Devops Assessment

Bash

1. What is the purpose of the `#!/bin/bash` line at the beginning of a Bash script?

To tell the interpreter to use bash as the shell to run this script.

2. How do you pass arguments to a Bash script?

$1, $2, $.....

3. What grep command do?

Used to filter data, usually chained with other command's output e..g
$ history | grep apt install (will return all commands maching apt install from history)

4. What does the `export` command do in Bash?

Export adds environment variables to the path.

5. How do you make a Bash script executable?

chmod +x <script.sh>

6. How can you check the exit status of a command in Bash?

7. How do you redirect the output of a command to a file in Bash?

Output > file.txt

9. What is the purpose of the `set -e` command in a Bash script?

Modifying the shell's behaviour regarding the handling of errors, when enabled the shell will exit immediately.

11. How do you handle errors in Bash scripting?

With a except-else block and trap.

12. What does `&&` and `||` do in Bash?

&& - Both commands are done in order. E.g. (sudo apt update && sudo apt upgrade → will first update the package list and then sudo apt update will exec

13. What is the difference between `"$@"` and `"$"` *in Bash?*

$@ is for positional arguments, $ is for an argument to be considered as a string of continuous characters.*

14. How can you define and use a function in Bash?

Define: function name( ) [ ]

Use: @name

15. What is the purpose of the `trap` command in Bash?

Trap commands is for error and exemption handling.

Docker

1. What is Docker and why is it used?

Docker provides the containerization functionality. It is used for seamless functionality of an application across all systems, standardizing the need for system resources.

2. How do you create a Docker image?

docker build -t <name-of-image>

3. What is the purpose of a Dockerfile?

To create a container from an image and other necessary configurations/dependencies defined in the Dockerfile.

4. How do you run a Docker container from an image?

Docker run -it <ubuntu:latest> bash

5. What is the difference between `docker run` and `docker exec`?

docker run starts a container from outside of container. Docker exec can execute from within the container.

6. How can you list all Docker containers?

docker ps -l

7. What is a Docker volume and why is it used?

It is used for data persistence, so that if a container crashes, data is not lost.

8. How do you remove a Docker container?

docker remove <container>

9. What is the purpose of Docker Compose?

For application running of multiple containers, it composes individual nodes into a single virtual system.

10. How do you scale services with Docker Compose?

11. What is a Docker network and why is it important?

12. How do you inspect a Docker image?

docker image

13. What is the purpose of the Docker `ENTRYPOINT` instruction?

14. How can you update a Docker image?

docker update <image>:latest

15. What is the Docker `CMD` instruction and how does it differ from `ENTRYPOINT`?

CI/CD

1. What is Continuous Integration (CI)?

CI refers to a system where developers can contiously integerate their code to main repository.

2. What is Continuous Deployment (CD)?

CD follows the blue-green method, where the deployed production code (blue) stays intact, and all deployment changes are first done on an identical staging enviroment (green) - so there's no interuptions in case of any error while deployment.

3. What is a CI/CD pipeline?

A CI/CD pipeline handles the integration of software development process and also ensure robust deployment with platforms like Gitlab and practices like TDD.

4. How does Continuous Testing fit into CI/CD?

Test driven development, continous testing practices ensure there are no breaking changes on the production code. It's purpose is to restrict and catch errors and misconfigurations in staging and testing environments.

5. What is the role of build automation in CI/CD?

Iptables

1. What is `iptables` and what is its primary purpose?

Iptables defines network traffic rules behaving like a firewall on a network. It's primary purpose is to administer a network, filter packets, do network address translation and packet mangling.

2. How do you list current `iptables` rules?

sudo iptables -l

3. What is the difference between `iptables -A` and `iptables -I`?

Iptables -A is for defining chain type (INPUT/OUTPUT/FORWARD)
Iptables -I is for inserting chain type as well

4. How do you create a rule to block incoming traffic from a specific IP address using `iptables`?

Sudo iptables -A INPUT -p tcp -s <blocked-ip-address> -j REJECT

5. What are the different built-in chains in `iptables`?

Common built-in chains are (INPUT, OUTPUT, FORWARD, PRERouting, POSTPouting)

6. How can you save and restore `iptables` rules?

sudo iptables-save >> /etc/iptables/rules.d

7. How do you use `iptables` to allow SSH traffic?

Sudo iptables -A INPUT -p tcp - -dport 22 -j ACCEPT

8. What does the `-p` option do in `iptables`?

Defines which protocol to follow e.g tcp

9. How do you configure `iptables` to forward traffic from one interface to another?

10. What is the purpose of the `NAT` table in `iptables`?

To translate devices on local network's ip addresses to external ip address.

11. How do you apply a `iptables` rule only to a specific IP range?

-s

12. What is the difference between `DROP` and `REJECT` targets in `iptables`?

DROP denies connection silently. REJECT denies while logging.

13. How can you view the detailed statistics of `iptables` rules?

14. How do you use `iptables` to limit the rate of incoming traffic?

15. How do you remove an `iptables` rule?

Iptables -D

Kubernetes

1. What is Kubernetes and what are its key components?

Container orchestration tool, Keycomponents are 1). Master Node 2). Worker Node.

2. What is a Pod in Kubernetes?

Smallest unit in a cluster code.

3. How do you create a Deployment in Kubernetes?

Kubectl

4. What is a Service in Kubernetes and why is it used?

A service provide network connection between individual pods in a cluster, enabling exchange of data.

5. What is the difference between `ClusterIP`, `NodePort`, and `LoadBalancer` service types?

6. How do you scale a Deployment in Kubernetes?

7. What is a ConfigMap and how is it used?

8. How do you create a Persistent Volume (PV) and a Persistent Volume Claim (PVC)?

9. What is a Namespace in Kubernetes and why is it used?

10. What is the purpose of Kubernetes' `kubectl` command-line tool?

11. How do you perform rolling updates with Kubernetes Deployments?

12. What are Helm charts in Kubernetes?

13. What is a StatefulSet and how does it differ from a Deployment?

14. How do you troubleshoot a failing Pod in Kubernetes?

15. What is Kubernetes' role-based access control (RBAC)?

Ansible

1. What is Ansible and what is its primary purpose?

Ansible is a configuration management tool which closely follows principles of (Iac) - Infrastructure as code.

2. What is an Ansible playbook and how is it used?

Ansible playbook defines rules, tasks and actions for hosts.

3. How do you define and use Ansible variables?

4. What is the role of Ansible roles?

Definitions and desired role for a host. For example, you can define a role of a specify host to be a database server.

5. How do you manage inventories in Ansible?

With yaml in the inventory file `name.ini`

6. What is the difference between `ansible` and `ansible-playbook` commands?

7. How do you use Ansible facts in playbooks?

8. What are Ansible modules and how are they used?

Reusable units which can be transferred to other hosts and even containers.

9. How do you handle error handling and retries in Ansible?

10. What is the purpose of Ansible's `notify` and `handler` mechanism?

11. How do you use templates in Ansible?

12. What is Ansible Tower and how does it differ from Ansible?

13. How do you manage sensitive data in Ansible?

With ansible secrets.

14. What is the purpose of `ansible-galaxy`?

15. How do you troubleshoot issues in Ansible playbooks?

System Design

Your organization is launching a new e-commerce platform that needs to be highly available, secure, and scalable. The platform consists of a frontend web application and a backend API. The deployment needs to be automated, and the application should be monitored and secured effectively.

Constraints and Requirements:

1. **High Availability: The system must be able to handle a large number of concurrent users and provide zero-downtime deployments.**

   Kubernetes for autoscaling, and cloudflare's features like CDN, cached data, and load-balancing can result in overall high availability.

2. **Security: The application needs to be protected against common web vulnerabilities and DDoS attacks.**

   Cloudflare will protect against DDoS attacks with a comibination of methods like load balancing and establing servers on multiple geographic locations. Cloudflare also provides a WAF which protects against common vulnerabilities like cross site scripting.

3. **Scalability: The system should scale horizontally based on traffic.**

   Kuberenets will manage the horizontal scaling with it's auto-scaling features.

4. **Monitoring: Real-time monitoring and alerting for application performance and system health are required.**

   Prometheus: Insights, System health, System statistics, and Monitoring and Grafana

can use Prometheus as a data source for real-time application performance visualization and alterting.

5. **Cost Efficiency: The solution should be cost-effective and optimize resource usage.**

   Monitoring tools like prometheus can provide real-time stats for system-resource usage and grafana can generate alerts for various sources like email, and create visualizations for better use and cost analysis.

Management Based Questions

1. **Quality Control Issues**

Scenario: A manufacturing company is experiencing high defect rates in one of its product lines, leading to customer complaints and returns.

Questions:

1. **What steps would you take to identify the root cause of the quality issues?**

   First I will read and evaluate the defect in the product line, after reviewing the defect and it's nature, I will look for any logged instances of this defect in any sort of registry offline or digital. Then, I will try to reproduce the anticipated issue and evaluate if nature of detect in the product line and my in controlled reproduced error are congruent. Now, I will have a preliminary proof that this defect occurs in which specific conditions. Finally, in my controlled environment - I will test the steps for resolution of this defect. After testing with my solution, I will analyse if overall product line presents no further issues.
   At this point, I will be able to implement the resolutions steps on the main product line and carry some further testing to ensure there are no other breaking changes.

2. **How would you implement corrective actions to address the defects?**

   Actions must be only implemented after reproducing the defects, isolating the underlying causes, and continuosuly testing the corrective actions so we have a proof that our steps will be viable and effective.

3. **What processes would you put in place to ensure ongoing quality control?**

   I will put a digital logging system in place for all stages in the prodcut line, so any change generates a log - which will help to cut down issue diagnosis and isolation

time when an issue arises in future.

Another process I will implement is of A/B testing - so we can understand how an action will affect the overall quality.

4. **How would you communicate with customers about the steps being taken to resolve the issues?**

   Firstly, I will communicate with customers with utmost respect and genuinelly empthaize with them for any inconvenience. I will explain the steps taken in a way which is easily understandable and provides confidence to the customers that our steps will result in a fast resolution. Any customers who will want to still return the product will be facilitated promptly and respectfully.

5. **What strategies would you use to prevent similar quality issues in the future?**

   Adequate testing at all stages in the product line.

2. Construction Project Delay

Scenario: A construction project for a new office building is running behind schedule due to unforeseen issues with securing necessary permits and delays in material deliveries.

Questions:

1. **What steps would you take to identify the root causes of the delays?**

   I will inquire at all nodes and get feedback for how this delay has occured. Double-check everything and ensure I know what the root causes are and possible steps I can take to resolve these issues.

2. **How would you communicate these delays to stakeholders and manage their expectations?**

   In a respectful and professional manner, I will honestly report the reason for these delays. I will provide an accurate estimation of time it'll take to get back on track and get any feedback I may get from the stakeholders.

3. **What strategies could you implement to get the project back on track?**

   As I'll know the causes for delays and possible solutions, I will now promptly ensure solutions are implemented at rapid pace and with complete integrity.

4. **How would you prioritize tasks and resources to make up for lost time?**

   Tasks will be prioritized in order of severity and then the tasks which can be completed quickly.
5. **What measures would you put in place to prevent similar delays in future projects?**

   I will ensure the required permits are available beforehand and any known causes for delays are already addressed.