

# voipfuture

RELEASE NEWS

## Qrystal

# 8





## New Registration Monitoring: **REGISTRAR PERFORMANCE & SUBSCRIBER STATUS**



## More Dual Visibility: **IMPROVED VIEWS ON SIGNALING KPIS AND FINAL RESPONSE CODES**

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## CARRIER-GRADE REGISTRATION MONITORING

### Registrar performance

- Detailed performance per registrar
- View on worst registrars
- Subscriber status statistics over time

### Individual subscriber status

- Current registration status and history per subscriber
- Search registration events by subscriber, contact and many other criteria
- Analyze registration message flows

8

## EXTENDED DUAL VISIBILITY

### Distribution of Final Response Codes over time in Control Plane Monitor

### Many monitoring features enriched with signaling indicators and KPIs

- Indicator Monitor
- Trunk Monitor
- Route Monitor

12

## GREATLY IMPROVED USABILITY

### Better Visualization

- Much crisper charts through client-side rendering
- Easily switch between linear, log10 and pow10 scale on charts

### More Customization

- Configurable display of KPIs, e.g. on KPI Monitor Page
- New template concept for SIP Trunk Rulesets

15

## OTHER NEW FEATURES

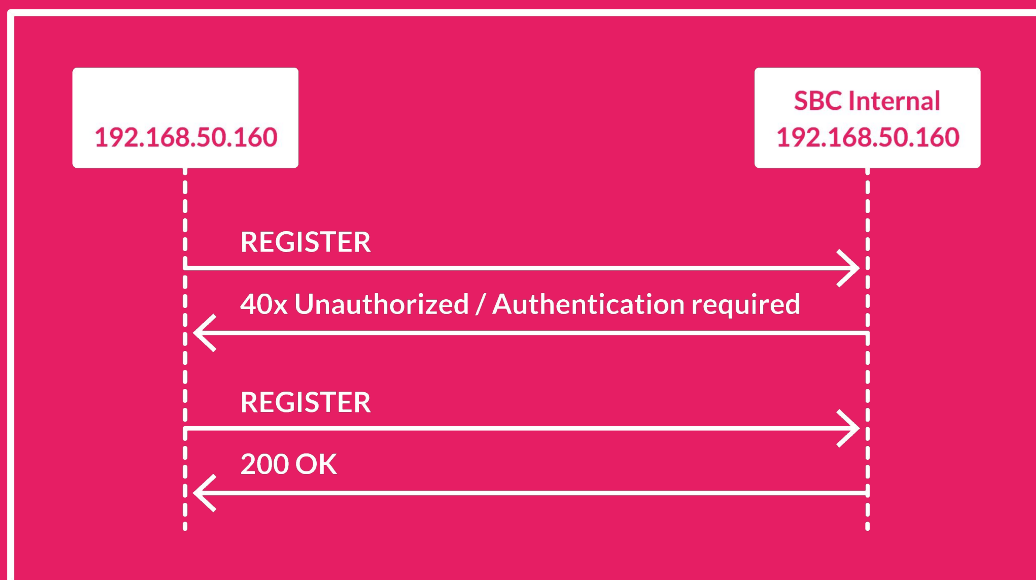
### Extended DTMF Support

- Support for SIP DTMF protocols
- Display of DTMF Events

### Other Features

- Configuration of SIP Reason Headers for dropped call detection
- More data on roaming LTE subscribers

# CARRIER-GRADE REGISTRATION MONITORING



# Carrier-Grade Registration Monitoring

Monitoring the call setup and in-call quality is important, but subscribers can only place and receive calls after their devices successfully register with the network. Qrystal 8 now provides you with detailed information about

- the performance of registrars and
- the status and history of individual subscribers and contacts.

**Registration Data Records (RDRs)** are created for the initial registration of every contact and any change of the registration status.

Registration List

voipfuture

[Home](#) | [Monitor](#) | [Analyze](#) | [Manage](#) | [Info](#) | [Logout](#)

Search Result

Search Interval2022-02-16 17:45 - 2022-02-17 17:45

RDR Time2022-02-16 17:46 - 2022-02-16 17:49

































Until Date2022-02-17

hh:mm:ss17:45:08

Apply

Previous

Next

Actions	Registration Time	Registration Status	Subscriber	Contact	Registered IP	User-Agent	Registrar UR
   	2022-02-16 17:49:22.559	Unauthorized	sip:501@192.168.172.170	sip:501@192.168.172.52:5060	192.168.172.52	Sipura/SPA941-4.1.8	sip:192.168.1
   	2022-02-16 17:49:22.559	Unauthorized	sip:501@192.168.172.170	sip:501@192.168.172.52:5060	192.168.172.52	Sipura/SPA941-4.1.8	sip:192.168.1
   	2022-02-16 17:47:08.835	Unauthorized	sip:952127@213.238.34.198	sip:952127@10.0.0.4:55716	10.0.0.4	erafsadfasfa	sip:213.238.3
   	2022-02-16 17:47:08.834	Unauthorized	sip:952127@213.238.34.198	sip:952127@10.0.0.4:55716	10.0.0.4	erafsadfasfa	sip:213.238.3
   	2022-02-16 17:46:19.768	Unauthorized	sip:99571@213.238.34.198	sip:99571@10.0.0.4:52183	10.0.0.4	erafsadfasfa	sip:213.238.3
   	2022-02-16 17:46:19.767	Unauthorized	sip:99571@213.238.34.198	sip:99571@10.0.0.4:52183	10.0.0.4	erafsadfasfa	sip:213.238.3
   	2022-02-16 17:46:06.594	Successful	sip:496922127567@phone.voipfuture.com	sip:496922127567@192.168.50.160:5060	192.168.50.160	--	sip:phone.voi
   	2022-02-16 17:46:06.594	Successful	sip:496922127567@phone.voipfuture.com	sip:496922127567@192.168.50.160:5060	192.168.50.160	--	sip:phone.voi

Refine Search

Export

Rows per page20

17:57:38 | (+01:00) Europe/Berlin | MOS Class Scaling: NB

Qrystal vn/a

The **Registration Search** page lets you search for registrations by many criteria, e.g.



**subscriber number**  
(sip:123@dom\*)



**contact**  
(sip:123@1.1.1.1)



**IP Addresses**



**User-Agent**

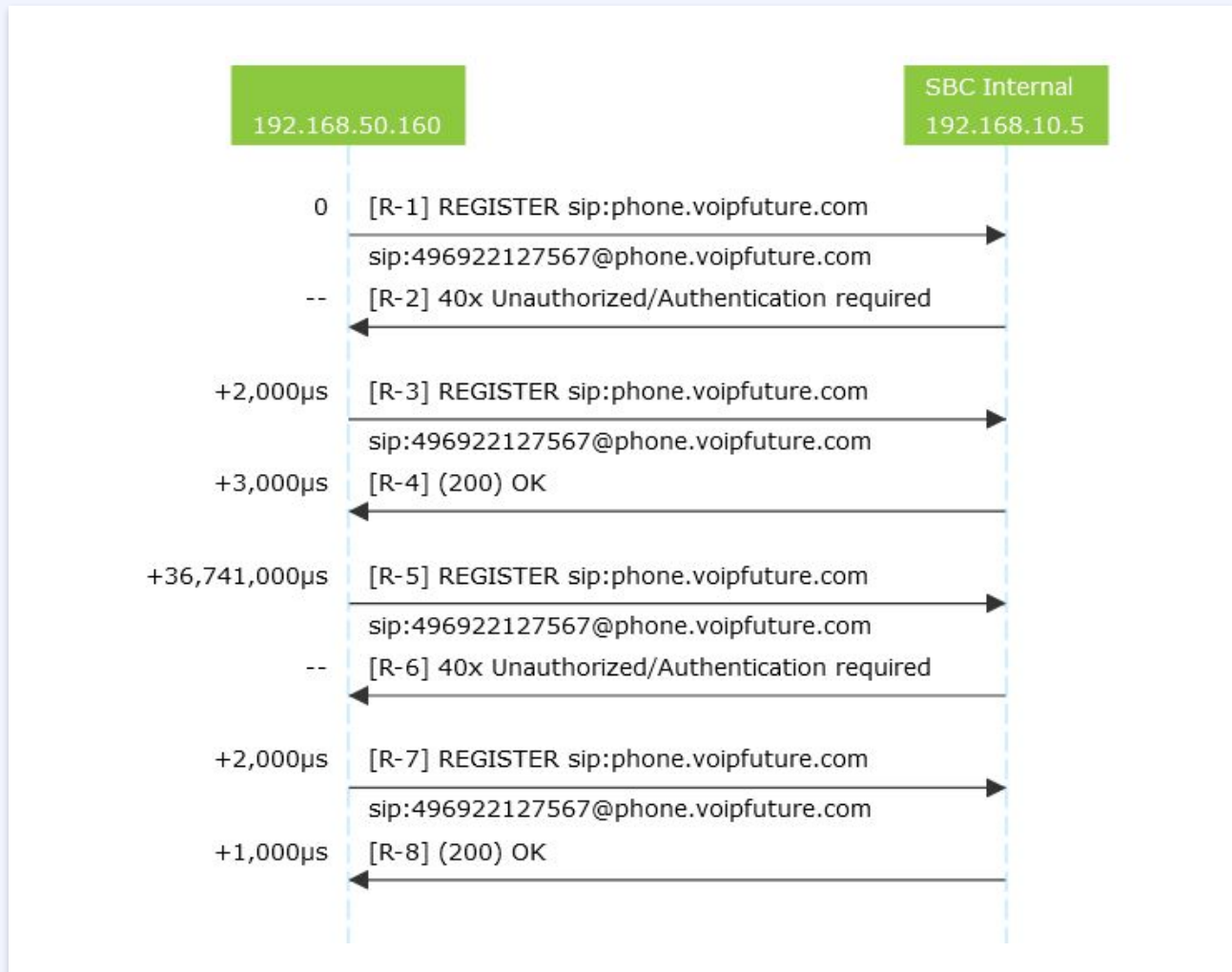


**P-Access-Network-Info**  
(for example mobile cells)



**P-Visited-Network-ID**  
(mobile roaming information)

The search results are shown on the **Registration List** page which allows further drill-down to individual registration data records and access to the **Registration Flow Diagram** with raw SIP messages for the most recent registration of that contact. This enables a detailed analysis of any registration issue.



The new Qrystal 8 **SIP Registrar Monitor** page presents statistical summaries of the subscribers and phones served by your network. You can filter by registrar names and data from specific Qrystal Probes.



The data is presented on different tabs:



### Subscribers Status

This tab provides the registration status of the registered subscriber base over the time. The graph for this tab is also available as portlet for the Dashboard.



### Registrar Performance

This tab shows the standard KPIs **Ineffective Registration Attempts (IRA)** and **Ineffective Initial Registration Ratio**.



### Registration Messages

The tab depicts the number of SIP messages resulting in a specific registration state.



### Worst Registrars

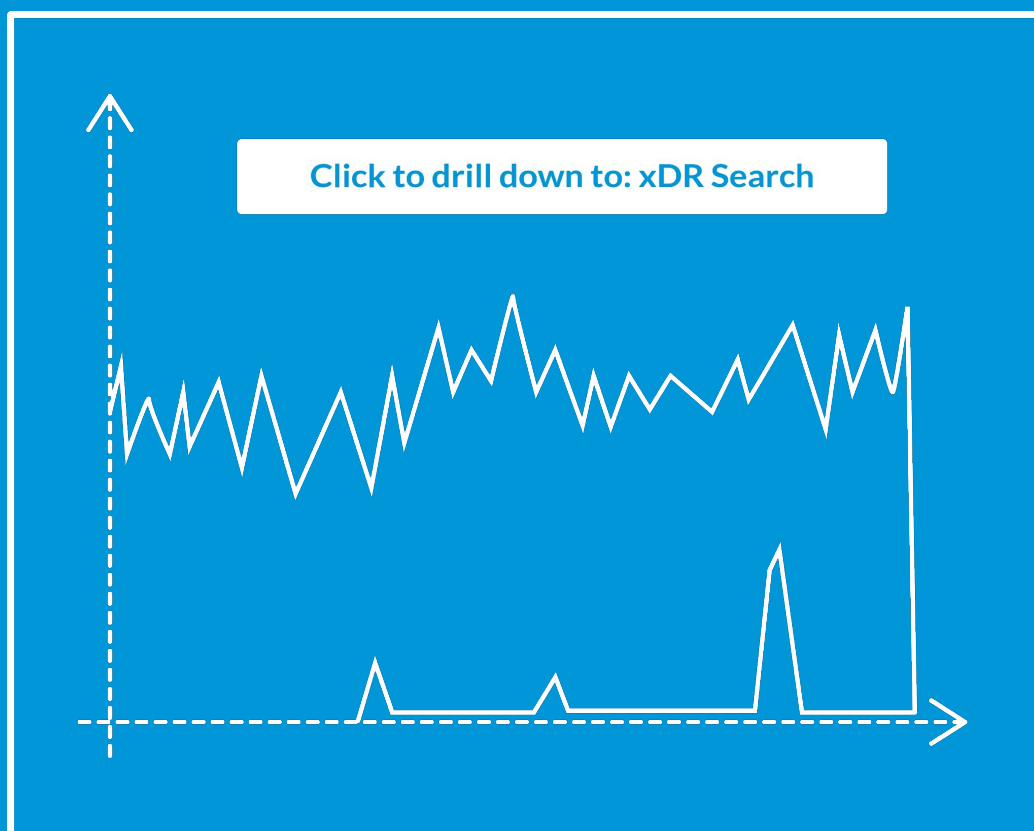
A table listing the identified registrars by their worst IRA rate.



### Subscriber Status Table

This tab provides a table detailing the overall subscriber status per registrar.

# EXTENDED DUAL VISIBILITY





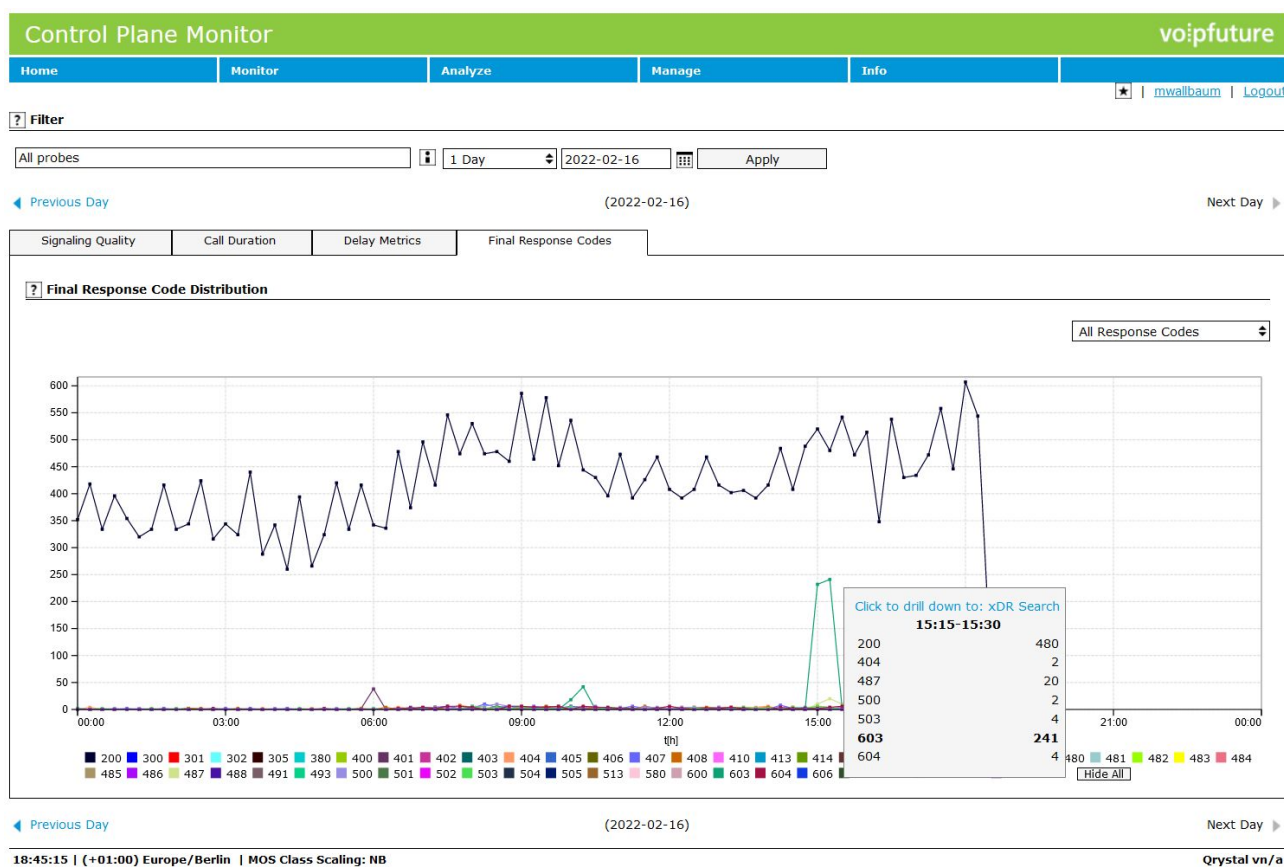
# Extended Dual Visibility

Qrystal 8 further extends the concept of Dual Visibility by enhancing many monitoring features, some of which used to focus on media performance, with rich signaling information.

The following Monitor features have been enhanced:

## CONTROL PLANE MONITOR

Qrystal 8 simplifies the analysis of signaling issues by providing very detailed statistics on SIP final response codes. The Control Plane Monitor features a new tab showing the distribution of response codes over time. Filters can be applied to show only response codes contributing to KPIs like SEER and NER.



## Indicator Monitor

Over the years Qrystal introduced many SIP indicators, that automatically detect signaling issues, complementing the typical Voipfuture RTP indicators. Still, the Indicator Monitor – as one of the oldest statistics features – only showed the RTP indicators.

Qrystal 8 greatly improves the **Indicator Monitor** by adding a new **Control Plane Indicator List** tab, which presents you with statistical data on all 28 signaling indicators. Also, the Indicator Chart tab now shows the user-selected signaling indicators over time.

On the tab, you can switch between the already known **QDR Minute View**, which is applicable only for media indicators, and the **xDR/Stream View**, which is applicable for control- and media indicators.



## Trunk and Route Monitor

Qrystal 8 also adds more Dual Visibility to the Trunk Monitor and Route Monitor pages by providing more signaling and media KPIs.

The new **Trunk Monitor** lets you search for bad quality trunks ranked by any of eight control plane KPIs and nine media plane KPIs. Most KPIs are calculated based on the IETF RFC 6076 and ETSI TR 103 639 standards and some proprietary KPIs, such as the Dropped Call Ratio.

The page visualizes the selected set of KPIs based on quality-colored tiles in a trunk format that is ranked by a quality KPI of your choice.

Trunk Monitor

voipfuture

Home

Monitor

Analyze

Manage

Info

voipfuture

Logout

Trunk Quality Overview

Trunk

ST: .\*

1 Day




















2021-12-14

Apply

Previous Day

(2021-12-14)

Next Day

Trunk Name	Action	SEER %	SER %	SCR %	ISA %	DCR %	TCR %	xDRs [#]	GMR %	GSR %	QTR %	CMR %	CSR %	EFR %	MOS [min]
Region 2 <--> Region 3	  	85.7	85.7	85.7	0.0	0.0	0.0	14	63.0	55.6	0.0	17.2	27.8	72.2	81
Region 2 <--> Access SBC 21	  	97.5	97.5	97.5	0.0	0.0	0.0	81	51.2	39.7	0.0	20.0	49.3	76.7	284
Core SBC 15 <--> Access SBC 21	  	98.4	98.4	98.4	0.0	0.0	0.0	125	56.5	50.0	0.0	15.4	37.5	75.0	61
Access SBC 21 <--> Terminals	  	99.5	99.5	99.2	0.0	26.2	0.0	1,885	49.6	45.5	0.6	15.9	34.1	69.7	11,170
Core SBC 14 <--> Core SBC 15	  	99.6	99.6	99.6	0.0	0.0	0.0	902	50.7	45.1	0.4	16.7	37.9	68.3	4,539
Access SBC 24 <--> Terminals	  	99.6	99.6	99.3	0.0	0.0	0.0	1,881	46.6	42.1	0.1	19.3	40.7	72.6	8,562
Core SBC 14 <--> Access SBC 21	  	99.8	99.8	99.8	0.0	0.0	0.0	960	49.1	44.7	0.0	16.6	38.1	70.8	4,570
Region 4 <--> Access SBC 24	  	100.0	100.0	100.0	0.0	0.0	0.0	282	53.3	48.1	0.0	17.0	37.4	76.1	1,139
Region 5 <--> Access SBC 21	  	100.0	100.0	98.5	0.0	0.0	0.0	133	53.2	53.1	0.0	14.1	33.1	66.9	430
Region 4 <--> Access SBC 21	  	100.0	100.0	99.5	0.0	0.0	0.0	370	41.7	41.3	1.1	17.8	32.4	76.6	1,645
Region 3 <--> Access SBC 21	  	100.0	100.0	100.0	0.0	0.0	0.0	149	45.4	44.3	0.0	16.9	36.9	72.1	579
Region 3 <--> Region 5	  	100.0	100.0	100.0	0.0	0.0	0.0	35	65.1	50.0	0.0	13.4	33.3	79.2	155
Region 5 <--> Access SBC 24	  	100.0	100.0	100.0	0.0	0.0	0.0	117	54.4	48.9	0.0	16.1	33.0	77.4	448
Region 2 <--> Region 4	  	100.0	100.0	100.0	0.0	0.0	0.0	94	53.5	45.5	0.0	16.2	38.2	73.6	483
Region 4 <--> Region 5	  	100.0	100.0	100.0	0.0	0.0	0.0	168	54.4	51.0	0.0	15.5	32.8	67.2	723
Region 2 <--> Access SBC 24	  	100.0	100.0	100.0	0.0	0.0	0.0	68	51.7	54.8	0.0	17.3	32.3	74.2	291
Core SBC 14 <--> Access SBC 24	  	100.0	100.0	100.0	0.0	0.0	0.0	77	35.4	40.0	0.0	14.8	30.0	40.0	65
Core SBC 12 <--> Access SBC 21	  	100.0	100.0	100.0	0.0	0.0	0.0	2	--	--	--	--	--	--	
Region 3 <--> Access SBC 24	  	100.0	100.0	99.2	0.0	0.0	0.0	258	51.4	45.5	0.8	18.3	33.1	75.8	1,066
Region 3 <--> Region 4	  	100.0	100.0	100.0	0.0	0.0	0.0	271	48.4	45.6	0.0	18.1	34.9	72.5	1,391

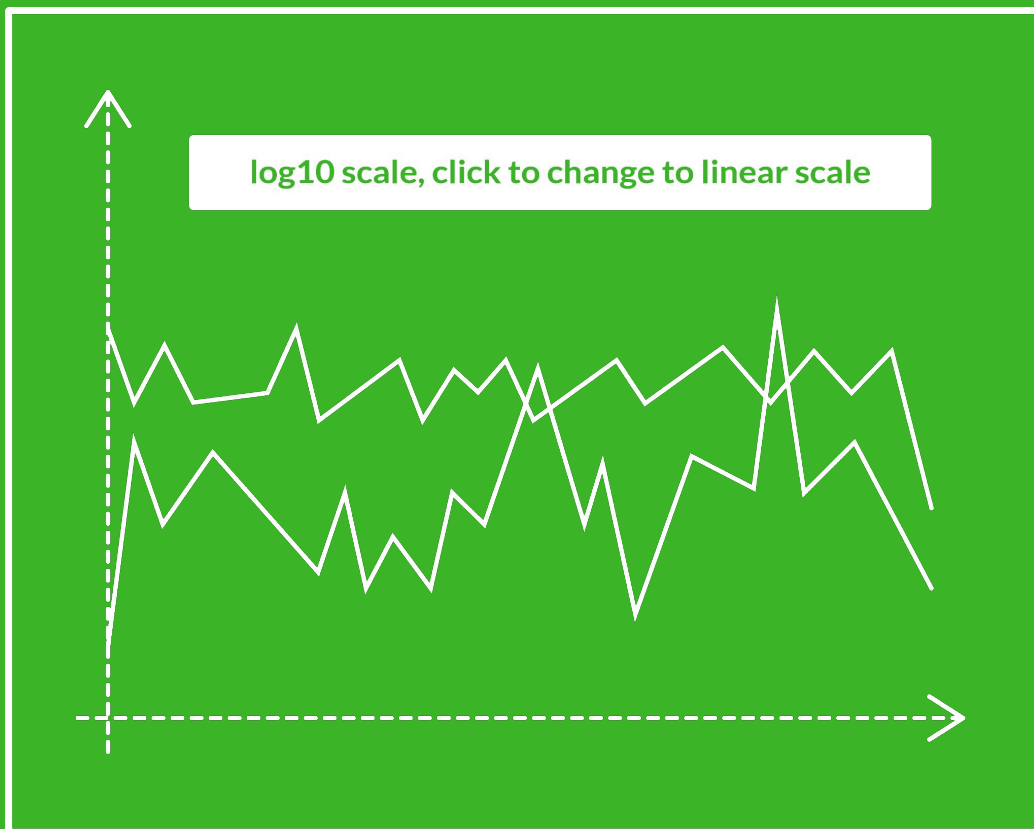
Rows per page: 20

1234

You can filter for specific trunks by entering a name pattern in the **Trunk** field, and sort the results list by the KPI of your choice by clicking the header line of that KPI. Drilling down presents performance data for the selected trunk.

The Route Monitor has been redesigned in a similar way, offering a comprehensive view on the signaling and media performance of routes. Likewise, Qrystal 8 improves the Trunks and Routes portlets for the Dashboard by showing selected KPIs in the new tile presentation.

# GREATLY IMPROVED USABILITY



# Greatly Improved Usability

Qrystal 8 provides numerous enhancements to the system's usability, including client-side rendering for crisper charts and images, adaptable chart axis and more customization options.

## CRISPER CHARTS

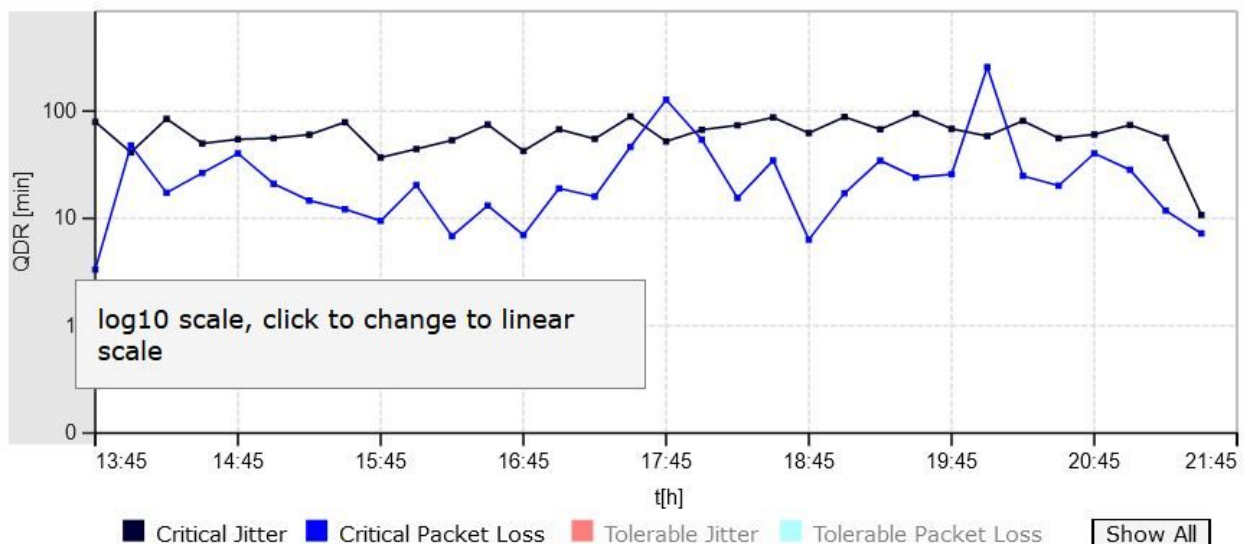
Most of our customers have policies relating to the allowed browsers and their software version. Unfortunately, these policies are not always updated frequently and some customers required support for very old browsers. This required that every chart displayed in the Qrystal frontend had to be rendered by the Qrystal Manager server as a fixed-size picture, which was then sent to the browser for visualization, causing a general blurriness.

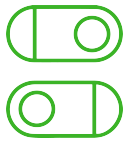
Qrystal 8 gets rid of blurriness and provides crisp and clean images plus improved interaction with your charts. To this end, the data itself is now sent to your browser, where a JavaScript application flexibly visualizes graphics directly in the browser window. You will see the difference.

## MORE CUSTOMIZATION AND FLEXIBILITY

Qrystal 8 offers many new options and features that improve the user experience.

? Indicator Line Chart / 2021-12-08 21:35:01 (5m refresh)





You can now easily switch between linear, log10 and pow10 scales on charts. This is particularly useful when using one chart to display KPIs that have very different ranges.



Many portlets and Monitor features allow to configure which KPIs to display. The benefit is that you can now focus on the KPIs that are most relevant to you.



SIP trunks are an important means to aggregate data. They also allow to define number normalization rules. Qrystal 8 now provides a template concept for SIP Trunk Rulesets, which saves a lot of typing when commissioning the system. Define a template once and assign it to all applicable trunks.



# OTHER NEW FEATURES



# Other New Features

Qrystal 8 introduces many additional improvements, such as improved DTMF detection, improved call drop detection and more data on VoLTE roaming.

## DTMF

DTMF signals are used for a number of purposes, such as control for answering machines, navigating Interactive Voice Response dialogs, entering PINs and operating two-stage dialers. For many years Qrystal detected the presence of DTMF events based on RFC 2833/4733 in RTP streams. In some cases, however, you need more information, e.g. which keys were pressed. On top, there are other protocols that were so far not supported.

Qrystal 8 now detects all DTMF protocols in use, i.e.



In-band RTP Named Telephone Events  
(RFC 2833/4733 TelEv) payload



Out-of-band SIP INFO method  
(RFC-2976)



Out-of-band SIP NOTIFY method  
(RFC-6665)



Out-of-band SIP Key Press Stimulus  
(RFC 4730 KPML)

You can find calls using any of these methods using the **Stream Search** and **xDR Search** pages. The **Indicators** tabs on the **Stream Summary** and **xDR Details** pages show the pressed keys and the corresponding time. Any DTMF sequences and digits are obfuscated, if the current user role does not have the **View DTMF digits** privacy permission.



xDR Details

Home

Monitor

Analyze

Manage

Info

Indicators

Signaling Information

Related

General Information

xDR ID

: 0000017dbf3d5f4e:ecbb11ddb2a6f63f

Signaling Quality

:

Stream Summary

Home

Monitor

Analyze

Manage

Info

Indicators & Histograms

Stream Details

RTCP Data

Call Flow Diagram

Home

Monitor

Analyze

Call Flow Diagram

View

Devices

95.91.241.215

SBC External  
172.28.52.11

0

[S-1] INVITE/SDP

→

+680μs

[S-2] 401 UNAUTHORIZED to INVITE

←

+35,270μs

[S-3] ACK

→

+5,822μs

[S-4] INVITE/SDP

→

+841μs

[S-5] 100 TRYING to INVITE

←

+9,716μs

[S-6] 200 OK/SDP to INVITE

←

+52,815μs

[S-7] ACK

→

+5,841,562μs

[D-1] DTMF SIP Info String: 123456

→

Media Information

Codec

: G.711 alaw (00:00:27.635)

Used Codecs

: G.711 alaw

SSRC

: 1798636877

# Total Packets

: 1,379

# Total Packets Lost

: 5 (0.36%)

# Total Buffer Underrun

: 24

# Total Buffer Overflow

: 27

SCD Quantity [μs]

: --

Min. Jitter [ms]

: 0

Avg. Jitter [ms]

: 9

Max. Jitter [ms]

: 35

PSI Period [ms]

: --

PSI Modulo

: --

Round Trip Time [ms]

: --

DTMF

2021-12-15 18:56:06.432 - 1234

2021-12-15 18:56:15.106 - 5678

2021-12-15 18:56:24.250 - 9#

2021-12-15 18:56:25.416 - 0

00TestAsterixMAC

SBC External:5060

2021-12-15 18:57:02.362 - INFO -

Authentication success

(200) OK

Caller

(16) Normal call clearing

none

2021-12-15 18:56:56.073 - 123456

2021-12-15 18:57:09.523 - 789#

2021-12-15 18:57:11.601 - 0

## OTHER FEATURES

### Configuration of call drop detection

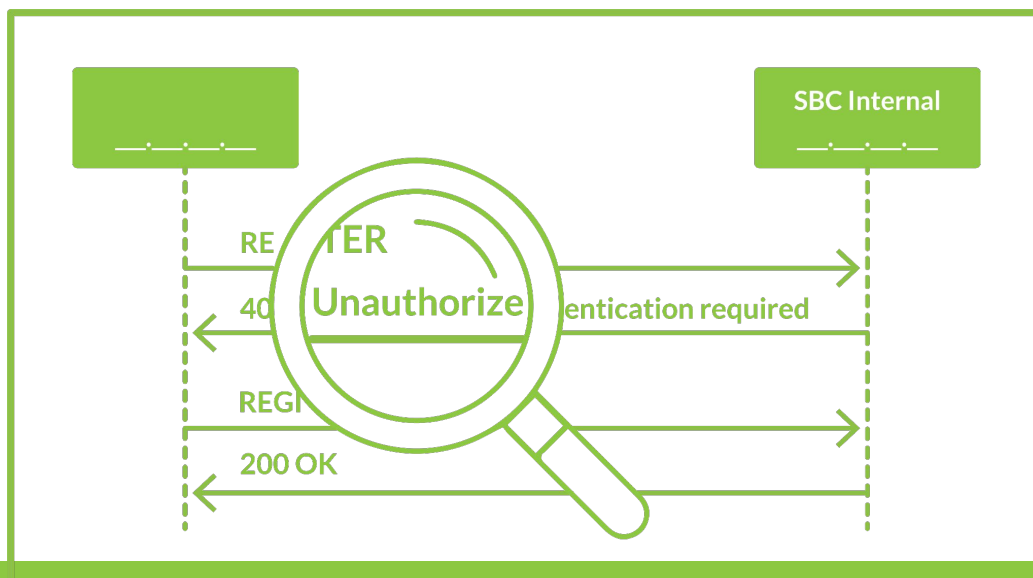
Qrystal 7 introduced the customizable **Dropped Call Ratio (DCR)** KPI showing the ratio of connected calls that were dropped by the network. The configuration required the assistance of the Voipfuture Support team to configure the reason strings on every probe.

Qrystal 8 now includes the **Dropped Call Management** feature which lets you easily configure the Dropped Call reason headers yourself. On top, the system can be set to auto-configure itself on a daily, weekly or monthly basis according to configurable thresholds for redial rates and minimum number of occurrences of a reason header.

## More data on roaming LTE subscribers

When visiting a foreign network, a VoLTE handset still registers itself with, and still calls through, the infrastructure of the home network. The visited network identifies itself by inserting its unique **P-Visited-Network-ID** into the SIP messages that are forwarded to the home network.

Qrystal 8 identifies roaming registrations by storing the **P-Visited-Network-ID** in the RDR mass data and roaming calls by storing the **P-Visited-Network-ID** with the xDR mass data. This facilitates dedicated monitoring of inbound roamers.



### ABOUT

Voipfuture is a premium voice service monitoring and analytics company, which provides a unique technology for assessing, aggregating, analyzing, and visualizing voice quality information, for better data-based insights,

Voipfuture products offer a precise view on both the media and control planes to communication service providers, wholesalers, enterprises, call centers and cloud-based voice services. Since its launch, Voipfuture has been at the forefront of voice quality monitoring and continues to redefine Voice over IP by connecting customers' view on service quality with high resolution user experience, as well as with insights that enable next gen voice services.

