voipfuture

Qlear

THE QLEAR EXPERIENCE

INSIGHTS AFTER QLEAR PROBE INSTALLATION

2017

Voipfuture Qlear | Overview

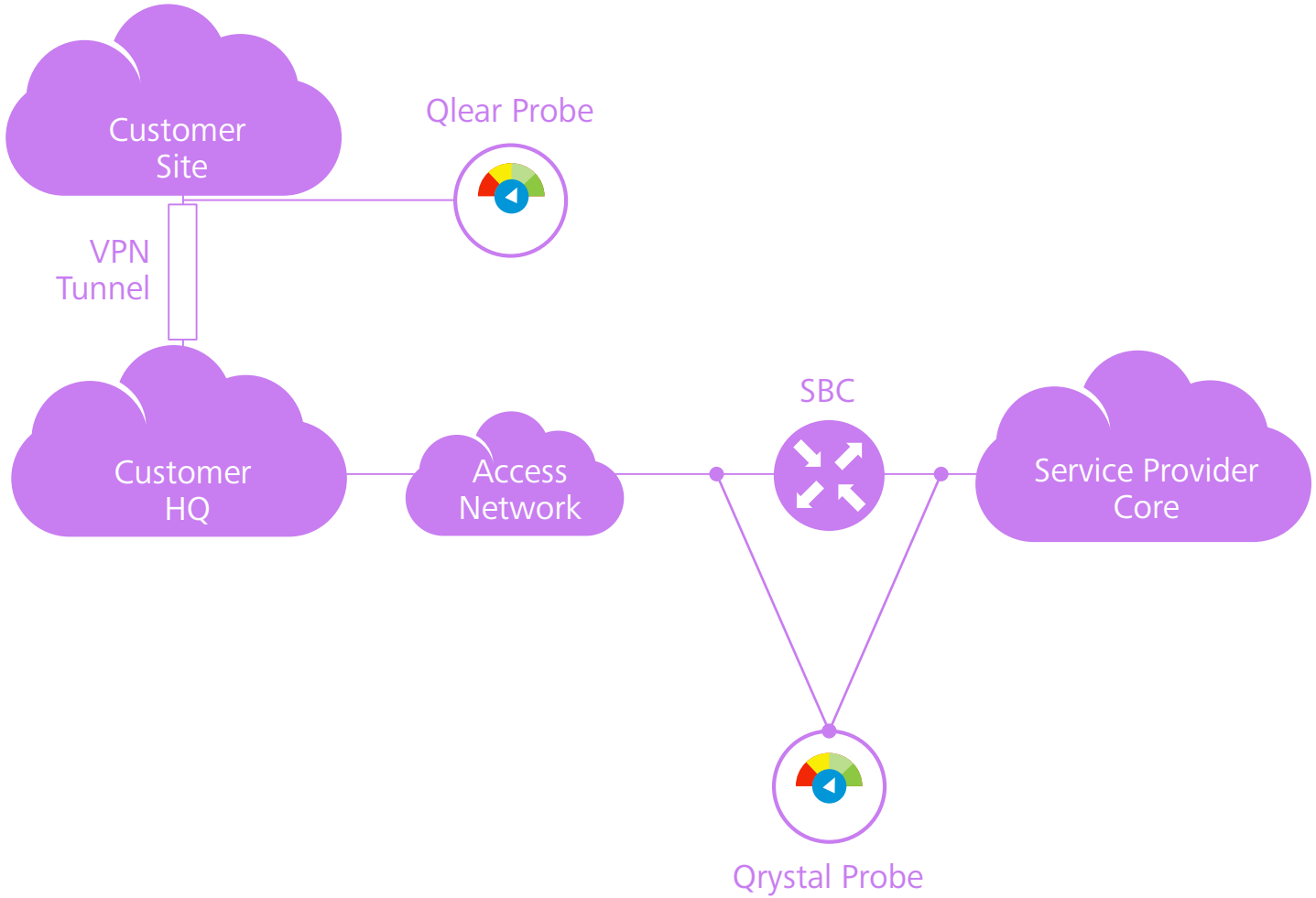
Enterprise voice services open an attractive market. Yet the complex environment can lead to immense technical service costs.

Qlear makes the quality of enterprise VoIP services visible - by customer, site and call.

- Customer complains about sporadic severe impairments in voice quality
  - Call parties at customer site have good quality
  - Remote call parties (at HQ) state that they are not able to understand what is being said
- Customer states that frequently they switch to using mobile phones because quality is so bad

Monitoring Setup

- Customer agreed to installation on January 5th
- Qlear Probe installed on January 9th
- Time on site: 30 minutes



Status Summary

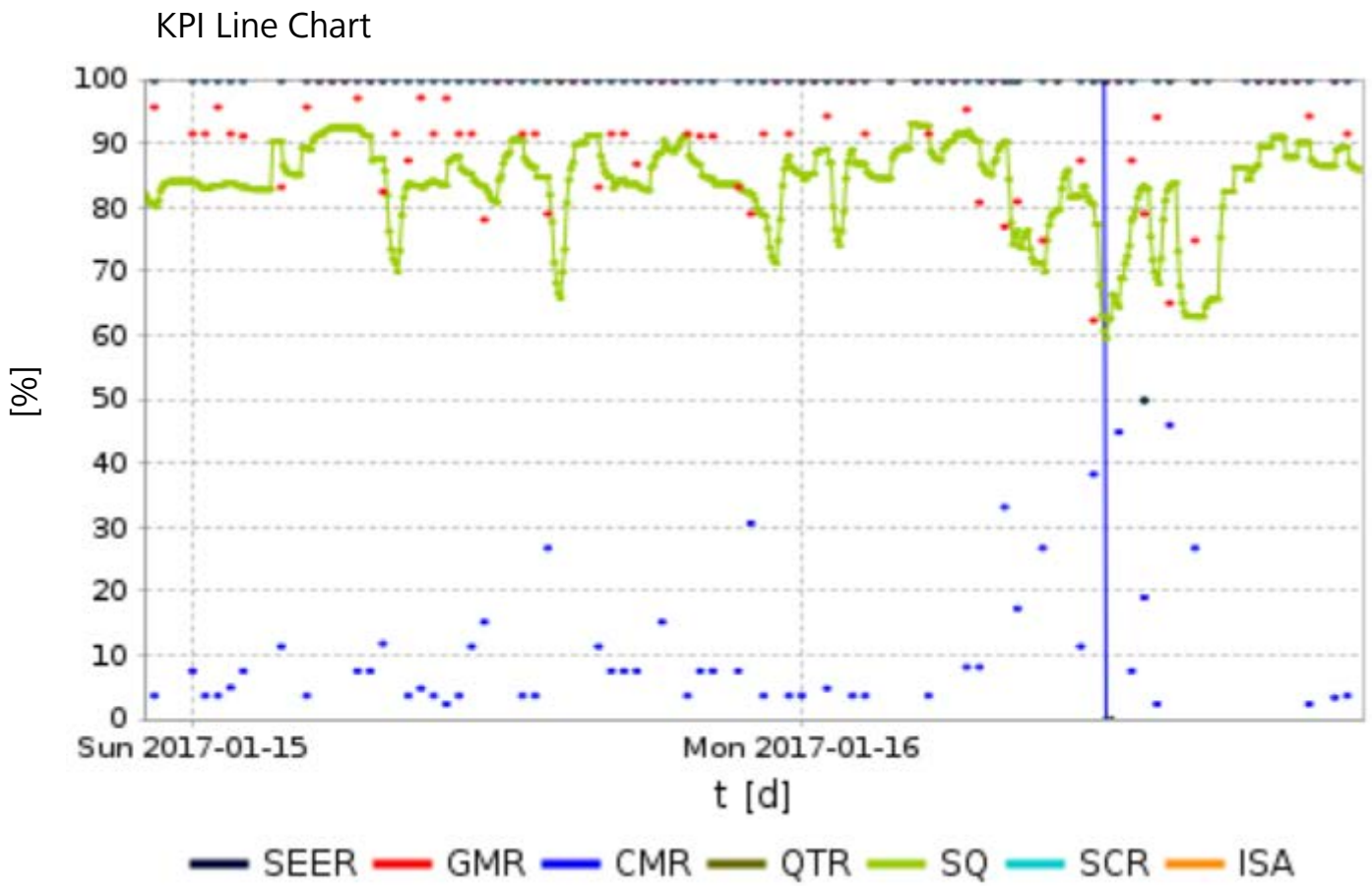
Service

24h Service Summary 2017-01-15 21:56:59 - 2017-01-16 21:56:59

Live Calls (in/out)	49	Test Calls (out)	43
Successful SDT	00:01:02	FTP Downlink Speed (MBit/s)	--
SEER	93.9%	(--)	
Successful SCR	93.9%	FTP Uplink Speed (MBit/s)	--
ISA	0.0%	(--)	
GMR (in/out)	92.0%	HTTP Downlink Speed	--
CMR	13.2%	(MBit/s)	
QUIT	8	(--)	
Waveform-Analyzed Calls	11		
Good Waveform Ratio	27.3%		

Service Quality over Time

- Signaling quality is good as per RFC 6076 KPIs
- Apparent issues with media quality even outside of peak hours
- Significant amount of critical minutes / low good minute ratio (GMR)

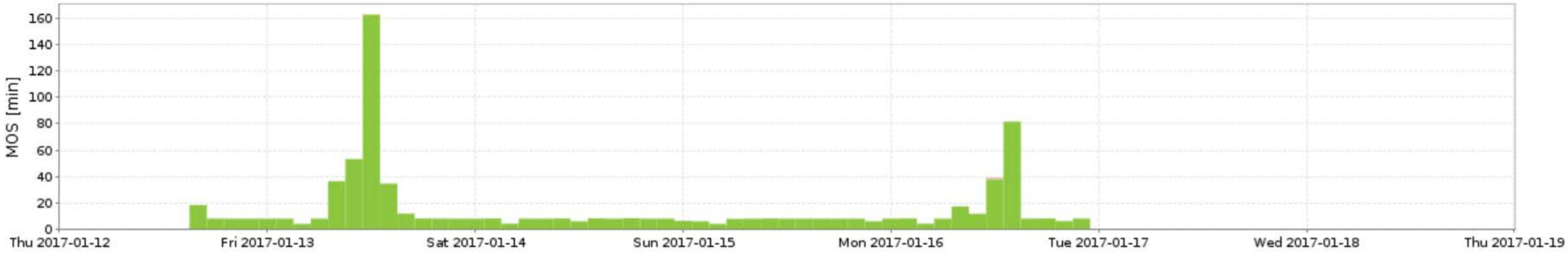


Drill-Down to Data from Qlear Probe

- Probe shows nearly perfect media quality – 99.7% in highest MOS class
- Proof that quality at customer site is perfect

MOS Classes	R-value	~Minutes	Relative [%]
≥ 4.34	≥ 90	777	99.70
≥ 4.03	≥ 80	1	0.17
≥ 3.60	≥ 70	0	0.03
≥ 3.10	≥ 60	0	0.02
< 3.10	< 60	1	0.08
Total		779	100.00

Qualified By Minutes In MOS Classes



Call History

	Call End Time	Call Duration	Origination	Destination	GMR (%)
	2017-01-16 19:34:08	00:01:00.327	004921	004982	100.0
	2017-01-16 19:04:09	00:01:00.327	004921	004982	100.0
	2017-01-16 18:34:08	00:01:00.314	004921	004982	100.0
	2017-01-16 18:04:08	00:01:00.415	004921	004982	100.0
	2017-01-16 17:34:09	00:01:00.322	004921	004982	--
	2017-01-16 16:04:08	00:01:00.348	004921	004982	--
	2017-01-16 15:34:09	00:01:00.311	004921	004982	75.0
	2017-01-16 14:34:14	00:01:00.333	004921	004982	63.5
	2017-01-16 14:04:08	00:01:00.305	004921	004982	90.5
	2017-01-16 13:34:08	00:01:00.326	004921	004982	79.0

Where does bad quality come from?

RTP Streams of One Call

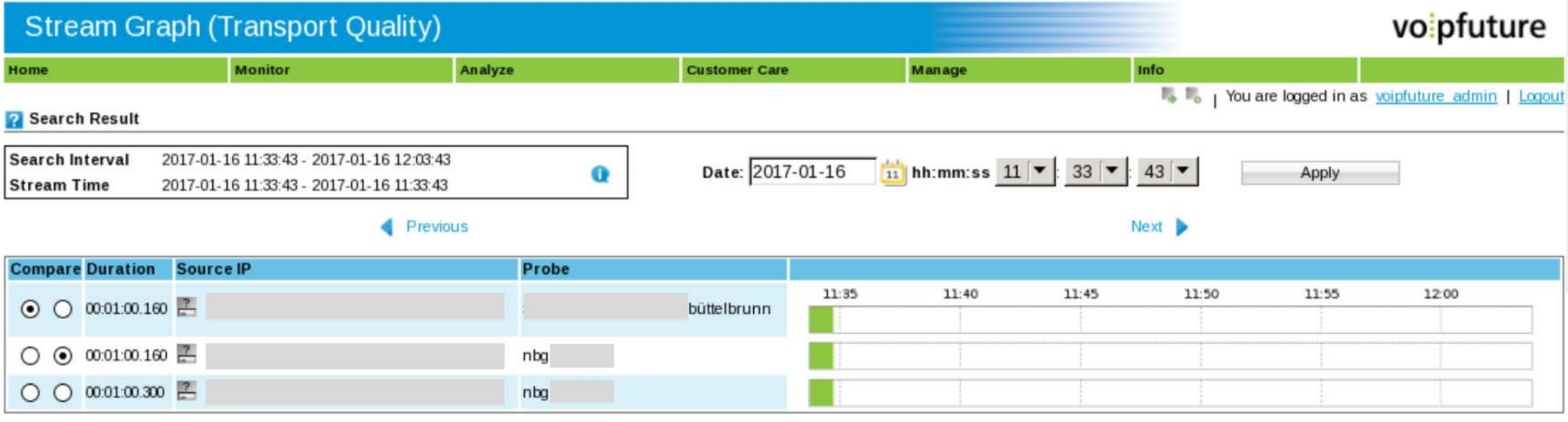
- Time: 2017-01-16 at 11:33
- A-Party: Qlear Probe
- B-Party: Active Call Responder

xDR Related Streams

Compare	Quality	MOS-LQE + GMR	Direction	Source IP	Destination IP	Probe	Stream SSRC	Start	Duration
◉ ○	●	4.41/4.41/100	A → B			6V56G2PP	1283856118	2017-01-16 11:33:43.703	00:01:00.180
○ ◉	●	1.00/4.41/27	A → B			nbg	1283856118	2017-01-16 11:33:43.734	00:01:00.178
○ ○	●	0.99/4.20/25	A → B			nbg	1283856118	2017-01-16 11:33:43.734	00:01:00.178
○ ○	●	4.41/4.41/100	B → A			nbg	1063274227	2017-01-16 11:33:43.636	00:01:00.300
○ ○	●	4.41/4.41/100	B → A			nbg	1063274227	2017-01-16 11:33:43.756	00:01:00.160
○ ○	●	4.41/4.41/100	B → A			6V56G2PP	1063274227	2017-01-16 11:33:43.765	00:01:00.160

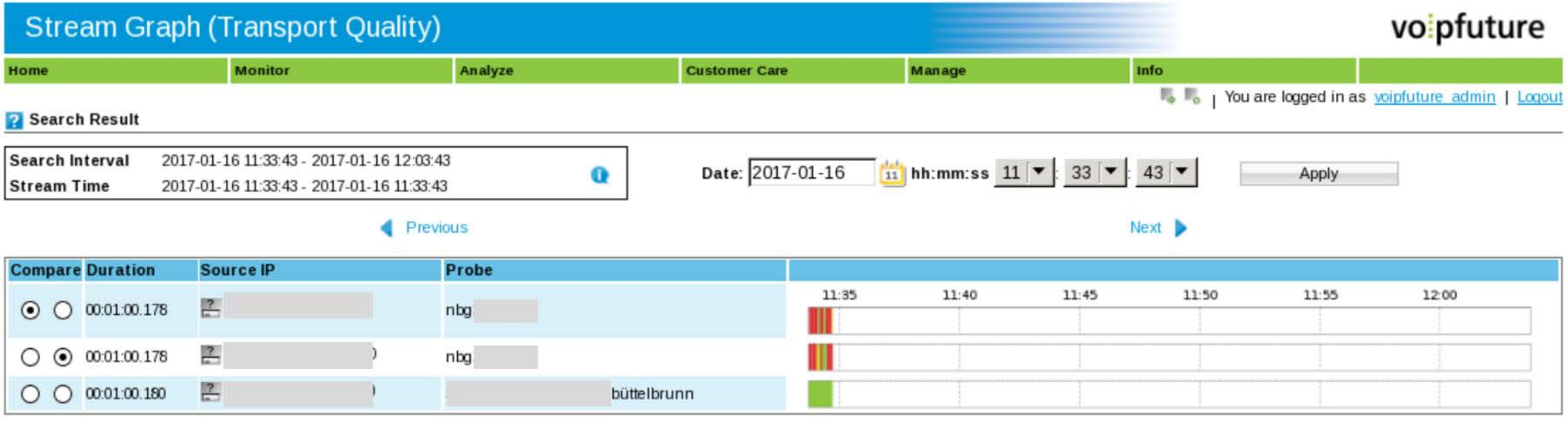
Stream from Core to Customer

- Perfect quality from source (ACR) to destination (Probe)



Stream from Customer to Core

- Stream leaves customer site in perfect shape
- Severe impairments measured at access SBC



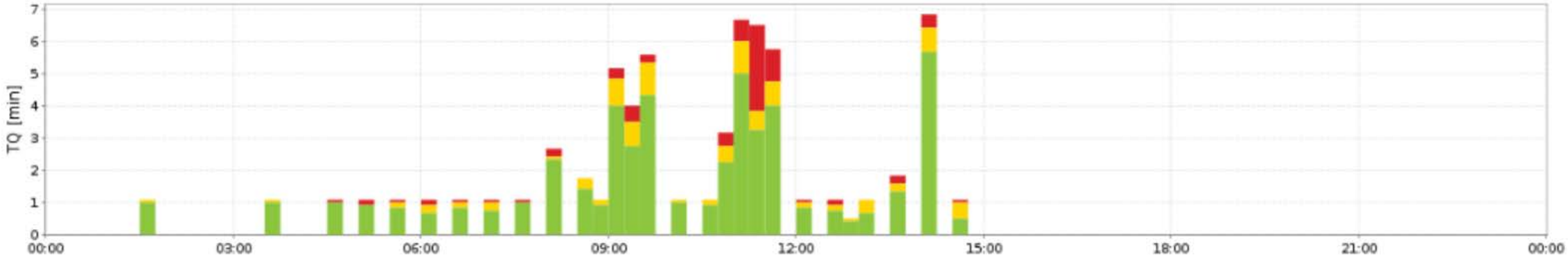
Quality statistics for RTP sender (customer)

- Quality as measured at access SBC
- Issue is persistent over time

Quality	~Minutes	Relative [%]
Good	50	74.29
Tolerable	10	14.15
Critical	8	11.56
Total	68	100.00

Tolerable Impairment Level	# Streams	Relative [%]
0 %	11	21.57
1 - 20 %	26	50.98
21 - 40 %	11	21.57
41 - 70 %	3	5.88
71 - 100 %	0	0.00
Total	51	100.00

Qualified By Minutes In Transport Quality



Root Cause

- Extreme packet loss and jitter
- Network overload points to packets being buffered in the network

The root cause is an underdimensioned Cisco ISR router that acts as endpoint for the VPN tunnel.

[VPF] Troubleshooting: Media-Src (EpA) | 1 Day | 2017-01-17

Previous Day (2017-

Indicator List | Indicator Chart

Indicator Analysis (Total Streams: 51; Total Minutes: 67)

Type	Description	Streams	Minutes	in [%]	Trend
Transport Quality					
Jitter					
☑	Tolerable Jitter	40	12	18.45	n.a.
☑	Critical Jitter	13	4	6.40	n.a.
☐	Very Large Jitter	5	0	0.98	n.a.
☐	Jitter Buffer Underrun	18	3	4.92	n.a.
☐	Jitter Buffer Overflow	11	1	2.09	n.a.
Packet Loss					
☑	Tolerable Packet Loss	36	5	7.63	n.a.
☑	Critical Packet Loss	19	3	5.17	n.a.
☐	Critical Loss Density	12	1	1.85	n.a.
Overload					
☑	Network Overload	23	6	9.23	n.a.
	Overload with Loss Event	0	0	0.00	n.a.
	Overload with Packet Order	0	0	0.00	n.a.
	Overload At Bottleneck	0	0	0.00	n.a.

Qlear Probe at business customer site

- Easy & cost-effective installation at end customer site (installed in minutes)
- Efficient: Customer VPN was quickly identified as problem source
- Problem affected not just VoIP service, but all traffic - overall improvement of customer network

Qlear troubleshooting prevented churn of a large account when it was placed in branch office

Our Offer

- One integrated solution to automate and perform pre-qualification, onboarding, service assurance, and quality monitoring of enterprise customers

- Including
  - Solution elements
    - Software
    - Hardware
  - Professional services for high-level design and implementation

THANK YOU FOR YOUR ATTENTION

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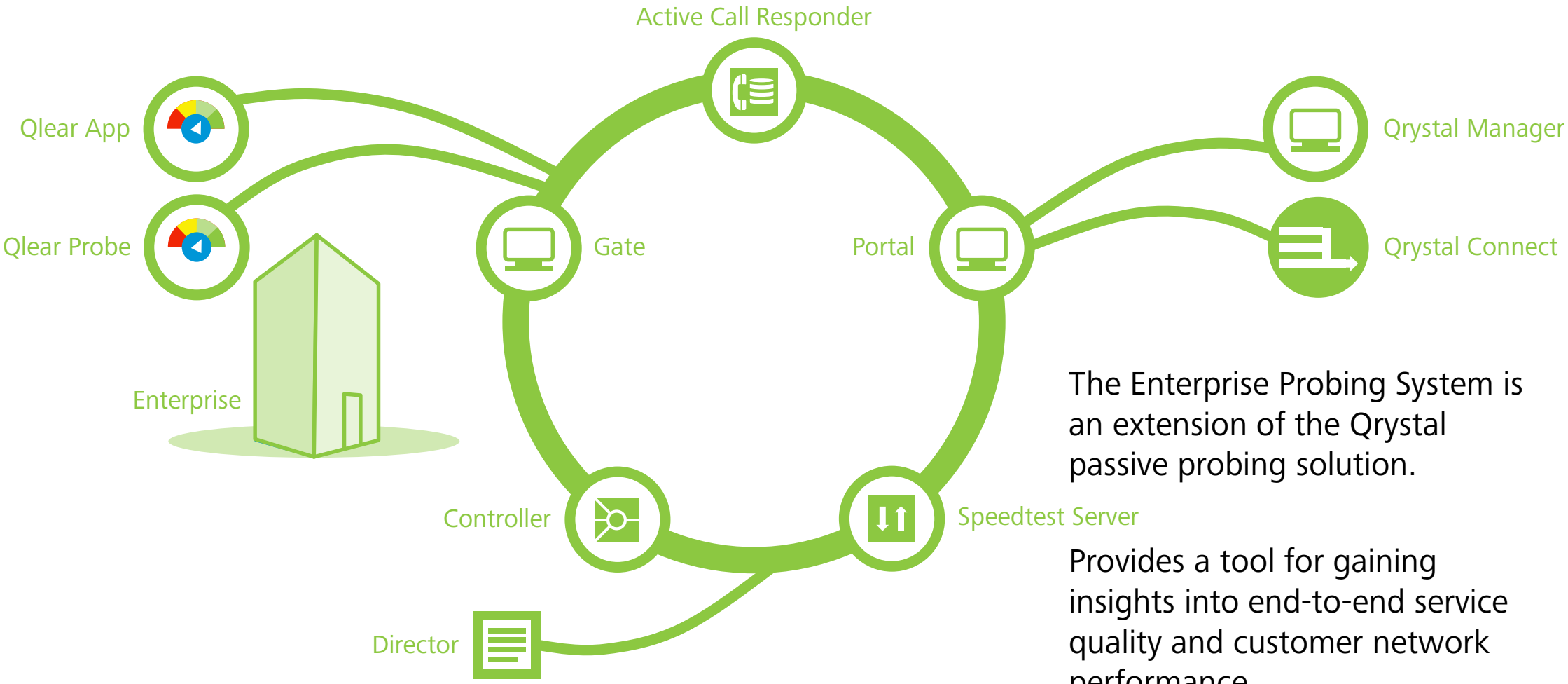
ANNEX

Voipfuture Enterprise | Overview



The Enterprise Probing System is an extension of the Qrystal passive probing solution.

Provides a tool for gaining insights into end-to-end service quality and customer network performance

Voipfuture Qlear | Service Infrastructure

- Gate
  - provides a simple customer-facing user interface for end customers to download the Qlear App
  - Hidden “feature”: co-located with ACR Manager service, which controls the Active Call Responders

- Controller
  - responsible for all communication with the Satellite Probes
  - collects passive probing data and forwards it to the Qrystal Application Manager

- Director
  - global directory service operated by Voipfuture
  - points Qlear Probes to their Controller instance

Voipfuture Enterprise | Test Endpoints

- Active Call Responder (ACR)
  - central architecture component typically connected to IMS
  - terminates active test calls and measures the call quality.
- Speedtest Server
  - used by probes for active tests to determine the bandwidth of a customer's access network.
  - Note: the Speedtest Server is an optional component in the sense that existing http/FTP-servers may be used.

Qlear App | Key Features

Purely software-based	✓
LAN testing	✓
Basic IP testing	✓
WAN testing	✓
VoIP readiness testing	✓
Customer firewall check	✓
Windows client	✓

Qlear Probe | Key Features

LAN testing	✓
Basic IP testing	✓
WAN testing	✓
VoIP readiness testing	✓
Customer firewall check	✓
Periodic service availability testing	✓
Analysis of live calls	✓
Quality by network segment	✓
Extensive troubleshooting & diagnostics	✓