

Workshop on
Next-Generation
File Formats (NGFF)



Accessing “cloud”-hosted image data



- Introductions: us & you
- Benefits to you: sharing & viewing
- De-mystifying cloud: “S3?”
- Choose your adventure:
 - 1. Viewing
 - 2. Your own S3 (minio)
 - 3. Conversion & upload
 - 4. Analysis

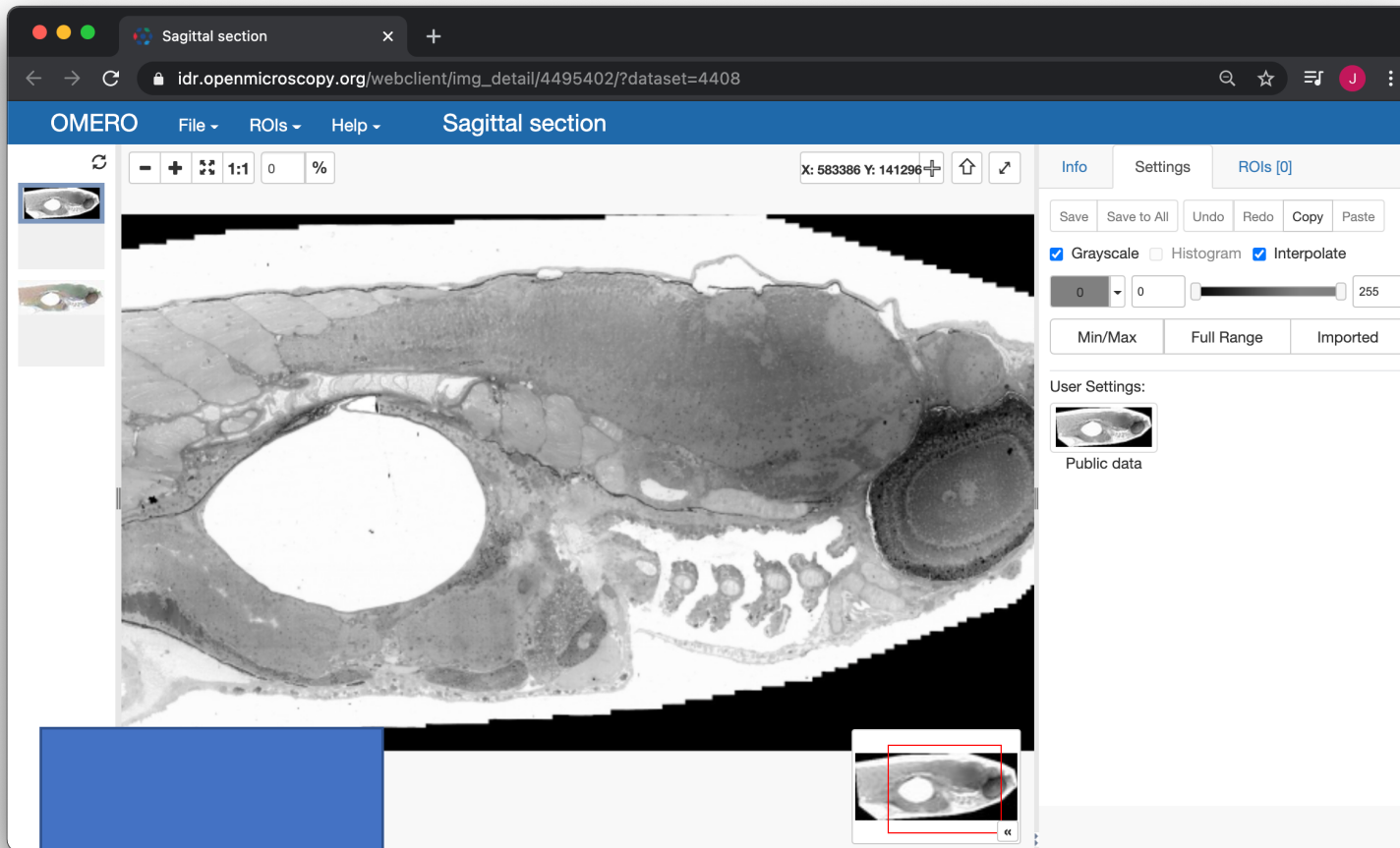


You ?

Large data needs
chunks & pyramids to
be accessible.

Current formats for
chunked access tends
to be *monolithic*.

Monolithic formats
are difficult to access
remotely.



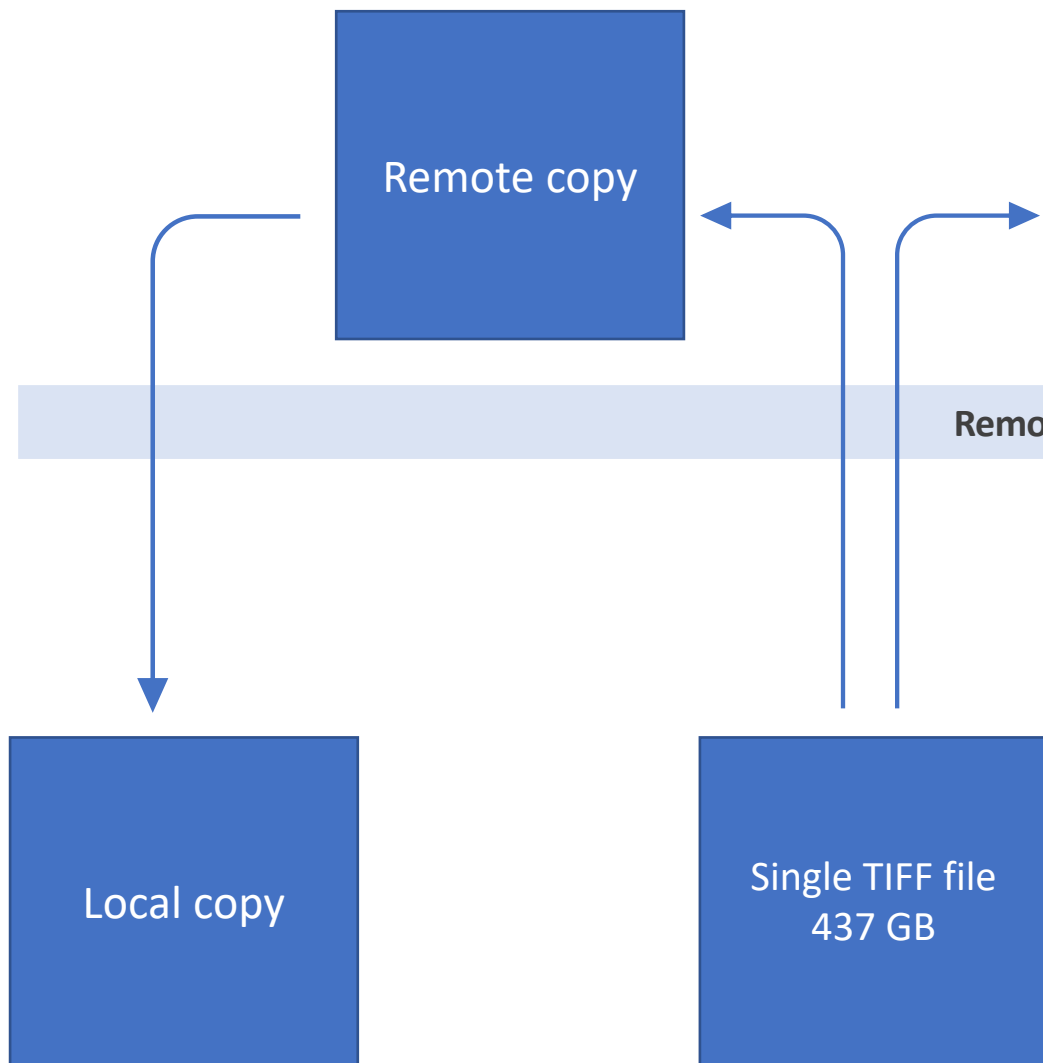
Single TIFF file
437 GB

Faas *et al.* ([idr0053](#), CC BY-NC-SA 3.0)
J Cell Biol (2012)
921600 x 380928 pixels

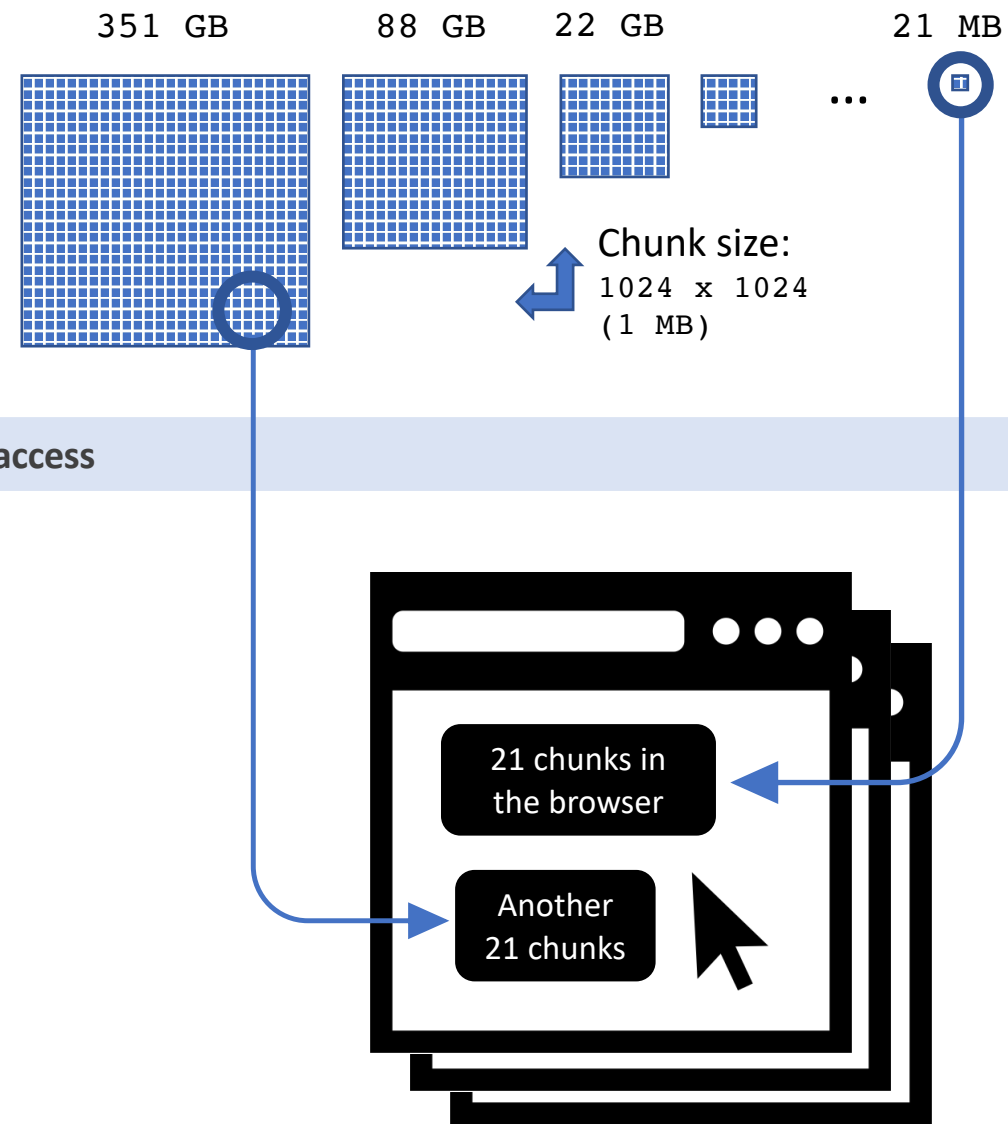
Use cases:

1. Remotely sharing without a server.
2. Sharing beyond current limits, e.g., downloading TBs from OMERO.

Monolithic format



Next-generation file format (NGFF)



“Cloud” → “Storage”

Object

Commercial providers



Scientific providers



“Cloud” providers



Filesystems

- NFS/SMB
- GPFS
- HDD
- SDD

Filesystem	Object storage
1 €/GB	0.01 €/GB
Gbps	Tbps
10 μs	1 ms
I/O intensive	Immutable
High frequency	Versioned
...	...

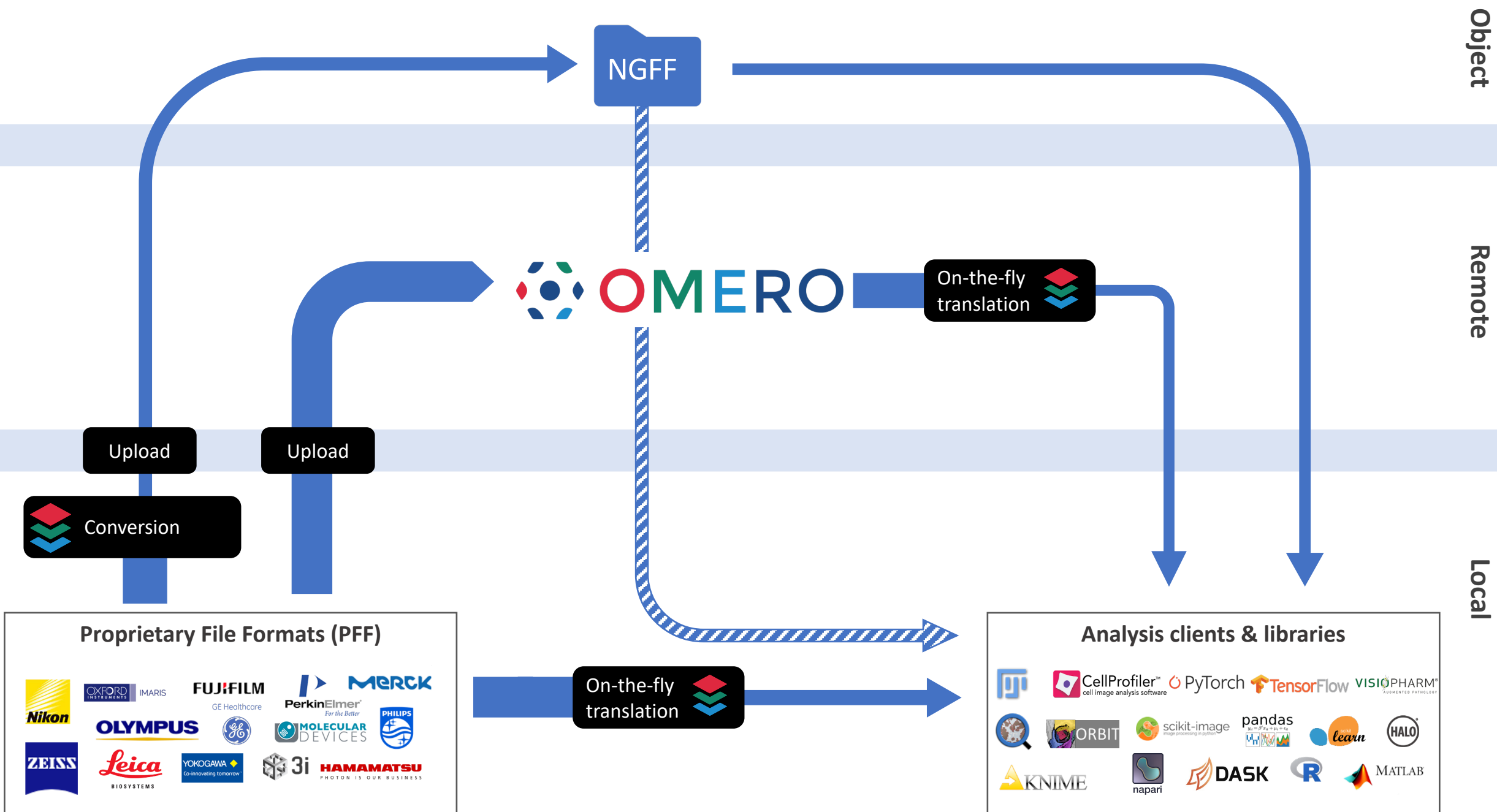
<https://www.openio.io/blog/block-file-object-storage-evolution-computer-storage-systems>

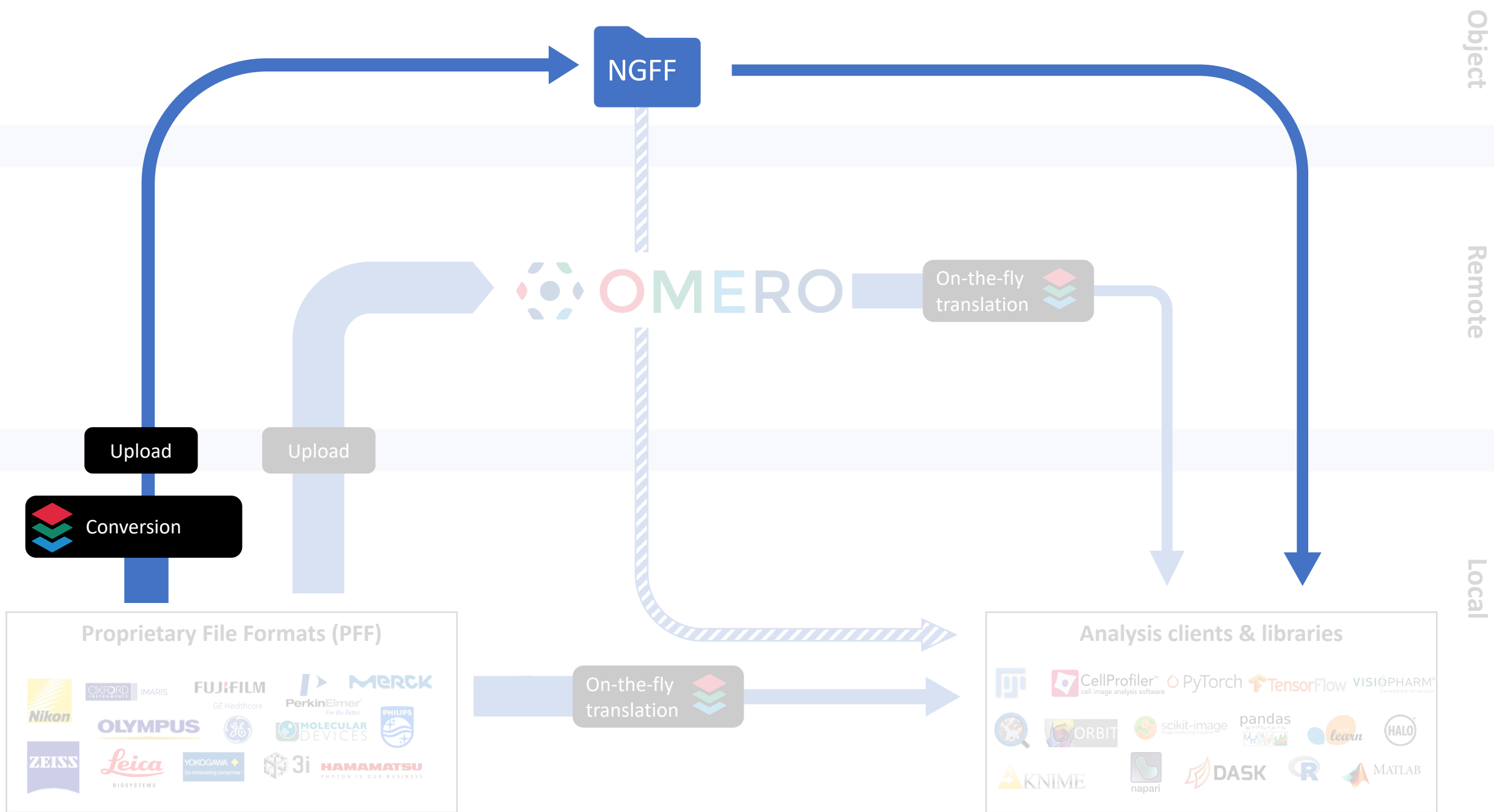
Software needs to be smarter.

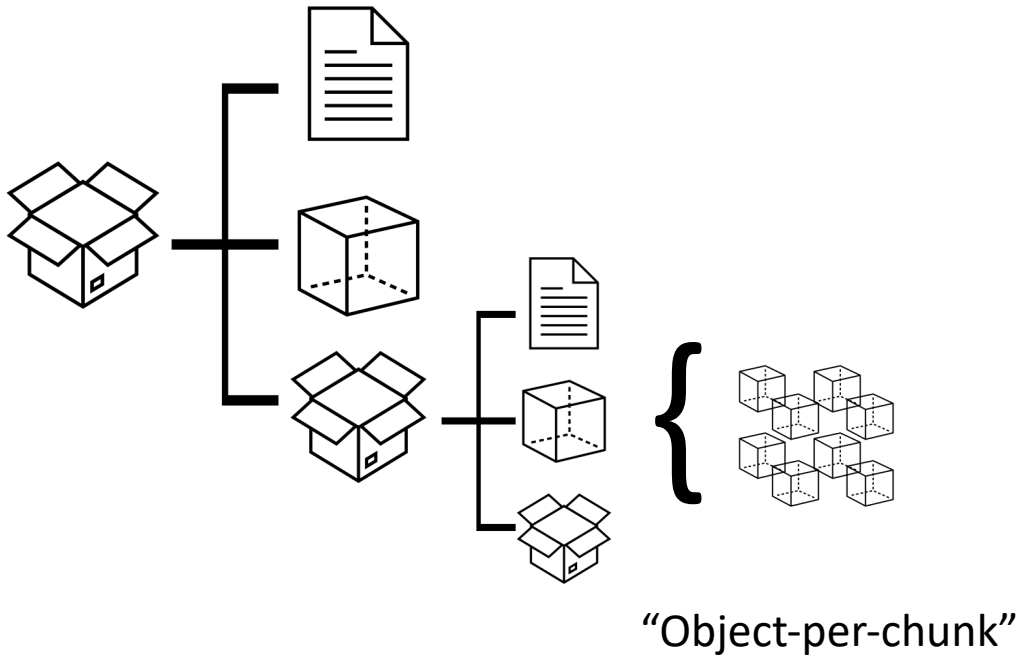
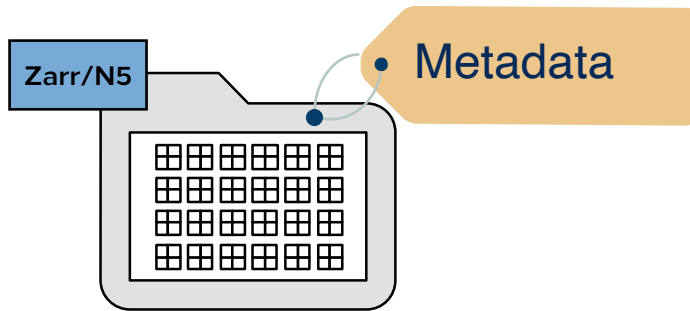
Each object is a chunk.

Remote

Local

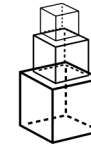






Specifications:

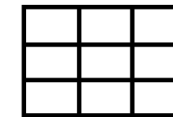
- Multiscales



- Labels



- HCS Plates



Process:

- Discussions: <https://image.sc>
- Publication: <https://ngff.openmicroscopy.org>
- Samples: <https://s3.embassy.ebi.ac.uk/idr/zarr>

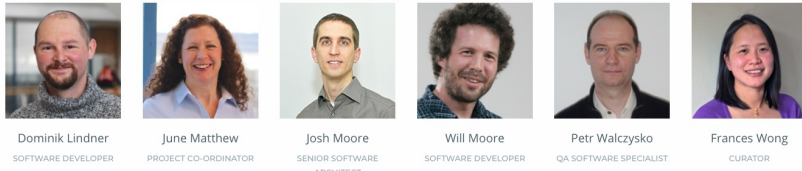
Practical

<https://j.mp/ngff-elmi-2021>

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Acknowledgements



Former members of the OME team in Dundee

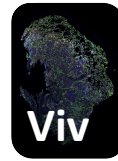
Chris Allan	Colin Blackburn	Andrea Falconi
Gus Ferguson	Helen Flynn	Stefan Frank
Kelli Griffis	Emma Hill	Kenny Gillen
Roger Leigh	Simone Leo	Scott Littlewood
Brian Loranger	Scott Loynnton	Donald MacDonald
Andrew Patterson	Blazej Pindelski	Balaji Ramalingam
Gabriella Rustici	Aleksandra Tarkowska	Joyce Walsh
Harald Waxenegger	Simon Wells	Eleanor Williams
Wilma Woudenberg		

Development Teams

Other teams are also working on developing or integrating OME tools.

Glencoe Software	Baldock Lab	Bertrand Lab	Brazma Lab
Carazo-Salas Lab	Danuser Lab	Davis Lab	Eliceiri Lab
French Lab	Murphy Lab	Shorte Lab	Zanetti Lab

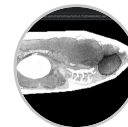
<https://www.openmicroscopy.org/teams>



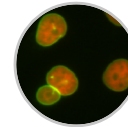
Gehlenborg Lab (HMS)



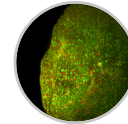
napari



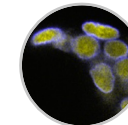
Faas *et al.* ([idr0053](#), CC BY-NC-SA 3.0)
J Cell Biol (2012)



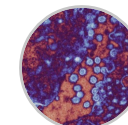
Hériché *et al.* ([idr0002](#), CC-BY 4.0)
MBoC (2016)



McDole *et al.* ([idr0044](#), CC BY 4.0)
Cell (2018)



Blin *et al.* ([idr0062](#), CC BY 4.0)
PLOS Biology (2019)



Lamers *et al.* ([idr0083](#), CC BY 4.0)
Science (2020)

BDV

Tomancak Lab
(MPI-CBG)

KLB

Keller Lab
(Janelia)

N5

Saalfeld Lab
(Janelia)

Zarr

Alistair Miles
(Oxford)

