Glencoe Software and OME:
Another Year, Another Collaboration

OME Users Meeting 2018

Wednesday, 30th May 2018
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
10 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
Outline

• Who is Glencoe Software?
• Last 12 Months
• omero-ms overview
• Parade overview
• Future directions
Commoerical & 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
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 ...  

**150+** image file formats currently supported
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

Medical Imaging
- MRI
- CT

Publishing
- Video Injection
- DataViewer

And more...
- X-Ray Crystallography
- Light Sheet Microscopy
- Other data types
- ... What’s yours?
The Last 12 Months
What we said a year ago

• 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
**Timeline**

- **PathViewer 2.0 Shipped**
  - Sept. 1, 2017

- **HCS Professional Services in the Cloud**
  - Sept. 1, 2017

- **PathViewer 2.1.0 Update shipped**
  - Jun. 1, 2018

- **Funding secured for PDI Parade Work**
  - Jan. 1, 2018

- **Funding secured for SPW Parade Work**
  - Jun. 1, 2018

- **Parade Webinar**
  - Jun. 1, 2018

- **Microservices Announcement**
  - Jun. 1, 2017

- **Image Region Microservice made public**
  - Jun. 1, 2017

- **Pixel Buffer Microservice made public**
  - Sept. 1, 2017

- **Bio-Formats Release With PerkinElmer Vectra/QPTIFF Support**
  - Jan. 1, 2018

- **CellLibrarian Announced**
  - Jun. 1, 2017

- **ZEN Blue 2.5 Shipping with Bio-Formats**
  - Jun. 1, 2018
Technology – Microservices
Bio-Formats and OMERO Plus 5 model

Separate, modular data storage & interfaces —> Scalable, Flexible, Future Proof informatics
Introducing OMERO HTTP microservices

- Build upon the ElasticSearch prototyping work [1] from Nov 2016
- Long running tasks in a task queue do not block the worker
- Long running data retrieval does not block the worker
- Allows us to make better use of server resources
- Allows us to scale computationally expensive tasks horizontally
- Integrates seamlessly with the OMERO.web platform
- Is NOT a panacea

1. [https://github.com/glencoesoftware/omero-es](https://github.com/glencoesoftware/omero-es)

Rafael Salerno (http://salerno-rafael.blogspot.co.uk)
Microservices - Why do this in the first place?

- HCS and Digital Pathology domains
- 10s of TBs of data, some made available publicly (IDR like)
- 10s of GBs high channel count big images
- Offset for Bio-Formats memo file creation
- **Stop** blocking workers
- Achieve better hardware resource utilization
- Explore different ways of engineering our software
Logical Architecture

Parallel filesystem / Database / Object Store

Acquisition System

OMERO

Analytical Resource

Data Files and metadata
Logical Architecture – Horizontal Scalability

Parallel filesystem / Database / Object Store

Acquisition System

OMERO.web

OMERO

OMERO RO

OMERO RO

OMERO 5.4.6+

OMERO.web

Data Files and metadata

Analytical Resource

Analytical Resource

OMERO 5.4.6+
Technology – Parade
OMERO Parade

History

- November, 2016
  - Initially devised by Will Moore, OME Dundee
- January, 2018
  - Development reactivated
- February 20\textsuperscript{th}, 2018
  - Design presentation by Will Moore to OME developers
- March 10\textsuperscript{th}, 2018
  - First contributions by Glencoe Software
OMERO Parade
At a glance

- Open source OMERO.web center panel plugin
- Usable by both biologists AND computational team members
- Visualization Project-wide or Screen-wide
- Filtering of Images based on Boolean logic
  - Image metadata
  - Annotations
  - OMERO.tables data
- Display of Analytical and Experimental data associated with Images
  - Table
  - Heatmap
  - Charting
- Expanding on the plugin concept
  - Filter
  - Data provider
Summary
Where to from here?

• More work on both horizontal and vertical scalability for HCS and WSI

• A file format for 2017 and beyond

• Regular webinars showcasing Bio-Formats and OMERO

• Development projects with major instrumentation vendors ensuring PFF support

• Expansion of the informatics capabilities of OMERO
  • OMERO.tables and metadata
  • Masks and Regions of Interest

• New directions and domains for PathViewer
The Development 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

Full Stack Development
- Kevin Kozlowski

Leadership
- Kevin Kozlowski
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