

(or How I Learned to Stop Worrying and Love the Command Line)

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Since 1985, I've built tools on BSD 4.13, Unix SVR4, Solaris 2 through 11, AIX, Linux, Darwin, Irix, Compuserve GIS, and Atari DOS/TOS command-line systems.





Fujifilm SonoSite is the global leader in point-of-care ultrasound.

We self-host a suite of Drupal-based product sites, educational sites, and web-based apps.

# Before we begin, you should know how to do this:

- Log-in to a Linux system using ssh, PuTTY, etc.
- Move between directories (cd)
- Edit a simple text file (vim, emacs, or other)
- Create & use file and database backups



# But if you don't know any of that, these links will get you started:

http://www.ee.surrey.ac.uk/Teaching/Unix/unix1.html https://www.liquidweb.com/kb/new-user-tutorial-basic-ssh/ https://ryanstutorials.net/linuxtutorial/vi.php

### The Command Line – - - - So Why Bother???



When an interface can't (or won't) do everything we need...

### The Command Line – - - - So Why Bother???

# ...it may be necessary to go around that interface







- Strange-sounding, hard-to-pronounce words and phrases
- Amazingly powerful (and amazingly dangerous)
- Ancient, seldom-changed texts, authored by wizards with long hair and beards
- No wizard knows *all* of it
- Pretty scary to muggles and mortals





- Practice in a sandbox, scratch directory, or other non-critical area
- Have a recovery plan
- Backups are your friend
- Anything that can blow-up probably will.
   Be Prepared.





 Display the contents of one or more text files:

cat settings.php

cat \*.html

cat one.txt two.txt



#### Concatenate files:

cat \*.pdf > all\_in\_one.pdf





# Write the output of a command to a file: date > my\_date\_file.txt my\_date\_file.txt now contains the string: Thu Dec 28 11:13:57 PST 2017







#### Same as before, but append to a file:

echo "hello world" >> my\_date\_file.txt

Thu Dec 28 11:13:57 PST 2017 hello world

# Redirection



#### Pass output from one command to another:

- cat log.txt | mail -s "Logs" it@hogwarts.edu
- ls -1 /tmp/\* | sort --ignore-case > sorted.txt
- ls -1R sites/default/files | wc -1
- ls -lt | more

### **Bash Aliases**

Macros for Linux. Add them to your .bashrc file.

# Safety Nets
alias rm='rm -i'
alias mv='mv -i'
alias cp='cp -i'
alias dc='cd'

### **Bash Aliases**

Macros for Linux. Add them to your .bashrc file.

# Tools

alias numusr='netstat -an |egrep "443|80" |wc -l'

alias h='history'

alias cpuinfo='lscpu'



# Tools

alias numusr='netstat -an |egrep "443|80" |wc -l'

Example: numusr

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#### Bash Aliases - history Macros for Linux. Add them to your .bashrc file.

# Tools

alias h='history'

Records and plays back what you did (and what other users have done)



#### Bash Aliases - history Macros for Linux. Add them to your .bashrc file.

**Example:** 

WO

!!repeats the previous command!8927repeats command 8927Up/Down Arrows to scroll

#### Bash Aliases - cpuinfo Macros for Linux. Add them to your .bashrc file.

# Tools

alias cpuinfo='lscpu'

#### Example:

**lscpu** Architecture:

CPU op-mode(s): Byte Order: CPU(s): On-line CPU(s) list: Thread(s) per core: Core(s) per socket: Socket(s): NUMA node(s): Vendor ID:

x86\_64 32-bit, 64-bit Little Endian 10 0-9 1 1 10 2 GenuineIntel

and lots lots more . . .

#### Bash Functions – dos2unix May also be added to your .bashrc file

# Convert MS-DOS line endings to Unix dos2unix() { cat \$1 | tr -d '\015' > \$2; }

#### Example:

dos2unixdefault.htmindex.htmlExisting MS-DOS fileNew Unix file

Bash Functions - dircmp May also be added to your .bashrc file # Recursively compare two directories

dircmp() { diff -qr \$1 \$2 ;}

Example with directories called foo and bar:

dircmp foo bar

Only in bar: file.bin Only in foo: hello.txt Files foo/name.txt and bar/name.txt differ

(only the differences are printed)

#### Bash Functions - dircmpdiff May also be added to your .bashrc file

# dircmp, in diff format: dircmpdiff(){ diff -q -r \$1 \$2 | \ sed 's/^Files /diff /g;s/ and / /g;s/differ\$//g';}

#### Example:

dircmpdiff foo bar

Only in bar: file.bin
Only in foo: hello.txt
diff foo/name.txt bar/name.txt

# **Real-time logfile monitors**

First, find your logfiles . . .

cd /var/log/httpd Or cd /var/log/nginx

Example 1:

#### tail -f access\_log

Displays a realtime scrolling display of the access\_log file, as it is being written.

0.00 / 🚮 tal +F+	×	Quest
C @ localhost 9001		1
tail -F -		Filter
223.334.04.06 - (10.56) 10.31.06.0.31.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.32.05.01.05 10.45.05.01 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05.05 10.45.05	98:14:03 - 4420 - 547 - Acaline WY2,47 (1994) - 91,14,1,20 - 540 - 540,14	200 005 11112/200 00000000000000000000000000000

# **Real-time logfile monitors**

**Example 2:** 

#### tail -f access\_log SSL\_access\_log

Displays a realtime scrolling list of the last few lines of the the named files, as they are being written.

# **Real-time logfile monitors**

**Example 3:** 

tail -f access\_log | grep -i Googlebot

Only show lines containing Googlebot (case-insensitive) in the scrolling display.

# Where Is That String?



"It's either in a file or it's in the database"

How to search both



g/re/p – global search for regular expression and print

Case-sensitive search through one or more text files for a string, and then show all the lines that contain that string



EPep will sind you

grep 51.255.71.120 access.log
51.255.71.120 - - [28/Dec/2017:03:43:04 -0800] "GET...
51.255.71.120 - - [28/Dec/2017:05:37:33 -0800] "GET...
51.255.71.120 - - [28/Dec/2017:06:15:00 -0800] "GET...

#### grep

#### Example 2:

Search all logs (in the current directory) for an IP address:

#### grep 51.255.71.120 \*.log

- son1\_access.log: 51.255.71.120 - [28/Dec/2017:03...
- son2\_access.log: 51.255.71.120 - [28/Dec/2017:05...

- son0\_access.log: 51.255.71.120 - [28/Dec/2017:06...

grep compressed files zgrep and bzgrep

Search all *compressed* logs in the current directory

#### **Example:**

bzgrep 51.255.71.120 \*.bz2 > /tmp/srch1.log
zgrep 51.255.71.120 \*.gz > /tmp/srch2.log

son1.log-209.bz2:51.255.71.120 - - [18/Nov/2017:22:47:54 -0800] "GET /ja/bl . . .
vis2.log-119.bz2:51.255.71.120 - - [18/Nov/2017:23:58:22 -0800] "GET /it/pr . . .
vis2.log-219.bz2:51.255.71.120 - - [19/Nov/2017:03:03:55 -0800] "GET /kr/nb . . .

# *Recursive* grep



Search for a string in any file at or beneath the current directory

cd sites/all/modules/custom
grep -rin some\_unique\_reference

- -r = Recursive search
- -i = Case-insensitive
- -n = Print line numbers

*TIP:* Make a shortcut alias with: alias grin='grep -rin'

# grep the MySQL database

No luck with recursive string searches? Here's how to grep your database.

1. Download and configure the dumpXMLtables.php script, https://github.com/nightbeacons/Expecto\_Patronum

2. Run dumpXMLtables.php. It writes an XML file for each table in your db. (users.xml, watchdog.xml, . . .)

# grep the MySQL database

**3.** grep -i for your target string. (*Tip: If you get a large search result, redirect the output to a file.*)

The grep shows the table name (as the name of the XML file) as well as the column name and the target string.

# grep the MySQL database

#### **Example:**

grep drupal \*.xml

actions.xml: <field name="callback">node\_export\_drupal... advagg\_files.xml: <field name="filename">misc/drupal.js... locales\_source.xml: <field name="source">drupal name for... table name

1. Run dumpXMLtables.php to create a "before" snapshot of the database.

Rename the dump directory before\_xml



2. In Drupal, change just one thing.

(Typically this will be your "prime suspect" component.)



3. Re-run dumpXMLtables.php to create an "after" snapshot.

Rename that dump directory after\_xml



4. Use dircmp before\_xml after\_xml to discover all changes to the database.

(Tip: Or use dircmpdiff for copy/paste ability)



Manipulating Images using convert, from imagemagick.org



If you can do it with Photoshop (or gimp), you can do it *faster* with convert:

- Convert between formats (JPG, PNG, GIF, SVG . . .)
- Resize, rotate, and optimize images
- Make animated GIFs and sprites
- Adjust colors, apply special effects, draw shapes, and master time, space, and dimension

#### convert: Basic Examples

convert banner.jpg banner.png
convert -geometry 50% big.jpg small.gif
convert -quality 51% orig.jpg opti.jpg
convert --help | more



### convert: Power Tools

Example 1:

# convert -delay 20 -loop 0 cradle\*.gif \ animated\_cradle.gif





### convert: Power Tools

Example 2:

convert -colorspace Gray fullcolor.jpg \
 monochrome.png

Example 3:

curl -s http://pnw.org/banner.jpg \ | - convert -resize 200% my.png Sending email

Using the mail command

Example 1:

echo "This is the body of the email" \
 mail -s "The Subject" foo@bar.com

Sending email Using the mail command Example 2:

cat /tmp/msg.txt | \ | mail -s "Another One" foo@bar.com

# **Sending email**

Adding an attachment

Example 3:

#### **SCP** "secure copy"



Quickly copy files between systems (You need a valid login on both systems)

Send a local file to a remote system: scp myfile.txt harryp@hgwrt1.edu:/var/www

Fetch multiple files from a remote system:
scp harryp@hgwrt1.edu:/tmp/images/\*.jpg \
 /var/www/images

#### scp: Power Tools

Send an entire directory to a remote system: scp -rp images draco@hgwrt1.edu:/var/www

Copy ginormous directories to a remote system:
tar -cpf - /var/www | ssh luna@hgwrt.edu \
 "(cd /archive/; tar -xpf - )"
 Tip: Useful if you have limited disk space

Automate Anything crontab

crontab -1 - List your cron table

Example:

crontab -1
# Generate video sitemap
15 5 \* \* 0 /path/bin/VSitemap.drush
45 2 \* \* \* /path/bin/tMon.php >/dev/null 2>&1

# Automate Anything crontab -e - Edit your cron table

Loads your cron table into the default editor (typically vi). Edit/Save to activate.

2 16 \* \* \* /home/charlesj/bin/getCleanersDB.sh \*/10 \* \* \* \* cd /var/www/sonosite.com && /usr/bin/drush sonor \*/6 \* \* \* \* cd /var/www/sonosite.com && /usr/bin/drush sonop ~ ~ ~ ~

Automate Anything The Five cron scheduling fields: Field Allowed Values (\* = wildcard) 0 - 59minute 0 - 23hour day of month 1 - 311 - 12month 0-7 (0 or 7 is Sun) day of week

(Tip:man -s5 crontab will show this info, and much more!)

# Just for Fun - figlet

Examples:

figlet Drupal Rocks



Redirect to a file:

figlet Development System > /etc/motd

### Just for Fun - figlet

More fonts??

showfigfonts shows all of them, with samples

figlet -f slant Too Cool



# Just for Fun - fortune

Example:

fortune
yo-yo, n.:
 Something that is occasionally up
 but normally down.
 (see also Computer).

# Just for Fun - cowsay

Example 1:

cowsay I LOVE this presentation

< I LOVE this presentation >

#### **Just for Fun - cowsay** Example 2: cowsay -f ghostbusters Who you gonna call?

< Who ya gonna call? >



# Just for Fun - cowsay

Example 3:

fortune | cowsay

One can search the brain with a microscope and not find the mind, and can search the stars with a telescope and not find God.

. -- J. Gustav White



# Learning More . . .

- man pages, "man" command
- --help and -h and -usage flags
- apropos (a hidden gem!)
- and don't forget Google and Bing



# **Thank You**

# Happy and safe Wizardry



Slides and sample code is available at https://github.com/nightbeacons/Expecto\_Patronum

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