

# Omni-Q Probes

VoIP Quality and Performance Probes

## Omni-Q - Quality online

Is VoIP quality an issue for you?

Do you need to trace signaling across your network?

Do you need to continuously collect, monitor and analyze voice traffic performance parameters?

Omni-Q is a VoIP quality monitoring solution designed to continuously collect, monitor and analyze voice traffic performance parameters and voice quality. Omni-Q consists of a comprehensive array of voice performance and quality measurement methodologies, all under one unified offering. These include a broad range of intrusive (active) and non-intrusive (passive) hardware and software probes covering both the PSTN and the IP environments. A powerful user-friendly management layer offers many features that allow you to set up and monitor value-added voice related offering such as Service Level Agreements and Partner Verification Services.

## Omni-Q - Probe-based Solution

The Omni-Q probes are centrally managed by the Management Server, the QManager. They are remotely accessed by the QConsole Software, installable on any PC/laptop. All collected parameters are stored in an Oracle database for use by the QExpert Web-based analysis and reporting tool. Both active and passive probes are available.

## Active Probe Operations

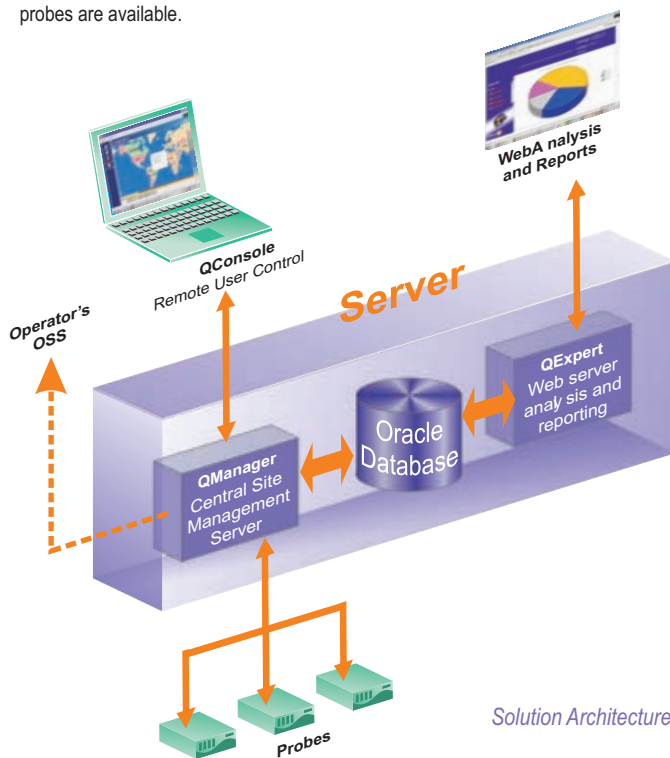
Active probes provide link quality and performance measurements by creating test calls between probes. Users can define a flexible automated scheduling regime, or execute ad-hoc test calls. Creating automated test schedules is an important component of real pro-active monitoring/testing, as it enables operators to benchmark VoIP service quality and detect service degradation before their customers. The probes provide availability (signaling), performance and voice quality (PESQ) measurements on the test call session.

## Passive Probe Operations

Passive monitoring probes provide single point quality and performance measurements on all live user-traffic and on detected test calls generated by other Omni-Q probe. The vProbe's operational concept is based on user configurable definitions of the target traffic and of the actions to be performed on the detected target traffic. Once actions are defined, the vProbe continuously monitors those targets 24 hours a day, 7 days a week. The targeting mechanism is direction aware and is based on the probes sophisticated run-time signaling and packet-by-packet analysis capabilities, where 'wild characters such as \* and ? can be applied to the extracted E164 and Alias, and where masks and ranges can be applied to IP addresses.

The action options include:

- ▶ Enhanced detail record (eDR) of the session, providing measurements on both RTP directions and on the signaling plane
- ▶ Saving of a full detailed, hardware time stamped call flow signaling decode of the session (this can be limited to abnormal calls only)
- ▶ Saving the WAV of the call
- ▶ Calculating the ITU T P862 (PESQ) voice quality on detected test calls generated by active Omni-Q probes
- ▶ Calculating passive mean opinion scores for each live (user traffic) stream.



Solution Architecture

### vProbe - Live Traffic Visibility

The vProbe provides multiple parameters and measurements on VoIP signaling, user media, and availability indicators. Supporting a three-layered operational approach, it enables operators to easily shift between monitoring, drill down and troubleshooting, all in one probe. In the first level enhanced call-detail-record of performance measurements are collected for each call (both RTP directions). RTP streams and their associated signaling procedures are correlated. In the second level signaling storage is offered. In signaling storage, abnormal calls can be specifically targeted and their detailed call-flow decodes collected and stored for on-line, real-time operations and customer support.

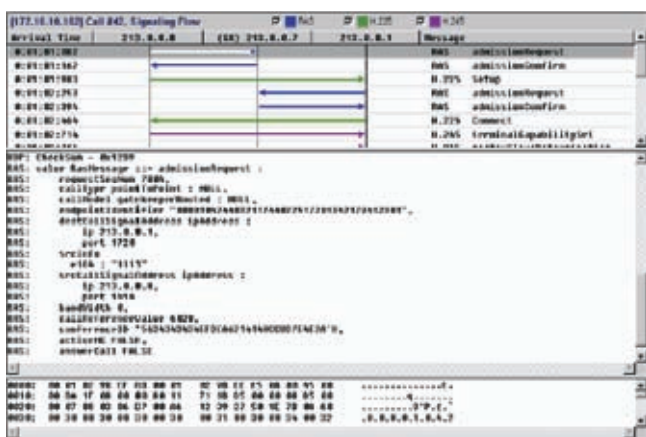
The signaling flow decode is provided for each call, and is displayed together with all the other quality detail records of the call. These provide a more comprehensive view that can be further utilized for assessing and correcting degradation on the network.

The graphic flow display is based on accurately time stamped frames collected from probe hardware (The arrival times are accurate to within 200 nano seconds). In the third level, run time and more in-depth real-time trouble shooting capabilities are offered. In this manner, the probe server unit can be used for remote testing capabilities, saving on operations cost by eliminating the need for a field engineer.

### cProbe/iProbe - End-to-end User Perspective

The cProbe-server supports multiple types of PSTN interfaces including analogue, BRI, PRI (E1/T1), CAS (E1/T1), SS7 and cellular handsets and is used to establish real voice test calls to other Omni-Q entities deployed in the IP or PSTN clouds.

The iProbe probe-server comes in two variants, SIP and H323. It is used to establish up to 15 simultaneous real voice test calls, either in "direct" mode or "routed" mode, to other Omni-Q entities deployed in the IP or PSTN clouds. The iProbe can be configured to operate either as a VoIP termination point or as an independent closed-box gateway, thus enabling the attachment of the iProbe to virtually any network element with an Ethernet interface.



Signaling Flow Report

### Active Probe Deployment Applications

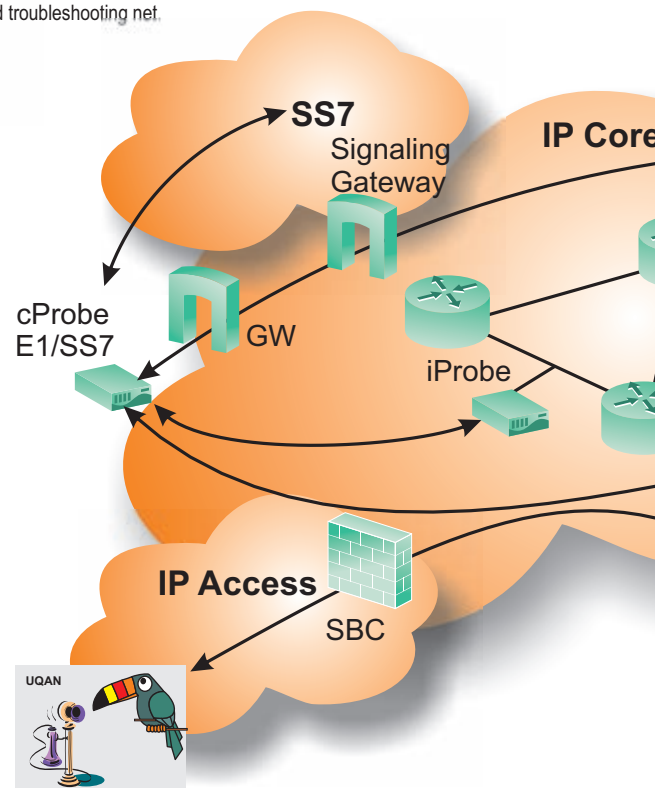
The active probes can be deployed with other Omni-Q probes to fulfill the demanding needs of VoIP monitoring in core and access applications. Active probes provide link quality and performance measurements by creating test calls between probes. Some example scenarios aimed at demonstrating the Probes unique deployment flexibility and operational advantages follow.

**PoP-to-PoP/edge-to-edge** - Probes at the edges of the IP cloud, configured to make real test calls, obtain benchmarks of various VoIP routes.

**PoP-to-end user** - Probes located at central points in the network scheduled to make automated test calls to the Omni-Q's UQAN probes deployed at end-users, perform pro-active monitoring and troubleshooting of end-user perception of voice quality and quality of service.

**PSTN-to-IP crossover** - Probes located at central points in the network (iProbes) or at edge PoPs (cProbes) scheduled to make automated test calls to Omni-Q's IP or PSTN probes; provide pro-active monitoring and troubleshooting capabilities across the IP or PSTN network for calls originating in the PSTN and terminating in VoIP, or vice versa.

**Segmenting the IP cloud** - iProbes deployed in multiple locations across the IP cloud, scheduled to set up automated test calls, create a fully meshed pro-active monitoring and troubleshooting net.



Active Probe Deployment

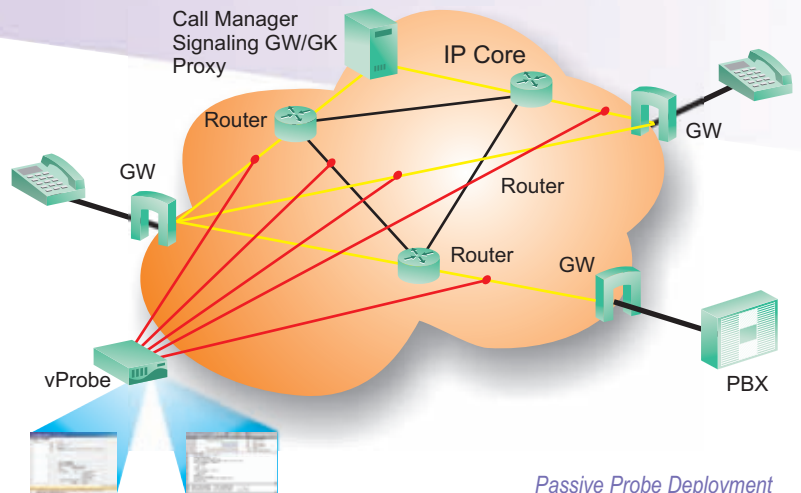
# cProbe iProbe vProbe

## Passive Probe Applications

### vProbe Deployment Applications

Passive monitoring probes provide single point quality and performance measurements. However, since the Omni-Q solution can correlate measurements made by different probes of same session as it traverses the network, multiple vProbes can be used to provide end-to-end link quality. Consequently the vProbe can be deployed with other active Omni-Q probes or in passive only probe deployment. Following are some example scenarios aimed at demonstrating the vProbes unique deployment flexibility and operational advantages.

**Enhance any of the active probe deployment applications** - adding probes provides the user with additional detailed in-path quality and performance measurements. **Addresses** collected from different probes of the same call session are correlated together. This provides the operator with a unified view of the call session and information on degradations across the path, enabling better understanding and troubleshooting of the service.

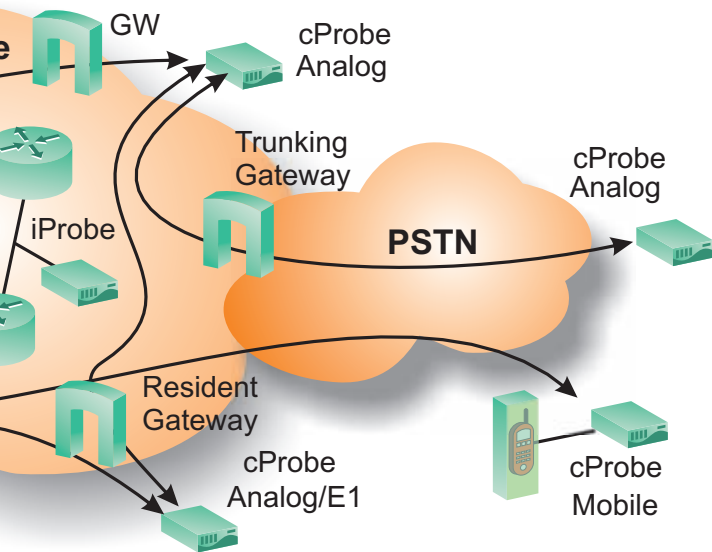


*Passive Probe Deployment*

**Visibility into VoIP networks** - multi technology vProbes with signaling storage capabilities deployed at signaling gateways are able to measure, decode and display multiple VoIP signaling protocols. Via the QManager, the different signaling sessions/legs measured by the vProbe are correlated into a single call session.

**Voice quality monitoring** - high performance vProbes located at central aggregation points in the IP cloud can provide live user media with performance measurements as well as passive MOS per RTP stream. Results collected from vProbes monitoring only RTP streams, and results collected from vProbes monitoring only signaling are correlated to present the operator with a single unified view.

**Edge point monitoring** - vProbes can be used for edge point monitoring by deploying probes both at the core and deeper towards the edge. This provides the operator with a fuller view of network performance behavior at the edge and at the core. Furthermore, by supporting RFC 3611 the vProbe can intercept, collect and analyze reports generated by IP Phones and gateways and use them to provide end-to-end voice quality assessments.



# cProbe iProbe vProbe

## Measurements

The dedicated hardware used for generating test calls and monitoring voice calls ensures accurate hardware time-stamped measurements. The probes provide a wide variety of measurements

### vProbe Measurements

vProbe measurements include:

- Call Setup Time
- ASR & NER
- ITU T P862 PESQ Voice Quality on identified test traffic generated by the Omni-Q active probes (cProbe/iProbe) to provide in-path voice quality measurements
- Call termination cause
- Round trip delay
- Passive MOS
- Jitter (RTP)
- Packet loss, packet loss burst (RTP)
- Answer delay
- Source/destination number/IP address/ endpoint/ termination ID
- RFC3611 analysis
- RTCP analysis application add-on
- Video quality monitoring

### Active Probe Measurements

- Call Setup Time
- ASR & NER
- ITU T P.862 PESQ Voice Quality
- Background Noise
- Signal Level & insertion loss
- Call termination cause
- Round Trip delay
- DTMF verification
- Echo delay and attenuation
- Facsimile test calls (T30 compliant ) (cProbe only)
- Number of Packets (iProbe only)
- Jitter (iProbe only)
- Packet Loss (iProbe only)
- Variable length quality calls
- Advanced voice analysis drill down
- T105 responder testing (cProbe only)
- T108 loop-back testing (iProbe only)

## Specifications

### Probe Specifications

	Width	Depth	Height	
R70	440mm (17.5in)	550mm (21.8in)	89mm (3.5in)	Rack Mount
R1000	440mm (17.5in)	470mm (18.7in)	89mm (3.5in)	Rack Mount
P1000	360mm (14.1in)	480mm (18.9in)	130mm (5.1in)	Portable
R4000	430mm (17in)	680mm (27in)	220mm (8.7in)	High-density Rack Mount

Available in 110-230 Volt AC or -48 Volt DC

### cProbe port densities (based on R1000 probe server)<sup>5</sup>

Analog <sup>1,2</sup>	Digital <sup>3,4</sup>	SS7 (E1/T1)
24 (3 boards)	—	—
16 (2 boards)	1 to 4 (1 board)	—
8 (1 board)	2 to 8 (2 boards)	—
8 (1 board)	1 to 4 (1 board)	2 (1 board)
—	2 to 8 (2 boards)	2 (1 board)

1. Mobile adapters can be connected to any analog interface (optional).
2. A 4 port BRI card can be ordered in place of a 8 port analog card.
3. CAS and CCS variants supported
4. PCM A-Law and U-Law supported
5. P1000 server supports up to 3 interface cards

### iProbe 10/100Mbps Ethernet

Signalling	Voice Codecs
H.323, SIP	G711 A/u-Law, G7231 (5.3/6.4), G729

### vProbe

Signalling	Voice Codecs
H.323, SIP, MGCP, NCS, H.248, SCCP (future option)	G711 A/u Law, G723.1 (5.3/6.4) G729, G726 (32)

vProbe port densities (based on R1000/R70 probe server)

Port mirror <sup>1</sup>	In-line <sup>2</sup>
Up to 2 GBE ports (2-port board)	1 GBE link (2-port board)
Up to 4 GBE ports (4-port board)	Up to 2 GBE links (4-port board)
Up to 4 FE ports (4-port board)	Up to 2 FE links (4-port board)

1. In port mirror connection the vProbe is connected to the network a mirrored port (spanned port) in a switch or router.
2. In in-line connection (bump-on-the-wire) the vProbe is connected on the traffic, from and to the switch/router/gateway.



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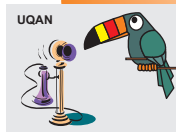
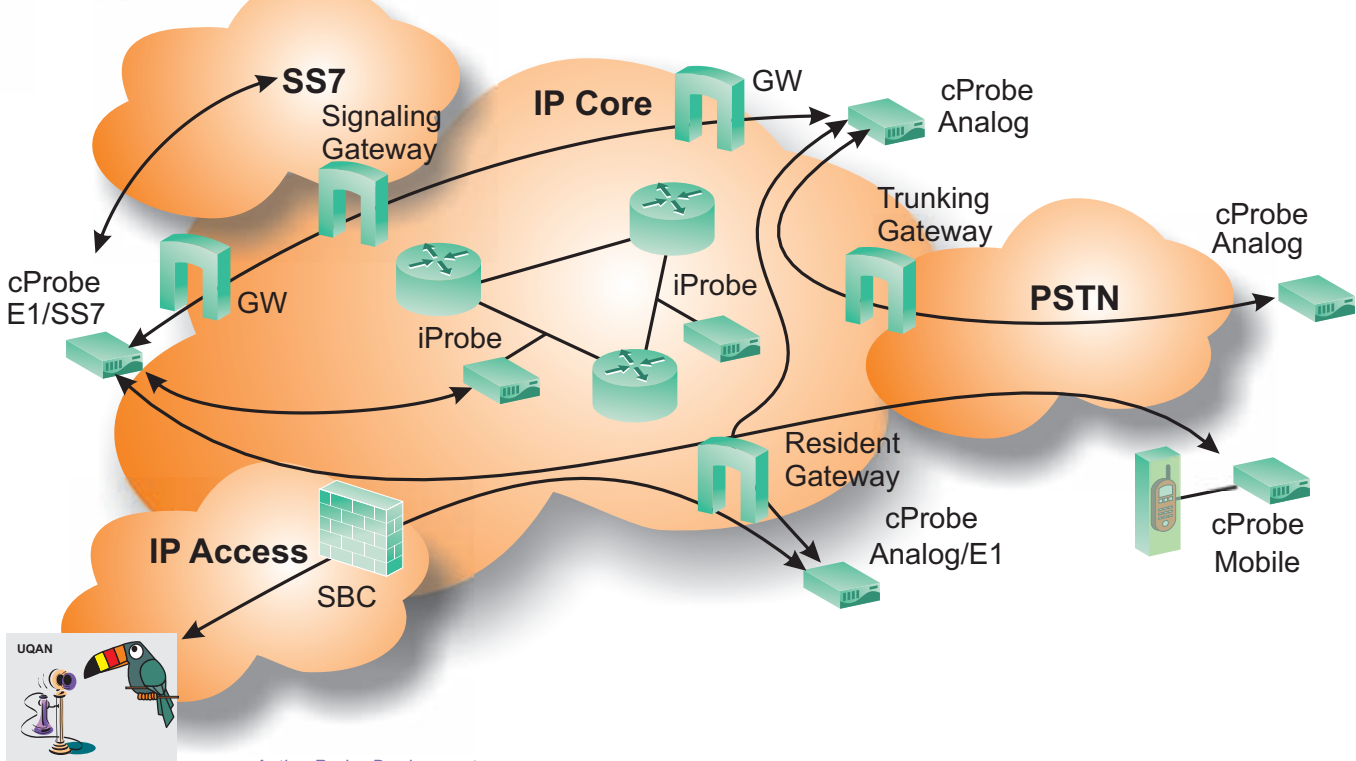
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