IT Network Systems Administration

Technical Description

WorldSkills Armenia (the stage of the national competition), by a resolution of the Competitions Committee and in accordance with the Constitution, the Standing Orders, and the Competition Rules, has adopted the following minimum requirements for this skill for the WorldSkills Competition.

The Technical Description consists of the following:

1 Introduction

1.1 Name and description of the skill competition

1.1.1 The name of the skill competition is

IT Network Systems Administration

1.1.2 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. 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 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.

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.

1.1.3 Number of Competitors per team

IT Network Systems Administration is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 21 years in the year of the Competition.

1.2 The relevance and significance of this document

This document contains information about the standards required to compete in this skill competition, and the assessment principles, methods and procedures that govern the competition.

Every and Competitor must know and understand this Technical Description.

In the event of any conflict within the different languages of the Technical Descriptions, the English version takes precedence.

2 The Marking Scheme

2.1 General guidance

This section describes the role and place of the Marking Scheme, how the Chairman and Members of the Committee will assess Competitors' work as demonstrated through the Test Project, and the procedures and requirements for marking.

The Marking Scheme is the pivotal instrument of the WorldSkills Armenia Competition, in that it ties assessment to the standard that represents each skill competition, which itself represents a global occupation. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Standards.

By reflecting the weightings in the Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill competition and its assessment needs, it may initially be appropriate to develop the Marking Scheme in more detail as a guide for Test Project design. Alternatively, initial Test Project design can be based on the outline Marking Scheme. From this point onwards the Marking Scheme and Test Project should be developed together.

For integrity and fairness, the Marking Scheme and Test Project are increasingly designed and developed by one or more independent people with relevant expertise. In these instances, the Marking Scheme and Test Project are unseen by Competitor until immediately before the start of the skill competition, or competition module. Where the detailed and final Marking Scheme and Test Project are designed by Expert (Chairman of the Committee), they must be approved by the whole Members of the Committee prior to submission for independent validation and quality assurance.

The Expert and Members of the Committee are required to submit their Marking Schemes and Test Projects for review, verification, and validation well in advance of completion.

2.2 Assessment Criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived before, or in conjunction with, the Test Project. Whether or not the headings match, the Marking Scheme as a whole must reflect the weightings in the Standards.

Assessment Criteria are created by the person or people developing the Marking Scheme, who are free to define the Criteria that they consider most suited to the assessment and marking of the Test Project. *The Assessment Criteria, the allocation of marks, and the assessment methods, should not be set out within this Technical Description. This is because the Criteria, allocation of marks, and assessment methods all depend on the nature of the Marking Scheme and Test Project, which is decided after this Technical Description is published.* The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria and Sub Criteria.

2.3 Sub Criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a WorldSkills Armenia marking form. Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement, or both measurement and judgement.

Each marking form (Sub Criterion) specifies both the day on which it will be marked, and the identityof the marking team.

2.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked, together with the marks, anddetailed descriptors or instructions as a guide to marking. Each Aspect is assessed either by measurement or by judgement.

2.5 Assessment and marking

There is to be one marking team for each Sub Criterion, whether it is assessed and marked by judgement, measurement, or both. The same marking team must assess and mark all Competitors. Where this is impracticable (for example where an action must be done by every Competitor simultaneously, and must be observed doing so), a second tier of assessment and marking will be putin place, with the approval of the Competition Committee Management Team. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances.

2.6 Assessment and marking using judgement and measurement

Judgement uses a scale of 0-3. To apply the scale with rigour and consistency, judgement must beconducted using:

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts or separateguidance notes)
- the 0-3 scale to indicate:
  - 0: performance below industry standard
  - 1: performance meets industry standard
  - 2: performance meets and, in specific respects, exceeds industry standard
  - 3: performance wholly exceeds industry standard and is judged as excellent

The Competition Committee will judge each Aspect, normally simultaneously, and record their scores. They also act as a judge when required to prevent compatriot marking.

Normally the Competition Committee will be used to assess each aspect. In some circumstances the team may organize itself as two pairs, for dual marking. Unless otherwise stated, only the maximum mark or zero will be awarded. Where they are used, the benchmarks for awarding partial marks will be clearly defined within the Aspect. To avoid errors in calculation or transmission, the Competition Committee provides a large number of automated calculation

options, the use of which is mandated.

2.7 The use of measurement and judgement

Decisions regarding the choice of criteria and assessment methods will be made during the design of the competition through the Marking Scheme and Test Project.

2.8 Skill assessment strategy

WorldSkills Armenia is committed to continuous improvement. This particularly applies to assessment. The SMT is expected to learn from past and alternative practice and build on the validity and quality of assessment and marking.

The module groups of Expert and Competition Committee will decide on the marking criteria for their own module.

The following is not a definitive list but is an example of possible aspects that are assessed:

- RAID one mirrors exist;
- Five SCSI Hard disk detected;
- Second hard disk contains two partitions;
- Both 10GB in size, formatted and ready to use no DNS timeout;
- Backup includes drive D;
- Backup includes system state;
- Backup includes/usr/local or files representing it;
- Backup schedule show one full backup per week and differential on other days;
- Above scheduled for 12pm every day;
- Linux install completed;
- DNS forwarder set to Linux;
- All DNS root hints cleared;
- DHCP Range created and correct;
- Default gateway 192.168.1.1;
- DNS 192.168.1.2;
- DHCP Lease time two days;
- Domain in 2003 Native Mode;
- RDWeb installed;
- RDWeb only listen/respond on VPN range;
- RRAS setup and set to VPN server. Printouts/Scripts;
- Postfix/Outlook receive Mails;
- Folder redirection for "My Documents";
- PPP with Chap authentication;
- IP Phone Calls Remote.

3 The Test Project

3.1 General notes

The Test Project will enable the assessment of the applied knowledge, skills, and behaviours set out in each section of theWSOS.

The purpose of the Test Project is to provide full, balanced, and authentic opportunities for assessment and marking across the Standards, in conjunction with the Marking Scheme. The relationship between the Test Project, Marking Scheme, and Standards will be a key indicator of quality, as will be its relationship with actual work performance.

The Test Project will not cover areas outside the Standards, or affect the balance of marks within the Standards. This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standards.

The Test Project will enable knowledge and understanding to be assessed solely through their applications within practical work. The Test Project will not assess knowledge of WorldSkills rules and regulations.

Most Test Projects (and Marking Schemes) are designed and developed either by the Skill Competition Expert, Manager, or an Independent Test Project Developer. They are subject to independent review, verification, and validation.

The information provided below will be subject to what is known at the time of completing thisTechnical Description, and the requirement for confidentiality.

Please refer to the current version of the Competition Rules for further details.

3.2 Format/structure of the Test Project

3.2.1. Format of the Test Project if developed by module teams

Period	Module	Tasks
Module A	Client Server Environment	Installation, configuration, andupgrading
Module B	Networking Environment	Installation, configuration, andupgrading
Module C	IoT, DevOps & Programmability Environment	Installation, configuration, andupgrading
Module D	Troubleshooting & Secret Challenges	-

3.2.2. Format of the Test Project if developed by an Independent Test Project Designer

Period	Module	Tasks
Module 1	Work organization and management	See section 1 at 2.2 WorldSkills Standards Specification
Module 2	Communication and interpersonal Skills	See section 2 at 2.2 WorldSkills Standards Specification
Module 3	User support and consultancy	See section 3 at 2.2 WorldSkills Standards Specification
Module 4	Troubleshooting	See section 4 at 2.2 WorldSkills Standards Specification
Module 5	Design	See section 5 at 2.2 WorldSkills Standards Specification
Module 6	Install, up-grade, and configure operating systems	See section 6 at 2.2 WorldSkills Standards Specification
Module 7	Configuring networking devices	See section 7 at 2.2 WorldSkills Standards Specification

Test Project design requirements

Each Test Project module must be:

- At a level of difficulty that a competent Competitor may expect to deal with in normal circumstances;
- With scope and range that Competitors trained at least to the equivalent of the following certification may expect to recognize as within their capability and potential.
- Cisco Certified Network Associate (CCNA) R&S;
- Cisco Certified Network Associate (CCNA) Security;
- Cisco Certified Network Associate (CCNA) Collaboration;
- Microsoft Certified Solutions Expert (MCSE): Mobility Infrastructure;
- Microsoft Certified Solutions Expert (MCSE): Core Infrastructure;
- Advanced Level Linux Certification LPIC-2 or equivalent skill set;
- PCAP – Certified Associate in Python.

(Please note that this list is purely indicative, since the Marking Scheme and Test Project must reflect current best practice in IT, as expected of an IT Systems Network Administrator.)

Notes:

Whenever a certification is replaced by a newer and equivalent one, we will use the oldest certification for which an exam can still be taken on C1.

All certification levels and names are discussed, revised, voted, and finally decided by Experts on the WorldSkills Armenia Competitions Committee prior to the CPW (Competition Preparation Week) for the upcoming next National Skills Competition.

Designed using a standard cover sheet for each section on the WorldSkills Armenia template available on the website;

Self-explanatory requiring minimal translation (Competitor instructions containing a minimum of text);

Each Test Project should have a detailed physical topology image followed by a detailed logical topology image;

Be accompanied by a Marking Scheme that is finalized at the Competition in accordance with the Technical Description;

All operating systems and other software used in the Competition are to be in English language versions.

All software used in the Test Project must be clearly identified, including the source to download it, when the Test Project is made public and at the same time, a repository of this software must be created and made public, including the respective integrity hashes.

3.3 Material or manufacturer specifications

Details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These such items may include those for fault finding modules or modules not circulated.

The Infrastructure List could include the requirement for a total virtualization environment to be built, tested, and managed on site by an external company (or sponsor) with someone onsite during competition time in that case.

The Competition Organizer should provide US keyboard for all PCs.

4 Materials and equipment

4.1 Infrastructure List

The Infrastructure List details all equipment, materials, and facilities provided by the Competition Organizer.

The Infrastructure List specifies the items and quantities requested by the Skill Management Team for the next Competition. The Competition Organizer will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items. Note that in some cases details of specific materials and/or manufacturer specifications may remain secret and will not be released prior to the Competition. These such items may include those for fault finding modules or modules not circulated.

At each Competition, the Skill Management Team must review and update the Infrastructure List in preparation for the next Competition. The Skill Competition Manager must advise the Director of Skills Competitions of any increases in space and/or equipment.

At each Competition, the Technical Observer must audit the Infrastructure List that was used at that Competition.

The Infrastructure List does not include items that Competitors and/or Experts are required to bring and items that Competitors are not allowed to bring – they are specified below.

4.2 Competitors toolbox

Competitors are not allowed to send a toolbox to the Competition. All tools are provided by theCompetition Organizer.

4.3 Materials, equipment, and tools supplied by Competitors

It is not applicable for the IT Network System Administration skill competition for Competitors to bring materials, equipment, and tools to the Competition. However, Competitors are allowed to bring three (3) keyboards and three (3) mouse.

4.4 Materials, equipment, and tools supplied by Experts

Experts are not required to bring materials, equipment, or tools. All is supplied by the Competition Organizer.

4.5 Materials and equipment prohibited in the skill area

Regarding the use of electronic equipment within the competition area. Devices such as tablet, cell phones, media players, recorders, etc. are to follow WSI rules and/or by the SMT presented rules forthe actual Competition.