4.2.8 Elasticity

Return to Non-Functional Requirements

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Cloud Elasticity also known just Elasticity “is the degree to which a system is able to adapt to workload changes by provisioning and de-provisioning resources in an autonomic manner, such that at each point in time the available re-sources match the current demand as closely as possible.”[1)]. A primary motivation behind Elasticity is to save money by not investing in Infrastructure-as-a-Service (IaaS) that is not used or under used. It also saves natural resources since heating and air conditioning are not used on resources that are on standby[2)].

- **Cost-aware criteria** the default is to assume that there is a firm fixed price for IaaS providers, however, some providers allow for spot pricing schemes (i.e., Amazon) which can allow users to tap into IaaS excess capacity. This excess capacity is there so that the IaaS provider can meet the Service Level Agreements (SLAs) guaranteed to all customers.
- **Power-aware cost function**. There are also benefits be reaped when using the off-peak power consumption only use the power required to meet the application's needs and little more.
- **Multiple classes of requests**. This allows an applications to be segmented into categories based on the need for service. For example, customers requests for service from the application cn be divided into three categories: High Priority for performing financial transactions; Medium Priority for those making product enquirers; Low priority for this browsing.
- **Other types of applications**
- **Scaling multiple applications**. This allows for an application to be broken up into smaller applications whose functionality and services are orchestrated.

DDS Specifics

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Data Distribution Service (DDS) is generally implemented as a Peer-to-Peer (P2P) and uses the Publish-Subscribe model rather than the Client-Server model. Therefore, there is little need for elasticity is unless the durability is used and then only the ddsnode responsible for keeping the messages needs to worry about Elasticity.

1)

Nikolas Roman Herbst, Samuel Kounev and Ralf Reussner, Elasticity in Cloud Computing: What It Is, and What It Is Not, Accessed on 11 August 2020,

https://sdqweb.ipd.kit.edu/publications/pdfs/HeKoRe2013-ICAC-Elasticity.pdf
2)

Rui Han, Investigations into Elasticity in Cloud Computing, November 2013, Accessed 12 August 2020, https://arxiv.org/ftp/arxiv/papers/1511/1511.04651.pdf