



Rsync Basics

Basic Syntax

```
rsync [options] source destination
```

Example:

```
rsync -avz /path/to/source/
user@host:/path/to/destination/
```

Essential Options

- a** Archive mode; preserves permissions, ownership, timestamps, etc.
- v** Verbose mode; increases the amount of information displayed during the transfer.
- z** Compress file data during the transfer.
- r** Recursively copy directories and files.
- t** Preserve modification times.
- o** Preserve owner.
- g** Preserve group.
- p** Preserve permissions.

Basic Examples

Copy a file to a remote server:

```
rsync myfile.txt user@host:/path/to/destination/
```

Copy a directory recursively to a remote server:

```
rsync -r /local/directory/
user@host:/remote/directory/
```

Synchronize two directories:

```
rsync -avz /source/directory/
/destination/directory/
```

Advanced Options

Deletion Options

- delete** Delete extraneous files from the destination directory.
- delete-before** Deletion happens before transfer.
- delete-after** Deletion happens after transfer.
- delete-during** Deletion happens during transfer.
- delete-excluded** Also delete excluded files from destination.

Transfer Options

- progress** Show progress during transfer.
- partial** Keep partially transferred files if the transfer is interrupted.
- checksum** Skip files based on checksum, not modification time and size.
- ignore-existing** Skip updating files that exist on destination.
- remove-source-files** Remove source files after successful transfer.
- max-size=SIZE** Don't transfer any file larger than SIZE.

Filtering Options

- exclude='pattern']** Exclude files matching pattern.
- include='pattern']** Include files matching pattern.
- exclude-from=FILE** Read exclude patterns from FILE.
- include-from=FILE** Read include patterns from FILE.

Security and Remote Transfers

SSH Options

- e 'ssh -p port']** Specify a different SSH port.
- rsh='ssh -l user']** Specify a remote shell program.
- rsync-path=PATH** Specify where rsync is installed on the remote machine.

Using SSH Keys

Ensure SSH keys are set up for passwordless authentication to avoid interactive prompts.

Use `ssh-keygen` to generate keys and `ssh-copy-id` to copy them to the remote server.

Security Considerations

Always use secure protocols like SSH for remote transfers.

Avoid using rsync over unencrypted connections, especially for sensitive data.

Real-world examples

Backup

Incremental backup of a directory to an external drive:

```
rsync -av --delete /home/user/documents/
/mnt/backup/documents/
```

Daily incremental backup:

```
rsync -av --link-dest=/mnt/backup/yesterday
/home/user/ /mnt/backup/today
```

Synchronization

Sync a website to web server:

```
rsync -az -e "ssh -i /path/to/key" /local/website
user@host:/var/www/website
```

Mirroring

Create a mirror of a website:

```
rsync -avz --delete /path/to/source/
user@host:/path/to/destination/
```