White Paper

TCO Study for SAP on Amazon Web Services (AWS)

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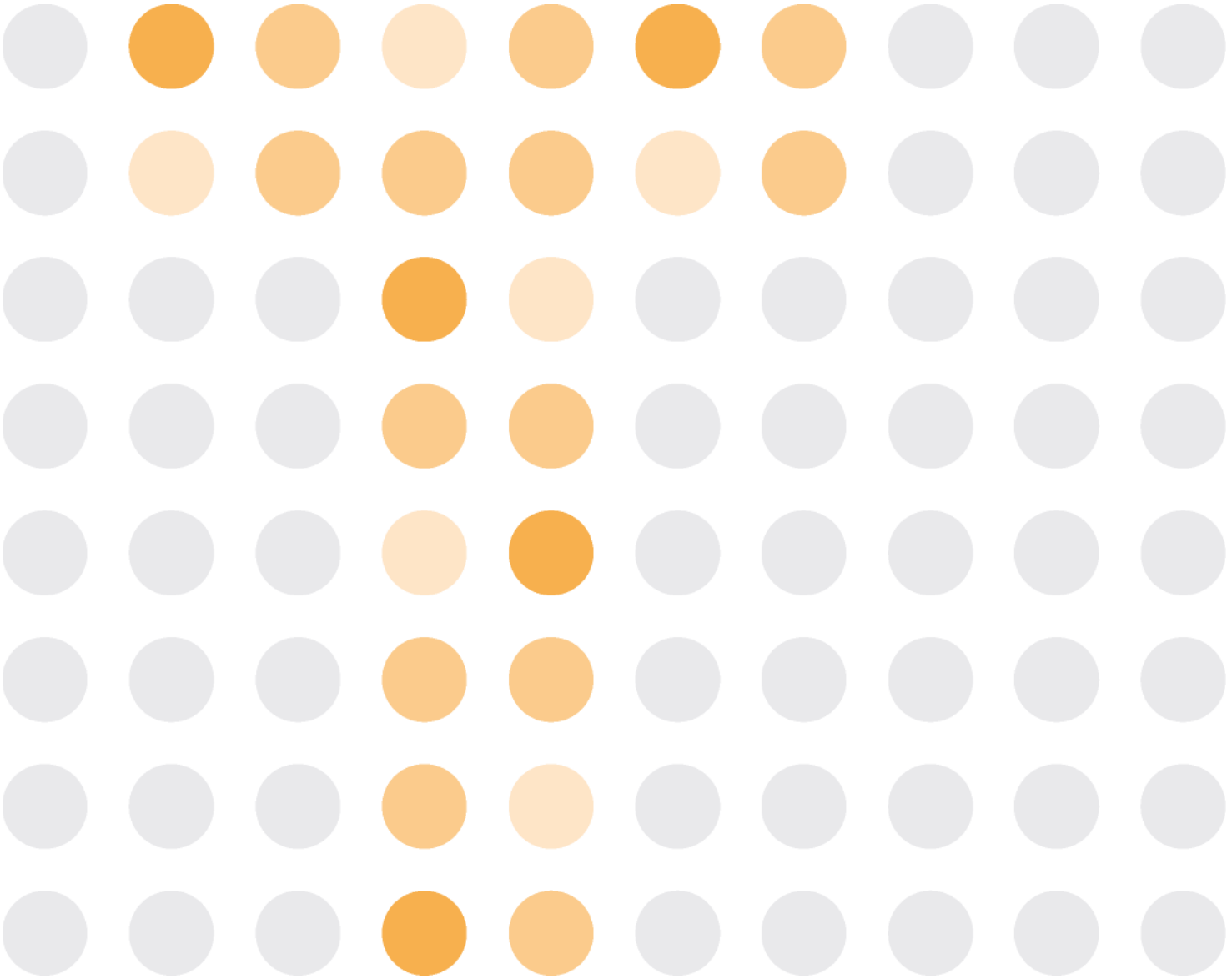

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1 Executive Summary

Amazon Web Services (AWS) delivers a set of services that together form a reliable, scalable, and inexpensive computing platform "in the cloud". **VMS** is specialized in analyzing and optimizing SAP landscapes (DNA-level Benchmark for SAP) and owns the largest and most detailed database for SAP benchmark results worldwide.

In this paper, VMS AG presents its research into the Total Cost of Ownership (TCO) of SAP systems and provides in-depth views of costs involved.

The overall result is a Cloud Worthiness Index (CWI) of 59.

In order to derive this Amazon-specific CWI (for an explanation of the CWI calculation see appendix) VMS AG has compared the following three SAP solutions running on-premises (or outsourced) against running them on AWS:

1. A Typical ERP solution for 300 users running on-premises,
2. The same ERP solution for 300 users outsourced and managed by an authorized vendor, and
3. A SAP All-in-One system for 100 users running on-premises.

Using the SAP TCO Model and the VMS Benchmarkbase, that contains TCO data from over 2,600 measured SAP systems, it provides an overview of costs associated in running SAP environments when deployed on-premises (or outsourced) and the resulting savings when deployed on AWS cloud infrastructure. It carefully analyzes items that are affected by AWS and highlights savings in overall TCO and savings on items that are impacted by AWS.

The AWS-specific CWI (Cloud Worthiness Index) is an aggregation of following detail calculations:

Savings (5 Years)	vs. ERP (on premises)	vs. ERP (outsourcing)	vs. SAP All-in-One (on-premises)
% Savings in overall TCO	17%	15%	22%
% Savings on items that AWS has an impact on	62%	58%	69%

Major components that make up the overall TCO are software licensing costs, maintenance fees, and application operations (which includes incident and problem management), are not affected by AWS. The overall 5-year TCO savings for SAP systems running on AWS range between 15% and 22% over identical systems that are deployed on-premises or outsourced.

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Our research shows that if only those TCO components that are relevant to AWS are taken into account, such as infrastructure and operational costs, VMS calculates that AWS offers savings between 58% and 69%. AWS lowers platform costs and operations costs. You pay only for what you use. When using AWS, you turn infrastructure costs from being capital expenses (CAPEX) into variable operational costs (OPEX).

Amazon, a Fortune 500 company based in Seattle, Washington, is the global leader in e-commerce. Amazon Web Services LLC ("AWS"), an Amazon.com company, offers a completely new way to run virtually any business that uses technology. Since officially launched in 2006, AWS has enabled developers and hundreds of thousands of companies of all sizes across 190 countries easy access to AWS suite of infrastructure web services to build their businesses and run their applications in the cloud. Companies incur no up-front expenses or long-term commitments, turn capital expense into variable operating expense, pay only for what is used, add or shed resources quickly, free up scarce engineering resources from the undifferentiated heavy lifting of running their own infrastructure. AWS helps customers focus on work that truly differentiates their business, rather than worrying about the infrastructure. For more information, visit http://aws.amazon.com.

VMS is a service provider based in Heidelberg, Germany. Main service provided is the benchmarking of SAP systems, supported by the VMS Benchmarkbase™, which at this point contains the measured data of more than 2,600 SAP systems, making it the largest and most detailed SAP benchmark database worldwide. For more information, visit www.vms.net.

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2 Amazon Web Service (AWS)

AWS for SAP is based on:

- Amazon Elastic Compute Cloud (Amazon EC2), a web service that provides resizable compute capacity in the cloud.
- Amazon Elastic Block Store (EBS), which provides block level storage volumes for use with Amazon EC2 instances.
- Amazon Simple Storage Service (Amazon S3), which is used to store and retrieve any amount of data, at any time, from anywhere on the web.
- Amazon Virtual Private Cloud (Amazon VPC), which lets you provision a private, isolated section of the Amazon Web Services (AWS) cloud where you can launch AWS resources in a virtual network that you define and connect to your existing IT infrastructure using encrypted IPsec VPN.

AWS provides customers the flexibility to place SAP instances and store data within multiple geographic regions worldwide as well as across multiple Availability Zones within each region. Each Availability Zone is designed as an independent failure zone.

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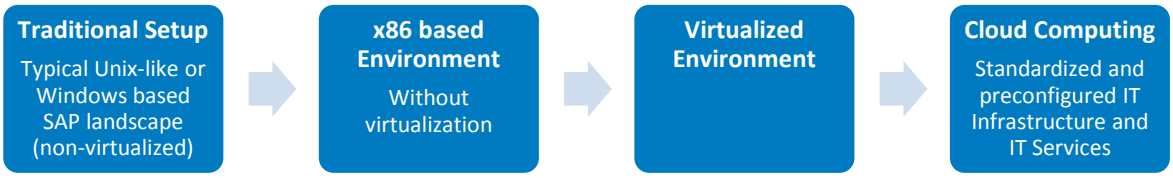
3 Methodology

This section outlines the methodology VMS used to perform the TCO analysis. The study's **background** (section 3.1) is discussed in detail and the **SAP TCO Model** – the basis of the TCO analysis – is introduced (section 0). An outline of the **reference groups** shows how the reference groups were derived that are later subject to separate cost analysis (section 3.3), followed by **Frequently Asked Questions** (section 3.4).

3.1 Background and Approach

The goal of this study is to investigate the benefits of the cloud computing architectures for SAP environments and understand the *existing* benefits (investments, ongoing costs and operations) and *expected* benefits (for variety of different projects). The focus is to compare TCO of SAP environments running in a more traditional setting with same system running on AWS cloud.



Stages from non-virtualized environments up to Cloud Computing

The basis for this comparison is the SAP TCO Model (section 3.2); the SAP TCO Model provides a multi-level hierarchy of cost categories. It covers all significant components of a SAP environment (hardware, software, and operations), and considers the complete lifecycle of SAP systems (plan, purchase, roll-out, operate, maintain, fix, change, and improve). By using the SAP TCO Model to calculate the total (and partial) costs of varying scenarios, it is possible to obtain a highly comparable cost overview. The overview allows for the comparison and identification of cost discrepancies in detail, as well as in the total costs.

Although AWS is around for 6 years, SAP based deployments on AWS are fairly new and hence the study is limited due to the novelty of the product.

VMS was able to extrapolate the required data from both the features of the product, as well as from the available data of thousands of measured systems in the VMS Benchmarkbase. The VMS Benchmarkbase contains data that compares more than 2,600 SAP environments, along with their respective costs. VMS analyzes best practices based on detailed measurements along with cost data from the VMS AdaptiveTCO workbench.

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3.2 SAP TCO Model

The basis of this study is the SAP TCO model. It covers the TCO of SAP software over its entire lifecycle. It is structured hierarchically, consisting of 3 levels originally (levels 1 and 2 are shown in the graphic below), each enabling a more detailed view on the subject. To better understand the impact of AWS, VMS provides an even greater level of detail where applicable (*section* 5). The drill-down helps readers to understand their flow of resources when running SAP. The study covers CAPEX (investments) and OPEX (operational costs) elements. The study is based on an environment over a lifecycle of 5 years.

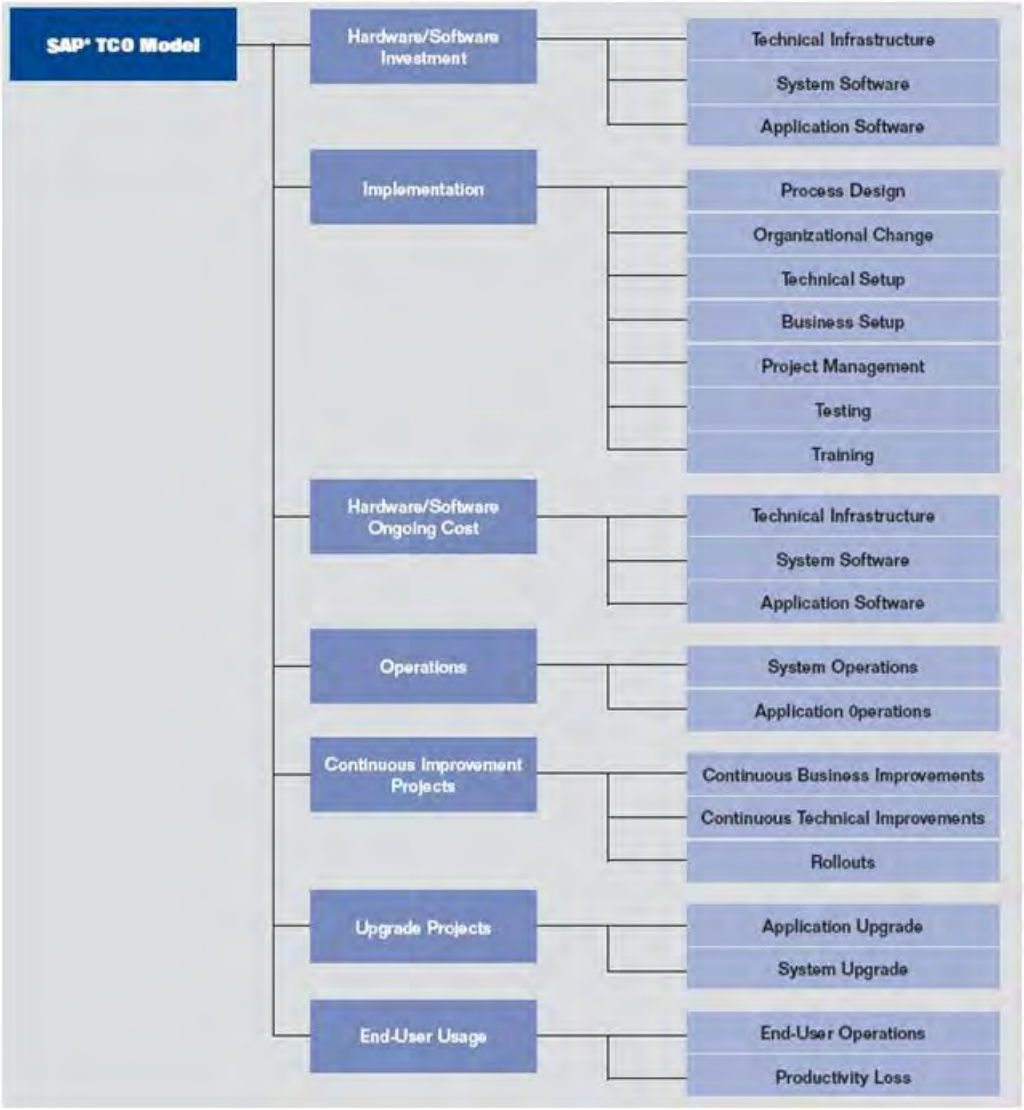

Table 3: SAP TCO Model (Level 1 and 2)

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Assumptions:

End-User usage was not considered in this study because the cost of workplace and business process operation is not in scope.

The End-User usage second-level category – productivity loss – makes ROI studies look good because even a small figure for loss per hour multiplied with a high number of hours multiplied with a high number of users will lead to savings that look significant. In reality these savings potential will rarely become effective. For that reason, VMS will not take these costs into account when highlighting TCO.

Cost for WAN traffic is excluded, but it plays a role when SAP is outsourced (externally or on AWS).

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3.3 Reference Groups

The reference groups for this study are very representative of SAP penetration of these industries. One exception is IT because IT providers are more likely customers of VMS for optimization of SAP.

Reference Group	Share
Manufacturing	32%
Utilities	16%
Finance	8%
Services	12%
IT	16%
HealthCare	10%
Others	6%

Table 5: Distribution according to the number of systems

3.3.1 Forming Profiles

Starting Point

Although SAP is standard software and the TCO model is universally valid, each single company and each SAP installation is unique.

Solution

For the purpose of the study, VMS defined three different profiles that represent typical SAP customer landscape components, provide criteria to explain the differences, and are based upon real data, commonly found.

The TCO model is an abstract model that groups different aspects of cost over the SAP project lifecycle. With the help of these three company profiles, readers may find themselves within the model more easily.

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3.3.2 Profiles for the TCO Study

	ERP (on-premises)	ERP (outsourcing)	SAP All-in-One (on-premises)
Revenue[1]	$ 300,000,000	$ 300,000,000	$ 75,000,000
Employees[1]	1,000	1,000	300
Users	300	300	100
Systems	ERP system line with development, quality, and production systems	ERP system line with development, quality, and production systems	SAP All-in-One (on premise) with ERP, BI and CRM functionality. 3-tier system line: development, QA, and production systems
Modules	FI/CO, PS, LO, MM, SD, and HR	FI/CO, PS, LO, MM, SD, and HR	ERP functionality: FI/CO, MM, SD with BI dashboards and CRM functionality: Lead-, Account-, Activity-, Opportunity,- and Order-Management
Database, P system only[2]	500 GB	500 GB	350 GB
SAPS, P system only[3]	3,000	3,000	1,000
SLA[4]	No	99.5%	No
Operation	Own IT (on-premises)	Outsourcing	Own IT (on-premises)

Table 6: Prototype Profiles

[1] Reference only. This can differ depending on the industry.
[2] Assumption: Q-systems need the same disk space as the P-systems.
[3] Amount of SAPS offered by AWS, the typical amount of SAPS for a system of this size is lower.
[4] Service Level Agreement: availability per month.

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3.4 FAQ – Highlights on some typical TCO related questions

3.4.1 What's In – What's Out

The SAP TCO model includes all elements necessary to run SAP in the enterprise but excludes end user equipment and WAN network elements to reach them.

The study also excludes initial business process (re)design efforts when implementing SAP for the first time. Those efforts are largely driven by the status and demand of an enterprise but not by the hardware, software, or infrastructure used.

The use of cloud computing, such as AWS, defines a change in landscape architecture. Such a change, especially in business processes, triggers the need for education of IT staff, a one-time effort. Since the steepness of the learning curve is very individual and depends on the individual IT team, it is not considered in this TCO model.

3.4.2 Pay Only for What You Need

With AWS, you can benefit from the economies of scale. You pay a very low rate for the compute capacity you consume. There is no minimum fee and no long-term contracts. Moving from the capital expenditure (CAPEX) model of an on-premises system to the operational expenditure (OPEX) model of the cloud means that you have operational expenses rather than expenditures of capital assets. So operating statements rather than balance sheet management is used in the calculation of TCO, and this change has a great impact. In addition to providing the flexibility to easily choose the number, size, and configuration of the compute instances you need for your application, AWS provides SAP customers two different purchasing models that give you the flexibility to optimize your costs.

- **On-Demand Instances** let you pay for compute capacity by the hour with no long-term commitments. This frees you from the costs and complexities of planning, purchasing, and maintaining hardware, and transforms what are commonly large fixed costs into much smaller variable costs. On-Demand Instances also remove the need to buy "safety net" capacity to handle periodic traffic spikes.
- **Reserved Instances** give you the option to make a low, one-time payment for each instance you want to reserve and in turn receive a significant discount on the hourly charge for that instance. There are three Reserved Instance types (Light, Medium, and Heavy Utilization Reserved Instances) that enable you to balance the amount you pay upfront with your effective hourly price.

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3.4.3 The Comparison Base

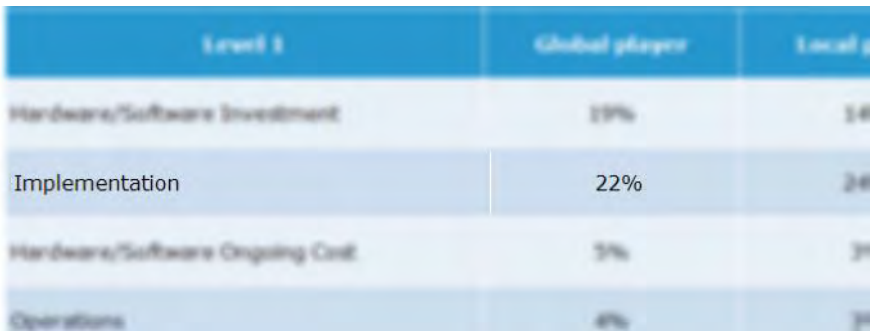
We compare AWS against typical scenarios of systems in use today, including various Unix, Linux, and Windows-based implementations with a variety of database products running on dedicated servers. The base for the comparison is provided by the VMS Benchmarkbase. The Benchmarkbase contains the real-life usage, quality, and cost data of more than 2,600 SAP environments. It covers a broad variety of industries and geographies and accurately reflects the current dissemination of SAP's products in use.

The distribution of the reference groups is presented on the following pages. The comparison group does not include any mainframe-based installations. From a CAPEX point of view this would lead to even more significant savings when a company switches from mainframe to cloud computing. VMS acknowledges this as a reasonable, albeit rare, step. The focus of this study, however, remains on mainstream elements and attempts to avoid special cases such as this.

3.4.4 Percentages

VMS shows savings as precise percentages (e.g., 22% savings on implementing SAP for a global player) rather than as a range (e.g., 15%-30%).

The VMS TCO model allows the calculation of typical savings for the specific defined profile, which VMS doesn't want to dilute by showing ranges. Of course a new AWS user might come up with slightly different percentages in the end because the real-world implementation will not be exactly identical to the prototyped profile.



Level 1	Global player	Local
Hardware/Software Investment	19%	14
Implementation	22%	24
Hardware/Software Ongoing Cost	5%	3
Operations	4%	3

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How to read the tables?

Within the details (section 5), the savings potential is shown on level 3. There are cost elements where AWS will save money (background light blue), but there are also elements AWS has no influence, e.g., SAP licenses (background light grey). On the bottom line, the consolidated savings are shown for each company profile.

SAP TCO Model			VMS	Weight	AWS triggered Savings		
Level 1	Level 2	Level 3	Details		ERP (on premise)	ERP (outsourcing)	SAP All-in-One
Hardware/ Software Investment	Technical Infrastructure	Computing Hardware	Application Server	W1%	AA%	BB%	CC%
		Computing Software	Operating System	W2%	-	-	-
Consolidated Level 1 Savings:					**XX %**	**YY%**	**ZZ%**

In this example, AWS will reduce investments in the area of Application Server, but not for Operating System. Each cost element has a different weight within its category. Therefore the consolidated savings: XX%, YY%, and ZZ%, are lower in comparison to Application Server related savings: AA%, BB%, and CC%.

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4 Savings by AWS

4.1 Level 1 Aggregation

Overall TCO savings of the SAP Application Lifecycle for the three scenarios is as shown below:

SAP TCO model		Savings by AWS in %		
Level 1	**Weight**	**ERP (on premise)**	**ERP (outsourcing)**	**SAP All-in-One**
Hardware/Software Investment	14%	15%	2%	29%
Implementation	7%	39%	36%	39%
Hardware/Software Ongoing Cost	13%	9%	19%	17%
Operations	39%	2%	1%	2%
Continuous Improvement Projects	13%	37%	35%	45%
Upgrade Projects	14%	38%	33%	45%
Consolidated		**17%**	**15%**	**22%**

Table 7: Level 1 Aggregation

As you can see, the major savings are within infrastructure investment and implementation. This is because, when you use the cloud, you don't need any capital investments except the license cost for SAP and the database. The second major area of savings is around projects. Here the advantage that AWS has is that capacity can be added or released on time.

Operations (application management and support) remain the biggest cost driver in SAP environments. More than 80% of today's IT costs are related to systems and application management, widely exceeding more obvious and directly measurable costs, such as infrastructure investments. AWS does not have a direct impact on application operations and hence the savings seem low. However, because they have a very high impact on TCO, the potential savings are huge.

On the following pages savings up to level 3 of the SAP TCO model will be detailed and combined with arguments that look at the AWS solution. Looking at different TCO elements, similar reasons for cost reduction will re-occur.

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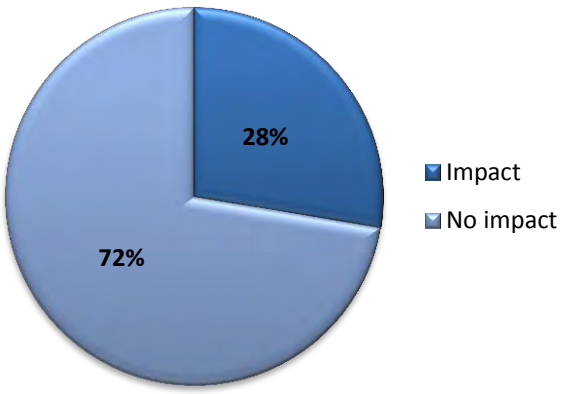
Taking a second view with only the elements that are relevant to AWS, the picture looks different:

EXTRACT		EXTRACT: AWS triggered savings		
Level 1 ***Only elements, where the operational model has an impact on***	**Weight**	**ERP (on premise)**	**ERP (outsourcing)**	**SAP All-in-One**
Hardware/Software Investment	6%	100%	100%	100%
Implementation	16%	63%	59%	63%
Hardware/Software Ongoing Cost	10%	56%	76%	59%
Operations	4%	70%	60%	58%
Continuous Improvement Projects	31%	58%	56%	65%
Upgrade Projects	34%	57%	52%	64%
Consolidated		**62%**	**58%**	**69%**

When considering only the items that are relevant to AWS, you can see significant savings over on-premises deployments.



Impact: a variety of different hardware investments; planning and setup of infrastructure; ongoing costs for hosting and operating servers and storage; implementation of test and training systems.

No impact: license cost and maintenance fee; business tasks and project management during implementation, upgrade or continuous improvement; incident and problem management, change management, process design.

The operational model impacts only 28% of the overall lifecycle costs. The biggest cost drivers are SAP licenses and Application Support (Incident and Problem Management).

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4.2 Level 2 Aggregation

SAP TCO Model			AWS triggered savings		
Level 1	Level 2	Weight	ERP (on premise)	ERP (outs.)	SAP All-in-One
Hardware/Software Investment	Technical Infrastructure	2%	100%	-	100%
	System Software	2%	13%	-	16%
	Application Software	10%	-	-	-
Implementation	Process Design	1%	45%	37%	45%
	Organizational Change	0%	-	-	-
	Technical Setup	2%	90%	88%	90%
	Business Setup	1%	-	-	-
	Project Management	1%	-	-	-
	Testing	1%	35%	35%	35%
	Training	1%	35%	35%	35%
Hardware/Software Ongoing Cost	Technical Infrastructure	2%	46%	73%	55%
	System Software	2%	14%	-	17%
	Application Software	9%	-	-	-
Operations	System Operations	5%	18%	15%	16%
	Application Operations	34%	-	-	-
Continuous Improvement Projects	Continuous Business Improvement	10%	31%	30%	42%
	Continuous Technical Improvement	1%	90%	90%	90%
	Rollouts	2%	40%	40%	40%
Upgrade Projects	Application Upgrade	11%	31%	30%	42%
	System Upgrade	3%	55%	55%	55%

Table 8: Level 2 Aggregation

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5 AWS Savings in Detail

5.1 Hardware/Software Investment

SAP TCO Model			VMS	Weight	AWS triggered savings		
Level 1	**Level 2**	**Level 3**	**Details**		**ERP (on premise)**	**ERP (outs.)**	**SAP All-in-One**
Hardware/ Software Investment	Technical Infrastructure	Computing Hardware	Application Server	2%	100%	-	100%
			Database Server	2%	100%	-	100%
			Storage	6%	100%	-	100%
			Backup Hardware	0%	100%	-	100%
		Network		1%	100%	-	100%
	System Software	Computing Software	Operating System	0%	100%	-	100%
			Database	12%	-	-	-
			Tools	1%	100%	100%	100%
			Backup Software	1%	100%	100%	100%
	Application Software	Licenses		75%	-	-	-
Consolidated Level 1 Savings:					**15%**	**2%**	**29%**

Table 9: Hardware/Software Investment

Where are the potential savings of between 2% and 29% in the Hardware/Software Investment category coming from?

This answer is very simple: When AWS is used there are no up-front costs, except for the SAP and database license. The server, storage, data center, and software tools are included in the monthly price of AWS. Therefore, the savings compared to on-premises solutions are high.

Since AWS is a type of outsourcing, the comparison with “traditional” outsourcing doesn’t show big effects.

Considering the TCO for AWS, we note that 87% of the implementation costs for AWS are independent of the operation mode. These costs are for the SAP license and database.

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Remarks:

- Archiving and printing are not common for small SAP installations. End-User Usage was not considered in this study because the cost of workplace and business process operation is not in scope.
- The network is a LAN; WAN is not considered in this study.

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5.2 Implementation

SAP TCO Model			VMS	Weight	AWS triggered savings		
Level 1	Level 2	Level 3	Details		ERP (on premise)	ERP (outs.)	SAP All-in-One
Implementation	Process Design	Planning of Infrastructure		4%	90%	87%	90%
		Blueprint/ Conceptual Design		5%	-	-	-
	Organizational Change	Change Management		3%	-	-	-
	Technical Setup	Installation, Technical Configuration, Technical Operation, Technical Conceptual Design		25%	90%	88%	90%
	Business Setup	All level 3 elements		22%	-	-	-
	Project Management	All level 3 elements		8%	-	-	-
	Testing	Testing		19%	35%	35%	35%
	Training	Training		14%			
Consolidated Level 1 Savings					**39%**	**36%**	**39%**

Table 10: Implementation

Process Design is limited here to the technical components (infrastructure and landscape blueprint). This model does not include business process such as the design and redesign efforts of the company when it starts to implement SAP.

Where are the potential savings of between 36% and 39% in the Implementation category coming from?

Using AWS, the technical implementation is already done. If you have your own IT, then your IT needs to complete the set ups. Even with outsourcing, you have to pay an installation fee, but usually the installation fee can be negotiated with the outsourcer. Here, VMS shows an average of reality and there are companies paying that fee. Additionally, there are costs for approving the technical design of the outsourcer, because even if the IT is outsourced, the corporate CIO is responsible for planning, blueprint, and conceptual design of the SAP infrastructure. Only the planning for the integration into the existing IT landscape is required.

The provisioning and management of SAP training and test systems can be simplified and accelerated by cloning and recovery functions.

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Surrounding systems of a SAP landscape (e.g., middleware and Add-Ons) can be hosted and operated on AWS as well.

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5.3 Hardware/Software Ongoing Costs

SAP TCO Model			VMS		AWS triggered savings		
Level 1	**Level 2**	**Level 3**	**Details**	**Weight**	**ERP (on premise)**	**ERP (outs.)**	**SAP All-in-One**
Hardware/ Software Ongoing Cost	Technical Infrastructure	Computing Hardware	Application Server	3%	52%	73%	55%
			Database Server	3%	52%	73%	55%
			Storage	13%	52%	73%	55%
			Backup Hardware	0%	56%	-	56%
		Network		1%	100%	100%	100%
	System SW	Computing SW	Operating System	0%	100%	100%	100%
			Database	11%	-	-	-
			Tools	1%	100%	100%	100%
			Backup Software	1%	100%	100%	100%
	Application Software	Maintenance Fees		68%	-	-	-
Consolidated Level 1 Savings					**9%**	**19%**	**17%**

Table 11: Hardware/Software Ongoing Costs

Where are the potential savings of between 9% and 19% in the Hardware/Software Ongoing Costs category coming from?

Here it is important to differentiate between on-premises and outsourcing. There are no savings compared to an on-premises solution, because with the monthly fee for AWS, the investments have to be paid. Savings mainly occur when compared to outsourcing.

But here, there is an effect similar to the one in the Investments category. When we consider TCO, most of the AWS costs are independent of the operation model (maintenance cost for the SAP license and database).

The flexibility of AWS in providing computing and storage resources prevents immediate additional investments due to typically slighter changes in hardware needs by individual systems. If needed, AWS offers easy scalability as it is possible to expand the capacity of the AWS infrastructure without re-arranging existing landscape elements.

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5.4 Operations

SAP TCO Model			VMS		AWS triggered savings		
Level 1	Level 2	Level 3	Details	Weight	ERP (on premise)	ERP (outs.)	SAP All-in-One
Operations	System Operations	System Monitoring	Storage, Server, OS	0%	55%	53%	23%
			Database	0%	-	-	-
			SAP Basis	1%	-	-	-
		System Administration	Storage, Server, OS	1%	100%	100%	100%
			Database	1%	-	-	-
			SAP Basis	2%	-	-	-
			Backup	1%	44%	20%	33%
			User Administration	2%	-	-	-
		System Problem Management	Storage, Server, OS	0%	55%	53%	23%
			Database	0%	-	-	-
			SAP Basis, Early Watch	1%	-	-	-
		Software Change Management	-	1%	-	-	-
		System Service Desk & Incident Mgt.	-	1%	-	-	-
		General/Administrative Costs	-	1%	-	-	-
Operations	Application Operations	Monitoring, Administration, Problem Mgt., Software Change Mgt., Service Desk, General Administration	-	88%	-	-	-
Consolidated Level 1 Savings					**2%**	**1%**	**2%**

Table 12: Operations

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Where are the potential savings of up to 2% in the Operations category coming from?

The biggest part of operations is Application Support (Incident & Problem Management), which mainly belongs to Application Operations. This part is independent of the operational model, so there are no savings. So the overall savings are low, between 0% and 2% due to the technical part.

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5.5 Continuous Improvement Projects

SAP TCO Model			VMS		AWS triggered savings		
Level 1	Level 2	Level 3	Details	Weight	ERP (on premise)	ERP (outs.)	SAP All-in-One
Continuous Improvement Projects	Continuous Business Improvement	Process Design		5%	-	-	-
		Organizational Changes		2%	-	-	-
		Technical Setup		19%	90%	90%	90%
		Business Setup		14%	-	-	-
		Interfaces		5%	-	-	-
		Project Management		9%	-	-	-
		Testing		14%	35%	35%	35%
		Training		9%			
	Continuous Technical Improvement	Continuous Technical Improvement		7%	90%	90%	90%
	Rollouts	Rollouts		15%	40%	40%	40%
Consolidated Level 1 Savings					**37%**	**35%**	**45%**

Table 13: Continuous Improvement Projects

Where are the potential savings of between 35% and 45% in the Continuous Improvement Projects category coming from?

Business effort will stay the same independent of running SAP on AWS, but the technical setup on AWS is much easier. When AWS is used, you just add another resource that you need. The simple expansion and scaling of SAP instances, in the case of higher demand due to an increasing number of users or new functions, is based on the ability to expand the capacity of AWS infrastructures. The AWS architecture is very flexible and extensible.

The provisioning and management of SAP training and test systems can be simplified and accelerated using cloning and recovery functions.

Fallback scenarios (return to original state in case of failure) are available right out of the box.

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5.6 Upgrade Projects

SAP TCO Model			VMS		AWS triggered savings		
Level 1	**Level 2**	**Level 3**	**Details**	**Weight**	**ERP (on premise)**	**ERP (outs.)**	**SAP All-in-One**
Upgrade Projects	Application Upgrade	Process Design		5%	-	-	-
		Organizational Changes		2%	-	-	-
		Technical Setup		19%	90%	90%	90%
		Business Setup		14%	-	-	-
		Interfaces		5%	-	-	-
		Project Management		9%	-	-	-
		Testing		14%	35%	35%	35%
		Training		9%			
	System Upgrade	System Upgrade		24%	55%	55%	55%
Consolidated Level 1 Savings					**38%**	**33%**	**45%**

Table 14: Upgrade Projects

Where are the potential savings of between 33% and 45% in the Upgrade Projects category coming from?

Business effort will stay the same independent of running SAP on AWS, but the technical setup is much easier on AWS. When AWS is used, you just add another resource that you need. The simple expansion and scaling of SAP instances, in the case of higher demand due to an increasing number of users or new functions, is based on the ability to expand the capacity of AWS infrastructures. The AWS architecture is very flexible and extensible.

The provisioning and management of SAP training and test systems can be simplified and accelerated using cloning and recovery functions.

Fallback scenarios (return to original state in case of failure) are available right out of the box.

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6 Appendix – Cloud Worthiness Index (CWI)

6.1 Introduction

Everybody "knows" that one of the key benefits of the cloud is its – perceived or real – economic value. But virtually nobody can actually quantify the economic value of the cloud in financial terms. Nobody knows how many dollars could be generated by leveraging the cloud for their SAP environment.

Thus VMS AG has decided to make the economic value of the cloud easily quantifiable and comparable. Based on our insights of more than 2,600 SAP systems we have derived the so-called Cloud Worthiness Index (CWI).

The CWI can be characterized as follows:

- True indicator of the economic value of cloud platforms.
- Easily understandable and comparable simple number between 1 and 10.
    - For Cloud Providers the cloud-platform-specific CWI ranges from 10 to 100.
- Expressing the customer-specific cost savings potential in Dollars/Euros.
    - For Cloud Providers it is the cloud-platform-specific cost savings potential.
- Leveraging best practices of more than 2,600 SAP systems.
- Applicable to all leading cloud platforms.
- Applicable to Private AND Public Cloud platforms.
- Applicable to SAP HANA.
- Independent of VMS.

We know that there is a public interest in quantifying the economic value of cloud platforms. Hence we have donated our vast benchmarking intelligence in the form of the CWI to the community of interested SAP customers and partners. In order to foster the usage of the CWI we would be more than happy to answer any questions regarding the CWI as fast as possible.

6.2 Customer-specific Cloud Worthiness Index

The primary usage of the CWI is for individual customers.

The formula as derived from our benchmarking business intelligence is:

$$\mathbf{CWI_{CU}} = \Delta_{\mathbf{T}} * \mathbf{max}(\Delta_{\mathbf{WO}}, \Delta_{\mathbf{W}}) * \mathbf{35}$$

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Definitions:

$\mathrm{CWI_{CU}} = \mathrm{Customer_Specific_CWI}$

$\Delta_{\mathrm{T}} = \frac{\mathrm{TC_{WO}} - \mathrm{BP_{W}}}{\mathrm{TC_{WO}}}$

$\Delta_{\mathrm{WO}} = \frac{\mathrm{BP_{WO}} - \mathrm{BP_{W}}}{\mathrm{BP_{WO}}}$

$\Delta_{\mathrm{W}} = \frac{\mathrm{TC_{WO}} - \mathrm{TC_{W}}}{\mathrm{TC_{WO}}}$

$\mathrm{TC_{WO}} = \mathrm{Customer_TCO_Without_Cloud}$

$\mathrm{TC_{W}} = \mathrm{Customer_TCO_With_Cloud}$

$\mathrm{BP_{WO}} = \mathrm{Best_Practice_TCO_Without_Cloud}$

$\mathrm{BP_{W}} = \mathrm{Best_Practice_TCO_With_Cloud}$

(Special cases handled separately.)

6.3 Cloud-Provider-specific Cloud Worthiness Index

The secondary usage of the CWI is for cloud platforms. The CWI for Cloud Providers is a special case of the customer-specific CWI.

The formula as derived from our benchmarking business intelligence is:

$$\mathbf{CWI_{CP}} = \left(\frac{\mathbf{BP_{WO}} - \mathbf{BP_{W}}}{\mathbf{BP_{WO}}}\right)^{\mathbf{2}} * \mathbf{900}$$

Definitions:

$\mathrm{CWI_{CP}} = \mathrm{Cloud_Provider_Specific_CWI}$

$\mathrm{BP_{WO}} = \mathrm{Best_Practice_TCO_Without_Cloud}$

$\mathrm{BP_{W}} = \mathrm{Best_Practice_TCO_With_Cloud}$

(Special cases handled separately.)

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