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Building Clouds with OpenNebula 3.4

Constantino Vázquez Blanco
dsa-research.org | OpenNebula.org

Distributed Systems Architecture Research Group
Universidad Complutense de Madrid

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Hybrid Cloud Computing

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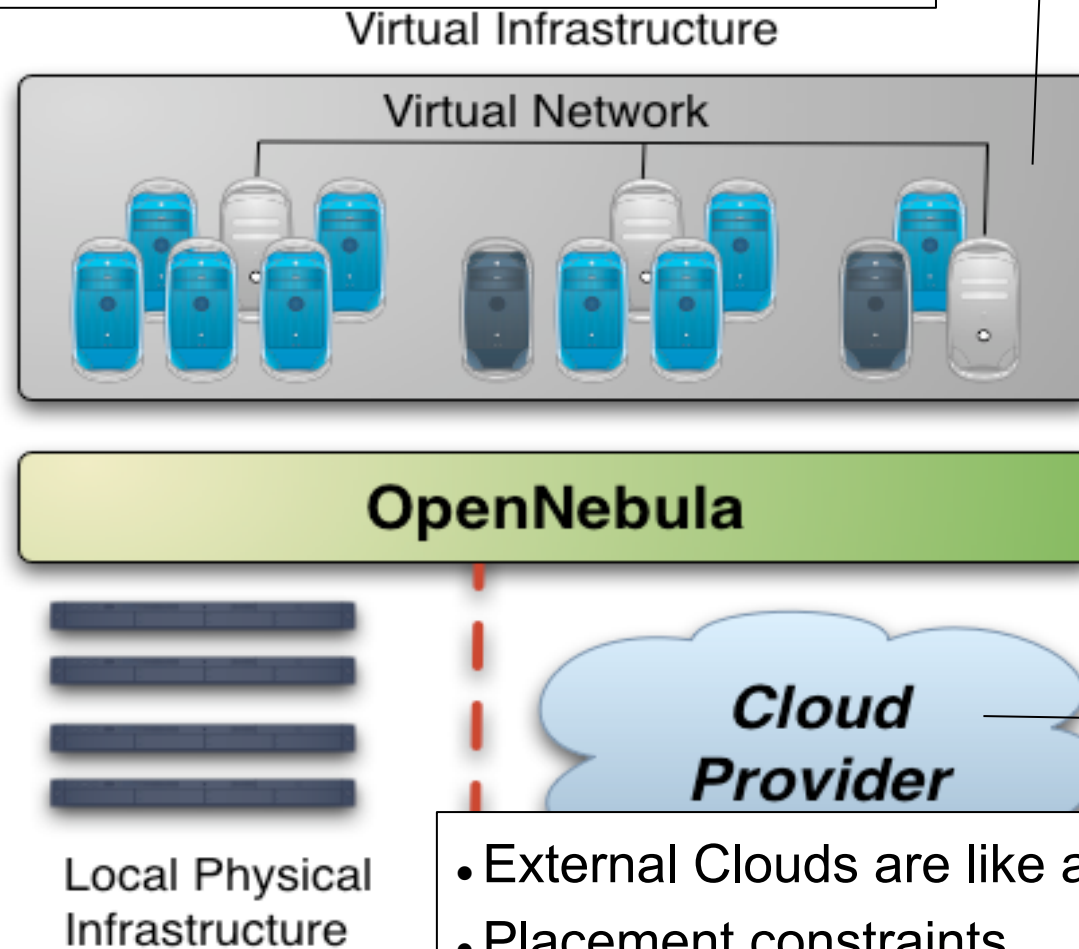


- Hybrid Cloud Computing
- Installing a Hybrid Cloud with EC2
- Configuring the Hybrid Cloud
- Using the OpenNebula-EC2 Cloud

Hybrid Cloud Computing

Overview

- VMs can be local or remote
- VM connectivity has to be configured, usually VPNs



- External Clouds are like any other host
- Placement constraints
- OpenNebula distribution includes EC2 drivers

Installing the Hybrid Cloud

Runtime Requirements (front-end)

- EC2 libraries and tools.

```
# apt-get install ec2-ami-tools ec2-api-tools
```

- EC2 tools credentials:

```
$ export EC2_PRIVATE_KEY=/srv/cloud/one/ec2/pk.pem  
$ export EC2_CERT=/srv/cloud/one/ec2/cert.pem
```

- Add those variables to `.bashrc` and test the tools

```
$ ec2-describe-images  
IMAGE      ami-0742a66e      /rubensm-amis.s3.amazonaws.com/  
image.manifest.xml      418314910487      available      private  
i386      machine  
IMAGE      ami-e142a688      rubensm-amis.s3.amazonaws.com/  
image.manifest.xml      418314910487      available      private  
i386      machine
```

Installing the Hybrid Cloud

OpenNebula drivers for EC2

- Configure OpenNebula to use the EC2 drivers

```
IM_MAD = [  
  name           = "im_ec2",  
  executable     = "one_im_ec2",  
  arguments      = "im_ec2/im_ec2.conf" ] # No. of instances of each type  
  
VM_MAD = [  
  name           = "vmm_ec2",  
  executable     = "one_vmm_ec2",  
  arguments      = "vmm_ec2/vmm_ec2.conf", # Defaults, e.g. keypair  
  type           = "xml" ]  
  
TM_MAD = [ #No actual transfers are made by OpenNebula to EC2  
  name           = "tm_dummy",  
  executable     = "one_tm",  
  arguments      = "tm_dummy/tm_dummy.conf" ]
```

Installing the Hybrid Cloud

OpenNebula drivers for EC2

- Configure the OpenNebula account (will use bashrc)

```
$ vim $ONE_LOCATION/etc/vmm_ec2/vmm_ec2rc
#-----
# EC2 API TOOLS Configuration.
#-----
EC2_HOME="/usr/"
#EC2_PRIVATE_KEY="/srv/cloud/one/ec2/certs/pk.pem"
#EC2_CERT="/srv/cloud/one/ec2/certs/cert.pem"
```

- Configure the capacity to be outsourced

```
$ vim $ONE_LOCATION/etc/im_ec2/im_ec2.conf
#-----
# Max number of instances that can be launched into EC2
#-----
SMALL_INSTANCES=5
LARGE_INSTANCES=
EXTRALARGE_INSTANCES=
```

Installing the Hybrid Cloud

OpenNebula drivers for EC2

- Amazon EC2 cloud is managed by OpenNebula as any other cluster node. Restart the oned, and check that the new drivers are loaded

```
$ one stop; one start
$ more $ONE_LOCATION/var/oned.log
Fri Jan 15 18:16:46 2010 [VMM][I]: Loading Virtual Machine Manager
driv
Fri Jan 15 18:16:46 2010 [VMM][I]:      Loading driver: vmm_kvm (KVM)
Fri Jan 15 18:16:47 2010 [VMM][I]:      Driver vmm_kvm loaded.
Fri Jan 15 18:16:47 2010 [VMM][I]:      Loading driver: vmm_ec2 (XML)
Fri Jan 15 00:16:47 2010 [InM][I]: Loading Information Manager
drivers.
Fri Jan 15 00:16:47 2010 [InM][I]:      Loading driver: im_kvm
Fri Jan 15 00:16:47 2010 [InM][I]:      Driver im_kvm loaded
Fri Jan 15 00:16:47 2010 [InM][I]:      Loading driver: im_ec2
```

Configuring the Hybrid Cloud

Register the EC2 Cloud

- Register the EC2 Cloud
- Check the information and characteristics of the new *host*

```
$ onehost create ec2 im_ec2 vmm_ec2 tm_dummy
```

```
$ onehost list
```

ID	NAME	RVM	TCPU	FCPU	ACPU	TMEM	FMEM	STAT
0	host01	0	200	200	200	2017004	1667080	on
1	host02	1	200	200	200	2017004	1681676	on
2	ec2	0	500	500	500	8912896	8912896	on

Configuring the Hybrid Cloud

Using EC2 zones and multiple accounts

- You can use **several accounts** by adding a driver for each account (use the arguments attribute, -k and -c options). Create a host that uses the driver

```
VM_MAD = [  
  name          = "vmm_ec2",  
  executable    = "one_vmm_ec2",  
  arguments     = "vmm_ec2/vmm_ec2.conf -k /srv/cloud/...",  
  type          = "xml" ]
```

- You can use **multiple EC2 zones**, add a driver for each zone (use the arguments attribute, -u option). Create a host that uses the driver

```
VM_MAD = [  
  name          = "vmm_ec2",  
  executable    = "one_vmm_ec2",  
  arguments     = "vmm_ec2/vmm_ec2.conf -u http://...",  
  type          = "xml" ]
```

Using the Hybrid Cloud

Defining an EC2 Virtual Machine

- Virtual Machines can be instantiated locally or in EC2
 - The template must provide a description for both instantiation methods.
 - The EC2 counterpart of your VM (AMI_ID) must be available for the driver account
 - The EC2 VM template attribute:

```
EC2 = [  
  AMI           = "ami_id for this VM",  
  KEYPAIR       = "the keypair to use the instance",  
  AUTHORIZED_PORTS = "ports to access the instance",  
  INSTANCETYPE  = "m1.small...",  
  ELASTICIP     = "the elastic ip for this instance",  
  CLOUD         = "host (EC2 cloud) to use this description with"  
]
```

Using the Hybrid Cloud

Example, Use the OpenNebula –Ec2 Hybrid Cloud

- Add an EC2 counterpart to the ttylinux image

```
$ vi ttylinux.one
#EC2 template machine, this will be use if this VM is created in EC2
EC2 = [ AMI="ami-ccf405a5",
        KEYPAIR="keypair",
        AUTHORIZED_PORTS="22",
        INSTANCETYPE=m1.small]

#Add this if you want to use only EC2 cloud
REQUIREMENTS = "HOSTNAME = \"ec2\""
```

Using the Hybrid Cloud

Example, Use the OpenNebula –Ec2 Hybrid Cloud

- Check progress
- Check VM information with `onevm show` and Sunstone

```
$ onevm list
ID      USER      NAME  STAT  CPU    MEM      HOSTNAME      TIME
   5  oneadmin  ttylinux  runn   0      0K      ec2 00 00:00:59
$ ec2-describe-instances
RESERVATION      r-53599b3f      418314910487      default
INSTANCE         i-a884b7c7      ami-ccf405a5
ec2-50-19-44-30.compute-1.amazonaws.com ip-10-85-65-203.ec2.internal
running keypair 0      m1.small
2011-05-03T01:14:08+0000      us-east-1d      aki-407d9529
monitoring-disabled      50.19.44.30      10.85.65.203
ebs
BLOCKDEVICE      /dev/sda1      vol-ed935186
2011-05-03T01:14:31.000Z
```

Using the Hybrid Cloud

Example, Use the OpenNebula –Ec2 Hybrid Cloud

```
$ onevm show 17
...
VIRTUAL MACHINE TEMPLATE
CPU=0.5
...
EC2=[
  AMI=ami-ccf405a5,
  KEYPAIR=keypair ]
IP=ec2-50-19-44-30.compute-1.amazonaws.com
...

$ ssh -i keypair.pem ubuntu@ec2-50-19-44-30.compute-1.amazonaws.com
Linux ip-10-212-134-128 2.6.21.7-2.fc8xen-ec2-v1.0 #2 SMP Tue Sep 1
10:04:29 EDT 2009 i686
...
ubuntu@ip-10-85-65-203:~$ exit

This costs money!
$ onevm shutdown 17
$ onehost disable ec2
$ onehost list
```

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