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Linux Foundation

KCSA

Kubernetes and Cloud Native Security Associate (KCSA)

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QUESTION & ANSWERS

QUESTION: 1

Why is setting resource limits and requests for Kubernetes pods important to prevent internal Denial of Service scenarios?

- Option A : To optimize the network performance of the cluster
- Option B : To ensure even distribution of storage resources among pods
- Option C : To prevent a single pod from consuming excessive resources, impacting overall cluster stability
- Option D : To facilitate rapid scaling of applications in response to demand

Correct Answer: C

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Linux Foundation KCSA Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none">Kubernetes Security Fundamentals: This section of the exam measures the skills of a Kubernetes Administrator and covers the primary security mechanisms within Kubernetes. This includes implementing pod security standards and admissions, configuring robust authentication and authorization systems like RBAC, managing secrets properly, and using network policies and audit logging to enforce isolation and monitor cluster activity.
Topic 2	<ul style="list-style-type: none">Kubernetes Threat Model: This section of the exam measures the skills of a Cloud Security Architect and involves identifying and mitigating potential threats to a Kubernetes cluster. It requires understanding common attack vectors like privilege escalation, denial of service, malicious code execution, and network-based attacks, as well as strategies to protect sensitive data and prevent an attacker from gaining persistence within the environment.

Topic 3	<ul style="list-style-type: none"> Platform Security: This section of the exam measures the skills of a Cloud Security Architect and encompasses broader platform-wide security concerns. This includes securing the software supply chain from image development to deployment, implementing observability and service meshes, managing Public Key Infrastructure (PKI), controlling network connectivity, and using admission controllers to enforce security policies.
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Linux Foundation Kubernetes and Cloud Native Security Associate Sample Questions (Q44-Q49):

NEW QUESTION # 44

In a Kubernetes cluster, what are the security risks associated with using ConfigMaps for storing secrets?

- A. ConfigMaps store sensitive information in etcd encoded in base64 format automatically, which does not ensure confidentiality of data.
- B. Storing secrets in ConfigMaps does not allow for fine-grained access control via RBAC.
- C. Using ConfigMaps for storing secrets might make applications incompatible with the Kubernetes cluster.
- D. Storing secrets in ConfigMaps can expose sensitive information as they are stored in plaintext and can be accessed by unauthorized users.

Answer: D

Explanation:

* ConfigMaps are explicitly not for confidential data.

* Exact extract (ConfigMap concept): "A ConfigMap is an API object used to store non- confidential data in key-value pairs."

* Exact extract (ConfigMap concept): "ConfigMaps are not intended to hold confidential data. Use a Secret for confidential data."

* Why this is risky: data placed into a ConfigMap is stored as regular (plaintext) string values in the API and etcd (unless you deliberately use binaryData for base64 content you supply). That means if someone has read access to the namespace or to etcd/API Server storage, they can view the values.

* Secrets vs ConfigMaps (to clarify distractor D):

* Exact extract (Secret concept): "By default, secret data is stored as unencrypted base64- encoded strings. You can enable encryption at rest to protect Secrets stored in etcd."

* This base64 behavior applies to Secrets, not to ConfigMap data. Thus option D is incorrect for ConfigMaps.

* About RBAC (to clarify distractor A): Kubernetes does support fine-grained RBAC for both ConfigMaps and Secrets; the issue isn't lack of RBAC but that ConfigMaps are not designed for confidential material.

* About compatibility (to clarify distractor C): Using ConfigMaps for secrets doesn't make apps "incompatible"; it's simply insecure and against guidance.

References:

Kubernetes Docs - ConfigMaps: <https://kubernetes.io/docs/concepts/configuration/configmap/> Kubernetes Docs - Secrets:

<https://kubernetes.io/docs/concepts/configuration/secret/> Kubernetes Docs - Encrypting Secret Data at Rest:

<https://kubernetes.io/docs/tasks/administer-cluster/encrypt-data/>

Note: The citations above are from the official Kubernetes documentation and reflect the stated guidance that ConfigMaps are for non-confidential data, while Secrets (with encryption at rest enabled) are for confidential data, and that the 4C's map to defense in depth.

NEW QUESTION # 45

What is the difference between gVisor and Firecracker?

- A. gVisor and Firecracker are both container runtimes that can be used interchangeably.
- B. gVisor and Firecracker are two names for the same technology, which provides isolation and security for containers.
- C. gVisor is a lightweight virtualization technology for creating and managing secure, multi-tenant container and function-as-a-service (FaaS) workloads. At the same time, Firecracker is a user-space kernel that provides isolation and security for containers.
- D. gVisor is a user-space kernel that provides isolation and security for containers. At the same time, Firecracker is a lightweight virtualization technology for creating and managing secure, multi-tenant container and function-as-a-service (FaaS) workloads.

Answer: D

Explanation:

* gVisor:

* Google-developed, implemented as a user-space kernel that intercepts and emulates syscalls made by containers.

* Provides strong isolation without requiring a full VM.

* Official docs: "gVisor is a user-space kernel, written in Go, that implements a substantial portion of the Linux system call interface."

* Source: <https://gvisor.dev/docs/>

* Firecracker:

* AWS-developed, lightweight virtualization technology built on KVM, used in AWS Lambda and Fargate.

* Optimized for running secure, multi-tenant microVMs (MicroVMs) for containers and FaaS.

* Official docs: "Firecracker is an open-source virtualization technology that is purpose-built for creating and managing secure, multi-tenant container and function-based services."

* Source: <https://firecracker-microvm.github.io/>

* Key difference: gVisor # syscall interception in userspace kernel (container isolation). Firecracker # lightweight virtualization with microVMs (multi-tenant security).

* Therefore, option A is correct.

References:

gVisor Docs: <https://gvisor.dev/docs/>

Firecracker Docs: <https://firecracker-microvm.github.io/>

NEW QUESTION # 46

What is a multi-stage build?

- A. A build process that involves multiple containers running simultaneously to speed up the image creation.
- B. A build process that involves multiple repositories for storing container images.
- C. A build process that involves multiple stages of image creation, allowing for smaller, optimized images.
- D. A build process that involves multiple developers collaborating on building an image.

Answer: C

Explanation:

* Multi-stage builds are a Docker/Kaniko feature that allows building images in multiple stages # final image contains only runtime artifacts, not build tools.

* This reduces image size, attack surface, and security risks.

* Exact extract (Docker Docs):

* "Multi-stage builds allow you to use multiple FROM statements in a Dockerfile. You can copy artifacts from one stage to another, resulting in smaller, optimized images."

* Clarifications:

* A: Collaboration is not the definition.

* B: Multiple repositories # multi-stage builds.

* C: Build concurrency # multi-stage builds.

References:

Docker Docs - Multi-Stage Builds: <https://docs.docker.com/develop/develop-images/multistage-build/>

NEW QUESTION # 47

In the event that kube-proxy is in a CrashLoopBackOff state, what impact does it have on the Pods running on the same worker node?

- A. The Pod's security context restrictions cannot be enforced.

- B. The Pods cannot communicate with other Pods in the cluster.
- C. The Pod's resource utilization increases significantly.
- D. The Pod cannot mount persistent volumes through CSI drivers.

Answer: B

Explanation:

* kube-proxy manages cluster network routing rules (via iptables or IPVS). It enables Pods to communicate with Services and Pods across nodes.

* If kube-proxy fails (CrashLoopBackOff), service IP routing and cluster-wide pod-to-pod networking breaks. Local Pod-to-Pod communication within the same node may still work, but cross-node communication fails.

* Exact extract (Kubernetes Docs - kube-proxy):

* "kube-proxy maintains network rules on nodes. These rules allow network communication to Pods from network sessions inside or outside of the cluster." References:

Kubernetes Docs - kube-proxy: <https://kubernetes.io/docs/reference/command-line-tools-reference/kube-proxy/>

NEW QUESTION # 48

A cluster is failing to pull more recent versions of images from k8s.gcr.io. Why may this be?

- A. There is a network connectivity issue between the cluster and k8s.gcr.io.
- B. The authentication credentials for accessing k8s.gcr.io are incorrectly scoped.
- C. The container image registry k8s.gcr.io has been deprecated.
- D. There is a bug in the container runtime or the image pull process.

Answer: C

Explanation:

* k8s.gcr.io was the historic Kubernetes image registry.

* It has been deprecated and replaced with registry.k8s.io.

* Exact extract (Kubernetes Blog):

* "The k8s.gcr.io image registry will be frozen from April 3, 2023 and fully deprecated. All Kubernetes project images are now served from registry.k8s.io."

* Pulling newer versions from k8s.gcr.io fails because the registry no longer receives updates.

References:

Kubernetes Blog - Image Registry Update: <https://kubernetes.io/blog/2023/02/06/k8s-gcr-io-freeze-announcement/>

NEW QUESTION # 49

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