Advanced Virgo Computing Needs 2016

Status (2015)

In 2015 LIGO initiated the O1 science run that will conclude in January 2016. Virgo collaborators have been involved in the offline and online analysis of these data in the LIGO computing centers, in the online analysis in the EGO computing facilities (MBTA on h reconstructed data stream), and on the preparation of future data analysis in the computing centers (CCIN2P3 and CNAF). The latest activity manly involved CNAF with the development of the MTA pipeline and mainly with the Mock Data Challenge of the CW analysis (All sky Hough transform) performed by the INFN-Roma1 team. O1 analysis is still completely missing at the computing centers because of the RDS data transfer problems from LIGO affecting both CNAF and CCIN2P3.

It Table 1 the use of the computing centers in 2015 is summarised.

Table 1 – 2015 main computing resources usage (for DA purposes)

	CPU [HS06.day]	Storage on disk [TB]	Storage on Tape
CCIN2P3	109k (23/11/2015)	16TB	869TB
CNAF	4.1M (24/11/2015)	430TB	751 (/846)
EGO	2240 cores (416 for DA/Detchar)	580TB	≥400TB

Needs 2016

In 2016 we expect a consistent increase of the computing needs due to the CW analysis of the O1 data (CW analysis needs the full data set to start the processing) to the analysis of the O2 data (the Advanced Virgo detector is expected to contribute to the O2 science run since September 2016). A survey of the needs of the analysis pipelines has been performed in Virgo, trying to quantify also the involvement of the other computing resources available within the collaboration. The result is visible in Table 2 (MBTA info is still missing). Furthermore some pipelines, currently running on LIGO computing resources, will be adapted to be compatible with the GRID-based computing resources in CNAF and CCIN2P3 (the impact of the new pipelines has not still fully quantified, but we can evaluate that the redirection of a 20-25% of the cWB computation at CNAF in 2016 will fit inside the requested pledge).

The amount of data generated by O2 will be of the order of 380TB. That data need to be saved on disk and tape in CNAF and to tape in CCIN2P3. Furthermore, the MBTA online analysis requires additional resources at EGO. The summary of the requests are shown in Table 3-Table 5

Data Transfer

Two are the crucial tasks to be accomplished in the data transfer activity. (1) In very short time the O1 data from LIGO must be working both in CCIN2P3 and in CNAF. Different difficulties are delaying these achievements. In Lyon not completely understood errors are occurring using LDR (LIGO Data Replicator) in interaction with iRODS. An intense debugging activity is underway involving Virgo, CCIN2P3 and LIGO people. In Bologna a full installation of GridFTP was missing; Virgo and CNAF people are proceeding with the setup of the needed environment.

(2) In medium term, well before O2, the bulk data transfer from Virgo to CC needs to be made more reliable. A series of "fake ffl" issues occurred in the past and this was due to the constrains imposed to the data transfer procedure. An updated procedure, based on a customised set-up hosted by the CCs (technical details will be agreed between EGO computing department and CC contact persons, but essentially based on a buffer repository and a virtual machine devoted to Virgo data transfer hosted in the CC) is under definition.

Table 2 - 2016 needs per pipeline

Family (BURST, CBC, …)	Contact Person	CNAF CPU (HS06.day)	Conversion factor to kSU	CPU (kSU)	Disk (TB)	Lyon CPU [kHS06.hours]	Conversion factor to kSU	CPU (kSU)	Disk (TB)	Rome CPU (local unit)	Conversion factor to kSU	CPU (kSU)	Disk (TB)	Polgraw CPU (local unit)	Conversion factor to kSU	CPU (kSU)	Disk (TB)	EGO CPU (local unit)	Conversion factor to kSU	CPU (kSU)	Disk (TB)
CW All-Sky	Pia Astone/Cristiano Palomba	5,50E+06	1 HSE06=0.69 kSU	1,04E+04	40			0		320 cores	1 core=6.9 kSU	2200	add 10			0				0	
CW All-Sky	Andrzej Krolak/Michal Bejger	3,65E+05	1 HSE06=0.69 kSU	6,90E+02	20								0	848	1core = 5.	4452	20			0	
Glitches/decthar	Elena Cuoco	0,5	1 HSE06=0.69 kSU	0,000945	1													10			1TB
Cosmic string	Florent Robinet					120	1 SU=10 H	12	2												
EM-followup	Barbara Patricelli					1330	1 SU=10 H	133	5												
Schumann	Izabella Kowalski					10	1 SU=10 H	1	1												
Omicron	Florent Robinet					720	1 SU=10 H	72	0,5												
stampas	Marie Anne Bizouard					2000	1 SU=10 H	200	2												

Table 3 - 2016 needs at CNAF

CPU power [HS06]	Disk Storage [TBN]	Tape Storage (additional TB)
25000 (pledge)	592 (pledge)	300 (95TB currently available)

Table 4 - 2016 needs at CCIN2P3

CPU Energy [HS06.day]	Disk Storage	Tape Storage (additional TB)
174k	21 TB (semi-permanent) + 100GB browser-able	380

Table 5 - 2016 (DA computing) needs at EGO

CPU	DISK Storage	Tape Storage
10 nodes MBTA	120TB	Within the current availability
3+1 Virtual Machines for Detchar	0.5TB	Within the current availability