HP-to-IBM Communications

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IBM connectivity is an important element of Hewlett-Packard's HP AdvanceNet strategy for multivendor networking, and the company offers a full line of products that integrate HP computers with IBM systems. These products allow subnetworks of distributed systems to coexist with IBM systems at corporate or divisional headquarter locations.

A strong commitment to multivendor networking based on international and de facto standards, such as SNA, is central to the HP AdvanceNet strategy.

HP provides batch and interactive SNA communications on the HP3000 family of business computers in both gateway and standalone configurations.

The HP3000 batch communications product, SNA/NRJE, enables an HP3000 to appear as an 8100 DPPX/RJE Workstation to an IBM host, when used with HP's SNA Link product. Batch jobs are spooled when communications lines are busy, and automatically processed when the lines are free.

HP's SNA Interactive Mainframe Facility (IMF) is the company's interactive communications product. SNA IMF emulates the main features of an IBM 3270 control unit, using SNA PU2 and LU1, 2 and 3 protocols. HP terminals, printers, and applications on the HP3000 that are running SNA/IMF emulate IBM terminal and printer functions.

SNALink/3270 on the HP Vectra PC and the HP Portable Plus PC provides interactive access to IBM 3270 applications by emulating an IBM 3274 control unit with 3278 display stations and 3287 printers attached.

For program-to-program applications between an HP3000 and an IBM host, users can either use the 3270 datastream based programmatic interface in SNA IMF or the LU6.2 API product. The LU6.2 Application Programming Interface (API) enables third parties or end users to develop HP3000 applications that use the LU 6.2 protocol to communicate with IBM systems.

HP Information Access and the Information Access Cullinet Link provide a controlled way to link PC users with mainframe databases. The PC user can transfer files in Lotus 1-2-3, R Base:5000, dBase II, or other popular PC word processing and graphics applications to or from Cullinet C/ICMS tables on an IBM mainframe.

Thus users can enter transactions on the HP3000, send information to the host's central database, and retrieve information from that database.

HP additionally offers bisynchronous (BSC) HP-to-IBM products, including: 2780/3780 (RJE) batch workstation emulation, HASP workstation emulation, and 3270 terminal emulation.

Office Connections

Hewlett-Packard offers connections to IBM's PROFS and DISOSS, as well as support of IBM's Document Content Architecture (DCA), Document Interchange Architecture (DIA), and Logical Unit Type 6.2 (LU 6.2).

HP OfficeConnect to DISOSS enables HP DeskManager users to exchange electronic mail with DISOSS users, and to file, search for, retrieve and delete

documents in a DISOSS library. The product also includes a converter that permits exchange of documents with DISOSS in Final Form Text DCA.

HP OfficeConnect to PROFS allows users of IBM's PROFS and HP3000's to communicate through their own electronic mail systems.

HP OfficeConnect products provide HPDesk users with transparent access to PROFS and DISOSS. No HP software is required for the IBM system.

Hewlett-Packard has verified the performance of third-party solutions for Reverse Pass-Through and SNA-to-X.25 conversion. Reverse pass-thru makes the IBM 3270-to-HP terminal conversion needed to allow users to access applications based on the HP3000.

SNA/X.25 conversion allows the SNA HP-to-IBM communication products to be used over an X.25 network.

Hewlett-Packard currently has an entire R & D facility working on the development of new products that enable users to communicate within IBM environments; among these products are:

-- HP's software-only, enhanced reverse pass-through product;

-- SNA-to-X.25 conversion software.

Hewlett-Packard's objective is to make HP StarLAN, which is the company's strategic commercial LAN product for the office, useful in the widest possible range of office environments.

To meet this goal, Hewlett-Packard has tested HP StarLAN over IBM Cabling Types 2 and 3 (shielded and unshielded twisted pair wiring, which is used by both StarLAN and Token Ring). HP will run tests with other wiring (such as IBM Cabling Plan Types 1 and 9) as customer need requires.

HP firmly believes that HP StarLAN offers several advantages over Token Ring, but we are also commited to protecting customers' investments in our own office solutions as well as those of IBM. To this end, HP plans to enable Vectra PCs that are linked to Token Ring networks to access Personal Productivity Center (PPC) functionality on the HP3000 through an 802.3/802.5 bridge. HP's Vectra PC third party program will also include a Token Ring adapter card and software. In addition, HP plans to offer a method of connection for HP 802.3 LAN attached Vectra PCs to gain access to an IBM mainframe on the Token Ring Network.

The advantages which StarLAN offers to customers include a lower cost per connection than Token Ring. In addition, since HP StarLAN is designed for use over phone wire, customers can feel confident that StarLAN will work with fewer limitations and permit more flexible configurations over existing phone wire (which is unshielded twisted pair).

HP is commited to continually enhance our capabilities in SNA and SNA-based architectures, so we have made SOI's for IBM Network Management Architecture and PU 2.1.

To provide coexistance between HP industry-standard networking an IBM's SNA networking, HP will support IBM's Network Management Architecture (NMA) on the company's SNA HP-to-IBM products. A distinction, however, should be made

between NMA and NetView. NetView is an IBM product packaging and not an architecture. HP is investigating how it will implement support of NMA.

This does not necessarily imply that HP will support NetView/PC. Given the limited functionality currently defined in NetView PC coupled with the present limitations of the PC itself, we are not convinced that NetView PC will be able to provide our customers with the type of network management capability they need. We believe that our recently introduced Private Packet Network (PPN) offerings can deliver more state-of-the-art functionality than NetView/PC offers.

At present, HP has developed a network management architecture that parallels as closely as possible future ISO standards for network management. HP's architectured solution will provide applications that span all HP processors and multivendor environments.

On June 16, 1987, IBM for the first time, announced their intent to support Node Type 2.1 on their strategic processor line, the System 370 for delivery in 3rd Quarter 1988. Accordingly, peer-to-peer connectivity is still an emerging technology for IBM. In HP's continuing commitment to provide means for HP networks to coexist with IBM, HP now formally commits to provide a Node Type 2.1 for the HP3000.

A number of connectivity options will arise as IBM begins to deliver Node Type 2.1. Examples are: LU 6.2 Application Programming Interface, other LU 6.2-based applications and peer-to-peer communications between two Node Type 2.1 peripheral nodes over an SNA backbone network. HP will assess the need to these capabilties as they apply to our customers and to the HP3000.

HP also offers a number of products for HP9000 to IBM communcations. For batch communications, SNA users can use HP-UX SNA3770 to exchange files between the HP9000 and an IBM host ; Series 300 BSC users can use BSC RJE to perform the same function.

For interactive communications, HP-UX SNA3270 provides 3274 emulation which allows HP9000 terminals and printers to emulate IBM 3278 terminals and 3287 printers. In addition, HP-UX SNA3270 supports IBM 3270 PC File Transfer which makes it possible to exchange files with the IBM host with a one line command.

HP-UX SNA3270 and HP-UX SNA3770 can be accessed in a standalone or gateway configuration. HP-UX SNA3270 and HP-UX SNA3770 can also share the same link to a host.

In summary, Hewlett-Packard is firmly commited to making connectivity to IBM easy to implement and use for its customers. This is an important element of HP's commitment to multivendor networking based on both international and de facto industry standards.

HP ADVANCENET STRATEGY

* **PROVIDE FOUNDATION FOR HP'S COMPUTER PLATFORMS**
  - PEER-TO-PEER COMMUNICATIONS OVER LAN AND WAN
* **PRACTICAL APPLICATION OF INDUSTRY/DE FACTO STANDARDS TO SOLVE MULTIVENDOR NETWORKING NEEDS**
  - HP-HP & MULTIVENDOR: OSI
    - SHORT TERM: OSI + ARPA
    - LONG TERM: FULL OSI (MAP, TOP, ISDN)
    - OTHER DE FACTO STANDARDS
  - HP TO IBM: SNA
* **QUALITY PRODUCTS AND SERVICES**
  - FUNCTIONALITY, LOCALIZABILITY, USABILITY, RELIABILITY, PERFORMANCE, SUPPORTABILITY
  - CONSULTING, SUPERVISION, AND SUPPORT
* **AREAS OF EMPHASIS**
  - INFORMATION ACCESS
  - NETWORK MANAGEMENT AND REMOTE OPERATOR SUPPORT

* A strong commitment to multivendor networking based on international and de facto standards, such as SNA, is central to the HP AdvanceNet strategy.

* HP currently has an entire R & D facility working on the development of new products that enable users to communicate within IBM environments.

HP–IBM NETWORKING

CUSTOMER NEED:

* *ABILITY TO COMMUNICATE WITH INSTALLED IBM SYSTEMS AND NETWORKS.*

HP'S OBJECTIVE:

* *QUALITY PROVIDER OF MULTIVENDOR NETWORKING USING INDUSTRY STANDARDS & DEFACTO STANDARDS SUCH AS SNA.*

HP'S OFFERINGS:

* *HP–IBM COMMUNICATION PRODUCTS IN 3 ENVIRONMENTS:*
  - *BUSINESS OFFICE*
  - *MANUFACTURING*
  - *ENGINEERING & RESEARCH*
* *CHOICE OF GATEWAY OR STANDALONE IMPLEMENTATION.*

Information Networks Division

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* HP offers a full line of products that integrate HP computers in different solutions with IBM systems.

* These products allow subnetworks of HP distributed systems or standalone systems to coexist with IBM systems at corporate or divisional headquarters locations.

HP-IBM NETWORKING

WORK ENVIRONMENTS

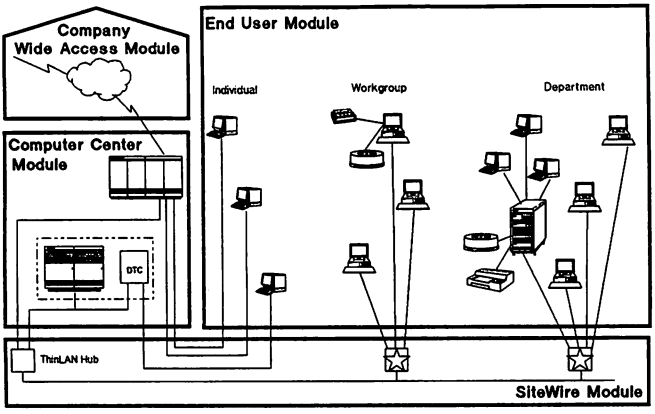
	BUSINESS OFFICE, REG. SALES & SERV. & MFG. DATA CENTER HP3000 & PC	MFG. REAL-TIME HP1000	BUSINESS OFFICE, ENGINEERING & CIM HP9000
BATCH (RJE) COMMUNICATIONS	SNA NRJE RJE MRJE SNA Server	RJE MRJE	HP-UX SNA 3270 SERIES 300, 600 UNIX* RJE EMULATOR SERIES 200, 300 500 UNIX
INTERACTIVE (3270) COMMUNICATIONS	SNA IMF & BSC IMF SNA 3270 LINKS (MICRA & PORTABLE *) 3278 IRMA (MICRA & TOUCHSCREEN SNA Server	PMF PROGRAMMATIC	HP-UX SNA 3270 SERIES 300, 600 UNIX 3270 EMULATOR SERIES 200 + 300 BASIC & PASCAL
OFFICE CONNECTION	OFFICE CONNECT TO DISOSS & LU6.2 BASE OFFICE CONNECT TO PROFS HP CONVERT/DCA INFO ACCESS		

* Future Product

* For the HP3000 family of business computers, HP supports a number of HP-to-IBM products that offer batch, interactive, program-to-program, and office connection functionality.

* After a quick overview of how HP to IBM communications fits into the Business Office solution, we will look at these products for the HP3000.

Business Office Solution Summary



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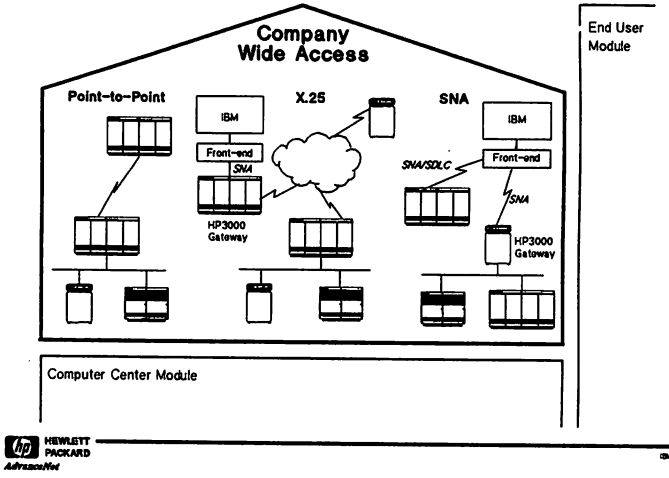
AdvanceNet

* In the Business Office there is sometimes the need to send accounting information from a remote office to a corporate mainframe, or to submit payroll figures to an IBM host.

* HP AdvanceNet offers high-performance packages that maximize productivity by making tasks like these fast and easy.

Company Wide Access Module



* There are several ways to connect HP3000's to IBM mainframes.

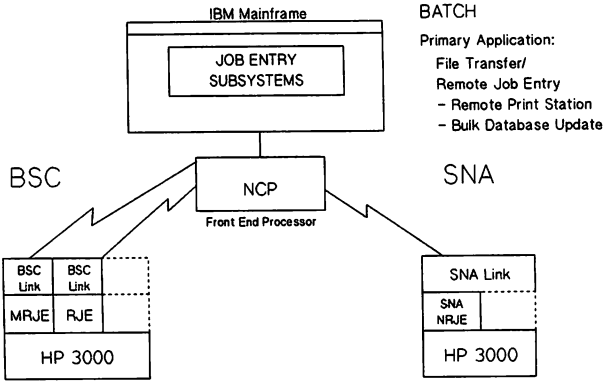
* If the HP3000 is not on a LAN, a standalone connection can be used to connect directly to an IBM host.

* If several HP3000's on a LAN require SNA access, one of these systems can serve as a non-dedicated SNA gateway.

* The SNA gateway can be locally attached to the IBM host and accessed by remote locations through an X.25 network, or the SNA gateway can can be locally attached to the LAN with a remote connection to the IBM host.

HP - IBM NETWORKING:

Business Office Environment



* Starting first in the batch area, we'll now take a look at some of the services which are available.

* Batch products can be used as an easy way to exchange files with an IBM host. Batch jobs are spooled when communications lines are busy, and automatically processed when the lines are free.

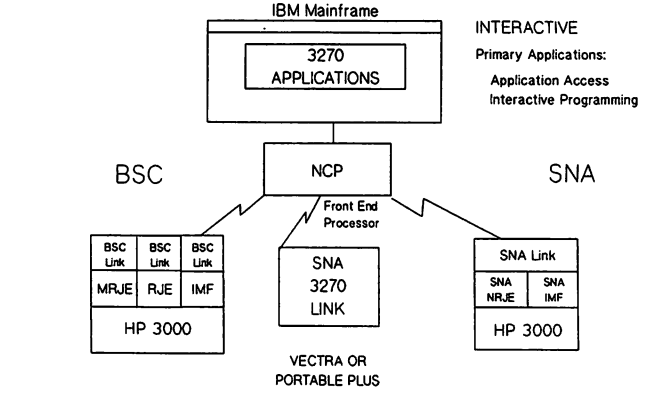
* Batch products can also be used to subit jobs to a host, or for print jobs, or for bulk database update.

* SNA users can use SNA/NRJE which enables an HP3000 to appear as an 8100/DPPX workstation to an IBM host, when used with the SNA Link product.

* For BSC users, RJE provides 2780/3780 emulation, while MRJE provides HASP emulation.

HP - IBM NETWORKING:

Business Office Environment



* In the interactive area, users can access applications on the host and do some local printing. HP terminals and printers are allowed to emulate IBM terminal and printer functions.

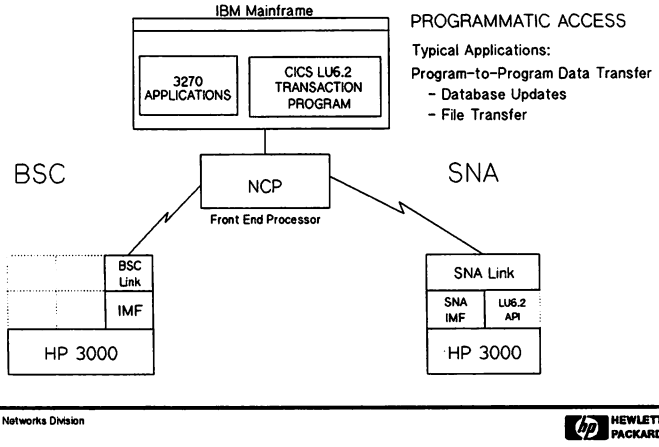
* SNA Interactive Mainframe Facility (IMF) emulates the main features of an IBM 3270 control unit, using SNA PU2 and LU1, 2, and 3 protocols.

* For BSC networks, IMF offers similar functionality.

* The SNALink/3270 product for the HP Vectra PC and the HP Portable Plus PC provides interactive access to IBM 3270 applications by providing PU2 emulation.

HP - IBM NETWORKING

Business Office Environment



* Both IMF and SNA IMF also provide a 3270 applications programming interface. A program running on the HP3000 can access information from a program running on the IBM host, and vice-versa.

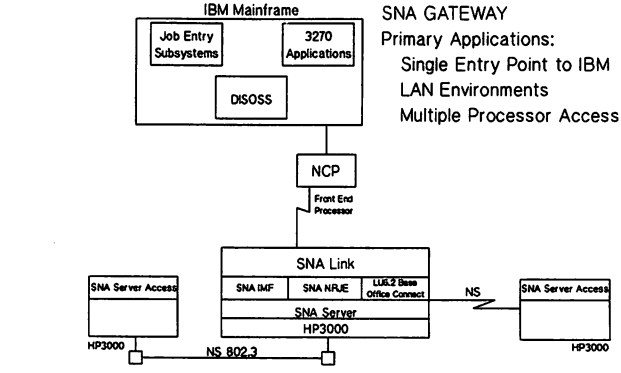
* This capability can be used for database access and updates, or for file transfer.

* Another alternative to the 3270 programmatic interface is to use the LU6.2 API product.

* While the LU6.2 sessions to hosts early in 1988 were restricted to CICS access, VTAM/APPC will provide much better functionality when it is released at the end of this year. VTAM/ APPC will allow applications running in IMS, TSO, and CMS to access LU6.2 sessions.

HP – IBM NETWORKING

Business Office Environment

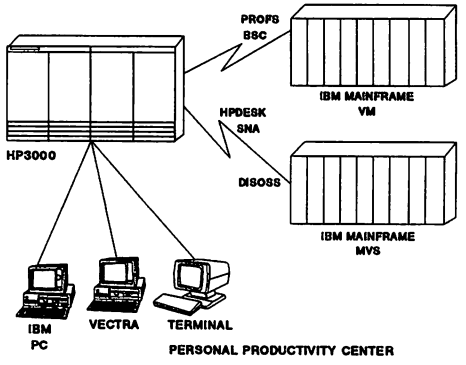


* While we have been showing standalone connections up until now, users can also access SNA sessions to the IBM host through the SNA Server gateway.

* Other nodes on the LAN or linked remotely through a point-to-point link can access SNA services as if there were an SNA Link on that system.

FULLY INTEGRATED HPDESK SOLUTIONS TO DISOSS OR PROFS

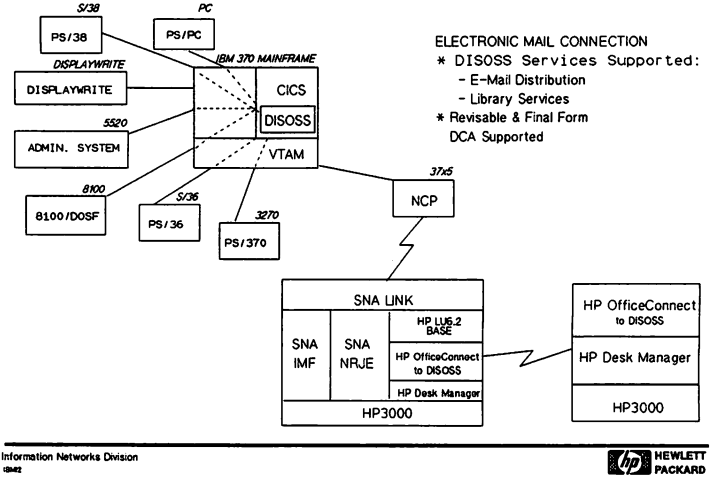
HP OFFICECONNECT TO DISOSS AND PROFS



* Two office connect products allow HPDesk users to exchange mail with PROFS and DISOSS users.

* For VM users, HP Officeconnect to PROFS allows HPDESK mail to be exchanged with VM through a BSC link. (BSC RJE is also required.)

* For MVS users, HP Officeconnect to DISOSS allows the exchange of mail between HPDESK and DISOSS through a more complicated SNA link.



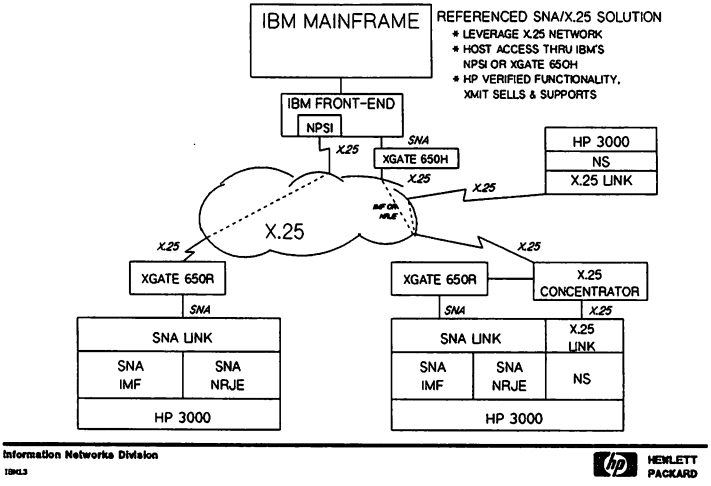
* HP OfficeConnect to DISOSS enables HP DeskManager users to exchange electronic mail with DISOSS users, and to file, search for, retrieve and delete documents in a DISOSS library.

* HPOfficeconnect to DISOSS emulates some of the functions of a Displaywriter. This provides a DIA interface to the host over an LU6.2 session. This product also supports the Final Form DCA format.

* The user has the option of converting HP3000 documents to revisable form DCA format with the HP Convert/DCA product.

* Although the technology used here is quite impressive, most IBM users have not adopted DISOSS. DISOSS appears to consume a large amount of resources and has a complicated user interface.

SNA OVER X.25 VIA XMIT



* With IBM's recent release of NPSI, the performance of SNA over X.25 is much improved on the FEP end -- on the other end, a referenced product from XMIT called XGATE 650R lets the HP3000 handle the SNA over X.25 traffic.

* The HP3000 on the right is using the X.25 network to access both an HP3000 and an IBM host.

3rd PARTY PRODUCT

REVERSE PASS THRU

* HP Recommended Alternatives

- 3rd Party
  Low End: COAX 3270 from Gandalf and
  PREVIEW from Tymlabs
  High Performance: Gateway/1000 from Forest Computer

- Line Mode, HPDESK Access Only
  Network Project Center Special

* For IBM host users who would like interactive access to an HP3000, there are several solutions which are available today.

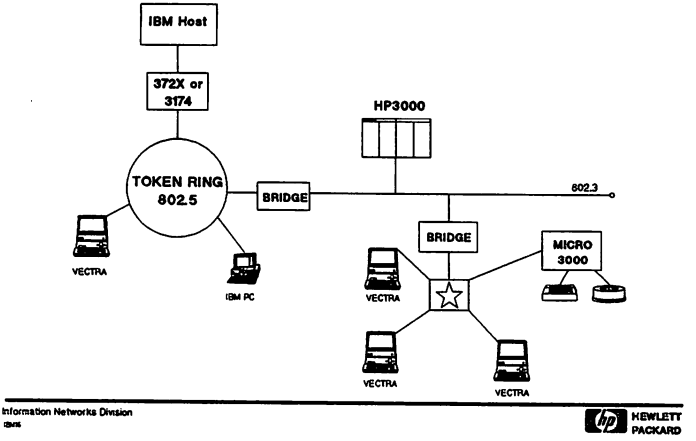
* At the low end, COAX 3270 from Gandolf converts ASCII data to EBCDIC data and vice-versa, giving the user line mode access. By running PREVIEW on the HP3000, the 3278 terminal can access V-Plus block mode applications. Each 3278 requires a terminal port on the HP3000.

* A higher performance solution called Gateway/1000 uses a DHCF connection to the host and some terminal ports on the HP3000. This solution provides V-Plus block mode access but without extended attributes. Any 3278 attached to the IBM host can access an HP3000 session.

* For customers needing line mode access to HPDESK only, there is a special which is available from the HP ING Network Project Center.

UNDER DEVELOPMENT:

STARLAN AND TOKEN RING COEXISTENCE



* (0) HP has run tests that show that StarLAN can be run over IBM Cabling Plan Types 2 and 3.

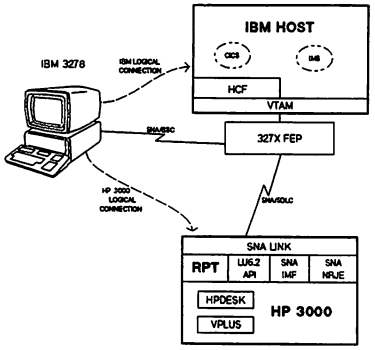
* (1) IBM's Token Ring card will be used in Vectra PC's.

* (2) A Token Ring to 802.3 bridge is being done. There should be no throughput limitation, since it is a fast bridge.

* (3) -PC's on Token Ring can access other PC's using IBM PC LAN program.
  -PC's on Token Ring can access the IBM mainframe through the IBM 3270 gateway (IBM NetBIOS), IBM PU2.0 emulation S/W (SNA over TR), or a DCA 3270 gateway (HP NetBIOS).
  -PC's on Token Ring can access the HP3000 through the bridge, using HP NetBIOS over TCP/IP.

* (4) PC's on 802.3 access the IBM mainframe through the bridge to a DCA gateway (HP NetBIOS).

UNDER DEVELOPMENT: REVERSE PASSTHRU (BUSINESS OFFICE & REG. SALES AND SERVICE SOLUTIONS)



PRIMARY USAGE:

IBM 3270 TERMINAL ACCESS TO

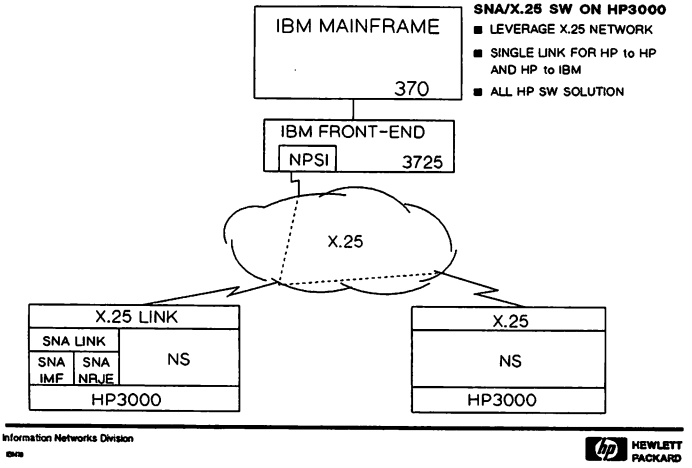
- HPDESK
- MM AND PM
- OTHER VPLUS APPLICATIONS
- TTY APPLICATIONS

Information Networks Division
IBM17

HEWLETT PACKARD

* A reverse passthru S/W product is under development which would not require any dedicated HP3000 terminal ports. Through the IBM Host Command Facility (HCF), IBM users will be able to access V-plus block mode applications.

UNDER DEVELOPMENT: SNA OVER X.25



* Also under development is a product which would allow SNA over X.25 from an HP3000. An HP3000 at a single node address would be able to communicate with HP3000's and IBM mainframes.

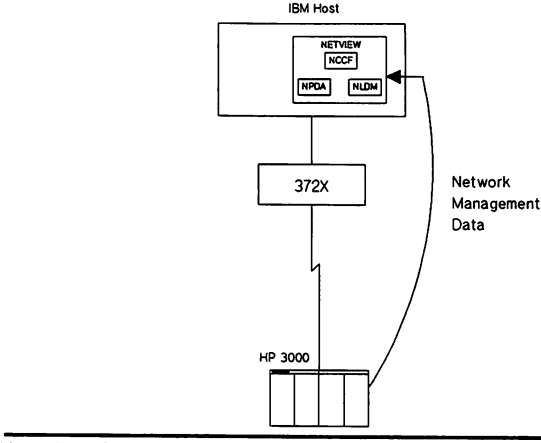
FUTURE DIRECTIONS

* IBM NETWORK MANAGEMENT ARCHITECTURE SUPPORT

* PU2.1 (NODE TYPE 2.1) SUPPORT

* HP is committed to continually enhance capabilities in SNA and SNA-based architectures, so we have made SOI's for IBM's Network Management Architecture and PU2.1.

FUTURE DIRECTION:
IBM Network Management Support



Information Networks Division

HEWLETT PACKARD

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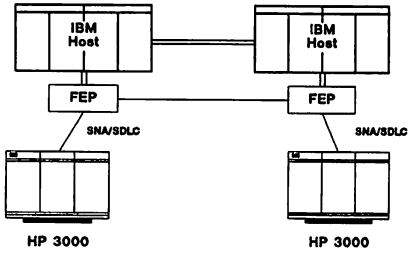
* HP will forward to Netview the alerts which are supported by the emulated subsystem. For example, SNA IMF emulates a 3274 cluster controller, so SNA IMF will forward the alerts to Netview which are supported by the 3274.

IF ASKED,

* This does not necessarily imply that HP will support NetView/PC. Given the limited functionality currently defined in NetView PC coupled with the present limitations of the PC itself, we are not convinced that NetView PC will be able to provide our customers with the type of network management capability they need.

Under Development: LU6.2/PU2.1 SUPPORT



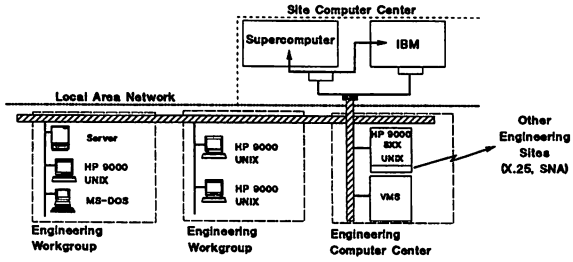
* With IBM's NCP support for PU2.1 at the end of 1988, it will be possible to route LU6.2 sessions through an FEP. This would allow the two HP3000's to have an LU6.2 session through the two FEP's.

* PU2.1 support for the HP3000 will also allow parallel and multiple sessions. Parallel sessions allow several applications to share one LU6.2 to LU6.2 session to another system. Multiple sessions allows one LU6.2 to talk to multiple LU6.2 sessions that may be on the same and/or different hosts.

FOR LARGE PUBLIC AUDIENCES:

* Other services are under investigation.

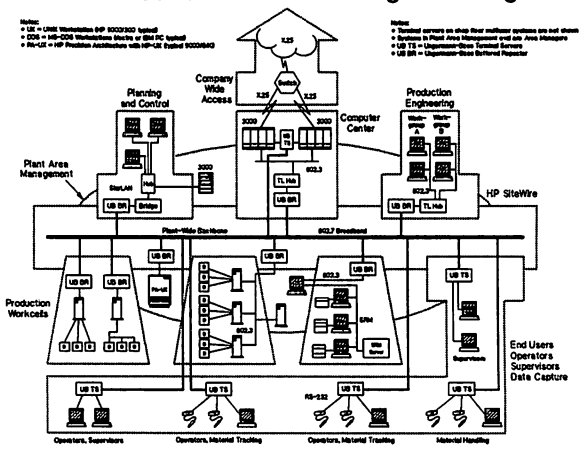
HP AdvanceNet for Engineering



* We'll now take a look at our HP-UX to IBM products. HP-UX is used in the HP9000 in the Business Office, Engineering, and CIM solutions. We can skip the Business Office since we have previously covered it for the HP3000.

* In the Engineering solution, engineers and designers need to get higher quality products to market faster. HPAdvanceNet enables an HP9000 user to access applications, data and peripherals on the IBM host.

HP AdvanceNet for CIM: Putting It All Together

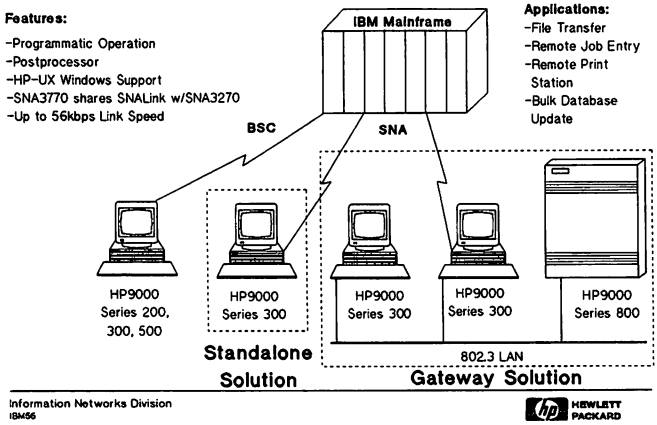


Information Networks Group
IBM55 (CIM22 BC 9/14/87)

HEWLETT PACKARD

* In the CIM solution, there may be the need to access an IBM host from the Computer Center. Or in some cases, there may be an IBM computer in the Computer Center which needs to download information to area managers or cell controllers on the factory floor.

HP-UX to IBM BATCH NETWORKING



* Batch products can be used as an easy way to exchange files with an IBM host. Batch jobs are spooled when communications lines are busy, and automatically processed when the lines are free.

* Batch products can also be used to subit jobs to a host, or for print jobs, or for bulk database update.

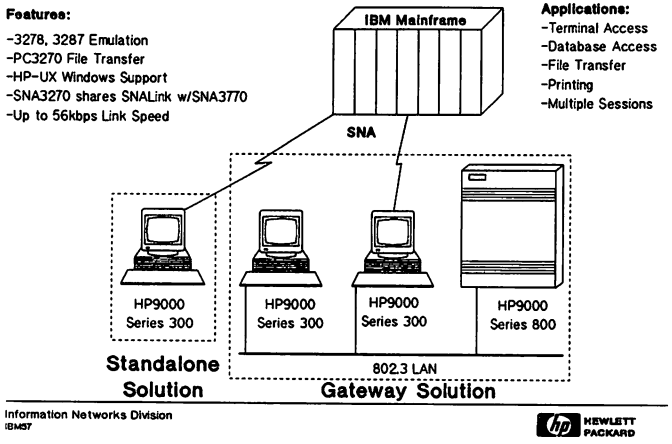
* SNA users can use SNA3770 which enables an HP9000 to appear as a 3777 batch workstation to an IBM host, when used with the SNA Link product.

* The product can be used programmatically from Unix. This feature might be used to perform batch updates late at night when computer rates are less expensive.

* The product also has a post processor capability, which allows the user to specify a program which can be started when the job output returns.

* For the S300, there is a BSC RJE product to the host.

HP-UX to IBM INTERACTIVE: SNA3270

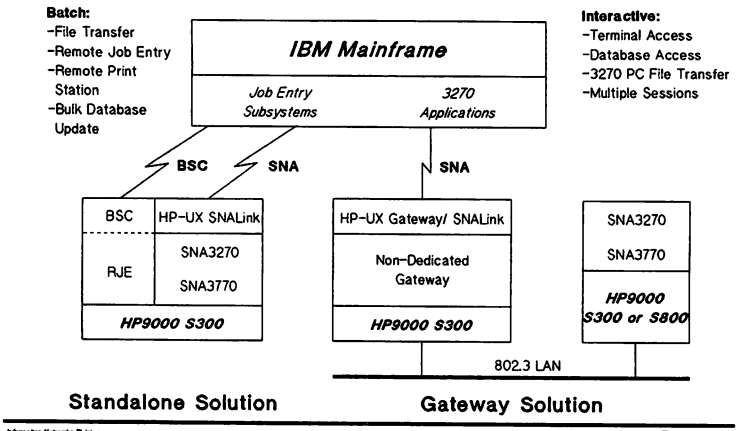


* In the interactive area, users can access applications on the host do some local printing, and transfer files. HP9000 attached terminals and printers are allowed to emulate IBM terminal and printer functions.

* HP-UX SNA3270 emulates the main features of an IBM 3274 control unit, using SNA PU2 and LU1, 2, and 3 protocols.

* HP-UX SNA3270 also supports PC3270 file transfer to and from the IBM host. Files can be transfered to and from the host with a one line command! (This capability requires that the host have the PC3270 program available.)

COMPLETE HP-UX to IBM NETWORKING:



* One SNA Link can be used to support both batch and interactive communications to the host.

HP-IBM NETWORKING ADVANTAGES

BUSINESS SYSTEMS

* DISOSS CONNECTION INTEGRATION WITH HP DESK MANAGER
* PROFS CONNECTION TO 9370 DEPARTMENTAL SYSTEMS
* CHOICE OF GATEWAY OR STANDALONE
* REVERSE JOB ENTRY: IBM → HP
* SOPHISTICATED JOB OUTPUT MANAGEMENT

ENGINEERING SYSTEMS

* HIGH PERFORMANCE UNIX TO SNA 3270 GATEWAY
* IBM CONNECTIONS FOR UNIX, BASIC, AND PASCAL ENVIRONMENTS

PC'S

* CHOICE OF: COAX 3278 EMULATION (FOR VECTRA AND TOUCHSCREEN) OR 3274 PU2 REMOTE SNA CONNECTION (FOR VECTRA AND PC PORTABLE)
* TRANSPARENT ACCESS TO IBM MAINFRAME CULLINET DATABASE

* Summary slide.

HP-IBM NETWORKING

SUMMARY

* COMPLETE SNA FAMILY OF BATCH, INTERACTIVE, PROGRAM-TO-PROGRAM AND OFFICE HP-IBM DATA COMMUNICATIONS PRODUCTS

* CONNECTIVITY TO IBM IN BUSINESS OFFICE, REGIONAL SALES & SERVICE, MANUFACTURING/CIM AND ENGINEERING ENVIRONMENTS

* COMMITMENTS TO CONTINUALLY ENHANCE CAPABILITIES IN SNA AND SNA-BASED ARCHITECTURES WHILE IMPLEMENTING INTERNATIONAL STANDARDS IN HP ADVANCENET PRODUCTS

*** Summary slide.**