IBM eNetwork Communications Server for Windows NT Presentation Script

Chart 1: Title page

This presentation is an overview of IBM eNetwork Communications Server for Windows NT, the premiere multifunction gateway for the Windows NT environment.

Chart 2: Abstract

Chart 3: Trademarks

Chart 4: Acronyms

Chart 5: Agenda

This presentation answers the question "What is a Communications Server?", overviews Communications Server for Windows NT (CS/NT), looks at solutions for network integration, and concludes by covering application development and support tools.

Chart 6: What is a Communications Server?

IBM has long been a leader in communications software. Customers need reliable and powerful
networking support to enable workstations to communicate with other workstations and with host computers over today's leading networking technologies.

IBM's Communications Server provides a powerful SNA gateway function for any product using industry standard 3270 display and printer protocols, a great solution for integrating your LANs with your hosts. It also delivers the capability to integrate SNA, TCP/IP, and IPX/SPX networks, enabling SNA and sockets applications on any platform and from any vendor to be transported across connected SNA, TCP/IP, and IPX/SPX networks. And TN3270E server function provides SNA 3270 access to host systems for TCP/IP users with TN3270 emulators.

For example, the Communications Server can be the communications gateway between your internal network and the Internet, bringing Internet connectivity to all of your users, whether they are running SNA or TCP/IP.

The Communications Server product line includes solutions for OS/2, AIX, Windows NT, OS/390 and NetWare server environments, and is fully interoperable with OS/400 networks.

Chart 7: Communications Server for Windows NT

CS/NT will be of interest to customers who want to run multiple protocols in their network.   Or for people who plan to consolidate or change their wide area backbones. You can extend the reach of your SNA applications like IMS or DB2 to your TCP/IP and IPX/SPX users, or run Sockets based applications like Web browsers on your SNA desktops. CS/NT should also be considered by customers who want to improve network availability and performance, or who are interested in running new resource demanding applications like multimedia or collaborative processing.

Chart 8: eNetwork Communications Server for Windows NT

In response to customer demands for an industrial strength communications solution for the

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Windows NT environment, IBM introduces Communications Server for Windows NT (CS/NT). As the newest member of the Communications Server product line, IBM's premier solution for your network computing needs, CS/NT is a powerful multifunction gateway that supports diverse applications and network environments with enterprise-class dependability, backed by IBM's excellence in service and support.

CS/NT combines the industry's best SNA gateway with multiprotocol gateway support to allow a mix-and-match of SNA and TCP/IP applications and networks, plus LAN-to-host, LAN-to-LAN, and LAN-to-Internet communications -- all in one product. You have the freedom to choose applications based on your business needs - and not your network protocol - because CS/NT enables workstations to communicate with other workstations and with host computers, regardless of platforms and network configurations. And with our new IPX/SPX support, you can run SNA applications over IPX/SPX and TCP/IP networks.

CS/NT prepares your networks for the high speed applications of the future with high performance routing (HPR). HPR brings together the best qualities of SNA and TCP/IP to provide high availability with maximum throughput and efficiency.

CS/NT also delivers a broad range of network integration solutions, including AnyNet and TN3270E. AnyNet Sockets over SNA lets you build intranets and connect to the Internet using your SNA, APPN, or HPR backbone. And with the integration of Host On-Demand, CS/NT leads the evolution to network computing by providing seamless integration between web users and 3270 SNA applications.

Chart 9: What's New for CS/NT V5.01

Enhancements to Communications Server for Windows NT, which recently became "Designed for Microsoft BackOffice", include:

SNA data compression optimizes network utilization and reduces network costs by achieving faster transmission speeds over links with lower line capacity, and by sending fewer packets into the network. Unlike competitive products on the Windows NT platform, Communications Server for Windows NT uses compression of data at the session level to increase throughput of data across communication links.

IPX/SPX-attached client support broadens network integration capabilities by allowing LAN-attached IPX/SPX clients to access host SNA data. IPX/SPX clients can access SNA APIs without requiring SNA protocols to flow between the clients and server. This remote API allows most SNA configurations to take place at the central server, and may reduce time and money involved in multiple configurations at individual workstations. This capability helps customers support multiple protocols, and serves as a migration tool for customers moving to Communications Server for Windows NT.

Customers can now use TN3270E IP address filtering to designate which users have access to certain host applications, resulting in centralized administration of resources. This access is based on IP addresses, and removes the burden of having to request a specific LU name for each connection.

Session Level Interface (SLI) API support on the server leverages current application investments by improving access to industry applications, including those used primarily in the banking industries.

Chart 10: IBM eNetwork Software

These are the range of Networking Software Client and Server products. Known as middleware, these products provide the infrastructure for applications and data to move through a network which is to be used in an enterprise-wide approach. Given the importance of networking software today, the networking software group has renamed its product line "IBM eNetwork Software." As its value proposition, eNetwork Software intends to provide enterprise-class, universal connectivity and information access for cost effective network computing. To elaborate, the products need to exhibit enterprise-class dependability to support mission critical applications, end-to-end universal access to provide access from anywhere to anywhere, easy implementation and use to provide minimum disruption to the enterprise and effective resource utilization to minimize duplication and costs in network design and configuration.
The IBM eNetwork Software family of products includes a wide range of client and server platforms that span the desktop to the mainframe. Regardless of your mix of OS platforms, you can get full capability and flexibility for your networking dollars.

You can start now to add intranet and Internet access to your network. With eNetwork Software's multiprotocol support, you don't have to wait to install new networks. Leverage what you already have in SNA networks to transport TCP/IP data and traffic. Are you charged with adding remote networking support for home and mobile users? Our clients, servers, and ARTour family of products may be just what you need.

The product family consists of Communications Servers supported on Windows NT, OS/2, AIX NetWare, and OS/390. Common to all of our servers is the move from SNA gateways to multifunction gateways supporting a mix and match of SNA and TCP/IP applications and networks.

The Personal Communications client is a suite of application development, communication, connectivity and emulation software all provided on a single CD ROM. With PCOMM, users are guaranteed the same interface whether they are in the office, at home, or on the road.

And our commercial strength TCP/IP client, Internet Connection for Windows, provides TCP/IP users an easy and inexpensive entry into the world of TCP/IP networks and the benefits of electronic communications, information access, and resource sharing.

Our recently announced eNetwork Communications Suite provides a total desktop communications solution, whether you need host emulation, web access, or collaborative work group, you get it all with one call.

Extending the reach of new and existing business applications to the wireless environment, the ARTour product line offers a competitive business advantage. ARTour gateways and servers work in tandem with ARTour clients to minimize data traffic, reduce network costs, enhance performance, and provide affordable and effective mobile solutions.

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Chart 11: Industry Leading SNA Support

Now we'll start to look at the Communications Server SNA functions and benefits on Windows NT.

Chart 12: Communications Server for Windows NT SNA Function

CS/NT provides industry leading SNA support including full APPN Network Node and End Node capabilities. Our CS/NT product will provide high availability and great throughput through the use of technologies such as HPR. We can provide a migration strategy for emulator and printer devices from a subarea environment to APPN through our DLUR support. Our Discovery server allows CS/NT, which operating as an EN, to search for a Network Node Server over any LAN (802.2) connection. When CS/NT is operating as a NN, we will answer discovery requests from ENs looking for a Network Node Server.

All APPN load balancing and route calculations will provide the best path for your network traffic. Because CS/NT is a member of the Communications Server family, it can work as peer to our other servers. This means that your LAN workstations can be routed as easily through an AIX, OS/2, or NT gateway. These multiplatform servers can also provide alternative routes and share topology when configured as Network Nodes. Only IBM can deliver this kind of multiplatform support.

CS/NT will ship the leading SNA applets including APING, AFTP, and APPC3270. As always, these applets interoperate with SNA applets on all of the Communications Servers. We offer a wide range of connectivity options and client choices. We support a wide range of industry client stacks and emulators, including Personal Communications, the industry's leading emulator as well as clients from WRQ, Eicon Technology, NetManage, and Wall Data.

For true networking flexibility, a wide range of connectivity options are provided, such as adapters and direct attached channel products, allowing customers to leverage their current hardware investments. You can connect your server to the network or your clients to the server via SDLC, Token Ring, Ethernet, X.25, FDDI, ATM (LAN Emulation), channel and twinax. Supported connectivity products include IBM's WAN and LAN adapters as well as Eicon Technology, MicroGate, Quadron, Interphase (Synaptel), and Bus-Tech's and Barr System's direct attached channel products for high performance environments.

Chart 13: SNA Gateway

The SNA Gateway enables multiple LAN or WAN attached OS/2, Windows 3.1, Windows 95, Windows NT workstations access to multiple S/390s through one or more physical connections to one or more hosts. The gateway is optimized to provide cost effective host connectivity by sharing communications resources such as adapters and physical connections.

The Communications Server gateway supports the SNA protocols LU 0, 1, 2, 3 and dependent LU 6.2 (APPC). With the SNA over TCP/IP function, downstream workstations can now communicate with SNA gateway over an IP network. The gateway also supports LU 0, 1, 2, or 3 to an AS/400 using SNA pass-through.

LUs defined in the gateway can be dedicated to a particular PC or pooled among multiple PCs. Pooling allows PCs to share common LUs, which increases the efficiency of the LUs and reduces the configuration and start up requirements at the host. You can also define multiple LU pools, each pool associated with a specific application. When a link is defined through the gateway between a PC and host, the LU is activated when the session is established and returned to the pool for access by other PCs when the session is ended.

Chart 14: More Effective Utilization of Available Bandwidth - Data Compression

SNA data compression optimizes network utilization and reduces network costs by achieving faster transmission speeds over links with lower line capacity, and by sending fewer packets into the network. Unlike competitive products on the Windows NT platform, Communications Server for Windows NT uses compression of data at the session level to increase throughput of data across communication links.

SNA data compression is compatible with the S/390 and AS/400 implementation and can be used with all LU types. Support includes:

RLE compression for independent LU 6.2, RLE and LZ compression for LU types 0, 1, 2, and 3.

Compression of data sent between a host and a downstream workstation where CS/NT is used as a gateway

Compression of data sent between a host and CS/NT on behalf of downstream TN or SNA API clients.

Chart 15: Partnerships

IBM has partnered with leading emulation and connectivity vendors to provide ultimate networking flexibility with its Communications Server for Windows NT.

A wide variety of emulation support means customers can access their enterprise and intranet business applications from the office, home or on the road. In addition to seamless support with IBM's Personal Communications family of products, CS/NT supports emulation programs including: Eicon Technology's Aviva Mainframe Edition, NetManage NS/ElitePlus for Mainframe Access and NS/Elite for AS/400, Wall Data's RUMBA family of emulators, and WRQ's Reflection for IBM product line.

Through a broad array of connectivity options such as adapters and direct attached channel products, customers can leverage their current hardware. Supported connectivity products include IBM's WAN and LAN adapters as well as Eicon Technology's, Quadron's, MicroGate, and Interphase (Synaptel) WAN adapter cards. Direct attached channel products include Bus-Tech and Barr Systems for high performance environments.

Chart 16: IBM NT Solutions

This chart summarizes the IBM industry-leading middleware solutions that now interoperate with Communications Server for Windows NT. There are focused programs in place to educate and support ISVs and to encourage them to test with and endorse Communications Server. For the most current list of supported ISVs, check out our Web page at http://www.networking.ibm.com/cms/csncom.html.

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Chart 17: CS/NT Network Integration Solutions

In this next section, we'll look at the broad range of network integration solutions that CS/NT offers. This graphic depicts a number of them, including:
- web browsing over an SNA backbone to a Web server on the Internet
- running a Lotus Notes client from an IP LAN to a Notes Server at an SNA central site
- accessing host 3270 SNA data from a TN3270E client on a branch IP LAN
- using CS/NT as an SNA gateway over either an SNA or IP backbone

Chart 18: What kind of customer problems are solved with network integration solutions?

This chart depicts key customer problems that are solved by our multiprotocol solutions.

Chart 19: SNA and TCP/IP Network Integration Overview

Here is a list of the many network integration technologies available in CS/NT. Now we'll take a look at some business problems these technologies can help to solve.

Chart 20: TN3270E Server

Communications Server now provides TCP/IP users easy access to 3270 applications with its new TN3270E server function. Customers can connect TCP/IP clients on OS/2, DOS, Windows, Windows 95, Windows NT, MAC, and UNIX to their SNA or APPN network.

TN3270E support will allow TN3270 or TN3270E clients on a TCP/IP network to access host 3270 SNA applications. With the new extensions of TN3270E, users can print to their workstations or printers in their TCP/IP network. Also, requesting a resource (LU or pool of LUs), responses, Attention and System Request keys are supported. TN3270E support is compliant with industry standard Request for Comments (RFCs) 1576, 1646, and 1647. Any TN3270 or TN3270E client which adheres to these RFCs are supported.

The TN3270E server enables SNA/APPN connectivity to the host and TCP/IP connectivity to the clients. TCP/IP connections are mapped to SNA sessions and passed through the 3270 datastream. Since the TCP/IP connections are mapped to SNA sessions, the customer can take full advantage of SNA/APPN on the host side of the network, with no TCP/IP required on the mainframe. The 3270 datastream that comes out of the TN3270 client can be transported using Dependent LU Requester (DLUR). By using DLUR/DLUS, the customer can benefit from APPN networking. Also, the customer can use high performance routing (HPR) from the TN3270E server all the way to the mainframe, delivering non-disruptive session routing.

Chart 21: Host-on-Demand - Internet-to-SNA

Host on-Demand is an Internet- to- SNA connectivity solution that provides 3270 application discovery and access via the World Wide Web. Communications Servers are leading the evolution to network computing by being the first multiprotocol gateway to provide seamless integration between 3270 SNA applications and web-centric end-users.

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Web-users needing host applications, such as public catalogs, software applications, databases, or other resources, can use Host on-Demand from inside their web browsers to access central computer data. For web users with occasional need to access central SNA computer applications or databases, Host on-Demand provides an alternative to installing a terminal emulation product on the desktop. Host on-Demand brings network computing to the web by enabling web users to seamlessly access non-web based content and services.

Host on-Demand uses the Java environment and native TN3270 and Internet protocols to provide platform independent host access from within a web browser window. Java-enabled Host on-Demand clients are dynamically downloaded from a standard web server on your intranet or in the Internet.

No programming is needed to implement Host on-Demand. Simply install it and specify a URL for the SNA application you wish to access. Host on-Demand function are available on Communications Servers on OS/2 Warp, AIX 4.2, Windows NT, CS/MVS, as well as NetWare for SAA V2.2.

Chart 22: Web Access to Legacy CICS Data

With the explosion of the Internet and intranets in your business, this solution shows how a user with a Java-enabled browser can now access existing CICS applications on the host without any modifications to the CICS 3270 application using CS/NT as the networking infrastructure. Adding intranets to extend your reach of your enterprise network has never been easier.

Chart 23: Client Access to host DB2 Databases

Communications Server for Windows NT is the most cost effective high performance, SNA gateway server on the market. IBM DB2 Connect Enterprise Edition for Windows NT provides the most secure, feature rich service for workstation client access to host databases. Together, Communications Server and DB2 Connect provide the best combination of services for PC and UNIX client connections to databases on DB2 for AS/400, DB2 for OS/390, or DB2 for VM and VSE.

Together, DB2 Connect and Communications Server provide the best offering for customers wishing to implement a replicated branch office, departmental data mart, or a Web application delivering both host data and multimedia content. Insurance, Retail, Banking, and Health Care industries rich in data distributed across a mixture of hardware platforms queried from distributed sites would find this combination of products an indispensable foundation to their specific solutions. So tell your customers and business partners today IBM's winning combination of Communications Server and DB2 Connect on NT.

Chart 24: Enterprise Intranet: Sockets over SNA Gateway

Intranets are a very popular way for enterprises to streamline communications internally. Here's an example of how the Sockets over SNA technology in CS/NT can be used to build an intranet in an enterprise that has an SNA/APPN/HPR backbone!

The enterprise can choose the web server platform based on the scalability of their requirements. Communications Servers on OS/390, AIX, Windows NT, OS/2, as well as

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OS/400 all have integrated Sockets over SNA support which allows a web server to run over SNA, with no need for TCP/IP!

Once the web server is established, web browsers on branch IP LANs can easily get information from the web server on the SNA central site through CS/NT Sockets over SNA gateway function.

Once the CS/NT gateway is implemented, it can convert most any TCP/IP sockets-based applications from the branch IP LANs to run over the central site SNA network.

Chart 25: Transportation Industry: Internet/intranet access using SNA

With the Communications Server Sockets over SNA gateway capability, you can connect your internal SNA network to the Internet.

In this example, a transportation corporation mandated that all departments reduce paper use by 25%. So the Director of Customer Service searched for ways to improve document distribution to the representatives, while maintaining their access to the reservations system at the SNA central site.

With the high visibility of Internet technology, the Director saw a corporate intranet as a logical distribution avenue. The company could publish documentation on a Web site at the central office. Communications Server for MVS/ESA would allow their mainframe to run TCP/IP based Web server over their SNA network. The interactive, searchable web site would improve access by the service reps and reduce their transaction time. The service reps at TCP/IP-based branches had access to the SNA intranet via Communications Server at their location. And customers on the Internet could access an external web site and avoid needless customer service calls. A Communications Server on the boundary of the SNA intranet and Internet provides this connectivity.

Using a corporate intranet enhanced productivity, reduced costs, and strengthened customer service.

SNA clients on the intranet could also access the mainframe server of the Internet. Clients running Communications Server OS/2 Access Feature or PCOMM OS/2 can run a Sockets-based web browser and access information on the Internet. Your users stay connected to their SNA networks. No TCP/IP is required.

In this scenario, TCP/IP applications benefit from the performance advantages of SNA like class-of-service and congestion control.

Chart 26: Lotus Notes over APPN: Traffic Prioritization

Zahid Tractors is an example of a customer who used traffic prioritization for their TCP/IP-based
Lotus Notes application.

Zahid Tractors and Heavy Machinery, Ltd. in Saudi Arabia is the leading supplier of equipment, machinery, and auxiliary products to a wide cross-section of industries in Saudi Arabia. Zahid

had an enterprise-wide IBM AS/400 APPN network running business applications. They implemented a new quality system associated with ISO 9000 accreditation on a Lotus platform. Since Lotus Notes runs on NetBIOS or TCP/IP, they required a multiprotocol solution that could allow Notes to run over their AS/400 APPN network. This solution would enable Notes replication over their existing leased line SNA network.

Zahid Tractors installed Sockets over SNA Gateways (available in CS/2) in their central and branch offices. On the LANs, Notes clients communicated with Notes servers using NetBIOS. Over the APPN backbone, Notes servers replicated data using the sockets over SNA gateways. to connect their remote and central offices.

The ability to use SNA's class of service for TCP/IP sockets applications running over SNA was used. a "batch" class of service was specified for Notes traffic so existing backbone 5250 interactive traffic was not impacted by the solution.

The primary benefit was savings in dial-up line costs. Another benefits: the ease of deployment. The solution was deployed without disruption to the existing network, without upgrading OS/400 software or disrupting the APPN network.

Zahid's entire APPN network is now Internet enabled, meaning that any TCP/IP sockets-based application, including Internet applications, can run from the branches over the backbone APPN network.

Chart 27: Customer Quotes

These are quotes from Zahid Tractor on the benefits of their network integration solution.

Chart 28: SNA over TCP/IP

SNA over TCP/IP multiprotocol combination allows all SNA applications including APPC, emulator, and printer applications to communicate across TCP/IP networks without any modification. With this function, existing LU 2 terminal emulator applications or LU 1/LU 3 Printer applications can be used across TCP/IP networks. The dependent LU SNA application support is provided by the VTAM DLUS function and by Communications Server DLUR functions.

Examples of SNA applications which can now run over TCP/IP networks, include CICS, DB2, IMS, DCAF, and TSO. APPC and SNA applications which were primarily confined to SNA networks are able to communicate with end users in a TCP/IP network, and the application does not need to be changed. With APPC over TCP/IP, the engineer or scientist at a workstation in a TCP/IP network now has easy access to database applications in SNA hosts.

In this configuration, SNA over TCP/IP combination in the client is provided by PCOMM. The DLUR is provided by Communications Server gateway. For small numbers of connections the gateway is not required, as PCOMM also has DLUR support, but if a customer has multiple connections then the gateway implementation would:
- reduce the number of PUS defined on the host and
- reduce the number of DLUS/DLUR connections

Chart 29: Remote API Client Support

The Communications Server SNA API client support allows IPX/SPX and TCP/IP attached clients to access SNA APIs without requiring SNA protocols to flow between the clients and the server. This allows most SNA configuration to take place at the central server.

Communications Server supports SNA API clients on Windows 95, Windows NT, Windows 3.1 (TCP/IP only), and OS/2 (TCP/IP only). The SNA clients provide support for CPI-C APPC, ENHAPPC, and LUA RUI API interfaces. These clients are shipped as part of the server but are actually installed and configured at the client.

Chart 30: Advanced Technologies

Leading open, industry standard, network technologies are incorporated in Communications Server to enable the integration of diverse network types, optimize performance, and facilitate the use of 3270 displays and emulators in APPN networks.

Chart 31: Built on Advanced Technologies

AnyNet technology has been integrated in to the Communications Server and Personal Communications product line. AnyNet separates the choice of application (whether Sockets or SNA) from the choice of network (whether SNA or TCP/IP), expanding the reach of your applications and offering greater flexibility.

The AnyNet gateway support in Communications Server connects two or more unlike networks and causes them to function as a single network. SNA applications such as CICS, IMS, DB2, DDCS, emulator, or printer programs can run over SNA and TCP/IP. TCP/IP sockets applications such as FTP, SAP R/3, SNMP, Lotus Notes, and web browsers can run over SNA and TCP/IP. Networks can be integrated and new applications added without impacting your existing users, and without requiring any new hardware.

High Performance Routing is the next generation of APPN and brings together the best qualities of SNA and TCP/IP. HPR is geared to provide exceptionally high throughput and availability with automatic routing around failures and no impact to the end user or application.

Dependent LU Requester, or DLUR, allows older SNA LU types (such as LU0 and LU2) to have their control sessions routed across the APPN network.

Chart 32: Advanced Multiprotocol Support

Applications are typically bound to the underlying protocol. This either limits your choice of application to those running on currently installed protocols, or requires that you run multiple networks in parallel to support all the applications required. This increases network complexity as well as management and operational costs. Under heavy traffic conditions, the different protocols have different procedures for handling congestion. In addition, traffic prioritization becomes more difficult in a multiprotocol environment.

Communications Server and PCOMM eliminate the need to run parallel networks by allowing Sockets applications to run over SNA networks and SNA applications to run over TCP/IP networks.

AnyNet, based on the Multiprotocol Transport Networking (MPTN) technology, an open industry standard, has been integrated into our Communications Server and Personal Communications product line. Communications Server and PCOMM eliminate the need to run parallel networks by allowing Sockets applications to run over SNA networks and SNA applications to run over TCP/IP networks. NetBIOS and IPX applications are also supported in LAN to LAN internetworking configurations over either an SNA/APPN or TCP/IP backbone.

AnyNet access nodes (top graphic) let new types of applications run on your existing network, without adding communications lines and equipment and without rewriting applications. You can run all your SNA and TCP/IP applications over the protocol of your choice.

The Communications Server gateway can connect two or more unlike networks and cause them to function as a single network, allowing a variety of configuration options for LAN/WAN internetworking.

A single gateway (middle graphic) allows any vendor's native system on one network to communicate with a matching application on a different network. For example, using a Sockets over SNA gateway configuration, which connects SNA and TCP/IP networks, users on SNA workstations with access node software can access the World-Wide-Web (WWW) using Sockets applications such popular Web browsers.

Paired gateways (bottom graphic) allow users in remote branch offices to communicate over an existing backbone network. For example, an SNMP agent on a TCP/IP network can communicate across an SNA network to an SNMP manager on another TCP/IP network through AnyNet gateways. Or, an IPX or NetBIOS application could run over an SNA or IP backbone to a
similar application on another LAN.   Similarly, an SNA based application, such as CICS or DB/2, running on an SNA network can communicate across a TCP/IP network to a like application on another SNA network. All of this is accomplished without requiring any new hardware and without rewriting your applications, so you can roll out new applications quicker. The number of protocols can be reduced, saving you time and money because there are fewer networks to maintain and your network is easier to configure.

Chart 33: High Performance Routing

High Performance Routing really brings together the best qualities of SNA and TCP/IP. Geared to provide 100% network availability with maximum throughput and efficiency, HPR prepares SNA networks for the high speed applications of the future.

Non-disruptive rerouting automatically reroutes around a network failure, without impact to the end user or application.
Application-specific prioritization insures that interactive sessions take precedence over batch traffic. As a result, response times are minimized while link utilization is kept high.
Adaptive, rate-based congestion control throttles incoming data in the case of congestion while at the same time, ensuring maximum link utilization by keeping the throughput at the knee of the congestion curve.

Dynamic, deterministic routing means that the data flow between two end points always takes the same predetermined path. This is required to guarantee the quality and performance of network demanding applications like multimedia. ATM was designed to be connection oriented. HPR's deterministic routing is complementary to ATM's architecture, and while HPR picks up some of the connectionless features of IP routing, it retains the deterministic nature of SNA, and is thus well positioned to take advantage of ATM networking down the road.

In fact, HPR has been endorsed by Cisco, Bay Networks, and 3Com and was selected by the 41-vendor APPN Implementor's work group for SNA over ATM.
APPN/HPR has *plug-and-play* capability. A user can literally pick up his workstation, move to another location across the country or the world, plug into the network, and have immediate access to other users and applications across the network. This is in contrast with TCP/IP where the domain name server must be manually updated to reflect the user's new network address before he can be reached by another application or user.

HPR is capable of running efficiently on a wide variety of platforms, coexisting with other protocols, and exploiting existing and newly emergent technologies, such as ISDN, frame relay, and ATM.

Chart 34: Dependent LU Requester

Dependent LU Requester is an architecture that provides dependent LU support in an APPN network. It provides a migration strategy for dependent LU devices from a subarea environment to APPN.

Communications Servers on Windows NT, OS/2 Warp, and AIX provides Dependent LU Requester (DLUR) end-node and network-node support for workstations, allowing them to take advantage of the enhanced SSCP support provided by a Dependent LU Server (DLUS). The DLUS function is provided by VTAM V4R2 and later releases. With the use of this support, traditional SNA dependent LUs, such as emulators and printers, can gain the many advantages of an APPN network.

A few of these benefits are:
- dependent LUs (LU0, LU1, LU2, LU3, independent LU6.2) can reside on nodes that are
  non-adjacent to the host
- APPN search logic is used to provide the best path for LU-LU sessions

The DLUR and DLUS nodes establish an LU6.2 pipeline that SSCP-PU and SSCP-LU sessions are setup over. The LU-LU sessions are then routed independently of the location of the owning SSCP thereby taking advantage of APPN search logic.

In this chart, the DLUS function is provided by the owning SSCP VTAM A at the top left. The dependent LUs are supported by the DLUR function in the EN at the bottom. The primary LU is in VTAM B. Note that the LU-LU session is setup over a different route than the SSCP-LU session. That is, the LU-LU session is not setup via the owning VTAM A, but rather by connecting directly with the target VTAM B over the APPN cloud. This has several benefits:
- increased speed (only goes over one link)
- decreased cost (one NCP traversed, not two)
- increased reliability (if VTAM A goes down, the LU-LU session with VTAM B is unaffected).

Several other DLUR benefits:
- with CS/NT, SNA over TCP/IP support allows dependent LU sessions serviced by
  DLUR/DLUS to be established over a TCP/IP network.
- backup DLUS support: When the connection to the primary DLUS fails or does not become
  active, Communications Server will automatically try to establish a connection with the backup
  DLUS.
- Multi-subnet support: This support allows the DLUR, DLUS, and node containing the
  application all to be in different APPN subnetworks.

Chart 35: Communications Server Technology Highlights

This chart summarizes the industry-leading SNA and multiprotocol support delivered in the Communications Server family.

Chart 36: Development and Support Tools

Now let's look at what CS/NT offers for development and support tools. We'll look at API support, graphical interfaces, and a web-based administration tool.

Chart 37: Middleware

CS/NT supports a wide range of 32-bit APIs on the server for the applications developer. These APIs provide a convenient way for application programs to access Communications Server functions and allow applications to address the communications needs of connections to both IBM and other computers. This chart gives examples of API support included in CS/NT.

Chart 38: Installation and Configuration

Communications Server provides an interactive interface for installing the product. InstallShield provides silent support for automatic installation. Communications Server for Windows NT provides several advanced graphical configuration aids to help reduce configuration time. You can now configure and use Communications Server based on the task you are trying to accomplish. There is a list of common configuration types that you can select which walks you through the configuration. Examples include SNA Gateway, TN3270E server, APPN network node (including HPR), Anynet SNA over TCP/IP and Sockets over SNA gateways, SNA API clients, etc. By selecting the configuration type you want, the program will walk you through the configuration. And if you need help along the way, there is a full online tutorial that will assist you in completing the task.

Chart 39: Administration

The Node Operations Facility provides the managing and controlling of communication resources. With a simple click of the mouse, you can get information on the message and error logs, trace files, network resources, configurations, and other information. You can remotely or locally start, stop, and monitor resources in the network. The node operations application is supported from any Windows NT client.

IBM eNetwork Communications Server for Windows NT Presentation Script

Chart 40: Web-Based Administration

Have you ever wanted to use the Internet for remote system administration? Well now you can! Communications Server provides an unique way to perform basic server administration functions remotely via the WWW with a simple click of a mouse. A simple graphical interface provides a convenient, at-a-glance status of Communications Server, as well as, convenient button for starting and stopping Communications Server, viewing configuration and trace data and other useful information.

This feature reduces the complexity and time associated with administering and managing distributed systems. By allowing flexible access over the Web, administrators can remotely track and manage Communications Servers from any browser which supports frames, Java, and JavaScript.

Chart 41: All-In-One Packaging

The Communications Server for Windows NT is available on CD-ROM only. The product CD contains the following:
- product files
- online documentation
- Adobe Acrobat Library Reader
- Clients for remote SNA API
- Remote administration and configuration clients
- Host-on-Demand
- Web Administration
- Entry-level Personal Communications Emulators

Chart 42: Prerequisite Hardware/Software

The following chart indicates the prerequisite hardware and software required to run Communications Server for Windows NT. Depending upon your Communications Server workload, you may require more resources. Communications Server requires 10MB disk space on the startup drive for temporary files used during installation.

Chart 43: Capacity Planning

A frequently asked question from potential customers is "How many users can the server support?" Another common question is "How many sessions can the server handle?" The answers to both of these questions will depend upon many things such as server hardware configuration, server software configuration, server workloads, and network environment.   The chart shows the server capabilities in terms of the designed maximum "sessions" a server can handle.

Chart 44: Summary

We have now completed our discussion of CS/NT, the premiere multifunction gateway for the NT environment.   This chart lists key product advantages. CS/NT provides an exceptionally flexible solution which enables rapid applications deployment - regardless of whether your underlying network is SNA, IPX/SPX, TCP/IP or a combination. They can be the basis of

connectivity for your internal intranet, or for connectivity to the Internet - again whether you are running SNA, IPX/SPX, or TCP/IP.

Communications Server incorporates advanced routing technology which enables support for today's network demanding applications and migration to new high-speed applications of tomorrow.

All of this with the broadest array of connectivity, platform and applications support, based on open technologies and designed to interoperate.   CS/NT put you in a leadership position in anticipation of the future with a solution that is exceptionally flexible and complete.

Chart 45: CS/NT Future Directions

We will continue to develop new enhancements and features to our NT product line. We will provide end-to-end universal connectivity for the enterprise - whether your needs are that of a large corporate enterprise, or a growing, enterprising business. To address the critical networking challenges, IBM will develop new capabilities for handling the networks of the future. Under our eNetwork Software brand, there are four strategic initiatives which support the fundamental goal of more cost-effective networking. Managing all the resources associated with a network, such as end user addresses, can be unnecessarily complex. Communications Server is targeted to expand the services beyond the host gateway access and multiple protocol integration, to simplify networking, and to provide easier management and more effective utilization of interconnected LANs.

Some key areas of exploitation will include:

o S/390 and AS/400 host integration capabilities
o Availability
o Security
o Manageability
o DLC support
o SNA enhancements

Chart 46: For more info: