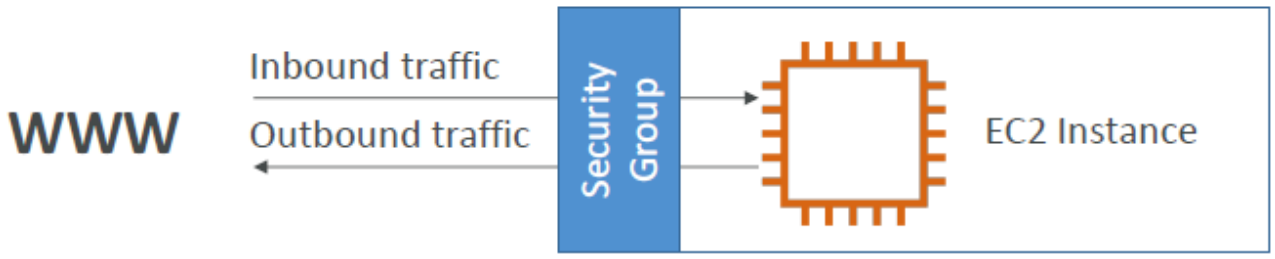
EC2:Elastic Compute Cloud = Infrastructure as a Service

Questions	Notes
EC2 sizing & configuration options	• OS: Linux, Windows or MAC OS • compute power & cores(CPU • Random-acces memory(RAM) • storage space: Network-attached(EBS&EFS) Hardware(Ec2 instance store) • Network card: speed of the card , Public IP address • Firewall rules : security group • Bootstrap script(configure at first Launch):EC2 user data
EC2 user data	• It is possible to bootstrap our instances using an EC2 User data script. • bootstrapping means launching commands when a machine starts • That script is only run once at the instance first start • EC2 user data is used to automate boot tasks such as: • Installing updates • Installing software • Downloading common files from the internet • Anything you can think of • The EC2 User Data Script runs with the root user
EC2 Instance types	• **General Puspose:** • Great for a diversity of workloads such as web servers or code repositoiries • balance between: compute,memory & Networking • **Compute Optimized:** • Great for compute-intensive tasks that require high performance processors • batch processing • Media Transcoding • High performance web servers • Higgh performance computing(HPC) • Scientific modeling & machine learning • Dedicated gaming servers • **Memory Optimized:** • Fast performance for workloads that process large data sets in memory • Use cases: • High performance, relational/non-relational databases • Distributed web scale cache stores • In-memory databases optimized for BI (business intelligence) • Applications performing real-time processing of big unstructured data • **Storage Optimized:** • Great for storage-intensive tasks that require high, sequential read and write • access to large data sets on local storage • Use cases: • High frequency online transaction processing (OLTP) systems • Relational & NoSQL databases • Cache for in-memory databases (for example, Redis) • Data warehousing applications • Distributed file systems

Security Groups

- They control how traffic is allowed into or out of our EC2 Instances



- Security Groups only contain allow rules
- security groups rules can reference by IP or by security group
- security groups are acting as a "firewall" on EC2 instances
- They regulate :
  - Access to Ports
  - Authorised IP ranges – IPv4 and IPv6
  - Control of inbound network (from other to the instance)
  - Control of outbound network (from the instance to other)

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	test http page
SSH	TCP	22	122.149.196.85/32	
Custom TCP Rule	TCP	4567	0.0.0.0/0	java app

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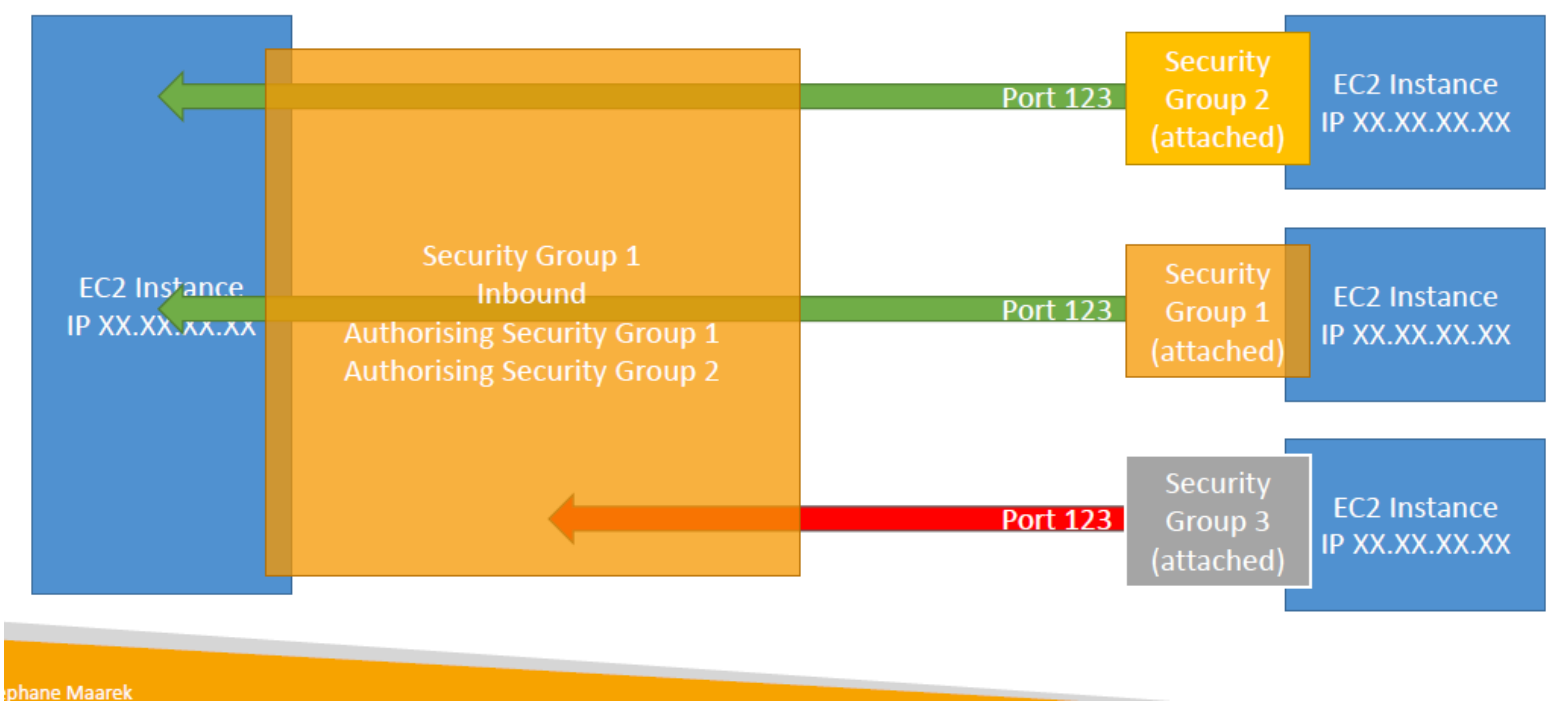

Classic Ports

- 22 = SSH (Secure Shell) - log into a Linux instance
- 21 = FTP (File Transfer Protocol) – upload files into a file share
- 22 = SFTP (Secure File Transfer Protocol) – upload files using SSH
- 80 = HTTP – access unsecured websites
- 443 = HTTPS – access secured websites
- 3389 = RDP (Remote Desktop Protocol) – log into a Windows instance

SSH Summary Table

EC2 Instance Connect	• Connect to your EC2 instance within your browser • No need to use your key file that was downloaded • The “magic” is that a temporary key is uploaded onto EC2 by AWS • Works only out-of-the-box with Amazon Linux 2 • Need to make sure the port 22 is still opened!
EC2 On Demand	• Pay for what you use: • Linux or Windows - billing per second, after the first minute • All other operating systems - billing per hour • Has the highest cost but no upfront payment • No long-term commitment • Recommended for short-term and un-interrupted workloads, where you can't predict how the application will behave
EC2 Reserved Instance	•Up to 72% discount compared to On-demand • You reserve a specific instance attributes (Instance Type, Region, Tenancy, OS) • Reservation Period – 1 year (+discount) or 3 years (+++discount) • Payment Options – No Upfront (+), Partial Upfront (++), All Upfront (+++) • Reserved Instance’s Scope – Regional or Zonal (reserve capacity in an AZ) • Recommended for steady-state usage applications (think database) • You can buy and sell in the Reserved Instance Marketplace • Convertible Reserved Instance: Can change the EC2 instance type, instance family, OS, scope and tenancy Up to 66% discount

EC2 Saving plans	• Get a discount based on long-term usage (up to 72% - same as RIs)
	• Commit to a certain type of usage ($10/hour for 1 or 3 years)
	• Usage beyond EC2 Savings Plans is billed at the On-Demand price
	• Locked to a specific instance family & AWS region (e.g., M5 in us-east-1)
	• Flexible across:
	  • Instance Size (e.g., m5.xlarge, m5.2xlarge)
	  • OS (e.g., Linux, Windows)
	  • Tenancy (Host, Dedicated, Default)

EC2 Spot Instances	

	• Can get a discount of up to 90% compared to On-demand • Instances that you can “lose” at any point of time if your max price is less than the current spot price • The MOST cost-efficient instances in AWS • Useful for workloads that are resilient to failure • Batch jobs • Data analysis • Image processing • Any distributed workloads • Workloads with a flexible start and end time • Not suitable for critical jobs or databases
EC2 Dedicated Hosts	• A physical server with EC2 instance capacity fully dedicated to your use • Allows you address compliance requirements and use your existing serverbound software licenses (per-socket, per-core, pe—VM software licenses) • Purchasing Options: • On-demand – pay per second for active Dedicated Host • Reserved - 1 or 3 years (No Upfront, Partial Upfront, All Upfront) • The most expensive option • Useful for software that have complicated licensing model (BYOL – Bring Your Own License) • Or for companies that have strong regulatory or compliance needs
EC2 Dedicated Instances	• Instances run on hardware that’s dedicated to you • May share hardware with other instances in same account • No control over instance placement (can move hardware after Stop / Start)
EC2 Capacity Reservations	• Reserve On-Demand instances capacity in a specific AZ for any duration • You always have access to EC2 capacity when you need it • No time commitment (create/cancel anytime), no billing discounts • Combine with Regional Reserved Instances and Savings Plans to benefit from billing discounts • You’re charged at On-Demand rate whether you run instances or not • Suitable for short-term, uninterrupted workloads that needs to be in a specific AZ
Which purchasing option is right for me?	• On demand: coming and staying in resort whenever we like, we pay the full price • Reserved: like planning ahead and if we plan to stay for a long time, we may get a good discount. • Savings Plans: pay a certain amount per hour for certain period and stay in any room type (e.g.,King, Suite, Sea View, …) • Spot instances: the hotel allows people to bid for the empty rooms and the highest bidder keeps the rooms. You can get kicked out at any time • Dedicated Hosts: We book an entire building of the resort • Capacity Reservations: you book a room for a period with full price even you don’t stay in it