

## **Nefeli: Hint-based Execution of Workloads in Clouds**

Virtualization of computer systems has made feasible the provision of entire distributed infrastructures in the form of services. Such services do not expose the internal operational and physical characteristics of the underlying machinery to either users or applications. In this way, infrastructures including computers in data-centers, clusters of workstations, and networks of machines are shrouded in "clouds". Mainly through the deployment of virtual machines, such networks of computing nodes, become cloud-computing environments. In the presented work, we propose Nefeli, a virtual infrastructure gateway that is capable of effectively handling diverse workloads of jobs in cloud environments. By and large, users and their workloads remain agnostic to the internal features of clouds at all times. Exploiting execution patterns as well as logistical constraints, users provide Nefeli with hints for the handling of their jobs. Hints provide no hard requirements for application deployment in terms of pairing virtual-machines to specific physical cloud elements. Nefeli helps avoid bottlenecks within the cloud through the realization of viable virtual machine deployment mappings. As the types of jobs change over time, deployment mappings must follow suit. To this end, Nefeli offers mechanisms to migrate virtual machines as needed to adapt to changing performance needs. Using our prototype system, we show significant improvements in overall time needed and energy consumed for the execution of workloads in both simulated and real cloud computing environments.