Chapter 22
Simple Mail Transfer Protocol: Email

Overview

Modern email grew out of a number of older protocols that were often vendor specific. While many early network OS were able to send short messages, almost none were designed to interoperate with all of the products from the same vendor[1], let alone between different vendors. By far, the most successful solution to this problem is SMTP, or email, and its later enhancements. However, email administrators and spammers are involved in a constantly escalating battle over the delivery of unwanted electronic mail.

In reality, email consists of two different types of protocols: server–to–server protocols and client/server protocols. The electronic mail service between servers, or server–to–server email, is SMTP. Servers exchange email based mainly upon the domain with little regard to the user names involved. Early on it was common for a single email to traverse many, many servers before it reached its destination. As connectivity between domains on the Internet has improved, it is more and more common for an email to be transferred directly from the source server to the destination without the need for intermediary servers.

The email protocols that most users are familiar with are the second type or client/server protocols such as Outlook or webmail. These protocols are tasked with transferring email between a user to the server. This is true even if the client, such as webmail, is running on the same physical device as the SMTP service.

This chapter will cover configuring an email server and email client support to run on the Pi. Email clients will be discussed only briefly.

[1] For example, early messaging on the Burroughs line of products did not interoperate well between BTOS and the various operating system versions of the Master Control Program (MCP). Burroughs used the term MCP long before TRON was ever thought of. MCP goes back to the early Burroughs mainframes and was first written around 1961. Surely there were some attempts to produce specialty products to interact, but the author is not familiar with these.

G. Howser, *Computer Networks and the Internet*,
https://doi.org/10.1007/978-3-030-34496-2_22

22.1 Early Attempts at Email

Email evolved from early messaging applications built into UNIX and mainframe operating systems that supported time–sharing terminals[2]. It was an obvious extension of these applications to create a method to send longer messages between devices on a network.

Before a working electronic method of email was developed, users struggled with solutions such as "sneaker net". The information was copied to a floppy disk[3] and then handed to the intended recipient. If it was not possible to walk the disk to the recipient, it might need to be sent via normal mail. Obviously this is very inefficient.

22.1.1 File Sharing as a Work–around

One of the early attempts to work around the lack of an application to send the equivalent of an office memo between devices was to use network file sharing applications. A user would create a memo as a file and then share that file with the recipient user. This worked well as long as everyone in the organization could share files and used the same office applications which was not always the case. The need for a standard method of creating files and moving those files between networks in a standard format was obvious.

Another inventive solution was used for a number of years at Lincoln University in Jefferson City, Missouri. The administration building was networked together using proprietary hardware that ran BTOS to allow file sharing. Each administrative assistant had a microcomputer running BTOS and a high quality printer that used a daisy wheel to produce typed pages. The network allowed for the sharing of resources on the central file server, each microcomputer, and all printers[4].

Users are very inventive. Before very many users were given microcomputers, the users discovered that when they printed a document they were presented a choice of *all* the printers on the network and the computer to which each printer was attached. This meant that a user could produce a document and send it to another user by printing the document on the recipient's printer. A memo could be sent to 20 people by issuing print commands for 20 printers.

This was so effective that it was difficult to convince these users to start using email for inter–office communications when it became available a few years later.

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[2] These applications were much like Twitter in that the messages were typically limited to a small number of characters.

[3] Even floppy disks created a minor problem due to the number of sizes and formats. It was difficult to explain to a user that a soft–sector 5.25 diskette was not compatible with a 5.25 hard sector diskette drive. Explaining the difference today would be a good student research question.

[4] Printers were shared so that a user could still print important documents if their local printer was out of service.