





*Glencoe Software and OME:
A Year of Continuing Success*

OME Users Meeting 2017

Wednesday, 31st May 2017

Welcome to Glencoe Software

Founded in 2005 10+ Years of success!

Powerful, Proven Image Data
Management Solutions and Services

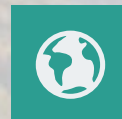
Dundee, UK and Seattle, WA, USA

Exclusive Commercial Partner of Open
Microscopy Environment (OME)



Our Team

15 Glencoe Software and 30+ OME employees



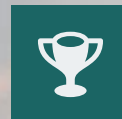
Established Worldwide

Customers in Pharma, Biotech, Academia and
Technology



Expertise

65+ years of experience in life sciences, imaging
and software engineering



Award Winning

BBSRC Innovator of the Year 2011

Commerical & Community Synergy

A Powerful, **Exclusive** Partnership built on Open Source Foundations



COMMERCIAL LICENSES

Warrantied, Indemnified
Data Management
Solutions



CUSTOMIZATION

Integration,
Consultation, Software
Development....



SERVICE & SUPPORT

Commercial Service,
Support Agreements

Bio-Formats

An Image Translation Library

ADDRESSES the challenge of working with numerous proprietary file types

UTILIZED by OMERO Plus & PathViewer to access and integrate image data

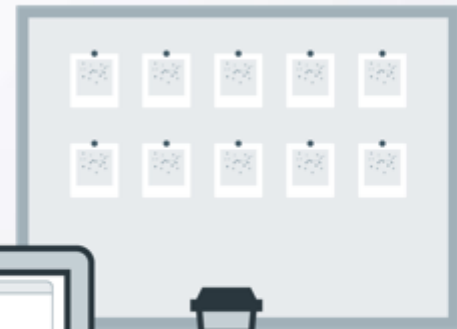
COMPATIBLE with image data files from numerous imaging domains

POWER to combine images from any imaging domain in a single system

ACCESSIBILITY of image metadata with any type of analysis software

WORK DIRECTLY with image analysis tools such as ImageJ, MATLAB®, Imaris®, CellProfiler® and ...

145+ image file formats
currently supported



OMERO Plus

Platform agnostic, enterprise-level data management software

VIEW your data anywhere... anytime

MANAGE your scientific images and associated metadata

SHARE your data securely and easily with anyone whom you chose to, globally

ANALYZE your data with all the tools you need from within one simple framework

PUBLISH your data with confidence

* OMERO Plus offers full warranty and indemnification



PathViewer

An intuitive, interactive, visualization, analysis and annotation tool

BROWSER-BASED OMERO client designed for **Digital Pathology** workflows; key features:

FREE-HAND annotation, drawing and measurement

BRIGHTNESS contrast and color level adjustment

PARAMETRIC URLS enabling precise sharing

ROI map annotations (more metadata)

BRIGHTFIELD & FLOURESCENCE

ENABLES MULTI views and users



Imaging Domains & Applications

Our Areas of Expertise

Digital Pathology

Tissue Samples
WSI
Histology



Microscopy

Electron
Fluorescence



High Content Screening

High Content Screening
3D Electron Tomography



Publishing

Video Injection
DataViewer



Medical Imaging

MRI
CT

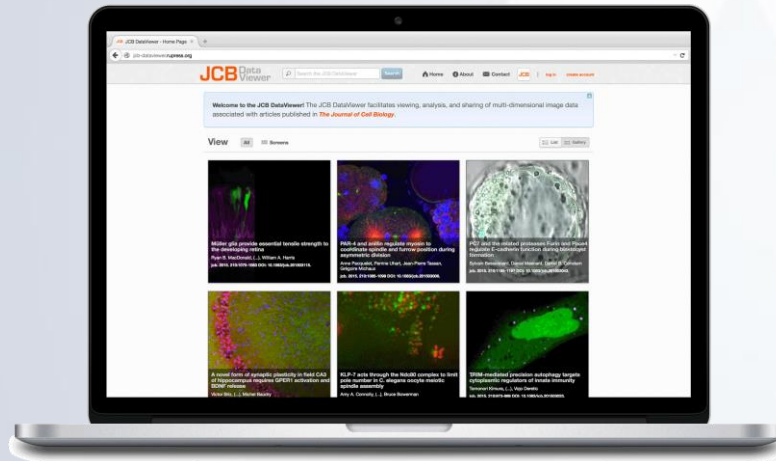


And more...

X-Ray Crystallography
Light Sheet Microscopy
Other data types
... What's yours?

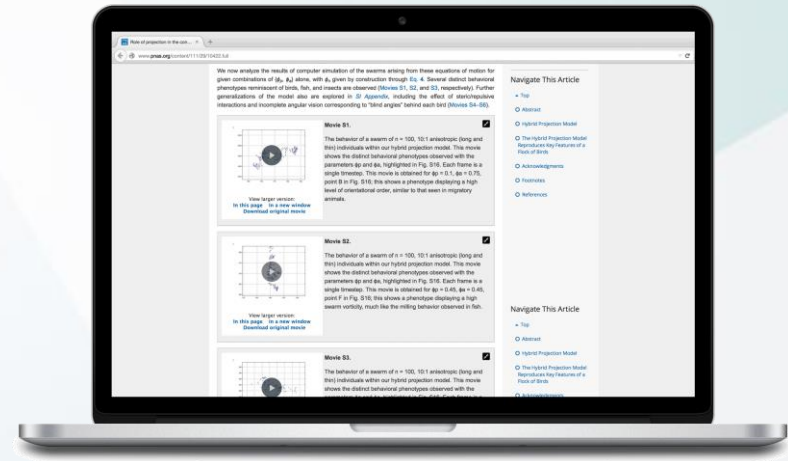


DataViewer



Interactive visualization of original, multidimensional image data in over 150 different file formats – all in web browser plug-ins

Video Injection Service



Branding Company

Integrating image data into online publications. Seamlessly.

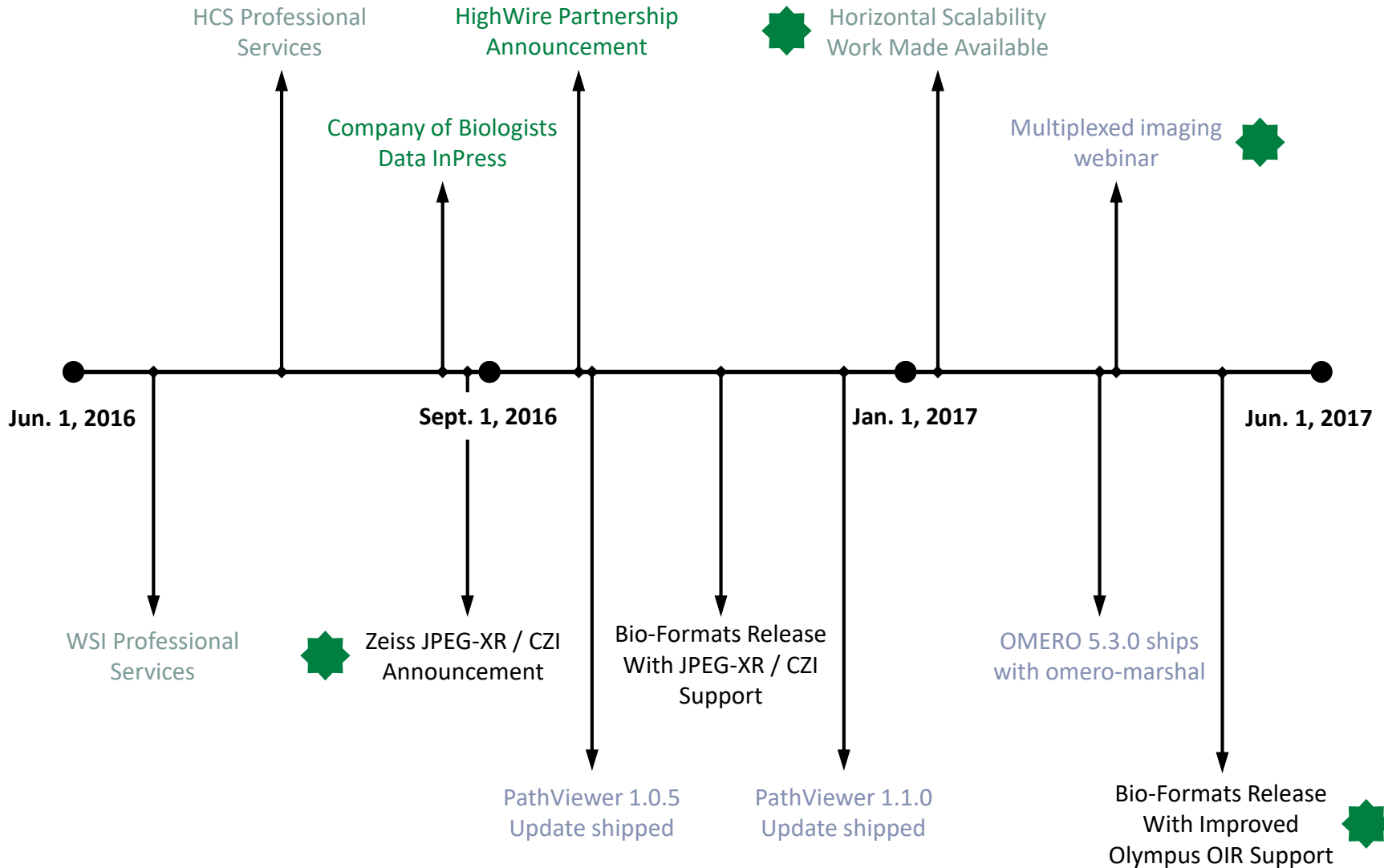
The Last 12 Months



What we said a year ago

- More work on scalability for HCS and WSI
- Better and more thorough portfolio of integrations
- Quarterly webinars showcasing Bio-Formats and OMERO
- Development projects with major instrumentation vendors ensuring PFF support

Timeline



Browse

1 Slides Viewing Options

Rotation

0° 90° 180° 270°

Channels

Render in color

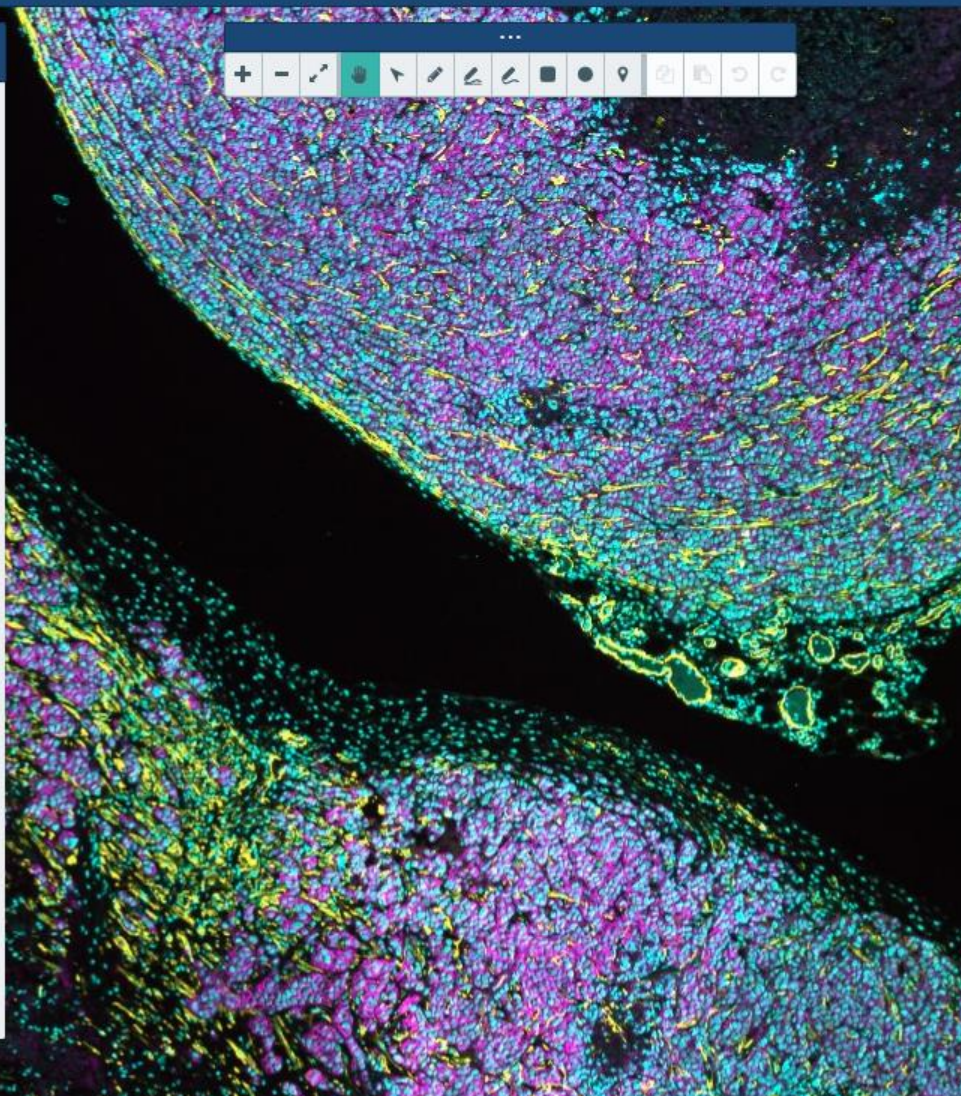
Apply Save Settings

Channel Groups

- Cycle 1
- Cycle 2
- Cycle 3
- Cycle 4
- Cycle 5
- Cycle 6
- Cycle 7

Magnification: 50.0%

500µm



Navigation toolbar:

Properties

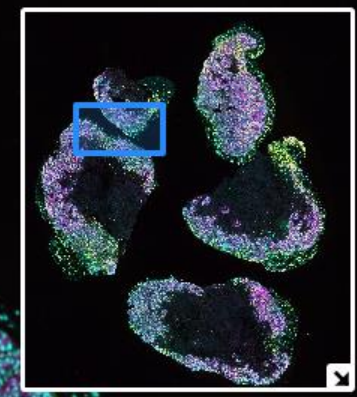
Load Save

Details 0 ROIs

Delete

Image Info

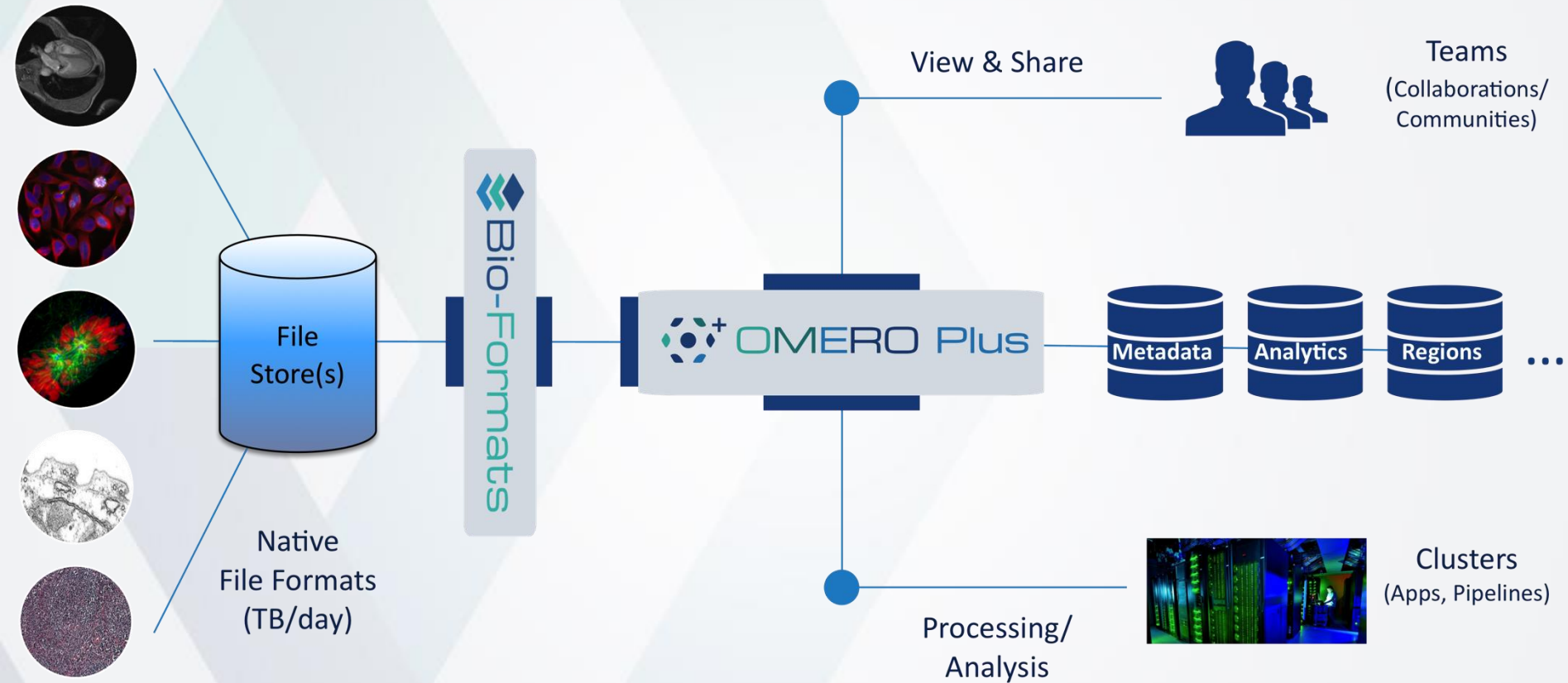
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Name:	SCP3.ome.tif
Owner:	Emil Rozbicki
Acquisition Date:	Apr 20, 2017
Dimensions (XY):	9856 x 11328 px
Pixels Size (XY):	1.300 x 1.300 µm
Pixels Type:	uint16



Technology

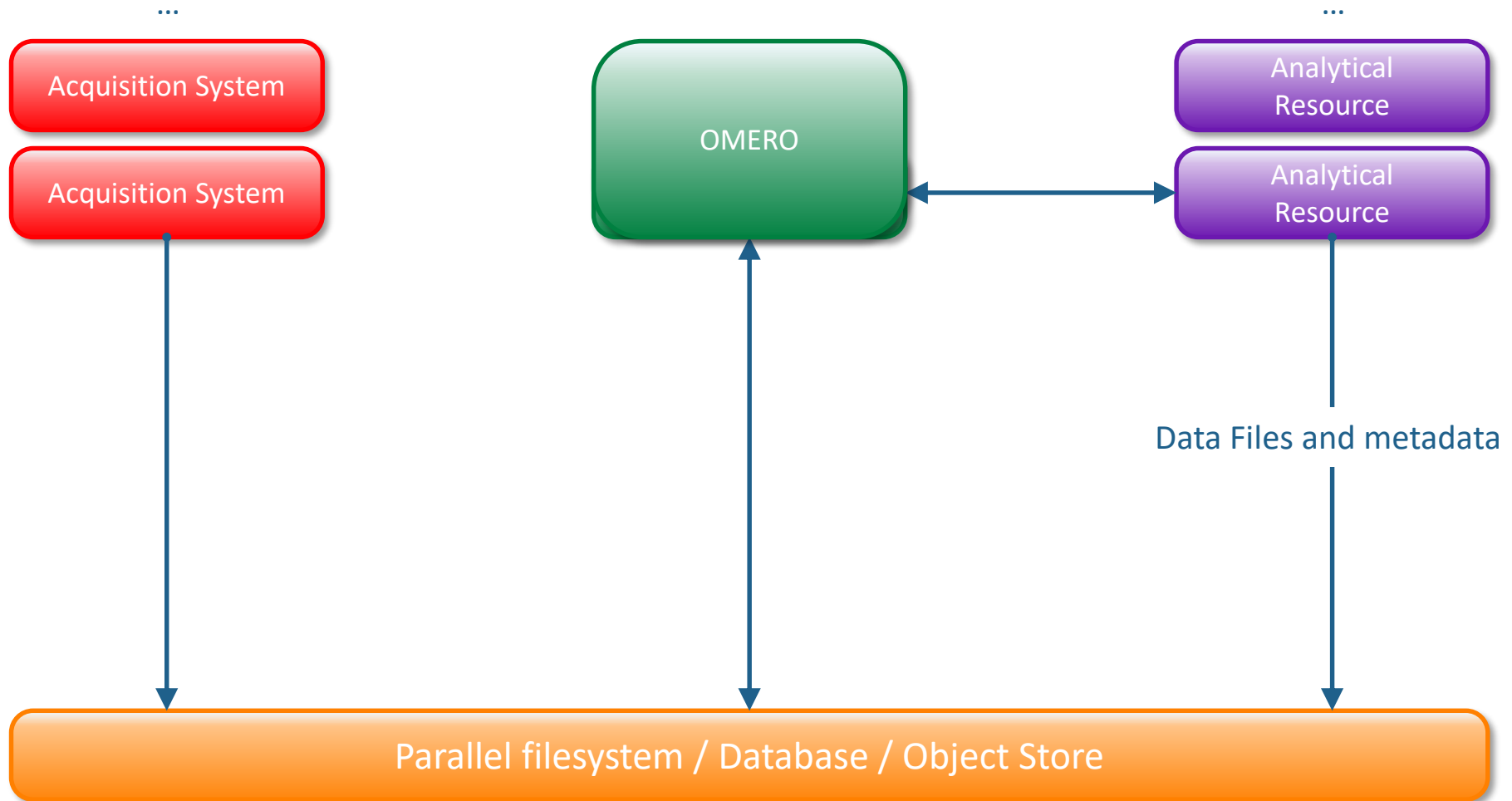


Bio-Formats and OMERO Plus 5 model

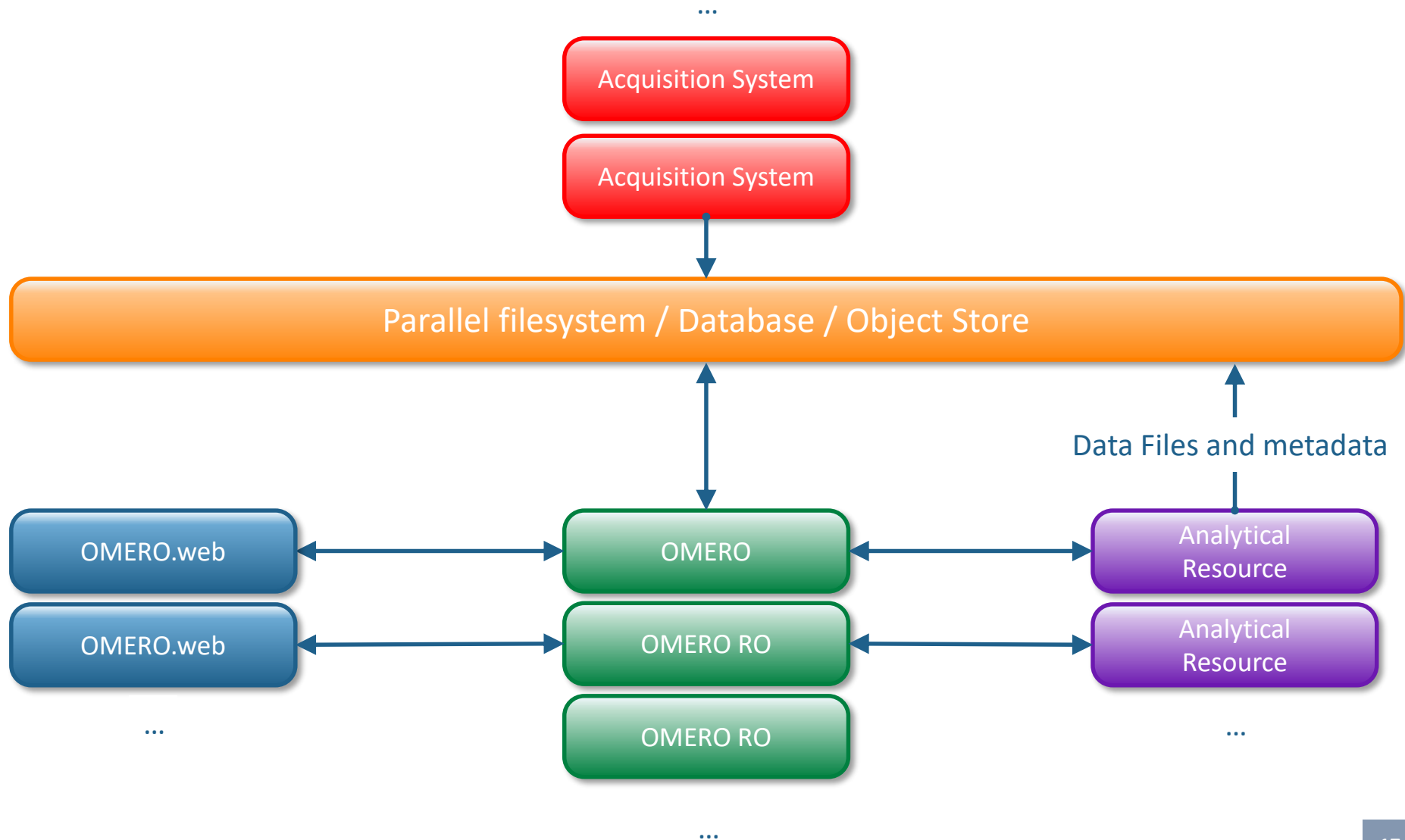


Separate, modular data storage & interfaces —> Scalable, Flexible, Future Proof informatics

Logical Architecture

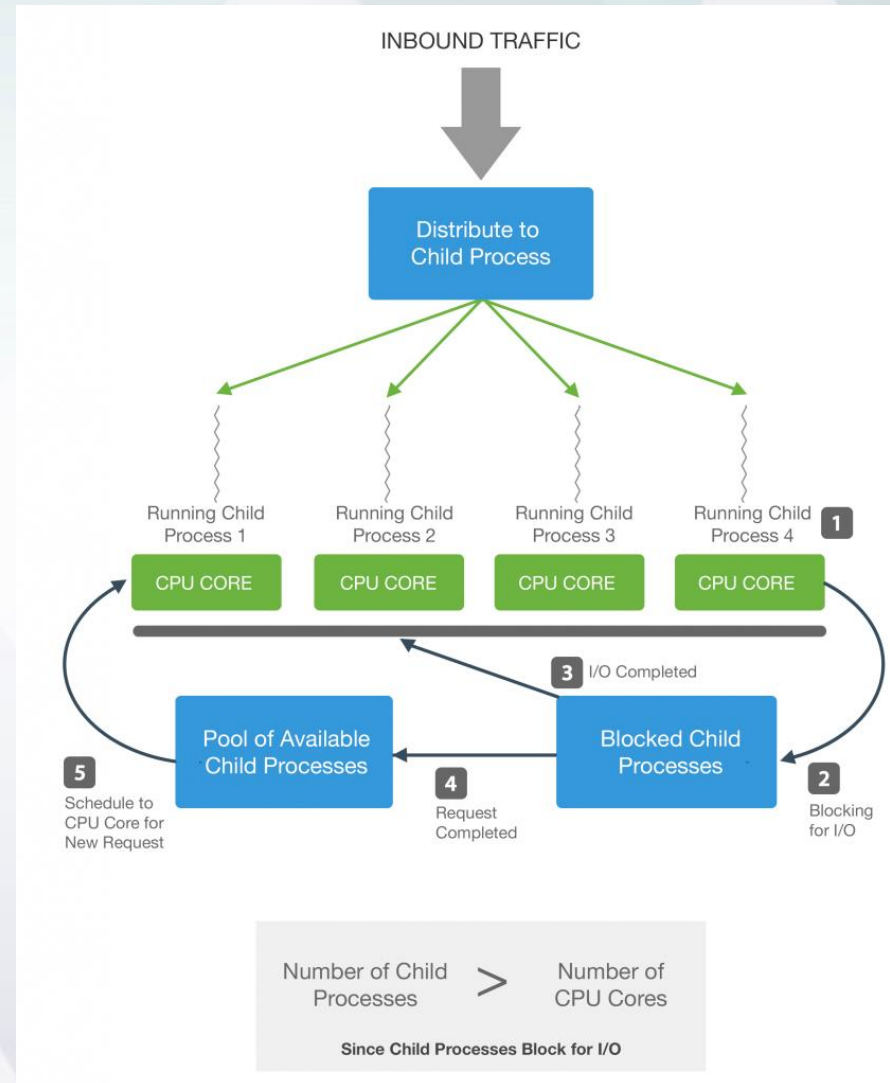


Logical Architecture – Horizontal Scalability



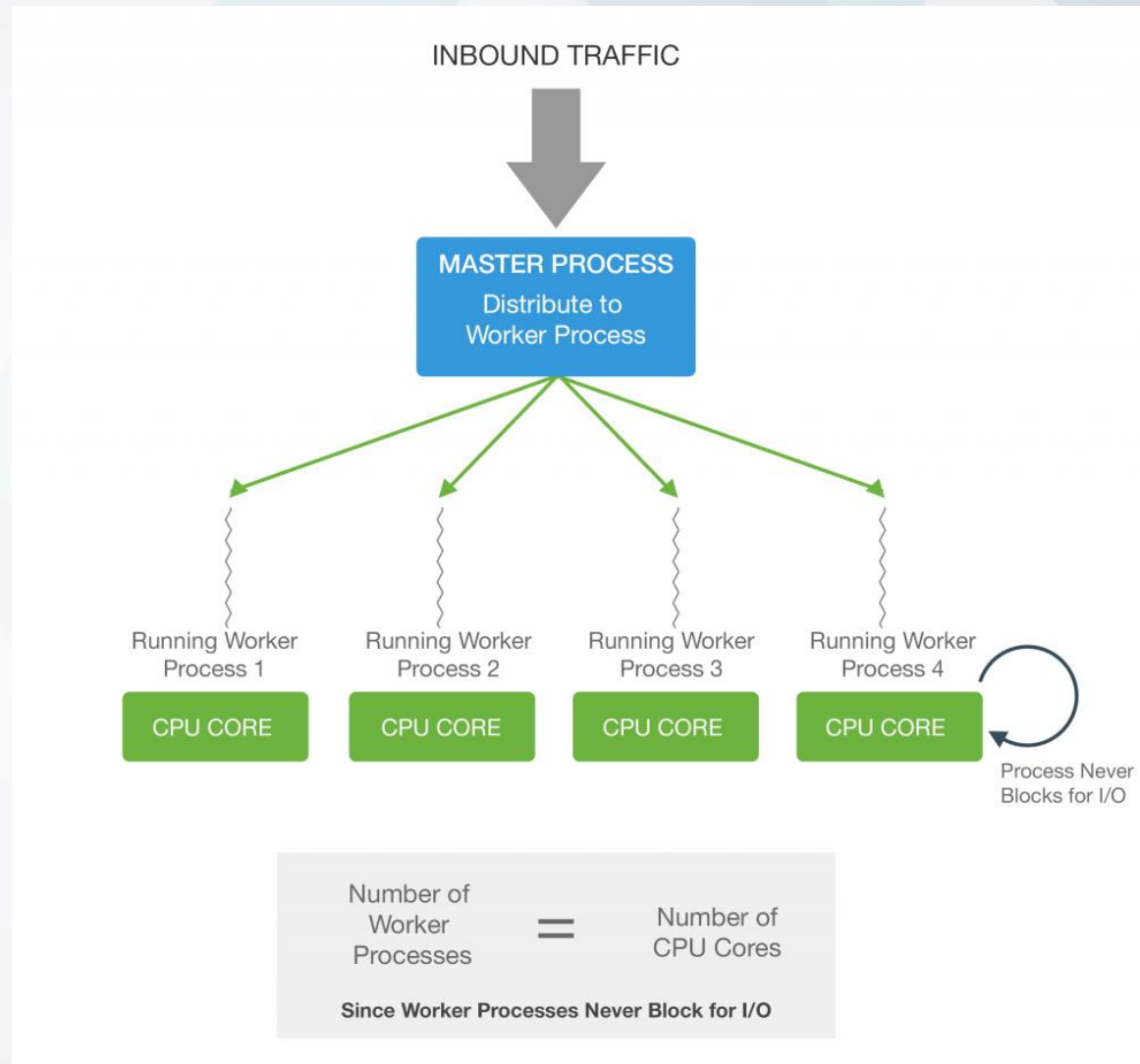
The Current Model

- OMERO.web is the client choice for many installations
- Pre-fork worker model with nginx and gunicorn is the standardized deployment as of OMERO 5.2.0
- Long running tasks block the worker
- Long running data retrieval blocks the worker
- Monolithic development and deployment

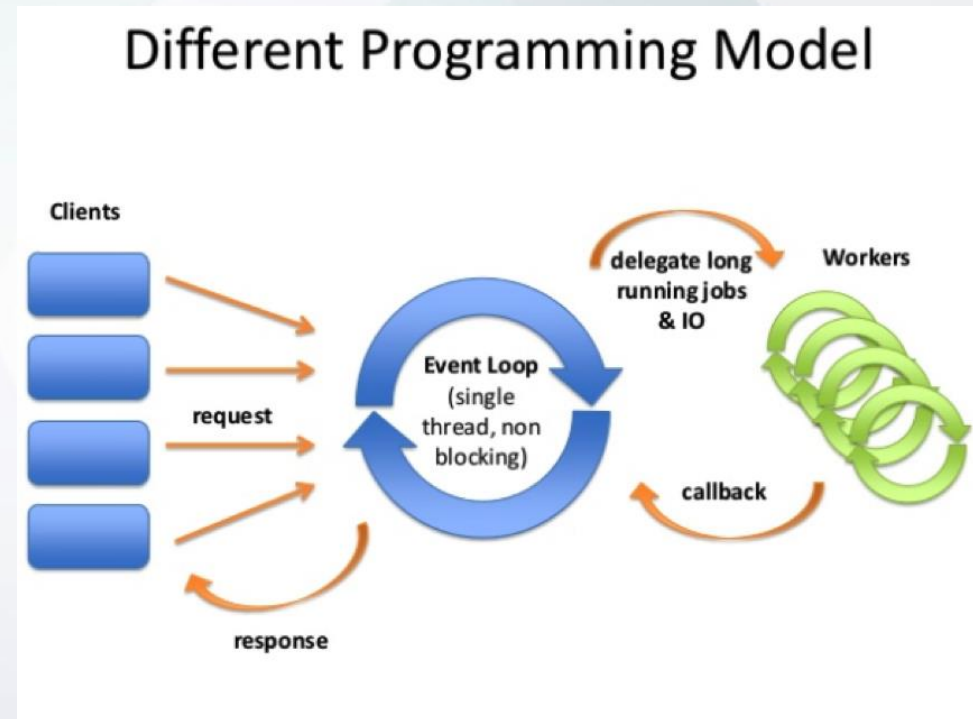


Async IO - A Different Way of Thinking

- Recent popularity courtesy of browser development and Node
- Several implementations in OMEMO aware languages such as Python and Java
- Long running tasks in a task queue do not block the worker
- Long running data retrieval blocks does not block the worker
- Nicely suited to microservice architectures
- Allows us to make better use of an OMEMO server instance



- Build upon the Elasticsearch prototyping work [1] from Nov 2016
- Use Java 8 and Vert.x as the prototyping environment
- Vert.x provides:
 - Polyglot fundamentals
 - Async IO HTTP implementation
 - Single and multithreaded worker “verticles”
 - EventBus

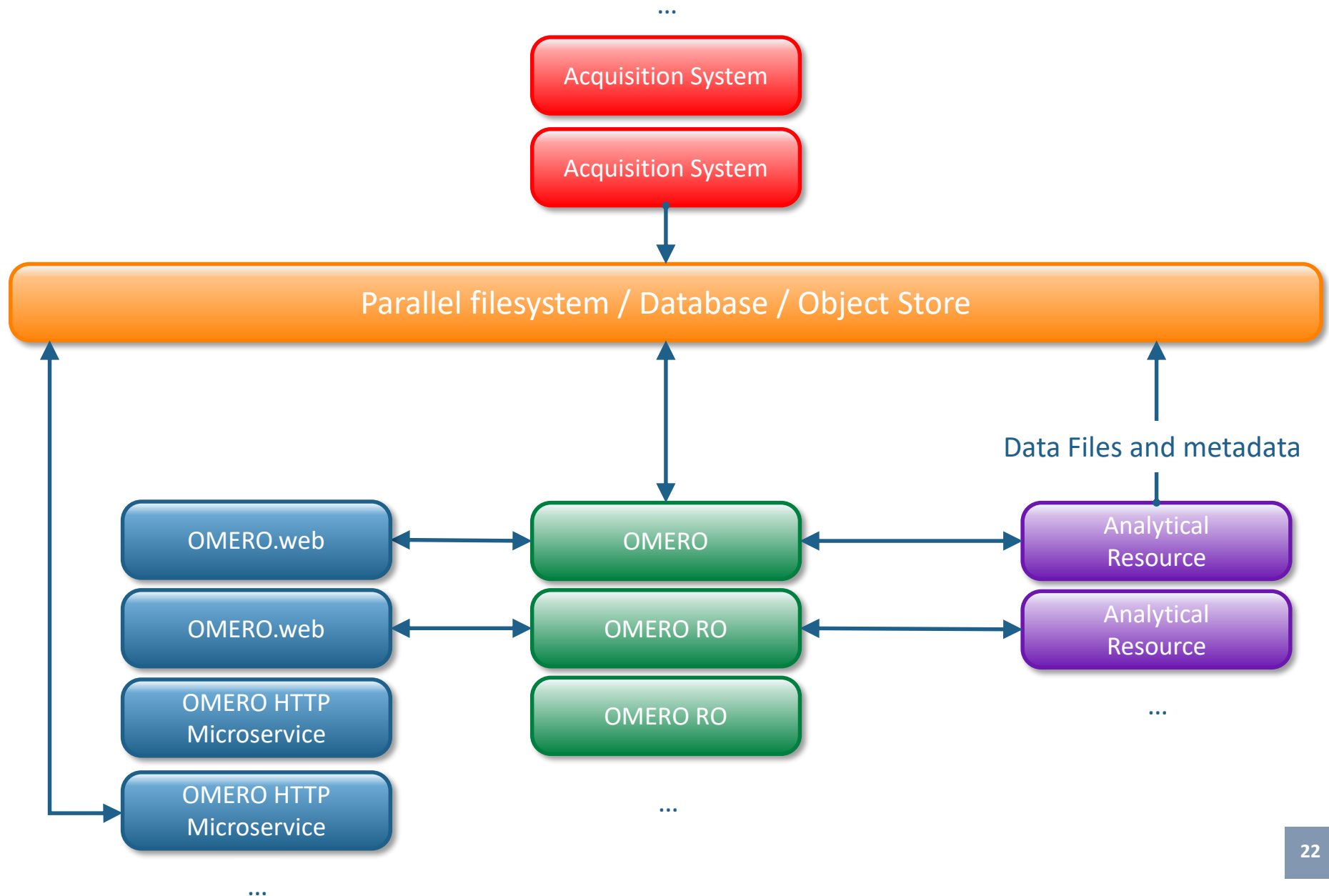


Rafael Salerno (<http://salerno-rafael.blogspot.co.uk>)

Introducing OMERO HTTP microservices

- OMERO microservice core and thumbnail microservice available today
 - <https://github.com/glencoesoftware/omero-ms-core>
 - <https://github.com/glencoesoftware/omero-ms-thumbnail>
- More coming soon!
 - Tile and image rendering
 - Bringing the rendering engine into the microservice
 - Image and original file download
 - Plane server

Logical Architecture – Horizontal Scalability



Where to from here?

- More work on both horizontal and vertical scalability for HCS and WSI
- Better Cloud computing compatibility
- A file format for 2017 and beyond
- Better and more thorough portfolio of integrations
- Regular webinars showcasing Bio-Formats and OMERO
- Development projects with major instrumentation vendors ensuring PFF support

Summary



The Team

Leadership



Chris Allan

File Formats and Plumbing



Melissa Linkert

Systems



Chris MacLeod

Backend Development



Joshua Ballanco

Design and User Experience



Liza Unson

Frontend Development



Andreas Knab

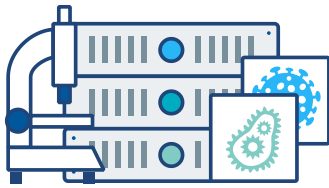
Applications



Emil Rozbicki

Our Solutions

Let's work together



Terabyte Scale Imaging
(LM, EM, HCS, DP, MI) *



Image Informatics Solutions



Images as Knowledge

Expertise

Solutions

* (light microscopy, electron microscopy, high content screening, digital pathology, medical imaging)

Thank you!

Visit us at www.glencoesoftware.com for more info, or follow us on Twitter [@glencoesoftware](https://twitter.com/glencoesoftware)

