# App QoE Scoring
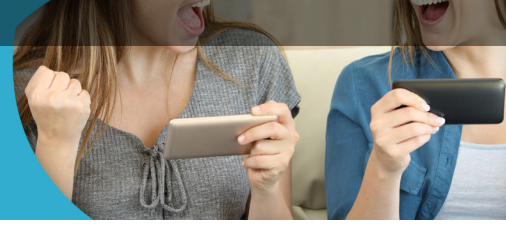
## KEY BENEFITS

Sandvine's App QoE Scoring unlocks better decision making by providing the most detailed, reliable and granular level set of measurements in the market today. App QoE scoring benefits customers with:

- Granular **Content Based Scoring:** Best accuracy in market within different sets of classification. This has been proven in the industry that the new AI/ML models can be trusted.

- **Value Add to All Departments:** With the combination of AppLogic KPIs or App QoE Scoring, service providers around the world can leverage Sandvine's game-changing, app-experience-centric data.

- **Near Real-Time Data:** Sandvine can offer the industry's most granular datasets. With innovations around its TCO, Sandvine can provide a high powered system with high volumes of data at competitive pricing.

**With over 6M applications on the Internet today, it's appropriate to say that applications are the Network.**

Which means, understanding how applications perform on the network could allow us to understand how individual people feel about the apps they are using at any given time and can tie their satisfaction or disatisfcation toward their network.

This is the premise of Application Quality of Experience or App QoE Scoring, a depiction of subscriber sentiment towards their service provider's network.

So why is it important to know this info? Because there are so many applications with unique behaviors and requirements that are tied directly to a subscriber's overall perception of the network or quality of experience. And any deviation to how they are supposed to behave could result in a subscribers poor App QoE.

And in today's networks, the types of applications used and the time of day are blurred as users lifestyles are tied to their applications and Internet use. In fact it's completely random as any given user can be working from home, using video conferencing, using AR/VR applications, ultra HD video streaming, cloud gaming, online education, live workout sessions or any combination of these or even all of them at simultaneously. Each of these different types of applications have their own set of network requirements which translates into different combinations of throughput, latency, packet loss and jitter.

### Figure 1

**New Applications, New Expectations**
Today's class of Apps bring new requirements and expectations
- Higher Throughput
- Lower Latency
- Low Jitter



Thanks to Sandvine's AppQoE solution, the feeling or sentiment of a user's experience while using the application and type of traffic within the app (app content), can now be captured. With Sandvine's App QoE scoring, quantified depictions are calculated per subscriber, per application and per content. Correlating a subscriber's feelings towards their network services (a qualitative measure) with network metrics (a quantitative measure) opens up many doors to profitability which were otherwise closed.

### WHO DOES IT HELP?

App QoE scoring can be aggregated over different dimensions and time (content, network, location, devices, segments, etc) creating new opportunities in planning, operations, marketing, product development, and unlocking better decisions all across different teams (**Figure 2** on the following page).

**Figure 2**

**Who does this help?**

App QoE can get rolled up for:

- Network QoE
- Location QoE
- Content Types QoE
- Devices QoE
- Segments QoE
- App Trends QoE
- Subscribers QoE
- Slice QoE



## HOW DO YOU USE IT? HOW DOES IT WORK?

For Sandvine, the calculation of an App QoE Score is a process that quantifies the feelings expressed by real humans through the knowledge and experience of our analysts and the power of our AI/ML algorithms.

The App QoE method is cross verified with deterministic and subjective tests by human subjects, who use and score their experience of an application that is under a set of network conditions during that time. This enables our data scientists to compare the data with our metrics to build and fine tune correlations between the suites of metrics (**Figure 3**). This feeds different Machine Learning models that results in an application score for the different applications that are on the network.

**Figure 3**

**Who does this help?**
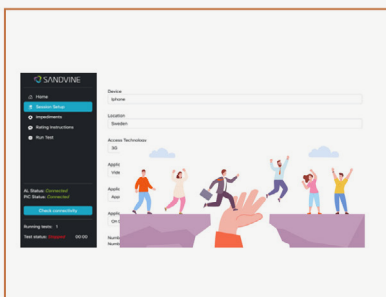


**Data Collection**
App QoE data is collected through crowd-sourced human testing of applications and their recorded perceived experience
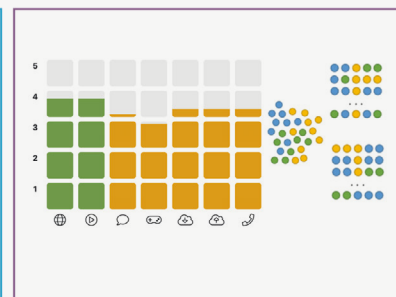
**Data Analysis**
KPIs that influence the most each App content category are identified and analyzed

**AppQoE Modeling**
QoE models are created from the KPIs selected by app content type. QoE scores are derived for different combinations & rollups

The App QoE scores are calculated in Sandvine's solution per Subscriber, per Application, and per Application Content every 5 minutes prior to data being ingested into Sandvine's Insights Data Storage.
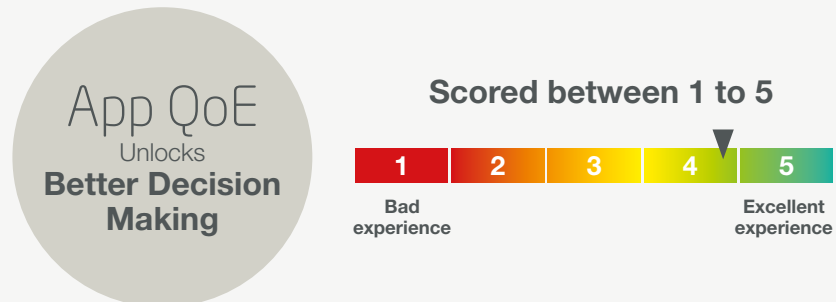
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## WHAT DOES IT LOOK LIKE?

For each application and content category, a score of 0-5 is assigned to indicate how well it is performing from a Quality of Experience standpoint (**Figure 4**).

For each application category, the score assigned indicates:

5 – Excellent experience
4 – Good experience, but with slight impairments
3 – Fair experience, but with noticeable impairments
2 – Poor experience, with frustrating impairments
< 1 – Bad experience



**Figure 4**

App QoE Scoring Scale

App QoE
Unlocks
**Better Decision Making**

**Scored between 1 to 5**

| 1 | 2 | 3 | 4 | 5 |

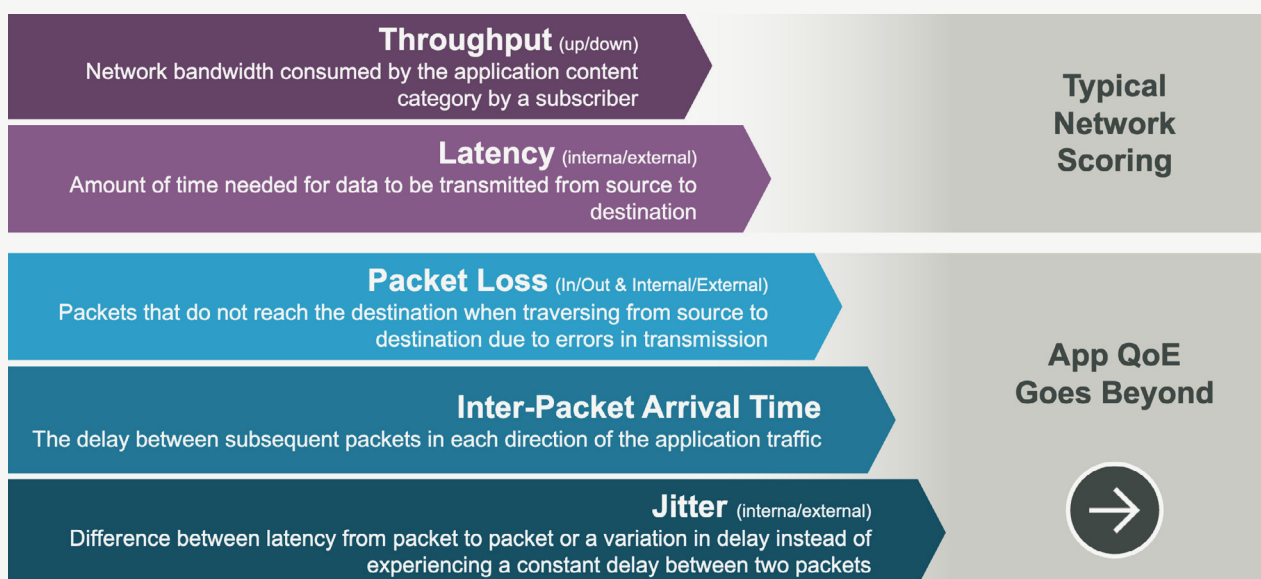Bad experience

Excellent experience

## APP QOE SCORING, AN EXTENSION TO APPLOGIC

App QoE Scoring leverages the industry leading AppLogic solution. With 3500+ applications classified and better than 95% coverage of the internet traffic, AppLogic leads the way with delivering 14 app categories and 11 content categories. These App content categories, enable a deeper understanding of how applications behave, for example video streaming, file delivery, or messaging.

App QoE is enabled by AppLogic which bring the best app classification and KPIs on the market. While Througput and Latency are standard measurements to many, Sandvine's KPIs go beyond (**Figure 5**). AppLogic KPIs also include Packets lost (in/out & Internal/External), Inter-Packet Arrival Time & Jitter (interlan/external).



**Figure 5**

Going beyond to meet app scoring requirements

**Throughput** (up/down)
Network bandwidth consumed by the application content category by a subscriber

**Latency** (interna/external)
Amount of time needed for data to be transmitted from source to destination

**Typical Network Scoring**

**Packet Loss** (In/Out & Internal/External)
Packets that do not reach the destination when traversing from source to destination due to errors in transmission

**Inter-Packet Arrival Time**
The delay between subsequent packets in each direction of the application traffic

**Jitter** (interna/external)
Difference between latency from packet to packet or a variation in delay instead of experiencing a constant delay between two packets

**App QoE Goes Beyond**

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Together with the industry's most granular measurements provided by AppLogic, App QoE scoring can be made possible. And depending on the departmental need, either AppLogic or App QoE Scoring is required to realize different use cases within different departments of a service provider or enterprise customer.

**Figure 6**

App QoE Scoring is key to profitability

App QoE Unlocks **Better Decision Making**

Key App attributes that help your departments

"New Opportunity"

| App attributes | Department |
|---|---|
| • App Usage<br>• App Growth Trends | **Planning** |
| • App Performance<br>• App Congestion/Tolerance | **Engineering and Optimization** |
| • App Outliers<br>• App Issues | **Operations and Performance** |
| • App/Subscriber Trends<br>• App Churn Behaviors | **Customer Care** |
| • App Segmentation<br>• App/Subscriber Trends | **Marketing** |
| • Subscriber Propensity to Buy<br>• App Segmentation/Profile | **Product Development** |

Save $

Profitability

Make $

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The App QoE Company

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