Backhaul Network Performance Monitoring Analysis

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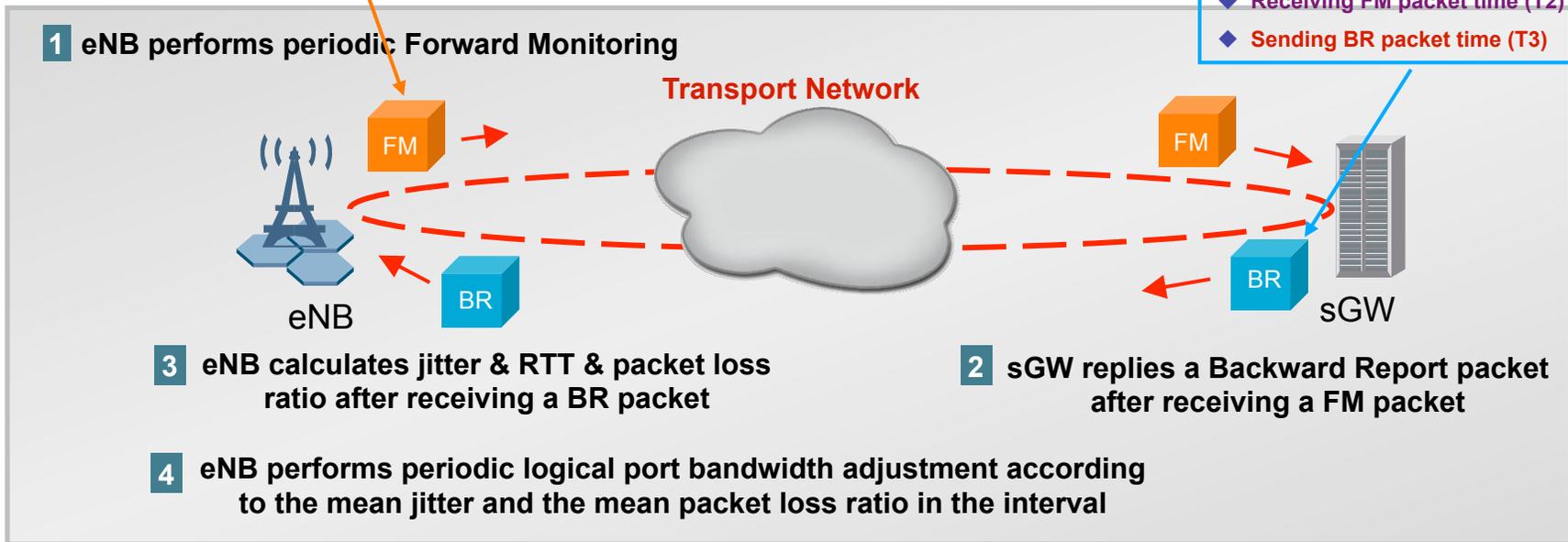
Requirements about Passive Measurement

- In NGMN "Optimized Backhaul Requirements" document, there are several requirements about RAN sharing, which leads to the bandwidth adjustment requirements.

- The NGMN bandwidth requirements point that "In case of RAN Sharing, the eNB/aGW transport modules should priorities the traffic of a certain operator within a certain portion of the overall transport bandwidth. This will enable a fair use of transport resources in the case where the two operators have different strategies".

- The NGMN connective requirements point that "The NGMN Backhaul solution MUST allow connecting each e-NB to one or several aGW's (i.e. S1 interface in 3GPP LTE standard) for multi-homing purpose (e.g. S1-flex in 3GPP LTE standard) or multi-operator RAN Sharing reason."

- In backhaul network, there must be performance monitoring mechanism to check the traffic status in the network, with the status information, eNBs can "priorities the traffic of a certain operator within a certain portion of the overall transport bandwidth" as the NGMN requirements.

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Solution from Huawei

IP Performance Monitoring Adaptive Bandwidth Adjustment

- ◆ FSN n
- ◆ **Total packet sent (PkTx)**
- ◆ **Total byte sent (ByteTx)**
- ◆ **Sending FM packet time (T1)**

- ◆ FSN n
- ◆ **Total packet sent (PkTx)**
- ◆ **Total byte sent (ByteTx)**
- ◆ **Sending FM packet time (T1)**
- ◆ **Total packet received (PkRx)**
- ◆ **Total byte received (ByteTx)**
- ◆ **Receiving FM packet time (T2)**
- ◆ **Sending BR packet time (T3)**

Transport Network

1 eNB performs periodic Forward Monitoring

FM

FM

BR

BR

eNB

sGW

3 eNB calculates jitter & RTT & packet loss ratio after receiving a BR packet

2 sGW replies a Backward Report packet after receiving a FM packet

4 eNB performs periodic logical port bandwidth adjustment according to the mean jitter and the mean packet loss ratio in the interval

IP Performance Monitroring Maintain fairness and differentiation between flow-control services in transport bandwidth variation scenarios

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An IP Performance Monitoring cycle

eNB

S-GW

Record total packet and byte sent

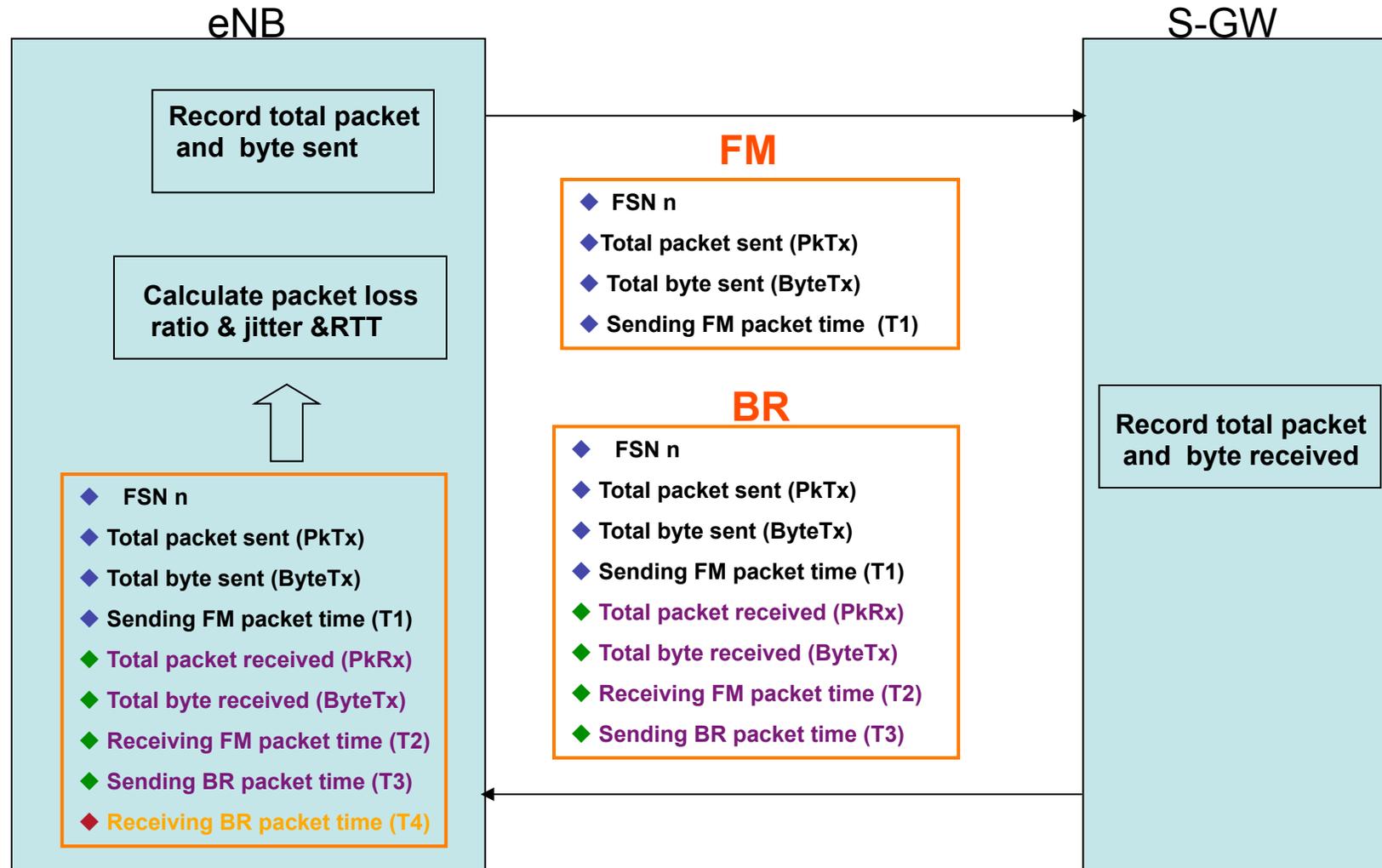**Calculate packet loss ratio & jitter &RTT**

FM

- ◆ FSN n
- ◆ Total packet sent (PkTx)
- ◆ Total byte sent (ByteTx)
- ◆ Sending FM packet time (T1)

BR

- ◆ FSN n
- ◆ Total packet sent (PkTx)
- ◆ Total byte sent (ByteTx)
- ◆ Sending FM packet time (T1)
- ◆ Total packet received (PkRx)
- ◆ Total byte received (ByteTx)
- ◆ Receiving FM packet time (T2)
- ◆ Sending BR packet time (T3)

Record total packet and byte received

- ◆ FSN n
- ◆ Total packet sent (PkTx)
- ◆ Total byte sent (ByteTx)
- ◆ Sending FM packet time (T1)
- ◆ Total packet received (PkRx)
- ◆ Total byte received (ByteTx)
- ◆ Receiving FM packet time (T2)
- ◆ Sending BR packet time (T3)
- ◆ Receiving BR packet time (T4)

- ◆ **eNB sends a FM packet periodically**
- ◆ **S-GW replies a BR packet after receiving a FM packet**
- ◆ **eNB calculates the IP QoS performance after receiving a S-GW packet**

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Proposal and question

Proposal:

- Standardize the Passive Measurement negotiation process

- Standardize the Passive measurement metrics

Question:

- If the Passive Measurement standardization work can be done in IPPM working group?

- Is it possible to build another working group which focuses on Passive Measurement?

Thank You

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