TECHNICAL REPORT

Course Project: Student Attendance Management System

Lab: AWS Academy – Microservices & CI/CD Pipeline Builder

Name: Usman Farooq

Roll No: BSSE-23062

Instructor Name: Prof. M Zunnurain Hussain

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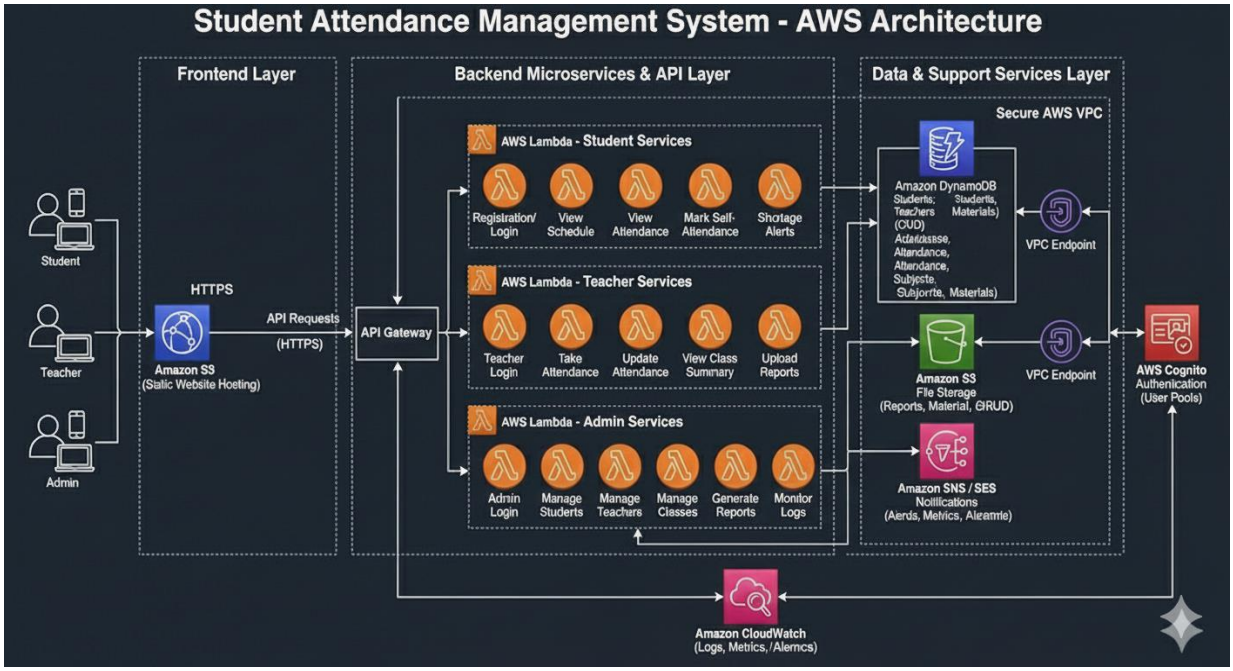
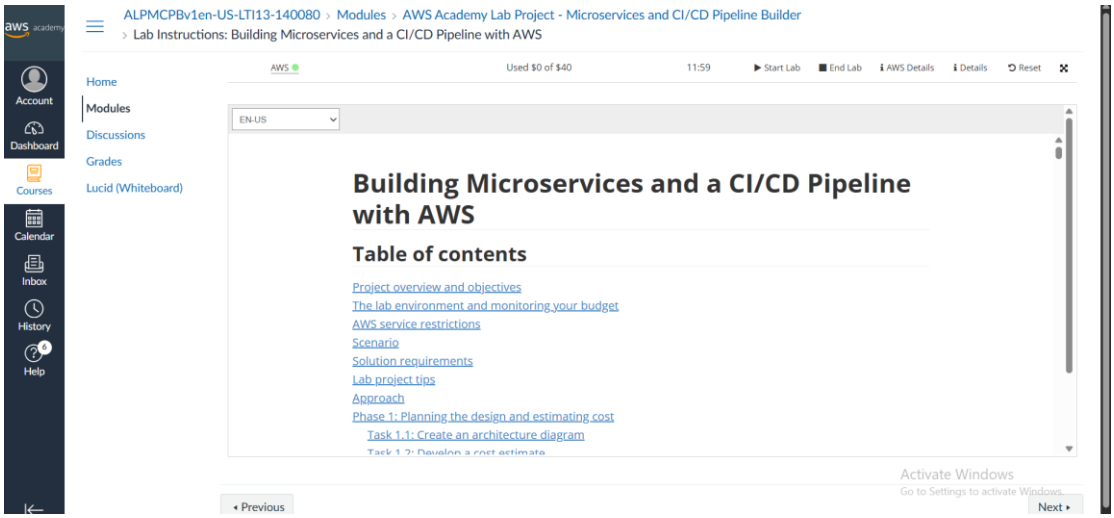
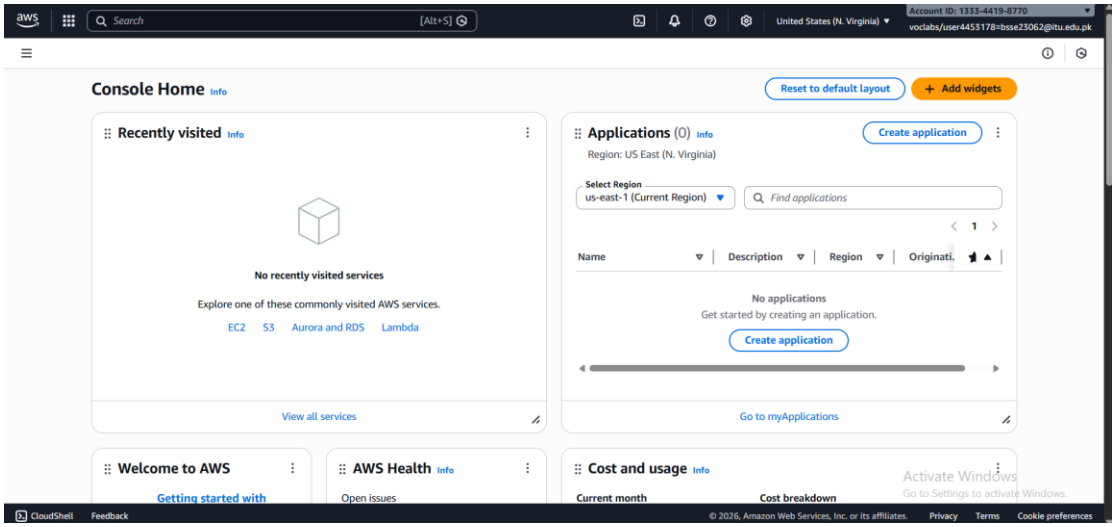
Architecture Diagram






Console Home Info
Reset to default layout
+ Add widgets
Recently visited Info
No recently visited services
Explore one of these commonly visited AWS services.
EC2 S3 Aurora and RDS Lambda
View all services
Applications (0) Info
Create application
Region: US East (N. Virginia)
Select Region
us-east-1 (Current Region)
Find applications
Name
Description
Region
No applications
Get started by creating an application.
Create application
Go to myApplications
Welcome to AWS
Getting started with
AWS Health Info
Open issues
Cost and usage Info
Current month
Cost breakdown
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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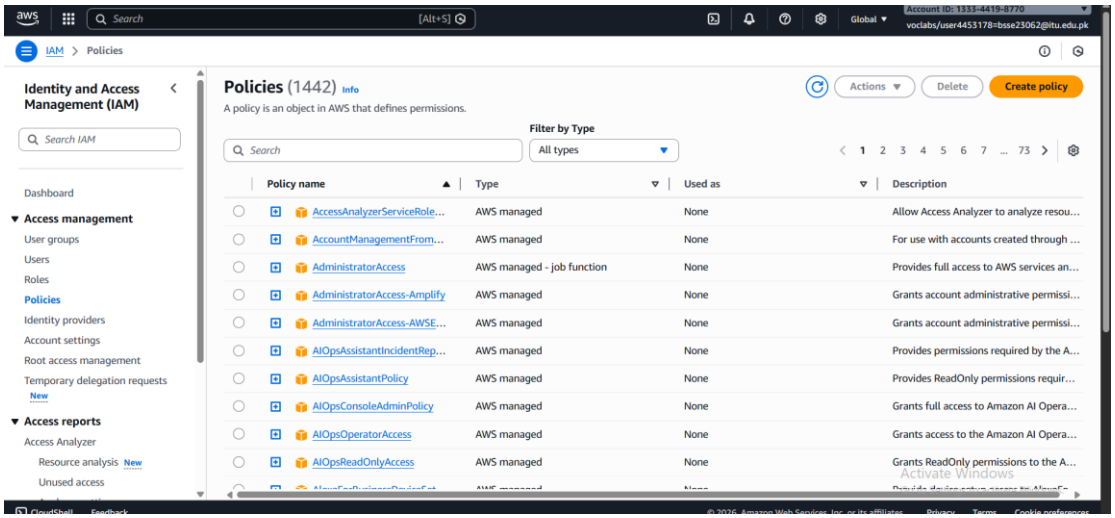
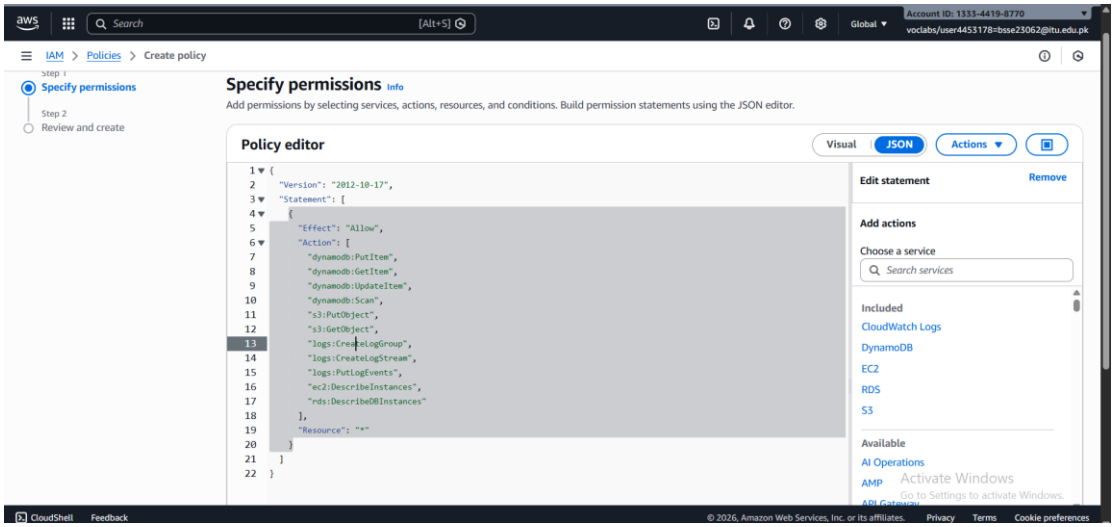

IAM > Policies
Identity and Access Management (IAM)
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
Identity providers
Account settings
Root access management
Temporary delegation requests
New
Access reports
Access Analyzer
Resource analysis New
Unused access
Policies (1442) Info
A policy is an object in AWS that defines permissions.
Actions
Delete
Create policy
Filter by Type
All types
Policy name
Type
Used as
Description
AccessAnalyzerServiceRole... AWS managed None Allow Access Analyzer to analyze resou...
AccountManagementFrom... AWS managed None For use with accounts created through ...
AdministratorAccess AWS managed - job function None Provides full access to AWS services an...
AdministratorAccess-Amplify AWS managed None Grants account administrative permissi...
AdministratorAccess-AWSE... AWS managed None Grants account administrative permissi...
AIOpsAssistantIncidentRep... AWS managed None Provides permissions required by the A...
AIOpsAssistantPolicy AWS managed None Provides ReadOnly permissions requir...
AIOpsConsoleAdminPolicy AWS managed None Grants full access to Amazon AI Opera...
AIOpsOperatorAccess AWS managed None Grants access to the Amazon AI Opera...
AIOpsReadOnlyAccess AWS managed None Grants ReadOnly permissions to the A...
Activate Windows


IAM > Policies > Create policy
Step 1
Specify permissions
Step 2
Review and create
Specify permissions Info
Add permissions by selecting services, actions, resources, and conditions. Build permission statements using the JSON editor.
Policy editor
Visual
JSON
Actions
{
"Version": "2012-10-17",
"Statement": [
{
"Effect": "Allow",
"Action": [
"dynamodb:PutItem",
"dynamodb:GetItem",
"dynamodb:UpdateItem",
"dynamodb:Scan",
"s3:PutObject",
"s3:GetObject",
"logs:CreateLogGroup",
"logs:CreateLogStream",
"logs:PutLogEvents",
"ec2:DescribeInstances",
"rds:DescribeDBInstances"
],
"Resource": "*"
}
]
}
Edit statement
Remove
Add actions
Choose a service
Search services
Included
CloudWatch Logs
DynamoDB
EC2
RDS
S3
Available
AI Operations
AMP
API Gateway
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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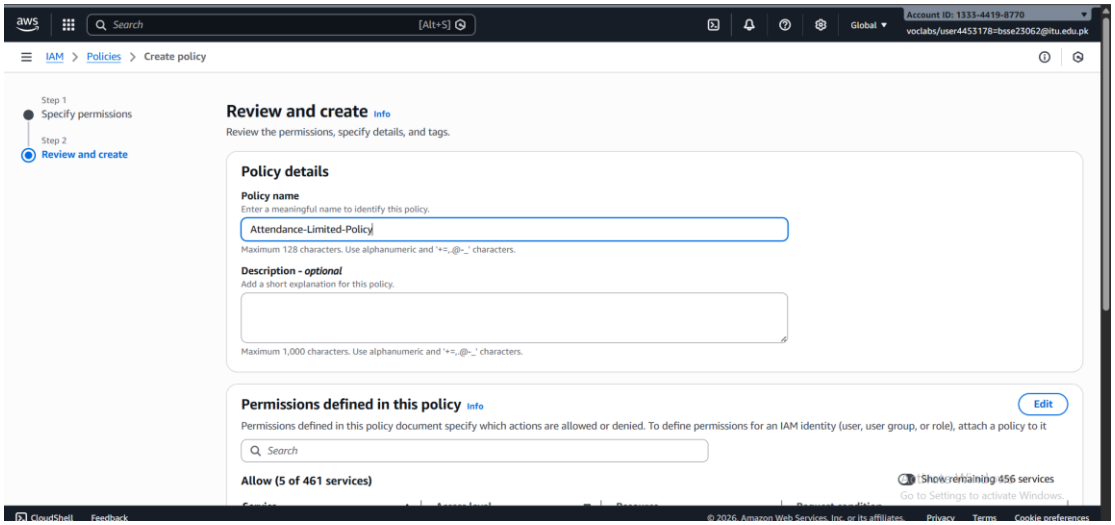
Search [Alt+S]
Global
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
IAM > Policies > Create policy
Step 1
Specify permissions
Step 2
Review and create
Review and create Info
Review the permissions, specify details, and tags.
Policy details
Policy name
Enter a meaningful name to identify this policy.
Attendance-Limited-Policy
Maximum 128 characters. Use alphanumeric and '+=,.@-_' characters.
Description - optional
Add a short explanation for this policy.
Maximum 1,000 characters. Use alphanumeric and '+=,.@-_' characters.
Permissions defined in this policy Info
Edit
Permissions defined in this policy document specify which actions are allowed or denied. To define permissions for an IAM identity (user, user group, or role), attach a policy to it
Search
Allow (5 of 461 services)
Show remaining 456 services
Go to Settings to activate Windows.
CloudShell
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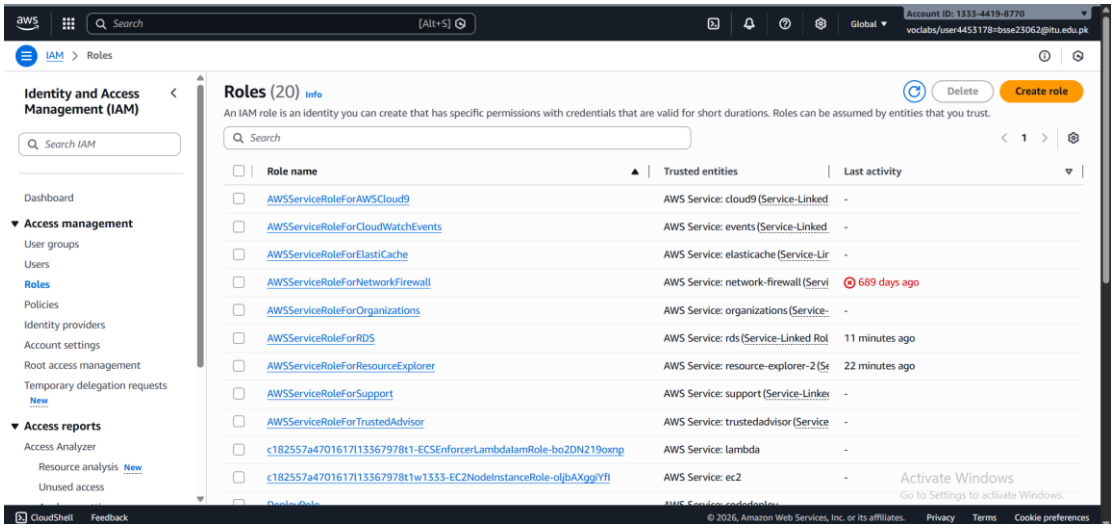
Search [Alt+S]
Global
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
IAM > Roles
Identity and Access Management (IAM)
Search IAM
Dashboard
Access management
User groups
Users
Roles
Policies
Identity providers
Account settings
Root access management
Temporary delegation requests
New
Access reports
Access Analyzer
Resource analysis New
Unused access
Roles (20) Info
Delete
Create role
An IAM role is an identity you can create that has specific permissions with credentials that are valid for short durations. Roles can be assumed by entities that you trust.
Search
1
Role name
Trusted entities
Last activity
AWSServiceRoleForAWSCloud9
AWS Service: cloud9 (Service-Linked
-
AWSServiceRoleForCloudWatchEvents
AWS Service: events (Service-Linked
-
AWSServiceRoleForElastiCache
AWS Service: elasticache (Service-Lir
-
AWSServiceRoleForNetworkFirewall
AWS Service: network-firewall (Servi
689 days ago
AWSServiceRoleForOrganizations
AWS Service: organizations (Service-
-
AWSServiceRoleForRDS
AWS Service: rds (Service-Linked Rol
11 minutes ago
AWSServiceRoleForResourceExplorer
AWS Service: resource-explorer-2 (Se
22 minutes ago
AWSServiceRoleForSupport
AWS Service: support (Service-Linke
-
AWSServiceRoleForTrustedAdvisor
AWS Service: trustedadvisor (Service
-
c182557a4701617l13367978t1-ECSEnforcerLambdaIamRole-bo2DN219oxnp
AWS Service: lambda
-
c182557a4701617l13367978t1w1333-EC2NodeInstanceRole-oIjbAXggiYfI
AWS Service: ec2
-
Activate Windows
Go to Settings to activate Windows.
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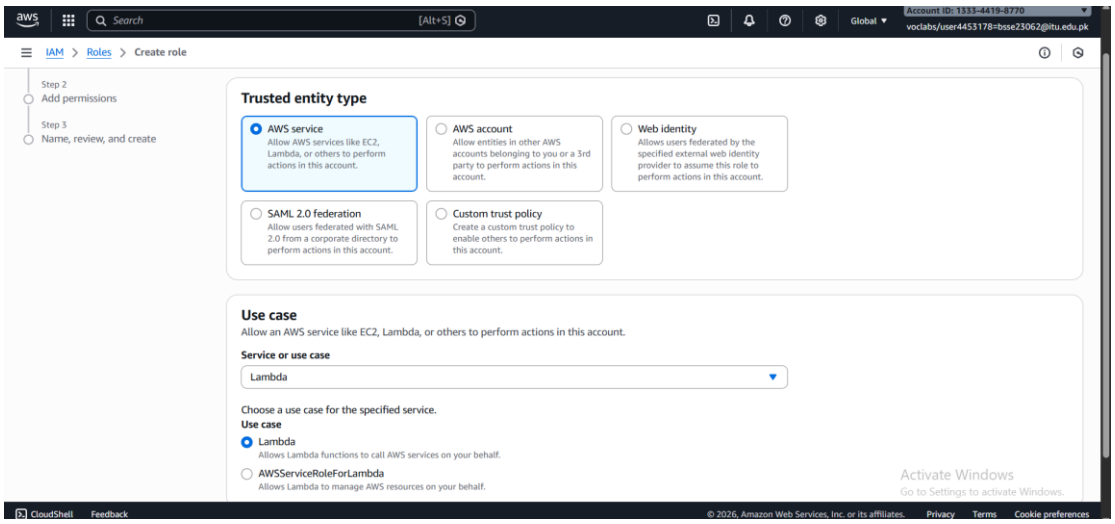
Search [Alt+S]
Global
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
IAM > Roles > Create role
Step 2
Add permissions
Step 3
Name, review, and create
Trusted entity type
AWS service
Allow AWS services like EC2, Lambda, or others to perform actions in this account.
AWS account
Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.
Web identity
Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.
SAML 2.0 federation
Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.
Custom trust policy
Create a custom trust policy to enable others to perform actions in this account.
Use case
Allow an AWS service like EC2, Lambda, or others to perform actions in this account.
Service or use case
Lambda
Choose a use case for the specified service.
Use case
Lambda
Allows Lambda functions to call AWS services on your behalf.
AWSServiceRoleForLambda
Allows Lambda to manage AWS resources on your behalf.
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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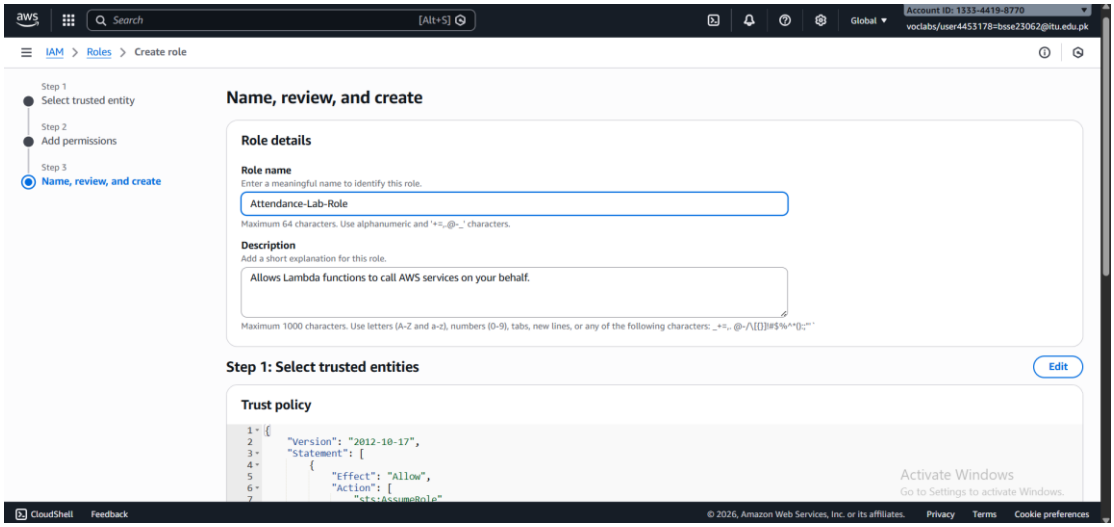
Search
[Alt+S]
Global
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
IAM > Roles > Create role
Step 1
Select trusted entity
Step 2
Add permissions
Step 3
Name, review, and create
Name, review, and create
Role details
Role name
Enter a meaningful name to identify this role.
Attendance-Lab-Role
Maximum 64 characters. Use alphanumeric and '+=,.@-_' characters.
Description
Add a short explanation for this role.
Allows Lambda functions to call AWS services on your behalf.
Maximum 1000 characters. Use letters (A-Z and a-z), numbers (0-9), tabs, new lines, or any of the following characters: _+=,. @-/\[{}]!#$%^*();:"'`
Step 1: Select trusted entities
Edit
Trust policy
{
"Version": "2012-10-17",
"Statement": [
{
"Effect": "Allow",
"Action": [
"sts:AssumeRole"
Activate Windows
Go to Settings to activate Windows.
CloudShell
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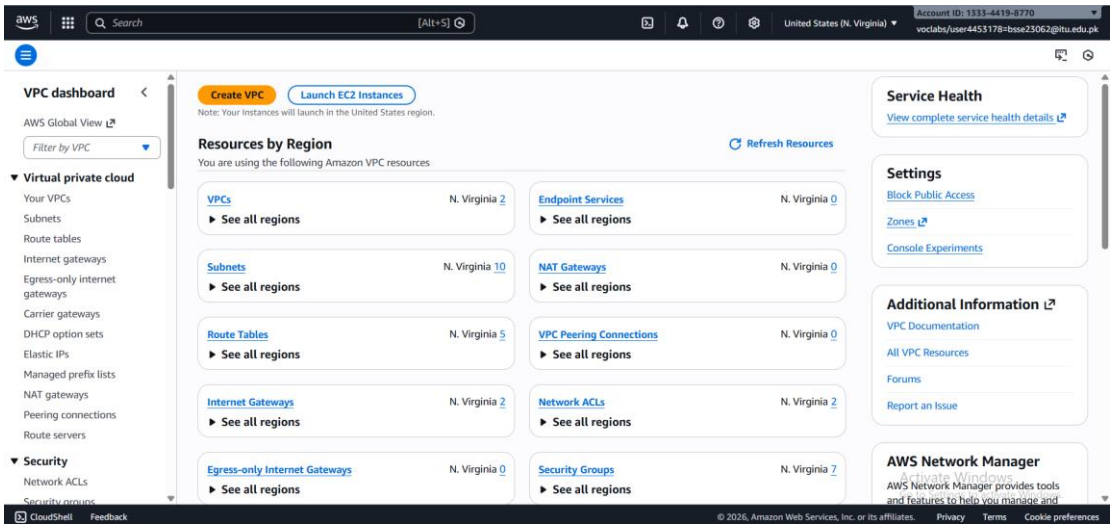
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Create VPC
Launch EC2 Instances
Note: Your Instances will launch in the United States region.
Resources by Region
Refresh Resources
You are using the following Amazon VPC resources
VPCs N. Virginia 2
Endpoint Services N. Virginia 0
Subnets N. Virginia 10
NAT Gateways N. Virginia 0
Route Tables N. Virginia 5
VPC Peering Connections N. Virginia 0
Internet Gateways N. Virginia 2
Network ACLs N. Virginia 2
Egress-only Internet Gateways N. Virginia 0
Security Groups N. Virginia 7
See all regions
Service Health
View complete service health details
Settings
Block Public Access
Zones
Console Experiments
Additional Information
VPC Documentation
All VPC Resources
Forums
Report an Issue
AWS Network Manager
AWS Network Manager provides tools and features to help you manage and
Activate Windows
CloudShell
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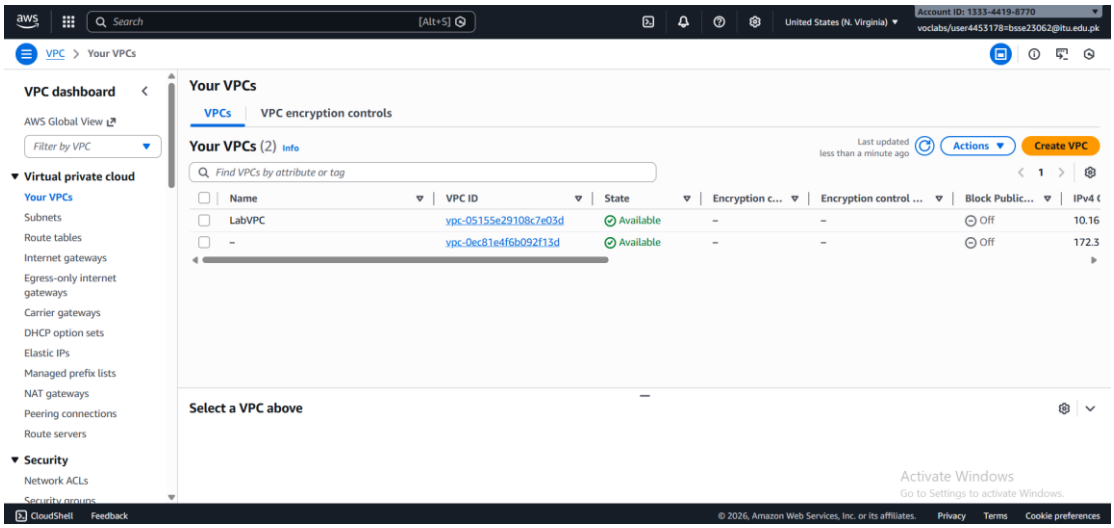
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
VPC > Your VPCs
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Your VPCs
VPCs
VPC encryption controls
Your VPCs (2) Info
Last updated less than a minute ago
Actions
Create VPC
Find VPCs by attribute or tag
Name
VPC ID
State
Encryption c...
Encryption control ...
Block Public...
IPv4
LabVPC
vpc-05155e29108c7e03d
Available
Off
10.16
-
vpc-0ec81e4f6b092f13d
Available
Off
172.3
Select a VPC above
Activate Windows
Go to Settings to activate Windows.
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Feedback
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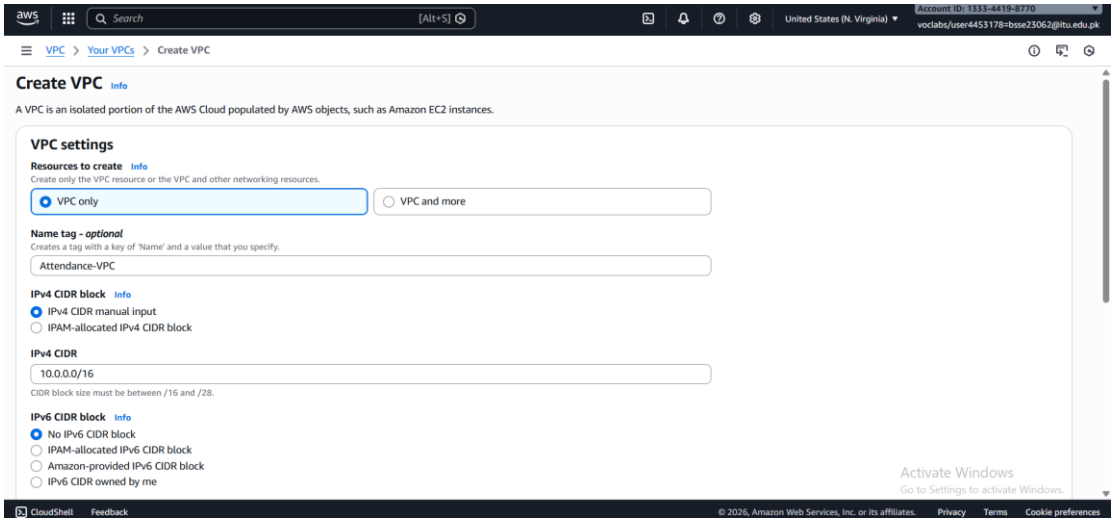
Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
VPC > Your VPCs > Create VPC
Create VPC Info
A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.
VPC settings
Resources to create Info
Create only the VPC resource or the VPC and other networking resources.
VPC only
VPC and more
Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.
Attendance-VPC
IPv4 CIDR block Info
IPv4 CIDR manual input
IPAM-allocated IPv4 CIDR block
IPv4 CIDR
10.0.0.0/16
CIDR block size must be between /16 and /28.
IPv6 CIDR block Info
No IPv6 CIDR block
IPAM-allocated IPv6 CIDR block
Amazon-provided IPv6 CIDR block
IPv6 CIDR owned by me
Activate Windows
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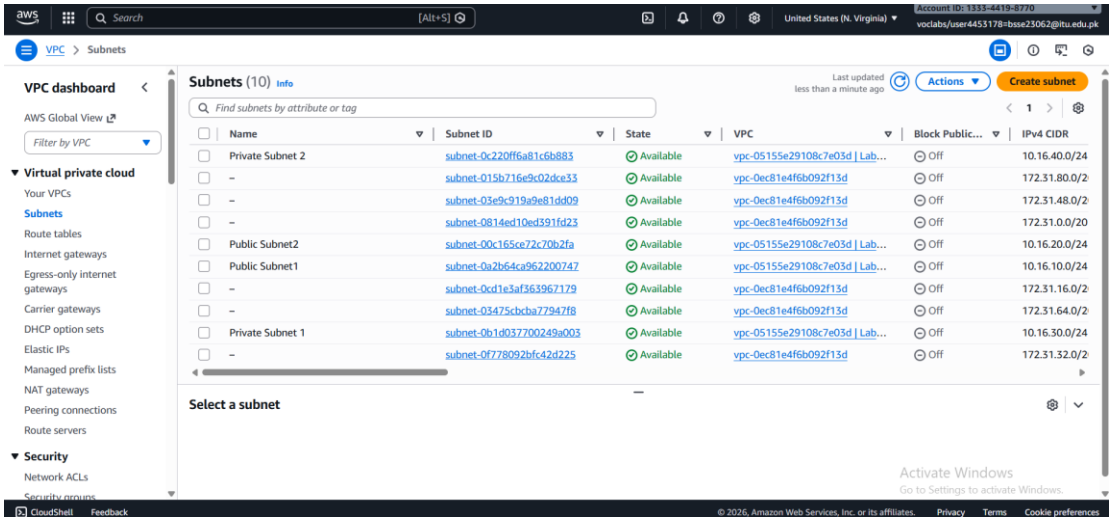
Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
VPC > Subnets
VPC dashboard
AWS Global View
Filter by VPC
Virtual private cloud
Your VPCs
Subnets
Route tables
Internet gateways
Egress-only internet gateways
Carrier gateways
DHCP option sets
Elastic IPs
Managed prefix lists
NAT gateways
Peering connections
Route servers
Security
Network ACLs
Subnets (10) Info
Last updated less than a minute ago
Actions
Create subnet
Find subnets by attribute or tag
Name
Subnet ID
State
VPC
Block Public...
IPv4 CIDR
Private Subnet 2 subnet-0c220ff6a81c6b883 Available vpc-05155e29108c7e03d | Lab... Off 10.16.40.0/24
– subnet-015b716e9c02dce33 Available vpc-0ec81e4f6b092f13d Off 172.31.80.0/2
– subnet-03e9c919a9e81dd09 Available vpc-0ec81e4f6b092f13d Off 172.31.48.0/2
– subnet-0814ed10ed391fd23 Available vpc-0ec81e4f6b092f13d Off 172.31.0.0/20
Public Subnet2 subnet-00c165ce72c70b2fa Available vpc-05155e29108c7e03d | Lab... Off 10.16.20.0/24
Public Subnet1 subnet-0a2b64ca962200747 Available vpc-05155e29108c7e03d | Lab... Off 10.16.10.0/24
– subnet-0cd1e3af363967179 Available vpc-0ec81e4f6b092f13d Off 172.31.16.0/2
– subnet-03475cbcba77947f8 Available vpc-0ec81e4f6b092f13d Off 172.31.64.0/2
Private Subnet 1 subnet-0b1d037700249a003 Available vpc-05155e29108c7e03d | Lab... Off 10.16.30.0/24
– subnet-0f778092bfc42d225 Available vpc-0ec81e4f6b092f13d Off 172.31.32.0/2
Select a subnet
Activate Windows
Go to Settings to activate Windows.
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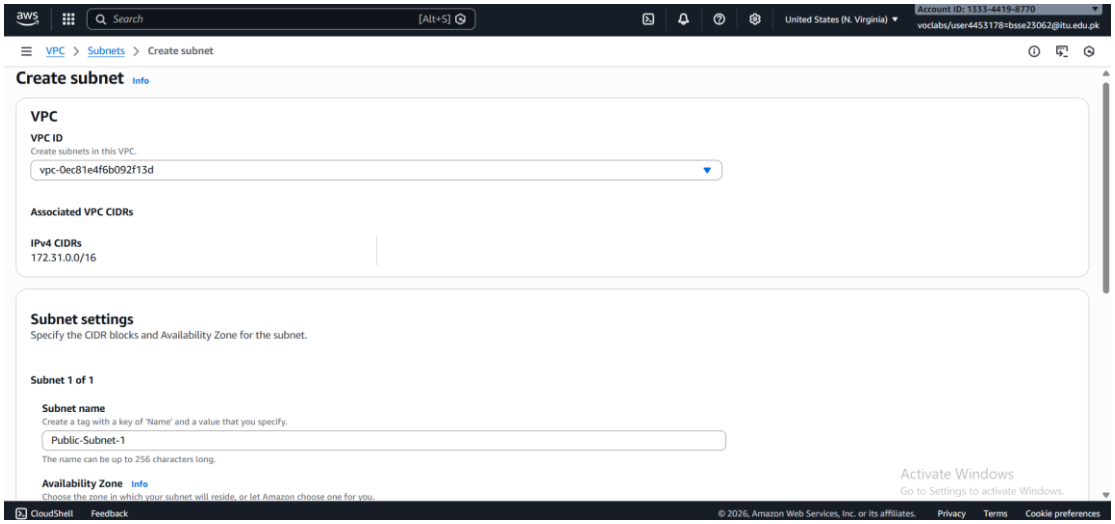
Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
VPC > Subnets > Create subnet
Create subnet Info
VPC
VPC ID
Create subnets in this VPC.
vpc-0ec81e4f6b092f13d
Associated VPC CIDRs
IPv4 CIDRs
172.31.0.0/16
Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.
Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
Public-Subnet-1
The name can be up to 256 characters long.
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
Activate Windows
Go to Settings to activate Windows.
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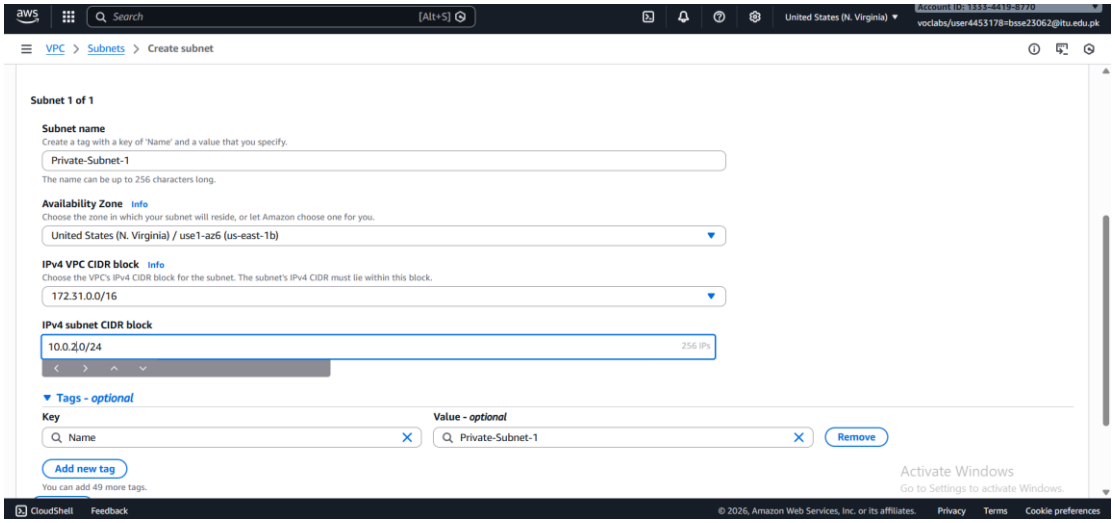
VPC > Subnets > Create subnet
Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
Private-Subnet-1
The name can be up to 256 characters long.
Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.
United States (N. Virginia) / use1-az6 (us-east-1b)
IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.
172.31.0.0/16
IPv4 subnet CIDR block
10.0.2.0/24
256 IPs
Tags - optional
Key
Value - optional
Name
Private-Subnet-1
Remove
Add new tag
You can add 49 more tags.
Activate Windows
Go to Settings to activate Windows.
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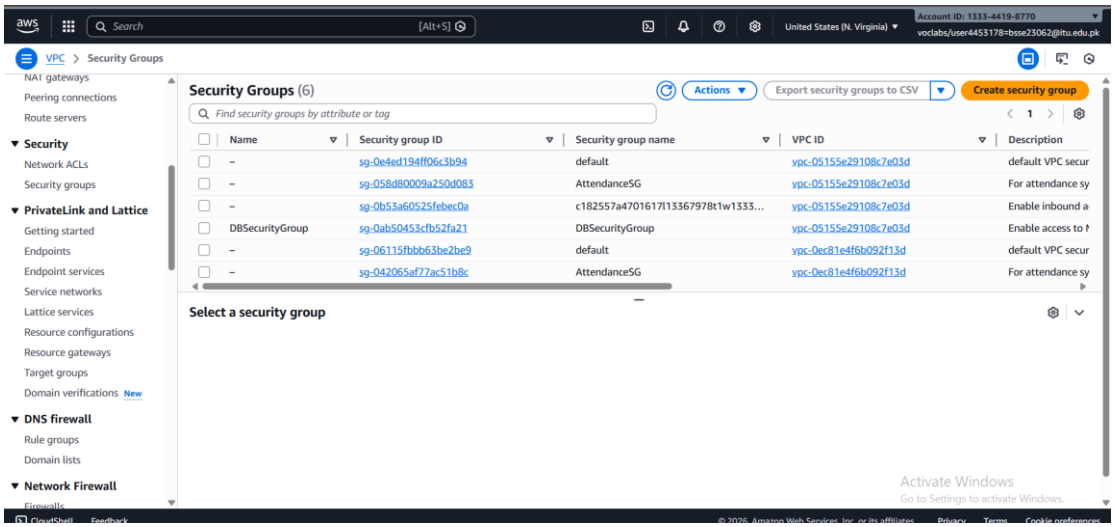
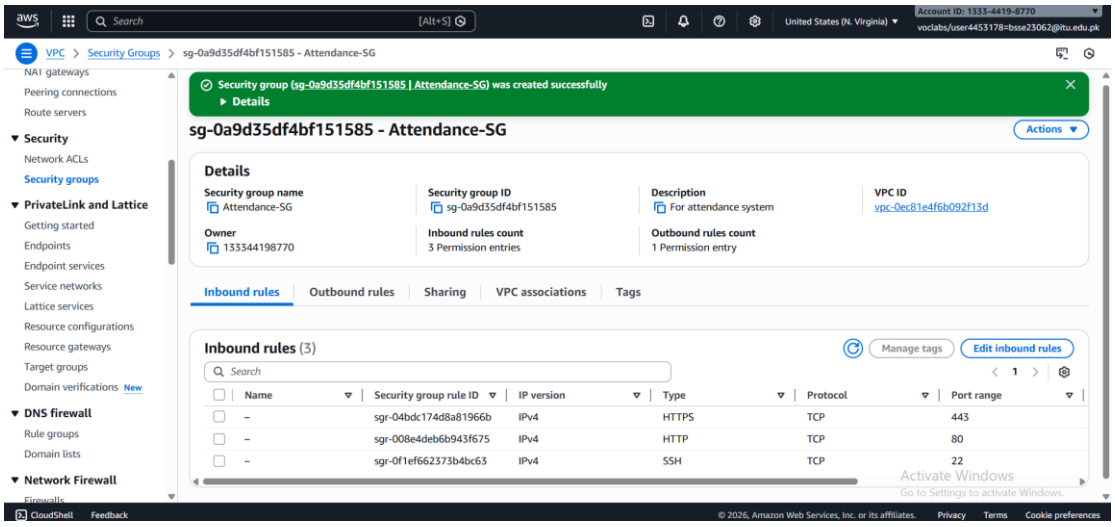
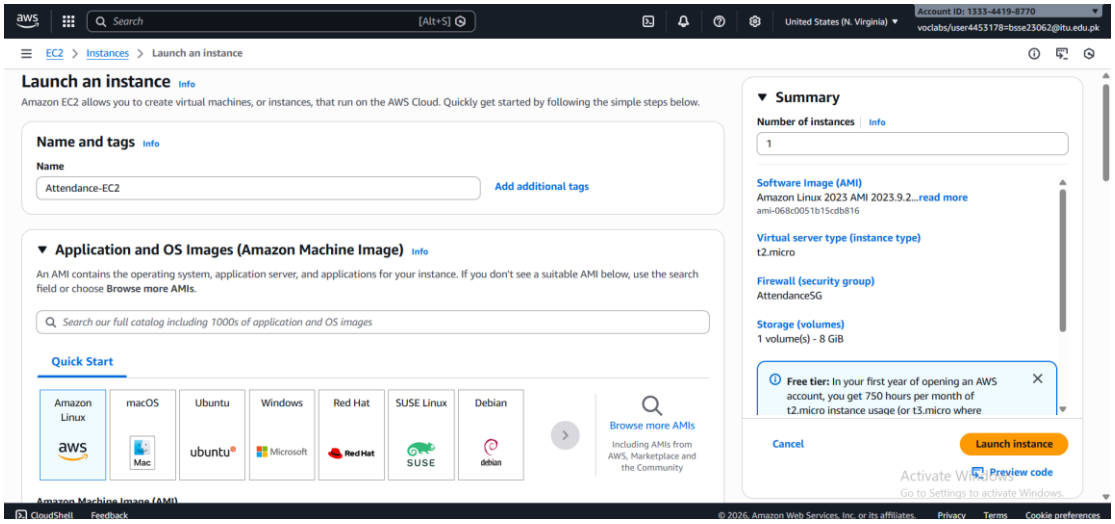

VPC > Security Groups
Security Groups (6)
Actions
Export security groups to CSV
Create security group
Find security groups by attribute or tag
Name
Security group ID
Security group name
VPC ID
Description
Select a security group
Activate Windows
Go to Settings to activate Windows.


VPC > Security Groups > sg-0a9d35df4bf151585 - Attendance-SG
Security group (sg-0a9d35df4bf151585 | Attendance-SG) was created successfully
Details
sg-0a9d35df4bf151585 - Attendance-SG
Actions
Details
Security group name
Attendance-SG
Security group ID
sg-0a9d35df4bf151585
Description
For attendance system
VPC ID
vpc-0ec81e4f6b092f13d
Owner
133344198770
Inbound rules count
3 Permission entries
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Sharing
VPC associations
Tags
Inbound rules (3)
Manage tags
Edit inbound rules
Search
Name
Security group rule ID
IP version
Type
Protocol
Port range
sgr-04bdc174d8a81966b
IPv4
HTTPS
TCP
443
sgr-008e4deb6b943f675
IPv4
HTTP
TCP
80
sgr-0f1ef662373b4bc63
IPv4
SSH
TCP
22
Activate Windows
Go to Settings to activate Windows.


Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
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
Attendance-EC2
Add additional tags
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.9.2...read more
ami-068c0051b15cdb816
Virtual server type (instance type)
t2.micro
Firewall (security group)
AttendanceSG
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where
Cancel
Launch instance
Preview code
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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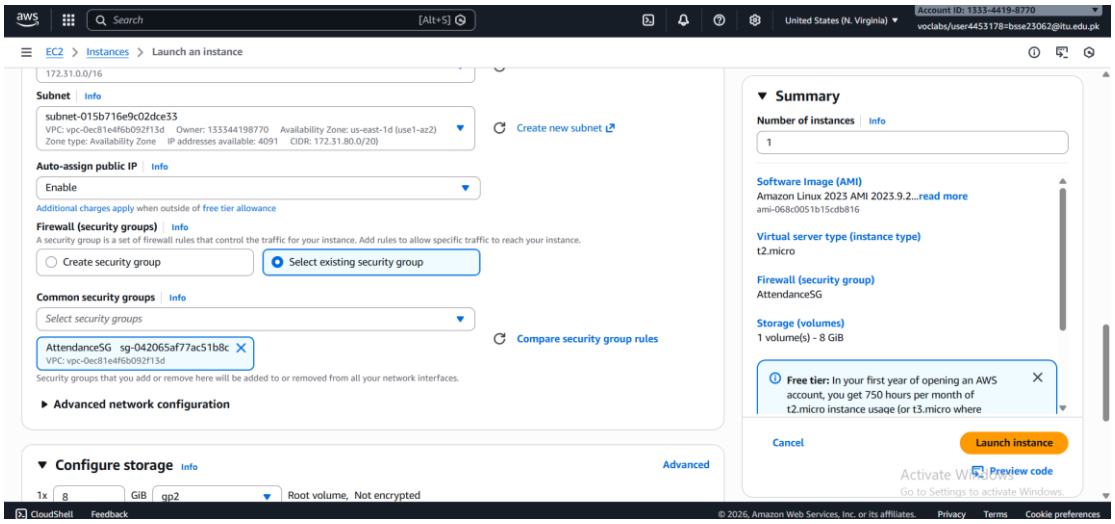
Privacy
Terms
Cookie preferences


Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
EC2 > Instances > Launch an instance
172.31.0.0/16
Subnet Info
subnet-015b716e9c02dce33
VPC: vpc-0ec81e4f6b092f13d Owner: 133344198770 Availability Zone: us-east-1d (use1-az2)
Zone type: Availability Zone IP addresses available: 4091 CIDR: 172.31.80.0/20)
Create new subnet
Auto-assign public IP Info
Enable
Additional charges apply when outside of free tier allowance
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
Common security groups Info
Select security groups
AttendanceSG sg-042065af77ac51b8c
VPC: vpc-0ec81e4f6b092f13d
Compare security group rules
Security groups that you add or remove here will be added to or removed from all your network interfaces.
Advanced network configuration
Configure storage Info
Advanced
1x 8 GiB gp2 Root volume, Not encrypted
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.9.2...read more
ami-068c0051b15cdb816
Virtual server type (instance type)
t2.micro
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1 volume(s) - 8 GiB
Free tier: In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage (or t3.micro where
Cancel
Launch instance
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Go to Settings to activate Windows.
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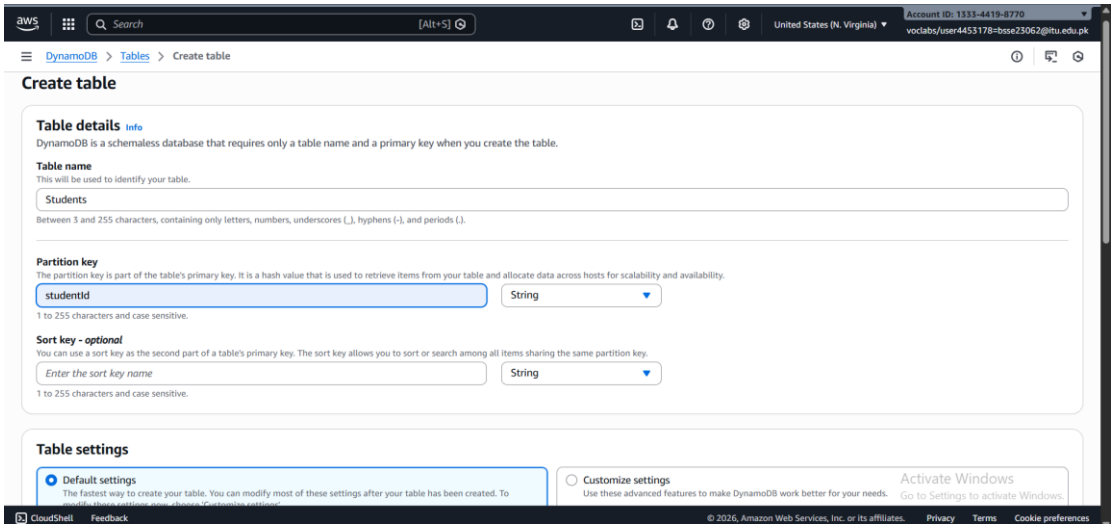
Search [Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
DynamoDB > Tables > Create table
Create table
Table details Info
DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.
Table name
This will be used to identify your table.
Students
Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).
Partition key
The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.
studentId
String
1 to 255 characters and case sensitive.
Sort key - optional
You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.
Enter the sort key name
String
1 to 255 characters and case sensitive.
Table settings
Default settings
The fastest way to create your table. You can modify most of these settings after your table has been created. To
Customize settings
Use these advanced features to make DynamoDB work better for your needs.
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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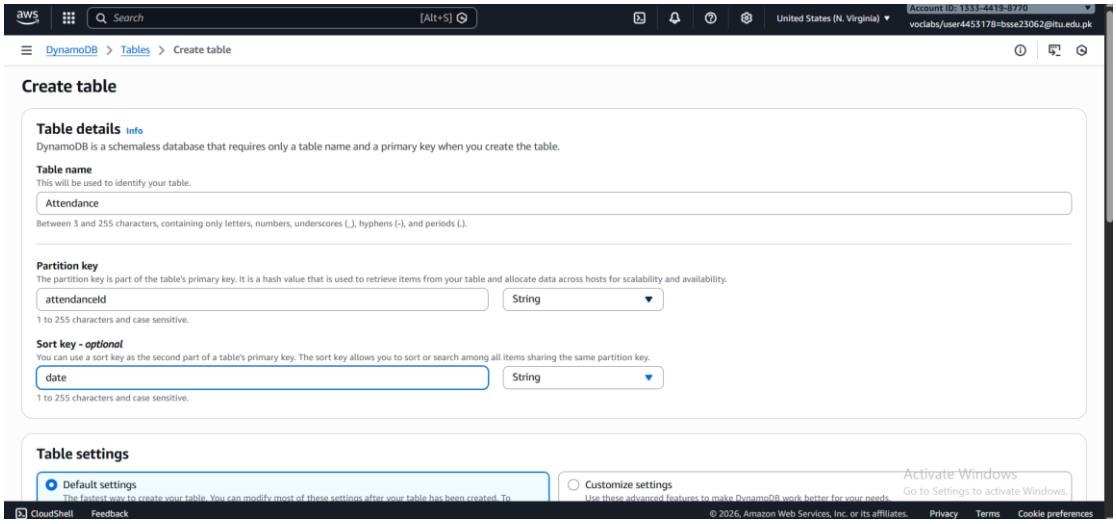
Terms
Cookie preferences


Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
DynamoDB > Tables > Create table
Create table
Table details Info
DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.
Table name
This will be used to identify your table.
Attendance
Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).
Partition key
The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.
attendanceId
String
1 to 255 characters and case sensitive.
Sort key - optional
You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.
date
String
1 to 255 characters and case sensitive.
Table settings
Default settings
Customize settings
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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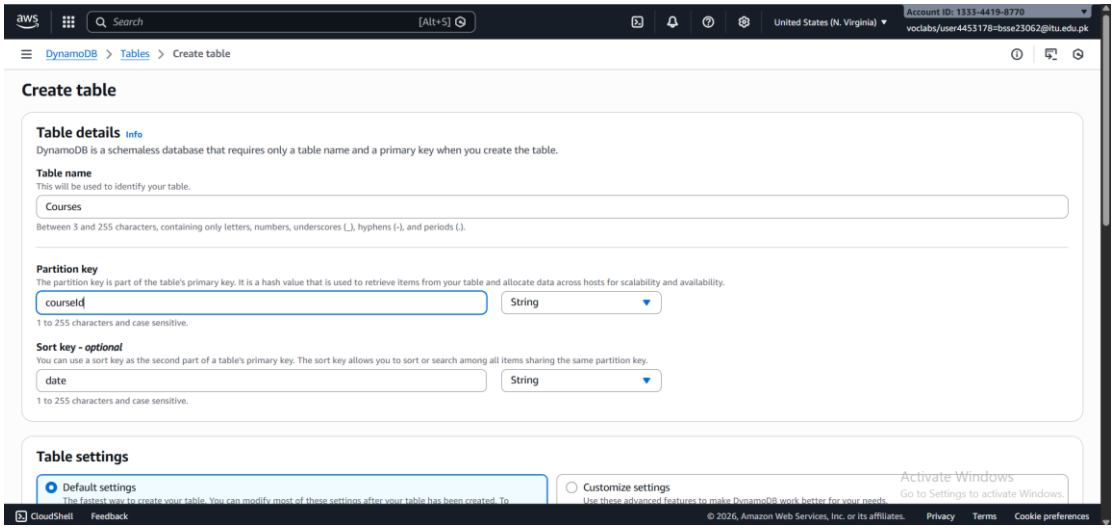
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
DynamoDB > Tables > Create table
Create table
Table details Info
DynamoDB is a schemaless database that requires only a table name and a primary key when you create the table.
Table name
This will be used to identify your table.
Courses
Between 3 and 255 characters, containing only letters, numbers, underscores (_), hyphens (-), and periods (.).
Partition key
The partition key is part of the table's primary key. It is a hash value that is used to retrieve items from your table and allocate data across hosts for scalability and availability.
courseId
String
1 to 255 characters and case sensitive.
Sort key - optional
You can use a sort key as the second part of a table's primary key. The sort key allows you to sort or search among all items sharing the same partition key.
date
String
1 to 255 characters and case sensitive.
Table settings
Default settings
Customize settings
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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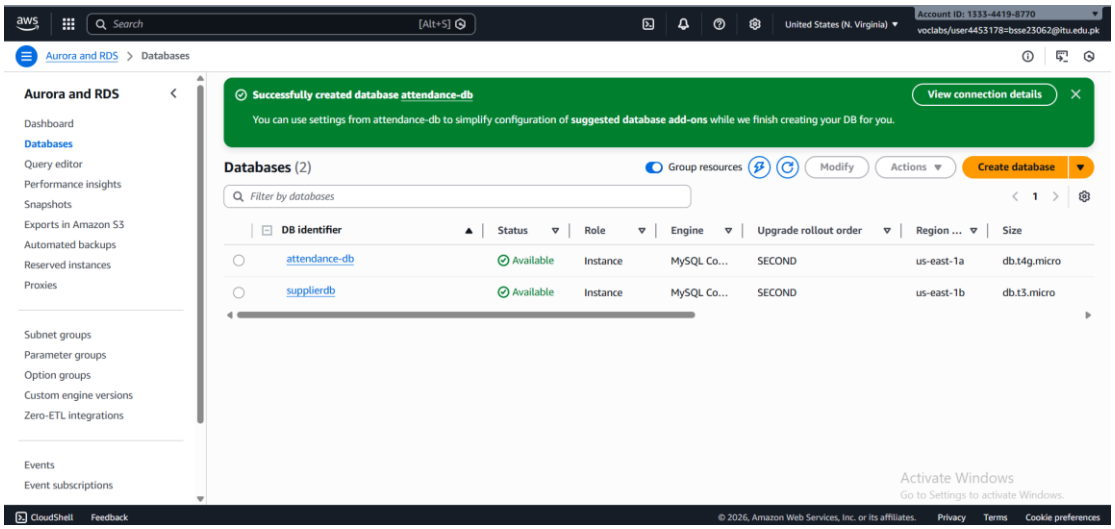
Cookie preferences


Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
Aurora and RDS > Databases
Aurora and RDS
Dashboard
Databases
Query editor
Performance insights
Snapshots
Exports in Amazon S3
Automated backups
Reserved instances
Proxies
Subnet groups
Parameter groups
Option groups
Custom engine versions
Zero-ETL integrations
Events
Event subscriptions
Successfully created database attendance-db
View connection details
You can use settings from attendance-db to simplify configuration of suggested database add-ons while we finish creating your DB for you.
Databases (2)
Group resources
Modify
Actions
Create database
Filter by databases
DB identifier
Status
Role
Engine
Upgrade rollout order
Region ...
Size
attendance-db
Available
Instance
MySQL Co...
SECOND
us-east-1a
db.t4g.micro
supplierdb
Available
Instance
MySQL Co...
SECOND
us-east-1b
db.t3.micro
Activate Windows
Go to Settings to activate Windows.
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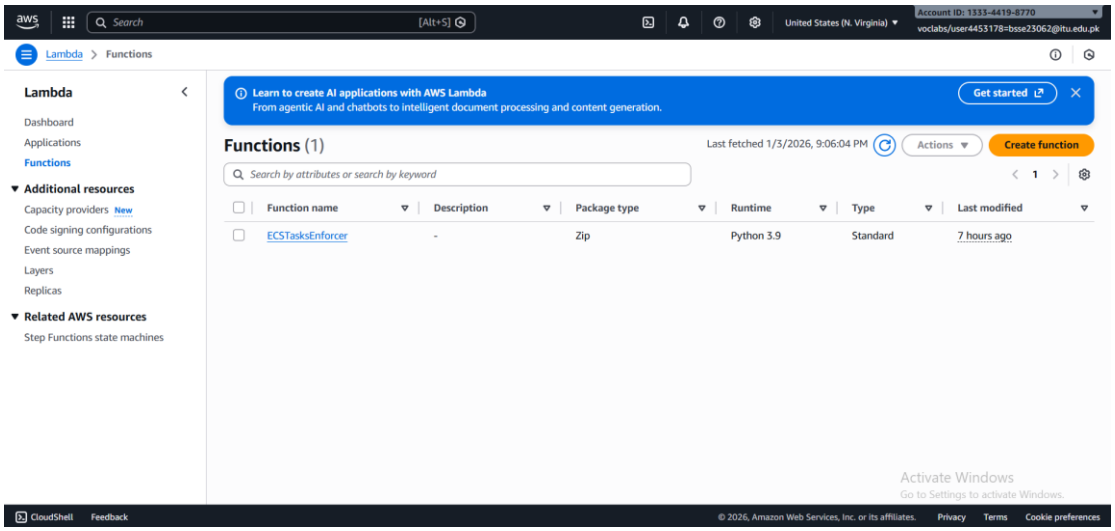
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
Lambda > Functions
Lambda
Dashboard
Applications
Functions
Additional resources
Capacity providers New
Code signing configurations
Event source mappings
Layers
Replicas
Related AWS resources
Step Functions state machines
Learn to create AI applications with AWS Lambda
From agentic AI and chatbots to intelligent document processing and content generation.
Get started
Functions (1)
Last fetched 1/3/2026, 9:06:04 PM
Actions
Create function
Search by attributes or search by keyword
Function name
Description
Package type
Runtime
Type
Last modified
ECSTasksEnforcer
-
Zip
Python 3.9
Standard
7 hours ago
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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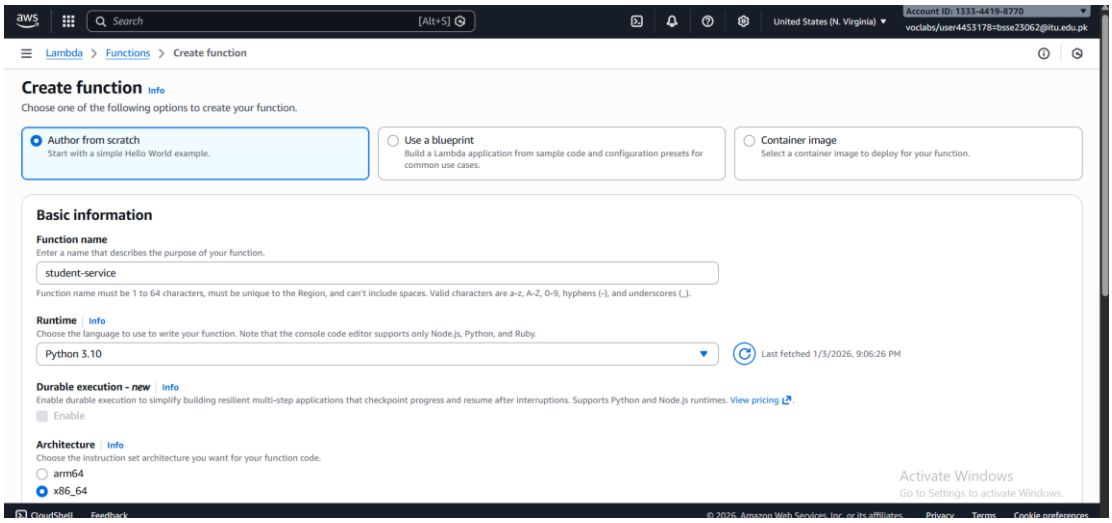
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
Lambda > Functions > Create function
Create function Info
Choose one of the following options to create your function.
Author from scratch
Start with a simple Hello World example.
Use a blueprint
Build a Lambda application from sample code and configuration presets for common use cases.
Container image
Select a container image to deploy for your function.
Basic information
Function name
Enter a name that describes the purpose of your function.
student-service
Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).
Runtime Info
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.
Python 3.10
Last fetched 1/3/2026, 9:06:26 PM
Durable execution - new Info
Enable durable execution to simplify building resilient multi-step applications that checkpoint progress and resume after interruptions. Supports Python and Node.js runtimes. View pricing
Enable
Architecture Info
Choose the instruction set architecture you want for your function code.
arm64
x86_64
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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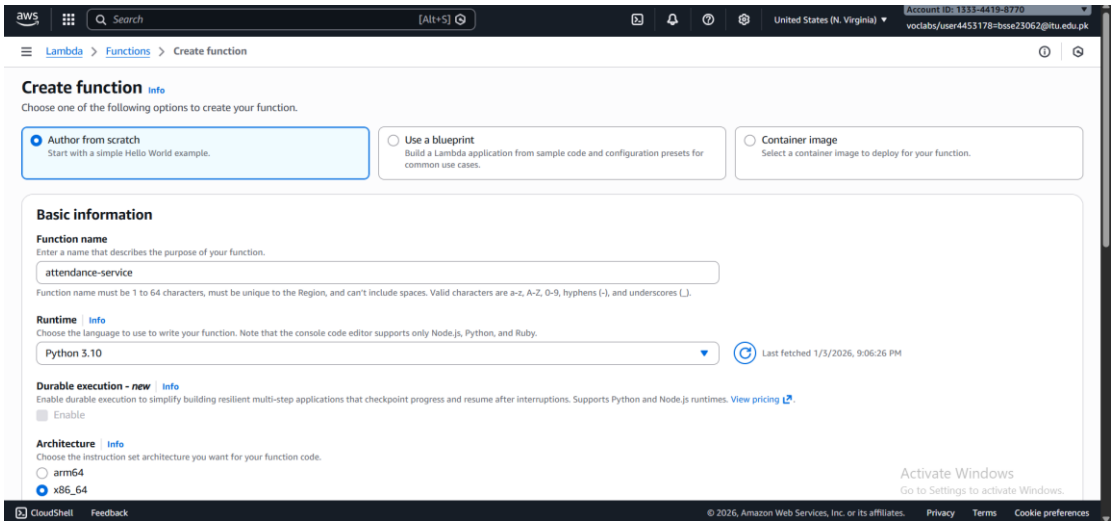
Terms
Cookie preferences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[Alt+S]
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Account ID: 1333-4419-8770
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Lambda > Functions > Create function
Create function Info
Choose one of the following options to create your function.
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Build a Lambda application from sample code and configuration presets for common use cases.
Container image
Select a container image to deploy for your function.
Basic information
Function name
Enter a name that describes the purpose of your function.
attendance-service
Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).
Runtime Info
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.
Python 3.10
Last fetched 1/3/2026, 9:06:26 PM
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Architecture Info
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x86_64
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Go to Settings to activate Windows.
CloudShell
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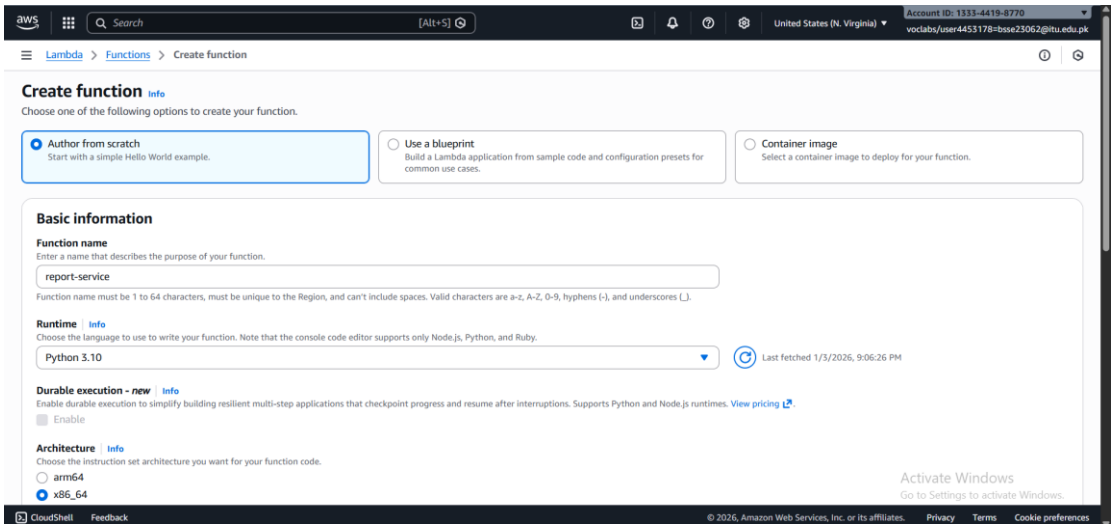
Terms
Cookie preferences


Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
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Create function Info
Choose one of the following options to create your function.
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Start with a simple Hello World example.
Use a blueprint
Build a Lambda application from sample code and configuration presets for common use cases.
Container image
Select a container image to deploy for your function.
Basic information
Function name
Enter a name that describes the purpose of your function.
report-service
Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).
Runtime Info
Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.
Python 3.10
Last fetched 1/3/2026, 9:06:26 PM
Durable execution - new Info
Enable durable execution to simplify building resilient multi-step applications that checkpoint progress and resume after interruptions. Supports Python and Node.js runtimes. View pricing
Enable
Architecture Info
Choose the instruction set architecture you want for your function code.
arm64
x86_64
Activate Windows
Go to Settings to activate Windows.
CloudShell
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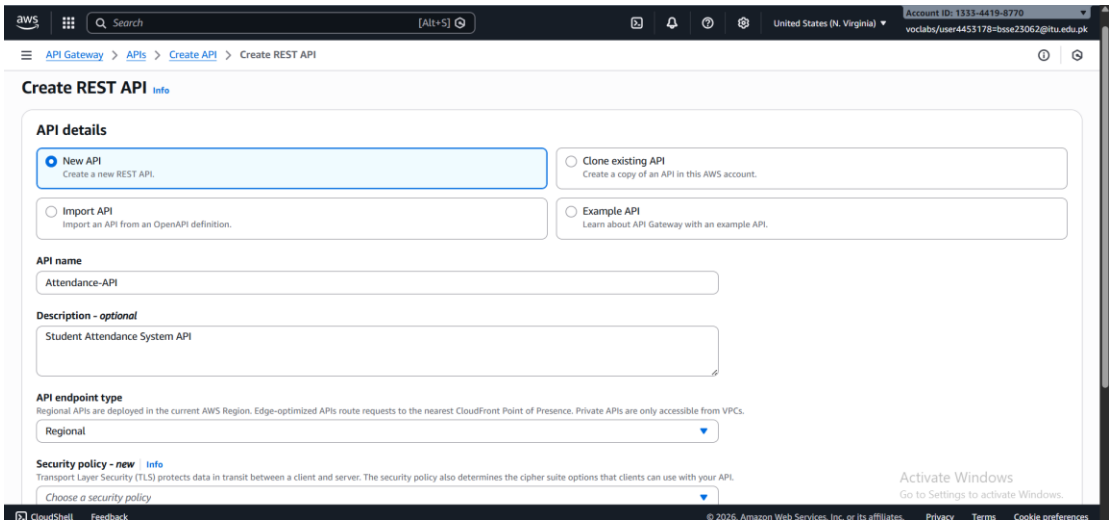
Cookie preferences


Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
API Gateway > APIs > Create API > Create REST API
Create REST API Info
API details
New API
Create a new REST API.
Clone existing API
Create a copy of an API in this AWS account.
Import API
Import an API from an OpenAPI definition.
Example API
Learn about API Gateway with an example API.
API name
Attendance-API
Description - optional
Student Attendance System API
API endpoint type
Regional APIs are deployed in the current AWS Region. Edge-optimized APIs route requests to the nearest CloudFront Point of Presence. Private APIs are only accessible from VPCs.
Regional
Security policy - new Info
Transport Layer Security (TLS) protects data in transit between a client and server. The security policy also determines the cipher suite options that clients can use with your API.
Choose a security policy
Activate Windows
Go to Settings to activate Windows.
CloudShell
Feedback
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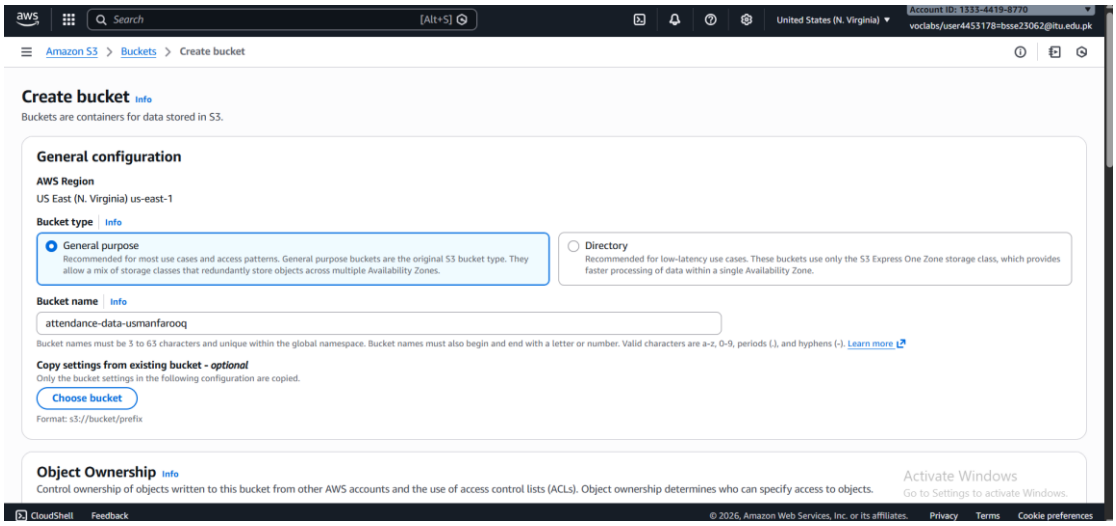
Search
[Alt+S]
United States (N. Virginia)
Account ID: 1333-4419-8770
voclabs/user4453178=bsse23062@itu.edu.pk
Amazon S3 > Buckets > Create bucket
Create bucket Info
Buckets are containers for data stored in S3.
General configuration
AWS Region
US East (N. Virginia) us-east-1
Bucket type Info
General purpose
Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.
Directory
Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.
Bucket name Info
attendance-data-usmanfarooq
Bucket names must be 3 to 63 characters and unique within the global namespace. Bucket names must also begin and end with a letter or number. Valid characters are a-z, 0-9, periods (.), and hyphens (-). Learn more
Copy settings from existing bucket - optional
Only the bucket settings in the following configuration are copied.
Choose bucket
Format: s3://bucket/prefix
Object Ownership Info
Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.
Activate Windows
Go to Settings to activate Windows.
CloudShell
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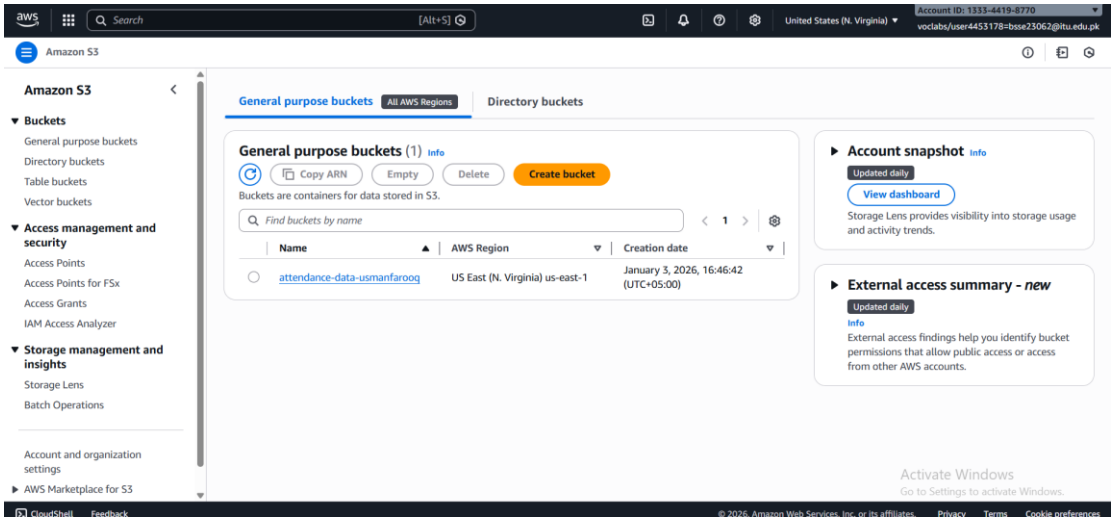
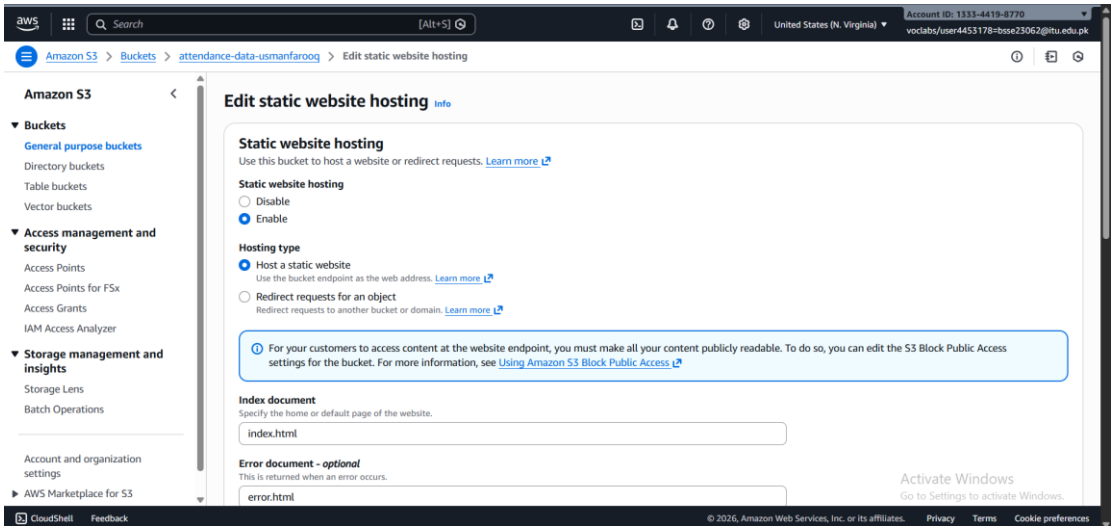


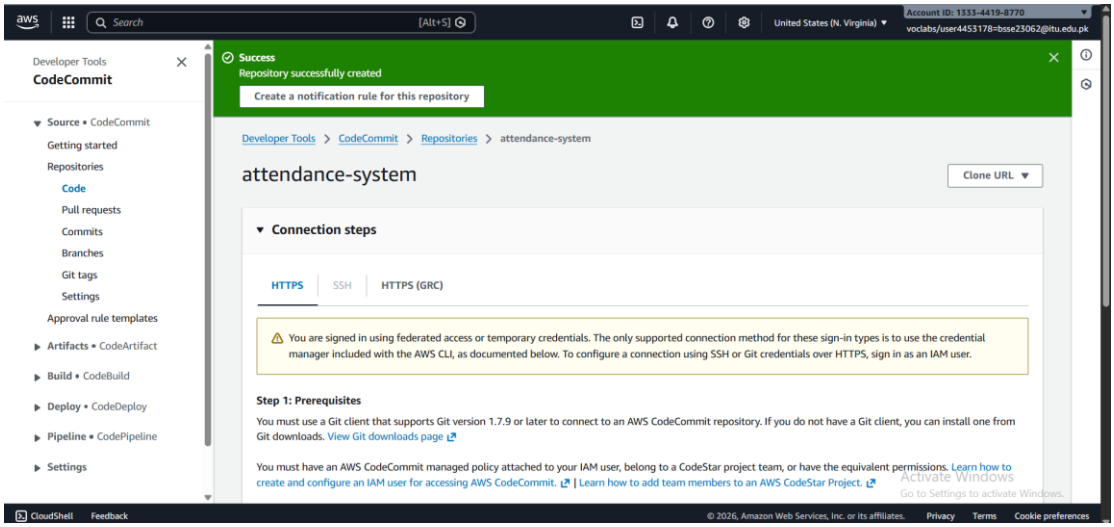


index.html

File Edit View

```
<!DOCTYPE html>
<html>
<head>
    <title>Student Attendance System</title>
    <style>
        body { font-family: Arial; margin: 40px; }
        .container { max-width: 600px; margin: auto; }
        input, button { padding: 10px; margin: 5px; }
    </style>
</head>
<body>
    <div class="container">
        <h1>Student Attendance System</h1>
        <div id="login">
            <input type="text" id="studentId" placeholder="Student ID">
            <button onclick="markAttendance()">Mark Attendance</button>
        </div>
        <div id="status"></div>
    </div>
    <script>
        const API_URL = "YOUR_API_GATEWAY_URL";

        async function markAttendance() {
            const studentId = document.getElementById('studentId').value;
            const response = await fetch(API_URL + '/attendance', {
                method: 'POST',
                body: JSON.stringify({ studentId, date: new Date().toISOString() })
            });
            document.getElementById('status').innerHTML = 'Attendance marked!';
        }
    </script>
</body>
</html>
```



3. LIST OF TABLES (LOT)

AWS Service	Purpose
S3	Frontend hosting & file storage
Lambda	Backend microservices
API Gateway	REST API Management
DynamoDB	Attendence Data Storage
RDS	Relational reporting
Cognito	User Authentication
CloudWatch	Monitoring & logs

4. LIST OF EQUATIONS (LOE)

This project focuses on cloud system design and deployment. No mathematical equations were required; therefore, a List of Equations is not applicable.

5. INTRODUCTION

Attendance management in educational institutions is traditionally handled manually, leading to inefficiencies, errors, and lack of transparency. This project proposes a cloud-based Student Attendance Management System using AWS microservices architecture to ensure scalability, security, and automation. The system leverages serverless services and CI/CD pipelines for efficient deployment and maintenance.

6. PROBLEM STATEMENT

Existing attendance systems lack scalability, real-time access, and centralized monitoring. Manual systems are error-prone and difficult to manage across multiple classes and users. The goal is to design and deploy a secure, cloud-native solution using AWS.

7. SYSTEM ARCHITECTURE DESIGN

Include:

- **Architecture diagram**

Explanation of:

- Frontend
- Backend microservices
- Database
- Authentication
- CI/CD

8. AWS SERVICES USED

- **Amazon S3** → Frontend hosting & file storage
- **Amazon API Gateway** → Exposes and routes backend APIs
- **AWS Lambda** → Backend microservices & business logic
- **Amazon DynamoDB** → Stores attendance and user data
- **AWS Cognito** → User authentication & authorization
- **Amazon CloudWatch** → Logging, monitoring, and alerts
- **Amazon SNS / SES** → Notifications (alerts, emails)
- **AWS VPC & VPC Endpoints** → Secure network isolation

9. IMPLEMENTATION DETAILS

Include:

- IAM roles
- VPC & subnets
- DynamoDB tables
- Lambda creation
- API Gateway configuration

10. DEPLOYMENT PROCESS

Use the **deployment-only steps** I gave you earlier:

- Lambda deploy
- API Gateway deploy
- S3 frontend upload
- CI/CD trigger

11. TESTING & VALIDATION

Include:

- API testing
- UI testing
- Database verification

12. MONITORING & LOGGING

Explain:

- CloudWatch log groups
- Error monitoring
- Performance visibility

13. SECURITY & IAM

Explains:

- Least privilege IAM
- Cognito authentication
- VPC isolation
- HTTPS enforcement

14. CONCLUSION

The project successfully demonstrates a scalable and secure cloud-based attendance management system using AWS microservices. The use of CI/CD pipelines ensures maintainability and real-world applicability.

15. REFERENCES

- Amazon Web Services, “AWS Lambda Developer Guide,” AWS Documentation, 2024.
- Amazon Web Services, “Amazon API Gateway,” AWS Documentation.
- Amazon Web Services, “Amazon DynamoDB Developer Guide.”
- Amazon Web Services, “AWS Cognito Authentication,” AWS Documentation.
- AWS Academy, “Microservices and CI/CD Pipeline Builder Lab Manual.”
- R. Buyya et al., “Cloud Computing: Principles and Paradigms,” Wiley, 2019.