НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ЦЕНТР «КУРЧАТОВСКИЙ ИНСТИТУТ»

Data Knowledge Base current status and operation

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with support from NRC “Kurchatov institute” and from Marina Golosova, Vasilii Aulov, Mikhail Borodin

The Data Knowledge Base (DKB) project is aimed at knowledge acquisition and metadata integration, providing fast response for a variety of complicated queries, such as summary reports and monitoring tasks (aggregation queries) and multi-system join queries, which are not easy to implement in a timely manner and, obviously, are less efficient than a query to a single system with integrated and pre-processed information would be. In this work the current status of the project as well as its integration with the ATLAS Workflow Management and future perspectives are shown.

Introduction

The Data Knowledge Base (DKB) project is aimed at knowledge acquisition and metadata integration

Started at 2016 v1 main purpose

- Integrate and link pieces of information from independent sources (pdf, indico, wiki pages,…)
- Reconstruct connections between research results and data samples
- Provide fast and flexible access to everything people might want to know about some process or object

2018 v2

- Universal tool for multi-source queries
  - Library pyDKB
  - ATLAS dataflow system
    - ETL flow based on scripts and library
    - System to run and check flow
    - Database to store results
    - REST API to access system
    - Frontend UI for users

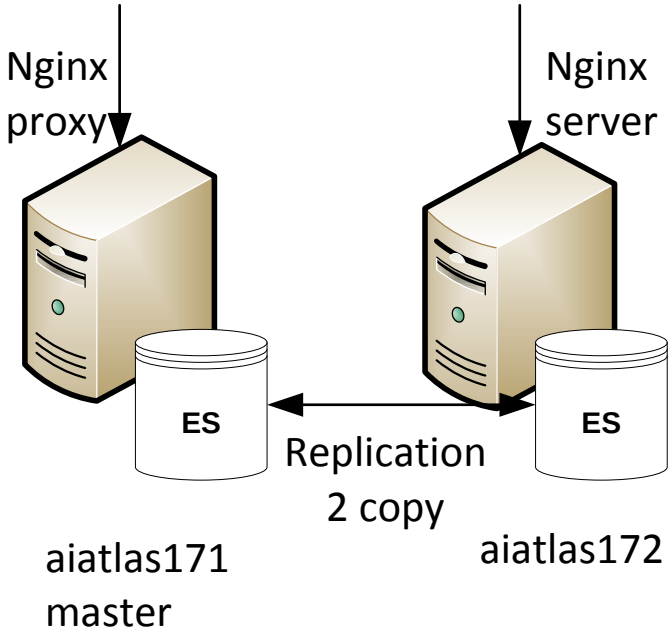
Current environment

host	OS	where	Running	Alias	Puppet
aiatlas172	CC7-x86_64	cern-geneva-a	4 years	api.atlas-dkb.cern.ch	master
aiatlas171	CC7-x86_64	cern-geneva-a	4 years	es.atlas-dkb.cern.ch	master
atlas-dkb-dev-1	CC7-x86_64	cern-geneva-c	7 months	-	qa
atlas-dkb-dev-0	CC7-x86_64	cern-geneva-b	7 months	-	qa
dkb-dev-cc7	CC7-x86_64	cern-geneva-b	1 year	-	-

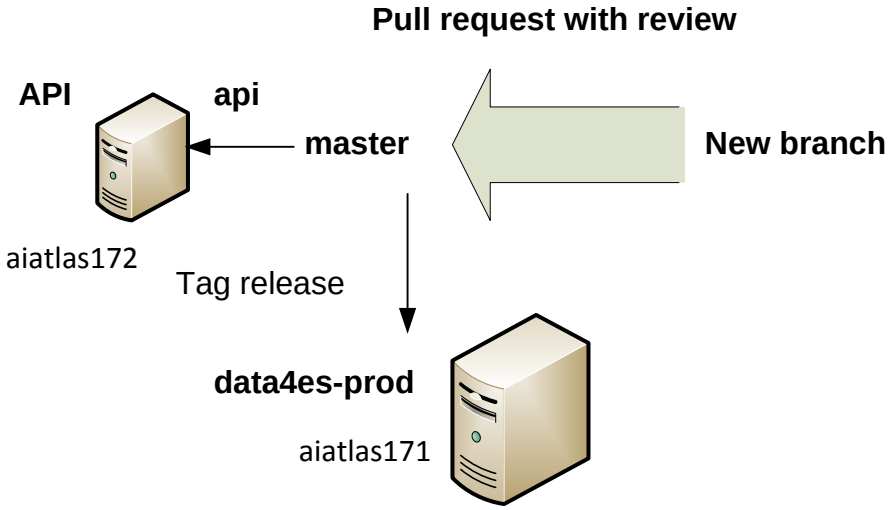
gitlab.cern.ch it-puppet-hostgroup-voatlasdkb
https://github.com/PanDAWMS/dkb

Current environment

es.atlas-dkb.cern.ch **api.atlas-dkb.cern.ch**



https://github.com/PanDAWMS/dkb



API – api (0.3.3)

DKB flow - data4es-prod (tags v0.2-0)

Current environment: numbers

```
[root@aiatlas171 ~]# curl -sS -X GET 'http://127.0.0.1:9200/_cat/indices?v' | grep -e docs.count -e 0_1_1
health status index                            uuid                   pri rep docs.count docs.deleted store.size pri.store.size
green  open   nested_production_tasks_v0_1_1    PxedXrvvTtuDz8oHcx8Tug   4   1    7158575       187500     13.5gb          6.7gb
green  open   nested_analysis_tasks_v0_1_1      mmbaOhMASO-Jry5fz5QALQ   4   1   57789339       196118       51gb         25.5gb
green  open   nested_analysis_progress_v0_1_1   Ab6deEeyR3iRfj5rViNxNg   4   1    2622630         5969    425.2mb        212.2mb
green  open   nested_production_progress_v0_1_1 KR-1DyB3SAischb2ZfqEvA   4   1    1000876        19979    286.4mb        142.6mb
```

DKB workflow runs every hour by cron

- ATLAS production 980 sec (654 tasks 590 datasets)
- ATLAS analysis 316 sec (815tasks 4263datasets)

Consistency check every day

- Check if some records in DB missed in DKB

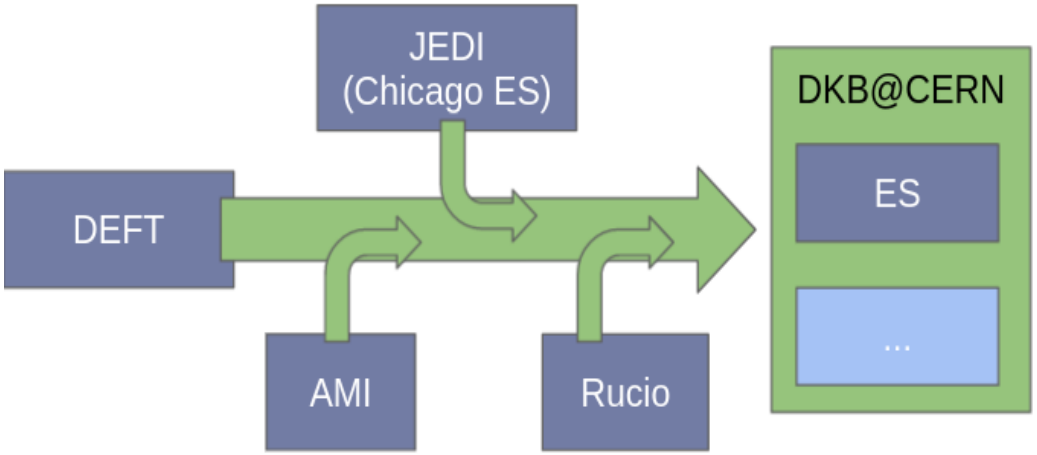
Access from aipanda[xx].cern.ch

```
cat /var/log/nginx/es.access.log| awk '{print $1;}'| sort | uniq  -c
     11 188.184.80.118
     30 188.185.66.16
   2268 188.185.70.23
```

Current DKB metadata integration

ATLAS case:

- information update is based on “task timestamp” from ProdSys;
- main information comes from DEFT (Database Engine for Tasks) and is extended with additional metadata from other systems:
  - AMI – ATLAS Metadata Interface
  - JEDI - Job Execution and Definition Interface
  - Rucio - scientific data management system



Current DKB metadata integration

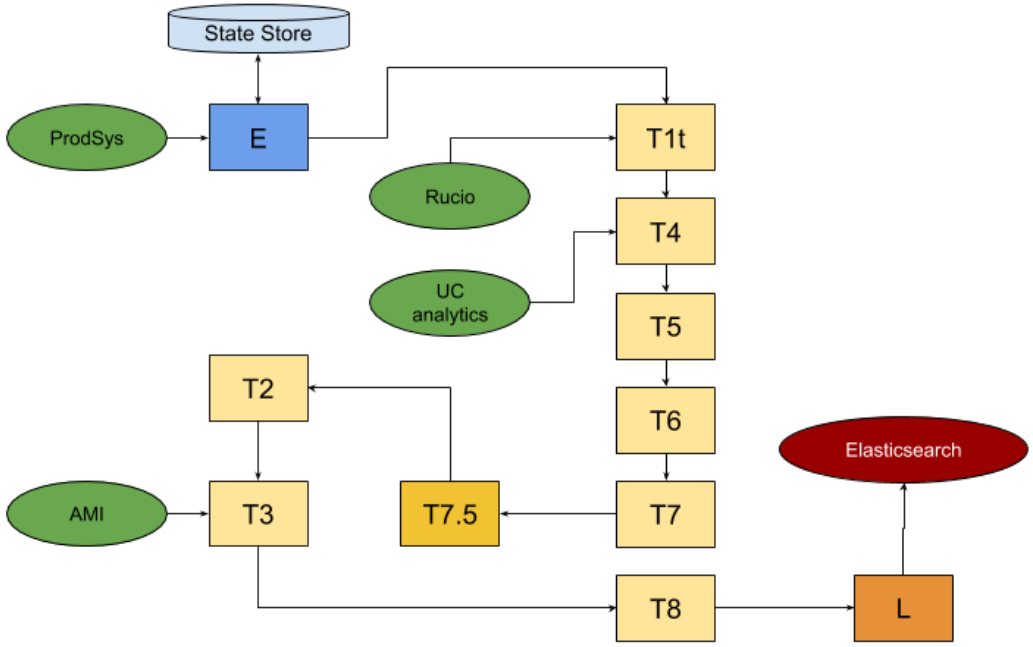
ATLAS flow:

- ETL (Extract, Transform,Load) process
- Single bash script for data flow
  - Stages flow parts
  - DKB python library to build stages

Utils/Dataflow/data4es-nested/run/data4es-start

```
....
source_chain() {
 run_stage '09' | tee $b_process
}
process_chain() {
 cat $b_process | run_stage '91' | eop_filter \
          | run_stage '25' | eop_filter \
          | run_stage '16' | eop_filter \
          | run_stage '17' | eop_filter \
          | run_stage '40' | eop_filter \
          | run_stage '93' | eop_filter \
          | run_stage '95' | eop_filter
}
# Sink chain
sink_chain() {
 [ -n "$DEBUG" ] \
  && cmd_69="tee"
 tr $'\n' $'\x1e' | run_stage '19' "$1" | tr -d $'\x1e' | eop_filter \
          | mediator "$1" | run_stage '69' "$1" > /dev/null
}
process_chain | tee $out | sink_chain from95
```

```
Utils/Dataflow/data4es-nested/
009_oracleConnector
025_chicagoES
091_datasetsRucio
016_task2es
040_progress
093_datasetsFormat
017_adjustMetadata
069_upload2es
095_datasetInfoAMI
019_esFormat
071_esConsistency
```

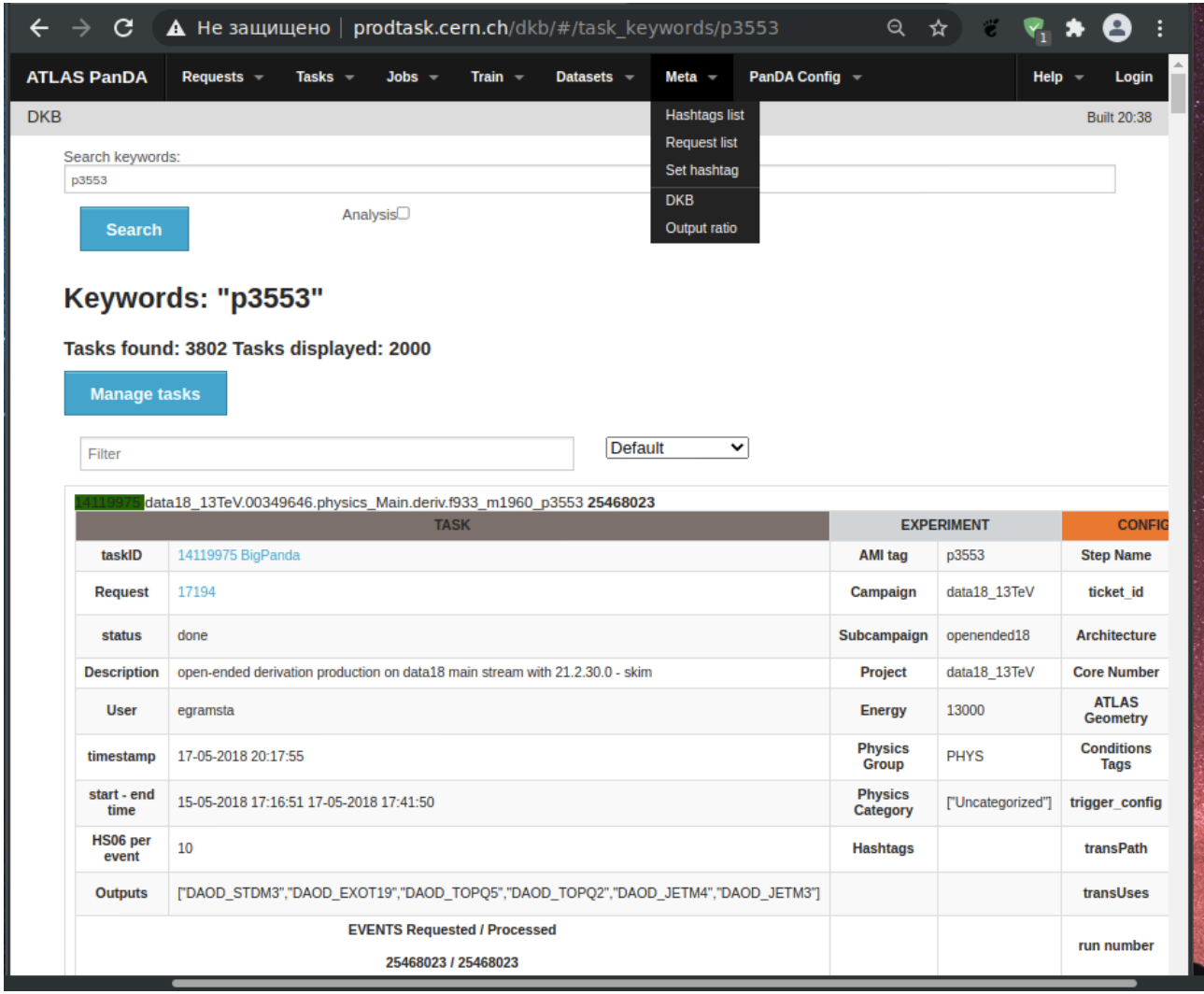


ATLAS DKB UI + REST API

https://prodtask.cern.ch/dkb/

Added for ProdSys by Mikhail Borodin

- Google-like search for tasks and related datasets
- High-level aggregated view
- Generated on demand (up to date information)
- Takes only few seconds to load the page
- Based on #tag(universal" may be used for different use-cases)
  - dkb/#/output_stat
  - dkb/#/steps_stat
  - dkb/#/deriv_ratio
  - dkb/#/task_keywords



http://api.atlas-dkb.cern.ch:5080/

- /server_info - Server info
- [/path/to/category]/info - Method/category info
- /task/kwsearch - Tasks keyword search
- /task/chain - Task chain reconstruction
- /task/hist - Tasks distribution over time (by steps)
- /task/deriv - Derivation efficiency
- /campaign/stat - Campaign statistics
- /step/stat - Steps statistics

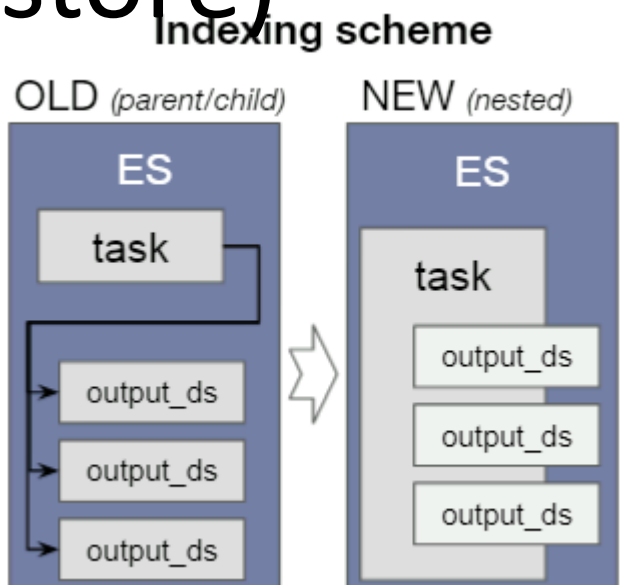
Resent changes (ES store)

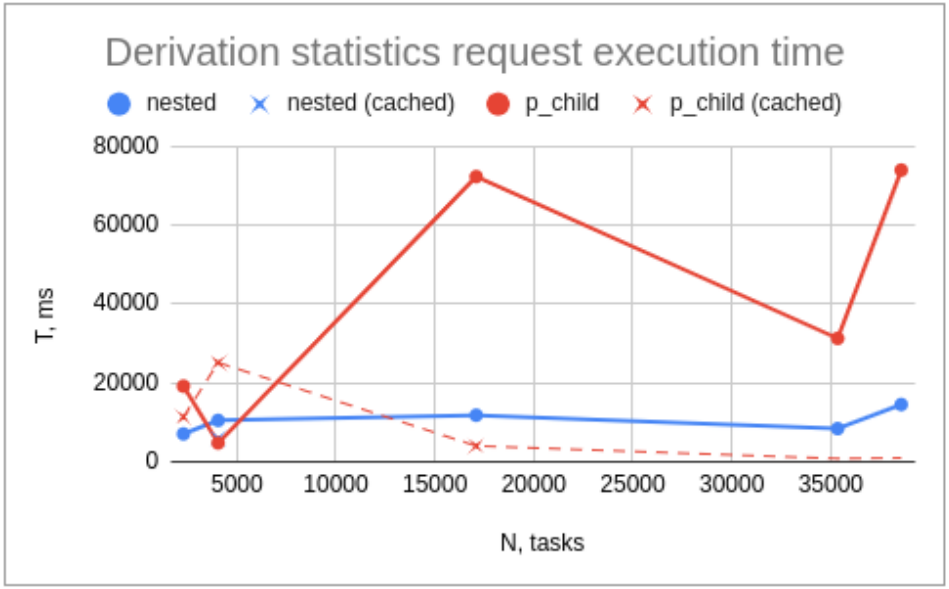
Task (parent)

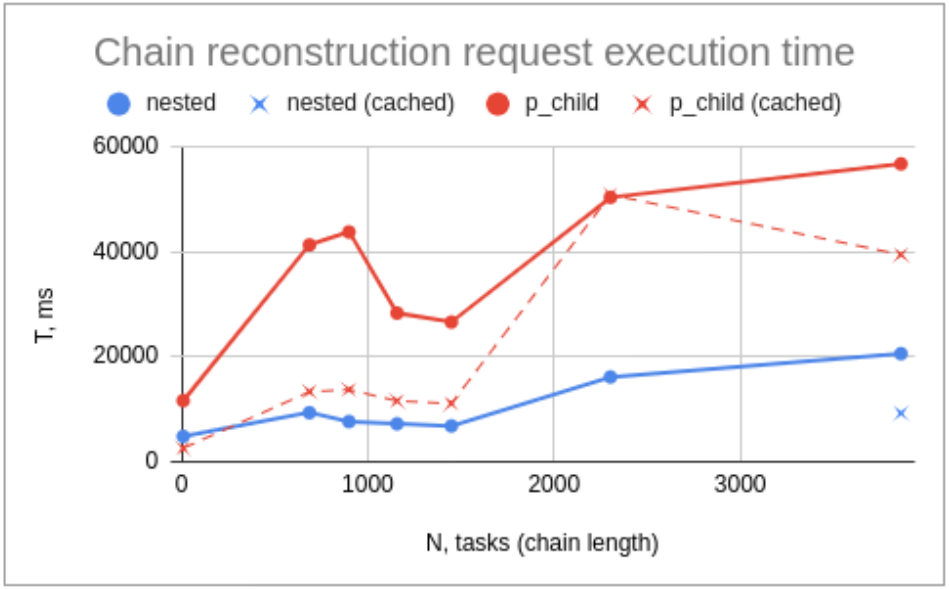
- task metadata
  - User
  - creation time
  - computing site…
- resource usage
  - CPU
  - Walltime…
- derived values
  - reconstructed task chain root…

Dataset (child output for task)

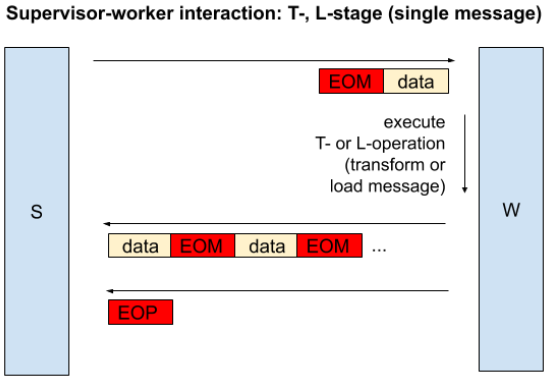
- Storage information
- Data characteristics

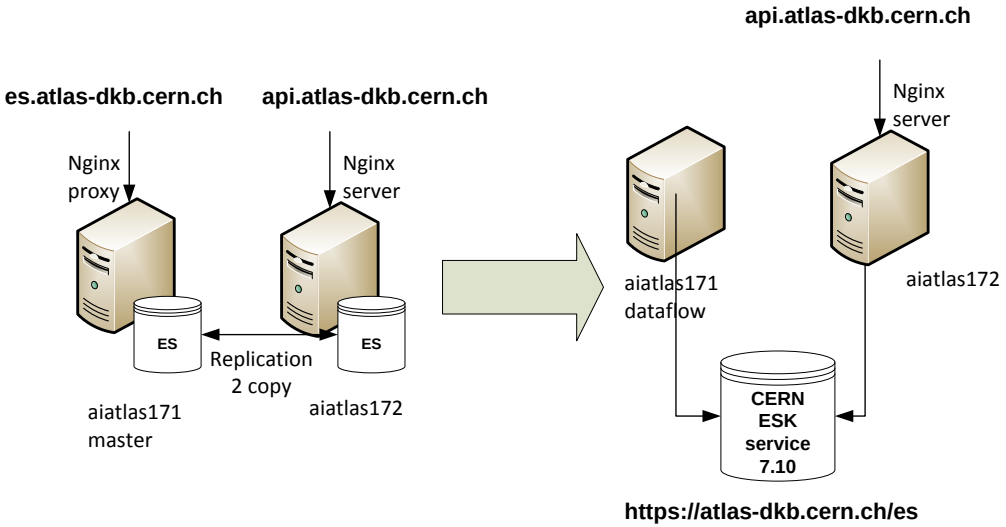


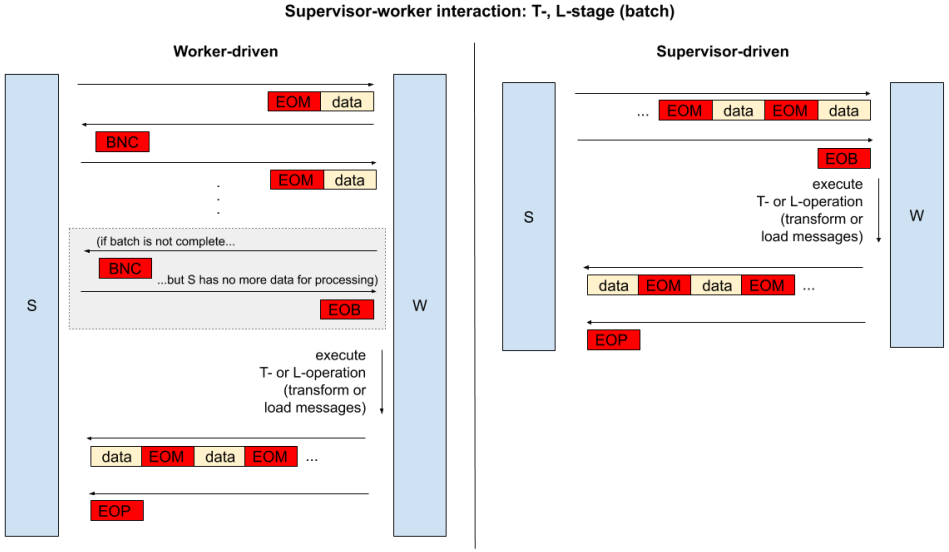




Works in progress







- Batch processing
- ES migration

https://github.com/PanDAWMS/dkb/wiki/Internal-communication-protocol

Thank you!

Any questions?