

Unit 114: Cisco CCNP Route

Unit code: F/601/9581

QCF Level 4: BTEC Higher National

Credit value: 10

Guided learning hours: 80

● Aim and purpose

This unit covers, network design, implementation, and verification plans, the management and configuration of EIGRP, OSPF and BGP with IGP redistribution. The inclusion of policy-based routing and IP service-level agreement. Address and network management of IPv6 ensuring IPv4 and IPv6 coexistence.

● Unit introduction

This unit is a comprehensive exploration of the core principles of infrastructure and internet routing. This is one of the three units in the professional study pathway, leading to the Cisco Certified Networking Professional (CCNP) qualification. This unit focuses on Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Border Gateway Protocol (BGP), internet Protocol (IP) v6 and the redistribution and management of routing updates.

The unit covers networking sector skills and knowledge that an ICT networking expert would need to successfully complete their work. In particular, learners will be taught how to plan and deploy a complex network infrastructure using more than one internal routing protocol in unison with the exterior BGP routing protocol.

This unit involves hands-on, lab-oriented activities that stresses laboratory safety and working effectively in a group environment. Theory aspects are studied and tested online using Cisco's own electronic curriculum which learners may also access from home. The unit is delivered through a blended learning approach where tutor-led teaching is combined with the electronic materials and testing.

This unit is assessed via the Cisco CCNP Route (CCNP1) online examination. There are further criteria for merit and distinction grades.

● Learning outcomes

On completion of this unit a learner should:

- 1 Understand the principles of Routing Services
- 2 Be able to implement an EIGRP-Based Solution
- 3 Be able to implement an OSPF-based Solution
- 4 Understand the manipulation of Routing Updates
- 5 Understand path control
- 6 Be able to implement a BGP solution for ISP connectivity
- 7 Be able to implement Routing Facilities for Branch Offices and Mobile Workers
- 8 Be able to Implement IPv6 in an Enterprise Network.

Unit content in relation to the Merit and Distinction Criteria

Routed Network: four or more routers in a mesh with two or more routing protocols

Interior Protocols: protocols eg OSPF, EIGRP, ISIS, static route, RIP, RIPv2, BGP

Exterior Protocol: BGP

Benchmark data: types eg current system throughput, routing table size, routing performance

Current standards: types eg quality of service, campus design, address space allocation

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| To achieve a pass grade the evidence must show that the learner is able to: | To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to: | To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to: |
| Pass Cisco CCNP Route (CCNP1) academy examination. The centre will evidence this with a copy of the learner's class grade book from the assessment system on completion of the course (this must be listed by learner name). A pass grade is a score of 70% or more in the final examination . | M1 research an existing network infrastructure and evaluate current performance M2 plan a routed network infrastructure using an interior and exterior routing protocol M3 manage the deployment of the planned routed network. | D1 justify network design against current standards D2 research performance of network design and provide benchmark data. |

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

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| Key | IE – independent enquirers CT – creative thinkers | RL – reflective learners TW – team workers | SM – self-managers EP – effective participators |
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Essential guidance for tutors

Delivery

Cisco CCNP Route is a proprietary unit within the Cisco Networking Academy program. The curriculum, assessment and support materials are available only to institutions participating in the program.

Cisco Systems makes these available at no cost for any non-profit institution; there are some costs for instructor training and support. For detailed information please consult this web link:

www.cisco.com/web/learning/netacad/get_involved/BecomeAnAcademy.html.

If learners are following the Cisco unit in parallel with a BTEC National or Higher National unit then it is recommended that the two aspects of the assessment are integrated. Tasks being completed as part of the practical preparation for Cisco Skills Based Exams can then be used to support the BTEC assessment for the merit and distinction criteria.

To view general information about the Cisco CCNP Route objectives please visit: www.cisco.com/web/learning/netacad/course_catalog/CCNP.html. The detailed scope and sequence documents are available to academies on the Cisco internal site.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

The learning outcomes associated with this unit are closely linked with:

| Level 3 | Level 4 | Level 5 |
|-------------------------------------------|----------------------------------|------------------------------------------|
| Unit 5: Managing Networks | Unit 2: Computer Systems | Unit 43: Networking Infrastructure |
| Unit 9: Computer Networks | Unit 24: Networking Technologies | Unit 44: Local Area Network Technologies |
| Unit 32: Network Systems Security | Unit 25: Routing Concepts | Unit 45: Wide Area Network Technologies |
| All Cisco Discovery and Exploration Units | All Cisco CCNP Units | Unit 46: Network Security |

This unit has links to the Level 4 and Level 5 National Occupational Standards for IT and Telecoms Professionals, particularly the areas of competence of:

- IT/Technology Infrastructure Design and Planning
- Systems Development
- IT/Technology Service Operations and Event Management
- IT/Technology Management and Support
- Change and Release Management.

Essential Requirements

Learners must have access to a live or 'detached' network environment to create the network infrastructure and develop their skills; this may be successfully accomplished using virtual machines.

Learners must have access to facilities, which allow them the opportunity to fully evidence all the criteria of the unit. If this cannot be guaranteed then centres should not attempt to deliver this unit.

Evaluation of current systems and solutions, commercial practices, social conditions and the culture surrounding the system in use is of as much importance as delivering work supporting potential understanding of the technological systems and the services they offer.

Learners must have access to a range of suitable routing hardware as it is important to undertake as many practical activities as possible to reinforce theoretical learning. There are many virtual, emulated and simulated systems that now support delivery.

Resources

For a list of Cisco resources to assist with this unit, including exam preparation materials, see:
www.cisco.com/web/learning/netacad/course_catalog/CCNP.html

Books

Macfarlane J – *Network Routing Basics: Understanding IP Routing in Cisco Systems* (Wiley, 2006) ISBN-10: 0471772739

Medhi D, Ramasamy K – *Network Routing: Algorithms, Protocols, and Architectures* (Morgan Kaufmann, 2007) ISBN-10: 0120885883

Xiao Y, Li J, Pan Y – *Security and Routing in Wireless Networks: Wireless Networks and Mobile Computing v. 3* (Nova Science, 2005) ISBN-10: 159454316X

Teare, D, Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide: Foundation learning for the ROUTE 642-902 Exam (Cisco Press 2010) ISBN-10: 1-58705-882-0

Websites

www.cisco.com

cisco.netacad.net

Employer engagement and vocational contexts

The Cisco CCNA certification is internationally recognized by a diverse range of employers (from SME's to large corporations) as one of the principal certifications in networking and telecommunications.