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Conference Debate Session VI: Ethernet's growing role in the Cloud

Introduced by: Roopashree Honnachari

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Hello, everyone. Thanks for staying for the last session. I know you were tempted to go away, but thanks for coming back.

I am Programme Manager for Business Communication Services at Frost & Sullivan, and my areas of coverage include WAN transport services, both business and wholesale markets. I also look after data centre and Cloud services.

Today's topic is the role of Carrier Ethernet in Cloud. Before we dive into the debate session, I would like to set the stage and look at the market needs today. When you look at the enterprise market, the needs have completely changed. Nan Chen was completely right yesterday when he said that TDM just works. You pick up the phone and you always get a ring tone.

But when you look at the enterprise market trends, it's not only about voice anymore. It's about internet data, video. And if that were not enough, you have highly distributed enterprises. You have to take care of disaster recovery, remote employee, back up – all these things. And to add to that, you have the Cloud-based solutions, so Caas, Saas, IaaS.

So what I'm trying to say in the slide is that network is the connecting piece, and I think everybody understands that. But I want to emphasize that, because with more and more of these applications moving to Cloud, typical IP services, network becomes extremely critical. And I don't think most of the Cloud users today understand how important the network is, but some do. That's why I say that reliable, scalable and cost-effective bandwidth is critical for efficient use of all these applications we're talking about.

Where are we today, in terms of what enterprises are using in their WAN transport? So there is a bunch of them, as most of you would know – Private Line, Frame Replay,

ATM, SONET, MPLS and Ethernet. But the trend is clearly toward MPLS and Ethernet, as you can see – 36% for MPLS, growing to 45%, and Ethernet going from 16% of total WAN transport revenues to 31%. And this is based on service provider revenues. So the market is clearly shifting, and service provider revenues validate that.

When you look at the high percentage increase for MPLS and Ethernet, some portion of that MPLS is also going toward Ethernet because carriers are offering Ethernet virtual Private Line type services or MPLS. So clearly the end game is with Ethernet.

Connecting Cloud and Carrier Ethernet – I think enough has been said about all of the security concerns Cloud users have with running their applications on the public internet. My information is taken directly from the materials provided by the MEF. Clearly, Carrier Ethernet is solving the problem, in terms of security of the network, predictable performance and regulatory compliance.

So looking more closely at Cloud, why is Carrier Ethernet so important for Cloud? Purely because the enterprise IT infrastructure is changing, and changing rapidly. When you look at the future IT infrastructure, it's got to be private Cloud, enterprises having their own private data centres in-house, whether they have physical servers or virtualized servers. And then you have hosted public Cloud, hosted private Cloud. So it's going to be a combination of all of these things. And the network has to change to adapt to this, which is the reason Carrier Ethernet is so important.

In one of the surveys that we conducted on Cloud adoption, 64% of the respondents clearly said they are concerned about the security risks of the public internet while adopting Cloud applications. And 61% of the same respondents also said they'd only be interested in a private Cloud network. So this is private Cloud per se, in terms of dedicated private servers. Also, whoever is adopting a private Cloud infrastructure is also looking at adapting it over a private network. And that's why Ethernet becomes totally critical here.

Now, looking at the other side of the coin, what are the end-user adoption trends? When they're using Cloud, what kind of network services are they using? You can see the stats for yourself – there's a combination of public internet and private VPNs being used today, as expected. But what kind of threw us off is that Ethernet ranks No. 1, in terms of the networking being adapted today when they're connecting Cloud. If they have a private Cloud and want a private network, it's Ethernet that they are using, which is critical for our discussion now.

So what does Carrier Ethernet 2.0 mean to Cloud? We've already seen that some of the Ethernet services in place today are being used by enterprises as [a lesson] of the Cloud providers. But Carrier Ethernet 2.0 kind of takes the next leap and solves some of the challenges they've been facing so far. It assists in Multi-CoS offerings so that you can apply class of service traffic on the network, manage network performance in a better way, and interconnect – enabling more service providers to connect in a standardized fashion so that Ethernet becomes one day as ubiquitously available as TDM is today.

So with that context, I want to introduce Bob Mandeville, who will invite the panel.
Thank you.

Moderated by: Bob Mandeville

President and Founder, Iometrix

<u>Panellists:</u>	
Patrick Ostiguy	President & CEO, Accedian Networks
Greg Gum	Senior Vice President, Chief Marketing and Business Development Officer, Telco Systems
Roopashree Honnachari	Program Manager, Business Communication Services – ICT, Frost & Sullivan
Ben Mack-Crane	MEF Technical Committee Cloud Project Editor, Huawei Technologies

Can I ask you to briefly introduce yourselves? Patrick?

Patrick Ostiguy

I am President and CEO of Accedian Networks. Accedian is a Montreal-based company that offers solutions to carriers to be able to offer performance-assured Ethernet, so essentially allowing them to take Carrier Ethernet and Metro Ethernet and offer value-added, performance-assured services over those infrastructures using a variety of demarcation devices and overhanging software solutions.

Greg Gum

I am the Senior Vice President and Chief Marketing Officer for Telco Systems. We are a division of the telecommunications subsidiary of the ATM Group, which is publicly traded on the London Stock Exchange. We provide Carrier Ethernet and MPLS access and Edge aggregation equipment, as well as Cloud gateway products. We also provide Carrier Ethernet 2.0-compliant devices that also have a service manager platform that allows you to do point-and-click service management for end-to-end SLA assurance, and also planning and analysis.

Roopashree Honnachari

Roopa from Frost& Sullivan. I've already introduced myself.

Ben Mack-Crane

I am with Huawei Technologies. I'm in the IP standards and Advanced Technologies Group. And I am also working in the MEF as Editor for the Carrier Ethernet for

Cloud project, editing a document on use cases for Carrier Ethernet in the Cloud environment.

Bob Mandeville

Here is how I'd like to frame things up in this discussion. I'd like to characterize this debate as us talking about the bedrock of networking, not future things or very controversial things. I think we need to talk about what we really have today and how it is moving forward, what is moving forward – Carrier Ethernet – and what is making it move forward, requirements coming from the use and introduction of Cloud services. This is real stuff, the role of Carrier Ethernet and its relationship to the Cloud as I've just described it.

The Cloud is taking everything that Carrier Ethernet has developed up until today and is taking full advantage of it, and can take full advantage of it. I'll be asking Greg Gum to fill us in on some details. And it's also pushing Carrier Ethernet to develop new capabilities. This is something that Ben is doing. Ben is a standards guy.

And then we have to make sure that, as all of this happens, it is happening in a way that can be measured, can be verified. And so that side of the Ethernet house has to step up to the plate. And this is where Patrick's experience, and the experience of his company, is of tremendous value. If you can't verify, who knows what you have.

And then just generally, the service providers' perspective is something that we'll be relying on Roopa to give us.

So I originally thought of starting with Ben, but I'm now thinking, Greg, maybe we should start with you. You are closer to the here and now. Please consider the following question: Carrier Ethernet 2.0 was announced by the MEF a few months ago. It exists; it's very much on the map. The Cloud has requirements. Those requirements are derived naturally from the applications that run in the Cloud. What can Carrier Ethernet 2.0 do better than other technologies in order to satisfy those requirements?

Greg Gum

Let me see if I can answer that in a couple of succinct points. It's obviously a lengthy topic. I think the CE 2.0 specification accomplishes a couple of things. Fundamentally we're adding more classes of services, so moving to more classes of services port, so you can differentiate the different applications that you would have within the Carrier Ethernet connectivity service. And that is of course important, as you now begin to see many different types of applications. Now you may be doing virtualized services. So to be able to have that capability to distinguish between the different classes of service is important. So that's one key element that ties the CE 2.0 specification to some of the new requirements of the Cloud.

I think the second thing is that Clouds are not just in one place anymore. There won't be just one centralized Cloud in the sky. Long ago we had PSTN. Nan talked about Network 1.0 – one big Cloud. As Roopa said, you'll see both private and public Clouds. You'll see hybrid Clouds as well. Those Clouds will need to be

interconnected. Clouds will need to talk to each other at some point – so Cloud-to-Cloud connectivity.

The ENNI specification that is also being talked about in CE 2.0 allows that ability to have a common interface to be able to connect these Carrier Ethernet pipes that will go between Clouds. So that's also an important application use case.

And then I think the third thing we should touch on is a broad area called OANM. So the whole concept of being able to have the measurement visibility, statistics, the actual SLA of measurements that now are provided, like we used to have in TDM, now provided in a Layer 2 Ethernet service. So things like the OANM specifications to provide that in the new CE 2.0 framework, then allow you to have service assurance of those Cloud connectivity pipes, which would be Carrier Ethernet carrying different multiple classes of service, which may have different SLAs attached to each of those. I think you'll hear Patrick talk a bit about service assurance and how that can be done in a more granular fashion.

So at a high level, those would be the three things I would say, from a CE 2.0 perspective, that would attach to Cloud.

Bob Mandeville

One of the key things that you've talked about is classes of service. By the way, Patrick, you're going to be the next one, not Ben. I'm changing the order here. The reason being, the MEF technical committee spent 2.5 years to develop a specification – it's MEF 23.1. It is somewhat revolutionary, in that the MEF has stuck out its neck with the full support of the entire technical committee to define performance objectives, detailed performance objectives, for four tiers of performance, and for every tier of performance there is a high, medium and a low class of service. There are five metrics, and values are attached to each of those metrics, for example, for mean frame delay, frame delay range, frame loss ratio and inter-frame delay variation.

So, clearly the MEF has considered it critical to provide the industry with performance objectives such that, if you meet those objectives, you pass. And if you don't meet those objectives, you fail. These objectives only have meaning if they are measured.

Patrick, can you think of a better introduction?

Patrick Ostiguy

This is a perfect Segway. I think this is one of the things that allows service providers to not only define services, in terms of priority, but also provide them in terms of predictable performance. In the last couple of years, with the advent of QoS, you could say I've got gold, silver and bronze types of class of service, and now it goes beyond that. Even if you had gold or platinum quality of service, you really didn't know how long it was going to take a packet to go from A to Z. Now with these performance objectives, what it allows services providers to do is differentiate themselves and offer very predictable performance objectives. It's not just an objective; it becomes an SLA upon which penalties can be claimed.

How does this translate to Cloud? Maybe to put things in perspective, I'm going to refer to a real life use case by one of our prime customers, which is a global leader in offering globalized Ethernet services. It's a company that essentially is leveraging a very strong footprint, in terms of a network infrastructure, to offer business services. And one of the things that they've started doing recently, probably in the last year and half, like many of those, they have started to build big data centres, started to offer hosted services, and really try to become more than just a 'dumb pipe provider'. They see that everything related to applications and content has slipped out of their hands and into the hands of Google and others. They have had to think of how not to be left with the bag, just the guy holding the pipe.

So essentially what they're doing is taking a Cloud infrastructure, selling a private Cloud infrastructure, and then extending those Clouds with 'Cloud pipes' that are being extended all over to the customer premises. And really the idea for them is to offer a Cloud service that is performance-assured, so a Cloud service that has predictability and that is performing in a way that can provide real-time applications.

The word 'real-time' here is very important. Obviously, if you're running applications from the Cloud which are cashable, if you will, performance is not so much an issue. But when you're doing transactional, when you're doing applications that are extremely time-sensitive, whether it's news, stock transactions, financial transactions, you're really talking about milliseconds and microseconds, and even below microseconds, in terms of differentiation.

So this has forced these companies to split hairs, in terms of fibre, route, wireless routes. So having a service provider that is capable of taking their Cloud and taking it all the way to the customer premises and saying, you've got this real-time capability to have, not just a hosted Cloud service, but a hosted Cloud service that performs within these specific performance objectives, is something that we have seen. We have deployed this in many cases for these emerging services.

So that's an example of a real life scenario for the convergence of CE 2.0 and Cloud services.

Bob Mandeville

My take-away would be that Carrier Ethernet 2.0 has the class of service support that the Cloud and Cloud applications will need. That's pretty much a done deal. The measurement thereof is in a very advanced state. Patrick does that every day. Your equipment is deployed very, very widely. It does just that and in a very satisfactory way. The support for Carrier Ethernet for the Cloud is very, very strong.

There may be some things missing. And the technical committee of the MEF is very aware and starting to work very hard on those missing pieces. And Ben is the Co-Editor of their Cloud Project. I'll let you state the problem, and then talk to us about the standard that you're working on that will take us to these future Cloud services, which will be dynamic.

Ben Mack-Crane

As Bob was saying, there are Cloud services in our Carrier Ethernet services today, and people are putting those together in very constructive ways. What the MEF is looking at is the impact of Cloud services going forward on Carrier Ethernet services.

One of the things that we're seeing is that, when you're setting up and operating Cloud services, there are some dynamics that aren't well addressed, in the sense that, if you're moving a virtual machine image from one place to another, or moving a large database from one data centre to another, either for rebalancing or moving it from an enterprise data centre to a Cloud provider, if you're going to start letting them provide some services to you, there can be very dramatic changes in the bandwidth requirements to get these copies done in a reasonable amount of time.

Rather than enterprises, or even Cloud providers, having to maintain and lease very large bandwidth services in order to meet these peak demands, we're looking at the possibility of making the Ethernet services more dynamic so that you can change bandwidth or class of service on the fly and in a relatively short amount of time, use a high bandwidth service to make these large data copies and then drop it back to what your normal usage requirements are, thereby enabling enterprises to spend less on their leased network infrastructure because they can lease higher bandwidth by the minute or by the hour, rather than having to have long-term leases on that. And it also enables the network providers to then sell additional bandwidth on short time scales, and that provides them with a different business model for selling some of their bandwidth.

The project is now on-going in the MEF, formally called Carrier Ethernet for Cloud. What we're looking at is use cases where these dynamics of Carrier Ethernet Services would come into play. We're trying to identify what attributes of the services would be dynamic, on what time scales, what kind of performance, in terms of setup, and what kind of [hold times] people might expect. Then we're going to produce a document on use cases to give some examples of the kinds of service dynamics that would go with Cloud services.

And then the second document will be a management requirements document that talks about the management models and interfaces consumers would require to support these dynamic services. Or Cloud service brokers, an organisation or business that might put together Cloud service provider services with network services and basically build end-to-end Cloud services for Cloud consumers. What interface do they need to the network in order to manipulate the services? That is what the MEF is looking at going forward.

Bob Mandeville

And what is the timescale for the project?

Ben Mack-Crane

I think we're trying to get the first phase out mid-next year. So some initial use cases, and then depending on what we find – it's going to be a process of discovery as

people get to use these services and we learn more about them. There are probably more things that we'll want to do going forward after that. But the first round is basically for a year from now.

Bob Mandeville

How does a company manage the on-going research and development of products? And how does that dovetail with the sort of work you're doing at Huawei, which is standards development? It's a difficult interface, I would imagine.

Ben Mack-Crane

It is. There are always a lot of ideas being offered as things that you could do. And then we're always looking at what the market is buying. In fact, in this particular case, as in many-- I'm in advanced technologies, so I see this a lot. You can dream up technologies, or you can imagine people doing things that would be useful in the future, but the infrastructure isn't there for it today. And so you're always working with the product planners who are planning what they want to release in the next six months and year. And you're also looking at the fact there are new markets that will be developing, but you don't really know when. So there's always a challenge. And there's always new prototyping work, as well as product development work going on to push that boundary.

Bob Mandeville

Roopa, you work with service providers a lot. So you must know more than any of us what they are really asking for. Does anything that we've said so far make sense, with respect to what you are hearing service providers say?

Roopashree Honnachari

Yes. It absolutely makes sense what the other panellists have been commenting on. But when you look at Carrier Ethernet 2.0 specifications, particularly the three different aspects that we addressed, I think multiple classes of service are totally critical. This is something that the enterprises have been asking for a long time now. Since Ethernet could not support that, most of it was going over MPLS. But now Ethernet being able to support that, hopefully with all of these specifications in place, that will obviously help all of the service providers, not only with conversions, but to manage all of these applications in a reliable fashion.

The other aspect is interconnection, which I think is also very important. MEF launched its MEF 26 standards a while ago, but honestly I haven't seen a lot of it being adopted for ENNI connectivity. Some service providers are using it, but many are not. They are just doing their own ENNIs. I think this sort of addresses that and takes us a step ahead of MEF 26 standards, which is critical for wide-spread availability of Ethernet. We could be speaking about all the performance and how great Ethernet is, but if it's not available, then obviously it's limited. So I think that really helps the wholesale market move to the next level, where a lot of carriers interconnect and then sell it more to enterprises.

Bob Mandeville

Greg, can you help everybody out a little bit? Everyone hears vendors position their products with respect to this interface between Carrier Ethernet 2.0 and the Cloud. And I think different vendors have chosen to position themselves differently, some more aggressively, some less aggressively. Is there a landscape that you could characterize?

Greg Gum

The easy answer to that is that there are always many standards and as many positions that different companies are taking. I think you have several streams that are on each end, I guess I could say. I could emphasize the polar ends of it, and then of course there's a lot of people in between.

First of all, I'd say that CE 2.0 is fairly new. We're going through certification tests this summer. But I think the need is strong, based on what on what Roopa was saying. I don't think anyone doubts the fact that MPLS and Ethernet are the choices, 76% are choosing that methodology to get to the connectivity point.

To answer your question, there are some folks who know what Cloud is, it's happening already. They are actively selling products and services into that area. That could be in various aspects, using Carrier Ethernet for that connectivity, and then putting value around that and then selling those products and services to the operators and enterprises.

There is another camp that, of course, is maybe on the other end of the spectrum. What is really Cloud? We hear lots of cloudy jokes on and on, cloudy drinks last night, cloudy mojitos. So there is a whole group that asks if Cloud is really here. So there are some folks that would take the other camp.

Bob Mandeville

It's a fundamentally different thing.

Greg Gum

Exactly. So I think the good news is that there has been standardization work done in a number of areas, not just MEF, but also BBWF, ONF, IEEE, IETF, ... So a number of standards organisations are approaching it. So I don't think that any doubts there are Cloud services out there, because now there are a number of hosted providers out there amongst the infrastructure providers. Really now it's about understanding, relative to the topic, how Ethernet impacts the Cloud, of us looking to those connectivity options and how they really provide users their nirvana at the end of the day.

There is a laptop, a smartphone, a tablet – bring your own device. You've got four screens. What you want to have is ultimate connectivity wherever you are, whenever you want it, with the same experience. You don't want to have a lag. You don't want to be on your phone waiting for it to load. You'd like to have it just as instantaneous

as if you were on a wired LAN or wireless LAN, smartphone tablet, dongle or whatever.

So we're not there yet. Clearly, reach is one of the issues that comes up, particularly as you get into a virtualized environment, because people want to have the same experience. Where are we today? We're not there quite yet. Fibre penetration is getting deeper. Wireless technologies are evolving to get better and better coverage, and so is microwave. So that's why you see people taking such polar positions, and in the middle. It's because we're not there yet. There's not crystal clear answer.

Ben Mack-Crane

And a lot of different standards organisations are going to get involved in making this all happen. There are the dynamics we're talking about in the MEF with Carrier Ethernet for Cloud. But that's big infrastructure dynamics.

When you're talking about moving around with your tablet or your smartphone, if you fly to another city, it's entirely possible that your virtual desktop can be moved to a data centre that was in your home town to a data centre in that city, which would require the dynamics of moving the virtual machine between data centres, but also the dynamics of providing you with secure access to that data centre over either the internet or a private network. That gets into the whole smartphone mobility issue and other mobility solutions, which are in a different category and will probably be addressed in different standards bodies, like IETF.

Bob Mandeville

Patrick, I want to get up close and personal. Measurement has been around in our industry for a long time. You somehow figured out when the industry would actually be ready to actually act on it, to actually buy products on a large scale to provide a start-up that started with nothing a tremendously fast-growing customer base. You figured something out to do with measurement.

And so the question is, are there things that triggered the rush that the industry has suddenly made, doing it had never done before, other than in very vague overall network measurements on a backbone published as a monthly statistic? You are right down to the circuit level. You're right down to the EVC. You are measuring at a degree of granularity that clearly the market is rushing into. What triggered all that? Where did that come from? What did you read or see?

Patrick Ostiguy

A couple of things. Like I said earlier, I would say that the advent of the anti-carrier guys, like Google, Amazon – all the big, new Cloud operators. You can call them content providers – there are many things they can be called. But at the end of the day, these guys came in and spoiled what the carriers were dreaming to offer as a way to differentiate each other.

So it was sort of a view that, if they're going to have nothing to differentiate, in terms of nothing but their network, how are they going to be better than the service provider next door? At the same time, you were starting to see things ...

Bob Mandeville

Given that the buyers are now very performance-sensitive.

Patrick Ostiguy

For instance, the whole 2008 market crash that happened, if you remember, it was really accelerated by algorithmic trading, and a lot of the things that were happening in microseconds. You were seeing a place where microseconds were worth millions and millions of dollars. At the same time, you were seeing the whole modernization programs of the service providers, the mobile service providers, going to 3G, 3G+, 4G and so on. At the same time, for them as well, content and applications were slipping out of their hands into those of the apps stores of this world. At the same time these guys had to differentiate themselves by offering more speed and so on and so forth.

So if you look at all of them, all of their marketing campaigns have turned into – we're faster, we've got the fastest racing car or motorcycle, or whatnot. And so it became a very table stake issue for them to be better, faster, and so on and so forth, especially as decisions were being made faster, transactions were being made faster, everything was becoming real-time. And it's really the word real-time that, again, made accuracy, granularity and scalability that much more important.

And again, back to the Cloud story, at the end of the day, if these enterprises are relying on the unpredictable internet to reach a Cloud service that is in the confines of the internet, to get something that's going to be taking these ultra-fast decisions, like Roopa said, it's concerns galore, in the sense that you have to have a way to have a little more predictability around this and a bit more 'performance'.

So what we're seeing happening next, and what we're going to be leveraging, is this. You've got the service providers that will use all of the performance assurance means to be better and to avoid Google, Amazon and the others from eating our lunch again. And on the other hand, what you're going to get, because of regulatory restrictions and permissions, you're going to get Google and Amazon buying performance assurance means, and they will simply leverage the dumb pipes they can still buy from the service providers. They will put these means at the end and own the customer experience all the way to the customer premises. So there will still be situations where the infrastructure owner will be left providing a 'dumb pipe' that is being managed by the owner of the huge Cloud, for a certain premium.

Bob Mandeville

Roopa, I saw you nodding. Why don't you be the first and last speaker of this session.

Roopashree Honnachari

To add to what Patrick was speaking about, I think initially when service providers launched Carrier Ethernet in the WAN networks, it was positioned more as a replacement for the TDM networks, cost-effective bandwidth. So you get more bandwidth for a lower price. That was great. Then they realized that you can converge all these applications, and gradually the market started migrating toward Ethernet and adding all these different types of applications.

So it's cost-effective bandwidth, but is it really reliable? That's when the need for end-to-end performance management started appearing in the market. And maybe that's when Patrick really caught on to the trend. That's my comment on it.

Bob Mandeville

And what you're working on, Ben, how does performance fit in there? I'm thinking it's a whole new set of metrics that have to do with how quickly circuits can come up, how quickly provisioning of specific classes of service ...

Ben Mack-Crane

There definitely may be new metrics related to that kind of performance for the dynamic aspects. That's true. We're starting to look at that. We don't really know what people will require, because again we're talking about changes in infrastructure. So it doesn't have to be microseconds; it might be seconds, or minutes are okay because the actions we're supporting are things you've probably planned execute over a period of time. But there could be new things there.

I think the other thing we have to deal with, or at least the people who support these dynamic services have to deal with, is to make them dynamic whilst maintaining the quality of service that the static services have. So there's going to be some challenge there potentially. For instance, if you're increasing the bandwidth of a service, you have to be able to do that within the network plan that you have. You may have to re-route the service with as little disruption as possible. So there are going to be a number of aspects that dynamics bring that will be challenging in maintaining the current service models and characteristics.

Bob Mandeville

Any more questions?

I would like to thank you all – Patrick, Greg, Roopa and Ben – for contributing to this discussion. I would hope that you've fixed in everybody's mind that there is a thing called Carrier Ethernet 2.0. There's a thing called Cloud, is so far as the support for applications requires classes of service, the Metro Ethernet Forum has done a solid job of bringing to the marketplace Carrier Ethernet 2.0. And I think the future work really belongs to the effort that Ben is carrying out, and that Patrick is keeping a very close eye on through measurement.

So, there we are. Thank you, everyone.

[End]