

AWS ARCHITECTURE DESIGN, IMPLEMENTATION STEPS & SCREENSHOTS

SmartSOS: AWS-Based Location-Aware Emergency Assistance and Management System

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AWS account setup:

The screenshot shows the AWS Console Home page. At the top right, it displays the Account ID: 1564-2932-8349 and the Region: United States (N. Virginia). The main area features a "Recently visited" section with a placeholder icon and a message: "No recently visited services". Below this, there's a list of commonly visited services: EC2, S3, Aurora and RDS, and Lambda. To the right, there's a "Applications" section with a count of 0. It includes a "Create application" button and a search bar. The region is set to us-east-1 (Current Region). A message at the bottom of the applications section says: "Get started by creating an application." and has a "Create application" button.

IAM roles & policies:

The screenshot shows the "IAM instance profile" configuration screen. It has a search bar at the top with the placeholder "Specify a custom value...". Below the search bar are two options: "Don't include in launch template" (unchecked) and "EMR_EC2_DefaultRole" (checked, indicated by a blue checkmark). The EMR_EC2_DefaultRole entry includes the ARN: arn:aws:iam::156429328349:instance-profile/EMR_EC2_DefaultRole. Below these, there is another section labeled "LabInstanceProfile" with the ARN: arn:aws:iam::156429328349:instance-profile/LabInstanceProfile.

Used **labinstanceprofile** IAM role.

VPC/subnets/security groups:

Name tag - optional
Creates a tag with a key of 'Name' and a value that you specify.

IPv4 CIDR block [Info](#)
 IPv4 CIDR manual input
 IPAM-allocated IPv4 CIDR block

IPv4 CIDR

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

Tenancy [Info](#)

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You successfully created [vpc-098c2e06b05643379 / smartsos-vpc](#)

vpc-098c2e06b05643379 / smartsos-vpc

[Actions](#)

Details Info	
VPC ID	vpc-098c2e06b05643379
State	Available
Block Public Access	Off
DNS resolution	Enabled
Tenancy	default
DHCP option set	dopt-0533fd6ea82845f
Main network ACL	acl-09dcffab8c3877b5
Default VPC	No
IPv4 CIDR	10.0.0.0/16
Network Address Usage metrics	Disabled
Route 53 Resolver DNS Firewall rule groups	Failed to load rule groups
IPv6 pool	-
Encryption control ID	-
Owner ID	156429328349
DNS hostnames	Disabled
Main route table	rtb-0b44d32a2c5e4dc16

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You have successfully created 1 subnet: [subnet-08c8d9022a4c244f9](#)

Subnets (1) [Info](#)

Last updated less than a minute ago

[Actions](#) [Create subnet](#)

<input type="checkbox"/> Name	Subnet ID	State	VPC
<input type="checkbox"/> smartsos-public-a	subnet-08c8d9022a4c244f9	Available	vpc-098c2e06b05643379 sma...

Select a subnet

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You have successfully created 1 subnet: subnet-0daf9878972817e0a

Subnets (1) Info

Last updated less than a minute ago

Actions Create subnet

Name	Subnet ID	State	VPC
smartsos-public-b	subnet-0daf9878972817e0a	Available	vpc-098c2e06b05643379 sma...

Select a subnet

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You have successfully created 1 subnet: subnet-00c2d6145111cbaaa

Subnets (1) Info

Last updated less than a minute ago

Actions Create subnet

Name	Subnet ID	State	VPC
smartsos-private-a	subnet-00c2d6145111cbaaa	Available	vpc-098c2e06b05643379 sma...

Select a subnet

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You have successfully created 1 subnet: subnet-044179ed229d82a79

Subnets (1) Info

Last updated less than a minute ago

Actions Create subnet

Name	Subnet ID	State	VPC
smartsos-private-b	subnet-044179ed229d82a79	Available	vpc-098c2e06b05643379 sma...

Select a subnet

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AWS VPC Route Table Details

rtb-0882b37270609fd49 / smartsos-public-rt

Details		Info	
Route table ID	rtb-0882b37270609fd49	Main	No
VPC	vpc-098c2e06b05643379 smartsos-vpc	Owner ID	156429328349
Explicit subnet associations Edge associations			

Routes | [Subnet associations](#) | [Edge associations](#) | [Route propagation](#) | [Tags](#)

Routes (1)

Routes (1)					Both	Edit routes
Destination	Target	Status	Propagated	Route Origin		
10.0.0.0/16	local	Active	No	CreateRouteTable	Create Route Table	

AWS VPC Edit Routes

Edit routes

Destination	Target	Status	Propagated	Route Origin
10.0.0.0/16	local	Active	No	CreateRouteTable
0.0.0.0/0	Internet Gateway	-	No	CreateRoute
	igw-0d6b5d46835cb91ff	-		

[Add route](#) | [Cancel](#) | [Preview](#) | [Save changes](#)

AWS VPC Edit Subnet Associations

Change which subnets are associated with this route table.

Available subnets (2/4)

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
smartsos-private-b	subnet-044179ed229d82a79	10.0.4.0/24	-	Main (rtb-0b44d32a2c5e4dc16)
smartsos-private-a	subnet-00c2d6145111cbaaa	10.0.3.0/24	-	Main (rtb-0b44d32a2c5e4dc16)
<input checked="" type="checkbox"/> smartsos-public-a	subnet-08c8d9022a4c244f9	10.0.1.0/24	-	Main (rtb-0b44d32a2c5e4dc16)
<input checked="" type="checkbox"/> smartsos-public-b	subnet-0daf9878972817e0a	10.0.2.0/24	-	Main (rtb-0b44d32a2c5e4dc16)

Selected subnets

- subnet-08c8d9022a4c244f9 / smartsos-public-a
- subnet-0daf9878972817e0a / smartsos-public-b

[Cancel](#) | [Save associations](#)

AWS VPC > Route tables > rtb-0cd86d3d4187a7914

Route table rtb-0cd86d3d4187a7914 | smartsos-private-rt was created successfully.

rtb-0cd86d3d4187a7914 / smartsos-private-rt

Details

Route table ID rtb-0cd86d3d4187a7914	Main No	Explicit subnet associations -	Edge associations -	
VPC vpc-098c2e06b05643379 smartsos-vpc	Owner ID 156429328349			

Routes (1)

Destination	Target	Status	Propagated	Route Origin
0.0.0.0/0	rtb-0cd86d3d4187a7914	Active	Yes	Static

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AWS EC2 > Security Groups > sg-06f7fb458f62c8242 - smartsos-app-sg

Security group (sg-06f7fb458f62c8242 | smartsos-app-sg) was created successfully

sg-06f7fb458f62c8242 - smartsos-app-sg

Details

Security group name smartsos-app-sg	Security group ID sg-06f7fb458f62c8242	Description Security group for SmartSOS EC2 app servers	VPC ID vpc-098c2e06b05643379
Owner 156429328349	Inbound rules count 0 Permission entries	Outbound rules count 1 Permission entry	

Inbound rules

Name	Security group rule ID	Type	Protocol
-	sgr-050762e89201789ec	MySQL/Aurora	TCP

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AWS EC2 > Security Groups > sg-01a25cfe348edda20 - smartsos-db-sg

Security group (sg-01a25cfe348edda20 | smartsos-db-sg) was created successfully

sg-01a25cfe348edda20 - smartsos-db-sg

Details

Security group name smartsos-db-sg	Security group ID sg-01a25cfe348edda20	Description Security group for SmartSOS RDS	VPC ID vpc-098c2e06b05643379
Owner 156429328349	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules

Name	Security group rule ID	Type	Protocol
-	sgr-050762e89201789ec	MySQL/Aurora	TCP

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Screenshot of the AWS EC2 Security Groups page showing the creation of a new security group.

Details

Security group name smartsos-alb-sg	Security group ID sg-01a950f0e1716abfa	Description Security group for SmartSOS Application Load Balancer	VPC ID vpc-098c2e06b05643379 ↗
Owner 156429328349	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules (1)

Name	Security group rule ID	IP version	Type	Protocol
-	sgr-071c7b42e7f496852	IPv4	HTTP	TCP

Screenshot of the AWS EC2 Security Groups page showing the creation of another security group.

Details

Security group name smartsos-bastion-sg	Security group ID sg-0d5b8f68af6cc1ee5	Description smartsos-bastion-sg	VPC ID vpc-098c2e06b05643379 ↗
Owner 156429328349	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules (1)

Name	Security group rule ID	IP version	Type	Protocol
-	sgr-00578757a67cd9725	IPv4	SSH	TCP

EC2, S3, Lambda, DynamoDB, RDS, API Gateway, or any used service:

Screenshot of the AWS VPC Internet Gateways page showing the creation of a new internet gateway.

Details

Internet gateway ID igw-0d6b5d46835cb91ff	State Detached	VPC ID -	Owner 156429328349
--	-------------------	-------------	-----------------------

Tags (1)

Key	Value
Name	smartsos-igw

AWS | Search [Alt+S] | United States (N. Virginia) | Account ID: 1564-2932-8349
voclabs/user4452792=bsse23081@itu.edu.pk

VPC > Internet gateways > igw-0d6b5d46835cb91ff

igw-0d6b5d46835cb91ff / smartsos-igw

Details

Internet gateway ID igw-0d6b5d46835cb91ff	State Attached	VPC ID vpc-098c2e06b05643379 smartsos-vpc	Owner 156429328349
--	--	---	---------------------------------------

Tags (1)

Key	Value
Name	smartsos-igw

[Manage tags](#)

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AWS | Search [Alt+S] | United States (N. Virginia) | Account ID: 1564-2932-8349
voclabs/user4452792=bsse23081@itu.edu.pk

VPC > NAT gateways > nat-1a0cd09fb8c81aff1

nat-1a0cd09fb8c81aff1 / smartsos-nat

Details

NAT gateway ID nat-1a0cd09fb8c81aff1	Availability mode Regional	State Available	State message –
NAT gateway ARN arn:aws:ec2:us-east-1:156429328349:natgateway/nat-1a0cd09fb8c81aff1	Connectivity type Public	Created Thursday, January 1, 2026 at 18:38:40 GMT+5	Deleted –
VPC vpc-098c2e06b05643379 smartsos-vpc	Method of EIP allocation Automatic		

[IP addresses](#) [Monitoring](#) [Flow logs](#) [Tags](#)

Associated IP addresses (1)

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Aurora and RDS > Databases > Create database

Choose a database creation method

Full configuration
You set all of the configuration options, including ones for availability, security, backups, and maintenance.

Easy create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type [Info](#)

<input checked="" type="radio"/> Aurora (MySQL Compatible) 	<input type="radio"/> Aurora (PostgreSQL Compatible) 	<input type="radio"/> MySQL 	<input type="radio"/> PostgreSQL
<input type="radio"/> MariaDB 	<input type="radio"/> Oracle 	<input type="radio"/> Microsoft SQL Server 	<input type="radio"/> IBM Db2

Aurora and RDS > Databases > smartsos-db

smartsos-db

Summary

DB identifier smartsos-db	Status Modifying	Role Instance	Engine MySQL Community
CPU 48.08%	Class db.t3.micro	Current activity 0 Connections	Region & AZ us-east-1b

Recommendations

Connectivity & security | Monitoring | Logs & events | Configuration | Zero-ETL integrations | N >

Subnet groups | Parameter groups | Option groups | Custom engine versions

CloudShell | Feedback

Amazon S3 > Buckets

Successfully created bucket "smartsos-evidence"

To upload files and folders, or to configure additional bucket settings, choose View details.

General purpose buckets (1) Info

<input type="button" value="C"/> Copy ARN	<input type="button" value="Empty"/>	<input type="button" value="Delete"/>	<input type="button" value="Create bucket"/>
Buckets are containers for data stored in S3.			
<input type="text" value="Find buckets by name"/>			
Name	AWS Region	Creation date	
<input type="radio"/> smartsos-evidence	US East (N. Virginia) us-east-1	January 2, 2026, 01:40:39 (UTC+05:00)	

Account snapshot Info

Updated daily

Storage Lens provides visibility into storage usage and activity trends.

External access summary - new Info

Updated daily

External access findings help you identify bucket permissions that allow public access or access from other AWS accounts.

https://us-east-1.console.aws.amazon.com/console/home?region=us-east-1

Events

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Capacity Manager New

Images

AMIs

AMI Catalog

Elastic Block Store

Volumes

CloudShell | Feedback

Screenshot of the AWS EC2 Load Balancers console showing the creation of a new load balancer named "smartsos-alb". A success message indicates it has been created and is provisioning.

smartsos-alb

Details

Load balancer type	Status	VPC	Load balancer IP address type
Application	Provisioning	vpc-098c2e06b05643379	IPv4
Scheme	Hosted zone	Availability Zones	Date created
Internet-facing	Z35SXDOTRQ7X7K	subnet-08c8d9022a4c244f9 us-east-1a (use1-az2)	January 1, 2026, 20:03 (UTC+05:00)
		subnet-0daf9878972817e0a us-east-1b (use1-az4)	

Load balancer ARN: [DNS name](#) [Info](#)

CloudShell Feedback

Screenshot of the AWS EC2 Auto Scaling groups console showing one group named "smartsos-app-asg" listed.

Auto Scaling groups (1) [Info](#)

Name	Launch template/configuration	Instances	Status	Desired capacity
smartsos-app-asg	smartsos-app-lt Version Default	1	-	1

0 Auto Scaling groups selected

CloudShell Feedback

Screenshot of the AWS EC2 Instances console showing three instances listed. One instance, "i-040ff45364ce01985", is selected and detailed below.

Instances (1/3) [Info](#)

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Av
<input checked="" type="checkbox"/>	i-040ff45364ce01985	Running	m1.small	2/2 checks passed	View alarms +	us
<input type="checkbox"/>	i-003da0e9a3a0a3b73	Running	m1.small	2/2 checks passed	View alarms +	us
<input type="checkbox"/>	i-00c3c5c132401882f	Terminated	m1.small	-	View alarms +	us

i-040ff45364ce01985

Details [Status and alarms](#) [Monitoring](#) [Security](#) [Networking](#) [Storage](#) [Tags](#)

Instance summary [Info](#)

Instance ID	Public IPv4 address	Private IPv4 addresses
i-040ff45364ce01985	-	10.0.4.68

CloudShell Feedback

The screenshot shows the AWS EC2 Instances page. The instance summary for the instance `i-0baea108c6f926bb5` (smartos-bastion) is displayed. Key details include:

- Instance ID:** i-0baea108c6f926bb5
- Public IPv4 address:** 13.219.95.119
- Private IPv4 address:** 10.0.1.103
- Instance state:** Running
- Private IP DNS name (IPv4 only):** ip-10-0-1-103.ec2.internal
- Instance type:** t3.micro
- VPC ID:** vpc-098c2e06b05643379
- Subnet ID:** subnet-08c8d9022a4c244f9

The left sidebar shows navigation options like Dashboard, EC2 Global View, Events, Instances, Images, CloudShell, and Feedback.

Deployment process:

```
ec2-user@ip-10-0-1-103:~$ 
[ec2-user@ip-10-0-1-103 ~]$ # Authenticating with public key "imported-openssh-key"
[ec2-user@ip-10-0-1-103 ~]$ 
[ec2-user@ip-10-0-1-103 ~]$ sudo yum update -y
[ec2-user@ip-10-0-1-103 ~]$ 
[ec2-user@ip-10-0-1-103 ~]$ # Install Node.js 18 (LTS) from Amazon Extras
[ec2-user@ip-10-0-1-103 ~]$ sudo amazon-linux-extras install nodejs18 -y
[ec2-user@ip-10-0-1-103 ~]$ 
[ec2-user@ip-10-0-1-103 ~]$ # Confirm
[ec2-user@ip-10-0-1-103 ~]$ node -v
[ec2-user@ip-10-0-1-103 ~]$ npm -v
[ec2-user@ip-10-0-1-103 ~]$ # Install Git (if not installed)
[ec2-user@ip-10-0-1-103 ~]$ sudo yum install -y git
```

```

ec2-user@ip-10-0-1-103:~#
(3/8): perl-Error-0.17029-5.amzn2023.0.2.noarch 1.3 MB/s | 41 kB 00:00
(4/8): perl-core-2.50.1-1.amzn2023.0.1.x86_64.rpm 50 MB/s | 4.9 MB 00:00
(5/8): perl-File-Find-1.37-477.amzn2023.0.7.noarch 720 kB/s | 25 kB 00:00
(6/8): perl-Git-2.50.1-1.amzn2023.0.1.noarch.rpm 1.2 MB/s | 41 kB 00:00
(7/8): perl-lib-0.65-477.amzn2023.0.7.x86_64.rpm 544 kB/s | 15 kB 00:00
(8/8): perl-TermReadKey-2.38-9.amzn2023.0.2.x86 1.1 MB/s | 36 kB 00:00
Total 47 MB/s | 7.9 MB 00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
Preparing : 1/1
Installing : git-core-2.50.1-1.amzn2023.0.1.x86_64 1/8
Installing : git-core-doc-2.50.1-1.amzn2023.0.1.noarch 2/8
Installing : perl-lib-0.65-477.amzn2023.0.7.x86_64 3/8
Installing : perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64 4/8
Installing : perl-File-Find-1.37-477.amzn2023.0.7.noarch 5/8
Installing : perl-Error-1.0.17029-5.amzn2023.0.2.noarch 6/8
Installing : perl-Git-2.50.1-1.amzn2023.0.1.noarch 7/8
Installing : git-2.50.1-1.amzn2023.0.1.x86_64 8/8
Running scriptlet: git-2.50.1-1.amzn2023.0.1.x86_64
Verifying : git-2.50.1-1.amzn2023.0.1.x86_64 1/8
Verifying : git-core-2.50.1-1.amzn2023.0.1.x86_64 2/8
Verifying : git-core-doc-2.50.1-1.amzn2023.0.1.noarch 3/8
Verifying : perl-Error-1.0.17029-5.amzn2023.0.2.noarch 4/8
Verifying : perl-File-Find-1.37-477.amzn2023.0.7.noarch 5/8
Verifying : perl-Git-2.50.1-1.amzn2023.0.1.noarch 6/8
Verifying : perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64 7/8
Verifying : perl-lib-0.65-477.amzn2023.0.7.x86_64 8/8
Installed:
git-2.50.1-1.amzn2023.0.1.x86_64
git-core-2.50.1-1.amzn2023.0.1.x86_64
git-core-doc-2.50.1-1.amzn2023.0.1.noarch
perl-Error-1.0.17029-5.amzn2023.0.2.noarch
perl-File-Find-1.37-477.amzn2023.0.7.noarch
perl-Git-2.50.1-1.amzn2023.0.1.noarch
perl-TermReadKey-2.38-9.amzn2023.0.2.x86_64
perl-lib-0.65-477.amzn2023.0.7.x86_64
Complete!
[ec2-user@ip-10-0-1-103 ~]$ 

```

Monitoring / logging (CloudWatch):



Final output:

SMARTSOS

SELECT SYSTEM INTERFACE



CIVILIAN PORTAL



COMMAND CENTER