

15.566
**Information Technology as an Integrating
Force in Manufacturing**

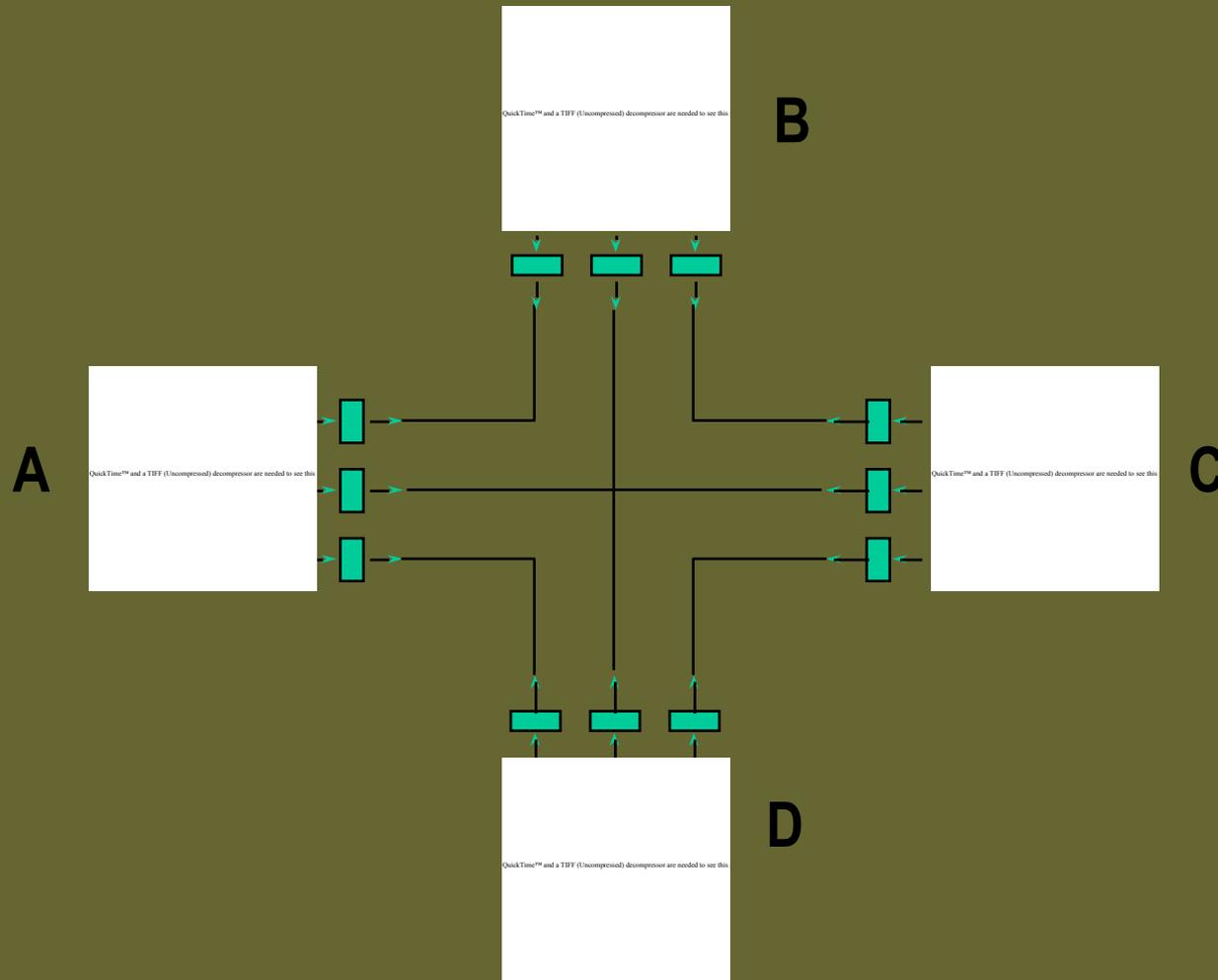
Session 7 of 25

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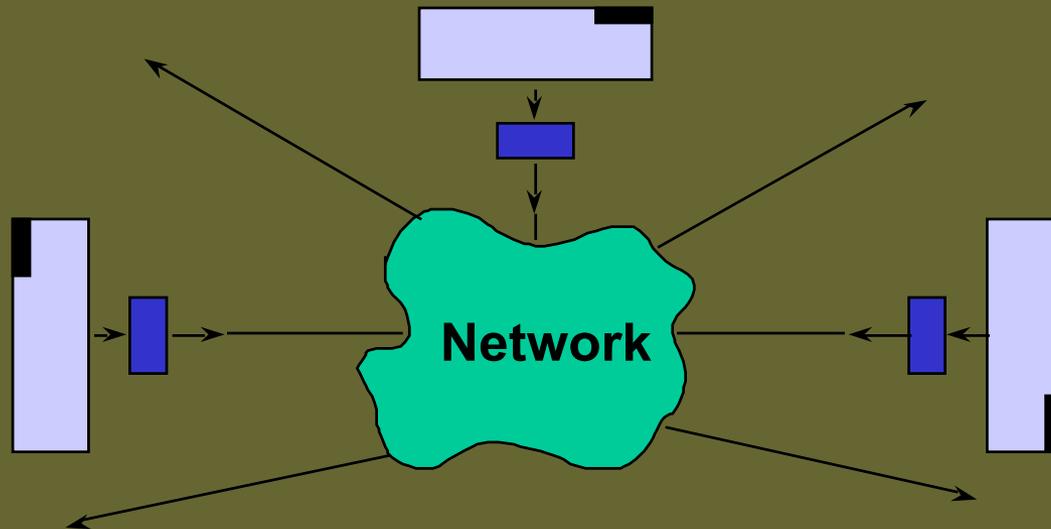
(*) Some of the transparencies used in these sessions are based on slides used by the IT group in previous years

Why build networks?



Full Connectivity doesn't scale!

Networks are about sharing

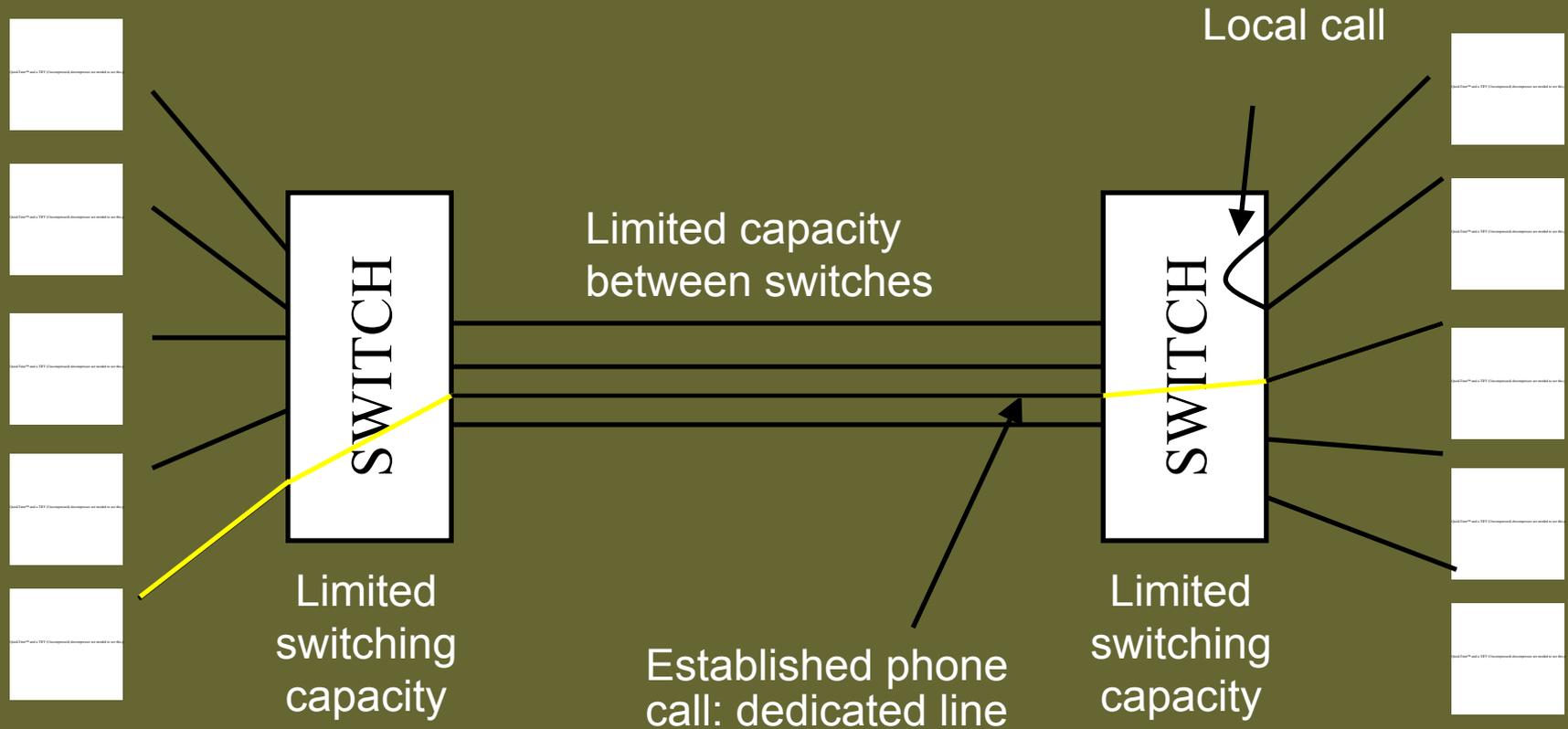


- The network allows an entity to switch its attention among a large number of others
- Permits sharing of resources attached to the network, including the resources of the network itself.

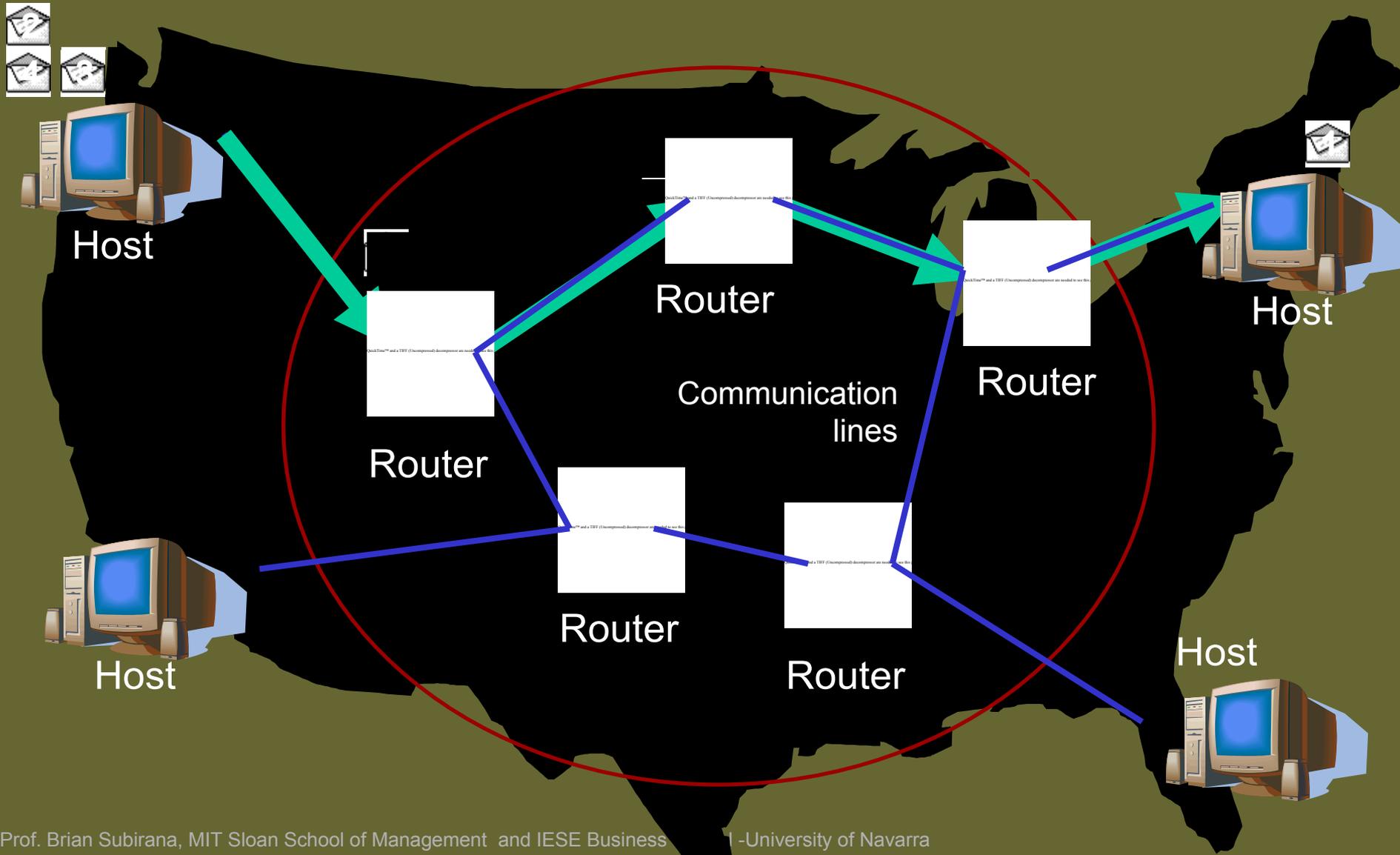
Two forms of network connection

- Circuit or line switching
 - A dedicated end-to-end connection is established for the duration of the connection
 - Used in telephone network
- Packet switching
 - Messages are divided into small packets
 - Each packet is separately routed to the destination
 - Different packets can take different paths and times
 - Missing or garbled packets are retransmitted, if necessary
 - Packets are reassembled into messages at the destination

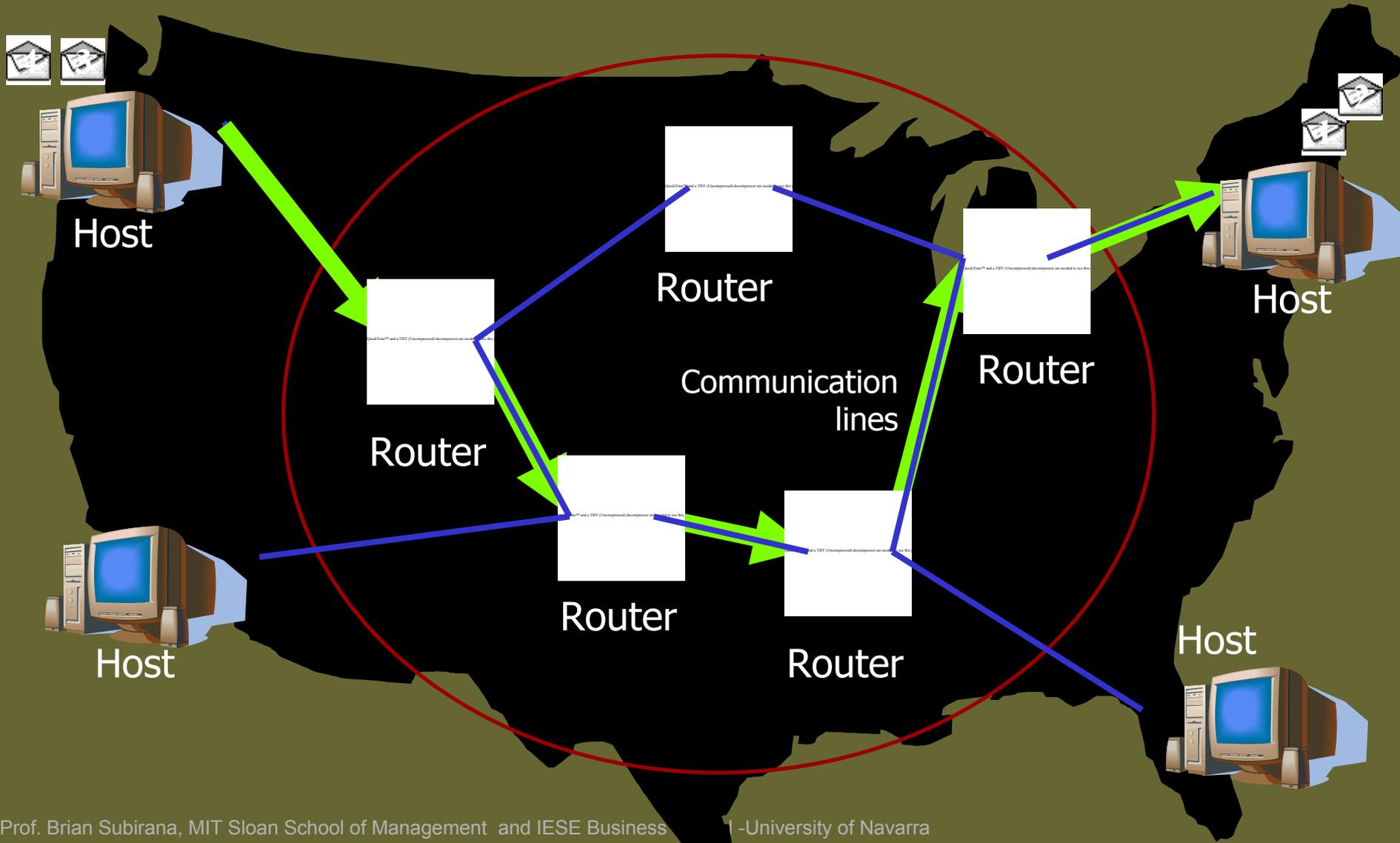
Line switching



Packet Switching



Packet Switching



Comparison

Circuit switching	Packet switching
Minimum delay	Variable delay
Very inefficient use of connection capacity	Much more efficient use of connection capacity
When overloaded, unable to make connection at all	Can almost always connect, but may be long delays
Both ends of connection must use same data rate	Data-rate conversion is easy