CCDE Written & Practical Exam, Revision 3.1

Blueprint Revisions

Products and technologies are evolving faster than ever before. To keep up with the fast pace, we are introducing a new agile process that will allow us to align our exams faster with these changes: *minor revisions*. Minor revisions will provide us with the agility and speed that are necessary to adjust our programs to match industry changes and the evolution of technologies. Minor revisions will allow us to update track details (exam blueprint, equipment list, and software) more frequently while keeping overall changes to a minimum (up to 20%). These revisions allow us to ensure our content stays relevant, and they minimize learning curves between revisions.

The main objective of a minor revision is to:

- Further scope out the exam blueprint by ensuring exam objectives are clear.
- Introduce new blueprint tasks to ensure exams stay relevant.
- Phase out old(er) products and/or technology solutions that are less relevant today.
- Update equipment and/or software.

Today we are revising the CCDE Written and Practical exams.

CCDE Minor Revision 3.1

The CCDE Written and Practical exams will be updating through a *minor revision* (changes are small and incremental). Although the overall domains within the exam blueprint might look similar at first sight, with this minor revision we added and removed technologies and updated the exam topics to ensure exam relevancy.

Refer to www.cisco.com/go/CertRoadmap for the list of exam topics covered in the updated CCDE Written & Practical exams and for more information about the Cisco Certified Design Expert certification program. Candidates can expect to be tested on the new exam material for CCDE starting November 20, 2024.

CCDE Written & Practical Exams v3.1 – Executive Summary

The new minor revision for CCDE allows us to keep the domains and topics closely aligned with the expectations of today's network designers and architects. The CCDE exam blueprint v3.1 introduces AI/ML from a networking perspective along with the challenges and changes it comes with. There is also an increased focus on cloud-managed or cloud-delivered services, which has an impact on network designs. Several new technologies were added to the various technology lists. Note that changes are made to exam topics and the technology lists. Each is detailed in this release note.

Below is a summary of the changes made to the CCDE Written & Practical exam topics.

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Exam Topic Change Highlights

These tables contain only highlights of changes made to the exam topics. For details, refer to the actual exam topics list.

V3.0	V3.1
1. Business Strategy Design (15%)	**1. Business Strategy Design (15%)**
	1.3 AI/Machine Learning 1.3.a Business needs 1.3.b Data sovereignty (location and public/private/hybrid) 1.3.c Security 1.3.d Assurance 1.3.e Integrity 1.3.f Impacts (such as storage requirements and traffic patterns) 1.3.g Auto scalability 1.3.h Cost and ROI 1.3.i Governance
2. Control, data, management plane and operational design (25%)	**2. Control, Data, Management Plane, and Operational Design (25%)**
2.4 Automation/orchestration design, integration, and on-going support for networks (for instance interfacing with APIs, model-driven management, controller-based technologies, evolution to CI/CD framework)	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) 2.6 Visibility, observability, and assurance 2.7 User and application experience
3. Network Design (30%)	**3. Network Design (30%)**
	3.1 Resilient, scalable, and secure modular networks, covering traditional and software-defined architectures, considering: 3.1.g Automation goals and requirements 3.2 AI network design use cases (such as machine learning, large language models, and pattern recognition)
4. Service Design (15%)	**4. Service Design (15%)**

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4.2 Cloud/hybrid solutions based on business-critical operations 4.2.a Regulatory compliance	4.2 Cloud/hybrid solutions based on business-critical operations 4.2.a Regulatory compliance (regulations as provided) 4.2.g AI/ML
5. Security Design (15%)	**5. Security Design (15%)**
5.1 Network security design and integration 5.1.c Visibility	5.1 Network security design and integration 5.1.c Visibility, observability, and assurance 5.1.f Regulatory compliance (regulations as provided) 5.1.g Impacts of AI on corporate security policy (such as IP, PII, proprietary information, quality, corporate credibility, and use of external AI services)

Core Technology List

The Core Technology List document lists the technologies that every CCDE candidate is likely to encounter during their exam and thus are expected to know. The Core Technology List covers CCDE Written and the core scenarios of the CCDE Practical exam. This table only highlights changes, so make sure to review the full list before starting your exam preparations.

V3.0	V3.1
3. Layer 3 Control Plane	**3. Layer 3 Control Plane**
3.2 Unicast routing protocol operation (OSPF, EIGRP, ISIS, BGP, and RIP)	3.2 Unicast routing protocol operation (OSPF, EIGRP, ISIS, BGP, and RIP) 3.2.g Securing routing protocols 3.2.h Aggregation
3.4 Factors affecting convergence	3.4 Factors affecting convergence 3.4.c Micro-bursts 3.4.d Physical failures
3.9 Multicast routing concepts 3.9.b MSDP/anycast 3.9.c PIM	3.9 Multicast routing concepts 3.9.b Intra- and interdomain multicast 3.9.c MSDP, anycast, and priority cast 3.9.d PIM flavors 3.9.e RP selection and placement
	4. Data Plane Transport Protocols (such as TCP, UDP, and QUIC)
	4.1 Areas of application and deployment 4.2 Characteristics and properties 4.3 Security

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4. Network Virtualization	5. Network Virtualization
4.1 Multiprotocol Label Switching 4.1.c LDP 4.2 Layer 2/3 VPN and tunneling technologies 4.2.g MACsec (802.1ae)	5.1 Multiprotocol Label Switching 5.1.c Label distribution protocols, such as LDP, RSVP, and BGP+label 5.1.d Segment routing 5.2 Layer 2/3 VPN and tunneling technologies 5.2.g Overlay encapsulation and control plane protocols (such as VXLAN, LISP, and MP-BGP) 5.2.h Infrastructure segmentation methods 5.2.h.iv SGT
5. Security	**6. Security**
5.1 Infrastructure Security 5.1.e Layer 2 security techniques 5.1.f Wireless security technologies 5.4 Network control and identity Management	6.1 Infrastructure security 6.1.d Policy plane signaling 6.1.d.i RADIUS 6.1.d.ii TACACS+ 6.1.d.iii pxGrid 6.1.d.iv SXP 6.1.e Layer 2 security techniques 6.1.e.viii MACsec (802.1AE) 6.1.e.ix MACsec in WAN environments 6.1.f Wireless security technologies 6.1.f.vi OWE 6.4 Zero trust 6.4.a ZTNA 6.4.b Build policies using tools such as AI/ML 6.4.c Use cases, principles, and architecture 6.4.d Migration from classic deployments 6.5 Network control and identity management 6.5.a Wired and wireless network access control 6.5.b AAA for network access with 802.1X and MAB 6.5.c Guest and BYOD considerations 6.5.d Internal and external identity sources 6.5.e User- and certificate-based authentication 6.5.f EAP Chaining authentication method 6.5.g Integration with multifactor authentication
6. Wireless	**7. Wireless**

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6.1 IEEE 802.11 Standards and Protocols	7.1 IEEE 802.11 Standards and Protocols (up to and including Wi-Fi 7)
7. Automation	**8. Automation**
7.2 Infrastructure as Code (tools, awareness, and when to use) 7.2.a Automation tools (i.e. Ansible) 7.2.b Orchestration platforms 7.2.c Programming Language (e.g. Python) 7.3 CI/CD Pipeline	8.2 Infrastructure as Code (tools, awareness, and when to use) 8.2.a CI/CD and automation platforms (such as Jenkins, GitLab, and GitHub) 8.2.b Configuration management tools (such as Ansible) 8.2.c Provisioning tools (such as Ansible and Terraform) 8.2.d Orchestration platforms 8.2.e Programming languages (such as Python)

Large-Scale Networks Technology List

The Large-Scale Networks Technology List document lists the technologies that CCDE candidates that plan to select the Large-Scale Networks area-of-expertise scenario during their CCDE Practical exam are likely to encounter and thus are expected to know. The Large-Scale Networks Technology list covers only the Large-Scale Networks scenario of the CCDE Practical exam. This table only highlights changes, so make sure to review the full list before starting your exam preparations.

V3.0	V3.1
4. Network Virtualization	**4. Network Virtualization**
4.1 Multiprotocol Label Switching 4.1.a Segment Routing 4.1.b LDP and SR Interworking 4.1.c MPLS Traffic Engineering 4.2 QoS techniques and strategies 4.2.a End-user requirements 4.2.b DiffServ 4.2.c IntServ 4.3 EVPN 4.3.a Management plane 4.3.b Control plane 4.3.c Data plane (such as VXLAN, MPLS,	4.1 MPLS 4.1.a Label distribution (such as LDP, BGP, and RSVP) 4.1.b IGP integration 4.1.c Congruent and noncongruent topologies 4.1.d Traffic Engineering (RSVP and TE tunnels) 4.2 Segment routing 4.2.a LDP and SR interworking 4.2.b SRv6/MPLS 4.2.c Traffic Engineering (SR-TE) (such as TI-LFA, ODN, AS, and Flex-Algo) 4.3 QoS techniques and strategies 4.3.a End-user requirements 4.3.b QoS behavior (such as PHB, queuing

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PBB) 4.3.d Segmentation 4.3.e Policy 4.3.e.i Security 4.3.e.ii Topologies 4.3.e.iii Multiple site strategy	techniques, buffer depths, and MPLS QoS operations) 4.4 EVPN 4.4.a Management plane 4.4.b Control plane 4.4.c Data plane (such as VXLAN, MPLS, and PBB) 4.4.d Segmentation 4.4.e Policy 4.4.e.i Security 4.4.e.ii Topologies 4.4.3.iii Multiple site strategy
5. Security	**5. Security**
5.1 Infrastructure security	5.1 Infrastructure security 5.1.b Control plane security 5.1.b.i Securing and hardening BGP (such as RPKI, RoA, TTL-based security, peer authentication etc) 5.1.b.ii Device hardening (such as CoPP, transit filtering, anti-spoofing etc) 5.1.b.iii Out-of-band management 5.2 DoS and DDoS protection mechanisms 5.2.a BGP FlowSpec 5.2.b Washing
6. Automation	**6. Automation**
	6.2 Crosswork network automation

On-Premises and Cloud Services Technology List

The On-Premises and Cloud Services Technology List document lists the technologies that CCDE candidates that plan to select the On-Premises and Cloud Services Network area-of-expertise scenario during their CCDE Practical exam are likely to encounter and thus are expected to know. The On-Premises and Cloud Services Technology list covers only the On-Premises and Cloud Services scenario of the CCDE Practical exam. This table only highlights changes, so make sure to review the full list before starting your exam preparations.

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V3.0	V3.1
4. Automation	**4. Automation**
	4.2 Network automation 4.3 Network-wide deployments (including risks and factors)
5. Data Center	**5. Data Center**
5.1 Storage 5.1.a Physical topology 5.1.b QoS requirements 5.1.c FC and FCoE 5.1.c.i Zoning 5.1.c.ii Trunking 5.1.c.iii Link aggregation 5.1.c.iv Load balancing 5.1.d iSCSI 5.1.d.i Authentication 5.1.d.ii Multipathing	5.1 Network 5.1.a Software-defined data center, such as Cisco ACI 5.1.b DC fabrics based on EVPN, VXLAN, and OTV etc. 5.1.c Topologies 5.1.c.i Spine/leaf topologies 5.1.c.ii CLOS topologies 5.1.c.iii Hierarchical 5.1.d AI/ML-enabled data center 5.1.d.i Nonblocking fabric 5.1.d.ii Low latency 5.1.d.iii Lossless Ethernet 5.1.d.iv RDMA protocols, such as RoCE, RoCEv2, and InfiniBand 5.1.d.v Application requirements
5.2 Application delivery 5.2.a Load balancer deployment modes	5.2 Storage 5.2.a Physical topology 5.2.b QoS requirements 5.2.c FC and FCoE 5.2.c.i Zoning 5.2.c.ii Trunking 5.2.c.iii Link aggregation 5.1.c.iv Load balancing 5.2.c.v Link pinning 5.2.d iSCSI 5.2.d.i Authentication 5.2.d.ii Multipathing
5.3 Compute 5.3.a UCS blade integration 5.3.b UCS rack server integration 5.3.c HyperFlex integration	5.3 Application delivery 5.3.a Load balancer deployment modes 5.3.b SSL offloading/decryption
5.4 Compute connectivity	5.4 Compute 5.4.a UCS Fabric Interconnects

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5.4.a SAN/LAN uplinks 5.4.b Port modes	5.4.b UCS chassis-based and rack-based servers 5.4.c UCS blade integration 5.4.d UCS rack server integration 5.4.e Third-party servers 5.5 Compute connectivity 5.5.a SAN/LAN uplinks 5.5.b Port modes

Workforce Mobility Technology List

The Workforce Mobility Technology List document lists the technologies that CCDE candidates that plan to select the Workforce Mobility area-of-expertise scenario during their CCDE Practical exam are likely to encounter and thus are expected to know. The Workforce Mobility Technology list covers only the Workforce Mobility scenario of the CCDE Practical exam. This table only highlights changes, so make sure to review the full list before starting your exam preparations.

V3.0	V3.1
1. Security	**1. Security**
1.1 Network control and identity management 1.1.a Cisco ISE	1.1 Network control and identity management 1.1.a RADIUS, including Cisco ISE 1.1.b TACACS+
2. Wireless	**2. Wireless**
2.1 Enterprise wireless network 2.1.a WLAN architectures 2.7 Location services and solutions 2.7.b DNA Spaces 2.7.b.i Analytics 2.8 Automation, Assurance, Insights, and Telemetry (Legacy and DNAc) 2.8.b DNAc	2.1 Enterprise wireless network 2.1.a WLAN architectures 2.1.a.iii Cloud-managed 2.7 Location services and solutions 2.7.b Cisco Spaces 2.7.b.i Analytics 2.8 Automation, Assurance, Insights, and Telemetry (Legacy and Catalyst Center) 2.8.b Catalyst Center 2.9 Wireless optimization using features in Wi-Fi versions up to and including Wi-Fi 7
	3. Campus networks
	3.1 Technologies 3.1.a Classic 3.1.b SD-LAN (such as SD-Access and BGP EVPN/VXLAN) 3.1.c Cloud-managed solutions, such as Cisco Meraki

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	3.2 Operational planes 3.2.a Data plane 3.2.b Control plane 3.2.c Management plane 3.2.d Policy plane 3.2.e Security plane 3.2.f Orchestration plane

Exam Format

No changes have been made to the exam formats in this minor revision. Visit the CCDE Exam Format document for more information about the exam formats for CCDE Written and CCDE Practical exams.