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Linux Foundation KCSA Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none">Compliance and Security Frameworks: This section of the exam measures the skills of a Compliance Officer and focuses on applying formal structures to ensure security and meet regulatory demands. It covers working with industry-standard compliance and threat modeling frameworks, understanding supply chain security requirements, and utilizing automation tools to maintain and prove an organization's security posture.
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"> • 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.
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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. Using ConfigMaps for storing secrets might make applications incompatible with the Kubernetes cluster.
- C. Storing secrets in ConfigMaps does not allow for fine-grained access control via RBAC.
- **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/APIServer 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 toSecrets, 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

Why does the default base64 encoding that Kubernetes applies to the contents of Secret resources provide inadequate protection?

- **A. Base64 encoding does not encrypt the contents of the Secret, only obfuscates it.**
- B. Base64 encoding is vulnerable to brute-force attacks.
- C. Base64 encoding is not supported by all Secret Stores.
- D. Base64 encoding relies on a shared key which can be easily compromised.

Answer: A

Explanation:

* Kubernetes stores Secret data as base64-encoded strings in etcd by default.

* Base64 is not encryption- it is a simple encoding scheme that merely obfuscates data for transport and storage. Anyone with read

access to etcd or the Secret manifest can easily decode the value back to plaintext.

* For actual protection, Kubernetes supports encryption at rest(via encryption providers) and external Secret management (Vault, KMS, etc.).

References:

Kubernetes Documentation - Secrets

CNCF Security Whitepaper - Data protection section: highlights that base64 encoding does not protect data and encryption at rest is recommended.

NEW QUESTION # 46

A container image is trojanized by an attacker by compromising the build server. Based on the STRIDE threat modeling framework, which threat category best defines this threat?

- A. Denial of Service
- **B. Tampering**
- C. Spoofing
- D. Repudiation

Answer: B

Explanation:

* In STRIDE, Tampering is the threat category for unauthorized modification of data or code/artifacts. A trojanized container image is, by definition, an attacker's modification of the build output (the image) after compromising the CI/build system-i.e., tampering with the artifact in the software supply chain.

* Why not the others?

* Spoofing is about identity/authentication (e.g., pretending to be someone/something).

* Repudiation is about denying having performed an action without sufficient audit evidence.

* Denial of Service targets availability (exhausting resources or making a service unavailable). The scenario explicitly focuses on an altered image resulting from a compromised build server-this squarely maps to Tampering.

Authoritative references (for verification and deeper reading):

* Kubernetes (official docs)- Supply Chain Security (discusses risks such as compromised CI/CD pipelines leading to modified/poisoned images and emphasizes verifying image integrity/signatures).

* Kubernetes Docs#Security#Supply chain security and Securing a cluster(sections on image provenance, signing, and verifying artifacts).

* CNCF TAG Security - Cloud Native Security Whitepaper (v2)- Threat modeling in cloud-native and software supply chain risks; describes attackers modifying build outputs (images/artifacts) via CI

/CD compromise as a form of tampering and prescribes controls (signing, provenance, policy).

* CNCF TAG Security - Software Supply Chain Security Best Practices- Explicitly covers CI/CD compromise leading to maliciously modified images and recommends SLSA, provenance attestation, and signature verification (policy enforcement via admission controls).

* Microsoft STRIDE (canonical reference)- Defines Tampering as modifying data or code, which directly fits a trojanized image produced by a compromised build system.

NEW QUESTION # 47

What is the difference between gVisor and Firecracker?

- **A. 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.**
- B. 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.
- C. gVisor and Firecracker are two names for the same technology, which provides isolation and security for containers.
- D. gVisor and Firecracker are both container runtimes that can be used interchangeably.

Answer: A

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 # 48

Which of the following statements best describe container image signing and verification in the cloud environment?

- A. Container image signatures are mandatory in cloud environments, as cloud providers would deny the execution of unsigned container images.
- **B. Container image signatures and their verification ensure their authenticity and integrity against tampering.**
- C. Container image signatures affect the performance of containerized applications, as they increase the size of images with additional metadata.
- D. Container image signatures are concerned with defining developer ownership of applications within multi-tenant environments.

Answer: B

Explanation:

- * Image signing (with Notary, cosign, or similar tools) ensures that images are from a trusted source and have not been modified.
- * Exact extract (Sigstore cosign docs): "Cosign allows you to sign and verify container images to ensure authenticity and integrity."
- * Why others are wrong:
 - * B: Ownership can be inferred but it's about authenticity & integrity not tenancy.
 - * C: Not mandatory; enforcement requires admission controllers.
 - * D: Metadata size is negligible and has no runtime performance impact.

References:

Sigstore Project: <https://docs.sigstore.dev/cosign/overview>

CNCF Security Whitepaper

NEW QUESTION # 49

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