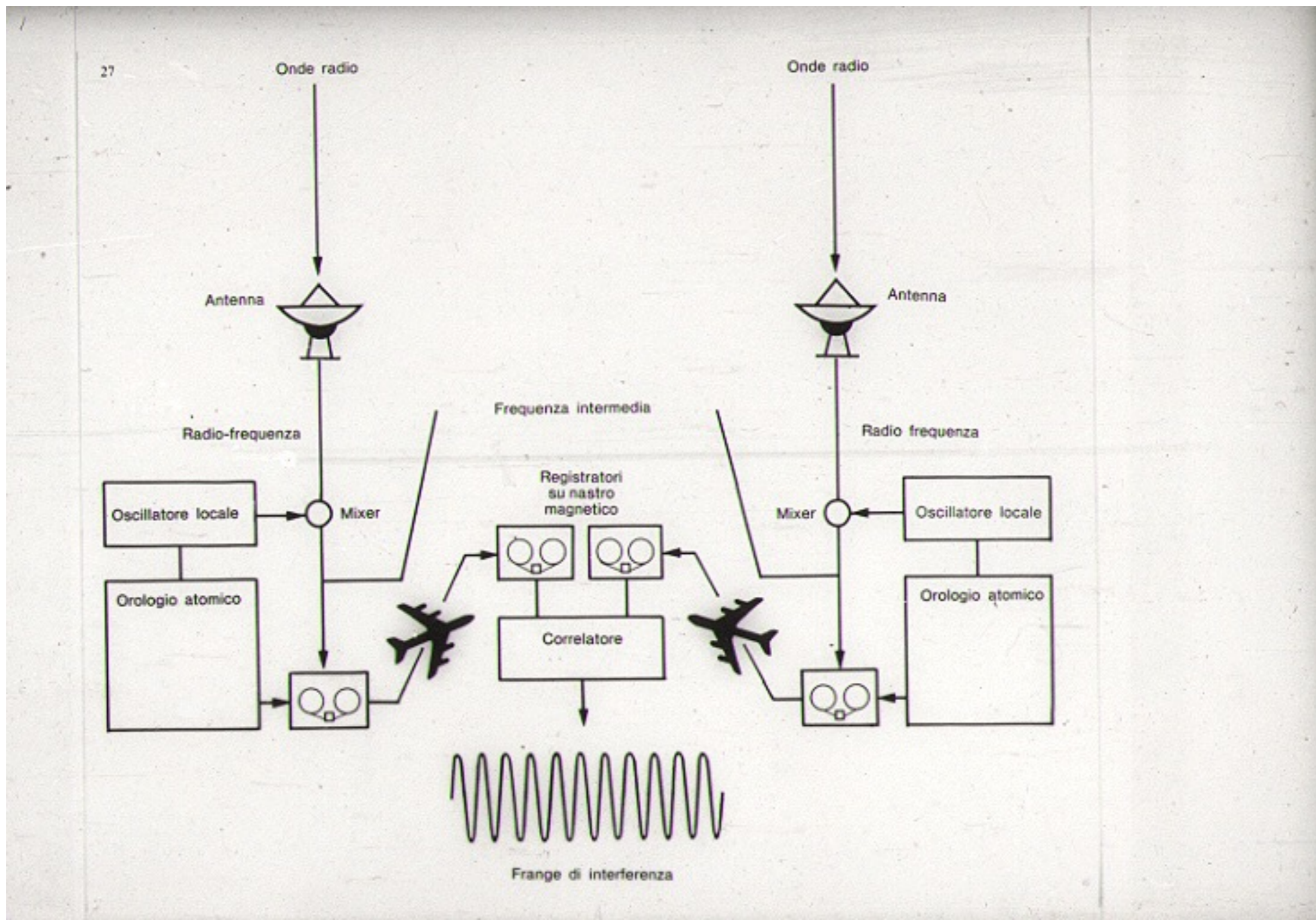




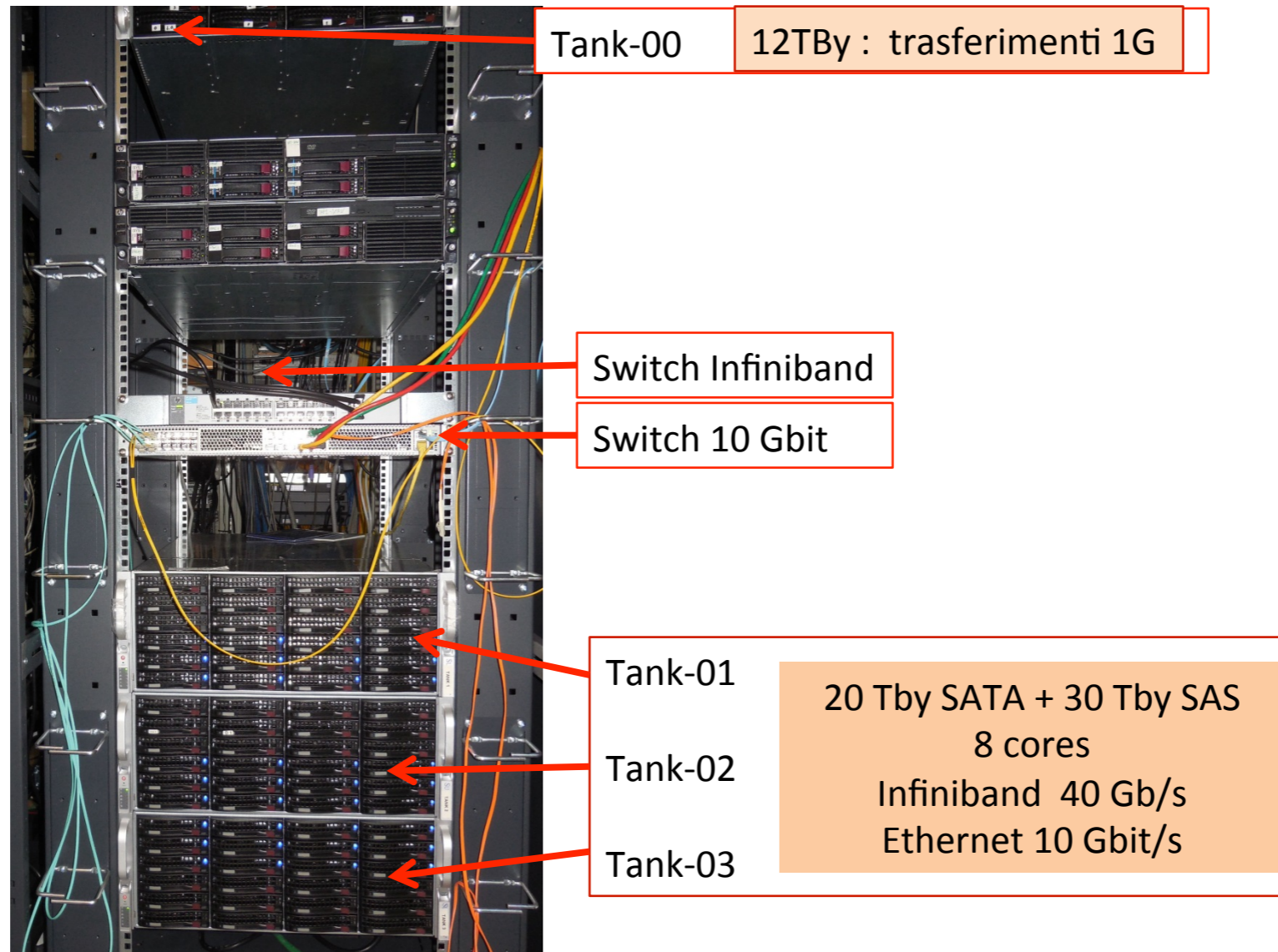
Dati VLBI - Registrazione, processamento e archiviazione

Matteo Stagni - ICT WORKSHOP INAF 07-10-2015

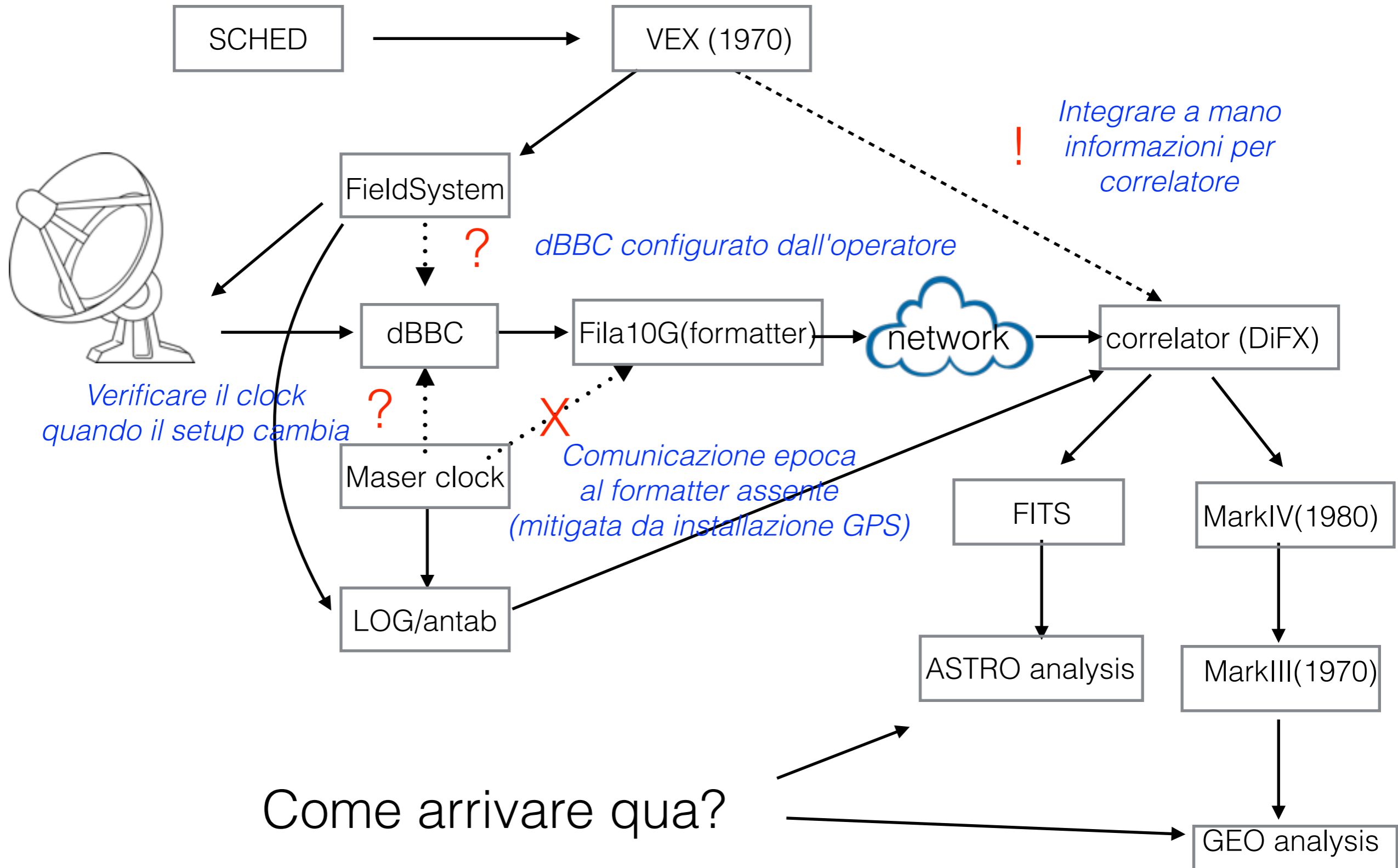
C'era una volta...



Correlatore



Oggi



VLBI - IT



- $Mc \rightarrow \text{dBBC} + \text{Mk5C} + \text{Mk5A}$
- $Nt \rightarrow \text{dBBC} + \text{Mk5B}$
- $Srt \rightarrow \text{dBBC} + \text{Mk5C} + \text{Mk5B} ?$
- $Ma \rightarrow \text{VLBA} + \text{Mk5B} (\text{dBBC} ?)$

VLBI - IT



+



=

Fringes
on
21-9-2013
Nt + Srt + Hh

HartRAO (South Africa)

Trasferimento dati a Bologna 300 Mbit

VLBI - IT



+



Torun (Poland)

=

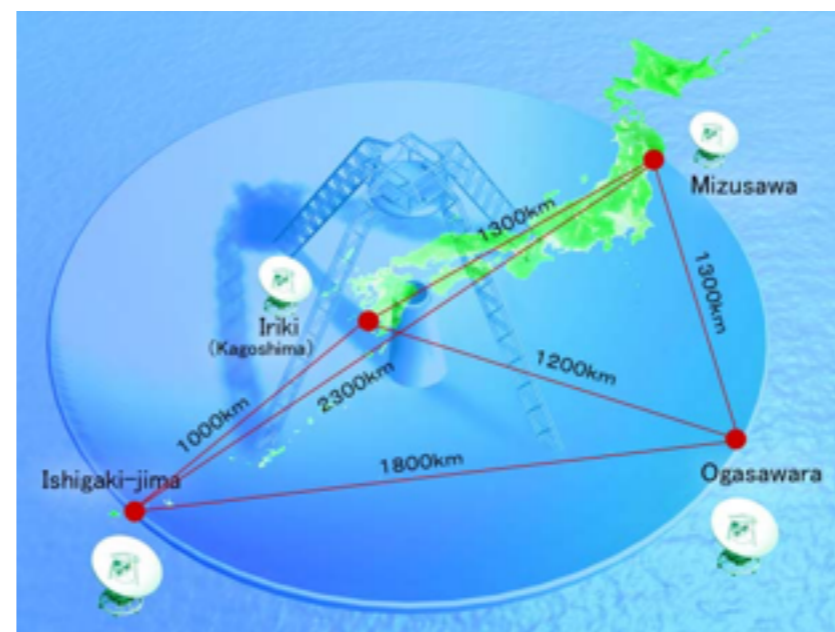
Fringes
on
IJ15K
Mc + Nt + Tr

Trasferimento dati a Bologna 1 Gbit

VLBI - IT



+



=

Ongoing
Fringes
for VLBI - IT!

VERA (Japan)

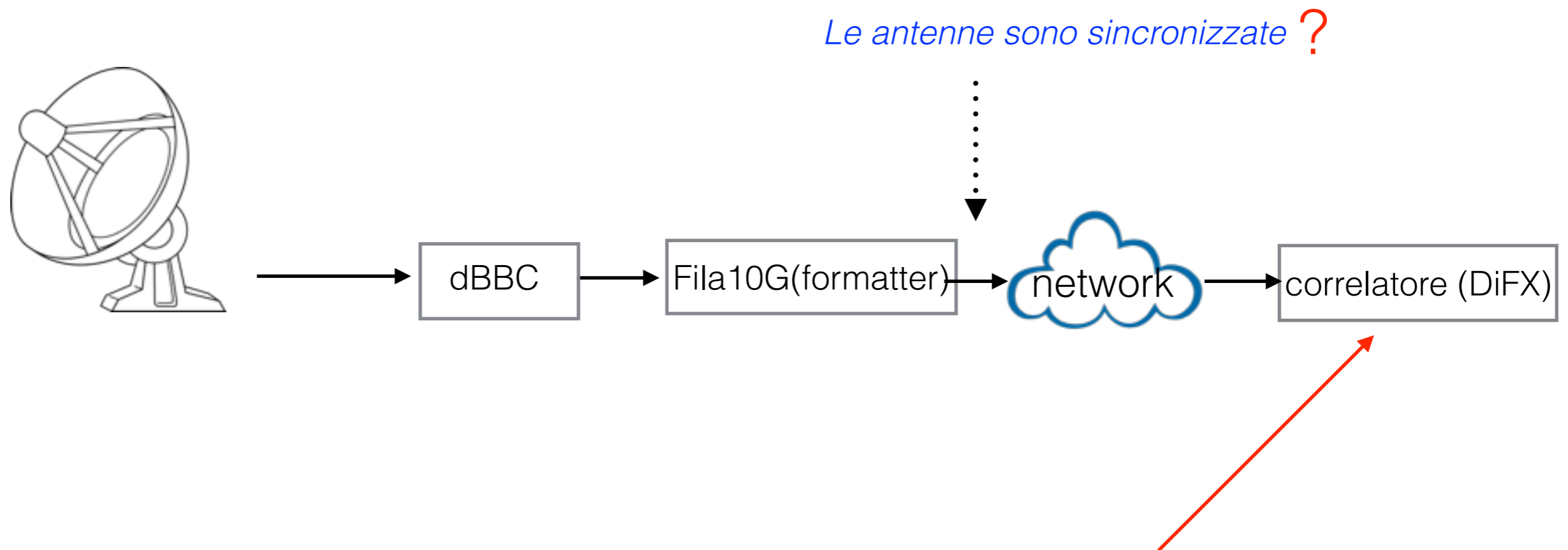
Trasferimento dati a Tokyo ~10 Mbit

Esperimenti VLBI correlati @IRA

Dal 1/3/2013 : 38 osservazioni con 2-4 antenne
di cui 14 soddisfacenti (37%)

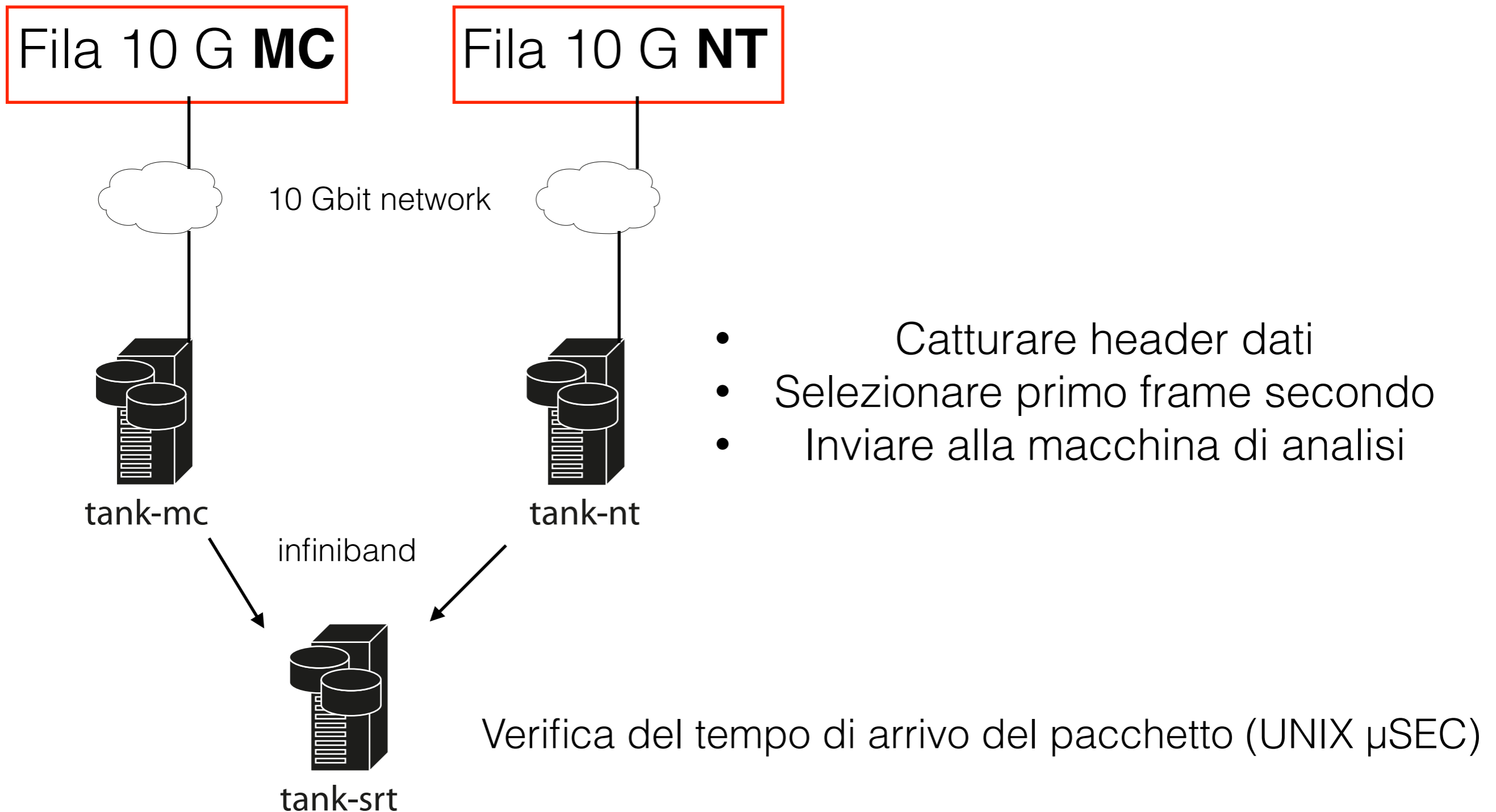
	Mc	Md	Nt	Nd	SRT	Mt	Ef	Hh
MK5	A	C	B	B	C	B	B	B
Num	19	24	8	19	14	2	4	2
OK	13	9	4	11	4	1	4	2
% ok	68	37	50	58	35	50	X	X

Problemi di sincronizzazione



Cosa succede quando i dati arrivano direttamente al correlatore?

vbiTimeServer



vlbiTimeServer

esempio di log

```
INFO:root:2015-03-12 10:16:24 got DATASTREAM from 192.168.90.1 @ 10:16:24.001140 HEADER TIME MJD 3 SECONDS 36984
INFO:root:2015-03-12 10:16:24 got DATASTREAM from 192.168.90.2 @ 10:16:24.017512 HEADER TIME MJD 3 SECONDS 36984
INFO:root:2015-03-12 10:16:25 got DATASTREAM from 192.168.90.1 @ 10:16:25.001189 HEADER TIME MJD 3 SECONDS 36985
INFO:root:2015-03-12 10:16:25 got DATASTREAM from 192.168.90.2 @ 10:16:25.017506 HEADER TIME MJD 3 SECONDS 36985
ERROR:root:2015-03-20 11:53:06 !Packets disalignment! got from 192.168.90.1 @ 11:53:06.001450 HEADER TIME MJD 101 SECONDS 42786
ERROR:root:2015-03-20 11:53:06 !Packets disalignment! got from 192.168.90.2 @ 11:53:06.017464 HEADER TIME MJD 101 SECONDS 42785
ERROR:root:2015-03-20 11:53:06 !!SECOND JUMP!! got 192.168.90.1 @ 11:53:06.001450 HEADER TIME MJD 101 SECONDS 42786
ERROR:root:2015-03-20 11:53:06 !!SECOND JUMP!! got 192.168.90.2 @ 11:53:06.017464 HEADER TIME MJD 101 SECONDS 42785
ERROR:root:2015-03-20 11:53:06 Queues empty - resuming normal operations
```



Noto cade 1 secondo indietro

vlbiTimeServer

- Ritardo di rete -> 0.10 **seconds** tra Noto e Medicina
- Pacchetti persi a volte
- Test per 1 settimana @ 1 Gbit -> niente 'salti'
- Quando il tempo 'salta' bisogna ri-sincronizzare dBBC e Fila 10





IRA-INAF Station Manager
Choose what you would like to do:

Antenna **Mc** selected

Select antenna	Storage status Delete old data	New experiment	Reserve space Clear reserve table	Schedule observations Delete scheduled job
→	→	→	→	Ω

Administration options

[Global partition status](#) [Global jobs queued](#) [Users Management](#)


VSM

Vibi Storage Manager

Schedule observations

vibi-mgr.ira.inaf.it/iravsm/sched.php

NEXPRES



scheduling

	Host	Obs	Path	Filename	StartTime	LastingTime	Command
X	Ordinato per: StartTime crescente						
<input checked="" type="radio"/>	tank-01.ira.inaf.it	testNewITA	/space1/local-2013-7/testNewITA	Mc	2013-12-20 17:34:10	86400	captureUDPVDIF 2222 test
<input type="radio"/>	tank-01.ira.inaf.it	ggg	/space1/local-2012-2/ggg	Mc	2014-09-18 12:49:07	86400	vbs_record test

<< < Aggiungi Visualizza Modifica Copia Cancella > >> Val a 1 :

5.089 milliseconds

Pagina: 1 / 1 Voci: 2

To confirm submission please select Continue to insert the jobs into the machine(s) queue:

Continue

Home

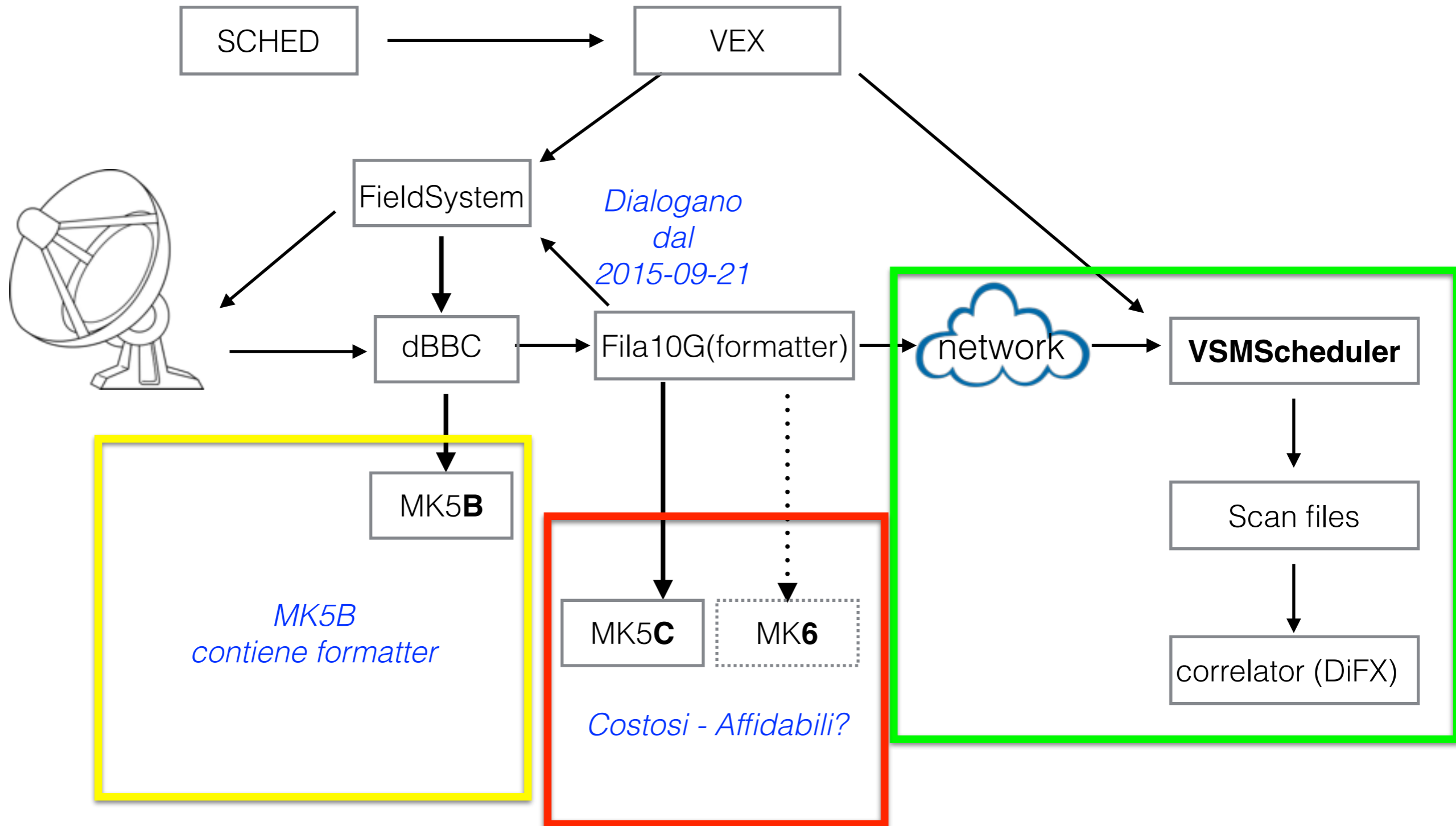
Recording tools

testing tools to try recording
VDIF and MARK5 data
providing more automation

VSMScheduler

- Parsa il file vex e produce una schedula di registrazione
- Sostituisce un Mark5C = Linux computer + moduli RAID proprietari
- Capacità di registrazione con VSMScheduler = fino a che un RAID resiste! (4 Gbit/s testati)

VSMScheduler



VSMScheduler

- VSMScheduler si interfaccia con demone jive5ab (software di registrazione di JIVE) dicendo quando to iniziare/terminare la registrazione dei files secondo il vex
- Crea nomi di scan secondo gli standard: experimentName_antenna_scan# (e.g. vlbit_mc_no0001)
- Si possono programmare le registrazioni prima degli esperimenti

VSM Scheduler

- 1 ora di trasmissione a 4 Gbit (2 TB scritti)

	MK5B con SATA	MK5B con SAS	VDIF con SAS
Mc → BO	1.4 %	0.01%	
Nt → BO			0.00001 %

Scrivo pacchetti fino a 8000 byte con jive5ab

Assemblo 2 pacchetti da 5008 byte con jive5ab

VSM Scheduler

Configuring jive5ab on telnet port 2620 in Fila10G Mark5B mode
telnet: connect to address 127.0.0.1:
Trying 127.0.0.1...
Configuration done!

You are scheduling the following scans for experiment ij15l :

Scan ij15l_mc_no0001 @ 2015-02-19 13:00:00
Scan ij15l_mc_no0002 @ 2015-02-19 13:01:15
Scan ij15l_mc_no0003 @ 2015-02-19 13:02:30
Scan ij15l_mc_no0004 @ 2015-02-19 13:03:45
Scan ij15l_mc_no0005 @ 2015-02-19 13:14:00
Scan ij15l_mc_no0006 @ 2015-02-19 13:28:00
Scan ij15l_mc_no0007 @ 2015-02-19 13:29:15
Scan ij15l_mc_no0008 @ 2015-02-19 13:30:30
Scan ij15l_mc_no0009 @ 2015-02-19 13:31:45
Scan ij15l_mc_no0010 @ 2015-02-19 13:42:00
Scan ij15l_mc_no0011 @ 2015-02-19 13:56:00
Scan ij15l_mc_no0012 @ 2015-02-19 13:57:15
Scan ij15l_mc_no0013 @ 2015-02-19 13:58:30
Scan ij15l_mc_no0014 @ 2015-02-19 13:59:45
Scan ij15l_mc_no0015 @ 2015-02-19 14:10:00
Scan ij15l_mc_no0016 @ 2015-02-19 14:24:00
Scan ij15l_mc_no0017 @ 2015-02-19 14:25:15
Scan ij15l_mc_no0018 @ 2015-02-19 14:26:30
Scan ij15l_mc_no0019 @ 2015-02-19 14:27:45
Scan ij15l_mc_no0020 @ 2015-02-19 14:38:00

Waiting for start time ... first scan should begin recording at 2015-02-19 13:00:00

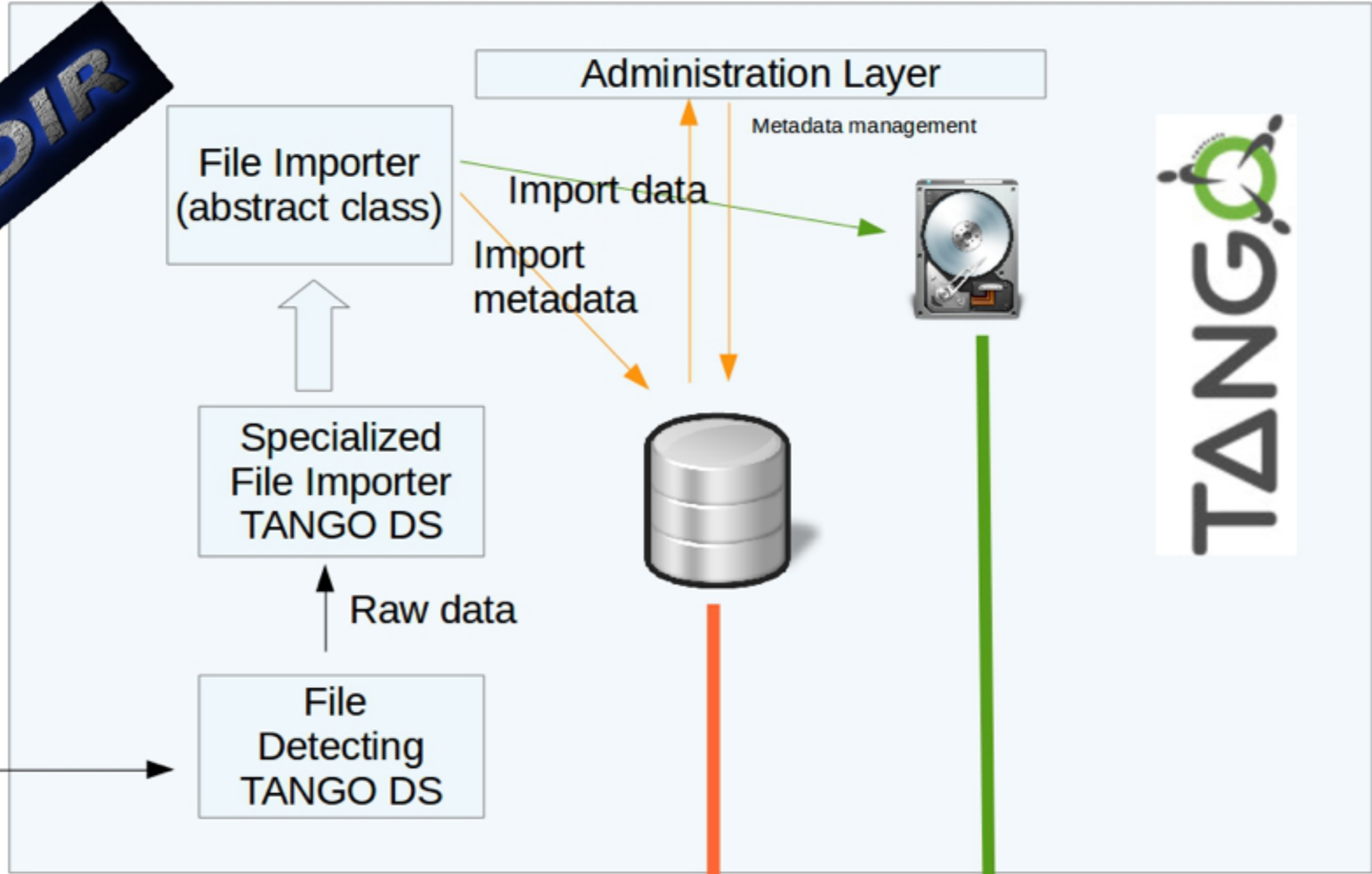
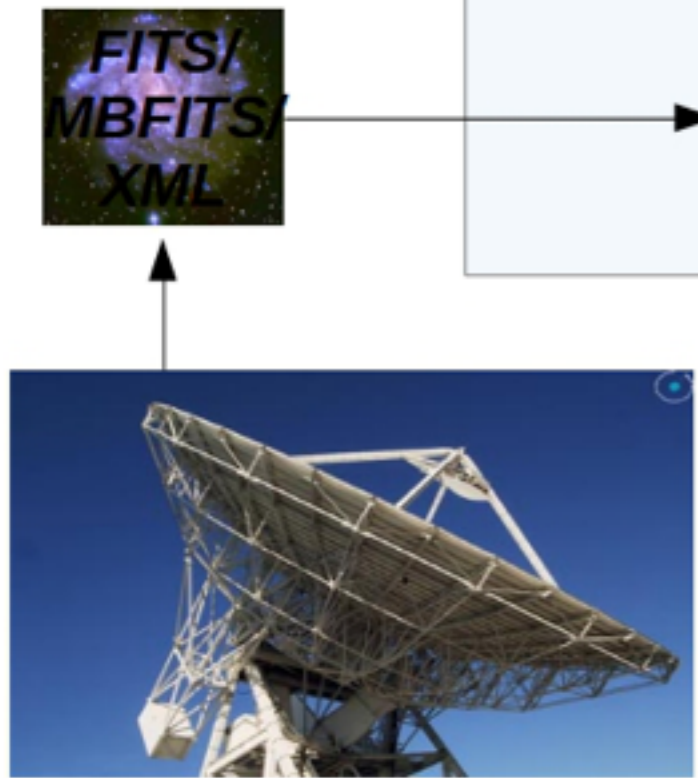
Archivio

IA2 Trieste

Alcuni obiettivi (come indicato su IA2 website):

- Inserire i log di osservazione nel database
- Archiviare i dati scientifici in formato FITS
- Fornire strumenti per la ricerca nel DB attraverso chiavi predefinite

NADIR



TANGO



WEB PORTALS

WEB SERVICES

NADIR's offered solutions

- Based on TANGO Distributed Control System (independent from OS);
- Modular software, optimized to be as much as possible flexible in configuration;
- Scalable in number of data importer devices available;
- Handling of different data format (FITS/ MBFITS/ XML);
- Policy and versions revised easily, in a flexible manner;
- Capability to develop services in the major Object Oriented Languages (C++, Java, Python);
- Strong logging and error handling;
- Open source;
- Maintained at IA2;

NADIR Mandatory Requirements:

- INSTRUMENT;
- OBS DATE;

NADIR functional requirements:

- ProjID;
- PINAME;

NADIR non functional requirements:

- Coherent filling of fits keyword values in terms of types and values consistencies to allow query efficiency;

Data delivery depends on ingestion date and policy. Policy depends on OWNERSHIP.

No ownership = no data distribution!



Archivio

Bologna

- Preparare un file XML parsando il file VEX file per fornire le informazioni chiave da processare
- L' XML 'digerito' produce n tuple (righe) nella tabella del database

Si crea un file tar che contiene:

- FITS files
- antab files (curva di guadagno e temperatura di sistema per antenna)
- log files (dalle antenne - setup/clock/errori)
- Note di correlazione

Archive

WEB

[Home](#)

[Decimal degrees](#)



Radio Archive

File name

RA Dec Radius

Observation Date From: To:

Frequency MIN: MAX:

Project ID

VLBI-IT

SD

Telescope

PI Name

Exposure Time

Antenas

Data Rate



Domande?

Credits

Si ringrazia Cristina Knapic per le slides su Nadir