Synchronization Testing – an MEF Perspective

European Advanced Networking Test Center

Jambi I. Ganbar

November 5, 2009

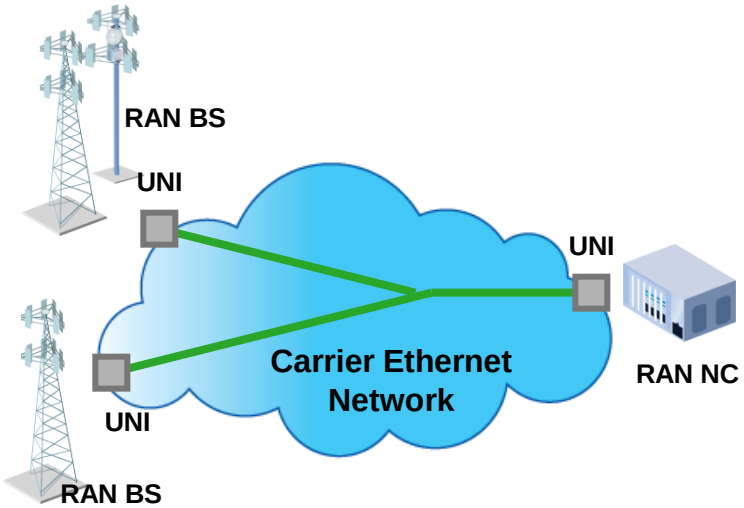
Agenda

- **MEF Plans for Synchronization support in Carrier Ethernet**
- **Synchronization Testing at recent EANTC Interoperability Events**
  - IEEE 1588-2008
  - Synchronous Ethernet

MEF Synchronization Plans

MEF is advocating Ethernet as backhaul

Synchronization – Integral to mobile backhaul

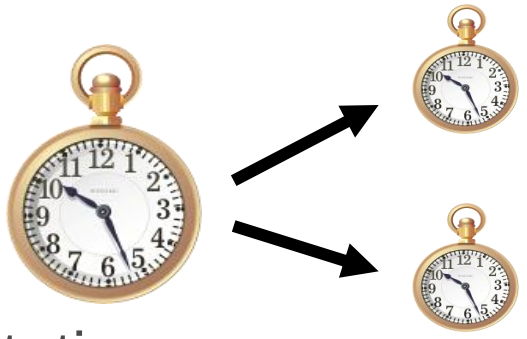


Packet/Frame Synchronization wider in scope (examples):

- Transport applications
- Financial sector

MEF Approach to Synchronization

MEF22 – Mobile Backhaul IA – Current Specification



Packet based

- Synchronization quality requirements reference the ITU G.8261 standard
- Agnostic to specific methods/implementations like adaptive clocking, IEEE1588 etc.
- Eliminates the cost and need for retention of T1/E1 circuit solely for synchronization

- **Other approaches**
  - Common Clock (GPS, legacy E1 clocking) is out of scope
  - Synchronous Ethernet in scope for future phases (phase 2)

Future MEF Synchronization Plans

Mobile Backhaul Implementation Agreement – Phase 2

Phase 2 work started spring 2009

- Planned completion - 2011

- +Synchronous Ethernet
- + specific Phase, Frequency and Time of Day requirements mapped to mobile standards
- Must work equally well across Microwave, Copper, and Fiber

PSN Synchronization Tested at EANTC

"Promote interoperability and deployment of Carrier Ethernet worldwide"

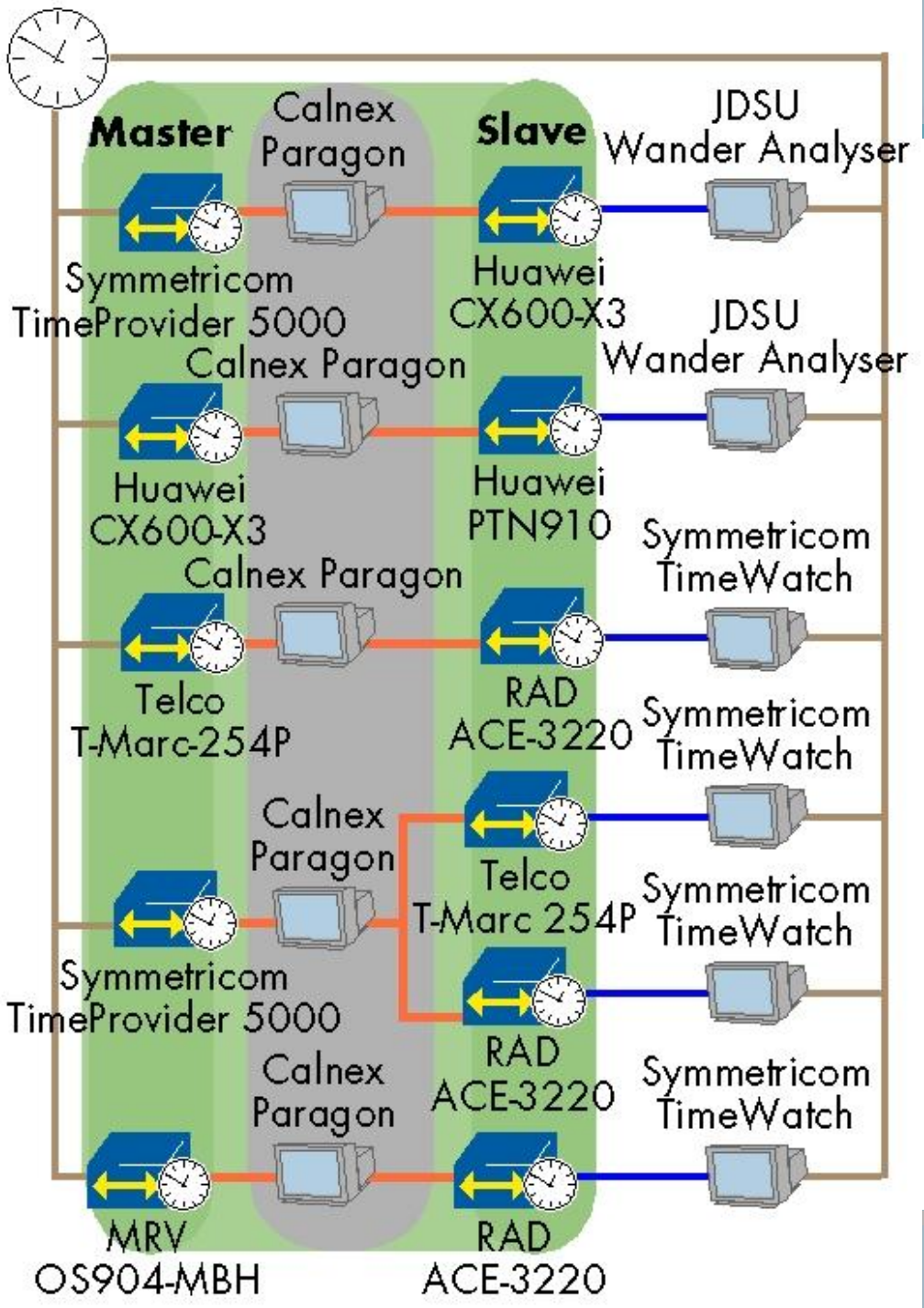
- 1588 Precision Time Protocol version 2 (PTPv2)
- Synchronous Ethernet
  - Ethernet Synchronization Messaging Channel (ESMC)

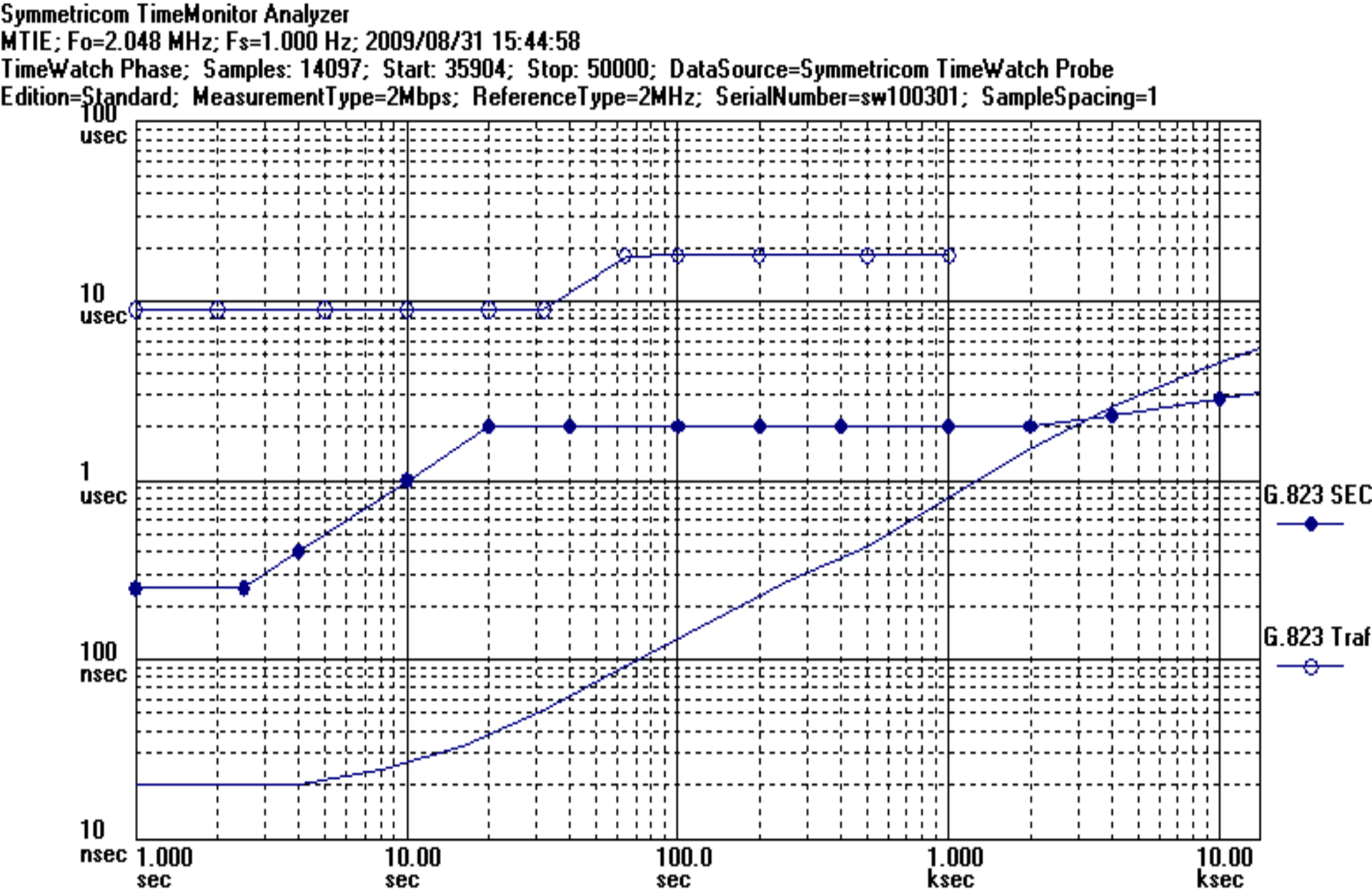
PTPv2 Results

Protocol Interoperability and Clock Quality verification

ITU-T G.8261 Test case 12

- **Impairment profiles from test case**
- **1 hour MTIE measurements, compared ITU-T masks**

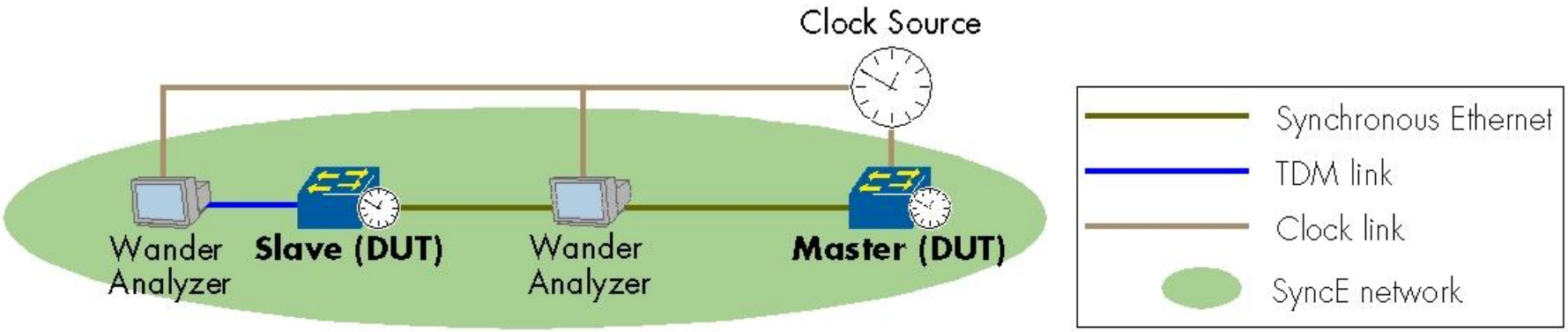




Example PTPv2 Result

Synchronous Ethernet Results

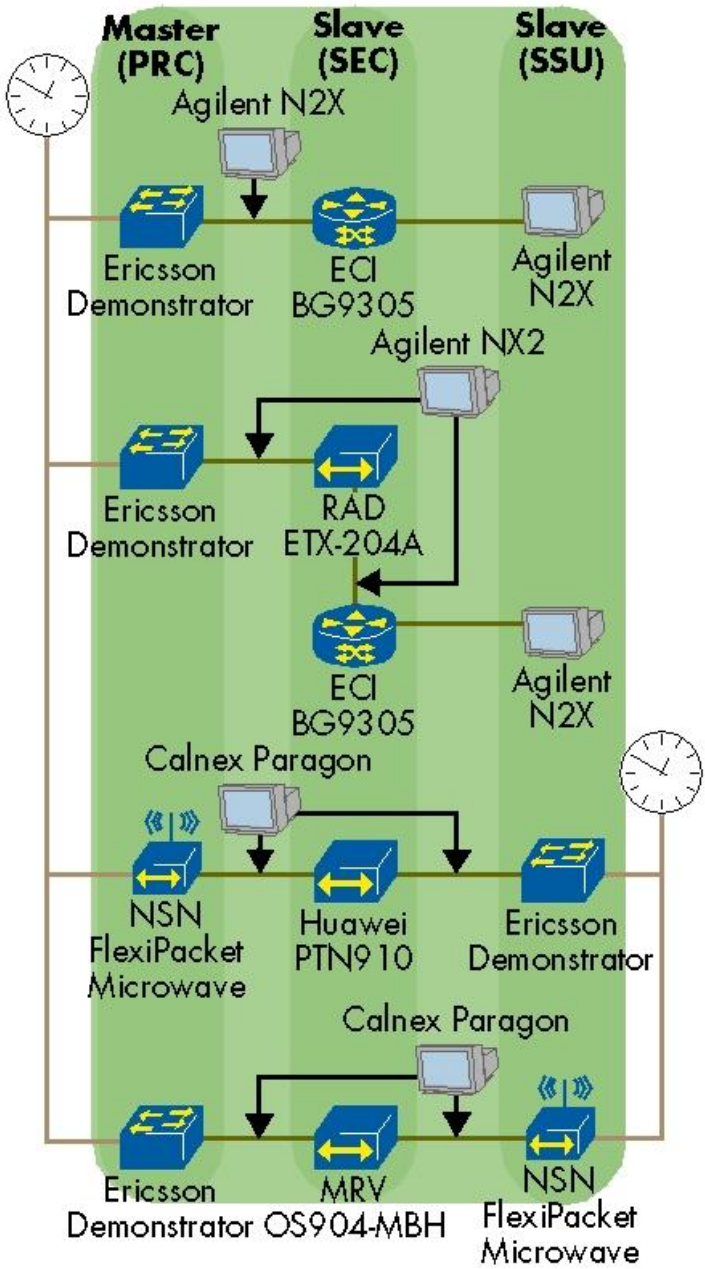
- 21 pairs tested
- Used ITU-T G.813 SEC Option 1 MTIE and TDEV masks
- 10-15 minutes measurements duration



ESMC Results

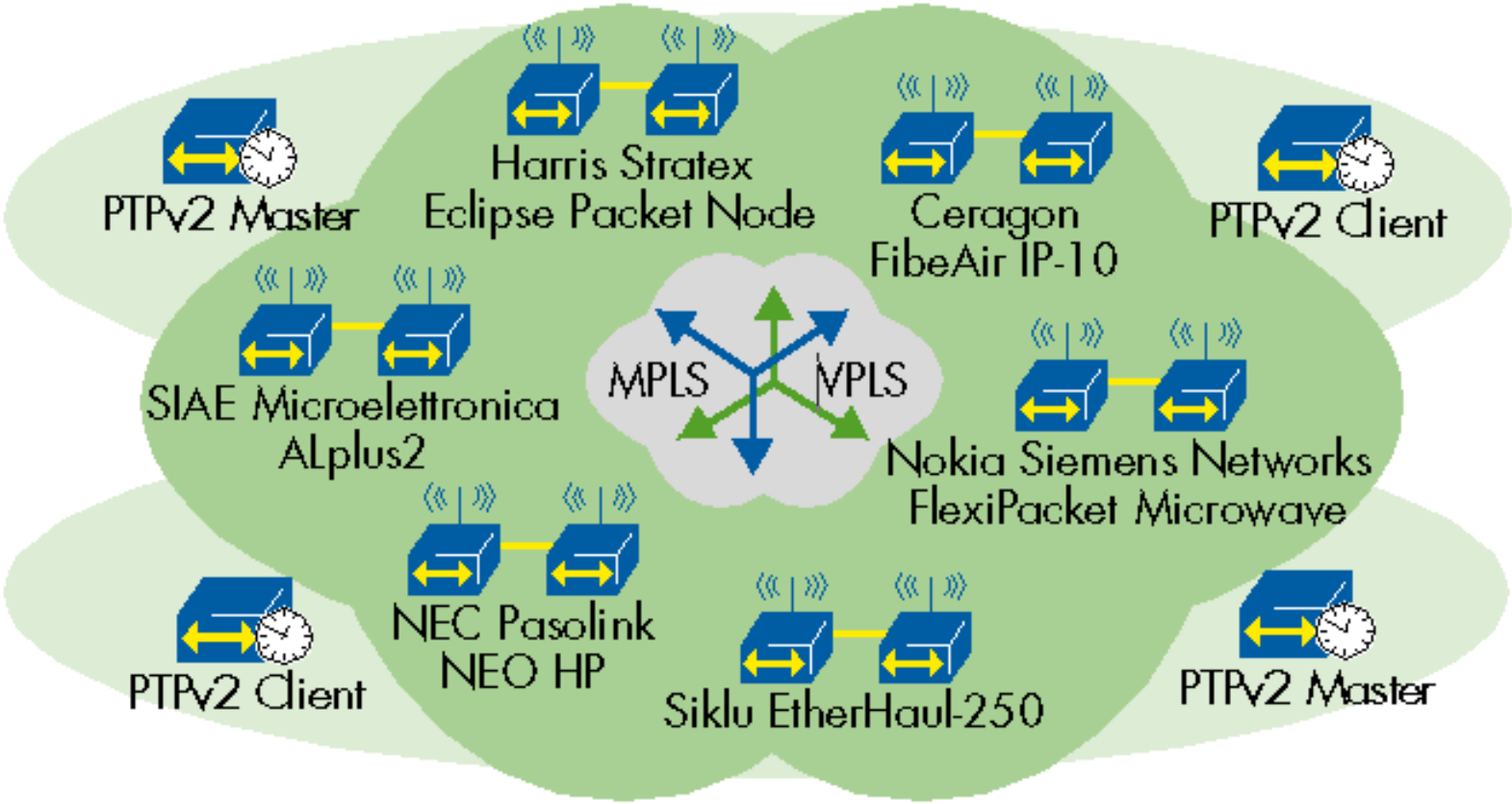
Relevant to carrier deployment tested:

- **Protocol Interoperability**
- **Reaction to Events**
  - New clock selection



PTPv2 over Microwave

Verify Master and Slaves can Synch over Microwave



Summary

- **MEF pushing for Carrier Ethernet for Mobile Backhaul**
- **Increased protocol implementations**
- **Testing PTPv2 is:**
  - Time consuming
  - Impaired networks (even emulated) – a challenge