

BCS Level 4 Award in Voice and Data Solutions Syllabus 603/3257/8

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BCS Level 4 Award in Voice and Data Solutions Syllabus

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Change History

Any changes made to the syllabus shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

Version Number	Changes Made
V1.0 May 2018	Document created.

Introduction

This award is the last module of four knowledge modules that are applicable to the level 4 Unified Communications Trouble Shooter apprenticeship. It covers the range of concepts, approaches and techniques that are applicable to voice and data solutions, for which apprentices are required to demonstrate their knowledge and understanding.

Objectives

Apprentices should be able to demonstrate an understanding of modern voice and data solutions. Key areas are:

1. Understands Voice routes and PSTN uses.
2. Understands emergency routes.
3. Understand the importance of QoS and how to review QoS reports.
4. Understands client behaviour for different outage scenarios.
5. Understands how to configure Domain Name Server (DNS).
6. Understands server and client architecture.
7. Understands how to set up, configure and manage devices.
8. Understands site topologies.
9. Understands and can represent the ability to define and implement reliable routes.
10. Understands conferencing capabilities.

Evidence of lessons learnt in these key areas should be collected and reflected upon when the apprentice is compiling the summative portfolio as the apprentice could identify how the task might be done better / differently with knowledge subsequently gained.

Target Audience

This award is relevant to anyone enrolled on the Level 4 Unified Communications Trouble Shooter Apprenticeship programme.

Course Format and Duration

Apprentices can study for this award by attending a training course provided by a BCS accredited Training Provider. The estimated total qualification time for this award is 82 hours.

Eligibility for the Examination

Individual employers will set the selection criteria, but this is likely to include 5 GCSEs (especially English, mathematics and a science or technology subject); other relevant qualifications and experience; or an aptitude test with a focus on IT skills.

Level 2 English and Maths will need to be achieved, if not already, prior to taking the endpoint assessment.

Duration and Format of the Examination

The format for the examination is a one-hour multiple-choice examination consisting of 40 questions. The examination is closed book (no materials can be taken into the examination room). The pass mark is 26/40 (65%).

Additional Time for Apprentices Requiring Reasonable Adjustments Due to a Disability

Apprentices may request additional time if they require reasonable adjustments. Please refer to the [Access to Assessment policy](#) for detailed information on how and when to apply.

Additional Time for Apprentices Whose Language Is Not the Language of the Exam

If the examination is taken in a language that is not the apprentice's native / official language, then they are entitled to 25% extra time.

If the examination is taken in a language that is not the apprentice's native / official language, then they are entitled to use their own **paper** language dictionary (whose purpose is translation between the examination language and another national language) during the examination. Electronic versions of dictionaries will **not** be allowed into the examination room.

Guidelines for Training Providers

Each major subject heading in this syllabus is assigned an allocated time. The purpose of this is two-fold: first, to give both guidance on the relative proportion of time to be allocated to each section of an accredited course and an approximate minimum time for the teaching of each section; second, to guide the proportion of questions in the exam. Training providers may spend more time than is indicated and apprentices may spend more time again in reading and research. Courses do not have to follow the same order as the syllabus. Courses may be run as a single module or broken down into two or three smaller modules.

This syllabus is structured into sections relating to major subject headings and numbered with a single digit section number. Each section is allocated a minimum contact time for presentation. Apprentices should be encouraged to consider their summative portfolio throughout the modules.

Syllabus

For each top-level area of the syllabus a percentage and K level is identified. The percentage is the exam coverage of that area, and the K level identifies the maximum level of knowledge that may be examined for that area.

1 Voice solutions (40%, K3)

In this topic area, the apprentice will recognise voice solutions and describe their features. The successful apprentice should be able to:

1.1 Describe the purpose of different voice solutions.

- PSTN / POTS;
- PABX;
- IP PBX;
- VOIP;
- Online conferencing.

1.2 Describe features of voice solutions.

- common;
 - voice and data;
 - caller display;
 - call divert;
 - voicemail;
- PABX and IP PBX;
 - group pickup;
 - conference calls;
 - hunt groups;
- VOIP;
 - softphones;
 - find me / follow me call routing to a list of different destinations;
 - email system integration;
 - voice to email or SMS transcription;
 - bandwidth utilization and inbound / outbound call detail reports;
 - smart forwarding;
 - virtual receptionist.

1.3 Describe common terminology and components of VOIP solutions.

- frontend server;
 - translation service;
 - E.164 format for dial strings;
 - inbound routing;
 - outbound routing;
 - intercluster routing;
 - user services;
 - user replicator;
 - address book.
- trunks;
 - mediation servers;
 - PSTN gateway;
 - IP-PBXs;
 - session border controllers (SBCs);
- least cost routing.

1.4 Describe PSTN records.

- description of a PSTN record (list of permissions placed on the call);
- associations to PSTN records that are needed;
 - voice policies (assigned to users);
 - routes (assigned to 'phone numbers).

1.5 Describe how VOIP solutions comply with section 48(1) of the Communications Act 2003 modifying General Condition 4 (Access to Emergency Services) by routing all calls to 999 and 112 numbers to the emergency services.

1.6 Define quality of service (QoS) and the related factors that can contribute to QoS.

- network traffic prioritisation rules;
 - Differentiated Services Code Point (DSCP);
 - IP Precedence;
- congestion management methods;
 - queuing (FIFO);
 - priority queuing (PQ);
 - custom queuing (CQ);
 - weighted fair queuing (WFQ);
 - class-based weighted fair queuing (CBWFQ);
 - low latency queuing (LLQ);
- bandwidth availability;
- low throughput;
- dropped packets;
- errors;
- latency;
- jitter;
- out-of-order delivery.

- 1.7 Demonstrate how QoS logs relating to voice and data solutions are reviewed.
- 1.8 Describe how different client symptoms can assist with the troubleshooting of VOIP outage (or reduces QoS) issues.
- loss of incoming calls;
 - loss of power;
 - loss of internet connectivity;
 - firewall related issues;
 - internet access but no dial tone;
 - infrastructure issues;
 - interference from another device;
 - 'choppy' audio;
 - bandwidth issues.
 - echo;
 - physical issues;
 - poor quality cabling;
 - interference from another device;
 - only able to access a limited set of destinations;
 - routing or firewall issues;
 - static or similar noise on the line;
 - electrical voltage being added into the lines by an alarm system, separate caller ID or faulty wiring;
 - wireless interference;
 - weak signals due to environment or distance from WAP.

2 DNS Configuration (17.5%, K2)

In this topic area, the apprentice will understand how to configure Domain Name Servers (DNS). The successful apprentice should be able to:

- 2.1 Explain the purpose of name resolution.
- domain names;
 - domain name resolution;
 - requirements of DNS servers;
 - host name resolution (7 step sequence);
 - NetBIOS name resolution (6 step sequence).
- 2.2 Describe the purpose of the following DNS record types.
- start of authority (SOA);
 - name servers (NS);
 - host (A and AAAA);
 - Pointer (PTR);
 - Canonical Name (CNAME) or Alias;
 - mail exchanger (MX) record.

2.3 Describe different types of DNS zones, characteristics, features and benefits.

- primary DNS zone;
- secondary DNS zone;
- stub zones;
- Active Directory integrated DNS zone;
- forward lookup zones;
- reverse lookup zones.

3 Data Solutions (37.5%, K2)

In this topic area, the apprentice will be able to describe and explain data solutions. The successful apprentice should be able to:

3.1 Describe different server roles found as part of a client-server architecture.

- domain server - authenticates and authorises access to domain resources by users and computers;
- name servers;
 - DNS;
 - WINS;
- DHCP server – provides dynamic allocation of IP addresses;
- file server – provides a network-based data storage location;
- print server – manages network linked print devices;
- communications server - handles common communication functions for the network;
 - email;
 - fax;
 - remote access;
 - firewalls;
 - internet services;
- application server – provides access to network-enabled versions of application software;
- database server - provides network access to a database, handling data storage, manipulation and management.

3.2 Describe how to configure and support networks by editing key device settings related to VOIP.

- DNS;
 - SRV records for SIP;
- firewall;
 - enabling / disabling the entire firewall;
 - enabling / disabling ports;
 - SIP ports 5060/61 (TCP/UDP);
 - RTP ports 16384 - 32767 (UDP);
- enabling internet access to specific applications.

- 3.3 Describe the differences between sites, domains and organisational units, and relate them to the geographical differences between LAN, WAN and MAN.
- 3.4 Explain how Windows Servers use Active Directory sites for:
- routing replication;
 - client affinity;
 - SYSVOL replication;
 - location of services.
- 3.5 Explain the role of protocols in facilitating interoperability in network communications.
- RIPv1;
 - RIPv2;
 - OSPF;
 - EIGRP;
 - RIPng;
 - OSPFV3;
 - EIGRP for IPv6.
- 3.6 Define what is meant by a reliable route.
- 3.7 Explain what an algorithm is and give examples of their use in computer networking.
- DUAL.
 - which routing protocol uses it.
 - how it determines the correct path.
 - Dijkstra.
 - which routing protocol uses it.
 - how it determines the correct path.
- 3.8 Describe the capabilities of conferencing systems.
- voice;
 - video;
 - shared presentations;
 - instant messaging (IM)
 - share of delegate screen;
 - voting / polling systems;
 - voice to text transcription;
 - text to voice transcription;
 - recording, archive and sharing of meetings.

Levels of Knowledge / SFIA Levels

This syllabus will provide apprentices with the levels of difficulty / knowledge skill highlighted within the following table, enabling them to develop the skills to operate at the levels of responsibility indicated. The levels of knowledge and SFIA levels are explained on the website www.bcs.org/levels. The levels of knowledge above will enable apprentices to develop the following levels of skill to be able to operate at the following levels of responsibility (as defined within the SFIA framework) within their workplace:

Level	Levels of Knowledge	Levels of Skill and Responsibility (SFIA)
K7		Set strategy, inspire and mobilise
K6	Evaluate	Initiate and influence
K5	Synthesise	Ensure and advise
K4	Analyse	Enable
K3	Apply	Apply
K2	Understand	Assist
K1	Remember	Follow

Question Weighting

Syllabus Area	Target Number of Questions
1. Voice Solutions	16
2. DNS Configuration	7
3. Data Solutions	17
Total	40 Questions

Format of Examination

Type	40 Question Multiple Choice.
Duration	1 hour. An additional 15 minutes will be allowed for apprentices sitting the examination in a language that is not their native / mother tongue.
Pre-requisites	Training from a BCS accredited training provider is strongly recommended but is not a pre-requisite.
Supervised	Yes.
Open Book	No.
Pass Mark	26/40 (65%).
Calculators	Calculators cannot be used during this examination.
Total Qualification Time (TQT)	82 Hours, 45 GLH recommended.
Delivery	Online.

Trainer Criteria

Criteria	<ul style="list-style-type: none"> ▪ Have 10 days' training experience or have a Train the Trainer qualification. ▪ Have a minimum of 3 years' practical experience in the subject area.
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Classroom Size

Trainer to apprentice ratio	1:16
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