



# ASTRI and CTA activities on computing, software management, and data acquisition

Vito Conforti, Fulvio Gianotti – INAF OAS Bologna  
for the ASTRI Project

**OAS Very High Energy Meeting: towards ASTRI and CTA, 8-9 June 2022**



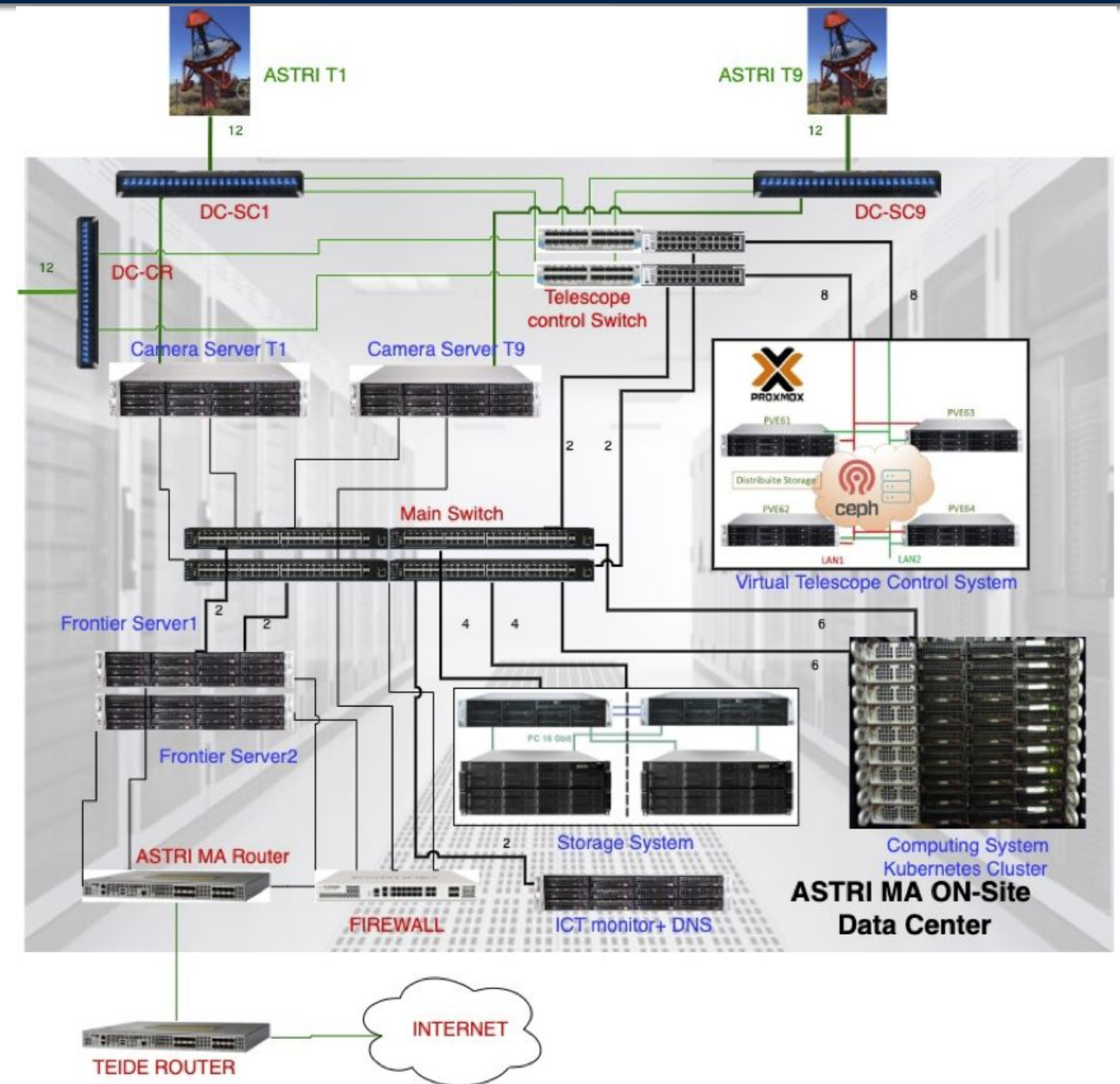
- ASTRI-MA ON-Site ICT Infrastructure
- ASTRI-MA mini-ICT (m-ICT) infrastructure
- ASTRI and ASTRI-MA Virtual Test Bed
- CTA Virtual Infrastructure for CTA - PO

# ASTRI-MA ON-Site ICT Infrastructure



The **ASTRI Mini-Array On-Site Hardware system** providing the design of an IT infrastructure suitable to support the **ASTRI Mini-Array On-Site Software system**.

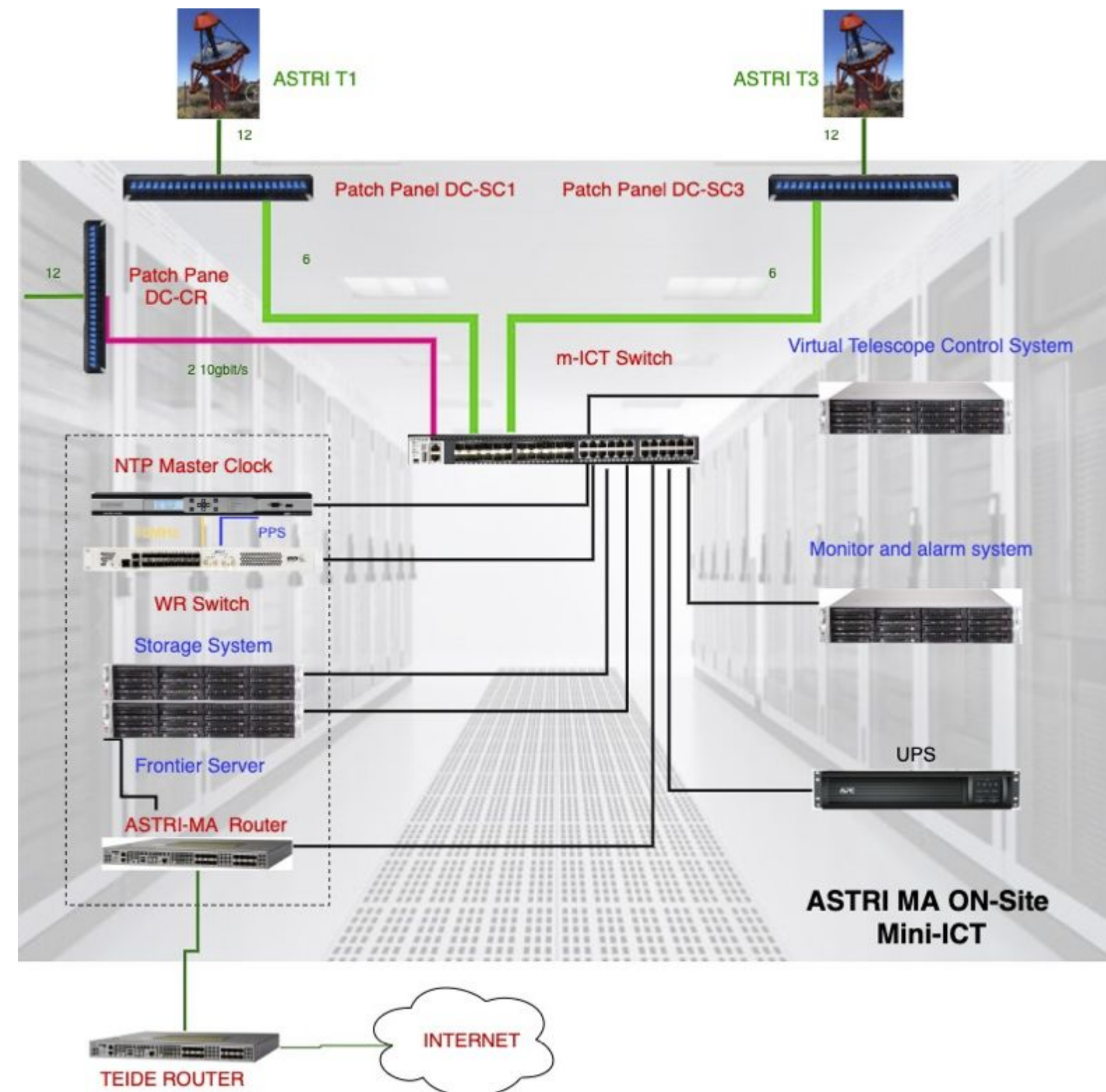
- Main scheme of the ASTRI-MA's ICT ON-SITE infrastructure. Here you can see the main subsystems and components of the ICT and how they are connected to each other and with Internet.
- We are ready to start with the purchase tender
- Presented in the Workshop "From Science Gateway to Papers" Palermo 23-27/5/2022.
- [https://indico.ict.inaf.it/event/1802/contributions/11747/attachments/5767/11658/F.Gianotti\\_ASTRI-MA\\_ICT\\_Infrastructures\\_Worshop\\_Palermo\\_05\\_2022\\_V4.pdf](https://indico.ict.inaf.it/event/1802/contributions/11747/attachments/5767/11658/F.Gianotti_ASTRI-MA_ICT_Infrastructures_Worshop_Palermo_05_2022_V4.pdf)



# ASTRI-MA mini-ICT Infrastructure

The Mini ICT will provide an adequate IT infrastructure capable of operating ASTRI-MA in phase 0 only with the first 3 Telescope. The mini-ICT will be installed in a small 27U rack located in the Data Center. Currently installed at Tenerife Site.

**SPIE 2022 accepted contribution - ASTRI Mini-Array On-Site Information and Communication Technology - F.Gianotti at all**



## NEWS ASTRI - MINI-ARRAY È COLLEGATO CON IL MONDO!



Caption: Salvatore Sudaeri, Alessandro Turchini, Giuseppe Malaspina, Marcello Lodi, Fabio Gianotti, Christine Grisei con il mini-ICT collegato al mondo. (Credit: Giuseppe Malaspina)

Maggio 2022 - In aprile, a Izana a Tenerife (Isole Canarie, Spagna), nel sito astronomico dell'Osservatorio del Teide, è stato raggiunto un importante risultato nel percorso che sta portando all'installazione di ASTRI Mini-Array. Grazie a uno sforzo coordinato di personale di INAF, della Fundación Galileo Galilei, dell'Osservatorio Temis/CNRS e tramite il

<http://www.astris.inaf.it/notizie/>

# ASTRI-MA Virtual Test Bed

In the ProxMox Virtual system we will have to reproduce the ICT of the ASTRI-MA, in terms of Server and network infrastructure.

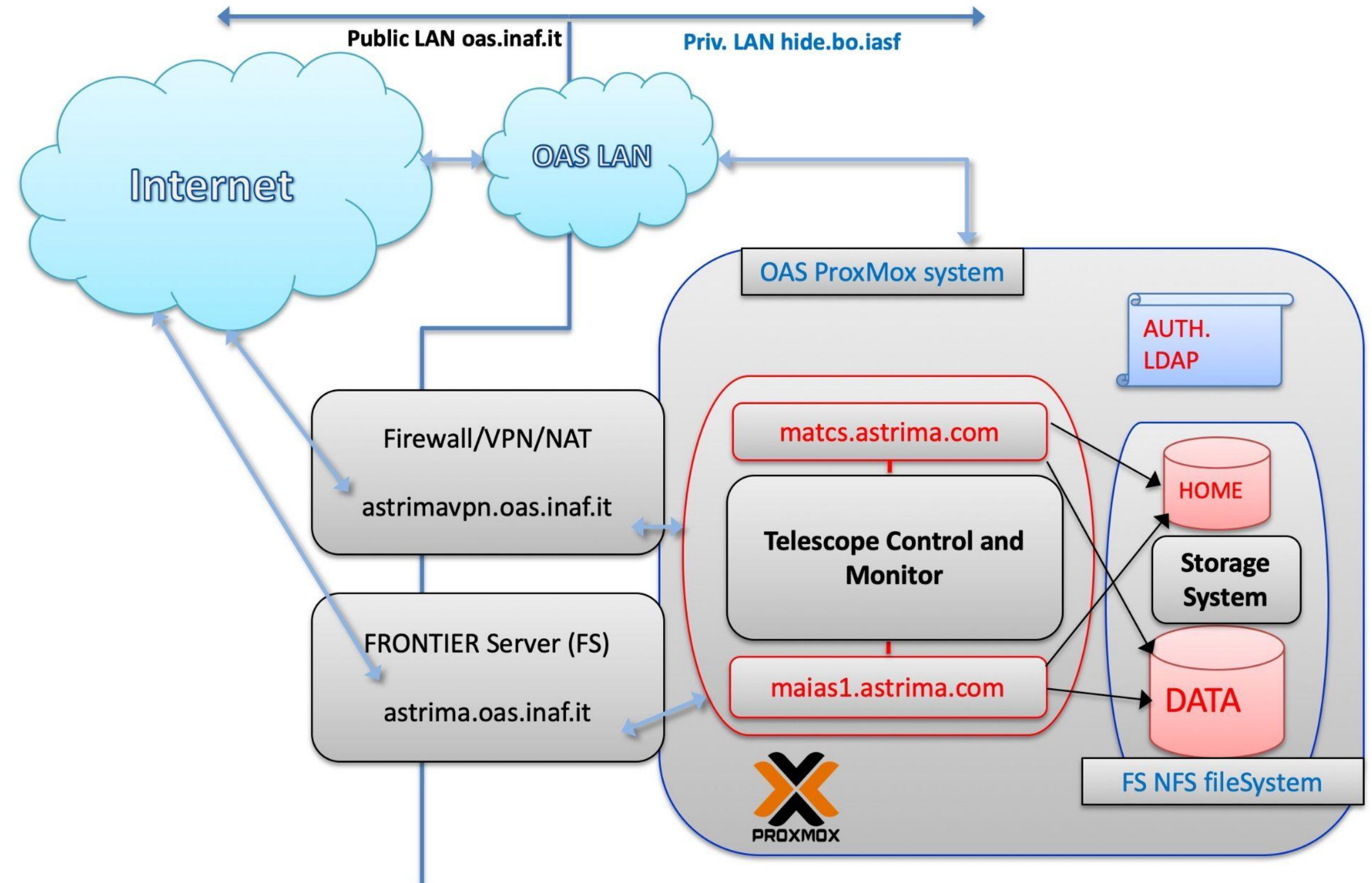
Presented to the ICT Workshop Milano 21-25/10/2019

[https://indico.ict.inaf.it/event/795/contributions/5131/attachments/2867/5592/FGianotti\\_ASTRI\\_TestBed\\_From\\_Prototype\\_to\\_Mini\\_Array\\_Slides\\_24\\_10\\_2019\\_V02.pdf](https://indico.ict.inaf.it/event/795/contributions/5131/attachments/2867/5592/FGianotti_ASTRI_TestBed_From_Prototype_to_Mini_Array_Slides_24_10_2019_V02.pdf)

ADASS 2020: “ASTRI Virtual Test Bed: from Prototype to Mini Array”, F.Gianotti at All.

<https://adass2020.es/static/ftp/P1-190/P1-190.pdf>

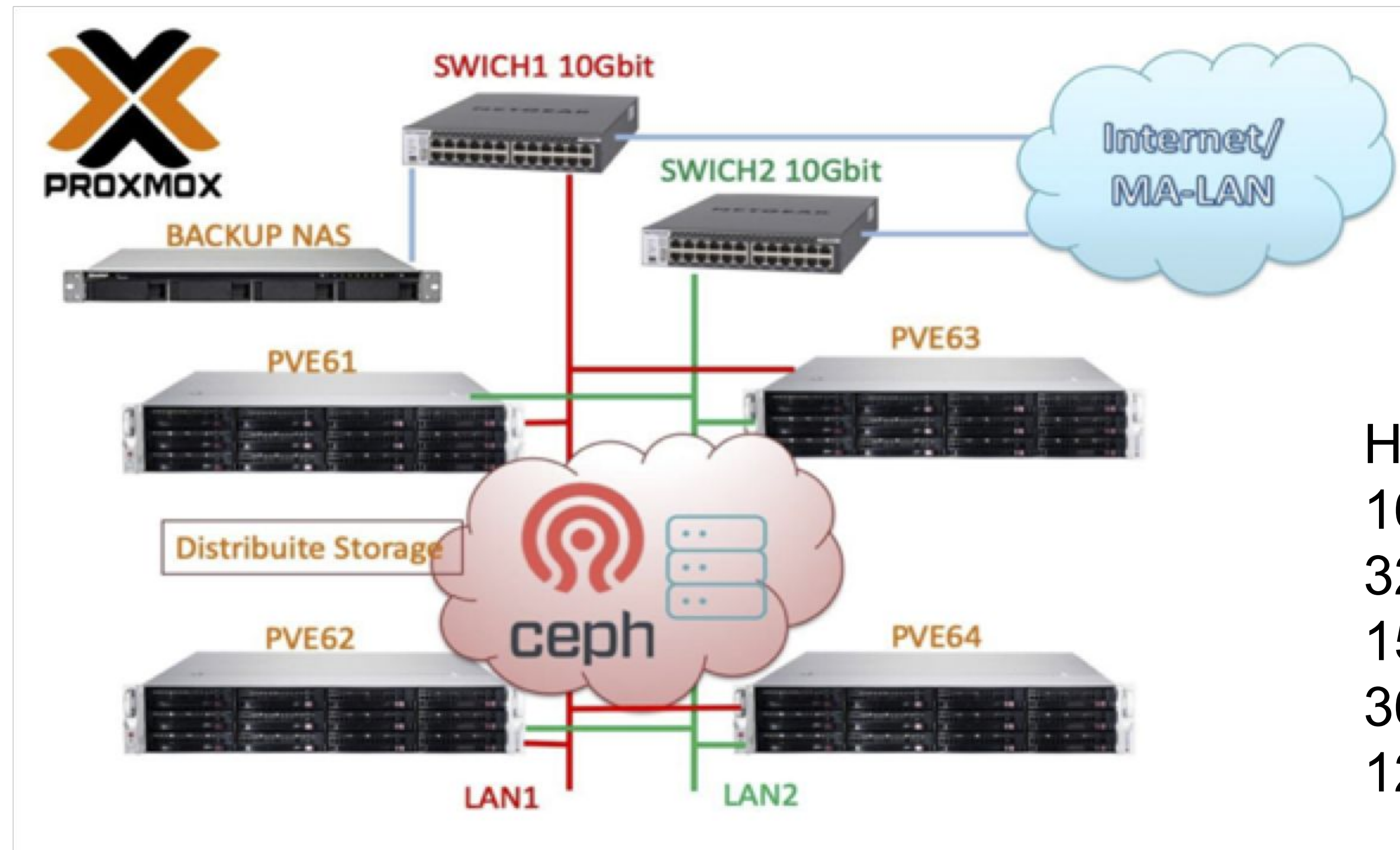
**The Software services that will be illustrated later are also installed in the Virtual System**



# ASTRI-MA Virtual TB Implementation

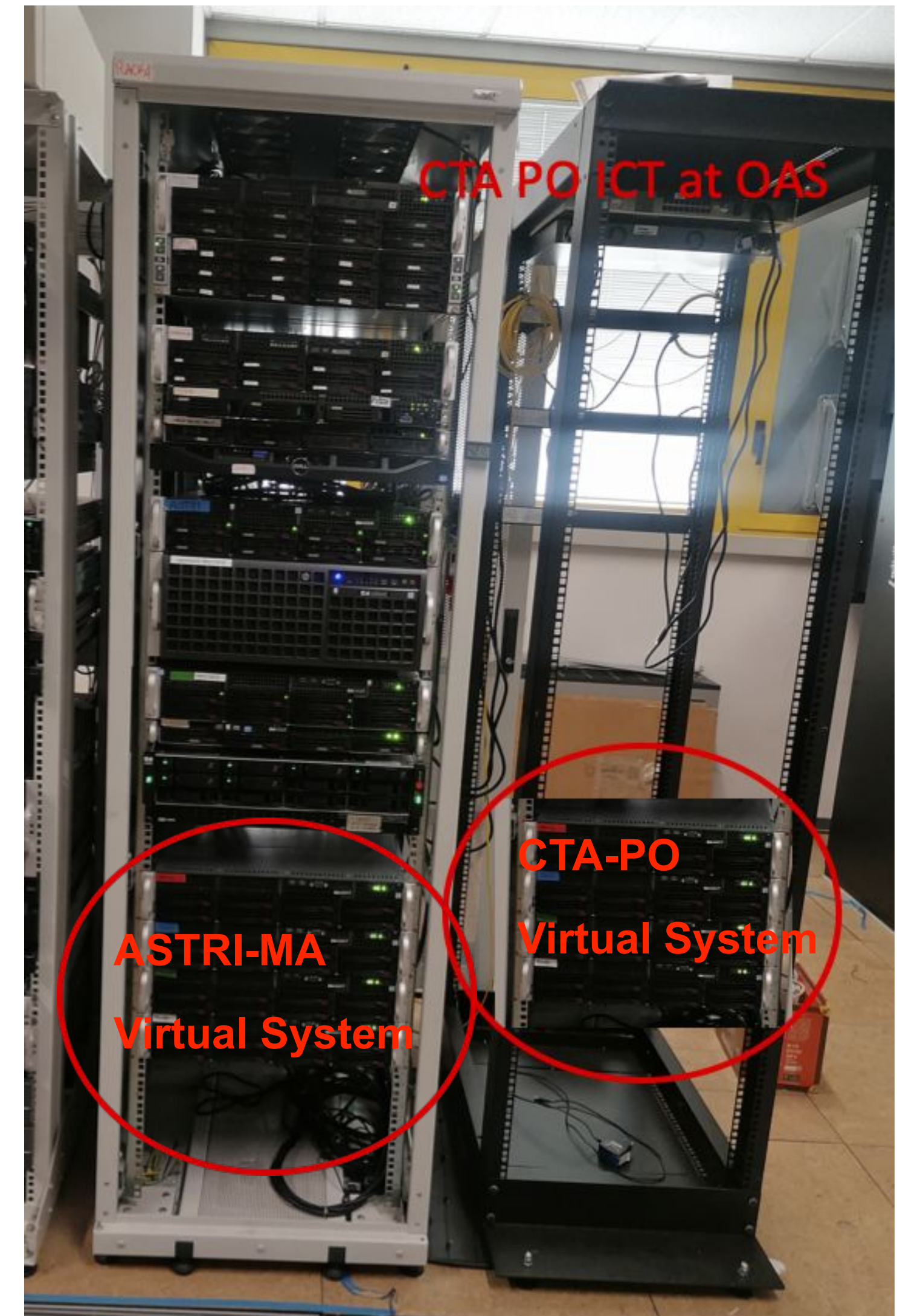


With only 4 Hypervisor servers and 2x10Gbit switches we are able to virtualize what will be needed for the ASTRI Mini Array TB



HW Resources  
160 Phis. Core  
320 Thread  
1536 GB RAM  
36TB Gross SSD Storage  
12 TB Available

Another nearly identical system will be provided by INAF to CTA PO to implement their services. And it will be installed in the OAS Computing Center which houses the IT infrastructures of CTA PO.



# Software Management outline

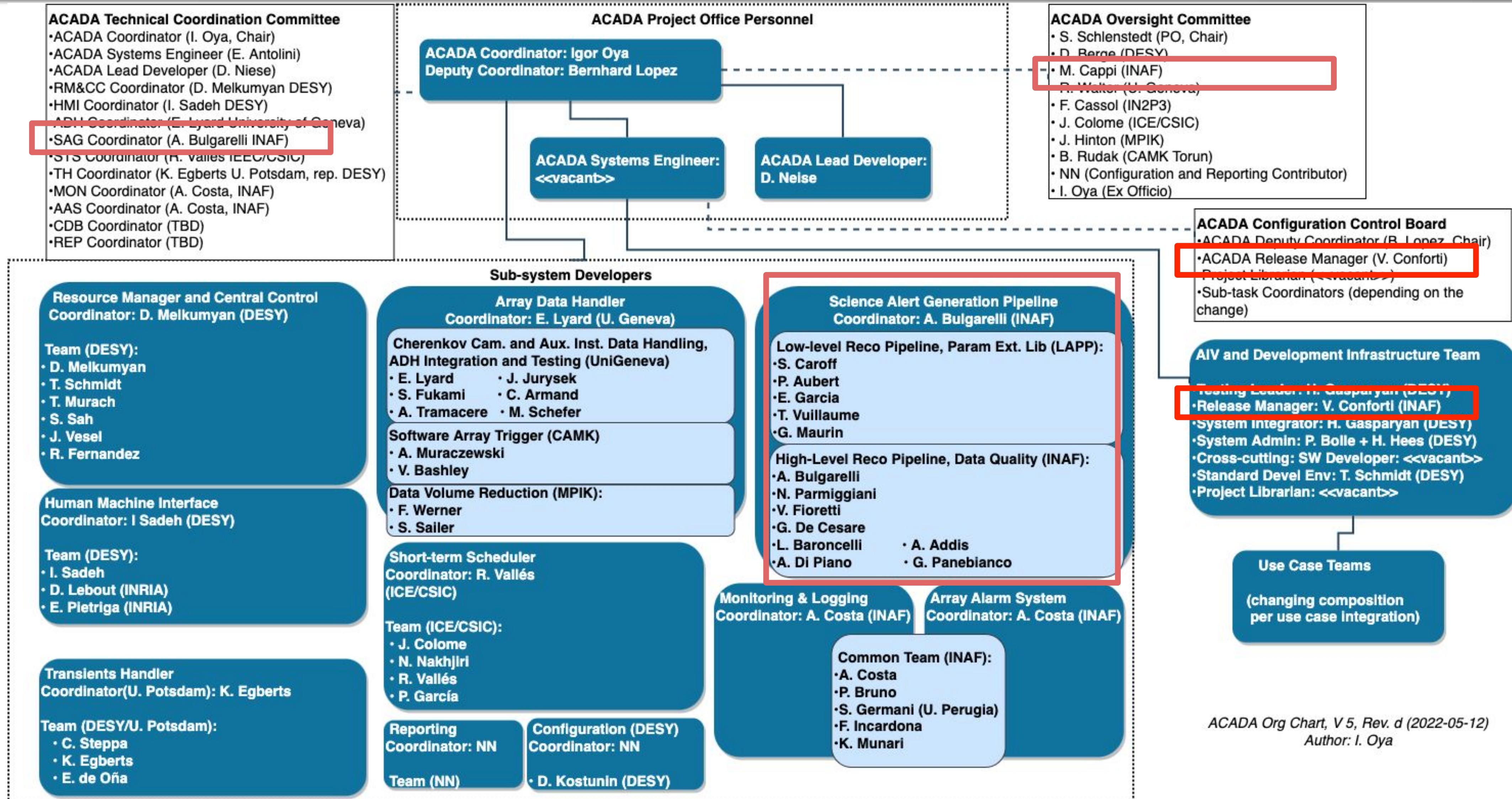
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- **CTA - ACADA**
  - Release Management
  - AIV + CCB
- **ASTRI-MA**
  - Software QA Management
  - Project Management
  - Software Engineering
  - Software Integration Test

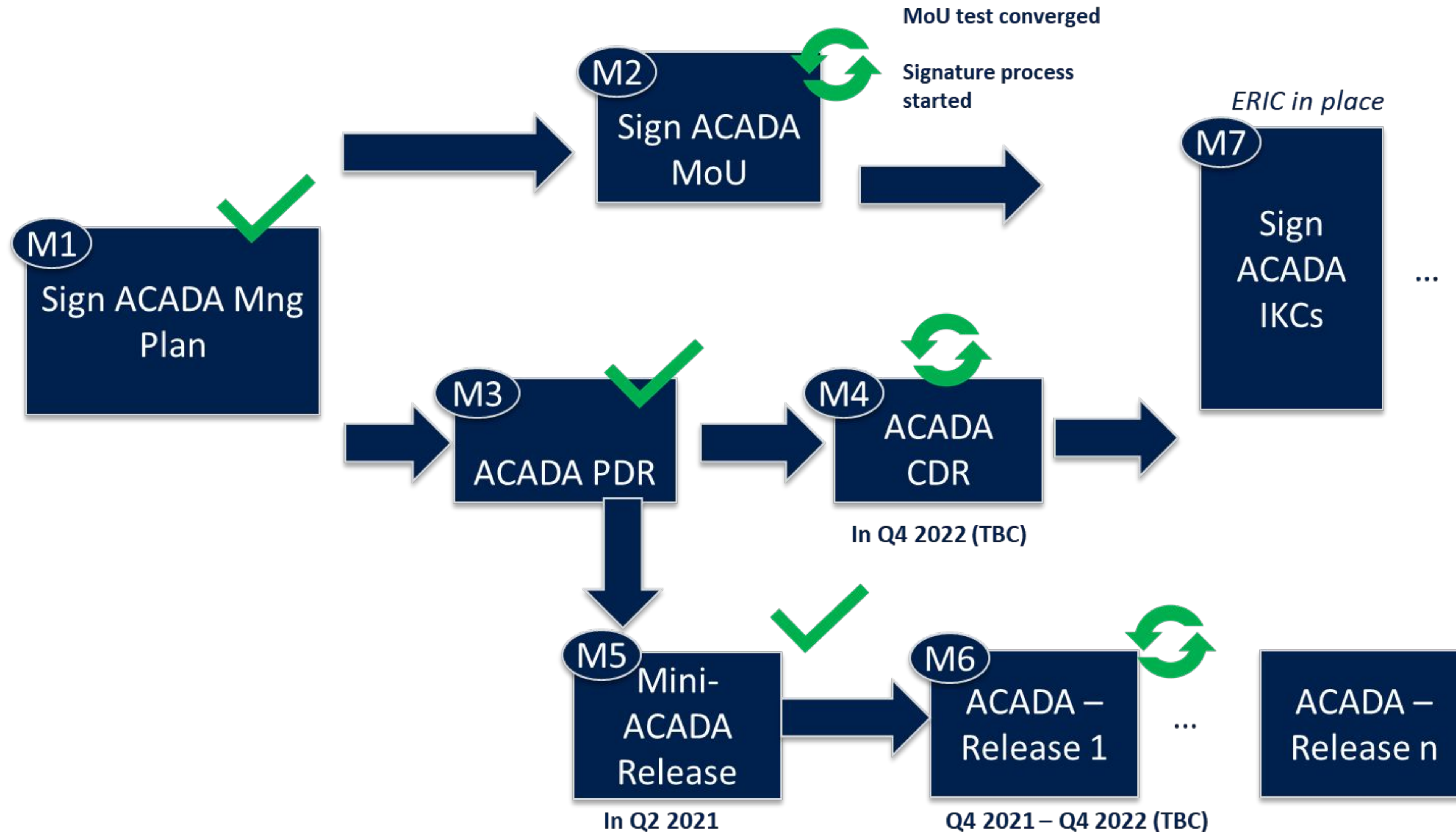


# Software Management - CTA-ACADA

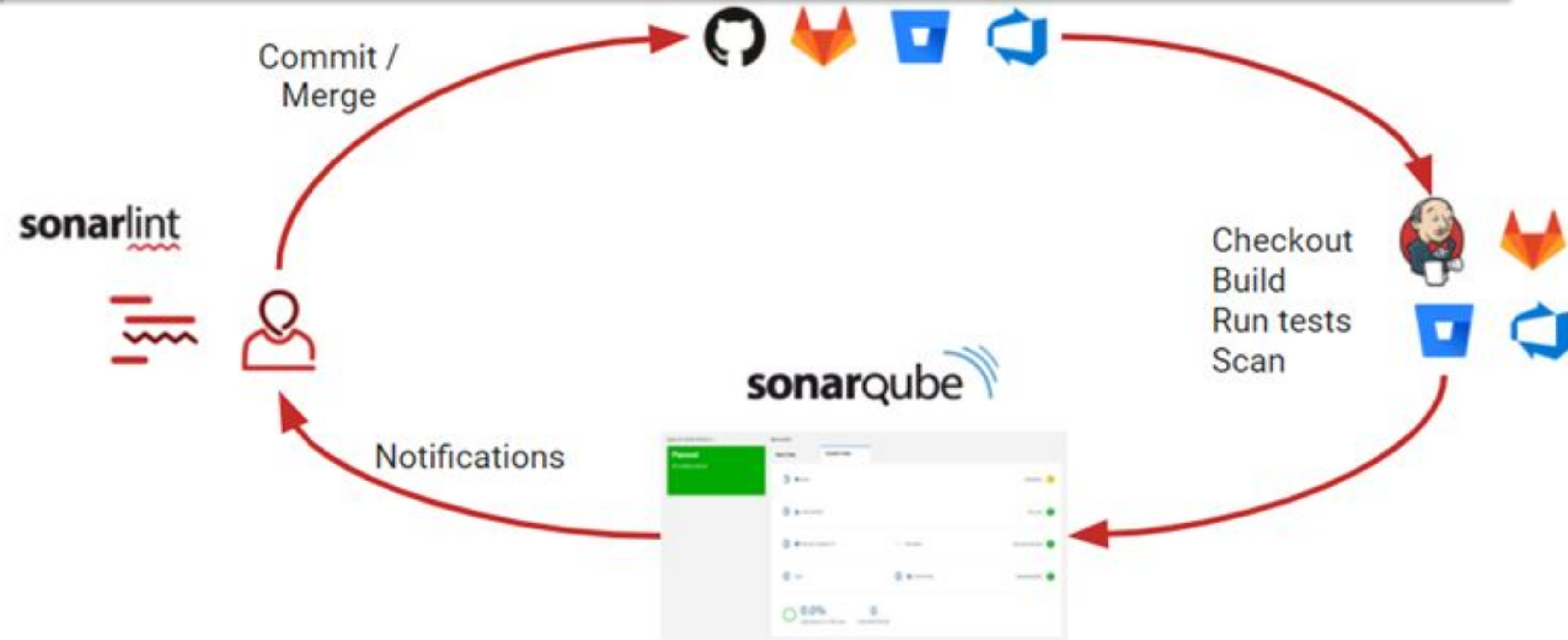


ACADA Org Chart, V 5, Rev. d (2022-05-12)  
Author: I. Oya

# Software Management - CTA-ACADA



- Software QA Manager
  - released Quality Assurance Plan
  - Static Code Analysis with SonarQube



- Publications:

- SPIE 2022 accepted contribution - N. La Palombara, V. Conforti et al “**The Product Assurance Programme of the ASTRI Mini-Array project**” as a poster
- ACAT 2022 preparing abstract - V. Conforti “**The Product Assurance Programme of the ASTRI Mini-Array project**”

- Project Management
  - redmine administration for the CTA-SST, ASTRI-MA, ASTRI-MA ASPO
- Software Engineering
  - software development plan
  - software integration test model
  - Deployment model
- Software Integration Test
  - Configuration of environment to run integration tests on the test bed;
  - Support to run integration tests

# Data Acquisition outline

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- **ASTRI-MA** Array Data Acquisition System (ADAS)
  - Software Architecture overview
  - Status of work
  - Publications

# ASTRI MA - ADAS SW Architecture



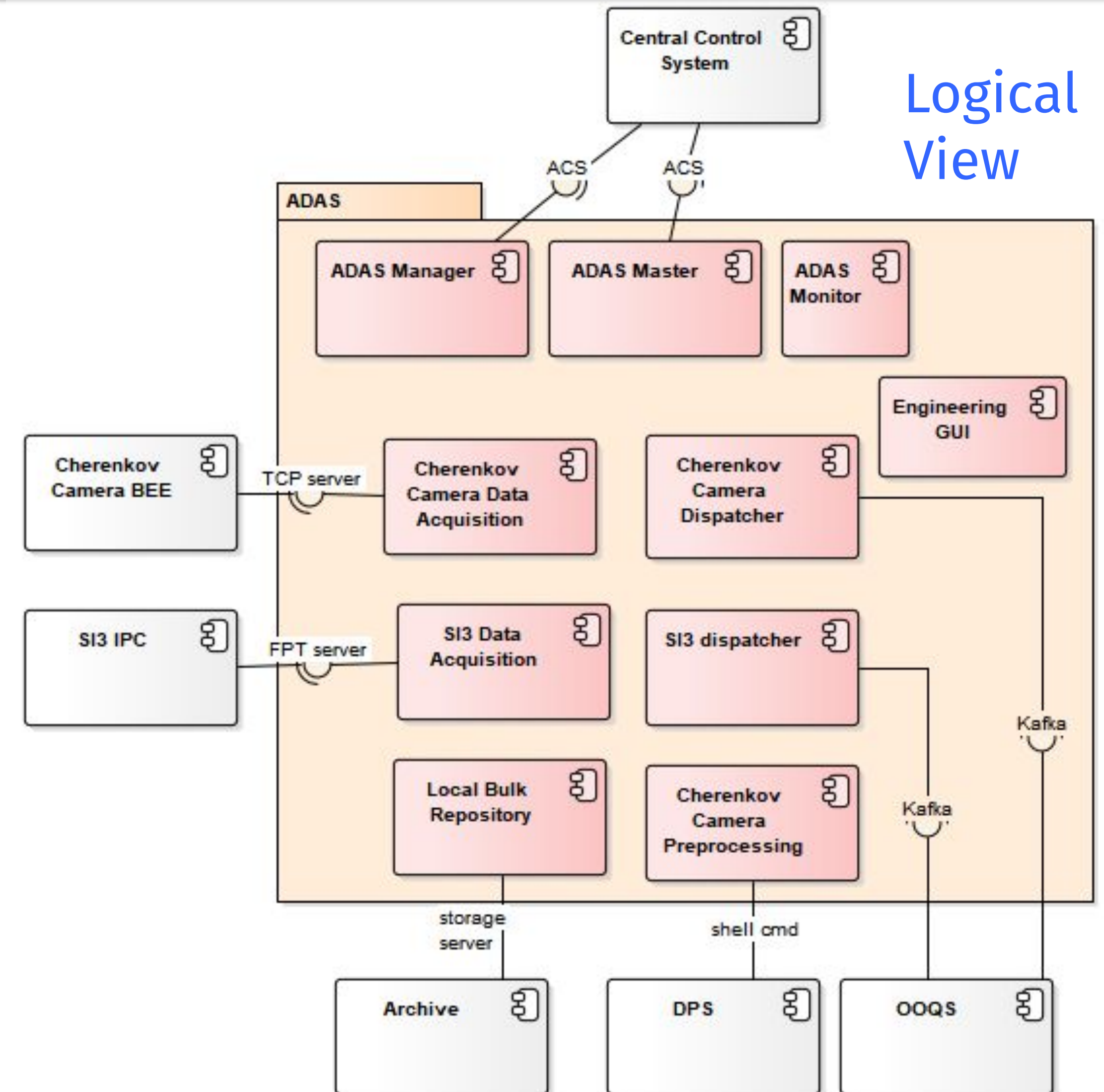
The main ADAS scenarios concerns the scientific data acquisition from the array of **9 ASTRI telescopes**:

- Cherenkov measures
- Intensity Interferometry measure

Lessons Learned from ASTRI-Horn Telescope

Physical view:

- 9 camera servers will be installed at on-site Data Center. Each server connects the telescope instruments (point to point fiber connection).



- completed Internal Design Review
  - Software Requirement Specification Document
  - Use Cases Document
  - Detailed Design Document
  - Verification Document
- software under development
  - completed cherenkov acquisition software
  - completed ACS components to interface the Central Control System
  - alfa version of cherenkov camera pre-processing (Raw2FITS)
  - alfa version of cherenkov camera dispatcher (ADAS - 00QS)

- **V. Conforti** - The Array Data Acquisition System software architecture of the ASTRI Mini-Array Project (talk), proc. SPIE 2022
- **V. Pastore** - Array Data Acquisition System interface for online distribution of acquired data in the ASTRI Mini-Array project (poster), proc. SPIE 2022
- **V. Conforti** - The Data Acquisition System assessment to support the observation quality system of the ASTRI Mini-Array (poster), proc. ADASS 2021



# That's All

