

# 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.



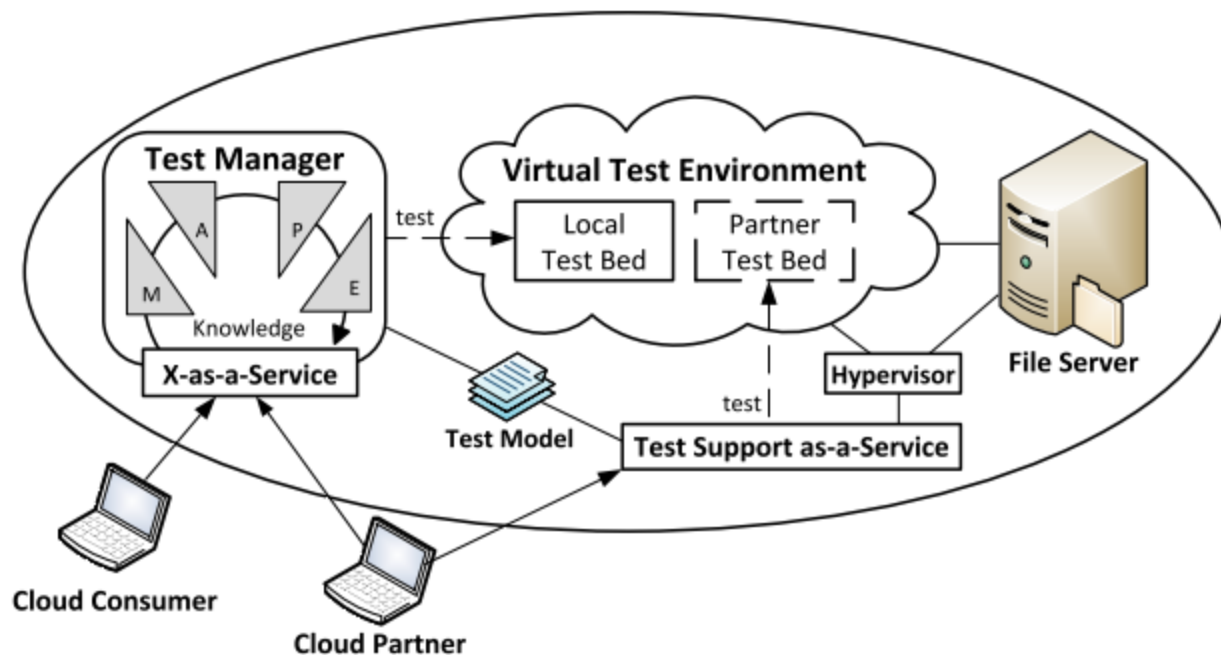
# Five essential elements of cloud computing are:

- 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.



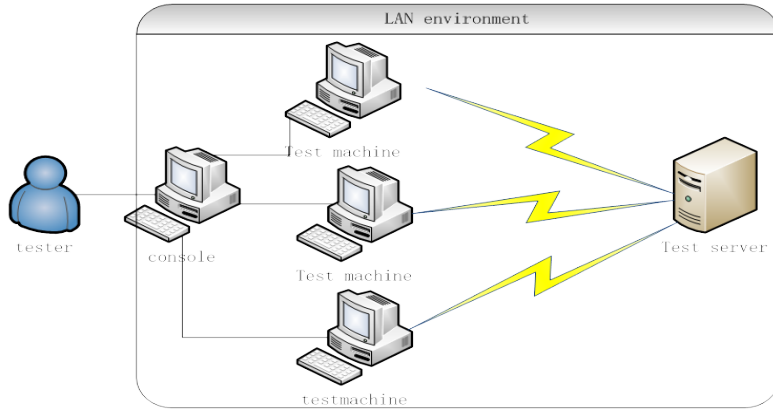
# Why cloud testing

- 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
- .....

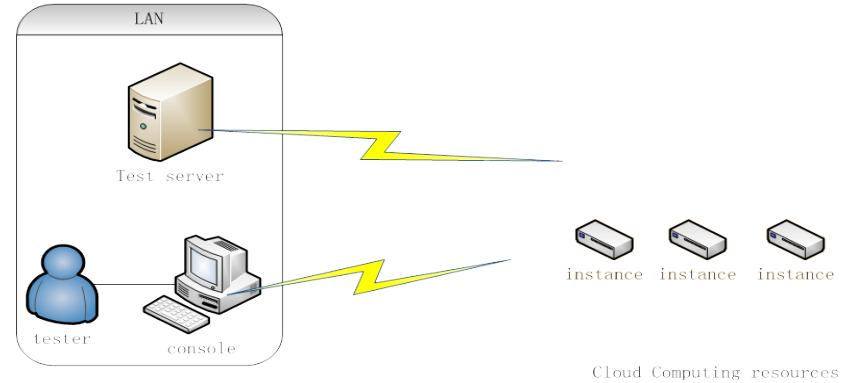




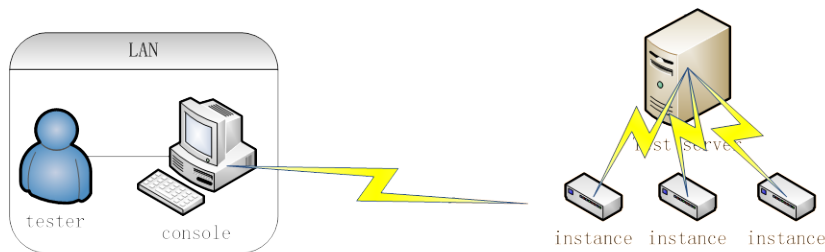
# Topologies of performance testing



**LAN-Test-LAN**

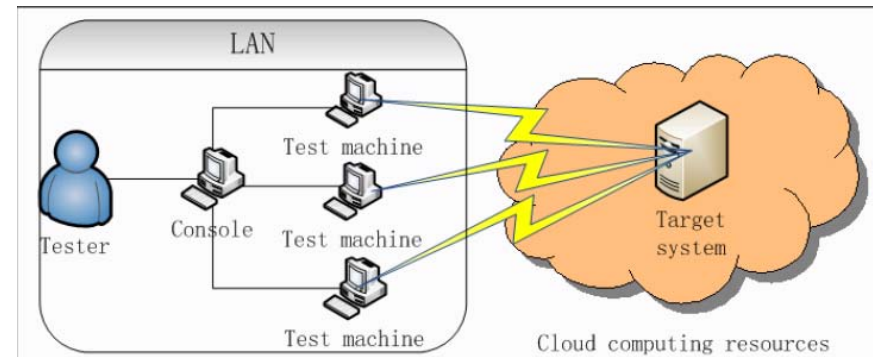


**CLOUD-Test-LAN**



Cloud Computing resources

**CLOUD-Test-CLOUD**



Cloud computing resources

**LAN-Test-Cloud**



# 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.



End

**Thank You!**

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