Harnessing FreeSWITCH for scaleinvariant call-centre reporting in growing VoIP providers



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Goals of this presentation

- Illustrate the challenges we faced integrating FreeSWITCH's mod_callcenter Module, and our call center reporting software: QueueMetrics-Live.
- Illustrate the advantages this integration brings, especially to growing VoIP providers.

What is QueueMetrics-Live

- An industrial-grade call-center **monitoring and reporting system**
- SAAS Model, priced based on the number of agents.
- Suitable from **5 to 1000+ live agents**.
- Provides statistics, wallboards, QA evaluation and agent panels with WebRTC phones.
- Supports FreeSWITCH/FusionPBX, Asterisk, GrandStream, Enswitch, MirtaPBX, Yeastar...

A bit of history:

- Started working with Asterisk in 2003.
- Developed QueueMetrics in **2005**.
- Developed WombatDialer in **2012**.
- Launched QueueMetrics-Live in **2015**.
- Integrated QueueMetrics-Live with FreeSWITCH/FusionPBX in 2019.

What is mod_callcenter

- mod_callcenter is an **inbound call queuing application** for FreeSWITCH.
- Provides call center functionality, with different options for call distribution.

What VolP Providers tell us - 1 Many small Businesses are in fact small Call-Centers (And don't know it).

- The SAAS approach enables small businesses to access industrial grade reporting, **without a huge investment**.
- Radical improvements can be obtained through measuring, even in very small environments.
- **Data Visibility** through wallboards and reports have an immediate impact.

Example - Medical Center

A Private Medical Center with four employees answering the phone and taking appointments, would not consider itself a call center. That said, they do still benefit from tracking agent activity or call traffic during peak times, and having a realtime view of what's going on.

What VoIP Providers tell us - 2 Medium and bigger-sized Businesses often list reporting as a requirement for adoption

- Difficult to keep track of **efficiency**.
- Need for advanced agent tracking features.
- Need to show results to stakeholders.

Why is FreeSWITCH a good choice?

- Native Multi-Tenant support.
- Scales very well.
- Great for **Providers** because of power and flexibility.

Why QueueMetrics-Live?

- It's difficult for VoIP Providers to offer reporting natively.
- Software As A Service model
- Cloud based infrastructure based on Docker and Kafka.
- Administration, upgrades, **backups are done by us**.

Benefits of the integration - Multi Tenant Support

- SAAS model is a **perfect fit** for **Multi-Tenant environments**.
- Each tenant has its own QM-Live environment.
- Data is loaded to different tenants' QM-Live instances, from the same PBX.
- Adding/removing tenants can be done programmatically.

Benefits of the integration - APIbased Lifecycle

- Create/Edit/Delete QM-Live instances through our APIs.
- Scale-invariant tenant creation.

Benefits of the integration - Out of the box reporting

- When setup, QueueMetrics-Live is able to auto-configure with queue and agent data.
- Customers get a trial period with their own data.

Multiple Geographies

- Reduce delays.
- Avoid legal concerns about data storage location.
- USA, Europe, Asia, South Africa.



FreeSWITCH Integration (mod_callcenter)

- mod_callcenter is an **inbound call queuing application** that can be used for call center needs.
- This is similar to Asterisk, with the plus that FreeSWITCH is more suited for Multi-Tenant environments.

Challenges

1. Write mod_callcenter data in a **QM-Compatible format**.

- 2. **Split and load data** to QM-Live securely and to the correct tenant's instance.
- 3. Send commands from QM to mod_callcenter (login/logout/pause/unpause).
- 4. Automatic QM Configuration of agents and queues.

Uniloader

- Uniloader is a lightweight package that, when installed on the PBX, sets up the **two services** we will need for the integration.
- All the services reference a **single Go binary**, the focus of which is to have **as little impact as possible** on the PBX while running its operations.

Solutions 1 - Translate mod_callcenter data

- Uniloader service that **runs constantly on the PBX** (uniloader-FreeSWITCH).
- Accesses the Event Socket.
- Translates mod_callcenter events to a QM-compatible format (queue_log events).
- Agent and Queues Unique IDs are converted in a readable format, based on the extension (e.g. Agent/200).
- Data is then **saved to a queue_log file**.

Solutions 2 - load data to QM-Live securely

- Uniloader service that **runs constantly on the PBX** (uniloader-splitter).
- The service accesses the queue_log file.
- The service uses user-defined matchers (regexp) to split data belonging to different tenants.
- Data is then **uploaded to different QM-Live instances**, based on the tenant.
- Data upload happens securely through HTTPS.

Handle Tenants Programmatically

- The configuration file is easy to edit.
- We provide Ansible Playbooks to automate the process.

Solutions 3 - send data from QM to mod_callcenter

- Commands issued by the QueueMetrics-Live user are stored by QM.
- when uniloader-splitter uploads data, it **checks if there are any pending commands**.
- uniloader-splitter then acts as a proxy and sends the commands to the PBX through the Event Socket.

Solutions 4 - auto-configuration

- By accessing the PBX's Postgres database, QM can read a tenant's agent and queue configuration, creating a JSON representation of it.
- The Uniloader module can leverage **QM-Live APIs** to send a **JSON configuration** to be applied.
- With **one command**, the setup is complete and **reporting can happen immediately**.

Auto-configuration is essential

- Small Businesses want immediate results.
- Seeing your own data generates interest.
- Medium/Huge sized business save a lot of configuration time.

Let's take a look!

Raw Data

- Each record represents an event on a queue or an agent.
- Generated from mod_callcenter events only.
- Is processed by QueueMetrics-Live to produce reports and wallboards.

1579884990	1579884967.3 ZRK-IN NONE ENTERQUEUE 03028556757 1
1579885005	1579884967.3 ZRK-IN SIP/501 RINGNOANSWER 15000
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1579885177	1579884967.3 ZRK-IN SIP 502 RINGNOANSWER 15000
1579885179	1579884967.3 ZRK-IN NONE ABANDON 1111189
1579931491	1579931455.23 ZRK-IN NONE ENTERQUEUE UNknown 1
1579931499	1579931455.23 ZRK-IN SIP/501 CONNECT 8 1579931491.24 5
1579931617	1579931455.23 ZRK-IN SIP/501 COMPLETEAGENT 8 118 1
1579933484	NONE NONE NONE CONFIGRELOAD
1579934167	1579934113.40 ZRK-IN NONE ENTERQUEUE Unknown 1
1579934172	1579934113.40 ZRK-IN SIP/501 CONNECT 5 1579934167.41 2
1579934321	1579934113.40 ZRK-IN SIP/501 COMPLETEAGENT 5 149 1
1579934423	1579934407.43 ZRK-IN NONE ENTERQUEUE 0512726656 1
1579934434	1579934407.43 ZRK-IN SIP/502 CONNECT 11 1579934423.45 8
1579934441	1579934407.43 ZRK-IN SIP/502 COMPLETEAGENT 11 7 1
1579934796	NONE NONE NONE CONFIGRELOAD
1579934835	1579934823.46/ZRK-IN/NONE/ENTERQUEUE//0512726656/1
1579934842	1579934823.46 ZRK-IN SIP/501 CONNECT 7 1579934835.47 4
1579934867	1579934823.46 ZRK-IN SIP/501 TRANSFER 502 fxogateway 7 25 1
1579935263	NONE NONE NONE CONFIGRELOAD
1579935781	1579935765.52 ZRK-IN NONE ENTERQUEUE 0512726656 1
1579935796	1579935765.52 ZRK-IN SIP/501 RINGNOANSWER 15000
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1579935893	1579935882.57 ZRK-IN NONE ENTERQUEUE 0512726656 1
1579935899	1579935882.57 ZRK-IN SIP/501 CONNECT 6 1579935893.58 3
1579935972	1579935882.57 ZRK-IN SIP/501 COMPLETEAGENT 6 73 1
1579941520	NONE NONE NONE CONFIGRELOAD
1579941595	NONE NONE NONE CONFIGRELOAD
1579941748	1579941716.65 ZRK-IN NONE ENTERQUEUE 0512726656 1
1579941763	1579941716.65 ZRK-IN SIP/501 RINGNOANSWER 15000
1579941763	1579941716.65 ZRK-IN SIP/502 RINGNOANSWER 15000
1579941778	1579941716.65 ZRK-IN NONE ABANDON 1 1 30
1579941811	NONE NONE NONE CONFIGRELOAD
1579941850	1579941841.70 ZRK-IN NONE ENTERQUEUE 0512726656 1
1579941865	1579941841.70 ZRK-IN SIP/501 RINGNOANSWER 15000
1579941865	1579941841.70 ZRK-IN SIP/502 RINGNOANSWER 15000
1579941876	1579941841.70 ZRK-IN NONE ABANDON 1 1 26
1579942132	NONE NONE CONFIGRELOAD
1579942169	1579942157.75 ZRK-IN NONE ENTERQUEUE 0512726656 1

Wallboards



Wallboards

Quei	ueMetrics		🎔 🕂 💼 7 - Public Agent Status » First page 🕞 🗙
Gene Berry	Jim Cipriano	John Blackson	Mario Rossi
1 :01	9 2:01	6 0:10	9 7:48
	Sales Support		Technical Support
Rose Miller	Bella Ferdinand	Michael Fontana	Mike Bosh
9:01	9 1:37	9 0:55	9 0:07
Sales Support	Sales	Sales Support	Technical Support

Realtime

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Reports

Agents on queue

Agent	N. Calls		 Total call time	Average call time
John Blackson	331	13.1%	 5:31:00	1:00
Mike Bosh	312	12.4%	 5:46:05	1:06
Rose Miller	312	12.4%	 6:02:06	1:09
Mario Rossi	309	12.2%	 5:43:50	1:06
Michael Fontana	312	12.4%	 5:24:43	1:02
Gene Berry	328	13.0%	 5:36:38	1:01
Bella Ferdinand	306	12.1%	 5:48:24	1:08
Jim Cipriano	316	12.5%	 5:45:40	1:05



Export as... Excel $\underline{\downarrow}$ CSV $\underline{\downarrow}$ XML $\underline{\downarrow}$

Service level agreement

Answer	N. Calls	Delta	Percent	Of Offered	 100	
Within 5 seconds:	1945		77.0%	55.3%	75	
Within 10 seconds:	2242	+ 297	88.8%	63.7%		
Within 15 seconds:	2435	+ 193	96.4%	69.2%	 - 50	1
Within 20 seconds:	2491	+ 56	98.6%	70.8%	25	
Within 30 seconds:	2524	+ 33	99.9%	71.8%	0	
Within 40 seconds:	2526	+ 2	100.0%	71.8%		
Within 50 seconds:	2526	0	100.0%	71.8%		
Within 60 seconds:	2526	0	100.0%	71.8%		
Within 70 seconds:	2526	0	100.0%	71.8%		
Within 80 seconds:	2526	0	100.0%	71.8%		
Within 90 seconds:	2526	0	100.0%	71.8%		



Agent Page

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Call	List											8
	Start of call	Waiting	Talking	Caller	Queue	URL	Transfer to	Outcome	Tag	Variables		
•	10:54:44	0:07	3:18	901-555-5680	Technical Support [b]	B)					Ø	
2	10:53:48	0:03	0:02	908-555-4213	Technical Support [b]	B)					Ø	
e	10:53:02	0:01	0:33	233-555-6917	Technical Support [b]	B)					Ø	
2	10:52:14	0:03	0:01	254-555-6013	Technical Support [b]	B)					Ø	
•	10:50:58	0:08	0:10	860-555-8862	Technical Support [b]	J.					Ø	
e	10:50:19	0:11	0:05	878-555-7861	Technical Support [b]	J-					Ø	-

vailable Queues	Queues Logged In	Agent code
Sales Main	Technical Support Main	101
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Pauses	8
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PAUSE	
UNPAUSE	

Lessons Learned

- Features != Usage.
- Handle **Operators**, not **Customers**
- Growing VolP Providers are a great fit for FreeSWITCH/FusionPBX, due to multi-tenant support and mod_callcenter.

Features != Usage

- Prospects want more features, customers want less. Catch: the ones they need, which are different for each customer
- More features are needed in the sales stage
- Depending on the situation, you might want to **enable/disable features**.

Operators

- An **Operator** is an entity that handles a significant number of QueueMetrics-Live instances (e.g. VoIP Provider).
- Generally use the same **Platform** and offer the same **Features**.

Operators not Customers

- Enabling/Disabling features usually makes more sense at the Operator level.
- Makes it natural to run **multiple geographies**.

Growing VoIP Providers are a natural fit for FreeSWITCH/FusionPBX and QM-Live

- Multi-Tenant realities need **efficient data separation**, which is made trivial in this case (Separate QM-Live instances).
- mod_callcenter offers a reliable way to handle incoming traffic for businesses
- FreeSWITCH's Native Multi-Tenant support makes our job very easy (Autoconfiguration, splitting, uploading, etc...)





For more information visit our websites:

<u>https://www.loway.ch</u> <u>https://www.queuemetrics-live.com/</u>