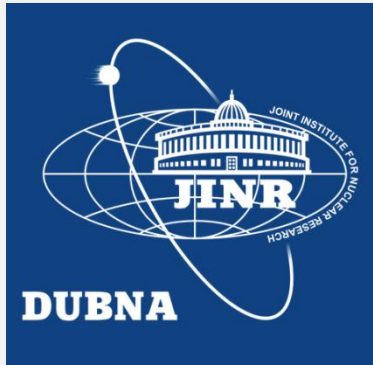


Development of JINR Tier-1 service monitoring system



I.S.Kadochnikov, V.V.Korenkov, V.V.Mitsyn, I.S.Pelevanyuk, T.A.Strizh

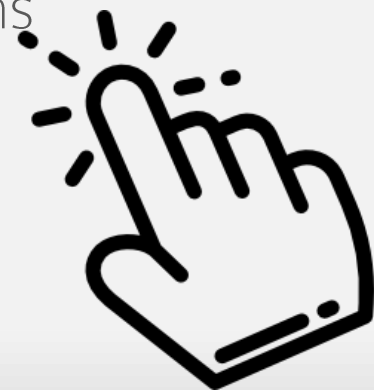


Tier-1 for CMS experiment

More detailed information about Tier-1 at JINR
is on slides presented by Tatiana Strizh:

<https://indico.jinr.ru/contributionDisplay.py?contribId=346&confId=447>

Presented during GRID 2018, Tuesday;
The CMS Tier1 at JINR: five years of operations





Multifunctional Information and Computing Complex

- LAN: 10 Gbps
- WAN: 100 Gbps + 2x10 Gbps
- Tier-1: 4160 core, 56 kHS06, 5.8 PB disk, 11 PB tape
- CICC/Tier-2: 3500 core, 48 kHS06, 2PB disk
- HybriLIT: 252 CPU, 77184 GPU cores, 182 PHI-cores, 2.4 TB RAM, 57.6 TB HDD, 142 Tflops
- Cloud: 700CPU, 1 TB RAM

LIT IT-infrastructure is the one of JINR basic facilities



JINR grid sites of WLCG/EGI: Tier-1 for CMS
Tier-2 for ALICE, ATLAS, CMS, STAR, LHCb,
BES, biomed, fermilab



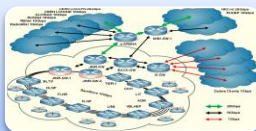
Cloud infrastructure



Heterogeneous(CPU + GPU)
computing cluster HybriLIT



Off-line cluster and storage system for BM@N, MPD,
SPD Storage and computing facilities for local users



Network infrastructure



Engineering infrastructure



Multifunctional Information and Computing Complex

Users



Admins



Executives



Network infrastructure



Engineering infrastructure



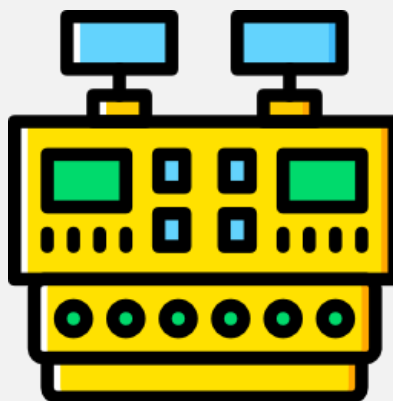
What is the “Monitoring”

Warning detection
and notification



Immediate

Properties
visualization



Actual

Accounting



Periodic

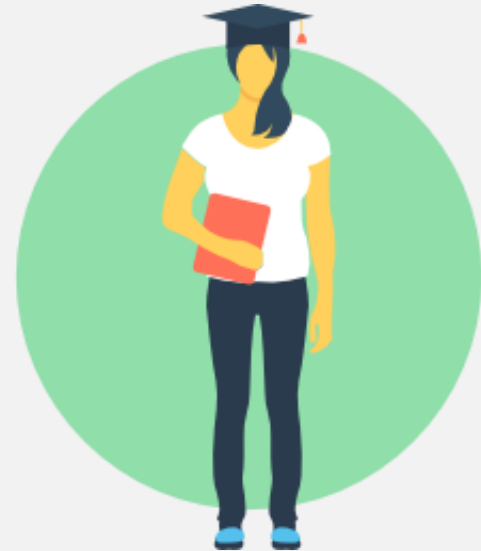




For Users

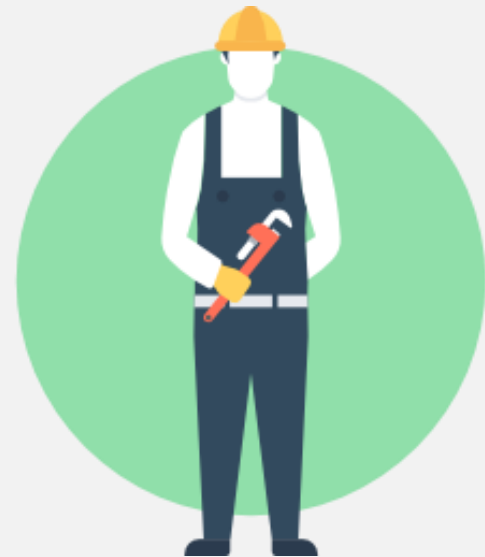
Important when:

- Information about component could form user behavior
- Information about component could explain occurring issues





For Admins



Important for:

- Issues alarming
- Debugging of complex systems
- Aggregated information source



For Executives



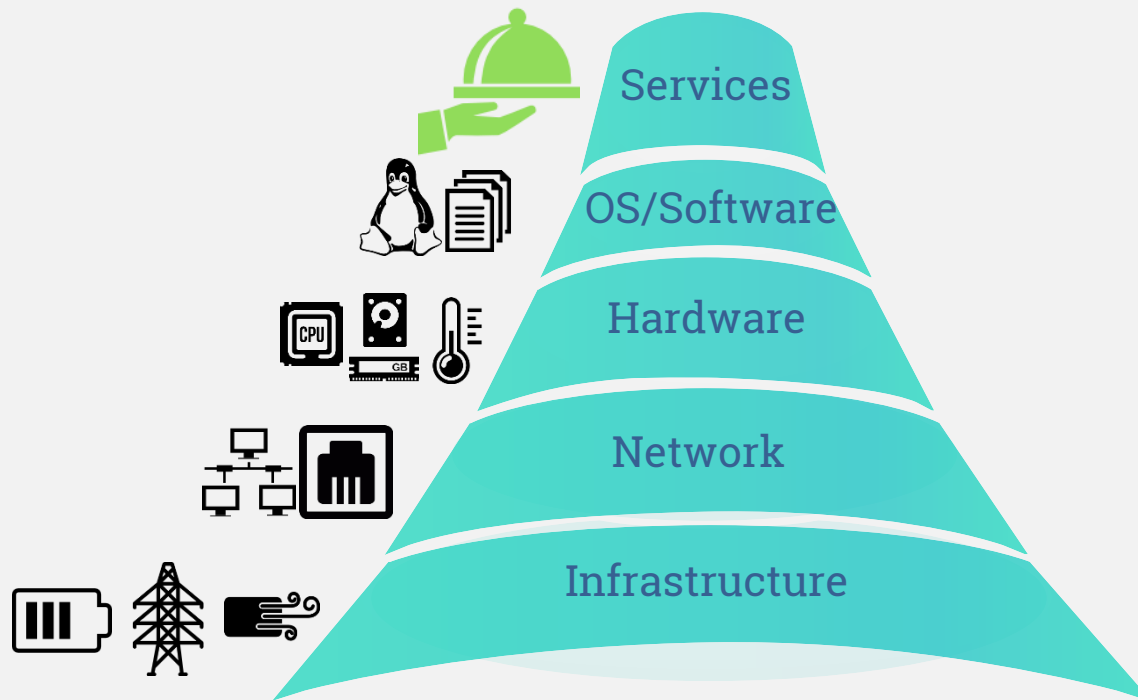
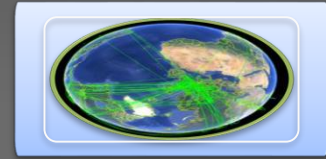
Important for:

- Reports and statistics
- Finding “Bottle necks”
- Planning





What we monitor

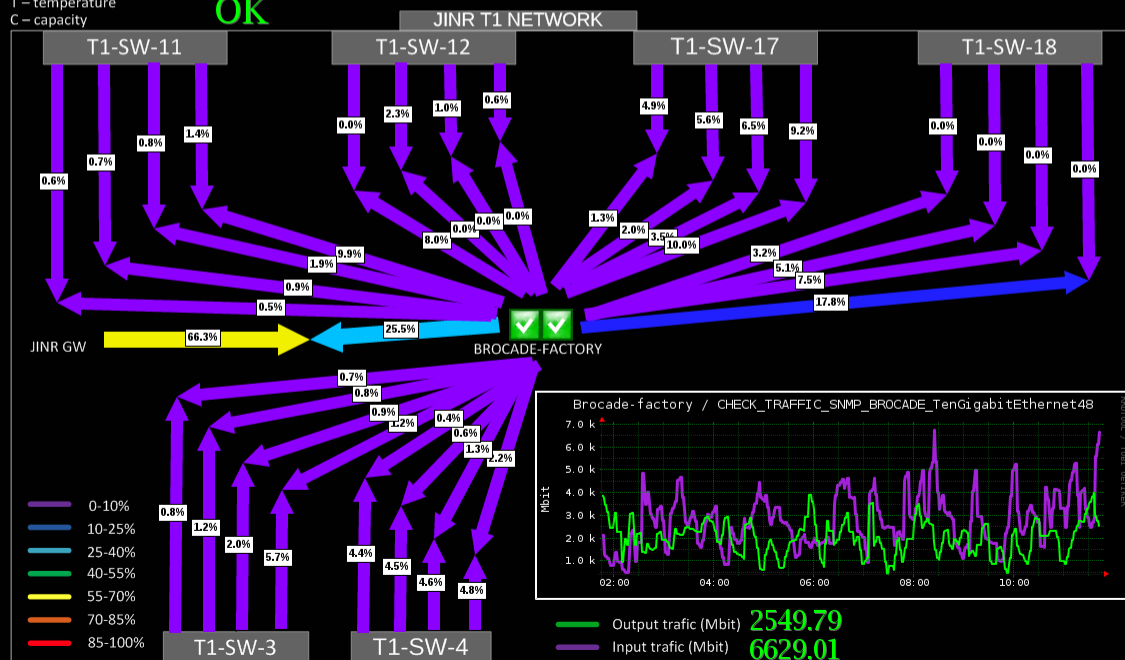
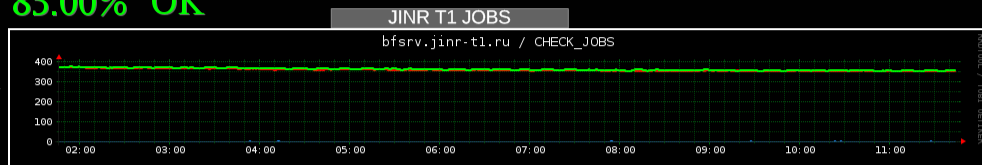
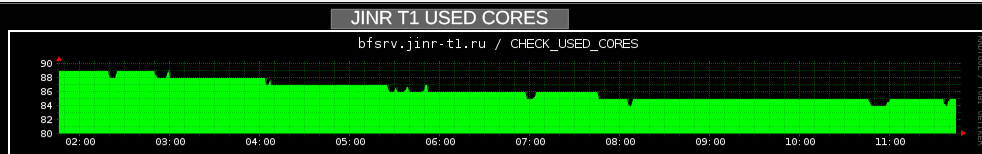
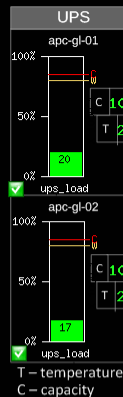




Tier-1 monitoring



WORK NODES	WORK NODES	RAIDS
wna000-004	wna130-134	rda000-004
wna005-009	wna135-139	rda005-009
wna010-014	wna140-144	rda010-014
wna015-019	wna145-149	rda015-019
wna020-024	wna150-154	rda020-024
wna025-029	wna155-159	rda025-029
wna030-034	wna160-164	rda030
wna035-039	wna165-169	
wna040-044	wna170-174	rdd000-004
wna045-049	wna175-179	rdd005-009
wna050-054	wna180-184	rdd010-014
wna055-059	wna185-189	rdd015-019
wna060-064	wna190-194	rdd020-023
wna065-069	wna195-199	
wna070-074	wna200-204	rdb000-004
wna075-079	wna205-209	rdb005-009
wna080-084	wna210-214	rdt000-004
wna085-089	wna215-219	rdt005-009
wna090-094	wna220-224	rdt010-014
wna095-099	wna225-229	rdt015-019
wna100-104	wna230-234	
wna105-109	wna235-239	
wna110-114	wna240-244	
wna115-119	wna245-247	
wna120-124		
wna125-129		
TEMPERATURE	SPARE SERVERS	Tier-1 dCache
apc-rc-10 17.4	rda031,32	se-hd02
apc-rc-13 17.5		
apc-rc-16 17.4		
apc-rc-19 17.1		
apc-rc-24 17.0		
apc-rc-27 17.1		
apc-rc-5 17.3		
apc-rc-2 17.1		
COMMON SERVERS	Tier-1 blades CMM	Tier-1 enstore
t1-s154-158	r14cmm0-4	enstore01-02
t1-s159-161	r24cmm0-4	
t1-s170-174	r25cmm0	
t1-s175-177		
cmsvb01-02		
lxvh000-002		





Monitoring in LIT JINR

More information about monitoring at JINR is
on slides presented by Ivan Kashunin:

<https://indico.jinr.ru/contributionDisplay.py?contribId=375&confId=447>

Presented during GRID 2018, Tuesday;

Evaluation of the performance of a cluster monitoring system based on
Icinga2





Tier-1 services

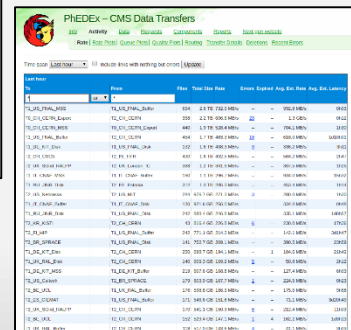
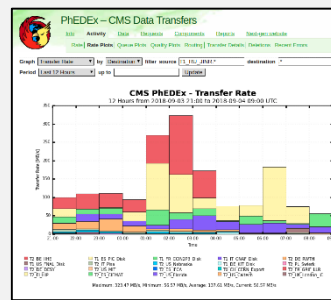
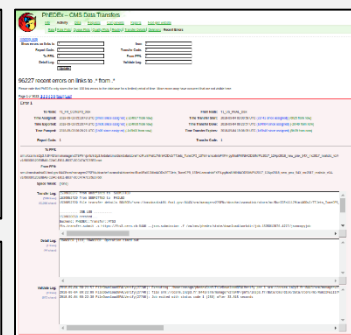
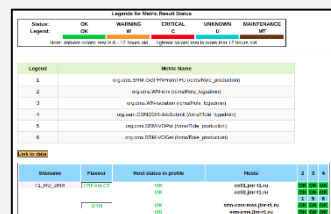
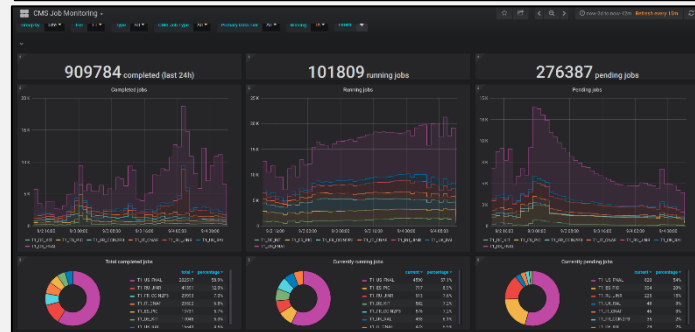
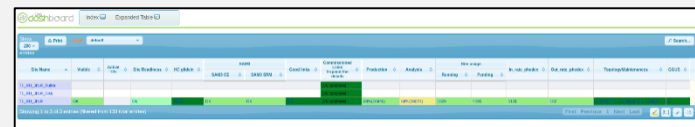
Apart from hardware metrics, service metrics are scattered among many internal and external systems.

This information relates to data transfers, data storage and data processing. In order to keep track of the services admin should regularly check several dozens of web pages.

Interpretation of data is more complex.

Aim is:

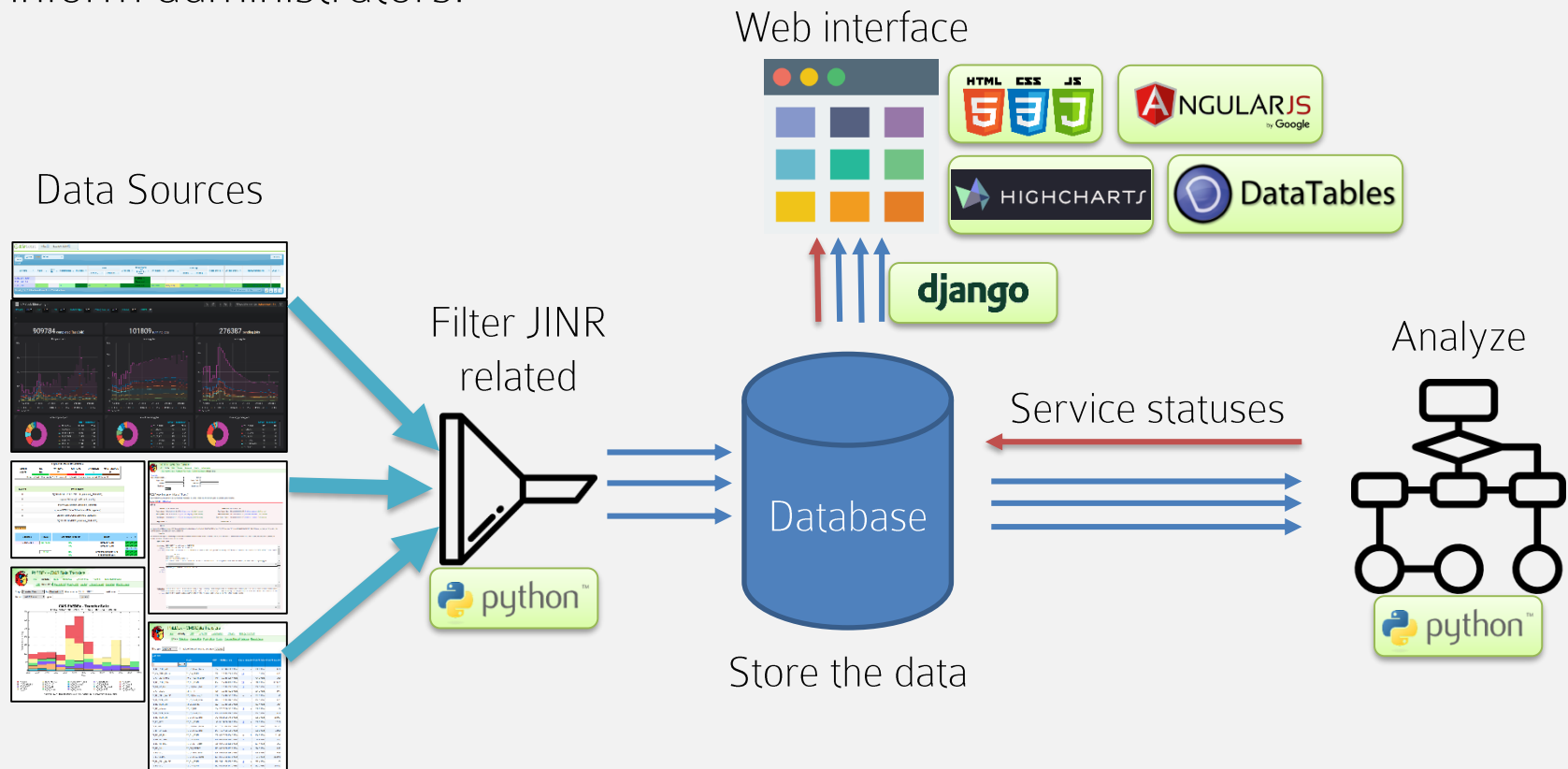
1. Provide a single source of aggregated monitoring information.
2. Perform basic analysis of data and provide status of the system.





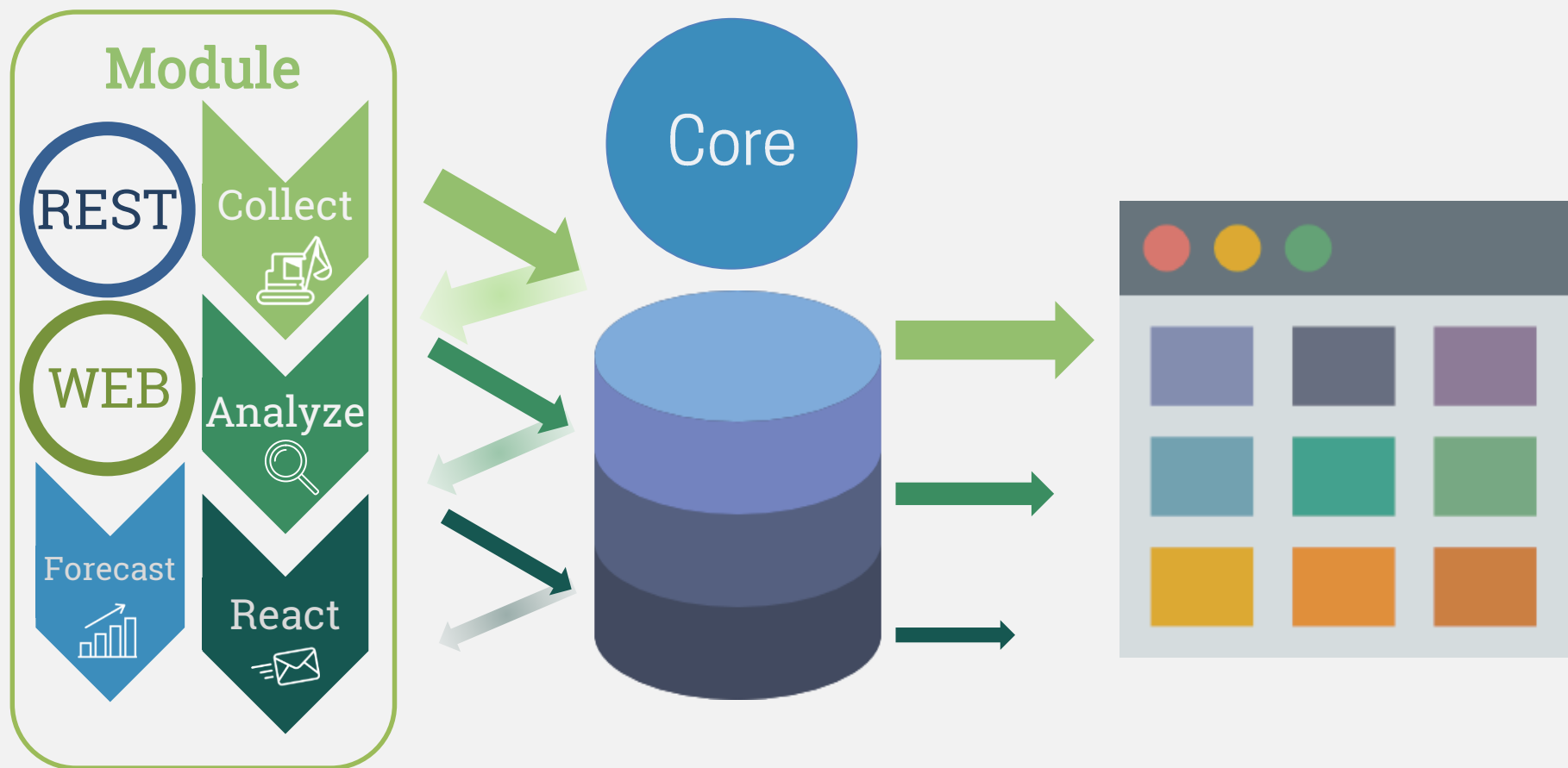
Tier-1 Service monitoring

Idea is to collect, aggregate and analyze data from different sources. Then provide in comprehensive form on the web page. In case of critical failures – inform administrators.





Tier-1 Service monitoring

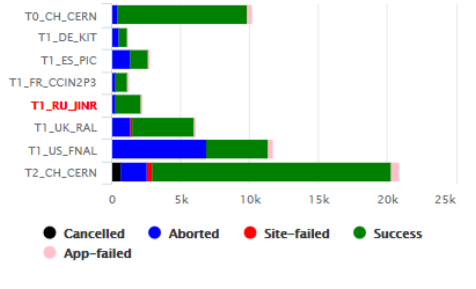




Tier-1 Service monitoring

Dashboard Main Page

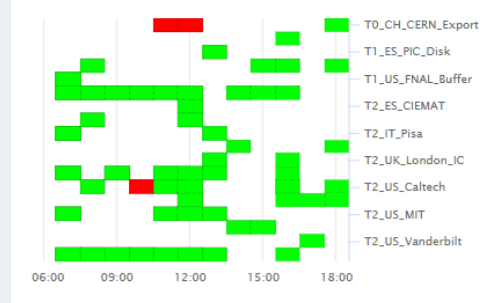
load	Bad	28 Jan 5:00	Load: is 1048
rank	Normal	27 Jan 18:00	Rank: is 5
site_failures	Excellent	21 Jan 3:00	Fail ratio: is 0.0078584303417



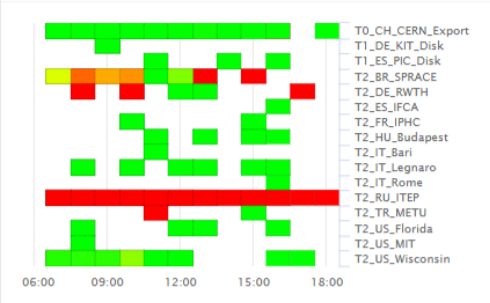
SSB 28 Jan 22:28 Excellent

Time:	4 minutes ago	GGUS tickets:	1
Visible:	OK	Active T2s:	
Site Ready:	OK	HC Glidein:	100.0
SAM3 CE:	OK	Analysis:	88%(7)
SAM3 SRM:	OK	Com. Links:	3/5 combined
Good Links:	OK	Topology:	1 XROOTD . 2 CREAM-CE . 2 SRM .
Running:	1265	IN phedex rate:	34
Pending:	3401	OUT phedex rate:	137

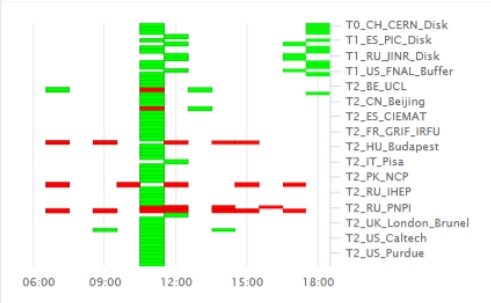
PhedexQualityToProd To Prod 28 Jan 22:27 Bad



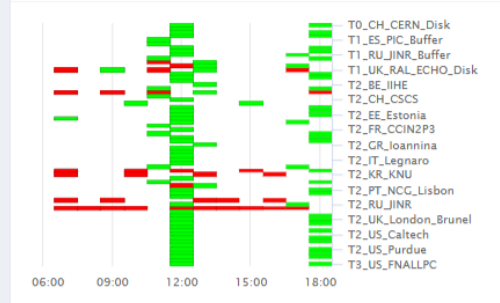
PhedexQualityFromProd From Prod 28 Jan 22:27 Normal



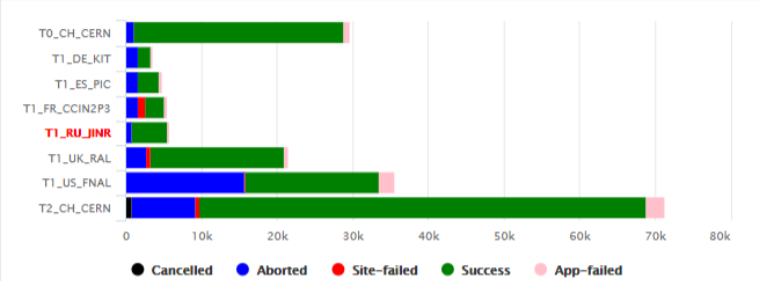
PhedexQualityToDebug To Debug 28 Jan 22:27 Normal



PhedexQualityFromDebug From Debug 28 Jan 22:27 Good



CMSJobStatusMed for last 24 hours 28 Jan 22:28 Bad



PhedexTransfersProd Last 2 hours 28 Jan 22:28 Status

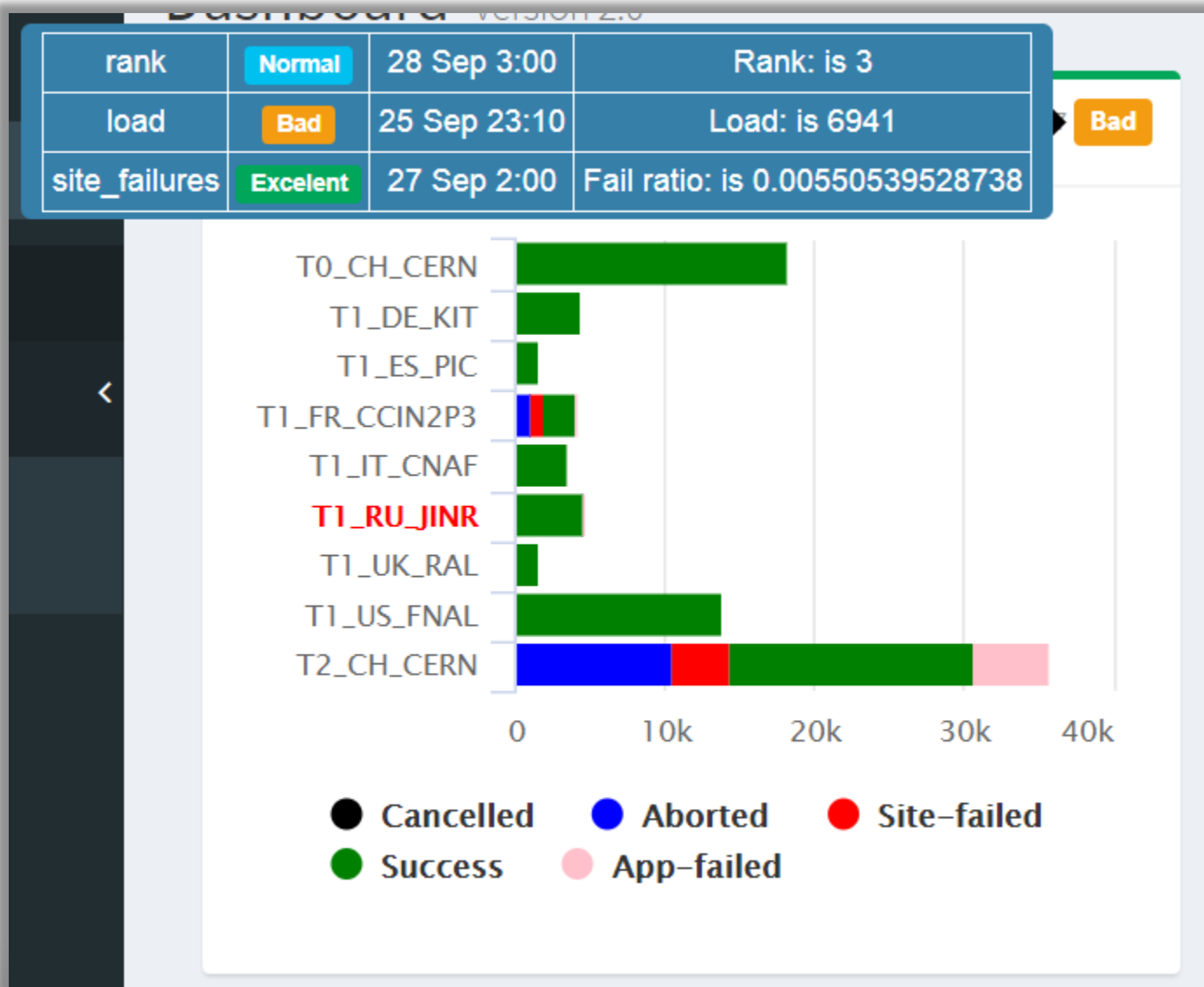
Show 10 entries

Search:

From	To	Done Files	Fail Files	Done Bytes	Fail Bytes
T1_RU_JINR_Disk	T2_RU_ITEP	0	12	0 byte	18.55 GB
T1_RU_JINR_Disk	T2_DE_RWTH	0	11	0 byte	37.79 GB
T2_US_Florida	T1_RU_JINR_Disk	5	0	25.50 GB	0 byte
T1_US_FNAL_Buffer	T1_RU_JINR_Disk	0	0	0 byte	0 byte
TO_CH_CERN_Export	T1_RU_JINR_Disk	1	0	3.80 GB	0 byte
T1_RU_JINR_Disk	T2_KR_KISTI	1	0	1.54 GB	0 byte



Tier-1 Service monitoring





Tier-1 Service monitoring

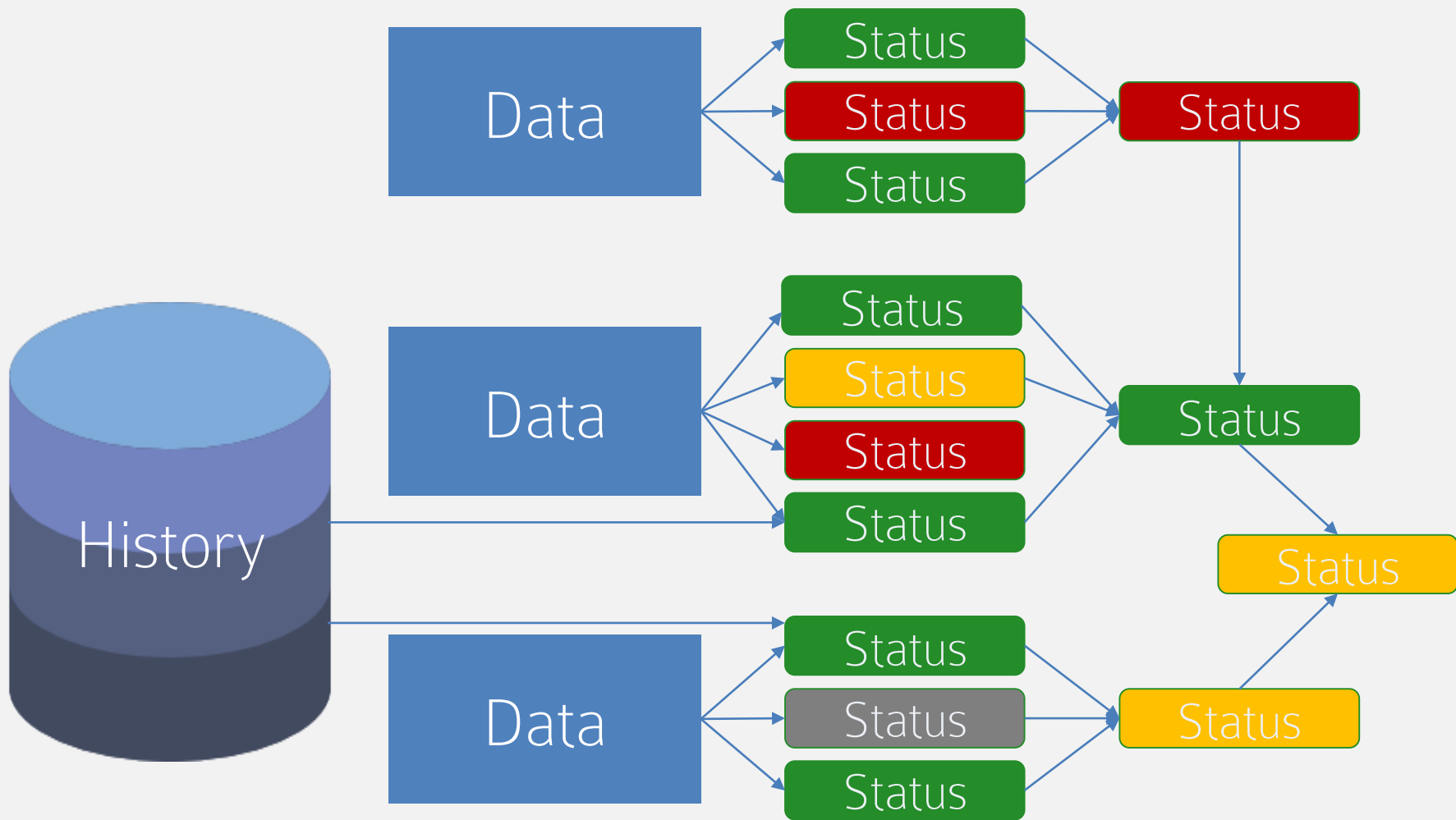
MonstrJournal Last 8 hours

Show entries

ID	Module	Result	Step	Time	Description
632789	PhedexTransfers	Success		10:51 26 Apr (2 minutes ago)	
632788	PhedexErrors	Success		10:51 26 Apr (2 minutes ago)	
632787	CMSJobStatus	Success		10:50 26 Apr (3 minutes ago)	
632786	SSB	Success		10:50 26 Apr (4 minutes ago)	
632785	PhedexErrors	Success		10:46 26 Apr (7 minutes ago)	
632784	CMSJobStatus	Success		10:45 26 Apr (9 minutes ago)	
632783	SSB	Success		10:45 26 Apr (9 minutes ago)	
632782	PhedexTransfers	Success		10:41 26 Apr (12 minutes ago)	
632781	PhedexErrors	Success		10:41 26 Apr (12 minutes ago)	
632780	CMSJobStatus	Success		10:40 26 Apr (13 minutes ago)	
632779	SSB	Success		10:40 26 Apr (14 minutes ago)	
632778	PhedexErrors	Success		10:37 26 Apr (17 minutes ago)	
632777	CMSJobStatus	Success		10:35 26 Apr (18 minutes ago)	
632776	SSB	Success		10:35 26 Apr (19 minutes ago)	
632775	PhedexQuality	Success		10:34 26 Apr (20 minutes ago)	
632774	PhedexTransfers	Success		10:31 26 Apr (22 minutes ago)	
632773	PhedexErrors	Success		10:31 26 Apr (23 minutes ago)	
632772	CMSJobStatus	Success		10:30 26 Apr (24 minutes ago)	
632771	SSB	Success		10:30 26 Apr (24 minutes ago)	
632770	PhedexErrors	Success		10:26 26 Apr (27 minutes ago)	
632769	CMSJobStatus	Success		10:25 26 Apr (29 minutes ago)	
632768	SSB	Success		10:25 26 Apr (29 minutes ago)	
632767	PhedexTransfers	Success		10:21 26 Apr (32 minutes ago)	



Statuses





DevOps



GitHub

<https://github.com/tier-one-monitoring>



Landscape.io – Coding style check



Travis CI

Travis CI – Continuous Integration
Installation, Regressive, Compatibility,
Functionality, ...



COVERALLS

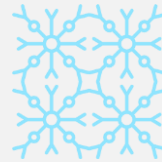
Covetalls.io – Code coverage



Conclusion



Software development is expensive (time, qualification)



Same but different



Definitely useful

Thank you for attention!

