Course and Labs

Module 2: Migrating Compute to EC2 Platform

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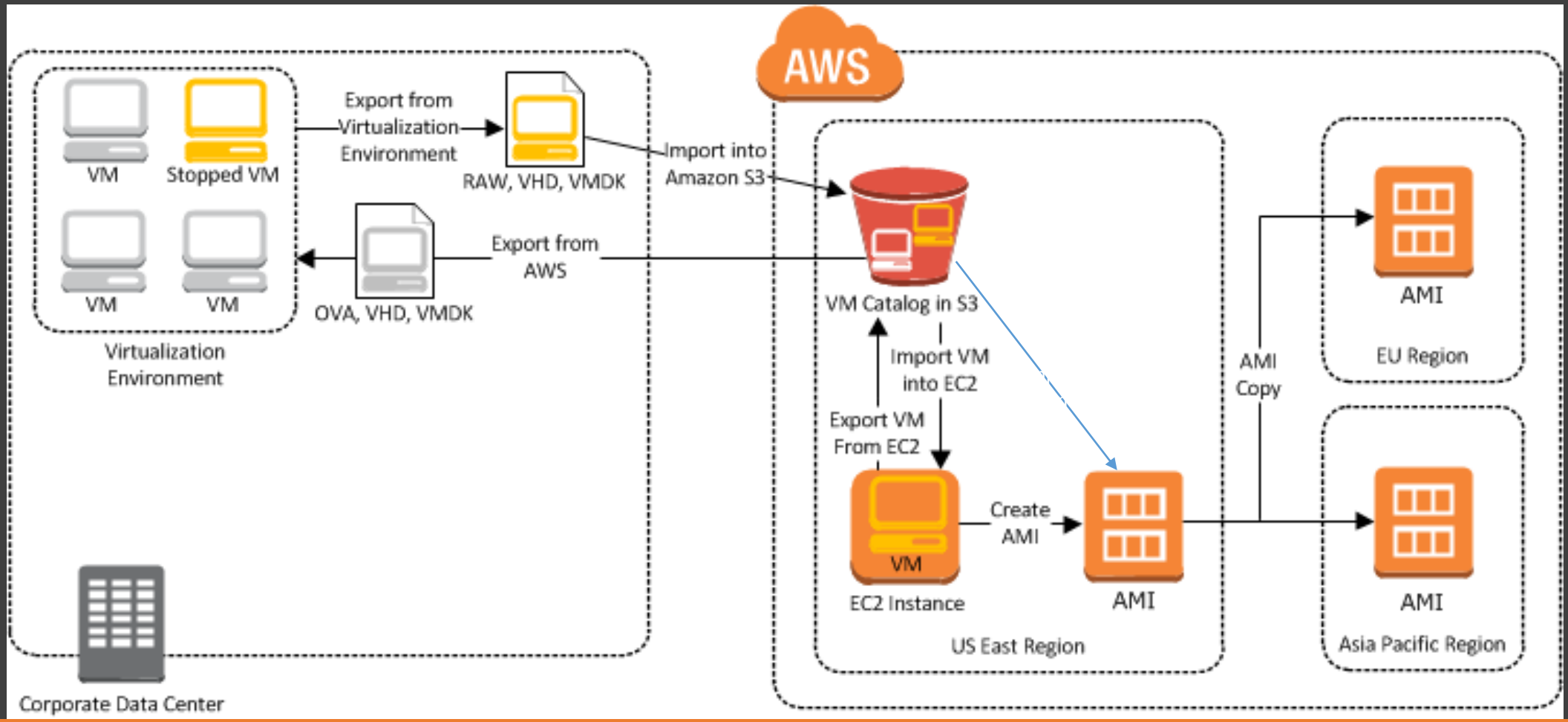
Importing and Exporting Instances

- You can use the Amazon Web Services (AWS) VM Import/Export tools to import virtual machine (VM) images from your local environment into AWS and convert them into ready-to-use Amazon EC2 Amazon machine images (AMIs) or instances.
- Later, you can export the VM images back to your local environment as an instance.
- VM Import/Export allows you to leverage your existing investments in the VMs that you have built to meet your IT security, configuration management, and compliance requirements by bringing those VMs into Amazon Elastic Compute Cloud (Amazon EC2) as ready-to-use AMIs or instances.

Importing/Exporting VMs Process in AWS



Migrate existing applications and workloads to Amazon EC2

- You can migrate your VM-based applications and workloads to Amazon EC2 and preserve their software and configuration settings.
- When you import a VM using VM Import, you can convert an existing VM into an Amazon EC2 instance or an Amazon Machine Image (AMI) that you can run on Amazon EC2.
- When you create an AMI from your VM, you can run multiple instances based on the same imported VM
- When you create an AMI from your VM, you can run multiple instances based on the same imported VM

Import your VM image catalog to Amazon EC2

- You can import your existing VM image catalog into Amazon EC2.
- If you maintain a catalog of approved VM images, you can copy your image catalog to Amazon EC2 and create AMIs from the imported VM images.

Create a disaster recovery repository for VM images

- You can import your local VM images into Amazon EC2 for backup and disaster recovery purposes.
- You can import your VMs and store them as AMIs.
- The AMIs you create will be ready to launch in Amazon EC2 when you need them.
- If your local environment suffers an event, you can quickly launch your instances to preserve business continuity while simultaneously exporting them to rebuild your local infrastructure.

VM Migration to AWS

- VM Import/Export is compatible with Citrix Xen, Microsoft Hyper-V, or VMware vSphere virtualization environments.
- It also supports raw disk image formats to import KVM virtual machines as well
- If you're using VMware vSphere, you can also use the AWS Connector for vCenter to export a VM from VMware and import it into Amazon EC2.
- If you use Microsoft Systems Center, you can also use AWS Systems Manager for Microsoft SCVMM to import Windows VMs from SCVMM to Amazon EC2.

Operating Systems Supported

- **Windows (32- and 64-bit)**
  - Microsoft Windows Server 2003 (Standard, Datacenter, Enterprise) with Service Pack 1 (SP1) or later (32- and 64-bit)
  - Microsoft Windows Server 2003 R2 (Standard, Datacenter, Enterprise) (32- and 64-bit)
  - Microsoft Windows Server 2008 (Standard, Datacenter, Enterprise) (32- and 64-bit)
  - Microsoft Windows Server 2008 R2 (Standard, Datacenter, Enterprise) (64-bit only)
  - Microsoft Windows Server 2012 (Standard, Datacenter) (64-bit only)
  - Microsoft Windows Server 2012 R2 (Standard, Datacenter) (64-bit only)
  - Microsoft Windows 7 (Professional, Enterprise, Ultimate) (32- and 64-bit)
  - Microsoft Windows 8 (Professional, Enterprise) (32- and 64-bit)
  - Microsoft Windows 8.1 (Professional, Enterprise) (64-bit only)
  - Microsoft Windows 10 (Home, Professional, Enterprise, Education) (64-bit only)

Operating Systems Supported

- **Linux/Unix (64-bit)**
  - Imported Linux VMs should use default kernels for best results. VMs that use custom Linux kernels might not import successfully.
  - Red Hat Enterprise Linux (RHEL) 5.1-5.11, 6.1-6.6, 7.0-7.1
  - SUSE Linux Enterprise Server
    - SUSE Linux Enterprise Server 11 Service Pack 1 - 2.6.32.12-0.7
    - SUSE Linux Enterprise Server 11 Service Pack 2 - 3.0.13-0.27
    - SUSE Linux Enterprise Server 11 Service Pack 3 - 3.0.76-0.11, 3.0.101-0.8, and 3.0.101-0.15
    - SUSE Linux Enterprise Server 11 Service Pack 4 - 3.0.101-63
    - SUSE Linux Enterprise Server 12 - 3.12.28-4
    - SUSE Linux Enterprise Server 12 Service Pack 1 - 3.12.49-11

Operating Systems Supported

- Ubuntu 12.04, 12.10, 13.04, 13.10, 14.04, 14.10, 15.04
- CentOS 5.1-5.11, 6.1-6.6, 7.0-7.1
- Debian 6.0.0-6.0.8, 7.0.0-7.8.0, 8.0.0
- Oracle Linux 6.1-6.6, 7.0-7.1
- Fedora Server 19-21

Image Formats

- **Importing Image Formats into Amazon EC2**
  - RAW format for importing disks and VMs.
  - Fixed and Dynamic Virtual Hard Disk (VHD) image formats, which are compatible with Microsoft Hyper-V and Citrix Xen virtualization products. VHDX images are not currently supported.
    - You can only import VMDK files into Amazon EC2 that were created through the OVF export process in VMware.
  - Open Virtual Appliance (OVA) image format, which supports importing images with multiple hard disks.

Image Formats

- **Exporting Image Formats from Amazon EC2**
- AWS supports the following image formats for exporting both volumes and instances from Amazon EC2.
- Make sure that you convert your output file to the format that your VM environment supports:
  - Open Virtual Appliance (OVA) image format, which is compatible with VMware vSphere versions 4 and 5.
  - Virtual Hard Disk (VHD) image format, which is compatible with Citrix Xen and Microsoft Hyper-V virtualization products.
  - Stream-optimized ESX Virtual Machine Disk (VMDK) image format, which is compatible with VMware ESX and VMware vSphere versions 4 and 5 virtualization products.

Instance Types

- AWS supports importing Windows instances into most instance types.
- Microsoft Windows BYOL instances must be launched as a dedicated instances or dedicated hosts for Microsoft Windows, and therefore cannot use the t2 instance type because it doesn't support dedicated instances
- Linux instances can be imported into the following instance types:

•General purpose: `t2.micro` | `t2.small` | `t2.medium` | `m3.medium` | `m3.large` | `m3.xlarge` | `m3.2xlarge`

•Compute optimized: `c3.large` | `c3.xlarge` | `c3.2xlarge` | `c3.4xlarge` | `C3.8xlarge` | `cc1.4xlarge`

•Memory optimized: `r3.large` | `r3.xlarge` | `r3.2xlarge` | `r3.4xlarge` | `r3.8xlarge`

•Storage optimized: `i2.xlarge` | `i2.2xlarge` | `i2.4xlarge` | `i2.8xlarge`

Volume Types and Filesystems

- AWS supports importing Windows and Linux instances with the following filesystems:
- **Windows (32- and 64-bit)**
  - VM Import/Export supports MBR-partitioned volumes that are formatted using the NTFS filesystem. GUID Partition Table (GPT) partitioned volumes are not supported.
- **Linux/Unix (64-bit)**
  - VM Import/Export supports MBR-partitioned volumes that are formatted using ext2, ext3, ext4, Btrfs, JFS, or XFS filesystem. GUID Partition Table (GPT) partitioned volumes are not supported.

Amazon S3 Buckets

- VM Import requires an Amazon S3 bucket, to store your disk images, in the region where you want to import your VMs.

VM Import Service Role

- VM Import uses a role in your AWS account to perform certain operations (e.g: downloading disk images from an Amazon S3 bucket).
- You must create a role with the name vmimport
- Create a Policy for the vmimport role and give access to S3 bucket created and ec2 operations as well as well

Limitations for Importing a VM into Amazon EC2 Using Import Image

- You can have up to twenty import image or snapshots tasks per region in progress at the same time. To request an increase to this limit, contact AWS Support. Tasks must complete within 7 days of the start date.
- Imported VMs create Amazon EC2 AMIs that use Hardware Virtual Machine (HVM) virtualization. Creating AMIs that use Paravirtual (PV) virtualization using VM Import is not supported. Linux PVHVM drivers are supported within imported VMs.
- Imported Red Hat Enterprise Linux (RHEL) VMs must use Cloud Access (BYOL) licenses.
- Imported Linux VMs must use 64-bit images. Importing 32-bit Linux images is not supported.
- Imported Linux VMs should use default kernels for best results. VMs that use custom Linux kernels might not import successfully

Limitations for Importing a VM into Amazon EC2 Using Import Image

- Typically, you import a compressed version of a disk image; the expanded disk image cannot exceed 1 TiB.
- Make sure that you have at least 250 MB of available disk space for installing drivers and other software on any VM you want to import into an Amazon EC2 AMI running Microsoft Windows or Linux.
- Multiple network interfaces are not currently supported. When converted and imported, your VM will have a single virtual NIC using DHCP for address assignment.
- Internet Protocol version 6 (IPv6) IP addresses are not supported.
- For vCenter 4.0 and vSphere 4.0 users, remove any attached CD-ROM images or ISOs from the virtual machine

Limitations for Importing a VM into Amazon EC2 Using Import Image

- VMs that are created as the result of a P2V conversion are not supported by Amazon EC2 VM import. A P2V conversion occurs when a disk image is created by performing a Linux or Windows installation process on a physical machine and then importing a copy of that Linux or Windows installation into a VM.
- Amazon VM Import does not install the single root I/O virtualization (SR-IOV) drivers except for imports of Microsoft Windows Server 2012 R2 VMs. These drivers are not required unless you plan to use enhanced networking, which provides higher performance (packets per second), lower latency, and lower jitter. To enable enhanced networking on a c3 or i2 instance type after you import your VM

Limitations for Importing a VM into Amazon EC2 Using Import Image

- In connection with your use of your own Microsoft licenses, such as through MSDN or Windows Software Assurance Per User, to run Microsoft Software on AWS through a bring your own license (BYOL) model:
  - Run on a Dedicated Instance
  - Launch from VMs sourced from software binaries provided by you using VM Import/Export, which will be subject to the then-current terms and abilities of VM Import/Export;
  - Designate the instances as BYOL instances (i.e., declare the appropriate platform type flag in the services);
  - Run the instances within your designated AWS regions, and where AWS offers the BYOL model;
  - Run the instances within your designated AWS regions, and where AWS offers the BYOL model;

Known Limitations for Importing a VM into Amazon EC2 Using ImportInstance

- You can have up to five import tasks per region in progress at the same time. To request an increase to this limit, contact AWS Support. Tasks must complete within 7 days of the start date.
- Imported VMs create EC2 instances that use Hardware Virtual Machine (HVM) virtualization. Creating instances that use Paravirtual (PV) virtualization using VM Import is not supported. Linux PVHVM drivers are supported within imported VMs.
- Imported Red Hat Enterprise Linux (RHEL) VMs must use Cloud Access (BYOL) licenses.
- Imported Linux VMs must use 64-bit images. Importing 32-bit Linux images is not supported.
- Imported Linux VMs should use default kernels for best results. VMs that use custom Linux kernels might not import successfully.

Known Limitations for Importing a VM into Amazon EC2 Using ImportInstance

- Typically, you import a compressed version of a disk image;
- the expanded disk image cannot exceed 1 TiB.
- Make sure your VM only uses a single disk.
- Importing a VM with more than one disk is not supported.
- For Linux VMs, /boot and / can be located in different partitions, but they need to be on the same disk.

Known Limitations for Importing a VM into Amazon EC2 Using Import Instance

- We suggest that you import the VM with only the boot volume, and import any additional disks using the ec2-import-volume command.
- After the Import Instance task is complete, use the ec2-attach-volume command to associate the additional volumes with your instance.
- Virtual Hard Disk (VHD) images must be dynamic.
- Make sure that you have at least 250 MB of available disk space for installing drivers and other software on any VM you want to import into an Amazon EC2 instance running Microsoft Windows or Linux.

Known Limitations for Importing a VM into Amazon EC2 Using Import Instance

- Imported VMs automatically have access to the Amazon EC2 instance store, which is temporary disk storage located on disks that are physically attached to the host computer. You cannot disable this during import.
- Multiple network interfaces are not currently supported. When converted and imported, your instance will have a single virtual NIC using DHCP for address assignment.
- Internet Protocol version 6 (IPv6) IP addresses are not supported.
- For vCenter 4.0 and vSphere 4.0 users, remove any attached CD-ROM images or ISOs from the virtual machine.
- Amazon VM Import does not install the single root I/O virtualization (SR-IOV) drivers on the c3 and i2 instance types, except for imports of Microsoft Windows Server 2012 R2 VMs. These drivers are not required unless you plan to use enhanced networking, which provides higher performance (packets per second), lower latency, and lower jitter. To enable enhanced networking on a c3 or i2 instance type after you import your VM
- You cannot import Microsoft Windows VMs that use the bring your own license (BYOL) model. To import these VMs,

Known Limitations for Importing a VM into Amazon EC2 Using Import Instance

- You can have up to five export tasks per region in progress at the same time.
- You cannot export Amazon Elastic Block Store (Amazon EBS) data volumes.
- You cannot export an instance or AMI that has more than one virtual disk.
- You cannot export an instance or AMI that uses a fixed Virtual Hard Disk (VHD).
- You cannot export an instance or AMI that has more than one network interface.
- You cannot export an instance or AMI from Amazon EC2 unless you previously imported it into Amazon EC2 from another virtualization environment.
- You cannot export an instance or AMI from Amazon EC2 if you've shared it from another AWS account