Transitioning a Data Center to the Cloud

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Welcome to Transitioning a Data Center to the Cloud.

What you will learn

At the core of the lesson

You will walk through an example of transitioning a data center to the cloud.

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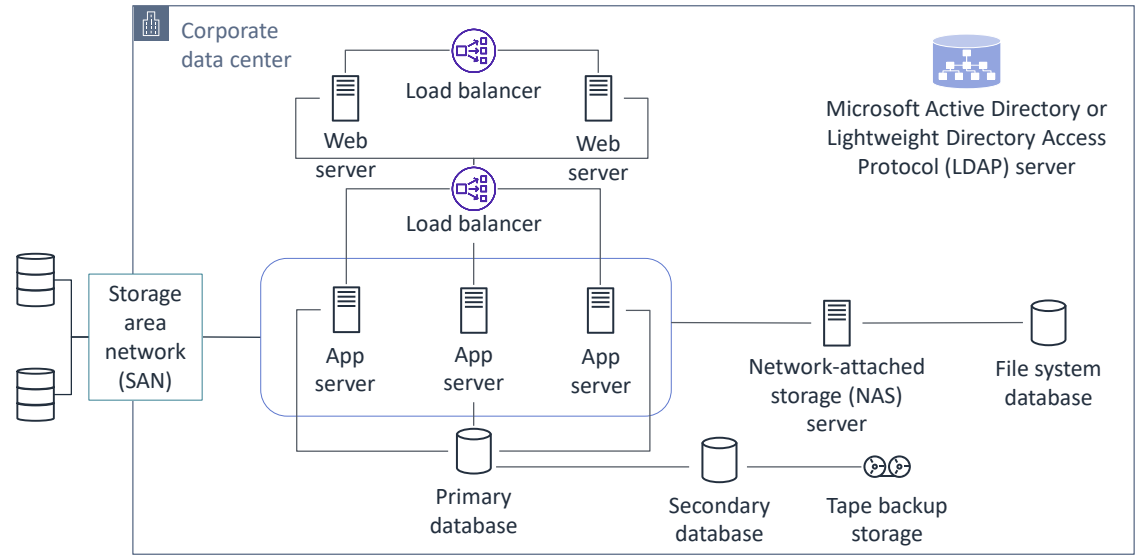
In this lesson, you will walk through an example of transitioning a data center to the cloud. You will first learn about the components and characteristics of an example corporate data center. Then, you will walk through how an environment like this example could be set up and run on Amazon Web Services (AWS) instead.

Corporate data center example



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A traditional on-premises infrastructure (or corporate data center) might include a setup that is similar to this example. This diagram represents a three-tier, client-server architecture in a corporate data center. The box labeled Corporate Data Center indicates what is contained in the data center.

The bottom of this diagram includes the database servers with attached tape backup devices. This tier is responsible for the database logic.

The middle of the diagram contains the application servers. An application server is a component-based product that resides in the middle tier of a server-centric architecture. It provides middleware services for security and state maintenance and also provides data access and persistence. The application servers also contain the business logic. The middle section also contains network-attached storage (NAS). NAS devices are file servers that provide a centralized location for users on a network to store, access, edit, and share files.

The web servers are located at the top of the diagram. The web servers are responsible for the presentation logic. They are accompanied by load balancers. Load balancers are responsible for efficiently distributing incoming network traffic across a group of backend servers.

The Microsoft Active Directory or Lightweight Directory Access Protocol (LDAP) server is like a phone book that anyone can use to locate organizations, individuals, and other resources (such as files and devices in a network) on the public internet or on a corporate intranet.

The box labeled Storage Area Network (SAN) with the attached external disks refers to storage that is outside the corporate data center. A SAN is a specialized, high-speed network that provides block-level network access to storage. SANs are often used to improve application availability (for example, multiple data paths). SANs are also used to enhance application performance (for example, off-load storage functions, separate networks, and so on).

Corporate data center example: Discussion

Discuss your findings

As a class, answer the following question based on the diagram of the corporate data center example. Discuss your findings with the class.

In a previous lesson, you learned about the advantages and benefits of cloud computing. Which cloud computing advantages and benefits could this data center use?

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Earlier, you learned about the advantages and benefits of cloud computing. Consider the following advantages during your group discussions:

- Trade upfront costs for variable costs: Stop buying hardware.
- Benefit from massive economies of scale: Benefit from the purchasing power of AWS.
- Eliminate guessing your capacity needs: Construct a flexible, highly available solution by using scaling.
- Increase speed and agility: Deploy and decommission with a few clicks.
- Stop spending money to run and maintain data centers: Purchase only the services that you need.
- Go global in minutes

Activity: Transitioning a corporate data center

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Corporate data center activity

Think about this

Using what you have learned about the core services and architecture best practices, how could you migrate this data center to the cloud?

In this activity

In small groups, based on the diagram of the corporate data center example, whiteboard your findings and discuss with the class.

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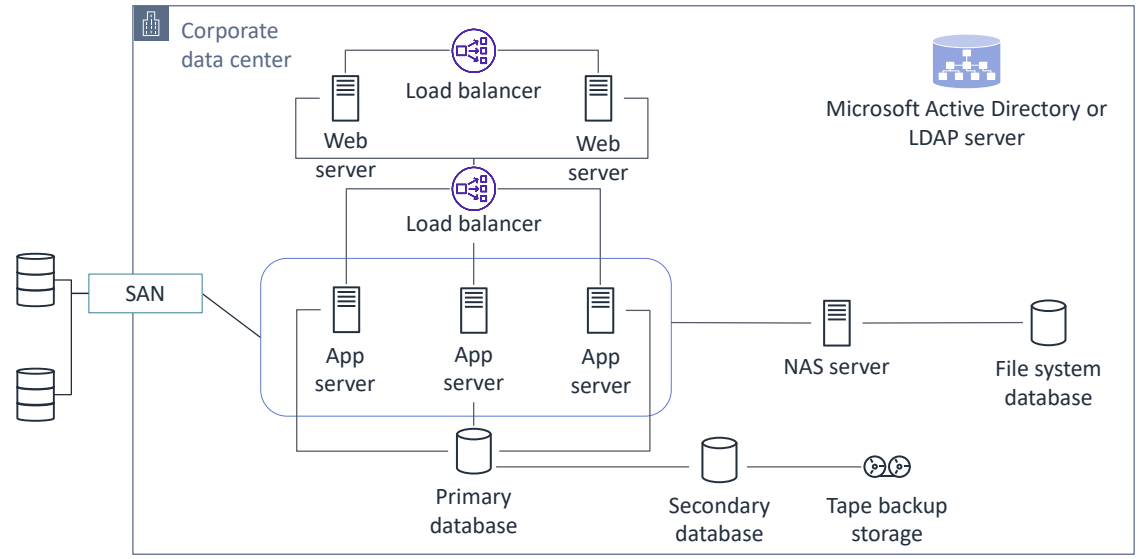
While in your small group, try to draw the diagram and replace components with AWS services.

Corporate data center transition considerations



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Consider the following items and which AWS core services could replace them:

- Servers
- LDAP server
- Software-based load balancers
- SAN solutions
- NAS file server
- Databases

Transitioning a corporate data center to the cloud

On-Premises Icon	On-Premises Item	AWS Service or Resource	AWS Icon
	Server	Amazon Elastic Compute Cloud (Amazon EC2) Instances	
	LDAP	AWS Directory Service	
	Software-based load balancers	Elastic Load Balancing (ELB)	
	SAN solutions	Amazon Elastic Block Store (Amazon EBS)	
	NAS file server	Amazon Elastic File System (Amazon EFS)	
	Databases	Amazon Relational Database Service (Amazon RDS)	
	Tape backup storage	Amazon Simple Storage Service (Amazon S3)	

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You could replace a traditional on-premises or corporate data center with the following in the AWS Cloud:

- You can replace servers, such as the on-premises web servers and app servers, with Amazon Elastic Compute Cloud (Amazon EC2) instances that run all the same software. Because EC2 instances can run a variety of Microsoft Windows Server, Red Hat, SuSE, Ubuntu, or Amazon Linux operating systems, you can run many server applications on EC2 instances.

- You can replace the LDAP server with AWS Directory Service, which supports LDAP authentication. With Directory Service, you can set up and run Microsoft Active Directory in the cloud or connect your AWS resources with existing on-premises Microsoft Active Directory.

- You can replace software-based load balancers with Elastic Load Balancing (ELB) load balancers. ELB is a fully managed load balancing solution that scales automatically as needed. It can perform health checks on attached resources and redistribute a load away from unhealthy resources as necessary.

- Amazon Elastic Block Store (Amazon EBS) is a storage service to use with Amazon EC2. You can replace SAN solutions with EBS volumes. You can attach these volumes to application servers to store data long-term and share the data between

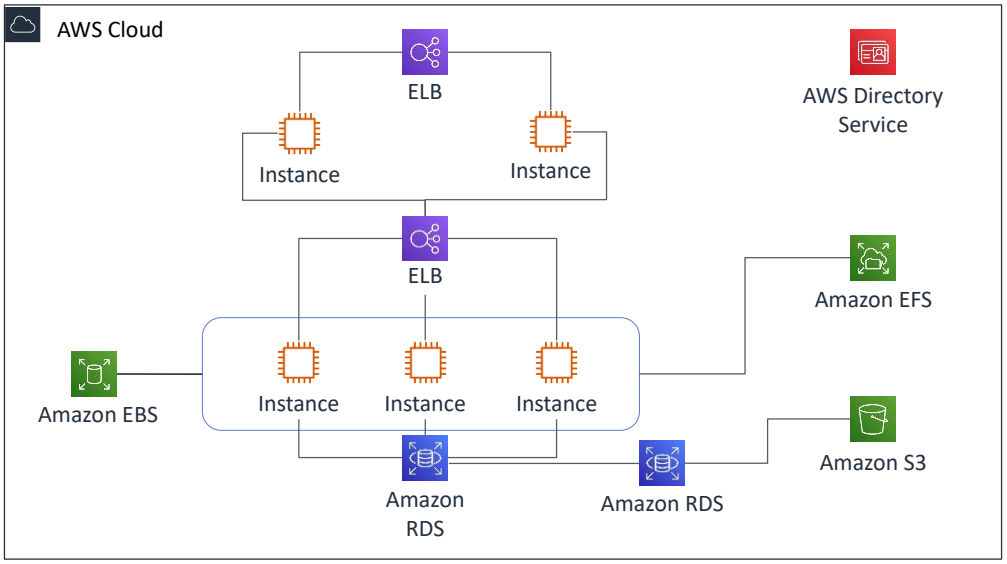
instances.

- You can use Amazon Elastic File System (Amazon EFS) to replace your NAS file server. Amazon EFS is a file storage service for EC2 instances. It offers a user-friendly interface that you can use to create and configure file systems. It also grows and shrinks your storage automatically as you add and remove files so that you always use exactly the amount of storage that you need. Another solution could be to run an NAS solution on an EC2 instance. Many NAS solutions are available via AWS Marketplace. For more information, see AWS Marketplace at https://aws.amazon.com/marketplace/.

- You can replace databases with Amazon Relational Database Service (Amazon RDS). With this service, you can run Amazon Aurora, PostgreSQL, MySQL, MariaDB, Oracle, and Microsoft SQL Server on a platform that is managed by AWS.

- Finally, you can automatically back up RDS instances to Amazon Simple Storage Service (Amazon S3). Using Amazon S3 replaces the need for on-premises, database backup hardware. Amazon S3 provides object storage through a web service interface. Objects can be up to 5 GB, and you can turn on versioning for your objects.

Corporate data center example on AWS



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After transitioning to the AWS Cloud, the example data center might look like this diagram.

The ELB load balancer distributes traffic to the web servers that are now located on EC2 instances. The LDAP server is now Directory Service. ELB has replaced software-based load balancers and distributes traffic to the servers, which are now EC2 instances. Amazon EBS has replaced SAN solutions. Amazon EFS has replaced the NAS file server, and Amazon RDS has replaced the databases.

Checkpoint questions

1. Which AWS services can organizations use to transition a data center to the cloud?
2. What are some of the benefits of transitioning a data center to the cloud?
3. Which AWS service can replace a data center SAN system?

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1. Which AWS services can organizations use to transition a data center to the cloud?

Organizations can transition components of traditional data centers to AWS services by selecting the appropriate service to fulfill the business need. Like in the lesson example, organizations can transition the following over to the associated AWS services:

- A traditional web server to an EC2 instance
- LDAP to Directory Service
- Software-based load balancers to ELB
- SAN solutions to Amazon EBS
- NAS file server to Amazon EFS
- Databases to Amazon RDS
- Tape backup storage to Amazon S3

2. What are some of the benefits of transitioning a data center to the cloud?

- Trade upfront costs for variable costs: Stop buying hardware.
- Benefit from massive economies of scale: Benefit from the purchasing power of AWS.
- Eliminate guessing your capacity needs: Construct a flexible, highly available solution by using scaling.

- Increase speed and agility: Deploy and decommission with a few clicks.
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3. Which AWS service can replace a data center SAN system?

Amazon EBS

Key ideas

- You can replace traditional on-premises data center components with AWS services to transition to the cloud and gain the benefits of cloud computing.
- Use the principles and best practices that are defined in the **AWS Cloud Adoption Framework (AWS CAF)** and the **AWS Well-Architected Framework** to guide your transition to the cloud.

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