



# AWS Local Zones

An **AWS Local Zone** is a type of infrastructure deployment that extends AWS services closer to end-users in specific geographic locations. It's essentially a mini AWS Region that offers a subset of AWS services closer to where end-users or specific industries operate. AWS Local Zones are particularly useful for applications that require low latency or have local data residency requirements.

## Key Characteristics of AWS Local Zones

### 1. Proximity to End-Users:

- Local Zones are physically located near large population centers, industries, or IT hubs. This proximity helps reduce the latency experienced by users when they interact with applications hosted on AWS.

### 2. Subset of Services:

- While not all AWS services are available in Local Zones, they do offer critical services like compute (Amazon EC2), storage (Amazon EBS), database (Amazon RDS), and content delivery (Amazon CloudFront). This selection is designed to support latency-sensitive and data-intensive applications.

### 3. Low Latency:

- By being closer to users, Local Zones help applications achieve lower network latency, often in the range of single-digit milliseconds. This is crucial for applications like online gaming, live video streaming, augmented/virtual reality, and machine learning inference, where even small delays can impact user experience.

### 4. Data Residency and Compliance:

- Some organizations are subject to regulatory requirements that dictate where data must be stored and processed. AWS Local Zones allow these organizations to keep data and workloads local, meeting compliance and data residency requirements without needing to build and maintain their own data centers.

### 5. Seamless Integration with AWS Regions:

- Local Zones are fully integrated with the broader AWS ecosystem. They connect to the parent AWS Region over a dedicated, low-latency network. This integration allows customers to easily extend their existing applications to the Local Zone without significant changes to their architecture. They can also use services available in the parent Region, such as Amazon S3 or Amazon DynamoDB, in conjunction with the services offered in the Local Zone.

### 6. Consistency in Operations:

- Management, monitoring, and security tools are consistent across AWS Regions and Local Zones. This consistency simplifies the operations and management of resources, as users can employ the same AWS Management Console, CLI, and APIs they use for other AWS resources.

## Use Cases for AWS Local Zones

### 1. Media and Entertainment:

- Video editing, rendering, and live broadcasting can benefit from low-latency access to compute resources.

## 2. Gaming:

- Multiplayer online games require minimal latency to provide a smooth and responsive experience to players.

## 3. Healthcare:

- Local data processing can be critical for healthcare applications that must comply with strict data residency laws.

## 4. Manufacturing and Industrial Applications:

- Real-time analytics and control systems often need low-latency access to compute and storage resources.

## 5. Finance and Trading:

- Financial institutions may require low-latency connections for trading systems and other time-sensitive applications.

## Example

For instance, consider a company that provides live video streaming services. The company's users are primarily located in Los Angeles, California. By deploying their application in an AWS Local Zone in Los Angeles, they can significantly reduce the latency of video streams, providing a higher quality experience for their users compared to hosting the application in a distant AWS Region.

In summary, AWS Local Zones bring AWS infrastructure closer to specific geographic locations, enabling applications to achieve lower latency, meet local compliance requirements, and deliver a better user experience. They offer a targeted set of services and seamlessly integrate with the full AWS environment, allowing organizations to extend their cloud infrastructure to new locations with minimal effort.



## What are we doing in this Lab?

In this lab, the goal is to enable an AWS Local Zone, create a network infrastructure within it, and launch a compute resource (EC2 instance).

### Steps Overview:

- Enable Local Zone:** You start by enabling the Delhi Local Zone in the ap-south-1 region (Mumbai) via the AWS Management Console.
- Create VPC and Subnet:** Next, you create a Virtual Private Cloud (VPC) and a subnet specifically in the Delhi Local Zone.
- Launch EC2 Instance:** Finally, you launch an EC2 instance within the newly created subnet in the Local Zone, selecting an appropriate instance type supported by the zone.

### End Goal:

The end goal is to demonstrate how to use AWS Local Zones to deploy resources closer to end-users for reduced latency, while also learning how to set up and manage network infrastructure and compute resources within these zones.

## To begin with the Lab:

1. In this lab we are going to enable an AWS Local Zone, create a Subnet in our Local Zone then we will launch a resource in that.
2. You can also go through this link for more information. As in the snapshot, you can see that we will enable the Local Zone in the ap-south-1 region which is Mumbai. The name of the Local Zone region is Delhi, as you can see in the snapshot.

<https://aws.amazon.com/about-aws/global-infrastructure/localzones/features/>

AWS Local Zones location	AWS services	Amazon EC2	Amazon EBS	AWS Shield	Amazon ELB	Amazon ECS	Amazon EKS	Amazon VPC	Amazon Direct Connect	Amazon FSx	Amazon EMR
instances											
Copenhagen, Denmark	eu-north-1-cph-1a	T3, C5, R5, G4dn, and M5 instances	General Purpose SSD (gp2)	Standard	ALB	✓	✓	✓	✓		
Delhi, India	ap-south-1-del-1a	T3, C5, R5, G4dn, and M5 instances	General Purpose SSD (gp2)	Standard	ALB	✓	✓	✓	✓		

## Step 1: Enable Local Zone

1. Now in your AWS Console go to EC2 and from its dashboard, if you scroll down a bit, you will see the Service health. Here you can see that we have the ability to enable additional Zones. Click on it.

**Launch instance**

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

**Launch instance** ▾

**Migrate a server** ↗

Note: Your instances will launch in the Asia Pacific (Mumbai) Region

**Service health**

AWS Health Dashboard ↗ C

Region  
Asia Pacific (Mumbai)

Status  
⌚ This service is operating normally.

**Zones**

Zone name	Zone ID
ap-south-1a	aps1-az1
ap-south-1b	aps1-az3
ap-south-1c	aps1-az2

[Enable additional Zones](#)

- Now you can see below that we have some AZs enabled by default but two of our Zones are currently disabled. So, we'll choose our Delhi Zone and click on actions, then we need to choose Manage Zone group.

**Settings**

Data protection and security | **Zones** | Default credit specification | EC2 Serial Console | EC2 console preferences

**Zones (1/5)**

Switch regions to manage Zones for a different AWS region.

All Zones ▾

Zone ID	Zone name	Zone type	Location	State	Opt-in status	Network b...
aps1-az1	ap-south-1a	Availability Zone	-	⌚ Available	⌚ Enabled by default	ap-south-1
aps1-az3	ap-south-1b	Availability Zone	-	⌚ Available	⌚ Enabled by default	ap-south-1
aps1-az2	ap-south-1c	Availability Zone	-	⌚ Available	⌚ Enabled by default	ap-south-1
aps1-ccu1-az1	ap-south-1-cc...	Local Zone	India (Kolkata)	⌚ Available	⌚ Disabled	ap-south-1-cc...
aps1-del1-az1	ap-south-1-del...	Local Zone	India (Delhi)	⌚ Available	⌚ Disabled	ap-south-1-del...

**Actions** ▾

- Manage Zone group
- Request access ↗

- Now check the Enable option and click on Update. So, it will take some time to enable the zone, you have to wait for 5 minutes or so and keep on refreshing.

## Manage zone group

X

**i** This action might enable or disable a group of zones listed below. Before disabling a zone group make sure you remove all associated resources.

Group name

ap-south-1-del-1

Zone names

ap-south-1-del-1a

Opt-in status

Check to enable or uncheck to disable the zone group.

Enable

Cancel

Update

4. Below you can see that our Zone is now enabled.

Zones (1/5)									Actions ▾
Switch regions to manage Zones for a different AWS region.								< 1 >	
Zone ID	Zone name	Zone type	Location	State	Opt-in status	Network bor...			
aps1-az1	ap-south-1a	Availability Zone	-		Available		Enabled by default	ap-south-1	
aps1-az3	ap-south-1b	Availability Zone	-		Available		Enabled by default	ap-south-1	
aps1-az2	ap-south-1c	Availability Zone	-		Available		Enabled by default	ap-south-1	
aps1-ccu1-az1	ap-south-1-cc...	Local Zone	India (Kolkata)		Available		Disabled	ap-south-1-cc...	
aps1-del1-az1	ap-south-1-del...	Local Zone	India (Delhi)		Available		Enabled	ap-south-1-del...	

## 😊 Step 2: Create VPC and a Subnet

1. Now, go to VPC and click on Create VPC. Then you need to choose VPC only, give it a name, give an IPv4 CIDR to your VPC then keep the rest of the settings to default and click on create.

## 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.

LocalZoneVPC

IPv4 CIDR block [Info](#)

- IPv4 CIDR manual input
- IPAM-allocated IPv4 CIDR block

IPv4 CIDR

192.168.0.0/16

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

Tenancy [Info](#)

Default

2. Now we will create a Subnet. So, go to Subnets and click on Create Subnet
3. First, you need to choose your VPC ID and scroll down.

[VPC](#) > [Subnets](#) > [Create subnet](#)

## Create subnet [Info](#)

### VPC

VPC ID

Create subnets in this VPC.

vpc-0aa67de8dea62b1d4 (LocalZoneVPC)

### Associated VPC CIDRs

IPv4 CIDRs

192.168.0.0/16

4. Then you need to give it a Subnet name and choose your Availability Zone as Delhi because you just enabled this zone.
5. Now you need to give your IPv4 subnet CIDR block as shown below and then click on Create Subnet.

## Subnet 1 of 1

### Subnet name

Create a tag with a key of 'Name' and a value that you specify.

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.



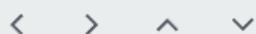
### IPv4 VPC CIDR block [Info](#)

Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.



### IPv4 subnet CIDR block

256 IPs



## 😊 Step 3: Create an EC2 Instance

1. Now we are going to create an EC2 instance in our new Local Zone. So, now go to EC2 and click on Launch instance.
2. The only thing that you need to remember is that go to the link I mentioned at the start of the lab and check which type of instances are allowed in our newly enabled Local Zone.
3. So, below you can see which instance family type is supported in our Local Zone. So, you need to choose your instance type on this behalf.

AWS Local Zones location	AWS services	Amazon EC2	Amazon EBS	AWS Shield	Amazon ELB	Amazon ECS	Amazon EKS	Amazon VPC	Amazon Direct Connect	Amazon FSx	Amazon EMR
Delhi, India	ap-south-1-del-1a	T3, C5, R5, G4dn, and M5 instances	General Purpose SSD (gp2)	Standard	ALB	✓	✓	✓	✓		

4. Now you should click on launch instance. Give your instance a name and choose your OS.

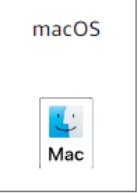
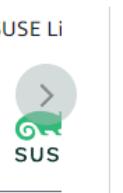
**Name and tags** [Info](#)

Name  
 [Add additional tags](#)

**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

[Recents](#) [Quick Start](#)

[!\[\]\(cf477711cc64dc860a0ec0004ce591dd\_img.jpg\) Browse more AMIs](#)  
Including AMIs from AWS, Marketplace and the Community

5. Then choose your instance type as t3.medium.

**Instance type** [Info](#) | [Get advice](#)

Instance type

t3.medium  
Family: t3 2 vCPU 4 GiB Memory Current generation: true  
On-Demand Windows base pricing: 0.0632 USD per Hour  
On-Demand SUSE base pricing: 0.1011 USD per Hour  
On-Demand RHEL base pricing: 0.0736 USD per Hour  
On-Demand Linux base pricing: 0.0448 USD per Hour  
On-Demand ap-south-1-del-1 Windows base pricing: 0.0789 USD per Hour  
On-Demand ap-south-1-del-1 SUSE base pricing: 0.1168 USD per Hour  
On-Demand ap-south-1-del-1 RHEL base pricing: 0.0893 USD per Hour  
On-Demand ap-south-1-del-1 Linux base pricing: 0.0605 USD per Hour

[All generations](#) [Compare instance types](#)

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

6. In the network settings you need to choose your new VPC and Subnet, then click on Enable public IP.

## ▼ Network settings [Info](#)

VPC - required | [Info](#)

vpc-0aa67de8dea62b1d4 (LocalZoneVPC)  
192.168.0.0/16



Subnet | [Info](#)

subnet-056c72b274dd396ea LocalZoneSubnet  
VPC: vpc-0aa67de8dea62b1d4 Owner: 878893308172  
Availability Zone: ap-south-1-del-1a IP addresses available: 251 CIDR: 192.168.1.0/24)

Create new subnet

Auto-assign public IP | [Info](#)

Enable

[Additional charges apply](#) when outside of [free tier allowance](#)

- Now in the storage increase your storage to 16 GB and choose GP2 as the root volume. Then just launch your instance.

## ▼ Configure storage [Info](#)

[Advanced](#)

1x  GiB  Root volume (Not encrypted)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

[Add new volume](#)

Click refresh to view backup information

The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.

0 x File systems

[Edit](#)

- And below you can see that your instance has been launched in the Local Zone.
- You can connect with your instance also.

**Instances (1/1) Info**

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 ...
LocalZoneInst...	i-071539082836f1610	Running	t3.medium	Initializing	View alarms +	ap-south-1-del-1a	-	15.220.137.17

**i-071539082836f1610 (LocalZoneInstance)**

- Details**
- Status and alarms
- Monitoring
- Security
- Networking
- Storage
- Tags

**Instance summary**

Instance ID	i-071539082836f1610 (LocalZoneInstance)	Public IPv4 address	15.220.137.17   open address	Private IPv4 addresses	192.168.1.52
IPv6 address	-	Instance state	Running	Public IPv4 DNS	-
Hostname type	IP name: ip-192-168-1-52.ap-south-1.compute.internal	Private IP DNS name (IPv4 only)	ip-192-168-1-52.ap-south-1.compute.internal	Elastic IP addresses	-
Answer private resource DNS name	-	Instance type	t3.medium	AWS Compute Optimizer finding	Opt-in to AWS Compute Optimizer for recommendations.   Learn more
Auto-assigned IP address	15.220.137.17 [Public IP]	VPC ID	vpc-0aa67de8dea62b1d4 (LocalZoneVPC)	Subnet ID	Auto Scaling Group name
IAM Role		Subnet ID			

10. Now if you try to launch your instance in the Local Zone and the instance type or the root volume is not supported in that Zone then your instance won't get launched.
11. For example, below you can see that I tried to launch my instance using instance type as t2.micro and gp3 root volume so, it gave me an error.

EC2 > Instances > Launch an instance

**Instance launch failed**  
Instance launch can not be fulfilled as 'gp3' volumes are not supported in this zone.

**Launch log**

Initializing requests	Succeeded
Launch initiation	Failed

Cancel Edit instance config Retry failed tasks