Digital Industries Apprenticeship: Occupational Brief

Infrastructure Technician

January 2017

Digital Industries Apprenticeships: Occupational Brief Level 3 Infrastructure Technician Apprenticeship Minimum Standards and Grading Criteria

This paper defines the minimum requirements for the knowledge, skills and behaviours defined in the standard, which are required for a pass. It also defines the criteria to be used for awarding the grade for merit or distinction. This paper should be read in conjunction with the Standard and Assessment Plan for the Level 4 Software Developer Apprenticeship

Overview of Grading

There are three sets of criteria on which the assessment and grading is made. The three criteria are

The What: what the apprentice has shown they can do,

The How: the way in which the work has been done

The With Whom: The personal and interpersonal qualities the apprentice has brought to all their work relationships

Each of these three criteria has minimum (expected) requirements, which must be satisfied for a pass.

Each of these criteria has a number of dimensions which should be considered to determine if the apprentice is significantly above the minimum (expected) level of quality

The purpose of grading is to differentiate between those apprentices whose work is at the expected level of quality against the totality of the skills, knowledge and behaviours specified in the standard and those whose work is significantly above this expected level

For a pass, <u>each </u>of the three sets of criteria must demonstrate at least <u>the expected (minimum requirement) level </u>of quality

For a merit, t<u>he What has to be significantly above </u>the level of quality and <u>one of either the How or the With Whom has to be significantly above </u>the level of quality expected

For a distinction, <u>each of the three sets of criteria must be significantly above the expected </u>level of quality

The assessor takes a holistic judgement of whether or not their assessments demonstrate that the apprentice is "significantly above the expected level of quality" in each of these three areas and can then determine which grade should be awarded

The what – what the apprentice has shown they can do

Minimum Requirements

The following table shows what the minimum, expected requirements are for a pass on this criteria

Competency Standard	Minimum, expected, requirements for a pass
Communication Works both independently and as part of a team and following the organisations standards; competently demonstrating an ability to communicate both in writing and orally at all levels, using a range of tools and demonstrating strong interpersonal skills and cultural awareness when dealing with colleagues, customers and clients during all tasks.	The apprentice should be able to use a minimum of 3 tools to communicate • Oral • Face-to-face • Remote • Diagrammatic The apprentice should be able to demonstrate and compile three different forms of written professional correspondence. The apprentice must be able to explain 3 types of communication styles to ensure cultural awareness and appropriateness for customer is taken into account.
IT Security Demonstrates the necessary skills and behaviours to securely operate across all platforms and areas of responsibilities in line with organisational guidance, legislation	The apprentice must demonstrate how they comply with organisational security processes and how they would recognised and escalate issues. The apprentice must be able to locate and follow policies and legislation
Remote Infrastructure Effectively operates a range of mobile devices and securely add them to a network in accordance with organisations policies and procedures	The apprentice must demonstrate how to securely connect a minimum of two different types of devices (e.g. laptop/mobile) to access the organisation's network services (e.g. email, files, applications)

Data Effectively records, analyses and communicates data at the appropriate level using the organisation's standard tools and processes and to all stakeholders within the responsibility of the position	The apprentice must be able to select and securely use three appropriate tools when working with and analysing data.
Problem solving Applies structured techniques to common and non-routine problems, testing methodologies and troubleshooting and analyses problems by selecting the digital appropriate tools and techniques in line with organisation guidance and to obtain the relevant logistical support as required	The apprentice must be able to select and use three appropriate tools for testing, troubleshooting and analysing problems. The apprentice must be able to demonstrate compliance with organisational guidance. The apprentice should demonstrate processes and practices for obtaining logistical support.
Workflow management Works flexibly and demonstrates the ability to work under pressure to progress allocated tasks in accordance with the organisation's reporting and quality systems	The apprentice must be able to demonstrate the ability to prioritise workflow and manage allocated tasks. The apprentice must be able to record tasks and comply with organisations quality processes.
Health and Safety Interprets and follows IT legislation to securely and professional work productively in the work environment Understands and applies Health & Safety policies to every day work	The apprentice must be able to demonstrate their interpretation and secure working practices in accordance with IT legislation. The apprentice must demonstrate an understanding and apply Health & Safety policies to every day work.
Performance Optimises the performance of hardware, software and Network Systems and services in line with business requirements	The apprentice must be able to demonstrate how to configure a minimum of three pieces of hardware and configure three different types of software in line with business requirements.
Understands and responds to the correct processes associated with WEEE (the Waste Electrical and Electronic Equipment Directive)	The apprentice must be able to explain how to comply when required with WEEE and the implications of data protection during disposal.

The What – what the apprentice has shown they can do

Criteria for a Merit or Distinction

The following table shows what the apprentices would need to demonstrate to be assessed as significantly above the expected level for what they have done

Dimensions	Description of what significantly above the expected level of quality looks like
Breadth – the range of tools and methods understand and applied	Understands and applies a wide range of tools and methods Accurately and appropriately applies and effectively implements the right tools and methods in a variety of different situations
Depth – the level to which these tools and methods are understood and applied	A capable user - exploits the functionality/capability of the tools and methods Broad understanding of different tools and methods and how and why they can be applied in different contexts
Complexity – the extent and prevalence of inter-related and inter-dependant factors in the work and how well the apprentice has dealt with these	Deals confidently and capably with interrelated and interdependent factors in their work

The how: the way in which the work has been done

The following table shows what the minimum, expected requirements are for a pass on this criteria

Competency Standard	Minimum expected requirements for a pass
Apprentices can demonstrate the full range of skills, knowledge and behaviours required to fulfil their job role	Knows what skills, knowledge and behaviours are needed to do the job well Are aware of their own strengths in the job role, and any areas for improvement Appreciate who else is important, for them to do their job and fulfil the role effectively (e.g. colleagues, managers, other stakeholders) Are aware of potential risks in the job role (e.g. security, privacy, regulatory) Use personal attributes effectively in the role Understand how the job fits into the organisation as a whole
Apprentices can demonstrate how they contribute to the wider business objectives and show an understanding of the wider business environments	Understands the goals, vision and values of the organisation Aware of the commercial objectives of the tasks/ projects they are working on Understands their role in meeting or exceeding customers' requirements and expectations Is in tune with the organisation's culture
Apprentices can demonstrate the ability to use both logical and creative thinking skills when undertaking work tasks, recognising and applying techniques from both.	Logical thinking: • Recognises the conclusion to be reached • Proceeds by rational steps • Evaluates information, judging its relevance and value • Supports conclusions, using reasoned arguments and evidence Creative thinking: • Explores ideas and possibilities • Makes connections between different aspects • Embraces ideas and approaches as conditions or circumstances change
Apprentices can show that they recognise problems inherent in, or emerging during, work tasks, and can tackle them effectively	Problem-solving: • Analyses situations • Defines goals • Contributes to the development of solutions • Prioritises actions • Deals with unexpected occurrences

The How: the way in which the work has been done

Criteria for a Merit or Distinction

The following table shows what the apprentices would need to demonstrate to be assessed as significantly above the expected level for the way in which the work has been done

Dimensions	Description of what significantly above the expected level of quality looks like
Responsibility – the scope of responsibility and level of accountability demonstrated in the apprentices work	Undertakes work that is more complex, more critical or more difficult
	Works independently and takes responsibility
Initiative	Demonstrates an ability to extend or enhance their approach to work and the quality of outcomes
	Doesn't just solve the problem but explores all known options to do it better, more efficiently, more elegantly or to better meet customer needs
Delivery focus – the extent to which the apprentice has shown they can grasp the problems, identify solutions and make them happen to meet client needs	Shows good project management skills, in defining problem, identifying solutions and making them happen
	Demonstrates a disciplined approach to execution, harnessing resources effectively
	Drives solutions – with a strong goal focused and appropriate level of urgency

The with whom: the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Minimum Requirements

The following table shows what the minimum, expected requirements are for a pass on this criteria

	Minimum expected requirements for a pass
Apprentices can manage relationships with work colleagues, including those in more senior roles, customers/clients and other stakeholders, internal or external and as appropriate to their roles, so as to gain their confidence, keep them involved and maintain their support for the task/project in hand Apprentices can establish and maintain productive working relationships, and can use a range of different techniques for doing so.	Managing relationships: • Understands the value and importance of good relationships • Acknowledges other people's accomplishments and strengths • Understands how to deal with conflict • Promotes teamwork by participating Customer/client relationships: • Understands their requirements, including constraints and limiting factors • Sets reasonable expectations • Undersands how to communicate with them in decisions and actions • Interacts positively with them • Provides a complete answer in response to queries ('transparency', 'full disclosure') Stakeholders: • Understands who they are and what their 'stake' is • Prioritises stakeholders in terms of their importance, power to affect the task and interest in it ☐ Agrees objectives
Apprentices can communicate effectively with a range of people at work, one-to-one and in groups, in different situations and using a variety of methods. Apprentices can demonstrate various methods of communication, with an understanding of the strengths, weaknesses and limitations of these, the factors that	Intention/purpose: • Understands the purpose of communicating in a particular situation or circumstance (e.g. inform, instruct, suggest, discuss, negotiate etc.) • Checks that the person/people with whom one is communicating also understand the purpose • Is sensitive to the dynamics of the situation • Is aware of anything that might disrupt the effectiveness of the communication (e.g. status, past history) a. Method:

may disrupt it, and the importance of checking other people's understanding.	• Understands the most appropriate method for the situation • Aware of the limitations of the chosen method, and the possible risks of miscommunication (e.g. ambiguity) • Takes account of the affective dimensions of the method (e.g. body language, tone of voice, eye contact, facial expression etc.) b. Execution: • Expresses self clearly and succinctly, but not over-simplifying • Checks that the other person/people understand what is being expressed • Takes account of the potential barriers to understanding (e.g. filtering, selective perception, information overload) • Modifies the purpose and methods of communication during a situation in response to cues from the other person/people

The With Whom: the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Criteria for Merit or Distinction

The following table shows what the apprentices would need to demonstrate to be assessed as significantly above the expected level for the personal and interpersonal qualities the apprentice has brought to internal and external relationships

Dimensions	Description of what significantly above the expected level of quality looks like
Scope and appropriateness – the range of internal and external people and situations that the apprentice has engaged appropriately and effectively with	Internally – works alone, 1:1, in a team and with colleagues at all levels Externally – works with customers, suppliers and partners in a variety of situations Reads situations, adapts behaviours, and communicates appropriately for the situation and the audience
Reliability – the extent to which they perform and behave professionally	Can be trusted to deliver, perform and behave professionally, manages and delivers against expectations, proactively updates colleagues and behaves in line with the values and business ethics
A role model and exemplar to others	Actively works with others and leads by example

Annex: Infrastructure Technician: Knowledge and Understanding

Knowledge and Understanding is assessed on programme through Knowledge Modules and Vendor or Professional Qualifications

Knowledge Module 1: Networking and Architecture (for Level 3 Infrastructure Technician Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Working knowledge of: a range of cabling and connectivity, the various types of antennas and wireless systems and IT test equipment	a) Understand and identify Ethernet, Coaxial, Fibre optic and RJ 45 connector b) Understand and identify a range of Cat 1-6 cables c) Understand and identify Directional, Omni directional, point to point, point to multi point, mobile antennas Understand d) the types of wireless systems e) Understand the relevant test equipment associated with each element of the above
Understands maintenance processes and applies them in working practices	a) Understands the requirements for managing maintenance work order records b) Understands how to respond to real time system down times for maintenance order requests. c) Understand how to undertake short notice tasking requests d) Understand how to record all maintenance tasking through a job card system of control e) Understand maintenance tools f) Understand, configure and manage updates g) Understand how to manage local storage h) Understand how to monitor system performance
Understands and applies the basic elements and architecture of computer systems and business IT architecture	a) Understand the basic architecture of "computer systems" b) Understand business IT architecture, taking into account the full range of devices: OS, applications, databases, servers, networking, security and services
Understands where to apply the relevant numerical skills e.g Binary	a) Understanding of Internet Protocol addresses and how they work b) Understand how computers see IP addresses c) Understand and be able to use binary arithmetic and create large numbers from groups of binary units or bits

Understands the relevant networking skills necessary to maintain a secure network	a) Understanding of Platforms and Data Communications
	b) Understanding of the requirements to configure IP settings
	c) Understanding how to deploy and configure DNS service
	d) Understanding of how to create and configure virtual networks
	e) Understanding how to configure/ support networking settings and connectivity
	f) Understanding how to configure/ support and maintain network security
	g) Understanding how to configure/ support remote management systems
	h) Understand why and how to install domain controllers
	i) Understand the need for creating and managing Active Directory users and computers
	j) Understand how to create and manage Active Directory groups and organizational units (OUs)

The following Vendor or Professional Certifications exempt apprentices from this knowledge module

CCNA 1*

MTA Network Fundamentals

Network +*

A +

CIW Network Technology Associate*

* Or their direct replacement

Knowledge Module 2: Mobile and Operating Systems (for Level 3 Infrastructure Technician Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understands the similarities, differences and benefits of the current Operating Systems available	a) Understanding of different platforms b) Understands the process for constructing PCs with applied Software utilised c) Understands and is able to apply knowledge to various operating systems with installations required for end to end testing. d) Understand native applications and tools e) Understands security principles associated with different platforms and operating systems
Understands how to operate remotely and how to deploy and securely integrate mobile devices	a) Undertakes a Data Network Deployed Exercise to implement and deploy remote and mobile communications technology b) Understands Secure Communications Interfaces for mobile connectivity c) Understand mobility d) Understand remote management and assistance e) Understands security in mobile devices f) Understanding of configuration for: - support remote access/ connections - support mobility options - support security for mobile devices

The following Vendor or Professional certifications exempt apprentices from this knowledge module

CCNA Security*

MCP Managing and Maintaining Windows 8*

MCP Configuring Windows 8*

MTA Mobility and Devices

Fundamentals*

Security +

Mobile +

CIW Internet Business Associate

CIW Mobile Application Development

*Or their direct replacement

Knowledge Module 3: Cloud Services (for Level 3 Infrastructure Technician Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understanding and working knowledge of Cloud and Cloud Services	a) Understand how to create and configure virtual machines b) Understand hosted applications, such as: email, server, storage, desktops c) Understand and explain provision tenants d) Understand how to configure secure passwords and management of passwords e) Understand how to manage user and security groups and/or cloud identities and their importance f) Understand how to configure DNS records for services g) Understand how to enable client connectivity to Cloud Service
Understands the importance of disaster recovery and how a disaster recovery plan works and their role within it	a) Understand backup and recovery methods b) Understand what a Disaster recovery plan is and where it can be found c) Understand their role within the disaster recovery plan d) Understand what should be in a recovery plan e) Understand how and when it should be practiced or tested f) Understand how to implement and configure system recovery g) Understand how to configure file recovery

The following Vendor or Professional certifications exempt apprentices from this knowledge module

MTA Server Admin*

Enabling Office 365 Services

Enabling Office 365 Identities and Requirements

MTA Could Fundamentals

Install, Configure Windows Server

2012*

Administration of Windows Server

2012*

Configure Advanced Windows Server 2012 Services*

*Or their direct replacement

Knowledge Module 4: Coding and Logic (for Level 3 Infrastructure Technician Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understands the similarities and differences between a range of coding and logic	a) Understand working/scripting at command line: particularly when supporting any server work b) Understand and recognise different coding and language c) Understand application life cycle management d) Understand algorithms and data structures e) Understand web page development

The following Vendor or Professional certifications exempt apprentices from this knowledge module

MTA Software Development Fundamentals

App Development

Knowledge Module 5: Business Processes (for Level 3 Infrastructure Technician Apprenticeships)

The Knowledge Standards	Definition of the Minimum Requirements
Understands and complies with business processes	a) Understanding of Security Operating Procedures b) Understanding and ability to work confidentiality c) Understanding of how to work within the Company Operating Procedures d) Understanding and ability to comply with Data Protection

Working knowledge of business IT skills relevant to the organisation	a) Understanding of company IT requirements b) Understanding of company IT systems and platforms c) Understanding of company IT business required skills d) Understand software life cycles Understanding of desktop applications, messaging systems, document management

The following Vendor or Professional certifications exempt apprentices from this knowledge module

CIW Internet Business Associate

ITIL Foundation Level