

Installing and Configuring HCL Domino 11.0.1 on CentOS 8 Enterprise Linux



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Introduction & Audience

This paper will walk through the steps necessary to perform a ground-up installation of HCL Domino 11.0.1 on CentOS Enterprise Linux 8. This will include:

- Installation of 64-bit CentOS 8
- Minimal configuration of the Operating System
- Configuration specific for HCL Domino installation
- Installation of 64-bit HCL Domino 11.0.1

This document is aimed at administrators who have some working knowledge / understanding of HCL Domino, but who may be unfamiliar or uncomfortable with Linux. The goal of this document is to demonstrate the very minimal requirements for Domino on Linux, point out some potential pitfalls, and ultimately show that installing and running Domino on a Linux machine is much easier than you think.

COPY / PASTE

If you are sitting at a server console with this document in electronic format, then whenever you see a console command such as:

```
># cat /etc/selinux/config
```

It can be copied and pasted directly into the console. This should save time and avoid frustrating typos. Just make sure to change any specific-to-your-installation values before hitting that enter key.

Note on Fonts and Spacing

The ability to scrawl hand-written notes onto a document is often helpful, and for this reason many administrators prefer paper documents to digital. This document is formatted with the intention of being printed out and used as a reference whenever a new server needs to be installed or configured.

Extra white space has been included for you to take your own notes. Font selection and sizing is deliberate and intentional; they are easier to read and follow when switching focus back and forth between a paper document and a server console.

Typographic Conventions

Throughout this document there are several different types of text.

- There is explanatory (normal body) text, which appears in Century Gothic
- Example file content or lists of information appear in Consolas
- Courier New is used for command-line content (stuff you should type)
- **Console commands are dark orange bold Courier New**
- *Colors*, *italics*, and **bold** fonts are used in various other areas to *help things stand out*

CentOS 8 Enterprise Linux

Depending upon your installation, you might be setting up a hosted server with one of the various hosting providers, a Virtual Machine, or directly as the main Operating System on a physical server. Each of these installation types have their own unique nuances for the installation. This paper will focus on the major points common to all installation types. Most of the major hosting providers will automatically handle the base Operating System and Network IP configuration. If this fits your situation go ahead and skip to the next section.

For the purposes of preparing this document, a Virtual Machine installation using Oracle VirtualBox running on a Macbook OSX Catalina host OS was used with [CentOS-8.2.2004-x86_64-minimal.iso](#)

HCL Domino 11.0.1 System Requirements

The official HCL Domino 11.0.1 Detailed System Requirements can be found at

https://support.hcltechsw.com/csm?id=kb_article&sysparm_article=KB0077033

The applicable HCL Domino 11.0.1 Disk and Memory requirements for 64-bit CentOS are reproduced below:

Components	Requirement	Applicable OS
Disk Space	1.5 Gb minimum Disk swap space: Same amount as physical RAM required 2 times the physical RAM recommended	Applies to all AIX, Linux operating systems supported by the deliverable
Memory	512 Mb Minimum 512 Mb or more recommended per CPU	Apply to all operating systems supported by the deliverable

Please note that these minimal requirements conflict with the [CentOS 8 Disk and Memory Requirements](#). CentOS 8 requires a minimum of 10 GiB disk space and 768 Mb of RAM, with a minimum of 2 physical partitions (one for OS, the other for swap).

Minimum Recommendations

While the above minimum requirements should technically allow one to install Domino 11.0.1 on CentOS 8, any such installation would likely only be useful as a Proof of Concept. For an installation to actually provide business benefit both the Disk space and RAM need to be increased. What is the recommendation? Unfortunately, this is not a simple answer. Every business need is different.

Memory

The Domino 11.0.1 Server is exceptionally memory efficient, and in most instances will run just fine on 2 Gb of RAM. Depending on the expected workload of your server you may want to increase your RAM. Certain processes (such as full-text indexing document attachment content or OSGI plug-in processing) use more RAM than others (such as mail routing). Only you can decide how much RAM you will need; but considering that the cost of high-quality server RAM has dropped dramatically in recent years it may be worthwhile to add more to your server.

Partitions

Before continuing it is strongly recommended that you read the [CentOS 8 Advice on Partitions](#). Your partition scheme is entirely up to you, and a full discussion of partition layout is beyond the scope of this document. The following guidelines should help you determine your needs.

Partition	Size	Notes
swap	See Notes	<ul style="list-style-type: none">• For memory less than 2 Gb, a swap partition of 2x the memory is recommended.• > 2 – 8 Gb should be 1.5x memory• > 8 – 32 Gb should be 1x memory• > 32 – 64 Gb should be 0.5x memory• > 64 Gb is workload dependent.
boot	1 Gb	A full Gb here may seem excessive but resizing a boot partition is extremely difficult. Planning extra space now will avoid future headaches.

/home	3 Gb	Assuming the server is a dedicated Domino server, there should be very few OS-level user accounts (typically only 1 is needed). 3 Gb should provide enough space for several sets of installation files. If there will be multiple OS-level user accounts, then plan 3 Gb for the Domino account + 1 Gb per expected user.
[/domino]	See Notes Minimum 5 Gb	<p>A dedicated partition is recommended for Domino data. The size of this partition is entirely dependent upon the expected use and footprint of Domino content.</p> <p>The default directory from the Domino installer is /local/dominodata.</p> <p>Another common pattern often used is /domino/organization/servername/dominodata.</p> <p>The name of the partition does not matter, choose one that works for your environment.</p>
/	Minimum 10 Gb Recommended 20 Gb	<p>Other than /boot, /home, and any dedicated data partitions (such as /domino), it is recommended to leave everything else (/tmp, /var, /usr, /etc) in the / (root) partition. Storage administration becomes more complicated and difficult when unnecessary mount points are added.</p> <p>If you are planning on using your server for anything else than a Domino server, you may want to consider adding additional explicit mount points.</p> <p>For installations using a graphical environment, plan on an additional 5 Gb per OS-level user. This space will be used by the operating system for installation content written to the /usr folder (whether a distinct mount point or not). This is in addition to the user content written to the /home folder.</p>

Dedicated DAOS and Index Partitions

If you have multiple physical drives (or RAIDs), it is recommended to create a DAOS and index partition on other drives. If you have an available SSD it is recommended to create an index partition on SSD. Creating dedicated partitions for DAOS or index content on the same drive or RAID as the Domino data partition provides no performance benefit -they need to be different physical devices (or RAID instances).

Partition Worksheet

Partition	Size	Notes
swap		
boot		
/home		
/		
/domino		
Total		Primary Drive Space Needed

Partition	Size	Notes
/daos		DAOS Drive Space Needed

Partition	Size	Notes
/dindex		Index Drive Space Needed

Drive	Size	Notes
Domino		
DAOS		
Domino Index		
Total		Total Drive Space Needed

[Optional] Create Virtual Machine

For the purposes of this document a minimal installation was used. Memory and Partition sizes are for demonstration only, please refer to the previous section to determine what is needed for your environment.

- Version = Red Hat 64-bit (VirtualBox does not differentiate CentOS)
- RAM = 768 Mb
- Image Type = VDI (Virtual Disk Image)
- Image Footprint = Dynamically Allocated
- Image Size = 21 Gb
- Optical Disk Drive pointing CentOS iso
- Enable Network Adapter 1 attached to NAT
- Enable Network Adapter 2 attached to Host-only Adapter (Promiscuous mode allow all)
- Verified different MAC addresses (Advanced settings)



Install 64-bit CentOS 8 Enterprise Linux

The Minimal installation version is all that is needed. The latest versions are available at www.centos.org.

During the installation you will need to answer various things like language and keyboard layout, installation destination, how to configure the partitions, the root password, time zone, and whether or not to configure a user account. **Do not create an additional user at this time.**

MANUAL PARTITIONING CENTOS LINUX 8 INSTALLATION

Done us Help!

New CentOS Linux 8 Installation

DATA

- /home 3 GiB
- /domino 5 GiB**

SYSTEM

- / 10 GiB
- /boot 1024 MiB
- swap 2 GiB

+ - ↺

AVAILABLE SPACE 1023 KiB **TOTAL SPACE** 21 GiB

[1 storage device selected](#)

/domino

Desired Capacity: 5 GiB

Device Type: LVM ☐ Encrypt

File System: xfs ☒ Reformat

Volume Group: vg00 (0 B free)

Label:

Name: domino

Update Settings

Reset All

Root password

Create a proper strong root password. A proper strong password is something that is easy for you, a human, to remember; and hard for a machine to guess. Longer passwords (those greater than 16 characters) are strong passwords. Combining 4 or more random words and throwing in a few salted characters (such as replacing "e" with "7" and "o" with "@") tends to provide an easy to remember and hard to guess password.

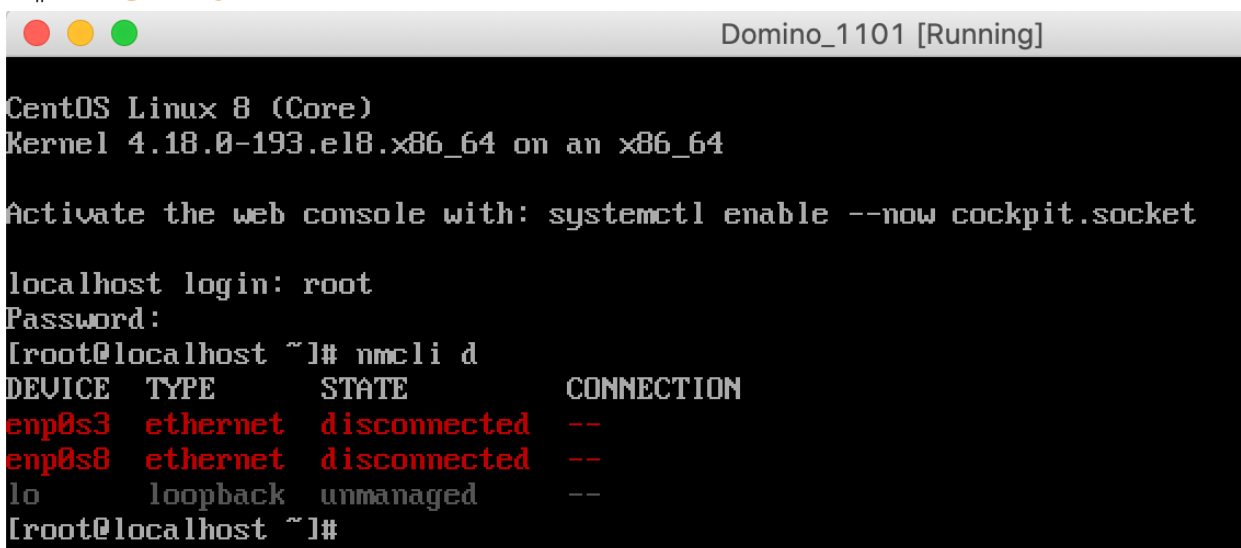
After the installation completes, reboot the server (make sure to eject the installation virtual disk) and sign in as root, using the easy-to-remember password you have created.

[OPTIONAL] Configure network

This document is not intended to be a dissertation on networking, protocols, DNS, or IPV4 vs IPV6. To that end it is being kept as simple as possible and focused entirely on IPV4.

Check the network cards and their status

```
># nmcli d
```

A terminal window titled "Domino_1101 [Running]" showing the output of the 'nmcli d' command. The terminal displays system information for CentOS Linux 8 (Core) and the output of the command, which lists network devices: enp0s3 (ethernet, disconnected), enp0s8 (ethernet, disconnected), and lo (loopback, unmanaged).

```
CentOS Linux 8 (Core)
Kernel 4.18.0-193.el8.x86_64 on an x86_64

Activate the web console with: systemctl enable --now cockpit.socket

localhost login: root
Password:
[root@localhost ~]# nmcli d
DEVICE   TYPE      STATE      CONNECTION
enp0s3   ethernet  disconnected --
enp0s8   ethernet  disconnected --
lo       loopback  unmanaged  --
[root@localhost ~]#
```

This example shows the loopback device (lo), and two network cards (enp0s3 and enp0s8).

There are two primary ways to configure your network cards in CentOS 8. Use either the network manager utility (nmtui) simply directly edit the appropriate configuration files. It really doesn't matter which one you choose; they both accomplish the same thing. Use the one with which you are more comfortable.

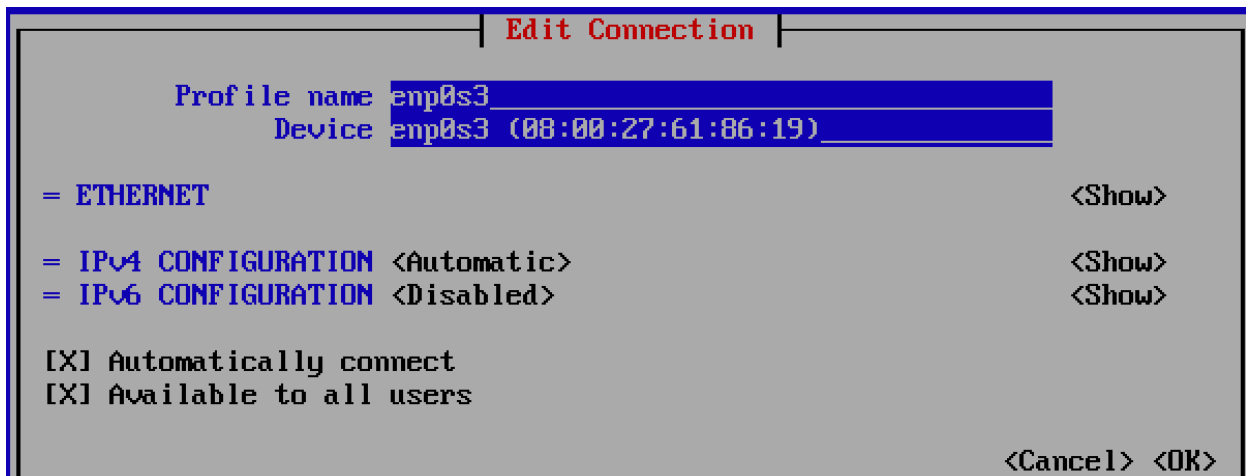
Network Manager Utility

Using the network manager utility is fairly straightforward. You pick the various tasks, make the edits as needed, then save and quit. It does take a bit of patience as the interface and navigation are not the best, but it works. If you to directly edit the configuration files, then skip ahead to the next section. Otherwise use the `nmtui` utility.

```
># nmtui
```



Device `enp0s3` using DHCP



Device enp0s8 using Static IP

Edit Connection

Profile nameenp0s8

Deviceenp0s8 (08:00:27:A9:EC:2D)

= ETHERNET

Show

IPv4 CONFIGURATIONManual

Hide

Addresses192.168.56.46/24RemoveAdd...

Gateway192.168.56.1

DNS serversAdd...

Search domainsAdd...

Routing (No custom routes) Edit...

☐ Never use this network for default route

☐ Ignore automatically obtained routes

☐ Ignore automatically obtained DNS parameters

☒ Require IPv4 addressing for this connection

= IPv6 CONFIGURATIONDisabled

Show

☒ Automatically connect

☒ Available to all users

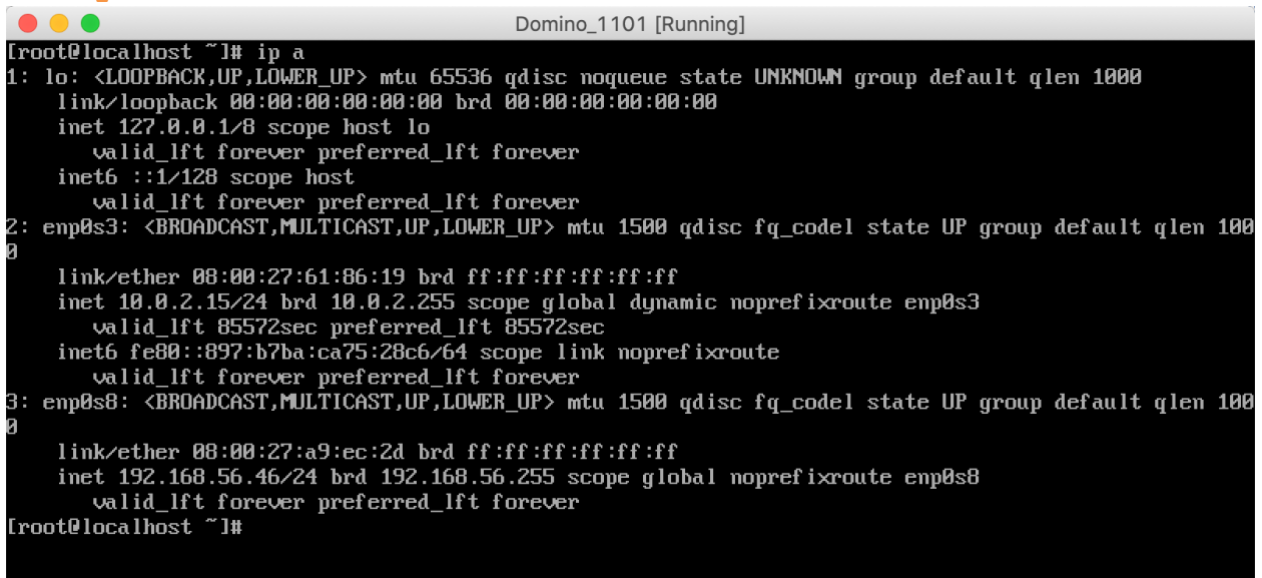
CancelOK

Directly Edit Configuration Files

For experienced users this is often the preferred method because it is faster and easier and easier to check all settings at a glance. Use whichever method you prefer.

Use the network information from the previous command or use the `ip a` command.

># **ip a**



```
[root@localhost ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:61:86:19 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85572sec preferred_lft 85572sec
    inet6 fe80::897:b7ba:ca75:28c6/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:a9:ec:2d brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.46/24 brd 192.168.56.255 scope global noprefixroute enp0s8
        valid_lft forever preferred_lft forever
[root@localhost ~]#
```

While this provides more information than the `nmcli` command, it is not nearly as simple and clean an output.

The configuration files which need to be edited can be found in the `/etc/sysconfig/network-scripts` folder. The naming pattern is **ifcfg-DEVICENAME**, where DEVICENAME is the name of the device.

Use the editor of your choice to edit the file.

># **vi** /etc/sysconfig/network-scripts/ifcfg-enp0s3

**i <return> to insert text*

<esc> to finish inserting text

**:wq <return> to save and quit*

The necessary changes are noted in **bold green**, comments are in **Consolas purple**.

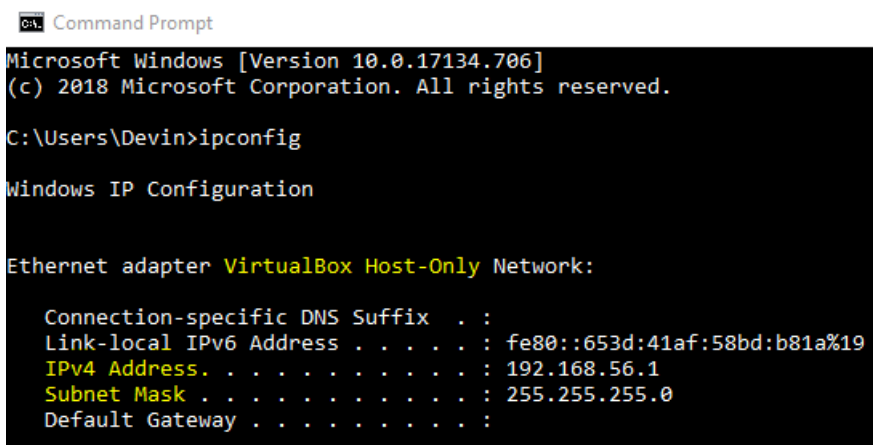
DHCP Example

```
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=dhcp      # Use DHCP to assign the IP
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no          # Do not initialize IPV6
IPV6_AUTOCONF=no     # Do not auto configure IPV6
IPV6_DEFROUTE=no     # IPV6 should not be the default route
IPV6_FAILURE_FATAL=no # Ignore IPV6 Failures
NAME=enp0s3
UUID=the universally unique id of your device # Do not change this
DEVICE=enp0s3
ONBOOT=yes           # Enable interface when booting
```

Static Example

The IP address, netmask, and gateway for the example below are from the VM instance used for writing this document and are unlikely to work in your environment. You can get the correct values from your VM hosting OS. If you are using VirtualBox on Windows, you can get this information from the command prompt:

```
C:\Users\You> ipconfig
```



```
CA: Command Prompt
Microsoft Windows [Version 10.0.17134.706]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\Devin>ipconfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::653d:41af:58bd:b81a%19
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . :
```


Look for **VirtualBox Host-Only Network**. Use the IPv4 Address for your GATEWAY, and the Subnet Mask for your NETMASK. Assign any IPADDR you wish (as long as it is valid for the Mask) and you should be good to go.

```
TYPE=Ethernet
PROXY_METHOD=none
BROWSER_ONLY=no
BOOTPROTO=static      # Assign a Static IP address
DEFROUTE=yes
IPV4_FAILURE_FATAL=no
IPV6INIT=no           # Do not initialize IPV6
IPV6_AUTOCONF=no      # Do not auto configure IPV6
IPV6_DEFROUTE=no      # IPV6 should not be the default route
IPV6_FAILURE_FATAL=no  # Ignore IPV6 Failures
NAME=enp0s8
UUID=the universally unique id of your device # Do not change
DEVICE=enp0s8
ONBOOT=yes           # Enable interface when booting
IPADDR=192.168.56.45 # IP address
NETMASK=255.255.255.0 # Subnet Mask
GATEWAY=192.168.56.1 # Default Gateway
```

Verify Changes and Restart Network

Save your changes and exit back to the command prompt. You can verify your changes by displaying the contents of the config files (where DEVICENAME is the name listed from the previous `nmtui` command).

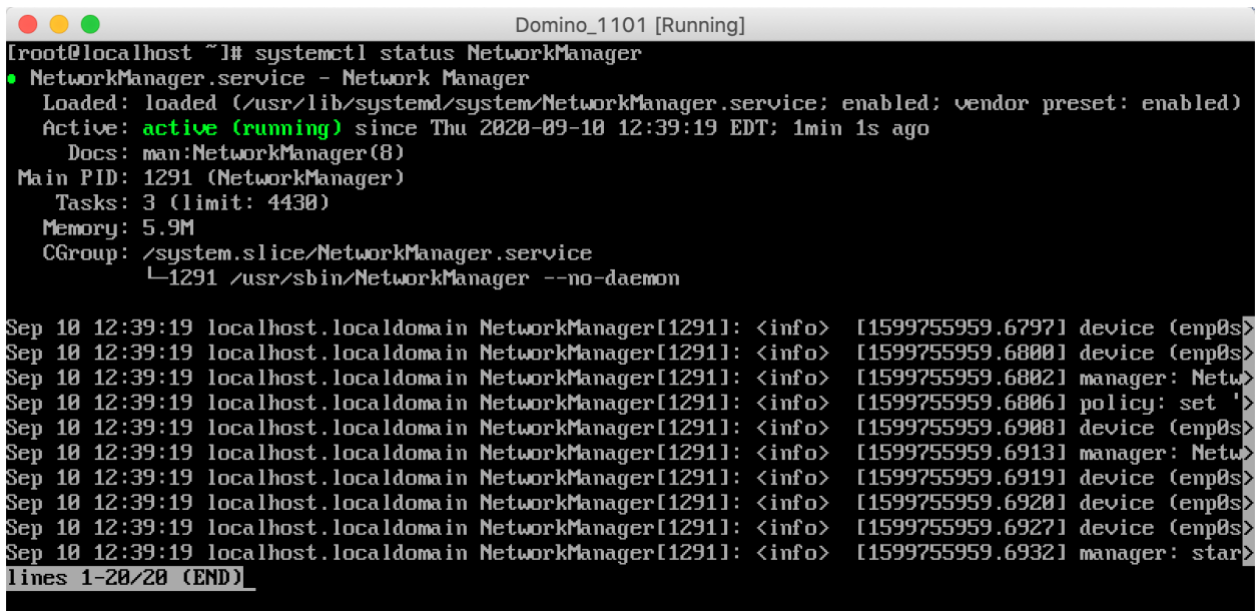
```
># cat /etc/sysconfig/network-scripts/ifcfg-enp0s8
```

Use `systemctl` to restart the network:

```
># systemctl restart NetworkManager
```

You can also use `systemctl` command to check the status of the network:

```
># systemctl status NetworkManager
```



```
Domino_1101 [Running]
[root@localhost ~]# systemctl status NetworkManager
• NetworkManager.service - Network Manager
   Loaded: loaded (/usr/lib/systemd/system/NetworkManager.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2020-09-10 12:39:19 EDT; 1min 1s ago
     Docs: man:NetworkManager(8)
  Main PID: 1291 (NetworkManager)
    Tasks: 3 (limit: 4430)
   Memory: 5.9M
    CGroup: /system.slice/NetworkManager.service
            └─1291 /usr/sbin/NetworkManager --no-daemon

Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6797] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6800] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6802] manager: Netw
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6806] policy: set '
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6908] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6913] manager: Netw
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6919] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6920] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6927] device (enp0s8)
Sep 10 12:39:19 localhost.localdomain NetworkManager[1291]: <info> [1599755959.6932] manager: star
lines 1-20/20 (END)
```

SSH (Secure Shell) - Part 1

SSH Clients

If you are using a Mac or Linux to perform this configuration, the SSH command is included as part of the operating system. Microsoft began to include this standard command with the release of Windows 10. If you are using a previous version of Windows, you should consider upgrading to Windows 10. Assuming you cannot upgrade, you will need to install a 3rd party SSH client in order to proceed. Putty (available at <https://www.putty.org>) is a simple and easy to use tool that works well.

SSH on Windows 10

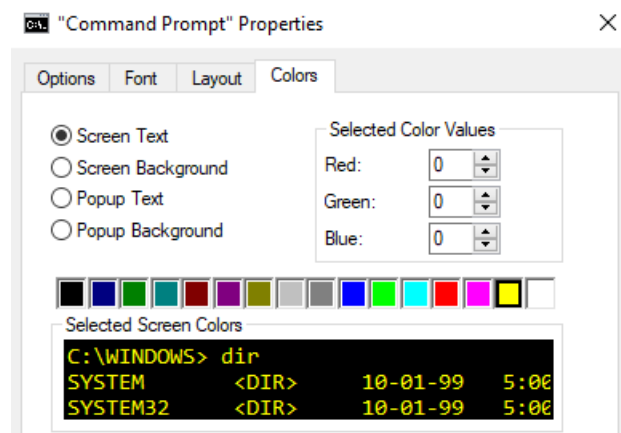
There can be some quirky behavior with the SSH command on Windows 10, specifically when starting an editor in the client. The command window font color will sometimes change, making it nearly unusable.

```
root@localhost:~  
# This file controls the state of SELinux on the system.  
# SELINUX= can take one of these three values:  
#   enforcing - SELinux security policy is enforced.  
#   permissive - SELinux prints warnings instead of enforcing.  
#   disabled - No SELinux policy is loaded.  
SELINUX=disabled  
# SELINUXTYPE= can take one of three values:  
#   targeted - Targeted processes are protected,  
#   minimum - Modification of targeted policy. Only select  
#   mls - Multi Level Security protection.  
SELINUXTYPE=targeted
```

Fortunately, this is easy to change.

Right-click on the top bar of the window and select **Properties**.

In the displayed Properties dialog, select the Colors tab, then specify the color combination you want and click the **OK** button.



Once you have done that the window color will change to the colors you specified.

```
root@localhost:~
```

```
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#   enforcing - SELinux security policy is enforced.
#   permissive - SELinux prints warnings instead of enforcing.
#   disabled - No SELinux policy is loaded.
SELINUX=disabled
# SELINUXTYPE= can take one of three values:
#   targeted - Targeted processes are protected,
#   minimum - Modification of targeted policy. Only selected pro
#   mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

SSH and CentOS 8

The CentOS 8 Minimal installation includes the SSHD service and initial configuration information; which makes things much easier than with previous distributions. There is no need to manually install SSH. There is, however, some configuration that needs to be completed. This all starts with opening an SSH session to your server by issuing the following command:

```
> ssh root@ip.address.of.your.server
```

Enter the root password to log in and proceed.

User Accounts

Without going into too much unnecessary detail, all Linux user accounts require a minimum of two things: a username, and a primary group with which the user account is associated. Your Domino server will need to run using a Linux account, which means you need to decide upon names for the group and user account for your Domino server. This can be as simple as “servergroup” and “server”, or (from the Domino installer defaults), “Notes” and “Notes”. A common practice is to use the organization name for the group, and the server name for the user. This makes it easy to keep track of things when setting up multiple servers for an organization. For the purposes of creating this document the values `hcl demos` and `demoserver1` are used for the group and username respectively.

NEVER run Domino AS root

Create the user account (replacing `groupname` and `username` with the names appropriate for your server) for your Domino server as follows:

Create a Group

```
># groupadd groupname
```

Add the user

Use the `useradd` command to add the user. I realize the spacing in the example is weird, but it works.

`-g` initial group to which the user should be added

`-s` shell for the user when signing in. User scripts are here.

`-d` home directory

`-m` make the user

```
># useradd -ggroupname -s/bin/bash -d/home/username  
-m username
```

Create a password for the user

```
># passwd username
```

You will be prompted to enter the password 2 times.

You have now completed creating the user account for your HCL Domino server.

```
[[root@localhost ~]# groupadd hcl demos
[[root@localhost ~]# useradd -ghcl demos -s/bin/bash -d/home/demoserver1 -m demoserver1
[[root@localhost ~]# passwd demoserver1
Changing password for user demoserver1.
[New password:
[Retype new password:
passwd: all authentication tokens updated successfully.
[[root@localhost ~]# █
```

SUDO privileges

Throughout the rest of this guide you will be instructed to change from the user account to the root account in order to perform tasks that require elevated privileges. Those of you familiar with may as why not add the user account for the Domino server as an authorized SUDO user. Other than “ease of use” during this initial configuration, there is absolutely no reason to grant the Domino server account elevated privileges. Granting elevated sudo privileges to the Domino server account **is a potential security risk** and is therefore not recommended.

SSH (Secure Shell) - Part 2

Now that you have added a user account, it is time to configure the SSH daemon to provide a bit more security for your server. As with many other topics in this document, there is massive amount of information and context available that I am not going to go into. What follows is the absolute bare minimum recommended SSH configuration changes.

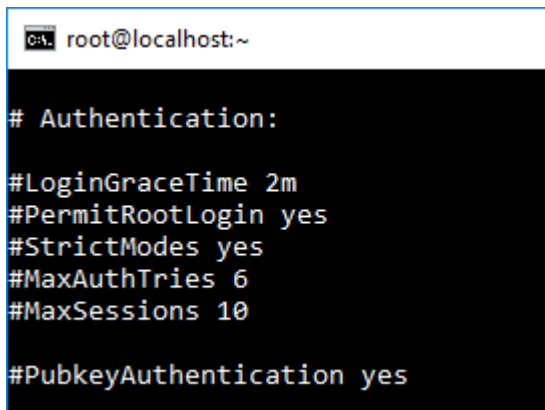
Configure and verify SSH

Edit the `sshd_config` file using the editor of your choice.

```
># vi /etc/ssh/sshd_config
```

Find the line `#PermitRootLogin yes`

(you can use `*/ searchtext <return>` to search for text)

A terminal window with a black background and white text. The prompt is 'root@localhost:~'. The text displayed is the content of the /etc/ssh/sshd_config file, showing various configuration options with their default values. The options shown are: # Authentication:, #LoginGraceTime 2m, #PermitRootLogin yes, #StrictModes yes, #MaxAuthTries 6, #MaxSessions 10, and #PubkeyAuthentication yes.

```
root@localhost:~  
# Authentication:  
#LoginGraceTime 2m  
#PermitRootLogin yes  
#StrictModes yes  
#MaxAuthTries 6  
#MaxSessions 10  
#PubkeyAuthentication yes
```

Change `PermitRootLogin` to `no` and add additional settings for `AllowUsers` and `AllowGroups`, then save and close the file:

```
PermitRootLogin no  
AllowUsers username  
AllowGroups groupname
```

Use systemctl to restart the SSHD daemon:

```
># systemctl restart sshd
```

Verify your SSH Changes

This is very important and cannot be stressed enough: **DO NOT CLOSE YOUR CURRENT SSH SESSION**. If you have mis-configured the sever you will not be able to get back in to correct things. So, to be clear, attempt to start a NEW SSH Session for root, and enter your password. This **should** fail.

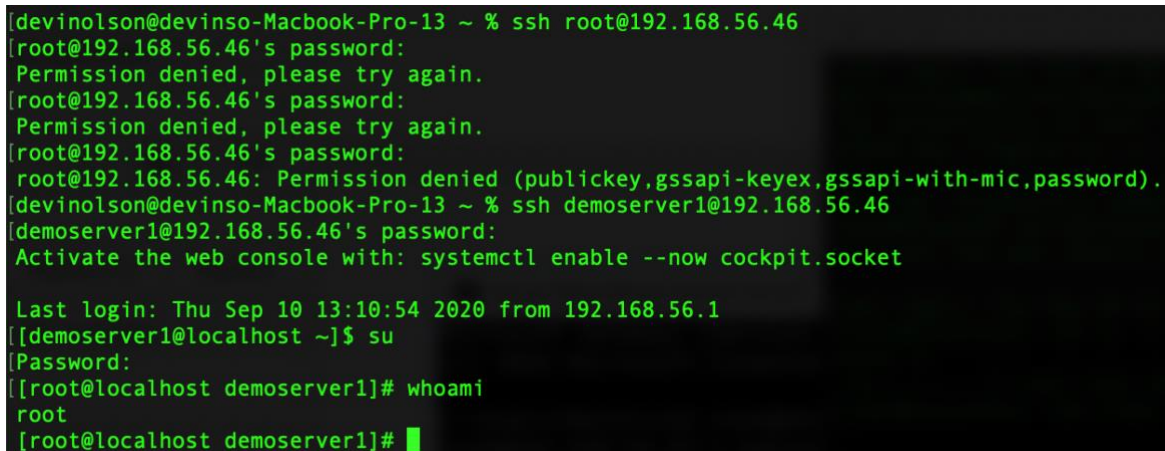
```
> ssh root@ip.address.of.your.server
```

Assuming your login attempt fails (hooray for fail fast, fail early testing), now attempt to start an SSH session using the user credentials you created.

```
> ssh username@ip.address.of.your.server
```

Once you have successfully logged in, use the su command and then enter the root password to change to the root user.

```
># su
```



```
[devinolson@devinso-Macbook-Pro-13 ~ % ssh root@192.168.56.46
root@192.168.56.46's password:
Permission denied, please try again.
root@192.168.56.46's password:
Permission denied, please try again.
root@192.168.56.46's password:
root@192.168.56.46: Permission denied (publickey,gssapi-keyex,gssapi-with-mic,password).
[devinolson@devinso-Macbook-Pro-13 ~ % ssh demosever1@192.168.56.46
demosever1@192.168.56.46's password:
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Thu Sep 10 13:10:54 2020 from 192.168.56.1
[[demosever1@localhost ~]$ su
Password:
[[root@localhost demosever1]# whoami
root
[root@localhost demosever1]#
```

If you cannot login using the new SSH Session, use the first window root session to make the necessary corrections until you can open a new session.

Install Required Packages

The following packages are required for Domino 10 on CentOS. CentOS 8 has switched from yum to dnf for the default package manager. Use dnf to install the required packages.

chrony: network time management service, replaces ntp.

perl: open source general-use interpreted scripting language

bc: an arbitrary precision numeric processing language

```
># dnf -y install chrony perl bc
```

Start and enable the cron service

```
># systemctl start crond
```

```
># systemctl enable crond
```

```
># systemctl status crond
```

```
[root@localhost demoserver1]# systemctl start crond
[root@localhost demoserver1]# systemctl enable crond
[root@localhost demoserver1]# systemctl status crond
● crond.service - Command Scheduler
   Loaded: loaded (/usr/lib/systemd/system/crond.service; enabled; vendor preset: enabled)
   Active: active (running) since Thu 2020-09-10 14:04:41 EDT; 16min ago
     Main PID: 874 (crond)
       Tasks: 1 (limit: 4430)
      Memory: 1.1M
     CGroup: /system.slice/crond.service
            └─874 /usr/sbin/crond -n

Sep 10 14:04:41 localhost.localdomain systemd[1]: Started Command Scheduler.
Sep 10 14:04:41 localhost.localdomain crond[874]: (CRON) STARTUP (1.5.2)
Sep 10 14:04:41 localhost.localdomain crond[874]: (CRON) INFO (Syslog will be used instead of sendmail.)
Sep 10 14:04:41 localhost.localdomain crond[874]: (CRON) INFO (RANDOM_DELAY will be scaled with factor 87% if used.)
Sep 10 14:04:41 localhost.localdomain crond[874]: (CRON) INFO (running with inotify support)
[root@localhost demoserver1]#
```

Security Enhanced Linux

Security Enhanced Linux (SELinux) is incompatible with Domino, however it is enabled by default on CentOS 8. It will need to be disabled.

```
># vi /etc/selinux/config
```

Change the setting to **SELINUX=disabled** and save and close the file. Then set SELINUX enforcing mode to disabled.

```
># setenforce 0
```

Firewall Configuration

A complete set of firewall rules **must** be configured if your server will be publicly accessible - and is beyond the scope of this document. You need to ensure that your firewall is correctly configured, and the appropriate ports are open. Please refer to Appendix A for common ports used by a Domino server.

Optional Settings

The following instructions are optional.

Edit the Hosts file and add the hostname

```
># vi /etc/hosts
```

Add the information for your server to the bottom of the file. Do not change the loopback 127.0.0.1 unless you absolutely know what you are doing and have a very good reason to do so. Changing the loopback hosts entry can cause "very bad things" to happen with your server's network connections.

```
your.server.ip.address shortname fully.qualified.host.name
```

Set the Hostname

Use the `hostnamectl` command to set the host name.

```
># hostnamectl set-hostname yourserverhostname
```

Domino Specific Configuration

Make sure everything is up to date by using dnf to upgrade all installed content.

```
># dnf -yb upgrade
```

Disable Conflicting Services

There are three specific services that conflict with Domino. Depending upon the build version of CentOS these may have been automatically installed. If so, they need to be disabled and removed. These services are [httpd](#), [sendmail](#), and [postfix](#). Follow the subsequent instructions for each of these services.

Check the status of the service

```
># systemctl status servicename
```

If the service is operational you will need to kill it.

```
># systemctl stop servicename
```

Then disable and remove the service.

```
># systemctl disable servicename
```

```
># systemctl mask servicename
```

Set File Handles

Increase the number of file handles available for use.

```
># ulimit -n 65535
```

```
># vi /etc/security/limits.conf
```

Add the following lines to the end of the file, where **username** is the name of user you created for running Domino:

```
username soft nofile 65535
```

```
username hard nofile 65535
```

Reboot the server

You need to reboot the server at this point.

```
># reboot now
```

Log in via SSH

After the server has rebooted, log in again via SSH and change to root using the su command

```
># su (enter password when prompted)
```

Allow Domino to tune the Linux kernel

Use the **export** command to set the operating system variable.

```
># export DOMINO_LINUX_SET_PARMS=1
```

Use the echo command to append the export command to the end of the /home/username/.bashrc file:

```
># echo -e "\nexport DOMINO_LINUX_SET_PARMS=1" >>  
/home/username/.bashrc
```

Create the directory for your Domino server

You need to decide where to put your Domino Data. If you followed the suggested partition layout for your server this will be very easy.

```
># mkdir /domino/organization/servername/dominodata  
-p
```

Get Install File

Download the Domino installation file from the HCL License and Delivery Portal to your local machine

<https://hclsoftware.flexnetoperations.com/flexnet/operationsportal/logon.do>

Now you need to get the Domino installation file onto your newly created server so you can install it. While there are a number of ways to do this, SCP (Secure Copy Protocol) is recommended. If you are using Linux, Mac OSX, or Windows 10 this command is built into the OS. If you are using a version of Windows prior to 10, you will need to download and install an SCP Tool such as [WinSCP](#).

Use the tool of your choice to upload the Domino Installation media to your new server (place it in your server user's home directory for now).

If using command line, change directory to the directory containing your installation media and use the **scp** command to upload it to your server.

```
> scp Domino_1101_Linux_English~.tar  
username@ip.address.of.your.server:~
```

Do not forget the colon tilde (:~) at the end. This tells the **scp** command to place the file in the home folder of the user.

Go back to your server console, switch to your user's directory, and verify the file is there

```
># cd /home/username
```

```
># ls -l
```

```
[[root@dleapt05 demoserver1]# cd /home/demoserver1
[[root@dleapt05 demoserver1]# pwd
/home/demoserver1
[[root@dleapt05 demoserver1]# ls -l
total 715412
-rwxr--r-- 1 demoserver1 hcl demos 732579840 Sep 10 16:14 Domino_1101_Linux_English.tar
[[root@dleapt05 demoserver1]# █
```

Verify File and Unpack

Use the tar command to check the file.

-t Table of contents. List all the files contained in the tar file.

-v Verbose output.

-f Use the filename from the argument parameters.

-x Extract or restore the file(s)

```
># tar -tvf Domino_1101_Linux_English.tar
```

If there are problems with the file, you will need to delete it and download a clean one. If there are no problems, then go ahead and extract the file contents.

```
># tar -xvf Domino_1101_Linux_English.tar
```

Domino Installation

From the directory where you extracted the installer, change directory to the linux64 folder, then run the install file.

```
># cd linux64
```

```
># ./install
```

```
[[root@dleapt05 linux64]# ./install

HCL Domino for Linux/Unix Install Program
-----
Preparing to install
Extracting the JRE from the installer archive...
Unpacking the JRE...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...

=====
Choose Locale...
-----

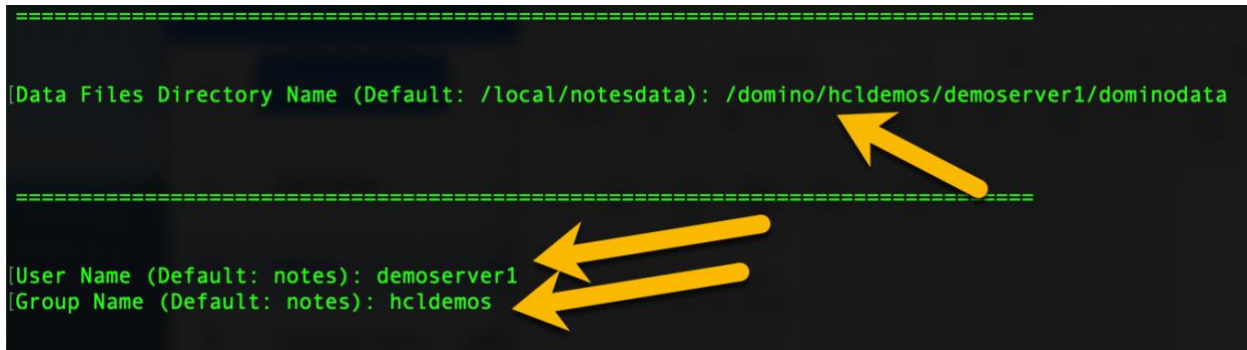
  1- Català
  2- Deutsch
->3- English
  4- Español
  5- Français
  6- Italiano
  7- Nederlands
  8- Português (Brasil)
  9- Svenska
```

Follow Prompts

Select your locale and proceed to answer the questions as they appear. When prompted for the Program File Directory (default is /opt/hcl/domino) you may change the value, however changing the **Program File** directory is supported but is not recommended.

If the partition and / or directory you created for your HCL Domino data differs from the default (/local/notesdata), make certain you change the value when prompted for **Data Files** directory. If you used a different value for Group or User (default is notes), make sure you change those values when prompted:

```
=====
[Data Files Directory Name (Default: /local/notesdata): /domino/hcldemos/demoserver1/dominodata
=====
[User Name (Default: notes): demoserver1
[Group Name (Default: notes): hcldemos
```



When prompted for Select Server Setup (launch type), choose Manual.

```
=====
Select Server Setup

After the installation completes, for new installation server setup will be
launched and for upgrade the server will be restarted automatically.

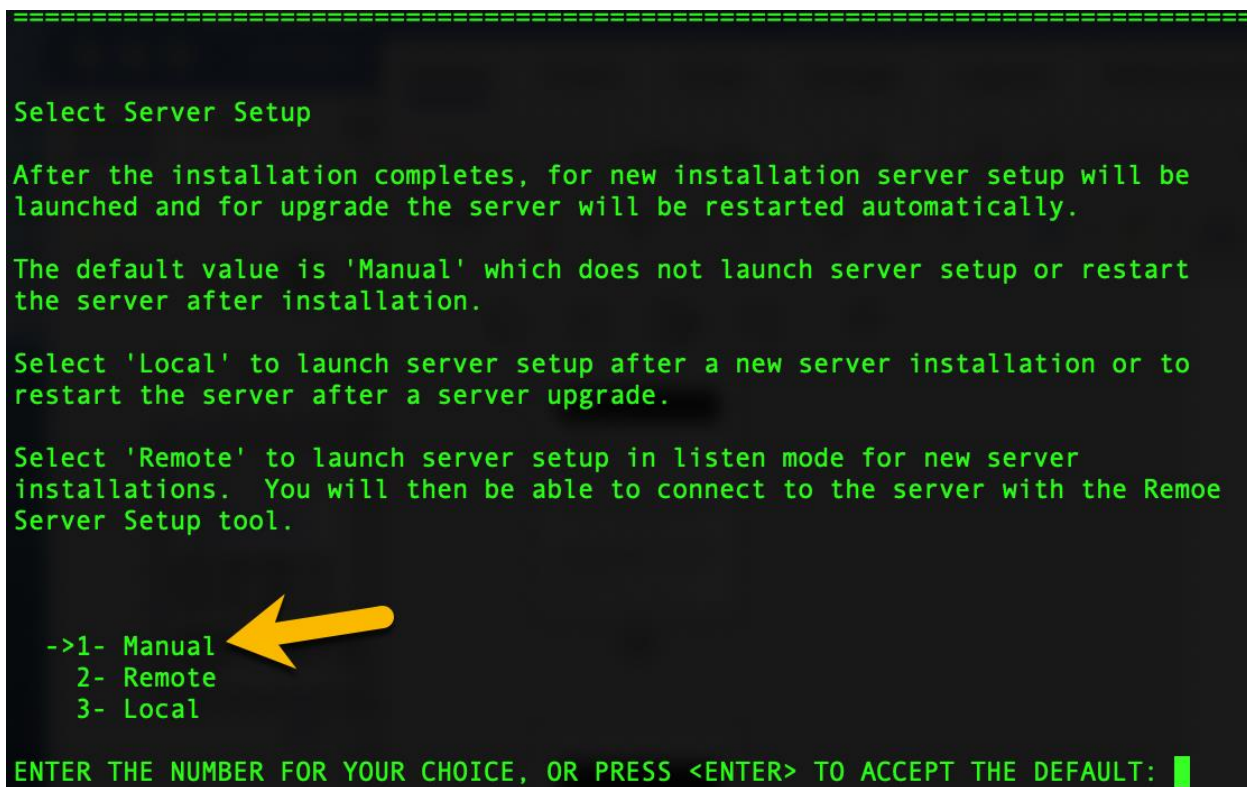
The default value is 'Manual' which does not launch server setup or restart
the server after installation.

Select 'Local' to launch server setup after a new server installation or to
restart the server after a server upgrade.

Select 'Remote' to launch server setup in listen mode for new server
installations. You will then be able to connect to the server with the Remoe
Server Setup tool.

->1- Manual
   2- Remote
   3- Local

ENTER THE NUMBER FOR YOUR CHOICE, OR PRESS <ENTER> TO ACCEPT THE DEFAULT: █
```



Select the Install Set for which you have a valid license, then hit <enter> to proceed with the installation.

```
=====
Choose Install Set
-----

Please choose the Install Set to be installed by this installer.

    1- Domino Utility Server
    2- Domino Messaging Server
-> 3- Domino Enterprise Server
    4- Domino Custom Enterprise Server

ENTER THE NUMBER FOR THE INSTALL SET, OR PRESS <ENTER> TO ACCEPT THE DEFAULT

```

The server installation will now begin. Once finished, you will be presented with a post-installation instructions page.

```
=====
Installation Complete for Manual ServerSetup
-----

Congratulations. HCL Domino has been successfully installed to:

/opt/hcl/domino

Please, manually configure the Domino Server as follows:
1) Login as the appropriate user: demosever1
2) Change to data directory using the command: cd
   /domino/hcldemos/demosever1/dominodata
3) Configure the server using the command: /opt/hcl/domino/bin/server
   To configure server remotely, the remote server setup tools is required
   and you can use the command: /opt/hcl/domino/bin/server -listen'
   After issuing this command, additional instructions will appear for remote
   server setup. For additional details see the section 'Using the Domino Server
   Setup remotely' in the HCL Domino Administration Help Documentation.

The InstallAnywhere has successfully installed HCL Domino to /opt/hcl/domino.

PRESS <ENTER> TO EXIT THE INSTALLER: 

```

Press <enter> and exit the installer. It will take a few moments to exit, do not be alarmed by the delay.

Change Directory Ownership

If you used the naming pattern of group and server for your domino data directory (example: /domino/hcldemos/demoserver1/dominodata), you should change ownership of the server directory. Use the cd command to change to the directory one level above the server name, and then change ownership of the server's directory to the username for the server.

```
>$ cd /domino/groupname  
  
>$ ls -l  
  
>$ chown -R username:groupname username  
  
>$ ls -l
```

```
[root@dleapt05 demoserver1]# cd /domino/hcldemos/  
[root@dleapt05 hcldemos]# ls -l  
total 0  
drwxr-xr-x 3 root root 24 Sep 11 10:40 demoserver1  
[root@dleapt05 hcldemos]# chown -R demoserver1:hcldemos demoserver1  
[root@dleapt05 hcldemos]# ls -l  
total 0  
drwxr-xr-x 3 demoserver1 hcldemos 24 Sep 11 10:40 demoserver1  
[root@dleapt05 hcldemos]#
```

Congratulations. The server is now installed. After we complete some basic configuration, you should have an operational Domino Server.

Domino Setup

Change back to the user id you used to log into the SSH session:

```
># exit
```

Server ID

If this is the first server in your organization, go ahead and skip to the next step (Launch Server in listen mode).

If this is **not** the first server, you will need to register a new server using the Domino Administrator client. Once you have created the server.id file, you need to put it on your new server. Use SCP in the same manner as the installation files to place the file into your server's home directory. Then use the mv command from the console to move the file from the home directory to the domino directory.

```
>$ cd ~
```

```
>$ pwd
```

```
>$ ls -l
```

```
># mv server.id path_to_your_domino_data_folder
```

```
>$ ls -l
```

Launch Server in listen mode

Change to the /domino/servername/dominodata folder:

```
>$ cd path_to_your_domino_data_folder
```

Launch the server and put it into listen mode for remote server setup access:

```
>$ /opt/hcl/domino/bin/server -listen
```

```
Last login: Fri Sep 11 10:51:09 2020 from 192.168.56.1
[demoserver1@dleapt05 ~]$ cd /domino/hcldemos/demoserver1/dominodata/
[demoserver1@dleapt05 dominodata]$ /opt/hcl/domino/bin/server -listen
/proc/sys/fs/file-max has been set to "131072".
/proc/sys/kernel/sem has been set to "250 256000 32 1024".
/proc/sys/net/ipv4/tcp_fin_timeout has been set to "15".
/proc/sys/net/ipv4/tcp_max_syn_backlog has been set to "16384".
/proc/sys/net/ipv4/tcp_tw_reuse has been set to "1".
/proc/sys/net/ipv4/ip_local_port_range has been set to "1024 65535".
./java -ss512k -Xms05M -cp jhall.jar:cfgdomserver.jar:./ndext/ibmdirectoryservices.jar lotus.domino.setup.WizardManagerDomino -dat
a /domino/hcldemos/demoserver1/dominodata -listen
Remote server setup enabled on port 8585.

The Domino setup server is now in listening mode.
A remote client can now connect to this server and configure Domino.

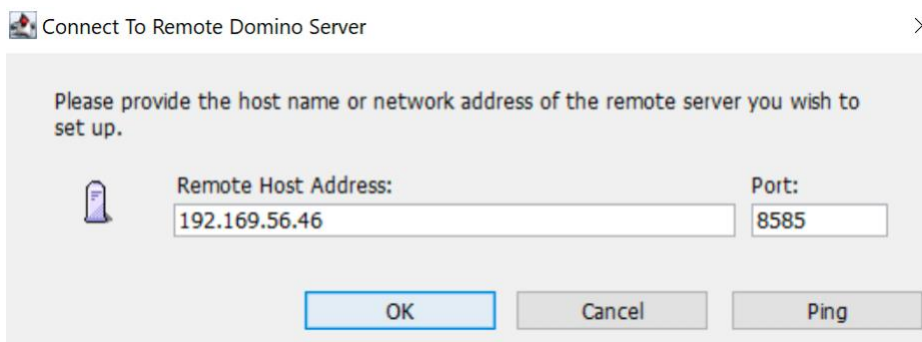
To connect to this server, launch the Remote Domino Setup program from a command-prompt as follows:
From a Domino administrator client: serversetup -remote
From a Domino server: server -remote

To end this server, launch the Remote Domino Setup program from a command-prompt as follows:
From a Domino administrator client: serversetup -q dleapt05.azlighthouse.com
From a Domino server: server -q dleapt05.azlighthouse.com

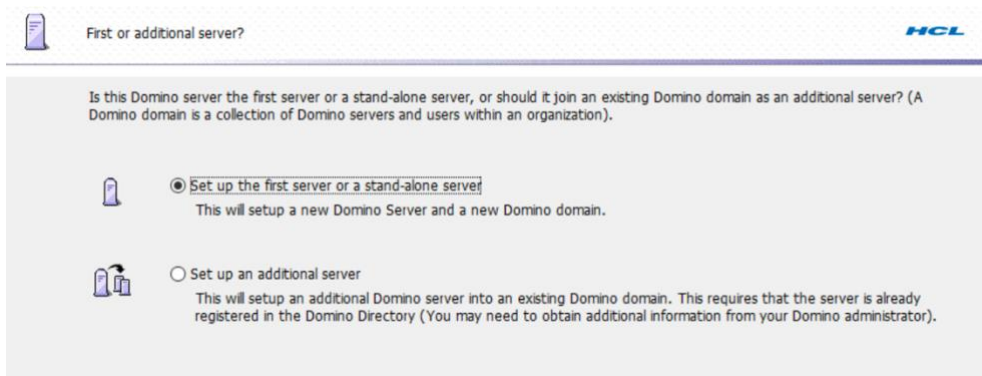
For more information, see the printed guide Setting Up Domino Networks and Servers.
```

Domino Remote Server Setup Utility

On a Windows machine, launch the HCL Domino Remote Server Setup Utility. Enter the ip address (or FQDN) of your server in the dialog box to begin configuring your server.



Select first or additional server, then proceed as appropriate



The screenshot shows the 'First or additional server?' window. It has a title bar with a server icon and the text 'First or additional server?'. The HCL logo is in the top right corner. The main text asks: 'Is this Domino server the first server or a stand-alone server, or should it join an existing Domino domain as an additional server? (A Domino domain is a collection of Domino servers and users within an organization).' There are two radio button options. The first option, 'Set up the first server or a stand-alone server', is selected and underlined. Below it, it says 'This will setup a new Domino Server and a new Domino domain.' The second option is 'Set up an additional server', with a description: 'This will setup an additional Domino server into an existing Domino domain. This requires that the server is already registered in the Domino Directory (You may need to obtain additional information from your Domino administrator).' There are server icons next to each option.

First or additional server?

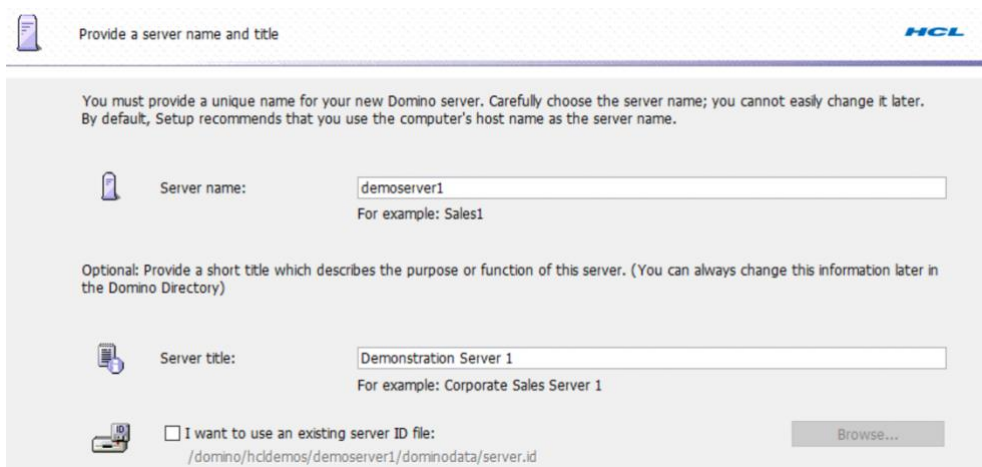
Is this Domino server the first server or a stand-alone server, or should it join an existing Domino domain as an additional server? (A Domino domain is a collection of Domino servers and users within an organization).

☒ Set up the first server or a stand-alone server
This will setup a new Domino Server and a new Domino domain.

☐ Set up an additional server
This will setup an additional Domino server into an existing Domino domain. This requires that the server is already registered in the Domino Directory (You may need to obtain additional information from your Domino administrator).

First server in your organization or stand-alone server.

Enter the server name and title.



The screenshot shows the 'Provide a server name and title' window. It has a title bar with a server icon and the text 'Provide a server name and title'. The HCL logo is in the top right corner. The main text says: 'You must provide a unique name for your new Domino server. Carefully choose the server name; you cannot easily change it later. By default, Setup recommends that you use the computer's host name as the server name.' There is a text input field for 'Server name' containing 'demosever1'. Below it, it says 'For example: Sales1'. Below this, it says 'Optional: Provide a short title which describes the purpose or function of this server. (You can always change this information later in the Domino Directory)'. There is a text input field for 'Server title' containing 'Demonstration Server 1'. Below it, it says 'For example: Corporate Sales Server 1'. At the bottom, there is a checkbox 'I want to use an existing server ID file:' which is unchecked. To its right is a 'Browse...' button. Below the checkbox, the file path '/domino/hcldemos/demosever1/dominodata/server.id' is shown.

Provide a server name and title

You must provide a unique name for your new Domino server. Carefully choose the server name; you cannot easily change it later. By default, Setup recommends that you use the computer's host name as the server name.

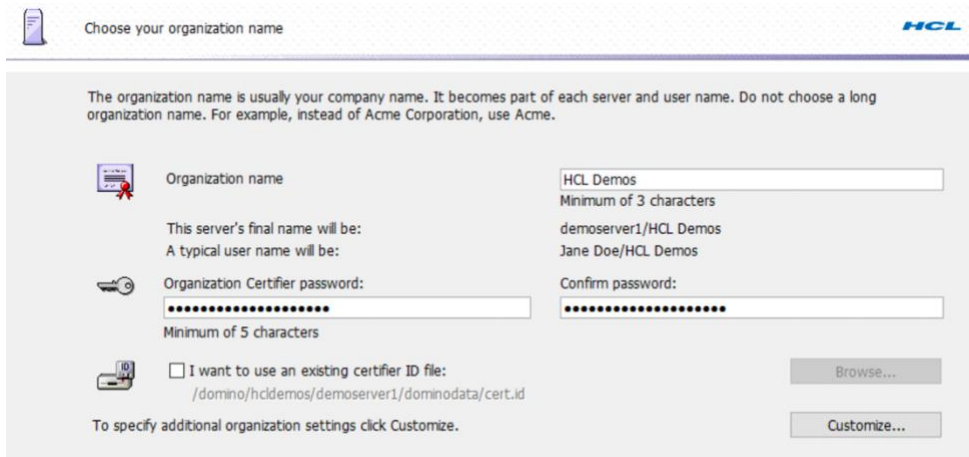
Server name:
For example: Sales1

Optional: Provide a short title which describes the purpose or function of this server. (You can always change this information later in the Domino Directory)

Server title:
For example: Corporate Sales Server 1

☐ I want to use an existing server ID file:
/domino/hcldemos/demosever1/dominodata/server.id

Create a Certifier ID and Password



Choose your organization name

The organization name is usually your company name. It becomes part of each server and user name. Do not choose a long organization name. For example, instead of Acme Corporation, use Acme.

Organization name:
Minimum of 3 characters

This server's final name will be:
A typical user name will be:
demo server1/HCL Demos
Jane Doe/HCL Demos

Organization Certifier password:
Minimum of 5 characters

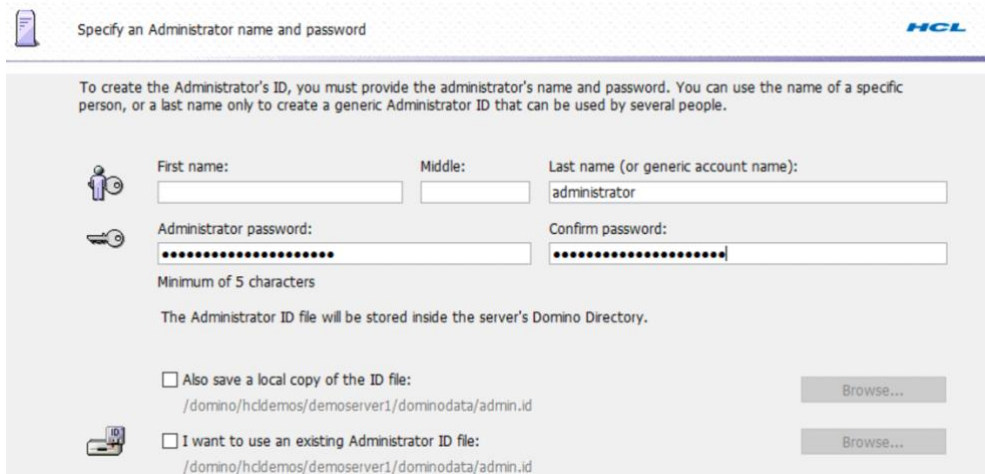
Confirm password:

☐ I want to use an existing certifier ID file:
/domino/hcldemos/demoserver1/dominodata/cert.id

To specify additional organization settings click Customize.

Browse...
Customize...

Create your Administrator account and set the password.



Specify an Administrator name and password

To create the Administrator's ID, you must provide the administrator's name and password. You can use the name of a specific person, or a last name only to create a generic Administrator ID that can be used by several people.

First name:
Middle:
Last name (or generic account name):

Administrator password:
Minimum of 5 characters

Confirm password:

The Administrator ID file will be stored inside the server's Domino Directory.

☐ Also save a local copy of the ID file:
/domino/hcldemos/demoserver1/dominodata/admin.id

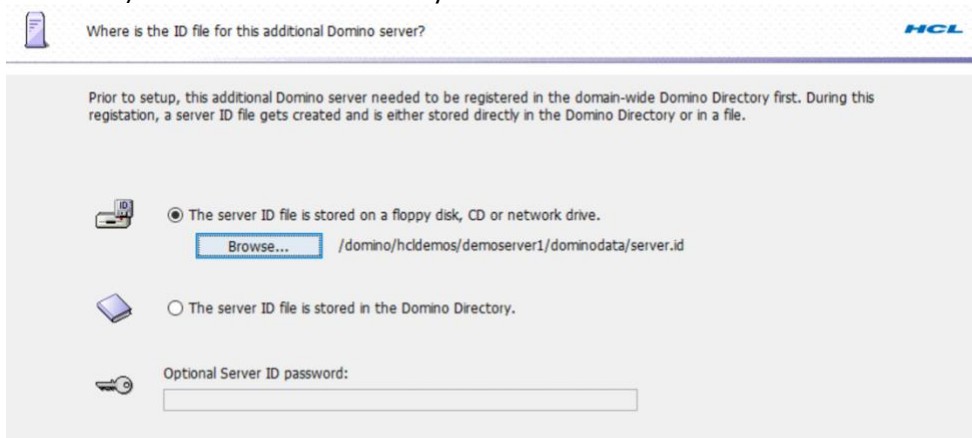
☐ I want to use an existing Administrator ID file:
/domino/hcldemos/demoserver1/dominodata/admin.id

Browse...
Browse...

Continue to the step "Select Services"

Set up Additional Server

Identify the location of the server.id file (the “browse” button will browse the filesystem of the SERVER)



Where is the ID file for this additional Domino server?

Prior to setup, this additional Domino server needed to be registered in the domain-wide Domino Directory first. During this registration, a server ID file gets created and is either stored directly in the Domino Directory or in a file.

☒ The server ID file is stored on a floppy disk, CD or network drive.

/domino/hcldemos/demoserver1/dominodata/server.id

☐ The server ID file is stored in the Domino Directory.

Optional Server ID password:

Verify the server name (pulled from the server.id file) is what you expect it to be. If not, you will need to retrieve the correct server.id file before proceeding.



Provide the registered name of this additional Domino server

Type the name of this additional Domino server as it has been registered in the Domino Directory (Your company's Domino administrator can tell you what name to use).

Server name:

For example: Sales1/Acme

To set up an additional server, you must first have registered it using the Domino Administrator or Domino Web Administrator client. If you are creating a new Domino domain and this is the first server in that domain, click the Back button and choose to setup a first server instead.

Proceed with the next step (Select Services). Eventually you will be presented with a page requesting the server name and IP address of another HCL Domino server in your organization from which to pull certain system databases. Enter the information and continue with the server setup.

The screenshot shows a web-based setup wizard for HCL Domino. The title bar at the top says 'Provide the system databases for this Domino server' with the HCL logo on the right. Below the title bar, a message states: 'The Domino server needs several system databases (Domino Directory) to operate properly. By default it will replicate them over the network from another Domino server. Alternatively, you can provide them from a CD or other media (faster).' The main form area contains two columns of input fields. The left column is for 'Other Domino server name:' with a text box containing 'Domino Primary/HCL Demos' and a hint 'For example: Sales2/Acme'. The right column is for 'Optional network address:' with a text box containing '192.168.56.21' and a hint 'For Example: sales2.acme.com'. Below these, there is a checkbox 'Use a proxy server to connect to the other Domino server'. If checked, it would reveal 'Address:' and 'Port:' fields. The 'Port' field currently shows '0' and a dropdown menu is set to 'HTTP Tunnel'. At the bottom, there is a checkbox 'Get system databases from CD or other media' with a hint '/domino/hcldemos/demoserver1/dominodata' and a 'Browse...' button.

Provide the system databases for this Domino server

The Domino server needs several system databases (Domino Directory) to operate properly. By default it will replicate them over the network from another Domino server. Alternatively, you can provide them from a CD or other media (faster).

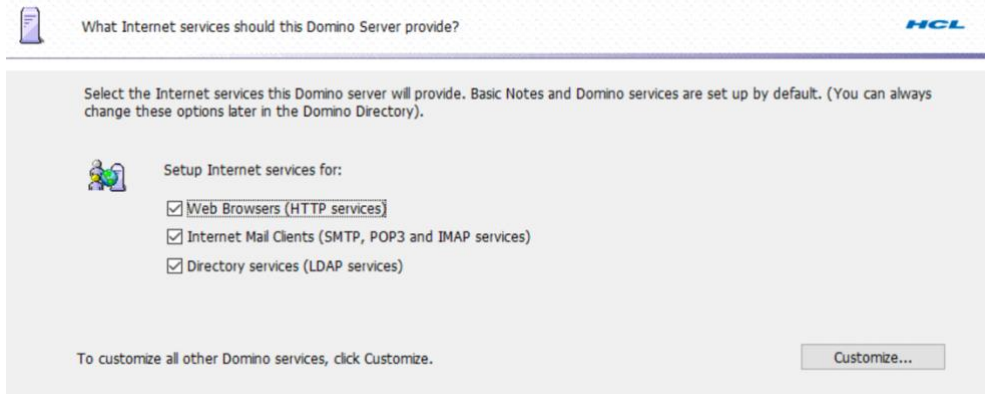
Other Domino server name: Optional network address:
For example: Sales2/Acme For Example: sales2.acme.com

☐ Use a proxy server to connect to the other Domino server
Address: Port: HTTP Tunnel

☐ Get system databases from CD or other media
/domino/hcldemos/demoserver1/dominodata

Select Services

Select the internet services this server will provide.



What Internet services should this Domino Server provide?

Select the Internet services this Domino server will provide. Basic Notes and Domino services are set up by default. (You can always change these options later in the Domino Directory).

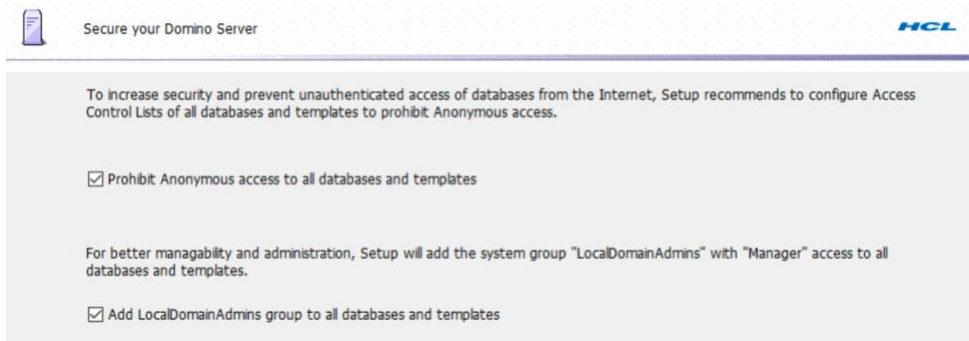
Setup Internet services for:

- ☒ Web Browsers (HTTP services)
- ☒ Internet Mail Clients (SMTP, POP3 and IMAP services)
- ☒ Directory services (LDAP services)

To customize all other Domino services, click Customize.

Customize...

Select security Options



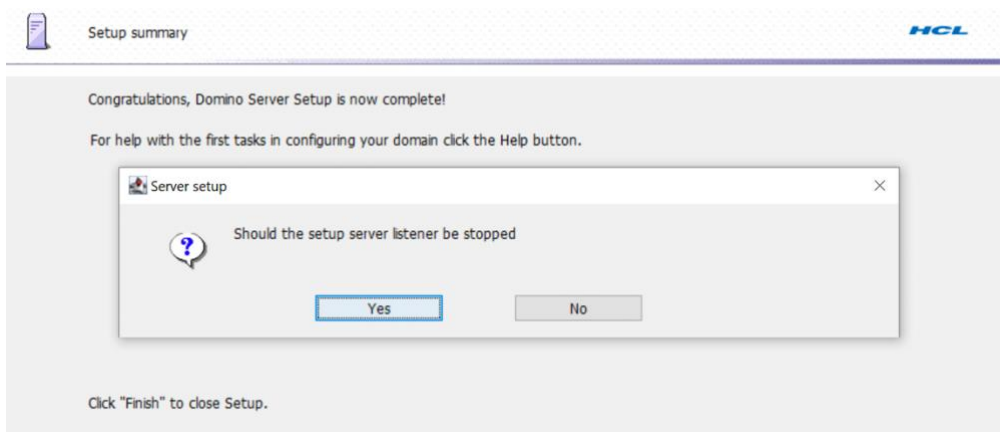
Secure your Domino Server

To increase security and prevent unauthenticated access of databases from the Internet, Setup recommends to configure Access Control Lists of all databases and templates to prohibit Anonymous access.

- ☒ Prohibit Anonymous access to all databases and templates
- ☒ Add LocalDomainAdmins group to all databases and templates

For better managability and administration, Setup will add the system group "LocalDomainAdmins" with "Manager" access to all databases and templates.

Continue through the setup screens until the server setup is complete. When asked if the server listener should be stopped choose Yes.



Setup summary

Congratulations, Domino Server Setup is now complete!

For help with the first tasks in configuring your domain click the Help button.

Should the setup server listener be stopped?

Yes No

Click "Finish" to close Setup.

When you finish the configuration, a dialog will ask you if you want to shut down the listening server. Do so, then go back to the SSH console from which you launched the server. It should be back to a command prompt.

Launch Domino

Launch the server, only this time do not add any parameters.

```
>$ /opt/hcl/domino/bin/server
```

Celebrate

Congratulations. Your server is now operational. To verify that the server is operational, type in the server's IP address in the URL window of your browser.

Appendix A: Common Internet Ports

This is for reference; keep all ports closed and only open those you will actually use.

20	FTP (File Transfer Protocol transfer)
21	FTPC (File Transfer Protocol Command)
22	SSH (Secure SHell) DO NOT CLOSE THIS IF USING SSH
389	LDAP (Lightweight Directory Access Protocol)
636	LDAPS (Lightweight Directory Access Protocol over SSL)
1352	NRPC (HCL Notes/Domino Remote Procedure Calls)
80	HTTP (Hypertext Transfer Protocol)
443	HTTPS (Hypertext Transfer Protocol over SSL)
25	SMTP (Simple Mail Transfer Protocol)
143	IMAP (Internet Message Access Protocol)
220	IMAPV3 (Internet Message Access Protocol Version 3)
993	IMAPS (Internet Message Access Protocol over SSL)
110	POP3 (Post Office Protocol Version 3)
995	POP3S (Post Office Protocol Version 3 over SSL)
8585	Used by Domino Remote Server Setup

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