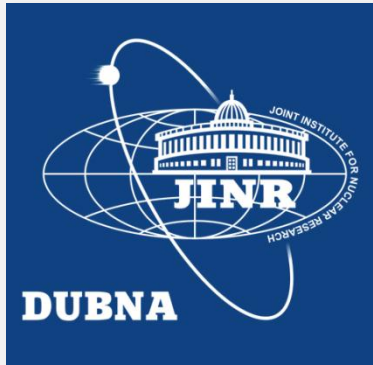


Multy-level monitoring system for Multifunctional Information and Computing Complex at JINR



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



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



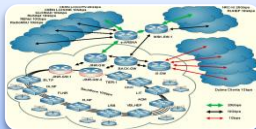
Cloud infrastructure



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



Data storage, processing, analysis

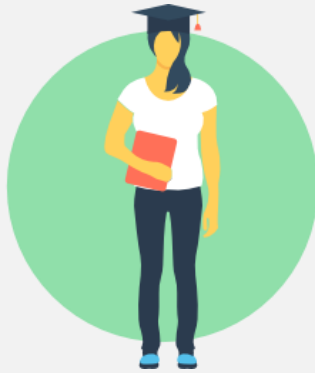


During three years more than **15 million** tasks have been carried out at the Computing center of JINR



Multifunctional Information and Computing Complex

Users



Admins



Executives



Network infrastructure



Engineering infrastructure



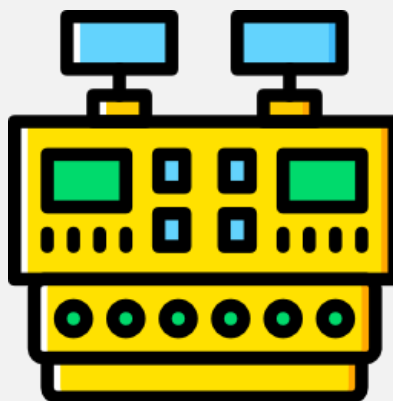
What is the “Monitoring”

Warning detection
and notification



Immediate

Properties
visualization



Actual

Accounting



Periodic

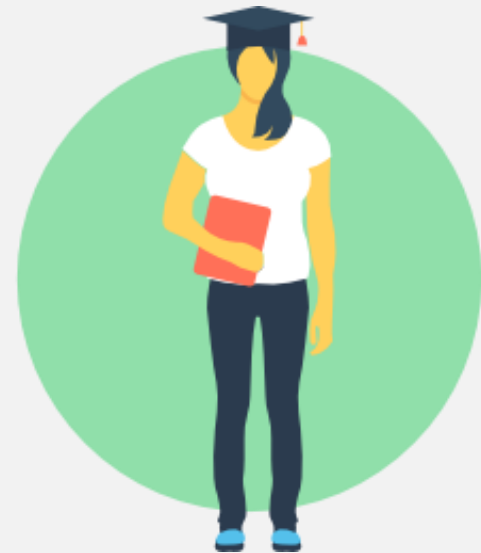




For Users

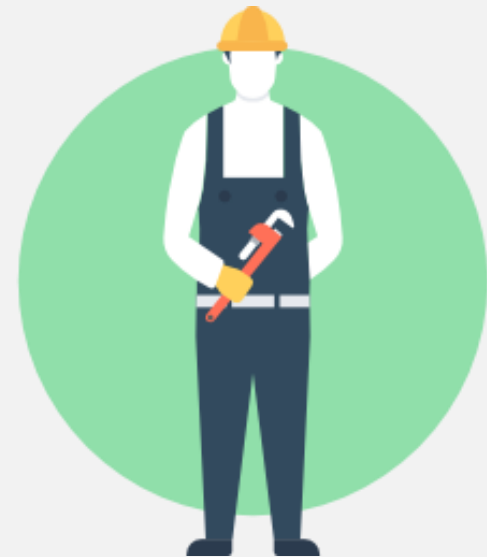
Important when:

- 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



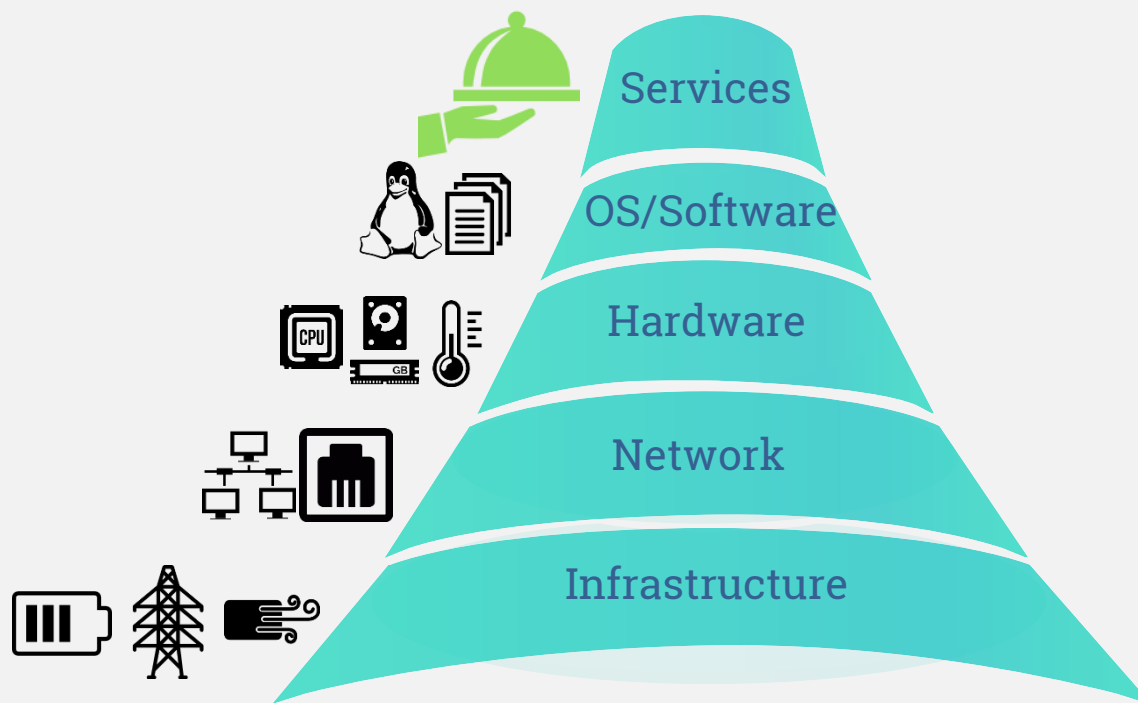
Important for:

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



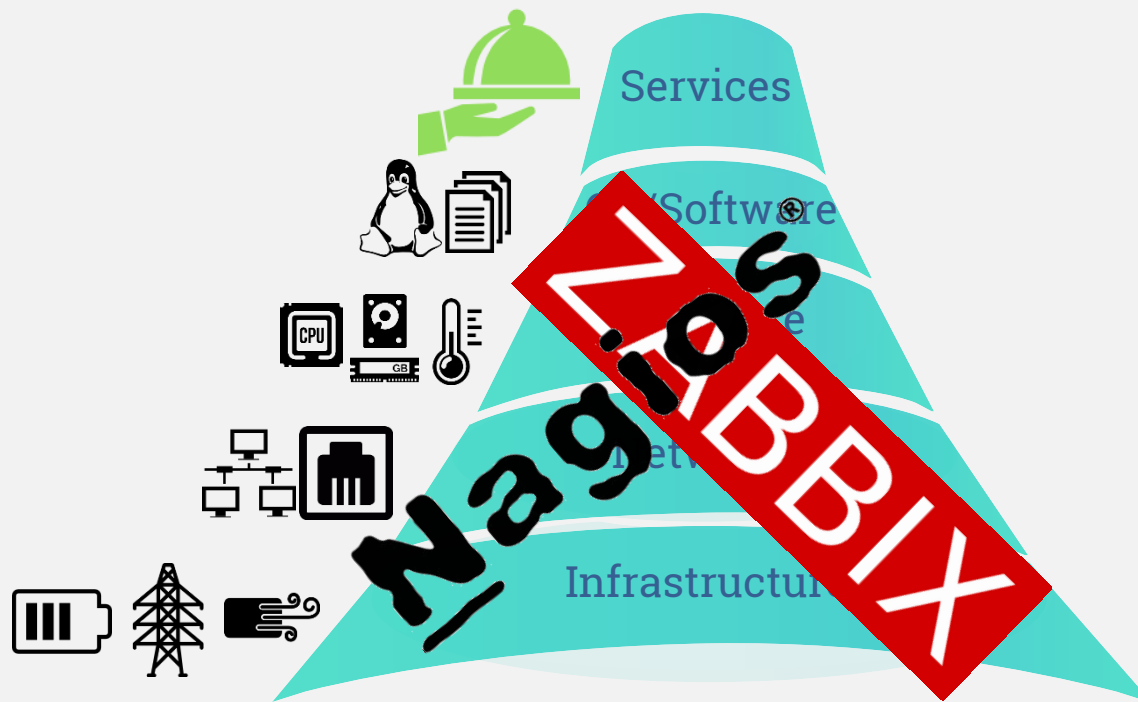


What we monitor





What we monitor

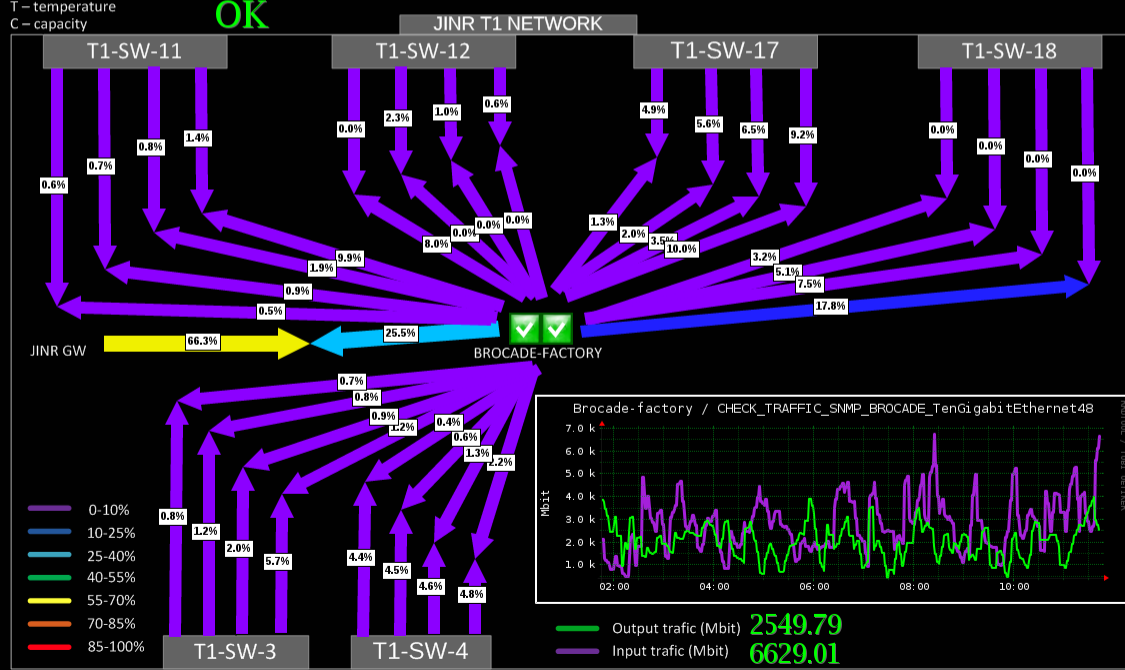
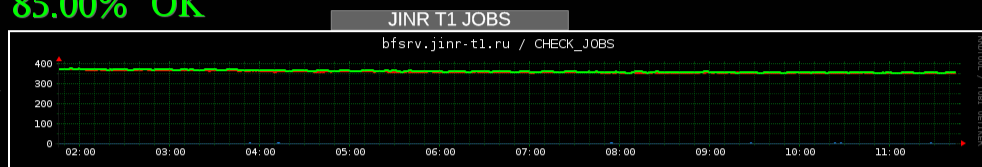
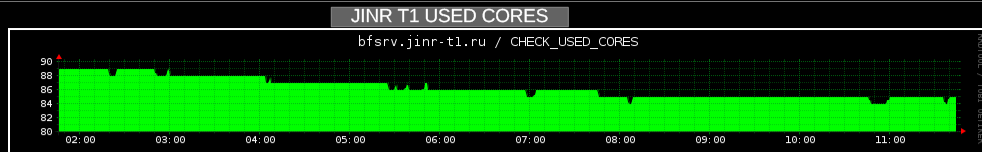
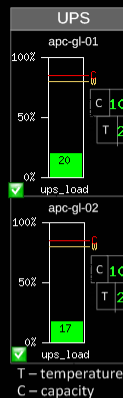




Tier-1 monitoring



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	COMMON SERVERS	Tier-1 dCache
apc-rc-10	t1-s154-158	se-hd02
apc-rc-13	t1-s159-161	r14cmm0-4
apc-rc-16	t1-s170-174	r24cmm0-4
apc-rc-19	t1-s175-177	r25cmm0
apc-rc-24		
apc-rc-27		
apc-rc-5		
apc-rc-2		
SPARE SERVERS	Tier-1 blades CMM	Tier-1 enstore
rda031,32	cmsvb01-02	enstore01-02
	lxvh000-002	

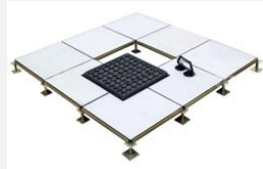




Engineering infrastructure



Raised Flooring System



Fibre Optic & Data Structured Cabling System



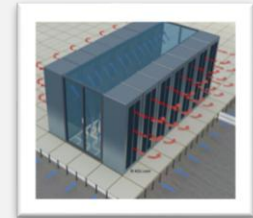
Diesel generator set



Uninterruptible power supply



High Density Heat Containment System



Computer Room Air Conditioner



Water Detection System



MICC Monitoring System



Biometric Access System



Fire Suppression System



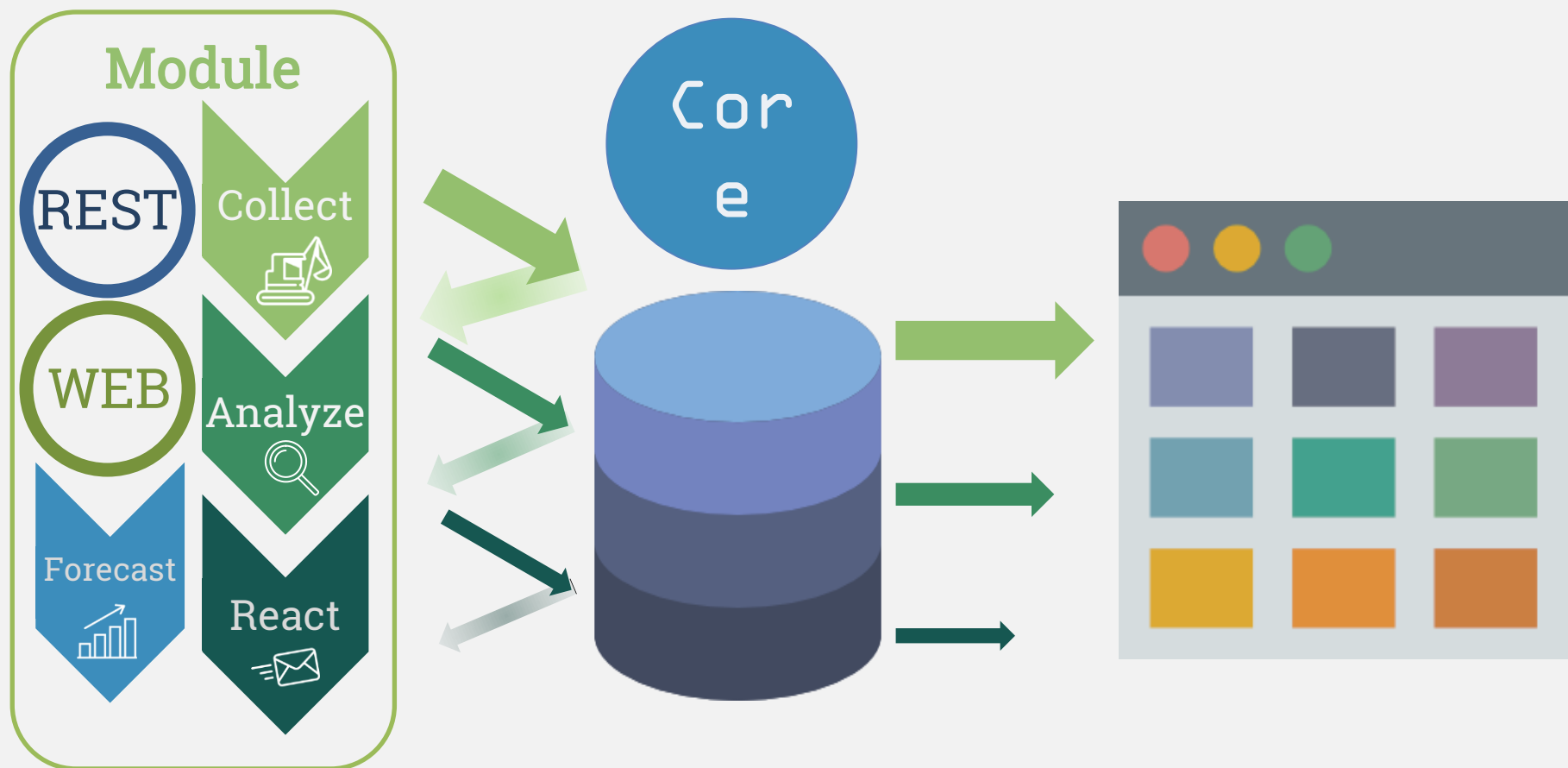
Surveillance System



VESDA (Very Early Smoke Detection Apparatus)

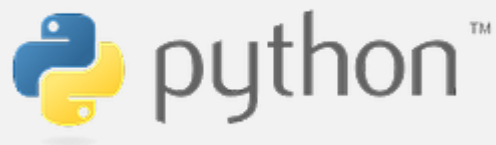


Tier-1 Service monitoring





Tier-1 Service monitoring



python™



DataTables

django



ANGULARJS

by Google



Bootstrap



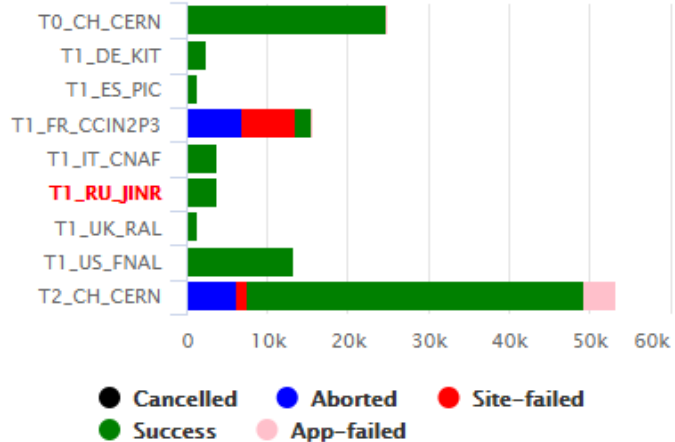


Tier-1 Service monitoring

Dashboard Version 2.0

rank	Normal	27 Sep 19:00	Rank: is 3
load	Bad	25 Sep 23:10	Load: is 6941
site_failures	Excellent	27 Sep 2:00	Fail ratio: is 0.00550539528738

Bad



SSB

28 Sep 1:15 **Excellent**

Time:	a minute ago	GGUS tickets:	0
Visible:	OK	Active T2s	
Site Ready:		HC Glidein	100.0
SAM3 CE:	OK	Analysis:	95%(621)
SAM3 SRM	OK	Com. Links	3/5 combined
Good Links:	OK	Topology	2 CREAM-CE , 2 SRM ,
Running:	2011	IN phedex rate	485
Pending:	4920	OUT phedex rate	586

PhedexQualityFromProd From Prod

28 Sep 1:10 **Status**



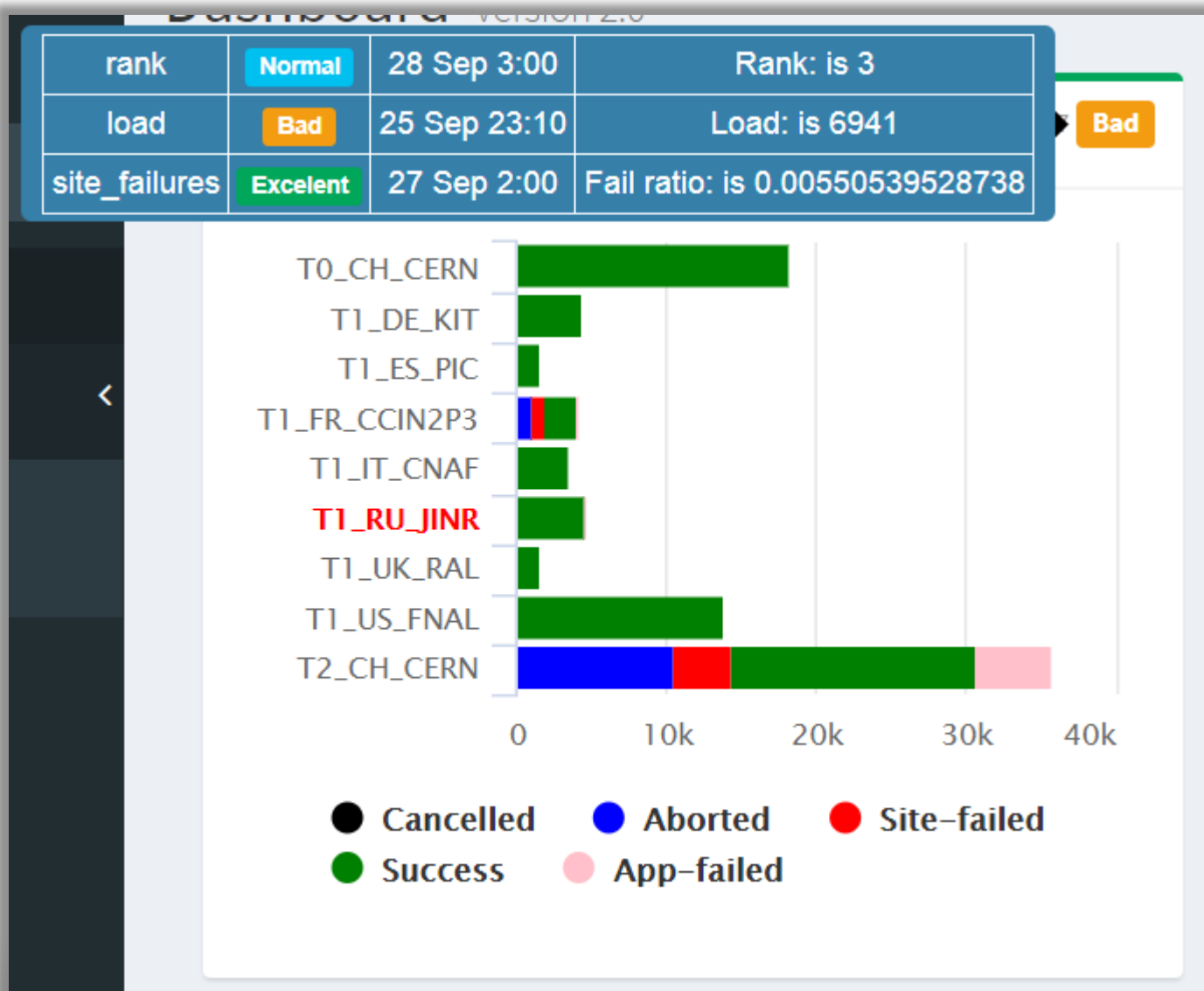
PhedexQualityToDebug To Debug

28 Sep 1:10 **Status**





Tier-1 Service monitoring





Tier-1 Service monitoring

MonstrJournal Last 8 hours 26 Apr 10:53 **Status**

Show **50** entries Search:

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)	



MICC Control Room

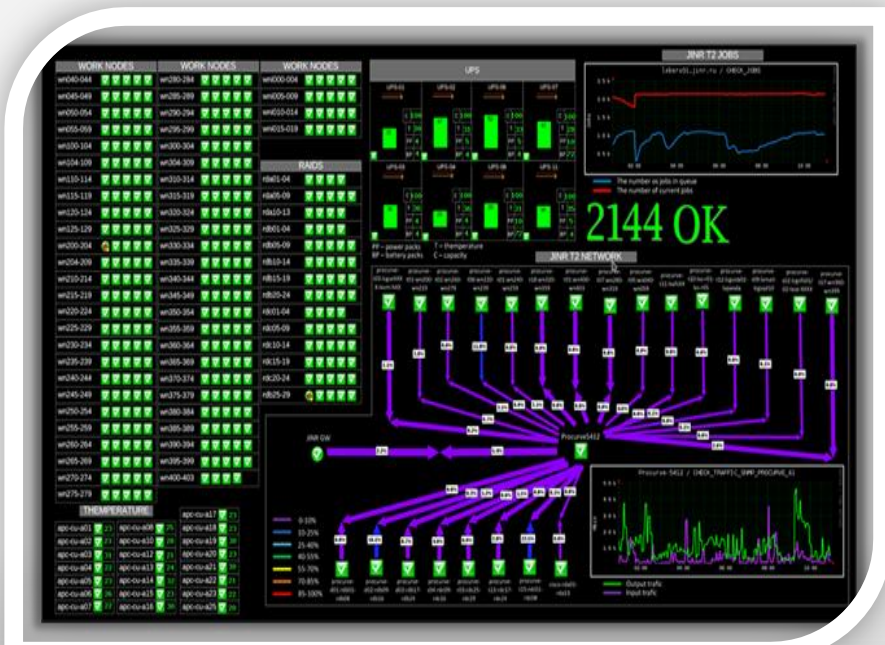
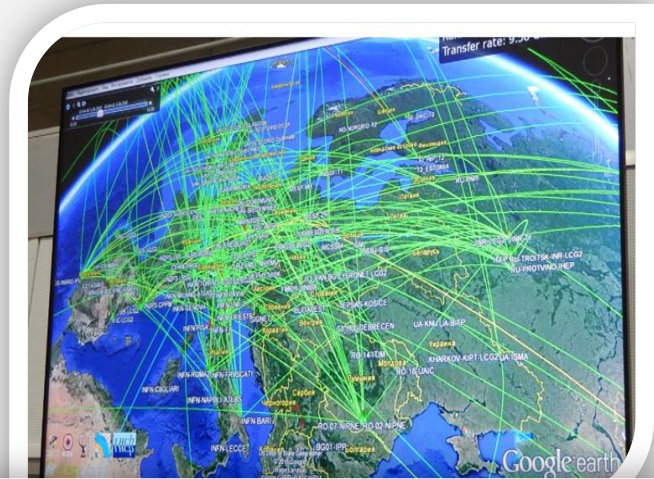
The monitoring system of the JINR Computing Complex has been developed and put into exploitation.

System allows one, in a real time mode, to observe the whole computing complex state and send the system alerts to users via e-mail, sms, etc.

~ 850 elements are under observation

~ 8000 checks in real time

~ 100 scripts

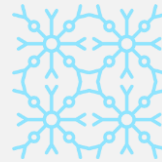




Conclusion



Software development is expensive (time, qualification)



Same but different



Definitely useful

Thank you for attention!

