NetWare. NDS kører i dag på visse Unix-versioner. I mangel af en Windows NT directory service har Novell set sit snit til at drille Microsoft ved at markedsføre *NDS for NT*. Novell erstatter en enkelt DLL på Windows NT serveren, hvorved at alle forespørgsler til NT domain-databasen redirigeres til en IntranetWare-servers NDS. Derved har Novell som den første producent muliggjort administration af Windows NT i distribuerede miljøer!

3.2 Sammenligning af tekniske features

Tabellen nedenfor illustrerer, at begge NOS'er har de basale features, der skal til for at tilfredsstille DBC's behov for fil og print.

	Windows NT Server 4.0	IntranetWare
Arkitektur		
Processorer	Intel, Alpha	Intel
Preemptive multitasking	✓	Delvis
Symmetrisk multiprocessing	✓	✓

	Windows NT Server 4.0	IntranetWare
Virtuel hukommelse	✓	
Memory protection	✓	Delvis
Protokoller		
Medfølgende protokoller	NetBEUI, IPX, TCP/IP (NetBios over TCP/IP)	IPX, TCP/IP (NetWare/IP)
Multi-protokol router	✓	✓
Remote Access server	✓	Option
DHCP support	✓	✓
WINS support	✓	✓
DNS server	✓	✓
Internet/Intranet features		
Web server	✓	✓
FTP server	✓	✓
Web-database integration	✓	Yderst begrænset
Remote web-server administration	✓	✓
CGI	✓	✓
SSL	✓	✓
Søgeværktøjer	✓	✓
Filsystem		
Kompression	✓ (hele diske, omgående kompr.)	✓ (efter x dages inaktivitet, kan udføres ved lav belastning)
Blokstørrelse	512 bytes	4Kb-64Kb
Blok sub-allokering		✓
Lange filnavne	✓	✓
Macintosh filsystem	3. part	✓
NFS filsystem	3. part	Option
Sikkerhed		
Sikkerhedsevalueringer	C2 Orange Book (OS alene uden netværk)	C2 Red Book (hele netværket incl. Klienter)
Single logon	✓	✓
Auditeringsfaciliteter	✓	✓
Management		
Grafisk administrationsprogram	Flere separate	NWADMIN
Remote administration	Yderst begrænset	✓
Netværksanalysator	✓	Option
Directory service		
Flad struktur	✓	
Hierarkisk struktur		✓
Single network logon	✓	✓
Integration af applikationer	✓	✓

	Windows NT Server 4.0	IntranetWare
Fejltolerance		
Disk mirroring (RAID 0)	✓	✓
Disk duplexing	✓	✓
RAID 4,5	Hardware	Hardware
Server mirroring		✓ (SFT III)
Clustering		

Tabel 2 Tekniske features

3.3 De tre bud

Hvordan passer de to producenters strategier ind i de tre bud? Det illustrerer følgende tabel.

	Manageability	Scalability	Security
Novell	Novell Directory Services (NDS) Java Novell Application Launcher ManageWise LDAP DNS+DHCP i NDS (DDNS?)	NDS SFTIII Multi CPU Replication Services Java (distribuerede applikationer) Clustering	NDS RSA X.509 (Certificate) Radius VPN BorderManager
Microsoft	Microsoft Active Directory (AD) SMS LDAP Dynamic DNS (DDNS)	(AD?) Multi CPU Clustering	AD X.509 (Certificate) Radius VPN Proxy Server

Tabel 3 Microsoft og Novell strategier

3.4 Fremtiden

Microsoft og Novell arbejder i øjeblikket med nye versioner af deres operativsystemer, som yderligere markerer deres skift fra *serveroperativsystemer* til *netværksoperativsystemer*. Microsoft har annonceret, at Windows NT version 5.0 er på gaden ultimo 1998/primo 1999. Novell's IntranetWare version 5.0 (p.t. kendt som *Moab*) forventes frigivet ultimo 1998.

Begge forventes at benytte *native TCP/IP* i stedet for den nuværende enkapsulering af hhv. NetBios og IPX i deres implementeringer af TCP/IP.

Microsoft sætter sandsynligvis nye standarder med en ny *directory service* og *dynamisk DNS* (integration af DNS og DHCP), som omsider skulle aflive *WINS*. Desuden introduceres et produkt under kodenavnet *Hydra*, som giver terminal-adgang mod en Windows NT server. Produktet skal efter produktbladene have en funktionalitet som i *Citrix WinFrame* (det er en videreudvikling af samme). Det bliver således muligt at afvikle 32-bits Windows-applikationer på bl.a. Unix, Macintosh og *thin clients*.

Novell satser hårdt på *Java* og *Novell Directory Services* (NDS). Alle administrative værktøjer skal være Java-baserede, og serveren skal kunne afvikle Java-applikationer. DNS og DHCP bliver integreret med NDS.

Fælles for begge producenter er deres fokus på en distribueret arkitektur samt anvendelse af standarder som TCP/IP, Java, LDAP, Radius.

Begge producenter forventer som nævnt tidligst at frigive deres nye versioner ultimo 1998. Markedets generelle inerti mod at være prøveklude taget i betragtning skal man forvente en meget langsom adoption af så fundamentalt nye features som f.eks. *Active Directory* i Windows NT 5.0. Ingen IT-afdeling ønsker at være den første, som migrerer sin bruger-database til et helt nyt format. Eksempelvis introducerede Novell NDS sidst i 1992, men det slog for alvor først igennem i december 1994 med frigivelsen af NetWare 4.1. De forudgående versioner var rent ud sagt en uventet udfordring for IT-afdelingerne.

Det vil derfor ikke være realistisk at påtænke en opgradering af et driftsmiljø før tidligst ultimo 1999.

3.5 Hvad gør alle de andre?

Der er inden for de sidste år brugt megen blæk på "krigen" mellem operativsystemer. IT-chefer er blevet enten fyret eller forgudet på grund af deres strategiske valg af netværks-infrastruktur.

Tilsynekomsten af Microsoft's Windows NT har ganske afgjort været den mest betydende grund til debatten. Man har iagttaget, hvorledes Windows NT har gnavet sig hastigt ind på markedsandele, mens gamle travere som Unix og NetWare har stået passive på sidelinien.

I et oktober-nummer (1997) af det amerikanske Computerworld har man taget pulsen på, hvorfor virksomheder vælger/vælger ikke at integrere Windows NT.

Hovedgrundene for at vælge Windows NT var (i faldende prioritet):

- Stabilitet/kvalitet
- Forventning om, at Windows NT bliver en standard
- Standardisering
- Den brede anvendelse (universel software)
- At Windows NT er en "hyldevare"
- At kunne nøjes med en enkelt producent
- Lavere omkostninger
- Indbyggede Internet-funktioner
- Anden eller ingen angivelse af årsag

Hovedgrundene for ikke at vælge Windows NT var (i faldende prioritet):

- Interoperabilitet
- Skalerbarhed
- Har Unix i forvejen
- Konvertering/migrering skræmmer
- Bedre konkurrerende produkter
- Anden eller ingen angivelse af årsag

4. ØKONOMISKE OVERVEJELSER

Begrebet *Total Cost of Ownership* (TCO) er de seneste år blevet en meget populær målestok inden for software-branchen. Alle producenter af software ynder at fremhæve de lave installations- og drifts-omkostninger ved netop deres produkt.

Man skal dog ikke glemme, at fomålet med IT er at tilvejebringe en infrastruktur, for at medarbejderne kan skabe resultater for virksomheden. Måling af sådanne resultater foregår oftest uden for IT-afdelingen. Det er derfor ikke sikkert, at de totale omkostninger af IT kun er relateret til de penge, som IT-afdelingen anvender på indkøb og administration af software og hardware.

Derfor skal TCO som en redskab i beslutningsprocessen anvendes med omtanke.

4.1 Omkostninger ved migrering

Disse omkostninger skal betragtes som en fast engangs-omkostning. De indeholder

- Planlægning og dimensionering
- Dokumentation af nye/manglende features ved den nye løsning
- Omskoling/videreuddannelse af IT-medarbejdere
- Indkøb af ny hardware og software
- Installation af ny platform
- Migrering på serversiden (fil, print, backup)
- Migrering på klientsiden (protokol, klientsoftware)
- Omskoling/uddannelse af brugere

Generelle erfaringer viser i øvrigt, at Windows NT i forhold til IntranetWare har samme performance på op til 50 samtidige brugere, hvorefter performance falder markant. For DBC's vedkommende skal man derfor regne med at skulle installere to, måske tre, filservere i stedet for een, hvis man vælger at skifte fra NetWare til Windows NT.

NWC's kan løseligt vurdere DBC's omkostninger ved migration fra NetWare til Windows NT til følgende:

- Planlægning – 100 timer
- Indkøb af 2-3 nye servere (1-2 CPU'er)
- Indkøb af evt. ny backup, 3. parts programpakker, printservere etc.
- Migration fra gammel til nye servere – 50 timer
- Migration af klienter – ½-1 time pr. klient

4.2 Driftsomkostninger

Der er i markedet en udpræget holdning af, at prisen pr. licens på NetWare er højere end på Windows NT server. Det er naturligvis ikke sandt, da dette ikke er muligt i et så konkurrence-præget marked. Der er til gengæld store forskellige i håndtering af licenser.

En NetWare-server kræver en licens pr. pålogget bruger. Såfremt man overskrider antallet af licenser, vil man ikke kunne logge på. Det er altså ikke muligt at "snyde". Når man køber en NetWare server-licens, kan man vælge mellem licenser til 5, 10, 25, 50, 100, 250, 500 eller 1000 brugere. Hvis man er 160 brugere, kan man f.eks. gøre eet af følgende:

- Købe 1 stk. 100-bruger, 1 stk. 50-bruger og 1 stk. 10 bruger (ialt 160 licenser)

- Købe 2 stk. 100-bruger (ialt 200 licenser)
- Købe 1 stk. 250-bruger

Den billigste af ovennævnte muligheder vil sandsynligvis være at købe en 250-bruger licens. Såfremt man har flere servere, som alle skal kunne logge på, skal hver server have en 250-bruger licens, idet licensen er tilknyttet hver server. Til gengæld er anvendelsen af NetWare klienter ubegrænset. Man kan således installere et vilkårligt antal klienter.

På Windows NT forholder det sig omvendt, idet man køber det nødvendige antal klient-licenser. Det er desuden umiddelbart muligt at overskride denne grænse, idet der ikke foregår noget regulært check af anvendelsen.

Et NetWare-miljø syner derfor langt dyrere og mindre fleksibelt en et Windows NT miljø, når man udelukkende betragter licenser. Imidlertid forholder det sig sådan, at kunder kan indgår storkundeaftaler, som reducerer omkostningerne væsentligt. Således har Statens og kommunernes *Indkøbs Service* (SKI) på vegne af offentlige institutioner indgået aftaler med Novell (CLA aftaler) og Microsoft (Select-aftaler), som gør, at man med et forholdsvist beskedent antal licenser kan erhverve en site-licens. En sådan licens baseres på det samlede antal noder på netværket, uanset hvor mange servere, man måtte ønske at installere.

5. EKSPERTISE

5.1 Intern ekspertise

Et af DBC's problemstillinger er, at man p.t. opfatter sin viden på NetWare-siden som begrænset. Det skyldes, at den mest kyndige medarbejder er nyligt fratrådt. Denne medabejder besad en teoretisk viden, opnået gennem kurser, samt en praktisk viden om detaljer i DBC's installation.

Det er klart utilfredsstillende, at DBC ikke føler at besidde tilstrækkelig intern viden, men set fra den anden side må det opfattes som positivt, at man kun har haft behov for en enkelt medarbejder med dybere indsigt i NetWare. Det tyder på en fornuftig grad af *manageability*.

Øvrige medarbejdere har deres fokus på Windows NT og har kun en mere overfladisk administrativ indsigt i NetWare.

5.2 Ekstern ekspertise

For et par år siden gjorde Novell en stor indsats for at sikre en udbredelse af teknisk viden omkring NetWare ved at tilbyde en certificering af den erhvervede viden. Det lykkedes i høj grad, idet der på verdensplan er adskillige hundrede tusinde CNE'er (Certified NetWare Engineers). Udbredelsen gav blandt andet det resultat, at danske virksomhedernes IT-organisationer i stillingsannoncer i dag forlanger en certificering af ansøgerne.

Microsoft har været mere passive på dette område. En årsag kan være, at Windows NT først det seneste år har fået fodfæste i virksomhedernes maskinpark af højtydende, mission critical systemer, hvor det tidligere fristede en tilværelse som et serveroperativsystem for mindre arbejdsgrupper. Den tilsyneladende mindre kompleksitet og deraf lettere tilgængelighed har ikke foranlediget det samme behov for medarbejdere, der kender systemet ned i de dybere tekniske detaljer.

Selv om billedet er ved at ændre sig, er det NWC's opfattelse, at der på det danske marked p.t. er en langt højere tilgængelig af professionel teknisk ekspertise på Novell's NetWare produkter end på Windows NT. Det er dog blot et spørgsmål om tid.

6. KONKLUSION

Netværksoperativsystemet (NOS'et) er i dag en uundværlig hjørnesten i arbejdsrutiner i enhver virksomhed. Så meget desto vigtigere er det at træffe den rigtige beslutning om, hvilke syster, man skal basere sig på.

Det ville være ønskeligt, om man kunne vælge eet NOS, som ville være fleksibelt og kraftigt nok til at dække alle virksomhedens behov. Virkelighedens verden er dog, at man må acceptere hvert enkelt systems begrænsninger og vælge flere for at dække alle virksomhedens behov.

Både IntranetWare og Windows NT løser i dag de basale behov i en virksomhed. Alle er "født" med "must have" funktionaliter såsom deling af fil og print, web- og ftp-services, kommunikation via TCP/IP. Ud fra denne rent tekniske betragtning kan valget være aldeles underordnet.

Inden beslutningerne tages, bør følgende punkter dog tages i ed:

- *Manageability*

Det kan være fristende at vælge det NOS, som IT-afdelingen finder er det letteste at installere og servicere. Windows NT's grafiske brugergrænseflade kan være fristende fremfor IntranetWare's skærmbaserede server-konsol (ikke mindst for ikke-teknisk funderede personer). Hvis man vælger at skifte, vil man dog kuldkaste en eventuel solid intern viden om drift og vedligeholdelse af IntranetWare platformen og foretage endnu en investering på uddannelse i og professionel drift af et nyt NOS.

- *Scalability*

Performance spiller i dag en betydelig rolle. Det er dog en parameter, som ofte vil kunne forbedres ved at investere i hurtigere (og dyrere) hardware. Hvis man vælger en platform med proprietære løsninger (løsninger, der ikke kan porteres til andre platforme), løber man en risiko for ikke at kunne skalere.

- *Security*

På grund af den stigende "globalisering" af netværket skal det sikres, at de anvendte systemer tilbyder en tilstrækkelig sikkerhed.

- *Interoperability*

Hvis man udelukkende skulle basere sig på producenternes marketing, skulle man tro, at hvert eneste NOS var verdens bedste, baserede sig på alle former for standarder og i øvrigt integrerede perfekt med alt andet. Oftest overstiger indsatsen med at opnå dette integrationsmål den indsats, der skulle til for at vedlige hvert system separat.

Standardisering er et af nøgleordene. Standardisering betyder, at man vælger systemer, der overholder og anvender åbne standarder. Det gøres ikke nødvendigvis ved at "standardisere" på een producent. Derved opnår man selvfølgeligt en forbedret *manageability*, men man risikerer til gengæld at gøre køb på *scalability* og *security*.

En radikal ændring af arkitekturbetingede mangler i Windows NT vil i skrivende stund være tilgængelige i ultimo 1998/primo 1999 (Windows NT version 5.0). Her vil performance og administration formodentlig have undergået store forandringer. Bl.a. har Microsoft planlagt *clustering* samt en *directory service* (Active Directory). Desuagtet vil det først være realistisk (og klogt) at påtænke server-installationer af Windows NT version 5.0 ultimo 1999.

På det foreliggende grundlag finder Network Consult, at gevinsten ved at ændre NOS på nuværende tidspunkt er til at overse. Omvendt er der ingen grund til at advare mod at migrere - det er Network Consult's opfattelse, at DBC ikke løber nogen særlig risiko for uforudsete tekniske eller funktionelle problemer. Det skyldes, at DBC's installation er relativt "simpel" i relation til antal brugere og den centrale placering af servere. Havde DBC haft decentralt placerede servere og faste kredsløb med lav båndbredde, ville alene Windows

NT's manglende skalerbarhed i *Domain*-arkitekturen have besværliggjort driften og administrationen.

Det tyder på, at DBC i ansættelses- og uddannelses-processen (bevidst eller ubevidst) ikke vælger at lægge vægt på NetWare-viden hos medarbejderne. Hvis dette er korrekt, har man altså allerede (bevidst eller ubevidst) taget en beslutning om at nedprioritere/udfase denne platform.

DBC bør under alle omstændigheder gøre en indsats for at få det eksisterende NOS til at fungere stabilt. De konkrete problemer er sandsynligvis relateret til hardware fremfor NOS'et. Alternativt kan man risikere at sætte sig selv i en situation, hvor man af ledelsen bliver påtvunget et skift. I et forsøg på at migrere til et nyt system, risikerer man nemlig altid at gøre tingene værre. Med andre ord - *If it ain't broke, don't fix it!*

Det overordnede mål er og bliver, at IT-afdelingen kan stille ønskede services til rådighed for brugerne. Ud fra denne betragtning er virksomhedens NOS en usynlig størrelse, hvis navn og kulør er underordnet.

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Vurdering af Novell contra NT – internt DBC notat

7.2 Øvrige links

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Novell IntranetWare – http://www.novell.com/intranetware

Novell Directory Services – http://www.novell.com/products/nds

Novell Application Launcher – http://www.novell.com/products/nds/nal.html

How Novell compares – http://www.novell.com/products/compare/index.html