Antelope: Eartquake and Volcano Monitoring in Costa Rica

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OVSICORI-UNA
INSTITUTO DE INVESTIGACIÓN OBSERVATORIO VULCANOLÓGICO Y SISMOLÓGICO DE COSTA RICA

- Since 1984
- 30 Workers
- Earthquake and Volcano Monitoring

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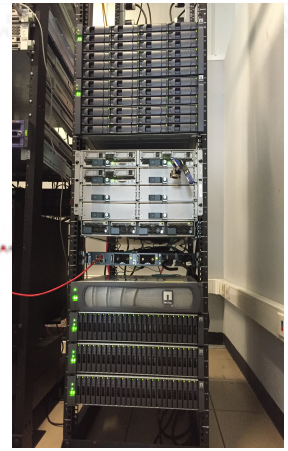
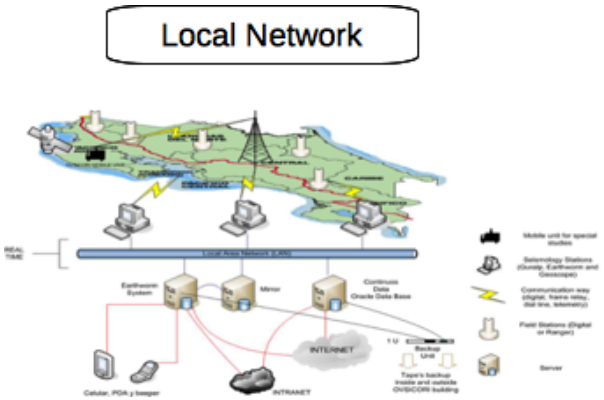
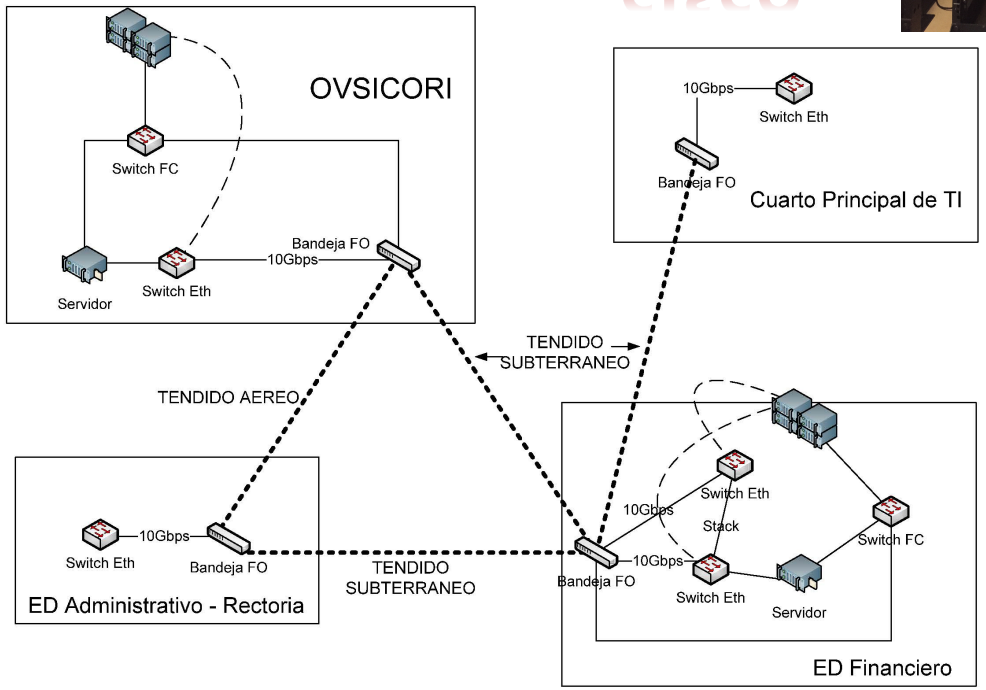
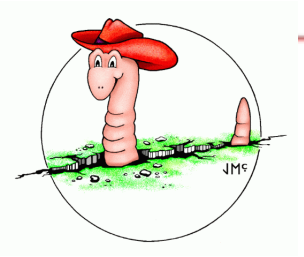
OVSICORI-UNA Infrastructure





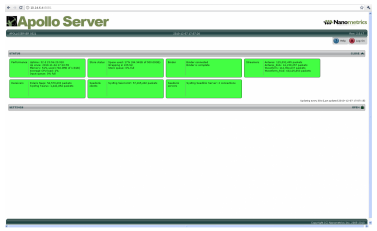


Acquisition



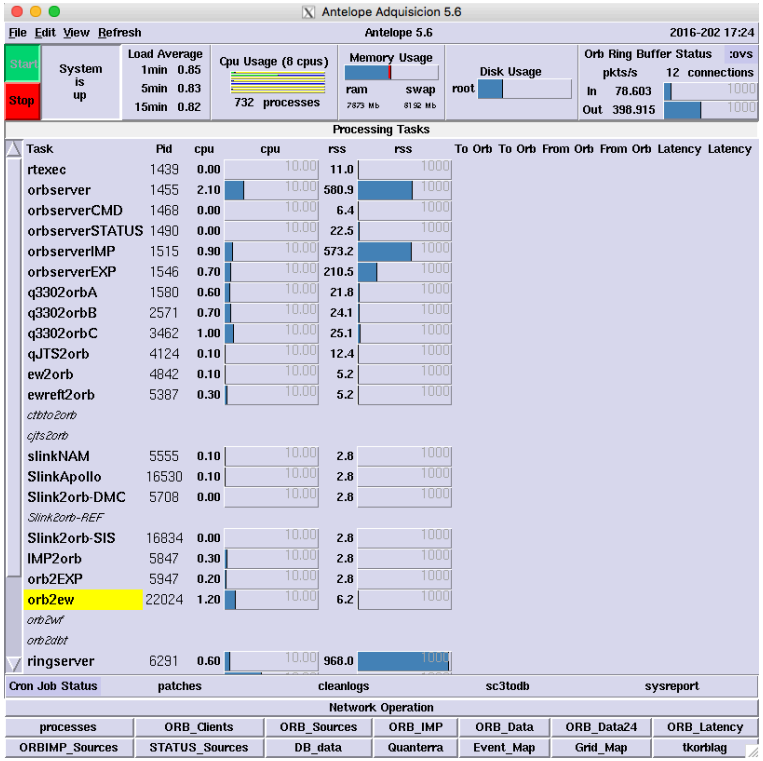
Ranger SS-1
Reftek

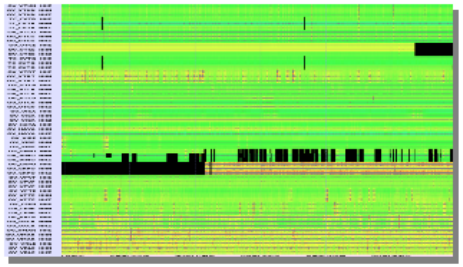
Global and
Regional data

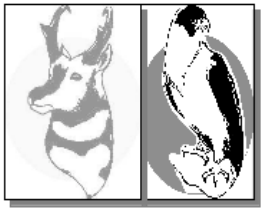


Nanometrics

NAM Guralp







Antelope Acquisition System

ORB

Antelope Seismology Processing System

Antelope Volcanology Processing System

Seiscomp 3 Processing System

q3302orb

Ew2orb

ewreft2orb

slinkGuralp

slinkApollo

IRIS

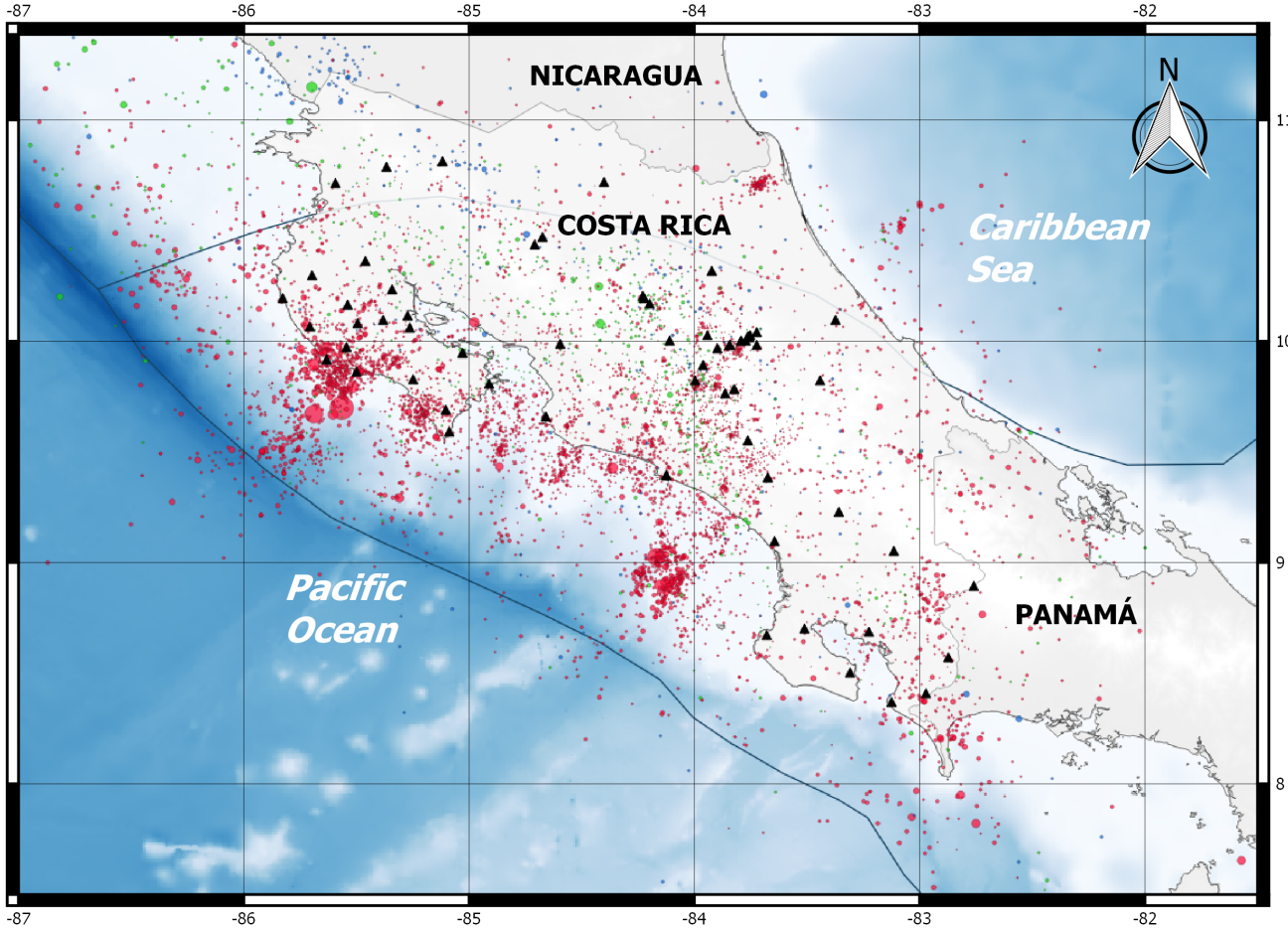
OVSICORI-UNA Seismic Network and Seismicity in Costa Rica

- OVSICORI-UNA operates and maintains a broadband, strong motion and short-period seismic network of about 65 seismic stations which are streaming the data in near real-time to the datacenter.

- A group of seismic stations are used mainly to register the seismic activity of the volcanoes in Costa Rica. Currently, the most seismic-monitored volcanoes are the Irazú and Turrialba ones.

- There will be new seismic deployments of seismic stations in order to improve seismic monitoring and the geospatial distribution control the EQ location.

Current seismic stations (black triangles) and the earthquakes located during the year 2012.



Automatic Earthquake Location and Disemination

- We use ANTELOPE and SeisComP3 seismic software to process the seismic data automatically in order to obtain automatic solutions in near real-time.

- We have a basic program to cast automatically possible volcano eruption in progress based on RMS amplitude using two seismic stations.

- We provide information to the public for both seismic and volcano activity as soon as the automatic systems cast their results.

- Since the automatic systems are not perfect or at least precise as they are when there is human intervention, it is necessary to have basic algorithm to check the quality or validate the results automatically.

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Automatic Earthquake Location and Disemination

Earthquakes

Validation

- Read the configuration file
- Check if the automatic EQ solution meets basic conditions stablished by the users.

Filters

- The automatic solutions must have:
  - A máximum RMS
  - A mínimum Acimutal Coverage
  - Minimum number of Stations

Reporting

- To the public when the auto-solutions pass the filters. They are reported via:
  - Email
  - SMS
  - Social Networks

Volcano Eruptions – Turrialba Volcano

Evaluation

- Quantify the RMS for a seismic station which is close to the volcano.
- Check if the RMS value is over the mínimum threshold for about 3 minutes.
- Compare the RMS values with another station to discart fake reports for regional and teleseismic events.

Reporting

- An SMS is cast to the scientific and technical staff of OVSICORI as well as stakeholders.

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Thank you!

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