PROCERA

SCORECARD

Scoring Network QoE:
Do operators truly understand subscriber experience?

CHALLENGE

In recent years, Subscriber's definition of network quality has drastically changed. Over-The-Top (OTT) services are being utilized more than ever. Expectations of quality once revolved around mobile phone signal strength or whether SMS worked but, now relate to whether streaming HD video works consistently and clearly. Customers are looking for operators who can provide the best experience possible.

As expectations change, how do network operators define and measure what qualifies as the best subscriber experience? Traditionally operators have used quotas and theoretical speeds to determine their network quality. However this makes it very difficult to differentiate their competitive offerings for subscribers as they cannot measure Quality of Experience (QoE). For example, comparing an 8 Mbps DSL connection to an 8 Mbps 3G connection, or even an 8 Mbps connection on Cable, results in different QoE for different services. So how can operators measure and explain this?

Operators are now being reviewed and graded by OTT content providers and customers are using these numbers to compare broadband service quality. Currently, operators cannot verify the numbers reported by these outside services and as a result, find it difficult to find ways to improve. A root cause breakdown by service, not just a general performance rank, is required to properly assess network quality. Operators need actionable reports that can not only tell them how their network is performing, but why it is performing this way and how they can invest to maximize their ROI.

SOLUTION

Operators need to differentiate their offerings based on the quality they can deliver to their end-customers. They can do this by measuring the capability of the network in application categories that consumers can easily understand. Although this is a sound strategy, execution is challenging. As networks become more complex and traffic volumes increase rapidly, the challenge also increases.

To properly assess network quality and take action, operators can explore several different options, however each comes with their own trade-offs and shortcomings:

- **Passive Probe Systems** can measure QoE, but do not enable action to be taken. The focus is on signalling so these systems tend to lead to a simplistic view of QoE that only focuses on the start of a session.

The ScoreCard solution is quick to implement and monitors all data traffic in real-time.

- **OSS Systems getting data from routing nodes** are difficult to get one consistent view of a network. Measurements throughout the network must be done in nodes, which takes a performance toll and makes it difficult to compare QoE with other vendors.

- **Big Data Solutions** are very custom and specific in their use and do not provide real-time insights making information gathered from these systems relatively expensive and difficult to take immediate action into known issues.

- **Active Measuring Systems** provide real-time insights, but are intrusive to the end user, cost extra bandwidth usage and draw upon a small sample rate. This makes it difficult to measure actual Subscriber Experience.

A better approach to measuring network QoE is to look at every packet in an off-the-shelf solution. By analyzing each packet and combining this data with knowledge about OTT service needs of the network, operators can calculate the readiness for the network to carry different services. This solution provides network operators with proactive information on expected Subscriber Experience with an insightful breakdown of how to improve it.

Procera Networks' ScoreCard solution takes this approach to analyze and provide actionable insights into network QoE. ScoreCard is the operator's answer to OTT broadband service ratings. It segments the network by services that are meaningful and important to subscribers and rates the experience that the network is capable of delivering. ScoreCard is quick to implement and monitors all data traffic in real-time. This information is then placed into an actionable matrix, with a break down of the root causes of any network issues affecting QoE. Operators can now determine how to prioritize network investments and where to invest to see maximum ROI.

The ScoreCard Matrix of a Cable Network
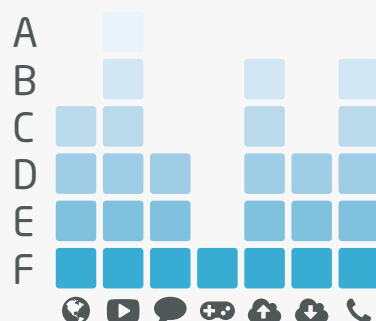
Web Surfing
Scores C. Experience impacted by network quality. Did you know 3% Packet Loss doubles page load times?

Social Media
Scores D. Latency is severely effecting the interactive experience of social messaging applications.

Upload
Scores B. With continuous good throughput large email attachments are sent in a snap. Did you know the average smartphone photo is 6 MB?

Streaming Video
Scores A. With very high throughput available this network is ready for HD and even 4K streaming.

Real Time Gaming
Scores F. Due to the high latency gaming is not viable. Fixed is better than mobile for real time gaming.

Download
Scores C. Expectations are higher and simultaneous downloads happen more frequently than uploads.

Voice Applications
Scores B. Great conversation quality. Modern voice applications benefit from a stable consistent latency.

ONCE THE SCORECARD SOLUTION IS IMPLEMENTED, NETWORK OPERATORS CAN:

- Assess their network QoE effectivelyRate their network performance by categories meaningful to their customers

- Discover root causes of issues affecting their network QoE

- Take action to improve their network performance scores

- Prioritize future in their network to achieve maximum ROI

Network operators using ScoreCard will have a fast and accurate solution that provides an instant picture of how their network impacts their Subscriber Experience. ScoreCard enables operators to know what to fix and where to focus investments that will have a direct impact on the end subscriber's experience.

Use Case Examples

1 During busy times ScoreCard is showing that one area of the cable network (topology wise) has poor Web Surfing experiences, rating a D. This is caused by the high amount of packet loss in that area of the network. The Video Streaming service is not impacted and is still providing a B as the packet loss is not severe enough to impact the video play out buffer. Gaming is receiving an F as it is severely impacted by the network.

Drill down into the area indicates that there is likely congestion on links that are configured with a small queue size. If the queue size was large, a significant delay would have been introduced instead. The total throughput from an area in the topology can be read and from that it is determined that this is likely a load balancing scenario miss configured.

ScoreCard visualized the impact on the subscriber experience with clear figures on the amount of customers affected. The problem is isolated to a specific set of nodes and can therefore be fixed quickly. ScoreCard will display the impact the improvements have made on Subscriber Experience.

2 A DSL operator is placed lowest on the ISP Index by Netflix for its throughput. ScoreCard reveals that there are many "Low Tier" subscribers (e.g. with a DSL connection of 2 Mbps) who are experiencing a low Streaming Video Score because of their connection. An upsell campaign is set up to increase the speed for these subscribers. The operator generates more revenue, and the ISP rating goes up automatically as the streams are now of higher bandwidth.

3 A mobile operator is getting random complaints on slow Web Surfing experiences but cannot localize the problem. ScoreCard shows, in a per-device view, that one model of has a significantly lower score on Web Surfing. It shows that there is a slight but constant packet loss common to this model. It indicates a poor performing terminal firmware and the action is to recommend software upgrades or phase out this model with a promotion campaign.

4 Viewing the score per Cell ID identifies one poor performing cell. In a drill down, it shows that there is high latency on this particular cell, much more than on others. Packets are being retransmitted in the Radio Access Network since retransmission is a built-in function. A delay in the overall session delivery points to congestion in the cell. If the links had shown packet loss instead, it would mean that the packet would have been retransmitted, revealing that the backhaul link is the problem.

PROCERANETWORKS.COM

Procera's ScoreCard solution enables operators to enhance their Subscribers' Experience. By providing meaningful insights into network Quality of Experience, operators are able to prioritize their investments to achieve maximum ROI and take actions that will have the greatest effect on network quality.

To learn more about ScoreCard visit
proceranetworks.com/scorecard

ABOUT PROCERA NETWORKS

Procera Networks, the global Subscriber Experience company, is revolutionizing the way operators and vendors monitor, manage and monetize their network traffic. Elevate your business value and improve customer experience with Procera's sophisticated intelligence solutions.
For more information, visit proceranetworks.com or follow Procera on Twitter at @ProceraNetworks.

PROCERA

CORPORATE OFFICES	CORPORATE OFFICES	ASIA/PACIFIC HEADQUARTERS
Procera Networks, Inc.	Procera Networks	Unit B-02-11, Gateway Corporate Suite,
47448 Fremont Blvd Fremont,	Birger Svenssons	Gateway Kiaramas
CA 94538	Väg 28D 432 40 Varberg, Sweden	No. 1, Jalan Desa Kiara,
P. +1 510.230.2777	P. +46 (0)340.48 38 00	Mont Kiara 50480 Kuala Lumpur,
F. +1 510.656.1355	F. +46 (0)340.48 38 28	Malaysia