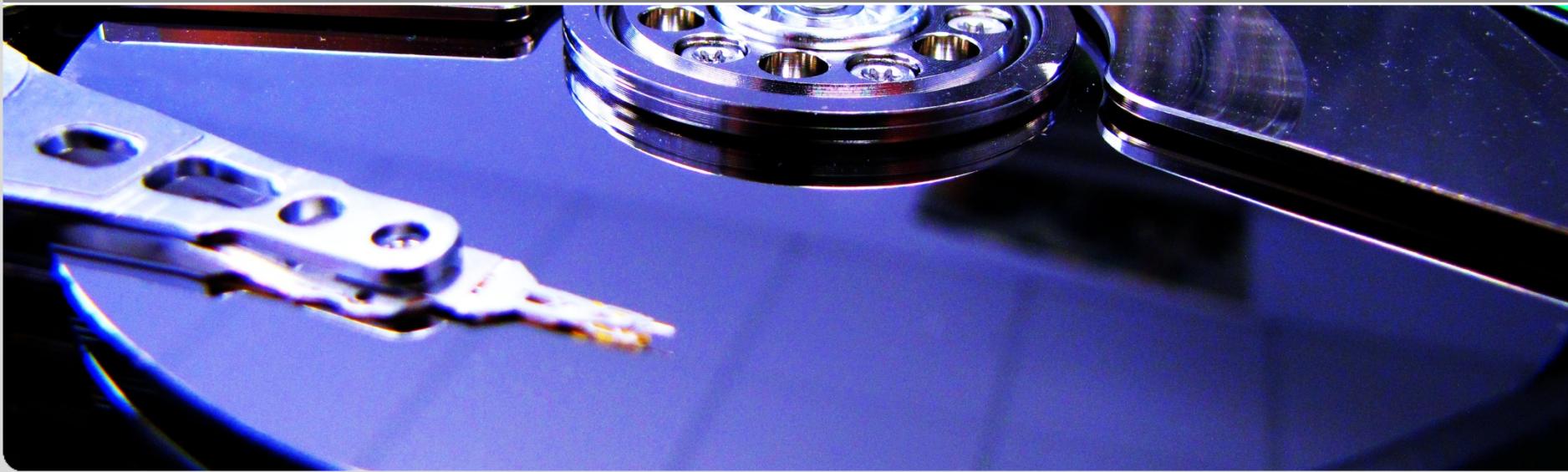


DLCL Key Technologies: Status + Future

Rainer Stotzka,
Richard Grunzke, Volker Hartmann, Michael Hausmann, Jürgen Hesser, Thomas Jejkal, Nick Kepper, Ralph Müller-Pfefferkorn, Halil Pasic, Rasmus Schröder, Danah Tonne, Xiaoli Yang

The LSDMA DLCL-Key Team – Heidelberg, Dresden, Karlsruhe



4 (+EU) locations

5 (+1) subprojects:

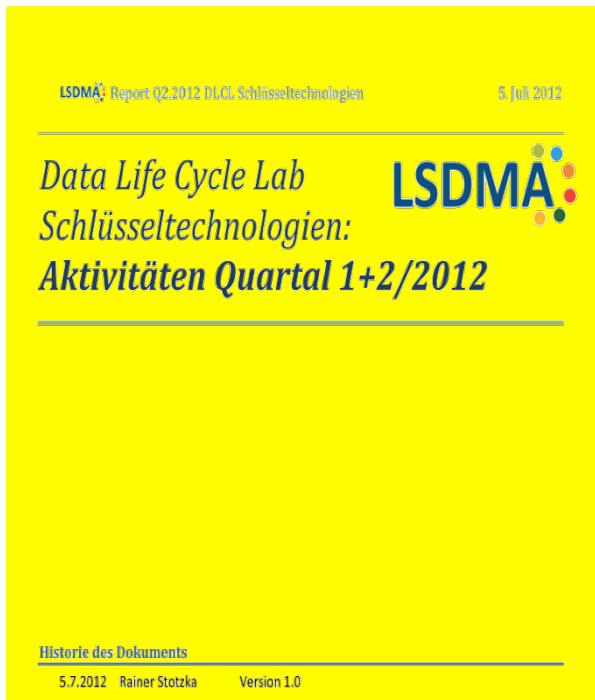
- Lightoptical Nanoscopy (Heidelberg, Mannheim)
- High Throughput Microscopy: Gen Scans
(TU Dresden + MPI of Molecular Cell Biology and Genetics)
- High Throughput Microscopy: Selective Plane Illumination Microscope
(Karlsruhe)
- Electron Microscopy (Heidelberg)
- Material Research: Tomography Beam Line at ANKA (Karlsruhe)
- *ESFRI project DARIAH: Digital Research Infrastructures for the Arts and Humanities (Europe)*

Status



Regular phone conferences:

- April
- June
- August



The image shows the cover of a report titled "DLCL-Key Report Q2 2012 Schlüsseltechnologien". The cover is yellow with black text. At the top left is the LSDMA logo. In the center, the title "Data Life Cycle Lab" is followed by "Schlüsseltechnologien:" and "Aktivitäten Quartal 1+2/2012". At the bottom left is the section "Historie des Dokuments". At the bottom right, it says "5. Juli 2012". The bottom of the cover has a thin horizontal line with the text "5.7.2012 Rainer Stotzka Version 1.0".

Publications:

- [1] DLCL-Key Anforderungsanalyse, June 1012
- [2] DLCL-Key Foliensatz, June 2012
- [3] DLCL-Key Aktivitäten Quartal 1+2/2012, July 2012
- [4] Xiaoli Yang, Halil Pasic et al., Data Intensive Computing of X-Ray Computed Tomography: Reconstruction at the LSDF, submitted to PDP2012
- [5] Danah Tonne et al., Access to the DARIAH Bit Preservation Service for Humanities Research Data, submitted to PDP2012
- [6] Simon Ochsenreither, Workflow zur Verarbeitung von rechenintensiven Lichtscheibenmikroskopie-Daten, BA-Thesis, DHBW Karlsruhe, September 2012
- [7] D. Haas, H. Pasic, et al., Status of the ultra fast tomography experiments control at ANKA, accepted at PCaPac 2012

Lightoptical Nanoscopy

Workplan:

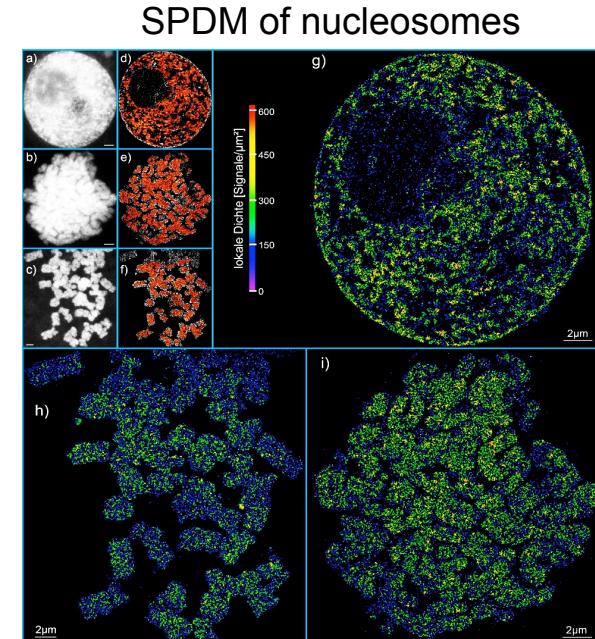
2013 Definition of tool tree for image data evaluation, data storage and image visualization

2014 Data life cycle analysis, development data workflow for specific *applications* in *biomedicine* and *radiation research*

2015 Application analysis for meta data handling – multi user test

Most important requirements:

- Data storage facilities
- Data life cycle definition
- Application dependent evaluation
- Meta data handling



DSIT Services

- ❖ Federated Identity Management
- ❖ Federated Data Access
- ❖ Meta Data Catalogues and Repositories
- ❖ Archive Service
- ❖ Monitoring
- ❖ Data Life Cycle Support
- ❖ Data Intensive Computing

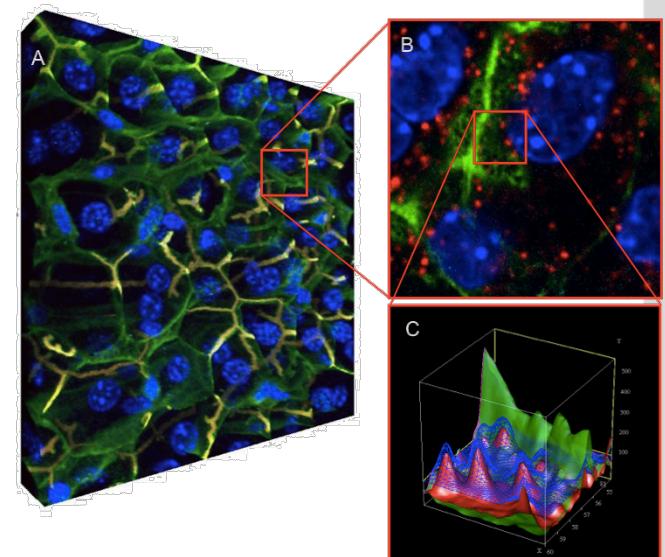
High Throughput Microscopy: Gen Scans



Workplan:

2013 Improvement data organization,
data formats

2014 Data life cycle analysis, development
data workflow, analysis and meta data
handling



Most important requirements:

- Data life cycle definition
- Meta data handling
- Analysis workflow and seamless integration into the biologist's working environment

DSIT Services

- ❖ Federated Identity Management
- ❖ Federated Data Access
- ❖ Meta Data Catalogues and Repositories
- ❖ Archive Service
- ❖ Monitoring
- ❖ Data Life Cycle Support
- ❖ Data Intensive Computing

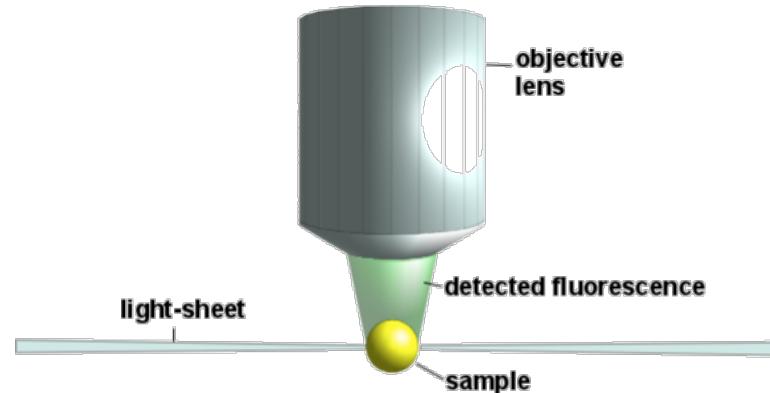
High Throughput Microscopy: Selective Plane Illumination Microscope



Workplan:

2013 Development of an image analysis workflow based on ImageJ and HADOOP

2014 Graphical user interface for workflow management (editor, monitoring)



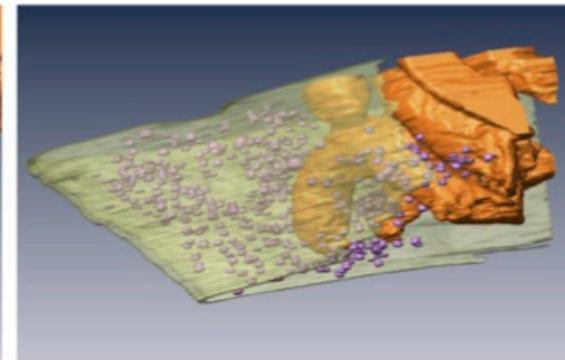
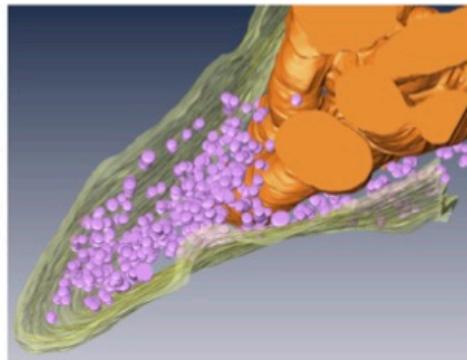
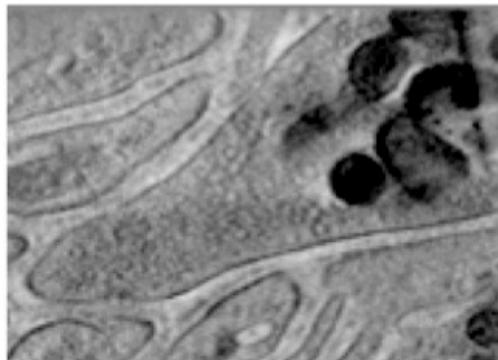
Most important requirements:

- Performant data access
- Meta data
- Data intensive workflows

DSIT Services

- ❖ Federated Identity Management
- ❖ Federated Data Access
- ❖ Meta Data Catalogues and Repositories
- ❖ Archive Service
- ❖ Monitoring
- ❖ Data Life Cycle Support
- ❖ Data Intensive Computing

Large Volume Electron Microscopy



Wacker et al., Microscopy&Microanalysis, (2010)

Workplan:

2013 Define sample preparation and microscopy workflow,
data recording and meta data scheme

2014 Automation of data recording workflow, 3D reconstruction pipeline,
life cycle archiving

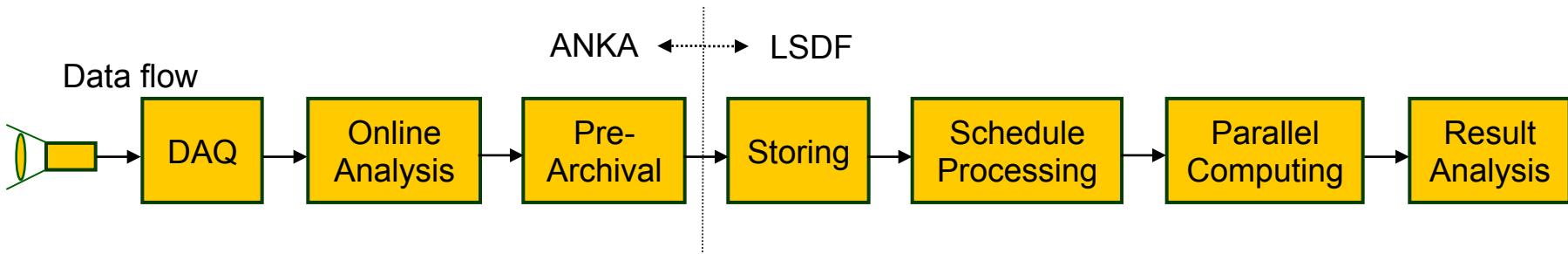
Most important requirements:

- Data life cycle definition
- Meta data definition and handling
- Analysis / 3D reconstruction workflow
- Performant data access
- Data intensive workflows

DSIT Services

- ❖ Federated Identity Management
- ❖ Federated Data Access
- ❖ Meta Data Catalogues and Repositories
- ❖ Archive Service
- ❖ Monitoring
- ❖ Data Life Cycle Support
- ❖ Data Intensive Computing

Material Research: Tomography Beam Line at ANKA



Workplan:

2013 Development of data life cycle components within the beam line and the LSDF

Development of reconstruction algorithms

2014 Automated workflow with data placement in the LSDF repository

Most important requirements:

- Sustainable data life cycle definition
- Performant data access
- Meta data
- Data intensive workflows

DSIT Services

- ❖ Federated Identity Management
- ❖ Federated Data Access
- ❖ Meta Data Catalogues and Repositories
- ❖ Archive Service
- ❖ Monitoring
- ❖ Data Life Cycle Support
- ❖ Data Intensive Computing

DLCL-Key: Planned Publications



- A. Zyl, ..., M. Hausmann, ..., J. Hesser,
Deblurring Axial Tomography using Non-Linear Regularization
- J. Lux, ..., M. Hausmann, Reconstruction and optical sequencing of a
DNA repeat expansion unit by location nanoscopy.
- Xiaoli Yang, Halil Pasic et al., Data Intensive Computing of X-Ray
Computed Tomography: Reconstruction at the LSDF, submitted to
PDP2012
- Danah Tonne et al., Access to the DARIAH Bit Preservation Service for
Humanities Research Data, submitted to PDP2012
- Volker Hartmann, Jens Otte, et al., Selective Plane Illumination
Microscope
- Halil Pasic et al., Data Life Cycle Design at ANKA
- D. Haas, H. Pasic, et al., Status of the ultra fast tomography
experiments control at ANKA, accepted at PCaPac 2012

Conclusions



- a. DLCL-Key: ***broad spectrum*** of scientific projects
-
- b. ***Heterogeneous*** team, ***highly motivated***
-
- c. Nearly all ***DSIT services*** will be required
-
- d. Workplan (18 months) is defined

Next steps:

- Overlaps and common tools need to be defined:
imaging, large data volumes, ...
- Establish knowledge and software exchange?

International Activities



Research Data Alliance (www.daitf.org)
Data Access and Interoperability Taskforce

1.-3.10. Global Data Meeting Washington (WW)

- Forum to achieve interoperability
- Define building blocks of a data/information infrastructure
- Definition of Working Groups (12-18 month)

22.-24.10. EUDAT conference (Barcelona)

3.-4.12. e-IRG Meeting on Data Issues (Amsterdam)

18.-20.3.2013 Global Meeting on Data Issues (Gothenburg)

Literature:

Riding the Wave, Knowledge Exchange: A Surfboard for Riding the Wave

Gemeinsame Wissenschaftskonferenz des Bundes und der Länder: Gesamtkonzept für die Informationsinfrastruktur in Deutschland, April 2011