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## CCDE Written (400-007) and Practical Exam v3.1

**Exam Description:** The following topics are general guidelines for the content likely to be included on the CCDE Written (400-007) and Practical exam v3.1. However, other related topics may also appear on any specific delivery of the exam. To better reflect the contents of the exam and for clarity purposes, the guidelines below may change at any time without notice.

- The CCDE Written (400-077) exam v3.1 is a 2-hour, multiple-choice test with 90-110 questions that focuses on core Enterprise network architectures and technologies.
- The CCDE Practical exam v3.1 is an 8-hour scenario-based exam that focuses on the core Enterprise network architectures and technologies, as well as on your selected elective.

Both exams validate your knowledge, skills, and abilities throughout the entire network design lifecycle. Both exams are closed book, and no outside reference materials are allowed.

Your knowledge, skills, and abilities of recommending, building, validating, optimizing, and adapting technologies and solutions in the context of complex, high-level network designs will be tested throughout the exam:

- Recommend technologies or solutions that align with the stated requirements.
- Justify why a given decision was made.
- Make design choices and fully design solutions that comply with the stated requirements.
- Validate existing designs to ensure they are compliant with all requirements and suggest design changes to accommodate for changed specifications or requirements in the network.
- Perform optimizations of existing network designs to fix issues or mitigate risks.
- Build high-level implementation plans or steps.
- Recommend, build, or justify strategies.

The Written and Practical exams are designed with dual-stack in mind, so IPv4 and IPv6 should be expected across every exam topic and technology.

For more information about the exam format and the technologies covered within your exam, refer to:

- [CCDE v3.1 Core Technology List](#)
- [CCDE v3.1 Practical - AI Infrastructure Technology List](#)
- [CCDE v3.1 Practical - Large-Scale Networks Technology List](#)
- [CCDE v3.1 Practical - On-Prem and Cloud Services Technology List](#)
- [CCDE v3.1 Practical - Workforce Mobility Technology List](#)
- [CCDE v3.1 Written and Practical Exam Format](#)

- 15%**    **1.0**    **Business Strategy Design**
  - 1.1    Impact on network design, implementation, and optimization using various customer project management methodologies (for instance Waterfall and Agile)
  - 1.2    Solutions based on business continuity and operational sustainability (for instance RPO, ROI, CAPEX/OPEX cost analysis, and risk/reward)
  - 1.3    Environmental sustainability
  - 1.4    AI/Machine Learning
    - 1.4.a    Business needs
    - 1.4.b    Data sovereignty (location and public/private/hybrid)
    - 1.4.c    Security
    - 1.4.d    Assurance
    - 1.4.e    Integrity
    - 1.4.f    Impacts (such as storage requirements and traffic patterns)
    - 1.4.g    Auto scalability
    - 1.4.h    Cost and ROI
    - 1.4.i    Governance
  
- 25%**    **2.0**    **Control, Data, Management Plane, and Operational Design**
  - 2.1    End-to-end IP traffic flow in a feature-rich environment
  - 2.2    Data, control, and management plane technologies
  - 2.3    Centralized, decentralized, or hybrid control plane
  - 2.4    Automation/orchestration design, integration, and on-going support for networks (such as interfacing with APIs, model-driven management, controller-based technologies, and evolution to CI/CD framework)
  - 2.5    Software-defined architecture and controller-based solution design (SD-WAN, overlay, underlay, and fabric)
  - 2.6    Visibility, observability, and assurance
  - 2.7    User and application experience
  
- 30%**    **3.0**    **Network Design**
  - 3.1    Resilient, scalable, and secure modular networks, covering traditional and software-defined architectures, considering:
    - 3.1.a    Technical constraints and requirements
    - 3.1.b    Operational constraints and requirements
    - 3.1.c    Application behavior and needs
    - 3.1.d    Business requirements
    - 3.1.e    Implementation plans
    - 3.1.f    Migration and transformation
    - 3.1.g    Automation goals and requirements
  
  - 3.2    AI network design use cases (such as machine learning, large language models, and pattern recognition)

- 15%**    **4.0**    **Service Design**
- 4.1    Resilient, scalable, and secure modular network design based on constraints (such as technical, operational, application, and business constraints) to support applications on the IP network (such as voice, video, backups, data center replication, IoT, and storage)
- 4.2    Cloud/hybrid solutions based on business-critical operations
  - 4.2.a    Regulatory compliance (regulations as provided)
  - 4.2.b    Data governance (such as sovereignty, ownership, and locale)
  - 4.2.c    Service placement
  - 4.2.d    SaaS, PaaS, and IaaS
  - 4.2.e    Cloud connectivity (such as direct connect, Cloud OnRamp, MPLS direct connect, and WAN integration)
  - 4.2.f    Security
  - 4.2.g    AI/ML
  
- 15%**    **5.0**    **Security Design**
- 5.1    Network security design and integration
  - 5.1.a    Segmentation
  - 5.1.b    Network access control
  - 5.1.c    Visibility, observability, and assurance
  - 5.1.d    Policy enforcement
  - 5.1.e    CIA triad
  - 5.1.f    Regulatory compliance (regulations as provided)
  - 5.1.g    Impacts of AI on corporate security policy (such as IP, PIL, proprietary information, quality, corporate credibility, and use of external AI services)