

Estimating AWS Deployment Costs for Microsoft SharePoint Server

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Abstract

This whitepaper is intended for IT managers, systems integrators, pre-sales engineers, and Microsoft Windows IT professionals who want to learn how to use the Amazon Web Services (AWS) [Simple Monthly Calculator](#) to estimate the cost of their cloud infrastructure on AWS.¹ A scalable and highly available Microsoft SharePoint Server 2013 architecture is given as an example, and its various components are plugged into the calculator to estimate the monthly cost. Although SharePoint is highlighted, the techniques described can easily be applied to other Windows workloads on AWS, such as Dynamics CRM, or Skype for Business Server.

The cost estimates include licenses for Windows Server and SQL Server, but exclude licenses for SharePoint Server, as will be explained. A few ways to save money on the SharePoint Server deployment are also described.

This paper focuses on Amazon Elastic Compute Cloud (Amazon EC2) and AWS storage services that are common to most Microsoft infrastructure deployments on AWS, and briefly mentions how AWS Directory Service and NAT gateways can be very beneficial in your architecture.

Introduction

AWS currently offers over 50 cloud computing services, with new services being added frequently. You won't need to be familiar with all the services to deploy SharePoint Server on AWS, but the key point is that at the end of each month, you pay only for what you use, and you can start or stop using a service at any time. There are no minimum commitments or long-term contracts required. This pricing model helps replace upfront capital expenses for your IT projects with a low variable cost. For compute resources, you pay on an hourly basis from the time you launch a resource until the time you terminate it. For storage and data transfer, you pay on a per-gigabyte basis.

For additional information on how AWS pricing works, see the following sources:

- [How AWS Pricing Works](#) whitepaper²
- [AWS Cloud Pricing Principles](#) on the AWS website³

Before we get into the calculator, let's briefly review a few of the key features and services that will come into play in a SharePoint architecture on AWS.

AWS Regions and Availability Zones

Amazon EC2 is hosted in multiple Regions around the world. Each Region is a separate geographic area, and has multiple, isolated locations known as Availability Zones. You can think of Availability Zones as very large data centers. Using redundant Availability Zones in your architecture enables you to achieve high availability. AWS does not move your data or replicate your resources across Regions unless you do so specifically. Figure 1 shows the relationship between Regions and Availability Zones.

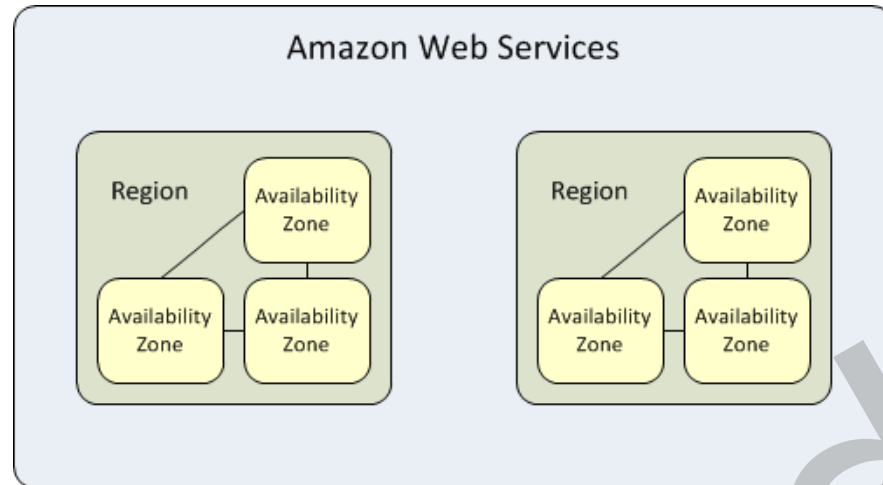


Figure 1: Each AWS Region Contains at Least Two Availability Zones

Windows Server in Amazon EC2

[Amazon Elastic Compute Cloud \(Amazon EC2\)](#) provides a secure global infrastructure to run Windows Server workloads in the cloud, including Internet Information Services (IIS), SQL Server, Exchange Server, SharePoint Server, Skype Server for Business, Dynamics CRM, System Center, and custom .NET applications.⁴ Pre-configured Amazon Machine Images (AMIs) enable you to start running fully supported Windows Server virtual machine instances in minutes. You can choose from a number of server operating system versions and decide whether or not to include pre-installed SQL Server in the hourly cost.

Amazon EBS

[Amazon Elastic Block Storage \(Amazon EBS\)](#) provides persistent block-level storage volumes for use with Amazon EC2 instances.⁵ Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability. Amazon EBS volumes provide consistent low-latency performance. On Windows Server instances, Amazon EBS volumes are mounted to appear as regular drive letters to the operating system and applications. Amazon EBS volumes can be up to 16 TiB in size, and you can mount up to 20 volumes on a single Windows instance.

After writing data to an EBS volume, you can periodically create a snapshot of the volume to use as a baseline for new volumes or for data backup. Snapshots are

incremental so that only the blocks on the device that have changed after your last snapshot are saved in the new snapshot. Snapshots are automatically saved in Amazon Simple Storage Service (Amazon S3), which stores three redundant copies across multiple Availability Zones, so you have peace of mind knowing that your data is immediately backed up “off site.”

Amazon S3

[Amazon Simple Storage Service \(Amazon S3\)](#) provides developers and IT teams with secure, durable, highly scalable, cost-effective object storage.⁶ Amazon S3 is easy to use and includes a simple web services interface to store and retrieve any amount of data from anywhere on the web. Object storage is not appropriate for workloads that require incremental data insertions, such as databases. However, Amazon S3 is an excellent service for storing snapshots of Amazon EBS volumes. While Amazon EBS duplicates your volume synchronously in the same Availability Zone, snapshots to Amazon S3 are replicated across multiple zones, substantially increasing the durability of your data.

Amazon VPC

[Amazon Virtual Private Cloud \(Amazon VPC\)](#) enables you to launch AWS resources into a virtual network that you define.⁷ This virtual network closely resembles a traditional network that you’d operate in your own data center, with the benefits of using the scalable infrastructure of AWS. Your VPC is logically isolated from other virtual networks in the AWS cloud. You can configure your VPC; you can select its IP address range, create subnets, and configure route tables, network gateways, and security settings. With the AWS Direct Connect service, you can effectively make your VPC function as an extension of your own on-premises network.

Elastic Load Balancing

[Elastic Load Balancing](#) automatically distributes incoming application traffic across multiple Amazon EC2 instances.⁸ It enables you to achieve greater levels of fault tolerance in your applications, seamlessly providing the required amount of load balancing capacity needed to distribute application traffic. Elastic Load Balancing ensures that only healthy Amazon EC2 instances receive traffic by

detecting unhealthy instances and rerouting traffic across the remaining healthy instances.

Elastic Load Balancing automatically scales its request handling capacity to meet the demands of application traffic. Additionally, Elastic Load Balancing offers integration with [Auto Scaling](#) to ensure that you have back-end capacity to meet varying levels of traffic levels without requiring manual intervention.⁹

For SharePoint Server, you can create an internal (non-Internet facing) load balancer to route traffic between your web tier and your application tier using private IP addresses within your Amazon VPC. You can also implement a multi-tiered architecture using internal and Internet-facing load balancers to route traffic between application tiers. With this multi-tier architecture, your application infrastructure can use private IP addresses and security groups, allowing you to expose only the Internet-facing tier with public IP addresses.

AWS Direct Connect

[AWS Direct Connect](#) makes it easy to establish a dedicated private network connection from your premises to AWS.¹⁰ In many cases this can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections. This dedicated connection can be partitioned into multiple virtual interfaces. This enables you to use the same connection to access public resources such as objects stored in Amazon S3, and private resources such as Amazon EC2 instances running within an Amazon VPC, while maintaining network separation between the public and private environments.

AWS Simple Monthly Calculator

The [AWS Simple Monthly Calculator](#) is an easy-to-use online tool that enables you to estimate the monthly cost of AWS services for your project based on your expected usage. The Simple Monthly Calculator is continuously updated with the latest pricing for all AWS services in all AWS Regions. Before continuing with this guide, please take a few minutes to watch this video for an introduction to the Simple Monthly Calculator:

[Video: Getting Started with the AWS Simple Monthly Calculator](#)¹¹

Reviewing the SharePoint Reference Architecture

AWS provides several [Quick Starts](#), which consist of detailed deployment guides and deployment code.¹² Quick Starts help you understand and quickly deploy reference architectures on AWS. In this whitepaper, we will be using the reference architecture for SharePoint Server 2013 as an example to explore the Amazon Simple Monthly Calculator.

Figure 2 is copied from the [AWS SharePoint Server 2013 Quick Start](#).¹³ It includes several AWS services that we will enter into the calculator.

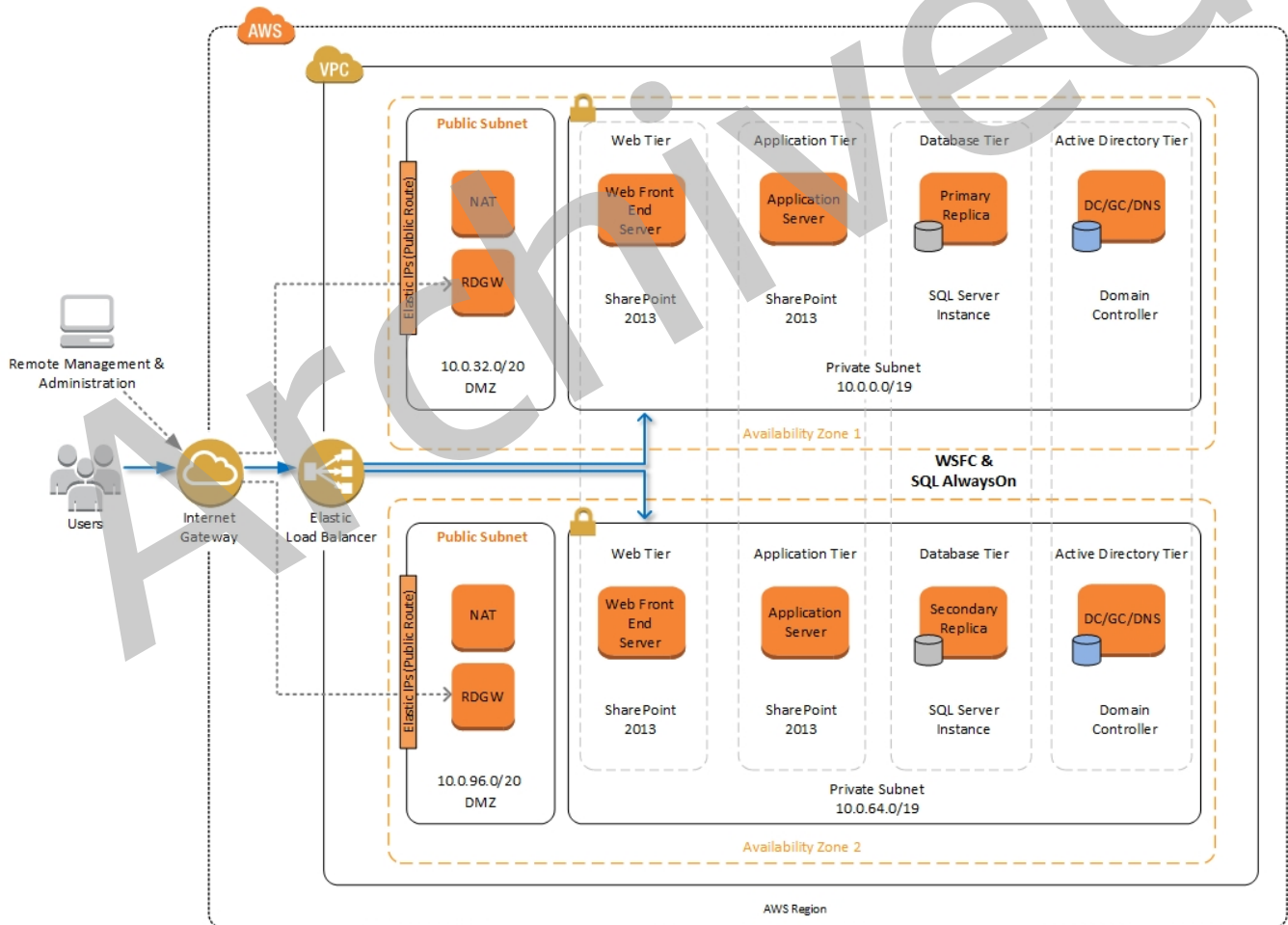


Figure 2: Reference Architecture for SharePoint Server 2013

Licensing and Tenancy Options

On Amazon EC2, you can choose to run instances that include the relevant license fees in their cost (“license included”) or use the Bring Your Own License (BYOL) licensing model.

License Included

When you are launching an EC2 instance, there are two ways to find an AMI for the license-included model:

- Choose a Quick Start AMI that includes Windows Server or SQL Server. The license cost is included in the hourly instance charge. At this time, only Windows Server and SQL Server (excluding SQL Server Enterprise Edition) are available with this option.
- Choose an AMI from the AWS Marketplace. A much wider selection of software is available here, including SQL Server Enterprise Edition, SharePoint Enterprise Edition, and many other Windows-based applications from other vendors.

Windows Server Client Access Licenses (CALs) are not required with any of these AMIs.

BYOL

Many vendors offer cloud licenses for their software. There are three ways you can take advantage of your Microsoft software licenses on AWS:

- BYOL with License Mobility (shared tenancy). This option does not cover Windows Server.
- BYOL with Dedicated Hosts (dedicated tenancy). This option allows you to comply with Microsoft’s 90-day rule for Windows Server cloud licenses. With Dedicated Hosts, you can import your own virtual machine images with Windows Server and pay Amazon EC2 Linux rates. AWS has a [qwikLAB that demonstrates this process](#).¹⁴
- MSDN with Dedicated Hosts or Dedicated Instances. All Microsoft products covered by MSDN can be run on AWS for dev/test environments per MSDN terms.

For more information, see the [AWS Software Licensing FAQ](#).¹⁵

If you use the BYOL option for Windows Server, the license cost is not included in the instance cost. Instead, you pay the same rate as EC2 instances with Amazon Linux pricing, which is lower than the cost of instances with Windows Server pre-installed. When you use BYOL, you are responsible for managing your own licenses, but AWS has features that help you maintain license compliance throughout the lifecycle of your licenses, such as [instance affinity](#),¹⁶ [targeted placement](#) available through Amazon EC2 Dedicated Hosts,¹⁷ and the [AWS Key Management Service](#) (AWS KMS).¹⁸

Microsoft License Mobility is a benefit for Microsoft Volume Licensing customers with eligible server applications covered by active Microsoft Software Assurance (SA). Microsoft License Mobility allows you to move eligible Microsoft software to AWS for use on EC2 instances with default tenancy (which means that instances might share server space with instances from other customers). But if you are bringing your own Microsoft licenses into EC2 Dedicated Hosts or EC2 Dedicated Instances (instead of using default tenancy), then Microsoft Software Assurance is not required.

You should use Dedicated Hosts for BYOL license scenarios that are server bound (e.g., Windows Server, SQL Server) and that require you to license against the number of sockets or physical cores on a dedicated server.

If you have SQL Server Enterprise Edition licenses that you want to use on AWS, there are two significant advantages to using Dedicated Hosts:

- Licensing on a Dedicated Host is per physical core (instead of vCPU). This means that when you use large instances you can license the entire host instead of licensing the instances separately. For a r3.8xlarge instance (which is well-suited for SQL Server), that means you would consume only 20 of your SQL Server licenses instead of 32.
- For disaster recovery deployments, if a failover instance is dedicated to you, you don't need licenses for it. For a cluster of two r3.8xlarge instances, that means you would consume only 20 licenses instead of 64.

Using the Simple Monthly Calculator

Process Overview

The following is a suggested process to help you estimate the costs of deploying your IT project on AWS. We'll discuss each step in subsequent sections.

1. The first choice you need to make is usually an easy one: Which AWS Region do you want to run your SharePoint farm in? AWS pricing varies slightly by region.
2. Now sketch a high-level diagram of your project, including each server you will need, labeling the servers with the software functions they will perform, e.g., *Web Front End*. For this whitepaper, we'll use the diagram in [Figure 2](#), from the [AWS Quick Start reference deployment for SharePoint](#). After you're happy with your sketch, make a list of each server and load balancer in your diagram. This list will be a key input to the calculator.
3. Think about whether you will use On-Demand Instances or Reserved Instances. On-Demand Instances make it easy to get started, but when you are ready to make a commitment you can [save significantly \(up to 75%\) by purchasing Reserved Instances](#).¹⁹
4. Determine if you have unused software licenses available, and if you have the appropriate agreements with those software vendors to use those licenses in the cloud (e.g., Microsoft License Mobility through Software Assurance). See the [Licensing and Tenancy Options](#) section earlier in this paper for more information.
5. Examine or estimate the volume of your current SharePoint storage that you intend to migrate to the cloud, and estimate your monthly growth (this storage will go to Amazon EBS). Also estimate the volume and growth of your data backups (this storage will go to Amazon S3). One nice thing about the cloud is that you don't need to over-provision capacity in advance to handle demand spikes. You can scale up almost instantly as you grow, and pay only for what you actually consume.
6. Estimate the monthly data transfers for an average user, and then multiply that by the number of users of your system to determine a ballpark total for

data transfers. You'll also need to estimate data transfers between Availability Zones when synchronization or replication is included in your architecture.

7. Determine if you will use AWS Direct Connect or a virtual private network (VPN) to connect your on-premises network to your VPC, or neither option (for example, if you plan to have all employees and customers access your AWS resources over the Internet).
8. Finally, decide what level of AWS Support you will need. For a business-class SharePoint deployment, you should choose the Business Support plan at the minimum. But you should also consider the Enterprise Support plan, which adds 15-minute response times for critical questions and a dedicated technical account manager.

Estimating Compute Costs

Now let's follow the steps outlined previously to begin estimating our AWS monthly costs for the SharePoint farm depicted in [Figure 2](#).

Building Your Server List

Working from the sketch of our architecture, we can create the following list of servers and the Amazon EC2 instance types that we think might be suitable for each server role. We needn't worry about getting the instance type exactly right at this stage, because this is just an estimate. If you have particular service-level agreements that you must deliver, then picking the right instance types may require some experimentation and budget analysis. For additional information about Amazon EC2 instance types, see [Amazon EC2 Instance Types](#) on the AWS website.²⁰ At this point, you're just making a list of what you need, before you use the calculator. After you enter and save the data in the calculator, you can also go back to edit it anytime.

Server	Description	Quantity	Operating System	Instance Type	vCPUs	RAM (GiB)
NAT	Network Address Translation	2	Amazon Linux	t2.micro	1	1
RDGW	Remote Desktop Gateway	2	Windows Server 2012 R2	t2.medium	2	4
WFE	Web front-end servers	2	Windows Server 2012 R2	c3.2xlarge	8	15

Server	Description	Quantity	Operating System	Instance Type	vCPUs	RAM (GiB)
APP	Application servers	2	Windows Server 2012 R2	c3.2xlarge	8	8
SQL	SQL Server	2	Windows Server 2012 R2	r3.2xlarge	8	61
AD	Active Directory	2	Windows Server 2012 R2	m4.large	2	8

We set the quantity to two for each server because we want to use two Availability Zones to deploy a high availability design.

The NAT instance runs Amazon Linux because NAT is a basic function, and Amazon Linux is less expensive than Windows. It's simple to set up a Linux NAT instance on AWS, but an even better option is to use the [NAT Gateway](#) service.²¹ This service isn't available in the calculator yet, so for the purposes of this whitepaper, we'll try to stick to the design from the SharePoint Quick Start that's shown in Figure 2.

Licensing Considerations

SQL Server AlwaysOn Availability Groups, which come with SQL Server Enterprise Edition, are a good solution to achieve a highly available deployment across two Availability Zones. So the SharePoint Quick Start recommends using SQL Server Enterprise in your SharePoint deployment on AWS. You have two choices here: you can either purchase the SQL Server Enterprise licenses from AWS (in which case, license costs will be included in your hourly charges for those Amazon EC2 instances), or you can utilize [Microsoft License Mobility through Software Assurance](#) to bring your own licenses into the cloud.²²

If you choose to purchase SQL Server Enterprise from AWS, when you launch your EC2 instances, you will need to select the AMI from AWS Marketplace. (Other editions of SQL Server are offered as Quick Start AMIs, but Enterprise Edition is currently offered only through AWS Marketplace.) This will save you time because you won't need to install SQL Server yourself. On the other hand, if you plan to use the BYOL model, you need to install your own bits or import your

virtual machine with SQL Server installed (using the [VM Import/Export service](#)).²³

For BYOL, the first trick to estimating your costs in the calculator is to choose Amazon Linux (not Windows Server!) for each instance for which you plan to bring your own Windows Server license. In the calculator, you can alternatively choose Windows Server without SQL Server if you plan to purchase Windows Server from AWS but use the BYOL model for SQL Server Enterprise; or you can choose Windows Server with SQL Server Enterprise if you don't want to use BYOL for either.

The second trick for entering BYOL in the calculator comes up when you open the dialog box to pick the instance type. In this dialog box, you can choose **Show** (advanced options) to see check boxes for **Detailed Monitoring** (for Amazon CloudWatch) and **Dedicated Instances**. At this time, the calculator doesn't offer Dedicated Hosts. Remember, you might use Dedicated Instances to bring your own license of SQL Server if your license is not based on the number of sockets or physical cores. If you bring your own SQL Server licenses that are based on the number of sockets or physical cores, then you must use Dedicated Hosts, not Dedicated Instances.

For this exercise, we will purchase all the Windows Server and SQL Server Enterprise licenses from AWS, so we won't be using Dedicated Hosts or Dedicated Instances. Just to be clear, if you plan to bring your own license, your monthly cost will be significantly lower than the cost estimate that the calculator will give us in this example.

EBS Optimization

There is one more detail to be aware of: For SQL Server instances, we recommend that you select the **EBS-Optimized** option. An EBS-optimized instance uses an optimized configuration stack and provides additional, dedicated capacity for Amazon EBS I/O. This optimization provides the best performance for your EBS volumes by minimizing contention between Amazon EBS I/O and other traffic from your instance. The hourly price for EBS-optimized instances is added to the hourly usage fee for supported instance types. In the calculator, when you select the r3.2xlarge instance type for SQL Server, be sure to

select the **EBS-Optimized** check box. See the [documentation for EBS-optimized instances](#) for more information.²⁴

Entering Your Data

Now we're ready to enter the table above into the calculator. Open your browser to the [AWS Simple Monthly Calculator](#) and begin entering the data. Our partial result looks like Figure 3. If you prefer not to enter all the data from scratch, you [can use the configuration that I've already shared](#).²⁵

Note The prices shown in this whitepaper reflect data from the Simple Monthly Calculator at the time of writing and are provided for illustration purposes only. Depending on pricing changes, regional factors, and special offers, the costs you get from the calculator may be different.

Services Estimate of your Monthly Bill (\$ 15757.93)

Choose region: US-East / US Standard (Virginia) Inbound Data Transfer is Free and Outbound Data Transfer is 1 GB free per region per month

Amazon Elastic Compute Cloud (Amazon EC2) is a web service that provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers. Amazon Elastic Block Store (EBS) provides persistent storage to Amazon EC2 instances. Clear Fc

Compute: Amazon EC2 Instances:

Description	Instances	Usage	Type	Billing Option	Monthly Cost
NAT	2	100 % Utilized/Mc	Linux on t2.micro	On-Demand (No Cor)	\$ 19.04
RDGW	2	100 % Utilized/Mc	Windows on t2.medium	On-Demand (No Cor)	\$ 105.42
WFE	2	100 % Utilized/Mc	Windows on c3.2xlarge	On-Demand (No Cor)	\$ 1100.94
APP	2	100 % Utilized/Mc	Windows on c3.2xlarge	On-Demand (No Cor)	\$ 1100.94
SQL	2	100 % Utilized/Mc	Windows and Enterprise SQL Server on r3.2xlarge EBS Optimized	On-Demand (No Cor)	\$ 8117.88
AD	2	100 % Utilized/Mc	Windows on m4.large	On-Demand (No Cor)	\$ 360.16
+ Add New Row					

Figure 3: Entering the Amazon EC2 Instances into the Calculator

For now, we've entered all the instances as On-Demand Instances running 100% of the time. Later, we'll discuss saving money by using Auto Scaling to shut down some instances on weekends, for example, or by changing the purchase option from On-Demand to Reserved Instances for 1-year or 3-year terms. Another thing to keep in mind is that you might want to use On-Demand Instances only in development and QA environments, and use Reserved Instances in your production environment.

Now that you've entered all that data, it's a good idea to save it before proceeding. Switch to the **Estimate** tab at the top of the calculator, and then choose **Save and Share**. You can optionally give your estimate a name and description, choose **OK**, and the calculator will generate a hyperlink for you (see Figure 4). Now copy and paste that hyperlink into an email to yourself. That way you can return to the calculator anytime to continue editing the data for your SharePoint farm.

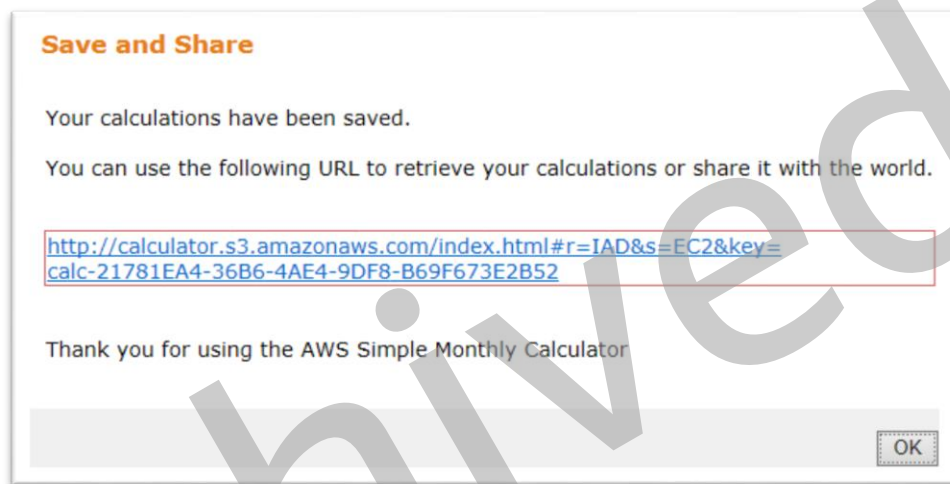


Figure 4: Saving Your Data in the Calculator

Estimating Storage Costs

The next step in the calculator is to put in the proper size for the boot volume on each instance and enter any additional Amazon EBS volumes that we need to attach to each instance. When launching a Windows instance in Amazon EC2, the default boot volume is 30 GiB, but the SharePoint Quick Start recommends setting it to 100 GiB. That provides extra space for installing SharePoint Server and other applications you may want. We won't add any storage to the Linux NAT instances, and we'll leave the boot volumes for the RDGW and AD instances at the default size of 30 GiB.

If you are migrating your existing SharePoint farm to AWS, you can examine your current storage needs to help estimate your future capacity requirements. For the purposes of this whitepaper, let's enter one additional 5 TiB volume for SharePoint storage in each Availability Zone.

You also need to think about I/O throughput. For this basic exercise, we’re going to skip over this consideration and simply use General Purpose SSD for all the EBS volumes. AWS also offers Magnetic volumes (which are less expensive than General Purpose) and Provisioned IOPS SSD volumes (for consistent performance). For additional information about Amazon EBS, see [Amazon EBS Product Details](#).²⁶

The final factor for Amazon EBS is the amount of backup storage that you require (backup copies are stored in Amazon S3). This value depends on the backup method, backup frequency, system size, and backup retention. Accurately calculating the amount of backup storage required can get quite involved and is beyond the scope of this guide. For now, let’s take a very simplistic approach and estimate that the snapshot storage for each volume will equal the size of the volume itself.

Once you enter the EBS volumes, the calculator should look like Figure 5. Go ahead and save the data in the calculator again.

Storage: Amazon EBS Volumes:

Description	Volumes	Volume Type	Storage	IOPS	Snapshot Storage
RDGW	2	General Purpose (SSD)	30 GB	90	30 GB-month of Storage
WFE	2	General Purpose (SSD)	100 GB	300	100 GB-month of Storage
APP	2	General Purpose (SSD)	100 GB	300	100 GB-month of Storage
SQL	2	General Purpose (SSD)	100 GB	300	100 GB-month of Storage
AD	2	General Purpose (SSD)	30 GB	90	30 GB-month of Storage
Data	2	General Purpose (SSD)	5000 GB	10000	5000 GB-month of Storage
+ Add New Row					

Figure 5: Entering the Amazon EBS Volumes into the Calculator

Elastic IP addresses, data transfers, and Elastic Load Balancing are three features that are closely related to Amazon EC2 that are optional in the Simple Monthly Calculator. We’ll talk about those next.

Using Elastic IP

Elastic IP addresses are a limited resource, but very useful for instances in a public subnet. AWS only charges for Elastic IP addresses that you allocate but don't assign to running instances, and the cost is only a few dollars per month if you allocate one and never utilize it. If you think you will have idle Elastic IP addresses, you can enter them here, but for this example, we'll ignore that option in the calculator.

Estimating Data Transfers

Inbound data transfer to Amazon EC2 is free. Charges do apply for data that is transferred out from Amazon EC2 to the Internet, to another AWS Region, or to another Availability Zone. For details on AWS data transfer pricing, see the "Data Transfer" section at <https://aws.amazon.com/ec2/pricing/>.

Just for illustration, let's say we plan to have 1,000 users on SharePoint, and each user will transfer out 0.5 GB per day (including weekends). So that's 1,000 users * 0.5 GB * 30 days = 15,000 GB/month. Let's enter that in the calculator on the row for **Data Transfer Out**.

Estimating Load Balancing

The SharePoint reference architecture uses one ELB load balancer. When we enter that in the calculator, we also need to estimate how much traffic will pass through it. We estimated 15,000 GB/month for egress in the previous section, so let's double that to cover ingress and egress. Typically, egress may exceed ingress, but this is only an estimate; please see [Elastic Load Balancing Pricing](#) for more information.²⁷ You will see that Elastic Load Balancing is typically a very small part of the total cost.

At this stage, the section of the calculator below Amazon EBS looks like Figure 6:

Elastic IP:		
Number of Additional Elastic IPs:	<input type="text" value="0"/>	
Elastic IP Non-attached Time:	<input type="text" value="0"/>	Hours/Month ▾
Number of Elastic IP Remaps:	<input type="text" value="0"/>	Per Month ▾
Data Transfer:		
Inter-Region Data Transfer Out:	<input type="text" value="0"/>	GB/Month ▾
Data Transfer Out:	<input type="text" value="15000"/>	GB/Month ▾
Data Transfer In:	<input type="text" value="0"/>	GB/Month ▾
VPC Peering Data Transfer:	<input type="text" value="0"/>	GB/Month ▾
Intra-Region Data Transfer:	<input type="text" value="0"/>	GB/Month ▾
Public IP/Elastic IP Data Transfer:	<input type="text" value="0"/>	GB/Month ▾
Elastic Load Balancing:		
Number of Elastic LBs:	<input type="text" value="1"/>	
Total Data Processed by all ELBs:	<input type="text" value="30000"/>	GB/Month ▾

Figure 6: Entering Data Transfer and Elastic Load Balancing into the Calculator

Switch to the **Estimate** tab at the top of the calculator and save your interim data again. You can browse through the detail rows and see the line item cost of each section.

Choosing AWS Direct Connect and Amazon VPC

Another factor you may want to enter in the calculator is the cost for AWS Direct Connect or Amazon VPC. If you decide to go with either option, you may want to revise your data transfer estimates for Elastic Load Balancing, because these options tend to replace or reduce the ordinary Internet traffic to your VPC.

There is no additional charge for using Amazon VPC, aside from the standard Amazon EC2 usage charges. If a secure connection is required between your on-premises network and Amazon VPC, you can choose a hardware VPN connection or private network connection, as described in the following sections.

Hardware VPN Connection

When you use hardware VPN connections to your Amazon VPC, you are charged for each *VPN connection-hour* for which your VPN connection is provisioned and

available. Additional information about hardware VPN connection pricing can be found at <https://aws.amazon.com/vpc/pricing/>.

Private Network Connection

AWS Direct Connect provides the capability to establish a dedicated network connection from your on-premises network to AWS. AWS Direct Connect pricing is based on per-port-hour and data transfer out charges. Additional information about AWS Direct Connect pricing can be found at <https://aws.amazon.com/directconnect/pricing/>.

For this example, since we've already entered our Internet data transfer estimates, we'll skip adding AWS Direct Connect or Amazon VPC.

Reviewing the Estimate

The final thing to do is click the AWS Support tab in the navigation bar, and then select the Business Support plan, as we recommended earlier. The final cost estimate looks like Figure 7.

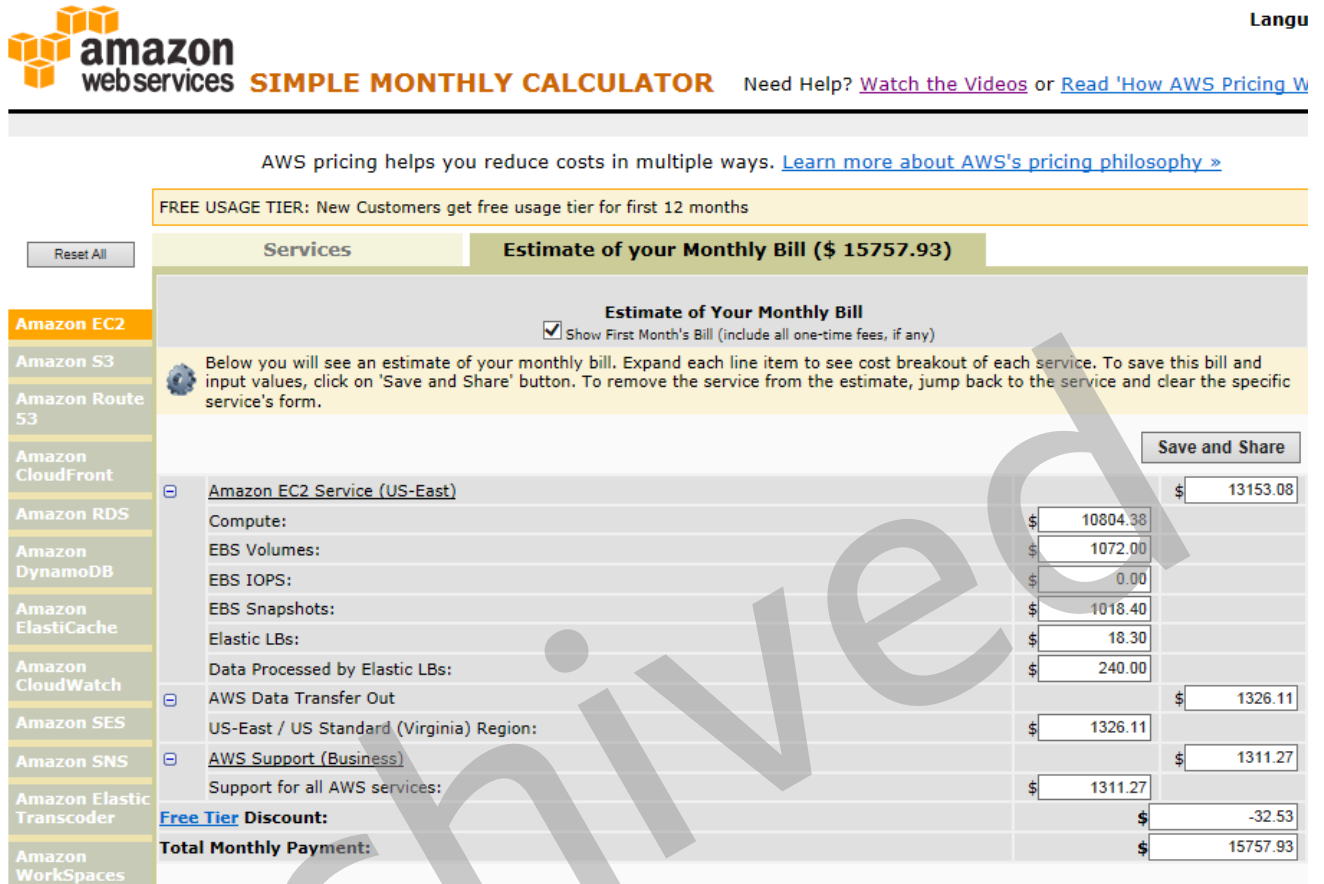


Figure 7: Estimate of Your Monthly Bill

This shows that Amazon EC2 is the dominant cost for SharePoint Server on AWS, and if you look in the **Services** tab, you'll see that the SQL Server instances are the lion's share of that cost. As a reminder, if you have licenses available, you could cut your costs substantially by bringing your own licenses into AWS, as discussed earlier in the [Licensing and Tenancy Options](#) section. There are several other cost-saving ideas that we haven't taken advantage of yet in this example. We'll survey those in the next section.

Money-Saving Ideas

AWS Directory Service

AWS Directory Service is a managed service that makes it easy to set up and run Microsoft Active Directory (AD) in the AWS cloud, or connect your AWS

resources with an existing on-premises Microsoft Active Directory. Once your directory is created, you can use it to manage users and groups, provide single sign-on to applications and services, create and apply group policy, domain-join Amazon EC2 instances, and simplify the deployment and management of cloud-based Linux and Microsoft Windows workloads.

If cost and simplified administration are important to you, you should consider using AWS Directory Service instead of running two EC2 instances with the Active Directory role installed in Windows Server. See [AWS Directory Service Product Details](#) for more information.²⁸

Reserved Instances and Spot Instances

Another way to save money in Amazon EC2 is to use Reserved or Spot Instances. Spot Instances work well for intermittent workloads, such as high-performance computing, and may not be applicable to SharePoint in general. But depending on the size and cost of your compute instances and the nature of your workload, you should consider using Spot Instances to incrementally process and save data computations.

Once you get your pilot SharePoint farm up and running on AWS, consider making a 1-year or 3-year commitment to take advantage of Reserved Instance pricing. You can save up to 75%.

Auto Scaling

Auto Scaling helps you maintain application availability and allows you to scale your Amazon EC2 capacity up or down automatically, according to conditions you define. You can use Auto Scaling to help ensure that you are running your desired number of Amazon EC2 instances. Auto Scaling can also automatically increase the number of Amazon EC2 instances during demand spikes to maintain performance, and decrease capacity during lulls to reduce costs. Auto Scaling is well suited both to applications that have stable demand patterns and to applications that experience hourly, daily, or weekly variability in usage.

If you have dev/test SharePoint farms that aren't used on weekends, or if you anticipate less network traffic to your production SharePoint farm on weekends, you may be able to realize significant cost savings by shutting down certain

instances periodically. For example, weekends account for about 33% of the total monthly cost. There may be some complications to auto-scaling your SharePoint farm, but the savings may be worth it. It's beyond the scope of this paper to go into the details, but you'll want to consider how to save, patch, and use your own SharePoint AMI with Auto Scaling. And bear in mind that booting and domain-joining can take a few minutes. See [Auto Scaling Product Details](#) for more information.²⁹

NAT Alternatives

Finally, let's talk about alternatives to Network Address Translation (NAT). In the calculator, we chose to deploy two Linux instances dedicated to running NAT. Amazon Linux is a low-cost option, and there are recipes for running NAT in Amazon EC2 that make it pretty simple. But there are other options that might be less costly and even easier to administer.

The AWS SharePoint 2013 Quick Start was written before the launch of the NAT Gateway service. This is a managed service that greatly simplifies the task of providing NAT for your VPC, and you should consider it as your first option. See the blog post [Managed NAT \(Network Address Translation\) Gateway for AWS](#) on the AWS blog for more information.³⁰

If NAT Gateway isn't appropriate for you, there are other options. Notice in our network diagram ([Figure 2](#)) that we have an RDGW instance running Windows Server in each public subnet. Since we're already paying for those instances, there's no reason we couldn't install the Windows Routing and Remote Access Service (RRAS) and make the instances dual-use for NAT and RDGW.

Finally, we have another NAT option if we choose to add a virtual private network or AWS Direct Connect. We could set up the route tables in the VPC to route all outbound traffic through the on-premises network. This would eliminate the need for NAT instances in the VPC.

Third-Party Solutions

AWS has a vast partner network of consulting and technology partners. A few partners are worthy of mention here. You could use [AvePoint](#)³¹ or [Metalogix](#)³² to offload storage of uploaded files (binary large objects, or BLOBs) from

SharePoint (which goes in SQL Server) to Amazon S3. That can substantially reduce the size of the database, which may, in turn, reduce your software license costs, reduce your backup storage space, and require less maintenance.

Additionally, you may consider using [SIOS](#)³³ or [SoftNAS](#)³⁴ shared-storage options to possibly remove the need for SQL Server AlwaysOn Availability Groups.

Conclusion

This paper outlined a process you can follow to estimate the cost of running your IT workloads on AWS. As an example, we entered a SharePoint Server 2013 reference architecture into the AWS Simple Monthly Calculator. We explored various AWS services relevant to an enterprise SharePoint deployment. We also discussed how you can use your existing Microsoft software licenses on AWS.

There is often more than one way to design and deploy your architecture in AWS, so we also provided alternative ideas that may help you save money on AWS.

Contributors

The following individuals and organizations contributed to this document:

- Scott Zimmerman, partner solutions architect, AWS
- Bill Timm, partner solutions architect, AWS
- Julien Lepine, solutions architect, AWS

Further Reading

For additional information, please consult the following sources:

- Getting Started with Amazon EC2 Windows Instances
http://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/EC2Win_GetStarted.html
- Quick Start: Microsoft SharePoint Server 2013 on AWS
<https://docs.aws.amazon.com/quickstart/latest/sharepoint/>

Notes

- ¹ <http://calculator.s3.amazonaws.com/index.html>
- ² http://media.amazonwebservices.com/AWS_Pricing_Overview.pdf
- ³ <http://aws.amazon.com/pricing/>
- ⁴ <https://aws.amazon.com/ec2/>
- ⁵ <https://aws.amazon.com/ebs/>
- ⁶ <https://aws.amazon.com/s3/>
- ⁷ <https://aws.amazon.com/vpc/>
- ⁸ <https://aws.amazon.com/elasticloadbalancing/>
- ⁹ <https://aws.amazon.com/autoscaling/>
- ¹⁰ <https://aws.amazon.com/directconnect/>
- ¹¹ <http://bit.ly/1mwA12X>
- ¹² <http://aws.amazon.com/quickstart/>
- ¹³ <https://docs.aws.amazon.com/quickstart/latest/sharepoint/>
- ¹⁴ <https://run.qwiklabs.com/>
- ¹⁵ <https://aws.amazon.com/windows/faq/>
- ¹⁶ <http://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/dedicated-hosts-instance-placement.html#dedicated-hosts-affinity>
- ¹⁷ <http://docs.aws.amazon.com/AWSEC2/latest/WindowsGuide/dedicated-hosts-instance-placement.html#dedicated-hosts-targeted-placement>
- ¹⁸ <http://docs.aws.amazon.com/kms/latest/developerguide/>
- ¹⁹ <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/instance-purchasing-options.html>
- ²⁰ <http://aws.amazon.com/ec2/instance-types/>
- ²¹ <http://docs.aws.amazon.com/AmazonVPC/latest/UserGuide/vpc-nat-gateway.html>
- ²² <http://aws.amazon.com/windows/resources/licenseability/>

- 23 <https://aws.amazon.com/ec2/vm-import/>
- 24 <http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/EBSOptimized.html>
- 25 <http://calculator.s3.amazonaws.com/index.html#r=IAD&s=EC2&key=calc-17621116-3ED7-4E66-9A4D-86681BBB4462>
- 26 <https://aws.amazon.com/ebs/details/>
- 27 <https://aws.amazon.com/elasticloadbalancing/pricing/>
- 28 <https://aws.amazon.com/directoryservice/details/>
- 29 <https://aws.amazon.com/autoscaling/details/>
- 30 <https://aws.amazon.com/blogs/aws/new-managed-nat-network-address-translation-gateway-for-aws/>
- 31 <http://www.aws-partner-directory.com/PartnerDirectory/PartnerDetail?Name=AvePoint>
- 32 <http://www.aws-partner-directory.com/PartnerDirectory/PartnerDetail?Name=metalogix>
- 33 <http://www.aws-partner-directory.com/PartnerDirectory/PartnerDetail?Name=SIOS+Technology+Corp>
- .
- 34 <http://www.aws-partner-directory.com/PartnerDirectory/PartnerDetail?Name=AvePoint>