GIN204 - Systèmes cloudifiés

Contrôle de connaissances

(# Questions : 16)

Les documents sont interdits. L'ordinateur portable est autorisé.
Durée : 1h30
Indiquez vos nom et prénom ci-dessous puis répondez aux questions suivantes.

Nom :
Prénom :
Groupe :

Multiple choice

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1. What is the feature of Cloud services that allows to dynamically adapt to a workload variation, thus allowing to manage computing infrastructure better and more efficiently ?

   ☐ Network abstraction
   ☐ Software switching/routing
   ☐ Scalability
   ☐ Cloud-native applications
   ☐ Not enough data to answer
   ☐ None of the above

2. Choose the correct(s) statement(s) about cloud services.

   ☐ Computing services are only charged by-the-hour
   ☐ Computing services can be charged by the hour or on a subscription-basis
   ☐ Cloud computing transforms the upfront cost into variable cost
   ☐ Cloud computing transforms variable costs into upfront costs
   ☐ Services can be added or reduced as needed
   ☐ Cloud systems do not offer cost management
   ☐ None of the above

3. Choose the correct(s) statement(s) about cloud deployments.

   ☐ Internet connection is required to access a cloud management console
   ☐ Cloud systems replace native hardware and software
   ☐ Cloud services are delivered locally
   ☐ IaaS provides virtual servers for application hosting
   ☐ A SaaS product requires to install the software before using it
   ☐ If a FaaS virtual instance is not accessed, it remains active and incur additional costs
   ☐ None of the above

4. In the Function-as-a-service model, a newly spawned container may experience a delay in execution for the first function call. This is called :

   - ☐ Scale-down
   - ☐ Ghost in the shell
   - ☐ Hard provisioning
   - ☐ Cold start
   - ☐ Warm start
   - ☐ There is no execution delay in FaaS model
   - ☐ None of the above

5. What are the services that a cloud system can provide to a customer ?

   - ☐ Storage
   - ☐ TCP and UDP protocols
   - ☐ Processing
   - ☐ Networking
   - ☐ Connection-less access
   - ☐ Hardware components
   - ☐ None of the above

6. Choose the correct(s) statement(s) about the IaaS model.

   - ☐ Applications are hosted by a third party because tenants have no access to the infrastructure
   - ☐ The IaaS model provides fully-fledged virtual servers, including networking and storage
   - ☐ IaaS requires large initial investments (upfront costs)
   - ☐ A VPC under the IaaS model requires the guest OS to be the same as the host OS
   - ☐ The underlying infrastructure is managed by the cloud provider
   - ☐ None of the above

7. A group of computing resources shared via a single abstract layer is called a :

   - ☐ Hypervisor
   - ☐ Cluster
   - ☐ Machine
   - ☐ Blade
   - ☐ Container
   - ☐ Network
   - ☐ None of the above

8. Choose the correct(s) statement(s) about the public/private/hybrid and multi-cloud deployments.

   - ☐ Public cloud services are hosted within third party equipment
   - ☐ With hybrid cloud deployments, the tenants' data are safely stored within the owner's computers
   - ☐ Running VMs in a multi-cloud environment is not compatible with cloud-native development
   - ☐ Both hybrid and multi-cloud deployments have different components hosted in a public/private environment
   - ☐ A private cloud service is not available on public Internet, but only via internal network (LAN or VPN)
   - ☐ In a multi-cloud scenario there is usually a private component offloaded to a public cloud in peaks periods
   - ☐ None of the above

9. Choose the correct(s) statement(s) about a Kubernetes pod.

   - ☐ A single pod corresponds to a single container
   - ☐ A pod is the smallest unit of work in Kubernetes
   - ☐ A pod is ephemeral
   - ☐ A pod can have a single label to help identify its type
   - ☐ A pod can have multiple replicas by configuring a ReplicaSet
   - ☐ None of the above

10. Choose the correct(s) statement(s) about the following Kubernetes yaml file.

```yaml
apiVersion: v1
kind: Deployment
metadata:
  name: my-deployment
  labels:
    app: web
spec:
  replicas: 5
  template:
    metadata:
      labels:
        app: web
    spec:
      containers:
       -name: ubuntu
          image: nginx
          ports:
           -containerPort: 80
```

   - ☐ This yaml will create a pod from the image `my-deployment`
   - ☐ This yaml will create a pod with 5 replicas from the image `ubuntu`
   - ☐ This yaml will create a pod with 5 replicas from the image `nginx`
   - ☐ This yaml will ensure that there will be at least 5 pod replicas
   - ☐ This yaml will ensure that there will be at most 5 pod replicas
   - ☐ This yaml will ensure that there will be exactly 5 pod replicas
   - ☐ By changing the number of replicas, all existing instances must be removed before instantiating the new ones
   - ☐ None of the above

11. Put the following steps in the correct order (1 to 8) in case of the creation of a Docker container from a registry and the execution of some code.

    ☐ On the client, run `docker pull` and specify the desired image and the registry
    ☐ If the image is available on the registry, it is downloaded locally on the client
    ☐ On the client, run `docker run` and specify the desired command parameters
    ☐ The Docker daemon will contact the Docker hub registry, if no other registry is specified
    ☐ The Docker daemon will build a container from the specified image
    ☐ On the client, run `docker attach` and execute the desired command
    ☐ On the Docker host, the Docker daemon will check if an image is stored locally
    ☐ The Docker daemon will contact the specified registry

12. Choose the correct(s) statement(s) about storage typologies.

    ☐ In File storage, data is stored into independent chunks
    ☐ Block volumes can be mounted at OS level or HV level
    ☐ Locking a block storage must be done on the entire volume
    ☐ Objects and Files are unstructured and non hierarchical
    ☐ A File is structured and can be locked individually
    ☐ None of the above

13. Choose the correct(s) statement(s) about OpenStack projects.

    ☐ Glance, the image service, stores and manages the VM images
    ☐ Neutron, the networking service, provides connections between physical NICs and virtual interfaces
    ☐ Nova, the compute service, manages the storage and the data persistence of VMs
    ☐ Swift, the object storage service, is not required, but is however suggested
    ☐ Keystone, the authentication service, is a minimal (required) service
    ☐ Horizon, the user interface service, is a minimal (required) service
    ☐ OpenStack services mostly focus on IaaS (i.e., providing VMs)
    ☐ None of the above

14. *(Bonus seminar question)* Which is the 3rd component, along with consistency and availability, of the CAP theorem :

    ☐ Erasure Coding
    ☐ Partition tolerance
    ☐ Peer 2 Peer
    ☐ Causal Consistency
    ☐ Paxos
    ☐ None of the above

15. Fill in the blanks.

    The process called _____ identifies the task of moving one VM instance from one physical server to another. This is usually done following events such as _____. If the process occurs _____, then the process is transparent to the user and the instance can keep running.

16. You have been hired by the Bleach® company to design their cloud system due to a growth in their user base. After a preliminary analysis, you have the following elements :
    — 7 different micro-services, all accessible by the same user-base
    — The company has some existing equipment in a private cloud configuration, and may either grow it or find an offloading alternative
    — The services have a peak rate during lunch time, and are rarely used during night time
    — Most of the requested data are privacy-sensitive
    — the user-base is growing

    Design a cloud system that is suitable for their experience. Provide the important design choices that you take into account (E.g., on-premises vs public cloud, XaaS model, VMs or containers, ...) and briefly justify your choices. You can use either French or English to motivate your answer.

Fin du CC