Unit 26: Design a Small or Home Office Network

Unit code: Y/601/0448
QCF Level 4: BTEC Higher National
Credit value: 15

Aim
To provide learners with opportunities to design, implement, manage and support a small or home office network as a standalone system or as part of a larger remote infrastructure.

Unit abstract
IT utilisation has evolved rapidly since the initial personal internet boom of the late 1990s with the majority of private homes and small organisations now having megabit capable bandwidth and an extensive range of devices able to connect to the Internet.

For many home and commercial users of the internet, the design of a system could be an ad hoc affair, with many high-street retailers offering ‘out-of-the-box’ solutions. Whilst this solution will suit the lower capacity user, many discover the limitations of security, scale and device interaction offered.

Learners taking this unit will explore how private homes and small organisations, as well as branches of larger enterprises can create a system that will scale according to demand. Learners will also have the opportunity to consider how they may design and deploy a system with the potential to adapt to technological change as well as user preference.

There is no restriction on the type of system or devices that may be incorporated into the learning behind this unit. The technological aspect ranges from games consoles through to mobile devices as well as systems with only two or three users up to a system that may have to support at least 50 users or devices.

Learning outcomes

On successful completion of this unit a learner will:
1. Understand the impact of small or home office networks
2. Be able to design small or home office networks
3. Be able to implement small or home office networks
4. Be able to support small or home office networks.
Unit content

1 Understand the impact of small or home office networks

Mobility: device participation, range of devices on system
Capacity: constraints eg bandwidth to internet; local internet contention ratio; internal network bandwidth; internal network contention ratio; bandwidth requirements (applications; users; devices)
Devices: types eg phones, handheld consoles, Personal Digital Assistants (PDA), laptops, games consoles, workstations, printers, network drives, media centres
Usage: activities eg entertainment, gaming, social networking, video streaming; users eg commercial, personal, home working
Security: methods eg address allocation, local Demilitarized Zone (DMZ), Network Address Translation (NAT) address mapping, wireless encryption, Virtual Private Network (VPN) to central employer/commercial location, device security, firewall
Communications: connections eg wireless, wired, Ethernet over power, 3G, Bluetooth, broadband, Asymmetric Digital Subscriber Line (ADSL)
Impacts: social practice eg working patterns, social engagement, user expectations, entertainment, sharing of resource, use of technology

2 Be able to design small or home office networks

Devices: number of connected devices; anticipated participation
Bandwidth: average load; peak load; local Internet availability; cost constraint
Users: quality expectations; concept of system growth
Applications: requirements eg security, quality of service
Communications: considerations eg suited to devices, suited to users, lifestyle preferences, commercial requirements
Scalable: considerations eg supporting device growth, supporting additional devices, bandwidth use trend change
Security: considerations eg addressing policy, device participation, firewall rules, encryption preference

3 Be able to implement small or home office networks

Devices: installation eg communication device, allocation of addresses, local client configuration
Connectivity: setup eg communication medium, external network, internet connection
Testing: internet access; security; bandwidth; documentation eg comparison charts, performance graphs
4 Be able to support small or home office networks

User access: requirements eg applications, devices, bandwidth

Maintenance: monitoring eg security, utilisation, bandwidth needs, user productivity

Future improvements: upgrades eg adding devices, removing devices, upgrade bandwidth, additional communications devices; maintenance schedule eg backups, upgrades, security, auditing
## Learning outcomes and assessment criteria

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<td><strong>The learner can:</strong></td>
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<tr>
<td>LO1 Understand the impact of small or home office networks</td>
<td>1.1 evaluate the usage and impact of current small or home office networks</td>
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| LO2 Be able to design small or home office networks | 2.1 design a small or home office network solution to meet a given specification  
2.2 evaluate the design and analyse user feedback |
| LO3 Be able to implement small or home office networks | 3.1 implement a small or home office network solution based on a prepared design  
3.2 test the small or home office network solution to meet user requirements  
3.3 document and analyse test results against expected results |
| LO4 Be able to support small or home office networks | 4.1 discuss future improvements for the small or home office network  
4.2 design a maintenance schedule to support a small or home office network. |
Guidance

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:

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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

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 of 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 the and the services they offer.

If your centre is using a real network to base the design upon, you must consider the legal implications of how this may affect the owners of the real network, as well as for the learner and the academic centre.

Implementation of the SOHO solution must be tested systematically and procedurally based on the technology used in the design solution.
Resources

Books


Employer engagement and vocational contexts

Working with a live system will present many risks that the centre, employer and learner must be aware of. Using a current vocational context to deploy an additional or alternate solution will enhance the learner’s experience and enable understanding of wider technical application.