LIME Base YANG Model Work Update
draft-tissa-lime-yang-oam-model
draft-wang-lime-yang-pm

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Qin WU

Status update since Dallas meeting

- Report LIME design team finding and present to LIME WG
  - Commonality between IP OAM/MPLS OAM/Y.1731/MPLS-TP/TRILL OAM were discussed.
    - Common OAM functions, e.g.,cc,cv, loss/delay measurement were agreed
    - Fault domain, test point, technology type as common objects that are applied to all the OAM technologies were agreed.
  - Difference between IP/IP-based OAM models and Y.1731/MPLS-TP/TRILL OAM were discussed
    - MEP is implicitly configured
- Follow up LIME design team report, two actions were proposed and agreed:
  - Document LIME design team finding
  - Draft Applicability document to demonstrate LIME model usability and extensibility(discussed in the separate slide presented by Tom).
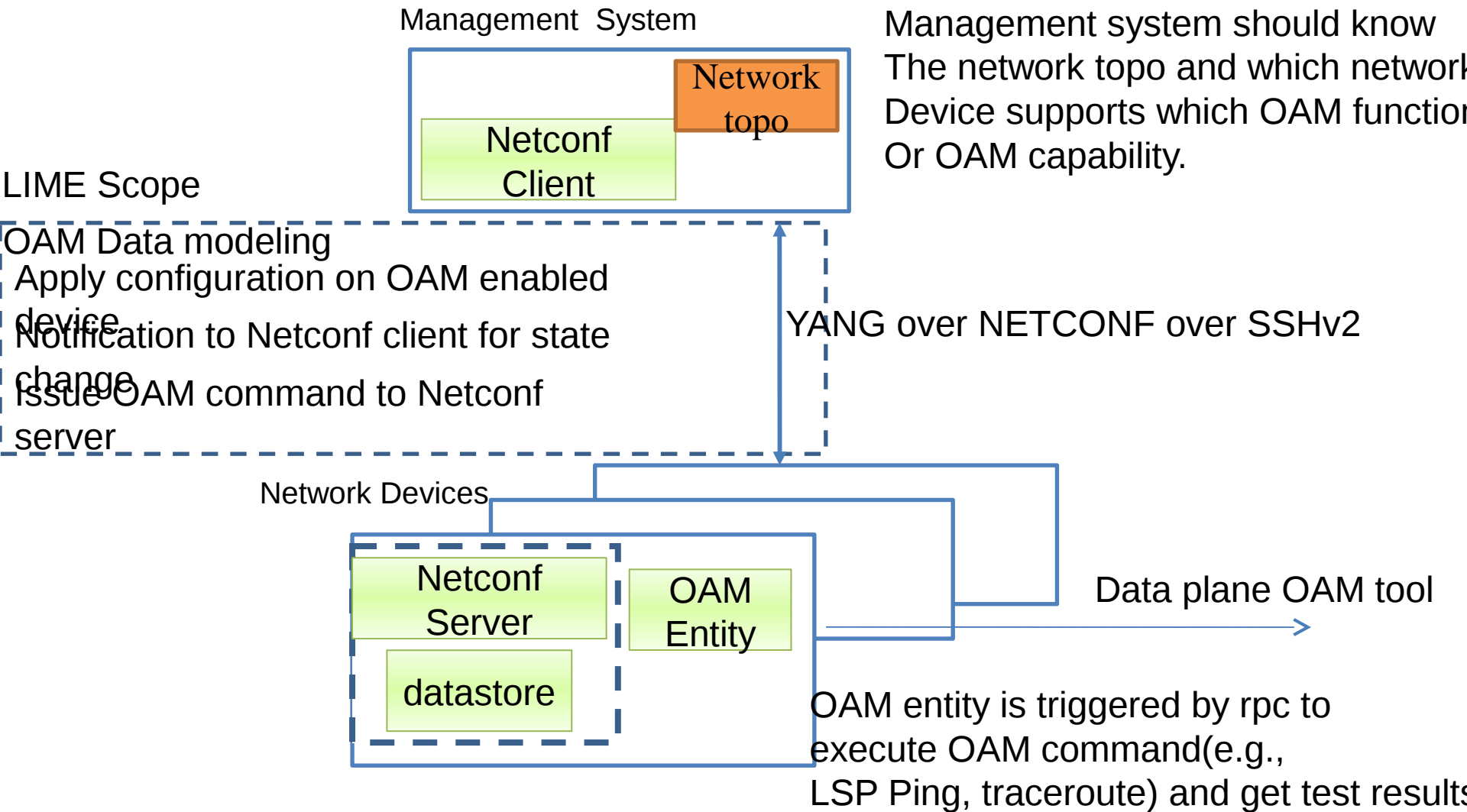
ML discussion Recap

- Chairs suggested some changes and asked to update LIME base model(i.e., dr aft-tissa-lime-yang-oam-model)
    - Two open issues raised by authors during the update
        - Interface referencing
        - Non-key leaf instance referencing
        - Yang model occurs at the management layer?
        - Pyang tools validation issue
- Detailed review on draft-tissa-lime-yang-oam-model provided by ITU-T SG 15 OAM information model work team and other contributors
    - Special thanks Mahesh Jethanandani, Benoit, Lada, GUBALLA, JENS,Yuji, Huub, Greg, Tom for c onstructive input and other authors of draft-lam-lime-summary-l0-l2-layer-independent.
    - Two open issues brought up
        - Connection vs network monitoring
        - IP OAM modeling
    - Tom Taylor and Yan Zhuang help take a pass on [draft-wang-lime-yang-pm](#).
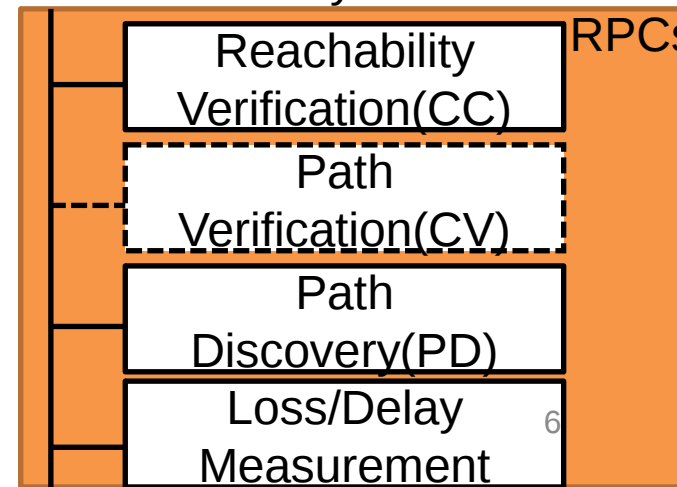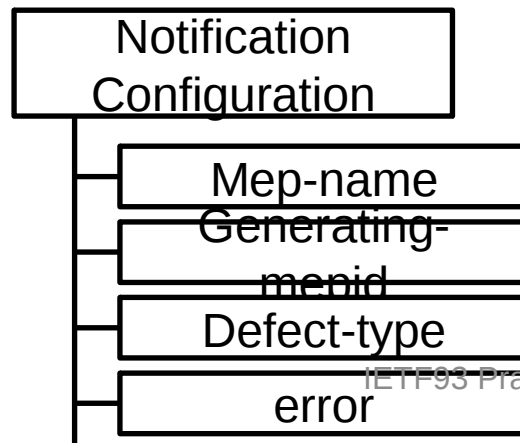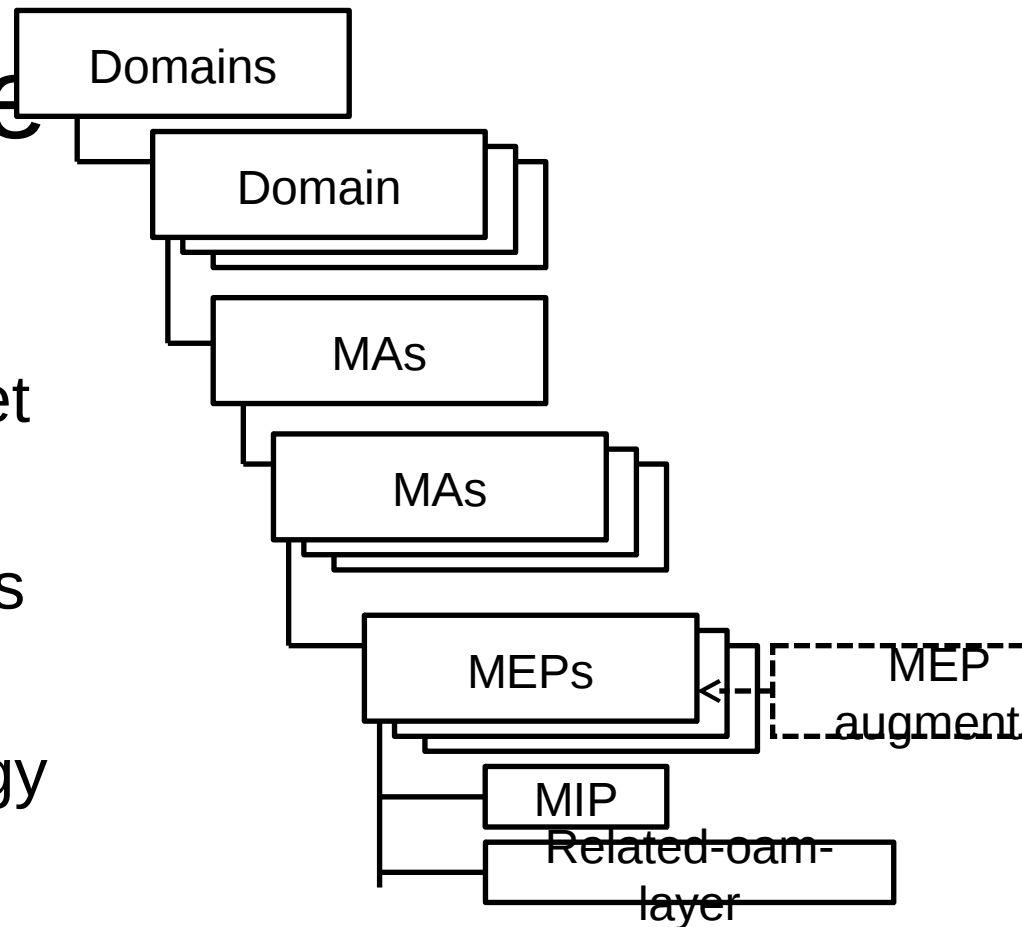
Document Update of LIME base model

- Clean up all the idnits issues
- Update the Acknowledgements to record all folks that need to be thanked
- Security Considerations section
- Keep two editors in the front page and move other authors to the contributor section.
- Generalize IP Ping and Traceroute into continuity check and path discovery rpcs.
- Make connectivity check rpc optional by using YANG feature(having consulted this with Andy Bierman , he suggested to use YANG feature if we want to make some rpc optional)
- Support either proactive mode and on demand mode by adding session type under cc, cv, path discovery
- Support various topology type by adding technology independent topo type in the base model then p2p and p2mp can be supported by augment in the model extension.
- Generalize notification to support various defect types to be reported by different MEP in different location(not necessary to limit to remote MEP).
- Generalize output part in each rpc call.
- OAM YANG module code format change to make it compliant with RFC6087.
- Split performance measurement YANG model from base model draft and move it to a separate draft.

Management Framework

Management System

Network topo

Netconf Client

Management system should know The network topo and which network Device supports which OAM function Or OAM capability.

LIME Scope

OAM Data modeling

Apply configuration on OAM enabled device

Notification to Netconf client for state change

Issue OAM command to Netconf server

YANG over NETCONF over SSHv2

Network Devices

Netconf Server

datastore

OAM Entity

Data plane OAM tool

OAM entity is triggered by rpc to execute OAM command(e.g., LSP Ping, traceroute) and get test results

Model Structure

- Adopt model structure concept defined for Ethernet /MPLS-TP network;
  - Make it adapt to various different OAM technologies
  - Extend it to a technology independent framework.

Domains

Domain

MAs

MAs

MEPs <--- MEP augment

MIP

Related-oam-layer

Notification Configuration

Mep-name

Generating-mepid

Defect-type

error

RPCs

Reachability Verification(CC)

Path Verification(CV)

Path Discovery(PD)

Loss/Delay Measurement

Relation of OAM YANG model to Generic YANG model
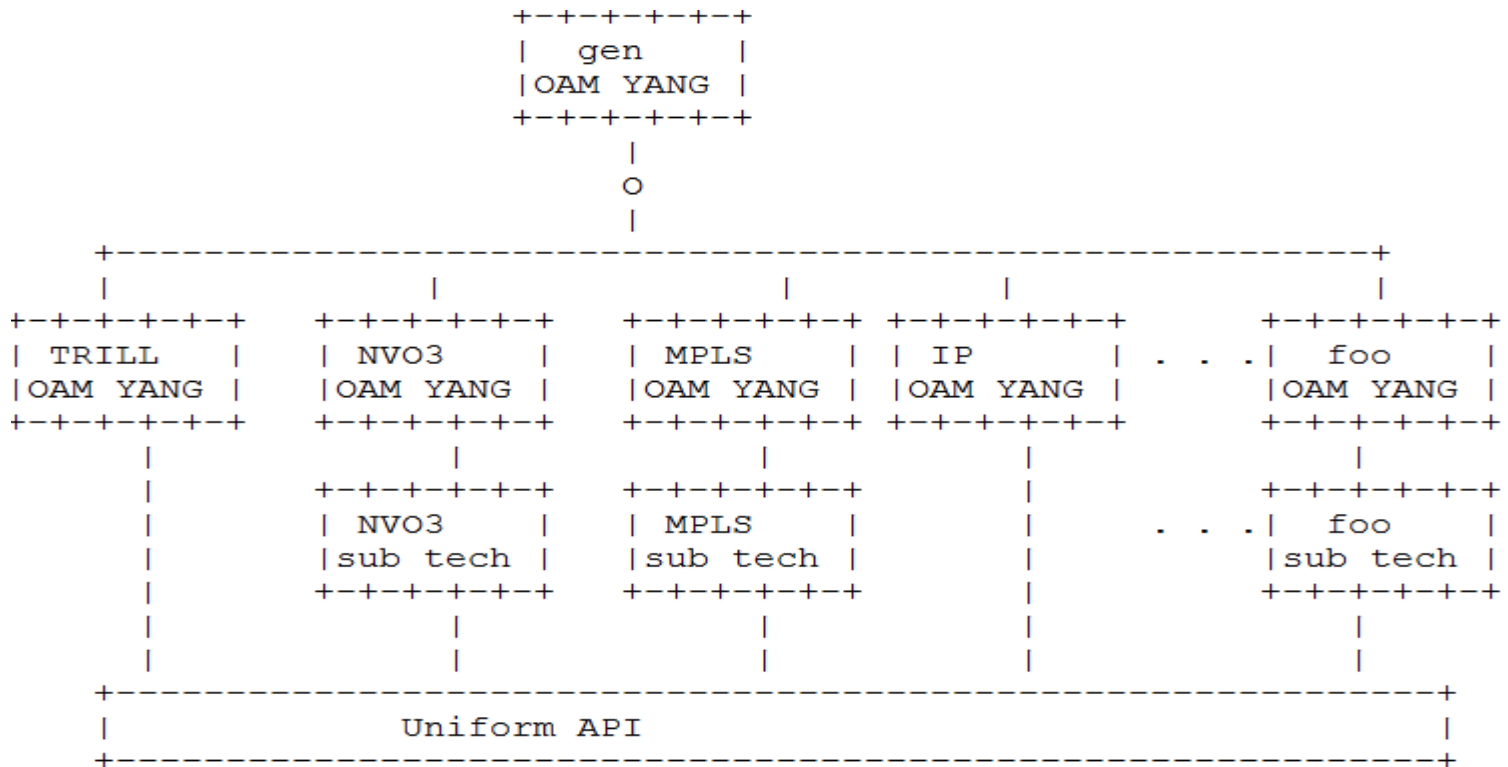
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| TRILL   |    | NVO3    |    | MPLS    | | IP      | . . .|  foo    |
|OAM YANG |    |OAM YANG |    |OAM YANG | |OAM YANG |      |OAM YANG |
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      |              Uniform API                                |
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Relationship of OAM YANG model to generic (base) YANG model
```

Open issues 1 in LIME base model work

- There are two kind of representations on re ferencing interface defined in ietf-interfaces module:

```
Representation A:
      leaf interface {
       type if:interface-ref;
      description
      "Interface name as defined by ietf-interfaces";
      }
```

```
Representation B:
      leaf interface {
       type leafref {
        path "/if:interfaces/if:interface/if:name";
       }
       description
        "Outgoing Interface";
      }
```

- Solution:
  - For consistency, we choose Representation A

Open issue 2 in LIME base model work

- Can we reference a leaf instance that is not index or key of the list?
  - admin-status and oper-status are both not index or key in the interface list.
  - Also admin-status is a optional parameter defined in the interface list.
- Lada clarified this is uml plugin issue since we pyang uml plugin tool.

Open issue 3 in LIME base model work

- Monitor connection or monitor network?
  - In connection oriented network, monitor connection
  - In connection less network, do we monitor the conne ction?
    - Monitor link/ section between network nodes
    - In connectionless network, only reachability verification is supported, path verification is not supported.
- Conclusion:
  - In connectionless network, choose to monitoring source and sink node only.

Open issue 4 in LIME base model work

- Can IP OAM be modeled in the same way as Et hernet and/or MPLS-TP?
  - MEP is implicitly configured
    - Sure, why it matters?
      - We don't change IP OAM toolset
      - LIME model provide model structure to carry IP OAM configure and state data
      - MD/MA/MEP are just management information.
  - IP OAM doesn't support ECMP
    - Sure, MPLS-TP also doesn't use ECMP.
    - we don't list ECMP as common element in the base model

Open issues of LIME base model work

- draft-tissa-lime-yang-oam-model said:

   "The YANG data model presented in this docume
nt occurs at the management layer"

  - Benoit questioned the meaning of "management layer" in this sentence.

  - Yuji suggested to change "occurs" into "exist"

  - We as authors believe this sentence needs to be rephrased.

    - Does "occur" means "produce"?

    - Management layer means management system.

Open issue 5 in LIME base model work

- Run pyang tools, it generate the following err or:

  "pyang --ietf ietf-gen-oam.yang
  ietf-gen-oam.yang:596: warning: IETF rule
  (RFC formatting): line length 73 exceeds 70
  characters"

  - Benoit suggested an example to fix line len gth exceeding issue.

  - Action: Accepted.

Next Step

- Fix the open issues raised one the list and pre pare another revision.

- Request Adoption?

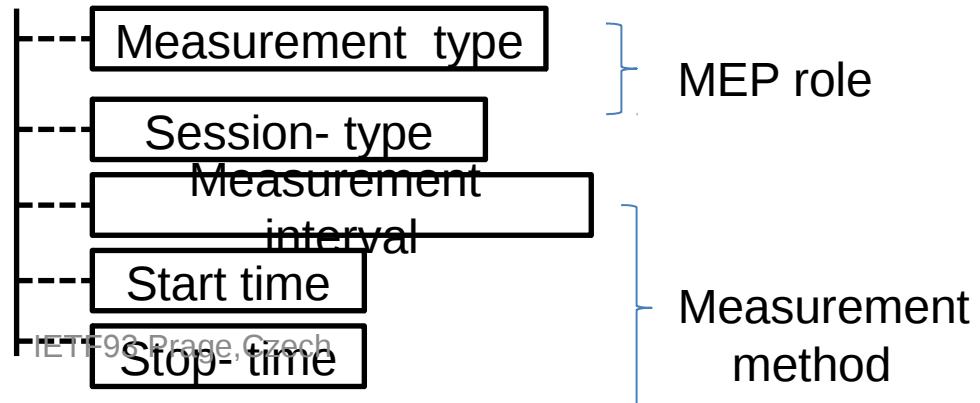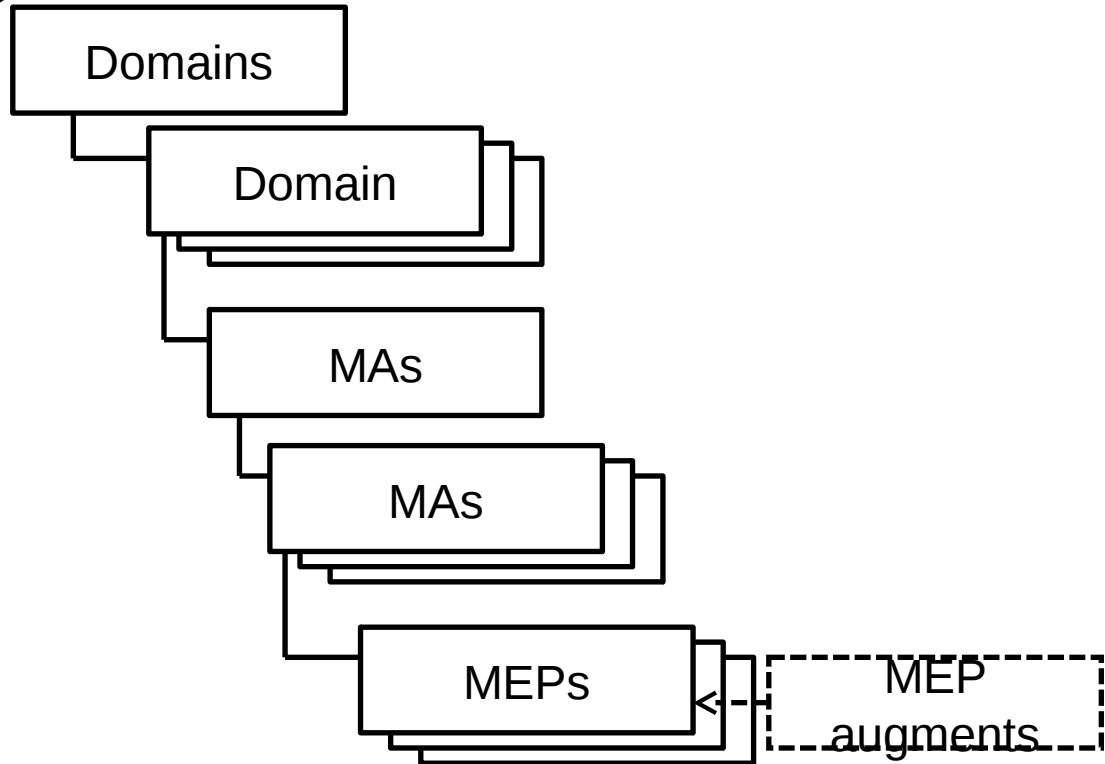- Demo in Bits-n-Bytes on Thursday

Model design: Overview

- **Performance Measurement module augments the Gen-OAM MEP with parameters related to PM**

- Loss Measurement Configuration

- Delay Measurement Configuration

Domains

Domain

MAs

MAs

MEPs

MEP augments

rpcs

Loss Measurement
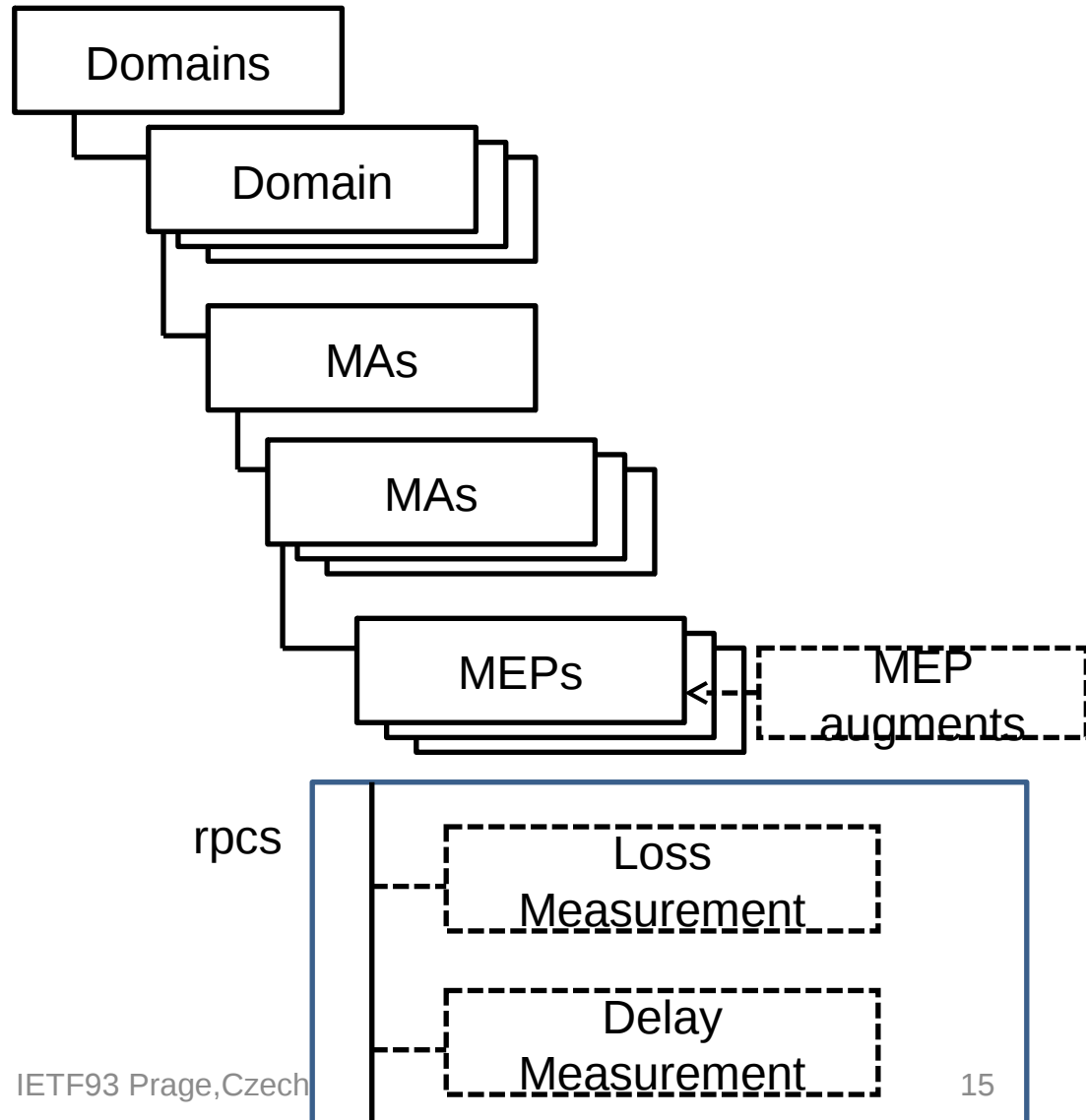
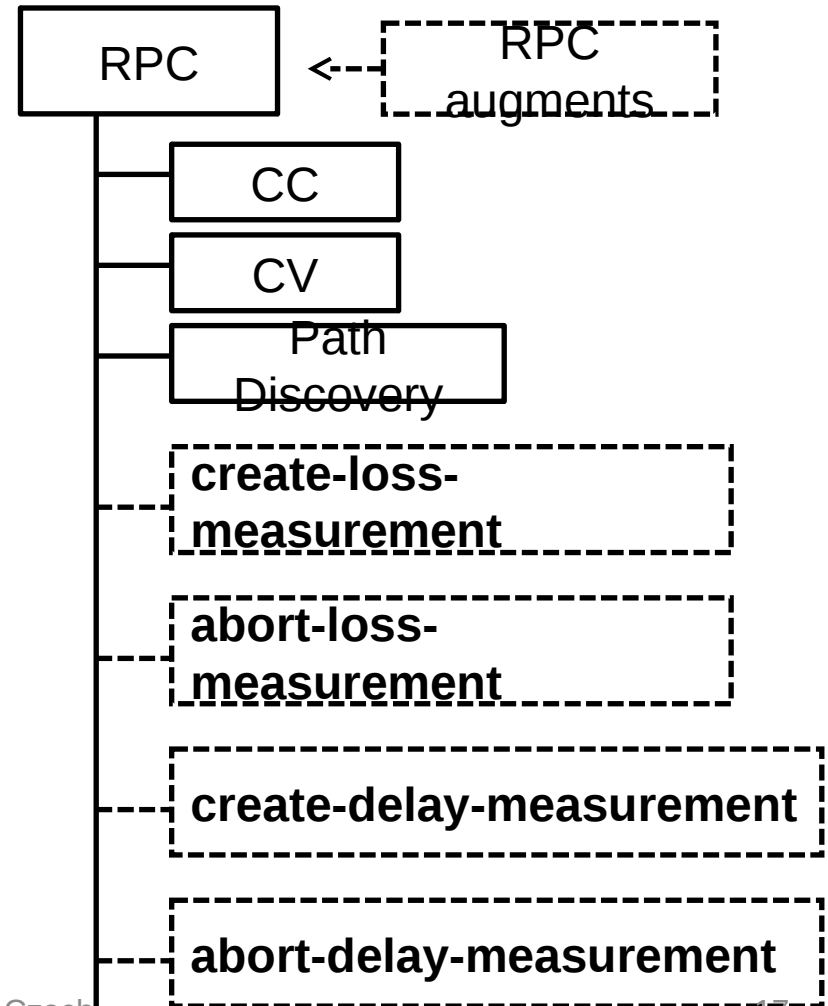Delay Measurement

Model design: MEP extension

- **Performance Measurement module augments the Gen-OAM MEP with parameters related to PM**

- Loss Measurement Configuration
  - define the role of the MEP, and
  - specify the measurement method to use for loss measurement

- Delay Measurement Configuration
  - define the role of the MEP, and
  - specify the measurement method to use for delay measurement

Domains

Domain

MAs

MAs

MEPs — MEP augments

Measurement_type

Session- type

} MEP role

Measurement interval

Start time

Stop- time

} Measurement method

Model design: RPC extension

- **create-loss-measurement**

- allows scheduling of a one-way or two-way on-demand or proactive performance monitoring loss measurement session.

  - **abort-loss-measurement**

- allows immediate cancellation of a currently running or scheduled loss measurement session.

  - **create-delay-measurement**

- allows scheduling of a one-way or two-way on-demand or proactive performance monitoring delay measurement session.

  - **abort-delay-measurement**

- allows immediate cancellation of a currently running or scheduled delay measurement session.

RPC

RPC augments ←--

CC

CV

Path Discovery

create-loss-measurement

abort-loss-measurement

create-delay-measurement

abort-delay-measurement

PM model Open issues (1)

- Should abort-loss-measurement and abort-delay-measurement rpc put the restriction to on-demand?

  – loss measurement and delay measurement should support both on-demand and proactive measurement

  – On demand is corresponding to immediate take action on a currently running session.

  – Proactive is corresponding to take action on scheduled measurement session

PM Model Open Issues (2)

- Should Performance model be part of LIME base model?
  - Con: Not all the in-band OAM protocols support PM feature
  - Pro: If in-band OAM protocol can be used to collect end to end path characteristics, loss measurement and delay measurement MUST be supported.

Next Step

- Fix the open issues raised one the list
- prepare another revision.
  -