

The 54th IETF Meeting - MAGMA Working Group

Measuring the performance of multicast services

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Emile STEPHAN

France Telecom R&D

What are the requirements ?

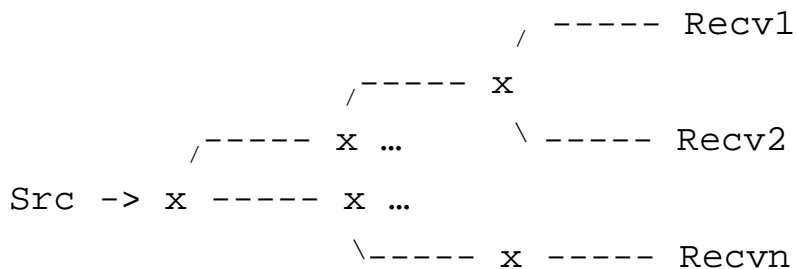
- Multicast performance metrics are needed for several reasons:
 - + for designing and engineering the multicast trees of the networks;
 - + for accounting multicast services;
 - + for controlling the quality of the multicast services;
 - + for controlling the performance of the inter domain multicast services.

Spatial metrics

H0 ----- H1 ----- H2 ... ----- Rcv1

- Type-P-spatial-hop-one-way-delay (§4)
The one way delay value between 2 sequential nodes of a path digest.
- Type-P-spatial-one-way-delay-stream (§5)
The sequence of the spatial one way delay values of a path digest.
- Type-P-spatial-one-way-delay (§6)
The sum of the spatial one way delay values of a path digest.

Multicast network metrics



- **Type-P-Multicast-Instantaneous-One-way-Delay-Stream (§7)**
The set of the one way delay values between the source and each receiver.
- **Type-P-Multicast-Instantaneous-Packet-Loss-Stream (§9)**
The set of the packet loss results between the source and each receiver.
- **Type-P-Multicast-Instantaneous-Connectivity (§11)**
the number of time the measurement packet is repeated by a node (*).

* For routers or equivalent

Indicators of multicast QOS (1/2)

- Statistics for Multicast instantaneous One-way Delay:
 - Type-P-Multicast-Instantaneous-Hop-One-way-Delay (§ 8.1)

The average of all the delay **per hop** values of a Type-P-Multicast-Instantaneous-**Hop-One-way-Delay** (*).
 - Type-P-Multicast-Instantaneous-One-way-Delay-Percentile (§ 8.2),
Type-P-Multicast-Instantaneous-One-way-Delay-Median (§8.3),
& Type-P-Multicast-Instantaneous-One-way-Delay-Inverse (§8.4):

The percentile, median, inverse percentile of all the **end to end** delay values of a Type-P-Multicast-Instantaneous-One-way-Delay-Stream.

* For routers or equivalent

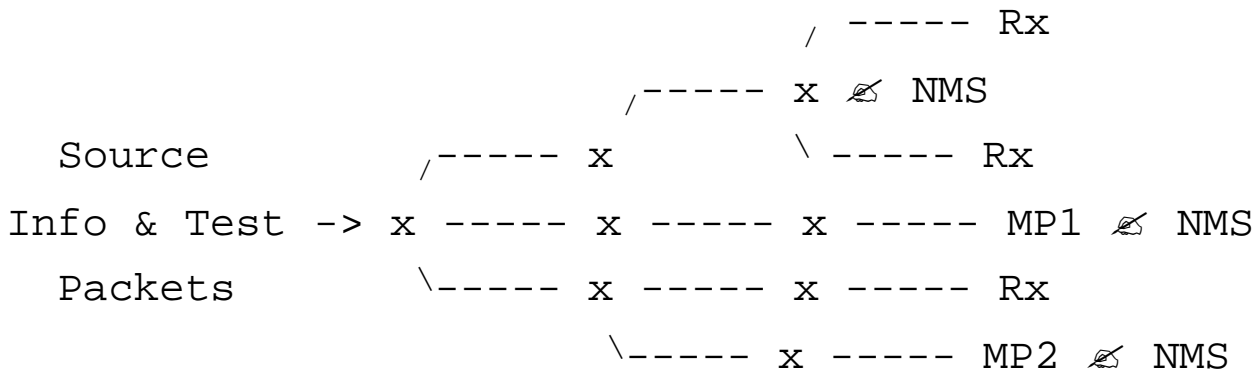
Indicators of multicast QOS (2/2)

- Statistics for Multicast instantaneous Packet Loss
 - Type-P-Multicast-Instantaneous-Packet-Loss-Percentile (§ 10.1), Type-P-Multicast-Instantaneous-Packet-Loss-Median (§ 10.2), Type-P-Multicast-Instantaneous-Packet-Loss-Inverse Percentile (§10.3):

The percentile, median, inverse percentile of all the **end to end** packet loss values of a Type-P-Multicast-Instantaneous-Packet-Loss-Stream

Measurement system using SNMP Traps and InformPDUs

- A basic system:
 - On the fly setup, measure and reporting
- Inband stateless Setup using a SNMP Trap that acts as the test packet;
- Acknowledged outband reporting using SNMP InformPDUs



ippmMulticastInstantaneousMeasureSetup (1/3)

Setup of an instantaneous multicast measure sent by the broadcasting application in the multicast channel.

ippmMulticastInstantaneousMeasureSetup NOTIFICATION-TYPE

OBJECTS {

ippmMeasureOwner,	-- measure setup
ippmMeasureIndex,	
ippmSystemTime,	-- time the setup is sent (to be added in the release 01)
ippmNetworkMeasureSrcTypeP,	-- Network measure setup
ippmNetworkMeasureSrc,	
ippmNetworkMeasureDstTypeP,	
ippmNetworkMeasureDst,	
ippmNetworkMeasureTimeoutDelay,	
ippmReportSetupNMS,	-- report setup

The other parameters of the measure is defined in the description field of the
ippmMulticastInstantaneousMeasureSetup

ippmMulticastInstantaneousMeasureSetup (2/3)

On reception of the ippmMulticastInstantaneousMeasureSetup

setup the receiver or the router:

- + timestamp the arrival time of the setup;
- + considers the following defaults values;
- + prepare the ippmMulticastInstantaneousMeasureReport notification;
- + send the report using a SNMP Inform PDU.

Defaults values:

IppmMeasureEntry default values:

ippmMeasureName: ippmMulticastInstantaneousMeasure;

ippmMeasureMetrics: {

Type-P-One-way-Delay,

Type-P-One-way-Packet-Loss,

Type-P-Multicast-Instantaneous-Connectivity, (*)

Type-P-spatial-hop-one-way-delay (*)

}

ippmMeasureStatus: createAndGo

*) only considered by routers.

ippmMulticastInstantaneousMeasureSetup (3/3)

pmMulticastInstantaneousMeasureReport default values:

```
IppmReportSetupDefinition: {  
    onSingleton,  
    inInformRequestPDU,  
    clearHistory  
}
```

```
ippmReportSetupMetricThreshold: 0  
ippmReportSetupEventsDurationThreshold: 0
```

ippmMulticastInstantaneousMeasureReport

ippmMulticastInstantaneousMeasureReport NOTIFICATION-TYPE

OBJECTS {

-- measure setup

ippmMeasureOwner,
ippmMeasureIndex,

-- Network measure setup

ippmNetworkMeasureSrcTypeP,
ippmNetworkMeasureSrc,
ippmNetworkMeasureDstTypeP,
ippmNetworkMeasureDst,

-- report of the measure

ippmHistoryTimeMark, -- timestamp
ippmHistoryValue, -- value of the Type-P-One-way-Delay
ippmHistoryValue, -- value of the Type-P-One-way-Packet-Loss
ippmHistoryValue, -- value of the Type-P-Multicast-Instantaneous-Connectivity (*)
ippmHistoryValue -- value of the Type-P-spatial-hop-one-way-delay (*)

Discussion

- Pro:
 - NOTIFICATION-TYPE available and adaptable
 - Inter domain, Measurement packet interoperability
 - Scalable
 - Snap shot of the performance
 - Low control bandwidth
 - Stateless (or not).
- Con:
 - Security: Are the regular info packets trustable ?
 - ...
- Evolution
 - Interdomain peering management ?
 - ...