NETWERK-ONDERSTEUNING VOOR TELELEREN

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ENSCHERDE
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APPLICATION DEMANDS

• BITRATE VERSUS DELAY
  • SECURITY

NETWORK FACILITIES

• LOCAL AREA NETWORKS
• WIDE AREA NETWORKS
  • PUBLIC ACCESS

CONCLUSIONS
APPLICATION DEMANDS

BITRATE VERSUS DELAY

LOW-TECH
• EMAIL
• WWW FORMS
• DOWNLOADING EXERCISES
• DOWNLOADING READERS

MEDIUM-TECH
• NON-INTERACTIVE VOICE
• NON-INTERACTIVE VIDEO
• SHARED WHITE-BOARD
• INTERACTIVE VOICE

HIGH-TECH
• TWO-PARTY VIDEO CONFERENCING
• MULTI-PARTY VIDEO CONFERENCING
APPLICATION DEMANDS

SECURITY

DATABASE

ACCESS CONTROL

SECURE SOCKET LAYER

NETWORK
LOCAL AREA NETWORKS

INDIVIDUAL SEGMENTS

SHARED ETHERNET:

SWITCHED ETHERNET:

• TRADITIONAL ETHERNET (10 MBPS)
• FAST ETHERNET (100 MBPS)
• GIGABIT ETHERNET (1 GBPS)
LOCAL AREA NETWORKS

INTERCONNECTION OF SEGMENTS - IP / ATM
WIDE AREA NETWORKS

IP

• SURFNET

EUROPE: TEN34

US: 16 MBIT/S (1997: 34 or 155 MBIT/S)
WIDE AREA NETWORKS

ATM

SURFNET4

• 34 MBIT/S: NOW

• 155 MBIT/S: END OF THIS YEAR?

• CONNECTED TO JAMES

STATUS

• PVCs AVAILABLE

• SVC INTRODUCTION IS DIFFICULT

• LACK OF APPLICATIONS
WIDE AREA NETWORKS

FUTURE

ATM WILL BECOME THE BACKBONE OF IP?

IPv6
RSVP
MBONE
PUBLIC ACCESS

MODEMS: 33.6 KBPS (V.34)

ISDN

56K MODEMS

CATV NETWORKS?

ADSL
### ADSL

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Data rate</th>
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</thead>
<tbody>
<tr>
<td>HDSL</td>
<td>High data rate Digital Subscriber Line</td>
<td>1.544 - 2.048 Mbps</td>
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<tr>
<td>SDSL</td>
<td>Single line Digital Subscriber Line</td>
<td>1.544 - 2.048 Mbps</td>
</tr>
<tr>
<td>ADSL</td>
<td>Asymmetric Digital Subscriber Line</td>
<td>Up: 16 to 640 kbps Down: 1.5 to 9 Mbps</td>
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<tr>
<td>VDSL</td>
<td>Very high data rate Digital Subscriber Line</td>
<td>Up: 13 to 52 Mbps Down: 1.5 to 2.3 Mbps</td>
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ADSL

Customer network

Transmission unit

1.544 / 2.044 Mbps

data network

Splitter

telephony

Network

Transmission unit

1.544 / 2.044 Mbps
CONCLUSIONS

LOW- AND MEDIUM-TECH TELE-EDUCATION CURRENTLY POSSIBLE

CONNECTING STUDENTS AT HOME REMAINS THE BOTTLENECK

HIGH-TECH TELE-EDUCATION EXPERIMENTS SHOULD BE POSSIBLE IN CONTROLLED ENVIRONMENTS