June 2019

ExtremeGuest Gateway

Release 10.757

Installation Guide –Rev AA

9036320-00

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Contents

Introduction

ExtremeGuest Gateway (XGG) is a software application product that connects users on the local area network to the internet while applying policies and services to the inline sessions of the users. The application is built on a stateful firewall that is automatically configured based on the policies and services required to be applied to the users. Furthermore, it incorporates DHCP servers which are automatically configured for the required deployments.

XGG is delivered on bare metal or on ESXi (VMWare) for HA clustering where scale is required.

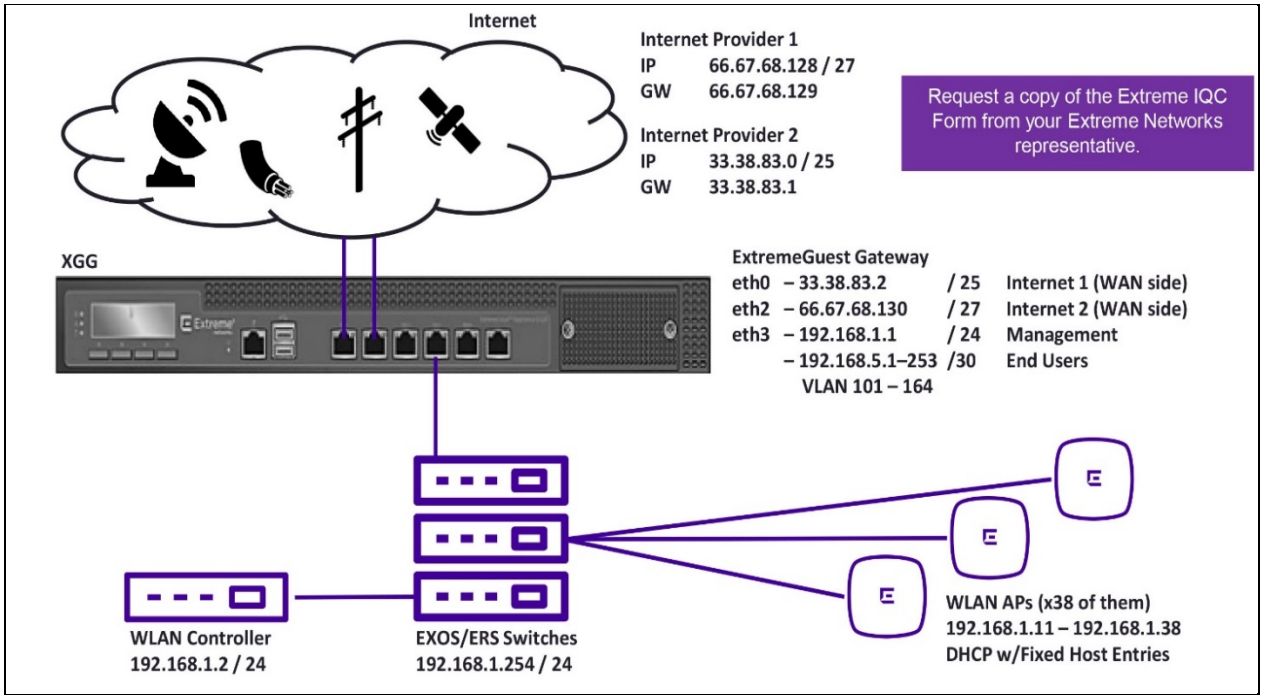
2 Initial Deployment and Basic Configuration

Overview

- Make a plan
- Environmental and Power Considerations
- Aquire access to XGG
- Access XGG on WAN side
- Access XGG on LAN side
- Load a license
- Configure FQDN
- Load an SSL certificate
- Test from the LAN

Make a Plan

Complete the Installation Questionnaire and Checklist (IQC) Form



Have a Plan that Makes Sense for a Router

- The XGG product behaves as a router with added functionality in the area of securing and containing personal networks
- An XGG must have at least two connected Ethernet interfaces
  - One for the WAN
  - One for the LAN
- Additional Ethernet interfaces are sometimes required
  - Multiple uplink control
  - Out-of-Band communication (e.g. with a Property Management System)
- Since XGG behaves as a router, bridging between ports is not supported
  - Connecting both the WAN and the LAN to the same L2 is not supported
- Clustering of multiple XGGs requires dedicated Ethernet connections

Have Details in the Plan

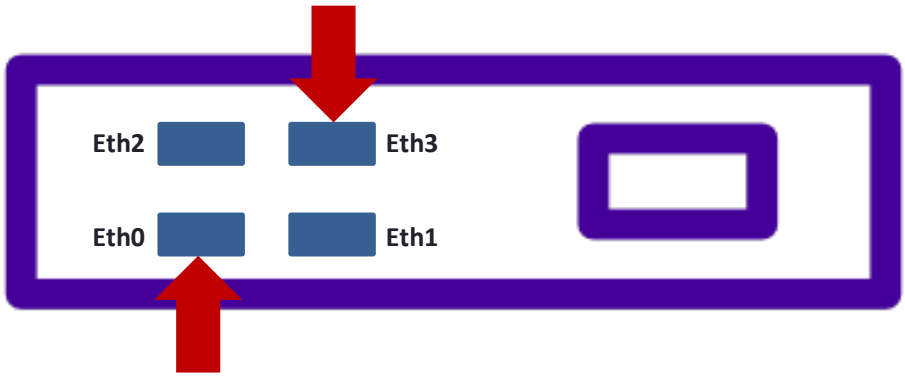
- Physical links
- WAN addresses
  - Public IP(s), FQDN
- LAN addresses
  - L3 IP scheme
  - L2 VLAN scheme
- Downstream equipment
  - Wireless LAN controllers and APs
  - Switches, preferably a complete topology
  - Unique administrative credentials for each operator

Environmental and Power Considerations

- UPS is highly recommended for all production environments
  - Protecting against power outages is critical
  - Bad power may destroy your power supplies and kill the storage SSDs
- Line conditioning is highly recommended for all production environments
  - Lightning strikes may destroy power supplies and kill Ethernet ports
  - Random power drops and lightning may result in filesystem corruption
- High temperatures may result in random reboots and hardware failures
- Air cooling and air flow are critical for keeping appliances operating under their design temperature

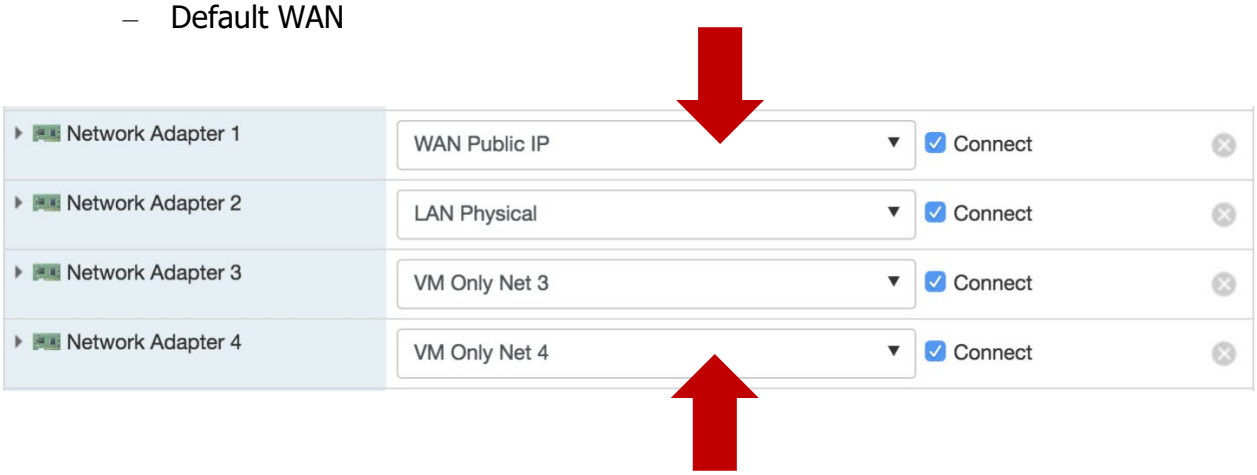
XGG Default Network Configuration upon Installation

- First network adapter is a DHCP server
  - Default LAN



- Last network adapter is a DHCP client
  - Default WAN

- First network adapter is a DHCP client
  - Default WAN

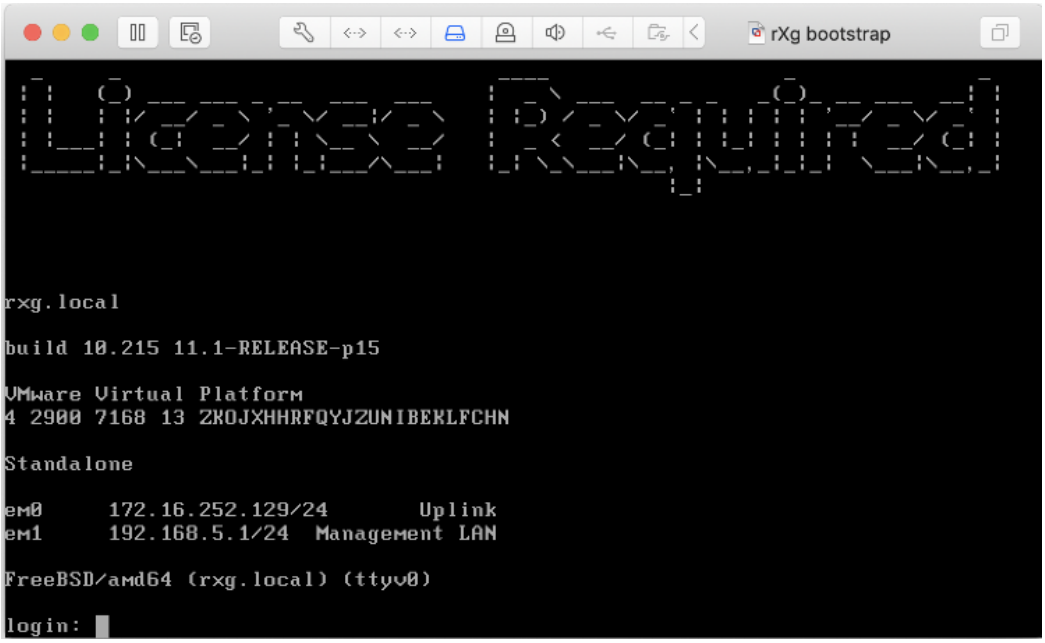


- Last network adapter is a DHCP server
  - Default LAN

To Access the XGG on the WAN side

- Default WAN - the "0th" physical (or virtual) network interface
  - Bare Metal Machines
    - Typically, ix0 / igb0 / em0
  - Typically, the left / bottom most port
    Virtualized Machines
    - Typically, vmx0 / em0
    - Typically Network Adapter 1 in VMware

- Default WAN is a DHCP client
  - Plug a cable into a network that has a DHCP server
  - Read the IP address acquired by XGG via DHCP server UI or via the XGG VGA console
- Navigate with web browser
  - https://ip.addr.of.xgg/admin/

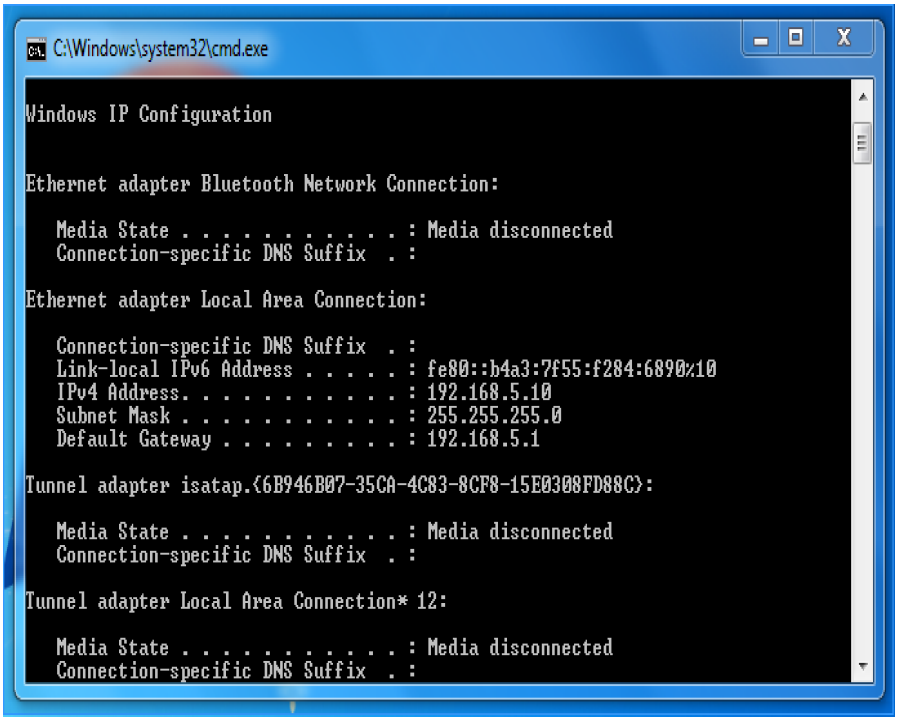


To Access the XGG on the LAN side

- Default LAN - the nth (last) physical (or virtual) network interface
  - Bare Metal Machines
    - Typically, ix3 / igb3 / em3
    - Typically, the right / top most port
  - Virtualized Machines
    - Typically, vmx1 / em1
    - Typically, Network Adapter 2 in VMware
- Default LAN is a DHCP server
  - Plug DHCP client (laptop) into default LAN
  - Check DHCP address from the XGG
  - Typically, this is IP address 192.168.5.10 / 24
- Navigate with web browser (example: https://192.158.5.1/admin/)

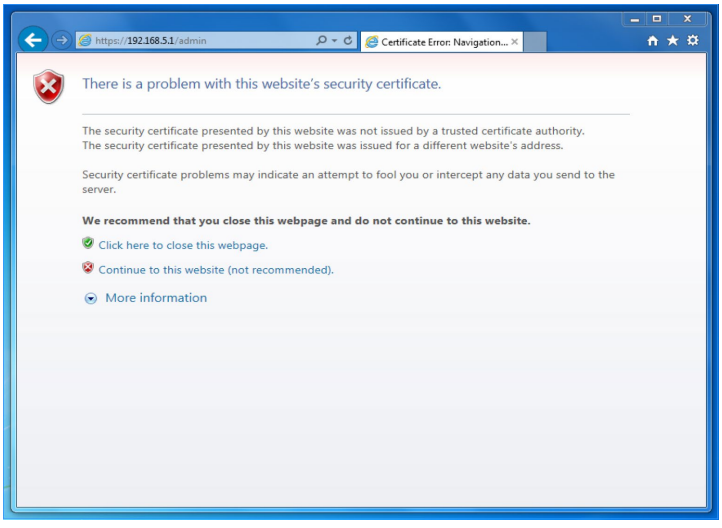
Notes

Be careful with default LAN port because a DHCP server is enabled. Connecting the default LAN port to production LAN may crash the LAN.



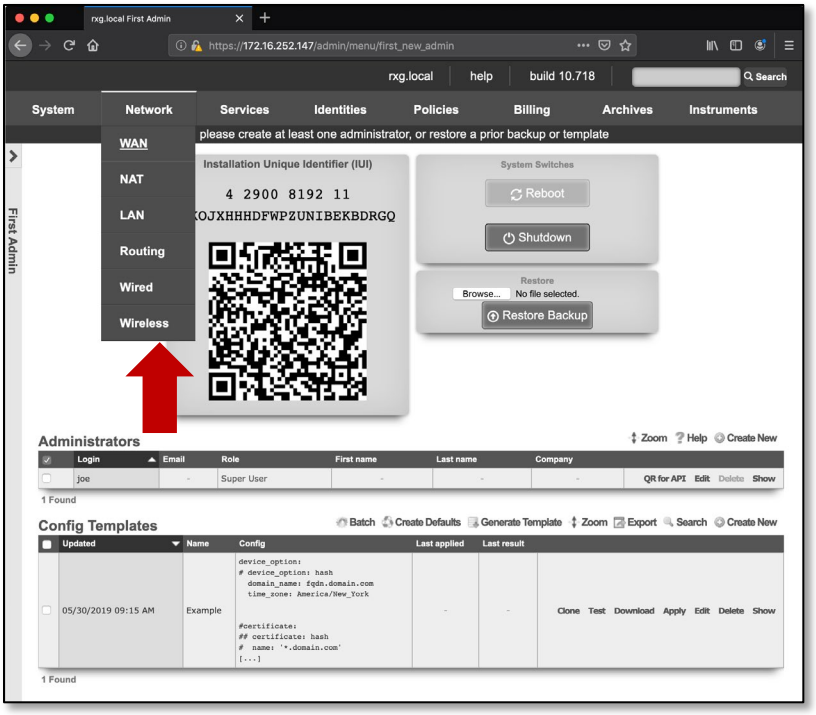
Certificate Warning

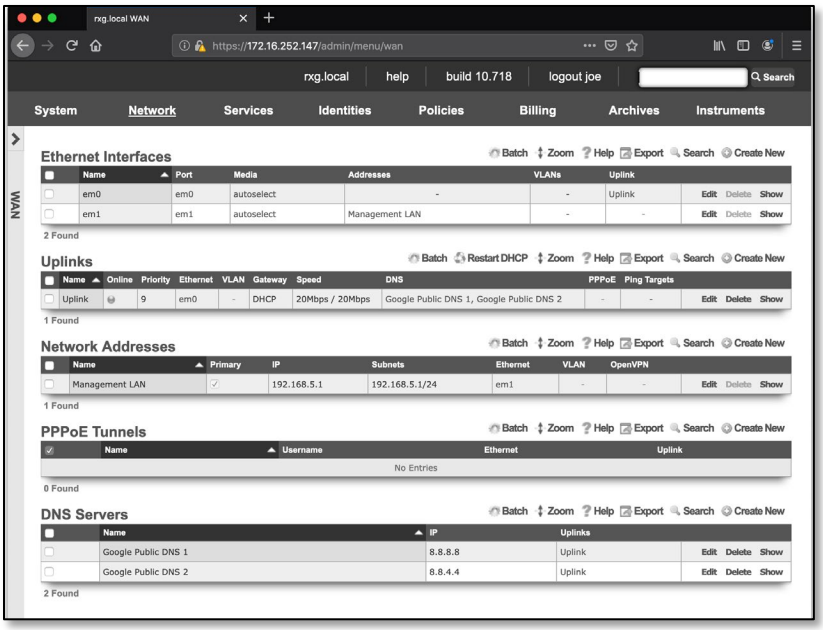
- XGG ships with a self-signed cert
- Unusable for production
- Need to install a real certificate
- Bypass warning for initial config



WAN Bootstrap Configuration Available w/o License

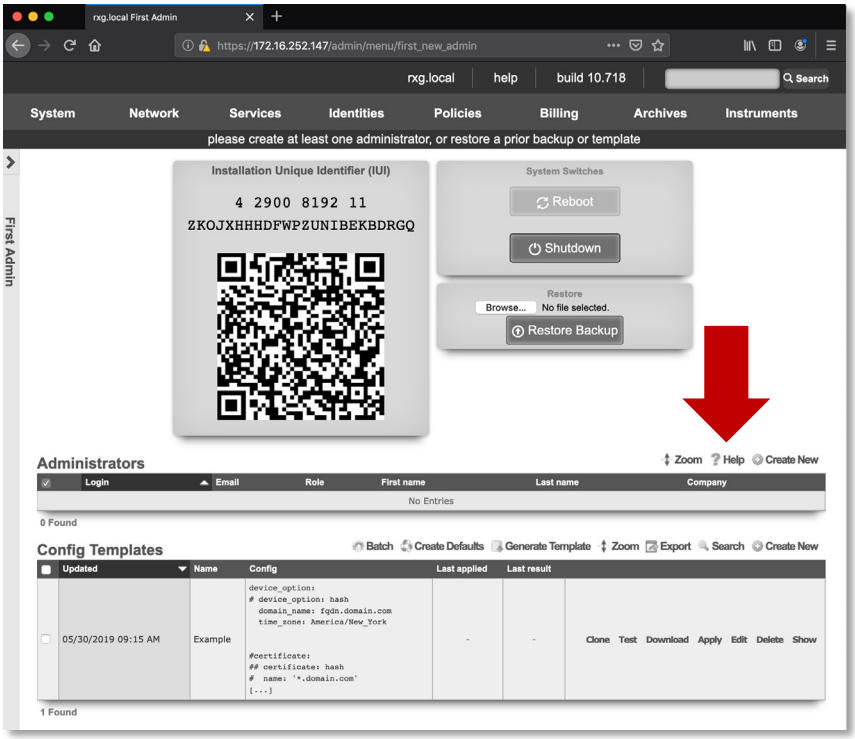
- Allows NOC personnel to perform all but the most fundamental bootstrapping remotely (including license installation, SSL cert, etc.)





XGG First Administrator and License

- Create a first administrator
  - XGG has no default administrative access
  - Make unique Administrators for each person



- Security Tips
  - It is not recommended to use role admins
  - It is not recommended to make login "admin"
  - Password strength based on time needed to crack it
  - Long passwords with only lower case letters work just as well as short passwords with many different character classes
- Copy IUI to clipboard
  - The IUI is your "serial Number" of the installed XGG
  - IUI is unique and different for every installation (bare metal or virtual). An example of an IUI follows:

- Navigate to license portal
  - Set DNS name
  - Assign IUI - immutable
  - Acquire license

- Load license into XGG. Example license follows:

```
LcGgodV7zi4PpXlKnv4PkEj1YtuO/17Jb7GJgSkP625IupGofErRCGAMeTWT
sc2FGUcHCwEeTNkxvlypUdAxcntaUi4ysdyJNoMKXcgv+S/rpS3kj/X+jf6+
SIJ2l881vrgqql4litxm1/Mvhi804mVnuyMPGng+PyajxXGYORNn7Wjsrae3
1GaZs2QoBZFeA5OQonglSjQ88FKFQfWfBvk5J3eVikkoZPNQqgsxMFGh7v5I
gTMNGMPR7LRqSNLx5/yP+DketycdXXo0qAQ/C0XWnPUV7PbdzyRcHDm/tllk
SPv/QQZCu8SFxgx2tCP4DG4oLpk82umpzVFySrUPyZT9gFor1fOIS2KAo67G
rKQhUi7xE8zzrf0FwIo7O8lSCoAu683GTx48Ky5EHo9BHJaFztWSzqk2zdUf
Pul8BElPkztdQJGYuANaG6sirxPUzT+WQ88n+URge4WVX8qDoRNpw6J7Optg
+BFDoj9V/+eO+hUPxq/pB+Umkt8IZeKA/8gdP8KdHLIIrmMyTTZt5CTSExV5
NMrw/SVxYrebK8LEe/bt5tr8atHV3qG8ZzimhduTjVBjcNIwmG2X7E8c/1lW
w+O3UAzQinE2E2IQphBem9L8EbNuJf/LnIYO/Xbv1qcDQGS7C5n/1Dojm2LJ
mEadeRtqB5CkhvWOUdFh6261VN7lQReBkVVHU5ljkk6BsohFhWs/2bWvVEXK
qxgXiDFu3X5f7IhyKPX1HH1pP0OCfZY+0OwMtxE9b87tSHD9pPT8S06DW7c4
p7sdh0AD5Y53jksvHDnlrx2AAh4T+pLJSBXY/p+Yy9AOgXReVrBG2IqaBUWW
52WC7FxhodOpXuzXZ5gpcggqW0huav7KCcdAWI48PUeHZH7AlZmLCknVab6e
iOA5hjTUwhWM2EC3VasuHaJaalJibHLg+4BWI6F1DlRfaoqPKMceNBLR9TCP
aPe3TAazgKI5nEOjkwpzkQ0HmCHoM2/byT12ATpCiyOehRzn5ScB8rwyQJ0v
1AmkFKTT/o4bUvtJChJpRNmwW7eZejdxTBMgPpGF3B93k8MzHjvhjLVK4h3j
uSYcifEw9887Q4ijLeHcsXVRZLkIFOqjPn+uIF4wmCvU6MOPUWrFbzLTxv9P
T2ZNI3+Ms3YrJFIVMEd2F0WbFwwXoSCsHg==
```

XGG Initial Configuration

- System :: Options :: Device Options
  - Set time zone
  - Set FQDN
- System :: Certificates
  - Create Certificate Chain (private key)
  - Create CSR - enter appropriate information
  - Send CSR to third-party for signature
  - Receive signed certificate (and intermediates)
  - Edit Certificate Chain, add signed certificate and intermediates

XGG Backup

- Regular backups are stored on XGG by default
- Remote backup server should be configured
- XGG can be easily setup to another warm spare XGG
- Manual restore on warm spare to take over original

Administrators

- Admin Roles
  - "Group" admins together and limit access read/write - read/only to certain views
  - Micro-granular access control on a per table basis
- Admin ACLs
  - Limit access to XGG web GUI and/or SSH
  - You can accidentally lock yourself out
- SMB Access
  - Create an active server, add a policy (or WAN target) to drop firewall, enable

SMB on role

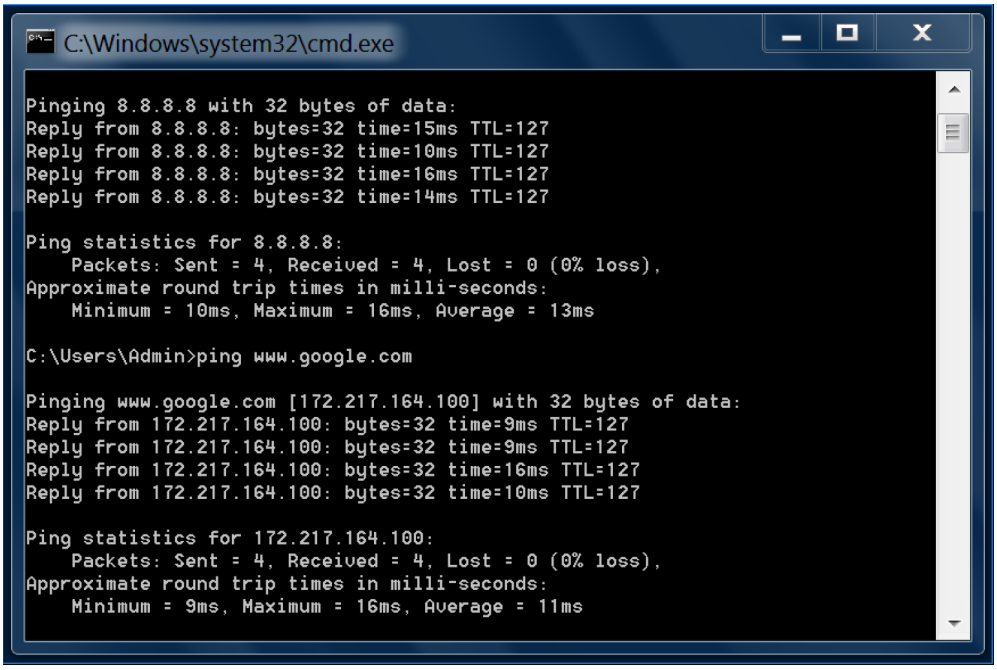
- Permits access to
  - custom portals and TFTP datastore read/write
  - Backups and Log files read only

Upgrades

- XGG upgrade
  - Approximately 125 MB download for XGG software package from Extreme Portal
  - Some XGG upgrades will cause packages to be downloaded over the internet, max 300 MB, usually less
  - Existing user connections are unaffected; no new connections due to web server restart
- FreeBSD OS Kernel upgrade
  - Some XGG upgrades bring down a kernel update and health notice will appear
  - Navigate to System :: Update and press the reboot and upgrade button
  - Requires a single reboot, 30 seconds to a few minutes of downtime
- FreeBSD OS upgrade
  - Some XGG upgrades will cause a health notice regarding an OS upgrade
  - Navigate to System :: Update and press the reboot and upgrade button
  - Will require multiple reboots and significant downtime as OS is pulled during reboot
  - Alternatively download new ISO / IMG, backup, reinstall and restore

End-to-End Test

- Connect a device to XGG LAN
- Set the device for DHCP
- Get a DHCP address from XGG
- Ping an address on the Internet
- Ask Google "What is my IP?"
- Try an Internet speed test


C:\Windows\system32\cmd.exe
Pinging 8.8.8.8 with 32 bytes of data:
Reply from 8.8.8.8: bytes=32 time=15ms TTL=127
Reply from 8.8.8.8: bytes=32 time=10ms TTL=127
Reply from 8.8.8.8: bytes=32 time=16ms TTL=127
Reply from 8.8.8.8: bytes=32 time=14ms TTL=127
Ping statistics for 8.8.8.8:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 10ms, Maximum = 16ms, Average = 13ms
C:\Users\Admin>ping www.google.com
Pinging www.google.com [172.217.164.100] with 32 bytes of data:
Reply from 172.217.164.100: bytes=32 time=9ms TTL=127
Reply from 172.217.164.100: bytes=32 time=9ms TTL=127
Reply from 172.217.164.100: bytes=32 time=16ms TTL=127
Reply from 172.217.164.100: bytes=32 time=10ms TTL=127
Ping statistics for 172.217.164.100:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 9ms, Maximum = 16ms, Average = 11ms

2 Installing ExtremeGuest on a Bare Metal Physical Appliance

Overview

- Download the rXg IMG installer
- Prepare a bootable USB drive
- Ensure bare metal hardware prerequisites are met
- Install rXg from a USB IMG
- Proceed with rXg initial configuration

Installation Files

Login into Extreme Portal and download the installation files:

- .img file is for rawrite to USB stick
- .img.md5 is a checksum for the IMG file
- .iso files are for rawrite to CD-R / DVD-R
- .iso.md5 is a checksum for the ISO file
- Most bare metal installs will be via USB stick written via IMG file
- Bare metal install may also be accomplished via CD-R / DVD-R written via ISO file

How to do Checksum Verification

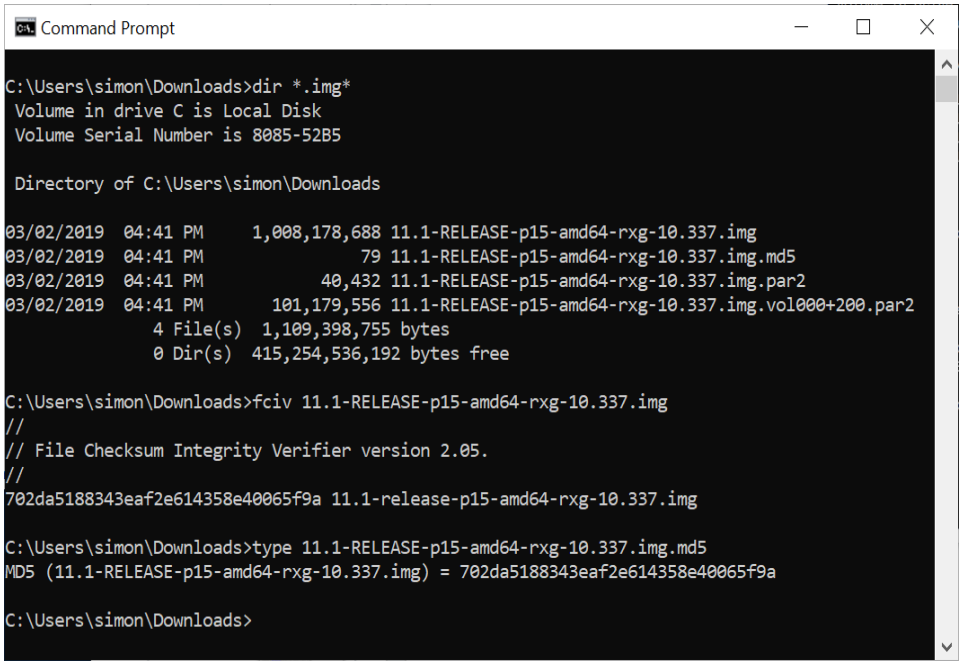
MacOS

- A MD5 is integrated into the base operating system and accessible via Terminal.

Windows MD5

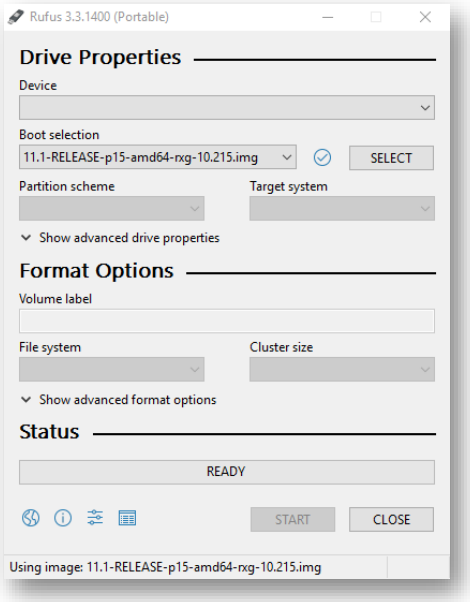
- Use the following URL: https://www.microsoft.com/en-us/download/details.aspx?id=11533

MD5 signature is 32 bytes.

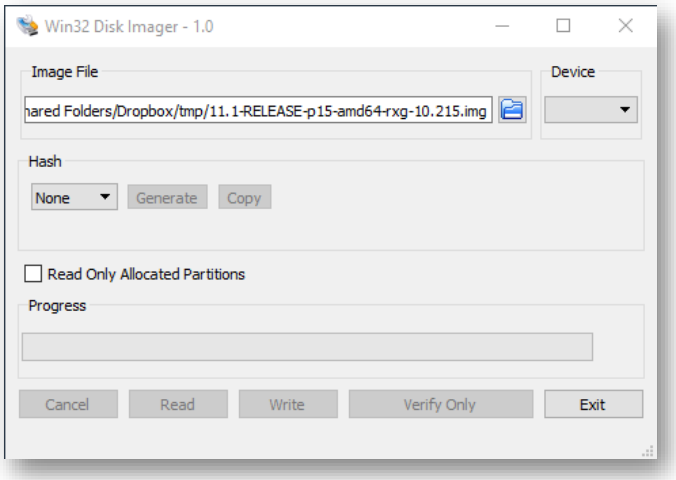

Command Prompt
C:\Users\simon\Downloads>dir *.img*
Volume in drive C is Local Disk
Volume Serial Number is 8085-52B5
Directory of C:\Users\simon\Downloads
03/02/2019 04:41 PM 1,008,178,688 11.1-RELEASE-p15-amd64-rxg-10.337.img
03/02/2019 04:41 PM 79 11.1-RELEASE-p15-amd64-rxg-10.337.img.md5
03/02/2019 04:41 PM 40,432 11.1-RELEASE-p15-amd64-rxg-10.337.img.par2
03/02/2019 04:41 PM 101,179,556 11.1-RELEASE-p15-amd64-rxg-10.337.img.vol000+200.par2
4 File(s) 1,109,398,755 bytes
0 Dir(s) 415,254,536,192 bytes free
C:\Users\simon\Downloads>fciv 11.1-RELEASE-p15-amd64-rxg-10.337.img
//
// File Checksum Integrity Verifier version 2.05.
//
702da5188343eaf2e614358e40065f9a 11.1-release-p15-amd64-rxg-10.337.img
C:\Users\simon\Downloads>type 11.1-RELEASE-p15-amd64-rxg-10.337.img.md5
MD5 (11.1-RELEASE-p15-amd64-rxg-10.337.img) = 702da5188343eaf2e614358e40065f9a
C:\Users\simon\Downloads>

Windows - Preparing a bootable USB drive

- Requires USB image direct "rawrite" tool
  - Rufus - https://rufus.ie/en_IE.html



Win32 Disk Imager - https://sourceforge.net/projects/win32diskimager/



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MacOS - Preparing a Bootable USB drive

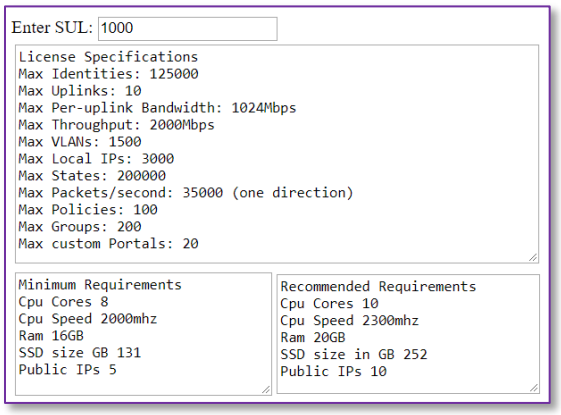
- CLI - Terminal – dd
  - dd if=12.0-RELEASE-p6-amd64-rxg-10.633.img of=/dev/rdisk2 bs=1m
  - Replace rdisk2 with the appropriate disk number
  - Use hdiutil list to find the correct disk number

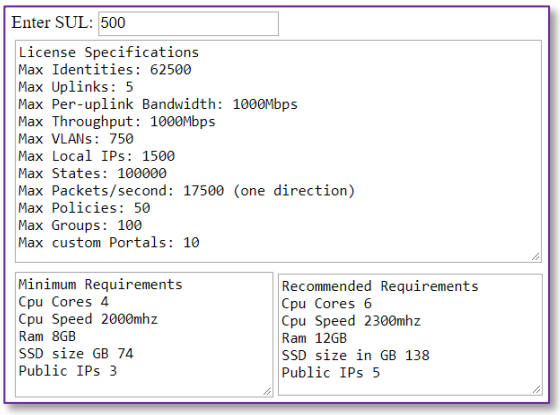
- GUI - Disk Utility
  - Varies with MacOS version

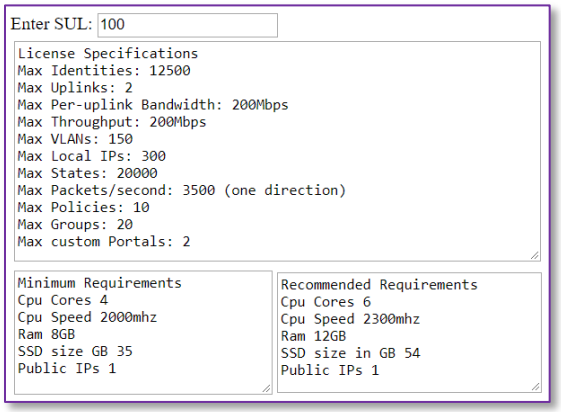
- GUI – Etcher
  - https://balena.io/etcher
  - Can do ISO emulation

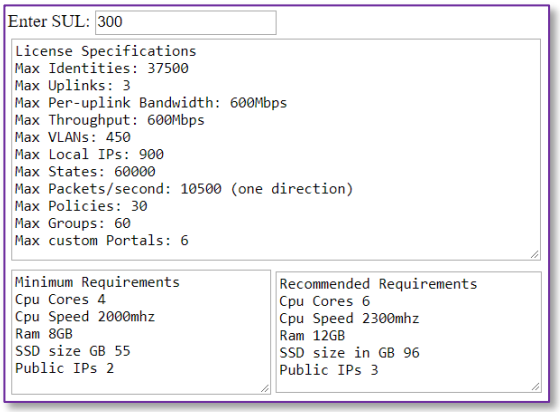
System Requirements Calculator

The following screens show the typical system requirements for the number of SULs:









Scale	Minimum			Highly Recommended			Max		
SULs	CPU cores	Mem GB	Disk GB	CPU cores	Mem GB	Disk GB	Managed IPs	VLANs	Throughput
10	4	8	40	6	12	80	30	15	20 Mbps
50	4	8	40	6	12	80	150	75	100 Mbps
100	4	8	40	6	12	80	300	150	200 Mbps
200	4	8	80	6	12	160	600	300	400 Mbps
500	4	8	100	6	12	200	1500	750	1000 Mbps
750	6	12	200	8	16	400	2250	1125	1500 Mbps
1000	8	16	250	10	20	500	3000	1500	2000 Mbps

Note

Request a copy of the System Requirements Calculator from your Extreme Networks representative.

Physical Ethernet Ports

- A minimum of two physical Ethernet ports are required
  - Recommended at least four
  - Install PCI-e cards to get more ports
- Intel Ethernet chipsets are preferred
  - Appears as em / igb / ix
- Intel i350-T4 card is an easy way to get 4 x RJ45 Ethernet ports
  - Under $50 on eBay new, under $25 on eBay used
- High density 6-port PCI-e cards available from Smalltree
  - 4U chassis / ATX mobo can fit 28 ports on PCI-E + 4 on mobo = 32 ports

Persistent Storage Device – IOPS

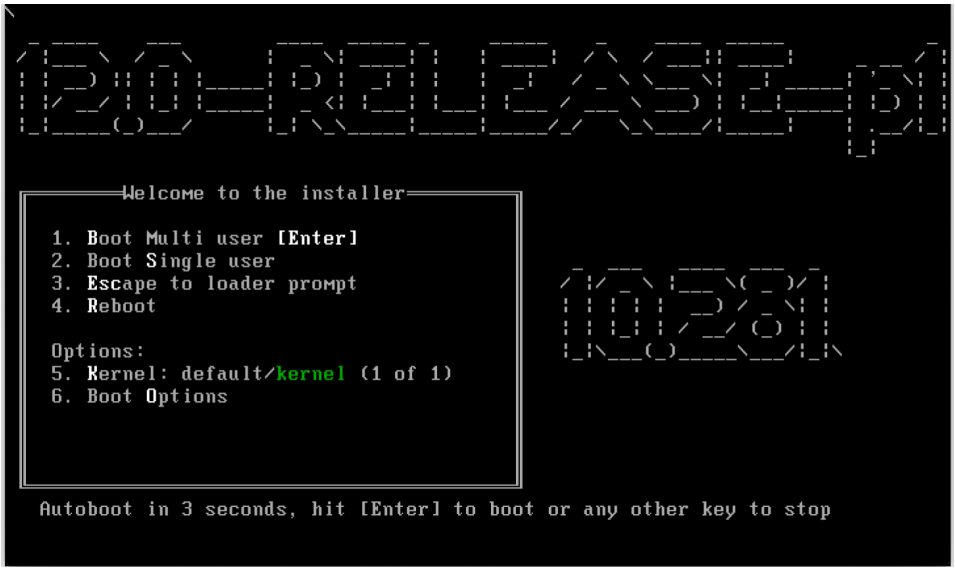
- For Lab Testing - anything will probably be fine, even platter HDD
  - HDDs deliver insufficient IOPS to support production environments
- SSD persistent storage devices are required for production
  - Less than 50 SUL - SSD required - budget for 50,000 IOPS
  - Less than 300 SUL - SSD required - budget for 100,000 IOPS
  - Less than 1000 SUL - SSD required - budget for 200,000 IOPS
- High throughput hardware RAID (presents 1 volume) of HDDs is acceptable
- Software RAID via ZFS is currently CLI and not officially supported

Persistent Storage Device – Endurance

- Demonstration - any SSD or HDD is fine
  - Consumer grade SSDs lack the endurance for production environments
- DWPD / DPD minimum requirements - going less than this kills drives fast
  - Less than 50 SUL - DWPD / DPD 1
  - Less than 300 SUL - DWPD / DPD 5
  - Less than 1000 SUL - DWPD / DPD 10
- DWPD / DPD is sometimes software configurable and often ship with DWPD / DPD 0.3
- NAND SDD Recommendations
  - Samsung SM863, SM1635, SM1725 Up to DWPD / DPD 10
  - Intel S3710 Configurable DWPD / DPD up to 10
- 3D XPoint SDD Recommendations
  - Intel Optane SSD 900P Configurable DWPD / DPD up to 10
  - Intel SSD DC P4800X Configurable DWPD / DPD up to 30
  - Intel SSD DC P4801X Configurable DWPD / DPD up to 60

BIOS / UEFI Boot Order

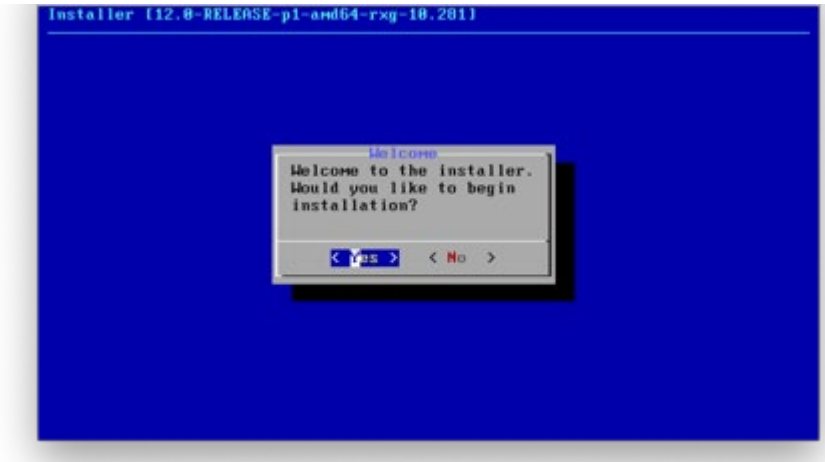
- Most PCs boot to HDD by default
- You must change the boot order or temporarily select the USB boot device
  - Typically achieved by pressing F1 / F11 / F12 / DEL at boot / POST
- Once you get the PC to boot from USB, the following screen appears:

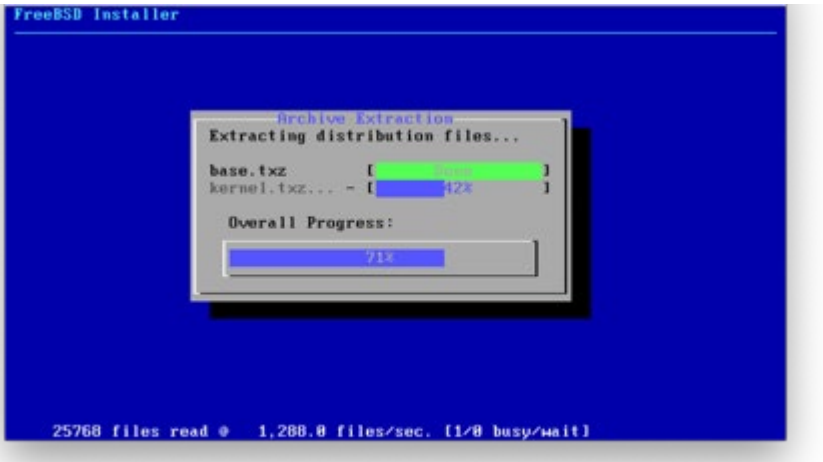


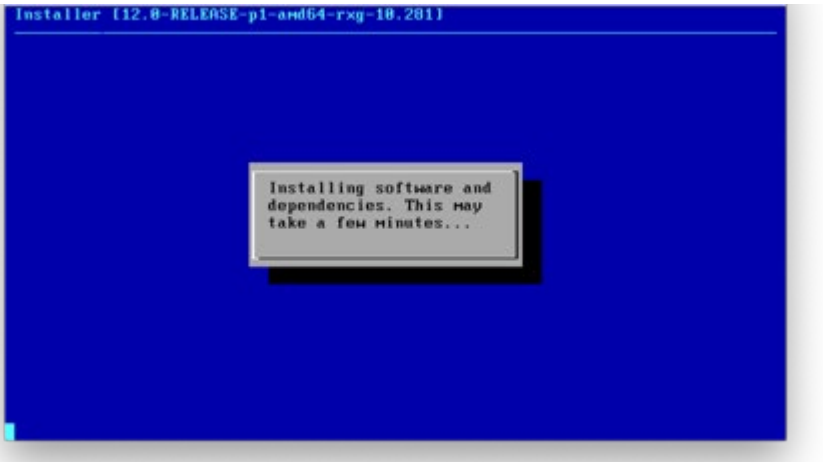
Installation Process

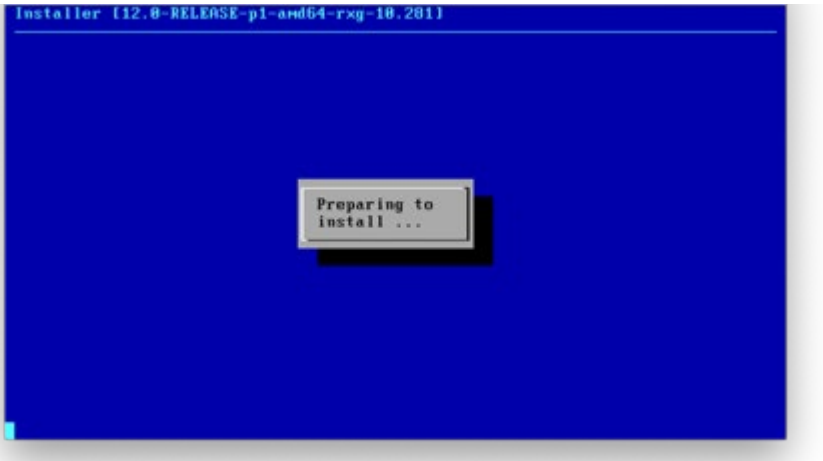
1. Boot the system from the USB IMG.
2. Click **Enter** at the prompt to begin the base operating installation process.

The following dialog boxes appear during the installation process:

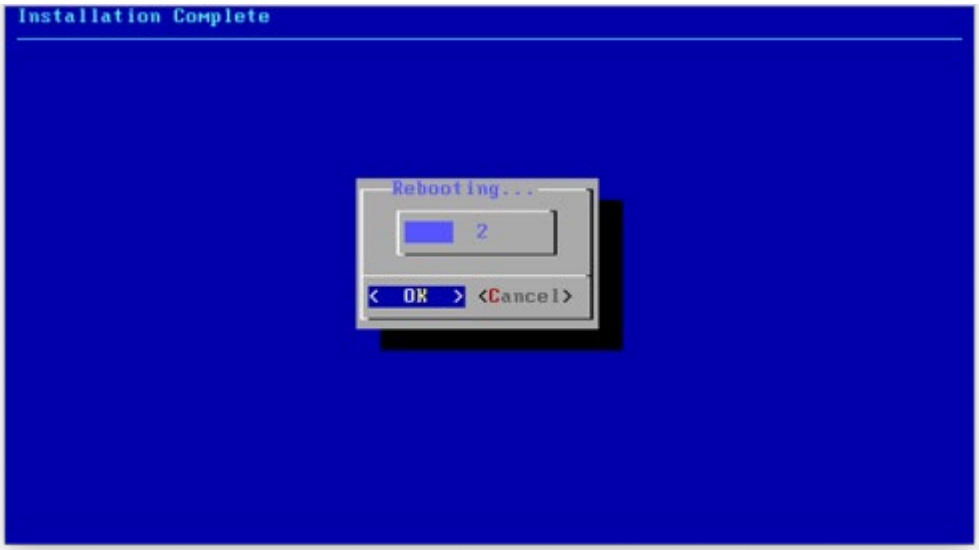




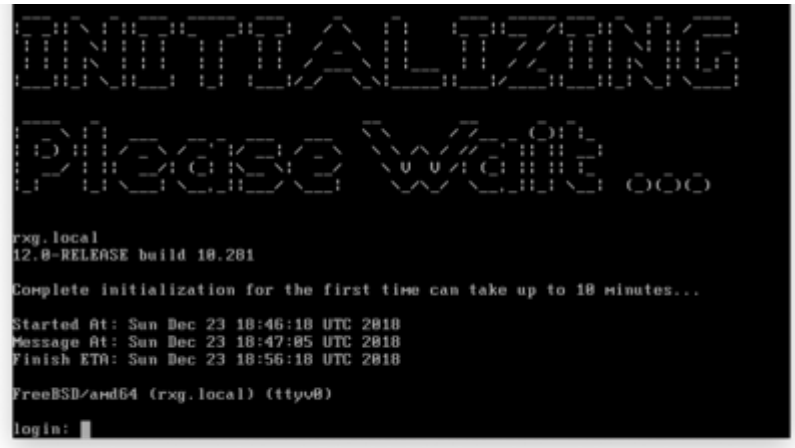




The system automatically reboots when the base operating system is installed. The following screens appear:



Once the base OS install is complete, the FreeBSD login screen appears. (Press **CTRL-D** to manually refresh the login screen.)



Use the VGA console to find the DHCP assigned WAN IP address for admin access. Follow Initial

Configuration in Section 1 of this document when complete.

2 Installing ExtremeGuest as a Virtual Appliance

Overview

- Deploy virtualization infrastructure
- Setup VM networking
- Acquire RG Nets support credential
- Download rXg ISO installer
- Create virtual machine
- Install rXg from ISO
- Proceed with rXg initial configuration

Virtualization Infrastructure

- VMware is the only virtualization infrastructure tested and supported
  - VMware ESXi is the only tested and supported infrastructure for production
  - VMware Fusion and Workstation are known to be usable for testing
- Hardware oversubscription is not supported
  - The product is a router and designed to be the default gateway for the end-users
  - DRS or other such settings should be configured to benefit end-user experience
  - The physical hardware in the host should exceed the license calculator requirements
  - Additional hardware resource margin is highly recommended
  - Deploying a "virtual simulated guest" is also highly recommended

Production Physical ESXi Host Recommendations

- Multiple physical Ethernet network adapters [NICs]
  - The product is a router and expects at least two virtual interfaces
  - If large scale dynamic VLAN assignment on LAN is required, then this implies dedicated physical LAN port
- Two physical persistent storage devices
  - boot drive - small SSD - ESXi will be installed here, ESXi will boot off of this device
  - primary datastore - large SSD - high endurance (DWPD/DPD > 10

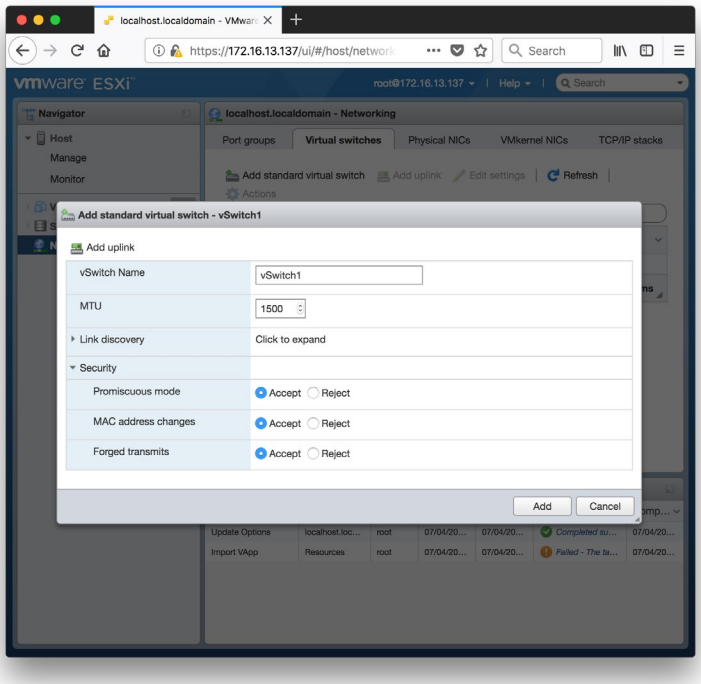
recommended)

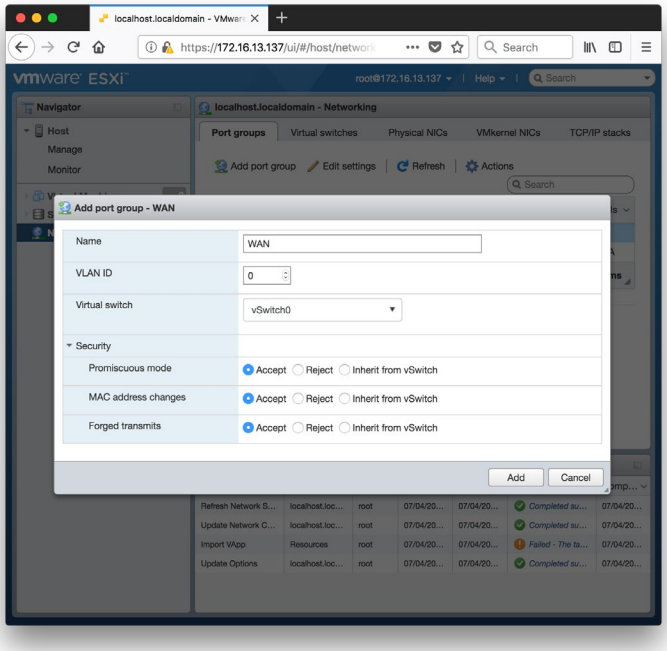
  - standalone ESXi - virtual machines stored here
  - clustered ESXi - single virtual SAN VM consumes 90% of this volume

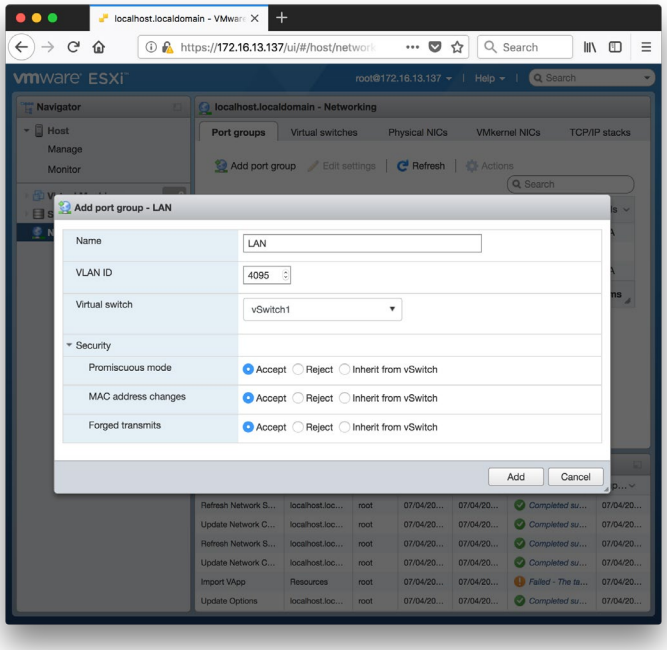
- Sufficient CPU and RAM - no oversubscription
- Hardware compatibility is critical
  - Installation may not complete if drivers are missing

Create ESXi Networking

- Minimum two vSwitches with two Port Groups
  - one vSwitch and one matching Port Group for WAN and another pair for LAN

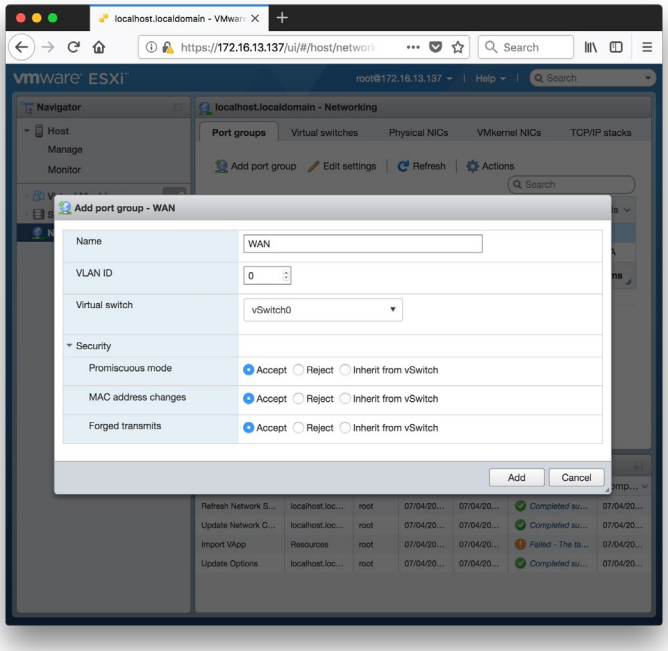




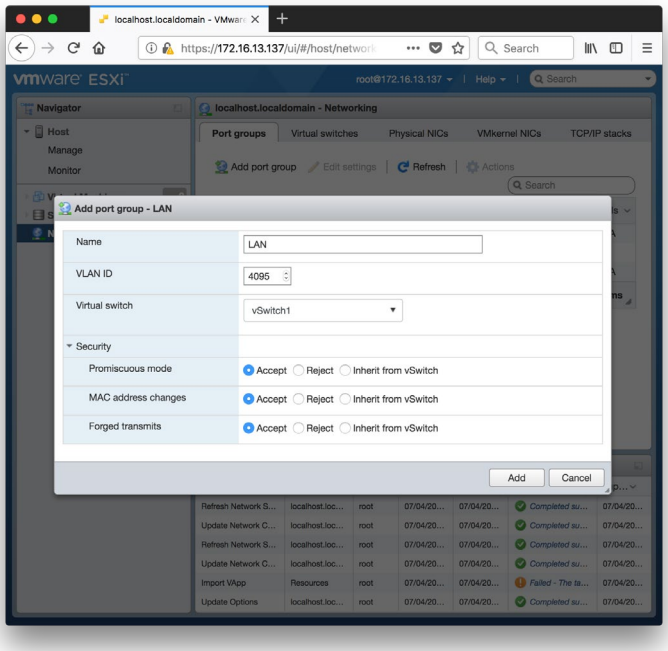


vSwitch Settings

- Promiscuous mode is needed to pass DHCP
  - WAN side if DHCP default WAN is being used for initial access



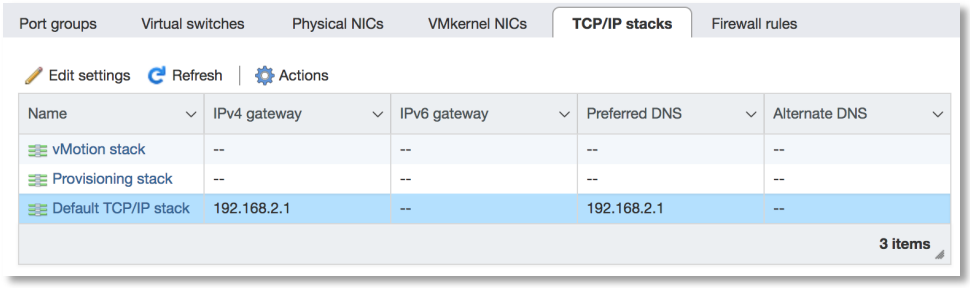
- LAN side is always going to be needed because XGG is DHCP server

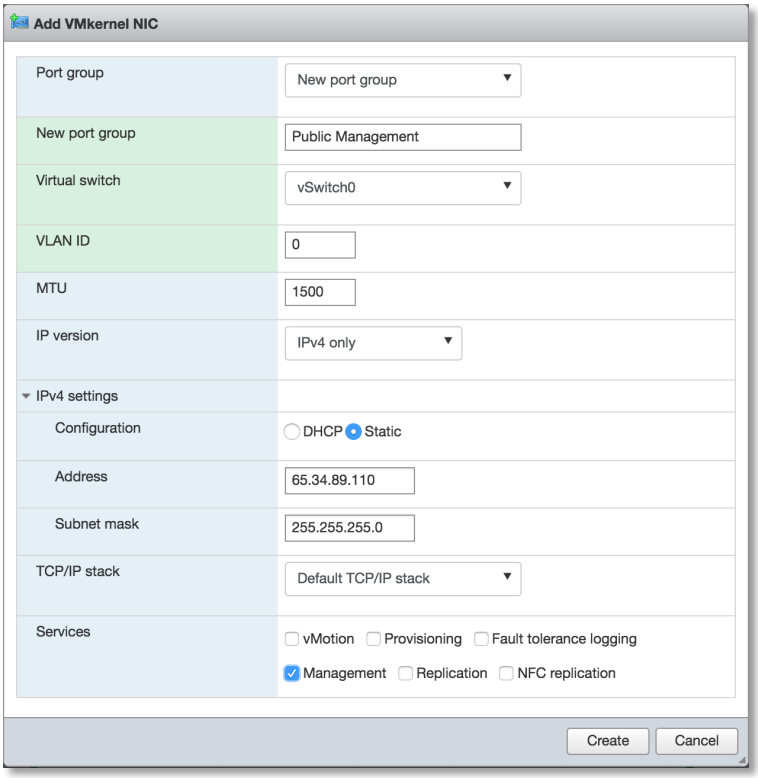


- VLAN 4095
  - Set to pass tags
  - Required on LAN

Setup Additional vmkernel Adapter

- Recommend public IP with proper firewall configuration.
  - Modify Default TCP/IP stack with proper default gateway, DNS, and hostname

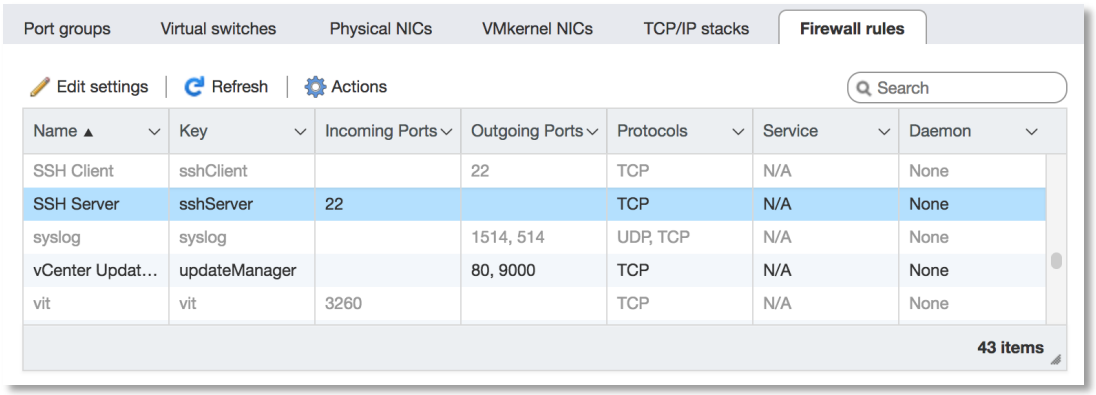


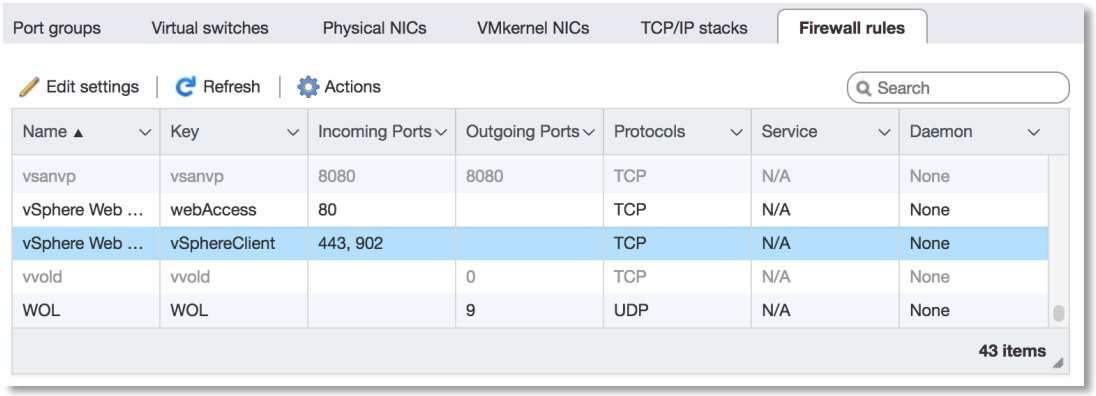


- Management network with VPN connectivity is also OK.

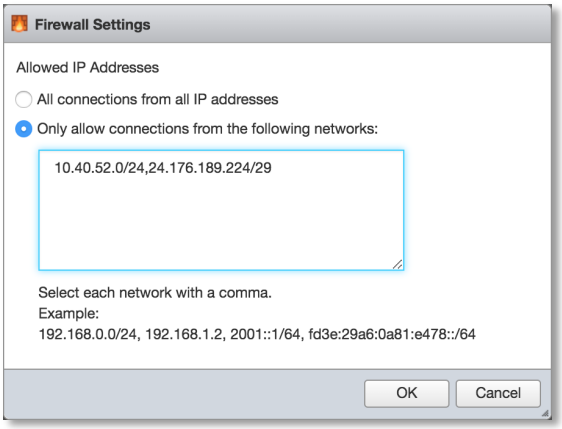
Configure Firewall

- Edit settings for SSH Server and vSphere Web Client.



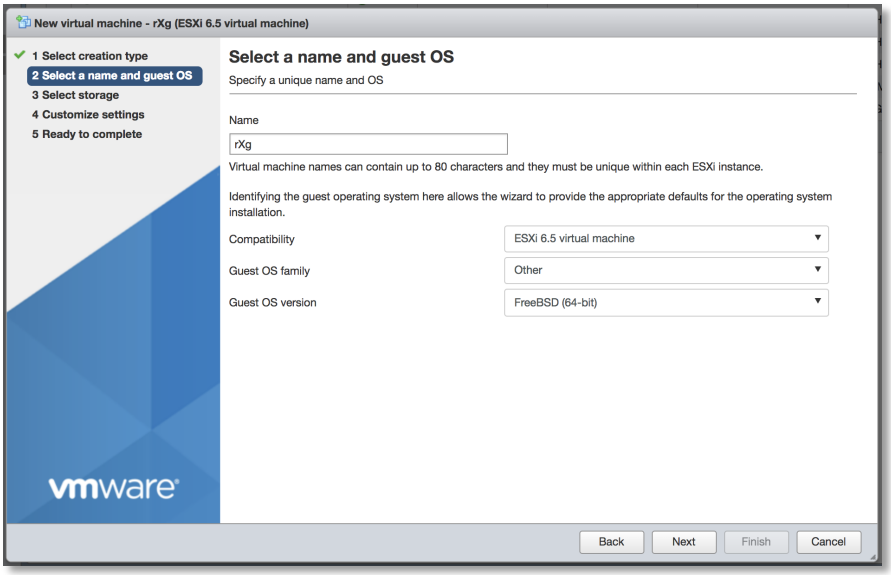


- Enter desired subnets.



Create a Guest Virtual Machine

- VMware wizards are designed for creating virtual servers… this is a router and requirements are very different
- Custom VM creation is required
- Choose FreeBSD 64-bit OS type



System Requirements Calculator

The following screens show the typical system requirements for the number of SULs:

Enter SUL: 1000

```
License Specifications
Max Identities: 125000
Max Uplinks: 10
Max Per-uplink Bandwidth: 1024Mbps
Max Throughput: 2000Mbps
Max VLANs: 1500
Max Local IPs: 3000
Max States: 200000
Max Packets/second: 35000 (one direction)
Max Policies: 100
Max Groups: 200
Max custom Portals: 20
```

```
Minimum Requirements
Cpu Cores 8
Cpu Speed 2000mhz
Ram 16GB
SSD size GB 131
Public IPs 5
```

```
Recommended Requirements
Cpu Cores 10
Cpu Speed 2300mhz
Ram 20GB
SSD size in GB 252
Public IPs 10
```

Enter SUL: 500

```
License Specifications
Max Identities: 62500
Max Uplinks: 5
Max Per-uplink Bandwidth: 1000Mbps
Max Throughput: 1000Mbps
Max VLANs: 750
Max Local IPs: 1500
Max States: 100000
Max Packets/second: 17500 (one direction)
Max Policies: 50
Max Groups: 100
Max custom Portals: 10
```

```
Minimum Requirements
Cpu Cores 4
Cpu Speed 2000mhz
Ram 8GB
SSD size GB 74
Public IPs 3
```

```
Recommended Requirements
Cpu Cores 6
Cpu Speed 2300mhz
Ram 12GB
SSD size in GB 138
Public IPs 5
```

Enter SUL: 100

```
License Specifications
Max Identities: 12500
Max Uplinks: 2
Max Per-uplink Bandwidth: 200Mbps
Max Throughput: 200Mbps
Max VLANs: 150
Max Local IPs: 300
Max States: 20000
Max Packets/second: 3500 (one direction)
Max Policies: 10
Max Groups: 20
Max custom Portals: 2
```

```
Minimum Requirements
Cpu Cores 4
Cpu Speed 2000mhz
Ram 8GB
SSD size GB 35
Public IPs 1
```

```
Recommended Requirements
Cpu Cores 6
Cpu Speed 2300mhz
Ram 12GB
SSD size in GB 54
Public IPs 1
```

Enter SUL: 300

```
License Specifications
Max Identities: 37500
Max Uplinks: 3
Max Per-uplink Bandwidth: 600Mbps
Max Throughput: 600Mbps
Max VLANs: 450
Max Local IPs: 900
Max States: 60000
Max Packets/second: 10500 (one direction)
Max Policies: 30
Max Groups: 60
Max custom Portals: 6
```

```
Minimum Requirements
Cpu Cores 4
Cpu Speed 2000mhz
Ram 8GB
SSD size GB 55
Public IPs 2
```

```
Recommended Requirements
Cpu Cores 6
Cpu Speed 2300mhz
Ram 12GB
SSD size in GB 96
Public IPs 3
```

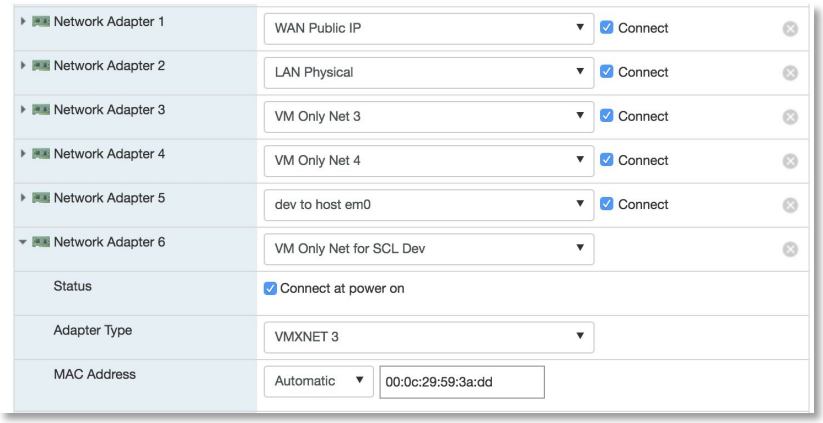
Scale	Minimum			Highly Recommended			Max		
SULs	CPU cores	Mem GB	Disk GB	CPU cores	Mem GB	Disk GB	Managed IPs	VLANs	Throughput
10	4	8	40	6	12	80	30	15	20 Mbps
50	4	8	40	6	12	80	150	75	100 Mbps
100	4	8	40	6	12	80	300	150	200 Mbps
200	4	8	80	6	12	160	600	300	400 Mbps
500	4	8	100	6	12	200	1500	750	1000 Mbps
750	6	12	200	8	16	400	2250	1125	1500 Mbps
1000	8	16	250	10	20	500	3000	1500	2000 Mbps

Note

Request a copy of the System Requirements Calculator from your Extreme Networks representative.

Guest Machine Virtualized Networking

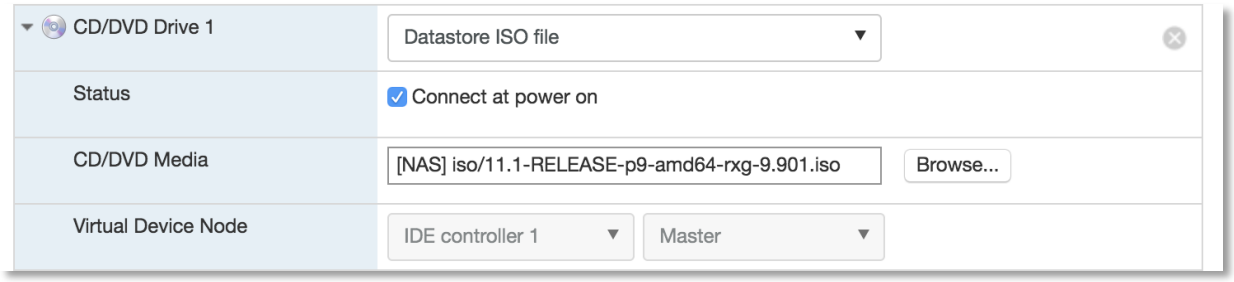
- VMware provisions all guest VMs with a single network interface by default



- Best practice is to create several additional interfaces
  - VMware Licensing is locked to interfaces
  - Create more interfaces than you need
  - Prevents relicensing problems
  - Unused interfaces can be disconnected
  - Use vmxnet3 driver
- Last interface is the default WAN
  - DHCP client by default
- First interface is the default LAN
  - DHCP server by default
  - DHCP will go to outside world if connected

Initial Power On

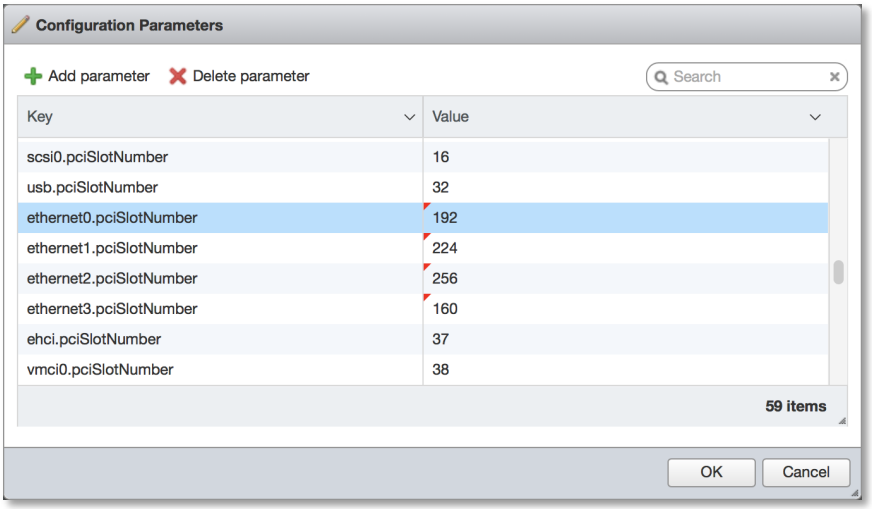
- Make sure virtual CD/DVD is set to connect at power on
- VM BIOS will attempt network boot by default

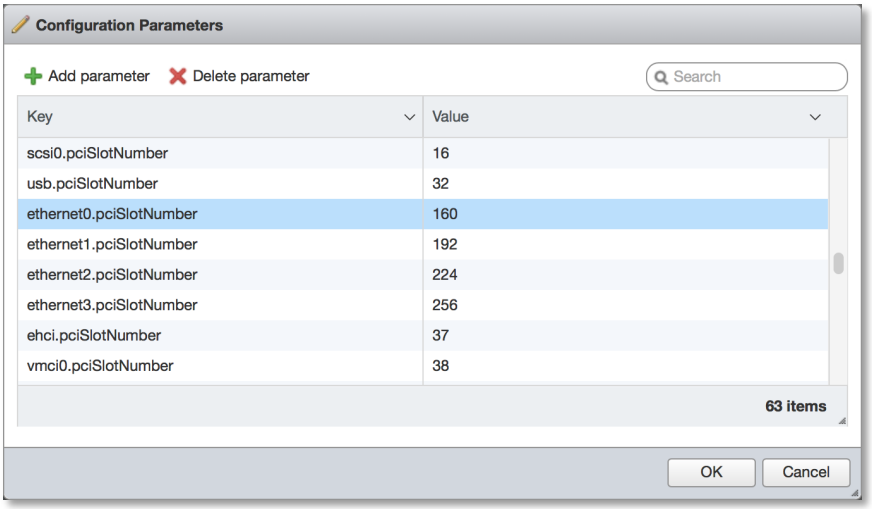


Note
CD/DVD "Connect at power on" option often unchecks itself, so confirm the setting is correct.

Virtual Network Adapter Order

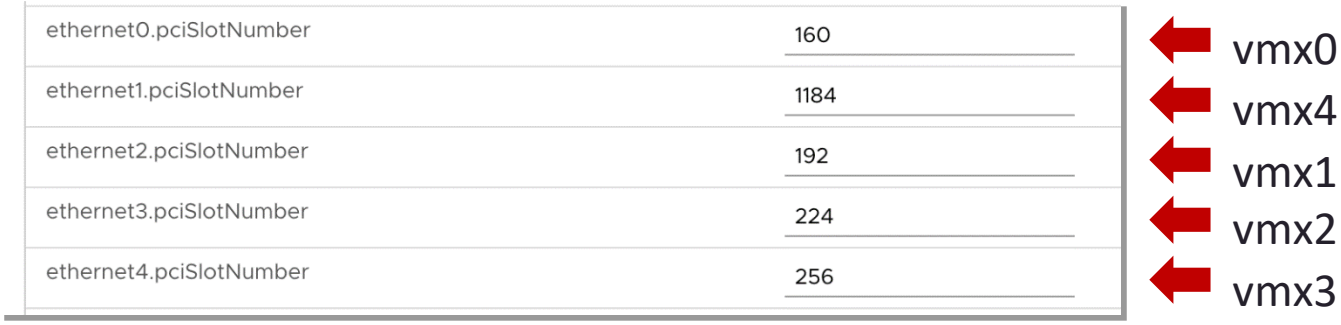
- Sometimes there is a virtual network adapter order problem
  - Network Adapter 1 -> vmxnet3 Network Adapter 2 -> vmxnet0
- Edit settings :: VM Options :: Advanced :: Edit Configuration
- Different network configurations require different modifications





Non-Linear Network Adapter Order

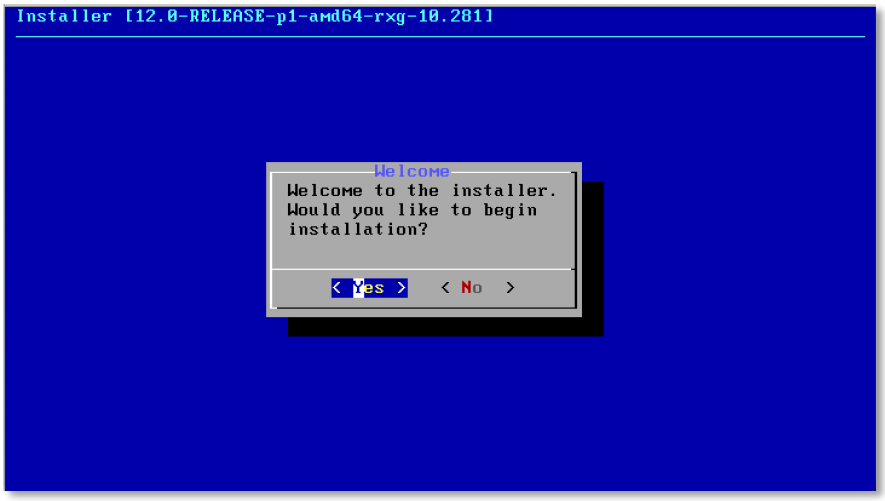
- Compare MAC addresses
  - ifconfig vmx0 … ifconfig vmx1 … ifconfig vmx2 … ifconfig vmx3 … to find MACs
  - open up virtual Network Adapter settings in VMware to find MACs
  - sometimes network adapter order is not linear and may need to be corrected after install



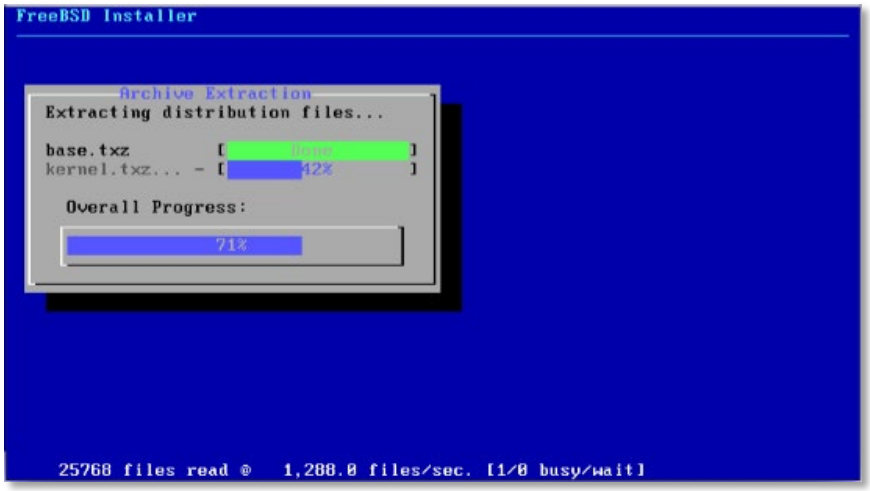
- Power off VM - Edit settings :: VM Options :: Advanced :: Edit Configuration
  - Change the value of the following pciBridge settings from TRUE to FALSE
    pciBridge5.present
    pciBridge6.present
    pciBridge7.present
  - Do not make any changes to pciBridge0.present and pciBridge4.present
  - Do not use this approach for more than four adapters
- Re-check the pciSlotNumber of the virtual network adapters after rebooting

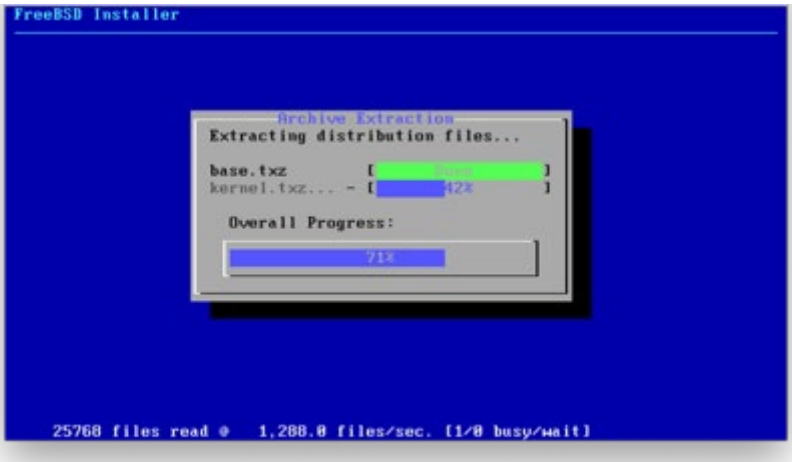
Boot from Virtual CDROM and Begin Install Process

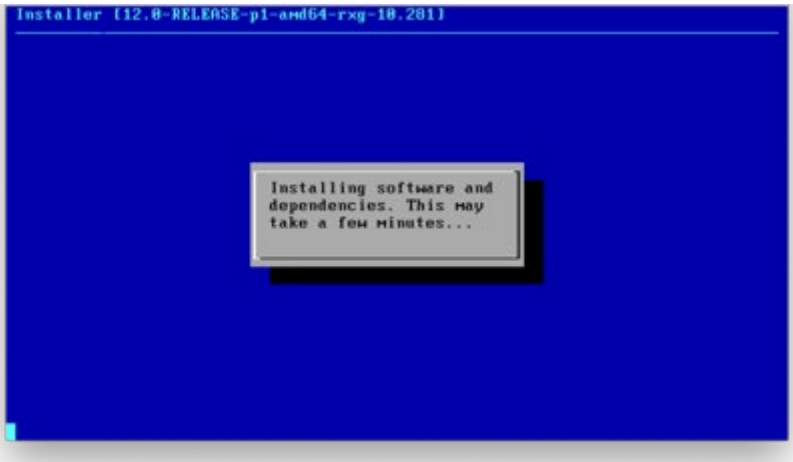
1. Press **Enter** at the prompt to begin base operating installation process.

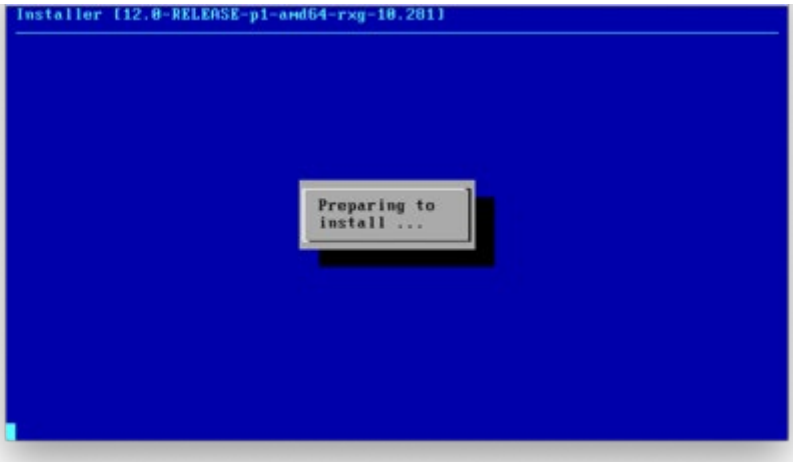


The following dialog boxes appear during the installation process:

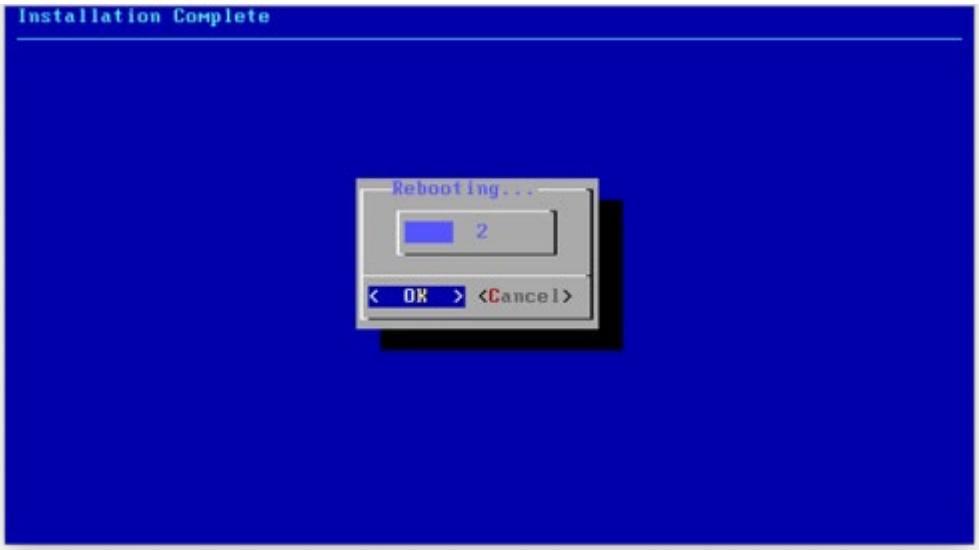




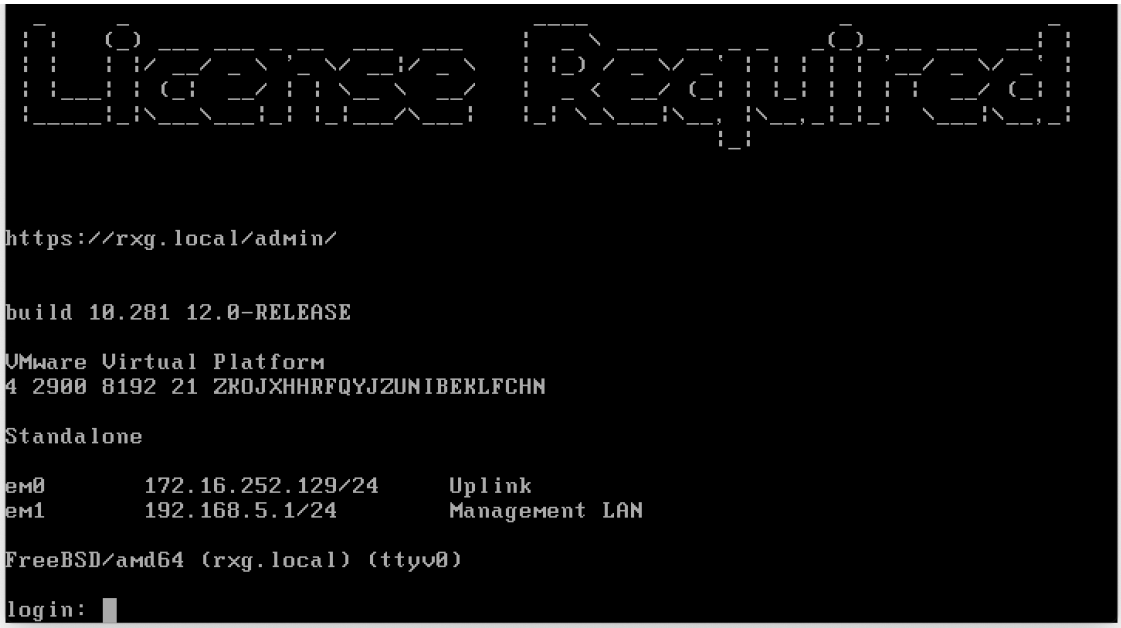




The system automatically reboots when the base operating system is installed. The following screens appear:



2. Use VGA console to find the DHCP assigned WAN IP address for admin access.
3. Follow Initial Configuration in Section 1 when complete.



Troubleshooting

1. If the installation is complete but there is no GUI, possible reasons are:
    a. Total conversion takes time. The installation process includes:
        - Running customized BSD installer
        - FreeBSD installer puts on base OS
        - FreeBSD installer puts on XGG software
        - To this moment … pure FreeBSD no application yet
        - FreeBSD installer reboots machine
        - Machine boots to bare FreeBSD
        - Application software is started for first time by RC
        - Application software performs FreeBSD total conversion

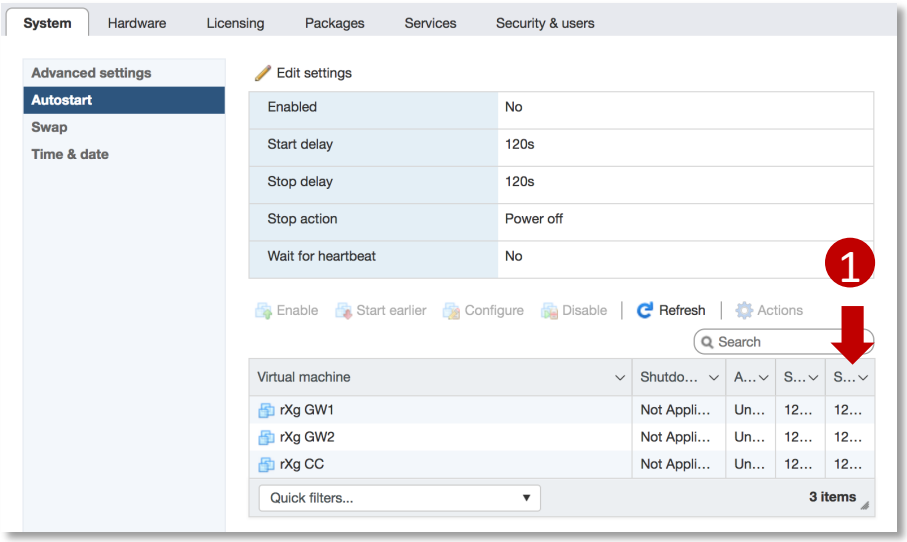
2. If the installation completes and reports errors on console, possible reasons are:
    a. The VM has a single Ethernet interface
    b. This is routing software, you must have at least two interfaces.

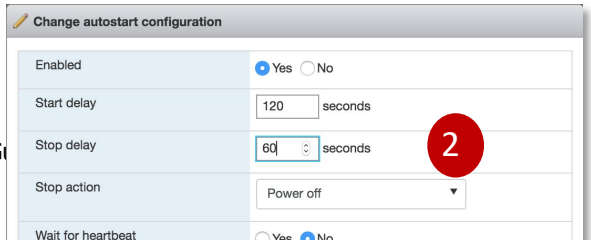
3. The VM has insufficient CPU / RAM / disk space for a minimum license
    a. Presently 4 cores, 8 GB RAM, 20 GB disk space

4. Refer to the license calculator and confirm that a virtual machine was built that meets the minimum requirements.
5. The safest approach is to build a new virtual machine with the appropriate configuration.

Setup Auto-start for the Application VM(s)

- Enable autostart, modify Stop delay to 60 seconds
- Enable autostart for each VM, starting with the first VM started, such as XGG CC





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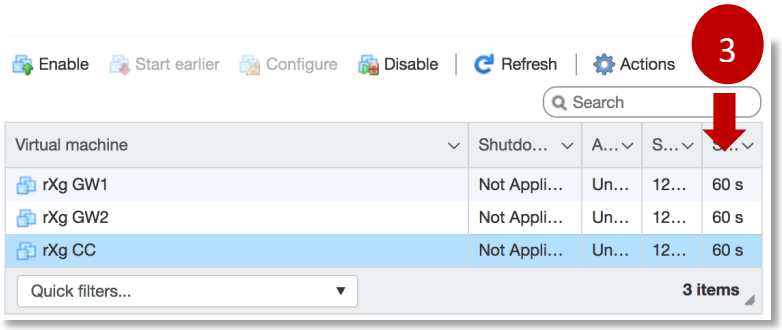
3
Enable
Start earlier
Configure
Disable
Refresh
Actions
Search
Virtual machine
Shutdo...
A...
S...
rXg GW1
Not Appli...
Un...
12...
60 s
rXg GW2
Not Appli...
Un...
12...
60 s
rXg CC
Not Appli...
Un...
12...
60 s
Quick filters...
3 items