

Lesson Module Status

- Slides
- Whiteboard with 1st minute quiz

- Flashcards
- Web Calendar summary
- Web book pages
- Commands
- Howtos

- Samba lab tested
- Lab template in depot

- Backup slides, Confer links, handouts on flash drive
- 9V backup battery for microphone

Course history and credits

Jim Griffin



- Jim created the original version of this course
- Jim's site: <http://cabrillo.edu/~jgriffin/>

Rick Graziani



- Thanks to Rick Graziani for the use of some of his great network slides
- Rick's site: <http://cabrillo.edu/~rgraziani/>



Instructor: **Rich Simms**

Dial-in: **888-450-4821**

Passcode: **761867**



Solomon



Sean C.



Chris



Corey



Bryan



Sean F.



Tony



David



Donna



Dave



Evan



Gabriel



Elia



Tajvia



Carlos



Adam



Ben



Laura

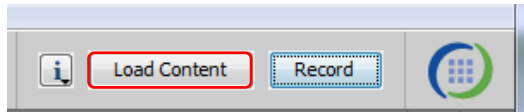


VMs for tonight

Elrond, Frodo

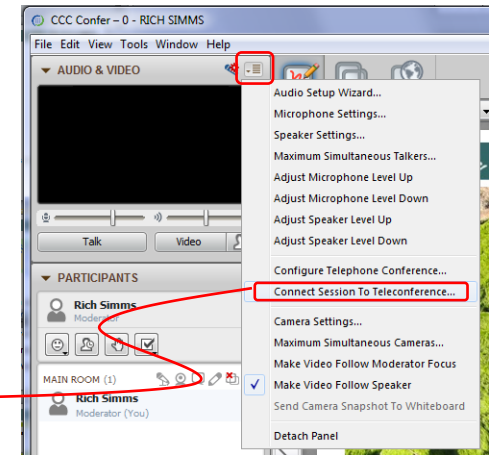
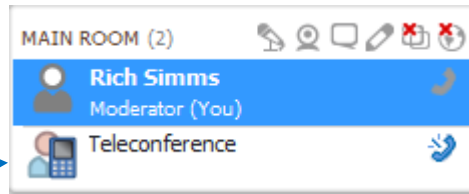


[] Preload White Board with *cis*lesson??*-WB*



[] Connect session to Teleconference

Session now connected to teleconference



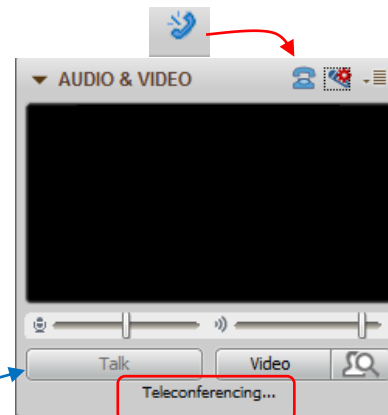
[] Is recording on?



Red dot means recording

[] Use teleconferencing, not mic

Should be greyed out





- [] Video (webcam) optional
- [] layout and share apps

The screenshot displays a Windows desktop environment with several applications open:

- CCC Confer**: A teleconference window on the left side of the screen.
- Chrome**: A web browser window displaying a document from `simms-teach.com/docs/cis90/cis-90-TEST-1-Fall-12.pdf`. The document contains flashcard questions:
 - Part 1 - Flashcards questions (1 point each)
 - [Q1] What command shows the other users logged in to the computer?
 - [A1] _____
 - [Q2] What environment variable is used by the shell to determine which directories to search when locating a command?
 - [A2] _____
- Putty**: A terminal window showing a shell session:

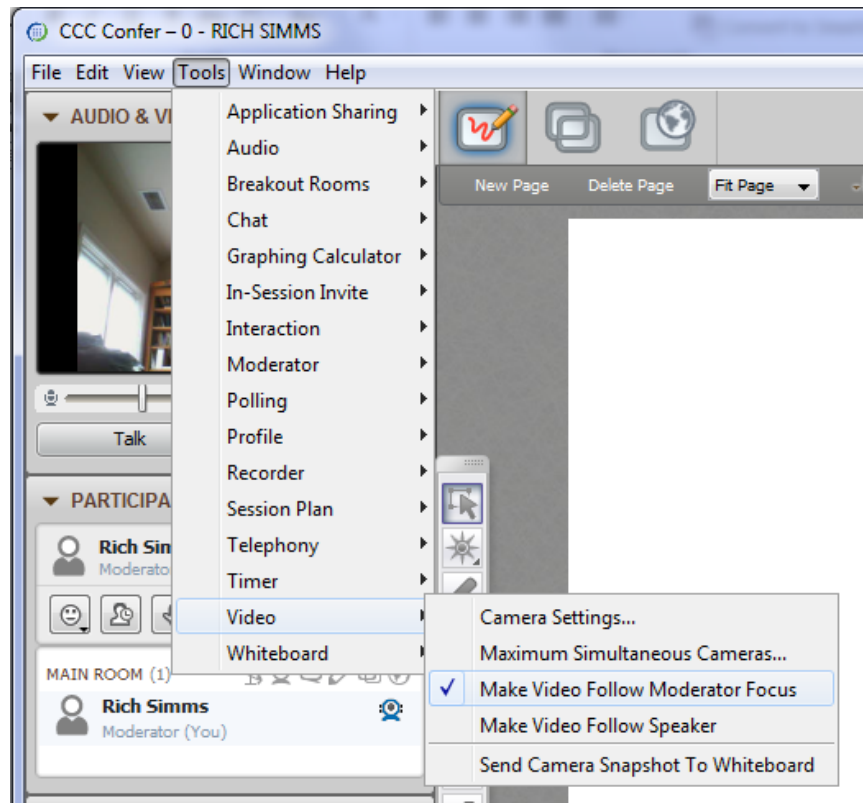
```
simben90@oslab:~$  
login as: simben90  
simben90@oslab.cabrillo.edu's password:  
Access denied  
simben90@oslab.cabrillo.edu's password:  
Last login: Mon Oct 8 18:58:43 2012 from  
d.com  
~  
~  
~  
Welcome to OpenSSH  
Server: Cabrillo College  
Copyright (c) 2009 by the OpenSSH Project  
Portions Copyright (c) 1999 by SSH Communications Security Oy  
SSH Communications Security Oy  
All rights reserved.  
Terminal type? [xterm]  
Terminal type is xterm.  
/home/cis90/simben $
```
- vSphere Client**: A window showing the vCenter interface for a virtual machine named `CIS 192`.
- File Explorer**: A window showing a directory structure with folders like `boot`, `bin`, `etc`, and `sbin`.

Red callout boxes with arrows point to the following elements:

- foxit for slides**: Points to the PDF document in the Chrome browser.
- chrome**: Points to the Chrome browser window.
- putty**: Points to the terminal window.
- vSphere Client**: Points to the vSphere Client window.



- [] Video (webcam) optional
- [] Follow moderator
- [] Double-click on postage stamps



Universal Fix for CCC Confer:

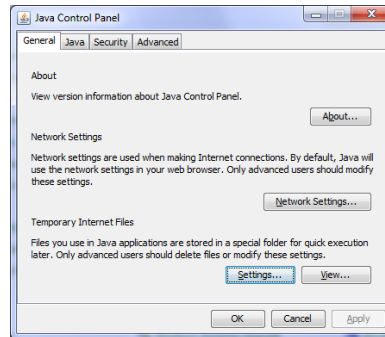
- 1) Shrink (500 MB) and delete Java cache
- 2) Uninstall and reinstall latest Java runtime



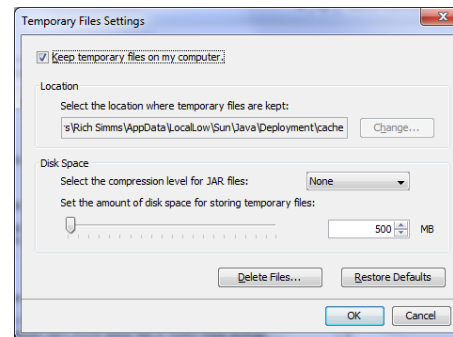
Control Panel (small icons)



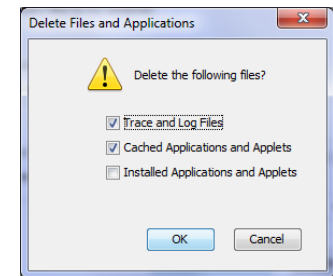
General Tab > Settings...



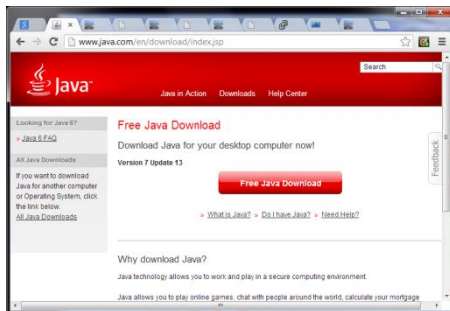
500MB cache size



Delete these



Google Java download



First Minute Quiz

Please answer these questions **in the order** shown:

Use CCC Confer White Board

**For credit email answers to:
risimms@cabrillo.edu
within the first few minutes of class**



email

Objectives

- Configure POP and IMAP services to allow a remote client to access e-mail on a Linux mail server

Agenda

- Quiz
- Questions on previous material
- Housekeeping
- Email overview
- Mail User Agent
- Email message
- Mail Transport/Submission Agents
- sendmail
- Delivery Agent
- Access Agent
- POP commands
- IMAP commands
- VM screen size
- MUA configuration
- Setting up DNS and Sendmail activity
- Lab 9
- Wrap

Questions on previous material



Questions

Lesson material?

Labs?

How this course works?

Chinese
Proverb

他問一個問題，五分鐘是個傻子，他不問一個問題仍然是一個傻瓜永遠。

He who asks a question is a fool for five minutes; he who does not ask a question remains a fool forever.

Housekeeping



- Lab 8 due tonight
- Five posts due tonight



Remaining point earning opportunities

Work	Points
Quizzes Q9 & Q10	6
Test T3	30
Forum F3 & F4	40
Labs L8, L9, L10	90
Final	60
Extra Credit	up to 90

Extra Credit

- Note you can earn up to 90 points of extra credit (labs, typos, HowTos, etc.)
- 3 extra credit labs
- HowTos
 - Up to 20 points extra credit for a publishable HowTo document (will be published on the class website)
 - 10 points additional if you do a class presentation
 - Topics must be pre-approved with instructor

Final Exam

- Timed test
- Open book, notes and computer
- You will be provided with a pristine exam pod
- There will be a number of tasks to implement
 - Some mandatory
 - Some optional
 - Some extra credit
 - Task specifications available one week in advance
- 60 points - the more tasks completed, the more points earned

--	6/4	<p>Final Exam for CIS 192</p> <p>Time</p> <ul style="list-style-type: none"> • 5:30PM - 8:20PM in Room 2501 <p>Materials</p> <ul style="list-style-type: none"> • Presentation slides (download) • Test (download) 	<p><u>5 posts</u></p> <p>Extra Credit Labs</p>
----	-----	--	--

- Preparing for the final exam
 - Know where to locate information quickly
 - Make a network map & crib sheet
 - "Muscle memory" for basic commands
 - Practice makes perfect



Help with labs



Like some help with labs?

I'm in the CIS Lab Monday afternoons

- See schedule at <http://webhawks.org/~cislabs/>

or see me during office hours

or contact me to arrange another time online

Warmup

Warmup - Partial Lab 9 Prep

**Select Elrond in your pod and configure as shown
(this can be as you have configured it for Lab 8)**



```
# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE="eth0"
BOOTPROTO="static"
NM_CONTROLLED="no"
ONBOOT="yes"
TYPE="Ethernet"
IPADDR=172.20.192.xxx
NETMASK=255.255.0.0
```

```
# cat /etc/sysconfig/network
NETWORKING=yes
HOSTNAME=pxx-elrond.cis192pods.cislab.net
GATEWAY=172.20.0.1
```

```
# cat /etc/resolv.conf
search cislab.net
nameserver 172.30.5.8
```

Warmup - Partial Lab 9 Prep

Rather than use the graphical VLab interface you can now switch to SSH with your favorite terminal



The screenshot shows the vCenter vSphere Client interface. The left pane displays a tree view of virtual machines, including 'p32-elrond'. The main console window shows the following output:

```

CentOS release 6.3 (Final)
Kernel 2.6.32-279.el6.x86_64 on an x86_64

p32-elrond login: cis192
Password:
Last login: Tue Apr 30 09:06:35 from oslab.cabrillo.edu
[cis192@p32-elrond ~]$ sudo -i
[sudo] password for cis192:
[root@p32-elrond ~]# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:50:56:BD:95:BF
          inet addr:172.20.192.224  Bcast:172.20.255.255  Mask:255.255.0.0

root@p32-elrond:~

```

Below the terminal window, a separate terminal window shows an SSH session:

```

root@p32-elrond:~
login as: rsimms
rsimms@oslab.cabrillo.edu's password:
Last login: Wed May  8 07:53:33 2013 from 50-0-68-177.dsl.dynamic.sonic.net

('v')
//--\
(\=_/ )
~~  ~~

Welcome to Opus
Serving Cabrillo College

[rsimms@oslab ~]$ ssh cis192@172.20.192.224
cis192@172.20.192.224's password:
Last login: Wed May  8 07:41:58 2013
[cis192@p32-elrond ~]$ sudo -i
[sudo] password for cis192:
[root@p32-elrond ~]#

```

Warmup - Partial Lab 9 Prep

Add an account for yourself

```
[root@p32-elrond ~]# useradd -c "Benji Simms" simben192  
[root@p32-elrond ~]# passwd simben192
```

Please use your own name and username



Warmup - Partial Lab 9 Prep



Install sendmail, the configuration file utilities and Unix mail

```
[root@p32-elrond ~]# yum install sendmail sendmail-cf mailx  
[root@p32-elrond ~]#
```


Warmup - Partial Lab 9 Prep

Configure sendmail macro to listen to other hosts

```
[root@p32-elrond ~]# vim /etc/mail/sendmail.mc
[root@p32-elrond ~]#
```

```
root@p32-elrond:~
dnl #
dnl # The following causes sendmail to only listen on the IPv4 loopback address
dnl # 127.0.0.1 and not on any other network devices. Remove the loopback
dnl # address restriction to accept email from the internet or intranet.
dnl #
dnl DAEMON_OPTIONS(`Port=smtp,Addr=127.0.0.1, Name=MTA')dnl
dnl #
dnl # The following causes sendmail to additionally listen to port 587 for
dnl # mail from MUAs that authenticate. Roaming users who can't reach their
dnl # preferred sendmail daemon due to port 25 being blocked or redirected find
dnl # this useful.
dnl #
-- INSERT --
116,1 67%
```

Comment out line 116 in /etc/mail/sendmail.mc by inserting "dnl" to the beginning then save file

```
root@p32-elrond:~
dnl #
dnl # The following causes sendmail to only listen on the IPv4 loopback address
dnl # 127.0.0.1 and not on any other network devices. Remove the loopback
dnl # address restriction to accept email from the internet or intranet.
dnl #
dnl dnl DAEMON_OPTIONS(`Port=smtp,Addr=127.0.0.1, Name=MTA')dnl
dnl #
dnl # The following causes sendmail to additionally listen to port 587 for
dnl # mail from MUAs that authenticate. Roaming users who can't reach their
dnl # preferred sendmail daemon due to port 25 being blocked or redirected find
dnl # this useful.
dnl #
-- INSERT --
116,1 67%
```



Warmup - Partial Lab 9 Prep



Build the sendmail configuration file

```
[root@p32-elrond ~]# /etc/mail/make
[root@p32-elrond ~]#
```

Warmup - Partial Lab 9 Prep

Open SMTP port 25 in the firewall

```
[root@p32-elrond ~]# vim /etc/sysconfig/iptables
```

```
# Generated by iptables-save v1.4.7 on Mon Apr 29 09:17:51 2013
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [6:360]
:OUTPUT ACCEPT [266:34887]
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p icmp -j ACCEPT
-A INPUT -i lo -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 445 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 139 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 138 -j ACCEPT
-A INPUT -p udp -m state --state NEW -m udp --dport 137 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 901 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 25 -j ACCEPT
-A INPUT -j REJECT --reject-with icmp-host-prohibited
COMMIT
# Completed on Mon Apr 29 09:17:51 2013
# Generated by iptables-save v1.4.7 on Mon Apr 29 09:17:51 2013
*nat
:PREROUTING ACCEPT [3097:512470]
:POSTROUTING ACCEPT [451:42204]
:OUTPUT ACCEPT [1703:143408]
-A POSTROUTING -o eth0 -j MASQUERADE
COMMIT
# Completed on Mon Apr 29 09:17:51 2013
```

```
[root@p32-elrond ~]# service iptables restart
```



Warmup - Partial Lab 9 Prep



Start service (permanently)

```
[root@p32-elrond ~]# service sendmail start  
[root@p32-elrond ~]# service sendmail status  
[root@p32-elrond ~]# chkconfig sendmail on
```



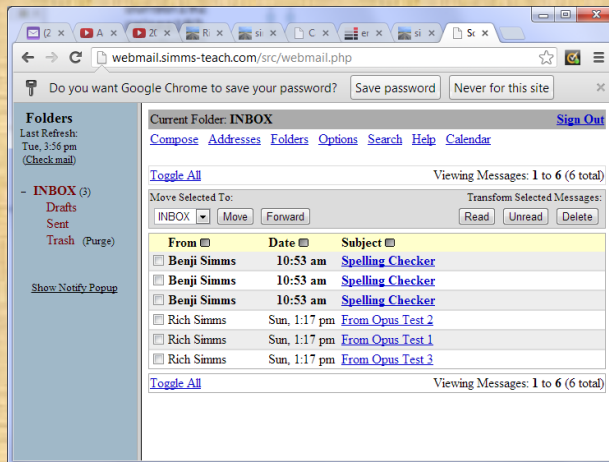
emails accounts for testing

```
[simben192@oslab ~]$ send-lab09-emails
```

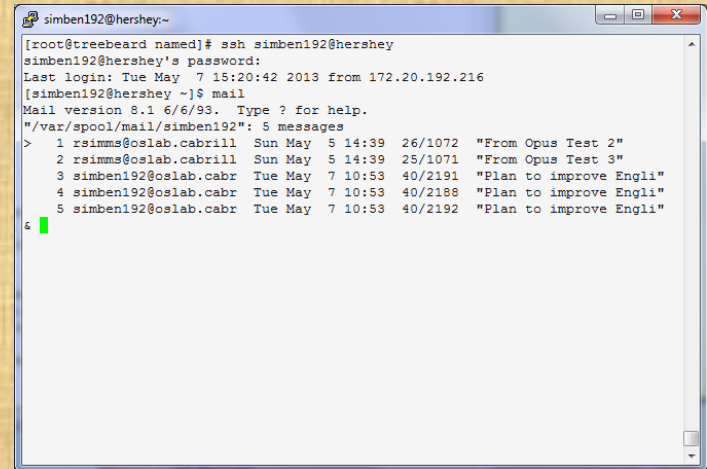
Mailing simben192@hershey.cislab.net the file, MarkTwain (Plan to improve English spelling)

Mailing simben192@simms-teach.com the file, spellk (Spelling Checker)

webmail.simms-teach.com



hershey.cislab.net



Username

simben192
milhom192
rodduk192
bunsol192
calsea192
capchr192
doucor192
drybry192
farsha192
garton192
hovdav192
irvdon192
musdav192
noreva192
pangab192
veleli192
wiltaj192
vascar192
rysada192
lyoben192
srelau192

*Send some sample emails then
read them on Hershey and
simms-teach.com*

email overview

Overview of email

This lecture is about configuring electronic mail, one of the most widely used internet programs in existence.

Electronic mail consists of many parts, from user interfaces to transfer protocols, and can be configured in numerous ways to make sending and receiving email transparent to users.

Based on Jim Griffin's Lesson #13 on Configuring Email at:
<http://cabrillo.edu/~jgriffin/CIS192/files/lesson13.html>

Overview of email

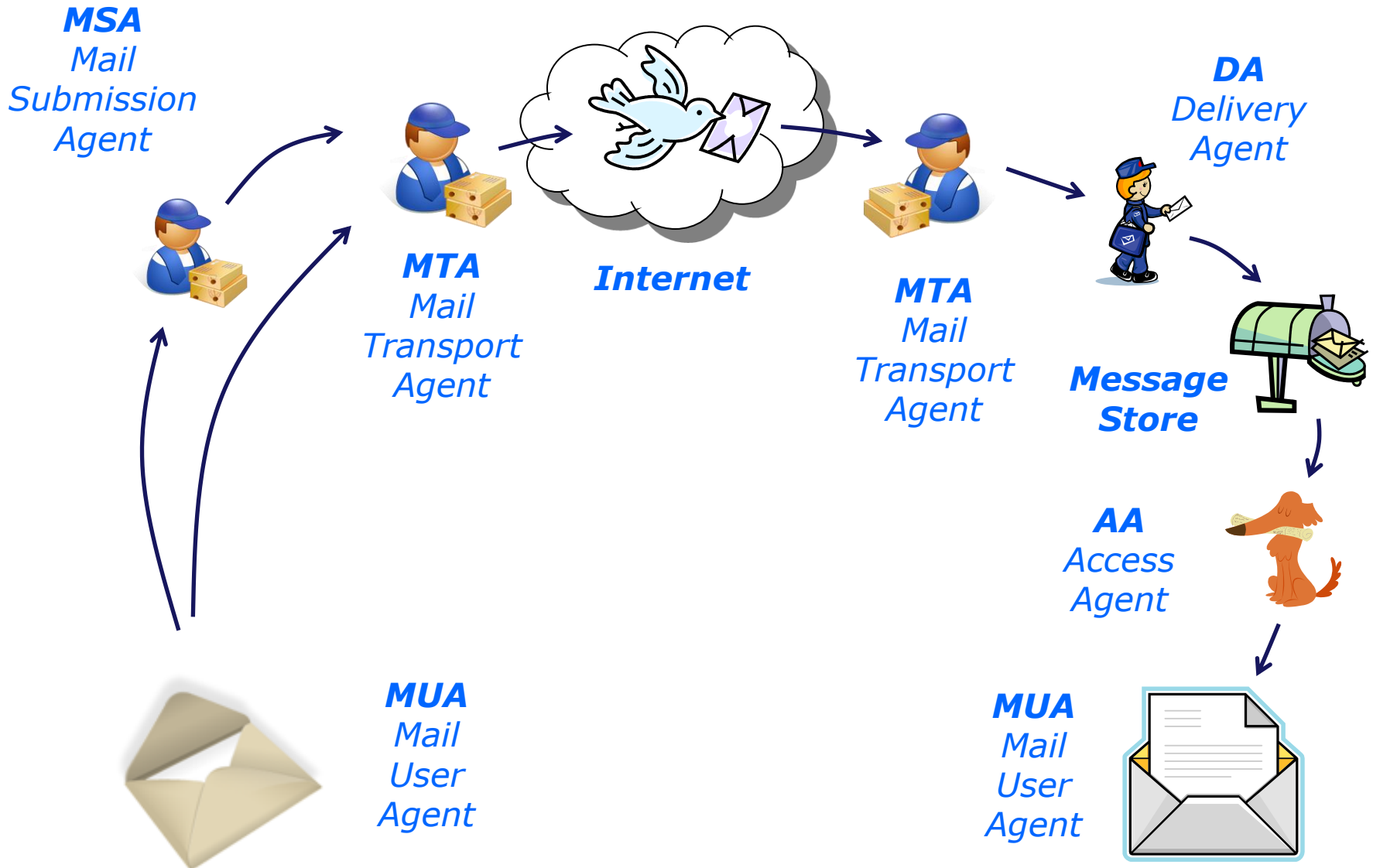


Yes, this is kinda how it works!

compose and send message

open and read message 33

Overview of email

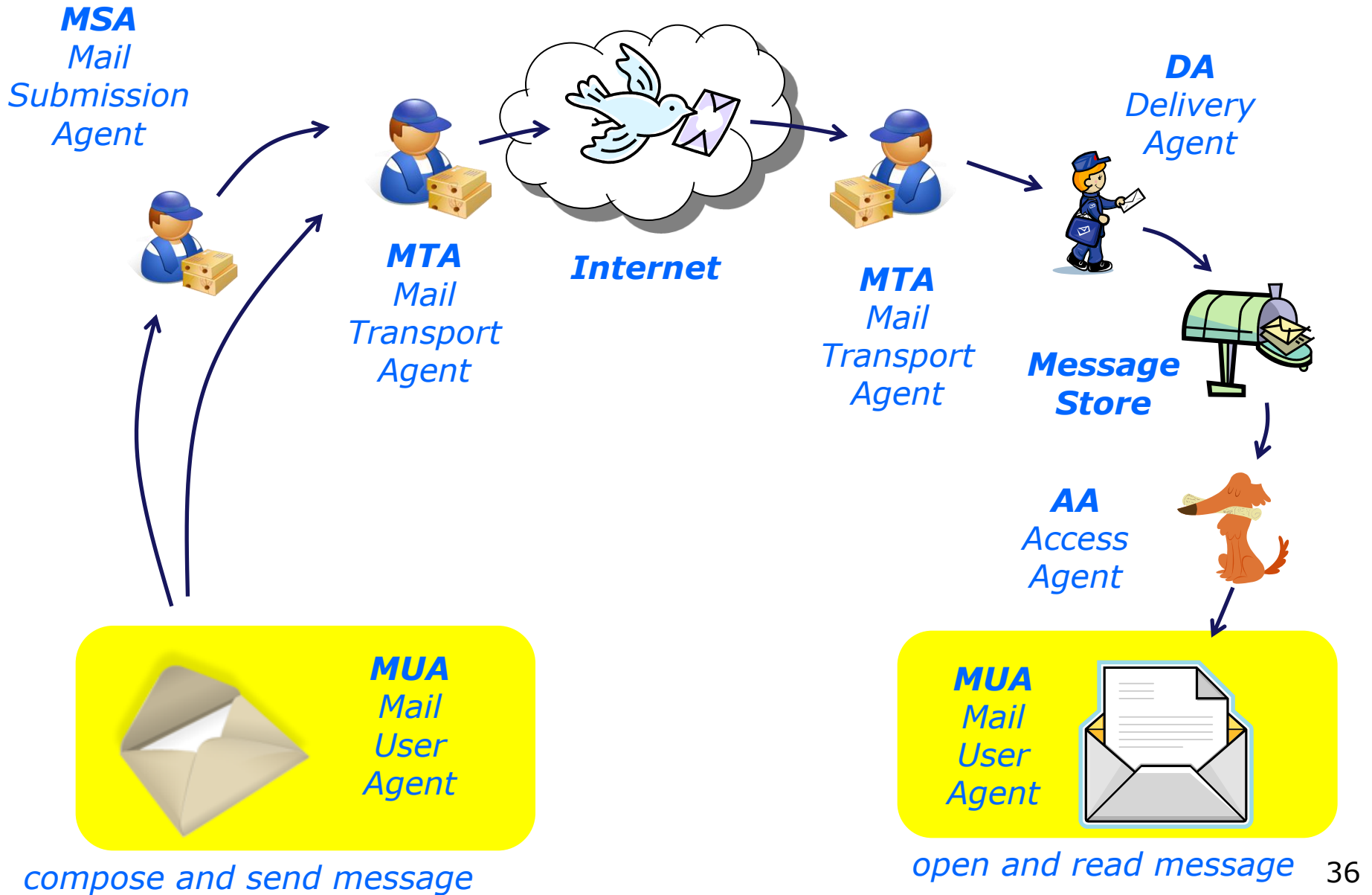


compose and send message

open and read message 34

MUA

Overview of email



compose and send message

open and read message 36

Mail User Agent (MUA)

The Mail User Agent (MUA)

Clients that users use to create and read their mail messages. The more popular MUAs support the Multipurpose Internet Mail Extension (MIME) format for attaching files to messages.

Examples:

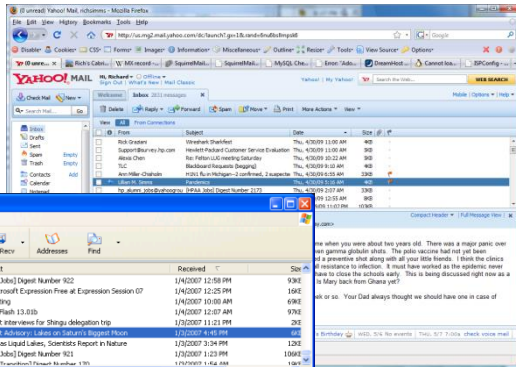
- Netscape Messenger
- Pine (University of Washington)
- Eudora (Qualcomm)
- Outlook (Microsoft)
- Evolution (Novell)
- /bin/mail (original UNIX email program)
- Yahoo Mail
- Gmail (Google)
- SquirrelMail
- Thunderbird Mail

CIS 192 - Lesson 12

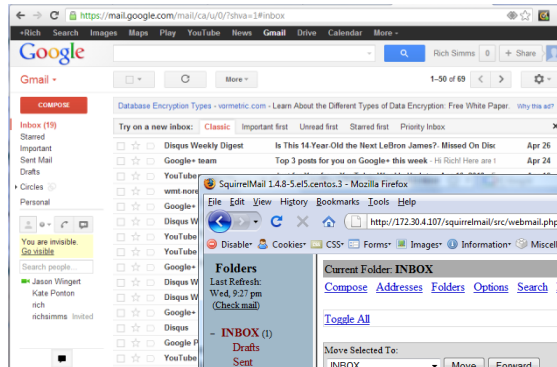
Mail User Agent (MUA)

Example MUAs

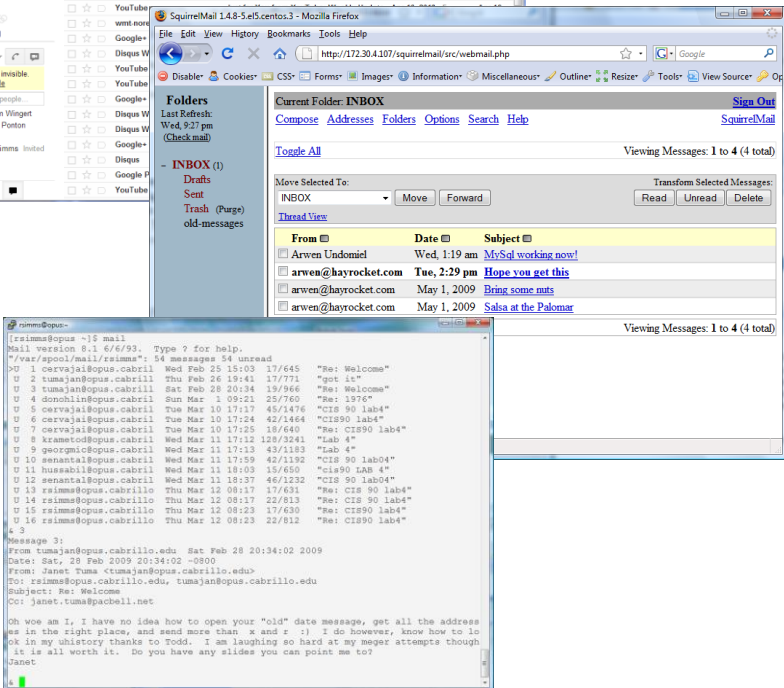
Yahoo Mail



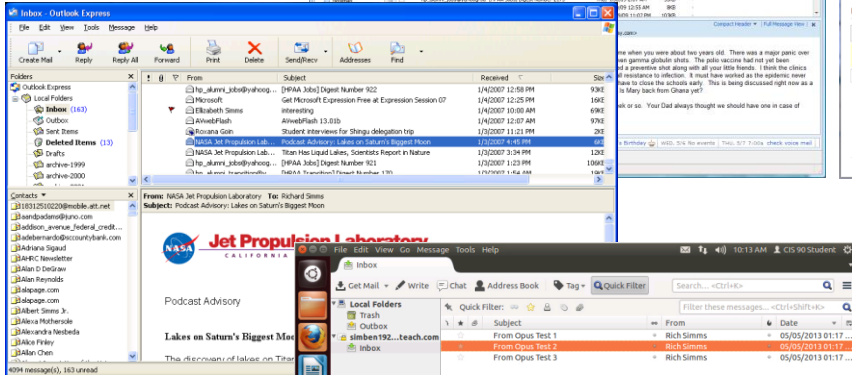
GMail



SquirrelMail



Outlook Express



Thunderbird Mail

/bin/mail

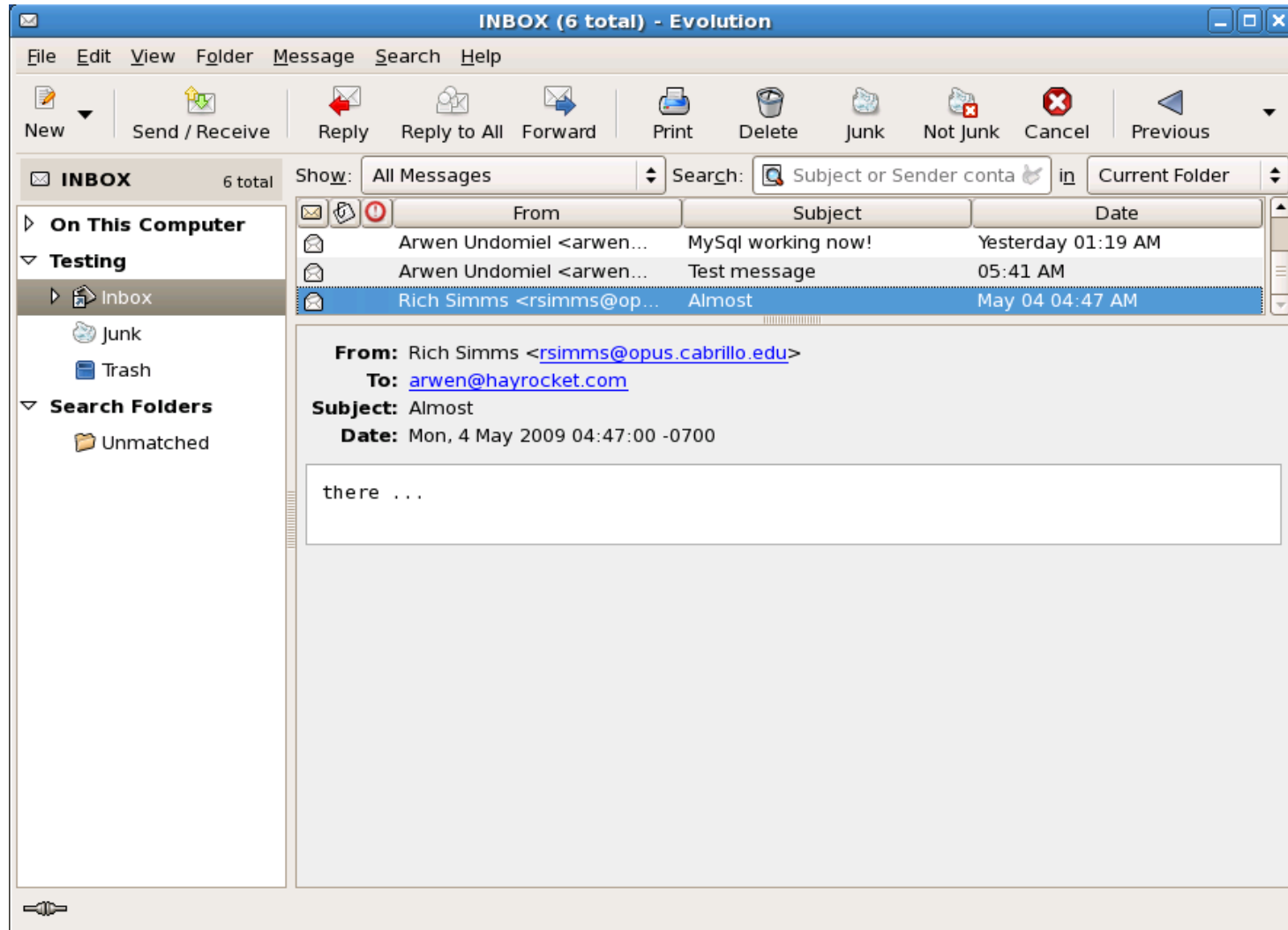
MUA Survey

Type the MUA you use most into the chat window

An email message

(Opus to Hayrocket)

email message



Here is an example email message in the Evolution MUA intray

CIS 192 - Lesson 12

email message

```
[rsimms@opus ~]$ mail arwen@hayrocket.com
Subject: Almost
there ...
.
Cc:
[rsimms@opus ~]$
```



*Sent using /bin/mail
MUA on Opus*

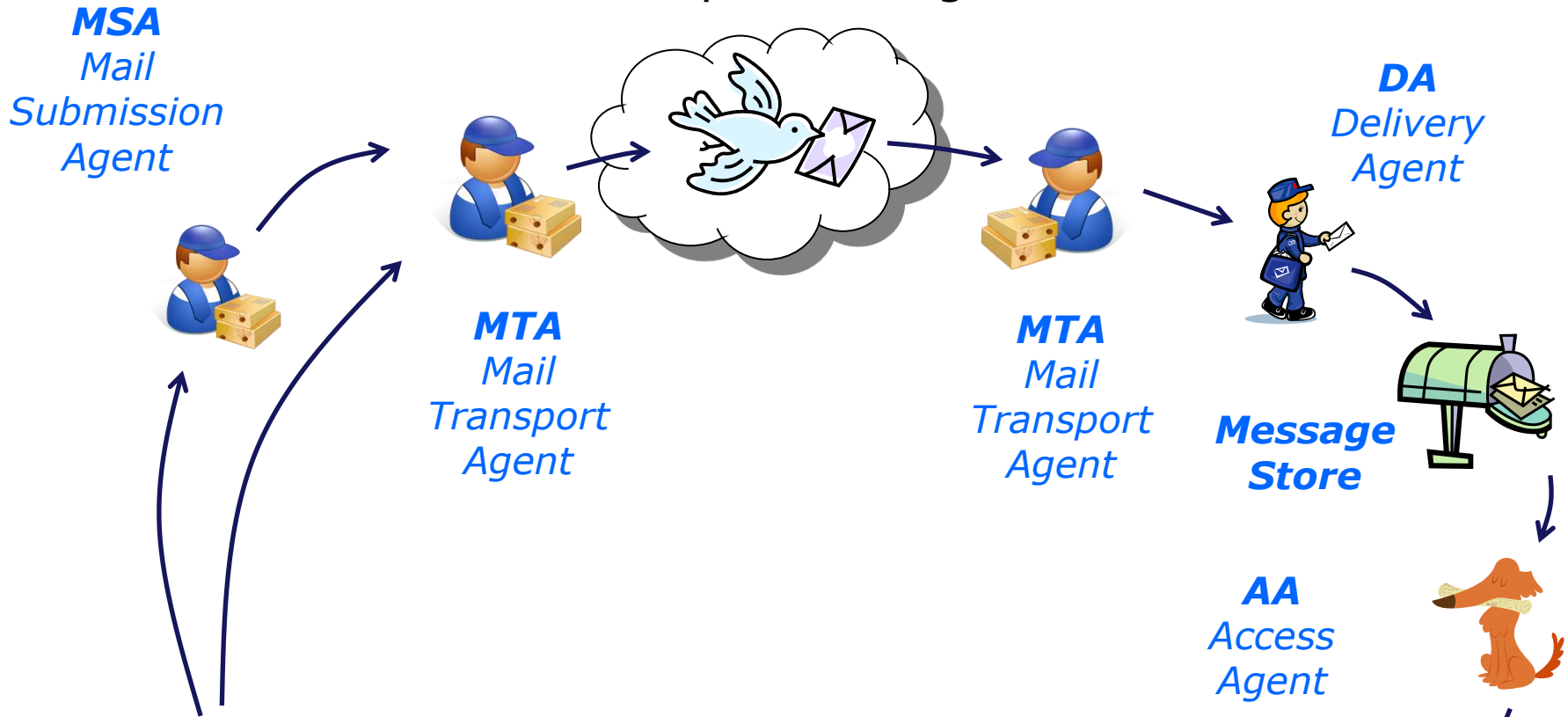


*Read using Evolution
MUA on Arwen*

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

Example message



Sent by the /bin/mail MUA

```
[rsimms@opus ~]$ mail arwen@hayrocket.com
Subject: Almost
there ...
.
Cc:
[rsimms@opus ~]$
```

Read by the Evolution MUA

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...



email message

Headers: property/value pairs

- defined by RFC2822
- added by MUA and MTAs

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

Property

Value

Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
 TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
 requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTTP id
 5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
 (8.13.8/8.13.8) with ESMTTP id n44B10mF028559 for <arwen@hayrocket.com>;
 Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
 (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
 May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0

there ...

Headers

email message

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

Body:

Actual content of the message

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
        TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
        requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTTP id
        5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
        (8.13.8/8.13.8) with ESMTTP id n44B10mF028559 for <arwen@hayrocket.com>;
        Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
        (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
        May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

Body { there ...

email message

Notice that the MUA hides almost all of the header information for readability!

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTTP id 5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu (8.13.8/8.13.8) with ESMTTP id n44B10mF028559 for <arwen@hayrocket.com>; Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4 May 2009 04:47:00 -0700

Date: Mon, 4 May 2009 04:47:00 -0700

From: Rich Simms <rsimms@opus.cabrillo.edu>

Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>

To: arwen@hayrocket.com

Subject: Almost

X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/

Mime-Version: 1.0

there ...

email message

These headers were (most likely) added by the sender MUA

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Unofficial headers (not defined when mail was first specified) start with an "X-"

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each system that handles the message adds a Received header line to the message

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the name of the sender or sending system

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the name of the receiving system

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the version of sendmail (or whatever MTA is using)

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the unique message ID while on the handling system.

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the recipient.

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

Each Received header line includes the date, time and offset from UTC.

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

```
Return-Path: <rsimms@opus.cabrillo.edu>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using
    TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate
    requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id
    5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)
Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
    (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>;
    Mon, 4 May 2009 04:47:00 -0700
Received: (from rsimms@localhost) by opus.cabrillo.edu
    (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4
    May 2009 04:47:00 -0700
Date: Mon, 4 May 2009 04:47:00 -0700
From: Rich Simms <rsimms@opus.cabrillo.edu>
Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/
Mime-Version: 1.0
```

there ...

email message

These headers were probably added by the delivery agent (DA)

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: arwen@hayrocket.com
Subject: Almost
Date: Mon, 4 May 2009 04:47:00 -0700

there ...

Return-Path: <rsimms@opus.cabrillo.edu>

X-Original-To: arwen@hayrocket.com

Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com

Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) (using TLSv1 with cipher DHE-RSA-AES256-SHA (256/256 bits)) (No client certificate requested) by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id 5591018901E for <arwen@hayrocket.com>; Mon, 4 May 2009 05:23:49 -0700 (PDT)

Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu (8.13.8/8.13.8) with ESMTP id n44B10mF028559 for <arwen@hayrocket.com>; Mon, 4 May 2009 04:47:00 -0700

Received: (from rsimms@localhost) by opus.cabrillo.edu (8.13.8/8.13.8/Submit) id n44B10w0028558 for arwen@hayrocket.com; Mon, 4 May 2009 04:47:00 -0700

Date: Mon, 4 May 2009 04:47:00 -0700

From: Rich Simms <rsimms@opus.cabrillo.edu>

Message-Id: <200905041147.n44B10w0028558@opus.cabrillo.edu>

To: arwen@hayrocket.com

Subject: Almost

X-Evolution-Source: imap://arwen%40hayrocket.com@mail.hayrocket.com/

Mime-Version: 1.0

there ...

Another email message

(Opus to skyhighway)

Overview of email

From: Rich Simms <rsimms@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

Date: Sun, 3 May 2009

there ...

Actual message content (the body)

X-Spam-Checker-Version: SpamAssassin 3.2.5 (2008-06-10) on skyhighway.com

X-Spam-Level:

X-Spam-Status: No, score=0.0 required=1.0 tests=none autolearn=disabled
version=3.2.5

Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) by
skyhighway.com with ESMTMP id n43MAHLC058199 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 15:10:17 -0700 (PDT)

Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
(8.13.8/8.13.8) with ESMTMP id n43LXVXu025747 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 14:33:31 -0700

Received: (from rsimms@localhost) by opus.cabrillo.edu
(8.13.8/8.13.8/Submit) id n43LXVOi025746 for ironchefkobe@skyhighway.com;
Sun, 3 May 2009 14:33:31 -0700

Date: Sun, 3 May 2009 14:33:31 -0700

From: Rich Simms <rsimms@opus.cabrillo.edu>

Message-Id: <200905032133.n43LXVOi025746@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

X-Cruzio-Spamtrap: 2.5 (2009/02/25)

X-CruzioSpamTrap: SpamAssassin Tagged vs 3

X-CruzioSpamtrapClass: OK

X-Evolution-Source: pop://ironchefkobe%40skyhighway.com@mail.skyhighway.com/

Mime-Version: 1.0

there ...



Overview of email

From: Rich Simms <rsimms@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

Date: Sun, 3 May 2009

there ...

Route taken (the Received header lines)

X-Spam-Checker-Version: SpamAssassin 3.2.5 (2008-06-10) on skyhighway.com

X-Spam-Level:

X-Spam-Status: No, score=0.0 required=1.0 tests=none autolearn=disabled
version=3.2.5

Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) by
skyhighway.com with ESMTTP id n43MAHLC058199 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 15:10:17 -0700 (PDT)

Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
(8.13.8/8.13.8) with ESMTTP id n43LXVXu025747 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 14:33:31 -0700

Received: (from rsimms@localhost) by opus.cabrillo.edu
(8.13.8/8.13.8/Submit) id n43LXVOi025746 for ironchefkobe@skyhighway.com;
Sun, 3 May 2009 14:33:31 -0700

Date: Sun, 3 May 2009 14:33:31 -0700

From: Rich Simms <rsimms@opus.cabrillo.edu>

Message-Id: <200905032133.n43LXVOi025746@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

X-Cruzio-Spamtrap: 2.5 (2009/02/25)

X-CruzioSpamTrap: SpamAssassin Tagged vs 3

X-CruzioSpamtrapClass: OK

X-Evolution-Source: pop://ironchefkobe%40skyhighway.com@mail.skyhighway.com/

Mime-Version: 1.0

there ...



Overview of email

From: Rich Simms <rsimms@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

Date: Sun, 3 May 2009

there ...

Unofficial headers used for spam filtering

X-Spam-Checker-Version: SpamAssassin 3.2.5 (2008-06-10) on skyhighway.com

X-Spam-Level:

X-Spam-Status: No, score=0.0 required=1.0 tests=none autolearn=disabled
version=3.2.5

Received: from opus.cabrillo.edu (opus.cabrillo.edu [207.62.186.9]) by
skyhighway.com with ESMTTP id n43MAHLC058199 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 15:10:17 -0700 (PDT)

Received: from opus.cabrillo.edu (opus [127.0.0.1]) by opus.cabrillo.edu
(8.13.8/8.13.8) with ESMTTP id n43LXVXu025747 for
<ironchefkobe@skyhighway.com>; Sun, 3 May 2009 14:33:31 -0700

Received: (from rsimms@localhost) by opus.cabrillo.edu
(8.13.8/8.13.8/Submit) id n43LXVOi025746 for ironchefkobe@skyhighway.com;
Sun, 3 May 2009 14:33:31 -0700

Date: Sun, 3 May 2009 14:33:31 -0700

From: Rich Simms <rsimms@opus.cabrillo.edu>

Message-Id: <200905032133.n43LXVOi025746@opus.cabrillo.edu>

To: ironchefkobe@skyhighway.com

Subject: Almost

X-Cruzio-Spamtrap: 2.5 (2009/02/25)

X-CruzioSpamTrap: SpamAssassin Tagged vs 3

X-CruzioSpamtrapClass: OK

X-Evolution-Source: pop://ironchefkobe%40skyhighway.com@mail.skyhighway.com/

Mime-Version: 1.0

there ...



email
with a
picture

MIME

MIME:

- Basic email messages using the SMTP protocol are limited to 7-bit ASCII characters.
- To transfer 8-bit character files such as programs, images, and audio the 8-bit information must be encoded as 7-bit ASCII.
- MIME defines the content headers in the message and the set of transfer encodings.

Overview of email

Message

From: Rich Simms <rich@skyhighway.com>
To: Andy
Subject: Almost
Date: Sun,

▶ 1 attachment

there ...

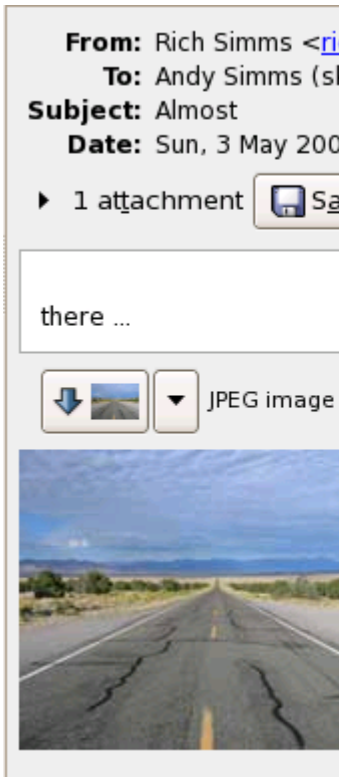


Photo

Sent by Outlook Express MUA containing message and photo

X-Spam-Checker-Version: SpamAssassin 3.2.5 (2008-06-10) on skyhighway.com
X-Spam-Level:
X-Spam-Status: No, score=0.0 required=1.0 tests=HTML_MESSAGE
 autolearn=disabled version=3.2.5
Received: from mail.cruzio.com (mail.cruzio.com [63.249.95.37]) by
 skyhighway.com with ESMTTP id n43Lk8nb093539 for
 <ironchefkobe@skyhighway.com>; Sun, 3 May 2009 14:46:08 -0700 (PDT)
Received: from shrekster (dsl-63-249-103-107.dhcp.cruzio.com
 [63.249.103.107]) by mail.cruzio.com with SMTP id n43Lk87K000805 for
 <ironchefkobe@skyhighway.com>; Sun, 3 May 2009 14:46:08 -0700 (PDT)
Message-ID: <96E1021BA6E445DAB309031CDACA3428@shrekster>
From: "Rich Simms" <rich@skyhighway.com>
To: "Andy Simms \ (sky\)" <ironchefkobe@skyhighway.com>
Subject: Almost
Date: Sun, 3 May 2009 14:46:16 -0700
MIME-Version: 1.0
Content-Type: multipart/mixed; boundary="-----
 _NextPart_000_000A_01C9CBFD.E97D30B0"
X-Priority: 3
X-MSMail-Priority: Normal
X-Mailer: Microsoft Outlook Express 6.00.2900.5512
X-MimeOLE: Produced By Microsoft MimeOLE V6.00.2900.5579
X-Cruzio-Spamtrap: 2.5 (2009/02/25)
X-CruzioSpamTrap: SpamAssassin Tagged vs 3
X-CruzioSpamtrapClass: OK
X-Evolution-Source: pop://ironchefkobe%40skyhighway.com@mail.skyhighway.com/

Overview of email



The message contains multiple parts each described by MIME content headers

This is a multi-part message in MIME format.

```
-----=_NextPart_000_000A_01C9CBFD.E97D30B0
Content-Type: multipart/alternative; boundary="-----
=_NextPart_001_000B_01C9CBFD.E97D30B0"
```

```
-----=_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/plain; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

there ...

```
-----=_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/html; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD>
<META http-equiv=3DContent-Type content=3D"text/html; =
charset=3Diso-8859-1">
<META content=3D"MSHTML 6.00.6000.16809" name=3DGENERATOR>
<STYLE></STYLE>
</HEAD>
<BODY bgColor=3D#ffffff>
<DIV><FONT face=3DArial size=3D2></FONT>&nbsp;</DIV>there =
...</BODY></HTML>
```


Overview of email



The plain text part for the message body

This is a multi-part message in MIME format.

```
-----_NextPart_000_000A_01C9CBFD.E97D30B0
Content-Type: multipart/alternative; boundary="-----
=_NextPart_001_000B_01C9CBFD.E97D30B0"
```

```
-----_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/plain; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

MIME content headers

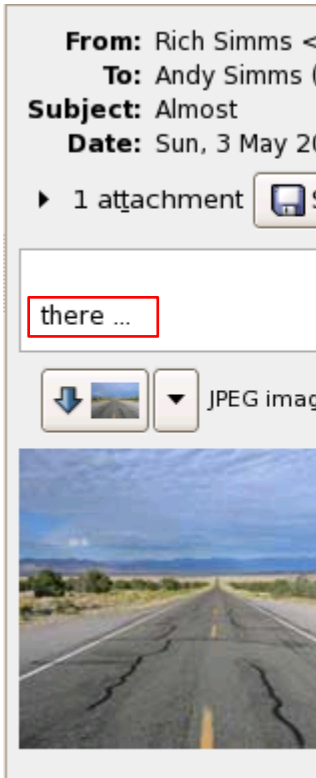
there ...

plain text

```
-----_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/html; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD>
<META http-equiv=3DContent-Type content=3D"text/html; =
charset=3Diso-8859-1">
<META content=3D"MSHTML 6.00.6000.16809" name=3DGENERATOR>
<STYLE></STYLE>
</HEAD>
<BODY bgColor=3D#ffffff>
<DIV><FONT face=3DArial size=3D2></FONT>&nbsp;</DIV>there =
...</BODY></HTML>
```

Overview of email



The html text part for the message body

This is a multi-part message in MIME format.

```
-----_NextPart_000_000A_01C9CBFD.E97D30B0
Content-Type: multipart/alternative; boundary="-----
=_NextPart_001_000B_01C9CBFD.E97D30B0"
```

```
-----_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/plain; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

there ...

```
-----_NextPart_001_000B_01C9CBFD.E97D30B0
Content-Type: text/html; charset="iso-8859-1"
Content-Transfer-Encoding: quoted-printable
```

MIME content headers

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<HTML><HEAD>
<META http-equiv=3DContent-Type content=3D"text/html; =
charset=3Diso-8859-1">
<META content=3D"MSHTML 6.00.6000.16809" name=3DGENERATOR>
<STYLE></STYLE>
</HEAD>
<BODY bgColor=3D#ffffff>
<DIV><FONT face=3DArial size=3D2></FONT>&nbsp;</DIV>there =
...</BODY></HTML>
```

html

Overview of email

From: Rich Simms <rich@skyhighway.com>
To: Andy Simms (sky) <ironchefkobe@skyhighway.com>
Subject: Almost
Date: Sun, 3 May 2009 14:46:16 -0700

1 attachment Save
there ...
 JPEG image att



Message body: jpeg image encoded into 7-bit ASCII

-----=_NextPart_001_000B_01C9CBFD.E97D30B0--

-----=_NextPart_000_000A_01C9CBFD.E97D30B0

Content-Type: image/jpeg; name="almost.jpg"

Content-Transfer-Encoding: base64

Content-Disposition: attachment; filename="almost.jpg"

MIME content headers

/9j/4AAQSkZJRgABAQAAZABkaAD/7AARRHVja3kAAQAEAAAAHgAA/+4ADkFkb2JlAGTAAAAAF/b
AIQAEAsLCwwLEAwMEBcPDQ8XGxQQEBQbHxcXFxcXHx4XGhoaGhceHiMlJyUjHi8vMzMvL0BAQEBA
QEBAQEBAQEBAQAERDw8RExEVEhIVFBEUERQaFBYWFbomGhocGhomMCMehH4eIzArLicnJy4rNTUw
MDU1QEA/QEBAQEBAQEBAQEBA/8AAEQgAlgDIAwEiAAIRAQMRAF/EAI0AAAIDAQEAAAAAAAAAAAAA
AAIDAAEEBQYBAQEBAQEAAAAAAAAAAAAAAAAABAQMEEAABAwIEBAUBBQcEAwAAAAABABECIQMxQRIE
UWFxgZEiMhMFUqHB0UIU8LHxcpJDU2KCIxXhMzQRAQACAQIFBAIDAAAAAAAAAAAAABEQIhEjFRYVID
QXGBE6EyKQQU/9oADAMBAAIRAxEAPwDTEAh0YmDSSqIiPzVV+U59163EZ0ipVe5E0d+SEyiKEupq
0+kB0DYCMqEBkUxacZNwSX1Bya8sVYjE5seJTXmh+mw7s48VZnA4CgSgIQDCpPFGNMRRuZCoKRiW
AcIhKMMBXiUAINQ5UarkDogsyncLOw5IxCMA0QHJzJQvcxAZTzkv4oCNcZMOAUFyMA0HkTiUIgSXJ
cI4xlk0RyQUPelVtI5oqgVkJHgMEUY8a9VZryHBQLD4mnLNXiDiRzRamwoheuNFRGcYNYAdTTwqq
fsoKnj1RFaJmsjpyVCINZYDijMuWChkMWcpYXQ4DV0wUPuZDsJ1E5dgq1NgFQoiQxLdA6iYbk1E
+Ec/VTorej5oQxwVsVmmrXGqIFgzOhAKtigKJINKBESSgYqwEDA7ZIo0pilBFXigapjiwQAnBWqC
c4Oir9VOiAHgrccaIhgROcj4JWquKrUOKKa8nxdTUUsSHEqXMPihZlVflGKW6sEIg/L1U1ACgQ6o
< snipped >

9gjOTcf2dRRBdsylScVzw7Lr/Gv+nP8AMVFFx8/6fMOni/b4c25q9642Oouq8ueKii6Rwj2YnjKU
zwYPwSp40wzUUVRI6qtjlxWW4IfrrZjJp/mABwUUVG7qPBF5m5KKKCi+TupF68OGaiiBkcNwbcCw
SNZaWXHsooqgBLcPplHyN5ZBsPFRRRB//9k=

-----=_NextPart_000_000A_01C9CBFD.E97D30B0--

*encoded
jpeg*

Viewing message headers

Work solo or with a partner and login to your favorite web-based email MUA:

- Select a message and view the headers
- Try and identify the route the message took across the Internet
- Pick one of the headers we didn't cover and Google it
 - google "mail header xxxx" (where xxxx is the header you want to look up)
- Put a one-liner definition of the header you researched in the chat window

For Yahoo! mail , select message, Actions > View Full Header

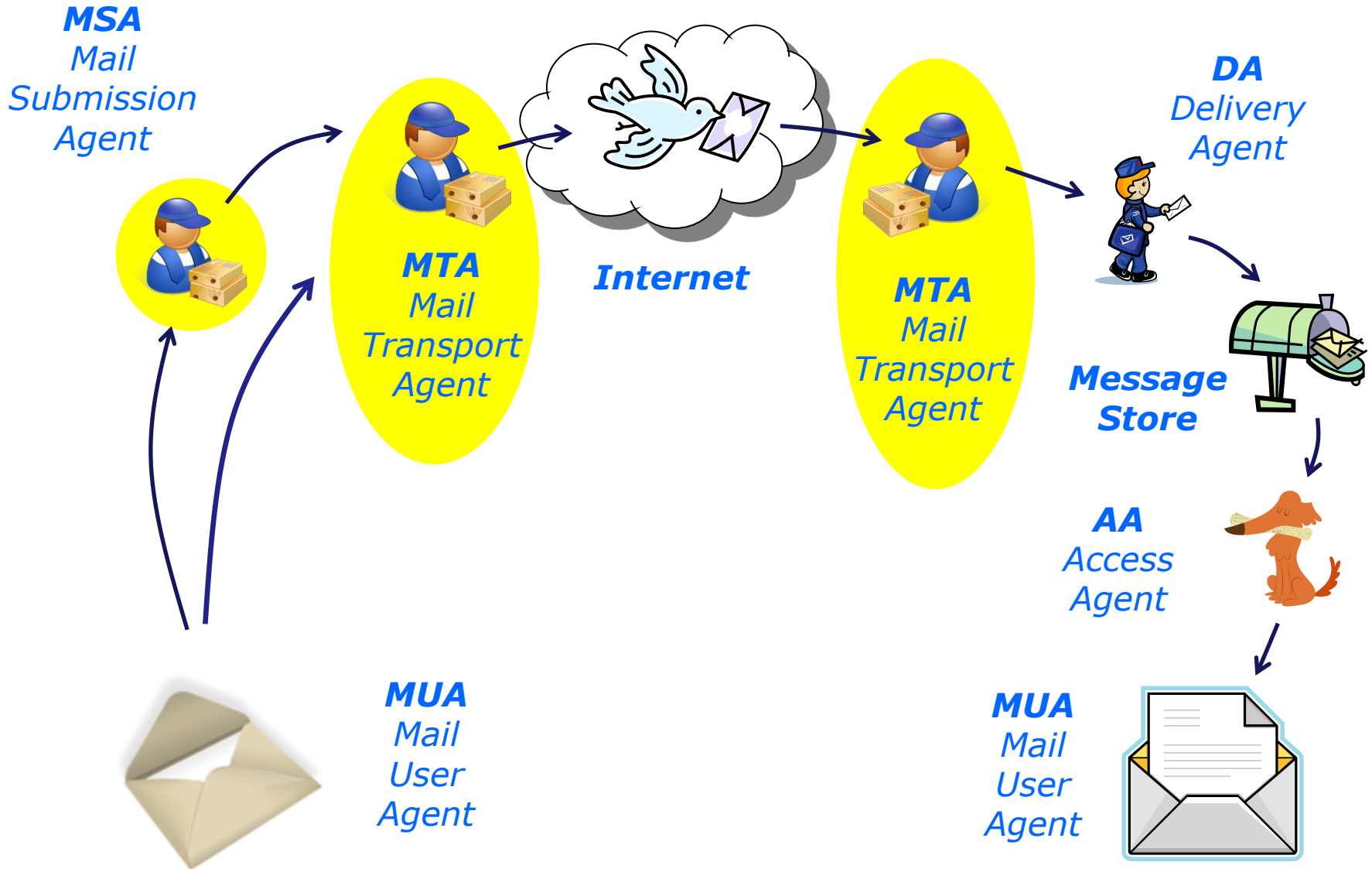
For Gmail, open message, "Down Arrow after reply arrow" icon > Show original

For SquirrelMail, open message, click View Full Header

MTA

MSA

Overview of email



compose and send message

open and read message 70

Mail Transport Agents

MTAs are responsible for getting messages from point A to point B. They also receive incoming mail from other MTAs.

MTA



Example implementations:

- sendmail (most widespread usage)
- Qmail (security aware, public domain)
- Exim (highly configurable, GNU license)
- Microsoft Exchange Server (proprietary)
- Postfix (IBM public license)

They are analogous to the Internet layer of the network stack.

They use destination addresses, aliases and distribution lists to route mail to one or more users.

Mail Transport Agents

MTA



Mail Transport Agents

- Use SMTP protocol (RFC 821)
- Or Extended SMTP protocol
- Uses port 25

MSA



MSAs (Mail Submission Agents) use port 587 and can offload the MTA by performing some of the pre-processing activities (finding and logging errors, verifying hostnames, fixing headers etc.)

Overview of email

DNS MX records

Where is the mail server for skyhighway.com users?

From: Rich Simms <rsimms@opus.cabrillo.edu>
To: ironchefkobe@skyhighway.com
Subject: Almost
Date: Sun, 3 May 2009 14:33:31 -0700

there ...

DNS MX records

```
[rsimms@opus ~]$ dig mx skyhighway.com
```

```
; <<>> DiG 9.3.4-P1 <<>> mx skyhighway.com
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59217
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 2, ADDITIONAL: 1

;; QUESTION SECTION:
;skyhighway.com.                IN      MX

;; ANSWER SECTION:
skyhighway.com.                81181   IN      MX      10 io1-sec.cruzio.com.
skyhighway.com.                81181   IN      MX      5 mail.skyhighway.com.

;; AUTHORITY SECTION:
skyhighway.com.                81181   IN      NS      io1-sec.cruzio.com.
skyhighway.com.                81181   IN      NS      io1.cruzio.com.

;; ADDITIONAL SECTION:
mail.skyhighway.com.           81181   IN      A       63.249.82.6
```

mail.skyhighway.com has the highest priority (5)

What mail server do you use?

Login to Opus or one of your VMs

- Select the domain you use for your own email, e.g. yahoo.com, gmail.com, etc.
- Find the name of your mail servers: **dig mx** *<your-email-domain>*
- Put the fully qualified hostname of the highest priority mail server in the chat window

MTA SMTP commands

Sending an email using SMTP

Some SMTP commands

HELO *sendinghostname*

Initiate SMTP conversation

EHLO *sendinghostname*

Initiate extended SMTP conversation

MAIL From: *<source email address>*

Source

RCPT To: *<destination email address>*

Destination

DATA

Message body

QUIT

End connection

MTA SMTP commands

(Using Cruzio MTA
to send message to hayrocket)

Sending an email using SMTP – Cruzio SMTP server



This has got to be the most basic of MUAs - using telnet!

```
[root@arwen ~]# telnet mx.cruzio.com 25
Trying 63.249.95.37...
Connected to mx.cruzio.com (63.249.95.37).
Escape character is '^]'.
220 mail.cruzio.com ESMTP ready at Mon, 4 May 2009 10:21:49 -0700 (PDT)
ehlo arwen
250-mail.cruzio.com Hello dsl-63-249-103-107.dhcp.cruzio.com
[63.249.103.107], pleased to meet you
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-8BITMIME
250-SIZE 25000000
250-DSN
250-ETRN
250-DELIVERBY
250 HELP
mail from: rich@hayrocket.com
250 2.1.0 rich@hayrocket.com... Sender ok
rcpt to: arwen@hayrocket.com
250 2.1.5 arwen@hayrocket.com... Recipient ok
```

SMTP uses port 25

*Notice how polite
the MTA is to you*

Sending an email using SMTP – Cruzio SMTP server



This has got to be the most basic of MUAs - using telnet!

data

```
354 Enter mail, end with "." on a line by itself
```

```
Date: May 4, 2009
```

```
From: Rich
```

```
Reply-to: rich@hayrocket.com
```

```
Message-ID: one
```

```
Subject: Manual SMTP message
```

```
Hi Arwen,
```

```
Almost there ...
```

```
- Rich
```

```
.
```

```
250 2.0.0 n44HLnNw035164 Message accepted for delivery
```

quit

```
221 2.0.0 mail.cruzio.com closing connection
```

```
Connection closed by foreign host.
```

```
[root@arwen ~]#
```

Sending an email using SMTP – Cruzio SMTP server



Voila ... the message is sent and it arrives in our intray

The screenshot shows the SquirrelMail webmail interface in a Mozilla Firefox browser window. The browser address bar shows the URL `http://172.30.4.107/squirrelmail/src/webmail.php`. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help), a toolbar with various icons, and a left sidebar for folder management. The main content area displays the details of an email message in the INBOX folder.

Current Folder: INBOX [Sign Out](#)

[Compose](#) [Addresses](#) [Folders](#) [Options](#) [Search](#) [Help](#) [SquirrelMail](#)

[Message List](#) [Delete](#) Previous | [Next](#) [Forward](#) [Forward as Attachment](#) [Reply](#) [Reply All](#)

Subject: Manual SMTP message
From: Rich@mail.cruzio.com
Date: Wed, December 31, 1969 9:00 am
To: undisclosed-recipients;
Priority: Normal
Options: [View Full Header](#) | [View Printable Version](#) | [Download this as a file](#)

Hi Arwen,
Almost there ...
- Rich

Delete & Prev | [Delete & Next](#)

Move to:

Done

Sending an email using SMTP – Cruzio SMTP server



View of the headers

The screenshot shows the SquirrelMail webmail interface in a Mozilla Firefox browser window. The browser address bar shows the URL `http://172.30.4.107/squirrelmail/src/webmail.php`. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help), a toolbar with navigation and utility icons, and a left sidebar with a 'Folders' list. The main content area displays the 'Current Folder: INBOX' and a list of folders: INBOX (3), Drafts, Sent, Trash (Purge), and old-messages. The selected message is titled 'Viewing Full Header - View message'. The email headers are displayed as follows:

```
Return-Path: <rich@hayrocket.com>
X-Original-To: arwen@hayrocket.com
Delivered-To: x3836465@spaceymail-mx3.g.dreamhost.com
Received: from mail.cruzio.com (mail.cruzio.com [63.249.95.37])
  by spaceymail-mx3.g.dreamhost.com (Postfix) with ESMTP id EEBD4189025
  for <arwen@hayrocket.com>; Mon, 4 May 2009 10:25:26 -0700 (PDT)
Received: from arwen (dsl-63-249-103-107.dhcp.cruzio.com [63.249.103.107])
  by mail.cruzio.com with ESMTP id n44HLnNw035164
  for arwen@hayrocket.com; Mon, 4 May 2009 10:22:51 -0700 (PDT)
Date: May 4, 2009
From: Rich@mail.cruzio.com
Reply-To: rich@hayrocket.com
Message-ID: one
Subject: Manual SMTP message
To: undisclosed-recipients: ;
```

MTA SMTP commands

(Using Hershey MTA
to send message to Opus)

Sending an email using SMTP – Hershey SMTP server



This has got to be the most basic of MUAs - using telnet!

```
[simben192@hershey ~]$ telnet hershey 25
Trying 127.0.0.1...
Connected to hershey.localdomain (127.0.0.1).
Escape character is '^]'.
220 hershey.cislab.net ESMTP Sendmail 8.13.8/8.13.8; Tue, 7 May 2013 08:23:13 -0700
ehlo hershey
250-hershey.cislab.net Hello hershey [127.0.0.1], pleased to meet you
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-8BITMIME
250-SIZE
250-DSN
250-ETRN
250-AUTH DIGEST-MD5 CRAM-MD5
250-DELIVERBY
250 HELP
mail from: simben192@hershey.cislab.net
250 2.1.0 simben192@hershey.cislab.net... Sender ok
rcpt to: rsimms@oslab.cabrillo.edu
250 2.1.5 rsimms@oslab.cabrillo.edu... Recipient ok
```

SMTP uses port 25

*Notice how polite
the MTA is to you*

Sending an email using SMTP – Hershey SMTP server



This has got to be the most basic of MUAs - using telnet!

data

354 Enter mail, end with "." on a line by itself

Date: May 5, 2010

From: Benji Simms

Reply-to: Benji Simms

Message-ID: one

Subject: Salsa

Don't forget ... Salsa tonight at the Palomar!

.

250 2.0.0 r47FNDI4021012 Message accepted for delivery

quit

221 2.0.0 hershey.cislab.net closing connection

Connection closed by foreign host.

[simben192@hershey ~]\$

Sending an email using SMTP – Hershey SMTP server



And the message is successfully delivered!

```
[rsimms@oslab ~]$ mail
Heirloom Mail version 12.4 7/29/08.  Type ? for help.
"/var/spool/mail/rsimms": 3 messages
  1 Ryan Schell      Mon May  6 13:03 198/13705 "Re: Technology for Mo"
  2 Ryan Schell      Mon May  6 13:16  83/3837  "Re: Technology for Mo"
>N  3 Benji.Simms@hershey.  Tue May  7 08:26 17/669  "Salsa"
& 3
```

```
Message 3:
From simben192@hershey.cislab.net  Tue May  7 08:26:14 2013
Return-Path: <simben192@hershey.cislab.net>
Date: May 5, 2010
From: Benji.Simms@hershey.cislab.net
Reply-to: Benji.Simms@hershey.cislab.net
Subject: Salsa
Status: RO
```

Note the headers here

```
Don't forget ... Salsa tonight at the Palomar!
```

```
&
```

MTA SMTP commands

(Using Opus MTA
to send message to Yahoo)

```
[rsimms@oslab ~]$ telnet localhost 25
Trying ::1...
telnet: connect to address ::1: Connection refused
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
220 oslab.cabrillo.edu ESMTP Sendmail 8.14.4/8.14.4; Tue, 7 May 2013 08:38:24 -0700
ehlo oslab
250-oslab.cabrillo.edu Hello localhost [127.0.0.1], pleased to meet you
250-ENHANCEDSTATUSCODES
250-PIPELINING
250-8BITMIME
250-SIZE
250-DSN
250-ETRN
250-AUTH GSSAPI
250-DELIVERBY
250 HELP
mail from: simben192@oslab.cabrillo.edu
250 2.1.0 simben192@oslab.cabrillo.edu... Sender ok
rcpt to: richsimms@yahoo.com
250 2.1.5 richsimms@yahoo.com... Recipient ok
data
354 Enter mail, end with "." on a line by itself
Date: May 5, 2013
From: Benji Simms
Reply-to: Benji Simms
Message-ID: one
Subject: Salsa
Don't forget ... Salsa tonight at the Palomar!
.
250 2.0.0 r47FcOSi021049 Message accepted for delivery
quit
221 2.0.0 oslab.cabrillo.edu closing connection
Connection closed by foreign host.
[rsimms@oslab ~]$
```

SMTP uses port 25

*Notice how polite
the MTA is to you*



And the message is successfully delivered!

The screenshot shows a web browser window with the Yahoo! Mail interface. The address bar displays the URL: <https://us-mg6.mail.yahoo.com/neo/launch?.rand=48t3t5jbuk3fi>. The page header includes the Yahoo! Mail logo, search bars for mail and web, and a greeting "Hi, Richard".

The navigation menu includes "INBOX", "CONTACTS", and "CALENDAR". Below this is a toolbar with "Compose", "Delete", navigation arrows, "Move", "Spam", and "Actions".

The inbox list shows the following messages:

Message	Sender	Subject	Time	Actions
<input type="checkbox"/> Gerlinde Brady	★ Camstudio		8:40 AM	
<input type="checkbox"/> Benji.Simms@oslab.ca...	★ Salsa		8:40 AM	
<input type="checkbox"/> nikoslynch@gmail.com	★ Estimate 080392 from		8:23 AM	
<input type="checkbox"/> Nikos Lynch	★ Re: Look at wall block		8:16 AM	

The selected message is from "Salsa" and is dated "Tue, May 7, 2013 at 8:40 AM". The sender is "Benji.Simms@oslab.cabrillo.edu". The message body contains the text: "Don't forget ... Salsa tonight at the Palomar!"


```
From Benji.Simms@oslab.cabrillo.edu Tue May 7 08:40:35 2013
X-Apparently-To: richsimms@yahoo.com via 98.139.220.204; Tue, 07 May 2013 08:40:35 -0700
Return-Path: <simben192@oslab.cabrillo.edu>
Received-SPF: none (domain of oslab.cabrillo.edu does not designate permitted sender hosts)
YWxvbWfyISABMAEBAQE-
X-YMailISG: flpZh3kWLDvzXZPvTs4PSJYZ6sqqYbnAq4ZFQFL8_Karblad
7RmtXYglwbbzC4xesvzMbMue2szteSS5jp_ML0MZEQZw9oLpIS2sXEQXDwtG
DAvAdDB6qvLoHN5h_9EL9T9WGMCMQOMbj_pKii.SmUPW4ET9vF3mVJJoHYFMG
txDe5B6UuNds2Yu8AZ6ydzYauyzI_QwacWmuD_fxeLdZCnUvMhHAzo0BhnI
Ac9IAVTYwd30xZz15J6v8QECnxLqRPqn.eilwyUGW3_iSRfdr1Vx0zuaQgXM
EliW9PdFBC0lyxoWB5AZb0UEVAvxPLAuE9hjJEWEzoOVYRMZ5sfCCARP3YEg
PplBmfvkuejkV31cJYiKfYwz9Tsj6PqT8ys9KVTUhiIL86yOmSa8Q4oxnrn_
dr_Pw9uQdD66o.1arSNU5wMPoqi2D5.IHFGqyyvbidFqqsK7mHNYhV8Beist
wmdQu2E4Q.nyf9phfYDCnkuwX.OnK45rFtiR7p6__b_f_WgRuR9Ornqb7UmA
hCL45ac4oBR13fSFq9AGozWqfA66.2pqbvy.Xfg_1IInFqTdk19DkKGI3pSm
OnWeTsKNalTpwLU4cPaPEDy4br5qR8rBiXozX0yiULvykAIsfqln_e3WZY1V
b81mQMkTP91TRioI_rzP7aiOspCsAd5RgRAeXUTl0BGX17oTq92xFJKCYHZI
d1Vz9uR4BqAfcZ9hyFDgDJdWK4cStqIWuTL5AQLUrv1nvf9PEMeftaxR9jbc
XsQ_HLV2MV1Y_Lc7040gEXN7kJfSxsbUiFH3q_mxp1xBul2b4APMniDR0X1f
JDjakBkUrIrb8Ms7u7admj4VYPm6FxmLrhy78hoRUFITrjDtX6BeUT1dZySy
O1.OPm4tez5IXeYcrqe.GGa2Ysc5y142DulJ8mqNfY2DwwA2xjAD0MCuGgiv
giOMOK9Ahiv72_J10UAJEDq2oGIj0CLgwSPNofUBIzMPC1K0e_Uws1P6Khjg
k7Z78AHz__YoamA0NCmFzbgX7qy2t.I3AwV3s3.O17L7crUBQSAYfEf5_sSW
aJXkwgh_Fx5WRzgyAXDNqoQ_
X-Originating-IP: [207.62.184.250]
Authentication-Results: mta1306.mail.gql.yahoo.com from=oslab.cabrillo.edu;
domainkeys=neutral (no sig); from=oslab.cabrillo.edu; dkim=neutral (no sig)
Received: from 127.0.0.1 (EHLO oslab.cabrillo.edu) (207.62.184.250)
by mta1306.mail.gql.yahoo.com with SMTP; Tue, 07 May 2013 08:40:34 -0700
Received: from oslab (localhost [127.0.0.1])
by oslab.cabrillo.edu (8.14.4/8.14.4) with ESMTp id r47FcOSi021049
for richsimms@yahoo.com; Tue, 7 May 2013 08:40:13 -0700
Date: May 5, 2013
From: Benji.Simms@oslab.cabrillo.edu
Reply-to: Benji.Simms@oslab.cabrillo.edu
Message-ID: one
Subject: Salsa
Content-Length: 47
```

*Viewing headers on the
email received from Opus*

*Received headers
show route taken
by message*

Send yourself an email from Hershey to Opus

From Opus, **ssh** into your new account on Hershey (uses your original Opus password) and send yourself a message on Opus

```
ssh hershey
```

```
telnet hershey 25
```

```
ehlo hershey
```

```
mail from: username@hershey.cislab.net
```

```
rcpt to: username@oslab.cabrillo.edu
```

```
data
```

```
Subject: Manual SMTP message
```

```
This is now my favorite way
```

```
to send emails!
```

```
.
```

```
quit
```

Usernames

simben192

milhom192

rodduk192

bunsol192

calsea192

capchr192

doucor192

drybry192

farsha192

garton192

hovdav192

irvdon192

musdav192

noreva192

pangab192

veleli192

wiltaj192

vascar192

rysada192

lyoben192

srelau192

exit and read your email on Opus

MTA
sendmail

Mail Transport Agent Sendmail

Sendmail

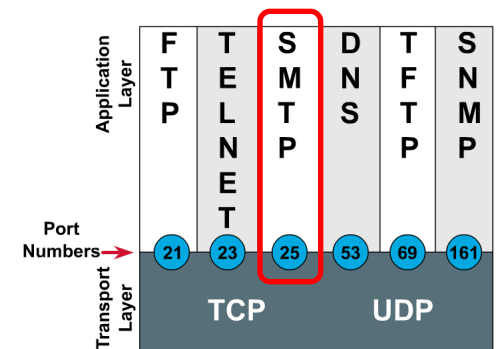
- Uses port 25 (SMTP – Simple Mail Transport Protocol)
- Mail router - controlled by /etc/mail/sendmail.cf
- Aliases - maintained in /etc/aliases
- Name resolution - using DNS records and /etc/hosts files
- User options - vacation notification and mail forwarding

```
[root@elrond ~]# cat /etc/services | grep -w 25
```

```
smtp      25/tcp    mail
smtp      25/udp    mail
```

<snipped>

Port Numbers



SMTP uses TCP port 25

sendmail configuration

The default sendmail configuration

Incoming mail:

- delivered locally if the destination exists
- rejected and returned to sender if the destination user does not exist
- forwarded to remote system if destined for another system (@hostname.dom)
- Mail to this system's postmaster is delivered to root.

Outgoing mail:

- delivered directly to the system in the address
- Append the FQDN to the sender's user name

sendmail configuration

Modifying the sendmail configuration

Must change the sendmail.cf file to do any of the following:

- To use a central mail server and you need to forward all mail to that server
- To configure your server as a central mail server
- To use other mail channels

Mail channels

- *badhost* - for mail with un-resolvable destination hostname
- *baduser* - for non-existing users
- *SMTP* - for mail to be sent using SMTP
- *UUCP* - for mail to be sent using UNIX to UNIX Copy program
- *local* - for mail that is to be delivered locally

sendmail configuration

```
[root@elrond ~]# service sendmail status
```

```
sendmail (pid 2204) is running...
```

```
[root@elrond ~]# netstat -tln
```

Active Internet connections (only servers)

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State
tcp	0	0	127.0.0.1:2208	0.0.0.0:*	LISTEN
tcp	0	0	0.0.0.0:111	0.0.0.0:*	LISTEN
tcp	0	0	0.0.0.0:6000	0.0.0.0:*	LISTEN
tcp	0	0	127.0.0.1:631	0.0.0.0:*	LISTEN
tcp	0	0	127.0.0.1:25	0.0.0.0:*	LISTEN
tcp	0	0	127.0.0.1:2207	0.0.0.0:*	LISTEN
tcp	0	0	0.0.0.0:703	0.0.0.0:*	LISTEN
tcp	0	0	:::6000	:::*	LISTEN
tcp	0	0	:::22	:::*	LISTEN

```
[root@elrond ~]#
```

sendmail listens on port 25

email aliases

Configuring mail aliases

- expand a single name to many users
- create mailing lists
- append mail to files, possibly for archival purposes*
- filter mail through programs or shell scripts
- after editing /etc/aliases file, you must run:
 - the **newaliases** command
 - or **service sendmail restart**

*In the text book (p. 547) they had this great alias: **complaints: /dev/null***

sendmail configuration - alias example

```
[root@p32-elrond ~]# tail -2 /etc/aliases
```

```
student: cis192
benji: simben192
```

*Add new aliases to
the end of this file*

```
[root@p32-elrond ~]# newaliases
```

```
/etc/aliases: 78 aliases, longest 10 bytes, 792 bytes total
```

```
[root@p32-elrond ~]# mail benji
```

```
Subject: Five posts due tonight
Get on it!
```

```
.
```

```
EOT
```

```
[root@p32-elrond ~]# su - simben192
```

```
[simben192@p32-elrond ~]$ mail
```

```
Heirloom Mail version 12.4 7/29/08. Type ? for help.
```

```
"/var/spool/mail/simben192": 1 message 1 new
```

```
>N 1 root Tue May 7 15:38 20/892 "Five posts due  
tonigh"
```

```
& 1
```

```
Message 1:
```

```
From root@p32-elrond.cis192pods.cislab.net Tue May 7 15:38:19 2013
```

```
Return-Path: <root@p32-elrond.cis192pods.cislab.net>
```

```
From: root <root@p32-elrond.cis192pods.cislab.net>
```

```
Date: Tue, 07 May 2013 15:38:18 -0700
```

```
To: benji@p32-elrond.cis192pods.cislab.net
```

```
Subject: Five posts due tonight
```

```
User-Agent: Heirloom mailx 12.4 7/29/08
```

```
Content-Type: text/plain; charset=us-ascii
```

```
Status: R
```

*Because of the
alias, the mail
sent to benji
goes to the
simben192 user*

```
Get on it!
```

```
& q
```

Mail aliases

- Add an alias for your **xxxxxxx192** username at the end of /etc/aliases on Elrond

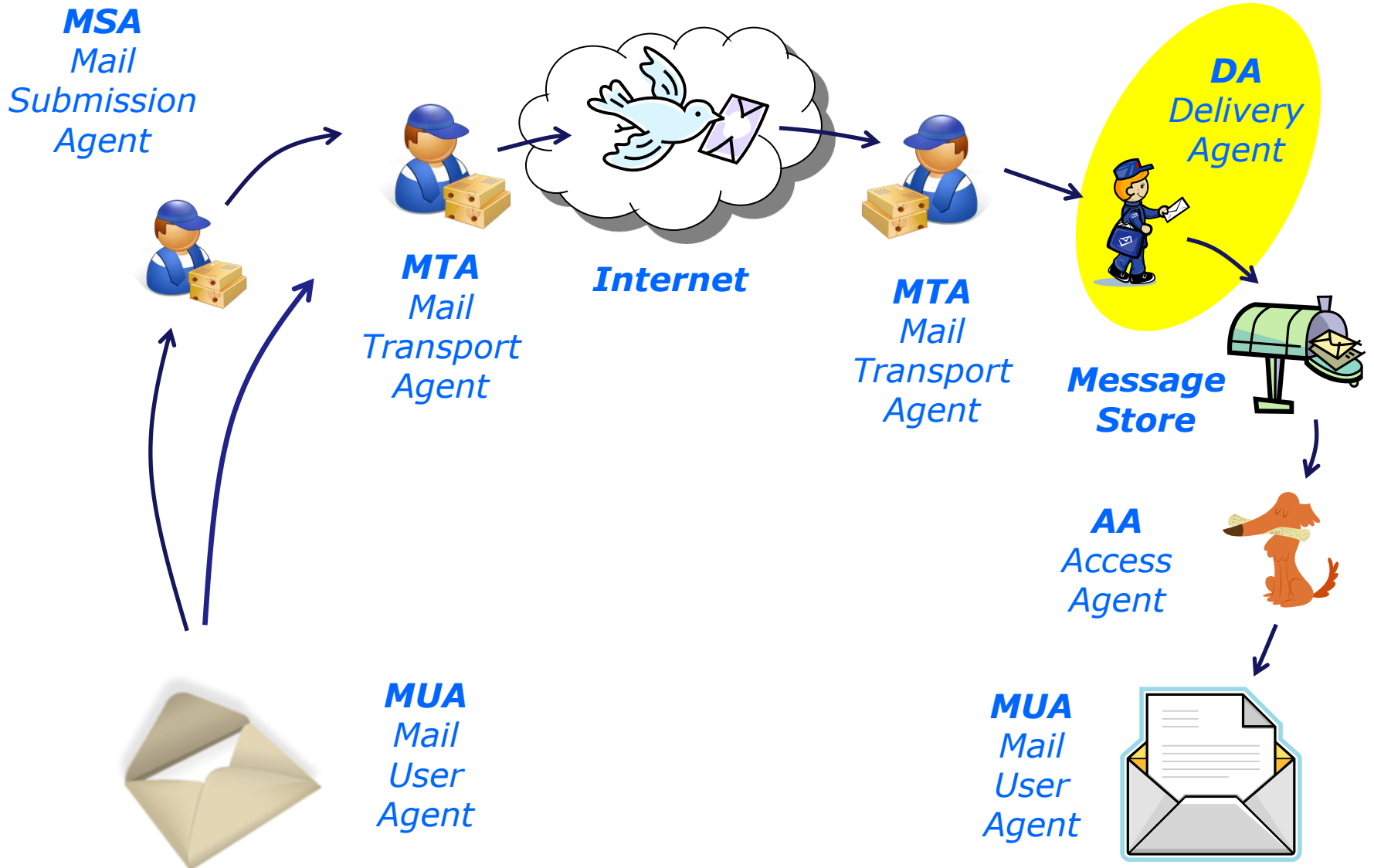
benji: *simben*192

*Use your own username,
not Benji's*

- Use **newaliases**
- Send an email to student with **mail benji**
- **su - xxxxxx192** and read your message with **mail**

DA

Overview of email



compose and send message

open and read message 101

Delivery Agents

Delivery agents deliver the mail to the recipient's mailbox. Mail can be delivered to a mailbox, a distribution list and to a program.

DA
Delivery
Agent



Examples:

- fetchmail - used when fetching mail from a remote (ISP's) server
- procmail - can be configured to filter and process mail as it delivers
- smrsh - a restricted shell to replace the use of sh for delivering mail to programs

We will use fetchmail in Lab 9 to pull mail from a remote mailbox and read it locally using /bin/mail.

Fetchmail Example



DA
Delivery
Agent

Current Folder: **INBOX** [Sign Out](#)

[Compose](#) [Addresses](#) [Folders](#) [Options](#) [Search](#) [Help](#) [Calendar](#)

[Toggle All](#) Viewing Messages: 1 to 11 (11 total)

Move Selected To: Transform Selected Messages:

From	Date	Subject
<input type="checkbox"/> Benji Simms	10:38 am	test from evolution
<input type="checkbox"/> simms@hayrocket.com	10:46 am	test from webmail
<input type="checkbox"/> Rich Simms	8:37 am	Motorpsycho (part5)
<input type="checkbox"/> Rich Simms	8:37 am	Motorpsycho (part4)
<input type="checkbox"/> Rich Simms	8:37 am	Motorpsycho (part2)
<input type="checkbox"/> Rich Simms	8:37 am	Motorpsycho (part3)
<input type="checkbox"/> Rich Simms	8:37 am	Motorpsycho (part1)
<input type="checkbox"/> Rich Simms	Tue, 10:57 pm	Star Wars
<input type="checkbox"/> Rich Simms	Tue, 10:53 pm	Star Wars
<input type="checkbox"/> Rich Simms	Tue, 10:53 pm	Star Wars
<input type="checkbox"/> Rich Simms	Tue, 10:40 pm	101

[Toggle All](#) Viewing Messages: 1 to 11 (11 total)

Viewing received messages using SquirrelMail (a web based MUA)

Messages are arriving on the simms@hayrocket.com account

Fetchmail Example



DA
Delivery
Agent

*Hidden file in user's
home directory*

```
[cis192@elrond ~]$ cat .fetchmailrc
poll mail.hayrocket.com protocol pop3
username simms@hayrocket.com
password ██████████
keep
```

*Keeps a copy of each
message on the server*

***fetchmail** is a delivery
agent that can be used to
pull down messages into
the local mail store*

```
[cis192@elrond ~]$
[cis192@elrond ~]$ fetchmail
fetchmail: Server CommonName mismatch: *.mail.dreamhost.com != mail.hayrocket.com
fetchmail: Server certificate verification error: unable to get local issuer certificate
fetchmail: Server certificate verification error: certificate not trusted
fetchmail: Server certificate verification error: unable to verify the first certificate
11 messages for simms@hayrocket.com at mail.hayrocket.com (13976 octets).
reading message simms@hayrocket.com@mail.hayrocket.com:1 of 11 (992 octets) not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:2 of 11 (1027 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:3 of 11 (1028 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:4 of 11 (1028 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:5 of 11 (1676 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:6 of 11 (1739 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:7 of 11 (1694 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:8 of 11 (1690 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:9 of 11 (1338 octets). not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:10 of 11 (900 octets) not flushed
reading message simms@hayrocket.com@mail.hayrocket.com:11 of 11 (864 octets) not flushed
[cis192@elrond ~]$
```


Fetchmail Example



DA
Delivery
Agent

```
[cis192@elrond ~]$ mail
```

```
Mail version 8.1 6/6/93. Type ? for help.
```

```
"/var/spool/mail/cis192": 11 messages 11 new
```

```
>N 1 rsimms@Opus.cabrillo Wed May 5 13:25 29/1398 "101"  
N 2 rsimms@Opus.cabrillo Wed May 5 13:25 29/1433 "Star Wars"  
N 3 rsimms@Opus.cabrillo Wed May 5 13:25 29/1434 "Star Wars"  
N 4 rsimms@Opus.cabrillo Wed May 5 13:25 29/1434 "Star Wars"  
N 5 rsimms@Opus.cabrillo Wed May 5 13:25 55/2056 "Motorpsycho (part1)"  
N 6 rsimms@Opus.cabrillo Wed May 5 13:25 55/2119 "Motorpsycho (part3)"  
N 7 rsimms@Opus.cabrillo Wed May 5 13:25 55/2074 "Motorpsycho (part2)"  
N 8 rsimms@Opus.cabrillo Wed May 5 13:25 55/2068 "Motorpsycho (part4)"  
N 9 rsimms@Opus.cabrillo Wed May 5 13:25 43/1728 "Motorpsycho (part5)"  
N 10 simms@hayrocket.com Wed May 5 13:25 29/1299 "test from webmail"  
N 11 simms@hayrocket.com Wed May 5 13:25 28/1264 "test from evolution"
```

```
& 10
```

```
Message 10:
```

```
From simms@hayrocket.com Wed May 5 13:25:17 2010  
X-Original-To: simms@hayrocket.com  
Delivered-To: x10727529@spaceymail-a4.g.dreamhost.com  
Date: Wed, 5 May 2010 10:46:27 -0700  
Subject: test from webmail  
From: simms@hayrocket.com  
To: simms@hayrocket.com  
User-Agent: SquirrelMail/1.4.20  
MIME-Version: 1.0  
Content-Type: text/plain; charset=iso-8859-1  
Content-Transfer-Encoding: 8bit
```

```
here we go
```

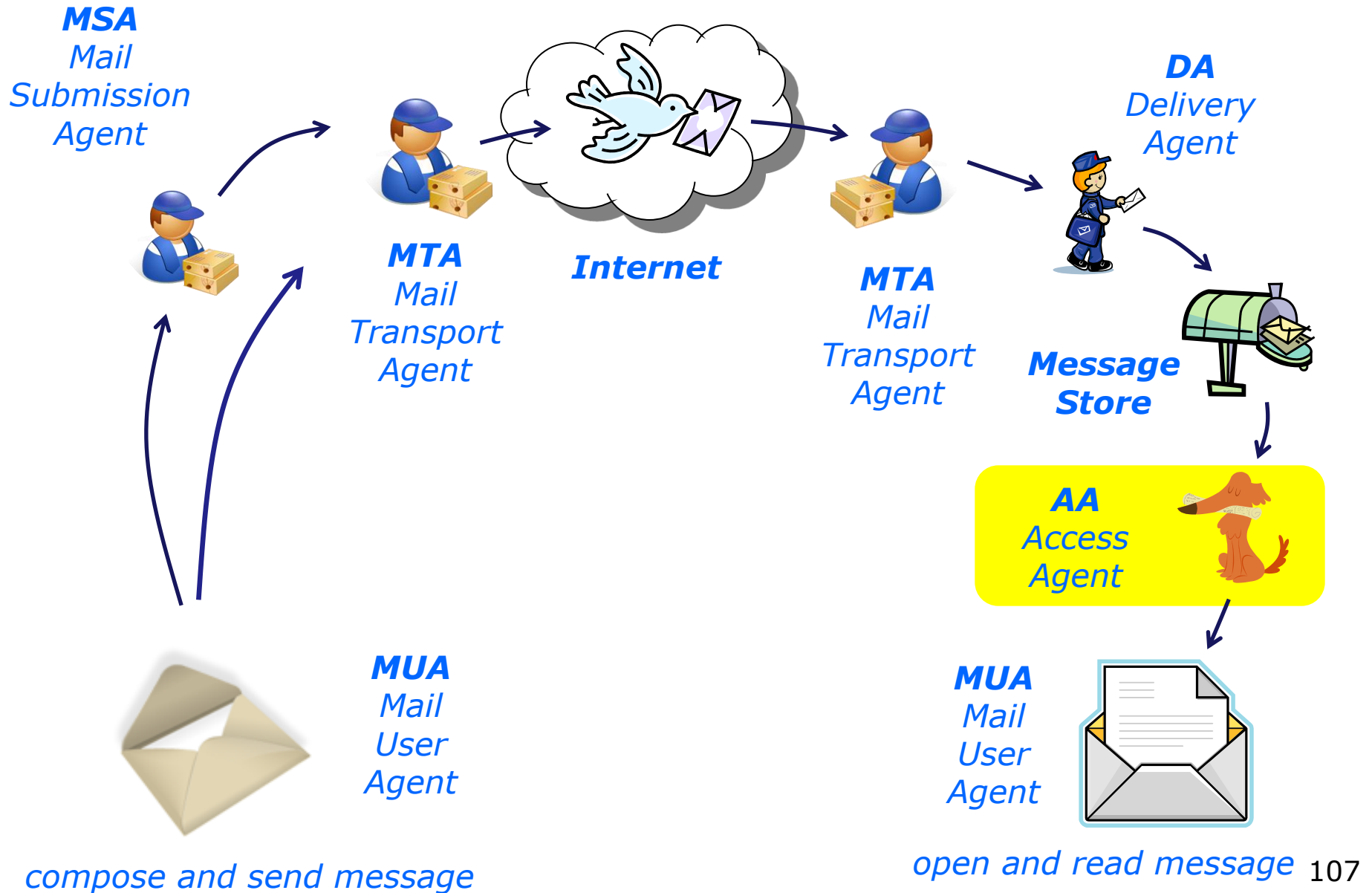
```
&
```

***The downloaded
messages can be read
using /bin/mail***

You will do this in Lab 9

AA

Overview of email



compose and send message

open and read message 107

Access Agents

AA



Access Agent services

- POP (port 110)
- IMAP (port 143)

MUAs (Mail User Agents) connect to POP or IMAP services to download messages that have been delivered.

Access Agents

POP and IMAP services are provided from the mail server. Remote clients connect to these servers to download the mail that has already arrived to its destination.

POP (Post Office Protocol)

- Allows only one way transfer from a central server to the client
- Must download all messages at once, and then messages are optionally deleted from the server
- Email is saved on whatever client is used to connect to the POP server

IMAP (Internet Message Access Protocol)

- Allows two way transmission
- Downloads only one message at a time and you can browse headers before deciding to download attachments (nice when in foreign country hotel room)
- Email messages are stored on the server in multiple folders
- Edits made offline can be uploaded and applied to messages later on

POP commmands

Getting messages from a POP server

Some POP commands

user *username*

Initiate POP connection

pass *password*

Provide password

list [*message*]

List one or all messages

retr *message*

Retrieves entire message

dele *message*

Deletes message

quit

End connection



POP

Example 1

(pop from cruzio)

Using POP Commands

Checking out a pop server using the telnet command

```
[cis192@elrond ~]$ telnet mail.skyhighway.com 110
```

```
Trying 63.249.82.6...
```

```
Connected to mail.skyhighway.com (63.249.82.6).
```

```
Escape character is '^]'.  
+OK Cruzio ready.
```

```
user ironchefkobe@skyhighway.com      login
```

```
+OK
```

```
pass Secret      password
```

```
+OK Logged in.
```

```
list      list messages (only one)
```

```
+OK 1 messages:
```

```
1 1292
```

```
.
```

```
retr      Retrieve (no message number specified)  
-ERR There's no message 0.
```

Using POP Commands

retr 1

```
+OK 1292 octets
X-Spam-Checker-Version: SpamAssassin 3.2.5 (2008-06-10) on skyhighway.com
X-Spam-Level:
X-Spam-Status: No, score=0.0 required=1.0 tests=none autolearn=disabled
    version=3.2.5
Received: from mail.cruzio.com (mail.cruzio.com [63.249.95.37])
    by skyhighway.com with ESMTTP id n3FN7Iss006071
    for <ironchefkobe@skyhighway.com>; Wed, 15 Apr 2009 16:07:18 -0700 (PDT)
Received: from cruziomail.cruzio.com (cruziomail.cruzio.com [63.249.95.24])
    by mail.cruzio.com with ESMTTP id n3FN7Ir0008189
    for <ironchefkobe@skyhighway.com>; Wed, 15 Apr 2009 16:07:18 -0700 (PDT)
Received: from 63.249.103.107
    (SquirrelMail authenticated user ironchefkobe@skyhighway.com)
    by cruziomail.cruzio.com with HTTP;
    Wed, 15 Apr 2009 16:07:18 -0700 (PDT)
Message-ID: <dd441411af6aa6dfe85b5f9fab30c2a6.squirrel@cruziomail.cruzio.com>
Date: Wed, 15 Apr 2009 16:07:18 -0700 (PDT)
Subject: test email
From: ironchefkobe@skyhighway.com
To: ironchefkobe@skyhighway.com
User-Agent: SquirrelMail/1.4.17
MIME-Version: 1.0
Content-Type: text/plain;charset=iso-8859-15
Content-Transfer-Encoding: 8bit
X-Priority: 3 (Normal)
Importance: Normal
X-Cruzio-Spamtrap: 2.5 (2009/02/25)
X-CruzioSpamTrap: SpamAssassin Tagged vs 3
X-CruzioSpamtrapClass: OK
```

```
test email
```

```
.
```

quit

```
+OK Logging out.
Connection closed by foreign host.
```

Retrieve message

Quit session

POP

Example 2

(pop from hershey)

```
[simben192@oslab ~]$ telnet hershey 110
Trying 172.30.5.17...
Connected to hershey.
Escape character is '^]'.
+OK Dovecot ready.
user simben192
+OK
pass Secret
+OK Logged in.
list
+OK 6 messages:
1 965
2 965
3 965
4 2075
5 2072
6 2075
.
```

From Opus, we pop off some messages from our mail account on Hershey

retr 6

```
+OK 2075 octets
Return-Path: <simben192@oslab.cabrillo.edu>
Received: from oslab.cabrillo.edu (oslab.cabrillo.edu [172.30.5.20])
    by hershey.cislab.net (8.13.8/8.13.8) with ESMTP id r47HrWqs024965
    for <simben192@hershey.cislab.net>; Tue, 7 May 2013 10:53:32 -0700
Received: from oslab.cabrillo.edu (localhost [127.0.0.1])
    by oslab.cabrillo.edu (8.14.4/8.14.4) with ESMTP id r47Hrf4j023552
    for <simben192@hershey.cislab.net>; Tue, 7 May 2013 10:53:41 -0700
Received: (from simben192@localhost)
    by oslab.cabrillo.edu (8.14.4/8.14.4/Submit) id r47HrfJG023541
    for simben192@hershey.cislab.net; Tue, 7 May 2013 10:53:41 -0700
From: Benji Simms <simben192@oslab.cabrillo.edu>
Message-Id: <201305071753.r47HrfJG023541@oslab.cabrillo.edu>
Date: Tue, 07 May 2013 10:53:41 -0700
To: simben192@hershey.cislab.net
Subject: Plan to improve English spelling
User-Agent: Heirloom mailx 12.4 7/29/08
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
```

From Opus, using pop we retrieve a message from our mail account on Hershey

```
A Plan for the Improvement of English Spelling
  by Mark Twain
```

```
For example, in Year 1 that useless letter "c" would be dropped to be replased
either by "k" or "s", and likewise "x" would no longer be part of the alphabet.
The only kase in which "c" would be retained would be the "ch" formation, which
will be dealt with later. Year 2 might reform "w" spelling, so that "which" and
"one" would take the same konsonant, wile Year 3 might well abolish "y"
replasing it with "i" and Iear 4 might fiks the "g/j" anomali wonse and for all.
Jenerally, then, the improvement would kontinue iear bai iear with Iear 5 doing
awai with useless double konsonants, and Iears 6-12 or so modifaing vowlz and
the rimeining voist and unvoist konsonants. Bai Iear 15 or sou, it wud fainali
bi posibl tu meik ius ov thi ridandant letez "c", "y" and "x" -- bai now jast a
memori in the maindz ov ould doderez -- tu riplais "ch", "sh", and "th"
rispektivli. Fainali, xen, aafte sam 20 iers ov orxogrefkl riform, wi wud hev a
lojikl, kohirnt speling in ius xrewawt xe Ingliy-spiking werld.
```

quit

```
+OK Logging out.
Connection closed by foreign host.
[simben192@oslab ~]$
```

Read email you sent yourself previously

On Opus, send some sample emails to your Hershey account

```
[simben192@oslab ~]$ send-lab09-emails
Mailing simben192@hershey.cislab.net the file, MarkTwain (Plan
to improve English spelling)
Mailing simben192@simms-teach.com the file, spellk (Spelling
Checker)
[simben192@oslab ~]$ send-lab09-emails
Mailing simben192@hershey.cislab.net the file, MarkTwain (Plan
to improve English spelling)
Mailing simben192@simms-teach.com the file, spellk (Spelling
Checker)
```

Username

simben192
milhom192
rodduk192
bunsol192
calsea192
capchr192
doucor192
drybry192
farsha192
garton192
hovdav192
irvdon192
musdav192
noreva192
pangab192
veleli192
wiltaj192
vascar192
rysada192
lyoben192
srelau192

From Opus, use the pop server on Hershey to read your mail

telnet hershey 110

user *username*

pass 

list

retr 1

quit

IMAP commands

Getting messages from an IMAP server

Some example IMAP commands

tag **login** *username password*

Initiate IMAP session

tag **list** "Mail" "*"

Shows folders in Mail folder

tag **list** "" "*"

Shows all folders

tag **select** INBOX

Selects folder (read-write)

tag **examine** INBOX

Selects folder (read)

tag **status** INBOX (messages)

Shows basic information

tag **fetch** *num* FULL

Shows message headers

tag **fetch** *num* **body**[text]

Shows message text content

tag **logout**

End session

IMAP

example 1

Using IMAP Commands - Example 1

Checking out a IMAP server with the telnet command

```
[root@arwen ~]# telnet mail.hayrocket.com 143
Trying 208.113.200.50...
Connected to mail.hayrocket.com (208.113.200.50).
Escape character is '^]'.
* OK [CAPABILITY IMAP4rev1 UIDPLUS CHILDREN NAMESPACE
THREAD=ORDEREDSUBJECT THREAD=REFERENCES SORT QUOTA IDLE STARTTLS]
Courier-IMAP ready. Copyright 1998-2005 Double Precision, Inc. See
COPYING for distribution information.
a001 login arwen@hayrocket.com Secret
a001 OK LOGIN Ok.
a002 list "Mail" "*"
a002 OK LIST completed
a003 SELECT INBOX
* FLAGS (\Draft \Answered \Flagged \Deleted \Seen \Recent)
* OK [PERMANENTFLAGS (\* \Draft \Answered \Flagged \Deleted \Seen)]
Limited
* 2 EXISTS
* 0 RECENT
* OK [UIDVALIDITY 1241196931] Ok
* OK [MYRIGHTS "acdilrsw"] ACL
a003 OK [READ-WRITE] Ok
```

Using IMAP Commands - Example 1

Checking out a IMAP server with the telnet command

a004 FETCH 1 full

```
* 1 FETCH (FLAGS () INTERNALDATE "01-May-2009 09:57:02 -0700"
RFC822.SIZE 1171 ENVELOPE ("Fri, 1 May 2009 09:57:02 -0700 (PDT)" "Salsa
at the Palomar" ((NIL NIL "arwen" "hayrocket.com")) ((NIL NIL "arwen"
"hayrocket.com")) ((NIL NIL "arwen" "hayrocket.com")) ((NIL NIL "arwen"
"hayrocket.com")) NIL NIL NIL
"<5d005d3ae56798364bdc396b730538ea.squirrel@webmail.hayrocket.com>")
BODY ("text" "plain" ("charset" "iso-8859-1") NIL NIL "8bit" 71 6))
a004 OK FETCH completed.
```

a005 FETCH 1 body[text]

```
* 1 FETCH (BODY[TEXT] {71})
Hi Arwen,
```

Interested in going Salsa dancing tonight?

- Elrond

```
)
* 1 FETCH (FLAGS (\Seen))
a005 OK FETCH completed.
```

Same message in SquirrelMail

<p>Subject: Salsa at the Palomar From: arwen@hayrocket.com Date: Fri, May 1, 2009 9:57 am To: arwen@hayrocket.com Priority: Normal Options: View Full Header View Printable Version Download this as a file</p>
<p>Hi Arwen, Interested in going Salsa dancing tonight? - Elrond</p>

Using IMAP Commands - Example 1

Checking out a IMAP server with the telnet command

a006 list "" "*"

```
* LIST (\HasNoChildren) "." "INBOX.Drafts"  
* LIST (\HasNoChildren) "." "INBOX.Trash"  
* LIST (\HasNoChildren) "." "INBOX.Sent"  
* LIST (\Marked \HasChildren) "." "INBOX"  
a006 OK LIST completed
```

a007 status INBOX (messages)

```
* STATUS "INBOX" (MESSAGES 2)  
a007 OK STATUS Completed.
```

a008 examine INBOX

```
* FLAGS (\Draft \Answered \Flagged \Deleted \Seen \Recent)  
* OK [PERMANENTFLAGS ()] No permanent flags permitted  
* 2 EXISTS  
* 0 RECENT  
* OK [UIDVALIDITY 1241196931] Ok  
* OK [MYRIGHTS "acdilrsw"] ACL  
a008 OK [READ-ONLY] Ok
```

a009 logout

```
* BYE Courier-IMAP server shutting down  
a009 OK LOGOUT completed  
Connection closed by foreign host.
```

Folder view using SquirrelMail

Folders

Last Refresh:
Thu, 11:37 pm
([Check mail](#))

- **INBOX**
Drafts
Sent
Trash (Purge)
old-messages

IMAP

example 2



Using IMAP Commands - Example 2

This has got to be the most basic of MUAs - using telnet!

```
[root@arwen ~]# telnet mail.hayrocket.com 143
Trying 208.113.200.50...
Connected to mail.hayrocket.com (208.113.200.50).
Escape character is '^]'.
* OK [CAPABILITY IMAP4rev1 UIDPLUS CHILDREN NAMESPACE THREAD=ORDEREDSUBJECT
THREAD=REFERENCES SORT QUOTA IDLE STARTTLS] Courier-IMAP ready. Copyright
1998-2005 Double Precision, Inc. See COPYING for distribution information.
a001 login arwen@hayrocket.com Secret
a001 OK LOGIN Ok.
a002 SELECT INBOX
* FLAGS (\Draft \Answered \Flagged \Deleted \Seen \Recent)
* OK [PERMANENTFLAGS (\* \Draft \Answered \Flagged \Deleted \Seen)] Limited
* 6 EXISTS
* 0 RECENT
* OK [UIDVALIDITY 1241196931] Ok
* OK [MYRIGHTS "acdilrsw"] ACL
a002 OK [READ-WRITE] Ok
```

Connecting to a IMAP server (an Access Agent) to get mail



Using IMAP Commands - Example 2

Note that each IMAP command label is incremented

a003 FETCH 6 full

```
* 6 FETCH (FLAGS () INTERNALDATE "04-May-2009 05:23:49 -0700" RFC822.SIZE
975 ENVELOPE ("Mon, 4 May 2009 04:47:00 -0700" "Almost" (("Rich Simms" NIL
"rsimms" "opus.cabrillo.edu")) (("Rich Simms" NIL "rsimms"
"opus.cabrillo.edu")) ("Rich Simms" NIL "rsimms" "opus.cabrillo.edu"))
((NIL NIL "arwen" "hayrocket.com")) NIL NIL NIL
"<200905041147.n44B10w0028558@opus.cabrillo.edu>") BODY ("text" "plain" NIL
NIL NIL "8bit" 11 1))
a003 OK FETCH completed.
```

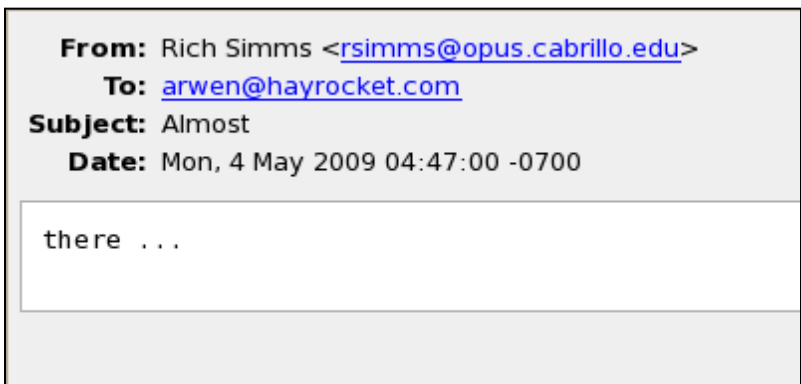
a004 FETCH 6 body[text]

```
* 6 FETCH (BODY[TEXT] {11}
there ...
)
* 6 FETCH (FLAGS (\Seen))
a004 OK FETCH completed.
```

a005 logout

```
* BYE Courier-IMAP server shutting down
a005 OK LOGOUT completed
Connection closed by foreign host.
[root@arwen ~]#
```

Same message in Evolution





IMAP

example 3


```
[simben192@oslab ~]$ telnet hershey 143
Trying 172.30.5.17...
Connected to hershey.
Escape character is '^'.
* OK Dovecot ready.
a001 login simben192 Secret
a001 OK Logged in.
a002 list "" "*"
* LIST (\NoInferiors \UnMarked) "/" "INBOX"
a002 OK List completed.
a003 select INBOX
* FLAGS (\Answered \Flagged \Deleted \Seen \Draft)
* OK [PERMANENTFLAGS (\Answered \Flagged \Deleted
\Seen \Draft *)] Flags permitted.
* 6 EXISTS
* 0 RECENT
* OK [UNSEEN 4] First unseen.
* OK [UIDVALIDITY 1367789848] UIDs valid
* OK [UIDNEXT 7] Predicted next UID
a003 OK [READ-WRITE] Select completed.
a004 fetch 1 full
* 1 FETCH (FLAGS (\Seen) INTERNALDATE "05-May-2013
14:39:04 -0700" RFC822.SIZE 965 ENVELOPE ("Sun, 05 May
2013 14:39:07 -0700" "From Opus Test 1" (("Rich Simms"
NIL "rsimms" "oslab.cabrillo.edu")) (("Rich Simms" NIL
"rsimms" "oslab.cabrillo.edu")) (("Rich Simms" NIL
"rsimms" "oslab.cabrillo.edu")) ((NIL NIL "simben192"
"hershey.cislab.net")) NIL NIL NIL
"<201305052139.r45Ld7dt028725@oslab.cabrillo.edu>")
BODY ("text" "plain" ("charset" "us-ascii") NIL NIL
"7bit" 15 1))
a004 OK Fetch completed.
a005 fetch 1 body[text]
* 1 FETCH (BODY[TEXT] {15}
Test number 1
)
a005 OK Fetch completed.
```

a006 fetch 6 body[text]

```
* 6 FETCH (BODY[TEXT] {1088}
A Plan for the Improvement of English Spelling
by Mark Twain
For example, in Year 1 that useless letter "c"
would be dropped to be replased
either by "k" or "s", and likewise "x" would no
longer be part of the alphabet.
The only kase in which "c" would be retained would
be the "ch" formation, which
will be dealt with later. Year 2 might reform "w"
spelling, so that "which" and
"one" would take the same konsonant, wile Year 3
might well abolish "y"
replasing it with "i" and Iear 4 might fiks the
"g/j" anomali wonse and for all.
Jenerally, then, the improvement would kontinue
iear bai iear with Iear 5 doing
awai with useless double konsonants, and Iears 6-12
or so modifaing vowlz and
the rimeining voist and unvoist konsonants. Bai
Iear 15 or sou, it wud fainali
bi posibl tu meik ius ov thi ridandant letez "c",
"y" and "x" -- bai now jast a
memori in the maindz ov ould doderez -- tu riplais
"ch", "sh", and "th"
rispektivli. Fainali, xen, aafte sam 20 iers ov
orxogrefkl riform, wi wud hev a
lojikl, kohirnt speling in ius xrewawt xe Ingliy-
spiking werld.
)
a006 OK Fetch completed.
a007 logout
* BYE Logging out
a007 OK Logout completed.
Connection closed by foreign host.
[simben192@oslab ~]$
```

Read email you sent yourself previously

On Opus, send some sample emails to your Hershey account

```
[simben192@oslab ~]$ send-lab09-emails
Mailing simben192@hershey.cislab.net the file, MarkTwain (Plan
to improve English spelling)
Mailing simben192@simms-teach.com the file, spellk (Spelling
Checker)
[simben192@oslab ~]$ send-lab09-emails
Mailing simben192@hershey.cislab.net the file, MarkTwain (Plan
to improve English spelling)
Mailing simben192@simms-teach.com the file, spellk (Spelling
Checker)
```

Username

simben192
milhom192
rodduk192
bunsol192
calsea192
capchr192
doucor192
drybry192
farsha192
garton192
hovdav192
irvdon192
musdav192
noreva192
pangab192
veleli192
wiltaj192
vascar192
rysada192
lyoben192
srelau192

From Opus, use the imap service on Hershey to read your mail

telnet hershey 143

a001 login *username* 

a002 list "" "*"

a003 select INBOX

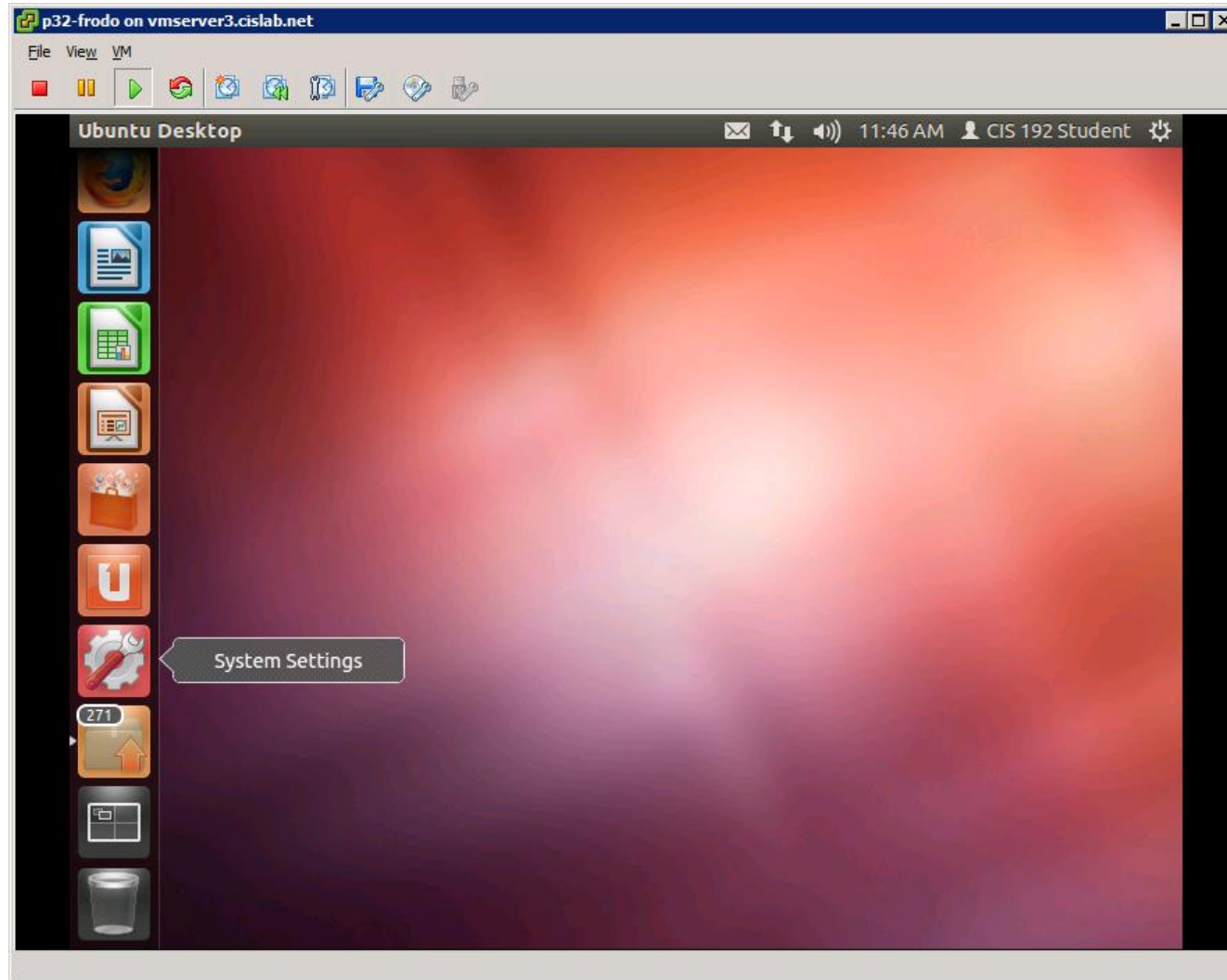
a004 fetch 1 full

a005 fetch 1 body[text]

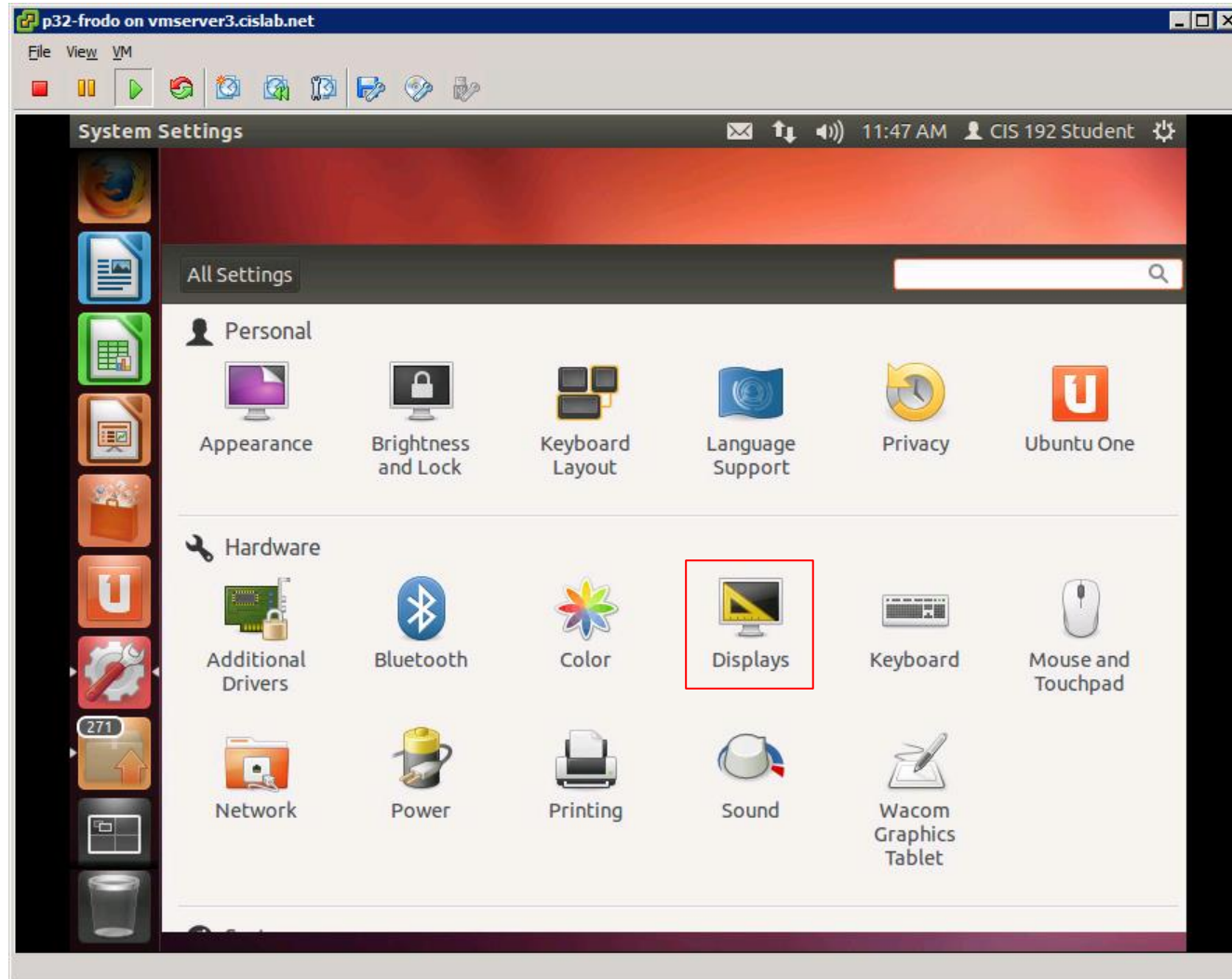
a006 logout

VM Screen Resolution VMware

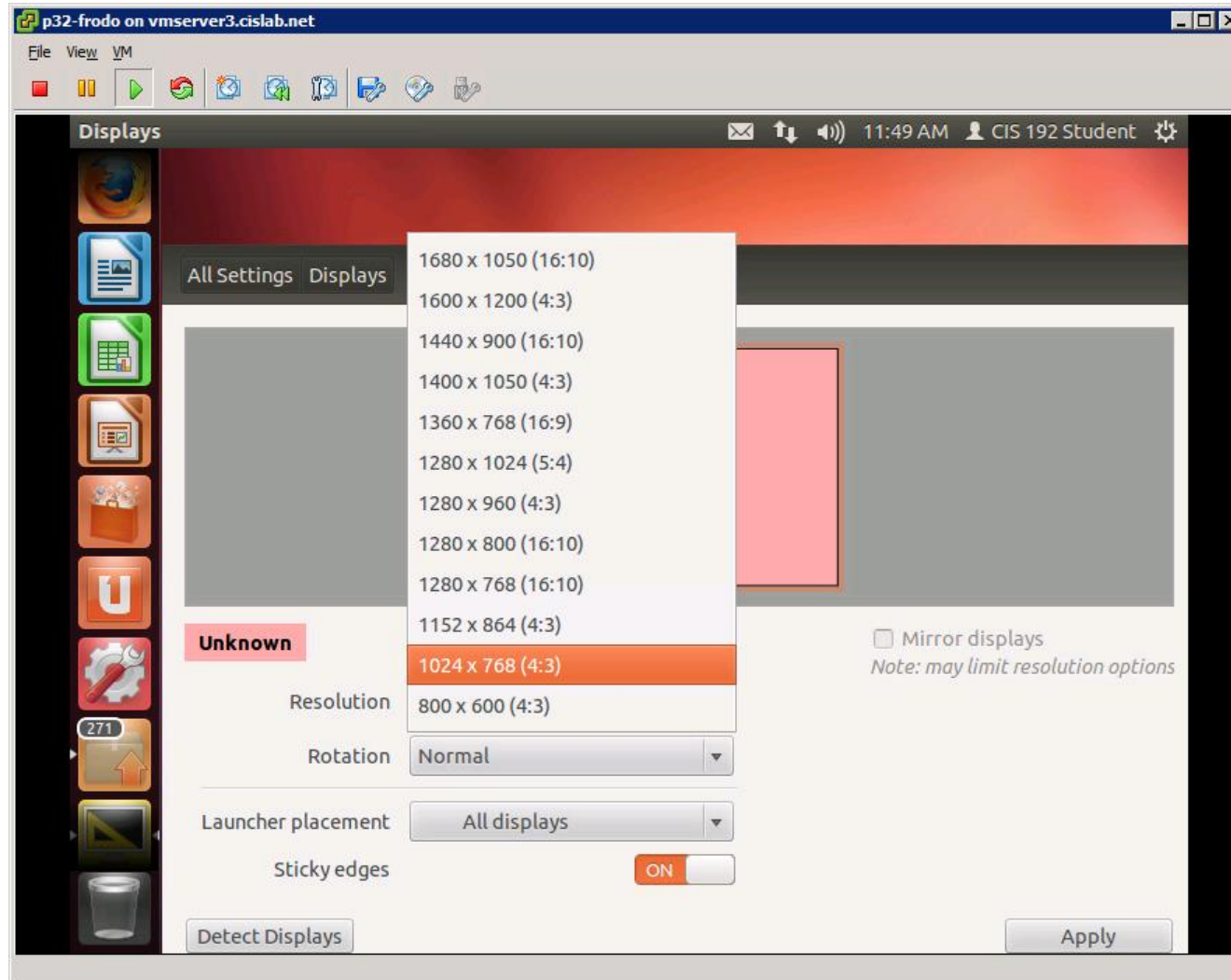
VM Screen Resolution



VM Screen Resolution



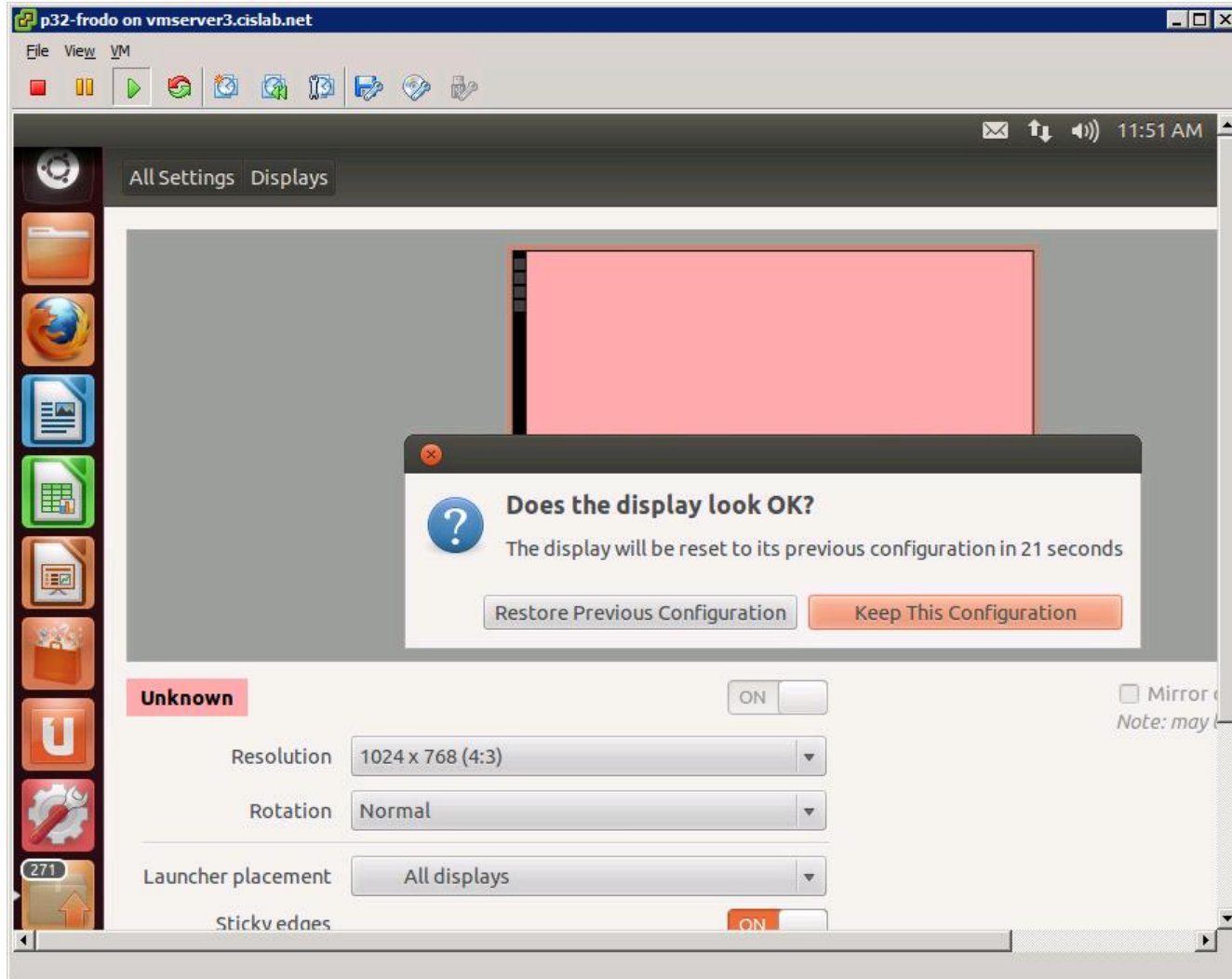
VM Screen Resolution



Select 1024 x 768 (4:3)

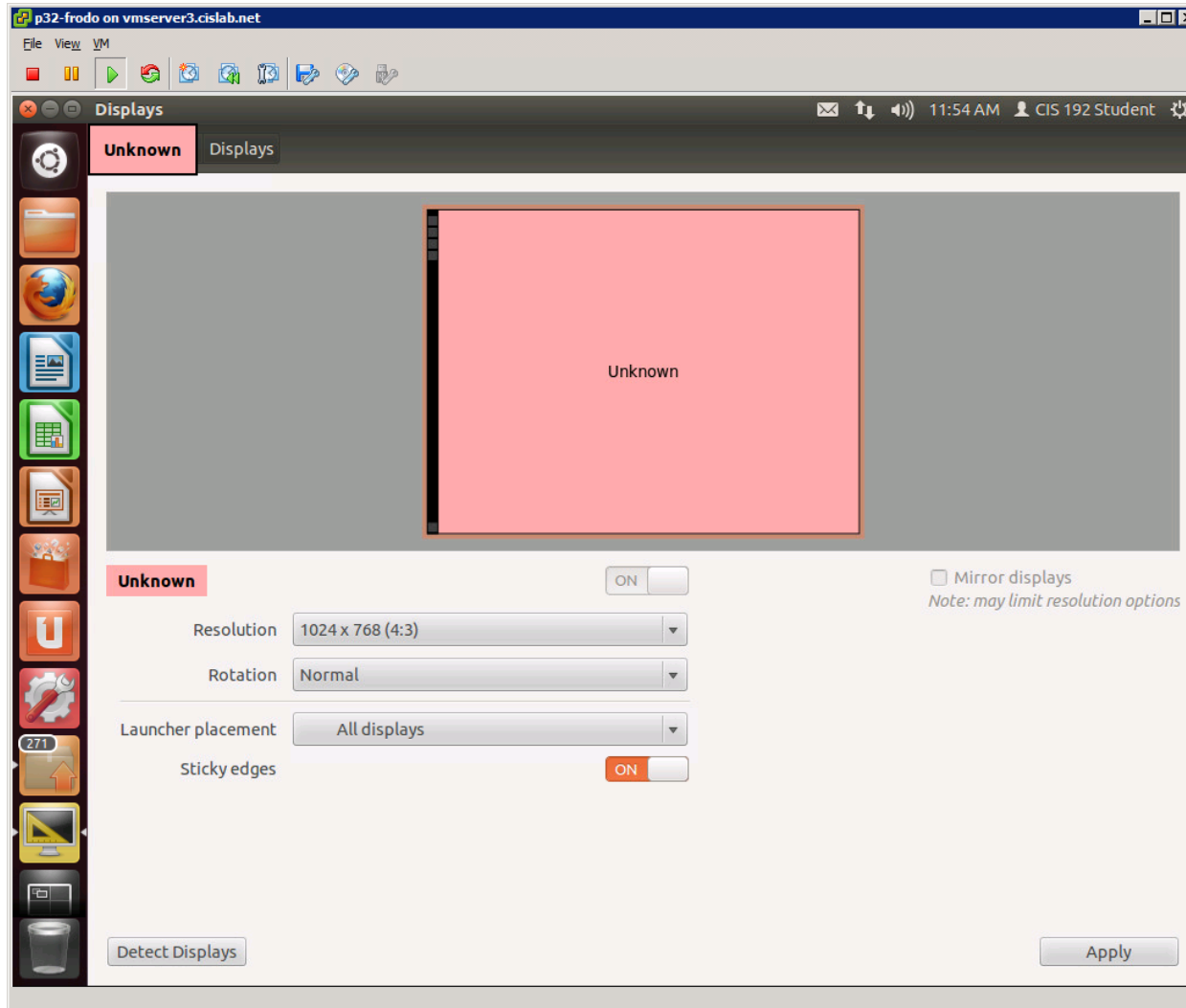
CIS 192 - Lesson 12

VM Screen Resolution



Click Keep This Configuration

VM Screen Resolution



Move mouse to upper left so red  appears and click to close

VM Screen Size

Configure the display settings on Frodo to be 1024 by 768

MUA Configuration

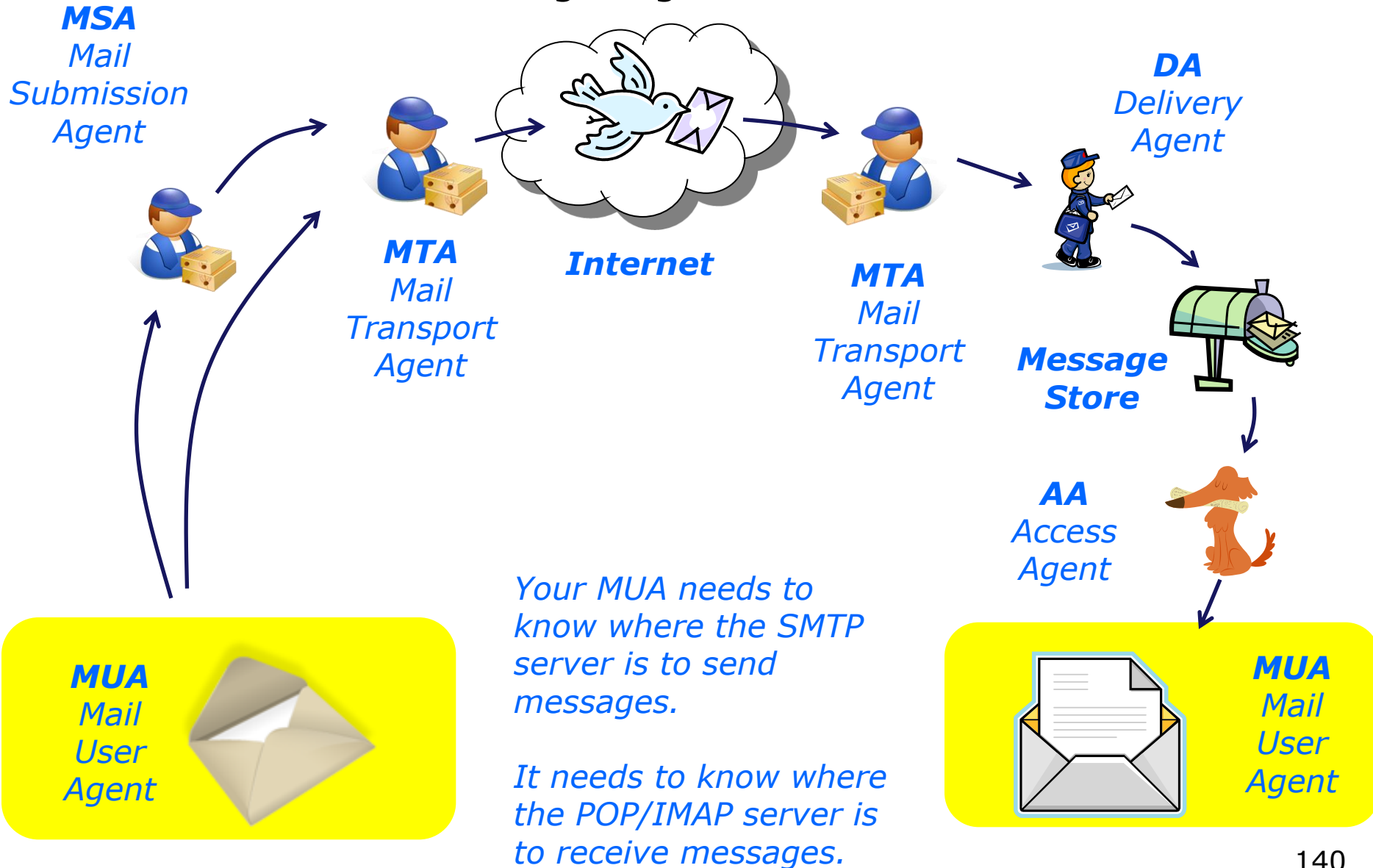
Configuring the MUA

You will need the following information from your ISP to configure your MUA:

- username and password
- SMTP server hostname
- POP or IMAP server hostname

There may also be special ports or security settings you may have to configure

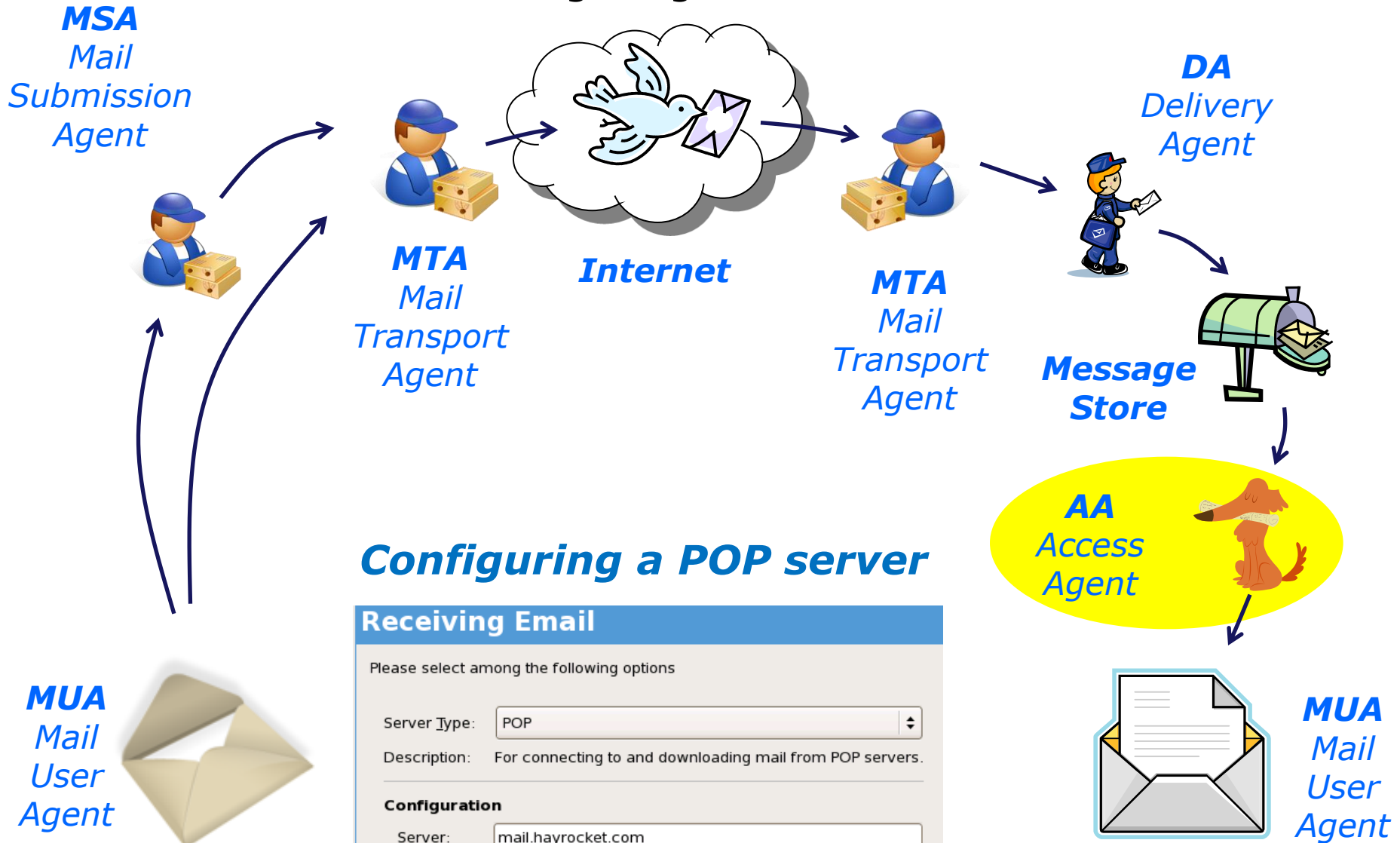
Configuring the MUA



Your MUA needs to know where the SMTP server is to send messages.

It needs to know where the POP/IMAP server is to receive messages.

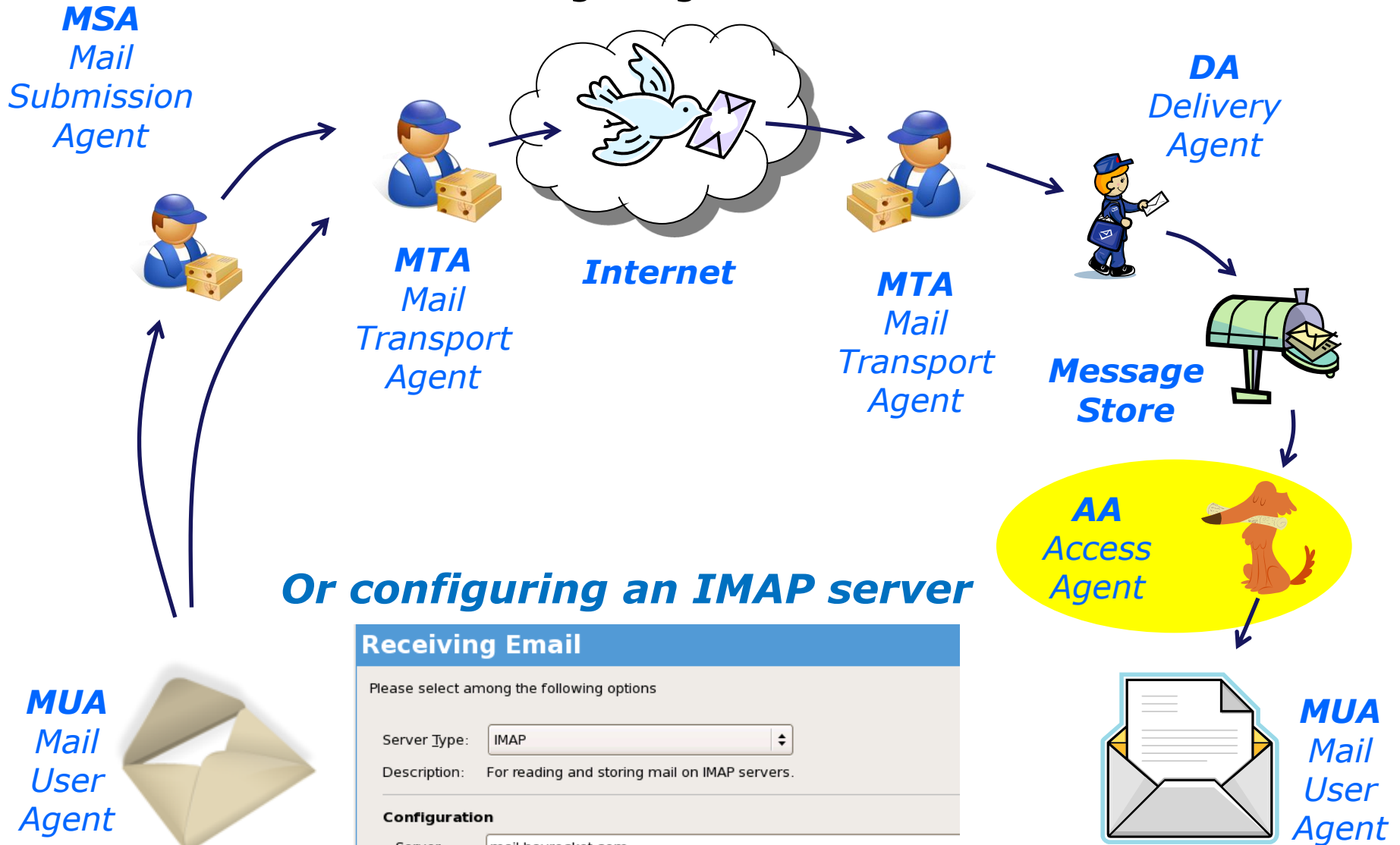
Configuring the MUA



Configuring a POP server

Receiving Email	
Please select among the following options	
Server Type:	<input type="text" value="POP"/>
Description:	For connecting to and downloading mail from POP servers.
Configuration	
Server:	<input type="text" value="mail.hayrocket.com"/>
Username:	<input type="text" value="rich@hayrocket.com"/>

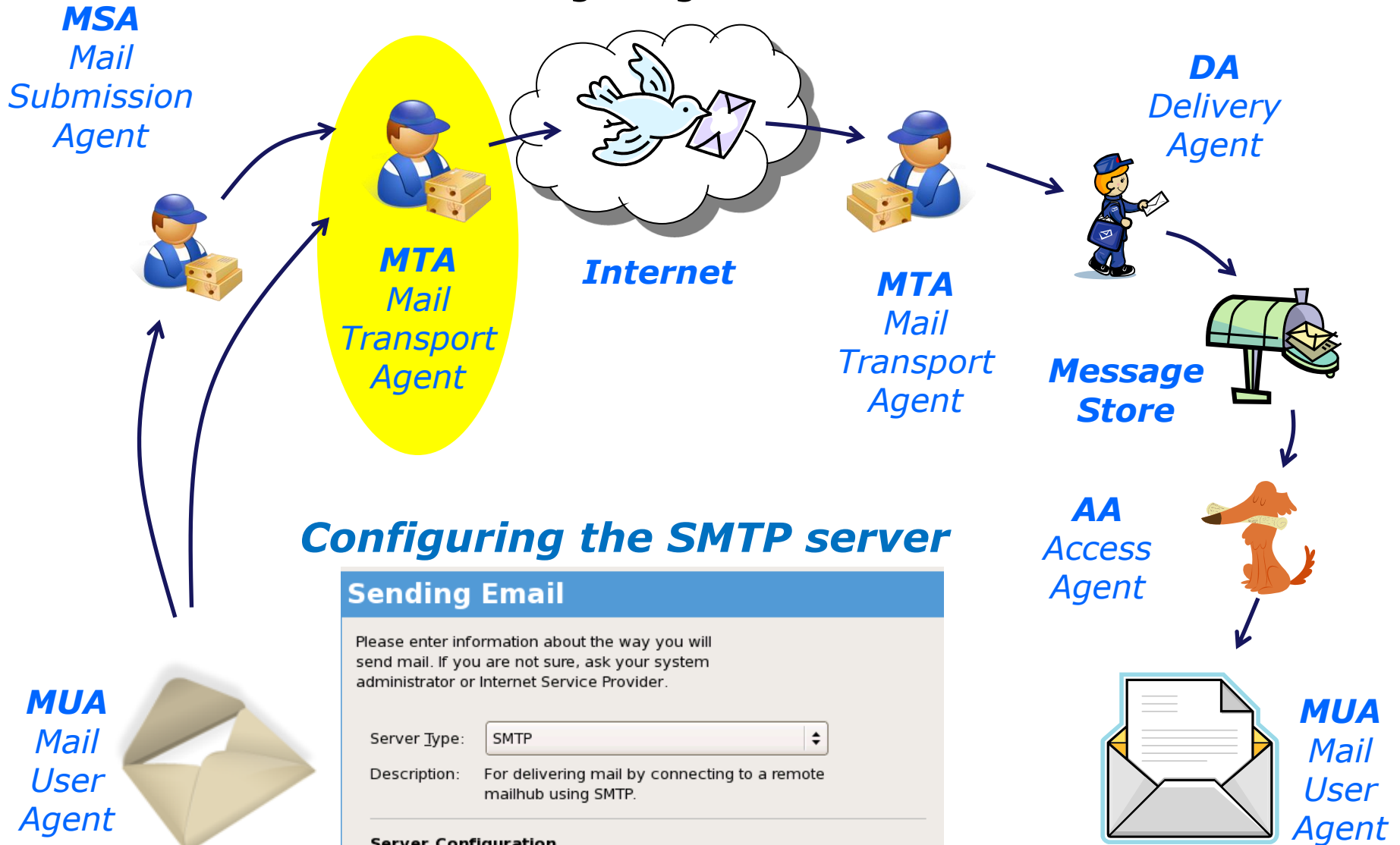
Configuring the MUA



Or configuring an IMAP server

Receiving Email	
Please select among the following options	
Server Type:	<input type="text" value="IMAP"/>
Description:	For reading and storing mail on IMAP servers.
Configuration	
Server:	<input type="text" value="mail.hayrocket.com"/>
Username:	<input type="text" value="arwen@hayrocket.com"/>

Configuring the MUA



Configuring the SMTP server

Sending Email

Please enter information about the way you will send mail. If you are not sure, ask your system administrator or Internet Service Provider.

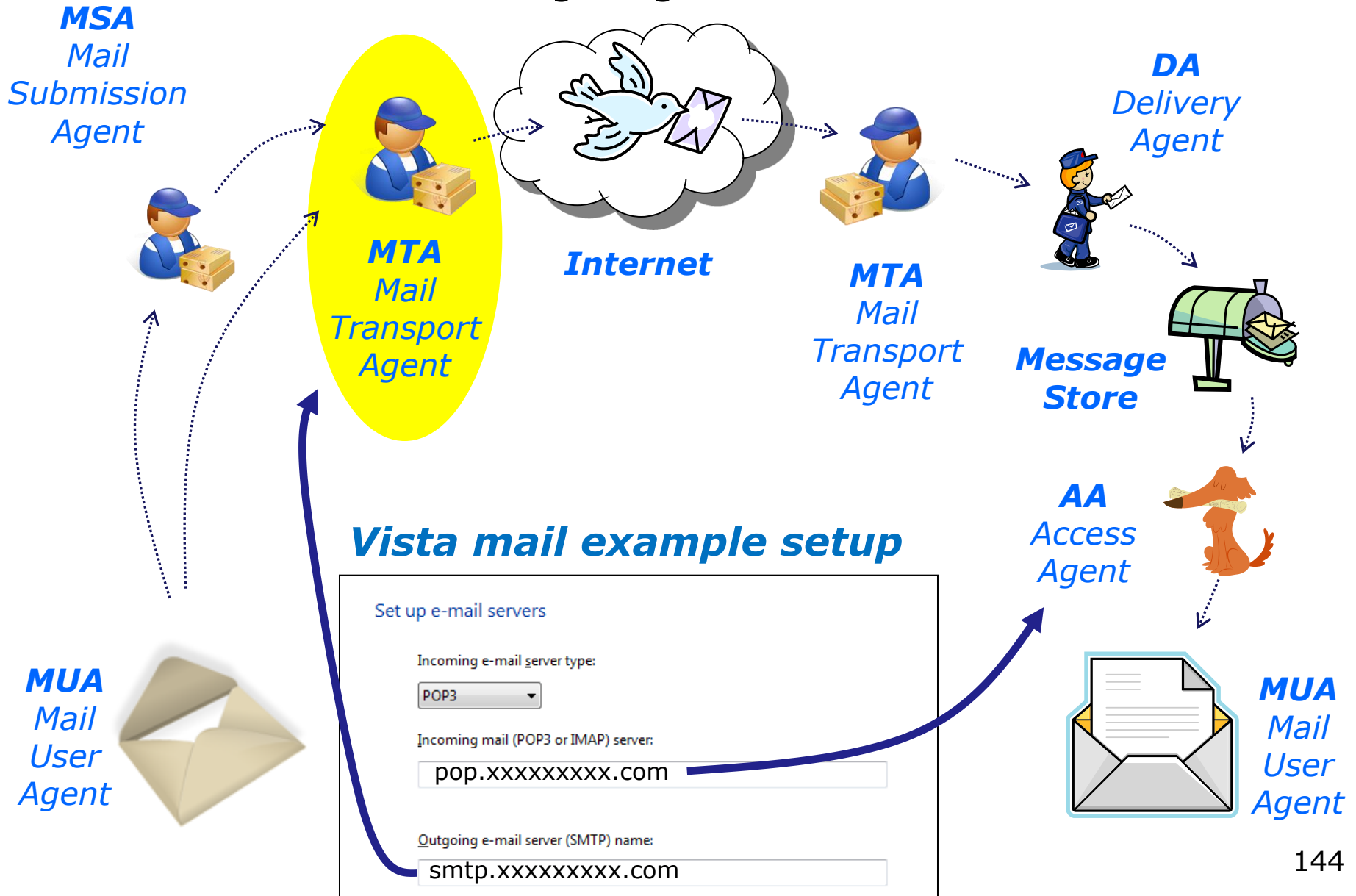
Server Type:

Description: For delivering mail by connecting to a remote mailhub using SMTP.

Server Configuration

Server:

Configuring the MUA



Vista mail example setup

Set up e-mail servers

Incoming e-mail server type:

Incoming mail (POP3 or IMAP) server:

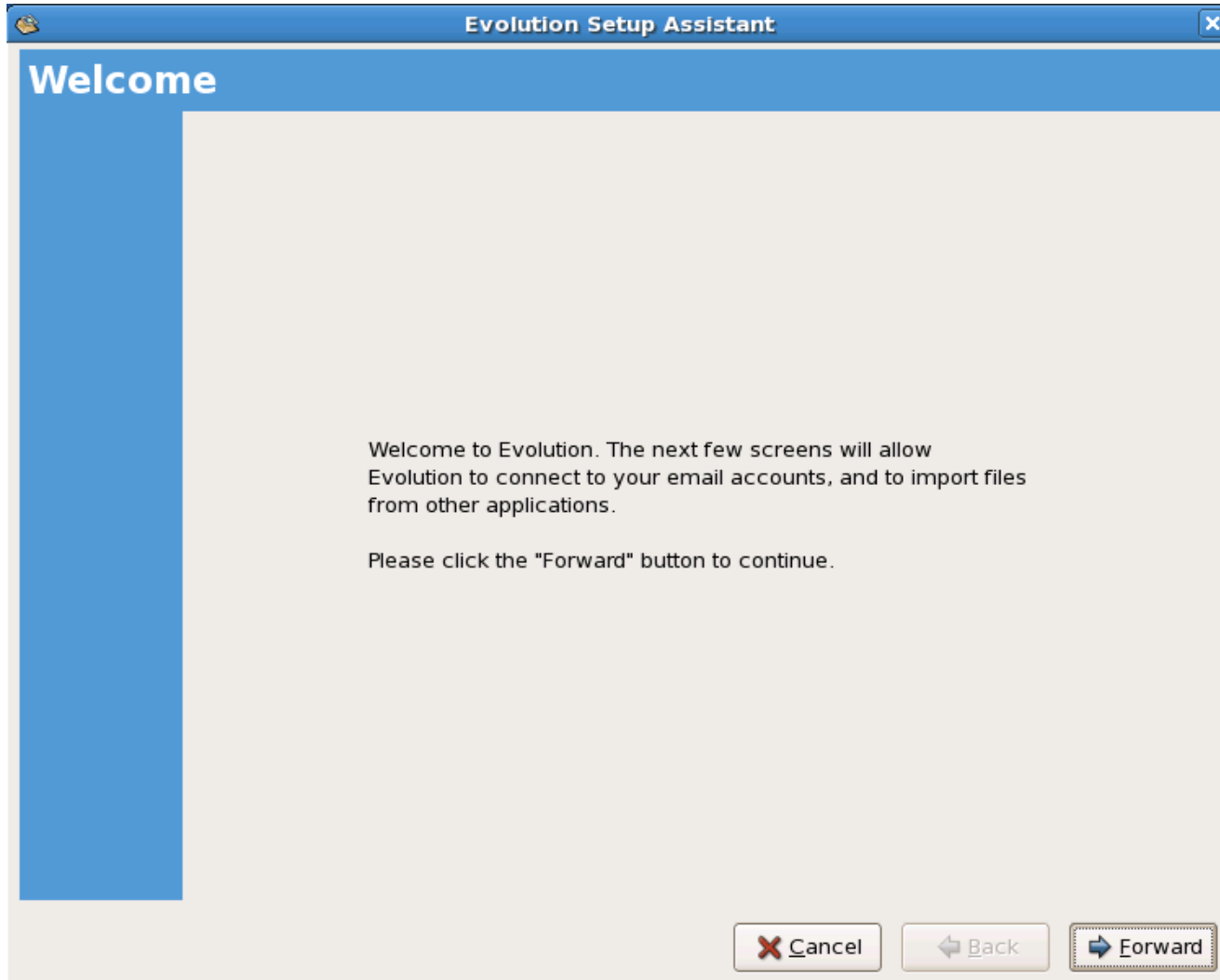
Outgoing e-mail server (SMTP) name:

Evolution

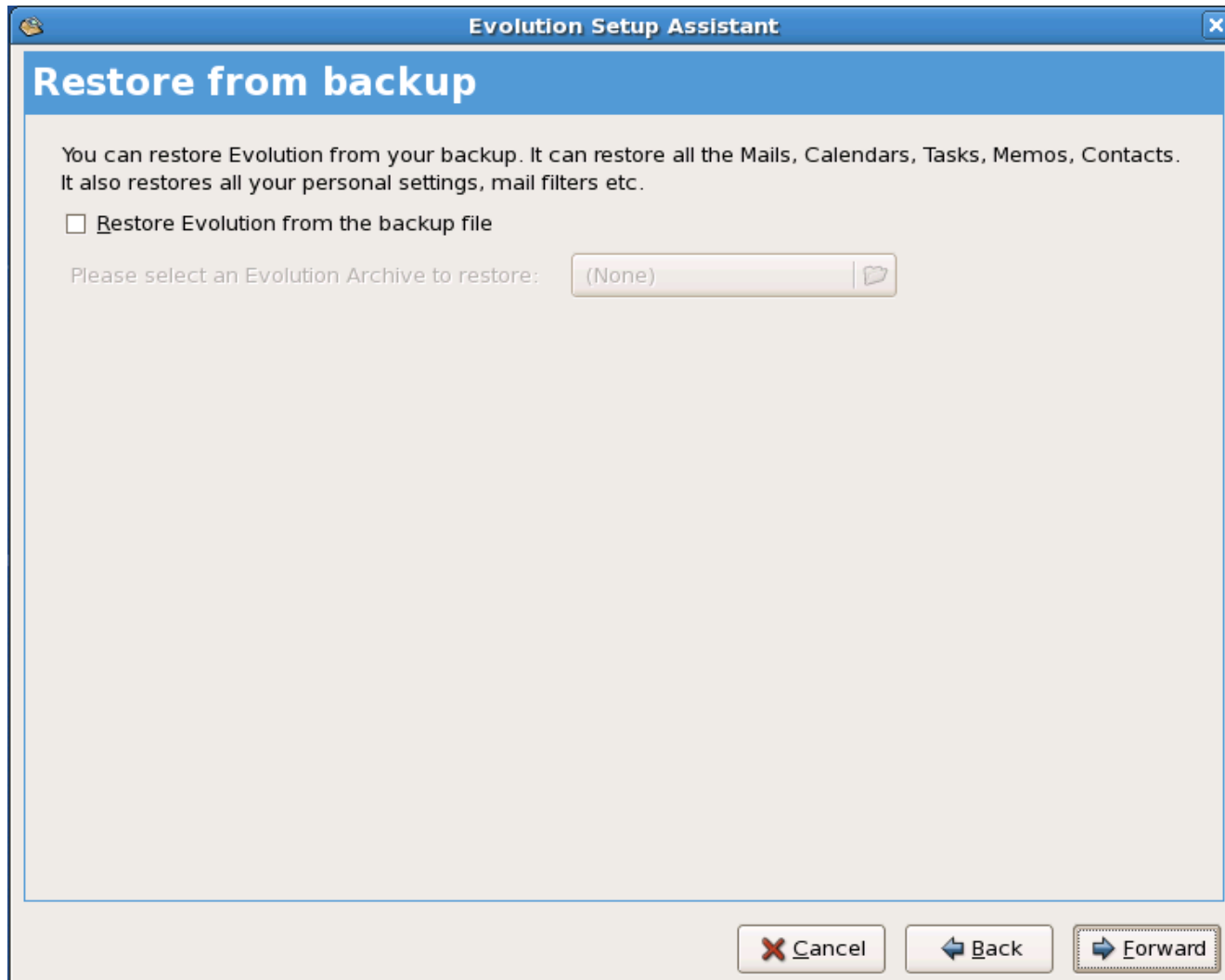
MUA

Configuration

IMAP



*Most MUAs
use a wizard
for first time
configuration*



*Most MUAs
allow
configurations
to be
exported and
imported*

The screenshot shows a window titled "Evolution Setup Assistant" with a close button in the top right corner. The window has a blue header bar with the word "Identity" in white. Below the header, there is a paragraph of instructions: "Please enter your name and email address below. The 'optional' fields below do not need to be filled in, unless you wish to include this information in email you send." The form is divided into two sections: "Required Information" and "Optional Information". Under "Required Information", there are two text input fields: "Full Name:" containing "Arwen Undomiel" and "Email Address:" containing "arwen@hayrocket.com". Under "Optional Information", there is a checked checkbox labeled "Make this my default account", followed by two empty text input fields for "Reply-To:" and "Organization:". At the bottom of the window, there are three buttons: "Cancel" with a red X icon, "Back" with a left-pointing arrow, and "Forward" with a right-pointing arrow.

Evolution Setup Assistant

Identity

Please enter your name and email address below. The "optional" fields below do not need to be filled in, unless you wish to include this information in email you send.

Required Information

Full Name:

Email Address:

Optional Information

Make this my default account

Reply-To:

Organization:

This is used to identify you on messages you send

The screenshot shows the 'Evolution Setup Assistant' window with the 'Receiving Email' tab selected. The window title is 'Evolution Setup Assistant'. The main heading is 'Receiving Email'. Below the heading, it says 'Please select among the following options'. The 'Server Type' is set to 'IMAP' in a dropdown menu. The description reads 'For reading and storing mail on IMAP servers.' There are three sections: 'Configuration' with 'Server:' set to 'mail.hayrocket.com' and 'Username:' set to 'arwen@hayrocket.com'; 'Security' with 'Use Secure Connection:' set to 'No encryption'; and 'Authentication Type' with 'Password' selected in a dropdown and a 'Check for Supported Types' button. There is also an unchecked checkbox for 'Remember password'. At the bottom, there are three buttons: 'Cancel', 'Back', and 'Forward'.

To read mail you must specify either a POP or IMAP server.

The username is used for authentication

Evolution Setup Assistant

Receiving Options

Checking for New Mail

- Automatically check for new mail every minutes
- Check for new messages in all folders

Connection to Server

- Use custom command to connect to server

Command:

Folders

- Show only subscribed folders
- Override server-supplied folder namespace

Namespace:

Options

- Apply filters to new messages in INBOX on this server
- Check new messages for junk contents
- Only check for junk messages in the INBOX folder
- Automatically synchronize remote mail locally

Various options are available depending on whether you chose a POP or IMAP server

Evolution Setup Assistant

Sending Email

Please enter information about the way you will send mail. If you are not sure, ask your system administrator or Internet Service Provider.

Server Type: SMTP

Description: For delivering mail by connecting to a remote mailhub using SMTP.

Server Configuration

Server: mx.cruzio.com

Server requires authentication

Security

Use Secure Connection: No encryption

Authentication

Type: PLAIN

Username: arwen@hayrocket.com

Remember password

Note: to use a different port than 25 append :nnn to the server name.

For example, to specify port 587 use mx.cruzio.com:587

Note, some ISPs (like Cruzio) will block sending messages using a non-ISP SMTP server.

Evolution Setup Assistant

Account Management

Please enter a descriptive name for this account in the space below.
This name will be used for display purposes only.

Account Information

Type the name by which you would like to refer to this account.
For example: "Work" or "Personal"

Name:

If you have multiple accounts you can use a label to identify them

MUA Configuration

Evolution Setup Assistant

Timezone

Use the left mouse button to zoom in on an area of the map and select a time zone.
Use the right mouse button to zoom out.

Time Zones



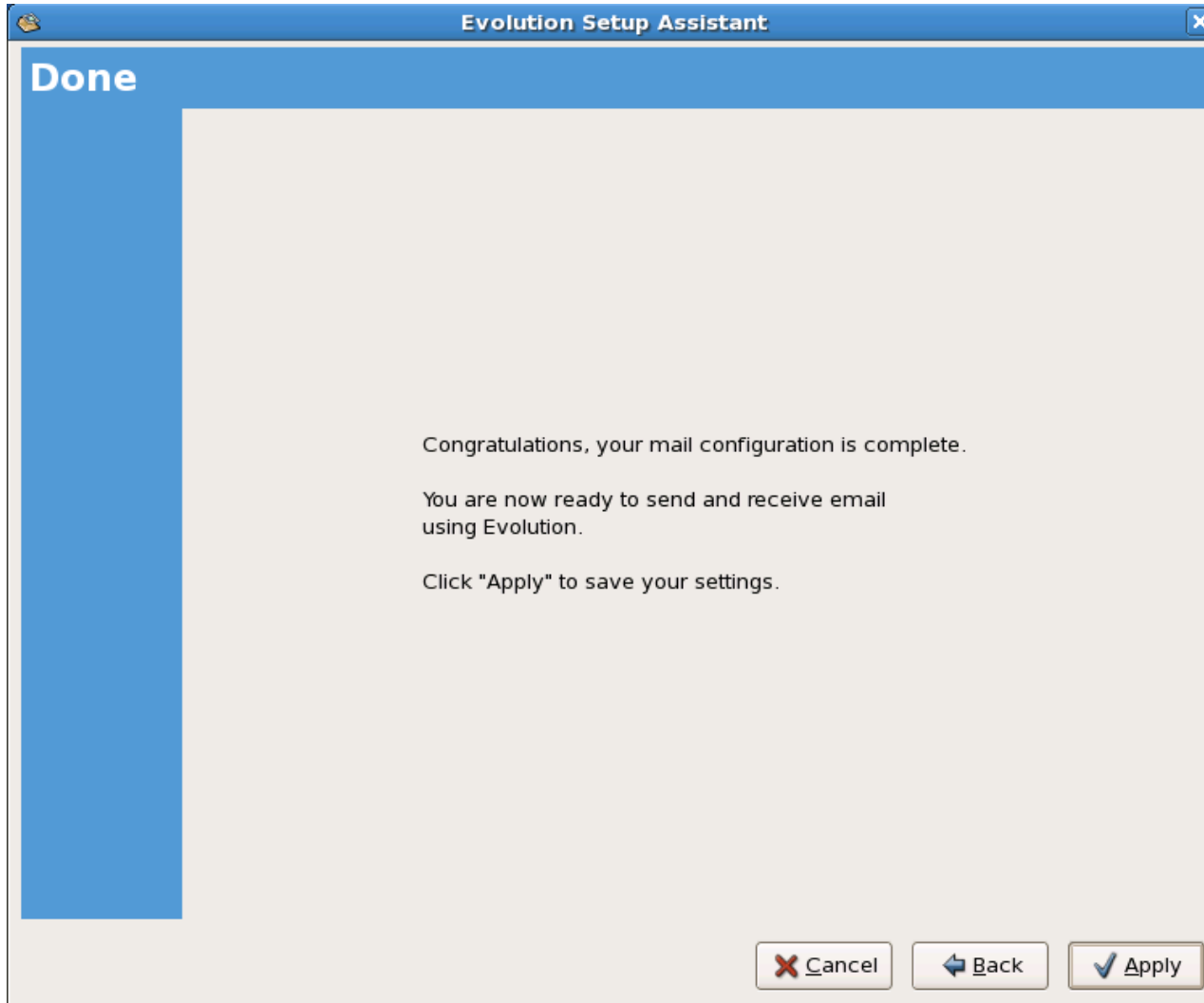
The map displays the world with various time zones marked by small diamond icons. The map is interactive, allowing users to zoom in and out using mouse buttons.

Selection

UTC

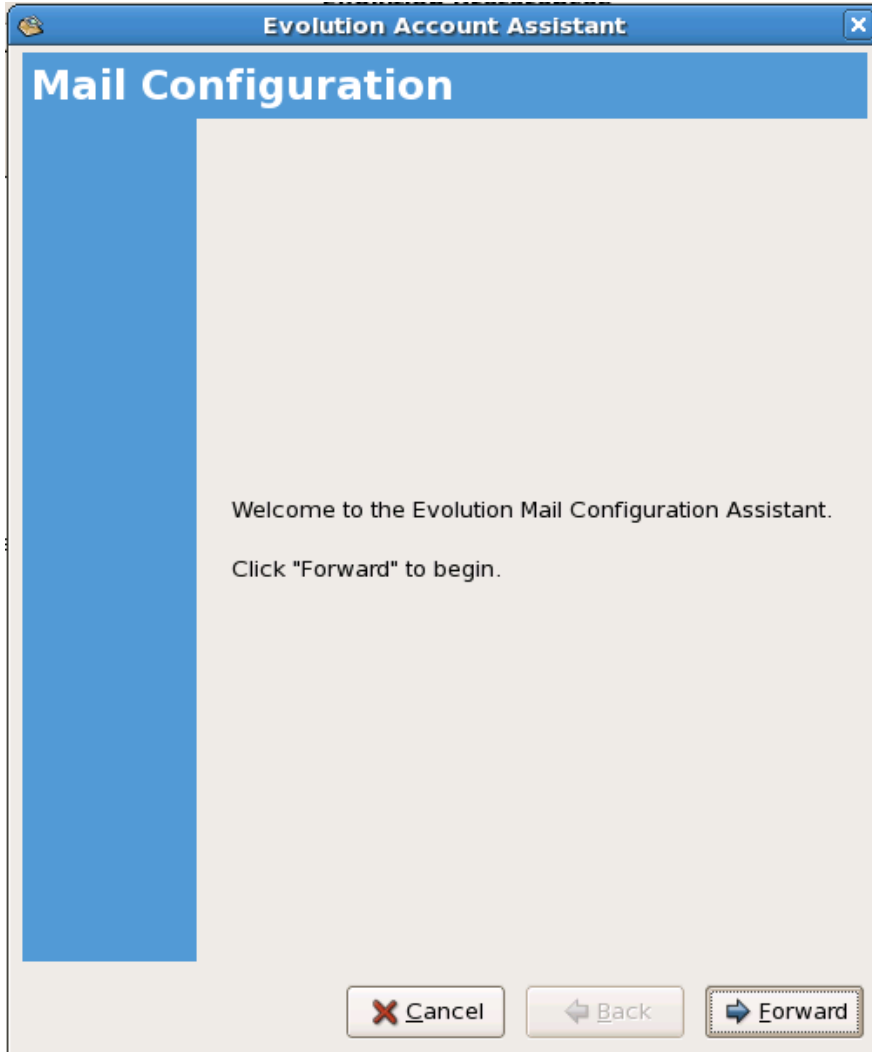
Cancel Back Forward

MUA Configuration

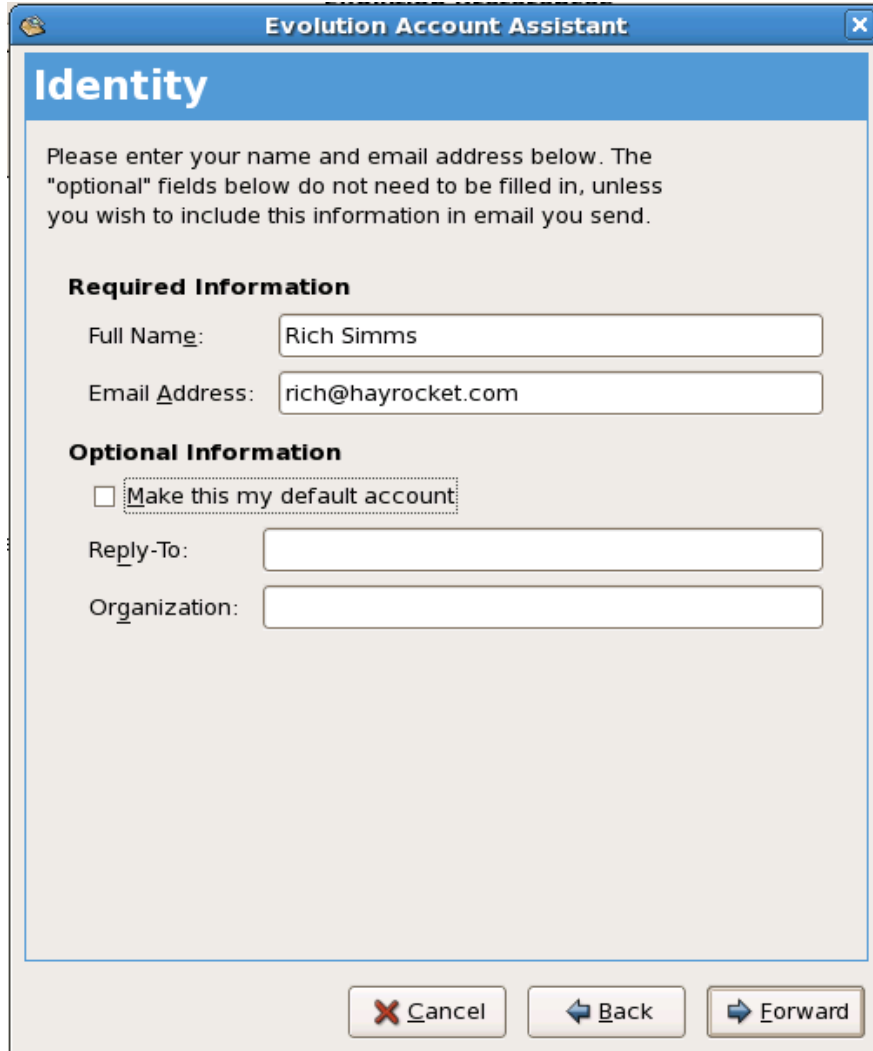


Evolution
MUA
configuration
POP

MUA Configuration



Most MUAs use a wizard for configuration



The screenshot shows a window titled "Evolution Account Assistant" with a close button in the top right corner. The window has a blue header bar with the word "Identity" in white. Below the header, there is a paragraph of text: "Please enter your name and email address below. The 'optional' fields below do not need to be filled in, unless you wish to include this information in email you send." The form is divided into two sections: "Required Information" and "Optional Information". Under "Required Information", there are two text input fields: "Full Name:" with the value "Rich Simms" and "Email Address:" with the value "rich@hayrocket.com". Under "Optional Information", there is a checkbox labeled "Make this my default account" which is currently unchecked. Below the checkbox are two more text input fields: "Reply-To:" and "Organization:", both of which are empty. At the bottom of the window, there are three buttons: "Cancel" (with a red X icon), "Back" (with a left arrow icon), and "Forward" (with a right arrow icon).

*This is used
to identify
you on
messages you
send*

The screenshot shows the 'Evolution Account Assistant' window with the 'Receiving Email' tab selected. The window title is 'Evolution Account Assistant'. The main heading is 'Receiving Email'. Below the heading, it says 'Please select among the following options'. The 'Server Type' is set to 'POP'. The description is 'For connecting to and downloading mail from POP servers.' The 'Configuration' section has 'Server' set to 'mail.hayrocket.com' and 'Username' set to 'rich@hayrocket.com'. The 'Security' section has 'Use Secure Connection' set to 'No encryption'. The 'Authentication Type' section has 'Password' selected, 'Check for Supported Types' checked, and 'Remember password' checked. At the bottom, there are three buttons: 'Cancel', 'Back', and 'Forward'.

Evolution Account Assistant

Receiving Email

Please select among the following options

Server Type: POP

Description: For connecting to and downloading mail from POP servers.

Configuration

Server: mail.hayrocket.com

Username: rich@hayrocket.com

Security

Use Secure Connection: No encryption

Authentication Type

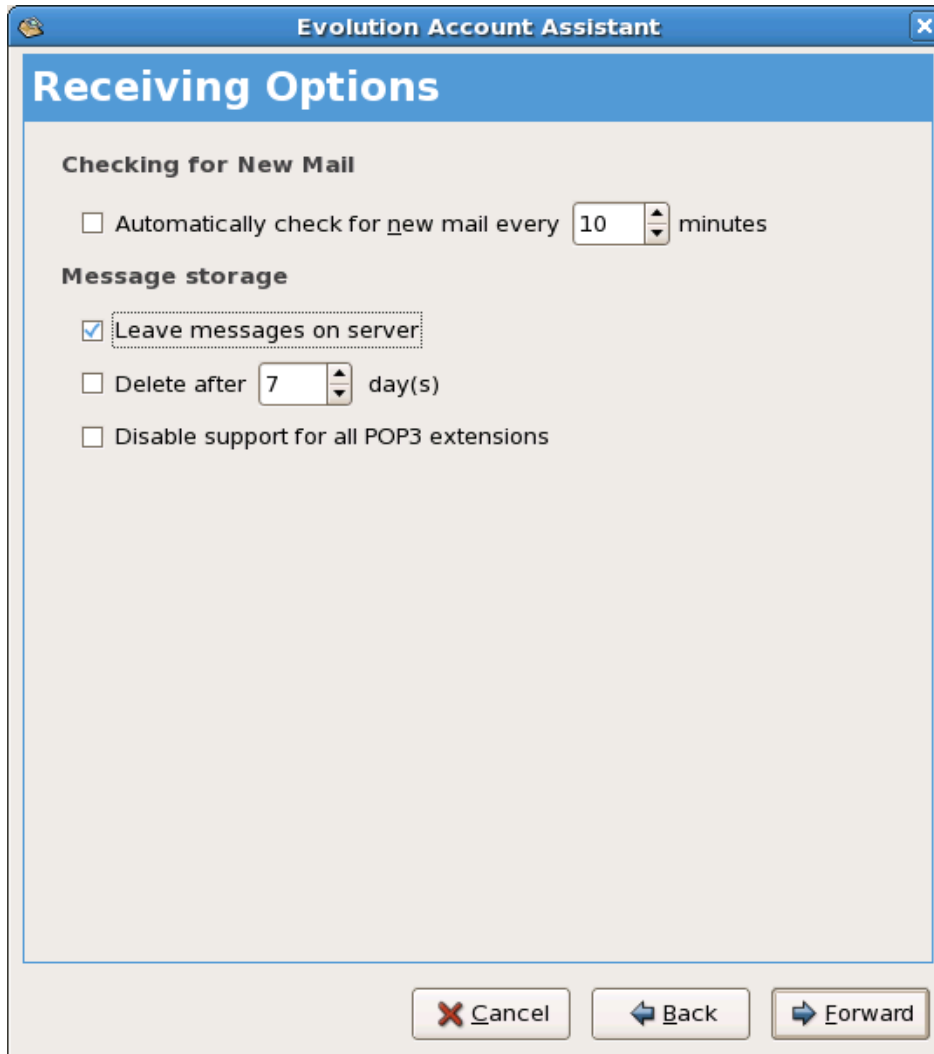
Password Check for Supported Types

Remember password

Cancel Back Forward

*To read mail
you must
specify either a
POP or IMAP
server.*

*The username
is used for
authentication*



Various options are available depending on whether you chose a POP or IMAP server

MUA Configuration

The screenshot shows the 'Evolution Account Assistant' window with the 'Sending Email' tab selected. The window title is 'Evolution Account Assistant'. The main heading is 'Sending Email'. Below the heading is a paragraph: 'Please enter information about the way you will send mail. If you are not sure, ask your system administrator or Internet Service Provider.' The 'Server Type' is set to 'SMTP'. The 'Description' is 'For delivering mail by connecting to a remote mailhub using SMTP.' The 'Server Configuration' section has 'Server' set to 'mx.cruzio.com' and a checked checkbox for 'Server requires authentication'. The 'Security' section has 'Use Secure Connection' set to 'No encryption'. The 'Authentication' section has 'Type' set to 'PLAIN', a 'Check for Supported Types' button, an empty 'Username' field, and an unchecked checkbox for 'Remember password'. At the bottom are 'Cancel', 'Back', and 'Forward' buttons.

Evolution Account Assistant

Sending Email

Please enter information about the way you will send mail. If you are not sure, ask your system administrator or Internet Service Provider.

Server Type: SMTP

Description: For delivering mail by connecting to a remote mailhub using SMTP.

Server Configuration

Server: mx.cruzio.com

Server requires authentication

Security

Use Secure Connection: No encryption

Authentication

Type: PLAIN

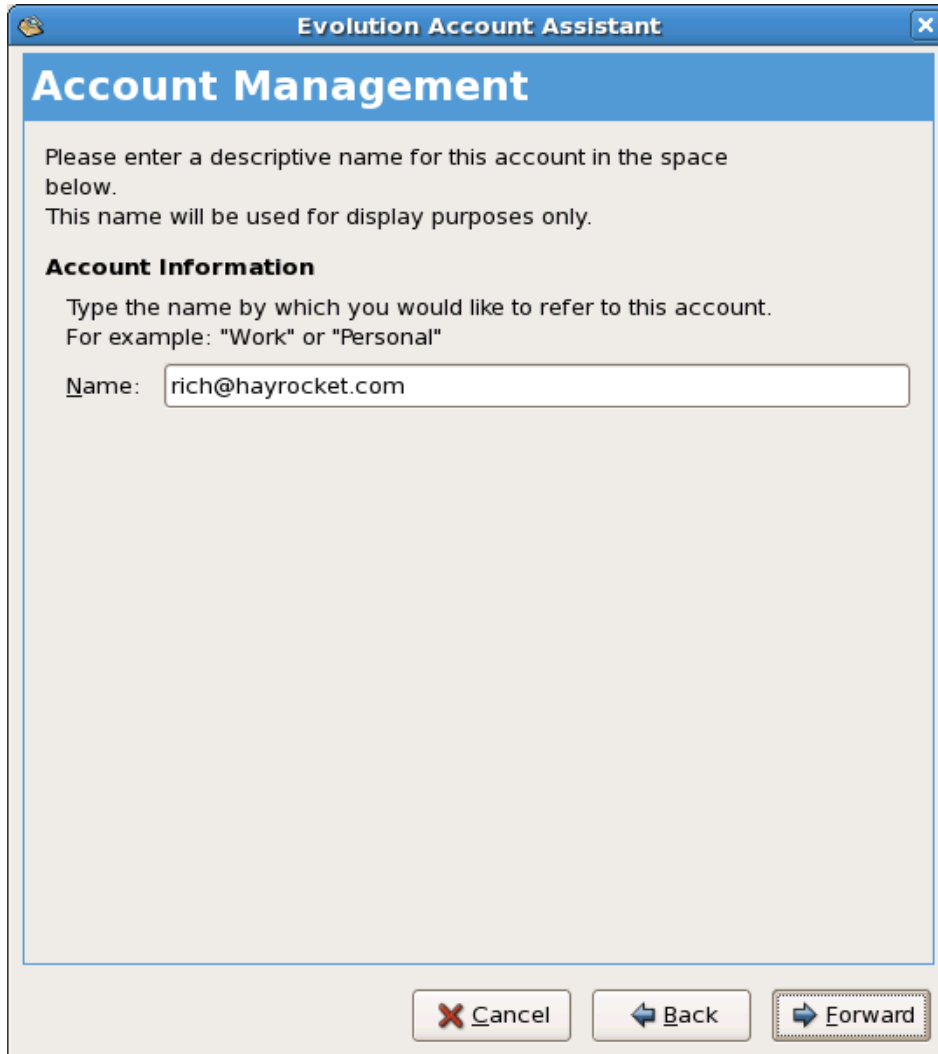
Username:

Remember password

Note: to use a different port than 25 append :nnn to the server name.

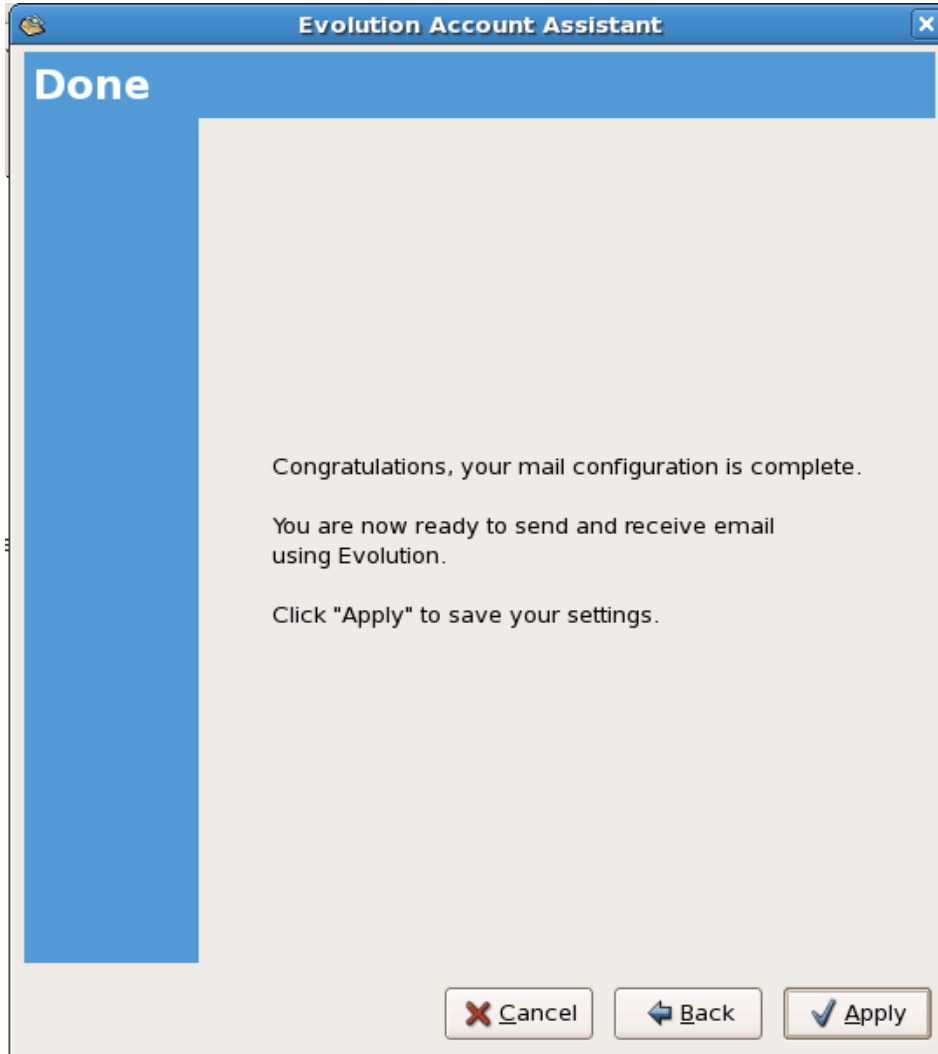
For example, to specify port 587 use mx.cruzio.com:587

Note, some ISPs (like Cruzio) will block sending messages using a non-ISP SMTP server.



The screenshot shows a window titled "Evolution Account Assistant" with a close button in the top right corner. The main heading is "Account Management". Below the heading, there is a text prompt: "Please enter a descriptive name for this account in the space below. This name will be used for display purposes only." Underneath this is a section titled "Account Information" with the instruction: "Type the name by which you would like to refer to this account. For example: 'Work' or 'Personal'". A text input field labeled "Name:" contains the text "rich@hayrocket.com". At the bottom of the window, there are three buttons: "Cancel" (with a red X icon), "Back" (with a left-pointing arrow icon), and "Forward" (with a right-pointing arrow icon).

If you have multiple accounts you can use a label to identify them



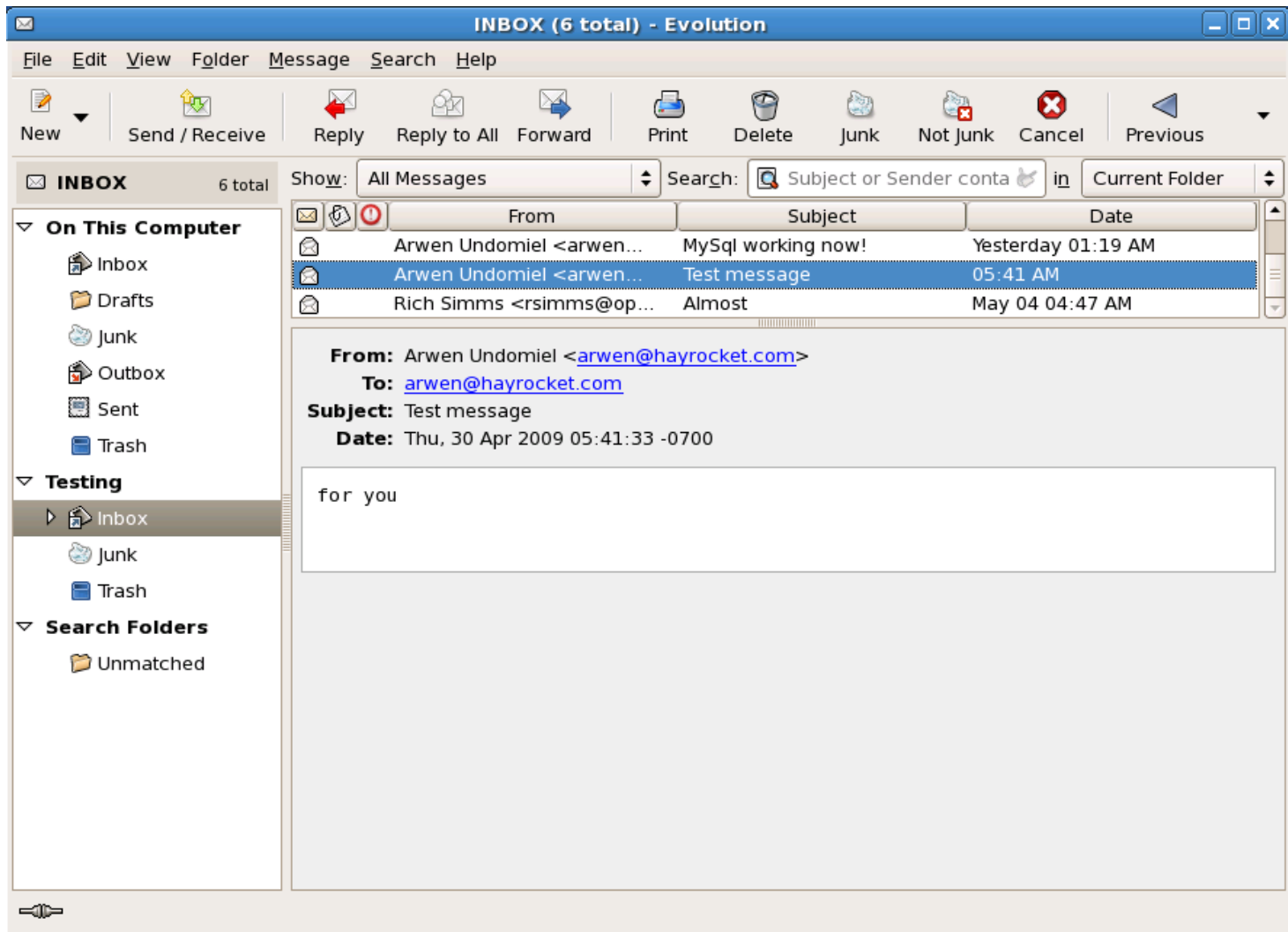
Evolution MUA Views

MUA Configuration

You should now be able to read your mail depending on your ISP access policies

*Account
using
POP*

*Account
using
IMAP*

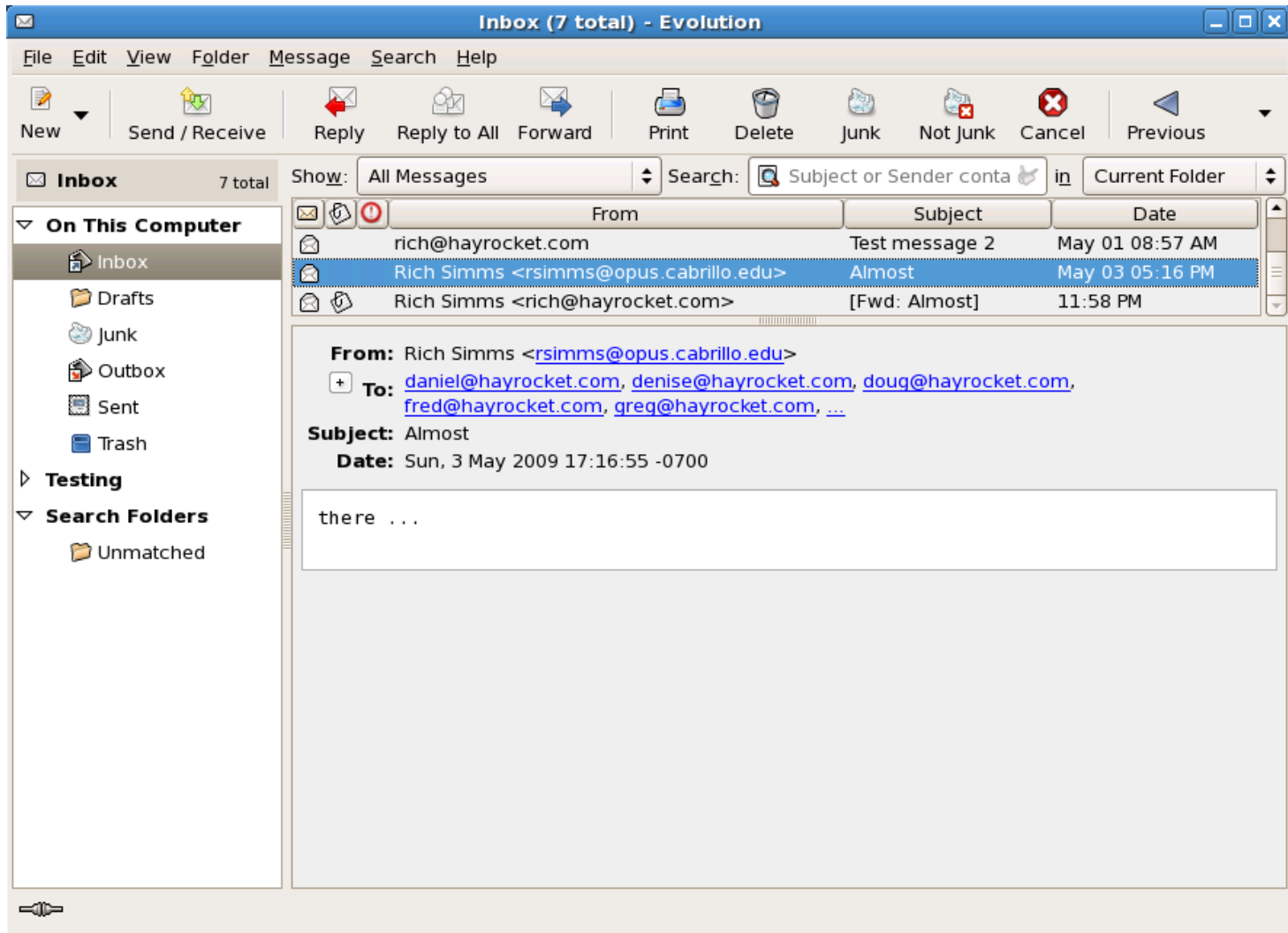


MUA Configuration

You should now be able to read your mail depending on your ISP access policies

*Account
using
POP*

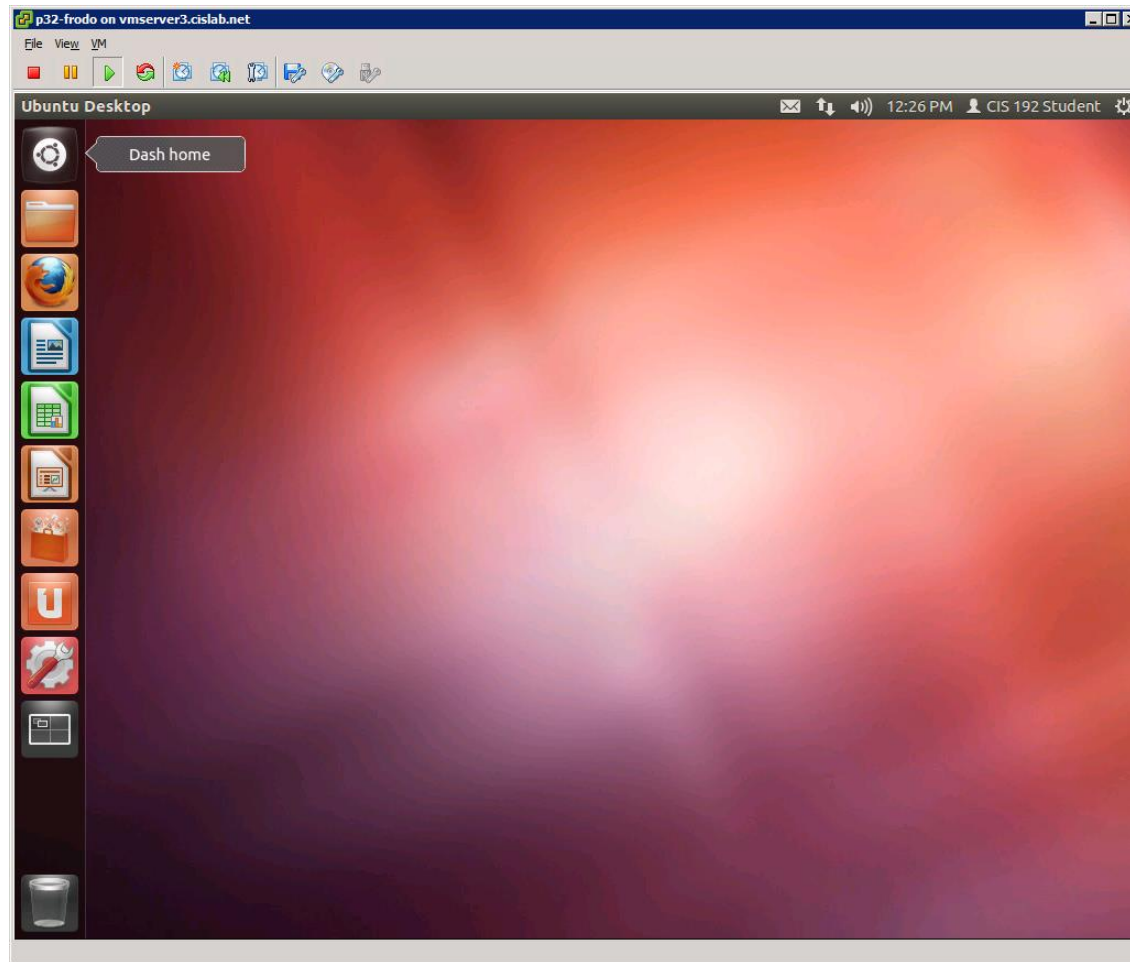
*Account
using
IMAP*



Thunderbird
MUA
configuration
POP

CIS 192 - Lesson 12

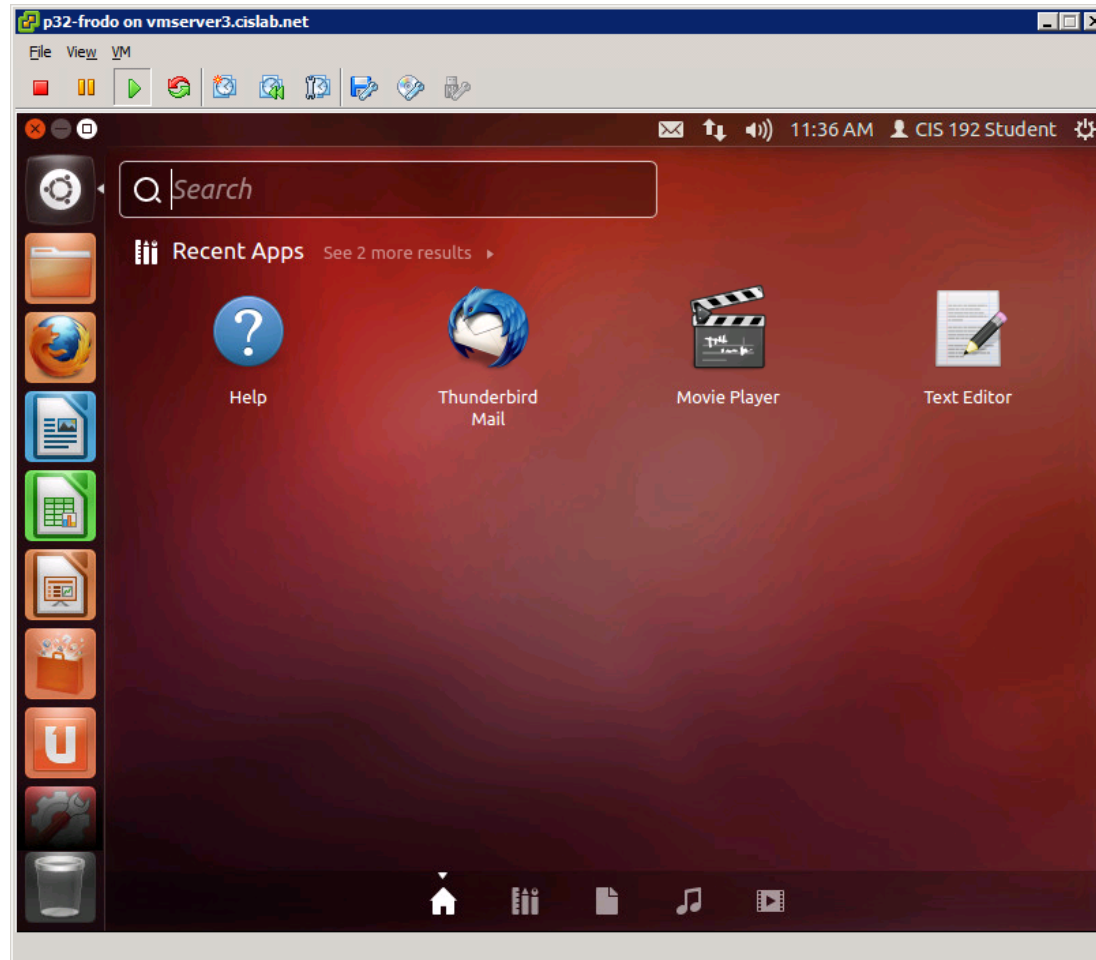
MUA Configuration



Click the Dash Home icon

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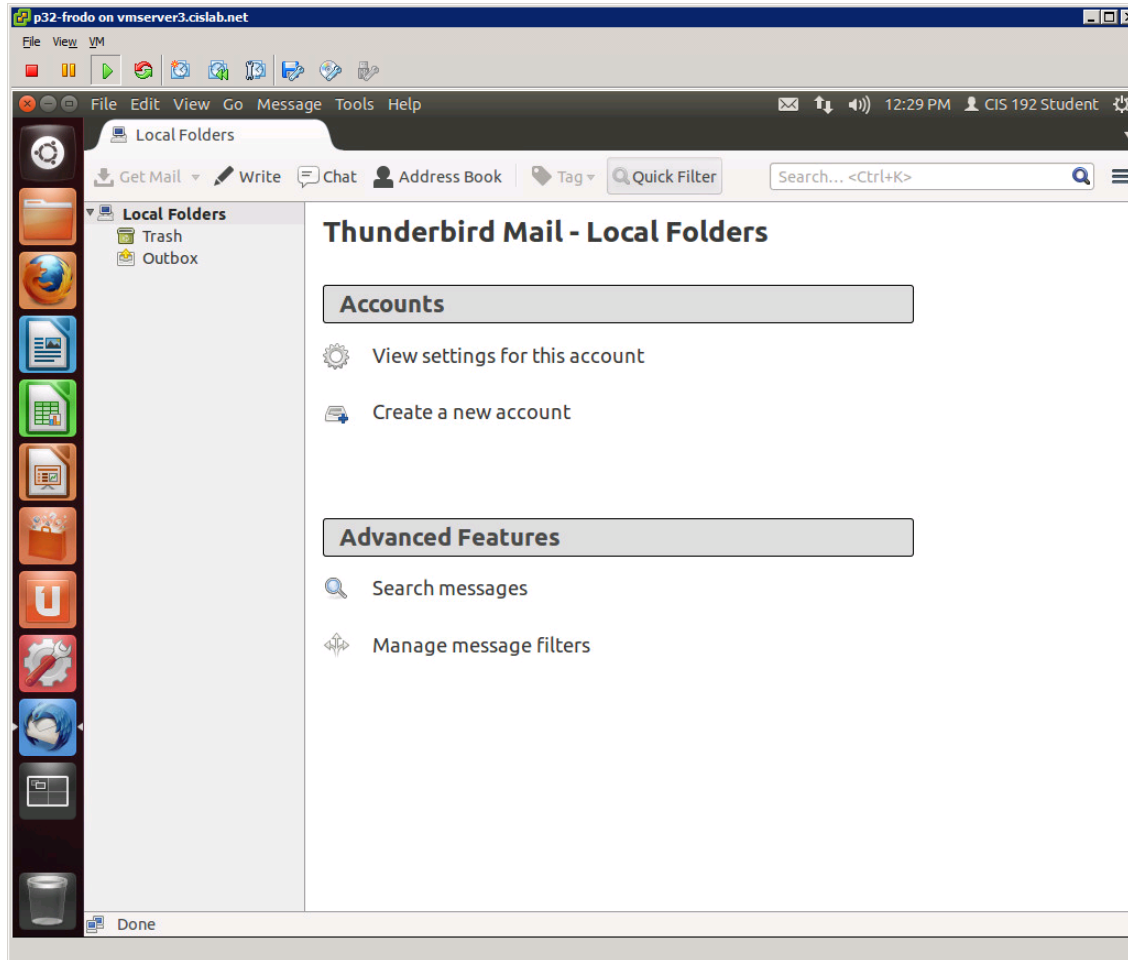
MUA Configuration



Click the Thunderbird Mail icon

CIS 192 - Lesson 12

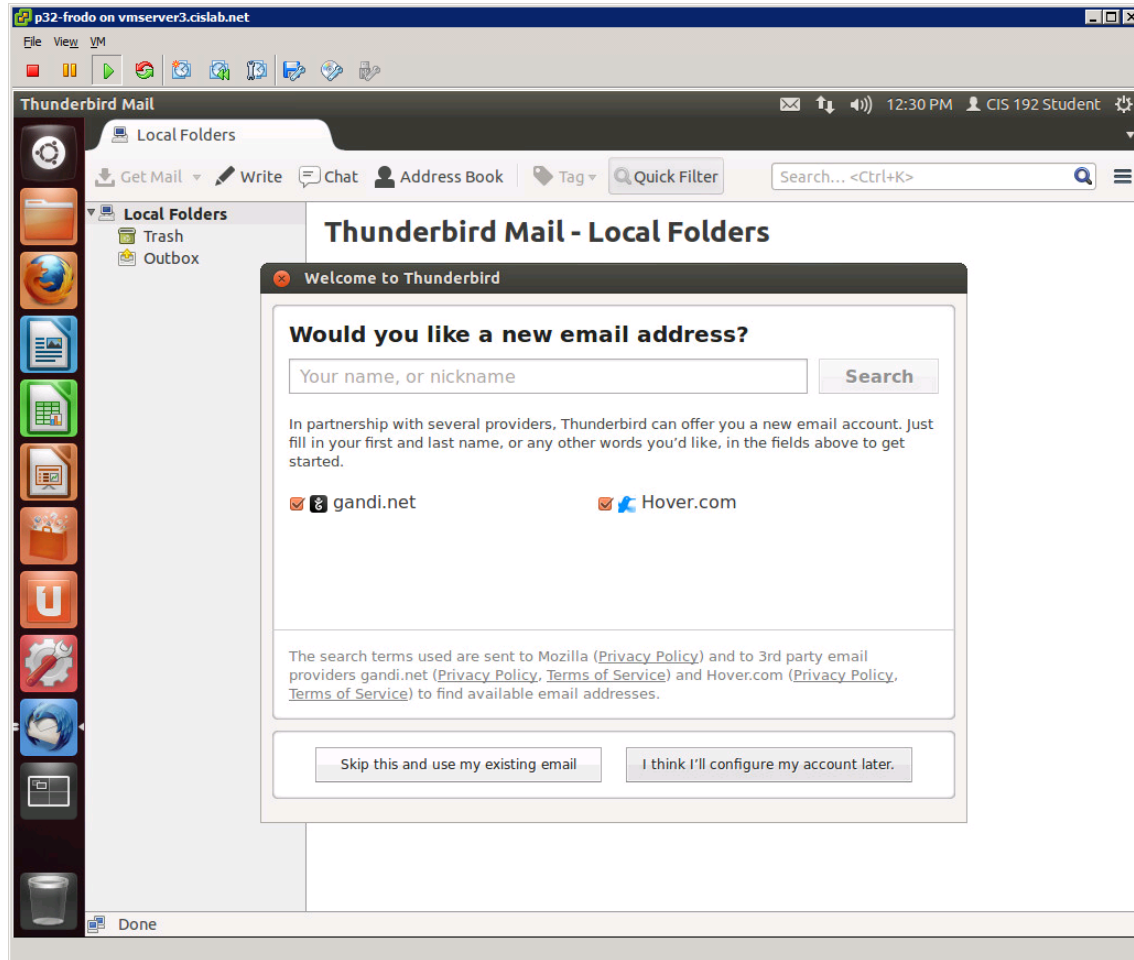
MUA Configuration



Click Create a new account

CIS 192 - Lesson 12

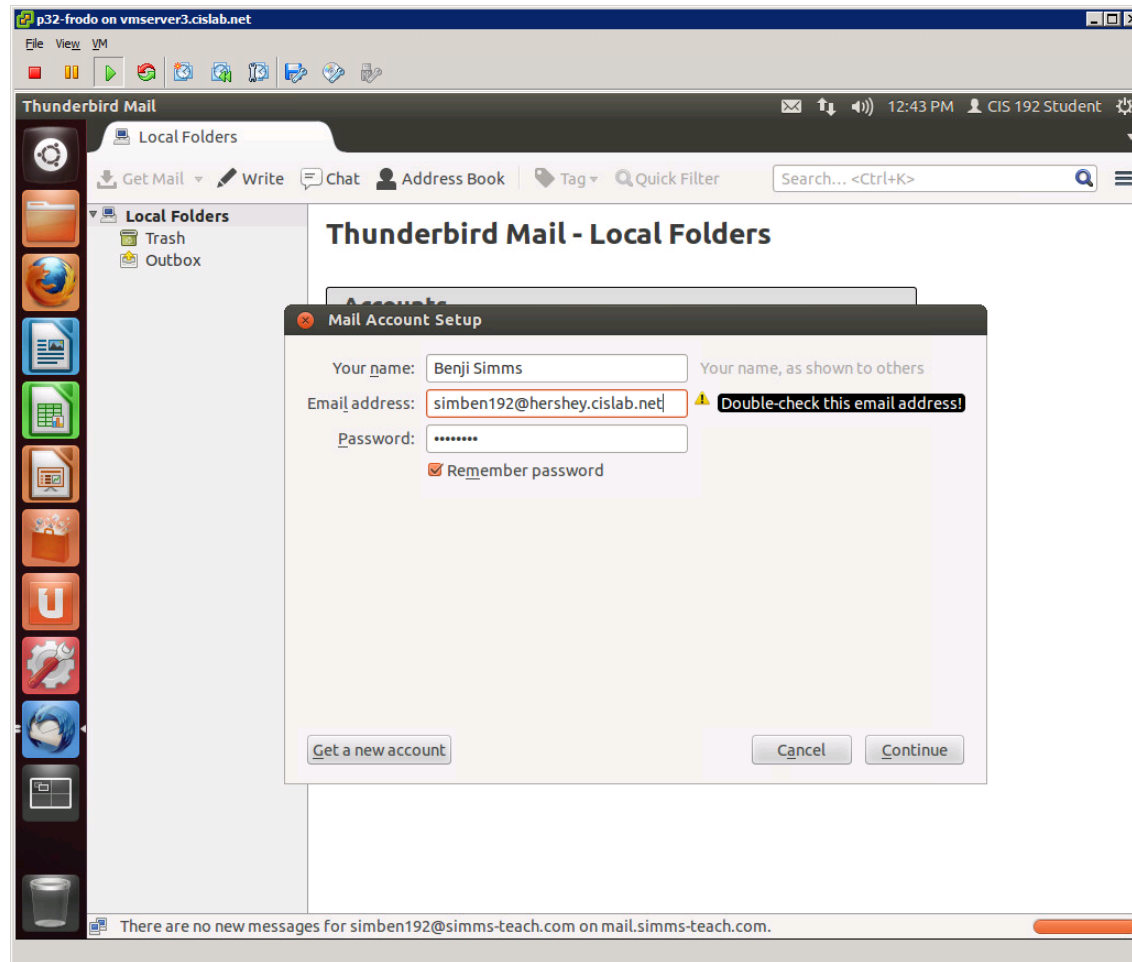
MUA Configuration



Click Skip this and use my existing email

CIS 192 - Lesson 12

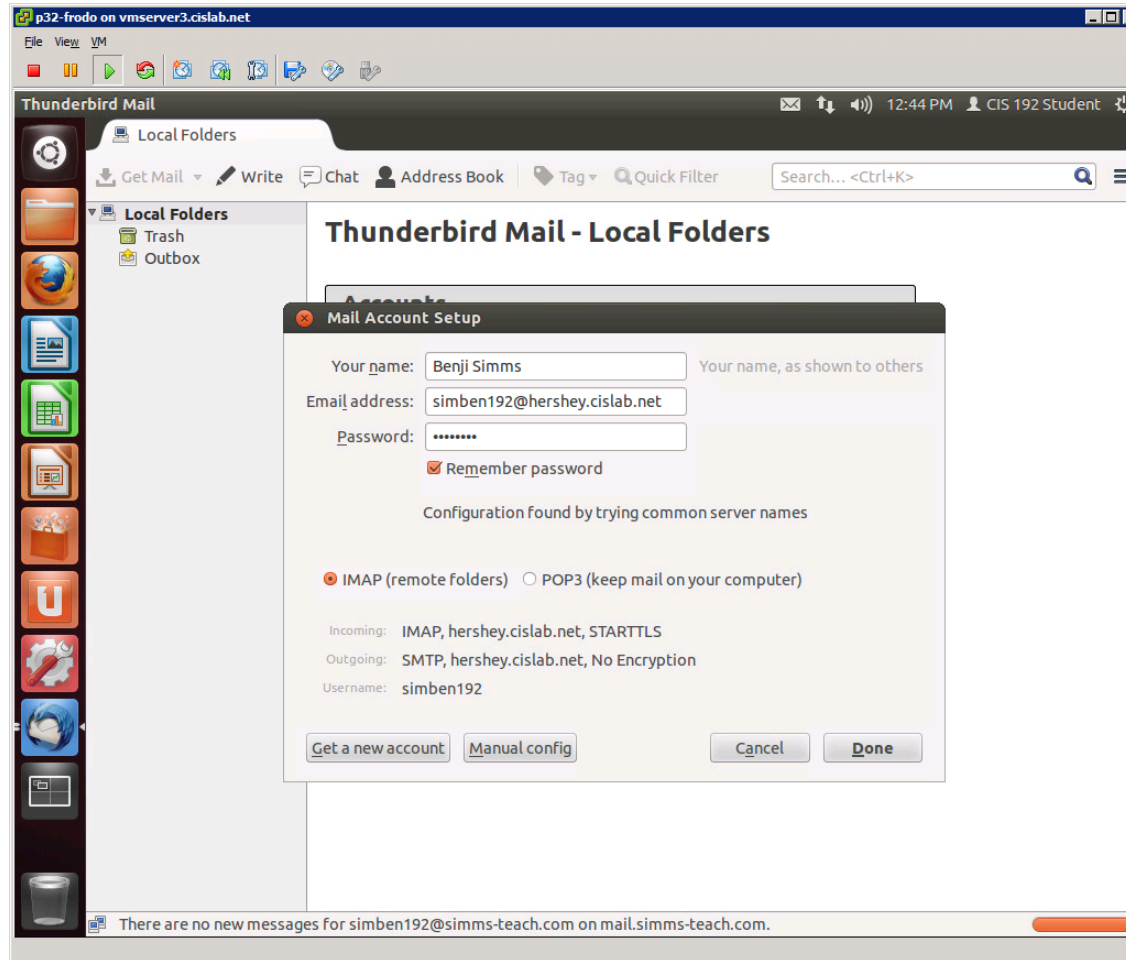
MUA Configuration



Fill in dialog box

CIS 192 - Lesson 12

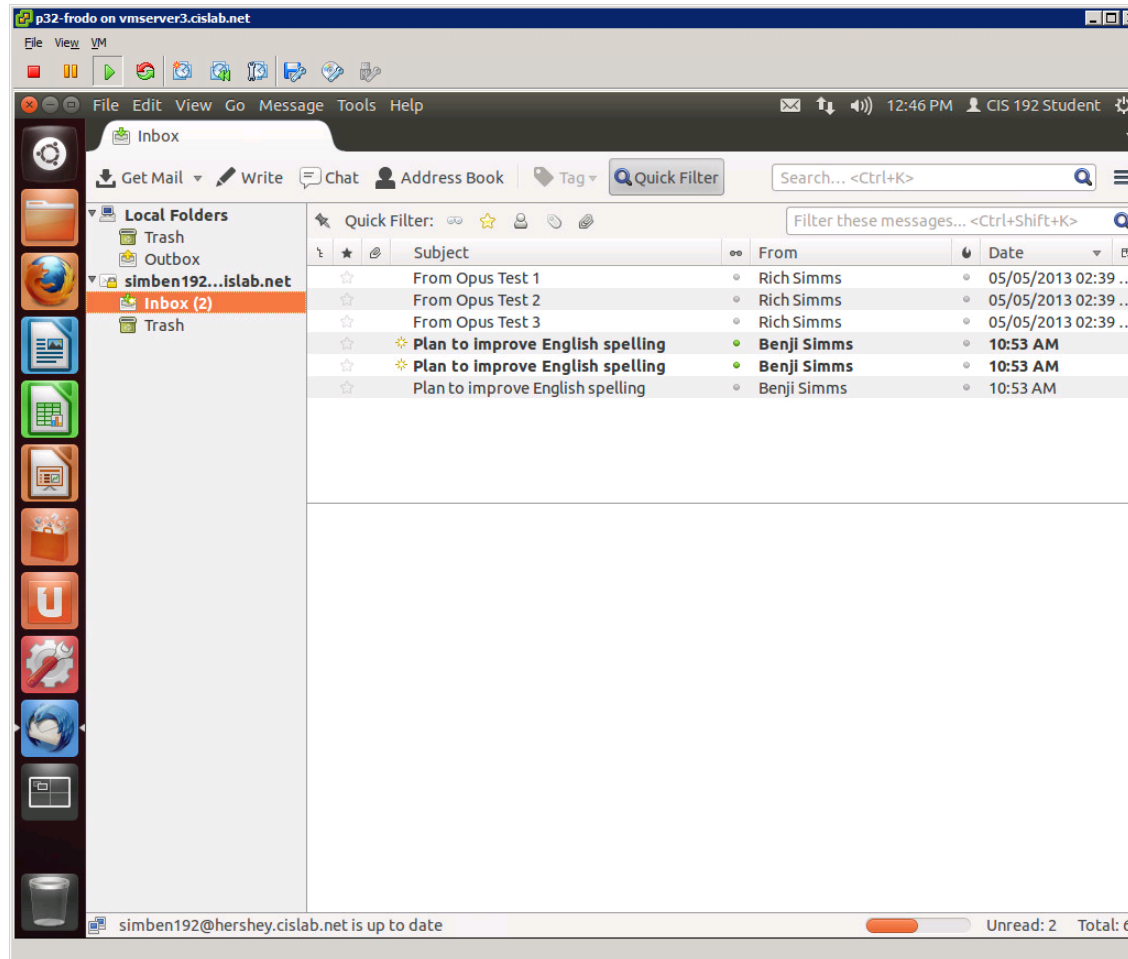
MUA Configuration



Thunderbird will do an automatic configuration

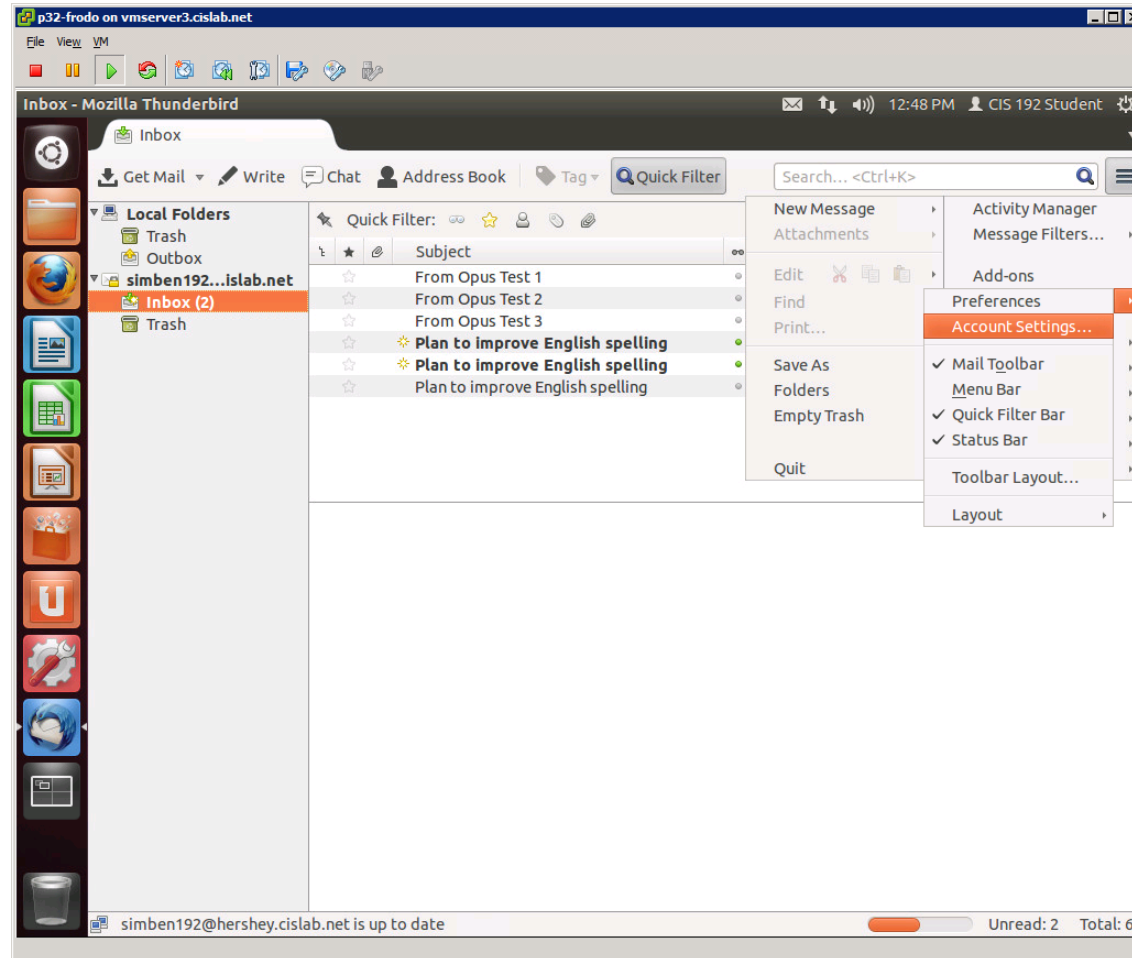
CIS 192 - Lesson 12

MUA Configuration



View messages

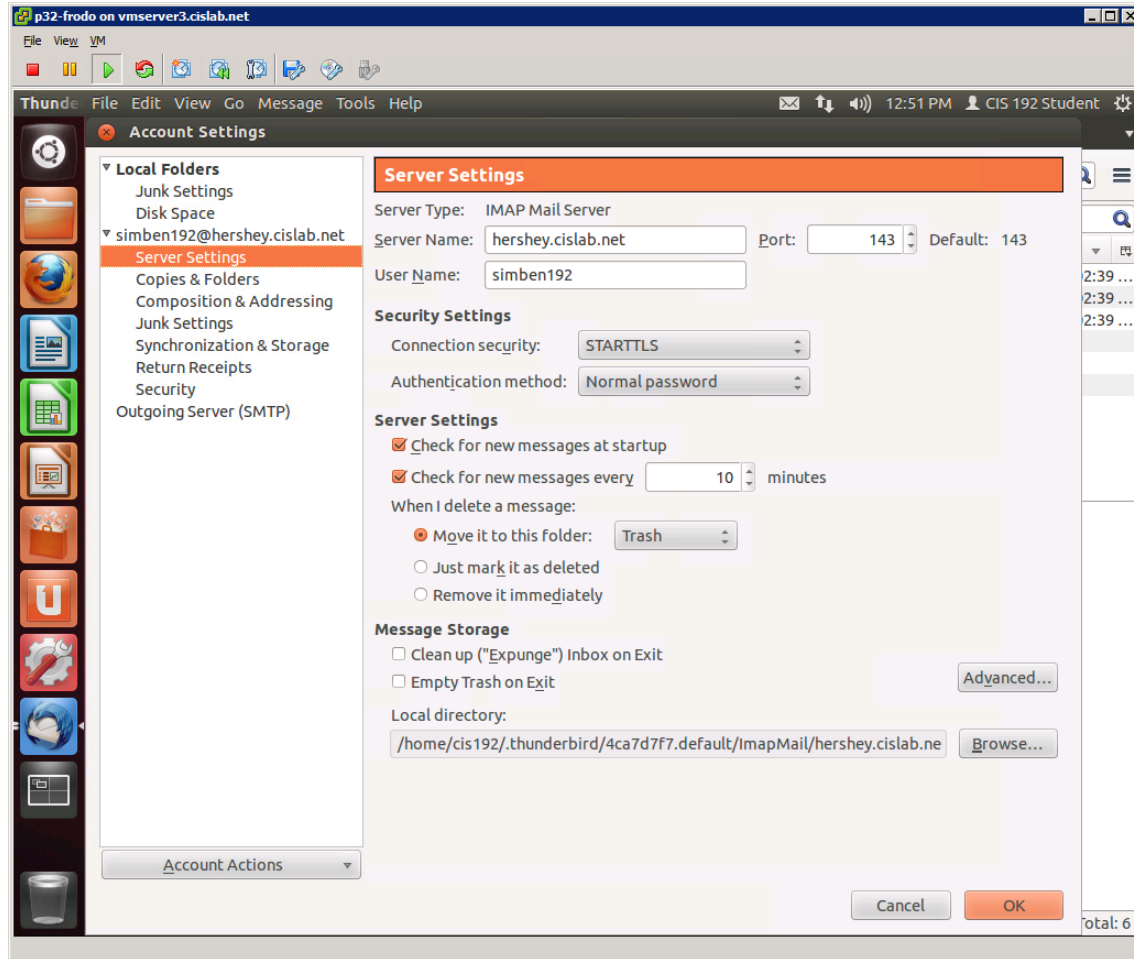
MUA Configuration



To see account settings click grill icon on upper left > Preferences > Account Settings

CIS 192 - Lesson 12

MUA Configuration



The automatic configuration selected IMAP server

Try and set up the Thunderbird MUA on Frodo

Server Settings

Server Type: POP Mail Server

Server Name: Port: Default:

User Name:

Security Settings

Connection security:

Authentication method:

Server Settings

Check for new messages at startup

Check for new messages every minutes

Automatically download new messages

Fetch headers only

Leave messages on server

For at most days

Until I delete them

Message Storage

Empty Trash on Exit

Local directory:

Outgoing Server (SMTP) Settings

When managing your identities you can use a server from this list by selecting it as the Outgoing Server (SMTP), or you can use the default server from this list by selecting "Use Default Server".

simben192 - hershey.cislab.net (Default)	<input type="button" value="Add..."/>
	<input type="button" value="Edit..."/>
	<input type="button" value="Remove"/>
	<input type="button" value="Set Default"/>

Description: <not specified>
Server Name: hershey.cislab.net
Port: 25
User Name: simben192
Authentication method: Encrypted password
Connection Security: None

Sendmail Configuration

Installing and Configuring Sendmail (Red Hat Family)

Sendmail

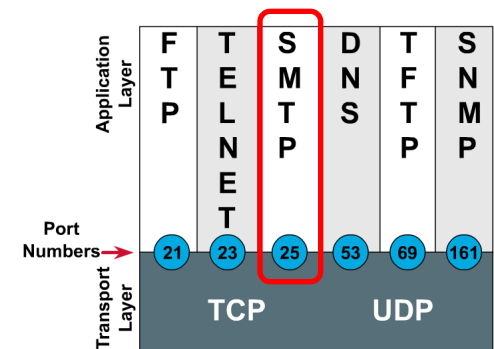
- Uses port 25 (SMTP – Simple Mail Transport Protocol)
- Mail router - controlled by /etc/mail/sendmail.cf
- Aliases - maintained in /etc/aliases
- Name resolution - using DNS records and /etc/hosts files
- User options - vacation notification and mail forwarding

```
[root@elrond ~]# cat /etc/services | grep -w 25
```

```
smtp      25/tcp    mail
smtp      25/udp    mail
```

<snipped>

Port Numbers



SMTP uses TCP port 25

Service Applications

Steps to installing services

1. Install software package using **yum**, **rpm** or build from source code
2. Customize service's configuration file
3. Modify the firewall to allow access to the service
4. Customize SELinux context settings to allow use
5. Start the service
6. Configure service to automatically start when system boots
7. Monitor and verify service is running
8. Troubleshoot as necessary
9. Monitor log files as appropriate
10. Configure additional security

Installing Sendmail

Step 1 *Install software*

Check if already installed

```
[root@elrond ~]# rpm -qa | grep sendmail  
sendmail-cf-8.13.8-2.e15  
sendmail-8.13.8-2.e15  
[root@elrond ~]#
```

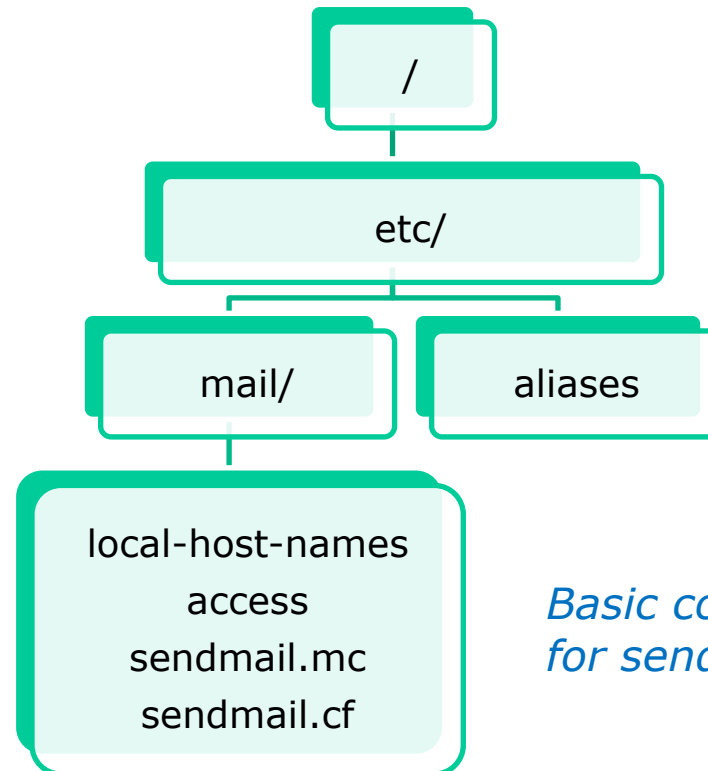
*sendmail-cf is used to build
the configuration files*

*sendmail is the SMTP service and is
usually already installed on Red Hat
and CentOS systems*

*If not installed use: **yum install sendmail sendmail-cf***

sendmail

Step 2 *Customize the configuration files*



*Basic configuration files
for sendmail*

sendmail configuration

The default sendmail configuration

Incoming mail:

- delivered locally if the destination exists
- rejected and returned to sender if the destination user does not exist
- forwarded to remote system if destined for another system (@hostname.dom)
- Mail to this system's postmaster is delivered to root.

Outgoing mail:

- delivered directly to the system in the address
- Append the FQDN to the sender's user name

sendmail configuration

Modifying the sendmail configuration

Must change the sendmail.cf file to do any of the following:

- To use a central mail server and you need to forward all mail to that server
- To configure your server as a central mail server
- To use other mail channels

Mail channels

- *badhost* - for mail with un-resolvable destination hostname
- *baduser* - for non-existing users
- *SMTP* - for mail to be sent using SMTP
- *UUCP* - for mail to be sent using UNIX to UNIX Copy program
- *local* - for mail that is to be delivered locally

sendmail configuration

By hand using /etc/mail/sendmail.cf

```
[root@arwen mail]# tail -20 sendmail.cf
#
SHdrToL
R$+                $: $>AddDomain $1          add local domain if needed
R$* < @ *LOCAL* > $*    $: $1 < @ $j . > $2

#
# Common code to add local domain name (only if always-add-domain)
#
SAddDomain
R$* < @ $* > $*        $@ $1 < @ $2 > $3        already fully qualified

R$+                $@ $1 < @ *LOCAL* >        add local qualification

Mlocal,            P=/usr/bin/procmail, F=lsDFMAw5:|@qSPfhn9, S=EnvFromL/HdrFromL,
R=EnvToL/HdrToL,
                  T=DNS/RFC822/X-Unix,
                  A=procmail -t -Y -a $h -d $u
Mprog,            P=/usr/sbin/smrsh, F=lsDFMoqeu9, S=EnvFromL/HdrFromL, R=EnvToL/HdrToL,
D=$z://,
                  T=X-Unix/X-Unix/X-Unix,
                  A=smrsh -c $u

[root@arwen mail]#
```

Its not binary but I wouldn't want to edit this monster by hand!

sendmail configuration

Using M4 macros

```
[root@p32-elrond ~]# head -25 /etc/mail/sendmail.mc
divert(-1)dnl
dnl #
dnl # This is the sendmail macro config file for m4. If you make changes to
dnl # /etc/mail/sendmail.mc, you will need to regenerate the
dnl # /etc/mail/sendmail.cf file by confirming that the sendmail-cf package is
dnl # installed and then performing a
dnl #
dnl # /etc/mail/make
dnl #
include(`/usr/share/sendmail-cf/m4/cf.m4')dnl
VERSIONID(`setup for linux')dnl
OSTYPE(`linux')dnl
dnl #
dnl # Do not advertize sendmail version.
dnl #
dnl define(`confSMTP_LOGIN_MSG', ` $j Sendmail; $b')dnl
dnl #
dnl # default logging level is 9, you might want to set it higher to
dnl # debug the configuration
dnl #
dnl define(`confLOG_LEVEL', `9')dnl
dnl #
dnl # Uncomment and edit the following line if your outgoing mail needs to
dnl # be sent out through an external mail server:
dnl #
[root@p32-elrond ~]#
```

Configure sendmail macro to listen to other hosts

```
[root@p32-elrond ~]# vim /etc/mail/sendmail.mc
[root@p32-elrond ~]#
```

```
root@p32-elrond:~
dnl #
dnl # The following causes sendmail to only listen on the IPv4 loopback address
dnl # 127.0.0.1 and not on any other network devices. Remove the loopback
dnl # address restriction to accept email from the internet or intranet.
dnl #
DAEMON_OPTIONS(`Port=smtp,Addr=127.0.0.1, Name=MTA')dnl
dnl #
dnl # The following causes sendmail to additionally listen to port 587 for
dnl # mail from MUAs that authenticate. Roaming users who can't reach their
dnl # preferred sendmail daemon due to port 25 being blocked or redirected find
dnl # this useful.
dnl #
-- INSERT --
116,1 67%
```

Comment out line 116 in /etc/mail/sendmail.mc by inserting "dnl" to the beginning then save file

```
root@p32-elrond:~
dnl #
dnl # The following causes sendmail to only listen on the IPv4 loopback address
dnl # 127.0.0.1 and not on any other network devices. Remove the loopback
dnl # address restriction to accept email from the internet or intranet.
dnl #
dnl DAEMON_OPTIONS(`Port=smtp,Addr=127.0.0.1, Name=MTA')dnl
dnl #
dnl # The following causes sendmail to additionally listen to port 587 for
dnl # mail from MUAs that authenticate. Roaming users who can't reach their
dnl # preferred sendmail daemon due to port 25 being blocked or redirected find
dnl # this useful.
dnl #
-- INSERT --
116,1 67%
```

Make changes to /etc/mail/sendmail.mc then:

```
[root@arwen mail]# /etc/mail/make
```

Sendmail and the Firewall

Step 3 *Modify the firewall*

Firewall ports used by sendmail

TCP 25 *SMTP port*

```
iptables -I INPUT n -p tcp -m state --state NEW -m tcp --dport 25 -j ACCEPT
```

Insert above the reject rule at the end

Sendmail and the Firewall

```
[root@elrond ~]# iptables -nL
Chain INPUT (policy ACCEPT)
target     prot opt source                destination
RH-Firewall-1-INPUT  all  --  0.0.0.0/0             0.0.0.0/0

Chain FORWARD (policy ACCEPT)
target     prot opt source                destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source                destination

Chain RH-Firewall-1-INPUT (1 references)
target     prot opt source                destination
ACCEPT    all  --  0.0.0.0/0             0.0.0.0/0
ACCEPT    icmp --  0.0.0.0/0             0.0.0.0/0             icmp type 255
ACCEPT    esp  --  0.0.0.0/0             0.0.0.0/0
ACCEPT    ah   --  0.0.0.0/0             0.0.0.0/0
ACCEPT    udp  --  0.0.0.0/0             224.0.0.251           udp dpt:5353
ACCEPT    udp  --  0.0.0.0/0             0.0.0.0/0             udp dpt:631
ACCEPT    tcp  --  0.0.0.0/0             0.0.0.0/0             tcp dpt:631
ACCEPT    all  --  0.0.0.0/0             0.0.0.0/0             state RELATED,ESTABLISHED
ACCEPT    udp  --  0.0.0.0/0             0.0.0.0/0             state NEW udp dpt:53
ACCEPT    tcp  --  0.0.0.0/0             0.0.0.0/0             state NEW tcp dpt:53
ACCEPT    tcp  --  0.0.0.0/0             0.0.0.0/0             state NEW tcp dpt:25
ACCEPT    tcp  --  0.0.0.0/0             0.0.0.0/0             state NEW tcp dpt:22
REJECT    all  --  0.0.0.0/0             0.0.0.0/0             reject-with icmp-host-prohibited
[root@elrond ~]#
```

*SMTP port is
open on this
system*

Sendmail and SELinux

Step 4 *SELinux configuration*

Set permissive mode

```
[root@legolas ~]# setenforce permissive  
[root@legolas ~]# getenforce  
Permissive
```

Set enforcing mode

```
[root@legolas ~]# setenforce enforcing  
[root@legolas ~]# getenforce  
Enforcing
```

Show SELinux status

```
[root@legolas ~]# sestatus  
SELinux status:                enabled  
SELinuxfs mount:                /selinux  
Current mode:                    enforcing  
Mode from config file:          enforcing  
Policy version:                  21  
Policy from config file:        targeted
```

No changes are needed for this lesson's activity

Keep SELinux in enforcing mode

Sendmail

Step 5 *Start the service*

```
[root@elrond ~]# service sendmail start  
Shutting down sm-client: [ OK ]  
Shutting down sendmail: [ OK ]  
Starting sendmail: [ OK ]  
Starting sm-client: [ OK ]
```

Step 6 *Start the service automatically during system startup*

```
[root@elrond var]# chkconfig sendmail on  
[root@elrond var]#
```

Note, sendmail is already configured to startup on most Red Hat and CentOS systems

Sendmail

Step 7 *Monitor and verify service is running*

```
[root@elrond ~]# service sendmail status  
sendmail (pid 14720) is running...  
[root@elrond ~]#
```

Sendmail

Step 7 *Monitor and verify service is running*

```
[root@elrond var]# netstat -tln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp      0      0 127.0.0.1:2208         0.0.0.0:*               LISTEN
tcp      0      0 0.0.0.0:876          0.0.0.0:*               LISTEN
tcp      0      0 0.0.0.0:111          0.0.0.0:*               LISTEN
tcp      0      0 10.10.5.1:53          0.0.0.0:*               LISTEN
tcp      0      0 172.30.1.130:53       0.0.0.0:*               LISTEN
tcp      0      0 127.0.0.1:53          0.0.0.0:*               LISTEN
tcp      0      0 127.0.0.1:631         0.0.0.0:*               LISTEN
tcp      0      0 0.0.0.0:25           0.0.0.0:*               LISTEN
tcp      0      0 127.0.0.1:953         0.0.0.0:*               LISTEN
tcp      0      0 127.0.0.1:2207        0.0.0.0:*               LISTEN
tcp      0      0 :::22                 :::*                     LISTEN
[root@elrond0 ~]#
```

Port 25 is used for SMTP (Simple Mail Transport Protocol)

Sendmail

Step 8 Troubleshoot

- *hostnames must match names in DNS!*
- *look at errors in returned messages for clues*
- *check firewall ports*
- *check DNS settings using host and dig*

Sendmail

Step 9 Monitor log files

```
[root@elrond ~]# tail /var/log/maillog
[root@elrond0 ~]# tail /var/log/maillog
May  4 17:19:33 arwen sendmail[14715]: /etc/aliases: 76 aliases, longest 10 bytes, 765 bytes total
May  4 17:19:33 arwen sendmail[14720]: starting daemon (8.13.8): SMTP+queueing@01:00:00
May  4 17:19:33 arwen sm-msp-queue[14729]: starting daemon (8.13.8): queueing@01:00:00
May  4 17:21:14 arwen sendmail[14736]: o450LE1M014736: from=<root@elrond1.galaxy1.universe>, size=618,
class=0, nrcpts=1, msgid=<201005050021.o450LDkf010712@elrond1.galaxy1.universe>, proto=ESMTP, daemon=MTA,
relay=elrond1.galaxy1.universe.1.30.172.in-addr.arpa [172.30.1.126] (may be forged)
May  4 17:21:14 arwen sendmail[14737]: o450LE1M014736: to=<root@elrond5.galaxy5.universe>, delay=00:00:00,
xdelay=00:00:00, mailer=local, pri=30890, dsn=2.0.0, stat=Sent
May  4 17:21:39 arwen sendmail[14740]: o450LcPp014740: from=root, size=104, class=0, nrcpts=2,
msgid=<201005050021.o450LcPp014740@elrond5.galaxy5.universe>, relay=root@localhost
May  4 17:21:39 arwen sendmail[14741]: o450Ldte014741: from=<root@elrond5.galaxy5.universe>, size=386,
class=0, nrcpts=2, msgid=<201005050021.o450LcPp014740@elrond5.galaxy5.universe>, proto=ESMTP, daemon=MTA,
relay=elrond5.galaxy5.universe [127.0.0.1]
May  4 17:21:39 arwen sendmail[14740]: o450LcPp014740:
to=root@elrond5.galaxy5.universe,root@elrond1.galaxy1.universe, ctladdr=root (0/0), delay=00:00:01,
xdelay=00:00:00, mailer=relay, pri=60104, relay=[127.0.0.1] [127.0.0.1], dsn=2.0.0, stat=Sent
(o450Ldte014741 Message accepted for delivery)
May  4 17:21:39 arwen sendmail[14742]: o450Ldte014741: to=<root@elrond5.galaxy5.universe>,
ctladdr=<root@elrond5.galaxy5.universe> (0/0), delay=00:00:00, xdelay=00:00:00, mailer=local, pri=60598,
dsn=2.0.0, stat=Sent
May  4 17:21:39 arwen sendmail[14742]: o450Ldte014741: to=<root@elrond1.galaxy1.universe>,
ctladdr=<root@elrond5.galaxy5.universe> (0/0), delay=00:00:00, xdelay=00:00:00, mailer=smtp, pri=60598,
relay=elrond1.galaxy1.universe. [172.30.1.126], dsn=2.0.0, stat=Sent (o450Ld1G010718 Message accepted for
delivery)
[root@elrond0 ~]#
```

Sendmail

Step 9 Monitor log files

```
[root@elrond ~]# mailstats
Statistics from Sun Apr  4 03:18:22 2010
 M  msgsfr  bytes_from  msgsto  bytes_to  msgsrej  msgsdis  msgsqur  Mailer
 4   2      2K          3      3K        0         0         0  esmtp
 9   8     12K          8     12K        0         0         0  local
=====
 T   10     14K         11     15K        0         0         0
 C   10          3          0
[root@elrond ~]#
```

The **mailstats** command displays mail statistics kept in `/var/log/mail/statistics`



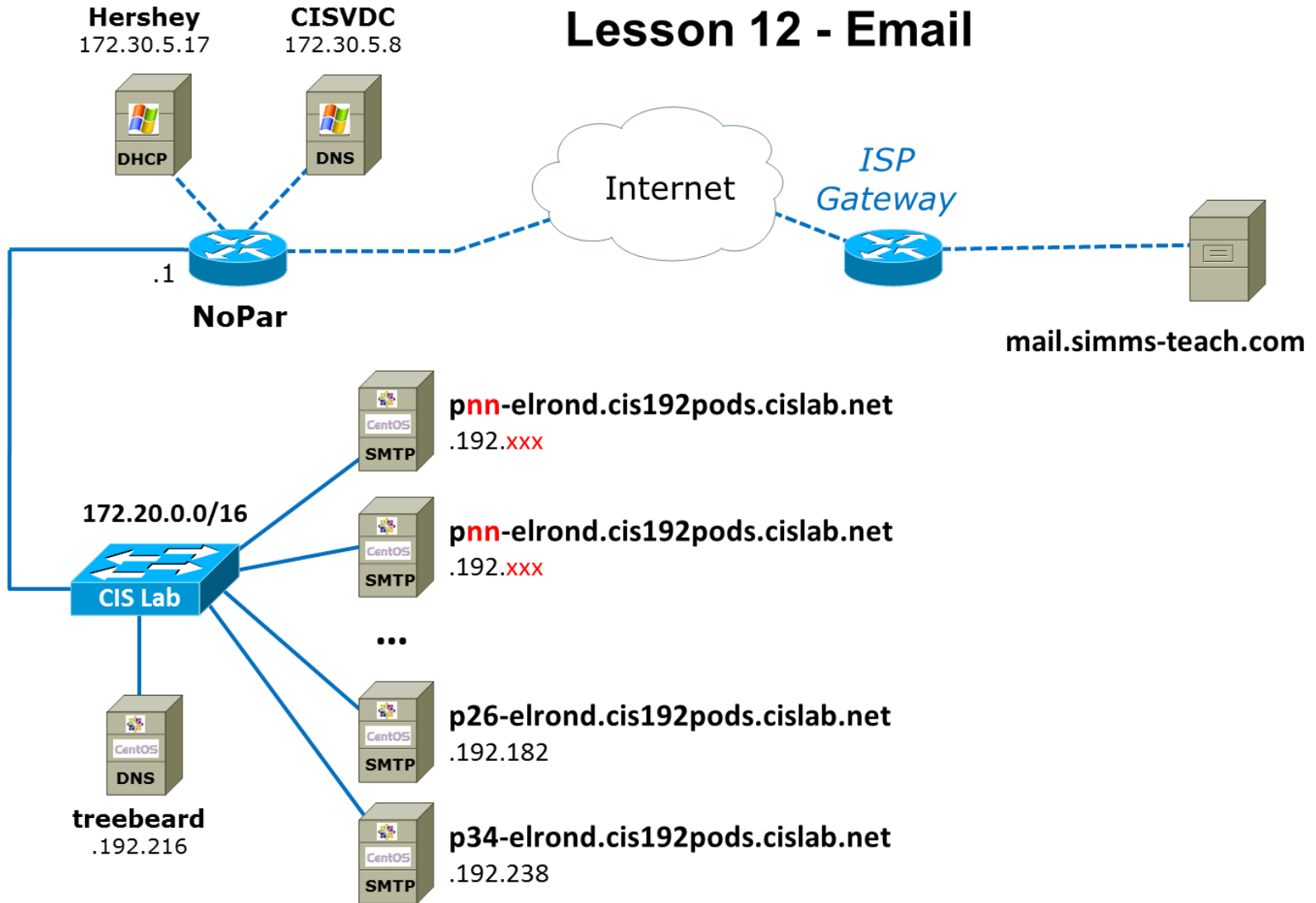
Sendmail

Step 10 *Additional security*

See section 18.12 in the textbook

Do we dare

Lesson 12 - Email



Local DNS Server for 192 pods

```

$TTL 604800
; cis192pods.cislab.net. Zone Definition
;
;
@      IN SOA treebeard.cislab.net. root.treebeard.cislab.net. (
        2013050401 ; serial number
        10800 ; refresh rate in seconds
        15 ; retry in seconds
        1209600 ; expire in seconds
        300) ; minimum in seconds
;
;
;Name Server Records
        IN NS treebeard.cislab.net.
;
;Reverse pointer records
p03-elrond  IN A 172.20.192.21
p04-elrond  IN A 172.20.192.28
p05-elrond  IN A 172.20.192.35
p06-elrond  IN A 172.20.192.42
p07-elrond  IN A 172.20.192.49
p08-elrond  IN A 172.20.192.56
p09-elrond  IN A 172.20.192.63
p10-elrond  IN A 172.20.192.70
p11-elrond  IN A 172.20.192.77
p12-elrond  IN A 172.20.192.84
p13-elrond  IN A 172.20.192.91
p14-elrond  IN A 172.20.192.98
p15-elrond  IN A 172.20.192.111
p16-elrond  IN A 172.20.192.112
p17-elrond  IN A 172.20.192.119
p18-elrond  IN A 172.20.192.126
p19-elrond  IN A 172.20.192.133
p20-elrond  IN A 172.20.192.140
p21-elrond  IN A 172.20.192.147
p22-elrond  IN A 172.20.192.154
p23-elrond  IN A 172.20.192.161
p26-elrond  IN A 172.20.192.182
p32-elrond  IN A 172.20.192.224
p33-elrond  IN A 172.20.192.231
p34-elrond  IN A 172.20.192.238
;
;CNAME records
[root@treebeard named]#

```

```

;Address Records
p03-elrond  IN A 172.20.192.21
p04-elrond  IN A 172.20.192.28
p05-elrond  IN A 172.20.192.35
p06-elrond  IN A 172.20.192.42
p07-elrond  IN A 172.20.192.49
p08-elrond  IN A 172.20.192.56
p09-elrond  IN A 172.20.192.63
p10-elrond  IN A 172.20.192.70
p11-elrond  IN A 172.20.192.77
p12-elrond  IN A 172.20.192.84
p13-elrond  IN A 172.20.192.91
p14-elrond  IN A 172.20.192.98
p15-elrond  IN A 172.20.192.111
p16-elrond  IN A 172.20.192.112
p17-elrond  IN A 172.20.192.119
p18-elrond  IN A 172.20.192.126
p19-elrond  IN A 172.20.192.133
p20-elrond  IN A 172.20.192.140
p21-elrond  IN A 172.20.192.147
p22-elrond  IN A 172.20.192.154
p23-elrond  IN A 172.20.192.161
p26-elrond  IN A 172.20.192.182
p32-elrond  IN A 172.20.192.224
p33-elrond  IN A 172.20.192.231
p34-elrond  IN A 172.20.192.238

```

```
[root@treebeard named]# cat db.192.20.172
$TTL 120
; 172.20.192.* Reverse Zone Definition
;
192.20.172.in-addr.arpa. IN SOA treebeard.cislab.net.
root.treebeard.cislab.net. (
    2013050401 ; Serial
    10800 ; Refresh
    15 ; Retry
    3600000 ; Expire
    86400 ) ; Minimum
;
;Name Server Records
;
192.20.172.in-addr.arpa. IN NS treebeard.cislab.net.
;
;Address Records
21     IN PTR p03-elrond.cis192pods.cislab.net.
28     IN PTR p04-elrond.cis192pods.cislab.net.
35     IN PTR p05-elrond.cis192pods.cislab.net.
42     IN PTR p06-elrond.cis192pods.cislab.net.
49     IN PTR p07-elrond.cis192pods.cislab.net.
56     IN PTR p08-elrond.cis192pods.cislab.net.
63     IN PTR p09-elrond.cis192pods.cislab.net.
70     IN PTR p10-elrond.cis192pods.cislab.net.
77     IN PTR p11-elrond.cis192pods.cislab.net.
84     IN PTR p12-elrond.cis192pods.cislab.net.
91     IN PTR p13-elrond.cis192pods.cislab.net.
98     IN PTR p14-elrond.cis192pods.cislab.net.
105    IN PTR p15-elrond.cis192pods.cislab.net.
112    IN PTR p16-elrond.cis192pods.cislab.net.
119    IN PTR p17-elrond.cis192pods.cislab.net.
126    IN PTR p18-elrond.cis192pods.cislab.net.
133    IN PTR p19-elrond.cis192pods.cislab.net.
140    IN PTR p20-elrond.cis192pods.cislab.net.
147    IN PTR p21-elrond.cis192pods.cislab.net.
154    IN PTR p22-elrond.cis192pods.cislab.net.
161    IN PTR p23-elrond.cis192pods.cislab.net.
182    IN PTR p26-elrond.cis192pods.cislab.net.
224    IN PTR p32-elrond.cis192pods.cislab.net.
231    IN PTR p33-elrond.cis192pods.cislab.net.
238    IN PTR p34-elrond.cis192pods.cislab.net.
[root@treebeard named]#
```

```
21     IN PTR p03-elrond.cis192pods.cislab.net.
28     IN PTR p04-elrond.cis192pods.cislab.net.
35     IN PTR p05-elrond.cis192pods.cislab.net.
42     IN PTR p06-elrond.cis192pods.cislab.net.
49     IN PTR p07-elrond.cis192pods.cislab.net.
56     IN PTR p08-elrond.cis192pods.cislab.net.
63     IN PTR p09-elrond.cis192pods.cislab.net.
70     IN PTR p10-elrond.cis192pods.cislab.net.
77     IN PTR p11-elrond.cis192pods.cislab.net.
84     IN PTR p12-elrond.cis192pods.cislab.net.
91     IN PTR p13-elrond.cis192pods.cislab.net.
98     IN PTR p14-elrond.cis192pods.cislab.net.
105    IN PTR p15-elrond.cis192pods.cislab.net.
112    IN PTR p16-elrond.cis192pods.cislab.net.
119    IN PTR p17-elrond.cis192pods.cislab.net.
126    IN PTR p18-elrond.cis192pods.cislab.net.
133    IN PTR p19-elrond.cis192pods.cislab.net.
140    IN PTR p20-elrond.cis192pods.cislab.net.
147    IN PTR p21-elrond.cis192pods.cislab.net.
154    IN PTR p22-elrond.cis192pods.cislab.net.
161    IN PTR p23-elrond.cis192pods.cislab.net.
182    IN PTR p26-elrond.cis192pods.cislab.net.
224    IN PTR p32-elrond.cis192pods.cislab.net.
231    IN PTR p33-elrond.cis192pods.cislab.net.
238    IN PTR p34-elrond.cis192pods.cislab.net.
```

```
simben192@p26-elrond:~  
[simben192@p26-elrond ~]$ mail simben192@hershey  
Subject: Hello from Pod 26  
How goes life?  
- Benji  
.  
EOT  
[simben192@p26-elrond ~]$ █
```

```
simben192@hershey:~  
[simben192@hershey ~]$ mail  
Mail version 8.1 6/6/93.  Type ? for help.  
"/var/spool/mail/simben192": 6 messages  
>  1 rsimms@oslab.cabrill  Sun May  5 14:39  26/1072  "From Opus Test 2"  
  2 rsimms@oslab.cabrill  Sun May  5 14:39  25/1071  "From Opus Test 3"  
  3 simben192@oslab.cabr  Tue May  7 10:53  40/2191  "Plan to improve Engli"  
  4 simben192@oslab.cabr  Tue May  7 10:53  40/2188  "Plan to improve Engli"  
  5 simben192@oslab.cabr  Tue May  7 10:53  40/2192  "Plan to improve Engli"  
  6 simben192@p26-elrond  Tue May  7 15:20  26/1224  "Hello from Pod 26"  
& 6  
Message 6:  
From simben192@p26-elrond.cis192pods.cislab.net  Tue May  7 15:20:27 2013  
From: Benji Simms <simben192@p26-elrond.cis192pods.cislab.net>  
Date: Tue, 07 May 2013 15:11:06 -0700  
To: simben192@hershey.cislab.net  
Subject: Hello from Pod 26  
User-Agent: Heirloom mailx 12.4 7/29/08  
MIME-Version: 1.0  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit  
X-UID: 7  
  
How goes life?  
- Benji  
& █
```

*See if you can send
an email to your
account on Hershey*

Lab 9

Lab 9

cis192lab09.pdf - Adobe Acrobat Pro

File Edit View Document Comments Forms Tools Advanced Window Help

1 / 5 75.7%

Find

CIS 192 Linux Lab Exercise
Lab 9: Electronic Mail
Spring 2013

Lab 9: Electronic Mail

The purpose of this lab is to explore the ways client systems download their mail from mail servers that support POP3 and IMAP protocols.

There are also mail accounts set up for you on Hershey and at simms-teach.com that you can use.

WARNING: Be careful using the procedures below on your own personal email accounts. They will download the messages on your POP or IMAP server and may delete them from that server!

In this lab, you will retrieve the mail for a user using three different mechanisms:

1. Direct communication with the pop3 or imap server
2. Thunderbird email program
3. fetchmail

Lab 9 Email

Supplies

- Talk to a POP server directly with Telnet
- Talk to a POP server directly with Telnet
- Configure a MUA
- Use fetchmail to pull messages from a mail server to your local mailbox

Wrap

References

Jim Griffin

- <http://www.cabrillo.edu/~jgriffin/CIS192/files/lesson13.html>

MIME

- <http://en.wikipedia.org/wiki/MIME>

SMTP

- <http://www.the-welters.com/professional/smtp.html>

Delivery Agents

- <http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/index.html>
- <http://fetchmail.berlios.de/fetchmail-FAQ.html#G1>
- <http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/com.ibm.aix.cmds/doc/aixcmds5/smrsh.htm>

sendmail configuration

- <http://www.surveymain.com/how-to-configure-sendmail-on-centos-5-215.html/>
- <http://www.solarum.com/library/configuring-sendmail-on-linux/printpage/>

IMAP commands:

```
telnet hershey 143
a001 login username password
a002 list "" "*"
a003 select INBOX
a004 fetch 1 full
a005 fetch 1 body[text]
a006 logout
```

POP commands:

```
telnet hershey 110
user yourname
pass yourpassword
list
retr 1
quit
telnet hershey 25
```

SMTP commands:

```
ehlo arwen
mail from: yourname@middleearth.net
rcpt to: yourname
data
Date: May 5, 2009
From: yourname
Reply-to: yourname
Message-ID: one
Subject: Manual SMTP message
Hi yourname,
Almost there ...
- yourname
.
quit
```



Next Class

Assignment: Check Calendar Page

<http://simms-teach.com/cis192calendar.php>

Lab 9

Quiz questions for next class:

- What port is used by an IMAP server?
- Is sendmail a (DA) Delivery Agent or a (MTA) Mail Transport Agent?
- What record types are used in DNS to route email over the Internet?

Backup