Course: IT224
Topic: Mail Servers (Postfix)

OVERVIEWS, INSTALLATION AND SETUP

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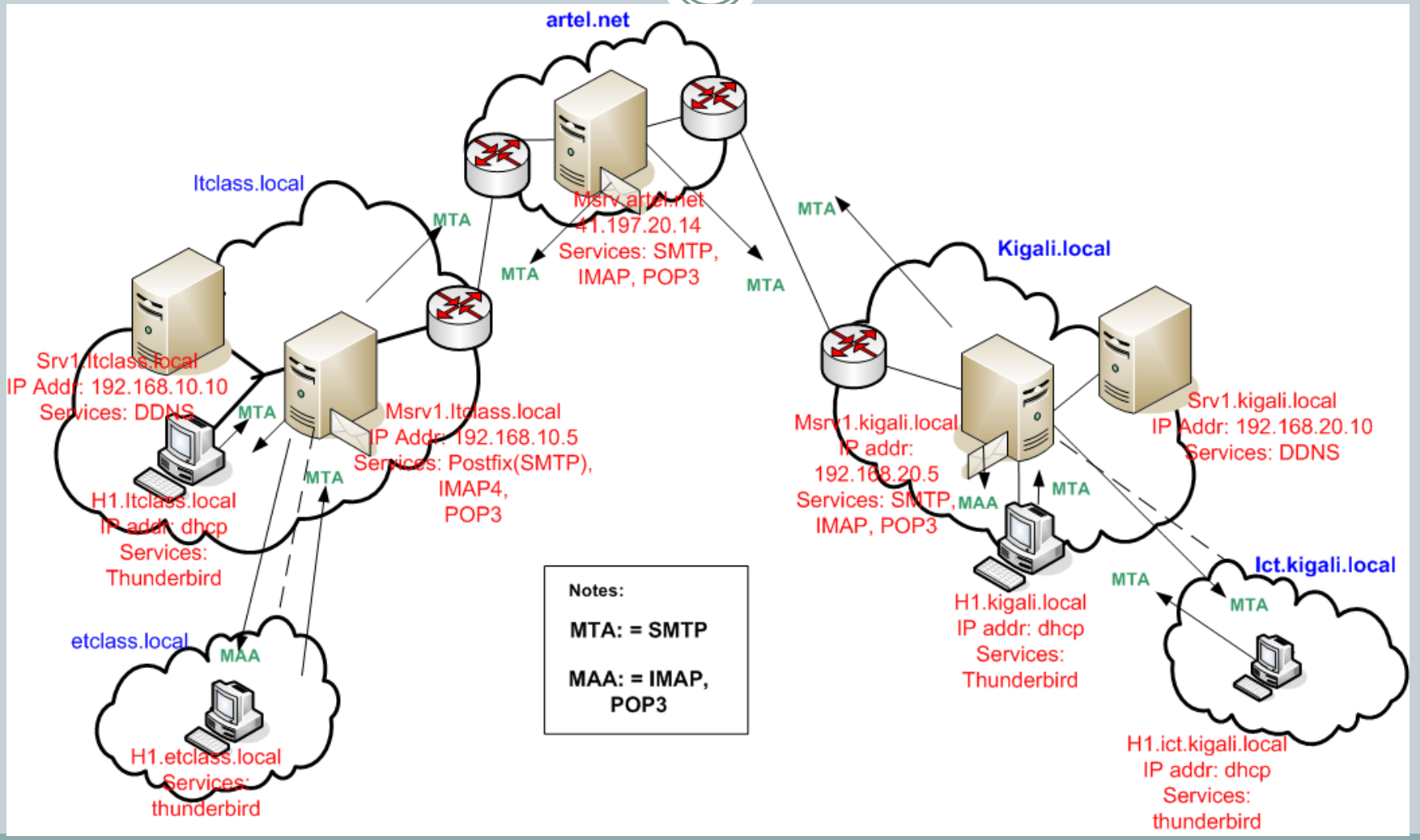
Context Definitions

- Mail server (daemon) – In Linux a daemon is a program that continually runs in the background but not under the direct control of any user and which is normally started at boot time. It usually forks up many child processes which it uses to provide certain service usually in a client-server arrangements, by listening at particular communication port for service requests in order to respond to clients. A mail server (also know as MTA, or Mail router or internet mailer) is a daemon which can receive incoming mail messages from local users (from same domain as the server) and remote senders and forward outgoing e-mail for delivery. Sometimes people also refer to a computer host dedicated to running a mail server, as the Mail Server itself. Most common examples of mail servers are (sendmail, Microsoft exchange , postfix, and exim).
- Mail Clients – Mail clients are computer applications which is used by a mail user to access and interact with the mail server. The user is able to use it to download messages from the server, to compose new email message, to send a message, to read email message, to create contact list, address book, calendar etc.
  - Computer-based Mail client applications – This kind of email-clients are installed on a personal computer. And cannot be accessed from another machine except the one in which it is `installed and for the user account to which it belongs.``````````````````````````````
  - Web-based Mail Client Application – This type of email-client is usually accessible from the web. It is a web based application. It has the advantage that the user is able to move to any other geographical position and still be able to access his email page as long as the user have internet access
- Mail User – this the human being usually associated with a user ID, which has the capability to originate mail messages and contents, user ID can be for unique person or for a group
- Mail Account – An email Account is an internet messaging system object which is used to associate a user or group of users to the email system, in a way as to enable them send mail , receive mail, store email messages and interact with the system in any other way as permitted by the level of rights attributed to the account.

Context Definitions

- Host Machine – Host here is associated to Internet service. Any machine running O/S in a way that it is capable of receiving and processing and sending IP messages is said to be IP host.
- Server Machine - This is the computer hardware and O/S upon which the email server application runs.
- Mail Domain – This is a group of computers in the same which are managed under one common set of policies – In this case such policies include email messaging system. They are associated to the same set of mail stores, email servers, data bases.
- MTA – Mail Transfer Agent: An MTA is a protocol which provides the functionality and format for the transferring (sending) email messages either from a email-Server to email-server or from an email-client to email-server
- MAA – Mail User Agent: This is a protocol which provides the functionality, format and pattern for email clients to be able to download email messages from the mail stores of the email server.
- MSA – Mail Submission Agent: This is a sub protocol of the MTA which is required for the section of functionality needed to submit mails to the Mail server's message store.
- MUA – Mail Access Agent: A mail user Agent is an application which runs in a computer host, with which a mail user is able to compose or read mail messages.

Internet Messaging System

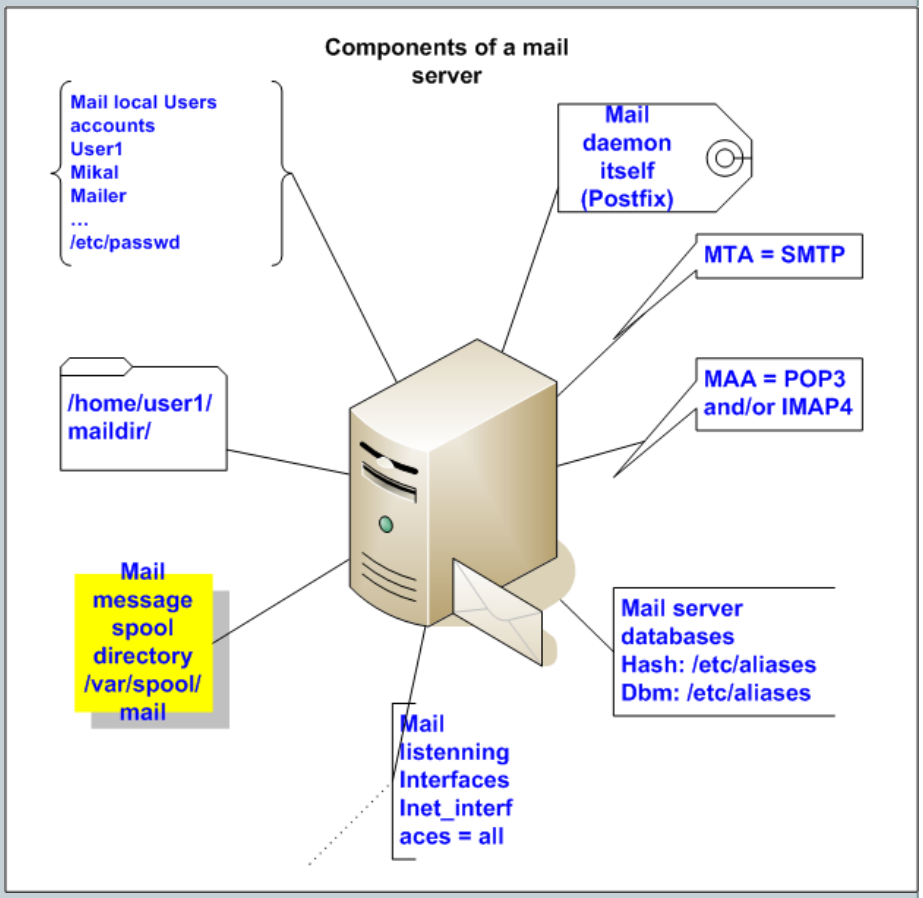


Explaining the email system

- In the simple configuration, an email system will consist of a mail server and two users communicating each other using two client machines in the same domain.
- A little more serious configuration beyond hosts in same domain involves communication, between hosts in separated domains. here we may have a user in a client machine in a domain – itclass.local – linked to an ISP artel.net, communicating another client host1.kigali.site in another domain kigali.site with some distance or ISP artel.net is between them
- A more complex configuration involves a host in a local domain that has a mail server, which is connected via a proxy to the ISP, and another host in a remote domain.
- A typical of what may occur between communicating ends in a relatively serious configuration of an email system can be explained using the scenario of the previous slide.
- This mail system consist of two separate domains *itclass.local* and *kigali.site* (each having mail servers *msrv1.itclass.local* and *msrv1.kigali.local* with virtual domains linked to the mail servers), with the client computers *h1.itclass.local* and *h1.kigali.local* in each domain. The two domains are separated by an ISP which also runs a public email server msrv1.artel.net.
- In domain itclass.local a mail user account **User1** is created with the address of ***user1@itclass.local*** and in domain kigali.local a mail user account **User2** is created with the address ***user2@kigali.local***

Explaining the e-mail system
(Inside A Mail Server)

- An email server has already been defined. But inside it what components can be found?
- Inside an OS (linux) dedicated for email service, components to find are:
- A mail server daemon **(postfix)**, including all its configuration files
- A mail system database **(hash: /etc/aliases; dbm: /etc/aliases)**
- Email service protocols **(MTAs (SMTP); MAAs(POP3, IMAP4)**
- Mail store for each local user, or the user's mail directory in user's home **(maildir/)**
- Mail spool directory **(/var/spool/mail/)**
- Interfaces of listening and receiving mail messages **(inet_interface)**
- Mail servers' local users account **(/etc/passwd)**



Explaining the email system
(Email Client)

- An email client is also often referred to as Mail User Agent (MUA). Examples of MUA include MozillaThunderbird, MS-Outlook Express, Sendmail etc
- For this course we shall use thunderbird.
- MUA gives the user the interface to use in interacting with the mail server (email system) from the client end. There are Web based email clients which can be used from any location, not dependent on any particular host machine. But there are computer based clients which are usually installed in a particular machine. A user must have logged into the particular host machine locally for him to be able to make use of the email-client.
- MUA allows the user to compose mail, read mail, create an email account, administer his/her own part of the mailbox store etc.

Explaining the email system

- The mail server works in conjunction with other programs to make up the messaging system. A messaging system includes all the applications necessary to keep e-mail moving as it should.
- If for instance in our scenario user1 wants to send mail to user2, he open his mail client application and composes a mail, and sends it. That mail carries the information's including the source and destination addresses user1@itclass.local and user2@kigali.local respectively
- the packet/frame carrying the mail is handled by the TCP/IP protocols, with the destination address as user1@kigali.local this pattern is recognized and sent to the mail server for the domain.
- Based on the email address of the sender and receiver the mail server checks its lookup table (database) – hash: /etc/aliases.
- It checks whether the sender is a local user, if this is the case then by rule it has to send the mail towards its destination whether it recognized the receiver or not.
- It then checks whether the receiver is in the database if it is there then it can forward the message to the receiver as a rule even if it did not recognize the sender.
- However if for any message the mail server receives it neither recognized the sender nor the receiver from its database, it discards it.
- If a mail meant for a user in another domain is not discarded, the mail server then looks at the domain name appended to the email address and uses it to query a DNS about the IP address of the mail server for the domain represented in the email address. Once it has obtained the IP address then it can route the packet in the direction of the remote domain.
- For a mail to be sent from the email client to the mail server , it is the MTA (SMTP) protocol that is used. Also for a mail to be transferred from one mail server to another mail server, it is the MTA protocol that is used.
- If the mail message eventually reaches the destination domain the @ sign in the address , indicates to the DNS server in that domain that the packet is a mail message type so it forwards it to to mail server for the domain. If there are many mail servers in the domain then it makes use of the priorities set on the mail servers at the DNS zone files to know which server to forward message to.
- If a mail server receives a message meant for a user in its local domain, it recognizes it which It checks at its database (/etc/aliases). This user must have a home in the mail server which contains mail directory (maildir/) as the user's mailbox store.

Explaining the email system

- The mail server then forwards the message to the user's maildir/ for storage.
- When the user wants to check mail, using his MUA, he clicks on get mail, if it has an active connection to the mail server, the MAA, will be set into action. The email system uses the MAA protocol to download messages from the mailbox store to the user's client machine.
- POP3 is different from IMAP4 in that while once a user downloads a mail from the mail server using POP3, the message is deleted from the mailbox store, IMAP4 still retains the message at the mail server mailbox store until the user personally deletes the message.
- Sometimes when a mail message arrives at the mail server and it is not matching any line in the databases (lookup table), and so its not recognized for both the sender and the receiver, the mail server "bounces" it. There is a setting usually made in the configuration file called "soft_bounce" which determines how the mail server will bounce an unrecognized mail message.

Setting Up a mail server

- The steps to setting up a mail server are
  - Install the necessary packages
    - Postfix
    - Courier-authlib
    - Courier-imap
    - Fam-server
  - Configure Postfix
  - Configure POP3, IMAP4 and SSL (openssl commands) to enable certificates for the email system.
  - Install the email client
    - MozillaThunderbird
  - Configure the email client for user account.

Installing Postfix

- Ensure that you have the right repository settings
- You can use
  - Zypper in –y postfix command
  - Or use yast2 graphical installer
- Use the commands
  - Zypper se postfix to ensure that the package has been installed
  - Or click the installed tab in yast2 graphical installer and search for the postfix package.
- You can use the same steps for other packages for POP3, Imap4, fam-server, mentioned earlier.

Configuring postfix

- The main configuration file for postfix is found at the path /etc/postfix/main.cf
- To access it type
  - Vi /etc/postfix/main.cf
- The default file has very many options which a grouped into sections.
- Not all the sections and option are necessary to modify
- Modification objectives for this file will be necessary in some sections only to answer the following questions

Postfix configurations

- What domain name to use in outbound mail?
  - /etc/postfix/main.cf
    myorigin = $mydomain
- What domains to receive mail for
  - /etc/postfix/main.cf
    mydestination = $myhostname localhost.$mydomain localhost $mydomain
- What clients to relay mail from
  - /etc/postfix/main.cf
    mynetwork_style = subnet
    mynetworks = 127.0.0.0/28 192.168.10.0/24
- What destinations to relay mails to
  - /etc/postfix/main.cf
    relay_domain = $mydestinations
- What delivery method: direct or indirect
  - /etc/postfix/main.cf
    relay_host = $mydomain
    relay_host = [mail.artel.net]
- What trouble to report to postmaster
  - /etc/postfix/main.cf
    notify classes = resource, software
  - /etc/aliases
    postmaster: user
    root: user

Postfix configurations cont'd

- Proxy/NAT external network addresses
  - /etc/postfix/main.cf
    proxy_interfaces = a.b.c.d {this is not used in normal domain wide standalone mail server}
- My own host name
  - /etc/postfix/main.cf
    myhostname = FQDN
- My own domain name
  - /etc/postfix/main.cf
    mydomain = itclass.local
- My own Network Interfaces
  - /etc/postfix/main.cf
  - Example: default setting.
  - /etc/postfix/main.cf:
  - inet_interfaces = all
  - Example: host running one or more virtual mailers. For each Postfix instance, specify only one of the following.
  - /etc/postfix/main.cf:
  - inet_interfaces = virtual.host.tld (virtual Postfix)
  - inet_interfaces = $myhostname localhost... (non-virtual Postfix)

Sections of the /etc/postfix/main.cf

- SOFT BOUNCE
- LOCAL PATHNAME INFORMATION
- QUEUE AND PROCESS OWNERSHIP
- INTERNET HOST AND DOMAIN NAMES
  - Myhostname = mysv.kigali.local
  - Mydomain = kigali.local
- SENDING MAIL
  - Myorigin = $mydomain
- RECEIVING MAIL
  - Inet_interfaces = all
  - Mydestination = $myhostname localhost.$mydomain localhost $mydomain
- REJECTING MAIL FOR UNKNOWN LOCAL USERS
  - Unknown_local_recipient_reject_code = 550
- TRUST AND RELAY CONTROL
  - Mynetwork_style = subnet
  - Mynetworks = 192.168.15.0/24 127.0.0.0/8
  - Relay_domains = $mydestination
- INTERNET OR INTRANET
  - Relayhost = $mydomain

For the basic configuration of postfix , not all the sections options are necessary to modify, the options to modify are the only ones we have included values

Sections of the /etc/postfix/main.cf

- REJECTING UNKNOWN RELAY USERS
- INPUT RATE CONTROL
  - In_flow_delay = 1s
- ADDRESS REWRITING
- ADDRESS REDIRECTION (virtual domain)
- “User has moved” Bounce messages
- TRANSPORT MAP
- ALIAS DATABASE
  - alias_maps = hash: /etc/aliases
  - Alias_database = hash: /etc/aliases
- DELIVERY TO MAILBOX
  - Home_mailbox = maildir/
  - Mail_spool_directory = /var/spool/mail
- JUNK MAIL CONTROLs
- FAST ERTN SERVICE
- PARALLEL DELIVERY TO SAME DESTINATION
- DEBUGGING CONTROL
- INSTALL-TIME CONFIGURATIONS INFORMATION