



# What is Driving the Growth of Carrier Ethernet?

## Business Drivers

(Including Case Studies & Videos from Leading Market Sectors)

## Mobile Backhaul

**Mike Tighe**

MEF Chairman

Executive Director Product Strategy, Verizon Communications



# 2008 Enterprise CIO Priorities

## CIO Business Priorities

- **Improve business processes**
- **Attract/retain new customers**
- **Create new products/services (innovation)**
- **Expand new markets/geographies**
- **Reduce enterprise costs**

## Network and IT Priorities

### Network Priorities:

- **Network security**
- **Application performance**
- **Bandwidth upgrades to support apps**
- **Convergence: Migration to VoIP**
- **Convergence: FMC platforms**

### Telecom Technology Priorities:

- **Mobile/wireless strategy**
- **VoIP migration**
- **Centralized mobile device/service management**
- **Adopt more Ethernet**
- **Migrate FR/ATM to IP**
- **Implement/upgrade video conferencing**

**Customer priorities are driving industry change and new services**

# Carrier Ethernet for Business

## Drivers behind the growth of Carrier Ethernet for Enterprises and business users

- **Top Market Sectors**

- Healthcare, finance, education , media, government

- **Benefits**

- Scalability, ubiquity, unprecedented reach, control, reliability, performance, data center & server consolidation, bandwidth on demand, expedites and enables new applications, predictability and risk reduction

- **Cost reduction, revenue acceleration**

- **Application drivers (covered later)**

# Healthcare

- **Application Profile**

- Regulatory issues, privacy, digital imaging driving storage and growth, high bandwidth, performance, scalability mostly over limited geography, TCO/ROI critical

- **Impact**

- New MRI technology generates 1-2 orders of magnitude more data



- MRI/CT systems from 16X to 64X for better diagnostic quality
- File size grows from 64MBytes to 5 GBytes
- Massive impact on network bandwidth & performance with 1Gbps required now
- Plus new HIPAA requirements dictate offsite back-up storage
- 10Gbps networks (later) will be seamless



# Healthcare: Virginia Mason Medical Center

- **Carrier Ethernet for VMMC**
  - **Better for the patients, doctors and the medical center**



- **Enabled local access to medical images**
- **Creates dramatic impact for patients on time, travel**
- **Speed of diagnosis**
- **Ease of deployment, cost savings, newly enabled applications**

## **Steve Tsukuno, IT Director, VMMC**

- *“Finally we had a cost metric that made sense for both the Enterprise and patients.”*

# Finance

- **Chicago Mercantile Exchange**

- **World's largest and most diverse exchange**
- **12 x (NYSE+NASDAQ)**
- **\$2-3 trillion trades per day**



- **Carrier Ethernet decision to switch from FR & ATM based on**
  - **Scalability, reliability, simplicity, increased, low latency (3msec) bandwidth demand (20Mbps to 100Mbps then 1Gbps)**



- **Solution**

- **EVPL**

- **Effect**

- **Increased business**
- **Increased customer satisfaction**
- **Reversed trend that high bandwidth triggered price increases and customer resistance**
- **Rapid conversion of >1200 customers**



# Education

- **New York Law School**
  - **“Impossible” installation timeframe met**
  - **Seamless virtual LAN**
  - **Higher bandwidth**
  - **Much reduced costs**
  - **New applications**



# Education

- **Bergen County School**
  - **2,000 full time students**
  - **20,000 adult students**
  - **Collaboration**
  - **Higher bandwidth**
  - **Lower costs**





# Media



- **Application Profile**

- Scalability, reach, convergence demands low latency, low frame loss, minimum frame delay variation, high performance networks
- Video, streaming media, massive increase in Ethernet co-located services

# Carrier Ethernet Application Drivers

## Principal Applications

- Server consolidation
- **Business continuity / disaster recovery**
- Content distribution
- Converged networking



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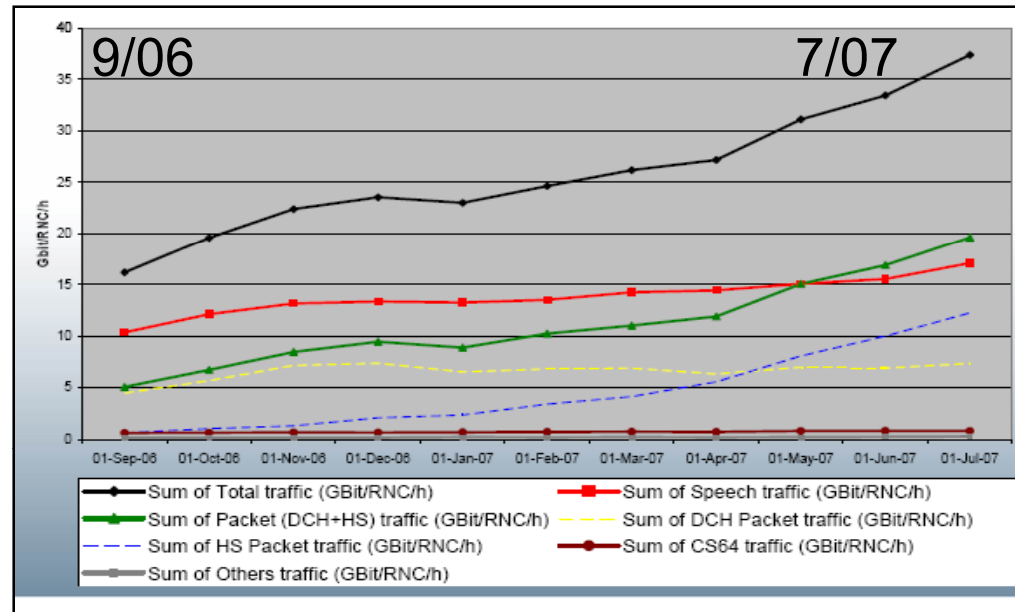
# Carrier Ethernet for Mobile Backhaul

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**A new MEF initiative that merges  
mobile backhaul and wire-line  
infrastructure into a single network**

# Mobile Backhaul Has Dynamic Growth ...

- **New mobile applications and bandwidth growth** (>100% in 2008 with much more to come)



Legacy TDM

Movies, music, news, more music, text, web, more content ..



# But Big Issues ...

## Mobile applications and bandwidth growth is great, but ...

- Fierce competition = squeeze on margins
- Exploding bandwidth requirements currently constrained by prohibitive costs of legacy networks
- Current TDM services can't scale to handle growth.
- Time/urgency
  - Cost effective development of Mobile Backhaul is stalled.
  - Services providers have report no clear path forward



## Carrier Ethernet removes these barrier to progress

# Compelling Reasons for Carrier Ethernet

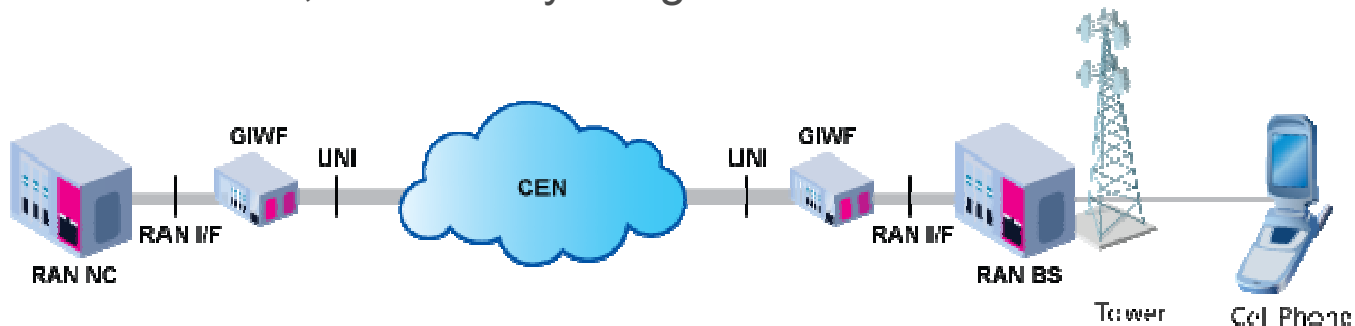
## for Mobile Backhaul

- **Carrier Ethernet**

- Economically meets exploding bandwidth requirements
- Easier for service providers to manage and maintain
- Carrier Ethernet is optimized for packet data traffic
- Overcomes TDM (T1/E1) services scalability

- **Smooth transition from legacy networks**

- Protects investment, seamlessly bridges from TDM to Ethernet



- **Supported by new MEF 18 Certification Program**

- Announced 2/08 first certification 6/08

# MEF Mobile Backhaul Implementation Agreement

Targeted to complete by 2008 Q3

The structure of the IA provides generic guidelines for several mobile technologies – specific guidelines for a given mobile technology may also be specified

- **UNI Requirements**

- Ethernet OAM (Link OAM and Service OAM)
- Protection and Fault Recovery Requirements

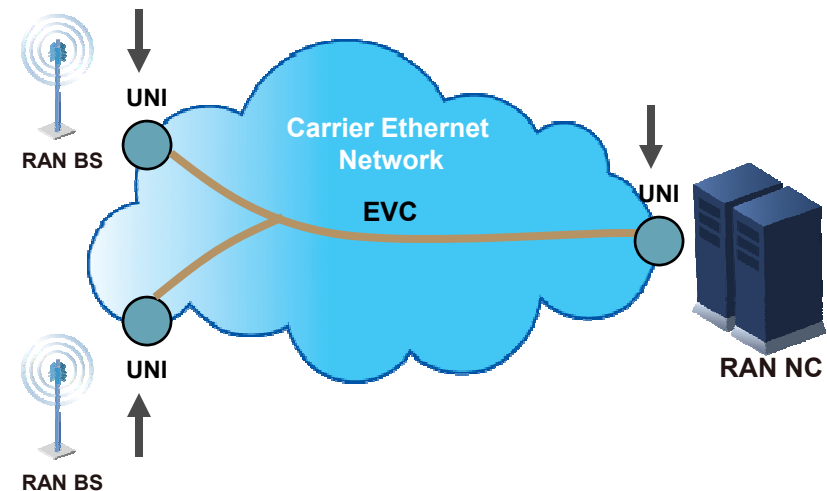
- **Service Requirements**

- CoS Requirements
- Service Definitions
- Synchronization

| Approved MEF Specifications |  |
|-----------------------------|--|
| • MEF 2                     | Requirements and Framework for Ethernet Service Protection                                   |
| • MEF 3                     | Circuit Emulation Service Definitions, Framework and Requirements in Metro Ethernet Networks |
| • MEF 4                     | Metro Ethernet Network Architecture Framework Part 1: Generic Framework                      |
| • MEF 6                     | Metro Ethernet Services Definitions Phase 1  |
| • MEF 7                     | RMS-AMS Information Model  |
| • MEF 8                     | Implementation Agreement for the Emulation of PDN Circuits over Metro Ethernet Networks      |
| • MEF 9                     | Abstract Test Suite for Ethernet Services at the UNI   |
| • MEF 10.1                  | Ethernet Services Attributes Phase 2*  |
| • MEF 11                    | User Network Interface (UNI) Requirements and Framework                                      |
| • MEF 12                    | Metro Ethernet Network Architecture Framework Part 2: Ethernet Services Layer                |
| • MEF 13                    | User Network Interface (UNI) Type 1 Implementation Agreement                                 |
| • MEF 14                    | Abstract Test Suite for Traffic Management Phase 1   |
| • MEF 15                    | Requirements for Management of Metro Ethernet Phase 1 Network Elements                       |
| • MEF 16                    | Ethernet Local Management Interface  |
| • MEF 17                    | Service OAM Framework and Requirements   |
| • MEF 18                    | Abstract Test Suite for Circuit Emulation Services   |
| • MEF 19                    | Abstract Test Suite for UNI Type 1   |

\* MEF 10.1 replaces and enhances MEF 10 Ethernet Services Definition Phase 1 and rebranded MEF 1 and MEF 6

MEF 15



# Questions?

For further information on the MEF Backhaul initiative, circuit emulation services over Ethernet, white papers and full presentation visit [www.metroethernetforum.org](http://www.metroethernetforum.org)

**MEF** ETHERNET MOBILE BACKHAUL FOR WIRELESS CARRIERS  
ENABLING THE NEXT GENERATION OF WIRELESS NETWORKS

**Carrier Ethernet Defined**  
The 3 Attributes of Carrier Ethernet

- Full carrier grade service
- Multi-domain mobile backhaul reference model
- QoS Requirements
- Ethernet Core
- Provisional and real-time resources
- Channel Service Requirements
- Service Interfaces
- LSP/Processing Requirements
- Administration

**Mobile Backhaul Implementation Agreement - Phase 1**  
Scope and Definitions

- Reference Models
- Single domain mobile backhaul reference model
- Multi-domain mobile backhaul reference model
- QoS Requirements
- Ethernet Core
- Provisional and real-time resources
- Channel Service Requirements
- Service Interfaces
- LSP/Processing Requirements
- Administration

**MEF Technical Committee Work Dashboard**

**Single Domain Reference Model**

**Multi-Domain Reference Model**

**Legacy Split Access**

**Legacy Backhaul**

**Split Access**

**Full Ethernet**

**Why Carrier Ethernet**

**Significant Cost Savings**

- 10x lower cost per bit
- Leverages IP/Ethernet for wireless backhauling
- Single integrated service and multi-carrier network
- New mobile applications and bandwidth growth yields
- More secure (fully all-IP) service
- Carrier Ethernet is optimized for IP/Ethernet
- Built-in service flexibility for manage and maintain
- Controller scalability and virtuality
- Consistent with 4G RAN support and 4G LTE/4G+ operation
- MEF architecture supports full interoperability