

# Fake it 'till you make it

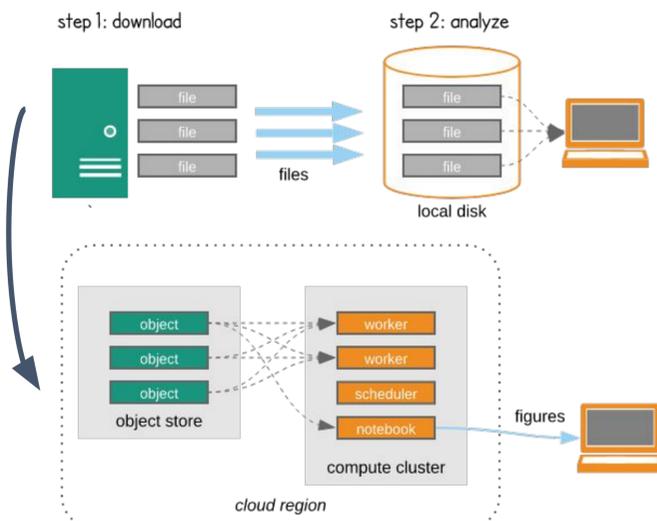
## Zarr-like Access of Existing NetCDF4 Datasets



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### Paradigm Shift

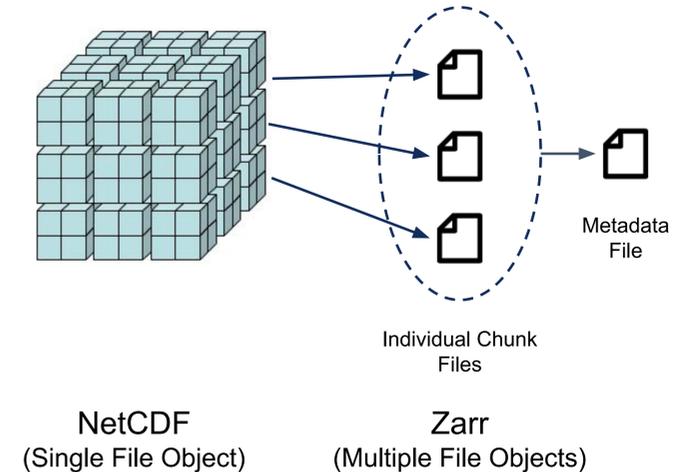


### Motivation

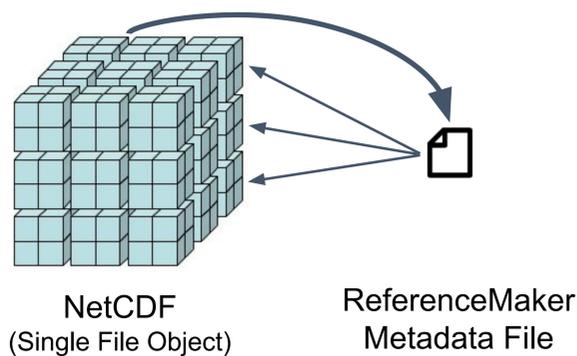
- Many institutions moving data to the cloud
- Most of this data is still in its native NetCDF4/HDF5 format, which is not cloud optimized
- The Zarr format is focused on optimizing large datasets for cloud access
  - Difficult to convince institutions to change data formats

**Is it possible to access cloud-hosted NetCDF4 data in a Zarr-like fashion?**

### NetCDF vs Zarr



### ReferenceMaker



**Instead of individual chunk files, ReferenceMaker creates metadata files that point to byte offsets in the original NetCDF4 file**

#### Introducing ReferenceMaker

- Creates metadata JSON files using Zarr specification
- Metadata describes remote file location, variable shape, and chunk information
- Allows Zarr engine to access netCDF chunks as if they were Zarr chunk files
- Metadata file is only a few MB per data file and easily shareable
- Can be generated/hosted by 3rd parties

Code available at <https://github.com/intake/fsspec-reference-maker>

### Results/Conclusions

Workflow consisted of 24-hour CONUS imagery loop, RGB composite imagery, spatial gradients, timeseries, and histogram. See QR code link for details

Format	Preprocess Time	Data Open Time	Workflow Time	Extra Storage
Native netCDF4	0 min	10 minutes	46 min	0 GB
Zarr	1 h 38 min	30 seconds	4 min 10 s	52 GB
ReferenceMaker	1 h 25 min	35 seconds	4 min 30 s	416 MB

#### Huge speed boost with low storage cost!

- Harness the cloud optimization of Zarr without needing to convert any data
- Reference files can be also created and hosted by third parties



Workflow products, interactive examples, tutorials, and more resources

### ACKNOWLEDGMENTS

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