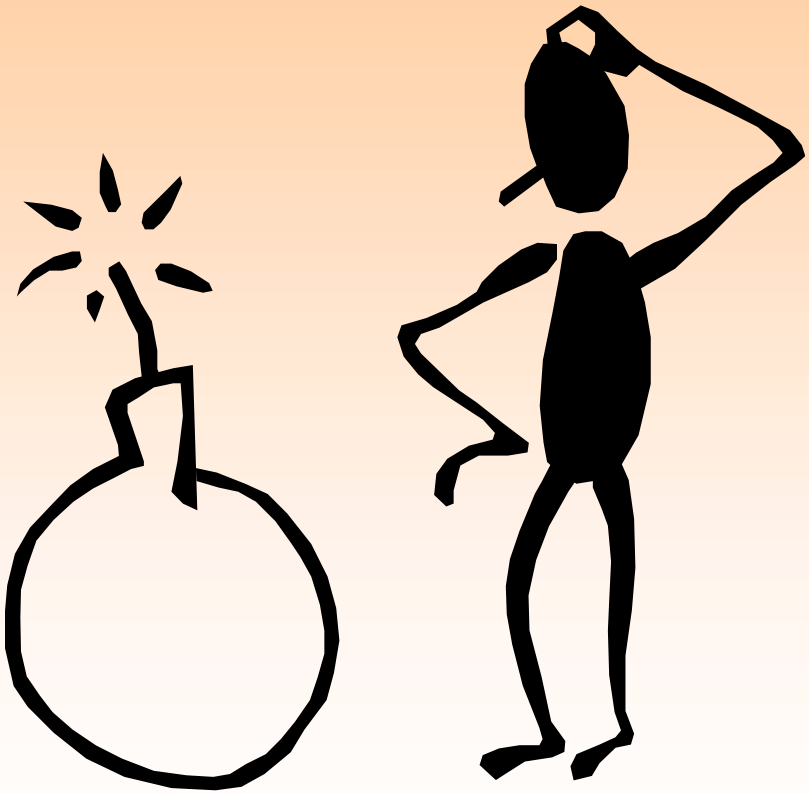
Automate Your Day and be home by 5:00
Using HP-UX to make your jobs easier

Russ Kahler
Technical Services Analyst
The Andersons
480 West Dussel Drive
Maumee Ohio 43537
(419) 891-6552
russ_kahler@andersonsinc.com

New to HP-UX? Feeling overworked? Confused?

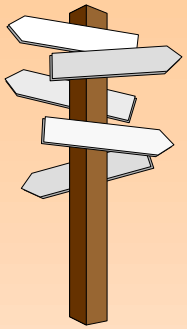


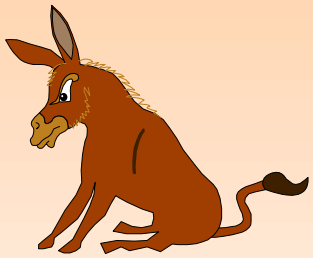
- Administering an HP 9000 can be a daunting task for a new administrator.
- Tasks are always plentiful…whether it's checking the backups or canceling a print job- there never seems to be just enough time in the morning hours to make sure your system is running just the way you want it.

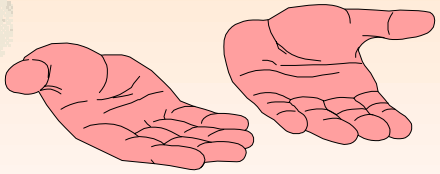
New to HP-UX? Feeling overworked? Confused?

- You need time to deal with the real needs of your user community- and need a way to get past the first “lost” hour of the day.
- Automating your day could be the answer.

What's an Admin to do?







- Manual Intervention: a good idea, but time consuming and tedious
- Just Ignore it: Is this really your solution?
- Outside Help: Another good idea, but just remember that you could end up working on Windows NT-yuck!
- Automation: That's why you came to this presentation…

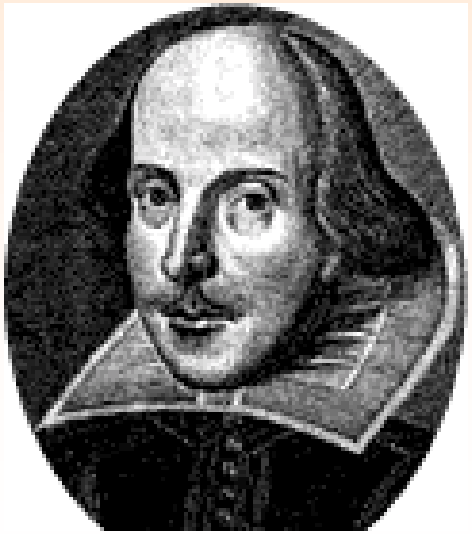
Automation puts the power of HP-UX to work for you. Your time is better spent on your users needs...

After all...users are the patrons of our work, and provide us a stage to display our knowledge and skills.

Your systems are your stage…

"All the worlds a stage and all its people are merely players, they have their exits and their entrances."

-William Shakespeare: As You Like It, Act 2, Scene 7, line 142,



But what can I automate- how does this apply to me?

- System checks- let your system check itself, and give you the results
- Database utilities- UNIX does the job in no time at all
- Backups/startup/shut down- All of these and more can be streamlined by HP-UX
- Time Saving Tips- integrate automation with tasks for your applications, use the command line, and other time saving tools

Tools you can make work for you include:

- Sed
- Awk
- Grep
- pr
- last
- lastb
- do/then/done
- Dmesg
- diff
- cmp
- paste
- cut
- if/then/fi
- $?

Sed- Power editing online

- Sed is an online “stream oriented” text editor that is designed to do the job of interactive editors, such as vi, in batch processes.
- Sed can be used in batch scripts to find/return values from files, programs, and logs
- Sed can be used as a filter to process input from file to file
- Standard use follows this construct:

sed [options] program file Input file

Using sed in your everyday tasks

Find/replace text while scripting:

```
sed 's/russ/jimbob/' russfile >file1.sed
```

Find a double space and replace it with a single space

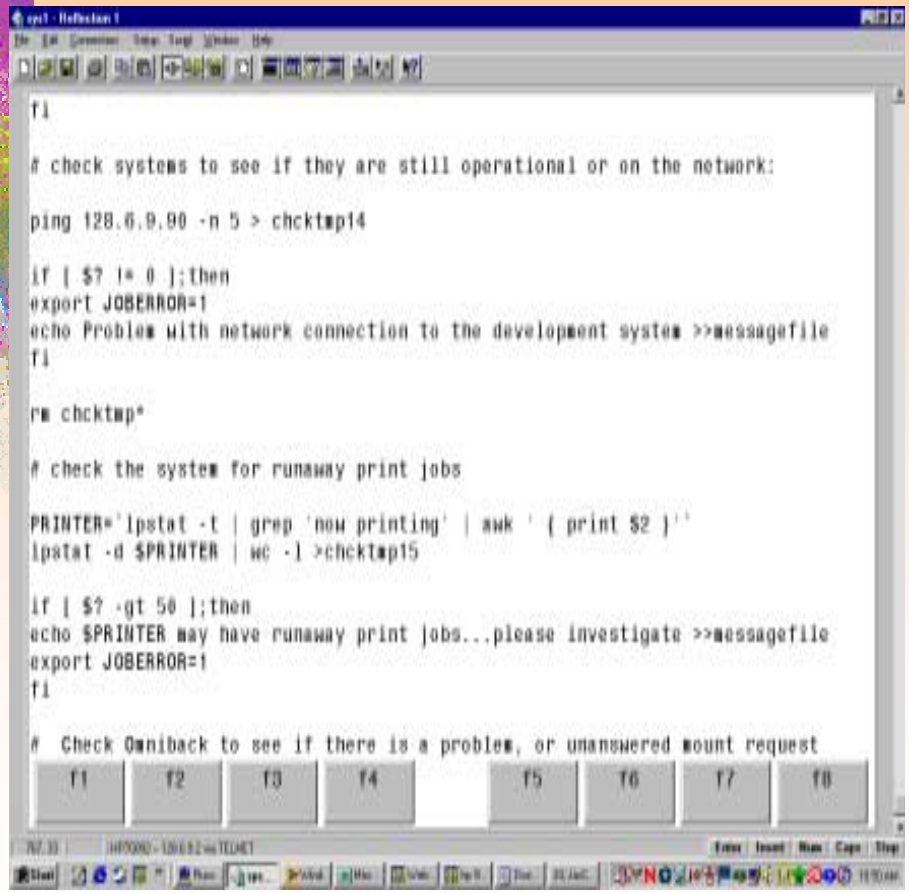
```
sed -f (command file) (input file)
```

```
command file= s/  */ /g
```

Want to do this at the beginning of a file- just add a ^ to the command script:

```
command file= s/^   */ /g
```

AWK- an Admin.'s true friend



```
fi

# check systems to see if they are still operational or on the network:

ping 128.6.9.90 -n 5 > chcktmp14

if [ $? != 0 ];then
export JOBERROR=1
echo Problem with network connection to the development system >>messagefile
fi

rm chcktmp*

# check the system for runaway print jobs

PRINTER=`lpstat -t | grep 'now printing' | awk ' { print $2 }'`
lpstat -d $PRINTER | wc -l >chcktmp15

if [ $? -gt 50 ];then
echo $PRINTER may have runaway print jobs...please investigate >>messagefile
export JOBERROR=1
fi

#  Check Omniback to see if there is a problem, or unanswered mount request
```

- Awk is a pattern matching tool designed to extract information from files, input or programs.
- Awk can be used in many ways- chiefly to match selected variables in files
- Awk can be used to create new files from it's pattern selection by redirecting output through files (touch), the LP spooler, or in cron/batch processes

Using AWK

Pattern matching: Find the non-alphabetical text that is located at the beginning of the file :

```
awk '$1 !~ /[a-zA-Z]/ {print}' /scripts/tmpfile1 >
    /scripts/tmpfile3
```

Pattern Matching continued:

Match the selected field in file and report the output to a file:

```
$BSE/bin/licmon6.1 -u | awk ' { print $1 }' >chcktmp11
```

Grep- don't leave home without it

- Grep is the most commonly used pattern matching tool in UNIX.

- Options include:

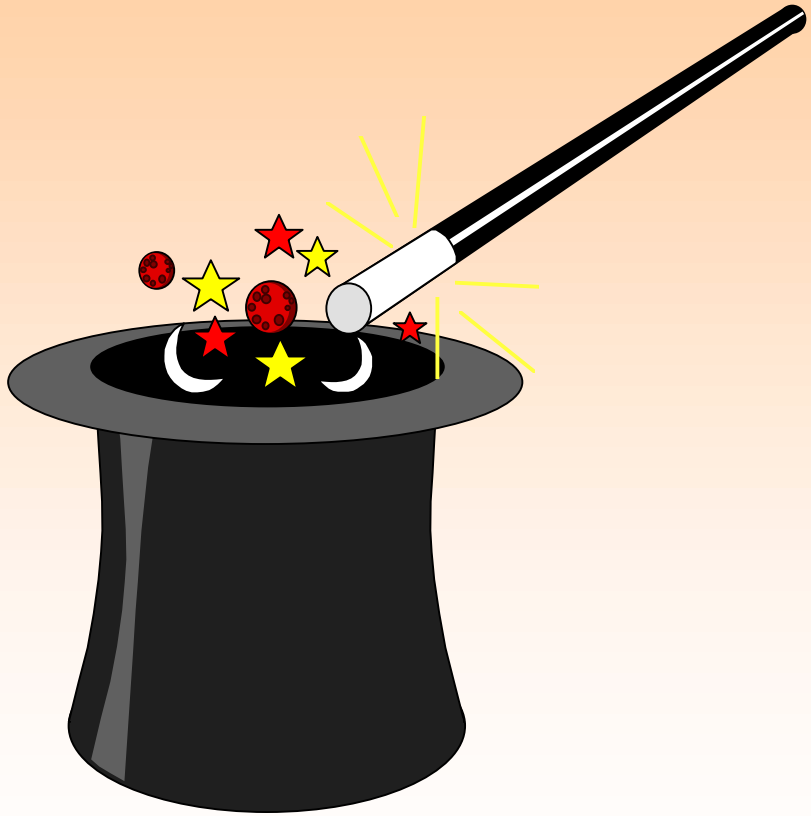
grep -v :

grep -n:

grep -e:

grep -s:

grep - l:



Grep checks out…

Grep to find a pattern:

- *cat /etc/passwd | grep russ*

russg:*:161:125:russ Grimshaw Informix user
russ:*:103:20:Russ Kahler test ODBC

How many times can I be found in this file?

- *grep -c russ /etc/passwd*

2

Weed out unwanted data:

- *ps -ef | grep pdaemon>> chcktmp9* returns:

root 2640 1 0 Feb 5 ? 159:02 /bmnt2/baan4/bse/bin/pdaemon6.1
root 21449 6609 1 15:32:10 pts/te 0:00 grep pdaemon

- *cat chcktmp9 | grep -v grep >chcktmp10* cleans up …

root 2640 1 0 Feb 5 ? 159:02 /bmnt2/baan4/bse/bin/pdaemon6.1

Conditions, Conditions, Conditions

- If/then/else/fi:

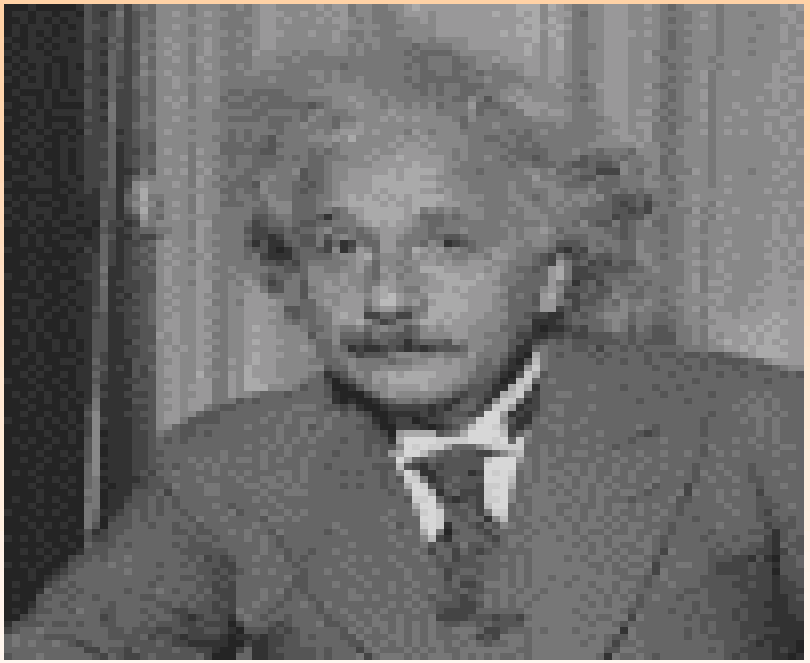
  commonly used conditions to determine need for output.

- Do/then/done:

  Why sit at your desk and repeatedly type in instructions

- Case/ESAC:

  Construct easy to use choices for users/operators/yourself to access data or run necessary procedures



"The most incomprehensible thing about the world is that it is at all comprehensible."- Albert Einstein

For your Conditional approval

- If/else/fi:

```
if [ $i -eq 1 ];then
echo "Completed " >>russlist6
else
if [ $i -eq 2 ];then
echo "in wait" >>russlist6
else
fi
```

- Do/Then/Done:

```
for x in `cat wf_users`
do
passwd -f $x
done
```

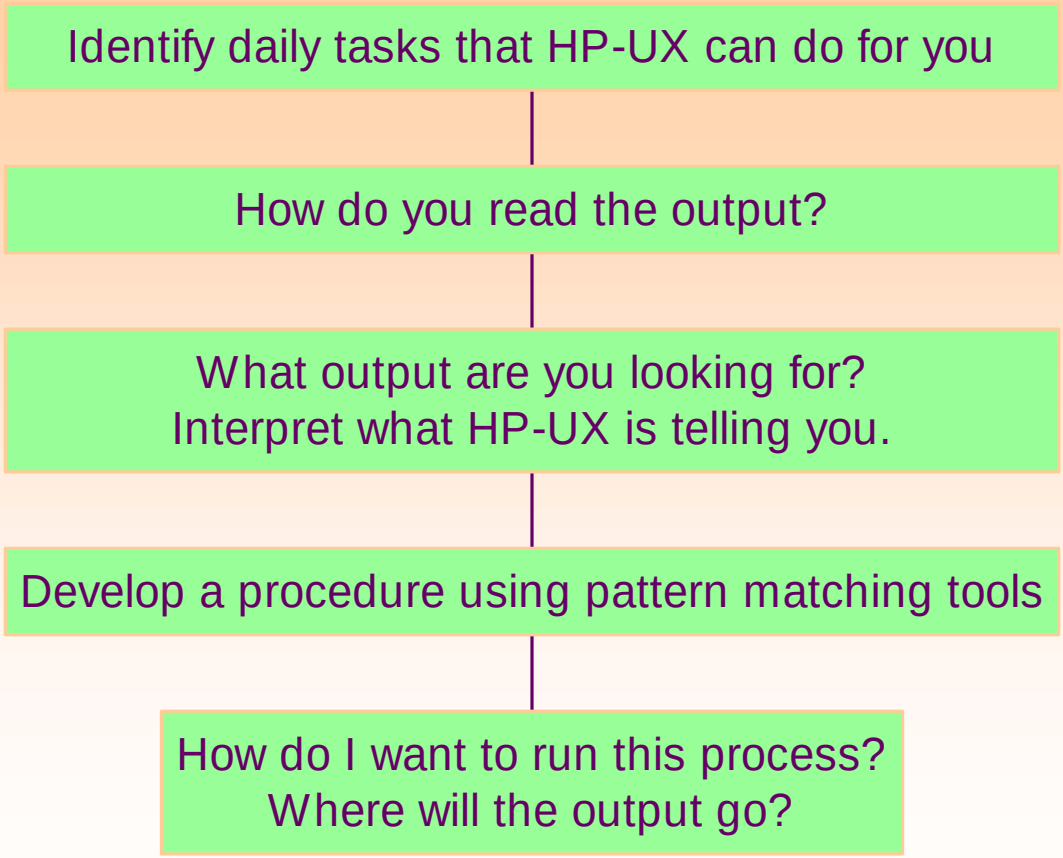
- Case/Esac: It's all about choices

```
case "$event" in

    Shutdown)               ./workfile;;

    Inf_test.backup)        ./tmp/inf_test;;

    Inf_prod.backup)        ./tmp/inf_prod.log;;

    exit            )        exit;;

    *               )        echo "invalid
selection...please try again";;
esac
```

OK- Now what do I do with all this?

NO NO NO. I meant all of the information you just gave us?

Make an automation battle plan

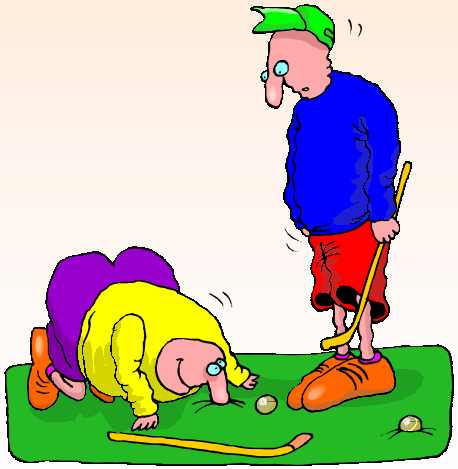


Daily tasks just waiting to be automated

- Checking you system logs: /var/adm/syslog
  /var/mail/(usermail)
  /var/adm/cron/log
  last and lastb
  bdf
- Checking your nightly backups
- Changing user passwords
- System startup/shutdown
- Monitoring logins to the system
- Database/application specific tasks

Output

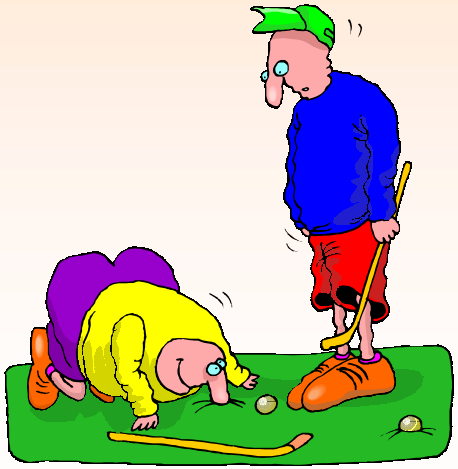
- Dmesg (or /var/adm/messages)- is the hardware error log- look here for hardware/driver related errors



- /var/adm/syslog/syslog.log- system log for all FTP login, predictive, mail, or file system errors. This log serves as a general catch-all for OS errors or messages.

Output

- /etc/rc.log- log for startup/shutdown messages
- /var/adm/wtmp or btmp- source files for last/lastb files to check user login and login errors.
- Console logs- don't forget the old reliable console. Your friend from the beginning



What are you looking for?

- How do I know if I have a full file system?
- Has anyone logged in as root overnight?
- Are the network services running normally?

What is HP-UX telling you?

- *Dmesg and syslog both report this:*

```
vxfs: mesg 001: vx_nospace -
    /dev/vg00/lvol4 file system
    full (1 block extent)
```

- *Check last/ lastb through grep or awk to pattern match "root" and the time: lastb | grep root| awk 'print {$3 <12} '*

```
root     pts/td       Sun Feb 25
    01:09   still logged in
```

- *Check the output of lanscan through awk:*

```
lanscan | awk '{print $4}' | grep
    UP
```

Check the output variable $?

```
echo $?
1
```

a result of 1 means an unexpected result- time to call for help!

A few examples…

- Lets find those full file systems:

```
cat /var/adm/syslog/syslog.log > chcktmp1
cat chcktmp1 | grep vx_nospace  > chcktmp2
if [ $? = 0 ];then
export JOBERROR=1
echo there is a full file system > messagefile
bdf | grep 100% >> messagefile
fi
```

- We can also check the state of the network:

```
ping 128.6.9.90 -n 5 > chcktmp14

if [ $? != 0 ];then
export JOBERROR=1
echo Problem with network connection to the development system
>>messagefile
```

A few examples…

- Be on the lookout for any hardware errors:

```
cat /var/adm/syslog/syslog.log > chcktmp8
cat chcktmp8 | grep 'SCSI ERROR'
if [ $? = 0 ];then
export JOBERROR=1
echo SCSI Error in Baanprod Hardware environment >>messagefile
fi
```

- Hate those annoying runaway print jobs…we can find those too:

```
PRINTER=`lpstat -t | grep 'now printing' | awk ' { print $2 }'`
lpstat -d $PRINTER | wc -l >chcktmp15

if [ $? -gt 50 ];then
echo $PRINTER may have runaway print jobs...please investigate
>>messagefile
export JOBERROR=1
```

A few examples…

System Monitoring made easy…just check the output file in your morning e-mail.

```
echo this report was started at `date` >>stattemp
# look at per processor useage
sar -u -M 60 10 >> stattemp
# look at disk usage
sar -d 60 10 >> stattemp
# look at virtual memory
vmstat -n 60 10 >> stattemp
# look at io
iostat 60 10 >> stattemp

export ONCONFIG=onconfig.baan
export INFORMIXDIR=/informix
export INFORMIXSERVER=baan
export PATH=$PATH:$INFORMIXDIR/bin

onstat -p >>stattemp
onstat -m >>stattemp
mailx -s “system info” -U russ_kahler@andersonsinc.com <<stattemp
mv stattemp /fert2/kjh/dump/stattemp.`date -u +%R`
```

A few examples…

- Check Your Backup this way:

```
omnistat | grep root | awk ' { print $3, $4 } ' > chcktmp16
cat chcktmp16 | grep Mount
if [ $? = 0 ];then
export JOBERROR=1
echo Mount Request waiting for Omniback backup session >>messagefile
fi
```

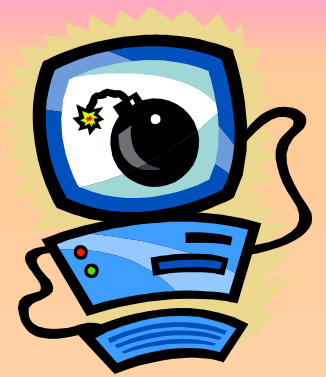
- Or this way:

omnidb -session -type backup -last 1 -detail >>omnifile (Reports the last days Omniback activity)

***Omniback has a wonderful reporting interface that makes use of web/mail/logfiles. It is a system that is worth the investment

Great…Now what do I do with it?

Reporting the output



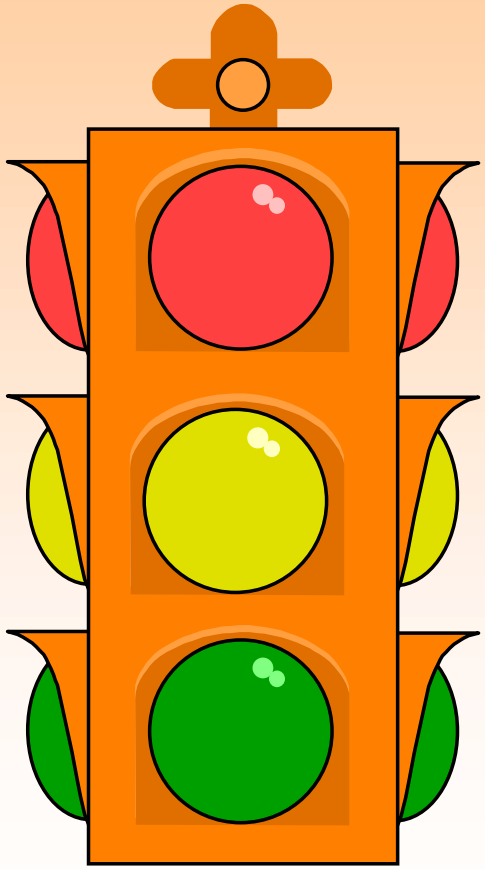
Most output can be piped (|) or redirected (< >>) into a temporary file for processing. Processing options can include :

•Mail is the simplest output- send it off via your mailer of choice: sendmail, elm, mail, or mailx

•Simple HTML is also a possibility. Use sed or other editing tools to format your file, and replace the daily web page report run by either the Apache or Netscape fast track server on your HP 9000

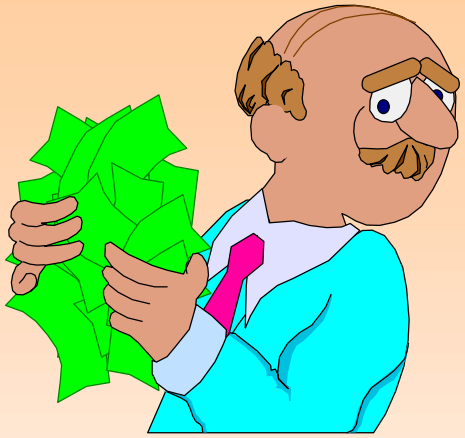
•Log file: create or append to your favorite logfiles and check them as you see fit...

Sendmail- send you information anywhere.



- Sendmail is an easy to configure tool.
- All configuration files reside in the /etc/mail directory, and the configurations there effect all mailers on the HP-UX system (mail, mailx, and elm)
- Mail can also be used to send to all mail systems (MS-mail, lotus notes, internet mail, even the HP3K using the sendmail/ix program.

Sendmail configuration:

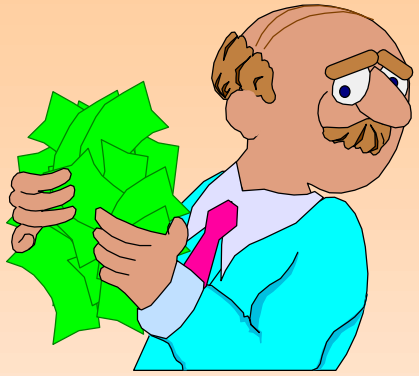


- Sendmail configuration file is /etc/mail/sendmail.cf and is user configurable.

- Sendmail is the workhorse program behind all UNIX mail programs.

- Current sendmail program is 8.9 available from HP

Sendmail configuration:



- To attach to most mail servers, modify the following lines:

```
# "Smart" relay host (may be null)
DSandmail1.andersonsinc.com


# my official domain name
# ... define this only if sendmail
cannot
 automatically determine your domain
#Dj$w.andersonsinc.com
```

- Most other lines can be left at their default for normal use

Cron/batch/at

- Cron is the Unix job scheduler daemon
- Cron reads a file called crontab to determine when to execute a job (/var/spool/crontabs)
- Cron is a good way to run regularly scheduled reports or jobs that need to be executed at a standard interval
- Cron is used on my system to run morning reports, and the hourly system check jobs, in addition to the DB and application processes

Cron/batch/at

- batch/at use the cron daemon to execute jobs from either the command line, or input files
- batch/at are particularly useful for executing processes in user interactive scripts (case/esac command options) or in processes that occur infrequently (system startup)
- Example in /sbin/init.d scripts:

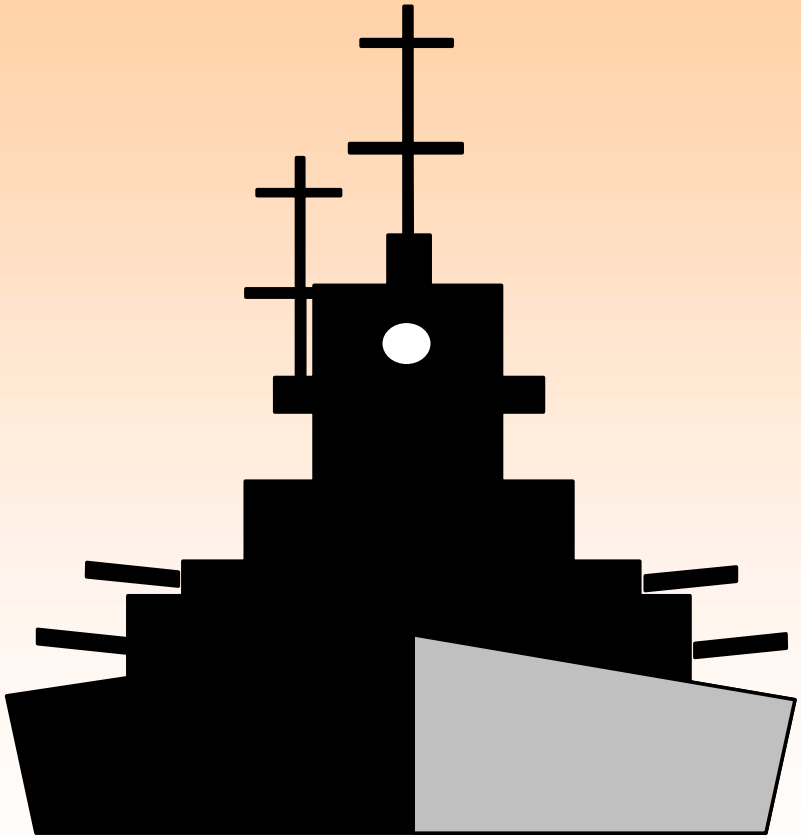
```
$BSE/etc/rc.start
    su baanjob -c "echo ./waitforjob | at now"
    else
    echo "ERROR: Missing Baan IV b2 Production startup command"
```

But wait …there's more

There are other tricks even the newest administrator can use.

- SAM -your loyal friend
- Command line- for those times when SAM can't come over to play
- /sbin/init.d -gentlemen start (and stop) your(database) engine

SAM- A great tool, not a crutch



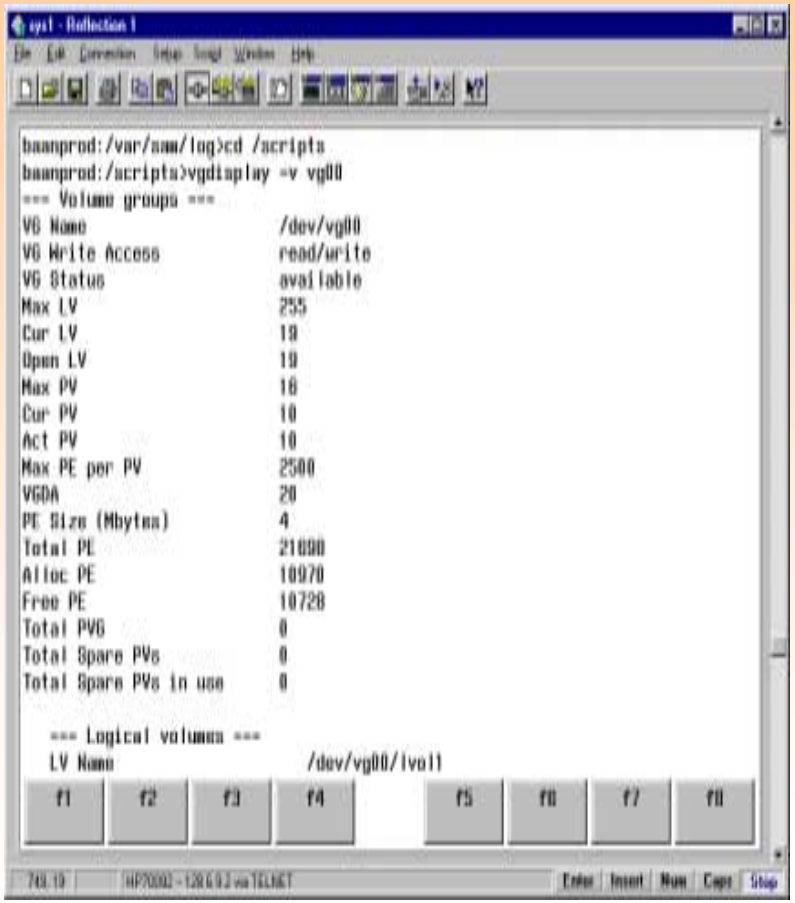
- SAM (System Administration Manager) is a tremendous tool included with HP-UX that will do a majority of all system tasks for you.
- SAM includes a fantastic help facility that explains how and why SAM does what it does
- SAM also creates a log (/var/sam/log/samlog) that includes a command line equivalent for each action executed

SAM

- Adding Users- creates the entry in the /etc/passwd file, group entries, and /home directories
- Kernel Changes- whether adding drivers, or modifying parameters, SAM is the safest way to make changes, and generate a new kernel
- Adding printers, modems, and other special devices- SAM will configure all special files for you as well
- Log file maintenance- use SAM to keep a handle on your system log file sizes (routine tasks-log files-actions-trim)

Command Line

- Don't let it worry you- the command line is often the most direct way to get things done
- SAM is great for those routine time consuming tasks (users), but using command line interface can be a better tool in cases such as LVM commands, or report interfaces (Omniback)
- Develop a list, and check it twice when using the command line



Command line

- It's easy to use the command line for startups:

```
baanprod:/>mwa start
The Transaction Tracker daemon is being started.
The Transaction Tracker daemon
/opt/perf/bin/ttd, is already running.
```

- Use Command line for LVM Commands:

```
baanprod:/scripts>vgcreate /dev/vg08
vgextend /dev/vg08 /dev/dsk/cytxdz
lvcreate -n lvol18 -rN /dev/vg08
lvextend -l 500 /dev/vg08/lvol18 /dev/dsk/cytxdz
```

- Write a Book about your system…

```
echo "$MVERSION System book for `hostname` created `date`" >>$FINAME
echo '\n'>>$FINAME
uname -a >>$FINAME
echo '\n' >>$FINAME
echo 'Model:' >>$FINAME
model >>$FINAME
echo '\n' >>$FINAME
```

/sbin/init.d- The Alpha and Omega

- HP-UX provides a facility for startup and shutdown of all O/S utilities in the /sbin/init.d directory. You can use the files in this directory as a template for starting or stopping any process on the system. Databases, Applications, Backup utilities can all be automated by using this directory and the templates within.

```
# Execute the commands to start your subsystem
        INFORMIXDIR=/informix
        INFORMIXSERVER=baan
        ONCONFIG=onconfig.baan
        KAIOON=1
        export INFORMIXDIR INFORMIXSERVER ONCONFIG KAIOON
        if [ -x $INFORMIXDIR/bin/oninit ] ; then
           $INFORMIXDIR/bin/oninit
           sleep 30
           echo /usr/local/bin/inf_log.backup |batch
        else
          echo "ERROR: Missing Informix Programs"
          rval=1
        fi
```

- Don't forget about the /sbin/rc#.d directory for start/stop positions!!

But what about my database or application utilities?

- Most 3rd party platforms come with robust interfaces that can not only give you the status of their operations, but also can give you a look into the operations of your system as a whole
- Integrating your applications and database in your automation plan is often as simple as adding some application specific variables to the mix, and then start reporting
- Output from command line application reports can be easily interpreted by tools such as grep, awk, and sed

Database tools

- Check to see if your database is operational:

```
onstat -p > chcktmp3
cat chcktmp3 | grep 'On-Line' > chcktmp4
if [ $? != 0 ];then
export JOBERROR=1
echo Informix Engine is down >> messagefile
tail -10 /informix/online_prod.log >> messagefile
fi
```

- Is the logical logfile backup running?

```
ps -ef |grep 'ontape -c' > chcktmp5
cat chcktmp5 | grep ' ontape -c' >chcktmp6
cat /informix/logs/online_prod.log | grep 'Logical Log Files are Full' > chcktmp7
if [ $? != 1 ];then
export JOBERROR=1
echo Logical Log Files are Full- Informix continuous backup cannot complete >>messagefile
fi
```

Database tools

- Database tools can produce output that can be broken down be pattern matching tools:

```
/informix/bin/oncheck -pe >/scripts/tmpfile1
awk '$1 !~ /[a-zA-Z]/ {print}' /scripts/tmpfile1 > /scripts/tmpfile3
cat /scripts/tmpfile3 |cut -c 13-46 | grep informix >/scripts/tmpfile4
cat /scripts/tmpfile3 |cut -c 50-80 |grep -v "-" | sed /^$/d >/scripts/tmpfile5
paste /scripts/tmpfile4 /scripts/tmpfile5 >/scripts/tmpfile6
```

- What seems like a real mess, actually has a happy, productive ending…

```
******* database name ******************** total *** used ** free ***

informix/baan/rootdbs                        250000      2260    247740
informix/baan/tempdbs                        250000       453    249547
informix/baan/tempdbs1                       250000       453    249547
informix/baan/tempdbs2                       250000       453    249547
informix/baan/llogdbs                        500000    150053    349947
informix/baan/plogdbs                       1000000    500053    499947
informix/baan/baandbs                        250000    239989     10011
informix/baan/baandbs.ck2                   1000000    191205    808795
informix/baan/datadbs3                      1000000        53    999947
```

Application Tools:

Baan also comes with many monitoring tools that can be automated :

How Many Baan Licenses are being used?

```
$BSE/bin/licmon6.1 -u | grep TOTAL > chcktmp12
cat chcktmp12 | awk ' { print $4 } ' > chcktmp13
if [ `cat chcktmp13` -gt 70 ];then
echo there are `cat chcktmp13` Baan Licenses being used >>messagefile
export JOBERROR=1
```

Notify Baan Users of password change

```
if [ $WARN = Jan ];then
for q in `cat pidfile`
do
bshcmd6.1 -M "$JAN" -u1 -w1 $q
done
```

The more hats you wear, the more you realize how well they match

- Very little goes on in either database, application, or HP-UX that only affects one and not the other.

  Wear your DBA hat proudly when you are working on your systems!

- Tune Your System with input from your applications

  Look to your applications- they will tell you about your disk/RAM/CPU usage as well as measureware/Glance/Perfview

- Compare…Contrast…Compromise

  Be proactive…but know when to ask for help.

Good references:

- Usenet- comp.sys.hp.hpux (HP-UX); alt.comp.baan (baan); comp.databases.informix/oracle/db2 (rdbms).
- us-support.external.hp.com- a treasure trove of info/tips/tricks for all HP products.
- O'Reilly and Associates- best books out there for the Unix admin:

  Essential System Administration -Aeleen Frisch

  Unix in a Nutshell - Daniel Gilley

- HP Professional Books- Marty Poniatowski=HP-UX God. Read his books over and over.

  HP-UX System Administration Handbook and Toolkit

More references…

- Informix Press- Good books about IDS:

  Informix DBA Survival Guide- Joe Lumbley

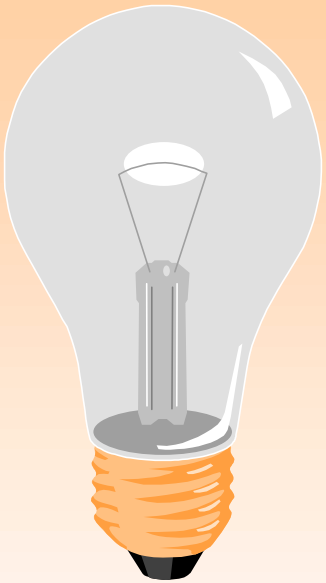
  Informix Basics- Glenn Miller

- Conferences- Regional Users Groups

  I've gotten more mileage out of the 1999 Interworks Chicago Conference CD Proceedings than most classes I've attended.

  Network, Network, Network- get to know the people in your local RUG's - they are a tremendous source of information and inspiration.

Any Questions? Need Help? Want to bounce an idea off someone?



Let me know…If I can lend a hand, I will.

"This is the night that either makes me…
or fordoes me quite."

-Iago, from *Othello* by William Shakespeare

Russ Kahler
Technical Services Analyst
The Andersons
480 West Dussel Drive
Maumee Ohio 43537
(419) 891-6552
(419) 891-6670 (fax)
russ_kahler@andersonsinc.com

Thanks for attending.

Now…go forth and make your jobs easier