Evolution of monitoring, accounting and alerting services at INFN-CNAF Tier1

INFN CNAF

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INFN Tier1 data center

- The INFN Tier1 at CNAF provides resource to experiments of LHC and 30 other in which INFN is involved
- >25000 CPU cores
- ~30PB of disk storage
- ~47PB of tape storage
- ~ 30TFlops of HPC Resources
- Elastic data center extension
  - ~15% Resources installed at INFN Bari-ReCaS (Level 2 VPN)
  - ~50% of CPU Resources at Cineca datacenter
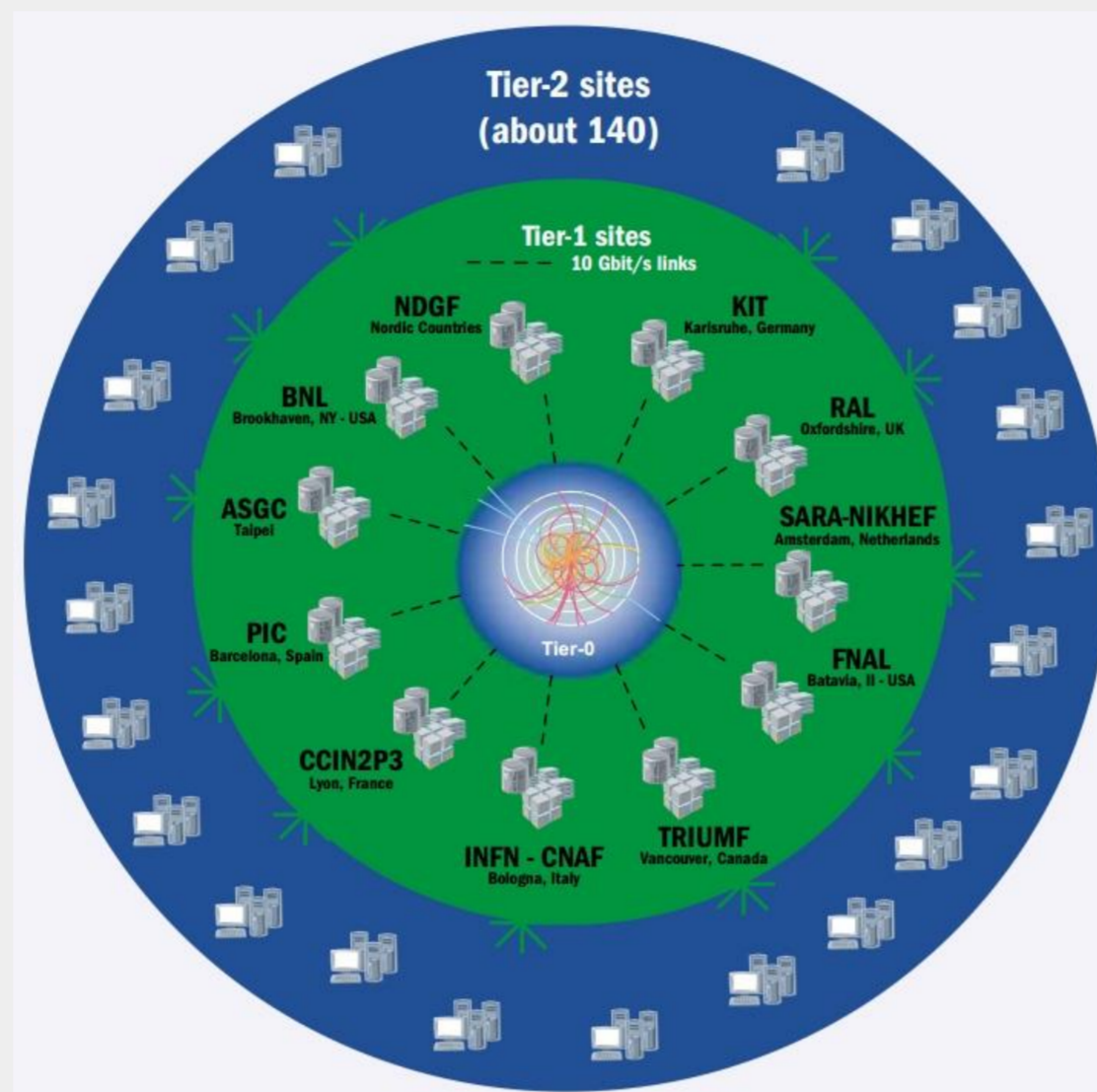
Old monitoring infrastructure [1]

- In past years, the teams at Tier-1 sub-units were using several software packages:
  - Lemon
    - developed at CERN and customized to suit the needs of a datacenter managing scientific data
  - Nagios
    - mainly used for alerting purposes
  - a system based on Graphite database
  - a number of in-house developed services for web reporting

New monitoring infrastructure [2]

- Recently the adoption of off-the-shelf solution has been chosen
- The new CNAF monitoring infrastructure uses Sensu as alternative to Lemon and Nagios
  - Sensu is able to issue checks as well as metrics measurements (easy port of nagios probes)
  - A Sensu server for each CNAF Unit
  - Communication between client and server through dedicated RabbitMQ message queue
  - Configuration → Puppet, Foreman
  - Time series persistence → InfluxDB
  - Dashboard composition → Grafana

Migration

- Server monitoring and standard metrics not ported
  - provided as Sensu community plugins

- Specific probes and script for batch system, GPFS servers, TSM server, building operation has been adapted to Sensu

Historical Data Migration

- Migration only of historical measurements to InfluxDB from:
  - Graphite
    - Accounting and specific service monitoring
    - Easy migration between time series Databases
  - Lemon
    - Standard metrics
    - Developed a layer between backend Lemon Database (Oracle) and InfluxDB
    - Schema is not in a human-readable format
    - Not every metrics has been migrated
- Resampled measurements to match InfluxdB retention policies

Pledges Add-on

- Web app developed in-house to handle pledges
  - php, javascript
  - Backend PostgreSQL DB
- Flask-based server to exposed the PostgreSQL data to Grafana

References

[1] Antonelli S. et. al. " INFN-CNAF Monitor and Control System",2010, JPCS IOP Publishing 331 042032 2011
[2] Bovina S. et. al. " The evolution of monitoring system: the INFN-CNAF case study",2017, Journal of Physics: Conf. Series 898