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QoS Measurement in Int.nal Voice Service

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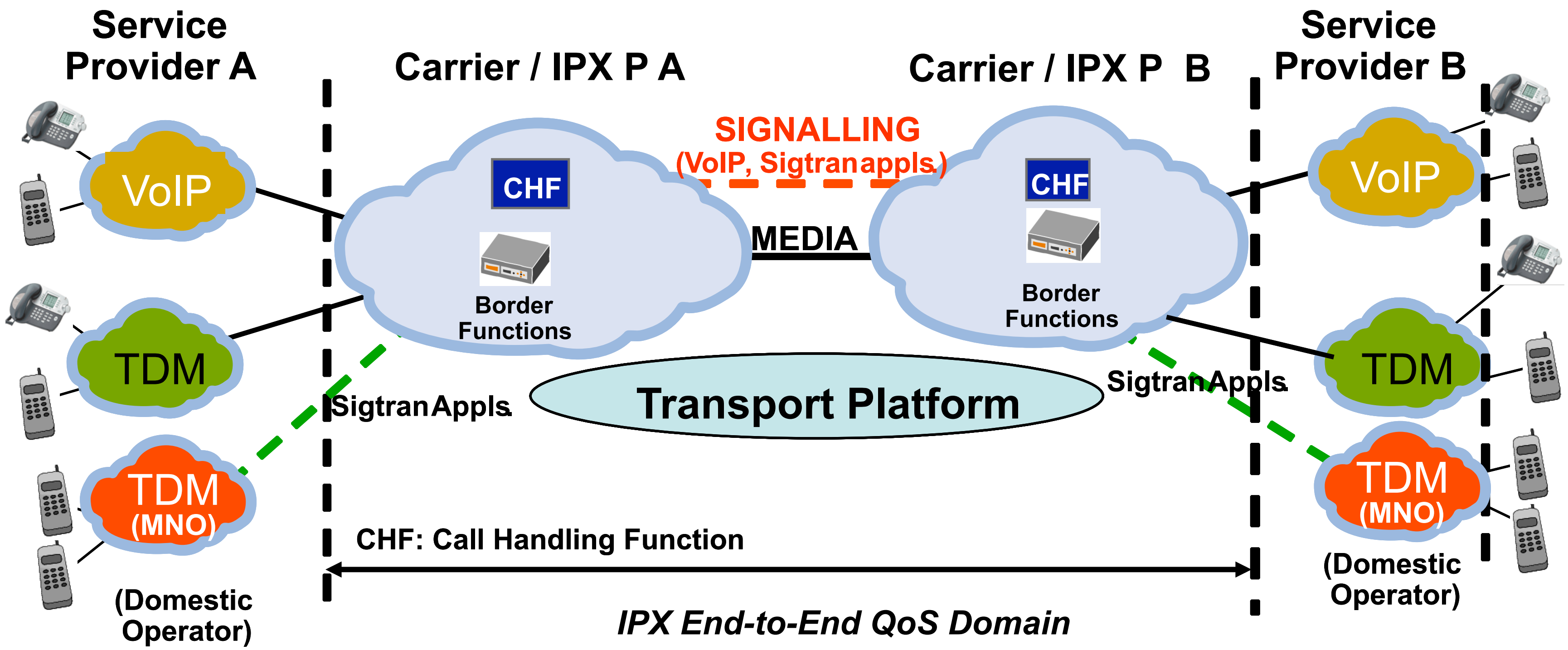
i³ forum
international ip interconnection

Agenda

- The GSMA Requirements
- The RTCP methodology
- Suggested Methodologies
  - “Aggregation” Scheme
  - “Media Loopback” Methodologies
- Proposed i3f guideline

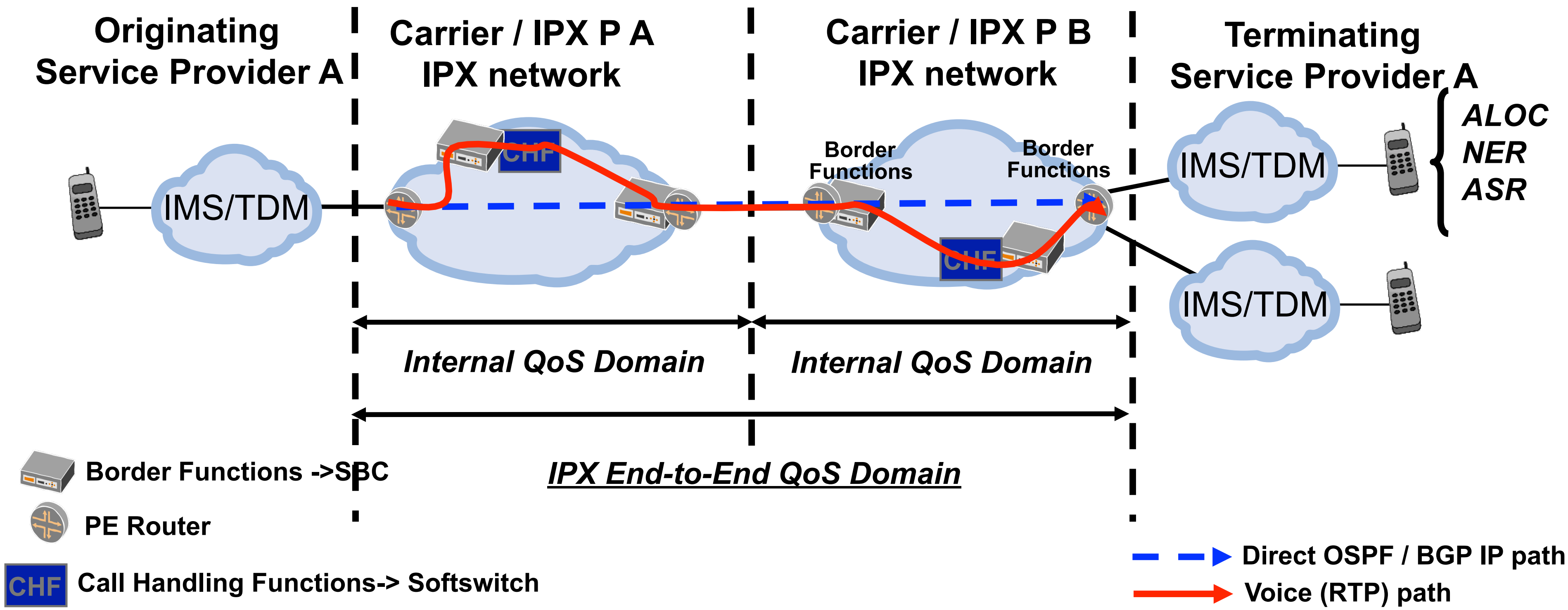
General Reference Configuration



- More than 2 carriers can be present in the end-to-end segment
- Border functions are not always located at the carrier's network edge -> €€ IMPACT
- Measurement of traditional Voice (e.g. ALOC, ASR, NER) parameters spans up to final user -> NO PROBLEM

GSMA requirements (PVI AA.81)

- The RTP path of the voice service may be different than the "direct OSPF/ BGP" IP path of the data service



- GSMA (AA.81): "*Transport (IP) Quality... shall be measured and reported for the path carrying PVI service*" -> Mutual trust among Carriers / IPX Providers
- RT Delay, Packet Loss, Packet Jitter -> MOS (Mean Opinion Score)

HOW to achieve QoS Control end-to-end?

Active vs. Passive Measurement Methodologies

Active

Methodology: Measurement by actively setting up test sessions across test domain

Pros:

- Can also provide MOS_{CQE}
- Control of measurement domain
- Other metrics available

Cons:

- Not always representative of real traffic path
- Large number of sessions may be required to provide full coverage e.g. N^2 problem

Passive

Methodology: Measurement by passively monitoring traffic sessions across the test domain

Pros:

- MOS_{CQE}
- Accurate representation of real performance
- Easy to configure
- Measurements easy to analyze

Cons:

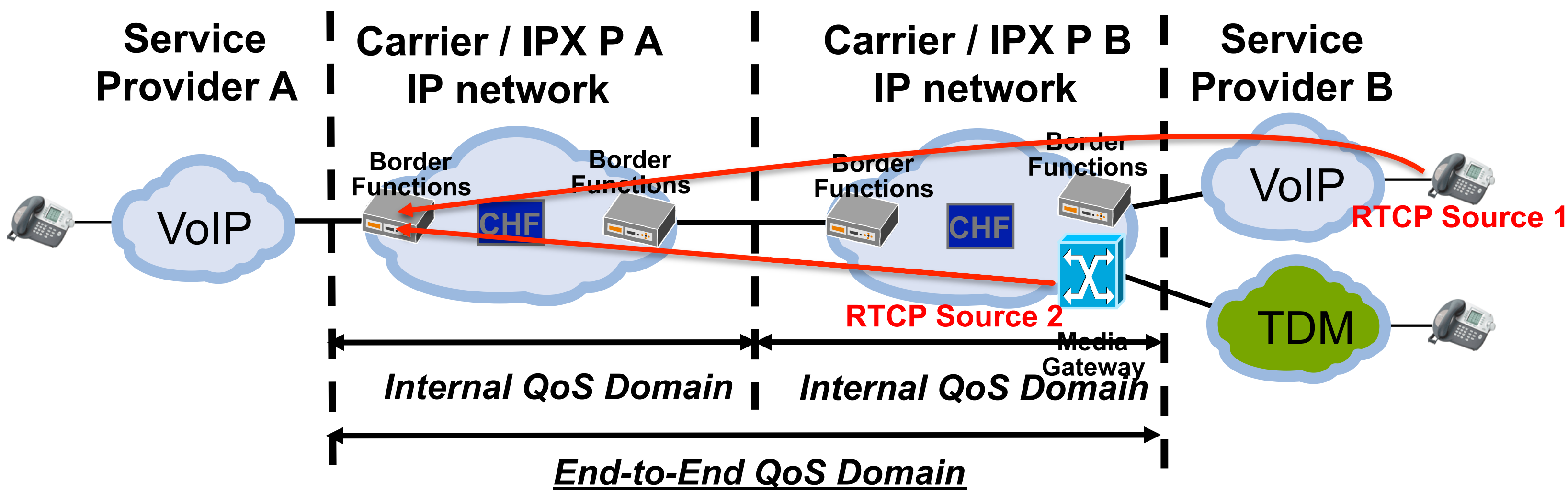
- Uncertain control of measurement domain
- Limited diagnostic ability

Whatever the methodology is, carriers have to invest at the network layer and for development of the OSS/BSS capabilities

An immediate answer: using RTCP (RTP Control Protocol)

PROS:

- based on real traffic -> accurate measurement
- no need of new standard
- available (as an option) in SBC
- calculates MOS_{CQE} from the R-Factor /E-model
- delay, jitter, loss from RTCP sender and receiver reports



It is not possible to distinguish the location of the RTP end-point

No reliable, accurate solution is available

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i3f Solution Requirements

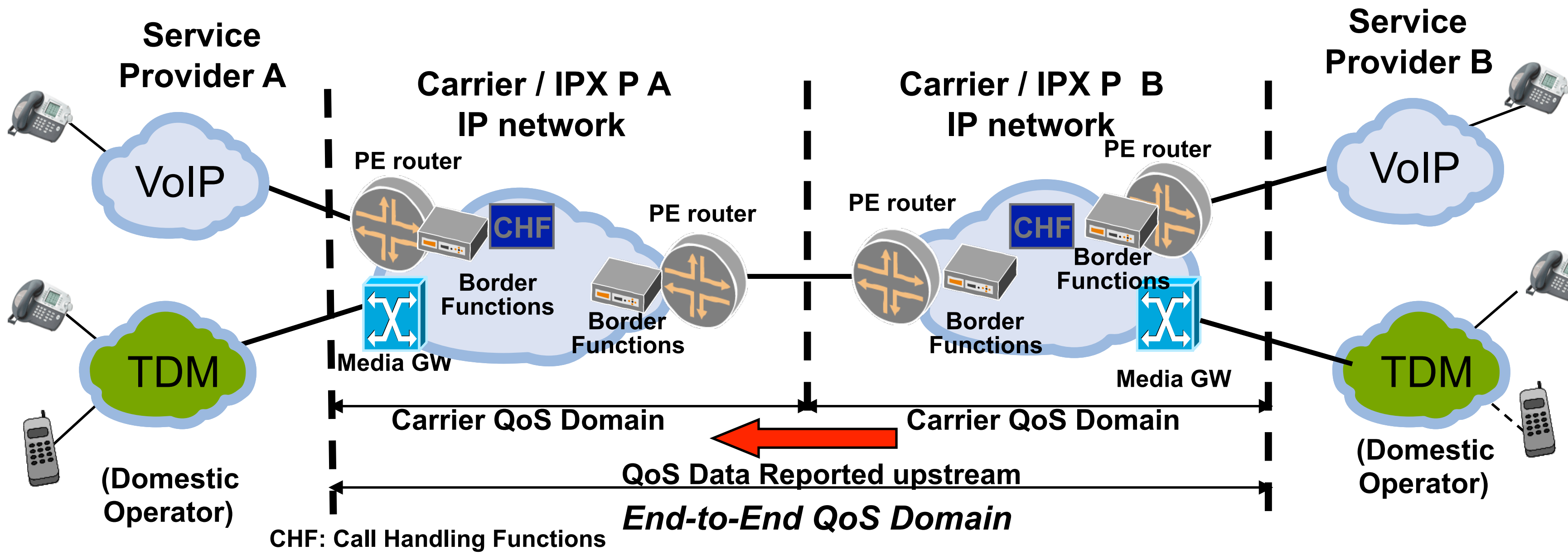
The selected methodology should be:

- "controllable" for a full set of transport parameters (provide measurement for identifiable domain(s))
- active or passive
- not vendor proprietary but with a broad industry support
- preferably integrated into existing equipment
- based on recognized standard i.e. from IETF/ITU-T
- relatively easy to integrate into OSS/BSS chain
- with a limited/reasonable deployment overhead
- capable to provide MOS_{CQE}
- capable to assist with SLA monitoring and troubleshooting
- capable in "*supporting*" at least Bilateral and IPX use cases

Activity carried out in parallel with vendors (2 open workshop plus constant contacts) and MNO representatives on behalf GSMA

QoS Methodologies: Quality Measurement Aggregation

- Each carrier monitors quality across their internal QoS domain using their chosen mechanism (e.g. probe servers or RTCP)

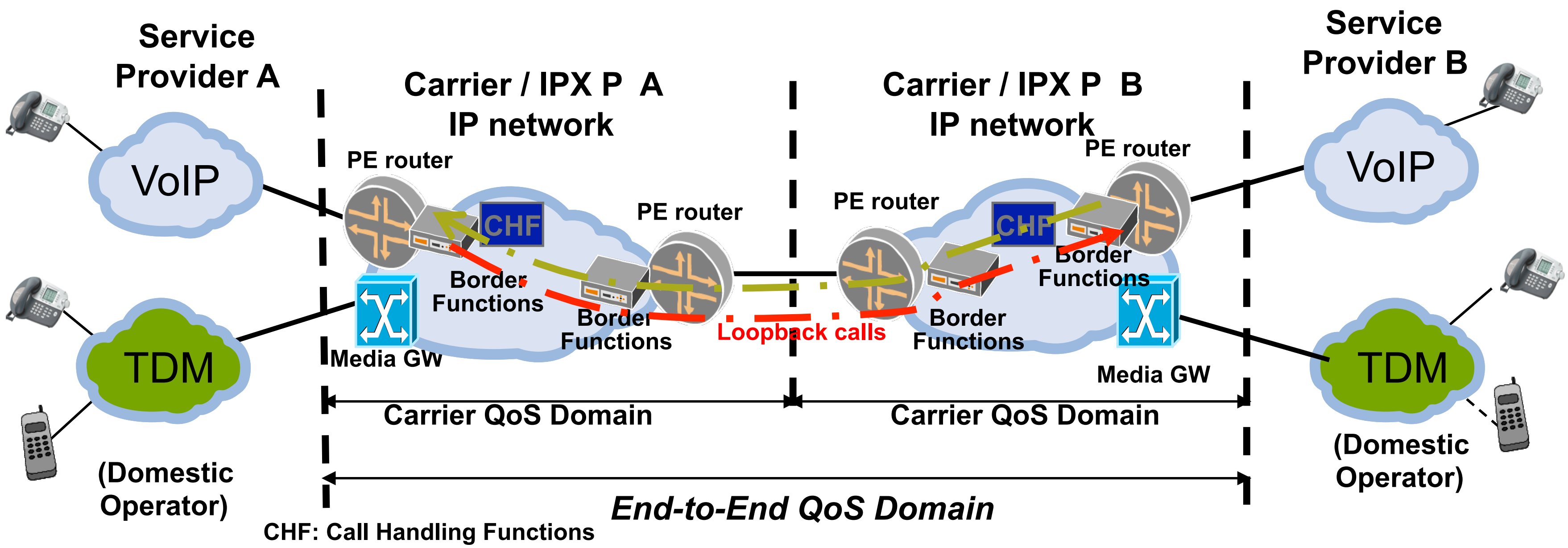


KPIs are computed **AGGREGATING** the values measured by each carrier / IPX P.

- *Delay*: estimated by adding up the delay of each carrier network
- *Loss*: estimated as the complement of joint probability of the event "Successful Packet Transmission"
- *Jitter*: no aggregation scheme. Jitter measured by the last carrier is provided

QoS Methodologies: Media Loop-back

- The Border Functions (i.e. SBC) make testing calls to dummy numbers terminated to the last SBC present in the carrier domain, based on *Draft IETF -mmusic-media-loopback-18 "An Extension to the Session Description Protocol (SDP) for Media Loopback"*



- *Encapsulated scheme:* encapsulated source RTP sent back to sender

- for *MOS_{CQE} (R-Factor / E-model)* computation: one way delay is needed so the two transmission paths should be symmetrical

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Proposed i3f guideline: 5 principles

- **P1**: i3 recognises GSMA requirements of E2E QoS measurement. ***This task, today, is challenging***

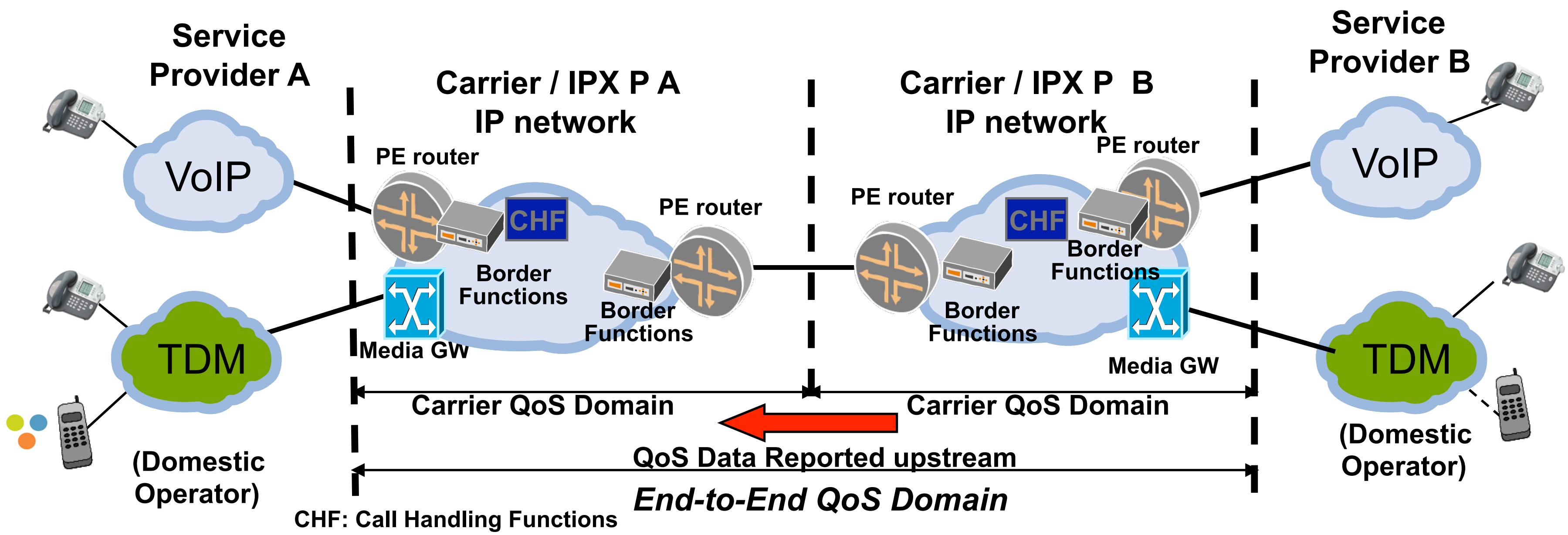
- **P2**: In case of a ***1 single Carrier / IPX Provider*** domain the solution is based on
  - Delay via RTCP (but RTP via external probes can be used)
  - Loss via RTP
  - Jitter via RTP
- which allows to compute MOS_{CQE} via R-Factor/E-Model

- **P3**: In case of a 2 Carriers / IPX Providers domain the ***today recommended solution is based on Aggregation***

- **P4**: In case of a 2 Carriers / IPX Providers domain the ***future recommended solution is based on media Loopback*** – encapsulated scheme

- **P5**: Service parameters (ASR, ALOC, NER, …..) can be measured as per requirement following “traditional” schemes

P3: TODAY solution for multiple networks domain based on Aggregation



Methodology widely used in current IPX trials

Some issues:

- How to pass QoS data?
- Jitter values cannot be worked out by aggregation

P4: FUTURE solution for multiple networks domain based on Media Loop-back

Some issues:

- Carrier B has to allow dummy calls -> mutual trust
- Which number to be called (Tel URI or Sip URI)? And belonging to whom?
- Large number of loopback sessions is required. It increases with a quadratic law.

Assuming fully meshed interconnection network

Overestimation

N_IPXP	20,00
N_POP/IPXP	8,00
N_Call/h	2,00
minutes/Call	0,50
N_Calls/day/pop	7.632,00
N_calls/day/IPXP	61.056,00
N_minutes/day/IPXP	30.528,00
N_minutes/month/IPXP	915.840,00
N_minutes/year/IPXP	10.990.080,00
N_minutes/day/IPXdomain	610.560,00
N_minutes/month/IPXdomain	18.316.800,00

Thank You