IBM eNetwork Software

Host Integration Solution

July 1998

Extend the reach of your network securely for e-business

✓ *Webify existing host application portfolio*
✓ *Deploy common secure infrastructure to quickly respond to Line Of Business pressures*
✓ *Create composite applications to address new user needs*
✓ *Support for users on all networks, Internet, Extranets, Intranets, TCP/IP, SNA*

Executive Summary

With the advent of Web technology, accessing information on IBM System 390's, AS/400's and other back end data sources such as Unix and NT based servers, has become increasingly important. This is where the majority of mission critical business information and applications now reside. The Web and its associated technologies have made extending the reach of that information virtually limitless. The quantity and quality of host based information coupled with the virtual limitless reach of the Web affords IS managers the opportunity to integrate the host with the web and transform business processes for competitive advantage. IBM has coined this use of technology ebusiness. Key to successful ebusiness deployments is the deployment of a fast and cost effective way of accessing, integrating, and publishing host information to web clients with a solution that has the flexibility to meet the needs of unique end users. That is what the eNetwork Host Integration Solution is designed to deliver.

In some instances the business information needed to address new end user requirements is available within existing data sources and applications, only the delivery method needs to be decided upon. Several technologies exist to deliver host information to users located on web based networks. The two most prevalent ways to deliver existing back end host based applications and data to users on the web are:

- { HTML delivery with host or web integration servers
- { Hybrid web delivery with Java or ActiveX emulation applications

In other instances existing information needs to be combined with new business logic. This new business logic is located in a new web based application and this new application can connect to existing back end data when it is needed by the user. These new applications can be server or client based applications and are known by the following industry terms:

- { Application integration servers
- { Java and ActiveX application integration

Each delivery option has its advantages and disadvantages, there is no clear technology at present that can address all user group needs within any organization. Each delivery method is at various stages of market and technical maturity, but vendors with advanced technology not only allow for the integration of existing applications with web front ends, but also integrate multiple back end data sources with bi-directional interfaces for the creation of new composite applications.

The benefit of utilizing existing applications and data is that customers receive an extremely high return on their IS investment. New users or customers can be reached, new services can be supplied and suppliers can be brought ever closer into a customers operations all without any change to the existing back end systems. In essence the customer receives the benefits of a new application portfolio without the investment in one.

IS organizations face many inhibitors in implementing web-to-host projects. IBM customer research reveals that the most often stated reason for web-to-host project failure is the selection of niche solutions, that cannot address unforeseen user requirements. Niche solutions are limited in back end data sources that can be delivered and in delivery. User groups vary greatly so no one technology or niche solution can meet all of their needs, in fact most users belong to several user groups depending on their use of any given application. Multiple product implementations do not share common directory and security technologies, and the sheer number of products and vendors needed to cobble together a complete solution quickly becomes unmanageable and can quickly negate any positive return on investment generated from the reuse of applications.

To address the problems confronted by IS managers in implementing web-to-host solutions, IBM eNetwork software has integrated the most complete line of Host Integration software in the industry. The eNetwork Host Integration Solution delivers a complete infrastructure for the integration of host applications and data across any network and to any user. The eNetwork Host Integration Solution delivers the following advantages to IS and LOB managers in the pursuit of transforming their business processes for competitive advantage:

- { Deploys an extensible and sharable host integration infrastructure
- { Maintains a flexible, open system architecture
- { Establishes a powerful application development infrastructure
- { Maximizes the return on IS and business investments
- { Delivers end user solutions that are secure and end-to-end

This paper lays out current industry trends in the host integration market, positions the eNetwork products within the market, identifies inhibitors that IS organizations must overcome and how eNetwork Software's Host Integration product line addresses market requirements.

Industry Observations

Web-To-Host Benefits

Business opportunity is the primary driver behind IS investment in web-to-host products. Web-to-host solutions move IS out of the back room and into the front office. In addition, utilizing existing applications and extending the reach of those applications provides an extremely high return on IS investment. Enterprises get the advantage of a new application portfolio without the high investment needed to design, develop, test and roll out new applications. Web-to-host solutions can also be implemented much faster then new application development. As long as the information required by an end user is available in a back end system, chances are that a web-to-host solution will be the quickest and least expensive solution available.

To satisfy end user delivery needs and network demands, a combination of Host Integration technologies is required. Not only will several web-to-host technologies need to be implemented, but traditional host access methods will need to be supported as some users will still require the function provided by these methods. A web-to-host implementation should not require an additional infrastructure to access the same information and data that is already being accessed by traditional users. To better understand user requirements for host information delivery and how IS organizations can move to a common Host Integration infrastructure, a brief look at the network types and delivery technologies is needed.

SNA Host Access

System Network Architecture (SNA) networks are still pervasive in enterprise accounts. In fact the number of end users located on these networks is still growing.

Several technologies provide access to host systems across SNA networks to primarily two user groups. In this environment regardless of the technology that is selected both user groups require a high level of network reliability and application availability. These users are running the applications that run the business and can be found at all levels of the enterprise. In nearly every instance they are internal users, employees of the enterprise.

The first technology provides access to System/390 or AS/400 applications for users who operate fixed function terminals, or dependent displays. These devices are protocol specific, they utilize a 3270 terminal protocol for accessing System 390's or they utilize a 5250 terminal protocol for accessing AS/400's. Most often these fixed function terminals connect through a hardware control unit.

The second type of user accesses the same systems and applications from PC's on a LAN. To access the host, software is loaded on the PC's that emulates the 3270 and 5250 fixed function terminals. This software is referred to as terminal emulation software. All the PC's on the LAN are then connected to the host system via an SNA gateway. This is most often a software gateway installed on a Intel or Unix based server. The SNA gateway is a consolidation point for the multiple PCs on the LAN and also translates between the wide area network protocol, in this case SNA and the LAN based protocol, NetBIOS or IPX as examples.
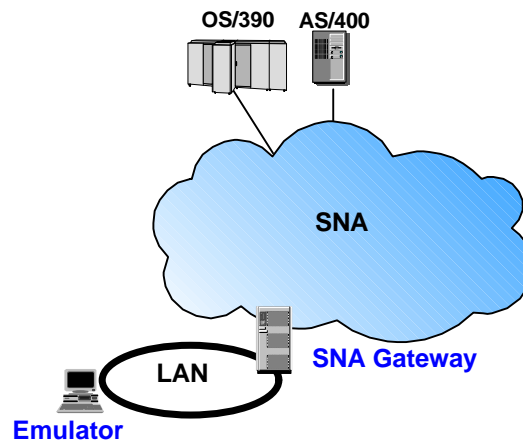
Figure 1: SNA Host Access

TCP/IP Host Access

TCP/IP networks are the fastest growing wide area networks. This is fueled to a great extent by the world wide web, but adoption of IP networks within enterprises is growing at double digit rates as well.

Users accessing host applications across TCP/IP networks require the same high network reliability and application availability as those on SNA networks. Once again these users are almost exclusively internal to the enterprise and are operating the same business applications as the SNA users.

Users on TCP/IP networks most often use one technology to gain access to host based applications. Users in this environment have PCs located on LAN's. Terminal emulation software is loaded on every PC. This software is called a TelNet 3270 or 5250 emulator (TN3270/TN5250). TN3270 or TN5250 refers to an industry standard protocol for transporting SNA data over TCP/IP. A gateway is once again used for consolidation and for translation between the LAN or WAN protocols, in this case a TCP/IP LAN or WAN and the host SNA based applications. This gateway is called a TelNet 3270 or 5250 (TN3270/TN5250) server.

Similar to the SNA Host Access scenario, the TN server must be placed at the intersection of the two network types. Unlike the SNA network, TCP/IP offers a number of options for gateway placement since TCP/IP is both a LAN and a WAN network protocol. Customers who choose TCP/IP as their WAN protocol can place the TN server:

- { Directly on the host
- { Channel attached to the host
- { In the glass house but remotely attached through a front end processor

Customers who prefer an SNA/APPN backbone with TCP/IP distributed LANs can place the TN server:

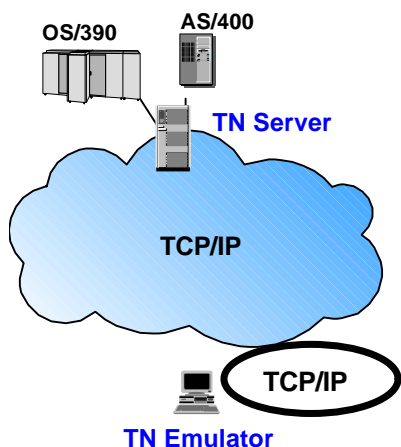- ◆ Remotely attached to the host at the edges of the WAN

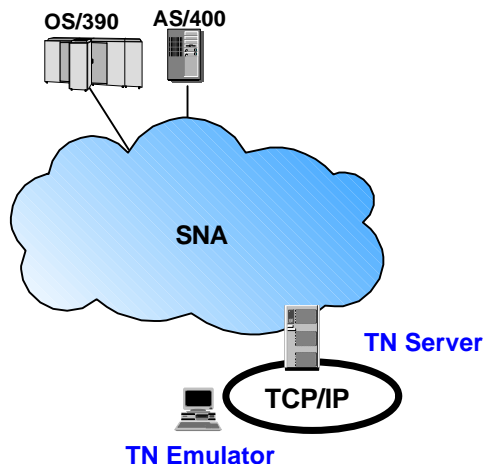Figure 2: TCP/IP Host Access, IP WAN   Figure 3: TCP/IP Host Access, SNA WAN

Intranets, Extranets And Internet Host Access

The promise of a universal client, an easy to implement application delivery model and the ability to reach nearly any user anywhere has lead many enterprises to add Web Servers and Browsers to their TCP/IP networks transforming them into intranets. Connecting intranets to other intranets forming extranets and to the Internet is a logical extension that the technology affords. But the users on these varying network types have different requirements for host information delivery. In fact depending on the users use of the information, individual users will require different delivery methods within a given network type.
There are two types of delivery methods or technologies for host information for use on a web based network. One is a hybrid web-to-host approach. A hybrid approach utilizes web technologies and existing technologies to deliver host information to an end user. The other type delivers host information via HTML or a standard web page off a web server.

Hybrid Web-To-Host Technology
Hybrid web-to-host technologies down load a Java applet from a web server to a web browser and then these applets connect to the back end systems using traditional technology, a TN 3270/5250 gateway. The mix of web and traditional technologies is where the Hybrid label originates. Hybrid approaches have several advantages. First they can support high transaction rate applications and users, with similar response time and performance characteristics to traditional access methods. They also provide a very easy application delivery method. A Java applet is down loaded from a web server to a web browser so

the end users desktop never needs to be touched, either for initial product installation of the software or for future upgrades. This provides great cost savings to the IS organization.

Two types of Java applets can be down loaded. Java emulators are the first type. A Java emulator applet is down loaded to a browser from a web server and the applet establishes a separate window to run in on the PC. For connectivity, the Java based emulator, which is a TN emulator, then connects to a TN server to access the host. Advanced Java based emulators contain APIs that allow for the integration of multiple back end host applications. There are limitations to the type of back end applications a Java emulator can connect to. Emulators can connect only to 3270 - S/390, 5250 - AS/400 and VT - Unix applications. The technology is limited to these types of systems because it emulates fixed function terminals that are protocol dependent.
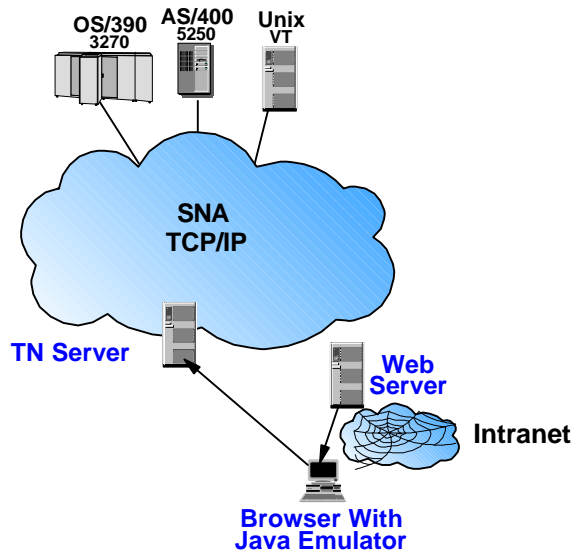
Figure 4: Hybrid Emulation Web-To-Host Access

The second type of Java applet is one that can integrate multiple applications and data types and is known as Java application integration. A new Java applet is developed for a specific user group with new business logic that runs within the new application. The new Java applet connects to one or more existing host applications or databases for delivery of the host information within the new Java applet. Java application integration solutions can integrate more than 3270, 5250 and VT applications while adding new business logic. Java applets gain access to the host through software known as connectors. Connectors are usually supplied by the back end system and application vendors. If the Java application is to integrate a 3270 or 5250 application, it would utilize a Java emulator and a TN server as a connector.

Figure 5: Hybrid Java Application Integration Web-To-Host Access

HTML Web-To-Host Technology

In addition to hybrid web-to-host delivery methods, HTML delivery methods will also be needed depending on application use and where users are located. There are several advantages to HTML delivery of host information. First, the end user desktop does not have to meet any minimum requirements for running Java. The end user can have virtual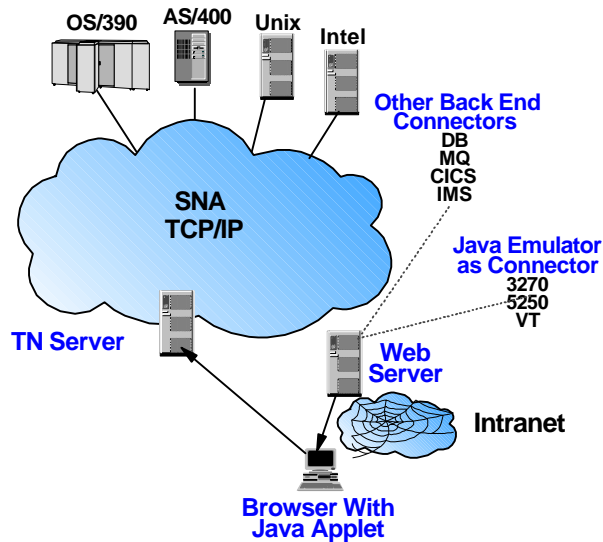ly any operating environment; DOS, Windows 3.1, 95, 98, NT, OS/2, Unix even Mac. All that is required is that the end user have a browser. Second, HTML delivery is very intuitive. Most users who are familiar with a browser can navigate any web page. Although the end user will be accessing host applications, they will not recognize the application as it will appear as any other web page. Finally this technology is not limited to 3270 - S/390 and 5250 - AS/400 application sources, it can integrate nearly any back end data source without the need for application rewrite or new application development.

Several technologies are available that can deliver host applications and data via HTML to a web server and on to a user with a web browser. The first is known as an HTML mapper. This is a relatively rudimentary form of web-to-host access. HTML mappers usually deliver a single application type, for instance just 3270, from a web server. HTML mapping products are also usually limited in their bi-directional capabilities.

The second type of technology, being new, has been labeled by several analysts and vendors. Most often it is known as a host publisher, host integration server or web integration server. Regardless of the name, advanced forms of this technology can tie users with browsers to virtually any back end system not just 3270 or 5250 applications. If the host integration server accesses 3270 or 5250 host applications it still needs to connect through a TN 3270/5250 server. The TN server provides connectivity between the TCP/IP network and the SNA applications. The integration of the back end systems is performed on the host publisher/web integration server and then HTML is delivered to the Web server where the web page can be customized. Aside from ubiquitous delivery, any user with a web browser can access back end systems, and multiple back end systems and data stores can be integrated to create new composite applications. This type of implementation is bi-directional; information that is accessed can be updated from the web interface. This technology delivers back-end applications to the web with no change to the back end systems. The disadvantage of this technology is that it does not deliver the class of service most internal users require if they are accessing applications

they require to perform their jobs. This technology is most often implemented for users external to the enterprise of for users who require occasional access to information.
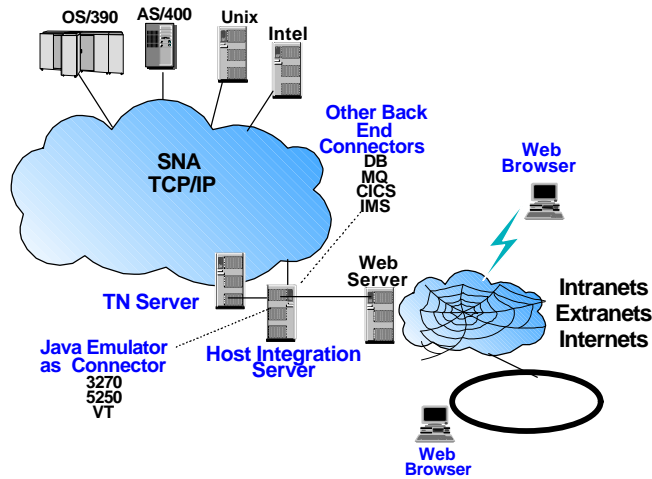
Figure 6: HTML Web-To-Host Access

The third technology that can deliver host applications to a web server is referred to as a web application server. Web application servers can access multiple back end systems just like host publisher systems. Web application servers provide an additional level of function in that totally new applications can be written to the web model and integrated with host applications and data. This enables web application servers to provide new business logic to existing applications by developing new front ends. One final advantage is that web application servers can usually deliver front end information via Java or HTML or in some instances to front ends totally native to the application server as in the case of Lotus Domino. Java emulators and in some instances host integration servers are used as connectors to 3270, 5250 and VT applications for web application servers. The disadvantage of web application servers is that additional front end application development work is required to deliver existing applications.

Figure 7: HTML Web Application Server, Web-To-Host Access

IS And End User Requirements

Host Integration Failure Points

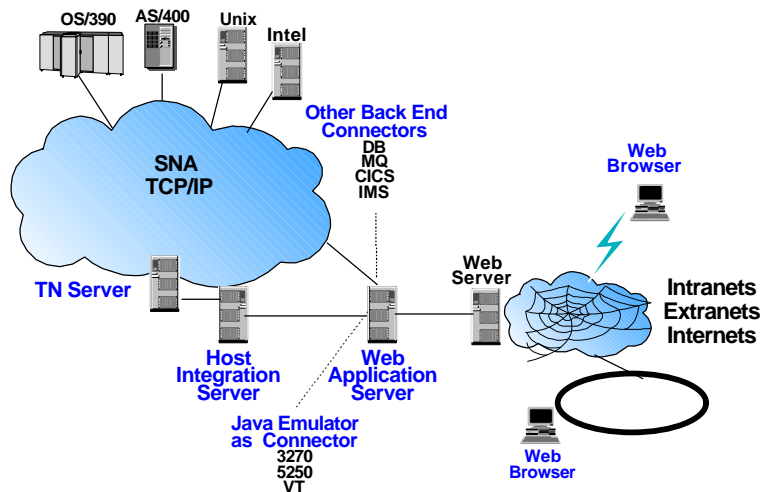The lure of significant benefits both to the core business and to the IS community have lead many enterprises to initiate web-to-host projects. These projects have also brought to light some problems or inhibitors early adopters have experienced in their implementation of the technology. Five key inhibitors with current web-to-host offerings have been identified. Any one of these can lead to the eventual failure of a web to host project:

- { Lack of an extensible and shareable infrastructure
- { Closed or proprietary system architectures
- { Limited end to end delivery and security
- { No common cross platform application development environment
- { Return on investment is compromised

Lack of an extensible and shareable host integration infrastructure
Web to host projects are motivated by the search for a competitive advantage. The idea that new customers can be reached or new services can be provided to existing users, or both, with existing applications is extremely enticing. After all, the return on investment should be extremely high. But current web to host solutions have limitations. These limitation often don't appear until well after implementation of the solution has begun, not because the solutions were not researched thoroughly but because additional unforeseen requirements were added to the project.

Current web-to-host offerings are niche solutions that can address only single user group needs. They have limited access to back end data and applications and cannot respond to new requirements from user groups. Few, if any, of the current offerings provide for the migration of users from one technology to another technology, even though they may be accessing the exact same data.

A host integration infrastructure is needed. An infrastructure can address quickly new unforeseen user requirements because it is an end to end delivery system. One that has many back end connections as well as multiple delivery methods. Further, an infrastructure can be built on. In the case of a web-to-host infrastructure, it can extend to web application servers and to Java application integration solutions.

A simple example will assist in highlighting the short comings of single technology solutions. Lets look at a retail bank scenario. A Retail bank Line Of Business (LOB) has asked the IS organization to extend existing checking and savings account information located in a 3270 application on an IBM S/390 to users, home bankers, on the web. This fit into the plans the IS organization had because internally the IS organization wanted to implement an intranet for the delivery of host information to the branch office tellers.

The same information, but as the IS department discovered, required two different delivery implementations. One implementation was over the intranet to existing users of the information the bank tellers. Tellers require a Hybrid Java emulation delivery method, they need the support that a hybrid technology brings, high transaction rates and quick response times. The second implementation was over the Internet to new users, home bankers. This user group required HTML delivery of the host information. HTML was preferred because every home banker, had a different desktop configuration. Some were running Mac's, some DOS, others Win 3.1 or Win 95 all that could be

counted on was that they had a browser. In addition, every home banker could not be trained on the existing application. They required a familiar web browser interface.

Without a shareable and extensible infrastructure multiple products need to be introduced into the network and they need to be supported. In this scenario not only would the IS organization need to support a Hybrid solution from one vendor but an HTML delivery method from another. In all likelihood traditional users on emulators would also need to be supported as some users would require the support of thick emulators as well.

Proceeding with the scenario, other problems are caused by not having an extensible and shareable infrastructure. Midway through development of the project, line of business executives were briefed. Excited by what they saw, the LOB managers added a requirement on the IS development team. Twenty percent of this banks customers not only had checking and savings accounts but also had a loan with the bank. It seemed natural that access to loan information was needed to complete the home banking users view of their financial status. As long as a new intranet solution was being deployed to the branch office tellers, loan information should be made available to them as well. The loan information was in a different application on a different system and the niche products selected did not support the integration of additional back end applications or data sources.

New users will require new views of existing information, and new front end applications with additional business logic. An extensible and shareable host integration infrastructure would not only deliver composite applications and data directly to end users, but it would also deliver information to web application servers for the development of new web based applications.   Without an infrastructure information can not be shared and how far, to who and how quickly it can be extended will be extremely limited.

Implementing web to host solutions with multiple niche products will clearly be untenable. In our simple retail bank scenario the IS organization would have a need to deploy and support up to 4 different web-to-host products as well as support traditional host access users. Initial product and support costs would soon eat away any positive return on investment planned for the use of existing applications.

What this nets down to is that a Host Integration solution that provides an extensible and sharable infrastructure must be found. IS must deploy host access products that are capable of integrating users on any network type, Internet, intranets, extranets, TCP/IP and SNA networks, with host information. Further, the same host access products must be able to integrate virtually any back end data source with users on the web. Finally, it must act not only as an end to end solution but also as a connector for web application development environments.

Closed or proprietary system architectures
Today most enterprises operate in a heterogeneous environment. If the enterprise does not internally, adding suppliers, vendors, customers and other new users will push them into a heterogeneous environment. This dictates that any web-to-host technology selected by the enterprise operate with multiple environments.
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Not only do multiple network types, with the appropriate delivery technologies need to be supported but multiple end user operating environments need to be supported as well. Users with Mac's, Windows 3.1, NT, 95, 98, OS/2 all need to be supported as potential users will have these systems. Middleware support on both Unix and Intel systems will need to be supported to address scalability and security issues. Most importantly all end users need to be supported in a manner that is native to their environment. Attempting to deliver host information HTML to a user who requires a Hybrid delivery solution will cause failure of a web-to-host project.

A flexible open system architecture will deliver more than just operating environment independence. It will also ensure that advanced networking technologies will work with the web-to-host solution that is selected. One Hybrid Java emulation solution provider has selected to implement their Java solution using a client/server model. Another mid tier server in addition to the web server and TN server is needed. The protocol that runs between the client and the server is a proprietary TN protocol. This architecture leaves the solution vulnerable to breaches as firewalls filter on industry standard IP. The selection of a proprietary web-to-host product will make securing the solution difficult and that much more likely to fail in implementation.

Limited end to end delivery and security
A complete infrastructure solution necessitates end to end delivery. Piece part solutions that do not interoperate with other technologies will cause restrictions on the use of information. A web-to-host solution should deliver information not only to end users, but also share it with other systems. A Hybrid solution using a Java based emulator should not only deliver information to users but should also interoperate with a Java application integration solution. In this manner, the infrastructure can be customized and extended to any user. By the same token host integration servers or host publishers should deliver information not only to browser users but also to web application integration servers once again ensuring deliver to any user.

Security is continually ranked by IS executives as one of their top requirements. With any move to the web, more then back end data sources and front end delivery methods need to be integrated, security must be as well. Without security being integrated maintaining consistent authorization, access and session controls across three or four connectivity solutions would be complex at best, and complexity generates security vulnerability. A single security infrastructure needs to be integrated with the host integration solution. Without a single infrastructure, the practice of implement now and worry about security later will surely be adopted to keep pace with competitive web-to-host initiatives.

No common cross platform application development environment
Deploying multiple host access products with limited flexibility contain the potential to escalate costs beyond any tangible business return. The promise of high return on investment, competitive advantage and improved services offered by the reuse and extension of existing applications can evaporate quickly when costs outrun budget. To ensure that costs are contained a host access solution needs to supply more than a common extensible and sharable infrastructure. It also needs to supply a common development environment.

Too much is different not to have a common development environment. Different users on different networks all needing different views of host applications and data and different delivery methods. A common set of API's across the network environments will ease the porting of customized front ends from one environment to another. In addition, advanced technologies like Java beans that can hasten the development of new front ends should be included in any web-to-host solution. Finally, solution development kits that allow IS and independent software providers access into the infrastructure should be provided. This will provide new back end access points as well as the ability to reach new users.

Return on investment is compromised
With the move to the web, IS has now changed its position within the business. No longer will IS just provide information to front office personnel to run the business. IS will become the front office. The IS organization will become an extension of the sales, service, support and other front office functions of the enterprise. Internal employees may tolerate confusing screens and data hidden across multiple applications but customers and partners will not. Internal employees, even though it limits greatly their productivity, will tolerate system or network outages but customers and partners will not. Outages, confusing applications or a lack of needed information will drive external users back to more expensive traditional front office approaches or worse into the arms of competitors. In short IS needs to

minimize its operational risks. With IS's move to a front office interface, back room IS operations must be rock solid and must be flexible enough to meet new requirements quickly. If the IS back office is not, users customers and partners, will turn away eliminating any return on investment.

To minimize operational risks web-to-host solutions must work without the need to rewrite existing applications. Rewriting would add additional expense and lower ROI and would create new failure points in applications that have run reliably for perhaps years..

Finally, regardless of the delivery method a web-to-host solution should be able to integrate multiple back end data sources. New users will most likely require different information than internal users. Without this capability, new users requirements for information will not be able to be addressed.

Host Integration Requirements

Given the complexity of the business and technical requirements, and the substantial inhibitors to meeting them, niche solutions will not address most enterprises needs for successful web-to-host deployments. The above research into major failure points of existing web-to-host projects assists in forming a base set of requirements. Although these may not serve to be an all encompassing list they do establish a minimum set of requirements needed by an enterprise to address both current and future host integration needs.

What is needed is a solution for the integration and delivery of host based information and applications to users on any network type. A host integration solution must deliver the following:

{ An extensible and shareable infrastructure
{ An open and nonproprietary system architectures
{ An integrated secure end to end solution
{ A powerful application development environment
{ Maximized return on investments for the business and for IS

IBM eNetwork Host Integration Solution

Choosing the right host integration solution is paramount to current and future business success. The eNetwork Host Integration Solution not only offers the flexibility to meet today's complex business and technology needs, but also enables simple and cost effective transformations that allow businesses to capitalize on new opportunities. The following sections explain why the eNetwork Host Integration Solution is the right choice.

The eNetwork Host Integration Solution includes the following market leading components:

{ **Communications Server** : A multi-purpose networking server featuring the industry's most advanced SNA gateway, a TN Server (3270 and 5250), and a Host Publisher.

{ **Personal Communications** : The industry's leading communications client offers 3270, 5250 and VT emulation as well as a variety of application programming interfaces (APIs).

{ **Host On-Demand**: The first 100% Pure Java emulator in the market offers 3270, 5250 and VT emulation in a thin client mode plus a set of Host Access Class Libraries and Java beans.

While these components individually offer substantial value, in aggregate they form the most powerful and comprehensive host integration solution in the industry featuring:

{ An extensible and shareable host integration Infrastructure
{ A flexible open systems architecture
{ Maximum return on investment
{ A secure end-to-end solution
{ A powerful application development infrastructure.

An Extensible and Shareable Host Integration Infrastructure

Competitive host integration solutions offer two unattractive alternatives. Businesses can choose to deploy upwards of 6 different products to meet their needs and hope that they work. Or, they can choose a single vendor product, force fit it into their environment and compromise the needs of some of their users. The eNetwork Host Integration Solution, on the other hand, is an integrated offering comprised of just 3 components (Communications Server, Personal Communications, and Host On-Demand) that is flexible enough to meet the unique needs of users within a variety of different host integration environments:

SNA Host Integration
Extending the reach to new environments does not mean abandoning the users connecting to host systems across the SNA network. To support this connectivity, Communications Server provides a powerful SNA gateway that features the most advanced SNA networking capability available today, like Advanced Peer-to-Peer Networking (APPN) and High Performance Routing (HPR). Client support is provided by Personal Communications which allows for both 3270 and 5250 emulation across in an SNA environment, and provides a significant set of APIs for application access to host data streams.
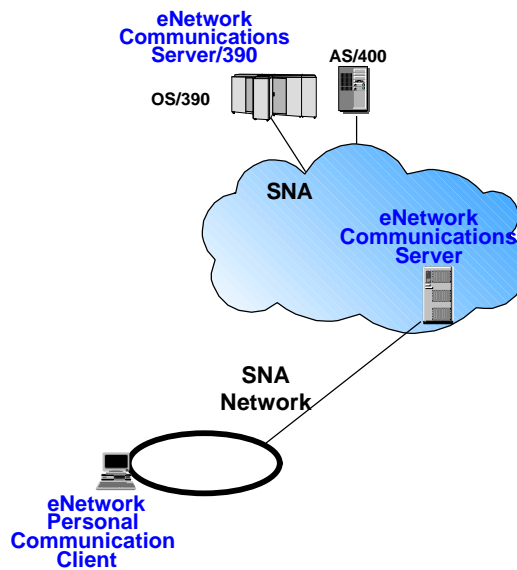

Figure 8: eNetwork SNA Access

TCP/IP Host Integration
Change to a TCP/IP backbone network and there's no change to the eNetwork solution required to support it. In the TCP/IP environment, Communications Server plays the role of a TN server for both 3270 and 5250. On the client side, Personal Communications provides the same capability as in an SNA network but adds support for VT emulation. And with the multi-protocol support in both of these products, SNA applications still work without modification.
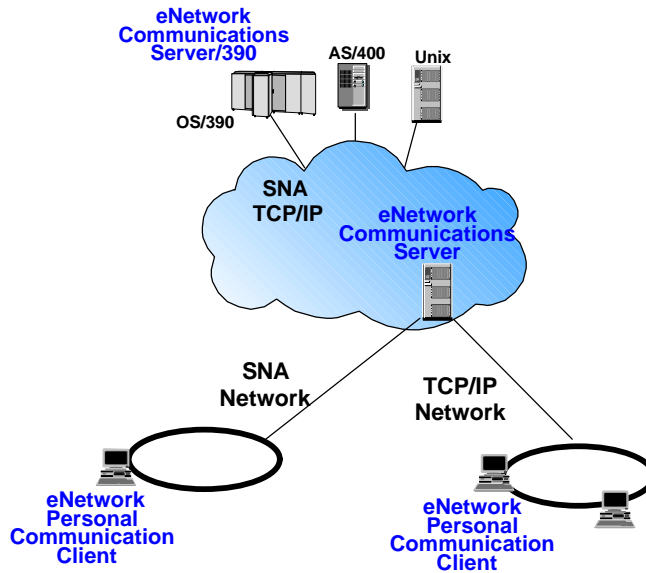
Figure 9: eNetwork SNA, TCP/IP Access

Intranet Host Integration

The introduction of web technology affords new options but is still part of a single host integration solution. Communications Server provides the same TN server support for web based clients. Host On-Demand, however, is the client of choice for intranet users who generate high transaction rates with host systems (3270, 5250, VT). While Host On-Demand provides these users with a traditional emulation interface, it is installed on and served from a web server, thus enabling significant expense savings in product deployment and maintenance.
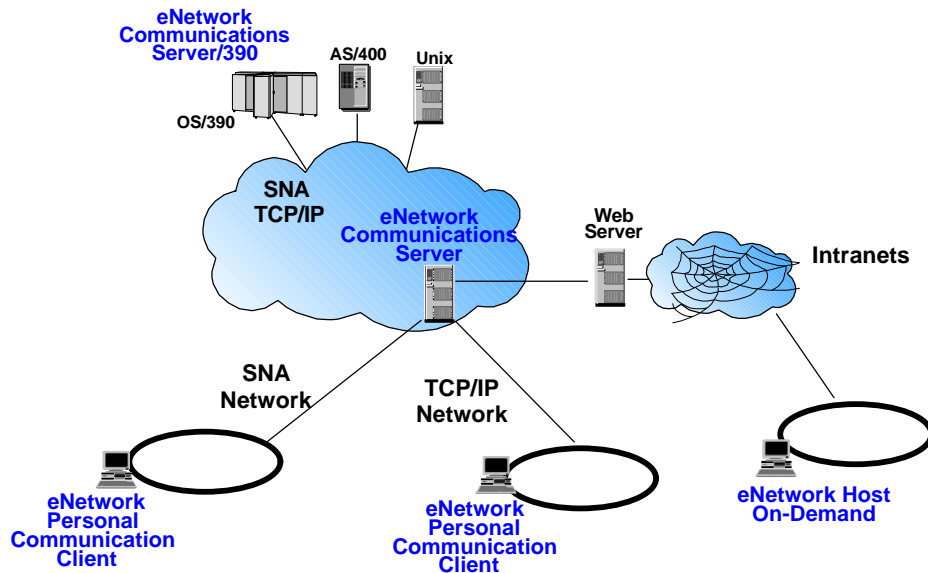

Figure 10: eNetwork SNA, TCP/IP, Intranet Access

Extranet Host Integration

The extranet introduces an entirely new class of users (business partners) who are likely unfamiliar with or uncomfortable using a "green screen" interface. To support these users, a graphical user interface (GUI) is provided with Host On-Demand. This feature automatically converts any 3270/5250/VT screen into a graphical equivalent, thus making host applications easier to use. The capability to create

customized views of host applications is also offered, enabling businesses to filter the information that is presented to particular groups of users.

These extranet users may also be connecting in over lower speed lines, which make large downloads (e.g., of Java applets) undesirable. A Host On-Demand local caching option (i.e., download required only once) and thin client option (basic emulator subset) helps alleviate this problem.

As with the TCP/IP and intranet environments, Communications Server provides the same TN server support for these extranet clients.

With the move outside of the enterprise network security becomes increasingly important. The eNetwork Host Integration Solution provides additional security with the shipment of the eNetwork firewall and the implementation of SSL between the client and server. In addition the solution works with all major host security systems such as RACF and ACF2.
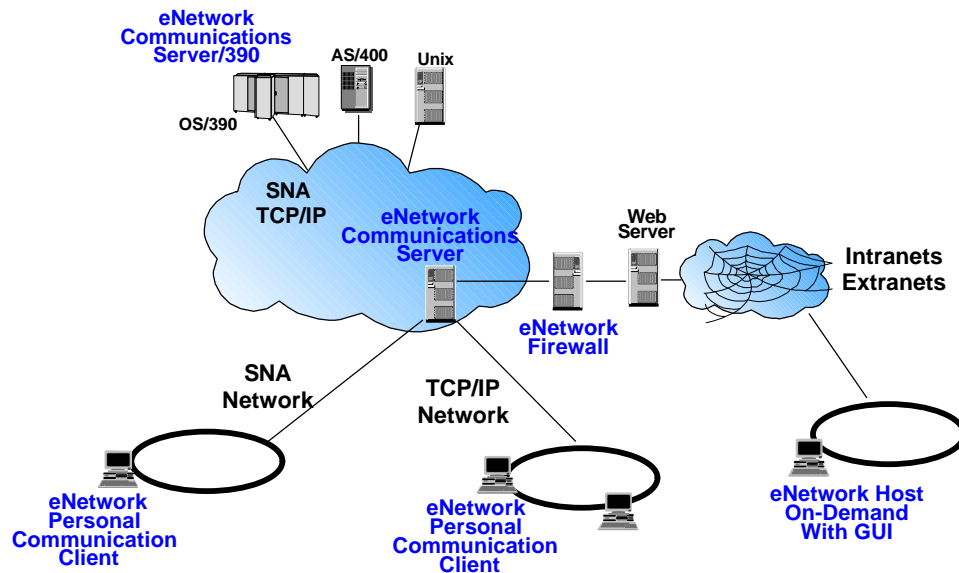

Figure 11: eNetwork SNA, TCP/IP, Intranet, Extranet Access

Internet Host Integration

Yet another new class of users need to be supported on the Internet, primarily customers. For these users, most businesses find it undesirable to provide direct access to host-based applications. And, most of these users would be very uncomfortable using an emulator interface. Businesses don't have any control over what's running on their customers' desktops and cannot assume they have Java enabled browsers. For these reasons, a solution for this user group must be based on a web browser interface.

Enter Host Publisher, a function of Communications Server for Windows NT 6.0. Host Publisher allows a business to easily integrate multiple sources of data and publish them (e.g., generate HTML) to a web browser user. Host Publisher, in fact, has redefined the host. In addition to support for traditional host systems (3270, 5250, VT), Host Publisher also connects to Java applications, ActiveX applications and any ODBC compliant database. This capability allows businesses to create new

"composite applications" that mine information from a variety of sources but do not rely on any modifications to those application or data sources.
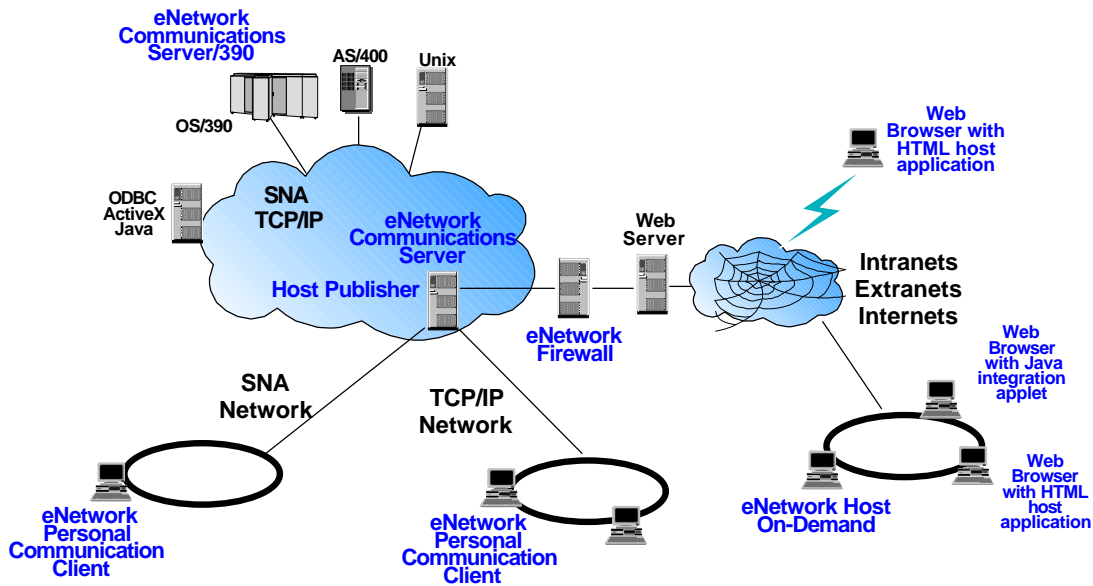

Figure 12: eNetwork SNA, TCP/IP, Intranet, Extranet, Internet Access

The key here is that new technologies have been added specifically to meet the unique requirements of users in each of these network environments, yet all of them are included in a single solution.

Host Integration Extensions

To complete the eNetwork Host Integration solution extensions have been provided to connect back end information to web application servers. This ensures that the Host Integration solution can meet any user requirements both in back end data access and in front end interface.
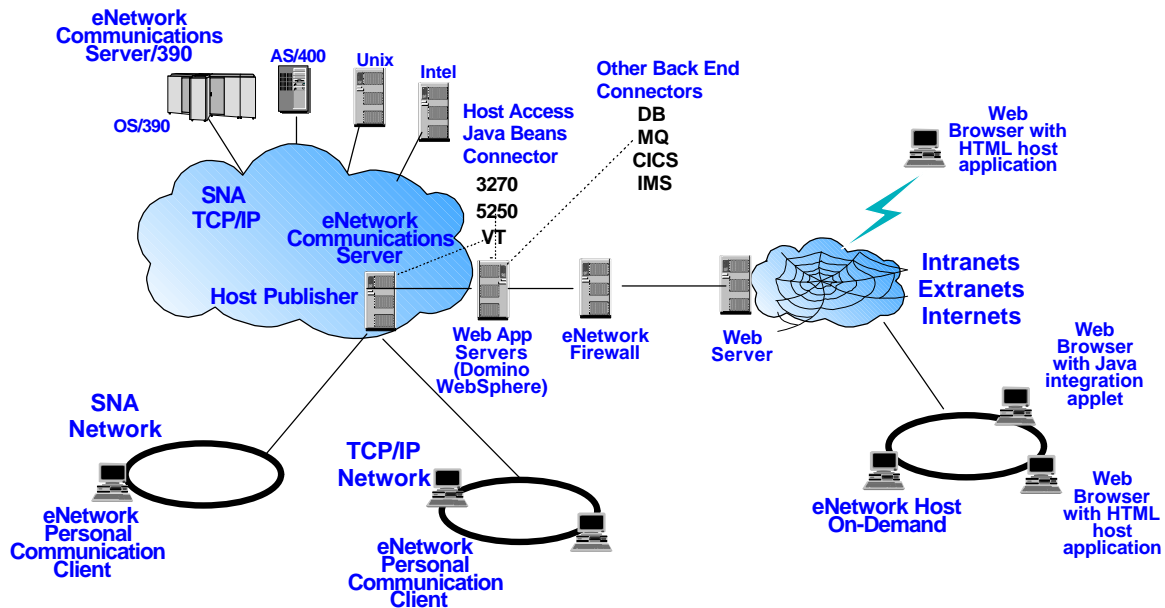

Figure 13: eNetwork Host Integration Infrastructure

A Flexible Open Systems Architecture

Recognizing that within most enterprises there is likely to be a great variety of users, hardware, software, and networking architectures, the eNetwork Host Integration solution has been designed to accommodate this complexity.

The eNetwork Host Integration Solution supports the industry's predominant client and server platforms. Communications Server is supported on Windows NT, SCO UnixWare, AIX, OS/2 and S/390. Personal Communications will run on Windows 3.1, Windows NT, Windows 95, Windows 98, and OS/2. Host On-Demand can be installed on a variety of server platforms: OS/2, AIX, SUN Solaris, HP-UX, Windows NT, and S/390. And, with Java's promise of "write once, run anywhere," Host On-Demand will run on any client providing JVM support when downloaded from any one of the supported servers.

Flexibility also extends to support for multiple network protocols. While Host On-Demand is designed specifically for IP environments, both Personal Communications and Communications Server will execute in IP or SNA environments. In addition, both of these products support AnyNet. This IBM technology enables applications to run in any network environment. For example, SNA applications can run over a TCP/IP network. Conversely, sockets (TCP/IP) applications can run over an SNA network. This allows customers to choose new applications based on their business value as well as make changes to their network infrastructure without concern for the effect it will have on their existing applications.

Maximum Return on Investments

A Key measuring stick for any host integration solution is its ability to not only preserve but extend the value of the investments made in both applications and infrastructure. This ability is manifested in the eNetwork Host Integration Solution in several ways.

First, the solution allows businesses to reach new users. Through the use of web technologies like host publisher (Communications Server for Windows NT) and Java emulation (Host On-Demand), businesses can establish an efficient communications mechanism with customers and business partners. This capability offers real benefits, for example, businesses can create new sales channels that help grow revenue at a low cost, thus significantly improving profitability. It also allows businesses to establish new support mechanisms for their business partners, thus minimizing operations expense.

Second, the solution enables businesses to exploit existing information in new ways. With Host Publisher, for example, new "composite" applications can be created using multiple sources of data. Also, using the application programming interfaces provided in all components of the solution, information can be mined from back-end systems and utilized in many different ways. For example, a catalog system accessible only through a 3270 emulator interface can be mined, manipulated and stored in a local (i.e., PC resident) data system like an ODBC database, an Excel spreadsheet or Lotus Notes.

Finally, the solution requires no changes to existing applications and infrastructure. This ensures the integrity of the solution. Furthermore, this offers the flexibility to create different views of the same applications, thus allowing for the most efficient and autonomous use of information by different user groups (e.g., finance department, customers, business partners, sales team), again without application or infrastructure modification.

A Secure Integrated End-to-End Solution

The industry is full of vendors who can provide pieces of the host integration puzzle. Unfortunately, they require that customers put the puzzle together, and often pieces are missing or just don't fit. The eNetwork Host Integration solution, on the other hand, represents a cohesive collection of products and services designed to meet the customer's entire need. The product components previously discussed

(Communications Server, Personal Communications, and Host On-Demand) are just one part of this solution. Security, services and support, and pricing are also addressed.

Security is fundamental when extending the reach of critical business information to users across public networks (e.g., the Internet). The eNetwork Host Integration solution offers several features to provide a secure environment. First, all the client and server products support SSL encryption for secure transport of sensitive information. Second, these same products also work with existing host security systems (e.g., RACF). Finally, the solution includes a firewall that provides bulletproof access control as well as support for virtual private networks (VPN).

The next pieces of the puzzle are services and support. To assist customers in their deployment of a host integration solution, IBM offers a wealth of services, including: planning, installation, configuration, migration, application development and training. Couple that with IBM's award-winning support offerings and customers are assured that their host integration solutions will deliver optimal reliability and performance.

To complete the picture, a simplified purchasing option is provided. While each of the individual product components can be purchased separately, the eNetwork Host Integration Solution can be purchased as a whole and features:

{ Simple one price per user
{ Mix and match of all product components: Communications Server, Personal Communications and Host On-Demand
{ No charge platform migrations (e.g., Communications Server for OS/2 to Communications Server for AIX)
{ No charge technology migrations (e.g., traditional emulation to web-to-host emulation)
{ Services included in the price: planning, installation, configuration, migration, training, etc.

This allows for the selection of whatever technologies are most suited to a customer's needs and maximizes the flexibility to accommodate changing requirements in the most cost effective manner.

A Powerful Application Development Infrastructure

Each business has unique needs so host integration solutions must provide the environment that allows businesses to add value to their applications. To this end, the eNetwork Host Integration Solution provides a comprehensive application development infrastructure that is based on industry standards, thus protecting investment.

The first element of this infrastructure is the Host Access Class Libraries. This object oriented API set is included in all the components of the eNetwork Host Integration Solution and provides access to 3270, 5250 and VT data streams. These class libraries allow businesses to utilize mission critical information in new ways, such as integrating data from one application into another or replicating information from one data source to another.

The second element is the Host On-Demand Java Beans. These beans provide emulator functions that allow customers, business partners, and ISVs to rapidly develop custom applications that deliver the specific functions they want to include in their host access applications. And, because they are object oriented, businesses can minimize development expense through reuse.

The third element is the Host Publisher (a function of Communications Server). This allows businesses to integrate information from multiple application and data sources with a standard interface and tool set.

Finally, whether you're accessing host information using the Host Access Class libraries, creating new applications using the Host On-Demand Java Beans, or building composite applications with Host Publisher, full support is provided for development tools such as web page builders and visual development environments.

In conclusion, the eNetwork Host Integration Solution is the most comprehensive and flexible solution in the market today. It's the only solution in the market that:

{   Addresses all the network environments: SNA, TCP/IP, Intranet, Extranet and Internet
{   Supports a common development infrastructure across the product line
{   Delivers technology uniquely designed to support specific types of users
{   Enables platform and technology migrations without additional purchase
{   Is designed, developed and tested to work together in large scale host integration environments

These factors in aggregate mean that the eNetwork Host Integration Solution offers the lowest total cost of ownership of any solution in the market.