(PL-)Grid Resource Allocation Framework

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Why Using Computer Center?

- Good performance
- Ready and tested configurations
- Safe storage solutions
- Installed software
- User support
- etc.
- (if you need anything please let us know)
- Our interest is to empower you to do better research!

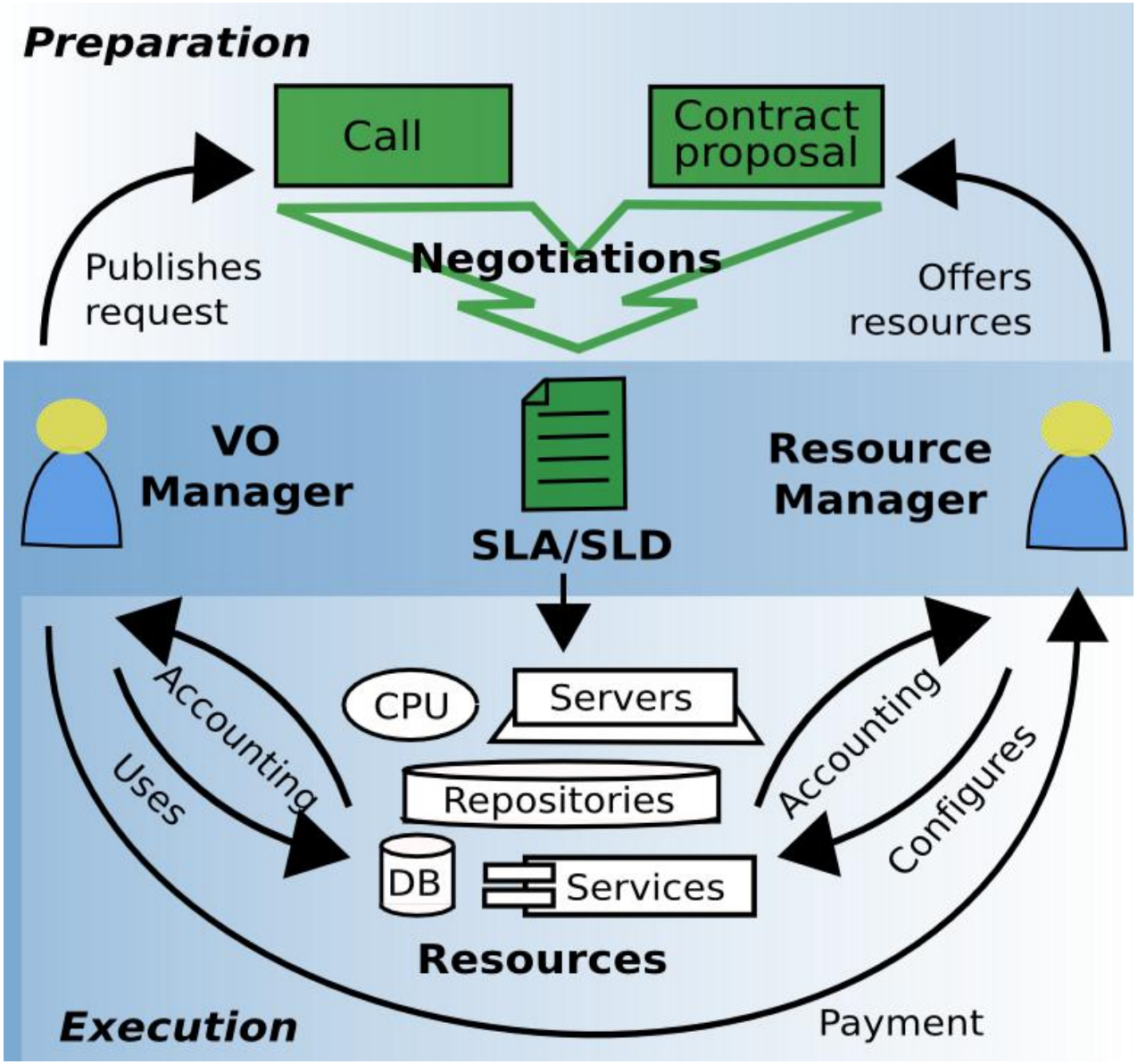
Motivation

- Wanted: Provide services that really fit users' expectations
- Know that: Best effort is not enough

as grids (but also HPC) are funded to provide *nontrivial (=defined) quality of service*

- Need: Distinguish between various classes of jobs
- **Searching for: Efficient and transparent process of resource allocation**

SLA based Resource Allocation



What we need?

- **Clear view on SLA details**
- **Communication patterns**
  - (Re-)Negotiation
  - Configuration validation
  - Tracking demands/policy changes
- **Process traceability**
- **SLA execution monitoring (including feedback from users)**

The solution is to define *a process*

and build *a collaboration tool*.

Proof of concept: “Bazaar” for EU EGEEIII Project.

Central European Region in EGEE

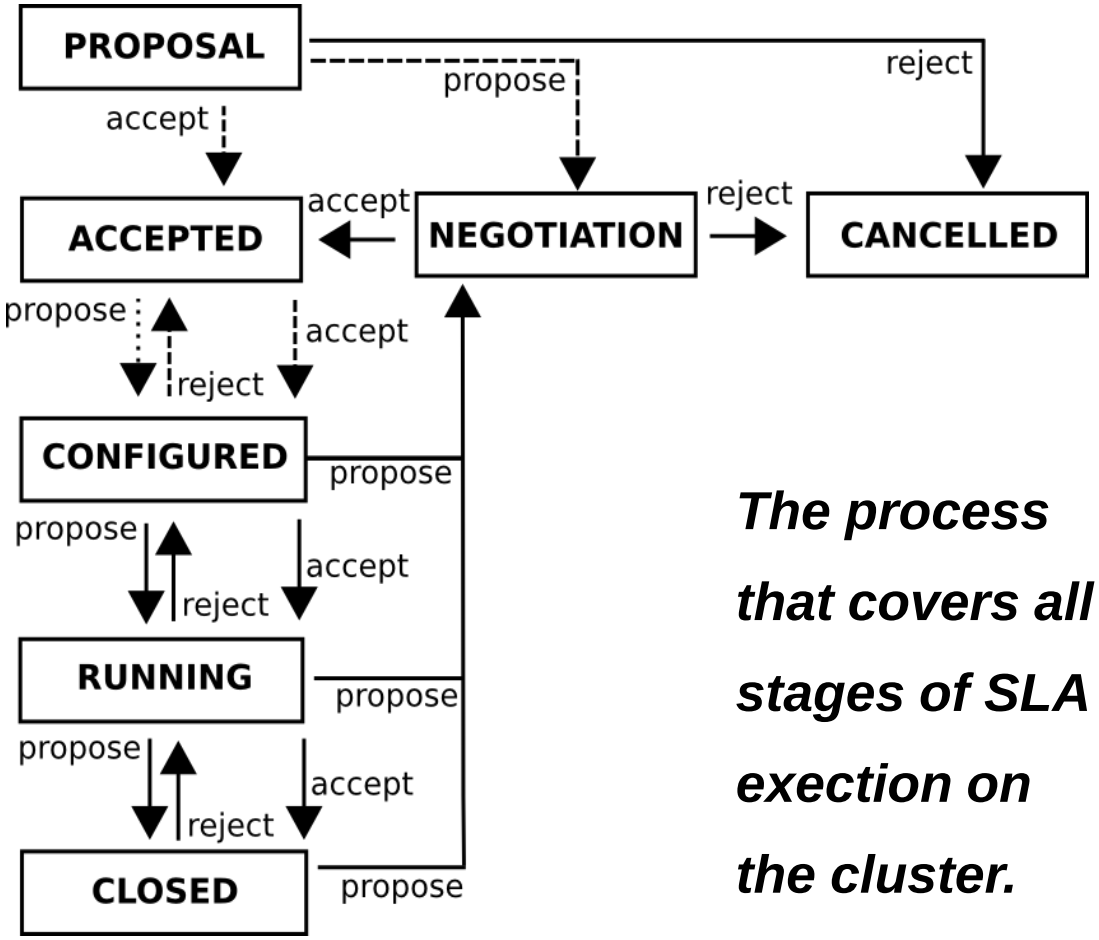
- 8 countries,
- 25 sites,
- ~8000 cores,
- ~850 TB storage
- ~30 VOs

Example of SLA

Metrics to define SLA between site and VO

1	The site must be an EGEE production site, keeping the following SLA/SLD metrics:	
	1.1 Minimum site availability (optional) 1.2 Minimum site reliability (optional) 1.3 Maximum time to acknowledge GGUS tickets (optional) 1.4 Maximum time to resolve GGUS incidents (optional)	% % days days
2	Specification of computational services (can be more than one such class)	
	2.1 Guaranteed number of slots in LRMS (CPUs or cores) 2.2 Maximum wall-clock-time n specified time period (weekly/monthly) (optional) 2.3 Maximum queing time within guaranteed pool (optional) 2.4 Average power of a single slot 2.5 Access period 2.6 Advance configuration (optional) 2.7 Available capacity in "Shared Workspace" (optional) 2.8 Available capacity of file system on a worker node (optional) 2.9 Additional requirements (optional)	- hours min kSpecInt dates from-to hours GB GB -
3	Specification of grid storage services	
	SLA can define several classes containing following metrics: 3.1 Storage quota guratanteed 3.2 Maximum latency in accesing files (optional) 3.3 Minimum bandwidth in accesing files (optional) 3.4 Storage quota for temporal use (optional) 3.5 Time limit for temporal use of storage (optional) 3.6 Period of using storage 3.7 Advance configuration (optional)	 GB ms Gb/s GB hours dates from-to hours
4	Specification of networking services (optional)	
	4.1 Up-link bandwidth 4.2 Access period	Gb/s dates from-to

SLA Execution Process in Bazaar



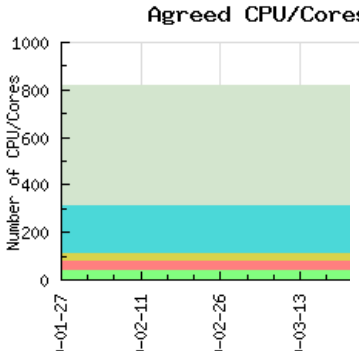
The process that covers all stages of SLA exection on the cluster.

Colaboration Tool: Functionality

- **Call management** - the user can perform call creation, edition and management.
- **SLA management including negotiation** - site managers can create a contract as a response to a call. Both partners can negotiate contract conditions and track contract changes.
- **Notification management -** system notifies a user via e-mail and user interface about actions like resource reconfiguration etc.
- **Feedback** - VO managers can assess site's configuration and both partners can provide a general assessment of the collaboration when the contract has been completed.
- **Accounting and statistics -** users can generate reports with resources usage statistics. In the next prototype, a tool shall enable obtaing data from

Colaboration Tool: Current view

- **Bazaar – a tool supporting resource allocation including SLA negotiation**
  - Integrated with EGEE Operation Portal (CIC Portal)
  - No cost of entry – data obtained from GOCDB and CIC-Portal VO-cards
  - Involved in operation within Central European Region
- **Main features of Bazaar**
  - Clear view on VOs demands for resources
  - Management of calls and SLAs between VOs and RC
  - SLA negotiation suport
  - E-mail notifications
  - Tracking of SLA changes



Contracts of your VOs

ID	Call	VO	Site	From/To	State	Actions
60	Exemplary Call	gaussian	CYFRONET-IA64	2008-07-01 2008-09-30	ACCEPTED	edit
63	Exemplary Call	gaussian	AEGIS07-PHY-ATLAS	2008-07-01 2008-09-30	NEGOTIATION	edit

Published and running calls

ID	Call open from/to	N
81	2008-07-08 2008-08-20	Exempl
80	2008-07-01 2008-07-31	Exemp

Contracts of your RCs:

ID	Call	VO	Site	From/To	State	Actions
						New contract
60	Exemplary Call	gaussian	CYFRONET-IA64	2008-07-01 2008-09-30	ACCEPTED	edit
61	Exemplary Call 2	balticgrid	CYFRONET-IA64	2008-07-02 2008-11-28	NEGOTIATION	edit
62	Exemplary Call 2	balticgrid	CYFRONET-IA64	2008-07-02 2008-11-28	CONFIGURED	edit

Calls in which your sites participate

CYFRONET-IA64

ID	Name	VO	Actions
80	Exemplary Call	gaussian	see your contracts
81	Exemplary Call 2	balticgrid	see your contracts

										Operator(role)	Decision
										Anna Pagacz (RC Manager)	propose
										Anna Pagacz (Bazaar operator)	accept
2008-07-20 10:43:21	2008-07-02 2008-11-28	CONFIGURED	40/50	60/70	0	0	0	0		Anna Pagacz (Bazaar operator)	propose
2008-07-20 10:43:25	2008-07-02 2008-11-28	CONFIGURED	40/50	60/70	0	0	0	0		Anna Pagacz (Bazaar operator)	accept

Conclusions

1. Defining SLA is the must for serious computations
2. In PL-Grid we plan to introduce a process of efficient handling of SLAs supported by a collaboration tool.
3. Bazaar deployed in EGEEIII showed this direction is good.