

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
НАЦІОНАЛЬНИЙ АЕРОКОСМІЧНИЙ УНІВЕРСИТЕТ ім. М. Є.  
Жуковського «Харківський авіаційний інститут»

Факультет радіоелектроніки, комп'ютерних систем та інфокомунікацій  
Кафедра комп'ютерних систем, мереж і кібербезпеки

Лабораторна робота №2

З дисципліни: «Теорія та технології розроблення безпечних розподільних  
систем»

Виконав:

студент 5 курсу групи №555 ім

Напряму підготовки

125 Кібербезпека та захист інформації

ст. Орлов Станіслав Валерійович

Прийняв:

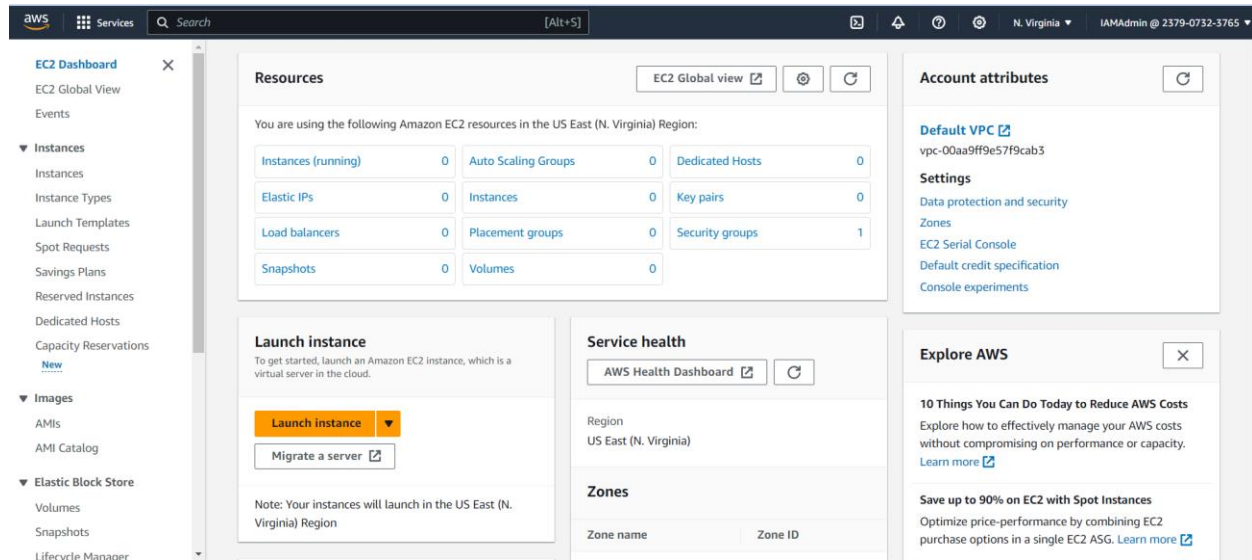
аспірант

Карпенко Андрій Сергійович

Харків, 2023

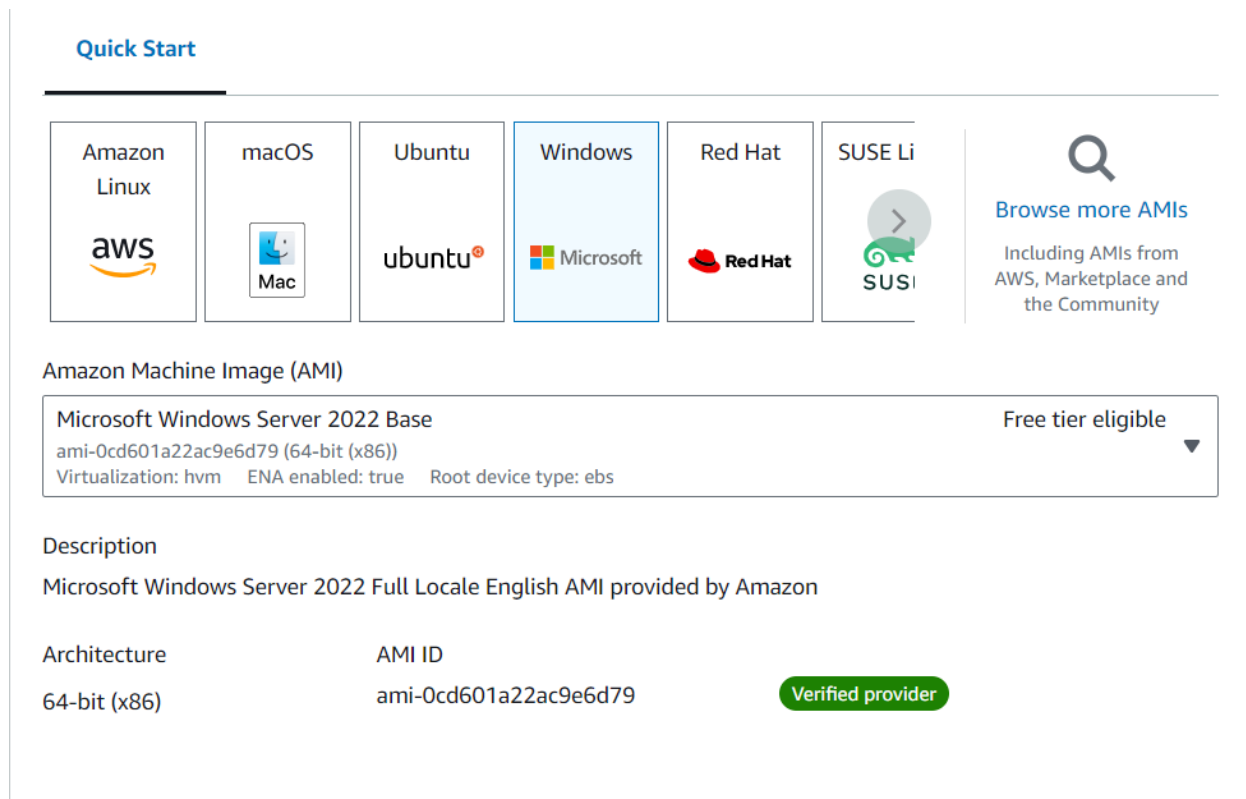
## Step 1 Creating Windows Server VM

### 1. Launching Amazon EC2 instance console



## Step 2 Launching Windows Server VM on Amazon EC2 instance

### 1. Choosing base image for Windows Server



## 2. Choosing Instance type

▼ Instance type [Info](#)

Instance type

t2.micro

Family: t2 1 vCPU 1 GiB Memory Current generation: true

On-Demand Windows base pricing: 0.0162 USD per Hour

On-Demand SUSE base pricing: 0.0116 USD per Hour

On-Demand RHEL base pricing: 0.0716 USD per Hour

On-Demand Linux base pricing: 0.0116 USD per Hour

Free tier eligible

☒ All generations

[Compare instance types](#)

[Additional costs apply for AMIs with pre-installed software](#)

## 3. Generating new key pair login

▼ Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

Select

▼

↻

[Create new key pair](#)

For Windows instances, you use a key pair to decrypt the administrator password. You then use the decrypted password to connect to your instance.

Assigning name as “[You Name] Web Server” tag

Create key pair

Key pair name

Key pairs allow you to connect to your instance securely.

StanislavOrlov-key-pair

The name can include upto 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

☒ RSA

RSA encrypted private and public key pair

☐ ED25519

ED25519 encrypted private and public key pair (Not supported for Windows instances)



Private key file format

☒ .pem

For use with OpenSSH

☐ .ppk

For use with PuTTY

 When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#) 

Cancel

Create key pair

## Downloaded Key Pair

 StanislavOrlov-key-pair.pem	11/20/2023 4:34 PM	PEM File	2 KB
---	--------------------	----------	------

#### 4. Configuring Network settings

Adding Rule to open 80 port (HTTP) in addition to 3389 (RDP)

Opening RDP 3389 port

##### Inbound Security Group Rules

▼ Security group rule 1 (TCP, 3389, 0.0.0.0/0, RDP inbound rule)

Remove

Type [Info](#)

rdp ▼

Protocol [Info](#)

TCP

Port range [Info](#)

3389

Source type [Info](#)

Custom ▼

Source [Info](#)

🔍 Add CIDR, prefix list or security

0.0.0.0/0 ✕

Description - optional [Info](#)

RDP inbound rule

Opening HTTP port 80

▼ Security group rule 2 (TCP, 80, 0.0.0.0/0)

Remove

Type [Info](#)

HTTP ▼

Protocol [Info](#)

TCP

Port range [Info](#)

80

Source type [Info](#)

Custom ▼

Source [Info](#)

🔍 Add CIDR, prefix list or security

0.0.0.0/0 ✕

Description - optional [Info](#)

e.g. SSH for admin desktop

## 5. Configuring storage with assigned volumes

▼ Storage (volumes) [Info](#)

Simple

EBS Volumes

[Hide details](#)

▼ Volume 1 (AMI Root)

Storage type [Info](#)

EBS

Device name - *required* [Info](#)

/dev/sda1

Snapshot [Info](#)

snap-0c7534d6900b054af

Size (GiB) [Info](#)

30

Volume type [Info](#)

gp2 ▼

IOPS [Info](#)

100 / 3000

Delete on termination [Info](#)

Yes ▼

Encrypted [Info](#)

Not encrypted ▼

KMS key [Info](#)

Select ▼

KMS keys are only applicable when encryption is set on this volume.

## 6. Configuring startup script

---

Metadata accessible [Info](#)


Enabled ▼

Metadata transport

Select ▼

Metadata version [Info](#)

V2 only (token required) ▼

 For V2 requests, you must include a session token in all instance metadata requests. Applications or agents that use V1 for instance metadata access will break.

Metadata response hop limit [Info](#)


2

Allow tags in metadata [Info](#)

Select ▼

User data - optional [Info](#)

Upload a file with your user data or enter it in the field.

 Choose file

```
<powershell>
Install-WindowsFeature Web-Server -IncludeManagementTools -
IncludeAllSubFeature
remove-item -recurse c:\inetpub\wwwroot\*
(New-Object
System.Net.WebClient).DownloadFile("https://gitlab.com/karpenkoKhAI/ec2-
template/-/raw/main/ec2-windows.zip", "c:\inetpub\wwwroot\ec2-windows.zip")
$shell = new-object -com shell.application
$zip = $shell.Namespace("c:\inetpub\wwwroot\ec2-windows.zip")
foreach($item in $zip.items())
{
$shell.Namespace("c:\inetpub\wwwroot\").copyhere($item)
}

```

---

## 7. Launching instance

Instances (1) <a href="#">Info</a>								
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>								
<input type="checkbox"/>	Name <a href="#">✎</a>	Instance ID	Instance state <a href="#">▼</a>	Instance type <a href="#">▼</a>	Status check	Alarm status	Availability Zone <a href="#">▼</a>	Public IPv4 DNS
<input type="checkbox"/>	Stanislav Orlo...	<a href="#">i-0e7b9f618a213df16</a>	Pending <a href="#">🔍</a> <a href="#">🔍</a>	t2.micro	-	No alarms <a href="#">+</a>	us-east-1d	ec2-54-89-217-1

## Instance in a running state

Instances (1) <a href="#">Info</a>								
<input type="text" value="Find Instance by attribute or tag (case-sensitive)"/>								
<input type="checkbox"/>	Name <a href="#">✎</a>	Instance ID	Instance state <a href="#">▼</a>	Instance type <a href="#">▼</a>	Status check	Alarm status	Availability Zone <a href="#">▼</a>	Public IPv4 DNS
<input type="checkbox"/>	Stanislav Orlo...	<a href="#">i-0e7b9f618a213df16</a>	Running <a href="#">🔍</a> <a href="#">🔍</a>	t2.micro	-	No alarms <a href="#">+</a>	us-east-1d	ec2-54-89-217-1

[EC2](#) > [Instances](#) > [i-0e7b9f618a213df16](#)

Instance summary for <a href="#">i-0e7b9f618a213df16</a> (Stanislav Orlov Web Server) <a href="#">Info</a>		
Updated less than a minute ago		
Instance ID <a href="#">i-0e7b9f618a213df16</a> (Stanislav Orlov Web Server)	Public IPv4 address 54.89.217.198 <a href="#">open address</a> <a href="#">🔗</a>	Private IPv4 addresses 172.31.45.105
IPv6 address -	Instance state Running	Public IPv4 DNS <a href="#">ec2-54-89-217-198.compute-1.amazonaws.com</a> <a href="#">open address</a> <a href="#">🔗</a>
Hostname type IP name: ip-172-31-45-105.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-45-105.ec2.internal	Elastic IP addresses -
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	AWS Compute Optimizer finding <a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a> <a href="#">  Learn more</a> <a href="#">🔗</a>
Auto-assigned IP address 54.89.217.198 [Public IP]	VPC ID <a href="#">vpc-00aa9ff9e57f9cab3</a> <a href="#">🔗</a>	Auto Scaling Group name -
IAM Role -	Subnet ID <a href="#">subnet-0ce6e4065a3443b17</a> <a href="#">🔗</a>	
IMDSv2 Required		



## 8. Connecting to Windows Server by using Microsoft Remote Desktop client.

Connect to your instance i-0e7b9f618a213df16 (Stanislav Orlov Web Server) using any of these options

Session Manager

**RDP client**

EC2 serial console

Instance ID

 i-0e7b9f618a213df16 (Stanislav Orlov Web Server)

Connection Type




**Connect using RDP client**

Download a file to use with your RDP client and retrieve your password.



**Connect using Fleet Manager**

To connect to the instance using Fleet Manager Remote Desktop, the SSM Agent must be installed and running on the instance. For more information, see [Working with SSM Agent](#) 

You can connect to your Windows instance using a remote desktop client of your choice, and by downloading and running the RDP shortcut file below:



**Download remote desktop file**

When prompted, connect to your instance using the following details:

Public DNS

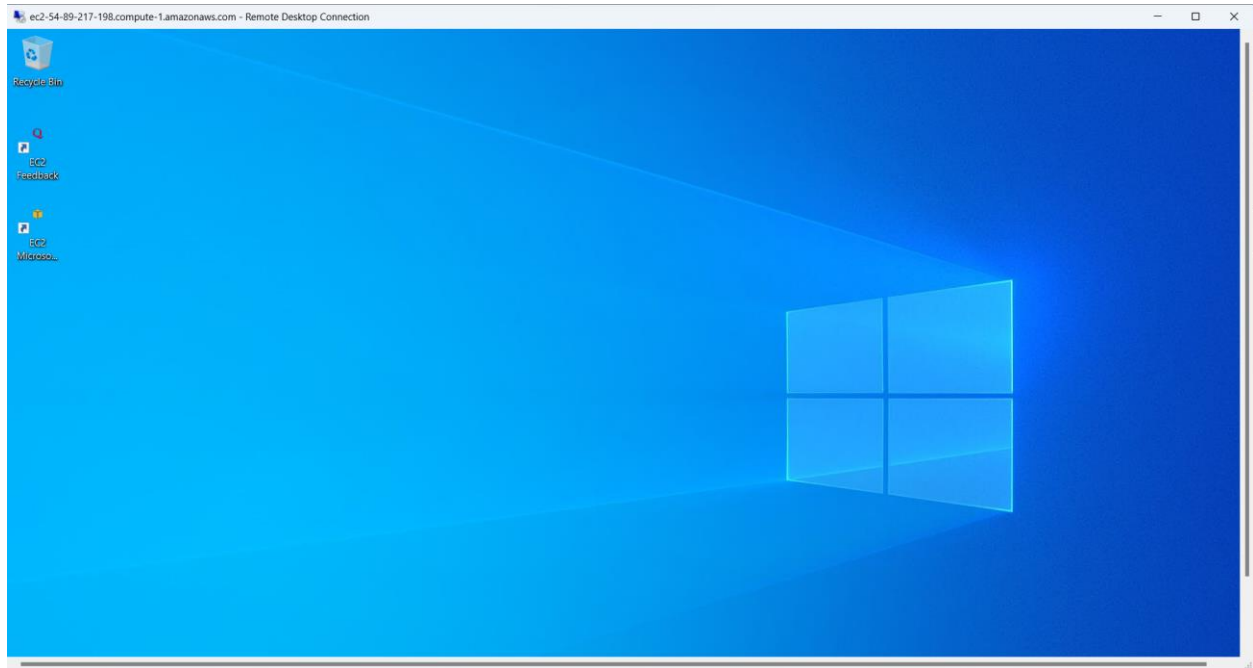
 ec2-54-89-217-198.compute-1.amazonaws.com

User name

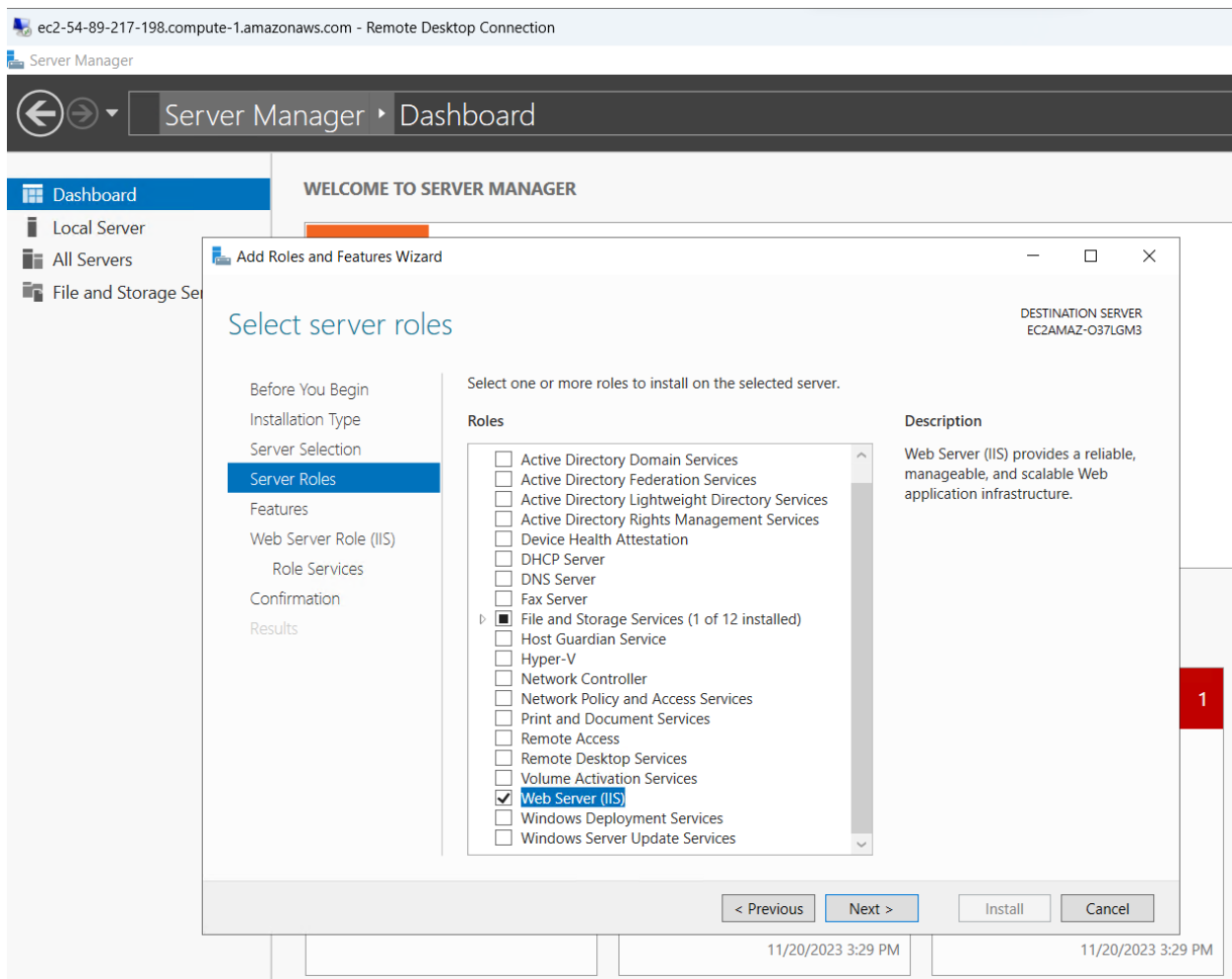
 Administrator

Password

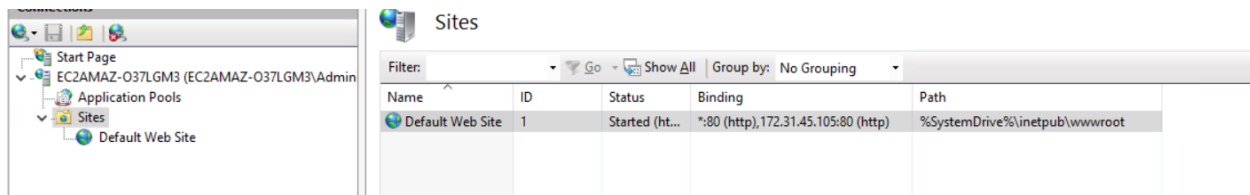
 [REDACTED]



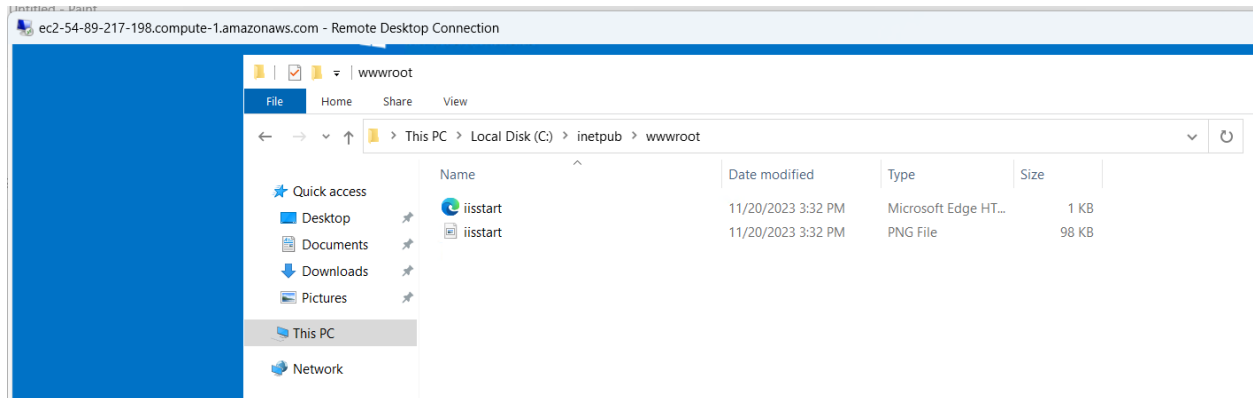
9. Opening Server Manager to make sure IIS Web Server is running



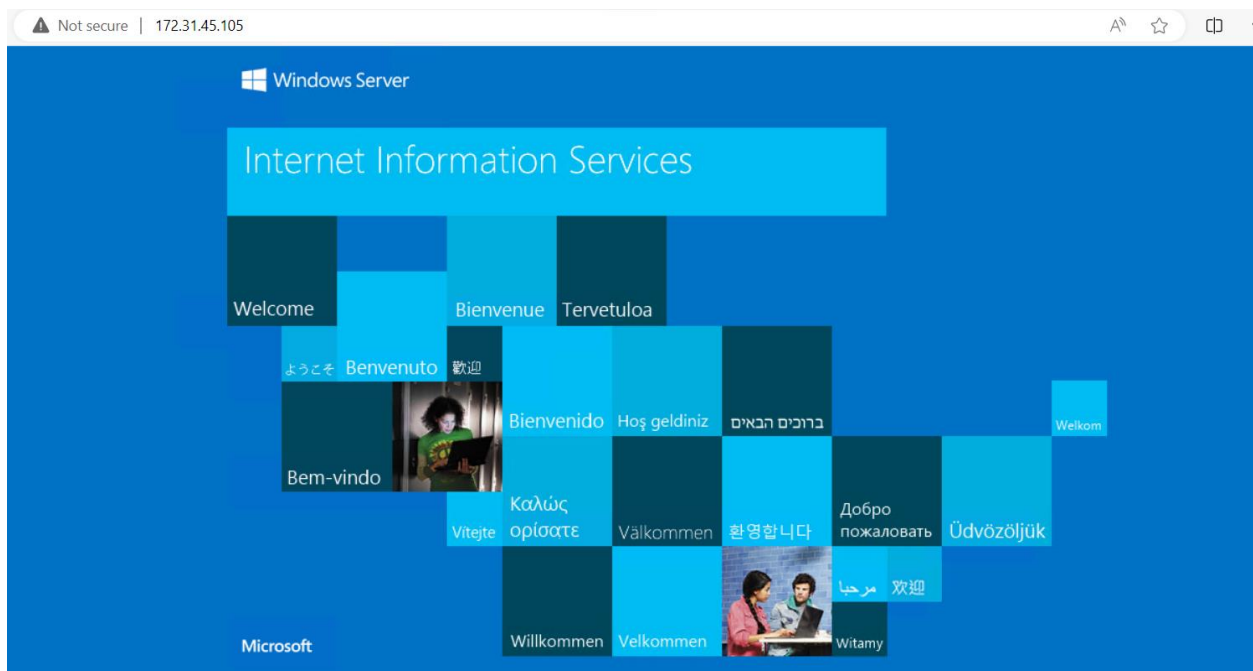
## Creating IN Bound Firewall rule to access WebSite page



## 10. Checking **wwwroot** folder of the IIS to see content of WebSite



## 11. Opening default web page created by IIS server to check if everything is properly configured.



## Task 2 Creating Linux Ubuntu VM

### Choosing Name on Linux instance

[EC2](#) > [Instances](#) > Launch an instance

## Launch an instance [Info](#)

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

### Name and tags [Info](#)

Name

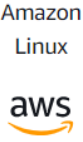
[Add additional tags](#)

### Choosing Amazon machine image


### ▼ Application and OS Images (Amazon Machine Image) [Info](#)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below


#### Quick Start




Amazon Linux




macOS




Ubuntu




Windows



Red Hat



SUSE Li



[Browse more AMIs](#)

Including AMIs from AWS, Marketplace and the Community

#### Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type  
ami-0fc5d935ebf8bc3bc (64-bit (x86)) / ami-016485166ec7fa705 (64-bit (Arm))  
Virtualization: hvm    ENA enabled: true    Root device type: ebs

Free tier eligible ▼

## Choosing instance type

▼ Instance type [Info](#)

Instance type

t2.micro

Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour  
On-Demand RHEL base pricing: 0.0716 USD per Hour  
On-Demand Linux base pricing: 0.0116 USD per Hour

▼

☒ All generations

[Compare instance types](#)

Additional costs apply for AMIs with pre-installed software

## Security group

Inbound Security Group Rules

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0)

Type [Info](#)

ssh ▼

Protocol [Info](#)

TCP

Port range [Info](#)

22

Source type [Info](#)

Anywhere ▼

Source [Info](#)

Q Add CIDR, prefix list or security

0.0.0.0/0 X

Description - optional [Info](#)

e.g. SSH for admin desktop

Remove

▼ Security group rule 2 (TCP, 80, 0.0.0.0/0)

Type [Info](#)

HTTP ▼

Protocol [Info](#)

TCP

Port range [Info](#)

80

Source type [Info](#)

Custom ▼

Source [Info](#)

Q Add CIDR, prefix list or security

0.0.0.0/0 X

Description - optional [Info](#)

e.g. SSH for admin desktop

Remove

## Launching Linux instance

EC2 > Instances > i-0f3056731d182c112

**Instance summary for i-0f3056731d182c112 (Amazon Linux Orlov)** [Info](#)

Updated less than a minute ago

[Refresh](#) [Connect](#) [Instance state ▼](#) [Actions ▼](#)

Instance ID i-0f3056731d182c112 (Amazon Linux Orlov)	Public IPv4 address 54.204.99.51 <a href="#">open address</a>	Private IPv4 addresses 172.31.31.41
IPv6 address -	Instance state <span>Running</span>	Public IPv4 DNS ec2-54-204-99-51.compute-1.amazonaws.com <a href="#">open address</a>
Hostname type IP name: ip-172-31-31-41.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-31-41.ec2.internal	
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	Elastic IP addresses -
Auto-assigned IP address 54.204.99.51 [Public IP]	VPC ID vpc-00aa9ff9e57f9cab3	AWS Compute Optimizer finding <a href="#">Opt-in to AWS Compute Optimizer for recommendations.</a> <a href="#">Learn more</a>
IAM Role -	Subnet ID subnet-048d0d0deec6417b6	Auto Scaling Group name -
IMDSv2		

## Connecting to EC2 Linux instance via SSH

EC2 > Instances > i-0f3056731d182c112 > Connect to instance

### Connect to instance [Info](#)

Connect to your instance i-0f3056731d182c112 (Amazon Linux Orlov) using any of these options

EC2 Instance Connect | Session Manager | **SSH client** | EC2 serial console

Instance ID  
i-0f3056731d182c112 (Amazon Linux Orlov)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is StanislavOrlov-key-pair.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.  
`chmod 400 StanislavOrlov-key-pair.pem`
4. Connect to your instance using its Public DNS:  
`ec2-54-204-99-51.compute-1.amazonaws.com`

Example:

```
ssh -i "StanislavOrlov-key-pair.pem" ubuntu@ec2-54-204-99-51.compute-1.amazonaws.com
```

**Note:** In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

**Instances (1/1) Info**

Find Instance by attribute or tag (case-sensitive)

Instance state = shutting-down X Clear filters

<input checked="" type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
<input checked="" type="checkbox"/>	Amazon Linux ...	i-0f3056731d182c112	Running	t2.micro	2/2 checks passed	No alarms	us-east-1c

## Connecting to Linux virtual machine via Windows terminal and SSH

```
PS C:\Projects\XAI_навчання\Безпечні розподілені системи\Лаб1> ssh -i "StanislavOrlov-key-pair.pem" ubuntu@ec2-54-204-99-51.compute-1.amazonaws.com

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@           WARNING: UNPROTECTED PRIVATE KEY FILE!          @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
Permissions for 'StanislavOrlov-key-pair.pem' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "StanislavOrlov-key-pair.pem": bad permissions
ubuntu@ec2-54-204-99-51.compute-1.amazonaws.com: Permission denied (publickey).
```

## Terminating all instances

**Instances (1/2) Info**

Find Instance by attribute or tag (case-sensitive)

Instance state: Stop instance, Start instance, Reboot instance, Hibernate instance, Terminate instance

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Availability Zone	Public IPv4 DNS
<input type="checkbox"/>	Amazon Linux ...	i-0f3056731d182c112	Running	t2.micro	2/2 checks passed	us-east-1c	ec2-54-204-99-51.compute-1.amazonaws.com
<input checked="" type="checkbox"/>	Stanislav Orlov...	i-0e7b9f618a213df16	Terminated	t2.micro	-	us-east-1d	-

## Висновки:

У ході виконання даних лабораторної роботи ознайомився з AWS EC2 сервісом Амазон для створення Linux/Windows віртуальних машин для розгортання веб серверу. Отримав навички конфігурування для підключення створених віртуальних машин та конфігурування базового веб сервісу.