

A high-angle, blurred photograph of a crowd of people walking on a light-colored floor, likely in a public space or transit area. The motion blur gives a sense of a busy, moving environment.

PRESEnCE: Performance Evaluation of SaaS Web Services across Multi-Cloud Providers

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CSC

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The logo of the University of Luxembourg, featuring a stylized 'uni.lu' in red and blue.

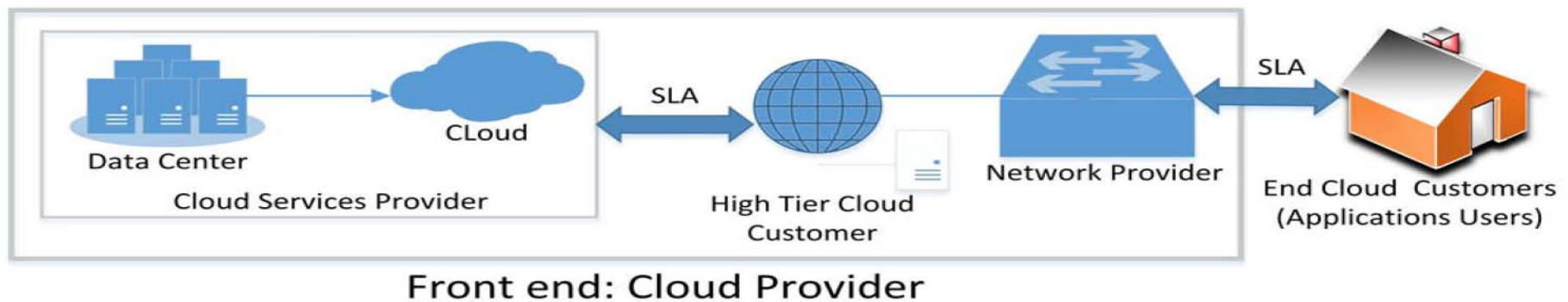
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Agenda

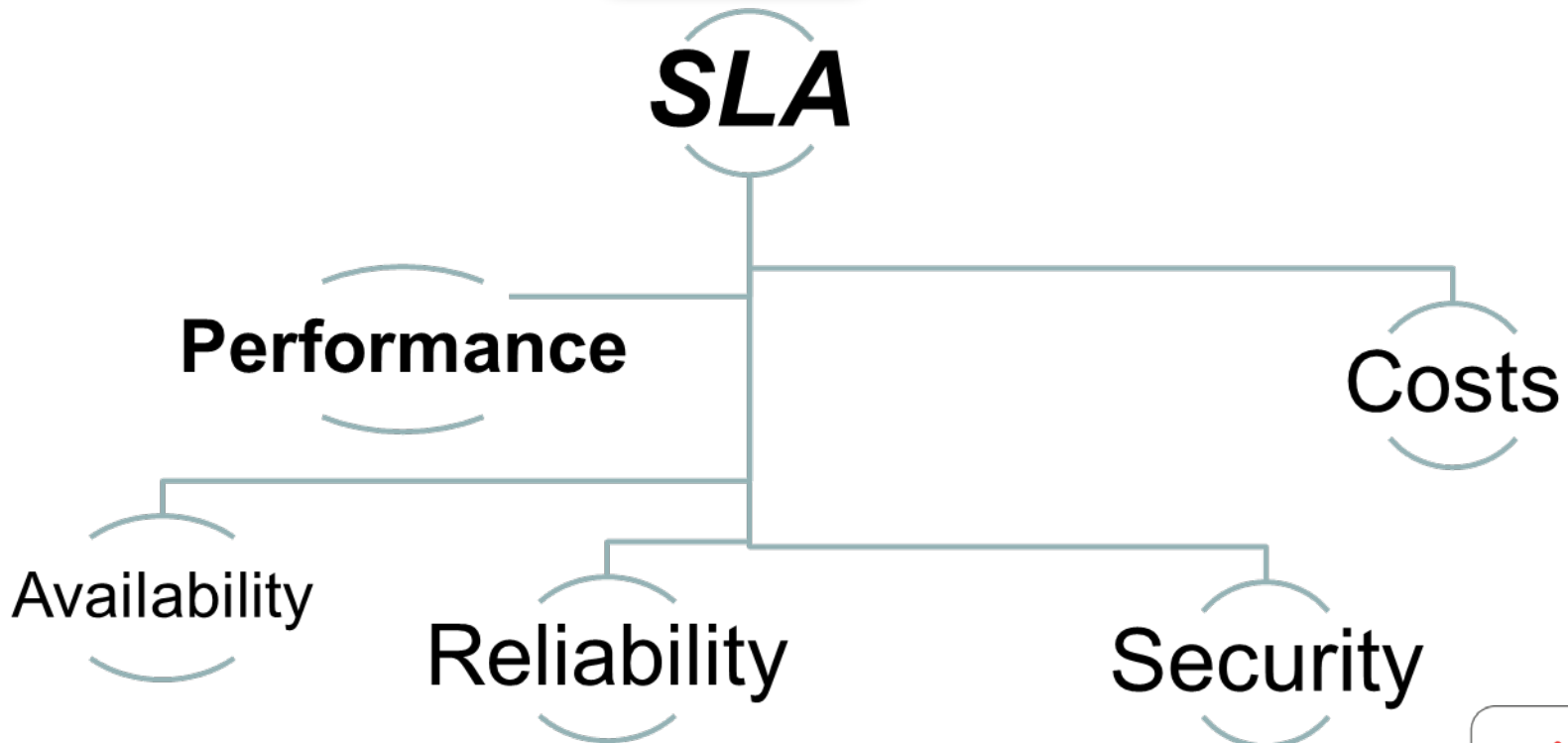
- Introduction
- Problem
- Motivation
- Objectives
- Methodology
- Testing
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- Future work

Introduction

- Cloud services providers (CSPs) deliver cloud services to cloud customers on a pay-per-use model.
- Quality of the provided services are defined using Service Level Agreements (SLAs)

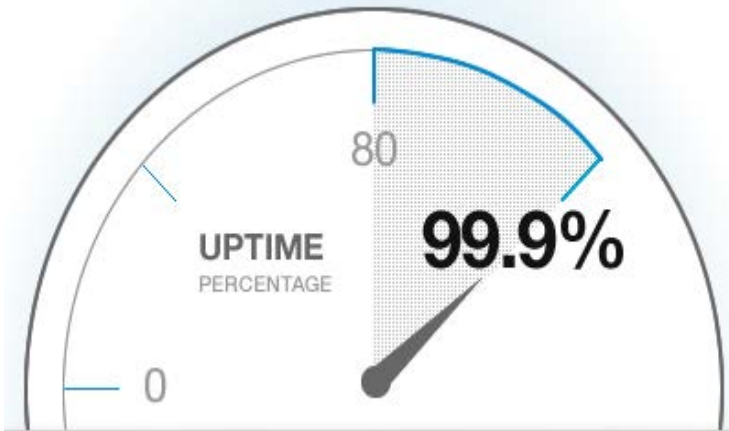


SLA : Services Level Agreement



SLA:

Up Time



Response Time



Services Availability

Services Performance
QoS

The Problem

- No standard mechanism which **exists** to:
 - Verify and assure that delivered services satisfy the signed SLA automatically
- No way to measure accurately the Quality of Services (QoS).
- It is difficult to verify on the response times or the services performance !!

Motivation

- It is difficult to be installed as a third party:
 - Between the CSPs and the cloud customers !

- So, the PRESEnCE framework (PeRformance Evaluation of SErvices on the Cloud) is proposed

Objectives and Ambitions

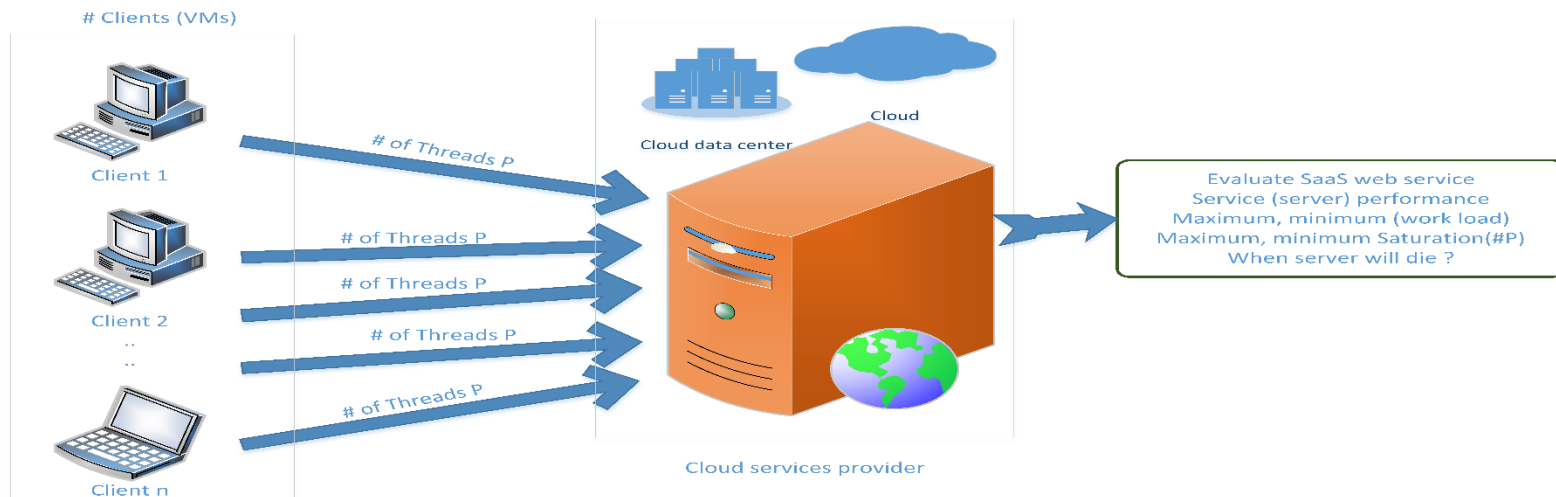
- We aim at offering an automatic framework able to:
 - Evaluate the QoS and SLA compliance of Web Services offered
 - And across several Cloud providers.
- By:
 - Quantify in a fair and by stealth way the performance and scalability of the delivered Web Services.
 - Assess the claimed SLA and the corresponding QoS from a set of relevant performance metrics (response time).
 - Provide a multi-objective analysis of the gathered performance metrics to be able to classify cloud brokers

Methodology

- PRESEnCE framework :
 - Define Common metrics for measuring:
 - behavior of services/applications
 - Services delivered by specific cloud providers.
 - Metrics assess the providers' **scalability** and **performance** for the services.

Methodology(cont.)

- Measure SaaS Web Service performance(p) , with :
 - parallel workload in each client
 - Common parameters: #threads, #clients
 - Used to **stress** the tested web service
 - **Standard workload representation** (toml, etc.)



- Doing this through multiple Cloud services provider

Proposed Evaluation Setup

- Use reference benchmarks to evaluate perf.
- Make it unnoticeable for cloud providers.
 - Mimic “normal” client network patterns
 - Or deploy a closed environment (same physical machin, etc)
- Example of selected benchmarks
 - Iperf
 - Twitter RPC-perf
 - Apache HTTP server benchmarking tool
 - Yahoo Streaming Benchmark

Experimental Setup: context #1

- Obj.: Use a closed environment to evaluate the expected web service performance
 - Try to deploy a VM on similar machine
 - Enable more control on the deployed environment
 - Typical benchmark in this context: Iperf

Experimental Setup: context #2

- Obj.: stress the web service using client based benchmark
 - Try to hide benchmarking campaign from cloud provider (avoid VW group scandal)
 - Requires careful analysis of normal client behavior
 - **Requires Standard workload representation** (toml, etc.)
 - Typical benchmark in this context:
 - Rpc-Perf
 - ab- Apache HTTP server
 - Yahoo streaming benchmark

Experiment not only local VMs and Servers

- Going for a real data center hypervisors (VMs and servers):
 - UL HPC
 - Xen
 - KVM
 - Grid 5000
 - Amazon web services

Challenges

- Find a way to combine these tools by stealth to evaluate cloud application performance.
 - Because CSPs could adapt their behavior, when they entered an evaluation campaign.

- We want to prevent these actions in cloud sector
 - evaluate SaaS-based services performance as close as possible from a huge usage of the service.

Expected Benefits

- For the CSPs:
 - PRESEnCE assesses the performance and SLA appliance of their offer or the one of their competitors
- For end-users(Cloud Customers):
 - PRESEnCE framework permits to control and validate the SLA and corresponding QoS.

Future work

- Get the correlations between the metrics
 - Classify the cloud services providers
- Measuring the behavior of the specific classes of the applications

Thank you for your attention



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