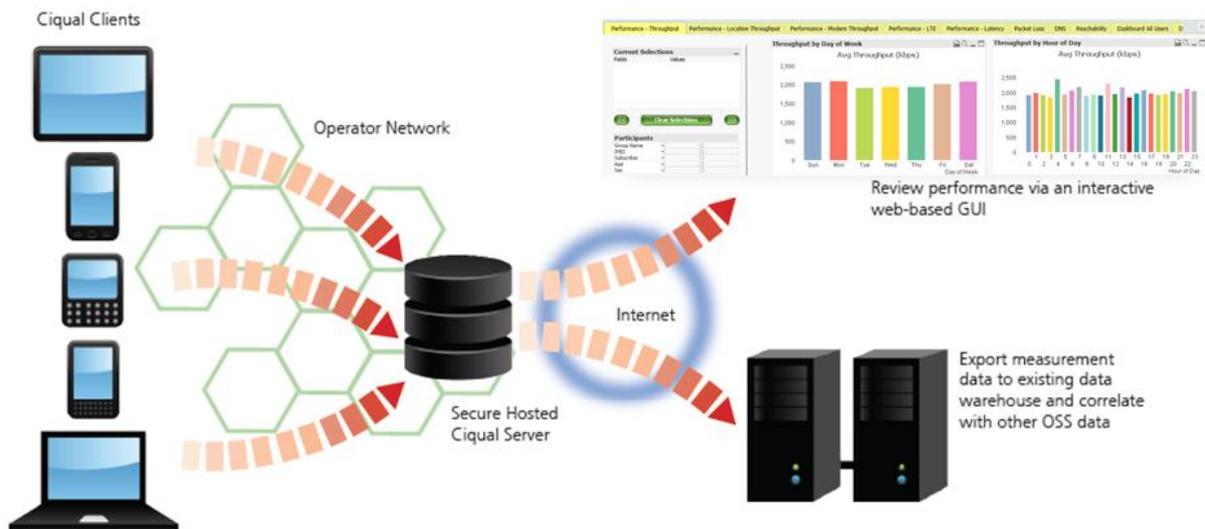


## Measure End-to-end LTE Customer Experience

Ciqual are pleased to offer a managed service study of the LTE Customer Experience you are delivering. This service measures the actual LTE experience of your customers and nominated employees, providing a set of actionable reports and dashboards for Senior Management, Marketing, Networks and Devices teams.

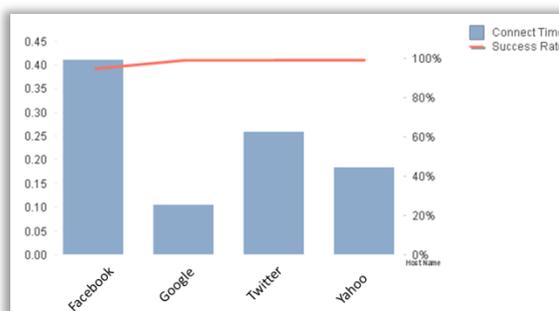
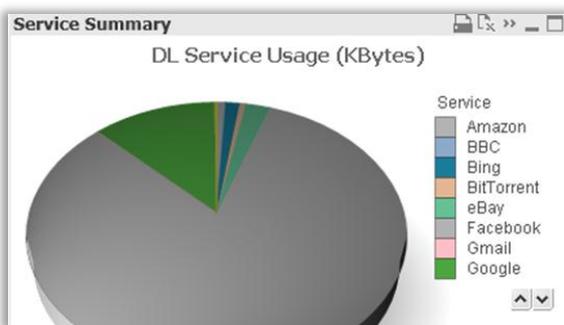
The Ciqual LTE Study Package is built from a highly distributed network of lightweight, intelligent software sensors running on LTE devices. The sensors measure service performance where it matters; on the customers device. Performance metrics are measured passively and actively, while the hosted central server administers the on-device sensors and automatically manages collection and analysis of the performance measures. The measurements can be taken automatically, with no intervention required by the user of the LTE device.



**On-device Sensors** are available for Android LTE smartphones and tablets, iPhone5 and laptops using LTE dongles/MiFi from leading manufacturers including Huawei, ZTE and Sierra Wireless. The set of measurements available vary by LTE device type

- Which devices are delivering the best and worst LTE performance to your customers?
- Which content types and Over-The-Top services are driving LTE usage?
- Are 3G-4G handovers delivering uninterrupted broadband service to your customers?
- Where are your customers experiencing disappointing 4G coverage?
- How can measuring actual 4G customer usage patterns help set monthly data plan limits?
- Are the usage patterns of extreme downloaders adversely affecting other customers?

LTE Customer Experience Dashboard	Benchmark LTE KPIs, including Peak and Average download/upload speeds, HTTP round-trip-time, TCP connect time, packet loss, average data volume/user and busy hour analysis
LTE Usage Report	Hourly / Daily / Weekly LTE usage by download and upload volumes, Top users by download/upload volumes and duration
LTE Cell Performance Ranking Report	Compare and rank the performance of each LTE cell, including the per-cell report of upload/download speeds, HTTP round-trip-time, TCP connect time and signal strength.
LTE Cell Usage Report	Identify the most used cells by download/upload data volume. Identify the impact on cells of 'extreme download' users
LTE Device Usage & Performance Report	Compare the LTE performance of different smartphones, tablets and dongle/MiFi devices. Identify how device performance alters customer usage of each device
LTE Service Usage and Performance Report	Compare the user experience of major internet brands, including Google, Facebook, Yahoo and Twitter. Measure DNS Response Time, website Reachability, jitter and throughput. Identify the traffic types most in use, including Bittorrent, video streaming, YouTube and audio streaming



Location	Avg UL Throughput (kbps)	Max UL Throughput (kbps)	Avg DL Throughput (kbps)	Max DL Throughput
1281	1,781.61	5,668.11	2,027.17	54,422.35
5635	83.29	3,226.36	1,298.50	52,945.55
3073	1,722.21	7,839.14	2,270.58	50,525.41
3586	151.38	728.24	7,632.70	49,459.12
4611	209.23	2,369.35	12,679.29	47,314.11
8195	933.49	3,091.96	1,723.73	44,873.29
5394	80.06	663.57	2,137.86	44,333.46
3827	92.85	5,854.07	286.83	43,640.77
7443	1,698.26	2,787.33	1,576.61	42,800.64
5907	243.91	1,042.39	9,528.70	42,067.09
1777	1,680.00	8,185.65	1,089.27	37,535.05
5650	48.41	5,436.15	1,470.95	37,527.88



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- CIQUAL LTE STUDY PACKAGE**
- A 12 week LTE Study program
  - Week 1-3: Project start-up meeting, system configuration and OTA client download, verification test to confirm measurement set available from your LTE devices
  - Week 4-11: 8 weekly reports delivered
  - Week 12: End-of-project review and close-down
  - Gathering LTE measures from up to 1000 LTE users
  - Fully Managed Service – no network changes or servers required
  - 8 weekly reports provided
  - Online access to LTE Dashboard and Reports
  - Measurement client downloaded OTA to user devices

If you would like more information on the Ciqual LTE Study Package, please email [info@ciqual.com](mailto:info@ciqual.com)