BELLE II

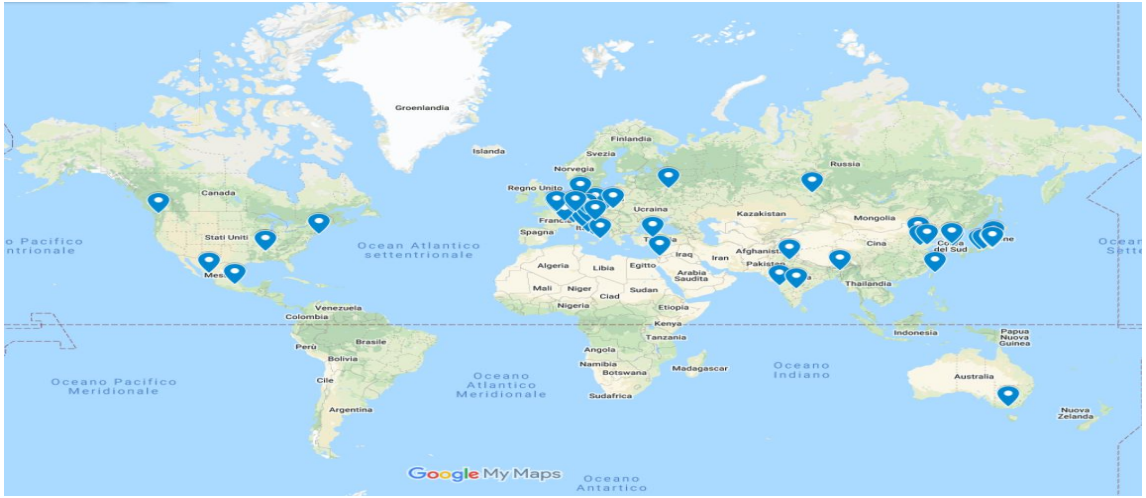
Dr. Silvio Pardi
Meeting dei siti Italiani
02 December 2021

Sites Report 2021 Summary

19 Countries

55 Sites Registered in DIRAC (5 LHC TIER1) who replyed to the questionnaire

5 Tape systems



Australia
Austria
Canada
Czech Republic
China
France
Germany
India
Israel
ITALY
Japan
Mexico
Poland
Russia
Slovenia
South Korea
Taiwan
TURKEY
USA

Site Report 2021

Resources	NOTE	CPU Pledged (kHS06)	CPU Pledged jobslots	CPU Opportunistic (kHS06)	CPU Opportunistic jobslots	Total CPU (kHS06)	Total Jobslots	Storage DISK (TB)	Tape (TB)
Production	Total Opportunistic CPU include the BNL core for calibration.	452,02	31.484	310,05	25.377	762	56.861	13.555	10.049

Resources	NOTE	CPU Pledged (kHS06)	CPU Pledged jobslots	CPU Opportunistic (kHS06)	CPU Opportunistic jobslots	Total CPU (kHS06)	Total Jobslots	Storage DISK (TB)	Tape (TB)
Calib/Recalibration	DESY and BNL	36,75	3130	0	0	36,75	3.130	500	600

Resources per country

	CPU Pledged (kHS06)	CPU Opportunistic (kHS06)	Total CPU (kHS06)	Storage DISK (TB)	Tape (TB)
Australia	18	0	18	50	0
Austria	4,8	0	4,8	250	0
Canada	80	20	100	600	0
Czech Republic	4,1	12,3	16,4	100	0
China	15	0	15	260	0
France	13,8	2,3	16,1	470	179,22
Germany	92,21	94,5	186,71	2241	920
India	17,34	0	17,34	0	0
Israel	2,7	0	2,7	60	0
ITALY	55	47,6	102,6	1602	650
Japan	47,5	42,6	90,1	3168	10837
Mexico	0,5	5	5,5	0	0
Poland	2	0	2	10	0
Russia	13	5	18	0	0
Slovenia	16	6	22	1210	0
South Korea	5,148	1	6,148	100	0
Taiwan	18,33	0	18,33	791,95	0
TURKEY	0,938	0	0,938	130	0
USA	82,4	40	122,4	2812	4100
	488,77	**276,30**	**765,07**	**13.854,95**	**16.686,22**

Site Report 2021

Resources	NOTE	CPU Pledged (kHS06)	CPU Opportunistic (kHS06)	Total CPU (kHS06)	Storage DISK (TB)	Tape (TB)
Production	Total Opportunistic CPU include the BNL core for calibration.	452,02	310,05	762	13.555	10.049

From sharing of computing resources approved by the 2020 FOP for 2021	CPU kHS06)	Storage DISK (TB)	Tape (TB)
All sites	495,65	11.000	3.230

Resources	NOTE	CPU Pledged (kHS06)	CPU Opportunistic (kHS06)	Total CPU (kHS06)	Storage DISK (TB)	Tape (TB)
Calib/Recalibration	DESY and BNL	36,75	0	36,75	500	600

CPU Requirements

Job requirement : 2GB RAM - 10 GB Disk per core
All sites respect the Memory Requirement of 2GB per core
5 sites cannot guarantee the requirement on the disk (2 sites with pledged resources and 3 among opportunistic).
16 Endpoints with pledged resources (out of 36) are configured with amount RAM >=4GB and DISK >=20GB per core.

Operative System
Most part of the sites are EL7 based, however at least 6 endpoints are based on EL6.

Singularity
6 sites declared no direct support for Singularity (if needed we should double check via CVMFS)

Situazione ITALIA
Non ci sono problemi per i siti Italiani

Storage Configuration

SRR JSON File
Following the process to moving away from SRM, Sites are asked to provide the storage space accounting information in JSON in a format defined by WLCG Working Group.

Most of the Storages provides account via JSON File except of 6 Storage Elements.
Some update is expected by this year (KEK) other sites should be stimulated to provides it

HTTP/WebDav Support:
All storage except 3 nominally support Http/Webdav

Situazione ITALIA
PISA SE Non supporta SRR-JSON file e HTTP/WebDav

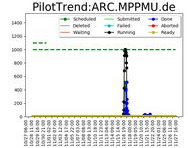
Update Pledged Information

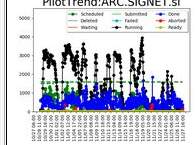
A seguito del site report è in corso l'update delle informazioni su DIRAC.

In particolare

- Update delle Pledged Line per il numero di jobslot
- Update delle Pledged Line per lo storage
- Switch del sistema di accounting via JSON file.

Dopo l'update partirà l'attività di verifica sulla corrispondenza tra Pledged e quanto riusciamo ad utilizzare per effettuare eventuali tuning di DIRAC o lato sito.





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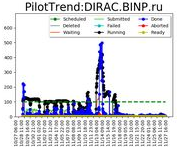
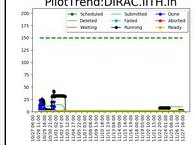
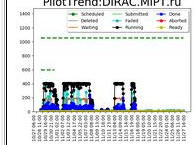
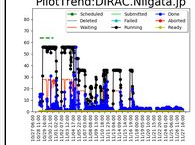
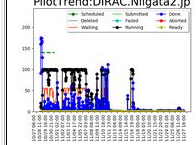
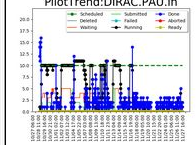


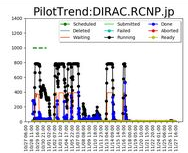


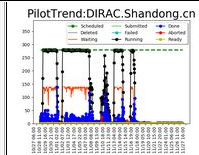


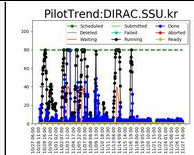


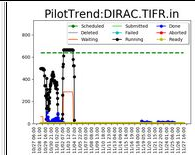


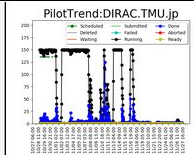


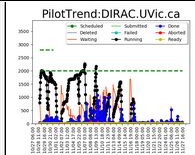


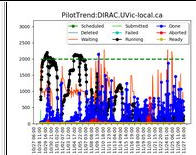


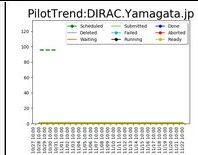


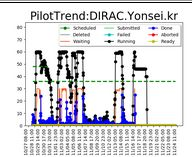


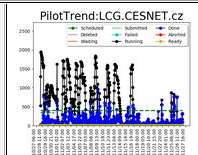


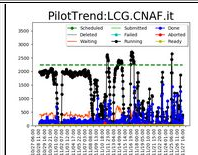


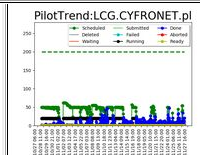


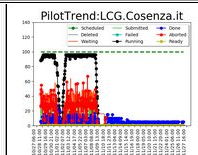


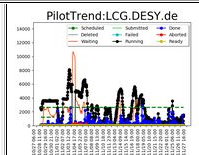


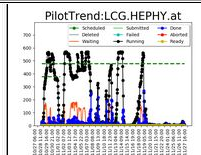


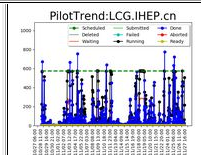


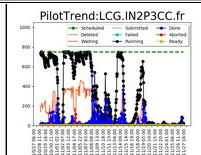


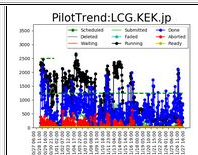


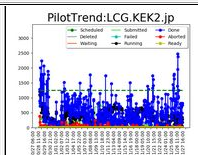


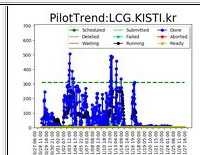


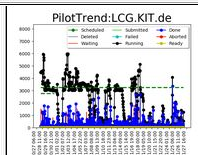


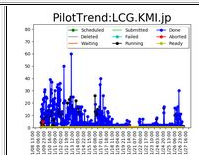


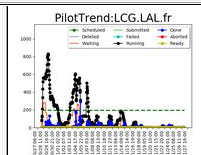


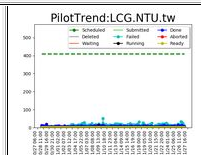


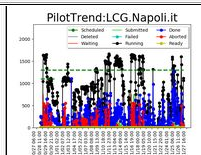


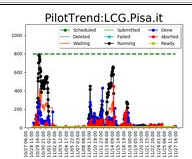


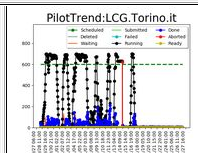


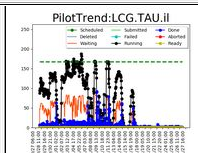


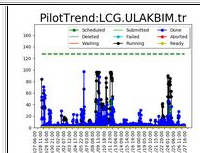


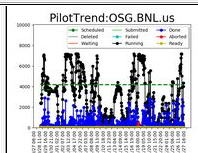


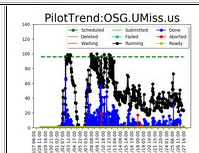






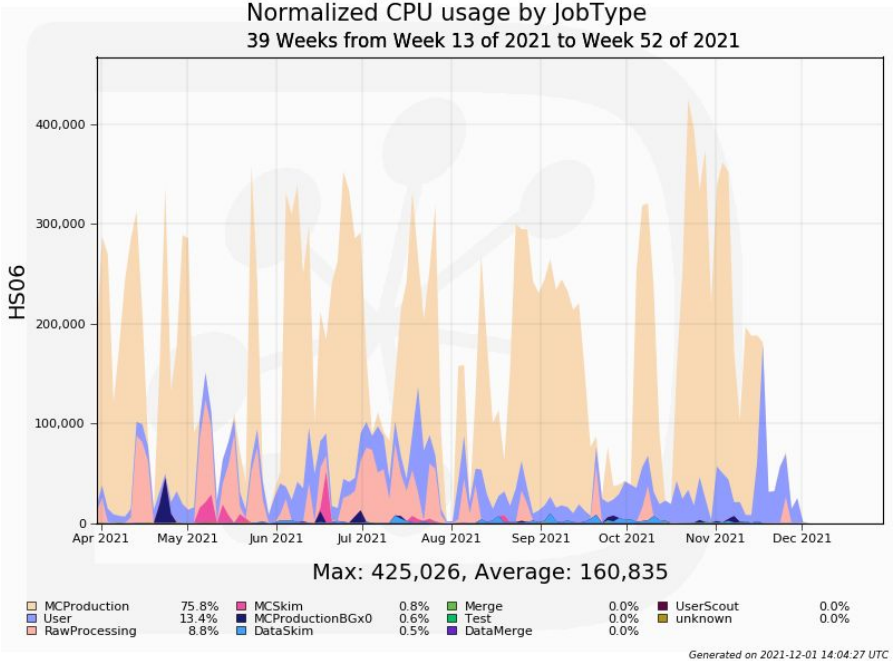


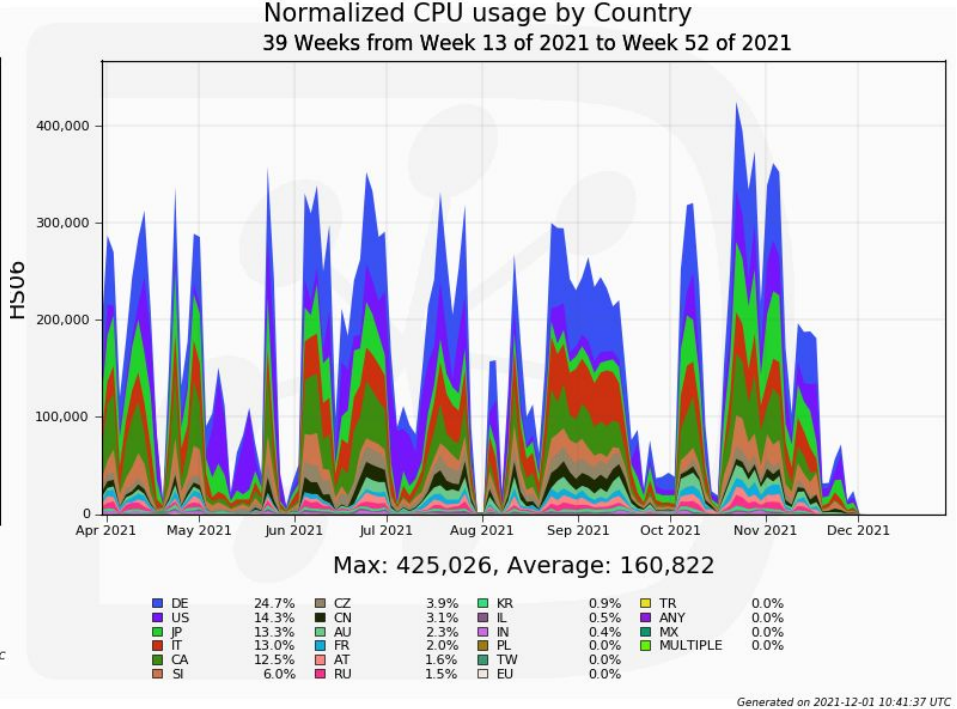




http://people.na.infn.it/~spardi/pledge30.html

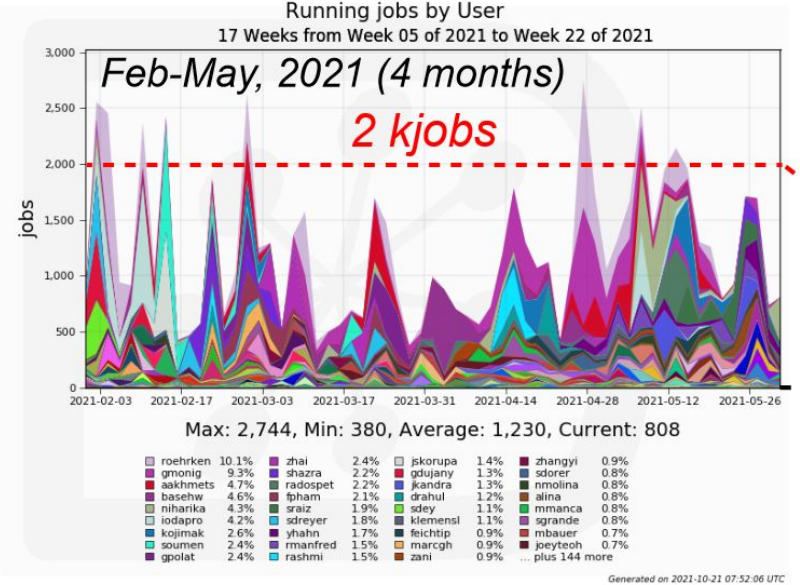
Utilizzo CPU da Aprile: Goal Italiano 12%

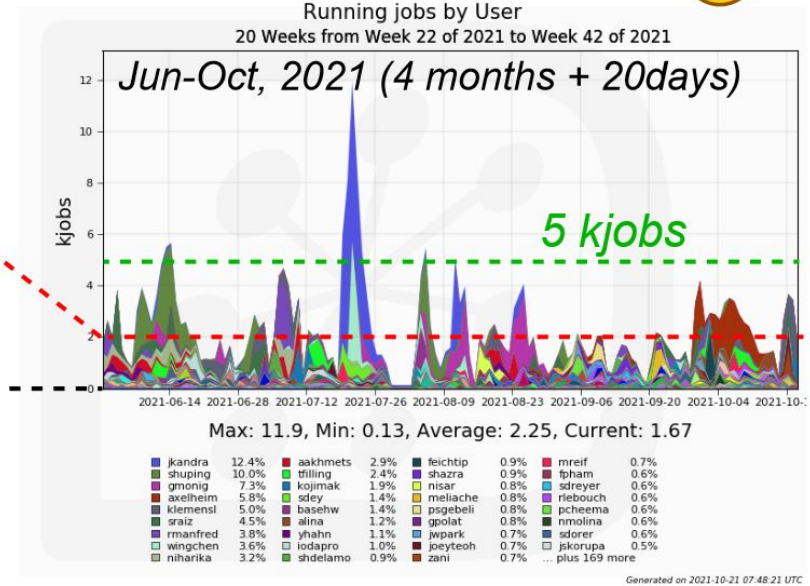




Users' activity on Distribued computing

Users became more active on their analysis with Distributed computing before 😂

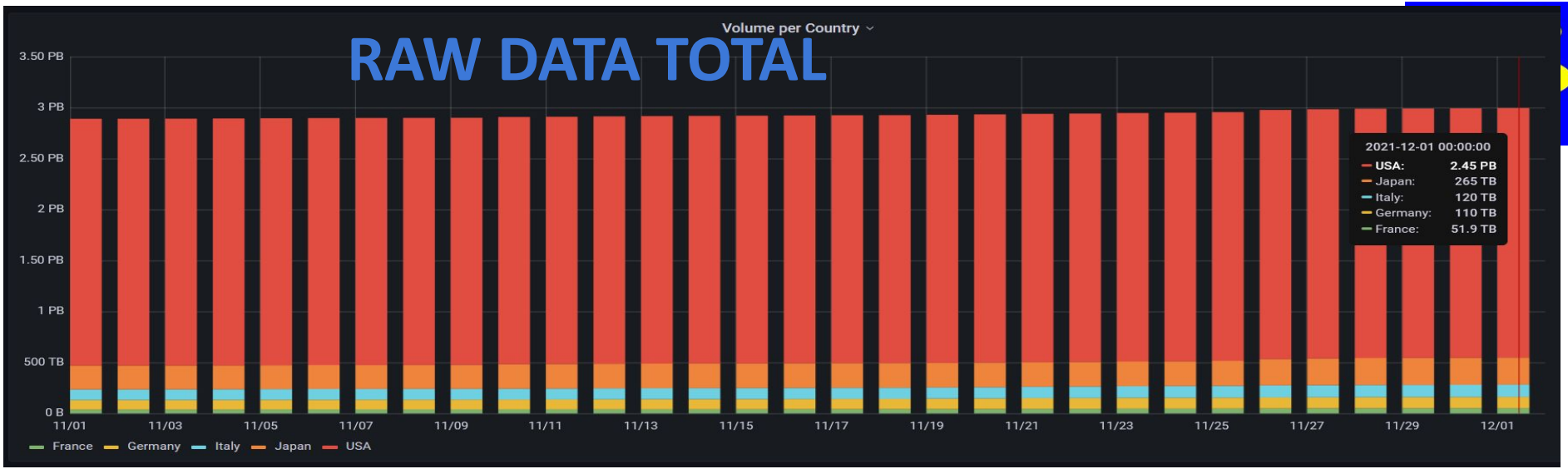




Basically smooth operation

but sometimes user needs to wait job starts running, because ....

- *+ many waiting jobs are already in the queue*
- *+ site where the target data is stored has trouble*
- *+ user job script has a problem, etc...*


Volume per Country
RAW DATA TOTAL
3.50 PB
3 PB
2.50 PB
2 PB
1.50 PB
1 PB
500 TB
0 B
11/01
11/03
11/05
11/07
11/09
11/11
11/13
11/15
11/17
11/19
11/21
11/23
11/25
11/27
11/29
12/01
2021-12-01 00:00:00
USA: 2.45 PB
Japan: 265 TB
Italy: 120 TB
Germany: 110 TB
France: 51.9 TB
France
Germany
Italy
Japan
USA


Successful transfers volume per destination (aggregation)
RAW DATA 2021
800 TB
700 TB
600 TB
500 TB
400 TB
300 TB
200 TB
100 TB
0 GB
01/01
02/01
03/01
04/01
05/01
06/01
07/01
08/01
09/01
10/01
11/01
12/01
2021-12-31 21:20:00
BNL-TAPE-SE: 431 TB
CNAF-TAPE-SE: 120 TB
DESY-TAPE-SE: 45.3 TB
IN2P3CC-TAPE-SE: 51.9 TB
KIT-TAPE-SE: 65.1 TB
BNL-TAPE-SE
CNAF-TAPE-SE
DESY-TAPE-SE
IN2P3CC-TAPE-SE
KIT-TAPE-SE

Last test done 16 November 2021

All storages providing davs access are now included in TPC test for a total of 24 endpoints.

In preparazione un report per il DOMA working group.

FTS SERVER fts.usatlas.bnl.gov

Tue Nov 16 21:51:36 CET 2021 - TEST HISTORY<

Green if Pull and Push tansfers have been completed successfully, Yellow if at least a Pull or a Push transfer have been completed successfully, Red if Pull and Push tansfers failed

DESTINATION

SOURCE	BNL-TMP-SE	CNAF-TMP-SE	DESY-TMP-SE	IN2P3CC-TMP-SE	KIT-TMP-SE	KEK-DISK-TMP-SE	Napoli-TMP-SE	SIGNET-TMP-SE	UVic-TMP-SE1	UVic-TMP-SE2	Australia-SE	HEPHY-TMP-SE	IHEP-TMP-SE	CESNET-TMP-SE	LAL-TMP-SE	IPHC-TMP-SE	MPPMU-TMP-SE	TAU-TMP-SE	Torino-TMP-SE	ROMA3-TMP-SE	Frascati-TMP-SE	CYFRONET-TMP-SE	NTUCC-TMP-SE	ULAKBIM-TMP-SE
BNL-TMP-SE		Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	ERROR	Pull FINISHED	ERROR	ERROR	Pull FINISHED	ERROR	Pull FINISHED	ERROR	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	ERROR	Pull FINISHED
CNAF-TMP-SE	ERROR		FINISEHD	FINISEHD	FINISEHD	Pull FINISHED	FINISEHD	ERROR	FINISEHD	ERROR	ERROR	Pull FINISHED	ERROR	Pull FINISHED	ERROR	FINISEHD	Pull FINISHED	Pull FINISHED	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
DESY-TMP-SE	FINISEHD	FINISEHD		FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	ERROR	ERROR	Pull FINISHED	Push FINISHED	FINISEHD	ERROR	FINISEHD	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
IN2P3CC-TMP-SE	FINISEHD	FINISEHD	FINISEHD		FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	FINISEHD	FINISEHD	Pull FINISHED	Push FINISHED	FINISEHD	ERROR	FINISEHD	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
KIT-TMP-SE	FINISEHD	FINISEHD	FINISEHD	FINISEHD		FINISEHD	FINISEHD	ERROR	FINISEHD	Push FINISHED	Push FINISHED	Pull FINISHED	Push FINISHED	FINISEHD	ERROR	FINISEHD	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
KEK-DISK-TMP-SE	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	FINISEHD		FINISEHD	ERROR	Push FINISHED	ERROR	ERROR	ERROR	ERROR	Pull FINISHED	ERROR	FINISEHD	ERROR	ERROR	ERROR	Push FINISHED	FINISEHD	FINISEHD	ERROR	FINISEHD
Napoli-TMP-SE	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD		ERROR	FINISEHD	Push FINISHED	Push FINISHED	FINISEHD	ERROR	FINISEHD	ERROR	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
SIGNET-TMP-SE	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD		Push FINISHED	Push FINISHED	Push FINISHED	ERROR	Push FINISHED	Push FINISHED	ERROR	Push FINISHED	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	ERROR	Push FINISHED
UVic-TMP-SE1	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	Pull FINISHED	FINISEHD	ERROR		Push FINISHED	Push FINISHED	Pull FINISHED	Push FINISHED	Pull FINISHED	ERROR	FINISEHD	Pull FINISHED	Pull FINISHED	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
UVic-TMP-SE2	Push FINISHED	Pull FINISHED	FINISEHD	Pull FINISHED	Pull FINISHED	ERROR	Pull FINISHED	ERROR	FINISEHD		Push FINISHED	Pull FINISHED	ERROR	Pull FINISHED	ERROR	FINISEHD	ERROR	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	ERROR	Pull FINISHED
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IHEP-TMP-SE	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	Pull FINISHED	ERROR	ERROR	Pull FINISHED	ERROR	ERROR	Pull FINISHED		ERROR	ERROR	Pull FINISHED	ERROR	Pull FINISHED	Pull FINISHED	Pull FINISHED	ERROR	ERROR	ERROR	ERROR
CESNET-TMP-SE	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	FINISEHD	Push FINISHED	FINISEHD	ERROR	Push FINISHED	Push FINISHED	ERROR	ERROR	ERROR		ERROR	FINISEHD	Pull FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	ERROR	FINISEHD
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IPHC-TMP-SE	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	Push FINISHED	Push FINISHED	Pull FINISHED	Push FINISHED	FINISEHD	ERROR		Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	Pull FINISHED	ERROR	FINISEHD
MPPMU-TMP-SE	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	ERROR	Push FINISHED	Push FINISHED	ERROR	Push FINISHED		Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	ERROR	Push FINISHED
TAU-TMP-SE	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	ERROR	ERROR	Pull FINISHED	ERROR	Pull FINISHED	Pull FINISHED		ERROR	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD
Torino-TMP-SE	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	ERROR	ERROR	Pull FINISHED	ERROR	FINISEHD	Pull FINISHED	ERROR		Push FINISHED	FINISEHD	FINISEHD	ERROR	FINISEHD
ROMA3-TMP-SE	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	Pull FINISHED	FINISEHD	ERROR	FINISEHD	Push FINISHED	Push FINISHED	Pull FINISHED	Push FINISHED	Pull FINISHED	ERROR	FINISEHD	Pull FINISHED	Pull FINISHED	Pull FINISHED		FINISEHD	FINISEHD	ERROR	FINISEHD
Frascati-TMP-SE	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	ERROR	ERROR	Pull FINISHED	ERROR	FINISEHD	ERROR	FINISEHD	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD		FINISEHD	ERROR	FINISEHD
CYFRONET-TMP-SE	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	FINISEHD	ERROR	Push FINISHED	Pull FINISHED	ERROR	FINISEHD	ERROR	FINISEHD	Pull FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD		ERROR	FINISEHD
NTUCC-TMP-SE	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	FINISEHD	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Pull FINISHED	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	Push FINISHED	FINISEHD	FINISEHD		FINISEHD
ULAKBIM-TMP-SE	Push FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	Push FINISHED	Push FINISHED	Push FINISHED	Pull FINISHED	ERROR	FINISEHD	ERROR	FINISEHD	Pull FINISHED	Push FINISHED	FINISEHD	FINISEHD	FINISEHD	FINISEHD	ERROR	

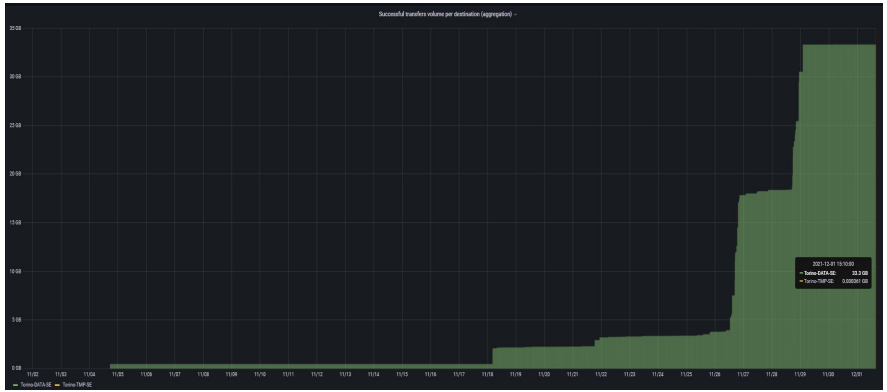
http://people.na.infn.it/~spardi/tpc-davs-latest.html

Nuovo storage Torino

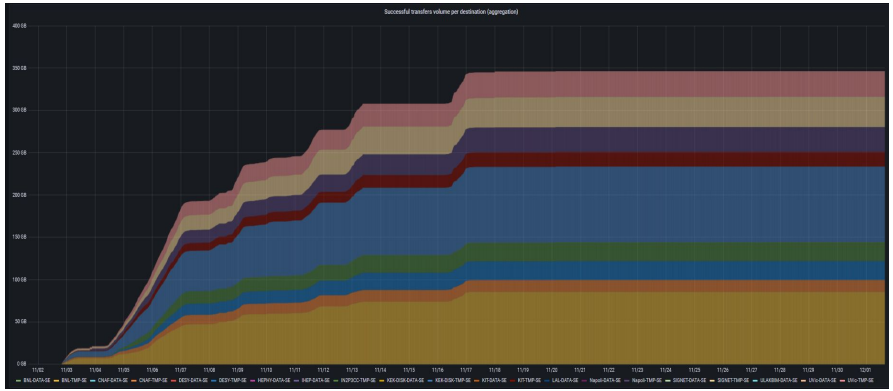
Disponibili 350TB effettivi.

Le attività proseguono regolarmente, assegnato un primo share che verrà incrementato con le nuove attività in programma.

Traffic IN



Traffic OUT



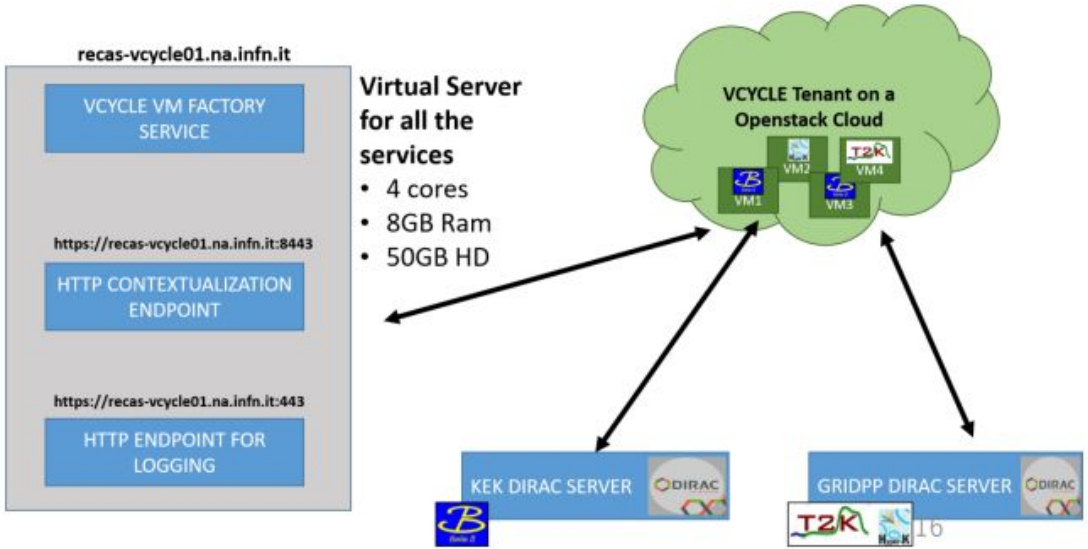
Cloud Resources

Due tecnologie principali

CloudScheduler by UVIc

VCYCLE con setup a Napoli
soluzione adottata in HNSciCloud e nel Jennifer2 project:
EGI Federation Cloud
LAL, LPNHE, Napoli, in fase di studio l'utilizzo di INFN-Cloud

14 Dicembre confronto con EGI



DIRAC Upgrade - v5r2

The target date for completion of this certification is Dec 22nd.

(before Christmas)

The Deadline to perform the first check is on Dec 6th (next Monday).

Data Production Status

Raggiunto più volte il picco di 35kjobs negli ultimi due mesi di attività.

MC15 in preparazione

Per ora previsto solo run dependent MC.

http://people.na.infn.it/~spardi/mon30.html

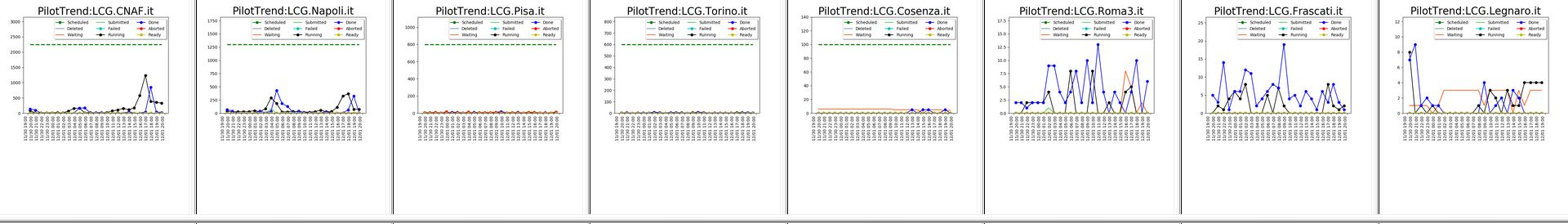
Exp	Dataset	Offline. Luminosity (/pb) Stat uncert only	Calibration	Data (had)	Data (all) (*)	MC rd (**)	MC ri
7, 8, 10	proc12 - chunk1	**e7**: 509.8 ± 1.5 **e8**: 4463.6 ± 1.5 **offres**: 812.7 ± 0.5 **scan** : 38.0 ± 0.4 **e10**: 3635.8 ± 1.1	Ready	Ready	Ready	4S Ready 4S_offres Ready	Ready
12	proc12 - chunk2	**4S**: 54642.2 ± 4.2 **4S_offres**: 8715.6 ± 3.1	Ready	Ready	4S Ready 4S_offre Ready	4S Ready 4S_offres Ready	
14	bucket16	10752.1 +/- 3.7 /pb	Ready	Ready	Ready	Ready	
	bucket16b	5666.3 +/- 2.7 /pb	Ready	Ready	Ready	Ready	
16	bucket17	10321.0 ± 3.7	Ready	Ready	Ready	Ready	
17	bucket18	10713.9 ± 3.7	Ready	Ready	Ready	Ready	
18	bucket19a*	**4S**: 89175.7 ± 10.1 **4S_offres**: 8424.3 ± 3.1	Ready	Ready	Ready	In preparation	
	bucket20		Ready	Ready	Ready	In preparation	
	bucket21		Ready	Ready	Ready		
	bucket22		Ready	Ready	Ready		
	bucket23		Ready	Ready	Ready		
	bucket24		Ready	Ready	Ready		
	bucket25		Ready	Ready	Ready	In preparation	
20	bucket26	**4S:**					
All		**4S: 189880.4 ± 13.1** **4S_offres: 17952.6 ± 3.6** **4S_scan: 38.0 ± 0.4**					

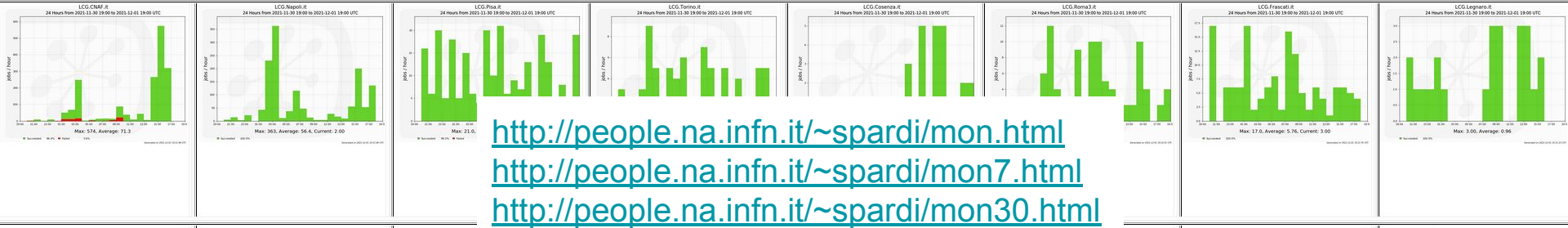
VALUTARE ATTIVITA' DEL SITO

Attraverso dei tools di monitoraggio è possibile valutare se il nostro sito sta lavorando bene o se ci sono delle problematiche.

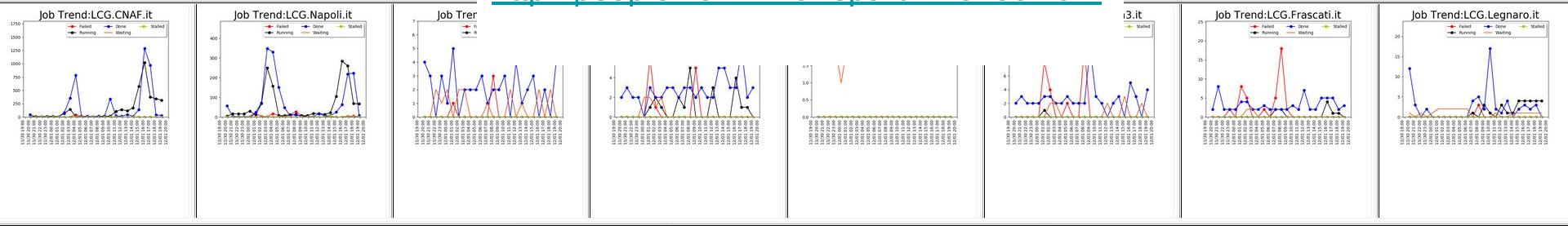
L'analisi può essere fatta a diversi livelli di profondità

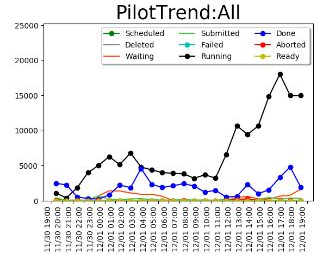
Nelle prossime slide sono raccolti alcuni screen shoot per una valutazione preliminare.

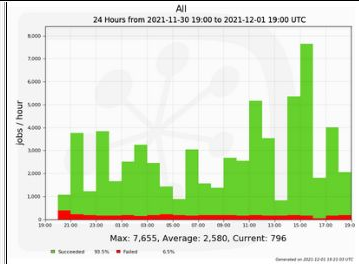


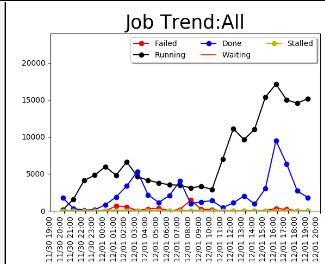


http://people.na.infn.it/~spardi/mon.html
http://people.na.infn.it/~spardi/mon7.html
http://people.na.infn.it/~spardi/mon30.html









Picco raggiunto fino ad ora 35kJobs

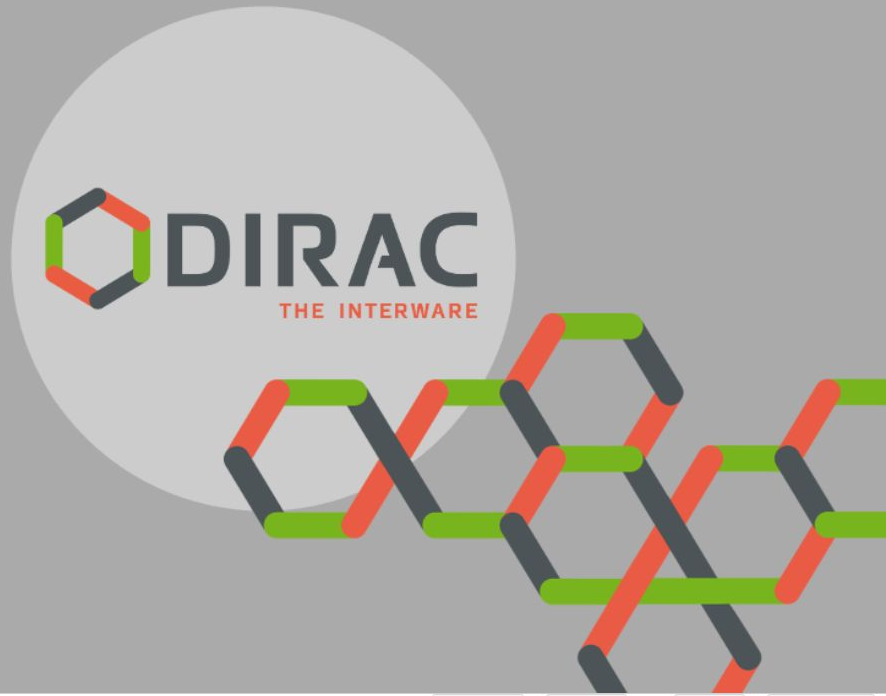
Meeting-Siti-Italiani-2021-12-0 | Belle - DIRAC

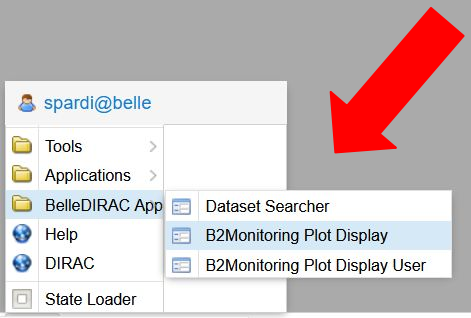
https://dirac.cc.kek.jp:8443/DIRAC/

97%

Come iniziare | DC Operations Experts... | Altri segnalibri

https://dirac.cc.kek.jp:8443/DIRAC





https://dirac.cc.kek.jp:8443/DIRAC/#

View | desktop | spardi | @ | belle | Belle-KEK

Scrivi qui per eseguire la ricerca

14°C Nuvole sparse

ITA 21:29 01/12/2021

B2Monitoring Plot Display

AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

Central Systems

Primary SEs

SE occupancy check

Red color for more than 95.0%.

Primary SE

No high occupancy SE

Other SE

No high occupancy SE

Sites

DIRAC.MIPT.ru
"Short Pilot" has been observed since 2021-12-01 11:29 UTC (for 8 hours) (details).
Following JIRA tickets submitted: BIIDCO-4064 , BIIDCO-3894 , BIIDCO-3691 , BIIDCO-1816
From OperationStatus:
"Short Pilot" has been observed since 2021-11-29 01:28 UTC (for 6 hours) BIIDCO-4064 - Getting issue details... STATUS
"Failed Pilot" has been observed since 2021-10-10 10:13 UTC BIIDCO-3894 - Getting issue details... STATUS
"Failed Pilot" has been observed since 2021-10-08 23:13 UTC BIIDCO-3894 - Getting issue details... STATUS
16 Jul 2021 Short pilot BIIDCO-3691 - Getting issue details... STATUS
Health checker info. : "Aborted pilot jobs" has been found since 13:20:00 UTC on 2019/04/20. BIIDCO-1816 - Getting issue details... STATUS

Health checker info: "Short Pilot Jobs" has been found since 04:11UTC 2021/07/13 BIIDCO-3691 - Getting issue details... STATUS
ARC.MPPMU.de
"Pilot Submission Failure" has been observed since 2021-11-29 17:28 UTC (for 50 hours) (details).
Following JIRA tickets submitted: BIIDCO-3437 , BIIDCO-3404 , BIIDCO-3286 , BIIDCO-128

Meeting-Siti-Italiani-2021-12-0 | Belle - DIRAC

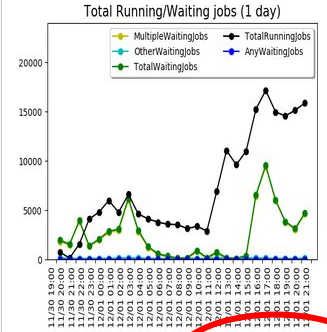
https://dirac.cc.kek.jp:8443/DIRAC/?view=desktop&theme=Crisp&url_state=0|BelleDIRAC.B2PlotDisplay.classes.B2PlotDisplay::0:0:1984:799:0:0

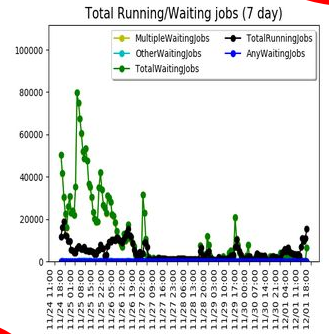
77%

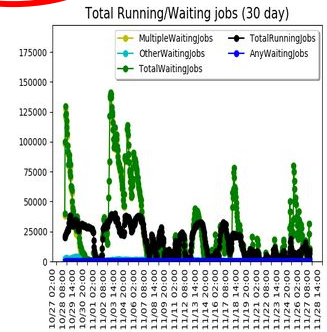
Come iniziare | DC Operations Experts... | Altri segnalibri

B2Monitoring Plot Display

AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

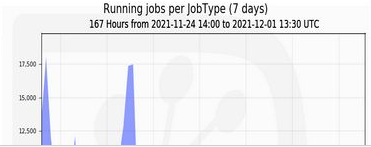


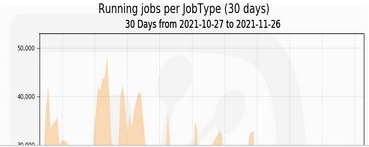




Total Running Job = 15886

Total Waiting Job = 4736





B2Monitoring Pl...

View | desktop | spardi | @ | belle | Belle-KEK

CNAF | Evidenzia | Maiuscole/minuscole | Segni diacritici | Parole intere | Corrispondenza 1 di 1

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https://dirac.cc.kek.jp:8443/DIRAC/?view=desktop&theme=Crisp&url_state=0|BelleDIRAC.B2PlotDisplay.classes.B2PlotDisplay::0:0:1984:848:0:0 77%

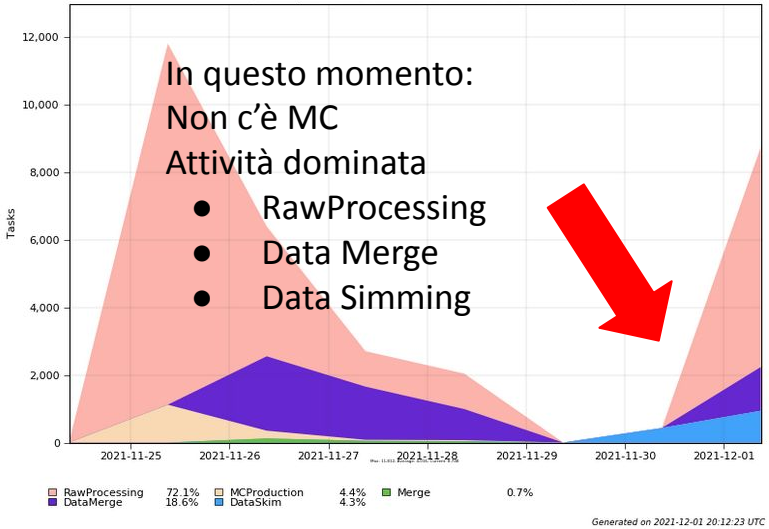
Come iniziare | DC Operations Experts... | Altri segnalibri

B2Monitoring Plot Display

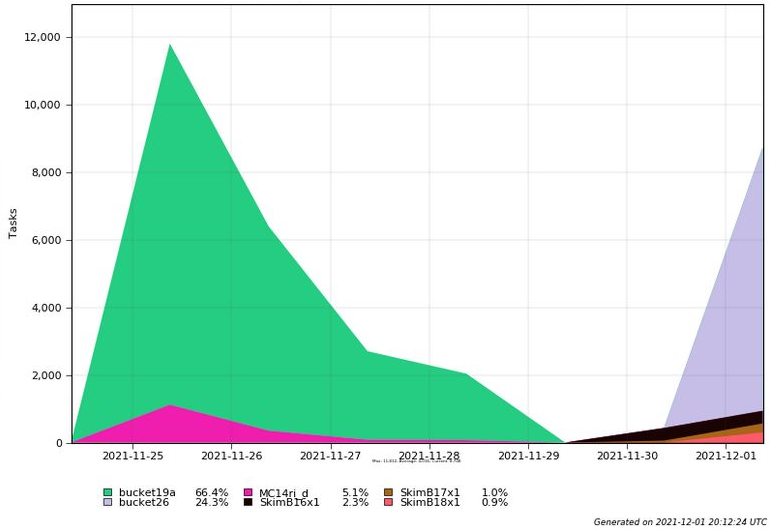
AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

All Campaigns

All active tasks group by FabType
(7 Days from 2021-11-24 to 2021-12-01)



All active tasks group by Campaign
(7 Days from 2021-11-24 to 2021-12-01)



Campaign:s-proc3

B2Monitoring Pl... | View desktop | spardi | @ belle | Belle-KEK

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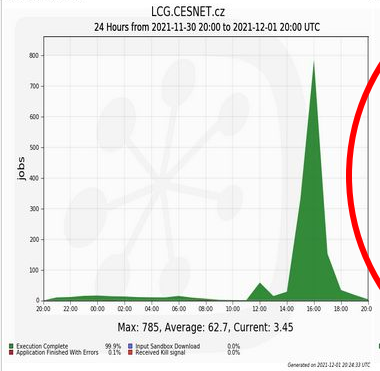
https://dirac.cc.kek.jp:8443/DIRAC/?view=desktop&theme=Crisp&url_state=0|BelleDIRAC.B2PlotDisplay.classes.B2PlotDisplay::0:0:1984:799:0:0 77%

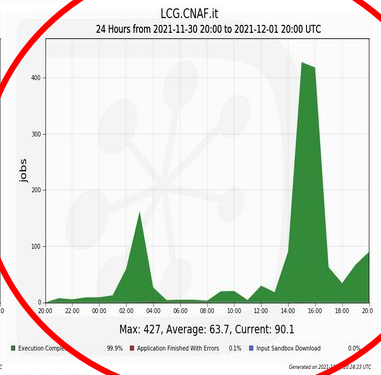
Come iniziare | DC Operations Experts... | Altri segnalibri

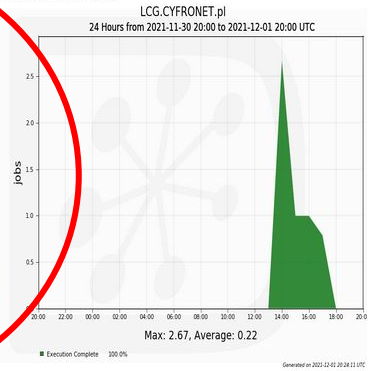
B2Monitoring Plot Display

AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

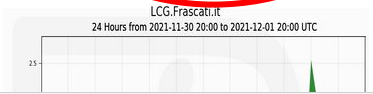
DIRAC.TMU.jp | DIRAC.Test.jp | DIRAC.UVic-local.ca | DIRAC.UVic.ca

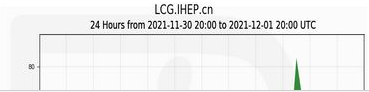






LCG.CESNET.cz | LCG.CNAF.it | LCG.CYFRONET.pl | LCG.Cosenza.it





B2Monitoring Pl... | View desktop | spardi @ belle | Belle-KEK

CNAF | Evidenzia | Maiuscole/minuscole | Segni diacritici | Parole intere | Corrispondenza 1 di 1

Scrivi qui per eseguire la ricerca | 14°C Nuvole sparse | ITA | 21:49 01/12/2021

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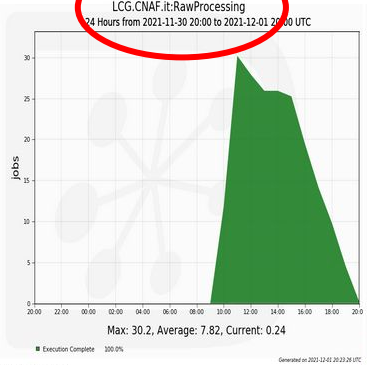
https://dirac.cc.kek.jp:8443/DIRAC/?view=desktop&theme=Crisp&url_state=0|BelleDIRAC.B2PlotDisplay.classes.B2PlotDisplay::0:0:1984:799:0:0 77%

Come iniziare | DC Operations Experts... | Altri segnalibri

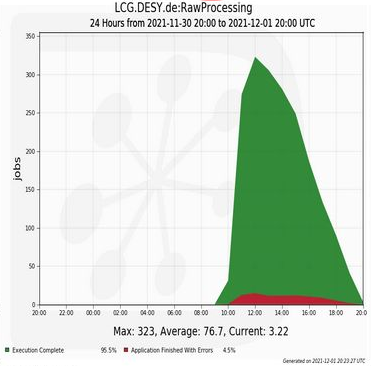
B2Monitoring Plot Display

AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

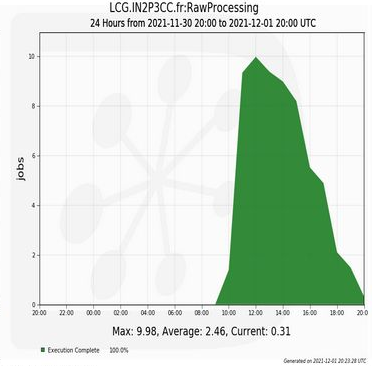
JobType:RawProcessing



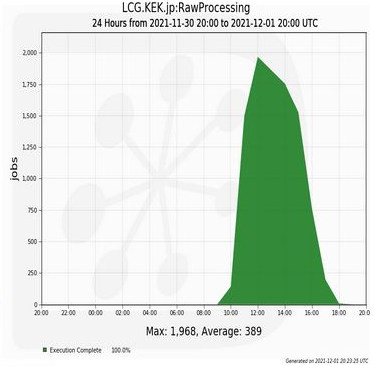
LCG.CNAF.it



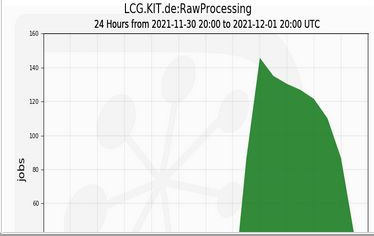
LCG.DESY.de

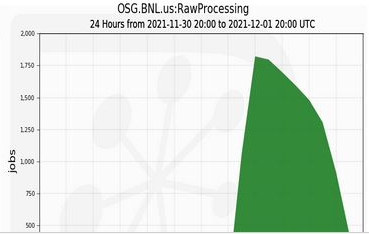


LCG.IN2P3CC.fr



LCG.KEK.jp





B2Monitoring Pl... | View desktop | spardi @ belle | Belle-KEK

CNAF | Evidenzia | Maiuscole/minuscole | Segni diacritici | Parole intere | Corrispondenza 1 di 1

Scrivi qui per eseguire la ricerca | 14°C Nuvole sparse | ITA | 21:50 01/12/2021

Meeting-Siti-Italiani-2021-12-0 | Belle - DIRAC

https://dirac.cc.kek.jp:8443/DIRAC/?view=desktop&theme=Crisp&url_state=0|BelleDIRAC.B2PlotDisplay.classes.B2PlotDisplay::0:0:2688:1082:0:0

57%

Come iniziare | DC Operations Experts... | Altri segnalibri

B2Monitoring Plot Display

AID | DownTime | Raw Time | Pilot Trend | Pilot Submission | JobStatus | RawJobStatus | Job Summary | DDM Trend | DDM Task Trend | Production Progress

DDM Task Trend figures with a range of 1day

Task Operation Type: ReplicateAndRegister

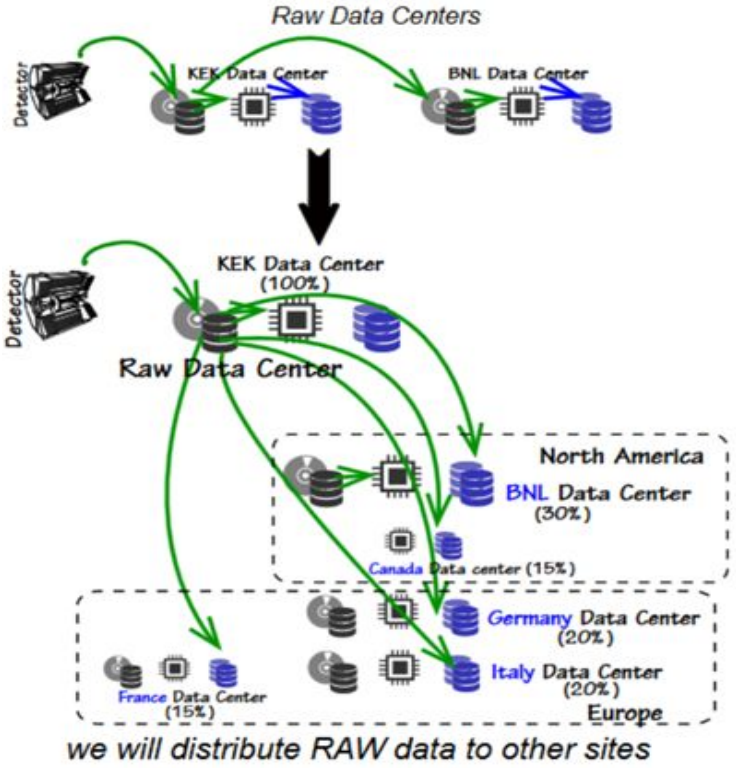
CNAF | Evidenzia | Maiuscole/minuscole | Segni diacritici | Parole intere | Corrispondenza 1 di 1

Scrivi qui per eseguire la ricerca

14°C Nuvole sparse | ITA | 21:52 01/12/2021

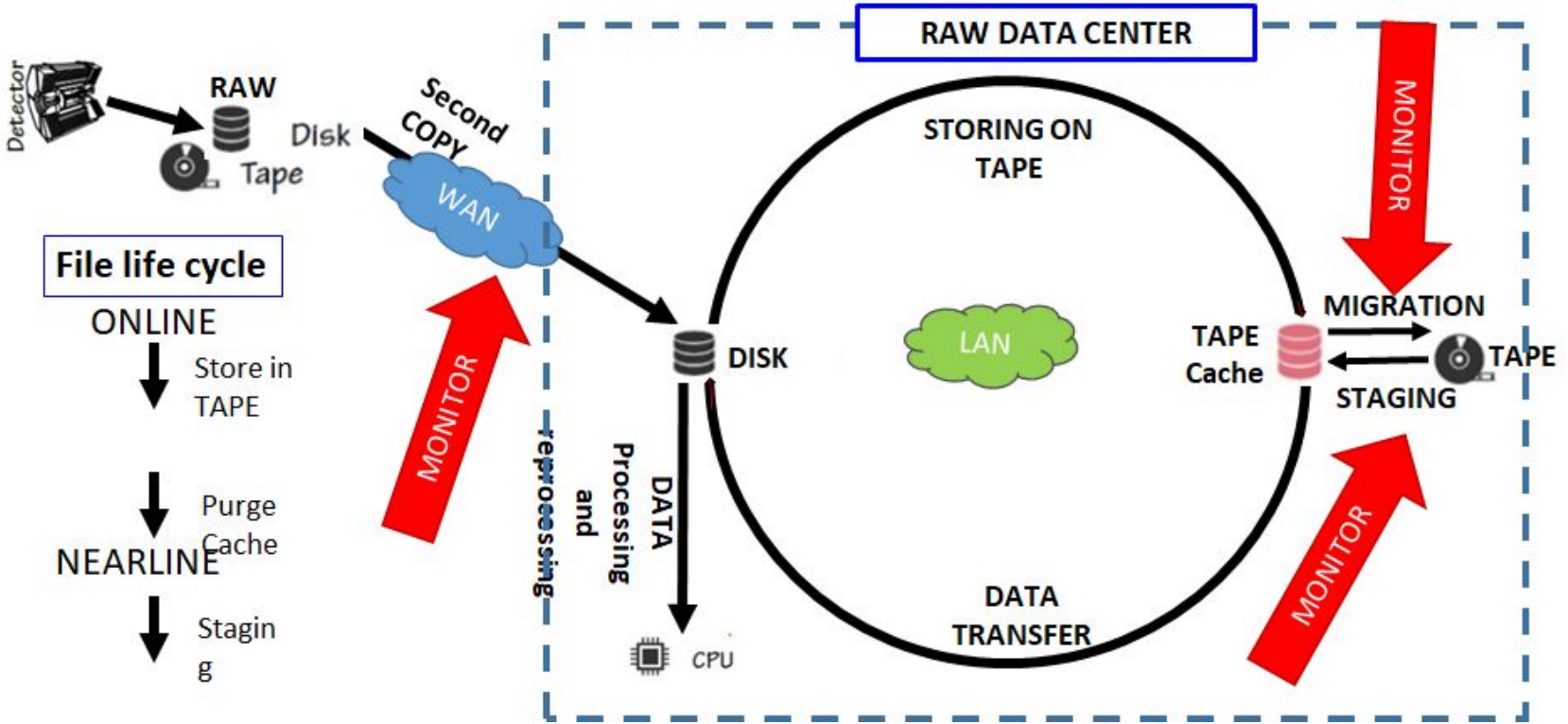
BACKUP

RAW Data distribution - Implementata a partire da Aprile

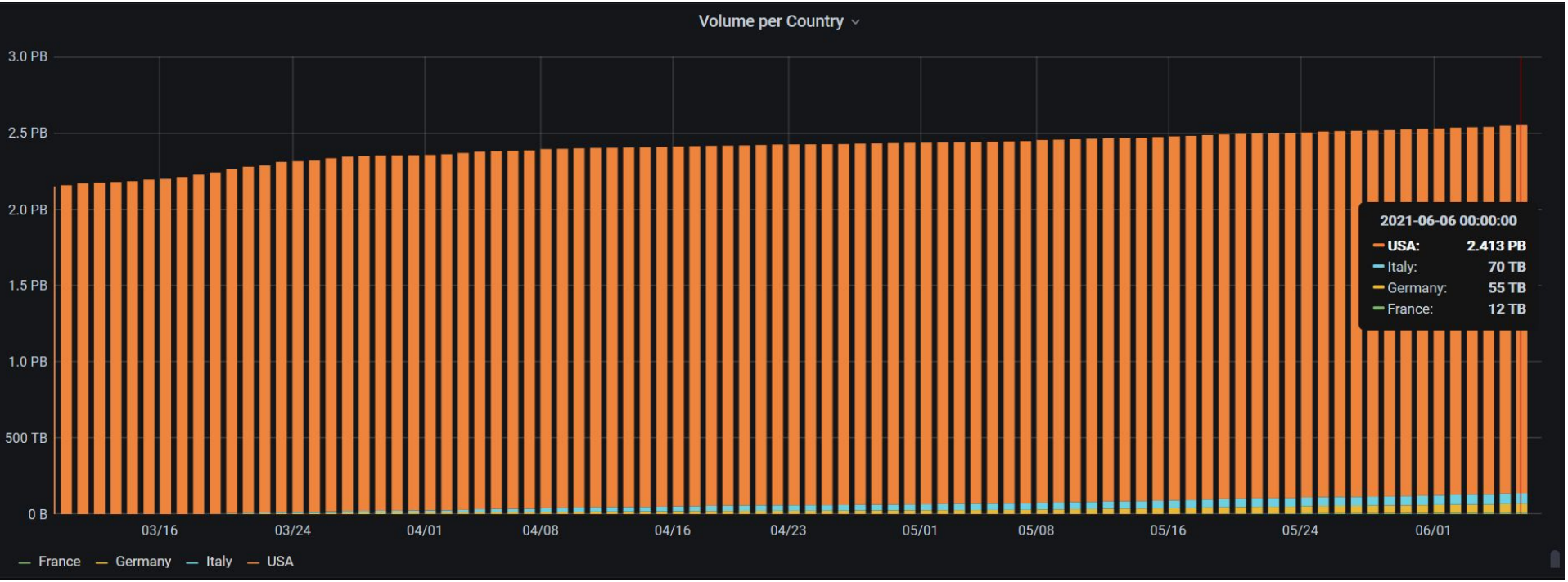


SITE	2019-2020	2021-2024
BNL - USA	100%	30%
CNAF - Italy	0%	20%
DESY - Germany	0%	10%
KIT - Germany	0%	10%
IN2P3CC - France	0%	15%
UVIC - Canada	0%	15%

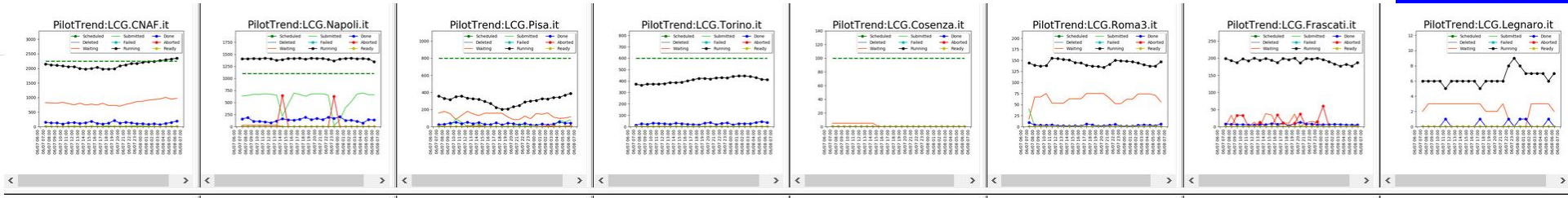
Raw Data Cycle

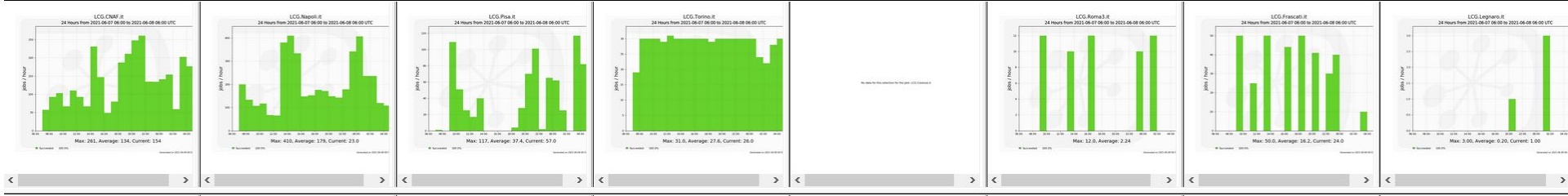


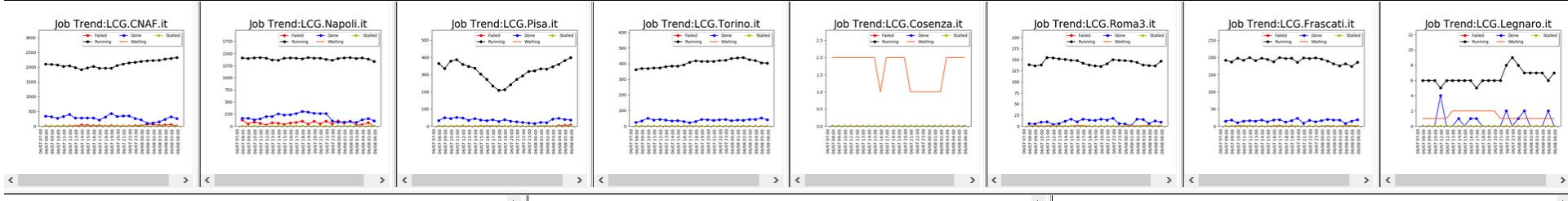
RAW Data collected so far

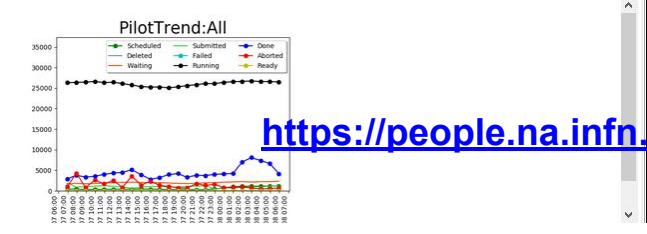


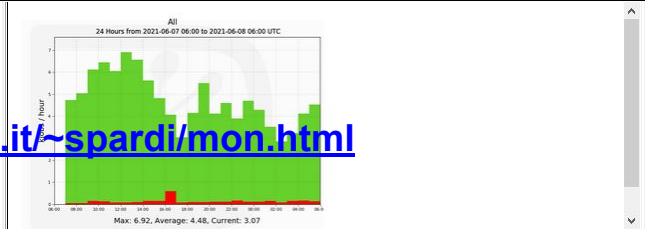
Pilot Trend - 24h - Aggiornate le soglie:

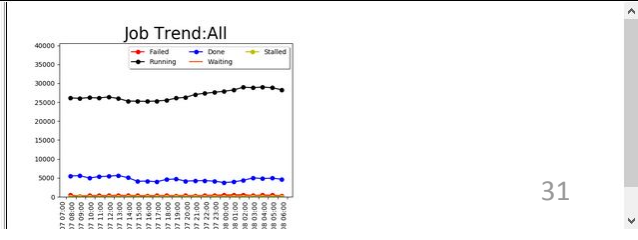








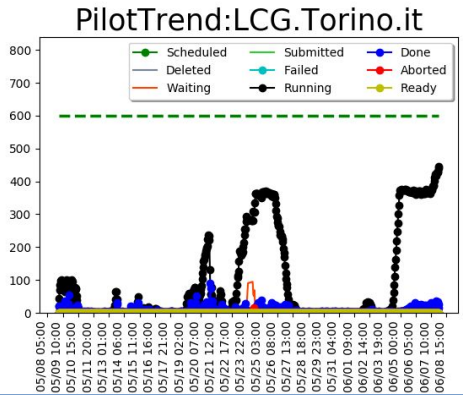


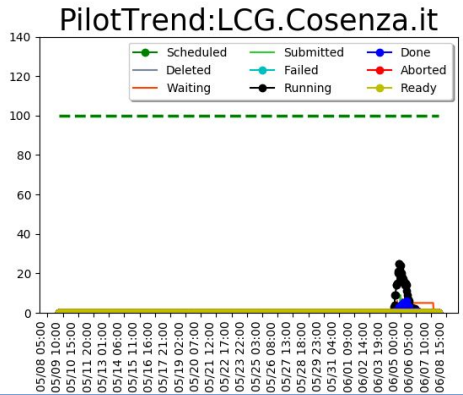


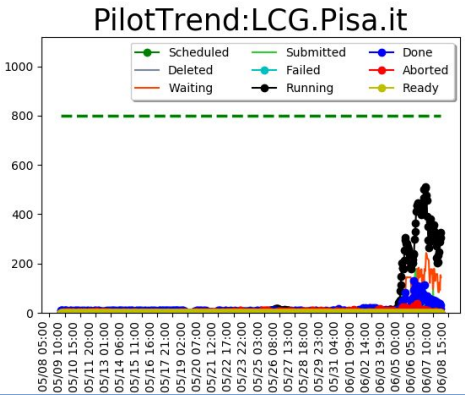
https://people.na.infn.it/~spardi/mon.html

CPU Pledged

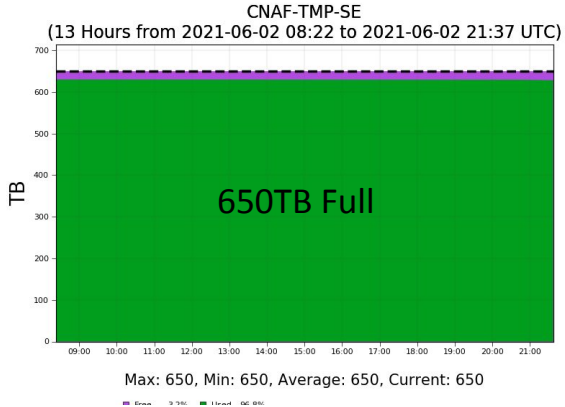
- Pledged CPU in recupero. Migrazione HTCondorCE completata. Ieri è stato settato DIRAC per arrivare fino a 6kHS06
- Cosenza: Migrazione HTCondorCE completata

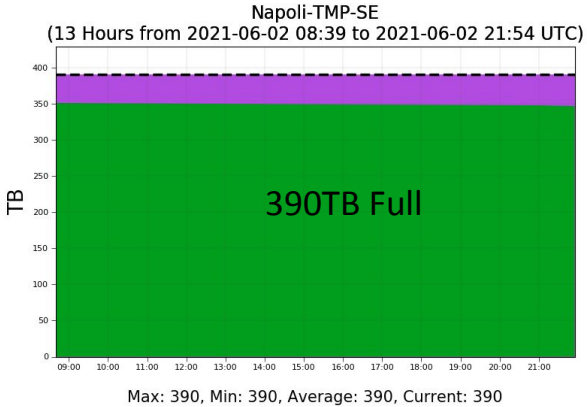


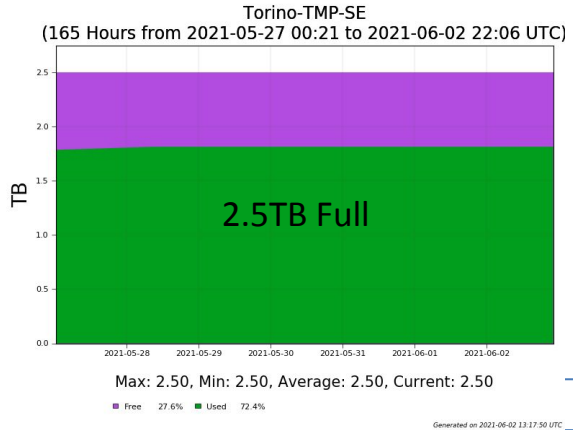


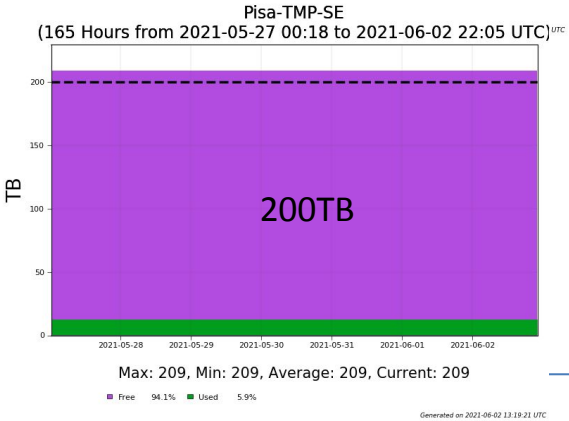


Spazio Disco in Italia: 1.2PB (+200 in installazione)









Storage Pledged

- Storage al CNAF e a Napoli in sofferenza.
- 200TB a Torino da installare
- 200TB a Pisa da rivedere la configurazione
  - 4 GGUS ticket aperti da molto tempo.
    - Contiene dati utenti e MC14
  - Urgente definire una timeline.

Esigenze per l'anno prossimo

SITE	CPU	STORAGE	TAPE
CNAF	27kHS06	650TB	350TB (chiesto estensione a 650TB)
Napoli+Cosenza	13kHS06	390TB	
Pisa	8kHS06 (4 da installare)	200TB da configurare	
Torino	6kHS06	200TB da installare	
TOTALE	54kHS06	1.440TB (1.040 Utilizzabile)	650TB
Esigenze 2022	**43kHS06**	**1.670TB**	**450TB**
Da richiedere		**+230TB**	**Necessario?**

Proposta per il 2020

- 130TB a Napoli su IBISCO
- 100TB CNAF

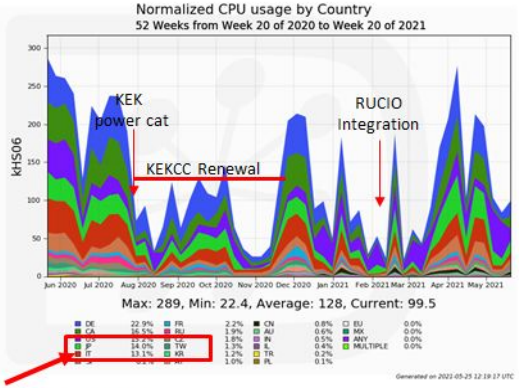
Occorrono rimpiazzi a Torino e a Pisa?


Belle II

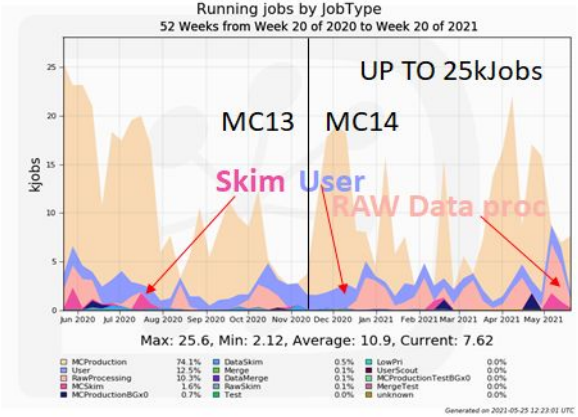
Stabilità dei servizi

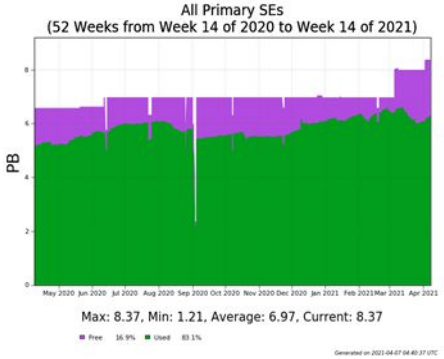
- TAPE
- STORAGE
- CPU
- Network
- Esigenze Breve/Lungo Termine

Overall activity in 2020 JFY



Italian Share 13.1
(Goal =>12%)

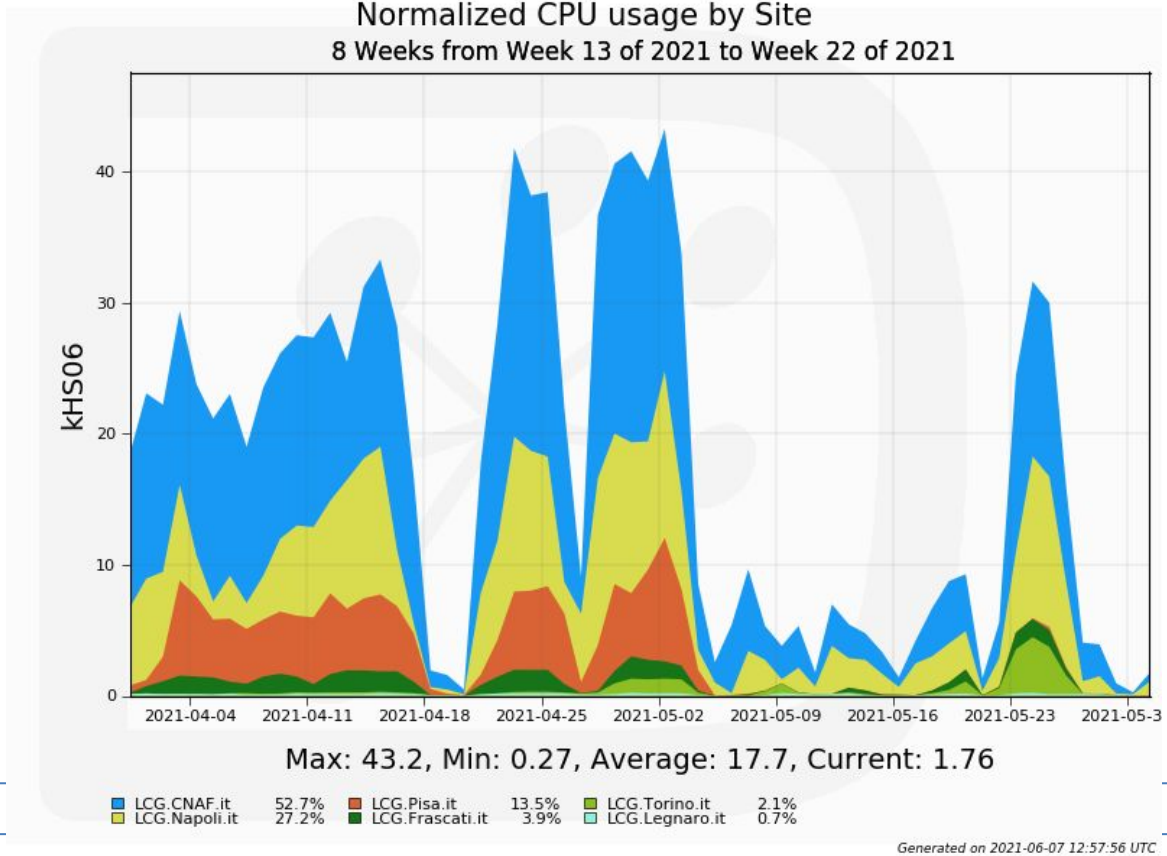




- Several Major Upgrades: KEKCC Renewal, Migration of the Data Management System to RUCIO. New Accounting System.
- More activity than in 2019 JFY
- UP to 25 k jobs running
- Many opportunistic CPU early 2020
- More than 7 PB data transfer
- Disk usage of 6 PB out of 8 PB.

SUMMARY

- TAPE
- STORAGE
- CPU
- Network
- Esigenze Breve/Lungo Termine

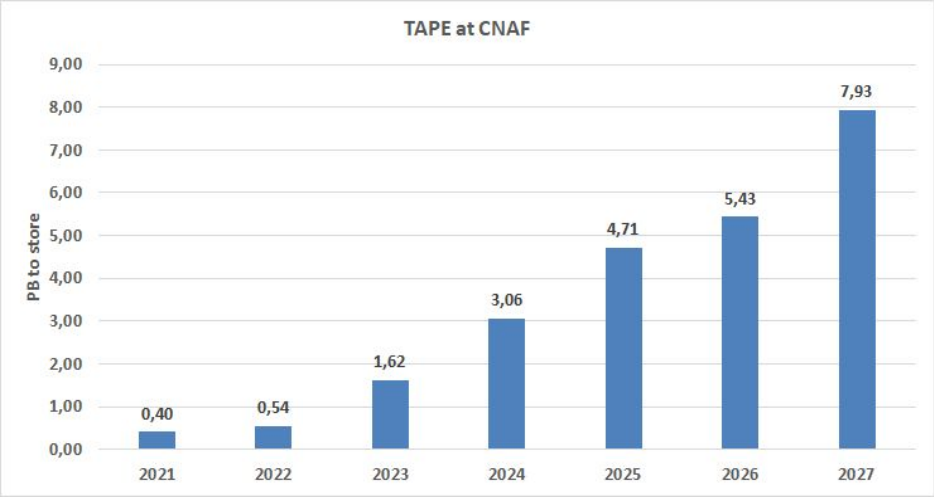

Normalized CPU usage by Site
8 Weeks from Week 13 of 2021 to Week 22 of 2021
kHS06
0
10
20
30
40
2021-04-04
2021-04-11
2021-04-18
2021-04-25
2021-05-02
2021-05-09
2021-05-16
2021-05-23
2021-05-3
Max: 43.2, Min: 0.27, Average: 17.7, Current: 1.76
LCG.CNAF.it 52.7%
LCG.Napoli.it 27.2%
LCG.Pisa.it 13.5%
LCG.Frascati.it 3.9%
LCG.Torino.it 2.1%
LCG.Legnaro.it 0.7%
Generated on 2021-06-07 12:57:56 UTC

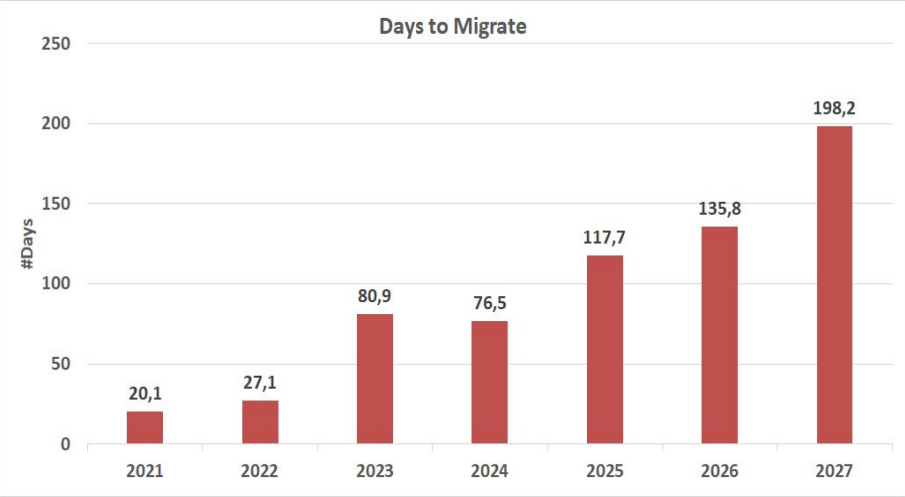
Test Tape System 2020

		COPY	MIGRATION		STAGING+TRANSFER	
		Network Throughput Average/Peak	Peak Real Time	Av. Throughput	Peak Real Time	Test Average Throughput
DESY	Feb	4.8 Gbps/10 Gbps	200MB/s	130-200MB/s	137MB/s	137MB/s
DESY	June	4.8 Gbps/19 Gbps	1000MB/s	446MB/s	840MB/s	260MB/s
BNL	April	4.8 Gbps/14 Gbps	900MB/s	834MB/s	1.3GB/s	460MB/s
KIT	April	4.8 Gbps/17 Gbps	805MB/s	418MB/s	1.16GB/s	626MB/s
KIT 1G	June	4.8 Gbps/25 Gbps	676MB/s	370MB/s	1.01GB/s	691MB/s
CNAF	May	4.8 Gbps/15 Gbps	670MB/s	463MB/s	1.24GB/s	781MB/s
UVic	June	4.8 Gbps/19 Gbps	N/A	N/A	N/A	N/A
IN2P3	July	4.8 Gbps/16 Gbps	/	430MB/s	925MB/s	670MB/s
IN2P3	July	Only Staging			1.5GB/s	521MB/s
IN2P3	July	Only Staging			1.02GB/s	835MB/s

TAPE al CNAF (Stima)

Considerando la velocità media di migrazione su tape misurata durante i test (463MB/s)





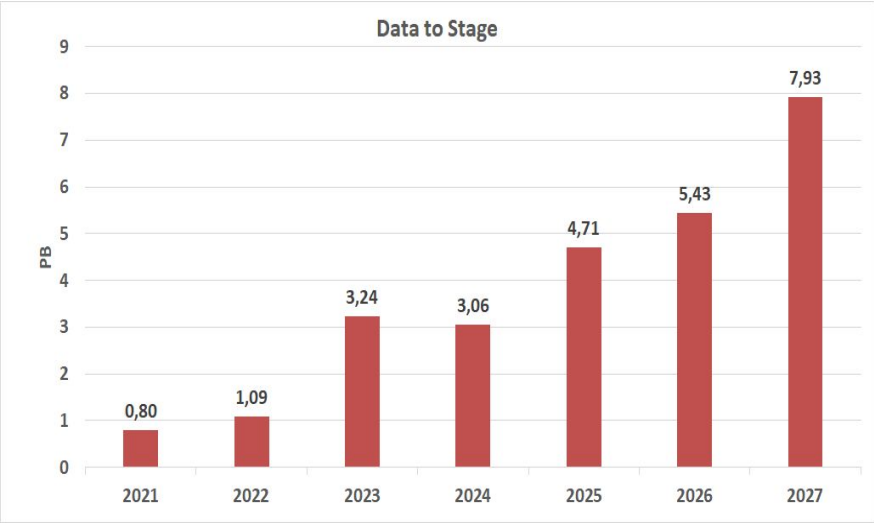
Perchè abbiamo chiesto incrementare a 650TB il tape per il 2021/22?

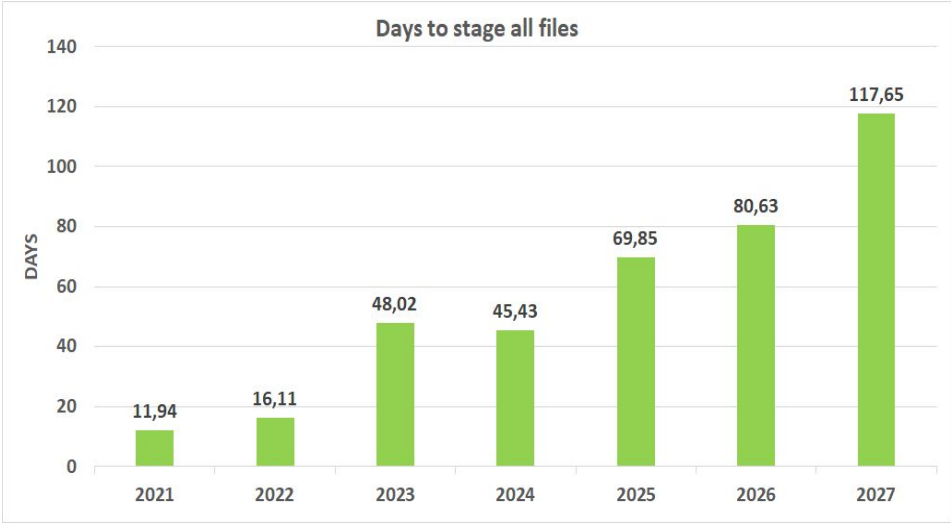
Due questioni principali potranno incidere sul totale dello spazio TAPE necessario al CNAF rispetto alla stima:

- HLT: L'High Level Trigger potrebbe non avere le prestazioni attese, il che fa sì che il volume dei dati attesi sia maggiore del previsto.
- Ritardi su altri RAW-DC:
  - UVIc deve ancora implementare la facility per conservare i RAW Data
  - BNL gets 30 / (30+20+15+10+10) = 35.3%
  - CNAF gets 20 / (30+20+15+10+10) = 23.5%
  - IN2P3CC gets 15 / (30+20+15+10+10) = 17.6%
  - DESY gets 10 / (30+20+15+10+10) = 11.8%
  - KIT gets 10 / (30+20+15+10+10) = 11.8%

SCENARIO PER LO STAGING

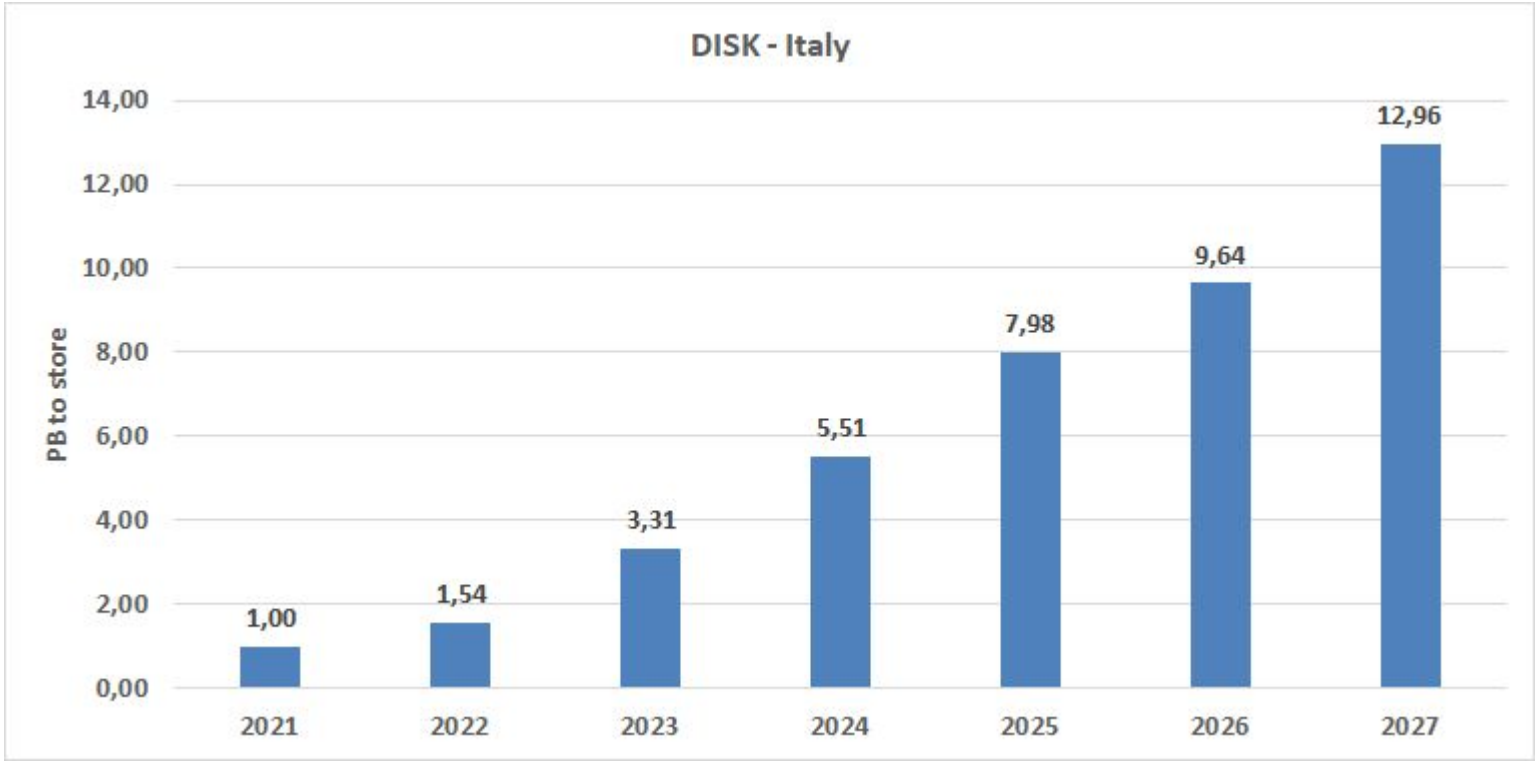
Assumendo più di un reprocessing nel 2021/2022, 1 reprocessing nel 2023 e un reprocessing ogni due anni successivamente.





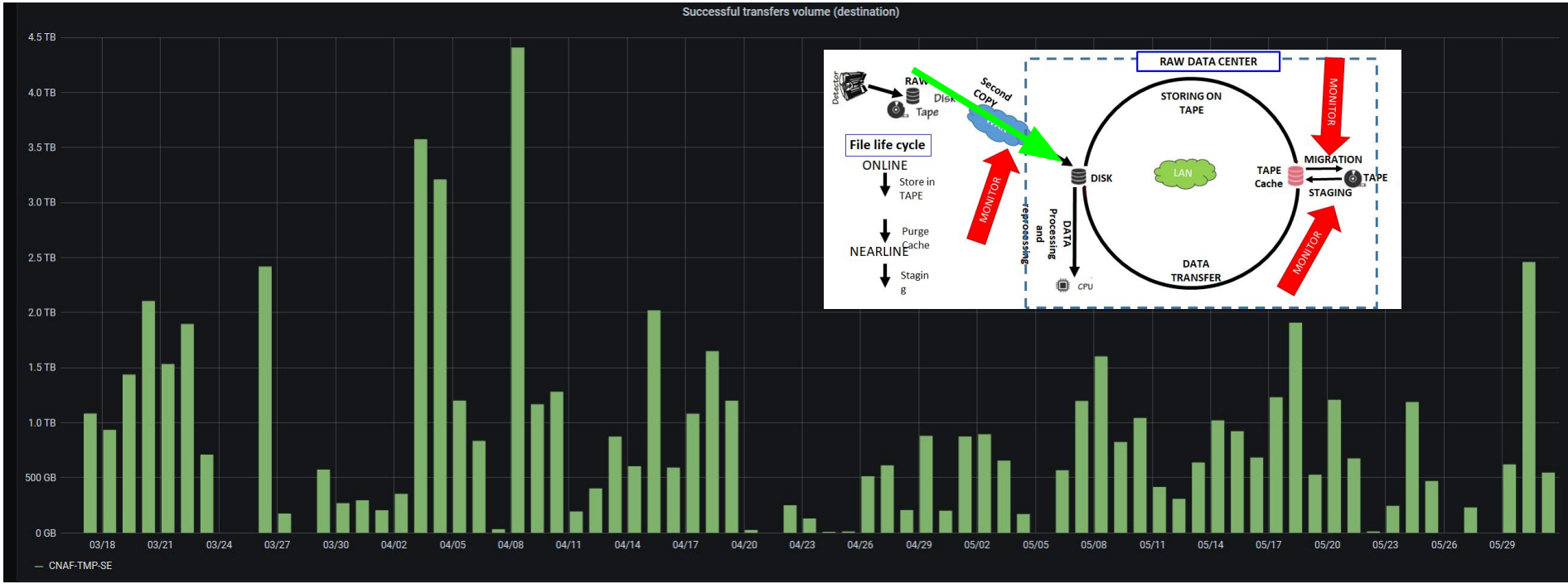
Considerando 781MB/s

SPAZIO DISCO TOTALE PER L'ITALIA

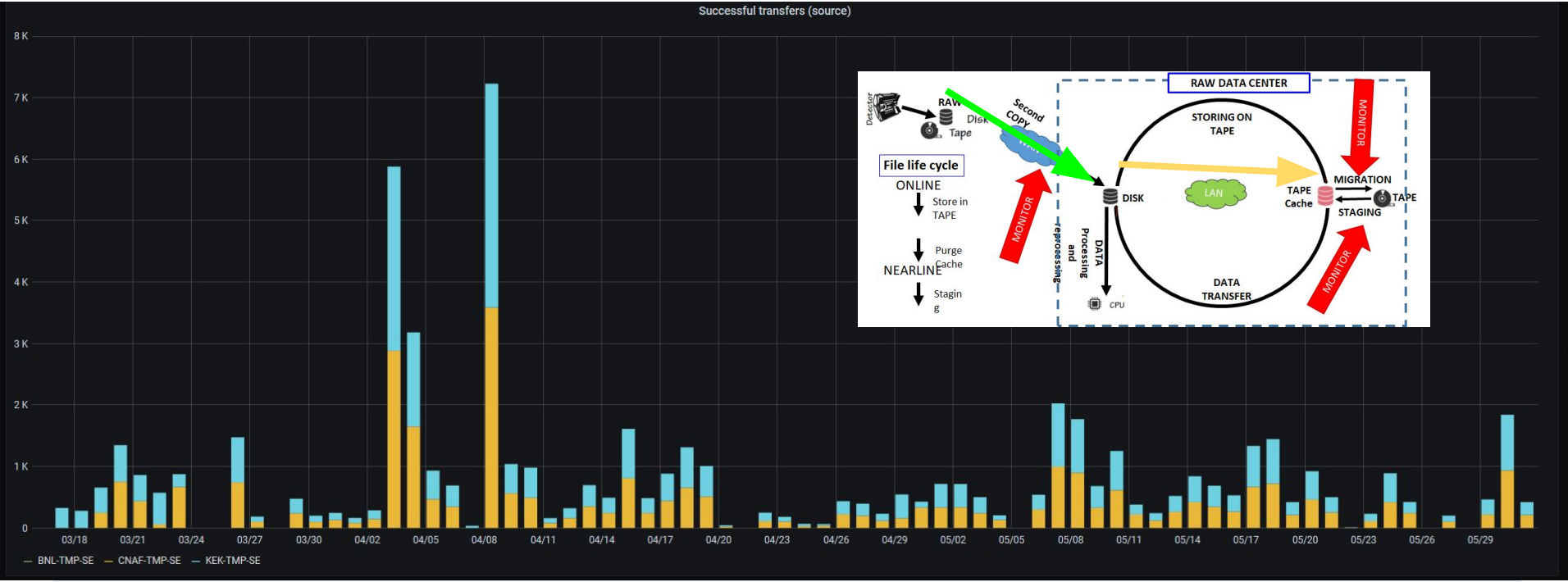


COSA MISURIAMO OGGI

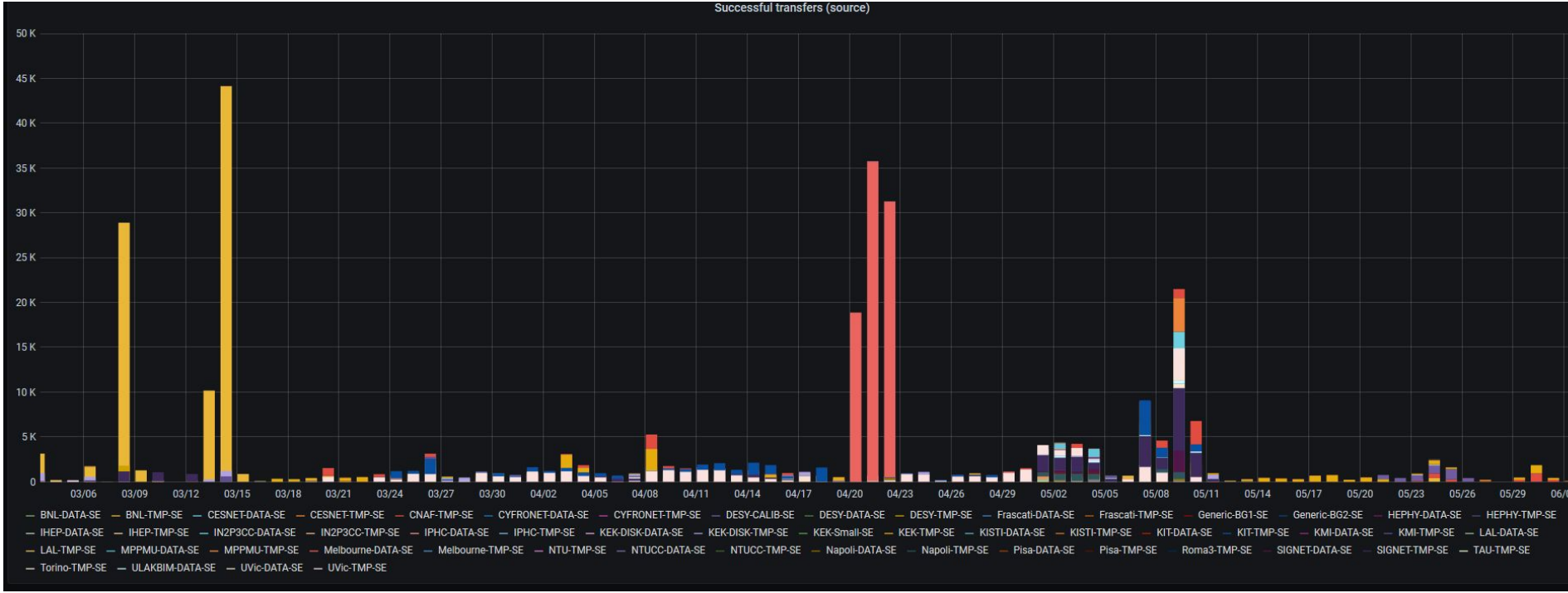
RAW DATA IN ARRIVO: Picco 4TB/Day



RAW Data:Media di 700 Trasferimenti/Giorno - picco 7kTransfer

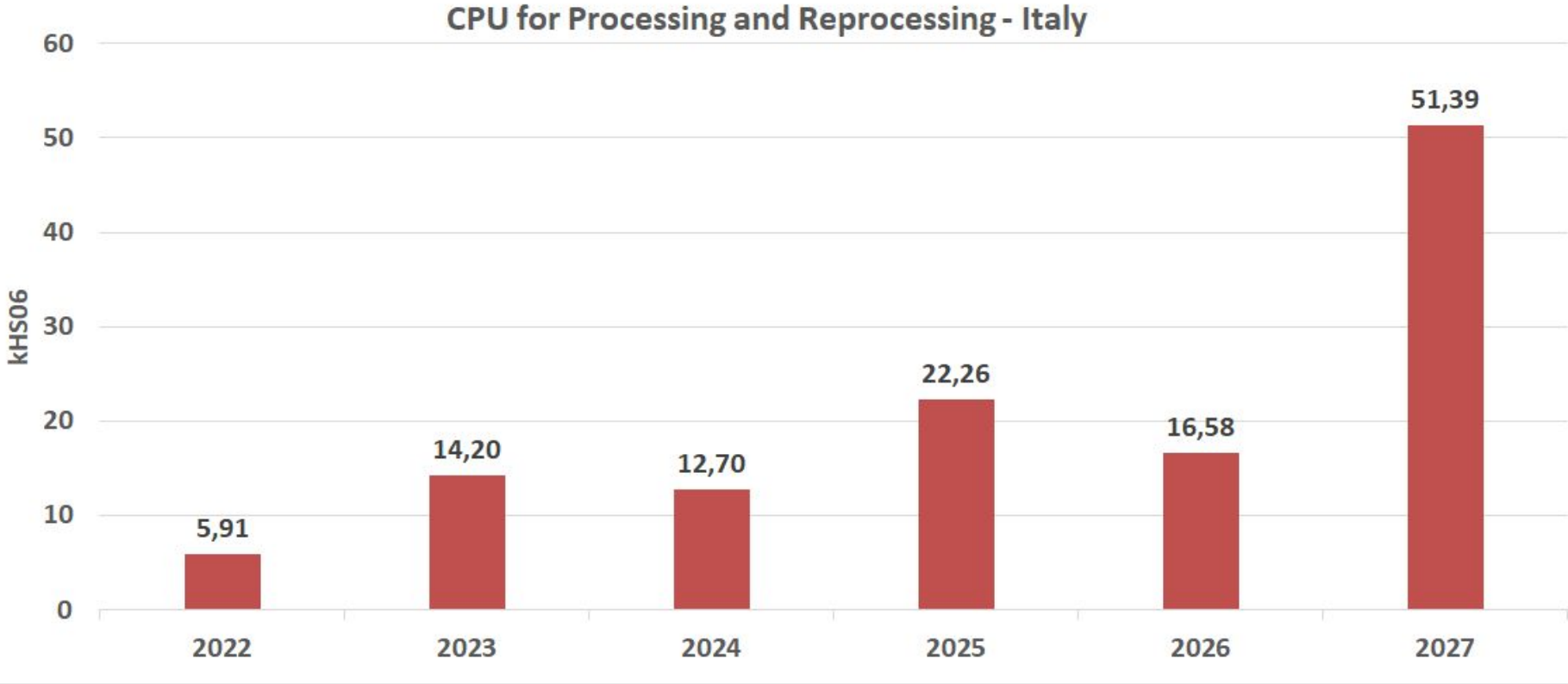


Tutte le attività: 2kTransfer/al giorno, picco 44kTranfer al CNAF

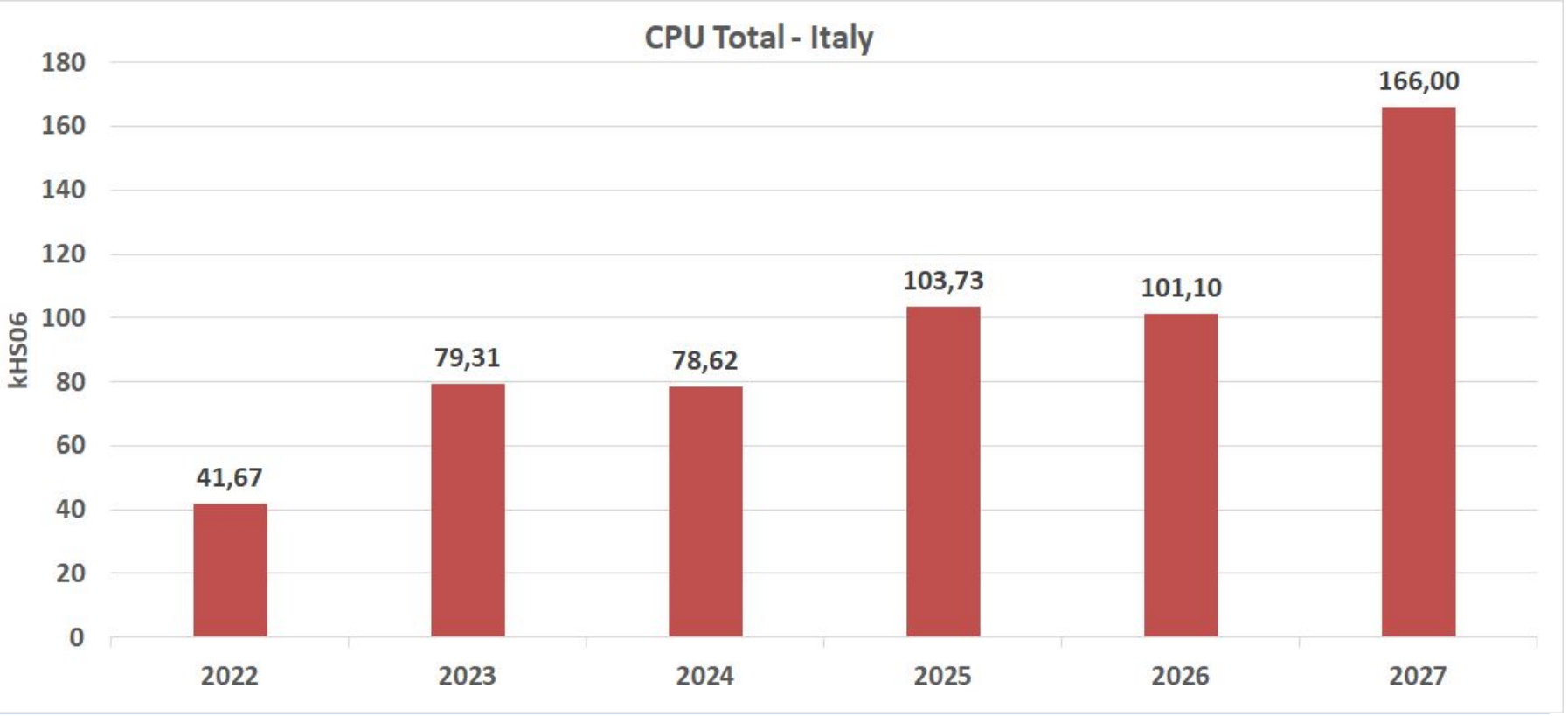


TAPE - 61TB and 28Kfile -> 400TB around 183kfile Files

Stima CPU per Processing e Reprocessing - Italy



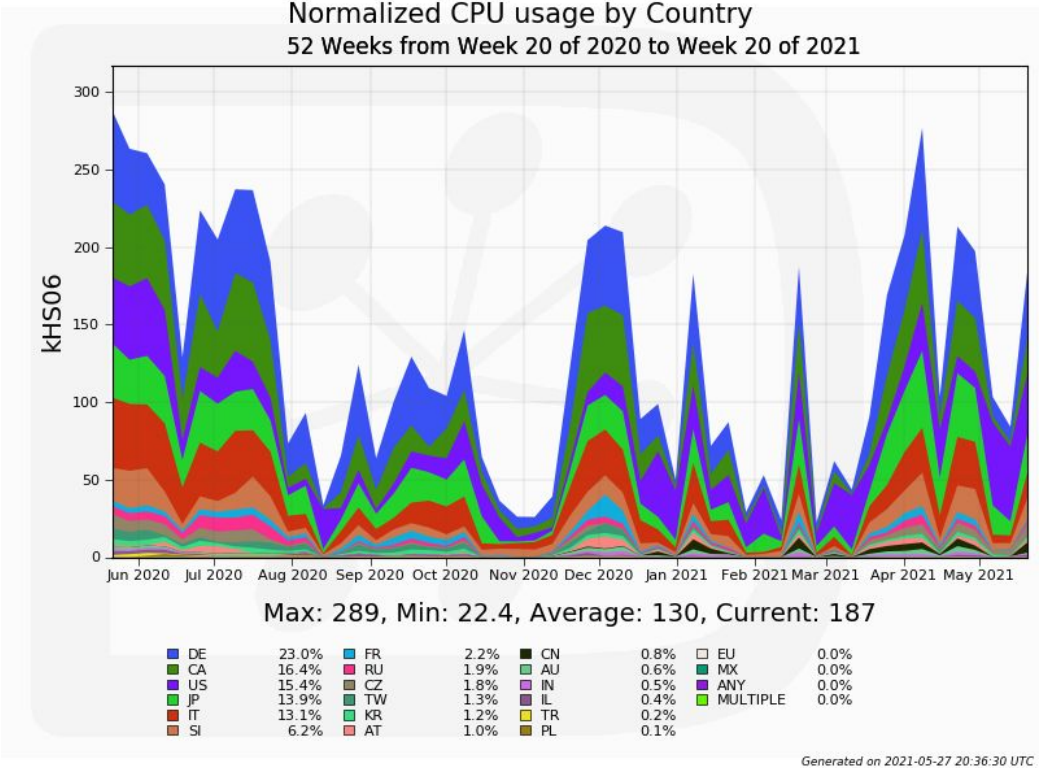
Stima CPU totali - Italy



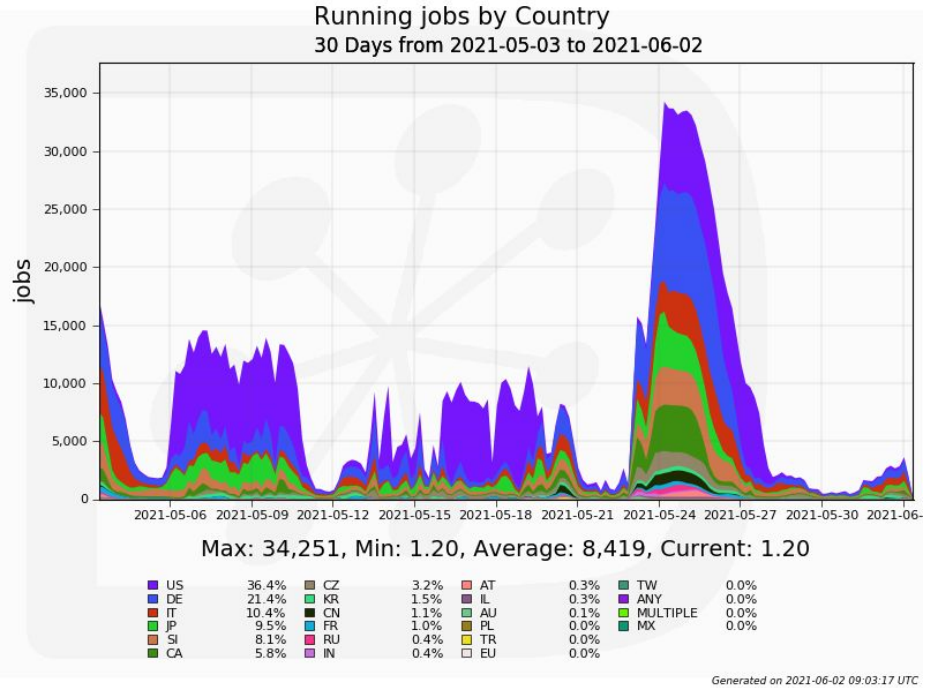
ITALIAN Infrastructure

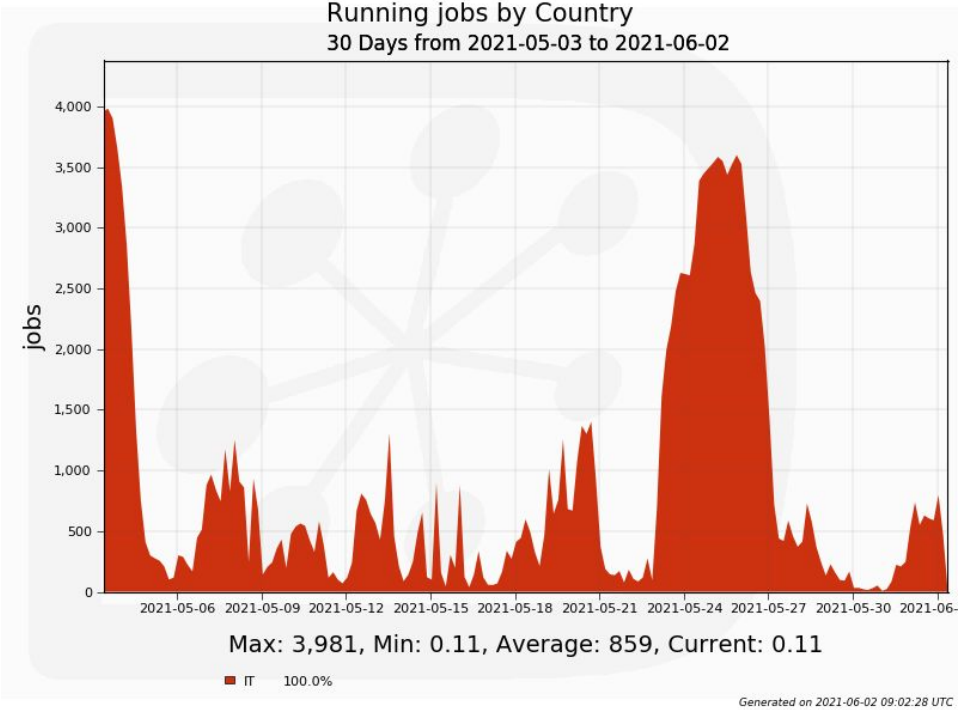
CNAF - RAW DC
Cosenza
Napoli
Pisa
Torino

Frascati
LNL
Roma3

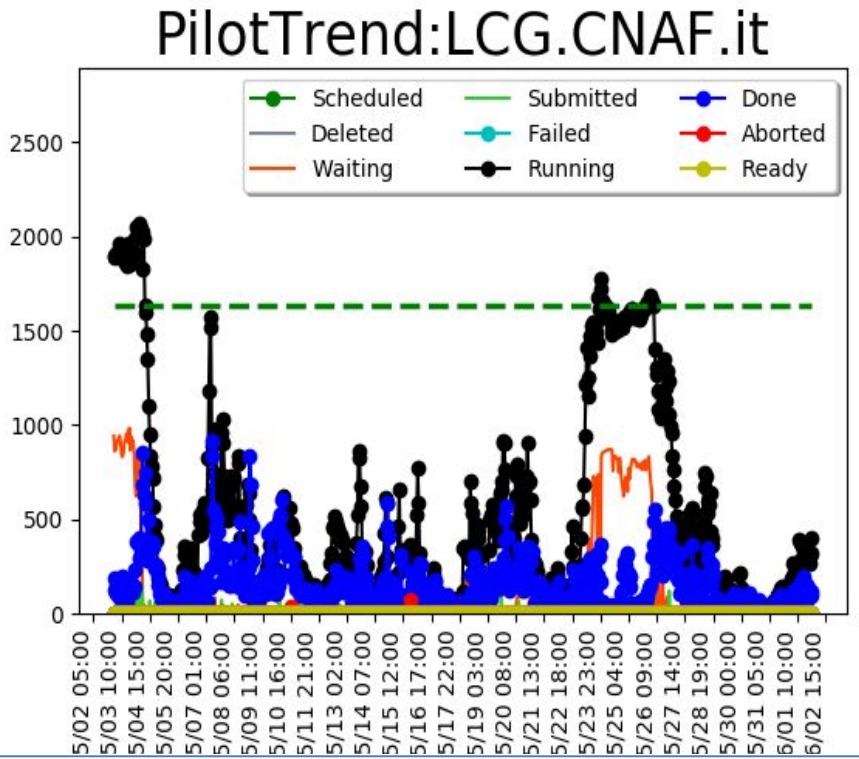


Running jobs per country - Last month





CPU at CNAF



Linea di share in jobslot da aggiornare.

Attualmente in pledge 27kH06

27kH06 -> 2.250-2.700

Network per i RAW Data

Latenza KEK - CNAF 90ms

Trasferimenti FTS mostrano circa 120Mbit/s (15MB/s) per singolo file da 2.5GB

Network Data Challenge ha dimostrato di poter raggiungere picchi di 20Gbp/s con trasferimenti concorrenti.

Nelle attività di replica dei RAW Data si stima di raggiungere picchi intorno ai 10/12Gbps o anche superiori con file da 5GB (target size per i RAW Data) con un pattern a burst.

La media su base mensile < 100Mbit/s - (1TB/giorno) per il 2021/2022 che crescerà verso <1Gbit/s nel 2027 ma con burst sempre più consistenti.

Breve Termine: Richieste 2022

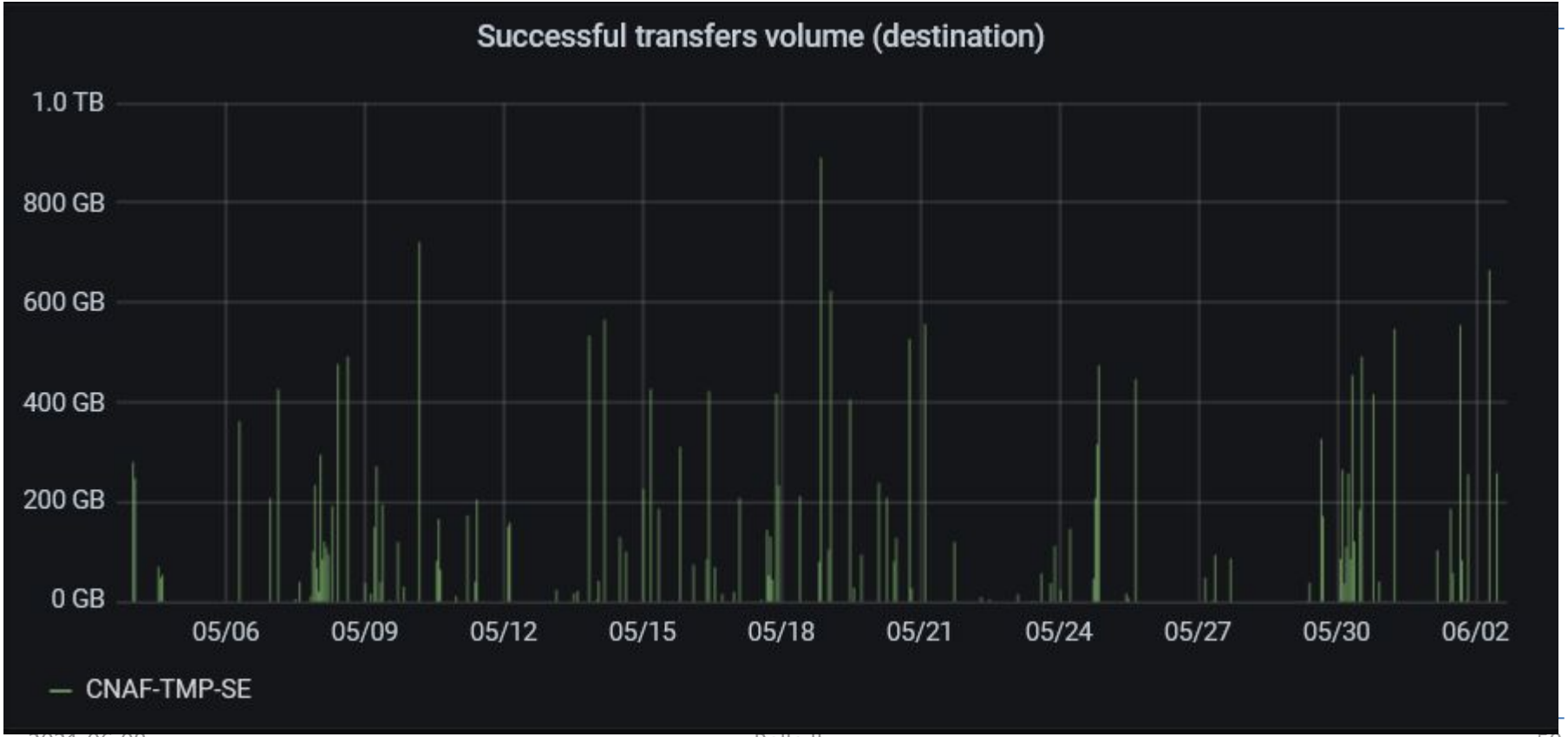
TAPE - OK. Revisione a fine 2021 dello spazio occupato.

DISCO +270TB vorremmo aggiungere presso il CNAF (attualmente abbiamo 1.4PB in italia dobbiamo arrivare a 1.67)

CPU - OK per il 2022 in previsione del long shutdown. Ulteriori richieste verranno fatte nel 2023

Qualcosa per il renew?

30 Giorni traffico RAW Data al CNAF(bin da 1h)



Analisi puntuale

Da un analisi puntuale dei job FTS attuali abbiamo osservato:

Latenza KEK - CNAF 90ms

In ogni trasferimento misuriamo 120Mbit/s (15MB/s) per singolo file da 2.5GB

Trasferimenti popolari su FTS con throughput da 5Gbps sono del tipo:

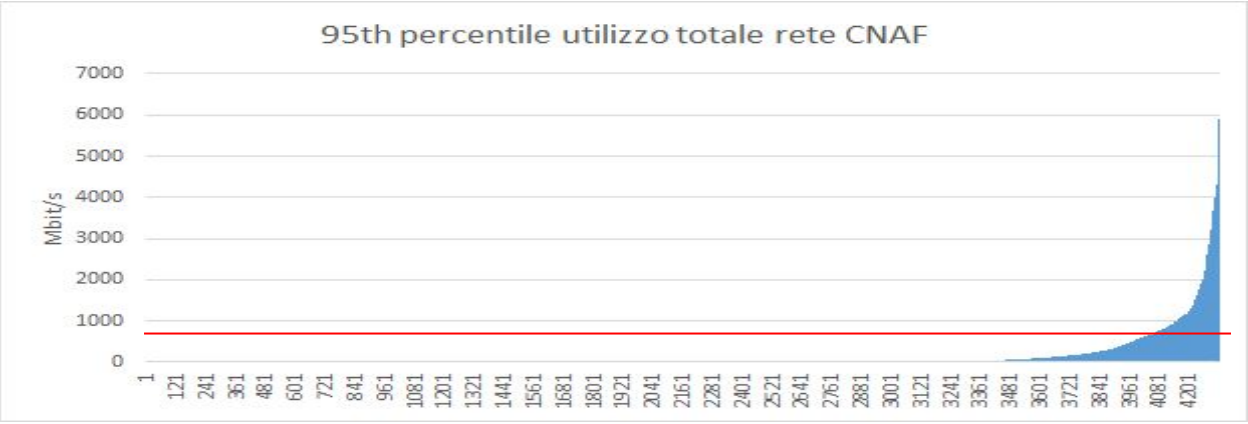
25 File da 2.5GB processati in circa 100s.
50 File da 2.5GB processati in circa 200s.

Job FTS di dimensioni superiori (anche oltre gli 80files) e la sovrapposizione di job FTS ha fatto si che osservassimo picchi istantanei superiori ai 15Gbps

Utilizzo attuale della rete del CNAF (incluse tutte le attività RAW data copy, MC, analisi)

Analisi su finestre temporali di 10min nell'arco dell'ultimo mese:

- 95th percentile: **827Mbit/s** - il 95% del tempo si è utilizzata la rete sotto il 1Gbit/s
- Throughput Medio: **136 Mbit/s**
- Picco: **6Gbit/s** (N.B. sempre nella finestra dei 10 min, picchi istantanei osservati anche superiori 15Gbps)
- 95th percentile = 13% Picco
- Throughput medio = 16% del 95th



Utilizzo futuro della rete del CNAF (incluse tutte le attività RAW data copy, MC, analisi)

Per il 2021/2022 ci si aspetta un andamento simile, o non drammaticamente diverso.

A partire dal 2023 sulla stessa analisi (finetre da 10min) ci aspettiamo:

- **Picchi più alti** dovuti all'effetto dovuti all'incremento del numero del numero di file di RAW-data da trasferire e della loro dimensione.
- **Incremento del throughput medio** dovuto all'aumento dei dati da trasferire.
- **Incremento del 95th percentile**.
- Picchi istantanei potrebbero tendere al massimo ottenuto in fase di test 20Gbps

TAPE, DISCO, e CPU previste, e ipotesi speculativa sull'andamento dei rate

	2022	2023	2024	2025	2026	2027
TAPE Totale(PB)	0,54	1,62	3,06	4,71	5,43	7,93
#Files per i RAW Data	250k	<600k	<1.5M	<2M	<2.5M	<3.5M
#Trasf/Day RAW average	<1k	2k	2.5k	2.7k	2k	2.5k
#Trasf/Day RAW Peaks	40k	80k	100k	100k	80k	100k
DISCO Tot (PB)	1,54	3,31	5,51	7,89	9,64	12,96
CPU Totali- kHS06	41	79.3	78.6	103	101	166
Job Running Totali	4kJ	8kJ	8kJ	10kJ	10kJ	16kJ
Net IN Raw (Gbps) Picco nei 10min al CNAF	6Gbps	10Gbps	12Gbps	15Gbps	12Gbps	18Gbps
Net IN (Gbps) av totale ITA	0,34	1,07	1,34	1,69	1,33	2,63
Net out (Gbps) av totale ITA	0,25	0,53	0,57	0,84	0,91	1,44

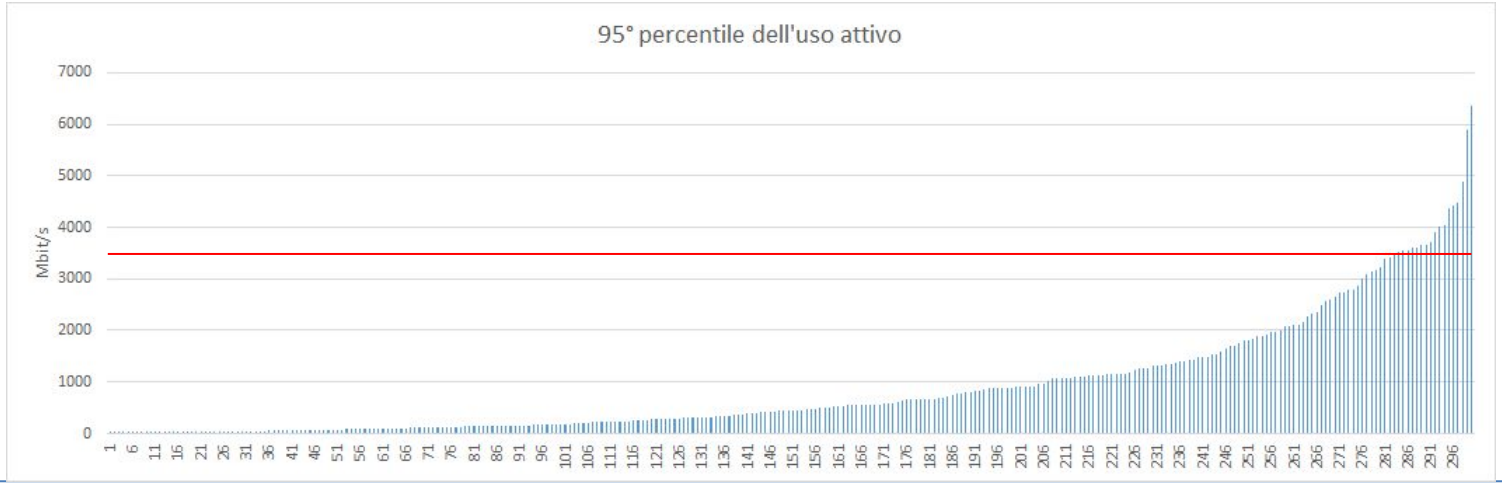
Formato dati

Moltissimi dati sia di stima che di monitoraggio/accounting raccolti.

Serve un formato specifico?

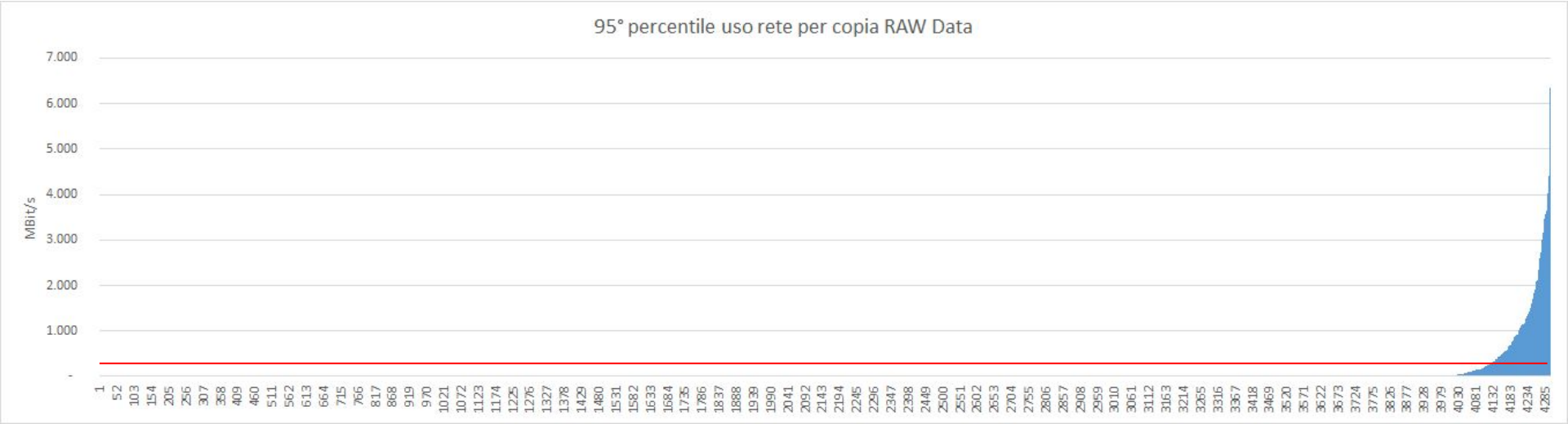
95th percentile dell'uso attivo della rete al CNAF per la copia dei RAW Data

Un analisi statistica nel periodo di utilizzo effettivo, svolta su finestre temporali da 10min mostra che:
Nel 95% del tempo di utilizzo la banda effettiva si è tenuta al di sotto i 3.5Gbps con una media di 900Mbit/s e picchi di 6Gbps.
Fino al 2022 ci aspettiamo un comportamento statisticamente simile



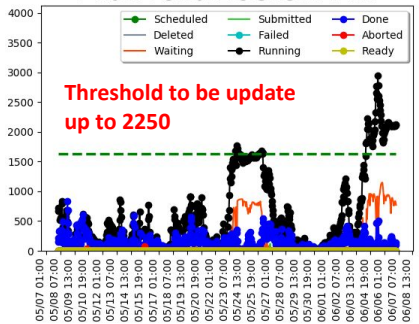
95th Percentile uso rete CNAF per la copia dei RAW Data

Negli ultimi 30 giorni la banda utilizzata per trasferire la seconda copia dei RAW Data è rimasta per il 95th del tempo sotto i 147Mbit/s. (analisi su finestre temporali di 10min)
Media 64Mbit/s

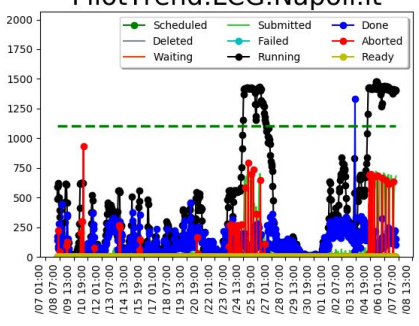


Pilot Trend - last 30 days

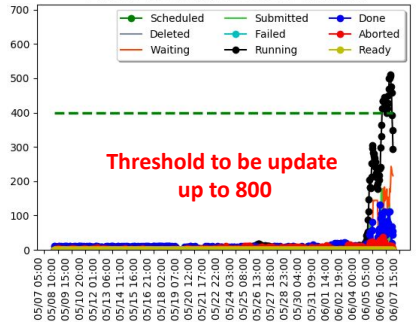
PilotTrend:LCG.CNAF.it



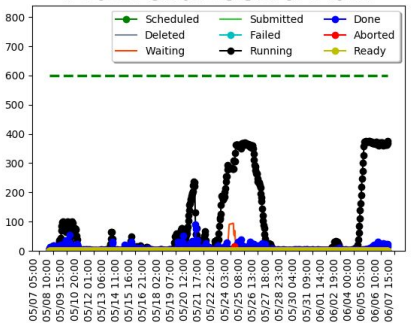
PilotTrend:LCG.Napoli.it



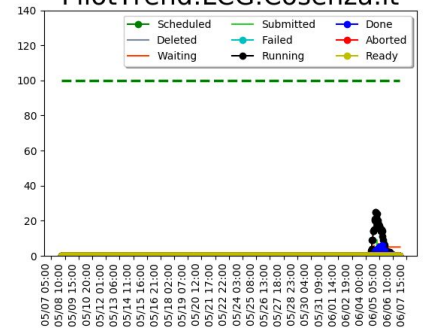
PilotTrend:LCG.Pisa.it



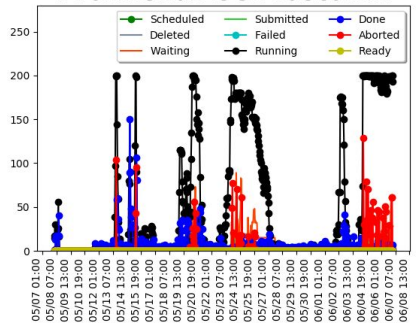
PilotTrend:LCG.Torino.it



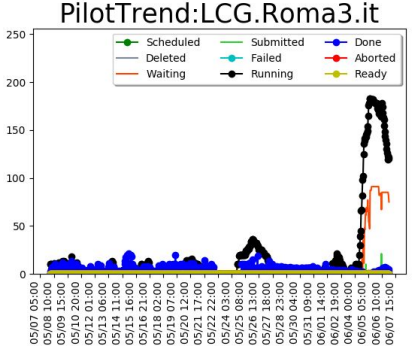
PilotTrend:LCG.Cosenza.it



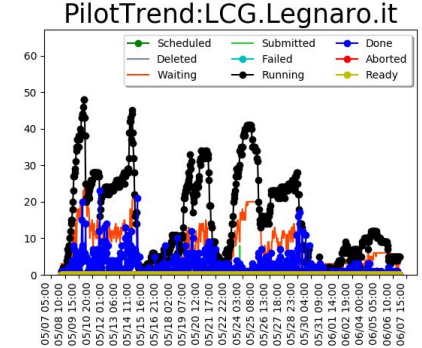
PilotTrend:LCG.Frascati.it



PilotTrend:LCG.Roma3.it

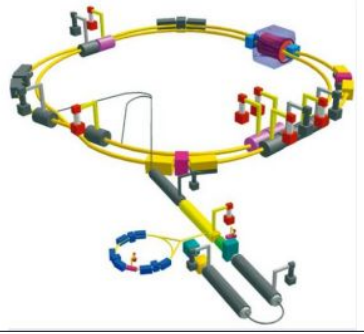


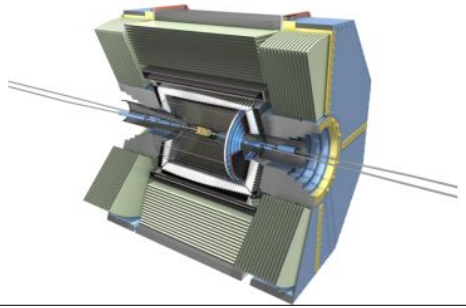
PilotTrend:LCG.Legnaro.it

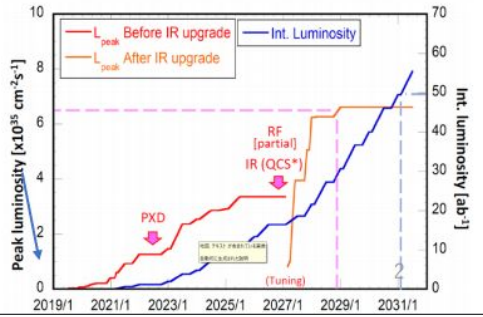


SuperKEKB/Belle II experiment

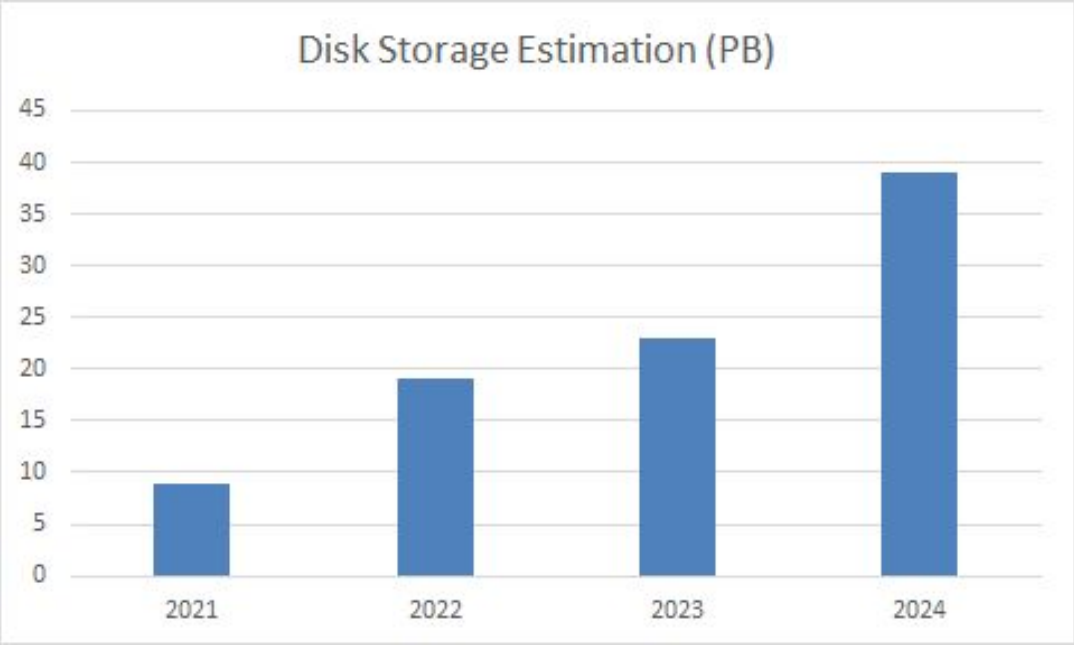
- Next generation B-factory experiment to search for physics beyond Standard Model.
- Aiming 30 times instantaneous luminosity and 50 times integrated luminosity compared with KEKB/Belle experiment
  - Luminosity world record on last June!
    https://www.kek.jp/en/newsroom/2020/06/26/1400/
- **O(100 PB)** storage and **O(1000k HepSpec)** required at the end of data taking





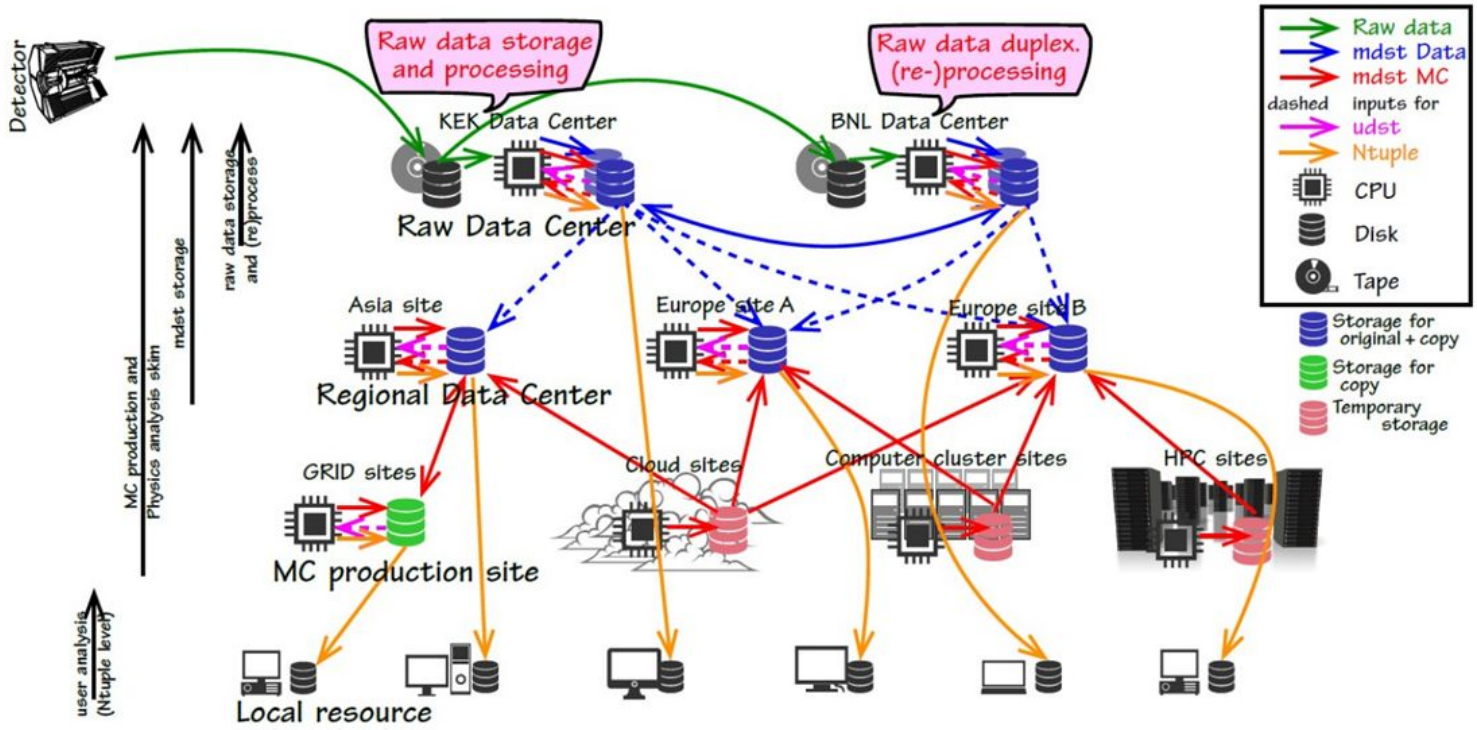


Disk Storage estimation



Storage resource estimation including disk for RAW Data. Storage for MC production and analysis, and storage for miniDST and uDST data will be shared among the different countries according to the PhD count.

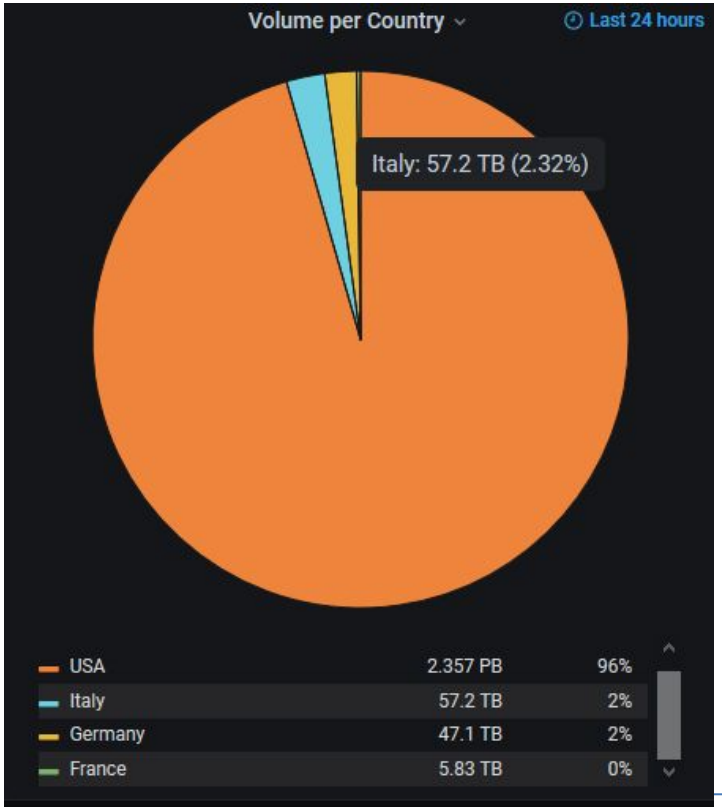
Belle II Computing Model



Test Tape System 2020

		COPY	MIGRATION		STAGING+TRANSFER	
		Network Throughput Average/Peak	Peak Real Time	Av. Throughput	Peak Real Time	Test Average Throughput
DESY	Feb	4.8 Gbps/10 Gbps	200MB/s	130-200MB/s	137MB/s	137MB/s
DESY	June	4.8 Gbps/19 Gbps	1000MB/s	446MB/s	840MB/s	260MB/s
BNL	April	4.8 Gbps/14 Gbps	900MB/s	834MB/s	1.3GB/s	460MB/s
KIT	April	4.8 Gbps/17 Gbps	805MB/s	418MB/s	1.16GB/s	626MB/s
KIT 1G	June	4.8 Gbps/25 Gbps	676MB/s	370MB/s	1.01GB/s	691MB/s
CNAF	May	4.8 Gbps/15 Gbps	670MB/s	463MB/s	1.24GB/s	781MB/s
UVic	June	4.8 Gbps/19 Gbps	N/A	N/A	N/A	N/A
IN2P3	July	4.8 Gbps/16 Gbps	/	430MB/s	925MB/s	670MB/s
IN2P3	July	Only Staging			1.5GB/s	521MB/s
IN2P3	July	Only Staging			1.02GB/s	835MB/s

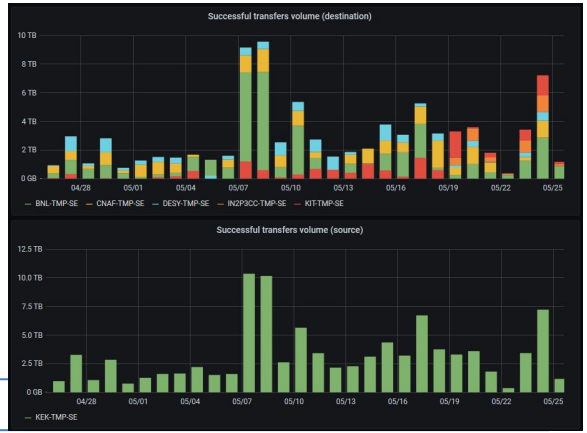
RAW Data Distribution started in April



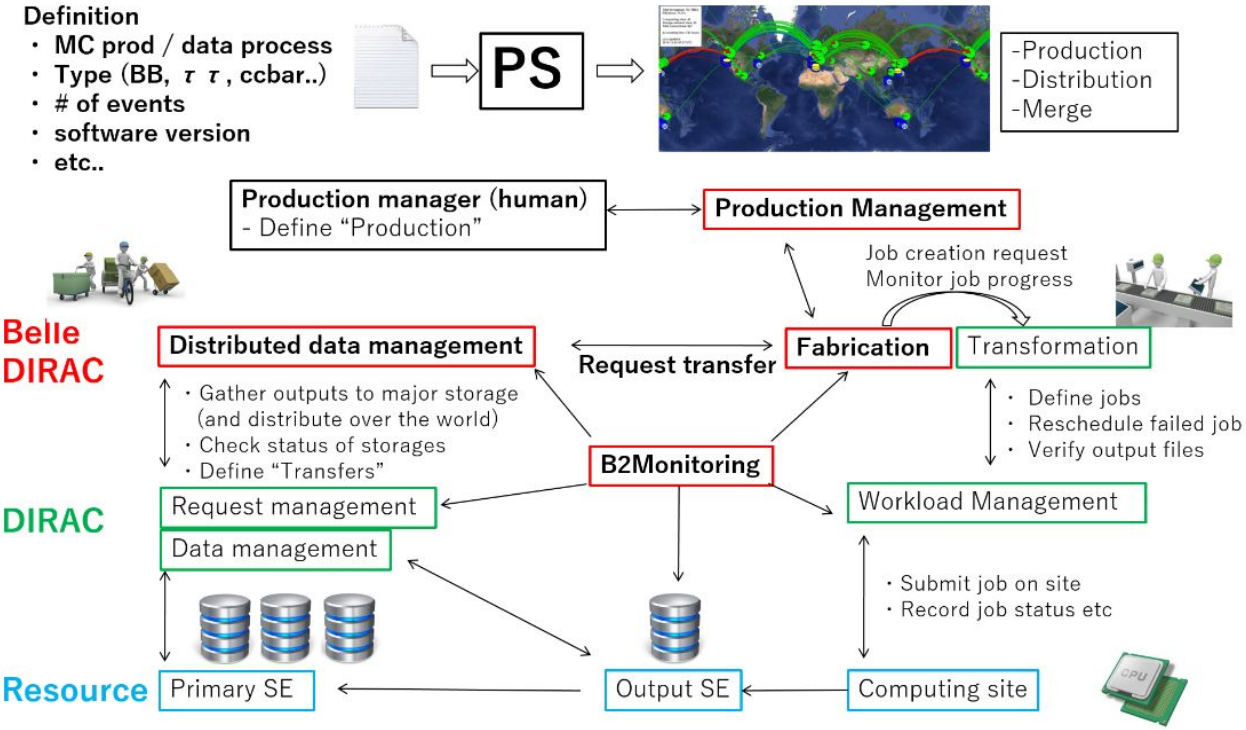
- CNAF è stato Raw Data Center pilota, iniziando a ricevere i data a Marzo.
- Attualmente in funzione BNL, CNAF, KIT, DESY and IN2PCC
- UVIc setup in preparazione

Picchi di 8TB/day

Negli ultimi 90g



Production System



Major upgrade of Computing Infrastructure

Migrazione di tutti CREAM-CE verso HTCondorCE/ARC-CE

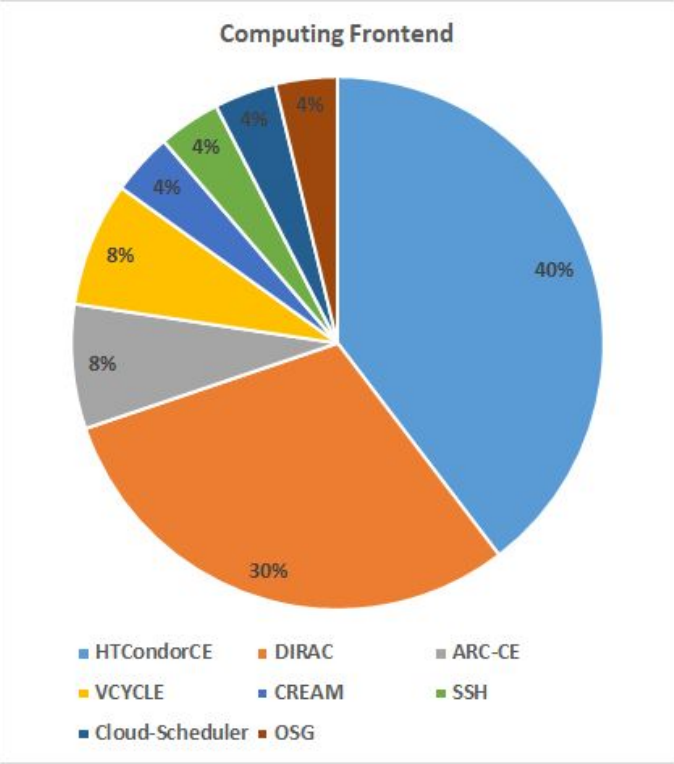
Migrazione del sistema di Data Management a RUCIO

Migrazione dell'accouting da SRM Space Token a JSON File

Migrazione DIRAC 7.0 con Pilot3

Setup /CVMFS/belle.kek.jp

Computing Frontend



Requisiti per i job

2GB RAM per core

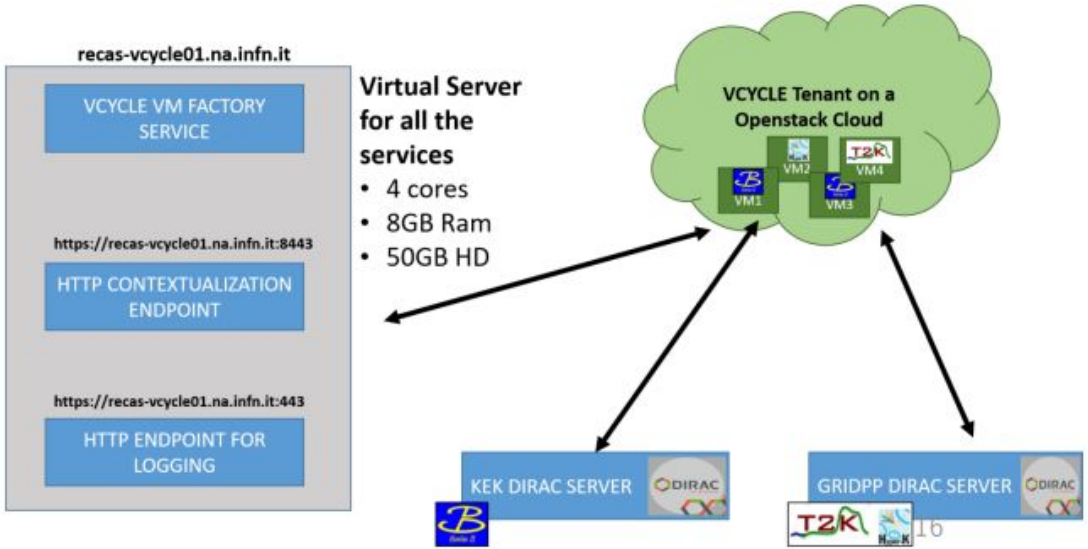
10GB local disk space / job

Cloud Resources

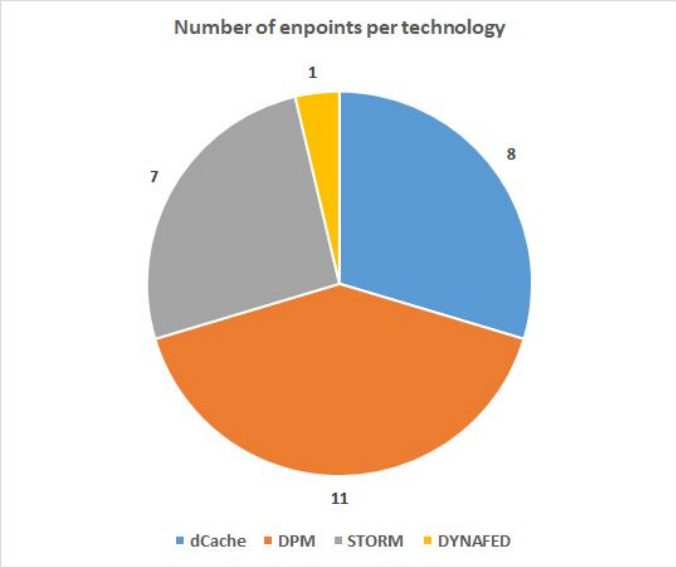
Due tecnologie principali

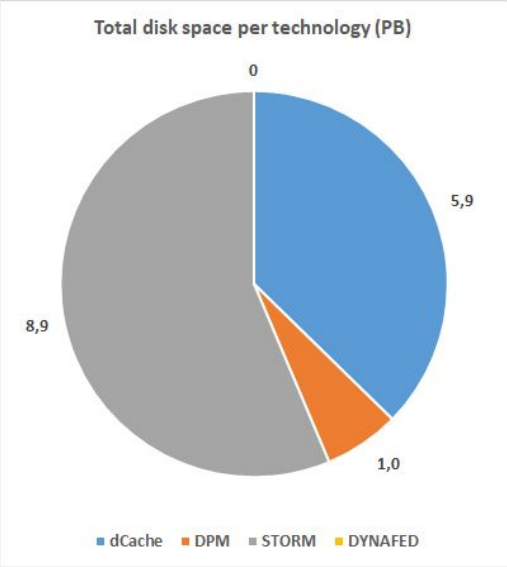
CloudScheduler by UVIc

VCYCLE con setup a Napoli
soluzione adottata in HNSciCloud e nel Jennifer2 project:
EGI Federation Cloud
LAL, LPNHE, Napoli, in fase di studio l'utilizzo di INFN-Cloud



Storage Technologies





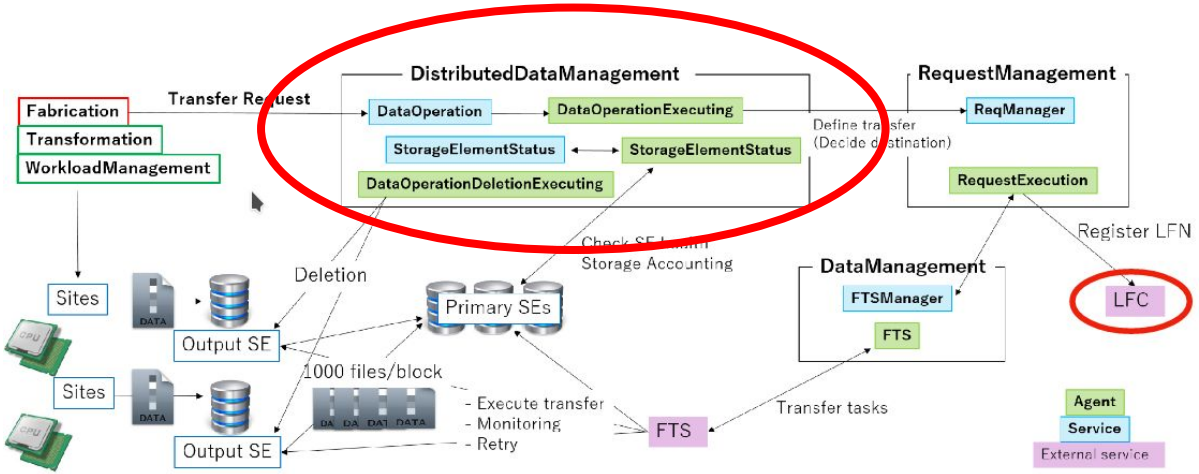
Protocolli utilizzati

- SRM
- gsiftp
- davs

Ready SRMLess Storage

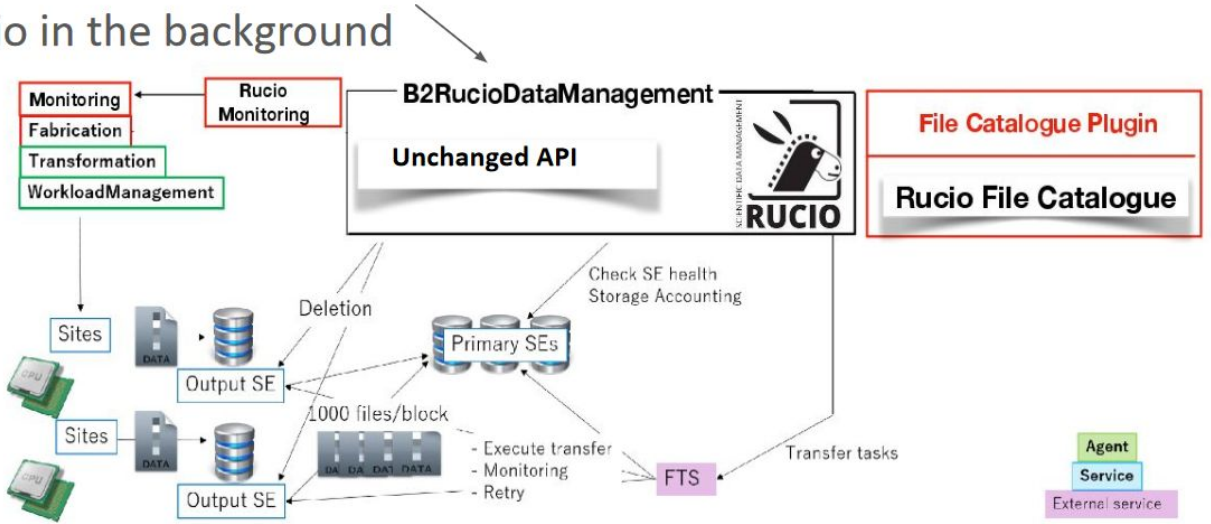
Migration to RUCIO

- Distributed Data Management (DDM) parte della estensione BelleDirac :
  - Original design by PNNL group respecting Dirac paradigms, good for Belle II customisation but all development effort must come from Belle II



Migration to RUCIO

- One of the most important changes is the introduction of a new component B2RucioDataManagement that provides the same API as the old DDM but interacts with Rucio in the background

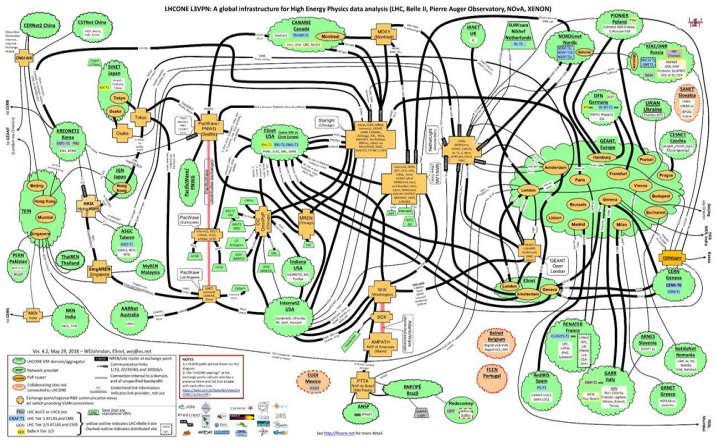


Overview of the new BelleDirac DDM

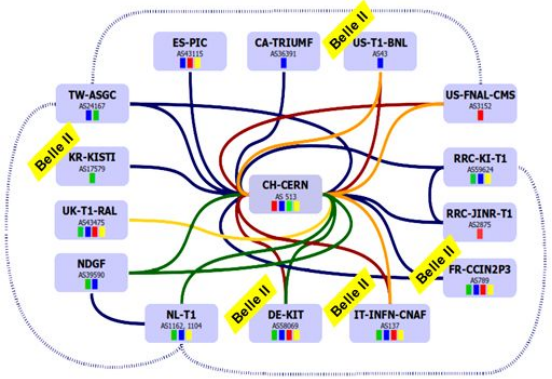
Network Infrastructure

100G Global Ring runned by SINET

LHCONE L3 VPN Connecting all the major Data Centres



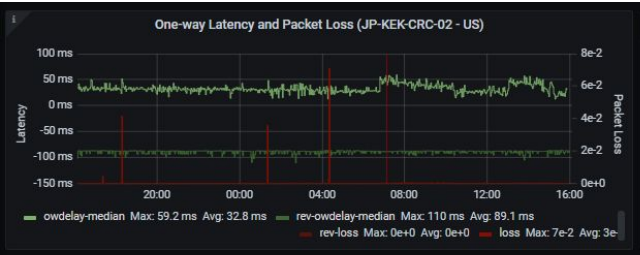
LHCOPN Optical infrastructure that can be used without jeopardizing resources

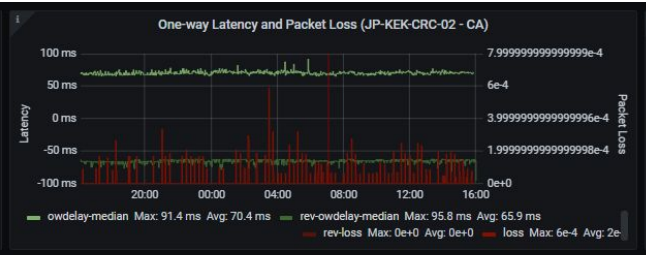


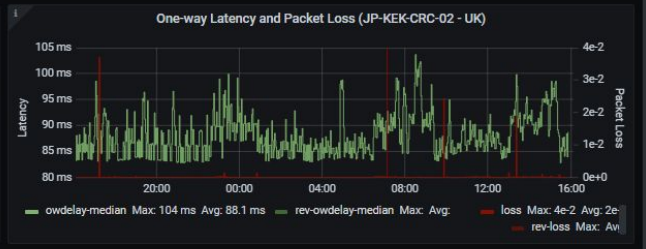
30% Sites on LHCONE, 70% Sites General IP, 5 Sites on LHCOPN

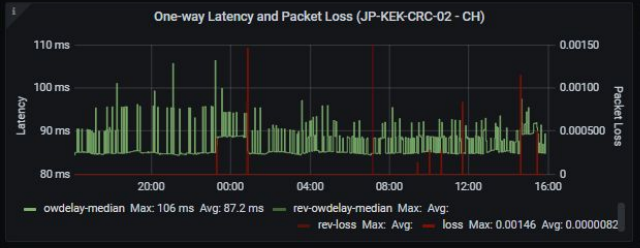
More than 80% of Storage and Computing Power on LHCONE

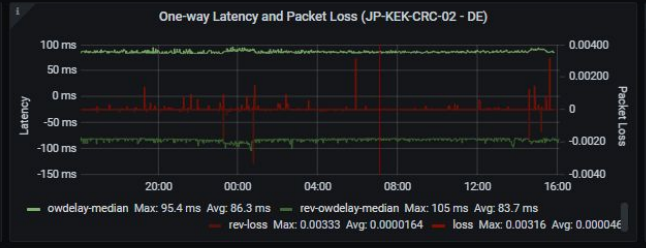
All RAW Data Centers are on LHCONE

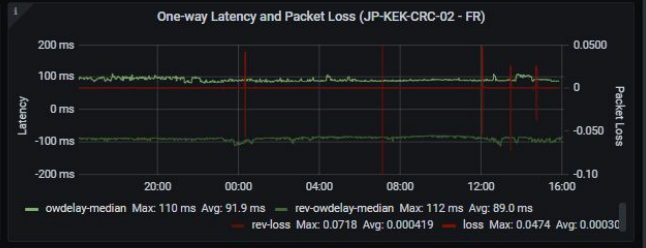


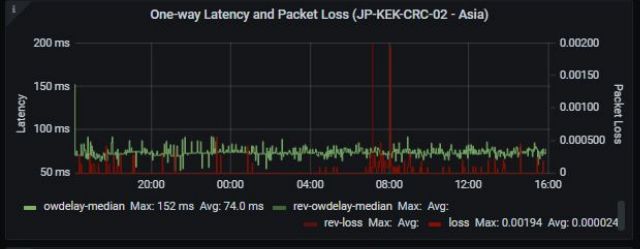


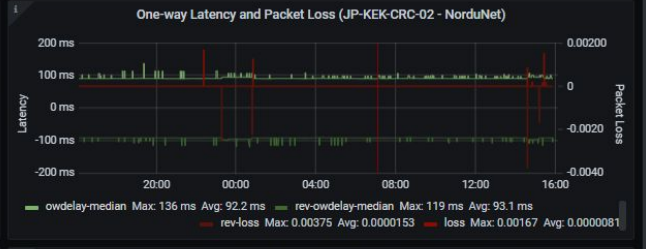


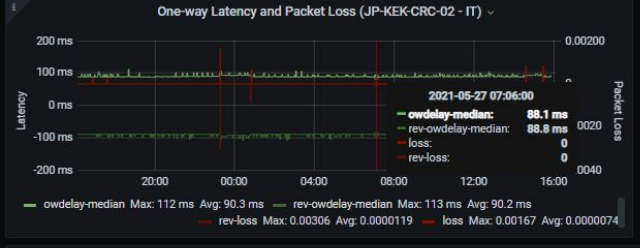


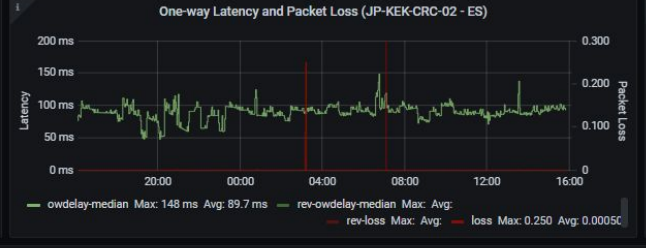


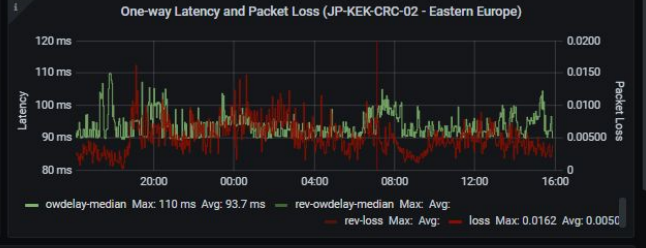




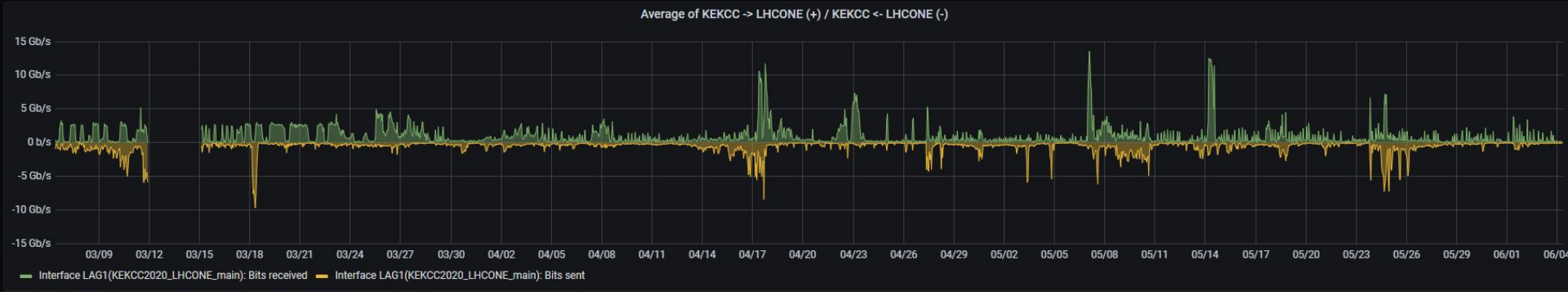


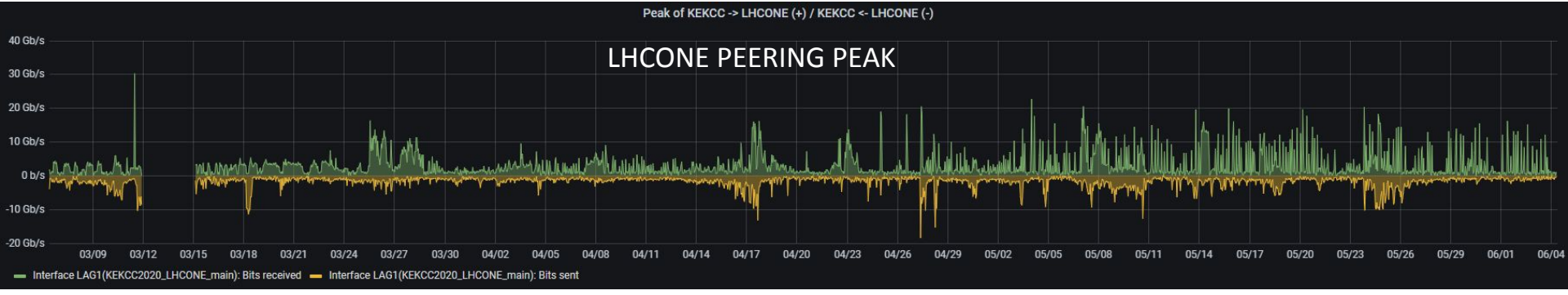


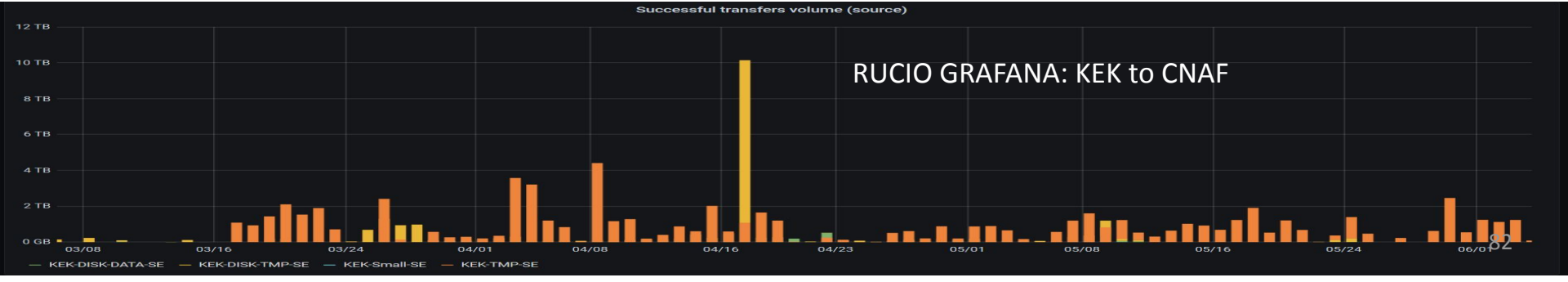




Sources: perfSONAR measurements are provided by Open Science Grid (OSG) and University of Chicago. Contacts: If you suspect a network problem and wish to follow up on it, please open a ticket with the appropriate support unit: For OSG sites please open a ticket with GOC; For WLCG sites please open a GGUS ticket to WLCG Network Throughput support.


Average of KEKCC -> LHCONE (+) / KEKCC <- LHCONE (-)
15 Gb/s
10 Gb/s
5 Gb/s
0 b/s
-5 Gb/s
-10 Gb/s
-15 Gb/s
03/09 03/12 03/15 03/18 03/21 03/24 03/27 03/30 04/02 04/05 04/08 04/11 04/14 04/17 04/20 04/23 04/26 04/29 05/02 05/05 05/08 05/11 05/14 05/17 05/20 05/23 05/26 05/29 06/01 06/04
Interface LAG1(KEKCC2020_LHCONE_main): Bits received
Interface LAG1(KEKCC2020_LHCONE_main): Bits sent


Peak of KEKCC -> LHCONE (+) / KEKCC <- LHCONE (-)
LHCONE PEERING PEAK
40 Gb/s
30 Gb/s
20 Gb/s
10 Gb/s
0 b/s
-10 Gb/s
-20 Gb/s
03/09 03/12 03/15 03/18 03/21 03/24 03/27 03/30 04/02 04/05 04/08 04/11 04/14 04/17 04/20 04/23 04/26 04/29 05/02 05/05 05/08 05/11 05/14 05/17 05/20 05/23 05/26 05/29 06/01 06/04
Interface LAG1(KEKCC2020_LHCONE_main): Bits received
Interface LAG1(KEKCC2020_LHCONE_main): Bits sent


Successful transfers volume (source)
RUCIO GRAFANA: KEK to CNAF
12 TB
10 TB
8 TB
6 TB
4 TB
2 TB
0 GB
03/08 03/16 03/24 04/01 04/08 04/16 04/23 05/01 05/08 05/16 05/24 06/0
KEK-DISK-DATA-SE
KEK-DISK-TMP-SE
KEK-Small-SE
KEK-TMP-SE

Conclusioni

Belle II è in data taking a partire dal 2019.

Il nuovo schema di distribuzione della seconda copia dei RAW Data è stato implementato con successo March 2021.

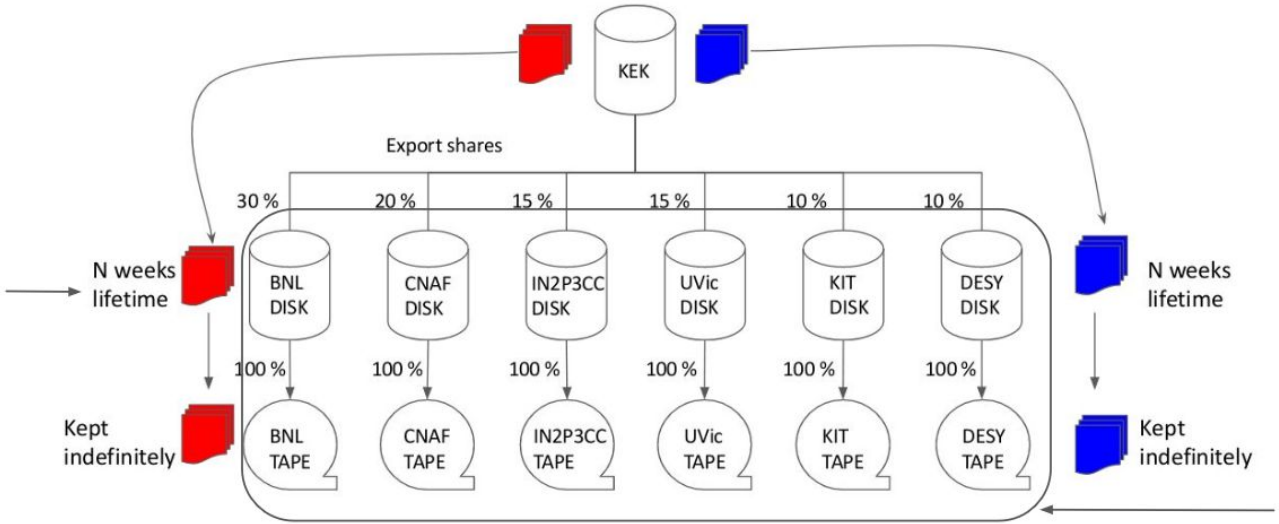
Contributo importante della comunità italiana sia dal punto di vista delle risorse che del know-how.

Una serie di major upgrade sono stati completati aggiornando alcuni aspetti chiave dell'infrastruttura di calcolo.

Numerose sfide da affrontare per i prossimi anni.

New rucio developments

- Some workflows requested by Belle II were not supported initially by Rucio and new features were developed to serve them (e.g. chained subscriptions)



Schema explaining the principle of chained subscriptions

LINK	Peak (Gbps)	Average (Gbps)	Data per Day (TB)	Site Connection	Peak/Site Connect.	Average/Site Connect.	Security Factor TBperDay /42TB
KEK-BNL	35.0	15.5	167	200	18%	8%	x 4
KEK-CNAF	20.0	15.0	162	200	10%	8%	x 3.8
KEK-DESY	16.0	10.0	108	100	16%	10%	x 2.5
KEK-IN2P3	15.7	14.7	158	100	16%	15%	x 3.7
KEK-KIT	20.0	13.0	140	100	20%	13%	x 3.3
KEK-UVIC	14.0	10.0	108	100	14%	10%	x 2.5