1. What is Amazon EC2 ?

Amazon EC2 (Elastic Compute Cloud) is a web-based service provided by Amazon Web Services (AWS) that allows users to create and manage virtual servers in the cloud. These virtual servers are called EC2 instances. EC2 provides scalable computing capacity, meaning you can easily increase or decrease the number of servers as per your application needs. It eliminates the requirement for investing in physical hardware and helps in deploying applications faster with high flexibility, security, and cost efficiency.

Amazon EC2 (Elastic Compute Cloud) ही Amazon Web Services (AWS) द्वारे पुरवली जाणारी एक वेब-आधारित सेवा आहे. या सेवेच्या मदतीने वापरकर्ते क्लाउडमध्ये **Virtual Servers** तयार करू शकतात आणि त्यांचे व्यवस्थापन करू शकतात. या व्हर्च्युअल सर्व्हरना **EC2 Instances** म्हटले जाते.

EC2 सेवा लवचिक आणि स्केलेबल Computing Capacity प्रदान करते, म्हणजेच आपल्या Application च्या गरजेनुसार सर्व्हरची संख्या सहज वाढविता किंवा कमी करता येते. या सेवेचा वापर केल्यामुळे Physical Hardware मध्ये गुंतवणूक करण्याची गरज राहत नाही. त्यामुळे Applications जलद गतीने deploy करता येतात आणि खर्च वाचतो. तसेच ही सेवा उच्च स्तरावरील सुरक्षा व लवचिकता प्रदान करते.

2. Types of Amazon EC2 Instances ?

Instance Family	Description (English)	Meaning in Marathi	Example Use
General Purpose	Balanced CPU, memory, and networking	सर्व कामांसाठी संतुलित resources	Web apps, Development environments
Compute Optimized	High CPU performance	प्रोसेसिंग जास्त असलेल्या कामांसाठी	Gaming servers, High-performance apps
Memory Optimized	Large memory for big data processing	मोठ्या डेटा कामांसाठी जास्त RAM	Databases, Real-time analytics
Storage Optimized	High storage and fast disk performance	मोठ्या storage आणि fast I/O operations साठी	Big Data, Data Warehousing
Accelerated Computing	Special hardware like GPU for heavy tasks	Graphics/ML सारख्या कामांसाठी GPU	Machine Learning, Video rendering

High Performance Computing (HPC)	Supercomputer-level performance	खूप जास्त विज्ञान/Engineering computation	Scientific simulation, Research
Bare Metal Instances	Full hardware access without hypervisor	Direct hardware control	Specialized workloads needing root-level access

3. EC2 Purchasing Options ?

Purchasing Option	English Description	Marathi Explanation	Best For
On-Demand Instances	Pay only for running instances with no long-term commitment	जेवढा वापर तेवढे पैसे. कोणतीही commitment नाही.	Short-term applications, Testing
Reserved Instances (RI)	1 or 3-year commitment. Lower cost than On-Demand	दीर्घकालीन वापरासाठी कमी खर्च. 1 किंवा 3 वर्षांचे commitment	Stable workloads, Production apps
Savings Plans	Commit to a certain amount of usage and get discount like Reserved	Usage commitment देऊन discount मिळतो	Predictable workloads, Cost saving
Spot Instances	Buy unused EC2 capacity at big discounts	AWS मधील उरलेली resources स्वस्तात मिळतात. परंतु कधीही बंद होऊ शकतात	Batch jobs, ML training, Flexible workloads
Dedicated Hosts	Physical server fully allocated to one customer	Full physical server एकट्याच्या वापरासाठी	Licensing needs, High security

Dedicated Instances	Hardware not shared with other customers	Hardware दुसऱ्यांसोबत share होत नाही	High security workloads
Capacity Reservations	Reserve capacity in a specific region/zone	एखाद्या region/zone मध्ये capacity reserve करून ठेवणे	Mission-critical applications needing guaranteed capacity

4. Types of Storage in Amazon EC2

Storage Type	English Description	Marathi Explanation	Usage
Amazon EBS (Elastic Block Store)	Block-level persistent storage that remains even after instance stops	Instance बंद झाला तरी डेटा Safe राहतो	Databases, OS root volume
Instance Store (Ephemeral Storage)	Temporary storage attached physically to the host	Instance restart/shutdown केल्यावर डेटा delete होतो	Cache, Temporary data
Amazon EFS (Elastic File System)	Shared file storage for multiple EC2 instances	अनेक instances सोबत एकाच वेळी वापरता येणारी shared storage	Web servers, Shared apps
Amazon S3 (Simple Storage Service)	Object storage for storing unlimited data in buckets	मोठ्या प्रमाणात डेटा Safe ठेवण्यासाठी Object storage	Backup, Media files, Big Data
FSx (Windows / Lustre)	High-performance file storage for windows & HPC workloads	Specific workload साठी advanced file system	Windows Apps, HPC jobs

5. Amazon EBS Volume Types

SSD-based (Performance Optimized for IOPS)

(I/O operations speed जास्त असलेल्या Applications साठी)

Volume Type	Full Form	Marathi Explanation	Best Use
gp3	General Purpose SSD	Default volume. Performance आणि cost मध्ये balance	OS, Boot volume, General apps

io1 / io2	Provisioned IOPS SSD	High performance. जास्त IOPS आणि durability	Databases, Mission-critical apps

Quick Memory:
gp3 = सर्व सामान्य वापरासाठी
io2 = जिथे performance खूप महत्त्वाची आहे

HDD-based (Performance Optimized for Throughput)

(मोठ्या फाइल्स आणि Streaming साठी)

Volume Type	Full Form	Marathi Explanation	Best Use
st1	Throughput Optimized HDD	कमी खर्चात Fast throughput	Big data, Logs, Data warehouse
sc1	Cold HDD	सर्वात स्वस्त पण slow	Rarely accessed data, Backup

6. What is a Key Pair in EC2?

A Key Pair in Amazon EC2 is a security credential used to securely connect to EC2 instances. It consists of two cryptographic keys:
• **Public Key** stored in AWS
• **Private Key** (.pem file) stored by the user

The private key is required when connecting to the instance through SSH (Linux) or RDP (Windows). If the private key is lost, you cannot access the instance.

Amazon EC2 मधील **Key Pair** म्हणजे सुरक्षा (authentication) साठी वापरले जाणारे दोन keys चे सेट. यात खालील दोन keys असतात:
• **Public Key** → AWS मध्ये store केलेला
• **Private Key (.pem file)** → वापरकर्ता जवळ ठेवायचा

Instance ला SSH (Linux) किंवा RDP (Windows) ने Connect करताना private key लागतो. Private key हरवला तर instance access करणे शक्य होत नाही.

7. What is a Security Group in AWS EC2?

A Security Group is a virtual firewall in AWS that controls **inbound (incoming)** and **outbound (outgoing)** traffic for EC2 instances. It allows or denies network traffic based on rules such as IP address, port number, and protocol.

Security Group हा AWS मधील एक **virtual firewall** आहे जो EC2 instance वर येणारा (Inbound) आणि जाणारा (Outbound) Network traffic नियंत्रित करतो. यात दिलेल्या rules (IP address, port, protocol) नुसार traffic Allow किंवा Deny केला जातो.

8. Difference between Security Group and NACL

Feature	Security Group (SG)	Network ACL (NACL)
Layer	Instance Level Firewall	Subnet Level Firewall
Traffic	Controls Inbound & Outbound to EC2	Controls Inbound & Outbound to Subnet
State	Stateful: If inbound allowed, outbound auto allowed	Stateless: Inbound & outbound rules must be added separately
Rules	Only Allow rules	Allow + Deny rules supported
Default Behavior	All traffic blocked by default (inbound)	All traffic allowed by default
Association	Applied to EC2 Instances	Applied to Subnets
Number of SG/NACL	Multiple SG per instance possible	Only one NACL per subnet
Best Use	Instance protection	Subnet level network protection