Development of JINR Tier-1 service monitoring system

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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

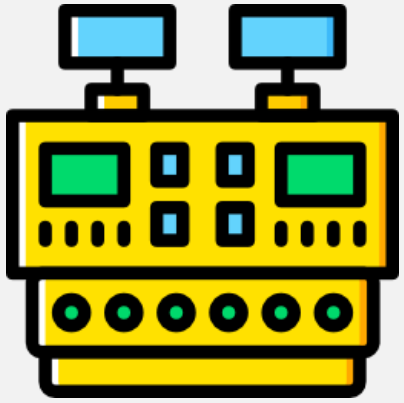
Network infrastructure

Engineering infrastructure

What is the “Monitoring”

Warning detection and notification

Properties visualization



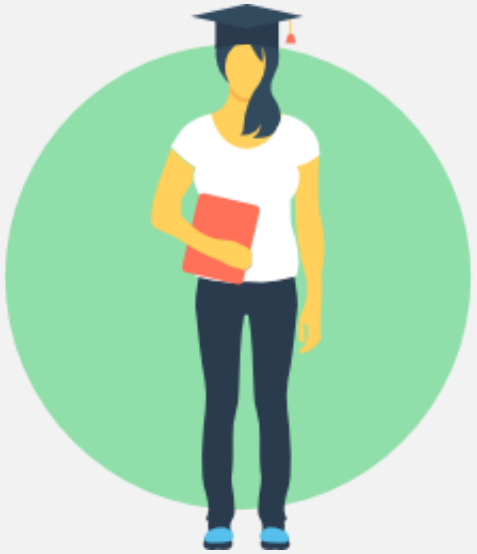
Accounting

Immediate — Actual — Periodic

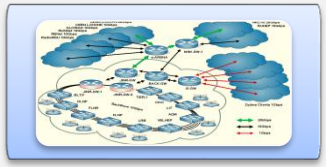
For Users

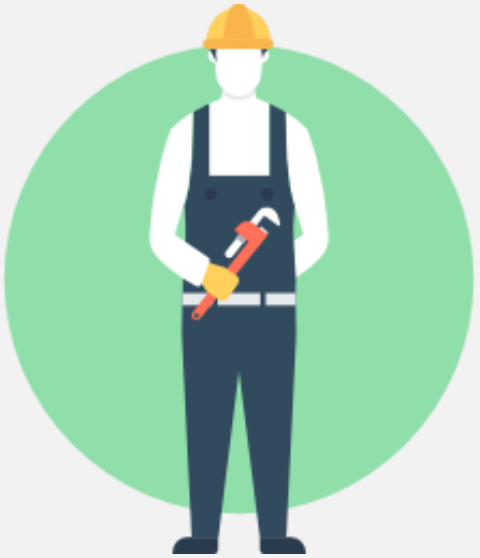
Important when:

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



For Admins

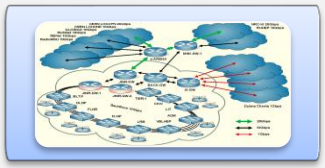



Important for:

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

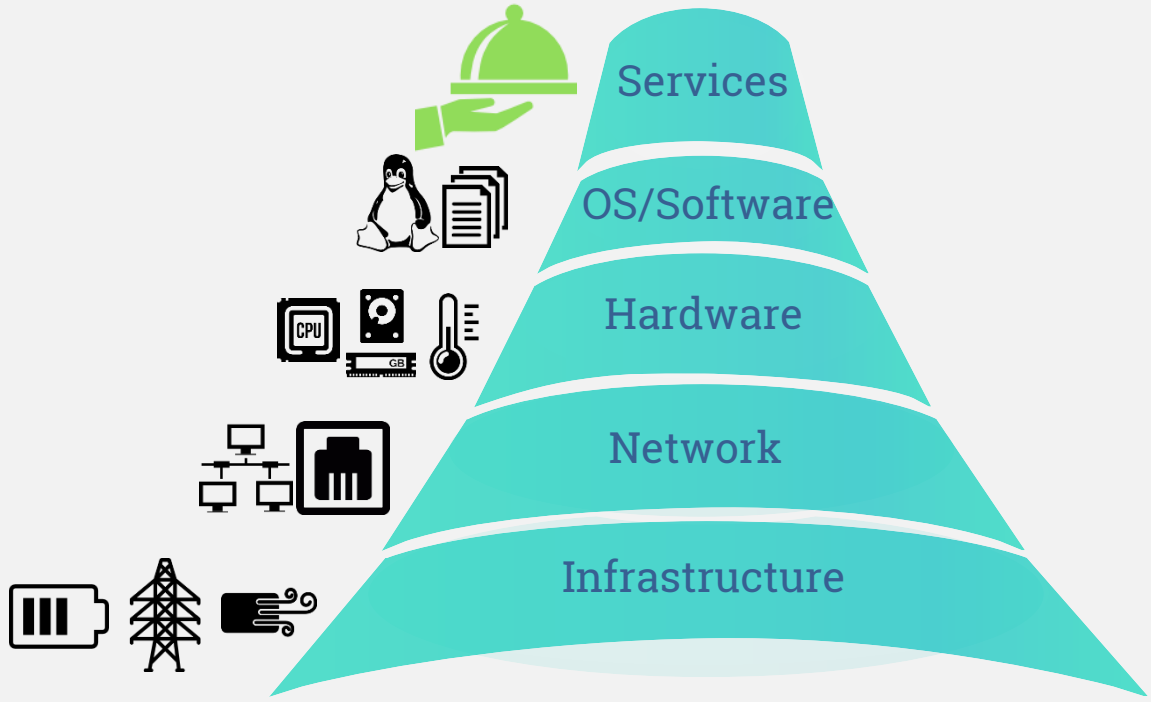
For Executives


( )

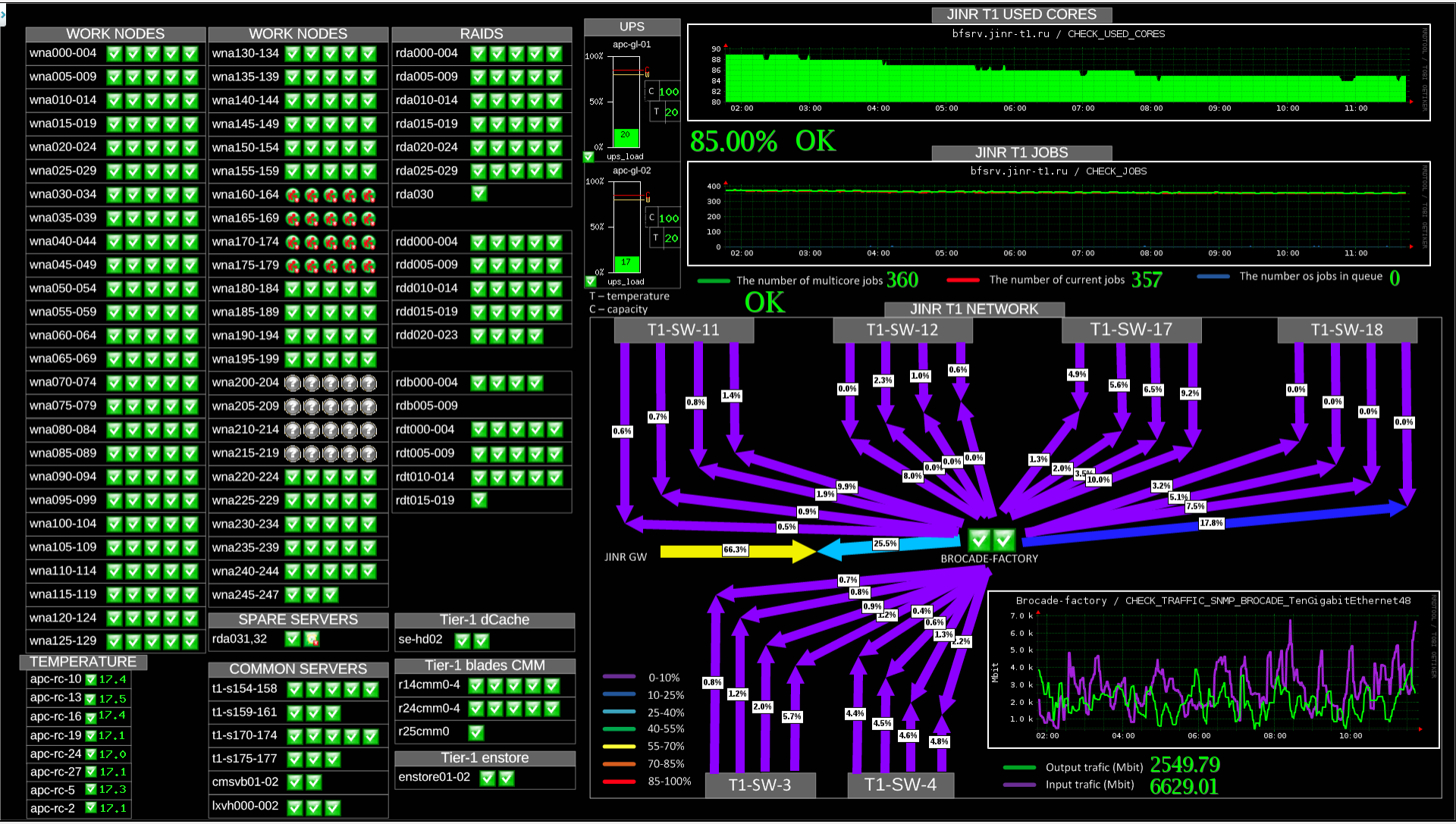
Important for:

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

What we monitor



Tier-1 monitoring



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

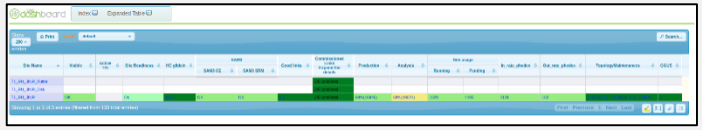
Tier-1 services

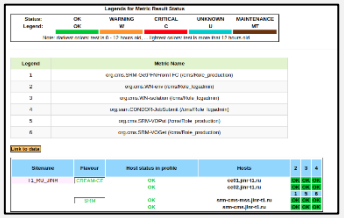
Apart from hardware metrics, service metrics are scattered among many internal and external systems.

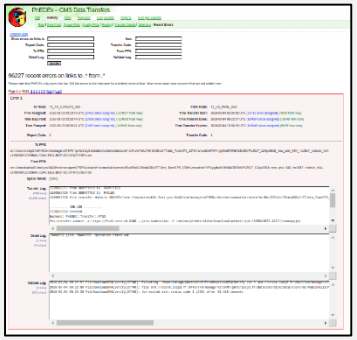
This information relates to data transfers, data storage and data processing. In order to keep track of the services admin should regularly check several dozens of web pages. Interpretation of data is more complex.

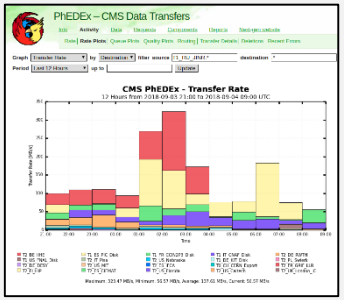
Aim is:

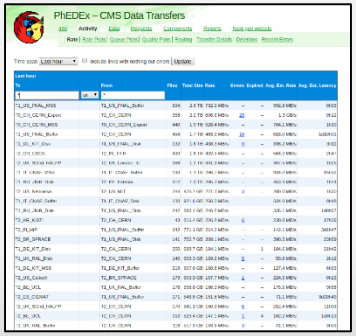
1. Provide a single source of aggregated monitoring information.
2. Perform basic analysis of data and provide status of the system.





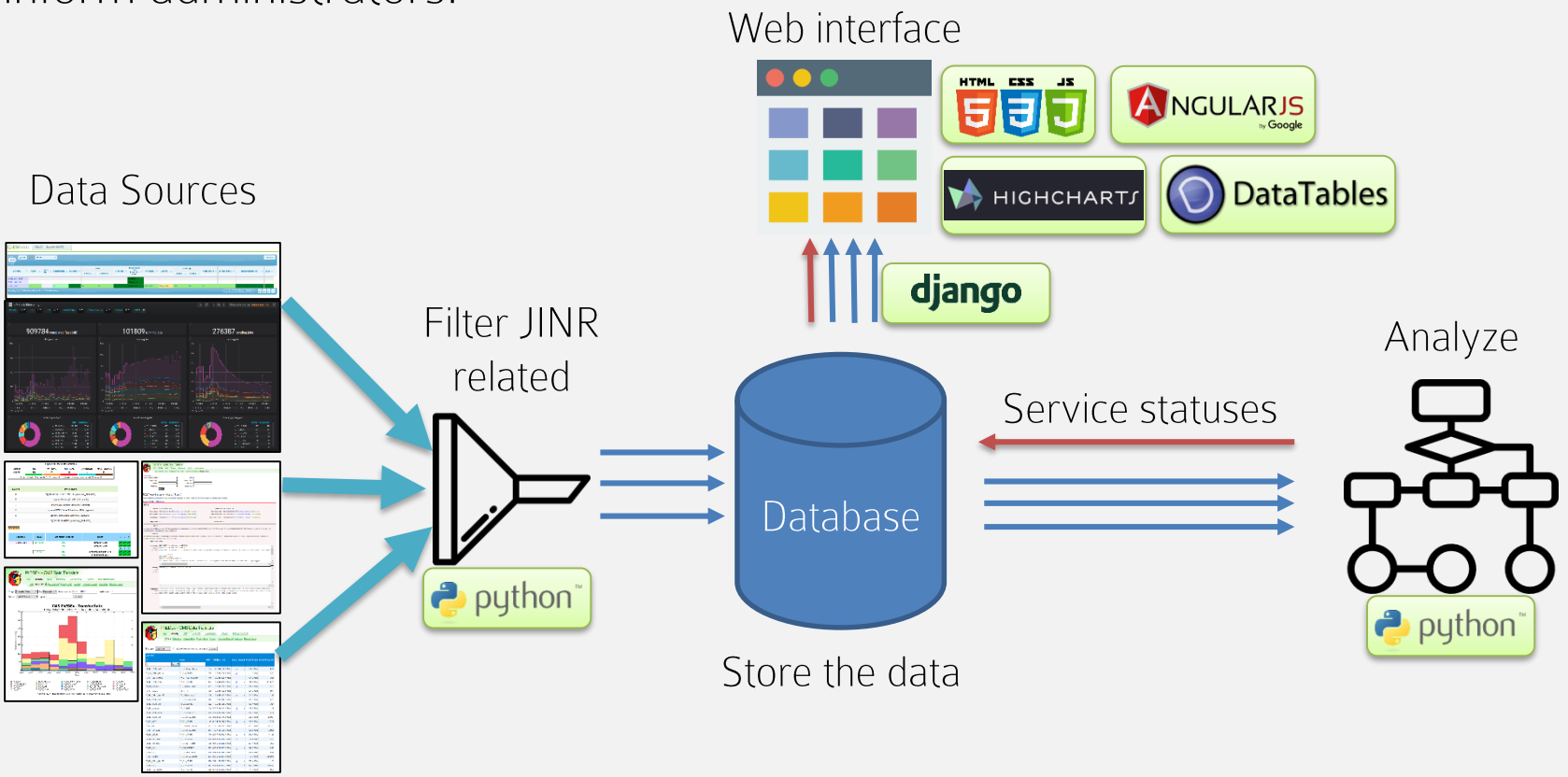




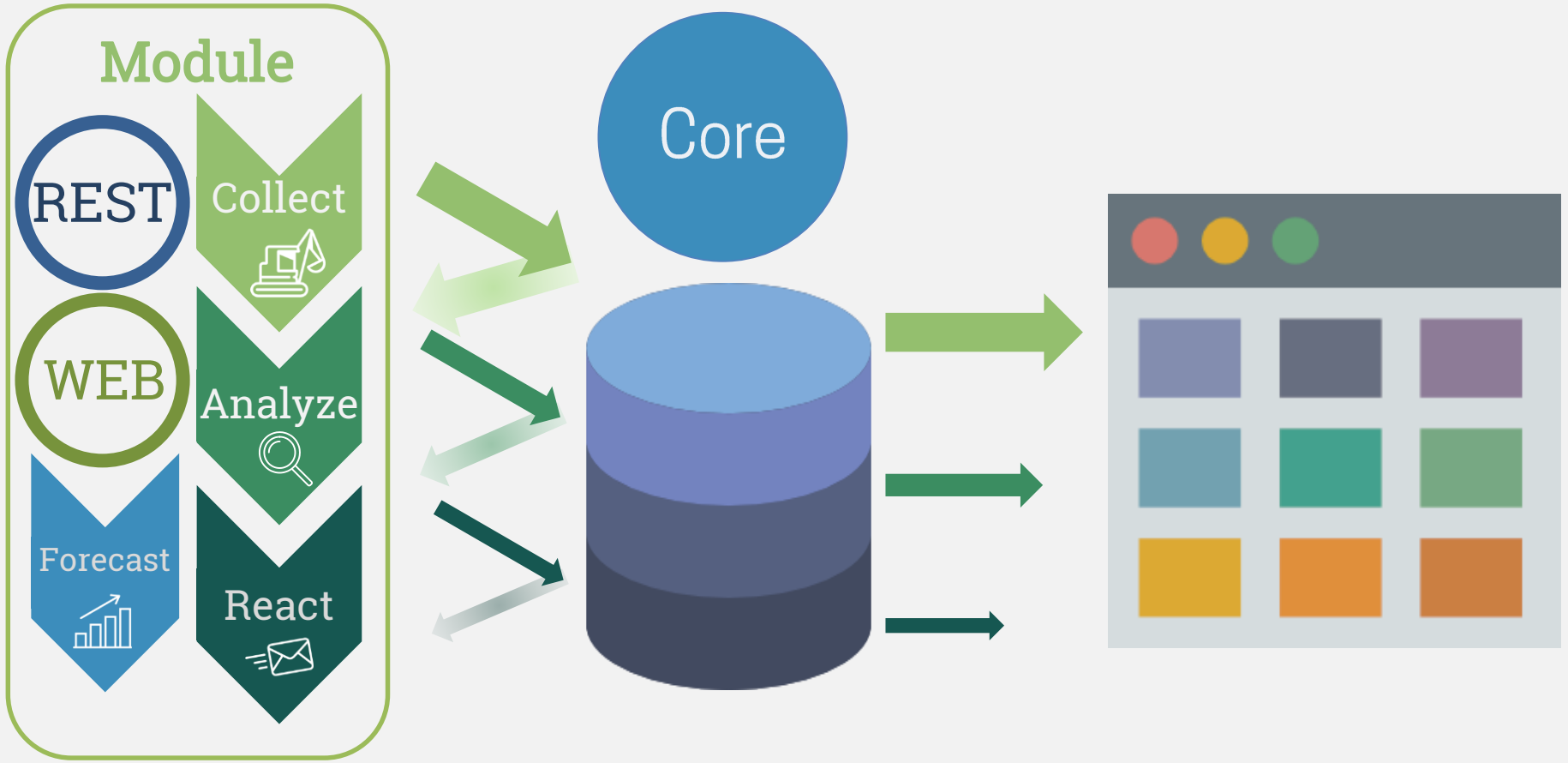


Tier-1 Service monitoring

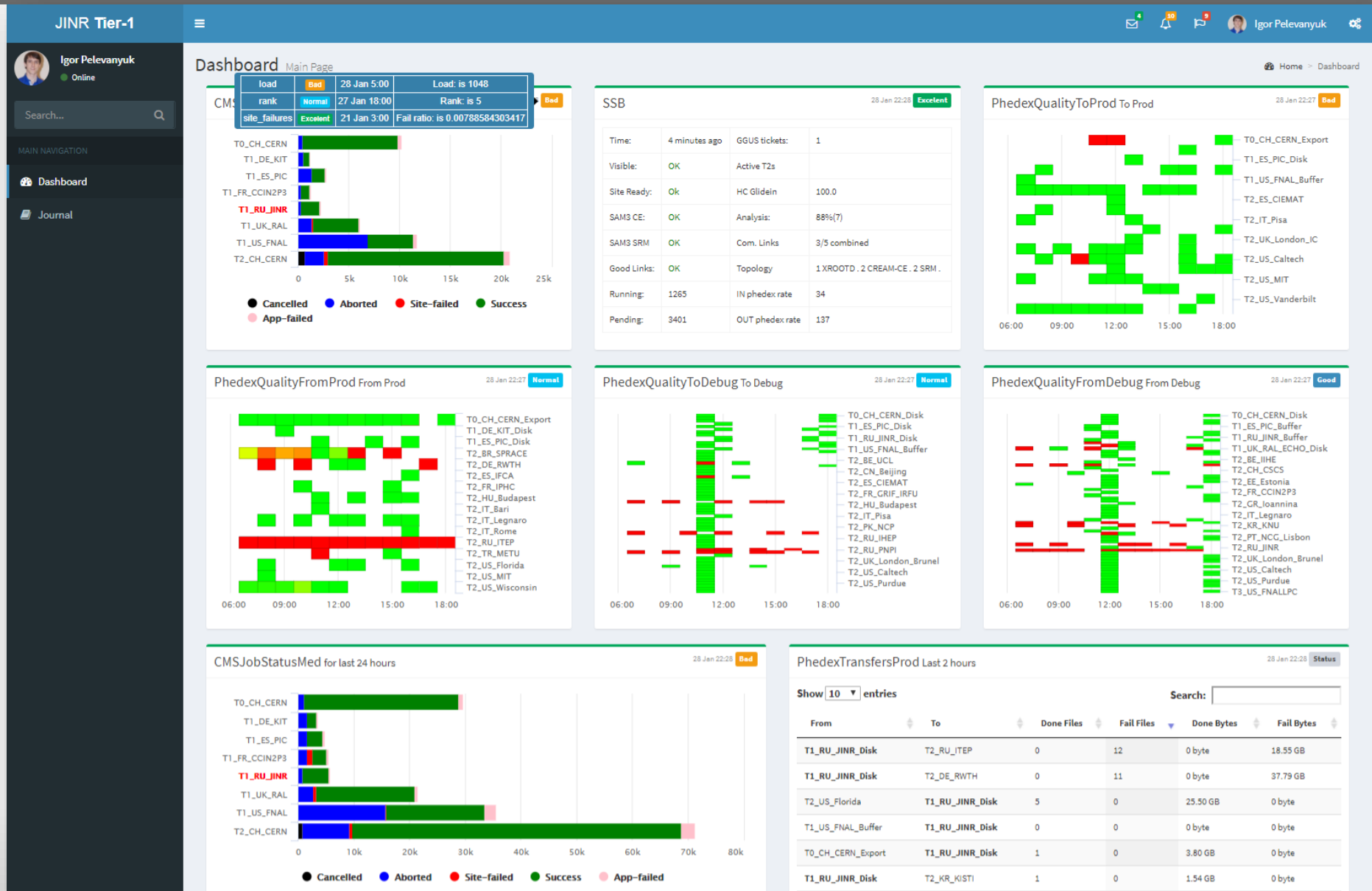
Idea is to collect, aggregate and analyze data from different sources. Then provide in comprehensive form on the web page. In case of critical failures – inform administrators.



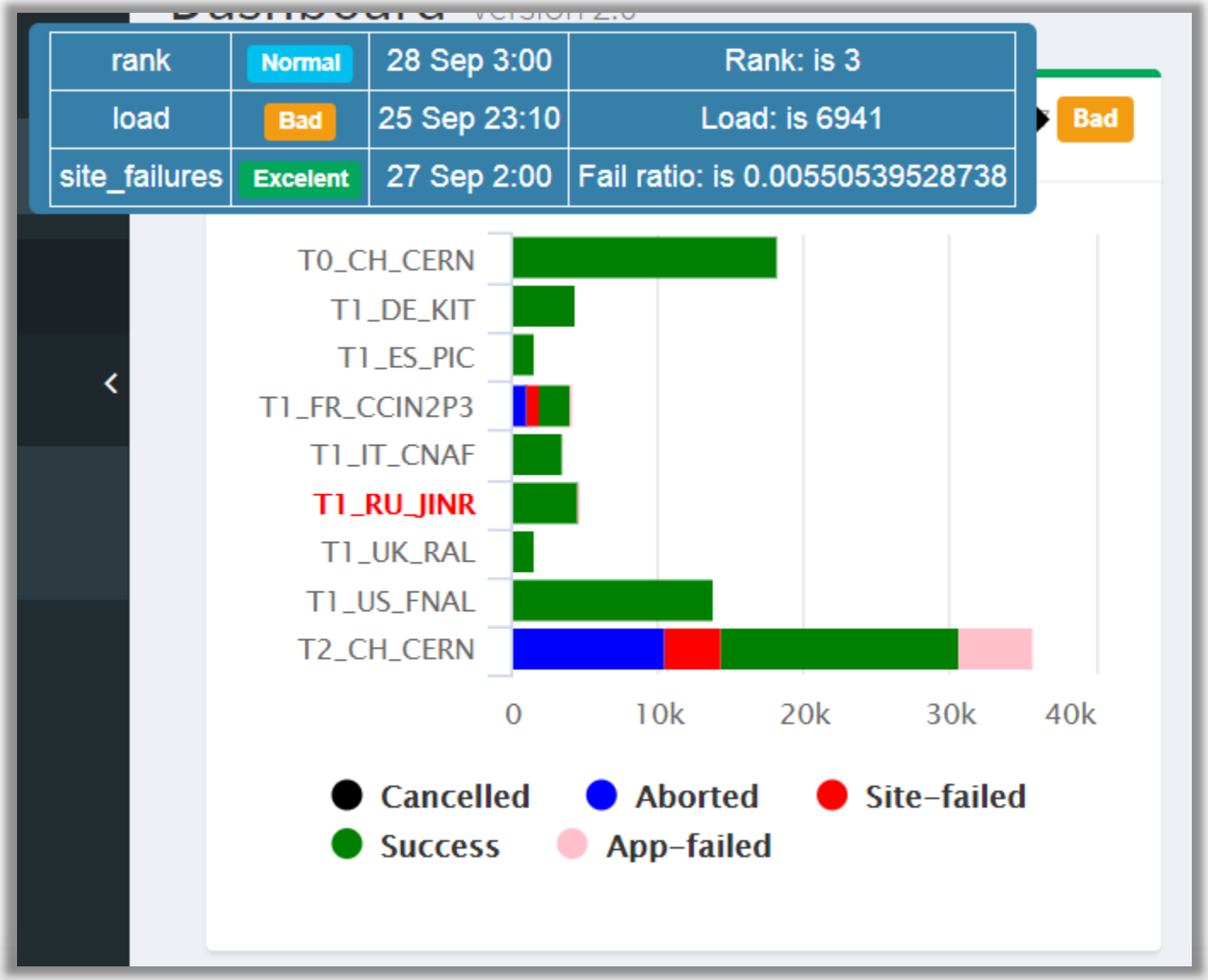
Tier-1 Service monitoring



Tier-1 Service monitoring



Tier-1 Service monitoring



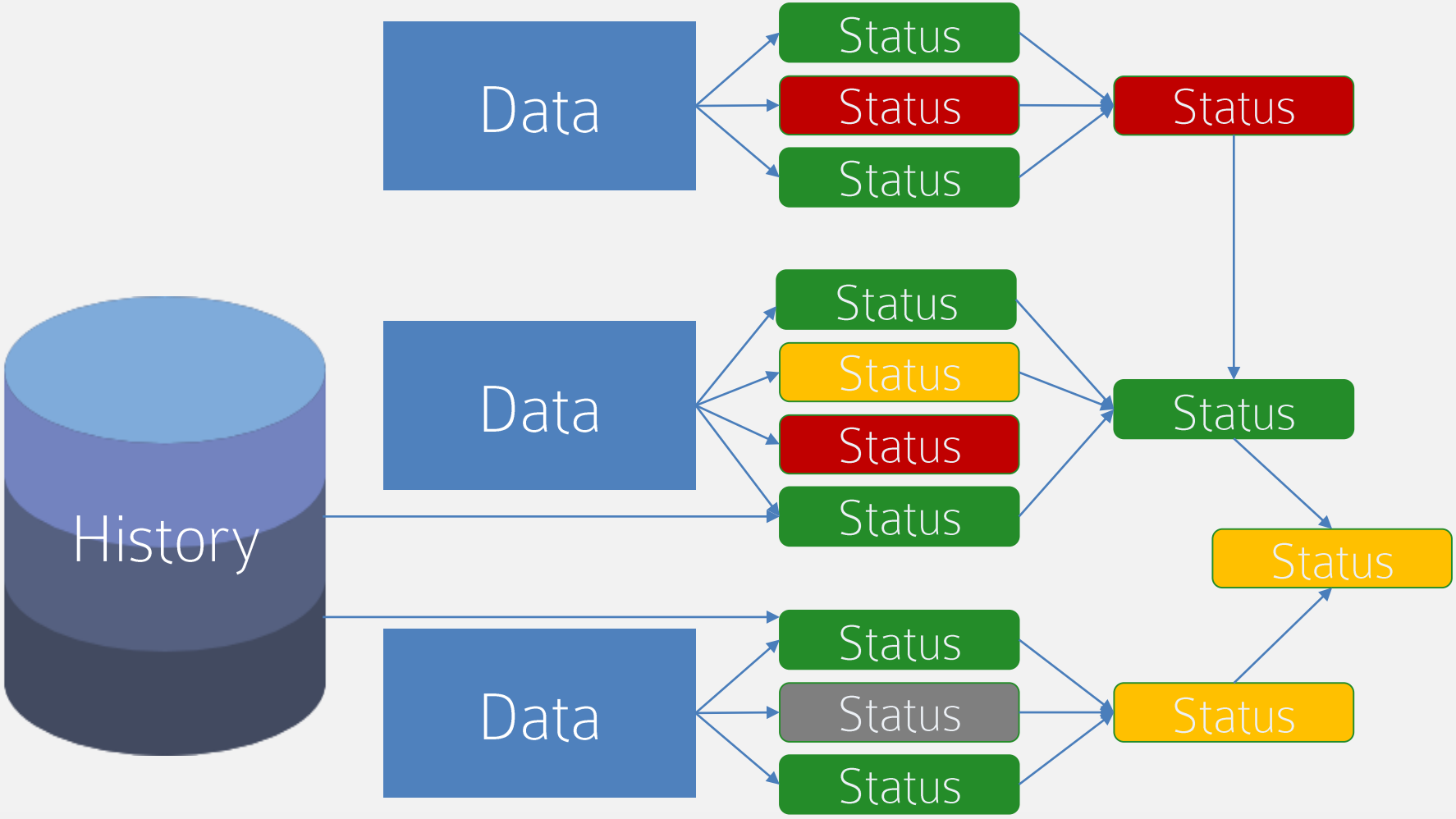
Tier-1 Service monitoring

MonstrJournal Last 8 hours

Show 50 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


Data
Status
Status
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Data
Status
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Status
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History
Data
Status
Status
Status
Status
Status

DevOps

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

Landscape.io – Coding style check

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

Covetalls.io – Code coverage

Conclusion

Software development is expensive (time, qualification)

Same but different

Definitely useful

Thank you for attention!