
DevOps Shack

200 scenario-based Docker interview questions

1. What is Docker, and how does it differ from a virtual machine?

- Docker is a containerization platform that packages applications with dependencies. Unlike VMs, it shares the host OS kernel, making it lightweight.

2. What are the main components of Docker?

- Docker Engine, Docker Daemon, Docker CLI, Docker Images, Docker Containers, Docker Registry.

3. What is the difference between Docker Image and Container?

- Image: Blueprint of a container (read-only).
- Container: Running instance of an image (read-write).

4. What happens when you run `docker run nginx`?

- Docker pulls the `nginx` image from the registry (if not available locally), creates a container, and runs it.



5. How do you list all running and stopped containers?

- `docker ps` (running), `docker ps -a` (all containers).

6. What is a Dockerfile, and why is it used?

- A Dockerfile is a script containing instructions to build a Docker image.

7. What is the difference between `COPY` and `ADD` in Dockerfile?

- `COPY` copies files, while `ADD` can also extract archives and fetch remote URLs.

8. How do you build an image from a Dockerfile?

- `docker build -t myimage .`

9. How do you reduce the Docker image size?

- Use Alpine base images, multi-stage builds, and minimize unnecessary layers.

10. What is a multi-stage build?

- It allows using intermediate containers to keep the final image lightweight.

11. How do you start, stop, and remove a container?

- Start: `docker start <container_id>`
- Stop: `docker stop <container_id>`
- Remove: `docker rm <container_id>`

12. How do you run a container in the background?

- `docker run -d nginx`

13. How do you restart a container automatically on failure?

- `docker run --restart=always nginx`

14. How do you access a running container's shell?

- `docker exec -it <container_id> /bin/`

15. How do you check the logs of a running container?

- `docker logs <container_id>`

16. How do you list all Docker networks?

- `docker network ls`

17. How do you connect a container to a specific network?



- `docker network connect <network_name>
<container_id>`

18. What is the difference between Bridge, Host, and Overlay networks?

- **Bridge:** Default network mode, used for container-to-container communication.
- **Host:** Container shares the host network directly.
- **Overlay:** Used for multi-host communication in Docker Swarm.

19. How do you expose a container port to the host?

- `docker run -p 8080:80 nginx`

20. How do you inspect the IP address of a running container?

- `docker inspect <container_id> | grep
"IPAddress"`

21. How do you create and mount a Docker volume?

- `docker volume create myvolume`
- `docker run -v myvolume:/data nginx`

22. What is the difference between Bind Mounts and Volumes?



- **Bind Mounts:** Maps a host path directly.
- **Volumes:** Managed by Docker and stored separately.

23. How do you check all available volumes?

- `docker volume ls`

24. How do you remove unused volumes?

- `docker volume prune`

25. How do you share a volume between multiple containers?

- `docker run -v myvolume:/data container1`
`docker run -v myvolume:/data container2`

26. What is Docker Compose?

- A tool to define and run multi-container Docker applications using `docker-compose.yml`.

27. How do you start and stop services in Docker Compose?

- `docker-compose up -d` (start)
- `docker-compose down` (stop)

28. How do you scale services using Docker Compose?



- `docker-compose up --scale app=3`

29. How do you update a running service in Docker Compose?

- `docker-compose up -d --build`

30. How do you specify environment variables in Docker Compose?

- Using an `.env` file or `environment` section in `docker-compose.yml`.

31. What is Docker Swarm?

- A native Docker orchestration tool for clustering and managing multiple Docker nodes.

32. How do you initialize a Docker Swarm cluster?

- `docker swarm init`

33. How do you add a worker node to a Swarm?

- `docker swarm join --token <worker_token> <manager_ip>:2377`

34. How do you deploy a service in Docker Swarm?

- `docker service create --name myservice nginx`



35. What is the difference between Docker Swarm and Kubernetes?

- Kubernetes is more feature-rich, supports auto-scaling, and is widely adopted.

36. How do you run a container with limited privileges?

- `docker run --user 1000:1000 nginx`

37. What is the `docker scan` command used for?

- To scan images for vulnerabilities.

38. How do you prevent a container from running as root?

- Define a non-root user in the Dockerfile.

39. How do you enforce security policies in Docker?

- Use Docker Content Trust (DCT) and security scanning.

40. What is a rootless Docker installation?

- Running Docker without root privileges for security.

41. How do you debug a failed container?

- Check logs (**docker logs**), inspect (**docker inspect**), and run in interactive mode.

42. How do you commit changes to an existing container?

- **docker commit <container_id> new_image_name**

43. How do you push an image to Docker Hub?

- **docker login, docker tag, docker push**

44. How do you limit memory and CPU for a container?

- **docker run --memory="512m" --cpus="1.5" nginx**

45. How do you auto-remove a container after it exits?

- **docker run --rm nginx**

46. How do you set environment variables in a Docker container?

- Using **-e** flag: **docker run -e ENV_VAR=value nginx**
- Using an **.env** file in **docker-compose.yml**

47. How do you copy files between a container and the host?

- `docker cp mycontainer:/path/to/file /host/path`

48. How do you inspect the history of a Docker image?

- `docker history <image_name>`

49. How do you forcefully remove an image?

- `docker rmi -f <image_id>`

50. How do you check which files are taking up space inside a container?

- Use `du -sh *` inside the container

51. How do you configure logging for a Docker container?

- `docker run --log-driver=file nginx`
- Use external log drivers like `syslog`, `fluentd`, `awslogs`, etc.

52. How do you get real-time logs from a running container?

- `docker logs -f <container_id>`



53. How do you change the log level in Docker?

Modify `daemon.`:

```
{  
  "log-level": "debug"  
}
```

- Then restart Docker.

54. How do you rotate logs to prevent excessive disk usage?

- `docker run --log-opt max-size=10m --log-opt max-file=5 nginx`

55. How do you monitor Docker container metrics?

- `docker stats` for live resource usage

56. How do you run a private Docker registry?

- `docker run -d -p 5000:5000 --name registry registry:2`

57. How do you push an image to a private registry?

- Tag the image: `docker tag myimage localhost:5000/myimage`



- Push the image: `docker push localhost:5000/myimage`

58. How do you pull an image from a private registry?

- `docker pull localhost:5000/myimage`

59. How do you list all images in a registry?

- `curl http://localhost:5000/v2/_catalog`

60. How do you delete an image from a Docker registry?

- Use **DELETE** API request (varies by registry implementation).

61. What do you do if a container keeps restarting?

- Check logs: `docker logs <container_id>`
- Inspect: `docker inspect <container_id>`
- Verify restart policy: `docker ps --filter "status=restarting"`

62. How do you troubleshoot a container that is not responding?

- Check logs, inspect networking, exec into the container for debugging.



63. How do you check if a container is using too much memory or CPU?

- `docker stats`

64. What happens if a container runs out of disk space?

- The container may stop working, logs might fail, and operations requiring disk writes will break.

65. How do you clean up unused Docker resources?

- `docker system prune`

66. How do you prevent unauthorized image downloads?

- Use private registries with authentication.

67. How do you enforce least privilege for containers?

- Run with `--user` flag or set `USER` in Dockerfile.

68. How do you scan a Docker image for vulnerabilities?

- `docker scan <image_name>`

69. How do you prevent privileged mode in containers?



- Avoid using `--privileged`, use `--cap-drop=ALL`

70. How do you prevent container breakout attacks?

- Enable AppArmor, Seccomp, and avoid running as root.

71. How do you check the status of a Docker Swarm node?

- `docker node ls`

72. How do you create a replicated service in Swarm?

- `docker service create --replicas 3 nginx`

73. How do you update a running service in Swarm?

- `docker service update --image newimage:latest <service_name>`

74. How do you rollback a service update in Swarm?

- `docker service rollback <service_name>`

75. How do you scale a Kubernetes Deployment with Docker containers?

- `kubectl scale deployment my-deployment --replicas=5`



76. How do you create a user-defined bridge network?

- `docker network create mynetwork`

77. How do you assign a static IP to a container?

- Use a custom network with `docker network create --subnet=192.168.1.0/24 mynetwork`

78. How do you block external network access for a container?

- Use `--network=none`

79. How do you inspect the open ports of a running container?

- `docker port <container_id>`

80. How do you run multiple containers on the same port?

- Use different host ports: `-p 8080:80` for one, `-p 9090:80` for another.

81. How do you integrate Docker with Jenkins?

- Use the Jenkins Docker plugin or run Jenkins inside a container.

82. How do you use Docker in GitHub Actions?

- Use the `docker/build-push-action` for building and pushing images.

83. How do you use Docker with AWS ECS?

- Push images to ECR, then deploy them in ECS tasks.

84. How do you deploy a Dockerized app using GitLab CI/CD?

- Define a `.gitlab-ci.yml` pipeline with Docker build & push stages.

85. How do you implement Canary Deployment with Docker containers?

- Deploy multiple versions and gradually shift traffic using a load balancer.

86. What do you do if a Docker build is stuck at a certain step?

- Use `--progress=plain` to debug the issue.

87. How do you handle large Docker image builds in CI/CD?



- Use caching, multi-stage builds, and avoid unnecessary layers.

88. How do you deploy a high-availability Dockerized application?

- Use Kubernetes or Docker Swarm with load balancing.

89. How do you debug a container that keeps exiting?

- Check logs, run with `--rm` for temporary debugging.

90. How do you set up Docker in an air-gapped environment?

- Pre-download images, use an internal registry.

91. How do you persist data across container restarts?

- Use Docker volumes: `docker run -v myvolume:/data nginx`

92. How do you mount a host directory inside a container?

- `docker run -v /host/path:/container/path nginx`



93. How do you make a volume read-only?

- `docker run -v myvolume:/data:ro nginx`

94. What happens if you delete a volume while a container is using it?

- The volume will not be deleted until all containers using it are stopped and removed.

95. How do you move Docker volumes between servers?

- Backup and restore using `docker run --rm -v myvolume:/data -v $(pwd):/backup busybox tar cvf /backup/data.tar /data`

96. How do you optimize Docker image size?

- Use `alpine` base images, multi-stage builds, and minimize unnecessary layers.

97. How do you analyze Docker container resource usage?

- `docker stats`

98. How do you set resource limits for a container?

- `docker run --memory=512m --cpus=1 nginx`



99. How do you prioritize container CPU usage?

- `docker run --cpu-shares=1024 nginx`

100. How do you avoid the “Docker cache busting” issue?

- Arrange Dockerfile layers efficiently, avoid frequent `ADD/COPY` commands at the top.

101. How do you connect two containers in different networks?

- `docker network connect <network_name> <container_id>`

102. What is Macvlan network, and when would you use it?

- Macvlan allows assigning unique MAC addresses to containers, useful for integrating with physical networks.

103. How do you create a multi-host network in Docker Swarm?

- `docker network create --driver overlay my-overlay-network`

104. How do you check which network a container is using?

- `docker inspect <container_id> | grep Network`

105. How do you restrict external access to a



container?

- Use an internal network (`docker network create --internal mynetwork`).

106. How do you automatically rebuild a Docker image when code changes?

- Use a CI/CD pipeline with a webhook to trigger `docker build`.

107. How do you store Docker secrets in a CI/CD pipeline?

- Use environment variables or a secrets management tool like Vault.

108. How do you use Docker Multi-Stage Builds for CI/CD?

- Use separate `build` and `final` stages in Dockerfile to reduce image size.

109. How do you implement zero-downtime deployment with Docker?

- Use rolling updates in Docker Swarm or Kubernetes.

110. How do you automate Docker container cleanup in CI/CD?

- Use `docker system prune -f` in cleanup steps.

111. How do you prevent unauthorized containers from running?



- Use `docker daemon.` to restrict image sources.

112. How do you enable SELinux/AppArmor for containers?

- Use `--security-opt apparmor=profile_name` or `--security-opt label:type:container_t`

113. How do you restrict system calls in a container?

- Use Seccomp profiles: `--security-opt seccomp=unconfined`

114. How do you prevent containers from accessing the host filesystem?

- Use `--read-only` mode.

115. How do you scan a running container for security vulnerabilities?

- Use tools like `Trivy` or `Docker Scan`.

116. How do you recover from a Docker Swarm leader node failure?

- Promote another node: `docker node promote <node_id>`

117. How do you drain a Swarm worker node?

- `docker node update --availability drain <node_id>`

118. How do you rollback a failed Swarm service update?



- `docker service rollback <service_name>`

119. How do you persist Swarm service logs?

- Use `docker service logs --follow`

120. How do you configure a Swarm service to use a secret?

- `docker secret create my_secret secret_file` and mount it in `docker service create`

121. How do you deploy a Docker container in Kubernetes?

- Use a `Deployment` YAML file and `kubectl apply -f deployment.yaml`

122. How do you expose a Docker container in Kubernetes?

- Create a Kubernetes `Service` resource.

123. How do you store Docker images in a private Kubernetes cluster?

- Push images to a private registry and use `imagePullSecrets`.

124. How do you scale a Kubernetes Deployment with Docker containers?

- `kubectl scale deployment my-deployment --replicas=5`

125. How do you set resource limits for a container in



Kubernetes?

- Define **limits** and **requests** in the Pod specification.

126. What happens if a Docker image layer is corrupted?

- The image fails to run. Fix by removing and re-pulling the image.

127. What do you do if Docker Build is stuck at a specific step?

- Run with **--no-cache** and check Dockerfile for inefficiencies.

128. How do you deal with DNS resolution failures in a container?

- Use **--dns=8.8.8.8** or custom DNS settings.

129. How do you restart all running containers after a system reboot?

- Set **--restart=always** for containers.

130. What happens if you stop the Docker Daemon?

- Running containers continue, but no new ones can be started.

131. How do you use Docker with AWS ECS?

- Deploy using ECS Task Definitions.

132. How do you store Docker images in AWS ECR?



- Authenticate using `aws ecr get-login-password` and push images.

133. How do you configure auto-scaling for Docker containers in AWS?

- Use ECS Service Auto Scaling.

134. How do you deploy Dockerized applications in Google Kubernetes Engine (GKE)?

- Build and push to Google Container Registry (GCR) and deploy with Kubernetes.

135. How do you use Azure Container Instances with Docker?

- Use `az container create` with an image from ACR.

136. How do you run a GUI application inside a Docker container?

- Use `xhost +` and mount the X11 socket.

137. How do you create a Windows container in Docker?

- Use `--platform windows` flag.

138. How do you run multiple processes inside a single container?

- Use a process manager like `supervisord`.

139. How do you monitor container health in production?

- Use health checks (`HEALTHCHECK`) and external monitoring tools.



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140. How do you automate Docker image updates?
- Use Watchtower or Kubernetes rolling updates.
141. How do you avoid caching issues when copying files in Docker?
- Place frequently changed files at the bottom of the Dockerfile and use `--no-cache` during build.
142. How do you debug a failed `docker build` command?
- Run with `--progress=plain` to get detailed logs.
143. How do you build a Docker image without using the Docker daemon?
- Use `buildah` or `kaniko` for rootless builds.
144. How do you pass build-time arguments in Docker?
- Use `ARG` in Dockerfile and pass values with `--build-arg key=value`.
145. How do you minimize the number of layers in a Docker image?
- Combine multiple `RUN` commands into a single layer using `&& \`.
- 146.1 How do you set up a custom DNS resolver for Docker containers?
- Use `--dns=8.8.8.8` when running a container.
147. How do you troubleshoot network connectivity

inside a Docker container?

- Use `ping`, `nslookup`, `traceroute`, or `curl` inside the container.

148. How do you enable IPv6 in Docker networking?

- Modify `daemon.:`

```
{  
  "ipv6": true,  
  "fixed-cidr-v6": "2001:db8:1::/64"  
}
```

149. How do you force a container to use a specific network interface?

- Assign it to a user-defined network:

```
docker network create --subnet=192.168.1.0/24  
mynetwork
```

150. How do you allow two containers to communicate without exposing ports?

- Connect them to the same Docker network.

151. How do you filter logs for a specific Docker container?

- `docker logs --tail 100 <container_id>`



152. How do you monitor Docker logs in real-time?

- `docker logs -f <container_id>`

153. How do you change the logging driver for a running container?

- Restart with `--log-driver=-file` or other supported drivers like `fluentd`.

154. How do you store container logs in a centralized system?

- Use log aggregation tools like ELK stack, Fluentd, or AWS CloudWatch.

155. How do you handle log rotation in Docker?

- `docker run --log-opt max-size=10m --log-opt max-file=5 nginx`

156. How do you rename a running Docker container?

- Stop the container and rename it:

```
docker rename old_name new_name
```

157. How do you pause and resume a container?

- `docker pause <container_id>` and `docker unpause <container_id>`

158. How do you export and import a container?

- `docker export <container_id> -o container.tar`
`docker import container.tar`

159. How do you check the exit code of a stopped



container?

- `docker inspect <container_id>`
`--format='{{.State.ExitCode}}'`

160. What happens when you remove a running container?

- You must force remove it using `docker rm -f <container_id>`.

161. How do you ensure a container is running as a non-root user?

- Add `USER nonroot` in the Dockerfile.

162. How do you enable Docker Content Trust (DCT)?

- `export DOCKER_CONTENT_TRUST=1`

163. How do you block privileged mode in Docker?

- Enforce policies to prevent `--privileged` flag usage.

164. How do you scan a running container for security vulnerabilities?

- Use `Trivy` or `Docker Scout`.

165. How do you prevent sensitive data from being stored in Docker images?

- Use `secrets` instead of environment variables for credentials.

166. How do you recover a lost Docker Swarm leader node?



- Promote another manager: `docker node promote <node_id>`

167. How do you update a service in Docker Swarm without downtime?

- Use rolling updates:
`docker service update --image newimage:latest <service_name>`

168. How do you manually schedule a container on a specific Swarm node?

- Use constraints:

yaml

deploy:

placement:

constraints: [node.hostname == worker1]

169. How do you restrict a service to a specific network in Docker Swarm?

- `docker service create --network mynetwork nginx`

170. How do you scale a Swarm service dynamically?

- `docker service scale myservice=5`

171. How do you restart a Kubernetes pod using Docker?



- `kubectl delete pod <pod_name>`

172. How do you view Docker logs for a Kubernetes pod?

- `kubectl logs <pod_name>`

173. How do you run a one-off command in a running Kubernetes pod?

- `kubectl exec -it <pod_name> --`

174. How do you expose a Docker container running in Kubernetes?

- Use a **Service** of type **LoadBalancer** or **NodePort**.

175. How do you set environment variables for a container in Kubernetes?

- Define them in a **ConfigMap** or **Secret**.

176. How do you authenticate with a private Docker registry?

- `docker login myregistry.com`

177. How do you list all images in a private registry?

- `curl http://myregistry.com/v2/_catalog`

178. How do you delete an image from a private registry?

- Use the **DELETE** API method or remove the manifest.

179. How do you configure Docker to use a proxy when



pulling images?

- Set `HTTP_PROXY` and `HTTPS_PROXY` in `/etc/systemd/system/docker.service.d/http-proxy.conf`.

180. How do you force a Docker container to use a specific image version?

- Use a specific tag: `docker run myimage:v1.2.3`

181. How do you deploy Docker containers in AWS Fargate?

- Define an ECS Task Definition and run it without managing infrastructure.

182. How do you use Docker with Azure Kubernetes Service (AKS)?

- Push images to Azure Container Registry (ACR) and deploy them with Kubernetes.

183. How do you enable GPU acceleration for Docker containers?

- Use `--gpus all` flag with NVIDIA runtime.

184. How do you run a Docker container on Google Cloud Run?

- `gcloud run deploy --image gcr.io/my-project/myimage`

185. How do you optimize Docker containers for IoT



devices?

- Use **alpine** base images and multi-architecture builds.

186. How do you attach a terminal to a detached running container?

- **docker attach <container_id>**

187. How do you migrate containers between two Docker hosts?

- Save and load the container:

```
docker save -o myimage.tar myimage
```

```
scp myimage.tar newhost:/path/
```

```
docker load -i myimage.tar
```

188. What do you do if Docker is not starting on a Linux machine?

- Check logs: **sudo journalctl -u docker --no-pager**

189. How do you automatically restart a crashed container?

- Use **--restart=always**

190. How do you run a Windows container on a Linux



machine?

- Use Windows Subsystem for Linux 2 (WSL2) with Docker Desktop.

191. How do you optimize Docker for running thousands of containers on a single host?

- Tune system limits (**ulimits**), optimize networking (**iptables** and **overlay** networks), and use **cgroups** for resource management.

192. How do you implement blue-green deployment with Docker?

- Run two versions of the application in separate environments and switch traffic using a load balancer.

193. How do you implement Canary deployments using Docker?

- Gradually shift traffic to a new version using weighted load balancing with tools like Nginx, Traefik, or Kubernetes Ingress.

194. How do you handle secrets securely in a Docker Swarm cluster?

- Use **docker secret create my_secret secret_file** and mount secrets into Swarm services.

195. How do you enforce security compliance in a Docker-based environment?



- Use tools like Docker Bench for Security, Pod Security Policies (Kubernetes), and apply RBAC for access control.

196. How do you ensure high availability of Docker containers?

- Use Docker Swarm or Kubernetes for cluster management and automated failover.

197. How do you back up and restore Docker volumes?

- Use **tar** to back up:

```
docker run --rm -v myvolume:/data -v $(pwd):/backup  
busybox tar cvf /backup/data.tar /data
```

Restore with:

```
docker run --rm -v myvolume:/data -v $(pwd):/backup  
busybox tar xvf /backup/data.tar -C /data
```

198. How do you failover a Dockerized application running on multiple hosts?

- Use floating IPs, DNS failover, or service discovery mechanisms like Consul or Kubernetes.

199. What strategies can you use to migrate containers between cloud providers?

- Use multi-cloud container registries (Docker Hub, AWS ECR, GCP Artifact Registry) and Kubernetes federation.

200. How do you reduce downtime when upgrading Dockerized applications?

- Use rolling updates, blue-green deployment, Canary releases, and traffic routing strategies to ensure a smooth transition.