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## UNIT 4    USER TO USER COMMUNICATION

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### 4.0    INTRODUCTION

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In this unit, you will learn how to communicate with other users in Linux. Such communication can be offline or online. Online communication can be done using the write command. While instant messaging applications are commonplace these days, they are not specific to Linux and are available for most popular operating systems. We will take a quick tour of an instant messaging application from one of the popular providers to understand some of the facilities that are available. Electronic mail is one of the offline applications available in Linux and we will look at the Ximian Evolution e-mail client that also allows you to schedule your engagements. The Apache webserver is a very popular one, and you will learn the elements of configuring it to enable your computer to serve out web pages. You will also see how to configure some other network services such as the domain name service and a network file system server. Again, because of the lack of space, we will be able to look at only the basic concepts and features and will not be able to delve into the details of these matters. There are also some other services that we will not be able to touch upon in this short chapter.

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### 4.1    OBJECTIVES

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After going through this unit you should be able to do the following tasks. The configurations that you will be able to perform will be at a basic level and you will not become an expert.

- communicate with other users on the same machine with the write command;
- use an instant messaging application to chat with another user on the network;
- use the Ximian Evolution e-mail client to send and receive mail;
- perform simple configuration of the Apache webserver on your machine;
- configure your machine as a domain name server, and
- configure your machine to be a network file system server.

## 4.2 ON-LINE COMMUNICATION

In Linux there are two ways of communicating with other users online. The first is available if the other user is logged in to the same machine. Whenever this is so the user will be a terminal on the machine to which you can send messages using the `write` command, even if that user has connected to your machine from another machine over the network. While the facilities are rudimentary, `write` is quick and simple to use. If you require more sophisticated features, you can use an instant messaging application from any of the popular providers, or use the `gaim` instant messenger that comes with Linux.

### The `write` command

This command allows you to send a message to another user logged onto the same machine at the same time. It is thus a means of online communication because the recipient obtains the message immediately. There are other means of communication that we will look at that are offline in the sense that you send the message and the other user might not pay any attention to them if he so desires. Of course, even with the `write` command, the other user might not pay attention to the message that you send. The same is true for an instant messaging application as well. So the distinction between what we are calling online and offline methods is just that in the former, the other user or users are expected to be available at that time – they may or may not choose to respond. If they do decide to engage in the communication, they are available at the other end and you can then conduct the conversation.

You should be careful while using `write` as it can be very annoying to receive a message which clutters up your screen while you are concentrating hard trying to do some piece of work. Sometimes you have some precious output on the screen which you have obtained after some effort and a `write` message appears and causes that output to scroll off. If you are working in a terminal window you can scroll back to see your output, but it can still be annoying to be disturbed. Or you are working in an editor and the message garbles your screen. There are many such situations in which you would rather not receive any message on your screen. Again, some people are more touchy than others on this issue. So you should be careful and use `write` only when you have something urgent to say, or when you are sure that the other party will not mind. In fact, one of the most irritating times to receive a `write` message is when you are already replying to somebody else's `write` message. You might even want to arrange with some friends for such a situation to happen and see how it feels.

One thing you could do is to find out using the `ps` command what the intended recipient is doing. If your party is in the shell, it might not be so inconvenient for him. On the other hand, if he is in `vi` or some application package, then it might be best not to bother the person. Then again, the urgency of your situation needs to be taken into account. Another possibility is to send the user a brief `write` message asking whether it is all right to send more. If the recipient does not want to be bothered at that time, she can tell you so. All said and done, you should be aware of the fact that `write` can be a rude command to use.

After this long sermon, we can come to the command itself, which should be a breeze for you after all of the two units of Linux experience that you have had. Let us find out some of the users on the system currently.

```
[kumarr@linux kumarr]$ who
rank      tty1 Dec 10 20:47
kumarr pts/0      Dec 10 22:59 (:0.0)
khanz     tty2 Dec 10 21:29
pramod    tty3 Dec 10 22:11
```

Suppose you, kumarr, want to write to khantz and ask him about some program he had promised to give you. So you say:

```
[kumarr@linux kumarr]$ write khantz
```

```
Can I have that matrix inversion program please?
```

```
I need it badly to test out my work.
```

```
^D
```

```
[kumarr@linux kumarr]$
```

We get back the prompt after sending the message. Notice a few things about write. One is that after issuing the command there is no indication at all that you should proceed with your message, because there is no prompt on the screen nor any automatic acknowledgement which comes from the other end. The command expects input from the standard input and faithfully transmits it to the destination.

Therefore after issuing the command you can type in your message, which can be as long as you like. When you are finished, you should type the end of file character to signal the end of input. This character is usually ^D. On doing this you will get back the prompt. There is no indication whether the other party has received the message or not. Also the message should not be longer than a screenful or the other person might have difficulty reading it, even though you can scroll back in a graphical terminal window in Linux.

Now what about the other end of the channel? Let us zip across to khantz's terminal and see what he has got, omitting the secret work he was busy with when you butted in.

```
Message from kumarr@linux on pts/0 at 23:08 ...
```

```
I need it badly to test out my work.
```

```
EOF
```

So he did get your message, but what about a reply? Well, you did not see anything on your screen because he has not had a chance to answer yet. Let us see his reply now;

```
[kumarr@linux kumarr]$ write kumarr
```

```
I was downloading it but the line got cut midway.
```

```
Will give it when I have it.
```

```
Have patience or get it yourself.
```

```
^D
```

and that is exactly what you receive on your terminal except for the letters EOF in place of the ^D.

So we now have seen a straightforward case of exchanging urgent messages with write. Often such messages would have gone by mail. The write command is more commonly used for carrying on an online conversation with others who are also logged in at the time, rather than just sending a message. Let us see how to do this.

Using the information from the who command earlier, let us say we try to converse with pramod.

```
[kumarr@linux kumarr]$ write pramod
```

Instead of immediately writing out your message, you can wait to see if pramod is in a mood to respond. After a minute or so you have not had a reply and so you just come out with ^D. He is too busy to talk to you, or maybe he just does not want to be disturbed and has arranged matters that way. This is getting to be irritating now, so let us try somebody else.

```
[kumarr@linux kumarr]$ write ramk
```

```
Message from ramk@linux on tty1 at 11:44 ...
```

At last somebody is ready to talk to you! This means that ramk has something like this on his screen.

```
Message from kumarr@linux on pts/0 at 11:43 ...
```

Now you are both all set to carry on a conversation, because both have issued a write command for writing to each other and can consequently write to each other's terminal. So go ahead and pour out your woes to your only friend in the installation.

```
I wanted a program so badly but khan has not yet got it.  I
Which program? I am sure he must have tried
don't know what to do...
```

What is happening here? This can be disconcerting for beginners, but there is nothing mysterious about it. The communication is asynchronous and full duplex. Both sides can transmit and receive at the same time, and unless you wait until the other side has finished, there can always arise opportunities for confusion. What you need is a protocol to be adhered to so that the screen does not get cluttered up and cause bemusement. The thing to understand here is that there is no way of knowing when the other party has finished unless the protocol is set up and observed. This is because after every linefeed character the message is sent to the other side and there is nothing to restrict a message to one screen line. So the other party might respond before you have finished, especially if you have also entered a linefeed in your message.

There are many local conventions you could come up with for this, but let us see a protocol where we use ga at the end of each message and terminate the conversation with a bye. Now the previous conversation will be more intelligible to both parties.

```
I wanted a program badly but khan has not yet got it.
```

```
ga
```

```
Which program?
```

```
ga
```

```
I don't know what to do.
```

```
ga
```

```
I am sure he must have tried.
```

```
Bye
```

```
EOF
```

```
bye
```

```
^D
```

This was when everything was favourable. Sometimes you will have the following

spot of bad luck.

```
[kumarr@linux kumarr]$ write ramk
```

```
write: ramk is not logged in
```

```
[kumarr@linux kumarr]$
```

This response is self explanatory. If you try to write to a user who is not logged in you will get this response from linux. Since write is an online command, it is not enough for the user to be a valid user on that installation. The user must actually be logged in to the system at the time you try to write to him. You can always make sure of that by doing a who first. If the person you want to write to is not logged in, you can save yourself the trouble of trying to write, knowing you will fail.

Then there are the times when you check out the users of the system and find something like this;

```
[kumarr@linux kumarr]$ who
```

```
ramk    tty1      Dec 10 20:47
kumarr  pts/0      Dec 10 22:59 (:0.0)
khanz   tty2      Dec 10 21:29
pramod  tty3      Dec 10 22:11
shyama  tty4      Dec 10 23:46
shyama  tty5      Dec 11 01:29
```

Now if you try to write to shyama you find

```
[kumarr@linux kumarr]$ write shyama
```

```
write: shyama is logged in more than once; writing to
tty4
```

If that user is logged in onto more than one place, you will find that Linux automatically writes to the lowest numbered terminal into which that person is logged in. That is usually fine, but if you want to specifically write to the person at some other terminal, you can do so by giving the terminal number of your recipient as well with the command itself. Thus

```
[kumarr@linux kumarr]$ write shyama tty5
```

will write to shyama at the terminal tty5 rather than the default terminal of tty4. So you see that you write to a terminal, not to a user. It follows that you can write to yourself if you wish.

Are you at the mercy of others to be able to work peacefully? Not entirely, because there is a command in Linux to prevent other users from being able to write to your terminal. In Linux every device is a file and you could use the chmod command to turn off write permission for others to that file. Then users will not be able to write to your terminal and consequently will not be able to disturb you while you are working. But to use write you would need to know which device file corresponds to your terminal. An easier way is to use the mesg command.

```
[kumarr@linux kumarr]$ mesg n
```

Now anybody trying to write to you will get a message like this

```
write: kumarr has messages disabled on pts/0
```

If you just want to check the status of write permission on your terminal, just issue the `mesg` command without any arguments. To restore write permission, you can use the `y` argument to `mesg`. Any denial of write permission lasts only for the duration of your login session. You can have a different write status on some other terminal to which you are logged in. You need to be aware of the fact that the superuser can always write to your terminal, irrespective of `mesg` status.

You should use the `mesg` command only when you are doing something important and do not want to be interrupted. Just as it is rude to unnecessarily bother a person, it is also rude to shut your doors to others trying to reach you, perhaps with something important.

The `write` command gets its input from the standard input and so you can always write the contents of a file to a

```
[kumarr@linux kumarr]$ write ramk < mymessage
```

Here the recipient will see the contents of the file. So the message should be short, lest it be hard to read off the screen. This session will not be interactive, because it will end after the file has been sent off and the party at the other end will get an EOF. Another facility you have is to send a message to all users logged in at the time. This can be done with the `wall` command.

```
[kumarr@linux kumarr]$ wall
```

```
Don't any of you guys want lunch?
```

```
^D
```

```
[kumarr@linux kumarr]$
```

```
Broadcast message from kumarr(pts/0) (Sun Dec 12
21:38:50 2004):
```

```
Don't any of you guys want lunch?
```

```
EOF
```

Here even the sender gets the message. An ordinary user cannot be sure that all those logged in will get the message because some users might have disabled the receipt of messages. So this command is suitable for the superuser only. It is usually used to send important messages pertaining to the installation to the users.

### Check Your Progress 1

- 1) What do you think are the advantages and disadvantages of electronic communication compared to
  - a) Postal Communication
  - b) A telephone conversation

.....

.....

- 2) Can you think of a couple of other ways of sending output to another terminal other than the ones covered here?

.....

.....

- 3) What happens if a user logs out after you have started writing to him?

.....

.....

- 4) If you wanted to send some message requiring some preparation, how would you use to write?

.....

.....

### Instant Messaging Applications

The `write` command that we looked at is rather rudimentary in that it does not offer very much by way of features or convenience. But it is useful if you want to communicate quick and fast with no set up required. For something that is much more powerful, you can use any of the instant messaging applications available today. With these applications you can communicate online with any user anywhere in the world if both of you are connected to the Internet. You can also hold conferences where more than two users can participate.

The act of using an instant messaging application is often referred to as chatting. This has become a very popular means of communication today. While not specific to Linux, chat applications are commonly used and will be described here briefly. Such applications are available from various providers but the one we will describe here is the Yahoo chat, called Yahoo messenger. This should not be construed as any endorsement of this particular application by the author or by IGNOU. This example has been used because you will not be able to appreciate the features of such applications unless we discuss them with reference to some specific application.

The Yahoo messenger application has many good features that make it useful and popular. It is available free of charge from the Yahoo website and is provided under different operating systems including Red Hat Linux. Once the file has been downloaded, it needs to be installed on your machine. This act requires root permission and will therefore not be discussed in this unit. We assume that your system administrator has done this for you. You can set up things in various ways but we will also assume here that you have to start up the application yourself whenever you want to chat with somebody or want to set up a conference. For this you just have to issue the command:

```
[kumarr@linux kumarr]$ /usr/bin/ymessenger
```

If you have set up your path properly in your login environment, you can omit the `usr/bin` and simply say `ymessenger` after entering into graphics mode and creating a terminal window. This brings up two windows that read Yahoo Messenger and Login. To be able to use the application you must already have a Yahoo id. If you do not have one, you could click on the button in the Login window that says "Get a Yahoo! ID". In the Login window you can now login by providing your id and password. The password is not echoed on the screen as you type and instead, you see an asterisk (\*) for every character that you type. This is to provide some security because then somebody looking over your shoulder will not be able to make out your password easily.

There are also two checkboxes available in the Login window. The first one will tell the application to remember your id and password the next time you login. This can be very convenient, but there are two points to consider here. First, you might well forget

your password if you do not use it for long. That can be inconvenient, though you can provide some information that you gave while signing up for the id and obtain a new password. That process takes time, however. Secondly, it is certainly most unwise to use that option unless you are working on a personal machine that you do not share with others, or at least with those you cannot trust. On a public computer, you must never set this option. Otherwise somebody could masquerade as you and perhaps perform objectionable acts in your name.

The second feature is to be able to login under invisible mode. When you enter the application, you will not be visible to others as having logged in. This will prevent others from trying to converse with you as they will not know you are online. We will see later that you can also put yourself into invisible mode after logging in normally.

The other Messenger window is blank in the beginning. While the Login window is visible, the Messenger window will not respond to your input (except for window manager operations that allow you to resize or close the window). It also shows in a status bar at the bottom that you are Not Connected.

Once you provide a valid id and password the login window closes, the application connects to the Internet and shows this in the status bar at the bottom of the Messenger window. It will also state that you are available, unless you have logged in invisible mode. You will initially not have any friends on the application so the middle portion of the window will be blank.

To be able to make use of the application, you need to have people you can chat with. These are called friends. So let us now add some friends to our list. To do this, click on the icon labelled Add, to open up a window that says "Add Friend".

The Add Friend window shows you four steps that you need to take to add a friend. You must know that person's id to be able to do so. Next, you have to decide what group that friend is to belong to. The application allows you to choose different kinds of groups into which you can classify your friends or contacts. You have the groups "Work" and "Personal" available to you by default. You can create a new group if you want to do so.

The ability to create groups is very useful as you can classify your contacts appropriately. For example, you could set up a group like "Family" where you put only your family members and relatives. Business or workplace contacts could be in the group called "Work" and so on.

In the next step you can enter the identity under which you want to add your friend. This will default to your login id.

In the last step you can enter a short message that your friend will see when she next logs in to the application, thereby telling her that she is now on your friend list. She could then choose to likewise add you to her friend list under the appropriate group. After this you can click on the "Add Friend" button to add the person to your list of friends. Now the person is displayed in the Messenger window under the appropriate group as your friend.

You can change your status by right clicking on the status bar at the bottom of the Messenger window. You get a list of status messages that you can choose from. These include "Busy", "Not At Home" and so on. When people who have you on your friends list login, they will see that status message against your name. Friends who are online at the time are displayed in bold, the others are displayed in ordinary type. Under invisible mode, your friend list is displayed in italics.

Now suppose your friend is online. You can now begin a chat session with that person by clicking on the Message icon in the Messenger window. This brings up another window that shows up the name of the friend in the title bar at the top. Below that are two rows of menu options. This is followed below by a text area where you can see



the messages that have been exchanged in that session. Below that is another area where you can type in your message.

For this message area there are several options available to you. You can set your messages to bold, italics or underline format by clicking on the B, I or U buttons. That changes the style of the text that you type subsequently in the message area. To stop bold, italics or underline, just click on the button again – it acts as a toggle. The recipient at the other end will see the message with the proper style. You can select more than one modification to the text style at the same time, such as bold and underline simultaneously.

Besides, there are options to change the font and the size of the characters you type. There is a drop down list available for both of these that includes a bewildering array of choices.

That is not all! You can also change the colour of the text that you type to any of some preset colours. As if that were not enough, you can create any custom colour you want to by specifying the RGB or HSB values of the colour. And then there are the different emoticons you can send by clicking on the smileys icon. There are several of them to display all kinds of feelings or emotions.

Once you have constructed your message, you can press the enter key or click the send button to have your recipient see what you typed. This is visible at your end also. Messages sent and received can be distinguished both by the id of the person as well as the colour.

When your conversation is over, or at any point that you wish, you can save the transcript of the entire discourse in a file on your disk. You could also cut and paste the conversation into a file in your word processor. If a person is not responding, you can “buzz” your friend to draw attention using the “Friend —> Buzz Friend” option in the menu bar. This will send an audible sound to the other end (will work only if the other party has their speakers on) as well as shaking the chat window of your correspondent.

There are several other options available and we will not be able to talk of all of them here. But one very useful and important facility is that of conferencing. Here you can invite a third party, and a fourth and more, to join in the conversation. Here all of you get to see what all of the others are saying. Thus you can conduct a meeting online. They are of course free to join your conference or to decline.

You can send a file to your recipient by using the “File —> Send” option or simply use the “Send File” option. You are then directed to another window where you can indicate the details of the file to be sent. With this you can also send a message to your friend. One more feature is the ability to ignore a user. You will then no longer receive any messages from them.

As your friends come online, you will receive a notification telling you about the event. Similarly when you come online, any users who have you on their friends list will be advised about the fact.

There are several preferences you can set to customize the look and feel of the application to your taste. These can be accessed by using the “File —> Preferences” menu option. You can, among other things, change the privacy options, decide the colour scheme used or set the alerts that you will receive.

So you see that an Instant Messaging application is much more sophisticated than the rudimentary `write` command that we saw earlier. However, for a quick and short conversation, you could still use `write`. These days you can also conduct a voice chat with your friends, effectively using your computer as a telephone. This would require a microphone and speakers at both ends and a reasonably good Internet connection. You can also conduct a voice conference.

## Check Your Progress 2

- 1) What is meant by being in invisible mode in Yahoo Messenger?  
.....
- 2) How do you being chatting with a friend?  
.....
- 3) What would you want to buzz a friend?  
.....
- 4) What are the different status messages that you can show others?  
.....
- 5) How can you save a transcript of the conversation you have had with a friend?  
.....

---

## 4.3 OFF-LINE COMMUNICATION

---

Let us now explore the facilities available in Linux for offline communication. This term is used here to refer to a method of communication where the other party is not necessarily on-line at the time. The recipient sees your message only the next time that she logs in. After looking at the array of features available in an instant messaging application, you might wonder what good it would be to use any other method! But consider some of its limitations and disadvantages.

The other party has to be available at the same time as you are. This can be inconvenient across different time zones.

Unless you keep yourself focussed, the conversation can tend to ramble and go on an on. This means more time spent on the chat proper.

If you are using text mode, then typing things out quickly can be difficult and tiresome unless you are a trained typist.

Infrastructural issues are important. If either side has a power or network outage, the conversation cannot happen.

Lengthy files cannot be sent, or even if they are sent, there is no chance for the recipient to peruse them.

We can get around many of these limitations by using an offline mode of communication such as electronic mail. While some of the good features of instant messaging might not be available, there are some advantages to it.

Communication is asynchronous. You send your message and the other party can reply at leisure. If they are not available, the message resides in their mailbox until they are ready to look at it.

File attachments can be sent and the other party can reply after examining the file.

Typing speed is not much of an issue as there is no one impatiently waiting for your reply at the other end.

Infrastructural bottlenecks are of less significance. The message can be sent or received as and when resources become available.

At the same time, if both parties are online, e-mail can be almost like an online means of communication as people exchange e-mail messages rapidly one after the other. We will therefore look at the e-mail facilities available in Linux. Here we will not concern ourselves with the mechanisms of setting up an e-mail system, which is the job of the system administrator or the network specialist at your installation. We assume that has been done and we will only look at an e-mail client to explore the features and facilities that it offers.

Linux has a rudimentary e-mail client in the mail command. This is a text oriented facility that is difficult to use, especially in today's scenario where we are all accustomed to graphical interfaces. It works at the command line level and allows us to send, receive and otherwise manage e-mail messages. But here we will look at a more sophisticated e-mail client – Evolution from Ximian. To be able to use it, it needs to be set up on your machine. Here we assume that the basic set up has been done for you and that you are ready to use it as your primary e-mail client.

To start up the client, click on the little arrow near the Red Hat on your bottom tray. This brings up a menu of choices from which you need to choose "Internet —> Evolution Email". This takes you to the main window panel on your screen. This window has several parts that are briefly described below. You will find that there are many ways of reaching a particular option. For example, to see your inbox, you can click on the Inbox link on the right hand panel in the summary page, or choose Inbox from the left hand panel, called the Shortcut bar, itself. We will here look briefly at some of the main features of the client.

The client has features such as helping you keep track of your appointments and tasks that you need to do. Here we will not dwell on those aspects as we would like to focus only on the communication aspects of the client that are made available through the e-mail related facilities.

## **Menu Bar**

At the top is a menu bar with the options File, View, Actions, Tools and Help. Each of these in turn has several options. The bar is context sensitive. For example, when you are viewing the summary, you will not see the Edit button. Likewise, the options that appear under the View or Actions button depend on where you are currently.

The View option lets you choose the appearance of the window. You can choose to see the Shortcut bar on the left or to hide it. You can also choose to see or hide a Folder bar that shows all the mail folders that you have. This appears to the right of the Shortcut bar.

The Actions option lets you send or receive your messages through your e-mail server that has been configured for your client. If you choose this option then all messages that have arrived on the server will be transmitted to your client and will appear in your Inbox. Also any messages in your Outbox will be sent out.

The Tools option lets you change the Settings of the client. This will allow a host of preferences to be set. These include the settings related to mail messages, message composition, servers, contact lists and others. You can also configure the synchronization of your computer with a Palm Pilot.

The Help option gives you a full description of how to configure and use the Evolution e-mail client. You should refer to it for all the details that we will not be able to discuss here.

The File option lets you create a new mail message, set up an appointment or add a task. You can also work with folders, import external files, print or work offline. Many of these choices can also be used through other navigational paths.

### **Shortcut bar**

This bar appears on the leftmost part of the window, unless you have chosen to hide it. It has several choices.

The Summary shows you some weather information in the centre pane, while the right hand pane shows the number of messages in your outbox and inbox. You also see any appointments and tasks that you have left. All of these are links that take you to the respective feature. So clicking on the "Inbox" will take you to your inbox.

Clicking on Inbox takes you straightaway to your Inbox, where you can see a list of the messages that you have received with the sender, subject and date. You see the total number of messages and the number of new messages as well.

There are also shortcuts to your appointments calendar and todo list.

You can maintain your Contact list by clicking on Contacts.

If you right click on the Shortcut bar, you get a menu whereby you can change the appearance of the bar. You can now —

- Hide the Shortcut bar, whereupon you can get more space for the actual option that you are at currently. So if you are in your Inbox and you hide the bar, the space that becomes available is now used for your Inbox itself. You can get back the bar by clicking on the View option in the menu bar at the top of the window and selecting the Shortcut bar.
- Choose to see large or small icons in the Shortcut bar according to taste. Small icons take up little space and give a compact appearance.
- You can create another Shortcut group where you can put in your own shortcuts to folders that you choose, such as a folder that you have created.
- You can change the names of groups or remove groups that you have created.

### **Inbox**

The Inbox shows you at the top statistics on the number of new and total messages that you have. By clicking on a column header such as "From", "Subject" or "Date", you can sort the list in ascending or descending order, or even remove the column. You can also add columns of your own by selecting one of the available choices and you can place the column wherever you like.

When you click on a message summary you can see the actual message in the bottom half of the window. You can now perform the usual actions of replying to the message, deleting it or forwarding it to another set of recipients.

You can search through your messages based on several criteria, such as

What the subject does or does not contain

What the body does or does not contain

What the sender's name contains

What the recipient's name contains

Your own custom criteria that you can build up using the options provided

## Composing Mail

One way of beginning to compose mail is to select Actions —> Compose New Message when in the Inbox. This brings up the "Compose a Message" window that lets you enter.

The "To" or recipient information

Information on those to whom you want to copy the message, using the "Cc" field

You can choose to send a "blind" copy by using the "Bcc" field. Other recipients will not be able to see that the mail has gone to the Bcc addresses, but they will be able to see the other addresses to which the mail has been Cc'd. To be able to use the Bcc field, you might have to choose the View option on the top menu bar and check the Bcc option in it.

For the above three fields, you can bring up your contact list by clicking on the To, Cc or Bcc buttons. Now you can select by name the contacts to whom you want to send the mail. When the list appears, you can place contacts in any of the three fields that you need. This way you do not have to remember any e-mail addresses, nor do you have to type them in.

The subject line. Although this is not compulsory, it is good to enter a subject so that the recipient can make out what the message is about when it sits in her inbox. The subject should be descriptive enough so that this can be done.

The Format option on the menu bar in the Compose windows has many features.

You can now start entering the message itself. Here again you have many features available. To begin with, the message can be in plain text or in HTML. In either case, you can make the text bold, underline it, put it in italics or use strikethrough mode.

You can choose the font size for your message.

You can align the text that is entered – left, centered or right alignment are possible.

You can change the colour of the text from among several preset choices, or you can even create your own custom colour.

You can create bulleted or numbered lists, with choices for different kinds of numbering such as Roman or alphabetical.

You can indent your text as desired.

While you are entering your message, you have several facilities available through the "Edit" option on the menu bar.

You can undo an action that you have performed by mistake, such as changing the indent or the font colour.

If you find you have undone something by mistake, you can redo that same action.

You can cut or copy and paste a block of text from another file to the message window or vice versa. The cut option will delete the text from the original location, while the copy option will leave the original as it is.

You can find and replace text in your message.

You can spell check the text that you have entered in your message.

Besides, you can add an attachment to your message. This attachment can be any file that you like to put in. Various emoticons, or smileys, can be inserted into the message

body as well. Apart from this, you can insert images that you have, hypertext links, ruler lines, text and html files directly into the body of the message. Having done all this and composed your message, you can now use the "Send" icon on the toolbar, just below the menu bar, to send your message off to the recipients.

If you wish, you can save your message as a file on the disk using the "File" option in the menu bar. You can also save your message in your Drafts folder for editing and sending later. This is useful when you are not able to complete an elaborate message in one session and want to continue to work on it later.

## Folders

To be more organised, you can store your mail in various folders. The default set of mail folders consists of Inbox, Outbox, Drafts, Sent and Trash, besides which there is a folder for your contacts. There are also folders for your calendar and todo list, but we do not look at them here.

The Inbox stores all messages that you have received. New messages that you have not read are to be seen in bold. The Outbox stores messages that you have composed and that you have asked to be sent. They remain here until they have been sent off successfully. If, for example, the network link is down, the message might remain here for some time till the link is restored. The Drafts folder contains messages that you have composed and chosen to save instead of sending off. As we saw before, this could be because you need to work on the message some more in a later session. The Sent folder contains messages that have been successfully sent off. They are moved here from the Outbox when this happens.

You can delete a message from any of these folders if you do not want them lying around. Such messages are not removed permanently at that time but are instead moved to the Trash folder. This gives you a chance to undo the delete if you realize you have made a mistake, or if you change your mind. To remove a message for good, you need to delete it from the Trash folder.

You can also create your own folders by using the File → New → Folder option. You will be asked to specify under which folder you want this to be created. You might find it useful to create new folders to organise your messages better. For example, instead of letting all your incoming mail clutter up your Inbox, you might like to store it in folders organized by sender name or organisation.

## Contacts

You can create a list of contacts with various details like their name, organisation, title, contact details with e-mail, postal address, phone numbers and so on. This can have other notes on them together with their birthday, spouse's name, anniversary, web page and other information too.

You can remove contacts and edit their information as well. This contact list can then be used while sending mail, as already described. You do not have to remember e-mail addresses and can just use the name. You can search for contacts using various fields as well.

Besides what we have described above, you can set a host of preferences for the look and feel of your client. With this wealth of features, it is a real pleasure composing and sending e-mail on your Linux machine. This is a big advance over the rudimentary facilities offered by the mail command that is inbuilt in Linux.

- 1) What are some of the advantages of e-mail over instant messaging?  
.....  
.....
- 2) Why would you not want to use the inbuilt mail command for managing your e-mail?  
.....  
.....
- 3) What is the utility of having different folders set up in your mail client?  
.....  
.....
- 4) Why would you want to set up an address book?  
.....  
.....

---

## 4.4 APACHE SERVER SETTINGS

---

The Apache webserver is a very popular webserver used by many websites around the world. Here we will take a brief look at its facilities and see how you can perform basic configuration of the webserver. While this will not make you an expert, it will give you an introduction and start you off.

In Linux, Apache version 2.0 is available as your webserver. This package can be installed while installing Linux. If it is not already available, then you can install the package, that is called `httpd`, using the command

```
[root@linux root]# rpm -i httpd
```

The configuration of Apache is specified in the configuration file that lies in `/etc/httpd/conf/httpd.conf`. You could make entries into this file by hand if you wish. When you install the package, a default version of this file is put in automatically. However, hand configuring this file is only for experts, and you should not try it until you are thoroughly familiar with it.

You can start the `http` server by issuing the command

```
[root@linux root]# httpd -k start
```

If you now start up your browser and point to `http://localhost`, you should see the Apache test page. This indicates that the Apache webserver has been configured properly and that it is working correctly. If there is something wrong with the configuration you will get an error message.

To be able to work with the webserver, you will need superuser or root access to your machine. Ordinary users cannot configure the webserver or stop or start it. This is

because the impact of a reconfiguration is installation wide and is not confined to the user who makes the change. Also it requires access to facilities that are accessible only to the superuser.

What if you are not an expert user and are not very familiar with the webserver? How do you begin to configure it? One way is to use the graphical HTTP Configuration Tool that comes with Linux. This gives you a user friendly interface and saves you from having to know any complex commands. To be able to use this tool, apart from superuser or root access to the machine, you need to have the X-Window system running. This needs setting up by your administrator, and after logging in, you can invoke it using the command

```
[root@linux root]# startx
```

You need to understand that if you use the HTTP Configuration Tool, you cannot configure the webserver by hand. This is because the tool generates the file after you exit the tool. Any changes you have made are therefore not preserved. Also there could be some modules that you have added to your webserver. The tool only supports modules that are made available with Linux. If you use any other modules from other sources, they cannot be configured using this tool.

To start the tool click on the red hat icon with a little upward pointing arrow. This is the Main Menu Button for Red Hat Linux. So you need to say Main Menu Button → System Settings → Server Settings → HTTP Server. If you wish, you can also start up the tool from the command line at the root prompt.

```
[root@linux root]# redhat-config-httpd
```

This brings up the main window of the tool, shown in *Figure 1*. You are currently at the Main tab where you enter the basic settings for the webserver.

### Main

In the Server Name, you should enter the complete or fully qualified domain name of the machine on which you are doing the configuration. This could be something like `www.mycompany.com`, or `www.mycompany.co.in`. If you do not give a valid name, when the webserver starts up, it tries to obtain the name from the IP address of the machine. The name of the machine that you give does not have to be the same as this one.

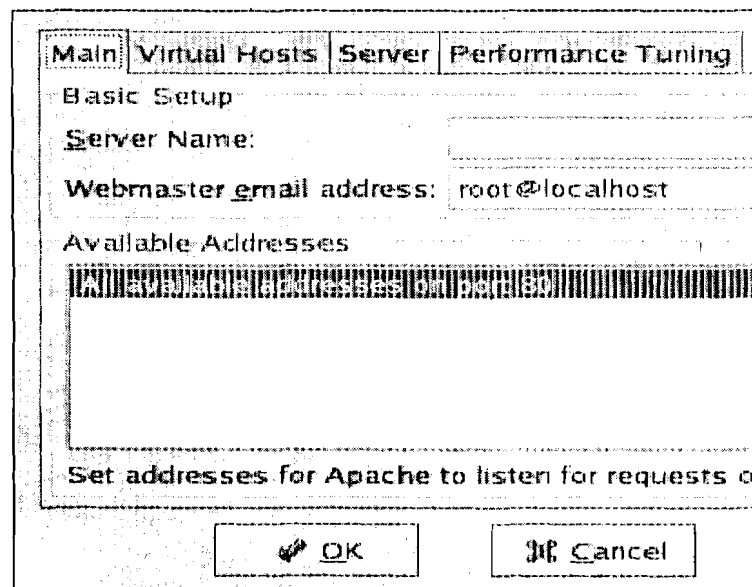


Figure 1: Main Window of HTTP Configuration Tool



The next field that you enter is the e-mail address of the webmaster. It defaults to root@localhost as can be seen in the figure. You can configure the webserver's error pages to contain an e-mail address. This can then be used by users to send e-mail to report errors. You can make the address something like

webmaster@mycompany.com.

Next you can set up the ports on which the webserver should listen for requests. The default is port 80 for non-secure communication. You can add an address by clicking on the Add button at the right. This brings up another window where you can either choose to Listen to all addresses or specify an IP address. You can also specify the port number at which you want to listen to requests from that address. You will have to make a separate entry for every combination of IP address and port number. It is better not to use domain names because of the possibility of DNS lookup failures.

You can edit or delete an entry by selecting it and then choosing the appropriate option from the buttons on the right. Note here that while the edit option lets you cancel your edit and seeks confirmation from the OK button before your entries take effect, the delete button immediately deletes the entry without further ado or warning.

### Virtual Hosts

This completes your basic settings. Now you should go to the next tab, that is "Virtual Hosts". On clicking here you will see the virtual hosts listed by name and address. Initially both will say "Default Virtual Host". In the lower portion of the window is a button labelled "Edit Default Settings". You need to click on this to bring up another window titled "Virtual Host Properties". On the left of this window you will be on the option for "Site Configuration". On the right you see entries for the Directory Search Page and the Error Page. You should not need to change these settings in the beginning. However, the tool does give you options to Add, Edit or Delete these entries.

The Directory Search Page is the page where the webserver looks for content to serve out when a user points a browser at the server's URL without specifying any directory or with a directory name ending in a /. These are searched for in the order that they appear here.

The Error Page is used to gracefully handle errors. The message in the footer is what the user sees in case of an error. If you click on the Edit button, you can change this behaviour. The user can be redirected to any URL that you choose in such a situation, and this can be an internal or external one. For an internal URL choose the File option. Let us say you want to show the user a message that you have stored in a file called badrequest.html whenever he makes an invalid request. In the Error Page, select Bad Request and click on Edit. In the behaviour, from the drop down list, choose File and enter the name of the file. This file must be under the Document Root directory.

The last menu option here is for the Default Error Page Footer. Here you can choose the default, no footer or the default together with the e-mail address of the person maintaining the website, that was specified during the basic settings.

Having done with Site Configuration, you can move on to the Logging menu. Here you can configure the Transfer log and the Error log. The transfer log logs all connection attempts to the webserver, with their IP address, date and time and the file that the client is trying to access. The default for this is the file `/var/log/httpd/access_log`. Similarly the error log holds all errors that the webserver encounters and the default for this is the file called `error_log` in the same directory.

You can change these default log files by entering either an absolute pathname or a pathname relative to the server root. You could also choose a custom log format by entering a string that defines the format, but we will not go into this here.

The log level determines the amount of logging that goes on and you can set to one of the eight possible levels, from Emergency that logs the least amount, to debug level that puts in a large amount of information. The default is to log only errors or more severe problems.

The last option here is the Reverse DNS Lookup, which you should leave at the "No Reverse Lookup". You can also do a Reverse Lookup or a Double Reverse Lookup, but this is not recommended because of the load it would place on your server and the Internet in general.

The next menu option under Virtual Hosts is Environment Variables. Here you can control the environment variables that are passed onto Common Gateway Interface (CGI) or Server Side Include (SSI) pages. This has three options – to set, to pass and to prevent an environment from being passed to the CGI script.

In the "Set for CGI Scripts" section, you can choose the Add button to add an environment variable to be sent to CGI scripts. This brings up a small window called "Environment Variable" where you can enter the name of the variable and its value. Then choose OK to add it to the list. Similarly in the "Pass to CGI Scripts" section, you can choose the Add button to bring up a window where you can enter the name of the environment variable. This passes to any CGI scripts the value of that variable when the webserver was started. Click on OK to add this to the list. Finally, in the "Unset for CGI Scripts" section, you can enter the name of variables that you do not want to pass to CGI scripts. For all the three cases, you can also edit and delete entries already made.

The last menu option here is Directories. Here you can set various options for different directories. At the top are options that are the default for all directories not mentioned in the lower portion of the window. You can edit these default options by using the Edit button the right. In the bottom part of the window you can set options for specific directories. For this click on the Add button at the right.

You now see a "Directory Options" window with various sections. In the Order section, you can either allow all machines to access the directory, process a deny list first or process an allow list first. In the Deny List and Allow List sections, you can either select all hosts or specify hosts based on matching with a partially specified domain name, an IP address or a subnet. You can also put in the directory to which these options apply. Moreover, you can choose to allow directives in a `.htaccess` file to take precedence. There are also some options that you can set. These same options can also be set for the default directories. These include allowing CGI scripts to be executed, allowing server side includes and allowing the following of symbolic links. You can also edit and delete directories that have options already set.

You would recollect that we have done all the above using the "Edit Default Settings" button, which means that what we did applies to all virtual hosts. Different virtual hosts can be hosted on the same physical machine, and they can have different IP addresses, ports or names. We will now see how to manage virtual hosts in Apache.

For every virtual host that you add, you can configure directories, environment variables, logging and site options the same way as described earlier. To add a host, click on the Add button which will bring you to the "General Options" button. You will now see a window where you can specify the name of the host, its document root, and the e-mail address for the webmaster. In the Host Information section, you can choose the type of host, which can be default, IP based or Name based. You should have only one default virtual host. For IP based virtual hosts you have to specify the IP address. This can be in the form `IP:port` if you want to specify the port as well, and you can specify multiple addresses by separating them with a space. You can likewise configure name based hosts by putting in the information that is asked for. Name

based virtual hosts cannot work with SSL and can work only with a non-secure webserver. You can set up SSL options by choosing the SSL menu option for your virtual host. This requires that your webserver have been set up to allow SSL support, and will require you to allow access through port 443 in the basic settings.

## Server

The next tab is "Server" and it allows you to configure some basic settings for your webserver. You should not normally have to alter these, at least the lock file and the PID file. The Core dump directory is where the server dumps core if it crashes.

The Apache webserver must not be run as root as that would expose many security holes in your system. The user for the server is specified in the User section, and by default the user is Apache. Here you can also enter the group to which that user belongs. This too is Apache by default. The user id is what determines access to the system resources. Any file that cannot be accessed by this user cannot be accessible to the server and will return an error. Also any CGI scripts run are run with the user id of this user. So you must take care to see that any scripts that are not to be run by the outside world cannot be accessed by the webserver user. Also any files that you do not want to allow others to read should not be accessible to the webserver user.

You must ensure that the core dump directory permissions allow the Apache user to write to it. If not, then it will not be possible to write core to the disk in case of a crash

## Performance Tuning

This is the last tab in the HTTP Configuration Tool. The window that it opens up has a few options that we look at here. In this case too the default options are likely to be appropriate choices for most situations.

The "Max Number of Connections" is the upper limit on the number of simultaneous client requests that can be handled by the webserver. This needs to be below 256 and is 150 by default. For a higher value, above 256, you will have to compile the Apache webserver again with the proper options – not recommended for beginners. If there are more client requests they will be refused unless connections become available.

The "Connection Timeout" setting sets the number of seconds for which the webserver will wait for a response to a communication request. The default value, as you can see, is 300 seconds. You can also set the maximum number of requests that are allowed per connection or allow any number of requests. If you allow persistent connections, the server will keep a connection open even after a request has been serviced. The time for which it will do so can be specified in "Timeout for next Connection". This should not be set too high as it could slow down the webserver as it waits for another request from clients.

With this we have looked at how to perform the basic configuration for the Apache webserver. There are of course many features that we have not touched upon, but after reading the material here you should be able to at least start off.

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## 4.5 NETWORK SERVER SETTINGS

---

In this section we will look at how to set up your machine to serve as a Domain Name server and as a Network File server. A domain name server helps convert domain names to IP addresses so that human beings do not have to remember incomprehensible strings of numbers and can instead work with names that they find much more intelligible. You will need to have sufficient understanding of the domain name service and the program, bind, that provides the service.

### 4.5.1 Domain Name Server

It is certainly possible to configure bind by hand, but that requires a good understanding of the format of the configuration files. If you are not an expert, the Bind Configuration Tool provides a graphical, user friendly way of performing basic configuration of the DNS service. However, any complex configuration will not be possible through this tool.

Like other server configurations, setting up the DNS service also requires you to have root or superuser access on your machine. Moreover, to run the tool, you need to be working in the X-Window system so that graphical facilities are available. You can start the tool through the command line at the root prompt, though.

```
[root@linux root]# redhat-config-bind
```

To start the tool from your Gnome desktop, click on the red hat icon with a little upward pointing arrow. This is the Main Menu Button for Red Hat Linux. So you need to say Main Menu Button → System Settings → Server Settings → Domain Name Service. This will bring up the main window of the tool, as shown in *Figure 2*.

The configuration file for bind is `/etc/named.conf`. If you are going to use the configuration tool, do not edit the file by hand as all changes you make will be lost when the tool writes out to the file when it is closed. Unlike the HTTP Configuration Tool, though, you can also put in your own configuration that you make by hand, by placing it in the file `/etc/named.custom`.

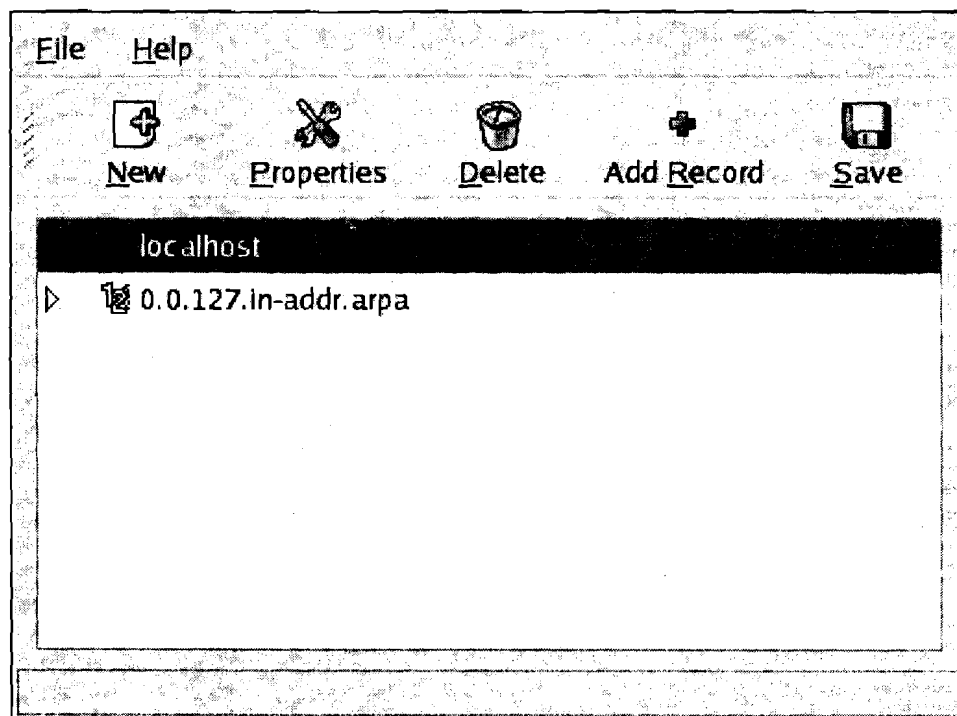


Figure 2: Bind Configuration Tool

You can work with the zone files and can add, delete or edit zones, which can be a forward master, a reverse master or slaves. To save your changes you need to use the menu option File → Save or just use the save button. If you want to quit without making changes, use File → Quit. The changes you made are reloaded by named so that they take effect right away.

You can add zones by clicking on the New button in the main window. A window titled "Select a zone type" appears where you can select from Forward, Reverse or Slave.

A window for "Name to IP Translations", shown in Figure 3, appears with the name of the zone that you just entered. The zone file name is the same as that of the zone, but with a `.zone` suffix. This filename is relative to the `/var/named` directory. In the contact field you can enter the e-mail address of the primary contact for the domain. The default, `root@localhost`, is probably not the best choice.

Next you need to enter the name of server that is authoritative for this domain. This is used to create the Start of Authority record for the domain. You must specify a primary nameserver and enter a record for it. The serial number has to be incremented each time there is any change to the configuration file, so that slave servers will update their own files. Usually it is set to the date of the file followed by a number, such as 20041226001. To change the serial number from the default of 1, click on the set button and enter it.

The button for "Time Settings..." lets you change the different life cycle times that you have to specify in a DNS file. These are the time to refresh, retry, expire and the minimum time to live (TTL). The values are to be entered in seconds, and here the defaults that appear, 28800, 7200, 604800 and 86400, are reasonable enough that you can leave them alone. However, depending on the characteristics of your site, you might have to alter these values.

Master Zone

Name: forward.example.com

File Name: forward.example.com.zone

Contact: root@localhost

Primary Nameserver (SOA):

Serial Number: 1 Set...

Time Settings...

Records

forward.example.com

Add Edit... Delete

Cancel OK

Figure 3: Forward Master Configuration

Finally you can add records for hosts, aliases and nameservers by clicking on the Add button in the Records section. You must add an entry for a nameserver. When you are done you can save the configuration.

### Reverse Master

When you choose to add a reverse master zone, you have to enter the first three octets of a valid IP address. The tool performs the necessary checks to see that the address entered is of a valid format. After you click OK, you will see a new window titled "IP to Name Translations" that shows several fields for you to enter. The first is the IP address field that is the same as the IP address that you just entered. The name of the zone is constructed from this by putting the octets in reverse order and appending `".in-addr.arpa"`. The name of the zone file is the

same as this with the suffix being ".zone". The contact field contains the e-mail address for the primary contact for the zone. As in the case of a forward master, you have to enter the name of the server that is authoritative for the domain together with the serial number. This is automatically incremented by the tool and can also be set manually by using the Set button.

You have to again add the zone life cycle information and provide at least one name server for the zone. The portion here that is different from the forward zone is the reverse lookup table of that gives the hostname for each IP address in the zone. When you click on the Add button you are prompted to add the IP address and the complete hostname (ending with a period) for hosts in the zone.

At the end of this you can save the configuration or quit. If you save, the named service will take cognizance of the changes and they will take effect. The window for Reverse Master configuration is shown in *Figure 4*.

Reverse Master Zone

IP Address: 192.168.10

Reverse IP Address: 10.168.192.in-addr.arpa

Contact: root@localhost

File Name: 10.168.192.in-addr.arpa.zone

Primary Nameserver (SOA):

Serial Number: 1 Set...

Time Settings...

Nameservers

Add Edit Delete

Reverse Address Table

Address	Host or Domain

Add... Edit... Delete...

Cancel OK

Figure 4: Reverse Master Configuration Window

### Slave Zones

You can also add a secondary master or a slave zone to your configuration. These serve as backups to the primary master for the zone. Here you have to add information on the nameservers from which the slave is to pick up its data, together with the name of the DNS database file. This name is specified relative to the /var/named directory. The nameservers are specified as IP addresses.

### 4.5.2 Network File Server

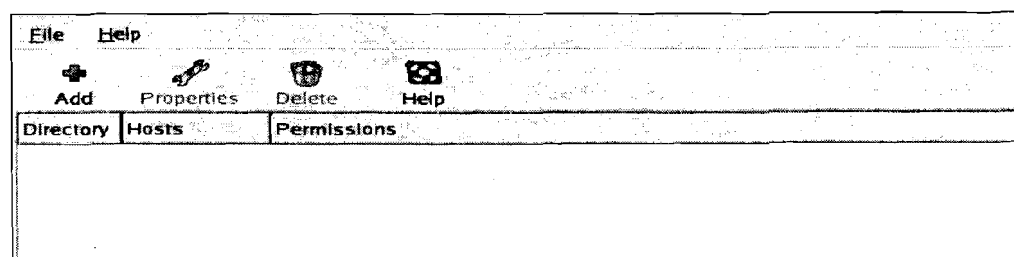
You can configure a Linux machine to work with a Network File System (NFS), where files on other machines on the network can be made available as if they were local files. A Linux machine can work as an NFS client, whereby it accesses files on the network. You can also configure your Linux machine as an NFS server, whereby you can let other machines access files on yours. In this section we will look at how this can be done.

As we have seen for the webserver and DNS server cases, although you can construct an NFS configuration file by hand, Linux comes with a tool to ease the task. This is the NFS Server Configuration Tool. It requires superuser or root access to use

the tool. Being graphical, you must have the X-Window system running to be able to use the tool. But you can still start up the tool from the command line by issuing the following command at the root prompt

```
[root@linux root]# redhat-config-nfs
```

The NFS Server Configuration Tool both reads from and writes to the configuration file `/etc/exports`, and so you can modify the configuration file by hand after using the tool. If you use the tool again later, it will understand and recognize your changes, provided you did the configuration correctly with the proper syntax. The main window of the tool is shown in *Figure 5* below:



**Figure 5: NFS Server Configuration Tool Main Window**

To share a directory, called adding an NFS share, you need to click on the Add button above. This brings up a window with the title “Add NFS Share” that has three tabs. The “Basic” tab allows you to specify a directory and a radio button lets you decide whether you want to allow read-write or read only access to others on it. You also have to specify the machines or hosts that are to be allowed access to that directory. This can be done by:

- Giving a fully qualified domain name. This should be something your machine can resolve to an IP address.
- Giving an IP address.
- Giving a host name, again your machine should be able to resolve this to an IP address.
- Giving a group of machines by specifying them as a domain name or host name with wildcards. You can use a `*` for matching any number of characters except a period, and a `?` to match any single character.
- Giving an IP network by specifying the network and a `/` followed by the number of bits in the netmask, or by specifying the netmask itself.

Doing the above makes the directory accessible to the host or hosts with permissions as desired.

The “General Options” tab has five options as described below:

- If you want to allow ordinary users to be able to start the NFS service and allow shares, you have to allow the service to be started on ports higher than 1024. This does make the service less secure because the share does not require the concurrence of the administrator.
- You can decide to allow insecure file locking.
- You can decide to disable subtree checking. This is useful if you have exported an entire file system, because your server will no longer check to see whether a file requested by a client is in the directory that has been shared.
- You can choose to force synchronization of writes immediately.
- You can choose to disable synchronization of write options, where the server first writes out to disk the changes caused by a request before replying to it.

The "User Access" tab has the following options that you can set.

- You can allow the superuser of a client machine root privileges on your machine. This is a big security risk and should be used only if necessary. Otherwise, by default, even the root user of the client is treated as an anonymous user on your machine.
- You can map all users on the client to the anonymous user on your machine. If you choose this option, you can set the user id and group id of the anonymous user.

You can now click on the OK button to save the configuration you have made. Of course you can add as many directories as you wish to share. You can also edit directory properties by selecting it and choosing the "Properties" button in the main window. This button is initially greyed out when there are no directories shared. Similarly you can delete a directory by selecting it and choosing the "Delete" button. Whether you add, edit or delete a directory, the configuration takes effect immediately after you save it. This is done by generating the new `/etc/exports` file and restarting the NFS server daemon.

---

## 4.6 SUMMARY

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This brings us to the end of this unit. Here we have looked at two broad themes – communicating with other users and setting up your machine as a server for different kinds of services.

In user communication, we have looked at online and offline communication. We have seen how to use the write command to quickly communicate with other users on your machine. It is a simple command that provides only a rudimentary communication facility. We then looked at an instant messaging application from Yahoo! That provides many sophisticated features and allows us to talk to anyone else connected to the Internet. The only demand this places on us is that it needs a good connection to the Internet, while the write command has no such constraints.

For offline communication we looked at the Evolution e-mail client from Ximian. This allows us to communicate asynchronously with users who might not be online at the same time that we are. It has a wealth of features that make the task of sending and receiving mail easy and we therefore did not consider the inbuilt mail command in Linux.

We then looked at setting up three different kinds of services. First was the Apache webserver that is available in Linux and is one of the most widely used web servers. We saw how to use the configuration tool provided with Linux to configure this webserver.

Next we saw how to configure our machine as a DNS server using the configuration tool available in Linux. Finally, we saw how to set up our machine so as to make it an NFS server.

All the server settings were discussed with reference to the user friendly, graphical configuration tools available in Linux.

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## 4.7 SOLUTIONS/ ANSWERS

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### Check Your Progress 1

- 1) a) Postal communication is slow and can be unreliable. But you can send physical material by post, something that is quite impossible electronically.
- b) A telephone conversation is synchronous and we can listen to the other party's response immediately. We also know if the other party has got our



message. When communicating using a computer, we can use asynchronous methods so that both parties do not have to be present simultaneously.

2) Try

```
cat /dev/tty04
```

where /dev/tty04 is the device file corresponding to the desired terminal.

One can also try

```
cp msgfile > /dev/tty04
```

3) You get an error message like

```
write: Input/output error
```

4) Prepare the message and store it in a file such as msgfile. For this you can use vi or any other editor. Then say

```
write khaz < msgfile
```

because write reads the standard input. You will have to see that khaz is logged in. If he is logged in from more than one terminal you will need to specify the terminal as well.

### Check Your Progress 2

- 1) You can login but others who have you in your friend list will not be able to see that you are online. This is called logging in invisible mode.
- 2) Try Yourself
- 3) When she has not responded to your message for quite some time and you want to draw her attention.
- 4) Try Yourself
- 5) One way is to select the transcript and copy it to a file in your favourite word processor.

### Check Your Progress 3

- 1) Try Yourself
- 2) The mail command has a rudimentary, hard to use interface. It does not have the features one would expect to have in a good e-mail client.
- 3) It allows one to organise one's mail better. Related messages can be stored in different folders rather than all messages being in one folder with hundreds of messages. This makes it easier to look for a message.
- 4) This saves us from the trouble of having to remember a large number of e-mail addresses. One can save the contact details of a person and then just use a short name or his nickname to send mail to him.

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## 4.8 FURTHER READINGS

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There are a host of resources available for further reading on the subject of Red Hat Linux version 9.0.

1. <http://www.redhat.com/docs/manuals/linux>
2. <http://www.linux.org> gives among other information, a list of good books on Red Hat Linux.
3. Consider joining a good linux mailing list.

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# UNIT 5 UNIX SYSTEM ADMINISTRATION

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## 5.0 INTRODUCTION

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In the previous units you have been introduced to Linux and have got an idea of its features and the facilities available in it. In this unit we will look at how to administer a Linux system and take care of it so that you can make use of its power. This would mean being able to install Linux on a machine and configuring and setting it up so that you could start working on it. It also requires maintaining the machine subsequently, such as by adding user accounts and keeping your data safe by backing it up.

The activities described in this unit are mostly performed as the superuser. So you have to be very careful and understand the commands you issue thoroughly, because Linux does not conduct many checks on what the superuser asks it to do. As an ordinary user you could not modify a file if you did not have permission, but the superuser can change any file irrespective of its permission settings. This might seem like a convenience, and it is indeed so. But it also means that you have the potential to cause severe damage to the installation through one mistakenly issued command.

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## 5.1 OBJECTIVES

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After completing this unit, you should be able to have an understanding of basic system administration tasks and be able to perform basic installation, configuration and maintenance of a Linux system. Some of the abilities you should have acquired are:

- understand what is meant by system administration;
- understand the responsibilities of the system administrator;