

UNIX Workshop

<http://www.comp.nus.edu.sg/~melvin/UWS/>

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Jurassic Park (1993)

"It's a UNIX system! I know this."

– Alexis “Lex” Murphy, Jurassic Park (1993)

Outline

Introduction to UNIX

- Origins of UNIX

- UNIX Concepts

UNIX in SoC

- Checking your SoC email account

- SoC's sunfire server

- Creating text files

- Organising your home directory

- Some useful applications on UNIX

Summary

Resources

Acknowledgement

The materials for this workshop are adapted from the following sources:

- ▶ UNIX Workshop 2005 notes by Mark Tan (SoC, NUS)
- ▶ CS1101 Lab 0 notes by Aaron Tan (SoC, NUS)
- ▶ UNIX/Linux Tutorial for Beginners by Michael Stonebank (University of Surrey)

UNIX in SoC

The UNIX environment provided by the Solaris OS on our servers are used for:

- ▶ writing programs for your programming labs/assignments
- ▶ learning about operating system concepts (CS2106, Operating Systems)
- ▶ hosting a database driven site (CS2102, Database Systems)
- ▶ accessing SoC printers and checking your print quota
- ▶ reading your SoC email account

What is an Operating System?

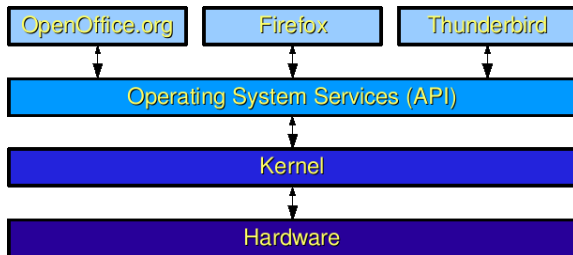


Figure: Relation between applications, OS and hardware

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Creators of UNIX



Figure: Dennis Ritchie (standing) and Ken Thompson working on a PDP-11.

Creators of UNIX



Figure: Ken Thompson (left) and Dennis Ritchie receiving the National Medal of Technology from President Clinton.

UNIX Family Tree

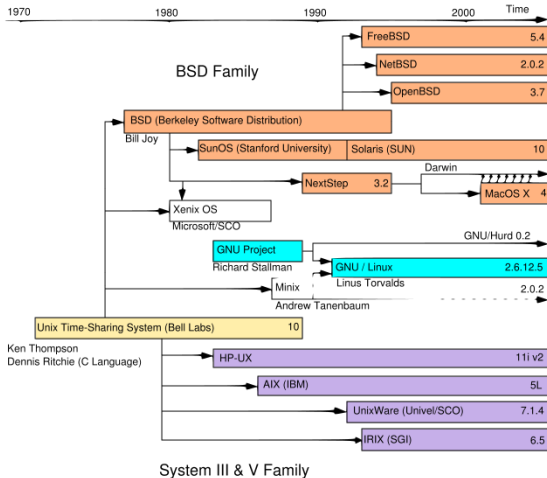


Figure: UNIX and its descendants

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Activity: Login to NUSNET

1. Press Ctrl-Alt-Delete.



2. Type in your NUSNET username, password and select NUSSTU domain.



3. Click on the Ok button.

Activity: Creating your UNIX account

1. Login to <https://mysoc.nus.edu.sg/~newacct> using your NUSNET username and password.
2. Read through the user-agreement and make sure you understand the obligations.
3. Decide your UNIX username. Your username should be between 5-8 characters and must be formed from your name. You may also use your NUSNET username.
4. Type in your new password (twice).
5. Submit your application.

Privileges

Your new UNIX account comes with the following privileges:

- ▶ Email : `unix_username@comp.nus.edu.sg`
- ▶ Website : http://www.comp.nus.edu.sg/~unix_username
- ▶ Solaris zone: `unix_username-z.comp.nus.edu.sg`
- ▶ Disk quota: 2Gb
- ▶ Print quota: 50 pages/month

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Checking UNIX email

You can access your UNIX email account via mySoC Webmail,
<http://mysoc.nus.edu.sg/~webmail>



The screenshot shows the mySoC Webmail login page. At the top is a dark blue header with the 'mySoC' logo and the tagline 'your personalized portal'. Below the header is an orange navigation bar containing the text '30 July 2015, 11:45 PM | Home | Logout | SiteMap | Help'. The main content area is white and contains the text 'mySoC Webmail' centered. Below this is a login form with two input fields: 'Name:' and 'Password:'. To the right of the 'Password:' field is a 'Login' button. Below the login form, there are two links: 'Your feedback/comments to SoC Helpdesk.' and 'WebMail Information and FAQs.'. At the bottom of the page, there is a red notice: 'Notice: SoC Staff and Students who do not have SoC email account will not be able to access email via this WebMail interface.'. The footer is a dark grey bar with the text 'Parent Office > School of Computing > SCS > SoC Access Portal'.

Figure: mySoC Webmail interface

Your mailbox part of your disk usage, which is 2Gb. You can forward your NUSNET email to your UNIX email using
<https://exchange.nus.edu.sg/autoforward>.

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sunfire server in the Machine Room



Figure: sunfire server located in the Machine Room with our Networks staff. Clockwise from top-left: Tan Chee Sin, Tan Kwang Pon, Budiman Tsjin (has since left SOC) and Lai Zit Seng.

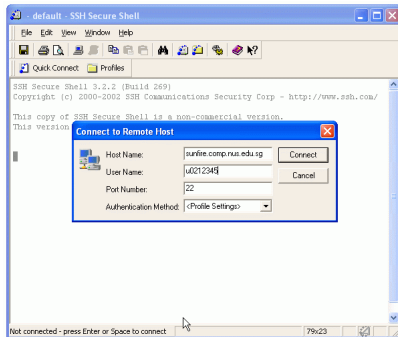
Activity: Connecting to sunfire

1. From the desktop, launch the SSH Secure Shell Client application.

2. Click on Quick Connect

Host Name: sunfire.comp.nus.edu.sg

User Name: your UNIX username



3. Click on Connect. Enter your UNIX password in the password dialog.

CLI vs GUI

Graphical User Interface

What they tell you, WYSIWYG (What you see is what you get).

CLI vs GUI

Graphical User Interface

What they tell you, WYSIWYG (What you see is what you get).
The truth is, WYSIAYG (What you see is all you get).

CLI vs GUI

Graphical User Interface

What they tell you, WYSIWYG (What you see is what you get).
The truth is, WYSIAYG (What you see is all you get).

Command Line Interface

- ▶ Suited to performing ad hoc operations by combining a few commands.
- ▶ Easy to automate repetitive tasks.
- ▶ Default interface when accessing remote servers.

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Text files are ubiquitous on UNIX

Program source code are stored as text files. A good text editor, such as Vim, can dramatically improve your productivity.

```

/* vimset
 *
 * vimrc
 *
 * VIM - VIM_nemset
 *
 * vin_tcl_init
 *
 * vin_nem_profile_dump
 *
 * Do the vininfo
 *
 * Do the vinchdirfile
 *
 * See REA vin_chdir
 */
vininfo
vin_snprintf
#include "vin_free
vin_isdigit
/* Structu vin_getenv
gui T qui: vin_strsave
11 gui.c vinrc_found
/* vimset vin_strsave_escaped_ext
 *
 * vin_strsave_escaped
 *
 * VIM - V vinconv_T
vinconv_T
vinconv
 *
 * Do the vin_strsave_up
 *
 * Do the vin_strchr
 *
 * See REA vinmenu_T gui.c
 *
 * vin_ishwhite gui.c
 *
 * vin_recomp gui.c
 *
 * if define vin_regeexec_n1 gui.c
 *
 * include "vin.h" > /* For close() and dup() */
#endif

#define EXTERN
#include "vim.h"

#ifdef SPWIND

[2] main.c [11c]
Scanning included files: arabic.c
-- Keyword Completion ("NPP" match 1 of 64

```

Figure: Screenshot of GVim

Vim is a modal editor

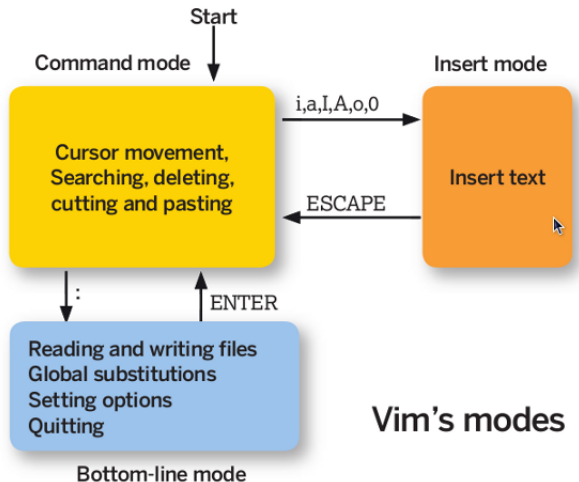


Figure: Different modes of Vim and how to switch between them

Activity: Text editing with Vim

1. From the Secure Shell Client window start Vim and create a new file using the command

```
vim hello.txt
```

2. Vim puts you in Normal mode by default. Switch to Insert mode using the 'i' key.

```
i
```

3. Type a short message to introduce yourself.
4. Now return to Normal mode by pressing the Escape key.

```
<Esc>
```

5. Save the file and exit Vim by pressing 'ZZ'

```
ZZ
```

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UNIX Directory Tree

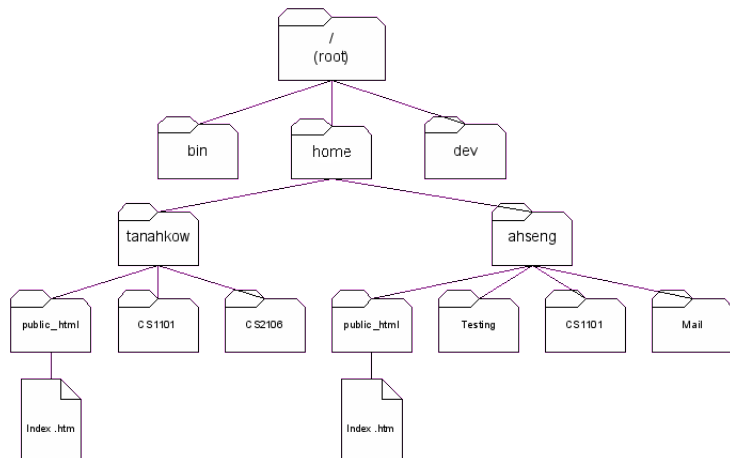


Figure: A subset of the UNIX directory tree showing home directories

Activity: sunfire as a web host I

1. Find out your home directory using the following command

```
pwd
```

2. Create a directory under your home directory named `public_html`.

```
mkdir public_html
```

3. Move `hello.txt` into the `public_html` directory.

```
mv hello.txt public_html
```

Activity: sunfire as a web host II

4. Change the permissions on `public_html` so that it is readable by the web server.

```
chmod a+rx public_html
```

5. Change your current directory to `public_html`.

```
cd public_html
```

6. Change the permission on `hello.txt` so that it is readable by the web server.

```
chmod a+r hello.txt
```

Activity: sunfire as a web host III

7. Ask the person next to you to download hello.txt from your personal website at http://www.comp.nus.edu.sg/~unix_username/hello.txt

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Activity: Printing



Figure: Lexmark printers at COM1

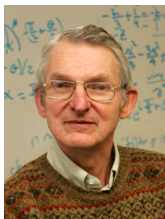
- ▶ View the status of the print queue, use `lpq`,
`lpq -P pstsc`
- ▶ Remove a print job after it has been sent, use `lprm`,
`lprm -P pstsc 89`
- ▶ Check your print quota, use `pusage`,
`pusage`

The UNIX Philosophy

Write programs that do one thing and do it well.

Write programs to work together.

Write programs to handle text streams, because that is a universal interface.



– Douglas McIlroy

Activity: SMS Word Count



Your friend from FASS is studying SMS language as part of a course project. She collected a number of SMS messages and would like to find out the frequency of each word.

Activity: SMS Word Count

For example, given the following text file:

```
U wan 2 haf lunch i'm in da
canteen now.
Haf u found him? I feel so
stupid da v cam was working.
Where r we meeting?
I went to ur hon lab but no
one is there.
```

The desired output is:

```
.
.
.
1 we
1 went
1 Where
1 working.
2 da
2 I
```

Activity: sort and uniq

Two UNIX utility programs are related to our task.

sort

Input:		Output:
dog		bat
bat	→	cat
log		dog
cat		log

uniq

Input:		Output:
dog		dog
dog	→	cat
cat		dog
cat		cat
dog		
cat		
cat		

Activity: SMS Word Count I

1. Download the file containing sms messages from <http://www.comp.nus.edu.sg/~melvin/UWS/SMSwords.txt> using wget

```
wget http://www.comp.nus.edu.sg/~melvin/  
UWS/SMSwords.txt
```

2. Sort the file.

```
sort SMSwords.txt
```

Activity: SMS Word Count II

- Sort and remove duplicates.

```
sort SMSwords.txt | uniq
```

- We need to use a particular option of `uniq` which counts the number of duplicates, read the manual page for `uniq`. Press `q` to leave the manual page.

```
man uniq
```

- Sort and count words,

```
sort SMSwords.txt | uniq -???
```


Activity: SMS Word Count III

- Sort by the frequency, so that more frequent words appear later,
`sort SMSwords.txt | uniq -??? | sort -n`

Activity: Setting up your homepage (Optional)

Instead of using `hello.txt`, create a file named `index.html` and put it in your `public_html` directory. Remember to change its permissions to readable by all.

```
<html>
<head>
<title>Sample index page</title>
</head>
<body>
Hello World
</body>
</html>
```

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In this workshop, we have covered the following topics:

- ▶ UNIX from past to present
- ▶ Connecting to `sunfire` via `ssh`
- ▶ Text editing using `Vim`
- ▶ Using `sunfire` as a web host
- ▶ Manipulating text files using UNIX utilities

Activity: Logging out of sunfire

To log out of sunfire, use the logout command,
logout

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Computing Resources in SoC

- ▶ Description of facilities in SoC,
<https://www.comp.nus.edu.sg/cf> and
<https://mysoc.nus.edu.sg/~wiki>
- ▶ Web based services, mySoC, <https://mysoc.nus.edu.sg>
- ▶ SoC Webmail <https://mysoc.nus.edu.sg/~webmail>
- ▶ SSH Secure Shell Client 3.2.9,
http://www.comp.nus.edu.sg/~cs1101x/2_resources/SSHSecureShellClient-3.2.9.exe