Set up automated server backups with Borg

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sysadmin

The Borg deduplicating backup program can automate daily, weekly, and monthly backups with a single script saving space and keeping data safe from mistakes.

Borg is a backup program written in Python that has excellent deduplication functionality. For my blog server backups you can see just how much smaller the deduplicated repository size is.

```
------------------------------------------------------------------------------
                       Original size      Compressed size    Deduplicated size
All archives:              780.76 MB            588.23 MB            141.46 MB

                     Unique chunks         Total chunks
Chunk index:                  2780                24029
------------------------------------------------------------------------------
```

If you run your websites on small servers like I do then this comes in handy to save some money. I currently have two layers of backups on my servers:

1. Linode provides their "Linode Backup" system. This is a complete backup of the entire disk your server is running on for a reasonable price.
2. Borg backup for daily automated backups that allow for quick "oops" restores.

These backups serve two different purposes. I can do an emergency full system restore using Linode, and a quick Borg restore if I happen to do something stupid, like accidentally delete a blog post.

I currently use a slightly modified script in my `/etc/periodic/daily` folder based on Borg's quick start automation suggestion.

```
#!/bin/sh

# Setting this, so the repo does not need to be given on the commandline:
export BORG_REPO=/srv/backup

# some helpers and error handling:
info() { printf "\n%s %s\n\n" "$( date )" "$*" >&2; }
trap 'echo $( date ) Backup interrupted >&2; exit 2' INT TERM

info "Starting backup"

# Backup the most important directories into an archive named after
# the machine this script is currently running on:

borg create                         \
    --verbose                       \
    --filter AME                    \
    --list                          \
    --stats                         \
    --show-rc                       \
    --compression lz4               \
    --exclude-caches                \
                                    \
    ::'{now}'                       \
    /srv/git                        \
    /srv/docker                     \
    /srv/data                       \
    /etc/caddy                      \

backup_exit=$?

info "Pruning repository"

# Use the `prune` subcommand to maintain 7 daily, 4 weekly and 6 monthly
# archives of THIS machine.

borg prune                          \
    --list                          \
    --show-rc                       \
    --keep-daily    7               \
    --keep-weekly   4               \
    --keep-monthly  6               \

prune_exit=$?

# actually free repo disk space by compacting segments
```

```
info "Compacting repository"

borg compact

compact_exit=$?

# use highest exit code as global exit code
global_exit=$(( backup_exit > prune_exit ? backup_exit : prune_exit ))
global_exit=$(( compact_exit > global_exit ? compact_exit : global_exit ))

if [ ${global_exit} -eq 0 ]; then
    info "Backup, Prune, and Compact finished successfully"
elif [ ${global_exit} -eq 1 ]; then
    info "Backup, Prune, and/or Compact finished with warnings"
else
    info "Backup, Prune, and/or Compact finished with errors"
fi

exit ${global_exit}
```

Borg's documentation can explain this better than I can but the gist is:

- I run daily backups on all my unique server files in `/srv` and `/etc`. I don't backup anything that is a system default.
- Then prune my backups to only keep 7 daily, 4 weekly, and 6 monthly backups at any given time.
- Then we compact the repository to save space and exit.

A better option for storing Borg backups would be to set up a Borg repo on another server or a platform like BorgBase. BorgBase is nice since they will notify you by email if a backup doesn't happen or fails however, as I said before, I only use Borg for "oops" backups so if I were to miss a couple I wouldn't stress out about it.

As an extra to this post, I have on my servers a `server-health-check.sh` script that allows me to quickly check things like auto-updates, Borg backups, free memory, and used disk space! I run it every so often just for peace of mind.

```
#!/bin/sh

echo -e "\napk upgrades
-------------------------------------------------------------------"
tail /var/log/apk-autoupgrade.log

echo -e "\nborg backups
-------------------------------------------------------------------"
borg list /srv/backup

echo -e "\nfree memory
-------------------------------------------------------------------"
free -h | head -n2

echo -e "\nfree space
-------------------------------------------------------------------"
df -h | head -n1 && df -h | grep "/dev/sda" | head -n1
```

The output of this script is pretty well formatted without much effort and looks a little something like this:

```
apk upgrades ------------------------------------------------------------
[Sat Jun 25 02:00:00 UTC 2022] fetch http://dl-cdn.alpinelinux.org/alpine/latest-stable/
main/x86_64/APKINDEX.tar.gz
[Sat Jun 25 02:00:00 UTC 2022] fetch http://dl-cdn.alpinelinux.org/alpine/latest-stable/
community/x86_64/APKINDEX.tar.gz
[Sat Jun 25 02:00:00 UTC 2022] OK: 512 MiB in 253 packages

borg backups ------------------------------------------------------------
2022-06-19T02:00:00                 Sun, 2022-06-19 02:00:01
[1c4a6d43b6ad80b3ee8e890ca5d9978ce60247a9a7a667614764b722f95a4d20]
2022-06-20T02:00:01                 Mon, 2022-06-20 02:00:01
[cf62b24465eb0d9b6296f6a7a752fa905b428b53a086adc5ca70c4d458570934]
2022-06-21T02:00:07                 Tue, 2022-06-21 02:00:08
[450016022ad57454d73815350f70f51c41bb3beda1c10405f41671947dd4fcfd]
2022-06-22T02:00:01                 Wed, 2022-06-22 02:00:01
[85aa754d92e5c33cd1f13abb5aff57a9092e197bf386eb73e60e26663d6c9b7b]
2022-06-23T02:00:01                 Thu, 2022-06-23 02:00:01
[6014ed6f2388302d6b09aecde605e4708b191e805190d154ae7bd7abf7d300c6]
2022-06-24T02:00:01                 Fri, 2022-06-24 02:00:01
[5676379d5d5b234446a438a624ab5e380f61c050d06a5f068191822ff1e8a495]
2022-06-25T02:00:00                 Sat, 2022-06-25 02:00:01
[8a5c05fcd142d48bb799cf13a64ecc22045d87b1d7239e76fa082fb5ef4f875f]

free memory  ------------------------------------------------------------
              total        used        free      shared  buff/cache   available
Mem:          983.8M      626.2M       97.1M      516.0K      260.5M      343.8M

free space   ------------------------------------------------------------
Filesystem                Size      Used Available Use% Mounted on
/dev/sda                 24.1G      7.5G     15.4G  33% /
```

If you're interested in Borg you can read more about it on Borg's website, they have extensive and well written documentation.