

# **Performance Measurement (PM) with Alternate Marking in Network Virtualization Overlays (NVO3)**

**draft-fmm-nvo3-pm-alt-mark-00**

Singapore, Nov 2017, IETF 100

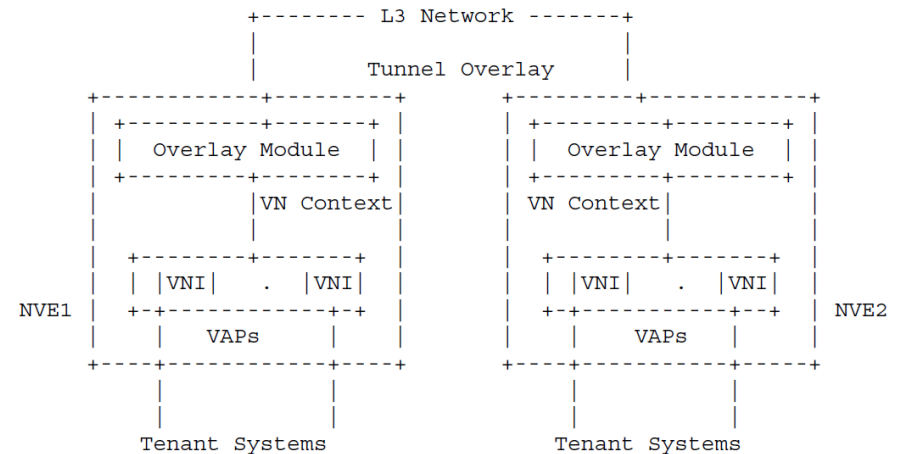
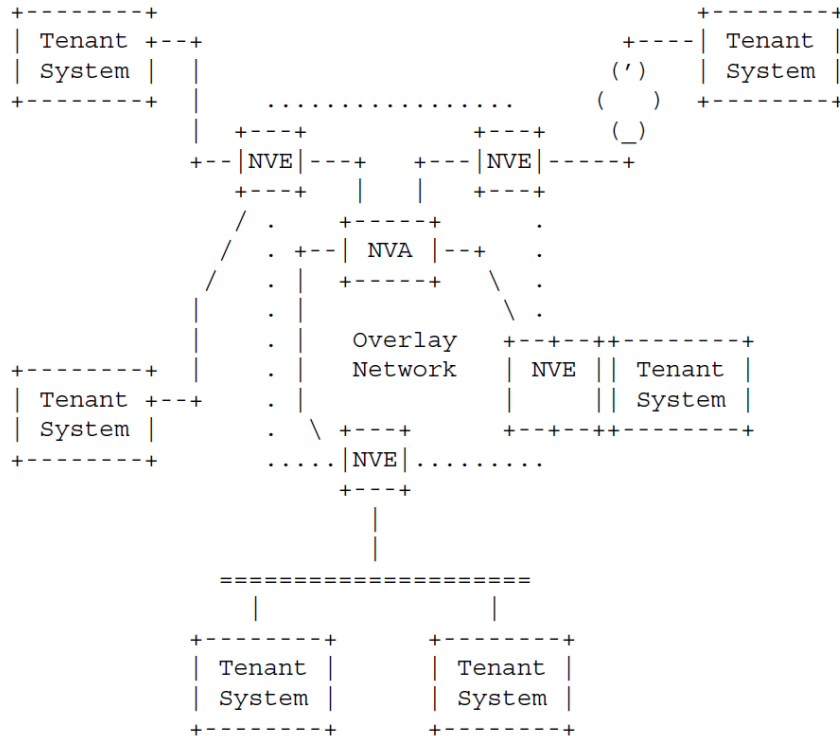
Giuseppe Fioccola (Telecom Italia)

Greg Mirsky (ZTE)

Tal Mizrahi (Marvell)

# Reference Model for DC NVO3 and NVE

- The emulated layer 2 network is provided by the NVE devices to which the Tenant End Systems are connected. This network of NVE can be operated by a single service provider or can span across multiple administrative domains.
- Likewise, the L3 Overlay Network can be operated by a single service provider or span across multiple administrative domains.



# OAM PM in a NVO3 Domain

Each of the layers is responsible for its own OAM. Complex OAM relationships exist as a result of the hierarchical layering, but this is out of scope here.

NVO3 OAM Performance Management **MUST** support measurements per VNI between two NVE devices that support the same VNI within a given NVO3 domain

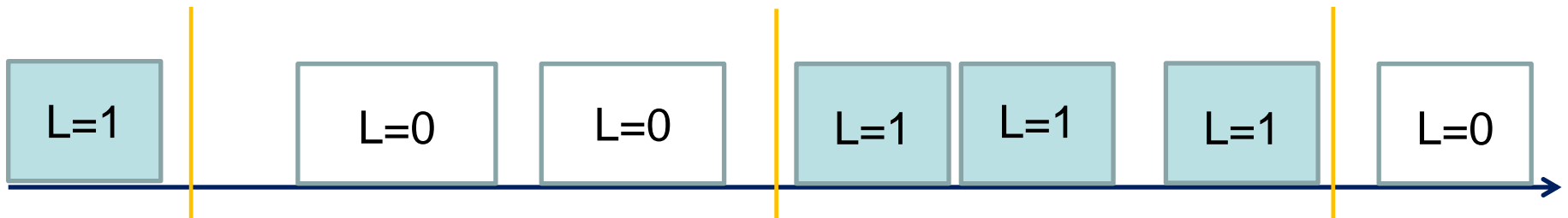
- Packet Loss,
- Delay
- Jitter (Delay variation)

# Marking Method Operation in NVO3

- draft-ietf-nvo3-encap recommended to address requirements for OAM considerations for alternate marking and for performance measurements that need 2 bits in the header
- Every NVO3 Header draft-ietf-nvo3-geneve, draft-ietf-nvo3-vxlan-gpe and draft-ietf-nvo3-gue can be considered for the application of AMM (Alternate Marking Method)
- Using the marking method NVE creates distinct sub-flows.  
Each sub-flow consists of consecutive blocks that are unambiguously recognizable by a monitoring point at any component of the NVO3 and can be measured to calculate packet loss and/or packet delay metrics.

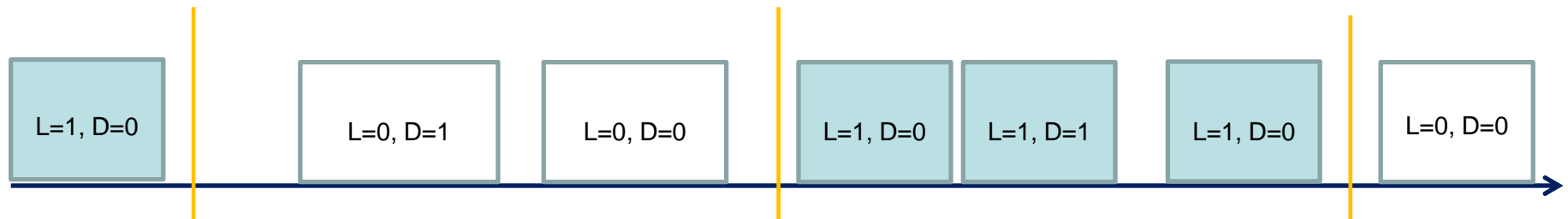
# Single Mark Method

- Batching packets based on time interval to measure packet loss by switching value of the L flag. D flag MUST be set to 0 on transmit and ignored on receipt.
- First/Last Packet Delay calculation:
  - capture timestamp of when L flag value flips. Method is sensitive to packet loss and packet re-ordering
- Average Packet Delay calculation:
  - collect timestamps for each packet received within a single block. Average of the timestamp is the sum of all the timestamps divided by the total number of packets received. Hence minimally impacted by a packet loss and no impact if packets get re-ordered.
- Average Delay Variation calculation is possible



# Double Mark Method

- Use L flag to create batch of packets as in Single Mark method
- Use D flag to create new set of marked packets that are fully identified over the NVO3 network
- Collect and compare timestamps on D-marked packets to calculate more informative one-way packet delay metrics, such as minimum, maximum delay, median and percentiles values.
- Double mark method may be implemented by multiplexing fields or making certain assumptions about characteristic information that identifies the flow. See also [draft-mizrahi-ippm-compact-alternate-marking](#)





# Next Steps

- Multipoint Alternate Marking Use Case  
(see [draft-fioccola-ippm-multipoint-alt-mark](#))
- Welcome questions, comments
- Address comments
- Adopt by WG

Thank you