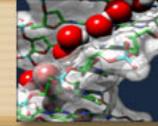


# Thoughts on Grid Computing

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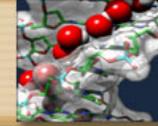
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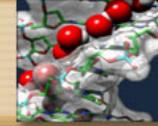
## Production Grids

- ❑ EGI – European Grid Infrastructure
  - ❑ 350 sites, 51 countries, ~75M CPU hours a month
- ❑ OSG
  - ❑ 95 sites, ~40M CPU hours a month
- ❑ Many small, regional or project-based grids
- ❑ Common features:
  - ❑ Driven by large collaborations,
  - ❑ Strong incentive for resource sharing,
  - ❑ “job processing” oriented,
  - ❑ Complex middleware and security solutions (e.g. certificates),
  - ❑ Low reliability as for a production infrastructure.



## Open R&D Problems

- ❑ Programming models, high level tools and environments, scientific SaaS (vs. low-level job processing)
- ❑ Autonomic and fault tolerance capabilities
- ❑ Resource management, provisioning, virtualization, SLA, sustainability, policy, cloud integration
- ❑ Distributed data management: scalable distributed storage, automatic replication, structured storage (NoSQL databases)
- ❑ Security, campus bridging, grid usability (“Plug and play”)



## The Path Forward

- ❑ More small and medium labs on the grid
- ❑ More focus on user perspective (vs. resource provider)
- ❑ Time to look into the past and analyze what worked and what did not
  - ❑ Do not fund too many different Grid middleware projects.
  - ❑ Differentiate between production and experimental grids; both are important.
- ❑ Learn from cloud computing, make it simple, adopt proven technologies (virtualization, storage, ...) and sustainability models and policies.