Usage Policy (UPL) Research for GriPhyN & iVDGL

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Outline

➢ Grid03 Deployment Model
➢ What is UPL
➢ Motivating Scenario
➢ Problems
➢ Time Frame
➢ Evaluation Methodology
➢ Open Questions
Grid03 Deployment Model

- **MP**: Manager Policy – the description provided by the person in charge about how resources must be used [Site Level]
- **SC**: Administrator Policy – the technical description written by site’s administrator, in short, the RM’s configuration files [Site Level]
- **SC’ (AP)**: Abstract Policies – Grid level *understanding* of site policies
- **MP’**: AP translation for verification and conformance purposes

- Translators: reverse SC to MP, but to a Grid understanding, using percentages [slide 5], and trying to abstract to a common RM model

- AP + MP’ + translators + others = UPL Service
What is UPL?

➢ UPL: resource owners’ (local policy makers) statements about how their resources must be allocated (high level descriptions) – *high level GOAL* or *MP*

➢ RM Priorities/Rules: resource administrators mappings of resource owners' statements to different software RMs' syntaxes – *the local POLICY that is actually implemented* or *SC*

➢ Abstract Policies: grid level understanding of the UPL, extracted from the SC – reverse translation from SC to MP done by means of automated tools
Example

➢ The resource owners’ statements (MP) for site X is:
  ➢ We have a cluster with 380 CPUs
  ➢ At any time: ATLAS has a 30%; the other VOs together have just 10%
  ➢ When additional resources are available, Grid03’s VOs can grab these resources
➢ The Condor priorities (SC) used to realize the above description is:
  % condor_userprio -setfactor atlas 2
  % condor_userprio -setfactor others 9
➢ The Grid understanding (AP) example:
  ➢ RM type: Condor
  ➢ RM allocations: ATLAS:30% Others:10%
  ➢ UPL type: VOESF
Problems

➢ *Is the UPL GOAL really necessary? Is it useful for the Grid environment? If yes, why?*

➢ Roles identification

➢ Amount of information to be made available from individual sites

➢ Heterogeneity considerations:
  ✓ Different RM models (Condor, PBS, LSF, others)
  ✓ RM priorities:
    ➔ local vs. remote users
    ➔ Atlas vs. CMS vs. CMStest
Deployment Technicalities

➢ Site Level:
  ✓ MDS providers: collect SC, translate to AP and publish it into MDS
  ✓ MDS schema enhancement: UPL-specific objects and attributes for storing RM type and per-VO allocations

➢ Grid Level / UPL OGSA service:
  ✓ SC collection and translation to AP support
  ✓ Smart UPL answers: “From the list $L$ of sites, which is the subset $S$ of sites where VO $V$’s workload is possibly to run?”, then “Which is the best site $X$ to send VO $V$’s workload?”
  ✓ Criteria for *best* site: #CPUS free, lowest cost, most required files available, most free space, etc
Time Frame

- **UPL role Identification**
  - *done*

- **MDS providers (coding)**
  - *partially done*

- **MDS schema enhancement**
  - *under review*

- **Grid UPL Service (coding)**
  - *1st vers.

- **MDS providers testing & debugging on grid3dev**
  - *in progress*

- **MDS schema deployment on Grid3dev**
  - *in progress*

- **Grid UPL Service deployment**
  - (location, clients)
  - *not started*

- **MDS providers movement to Grid03**
  - *in progress*

- **MDS schema deployment on Grid03**
  - *in progress*
Gains

➢ Additional information that give grid schedulers hints about where to submit jobs – for example, when a site is busy with work from a VO which had grabbed all resources when they were free

➢ Time-based entitlement to resources – VOs are guarantied under different FS policies that they can use resources when they need them instead of maintaining constant workloads
Evaluation Methodology

➢ Metrics:
  ✓ UPL accuracy: achieved vs. allocated
  ✓ Response Time: time interval from submission to start
  ✓ RoundTrip Time: time interval from submission to end

➢ Real Workloads (simultaneously running on Grid03 resources): Bio, Atlas, CMS, bTev.
Open Questions

➢ Is UPL based resource allocation really necessary?

➢ Is the proposed model good enough to achieve initial goals?

➢ How do I know that I have succeeded?