

APPLICATION NOTE

Voice and Data Integration :

Gaining maximum benefit from your leased line!!

Carrier Division



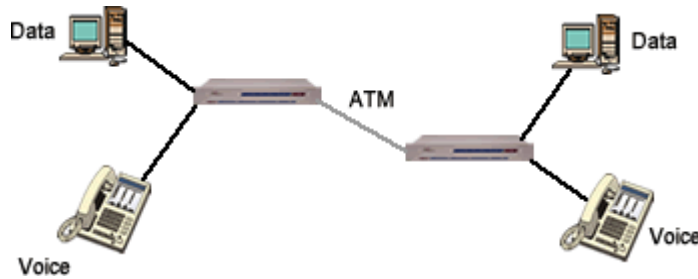
The current situation with most small to medium enterprises is that multiple sites are interconnected using leased lines, with separate networks for voice and for data. As remote communications requirements outgrow simple kilostream connections and the bandwidth requirements increase to E1 or maybe even E2 or E3 what options exist. It is clearly an expensive solution to maintain separate networks for voice and data, so integrating and utilising a single, converged network is a major benefit in terms of both costs and managability.

What do we mean by a voice network? Well basically the link between PBX's which may be an E1 or Primary Rate ISDN connection.

What do we mean by a data network? Well basically the links between routers across the various sites whether they be Nx64 or above.

What convergence options does the Metrodata APX Family offer? Put simply it allows both the Voice and the Data to be carried over a single network.

How is convergence achieved using the Metrodata APX?



The APX is an ATM Access Processor which utilises an ATM backbone to multiplex the voice and data traffic streams whilst maintaining quality of service. To transport the voice traffic, the incoming, constant bit rate, PBX signal is segmented into ATM cells using AAL.1 which are then carried as a high priority cell stream across the ATM backbone. Since voice traffic is highly sensitive to both delay and jitter, ATM QOS is the only sure way of guaranteeing correct voice service delivery. At the far end, the constant bit rate PBX signal is reassembled from the received ATM cell stream. Adaptive clocking and jitter attenuation ensure that end to end timing is maintained and that voice quality is not impaired.

What data services may be carried by the Metrodata APX ATM Access Processor? The APX provides several options depending upon the data services required; for example ATM, LAN or even Frame Relay each of which is handled in a different manner.

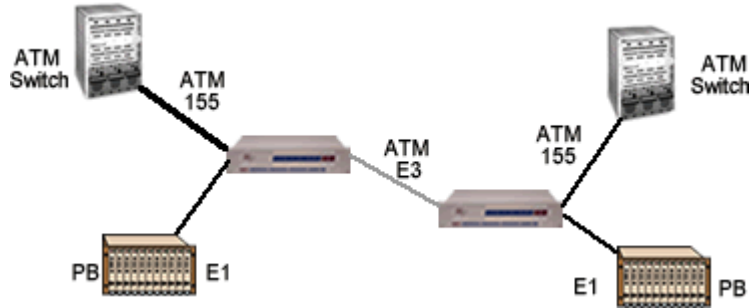


Figure 1: Voice and ATM Data Convergence

Where the data traffic is already in the form of ATM cells, sourced for example from an ATM enabled router or ATM Switch, then the APX will be fitted with an additional ATM UNI interface module to interface to the router or switch as shown in figure 1. Typically this will use a fibre interface at 155M, using either STM-1 or OC-3 framing. Other options include E3 or DS-3 as the ATM interface. APX must be configured for PVC operation and through VPC connections will transparently tunnel ILMI and Signalling allowing for transparent SVC operation. By allocating lower priority to the data traffic, the voice traffic will not be affected even under heavy congestion and overload conditions. The APX is well equipped to deal with overload through congestion management mechanisms such as EPD, EFCI cell marking and CLP based selective cell discard. Addition of the Policing Module to the interface gives full control over each individual traffic stream in terms of PCR, SCR and MBS definitions.

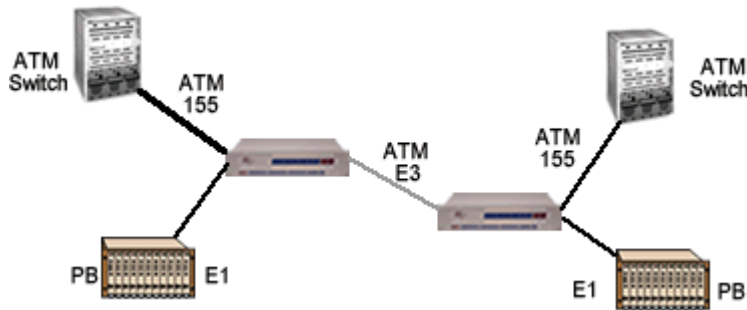


Figure 2: Voice and LAN Data Convergence

APX handles LAN based data in two ways. In a multi-protocol environment, transparent bridging over ATM using RFC-1483 encapsulation over AAL5 adaptation enables the transport of LAN MAC frames over the ATM backbone link. The APX keeps track of all end stations on the local network and discards all local traffic only forwarding broadcasts and traffic genuinely destined for the remote site. Alternatively, or in addition to bridging, in an IP environment routing may be enabled whereby IP traffic is routed to remote sites according to a routing table. IP traffic is transported according to RFC-1483 / RFC-1577 with PVC based support for ATM ARP.

For routers equipped with Frame Relay ports, especially HSSI, the solution is circuit emulation whereby a point to point connection is made. With HSSI Circuit Emulation, flexible bandwidth allocation upto 52M is available to give a high quality router interconnect.

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