How to parallelize rsync

GNU parallel can run multiple `rsync` processes concurrently to transfer files in batches.

Usage

```
find path/to/src/. -type f -print0 |
    parallel -0 -j 4 -N 100 --eta rsync -aR {} dest/ &&
    rsync -avP path/to/src/ dest/
```

This command approximately corresponds to:

```
rsync -avP path/to/src/ dest/
```

Options:

- `-print0` and `-0`: Safely handle filenames containing whitespace, including newlines.
- `-j 4`: Run up to four concurrent jobs.
- `-N 100`: Transfer up to 100 files per job.
- `–eta`: Display progress and estimated completion time.
- `rsync -aR`: Preserve file attributes and relative directory paths.

Similarly,

```
find path/to/./src -type f -print0 |
    parallel -0 -j 4 -N 100 --eta rsync -aR {} dest/ &&
    rsync -avP path/to/src dest/
```

This command approximately corresponds to:

```
rsync -avP path/to/src dest/
```

Directory Structure

The position of `/./` determines which path components are preserved by `rsync -R`.

- `path/to/src/.` copies the contents of `src/` directly into `dest/`.
- `path/to/./src` preserves `src/` under `dest/` but removes `path/to/`.
- `/path/to/src/.` copies the contents of `src/` directly into `dest/`.
- `/path/to/./src` preserves `src/` under `dest/` but removes `/path/to/`.

For absolute paths, explicitly position `/./` to preserve only the intended directory structure. Without `/./`, `rsync -R` preserves additional leading path components.

Limitations

- Only regular files are transferred; symbolic links and empty directories are excluded.
- Directory metadata may not be fully preserved.
- Progress is measured by completed batches, not bytes.
- Parallel transfers may be slower on I/O-constrained systems.
- `–del` is not supported directly by this approach.

The final `rsync` pass handles symbolic links, empty directories, directory metadata, and any remaining file differences. The && operator ensures that it runs only if GNU parallel succeeds. Add `–del` to the final `rsync` command to remove extraneous destination files.

References

- GNU Parallel
- rsync

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