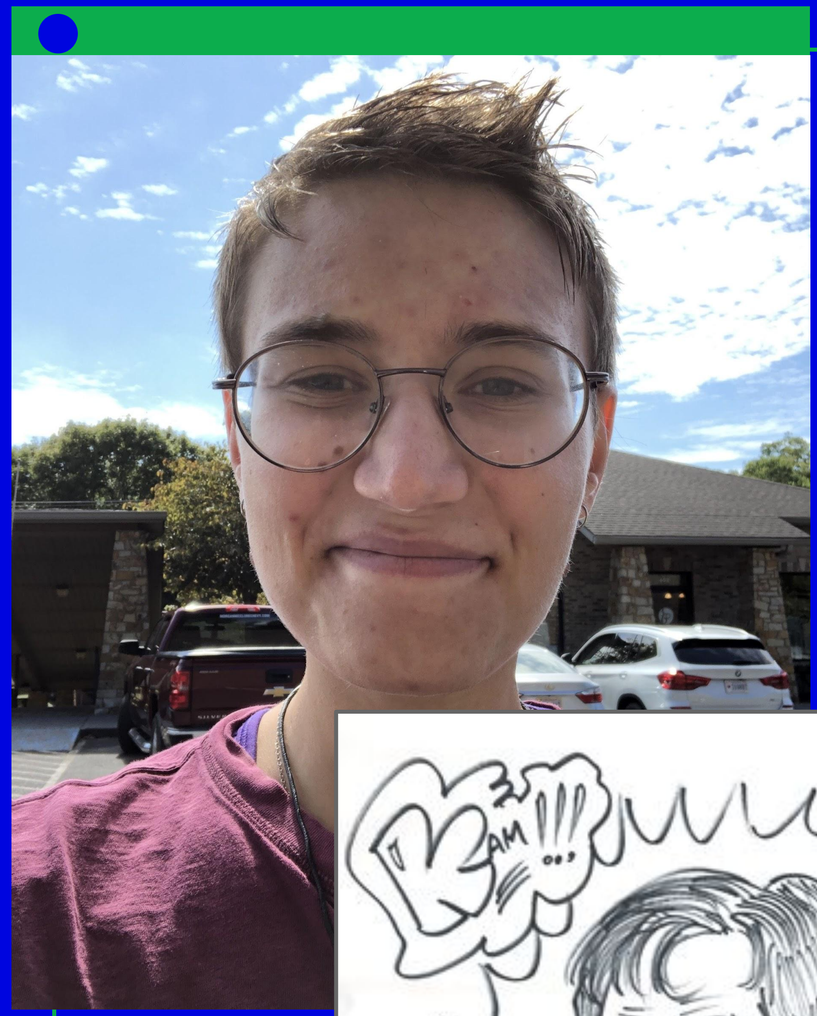
GDG [Location]

devfest

2020

Exporting Machines from AWS

Georgia Smith
Security Admin, PCCC
&
Kevin A. McGrail
Principal Evangelist, Dito



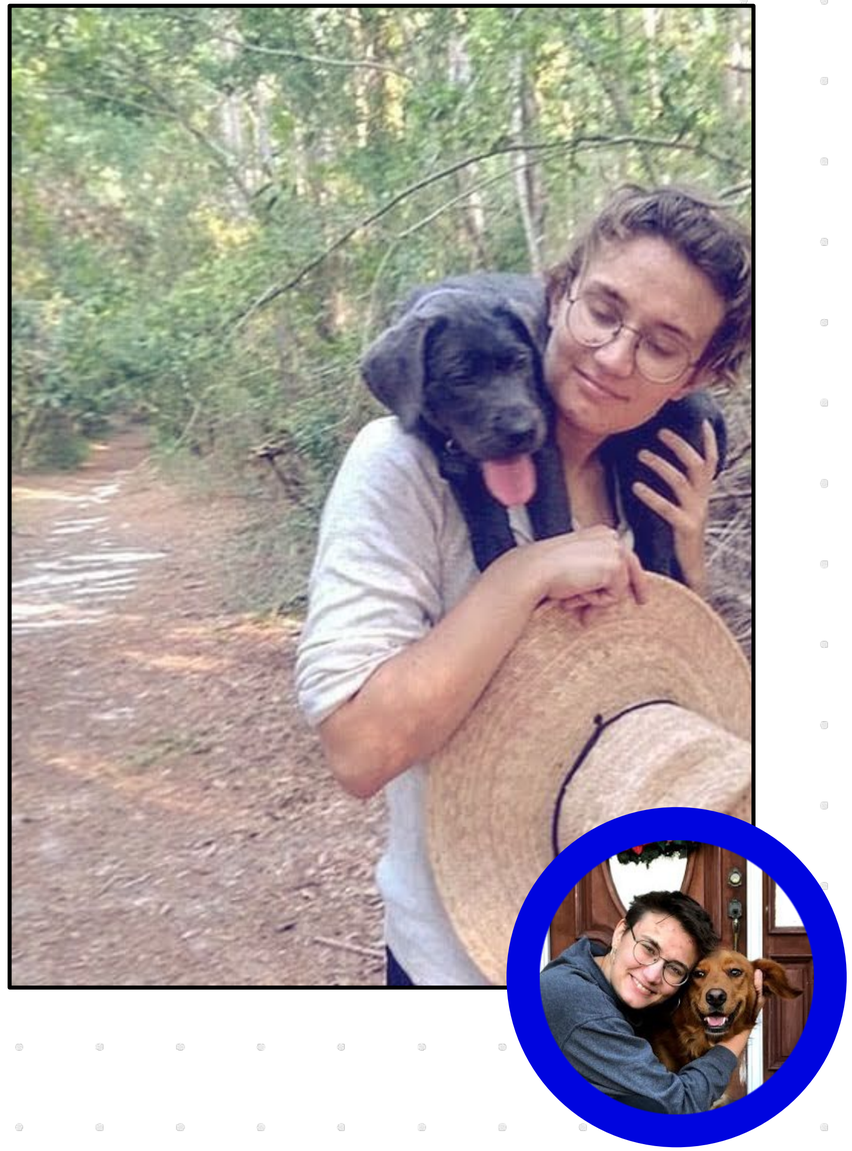
Introductions - Georgia Smith

Student, UVA Wise ‘21

Math BS, Computer Science BS

Security Analyst

Peregrine Computer Consultants Corporation



Introductions - KAM

Kevin A. McGrail

Principal Evangelist, Dito

Google Workspace TC, GDE & Ambassador

https://www.linkedin.com/in/kmcgrail

The Problem

Vendor Stickiness aka Roach Motel

You can't NORMALLY export an instance if:

It contains third-party software provided by AWS
Example: Windows or SQL Server or any instance created from an image in the AWS Marketplace

It has more than one virtual disk

It has more than one network interface.

Roach Motel
Roach Traps
Kill roaches without poison
odor or mess

Cost to Export Using Clonezilla

AWS Data Transfer	$140.47
Charges	$140.47
Estimated US sales tax to be collected	$0.00
Amazon Elastic Compute Cloud	$298.97
Charges	$298.97
Estimated US sales tax to be collected	$0.00

Data Transfer IN To Amazon EC2 From Internet	
All data transfer in	$0.00 per GB
Data Transfer OUT From Amazon EC2 To Internet	
Up to 1 GB / Month	$0.00 per GB
Next 9.999 TB / Month	$0.09 per GB
Next 40 TB / Month	$0.085 per GB
Next 100 TB / Month	$0.07 per GB
Greater than 150 TB / Month	$0.05 per GB

The Solution

Clonezilla

“Clonezilla is a partition and disk imaging/cloning program...”

Clonezilla Machine Specs

Clonezilla - ami-09307f75653f8792d

For Use Transferring from AWS to vm1

Root device type: ebs Virtualization type: hvm Owner: 916435243058 ENA Enabled: Yes

Debian Machine (any Debian Based Distro works)
- 30 GB Magnetic Storage
- t2.micro

Clonezilla Installation:
- sudo apt-get update
- sudo apt-get install clonezilla
- sudo drblsrv -i

Availability Zones

1. Choose AMI | 2. Choose Instance Type | **3. Configure Instance** | 4. Add Storage | 5. Add Tags | 6. Configure Security Group | 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advant

Number of instances	1 Launch into Auto Scaling Group
Purchasing option	☐ Request Spot instances
Network	vpc-e0597186 (default) Create new VPC
Subnet	No preference (default subnet in any Availability Zone) Create new subnet
Auto-assign Public IP	
Placement group	
Capacity Reservation	
Domain join directory	Create new directory

- No preference (default subnet in any Availability Zone)
- subnet-0db1c631 | Default in us-east-1e
- subnet-f76d2092 | Default in us-east-1b
- subnet-d9af6a91 | Default in us-east-1d
- subnet-4ab13946 | Default in us-east-1f
- subnet-1fd7d644 | Default in us-east-1a
- subnet-2fd9d302 | Default in us-east-1c

IMPORTANT: The Clonezilla Instance needs to be in the same Availability Zone (Set On Machine Creation)

Security Group

aws Services

1. Choose AMI | 2. Choose Instance Type | 3. Configure Instance | 4. Add Storage | 5. Add Tags | **6. Configure Security Group** | 7. Review

Step 6: Configure Security Group

sg-08aa1191eaa008fe8	CentOS 7 -x86_64- - with Updates HVM-2002_01-AutogenByAWSMP-1	This security group was generated by
sg-0aef6c7c1ea779a52	CentOS 7 -x86_64- - with Updates HVM-2002_01-AutogenByAWSMP-2	This security group was generated by
sg-0bae7cb7ef776fb9a	CentOS 7 -x86_64- - with Updates HVM-2002_01-AutogenByAWSMP-3	This security group was generated by
sg-04228f692abfcc73c	ClamAV	Allows connections to ClamAV listener
sg-01fbefa1c48141659	Clonezilla	For Clonezilla to vm1.pccc.com

Inbound rules for sg-01fbefa1c48141659 (Selected security groups: sg-01fbefa1c48141659)

Type	Protocol	Port Range
Custom TCP Rule	TCP	9015
Custom TCP Rule	TCP	9003
Custom TCP Rule	TCP	9009
SSH	TCP	22
SSH	TCP	22
Custom TCP Rule	TCP	9001

Port 22 for SSH

Clonezilla Ports

9001

9003

9009

9015

Consider a Clonezilla AMI

- Easy to Spin Up

- Easy to get the correct Availability Zone

Migrating a Linux Box

Linux Machine to Migrate

CentOS 7 (x86_64) - with Updates HVM

This is the Official CentOS 7 x86_64 HVM image that has been built with a minimal profile, suitable for use in HVM instance types only. The image contains just enough packages to run within AWS, bring up an SSH Server and allow users to login. Please note that this is the default CentOS-7 image that we recommend everyone uses. It contains ...

More info

View Additional Details in AWS Marketplace

Free tier eligible

CentOS 7 loaded from the AWS Marketplace

- 8GB Magnetic Storage
- **Same Availability Zone**
  - t2.micro
    - 1 GB RAM
    - 1 vCPU
- Security Group for SSH

Set Sudo / Passwd

- The default AWS user (centos) is only accessible using a key

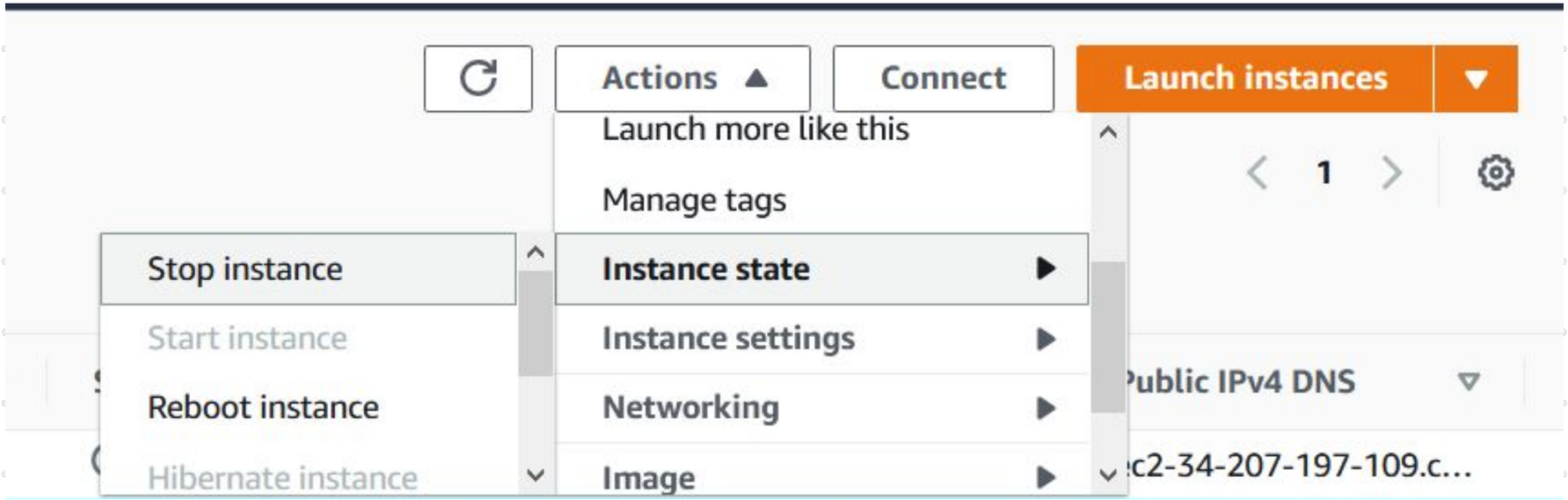
- Consider setting a password and sudo access

```
[centos@ip-172-31-44-70 ~]$ sudo usermod -aG wheel centos
[centos@ip-172-31-44-70 ~]$ passwd
Changing password for user centos.
Changing password for centos.
[centos@ip-172-31-44-70 ~]$ echo "migration time" > migrate.txt
[centos@ip-172-31-44-70 ~]$ cat migrate.txt
migration time
[centos@ip-172-31-44-70 ~]$ sudo shutdown -h now
```

Turn Off The Instances

- Prepare to attach the Volume for the Instance to Migrated to the Clonezilla Instance

- The Instances to be Migrated and Clonezilla MUST be turned off to do this

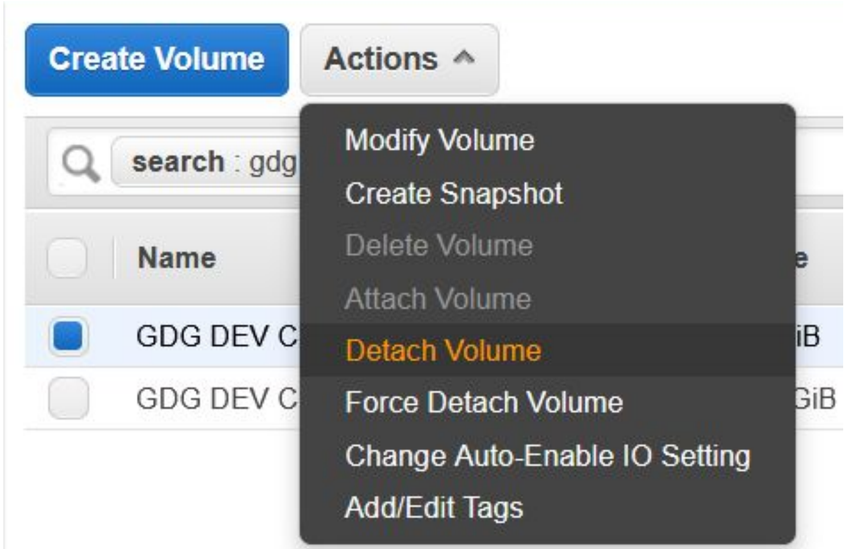


Detach & Attach Volume

- Detach the Volume to be Transferred
- Attach the Volume to Clonezilla Instance

HINT #1: Use the Default location of /dev/sdf

HINT #2: Name the Volumes & Instances in AWS for Easy Identify instead of AWS' long id strings!

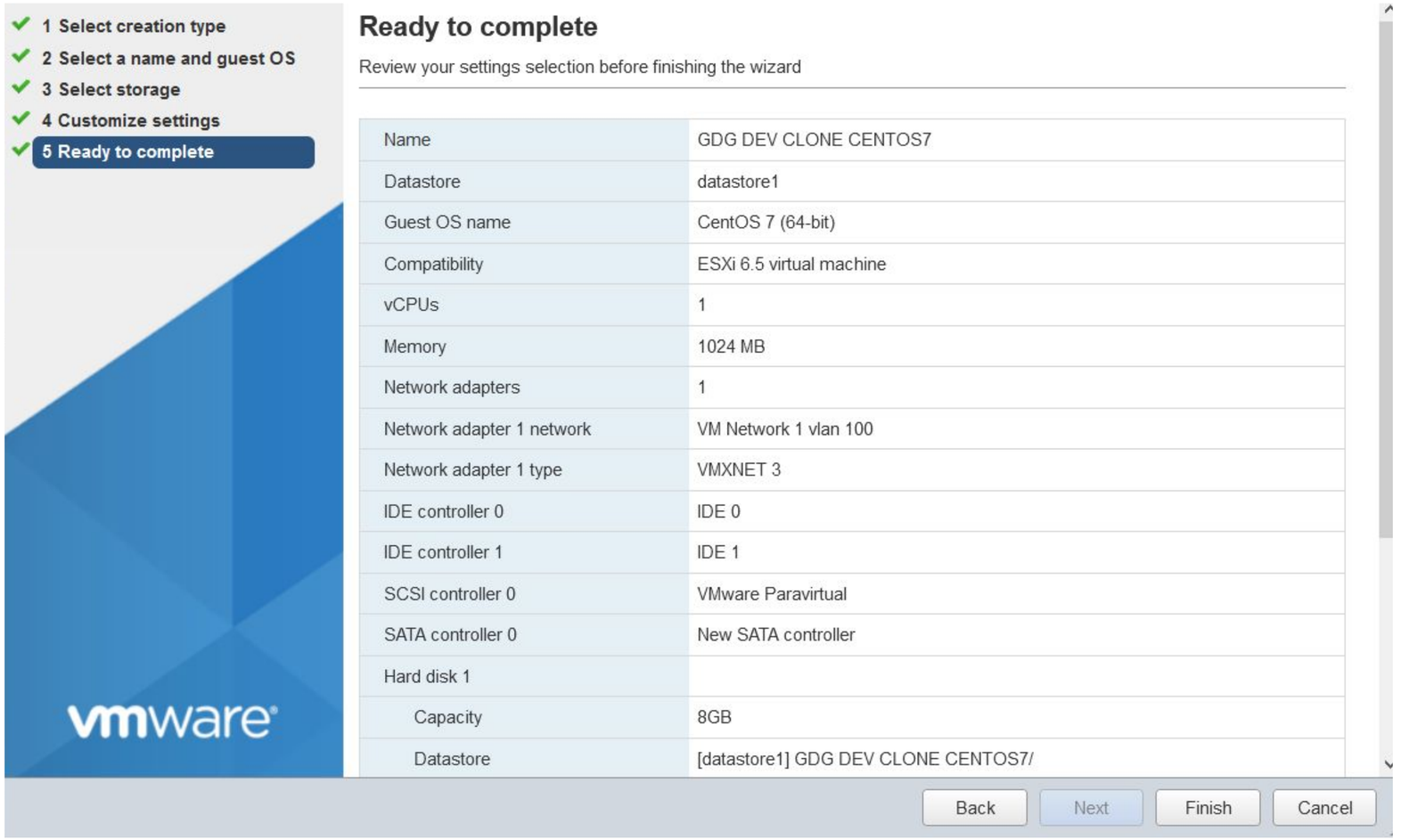


Prepare Destination Machine

For Best Results: The Destination Machine should match the MINIMUM specifications from the source and the exact same or more storage space.

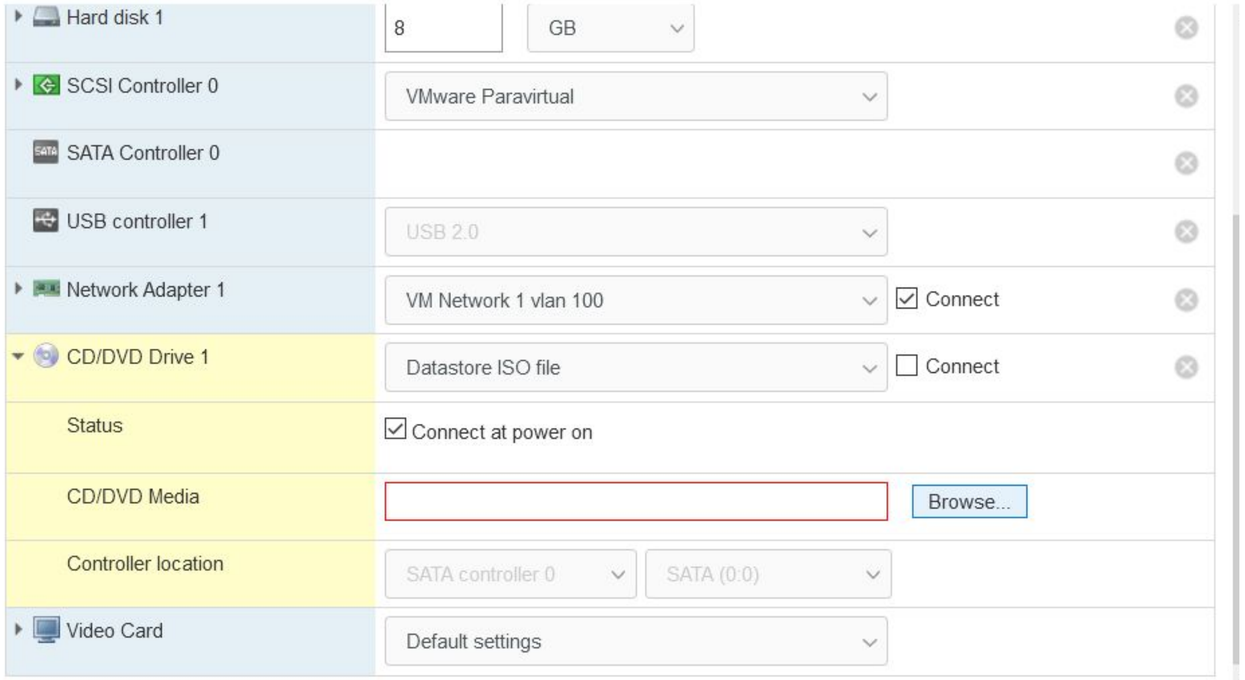
Name	vCPUs	RAM (GiB)	CPU Credits/hr
t2.nano	1	0.5	3
t2.micro	1	1.0	6
t2.small	1	2.0	12
t2.medium	2	4.0	24
t2.large	2	8.0	36
t2.xlarge	4	16.0	54
t2.2xlarge	8	32.0	81

Example Dest: VMware ESXI



Clonezilla Live on Dest Machine

- https://clonezilla.org/downloads.php
- The ISO allows for migration directly to the target machine



Source Clonezilla (AWS)

```
admin@ip-172-31-37-239:~$ sudo clonezilla
```

```
Clonezilla - Opensource Clone System (OCS)
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
///Hint! From now on, if multiple choices are available, you have to press space key to
mark your selection. An asterisk (*) will be shown when the selection is done///
Two modes are available, you can
(1) clone/restore a disk or partition using an image
(2) disk to disk or partition to partition clone/restore.
Besides, Clonezilla lite server and client modes are also available. You can use them for
massive deployment
Select mode:

        device-image  work with disks or partitions using images
        device-device work directly from a disk or partition to a disk or partition
        remote-source Enter source mode of remote device cloning
        remote-dest   Enter destination mode of remote device cloning
        lite-server   Enter_Clonezilla_live_lite_server
        lite-client   Enter_Clonezilla_live_lite_client


                    <Ok>                          <Cancel>
```

Source Clonezilla (Cont.)

```
┤ Clonezilla - Opensource Clone System (OCS) ├
Choose the mode to run the following wizard about advanced parameters:

        Beginner Beginner mode: Accept the default options
        Expert   Expert mode: Choose your own options
        Exit     Exit. Enter command line prompt

                <Ok>                        <Cancel>
```

```
┤ Clonezilla - Opensource Clone System (OCS) ├
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
This software will overwrite the data on your hard drive when cloning! It is recommended
to backup important files on the target disk before you cloning!***

        disk_to_remote_disk local_disk_to_remote_disk_clone
        part_to_remote_part local_partition_to_remote_partition_clone
        exit                Exit. Enter command line prompt

                <Ok>                        <Cancel>
```

Source Clonezilla (Cont.)

```
┤ Clonezilla - Opensource Clone System (OCS) | Mode: disk_to_remote_disk ├
Choose local disk as source.
The disk name is the device name in GNU/Linux. The first disk in the system is "hda" or
"sda", the 2nd disk is "hdb" or "sdb"...

                    xvdf 8590MB_Unknown_model_No_disk_serial_no

                    <Ok>                                <Cancel>
```

```
┤ Clonezilla on-the-fly advanced extra parameters | Mode: disk_to_remote_disk ├
Set the advanced parameters (multiple choices available). If you have no idea, keep the
default value and do NOT change anything.:

      -sfsck   Skip checking/repairing source file system
      -fsck    Interactively check and repair source file system before cloning
      -fsck-y  Auto (Caution!) check and repair source file system before cloning

                    <Ok>                                <Cancel>
```

Source Clonezilla (Cont.)

Mode: disk_to_remote_disk

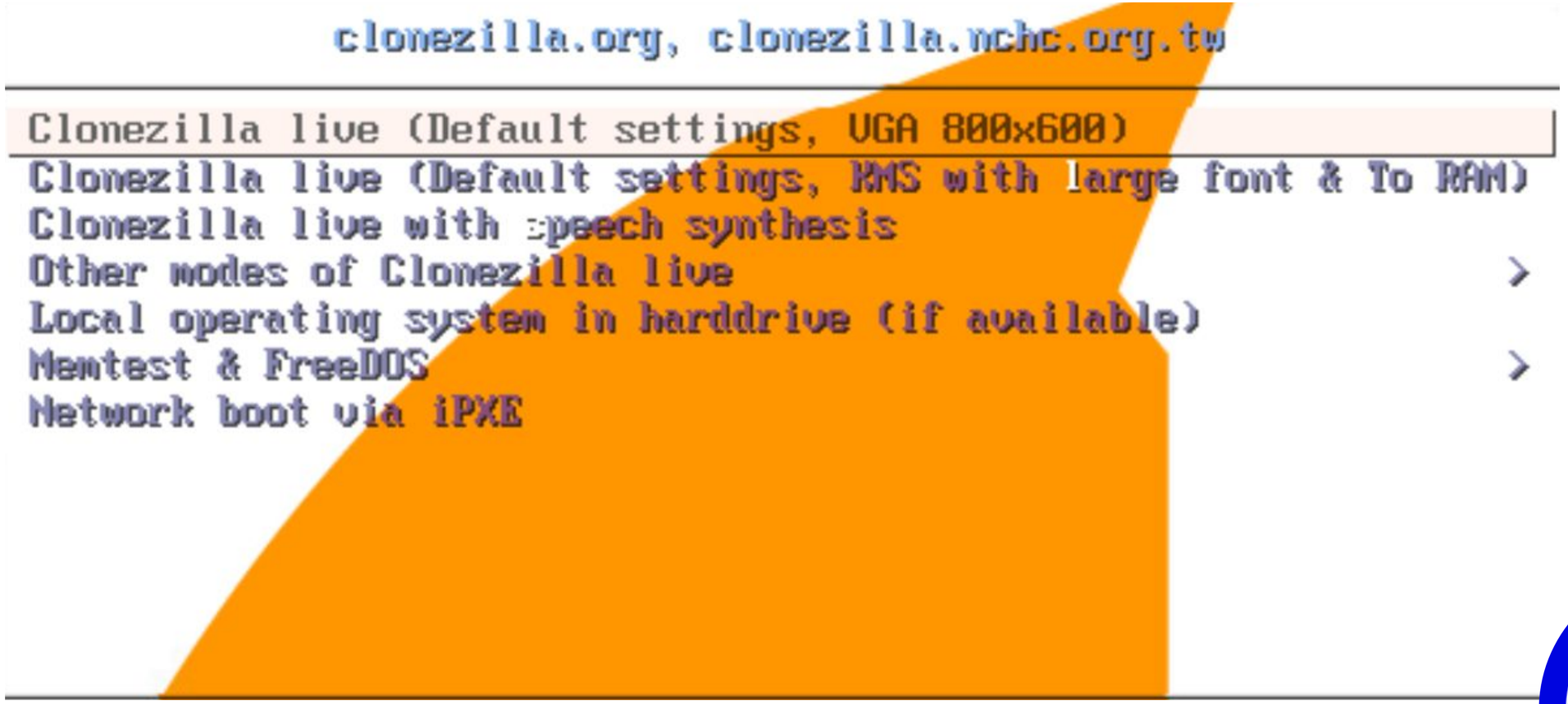
The action to perform when everything is finished:

-pa choose Choose reboot/shutdown/etc when everything is finished
-pa reboot Reboot
-pa poweroff Shutdown

<Ok> <Cancel>

PS. Next time you can run this command directly:
/usr/sbin/ocs-onthefly -g auto -e1 auto -e2 -r -j2 -sfsck -pa choose -a -f xvdf
This command is also saved as this file name for later use if necessary: /tmp/ocs
20-10-13-22-12
**********.
Press "Enter" to continue...

Destination Clonezilla



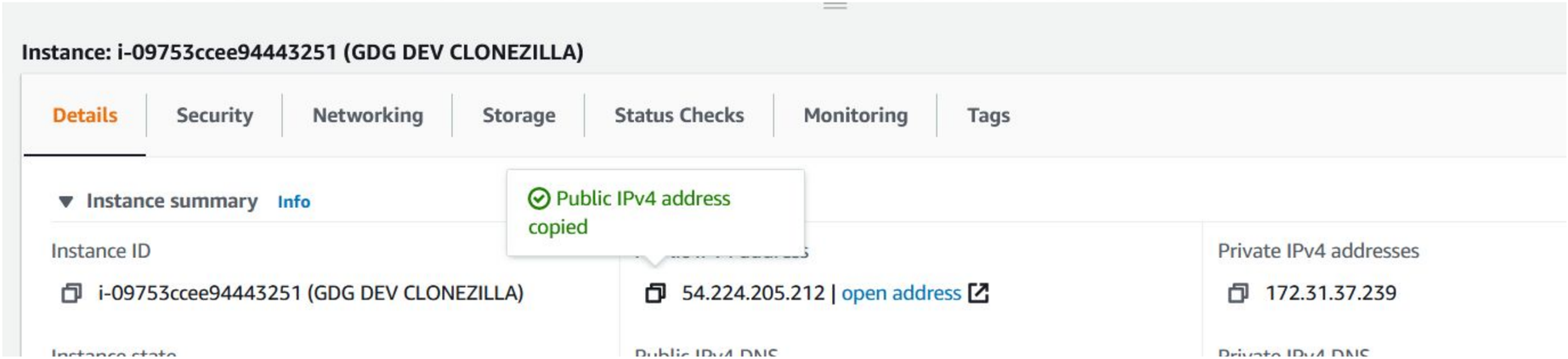
Migration - Destination Machine

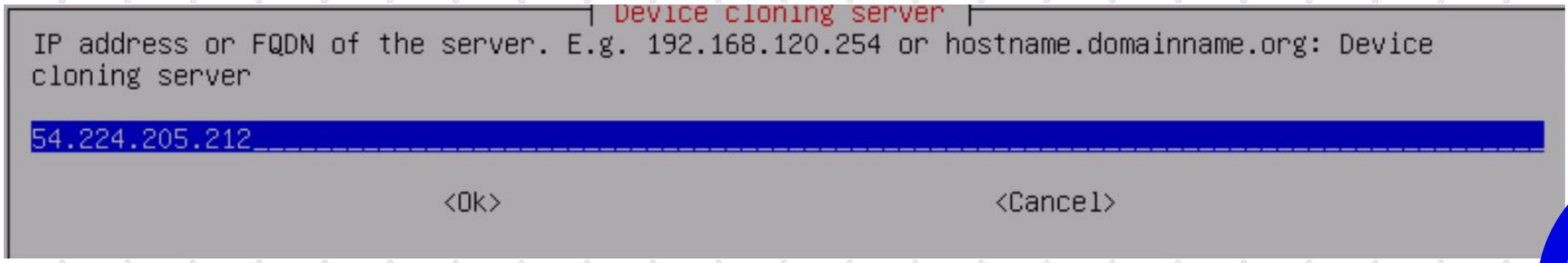
```
Clonezilla - Opensource Clone System (OCS)
*Clonezilla is free (GPL) software, and comes with ABSOLUTELY NO WARRANTY*
///Hint! From now on, if multiple choices are available, you have to press space key to mark
your selection. An asterisk (*) will be shown when the selection is done///
Two modes are available, you can
(1) clone/restore a disk or partition using an image
(2) disk to disk or partition to partition clone/restore.
Besides, Clonezilla lite server and client modes are also available. You can use them for
massive deployment
Select mode:

        device-image  work with disks or partitions using images
        device-device work directly from a disk or partition to a disk or partition
        remote-source Enter source mode of remote device cloning
        remote-dest   Enter destination mode of remote device cloning
        lite-server   Enter_Clonezilla_live_lite_server
        lite-client   Enter_Clonezilla_live_lite_client

                      <Ok>                              <Cancel>
```

Destination Clonezilla (Cont.)





Destination Clonezilla (Cont.)

```
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
 BE LOST: sda
**************************************************.
Machine: VMware Virtual Platform
sda (8590MB_Virtual_disk__No_disk_serial_no)
**************************************************.
Are you sure you want to continue? (y/n) y
OK, let's do it!!
**************************************************.
Let me ask you again.
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
 BE LOST: sda
Are you sure you want to continue? (y/n) y_
```

Destination Clonezilla (Cont.)

```
Partclone
Partclone v0.3.14 http://partclone.org
Starting to restore image (-) to device (/dev/sda1)
Calculating bitmap... Please wait...
done!
File system:  XFS
Device size:    8.6 GB = 2096896 Blocks
Space in use: 924.6 MB = 225727 Blocks
Free Space:     7.7 GB = 1871169 Blocks
Block size:   4096 Byte



Elapsed: 00:00:01 Remaining: 00:01:39   Rate:   0.00byte/min
Current Block: 0  Total Block: 2096896

Data Block Process:
                                                      1.00%

Total Block Process:
                                                      0.00%
```

Destination Clonezilla (Cont.)

```
┤ Choose mode ├
Now you can choose to:

 poweroff Poweroff
 reboot   Reboot
 cmd      Enter command line prompt
 rerun1   Start over (image repository /home/partimag, if mounted, will be umounted)


                                  <Ok>
```

Linux Boot Problems

```
[    8.377094] fbcon: svgadrmfb (fb0) is primary device
[    8.386084] Console: switching to colour frame buffer device 100x37
[    8.407465] [drm] Initialized vmwgfx 2.15.0 20180704 for 0000:00:0f.0 on minor 0
[   10.712344] floppy0: no floppy controllers found
[   10.712567] work still pending
[   12.346972] vmxnet3 0000:0b:00.0 ens192: intr type 3, mode 0, 2 vectors allocated
[   12.347978] vmxnet3 0000:0b:00.0 ens192: NIC Link is Up 10000 Mbps
```

```
 4min 9.802s cloud-init.service
      4.677s network.service
      3.287s cloud-init-local.service
      1.540s postfix.service
      1.212s dev-sda1.device
      1.206s tuned.service
      1.167s cloud-config.service
```

Fixing Linux Boot Problems

```
[centos@ip-172-31-44-70 network-scripts]$ ls
ifcfg-ens192  ifdown-ippp     ifdown-sit       ifup-bnep  ifup-plusb    ifup-TeamPort
ifcfg-eth0    ifdown-ipv6     ifdown-Team      ifup-eth   ifup-post     ifup-tunnel
ifcfg-lo      ifdown-isdn     ifdown-TeamPort  ifup-ippp  ifup-ppp      ifup-wireless
ifdown        ifdown-post     ifdown-tunnel    ifup-ipv6  ifup-routes   init.ipv6-global
ifdown-bnep   ifdown-ppp      ifup             ifup-isdn  ifup-sit      network-functions
ifdown-eth    ifdown-routes   ifup-aliases     ifup-plip  ifup-Team     network-functions-ipv6
[centos@ip-172-31-44-70 network-scripts]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens192: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1
000
    link/ether 00:0c:29:b8:2f:ff brd ff:ff:ff:ff:ff:ff
    inet 192.168.20.107/24 brd 192.168.20.255 scope global dynamic ens192
       valid_lft 6286sec preferred_lft 6286sec
    inet6 fe80::20c:29ff:feb8:2fff/64 scope link
       valid_lft forever preferred_lft forever
[centos@ip-172-31-44-70 network-scripts]$ rm -f ifcfg-eth0
rm: cannot remove ‘ifcfg-eth0’: Permission denied
[centos@ip-172-31-44-70 network-scripts]$ sudo !!
sudo rm -f ifcfg-eth0
```

Fixing Linux /etc/resolv.conf

```
; generated by /usr/sbin/dhclient-script
search pccc.com ec2.internal
nameserver 192.168.20.1
```

```
; generated by /usr/sbin/dhclient-script
search pccc.com
nameserver 8.8.8.8
```

```
BOOTPROTO=dhcp
DEVICE=ens192
HWADDR=00:0c:29:b8:2f:ff
ONBOOT=yes
TYPE=Ethernet
USERCTL=no
PEERDNS=no
```

Remove cloud-init

```
[centos@ip-172-31-44-70 ~]$ sudo yum autoremove cloud-init
Loaded plugins: fastestmirror
Resolving Dependencies
--> Running transaction check
---> Package cloud-init.x86_64 0:18.5-3.el7.centos will be erased
--> Finished Dependency Resolution
--> Finding unneeded leftover dependencies
Found and removing 0 unneeded dependencies

Dependencies Resolved

================================================================================
 Package              Arch              Version                    Repository          Size
================================================================================
Removing:
 cloud-init           x86_64            18.5-3.el7.centos          installed          3.0 M

Transaction Summary
================================================================================
Remove  1 Package

Installed size: 3.0 M
Is this ok [y/N]: y
```

Linux Boot Problem SOLVED!

```
3.783s network.service
1.679s dev-sda1.device
1.455s tuned.service
 961ms postfix.service
```

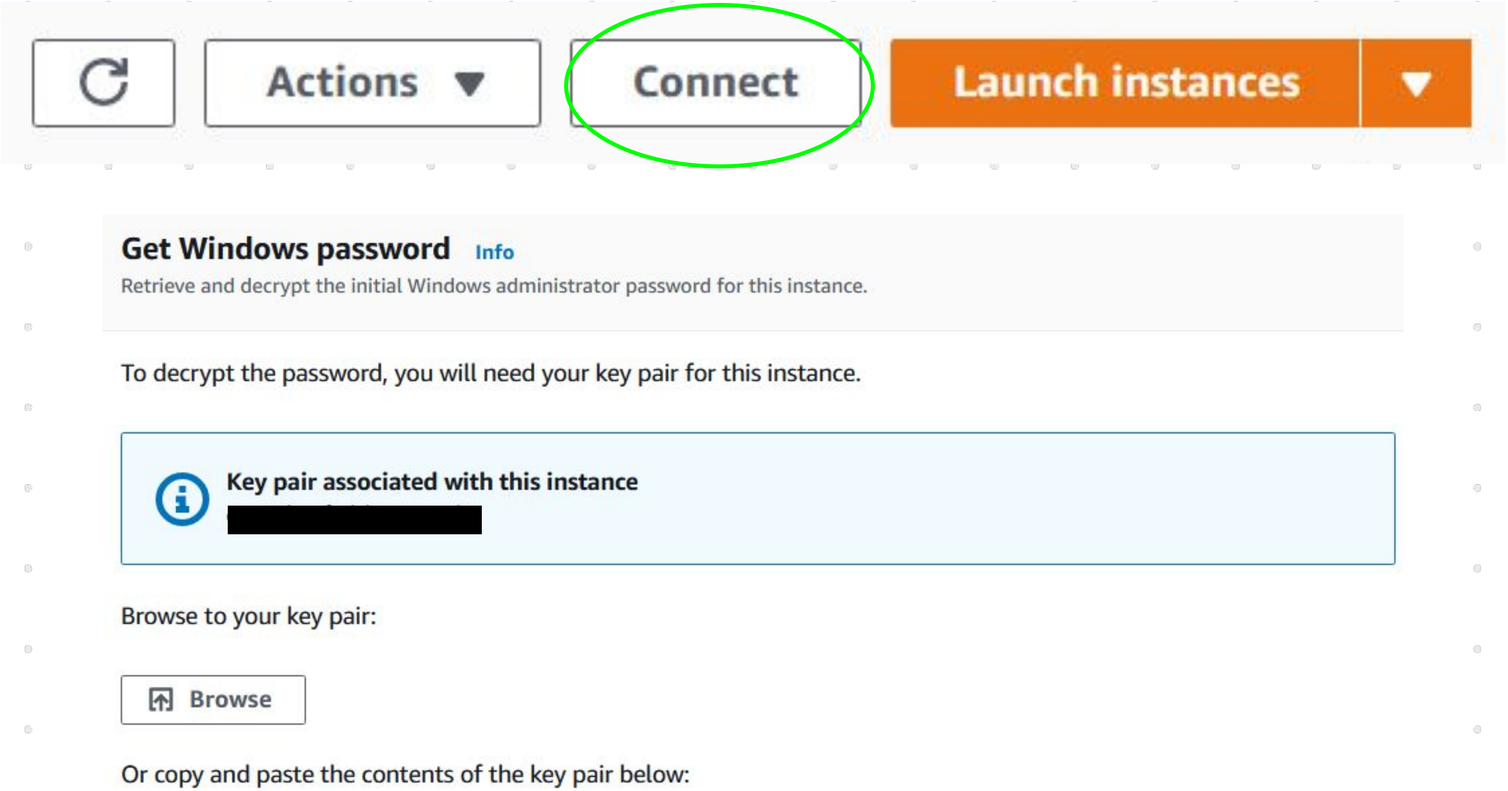
Migrating a Windows Box

Windows Machine to Migrate

Windows Server 2019 Datacenter Edition
(from AWS Marketplace)
- 30GB Magnetic Storage
- Same Availability Zone
- t2.micro
- 1 GB RAM
- 1 vCPU
- Security Group: RDP

Make Sure You Have Credentials

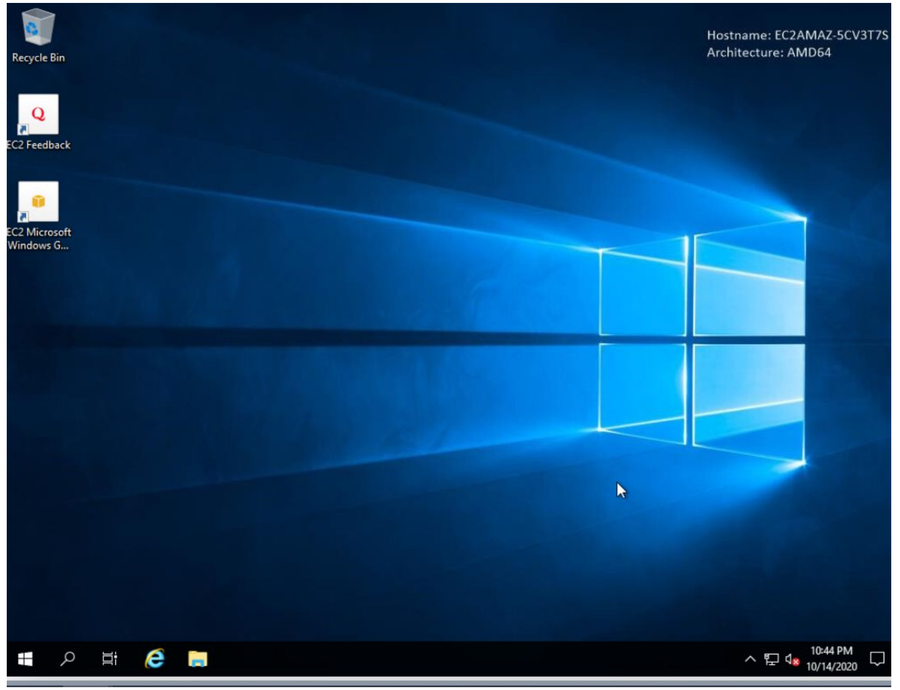
- Get Instance RDP Details and Password



Migration is the Same

- Follow the same steps as with the Linux box
  - Configure the network how you like (Static, DHCP, Public, Private, etc)

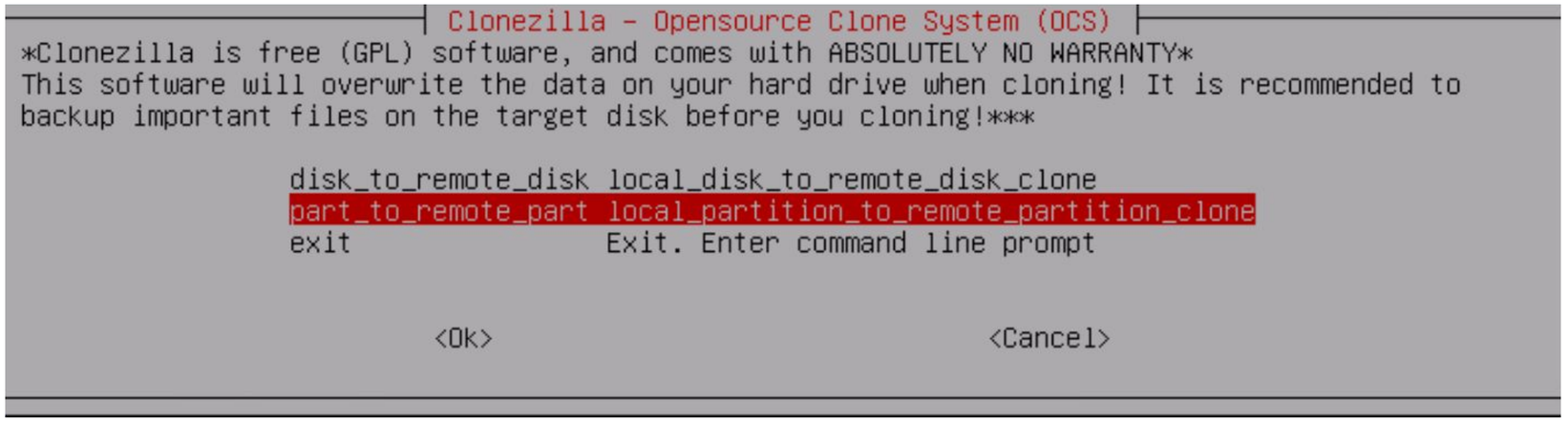
NOTE: Will need to know the IP for RDP!



Final Notes from KAM

Bombing Out after Partition 1?

- We found a repeatable issue with one box where partitions after the first.
-
- SOLUTION: Clone it like normal. When it fails on partition 2, the partition table has already been cloned. Now use partition to partition overtop for the other Partitions. Works great!



Avoid the Issue to Begin With

Consider tools like spinning up boxes in Vmware ESXI or VirtualBox and them importing into the cloud

Licensing

IMPORTANT: Boxes with licensing like Windows WILL report being unlicensed soon (though it might take some time).

Cloud Pros & Cons

Ease of Licensing with hosting like AWS

However, ESXI is free and a great tool!

Anthos is also amazing but not Free.

Three main types of Data Centers.
EACH TYPE HAS A PURPOSE!

Total Cost of Ownership

Virtual Machines STILL need administration!

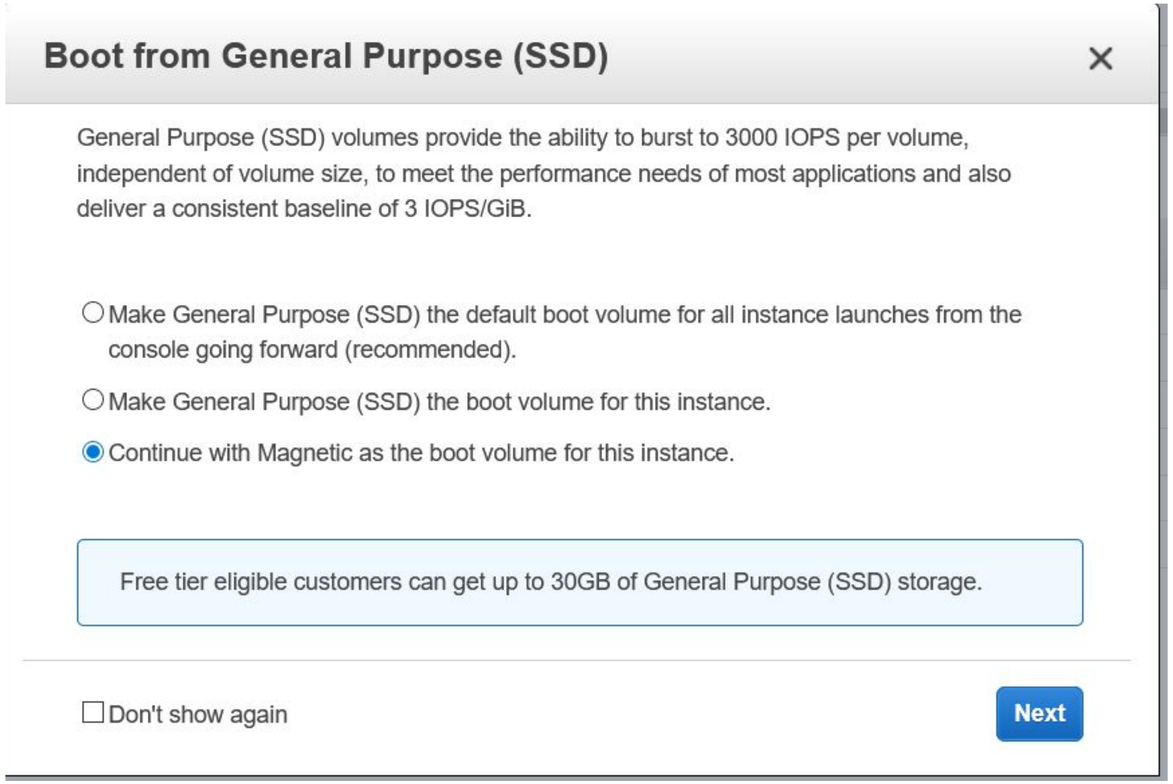
55 points for an full-time IT Administrator

1 point per workstation

5 points per server

4 points per virtual server

Death by Papercuts #1



Death by Papercuts #2

Product Details

Name	vCPUs	RAM (GiB)	CPU Credits/hr	On-Demand Price/hr*	1-yr Reserved Instance Effective Hourly*	3-yr Reserved Instance Effective Hourly*
t2.nano	1	0.5	3	$0.0058	$0.003	$0.002
t2.micro	1	1.0	6	$0.0116	$0.007	$0.005
t2.small	1	2.0	12	$0.023	$0.014	$0.009
t2.medium	2	4.0	24	$0.0464	$0.031	$0.021
t2.large	2	8.0	36	$0.0928	$0.055	$0.037
t2.xlarge	4	16.0	54	$0.1856	$0.110	$0.074
t2.2xlarge	8	32.0	81	$0.3712	$0.219	$0.148

*Prices shown are for Linux/Unix in US East (Northern Virginia) AWS Region. Prices for 1-year and 3-year reserved instances are for "Partial Upfront" payment options or "No upfront" for instances without the Partial Upfront option. For full pricing details, see the Amazon EC2 pricing page.

Q: How Much is $0.0928 per Hour per Month?

A: ~$70.00

Thanks!

Slides will be on KAM's LinkedIn & mcgrail.com/downloads

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Georgia Smith
www.linkedin.com/in/ga-smith

Kevin A. McGrail
www.linkedin.com/in/kmcgrail