VHF management for DC0

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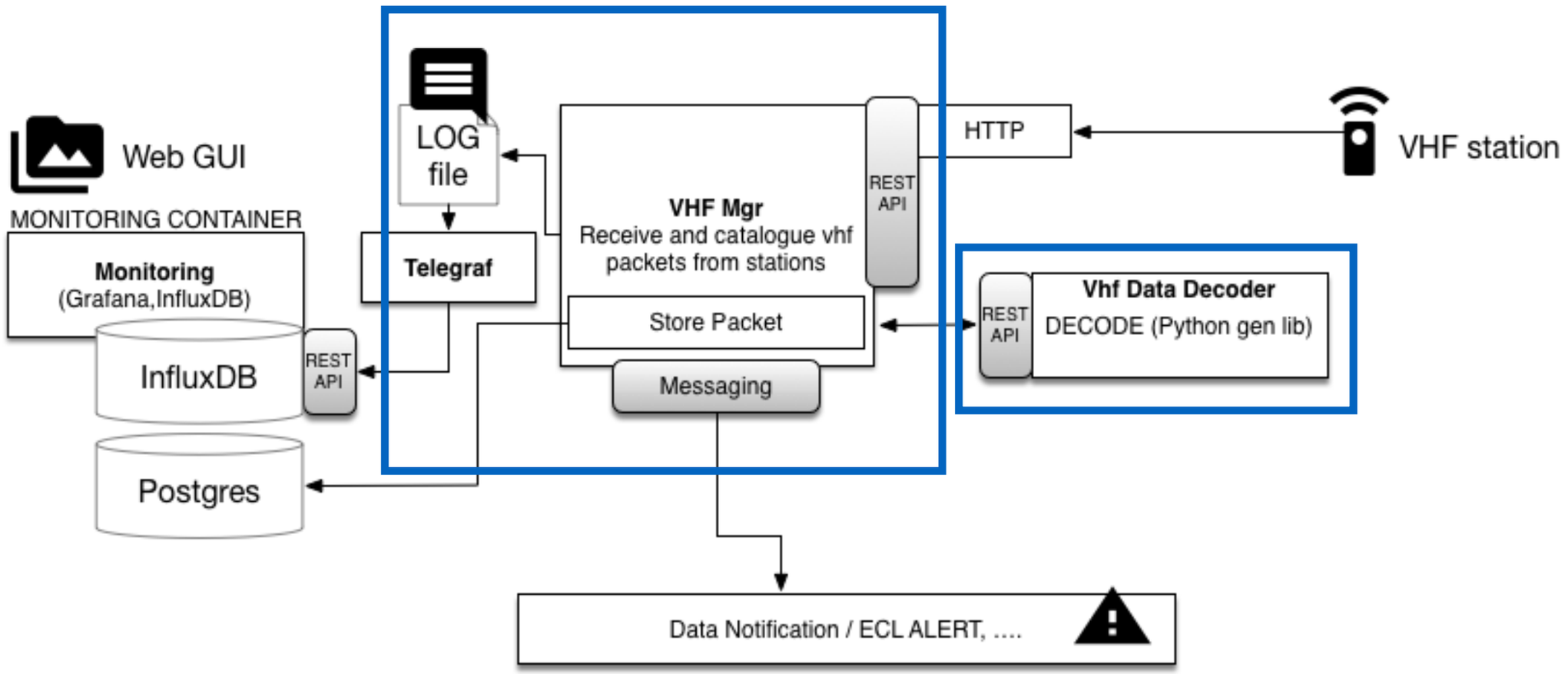
VHF mgr chain: services

- VHF manager (REST + messaging)
  - Decoding of station header, frame headers, filtering of duplicates etc
  - Use a dedicated service (**decoder**) to decode the internal packet content (APID specific)
- VHF decoder (REST)
  - Decode the packets internal content using generated python code from Marie Claire XML database describing the data formats

Storage and Monitoring

- Postgres
  - Dedicated instance for:
    - VHF data, shared with other applications like X-Band manager
- Grafana, InfluxDB, telegraf
  - Grafana: Web UI to check service activities
  - InfluxDB: Storage of data extracted from log files
  - Telegraf: parser of log files (writes relevant content as a time serie in InfluxDB)

DC0 VHF mgr services architecture



Starting DC0

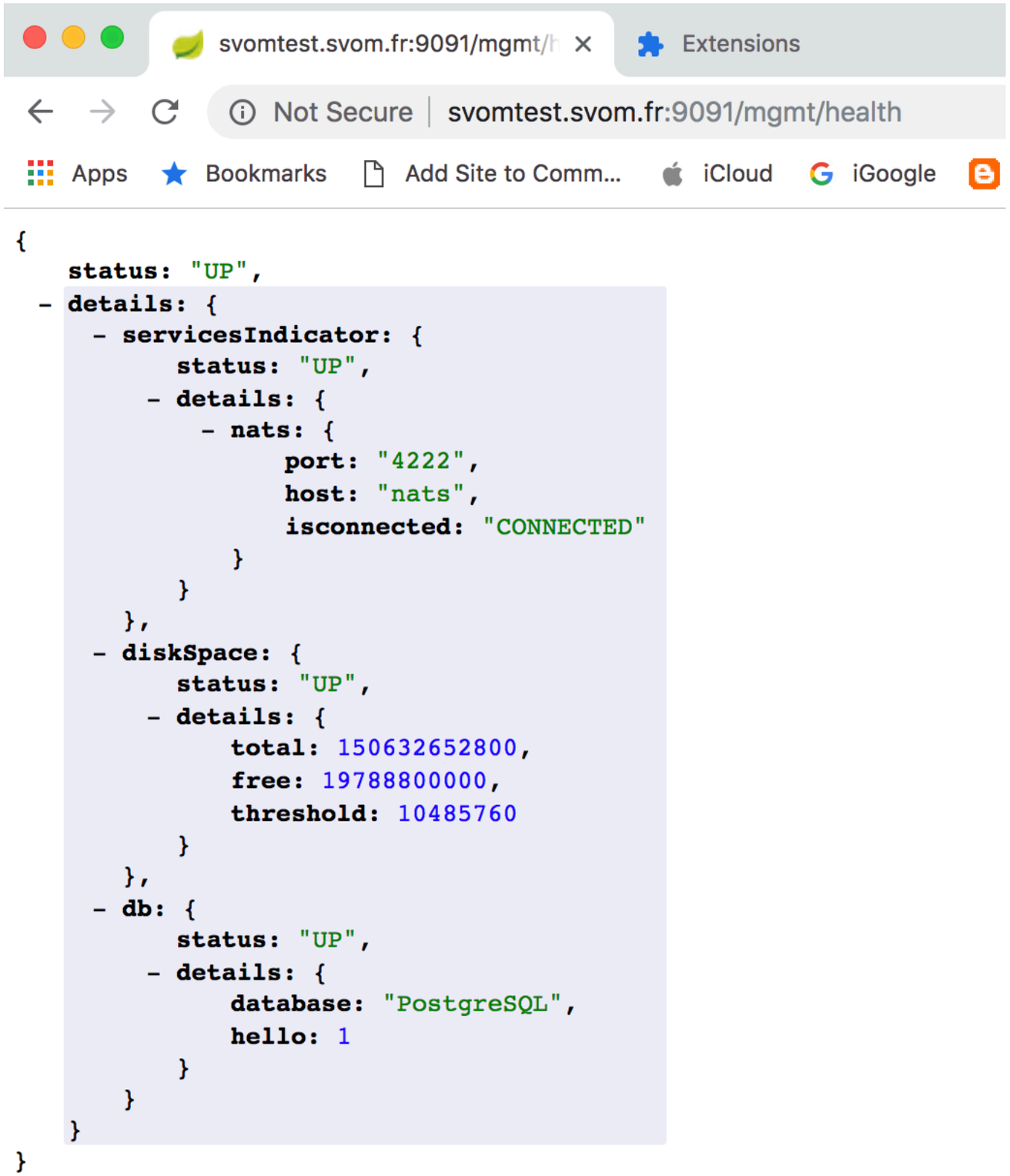
- Deployment of services
  - Follow instructions in Svom-deployment project
  - Services should be “independent” (do not crash if a needed service is not yet up)
- Verifications of service deployment
  - Use management API:
    - ex: http://svomtest.svom.fr:9091/mgmt/health
- Receive VHF from ground station
  - REST method to post packets (tested with developers of ground station using certificate); for DC0 no authentication…

Data processing

- Pre-decoding and decoding
  - Raw packet storage is synchronous with the request…then the following processing steps are launched in asynchronous mode
  - Using all available informations binary packets are classified (APID, ObsID, receptionTime,…)
  - Packets internal data are decoded : output is a Json object containing all parameters as key:value pairs.
- Scheduling tasks
  - Count number of packets by APID and ObsID
    - Once the “expected” number of packet for a given APID is reached we can trigger further processing on a bunch of packets
  - Trigger on alerts
    - If an alert APID is identified, send a notification on data.vhf queue in the messaging system

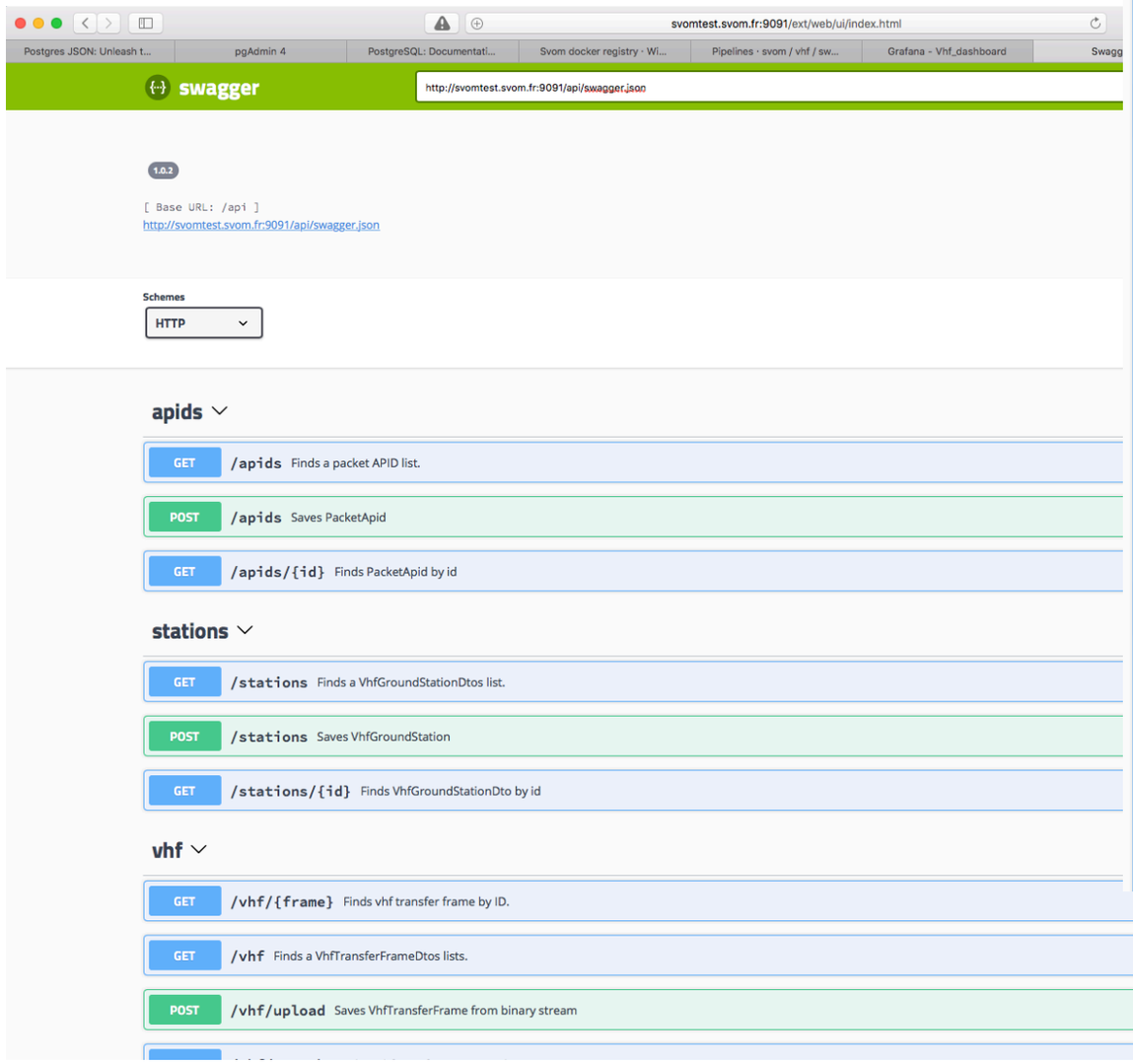
Management endpoint

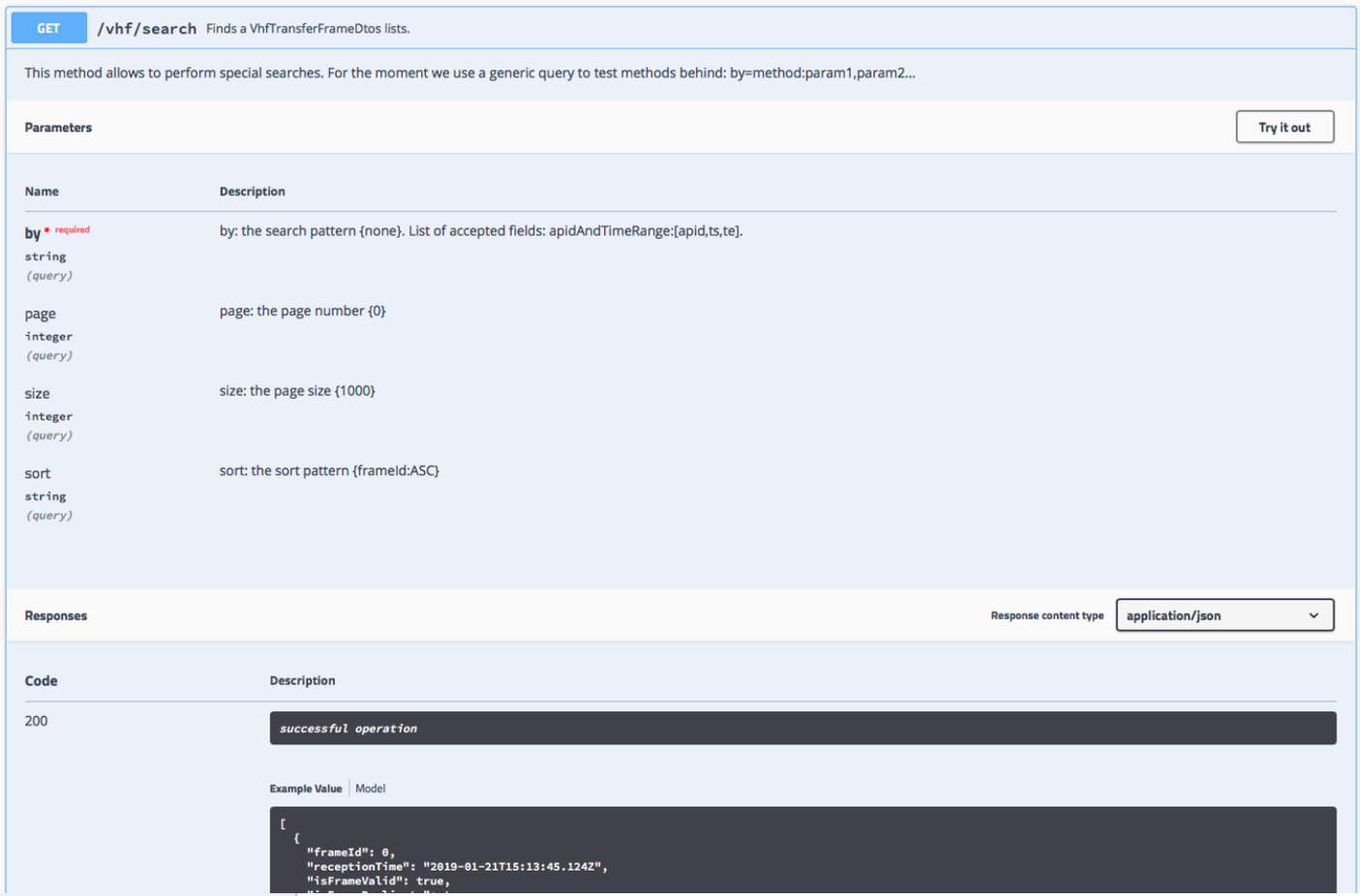
- Check health of the system



Service documentation

- Access to swagger UI
  - Some examples below: **endpoints** and models





Service documentation

- Access to swagger UI
  - Some examples below: endpoints and **models**

VhfBinaryPacketDto { *description: data container for binary format, inherit from generic vhfbasepacket*

pktformat*	string	
pkttype*	string	
hashId*	string	
insertionTime	integer($int64)	
uri	string	
pktsize	integer($int64)	
packet	string	A string representation of the packet content (can be JSON or base64 string)
binarypacket	[string($byte)]	The byte array representation of input packet, this parameter is optional

}

VhfDecodedPacketDto { *description: data container for json format, inherit from generic vhfbasepacket*

pktformat*	string	
pkttype*	string	
hashId*	string	
insertionTime	integer($int64)	
uri	string	
pktsize	integer($int64)	
packet	string	A string representation of the packet content (can be JSON or … string)

}

VhfStationStatusDto {

sstatusId	integer($int64)
idStation	integer($int32)
channel	integer($int32)
padding1	integer($int32)
stationTime	integer($int32)
corrPower	integer($int32)
padding2	integer($int32)
doppler	number($float)
dopDrift	number($float)
srerror	number($float)
reedSolomonCorr	integer($int32)
ckSum	integer($int32)
padding3	integer($int32)

}

Retrieve packets info and counts

svomtest.svom.fr:9091/mgmt/h | Grafana - Vhf_dashboard | localh

Not Secure | svomtest.svom.eu:5591/api/vhf?size=10

Apps | Bookmarks | Add Site to Comm... | iCloud | iGoogle | Blogger: Dashboa


```
[
  - {
        frameId: 1,
        receptionTime: 1548108410829,
        isFrameValid: true,
        isFrameDuplicate: false,
        dupFrameId: null,
      - apid: {
            apid: 587,
            packetName: "ECLRECURR2",
            packetDescription: "none",
            className: "none",
            instrument: "none",
            category: "none",
            expectedPackets: null
        },
      - station: {
            stationId: 7,
            stationName: "auto-added",
            idstation: "0x00000007",
            location: "FSC",
            loc: "Unknown",
            description: "Unknown vhf",
            macaddress: "0.0.0.0"
        },
      - frameHeader: {
            fId: 1,
            tframeVersion: 0,
            spaceCraftId: 391,
            vcId: 3,
            ocFlag: 0,
            mcfCount: 0,
            vcfCount: 0,
            dfStatus: 6144
        },
      - ccsds: {
            ccsdsId: 1,
            ccsdsVersionNum: 0,
            ccsdsType: 0,
            ccsdsSecHeadFlag: 0,
            ccsdsApid: 587,
            ccsdsGFlag: 3,
            ccsdsCounter: 1,
            ccsdsPlength: 87,
            ccsdsCrc: 60531
        },
```


svomtest.svom.fr:9091/mgmt/h | Grafana - Vhf_dashboard | localhost:8080/coolrapi/s

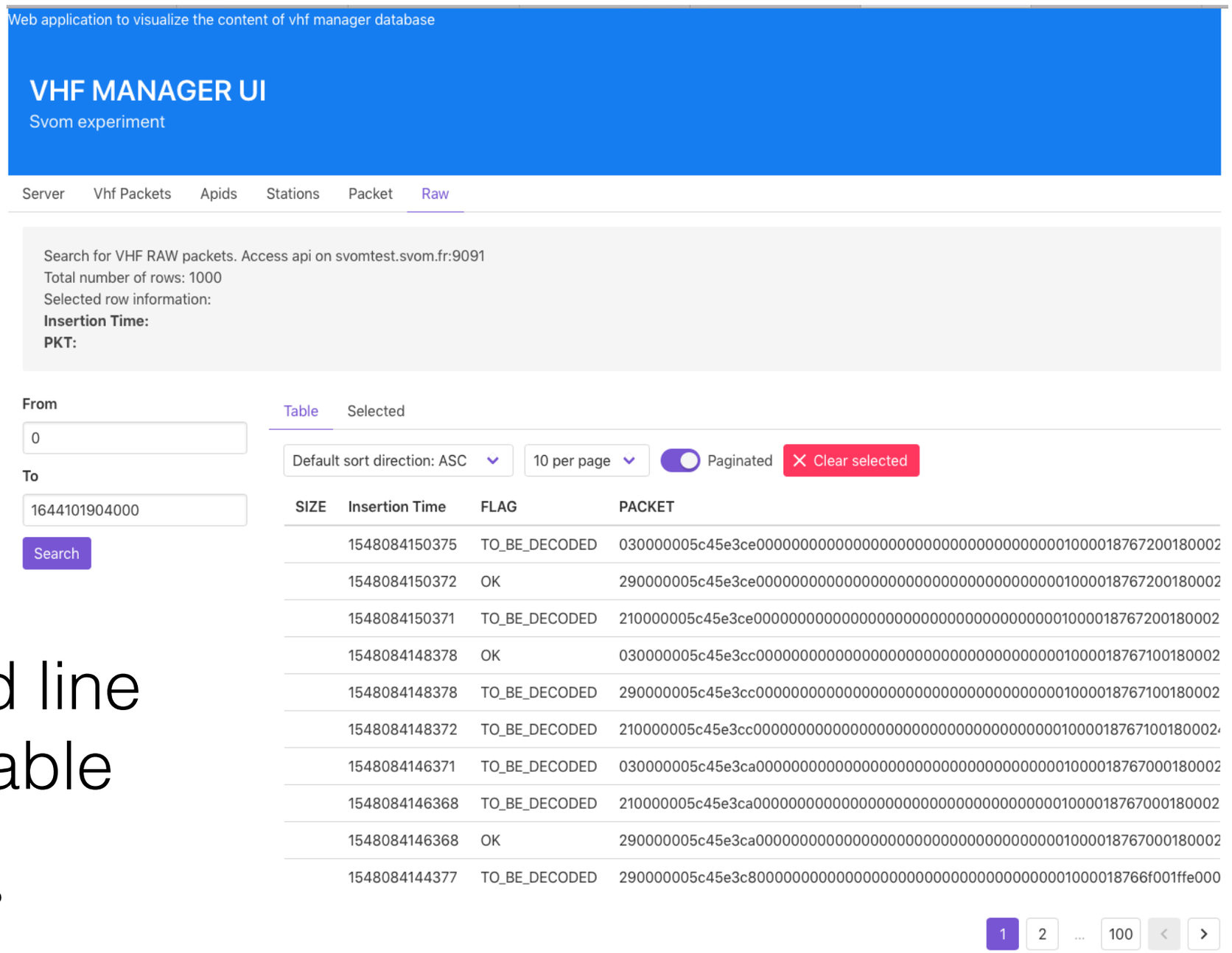
Not Secure | svomtest.svom.eu:5591/api/vhf/count?from=0&apid=all

Apps | Bookmarks | Add Site to Comm... | iCloud | iGoogle | Blogger: Dashboard | Google Ma


```
[
  - {
        apid: 546,
        packetName: "GRMLCURHIP",
        packetObsid: 6,
        status: null,
        countedPackets: 3,
        expectedPackets: 0,
        insertionTime: null,
        updateTime: null
    },
  - {
        apid: 587,
        packetName: "ECLRECURR2",
        packetObsid: 1,
        status: null,
        countedPackets: 186,
        expectedPackets: 0,
        insertionTime: null,
        updateTime: null
    },
  - {
        apid: 576,
        packetName: "ECLALERTL1",
        packetObsid: 6,
        status: null,
        countedPackets: 4,
        expectedPackets: 0,
        insertionTime: null,
        updateTime: null
    },
  - {
        apid: 521,
        packetName: "VT1SUBIMAR2",
        packetObsid: 10,
        status: null,
        countedPackets: 89,
        expectedPackets: 0,
        insertionTime: null,
        updateTime: null
    },
  - {
        apid: 610,
        packetName: "MXTPHOTDATA",
        packetObsid: 10,
        status: null,
        countedPackets: 837,
```

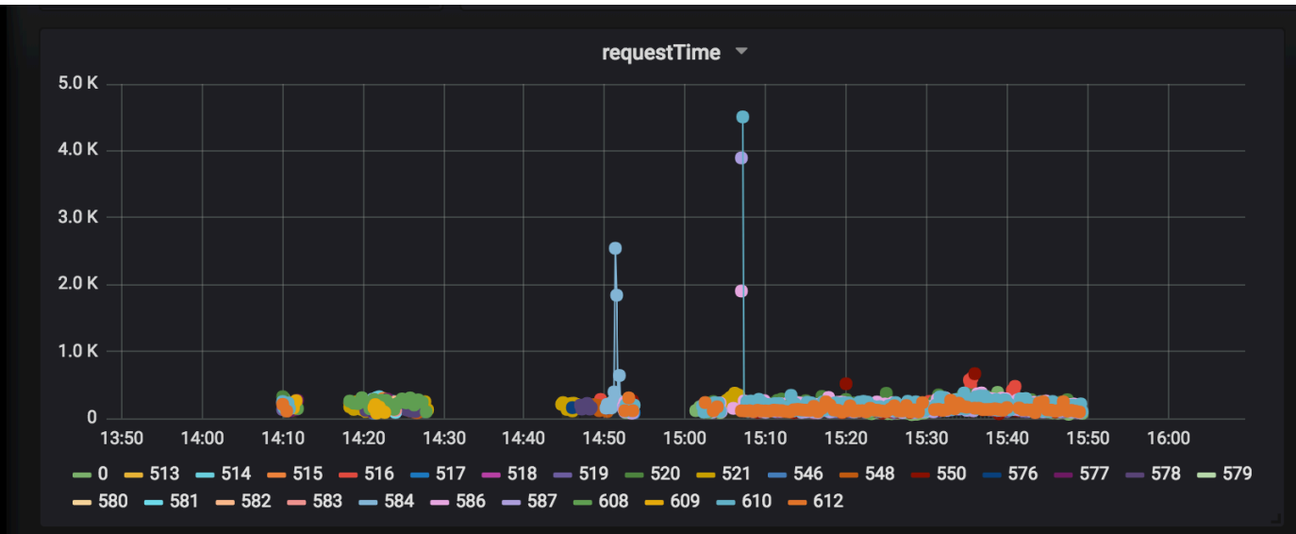
Browse data (very preliminary)

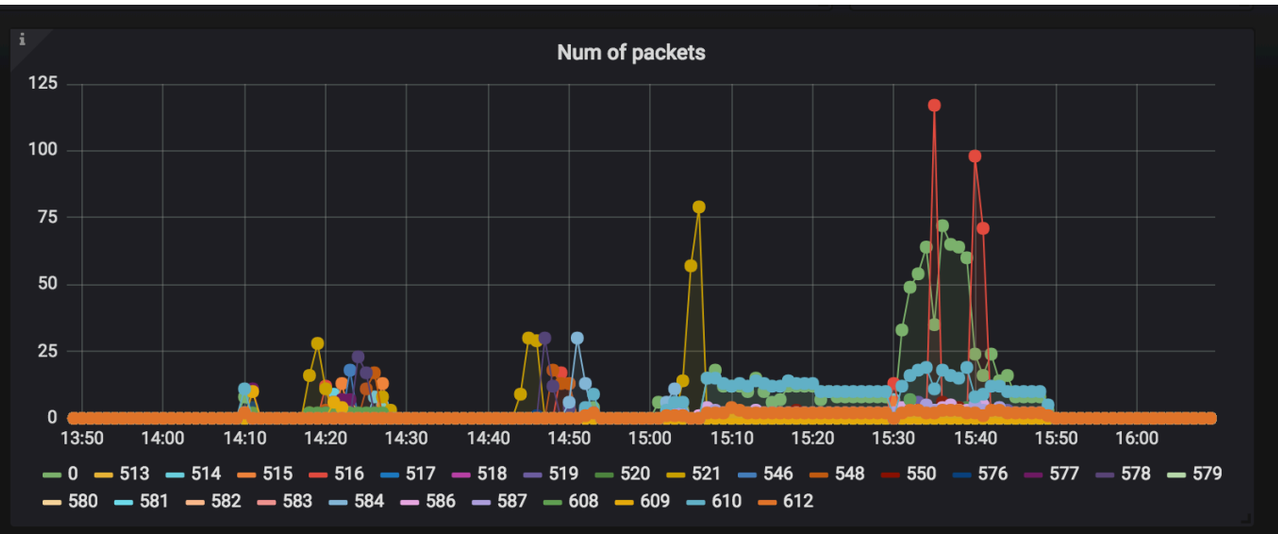
- Web UI (http://svomtest.svom.fr:9092/vhfui/index.html)
  - A tool to verify what the system is doing

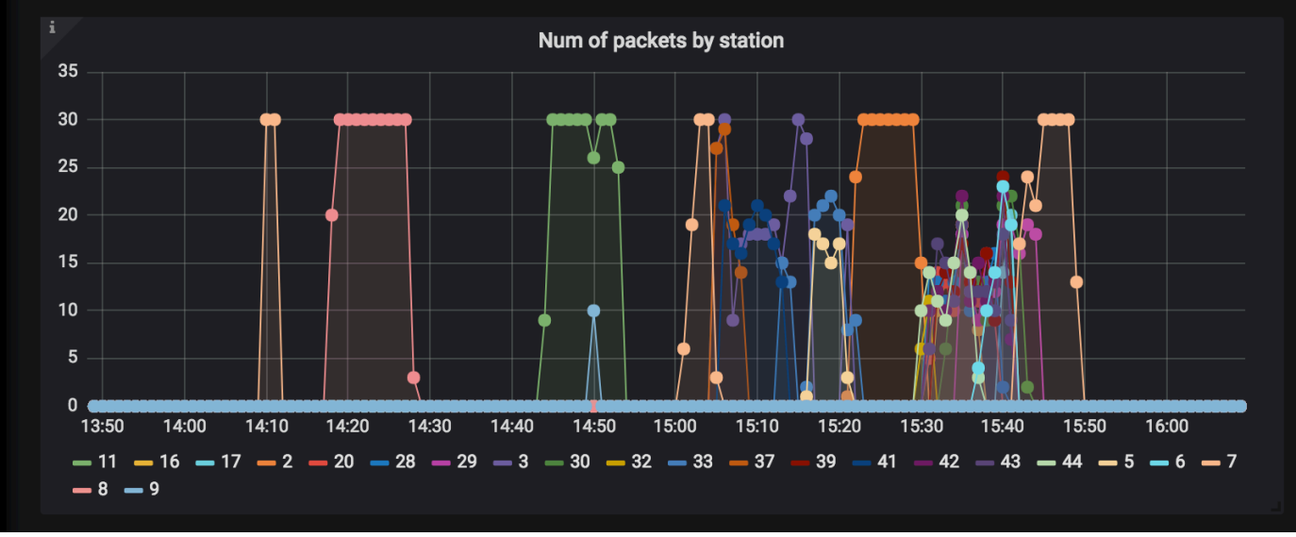


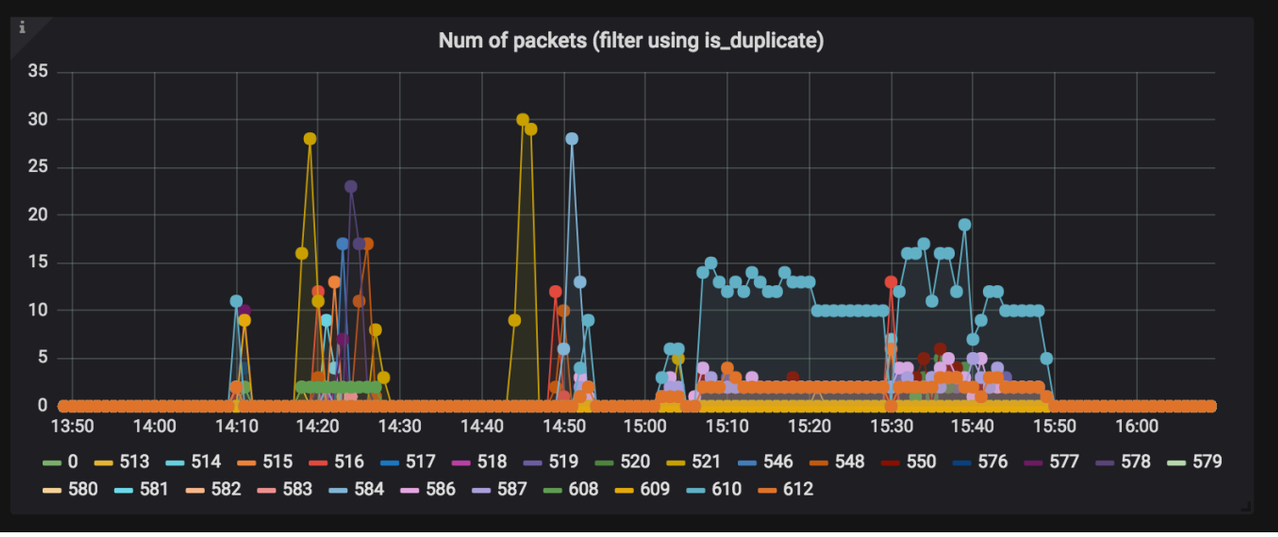
A python command line client is also available

Some plots from Grafana monitoring









Urls

- Useful links (for Saclay based machine):
  - http://svomtest.svom.fr:5000/api/decode/vhf/0242001500575c470c180000000203dec38a00290000000000000000000000000834e000068580000514c00003e620000264c000014fc00ea0188016800f000860023008b0200001e00d5001f0072017601b2004b0079007e005182ce
  - Notices browsing : http://svomtest.svom.fr:5001/notices
  - Grafana monitoring : http://svomtest.svom.fr:3000
  - Vhf UI : http://svomtest.svom.fr:9092/vhfui/index.html