CS351 - Cloud Computing

Lecture #9

Service Level Agreement (SLA)

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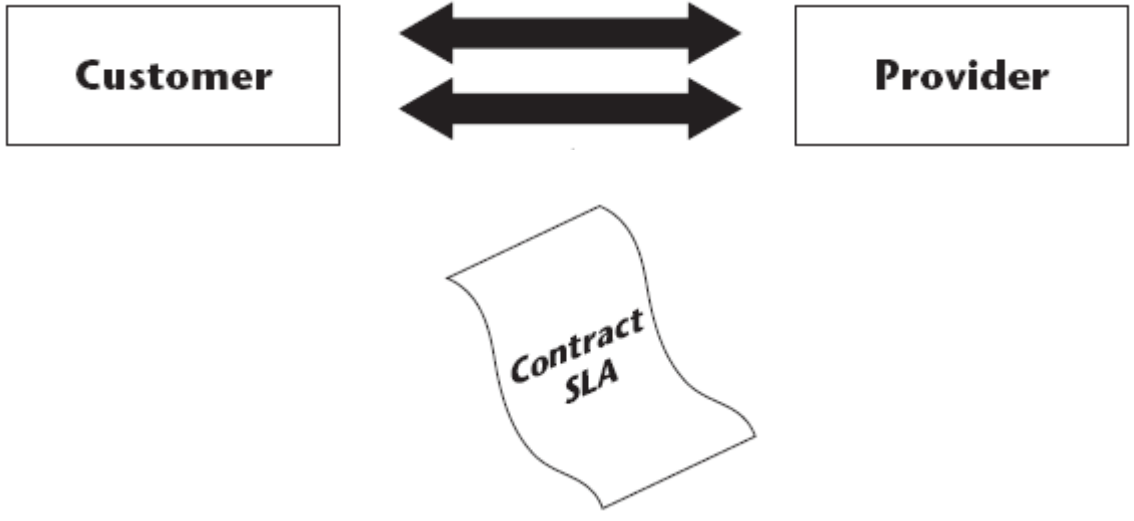
Definition

The SLA is a contract negotiated and agreed between a customer and a service provider

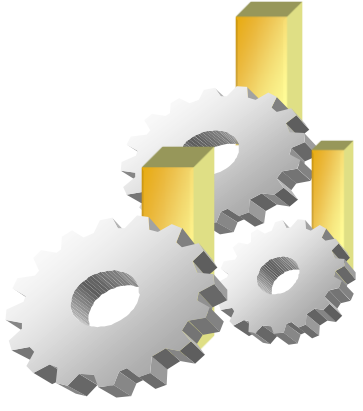


requirements

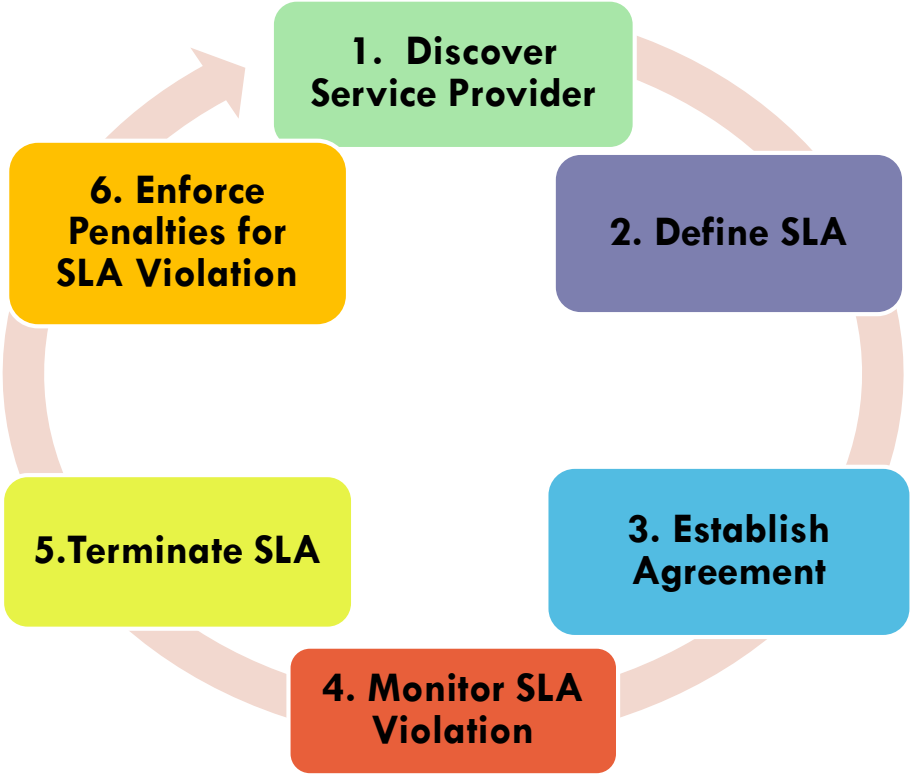
- SLA format should clearly describe a service
- Present the level of performance of service
- Define ways by which the service parameters can be monitored
- Penalties when service requirements are not met

SLA Components

- Purpose
- Restrictions
- Validity period
- Scope
- Parties
- Service-level objectives (SLO)
- Penalties



SLA Lifecycle



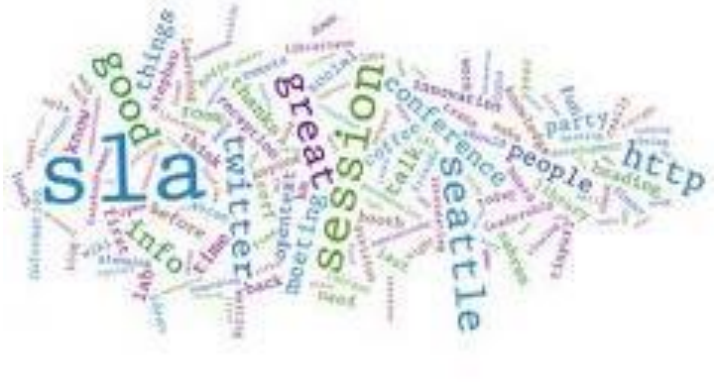
Discover service provider

- In cloud computing environments it is important to locate resources that can satisfy consumers requirement efficiently and optimally
- Resources are owned and operated by various providers

Define-SLA

it is necessary to identify the various elements of an SLA that will be signed by agreeing metrics

elements : QoS parameters, performanc , measurement, …



Stablish Agreement

In this step an SLA template is constructed template has to include all aspects of SLA components

Monitor SLA violation

It plays a critical role in determining whether SLOs are achieved or violated

un-fulfillmen

Terminate SLA

- a key aspect is to decide when it should be terminated
- once decided, all associated configuration information is removed from the service systems

who is the party that triggered this activity

what are the consequences of it

Enforce penalties

- A penalty clause can be applied to the party who violates SLA terms
- a direct financial compensa-tion being negotiated and agreed between parties

SLA violation has two indirect side impacts on providers

Consumers use less service from the provider

provider's reputation decreases

SLA Metrics for cloud services

- SLA metrics for IaaS
- SLA metrics for PaaS
- SLA metrics for SasS
- SLA metrics for Storage as a service

SLA metrics for IaaS

Parameter	Description
CPU capacity	CPU speed for VM
Memory size	Cash memory size for VM
Boot time	Time for VM to be ready for use
Storage	storage size of data
Scale up	Max of VMs for one user
Scale down	Min number of VMs for one user
Scale up time	Time to increase number of VMs
Scale down time	Time to decrease number of VMs
Availability	Uptime of service in specific time

SLA metrics for PaaS

Parameter	Description
Scalability	Degree of use with large number of online users
Pay as you go billing	Charging based on resources or time of service
Servers	
Browsers	Firefox , IE xplorer , ..

SLA metrics for SasS

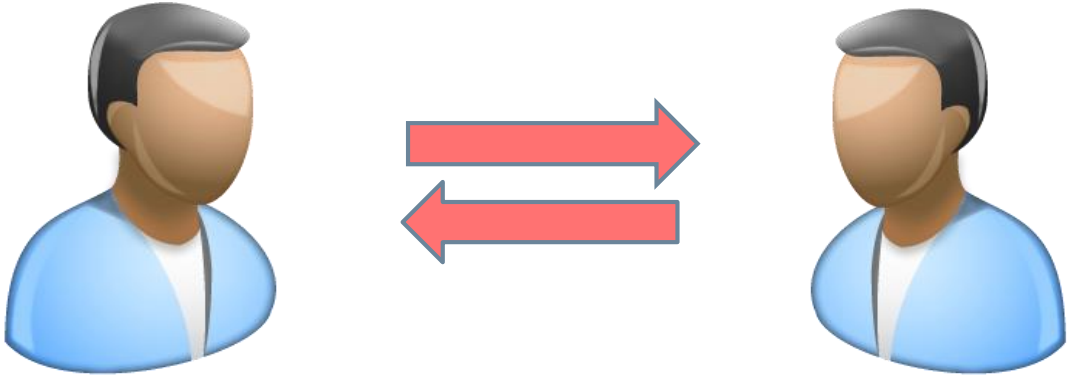
Parameter	Description
Scalability	Using with individual or large organisations
Availability	Uptime of software for users in specific time
Customizability	Flexible to use with different types of users

SLA metrics for Storage as a service

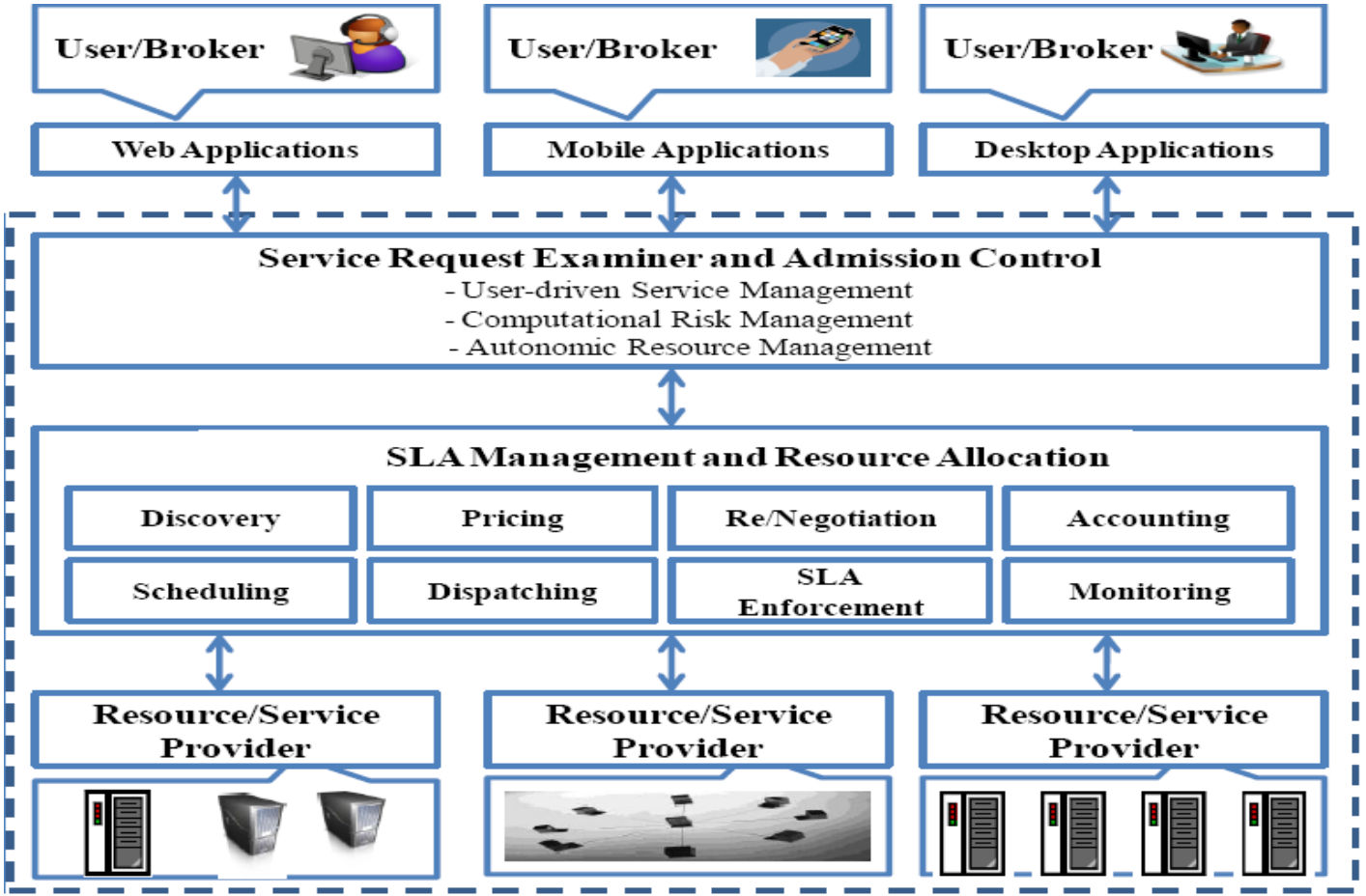
Parameter	Description
Geographic location	Availability zones in which data are stored
Scalability	Ability to increase or decrease storage space
Storage billing	How the cost of storage is calculated
Security	Cryptography for storage , authentication , authorization , …
Privacy	How the data will be stored and transferred
Backup	How and where images of data are stored
Recovery	Ability to recover data in disasters or failures
Transferring bandwidth	The capacity of communication channels

SLA negotiation

- The first scenario involves direct negotiation between the cloud consumer and the cloud service provider
- The second scenario is negotiation via trusted agent
- In the third scenario more than one agent is used to carry out the one type of negotiation



SLA-Oriented Architecture

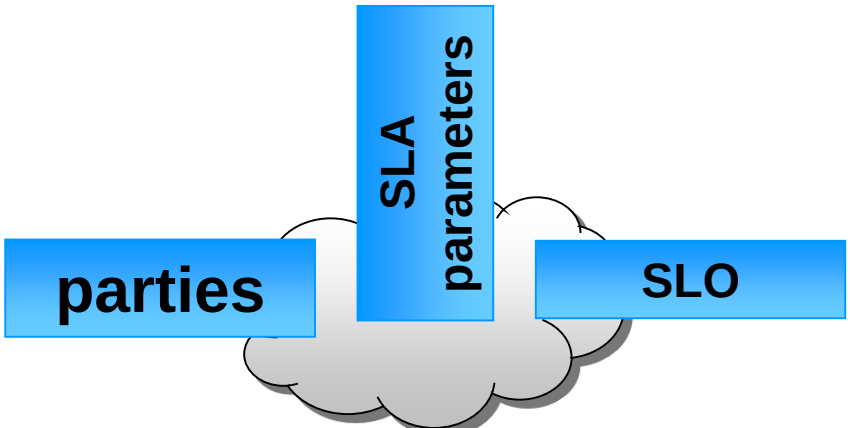


SLA Management Frameworks and Languages

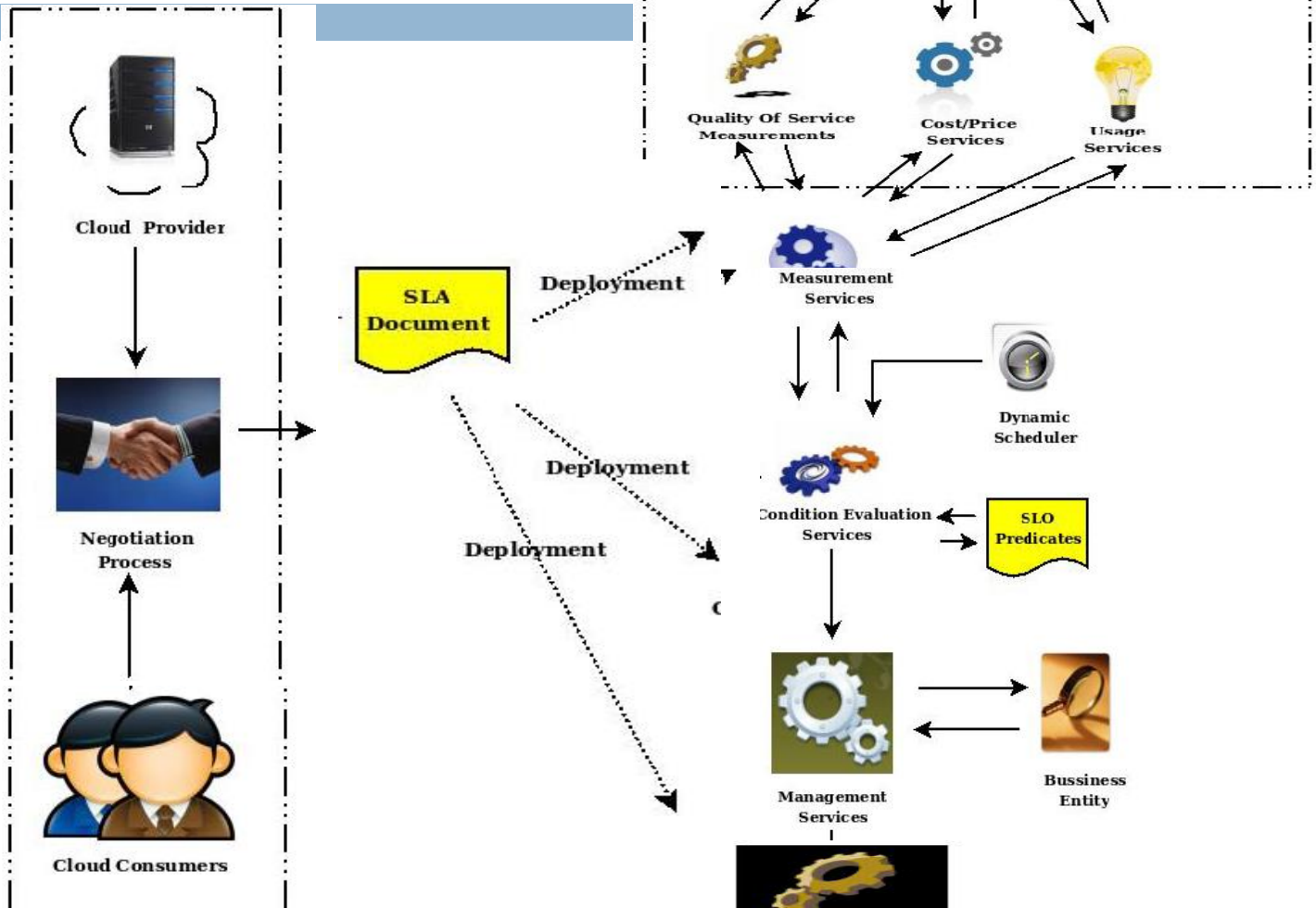
- Bilateral Protocol
- WS-Agreement
- Web Service Level Agreement (WSLA)
- WSOL
- SLAng
- QML
- QuO

WSLA

- WSLA is a framework developed by IBM to specify and monitor SLA for Web Services
- WSLA consists of a set of concepts and a XML language
- WSLA comprises of mainly three entities.



WSLA Architecture



Related work

- SLA@SOI provides two major benefits to the provisioning of services
  - service predictability
  - automation

Conclusion

- service level agreement is the key to ensure a service provider delivers the agreed terms of services
- cloud consumers with SLA parameters and negotiation can increase trust level of relationship
- We can manage SLAs with languages like WSLA, WS-Agreement

Refrences

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Azure Services Platform
Sun
Elitera
Microsoft
Google
YAHOO!
IBM
Google
EMC
HOSSO
amazon web services
NETSUITE
OpenID


QUESTIONS