rsnapshot

St. Louis Unix Users Group

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Ever experienced a disaster?

.. a total operating system failure?

.. deleted a file accidentally?

rm -rf /

Disasters

- Major disasters tend to be infrequent but are totally destructive:
  - High Levels of data destruction
  - Low frequency of occurrence
- Small disasters tend to be more frequent, but less destructive:
  - Nuisance level of damage
  - High frequency of occurrence
- Man made or Nature?

Disaster recovery

- Total destruction / loss of data
  - Natural Disaster
    - Tornado
    - Hurricane
  - Man Made
    - Fire
    - Water damage
- Hardware failure
- Software problem
  - Program
  - Human

How do **YOU** backup?

- Homemade script 45%
- Don’t backup 21%
- BackupPC 8%
- Bacula 8%
- rsnapshot 7%
- Commercial 6%
- Amanda 2%

Traditional backups

- Discontinuous – nightly/weekly
- Cannot restore between backups
- Special SW may be required
- External media used
- Multiple media copies to manage
  - Onsite
  - Offsite
- Well understood, and, .. **cheap**

Continuous Data Protection

- Changes journalled or logged
- Restore from any point in time
- Recovery “on demand” in realtime
- Typically replicated to a file system before offlined
- Many solutions can actually spin up a VM given the most recent snapshot in the event of a server failure
- Fairly new, commercial, OS dependent, and potentially very expensive

NearCDP

- Like CDP but **NOT CDP**
- Snapshots taken on any frequency but not continuous
- Stored online, not offline/separate media
- Low storage cost
  - 5 years ago, 1T = $150
  - 1 year ago, 4T = $150
  - Now, 6T = $150 (+/=)
- RAID6 is ***very*** fault tolerant

rsnapshot

- Replication/Snapshot **Near CDP solution**
- Opensource
  - Uses rsync to copy/version
  - Lightweight
  - Easily configurable, though can be a brain puzzle
    - Alpha, Beta, Gamma, Delta
    - Hourly, Daily, Weekly, Monthly
  - More sophisticated than DIY
  - Less complicated than commercial SW
- near CDP

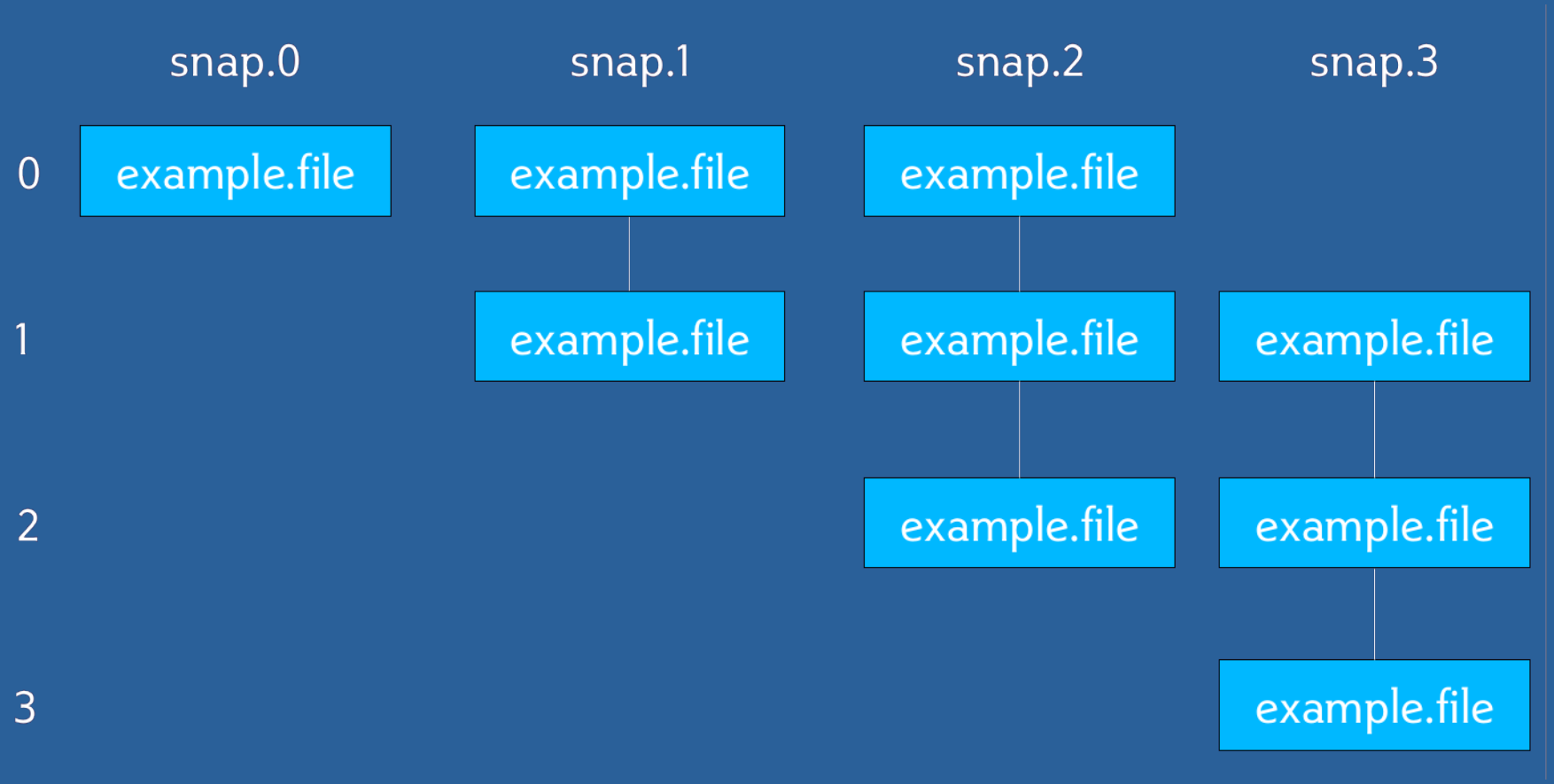
rsnapshot Components

- Perl (managing snapshots)
- Rsync (moving data)
- File system hard links (minimizing storage)
- logrotate (managing versions)
- OpenSSH (connect to other systems)
- Standard GNU/Posix

rsnapshot Operation

- Create a “snapshot” of files with rsync
- Subsequent runs use rsync to hard link identical files between the previous version and current
- Use logrotate to shuffle the snapshot stack, deleting the oldest in the stack
- snapshot.0 is always the newest, each additional snapshot.n+1 is one older

Snapshots


snap.0
snap.1
snap.2
snap.3
0
1
2
3
example.file
example.file
example.file
example.file
example.file
example.file
example.file
example.file

Installation

- Available in all standard repos
- Will also need (usually already installed):
  - rsync
  - Perl
  - logrotate
- Default configuration: /*etc*/rsnapshot.conf
- Better to create directory: /*etc*/rsnapshot/
- Let’s look at a configuration!

Tabs required, paths critical

```
#####################################################
# rsnapshot.conf - rsnapshot configuration file #
#####################################################
#                                                   #
# PLEASE BE AWARE OF THE FOLLOWING RULES:           #
#                                                   #
# This file requires tabs between elements          #
#                                                   #
# Directories require a trailing slash:             #
#   right: /home/                                   #
#   wrong: /home                                    #
#                                                   #
#####################################################
```

Standard config is single snapshot directory

```
############################
# SNAPSHOT ROOT DIRECTORY #
############################

# All snapshots will be stored under this root directory.
#
snapshot_root  /.snapshots/
```

Separate directories are more manageable

```
############################
# SNAPSHOT ROOT DIRECTORY #
############################

snapshot_root     /u/Bock
no_create_root    1              (if volume not mounted, don't bork the system)
link_dest         1              (hardlink to previous versions)
use_lazy_deletes  1              (delete old version after copy)
```

Versions to retain

- New format

```
retain   alpha 6            (hourly)
retain   beta  7            (daily)
retain   gamma 4            (weekly)
#retain  delta 3            (monthly)
```

- Old format

```
interval    hourly     6
interval    daily      7
interval    weekly     4
interval    monthly    12
```

- Must be ascending order!

Logging options

```
# Verbose level, 1 through 5.
# 1     Quiet           Print fatal errors only
# 2     Default         Print errors and warnings only
# 3     Verbose         Show equivalent shell commands being executed
# 4     Extra Verbose   Show extra verbose information
# 5     Debug mode      Everything
#
verbose         2
loglevel        3
logfile         /var/log/rsnapshot/Bock.log
lockfile        /var/run/bock_rsnapshot.pid
```

- Note the log directory, /etc/rsnapshot
- Be sure .pid file is named correctly

Include/Exclude options

```
#include    ???
#exclude    ???

#include_file     /path/to/include/file
#exclude_file     /path/to/exclude/file
#
exclude         /dev/
exclude         /lost+found/
exclude         /proc/
exclude         /run
exclude         /sys/
exclude         /tmp/
```

Backup operation

```
#########################################
### BACKUP POINTS / SCRIPTS ###
#########################################

backup      root@bock.sluug.org:/    ./
```

ssh tips

- Use a config to use a specific keypair

```
#
##  TSI (direct backup)
#
Host    tsid
    Hostname apollo.omnitec.net
    Port 3730
    IdentityFile /root/.cron/tsid_key
```

- Restrict root access to rsync on the target

```
from="127.0.0.1",command="rsync --server --sender -logDtprR --numeric-ids . /" ssh-rsa
```

Resulting backup directory

```
lvl@core:/etc/rsnapshot (-bash)

$ ll /u/Bock/
total 116

drwxr-xr-x 17 root root 4096 Jun  5 16:21 daily.0/
drwxr-xr-x 17 root root 4096 Jun  4 16:22 daily.1/
drwxr-xr-x 17 root root 4096 Jun  3 16:21 daily.2/
drwxr-xr-x 17 root root 4096 Jun  2 16:22 daily.3/
drwxr-xr-x 17 root root 4096 Jun  1 16:21 daily.4/
drwxr-xr-x 17 root root 4096 May 31 16:22 daily.5/
drwxr-xr-x 17 root root 4096 May 30 16:25 daily.6/


drwxr-xr-x 17 root root 4096 Jun  7 08:22 hourly.0/
drwxr-xr-x 17 root root 4096 Jun  7 04:21 hourly.1/
drwxr-xr-x 17 root root 4096 Jun  7 00:25 hourly.2/
drwxr-xr-x 17 root root 4096 Jun  6 20:21 hourly.3/
drwxr-xr-x 17 root root 4096 Jun  6 16:21 hourly.4/
drwxr-xr-x 17 root root 4096 Jun  6 12:20 hourly.5/
```

```
drwxr-xr-x 18 root root 4096 Apr 23 16:21 monthly.0/
drwxr-xr-x 17 root root 4096 Mar 26 16:20 monthly.1/
drwxr-xr-x 17 root root 4096 May 23  2021 monthly.10/
drwxr-xr-x 17 root root 4096 Mar 28  2021 monthly.11/
drwxr-xr-x 17 root root 4096 Feb 19 16:14 monthly.2/
drwxr-xr-x 17 root root 4096 Jan 15 16:18 monthly.3/
drwxr-xr-x 17 root root 4096 Nov 20  2021 monthly.4/
drwxr-xr-x 17 root root 4096 Oct 23  2021 monthly.5/
drwxr-xr-x 17 root root 4096 Sep 25  2021 monthly.6/
drwxr-xr-x 17 root root 4096 Aug 21  2021 monthly.7/
drwxr-xr-x 17 root root 4096 Jul 24  2021 monthly.8/
drwxr-xr-x 17 root root 4096 Jun 26  2021 monthly.9/
drwxr-xr-x 17 root root 4096 May 28 16:21 weekly.0/
drwxr-xr-x 17 root root 4096 May 21 16:21 weekly.1/
drwxr-xr-x 17 root root 4096 May 14 16:21 weekly.2/
drwxr-xr-x 18 root root 4096 May  7 16:22 weekly.3/
```

crontab

```
#
##
### SLUUG Bock rsnapshot
#minute hour    mday    month   wday    command

10      */4     *       *       *       /usr/bin/uptime; /usr/bin/time /usr/bin/rsnapshot -v -c
/etc/rsnapshot/bock.rsnapshot.conf hourly ; /usr/bin/uptime

00      14      *       *       *       /usr/bin/uptime; /usr/bin/time /usr/bin/rsnapshot -v -c
/etc/rsnapshot/bock.rsnapshot.conf daily ; /usr/bin/uptime

30      10      *       *       7       /usr/bin/uptime; /usr/bin/time /usr/bin/rsnapshot -v -c
/etc/rsnapshot/bock.rsnapshot.conf weekly ; /usr/bin/uptime

38      11      25      *       *       /usr/bin/uptime; /usr/bin/time /usr/bin/rsnapshot -v -c
/etc/rsnapshot/bock.rsnapshot.conf monthly ; /usr/bin/uptime
```

Bock Hourly results

```
echo 14881 > /var/run/bock_rsnapshot.pid
mv /u/Bock/hourly.5/ /u/Bock/_delete.14881/
mv /u/Bock/hourly.4/ /u/Bock/hourly.5/
mv /u/Bock/hourly.3/ /u/Bock/hourly.4/
mv /u/Bock/hourly.2/ /u/Bock/hourly.3/
mv /u/Bock/hourly.1/ /u/Bock/hourly.2/
mv /u/Bock/hourly.0/ /u/Bock/hourly.1/
mkdir -m 0755 -p /u/Bock/hourly.0/
/usr/bin/rsync -a --delete --numeric-ids --relative --delete-excluded \
    --rsync-path=/usr/bin/rsync -e ssh: --exclude=/dev/ \
    --exclude=/lost+found/ --exclude=/proc/ --exclude=/run --exclude=/sys/ \
    --exclude=/tmp/ --rsh=/usr/bin/ssh -p 2206 \
    --link-dest=/u/Bock/hourly.1/./ root@bock.sluug.org:/ \
    /u/Bock/hourly.0/./
touch /u/Bock/hourly.0/
rm -f /var/run/bock_rsnapshot.pid
/bin/rm -rf /u/Bock/_delete.14881
4.71user 22.86system 13:52.71elapsed 3%CPU (0avgtext+0avgdata 28804maxresident)k
2637776inputs+786736outputs (6major+64595minor)pagefaults 0swaps
 20:23:54  up 87 days  4:20,  0 users,  load average: 3.84, 2.93, 2.19
```

Bock Daily results

```
 14:00:02  up 87 days 21:56,  0 users,  load average: 0.00, 0.00, 0.14
echo 24516 > /var/run/bock_rsnapshot.pid
mv /u/Bock/daily.6/ /u/Bock/_delete.24516/
mv /u/Bock/daily.5/ /u/Bock/daily.6/
mv /u/Bock/daily.4/ /u/Bock/daily.5/
mv /u/Bock/daily.3/ /u/Bock/daily.4/
mv /u/Bock/daily.2/ /u/Bock/daily.3/
mv /u/Bock/daily.1/ /u/Bock/daily.2/
mv /u/Bock/daily.0/ /u/Bock/daily.1/
mv /u/Bock/hourly.5/ /u/Bock/daily.0/
rm -f /var/run/bock_rsnapshot.pid
/bin/rm -rf /u/Bock/_delete.24516
0.60user 9.82system 10:00.67elapsed 1%CPU (0avgtext+0avgdata 21492maxresident)k
1725640inputs+24outputs (0major+10991minor)pagefaults 0swaps
 14:10:02  up 87 days 22:06,  0 users,  load average: 2.21, 1.93, 1.12
```

Restoring

- Only requires your favorite file manager!!
  - Midnight Commander mc
  - scp/sftp/rsync -avz
  - Nautilus or your distros GUI tool
- Copy the file, directory, or everything from a version back to where it is needed
- Full restore:
  - Install a new OS with appropriate partitions
  - Update
  - Rsync -avz back the entire backup

Happy rsnapshotting!

Thank you!!

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