

Osmotic Computing

Massimo Villari

Abstract

With the promise of potentially unlimited power and scalability, cloud computing (especially infrastructure as a service [IaaS]) supports the deployment of reliable services across several application domains. In the Internet of Things (IoT), cloud solutions can improve the quality of service (QoS), fostering new business opportunities in multiple domains, such as health-care, finance, traffic management, and disaster management. Available mature solutions, such as Amazon IoT and Google Cloud Dataflow, demonstrate the success of cloud-centric IoT programming models and resource orchestration techniques. However, recent technological advances have disrupted the current centralized cloud computing model, moving cloud resources close to users. Osmotic computing is a new paradigm that's driven by the significant increase in resource capacity/capability at the network edge, along with support for data transfer protocols that enable such resources to interact more seamlessly with datacenter-based services. It aims at highly distributed and federated environments, and enables the automatic deployment of Microservices that are composed and interconnected over both edge and cloud infrastructures. Osmotic computing inherits challenges and issues related to elasticity in cloud Osmotic datacenters, but adds several features due to the heterogeneous nature of edge datacenters and cloud datacenters. Various stakeholders (cloud providers, edge providers, application providers, IoT DevOPs, and so on) can contribute to the provisioning of IoT service and applications in a federated environment. An interesting is becoming the new aspect that allows to leverage a simplified biotechniques and models for managing complex analogous systems.