



Backups

“Backups are only as good as your ability to reliably restore”

CIS 68C1

UNIX System Administration

Backups

□ Backups

- ✗ Help mitigate the risk of data loss
- ✗ May be very important because stored information is more valuable than the hardware
- ✗ Are very difficult to perform correctly
- ✗ Slow, labor intensive, and tedious
- ✗ Require a significant amount of planning
- ✗ Must be workable
- ✗ Require routine testing and verification
- ✗ Are worthless if restores are not guaranteed

Backups

- Events Causing Data Loss
 - × Hardware failures
 - × Software defects
 - × Accidental losses
 - × Malicious users or intruders
 - × Natural or human caused disasters

Backups

□ Considerations

- ✗ Determine acceptable levels of data loss
- ✗ Assume worst case scenario when planning
- ✗ Consider backup media capacity when creating filesystems
- ✗ Consider per filesystem data volatility
- ✗ Cost of backup device and media
- ✗ Media shelf-life, half-life, and reusability
- ✗ Data Size vs. media transfer speed
- ✗ Onsite and offsite storage
- ✗ Centralized backup server

Backups

□ Considerations

- ✗ Security of backup archives
- ✗ Minimize filesystem activity during backups
- ✗ Periodic backup monitoring and restore validation
- ✗ Heterogeneous vs. homogenous environments
- ✗ Brief management on risk/reward tradeoffs
- ✗ Label backup media appropriately
- ✗ Inform users of backup policies

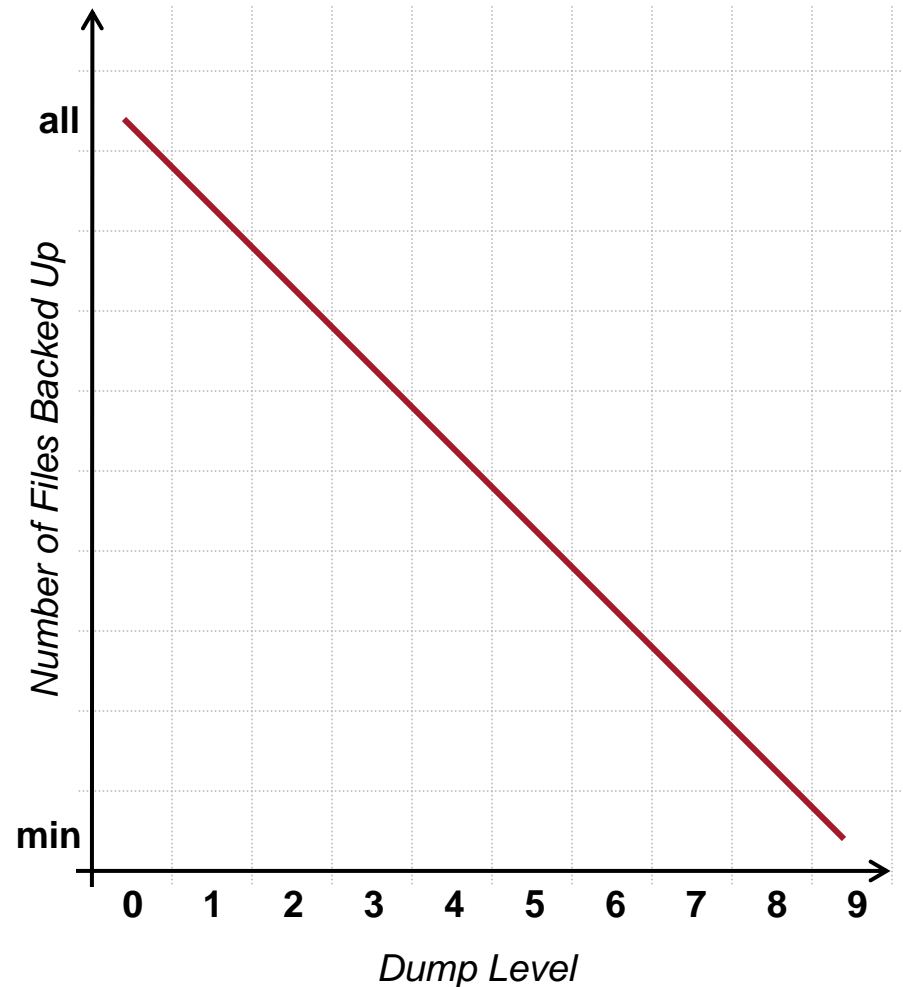
Backups

- **dump**
 - ✗ Standard UNIX backup utility
 - ✗ Supports spanning backups across multiple media
 - ✗ Correctly handles sparse files
 - ✗ Preserves file permissions, ownership and timestamps
 - ✗ Reads inodes directly from the raw filesystem
 - ✗ Very efficient
 - ✗ Requires dumping filesystems individually
 - ✗ Supports incremental dumps
 - ✗ Only files changed since last dump are backed-up

Backups

□ Incremental Dumps

- ✗ Dump supports 10 distinct **dump levels**
 - ✗ 0 to 9
- ✗ Assign a dump level N when you perform the backup
- ✗ Level 0 is a full backup
- ✗ All files changed since last dump level $< N$ are backed up



Backups

□ Incremental Dumps

- ✗ Eg: A level 5 dump will backup files changed since any dump of level 4, 3 ... 0
- ✗ /etc/dumpdates
 - ✗ Contains date and filesystem that dump level N was last performed
 - ✗ Updated by dump when `-u` option is supplied
 - ✗ Dump uses these timestamp to compare against file modification times

Backups

- restore
 - ✗ Extracts files or filesystems from a previous dump
 - ✗ Can be used interactively or via command line
 - ✗ Interactive mode
 - ✗ Allows perusal of files and directories within the backup archive via shell-like **cd**, **pwd** and **ls** commands
 - ✗ Files are *marked* for later restore via **add** command
 - ✗ Marked files are extracted with **extract** command
 - ✗ Command line mode
 - ✗ Allows easily restoring entire filesystem
 - ✗ Can be used in a pipeline

Backups

□ restore

- ✗ May require restoring files from several dump archives
- ✗ Dump sequence **0 9 9 5 9 9 3**
- ✗ Restore only 0 and then 3

