

# Administration of Operating Systems

DO2003

<http://www.hh.se/do2003>

## Administration Tasks



# Working as system administrator

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- So far, we covered
  - Core concepts of system administration
    - Working with root privileges, basic system operation, and setting up and securing a server
  - Important files and directories
  - Downloading and installing software
    - apt-get, aptitude, and dpkg
- Today
  - Additional system administrator tasks and tools
    - Setting up users and groups, backing up files, scheduling tasks, system reports, and general problem solving

# Managing User Accounts

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- Adding a user account

```
useradd [options] <username>
```
- Removing a user account

```
userdel [options] <username>
```

  - -r option user's home directory and files
- Modifying a user account

```
usermod [options] <username>
```
- Debian-based distros (wrappers or frontends to the commands above)

```
adduser mattias admin  
deluser -remove-all-files mattias  
usermod -g developers mattias  
usermod -G developers mattias
```

# Managing Group Accounts

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- Adding a user group  
`groupadd [options] <groupname>`
- Removing a user group  
`groupdel [options] <groupname>`
- Modifying a group definition  
`groupmod [options] <groupname>`
- Debian-based distros (wrappers or frontends to the commands above)  
`addgroup dev`  
`delgroup dev`  
`groupmod -n developers dev`

# Backing up files

- Why to making copies of data on a regular basis?
  - Restore the original data after a data loss event
    - System malfunctions
    - Catastrophic disaster (fire, earthquake, ...)
    - Users can delete or corrupt a file by accident
- Keep copies of backups offsite
- Repository models
  - Full, incremental or differential backup
- Media
  - HDD, DVD, cloud, ...
- Backup utilities: cat, cpio, dump, ...

Incremental				
MON	TUE	WED	THU	FRI
Full backup	All Tuesday changes	All Wednesday changes	All Thursday changes	All Friday changes

Differential				
MON	TUE	WED	THU	FRI
Full backup	All changes through Tuesday	All changes through Wednesday	All changes through Thursday	All changes through Friday

# Backup utilities

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- tar (tape archive)
  - Writes and retrieves files from archive (.tar)
  - -c - create a new backup archive
  - -x - extract files from an archive
  - -v - verbose mode, prints what it's doing to the screen
  - -p - preserves the permissions of the files put in the archive
  - -z - compress the backup file with 'gzip'
  - -f <filename> - specifies where to store the backup
  - --exclude=/dir/subdir - directories NOT to backup
- Backing up your home folder
  - \$ tar -cvpzf /media/external/backup.tar.gz --exclude=~/.tmp ~
- Restore
  - \$ tar -xvpzf backup.tar.gz -C /home/ide/

# Backup utilities

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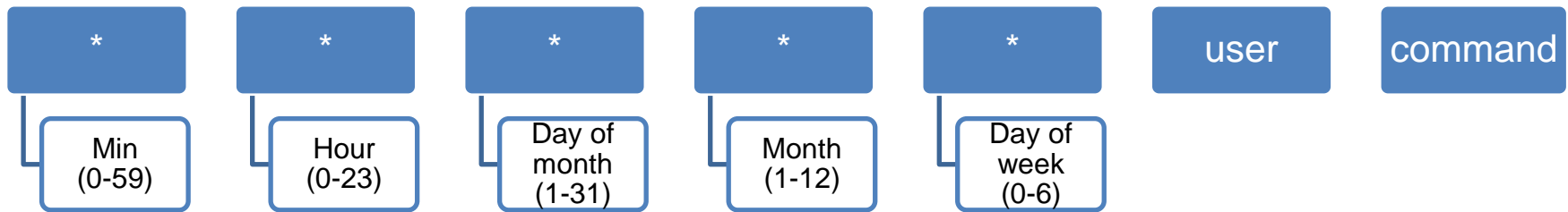
- cpio (copy in and out)
  - Tool for creating and extracting archives, or copying files
  - It handles a number of cpio formats as well as reading and writing tar files
  - -o - creates the archive
  - -i - extracts the archive
  - -v - verbose mode, prints what it's doing to the screen
  - -d - creates directories as necessary
  - -u - replaces all files
- Backing up your home folder  

```
$ find ~ -depth -print | cpio -ov > ~/backup.cpio
```
- Restore  

```
$ cpio -idvu < backup.cpio
```

# cron

- Executes scheduled jobs (commands or shell scripts) periodically
  - Scheduled jobs are executed in the background
- Commonly used to automate system maintenance or administration
- The crontab file (/etc/crontab) contains instructions that specifies shell commands to run periodically on a given schedule
  - General form: "run this command at this time on this date"

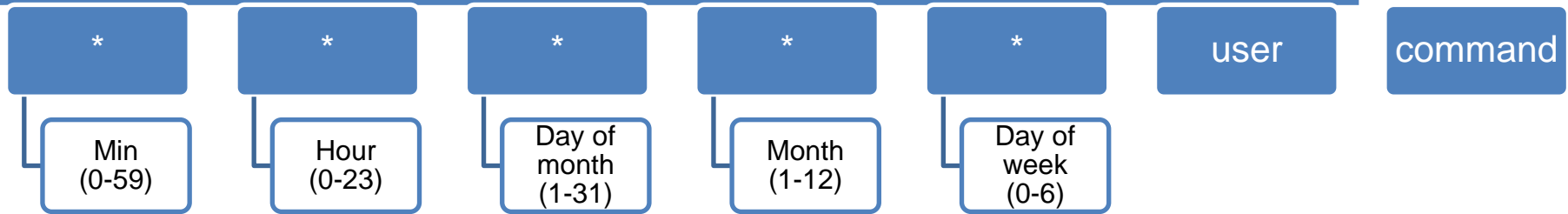


- Crontab utility
  - Each user can have their own crontab

```
crontab [-u user] [options]
```



# Crontab examples



- `0 22 * * * ide tar -cvpzf ~/backup.tar.gz --exclude=~/tmp ~`
- `0 */2 * * * ide /home/ide/scripts/script2.sh`

- `@reboot` Run once, at startup
- `@yearly` Run once a year, "0 0 1 1 \*".
- `@monthly` Run once a month, "0 0 1 \* \*".
- `@weekly` Run once a week, "0 0 \* \* 0".
- `@daily` Run once a day, "0 0 \* \* \*".
- `@hourly` Run once an hour, "0 \* \* \* \*"

# at

---

- Executes jobs (commands or shell scripts) at a specified time  
at [options] <timespecification>
- Time specification format in /usr/share/doc/at/timespec
- Examples

```
$ at -f ~/scripts/script2.sh 1050am
```

```
$ ...
```

```
$ at 00:20
```

```
at> tar -cvpzf ~/backup.tar.gz --exclude=~/tmp ~
```

```
at> <EOT>
```

```
job 11 at Wed Dec 7 00:20:00 2001
```

```
$
```

# System reports

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- Different utilities can be used to collect information about the system and to generate simple reports ( who, finger, ls, ps, ...)
- System monitoring tools are used to keep track of and generate reports about system resources, such as CPU usage and frequency, or the amount of free RAM, among many others
  - vmstat (virtual memory statistics)
    - Collects and displays summary information about operating system memory, processes, interrupts, paging, etc
  - top
    - Shows which users and processes are consuming the most system resources at any given time

# Communicating with users

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- Announcements
  - When the system will be down for maintenance
  - Training dates
  - How users can access new resources system printer
- write
  - Write messages to another user in the local system
- wall
  - Typically used by root to send out shutting down message to all users just before power off
- Email
- Message of the day
  - The contents of `/etc/motd` are displayed after a successful login just before the shell prompt

# Avoiding and Solving problems

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- Backup the system regularly
- Perform any task while using the least privilege possible
- Read and follow instructions
- Be careful when using a wildcard with certain commands
- Logs files (`/var/log/`) can be helpful
- Utilities like `top` and `ps` can help to find processes overloading the system and `KILL` to kill these processes
- Perform disk maintenance (defragment, remove unused files)
- Most of these tasks can be automated and scheduled

