DAIICT – Mid-Semester Examination – Autumn 2021
IT627 – Cloud Computing

MM: 40 Time: 60 mins

Instructions:

1. There are 15 questions in this paper.
2. Q1 to Q10 are multiple choice type. There could be one or more correct answers. You'll get marks only if all correct answers are given.
3. Q1 to Q10 are 1 mark each.
4. Marks for rest of the questions are mentioned against them

Q1. When we compare deployment of a web service on premises versus on cloud, which of the following is true.

a) The lag strategy in on-premises results in customer satisfaction
b) The lead strategy in on premises results in overspending
c) The auto-scaling in cloud reduces long term cost
d) The cloud deployment results in lesser upfront cost

Q1 – Correct answers: b,c,d

Q2. A developer sitting in company office uses his company's email hosted on cloud for communication, uses a virtual machine for development work and writes code to connect to Github to do code commits via its command line interface. Which of the following describe the services used by developer most appropriately?

a) Email – SaaS, VM – PaaS, GitHub – IaaS
b) Email – PaaS, VM – IaaS, GitHub – PaaS
c) Email – SaaS, VM – IaaS, GitHub – PaaS
d) Email – SaaS, VM – IaaS, GitHub – SaaS

Q2 – Correct answer: d

Q3. In cloud platforms the term polyglot persistence refers to

a) Use of mixed storage technologies in a cloud application/service
b) Use of on-premises and on-cloud data storage services
c) Use of RDBMS for on-premises and NoSQL for on-cloud services
d) Use of distributed file system for NoSQL DB for parallel processing

Q3 – Correct answer: a

Q4. To be able to use a blob storage in Azure, one needs to have one each of

a) Azure account, Subscription only
b) Azure account, Subscription, Storage account only
c) Azure account only
d) Subscription, Storage account only

Q4 – Correct answer: b

Q5. When you create a VM in Azure, which of the following get auto created, even if you do not specify explicitly in command / portal?

a) Virtual Network, Network Interface, Managed Disk, Non-static IP
b) Static IP, NSG, Network Interface, Virtual Network
c) Virtual Network, Network Interface, Static IP, Resource Group
d) Virtual Network, Network Interface, Non-static IP, NSG

Q5 – Correct answers: d

Q6. The SLA of 99.95% of uptime in Azure VMs will hold only if

a) Only one VM is created explicitly with NSG and Availability Set
b) Atleast two VMs are created within same Availability Set
c) Atleast two VMs are created each in its own Availability Set
d) Atleast two VMs are created within same Virtual Network and NSG

Q6 – Correct answer: b

Q7. A web application is to be deployed on IaaS solution in cloud. For setting this up, two VMs C1 & C2 are to be used as front-end servers, two VMs B1 & B2 are to be used as business logic processing and two D1 & D2 for setting up the data bases. For high availability, how will you configure them in Azure? (AvSet => Availability Set)

a) C1,C2 in 1st AvSet; B1,B2 in 2nd AvSet; D1,D2 in 3rd AvSet
b) C1,B1,D1 in 1st AvSet; C2,B2,D2 in 2nd AvSet
c) Every VM in its own AvSet for high availability
d) No AvSet is needed, all VMs should be in one NSG for high availability

Q7 – Correct answers: a

Q8. In IaaS cloud deployment for a web application solution, it is desired that REST requests containing 'video' in path of the URL be directed to a cache-server running on a VM in Web Tier of the deployment, instead of going to any other VMs in the Web Tier. How would you accomplish this?

a) By using Load Balancer in front of Web Tier
b) By using Application Gateway in front of Web Tier
c) By using Traffic Manager in front of Web Tier
d) By configuring cache-server to respond to URL with 'video' in its path

Q8 – Correct answer: b

Q9. The requirement is to store user info for a web site into a NoSQL option. User info contains name, mobile number, address, and a comma separated list two or more emails. Name of the user may or may not contain middle name. The sub fields in address could also be varied. Which NoSQL DB type is most appropriate for this kind of requirement?

a) Key-Value pair table
b) Document DB
c) Wide-column Store
d) Graph Data base

Q9 – Correct answer: c

Q10. In Azure, multi-region deployment will result in storage redundancy of different types. If you want to redirect GET REST requests to secondary region and remaining requests to primary region, this can be achieved using which of the following?

a) LRS
b) RA-GRS
c) GRS
d) ZRS

Q10 – Correct answer: b

Q11. Describe role of Application Gateway in reducing code complexity by enabling SSL termination.
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A11.

- Web traffic load balancer enables us to manage traffic to our web applications
- Operates at application level (OSI level 7 - Application).
    - Traditional load balancers operate at transport layer (OSI level 4 – TCP & UDP) and route traffic based on IP address and port.
    - Application Gateway can route traffic based on URL
- SSL termination
    - supports terminate encryption at gateway, so data travels un-encrypted to the backend servers. Saves overhead.
- Web application firewall – protection against common exploits
- Multiple site hosting, Redirection, Session affinity etc.

Q12. You have deployed your application dealing with medical history of individuals in multiple regions – one in US East and one in Central Europe. The GDPR law of Europe mandates the PII data like medical history cannot go outside of Europe Economic Area (EEA). First describe various routing methods of Traffic Manager and then specify which one will you chose for your application deployment above and why? 5
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A12.
The Traffic Manager distributes the traffic using the configured routing method

- Priority, Weighted, Performance, Geographic (see more here)

You'll use Geographic routing for the scenario in question.

Q13. How CouchDB can be used to run websites without having any web servers? 5
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A13.
See here

Q14. A website needs to be deployed on cloud. The primary use case for this website is to show pleasing and beautiful pictures/photos of various categories to users. Categories are – Nature, Space, Instruments, Society, Cars, History. The home page is beautifully laid out static page with some pictures from various categories and upon selection of a category, other pictures are shown. Though there are other scenarios, but for this question let us limit it to this only – home page, selection of a category, show pictures as grid. 6
Describe how would you deploy such static content service website on cloud (assume Azure) using most appropriate solution.
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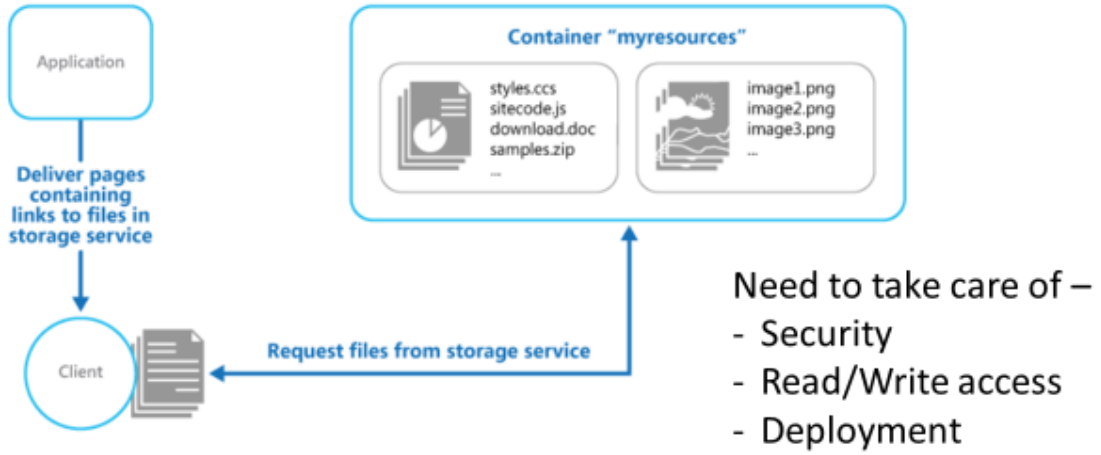
Scenario: Serving Static web content and media

- Static web content typically include HTML pages and other resources like images, video and documents – scripts, pdf downloads etc.
- Although web servers are well tuned to optimize requests through efficient dynamic page code execution and output caching, they still have to handle requests to download static content.
  - This means spending money on CPU cycles

GOAL: Minimise need for compute instances

Solution: URL based storage service



Need to take care of –
- Security
- Read/Write access
- Deployment

Q15. A website is going to be used by a company for its field agents who will upload large excel reports from their devices/laptops. These excel files will be processed as batch operations on the server side. Rest of the website is simple single page app that lets the field agents login and do their work related activities. Describe an architecture suitable to deploy this type of web application.
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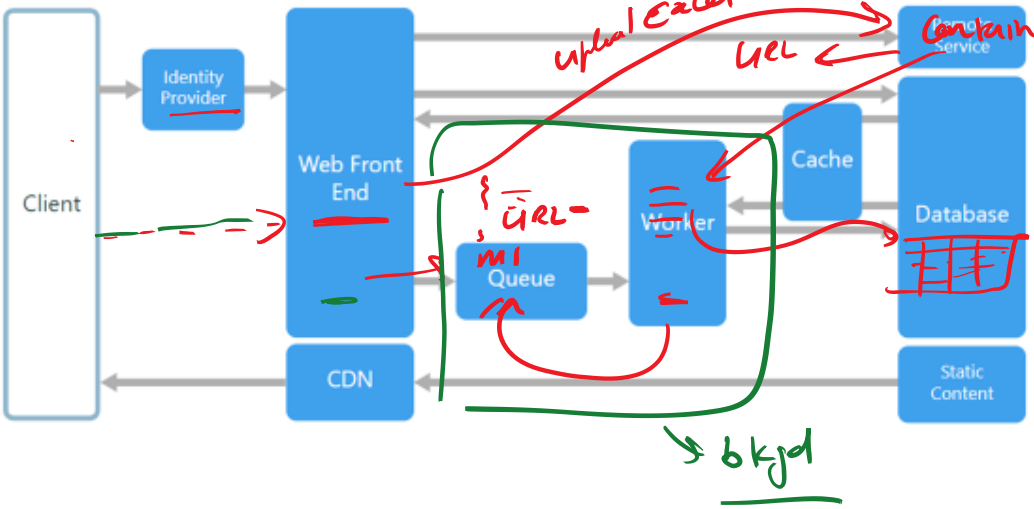
10

Web-Queue-Worker architecture



- The core components of this architecture are
  - a **web front end** that serves client requests,
  - a **worker** that performs resource-intensive tasks, long-running workflows, or batch jobs.
  - a **message queue** - the web front end communicates with the worker through it.
- Other components that are commonly incorporated into this architecture include:
  - One or more databases.
  - A cache to store values from the database for quick reads.
  - CDN to serve static content
  - Remote services, such as email or SMS service. Often these are provided by third parties.
  - Identity provider for authentication.

- The web and worker are both stateless.
- Session state can be stored in a distributed cache.
- Any long-running work is done asynchronously by the worker.
- The worker can be triggered by messages on the queue or run on a schedule for batch processing.
  - The worker is an optional component. If there are no long-running operations, the worker can be omitted.
- The front end might consist of a web API.
- On the client side, the web API can be consumed by a single-page application that makes AJAX calls, or by a native client application.

Web-Queue-Worker on Azure