SAP on AWS Pricing and Cost Optimization

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Contents

Abstract

This guide is part of a content series that provides detailed information about hosting, configuring, and using SAP technologies in the Amazon Web Services (AWS) Cloud.

For the other guides in the series, from overviews to advanced topics, see SAP on AWS Technical Documentation.

Overview

For SAP customers and partners who are new to Amazon Web Services (AWS), the process of estimating your monthly AWS bill might seem a bit overwhelming at first. This guide explains how to estimate the cost of running your SAP environment on AWS.

The number and types of services offered by AWS has increased dramatically over time, but the AWS philosophy on pricing has not changed: 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. No long-term contracts are required.

This guide is intended for SAP customers and partners who need to estimate the monthly cost of running SAP environments on AWS. For the purposes of this guide, we assume that you already know how to architect and size SAP solutions on AWS. If you do not, before you continue, we suggest that you read the SAP on AWS Overview and Planning documentation.

To help you understand how to effectively estimate the cost of running your SAP environment on AWS, we provide three examples of SAP on AWS pricing using the AWS Simple Monthly Calculator. For each example, we review the architecture on AWS, example usage of each service, cost breakdown for each service, and total estimated monthly charge.

AWS Pricing Overview

AWS offers you a pay-as-you-go approach for pricing of more than 165 cloud services. With AWS you pay only for the individual services you use, for as long as you use them, and without requiring long-term contracts or complex licensing. AWS pricing is similar to how you pay for utilities, such as water and electricity. You only pay for the services you consume, and when you stop using them, there are no additional costs or termination fees.

For more information about AWS pricing, see How does AWS pricing work?

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 use case based on your expected usage.[1] The AWS Simple Monthly Calculator is continuously updated with the latest pricing for all AWS services in all Regions. For an overview of how to use the AWS Simple Monthly Calculator, see the Getting Started with the AWS Simple Monthly Calculator[2] video.

AWS TCO Calculator

With the AWS TCO calculator you can evaluate the savings from using AWS and compare an AWS Cloud environment to on-premises and co-location environments. The TCO calculator matches your current infrastructure to the most cost effective AWS offering. This tool considers all the costs to run a solution, including physical facilities, power, and cooling, to provide a realistic, end-to-end comparison of your costs.

SAP on AWS Pricing Fundamentals

AWS currently offers over 165 different products and services. The following is an overview of the pricing characteristics for the AWS services that are most relevant for the deployment and operation of SAP systems on AWS.

AWS Region Pricing

AWS service pricing varies between different AWS Regions. The first step in estimating any SAP environment on AWS is to select which AWS Region you will deploy your SAP environment in.

Compute Pricing

Instances

Amazon Elastic Compute Cloud (Amazon EC2) provides a wide selection of instance types that provide varying combinations of CPU, memory, storage, I/O, and networking capabilities. You are charged by the hour for each running instance. The hourly fee of an instance is based on a combination of the following characteristics:

- **Instance type** – Specific virtual machine and bare metal configurations that offer different CPU, memory, storage, I/O, and networking capabilities. For more information about Amazon EC2 instance types, see Amazon EC2 Instance Types.
- **Operating system** – You can choose to buy an operating system license from AWS or bring your own operating system license or subscription. If you choose to buy the operating system license from AWS, the license fee is included in the EC2 instance fees. For more information, see SAP on AWS Overview and Planning.
- **Monitoring** – You can use Amazon CloudWatch to monitor your Amazon EC2 instances. *Basic monitoring* is included in the hourly cost of an instance and provides metrics at five-minute intervals. For an additional cost, you can use *detailed monitoring*, which provides metrics at one-minute intervals. Detailed monitoring is required for production SAP systems on AWS. For more information about Amazon CloudWatch pricing, see Amazon CloudWatch pricing.
- **I/O throughput** – Amazon EC2 instance types offer different levels of I/O throughput. For production SAP systems, either Amazon Elastic Block Store (Amazon EBS)-optimized instances or instances with 10 gigabit network connectivity are recommended. For more information about Amazon EBS-optimized instances and instances with 10 gigabit network connectivity, see Amazon EC2 Instance Configuration.[3]

For more information about Amazon EC2 instance pricing, see Amazon EC2 pricing.

Purchasing Options

Amazon EC2 offers multiple purchasing options that give you flexibility to optimize your costs. The *On-Demand*, *Reserved Instance,* and *Dedicated Host* purchasing options are most appropriate for SAP systems.

On-Demand

With the On-Demand option, you pay for compute capacity by the hour with no long-term commitments or upfront payments. You can increase or decrease your compute capacity depending on the demands of your application, and pay only the specified hourly rate for the instances you use.

Recommended for:

- Initial purchasing option for SAP on AWS projects
- Temporary SAP systems for testing, upgrades, trials, demos, and proof of concepts (POCs)
- Temporary SAP systems for scaling to handle increased load

Reserved Instances

The Reserved Instance purchasing option provides you with a significant discount (up to 75%) compared to On-Demand instance pricing. In addition, when Reserved Instances are assigned to a specific Availability Zone, they provide a capacity reservation, which enables you to launch instances when you need them.

For applications that have steady state or predictable usage, Reserved Instances can provide significant savings compared to On-Demand Instances. For more information, see How to Purchase Reserved Instances.

Recommended for:

- Permanent SAP systems such as production, quality assurance, and development systems
- Consider for any SAP system that will be online more than 60% of the time.

Dedicated Hosts

A Dedicated Host is a physical Amazon EC2 server dedicated for your use. Dedicated Hosts enable you to use your existing server-bound software licenses, including Windows Server and SQL Server.

> **Note** – Dedicated Hosts are required for Amazon EC2 High Memory instances (6 TB, 9 TB, and 12 TB of memory) and Amazon EC2 bare metal instances.

For more information about Amazon EC2 purchasing options, see Amazon EC2 Pricing.

Storage Pricing

AWS provides flexible, cost-effective, and easy-to-use data storage options for your SAP systems. Each option has a unique combination of performance and durability. This section provides an overview of the primary components of AWS storage pricing.

Primary Storage

Amazon Elastic Block Store (Amazon EBS) provides persistent, block-level storage volumes for SAP systems that run on Amazon EC2. Each SAP Amazon EC2 system requires one or more Amazon EBS volumes to store system components, such as the operating system, SAP software, SAP database data and log files, and local backup storage. For information about Amazon EBS pricing, see Amazon EBS Pricing.

Backup Storage

Multiple options are available to back up your SAP system on AWS. For an overview of options, see SAP on AWS Backup and Recovery Guide.[4] Each option stores backup files in Amazon Simple Storage Service (Amazon S3) to provide highly durable storage that is independent of primary storage. For information about Amazon S3 pricing, see Amazon S3 Pricing.

The amount of backup storage required depends on the backup method, backup frequency, system size, and backup retention. How to calculate the amount of backup storage you require is not included in this guide.

Network Pricing

Amazon VPC Connectivity

There is no additional cost for using Amazon Virtual Private Cloud (Amazon VPC) over the standard Amazon EC2 usage charges. If a secure connection is required between your on-premises network and Amazon VPC, you can choose one of the following connectivity options.

Hardware VPN Connection

When you use hardware VPN connections to your Amazon VPC, you are charged for each *VPN Connection-hour* that your VPN connection is provisioned and available. For more information about hardware VPN connection pricing, see Amazon VPC pricing.

Private Network Connection

With AWS Direct Connect, you can make a dedicated network connection from your on-premises network to AWS. AWS Direct Connect is billed by port hours and outbound data transfer rate. For more information about AWS Direct Connect pricing, see AWS Direct Connect pricing.

Data Transfer

There is no charge for inbound data transfer to Amazon EC2. 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 *On-Demand* section of the Amazon EC2 Pricing page.

AWS Support Pricing

AWS offers different levels of support, so you can choose the right level of support for your environment. AWS Basic support is included with all AWS services at no additional cost. If you require a deeper level of support, you can subscribe to Developer, Business, or Enterprise-level support. For more information about the different AWS support plans and pricing details, see AWS Support.

SAP on AWS Pricing Examples

To help you estimate the monthly cost of your SAP environment on AWS, review the following sample SAP on AWS environment estimates created using the AWS Simple Monthly Calculator.

- *SAP HANA – Multi-AZ (HA) Single-Node Architecture – Up to 4 TB Memory*
- *SAP HANA – Multi-AZ (HA) – Single-Node Architecture – 6–12 TB*
- *SAP S/4HANA – Multi-AZ (HA) – 3-Tier*

SAP HANA – Multi-AZ (HA) Single-Node Architecture – Up to 4 TB Memory

Description

The architecture in this example is based on the *SAP HANA Multi-AZ (HA), single-node architecture* described in the SAP HANA Quick Start guide. This architecture provisions two Amazon EC2 instances in private subnets in two different Availability Zones. High availability (HA) is based on SLES High Availability Extension (HAE), which is part of the SLES for SAP operating system. The SLES for SAP operating system uses a bring-your-own-subscription , or you can purchase a subscription through the AWS Marketplace. SAP HANA System Replication (HSR) synchronous replication is replicates between the primary node and secondary node. The SAP HANA nodes are run on the same sized Amazon EC2 instances types, and each system has its own set of Amazon EBS volumes.

- SAP HANA single node or scale-up system with 2 TB of memory
- SAP HANA scenarios – Include data mart, analytics, native SAP HANA application, ERP on HANA, S/4HANA, and BW/4HANA
- SAP HANA systems run in a private subnet and are not directly accessible from the internet
- Administrative and end user system access through a Windows Remote Desktop Services system running within a public subnet, which is accessible through a direct internet connection (VPN connection not required)

The following are sample compute requirements mapped to relevant Amazon EC2 instance types.

System	SAPS	Memory	Amazon EC2 Instance Type
SAP HANA DB – Primary	130,000	2 TB	x1.32xlarge
SAP HANA DB – Secondary	130,000	2 TB	x1.32xlarge
RDP	N/A	6 GB	c4.xlarge
Bastion host	N/A	2 GB	t2.small

Architecture

The following diagram shows the SAP HANA – Multi-AZ (HA) – Single-node architecture used in this example.

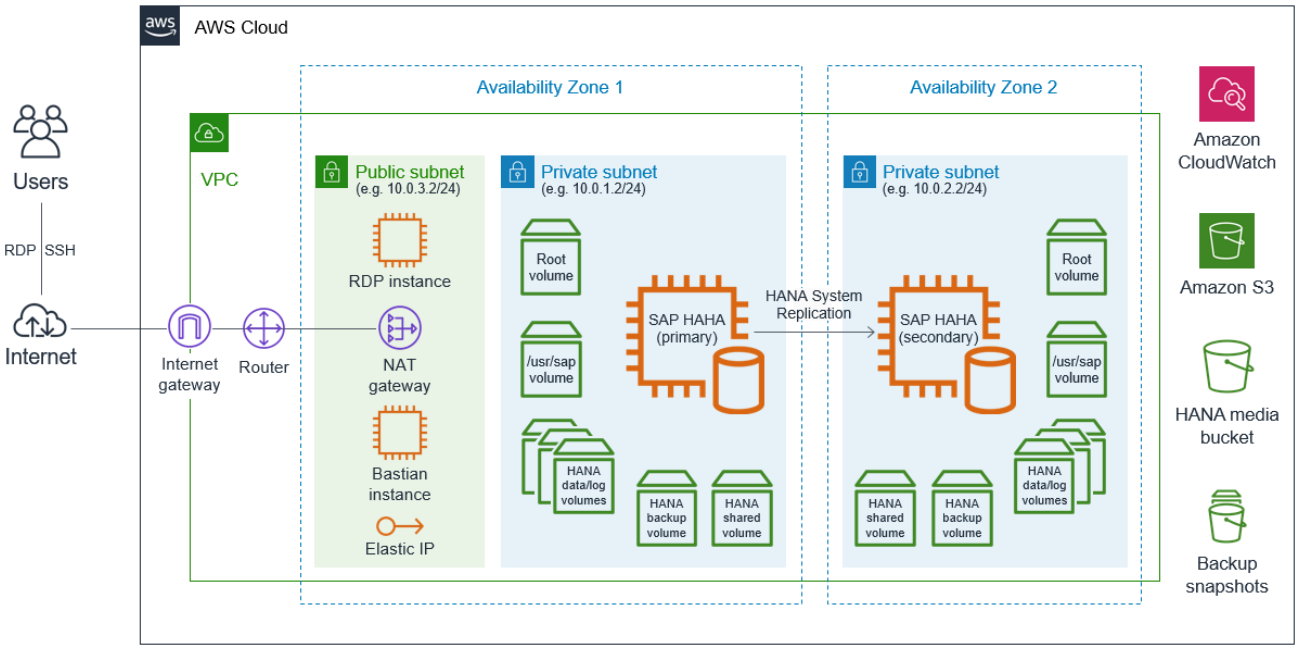


Figure 1 – SAP HANA – Multi-AZ (HA) – Single-node architecture

AWS Simple Monthly Calculator

You can see this sample estimate online in the AWS Simple Monthly Calculator at: [SAP HANA – Multi-AZ (HA) – Single-Node Architecture – Up to 4 TB Memory]

The following images show each part of the AWS Simple Monthly Calculator estimate.

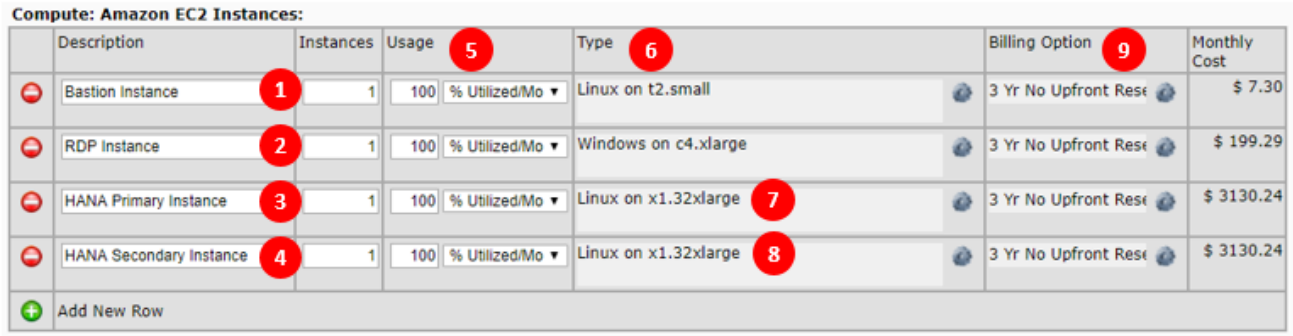
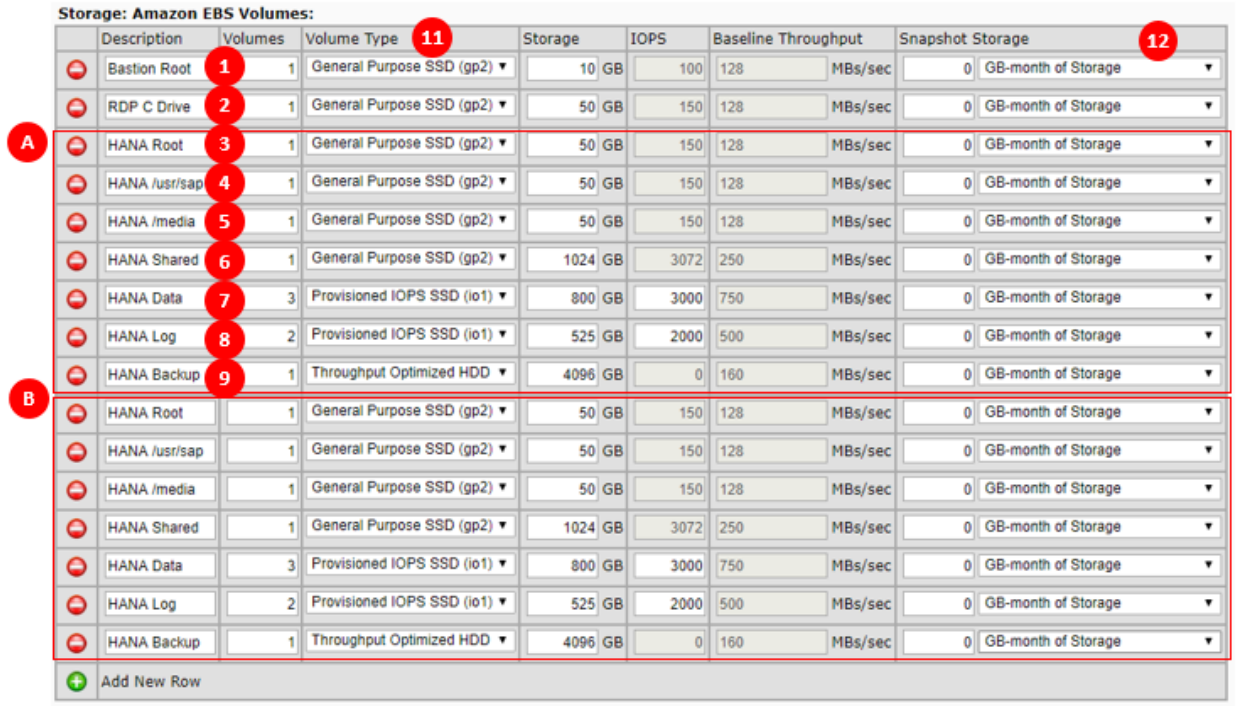


Figure 2 – Amazon EC2 Instances example settings

1. Bastion host system
2. RDP system
3. HANA Primary system
4. HANA Secondary system
5. All instances are set at 100% utilization
6. Amazon EC2 instance type selected
7. & 8. Linux operating system – Because this sample architecture uses SLES for the SAP operating system and a bring-your-own-subscription model on AWS, it uses a Linux operating system. If you do not require SLES for SAP and want to use the bundled standard SLES software and license, you select a SUSE Linux Enterprise Server for the operating system. For more information, see the SAP on AWS Overview and Planning guide.
9. Amazon EC2 purchasing option – Reserved Instance 3 Year No Upfront Payment



Storage: Amazon EBS Volumes:

	Description	Volumes	Volume Type (11)	Storage	IOPS	Baseline Throughput	Snapshot Storage (12)
	Bastion Root (1)	1	General Purpose SSD (gp2)	10 GB	100	128 MBs/sec	0 GB-month of Storage
	RDP C Drive (2)	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
A	HANA Root (3)	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
A	HANA /usr/sap (4)	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
A	HANA /media (5)	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
A	HANA Shared (6)	1	General Purpose SSD (gp2)	1024 GB	3072	250 MBs/sec	0 GB-month of Storage
A	HANA Data (7)	3	Provisioned IOPS SSD (io1)	800 GB	3000	750 MBs/sec	0 GB-month of Storage
A	HANA Log (8)	2	Provisioned IOPS SSD (io1)	525 GB	2000	500 MBs/sec	0 GB-month of Storage
A	HANA Backup (9)	1	Throughput Optimized HDD	4096 GB	0	160 MBs/sec	0 GB-month of Storage
B	HANA Root	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
B	HANA /usr/sap	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
B	HANA /media	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0 GB-month of Storage
B	HANA Shared	1	General Purpose SSD (gp2)	1024 GB	3072	250 MBs/sec	0 GB-month of Storage
B	HANA Data	3	Provisioned IOPS SSD (io1)	800 GB	3000	750 MBs/sec	0 GB-month of Storage
B	HANA Log	2	Provisioned IOPS SSD (io1)	525 GB	2000	500 MBs/sec	0 GB-month of Storage
B	HANA Backup	1	Throughput Optimized HDD	4096 GB	0	160 MBs/sec	0 GB-month of Storage
	Add New Row						

Figure 3 – Amazon EBS Volumes example settings

A & B – HANA primary and secondary nodes are deployed in different Availability Zones and each have their own set of EBS volumes.

1. Bastion root volume
2. RDP C:\ drive volume
3. HANA root volume
4. HANA /usr/sap volume
5. HANA metadata volume
6. HANA Shared volume
7. HANA Data volume
8. HANA Log volume
9. HANA Backup volume
10. EBS volume type selected for each volume
11. Native or third-party backup tools are used to perform system backups.
12. Amazon EBS snapshots are not used, so there is no data in the Snapshot Storage fields.

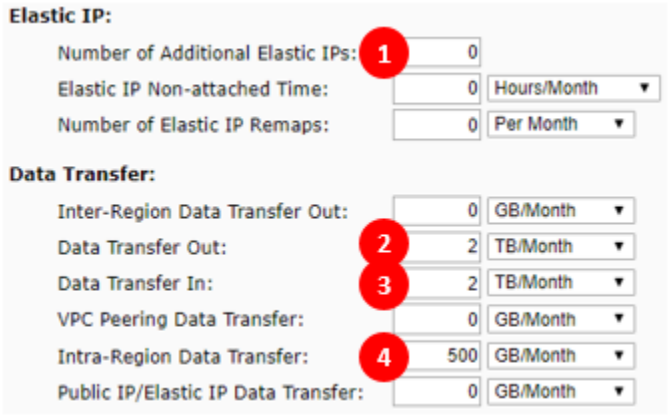


Figure 4 – Elastic IP Address, Data Transfer, and Elastic Load Balancing example settings

1. One Elastic IP address per running instance is provided at no charge. Additional Elastic IP addresses are not required.
2. 2 TB per month is estimated for data transferred out to the internet.
3. 2 TB per month is estimated for data transferred in from the internet.
4. 500 GB per month Intra-Region Data Transfer for database replication between HANA Primary system in Availability Zone 1 and HANA Secondary system in Availability Zone 2.

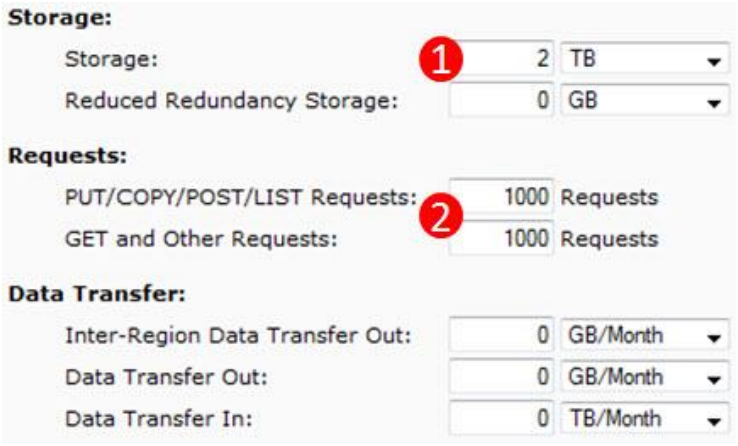
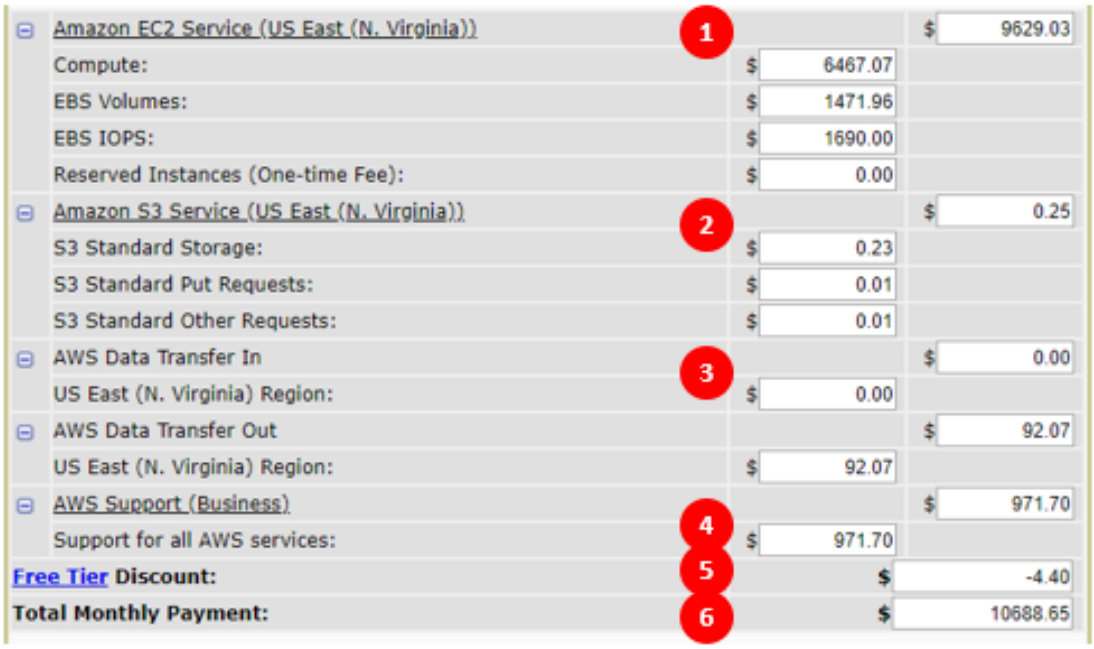


Figure 5 – Amazon S3 example settings

1. 4 TB of Amazon S3 storage is estimated for storing system and database backups. The actual backup storage required depends on the backup method, frequency, volume, and retention policy.
2. 1,000 requests are estimated for Amazon S3 PUT, COPY, POST, and LIST operations, and 1,000 requests are estimated for GET and other operations.



⊖	Amazon EC2 Service (US East (N. Virginia)) 1		$ 9629.03
	Compute:	$ 6467.07	
	EBS Volumes:	$ 1471.96	
	EBS IOPS:	$ 1690.00	
	Reserved Instances (One-time Fee):	$ 0.00	
⊖	Amazon S3 Service (US East (N. Virginia)) 2		$ 0.25
	S3 Standard Storage:	$ 0.23	
	S3 Standard Put Requests:	$ 0.01	
	S3 Standard Other Requests:	$ 0.01	
⊖	AWS Data Transfer In 3		$ 0.00
	US East (N. Virginia) Region:	$ 0.00	
⊖	AWS Data Transfer Out		$ 92.07
	US East (N. Virginia) Region:	$ 92.07	
⊖	AWS Support (Business)		$ 971.70
	Support for all AWS services: 4	$ 971.70	
Free Tier Discount: 5		**$**	-4.40
Total Monthly Payment: 6		**$**	10688.65

Figure 6 – Estimate of monthly bill example

1. Total and detailed breakdown of Amazon EC2 costs
2. Total and detailed breakdown of Amazon S3 costs
3. Total and detailed breakdown of data transfer costs
4. Total and detailed breakdown of AWS Support costs
5. AWS Free Tier discount[5]
6. Total monthly charge for all AWS services

SAP HANA – Multi-AZ (HA) – Single-Node Architecture – 6–12 TB Memory

Description

The architecture in this example is based on the *SAP HANA Multi-AZ (HA), single-node architecture* described in the SAP HANA Quick Start guide. This architecture provisions two Amazon EC2 instances in private subnets in two different Availability Zones. High availability is based on SLES High Availability Extension (HAE), which is part of the SLES for SAP operating system. The SLES for SAP operating system uses a bring-your-own-subscription model, or you can purchase a subscription through the AWS Marketplace. SAP HANA System Replication (HSR) synchronous replication is used to replicate between the primary node and secondary node. The SAP HANA nodes run on the same-sized Amazon EC2 instances types and each system has its own set of Amazon EBS volumes.

- SAP HANA scenarios – Include data mart, analytics, native SAP HANA application, ERP on HANA, S/4HANA, and BW/4HANA
- SAP HANA single node and scale-up system with 9 TB of memory
- High Availability
- SAP HANA system in a private subnet and not directly accessible from the internet
- Administrative and end user system access through a Windows Remote Desktop Services system running within a public subnet, which is accessible through a direct internet connection (VPN connection not required)

The following are sample compute requirements mapped to the relevant Amazon EC2 instance types.

System	SAPS	Memory	Amazon EC2 Instance Type
SAP HANA DB – Primary	130,000	9 TB	u-9tb1.metal
SAP HANA DB – Secondary	130,000	9 TB	u-9tb1.metal
RDP	N/A	6 GB	c4.xlarge
Bastion host	N/A	2 GB	t2.small

Architecture

The following diagram shows the SAP HANA – Multi-AZ (HA) – Single-Node Architecture in this example.

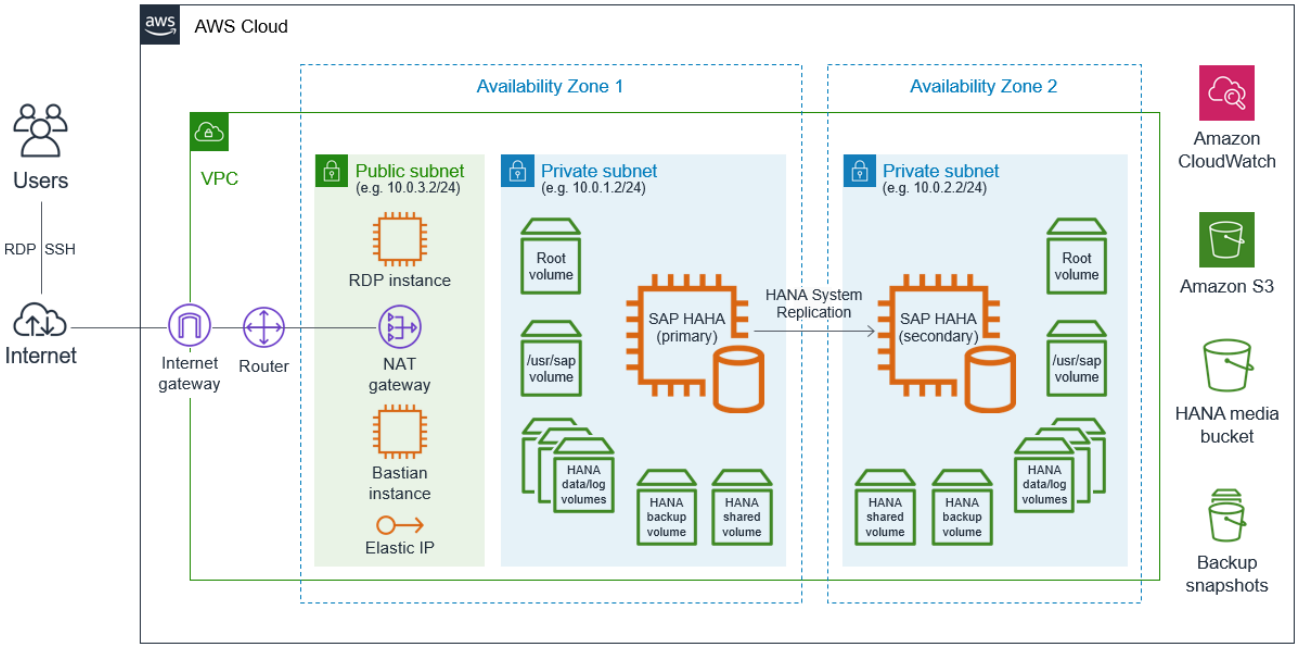


Figure 7 – SAP HANA – Multi-AZ (HA) – Single Node Architecture

AWS Simple Monthly Calculator

You can see this sample estimate online in the AWS Simple Monthly Calculator at: [SAP HANA – Multi-AZ (HA) Single-Node Architecture – 6 TB and larger]

The following images show each part of the AWS Simple Monthly Calculator estimate.

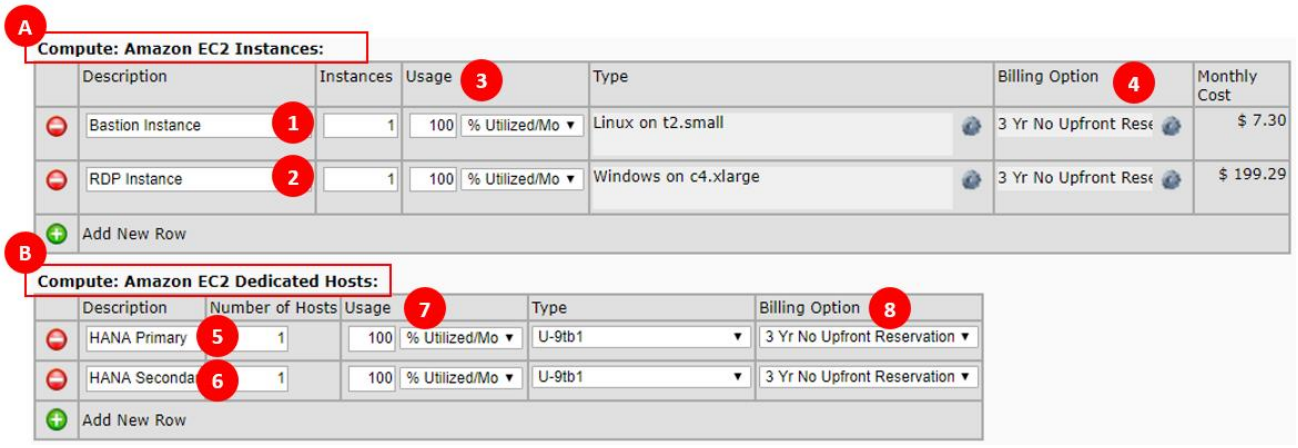


Figure 8 – Amazon EC2 example settings

A. On-demand Amazon EC2 instances

1. Bastion host – EC2 instance
2. RDP – EC2 instance
3. All instances are set at 100% utilization
4. Amazon EC2 purchasing option

B. Amazon EC2 High Memory and bare metal instance types require Amazon EC2 Dedicated Hosts

5. HANA Primary system
6. HANA Secondary system
7. All instances are set at 100% utilization
8. Amazon EC2 purchasing option

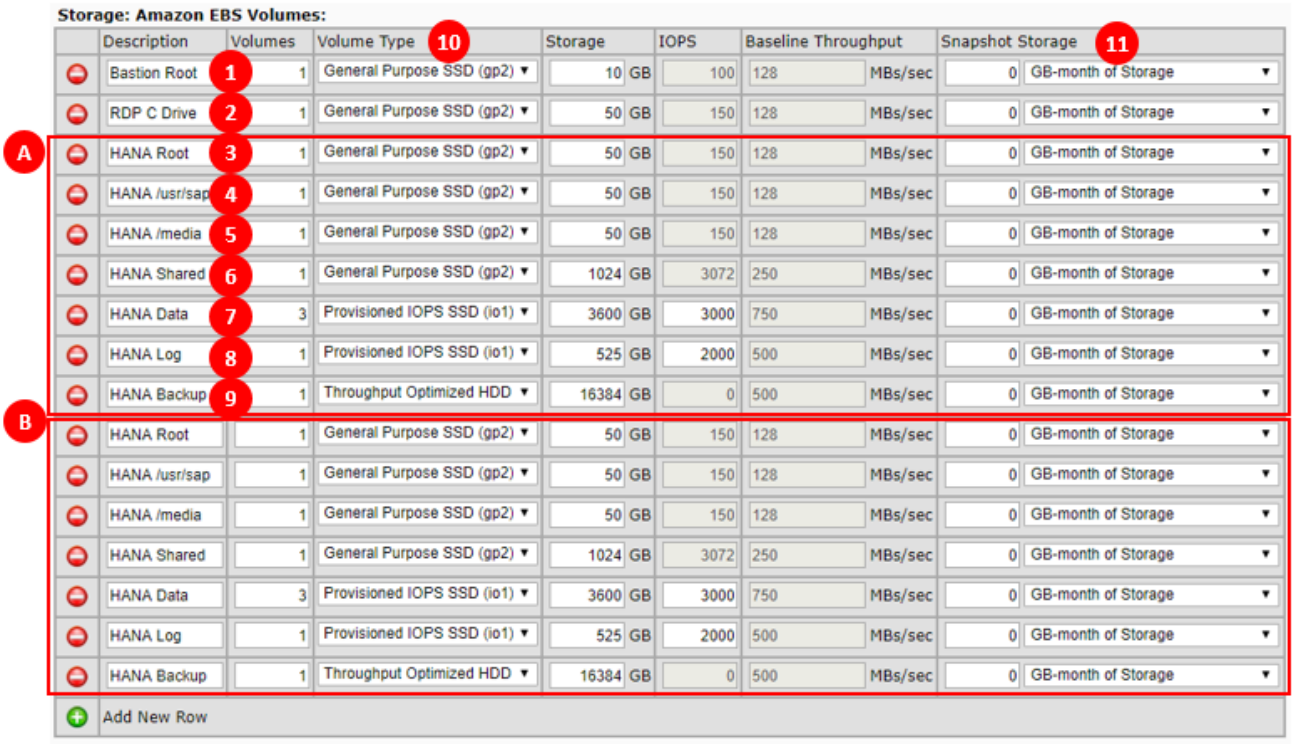


Figure 9 – Amazon EBS Volumes example settings

A & B – The HANA primary and secondary nodes are deployed in different Availability Zones and each have their own set of EBS volumes.

1. Bastion host root volume
2. RDP server C drive volume
3. HANA root volume
4. HANA /usr/sap volume
5. HANA metadata volume
6. HANA Shared volume
7. HANA Data volumes
8. HANA Log volume
9. HANA Backup volume
10. EBS volume type
11. Native or third-party backup tools are used to perform system backups. Amazon EBS snapshots are not used, so there is no data in the Snapshot Storage fields.

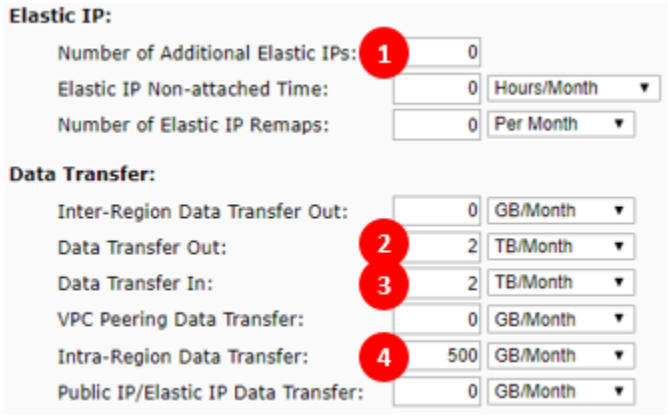


Figure 10 – Elastic IP Address, Data Transfer, and Elastic Load Balancing example settings

1. One Elastic IP address per running instance is provided at no charge. Additional Elastic IP addresses are not required.
2. 2 TB per month is estimated for data transferred out to the internet.
3. 2 TB per month is estimated for data transferred in from the internet.
4. 500 GB per month Intra-Region Data Transfer for database replication between HANA Primary system in Availability Zone 1 and HANA Secondary system in Availability Zone 2.

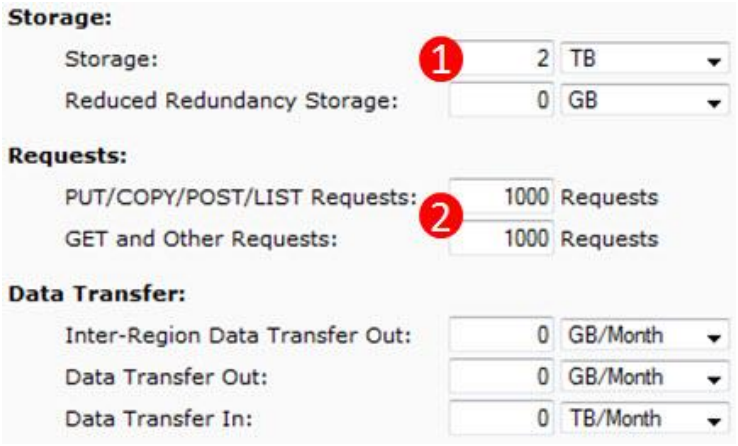


Figure 11 – Amazon S3 example settings

1. 4 TB of Amazon S3 storage is estimated for storing system and database backups. The actual backup storage required depends on the backup method, frequency, volume, and retention policy.
2. 1,000 requests are estimated for Amazon S3 PUT, COPY, POST, and LIST operations, and 1,000 requests are estimated for GET and other operations.

⊖	Amazon EC2 Service (US East (N. Virginia)) 1		$ 44604.57
	Compute:	$ 38627.95	
	EBS Volumes:	$ 4546.62	
	EBS IOPS:	$ 1430.00	
	Reserved Instances (One-time Fee):	$ 0.00	
⊖	Amazon S3 Service (US East (N. Virginia)) 2		$ 706.58
	S3 Standard Storage:	$ 706.56	
	S3 Standard Put Requests:	$ 0.01	
	S3 Standard Other Requests:	$ 0.01	
⊖	AWS Data Transfer In 3		$ 0.00
	US East (N. Virginia) Region:	$ 0.00	
⊖	AWS Data Transfer Out		$ 92.07
	US East (N. Virginia) Region:	$ 92.07	
⊖	AWS Support (Business) 4		$ 3477.92
	Support for all AWS services:	$ 3477.92	
Free Tier Discount: 5		**$**	-4.40
Total Monthly Payment: 6		**$**	48876.74

Figure 12 – Estimate of monthly bill example

1. Total and detailed breakdown of Amazon EC2 costs
2. Total and detailed breakdown of Amazon S3 costs
3. Total and detailed breakdown of data transfer costs
4. Total and detailed breakdown of AWS Support costs
5. AWS Free Tier discount[6]
6. Total monthly charge for all AWS services

SAP S/4HANA – Multi-AZ (HA) – 3-Tier Architecture

Description

The architecture in this example is for an SAP S/4HANA 3-tier (PRD/QAS/DEV) environment with Multi-AZ high availability for production.

The following are sample compute requirements mapped to the relevant Amazon EC2 instance types.

System	Landscape	SAPS	Memory	Amazon EC2 Instance Type
SAP S/4HANA DB	PRD	130,000	2 TB	x1.32xlarge
SAP S/4HANA NW AS	PRD	10,000	64 GB	r5.2xxlarge
SAP S/4HANA DB	PRD - HA	130,000	2 TB	x1.32xlarge
SAP S/4HANA NW AS	PRD - HA	10,000	64 GB	r5.2xlarge
SAP S/4HANA DB	QAS	130,000	2 TB	x1.32xlarge
SAP S/4HANA NW AS	QAS	10,000	64 GB	r5.2xlarge
SAP S/4HANA DB	DEV	5,000	32 GB	x1.16xlarge
SAP S/4HANA NW AS	DEV	5,000	32 GB	r5.xlarge
SAP SolMan	N/A	10,000	16 GB	c5.2xlarge
SAP SAProuter	N/A	N/A	2 GB	t2.small

Architecture

The following diagram shows the SAP S/4HANA – Multi-AZ (HA) – 3 tier architecture in this example.

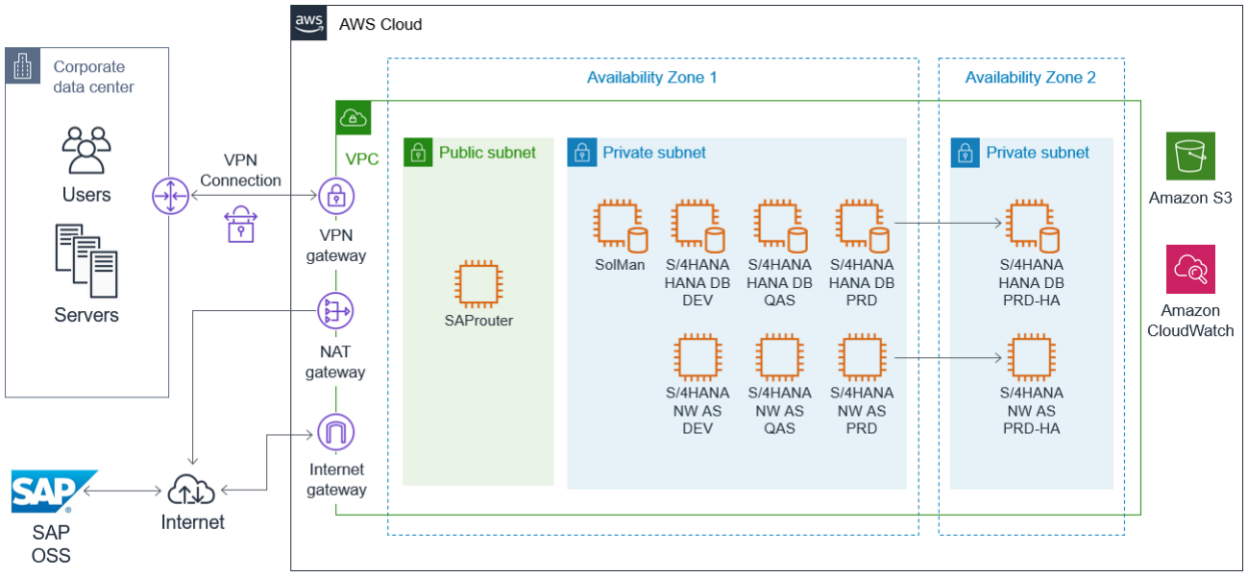


Figure 13 – SAP S/4HANA – Multi-AZ (HA) – 3-tier architecture

AWS Simple Monthly Calculator

This sample estimate is available online in the AWS Simple Monthly Calculator at [SAP S/4HANA – Multi-AZ (HA) – 3-tier (PRD/QAS/DEV) architecture].

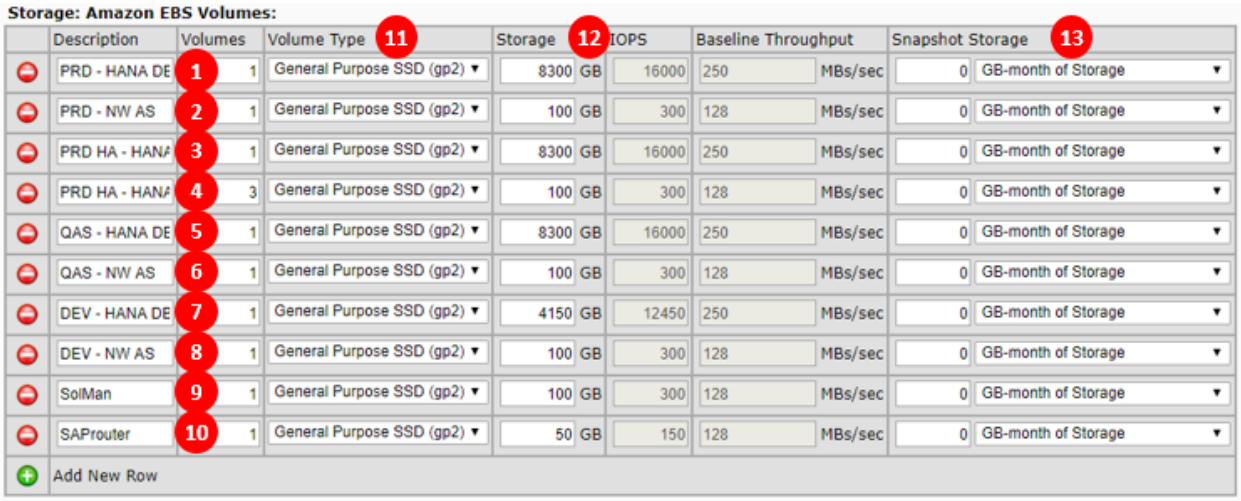
The following images show each part of the AWS Simple Monthly Calculator estimate.

Compute: Amazon EC2 Instances:

	Description	Instances	Usage (11)	Type (12)	Billing Option (13)	Monthly Cost
⊖	PRD - SAP HANA DB (1)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on x1.32xlarge Detail Monitored	3 Yr No Upfront Rese	$ 3156.43
⊖	PRD - SAP NetWeaver AS (2)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on r5.2xlarge Detail Monitored	3 Yr No Upfront Rese	$ 208.69
⊖	PRD HA - SAP HANA DB (3)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on x1.32xlarge Detail Monitored	3 Yr No Upfront Rese	$ 3156.43
⊖	PRD HA - SAP NetWeaver A (4)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on r5.2xlarge Detail Monitored	3 Yr No Upfront Rese	$ 208.69
⊖	QAS - SAP HANA DB (5)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on x1.32xlarge Detail Monitored	3 Yr No Upfront Rese	$ 3156.43
⊖	QAS - SAP NetWeaver AS (6)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on r5.2xlarge Detail Monitored	3 Yr No Upfront Rese	$ 208.69
⊖	DEV - SAP HANA DB (7)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on x1.16xlarge Detail Monitored	3 Yr No Upfront Rese	$ 1591.31
⊖	DEV - SAP NetWeaver AS (8)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on r5.xlarge Detail Monitored	3 Yr No Upfront Rese	$ 118.17
⊖	SAP SolMan (9)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on c5.2xlarge	3 Yr No Upfront Rese	$ 127.75
⊖	SAProuter (10)	1	100 % Utilized/Mo	SUSE Linux Enterprise Server on t2.small	3 Yr No Upfront Rese	$ 24.09
⊕	Add New Row					

Figure 14 – Amazon EC2 Instances example settings

1. PRD – SAP HANA DB system
2. PRD – SAP NetWeaver AS system
3. PRD-HA – SAP HANA DB system
4. PRD HA – SAP NetWeaver AS system
5. QAS – SAP HANA DB system
6. QAS – SAP NetWeaver AS system
7. DEV – SAP HANA DB system
8. DEV – SAP HANA NetWeaver AS system
9. SAP Solution Manager system
10. SAProuter system
11. Usage 100%
12. Amazon EC2 instance type selected for each system
13. Amazon EC2 purchasing option selected for each system



Storage: Amazon EBS Volumes:

	Description	Volumes	Volume Type (11)	Storage (12)	IOPS	Baseline Throughput	Snapshot Storage (13)	
1	PRD - HANA DE	1	General Purpose SSD (gp2)	8300 GB	16000	250 MBs/sec	0	GB-month of Storage
2	PRD - NW AS	1	General Purpose SSD (gp2)	100 GB	300	128 MBs/sec	0	GB-month of Storage
3	PRD HA - HANA	1	General Purpose SSD (gp2)	8300 GB	16000	250 MBs/sec	0	GB-month of Storage
4	PRD HA - HANA	3	General Purpose SSD (gp2)	100 GB	300	128 MBs/sec	0	GB-month of Storage
5	QAS - HANA DE	1	General Purpose SSD (gp2)	8300 GB	16000	250 MBs/sec	0	GB-month of Storage
6	QAS - NW AS	1	General Purpose SSD (gp2)	100 GB	300	128 MBs/sec	0	GB-month of Storage
7	DEV - HANA DE	1	General Purpose SSD (gp2)	4150 GB	12450	250 MBs/sec	0	GB-month of Storage
8	DEV - NW AS	1	General Purpose SSD (gp2)	100 GB	300	128 MBs/sec	0	GB-month of Storage
9	SolMan	1	General Purpose SSD (gp2)	100 GB	300	128 MBs/sec	0	GB-month of Storage
10	SAProuter	1	General Purpose SSD (gp2)	50 GB	150	128 MBs/sec	0	GB-month of Storage
	Add New Row							

Figure 15 – Amazon EBS Volumes example settings

Note – To simplify this example, Amazon EBS requirements for each SAP HANA system have been aggregated into a single line item. For detailed Amazon EBS volume configuration information see the SAP HANA Quick Start guide.

1. PRD – HANA DB volume - General Purpose SSD (gp2)
2. PRD – NetWeaver AS volume - General Purpose SSD (gp2)
3. PRD-HA – HANA DB volume - General Purpose SSD (gp2)
4. PRD-HA – NetWeaver AS volume - General Purpose SSD (gp2)
5. QAS – HANA DB volume - General Purpose SSD (gp2)
6. QAS – NetWeaver AS volume - General Purpose SSD (gp2)
7. DEV – HANA DB volume - General Purpose SSD (gp2)
8. DEV – NetWeaver AS volume – General Purpose SSD (gp2)
9. Solution Manager volume – General Purpose SSD (gp2)
10. SAProuter volume – General Purpose SSD (gp2)
11. EBS volume type
12. Total amount of storage in GB estimated per system
13. Native or third-party backup tools are used to perform system backups. Amazon EBS snapshots are not used, so there is no data in the Snapshot Storage fields.

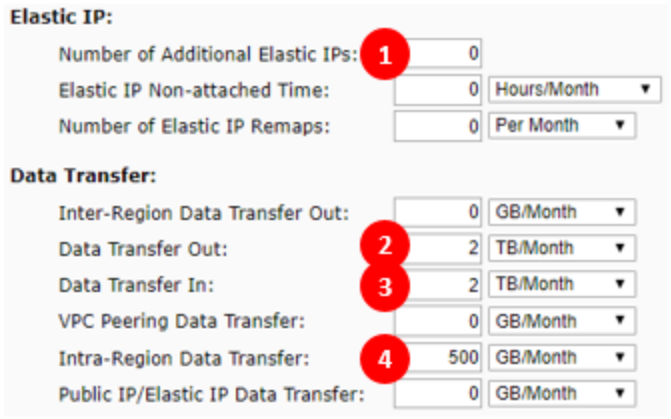


Figure 16 – Elastic IP Address, Data Transfer, and Elastic Load Balancing example settings

1. One Elastic IP address per running instance is provided at no charge. Additional Elastic IP addresses are not required.
2. 2 TB per month is estimated for data transferred out to the internet.
3. 2 TB per month is estimated for data transferred in from the internet.
4. 500 GB per month Intra-Region Data Transfer for database replication between HANA primary system in Availability Zone 1 and HANA secondary system in Availability Zone 2.

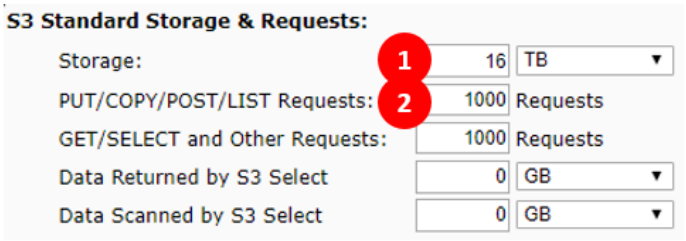
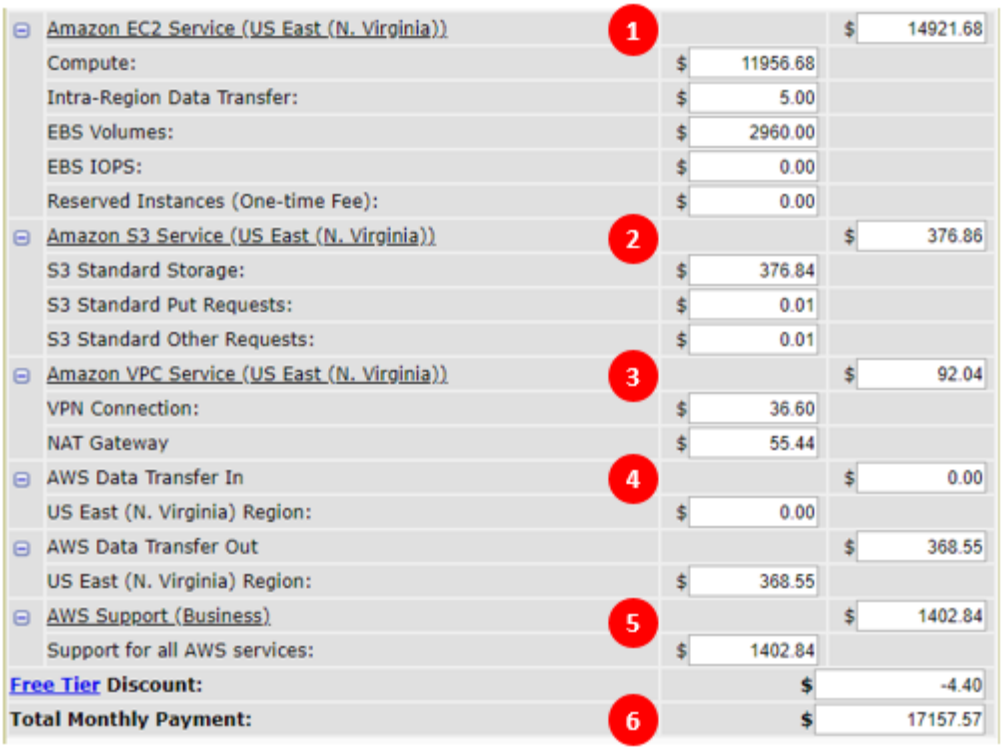


Figure 17 – Amazon S3 example settings

1. 16 TB of Amazon S3 storage is estimated for storing system and database backups. The actual backup storage required depends on the backup method, frequency, volume, and retention policy.
2. 1,000 requests are estimated for Amazon S3 PUT, COPY, POST, and LIST operations, and 1,000 requests are estimated for GET and other operations.



⊖ Amazon EC2 Service (US East (N. Virginia))	1		$ 14921.68
Compute:		$ 11956.68	
Intra-Region Data Transfer:		$ 5.00	
EBS Volumes:		$ 2960.00	
EBS IOPS:		$ 0.00	
Reserved Instances (One-time Fee):		$ 0.00	
⊖ Amazon S3 Service (US East (N. Virginia))	2		$ 376.86
S3 Standard Storage:		$ 376.84	
S3 Standard Put Requests:		$ 0.01	
S3 Standard Other Requests:		$ 0.01	
⊖ Amazon VPC Service (US East (N. Virginia))	3		$ 92.04
VPN Connection:		$ 36.60	
NAT Gateway		$ 55.44	
⊖ AWS Data Transfer In	4		$ 0.00
US East (N. Virginia) Region:		$ 0.00	
⊖ AWS Data Transfer Out			$ 368.55
US East (N. Virginia) Region:		$ 368.55	
⊖ AWS Support (Business)	5		$ 1402.84
Support for all AWS services:		$ 1402.84	
Free Tier Discount:		$	-4.40
Total Monthly Payment:	6	$	17157.57

Figure 18 – Estimate of monthly bill example

1. Total and detailed breakdown of Amazon EC2 costs
2. Total and detailed breakdown of Amazon S3 costs
3. Total and detailed breakdown of data transfer costs
4. Total and detailed breakdown of AWS Support costs
5. AWS Free Tier discount[7]
6. Total monthly charge for all AWS services

Document Revisions

Date	Description
July 2019	First publication

Notes

[1] https://calculator.s3.amazonaws.com/index.html

[2] https://www.youtube.com/watch?v=54TVCueOoAc&list=PLhr1KZpdzukcAtqFF32cjGUNNT5GOzKQ8

[3] http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ebs-ec2-config.html

[4] http://d0.awsstatic.com/enterprise-marketing/SAP/sap-on-aws-backup-and-recovery-guide-v2-2.pdf

[5] http://aws.amazon.com/free/

[6] http://aws.amazon.com/free/

[7] http://aws.amazon.com/free/