

# **MBH IA Phase 3 – Joint Call with 3GPP**

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# Outline

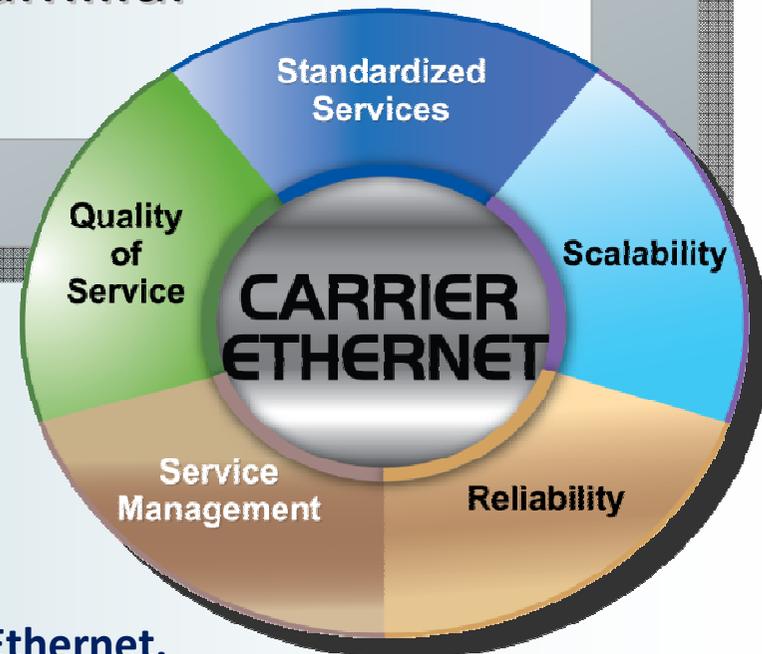
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- **Introduction to MEF**
- **Mobile CoS Phase 2 and Backhaul Phase 2**
- **Introduction to Mobile Backhaul Phase 3 Project**
  - MBH Phase 3 Small Cell discussion examples

# Carrier Ethernet Defined

The MEF has defined Carrier Ethernet as

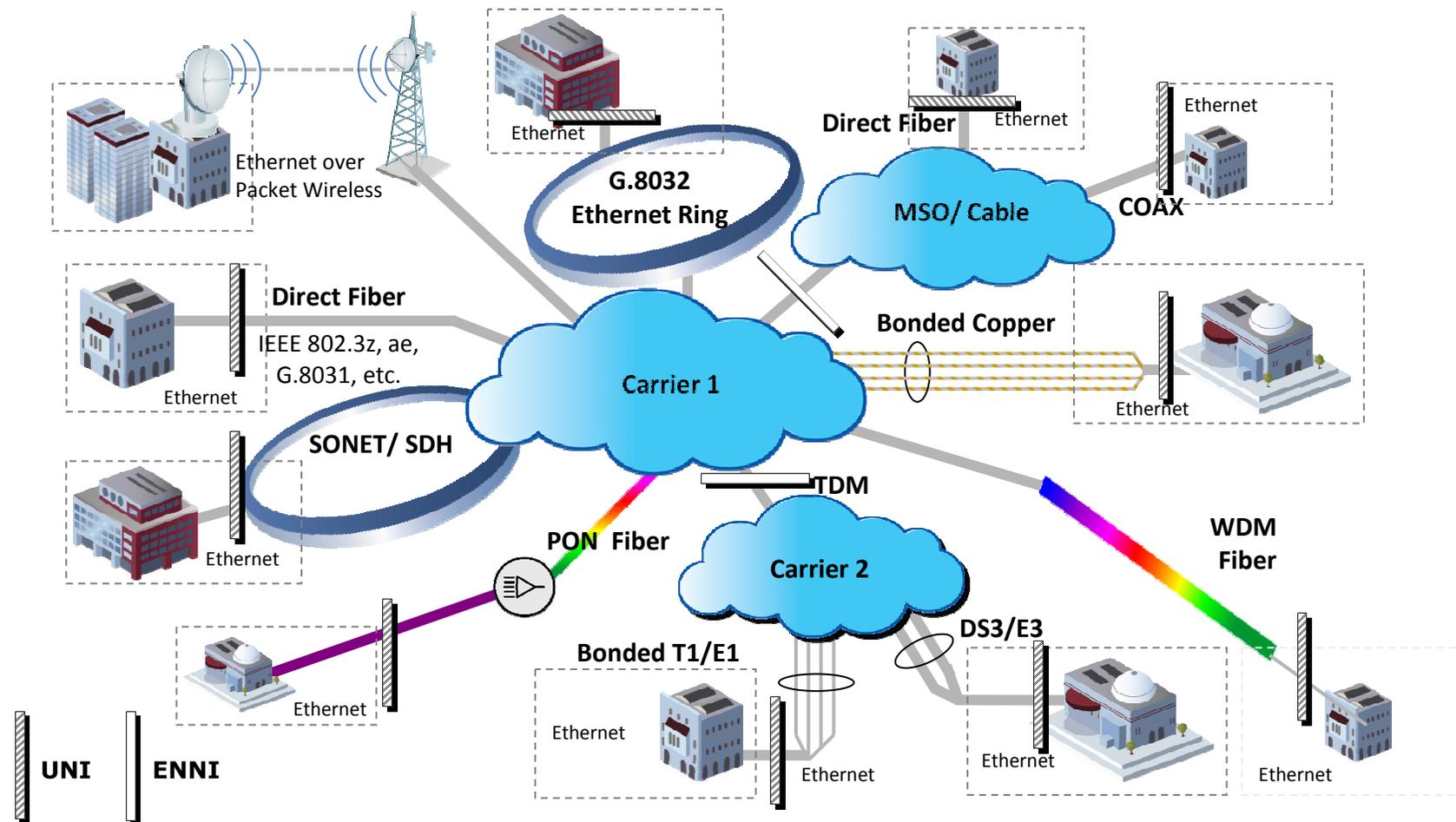
A ubiquitous, standardized,  
carrier-class Service and Network  
defined by five attributes  
that distinguish it from familiar  
LAN based Ethernet



**Carrier Ethernet** is often referred to in Enterprise circles as **Ethernet Business Services**.  
The MEF is the industry's defining body for **Carrier Ethernet**.

# Carrier Ethernet Over Variety of Access Media

Carrier Ethernet provides consistent services delivered to users connected over the widest variety of access networks



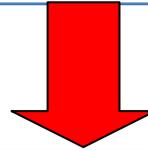
# CoS Phase 2: Performance Objectives by CoS Label

Example of Frame Delay (FD) oriented SLS, with FDR

Performance Metric	Parameters	Class of Service		
		H	M	L
Frame Delay (FD)	Objective (ms)	≤10	≤ 20	≤ 37
	Time Period (T)	1 month	1 month	1 month
	Percentile	99.9	99	95
Frame Delay Range (FDR)	Objective (ms)	≤ 5	≤ 10	N/S
	Time Period (T)	1 month	1 month	-
	Percentile	99.9	99	-
Frame Loss Ratio	Objective (%)	≤ .01	≤ .01	≤ .1
	Time Period (T)	1 month	1 month	1 month

*Performance Tier 1 (PT1 - Metro)*

# MBH Phase 2: Class of Service Mapping



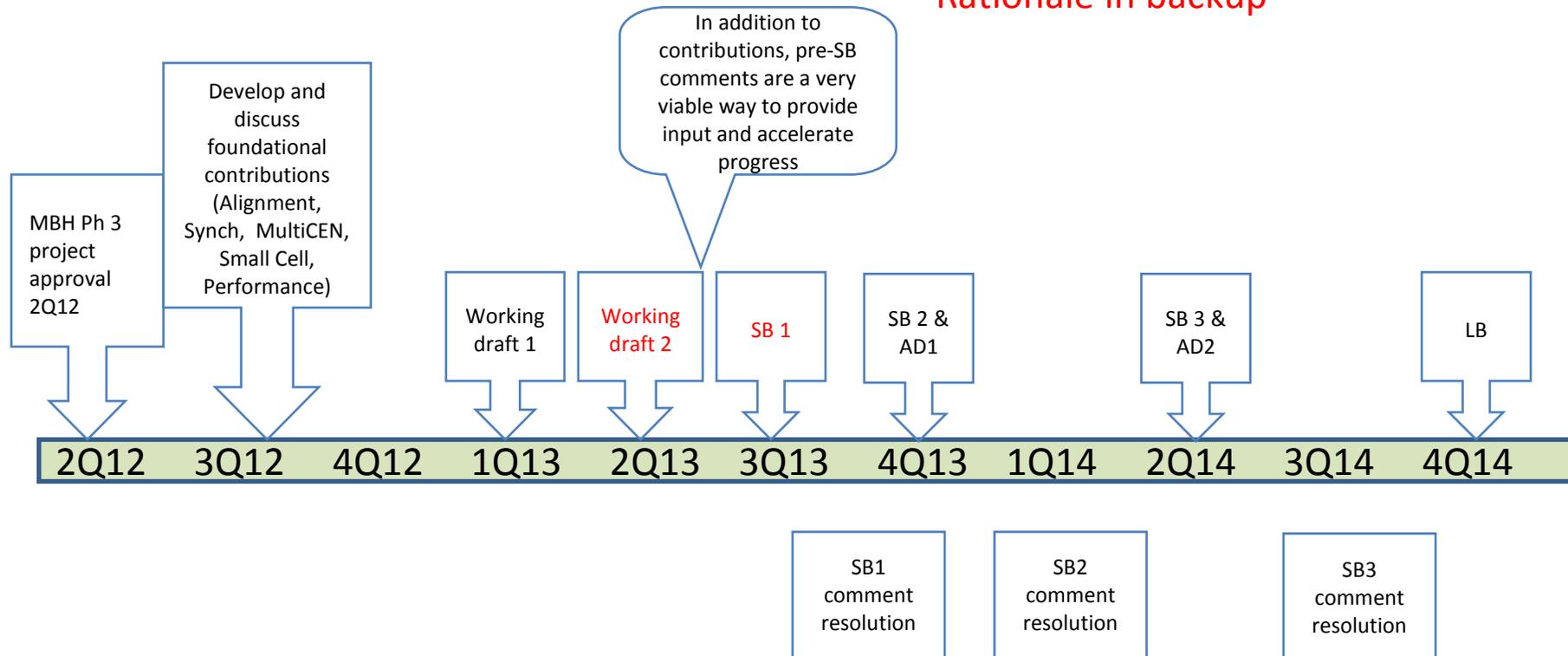
CoS Name	Example of Generic Traffic Classes mapping into CoS		
	4 CoS Model	3 CoS Model	2 CoS Model
Very High (H <sup>+</sup> )	Synchronization	-	-
High (H)	Conversational, Signaling and Control	Conversational and Synchronization, Signaling and Control	Conversational and Synchronization, Signaling and Control, Streaming
Medium (M)	Streaming	Streaming	-
Low (L)	Interactive and Background	Interactive and Background	Interactive and Background

Value to Mobile Operator: Know what performance each 3GPP traffic class will get

Value to MEN Operator: Standard CoS offering with default performance objectives

# MBH IA Phase 3 Timeline

SB1 slipped, LB goal remains 4Q14  
Rationale in backup



# Review of Primary Scope Work Areas

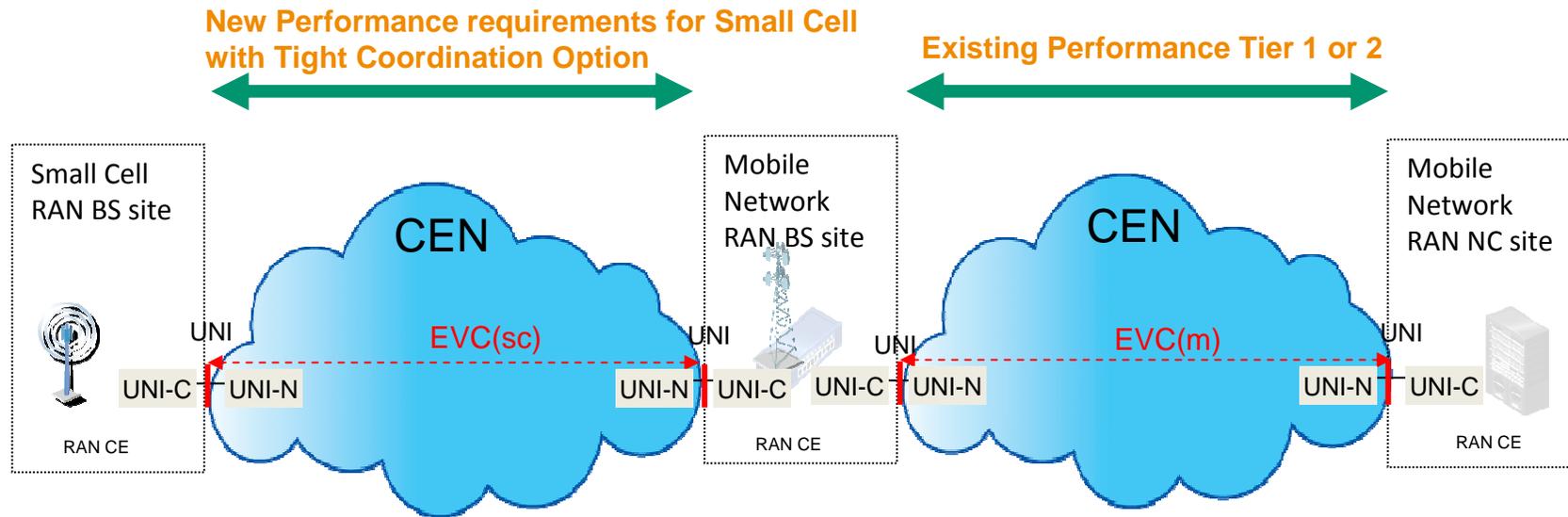
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- **Alignment**
  - MEF 6.x 10.3, 26.x, 33, etc as well as BBF, NGMN, etc
- **New Work Areas**
  - Areas are not independent. For example we are proceeding with Performance even though Synch contributions will likely impact. Note: no synch contributions so far.
  - **CoS/BWP (Performance)**
    - Addition of Availability, HLI, CHLI, FDR for H+
    - BWP constraints and use cases
    - Multi-MEN and MEF 23.2 dependency
  - **Multi-MEN**
    - EI and Service Attributes
    - SOAM PM and FM
    - CoS/BWP impacts including concatenation (see CoS/BWP)
    - Synch impacts (see Synch)
  - **Small Cell /Het Net**
    - Develop and prioritize Use Cases
    - EI and Service Attributes
    - Inter-cell coordination
    - Synch impacts including indoor/no GPS, tight coordination use cases (see Synch)
    - CPO changes proposed for small cells, coordination impact
  - **Synch**
    - Synch across Multi-MEN (work frequency first, await ITU on Time/Phase)
    - Frequency with packet method (await ITU response to New Metric liaison)
    - Time and Phase with packet method for TDD LTE and some parts of LTE-A (also await ITU progress)

# Phase/time synchronization requirements by feature and service

Features		Time/Phase
WCDMA-TDD/LTE-TDD		+/-1.5 us
LTE eMBMS (LTE or LTE -A)	FDD and TDD	TBD
LTE-A eICIC	Inter-cell interference cancellation	TBD
LTE-A CoMP (Coordinated Multi-Point Transmission and Reception)	UL coordinated scheduling	TBD
	DL coordinated scheduling	TBD
	DL coordinated beamforming	TBD
	DL non-coherent joint transmission	TBD
	UL joint processing	TBD
	UL selection combining	TBD
LTE-A cell cluster cooperation	ICIC and CoMP Joint Processing	TBD
Location Based Services (LBS)	OTDOA	TBD

# Small Cell BH Tight Coord Use Case



Performance Attributes	CoS Label H	CoS Label M	CoS Label L	Applicability
FD (ms)	<del>≤10</del> ≤1	<del>≤20</del> ≤5	<del>≤37</del> ≤10	At least one of either FD or MFD required
MFD (ms)	<del>≤7</del> ≤0.7	<del>≤13</del> ≤3	<del>≤28</del> ≤8	
IFDV (ms)	<del>≤3</del> ≤0.3	<del>≤8</del> ≤1 or N/S	N/S	At least one of either FDR or IFDV required
FDR (ms)	<del>≤5</del> ≤0.5	<del>≤10</del> ≤1 or N/S	N/S	
FLR (ratio)	≤.01% i.e. 10 <sup>-4</sup>	≤.01% i.e. 10 <sup>-4</sup>	≤.1% i.e. 10 <sup>-3</sup>	

# DRAFT - Backhaul requirement for loose & tight radio coordination

LTE / LTE-A feature	Time synch <i>common reference accuracy</i>	Latency RTT	Bandwidth
Range expansion	None	None	Low
Adaptive resource partitioning	None	None	Low
Inter-Cell Interference Coordination (ICIC)	None	None	Low
eICIC <i>(aka: ABS or Time Domain Partitioning)</i>	+/- 5 us	None	Low
UL Coordinated Scheduling	+/- 5 us	1-10 ms <sup>1</sup>	Low
UL Coordinated link adaptation	None	5-10 ms <sup>1</sup>	Low
DL Coordinated Scheduling	+/- 5 us	1-10 ms <sup>1</sup>	Low
DL Coordinated link adaptation	None	5-10 ms <sup>1</sup>	Low
DL Coordinated beamforming	+/- 1.5 us	< 1 ms	2.5-10 Gbps
DL non-coherent joint transmission	+/- 5 us	< 1 ms	< 150 Mbps
UL Joint processing	+/- 1.5 us	< 1 ms	2.5-10 Gbps
UL Selection combining <i>(aka: UL CoMP)</i>	+/- 5 us	< 1 ms	< 150 Mbps

LOOSE

tight

Very  
tight  
Out of  
scope

None: Meaning no other requirements than the FDD or TDD system as such requires  
<sup>1</sup>No strict requirement, performance benefit reduces with higher latency