

Jožef Stefan Institute

Agile Computing Federation and Slovenian plans for EINFRA-1

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Slovenian Point of View

- Strong HEP base
some large international projects
- NREN support, NGI, EGI membership, official
gvt. support, equipment funding promises
- Increasingly integrated ARC-using
HTC users and centres
- ARC-using users from other domains
(KT, biomedical, mathematics, statistics,
applied linguistics)



Slovenian Point of View

- Blocked PRACE, politicking Cloud.eu
- Centre integration / funding pressures (no central management)
- NREN: public cloud expectations
EGU Gain integration
- FUD regarding lack of EGI planning, envisioned grid future, CERN standing, distributing computing future
- Huge demands for future projects (Belle II)
- Expectations of uninterrupted functionality



Agile Computing Federation

Goals:

- Reuse of existing technologies
- Reuse of existing infrastructure:
institutional, national, international
- No interruption of existing services
- Unified user access regardless of tech
- Coordination with ongoing efforts

Similar infrastructures

Available resources for researchers:

- National and international grids
- HPC centres
- Private and public clouds





Computing Centre Dilemma

Different situations vs. size:

- Multiple independant infrastructures
- Multiple centres in the same institutions, with different networks
- Multiple infastructures in the same centres and network
- Resource reuse / reallocation / pain

Confusing access paths

- HPC centres: application policies and local committees
- Grid: PKI, certificates and VOs
- Cloud: different APIs, PR confusion, vendor/site isolation





Parallel efforts

NREN / large institute can have:

- Custom services
- Internal cloud
- HPC centre
- 1 or more grid sites
- Public/private cloud

**One agile
setup
required!**



Required components

- Provisioning system
- Local resource management
- User management, authorization
- Runtime envs / modules / VM images
- Information system, brockering
- Service mngt, check-pointing, transfer
- Data management

Choices...

CVMFS

Salt



KeyStone

CERN Agile

modEleph

Globus

NorduGrid **ARC**

Cinder gLite

VOMS

PKI

dCache

Torque

OpenMP

SLURM

OpenStack

Glance

gFTP

OpenNebula

oVirt

Puppet

science portals

VRC





Architectural Alternatives

- Grid/Cloud integration
- Unified Grid/Cloud access
- Virtualized Grid Services
- Integrated hybrid Grid/Cloud



Goals

- No interruption in existing services:
grid, HPC, cloud
- Soft transitions:
 - Glite → ARC
 - oVirt → OpenStack
 - PBS → SLURM
- Unification of stack:
 - for admins (agile stack, monitoring, repos)
 - for users (auth/z, RTE/images, projects)

User Satisfaction



- Single point of access:
(EduGain + VOMS + Keystone?)
- Single interface
(Horizon + ARC?)
- Flexible runtime environment or image repository
(ARC RTE + Glance: VM vs RTE, OpenMP, OpenCL)



Necessary steps

- Provisioning, abstraction and birtualization of resources and services
- Hybrid resource manager
- Customization of infosys: predefined instance flavors, service registration, quotas
- Storage and data management abstractions

Hard Problems

- Data management (hard)
- Workflow management (harder)
- Task management (hardest)





Micro and Macro Climate

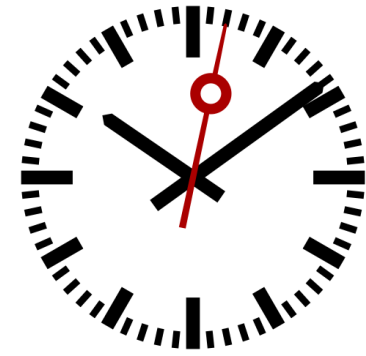
- H2020 ARC development project
(with 2 nordic partners, ATLAS interest, interest for EU-T0)
- H2020 Dirac development project
(Belle2 involvement)
- National projects
(ongoing HTC Puppet – HTC enabling grid-compatible provisioning and agile enhancement)
- National commitment: equipment, technical stuff, operation costs, int. project cofunding
- Continued EGI, HTC, Géant, WLCG
- No clear HPC / PRACE / HTC COE / Cloud



Involvements

- CERN: ATLAS
- Belle2, Pierre Auger
- Support existing groups
(KT, biomed, HPC/fluid dynamic)
- Interest (NG, Finland, Hungary, SE EU)
- Close/Opportunistic:
OpenArchive, Clarin, Darjah ...

Projection



- **1Y:** Experimental setup:
large institute (multiple sites)
- **2Y:** National federation:
NREN + NGI + HPC centres
- **3Y:** International federation:
Project, other groups /
projects
- **4Y:** „hard“ problems



Questions?



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Additional Slides



• **Grid and Cloud integration**

- VM managers = LRMS
- Virtualized WN
- Virtualized storage
- Example: WnoDes



Unified Grid/Cloud access

- One client used to submit both jobs and services
- virtualized WN
- Adapted LRMS (grid & cloud)
- Shared Cloud Storage
- Examples: Swarm, XtremWeb



Virtualized Grid Services

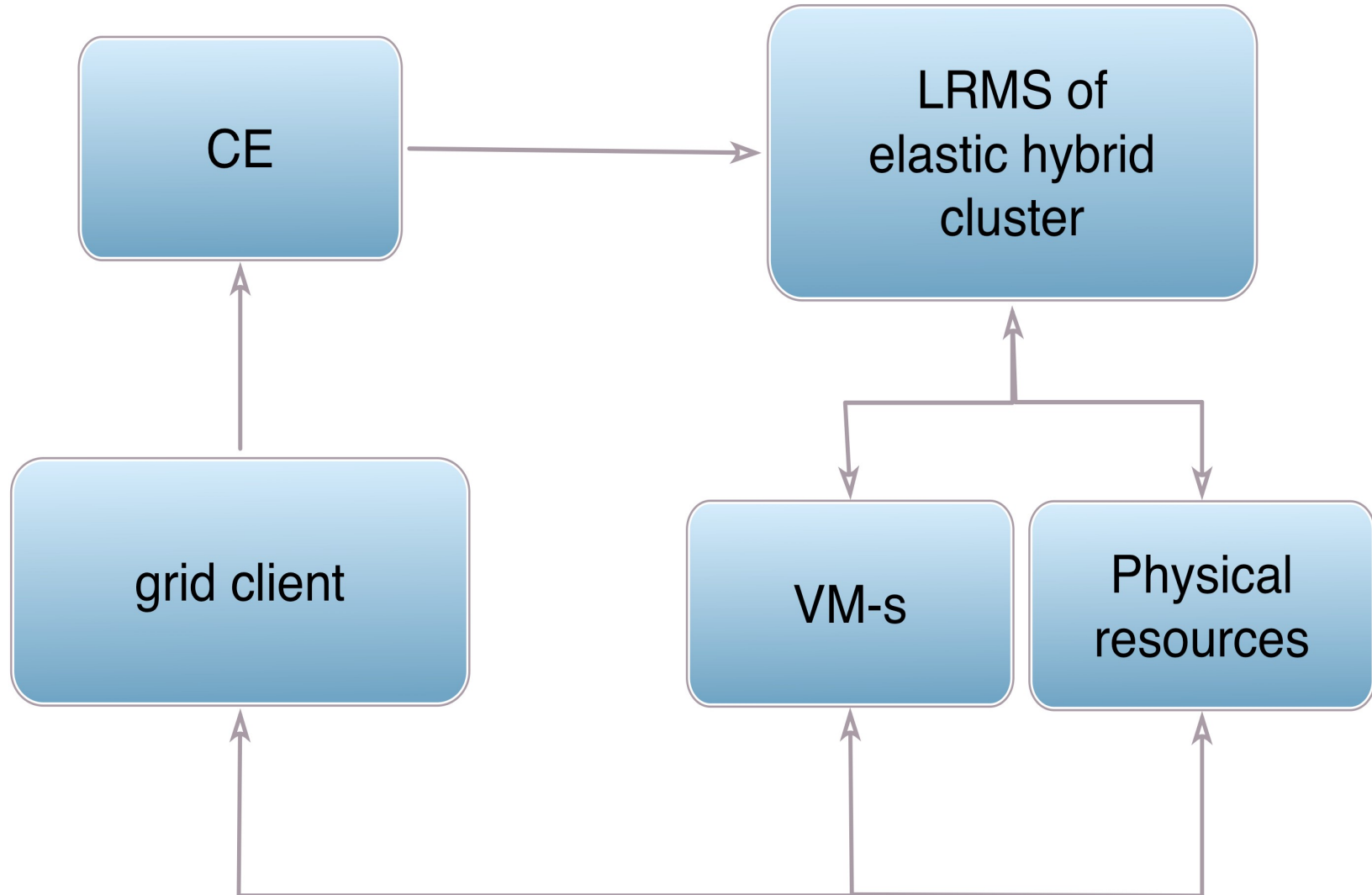
- Virtualization of all grid services
- Changes in infosys and registration services
- Cloud instances part of grid
- Example: none



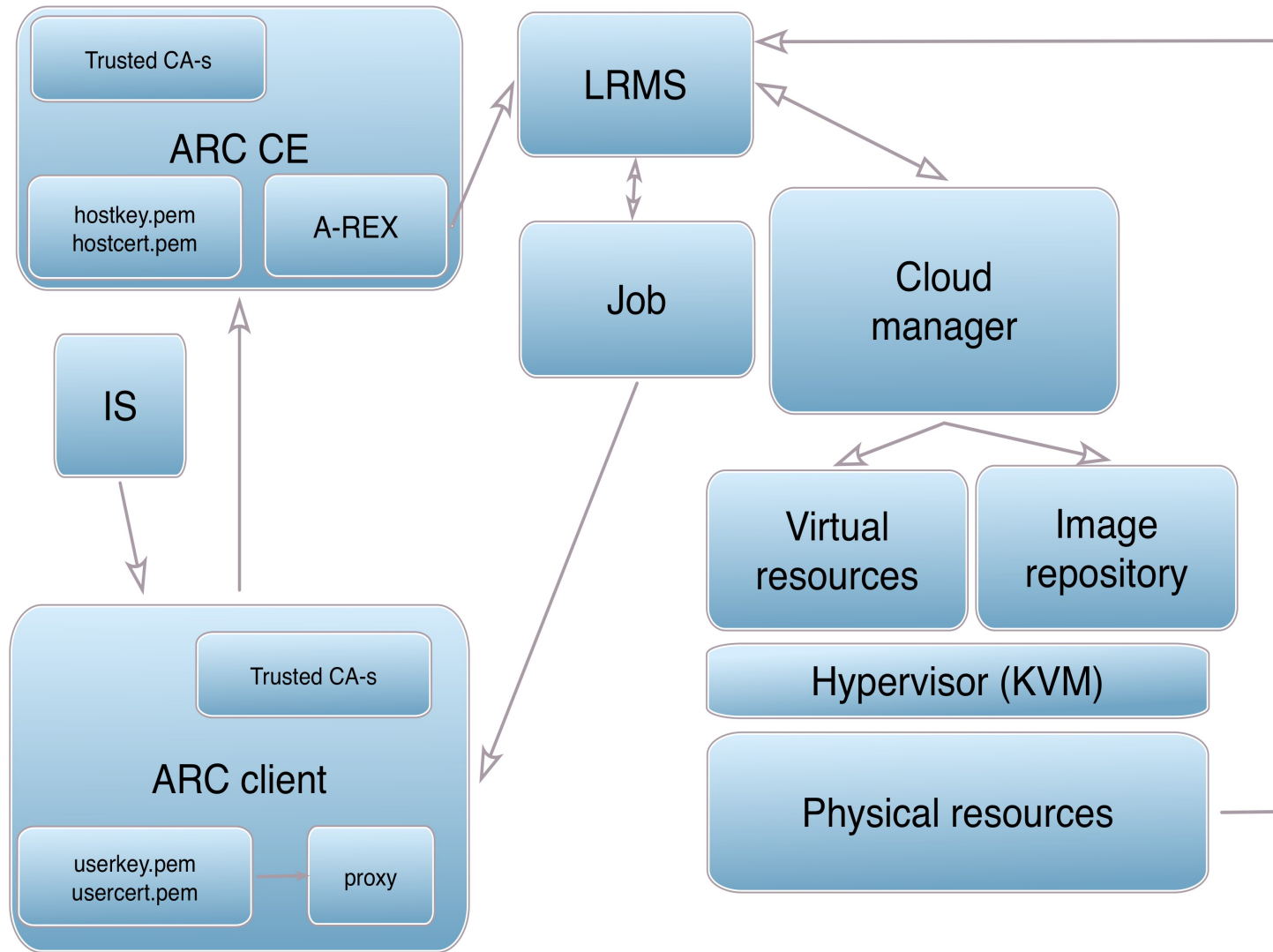
Integrated hybrid G / C

- Transparent access of resources: grid and cloud
- LRMS for grid and cloud
- Monitoring for both resources
- Optionally virtual WN

Integrated hybrid G / C



Objective?



Possibilities

