



Z H O N E

Pseudowire on IMACS

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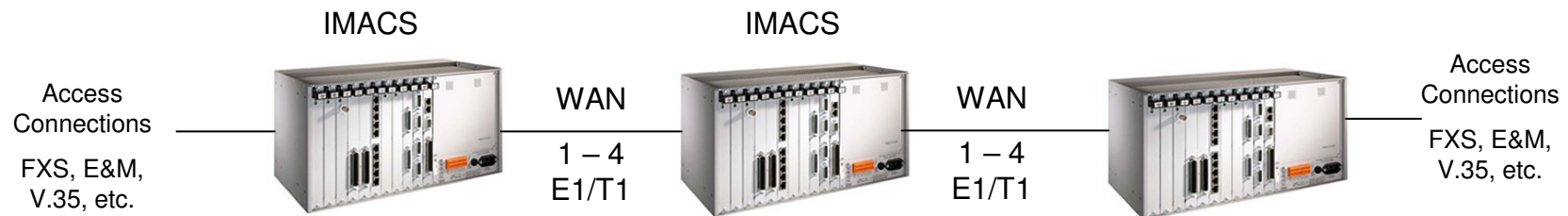
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Existing IMACS WAN Configuration

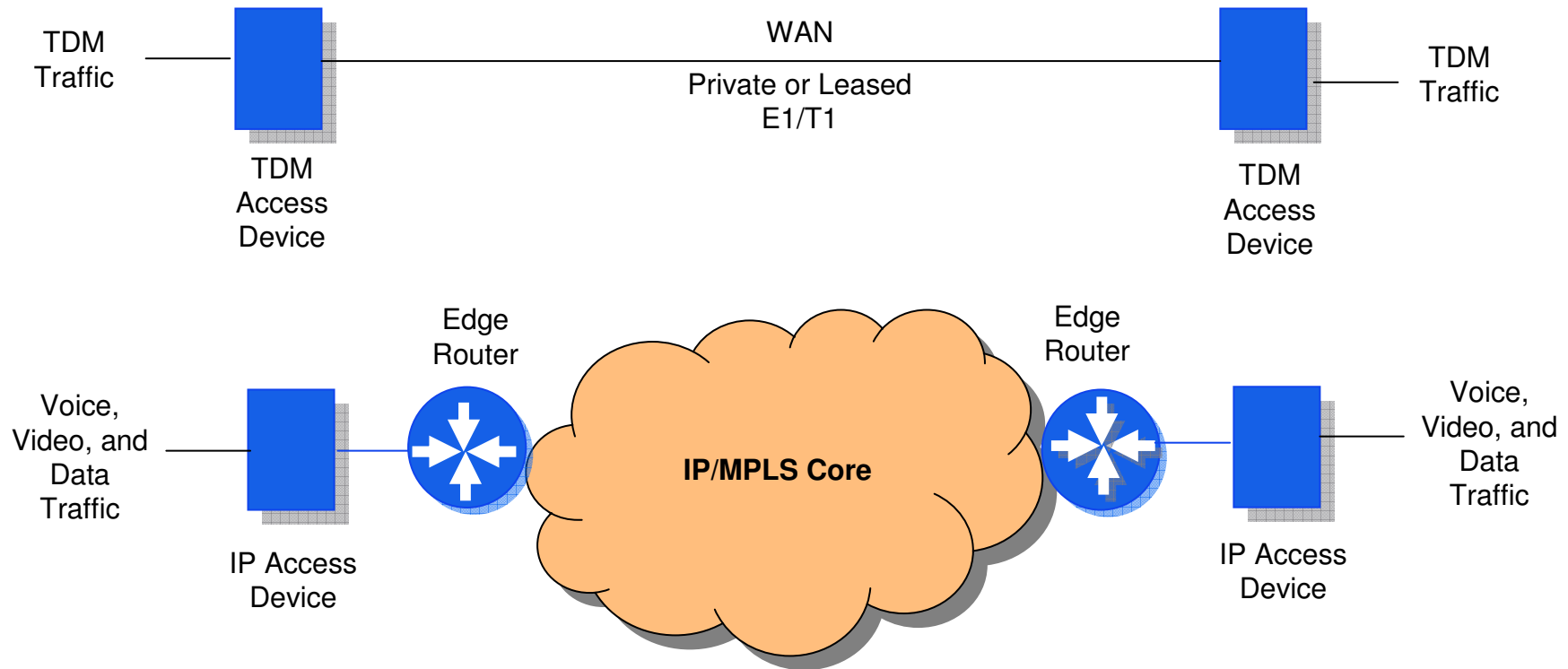


The IMACS system currently supports T1 and E1 WAN connections

- 1 to 8 E1 or T1 facilities per IMACS
- Point-to-Point or Linear Add/Drop configuration
- 1:N WAN hardware protection



Problem - Dual Networks



- Increasingly, data networks are being constructed to carry voice, video and data traffic.
- Network providers must also maintain TDM network (leased lines etc.) to preserve investments in existing TDM legacy equipment.



How can I “Have it All”?

■ Wish list

- Continue to grow IP network
 - ◆ IP infrastructure is becoming more economical
 - ◆ New services and equipment require it
- Continue to maintain embedded TDM infrastructure
 - ◆ Do not want to disrupt existing mission critical systems and applications
 - ◆ TDM equipment is not fully depreciated
 - ◆ Still need legacy interfaces (e.g. analog data, async data, etc.)
- Make it all work as one converged network

■ Required solution

- Upgrade embedded TDM devices so that they can co-exist on the same network as IP traffic.



Pseudowire to the Rescue

- The internet standards bodies have been working on this issue, and they now have a solution that is ready for prime time. That solution is generically called Pseudowire
- Pseudowire basics
 - Sort of like a wire ... but not really.
 - Emulates the essential attributes of a service (typically Layer 2), such as Frame Relay, PPP, T1, Ethernet, ATM, etc. over a packet switched network (MPLS or IP).
 - Standardization within the IETF PWE3 working group.

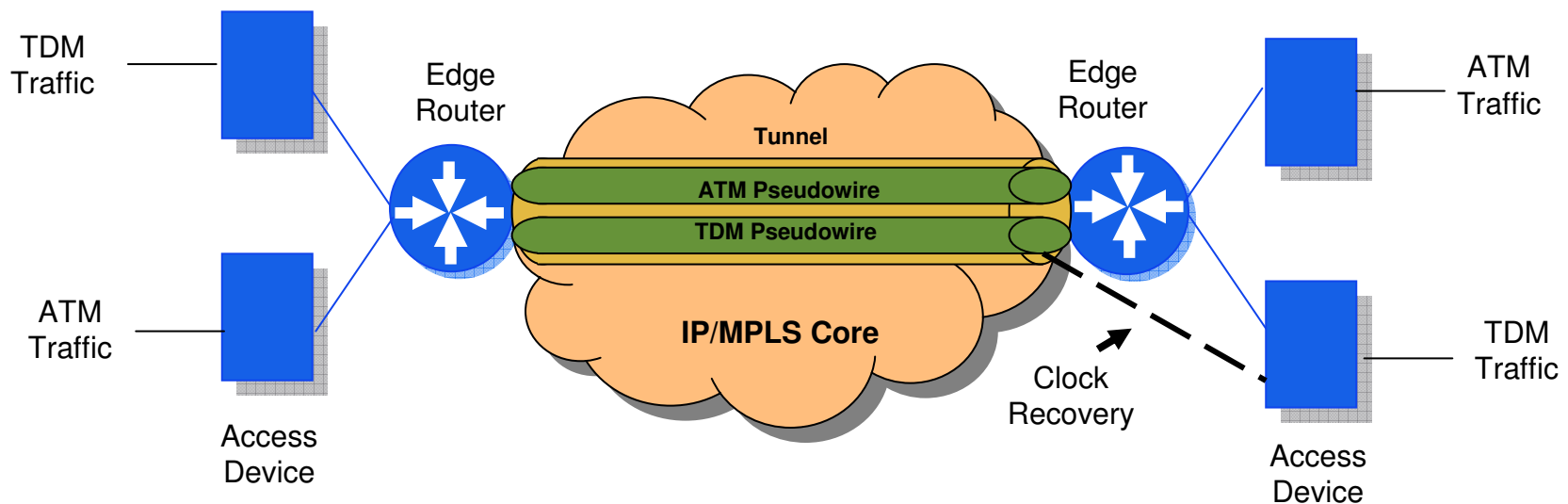
IETF - Internet Engineering Task Force

PWE3 - Pseudowire Emulation Edge-to-Edge



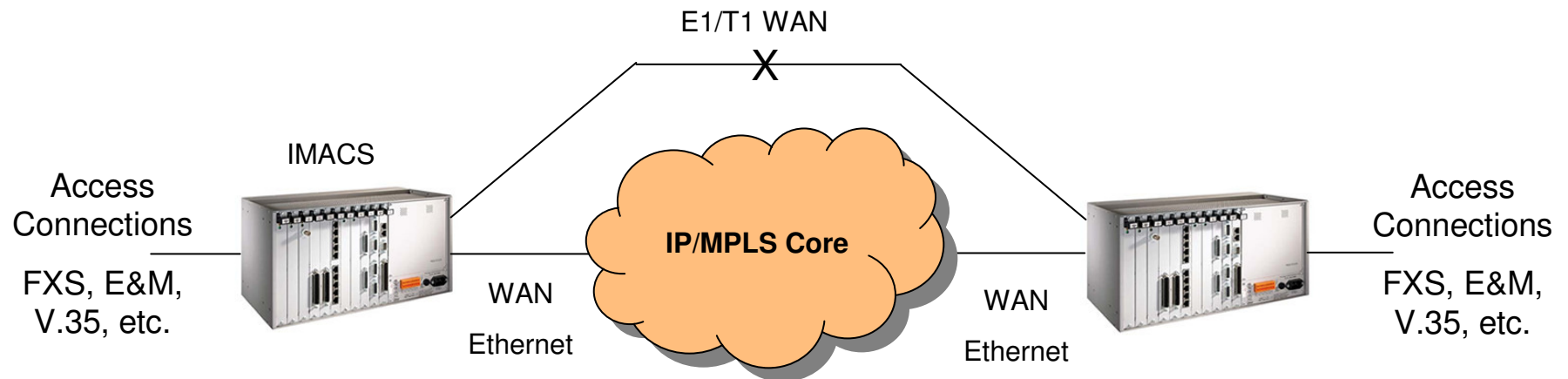
Pseudowire Concept

- Each Pseudowire maintains the original data format and “tunnels” it through the IP/MPSL network
- The services are carried in a manner transparent to the embedded protocols and signaling
- TDM Pseudowire also includes a “clock recovery” mechanism so that the TDM device can still be timed from the network.





IMACS Pseudowire Plan

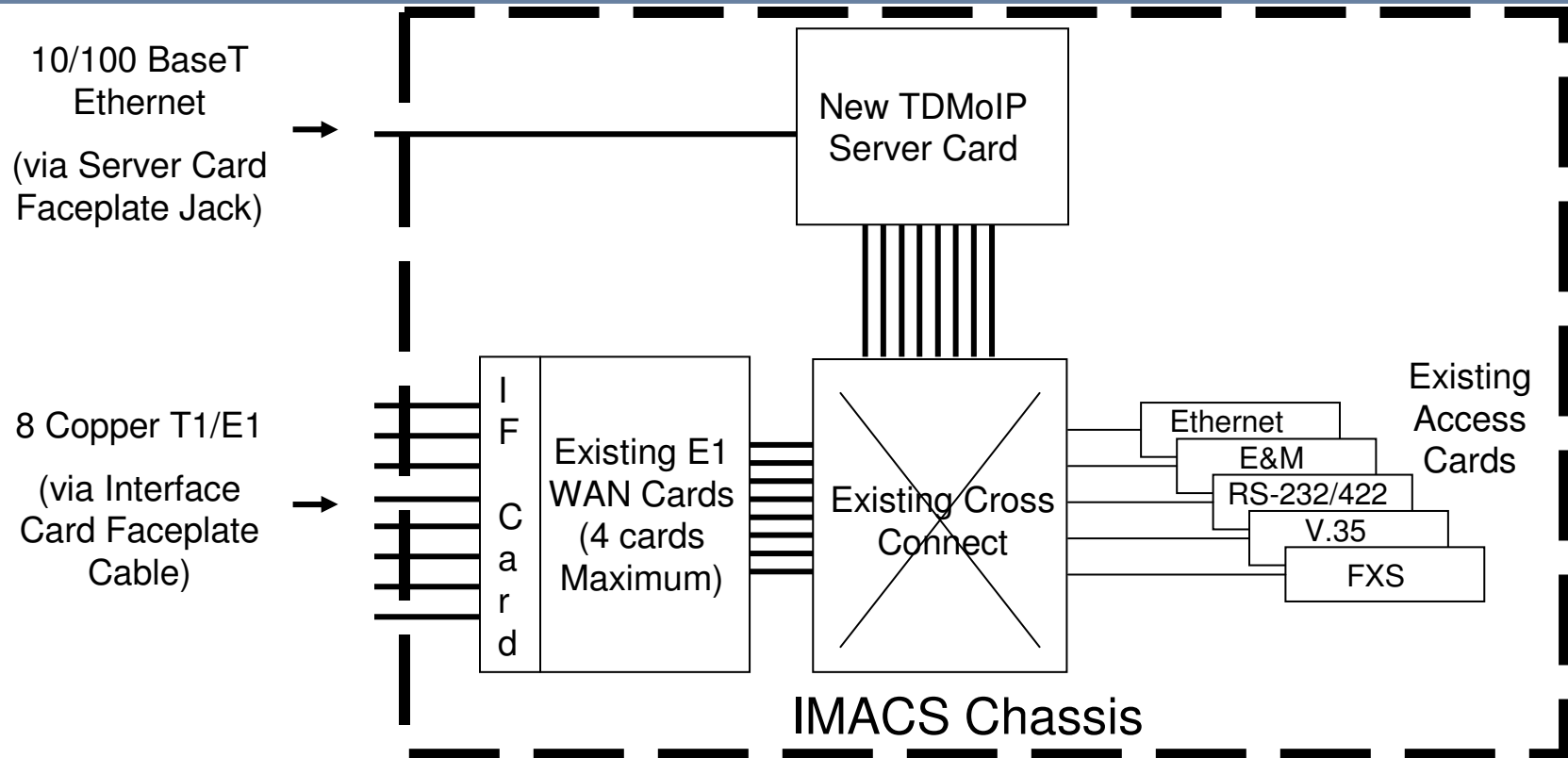


- IMACS systems will offer a TDMoIP (TDM over IP) Pseudowire option to enable a smooth migration of their WAN connections from the TDM to an IP network.
- The upgrade can be installed on any IMACS 600, 800, or 900 chassis and will not require any changes to the user cards or services carried.
- Standard cross connects will allow any user circuit in the system to be connected to either a T1/E1 WAN or an Ethernet WAN
- Migration of services from the TDM network to the IP network can be done one DS0 at a time, and on an “as required” basis. No need for a “flash cut”.
- If all the services are moved to the IP network, the T1/E1 WANs can be retired if desired.



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New TDMoIP Server Card



▪ **The IMACS TDMoIP Pseudowire Upgrade will consist of a new IP WAN Server Card and associated new version of host code. This will enhance the IMACS shelf's possible WAN capabilities as follows:**

- 1 to 8 E1 or T1 facilities per IMACS via today's WAN cards
- 1 IP (Ethernet) WAN Connection via the new server card.
- Any access port can be cross connected to a T1 or IP WAN port



IMACS TDMoIP Server Card Attributes

- Occupies one server slot in an IMACS 600, 800, or 900 shelf
- Four T1 or four E1 connections to the IMACS shelf backplane
- One 10/100 Ethernet IEEE 802.3 Ethernet WAN port
- Supports adaptive clock recovery
 - IMACS can be line timed from the Ethernet pseudowire port.
 - Recovered clock jitter and wander compliant to ITU-T G.823, G.824 synchronization interface
- Compliant with
 - IETF PWE3 Internet drafts for SAToP (RFC 4553) and TDMoIP
 - ITU recommendations Y.1413 and Y.1414 (clause 10), Y.1453, Y.1452
 - Metro Ethernet Forum Technical Specification MEF8



- **Other IETF PWE3 Acronyms;**
 - **TDMoIP** – TDM over IP
 - **SAToP** - Structured Agnostic TDM over Packet
 - **CESoPSN** - Circuit Emulation Service over Packet Switched Networks



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Thank You

