IBM

Telecommunications Systems Support - Raleigh

Telecommunications System Bulletin

3174 DIRECTIONS

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3174 DIRECTIONS

CR FREEHAFER

RALEIGH TELECOMMUNICATION SYSTEMS SUPPORT CENTER

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ABSTRACT

The purpose of this presentation is to discuss the direction of the IBM 3174 as an establishment connectivity machine. It also highlights the fact that the strong growth in Intelligent Workstations is contributing to the demand for the type of establishment connectivity provided by the IBM 3174.

When asked about 3174 directions, there is often a broader question in the customer's mind:

> The PC seems to be experiencing rapid growth...what does this mean for the future of the 3174 and dependent displays?

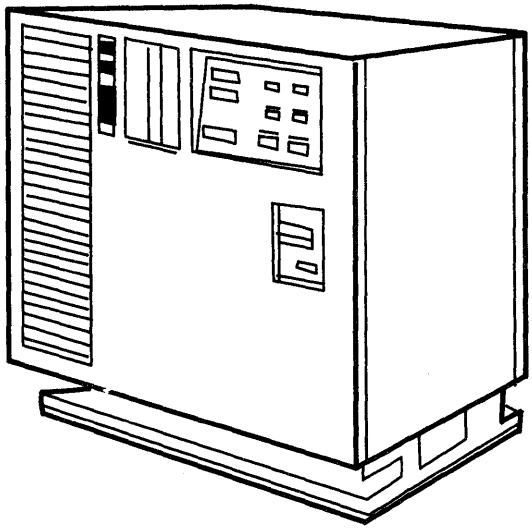
This presentation will also address that question.

Note to presenter: The attached script is intended for high-level non-technical audiences and is targeted at about one-half hour in duration. For additional detail, and a more technical presentation, materials from ZZ05-0264, "3270 EXCELLENCE...1988" Marketing Guide may be very effectively intermixed.

INTRODUCTION

Since its introduction in 1971, the 3270 Display family has become widely accepted as an industry standard for communication between end-users and IBM hosts. Since that time a number of innovations have taken place...both in the Control Unit and the Display. Fundamental to the 3270 architecture is the 3270 Control Unit...currently the IBM 3174. The purpose of this presentation is to discuss IBM's direction for the 3174.

IBM 3174 Directions



USER APPLICATION PROFILES

There are basically two categories of terminals in the market today:

Dependent displays.
- IBM 3270 family
- IBM 5250/5290 family
- ASCII "family" including IBM 3151, etc.
- Intelligent Workstations acting as a dependent displays.

Intelligent Workstations acting as Intelligent Workstations.

In an attempt to forecast which terminal types customers will buy, IBM conducts an annual survey of terminal usage patterns. What do end-users do with their workstations? How much of their usage is host-dependent? Standalone? Answers to questions such as these help shape IBM's workstation product strategy.

This chart depicts percent utilization of workstations for various applications. For example, 64% of the dependent displays perform data entry functions; 38% of the Intelligent Workstations do word processing, etc.

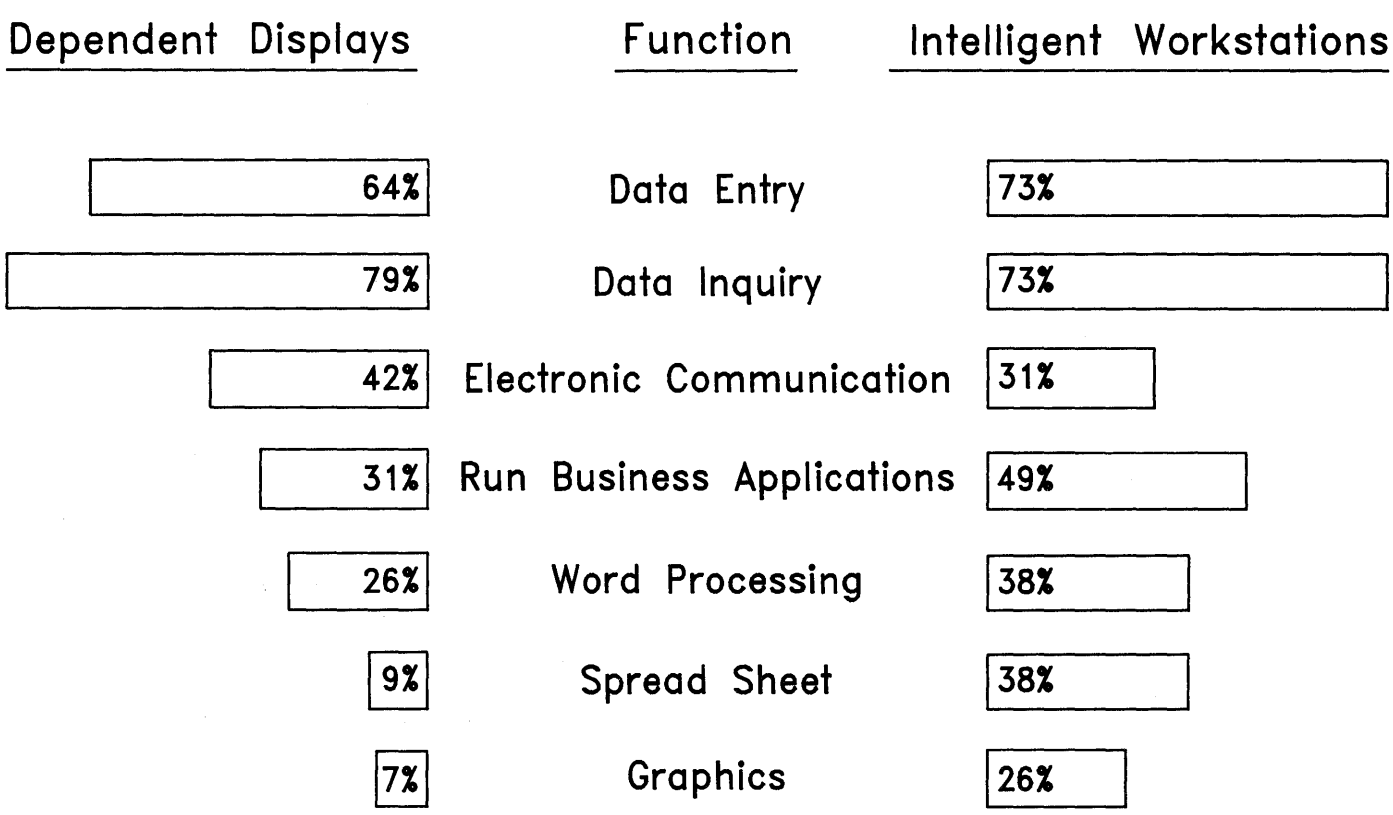
Percentages add to more than 100% because many workstations are used for multiple applications. For example, standalone word processing may be the primary application of a given secretary. However, terminal emulation will be used by that same secretary for occasional access to electronic mail. As another example, a business professional might use the workstation primarily to run mainframe statistical analysis programs, but occasionally require spreadsheet capability.

What do we learn from this chart?

For one thing, it is clear that the intelligent workstation is the "terminal of choice" for highly interactive applications like spread sheet, word processing, and graphics. What is not clear is the "terminal of choice" for the most-frequently used applications -- data entry/inquiry. From this group of applications, those which can exploit desk-top intelligence obviously require an intelligent workstation. However, where local processing is not required, the dependent display is certainly less expensive. And, for this reason, in spite of the "PC hysteria" in the trade journals, a large percentage of customers continue to add to the install base of dependent displays.

But the chart also highlights the fact that a very high percentage of ALL terminals -- both intelligent and dependent -- are used for traditional data entry and data inquiry applications. It is for this reason that customers will continue to need host connectivity...regardless of the amount of intelligence distributed to desk-top processors. And host connectivity is the primary role of the 3174.

User Application Profiles



Significant Requirement for Main Frame Connectivity

IBM DISPLAY PRODUCTS EVOLUTION

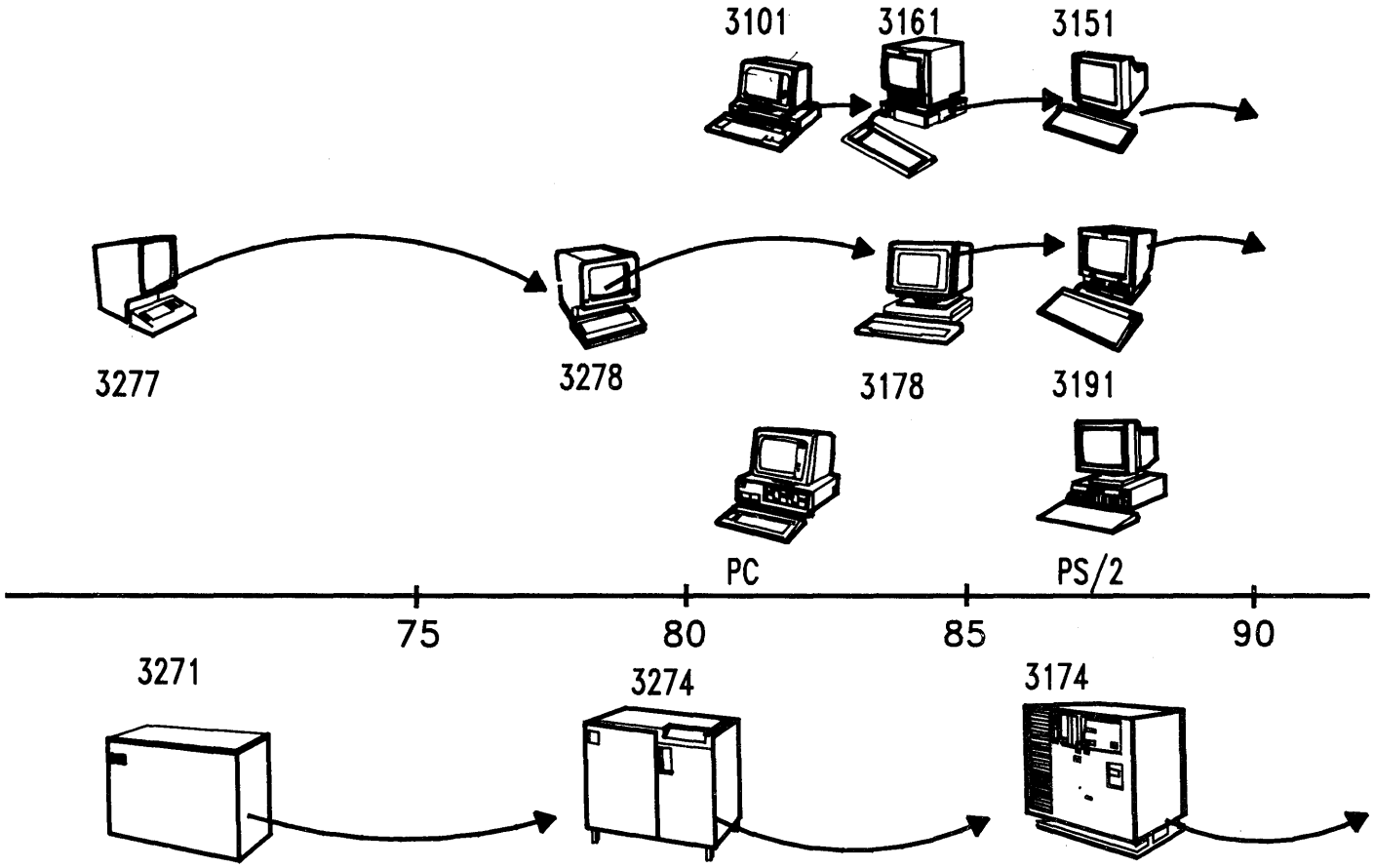
To understand the future direction of the IBM 3174, it is worth a minute to review the 3174's past. Announced in 1971, the 3270 family has matured into an industry standard for host-user communications. The heart of the system is the 3174 Control Unit.

Unlike displays, which are replaced relatively often, the 3174 has a significantly longer development cycle. Why? One major reason is that the 3270 Control Units incorporate removable diskettes which can accommodate many functional enhancements without hardware modification. Another reason for the longer life-span is that the 32-port models of the 3174 are designed with considerable room for growth so that when new hardware features ARE announced, a simple upgrade may eliminate the need for full replacement.

Today's 3174, announced in 1986, is in the early years of its life. Many enhancements are planned, and the designed-in growth provisions will help prevent installed equipment from obsolescence. Later we'll discuss some of these design provisions...but first I'd like to review the role of today's version of the 3270 Control Unit.

IBM Display Products Evolution

Displays
- Rapidly Changing Technology
- Frequent Model Changes



Controllers
- Significant Microcode Function
- Infrequent Hardware Changes
- Foundation for Significant New Growth

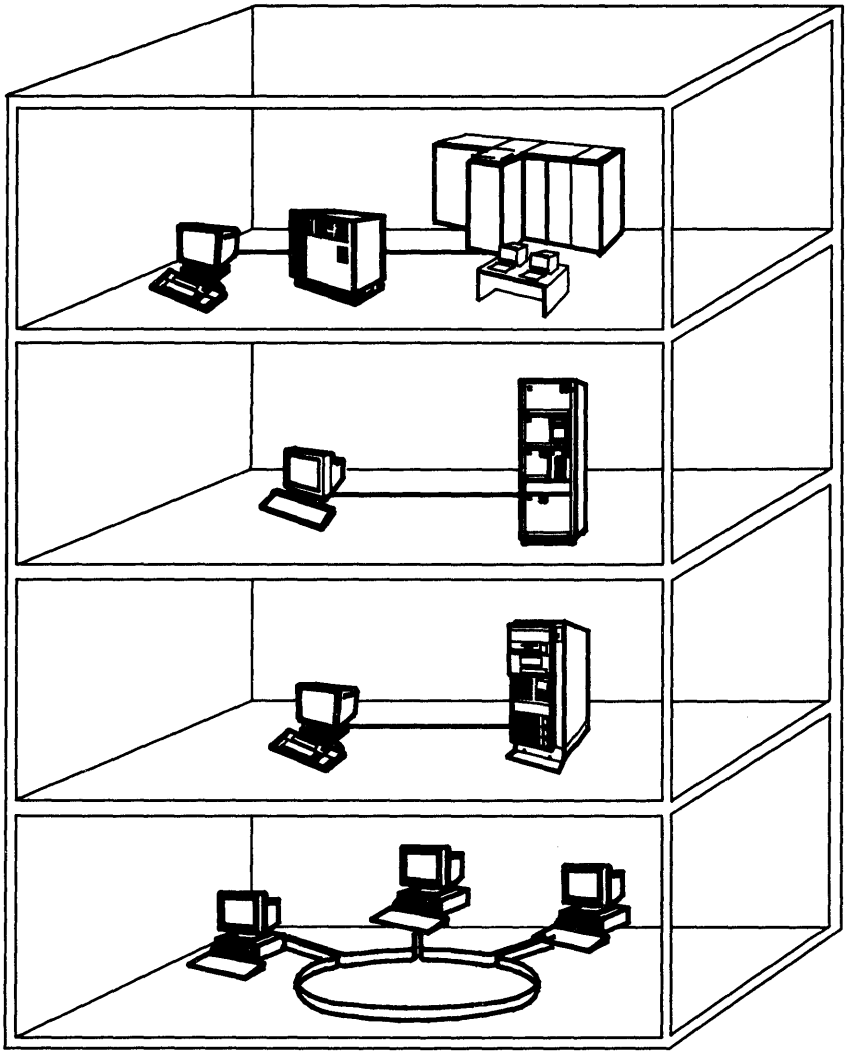
1980's CONNECTIVITY

In today's environment, there are four basic connectivity alternatives:

ASCII displays communicating with ASCII host processors.
5250/5290 displays communicating with AS/400-type processors.
3270 displays attached through 3174's to S/370-type hosts.
PC's interconnected through PCNET, Token-Ring, EtherNet, etc.

Each connection type has its own unique protocol and its own unique wiring scheme, making interconnection with other types difficult. Nevertheless, interconnection is often a strong requirement. The ability to interconnect--and manage--the various technologies illustrated here (plus voice) is the objective of IBM's overall telecommunications direction.

1980's Connectivity



- Unique Protocols
- Unique Wiring Schemes
- Requirement for Host Connection

IBM TELECOMMUNICATIONS DIRECTION

Let's review that overall direction, with emphasis on the role of the IBM 3174. In looking at today's communications environment, we find that there are five basic functions which must take place in almost every network -- regardless of complexity. These functions are:

Data Connectivity functions provide for connection of data devices to information systems and to one another. Examples of data devices include dependent displays, printers, intelligent workstations, and distributed processors. The IBM 3174, IBM 3720, IBM 9750, IBM 3745 and PS/2 ™ are data connectivity products.

Voice Connectivity devices establish connection between voice-devices and processors. Examples of voice-devices include telephones, CBX/PBX's, and computers which support voice-type transmissions. IBM's 9750 provides voice connectivity.

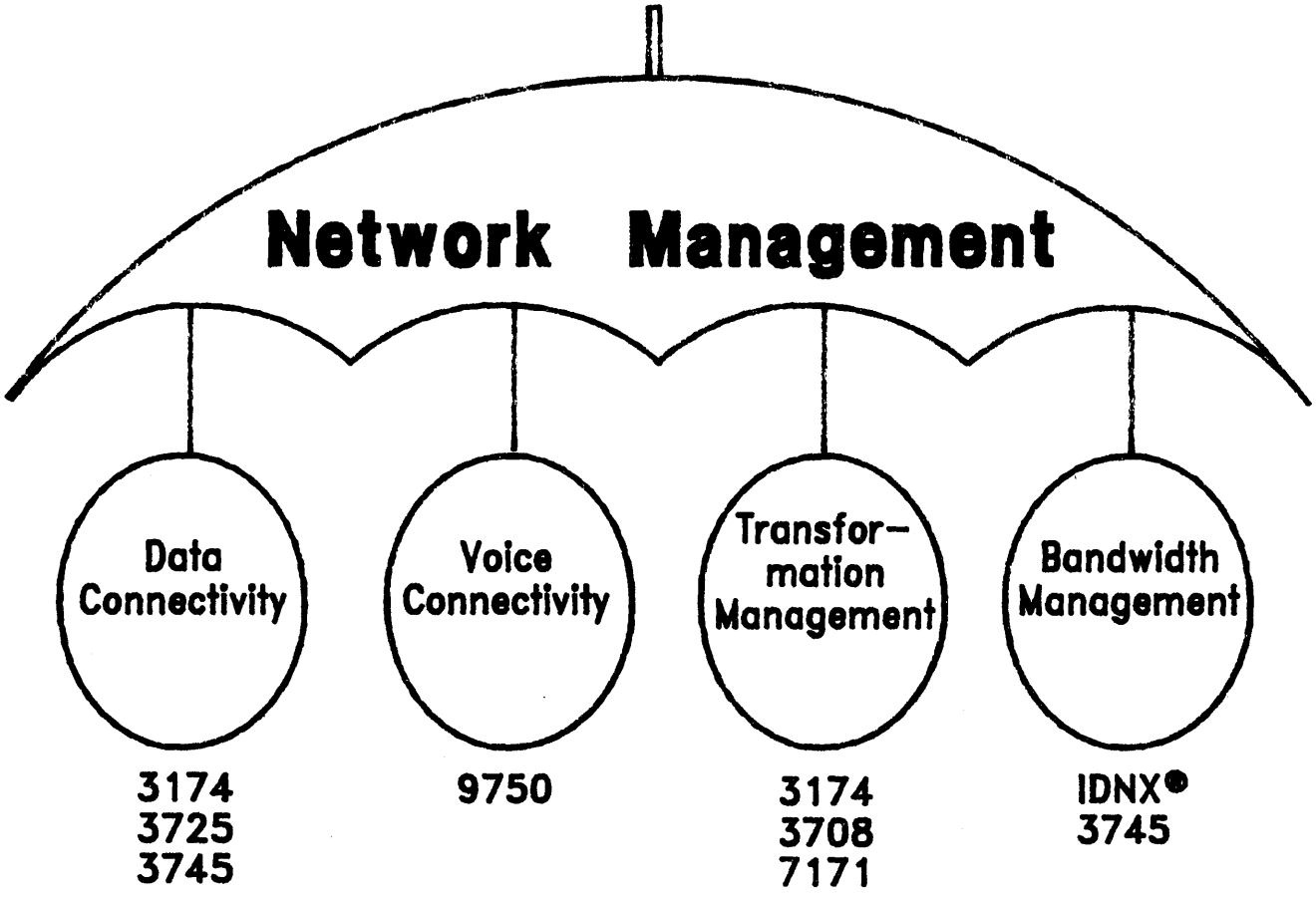
Transformation Management provides the necessary conversions between dissimilar technologies. Protocol conversion between ASCII and 3270 is an excellent example of this function. IBM 3174, IBM 3708, IBM 7171, and IBM 9750 all provide transformation facilities.

Bandwidth Management is a relatively new function which helps schedule usage of today's valuable broad-band communications offerings. IBM's IDNX ™ offering addresses this function.

Network Management ties the other functions together and includes the necessary services to manage vital customer networks. As networks become large and users become more and more dependent upon them, Network Management tools and facilities become indispensable.

These major emphasis areas comprise the foundation for IBM's Telecommunications direction. The IBM 3174 plays a vital role in terms of data connectivity, transformation, and Network Management.

IBM TELECOMMUNICATIONS DIRECTIONS



Five Major Emphasis Areas

Direction:Any-Any Connectivity
Network Management

IDNX is a registered trademark of Network Equipment Technologies Inc.

1990's CONNECTIVITY

We have talked briefly about IBM's direction for future telecommunications products, and we have reviewed the various connectivity techniques of the 80's.

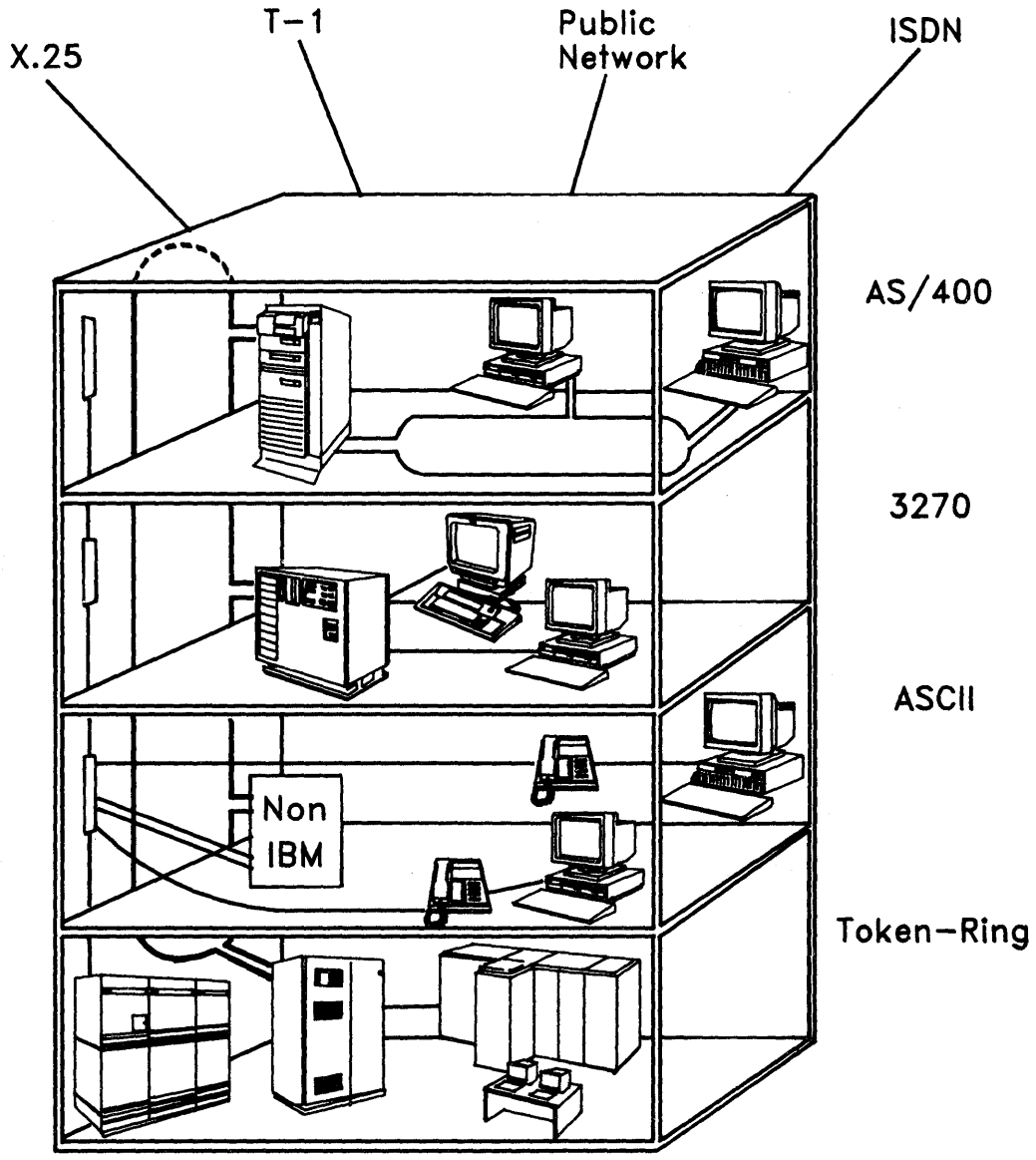
Let us now turn our attention to the connectivity requirements of the '90's. Many customers have the requirement to reduce the number of terminals to one per desk. However, many users require access from that terminal to applications on several information systems -- without regard for attachment and mainframe type. In many cases, this also implies a requirement for resolving the technical differences implicit in the interconnection of various technologies, protocols, and networking techniques.

These requirements, taken together, define the growing need for a device which can: provide data connectivity; accommodate various technologies and protocols; support peer-to-peer networking functions; provide protocol conversions when necessary; and support the emerging standards and high bandwidth communication offerings of the future. In addition, since there is such a large and growing inventory of 3270-type terminals, the device must continue to provide the shared-logic functions of the 3270 control unit. Finally, to be successful, it must have the Network Management capabilities to support the vital networks of the '90's.

The direction of the IBM 3174 is to be an Establishment Controller which provides these functions.

Let's look at these connectivity requirements in more detail, focusing on those which are already satisfied by the IBM 3174.

1990's Connectivity



- Required: Any-to-Any Connectivity

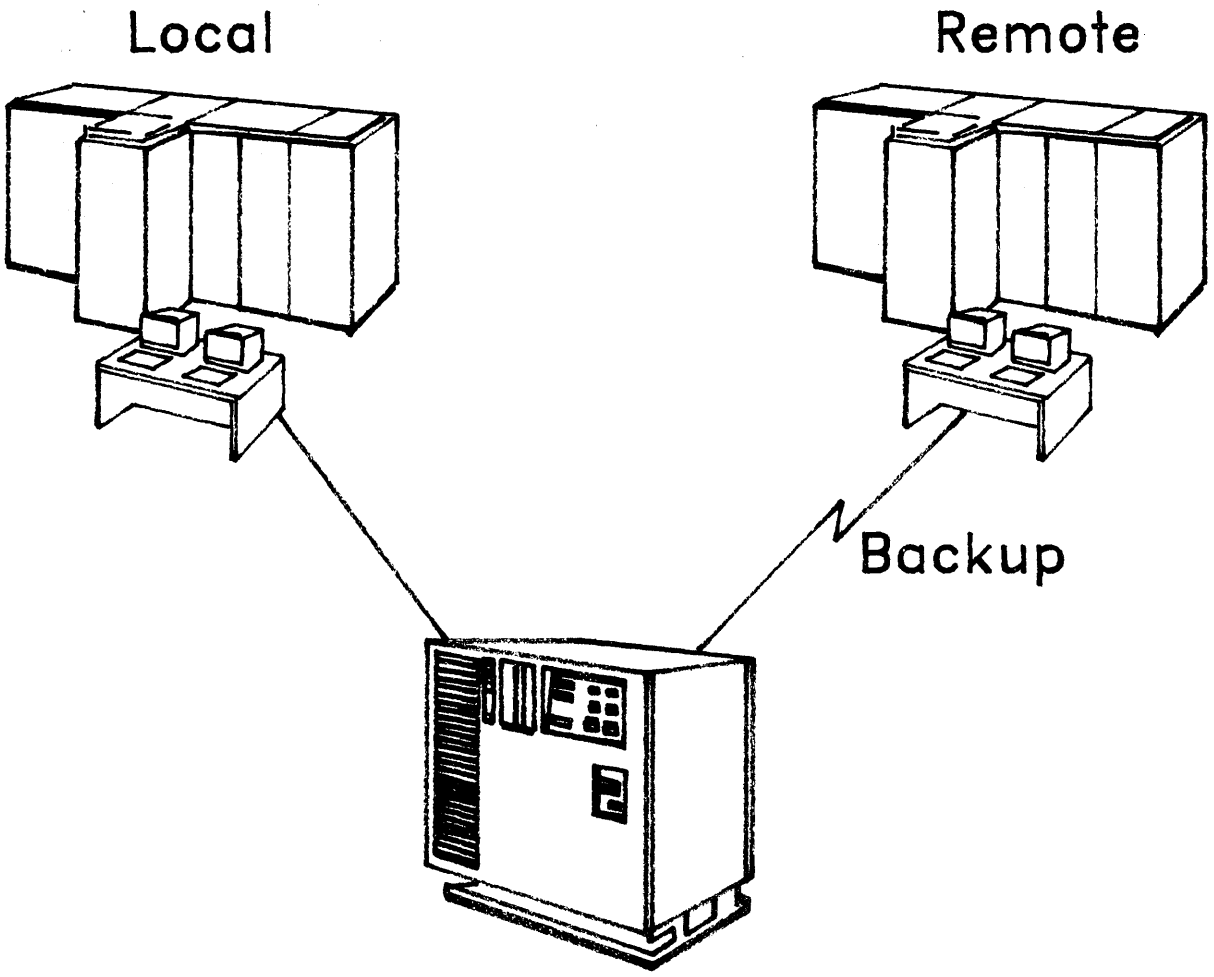
BACKUP CONNECTIVITY

Many 3270 customers would like the flexibility to reconnect a local controller to a remote processor for backup purposes. The 3174, with its flexible card-in-slot structure, can include both channel-attach and communications-attach adapters.

With this configuration, a normally channel-attached 3174 can be reconnected to a remote host with a simple IML of the Control Unit. Thus, if the primary host system is unavailable, the display operators can continue to process on a remote processor.

Thus the IBM 3174 provides both host and local connectivity, depending upon the customization selected.

Backup Connectivity



- IML Required
- Available for:
  - Channel Attach
  - IBM Token-Ring Attach

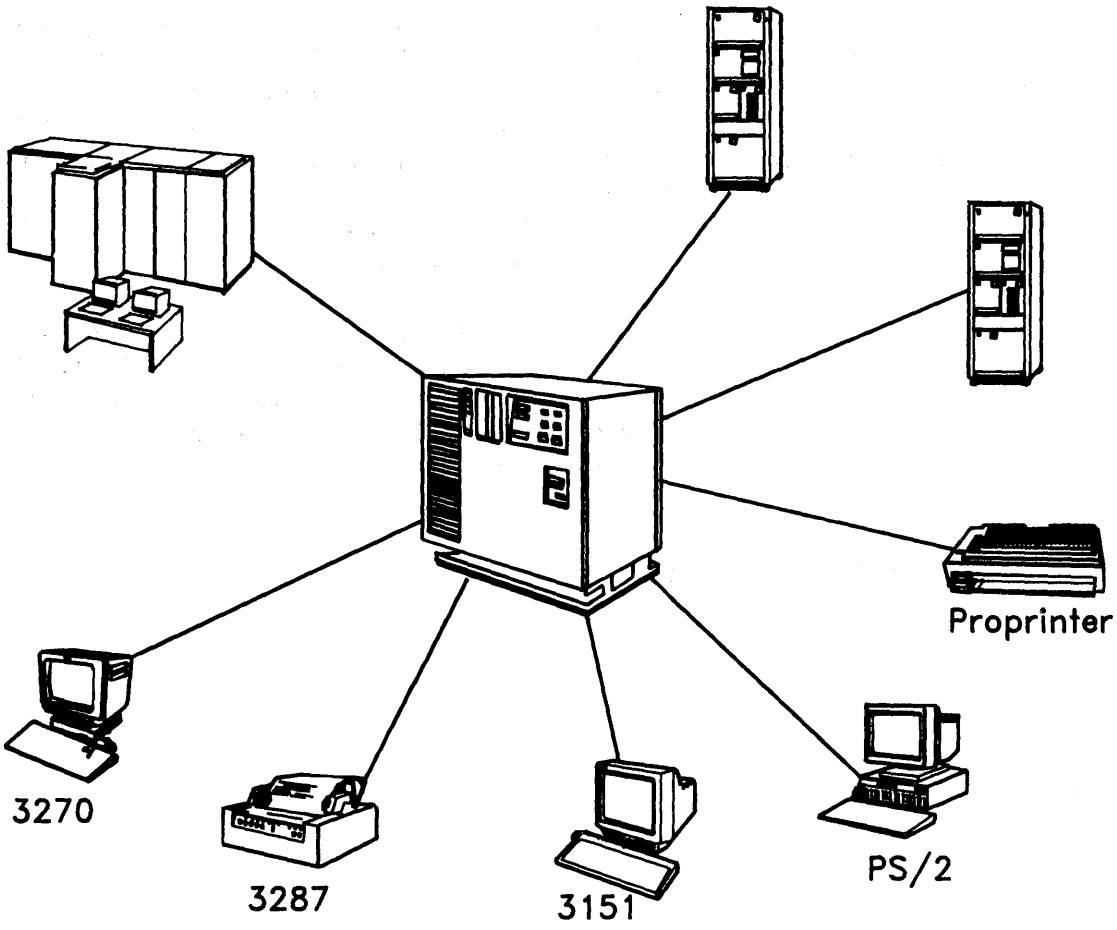
3270-ASCII CONNECTIVITY

Concurrent access to both S/370 applications and ASCII applications from a single terminal is a common requirement. In today's world, many desk-tops have more than one terminal -- simply because of the technical differences between mainframe systems. Consider a hospital with its patient record application on a S/370 host and the pharmacy application on an ASCII host. The nurse's station requires access to both. In many hospitals today, the nurse's station is crowded with data processing equipment because a single device can't communicate with both processors. The IBM 3174 may provide the necessary connectivity and transformation facilities to allow access to both systems and eliminates the need for multiple terminals.

Multiple Logical Terminal Support is an important addition to the 3174 Control Unit. This microcode capability permits a single terminal* to be connected to multiple host applications -- both S/370 and ASCII -- in any combination, up to a maximum of five. Using a simple "hot-key" sequence, the user can access any of the concurrent sessions on demand.

* CUT (Control Unit Terminal) mode

3270 - ASCII Connectivity



- Data Connectivity
- Transformation
- Multiple Logical Terminal Support

TOKEN RING CONNECTIVITY

The Personal Computer demands a whole new set of connectivity capabilities. At first, PC's were installed as standalone desk-top processors. Very quickly, the communication capabilities of the PC were recognized and connectivity products soon followed. For some, PC connectivity meant attachment to a mainframe. For others, PC connectivity meant interconnection with other PC's on a variety of networking technologies.

One of these technologies, which has been widely accepted is the IBM Token Ring. Initially, the Token Ring was strictly used for PC interconnection. In fact, the first IBM Token Ring Announcements were PC announcements. However, for a number of reasons -- including low cost, high reliability, excellent problem determination capabilities, and high performance -- the Token Ring became an obvious choice for inter-connecting non-PC devices as well. As a result, the next several announcements dealt with host connectivity. Today, in addition to the PC, the IBM Token Ring supports the IBM 9370, the AS400, the IBM 3725, the IBM 3745, and the IBM 3174.

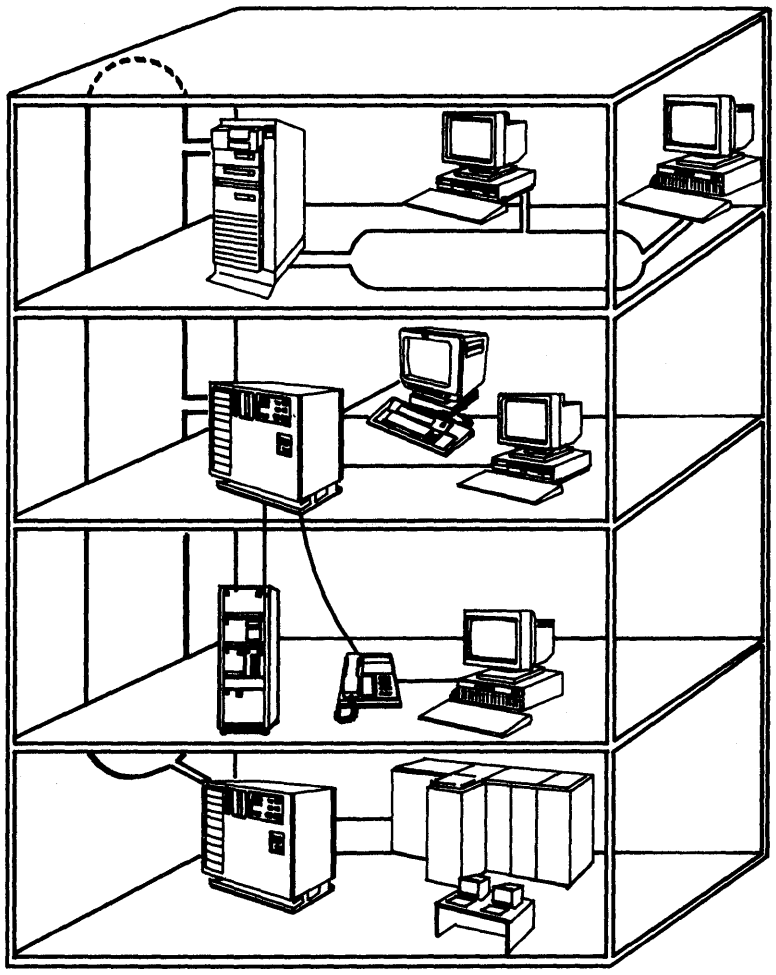
The IBM 3174 works with the Token Ring both as a gateway, and as a downstream node.

Token Ring Gateway. An IBM 3174, used as a Gateway, can provide host connectivity for up to 140 devices.* The 3174, acting as a Gateway can be either channel-attached or communications-link attached to the IBM host. A 3174 configured as a gateway can also support a complement of 3270 devices in addition to the Ring-attached devices.

3174 As A Token Ring Node. We have seen how the 3174 can provide connectivity between the devices attached to a Token Ring and an IBM S/370 host. The 3174 can also be used as one of the devices at the other end of the Ring. In this case, the 3174 uses the Token Ring as its upstream connection. Such a 3174 can support the standard complement of 3270 and ASCII devices. For local (channel-attached rings), Token-Ring attachment can provide a high performance alternative to direct Channel attachment with greatly improved distance capabilities. For example, with fiber optics and associated repeaters, network dimensions can be measured in miles.

* Note: 140 is theoretical maximum number of PU's. Performance considerations (particularly in Remote configurations) will determine practical maximum.

Token-Ring Connectivity



- Gateway
- Network Node

NETWORK CONNECTION

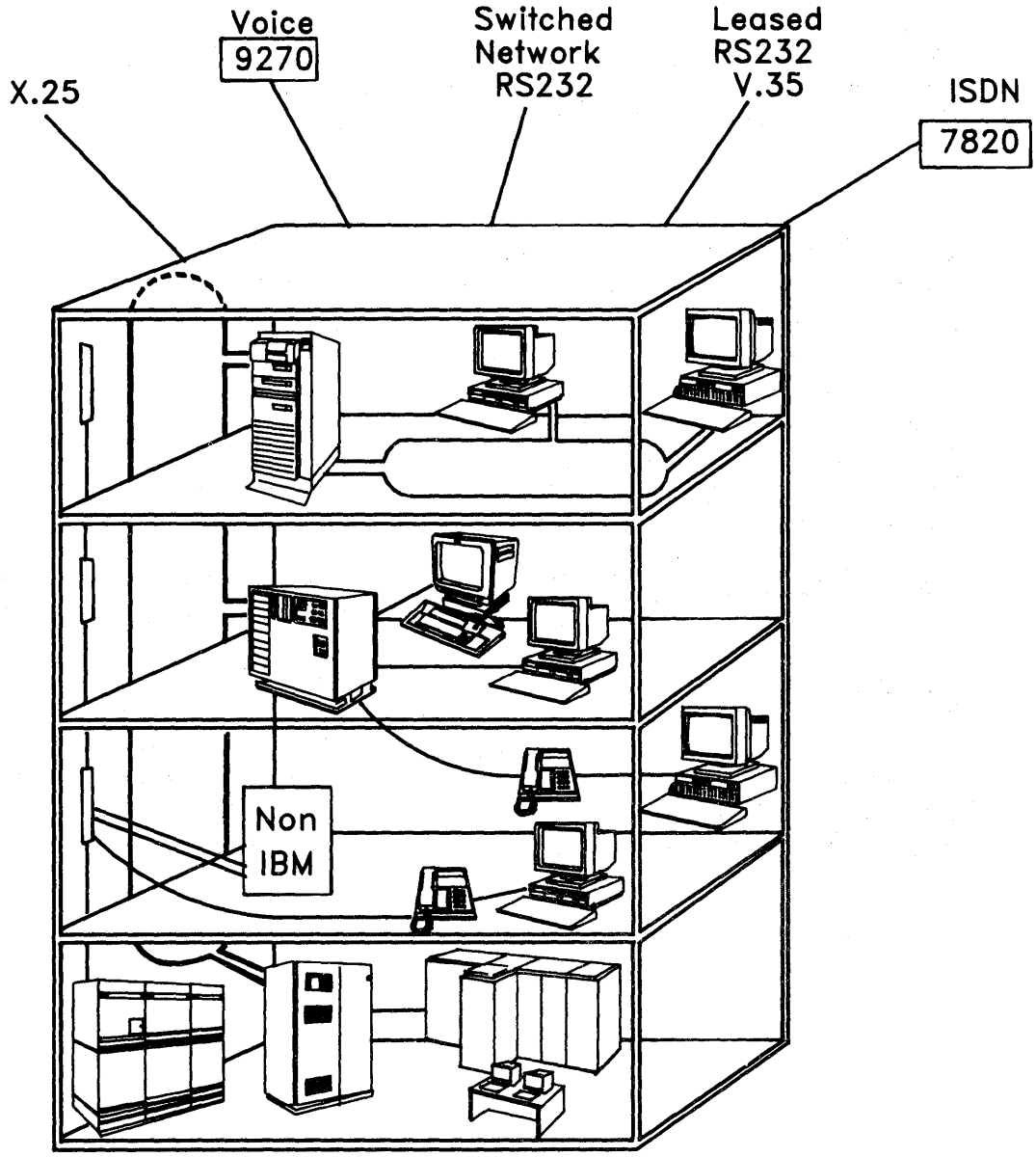
Other networks are also accommodated...Today's 3174 can be attached, not only through RS232 and V.35 to conventional networks--it can also be attached through X.25 packet switched facilities to S/370 hosts. Also, using the recently announced IBM 7820 ISDN Terminal Adapter, up to two 3174's can share the Basic 2B+D 64kbps facilities of a switched ISDN connection to a remote IBM 3720 or IBM 37x5.

The ASCII attachment capability, discussed previously, also permits 3174-attached devices to communicate through the switched network. A very important example is the use of the 3174 to provide access to S/370 applications from dial-in ASCII terminals and PC's emulating ASCII devices. Dial-in capability provides S/370 application access to anyone with a PC and modem -- assuming proper security credentials. Using this facility, S/370 application access is now available to business executives at home or on the road; salesmen visiting in customer locations; and small branch offices of larger businesses where 3270-type access was previously cost-prohibitive.

PS2's ™ as a Bridge. PS/2's ™ can be used to bridge to other Networks including non-Token-Ring implementations like PCNET and other technologies.

Voice/Data Integration. The newest "terminal" attachable to the IBM 3174 is the IBM 9270 Voice Response Unit which provides telephone access to host data and can place host-initiated telephone calls. Using the telephone as a workstation, the caller inputs choices and data via the telephone keypad. The unit, which appears to the 3174 as a coax-attached device, "speaks back" prompts and host data in digitally-stored human voice.

Network Connection



Enterprise Connections

NETWORK MANAGEMENT

Important as the data connectivity and transformation roles of the 3174 are, Network Management functions are equally vital to the success of any connectivity product. To some, Network Management suggests some sort of problem resolution technique. Actually, Network Management is much more than that...and the 3174 participates in all of the Network Management disciplines:

Problem Management. Over the years, 3174 has been known for its problem determination and recovery facilities. The 3174 introduced new levels of Alert and Maintenance Statistics, as well as the Ring Error Monitor for Token Rings.

Change Management. The 3174, in conjunction with NetView ™ Distribution Manager (NetView ™ DM), provides the ability to modify 3174 microcode from a central site without local operator intervention -- creating an environment in which the 3174 can operate unattended. Furthermore, using the facilities of NetView ™ DM, all changes to the microcode will be properly recorded so that in the event of problems, an audit trail is automatically available and the recovery procedures are optimized.

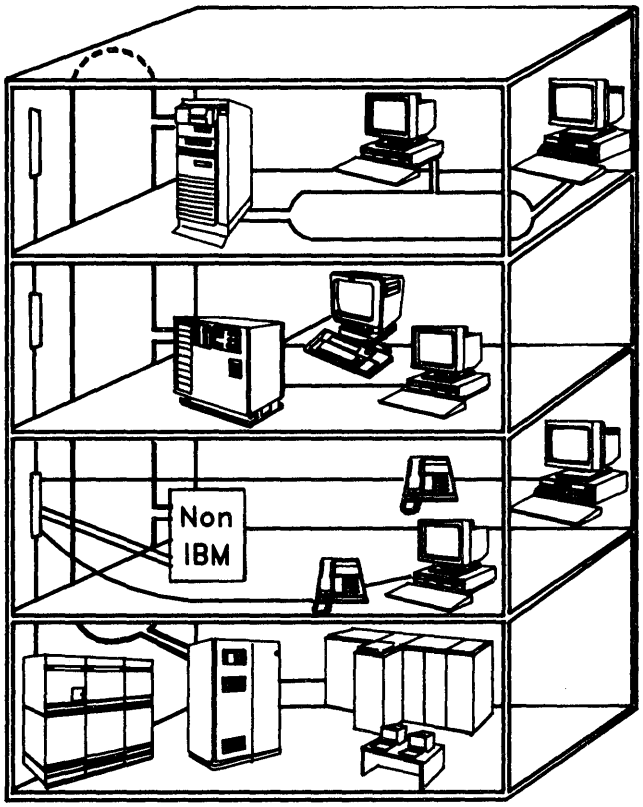
Configuration Management. The third Network Management function of the 3174 helps customers solve the common problem of tracking thousands of terminals... representing hundreds of thousands of dollars of assets. With this new feature, when any supported device powers on, its machine type, model and serial number are automatically recorded in the 3174 for transmission to the main frame Asset Management applications.

Performance Management. Finally, the 3174 performs two important performance functions:

> Response Time Monitoring. This function allows central site personnel (or end-users -- at the option of DP management) to review instantaneous or aggregated response time measurements -- by terminal -- for Service Level Agreement compliance as well as for performance tuning.
>
> Local Format Storage. For CICS Applications, IBM's 3174 provides an architected technique for storing frequently-used screen maps (formats) at the Controller to reduce communication line utilization and to improve response time at the terminal.

All of these Network Management facilities combine to provide the necessary support for maintaining high-quality service to the various classes of users on the Establishment Network.

Network Management



- Problem Management
  Alerts, Maintenance Statistics
- Change Management
  Central Site Customization
- Configuration Management
  Network Asset Management
- Performance Management
  Response Time Monitor, Local Format Store

3174...FOUNDATION FOR NEW GROWTH

We talked earlier about the history of the IBM 3270 family and pointed out that the 3174 is in the early years of its life, and that considerable growth capacity is designed-in to the product...especially the 32-port model.

The best way to see the unique growth capabilities of the IBM 3174 is to open the covers on the 32-port Models. The viewer's first impression is the lack of visible wiring. The design is based upon a back-board with plug-in components which essentially eliminates the need for interconnection. This not only simplifies construction but also significantly enhances reliability.

The IBM 3174 is intended for 24-hour a-day, seven-day per-week operation, with heavy emphasis on high availability. Two examples will help to illustrate this important point:

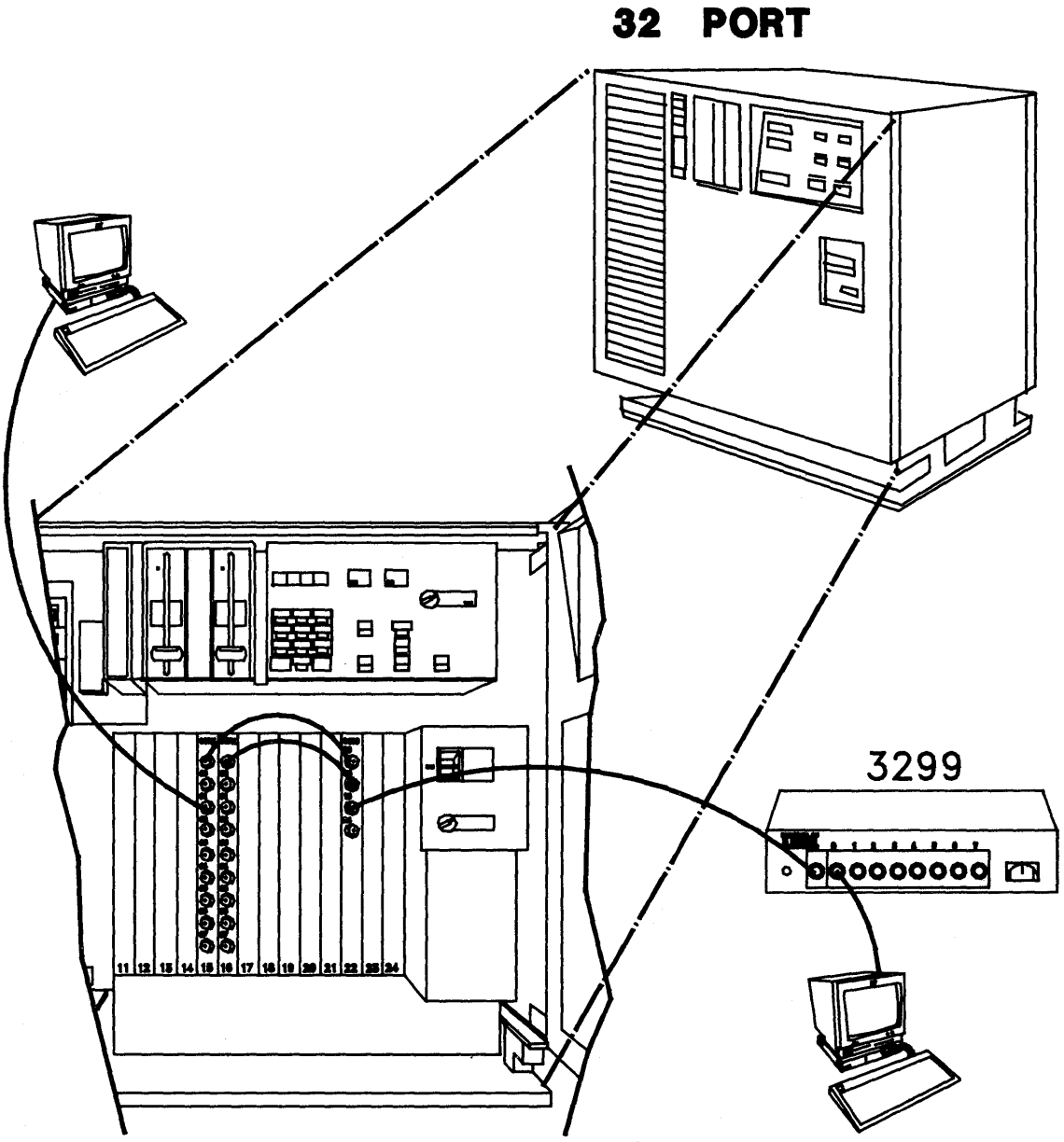
> The IBM 3174's one-meg memory chips utilize the same technology as those found in the IBM 3090 mainframes...with the same self correcting capabilities.
>
> Disk drives are rated for 24 hour operation.

In summary, a major advantage of the IBM 3174's design is its high reliability.

The second advantage of this construction is flexibility. Note the "feature slots". Similar to a PC, these slots permit the 3174 to be easily upgraded. For example, one of the slots contains the IBM Token Ring Adapter. Recently IBM announced an increase in the Token Ring speed to 16Mb... simple replacement of the adapter card allows installed 3174's to support the new capacity. Memory cards, Communication Adapters... all can be changed by simply replacing the appropriate card in the 32-port models.

Finally, many enhancements require nothing more than a micro-code change. For example, when we began shipping the powerful new Multiple Logical Terminal support, the new function was available as soon as customers installed the new diskette.

3174...Foundation for New Growth



- Growth
- Modularity
- Reliability

IBM 3174 ENHANCEMENTS

Over the years the 3270 Control Unit has evolved from a simple shared-logic controller for dependent displays to an establishment controller which can connect between a variety of devices in the establishment and an assortment of communications facilities and processors. This chart illustrates the new functions and performance enhancements of the IBM 3174 as it exists today. Note: Maintenance prices are current as of August, 1988, and subject to change.

Couple the significantly lower maintenance prices* with the new 3174 functions; add to these the potential for growth discussed above; and you can see why many customers are replacing 3274's with 3174's today.

The 3174 has developed over the years into a powerful, versatile, and flexible connectivity vehicle. But there's more to come...

* 3274 five year maintenance: $3840 - 3174 five year maintenance: $1378 = $2462.

3174 Enhancements vs. 3274

PERFORMANCE IMPROVEMENT

Channel Speed		2x
SNA RU Size		2.67x
Output Segmenting		2x
Communication Speed	SNA	Up to 64 Kbps
	BSC	Up to 2x
Memory		Up to 4x
Disk Storage		Up to 40x

NEW FUNCTION

- ASCII Support
- Multiple Logical Terminal Support
- Token-Ring Support
- ASCII PC File Transfer
- Keyboard Definition Utility
- Response Time Monitor (Standard)
- Asset Management

CUSTOMIZATION IMPROVEMENTS

- Central Site Library
- Reduced Customization Time
- Electronic Distribution
- Remote IML

MAINTENANCE COST

- 36% of 3274 Maintenance

3174 CUSTOMER REQUIREMENTS (no foil)

We've emphasized the growth capabilities of the 3174...

Given this flexibility to grow, what other changes are possible? 3174 enhancements are driven by customer demand. Although there is no implied commitment to deliver any of the following features/functions, recent customer surveys have indicated strong interest in the following:

Multiple Upstream Processing... the ability to access multiple IBM Mainframes from a single 3174 Control Unit.

Peer-to-Peer Networking... the ability to establish connectivity between Workstations on a peer-to-peer basis without going through the host.

High speed network support. Presently installed 3174's have the capability to communicate with the host at speeds up to 64kbps on V.35 and X.21 (X.25)-type networks. As ISDN and T1 communications become more pervasive, the requirement for 3174 support will increase. In fact, IBM is already conducting ISDN tests with customers in the US and Europe.

Additional ASCII support. The current implementation of the 3174 Asynchronous Emulation Adapter (AEA) provides emulation capabilities for a number of ASCII devices. However, unlike the 3270 environment, which is highly structured and architected, the ASCII world is only loosely structured. For every ASCII vendor there is a different implementation. Each implementation places a different requirement on the 3174. Developers are currently prioritizing those requirements and looking at techniques for implementing generic ASCII support which would satisfy a much wider range of connectivity needs.

In addition to the above, other user requests include file/print server, windowing, SAA support, and additional port capacity...to list just a few.

So you can see that 3174 function, as we know it today, can be significantly expanded. Some functions may require added 3174 capacity...perhaps additional disk storage, or a faster token ring. If that becomes necessary, the slot structure of the 32-port model should allow existing installed machines to be upgraded to the new level of function as required. Thus, the IBM 3174 has a long future with potential for significant additional growth.

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IBM 3174...ESTABLISHMENT CONTROLLER

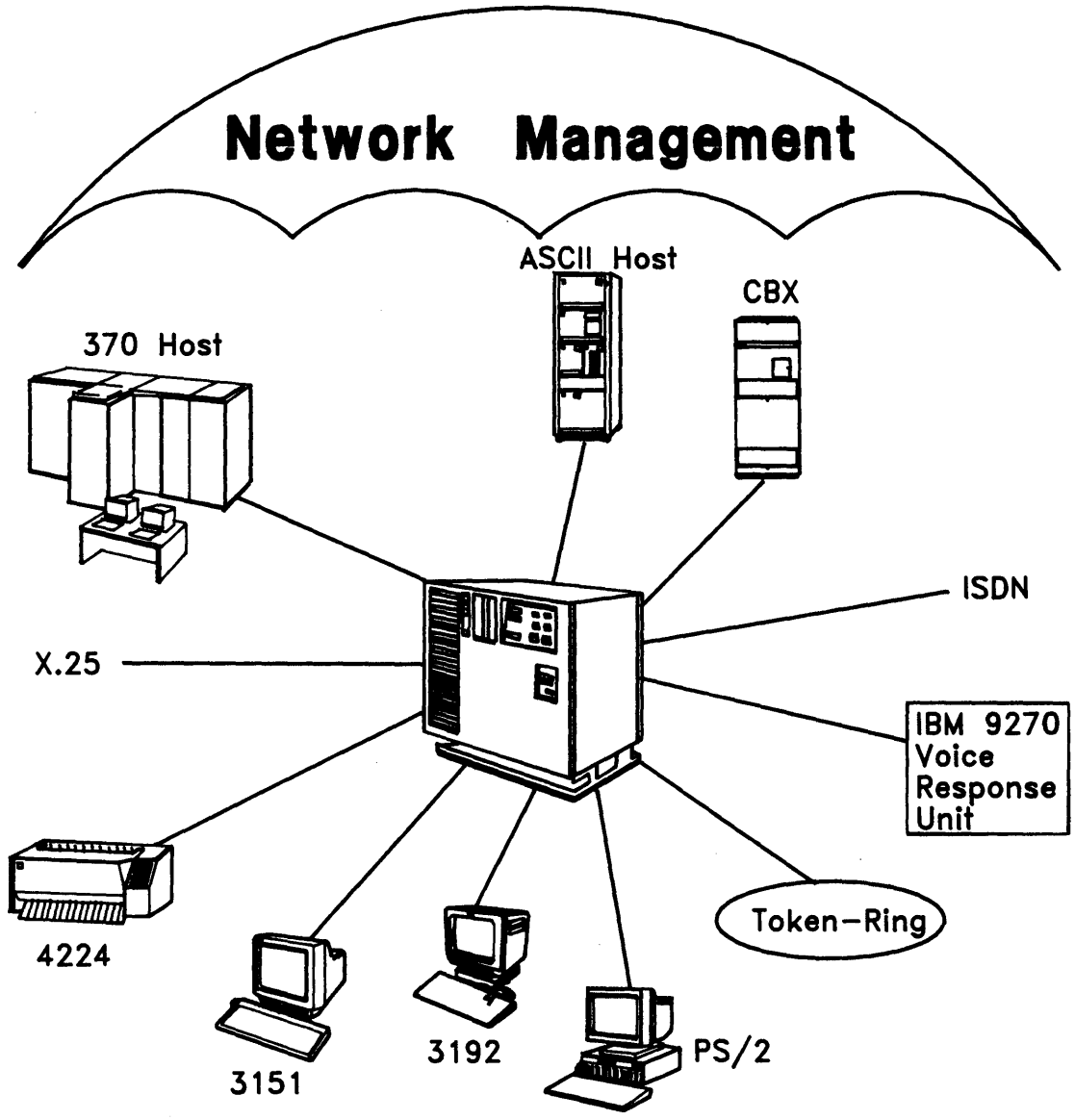
In summary, we have seen that the Dependent Display and the Intelligent Workstation will continue to coexist for the foreseeable future. Both types of terminal will require superior performance and highly reliable host connectivity. The IBM 3174 will continue to satisfy this requirement well into the '90's.

However, in addition to its traditional role as a highly reliable shared-logic controller for 3270-type displays, the IBM 3174 is taking on the major new role of Establishment Connectivity machine -- providing data connection, transformation, and Network Management for a variety of terminals, mainframe systems, and connection methods.

Today's 3174 provides an excellent base for connecting a wide range of terminals to both IBM and ASCII host processors. At its current level of function, it provides a strong start on the direction toward providing connectivity between "any terminal" and "any host". Furthermore, its outstanding function and technology, coupled with its design for growth, provide the necessary foundation to address the connectivity requirements of the future.

IBM 3174...the connection to have!

IBM 3174...Establishment Controller



Traditional 3270 Shared-Logic Controller Function Plus...

Network Management
Connectivity Support
Growth Foundation

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READER'S COMMENT FORM

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