

VMware recommends that you boot from the virtual CD, enter the `askmedia` option in the ESX installer boot screen, and then complete the installation with NFS, HTTP/HTTPS, or FTP. The ESX ISO must be mounted in a place that is accessible by one of these network installation methods. This approach is more reliable than attempting the entire installation using virtual media.

If you PXE boot the installer, you cannot install custom drivers during the ESX installation. If you boot the installer from the DVD and install custom drivers during the ESX installation, the drive that you use for the ESX DVD is the drive that you must use for the custom driver CD/DVD. If the drive is a USB drive (including an emulated USB drive), you must not detach the drive during the installation procedure. If the ESX DVD is an ISO image, the custom driver CD/DVD must be an ISO image as well.

Installing ESX Using Scripted Mode

You can quickly deploy ESX hosts using scripted, unattended installations. Scripted installations provide an efficient way to deploy multiple hosts.

The installation script contains the installation settings for ESX. You can apply the script to all your hosts that will have a similar configuration.

Scripted installations include the following steps:

- 1 Create a script using the supported commands.
- 2 Edit the installation script as needed to change settings that are unique for each host.
- 3 Run the scripted installation.

The installation script can reside in one of the following locations:

- Default installation script
- FTP
- HTTP/HTTPS
- NFS
- Local disk

Approaches for Scripted Installation

You can install ESX onto multiple machines using a single script for all of them or using a separate script for each machine.

One of the settings that you can configure in a script is the IP setting, which can be static IP or DHCP for the host on which you are installing ESX. Choose one of the following approaches:

- Create multiple scripts, each containing unique network identification information. The unique network information includes the static IP address and host name of each ESX host.
- Create one script (or use a default script) that uses DHCP to set up multiple ESX hosts. After you complete a scripted installation, you can configure each ESX host separately to assign a unique host name and IP address. VMware recommends that you use static IP addresses.

The `IPAPPEND` PXE configuration option specifies that the same network adapter that the machine boots from is also used for connecting to the network. See [“IPAPPEND,”](#) on page 34.

About Installation Scripts

The installation script is a text file, for example `ks.cfg`, that contains supported commands.

The command section of the script contains the options specified for the ESX installation. This section is required and must appear first in the script.

About Default Installation Scripts

Default installation scripts simplify the task of using scripted mode to perform ESX installations. Instead of writing a script, you can use default scripts.

After your first interactive installation of ESX, the installer creates a `/root/ks.cfg` script in the ESX filesystem. This script reflects the choices you made in the interactive installation. If you perform a second interactive installation on the same host with choices that differ from the first, `/root/ks.cfg` is overwritten with a new version.

The installation media contains the following default installation scripts:

ks-first-safe.cfg	Installs ESX on the first detected disk and preserves the VMFS datastores on the disk.
ks-first.cfg	Installs ESX on the first detected disk.

When you install ESX using `ks-first-safe.cfg` or `ks-first.cfg`, the default root password is `mypassword`.

Default ks-first.cfg Script

The ESX installer includes a default installation script that performs a standard installation to the first hard drive.

The default `ks-first.cfg` script reformats the `/dev/sda` disk and sets up default partitioning. This default script runs if you select the **ESX Scripted Install to first disk (overwrite VMFS)** option in the boot options menu.

You cannot modify the default script on the installation media. If you run the default script, the root password is `mypassword`. After the installation, you can log in to the ESX host and modify the default settings using the vSphere Client.

The default script contains the following commands:

```
#root Password
rootpw --iscrypted $1$MpéRëÈiî$n9sgFQJweS1PeSBpqRRu..
# Authconfig
authconfig --enableshadow --enablemd5
# BootLoader (Use grub by default.)
bootloader --location=mbr
# Timezone
timezone America/Los_Angeles --utc
#Install
install cdrom
#Network install type
network --device=MAC_address --bootproto=dhcp
#Keyboard
keyboard us
#Reboot after install?
reboot
# Clear partitions
clearpart --firstdisk
# Partitioning
part /boot --fstype=ext3 --size= --onfirstdisk
part storage1 --fstype=vmfs3 --size=10000 --grow --onfirstdisk
part None --fstype=vmkcore --size=100 --onfirstdisk
# Create the vmdk on the cos vmfs partition.
virtualdisk cos --size=5000 --onvmfs=storage1
# Partition the virtual disk.
```

```

part / --fstype=ext3 --size=0 --grow --onvirtualdisk=cos
part swap --fstype=swap --size=256 --onvirtualdisk=cos
#VMware Specific Commands
accepteula
serialnum --esx=XXXXX-XXXXX-XXXXX-XXXXX-XXXXX

```

Installation Script Commands

To modify the default installation script or create your own script, use supported commands. Use the following commands in the installation script (kickstart file), which you specify with a boot command when you boot the installer.

accepteula or vmaccepteula (required)

Accepts the ESX license agreement.

autopart (optional)

Compared to kickstart, the behavior of the ESX 4.1 `autopart` command is significantly different.

Specifies the disk onto which ESX is installed. Creates the default partitions on the disk. Not required if you include the `part` or `partition` command.

--disk= or --drive=	Specifies the disk to partition. For the accepted disk name formats, see Table 4-1 .
--firstdisk= <disk-type1> , [<disk-type2> , ...]	<p>Partitions the first non-USB disk found. This is the same disk as found by the <code>clearpart --firstdisk</code> command.</p> <p>You can add an optional string argument to the <code>--firstdisk</code> flag to select the disk types. You can use the following strings :</p> <ul style="list-style-type: none"> ■ local ■ remote ■ Device driver name in the vmkernel <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, <code>--firstdisk=local,remote</code> selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use <code>--firstdisk=mptspi,local</code>.</p>
--onvmfs=	Partitions only the service console VMDK and not the physical disk. The argument is the VMFS volume name where the VMDK should be placed. The service console must be installed on a VMFS datastore that is resident on a host's local disk or on a SAN disk that is masked and zoned to that particular host only. The datastore cannot be shared between hosts.
--extraspace=	Specifies the amount of extra space to add to the / (root) partition. The size is given in megabytes (MB). It must be greater than 0.
--vmdkpath=	Species the path for the VMDK file. Takes the same value format as the <code>virtualdisk--path=</code> option.
--overwritevmfs	Required if a VMFS partition exists on the disk before installation.

auth or authconfig (optional)

Sets up authentication for the system. Hesiod arguments are not supported.

If you omit this command, MD5-based and shadow passwords are enabled by default.

--enablenis	Enables NIS support. Requires nisdomain and nisserver .
--nisdomain=<domain>	Sets the NIS domain. Requires --enablenis .
--nisserver=<server>	Sets the NIS server (broadcasts by default). Requires --enablenis .
--usesshadow or --enableshadow (default)	Enables shadow password file.
--enablekrb5	Enables Kerberos 5 to authenticate users.
--krb5realm=	Specifies the Kerberos 5 realm to which your system belongs.
--krb5kdc=	Specifies the KDCs that serve requests for the realm. Separate the names of multiple KDCs with commas.
--krb5adminserver=	Specifies the KDC in your realm that is also running the KADM5 administration server.
--enableldap	Enables LDAP.
--enableldapauth	Enables LDAP as an authentication method. Requires --enableldap .
--ldapserver=	Specifies the name of the LDAP server. Requires --enableldap .
--ldapbasedn=	Specifies the distinguished name in your LDAP directory tree under which user information is stored. Requires --enableldap .
--enableldaptls	Enables transport layer security lookups. Requires --enableldap .

bootloader (optional)

Sets up the GRUB boot loader.

--append=	Specifies extra kernel parameters for when the system is booting.
--driveorder=	Specifies which drive is first in the BIOS boot order.
--location =[mbr partition none]	Specifies where the boot loader is installed. The values are: mbr for the master boot record, partition for the first sector of the partition with the VMnix kernel, or none to not install the boot loader. If you omit the location option, the default location is the MBR.
--md5pass=	Sets the GRUB bootloader password with the md5 encrypted password.
--password=	Sets the GRUB boot loader password.
--upgrade	Upgrades the existing boot loader configuration and preserves existing entries.

clearpart (optional)

Compared to kickstart, the behavior of the ESX 4.1 **clearpart** command is significantly different.

Removes partitions from the system before creating new partitions.

--all	Removes all partitions from the system.
--drives=	Specifies which drives to clear partitions from. For the accepted drives, see “Disk Device Names,” on page 44.
--alldrives	Ignores the --drives= requirement and allows clearing of partitions on every drive.
--ignoredrives=	Removes partitions on all drives except those specified. Required unless the --drives= or --alldrives flag is specified.
--overwritevmfs	Overwrites VMFS partitions on the specified drives. Required if the disk contains a VMFS partition.
--initlabel	Initializes the disk label to the default for your architecture.
--firstdisk= <disk-type1> , [<disk-type2> , ...]	<p>Clears partitions on the first non-USB disk found. This is the same disk as found by <code>autopart --firstdisk</code> command.</p> <p>You can add an optional string argument to the --firstdisk flag to select the disk types. You can use the following strings:</p> <ul style="list-style-type: none"> ■ local ■ remote ■ Device driver name in the vmkernel <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, --firstdisk=local,remote selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use --firstdisk=mptspi,local.</p>

dryrun (optional)

Parses and checks the installation script. Does not perform the installation.

esxlocation (optional)

Specifies an existing Linux partition to use as the `/boot` partition. The partition must be formatted with an ext2 or ext3 file system, be at least 1100MB, and be a primary partition.

--disk= or --drive=	Specifies the disk to search for an existing Linux partition that can be used as <code>/boot</code> . See Table 4-1 for the accepted disk name formats.
--firstdisk= <disk-type1> , [<disk-type2> , ...]	Uses the first disk that has a partition suitable to be the <code>/boot</code> partition. Supports the same argument format as the <code>autopart</code> command.
--uuid=<UUID>	Specifies a particular partition using the partition's ext2 UUID.
--clearcontents	Removes any files on the partition.

firewall (optional)

Compared to `kickstart`, the behavior of the ESX 4.1 `firewall` command is significantly different. Carefully edit the `firewall` command in your existing scripts.

Configures firewall options. All nonessential ports are blocked by default.

--allowIncoming	Opens all incoming ports on the system.
--allowOutgoing	Opens all outgoing ports on the system.

firewallport (optional)

Specifies firewall ports to allow or disallow connections.

--open	Allows the specified port to pass through the firewall.
--close	Disallows the specified port to pass through the firewall.
--port=<port>	Specifies ports allowed or disallowed through the firewall.
--proto=[tcp udp]	Specifies transmission protocols allowed or disallowed through the firewall.
--dir=[in out]	Specifies the direction of traffic to be allowed or disallowed through the firewall.
--name=<name>	Assigns a descriptive name to the firewall rule. The name must be specified for inbound ports.
--enableService=<service>	Allows services specified in <code>services.xml</code> to pass through the firewall.
--disableService=<service>	Disables services specified in <code>services.xml</code> from passing through the firewall.

install (optional)

Specifies that this is a fresh installation. (All scripted installations are fresh installations.)

<cdrom nfs url>	Specifies the type of installation. The values include the following: <ul style="list-style-type: none"> ■ cdrom installs from the DVD-ROM drive. For example: <pre>install cdrom</pre> ■ nfs. Installs from the specified NFS server. For example: <pre>install nfs --server=example.com --dir=/nfs3/VMware/ESX/41</pre> ■ url downloads across the network. For example: <pre>install url http://example.com</pre>
--server=	Specifies which NFS server to connect to. Use with nfs .
--dir=	Specifies which directory on the NFS server to mount. Use with nfs .
<url>	Defines the location of the runtime environment. Use with url (<code>http/https/ftp/nfs</code>).

keyboard (optional)

Sets the keyboard type for the system.

<keyboardType>	Specifies the keyboard map for the selected keyboard type.
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serialnum or vmserialnum (optional)

Configures licensing. If not included, ESX installs in evaluation mode.

--esx=<license-key> Specifies the vSphere license key to use. The format is 5 five-character tuples (XXXXX-XXXXX-XXXXX-XXXXX-XXXXX).

network (optional)

Configures network information for the system.

--bootproto=[dhcp|static] Specifies network settings.

--device= Specifies either the MAC address of the network card or the device name, as in vmnic0. This option refers to the uplink device for the virtual switch created for the service console. If you omit this option, the installer uses the network adapter specified with the IPAPPEND PXE configuration option or the netdevice bootstrap command. If you omit this option, the IPAPPEND option, and the netdevice bootstrap command, the installer uses the first plugged in network adapter. See [“IPAPPEND,”](#) on page 34 and [“Boot Commands,”](#) on page 49.

--ip= Sets an IP address for the machine to be installed. Required with the **--bootproto=static** option.

--gateway= Designates the default gateway as an IP address. Required with the **--bootproto=static** option.

--nameserver= Designates the primary name server as an IP address. Used with the **--bootproto=static** option. Omit this option if you do not intend to use DNS.

The **--nameserver** option can accept two IP addresses. For example: **--nameserver="10.126.87.104,10.126.87.120"**

--netmask= Specifies the subnet mask for the installed system. Used with the **--bootproto=static** option. If you omit this option, the default is the standard netmask for the given IP address.

--hostname= Specifies the host name for the installed system. Only works with **--bootproto=static**.

--vlanid=<vlanid> Specifies a VLAN to use for networking. Set to an integer between 0 and 4095.

--addvmportgroup=(0|1) Specifies whether to add the VM Network port group, which is used by virtual machines. The default value is 1.

paranoid (optional)

Causes any warning messages to interrupt the installation. If you omit this command, warning messages are logged.

part or partition (optional)

Compared to kickstart, the behavior of the ESX 4.1 **part** or **partition** command is significantly different. Carefully edit the **part** or **partition** command in your existing scripts.

Create service console partitions (except **/boot**) on the virtual disk and not on the physical disk.

Creates a partition on the system. Not required if you include the `autopart` command.

<code><mntpoint></code>	Specifies where to mount the partition.
<code>--asprimary</code>	Specifies that the partition must be created as a primary partition and not a logical partition in the extended partition table.
<code>--size=</code>	Defines the minimum partition size in megabytes.
<code>--grow</code>	Allows the partition to grow to fill any available space or up to the maximum size setting.
<code>--maxsize=</code>	Specifies the maximum size in megabytes for a partition to grow.
<code>--ondisk=</code> or <code>--ondrive=</code>	Specifies the disk on which partitions are created. For the accepted disk formats, see Table 4-1 . Cannot be used with the <code>--onvirtualdisk</code> option.
<code>--onfirstdisk=</code> <code><disk-type1></code> , <code>[<disk-type2>, ...]</code>	Partitions the first non-USB disk found. This is the same disk as found by the <code>autopart --firstdisk</code> command. You can add an optional string argument to the <code>--firstdisk</code> flag to select the disk types. You can use the following strings: <ul style="list-style-type: none"> ■ <code>local</code> ■ <code>remote</code> ■ Device driver name in the <code>vmkernel</code> <p>You can combine multiple values in a comma-separated list to concatenate other matches onto the list of matches. For example, <code>--firstdisk=local,remote</code> selects the first detected local disk or, if none are available, the first remote disk. This is the default behavior. To prefer a disk with the device driver named <code>mptspi</code> over any other local disks, use <code>--firstdisk=mptspi,local</code>.</p>
<code>--onvirtualdisk=</code>	Specifies the virtual disk on which partitions are created. Cannot be used with the <code>--ondisk</code> option.
<code>--fstype=</code>	Sets the file system type for the partition. Usually of type <code>vmfs3</code> , <code>ext3</code> , <code>swap</code> , or <code>vmkcore</code> .

reboot (optional)

Reboots the system after scripted installation is finished.

<code>--noeject</code>	Does not eject the DVD after installation.
------------------------	--

rootpw (required)

Sets the root password for the system. Can be between 6 and 64 characters.

<code>--iscrypted</code>	Specifies that the password is encrypted.
<code><password></code>	Specifies the password value.

timezone (required)

Sets the time zone for the system.

--utc (required)	Indicates that the BIOS clock is set to UTC (Greenwich Mean) time. Do not omit this option.
<timezone> (optional)	Specifies the timezone value. See the Olson database for supported values.

virtualdisk (optional)

NOTE The service console must be installed on a VMFS datastore that is resident on a host's local disk or on a SAN disk that is masked and zoned to that particular host only. The datastore cannot be shared between hosts.

Creates a new virtual disk.

<name>--<system-uuid>/ default-<name>.vmdk	Specifies the name of the virtual disk. If you omit the --path= option, the name of the VMDK is <name>/default-<name>.vmdk.
--size=	Specifies the size of the virtual disk in megabytes.
--path=	Specifies the location where the virtual disk is created. The path must include a directory and a filename ending in .vmdk. For example: cos/default-cos.vmdk.
--onvmfs=	Specifies the name of the VMFS volume where the VMDK file is created.
--onfirstvmfs= (<disk-type1>, [<disk-type2>,...])	Uses the first VMFS volume on a disk that matches the given description and has more free space than the requested size. Uses the same argument format as autopart.

%include or include

Specifies an additional installation script to parse. You can add several include commands to your script. When you use the %include command, put the <filename> argument on the same line as the command.

<filename>	For example: %include part.cfg
-------------------------	--------------------------------

%packages

Adds or removes a package from the installation ISO image.

The packages.xml file governs whether a package is added or removed by default. The requirement="recommended" tag means that the package is installed by default. To override the default setting in the script, include:

```
%packages
-<package_name> # The package will not be installed.
```

The `requirement="optional"` tag means that the package is not installed by default. To override the default setting in the script, include:

```
%packages
<package_name> # The package will be installed.
```

--resolvedeps Installs the listed packages and automatically resolves package dependencies.

--ignoredeps Ignores the unresolved dependencies and installs the listed packages without the dependencies.

%pre (optional)

Specifies a script to be executed before the kickstart configuration is evaluated. For example, a `%pre` script can generate include files, as shown here:

```
# Partitioning
%include part.cfg
...


```
%pre
cat > /tmp/part.cfg <<EOF
part /boot --fstype=ext3 --size= --onfirstdisk
part storage1 --fstype=vmfs3 --size=10000 --grow --onfirstdisk
part None --fstype=vmkcore --size=100 --onfirstdisk
EOF
```


```

--interpreter Specifies an interpreter to use. The default is bash.

=`[python|bash]`

%post (optional)

Executes the specified script after package installation has been completed. If you specify multiple `%post` sections, they are executed in the order they appear in the installation script. For example:

```
%post
MY_MAC=`esxcfg-nics -l | tail -1 | awk '{print $7}'` CONF_URL="http://example.com/$MY_MAC"
esxcfg-firewall --allowOutgoing
--interpreter python -c "import urllib; urllib.urlretrieve('$CONF_URL', '/tmp/myconfig.sh')"
esxcfg-firewall --blockOutgoing
sh /tmp/myconfig.sh
```

--interpreter Specifies an interpreter to use. The default is bash.

=`[perl|python|bash]`

--nochroot Indicates whether the script is executed after you chroot into the service console file system.

--timeout=secs Specifies a timeout for executing the script. If the script has not finished when the timeout expires, the script is forcefully terminated.

--ignorefailure If true, the installation is considered a success even if the `%post` script terminated with an error.

=`[true|false]`

Disk Device Names

Installation script commands such as `autopart` and `clearpart` require the use of disk device names.

[Table 4-1](#) lists the supported disk device names.

Table 4-1. Disk Device Names

Format	Examples	Description
MPX	mpx.vmhba0:C0:T0:L0	The vmkernel device name.
/dev/.+	/dev/sda, /dev/cciss/c0d0	Full device path in the service console.
sdX, cciss/cNdN	sda, cciss/c0d0	Shortened device path from the service console.

Differences Between Kickstart and ESX Commands

ESX scripted installation is similar to, but incompatible with Red Hat's kickstart.

In general, kickstart and ESX scripts differ as follows:

- ESX scripts use the UUID format for specifying disks.
- ESX scripts use MAC addresses to specify network adapters.
- ESX scripts generally allow file and NFS URLs.
- ESX command options and their values require an equal sign (=) instead of a space. For example:

```
--location=mbr # Correct
--location mbr # Incorrect
```

Command differences are noted in the following summary.

accepteula or vmaccepteula

Only in ESX.

autopart

Compared to kickstart, the behavior of the ESX 4.1 **autopart** command is significantly different. Carefully edit the **autopart** command in your existing scripts.

auth or authconfig

--enablehesiod	Only in kickstart.
--hesiodlhs	Only in kickstart.
--hesiodrhs	Only in kickstart.
--enablesmbauth	Only in kickstart.
--smbservers	Only in kickstart.
--smbworkgroup	Only in kickstart.
--enablecache	Only in kickstart.

bootloader

--driveorder=	Only in ESX.
--upgrade	Only in ESX.
--useLilo	Only in kickstart.
--lba32	Only in kickstart.

--linear	Only in kickstart.
--nonlinear	Only in kickstart.

clearpart

Compared to kickstart, the behavior of the ESX 4.1 `clearpart` command is significantly different. Carefully edit the `clearpart` command in your existing scripts.

device

Only in kickstart.

deviceprobe

Only in kickstart.

driverdisk

Only in kickstart.

dryrun

Only in ESX.

esxlocation

Only in ESX.

firewall

Compared to kickstart, the behavior of the ESX 4.1 `firewall` command is significantly different. Carefully edit the `firewall` command in your existing scripts.

firewallport

Only in ESX.

%include or include

In ESX, the `include` command can be specified without the leading `%`.

install

url nfs	Only in ESX.
usb	Only in ESX.
harddrive	Only in kickstart.

interactive

Only in kickstart.

keyboard

Optional in ESX. Mandatory in kickstart.

lang

Only in kickstart.

langsupport

Only in kickstart.

lilocheck

Only in kickstart.

logvol

Only in kickstart.

mouse

Only in kickstart.

network

--bootproto=bootp	Only in kickstart.
--vlanid=<vlanid>	Only in ESX.
--addvmportgroup=(0 1)	Only in ESX.
--device=	ethX identifiers are only in kickstart.
--nodns	Only in kickstart.

paranoid

Only in ESX.

part or partition

Compared to kickstart, the behavior of the ESX 4.1 `part` or `partition` command is significantly different. Carefully edit the `part` or `partition` command in your existing scripts.

raid

Only in kickstart.

reboot

--noeject	Only in ESX.
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skipx

Only in kickstart.

text

Only in kickstart.

virtualdisk

Only in ESX.

volgroup

Only in kickstart.

xconfig

Only in kickstart.