The First World Vocational College Skills Competition

Competition Rules

I. Name of the Skill

No.: W10

Chinese name: 云计算

English name: Cloud Computing

Industry: Electronics and information industry

II. Competition Purpose

The World Vocational College Skills Competition aims to bring together standards, technologies, equipment, teachers and students in the field of vocational and technical education at home and abroad, promote China's vocational education to go global and serve international cooperation in production capacity, build an important platform for teachers and students of international vocational schools to deepen friendship, exchange skills and show expertise, and promote the development of a world community of skills. Through the skills competition, expertise show and experience exchange, this Competition can be a platform to share the best practices of international vocational and technical education, enhance the influence of China's vocational and technical education in the world in this field, and promote the development of China's vocational and technical education in line with global vocational and technical education.

The Cloud Computing Skills Competition (the "Competition") closely follows the development trend of international mainstream cloud computing technology, conforms to the new circumstances of the international integration of cloud computing industry, and enhances mutual learning among international vocational schools. The Competition will serve as a platform to give full play to the leading and demonstrative role of the World Vocational College Skills Competition, strengthen exchanges and cooperation among various countries in the application of cloud computing technology, and build a platform for subsequent friendship and mutual exchanges between domestic and foreign schools. Meanwhile, it will promote teaching and learning through competition, lay the foundation for talent training featured by mutual learning, mutual benefit, integration and commonality, and enhance the development capabilities of cloud computing-related majors in various countries. Besides, it will promote the transformation of competition results and the international cooperation in production, education and research, facilitate the development of vocational and technical education in the post-pandemic era and highlight the importance of vocational education.

III. Competition Content

In accordance with the professional teaching standards and talent training plan for the application of cloud computing technology, focusing on the needs of social positions and closely following the actual production, and starting from business requirements and engineering application environment, the Competition allows competitors to realize the planning and design of the private cloud platform architecture, and complete the building, operation and maintenance of private cloud and container cloud platform, the application and

use of public cloud (based on the mainstream X86 architecture) service, the planning, design and implementation of enterprise project application migration to the cloud, and the optimization of enterprise project application architecture.

The contents of the Competition are as follows:

i. Private cloud service building task

1. Competitors should set up and manage the operating system of the physical host, including network, storage, virtualization and security, so as to ensure the normal operation of the operating system according to the requirements of the competition questions; check the connection between switches and servers, and test the connectivity of the network.

2. Competitors should make preparations, including installing and configuring yum source, ftp, ntp, http, RabbitMQ, MariaDB database, MemCached, etcd and other services.

3. Competitors should write the installation script (or use the one provided by the Competition) to complete the building of OpenStack private cloud platform. After the platform is built, they should check the operation status of each component and they should use the private cloud platform correctly.

ii. Private cloud service operation and maintenance tasks

1. Competitors should operate and maintain the cloud host, cloud storage, cloud network, cloud database, load balance and high availability of the OpenStack private cloud platform.

2. Competitors should complete the operation and maintenance of OpenStack private cloud platform components, including Keystone, Glance, Nova, Neutron, Cinder, Swift, Ceph, Manila, Zun, Blazar and cloudkitty.

3. Competitors should complete the arrangement of private cloud application projects, such as building a private blog system and an APP store website, and use Ansible, the automated operation and maintenance tool, to write scripts to upgrade the architecture of application systems.

4. Competitors should master the dependencies and corresponding relationships of each service on the private cloud, and should eliminate the faults encountered during the use process, so as to ensure the stable and smooth operation of the private cloud environment.

iii. Private cloud operation, maintenance and development tasks

Competitors should write Python scripts based on OpenStack APIs to implement the operation and maintenance management of the OpenStack cloud platform.

iv. Container cloud service building task

1. Competitors should install Docker services, deploy private container storehouses, and be proficient in using Docker commands.

2. Competitors should design the Kubernetes platform architecture, prepare container environment, write template files, and build the Kubernetes container cloud platform.

3. Competitors should use various commands of the container cloud platform to check and monitor the operation status of the container cloud platform.

v. Container cloud application deployment task

1. Based on Docker environment, competitors should write Dockerfile and use Commit to

make private container images and build microservice application system.

2. Based on Kubernetes container cluster, competitors should build a continuous integration environment.

vi. Container cloud service operation and maintenance tasks

1. Competitors should complete the operation and maintenance of Pod, Deployment, Service, Ingress, network, storage volume and Istio service grid of the Kubernetes container cloud platform.

2. Based on the KubeVirt service of Kubernetes, competitors should create, migrate, manage and maintain the instances of a virtual machine.

vii. Container cloud operation, maintenance and development tasks

Competitors should write Python scripts based on Kubernetes APIs to complete the operation and maintenance of container cloud platform services.

viii. Public cloud cluster building tasks

1. Competitors should calculate the public cloud cost budget according to the requirements for the application system planning.

2. Competitors should build a virtual private cloud in the public cloud, including applications for load balance and public IP.

3. Competitors should apply for a cloud container engine cluster in the public cloud, and deploy application grid services.

ix. Hybrid cloud cluster configuration tasks

Competitors should configure the Kubernetes cluster in the OpenStack platform to realize the connection between the local Kubernetes cluster and the public cloud cluster.

x. Public cloud operation, maintenance and development tasks

In a hybrid cloud cluster, competitors should write Dockerfile and use Commit to create private container images, deploy microservice applications, and deploy application service grids to manage and maintain them.

IV. Competition Method

i. Team formation requirements

1. The Competition adopts "1 + 1" Chinese and foreign joint teams, that is, a team consists of one group of Chinese competitors (from Chinese schools) and one group of foreign competitors (from foreign schools); each group consists of two students. Domestic students in each group are not allowed to come from different schools. Competitors should sign up, compete and win prizes by teams.

2. Chinese competitors must be current full-time students from higher vocational colleges and schools (including current full-time students of the higher vocational education category from undergraduate universities).

3. Competitor replacement: If a competitor is unable to participate for any reason during the preparation, the relevant department should issue a written explanation ten working days before the start of the corresponding Competition. The competitor will be replaced after

verification by the office of the Executive Committee of the World Vocational College Skills Competition. After the Competition starts, the team is not allowed to replace any competitor.

ii. Competition method

The Competition will be conducted in the forms of on-site Competition and recorded broadcast. Domestic competitors will engage in the on-site competition; if foreign competitors are unable to attend the on-site competition, the Competition should be recorded and broadcast. Foreign competitors must send the competition videos that meet the competition requirements to the mailbox designated by the Executive Committee seven days before the official competition day, and the Executive Committee should uniformly check it, conduct the pilot broadcast and seal it for filing. On the official competition day, the videos should be unsealed by the jury, and those from the foreign competitors should be broadcast on the large screen on site. The marking criteria should be the same as that of on-site competition. Requirements for competition video: The file format should be MP4; the resolution should not less than 1280*720, the recommended aspect ratio is 16:9, and the video content needs to fully display the competition process.

V. Competition Process

i. Competition sessions

The Competition is divided into three phases, and each phase lasts three hours. The Competition duration is 1.5 days, totaling nine hours (excluding lunch and rest time).

ii. Competition timeline

The Competition duration is 1.5 days, totaling nine hours. The Competition milestones and timeline is shown in Table 1.

Table 1 Competition Milestones and Timeline

Date	Time	Work content	Participants	Place
Two days before the Competition	Before 20:00	Judges, arbitrators and supervisors report for duty	Staff	Accommodation hotel
The day before the Competition	09:00-14:00	Teams check in. Accommodation is arranged, materials are collected and pandemic prevention measures are implemented.	Staff, anti-pandemic staff and teams	Accommodation hotel
	09:00-12:00	Judge training session	Jury presidents, judges, supervision and arbitration team and expert panel	Conference room
	13:00-14:00	Work meeting for judges	Jury presidents, judges, supervision and arbitration team	Conference room
	14:00-15:00	Team leader meeting	Team leaders, jury president	Conference room
	15:00-16:00	Opening ceremony	Leaders, team leaders, competitors, jury presidents, judges, supervisors, arbitrators	
	16:00-17:00	Familiarize with the competition venue	Team leaders, competitors	Workshop

Date	Time	Work content	Participants	Place
	17:15	Inspect and close the competition venue	Jury presidents, supervision and arbitration team	Workshop
	17:30	Teams return to hotel	Teams, team leaders	
Competition Day 1	07:30	Teams arrive at the competition venue and gather in front of the venue	Teams, staff	In front of the competition venue
	07:30-08:00	Conduct competition check-in and implement pandemic prevention measures	Competitors, check-in staff, pandemic prevention staff	In front of the competition venue
	08:00-08:20	The first draw and encryption (Draw the Competition No.)	Competitors, the first encryption judges, supervisors	The first draw Region
	08:20-08:40	The second draw and encryption (Draw the Workstation number)	Competitors, the second encryption judges, supervisors	The second draw Region
	08:45-09:00	Check and verify equipment and tools	Competitors, judges, supervisors, arbitrators	Workshop
	09:00-12:00	Conduct the first phase of the Competition and provide open display experience	Competitors, judges, supervisors, arbitrators	Workshop
	12:00-13:00	Lunch break		
	13:00-16:00	Conduct the second phase of the Competition and provide open display experience	Competitors, judges, supervisors, arbitrators	Workshop
	16:00-18:00	Appeal acceptance	Competitors, judges, supervisors, arbitrators	Workshop
Day 2 of the Competition	07:30	Teams arrive at the competition venue and gather in front of the venue	Teams, staff	In front of the competition venue
	07:30-08:00	Conduct competition check-in and implement pandemic prevention measures	Competitors, check-in staff, pandemic prevention staff	In front of the competition venue
	08:00-08:20	The first draw and encryption (Draw the Competition No.)	Competitors, the first encryption judges, supervisors	The first draw Region
	08:20-08:40	The second draw and encryption (Draw the Workstation number)	Competitors, the second encryption judges, supervisors	The second draw Region
	08:40-09:00	Check and verify equipment and tools, and distribute questions	Competitors, judges, supervisors, arbitrators	Workshop
	09:00-12:00	Conduct the third	Competitors, judges,	Workshop

Date	Time	Work content	Participants	Place
		phase of the Competition and provide open display experience	supervisors, arbitrators	
	12:00-14:00	Appeal acceptance	Competitors, judges, supervisors, arbitrators	Workshop
	14:00-17:00	The Competition ends and the judges award scores	Judges, supervisors	Marking Conference Room
	17:00-18:00	Sampling review	Judges, supervisors	Marking Conference Room
	18:00-19:00	Decryption	Judges, supervisors	Marking Conference Room
	20:00-22:00	Result announcement	Teams, judges, supervisors	Conference room appointed
Day 1 after the Competition	09:00-12:00	Closing ceremony of the Competition (announcement of results and awards)	Leaders, guests, judges, teams, expert panel	Venue appointed

Note: The competition venue is arranged by the Executive Committee and can be adjusted according to the specific status.
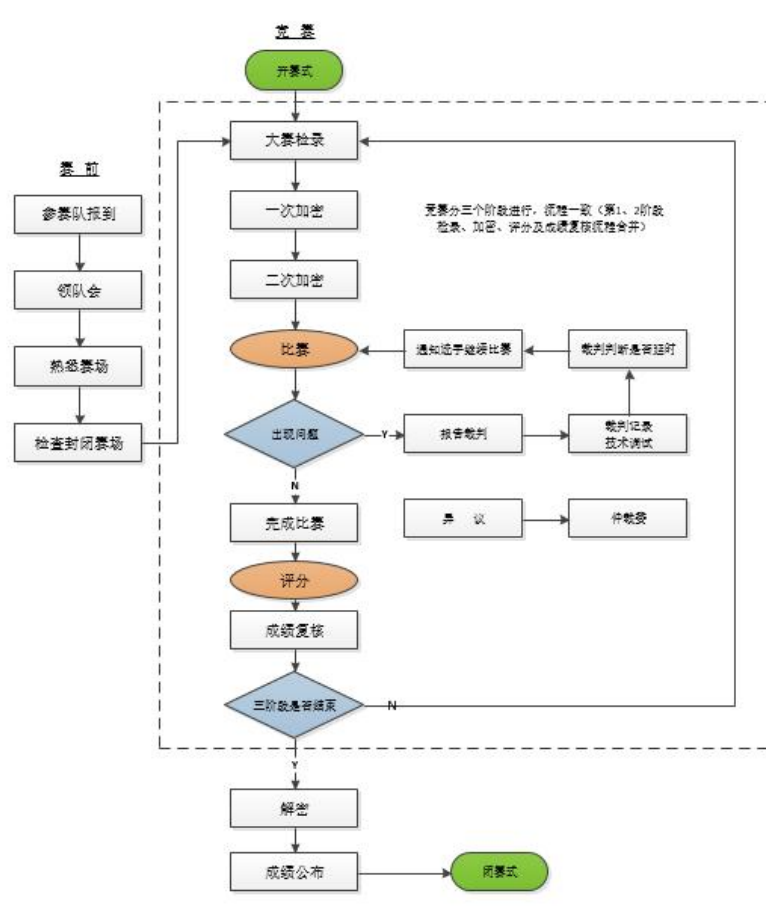
iii. Competition process flow chart

Figure 1 Competition Process Flow Chart

竞赛	Competition
开幕式	Opening ceremony
大赛检录	Competition check-in
赛前	Before the Competition
参赛队报到	Registration of participating team
领队会	Team leader meeting
熟悉赛场	Familiarize with the competition venue
检查封闭赛场	Inspect and close the competition venue
一次加密	The first encryption
二次加密	The second encryption
比赛	Competing
出现问题	Problems arise
Y	Y
报告裁判	Report to judges
裁判记录技术调试	Judges record the technical debugging
裁判判断是否延迟	The judges judge whether there is a delay
通知选手继续比赛	Inform the competitors to continue to compete
N	N
完成比赛	Finish the Competition
评分	Marking
成绩复核	Review results
三阶段是否结束	Whether three phases are over
解密	Decryption
成绩公布	Result announcement
闭幕式	Closing ceremony
竞赛分为三个阶段进行，流程一致（第 1、2 阶段检录、加密、评分及成绩复核流程合并）	The Competition is divided into three phases whose processes are the same (The processes of check-in, encryption, marking and results review at Phase I and II are combined)

iv. Competition process

Pre-competition preparations: Competitors enter the venue after lots drawing and encryption; teams take their places and receive the competition tasks, and complete the preparations for the inspection on competition equipment, cables and tools.

Formal competition: Competitors need to build a cloud host and set up the cloud host according to the requirements of the questions, and complete the competition tasks of three sessions (phases) of private cloud, container cloud and hybrid cloud in three phases, respectively.

VI. Competition Task Paper

The competition task paper is based on the real situation and complete tasks of the work process, paying attention to the comprehensive ability, adaptability and professional quality of the competitors, and focusing on the comprehensive application of the competitors' skills in a certain aspect and their ability to complete a certain task.

Following the principles of openness, fairness and impartiality, the task paper of the Competition should be made public on the network information release platform designated

by the Competition one month before the start of the Competition.

VII. Competition Rules

i. Familiarization with the venue

1. A unified and orderly time schedule is provided for each team to familiarize with the venue. When familiarizing with the venue, each team is confined in the designated area and route, and is not allowed to enter the competition area.

2. It is strictly forbidden to communicate with on-site staff. Please refrain from making unfounded remarks that can cause damage to the overall image of the World Vocational College Skills Competition.

3. Teams should strictly observe all rules for the Competition when familiarizing themselves with the workshop. In order to avoid accidents, crowding, talking loudly and jostling are strictly forbidden.

ii. Admission rules

1. Competitors should arrive at the check-in area on time according to the time stipulated by the Competition.

2. The judges will check the identity of each competitor. Competitors must provide the competition certificate, ID card, and student card registered by the school. The name, age, appearance characteristics on the certificate should be consistent with the information on the competition certificate.

3. The judges will inspect the personal belongings of competitors who are not allowed to bring any device with communication and storage functions, paper materials and other items. Competitors should enter the drawing area only after passing the inspection.

4. Competitors will obtain the Competition workstation number by drawing lots. Competitors will enter the competition venue in an orderly manner under the command of the on-site judges, and take their places according to the obtained Competition workstation number.

iii. Official competition rules

1. After entering the competition venue, competitors must obey the unified arrangement and command of the on-site judges.

2. After entering the competition workstation, competitors can check the competition environment, and report to the on-site judges immediately if there is any problem, but they cannot perform any operation about the competition task.

3. Only after the on-site judges announce the start of the Competition, can competitors start to perform the operation of the competition tasks.

4. During the Competition, competitors must strictly observe the safety operating procedures, ensure personal and equipment safety, and accept the supervision and warnings of the on-site judges and technicians.

5. If competitors encounter a problem with the competition system during the Competition, they can give a sign to the on-site judges who will solve it. If competitors believe that there is a problem with the competition equipment which needs to be repaired or replaced, it will be detected by the technicians and ruled by the on-site judges. If it is necessary to repair or replace the equipment due to equipment fault or damage, the time between the competitors'

reporting to the on-site judges and the completion of the repair or replacement should be taken as the added time for the Competition. After the repair or replacement is completed, the on-site judges and technicians must check and record the results in the corresponding column of the venue record sheet and the competitors should sign the workstation number for confirmation.

6. During the Competition, teams should not leave the competition workstation at will, and should not communicate with other teams. Competitors who terminate the Competition or complete the task ahead of schedule and need to leave the venue should report to the on-site refuges, fill in the departure time and reason for leaving the venue in the corresponding column of the venue record sheet which should be signed by the on-site judges, and confirmed with workstation number signed by the competitors.

7. During the Competition, those who seriously violate the disciplines of the venue and affect other competitors, those who violate the operating procedures and refuse to follow advice, those who cross the boundary and affect others, and those who intentionally damage the equipment or facilities of the venue, should be reported to jury presidents by the on-site judges. With the approval of the Executive Committee of the Competition, the jury presidents can announce their disqualification of the Competition.

iv. Departure rules

1. 15 minutes before the end of the Competition, the jury presidents will remind competitors of the remaining time of the Competition.

2. When the signal for the end of the Competition is given, the jury presidents will announce the termination of the Competition.

3. After the jury presidents announce the termination of the Competition, competitors should stop the operation of all competition tasks. All materials and equipment and tools used in the Competition must be neatly placed on the workbench and not allowed to be taken out of the venue.

4. When competitors finish the Competition, they should tidy up and clean up the competition workstation and its surroundings to make it conform to professional standards.

5. After the jury presidents announce the termination of the Competition, the on-site judges organize and supervise competitors to leave the workstation in an orderly manner and stand in the aisle beside the workstation. When the jury presidents announce the departure, the on-site judges direct competitors to leave the venue uniformly. Competitors who need added time continue to operate at their competition workstation. When the on-site judges announce that the added time is up, competitors should stop the operation and leave the venue.

VIII. Competition Environment

There is an operating platform in each competition workstation in the competition venue. Each workstation is equipped with a separate 220 V AC power supply with leakage protection air switch, and the cables in the workstation should meet safety requirements. Each competition workstation is planned and prepared according to the electricity load of 2,000 W. Each competition workstation covers an area of 9-10 m^2, and the workstations are separated by partitions to ensure that teams do not interfere with each other. The competition workstation is marked with the workstation number, and is equipped with the competition platform and the software and hardware equipment environment required by the technical work.

According to environmental standards, good day lighting (greater than 500 lux), lighting and ventilation in the venue should be guaranteed, and each team should be provided with tools such as pens and papers, drinking water, and a garbage can.

At the first and second phases, the intranet should be used for the Competition; at the third phase, the extranet environment should be provided for the public cloud competition.

The venue should be equipped with two dedicated Internet egresses, each with a broadband of not less than 200 M (to ensure that the egresses are used for the venue only).

IX. Technical Specifications

Each team is required to abide by the specifications stipulated in Table 2 when implementing competition questions:

Table 2 Table of Competition Technical Specifications

No.	Standard No./Specification abbreviation	Item
1	ISO/IEC TR 3445:2022	Information Technology - Cloud Computing - Cloud Service Audit
2	BS ISO/IEC 22123:2021	Information Technology Cloud Computing Vocabulary
3	BS ISO/IEC 30118:2021	Information Technology Open Connectivity Foundation (OCF) Specifications
4	PD ISO/IEC TR 23187:2020	Information Technology - Cloud Computing - Interacting with Cloud Service Partners (CSNs)
5	PD ISO/IEC TR 23613:2020	Information Technology - Cloud Computing - Cloud Service Metering Elements and Billing Models
6	PD ISO/IEC TR 23951:2020	Information Technology - Cloud Computing - Guidelines for Using Cloud SLA Metric Model
7	PD ISO/IEC TS 23167:2020	Information Technology - Cloud Computing - General Techniques and Tips
8	ISO/IEC 30115:2018	Information Technology - API Specifications for Redfish Extensible Platform Management
9	PD ISO/IEC TR 23186:2018	Information Technology - Cloud Computing - Trust Framework for Multi-source Data Processing
10	BS ISO/IEC 19086-3:2017	Level Agreement (SLA) Framework of Information Technology Cloud Computing Service, Core Conformance Requirements
11	BS ISO/IEC 19941:2017	Information Technology Cloud Computing Interoperability and Portability
12	ISO/IEC 17203:2017	Information Technology - Open Virtualization Format (OVF) Specifications
13	ISO/IEC 17826:2016	Information Technology - Cloud Data Management Interface
14	BS ISO/IEC 19831:2015	Cloud Infrastructure Management Interface (CIMI) model and Http-based RESTful Protocol Cloud Infrastructure Management Interface
15	BS ISO/IEC 17789:2014	Information Technology Cloud Computing Reference Architecture

X. Technology Platform

The competition practice environment takes the cluster mode. The size of the cluster is built according to the number of teams, and each competition workstation is connected and accessed through the network. The local environment cluster deployment or the public cloud

environment cluster deployment method can be adopted.

The recommended configuration of the software and hardware of the competition cluster is shown in Table 3 (configured based on 20 teams).

Table 3 Suggestion Table for Software and Hardware of Competition Cluster

Category	Item	Quantity	Notes
Hardware equipment	Control node server	3	General 2 U server is recommended to be configured with CPU of Intel Silver series or above, 64 G memory or more, 300 G hard disk or more.
	Compute node server	4	General 2 U server is recommended to be configured with CPU of Intel Silver series or above, 192 G memory or more, and 2 T hard disk or more.
	Rout switch module	1	Layer 3 Gigabit Ethernet switch is recommended to be configured with 24 Gigabit Ethernet ports or more, 200 Mpps or more, 2 K ARP table or more, and 2 K Layer 3 VLANs or more.
Software platform	Cloud computing infrastructure platform	1	Cloud computing OpenStack infrastructure platform is recommended, which can meet the functions including image upload, cloud host type definition, cloud network building, cloud host building and cloud hard disk usage.

The software and hardware configuration of a single workstation is shown in Table 4 (configured based on 20 teams).

Table 4 Configuration Table for Software and Hardware of a Single Workstation

Category	Item	Quantity	Notes	Total
Hardware Resources	Cloud host resources	1	Independent cloud computing platform tenant is recommended to be configured with resource quota not less than 16 vCPUS and 32 G memory	20
	PC	1	General equipment is recommended to be configured with i5 CPU or above or other CPU with the same performance, over 8 G memory and over 128 G SSD hard disk	20
Software Resources	Domestic mainstream public cloud providers		X86 architecture public cloud, and provide accounts	20
	Private cloud platform software packages	1	Contain OpenStack Train offline installation package, installation script, qcow2 image file.	20
	Container cloud platform software packages	1	Contain offline installation packages such as DockerCE, Docker compose, Kubernates1.22.1 and KubeVirt, as well as application software packages required for the Competition such as Nginx, Mysql, Centos7.9, Apache, LNMP, and WordPress	20

	Public cloud competition software packages	1	Contain application packages deployed on public cloud platforms	20
Platforms Resources	Cloud computing competition management platform	1	Support automatic marking	1

A list of general software and tools is shown in Table 5.

Table 5 List of General Software and Tools

No.	Software	Introduction
1	PC operating system	UbuntuDesktop20.04
2	SSH client tool	Terminal emulator for SSH (SSH1 and SSH2)
3	Python 3.6	Cloud platform development programming environment
4	PyCharm or VSCode	Python development tools

XI. Result Evaluation

i. Marking criteria (with 100 points in total)

The marking criteria for the Competition are shown in Table 6.

Table 6 Competition Marking Criteria

Module	Task	Main knowledge and skill points	Score
Session I Private cloud	Task 1: Private cloud service building task	Setting server IP address, settings host names, partitioning disks, mounting file systems, installing and configuring WEB, FTP, DNS, NTP and other common Linux servers. Building basic variables on OpenStack cloud platform for configuration, and installing and deploying OpenStack related components such as database, Keystone service, Glance service, Nova service, Neutron service, Dashboad service, Cinder service, Swift service, Heat service, Ceph service, Ceilometer, manila and Zun service to complete the building and deployment of the private cloud platform.	10 points
	Task 2: Private cloud service operation and maintenance tasks	Building basic variables on OpenStack cloud platform for configuration, and manually installing and deploying OpenStack-related components such as database, Keystone service, Glance service, Nova service, Neutron service, Dashboad service, Cinder service, Swift service, Heat service, Ceph service, Ceilometer, manila, and Zun service to complete the building and deployment of the private cloud platform and operations. Using Ansible, the automated operation and maintenance tool, to complete the deployment of private cloud application project and the upgrade of application system architecture	10 points
	Task 3: Private cloud operation, maintenance and development tasks	Writing Python code to call OpenStack APIs, so as to manage and maintain OpenStack-related components and cloud platform resources such as Keystone, Glance, Nova, Neutron, Cinder, Swift, Manila, Heat and Zun.	10 points
	Sub-total		30

Module	Task	Main knowledge and skill points	Score
			points
Session II Container cloud	Task 1 Container cloud service building task	Installing and configuring DockerCE, installing, configuring and using Docker Compose, and building, configuring, managing and using private storehouse. Configuring and building the Kubernetes container cloud platform.	5 points
	Task 2 Container cloud application building task	Using containers to implement system packaging, building Microservice systems, building message middleware systems, applying load balance, accessing and managing databases, arranging containers, and controlling access. Installing container continuous integration tool, building typical tool chain, and deploying project continuous integration environment.	15 points
	Task 3 Container cloud service operation and maintenance tasks	Operating and maintaining container clusters on the Kubernetes platform, including Pod, Deployment, Service, Ingress, Istio service grid, network, storage volume and security. Based on the KubeVirt service of Kubernetes, building, migrating, managing and maintaining the instances of a virtual machine.	10 points
	Task 4 Container cloud platform operation, maintenance and development tasks	Competitors should write Python scripts based on Kubernetes APIs to complete the operation and maintenance of container cloud platform services.	10 points
	Sub-total		40 points
Session III Hybrid cloud	Task 1 Public cloud service building task	Applying for cloud component services such as public cloud network, cloud host, cloud database, cloud storage, cloud security, log service, container cluster, building application services, and make the system become a cloud system.	15 points
	Task 2 Hybrid cloud cluster configuration	Realizing the connection between the local container cloud and the public cloud for the cloud system.	5 points
	Task 3 Hybrid cloud cluster application deployment	Jointly using public cloud and private cloud to deploy business systems to achieve traffic control, cluster monitoring, and automatic operation and maintenance.	10 points
	Sub-total		30 points
Total score			100 points

ii. Organization and division of responsibilities

1. The organizations involved in the management of the competition results include the jury and the supervision and arbitration team. The jury follows the "jury president responsibility system" with check-in judges, encryption judges, on-site judges, and marking judges. The judges can be composed of experts in relevant fields from all over the world. Specific requirements for judges are shown in Table 7.

Table 7 Specific Requirements for Various Types of Judges (configured based on 20 teams)

No.	Professional technical directions	Requirements for knowledge and competence	Judging, teaching and work experience	Professional and technical titles (professional qualification level)	Headcount
1	Jury president (professional technical direction: cloud computing)	Possessing profound theoretical knowledge of cloud computing and a high level of practical skills, familiar with vocational education and competition work, and having strong organizational, coordination and spot response abilities.	Having experience as a judge in national vocational skills competitions, and having been engaged in cloud computing teaching or having worked in the cloud computing industry for more than five years	Associate senior professional title or above or senior technician professional qualification	1
2	On-site and marking judges (professional technical direction: cloud computing)	Possessing profound theoretical knowledge of cloud computing and a high level of practical skills, familiar with vocational education and competition work, and having strong organizational, coordination and spot response abilities.	Having experience as a judge in provincial (state) or national vocational skills competitions, and having been engaged in cloud computing teaching or having worked in the cloud computing industry for more than five years.	Associate senior professional title or above or senior technician professional qualification	10
3	Check-in judges (professional technical direction: unlimited)	Familiar with vocational education and competition work, and having strong organizational, coordination ability and spot response abilities.	Having experience as a judge in provincial (state) or national vocational skills competitions	Associate senior professional title or above or senior technician professional qualification	2
4	Encryption judges (professional technical direction: unlimited)	Familiar with vocational education and competition work, and having strong organizational, coordination ability and spot response abilities.	Having experience as a judge in provincial (state) or national vocational skills competitions	Associate senior professional title or above or senior technician professional qualification	2

No.	Professional technical directions	Requirements for knowledge and competence	Judging, teaching and work experience	Professional and technical titles (professional qualification level)	Headcount
Total number of judges			15		

Note: This Table is the requirements for standard judge configuration. In case of special circumstances, appropriate adjustments can be made with this Table as a reference.

2. The supervision and arbitration team is responsible for supervising the work of the jury throughout the whole process, and reviewing the results of the Competition by sampling.

3. The supervision and arbitration team is responsible for accepting appeals against the judging results submitted by leaders of teams, organizing reviews and providing timely feedback on the results of the reviews.

iii. Marking method

1. This Competition adopts the automatic marking by the competition system and result marking.

Automatic marking by the competition system: The competition system will automatically score the questions. Each team will be given an account and password, and the results will be saved and submitted before the end of the Competition.

Result marking: For the questions that cannot be scored by the competition system, a marking form is designed according to the marking criteria, and the results are scored.

2. Each jury will summarize all the marking forms of the group and calculate the results. The judge members will sign and confirm the sheets. The result summary table will be filed for verification.

3. In order to ensure the accuracy of the performance assessment, the supervision and arbitration team will review the results of all teams (competitors) that rank in the top 30% of the total results of the Competition; the rest of the results will be checked and reviewed by random sampling, and the sampling coverage rate shall not be lower than 15%. Any mark errors will be promptly notified in writing to the jury president, and he/she will correct the results and sign for confirmation. When the error rate of review and random inspection exceeds 5%, the jury will review all results.

4. After the jury president formally submits and checks the results of the Competition and believes that they are correct, the encryption judges will decrypt the encrypted results level by level under the supervision of supervisors, which strictly follows the methods and templates of the relevant documents.

5. After the results of the Competition reviewed are correct, they will be announced after being reviewed and signed by jury presidents and supervisors. They will also be submitted to the competition administration system simultaneously.

6. The total score of each team is the average of the sum of the scores of the two groups. If the total results of teams are tied, the cumulative time spent in completing the three-phase

competition papers shall be used to calculate the result ranking from the least to the most.

XII. Awards and Prizes

A gold, a silver and a bronze medal will be awarded by the Competition to each different team, and the teams in the top 50% of the overall results (other than the top three) will be awarded the winning prize.

XIII. Preliminary Plans for the Competition Venue

Backup workstations on the venue: The venue provides backup workstations that account for 10% of the total teams.

Reliability of the competition system: The servers used in the competition system should be redundant, and the database and storage should be equipped with a high-availability architecture. They should start operating one week before the Competition. After many stress tests, the school should organize real competition environment tests.

Backup cloud host resources for the Competition: The competition site provides backup cloud host resources that account for 10% of the total teams.

The contingency plan for the Competition site is as follows:

1. Contingency plan for cloud host resource problems

If the cloud host freezes or crashes during the Competition, competitors should raise their hands to signal to the judges. After the judges and technical support personnel confirm the problems, the cloud host resources can be replaced. The waiting time and delay time for replacing cloud host resources should be determined by the judges.

2. Contingency plan for PC problems

If the PC crashes or has a blue screen during the Competition (which cannot be resolved after restarting), competitors should raise their hands to signal the judges. After the judges and the technical support staff confirm the problems, they can use the backup workstation or replace the PC to answer the questions. Whether to delay the competition time should be determined by the judges.

XIV. Safety

Event safety is a prerequisite for the smooth running of the Competition. It is the core issue that must be taken into consideration in the preparation and operation of the Competition.. The Executive Committee should take practical and effective measures to ensure the personal safety of competitors, judges, staff, and audience during the Competition. In particular, it should make every effort to prevent the pandemic to ensure that all people participate in the Competition healthily.

1. Competition environment

(1) The Executive Committee of the Competition should organize a special inspection on the competition venue, accommodation places and transport before the Competition, and make explicit requirements for safety and pandemic prevention. The layout of the venue, and the tools, equipment and anti-epidemic materials in the venue shall comply with the relevant national safety regulations. If necessary, workshop simulation tests can also be conducted to identify possible problems. Host school must exclude hazards in accordance with the requirements of the Executive Committee of the Competition before the Competition.

(2) A cordon and a one-meter line should be set up around the competition venue, and all participants are required to enter the venue with valid certificates issued by the Executive Committee of the Competition to prevent unrelated personnel from entering the venue and causing accidents. The necessary labor protection should be provided for the competitors with reference to the requirements of the relevant occupational positions within the competition site. In the section with dangerous operation, the judges should take strict precautions against the wrong operation of the competitors.

(3) Host school shall provide conditions to ensure the implementation of the contingency plan. For situations involving electricity consumption and fire-prone events, the system and contingency plan must be clarified, and emergency personnel and facilities must be provided.

(4) Flammables, explosives, and all kinds of hazardous materials unrelated to the Competition shall be strictly prohibited from being brought into the workshop, and it is not allowed to bring school bags into the workshop.

(5) Advanced equipment should be equipped to prevent someone from using electromagnetic waves to interfere with the Competition. Network security control should be carried out on the competition site to avoid the exchange of information inside and outside the Competition site, so as to fully reflect the seriousness, fairness and impartiality of the Competition.

(6) Host school needs to formulate a personnel guidance plan for the open venue and experience area. In addition to complete indication signs, additional guidance personnel shall be assigned in areas where there are crowded people in the venue environment.

(7) During the Competition, the host school shall take key positions in the management of the venue, increase efforts and establish a security management log.

2. Team responsibility

(1) Each school shall arrange to purchase personal accident insurance for the competitors during the Competition when organizing the teams.

(2) After the teams are formed, the relevant management policy shall be formulated and the safety and pandemic prevention education shall be provided for all competitors.

(3) The teams shall strengthen the safety and pandemic prevention management of the competitors and achieve the alignment with the safety and pandemic prevention management of the venue.

3. Contingency response

If an accident occurs during the Competition, whoever finds it should report to the Executive Committee of the Competition in the first instance, and also take measures to avoid further deterioration. The Executive Committee of the Competition should immediately activate the contingency plan to address the problem and report to the Executive Committee of the division. The decision on whether to suspend the categories with major problems of safety and pandemic prevention will be made by the Executive Committee of the division.

XV. Competition Notice

i. Notice for teams

1. Teams should participate in various events organized by the organizers.

2. During the Competition, team leaders and other team members are not allowed to contact the judges personally, and anyone found to have falsified will be disqualified and their results

will be invalid.

3. All competitors must complete the assessment of the Competition in accordance with the requirements of the Skill-Specific Competition Rules.

4. For the teams that hamper the fairness of the Competition and hinder the normal progress of the Competition, they will be subject to warnings and cancellation of the competition results and notice of criticism in accordance with the severity of the circumstances. Specifically, if there is a major impact on the competition process and related activities, the participating schools or the education administrative departments of the regions they are located shall be notified in an appropriate manner. The administrative or disciplinary sanctions shall be imposed in accordance with relevant regulations, and at the same time, the schools shall be suspended from participating in the 1st World Vocational College Skills Competition. If someone is involved in a criminal offense, he or she will be transferred to the judicial authorities.

ii. Notice for instructors

Instructors are the bridge between the Competition and the competitors. They must conscientiously play their role in imparting, helping, and guiding.

1. Before the Competition, carefully imparting the teaching contents and practical skills based on teaching; organizing the competition questions published on the student training official website; organizing the students to study and understand the competition rules and regulations; educating the students to obey the command and the judges' ruling; instructing competitors to make all the technical preparations and competition preparations before the Competition.

2. During the Competition, explaining doubts for students; relieving the huge psychological pressure of competitors during the Competition; playing a good role in linking the superior and the subordinate, that is, communicating the notice and requirements of the Executive Committee of the Competition to the competitors, and reporting the defects in the competition process to the supervision (arbitration) team.

3. After the Competition, carefully summarizing the experience of the Competition, and identifying the strengths and weaknesses of the team instructed; organizing the teaching team to check and review the strengths and weaknesses of the school against the competition questions, so as to play a leading and exemplary role in promoting education, learning and reform by competition.

iii. Notice for competitors

1. Competitors should not be replaced, in principle, after their sign-ups are confirmed. However, if a competitor fails to join the Competition during the preparation for the Competition, his/her provincial competent educational authorities should issue a written explanation, replace him/her with a substitute in line with relevant competitor qualifications, and have the substitute reviewed in ten working days; after the Competition begins, teams should not replace members. Competitors are allowed to miss the Competition. Teams should not replace instructors. Instructors are allowed to miss the Competition.

2. Competitors should strictly comply with the regulations and operating procedures of the venue, ensure personal and equipment safety, accept the supervision and warnings of the judges and compete in a civilized manner.

3. Competitors should enter the competition venue with a competition certificate, and wear it

throughout the operation process in the venue for inspection.

4. Competitors are not allowed to bring any books and other paper materials (electronic documents of relevant technical materials are provided by the staff), communication tools and storage equipment (such as USB flash disks) when entering the venue. The Competition provides computers and application software uniformly.

5. Each team should enter the venue to familiarize themselves with the environment in the specified time period one day before the start of the Competition. After entering the venue on the competition day, the venue staff and the competitors jointly confirm the operating conditions and equipment conditions.

6. Competitors are not allowed to start operating equipment before receiving the start instruction. Competitors should complete the competition project in the designated workstation, and cheating is strictly prohibited.

7. During the Competition, if a team cannot compete due to serious operational errors or safety accidents, the on-site judges have the right to terminate its competition.

8. Competitors should work continuously during the Competition, and things such as food and water are provided by the Competition in a unified manner. If competitors take a break, drink water, and use the restroom, these are included in the Competition time.

9. Any competitor who leaves the venue earlier during the Competition shall not return to the venue on the same day.

10. In order to cultivate the working style of technical and skilled talents, during the Competition, competitors should pay attention to keeping the working environment and equipment placement in line with the "5S" standards for enterprise production (namely, Seiri, Seiton, Seiso, Seiketsu and Shitsuke in Japanese). If they are violated, the judges have the right to deduct points at his/her discretion.

11. In case of any equipment fault caused by non-human factors during the Competition, after confirmation by the judges, the judges can apply to the jury president to make up the time for troubleshooting.

12. If a competitor wants to end the competition in advance, he/she should raise hands to give a sign to his/her judge. The judge will record his/her end time of the Competition. After the Competition is terminated, no further competition-related operations are allowed.

13. Each team should submit the competition results in accordance with the requirements of the Competition and the competition questions. It is forbidden to make any marks unrelated to the Competition on the competition results.

14. After the competition operation is over, teams must confirm that the documents required for the Competition have been successfully submitted. The judges should mark the specified position of the competition result and sign with the teams for confirmation.

iv. Notice for staff

1. All staff of the Competition must obey the unified command, and provide services for the Competition with a highly responsible attitude.

2. All staff should arrive on time according to the work division, perform their duties with due diligence, and do their duty and temporary work well to ensure the smooth progress of the Competition.

3. All staff must wear signs, carefully check the certificates, and the relevant personnel can only enter the designated place after checking.

4. In case of emergencies, the staff should report to the jury president in time, and at the same time take emergency measures to avoid major accidents and ensure the success of the Competition.

5. The heads of each working group must stick to their posts, organize the members of the group to efficiently complete their respective tasks, and supervise and coordinate the members.

6. All staff are not allowed to answer the phone in the venue to ensure that the venue is quiet and undisturbed.

XVI. Appeal and Arbitration

1. Each team can submit an appeal to the supervision and arbitration team of the Competition about the instruments, equipment, fixtures, materials, objects, computer software and hardware, tools and supplies used in the Competition, competition officiating, venue management, and non-standard behaviors of the staff that do not conform to the Skill-Specific Competition Rules. The subject of the appeal is the team leader. Team leaders may submit written appeal to the supervision and arbitration team within two hours after the end of the Competition (when the competitors have completed the Competition).

2. A written appeal should give a full and factual account of the incident, time, personnel involved and the basis for the appeal, and should be signed by the team leader. Non-written appeals will not be accepted.

3. The supervision and arbitration team should organize a review within two hours after receiving the appeal report and timely inform the appealing party in writing of the review result. If the appealing party still disagrees with the review result, the team leader may submit an appeal to the Supervision and Arbitration Committee of the division. The arbitration award of the Supervision and Arbitration Committee of the division shall be final.

4. The arbitration award should be signed for confirmation of receipt by the appealing party and cannot be received on his/her behalf. If the appealing party leaves at the agreed time and place, he/she is considered to have waived the appeal.

5. The appealing party may waive the appeal at any time.

6. The appealing party shall not disrupt the venue for any reason through drastic actions.

XVII. Competition Observation

i. Video observation

The open observation area is available to the public such as the media, enterprise representatives and college teachers and students, and it provides live broadcast for the competition venue on the outdoor big screen. At the same time, the answer progress of competitors can be watched in real time through the progress monitoring chart of the competition system. An exhibition area is also set up outside the venue to display the development achievements of "cloud computing" competitions, specialty and industry.

ii. Organizational arrangements

One hour after the start of the Competition every day, the host school organizes and sends staff to lead the media, experts, enterprise representatives, school teachers and students into

the open observation area set up outside the competition venue. Observers must follow the designated route to the observation area.

iii. Disciplinary requirements

In order to ensure the smooth running of the Competition, the following disciplinary requirements should be followed during the observation period:

1. Except for the staff directly, judges and competitors related to the Competition, other people are observers.

2. All disciplines stipulated in the regulations of the World Vocational College Skills Competition shall not be violated.

3. Observers should wear observation certificates and follow the instructions of the staff in the observation area.

4. Observers should observe in a courteous manner, keep the observation area clean and quiet, and prevent all kinds of uncivilized behaviors that violate the order of observation.

XVIII. Live Competition

i. Live broadcast method

1. There should be video equipment without blind spots in the competition venue, which can record and broadcast the circumstances of the competition venue in real time;

2. The answer progress of competitors should be displayed in real time through the large screen or projection outside the competition venue.

ii. Live broadcast arrangement

1. The preparations for the Competition, the opening and closing ceremonies for the Competition, and the Competition should be videoed.

2. From the moment the competitors enter the competition venue, the whole process in the competition venue should be videoed and broadcast live.

3. From the beginning of the Competition to the end of the Competition, the progress monitoring and live broadcasting of the competition system should be carried out in the whole process.

iii. Live broadcast content

1. The Executive Committee should arrange special personnel to broadcast and video the opening and closing ceremonies and the process of the Competition.

2. Videos on interviews with competitors and instructors, comments by experts and judges and the video materials of interviews with business people should be produced to highlight the skills and characteristics of this Competition. Comprehensive information and materials shall be provided for publicity, arbitration, and resource conversion.

The above contents should be made public through the Competition website and submitted to the official website of the World Vocational College Skills Competition.

XIX. Resource Conversion

Skill resource conversion should be handled by the Executive Committee. The application unit should carry out and promote the resource conversion according to the characteristics of

the skill assessment. A plan for resource conversion should be submitted to the office of the Executive Committee within 30 days after the Competition. The host school is the first responsible unit for resource conversion that should complete resource conversion. The completed resources should be uploaded to the network information release platform designated by the Competition.

i. Content of resources

The results of resource conversion should include basic and extended resources, fully demonstrating the characteristics of the skill assessment of this Competition.

1. Basic resources

Expertise show: A promotional video for the Competition should be made, and the expertise of the winning teams (competitors) should be shown.

Skill summary: Relevant text documents and operation demonstration videos should be made according to the competition task module for the production of skill introduction, skill operation points, assessment indicators and other materials.

Teaching resources: A "cloud computing" teaching resource library should be developed and produced, and digital professional teaching resources such as professional teaching materials, teaching PPT, skill training instructions and training operation videos should be developed, so as to provide typical teaching aids for leading cloud computing professional teaching.

2. Extended resources

Unique auxiliary resources including videos on comments by expert and interviews with excellent competitors, test question banks and other extended resources should be made, so as to provide searchable reference materials for subsequent events. A professional exchange platform for international schools and colleges should be built, and registration should be made available to domestic and foreign vocational schools.

Converted resources (in Chinese and English) of this Competition that have been reviewed should be uploaded to a website designated by the Competition.

ii. Expected results

1. Expertise show: Promotional videos for the Competition, interviews with competitors, interviews with instructors and experts should be made.

2. Skills summary: PPT for the technical introduction of the Competition, PPT for skill points, PPT for assessment indicators, competition questions and marking criteria, and recordings of practice on the competition platform and explanation videos should be made.

3. Teaching resources: A series of related teaching materials and resources should be developed by cooperating with the national resource database building project for the application of cloud computing technology.

4. Extended resources: They include videos on the comments on the Competition and interviews with excellent competitors, case library, and material resource library.

5. Building a professional exchange platform for international schools and colleges: For the world's vocational schools, school alliances and enterprise alliances should be built, a professional teacher-student exchange platform for international schools and colleges should be built, and "cloud computing" education should be provided for the study and employment of students in vocational schools around the world, so as to develop a benign interactive

intelligent platform for the talent training of the world's vocational schools and the needs of enterprise talents.

iii. Completion time

The resource conversion and development plan and completion time are shown in Table 8.

Table 8 Resource Conversion and Development Plan

Name of resources			Form of expression	Number of resources	Resource requirements	Completion time
Basic resources	Expertise show	Competition promotional video	Video	1	> 5 min	Within two weeks before the end of the Competition
		Expertise show video	Video	1	> 5 min	Within two weeks before the end of the Competition
	Skill summary	PPT for skill introduction PPT for skill points PPT for assessment indicators Recordings of practice and explanation on the competition platform Official competition questions and marking criteria	Text document Demo document Video	5	PPT with more than 20 pages; Practice recording with total duration not less than one hour; Publish the complete marking criteria for Competition questions	Within one month before the end of the Competition
	Learning support	Relevant professional textbooks	Text document	2	E-textbook	Within one month before the end of the Competition
		Skill training guide	Text document	2	E-textbook	Within one month before the end of the Competition
Extended resources	Case library		Text document	3	With total pages not less than 100 pages	Within one month before the end of the Competition
	Material resource library		Demo document	3	Each PPT with not less than 20 pages	Within one month before the end of the Competition
	Videos on the comments on the Competition and interviews with excellent competitors		Video	2	With total duration not less than 30 minutes	Within one month before the end of the Competition

XX. Miscellaneous

None