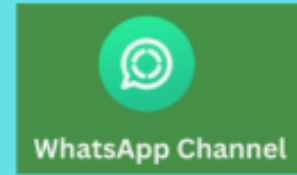


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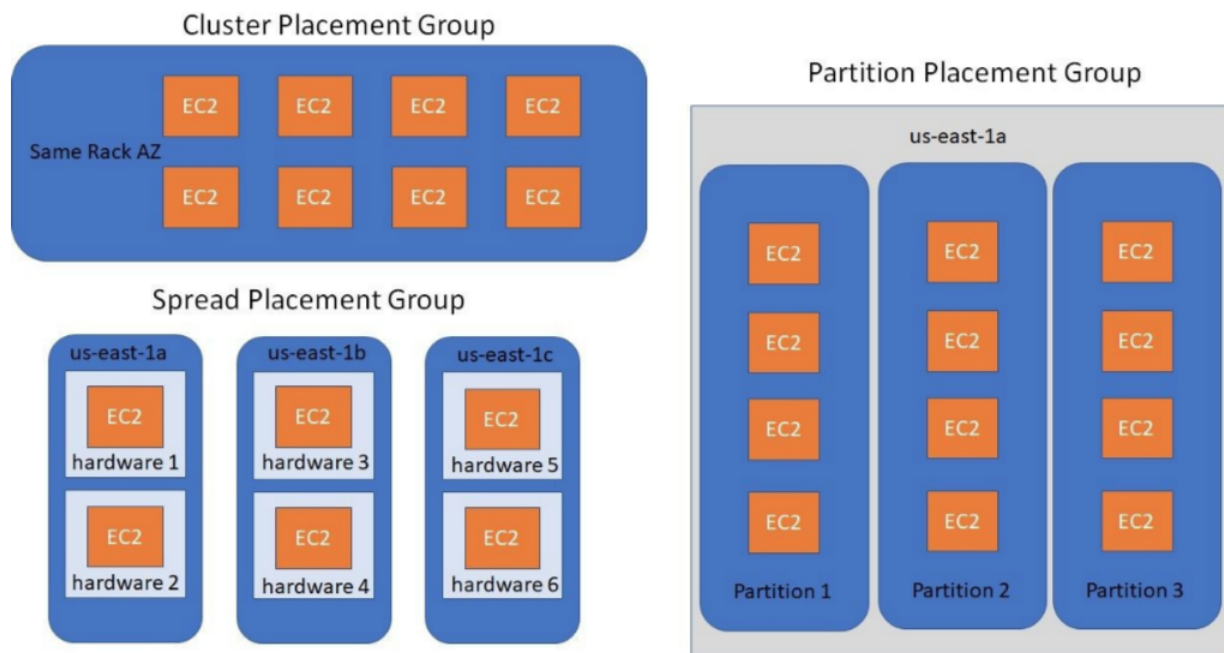
What are different types of placement group? Why do we need it?

What are Placement Groups?

Placement Groups are a way to control **how EC2 instances are placed** on the AWS hardware (servers and racks).

They help you **optimize** for **performance, low latency, and high throughput**, depending on your application's needs.

AWS gives you **three types** of Placement Groups:



◆ 1. Cluster Placement Group

- **Meaning:** All EC2 instances are placed very close together **inside a single Availability Zone**.
- **Best for:** High network performance (e.g., **low latency, high throughput**).
- **Use case examples:**
 - High-Performance Computing (HPC) apps
 - Big Data jobs
 - Applications needing fast inter-node communication (like a Cassandra database cluster).

⚡ *Instances get 10 Gbps+ network speeds when clustered!*

◆ 2. Spread Placement Group

- **Meaning:** EC2 instances are **spread across different hardware** (different racks).
- **Best for:** High **resilience** — if one hardware fails, others are safe.
- **Use case examples:**
 - Critical workloads
 - Small number of instances (up to 7 per AZ) that must not fail together.

🛡️ *Helps you survive hardware failure better!*

◆ 3. Partition Placement Group

- **Meaning:** EC2 instances are divided into **logical partitions**; each partition uses **separate hardware**.
- **Best for:** Very **large scale** distributed apps that need fault tolerance.
- **Use case examples:**
 - Big Data systems like Hadoop, HDFS
 - Large distributed databases like HBase, Cassandra.

📖 *Partitions help you manage thousands of instances across racks!*

🔧 When do you use Placement Groups?

- When you **need high-speed networking** between instances (use Cluster).
 - When you **cannot afford losing multiple instances together** (use Spread).
 - When **running very large distributed systems** needing **fault isolation** (use Partition).
-

! Is Placement Group Available for All Instance Types?

No. Placement groups have **instance type limitations**:

- **Cluster Placement Groups:**
 - Supported by most **compute-optimized, memory-optimized, and storage-optimized** instance families like c5, m5, r5, etc.
 - **Not supported** by older generation types or t2, t3, t4g, etc.
- **Spread and Partition Placement Groups:**
 - More broadly supported, including general-purpose types.

✨ Quick Summary Table

Type	Focus	Use For
Cluster	Speed & Low Latency	High-performance apps, HPC
Spread	Fault Tolerance	Critical apps, small count
Partition	Fault Isolation at Scale	Big Data, distributed apps

Q1. Which Placement Group type is best suited for low-latency, high-throughput network performance between EC2 instances?

a) Spread Placement Group

- b) Cluster Placement Group
- c) Partition Placement Group
- d) Auto Scaling Group

✓ **Answer:** b) Cluster Placement Group

Q2. In which Placement Group are instances distributed across different racks to reduce the risk of simultaneous hardware failure?

- a) Cluster
- b) Partition
- c) Spread
- d) VPC Peering

✓ **Answer:** c) Spread