

NETWORK APPLICATIONS

Strategic Direction for WordPerfect, the Novell Applications Group

“Eventually, networks will shift the computer industry’s center of gravity away from the desktop. Over time, the networks will take computing everywhere.”

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TWO NETWORK APPLICATION SCENARIOS

End User

Thanks to network applications, the following scenario is now becoming possible:
Picture WordPerfect user Jane Gillmore, in Madison, Wis.:

“I need to fax this proposal to Richard. Let’s see. Here’s the directory, he lives in New York. . . there it is! I’ll just click on ‘Send.’”

“That was easy! Now I’d better send my manager a message to let her know the proposal’s been faxed. Here’s the e-mail cover note. . . and ‘Send.’”

“Now I’d better call Richard’s assistant to let him know the proposal’s been faxed. I’ll just click on Richard’s assistant, and record my message . . . ‘Hello, Kevin, I just faxed Richard the Cyberspace proposal. Would you make sure he gets it? Thanks.’ Now the voice message is sent.”

“Voice, FAX, e-mail. . . it’s all covered. And I never left WordPerfect.”

MIS

Consider the perspective of John Taylor, who manages the network Jane Gillmore uses, as well:

“In the past, to add new users to the network meant adding them not only at each server, but to the server’s e-mail and document management directories, too.”

“Now that we moved to NetWare 4 and Novell’s Directory-integrated applications, we only need one directory to cover everything. When I add a new user, I just do it once.”

“Using network-integrated applications saves a lot of time--which saves us money, as well. Our total costs to deploy applications is much lower now.”

EXECUTIVE OVERVIEW

On June 27, 1994, Novell and WordPerfect completed the merger of the two companies. WordPerfect is now a business unit within Novell known as the Novell Applications Group. The Novell Applications Group consists of three business units that focus on business applications, such as WordPerfect and PerfectOffice; workgroup applications, such as Novell GroupWise and SoftSolutions; and consumer applications, which includes the Main Street product family.

In this report, Novell will outline the company's strategy for the continued evolution of network applications, and will discuss the company's goals for its own delivery of the next generation of network applications. This report will also discuss the steps Novell is taking to facilitate access to advanced NetWare services via its applications, and to make these open services more readily available to new developers of network applications.

Novell's goal for WordPerfect, the Novell Applications Group, is to demonstrate the value of network integration by building the industry's best network applications. Traditional standalone applications have focused on improving individual productivity. Novell applications will enable workgroups and departments to improve organizational productivity, allowing people to connect, communicate, and work together more effectively. Through these network integrated applications, the power of the personal computer will extend far beyond the desktop. Novell network applications will give people new and better ways to work together--at home, at work, or on the road.

THE STATE OF NETWORK APPLICATIONS

Since the beginning of the local area network (LAN), one of the big questions has been when the industry will see a wide variety of applications that take advantage of the network. Much like the PC gave individuals increased personal productivity, the hope for network applications was to enhance of the ability of people to collaborate, communicate and cooperate within groups or between organizations. As we look into the future, we see the emergence of the information highway, which greatly expands the scope of networks as we think of them today. One day, this information highway could potentially connect every household and organization in the world.

The goal of network applications has not changed since this early vision. The network industry has achieved several milestones in the development of useful network applications. One of the most important milestones towards the advancement of network applications has been the emergence of the network operating system (NOS) as the provider of both basic and advanced network services. Network services supply the building blocks for network applications. To be worthwhile, they need to be open, and, where possible, based on industry standards. Through an open architecture, support of industry standards and a strategy of "co-opetition," Novell NetWare has become the industry standard NOS, serving as the foundation for delivering basic and advanced network services.

Many of these services are provided directly by Novell; others can come from third party software vendors, such as the database services Oracle provides. But the key, even when services are from a vendor other than the supplier of the NOS, is that the services must reside in the network server in order to become tightly coupled with or become part of the NOS. This allows the application to leverage network services to the greatest degree possible and to operate as efficiently as possible in providing key services to users. This greatly simplifies the overall management of network services as well.

The usefulness of a network application to any organization is based on three things: 1) how well that application enables communication, collaboration and cooperation, 2) how easy the application is to manage in a network, and 3) how well the application is integrated into the foundation software of the network, the NOS. Three different levels of network applications can be observed, based on this criteria:

- Level One: Network aware applications. Applications that are able to run on a network, but do not make explicit use of the advanced network services offered by the NOS. They also are limited in their ability to enable communications and facilitate management of communications in a network environment.
- Level Two: Network enabled applications. Applications that provide communications features, but are not well integrated with the advanced network services of the NOS. These applications generally attempt to create their own services, which are not open to other applications. This redundancy in services is not optimal because 1) it adds extra cost, 2) the services can only be used by that

application, and 3) the overall management of network applications become more complex, which increases the total cost of ownership of the network and the applications.

- Level Three: Network integrated applications. Applications that are the optimum choice to the end user because they meet all three criteria for a network application. First, they provide good communication and collaboration features. Second, they are well integrated into the advanced services of the NOS. This helps them achieve the third benefit of making them easier to manage, thereby keeping down the cost of total ownership.

Most applications today are only network aware. Some of the more recent groupware and communications applications are network enabled. While applications have come a long way since the initial availability of applications software for networks, we still do not see the level of integration that is desired, or in other words, the Level Three network application. This is primarily due to the lack of integration with the advanced services offered in the NOS.

However, customers are now recognizing the need for network integrated applications due to the high cost of ownership, and due to the complexities of managing large networks. The time has come to move network applications to the third level. The Novell/WordPerfect merger plays a key role in this strategy. To make the third level possible, Novell will focus on the following two objectives.

- Broadening its NetWare NOS platform to include additional advanced network services, thereby increasing the facilities that are available to any application to build upon in the creation of a network application. All of these network services will remain open to any application developer.
- Enhancing its current WordPerfect family of business and workgroup applications and developing new applications that achieve the highest level of complete network integration (Level Three).

THE ROLE OF THE NETWORK OPERATING SYSTEM

The NetWare platform plays a critical role as the foundation for increasingly sophisticated network applications. NetWare provides the network infrastructure by supporting transport protocols and other communications via IPX/SPX, NetBIOS, or TCP/IP. In addition, the NetWare NOS acts as a platform for all three levels of network applications. NetWare is designed to allow NetWare Loadable Modules (NLMs) to run application software in the NOS server. SFT (System Fault Tolerance) Level III provides complete server redundancy for network applications.

In addition, the NetWare platform provides a suite of basic and advanced network services. We can define network services as functions the NOS provides to assist users in accomplishing their work.

The basic network services are file and print service. Because of network redirector technology, these services are easy for business and workgroup applications to use.

For many years, file and print service have been the primary services used by Level One and Level Two network applications.

Beyond file and print services, Novell has expanded the NetWare Services model. In NetWare 3 and NetWare 4, Novell is offering advanced services that leverage the connectivity of the network. These services function as a seamless part of the NOS. The advanced NetWare services include Directory, Management, Workflow, Messaging, and Imaging. Each of these advanced services is a connectable, extensible component.

The NetWare Services model provides developers with a number of benefits:

First, they provide a common set of services that any application can use. For example, Personal Information Manager (PIM) could easily add support for NetWare's Telephony service to their applications so that users could dial phone numbers right from the PIM's contact database. Another ISV could easily tap into the network's imaging ability to add pictorial instructions to the application it uses on its factory floor. All of this is possible *without* the application developer having to re-invent the wheel by creating these services themselves.

By tapping into the NetWare services, vendors can build on top of each others' features. Instead of having to develop or acquire the code for fundamental services, developers can devote their efforts to specializing. They can become experts in selected areas. Using the server functions means fewer resources are required at the desktop. This maximizes performance of the application and minimizes the resources required within the PC. The NetWare Services make it much easier for applications to expand their scalability, their functionality, and their scope. And finally, building on NetWare Management Services simplifies and facilitates network application management, which also serves to lower the total cost of ownership and implementation of applications.

THE PROGRESS

Most current applications, especially desktop programs, are Level One applications today. They take advantage of redirection, which allows them to leverage the network's file and print services. However, they have not integrated with any advanced network services. Currently, the application market offers very little in the way of network application management.

The network market currently includes a number of Level Two applications. The best examples are e-mail, calendaring, information sharing, document management, and project management. The primary factor limiting these applications to Level Two is the degree of network services integration. Many of these applications only use the network infrastructure and the basic file and print services the network provides.

These Level Two applications end up duplicating the advanced network services. They have been written to provide directory, security, messaging, and data communications services of their own. This redundancy creates a number of problems:

1. It adds extra cost-- both the cost of creating the application and the cost of resources required to run the application at the desk. It also increases the total cost of owning a network. All of these costs directly affect the enduser.
2. It duplicates the jobs of network administration. Today, most Level Two applications maintain directories of their own. This vastly increases the complexity of managing the network. There are various utilities that work to synchronize the directories with each other and the directory on the network. But by tying these applications into the core network directory service, applications developers can now eliminate that need. The network directory can automatically know who the user is and know which applications he or she has authorization to run. And in this scenario, there's no longer a separate login required for e-mail, scheduling, and workflow, etc.
3. The services an application provides can only be used by applications from that vendor. For example, the directory in Lotus Notes can't be used directly by other network applications. Users on other applications would have to interact with Notes via a gateway.

The duplicate work involved in creating network services application by application is currently minimizing the number and the availability of advanced network applications. It is also slowing down the progress of the industry. These are the problems the Novell Application Strategy is working to solve.

NOVELL'S APPLICATION STRATEGY

As the leading NOS supplier, Novell's objective is to spur the availability of Level Three network applications. Through the NetWare Services model, the company wants to eliminate the need for Independent Software Vendors (ISV) to re-invent the wheel as new services are required.

With the move to NetWare Services, Novell is promoting a move away from monolithic product development and moving toward easily customized, componentized applications. By building on top of advanced NetWare Services, it's easy for developers to add new features and capabilities to the programs they sell.

For example, applications can take a group oriented focus. The messaging component of NetWare allows for easy routing of documents to multiple users. Imaging and multimedia give users a common place on the network to store and manage these object types.

In addition to making it easy to add new features, the NetWare Services model makes it far simpler for developers to create new network applications. Development of the initial Notes product took more than five years and more than one million lines of code! Chief Notes developer Ray Ozzie reports that of the time he spent developing that product, only 40% of the development involved the application itself. A full 60% of the Notes development cycle involved the creation of what Ozzie calls "infrastructure"-- the basic connections and services that allow the application to run.

In the cases where traditional network applications are making advances today, they follow a monolithic model. For example, Lotus' network applications are centered on Notes. Microsoft's applications are centered on Windows. Neither of these vendors' strengths is in delivering advanced network services.

With the NetWare Directory Services, developers can tap into a common network directory for storing user information and configuration data. They can inherit replication of this data with the global naming services across the enterprise. Developers don't need to focus on the transport aspects of this user information and configuration data. Through the NetWare Directory Services, these issues are already resolved.

Imagine a future in which the network is able to provide the entire service infrastructure before product development is even begun. Imagine the number and the quality of the applications that will emerge as developers learn that 60% of the process is already complete. The resulting applications will have much smaller memory requirements. These applications will be able to access advanced network services such as imaging and telephony as seamlessly as they access file and print

services today. Users will be able to access these services from home, from the road, or from anywhere. The integration of applications with network services will bring a spectrum of services to users that was never possible before. This is the future the Novell/WordPerfect application strategy will provide.

To accomplish these objectives, Novell's network application strategy is threefold:

1. Novell will continue to expand the NetWare platform through the creation of advanced, open network services.
2. Novell will share these network services with developers by offering more comprehensive APIs. Novell will provide new education programs and Software Developer Kits (SDKs) to facilitate the use of these services.
3. Novell will show the industry how to truly leverage network services by showcasing full network/application integration in the WordPerfect business and workgroup applications. Novell's applications will be distributed computing ready.

EXPANDING THE NETWORK SERVICES

This section will examine several areas of the NetWare Services matrix that Novell is currently expanding. In this portion of the report, we'll look at the issues of application management, communications, and the ways Novell is helping network applications leverage shared information and shared resources through closer integration with the NetWare Services.

MANAGEMENT

Until now, there have been very few resources to help managers with the issues of application management on the network. But the management services in NetWare are bringing about a positive change. The purpose of the management service is to facilitate the management of network objects and resources, including network applications, as follows:

- 1. Directory.** In NetWare 4, the NetWare Directory Service provides a common database of network objects that developers can leverage. NetWare 4 Directory Services give network administrators and users the ability to access resources across an entire internetwork without having to know where the resource is physically located. With directory services, a user in Tokyo can review an up-to-the-minute sales report from company headquarters in Texas--simply by issuing a local command. The user doesn't need to know what the file is called or where it resides.
- 2. Security.** The security service allows network applications to leverage network-wide security, rather than having to duplicate security services for every person who enters the application. For developers, NetWare security simplifies the creation of new products and allows them to take up fewer local resources and less desktop memory space. For users, the network security in NetWare 4 means they can log into the network just once, and automatically have access to all the applications they are authorized to use. Integration with NetWare security eliminates the need for a separate login and password procedure for each application.
- 3. Object and Resource Management.** The NetWare NOS offers management services that serve as a platform for monitoring and managing network resources such as servers, hubs, routers, and network applications. The NetWare Management System (NMS) is open to all developers as a means to manage network traffic and resources. For example, integration with NMS allows applications to assist network administrators with inventory management and configuration planning. NMS applications can give network administrators an alert (via e-mail, via a network message, or even via a pager message) when problems occur or pre-determined thresholds are met. For example, a network manager can instruct the NMS application to notify him or her if collisions on an Ethernet network are reaching a high enough

level to cause the network's performance to degrade. With that knowledge, the manager can re-route the traffic on the network *before* serious problems arise.

4. Software Metering and Licensing. Integration with NetWare's management services will give administrators new ways to manage application use on the network. For example, administrators will have access to new models for software licensing--they will be able to purchase applications through licenses for concurrent use, through per-use contracts, or even potentially to rent software. The ability to track and manage applications in this fashion helps companies save money by allowing them to buy software licensing to cover only the amount and types of software usage they need. It also allows companies to protect themselves by having a means to prevent unauthorized software use. Through NetWare management services, companies will be able to create a NetWare License Server to monitor and manage application usage over all of the company's PCs.

5. Software Distribution. NetWare management services make it easy for network managers to distribute new software, product updates, or files from a single location to any workstations or servers on the network. The integration of NetWare Navigator with NMS allows managers to distribute software automatically to workstations and servers that require them.

6. Storage Management. NetWare management services provide a common facility for archiving and backing up information on the network. The Storage Management System (SMS) allows companies to manage network storage more effectively and in a more uniform fashion, as opposed to leaving this critical function to chance across the various departments and workgroups in a corporate network.

COMMUNICATION

One of the most important aspects of network applications is their increasing ability to support communication among users. The three NetWare Services that are especially key to communication are Messaging, Workflow, and Document Management.

1. Messaging. NetWare provides the basic platform for store-and-forward messaging of any kind of information--e-mail, forms, documents, spreadsheets, presentations, and more.

The Novell GroupWise suite of workgroup products exemplifies close integration with the messaging platform NetWare provides.

2. Workflow. The Workflow Service will provide a mechanism to automate the flow of information, whether serial or broadcast, and the rules upon which the information will flow. Close integration with the Workflow Services NetWare enables the development of workflow automation and business process re-engineering applications. Workflow services don't have to be built into the applications--they can use the Workflow Services in NetWare.

3. Document Management. The Document Management Service in NetWare serves as a platform to support the management of unstructured data throughout any size organization, from small company to large and from department to enterprise. One of the key aspects of Novell's Document Management Service is Novell's participation in DEN (Document Enabled NetWare). DEN is an architectural definition Novell and other vendors are forging to create a standard environment for document management solutions. Document management providers can create a DEN-compliant document management back end. As the NetWare Application Strategy moves forward, Novell will continue to lead the implementation of DEN, with DEN compliance being a key aspect of the Novell SoftSolutions strategy.

Another important component of Novell's document management service is support for Open Document Management Architecture API (ODMA). ODMA provides a well-defined interface between applications and document management systems. All the integration of SoftSolutions and WordPerfect applications is handled via ODMA. PerfectOffice 3.0 applications are ODMA compliant. Presentation 2.0, GroupWise, and Envoy will soon be ODMA compliant as well.

SHARED INFORMATION AND RESOURCES

The NetWare services provide a platform that allows software developers to leverage shared objects and resources across the network in the following ways:

- 1. Database and Transaction Tracking.** The NetWare platform acts as a common database repository for shared resources on the network. All of the leading database applications from vendors such as Oracle, Sybase, and Gupta have been able to vastly increase the abilities of their database products through integration with NetWare. In particular, integration with the Transaction Tracking Service (TTS) in NetWare makes it possible for database applications to protect the integrity of their data in the event of application or network failure.
- 2. Multimedia/Imaging.** The multimedia and imaging services in NetWare provide the facility to enable high-performance multimedia services to be delivered to any desktop in a network. The NetWare platform allows companies to create a common repository for video and images. Novell's increasing development of these advanced network services will make it easy for all application developers to add multimedia/imaging components to their existing and future applications.
- 3. Telephony.** Through telephony services, the NetWare platform can provide a standard interface between the network and companies' PBX systems. For example, integration with NetWare Telephony Services will allow users to receive incoming e-mail, voice messages, calendar updates and FAX through a single universal inbox.
- 4. Data Communications.** NetWare's Data Communications Services provide a common facility for interfacing between the external environment and the network. The NetWare Connect communications server, and Novell products such as NetWare

for SAA are examples of the Data Communications Services NetWare makes available for applications to use. Through these services, remote and mobile users can make use of local network resources from the road or from anywhere. Branch office users can gain transparent access to corporate resources through connectivity to SNA.

OPEN ARCHITECTURE AND DEVELOPER SUPPORT

As Novell's network application strategy progresses, Novell intends to maintain open programming interfaces for all NetWare Services. Where they are available, Novell will use industry standard APIs. For example, the NetWare Management System uses SNMP as its programming standard. Novell GroupWise uses MAPI. SoftSolutions supports ODMA.

In keeping with Novell's commitment to openness, both Novell and WordPerfect will also provide aggressive programs for third-party developer support. Novell will continue to build its popular "Yes" program for ensuring compatibility with Novell's network services.

In addition, WordPerfect will support applications developers with the PerfectFit Partners initiative. Through this program, developers whose products meet WordPerfect's testing and integration criteria can include the "PerfectFit with PerfectOffice" logo on their product boxes and marketing materials.

WordPerfect also offers a PerfectFit Software Developers Kit (SDK) that includes a broad range of developer tools including PerfectScript, shared programming code, and APIs. The Applications Group will work closely with Novell in the continuous development of new APIs to support the development of new network applications.

CURRENT NETWORK INTEGRATION OF NOVELL APPLICATIONS

To promote new application development, Novell's strategy of making network services available to developers is the first step. The second is equally critical--exposing the value of the connections through the example of fully-integrated network applications. The key objective of the Novell and WordPerfect merger is to deliver the next generation of network applications. This applies to both business and workgroup applications.

The applications currently available from WordPerfect, the Novell Applications Group, already demonstrate a high level of network integration. In the area of workgroup applications, for example, the GroupWise application suite is available in an NLM version. By having the application's server software run in the NOS server, GroupWise is able to minimize the need for a separate application server. In addition, GroupWise handles directory synchronization with NetWare 3 and NetWare 4 servers and is able to perform SNMP (Simple Network Management Protocol) management via the NetWare Management System (NMS). SoftSolutions is also available in an NLM version today.

In the case of the WordPerfect business applications, PerfectOffice supports software distribution of all the applications in the suite through NetWare Navigator. PerfectOffice offers e-mail enabling in WordPerfect, Quattro Pro, Presentations, and Envoy.

The Envoy workgroup publishing tool is able to route documents over the network with a mini viewer that allows collaboration on common documents by multiple users. These users can not only view the documents in progress, but can participate in evolving the document through annotation abilities that are handled by hypertext links.

The PerfectOffice applications are able to act as GroupWise clients, which allows users to seamlessly take advantage of the collaborative features of GroupWise (such as e-mail and faxing capabilities) from within the business applications they run. Support for ODMA will also allow SoftSolutions to manage the unstructured data from all of the workgroup and business applications WordPerfect provides.

NETWORK INTEGRATION —THE FUTURE

As Novell moves forward with its network application strategy, the company will focus on modularity as its theme. The network services on the back end will be easily integrated with modular front-end applications. This will make it easy for companies to create customized solutions that allow them to tap into all of the network resources they need.

While the network applications Novell provides have already demonstrated a high degree of network integration, future releases of the WordPerfect applications will include even greater integration with the network services in NetWare.

WORKGROUP APPLICATIONS

In the future, Novell will provide full integration between GroupWise, Informs, and SoftSolutions (although the products will continue to be sold separately).

In addition, Novell will use a common directory for all the WordPerfect workgroup applications. This step will simplify administration and will also help to reduce network management costs.

Through NetWare security, users will only need to login once, to the NetWare server, to automatically log in to all the WordPerfect applications they are authorized to use. Novell will integrate its workflow services into GroupWise and SoftSolutions. This robust server-based service will eliminate the need for companies to build their own workflow service as a separate application through Informs.

In the future, users will have access to Document Enabled NetWare--since the SoftSolutions architecture will be built entirely on DEN. Finally, support of Telephony services will bring voice mail directly into the network into a single, universal GroupWise inbox.

BUSINESS APPLICATIONS

For Novell business applications, including PerfectOffice, future product versions will add new collaboration features. These will include the ability to create and concurrently edit multiple-user documents and spreadsheets. Close integration with NetWare Services will enable the creation of personal, departmental, and corporate application facilities, such as libraries of macros for access by network users. Envoy will serve as an increasingly important tool for facilitating collaborative work among users and across applications on the network.

In addition, the Novell business applications will build new features based on NetWare Services. Some examples of these include NetWare Directory Service (NDS)

components for storing common information such as configuration data into a single resource that is accessible to all applications. GroupWise will act as the messaging facility for data within the Novell business applications. This will allow users to dial the phone, and send fax, e-mail and voice messages from within their familiar WordPerfect applications. Further integration with workflow services will allow for automatic routing of documents, budgets, and reports, etc., among the users on a network.

Integration with NetWare Telephony Services will allow applications to dial the phone via a central information repository. From within WordPerfect Office, regardless of where they are, users will be able to simply click a button and dial up the phone.

WordPerfect, the Novell Applications Group, will also continue to work on fully integrating its business applications with all of the Novell workgroup applications.

ADDITIONAL INTEGRATION

There will be several network integration features Novell will implement across all of its business and workgroup applications. The NetWare License Server will become a means of managing software over servers across the entire network. This solution will automate the licensing of software and open the door for innovative new licensing options such as per use licensing and renting, etc.

Through NetWare Navigator, network administrators will be able to manage the distribution of all Novell applications to desktops and servers. NetWare Navigator will be instrumental in managing the configuration and maintenance of the Novell applications as well. Companies will be able to reduce management costs and increase user productivity by automatically distributing application updates from a central location on the network.

In the area of NetWare Management, Novell will provide support for all workgroup and business applications via SNMP management applications. Novell will also incorporate the Desktop Management Interface (DMI) standard for applications at the desktop.

In the areas of multimedia and imaging, Novell Multimedia Services will make it possible to create a central repository for all video and image objects. The Novell workgroup and business applications will leverage these services to link multimedia and image objects in the server to documents, spreadsheets, e-mail messages, and other programs within the Novell product suites.

CONCLUSION

The development of new network-integrated applications is critical in order for the value of desktop computing to reach its next phase. Novell intends to drive this progression by expanding NetWare services, by showcasing the services through the example of WordPerfect's network-integrated applications, and by providing new tools to make these services more available to all developers of network applications.

In this way, Novell intends to guide the industry's center of gravity away from desktop computing and into the network. This evolution will continue to give computer users new and better ways to accomplish their work, and to work together wherever they are.