

Cloud Computing - WS 21/22

Exam

- ISIS / Moodle Exam
- open-book
- 50minutes

Questions

- which cloud service model relies on virtual machines to provide servers ?
- name 3 service models of cloud computing (NIST)
- name all NIST deployment models
- explain briefly one of the 5 NIST characteristic of cloud computing
- which cloud service model provides runtime environment for apps, deployment / tools ?
- which cloud service model provides the highest degree of integration in cloud computing ?
- label given venn diagram of classes of instruction (Popek and Goldberg)
- True/False: shadow pages can only be used when the guest OS is aware of being virtualized ?
- True/False: IA-32 contains critical instruction that are not sensitive
- True/False: guest os make changes to its one shadow page table
- True/False: extended page tables makes shadow page tables unnecessary
- In which virtualization approach and when does binary translation happen ? (full/para, runtime/compile/prepare time)
- OS running on which type of VMM Type is example of full virtualization ? (1,2,3, all)
- True/False: VM tries to write to allocated page in full-virt. IA-32 using binary translation. VMM needs to
 - run directly on CPU
 - check address is in VM space before running

- trap instruction
- drop instruction + exception
- True/False: migration VM in same subnet
 - subnet receives ARP request with VM mac
 - subnet receives ARP request with VM IP
 - keep mac address
 - keep IP address
- True/False:
 - VM provide capabilities of running multiple machines with different OS
 - VM is process that is isolated from the host
 - downside of VM technology is overhead by indirectly addressed resources
 - paravirt. presents a software interface to VM that is identical to underlying hardware-software interface
- True/False: Paravirt.
 - host knows it is virtualized
 - guest OS knows it is virtualized
 - more efficient than full virt. with binary translation
 - virtualization assisted by guest OS
- True/False: shadow page tables
 - VMM creates table for each VM
 - guest OS maintains own table
 - VMM doesn't find page and goes to guest OS software table
 - needs to trap-and-emulate all read accesses
 - page fault more expensive than non-virt.
 - can be used by hardware

- how is the cloud computing challenge of isolation realized by VMMs regard to instruction execution in full virtualization according to Popek/Goldberg ?
- briefly name/explain two reasons for virtualization in cloud computing
- True/False: replication of data improves scalability
- True/False: replication of data improves availability
- True/False: Definition of one the Client-centric consistency models
- In what CAP theorem class does a message send/receive system in a distributed cloud system fail ?
 - CA
 - CP
 - AP
- name 3 deployment strategies for Continuous Delivery (CD)
- which steps are part of CI/CD pipeline
- what are typical tasks of cloud OS ?
- run MapReduce (case-insensitive, ignore punctuation) on: "If a cluttered desk is a sign of a cluttered mind, of what, then, is an empty desk a sign?"
- what will benefit the least of distributed execution? (e.g. flink/spark)
 - memory intensive
 - disk intensive
 - stream process
 - graph algorithmn
- serverless service, what is true?
 - monitor hardware failure
 - patching underling OS
 - manage lifetime of docker containers

- provide code and dependency
- serverless service, what will you NOT do?
 - none, all are likely
 - trigger serverless functions based on infrastructure events
 - automatically scale-out based on workload
 - lambda functions
 - configure VMs
- second generation of distributed data processing frameworks like fink/spark. name improvements in comparison to mapreduce
- fog computing definition
- what are characteristics of fog computing ? (location awareness, geographical distribution, non-real time, homogeneity)
- (fill X, Y) fog computing minimizes response time, provides local X and when needed network connectivity to centralized Y