

Technical Description

*EuroSkills Gdańsk 2023
ICT Specialists (39)*

Contents

Contents	2
1 Introduction	3
2 The Standards Specification	5
3 The assessment approach & principles	12
4 The Marking Scheme	13
5 The Test Project.....	18
6 Skill management and communication	25
7 Skill specific safety requirements.....	26
8 Materials and equipment.....	27
9 Skill-specific rules.....	29
10 Visitor and media engagement	30
11 Sustainability	31

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1 Introduction

1.1 Name and description of the Skill Competition

1.1.1 The name of the Skills Competition is

ICT Specialists

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

ICT Specialists work in small to large organisations, in public and private sectors, offering a wide range of IT services which are critical to the daily operations of businesses and institutions. Besides performing user support tasks, troubleshooting, design, installation, upgrading and configuration of operating systems and network devices, they offer advice and guidance on the development of systems and services. They have the responsibility of working professionally and interactively with users to meet their needs and ensure the continuity of the systems and business operations.

ICT Specialists work in diverse environments, including network operations centers, internet service providers, data centers and climate-controlled server rooms. They offer a wide range of services based on user support, troubleshooting, design, installation/upgrading and configuration of operating systems and network devices

ICT Specialists may, at some stage in their careers, specialise in user support, design, installation of operating systems or configuration of networking devices. Attributes such as the capacity to self-organize, self-management, communication and interpersonal skills, problem-solving, a dedication to research and keeping up to date with industry developments and a consistently methodical and investigative approach are the universal attributes of the outstanding ICT Specialist.

In a mobile labour market, the ICT Specialist may work in teams, or alone, or both from time to time. Whatever the structure of the work, the trained and experienced Specialist takes on a high level of personal responsibility and autonomy.

With the fast globalisation of IT systems and the international mobility of people, ICT Specialists face rapidly expanding opportunities and challenges. For the talented Specialist, there are many commercial, public sector and international opportunities that require the need to understand and work with diverse cultures and keep up to date with fast-changing industry developments and standards.

1.2 The content, relevance and significance of this document

This document incorporates a Role Description and Occupational Standards which follow the principles and some or all of the content of the WorldSkills Occupational Standards. In doing so WSE acknowledges WorldSkills International's (WSI's) copyright. WSE also acknowledges WSI's intellectual property rights regarding 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:

- WSE – Competition Rules

- WSI – WorldSkills Occupational Standard framework
- WSE – WorldSkills Europe Assessment Strategy
- WSE – Online resources as referenced in this document
- WSE – Code of Ethics and Conduct
- Host Country – Health and Safety regulations

2 The Standards Specification

2.1 General notes regarding WSOS / WSEOS

Where appropriate WSE has utilised some, or all, of the WorldSkills International Occupational Standards (WSOS) for those Skills Competitions that naturally align between the two international competitions. Where the Skill is exclusive to the EuroSkills Competition, WorldSkills Europe has developed its own Occupational Standards (WSEOS) using the same principles and framework to that used for the development of the WSOS. For the purposes of this document the use of the words “Occupational Standards” will refer to both WSOS and WSEOS.

The Occupational Standards 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. Helpfully, for the global consultation on the WSOS in 2014-2021, around 50 percent of responses came from European industry and business.

Each Skill Competition is intended to reflect international best practice as described by the Occupational Standards, and to the extent that it is able to. The Occupational Standards 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 not be separate tests of knowledge and understanding.

The Occupational Standards are 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 Occupational Standards. 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 Occupational Standards. They will reflect the Occupational Standards 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 Occupational Standards to the extent practically possible. A variation of five percent is allowed, provided that this does not distort the weightings assigned by the Occupational Standards.

2.2 Occupational Standards

SECTION	RELATIVE IMPORTANCE %
1 Work organization and self-management	5

The individual needs to know and understand:

- Work process planning methods
- Tasks decomposition and prioritization methods
- The importance of verifying the work performed in each of its aspects
- How to work effectively as part of a team
- Material demonstration and presentation methods
- Current trends in information technology
- Modern approaches in IT infrastructure architecture
- Modern industry standards, best practices and professional certification systems
- Standards of professional communication

The individual shall be able to:

- Develop documentation for the existing or planned enterprise IT infrastructure
- Give recommendations and requirements based on requests and needs of a customer
- Build effective written and oral communication
- Apply analytical skills to diagnose and troubleshoot IT infrastructure issues
- Accurately describe the incident and document problem solution
- Search for information in open sources and work with technical documentation
- Select appropriate technologies for a specific use case considering best practices
- Introduce various tools and services into the corporate information infrastructure to ensure the internal technological business processes of the organization
- Formalize routine operations of IT infrastructure maintenance in the form of scripts in various programming languages
- Use modern tools for automation of deployment and configuration management
- Describe the infrastructure declaratively (like code)
- Effectively implement pipelines for continuous integration, delivery, and deployment of configurations and applications.

SECTION	RELATIVE IMPORTANCE %
2 Communication and interpersonal skills	5

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 team work
- 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
- Recognise 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 Data Transfer Networks	25
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The individual needs to know and understand:

- OSI model and the TCP/IP protocols stack
- Operational principles of data-link, network and transport protocols
- Roles and functions of different network components
- Network topology types and usage scenarios
- IPv4 and IPv6 network addressing concepts
- Routing and switching concepts
- Load balancing principles
- Common types of attacks on network protocols and mitigation methods
- Active network equipment management methods
- Network function virtualization concepts and principles
- Controller-based and software-defined network management approaches

SECTION	RELATIVE IMPORTANCE %
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The individual shall be able to:

- Perform basic initialization of active network equipment
- Configure access, aggregation and core level switching
- Provide enterprise-wide connectivity using internal and external gateway routing protocols
- Provide network fault tolerance at routing and switching levels
- Apply basic security configuration for control and data plane
- Provide network connectivity between remote branches
- Effectively use network discovery and traffic analysis tools

4	Network and System Operations	25
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The individual needs to know and understand:

- Principles of common application protocols operations
- Client-server application interaction models
- Modern application delivery models
- Operating systems embedded functionality for applications deployment
- Dependencies structure between different groups of services, applications and systems
- Enterprise services implementation options using variety of operating system

The individual shall be able to:

- Enterprise directory services (ADDS, LDAP)
- Domain name services (Windows DNS, BIND)
- Dynamic host configuration services
- Network address translation services
- Network time services
- Remote network access services
 - SSH
 - Remote Desktop Services
- Authentication, authorization and accounting services
- IT infrastructure resources monitoring systems
 - Icinga2
 - Nagios
 - Cacti
 - Windows Resource Monitor

SECTION	RELATIVE IMPORTANCE %
<ul style="list-style-type: none"> • E-mail exchange systems using SMTP, IMAP and POP with or without encryption. • Public key infrastructure services <ul style="list-style-type: none"> • Active Directory Certificate Services • OpenSSL • File sharing services <ul style="list-style-type: none"> • SMB • DFS • NFS • Web hosting services using modern web servers e.g. Apache, Nginx and IIS. • Terminal access services <ul style="list-style-type: none"> • SSH • Remote Desktop Services • Telnet • Backup systems <ul style="list-style-type: none"> • Windows Server Backup • rsync • Script based backup, e.g. Bash, Batch or PowerShell • Client workstations deployment systems <ul style="list-style-type: none"> • Windows Deployment Services • Group Policy • Manage file systems <ul style="list-style-type: none"> • Software RAID • mdadm • LVM/Dynamic disks • File systems such as NTFS, ReFS, EXT4 and NTFS 	

5	Infrastructure Programmability and Automation	15
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The individual needs to know and understand:

- Principles of common application protocols operations
- Client-server application interaction models
- Modern application delivery models
- Operating systems embedded functionality for applications deployment
- Dependencies structure between different groups of services, applications and systems
- Enterprise services implementation options using variety of operating systems

SECTION	RELATIVE IMPORTANCE %
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The individual shall be able to:

- Describe and run routine infrastructure maintenance operations using various scripting/programming languages
 - Bash
 - PowerShell
 - Python
- Use modern automation tools for systems deployment and configuration management
 - Git
 - YANG
 - RESTCONF
 - NETCONF
- Describe and implement infrastructure as code
 - Python
 - Ansible
- Interact with IT infrastructure elements using application programming interfaces
 - API calls over HTTP using Python
 - Authentication (basic and token)

6	Troubleshooting	25
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The individual needs to know and understand:

- The importance of a calm and focussed approach in solving a problem
- The significance of IT systems and the dependency of individuals and organisations 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 %
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> • Approach a problem with the appropriate level of confidence to calm the user as necessary • Check work regularly to prevent/ minimise problems at a later stage • Challenge incorrect information to prevent/minimise problems • Demonstrate resilience and persistence when dealing with problems • Recognise 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 being overwhelmed by the challenge of the problem • Check user satisfaction after a problem has been addressed • Accurately record problems and provide resolution reports 	
Total	100%

3 The assessment approach & principles

3.1 General guidance

Note: this Section and Section 4 summarize a great deal of new information and guidance regarding assessment. Please refer to the Competition Rules for greater detail.

The Competition Committee (CC) establishes the principles and techniques to which assessment at the EuroSkills Competition must conform.

Expert assessment practice lies at the heart of the EuroSkills Competition. For this reason it is the subject of continuing professional development and scrutiny. The growth of expertise in assessment will inform the future use and direction of the main assessment instruments used by the EuroSkills Competition: the Marking Scheme, Test Project, and Competition Information System (CIS).

Assessment at the EuroSkills Competition falls into two broad types: measurement and judgement. All assessments will be governed by explicit benchmarks, referenced to best practice in industry and business.

The Marking Scheme must include these benchmarks and follow the weightings within the Occupational Standards. The Test Project is the assessment vehicle for the Skill Competition, and also follows the Occupational Standards. The CIS enables the timely and accurate recording of marks, and has expanding supportive capacity.

The Marking Scheme, in outline, will lead the process of Test Project design. After this, the Marking Scheme and Test Project will be designed and developed through an iterative process, to ensure that both together optimize their relationship with the Technical Description and the principles for assessment as set out in the WSE Assessment Strategy. They will be agreed by the Experts and submitted to WSE for approval together, in order to demonstrate their quality and conformity with the Occupational Standards.

Prior to submission for approval to WSE, the Marking Scheme and Test Project will be reviewed by the WSE Skill Advisors in order to benefit from the capabilities of the CIS.

4 The Marking Scheme

4.1 General guidance

This Section describes the role and place of the Marking Scheme, how the Experts 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 EuroSkills Competition, in that it ties assessment to the standards that represent the skills to be tested. It is designed to allocate marks for each assessed aspect of performance in accordance with the weightings in the Occupational Standards.

By reflecting the weightings in the Occupational Standards, the Marking Scheme establishes the parameters for the design of the Test Project. Depending on the nature of the skill 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.

Section 2.1 above indicates the extent to which the Marking Scheme and Test Project may diverge from the weightings given in the Occupational Standards, if there is no practicable alternative.

The Marking Scheme and Test Project may be developed by one person, or several, or by all Experts. The detailed and final Marking Scheme and Test Project must be approved by the whole Expert Jury prior to submission for independent quality assurance. The exception to this process is for those Skill Competitions which use an Independent Test Project designer for the development of the Marking Scheme and Test Project.

In addition, Experts are encouraged to submit their Marking Schemes and Test Projects for comment and provisional approval well in advance of completion, in order to avoid disappointment or setbacks at a late stage. They are also advised to work with the CIS Team at this intermediate stage, in order to take full advantage of the possibilities of the CIS.

In all cases the complete and approved Marking Scheme must be entered into the CIS at least **eight weeks** prior to the Competition using the CIS standard spreadsheet or other agreed methods.

In the interests of fairness and transparency, all experts should have the same knowledge of the Marking Scheme at any given time. If an expert, including the chief expert and deputy chief expert, is assigned some information on the Marking Scheme, it should be shared with the other experts without delay.

4.2 Assessment criteria

The main headings of the Marking Scheme are the Assessment Criteria. These headings are derived in conjunction with the Test Project. In some Skill Competitions the Assessment Criteria may be similar to the section headings in the Occupational Standards; in others they may be totally different. There will normally be between five and nine Assessment Criteria. Whether or not the headings match, the Marking Scheme must reflect the weightings in the Occupational Standards.

Assessment Criteria are created by the person(s) developing the Marking Scheme, who are free to define criteria that they consider most suited to the assessment and marking of the Test Project. Each Assessment Criterion is defined by a letter (A-I).

The Mark Summary Form generated by the CIS will comprise a list of the Assessment Criteria.

The marks allocated to each criterion will be calculated by the CIS. These will be the cumulative sum of marks given to each aspect of assessment within that Assessment Criterion.

4.3 Sub criteria

Each Assessment Criterion is divided into one or more Sub Criteria. Each Sub Criterion becomes the heading for a EuroSkills marking form.

Each marking form (Sub Criterion) has a specified day on which it will be marked.

Each marking form (Sub Criterion) contains Aspects to be assessed and marked by measurement or judgement. Some Sub Criteria have assessment by both measurement and judgement, in which case there is a separate marking form for each method

4.4 Aspects

Each Aspect defines, in detail, a single item to be assessed and marked together with the marks, or instructions for how the marks are to be awarded. Aspects are assessed either by measurement or judgement and appear on the appropriate marking form.

The marking form lists, in detail, every Aspect to be marked together with the mark allocated to it, the benchmarks, and a reference to the section of the Standards Specification.

The sum of the marks allocated to each Aspect must fall within the range of marks specified for that section of the Standards Specification. This will be displayed in the Mark Allocation Table of the CIS, in the following format, when the Marking Scheme is reviewed from C-8 weeks. (Section 4).

CRITERIA											TOTAL MARKS PER SECTION
		A	B	C	D	E	F	G	H	I	
OCCUPATIONAL STANDARDS SPECIFICATION SECTIONS	1										
	2										
	3										
	4										
	5										
	6										
	7										
	8										
	9										
TOTAL MARKS PER CRITERION											100

4.5 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 put in place, with the approval of the Competitions Management Team. The marking teams must be organized to ensure that there is no compatriot marking in any circumstances. (Section 4.6 refers.)

4.6 Assessment and marking using judgement

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

- benchmarks (criteria) for detailed guidance for each Aspect (in words, images, artefacts or separate guidance 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

Three Experts will judge each Aspect, normally simultaneously, and record their scores. A fourth Expert coordinates and supervises the scoring, and checks their validity. They also act as a judge when required to prevent compatriot marking. Assessment and marking by measurement

4.7 Assessment and marking using measurement

Normally three Experts will be used to assess each aspect, with a fourth Expert supervising. 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 CIS provides a large number of automated calculation options, the use of which is mandated.

4.8 Assessment overview

For both measurement and judgement there will be three Experts in the assessment team.

Good practice in assessment comprises measurement and judgement applied both specifically and broadly. The final proportions of measurement and judgment, whether specific or broad, will be determined by the standards, their weightings and the nature of the Test Project.

4.9 Skill assessment strategy

This is a competition for teams of two competitors working together in the way that they choose. Assessment and results will be based on their joint effort.

The only equipment allowed in the Competitors work area is the equipment used by the competitors to develop the Test Project. Care must be taken to make sure that the competitor's computers contain all the software needed by the experts to perform the assessment. Experts are allowed to transfer to the competitors computers any scripts and or software that are needed to perform the assessment but whenever possible this must be done before the beginning of the competition.

Non-destructive assessment must be done whenever possible and must be the norm. Whenever there is no other option, Experts must consider if it is really worth the risk of doing destructive testing and if they decide to do so they must have a written verification procedure in place to guarantee the undoing of whatever action was performed in order to carry the assessment. As an example of destructive testing, consider that in order to assess a certain aspect one must shutdown an interface. Experts must at all cost find an alternative way to test that aspect and if they cannot find one they must consider if it is really worth the risk of changing the competitor's configuration and if after all this they still decide to go ahead, they must implement a written procedure to guarantee the undo of the shutdown command before leaving the competitor's workstation.

When assessing the competitor's work, the emphasis should be on performing functional testing. For example: viewing the configuration in Cisco equipment, in order to determine if marks should be awarded or not, should be a measure of last resort, used only when no other options are available.

All Experts should be assigned to a module team. With this module organization, the assignment of the Competitor's first day module is done as follows:

- The Competitor will start the first day of the competition in the same module as their compatriot Expert is a part of.
- If the Competitor's compatriot Expert does not belong to or is not a part of a module teams, their Competitor's starting module is by ballot draw as soon as the module teams are formed.

Each module is completed on the assigned day so that progressive marking can take place.

If automated "script marking" determines that an aspect is wrong, the Experts included in the marking group must do a manual check as stated in the "how-to-mark" Marking Scheme.

The automatic marking script must be hashed and encrypted with a two-part password (one part held by the CE and the other part held by the module team leader).

4.10 Skill assessment procedures

Assessment and marking are an intense process that depends upon skilful leadership, management, and scrutiny.

All Experts should be assigned to a module team. With this module organization, the assignment of the Competitor's first day module is done as follows:

- The Competitor will start the first day of the competition at the same module as their compatriot Expert is a part of.
- If the Competitor's compatriot Expert does not belong to or is not part of a module team, their Competitor's starting module is by ballot draw as soon as the module teams are formed.

The Competitor's work may not be altered in any way to facilitate marking unless included in the Marking Scheme.

The Experts attending the Competition are divided into smaller marking groups within their module team to mark each specific section of the marking criteria.

Progressive marking for all sections of the Competition

Each module is completed on the assigned day so that progressive marking can take place.

Marking Scheme:

- Each Competitor is provided with the Mark Summary Form
- A full "how-to-Marking Scheme" will only be seen by the Experts. (Reason: the full Marking Scheme would give the answers to the Competitor.)
- No single aspect can be more than 5% of module/day total marks. That is not more than 1.25 marks.

If automated “script marking” determines that an aspect is wrong, the Experts included in the marking group must do a manual check as stated in the “how-to-mark” Marking Scheme.

The marking automated script must be hashed and encrypted with a two-part password (one part held by the CE and the other part held by the module team leader).

5 The Test Project

5.1 General notes

Sections 3 and 4 govern the development of the Test Project. These notes are supplementary.

Whether it is a single entity, or a series of stand-alone or connected modules, the Test Project will enable the assessment of the skills in each section of the Occupational Standards.

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

The Test Project will not cover areas outside the Occupational Standards, or affect the balance of marks within the Occupational Standards other than in the circumstances indicated by Section 2.1.

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 the EuroSkills Competition's rules and regulations.

This Technical Description will note any issues that affect the Test Project's capacity to support the full range of assessment relative to the Standard Specification. Section 2.1 refers.

5.2 Format/ structure of the Test Project

- Test Project assessed at end of Competition
- Test Project with separately assessed modules
- Test Project assessed in stages
- Series of standalone modules
- Other

If other, please specify here:

5.2.1 Format of the test project

The Test Project should be constructed in the form of three modules, one for each day of competition. Great care needs to be taken to minimize overlapping between the modules. E.g. if one module requires the competitor to implement routing and switching, this should not be allowed in a great extend in another module. The modules should be doable independent of each other.

5.2.2 Example of module structure

Below is an example of modules to be used during the competition. The actual modules will be decided on the forum before the start of the Test Project development.

Period	Module	Tasks
Module A	Linux environments	Installation, configuration, automation and troubleshooting
Module B	Microsoft environments	Installation, configuration, automation and troubleshooting
Module C	Data transfer networks	Installation, configuration, automation and troubleshooting

5.3 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 regards to their age and limited work experience.
- 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. (Please note that this list is purely indicative, since the Marking Scheme and Test Project must reflect current best practice in IT.)
 - Cisco Certified Network Associate (CCNA)
The candidate's knowledge and skills related to network fundamentals, network access, IP connectivity, IP services, security fundamentals, and automation and programmability.
 - Implementing Cisco Enterprise Advanced Routing and Services (ENARSI)
The candidate's knowledge for implementation and troubleshooting of advanced routing technologies and services including Layer 3, VPN services, infrastructure security, infrastructure services, and infrastructure automation.
 - Advanced Level Linux Certification LPIC-2 or equivalent skill set;
 - PCAP – Certified Associate in Python.
 - Microsoft Windows Server and Microsoft client operating systems. (No applicable certification exists at the moment). Scope to be decided - and shared to the Competitors - by the Experts before work starts on the Test Project.
 - Red Hat Certified Specialist in Ansible Network Automation exam
 - Red Hat Certified Specialist in Developing Automation with Ansible Automation Platform exam

5.4 Test Project development

The Test Project MUST be submitted using the templates provided by WSE. Use the Word template for text documents and DWG template for drawings. Please contact jordy.degroot@worldskillseurope.org for guidance.

If the Test Project is designed by an Independent Test Project designer, then the Test Project must be designed in accordance with the WSE Independent Test Project Guide v1.1.

If your Skill wishes to have an Independent Test Project designer, you must ensure that WorldSkills Europe is made aware of this, so that it can be assured that there is proper funding in place, or that the Independent Test Project designer is aware that he/she will do this task free of charge.

5.4.1 Who develops the Test Projects or modules

The Test Project / modules are developed under the supervision of:

- All Experts
- Some Experts
- Nominated Experts
- Independent Test Project designer/ Third party
- Chief Expert, Deputy Chief Expert

Add information if needed:

Option 1 (preferred): The Test Project modules are developed by an Independent Test Project Designer with guidance from Chief Expert and Deputy Chief Expert (without CE and DCE knowing the contents of the Test Project). According to the WSE Independent Test Project Guide.

Option 2: One, two or three modules are developed independently while the remaining modules are designed as per option 3 process. According to the WSE Independent Test Project Guide.

Option 3: The SMT (Skill Management Team) selects the module teams and the Test Projects are then developed by each module team. Test Projects may ONLY be submitted by module development teams, no individual submissions, Experts should submit their ideas and work with the module development team.

5.4.2 How and where is the Test Projects or modules developed

The Test Project or modules are developed:

- Jointly on the Discussion Forum
- Independent Test Project designer
- Other:

Please refer to section 5.4.3

5.4.3 When is the Test Project developed

When developed by an independent designer:

TIME	ACTIVITY
~9 months prior to the competition	SMT starts the work of looking for an Independent Designer.
~6 months prior to the Competition	SMT invite one or more Independent Designers to start work on the Test Project. If no Independent Designer is selected at this point, the decision can be made to have some, or all the Test Project Modules developed by the Experts instead.
~6 months prior to the Competition	SMT have follow up meeting with the independent designer to check on the progress of the Test Project. If at this time the SMT is not satisfied by the progress by the Independent Designer, the decision can be made to have some, or all the Test Project Modules developed by the Experts instead.
~3 months (C-90) prior to the Competition	Deadline for the Independent Designer to submit the finished Test Project to EuroSkills Secretariat.

When developed by the Experts in the module teams:

TIME	ACTIVITY
~9 months prior to the competition	SMT contacts the registered Experts to invite them to be part of the Module team (Module A, B and C) that they prefer. After this the SMT choose and asks experienced Experts to be one of the Module Team Leaders.
~6 months prior to the Competition	SMT allocates Experts to the Module teams and under lead by the Module Team Leader they start designing the outlines and collection of activities suitable for the Test Projects for their Module.
~3 months (C-90) prior to the Competition	Deadline for the selection of the Test Project and delivery to WorldSkills Europe. Module Teams sends their Test Project to the SMT who will check the quality and consistency of the Test Project.
~2 months (C-60) prior to the Competition	Marking teams are created, and a team leader nominated, and are assigned the task of verifying the functionality of the Test Project, making suggestions as to improve not only the quality of the Test Project but also speed up the assessment procedure and create a how-to mark.

1 months (C-30) prior to the Competition

Deadline for posting possible 30% changes for the Test Projects. All 30% change proposals must be submitted with the respective marking scheme as well as the impact on the original Test Project and original marking scheme.

At the Competition

The final selection of the 30% changes will be taken from the suggested changes on the C-30 submitted list.

5.5 Test Project validation

In the case of Test Project developed by an Independent Designer, the following is not applicable.

The Test Projects modules will be validated by a Test Group of Experts appointed by the Chief and Deputy Chief Expert as described below.

The amended Test Project modules (with 30% changes) will be passed onto a Test Group who will check each of the selected projects on complete Competitor workstations. It must be demonstrated that the Test Project/modules can be completed within the material, equipment and knowledge constraints and that the hardware and software list is correct and is provided for use.

The Test Group must check the 30% changes and/or additions and also the corresponding marking scheme and provide further changes back to the Module team until agreement is reached and the project is in accordance with Test Project design requirements above. See 5.3 above.

5.6 Test Project selection

- By vote of Experts at the previous Competition
- By vote of Experts on the Discussion Forums
- By vote of Experts at the upcoming Competition
- By random draw by the Competition Director, three months before the current Competition
- Test Project is designed by an Independent Test Project designer, therefore there is no selection process
- Other, please specify below:

Option 1 (preferred). The Test Project is designed by an Independent Test Project designer, therefore there is no selection process.

Option 2: One, two or three modules are developed independently while the remaining modules are designed as per option 3 process.

Option 3: The Test Project are developed by the Experts in the Module Teams, and the Test Project put forward by the Module Team is selected.

5.7 Test Project circulation

Please note that if a Test Project is known by the Chief- and/or Deputy Chief Experts, and/or any of the other Experts, it must be shared via the forums before the start of the Competition. This also means that this Test Project is subject to a 30% change before the start of the Competition.

The Test Project is circulated via the website as follows:

- Submitted to the Secretariat for circulation **XX** months before the current Competition
- Not circulated
- Other, please specify below:

The selected Test Project modules are sent to EuroSkills forum for circulation on C-90. In this case the Test Project will be subject to 30% changes, that will be validated by the Experts in accordance with 5.5.

Where the Test Project modules are independently designed these are sent to EuroSkills Secretariat and are not released until C1. However, the complete topology, both physical and logical, should be released on C-30 to everyone on the EuroSkills forum.

5.8 Test Project coordination (preparation for competition)

Coordination of the Test Project will be undertaken by:

- Skill Management Team
- Chief Expert
- Chief Expert and Deputy Chief Expert
- Chief Expert and Workshop Manager
- Chief Expert with selected Experts
- Chief Expert with Competition Organizer
- All Experts
- Other, please specify below:

When the Test Project is developed by an independent designer, coordination is done by the Skill Management Team.

In other cases each Module Team is allocated a team of Experts. The module team leader will work closely with the Chief Expert and the Deputy Chief Expert to allow for the completion of the module. The team leader is responsible for the completion of each module in line with this document and ensure the modules are true and correct.

5.9 Test Project change at the competition

From the proposed 30% changes, experts may choose to change the original Test Project up to 30%. All changes must come from the proposed changes that were submitted by C-30.

As soon as possible, preferably on C-2, the Test Projects with the included 30% change will be given to all Experts who are responsible for sharing the updated Test Project with their Competitors. Summary marking schemes will also be given to the Experts, and the content may also be shared with the Competitors.

5.10 **Material or manufacturer specifications**

Specific material and/or manufacturer specifications required to allow the Competitors to complete the Test Project will be supplied by the Host Organization and are available via the forums. However, 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 items may include those for fault finding modules or modules not circulated.

6 Skill management and communication

6.1 Discussion forum

Prior to the EuroSkills Competition, all discussion, communication, collaboration, and decision making regarding the Skill Competition must take place on the skill specific Discussion Forum, which can be reached via www.worldskillseurope.org. Skill related decisions and communication are only valid if they take place on the forum. The Chief Expert (or an Expert nominated by the Chief Expert) will be the moderator for this Forum. Refer to Competition Rules for the timeline of communication and competition development requirements.

6.2 Competitor information

All information for registered Competitors is available from the WorldSkills Europe website www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

The information includes:

- Competition Rules
- Technical Descriptions
- Marking Schemes
- Test Projects
- Infrastructure List
- Health and Safety documentation
- Other Competition-related information
- List of material that can be used to build templates and not been provided by the host

6.3 Test Projects and Marking Schemes

Circulated Test Projects will be available at the WorldSkills Europe website from www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

6.4 Day-To-Day management

The day-to-day management of the Skill Competition during the EuroSkills Competition is defined in the Skill Management Plan that is created by the Skill Management Team led by the Chief Expert. The Skill Management Team comprises the Jury President, Chief Expert and Deputy Chief Expert. The Skill Management Plan is progressively developed in the six months prior to the Competition and finalized at the Competition by agreement of the Experts. The Skill Management Plan can be viewed at www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

7 Skill specific safety requirements

Refer to Host Country/Region Health and Safety documentation for Host Country/Region regulations. This document will be shared via the forums. One overall Health and Safety document will be published, as well as Skill specific safety requirements.

8 Materials and equipment

8.1 Infrastructure List

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

The Infrastructure Lists will be available at the WorldSkills Europe website from www.worldskillseurope.org. Please contact jordy.degroot@worldskillseurope.org for guidance.

The Infrastructure List specifies the items and quantities requested by the Experts for the next Competition. The Host Organization will progressively update the Infrastructure List specifying the actual quantity, type, brand, and model of the items.

At each Competition, the Experts must advise the Competition Manager 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.

8.2 Competitors toolbox

WorldSkills Europe aims to minimize the sending of toolboxes as much as possible. We therefore ask you to keep this in mind when writing the section below. Please be advised that competitors should bring as little as possible and what they do bring **MUST** be true hand tools. Only items are allowed that would significantly affect their ability to perform the task and deliver the Test Project to a high standard.

[No toolboxes are allowed.](#)

8.3 Materials, equipment and tools supplied by Competitors in their toolbox

[Competitors are allowed to bring:](#)

- [Two keyboards in their own language](#)
- [Two mice](#)

[The keyboards provided for all computers \(by the organiser\), including laptops, must be in Latin-script, QWERTY, United States \(English\) layout, according to ISO/IEC 9995. The locale settings on all systems must be set to US international.](#)

8.4 Materials, equipment and tools supplied by the Experts

[Nothing is to be provided by the Experts.](#)

8.5 Materials, equipment and tools prohibited in the Skill area

[Regarding the use of electronic equipment within the competition area, devices such as a tablet, cell phones, media players, recorders, etc., are to follow WSE rules and/or by the SMT presented rules for the actual competition. SMT may decide which items are allowed to be used, by whom and when.](#)

8.6 Proposed workshop and workstation

Workshop layouts from previous competitions are available by contacting the Competition and IT Coordinator at: jordy.degroot@worldskillseurope.org. New Workshop Layouts will be communicated via the forums when completed.

Please be advised that you will have the opportunity to discuss your Workshop Layout proposal with the Host Organization during the Competition Preparation Meetings (CPM).

For workshop layout development, please refer to the forums.

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 workflow, and documentation management and distribution. Breaches of these rules will be solved according to the Issue and Dispute Resolution procedure including the Code of Ethics and Conduct Penalty System.

9.1.1 **Personal laptops – USB – memory sticks– mobile phones**

No personal laptops, USB-memory sticks or mobile phones are allowed during the preparation work or when working on the Test Project and Marking Scheme. After preparation work personal laptops may be used inside the expert room but must be locked away when on duty.

9.1.2 **Personal photo cameras – video taking devices**

Taking photos or video inside the workshop is only allowed after agreement with the Chief Expert or Deputy Chief Expert.

9.1.3 **Communication between compatriot experts and competitors**

Communication between compatriot Experts and Competitors are allowed at all times except for during the competition time and during troubleshooting.

10 Visitor and media engagement

Following is a list of possible ways to maximize visitor and media engagement, within the remit of the Competition Rules:

- Video description of trade. For example: “Warriors of the Net”
- Dual displays – the public can observe work being done by competitors in detail
- Test Project descriptions
- Competitor profiles
- Career opportunities
- Daily reporting of competition status

11 Sustainability

This Skill Competition will focus on the sustainable practices below:

- Workstations are organized into modules corresponding to the skill sets (day one to three) being tested. Competitors are divided into these groups to reduce the need for a large number of networking devices.
- The usage of virtualization greatly reduces the number of computers needed for the competition.