



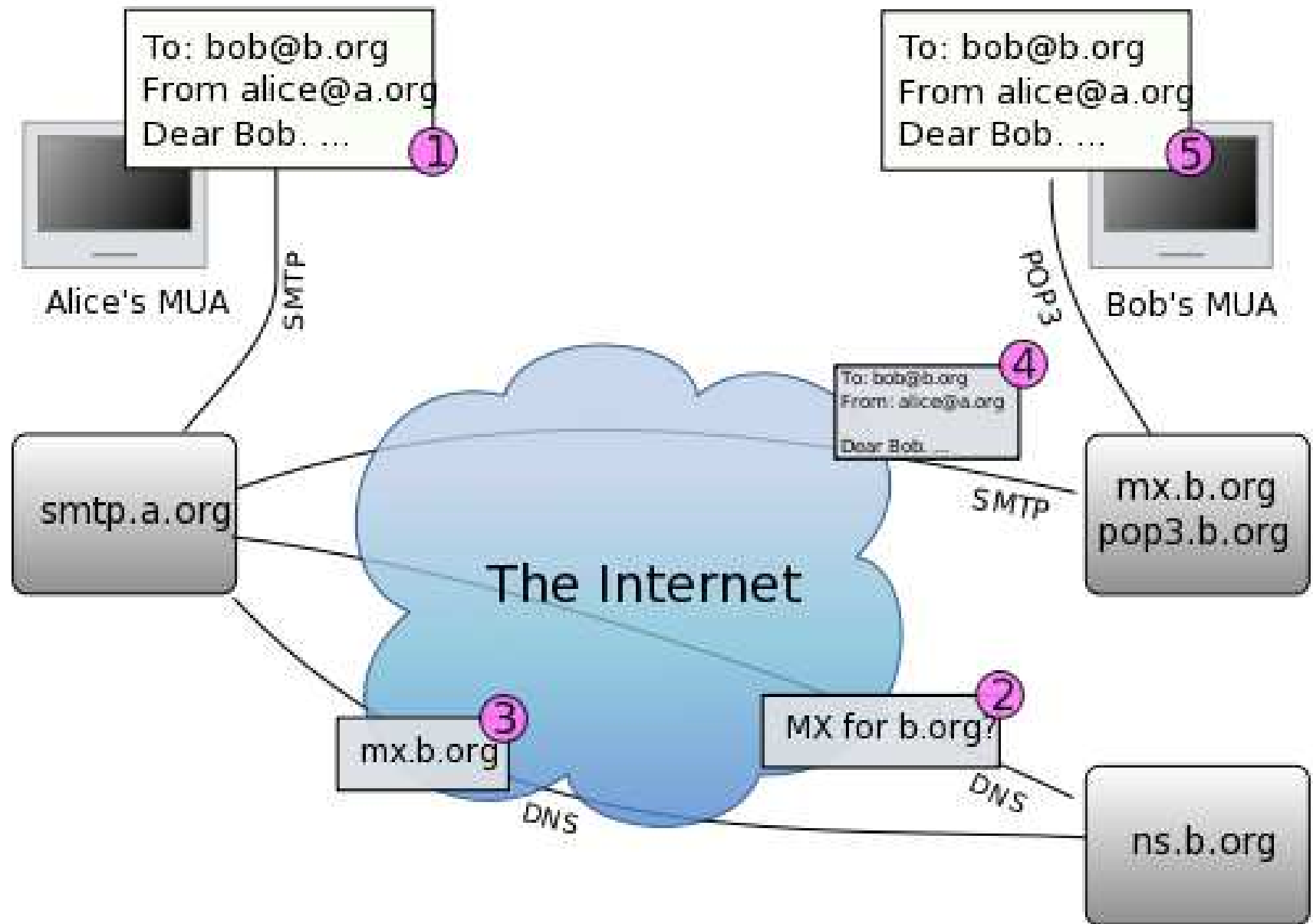
Intelligent
Systems
Lab

Administration of Operating Systems

Email
Chapter 20

November 14, 2011

Email

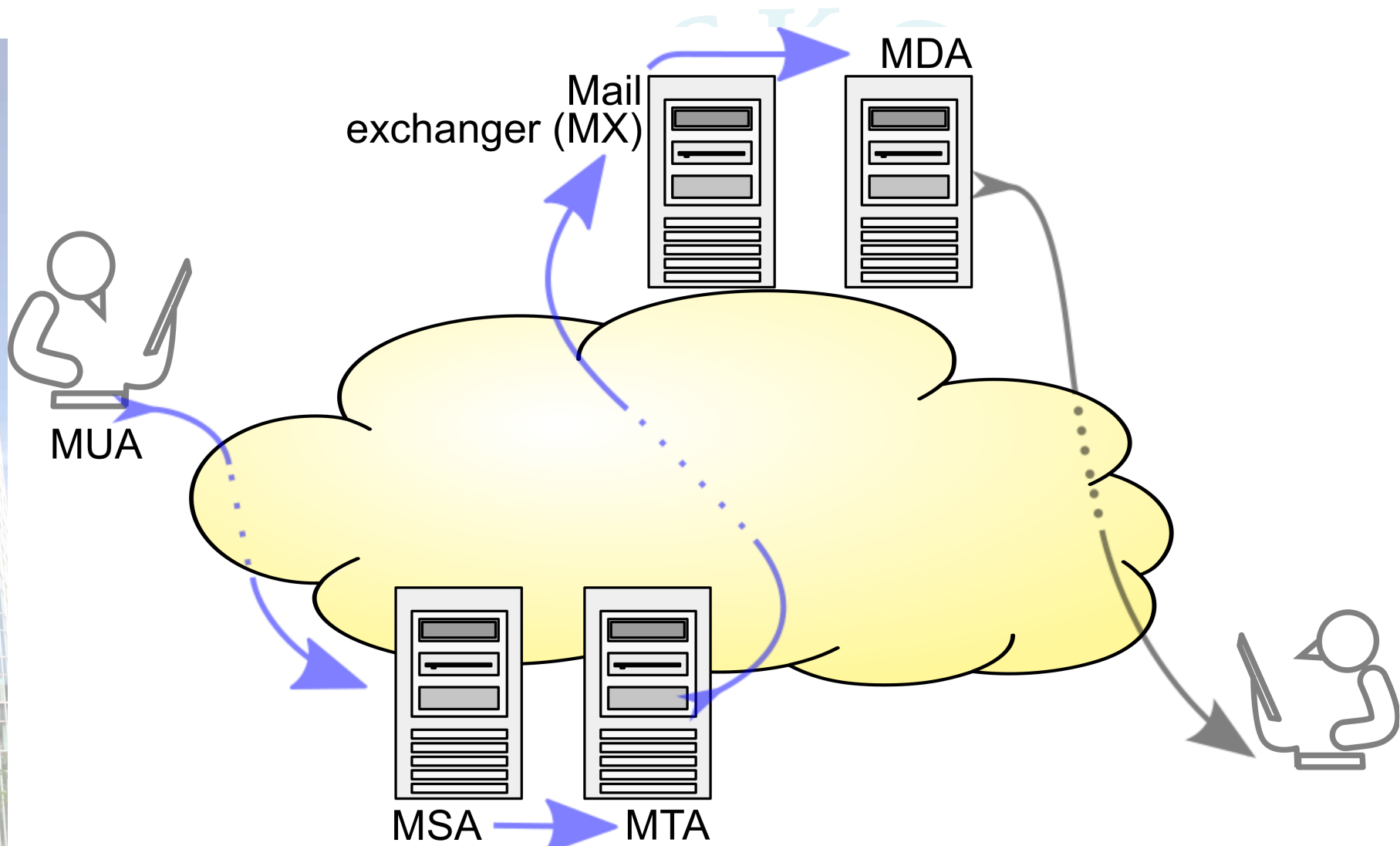


Email Agent Infrastructure



- Mail user agent (MUA)
 - pine, mutt, Thunderbird, OperaMail, ...
- Mail submission agent (MSA)
- Mail transfer agent (MTA)
 - exim, sendmail, postfix, zimbra, ...
- Mail delivery agent (MDA)
 - procmail, binmail, maildrop, ...
- Mail retrieval agent (MRA)
 - fetchmail, getmail, mpop, ...

SMTP Transfer Model



Email software



- Mail User Agent
 - compose email
 - read email
 - send email to own server
 - receive email from own server
 - on-and-off
- Email server
 - receive email from users
 - forward email to their destination
 - gather email for users
 - manage mailing lists and other services
 - always-on

Email Life Cycle



- Alice composes a message to Bob in her MUA
 - possibly offline
- Alice's Mail User Agent sends this message
 - to *her own* mail server
- Alice's server connects to Bob's server
 - or to some intermediate server
 - passes the message
- Bob's server receives the message
 - places it in Bob's mailbox
- Bob invokes his MUA and reads the email
 - again, possibly offline
- Alternatively, Bob can use MRA

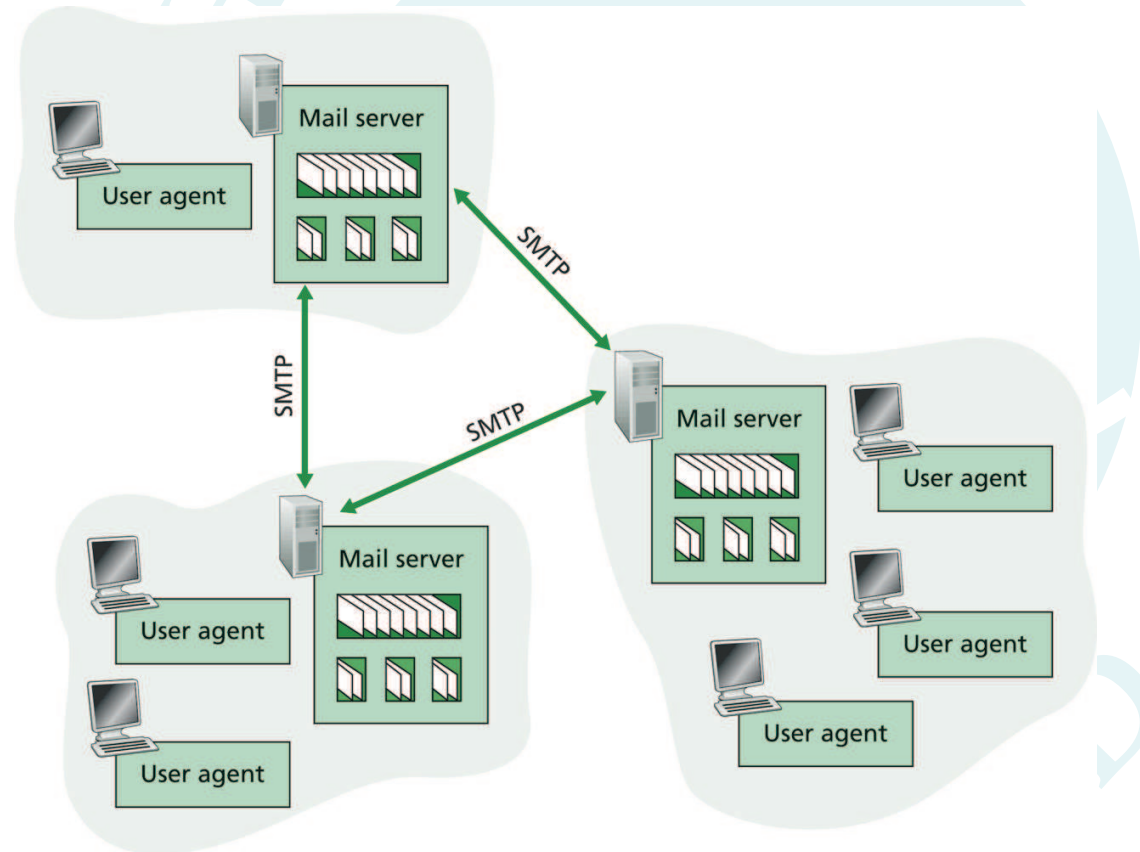
MSA vs MTA



- MTA is capable of doing MSA work
- Distinguishing between the two have benefits
 - including some security ones
- MSA is talking directly to author's MUA
- Can correct minor errors in a message's format
 - missing Date or Message-ID fields
 - an address with a missing domain name
- Immediately report an error to the author
 - corrected before sending to any recipients
- MTA cannot make such corrections
 - any error information can only be generated after the message has been sent

Email Protocols

- SMTP — Simple Mail Transfer Protocol
- POP3 — Post Office Protocol version 3
- IMAP — Internet Mail Access Protocol





```
220 himmelsborg.cs.lth.se ESMTP Sendmail 8.12.11/perf-jw-tr;  
    Mon, 12 Sep 2005 09:26:18 +0200 (CEST)  
helo  
250 himmelsborg.cs.lth.se Hello slawek@dain [130.235.16.76],  
    pleased to meet you  
mail from: test@com.se  
553 5.1.8 test@com.se... Domain of sender  
    address test@com.se does not exist  
mail from: test@cs.lth.se  
250 2.1.0 test@cs.lth.se... Sender ok  
rcpt to: slawek@cs.lth.se  
250 2.1.5 slawek@cs.lth.se... Recipient ok  
data  
354 Enter mail, end with "." on a line by itself  
test  
..  
test2  
.  
250 2.0.0 j8C7QIVM024988 Message accepted for delivery  
quit
```

Email Message Headers

- RFC 733, 821, 822, 2822, 2045–2049
- From: and To: headers are required
- Others are optional
 - Subject:
 - CC:
 - In-Reply-To:
- Some headers are added automatically
 - Received:
 - Date:
 - Return-Path:
 - Message-ID:



MIME



- Multipurpose Internet Mail Extensions
- Text is not the only thing being sent via email
- “Content-Type:” header
 - how MUA should present the data to the user
 - `multipart/mixed`
 - `multipart/alternative`
- “Content-Transfer-Encoding:” header
 - SMTP expects message body to be ASCII text
 - binary data needs to be encoded in some way
 - MUA receiving the message needs to know if and how to decode it

MIME Types



- text/plain, text/html
- image/jpeg, image/png
- video/mpeg,
- application/postscript, application/octet-stream,
- message/rfc822, message/partial,
message/external-body
- multipart/mixed, multipart/alternative,
multipart/parallel, multipart/digest

MIME — an Example



```
From: elinor@abcd.com
To: carolyn@xyz.com
MIME-Version: 1.0
Message-Id: <0704760941.AA00747@abcd.com>
Content-Type: multipart/alternative; boundary=qwertyuiopasdfghjklzxcvbnm
Subject: Earth orbits sun integral number of times
```

This is the preamble. The user agent ignores it. Have a nice day.

```
--qwertyuiopasdfghjklzxcvbnm
Content-Type: text/enriched
```

```
Happy birthday to you
Happy birthday to you
Happy birthday dear <bold> Carolyn </bold>
Happy birthday to you
```

```
--qwertyuiopasdfghjklzxcvbnm
Content-Type: message/external-body;
    access-type="anon-ftp";
    site="bicycle.abcd.com";
    directory="pub";
    name="birthday.snd"
```

```
content-type: audio/basic
content-transfer-encoding: base64
--qwertyuiopasdfghjklzxcvbnm--
```

POP3



- RFC 1939, 2449, 1734, 3206
- Post Office Protocol version 3
 - authorisation
 - list messages
 - retrieve messages
 - delete messages
 - quit session
- The idea is for user to download messages to his/her computer and manage them there
- As far as server is concerned, the only question is whether to delete messages or not
- No state information across sessions

IMAP



- Internet Message Access Protocol
- RFC 2060, 2595, 3501
- Much more complex than POP3
- The idea is to keep messages on the server
 - maintain folder hierarchy on the server
 - move messages between folders
 - search
 - retrieve parts of messages
 - synchronise data between server and cache maintained by the client

Webmail



- Ideas similar to IMAP
 - maintain folder hierarchy on the server
 - move messages between folders
 - search
- Getting rid of the client
- No local copy of messages
- More functionality
 - application, not protocol
- Reading and writing messages in web browser
- All the usual features of web applications
 - both advantages and disadvantages

exim4



- Only needed if you own a domain where you want to receive email
- Can be configured in several different ways
 - smarthost
 - closed relay
 - open relay
- `sudo apt-get install exim4`
- `sudo /etc/init.d/exim4 restart`
- `/etc/exim4/update-exim4.conf.conf`
 - `sudo update-exim4.conf`
- `sudo /etc/init.d/exim4 reload`

`/etc/exim4/update-exim4.conf.conf`

- `man update-exim4.conf.conf`
 - merges configuration files
 - verifies configuration validity
- `dc_eximconfig_configtype`
 - `local, smarthost, internet`
- `dc_localdelivery`
 - `mail_spool, maildir_home`
- `dc_other_hostnames`
 - `mydomain.example`
- `dc_smarthost`
 - `host.domain.example::587`



Email Forwarding



- By default, `user@system` is assumed to map to a real user
 - if no such user exists, message is refused
- Sometimes, however, it doesn't work
 - `webmaster@`, `techsupport@`, ...
 - multiple users
 - different users at different times
- `/etc/aliases`
 - `admin: sam, zach@example.com`
 - can be used as simple mailing lists
- `~/ .forward`
 - user-level aliases

Related Software



- SpamAssassin
 - evaluate likelihood that received email message is a spam
 - header & text analysis
- SquirrelMail
 - PHP-based IMAP Webmail server
- Mailman
 - Python-based mailing lists manager
- Dovecot
 - IMAP & POP3 server



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Questions?



Multiple Choice Questions



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- Some feedback
 - 284 questions
- Most of them are at least fine
 - but it wouldn't hurt for you to be a little more diligent and scrupulous
- This is part of your grading
 - not an SMS to your friends
- A few questions are really bad
 - both unclear and incorrect
- We were hoping for more really good ones!
 - encourage thinking instead of memorisation
 - combine different aspects of the problem

Multiple Choice Questions



- A file with an extension txt is ?
 - a text file created using vi editor
 - a text file created using a notepad
 - a text file created using word
 - none of above

Multiple Choice Questions



- You're having trouble with your Ubuntu-based secure network. Where you you first turn in order to start troubleshooting?
 - `/var/log/auth.log`
 - `/home/logs/sshd.log`
 - `/gnome/snet/boot.log`
 - `/home/ssdir/auth.log`

Multiple Choice Questions



- How many lines of a file are viewed by default when you type head in the terminal?
 - 5
 - 10
 - 15
 - 20

Multiple Choice Questions



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- Which of the following describes a Shell and its properties?
 - Shell is a software that provides an interface for users and operating system and one of its properties is viewing the contents of directories
 - Shell is the main processor of a computer that keeps the system alive and one of its properties is managing the system's resources
 - Shell is a Command Line Interface of an operating system and one of its properties is allowing the computer to type commands to perform specific tasks
 - Shell is a Graphical User Interface of an operating system and one of its properties is

Multiple Choice Questions



- What purpose does the -i (interactive) parameter fill?
 - Verification that you want to execute a command i.e. overwrite
 - Lets you communicate with other users
 - Grants you access to the Terminal
 - Allows the Hardware and software to communicate

Multiple Choice Questions



- Which file system does DOS typically use?
 - FAT32
 - FAT16
 - NTFS
 - WNFS

Multiple Choice Questions



- Someone is trying to break into your server over the SSH protocol, you decide to change the standard port that SSH uses, which is?
 - 22
 - 21
 - 23
 - 25

Multiple Choice Questions



- Can you use the "mv" command to delete files?
 - Yes, by moving it to another directory that already have a file with the same name
 - Yes, if u move it to a non-existing place
 - Yes, by moving it to the tmp directory
 - No

Multiple Choice Questions



- What Journalled file system is commonly used by the Linux kernel
 - FAT
 - NTFS
 - EXT
 - FHS

Multiple Choice Questions



- What do you need to think of when you use the `copy(cp)` and `move(mv)` commands?
 - If there is a file with the same name as the file you are trying to copy or move to that directory, it will overwrite(destroy) the file with the file you copied or moved.
 - The copy and move commands will make sure before it copies/moves the file to a directory that there isn't any file with the same name as the file you are copying/moving in that directory.
 - With the `-i`(interactive) option to the move and copy command, the commands will overwrite(destroy) files without warning.
 - The copy command has the ability to

Multiple Choice Questions



- How does the shell prevent overwriting of a file using redirection.
 - set +o noclobber
 - set noclobber
 - set -o noclobber
 - set o noclobber

Multiple Choice Questions



- Assume that you want to make a copy of a file, and you want to give the command "cp hej hejcopy". What option will help you avoid getting "hejcopy" overwritten if it already does exist?
 - -i
 - -u
 - -h
 - -j

Multiple Choice Questions



- If you have "alias ls=ls -a" but would like to ONLY get the normal ls what could you do?
 - ./ls
 - #ls
 - *ls
 - &ls

Multiple Choice Questions



- If you have "alias ls=ls -a" but would like to ONLY get the normal ls what could you do?
 - ./ls (/bin/ls)
 - #ls
 - *ls
 - &ls
 - "ls"

Multiple Choice Questions



- Which statement about the 2 sub-folders "." and ".." are false?
 - Before removing a directory, you must first remove the . and .. sub-directories.
 - Using command `cd ..` brings you to the parent directory
 - When creating a directory using the `mkdir` command, the directories . and .. will be created inside that directory automatically.
 - `ls` command will not show the . and .. directories, but `ls -a` will.

Multiple Choice Questions



- User bertil enters the following command: `cd /docs/report/../course/../../music/` Once the command has successfully completed, what will be the output of "pwd"?
- `/home/bertil/music`
- `/home/bertil/docs/music`
- `/docs/report/music`
- `/docs/music`

Multiple Choice Questions

- If you have logical dick D in Windows how it will be represented in Linux?
 - /media (or other name you like)
 - D:
 - D:/
 - it will not be represented because Linux use only one disk



Multiple Choice Questions



- Which of the following options presents a security risk on an FTP server?
 - Allowing local users to log in remotely through the ftp utility, with their local credentials
 - Allowing only anonymous log-ins
 - Lettings local users log in remotely with the sftp client from the OpenSSH suite
 - Using chroot jails on the server

Multiple Choice Questions



- You are currently in `/home/user` where you have a folder named `Folder1`. What happens if you run the command `"cp -R Folder1 Folder2"` ?
 - Folder2 is created with the same content as Folder1.
 - Folder2 is created with a folder called Folder1 inside.
 - Folder2 is created with the same content as Folder1, Folder1 is then deleted.
 - Folder2 is created with a folder called Folder1 inside, Folder1 is then deleted.