Real-time charging for OpenSIPS CGRateS - Workshop

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CGRATES
carrier grade realtime charging

Our Background

Located in Bavaria/Germany, over 8 years of experience with architecting server side solutions in VoIP environment

Platform implementations covering both wholesale and retail business categories

Responsibly understanding real-time processing constrains and the seriousness of live system outages

Charging/Billing engine

Plug-able into existing billing infrastructure
Accommodate new components into ISP/ITSP network (eg: add new VoIP switch, SMS Service, Data stream)
Non-intrusive

Modular architecture

Easy to enhance by rewriting specific components - JSON/HTTP/GOB RPC API

Performance Oriented

Built-in transactional cache system (data ageing, live counters)
Asynchronous processing with micro-threads

Feature-rich

Multi-tenancy, derived charging, account bundles, LCR, CDRStats, rates history, etc
Agile in developing new features

Test driven development

Aprox. 1000 tests as part of the build system

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RATING

- Functionality: calculate costs for events
- Standalone component, RPC/in-process accessible

ACCOUNTING

- Functionality: maintain accounts with balances
- Real-time fraud detection/mitigation at account level during balance operations (locked stage).
- Internal/independent scheduler for account operations

RPC Server

- Functionality: expose external access towards internal components.
- Interfaces: JSON/GOB over socket, JSON over HTTP, JSON over websocket

CDR Server

- Functionality: centralized CDR server (raw, rate, replicate, forward to CDRStats)
- Standalone component, RPC/in-process accessible

CDR Stats

- Functionality: compute real-time CDR stats
- Real-time fraud detection/mitigation with actions triggered.
- Standalone component, RPC/in-process accessible

LCR

- Functionality: compute real-time LCR
- Makes use of data in other subsystems in it's decisions (EG: Rating, Accounting, CDR Stats)

USER SERVER

- Functionality: maintain user profiles (LDAP similarity)
- Standalone component, RPC/in-process accessible

PUBSUB SERVER

- Functionality: expose internal events to interested external components(eg: balance ops)
- Standalone component, RPC/in-process accessible

HISTORY SERVER

- Functionality: archive rate changes using GIT in human readable JSON format
- Standalone component, RPC/in-process accessible

CGRateS subsystems

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OpenSIPS Integration

Multiple integration mechanisms
Based on traffic profile
Shared data through pseudovariables

REST_CLIENT for call authorization, LCR
HTTP-JSON RPC Request/Answer

EVI ACC_ACCOUNTING
*prepaid, *pseudoprepaid, *postpaid, *rated

EVI E_ACC_CDR
*pseudoprepaid, *postpaid, *rated

Db_flatstore CDR processing
*pseudoprepaid, *postpaid, *rated

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OpenSIPS Real-time Prepaid

Call Authorization
Async/sync support through the user of rest_client
Sets maximum call duration through dialog timeout

Call disconnect
Executed through mi_datagram by CGR SessionManager

Call Start
Out of E_ACC_EVENT via event_datagram to CGR-SM
Starts debit loop in case of prepaid calls – real or emulated ones

Call Stop/Missed
Out of E_ACC_EVENT/E_ACC_MISSED_EVENT via event_datagram to CGR-SM
Stops debit loop
Writes CDRs

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Task - Installation

VM install
Empty Debian Jessie out of netinstall

OpenSIPS install
Build debian packages, include rest_client (2.1 branch)

CGRateS install
Prerequisites: git, redis-server, mysql-server
Out of officially provided packages by CGRateS team (0.9.1rc6)

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Task - Configuration

OpenSIPS
Provided opensips.cfg file out of cgrates repository
Part of CGRateS build test environment

MySQL
Create CGRateS DB schema

CGRateS
Provided cgrates.json dedicated for OpenSIPS integration

AccountActions.csv
ActionPlans.csv
Actions.csv
ActionTriggers.csv
CdrStats.csv
DerivedChargers.csv
DestinationRates.csv
Destinations.csv
LcrRules.csv
Rates.csv
RatingPlans.csv
RatingProfiles.csv
SharedGroups.csv
Timings.csv
Users.csv

Meet the cgr-console

Interactive
Or not …

History

Auto-completion

Help

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Prepaid users
1001, 1006, 1007

Postpaid users
1002

Pseudoprepaid users
1003

Rated users
1004

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Db_flatstore generated CDR
Records split between multiple files
Failed/missed calls CDR records

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Task – Check CDR Stats

Customer Stats

Supplier Stats

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Task – Exporting CDRs

Standard template
Check derived charging

Extended template

Retrieve call details
Using cgr-console

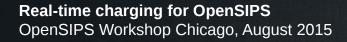ᏮRATES
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Task – Fraud Mitigation

Accounting level
Multiple calls from same account 1001

External top-up out of pattern
Warning – threshold level 1
Account disable - threshold level 2
Multiple calls out of same account – simultaneous disconnect on fraud detection

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Task – Console simulation

Check accounts

Call cost queries

LCR queries

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Questions?

Website
http://www.cgrates.org

Documentation
http://cgrates.readthedocs.org

Code + issues tracker
https://github.com/cgrates/cgrates

Support
Google group: CGRateS
IRC Freenode: #cgrates

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