

PurePacketCompact™



How the PurePacketCompact works

A single PurePacketCompact (PPC) system allows network operators to service buildings and campuses, housing as many as 72 business tenants. It supports up to 96 POTS lines and 72 xDSL lines in a single chassis. Service Providers can link the PPC back to their POP or Central office via multiple high-speed Wide Area Network (WAN) interfaces, including NxDS1/E1, OC3, Fast Ethernet, and DS3.

Like the PurePacketNode, PPC supports both SoftSwitch VoIP infrastructures and legacy Class 5 switches.

Introducing the PurePacketCompact

Introducing PurePacketCompact™, a telecommunications breakthrough solution designed to act as a multi-function platform, packaged in a small, high-density, rack or wall mountable footprint, which easily fits into wiring closets or basements of office buildings, hotels and campus environments. Supporting Class 5, SoftSwitch voice services, internet access, tiered data and VPN technologies, Integral Access' combined hardware and software solution offers Service Providers focused on the MTU marketplace, the ability to effortlessly provide converged voice and data services on the same platform, and the means to tap into new revenue streams.

The business of serving multi-tenant unit buildings is about to surge. The market for broadband services in MTU buildings will grow to almost \$1 billion by 2003*. Service Providers focused on serving the requirements of this high-growth MTU market, should be prepared to capitalize on the new revenue opportunities this market segment has to offer.

The PurePacketCompact was developed to satisfy these requirements by providing you with a technology solution that places network intelligence in buildings so you can capitalize on these opportunity-rich markets.

**According to The Yankee Group, Oct. 2000*

Product Highlights

- **Flexible IP/MPLS Multi-Service Access Platform for MTUs**
In-building broadband aggregator, with Integrated Voice Gateway and Virtual Routing services.
- **Service Automation**
PurePacketOMS (Operations Management System) automates service delivery and activation, SLAs, service assurance and billing using advanced modeling, templates and policy based facilities.
- **Converged Voice and Data**
Flexible customer and trunk (WAN) interfaces to support all current and future converged service needs. Tightly integrates with PurePacketOUTburst-IADs and PurePacketNode to enable differentiated, cost effective service offerings.
- **Supported Voice Services**
Digital and Analog PBX; Plain Old Telephone Service (POTS) FXS/FXO; ISDN BRI/PRI, VoIP.
- **New Revenue Streams**
Enforceable SLAs, dynamic bandwidth allocation, support for next generation IP applications.
- **Guaranteed Quality of Service**
MPLS and advanced traffic management ensure that differentiated services are prioritized and appropriately resourced.
- **Legacy and NGN Support**
Supports legacy Class 5 and offers migration to Next Generation services, including SoftSwitch-controlled Media Access Gateway.
- **Flexible Broadband Options**
DS-1, E-1, xDSL, ISDN, Fiber-To-The-Building (FTTB).
- **Standards Based**
Broad support for ITU, CE, IEEE, IETF standards and recommendations.
- **Compact, Flexible, Scalable**
Compact design for space constrained wiring closets, flexible power and interface options, scalable architecture common with PurePacketNode.

The PurePacket Solution

The PurePacket™ Solution includes the PurePacketNode™ and PurePacketCompact™ aggregators, PurePacketOUTburst® Integrated Access Devices (IADs) and the PurePacketOMS™ (Operations Management System), which provides Carrier Class support for legacy and emerging services – architected to concurrently support both SoftSwitch and Class 5 environments. The PurePacketCompact form-factor is ideally suited for space-constrained wiring closets and other such small areas, while the PurePacketNode solution is more suitable for large buildings. Both are designed to be easily wall mounted, or placed into a rack.

The Integral Access PurePacketCompact solution is an IP/MPLS (Internet Protocol/ Multi-Protocol Label Switching) access network based solution, which offers the flexibility, scalability, carrier class, Quality of Service (QoS) you expect, and will require, in order to capitalize on the tremendous financial opportunities the (MTU) market has to offer.

Benefit From PurePacketCompact Architecture

All services are packetized at the ingress of the PurePacket Solution and mapped to Label Switched Paths (LSPs), which act as intelligent virtual connections. Each LSP is individually managed and engineered to meet Quality of Service / Class of Service (QoS/CoS) requirements for each service type. Policy-enforcing SLAs ensure your customer requirements are met, and enable you to create a virtually unlimited portfolio of differentiated IP-based services. By extending these advanced services to the Customer Premise, the PurePacket System maximizes the utilization of scarce access network resources and delivers end-to-end QoS without the complexities and overhead associated with overlay networks.

Offer More Services; Leverage Your Investment

The Integral Access PurePacketCompact

solution enables Service Providers to offer:

- converged voice and data services via a single access line to provide tiered data services, Internet access, voice, LAN extension and VPN (Virtual Private Network) services.
- both SoftSwitch and Class 5 interworking simultaneously, allowing you to leverage your existing investment in Class 5 switches while expanding services on a SoftSwitch based system.
- broad range of interworking functions which leverage existing technologies including Frame Relay, SONET and GR-303/V5.2 based voice switches, while seamlessly integrating with IP/MPLS optical transport.

Dynamic Bandwidth Allocation

Dynamic bandwidth allocation, or the maximization and utilization of bandwidth, combined with QoS, enable voice and data to be transmitted simultaneously across a common xDSL access line, which can translate into significant cost savings for Service Providers. This maximization of bandwidth also allows you to deliver new revenue generating services, offers a

The PurePacketCompact solution offers Service Providers significant time-to-market advantages.

lower Total Cost of Ownership (TCO) and is directly tied into protecting either your legacy or next generation investment.

Gain Advantages from Utilizing Advanced Traffic Management and Class of Service (CoS) Capabilities

To ensure that your MTU customer's service levels are met,

PurePacketCompact employs MPLS-based traffic engineering and intelligent traffic management (queuing, buffering, marking, etc.). Traffic, depending on mission criticality and time sensitivity, is classified at the customer premise, and then mapped to a Class of Service (CoS) which correlates to a class-specific, application-specific LSP.

Main Features	Main Benefits
Multi-Service Capability	•Increase building penetration opportunity
IP/MPLS Architecture	•Ability to offer new services •Ability to offer new revenue generating opportunities
SoftSwitch and Circuit Environment Support	•Reduces network cost and complexity •Switch migration support, flexible voice service delivery options
Wall Mountable/Small Footprint	•Compact and saves space
Front Accessible Cabling	•Ease of installation and upgrades
AC or DC Power Supply	•Flexible deployment options
Automated Service and Network Management System	•Rapid service creation, provisioning and activation •Enables smart buildings

The PurePacketCompact solution enables you to create and deliver multiple service classes (eg. service level agreements, tiered and differentiated services), accommodating the entire service spectrum, from real-time to best effort, each with an unlimited range of traffic contract options, with the added benefit of producing new forms of revenue streams. Coupled with dynamic bandwidth allocation, PurePacketCompact fully optimizes the in-building wiring or local loop, enabling a new generation of "mass-customized" converged, IP-based services you can now offer to your customers.

Compatibility and Integration

The PurePacketCompact is one of the most "user friendly" access network devices you will experience integrating into your network. Some have referred to the installation process as a pure "plug-n-play" experience. Additionally, the PurePacketCompact solution comes equipped with all of the required communication protocols and interfaces to ease the connection process of this solution into either your existing or emerging infrastructures.

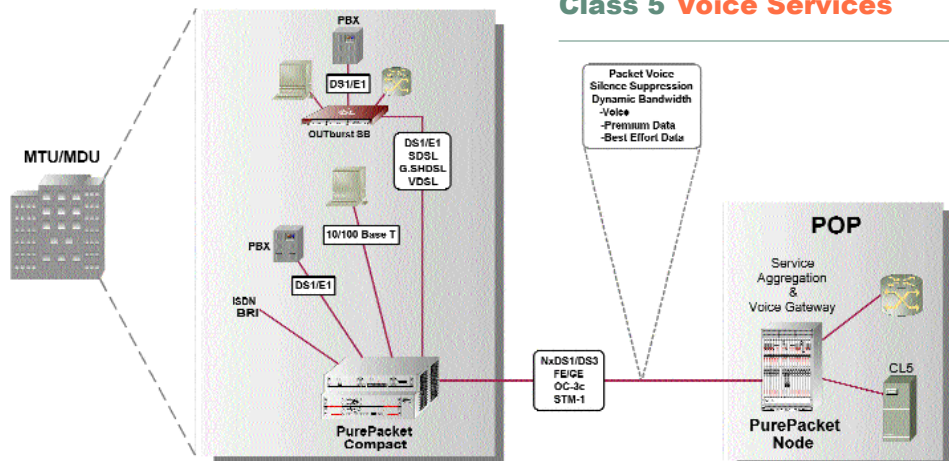
Replace or Augment Your Class 5 Voice Switch for a Fraction of the Cost

SoftSwitch architectures were developed to enable Service Providers to incrementally build-out voice-switching solutions while leveraging the scalability, efficiencies, and openness inherent to IP client-server architectures. Meanwhile, the benefits of this system architecture result in providing you with significant time-to-market advantages, and fulfill the promise of converged communications.

In this architecture scenario, PurePacketCompact functions as a Media Access Gateway, and operates under SoftSwitch control to establish and terminate packet-based voice and emerging, multi-media communication services. In combination with a SoftSwitch, PurePacketCompact can replace or augment a Class 5 voice switch for a fraction of the cost. Integral Access' commitment to open standards such as MGCP (Media Gateway Control Protocol), and MEGACO/H.248 ensures you will be given a clear migration path to next generation telecommunication environments.

How MPLS Delivers the Speed of a Layer 2 Network, and the Intelligence and Scalability of a Layer 3 Network

MPLS (Multi-Protocol Label Switching) delivers deterministic behavior to connectionless, IP-based networks enabling end-to-end QoS/CoS, without the cost of requiring an overlay network. As a link independent protocol, MPLS also provides a common control plan and the smooth hand-off to ATM backbones where necessary. Designed to address scaling issues with the routed IP Internet core, MPLS delivers the speed and efficiencies of a layer 2 network, while leveraging the intelligence and scalability of layer 3 networks. By implementing MPLS and advanced traffic management, PurePacketCompact extends the value of IP from the customer premise to the core, and drives the power of MPLS from the core of your network to your MTU customer premise.

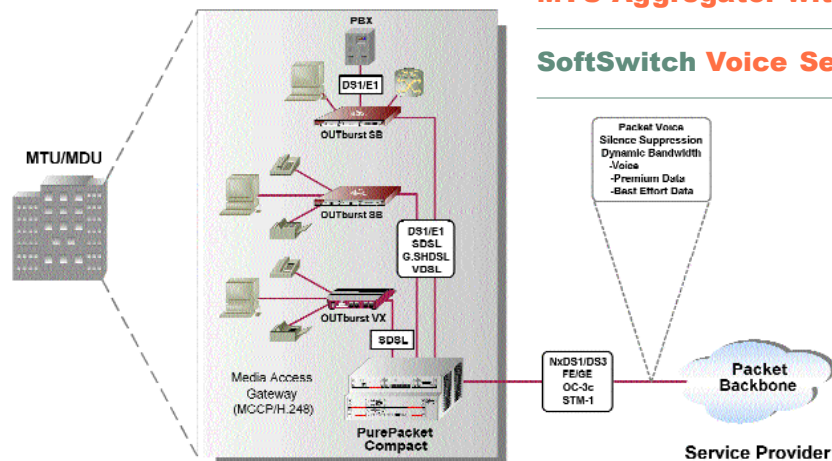


The PurePacketCompact (PPC) provides flexible in-building / MTU broadband aggregation of voice and data services. Strong QoS, dynamic bandwidth allocation and efficient packet voice transport allow bandwidth savings resulting in increased revenue-generating services to be provisioned. Aggregating a number of PPCs with a PurePacketNode at a PoP provides great efficiencies in the trunk between the MTU and PoP. The PPN at the PoP can aggregate PPCs / MTUs and provide direct broadband services to PurePacketOUTburst integrated access devices via DS1/E1 or xDSL.

> PurePacketCompact:

MTU Aggregator with

SoftSwitch Voice Services



The PurePacketCompact provides flexible in-building / MTU broadband aggregation of voice and data services. Strong QoS, dynamic bandwidth allocation and efficient packet voice transport allow bandwidth savings allowing increased revenue generating services to be provisioned. Voice services can be deployed via Class 5 switches (GR-303 or V.52) or SoftSwitch (MGCP/ H.248).

Ensure end-to-end QoS
without the overhead or complexity of overlay networks.

> Specifications

System Architecture

Packet Based

- Hub Function Module (HFM) central logic and frame forwarding
- Interface Modules implemented with active components on CFM* and connections and line protection on IFAM*
- Front access to all interfaces and components

Chassis

- 4 slot chassis, 3 CFM/IFAM and 1 HFM slots
- HFM provides common logic

Voice Switching

- MGCP, H.248, GR303, V5.2

*CFM = Communications Function Module
IFAM = InterFace Adapter Module

Interface Modules

Subscriber Side

- SDSL 16-ports, 2B1Q line coding
- ADSL 24-ports, full rate and G. Lite
- G. SHDSL 24-ports
- ISDN BRI / IDSL 14-ports, 2B1Q, 4B3T, line coding
- POTS FXS 32-ports, 2-wire POTS, loop start, ground start
- DS1 8-ports, integrated CSU, channelized or clear channel
- E1 8-ports, integrated CSU, channelized or clear channel
- Fast Ethernet 10/100BaseTx/Fx

Network Side

- DS1, E-1 Inverse MUX
- DS3 clear channel and channelized
- Ethernet IEEE 802.3, 100BaseFX, 10/100BaseTx
- OC3c/STM-1

Physical

- Dimensions: 17.5"(w) x 7" (4V)(H) x 13.5" (D)
- Weight: 20 lbs/9 Kg chassis only, 35 lbs/16 Kg fully configured

Mounting Options

- Wall Mount
- 19" & 23" Mountable - Rack and Cabinet

Power Requirements

- Internal AC power supply 100-240VAC 50/60 Hz
- 48V DC
- Power 250 Watts Max

Environmental

- Temperature: 5° to 50° C
- Humidity: 5 to 85%

Integrated Access Device (IAD) Support

PurePacketOUTburst IADs

OUTburst-SB (Voice & Data)

- Analog (FXS/FXO) or Digital Voice
- 10/100 Ethernet
- Serial Data (V.35/X21)
- xDSL or DS1/E1 trunk; 3xDS1/E1
- Traffic Management, Virtual Router, DHCP, NAT, Silence Suppression

OUTburst-Vx (Voice & Data)

- 2 or 4 port POTS
- 10BaseT
- G.shdsl / SDSL
- Traffic Management, Virtual Router, DHCP, NAT, Silence Suppression
- PPPoE

OUTburst-Sx (Voice & Data)

- 4 ISDN BRI S0 ports
- 10BaseT
- G.shdsl / SDSL
- Traffic Management, Virtual Router, DHCP, NAT, PPPoE, Silence Suppression

OUTburst-Dx (Data)

- 10BaseT
- SDSL
- Traffic Management, Virtual Router, DHCP, NAT, PPPoE

Services Enabled by PPC

- VoIP/VoMPLS
- PSTN dial tone (POTS)
- Corporate PBX access (DID, DOD)
- High speed internet access
- Corporate LAN interconnection
- Data and/or Voice Virtual Private Network (VPN)

Protocols

Voice

- Encoding: PCM G.711, ADPCM G.726
- Encapsulation: VoIP, VoMPLS with Voice Activity Detection (VAD), Silence Suppression and Comfort Noise
- Echo Cancellation: G.165, G.168
- IP Routing: TCP/IPUDP, ICMPARP, RIPv2, DHCP, NAT, RTP, PPP, MLPPP
- MPLS: RSVP-TE, LDP
- VPN: MPLS and IPVPN
- IP/MPLS with Traffic Engineering: Policing, Shaping, Dynamic Bandwidth Allocation, Integrated Services and DiffServ

Management Software

- PurePacket OMS Advanced Service Creation and Management platform for IP/Packet-based Infrastructure

Regulatory Approvals

Safety

- UL1950, EN 60950
- UL Listed

Emissions

- FCC CFR 47 Part 15
- EN55022: 1994/A1: 1995/A2: 1997
- VCCI ITE emissions (Japan)
- ICCS03
- FCC Part 68
- TBR-12, TBR-13
- AS/NZS 3648: 1995
- TR-274, TR-276, TR-283, TR-288

RFCs

- RFC 791 IP
- RFC 792 ICMP
- RFC 826 ARP
- RFC 768 UDP
- RFC 1157 SNMP
- RFC 1213 SNMPMIB-II
- RFC 2495 DS1/E1 interfaces
- RFC 1661 PPP
- RFC 1905 SNMPv2c
- RFC 2233 SNMP Interfaces grp
- RFC 2358 SNMP Ethernet-like interfaces
- RFC 2702 Traffic Engineering over MPLS
- RFC 2705 MGCP



The PurePacketCompact chassis, available in both wall mount and rack mount, is comprised of 4 slots (3 CFM/IFAM and 1 HFM). The HFM provides WAN interfaces for T1/E1, DS-3, and 100BaseFx.

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