YANG models for ACTN TE Performance Monitoring Telemetry and Network Autonomics

draft-lee-teas-actn-pm-telemetry-autonomics-03

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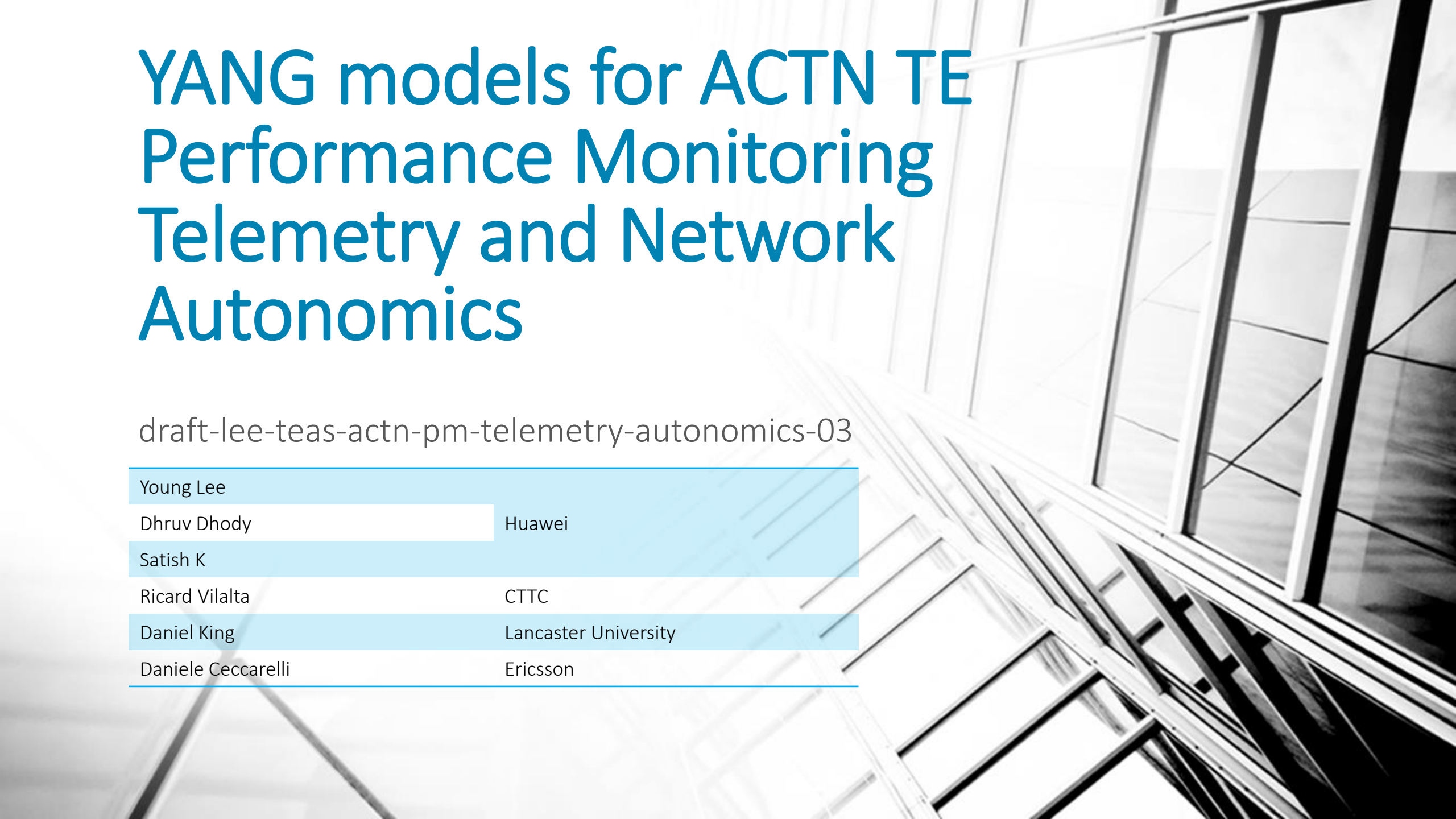
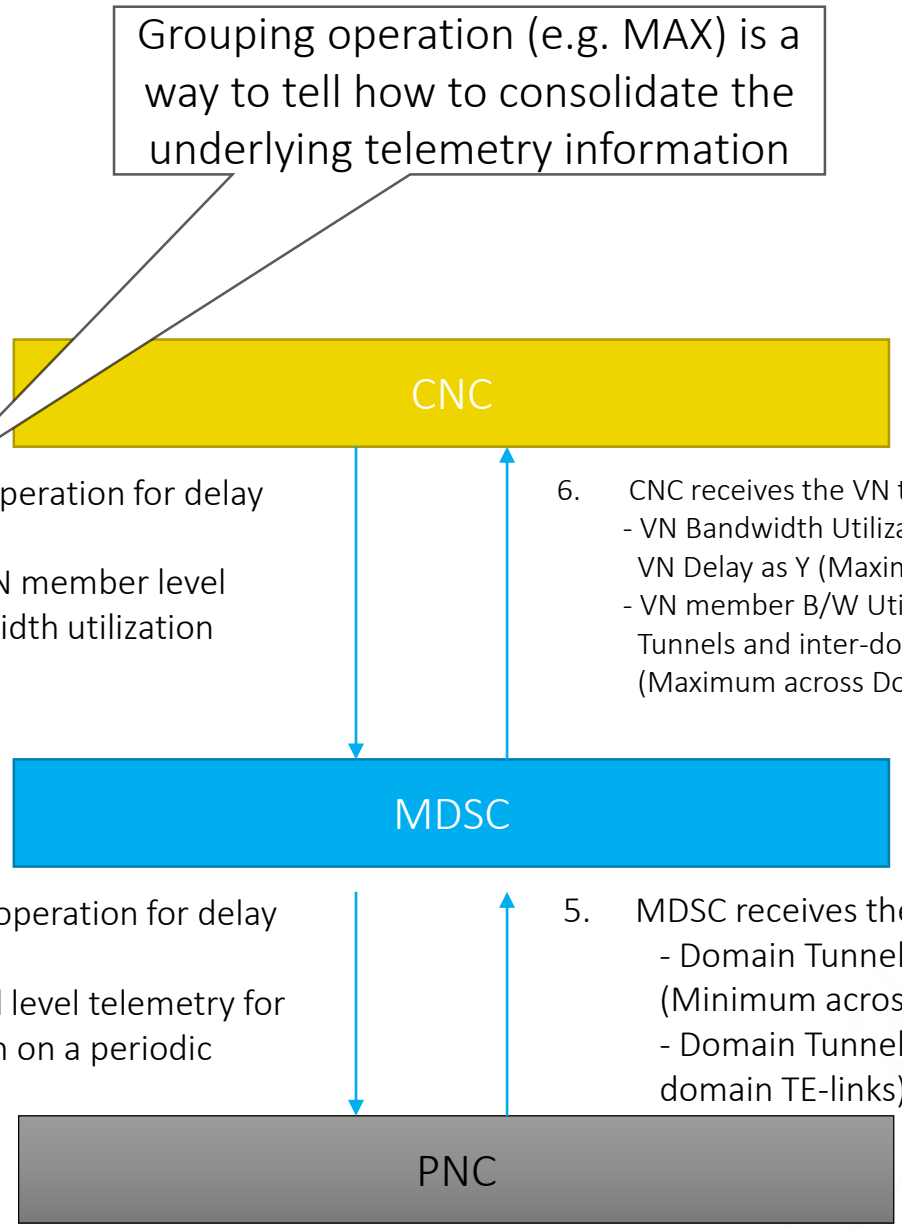


Overview Re-cap

- YANG data models that describe
  - Key Performance Indicator (KPI) telemetry
  - Network autonomics for TE-tunnels and ACTN VNs.
- Requirement 7 [ACTN-Requirement] and [I-D.xu-actn-perf-dynamic-service-control-03] provide the operator's requirements for:
  - Performance Monitoring
  - Dynamic control in ACTN – creation, modification, optimization etc.
  - Monitor Network Traffic, Detects traffic imbalance, Initiate optimization!
  - Measure customer SLA, take dynamic action to make sure you meet them at all times
  - Scalability of Performance data
- Support for
  - Performance telemetry data
  - Scaling Intent

Interactions



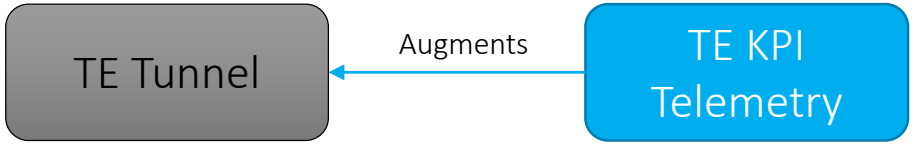
1. CNC configures the grouping-operation for delay and bandwidth utilization.
2. CNC subscribes to the VN or VN member level telemetry for delay and bandwidth utilization streaming data

6. CNC receives the VN telemetry or per VN member data:
   - VN Bandwidth Utilization as X (Minimum across VN- Members); VN Delay as Y (Maximum across VN-Members)
   - VN member B/W Utilization as W (Minimum across Domain Tunnels and inter-domain links); VN member Delay as Z (Maximum across Domain Tunnels and Inter-domain links)

3. MDSC configure the grouping-operation for delay and bandwidth utilization.
4. MDSC subscribes to the Tunnel level telemetry for delay and bandwidth utilization on a periodic basis

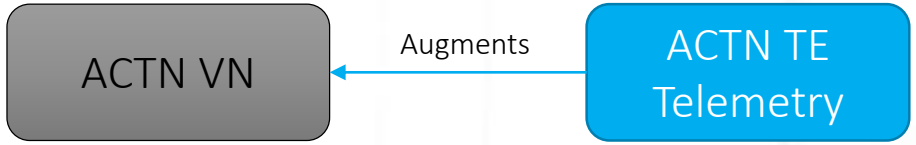
5. MDSC receives the Domain tunnel telemetry data:
   - Domain Tunnel Bandwidth Utilization as X(i) (Minimum across domain TE-links):
   - Domain Tunnel Delay as Y(i) (Maximum across domain TE-links)

Yang Model Relationships



- TE KPI Telemetry model provides the TE tunnel level performance monitoring.
- Augment the TE tunnel State with performance attributes
  - Use the notification subscription mechanism to subscribe to telemetry (YANG PUSH)
- Scaling Intent configurations for auto scaling in/out based on the performance monitored attributes

Enable auto-scaling by configuring the condition when to scale out or in automatically!



- ACTN TE KPI Telemetry model provides the VN level aggregated performance monitoring.
- Augment the VN state as well as individual VN-member state with performance attributes.
  - Use notification subscription (YANG PUSH)
- Scaling Intent configurations at the VN level to reach to the monitored performance KPI
- Allow configuration of aggregation mechanism from the lower level telemetry details (max, mean etc.)
  - From VN-Member to VN
  - From per-domain tunnel to E2E VN-Member

Updates for this version (03)

- Removed packet-loss related data from the models to make the draft/models technology-agonostic.
  - one-way-packet-loss
  - two-way-packet-loss
- Removed packet-loss from grouping operation for network scaling autonomics mechanism.
- Imported ietf-te-types and corrected *utilized-bandwidth* type to te-types:te-bandwidth.
- NMDA Compliancy Status
  - Ietf-te-kpi-telemetry (as this module augments TE-Tunnel module, it depends on that)
  - Ietf-actn-te-kpi-telemetry (NMDA complaint)

Models

```
module: ietf-te-kpi-telemetry
  augment /te:te/te:tunnels/te:tunnel/te:config:
    +--rw te-scaling-intent
       +--rw scale-in
       |  +--rw scale-in-operation-type?
       |  |       scaling-criteria-operation
       |  +--rw threshold-time?            uint32
       |  +--rw scale-in-condition* [performance-type]
       |     +--rw performance-type    identityref
       |     +--rw performance-data?   binary
       +--rw scale-down
          +--rw cooldown-time?              uint32
          +--rw scale-out-operation-type?
          |       scaling-criteria-operation
          +--rw scale-out-condition* [performance-type]
             +--rw performance-type    identityref
             +--rw performance-data?   binary
  augment /te:te/te:tunnels/te:tunnel/te:state:
    +--ro te-telemetry
       +--ro data
          +--ro one-way-delay?             uint32
          +--ro two-way-delay?             uint32
          +--ro one-way-delay-min?         uint32
          +--ro one-way-delay-max?         uint32
          +--ro two-way-delay-min?         uint32
          +--ro two-way-delay-max?         uint32
          +--ro one-way-delay-variation?   uint32
          +--ro two-way-delay-variation?   uint32
          +--ro utilized-bandwidth?        te-types:te-bandwidth
```

```
module: ietf-actn-te-kpi-telemetry
  augment /actn-vn:actn/actn-vn:vn/actn-vn:vn-list:
    +--rw vn-telemetry
    |  +--rw grouping-op
    |  |  +--rw delay-op?                identityref
    |  |  +--rw delay-variation-op?      identityref
    |  |  +--rw utilized-bandwidth-op?   identityref
    |  +--ro data
    |     +--ro one-way-delay?             uint32
    |     +--ro two-way-delay?             uint32
    |     +--ro one-way-delay-min?         uint32
    |     +--ro one-way-delay-max?         uint32
    |     +--ro two-way-delay-min?         uint32
    |     +--ro two-way-delay-max?         uint32
    |     +--ro one-way-delay-variation?   uint32
    |     +--ro two-way-delay-variation?   uint32
    |     +--ro utilized-bandwidth?        te-types:te-bandwidth
    +--rw vn-scaling-intent
       +--rw scale-in
       |  +--rw scale-in-operation-type?
       |  |       scaling-criteria-operation
       |  +--rw threshold-time?            uint32
       |  +--rw scale-in-condition* [performance-type]
       |     +--rw performance-type    identityref
       |     +--rw performance-data?   binary
       +--rw scale-down
          +--rw cooldown-time?              uint32
          +--rw scale-out-operation-type?
          |       scaling-criteria-operation
          +--rw scale-out-condition* [performance-type]
             +--rw performance-type    identityref
             +--rw performance-data?   binary
  augment /actn-vn:actn/actn-vn:vn/actn-vn:vn-list/actn-vn:vn-member-list:
    +--rw vn-telemetry
       +--rw grouping-op
       |  +--rw delay-op?                identityref
       |  +--rw delay-variation-op?      identityref
       |  +--rw utilized-bandwidth-op?   identityref
       +--ro data
          +--ro one-way-delay?             uint32
          +--ro two-way-delay?             uint32
          +--ro one-way-delay-min?         uint32
          +--ro one-way-delay-max?         uint32
          +--ro two-way-delay-min?         uint32
          +--ro two-way-delay-max?         uint32
          +--ro one-way-delay-variation?   uint32
          +--ro two-way-delay-variation?   uint32
          +--ro utilized-bandwidth?        te-types:te-bandwidth
```

Next Steps

- Continue to enhance the model…& Comments are welcome!
- Is this work a good base for WG adoption?


THANK YOU!