oXya

A Hitachi Group Company



Lessons Learned & Best Practices from Running SAP ERP on Public Clouds: AWS, Azure, Google Cloud

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Introduction: Public Clouds and oXya

oXya is a Hitachi Group Company – an independent IT services partner that provides managed cloud services for mission-critical systems. We run SAP and other business-critical workloads for hundreds of large and mid-size enterprises around the world. We also provide managed services on the customer's platform of choice: Private Cloud, Community Cloud, and a variety of Public Clouds. In addition to managing the application layer, we manage the full stack of cloud/platform, including hardware, operating systems, network, security, etc.

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

Many oXya customers leverage multiple clouds; for example, a Hybrid Cloud combining the customer's private cloud and a public cloud for additional workloads. oXya specializes in Cloud Orchestration, to provide customers with a seamless experience across all clouds, to achieve best performance and meet SLAs and costs.

This white paper is the outcome of a collaborative effort, sharing the knowledge of multiple oXya teams and experts that are managing oXya customers across the globe.





Lesson #1: Significant Reduction in Time to Value

Let's take a typical case of upgrading SAP in a standard data center. Whether it's your on- or off-premise data center, the process is similar.

First, you need to order all the relevant hardware. In a traditional data center, we manage a complex setup composed of racks of servers, storage devices, multiple layers of switches, routers, load balancers, firewall devices, and more. On average, it takes 4-6 weeks just to get the hardware servers fully deployed.

In addition to the complex array of hardware, in a traditional data center you must also have a more in-depth approach to security and network, as the options you can deploy are endless. The security and network options in a public cloud are more limited, yet these still have to be defined and configured; they are not handled by the public cloud, but by the customer. We have a separate white paper on the Security & Network Considerations for Deploying & Running SAP ERP on a Public Cloud.

Once the hardware has been deployed and presented to our Delivery teams, the deployment of our best practices comes into play with the creation of instances for SAP and other business critical environments. With recent advances in our delivery automation, our teams can deploy massive client-ready landscapes within weeks.

In contrast, a public cloud platform immediately hands over the keys to our delivery teams. It already has all the hardware, and its networking infrastructure is built around a Software-Defined Networking model (SDN). Also, the Public Cloud handles the low-level details of network provisioning and hardware provisioning. This model removes much of the aforementioned maintenance and managerial overhead, so we can more rapidly customize and scale services, to enable a customer to deploy and scale much quicker.

What if you want to execute fast in a traditional data center model? Well, that's very challenging, as you have to wait for the hardware. It is much simpler on a public cloud, where the 'hardware wait period' is eliminated.





Lesson #2: Resources Availability

In the previous lesson, we wrote that the public cloud has all the resources that you need, at any point in time. This is true in general, yet the devil is in the detail. While the public cloud provider may have the resources needed, they may not be in the specific region that you need, since resources are not infinite in each region.

Each public cloud is comprised of multiple data centers located around the world and divided into regions. Sometimes a region can be a specific country, or even a state (or several states) within a large country; and sometimes a region will be multiple countries in a specific area on the globe. Regions are defined by each public cloud; typically there is at least one data center within each region.

The challenge is that each data center has a certain capacity. That capacity may be huge but it is not infinite and it ends at some point. If you need a large number of resources in a specific region (say for a large HANA instance, which requires lots of resources and therefore frequently surfaces this issue), it's quite possible that the public cloud provider will not have resources in the region you need, at the time you need them.

The above is not a theoretical scenario; it has happened to us frequently with different customers, on different public clouds, and in different countries. In each case we were told that we could either get the resources immediately yet in a different region (i.e. in a different country); or that we could wait for 2-3 weeks until these resources become available in the region of our original choice.

Of course, changing a region can have a huge impact on the technical side (IP addressing, etc.), on the legal side (when the data must reside within a specific country), and on pricing (regional data transfer charges). Hence, changing the region in order to get resources is often not a viable solution.

In a different white paper, we provide a popular way to save considerable costs for a Disaster Recovery site by using the public cloud for DR. That DR mechanism needs just a small HANA instance (~ 100GB), which has to scale up (to 1TB, or 2TB, or even 4TB) in case of failover. This solution must be properly designed and planned to ensure that resources are available when needed. If done correctly, this solution brings great benefits. However, if such a failover solution is not orchestrated correctly, you have no guarantee the required resources can be assigned when needed. For more information about this solution, lookup the white paper Pricing Considerations of Deploying & Running SAP ERP on Public Clouds.

Lesson #3: Invest Time in Proper Architecture

The allure of public cloud is that you supposedly shorten time to value (and considerably so). You can setup systems in minutes rather than days, weeks, or months. However, this does not preclude the requirement to invest time in performing proper architecture design before jumping in. If you don't invest the time to properly architect your solution, it will cost you dearly downstream.

Often, especially among large organizations, oXya bridges between multiple separate and dispersed teams – one for security, another for storage, a third for network, a fourth for architecture, etc. Often these teams are located in different time zones; and sometimes these groups cannot put a comprehensive solution by themselves. This is where oXya comes in. We take over the big picture, connect and integrate with each of these groups, and put together the "big picture" implementation. This takes time and energy upfront, prior to implementation, and it's done to ensure that the implementation goes smoothly. If you don't perform this step correctly – changes done later can take a significant amount of time.

Another important point – if the customer started implementing the architecture by themselves, and made mistakes in the process, it typically takes longer to undo and fix these mistakes than it would have taken oXya to plan the entire thing from point zero. We've had such cases, which resulted in having to postpone Go Live timelines by many weeks.

Two points to remember here:

1. While public cloud enables fast deployment – it's essential to allow enough time upfront to architect it correctly; AND
2. Involve your technical consultants from point zero and let them help you with all the planning. This will save you time and money, so they don't need to fix mistakes that others made – mistakes which may end up taking you more time and increase the cost.





Lesson #4: Proper Sizing and Testing Can Be Challenging

Everyone knows that public cloud offers great flexibility and scalability. It allows you to start with small instances, without having to project few years into the future, and expand later on. Of course, this option may be more expensive; we discuss this at a different white paper, Pricing Considerations of Deploying & Running SAP ERP on Public Clouds. Still, in some cases, proper sizing and testing can be challenging. This is not *because* of public cloud, but *also* applies on public cloud (just as it does on private cloud).

Some of the cutting-edge technology from SAP, especially in the retail space, is so new that whatever sizing you try to do prior to the project may be invalid on the day that you start. You have to be very agile and must be able to dramatically expand from the initial sizing discussion.

A real-life example involves a customer that implemented an advanced, cutting-edge technology from SAP for their ecommerce website. The customer started with one application server and one database server, based on their initial assessment of likely demand.

Due to an enormous number of requests to the system – over 100 million requests-per-day on a few specific days – the customer concluded that their first design was too small and must be upgraded. They asked oXya to redesign the SAP landscape and we had to upscale their configuration, moving to a significantly higher number of servers, many times the initial configuration.

Because we were running this landscape on a public cloud, we were able to upscale very quickly from a very small project to something much larger. This quick upscaling is a huge advantage of the public cloud, as you don't need to wait for new hardware to arrive. Moreover, if they had bought the initial, small scale hardware, then it would have been a loss of money, because there was nothing that could be done with that hardware.

On the other hand, this extra agility did not alter the fact that the true cost of running this landscape on the public cloud was many times higher than what the customer had anticipated and budgeted for.

There are several lessons here:

1. Be very agile and know that you may need to dramatically expand from the initial sizing. This can burden your budget.
2. This is why you need to work with the correct partner – to minimize surprises and enable you to react quickly and be agile.
3. Even with the correct partner – especially for newer technologies, you should be ready to spend significantly more than the initial assessment.
4. Whenever dealing with such technologies, both the public cloud vendor & SAP itself must be involved together in the discussion, to minimize risks and surprises.



Lesson #5: Is It Really Lower-Cost?

The previous lesson addresses an interesting dilemma. Even if you work with a highly experienced partner, you must be ready to spend more than the initial estimate.

To help our customers find the best cost-appropriate solution for their needs, oXya operates as an independent consultant. We make our living from managed services and do not offer nor promote any specific cloud. We can offer you a private cloud, or a variety of public clouds. We currently partner with three public clouds – Amazon Web Services, Microsoft Azure, and Google Cloud Platform – and have multiple SAP customers running on each of these public clouds. We can and will work with additional public cloud platforms, if this can benefit our customers.

Moreover, we help our customers move from one cloud to another, or to run their SAP on a Hybrid cloud, meaning that one landscape is run across more than one cloud. Hence, we help each customer choose the best cloud or cloud combination for that customer's particular needs.

This means that we can give a straight, disinterested answer to the question raised here. Generally speaking, when customers move to the public cloud, they want this move to reduce costs and not just to achieve agility. This is often doable but it requires excellent needs-analysis and preparation. This is why it's important to have a partner who is truly an independent consultant, who can help you get an overall cost comparison between various cloud options, choose the best one for you, and help you plan and deploy correctly.

In order to achieve this, you need a partner that has both the expertise to complete that analysis and preparation, and the independence to tell you which cloud, or combination of clouds, will be most appropriate to your particular context and requirements.

We have an entire white paper on the subject of public cloud pricing, titled Pricing Considerations of Deploying & Running SAP ERP on a Public Cloud.





Lesson #6: Attention to License & Support

There are several ways to contract with public clouds, and they change from one cloud to the other. The first option, which we recommend, is to contract through oXya, so we hold the public cloud license. The second option is for the customer to contract directly with the public cloud, so the customer holds the license. The latter option, available at some public clouds, happens for example when customers already decided to go with a specific public cloud and contracted with it, even before connecting with oXya to help with the implementation and management of their SAP on the public cloud.

What's the difference between these two options? The following story will help explain.

A customer had a previous relationship with one of the large public clouds, so they signed the agreement directly with the public cloud and then contracted oXya to perform the implementation. In addition, this customer wanted to deploy in a very short period of time.

When the customer signed with the public cloud, they signed up for a certain package of technical support services. oXya, as a managed cloud provider, has a higher-level package with that same public cloud provider (we have such agreements with all three public clouds mentioned), to ensure that we get all the support services that you will need from the public cloud, and in a timely matter.

Here's what happened. During early process of deployment, there was an issue with the SAP installation. It wasn't something out of the ordinary—just one of the things that happen. However, when oXya tried to open a ticket with the public cloud's support desk to solve this issue, the public cloud would not let us do so. The reason was that the public cloud license was held by the customer, who only had a low-level support package, which was insufficient to get such support. The customer needed to upgrade their support level—for additional cost and in a rush process—in order for oXya to be able to speak with the public cloud's support service and solve the issue.

Of course, none of that would have happened had oXya held the license, as our support agreement with that public cloud already covers everything.

Lesson here – you need to understand the fine details of the specific public cloud you'd like to partner with, to make sure you get the correct level of support. This is another place where your technical partner plays a role.



Lesson #7: Public Clouds Can Run Really Old SAP environments

One of our customers runs an old SAP ERP system—an SAP v4.x, which is ~15 years old (as of 2019). That solution runs on an IBM environment (AIX with DB2).

The customer wanted to leave their previous SAP managed services provider and move to oXya. The chosen solution was to run their SAP system on one of the public clouds – which was tested for that purpose with a RedHat Virtual Machine and DB2.

The oXya technical team tested that configuration to determine whether it was possible. It's important to note that running such an ancient SAP ERP on a public cloud was not supported by either SAP or the public cloud. Hence, moving forward with such a setup would be a decision to be made by the customer.

oXya conducted a comprehensive PoC for that setup on the chosen public cloud, to make sure the configuration was possible. The PoC was successful, the customer approved the results, and the solution was implemented on the public cloud and runs successfully – for this old SAP environment.

Such old SAP environments are not rare in the market. Multiple SAP customers are still running similar old SAP systems. For such companies, who are looking to modernize their systems and move them to the cloud – this is a possible path. oXya and our sister SI company, Hitachi Consulting, can also help with the licensing side, for companies looking to upgrade their SAP systems to HANA or S/4HANA.

The lesson here: public cloud providers are strategic 'open' platforms. As such, they can support nearly all current—and many older—versions of SAP databases, and operating systems, including those no longer supported nor approved by SAP SE itself!

We have tested this with just one public cloud provider (at the time that this white paper is written), but there is no reason why this should not work with additional public clouds.





Lesson #8: Difference Between Managing SAP Workloads in the Private Cloud and Public Cloud

One common question, from various customers, asks what differences we see – if any – between a private cloud and a public cloud.

The bottom line is this – we haven't encountered much difference between private and public clouds as far as providing monitoring and regular services for SAP environments. There also should be no difference in performance, so long as the architecture was designed properly and everything is configured in the right way.

One small difference that does exist has to do with the tools we're using to achieve results – in some cases there's a difference between tools used for private cloud, and those used for public clouds. One such example is the tool used for monitoring. In traditional data centers, including a private cloud, the tool used is Solution Manager (often together with other tools). Some public clouds provide a different monitoring tool, which SAP also recommends.

"Public cloud vendors change things on a regular basis. To discuss your needs and possible solutions, email us to future@oXya.com, to schedule a call."



Lesson #9: Public Clouds are Not Created Equal

oXya has multiple SAP customers running on each one of the three large public cloud platforms: AWS, Azure, and Google Cloud Platform. We deployed each of the customers onto whichever public cloud they're using, and we provide ongoing, daily managed services for these customers, managing their SAP systems on that public cloud.

That vast experience has shown us that public clouds are not created equal. While all 3 of these public clouds are great for running SAP systems, including SAP Production – there are significant differences between them. The changes begin with pricing models and can affect how much you pay to get the SLAs that you need. Which of the leading public clouds (or combination of clouds) you should choose will depend on your particular SAP environment, needs, and SLAs required. There are also differences with regards to how each cloud addresses security, network, and other technical issues.

Since all public clouds evolve and update their services on a continuous basis; and since SAP customers differ from one another with regards to their needs – we do not think it would be helpful to go into the fine details here. If you'd like to learn more, we would welcome the opportunity to speak with you. Please email future@oxya.com to schedule a call.



Lesson #10: Knowing How to Design Backup Solutions

This section brings an example to what can happen if your public cloud design is incorrect. This is a true case which we tested, in an attempt to check several designs. Assume that you have 4TB of HANA on the public cloud which needs to be backed-up on the same public cloud. You perform the backup and all goes well, just like you would when performing a backup on-premise.

When you want to restore from that backup, things can go awry if you didn't design the architecture correctly. The restore process will be very long. What happens is that once you launch the restore for the full 4TB of data, the public cloud gives you the full 4TB of *storage space* right away, yet you still do not have your *actual data restored*. The data streams from backup very slowly, piece by piece and with terrible I/O, so the full process can take hours to restore, much longer than it would take on-premise.

This is one example which can be painful, if you or your technical SAP partner don't have enough experience with public cloud design. There is a way to guarantee fast restore-timing, and the public cloud provides the technical layers to do so. Moreover, oXya can offer its customers a restore timing guarantee – but you need to know exactly how to design this process, in order to avoid the issue described above.





Lesson #11: SAP ERP is Not Built to Best Utilize the Public Cloud

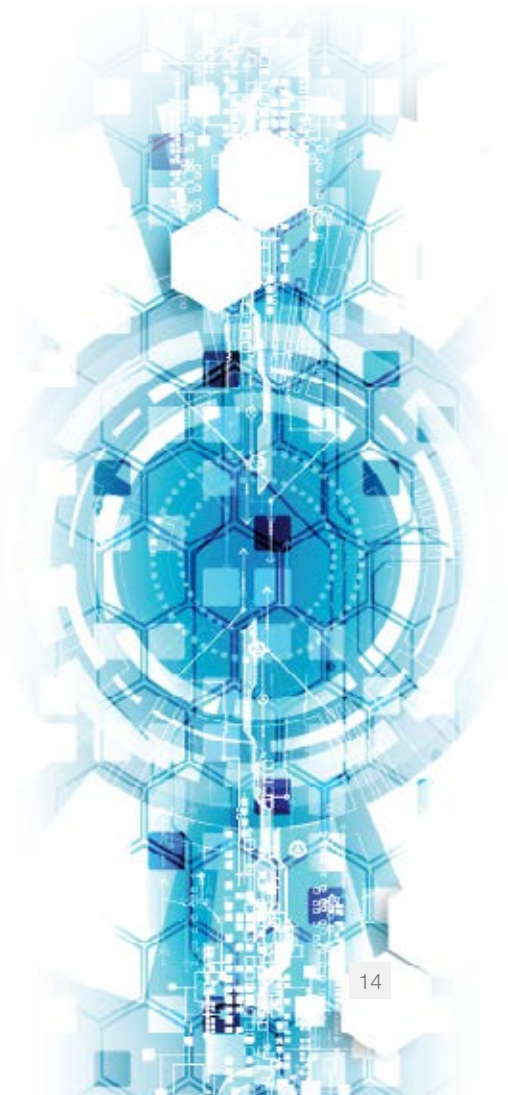
One of the biggest advantages of public cloud is agility – it allows you to upscale and downscale as needed, on the fly. Ideally, that will be done using auto-scaling, meaning the IT systems on the public cloud will upscale and downscale by themselves, based on external demand, with no human intervention.

An example is adding/deleting application servers needed to execute a month-closing process (or quarter/year-closing). For such process, you need more resources for just a short period of time (typically one week per month, for month-closing). Once you set up the auto-scaling option, the public cloud sees the threshold and if it decides there's lots of traffic coming in, it will add resources automatically in order to absorb it. When traffic goes down, the added resources will be released as you no longer need them, and so you stop paying for them. This is a great option to minimize costs.

This sounds great, but there's one inherent issue – SAP's software architecture does not know how to use public cloud resources in order to efficiently auto-scale up and down. SAP was designed for on-premise use, with fixed hardware resources and it does not know how to auto-utilize public cloud resources. The software itself needs to evolve. We assume this will happen but this functionality still does not exist as of the middle of 2019. Hence, the scenario described above, with auto-scaling of the application servers, is not possible with today's SAP software.

To provide a temporary solution for oXya customers, we developed an internal solution that offers auto-scaling capabilities for SAP on all public clouds. However, it's important to note that this oXya solution is not a native element of SAP – as it should be – but rather it is an external solution.

We're preparing a demo on this topic, which will be displayed in September 2019 at SAP TechEd Las Vegas. Starting September 2019, you'll be able to find it at oXya.Cloud/Auto-Scaling.





Lesson #12: Security & Network Aspects of Running SAP on Public Clouds

This is a bonus, not a single lesson learned. There's an entire chapter around Security & Network aspects of running SAP on public clouds, with many lessons learned and best practices. For that reason, we're dedicating a separate white paper to this subject. The lessons learned in that white paper include things like "surprise" costs that you may not be aware of; challenges and things to note on the security side when implementing SAP on a public cloud; how to guarantee SLAs and minimal latency on a public cloud; and more. This white paper will be available starting September 2019 on oXya.Cloud/Security.

Next Steps in Your Cloud Journey

The public cloud offers great benefits to SAP customers. However, public clouds do significantly differ from one another on multiple aspects, including pricing. It can be costly if you don't know exactly what to do, or which specific public cloud is best suited for your needs. We cover the pricing side of the public cloud in a separate white paper, *"Pricing Considerations of Deploying & Running SAP ERP on Public Clouds"*. You can get this white paper at oXya.Cloud/Pricing.

An additional white paper covers the *"Security & Network Considerations for Deploying & Running SAP ERP on a Public Cloud"*, and can be found at oXya.Cloud/Security.

This white paper gives a taste of some of the key lessons learned of running SAP ERP on a public cloud. There are many other lessons, some are general and some are specific to particular public clouds. The public cloud vendors change things on a regular basis, so any specific information may be irrelevant in a few weeks' time. We're happy to discuss your needs and possible solutions with you. If interested, email us to future@oXya.com, to schedule a call.

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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

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