

Network Management Model and Elements in Carrier Grade Ethernet



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Seminar Presentation

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« Agenda



- > The Purpose of the Paper
- > Why is the management needed in CGE?
- > Overlaying Management Model
- > Levels
 - » Link
 - » Connectivity
 - » Services
- > Demarcation point
- > Proposals for Improvements / Future Work
- > Conclusions

« The Purpose of the Paper

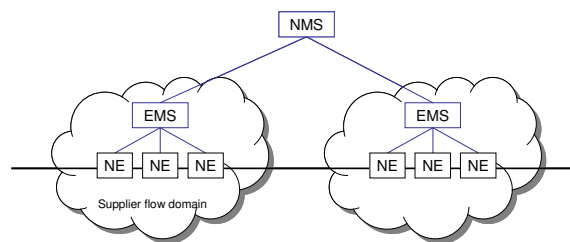
- > To present model and elements for network management in Carrier Grade Ethernet (CGE) by introducing standards and drafts of different standard bodies (IEEE, MEF and ITU) in the area of Carrier Grade Ethernet.
- > A short comparison to ATM management model in four categories is presented.
- > Some proposals for improvements are also presented

« Why is the management needed in CGE?

- > Automation, mechanization and scaling are required to ensure profitable services
- > SLAs and service guarantees are a critical part of CGE
 - » Without these enterprises will stick their current services
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 - » Without these enterprises will stick their current services
- > Routing table are transferred via management system

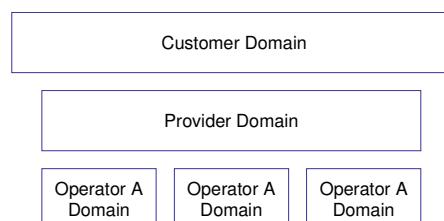
◀ Overlaying Management Model

- > Metro Ethernet Forum (MEF) defined a generic reference model for network/service management



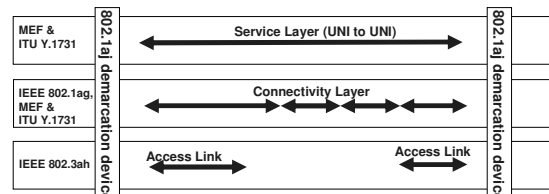
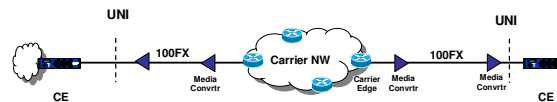
◀ Maintenance Domains

- > A Maintenance Domain (MD) is an administrative domain for the purpose of managing and administering a network
- > Important due to the different scopes of management that must be provided for different organizations
- > MIP
- > MEP



Management Model – Levels

- > Three levels: link, connectivity, and service level



Link Level

- > IEEE 802.3ah
- > Mainly for access links - Scope of management limited to physical link
 - » Cannot pass through a bridge
 - » Cannot perform end-to-end OAM functions

◀ Connectivity Level

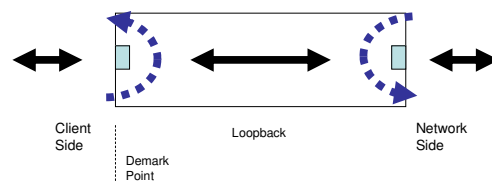
- › IEEE 802.1ag
- › Allows service providers to manage each customer service instance individually even in multi-operator networks
- › Enables the service provider to know if an EVC has failed

◀ Service Level

- › MEF and ITU Y.1731, built on IEEE 802.1ag
- › Performance management for SLA verification
 - › Frame loss ratio, frame delay, frame delay variation
 - › Now for point-to-point EVCs, multipoint performance parameters and functions in the future

Demarcation Point

- > IEEE 802.1aj
- > Located between a provider's Ethernet and a customer's private network
- > A point where all SLAs are defined
- > An operator has access to NID and is able to run some tests
 - » The operator can be sure that its own network is working properly



Comparing to ATM (1/2)

- > The both technologies are Carrier Grade like
 - » ATM developed ~20 years ago
- > Compared management system of the both technologies
 - » Four categories
 - » Model, Levels, Elements and Management functions

« Comparing to ATM (2/2)

- > Model
 - » is almost same: a generic model defined
 - » in CGE a fully centralized system available
 - » in ATM some decentralized solutions: mobile agents
- > Levels
 - » the same number of levels
- > Elements
 - » demarcation point is also available in ATM
 - » in CGE more SLA measurements available
- > Management functions
 - » Same kind of functions/messages (discovery not)
 - » No multicast in ATM

« Proposals for Improvement (1/2)

- > Demarcation device
 - » Passive monitoring has lifted its head in the operator world lately
 - » Passive monitoring feature into a NID could be added
 - » An operator could troubleshoot customer/own network on demand

« Proposals for Improvement (2/2)

- > Demarcation device
 - » Taking billing information from a NID with passive monitoring
 - » NID needs extra processing power
 - » Processed data transferred to operator's billing systems

« Future Work

- > Distributing management
 - » To bring for example from ATM mobile agents to CGE management
 - » To bring old ideas from other network management systems (test) to CGE
 - » To develop new ideas

« Conclusions

- > The management model of CGE networks is well-defined and many different standard bodies have effected on it
- > Management part of CGE networks looks like ATM one
 - » The biggest difference is multicast support in CGE
 - » If needed, a fully centralized management is available
 - » Better validation mechanisms of connections and SLA measurements