A FairShare Scheduling Service for OpenNebula

In a large Public Cloud, applications can scale out with only cost driven limitations. Whereas a small Scientific Datacenter normally works in a saturated regime and tenants are charged a priori by paying for a fraction of the total assets. In this case, an advanced resource allocation policy is required in order to optimise the datacenter occupation efficiency.

A fraction of the available resources is statically assigned and partitioned among projects. Additional assets are partitioned dynamically following the effective request per project. Efficient and fair access to dynamic resources must be granted to all projects. To this purpose, the FairShare scheduling Service implements an algorithm which prioritises tasks according to an initial weight and to the historical resource usage per project.

FUNCTIONAL REQUIREMENTS
- provide a resource partitioning framework to handle unallocated (dynamic) resources
- guarantee the coexistence of the dynamic and static partitioning models
- for dynamic resources, provide an allocation mechanism based on a fair-share algorithm
- define a new kind of dynamic quota
- provide a queuing mechanism for handling the requests that cannot be immediately fulfilled
- possibly apply the fair-share mechanism also to non standard resources (e.g. GPUs)

DESIGN
- not intrusive in the OpenNebula (ONE) core
- self-contained module interacting only with the ONE XML-RPC interface
- keep the original scheduler implementation for matching resources to requests
- order the requests queue according to priorities
- do not add new states to the VM life-cycle
- synergy with the ONE authentication, quotas, monitoring and accounting systems

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