OPEN SOURCE CONTRIBUTIONS AND USING OSGI BUNDLES AT DIAMOND LIGHT SOURCE

Matthew Gerring

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Real **Open Source**

- Permissive license Apache / EPL
  - DLS still have many GPL codes → we are moving

- **IP Checking** *by a Foundation like Apache or Eclipse*
  - Community proposal
  - Consultation Period
  - Initial IP check
  - **Public Repository** Allocation
  - CLA for all committers and/or organization

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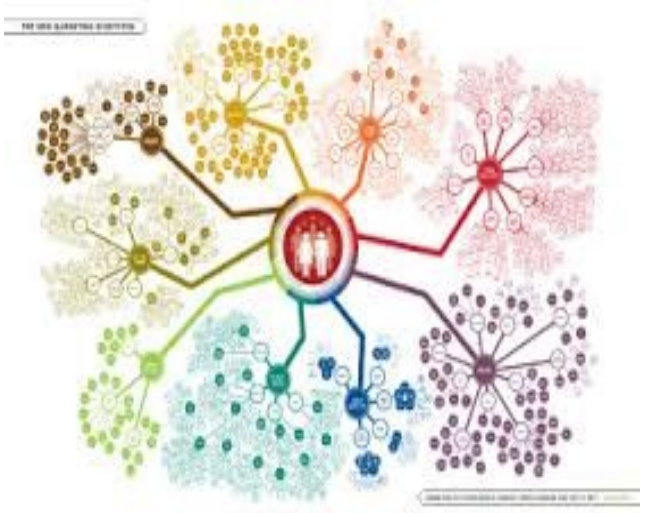
Open Source *Ecosystem*

- Rich set of features
- Permissive licenses
- IP checked
- Wide user base



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Eclipse Foundation – **Science Working Group**

Steering Committee

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OAK RIDGE National Laboratory

IBM

itema

Participating

Lablicate

MARINTEK

CLEMSON UNIVERSITY

FACILITY FOR RARE ISOTOPE BEAMS

kichwa coders

UPPSALA UNIVERSITET

TECH advantage

ifp Energies nouvelles

iSencia BELGIUM

AIRBUS

Software in Bundles

- **OSGi** manages dependencies
- Static types but *Dynamic* executable
- Declarative Services
- Code ***more*** modular
- Cheaper to own/support *large* projects
- Developing bundles / features *not* products

Case Studies

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1. Data Format / Math

- IDataset ~numpy / ~MATLAB for Java
  - See NumpyExamples in DAWNSCI eclipse project
- Service that loads any data
  - Extension point available in the binary
  - NeXus / HDF5, CBF, Ascii, scores of others
- Part of **DAWNSci** Eclipse Project! (**IP** check)

```
ILoaderService service = … // OSGi
File file = new File(…);
IDataset d = service.getDataset(file, …)
```

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2. Plotting with Tools

- IPlottingSystem, IPlottingService
  - 1D, 2D, 3D plotting
  - *Many* visual tools
  - Regions of Interest
  - Python connectivity

```
IPlottingService ser = …  // OSGi
IPlottingSystem ps = ser.createPlottingSystem()
ps.createPlotPart(…)
ITrace trace = ps.createImageTrace(…)
trace.setData(d)

// Other config like name, colour map etc. then
ps.addTrace(trace)
```

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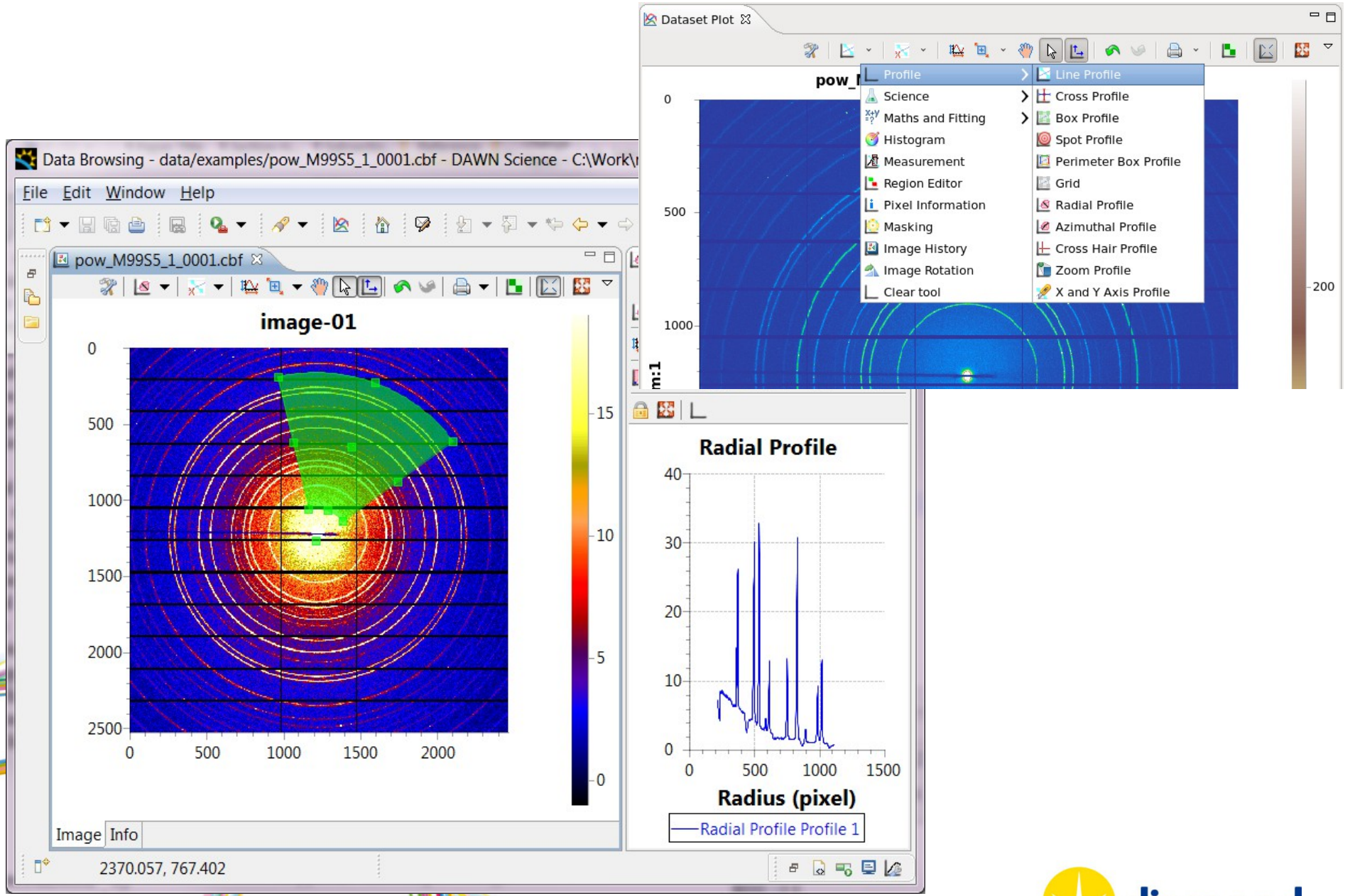
Dataset Plot
Profile
Science
Maths and Fitting
Histogram
Measurement
Region Editor
Pixel Information
Masking
Image History
Image Rotation
Clear tool
Line Profile
Cross Profile
Box Profile
Spot Profile
Perimeter Box Profile
Grid
Radial Profile
Azimuthal Profile
Cross Hair Profile
Zoom Profile
X and Y Axis Profile
Data Browsing - data/examples/pow_M99S5_1_0001.cbf - DAWN Science - C:\Work\
File Edit Window Help
pow_M99S5_1_0001.cbf
image-01
Radial Profile
Radius (pixel)
Radial Profile Profile 1
Image
Info
2370.057, 767.402

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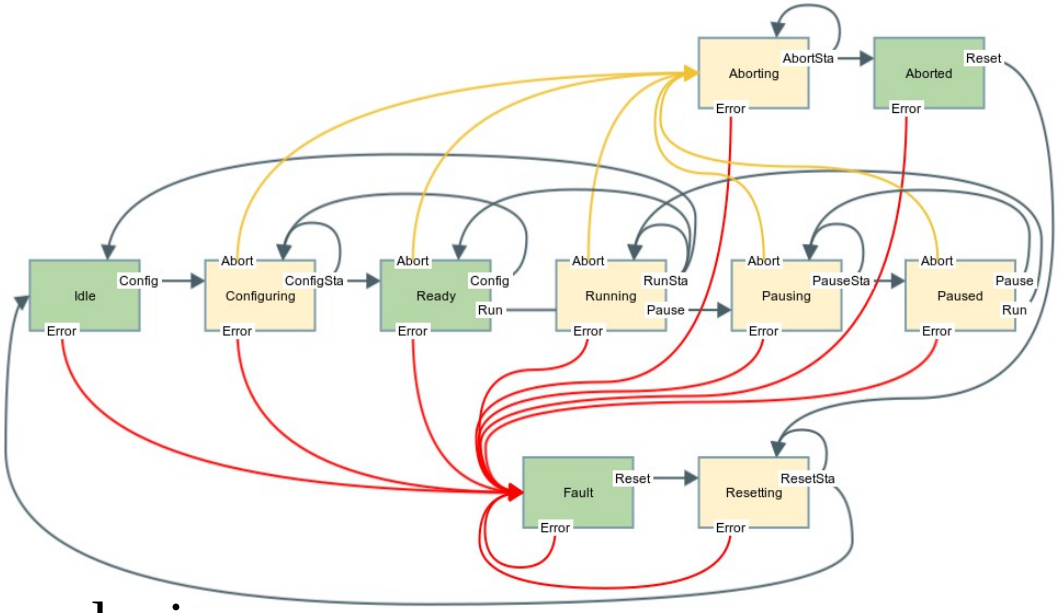
3. Malcolm



- **IMalcolmService**
  - Connect and drive ***Zebra*** devices
  - Connect any device and use standardized UI
  - State Machine Design

```
IMalcolmService ms = …  // OSGi
IMalcolmConnection c = ms.createConnection(…)
IMalcolmDevice device= c.getDevice(…)
device.configure(…)
  device.run()
```

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Lots of Services

- Conversion
- Operation
- Persistence
- Macro
- Expression
- … Around 40 others

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Conclusion

- Permissive licenses
- Science Working Group!
- Services = modularity
- Services = reuse – do things once!
- Services = cheaper

- **Thanks to:** Eclipse Foundation, SWG, DLS colleagues(!), Java Community, Apache Foundation, Kitchwa Coders, Itema