

ESX on ARM (Ampere A12c)

Scope:

This document covers the steps required to boot an ESX image on OCI Ampere A1-2C BareMetal nodes



Before you get started, Please register for [OCI ARM accelerator program](#) and request for limits to run a A1-2C BM

Step1:

Download the [ESX ARM ISO](#) from the VMware Flings website



ESXi Arm Edition

version 1.5 — August 06, 2021

ARM64

EDGE

ESXI

ESXI ARM EDITION

ESXI ON ARM

IOT

NANO-EDGE

☐ I have read and agree to the [Technical Preview](#)

[License](#) I also understand that Flings are experimental and should not be run on production systems.

ESXi-Arm-ISO

DOWNLOAD

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Step2:

Create a iPXE server to host the ISO

The iPXE server will hold the ISO needed to perform the install of the ESXi operating system on the donor BM instance. Ensure that port 80 has been allowed on the subnet for the iPXE server.

Follow this procedure:

1. Instantiate a VM instance (try to use a VM for same CPU architecture if possible).
2. Provision a block volume of at least 50G to hold the images. Attach to the instance, format and mount on /var/www (create the directory). Ensure that the /etc/fstab is updated to mount the volume at boot.
3. Install the following packages: httpd rsync lzma gcc libffi-devel python3-devel openssl-devel unzip gcc rsyslog jq python-firewall git
4. Attach a block volume to hold the ISOs, expansion of ISOs, and ipxe information.
5. Run the following commands on the iPXE server

```

git clone http://git.ipxe.org/ipxe.git
cd ipxe/src
LANG=C make bin-arm64-efi/snponly.efi
mkdir -p /var/www/html/ipxe/70/
mkdir -p /var/www/html/70/
cp bin-arm64-efi/snponly.efi /var/www/html/ipxe/70/
yum -y install httpd rsync lzma gcc libffi-devel python3-devel openssl-devel unzip gcc rsyslog
jq python-firewall git devtoolset-8 emacs-nox python36-oci-cli
scl enable devtoolset-8 bash
mkdir /mnt
mount -o loop /home/opc/VMware-VMvisor-Installer-7.0.0-18427252.aarch64.iso /mnt
pushd /mnt; find . | cpio -pmvdu /var/www/html/70/
cp /mnt/efi/boot/boot.cfg /var/www/html/ipxe/70/
cp /mnt/efi/boot/bootaa64.efi /var/www/html/ipxe/70/mboot.efi
service httpd status
service httpd start
service httpd status
systemctl enable httpd
service httpd status
chmod -R ug+rwX,o-w,o+rX /var/www/
firewall-cmd --zone=public --add-service=http --permanent
firewall-cmd --reload
mkdir /var/www/html/ipxe/70/esxi_ks

```

6. Update the boot.cfg

```

bootstate=0
title=Loading ESXi installer
timeout=5
# This is the iPXE server IP
prefix=http://10.0.2.175/70
kernel=b.b00
# This is the iPXE server IP
kernelopt=runweasel cdromBoot ks=http://10.0.2.175/70/esxi_ks/ks.cfg
modules=jumpstrt.gz --- useropts.gz --- features.gz --- k.b00 --- procfs.b00 --- vmx.v00 --- vim.v00
--- tpm.v00 --- sb.v00 --- s.v00 --- ena.v00 --- bnxtnet.v00 --- bnxtroce.v00 --- brcmfcoe.v00 ---
brcmnvme.v00 --- elxiscsi.v00 --- elxnet.v00 --- i40en.v00 --- i40iwn.v00 --- iavmd.v00 --- igbn.v00
--- iser.v00 --- ixgben.v00 --- lpfc.v00 --- lpnic.v00 --- lsi_mr3.v00 --- lsi_msgp.v00 --- lsi_msgp.
v01 --- lsi_msgp.v02 --- mtip32xx.v00 --- ne1000.v00 --- nenic.v00 --- nfnic.v00 --- nhpsa.v00 ---
nmlx4_co.v00 --- nmlx4_en.v00 --- nmlx4_rd.v00 --- nmlx5_co.v00 --- nmlx5_rd.v00 --- ntg3.v00 ---
nvme_pci.v00 --- nvmerdma.v00 --- nvmxnet3.v00 --- nvmxnet3.v01 --- pvscsi.v00 --- qcnice.v00 ---
qedentv.v00 --- qedrntv.v00 --- qfle3.v00 --- qfle3f.v00 --- qfle3i.v00 --- qflge.v00 --- rste.v00 ---
sfvmk.v00 --- smartpqi.v00 --- vmkata.v00 --- vmkfcoc.v00 --- vmkusb.v00 --- vmw_ahci.v00 --- elx_esx.
v00 --- btldr.v00 --- esx_dvfi.v00 --- esx_ui.v00 --- esxupdt.v00 --- tpmesxup.v00 --- weaselin.v00 ---
loadesx.v00 --- lsuv2_hp.v00 --- lsuv2_in.v00 --- lsuv2_ls.v00 --- lsuv2_nv.v00 --- lsuv2_oe.v00 ---
lsuv2_oe.v01 --- lsuv2_oe.v02 --- lsuv2_sm.v00 --- native_m.v00 --- qlnative.v00 --- vmware_e.v00 ---
vsan.v00 --- vsanheal.v00 --- vsanmgmt.v00 --- tools.t00 --- imgdb.tgz --- imgpayld.tgz
build=7.0.0-1.0.18427252
updated=0

```

7. Create a ks.cfg (Kickstart file)

```

#[root@ipxe-arm-server3 opc]# cat /var/www/html/ipxe/70/esxi_ks/ks.cfg
#Accept the VMware End User License Agreement
vmaccepteula

# Set the root password for the DCUI and Tech Support Mode
rootpw myp@ssw0rd

# Install on the first local disk available on machine
install --firstdisk --overwritevmfs

# Set the network to DHCP on the first network adapter
network --bootproto=dhcp --device=vmnic0
#[root@ipxe-arm-server3 opc]#

```

The iPXE server should be ready for use at this point.

Step3 :

Building the image

Building the image is composed of four parts: The iPXE script at launch, launch script, installation of ESXi, and verification.

iPXE Script

The iPXE script is created and placed the same directory from where the BM will be launched using the launch script

```

#!ipxe
set target-iqn iqn.2015-02.oracle.boot:uefi
set root-path iscsi:169.254.0.2:::${target-iqn}
set alt-root iscsi:169.254.0.2:::1:${target-iqn}
set eversion 70
sanhook ${root-path} || sanboot ||
sanhook ${alt-root} || sanboot || set url http://10.0.2.175
kernel ${url}/ipxe/${eversion}/mboot.efi -H -c ${url}/ipxe/${eversion}/boot.cfg
boot

```

Launch Script

This is the launch script that was used to build the image in R1. Modify to your needs:

```
#!/bin/bash

SSH_PUBLIC_KEY=`cat ~/.vinay_ssh.pub`

SUBNET_ID="ocid1.subnet.oc1.uk-london-1.aaaaaaaaw5rpswoosowvdbatshxhgtya5a4ncltkdcolyxgyonh6fagimbqq"

COMPARTMENT_ID="ocid1.tenancy.oc1..aaaaaaaaz3vffq654srxtl5zbzqjs7sugln2xthz73inbiig62s3ggpb25fq"

AD="PuSg:UK-LONDON-1-AD-1"

# VERSION is a concatenation of the ESXi version without the "."s
VERSION="7"

SHAPE="BM.Standard.A1.160"

# IMAGE_ID is the AllZeros image (or representation thereof) that can be used as a blank canvas
IMAGE_ID="ocid1.image.oc1.uk-london-1.aaaaaaaazy7ngsg5wj3byvhhegi4rqcdiuv7zk6lozosjdvw3o6sqib2lq"

echo ${IMAGE_ID}

echo ${AD}

echo ${SUBNET_ID}

oci compute instance launch \

--compartment-id=${COMPARTMENT_ID} --availability-domain=${AD} \

--image-id=${IMAGE_ID} \

--boot-volume-size-in-gbs=512 \

--ipxe-script-file=ipxeboot-7 \

--shape=${SHAPE} --display-name="arm-esxi1" --subnet-id=${SUBNET_ID} \

--metadata="{\"ssh_authorized_keys\": \"\"${SSH_PUBLIC_KEY}\"\" }'
```

Things to note:

- Use the same version string as you have for both the ipxeboot script and the directories on the iPX E instance.
- You need to have an AllZeros image that is devoid of an operating system. This prevents the BM instance to be used to generate the image from booting an OS and ignoring this process.
- OCID for AllZeros image

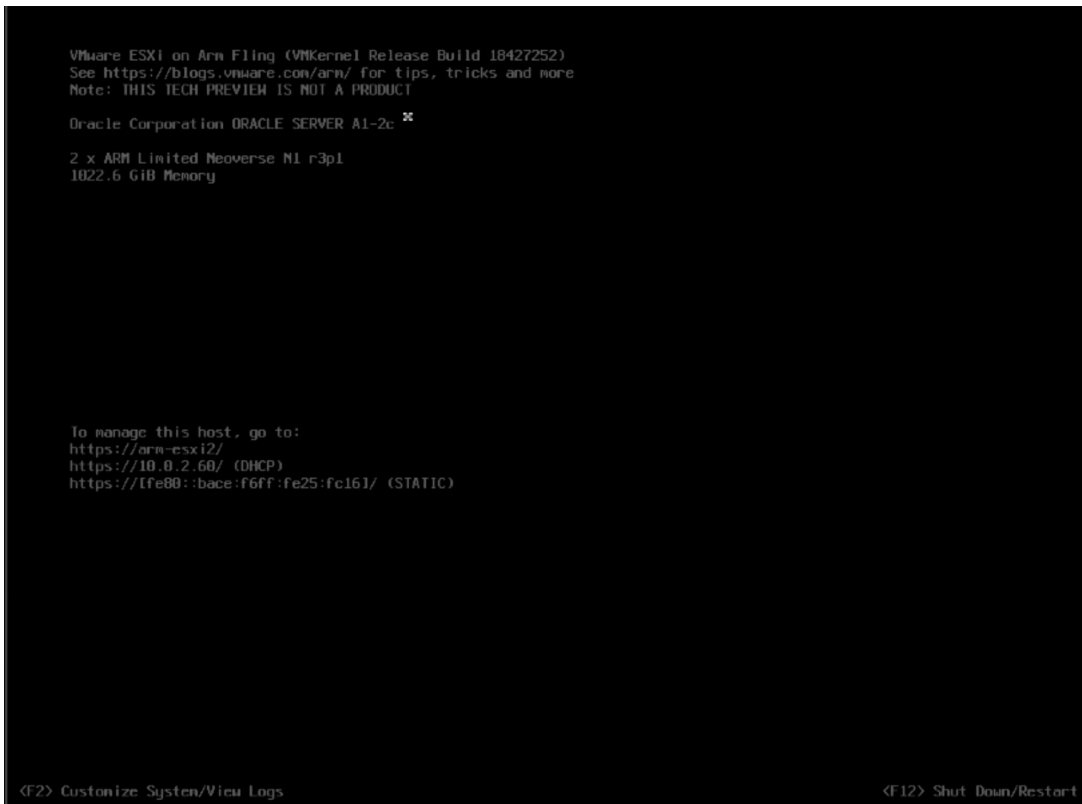
Region	OCID
PHX	ocid1.image.oc1.phx.aaaaaaaay27pdopotkapf2ahjlsn2wxndui5hn5w37hd2wss4ses4ol5xs6a
IAD	ocid1.image.oc1.iad.aaaaaaaqftkoa5web2r7w4ls3wegqmqy5f7untloetfiozyqbv2ql6qidq
FRA	ocid1.image.oc1.eu-frankfurt-1.aaaaaaaah4rggbyglst25peqd7vnyjzl6n5lwogijllb6jaircakom46nswq
LHR	ocid1.image.oc1.uk-london-1.aaaaaaaazy7ngsg5wj3byvhhegi4rqcdiuv7zk6lozosjdvw3o6sqib2lq

Step4:

ESXi Installation

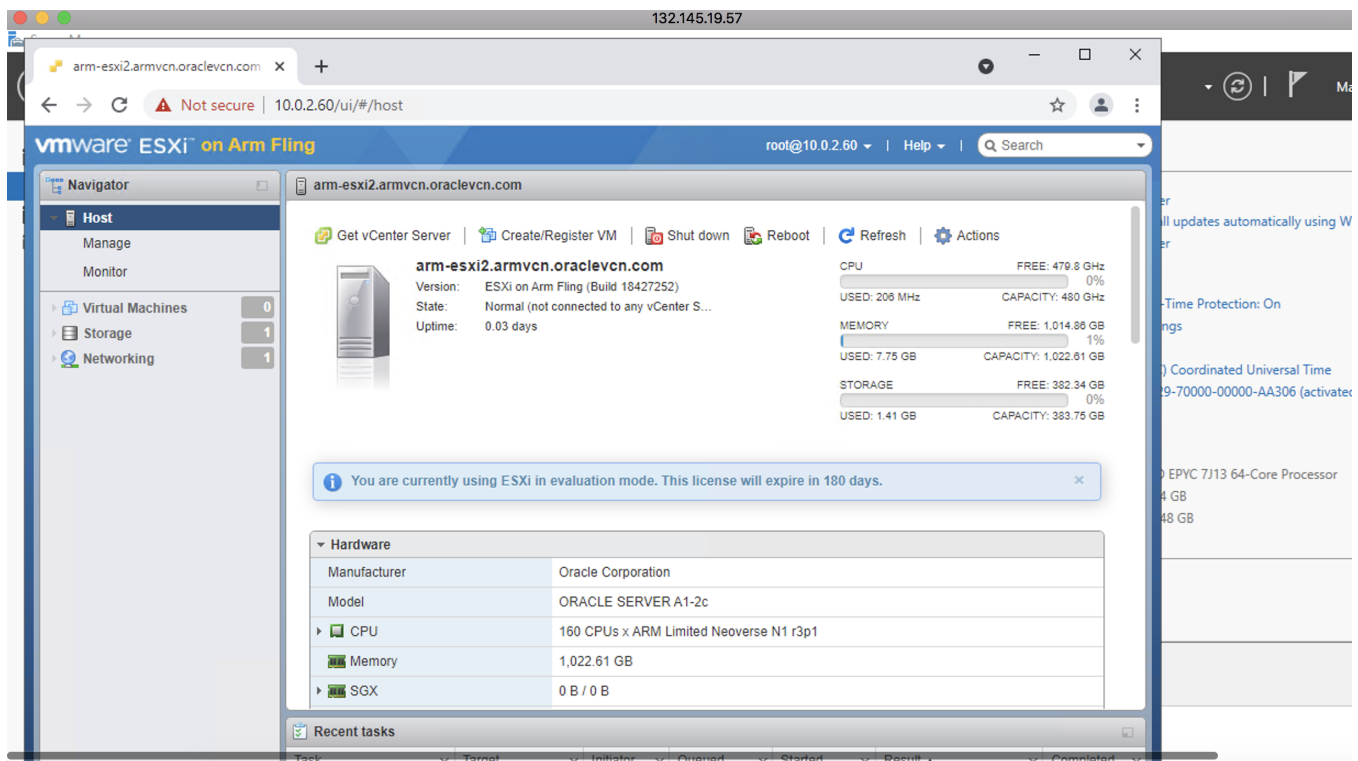
Perform the following procedure to for the initial installation. Execute the launch script above, coupled with the iPX E script to provision the BM instance.

1. Create a console connection to the BM instance when available.
2. Connect to the BM console *USING serial console*.
3. Hit "Enter" to reboot the box
4. Now connect to the BM console using VNC.
5. You will have the following screen.



Verification

Login to the ESX Host from a windows jump host:



Step5:

Create the L2 VLAN:

On OCI VCN, Create a VLAN and associate the same with RT and NSG



If you unable to create a VLAN, Please raise a SR with Oracle support and request allow-listing for VCN L2 feature

Resources

Subnets (2)

CIDR Blocks (1)

Route Tables (13)

Internet Gateways (0)

Dynamic Routing Gateways Attachments (0)

Network Security Groups (14)

Security Lists (3)

DHCP Options (1)

Local Peering Gateways (0)

NAT Gateways (1)

Service Gateways (0)

VLANs (0)

Work Requests (0)

VLANs in ocvp (root) *Compartment*

VLAN Description: A virtual local area network (VLAN) is a broadcast domain within a VCN created by partitioning and isolating a network at the data link layer (layer 2). VLANs work by using IEEE 802.1Q VLAN tags. A VLAN is analogous to a subnet, which partitions the VCN at the network layer (layer 3).

Create VLAN

Name	State	IEEE 802.1Q VLAN Tag ⓘ	VLAN Gateway CIDR ⓘ	Created
No items found.				

Showing 0 Items < 1 of 1 >

Create VLAN

ARM-VLAN1

CREATE IN COMPARTMENT ⓘ

ocvp (root)

VLAN TYPE

Regional

Instances in the VLAN can be created in any availability domain in the region. Useful for high availability. ✓

Availability Domain-specific

Instances in the VLAN can only be created in one availability domain in the region.

IEEE802.1Q VLAN TAG OPTIONAL ⓘ

100

Enter a number from 1 to 4094.

CIDR Block

VLAN GATEWAY CIDR ⓘ

10.0.100.0/24

Create a NSG For the VLAN

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Page: 6

NSG for ARM VLAN

Edit Move Resource Add Tags Terminate

Network Security Group Information Tags

OCID: ...7mewsq [Show](#) [Copy](#) Compartment: ocpv (root)

Created: Fri, Sep 17, 2021, 06:28:12 UTC

Security Rules

These security rules apply to all VNICs in this network security group. You can filter the list by ingress or egress. There can be other security rules that apply to a given VNIC in this group: from any other network security groups the VNIC is in, and any security lists associated with the VNIC's subnet. [Learn more about security rules.](#)

<input type="checkbox"/>	Direction ⁽ⁱ⁾	Source or Destination ⁽ⁱ⁾	Protocol ⁽ⁱ⁾	Details ⁽ⁱ⁾	Description ⁽ⁱ⁾
<input type="checkbox"/>	Direction: Ingress Stateless: No	Source Type: CIDR Source: 0.0.0.0/0	All Protocols	Allow: All tra... Show	
<input type="checkbox"/>	Direction: Egress Stateless: No	Destination Type: CIDR Destination: 0.0.0.0/0	All Protocols	Allow: All tra... Show	

0 Selected Showing 2 Items < 1 of 1 >

Create a Route table for the VLAN

RT for ARM VLAN

Move Resource Add Tags Terminate

Route Table Information Tags

OCID: ...jjkgzq [Show](#) [Copy](#) Compartment: ocpv (root)

Created: Fri, Sep 17, 2021, 06:27:37 UTC

Route Rules

<input type="checkbox"/>	Destination ⁽ⁱ⁾	Target Type	Target	Description
<input type="checkbox"/>	0.0.0.0/0	NAT Gateway	awesome-nat	

0 Selected Showing 1 Item < 1 of 1 >

Step6:

Attach VLAN to ESX ARM node

Under compute InstancesClick on the ARM Instance and attach a new Layer2 VNIC

Resources

Metrics

Attached block volumes

Attached VNICS

Boot volume

Console connection

Run command

Work requests

OS Management

Custom logs

Console history

Network bandwidth (GB): 1024

Memory (GB): 1024

Local disk: Block storage

Attached VNICS

A [virtual network interface card \(VNIC\)](#) lets an instance connect to a virtual cloud network (VCN) and outside the VCN.

Create VNIC

Name

arm-esxi1 (Primary VNIC)

Create VNIC

VNIC information

Name Optional

Layer2-vlan100

Select a virtual cloud network in **demo** [\(Change Compartment\)](#)

Arm-VCN

Network

Normal setup: subnet

The typical choice when adding a VNIC to an instance.

Advanced setup: VLAN

Only for experienced users who have purchased the Oracle Cloud VMWare Solution.

Advanced setup: VLAN in **esx-arm** [\(Change Compartment\)](#)

ARM-VLAN1

Physical NIC

NIC 0 (1 VNICs allocated)

Save changes

Cancel

Verify that the VNIC is Attached

Resources

Metrics

Attached block volumes

Attached VNICS

Boot volume

Console connection

Run command

Work requests

OS Management

Custom logs

Console history

Attached VNICS

A [virtual network interface card \(VNIC\)](#) lets an instance connect to a virtual cloud network (VCN) and determines how the instance connects with endpoints inside and outside the VCN.

Create VNIC

Name	Subnet or VLAN <small>i</small>	State	FQDN <small>i</small>	VLAN tag	MAC address
arm-esxi1 (Primary VNIC)	Subnet - private-instance	Attached	arm-esxi1... Show Copy	-	B8:CE:F6:25:FB:CA
Layer2-vlan100	VLAN - ARM-VLAN1	Attached	-	100	02:00:17:05:CF:EF

Showing 2 Items < 1 of 1 >

Now create a vSphere PortGroup on the ESX host with same VLAN ID

VLAN100

Edit settings

Refresh

Actions

VLAN100

Accessible: Yes

Virtual machines: 0

Virtual switch: vSwitch0

VLAN ID: 100

Active ports: 0

vSwitch topology

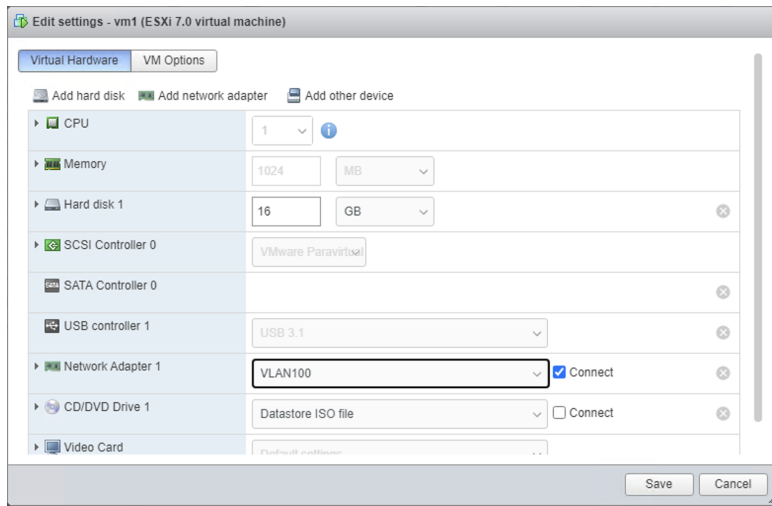
VLAN100

VLAN ID: 100

Physical adapters

vmnic0, 50000 Mbps, Full

And attach a VM to the portgroup



And now Validate the traffic

