

INFORMATION AND COMMUNICATION TECHNOLOGY

IT Network Systems Administration



WorldSkills Occupational Standards

WorldSkills Occupational Standards (WSOS)

Occupation description and WSOS

The name of the occupation is

IT Network Systems Administration

Description of the associated work role(s) or occupation(s)

An IT Network Systems Administrator works in small or large organizations in the commercial and public sectors, offering a wide range of IT services which are critical for the operation of daily business. Any 'downtime' is costly for an organization therefore the IT Network Systems Administrator has a responsibility to work professionally and interactively with users in order to meet their needs and ensure continuance of the systems and service levels they require to perform their roles effectively. The IT Network Systems Administrator also offers advice and guidance on the development of systems and services to take the organization forward.

The IT Network Systems Administrator works in diverse environments including network operations centres, internet service providers, data centres, e.g. Amazon and climate-controlled server rooms. He or she offers a wide range of services based on user support, troubleshooting, design, installation/upgrading, and configuration of operating systems and network devices.

The IT Network Systems Administrator may at some stage in their career specialize in user support, design, installation of operating systems or configuration of networking devices. Irrespective of this, work organization and self-management, communication, and interpersonal skills, problem-solving, a dedication to research/keeping up to date with industry developments and a consistently methodical and investigative approach are the universal attributes of the outstanding IT Network Systems Administrator.

In a mobile labour market, the IT Network Systems Administrator may work in teams, or alone, or both from time to time. Whatever the structure of the work, the trained and experienced IT Network Systems Administrator takes on a high level of personal responsibility and autonomy. From ensuring businesses remain consistently in operation, with limited IT systems breakdowns, to contributing to the design of new systems, every process matters and mistakes cost the business money.

With the fast globalization of IT systems and the international mobility of people IT Network Systems Administrators face rapidly expanding opportunities and challenges. For the talented IT Network Systems Administrator there are many commercial, public sector and international opportunities; however, these carry with them the need to understand and work with diverse cultures, and to keep up to date with fast changing industry developments. The diversity of skills associated with IT network systems administration is therefore likely to expand.

General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business (www.worldskills.org/WSOS).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

WorldSkills Occupational Standards

Section	Relative importance (%)
1 Work organization and management	5

The individual needs to know and understand:

- Health and safety legislation, obligations, regulations, and documentation
- The situations when personal protective equipment (PPE) must be used, e.g. for ESD (electrostatic discharge)
- The ability to seek assistance from peers when lacking in experience or knowledge in a particular area
- The importance of integrity and security when dealing with user equipment and information
- The importance of safe disposal of waste for re-cycling
- The techniques of planning, scheduling, and prioritizing
- The significance of accuracy, checking, and attention to detail in all working practices
- The importance of methodical working practices
- Collaboration and research methods and techniques
- The value of managing own continuing professional development
- The speed of IT systems change and the need to maintain currency

The individual shall be able to:

- Follow health and safety standards, rules, and regulations
- Maintain a safe working environment
- Identify and use the appropriate Personal Protective Equipment for ESD
- Select, use, clean, maintain, and store tools and equipment safely and securely
- Plan the work area to maximize efficiency and maintain the discipline of regular tidying
- Regularly schedule, re-schedule, and multi-task according to changing priorities
- Work efficiently and check progress and outcomes regularly
- Undergo various certification requirements, such as: Cisco, Microsoft, and Linux, specializing in at least one specific area
- Keep up-to-date with “license to practice” requirements and maintain currency
- Demonstrate thorough and efficient research methods to support knowledge growth
- Demonstrate enthusiasm to try new methods, systems, and embrace change
- Collaborate with work colleagues effectively to maximize efficiency and learning
- Work effectively as a member of a project team

Section	Relative importance (%)
2 Communication and interpersonal Skills	10

The individual needs to know and understand:

- The importance of listening as part of effective communication
- The roles and requirements of colleagues and the most effective methods of communication
- The importance of building and maintaining productive working relationships with colleagues and managers
- Techniques for effective teamwork
- Techniques for resolving misunderstandings and conflicting demands
- The process for managing tension and anger to resolve difficult situations

The individual shall be able to:

- Demonstrate strong listening and questioning skills to deepen understanding of complex situations
- Manage consistently effective verbal and written communications with colleagues
- Recognize and adapt to the changing needs of colleagues
- Pro-actively contribute to the development of a strong and effective team
- Share knowledge and expertise with colleagues and develop a supportive learning culture
- Effectively manage tension/anger and give individuals confidence that their problems can be resolved

3 User support and consultancy	10
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The individual needs to know and understand:

- The features of a defined range of IT systems to enable a good breadth of support
- Planning and scheduling techniques to facilitate a consistently high level of service, to meet the needs of the user and the organization
- Different demonstration and presentation techniques to support the development of users' skills and knowledge
- Different methods of assessing user's abilities in order to support immediate needs and encourage personal development
- Coaching techniques to meet individual learning styles
- Trends and developments in the industry and types of improvement which could be introduced to the user
- Negotiation techniques for different situations e.g. a project tender

Section	Relative importance (%)
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The individual shall be able to:

- Pro-actively maintain currency of IT systems knowledge
- Respond appropriately within target timescales, to users within an organization and those based remotely, in order to provide the appropriate level of IT support
- Plan, schedule, prioritize and regularly re-prioritize requests for IT support in order to meet and balance the needs of the individual and the organization
- Accurately determine user requirements and effectively manage expectations
- Produce a cost and time estimate for work to be completed
- Select appropriate demonstration techniques to suit different levels of experience/capability
- Effectively demonstrate IT systems to individuals and teams to enable them to grow their skills and knowledge
- Successfully coach individuals “face-to-face” and remotely to resolve IT problems, introduce new products and develop their skills and knowledge
- Recognize opportunities to contribute ideas to improve the product and overall level of user satisfaction
- Provide accurate up-to-date advice on up-grading and sourcing new IT products and services to support decision-making
- Translate needs, making recommendations which meet requirements e.g. budgets
- Contribute to bids and tenders for projects

4 Troubleshooting	25
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The individual needs to know and understand:

- The importance of a calm and focused approach in solving a problem
- The significance of IT systems and the dependency of individuals and organizations on its constant availability
- The common types of hardware/software errors which can occur
- Diagnostic and analytical approaches to problem solving
- Boundaries of own knowledge/skills/authority and sources of support/escalation procedures
- Standard resolution times for common problems

Section	Relative importance (%)
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The individual shall be able to:

- Approach a problem with the appropriate level of confidence to calm the user as necessary
- Check work regularly to prevent/minimize problems at a later stage
- Challenge incorrect information to prevent/minimize problems
- Demonstrate resilience and persistence when dealing with problems
- Recognize and understand problems swiftly and follow a self-reliant and managed process for resolving
- Thoroughly investigate and analyse complex problems/situations and apply fault finding processes
- Select and use diagnostic software and tools to identify problems
- Support users in resolving problems through advice, guidance, and instruction
- Seek support when further expertise is necessary and avoid temptation to 'be consumed' by the challenge of the problem
- Check user satisfaction level after a problem has been addressed
- Accurately record problem and provide resolution report

5	Design	5
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The individual needs to know and understand:

- Network environments and topologies
- Logical and functional diagrams
- The types and location requirements of active network devices e.g. routers and switchers
- Security options and their impact
- Address schemes
- Configuration documentation required e.g. installation instructions

The individual shall be able to:

- Discuss the technical design requirements for operating systems and networking devices at the appropriate level of responsibility and accountability within the client organization
- Give knowledgeable/best advice and possible solutions to customer to meet technical and security requirements
- Match budget/resource restraints with best possible client solutions
- Accurately transfer the customer wishes to a logical diagram
- Prepare configuration documentation
- Undertake pre-acceptance testing of the concept
- Prepare a document and get sign off

Section	Relative importance (%)
6 Install, up-grade, and configure operating systems	25

The individual needs to know and understand:

- The range of operating systems and their abilities to match particular user requirements, given the user budget requirements
- The process for selecting the appropriate driver for different kinds of hardware
- The basic functions of the hardware and the process for setting-up
- The importance of following instructions and the consequences/costs of not adhering to them
- The precautions that need to be actioned before an installation or an up-grade
- The purpose of documenting the completion of the installation or up-grade

The individual shall be able to:

- Closely listen, translate, and accurately identify user needs to ensure expectations are met
- Select the operating system: proprietary/open source, total cost of ownership in relation to customer resources
- Accurately identify the hardware and appropriate software driver required to match user/manufacturers specifications
- Consistently check manufacturers guidance for up-grading regarding "workflow"
- Select the roles and/or features of the operating/server system e.g. Active Directory Domain Services (role) and Window Server Back-up (feature)
- Discuss the proposed solution for role/feature and agree with relevant parties e.g. users, colleagues, and managers
- Prepare a technical document reflecting the solution in detail for agreement and sign-off
- Configure the appropriate role/feature following manufacturer's instructions or best practice within the organization
- Test and rectify any problems and re-test as appropriate
- Gain user acceptance and record

Section	Relative importance (%)
7 Configuring networking devices	20

The individual needs to know and understand:

- Networking environments
- Networking protocols e.g. IPv6
- Implement networking services as required by customer
- The process for building a network and how network devices can be configured to enable efficient communication
- The range of network devices e.g. routers, VoIP, IP devices e.g. security cameras, printers, wireless access points, and inter- networking connectivity
- Precautions which need to be taken to avoid issues arising from changing network configuration on operational equipment
- The importance of documenting the (rationale for as well as all) final configuration settings

The individual shall be able to:

- Interpret user demands and design requirements to industry certification requirements
- Work with other team members and follow required procedures to achieve successful configuration
- Select appropriate services to meet customer requirements
- Apply all types of different configurations, including software and hardware upgrades, on all kinds of networking devices that can appear in a network environment to include: Routing protocols, Network Security, Wi-Fi, VoIP, etc.
- Design and implement disaster recovery procedures
- Discuss the proposed solution for role/feature and agree with relevant parties e.g. users, colleagues, and managers
- Maintain configuration records

Total	100
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References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/>) ILO 3115
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O*NET OnLine (www.onetonline.org/)

This WSOS appears most closely to relate to *Network and Computer Systems Administrators*:
<https://www.onetonline.org/link/summary/15-1142.00>

and *ICT Network Technician*:

<http://data.europa.eu/esco/occupation/64c7d461-152c-477f-a8e2-c2c537e9d617> ILO 3513

Adjacent occupations can also be explored through these links.

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2022.

Organization	Contact name
Ridgeon Network (United Kingdom)	Jordan Reynolds, IT Systems Engineer
Huawei Technologies Co., Ltd. (Global)	Zeng Xudong, Director of Huawei Authorized Learning Partner Business/PM of Huawei ICT Competition