

Unit 116: Cisco CCNP Troubleshooting

Unit code:	L/601/9583
QCF Level 4:	BTEC Higher National
Credit value:	20
Guided learning hours:	180

● Aim and purpose

This unit covers, common network maintenance tasks and tools, accepted troubleshooting models, the use of a range of troubleshooting commands and features for Switches, STP, and BGP, OSPF, and EIGRP routing protocols. This is supported by the recognition of issues with route redistribution, security, and router performance. Students will explore a range of issues with IP services and IP communications along with IPv6 troubleshooting for a large enterprise network.

● Unit introduction

This unit is a comprehensive exploration of the core principles of multilayer networking. 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 resolving issues with switched and routed network systems.

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 manage the systematic evaluation of a network infrastructure and identify and resolve any faults as they arise.

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 Troubleshooting (CCNP3) online examination. There are further criteria for merit and distinction grades.

● Learning outcomes

On completion of this unit a learner should:

- 1 Be able to plan maintenance for complex networks
- 2 Understand Troubleshooting Processes for Complex Enterprise Networks
- 3 Be able to Implement Maintenance and Troubleshooting Tools and Applications
- 4 Be able to Maintain and Troubleshoot Campus Switched Solutions
- 5 Be able to Maintain and Troubleshoot Routing Solutions
- 6 Be able to Maintain and Troubleshoot Addressing Services
- 7 Be able to Maintain and Troubleshoot Network Performance Issues on converged
- 8 Be able to Maintain and Troubleshoot Network Security Implementations
- 9 Be able to Maintain and Troubleshoot Integrated, Complex Enterprise Networks.

Unit content in relation to the Merit and Distinction Criteria

Operational Network structure: four or more devices, where there is at least two switches and two routers

Baseline: types eg performance, data rate, configuration, qos, rules established

Routed infrastructure: types eg OSPF, EIGRP, ISIS, static route, redistributed routes, DHCP, BGP

Switched infrastructure: types eg HSRP, VSRP, cable mesh, ether-channel, STP, PV-STP, VLAN, dot1q, trunking, VTP, VACL's

Complex network fault: ten or more faults distributed across the operational network structure

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

Methodologies: types eg top-down, bottom-up, divide and conquer, systemic, element isolation

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:
<p>Pass CCNP Troubleshooting (CCNP3) academy examination.</p> <p>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.</p>	<p>M1 evaluate an existing operational network infrastructure and set a baseline</p>	<p>D1 justify methodology applied to troubleshooting a complex network fault</p> <p>D2 research performance of operational network infrastructure, post troubleshooting and provide benchmark data.</p>
	<p>M2 plan the systematic review of an operational network infrastructure</p>	
	<p>M3 research current methodologies for troubleshooting a switched infrastructure</p>	
	<p>M4 research current methodologies for troubleshooting a Routed infrastructure</p>	
	<p>M5 troubleshoot a complex network fault.</p>	

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.

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

Essential guidance for tutors

Delivery

Cisco CCNP Troubleshooting 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 Troubleshooting 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

Froom, R et al – *Implementing Cisco IP Switched Networks (SWITCH) Foundation Learning Guide: Foundation learning for the ROUTE 642-813 Exam* (Cisco Press 2010) ISBN-10: 1-58705-884-7

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

Ranjbar, A – *Troubleshooting and Maintaining Cisco IP Networks (TSHOOT) Foundation Learning Guide: Foundation learning for the ROUTE 642-832 Exam* (Cisco Press 2010) ISBN-10: 1-58705-876-6

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

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

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.