Call Fraud Prevention using Traffic Trends Monitoring

Fosdem 2025

About us

Located in Bavaria/Germany with back-offices in Romania and Albania

Over 17 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 constraints and the seriousness of live system outages

ITSYSCOM
Engineered Solutions

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About CGRateS

Real-time Enterprise Billing Suite
Pluggable into existing infrastructure
Accommodate new components into ISP/ITSP network (eg: new Comm switch, SMS Service)
Non-intrusive into existing setups

Open Source Software
Born in 2010, first sources published in 2012
Full sources available on Github repository
100% Go (golang.org) from beginning
No add-ons in private repositories
More than 425.000 lines of code
Consideration for community contributions

3 branches, indefinitely supported
v0.10, Master, 1.0

Performance Oriented
Built-in advanced cache system (transactional, LRU + TTL records)
Asynchronous processing with micro-threads
Including API load balancer

Modular architecture
Cloud-ready, micro-services with rich set of RPC APIs
Easy to enhance by rewriting specific components

Test driven development
Over 10000 tests as part of test suite

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CGRateS Appliances

Online/Offline Charging System
Complex rating
Unlimited bundles
CDR server
High number of interfaces IN / OUT

Routing Server
Flexible routing strategies
Number portability support
Complex rating
Bundles support
Stats/QoS support
Channel limits

Fraud Mitigation Sever
Built in multiple subsystems
Informative or reactive
Escalation procedures

StatS Server
In memory stat queues for instant access to stats
Predefined statistics used in Telecom (ie: *asr, *acd, *pdd, *ddc, *acc, *tcc)
Generic statistics built on any event fields

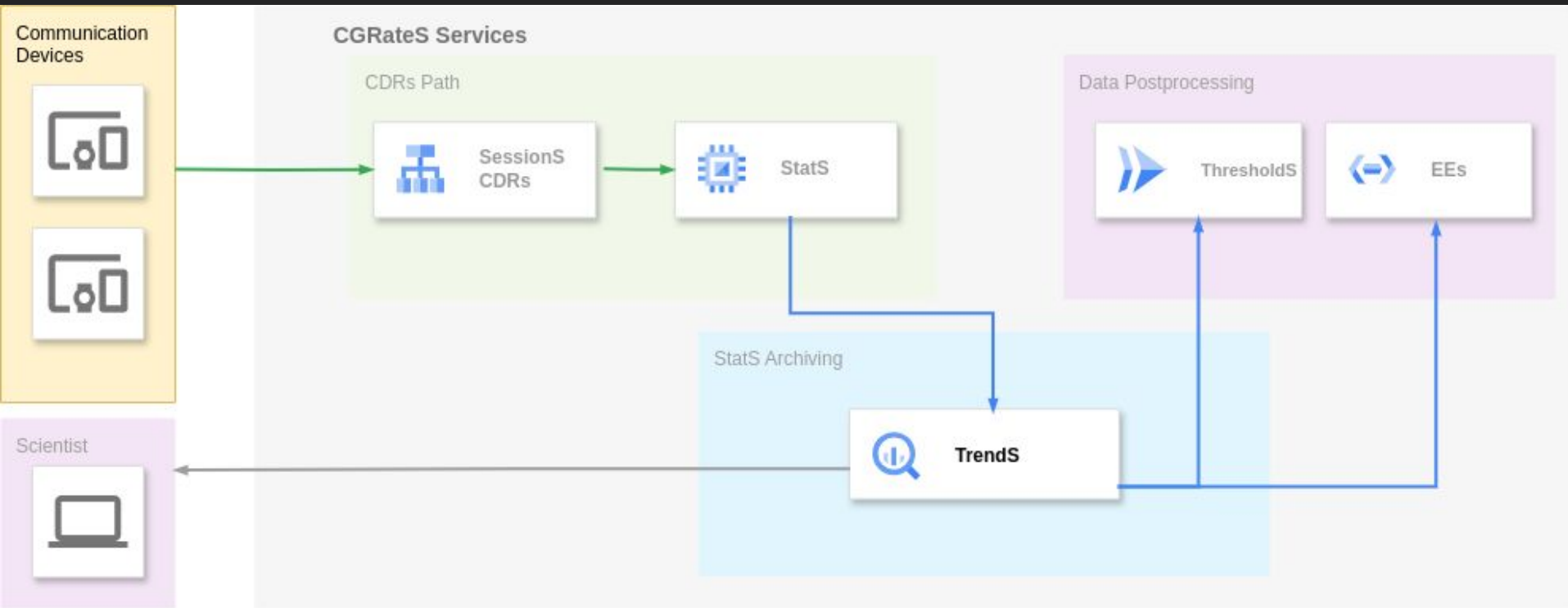## Resource utilization control server
Virtual resource counters
Groups of resources

Mediation server
Control Event parameters
Internal or external database

Billing Assurance
Compute/Compare/Parallel billing

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TrendS

Archiver for StatS metrics

Query intervals driven by Cron
TTL for metric values
Limits on number of metrics archived
Optionally stored in DataDB with compression
Computes TrendGrowth and TrendLabel

Trends computations

Metrics values must be numbers
Configurable correlation types <*average|*last>
Exportable towards ThresholdS and EEs with
MinItems configuration

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TrendS - config options

```
type TrendProfile struct {
    Tenant          string
    ID              string
    Schedule        string
    StatID          string
    Metrics         []string
    TTL             time.Duration
    QueueLength     int
    MinItems        int
    CorrelationType string
    Tolerance       float64
    Stored          bool
    ThresholdIDs    []string
}
```

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Sample API Data

APierSv1.GetTrendProfile

```json
{
    "id": 6,
    "result": {
        "Tenant": "cgrates.org",
        "ID": "TREND_1",
        "Schedule": "@every 1s",
        "StatID": "STATS2",
        "Metrics": null,
        "TTL": 0,
        "QueueLength": 100,
        "MinItems": 4,
        "CorrelationType": "*last",
        "Tolerance": 0,
        "Stored": false,
        "ThresholdIDs": [
            "THD1"
        ]
    },
    "error": null
}
```

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TrendSv1.GetTrend

```json
{
    "id": 24,
    "result": {
        "Tenant": "cgrates.org",
        "ID": "TREND_1",
        "RunTimes": [
            "2025-02-01T11:55:10.011323007+01:00",
            "2025-02-01T11:55:11.001560374+01:00",
            "2025-02-01T11:55:12.002164429+01:00"
        ],
        "Metrics": {
            "2025-02-01T11:55:10.011323007+01:00": {
                "*acd": {
                    "ID": "*acd",
                    "Value": 1860000000000,
                    "TrendGrowth": -1,
                    "TrendLabel": "N/A"
                },
                "*tcc": {
                    "ID": "*tcc",
                    "Value": 20,
                    "TrendGrowth": -1,
                    "TrendLabel": "N/A"
                }
            },
```
...

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TrendSv1.GetTrend (2)

```
                    …
        "2025-02-01T11:55:11.001560374+01:00": {
            "*acd": {
                "ID": "*acd",
                "Value": 960000000000,
                "TrendGrowth": -48.3871,
                "TrendLabel": "*negative"
            },
            "*tcc": {
                "ID": "*tcc",
                "Value": 50,
                "TrendGrowth": 150,
                "TrendLabel": "*positive"
            }
        },
        "2025-02-01T11:55:12.002164429+01:00": {
            "*acd": {
                "ID": "*acd",
                "Value": 960000000000,
                "TrendGrowth": 0,
                "TrendLabel": "*constant"
            },
            "*tcc": {
                "ID": "*tcc",
                "Value": 50,
                "TrendGrowth": 0,
                "TrendLabel": "*constant"
            }
        },
    },
    },
    "error": null
}
```

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ThresholdSv1.ProcessEvent

```
{
    "method": "ThresholdSv1.ProcessEvent",
    "params": [
        {
            "Tenant": "cgrates.org",
            "ID": "ddb3a6af-3167-4fbe-9ba7-5324510556e1",
            "Event": {
                "Metrics": {
                    "*acd": {
                        "ID": "*acd",
                        "Value": 960000000000,
                        "TrendGrowth": -48.3871,
                        "TrendLabel": "*negative"
                    },
                    "*tcc": {
                        "ID": "*tcc",
                        "Value": 50,
                        "TrendGrowth": 150,
                        "TrendLabel": "*positive"
                    }
                },
                "Time": "2025-02-01T11:55:13.002068315+01:00",
                "TrendID": "TREND_1"
            },
            "APIOpts": {
                "*eventType": "TrendUpdate"
            }
        }
    ],
    "id": 16
}
```

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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**

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