Benchmarking HDF5 Compression Filters in R

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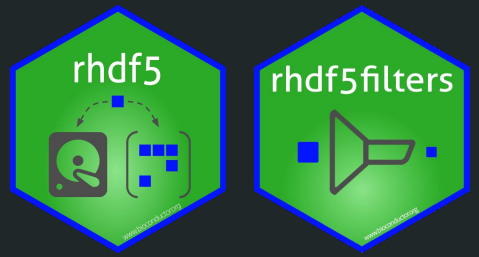
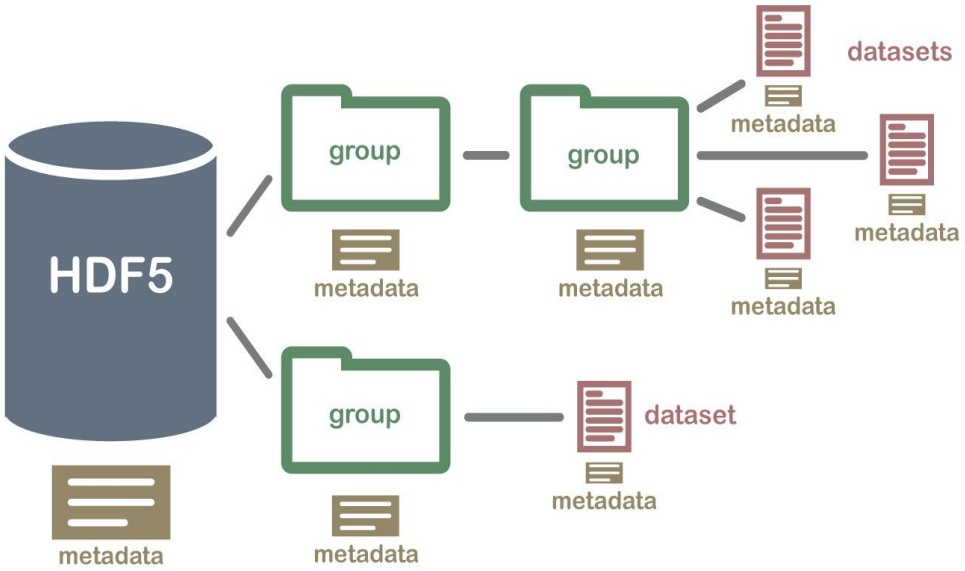


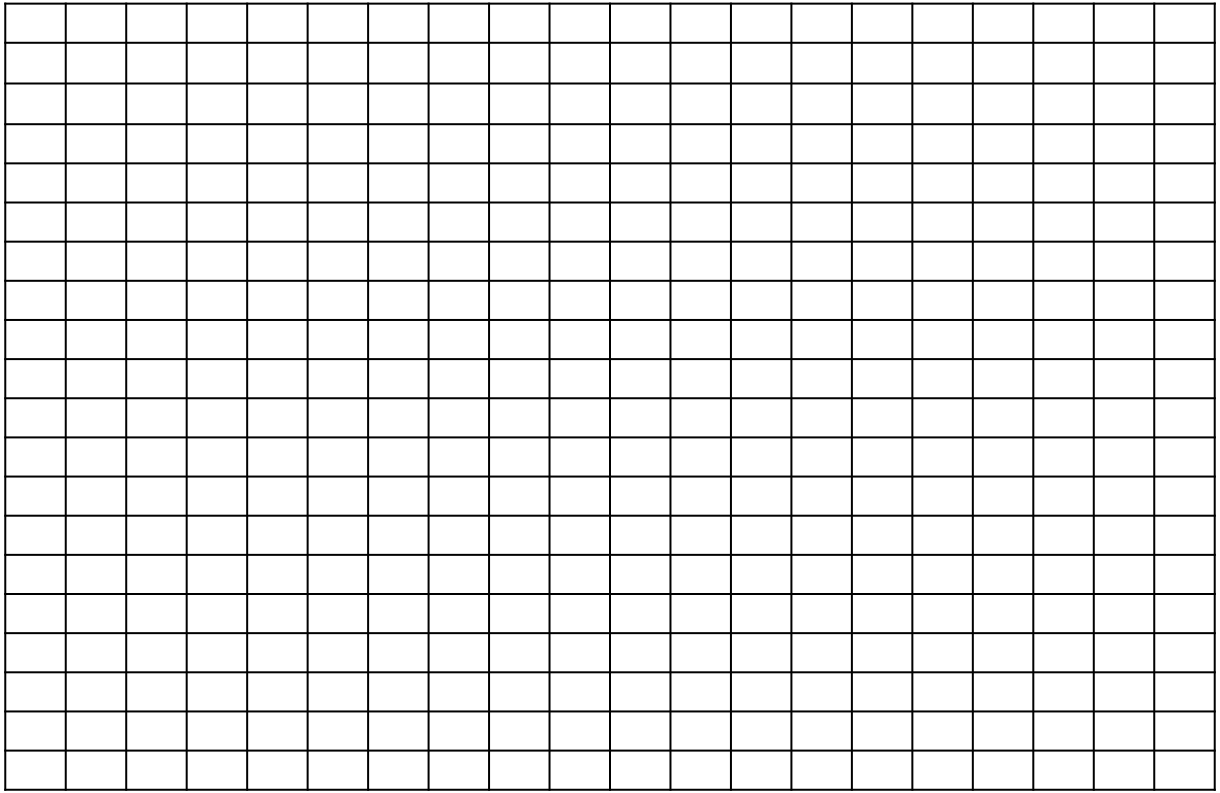
HDF5 is a file format for storing large, heterogenous, data



- Used in a variety of software, e.g:
  - DelayedArray
  - Kallisto
  - ONT sequencing
  - mz5 mass spec file
- Interfaces in many languages
  - C, Python, ...
  - **rhdf5** & **Rhdf5lib**
- Key features:
  - Hierarchical
  - Self describing
  - Efficient subsetting
  - Compressed

http://neondataskills.org/HDF5/About

HDF5 datasets are not contiguous, but stored in chunks



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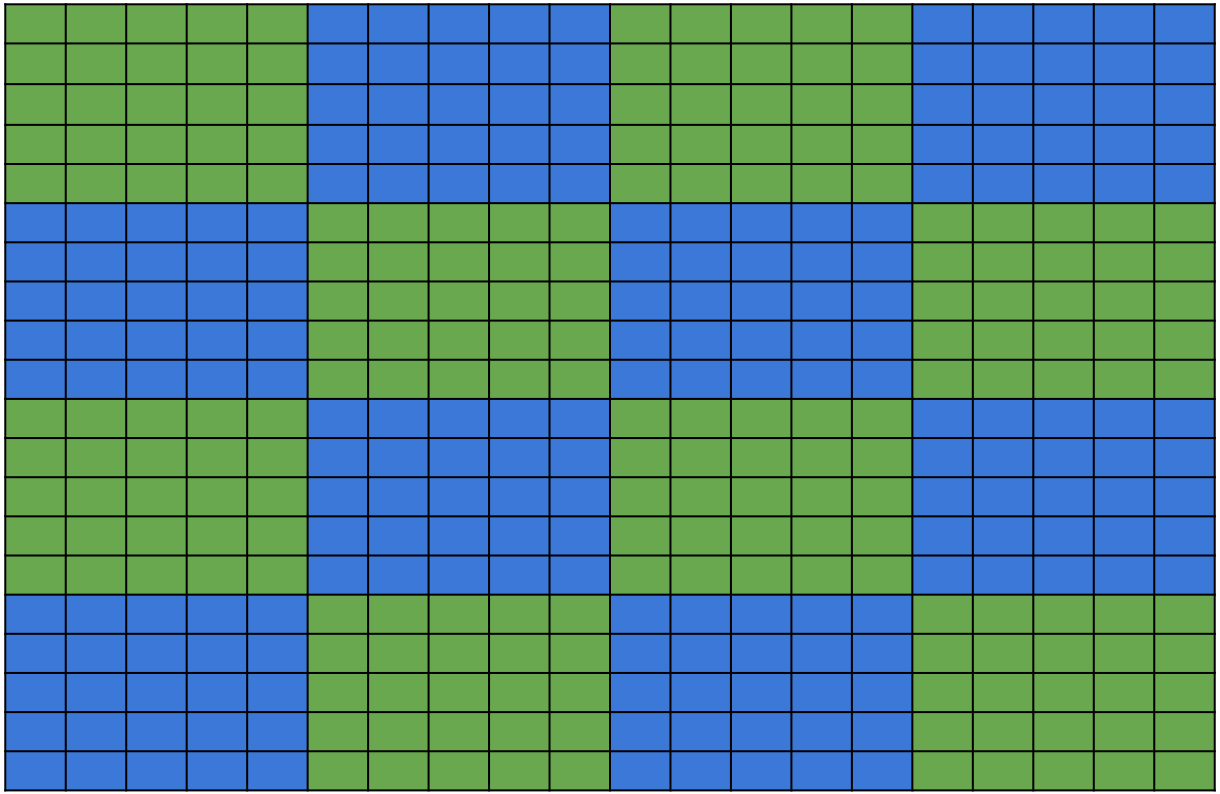
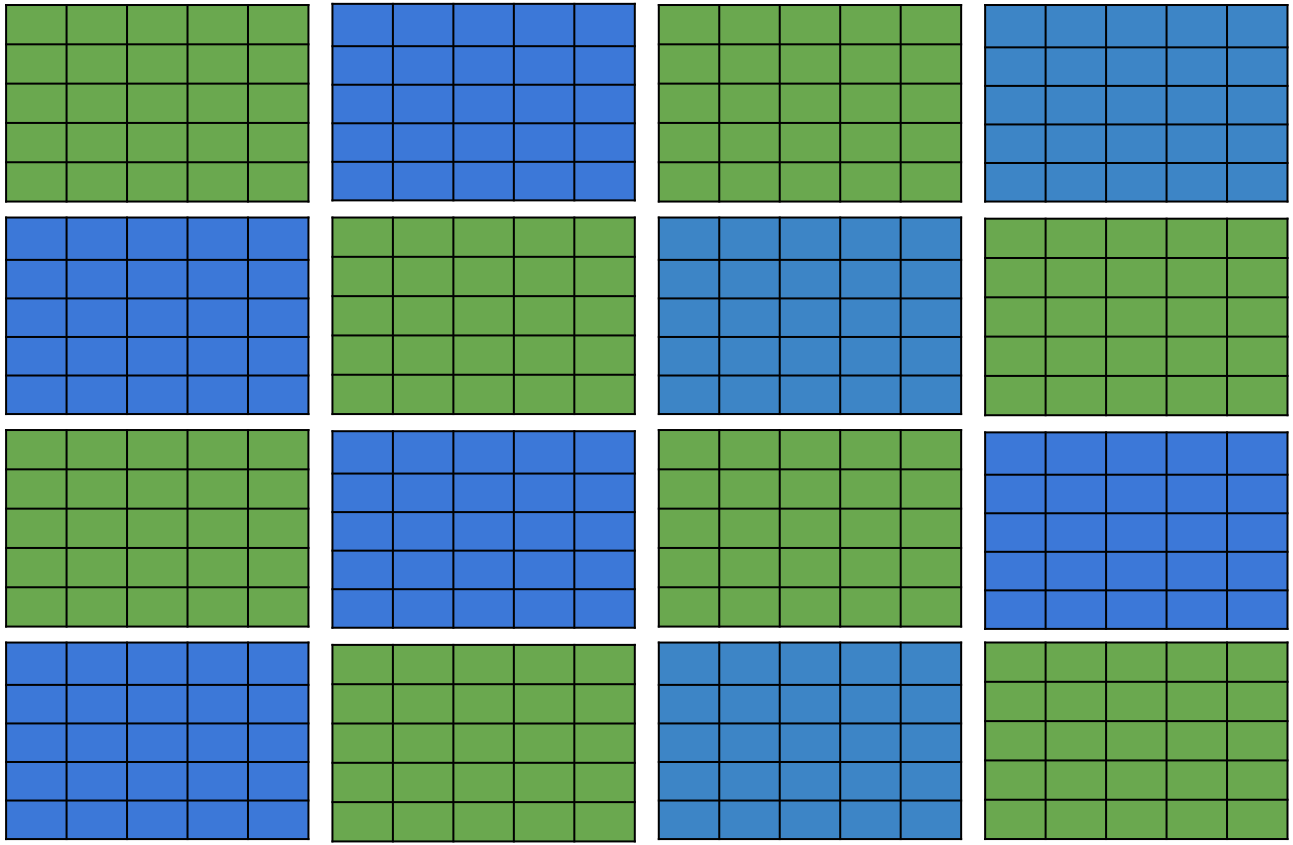
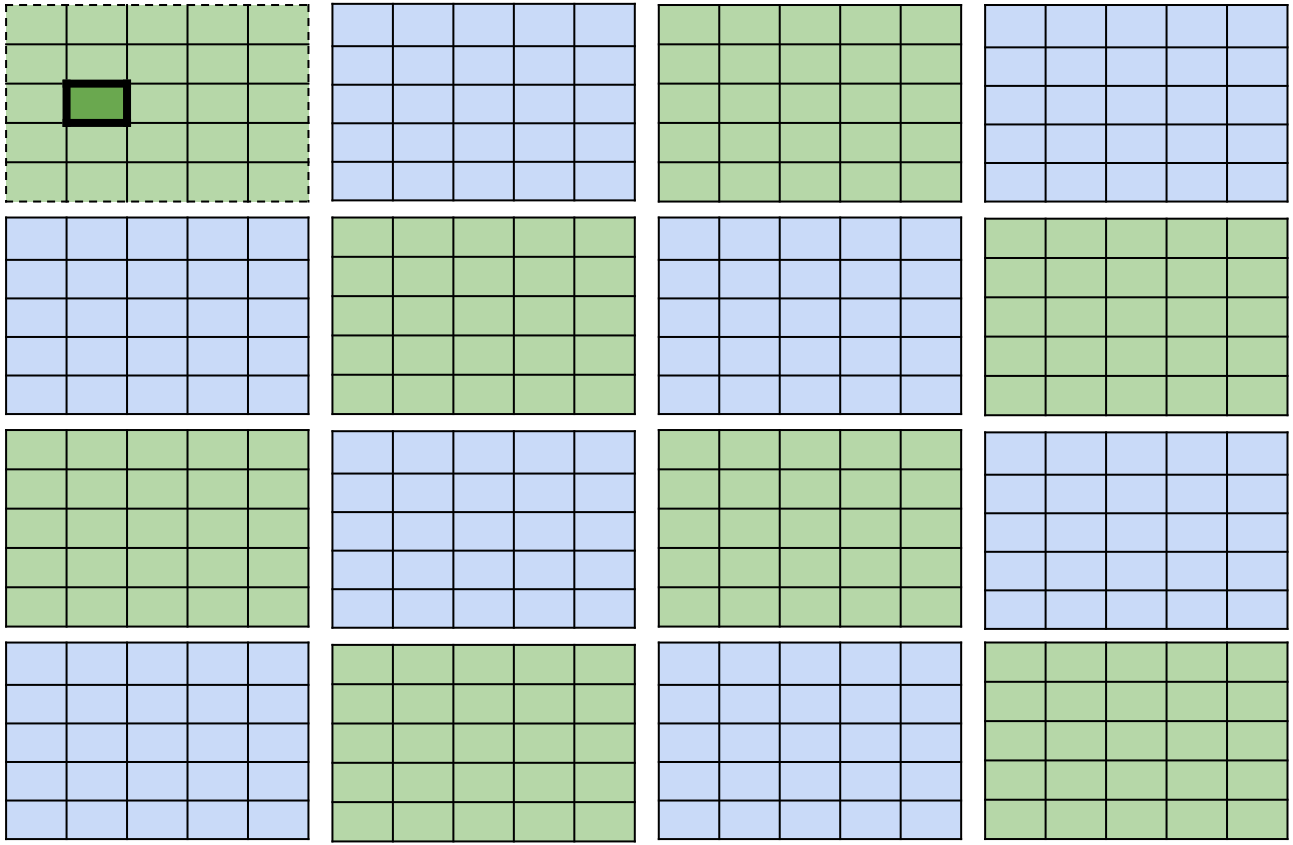


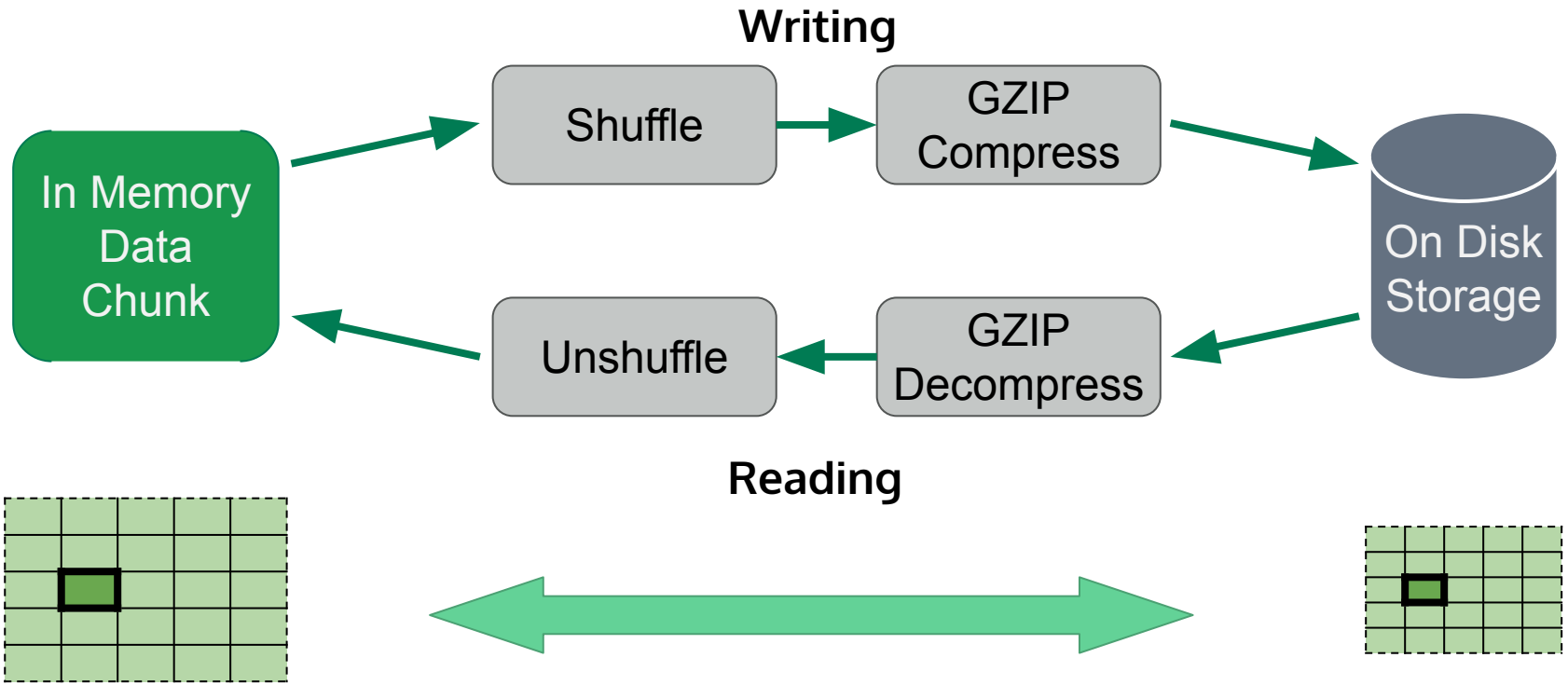
Chunks are stored separately on disk



Only read the chunks needed for a subset



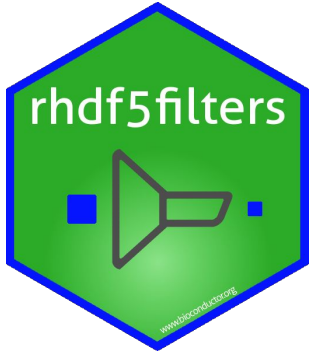
Chunks can be processed by filters - usually for compression



There are a number of compression filters available

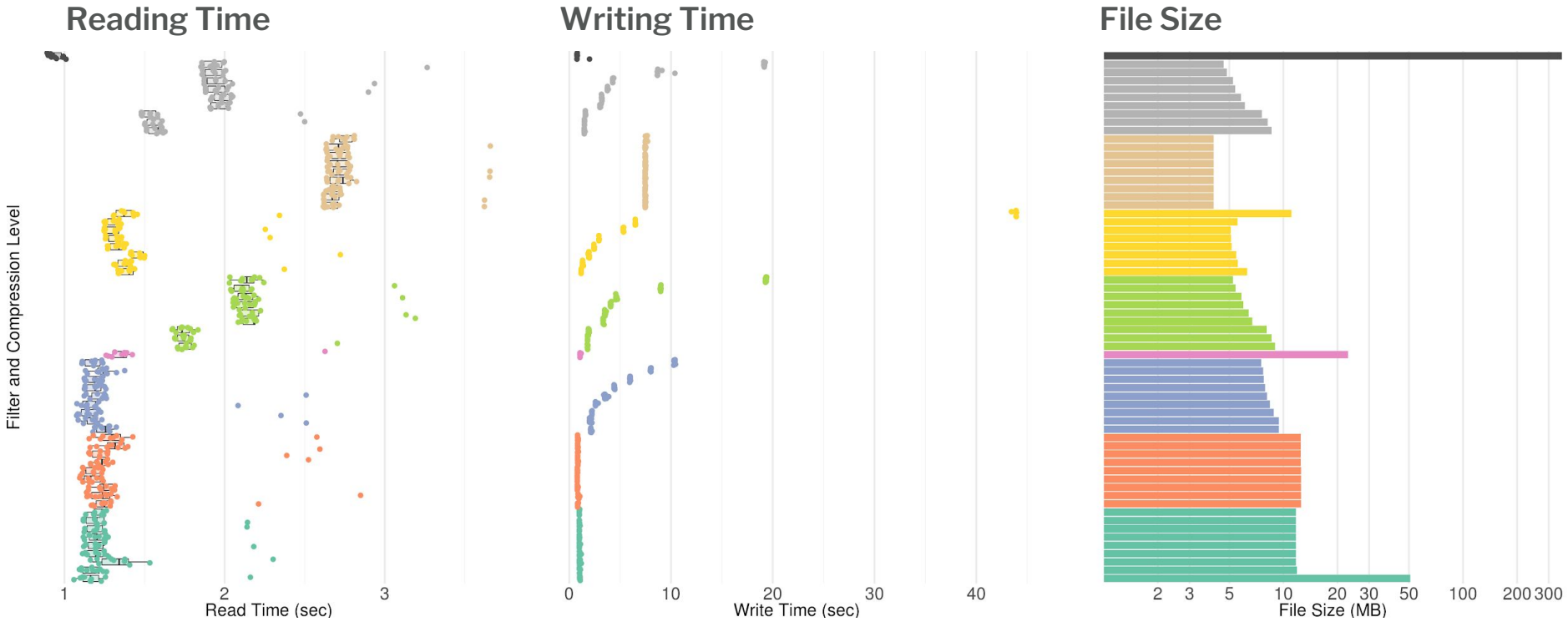
- Internal filters
  - HDF5 ships with support for GZIP and SZIP
- Dynamic filters
  - Third party tools can be made available at runtime
  - Wrap existing compression tool in small amount of C code
  - Provide location to HDF5 and they are loaded when required
  - Independent of the application(s) using them

rhdf5filters provides additional filters in R



- BLOSC meta compressor
- BZIP2
- Compiles C code on all platforms, including Windows
- Integrated with **rhdf5**
  - Writing: Supply argument to function
  - Reading: Used automatically if needed
- `msmith.de/rhdf5filters/`

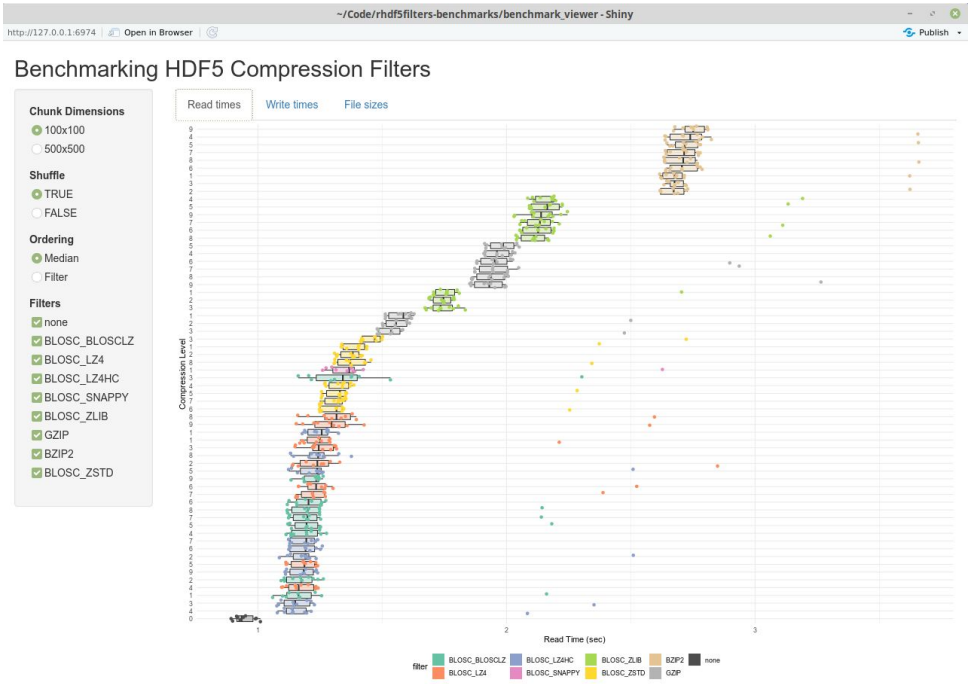
Filters & parameters have been benchmarked



You can explore the results with a shiny app

- **`msmith.de/rhdf5filters-benchmarks`**

- Scripts to run benchmarks also available
- Grateful for any contributions on both style and substance!



Thanks to EMBL Huber Lab & BioC community!

`msmith.de/rhdf5filters-benchmarks`

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