Omni-Q Solution

Mobile Broadband and Data Service Monitoring

Product Description

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RADCOM Overview

RADCOM Ltd., listed on NASDAQ, is a world leader in network service and customer experience monitoring solutions for data communications and telecommunications networks, providing high-performance monitoring systems that analyze, simulate and monitor data, IMS, voice and cellular network services.

RADCOM's products are used in the development and manufacture of network equipment, the installation of networks, and the ongoing maintenance of operational networks to facilitate fault management, performance monitoring and analysis, troubleshooting and pre-mediation (the provision of traffic details to third-party Operations Support Systems solutions).

Revenue-generating services require a well-managed network and mature service-delivery processes. Omni-Q provides the visibility and invaluable data that the service provider needs in order to manage both network and service performance and to ensure Quality of Service for subscribers.

The Need for Mobile Data Monitoring

The deployment of high speed wireless data networks, the mass adoption of 3G handsets and the decreasing price of data based services have all contributed to a significant increase in revenues for both CDMA2000 and UMTS Operators. Wireless broadband services have enjoyed tremendous success world wide and many operators are having difficulty in meeting the huge demand for wireless data cards and residential wireless modems. The success of wireless data services, with data traffic increasing by as much as 400% per year, presents many challenges to the service provider. Engineers must understand and rectify problems arising from IP network congestion, inadequate radio resources, IP mobility and data network abuse while constantly expanding the data network to cater for high speed data services and an ever increasing subscriber base.

Mobile broadband subscribers demand sustained high quality Internet connection services and have zero tolerance for low throughput and high packet loss and latency. Subscriber loyalty is low and subscribers will often abandon their service provider if they are not satisfied with the Quality of Service. In order to maintain customer satisfaction and ensure subscriber loyalty, Care Center personnel must be aware of subscriber quality of experience and react quickly to remedy problems.

Mobile broadband and high speed data services have become common place both in the workplace and at home. Subscribers are often prepared to pay extra for premium services such as “Internet gamers” packages, and enterprise customers typically demand high level SLAs. In order to guarantee enhanced SLAs for data services to both individual subscribers and enterprises, the service provider must have the means to proactively monitor SLAs and react quickly to rectify problems that degrade Quality of Service.

The Solution

RADCOM's Omni-Q service assurance system provides a comprehensive solution that meets all the challenges that mobile service providers face when delivering high speed data services. Omni-Q achieves this goal by monitoring all network activity, for the full 7 OSI levels, and applying specialized intelligence in order to provide realistic quality reports for IP services such as HTTP, FTP, SMTP, POP3, MMS and DNS.

By monitoring sessions that are meaningful to the end user, such as complete HTTP page downloads and large HTTP file downloads, Omni-Q provides real insight into customer experience for mobile broadband and "walled garden" WAP portals.

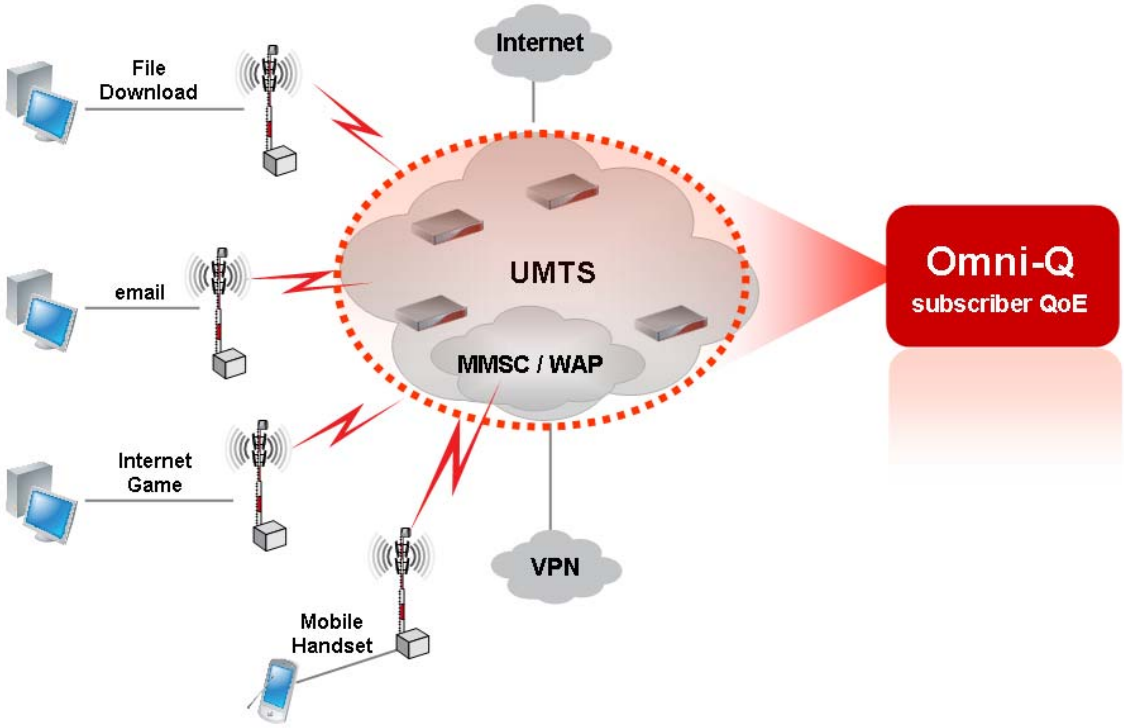


Fig 1: Omni-Q gathers network and service information from the PS network and calculates subscriber Quality of Experience

RADCOM's commitment to evolving technologies ensures that our customers receive the ideal solution for current technologies such as CDMA2000 1x/EVDO, GPRS/UMTS 3G (HSPA+) and for future technologies such as LTE.

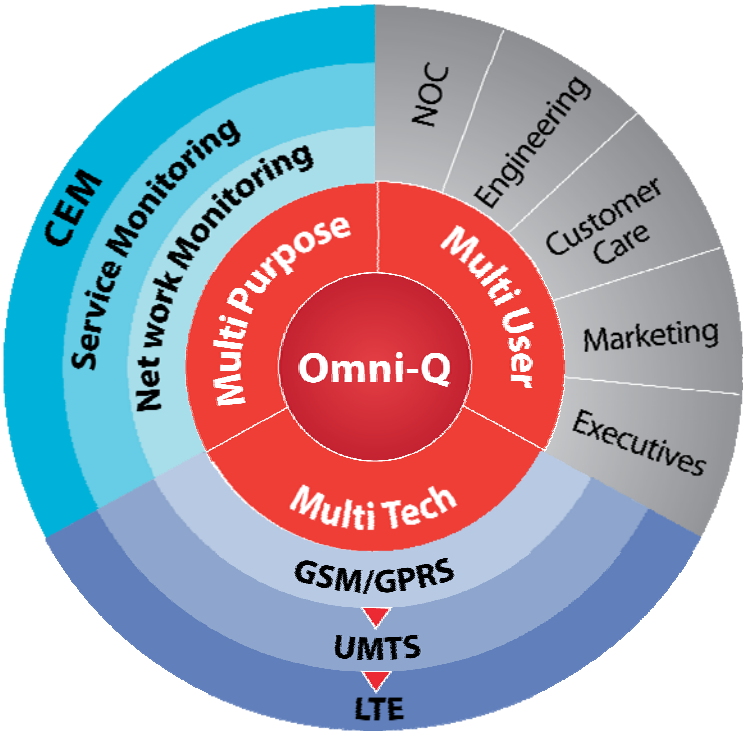


Fig 2: Omni-Q Multi-Purpose, Multi-User, Multi-Tech Service Assurance System

Omni-Q's Multi-User approach ensures that each department including, NOC, engineering, Customer Care and Marketing has access to report portals that are relevant for their specific area of interest.

NOC – Network Operations

Network Operations need to know about any network problem that degrades the Quality of Service for subscribers. For data services, such as mobile broadband, it is not sufficient merely to be aware of service failures since problems such as network congestion could contribute to low Quality of Service for the end user.

The Omni-Q dashboard monitors key performance and quality indexes for IP data services and immediately alerts the NOC whenever an index (KPI) drops below a certain threshold. The color-coded graphs provide effective visual means for problem notification. Email alerts and SNMP traps ensure that alarms are delivered quickly and effectively.

Omni-Q dashboard provides “drill down” capabilities to enable the engineer to quickly and efficiently pin point the source of the problem. Drilling down from a service view for the entire network to an individual subscriber detailed session view has never been easier.

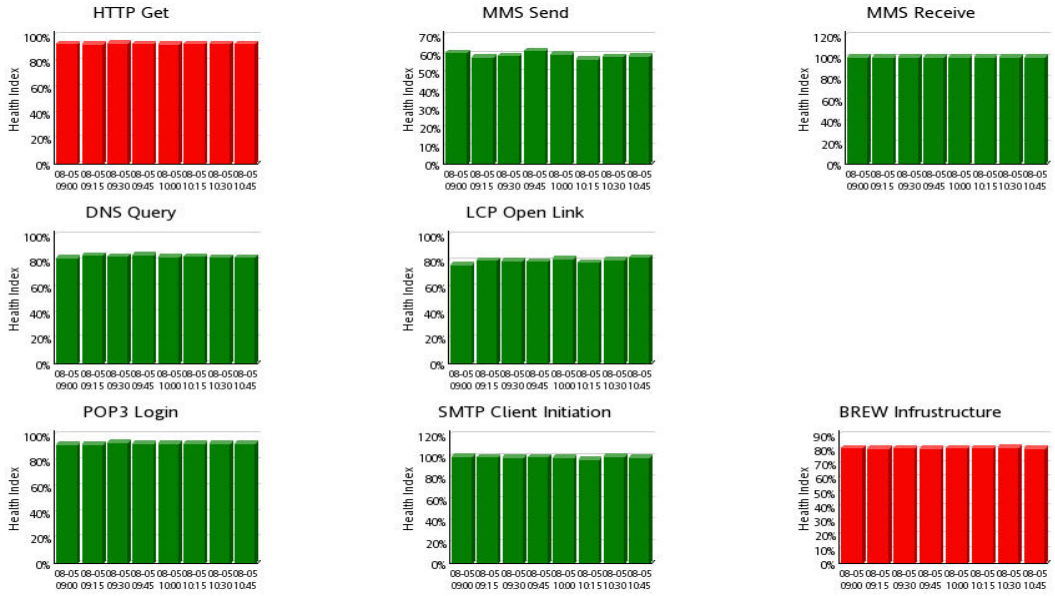


Fig 3: The NOC dashboard shows service health and sends alarms when service quality drops below a certain threshold.

Engineering

Service level troubleshooting is often very time-consuming as complex network architecture makes pinpointing the source of the problem difficult. Omni-Q reduces the problem resolution cycle by providing the necessary tools to alert the engineer and pinpoint the source of the problem. Omni-Q performs *end-to-end* correlation to combine data session *legs* into a complete session view for all subscribers 24/7. Omni-Q’s unique troubleshooting capabilities enable engineers to effectively and efficiently trouble shoot and solve problems that occurred today, yesterday or even last week. Statistical reports are provided for network performance and base lining for as long as 3 years.

By drastically reducing the problem resolution time, Omni-Q prevents lost revenues and customer frustration caused by data service failure.

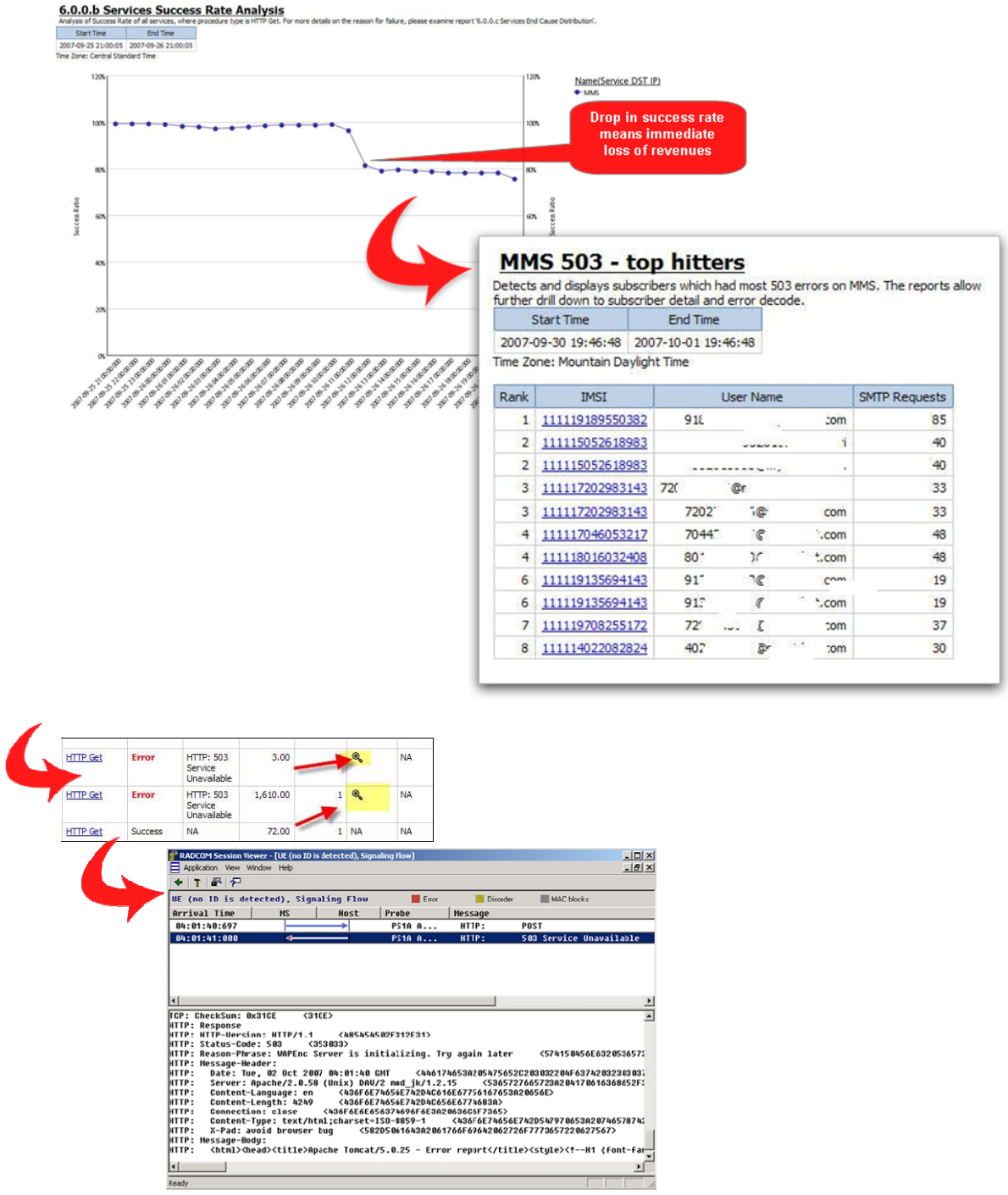


Fig 4: Omni-Q MMS QoS report shows a drop of 20% in the MMS success rate. The MMS success rate graph may be drilled-down to MMS "top hitters" (subscribers who are currently suffering from the problem). From this list, a further drill down displays the HTTP error codes and full session view for an individual MMS session.

Customer Care (Customer Experience Monitoring)

In the time it takes for a Care Center rep to take a call, a detailed subscriber report has already been prepared. This report not only shows all subscriber activity over the requested time period, including voice, SMS and data sessions, but also includes a Quality of Experience indicator for services such as HTTP. By simply clicking the table below, a detailed list of sessions is displayed showing the QoE per location and time. This report provides immediate insight into the actual service quality as experienced by the end user, an absolute necessity for ensuring high level customer experience for mobile broadband.

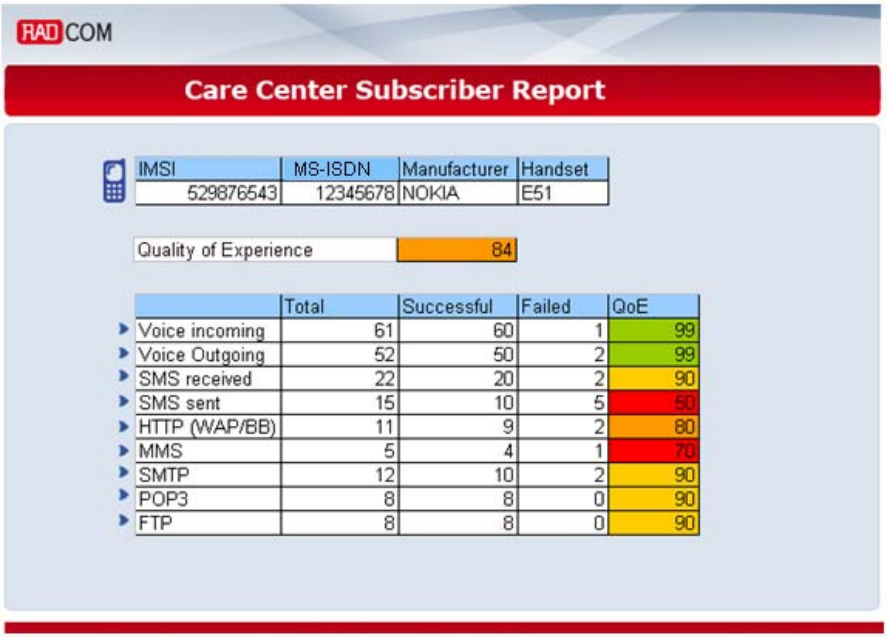


Fig 5: Care Center subscriber Quality of Service report

Marketing

In order to run successful campaigns, marketing must have visibility into the popularity, usage and customer experience for all WAP and internal Web sites. Omni-Q provides detailed reports for monitoring any WAP or Web URL and not only provides performance and usage information but also provides end user quality of experience while downloading a Web site.

APN	Application	Total Data UL	Total Data DL	SGSN ID
.wap.djuice.com.ua	WTP/WSP	895	393	1
.wap.djuice.com.ua		895	393	
.internet	DNS	7051	4132	1
.internet		7051	4132	
.www.jeans.ua	DNS	2987	8140	1
	HTTP	3332	12160	1
.www.jeans.ua		3086	9480	
.mms.jeans.ua	WTP/WSP	3373	782	1
	HTTP	24290	15896	1
.mms.jeans.ua		14994	9599	
.mms.djuice.com.ua	HTTP	7560	26194	1
.mms.djuice.com.ua		7560	26194	
.deltabank.umc.ua	DHCP(BOOTP)	25840	29270	1
.deltabank.umc.ua		25840	29270	
.wap.umc.ua	DHCP(BOOTP)	6258	10520	1
	WTP/WSP	1814	32457	1
	HTTP	14213	52381	1
.wap.umc.ua		11360	45307	

APN	Total Data UL	Total Data DL
.wap.beeline.ru	187	
.wap.dluice.com.ua	210	
.wap.mts.com.ua	118	
.wap.urs	313	
.wap.jeans.ua	10236	81032
.wap	7682	79949
.wap.umc.ua	6589	22929
.wap.Kyivstar.net	516	604
.wap.viaginterkom.de	250	443
.wap.beeline.ua	314	425
.wap.djuice.com.ua	340	349
.wap.mts.ru	228	248
.wap.kyivstar.net	537	228
.wap.ab.kyivstar.net	232	210
.wap.vodafone.co.uk	355	200
.wap.cingular	299	83

Fig 6: View top web and WAP site performance and popularity

Omni-Q Architecture

Managing and maintaining evolving networks with the introduction of new network capabilities, rapidly increasing traffic and various services is an enormous challenge involving many different professionals and teams. The Omni-Q next-generation service assurance solution addresses the needs and requirements of different users within the organization who may be using the solution simultaneously, ranging from the Network Operation Center (NOC) to engineering, customer support and management groups.

In line with this visionary solution, RADCOM has created a product architecture that encompasses the needs and requirements of the different system users and their respective operational workflows. Important requirements of the design are its scalable, open architecture and its ultra-high performance (based on RADCOM's exclusive GEAR hardware design), which ensure evolutional deployment and long life-cycle value. RADCOM's solution can function independently or be an integral part of the operator's total service offering by augmenting legacy OSS/BSS solutions. Additionally, it can be used as an auditing tool for system integrators who need to audit and understand the network traffic and traffic variables.

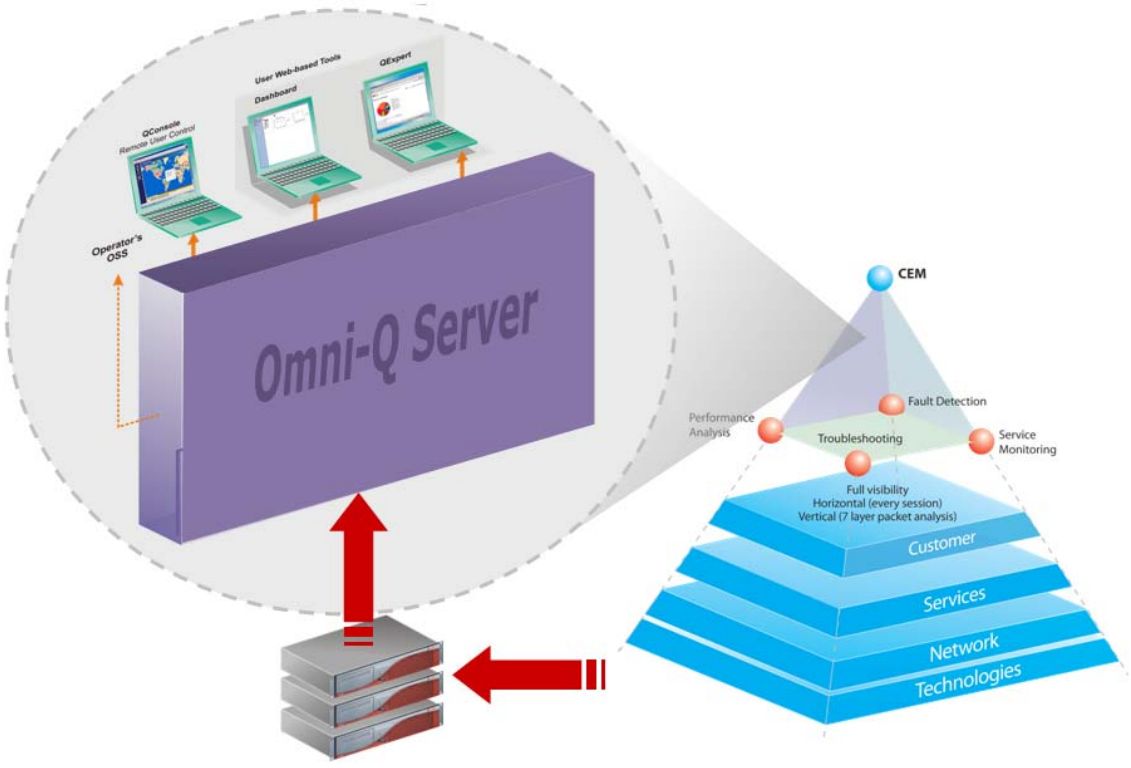


Fig 7: Omni-Q service assurance system

Application Examples

In addition to providing mobile service providers with a flexible monitoring system and extensive report portals, Omni-Q also provides "Out of the box" solutions. These solutions are designed to help our customers maximize revenues and customer satisfaction for important services such as roaming and data services for corporate accounts and to optimise network efficiency by identifying subscribers who abuse the network.

Network Abuse

Subscribers typically pay a monthly flat fee for mobile broadband services. Although most subscribers utilize wireless Internet access in a responsible manner, there are always a small number of end users who consume exorbitant data network resources. Some examples of this phenomenon are *bandwidth hogs* who constantly use P2P applications to download multi-media content, and email spammers.

The following reports show how Omni-Q can be used to identify and monitor network abusers. By being aware of such subscribers, operators can apply sanctions or restrictions in order to optimize the availability of network resources for the entire subscriber base.

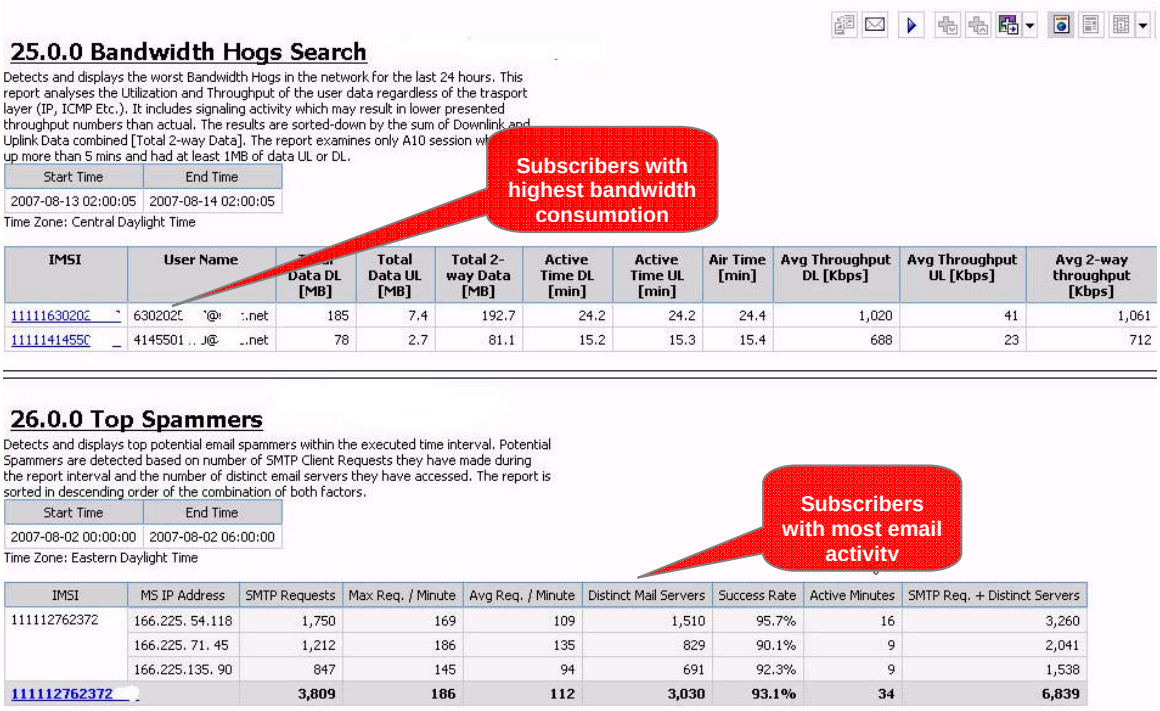
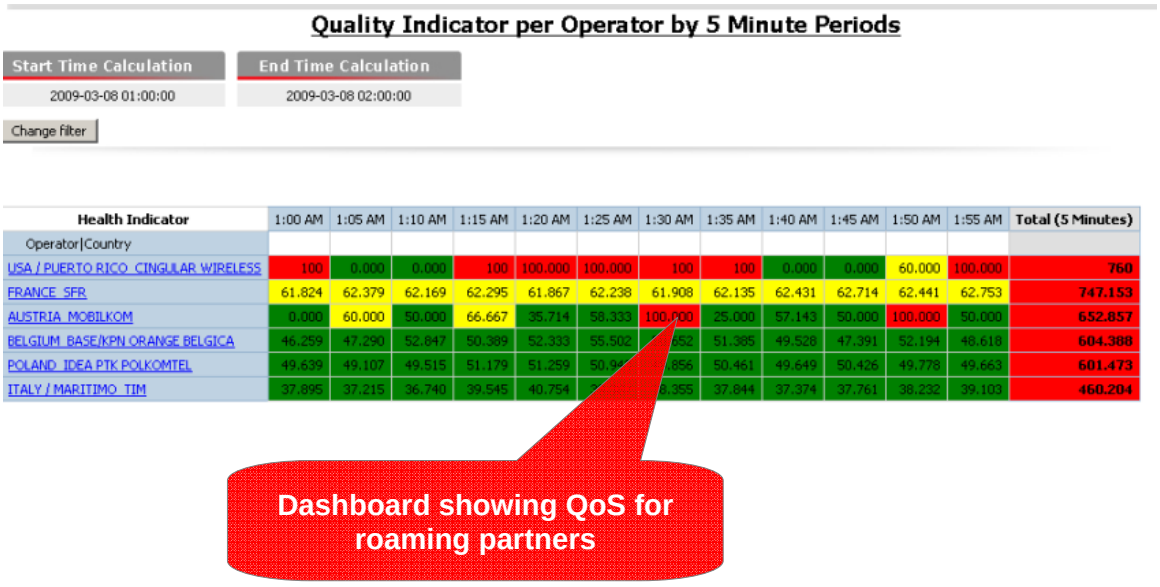


Fig 8: Hourly reports showing subscribers who utilize the highest throughput and send the most emails. By drilling down on the Top Spammers report it is possible to view the Spam email servers, session details and the content of the offending spam mail.

Roaming (QRoam)

Roaming subscribers present service providers with a relatively effortless source of increased revenue, requiring minimal investment compared to that required for gaining new subscribers or even maintaining existing customers.

There may be many factors for loss of roaming revenue, but is often due to network problems that go undetected. To avoid losing potential revenues, services must be maintained. With QRoam, service providers can spot roaming traffic problems *before* roamers leave their network, making it possible to prevent revenue leakage by improving the quality of the network.



Health Indicator	1:00 AM	1:05 AM	1:10 AM	1:15 AM	1:20 AM	1:25 AM	1:30 AM	1:35 AM	1:40 AM	1:45 AM	1:50 AM	1:55 AM	Total (5 Minutes)
Operator|Country													
USA / PUERTO RICO CINGULAR WIRELESS	100	0.000	0.000	100	100.000	100.000	100	100	0.000	0.000	60.000	100.000	760
FRANCE SFR	61.824	62.379	62.169	62.295	61.867	62.238	61.908	62.135	62.431	62.714	62.441	62.753	747.153
AUSTRIA MOBILKOM	0.000	60.000	50.000	66.667	35.714	58.333	100.000	25.000	57.143	50.000	100.000	50.000	652.857
BELGIUM BASE/KPN ORANGE BELGICA	46.259	47.290	52.847	50.389	52.333	55.502	652	51.385	49.528	47.391	52.194	48.618	604.388
POLAND IDEA PTK POLKOMTEL	49.639	49.107	49.515	51.179	51.259	50.9	856	50.461	49.649	50.426	49.778	49.663	601.473
ITALY / MARITIMO TIM	37.895	37.215	36.740	39.545	40.754		355	37.844	37.374	37.761	38.232	39.103	460.204

Fig 9: The following report shows a quality indicator for all roaming and interconnect links and sends alarms whenever there is a drop in the Quality of Service.

Real Customer Experience Monitoring (QVIP)

QVIP enables the SP to view statistical reports for individual subscribers and groups of subscribers. Such reports contain aggregated statistics for periods of up to 6 months and provide visibility not only into the subscriber's history for both voice and data sessions, but also an indication of the Quality of Service experienced by the subscriber over time and location. KPIs are calculated for each individual voice and data session and are displayed in an intuitive form that enables Customer Care representatives to receive an in-depth impression of subscriber quality of experience (QoE) both for individual sessions and for a certain time period.

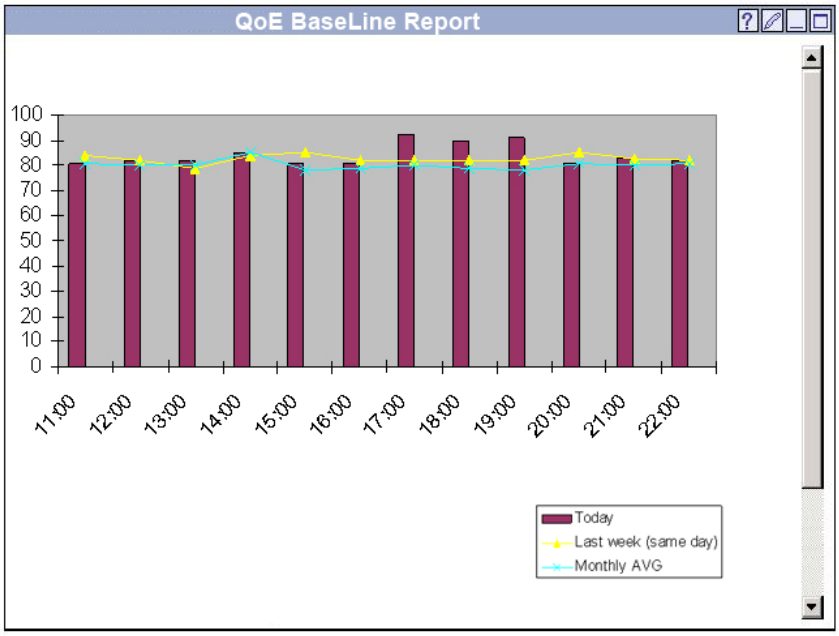


Fig 10: This report depicts the Quality of Experience for a certain subscriber or corporate account with a comparison between today and the weekly and monthly average.

The Benefits

RADCOM's Omni-Q solution provides the following benefits to the mobile Service Provider:

The Solution	Benefits
Engineering portals	• Optimize and maintain Quality of Service for mobile broadband and high speed data services. • Reduce service downtime by quickly resolving problems
Omni-Q Dashboard	• Notification of any problem affecting the Quality of Service and customer experience • Fast analysis of service and network problems
QRoam	• Receive alerts whenever there is a degradation in the QoS for any roaming or inter-connect partner • Drill down to the cause of the problem quickly and efficiently
QVIP	• Proactively monitor and maintain the Quality of Service for VIPs and corporate accounts. • Increase customer satisfaction
Network abuse portals	• Optimize network efficiently by identifying and dealing with bandwidth hogs and spammers
Marketing portals	• Increase revenues from "closed garden" WAP portals by monitoring performance and usage

Summary

The Omni-Q solution offers service providers a rich set of tools and applications that provide visibility into the data network, IP services and customer experience. Engineers can troubleshoot problems quickly and efficiently by utilizing Omni-Q's capability to "drill down" from service level reports to detailed correlated session view. Service dashboards alert NOC personnel immediately to any problem that potentially degrades service or customer Quality of Service. Omni-Q's ability to perform "real customer experience" analysis provides both Care Center and engineers with insight into the actual Quality of Service experienced by every subscriber on the network. By improving the quality of data services and customer experience, service providers effectively reduce revenue loss and ensure subscriber loyalty.