



Pre task assignment

ADMINISTRATION AND MANAGEMENT OF NETWORK SYSTEMS

1. Summary

The competition is divided into 2 tests.

The competition consists of completing 3 modules.

Module 1 – “Windows Island” - Configuration of services based on Microsoft Windows OS.

Module 2 – “Linux Island” - Configuration of services based on - Linux OS.

Module 3 – “Network Island” - Configuration of local and global data transmission networks.

2. Allocated time: 6 hours.

The contest duration is 6 hours.

Module 1 and 2: 3 hours 30 minutes.

Module 3: 2 hours 30 minutes.

3. Requirements

Modules 1 and 2 are grouped together.

Module 1 – “Windows Island” - Configuration of services based on Microsoft Windows OS.

Module 2 – “Linux Island” - Configuration of services based on - Linux OS.

Day 1

Allocated time: 3h30

Recommendations to candidates:

At the end of your work, you must provide the virtual machines (VMs) in the off state for testing. In any case, all virtual machines will be restarted by the judges before the judging. If it is impossible to enter the system, the judges will not evaluate this part.

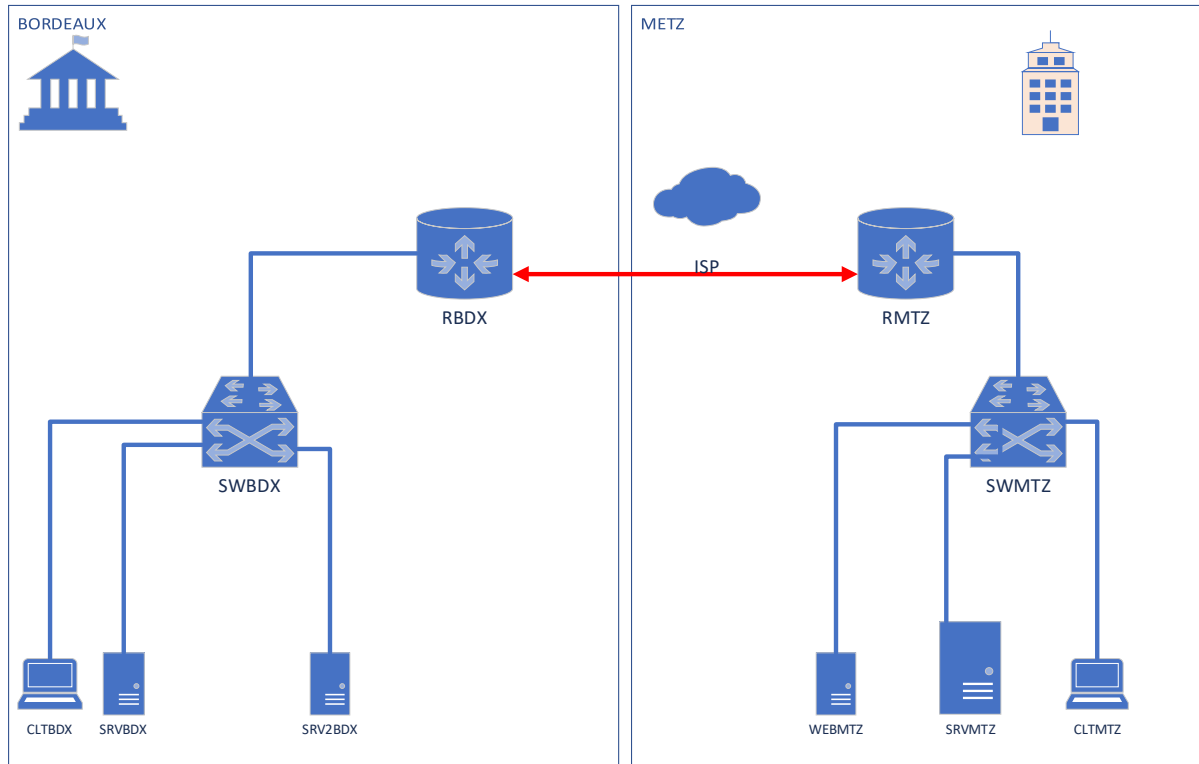
When working, be aware of possible power outages.

Situation:

The Abilympics France association, which has its headquarters in BORDEAUX, is responsible for organizing the competition for the 10th international ABILYMPICS. The chosen site is the city of METZ. In this context and in order to facilitate the work of the judges, an extension of the computer network from BORDEAUX to the METZ site is planned. Your task is to replicate, in part, the network infrastructure.

For the whole subject the passwords will be **P@ssw0rd**

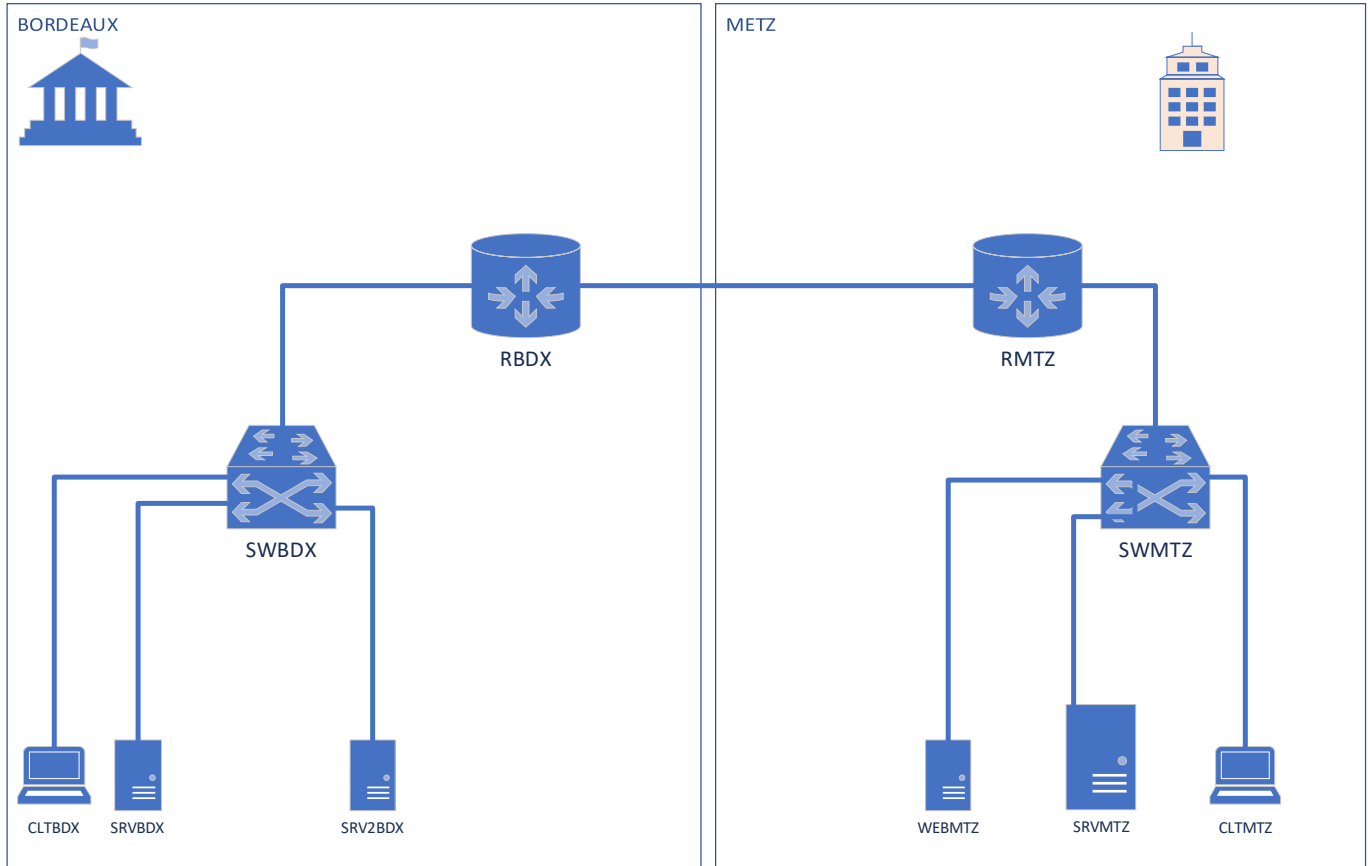
Physical Diagram:



For the systems part, each site will be represented by a physical machine, each of which makes it possible to virtualize all the machines on the site using the Virtualbox tool.

You have two switches and two routers to simulate the interconnection of sites. All machines (client server) will be in bridge mode on the network card integrated into the motherboard (named eth0 on the rest of the subject) so one link will be to SWBDX and SWMTZ from the physicals PC.

Simplified diagram for this test:



The link between the two sites is a Giga Ethernet link.

1- Network infrastructure

SITE TO SITE LINK

Port Gi0/0/0 on routers

BORDEAUX SITE:

Physical machine (Eth0) will be connected on port 1 of SWBDX
 RBDX Gi0/0/1 will be connected on port 24 of SWBDX

METZ SITE:

Physical machine (Eth0) will be connected on port 1 of SWMTZ
 RMTZ Gi0/0/1 will be connected on port 24 of SWMTZ

2- Infrastructure system

Adressing Plan

LAN BORDEAUX	172.30.0.0/18
LAN METZ	172.30.128.0 /18
WAN SITE TO SITE	1.0.0.16 /30

CLTBDX, WEBMTZ and CLTMTZ will be in dynamic address.
SRVMTZ will take the first address from METZ LAN
SRVBDX will take the first address of the BORDEAUX LAN
SRV2BDX will take the second address of the BORDEAUX LAN
RBDX Gi0/0/0 will take the first site-to-site WAN address
RMTZ Gi0/0/0 will take the last site-to-site WAN address
RBDX Gi0/0/1 will take the last address from the BORDEAUX LAN
RMTZ Gi0/0/1 will take the last address of the METZ LAN

BORDEAUX physical PC

IP address eth0 172.31.0.1 /16
IP address eth1 172.31.0.2 /16

METZ physical PC

IP address eth0 172.31.0.3 /16
IP address eth1 172.31.0.4 /16

Domain name

abilympics2023.org

Provide a basic configuration on the active equipment to establish a link between the two sites.

Creation of virtual machines using the VIRTUALBOX software on the BORDEAUX physical machine:

SRVBDX

Name SRVBDX
RAM 8Go, HDD 50 Go
Network card in bridge mode on eth0 card.
OS Windows server 2022, administrator password: **P@ssw0rd**
1 partition C: named **system** 30 Go NTFS for OS
1 partition D: named **share** 20 Go NTFS.
society: **abilympics2023**
Organization: **abilympics**
Hostname: **srvbdx**

CLTBDX

Name CLDBDX
RAM 2Go HDD 30Go
Network card in bridge mode on eth0 card.
OS Windows 10 pro
Local administrator account **adloc** password: **P@ssw0rd**
Hostname: **cltbdx**

SRV2BDX

Name SRV2BDX

RAM 8Go, HDD de 50Go

Network card in bridge mode on eth0 card.

OS Windows server 2022, administrator password **P@ssw0rd**

1 partition C: named **system** 50 Go NTFS for the OS

Society: **abilympics2023**

Organization: **abilympics**

Hostname: **srv2bdx**

IMPORTANT

Make a snapshot named "%machine name%_base" for each machine at the end of the first installation (before advanced configuration).

Creation of virtual machines using the VIRTUALBOX software on the METZ physical machine:

SRVMTZ

Name SRVMTZ

RAM 8Go, HDD 50Go

Network card in bridge mode on eth0 card.

OS Windows server 2022, administrator password **P@ssw0rd**

1 partition C: named **system** 50 Go NTFS for the OS

Society: **abilympics2023**

Organization: **abilympics**

Hostname: **srvmtz**

WEBMTZ

Name WEBMTZ

RAM 4Go, HDD 40Go

Network card in bridge mode on eth0 card.

OS Linux DEBIAN 10, root password **toortoor!**

Full username adloc password **P@ssw0rd**

Hostname: **webmtz**

CLTMTZ

Name CLTMTZ

RAM 2Go, DD de 30Go

Carte réseau en mode pont sur la carte eth0.

OS Windows 10 pro

Local administrator account **adloc** password **P@ssw0rd**

Hostname: **cltmtz**

IMPORTANT

Make a snapshot named "%machine name%_base" for each machine at the end of the first installation (before advanced configuration).

3- srvbdx specifications

This server will be the main domain controller with the following services: Active directory, DNS, file server.

AD

Configure the Bordeaux Active Directory site with the domain name abilympics2023.org.

DNS

srvbdx will be the main DNS server for the hosts of **abilympics2023.org** domain.

USERS and GROUP

Create the following users and groups.

The password for each user will be **P@ssw0rd**.

Name	First name	Login	Site	Departments
Leblanc	Mathieu	mleblanc	Bordeaux	Management
Laborde	Noemie	nlaborde	Bordeaux	Communication
Klein	Patrick	pklein	Bordeaux	IT
Kremer	Anne	akremer	Bordeaux	Works
Etchebarn	Patxi	petchebarn	Metz	Finance
Martin	Eve	emartin	Metz	Competition
Martinez	Lola	lmartinez	Metz	Competition

Users in the IT group will have full control over the domain.

Do not protect OUs against unintended deletions.

Create an OU at the root for each site.

Create a “computer” OU in each site, place the computers and servers in this OU.

Create a “groups” OU in each site.

Create a “users” OU in each site, place users in this OU according to their distribution.

GPO

Configure following policies:

- When connected on BORDEAUX Site: All users except users in IT group cannot launch cmd.exe and control panel. When connected to other site, this policy doesn't apply.
- All users in Works group can change their IP but must not be administrator of their PC.

File Shares

Configure srvbdc as File shares server.

All shares' folders will be in D:\Shares\ folder:

- Create one share "profiles" that will contain all user's profiles. This share should not appear when browsing all shares in the server. Users' profiles will be place in sub directories of the profile share. Share, profile directory and sub directories should be restricted as much as possible.

- Create one share "user_homes" that will contain all user's home directory. Each user directory is subdir of this share. On clients, users will automatically mount this share as **H** letter.

- Create one share "departments" that will contain all departments shares. Each department is subdir of this folder. See the following informations:

Departments	Read only allowed departments	Read/write allowed departments
Management		Management
Communication	Management	Communication
Works	Finance	Works, Management
Finance	Works	Finance, Management
Competition	all	Competition, Management
IT		IT

On clients, users will automatically mount this share as **S** letter.

For each share, right must be applied using NTFS security (not share security). Also, users must see only shares where they have read (at least) access.

4. Specifications srv2bdc

This server is an additional domain controller for the abilympics2023.org domain. The AD database should be replicated from srvbdc only.

Install following services: DNS, DHCP, IIS

DNS

srv2bdc will be the secondary server for the abilympics2023.org domain

DHCP

The DHCP pool must contain 256 addresses starting from the address 172.30.10.0 /18

Lease: 8h

Options: Primary and Secondary DNS server, Gateway, Domain Name

Reservation cltbdx will always take the second address from the pool.

Exclude: 172.30.10.50 to 172.30.10.60

IIS

Create an abilympics2023.org site accessible from http and https
Customize the home page with the message “Welcome to abilympics France internal webpage”.

FTP

Install FTP service on D:/FTPfolder. The access must synchronize with AD users.

5. Specifications srvmtz

AD

This server will be the domain controller for the **metz.abilympics2023.org** subdomain. Replication from/to srvbdx should be scheduled every 15 minutes.

DNS

This server is the dns server for LAN METZ and the domain metz.abilympics2023.org.

DHCP

The DHCP pool must contain 1024 addresses starting from the address 172.30.130.0 /18

Lease: 4h

Options: DNS primary server (srvmtz) and secondary (srvbdx), gateway, domain name

The webmtz server will always be assigned the last address in the pool.

6. Specifications cltbdx

This machine must be a member of the abilympics2023.org domain and can be used for testing.

7. Specifications cltmtz

This machine must be a member of the metz.abilympics2023.org domain and can be used for testing.

8. Specifications webmtz

Install Debian10.

Root password **toortoor!** full username adloc password **P@ssw0rd**.

FQDN webmtz.metz.abilympics2023.org

Install the Apache web service,

customize the home page with the message “Welcome to 10th international Abilympics contest in METZ”.

Create an IT group and add the corresponding account.

Module 3 – “Network Island” - Configuration of local and global data transmission networks.

Day 2

Allocated time: 2h30

Recommendations to contestants:

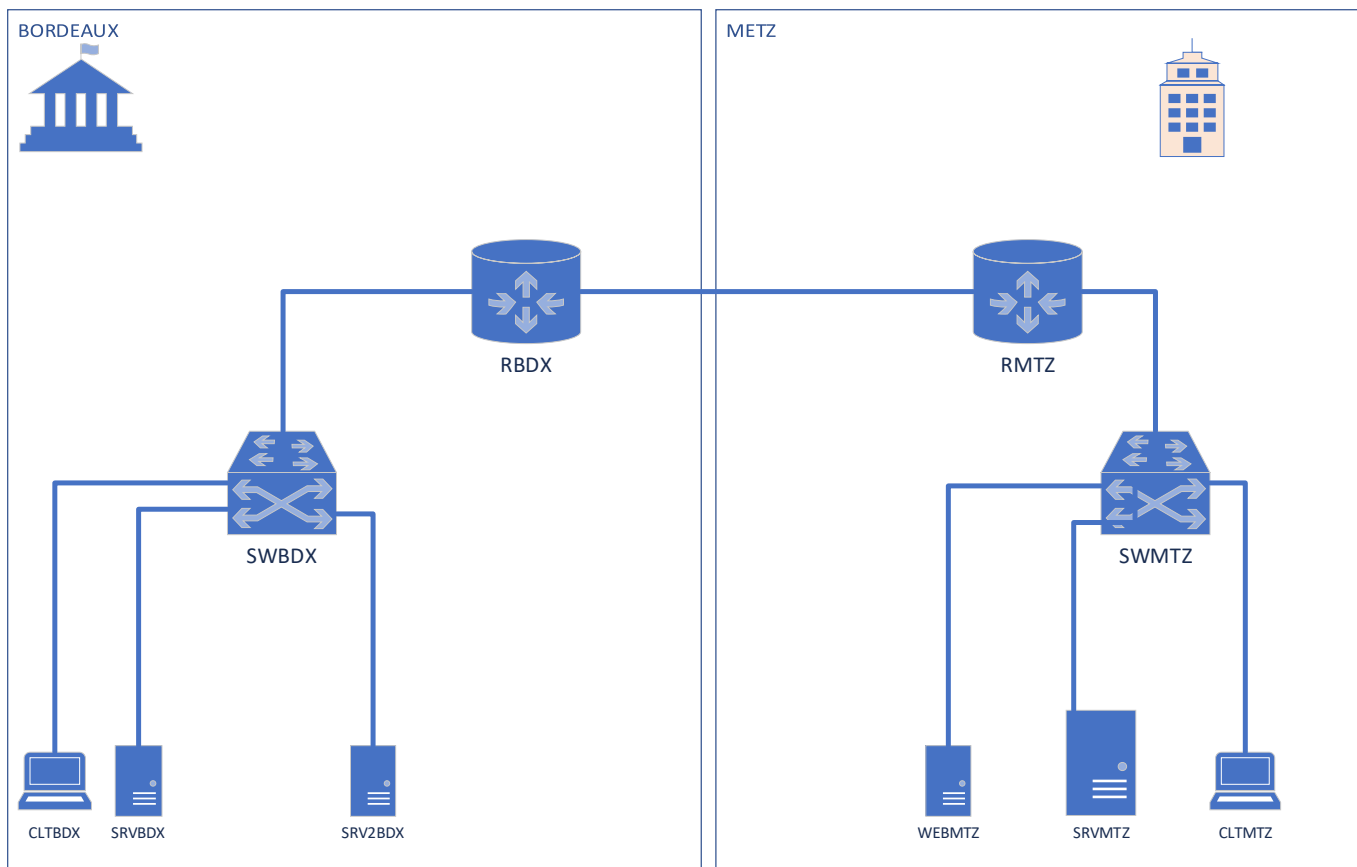
At the end of your work all sessions will be closed on all equipment. If it is impossible to enter the system, the judges will not evaluate this part.

When working, be aware of sudden power outages.

Situation:

As part of the 10th Abilympics World Competition, you are responsible for setting up network equipment for the "abilympics2023.org" association. This association has a historic site in BORDEAUX and a temporary extension to METZ.

Physical diagram:



All passwords will be P@ssw0rd except on the switches, routers and WEBMTZ. The root of the WEBMTZ machine is toortoor!

You also have at your disposal a laptop that allow you to do tests and other settings. This equipment does not appear on the diagram.

1- Preparation

Computer changes from topic day 1.

All the machines have been reset to the "name of the machine_base" state thanks to your snapshot, so:

- Domains have been deleted
- Services have been removed
- The servers will be used as a simple computer
- Clients are no longer integrated into the domain
- All windows machines will be in the workgroup **ABL10**

The addressing plan has been changed.

Modification and verification to be done on the VMs before starting the machines:

- For SRVBDX and CLTBDX the network cards will always be in bridge mode on eth0
- For SRV2BDX the network card will be in bridge mode on eth1
- For SRVMTZ and CLTMTZ the network cards will always be in bridge mode on eth0
- For WEBMTZ the network card will be in bridge mode on eth1

Common configuration to all CISCO equipment:

- The hostname must match the plan
- Secret password: **Password**
- Domain name abilympics2023.org
- Connection to the console port of the switch's with password **Password**
- Connection to the console port of the routeurs with user adloc password **Password**
- All passwords will be encrypted
- Dns lookup will be disabled
- Use of telnet prohibited
- Provide a warning banner with the message "Warning Authorized Access Only"

2- Setting up the network infrastructure

Link to SWBDX

Equipment	Ports
PC BDX eth0	FA0/1
PC BDX eth1	FA0/19
RBDX (Gi0/0/1)	G0/1

Warning:

The connection of certain equipment may be modified depending on the tests to be carried out, but you must return your installation with the configuration above.

Link to SWMTZ

Equipment	Ports
PC MTZ eth0	FA0/13
PC MTZ eth1	FA0/19
RMTZ (Gi0/0/1)	G0/1

Warning:

The connection of certain equipment may be modified depending on the tests to be carried out, but you must return your installation with the configuration above.

Link site to site:

This link will be on Gi0/0/0 routeurs interfaces.

Configure the equipment taking into account the following addressing plan

Device	Interface	Protocol	IP / MASK
RBDX	Gi0/0/1.100	IPv4	172.17.0.1 / 16
RBDX	Gi0/0/1.200	IPv4	172.18.0.1 / 16
RBDX	Gi0/0/1.300	IPv4	172.19.0.1 /16
RBDX	Gi0/0/1.77	IPv4	172.20.0.1 /16
RPBDX	Gi0/0/0	IPv4	2.1.1.9 / 30
RMTZ	Gi 0/0/1.77	IPv4	172.16.0.1 /24
RMTZ	Gi0/0/1.100	IPv4	172.16.1.1 /24
RMTZ	Gi0/0/1.200	IPv4	172.16.2.1 /24
RMTZ	Gi0/0/1.300	IPv4	172.16.3.1 /24
svrbdx	Eth0	IPv4	172.17.1.1 /16
cltbdx	Eth0	IPv4	dhcp
svr2bdx	Eth0	IPv4	172.18.1.1 /16
svrmtz	Eth0	IPv4	172.16.1.254/24
cltmtz	Eth0	IPv4	dhcp
webmtz	Eth0	IPv4	172.16.3.254 /24
SWBDX	VLAN 77	IPv4	172.20.100.1 / 16
SWMTZ	VLAN 77	IPv4	172.16.0.2 / 24

Physical machine BORDEAUX: eth0 192.168.1.1 /24 eth1 192.168.1.2/24

Physical machine METZ: eth0 192.168.1.3 /24 eth1 192.168.1.4 /24

3- Routers

Configure interfaces and sub-interfaces according to the addressing plan.

All routing will be done via static routes, provide a route for each network present in the installation.

Provide a last resort route to 10.0.0.1 for rbdx and 20.0.0.1 for rmtz, these addresses are not currently present in the installation, this is a future development.

SSH

RBDX and RMTZ,

- All remote access with SSH protocol version 2 on local database. User adloc password **Password** ; privilege 15
- RSA keys 1024 bits

NTP

- RBDX is NTP master server
- Other cisco devices will be synchronized via RBDX

DHCP

RBDX Vlan100

Pool 172.17.0.100 /16 to 172.17.1.200 /16

Exclusion 172.17.0.150 to 172.17.0.155

Options: gateway, dns (srvbdx), domain name

RBDX Vlan200

Pool: 10 addresses from 172.18.0.100 /16

Options: gateway, dns (srvbdx), domain name

RBDX Vlan300

Pool: 5 addresses from 172.19.0.100 /16

Options: gateway, dns (srvbdx), domain name

RBDX Vlan77

Pool: 2 addresses 172.20.0.10 /16 and 172.20.0.11/16

Options gateway, dns (srvbdx), domain name

RMTZ Vlan100

Pool 172.16.1.100 /24 to 172.16.1.200 /24

Exclusion 172.16.1.150 and 172.16.1.157

Options: gateway, dns (srvmtz), domain name

RMTZ Vlan200

Pool: 100 addresses from 172.16.2.100 /16

Options: gateway, dns (srvbdx), domain name

RMTZ vlan300

Pool: 3 adresses from 172.16.3.10 /24

Options: gateway, dns (srvbdx), domain name

RMTZ Vlan77

Pool: 172.16.0.100 /24 to 172.16.0.254 /24

Options: gateway, dns server (srvbdx) domain name

4- Switch

SSH

SWBDX and SWMTZ

- All remote access with SSH protocol version 2 on local database. User adloc password **Password**; Privilege 15.
- RSA keys 1024 bits

VLAN

Vlan: same on SWBDX and SWMTZ

ID	Name	Port	Equipment
100	data	ports 1 to 10	srvbdx cltbdx
200	voice	ports 13 to 18	srvmtz cltmtz
300	video	ports 19 and 21	Webmtz srv2bdx
77	mgt	Port 24	
99	depo	Unused ports	

Create the different VLANs.

Switch port security:

SWBDX

A maximum of five mac addresses will be authorized on all FastEthernet ports, they will be learned and recorded dynamically.

Only the mac address of RBDX will be authorized on the corresponding port. The violation mode must be protected.

Unused ports will be disabled.

SWMTZ

Three mac addresses maximum will be authorized on all FastEthernet ports, they will be learned and registered dynamically.

Only the mac address of RMTZ will be authorized on the corresponding port. The violation mode must be restricted.

Unused ports will be disabled.

5- Filtering

When the laptop is connected to port 24 (vlan management) it will have access to all machines in the domain.

Access to srv2bdx

- Full access for vlan100, vlan300 and vlan77 equipments
- Prohibited access for others.

Access to webmtz

- Access http et https only

Access to svrmtz

- No restriction

Access to svrbdx

- Only equipment belonging abilympics2023.org domain will have access to this server
- Prohibited access for equipment's that are not part of the association.

4. Procedure

Day - 1 (March 23rd): On the day before the competition, contestants will be welcomed on the stand by the members of the jury. A briefing about the organization of the contest and about the security rules will be arranged. Due to the large number of registered contestants, the contest will be organized in several groups. Contestants from a same delegation will be inevitably placed in the same group. Each contestant will receive a schedule with the detailed working hours. Contestants will draw lots to be assigned to a work station, where they may drop off their equipment.

The group that is not in competition will have to register to go on an organized trip.

Day 1 (March 24th): The final task assignment for module 1 and 2 will be handed out to contestants. They will have 3 hours 30 minutes to complete the modules.












Day 2 (March 25th): The final task assignment for module 3 will be handed out to contestants. They will have 2 hours 30 minutes to complete the module.





5. Evaluation criteria

N°	Items to be evaluated	Scoring scale
MODULE 1 AND 2		58/100
BORDEAUX SITE		33
01	Physical machine preparation and patching	1
02	Creation and configuration of VMs	4
03	Installation of AD and DNS services abilympics2023.org	2
04	Creation and configuration of users and groups	7
05	Creation of OR	4
06	GPO	4
07	File sharing	4
08	DHCP service	4
09	IIS and FTP	2
10	cltbdx on the domain	1
METZ SITE		17
11	Physical machine preparation and patching	1
12	Creation and configuration of VMs	4
13	AD and DNS services installation metz.abilympics2023.org	2
14	DHCP service	2
15	Clmtz on the domain	1
16	Apache configuration installation	3
17	Group and user creation	4
SITE TO SITE LINK		8
18	Configuration RBDX	4
19	Configuration RMTZ	4
MODULE 3		42/100
20	Preparation	5
21	Network infrastructure and patching	1
22	Routers	14
23	Switch	14
24	Filtering	8
TOTAL		100


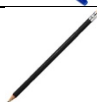



6. List of equipment

Non-exhaustive list.


LIST OF THE PROVIDED EQUIPMENT					
N°	Equipment	Photo	Specification	Unit	Qty
01	PC		Intel Core i7 or higher, 32 GB RAM, 256 GB SSD or higher, 2 Ethernet network cards, WINDOWS 10 pro–operating system or higher	Pc.	2
02	22-inch computer screen		22-inch and more	Pc.	2
03	Mouse		USB	Pc.	3
04	Keyboard		USB, AZERTY	Pc.	2
05	Laptop		Windows 10 or higher with wired Ethernet network card	Pc	1
06	Console cable		Console cable CISCO RJ 45 RS232	Pc.	2
07	Switch		Cisco 2960 Serie	Pc.	2
08	Routeur		Cisco 4321 or 4331 serie	Pc.	2
09	Power strip		220V, 3 meters, 6 sockets	Pc.	1
10	Patch cords		UTP 5e, 1 meter	Pc.	10
11	Patch cords		UTP 5e, 3 meters or more	Pc.	5
12	Os Windows Server 2022 Standard		ISO image, on the desktop of the contestant's 2 PCs	Pc.	1
13	Os Windows 10 pro		ISO image, on the desktop of the contestant's 2 PCs	Pc.	1
14	OS Debian 10		ISO image, on the desktop of the contestant's 2 PCs	Pc.	1
15	Putty		Pre-installed on both PCs of the contestant	Pc.	1
16	Oracle VirtualBox		Installation file on the desktop of both contestant's PCs	Pc.	1

17	Desk		1400x700 mm	Pc.	2
18	Chair		To be adapted according to the contestants' disability	Pc.	1
19	USB RS232 adapter		With driver compatible with Windows 10 or more	Pc	2
20	Console cable		Cisco USB mini console cable	Pc	2

EXPENDABLE MATERIALS PER CONTESTANT

N°	Item	Photo	Specifications	Unit	Qty
01	Pen		Ballpoint or gel pens	Pc.	2
02	Pencil		Graphite HB	Pc.	1
03	Notebook		A4 (50 sheets)	Pc.	1
04	Post it		Multicolor self-adhesive block note	Pc	1
05	USB key		64 GB or more	Pc	1

PROHIBITED EXPENDABLE MATERIALS AND EQUIPMENT

01	Electronic devices		Cell phone, tablet, watch, etc.		
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COMMON EQUIPMENT

01	Switch		Cisco 2960	Pc.	2
02	Routeur		Série Cisco 4321 ou 4331	Pc.	2
03	Console cable		Console cable Cisco RJ45 RS232	Pc.	2
04	Console cable		Console cable Cisco USB mini usb	Pc	2
05	Adaptateur USB RS232		With driver compatible with windows 10 or more	Pc	2

06	PC		Intel Core i7 ou supérieur, 32 Go de RAM, 256 Go SSD ou plus, 2 cartes réseau Ethernet, système d'exploitation WINDOWS 10 pro ou plus	Pc.	2
07	22-inch computer screen		22-inch computer screen	Pc	2
08	Keyboard		USB	Pc	2
09	Mouse		USB	Pc	2
10	Printer		A4 color laser	Pc.	1
11	Adapter USB RS232		Adapter USB RS232	Pc	2