

Multipoint Alternate Marking method for passive and hybrid performance monitoring

draft-ietf-ippm-multipoint-alt-mark-03

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Summary:

An Intelligent OAM approach

RFC 8321 to monitor unicast point-to-point flows or multicast flows



Multipoint Alt Mark to monitor multipoint unicast flows without any constrain

Motivation: It is resource consuming to monitor continuously all the flows and all the paths

Solution: A Controller can calibrate and manage the Performance Measurements.

It can start without examining in depth. In case of necessity, an immediate detailed analysis can be reconfigured and performed and the problem can be localized

Implementation:

Two ways: The traffic filter can be changed to select more detailed flows or new measurement points can be activated by defining appropriate Clusters.

The **Network Clusters** partition divides the Network Graph into the smallest subnetworks called Clusters. These Clusters can be combined and used at different levels to perform the needed degree of detail.

Changes from -02

This new revision addresses the comments received during the last IETF meeting and on the mailing list.

- In particular we have added the reference to the paper "**Multipoint Passive Monitoring in Packet Networks**" that has been accepted by the **IEEE/ACM Transactions on Networking journal**
 - Definition and mathematical formalization of the **algorithm for Cluster partition that can be applied to every graph.**
 - Two algorithms: Iterative clustering algorithm and Recursive clustering algorithm
- You can download from here:

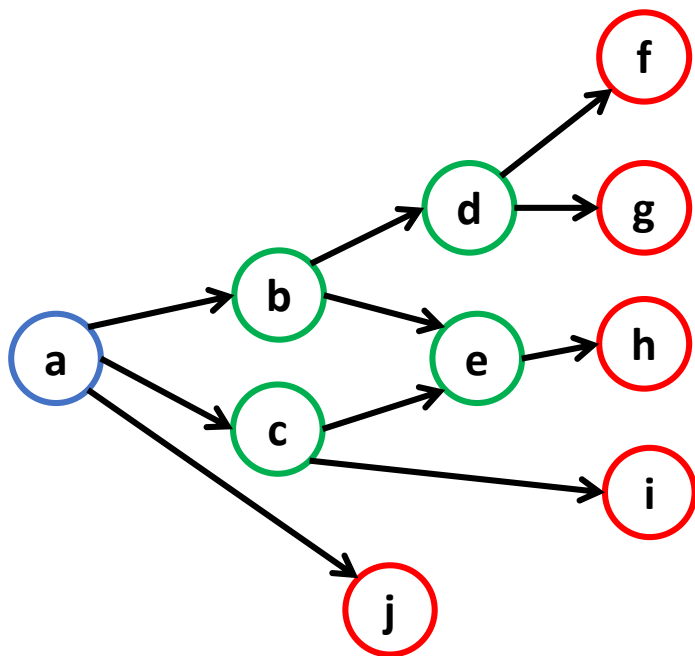
<https://iris.polito.it/retrieve/handle/11583/2765734/285822/FINAL%20VERSION.PDF>

A look at the algorithm for Cluster partition of a graph

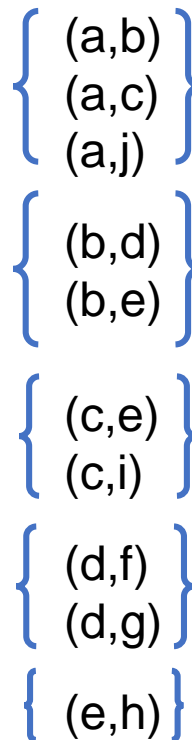
A possible algorithm for Cluster partition is a two-step algorithm (Iterative clustering algorithm):

1. Group the links where there is the same starting node;
2. Join the grouped links with at least one ending node in common.

Example

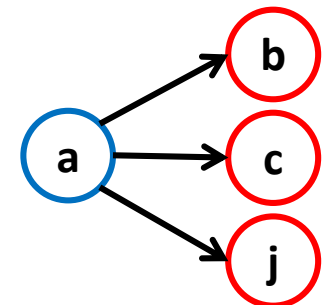


First step:

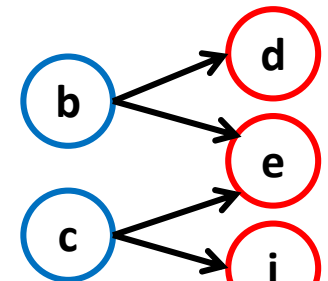


Second step:

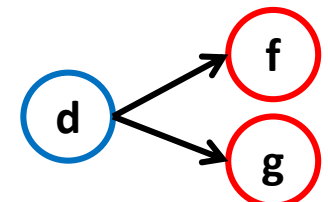
Cluster 1: (a,b)
(a,c)
(a,j)



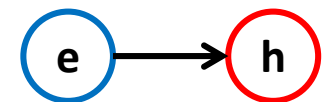
Cluster 2: (b,d)
(b,e)
(c,e)
(c,i)



Cluster 3: (d,f)
(d,g)



Cluster 4: (e,h)



A complete Performance Measurement Framework

- **Packet Loss** can be measured on Cluster basis or by considering a combination of Clusters; and the borderline cases of single flows and whole network.
- **Delay measurements** can be done in different ways:
 - **multipoint path basis measurement:** the delay value is representative of an entire multipoint path. The mean delay for a multipoint path can be defined.
 - **single packet basis measurement:** the multipoint path is used just to easily couple packets between inputs and output nodes of a multipoint path. Hashing (**RFC5475**) and Multipoint Alternate Marking are coupled in this case
 - Clusters simplify the correlation of the samples from a topological point of view **in terms of space**
 - Marking method anchor the samples to a specific period and simplify the correlation **in terms of time**

Next steps

The document is stable.

Beginning the path to become RFC.

Inputs and Comments always welcome