Cloud based performance testing: Issues and challenges

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Agenda

• Introduction of performance testing
• Background
• Issues and Challenges
• Conclusion
Performance testing

- *Performance testing* is a type of testing intended to determine the responsiveness, capacity, throughput, reliability, and/or scalability of a system under a given workload.

**Can:**
- Assess production readiness
- Evaluate against performance criteria
- Find system capacity
- Compare performance characteristics of multiple systems or system configurations
- Find the source of performance problems
- Support system tuning
- Find throughput levels

...
Importance of Performance testing

At the highest level, performance testing is almost always conducted to address one or more risks related to:

- expense,
- opportunity costs,
- continuity,
- and/or corporate reputation
A Motivation Case of Cloud testing

- The transaction of China Unionpay is above 20000/s, how can we load testing such systems with extremely high concurrency.

How much machines are needed for this test?

With Cloud! Easier but not easy.
Five essential elements of cloud computing are:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured Service
Concept of Cloud Testing

- Cloud testing use cloud infrastructure for software testing, including general functional testing, **performance testing** or security testing.
Why cloud testing

- Effective unlimited resources
- Quick availability of the infrastructure with scalability
- Flexibility and availability of distributed testing environment
- Convenient deployment
- Convenient delivery
- Do not need to maintain testing infrastructure
- ......
Topologies of performance testing

**LAN-Test-LAN**

- Test server
- Test machine
- Test machine
- Test machine

**CLOUD-Test-LAN**

- Test server
- Test machine
- Test machine
- Test machine

**CLOUD-Test-CLOUD**

- Target system
- Test machine
- Test machine
- Cloud computing resources

**LAN-Test-Cloud**

- Test machine
- Test machine
Main Differences

- Utilization of computing resources.
- Location of test agents.
- Cost.
- Security concerns.
Utilization of computing resources

For Cloud based performance testing

• Sharing physical resources with other test agents
• Each test agent would share physical resources with other applications.
• the execution of tests and measure are influenced both OS and hypervisor.
Location difference of test agents

- **Traditional:**
  - Local distributed -> low latency

- **Cloud-based:**
  - Global distributed -> high latency and fluctuation
Cost differences

- Traditional cost includes:
  - salary of engineers.
  - cost of purchasing and maintaining infrastructure.
  - cost of licensing and services.

- cloud-based cost includes:
  - salary of engineers
  - cost of cloud pay-as-you-consume resources
  - cost of licensing and services.
Security concerns

• LAN
  ▫ Data are private access
  ▫ Performance testing are for internal use

• Cloud-based
  ▫ Resource are open to public
Issues

- Quality of Workload generation
- Data Analysis
- Security
- Cost
- Service level agreement
Quality of workload generation

Two key influence factors:

- Overmuch workload on test machines
  - what kind of results are convincing?
  - how to figure out the capacity of different kinds of instances for different workloads?
- Performance variation of cloud
  - how to adaptively control the distribution of workload generation locally and globally?
Challenges

- Define sound metrics for performance testing quality
- Capacity of performance testing machines
- Controlling of workload generation
Data Analysis

- How can time be synchronized of different instances and CPUs?
- How to measure and evaluate the measurement error introduced?
- What is normal data and anomaly generated by cloud-based performance testing?
Security

- Protection of critical information.

- protection of performance testing services from illegal usage.
Cost

• How much is needed for a test?
Service level agreement

- Performance variation problem
- Resource allocation
- Trust
Conclusion

- Cloud is good, But be careful when using it.
- If you not careful enough, it will make you confused.
Thank You!

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