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# 50 EC2 Features that every Cloud Engineer should know

## 1. Amazon Time Sync Service:

This is a time synchronization service that you can use to ensure a consistent and accurate time across all your EC2 instances.

## 2. AWS License Manager:

This feature helps you manage software licenses, like Microsoft Windows Server and Microsoft SQL Server, across AWS and on-premises environments.

## 3. Optimized CPU:

This provides you with greater control of your EC2 instances on two fronts:

### a. First:

- i. You can specify a custom number of vCPUs when launching new instances to save on vCPU costs.

### b. Secondly

- i. You can disable Intel Hyper-Threading Technology for workloads that perform well with single-threaded CPUs, like certain high-performance computing (HPC) applications.

## 4. AWS Resource Groups:

Using this, you can create, maintain, and view a collection of resources that share common tags.



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## 5. Instance Store Volumes:

These are temporary storage volumes for data that's deleted when you stop, hibernate, or terminate your instance. Knowledge about these volumes is important when dealing with temporary, duplicate, or data that's frequently changed.

## 6. AWS Nitro System:

The AWS Nitro System is a rich collection of building blocks that offloads many of the traditional virtualization functions to dedicated hardware. It improves security, and performance.

## 7. Instance Types:

EC2 provides a variety of instance types optimized to fit different use cases. Understanding each type (compute optimized, memory-optimized, storage-optimized, etc.) helps in choosing the right one based on your workload requirements.

## 8. Auto Scaling:

This feature allows you to automatically adjust the number of instances based on the demand pattern. Knowing how to use this feature can help you maintain application availability and reduce costs.

## 9. Elastic Load Balancing:

ELB automatically distributes incoming traffic across multiple instances. It increases the fault tolerance of your applications.



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## 10. Amazon Machine Images (AMI):

AMIs are pre-configured templates for your instances. You can create an AMI containing your applications, libraries, data, and associated configuration settings.

## 11. Security Groups:

Security Groups act as a virtual firewall for your instances to control inbound and outbound traffic. Understanding this feature is critical for ensuring the security of your application.

## 12. Elastic IPs:

13. An Elastic IP is a static, public IPv4 address you can allocate to your AWS account, which you can associate with your instance. Unlike traditional static IP addresses, however, Elastic IPs allow you to mask instance or availability zone failures.

## 14. EBS Volumes:

15. Amazon Elastic Block Store (EBS) provides persistent block storage volumes for use with Amazon EC2 instances. They're suited for data that must be quickly accessible and requires long-term persistence.

## 16. Placement Groups:

17. A placement group is a logical grouping of instances within a single Availability Zone. Using placement groups enables applications to participate in a low-latency, 10 Gbps network.

## 18. User Data:

19. This feature allows you to run scripts or define the instance metadata at launch time, enabling you to automate boot tasks.

## 20. EC2 Instance Connect:

21. This provides a simple and secure way to connect to your instances using Secure Shell (SSH). Understanding how to use it is essential for managing your instances.



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## 22. Spot Instances:

23. Spot Instances allow you to take advantage of unused EC2 capacity in the AWS cloud. Spot Instances are available at up to a 90% discount compared to On-Demand prices. Knowledge about this can help in cost optimization.

## 24. Reserved Instances:

25. Reserved Instances provide you with a significant discount (up to 75%) compared to On-Demand instance pricing. You have the flexibility to change families, OS types, and tenancies while benefiting from Reserved Instance pricing.

## 26. Dedicated Hosts:

27. This is a physical EC2 server dedicated for your use. Understanding this can help in dealing with regulatory requirements and reduce costs by using your existing server-bound software licenses.

## 28. EC2 Launch Templates:

29. These templates streamline and simplify the launch process for auto scaling, spot fleets, and On-Demand instances.

## 30. Hibernate Instances:

31. This feature enables you to pause and resume your instances, helping you save money during periods of low activity.

## 32. Elastic Inference:

33. This allows you to attach low-cost GPU-powered inference acceleration to Amazon EC2 instances.

## 34. Capacity Reservations:

35. On-Demand Capacity Reservations allow you to reserve capacity for your EC2 instances in a specific Availability Zone for any duration. This gives you the ability to create and manage capacity reservations independently of the billing benefits.

## 36. Elastic Fabric Adapter (EFA):

37. EFAs provide the ability to run High Performance Computing (HPC) applications requiring high levels of inter-node communications at scale on AWS.



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## 38. Elastic Graphics:

39. This allows you to attach low-cost GPU resources to your instances to accelerate the graphics performance of your applications for a fraction of the cost of standalone GPU instances.

## 40. Multi-Attach for EBS:

41. This feature allows you to attach a single EBS volume to multiple EC2 instances in the same Availability Zone. It's useful for applications that require concurrent read/write operations from multiple instances.

## 42. EBS Snapshots:

43. Snapshots are point-in-time copies of your data. They play a crucial role in your backup strategy by enabling disaster recovery, migration across regions and accounts, and improving backup compliance.

## 44. Metadata and User-data:

45. These are data about your instance that you can use to configure or manage the running instance. Understanding how to use them can greatly simplify and automate the running of your instances.

## 46. Tagging Instances and Volumes:

47. Tags enable you to categorize your AWS resources in different ways (by purpose, owner, environment, etc.) for cost allocation.

## 48. AWS Systems Manager:

49. This gives you visibility and control of your infrastructure on AWS. It provides a unified user interface so you can view operational data from multiple AWS services and automate operational tasks across your AWS resources.

## 50. Amazon CloudWatch Monitoring:

51. This feature provides data and actionable insights to monitor your applications, understand and respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health.

## 52. CloudWatch Alarms:

53. These allow you to monitor a single EC2 instance or a group of instances and send a notification when a certain threshold has been hit. It's crucial for managing resources and avoiding unexpected charges.



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## 54. EC2 Systems Manager (SSM):

55. SSM provides a unified interface to manage and automate tasks across your EC2 instances. SSM can help manage system configuration, operational tasks, and patch operating systems to maintain version control.

## 56. AWS Command Line Interface (CLI):

57. A knowledge of AWS CLI is crucial for scripting access to EC2 instances, allowing direct control over the system from the command line.

58.

## 59. AWS SDKs:

60. AWS offers SDKs for a variety of languages like Java, .Net, Node.js, Python, etc., to create, manage, and deploy EC2 instances programmatically.

## 61. VPC and Subnets:

62. Understanding how to isolate resources, control the flow of traffic, and connect your instances to the internet or your on-premise network using VPCs and subnets is essential.

## 63. EBS Optimized Instances:

64. These instances deliver dedicated throughput between Amazon EC2 and Amazon EBS, with options between 500 Mbps and 1,000 Mbps depending on the instance type used.

## 65. Storage Options (EBS, EFS, S3):

66. Understanding the difference and use cases for each storage option will help you design and implement solutions that are cost-effective, reliable, and performant.

## 67. Lifecycle Hooks:

68. They allow you to perform custom actions when your Auto Scaling group launches or terminates instances.

## 69. Instance Purchasing Options:

70. Understanding the cost model for On-Demand Instances, Reserved Instances, Spot Instances, Savings Plans, and Dedicated Hosts is crucial for cost optimization.



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## 71. Elastic IPs:

72. These are static, public IPv4 addresses that you can assign to your instances. This is especially useful for handling the failure of an instance by remapping the address to another instance in your account.

73.

## 74. EC2 Auto Scaling:

75. Understanding how to use Auto Scaling to automatically adjust the number of EC2 instances in your applications in response to traffic patterns can help you maintain application availability and reduce costs.

## 76. Security Groups and NACLs:

77. These provide security at the port and subnet level respectively. Mastering these is key to maintaining the security and integrity of your application.

## 78. Elastic Load Balancing:

79. It automatically distributes your incoming application traffic across multiple targets, such as EC2 instances. This could increase the availability of your application.

## 80. Placement Groups:

81. Understanding the different types of placement groups (cluster, partition, and spread) and how to use them can help improve the performance of your application.

## 82. AWS Identity and Access Management (IAM):

83. IAM allows you to manage access to your AWS resources. You can create users, groups, and roles to which you can grant permissions.

## 84. User Data and Metadata:

85. These are features that allow you to configure your instances upon launch (User Data) and view data about your instances (Metadata).

86.

## 87. EC2 Instance Types:

88. AWS provides a variety of instance types optimized to fit different use cases. Understanding when to use which type can optimize performance and cost.



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## 89. Elastic Network Interfaces (ENI):

90. An ENI is a virtual network card that you can attach to an instance in a VPC. You can use ENIs for network traffic management.

## 91. AWS Marketplace:

92. This is an online store where you can find, buy, and immediately start using software and services that run on EC2.

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