Part II:
Service Level Agreements

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Service Level Agreements

Macías et al. in their chapter "*Enforcing Service Level Agreements using an Economically Enhanced Resource Manager*" demonstrate how a resource management system can be extended with economic properties – primarily focusing on revenue gain and penalty determination when an SLA is violated. They demonstrate, using a scheduling example, the use of an EERM (Economically Enhanced Resource Manager) which utilizes these concepts to launch jobs on multiple resources. Various sub-systems within the EERM are described, along with discussion about what constitutes a violation, and the type of monitoring that is necessary to detect violations.

Püschel et al. in "*Extended Resource Management Using Client Classification and Economic Enhancements*" extend the work by Macías et al. by focusing on client classification that can be used to facilitate long standing interactions between specific users (e.g. standard vs. gold customers), thereby enabling better revenue management. They demonstrate how such economic considerations could be integrated with resource management using the EERM.

Smith and van Moorsel in their chapter "*Mitigating Provider Uncertainty in Service Provision Contracts*" indicate that it is often difficult for a provider to be precise about what capabilities it can deliver. Such uncertainly may arise due to inherent non-determinism within a distributed system, such as load fluctuations (in non-dedicated machines) and resource failures (which are, by definition, unpredictable). They discuss how such uncertainty subsequently manifests itself in a provider forming sub-optimal service contracts. They discuss the use of statistical estimators that could be used by a service provider to engage in the development of contracts. They also utilize customer classes in order to determine how service levels should be adapted when system properties change.

SLAs must utilize a term language in order to define: (i) what must be measured – and therefore whether an SLA was successfully completed or it failed; (ii) what the measured term means to an application end user. In this context, Tenschert and Kotsiopoulos in their chapter "*Text-Content-Analysis based on the Syntactic Correlations between Ontologies*" discuss how term languages can be mapped between different application domains using an "ontology" mapping process. They demonstrate that by utilizing greater semantic information using a Text-Content analysis phase, two interacting participants forming an SLA can un-

dertake better, and more targeted negotiation. They also demonstrate how such an approach could be used to complement an SLA lifecycle, and support better management of SLAs within multi-institutional collaborations.