



Cloud Migration Planning

VMware Cloud on AWS

TECHNICAL WHITE PAPER

Introduction

Once you get your keys to your new VMware Cloud on AWS SDDC and you have configured and verified communications between it and your on-premises environment, you are ready for the next step, Migrating Applications. Of course, there is a lot of preparation work that should be completed prior to starting any migration project and moving your first applications to your SDDC cloud.

The primary technological goal of any migration project is to transfer an existing application (or solitary VMs) from your on-premises environment to your SDDC cloud, as quickly, efficiently, and cost effectively as possible. This is especially critical when considering a migration to a public cloud such as VMware Cloud on AWS; considerations must include application and data dependencies, security controls, latency, subsequent performance, operations practices for backup/recovery and others. Customers will need to assess their environment and focus on generating an effective, actionable migration plan to achieve this goal. Spending the time up front in the plan to reduce the time and increase likelihood of success of any migration project.

Inadequate prep work before migration can cause different kinds of failures:

- Failure to identify related or “internal” workload dependencies before migration – such as components of a multi-tiered application (e.g. webserver, business logic, database)
- Failure to identify external workload dependencies before migration – such as updating DNS, ensuring access to Active Directory for authentication
- Failure to determine how certain procedures – such as backups and security checks – will be done in the cloud
- Failure to identify applications that are inherently not suitable for the cloud – potentially for licensing or support reasons.

In this document, we will highlight the best practices and methodology that should be followed when planning a migration to VMware Cloud on AWS. We will concentrate on 5 areas of discussion: Migration Data Collection, Data Analysis and Application Weighting, Collection and Analysis Tools, Migration Options and finally VMware Migration Service options.



Migration Data Collection

The first thing you will need to do is gather data about your environment, application and business needs. This can be done through discovery and collection tools, but also through internal workshops and discussions with your line of businesses and application owners. Data collection falls into two categories:

- **Technical Criteria** are factors that characterize the details of the application and its components and will help you understand the overall complexity of a migration.
- **Business Criteria** are factors that relate to criticality of the application, operating model of the application, and ultimately, the potential impact to the business if a migration was not successful.

The following outlines a subset of the data that should be collected for both of these categories:

Technical Criteria

- Provisioned, Average and Peak memory used for each VM
- Provisioned, Average and Peak CPU used for each VM
- Provisioned, Average and Peak storage IO used for each VM
- Current latency across the environment and VMs
- Amount of raw storage provisioned and used for each VM
- What other VMs is a given VM communicating with (application dependencies)
- Number of communications in and out of each VM
- How much data is flowing over these communications (network traffic in and out)

Business Criteria

- Map out your known applications (which VMs are involved in which application)
- Business value of moving applications to the cloud
- Buy in from application owner or line of business
- Which VMs are Cattle and which VMs are Pets

Cattle – Are easily stood up and replicated, are easily replaceable if they fail, do not have special handling instruction or management needs and usually have numbers in their names. Cattle are often a small common component of an application that is involved in some form of high availability to negate downtime. A good example would be a webserver VM called “WebServer023” in a highly available array of web servers.

Pets – Are treated as special workloads, manually built and their management and care and feeding requires special attention. When a pet fails it’s a big deal.

- Security or compliance concerns
- Contracts and licensing concerns that may affect its ability to live in the cloud
- Support concerns - 3rd party managing the application may not agree to the move



Data Analysis and Application Weighting

Once you have collected the necessary data you will need to make intelligent migration decisions BASED on the data. To ensure a holistic assessment approach it is important to combine technical and business attributes through weightings based on the analysis run across the collected data. VMs and applications with the highest weightings are considered as not good candidates to migrate.

The examples below highlight some of the analysis that can be used to help drive your intelligent decision making and overall migration weighting.

Application Complexity

- Map discovered applications based on the collected VM flow connectivity data
- Verify your known application mappings against these discovered applications
- Adjust application mappings as needed to incorporate differences
- Use application complexity to affect your weighting. The larger the number of connections in and out of the application the higher the complexity therefore increase the weighting these applications.

Performance

- Determine the overall CPU, memory and storage needs for each application based on the data collected above and the application mapping
- High CPU intensive applications will likely benefit from the faster hardware in VMware Cloud on AWS so lower the weighting on these applications.
- Storage IO intensive applications will likely benefit from the faster vSAN storage in VMware Cloud on AWS so lower the weighting on these applications.

Business Needs

- Application that have a business driver behind them to be “moved to the cloud” should be some of your first choices so these should have a lower weighting.
- Cattle are easier to move then pets and should therefore have a lower weighting
- Applications that have buy in from application owner or line of business should have lower weighting (if you don't have to fight...don't).
- Applications with security or compliance concerns should have a higher weighting. Moving these may raise concerns with security teams and adds complexity to the process.
- Applications unable to move do to contractual or support concerns should have a higher weighting.

Cost

- Run cost comparisons between your private data center and VMWare Cloud on AWS. Applications that run on costly storage/compute or in higher priced datacenters might be cheaper (and perform just as well) on VMware Cloud on AWS. These applications should get a lower weighting.
- Applications that need public internet access may incur network charges (i.e. egress costs). Use the collected flow data to determine these potential charges. For those applications deemed to have large potential egress costs weight them higher.
- Applications that need public internet access will also need Public IP addresses which incur another cost. You may wish to make their weighting higher as well.

Depending on how you calculate your weighting your results may change, but when this is all done, applications and workloads with the lowest weighting score **should** be your candidates to migrate first.



Collection and Analysis Tools

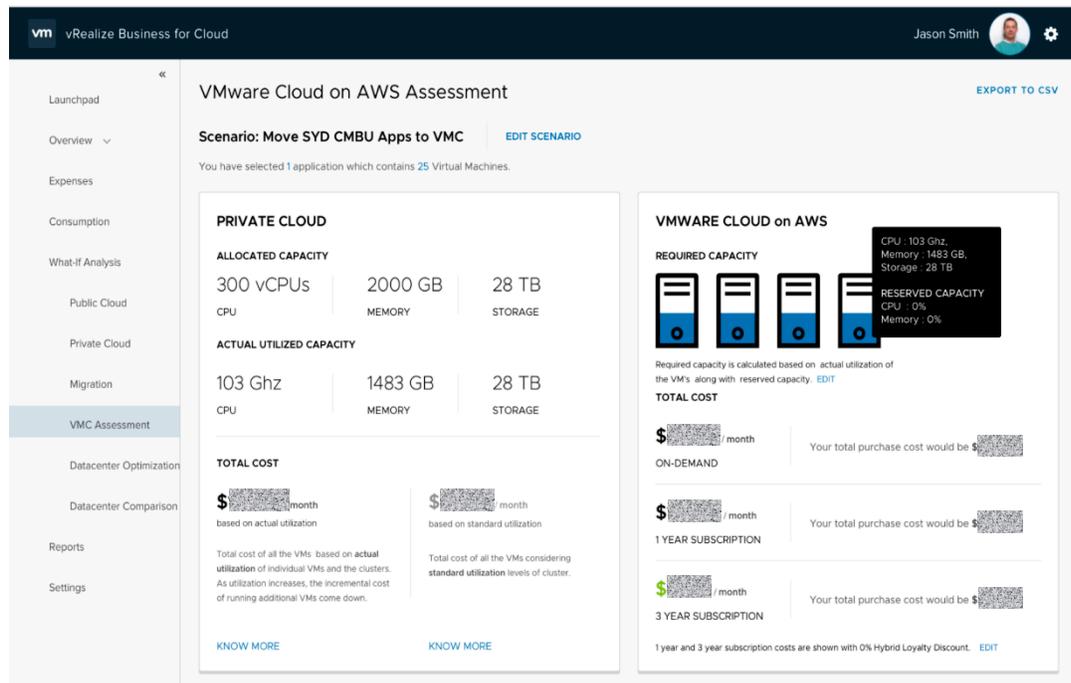
The collection and calculation of this migration data may seem daunting and time consuming but putting the right tools in place to help you with this process can greatly reduce the amount of effort required. There are numerous tools out there that can assist with this step, but let's look at a few of the more popular ones.

vRealize Business for Cloud (vRBC)

From a cost evaluation stand point the VMware Cloud on AWS Assessment built into vRealize Business for Cloud's [Hybrid Cloud Assessment](#) provides details on both your private cloud and VMware Cloud on AWS for comparison. This tool allows you to answer the question "How much VMware Cloud on AWS do I need". You simply connect vRBC to your on-premise vCenters and create a scenario to migrate applications, retire full datacenters, refresh HW for Hosts & Clusters, and pick and choose VMs. The results of the assessment include:

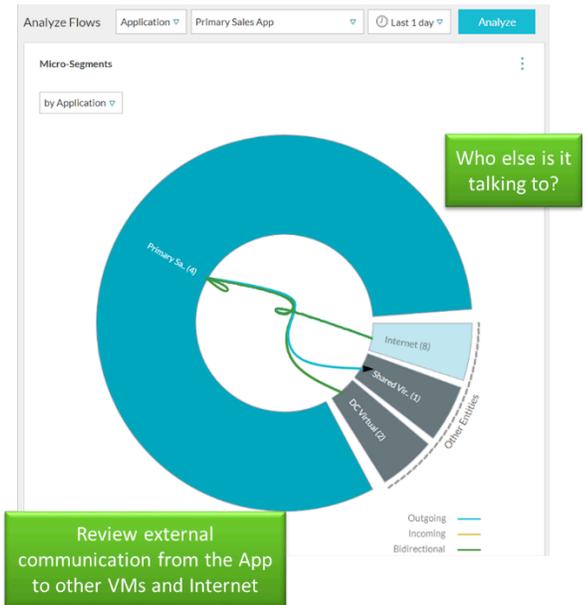
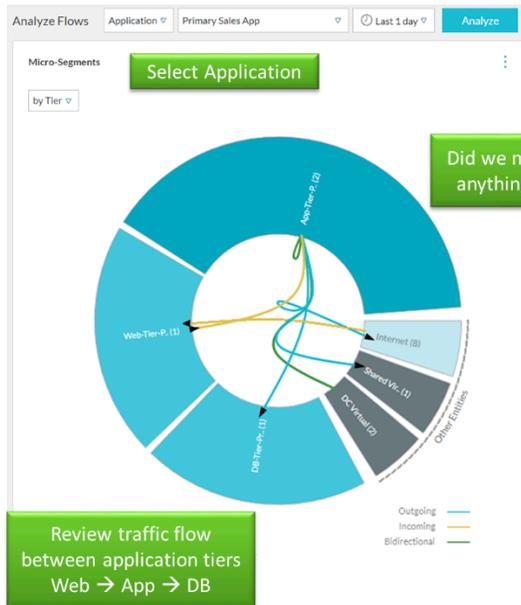
- The total capacity to be migrated from your on-premise environment
- The total number of hosts needed in VMware Cloud on AWS to accommodate this capacity
- The estimated cost of running these workloads in private cloud
- The estimated costs of running these workloads in VMware Cloud on AWS across the three possible subscription models

This flexible assessment tool will allow you to quickly evaluate deployment options, determine the right amount to move to VMware Cloud on AWS and gain a full understanding of deployment costs.



vRealize Network Insight (vRNI)

Another tool that will help with your application migration is [vRealize Network Insight \(vRNI\)](#) which can map out your applications and their dependencies. vRNI automatically identifies the connections between your VMs as well as connection to the internet, your shared components (e.g. DNS) and even your physical datacenter. It does this by collecting and analyzing IPFIX flow traffic, which traverses the vSphere Distributed Switch (VDS). Once you have a complete understanding of who is talking to whom you can easily map out your applications, the underlying services and their interdependencies. It can also show you the volume and nature of those flows allowing you to understand the network constraints to move the application.



vRealize Operations

The last tool is [vRealize Operations](#) which can gather the necessary technical details from your current on-premise environment like CPU, memory, storage, storage IO, network IO, etc. This information can be viewed at the VM level or grouped together to be viewed at the application level. Numerous out of the box dashboards and reports can quickly provide you the data you need when collecting the necessary technical details associated with your migration planning. There is even a simple to use API if you wish to programmatically pull out the data.



Migration Options

Now that you know WHAT you want to move to your new cloud SDDC you need to decide HOW you want to perform the migration and move the workloads. There are several options available for you to choose from each with its benefits and/or prerequisites.

Reprovision from Scratch

While this might not technically be considered a migration, it may be an option some of your cattle workloads. Instead of moving them, it might be possible to spin them up as new workloads in VMware Cloud on AWS instead. This works especially well when the source files are already loaded into the Content Library. Simply bring them up as new in the cloud and turn the old ones off in your on-premises environment.

Cold Migration

The next migration strategy is a cold migration where a workload is stopped, moved over to your VMware Cloud on AWS and then restarted there. This option may work well for your non-production workloads where you can simply turn it off with minimal business impact (e.g. development or test workloads). In order to perform a cold migration, you will need to have Hybrid Link Mode running between your on-premises infrastructure and VMware Cloud on AWS.

Live Migration

The ability to move a live running VM between your on-premises environment and your VMware Cloud on AWS SDDC is almost table stakes when talking about a hybrid cloud. The option you are probably most familiar with performing this live migration is vMotion which can be leveraged with VMware Cloud on AWS. There are a few prerequisites that are required to enable live migration to your SDDC in VMware Cloud on AWS. The primary requirement is to have Hybrid Link Mode enabled and a L2VPN established between your on-premises environment and your SDDC cloud. Each live migration requires a 250Mbps of bandwidth per vMotion.

While this seems like a no-brainer migration method, considerations must be given to the amount of data being live migrated, the bandwidth of the pipe that is being used, any latency issues that may occur, the change rate of running VM and the fundamental bandwidth management concerns if you are migrating large amounts of data.

Hybrid Cloud Extension

To deal with bandwidth, latency and data associated with migrating workloads VMware has created the [VMware Hybrid Cloud Extension \(HCX\)](#) add-on service to make things even easier. Hybrid Cloud Extension offers bi-directional application landscape mobility and data center extension capabilities between any vSphere version. Hybrid Cloud Extension includes vMotion, Bulk Migration, High Throughput Network Extension, WAN optimization, Traffic Engineering, Load Balancing, Automated VPN with Strong Encryption (Suite B) and secured data center Interconnectivity with built-in hybrid abstraction and hybrid interconnects.



VMware Migration Services

Some of you may be ready to jump right into building your own migration plans on your own today while others may prefer a more guided approach through VMware's migration assessment services. These assessment services are a group of services that help move customer along their journey to VMware Cloud on AWS. VMware understands customers have different approaches to migration and this set of services allows a customer to move through the different migration phases at their own speed. Sub-services included under the Migration Service umbrella include (but are not limited to):

Connectivity and Readiness Assessment

The VMware Cloud on AWS Connectivity and Readiness Assessment service has been updated to include new feature and configuration details for consultants to more accurately assess an environment for VMware Cloud on AWS. This service is a starting point in an engagement to build a profile for the customer and to assess the environmental details.

Application Discovery and Dependency Mapping Assessment

The VMware Application Discovery and Dependency Mapping Assessment provides a customer with insight into applications on their virtual infrastructure and the virtual machine dependencies of those applications. The customer is given details about data flows between multitiered application components and network service dependencies. Analysis can be used to determine data flows into and out of applications and application groups. As we discussed above, a thorough understanding of these dependencies and relationships is critical when planning a migration to VMware Cloud on AWS.

Cloud Value and Workload Placement Assessment

The VMware Cloud Value and Workload Placement Assessment provides a customer with insight into the cost feasibility of placing existing workloads into the VMware Cloud on AWS. The consulting team uses VMware Cloud on AWS Assessment to determine the most cost-effective workload placement.

Disaster Recovery as a Service Deployment

The VMware Cloud on AWS Disaster Recovery Deployment Service provides a base deployment VMware Site Recovery™ to expand disaster recovery capabilities to the public cloud using VMware Cloud on AWS. VMware Site Recovery™ extends VMware Cloud on AWS to provide a managed disaster recovery, disaster avoidance and non-disruptive testing capabilities to VMware customers without the need for a secondary site, or complex configuration. This service provides VMware's industry leading disaster recovery technologies Site Recovery Manager and vSphere Replication and deliver a full range of disaster recovery orchestration and capabilities to VMware Cloud on AWS.

For more information about VMware's migration assessment services contact your sales representative.

