

# Leveraging the Public Cloud to Run Actuarial Risk Modeling Software

By Yash Titus

Actuarial and IT teams have been challenged over the past few years by goals that are contradictory in nature. On one side, from a business perspective, there is a need for more processing power to meet new regulatory obligations or the need to reduce the time to produce reports. And, on the other side, IT teams are constantly under pressure to do more with the same budget or reduce cost further. The public cloud and the ability to procure infrastructure quickly and rent large processing capacity for short periods have provided an effective answer to ensure both business and IT goals are met.

## PUBLIC CLOUD AND THE FIT

The public cloud is resulting in a change in basic assumptions, enabling actuarial teams to focus on their models and calculations without having to work around or be restricted by the available calculation capacity.

Public cloud vendors, because of their size and scale, are able to keep costs low and offer attractive pay-as-you-go models. The cloud model makes it very cost effective, especially for applications that require large processing capacity comprising expensive servers and have usage patterns that have peaks and troughs.

Actuarial systems fit well into the cloud due to their need for a large amount of capacity to complete month-end/quarter-end and annual reporting requirements (additional 3x to 5x calculation capacity needs during peak periods) while often requiring much lower capacity on average for the rest of the year.

This provides the insurance company several benefits compared to a static solution within a conventional datacenter:

1. Pay for the additional capacity only when required, compared with needing to provision for peak capacity. This allows you to do more with the same budget or reduce costs for comparable capacity.
2. Flexibility: Ability to quickly provision up and then ramp down to meet business needs. It is not unusual in a



conventional datacenter to take weeks to fulfill any requests for new hardware or storage requested against minutes, hours or a few days on the public cloud based on the type of requests.

3. The public cloud solution also eliminates the need for large capital expenditure allocation every three to five years to replace aging hardware.

As insurance companies think more about leveraging the public cloud to meet their actuarial processing needs, companies also need to budget time to plan upfront and consider several factors prior to making the move to ensure they achieve the best possible results.

The first step is to prioritize the needs from an actuarial processing perspective. This will allow the company to plan for what is needed initially against what may be required 18 to 24 months down the road. There is no need to plan everything upfront due to the flexibility of the public cloud.

Many definitions are found on the internet of what the public cloud is; in essence, it is a set of resources/technologies (servers, storage, etc.) and services provided by a third-party public cloud provider. The cloud provider manages the underlying hardware, and the company that wishes to leverage the infrastructure will need to implement, host and support their applications on the public cloud.

Since the public cloud vendor provides you the necessary hardware required to host the actuarial applications, you need to think about whether you want to rent the infrastructure and build, host and support the actuarial environment yourself (I like to say it is analogous to buying the parts of the car and building the car yourself), or whether you want to sign up with a vendor managed Services or Software as a Service (SaaS) offering

(analogous to buying a car from a reputable brand and focusing on driving the car rather than focusing on building and ongoing maintenance of the car). To clarify the difference between SaaS solution and a managed services solution, a SaaS solution is a multi-tenant solution at the application level where the vendor is providing the software on a subscription model and offers a single fee to cover software license, maintenance, support and infrastructure costs. The vendor also usually does not customize the environment for individual customers, and services such as upgrades are as per the vendor schedule. In a managed services solution, while the vendor may have shared resources to manage the environment, the individual environments are built as per customer requirements and the customer may have more flexibility to schedule services like upgrades even if they are included as part of the service. The license and maintenance fees are usually separate from the fees to host and manage the environment for the customer.

The choice whether you decide to provision and support your actuarial systems yourself or rely on a vendor managed services or SaaS solution should be based on your overall IT and actuarial priorities, goals and risk appetite. Managing the actuarial system on your own may look attractive initially, and although the cost may seem higher for a vendor managed services or SaaS solution on first look, a detailed TCO is likely to show that this may be the better solution for you when you weigh all the costs and risks associated with both options.

Most of the leading actuarial risk modeling systems have adopted their solutions for the public cloud and offer various license models and deployment models to support it. Most of them have a solution on Amazon Web Services and/or Microsoft Azure, which are the two leading public cloud providers as per Gartner's "Magic Quadrant" as of June 2017.

As you consider which option and approach is best for you, a few factors to think about in more detail are listed next.

## PERFORMANCE AND USABILITY OF YOUR ACTUARIAL SOFTWARE ON THE CLOUD ENVIRONMENT

The underlying architectures for the cloud providers are different and hence it is important to know how the actuarial software that you currently use or are planning to choose performs on a particular cloud platform.

If you decide to do it yourself, then you will need to spend time and do, for instance, technical proof of concepts to get a deeper understanding of the various services available, server instance types, storage types and what works best with your actuarial software. When considering production environments, there is even more to consider to manage and support the environment and make it secure (e.g., antivirus, firewalls configuration, monitoring, encryption).

A related point to consider is the availability of resources that understand both the public cloud and the actuarial systems that they are supporting on the public cloud. Keyman risk is something that needs to be considered when supporting with your own IT team because demand for resources proficient with cloud technologies combined with knowledge of business applications is very high and hence should be accounted for in your TCO comparison.

If you choose to take a managed services or SaaS solution from the actuarial systems vendor, then the responsibility to optimize the solution on the public cloud lies with the vendor. While choosing a vendor managed services or SaaS solution, you need to ensure that the vendor is managing the engagement via strong service levels offered at the system level because you should be concerned with whether the application is available for use rather than just infrastructure availability. The common service levels that you should look for from the vendor are around incident response and resolution as well as system availability. You should also check that the vendor is offering hard service level agreements (SLAs) with associated service credit penalties rather than soft target service levels with no penalties attached for a miss of an SLA.

## SECURITY

Security is another key factor that always comes up when moving to a cloud solution. Leading cloud providers like AWS and Azure take security very seriously and take many steps to make their offering as secure as possible. The view and perception of IT and security teams within insurance companies have also evolved over the past 12 to 18 months, and there is a common acceptance that the security measures on the public cloud are comparable to, if not better than, solutions offered on the private cloud. If you take a vendor managed services or SaaS solution, those vendors may take additional steps to secure the environment in conjunction with the cloud provider. Managed services and SaaS vendors usually have additional SOC 2 Type 2 or equivalent certifications, which are in addition to all the certifications that the cloud provider maintains.

## DATA

What data to transfer to the cloud and how frequently you transfer data is another key consideration while moving to the cloud. Moving to the cloud is a good time to do some house-keeping so that you are transferring only data that are useful and required. Cloud vendors offer different storage options, and although you may need more expensive options to support actuarial runs in production, it may be possible to store infrequently used data on lower cost storage options. Cloud providers generally don't have data transfer costs to transfer data into the cloud environment, but usually have some costs to transfer data out of the cloud environment. It is best to transfer the required data upfront, complete the processing on the cloud, and then pull

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only the required results from the cloud so that you can feed other systems.

Finally, it is important to be able to estimate and budget the cost of the solution initially to support your business case and, once on the cloud, to be able to track and monitor your costs against budget. Although flexibility and having unit pricing provide a lot of flexibility, estimating total costs and budget can be tricky because the cost varies based on your usage of the various services and resources that you leverage from the cloud provider. The costs can vary greatly based on your design of the infrastructure and your usage patterns.

If you are planning to move and support yourself, you need to work out effective ways to validate the costs and track your budget. It is not very easy initially: the reporting provided by the cloud vendor provides details only at the infrastructure level and will not give actuarial teams a complete picture, because it does not provide them details as to which teams did how many runs, how much time each run took what resource used, and so on. You will need to think about how you will generate additional custom reports to meet your requirements, and the degree of difficulty and cost to create reports will vary based on access provided by the actuarial software vendor and cloud vendor.

You will also need to consider the costs to support the environment and the continuous investment required to keep abreast with cloud technologies and security requirements to get to the TCO.

If you go with a vendor managed services or SaaS solution, it will be easier to budget costs because they will abstract some of the details and provide you a cost that includes a number of the underlying individual cost elements. Some of the vendors may also provide additional reports that give you more details about, for example, the number of runs and which department or users have performed the runs, which will further help you budget and allocate costs internally to the appropriate teams or departments.

The one thing to keep in mind is to leave some flexibility in your budget for additional usage fees: usually once the actuarial teams fully understand the power and flexibility of the solution, which takes about three to six months, they tend to get new ideas on ways to further leverage the environment because the constraints of processing power and capacity have been largely reduced.

There is no doubt that for actuarial processing operations, the public cloud is a great fit. However, you need to plan upfront so that you choose the best option for you. ■



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