<table>
<thead>
<tr>
<th>Title</th>
<th>Enabling the information age</th>
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<tr>
<td>Author(s)</td>
<td>Kwanchai Patanapongpibul</td>
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Worldwide Internet/Intranet Products and Services Sales, 1996 and 2000

Projected Network Computer Shipments By Market Segment, Thousands of Units

A Bet On the Internet

Standards
- HTML
- PDF
- JAVA
- VRML
- Sound/Video
- FTP
- IP
- HTTP
- TCP
- RCP
- MPEG

Bandwidth

Content
- Internet is the global digital network
The NC Mission

To deliver inexpensive and easy-to-use appliances based on open standards for information access and communications.

What is Network Computing?

- Low cost, easy-to-use appliances
- Everything shared "on the network"
- Connect from anywhere to anywhere
- 1/3 the price of PCs with 1/4 the cost of management

What is Network Computer?

A Low Cost Digital Appliance Computer

Network Devices
What is the NC?

- Browser with Email and Universal Mail Gateway
- Word Processor, Spreadsheet and Presentation Graphics
- Data Entry and Forms based Applications
- JAVA Applets

All the functionality that most people need

- Lower Initial Costs
- Lower Management Costs

PC Computing Today

- $3,500 PC Purchase Price
- $8,000 Annual Cost of Ownership
- Microsoft Office 95
  - 136 Mb Hard disk space
  - 24 Mb RAM
- 80% of all users use only 20% of the functionality

NC and the PC

- The NC delivers a consistent user interface across
  Internet appliances (e.g., NCTV, NC Workstation, NC
  Phone, etc)
- PCs are used for content creation, unlike the NC which
  is primarily for content navigation and delivery
- PC run 100s of applications; NC applications will run on
  PCs
- NC will run a few core communications and personal
  productivity applications and a plethora of Internet JAVA
  applets
**What is Network Computing?**

- Everything is stored on the network
- Everyone is connected to the network

**NCI Target Markets**

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Community</th>
<th>Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporations</td>
<td>Vertical Industries</td>
<td>Government</td>
</tr>
<tr>
<td>Schools</td>
<td>Small Business</td>
<td>Local Government</td>
</tr>
<tr>
<td>Home</td>
<td>Personal</td>
<td>Public</td>
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<tr>
<td>Terminal Replacement</td>
<td>Corporate Apps</td>
<td>Information Access</td>
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<tr>
<td>Personal Productivity</td>
<td>Packaged Applications</td>
<td>Information Access</td>
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<tr>
<td>Personal Productivity</td>
<td>Enhanced TV</td>
<td>Entertainment</td>
</tr>
<tr>
<td>Personalized Content</td>
<td>Library</td>
<td></td>
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**NCI Market Products**

<table>
<thead>
<tr>
<th>Enterprise</th>
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<tr>
<td>NC Administration</td>
<td>Network in the Box</td>
<td>NC Custom Connect</td>
</tr>
<tr>
<td>Server</td>
<td>NC Server Suite</td>
<td>NC TV</td>
</tr>
<tr>
<td>NC Desktop</td>
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<td>NC Card</td>
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</table>
NC Market Opportunities

- Corporations
- Government Institutions
- Education
- Homes
- Developing Countries

NC Market Opportunities

- Corporations, Government and Institutions
  - vast markets and relatively risk averse
  - consumer data everywhere
- Schools
  - support proliferation of computers by uncoordinated
  - open point and user-of-one offers broad deployment
  - national effort for improving education within campus and
  - distance learning environments
- Homes
  - high-speed networks are coming
  - targeted for people who are served by PC capabilities
- World Market
  - catch the "new wave"
  - opportunity to become the standard

Corporate/Government Intranets

Network Computers
Shared Data
Commercial Database
Oracle Universal Database
Existing PCs
TCP/IP Intranet
Intranet Firewall
Oracle Database
Oracle Application Server
Oracle Server

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**Home Environment**

- ISP NC Server
- ISV Application Server
- Commercial NC Server
- Consumer NC Devices

**Education Environment**

- Student PCs
- Instructor's PC
- Internet and Environment Net
- SMS and Wireless Links

**Bi-Design**

- Consumer
- Corporate
Network Computing Architecture

Wired Marketplace Enabled by NC

Success Factors for the Future

- Increased Security (Public Key)
- Plug & Play Servers
- Changes in Information Retrieval and Gathering
- Free Roaming with Security
- Adherence and Development of Open Standards
Enabling the Information Age
Paradigm shifts expand usage and users for technology
- Focus on new users and uses
- Expand capabilities for terminal users, lower cost for PC users

Network Computers ... are the interactive components of the
Interactive Components of the Fourth Wave of Computing.
Interactive Components of the Fourth Wave of Computing.

Network Computers

IBM Network Stations

Network Computing

Distributed

Client/Server

Internal Components of the Fourth Wave of Computing.
Internal Components of the Fourth Wave of Computing.

Borders and boundaries disappear
- Information assets are becoming more critical
- Barriers to market entry are reduced

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The NC is not about hardware; it is not about software. It is not about whether it has more or less capability than a PC. The NC is about network computing. It’s about how users choose to design, deploy, and manage their network resources.

Our bottom-line recommendation is that pilot projects in transactional applications should be undertaken in 1997. NCA will enable a whole lot of new and emerging applications.

Access for today
- More than just Java applications
- Less than just Java applications
- Windows applications
- More than IBM's desktop

Access for tomorrow
- Java for new services at the desktop
- Java for new services at the server without touching the desktop
- Java for new services at the server with minimal effort

NCA will match PC volumes by 2005; dwarf them by 2010. The rise of NCA will challenge PC and PC software suppliers to rethink their business models.

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Network Computing is a natural choice for deploying Java-based business applications.

- Consistent with NC design philosophy
- Simplicity at the desktop, complexity moves to the network
- Full cost of ownership benefits plus:
  - Central management of applications
  - Avoid client software installation, configuration, version problems
  - Standard browser (WWW)

Network Computing solutions can be delivered to existing PCs:

- Standard WWW browser
- 100% Pure Java environment

PC users still pay associated 'fat' client burdens

- Administration
- Client installation, configuration, version control, system training

Desktop interface for NC users:

- Web browser
- Terminal emulation
- File manager

InfoBus technology

- Common services for all users
- Business productivity components

Start programming for the IBM Network Station today

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Current technology strategy assumes "one size fits all PC" - don't want PC's to become obsolete - standardize on models - results in significant costs for under-utilization PC's - optimal technology strategy would align users to job tasks to technology platform.

Acquisition is part of Total Cost of Ownership (TCO). Now a class of business productivity software designed for Network Computing - comprehensive set of integrated Java applets - common platform - the NC, text attributes, uniform user interface - same look and feel across applets - common panels - I/O, text attributes, uniform user assistance - will be submitted for 100% Pure Java certification - initially offered for Network Computers - designed for any platform.

Savings Compared to Typical Windows 95 LAN PC: Network Computing's most cost-effective way to provide access to II4O, Windows apps. Higher cost than NC's; Java NC's offer highest degree of flexibility, savings.

Annual Savings Compared to Typical Windows 95 LAN PC: 50% - $1.77/yr saved vs normal Windows; $1.505 - 1.8M; Saved 15 yr savings - 100 client network vs NC's best: $124.6K vs $628.1K.

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Using 3270-type terminals to train airport agents:
- Goal: move train luggage from the regional airport to the airport
- Deploy more than 1,000 IBM Network Stations with local servers.
- Run all transactions making airport management more convenient and reliable.
- Expand usage: place terminals at counters, new inventory systems.

Benefits:
- Tighter control and more convenience than with manual systems.
- Easier to manage and less expensive to own than PCs.
- Small size reduces real estate costs, avoids major counter modifications.
- Better service and support, faster management of year-round luggage.

Network Computing Solution:
- Manufacturer of more than 700 fine tools and a wide range of products.
- Using AS/400 linking 165 terminals, 60 PCs, and 10 printers.
- Dynamic asset allocation: Client/Servers.
- Network resources vary dynamically with the task being performed.
- Ubiquitous Internet/Intranet access.

Increased usability:
- Reduced training and support costs.
- Increased security:
  - Applications/ data are secured on servers.
  - Simplified software upgrade model.
  - Enhanced application deployment speed and flexibility.

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Washington, D.C. area, nonprofit family-run after-school program

Moving from networked PCs to Network Computer

Goal: Leverage the technology playing lead for city and suburban kids,
foster kids' technological understanding and experience, and improve their
ability to learn via hands-on experience.

- Lower initial cost and ongoing cost of ownership; installed management
- Avoid time and expense of PC hard drive failure; client software upgrade
- Silent operation, low power, low energy usage (7 watts per PC)

Banaflla

- Make people's jobs easier, without cost or maintenance of PC
- Affordable, valuable way to create applications on the Internet
- Low initial cost and low total cost of ownership

- Improved desktop management and support
- Network Station Navigator
- IBM Navigator, Web browser, applications, etc.

Indoors, based construction engineering firm

Using AS/400, connected terminals, and PCs

Goal: Deploy IBM Network Stations in headquarters, branches, distribution centers,
ser... applications, with

- Improved business process management and support
- Terminal support for AS/400, terminal support for AS/400, terminal support for AS/400,
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A strategic part of Network Computing

- Accelerated deployment of applications
- Device independence, server-managed
- Unified access to new and existing applications
- Windows support is assured
- Secure desktop environment
- Reduced Total Cost of Ownership
- Computing resources managed dynamically
- Better operational management
- Reduced training and support costs

Universal ACCESS to Information...

- National language support
  - Including DBCS, bi-directional
- SmartCard
- Global Language support for dial-up capabilit
Dealing With Cross-Border Broadcasting: More Regulations

Thawansak Sukhawun