# SRT DATA CENTER MANAGEMENT WITH OPEN SOURCE TOOLS

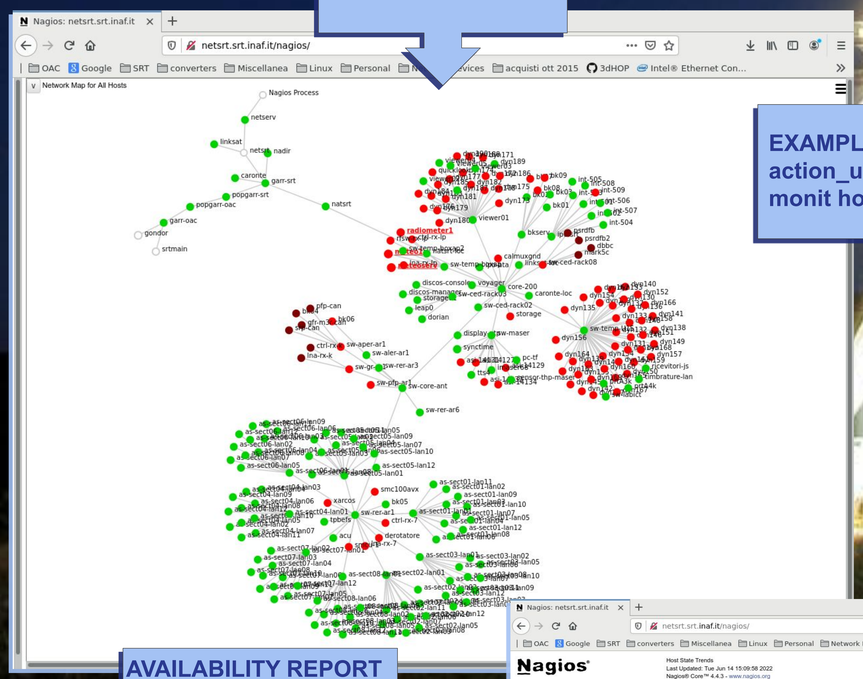
*Author: A.Fara - INAF - Osservatorio Astronomico di Cagliari*

***The management of the Sardinia Radio Telescope requires a stable and flexible ICT infrastructure, depending on the needs. The SRT site is a remote place not covered by landlines or mobile phones, with staff people usually shared between Cagliari Observatory and SRT. Furthermore, support during observations and maintenance operations can be required. In addition, the staff has to know the status of devices in real time to guarantee normal operations and safety of the whole infrastructure. This has forced us to build a solid monitoring pipeline over network and reliable procedures for remote working. We show some example of integration between open source tools, giving the SRT staff a continuous overview of the devices hosted in data center and allowing remote maintenance and support during observations.***

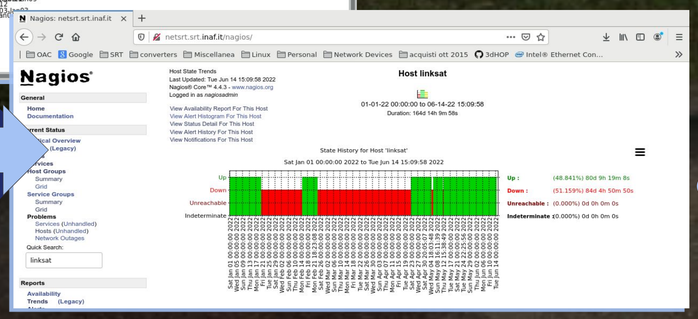
## NAGIOS: LAN AND BACKBONE MONITOR

- Nagios instance (nagios-core+nagios-plugins) running on a server and "pings" over the IP lan devices and SRT + OAC backbones
- Nagios monitoring IP and/or service ports
  - e-mails to custom admins in case of downlinks or service failure
- config file for each IP device on server
  - includes "action_url" linking to device's webpage (optional)
- nrpe (nagios specific local on each device) replaced by monit
- hosts group configuration reflecting the three network organization
- website password protected (admin and user)
- graphical interactive and customizable network map
- logging and history reports by host and services

NETWORK MAP




AVAILABILITY REPORT
Nagios generates interactive reports, users can zoom and select time periods for each host and/or service




## SRT WAN CONNECTION AND BACKUP

- GARR backbone 10 Gb/s
- Telecom + OpenFiber (managed by RAS) dark fiber IRU
- no landlines, no mobile phone provider covering SRT site
- satellite link (20/6 Mbps) 30 GB/month with public IP
- satellite modem connected to a PC with remote ssh access
- restricted access to staff, only for emergency activities

**SRT REMOTE MANAGEMENT**

VNC-VIEWER
- observations
- remote support
- management

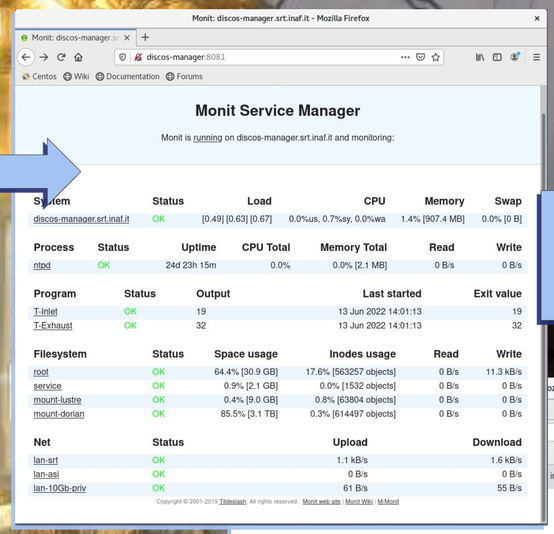
SITE STATUS
- web monitors
- alarms

## DATA CENTER = SHIELDED ROOM

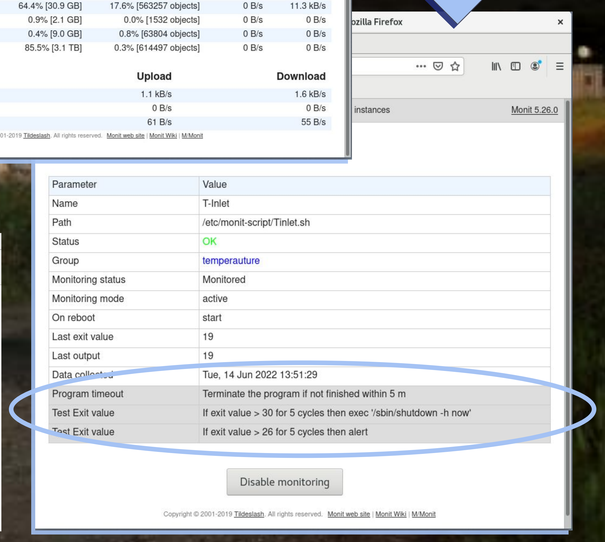
Photo by Gian Paolo Vargiu

A reconfiguration of data center has been required by the installation of new devices (SRT upgrade PON_PIR01_00010)

EXAMPLE
action_url
monit host page




EXAMPLE
T-inlet monitor
and actions




## MONIT: CHECK SERVER'S LOAD & MADE ACTIONS

- very small, light, available for the most of Linux distros and as source code, highly customizable
- a Monit instance running as daemon on critical servers
- useful for check disk/partition free space and resource's load (interface to cat /proc/sys, cat /proc/meminfo … )
- generates local web page
- config syntax includes tests checks & made actions
  - restart process, daemon, interface
  - send e-mails
  - execute complex scripts in any language
    - also remote over ssh-key exchange
- some monitoring and alert examples:
  - disk space over shared remote partitions
  - passwd file on a remote server
  - unregistered dhcp client connecting to LAN
  - executing a clean shutdown if temperature exceeds a custom critical threshold

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*Antonietta Fara*
*antonietta.fara@inaf.it*
OAC Osservatorio Astronomico di Cagliari

Photo by Sergio Poppi