PATAPSCO Communications

PacketBand®-ISDN-4P

Providing: ISDN PRI Pseudo-Wires, CESoIP (Circuit Emulation Services over IP) ISDN over IP and TDM over IP.

For: Establishing dynamically switched clear ISDN "B" channels and TDM "leased lines" over IP/MPLS network for clock-locked synchronous applications.

IP ISDN PRI and T1/E1 gateway

Switches ISDN "B" channels across and though managed IP/MPLS networks

New service opportunities for Carriers

More complete customer solution for System Integrators

Transmission of clock sensitive non-compressible data over IP networks

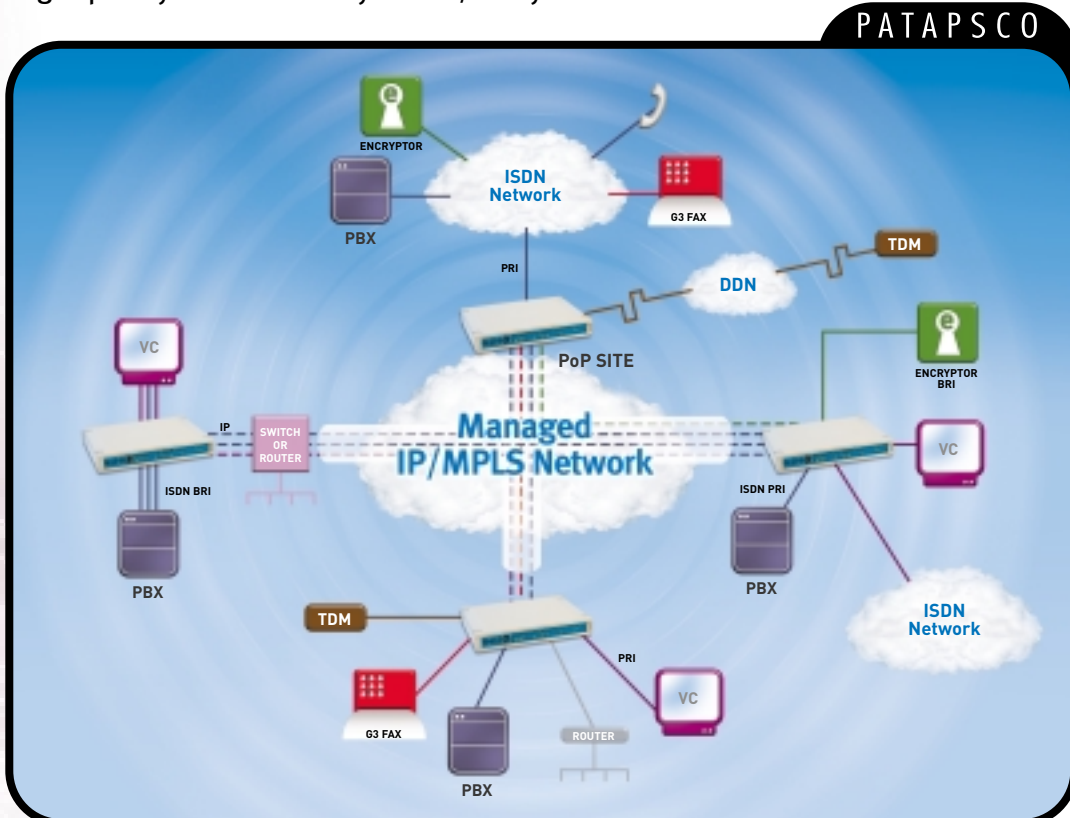High-quality uncompressed voice over IP

Turns the IP/MPLS network into a virtual switched ISDN network

On-IP network calls with national/international break-out

Delivers dynamically switched independent ISDN clear "B" channels

Support for traditional non-switched leased lines across IP networks

High quality clock recovery for E1/T1 synchronous DTEs

Who would use PacketBand and why?

1. IP-based Carriers who have no method of delivering ISDN and/leased lines to customers. Additionally, Carriers who want to utilise their national or international IP network for local "break-out" to retain revenue.

This illustration shows three customer locations on a Carrier's IP/MPLS network. The site on the right has a PacketBand interfacing to the IP network and local ISDN access. The lower site has a router connected through PacketBand's second IP/Ethernet port. The third PacketBand, on the left of the diagram, connects to the IP network via a switch/router which itself delivers LAN access.

Additionally a PacketBand is located at an inter-connect point or PoP site which could be in the same country or another continent. This location has a connection to an ISDN network for "off-network" calls and a local leased line tail to deliver services to a site without IP access.

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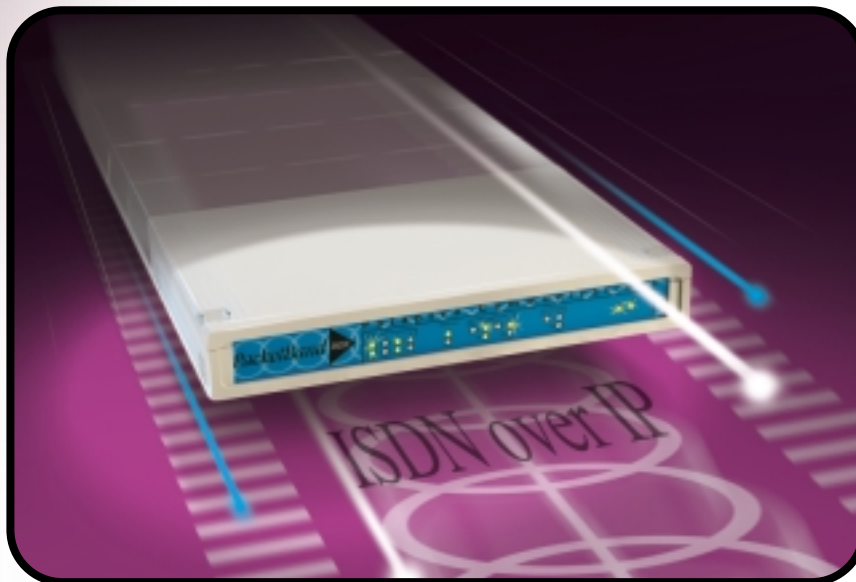
PacketBand allows ISDN clear-channel calls to be established across the IP network or to non-network based devices using break-out into the "real" ISDN network. Some typical applications/devices are shown such as video conferencing, fax, PBXs and encrytors.

PacketBand is shown delivering TDM circuits across the IP/MPLS network with break-out into a carrier's traditional TDM leased line network for delivery of the last mile.

The IP Carrier in this drawing is connecting customers' ISDN and TDM circuits across the IP network but is also using the IP network to transport traffic across national or international boundaries. This gives the IP Carrier opportunities to market services which retain all leased line revenues, or in the very worst case, to retain the high value high margin long-haul international element leaving just the remote country's "last mile" domestic link.

This solution will appeal to Tier 1, 2 and 3 Carriers where the Tier 1 operators can retain revenues for international traffic (and help migration as covered below). The same logic applies to Tier 2 and 3 Carriers, plus they can now deliver leased lines and PRI services cost-effectively to new and prospective customers using existing infrastructure.

2. Carriers with traditional circuit switched or TDM architecture seeking to migrate customers and products to an IP network.

Many of the world's best-known carriers have already announced plans to migrate to IP-based networks and most others are expected to work towards the same objective. But, moving ISDN circuit-switched or TDM-based services to an IP architecture has inherent problems because of clocking and synchronisation issues. Additionally, a key objective is to migrate customers to IP without wholesale equipment changes and high costs.

The PacketBand range provides a low-cost, easy-installable IP/MPLS solution for both ISDN switched services and traditional leased lines.

Installing PacketBand at a customer location immediately enables dynamically-switched ISDN calls across and through the IP network (another member of the PacketBand family supports BRI ISDN), as well as point-to-point leased lines, without adding any infrastructure equipment or expense. It means sites can run IP and non-IP platforms but use a common IP network; non-IP products can be inter-connected with IP-products across the packet network; and a more phased and controlled approach is available. In all, PacketBand can be a significant tool in the quest for painless migration and will be of particular use to planners and network designers.

3. Corporate users who want cost reductions for ISDN calls and synchronous traffic.

Any organisation which has access to a Managed or Private IP network and which is also running separate leased lines for synchronous devices, or which uses ISDN dial-up, can make effective use of PacketBand by migrating the legacy products to IP.

Using the IP network for ISDN calls between international offices can have considerable cost advantages. Breaking out of the IP network into a "real" ISDN network means non-compressible "data" calls can be made to potentially all locations across the world at a very low cost. Just one example would be ISDN calls for video conferencing.

A single ISDN network access point can be shared by all sites, reducing the number of ISDN services that need to be rented. Remote offices access the ISDN network via the IP network. PacketBand's ability to also deliver virtual leased lines, or Pseudo-Wires across the IP network can have further cost saving advantages.

Whether your organisation has one or more applications, the ROI will be very swift.

4. Applications where voice quality is critical.

Whilst one of the main drivers for the trend towards IP is low-cost voice over IP (VoIP), some applications cannot support the degradation in voice quality associated with VoIP systems because of the compression methods and/or delays. Examples could be dealer-desk and emergency calls. Traffic that originates from mobile telephones already suffers from reductions in quality and further reductions using VoIP can compound the problem.
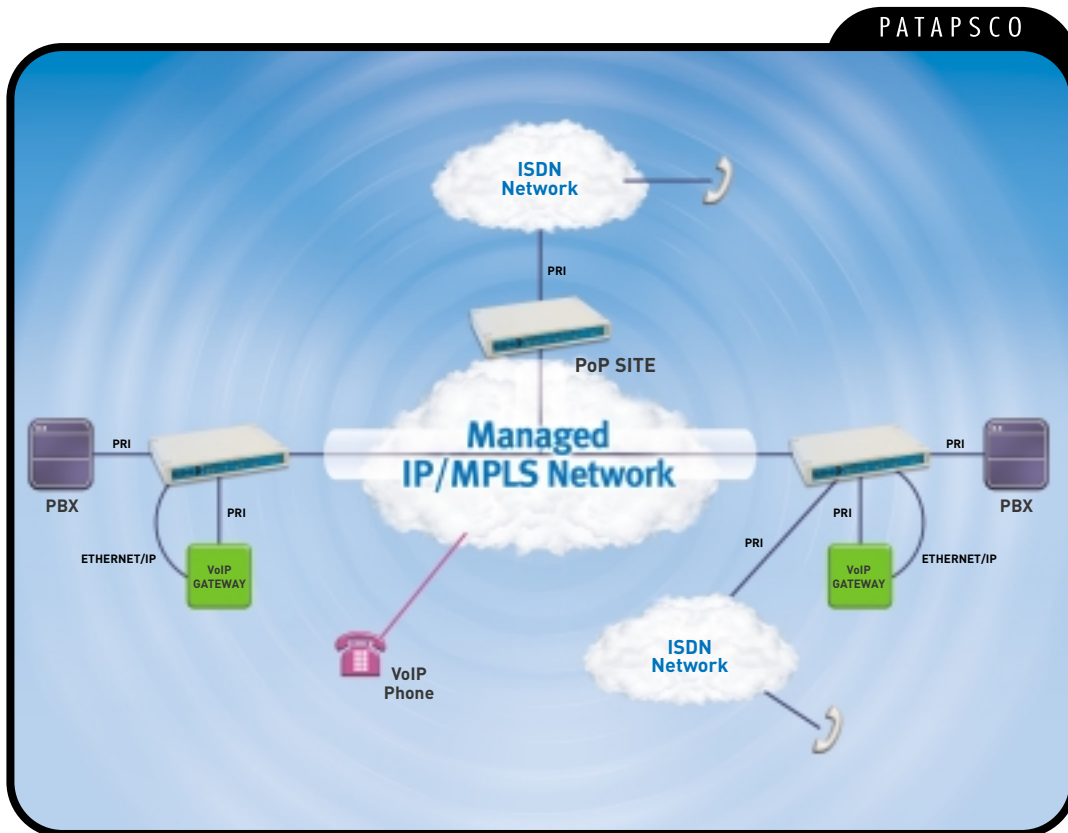
The diagram shows PBXs connected to PacketBand which then routes non-compressible calls, or certain called numbers, directly across the IP network without compression. Other voice calls which *can* be compressed using VoIP are passed to the VoIP gateway and then into the IP network for onward delivery. This means non-compressible data calls and high-quality voice calls can now use the IP network. They can connect to other PacketBands on the IP network or "break-out" to communicate with any ISDN device in the world. Voice that can be compressed is passed to a VoIP gateway, for example, and this traffic can then connect to similar gateways and IP phones.

PacketBand is an ideal solution for these quality-critical applications. PacketBand establishes clear channel ISDN calls so the voice quality is protected and the end-to-end delays are minimised, whilst taking advantage of low-cost international IP tariffs.

5. Government and Military for secure data, voice and fax transmissions.

Most government and military organisations have secure data, telephone and fax platforms (encryptors). It is common for these to have an ISDN presentation to the outside world and they need the full 64kbps ISDN "B" channel capacity. These organisations have not, until the arrival of PacketBand, been able to use the encryptors over IP networks.

PacketBand means encryptors can use existing IP networks to communicate and also break out into a carrier's network for calls to locations not on the IP network. It also means that these encryptors can be used at locations where ISDN services are not available but where IP delivery is possible (perhaps via satellite).

As well as offering benefits identified in other sections here, PacketBand can simplify communications between secure devices and allow them to take advantage of national, international and satellite IP delivery systems.

6. System Integrators allowing provision of a more complete customer solution.

Speak to most System Integrators (SIs) and mention IP and they are probably focused on voice; either IP-PBXs, VoIP gateways, mobile gateways or similar. Look at what else their customers are doing and a significant majority of the larger organisations will probably have leased lines and various ISDN circuits for different uses and applications.

PacketBand gives SIs the ability to offer new and existing customers a more integrated IP solution, incorporating more services. It gives the SI new marketing opportunities, a large competitive advantage, and the customer benefits from a more integrated and lower-cost network.

7. IP Equipment Vendors adding and "rounding" their product offering.

Similar to the System Integrator case above, many vendors of IP equipment focus on the voice area. Adding PacketBand to your offering and to that of your partners and distributors will open more sales opportunities and enable a more "rounded" and complete service and product-offering to customers.

Whilst PacketBand does have some voice applications, these are not competitive with compressed VoIP, but rather complementary in areas where VoIP would not be acceptable. The data-handling capabilities of PacketBand for leased lines, ISDN, faxes etc are the additional features that you can now offer.

Summary

The PacketBand-ISDN and PacketBand-TDM ranges open a large number of new opportunities and applications that can utilise the low-cost trend to IP.

- New innovative high-value high-margin services for carriers
- Cost savings and network consolidation for corporate users' legacy and switched services
- Complementary expanded business opportunities for SIs and IP vendors
- Specific verticals such as G3 fax and encryptor IP solutions

PacketBand-ISDN-4P and other PacketBand products have many uses in a wide number of scenarios – please contact Patapsco to discuss your requirements.

More Application Notes and detailed Technical Datasheets are available on the PacketBand range.

- 1 – 4 ISDN PRI T1/E1 ports
- Individual "B" channels dynamically and independently switched
- Also supports non-switched TDM T1/E1 clear, channelised or fractional circuits
- Transmits all data and voice protocols over managed IP/MPLS networks
- Totally transparent to all data formats
- Low-cost migration to IP networks for legacy equipment
- Point-to-point and point-to-multipoint with PRI E1/T1 "grooming"
- Two 10/100Base Ethernet ports
- Optional support for 1GE
- Dual Ethernet/IP/MPLS connectivity to network for resilience
- Or single connection to IP/MPLS/Metro network with local Ethernet port
- Various clocking options with very high quality clock recovery
- Low data overheads
- Configurable packet size
- Compensates for "jitter" or packet delay variation
- Very low latency or processing delay
- VLAN tagging
- Quality of Service (QoS) options
- "Time-of-Day" configurations
- Meets all relevant current and draft standards including Y.1413
- Fast and easy to manage locally or remotely via intuitive GUI
- Remotely software upgradeable
- Compact table-top unit with optional rack-mount extenders
- Attractively priced

More detailed information is in the PacketBand ISDN-4P Technical Datasheet.

For a description of this technology area, please see Patapsco's **"What is "Pseudo-Wire", "TDM over IP", "CESoIP" (Circuit Emulation Services over IP) or "Leased Lines over IP"** *white paper WP-010.*