Inaf ARC - computing resources

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Alma Regional Center Requirements

Users should be able to load data on the storage from remote hosts as well as from a local external USB/E-SATA disk. Single object size is up to 1 TB.

During processing, CASA requires about *three times the object size* of free disk space.

At least **10 TB of disk space** are needed **per-user**. Data has a limited lifetime.

Depending of the degree of parallelization reached, an 8 cores computer should be enough for both interactive and non-interactive usage.

Users should be able to use the program in a interactive/graphical manner as well as in a job scheduling way

Handling Alma files

…. Up to 1 TeraByte

Try to play with a 100 GByte File …..

Read from internal raid 5 disk	15 min
Copy disk to disk	25 min
Copy from USB disk	45 min
Copy from 1 Gbit/s net	25 min

…. At least 10 TeraByte for users …..

5 – 10 SATA Disks

To give users support at ARC

Set up more STRONG independent work stations

Return to the “old computer center philosopy”:

- To share the computing end disk resources
- Keep software updated
- More batch queues
- Parallelism
- Remote access via hight speed network
- Ready for a grid (?)

Laptop complementary

The cluster

12 Blade computers:

- 2 CPU, 4 cores 2.1 GHz
- 8 GB of RAM
- 1 Gbit/s ethernet
- 10 Gbit/s ethernet

The rack

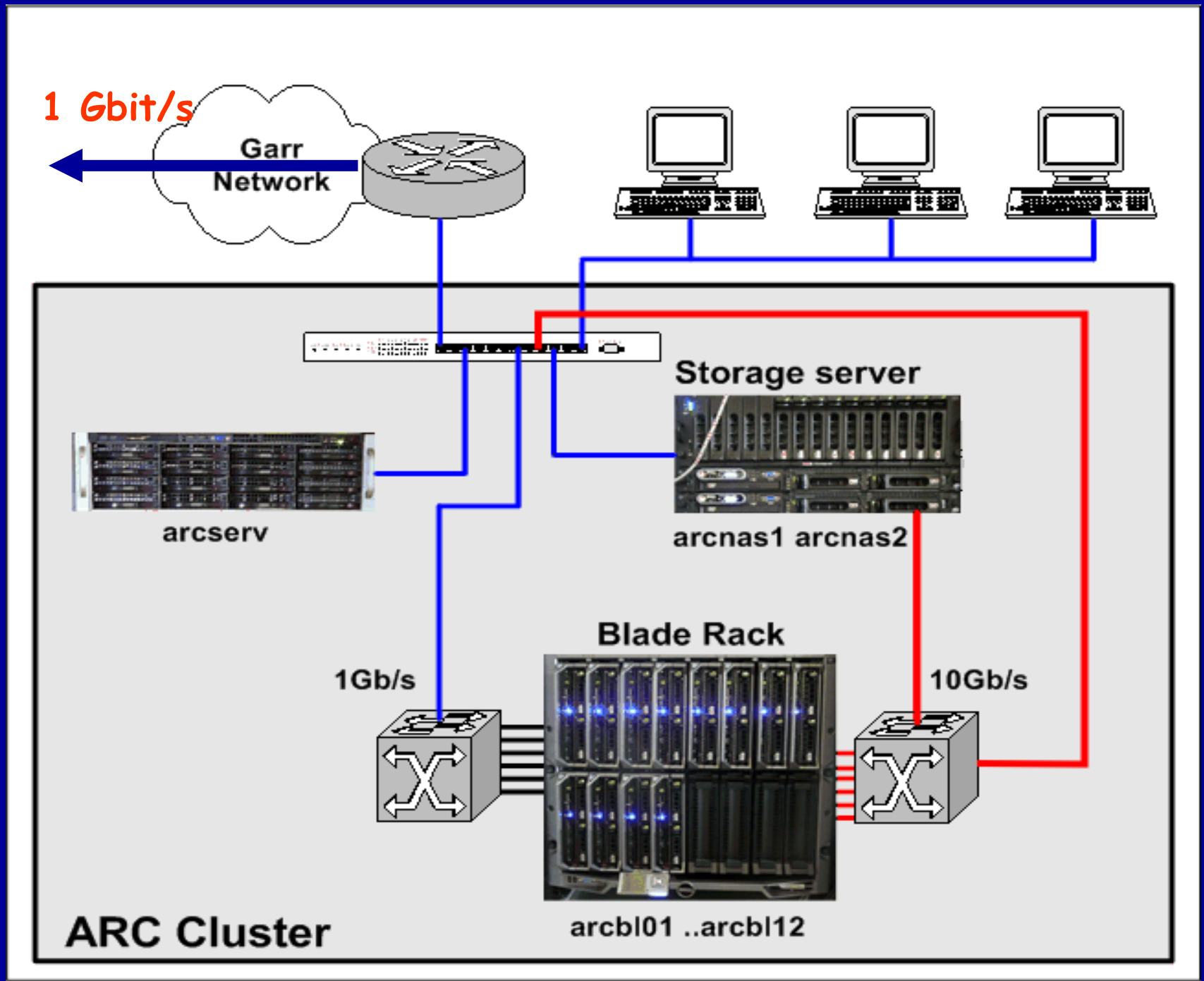
- Up to 16 blades
- 1 Gbit/s ethernet switch
- 10 Gbit/s ethernet switch

The cluster

Storage:

- Rack of SATA disks in raid5
- SAS interface
- 2 Storage servers with 10 Gbit/s ethernet
- GPFS Filesystem
- Can be updated with more racks of SATA disks !!!

The ARC cluster at IRA



Collegamenti INAF Marzo 2010

	Sede	Banda 2007 Mbit/s	Banda attuale Mbit/s	Collegamento		Upgrade eseguito in data	Upgrade Previsto in data
				Tipo	dark		
1	INAF - OA Arcetri	4	1000	P/P	X	Ott- 2009	
2	INAF - OA Bologna	10	10	Lan			
3	INAF - IASF Bologna	32	1000	Lan	X	gen-10	
4	INAF - IRA Bologna	32	1000	Lan	X	gen-10	
5	INAF - OA Cagliari, Capoterra (CA)	2	2	P/P			2010
6	INAF - OA Capodimonte (Napoli)	4	100	P/P	U	Mag-2009	
7	INAF - OA Catania	100	100	Lan			
8	INAF - OA Brera, sede di Merate	4	100	P/P	U	Giu-2009	
9	INAF - OA Brera, sede di Milano	10	10	P/P	X	Gen-2009	
10	INAF - IASF Milano	16	100	Lan			
11	INAF - IRA - Noto (SR)	0,5	2	P/P			
12	INAF - OA Padova	4	100	P/P	X	Ott- 2008	
13	INAF - OA Palermo	2	100	P/P	X	Dic-2009	
14	INAF - IASF Palermo	100	100	Lan			
15	INAF - OA Roma, Monte Porzio	4	100	P/P	U	Lug-2008	
16	INAF - IASF Roma (Tor Vergata)	100	1000	Lan			
17	INAF - IFSI Roma (Tor Vergata)	100	1000	Lan			
18	INAF - Presidenza, Roma	2	2	P/P			Mar-2010
19	INAF - OA Teramo	2	8	P/P		Ago-2009	
20	INAF - OA Torino	2	100	P/P	X	Feb-2009	
21	INAF - IFSI Torino	10	10	Lan			
22	INAF - OA Trieste	4	100	P/P	X	Set-2008	
23	INAF - IRA - Medicina (BO)	1000	1000	P/P		Gen-2006	
24	INAF- SRT						2011
25	INAF - NOTO						??

Software

CASA (Common Astronomy Software Applications)
a set of C++ tools bundled in an iPython interface. Conceived for interactive use, although scripting is possible via the iPython interface. Parallelization of algorithms is undergoing. A PBS/Torque scheduler is used to balance the load.

+

AIPS Classic

+

Gilda, Miriad, IDL, Parseltongue, ….

+

Pipeline (?)

Alma users can have an account on the arc cluster

Disk Space	
f2f users :	1 TBy (10 TBy) for the period + 1 month
Inaf staff :	250 GBy (2.5 TBy) unlimited

Workstation with USB and e-SATA ports connected at 1 Gbit/s

FTP client

Ssh access with load balancing:

ssh -Xt -l your_user arcserv.ira.inaf.it qsub -XI

Batch queues

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The Italian ARC is one of the six nodes that constitute the European network that will provide technical and scientific support to ALMA users.

The nodes will be operating in close collaboration with each other and with the central node at ESO, Garching. Each node contributes its own specific expertise, in order to ensure that maximum advantage is taken of the European competences in the field of mm-astronomy and interferometry.

Once ALMA is fully operational, the Italian ARC intends to fullfill its duties regarding face-to-face help and computing support.

WWW.ALMA.INAF.IT

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- 2010/0001 Chief of Staff - JAO
- 2010/0002 Internship Graphics Design
- 2010/0003 Internship Science Journalism
- 2009/0039 Senior Contract Officer
- 2009/0053 Science Operations Astronomers (JAO)

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The ARC cluster of computers

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What will be the tasks at INAF ARC computer cluster ?

Tasks that take advantage using many cores:

- Data reduction of many (100-1000) images at a time
- Run of the task on a data set with different parameters

Tasks that require strong CPU and BIG memory

- Large images (> 8000 x 8000)
- Mosaic
- Multidimensional images

Interactive or batch application ?

We will tune the system !

Can GRID help US ?

Massive submission of parametrized non-interactive jobs

Data transfer, storage and pruning

UI unification and portability

Aggregation of other resources geographically distributed across different locations (Arc)