jAliEn status and plans

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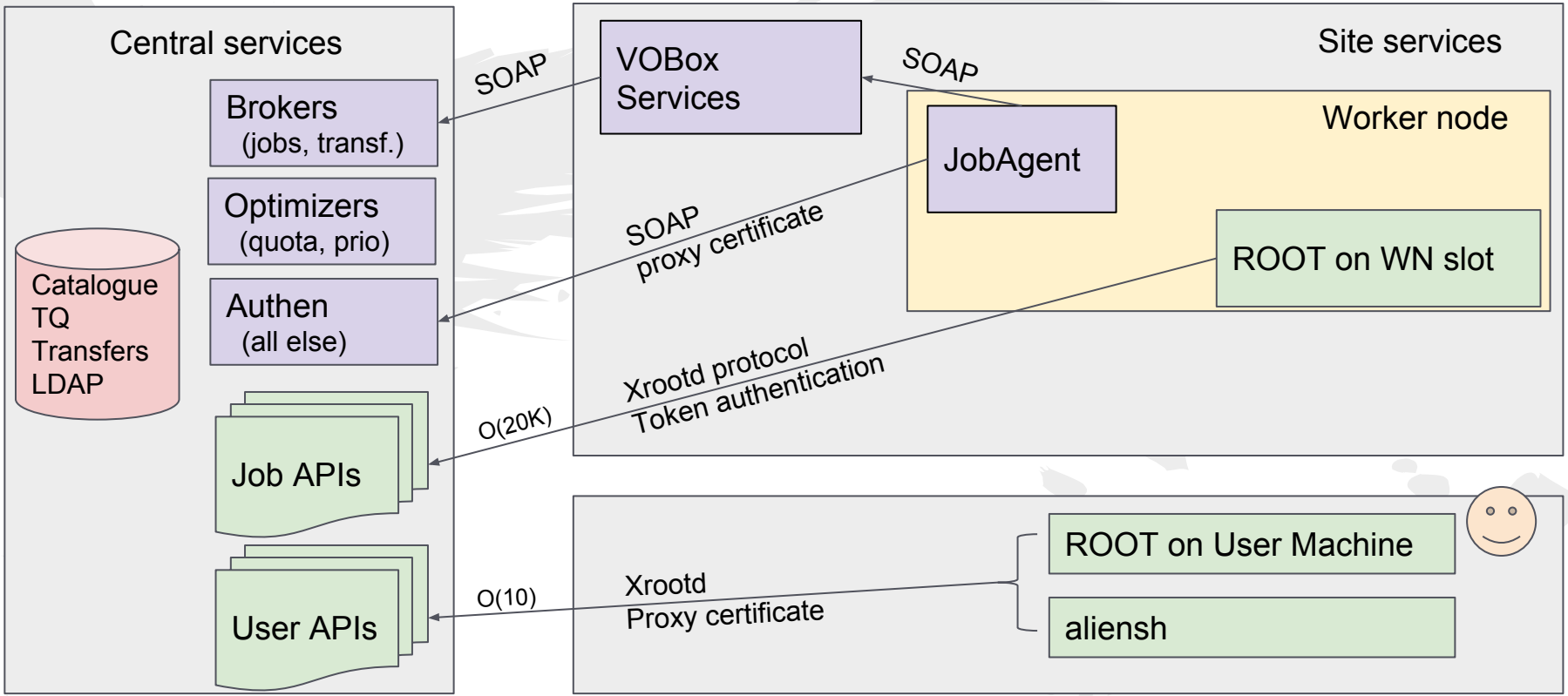
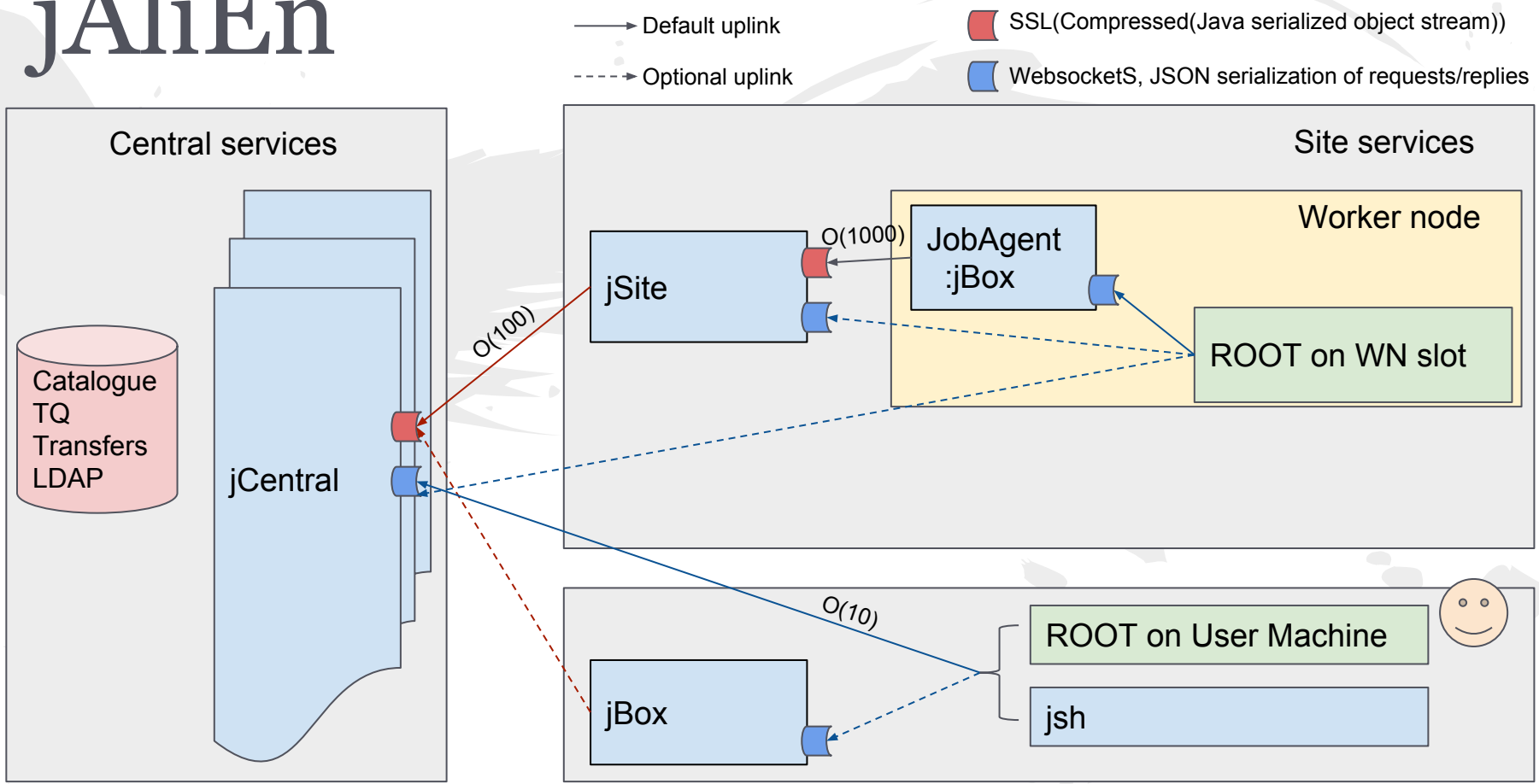
AliEn communication



jAliEn


Default uplink
Optional uplink
SSL(Compressed(Java serialized object stream))
WebsocketS, JSON serialization of requests/replies
Central services
Catalogue
TQ
Transfers
LDAP
jCentral
O(100)
Site services
jSite
O(1000)
Worker node
JobAgent
:jBox
ROOT on WN slot
O(10)
jBox
ROOT on User Machine
jsh

Flexible deployment

- Same codebase, each level multiplexes connections and caches objects
- Dual personality servers
  - Java binary serialization + SSL and compression
    - Efficient channel for inter-service communication
    - Asynchronous messages passed between endpoints
  - Websockets + SSL
    - End-clients (ROOT, custom clients)
  - Both are long-lived, persistent connections

Scenarios

- Jobs connect to the JobAgent-provided socket
  - or the VoBox service directly, or jCentral…
  - Option to scale horizontally the site services (for large sites)
- Users have several alternatives
  - Use full Grid certificate in ROOT to connect centrally (ask for password at every connection)
  - Same with proxy certificates (1 password/proxy generation)
  - Run jBox to act like ssh-agent, asking the password ~1/reboot

Early adopters

git clone https://gitlab.cern.ch/jalien/jalien.git
cd jalien
./jalien setup
./compile.sh
./jalien

A much faster way to download the internet (multiple threads, skipping existing files to resume/retry)

... > cp -T 32 output/*/*.zip file:/tmp/

More about websockets

Websockets provide full-duplex communication channel over a single TCP connection

Persistent channel, suitable for heavy load, low latency applications

ROOT implementation: based on libwebsockets, an open source library available in all popular linux distributions

Secure connections based on OpenSSL

Deployment options

Embedded Tomcat server providing the websocketS server endpoint

- fixed port no. for central services
- dynamic port no. for WN/user desktop instances

ROOT plugin loads identity and server addr:

- from environment (child process of JobAgent)
- from *$TMPDIR/jalien_token_<uid>* (user desktop)
- default locations (*~/.globus/user{cert,key}.pem* and *alice-jcentral.cern.ch:443*, for standalone ROOT instances)

Client connections

Similar ROOT call to the current one

```
TGrid *jalien = TGrid::Connect("jalien");
```

New clients can be built in any language

wss://<host>:<port>/websocket/json

wss:// = Secure WebSocket protocol

JSON for serialization

JSON is generic, compact and easy enough to work with

ROOT plugin uses JSON-C to compose and decode the messages from upstream

In Java we use json-simple

Any other language has an easy to use JSON library to use

JobAgent for Titan

Full stack, from BQ submission to job execution

Specialized version of the jAliEn JobAgent

Tackling network-less worker nodes

Filesystem-based communication channel between WNs and interactive nodes

Implements all steps of the job execution:

- Download input files, prepare sandbox, setup the environment
- Execute the actual job, monitor resource usage
- Upload job output files, clean up

Caching service for AliEn

Share cached data across all central AliEn and API services

- *find* command results - OCDB searches
- *access/whereis* - file locations
- LFN tree configuration
- JobToken generator
- User groups, database locations...

A Tomcat-based solution serving 5-10kHz of requests

Site services

	VoBox (CE)	WN (JobAgent)	Other
Done	Logger redirection LDAP tree configuration Startup script CE slots retrieval Number jobs matching Monitoring info	Logger redirection Job matching CVMFS and env setup Payload execution and control Monitoring info (process info: cpu, mem, disk, same for control) Configuration through VM env (instead of LDAP in AliEn)	JobManager and JobBroker calls
To-Do	Verify proxy utils (timeleft, re-create…) Batch interfaces	MessagesMaster (msgs for JAs: e.g. *kill payload*) Spy on job execution	Embedded || independent MonaLisa ? Startup scripts for services **Full-scale tests**

Optimizers

GUID tables

Automatically switch the catalogue to a new GUID table when content grows too much in the active one

LFN tables

Send alarms when parts of the tree grow to more than 50M rows

Still splitting the tree manually but this too could be automatized

Gradually plan to move the rest

Relying on Java thread pools to do the heavy lifting

Still need the ability to monitor and control them individually

Data movers

Transfer agents in production

Handling all bulk data operations

- Raw data migration to T1s
- Storage decommissioning / recovery
- Physical removal of SE files
- SE crawler / dark data cleanup

Misc points

- New catalogue (Cassandra-based) implemented only in the new framework
- Drops the proprietary Xrootd protocol between services
  - Xrootd client as command line tools (v4+ syntax ready)
  - Standard protocols lower the bar for writing new clients
- All services are IPv6-ready
- Simplify the firewall requirements (only upstream connections)
  - The only exception is the bandwidth/traceroute test

Trello dashboard - link

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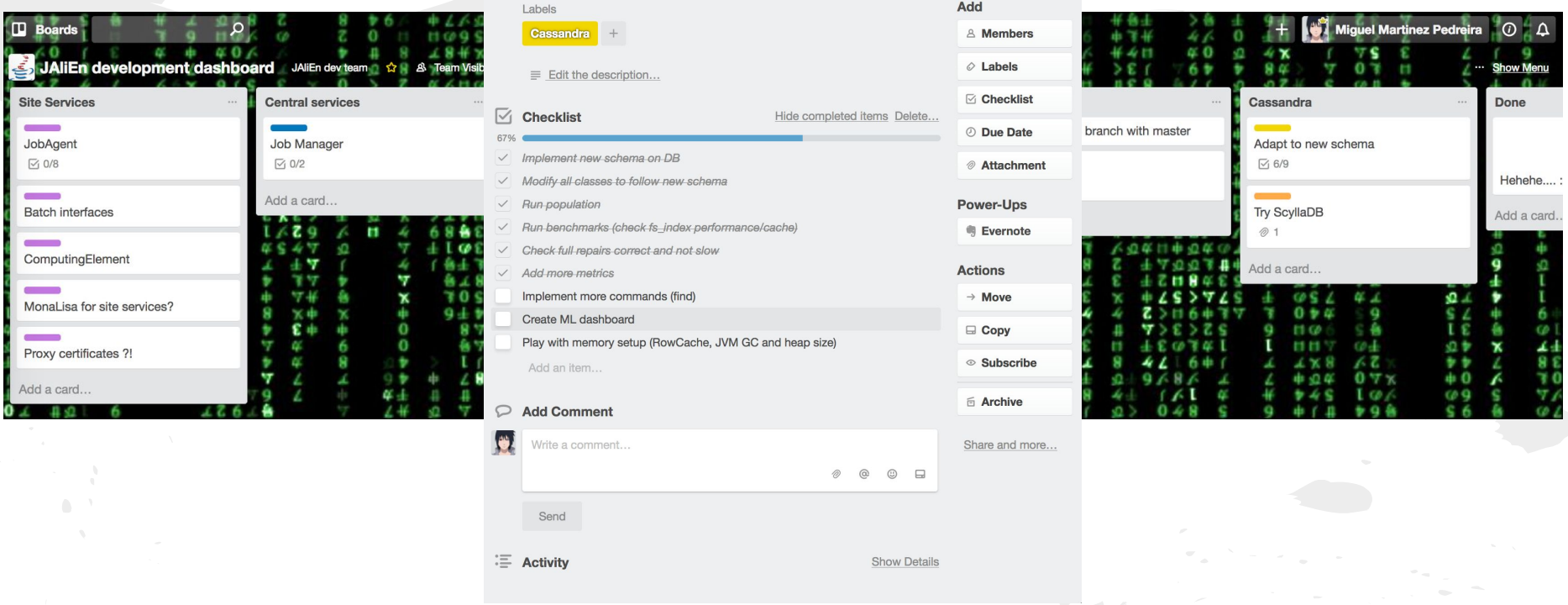

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