Libvirt for LDoms 1.0.1 Administration Guide

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Preface

This guide provides installation, usage, and removal information for Libvirt for LDoms 1.0.1 software. The `libvirt` library (version 0.3.2) included in this software interacts with the Logical Domains Manager 1.0.1 software running on the Solaris™ 10 Operating System (OS) to support Logical Domains virtualization technology on Sun UltraSPARC® T1– and T2–based platforms. This software is provided for system administrators who want to have consistent interfaces with other virtualization technologies.

Before You Read This Book

To fully use the information in this document, you must have thorough knowledge of the operation of Logical Domains software and the topics discussed in these books:

- *Beginners Guide to LDoms: Understanding and Deploying Logical Domains*
- *Logical Domains (LDoms) 1.0.1 Release Notes*
- *Logical Domains (LDoms) 1.0.1 Administration Guide*

You also must know how to perform system administration operations in the Solaris 10 OS.

How This Book Is Organized

Chapter 1 provides an overview of the Libvirt for LDoms 1.0.1 software.

Chapter 2 provides instructions for the installation and removal of the Libvirt for LDoms 1.0.1 software package.

Chapter 3 provides instructions for using the virsh(1M) subcommands with the Logical Domains Manager 1.0.1 software.

Chapter 4 describes how to use the virt-install script with the Logical Domains Manager 1.0.1 software.

Glossary is a list of abbreviations, acronyms, terms and their definitions specific to the Libvirt for LDoms 1.0.1 software.

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

  `http://docs.sun.com`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your .login file. Use ls -a to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% **su** Password:
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. To delete a file, type **rm** *filename*.

Note – Characters display differently depending on browser settings. If characters do not display correctly, change the character encoding in your browser to Unicode UTF-8.

Related Documentation

The following table lists the documentation for this product. The online documentation for Libvirt for LDoms 1.0.1 software is available at:

`http://docs.sun.com/app/docs/coll/ldom1.0`

Application	Title	Part Number	Format	Location
Administration	Libvirt for LDoms 1.0.1 Administration Guide	820-3838-10	HTML PDF	Online
Release Notes	Libvirt for LDoms 1.0.1 Release Notes	820-3839-10	HTML PDF	Online

The following table lists the documentation that is related to this product. The online *Logical Domains (LDoms) 1.0.1 Administration Guide* and *Release Notes* are available at:

`http://docs.sun.com/app/docs/coll/ldom1.0`

Application	Title	Part Number	Format	Location
Basics	Beginners Guide to LDoms: Understanding and Deploying Logical Domains Software	820-0832	PDF	Online at:
	`http://www.sun.com/blueprints/0207/820-0832.html`			
Administration	*Logical Domains (LDoms) 1.0.1 Administration Guide*	820-3268-10	PDF HTML	Online
Release Notes	*Logical Domains (LDoms) 1.0.1 Release Notes*	820-3269-11	PDF HTML	Online
`virsh`(1M), `virt-install`(1M)	*OpenSolaris™ xVM Documentation*	N/A	HTML	Online at:
	`http://opensolaris.org/os/community/xen/docs/`			
	Red Hat open source web site	N/A	HTML	Online at:
	`http://virt-manager.et.redhat.com/`			
`libvirt`	*libvirt the virtualization API*	N/A	HTML	Online at:
	`http://www.libvirt.org/`			
JumpStart™	*Solaris 10 8/07 Installation Guide: Custom JumpStart and Advanced Installations*	820-0179	HTML	Online at:
	`http://docs.sun.com/app/docs/doc/820-0179`			

Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- Documentation (`http://www.sun.com/documentation`)
- Support (`http://www.sun.com/support`)
- Training (`http://www.sun.com/training`)

Third-Party Web Sites

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Please include the title and part number of your document with your feedback:

Libvirt for LDoms 1.0.1 Administration Guide, part number 820-3838-10.

CHAPTER 1

Overview

The Libvirt for LDoms 1.0.1 software provides virtual library (`libvirt`) interfaces for Logical Domains (LDoms) software so that virtualization customers can have consistent interfaces. Libvirt is an open source management library that interacts with virtualization capabilities. The Libvirt for LDoms 1.0.1 software adds the LDoms driver as a supported hypervisor in the libvirt driver system. The `libvirt` library (version 0.3.2) included in this software interacts with the Logical Domains Manager 1.0.1 software running on Solaris 10 Operating System (OS) to support Logical Domains virtualization technology.

The main components of the Libvirt for LDoms 1.0.1 software are:

- Virtual library (`libvirt`) containing a subset of virtual shell, `virsh`(1M), commands to support Logical Domains Manager commands for CPU and memory management, domain lists, and life-cycle actions.
- Virtual install (`virt-install`) script that allows you to create a guest domain and install an OS on that domain for an LDoms system.

Logical Domains Software

LDoms software is Sun Microsystem's virtualization technology to subdivide a supported system's resources (CPUs, memory, I/O, and storage) creating partitions called logical domains. Each logical domain can run an independent OS. The Logical Domains Manager is used to create and manage logical domains and maps logical domains to physical resources. The LDoms Manager provides a command-line interface and also exports an XML-based control interface. The Libvirt for LDoms driver uses this XML interface to communicate with the LDoms Manager to retrieve the LDoms data for:

- Listing domains
- Requesting CPU and memory resource updates

- Performing life-cycle actions for logical domains

The `virt-install` Script

The `virt-install` script is a command-line tool that provides a straightforward way to provision operating systems into virtual machines. The `virt-install` Python script allows you to enter information about a guest (such as the name of the virtual machine, amount of memory to be allocated to the guest, path to the disk image of the guest) either as a set of command-line options or in response to a set of prompts. After entering required information, the `virt-install` script starts an installation. The `virt-install` script for LDoms uses the libvirt interface and `virtinst` module, which is provided by the Libvirt for LDoms 1.0.1 software. The `virtinst` module for LDoms uses the LDoms Manager's CLI interface to create the guest domain, add resources to the guest domain, and start the guest domain.

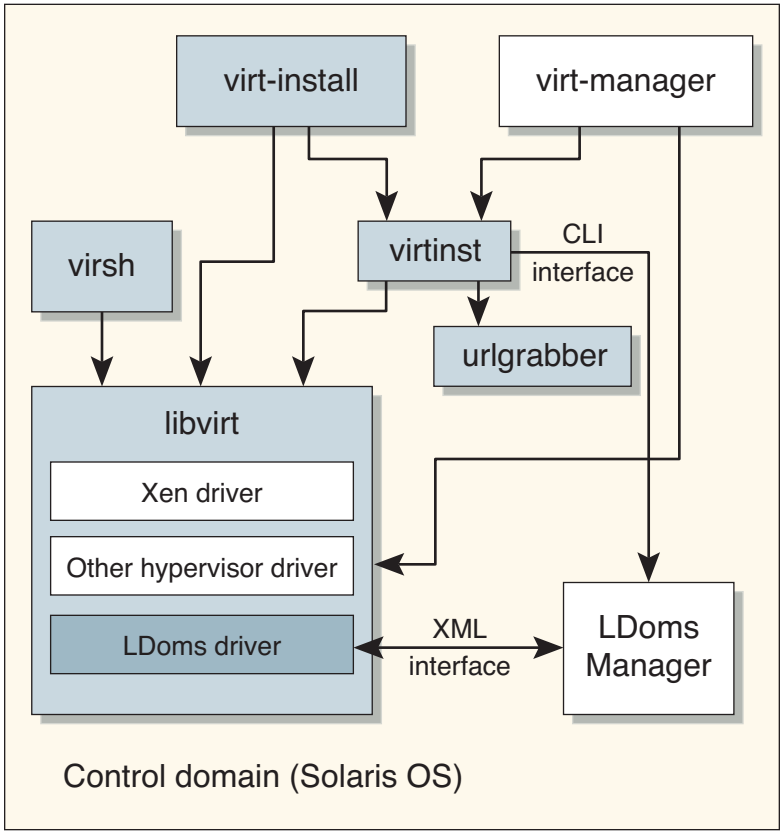
The `urlgrabber` is an open source Python package that simplifies retrieving files and is used by the `virtinst` module for LDoms. The `urlgrabber` is included in this release without any modifications.

The `virt-manager` Application

The `virt-manager` is a GNOME-based GUI application for monitoring and managing virtual machines. The `virt-manager` code is written primarily in Python. The `virt-manager` application uses the `libvirt` C API as an isolation layer to keep the application independent of a particular hypervisor technology and is outside the scope of this release.

The following diagram shows the components described in this overview. The shaded, or blue, components are part of this Libvirt for LDoms 1.0.1 software release.

FIGURE 1-1 Libvirt for LDoms Components



CHAPTER 2

Installing and Removing the Libvirt for LDoms Software

This chapter describes how to install and remove the two components of the Libvirt for LDoms 1.0.1 software.

Installing the Libvirt for LDoms Software

You can find the `Libvirt_LDoms-1_0_1.zip` file at the LDoms software download site at:

`http://www.sun.com/download/products.xml?id=46e5ba66`

The following table lists Libvirt for LDoms software packages that are contained within the zip file.

TABLE 2-1 Libvirt for LDoms Software Packages

Package Name	Description
`SUNWldlibvirt`	Virtual library (`libvirt`), including the virtual shell (`virsh`)
`SUNWldvirtinst`	Virtual installation module (`virtinst`) and script (`virt-install`)

▼ To Install the Libvirt for LDoms Software

1. **Download the `Libvirt_LDoms-1_0_1.zip` file from the LDoms software download site to a location of your choice.**

2. **Unzip the** `Libvirt_LDoms-1_0_1.zip` **file.**
3. **Use the** `pkgadd`**(1M) command to add** `SUNWldlibvirt` **to the control domain.**
4. **Use the** `pkgadd`**(1M) command to add** `SUNWldvirtinst` **to the control domain.**

Removing the Libvirt for LDoms Software

▼ To Remove the Libvirt for LDoms Software

1. **Use the** `pkgrm`**(1M) command to remove** `SUNWldlibvirt` **from the control domain.**
2. **Use the** `pkgrm`**(1M) command to remove** `SUNWldvirtinst` **from the control domain.**

CHAPTER 3

Using the Virtual Shell (`virsh`) Commands

This chapter describes using the virtual shell, `virsh`(1M), which is a new shell environment and is a management user interface for logical domains. The `virsh` commands can be used to perform various actions on a logical domain. See TABLE 3-1 for the `virsh` commands you can use with LDoms.

The `virsh` Commands Used With LDoms

Refer to the following site for overall information about `virsh`(1M) in the `virsh`(1M) man page. This man page contains all the commands available for use with OpenSolaris xVM.

`http://opensolaris.org/os/community/xen/docs/`

The following table shows the `virsh` commands that are available for use with the Logical Domains 1.0.1 software.

TABLE 3-1 The `virsh` Commands Used with LDoms

virsh Command	Usage	Description
`console`	**`console`** *domain*	Connect the virtual serial console for the guest domain **Note -** This command *cannot* be used to connect to the console for the control, or `primary`, domain.
`create`	**`create`** *file*	Create a domain from an XML file, and leave it in the inactive state
`define`	**`define`** *file*	Define (but do not start) a domain from an XML file, and leave it in the bound state
`destroy`	**`destroy`** *domain*	Destroy an active/bound domain and leave it in the inactive state.
`domid`	**`domid`** *domain*	Convert a domain name or UUID to a domain ID
`dominfo`	**`dominfo`** *domain*	Provide basic information about the domain.
`domname`	**`domname`** *domain*	Convert a domain ID or UUID to a domain name
`domstate`	**`domstate`** *domain*	Show a domain state.
`domuuid`	**`domuuid`** *domain*	Convert a domain name or ID to a domain UUID
`dumpxml`	**`dumpxml`** *domain*	Provide domain information in XML to standard output (`stdout`). The output is similar to that from an `ldm list-constraints` *domain* command.
`help`	**`help`** [*command_name*]	Print usage for one or all `virsh` commands used with LDoms
`hostname`	**`hostname`**	Print the hypervisor host name
`list`	**`list`** [`--inactive	--all`]	List domains
`nodeinfo`	**`nodeinfo`**	Show node, or system, information
`quit`	**`quit`**	Quit this interactive terminal
`setmem`	**`setmem`** *domain kilobytes*	Change a logical domain's memory allocation in kilobytes **Note -** The amount of memory must be greater than 4000 kilobytes, or you receive an error.
`setvcpus`	**`setvcpus`** *domain count*	Change the number of virtual CPUs assigned to a logical domain
`shutdown`	**`shutdown`** *domain*	Shut down a logical domain gracefully to the bound state

TABLE 3-1 The `virsh` Commands Used with LDoms *(Continued)*

virsh Command	Usage	Description
`start`	**`start`** *domain*	Start an inactive or bound logical domain
`undefine`	**`undefine`** *domain*	Undefine and delete an inactive logical domain
`vcpuinfo`	**`vcpuinfo`** *domain*	Provide basic domain virtual CPU information
`version`	**`version`**	Show the version of the `libvirt` library, the Logical Domains Manager, and the hypervisor.

Using the Virtual Shell (`virsh`) with LDoms

Note – You must be a superuser to run the `virsh` commands.

This section contains examples of using some of the `virsh` commands with LDoms and some output examples.

▼ To Start the Virtual Shell (`virsh`)

- **To start `virsh` with LDoms, type:**

```
# /usr/bin/virsh -c ldoms:///default
Welcome to virsh, the virtualization interactive terminal.
```

▼ To Get Help for Virtual Shell (`virsh`) Commands

- **To obtain usage information for all `virsh` commands, type:**

```
virsh # help
```

▼ To Get Node Information

1. **To obtain the following node, or system, information, type:**

```
virsh # nodeinfo
CPU model:           SPARC
CPU(s):              32
CPU frequency:       502 MHz
CPU socket(s):       1
Core(s) per socket:  8
Thread(s) per core:  4
NUMA cell(s):        1
Memory size:         33481216 kB
```

   - CPU model, CPU sockets, Cores per socket and NUMA cells are all static data and display data as shown in the preceding example.
   - Threads per core is either 4 or 8 depending on whether you have a Sun UltraSPARC™ T1– or T2–based server.

2. **Verify CPU frequency by using the** `psrinfo -v` **command on the control domain.**

3. **Verify memory by using the** `ldm list-bindings` **and** `ldm list-devices` **commands and adding the memory sizes together.**

▼ To Get Virtual CPU Information

1. **To obtain virtual CPU information from the control, or primary, domain, type:**

```
virsh # vcpuinfo primary
VCPU:           0
CPU:            0
State:          running
CPU time:       1460460.0s
```

   - Output shows valid CPU time only for CPUs in the control domain. This time is the same for all CPUs and is the same as uptime for the control domain.

2. **To obtain virtual CPU information from a guest domain (**`ldom1` **in this example), type:**

```
virsh # vcpuinfo ldom1
VCPU:           0
```

```
CPU:            15
State:          unknown
```

- All guest CPU time is not displayed.
- All guest CPU states are unknown.

▼ To Get Version Information

1. **To obtain version information for the `libvirt` library, the Logical Domains Manager, and the hypervisor, type:**

```
virsh # version
Compiled against library: libvir 0.3.2
Using library: libvir 0.3.2
Using API: LDoms 1.0.1
Running hypervisor: LDoms 1.5.1
```

2. **Verify the hypervisor version by using the `ldm -V` command.**

▼ To Quit the Virtual Shell (`virsh`)

- **To quit `virsh`, type:**

```
virsh # quit
```

CHAPTER 4

Using the Virtual Installation Script (`virt-install`)

This chapter describes using the `virt-install`(1M) script to install a guest operating system on a server running the Logical Domains Manager. To find more information about the `virt-install` script as it used with OpenSolaris xVM, refer to the following site:

`http://opensolaris.org/os/community/xen/docs/`

Before Using the `virt-install` Script

Before using the `virt-install` script to create the guest domain and add resources to the guest, ensure the following occurs on the LDoms control, or `primary`, domain:

- Installation server is preconfigured to boot over a network
- Solaris 10 8/07 OS is installed
- Logical Domains (LDoms) 1.0.1 software is installed
- Logical Domains Manager is running
- Control, or `primary`, domain is configured
- Default services set up:
  - Virtual disk server (`vds`)
  - Virtual console concentrator (`vcc`)
  - Virtual switch (`vsw`)

The `virt-install` script adds resources to the guest domain using the existing virtual disk or switch services. Refer to the *Logical Domains (LDoms) 1.0.1 Administration Guide* for more information about how to do all this.

Types of `virt-install` Script Installations

You can start the `virt-install` script in two ways:

- Interactive – Enter information about a guest domain in response to a set of prompts.
- Command-line – Enter information about a guest domain as a set of command-line options.

You can install the OS through a network installation in one of two ways:

- Regular installation
- JumpStart™ installation – With a JumpStart installation, you can automatically install or upgrade several systems, based on profiles that you create. Also, you can use a `sysidcfg` file to specify configuration information, so that the JumpStart installation is completely automatic. You must preconfigure the installation server before running the `virt-install` script. Refer to the *Solaris 10 8/07 Installation Guide: Custom JumpStart and Advanced Installations* for more information about how to set up the JumpStart installation server. See "Example JumpStart Files to Be Used With the `virt-install` Script" on page 20 for examples of JumpStart Files you can use.

Installation from Solaris Flash Archives or ISO image can be supported if those images are set up on the installation server to boot over a network. However, preconfiguration for Solaris Flash Archives or ISO image is not supported.

Installation from a local disk or CD-ROM is not supported.

Required Information for Using the `virt-install` Script

You must supply the following guest domain information:

- Name of the guest domain – This must be a unique name; if the name already exists, the `virt-install` script issues an error and exits.
- Amount of memory to be allocated to the guest domain in megabytes (MB).
- Path to the disk image of the guest.

- Size in gigabytes (GB) of the virtual disk for the guest domain if the path to the guest disk image does not already exist. The `virt-install` script creates the file, using the `mkfile`(1) command, if the file does not already exist.
- MAC address for the virtual network device – A MAC address is automatically allocated by the Logical Domains Manager if you do not provide one. See the `-m`/`--mac` option in TABLE 4-1 for more information about assigning MAC addresses.
- Number of virtual CPUs for the guest domain – If you do not provide a number, the default of one virtual CPU is used.

Responding to Prompts Using the `virt-install` Script

Note – You must be a superuser to run the `virt-install` script.

The `virt-install` script asks for the information listed in "Required Information for Using the `virt-install` Script" on page 14. After you enter the required information by responding to the prompts, installation starts.

The `virt-install` script for LDoms stops at the OpenBoot™ `ok` prompt. To continue the installation process, you must enter one of the following `boot` commands depending on whether you are doing a regular network installation or a JumpStart installation.

- To continue a regular network installation, type the following at the `ok` prompt.

```
ok boot vnet1
```

- If you use the JumpStart `sysidcfg` file, the installation can be completely automatic after you enter the following at the `ok` prompt.

```
ok boot vnet1 - install
```

The following example shows an example of using the `virt-install` script with LDoms.

CODE EXAMPLE 4-1 Example of the `virt-install` script for LDoms

```
# /usr/sbin/virt-install --connect=ldoms:///default
What is the name of your virtual machine? ldom_virt1
How much RAM should be allocated (in megabytes)? 1024
```

CODE EXAMPLE 4-1 Example of the `virt-install` script for LDoms *(Continued)*

```
What would you like to use as the disk (path)? /ldomsOSFiles/ldom_virt1_disk
How large would you like the disk (/ldomsOSFiles/ldom_virt1_disk) to be (in
gigabytes)? 7

Starting install...
Creating the virtual disk file /ldomsOSFiles/ldom_virt1_disk... It might take a
few minutes to complete.
LDom ldom_virt1 started

MAC address 00:14:4f:f8:65:c4 is used for a virtual network device vnet1 ==>
****NOTE: User can enter the fixed MAC address with -mac=<mac_addr> command line
argument. Since the MAC address was not entered as a command line argument, the
LDoms Manager has automatically assigned this MAC address to the virtual network
device for the new guest domain. Use this MAC address to configure the
installation server.
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Connecting to console "ldom_virt1" in group "ldom_virt1" ....
Press ~? for control options ...

ok boot vnet1 - install   ==> **** NOTE: enter this boot command at the ok prompt
Boot device: /virtual-devices@100/channel-devices@200/network@0
File and args: - install
Requesting Internet Address for 0:14:4f:f8:65:c4
SunOS Release 5.10 Version Generic_120011-14 64-bit
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Configuring devices.
Using RPC Bootparams for network configuration information.
Attempting to configure interface vnet0...
Configured interface vnet0
Setting up Java. Please wait...
Extracting windowing system. Please wait...
Beginning system identification...
Searching for configuration file(s)...
Using sysid configuration file 10.1.1.10:/export/VSP_DEV/ldom-126/sysidcfg
Search complete.
Discovering additional network configuration...
Completing system identification...
Starting remote procedure call (RPC) services: done.
System identification complete.
Starting Solaris installation program...
Searching for JumpStart directory...
Using rules.ok from 10.1.1.10:/export/VSP_DEV/ldom-126.
```

CODE EXAMPLE 4-1 Example of the `virt-install` script for LDoms *(Continued)*

```
Checking rules.ok file...
Using profile: prof
Using finish script: finish_script
Executing JumpStart preinstall phase...
Searching for SolStart directory...
Checking rules.ok file...
Using begin script: install_begin
Using finish script: patch_finish
Executing SolStart preinstall phase...
Executing begin script "install_begin"...
Begin script install_begin execution completed.

Processing profile
 - Selecting cluster (SUNWCXall)
 - Selecting all disks
 - Configuring boot device
 - Using disk (c0d0) for "rootdisk"
 - Configuring swap (c0d0s1)
 - Configuring / (c0d0s0)

Verifying disk configuration
 - WARNING: Changing the system's default boot device in the EEPROM

Verifying space allocation
 - Total software size: 3783.25 Mbytes

Preparing system for Solaris install

Configuring disk (c0d0)
 - Creating Solaris disk label (VTOC)

Creating and checking UFS file systems
 - Creating / (c0d0s0)

Beginning Solaris software installation

Starting software installation
 SUNWocfd.....................done.  3782.90 Mbytes remaining.
 SUNWlucfg....................done.  3782.82 Mbytes remaining.
 SUNWcsu......................done.  3768.09 Mbytes remaining.
 SUNWcsr......................done.  3763.90 Mbytes remaining.
 SUNWcsl......................done.  3749.86 Mbytes remaining.
 SUNWcnetr....................done.  3749.79 Mbytes remaining.
 SUNWjdmk-base................done.  3748.54 Mbytes remaining.
 SUNWkvmt200.v................done.  3748.36 Mbytes remaining.
 SUNWkvm.v....................done.  3747.83 Mbytes remaining.
```

CODE EXAMPLE 4-1 Example of the `virt-install` script for LDoms *(Continued)*

```
....
```

Using the `virt-install` Command-Line Options

The following table lists all the command-line options available in using the `virt-install` script with LDoms.

TABLE 4-1 The `virt-install` Script Command-Line Options with LDoms

Command-Line Option	Description
`--check-cpu`	Check that virtual CPUs do not exceed the physical CPUs, and warn if they do.
`--connect=`*URI*	Connect to the hypervisor at the Uniform Resource Identifier (URI). To connect to the Logical Domains hypervisor, use the following URI: **`--connect=ldoms:///default`**
`-d`, `--debug`	Display debugging information.
`-f` *disk_image*, `--file=`*disk_image*	Specify the file to use as a disk image.
`-h`, `--help`	Display list of `virt-install` command-line options.

`-m` *mac_addr*,
`--mac=`*mac_addr*
	Specify a fixed MAC address for the guest domain's virtual network device. If not provided, the Logical Domains Manager automatically allocates a MAC address when the virtual network device is added to the guest domain.
	The following MAC address blocks are used by the Logical Domains Manager for automatic MAC address allocation. You cannot manually request an address in this range:
	`00:14:4F:F8:00:00 - 00:14:4F:FB:FF:FF`
	You can use the following range for manual MAC address allocation:
	`00:14:4F:FC:00:00 - 00:14:4F:FF:FF:FF`
	Refer to "Assigning MAC Addresses Automatically or Manually" in the *Logical Domains (LDoms) 1.0.1 Administration Guide* for more information about MAC address allocation.

`-n`, `--name=`*name*	Specify the name of the guest domain. This must be a unique name; if a guest domain with the same name already exists, the `virt-install` script issues an error and exits.
`--vcpus=`*N*	Specify the number of virtual CPUs for the guest domain. If not specified, the default is 1.

TABLE 4-1 The `virt-install` Script Command-Line Options with LDoms *(Continued)*

Command-Line Option	Description
`-p`, `--paravirt`	For OpenSolaris xVM users, indicates the guest domain is paravirtualized instead of a fully virtualized guest. **Note -** LDoms guest domains are always paravirtualized, so you do not need to use this option with LDoms software.
`-r` *mem_amount* `--ram=`*mem_amount*	Specify the amount of memory, in megabytes, to allocate for the guest domain.
`-s` *disksize*, `--file-size=`*disksize*	Specify the size of the disk image, in gigabytes, if the disk image does not already exist. **Note -** The `virt-install` script for LDoms supports the Solaris OS installation. The Solaris 10 Installation Guide states that the entire Solaris software package requires 6.7 gigabytes. Therefore, the `virt-install` script issues a warning message if the entered disk size is too small (less than 6.7 gigabytes) or too big (greater than 8 gigabytes).

Logical Domains Manager Commands Used in the `virt-install` Script

The `virt-install` script for LDoms software uses the Logical Domains Manager command-line interface (CLI) to create the guest domain, add resources, and bind and start the new guest domain. The following Logical Domains Manager (`ldm`) commands are used in the `virt-install` script.

TABLE 4-2 The `ldm` Commands Used in the `virt-install` Script

Command	Description
`ldm add-domain`	Creates a logical domain.
`ldm add-vcpu`	Adds virtual CPUs to an existing logical domain.
`ldm add-memory`	Adds memory to an existing logical domain.
`ldm add-vnet vnet1`	Adds the virtual network device (`vnet1`) to an existing logical domain.
`ldm add-vdsdev`	Adds a device (entire disk, disk slice, file, or disk volume) to be exported by the virtual disk server to an existing logical domain.
`ldm add-vdisk`	Adds a virtual disk to an existing logical domain.
`ldm set-var`	Sets one or more variables for an existing logical domain.

TABLE 4-2 The `ldm` Commands Used in the `virt-install` Script *(Continued)*

Command	Description
`ldm bind-domain`	Binds resources to a created logical domain.
`ldm start-domain`	Starts a bound logical domain.
`ldm list-domain`	Lists a logical domain and its state.

After the guest domain is created and started, the `virt-install` script uses the following command to connect to the console of a guest domain.

```
# telnet localhost console_port
```

Example JumpStart Files to Be Used With the `virt-install` Script

JumpStart configuration files are manually created and managed. You can initiate a custom JumpStart installation through network installation after setting up the server. When you create a profile server, you must ensure that systems can access the JumpStart directory on the profile server during a custom JumpStart installation. Each time that you add a system for network installation, use the `add-install-client` command to specify the profile server. Use the `add-install-client` command to create the `/etc/bootparams` entry for the guest domain. The guest domain gets its IP address as part of the JumpStart process, either using DHCP or a static IP address.

The following example script does the following:

- Calls the `add-install-client` command
- Adds the MAC address to the `/etc/ethers` file
- Updates the `/etc/bootparams` file
- Creates the `sysidcfg` file that can be used for the automatic installation

CODE EXAMPLE 4-2 Example JumpStart File

```
#!/bin/ksh

RELEASE_DIR=/export/s10u4/combined.s10s_u4wos/latest/Solaris_10
CONF_PROF_DIR=/export/VSP_DEV
CLIENT=ldom-126
IP=10.1.1.126
ENET_ADDR=00:14:4f:f8:65:c4
CLASS=sun4v
```

CODE EXAMPLE 4-2 Example JumpStart File *(Continued)*

```
network=`echo $IP | cut -d. -f1-3`

case $network in
   10.1.1 )
         INSTALL_SVR=install-1200-gw1 ;;
   10.1.2 )
         INSTALL_SVR=install-1200-gw2 ;;
   *        )
         print "error: $network unknown.\n"
         return 1 ;;
esac

$RELEASE_DIR/Misc/jumpstart_sample/check && {
$RELEASE_DIR/Tools/add_install_client -i $IP -e
$ENET_ADDR -c $INSTALL_SVR:$CONF_PROF_DIR/$CLIENT -p
$INSTALL_SVR:$CONF_PROF_DIR/$CLIENT $CLIENT $CLASS
}

# generate sysidcfg file, required.

cat > sysidcfg <<EOF!
system_locale=C
timezone=US/Central
timeserver=localhost
terminal=vt100
name_service=NONE
security_policy=NONE
nfs4_domain=default
network_interface=primary {hostname=$CLIENT ip_address=$IP netmask=
255.255.255.0protocol_ipv6=no}
# password=imp
root_password=PUWxm0hAKz8hw
EOF!
```

The following profile is an example for Logical Domains software. Virtual disk device names in Logical Domains software differ from physical disk device names in that they do not contain a target ID in the device name.

CODE EXAMPLE 4-3 Example JumpStart Profile

```
# root_device is format of c0d0s0 for virtual disk device
install_type    initial_install
system_type     standalone
partitioning    explicit
cluster         SUNWCXall
```

CODE EXAMPLE 4-3 Example JumpStart Profile *(Continued)*

```
root_device     c0d0s0
filesys         rootdisk.s0         free    /
filesys         rootdisk.s1         1000    swap
```

Glossary

This list defines terminology, abbreviations, and acronyms in the Libvirt for LDoms documentation.

A

API application programming interface

C

C high-level programming language

CD-ROM compact disc–read-only memory

CLI command-line interface

CPU central processing unit

D

DHCP Dynamic Host Configuration Protocol

G

GB gigabyte

GNOME GNU Network Object Model Environment

GNU GNU's *not* UNIX, a UNIX-compatible software system

GUI graphical user interface

H

hypervisor thin software layer with a stable interface between the operating system and the hardware

I

I/O input/output

ID identifier

IP Internet Protocol

ISO International Organization for Standardization

K

KB, kB kilobyte

L

LDoms Logical Domains software, technology

`libvirt` virtual library

O

OS operating system

P

Python interpreted, object-oriented programming language

M

MAC media access control address, which LDoms can assign automatically or you can assign manually

MB megabyte

MHz megahertz

N

NUMA Non-Uniform Memory Architecture

U

URI Uniform Resource Identifier

UUID Universal Unique Identifier

V

`vcc` virtual console concentrator service

`vcpu` virtual CPU

`vds` virtual disk service

`virt-install`**(1M)** virtual installation script

`virtinst` virtual installation module for LDoms

`virsh`**(1M)** virtual shell

`vsw` virtual switch service

X

XML Extensible Markup Language

xVM Intersection of virtualization and management. Sun's OpenSolaris xVM can virtualize and manage mixed environments running various platform software, including OpenSolaris, on various hardware, including Sun hardware.