

ARCHITECTURE AND ORGANIZATION OF A HIGH PERFORMANCE METROPOLITAN AREA TELECOMMUNICATIONS PACKET NETWORK

Abstract

A high capacity metropolitan area network (MAN) is described. Data
5 traffic from users is connected to data concentrators at the edge of the network,
and is transmitted over fiber optic data links to a hub where the data is switched.
The hub includes a plurality of data switching modules, each having a control
means, and each connected to a distributed control space division switch.
Advantageously, the data switching modules, whose inputs are connected to the
10 concentrators, perform all checking and routing functions, while the 1024x1024
maximum size space division switch, whose outputs are connected to the
concentrators, provides a large fan-out distribution network for reaching many
concentrators from each data switching module. Distributed control of the space
division switch permits several million connection and disconnection actions to be
15 performed each second, while the pipelined and parallel operation within the
control means permits each of the 256 switching modules to process at least
50,000 transactions per second. The data switching modules chain groups of
incoming packets destined for a common outlet of the space division switch so
that only one connection in that switch is required for transmitting each group of
20 chained packets from a data switching module to a concentrator. MAN provides
security features including a port identification supplied by the data concentrators,
and a check that each packet is from an authorized source user, transmitting on a
port associated with that user, to an authorized destination user that is in the same
group (virtual network) as the source user.
25 This arrangement can also be used to switch voice packets, using a
voice interface such as a digital switch and a digital voice signal to voice packet
converter. In accordance with one embodiment of the invention, a packet switch
is used for switching voice packet outputs of the data switching modules and a
circuit switch, such as the space division switch, is used for switching data packet
30 outputs. In accordance with another embodiment, voice packets are switched from
the data switching modules through the space division switch to a small group of
data switching modules, which further switch the voice packets through the circuit
switch to a destination concentrator.

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