Routing Optimization and Service Assurance for LTE/IPX

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Network Ecosystem of tomorrow

Source: i3Forum
New choices... the complete picture!

New Routing Decision Points:

- QoS / New KPI’s
- Rate / Tiers
- Commitments / Bundles
- Connectivity required (Direct, Indirect, Break-out connectivity)
- Capacity / Volume
- Origination Service / Session type
- Codec requirements (match codec to minimize transcoding)
- Supplier Product / Service Differentiation
- Destination address / Dial Codes / TEL-SIP URI
- Destination address resolution / ENUM / NP lookup
- Destination type SIP / TDM (SIP or SIP-I)
- Origination / Dial Codes / Country Codes / SIP URI
- Jurisdictions / Regulatory issues
Define **Optimized Routing Policies** for each service

Consider all **business and technical parameters**

Enable **Centralized Routing Control**

- ENUM and NP address resolution

Solution for **all major network equipment providers**
Service Assurance
Need for Quality

General Approach
- Monitoring (supervision) against given thresholds (QoS reporting)
- Troubleshooting where breached
- Service Level Agreement (SLA)

Recommended QoS Measurements for IPX:
- Transport parameters
  - round-trip delay
  - jitter
  - packet loss
- Service parameters
  - MOS CQE / R-factor
  - ALOC
  - ASR
  - NER
  - PGRD (PGRD is preferred over PGAD)
  - CLI (not mandatory but recommended)
  - Service Capabilities, e.g. HD Voice (new)

Successful measurements however harder to achieve in practise...

Source: i3Forum
Challenges with ensuring QoS

- Problem 1: RTCP report source ambiguity between RTCP Source 1 & 2
  → Carrier border function does not know what it is measuring!

- Problem 2: RTCP measurement to end user device is not useful
  → Quality across the carrier domains needed, end SP quality useful but not needed

Problems 1 & 2 exists in all use cases, however depending on the relationship between carriers RTCP can be made to work, e.g. in a controlled Bilateral case
CSG Active QoS Testing
CSG Solution Approach

- Identify all possible Routes to Service Provider termination
- Map out all Service Capabilities, Availability and QoS KPIs
- Execute Test schedules
- Test nodes already in operation at more than 400+ Service Provider networks
- Nodes provide secure KPI feedback results “out of band”
- Pro-active testing for SLA mgt
- Perform Routing Optimization based on feedback
CSG Recommendations

- New and **Additional Routing Parameters** to consider
- Combine **Commercial and Technical Routing** for optimal results
- **Challenges** in how to obtain **reliable/un-ambiguous QoS KPIs**
- Strive for **True QoS Test Cases** e.g. from carriers ingress point to end user
- Enable **smarter routing with ENUM and NP look up’s**
- Aim for **Centralized Routing execution for IPX and TDM legacy networks**