

ITU-T SG15

Ethernet Frame Size Issue

David W. Martin

July 12, 2004

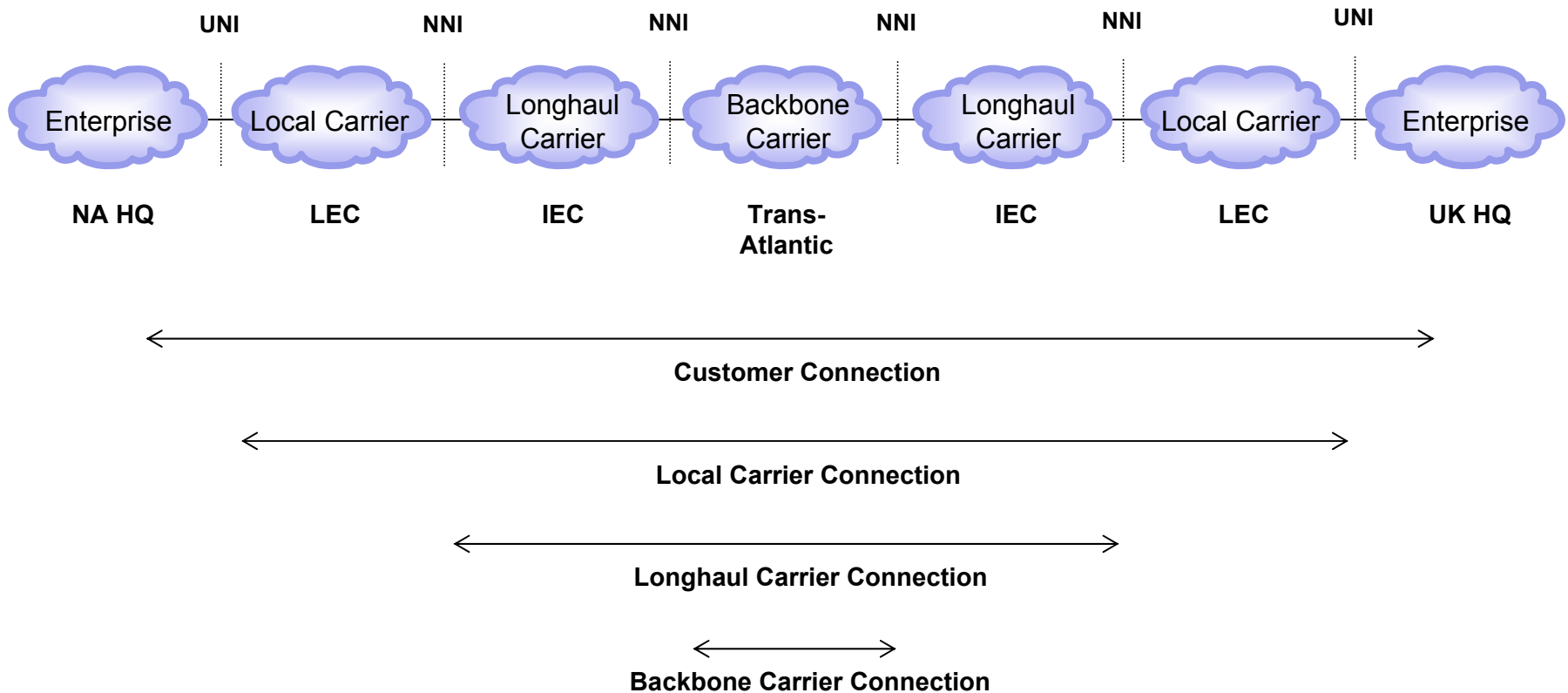
Agenda

- **Recursive Network Scenario**
- **Summary**

Recursive Network Scenario

- Consider the following Connection Oriented offering of an Ethernet service:

All handoffs shown between networks are Ethernet links



Recursive Network Scenario (cont'd)

➤ Some basic assumptions:

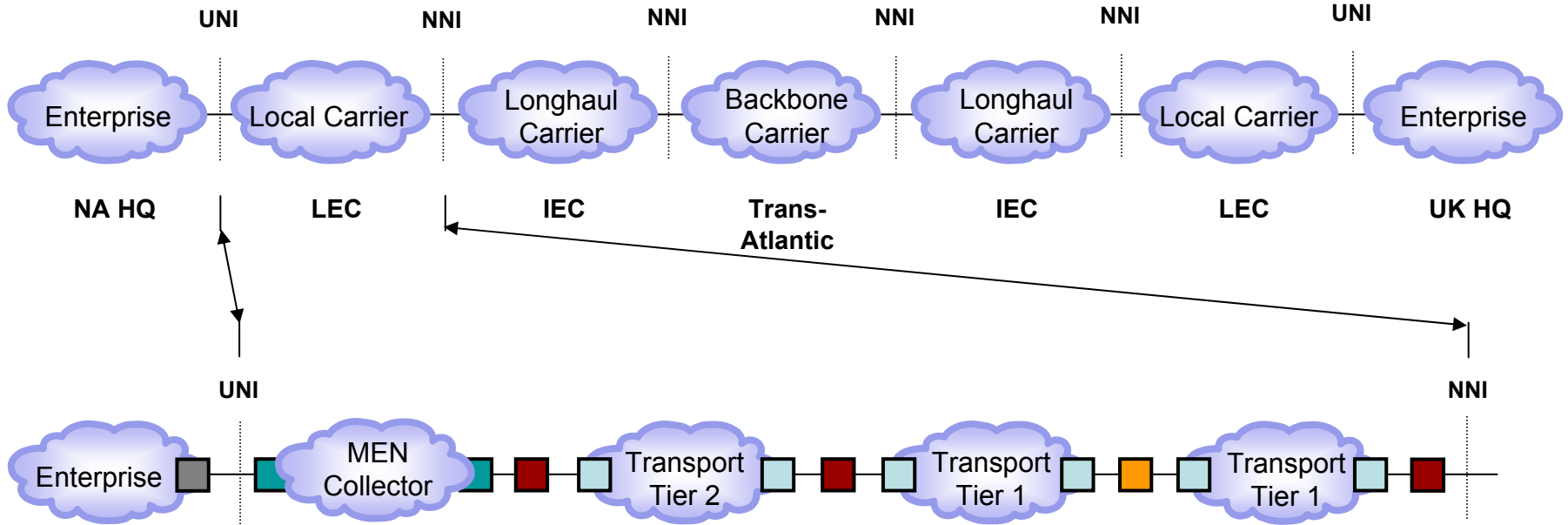
- Use QiQ and PVoMPLS encaps
- A MEN adds a SP Q-Tag on ingress, which remains at the handoff point to the LER
- There is only one level of SP Q-Tag
- An LER adds a CW, PW service tag, MPLS tunnel tag
- There are two levels of LERs within a carrier's network, the 2nd is MPLS tunnel only
- The LSRs within the carrier network swap MPLS tunnel tags
- The NNI handoff between carriers is the PW

➤ The location of maximum recursive overhead is in the “middle” of a carrier's network






➤ Can focus on just the first Local Carrier network

QiQ	P802.1ad Provider Bridges
PVoMPLS	Pseudo Wire over MPLS (i.e., Martini encaps)
MEN	Metropolitan Ethernet Network
SP	Service Provider
LER	Label Edge Router
LSR	Label Switch Router
CW	Control Word

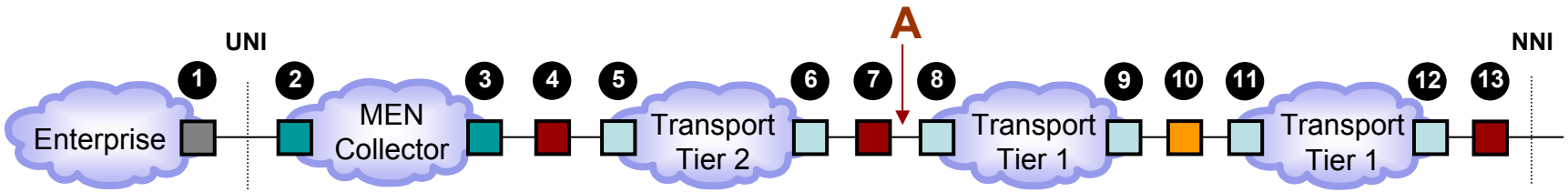
Recursive Network Scenario Expansion



All handoffs shown between platforms are Ethernet links

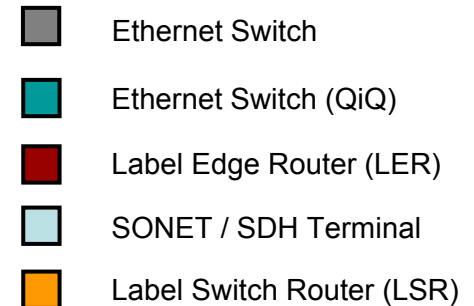
-  Ethernet Switch
-  Ethernet Switch (QiQ)
-  Label Edge Router (LER)
-  SONET / SDH Terminal
-  Label Switch Router (LSR)

Recursive Network Scenario Mappings



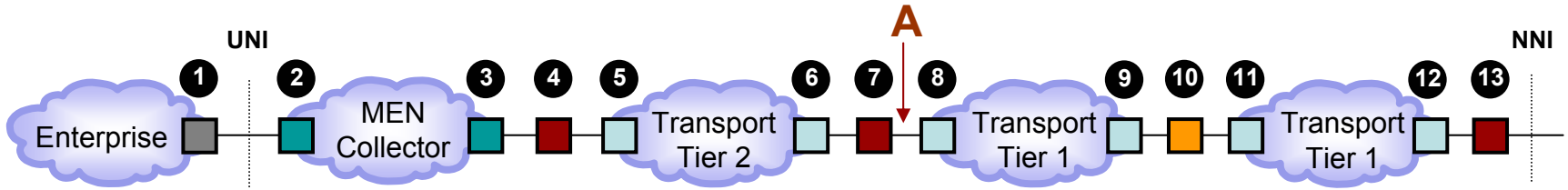
All handoffs shown between platforms are Ethernet links

1. Tagged Ethernet frame plus MAC Security
2. Adds SP Q-Tag and SP FCS (client FCS is retained)
3. Switches only
4. Uses SP Q-Tag to map to a PW. Adds Tier 2 CW, PW service tag, MPLS tunnel tag
5. Maps Ethernet frame to GFP-F
6. Extracts Ethernet frame
7. Adds Tier 1 MPLS tunnel tag
8. Maps Ethernet frame to GFP-F
9. Extracts Ethernet frame
10. Switches only, swaps the MPLS tunnel tag
11. Maps Ethernet frame to GFP-F
12. Extracts Ethernet frame
13. Strips the Tier 2 and Tier 1 MPLS tunnel tags

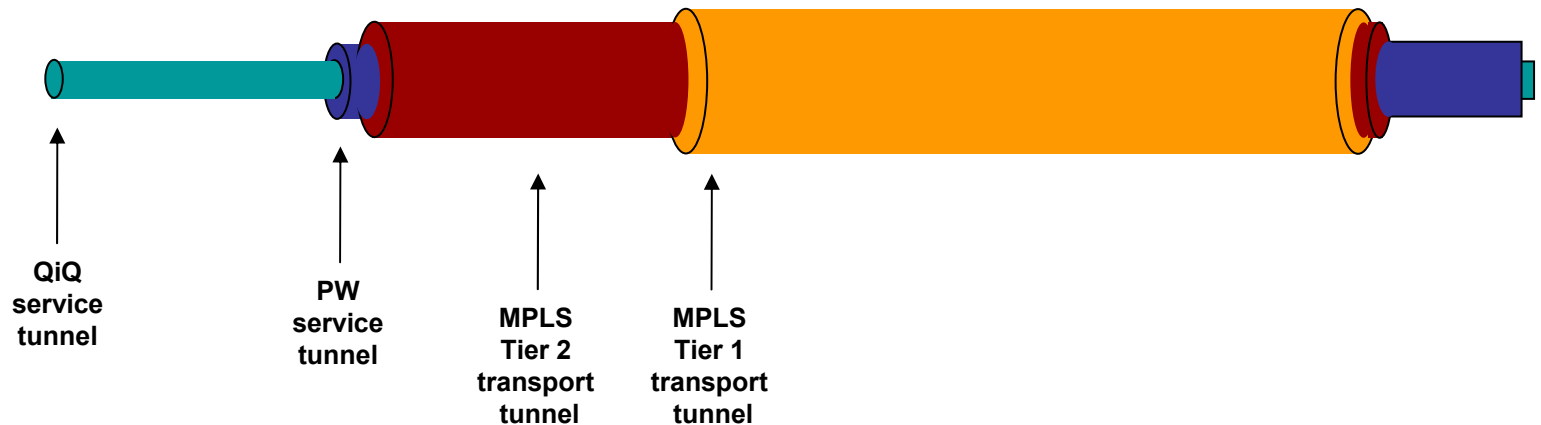







➤ The Tier 1 Transport networks carry the same size Ethernet frame

Recursive Network Scenario Mappings

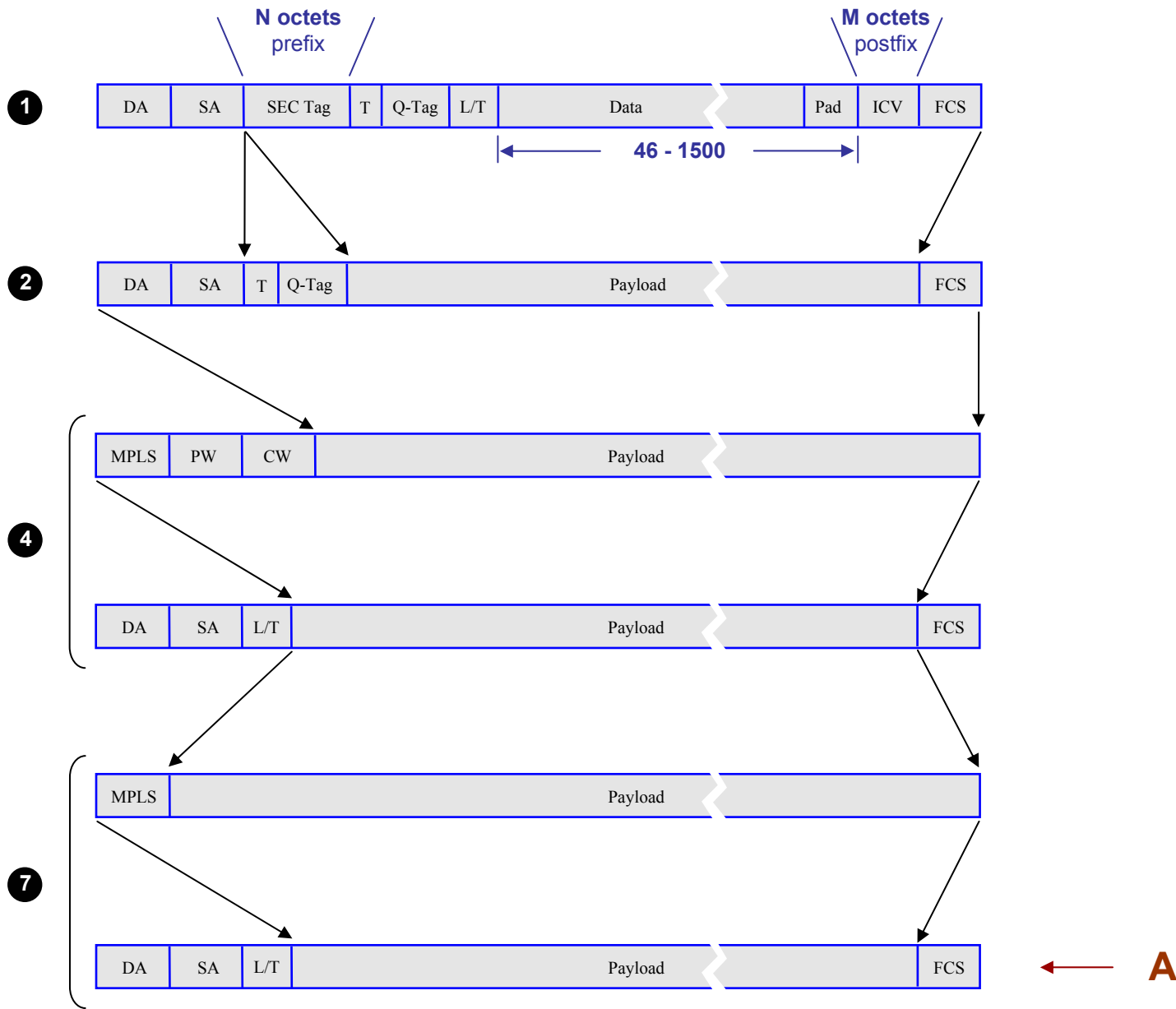


All handoffs shown between platforms are Ethernet links



-  Ethernet Switch
-  Ethernet Switch (QiQ)
-  Label Edge Router (LER)
-  SONET / SDH Terminal
-  Label Switch Router (LSR)

Resultant Frame At Mid-Point "A"



Resultant Frame Size At Mid-Point "A"

Field Sizes

Basic maxFrameSize	1518
Basic DA,SA,LT,FCS	18
CE T and Q-Tag size	4
SP T and Q-Tag size	4
SP FCS size	4
SEC tag size N	16
ICV size M	16
MPLS tunnel tag size	4
Control word size	4
PW service tag size	4

Resultant Ethernet Frame Size At "A" With QiQ and PVoMPLS Encaps

Frame size at 1	1554
Frame size at 2	1562
Frame size at 4	1592
Frame size at 7 ("A")	1596

Summary

- **This example used:**
 - **QiQ and PWoMPLS encaps**
 - **only one level of SP Q-Tag stacking**
 - **32 bytes for P802.1AE MAC Security overhead, and only one level**
 - **two levels of MPLS tunnel hierarchy**
- **Not a corner case, more frame size inflation is likely**
- **P802.3ar must consider this issue**