



*Polish Infrastructure
for Supporting Computational Science
in the European Research Space*

Towards Service Level Management in PL-Grid

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SLAs in Grid Definition

Grid is a system that coordinates resources that are not subject to centralized control...

...using standard, open, general-purpose protocols and interfaces...

...to deliver nontrivial qualities of service.

EGEE/EGI is an Infrastructure that coordinates resources from different ROCs/NGIs/sites ...

...using some protocols and interfaces...

...to deliver reliable infrastructure.

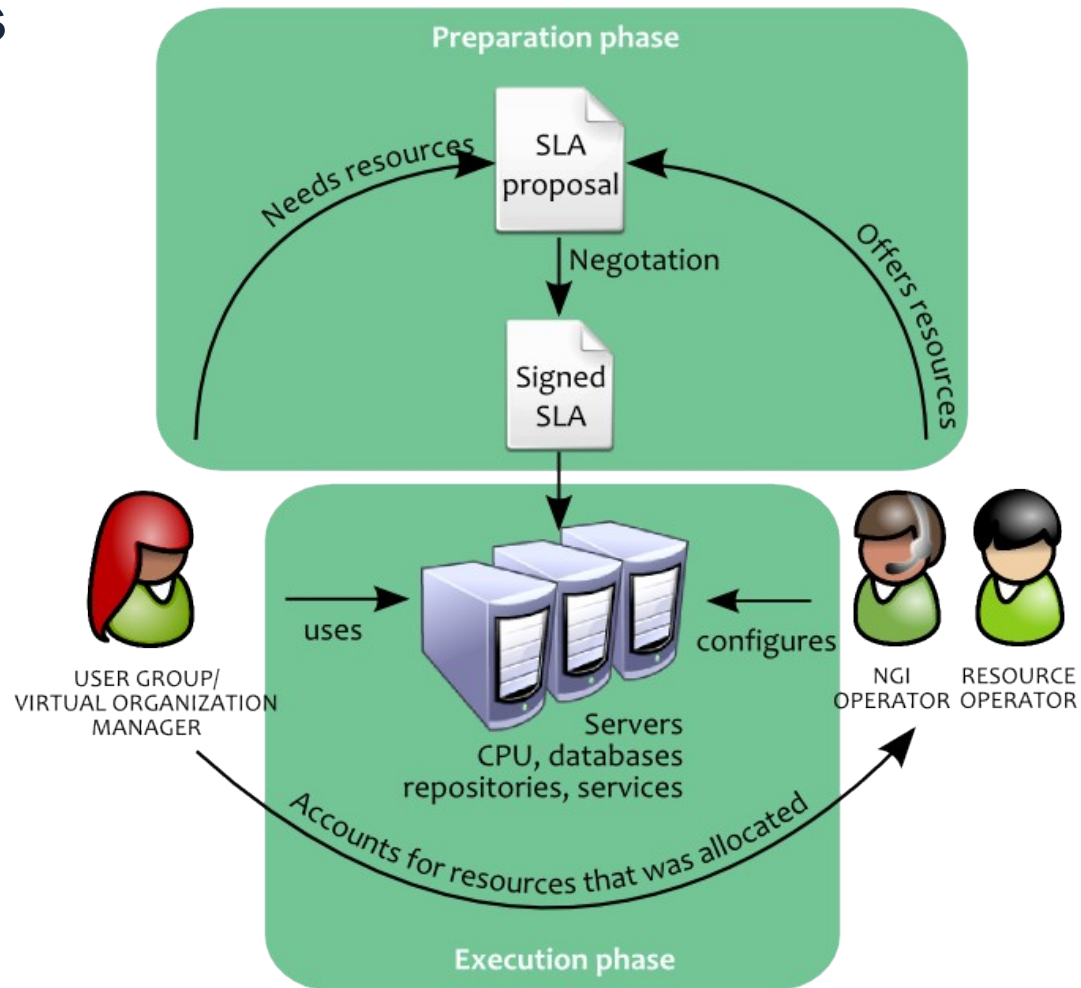
by Ian Foster (“What is the Grid? A Three Point Checklist”, 2002)

Current situation in EGI:

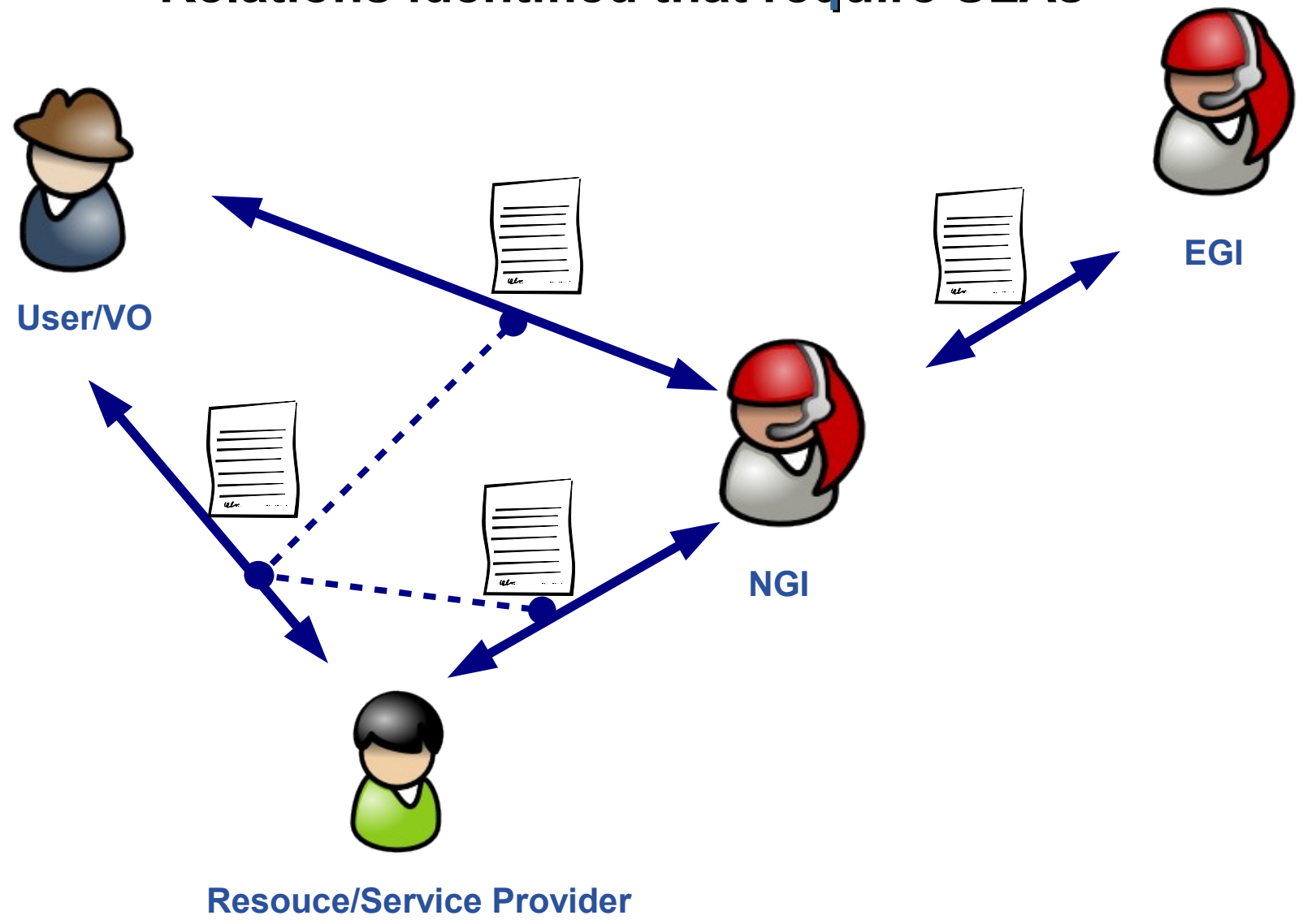
- SLA (AKA SLD or OLA) between the Infrastructure and sites: defining of a production service level
- SLA for HEP experiments
 - defining level of resources contributed by each site
 - agreed and signed with enormous effort
- Changes in Operation Level Agreement in progress (OLA Task Force established)

The Grid Core Service

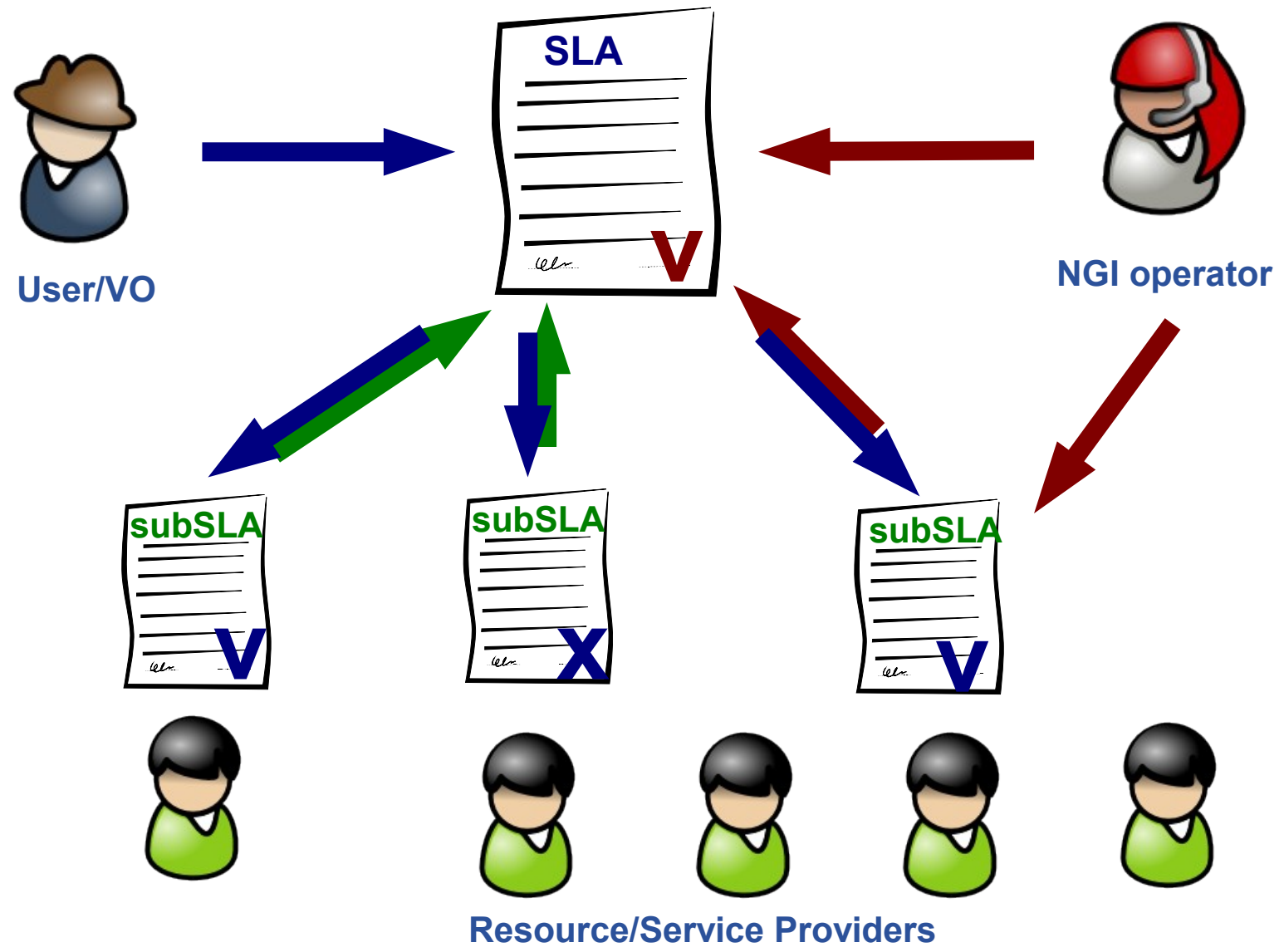
- Providing resources to users with required qualities of services



Relations identified that require SLAs



Resource Allocation Process in an NGI

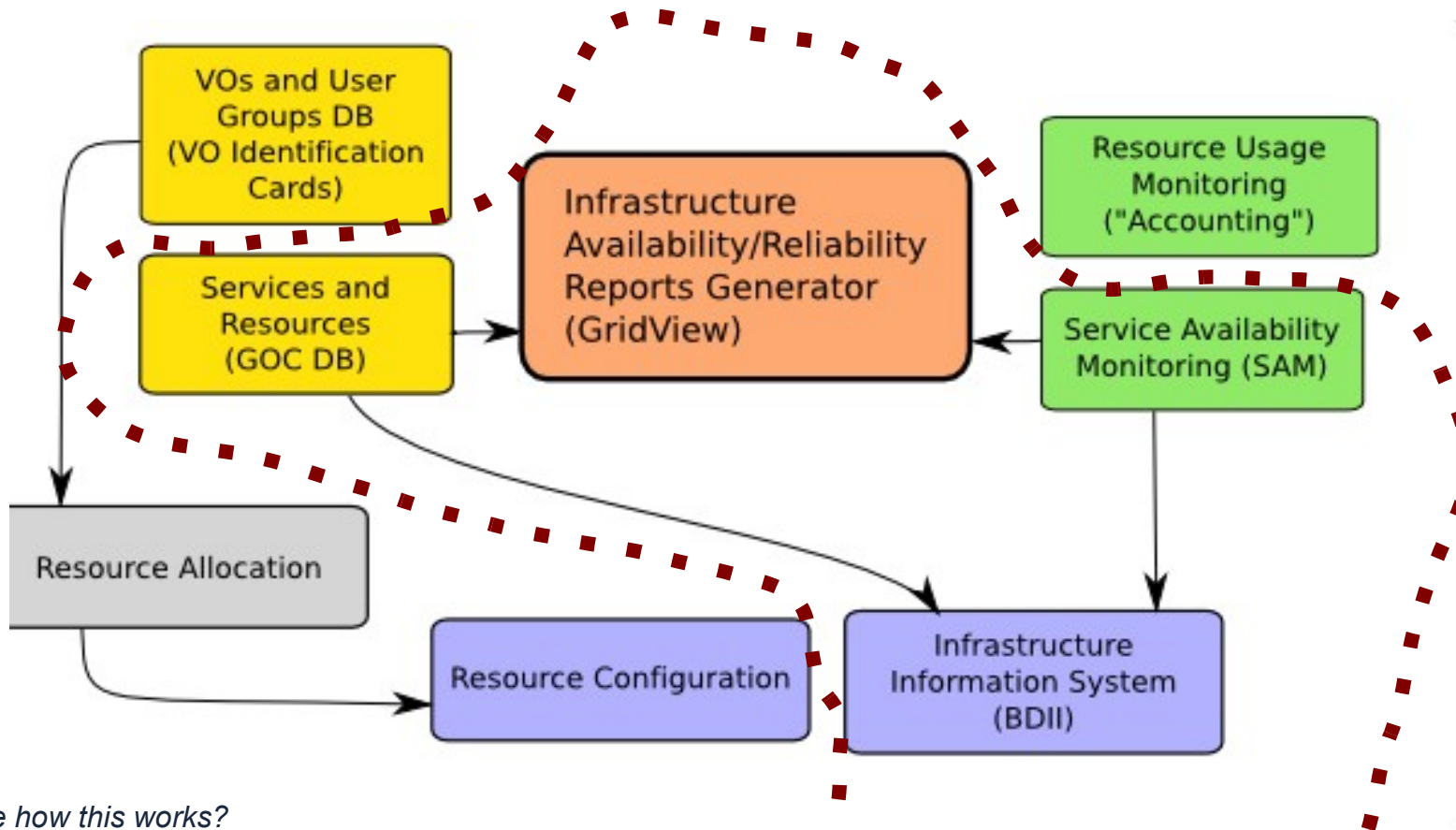


Complexity

- Many actors
- Many users/VOs
- Remote N-to-N relations
- Few types of services
- Lack of defined set of quality properties
- Uncertainty with usage characteristics
- Execution services need to be SLA-aware
-



Operational Architecture: EGEE/EGI Model

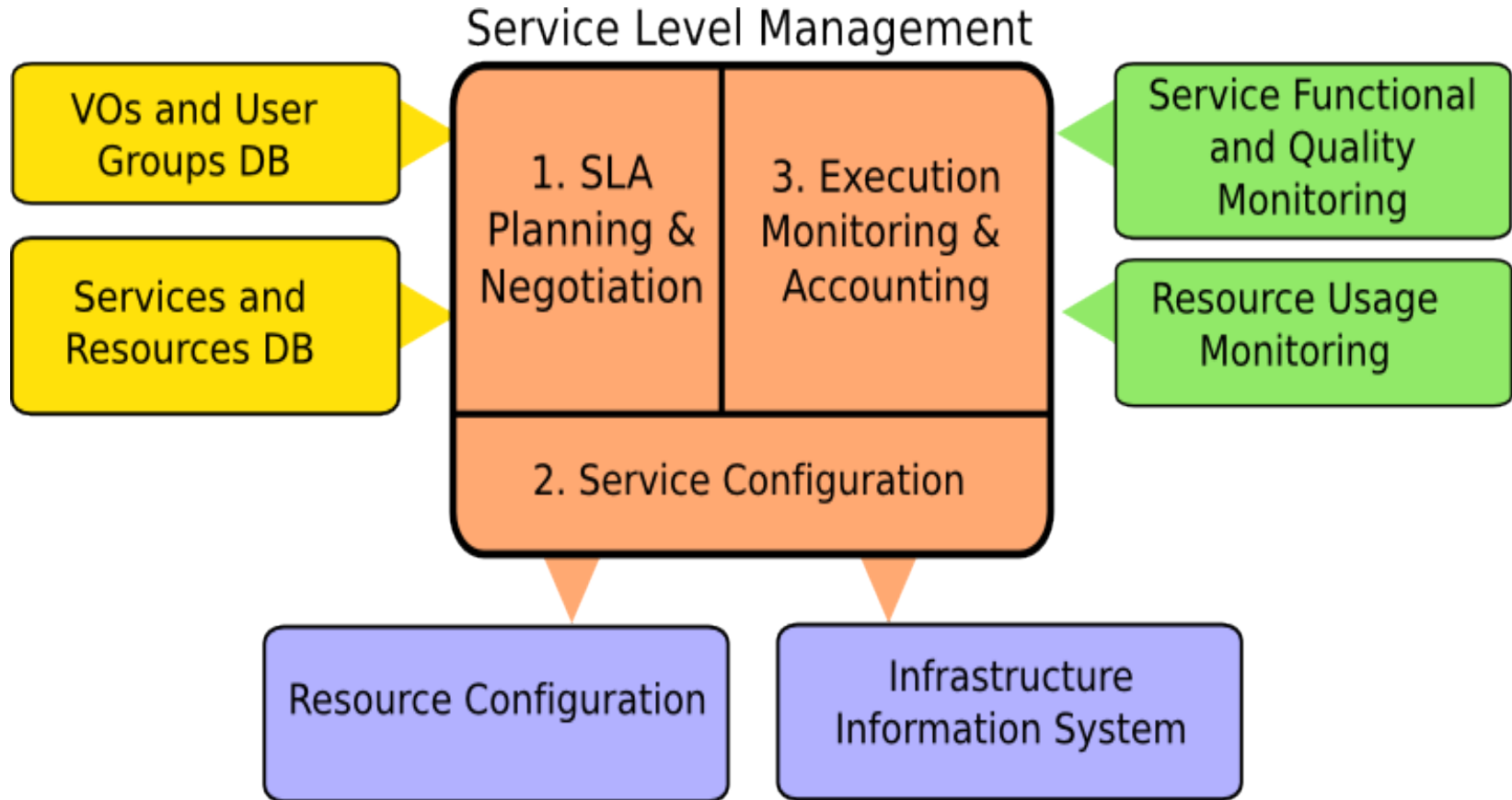


Example how this works?

LHCB requires an efficient scratch storage. There are sites, that deliver resources based on LHC SLAs. Opening ticket against when efficiency of the storage is not enough results: "operationally everything works".

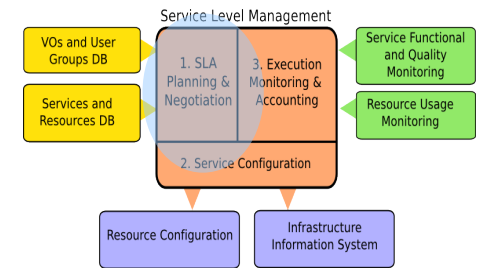
Connect this island with users using SLAs!

SLA-aware Operation Model





SLA Planning and Negotiation: Tool



grid resource BAZAAR

Your roles: RAG

Your VOs and RCs:

- VO List: EGEE, alice, argo
- SouthEasternEurope
- NorthernEurope
- astron, astrop, ncf, nordgrid.org, pvier
- France, Italy, SouthWesternEurope, UKI, GermanySwitzerland, CentralEurope
- RC List: CERN, Russia, AsiaPacific, France, UKI, GermanySwitzerland, Italy, CentralEurope, NorthernEurope, SouthEasternEurope, EGEE

Welcome | alice | argo

New call | Date scope: Start: 1/1/1970 | End: 31/8/2009 | Set

Actions & logs

Date	Topic	SLA	See	Det.
2009/10/2	Tomasz Stepieniec (CYFRONET) proposed a new SLA	15		
2009/9/22	Tomasz Kukulka (jakis site) proposed a new SLA	18		
2009/8/2	Tomasz Stepieniec (CYFRONET) accepted SLA change offer	10		

Log

2009/10/1 Tadeusz Szymocha (IFJ-PAN-BG) proposed a new SLA

Chart section - CPU & STORAGE

Number of cores/CPUs

Storage space [GB]

List of calls

Call name	VO Name	CPU	Stor.	Comp. Star	Comp. End	Act. Start	Act. End
alice call	alice	60	60	8/9/2009	9/30/2009	8/1/2009	9/1/2009

List of SLAs

ID	Site Name	CPU	CPU BE	Stor.	Stor. BE	Comp. Start	Comp. End
359	BMEGrid	0	24	0	2	8/9/2009	9/30/2009
367	BUDAPEST	0	150	0	52960	6/1/2009	4/30/2010

all available SLAs are shown

Call 426: 'alice call'

Basic information:

Call opening period: 2009-08-01 - 2009-09-01
 Computation period: 2009-08-09 - 9999-01-01
 Call status: PUBLISHED
 Responsible person: Malgorzata Tomanek
 VO Name: alice
 Is active: yes
 Is seed resources: no
 Description: -

Resources:

Estimated:	cores/CPU[no]	stor. space [GB]
	60	60

Services:

SLA: 367 for call: 'alice call'

Basic information:

Related call: 426, alice call
 VO Name: alice
 Computation Period: 2009-06-01 - 2010-04-30
 States: Main: AGREED, Activity: ACTIVE, Configuration: PREPARED
 Responsible person: Malgorzata Tomanek
 Description: Agreement registered according to BDI status from 1.06.2009

Resources:

Estimated:	cores/CPU[no]	stor. space [GB]
	1	1
Best effort:	cores/CPU[no]	stor. space [GB]
	150	52960

Edit: 'ALICE CALL' (ID: 426)

Here you can change your call's properties and requirements. Bold fields are mandatory

Basic information:

Call ID: 426
 Call name: alice call
 Seed resource:
 Responsible Person: Malgorzata Tomanek
 Number of CPUs: 60
 Storage [GB]: 60 GB
 Comp. start date: 9/8/2009
 Comp. end date: 1/1/9999
 Unspec. end date
 Call open from: 1/8/2009
 Call open to: 1/1/9999
 Unspec. end date
 Description:

Services:

VOMS:
 LFC:
 Top level BDI:

Update Cancel

SLA edition: SLA no. 367

Best effort:

Number of CPUs: 150
 Storage: 52960 GB
 Comp. start date: 18/1/2010
 Comp. end date: 30/4/2010
 Unspecified end date
 Agreement registered according to BDI status from 1.06.2009
 Description:

Services:

VOMS: 33
 LFC: 44
 Top BDI Level: adres do serw [X] [X]
 adres do serw [X] [X]
 add a new entry
 RB/WMS: rb 1 [X] [X]
 rb2 [X] [X]
 add a new entry

Notification:

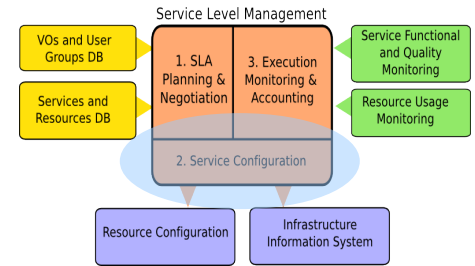
PAG Virtual Organization
 ROC Resource Center

Update Cancel

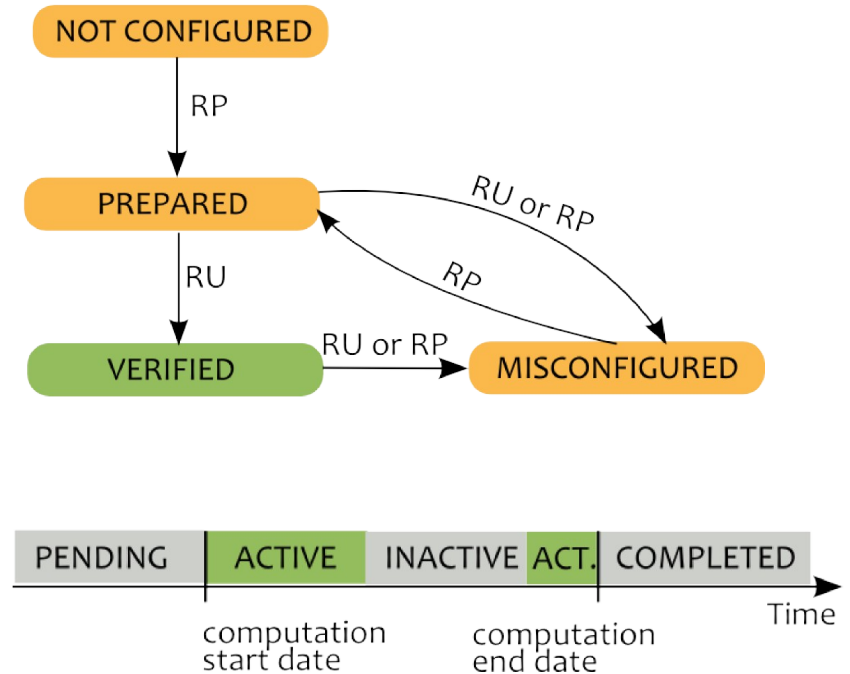
- Resource-related SLAs Dashboard for VOs, Resource Providers and NGIs
- Traceable SLA negotiation process
- V1.2 deployed in CIC Portal used for CE ROC and for seed resources operation in EGEEIII
- V2.0 with NGI-role support in beta testing
- Plans to deploy in PL-Grid early 2011 (NGI France & Portugal interested)

<http://bazaar.grid.cyfronet.pl>

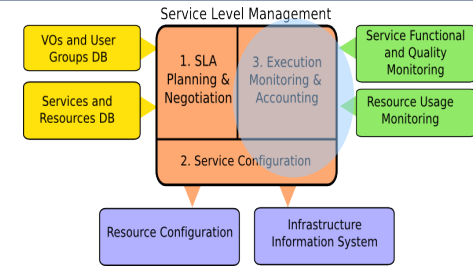
SLA Service Configuration



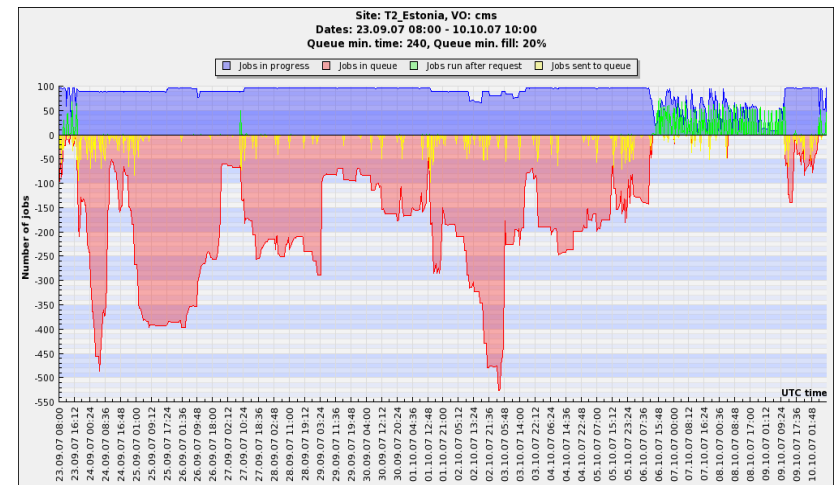
- Resource/Services are configured according to the SLA:
 - Limits
 - Priorities
 - Reservations
 - Quotas
 - Software required
 -
- Verification of a site configuration by a VO is required
- Only sites having an agreed, active SLA with a VO with verified configuration are available in Infrastructure Information System
 - this prevent not-verified resources to be put into 'production'



SLA Execution & Accounting



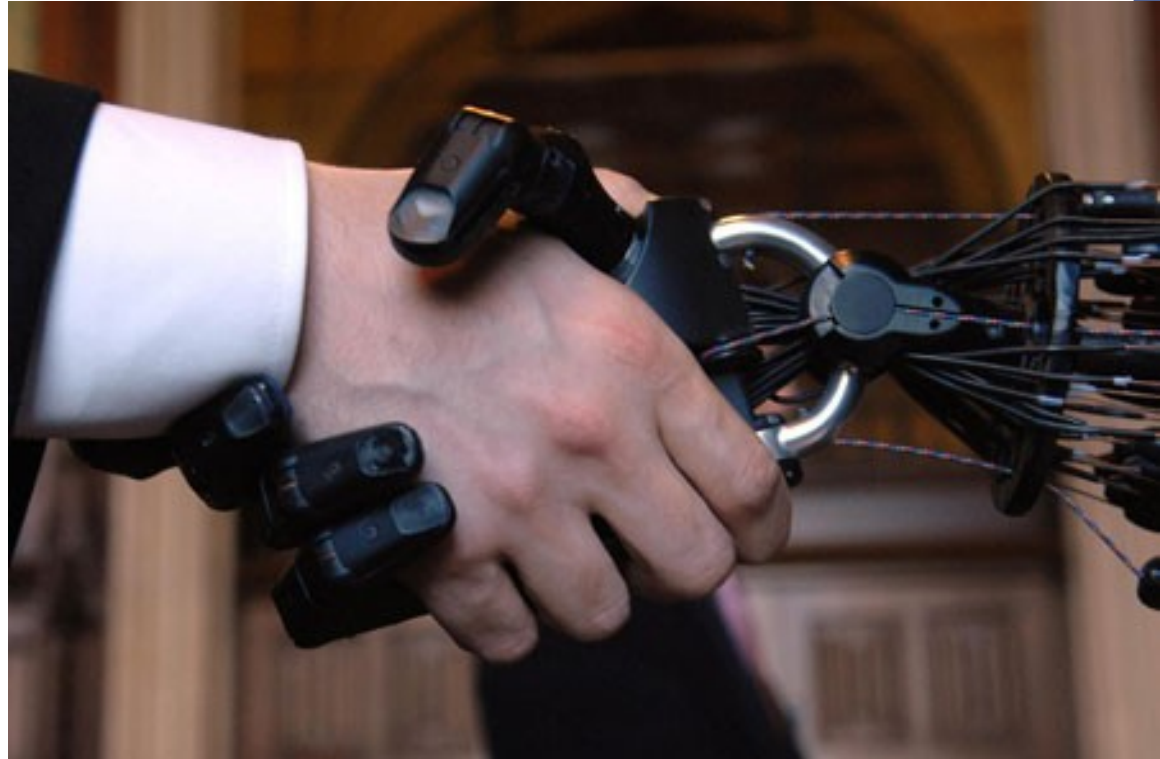
- Infrastructure monitoring results are used to monitor SLA metrics
 - Critical tests
 - Availability/reliability
 -
- Accounting data are used to verify SLA metrics:
 - Resource level
 - Failed job ratio
 - Waiting time
 -
 - new requirement: **job submission data**
- Option to exclude a site in case SLA violation
- Feedback about sites/VOs can be published



Summary

- To keep users with grid technology we need to *delivered resources with non-trivial qualities of service*
- There is a initial momentum:
 - Projects like: gSLM, SLA4D-Grid,...
 - Interest of some NGIs, OLA TF
- PL-Grid (Polish NGI) is building a prototype for SLA-aware operation model model and tools that support it (e.g. Grid Resource Bazaar – a dashboard for SLA management)

- Fundamental limitation of automation
 - Policy managers want to decide about their resources (particularly in complex cases)
 - Delay in providing the service is essential – set-up/deployment should be automated first
- Start with human-based SLA-enabled process and then gradually enable automation



It is POSSIBLE! But is this something we really NEED?