Benchmarking HDF5 Compression Filters in R

Mike L. Smith
@grimbough
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/](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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