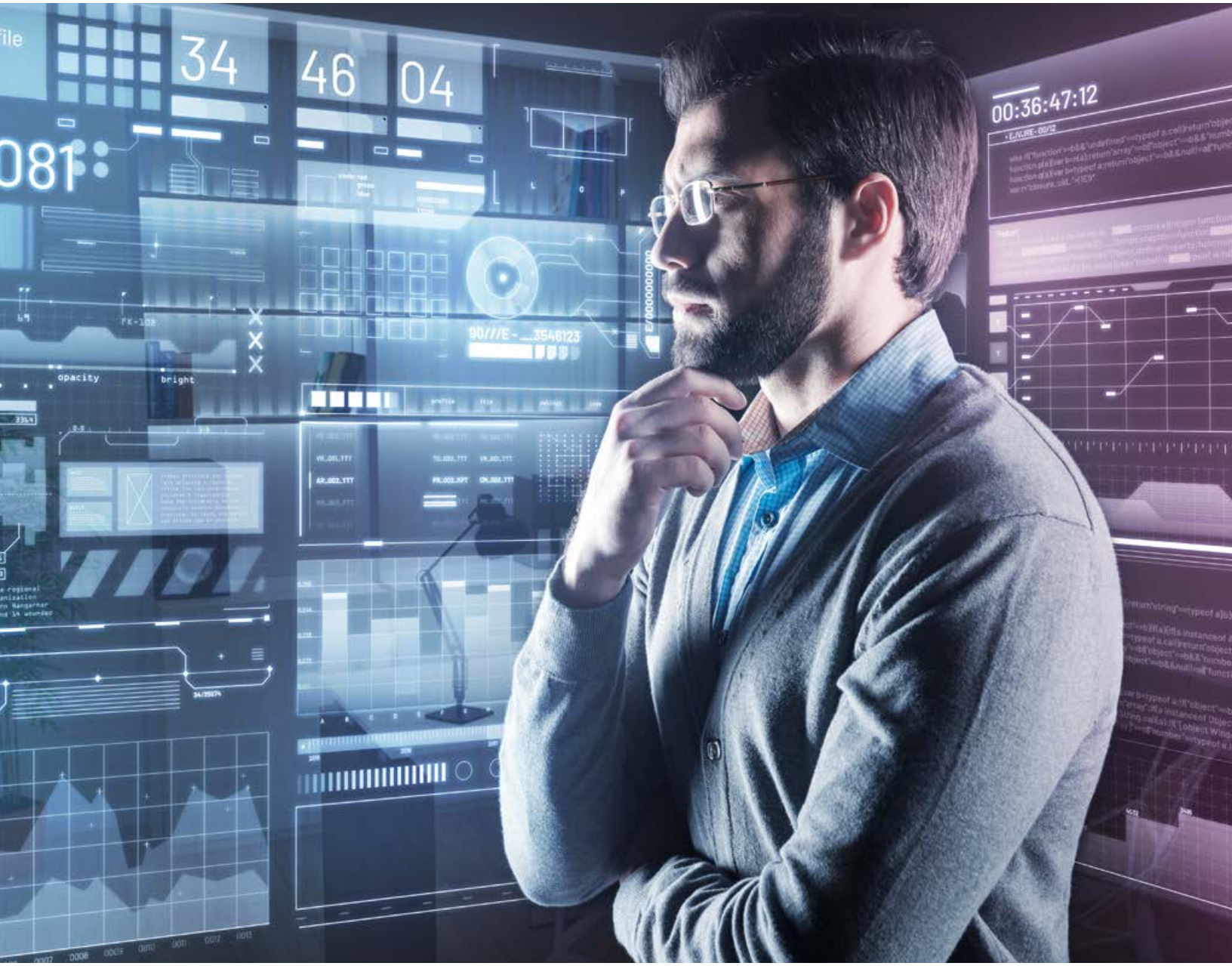
oXya

A Hitachi Group Company



Pricing Considerations of Deploying & Running SAP ERP on Public Clouds

Contents

Your Public Cloud Strategy	3
Background: Pricing of Public vs. Private Cloud	4
First Challenge: On-Demand or Reserved Instances?	5
Second Challenge: What Do You Need Today?	6
Solving these Challenges – Implementation Stage	7
Balancing Reserved vs. On-Demand Instances Over Time	8
Comparing Private vs. Public Cloud Costs	9
Third Challenge: Cost of Data Transfer	11
Public Cloud Benefits That Save Money	13
Next Steps Towards Your Own Cloud Strategy	15



Your Public Cloud Strategy

A recurring discussion in the industry is whether public cloud is more cost effective than private cloud, or vice versa. There is no argument that the public cloud provides great agility, enabling you to add and remove resources at will. It is also known that the public cloud is sold in an Opex model, saving the Capex investments that are needed for a private cloud, whether on-premise or off. What has not been so clear is the likely effect of public cloud on your total cost of ownership.

Will the public cloud save you money, or cost you more?

There is no definite answer to this question as it depends on multiple variables. We'll address that later in this white paper. But as for pricing considerations – there are some clear aspects you should be aware of, and which this white paper covers.

Who are we, and what led us to write this white paper?

oXya is a Hitachi Group Company. We specialize in the technical side of SAP and provide managed services for mission-critical SAP systems. We run SAP and other business-critical workloads for hundreds of large and mid-size enterprises, on whichever platform each of our customers prefers: Private Cloud, Community Cloud, or a variety of Public Clouds.

We work closely with the three largest public cloud providers – Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP). We have multiple customers running SAP and other critical workloads on each of these public clouds. oXya also serves as an objective and independent consultant, helping our customers choose the best platform for them, based on their specific business needs, SLAs, and cost constraints. We do not have a preference for one cloud or another (note that our public cloud partners are listed in alphabetical order!).

Many of our customers use a hybrid cloud, combining private and public clouds to achieve best SLAs and price. We often find this approach to offer the greatest benefits for our customers. This is a point to which we will return later.

This white paper is based on oXya's real-world experience, accumulated from deploying and managing multiple SAP systems on all of the three leading public clouds. We have seen the pitfalls and we know where companies may end up spending significant amounts of money that they were not prepared for. That is why we decided to share this knowledge and our insights.

There are two lessons which top all others when you want to optimize the costs of running your SAP systems on a public cloud.

1. Work with a specialized technical partner who knows the different public clouds inside-out and the differences between them. Whatever partner you choose, they should already have experience of working on all the public clouds. Only then will they be able to give you well-founded advice and help you choose the best cloud solution for YOUR needs.
2. Analyze your needs thoroughly and make a detailed plan of how you are going to run your SAP systems (Production, Dev, QA, etc.). It is *possible* to save money, compared to running on a private cloud, but you will need a technical partner with plenty of experience on different public cloud platforms if you are going to achieve that goal.



Background: Pricing of Public vs. Private Cloud

Consider our traditional procurement models, which are relevant for regular SAP systems and other workloads running on-premise or on a private cloud. Because hardware (servers, storage, etc.) is expensive, you will want to make sure it is used for at least three years, perhaps five. This means that it is not enough to buy the hardware that meets your present needs. You must estimate your likely business growth and buy hardware that will meet your future needs in three- or five-years' time.

Of course, there are some exceptions to this rule. It is easy to buy more disks when you need them, expanding your system incrementally, but other components, like network equipment, must be purchased in advance.

Following the traditional procurement model, you will typically buy more resources than you presently need (sometimes significantly more). This means that today, you have more resources than necessary to implement and run what you need. You cannot then cut costs by reducing resources that you have already committed to.

Public cloud is different. One of its main selling points is agility – the ability to scale up and down instantaneously, according to current need. You don't need to follow the traditional procurement model anymore. You can acquire more resources only when you need them.

If you treat public cloud like a private cloud, it will cost you dearly. If you buy more resources than you need at this moment, you will end up paying significantly more for your public cloud than for a private cloud alternative. If you want to save money on the public cloud, you must think differently.





First Challenge: On-Demand or Reserved Instances?

Public cloud is a business that wants to make money. Public cloud providers (AWS, Azure, or Google Cloud) have to provide huge quantities of resources if they are going to meet the needs of all their customers. Flexibility for the customer means uncertainty for the provider, who needs to balance the risk of having resources standing idle against the risk of not being able to meet customer demand. This means that if you, the customer, want to get the best prices, then you will probably be asked to commit to them for a significant period of time (typically for few years). These are normally called Reserved instances, or sometimes Committed instances.

There is little to distinguish a Reserved instance from resources on a private cloud. If you want to get good pricing on the public cloud, you typically need to project several years into the future, just as you do for a private cloud. The advantage of being on the public cloud is that you can then buy more resources (upscale) as you need them.

Upscaling works differently between public clouds: one cloud allows you to upscale from the present point until the end of the original committed time, while another determines that if you upscale your Reserved instances, you must restart your contract for “n” years (where “n” equals the original number of years of contract), from that point at which the upscaling was performed.

Downscaling of Reserved instances is also treated differently by different public clouds. One may not allow downscaling without paying some type of penalty, while another may be more flexible and allow you to downscale, even for your Reserved instances.

Even if you make a long-term commitment to Reserved instances, the public cloud will still provide you with agility at the margin, enabling you to bring resources up and down instantaneously according to your needs. Yet you will pay significantly more for these On-Demand or Pay-As-You-Go instances. On-Demand instances cost the regular, list price, with no discount. To achieve customers long-term commitments, the public cloud significantly discounts the cost of Reserved instances. Typically, if your system is up-and-running 24/7, then the cost of an On-Demand instance may be three or four times than an equivalent Reserved Instance!

This presents challenges for the way that you manage your public cloud infrastructure. Which type of instances should you use and when? We will help you to answer these questions later on.



Second Challenge: What Do You Need *Today*?

Estimating the resources that you need *today* may not be quite as simple as you might think. There are several sub-challenges here, that we know well through oXya's real-life experience with many customers, who run their SAP systems on different public cloud platforms. Each of the three leading public clouds present different challenges in this respect; and some of these sub-challenges also apply to the design of a private cloud.

First sub-challenge: you need to be very precise in your design. If you made a mistake with your initial sizing (for example, you overestimate the number of resources than you will need) and you have committed to Reserved instances, then you may be stuck with these extra resources and will find that you are paying too much.

Second sub-challenge: exact sizing is not always possible until you have actually run your new landscape for a while. The way that the new design will behave is not completely predictable – and this unpredictability will be exacerbated if you are also right-sizing your data or upgrading your databases or SAP solutions.

Third sub-challenge: for some newer SAP technologies, and especially those related to retail and on-line activity (like SAP CAR), the challenge of sizing in advance is compounded by the difficulty of predicting demand. We have seen cases in which customer traffic (i.e. demand) turned out to be many times higher than what had been predicted, so that the resources needed were also many times the initial estimate. Although this meant that costs to the customer were many times higher than the initial estimate, the good news is that since this is a public cloud, significant upscale is quick and easy. The customer would have had the same problem on a private cloud but it would have been harder to fix.

"It is possible to save money (using public cloud), but you must have a clear and accurate plan."



Solving these Challenges – Implementation Stage

SAP customers should understand that it is not possible to fully solve all of these challenges. It is not possible to guarantee that the project will end exactly on budget. Customers' functional scope often evolves during the project, it happens each and every time and affects the architecture. Hence, while the implementation stage might have a set budget, you cannot and will not know how much exactly it would cost in advance. You should always be ready for surprises and higher costs.

For this reason, oXya always uses On-Demand instances during an implementation stage. These give our customers the flexibility to make adjustments during the project. Yet there is a downside too, because On-Demand instances are far more expensive to use.

We recommend to oXya customers that they continue using On-Demand instances for their Production systems for a few months after Go-Live. The exact timeframe is based on business process load: we recommend waiting until at least one full load has gone through the new architecture. For some customers this translates as a single month; others may have to wait few months. Only when both oXya and customer are confident that no more changes are needed to the architecture do we recommend switching to Reserved instances.

Of course, the final decision on when to switch from On-Demand to Reserved instances is always made by the customer. oXya can only advise.

The challenge is that using On-Demand instances while you run SAP Production for the first time costs a lot of money, which some SAP customers may not have prepared for.

"Running HANA on a public cloud is *typically* more expensive than running HANA on a private cloud. This is true for oXya and our customers."

Balancing Reserved vs. On-Demand Instances Over Time

oXya's approach is designed to answer two needs: (1) deliver the SLAs that a specific customer asked for; and (2) do so at the best possible price.

To achieve these two goals, we look at each SAP system separately and analyze its requirements precisely. It is important to note that while all SAP customers need their Production system to run 24/7, there can be significant differences between customers when it comes to their other systems.

An SAP **Production environment** must be up 24/7 after go-live and everything must be done to avoid unplanned downtime. At some point of time after go-live, when both customer and SAP technical consultants are confident that there will be no further changes to the architecture, we recommend moving the Production system to a Reserved instance. Production systems always justify Reserved instances.

It is important to note that while the Production environment must be up 24/7 after go-live, this is not the case for **project environments**. These can normally be closed down during nights, weekends and holidays to save money.

Typically, all **other SAP environments**, including DEV, QA, Pre-Production, Training, etc., will depend on specific customer's needs. At first, some customers think that you can save money by running certain systems using On-Demand instances, and shutting them during nights and weekends. The perception is that you will save costs this way, compared to using Reserved instances that will be up 24/7. The reality is that due to cost of On-Demand instances being three to four times as expensive as Reserved instances, it's not enough to just take them down during nights and weekends in order to make up for the price difference. Moreover, many customers have teams in different time zones, hence certain systems (development and quality, for example) must be available 24/7.

Many customers will choose to run other **satellite environments** (such as sandboxes) using On-Demand instances because they can be shut down for significant time periods. Training environments may be used for only few weeks every year; in such case, there is certainly no reason to run on Reserved instances.

Actual usage differs between customers, so it is important to understand a specific customer's needs.

Important: Running medium-to-large HANA workloads on the public cloud can be very expensive, even when using Reserved instances. If you run a HANA database, then this is one case where it's worth comparing costs to a private cloud, as the private cloud may be more cost-efficient (as of Summer of 2019, when this white paper is published). We'll expand on this later on.

The bottom line is that public cloud does not necessarily save you money and may end up being more expensive. You need to be clear about what your needs are, how you are implementing SAP and other workloads, and how you will balance On-Demand and Reserved systems. It is possible to save money, but you must have a clear and accurate plan. To achieve that, you will need an expert partner to help you analyze your needs, make these implementation decisions, and save you a lot of money as a result.



Comparing Private vs. Public Cloud Costs

Many customers ask us to compare the costs of running SAP on a private cloud and on a public cloud. It's easy to answer this question on a case-by-case basis, when evaluating these two solutions for the needs of a specific customer. Unfortunately, there is no general answer, as it depends on the needs of the specific customer.

A simplistic, theoretical view might suggest that public cloud should *always* be more cost-effective than private cloud. Let us assume that the cost of an environment is $1,000, and that it is expected to grow by a steady 10% per year (regular growth, not exponential). We also assume that the cost per "unit" of hardware capacity is identical on both private and public clouds (it's not).

Public cloud cost, using this example: $1,100 for the 1st year (based on load at the end of the year), plus $1,200 for the 2nd year, plus $1,300 for the 3rd year – or a total of $3,600 for all three years.

With the private cloud, the investment made up-front needs to cover the next 3 years. Assuming that the cost of resources is the same on public and private cloud, the cost of an equivalent private cloud would be 3 times $1,300, or $3,900. A quick calculation shows that moving from a private cloud costing $3,900 to a public cloud costing $3,600 saved us ~ 8%.

Although public cloud can indeed achieve this level of savings (or even more), this model cannot be relied on because:

1. Even with a private cloud, you don't buy at present exactly what you'll need 3 years into the future – you can add some components later on, as already covered above.
2. Public cloud prices are based on Reserved instances, meaning long-term commitment – but if a customer needs to run for a time using On-Demand instances, then the costs of public cloud will be higher.
3. This model ignores additional costs you have for a private cloud, such as paying for real estate (the site itself, for hosting), electricity, manpower, and more.

And there are additional issues.

Hence, it is impossible to generally compare costs between private and public clouds, without knowing the exact customer needs. Still, here are two rules of thumb to help you with pricing decisions.

The first rule has to do with balancing between Reserved and On-Demand systems. From our experience with multiple customers running on several public clouds, when you have many systems running 24/7 or close to it, the best option is to commit and choose Reserved instances for them,

in order to get the biggest discount. If you try to have On-Demand systems and stop/start them all the time, you'll most likely end up paying more.

The second rule of thumb has to do with HANA systems, which we mentioned earlier. At present (Summer 2019), running HANA on a public cloud is *typically* more expensive than running HANA on a private cloud; and the bigger the HANA system is, the more cost-effective it is to run it on a private cloud (not looking at all other factors, like agility). While regular non-HANA SAP systems are typically more cost-effective to run on the public cloud, this is not yet the case for HANA.

The reason is that HANA often requires hundreds of CPUs and terabytes of memory. The cost of such a combination is significantly more expensive on the public cloud compared to the cost you can get in a private cloud architecture (at least in a private cloud architecture run by oXya). Hence, if you'd like to leverage the public cloud's agility to run your HANA systems, it may be more expensive than on a private cloud.

Please note that the "HANA rule" is true for oXya and our customers, based on oXya being a Hitachi Group company, and purchasing Hitachi hardware with an advantageous discount. This rule may not apply to other providers.

Hardware cost has huge impact

When comparing between costs of a private cloud and a public cloud, there are two variables that will influence the answer beyond all others: the costs of hardware and hosting.

Hardware cost. Comparing between different public clouds for given requirements is one thing; however, when comparing with a private cloud offering, it makes a huge difference to know from whom you're purchasing the hardware.

Hosting cost. You need to place your hardware somewhere, whether your on-premise data center or renting space at an external data center. You will also need to pay for a redundant network connection to that hardware, and there are additional potential costs. These costs can vary greatly, based on several variables. With a public cloud, these costs are already included.

The above hardware and hosting variables are just two that show why it's very challenging to categorically say which option – public cloud or private cloud – is lower cost.





Third Challenge: Cost of Data Transfer

Many customers are unaware of this subject. They think that they only pay the public cloud provider for instances – Reserved or On-Demand. So, they are surprised when they get bills (and often high ones) for data transfer. What exactly is data transfer and how should its cost be minimized?

Let's begin with the basic rule, which applies to the three public cloud platforms on which oXya runs SAP systems for its customers – AWS, Azure, and Google Cloud – as well as additional public clouds:

Uploaded data: There is no cost when you upload data to the public cloud. You can upload as much as you want.

Downloaded data: The public cloud charges for all data that you download from your systems that are hosted on the public cloud. Your monthly data transfer cost depends on the amount of data that you've downloaded during the month. If you didn't carefully plan your architecture to account for these data transfer costs, they can be very painful to your budget.

Data transfer inside the public cloud: This depends on the location at which your data is hosted; after all, a public cloud is merely a collection of data centers, located in various regions around the world. Typically, if the data transfer occurs between systems in the same data center, then there is no cost for transferring data between various systems. However, transferring data between data centers within the same public cloud can often incur charges. If you want to predict these charges, you will need to be familiar with the public cloud you are using.

Being a prudent SAP customer, your goal – and typically this is done with an expert technical consultant – is to carefully analyze your data transfer needs, and account for them when designing your overall SAP architecture. While there's no way to completely avoid data transfer costs, a good technical SAP consultant can help you design your architecture so that these costs are reduced to the minimum.

Here's an example to explain how it works, using the SAP BW system. SAP BW is a widely popular module in the SAP market, used to build a company warehouse.

SAP BW generates a lot of data transfer by ingesting data from different sources. Customers generally integrate their ECC data within the BW system, to drive their business intelligence. If you consider implementing some BW source-systems on a public cloud, you would need to retrieve the information from the public cloud and pay high data transfer costs.

The lesson is that you have to know in advance, how you will use each system. That will determine what to put on the public cloud and what to keep on-premise.

You should try to keep systems that generate a lot of data exchange between them in the same location – either public or private – to reduce the networking costs.

Data transfer fees can significantly increase your overall costs. This is why, of all of oXya'a customers that have implemented a public cloud solution, hardly any are running their SAP systems solely on public cloud. Rather, they are running SAP on a mixture of public and private clouds. If you have the expertise to orchestrate your SAP systems across multiple clouds, we think Hybrid cloud is the best solution for SAP customers who want to achieve great performance, meet their SLAs, AND optimize their costs.





Public Cloud Benefits That Save Money

1. Increased Automation

Automation, including DevOps, generates significant benefits for a technical partner who manages SAP systems for their customers, as well as for the customers themselves. Automation can help to reduce the risks and errors involved in performing repetitive and recurring tasks. This brings costs savings in management of the SAP systems, which a technical partner can pass onto its customers.

oXya is using automation tools, which are not limited to any specific public cloud. These tools can and are also used for hybrid cloud solutions, and also help to eliminate additional costs if/when moving a customer's environment between clouds.

2. Financial Reporting

Public cloud providers – AWS, Azure, Google Cloud, and others – provide customers with extremely detailed financial reporting. These include all of the smallest details, enabling oXya and our customers to get an extremely accurate view on each customer's costs.

Remember – with the public cloud, unlike a private cloud, you have the flexibility to change things along the way to achieve financial benefits. Given the right level of analysis, the monthly report from the public cloud can be used to find "quick wins" – either areas for improvement, or things that are working well that can be preserved and replicated.

3. Disaster Recovery on Public Cloud

Your Disaster Recovery (DR) architecture is one area where you can save a lot of money with a public cloud. This is regardless of whether your Production system is running on-premise, on a private cloud, or on a public cloud.

A traditional DR plan requires you to have a remote site with an exact (or near exact) duplicate of your hardware, to which you can failover if your primary location becomes unusable. This means paying for real estate (the site itself), a set of duplicate hardware systems that just stand by in case of a disaster, and probably additional costs such as electricity, manpower, etc.

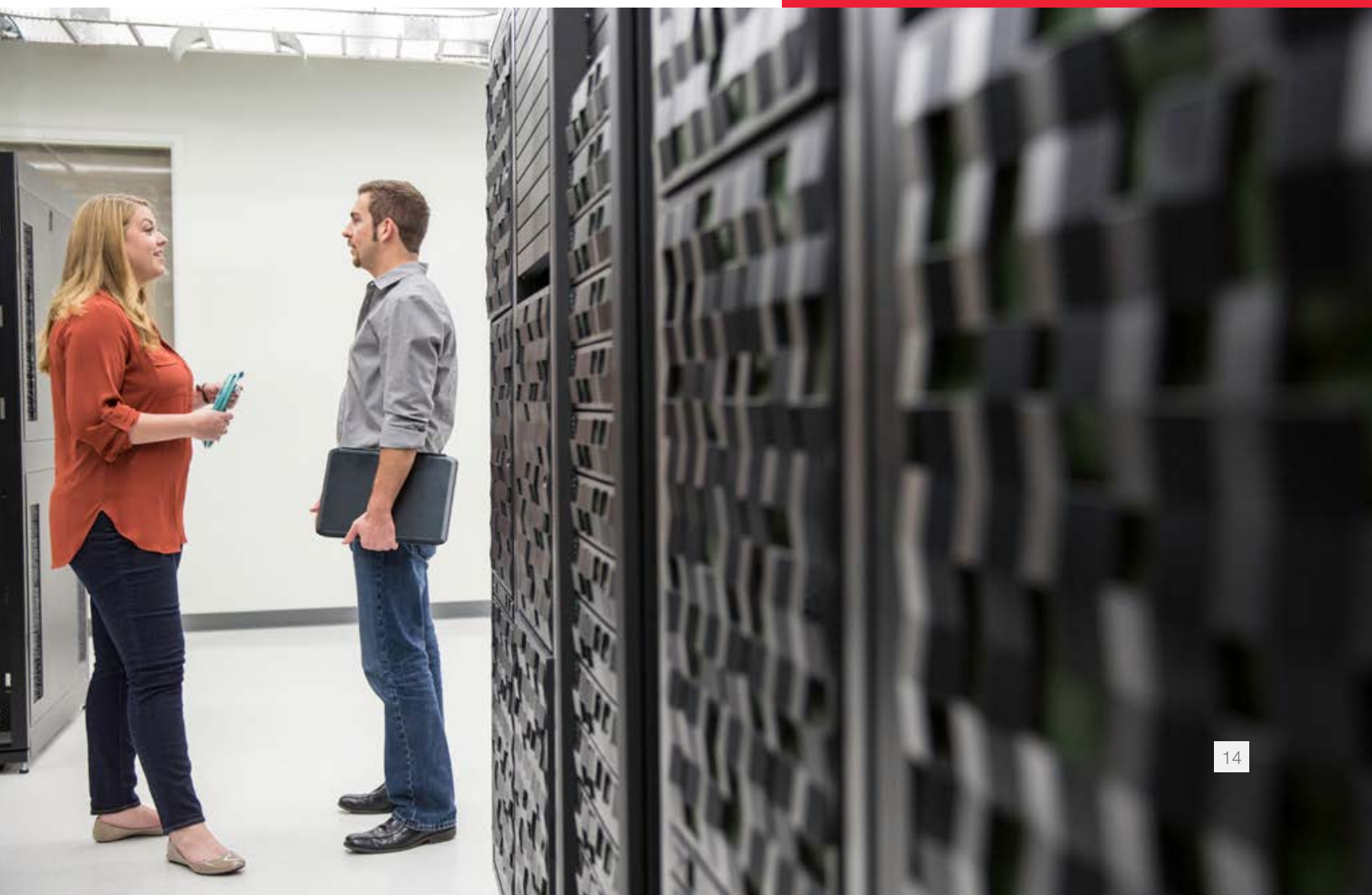
There is another way to do DR, which many customers already leverage – using the public cloud. All you need is a very small instance on the public cloud. If a disaster happens, you bump it up within minutes by adding resources on the fly, and move your activity to what can quickly become a full-blown DR instance. Only then will you pay for the large size of the instance.

Here is an example from a real oXya customer, who runs a 4TB in-memory HANA database on-premise. Their DR site, running on a public cloud, only uses ~100MB memory, the rest of their data being persisted on low-cost disk. Both HANA systems are

fully synchronized – the on-premise Production site and the DR site on the public cloud – but the size of the compute resources used on the DR site is significantly smaller than on the Production site. Once we need to activate the DR site, we ask the public cloud to allocate 4TB of memory as we failover to the DR site. This entire process takes just a few minutes. This model is already achieving significant cost savings for oXya customers.

You may wonder what effect this model has on the Recovery Time Objective (RTO) and the Recovery Point Objective (RPO). RTO is very short, since the entire process of bumping up the DR instance to full size and moving to the DR site takes just a few minutes. As for RPO, it is determined principally by different customer needs, and is no different than it would have been for an on-premise DR site.

"Hybrid cloud is the best solution for SAP customers who want to achieve great performance, meet their SLAs, AND optimize their costs."



Next Steps Towards Your Own Cloud Strategy

The public cloud has great benefits with regards to running SAP systems. We cover these, and some Lessons Learned, in a separate white paper, *"Lessons Learned & Best Practices from Running SAP ERP on Public Clouds: AWS, Azure, Google Cloud"*. You can get this white paper at oXya.Cloud/Lessons.

An additional white paper on the subject of deploying and running SAP systems on different public clouds covers *"Security & Network Considerations for Deploying & Running SAP ERP on a Public Cloud"*, which can be found at oXya.Cloud/Security (if you have issues with the links, please send an email to whitepapers@oxya.com and let us know which white paper you're looking for).

Still, while the public cloud has great benefits, aprudent SAP customer should also be aware thatpublic cloud behaves differently with regards to pricing, compared to other deployments you may be familiar with.

This white paper gives a high-level overview of some pricing aspects you should be aware of when considering whether you should move your SAP environment (all of it or part) to the public cloud. It is by no means a full nor complete coverage of all pricing aspects of the public cloud – this is impossible, since each SAP system is unique, as are each of the 3 public clouds covered in this white paper – AWS, Azure, and Google Cloud.

Deploying and running SAP ERP successfully on a public cloud requires experience and expertise. This is a project for which you'll want to leverage the help of the best technical SAP partner you can find, rather than go at it by yourself. Mistakes can be costly, both for the IT budget and in terms of impacts on the business.

If you wish to discuss your needs and plans with us, please send us an email to future@oxya.com.

oXya, A Hitachi Group Company

Corporate Headquarters
21 rue Camille Desmoulins
92130 Issy-les-Moulineaux, France
www.oXya.com

Americas Headquarters
15 Exchange Place
Jersey City, NJ 07302 USA
info-us@oxya.com | +1 201 604 5305

APAC Headquarters
19th Floor, HuiYin Building
758 West Nanjing Road, Jing'An District
Shanghai, 200041, China | +86 (0)21 61 20 38 21

oXya is a trademark or registered trademark of oXya, a Hitachi Group company. HITACHI is a trademark or registered trademark of Hitachi, Ltd.
All other product and service names mentioned are the trademarks or registered trademarks of their respective companies.

July 2019