

Network and hardware engineering



GE 03

January 2024

Network and hardware engineers work on the research, design and development, production, installation, maintenance and support of computer systems. Network and hardware engineers normally require degree-level qualifications. For technical support jobs you usually need at least some GCSEs at good grades (or equivalent) to get started.

Network and hardware engineers

People working in network and hardware engineering are concerned with the electronic communication and information systems used by organisations and individuals. They design systems and take responsibility for ensuring they perform effectively.

Network engineers design, install and maintain networks for organisations, linking computers so that users can communicate, access the same information etc. The organisation's network may be based in one building, in separate offices, or even across several countries. Engineers may also deal with networks that operate between organisations. They decide on the best choice of hardware (e.g. switches, routers etc), take responsibility for the smooth running of the network, and deal with any problems. They build security processes into the design, and make sure that it has sufficient capacity. Network engineers need to understand about network configuration and cloud infrastructure. They may work for a digital consultancy or be directly employed by the organisation using the network.

Hardware engineers research, design and develop computer hardware (the physical components of computer systems) including processing units, screens, keyboards, wireless routers, printers and scanners. This involves working with microchips, circuit boards, electronics, embedded systems etc. Hardware engineers are mainly employed by manufacturers of computers and equipment suppliers. Once components have been designed, other types of engineers work on producing the equipment.

Network and hardware engineers often work in teams that may include, for example, software engineers, systems managers and project managers. Engineers have to regularly update their skills. Depending on their exact job role and employer, network or hardware engineers may be known by other job titles, e.g. **computer engineer** or **network architect**.

Those who become **Incorporated Engineers** are often team leaders. They manage day-to-day operations, and solve production and design engineering problems. **Chartered Engineers** can work at the highest level of research and development, planning, design and management.

Technician-level work

Technicians help to develop, install, maintain and upgrade computer equipment and networks. They set people up on systems and provide support, do routine testing, investigate problems, trace faults and replace parts when necessary. Technicians are employed by manufacturers, by consultancies offering computer systems support, or by large companies that require 24-hour servicing and support. The nature of the work means that they may be on call at nights or over weekends.

Some technicians work as field engineers, organising the installation of equipment on customers' premises, conducting checks after installation and dealing with faults on site. Other technicians are based in workshops or are office-based.

What it takes

Those working in network and hardware engineering need a range of skills and aptitudes, including:

- to be able to think logically about abstract problems
- plenty of patience
- good teamworking and communication skills

- decision-making skills.

Entry requirements

N.B. For more detail on entry to careers in engineering and computing, see the leaflets on *Engineering - qualifications and training* and *Digital careers - an introduction to the work and training*.

Engineer level

For work in research, design and development at this level, higher education qualifications are normally needed. Relevant **degree course** titles include computer networks, network engineering, computer systems engineering, computer engineering, and electronic engineering. For entry to such degree courses you need A levels, normally including maths and a science or technology subject (physics may be required or preferred). Alternative qualifications, such as a relevant BTEC Level 3 National or T level qualification, may be acceptable; you may need a relevant A level alongside. **Check entry requirements with individual institutions, as they do vary.**

Some relevant **HND** and **foundation degree** courses are available. These work-related programmes normally take two years full time or longer part time. With further study it's possible to gain a full honours degree. Again, check entry requirements.

Sandwich courses are available - these include valuable industrial **experience**. You may also be able to gain experience through an internship or company sponsorship (which includes vacation work).

In England, training with an employer may be available through a **Degree Apprenticeship**, e.g. for:

- digital and technology solutions professionals (level 6), which offers a network engineer specialism and leads to a BSc degree
- digital and technology solutions specialists (level 7), which also has a network engineer specialism and leads to an MSc (this is suitable for graduates of relevant subjects)
- embedded electronic systems design and development engineers (level 6), which can provide the basis for specialising as a hardware engineer and leads to an accredited degree in electronics or electrical and electronic engineering.

It's possible for network and hardware engineers to work towards registration as an **Incorporated Engineer (IEng)** or **Chartered Engineer (CEng)** through a professional engineering body, such as **The Institution of Engineering and Technology (IET)**. Details on routes to professional registration can be found in the leaflet on *Engineering - qualifications and training*. Depending on your role, it may be more appropriate to gain **Chartered IT Professional (CITP)** status through the **BCS, The Chartered Institute of IT** - see website under Further Information. Gaining professional status can improve your career prospects.

Technician level

You can train for technician-level work through on-the-job training while in employment. Employers often ask for a few GCSEs at grades 9-4/A*-C (or equivalent) in subjects such as maths, English and computer science, and/or they may look for relevant experience. You may be expected to take an aptitude test.

Training at technician level can be through an **Apprenticeship**. Level 3 and 4 Apprenticeships in IT infrastructure (suitable for hardware and network roles) are available in Wales. In England, Apprenticeships are available for roles such as IT solutions technician at level 3, network cable installer at level 3 and network engineer at level 4.

If you want to continue in full-time education after GCSEs, you could take a course that will help you prepare for entry into the industry, such as one leading to a **BTEC Level 3 National** or **OCR Level 3 Cambridge Technical** qualification in engineering/computer engineering, computing or IT; these may offer relevant options/pathways. The **T level** in digital support services - available in certain schools and colleges in England - has occupational specialisms in digital infrastructure and network cabling. This may provide a suitable background for entry to this area of work or lead to higher education. Check that courses cover areas of interest to you, and find out where they might lead.

Technicians can work towards professional registration as an **Engineering Technician (EngTech)** or **ICT Technician (ICTTech)** through the IET - see website under Further Information.

Further Information

The Institution of Engineering and Technology (IET) - for a list of IET-accredited higher education courses, information about professional registration, job vacancies etc, view:

www.theiet.org/career

BCS, The Chartered Institute for IT:

www.bcs.org

For information on **Apprenticeships** and vacancies, see:

www.apprenticeships.gov.uk

www.careerswales.gov.wales

See the leaflet on ***Engineering - qualifications and training*** for information on activities, events and other engineering careers initiatives, and for links to sites where you can find out more about careers in engineering and employers, and search for internships, graduate opportunities, job vacancies etc.

Related Leaflets

1.14 STEM careers: an overview

D 01 Digital careers - an introduction to the work and training

D 02 Tech and digital support

D 13 Careers in digital systems

G 01 Engineering - qualifications and training

GE 05 Electronics engineering

GE 08 Communications engineering

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