Technical Description

Cloud Computing

Information and Communication Technology

worldskills

WorldSkills International, 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:

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Stefan Praschl
Chair of the Competitions Committee

Michael Fung
Vice Chair of the Competitions Committee

1 INTRODUCTION

1.1 NAME AND DESCRIPTION OF THE SKILL COMPETITION

1.1.1 The name of the skill competition is

Cloud Computing

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

The positions responsible for the design and implementation of information technology infrastructure in a public cloud environment can span multiple roles including, Systems Administrators/Engineers, Database Administrators, Network Administrators/Engineers, Storage Administrators/Engineers, Systems/Network/Solutions/Enterprise Architects, programmers/developers, and similar technology-driven roles which shoulder the business and functional responsibilities for architecting infrastructure design. Due to the ever-expanding features and capabilities of public cloud providers, this list of associated infrastructure specialists is also expanding.

Infrastructure Architects are responsible for the overall design and direction for system and application deployments. These architects have traditionally created designs that have spanned multiple office locations as well as corporate and collocated data centres. With the growing prevalence of public cloud deployments, they have added IaaS (Infrastructure as a Service) opportunities to their list of deployment tools. This allows these technology specialists to work towards migration solutions, offsite storage solutions, dynamic resource elasticity, and other design paradigms to create solutions that best fit the needs of each organization.

Systems Administrators/Engineers are able to utilize public cloud providers in order to automate, expand, streamline, simplify, and accelerate their deployment models. Utilizing their experience in automation, these technologists can programmatically deploy infrastructure using the command line, language-specific SDK integrations, and infrastructure templating capabilities. This group is able to manage their technology footprint through the use of managed services to offload the administration of tasks such as managing a centralized activity logging by defining permissions and recording events. The ability to define a solution and then replicate that design to multiple environments and locations can be a significant responsibility of the position along with managing the integration of cloud computing offerings into existing technology solution sets.

Database Administrators are increasingly engaging with public cloud providers as it gives them greater control over the details of their deployments. They are able to utilize resources on demand rather than waiting for resources from other departments. Additionally, they can use the advanced features of cloud providers such as managed database services for caching, relational databases, and NoSQL data solutions.

Storage Administrators gain the flexibility to scale their storage needs without concern for hardware availability or capital expense. Using multiple storage offerings from cloud vendors, storage-related technology specialists can build solutions that best fit their storage needs using the tools provided by their vendor, or solutions from the vendor's 3rd party partners to deliver scalable, highly available primary and disaster recovery storage solutions. Implementing backups, deploying shared and clustered storage solutions, system snapshots, and data migrations are just a few examples of activities that can be automated via multiple programming languages using public cloud vendors and 3rd party partner solutions.

1.1.3 Number of Competitors per team

Cloud Computing is a single Competitor skill competition.

1.1.4 Age limit of Competitors

The Competitors must not be older than 25 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 Expert 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.

1.3 ASSOCIATED DOCUMENTS

Since this Technical Description contains only skill-specific information it must be used in association with the following:

- WSI – Competition Rules
- WSI – WorldSkills Standards Specification framework
- WSI – WorldSkills Assessment Strategy
- WSI Online resources as indicated in this document
- WorldSkills Health, Safety, and Environment Policy and Regulations

2 THE WORLDSKILLS STANDARDS SPECIFICATION (WSSS)

2.1 GENERAL NOTES ON THE WSSS

The WSSS 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/WSSS).

The skill competition is intended to reflect international best practice as described by the WSSS, and to the extent that it is able to. The Standards Specification 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 Standards Specification 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 Specification. This is often referred to as the "weighting". The sum of all the percentage marks is 100.

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

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

2.2 WORLDSKILLS STANDARDS SPECIFICATION

SECTION		RELATIVE IMPORTANCE (%)
1	**Work organization and management**	**10**
	The individual needs to know and understand: • The relationships between different technologies and areas of expertise used in a public cloud deployment. • Interoperability requirements for each aspect of a systems deployment within a public cloud provider. • The requirements of each group of stakeholders in the design of an IT solution using public cloud services. • Methods of Integrating an organization's best practices and public cloud offerings to create application-specific deployments. • Methods of evaluating, comparing and contrasting the wide range of possible solutions for each IT implementation • Methods of determining which solution is optimal for each organization taking into account internal best practices, business requirements, existing infrastructure, and resource expertise.	
	The individual shall be able to: • Identify common deployment models with public cloud providers and how those models can apply to organization-specific requirements. • Identify opportunities and create migrations plans to phase-in public cloud deployments and reduce risks. • Create highly available, scalable, and secure IT architectural designs specific to each application, taking into account compute, storage, networking, database management, and deployment requirements. • Take advantage of public cloud provider solutions to reduce operational burden associated with service deployments.	
2	**Communication and interpersonal skills**	**10**
	The individual needs to know and understand: • How to communicate across organizational teams to identify infrastructure requirements and architectural opportunities. • How to engage with business units to identify best practices for deployment and create a migration path to the public cloud. • Methods and techniques for working with business stakeholders in meeting organizational and compliance related goals. • The bases for creating department and team-specific infrastructure designs that take advantage of public cloud capabilities and value-add services.	

9 SKILL-SPECIFIC RULES

Skill-specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from skill competition to skill competition. This includes but is not limited to personal IT equipment, data storage devices, internet access, procedures and work flow, and documentation management and distribution.

TOPIC/TASK	SKILL-SPECIFIC RULE
Use of technology – USB, memory sticks	• Experts – Experts are allowed to bring USB/memory sticks into the Expert Meeting Room. USB/memory sticks will be allowed to be taken outside of the meeting room at the end of each day. Competitors – Competitors are not allowed to bring USB/memory into the workshop.
Use of technology – personal laptops	• Experts – Experts are allowed to bring laptops into the Expert Meeting Room. Laptops will be allowed to be taken outside of the meeting room at the end of each day. • Competitors – No laptops are allowed in the workshop.
Use of technology – personal cameras	• Experts – Experts are allowed to bring cameras into the Expert Meeting Room. Cameras will be allowed to be taken outside of the meeting room at the end of each day. • Competitors – No cameras are allowed in the workshop until the completion of competition on day four.
Use of technology – mobile devices	• Experts – No electronic devices are to be brought to any Competitors workstations under any circumstances unless with the approval of either the Chief or Deputy Chief Experts. • Competitors – Electronic devices (Including mobile phones) must stay in Competitor bags (switched off or on silent) within the lockers provided. No electronic devices are to be brought to Competitors workstations under any circumstances unless with the approval of either the Chief or Deputy Chief Experts.
Source file/notes	• Competitors – No notes may be brought into the workshop under any circumstances. All notes made at the Competitor workstation must remain on the Competitors desk at all times. No notes may be taken outside of the workshop.
Equipment failure	• Competitors – In the occurrence of equipment failure Competitors must notify Experts immediately by raising their hand. Experts will take note of the time that the Competitor is not able to make use of their equipment. Any time lost due to equipment failure will be provided to the Competitor at the end of the standard Module time. • No additional time will be granted for work not saved prior to the equipment failure.
Final Test Projects	• Competitors - Final Test Projects for all Competitors will be backed up and made available to all Competitors at the conclusion of the competition.

TOPIC/TASK	SKILL-SPECIFIC RULE
Music	• Competitors - Competitors will be allowed to supply on Familiarization Day a memory stick containing a maximum of 20 un-edited songs. In addition to the memory stick, Competitors may also supply a maximum of three original music CDs. All music will be collated and shared amongst all Competitors.
Familiarization Day	• Competitors - During Familiarization Day Competitors cannot use the available time to work on or solve any tasks related to the Competition. Prior to completing Familiarization all Competitors need to clean their respective computers removing all the files created/used to test the software. This includes the removal of all databases which have been created.
Breaks	• Competitors - No extra time will be given to Competitors who stop work during competition time to go to the bathroom or for those who break for a food and/or drink. When time is completed all Competitors must stop all work on their computer immediately.

10 VISITOR AND MEDIA ENGAGEMENT

Following is a list of possible ways to maximize visitor and media engagement:

- Two mirrored monitors displayed for the public to view Competitors screens;
- Display screens showing a presentation on what competitors are currently working on;
- Enhanced understanding of Competitor activity;
- Career opportunities.

11 SUSTAINABILITY

This skill competition will focus on the sustainable practices below:

- Recycling – No printing for Competitor workstations;
- No printing of Test Projects. Test Projects will be provided within media files;
- Use of completed Test Projects after Competition;
- Limit the amount of software to be installed on Competitor workstations;
- Open source software.

12 REFERENCES FOR INDUSTRY CONSULTATION

WorldSkills is committed to ensuring that the WorldSkills Standards Specifications 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 Standards Specification 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/)
- ESCO: (https://ec.europa.eu/esco/portal/home)
- O*NET OnLine (www.**oneto**nline.org/)