“Same same but different”
Research data and digital preservation at ETH Zurich

Rosetta Roadshow 2011
6th to 9th September
Dr. Matthias Töwe
1. ETH Zurich and ETH-Bibliothek
2. Background and objectives of our project
3. First results of a survey with researchers
4. Pilot projects
5. Expectations concerning the role of Rosetta
6. Strategic options for ETH-Bibliothek
ETH Zurich

- Swiss Federal Institute of Technology Zurich
- Founded in 1855
- University for technology and the natural sciences
- More than 16,000 students from 80 countries, 3,500 among them are doctoral candidates
- More than 400 professors teach and conduct research in the areas of engineering, architecture, mathematics, natural sciences, system-oriented sciences, and management and social sciences
THE UNIVERSITY LIBRARY: ETH-BIBLIOTHEK

- Central university library for ETH Zurich with four special libraries
- Swiss centre for technical and scientific information
- Special collections including ETH Archives, Image Archive, Map Collection, ETH’s Collection of Prints and Drawings and others
- Hosting nationwide services for university libraries, e.g.
  - NEBIS library network ([http://www.nebis.ch](http://www.nebis.ch))
  - Consortium of Swiss Academic Libraries ([http://lib.consortium.ch](http://lib.consortium.ch))
  - Swiss electronic library e-lib.ch ([http://www.e-lib.ch](http://www.e-lib.ch))
  - National digitization projects with currently about 3 million pages:
    - [http://www.e-rara.ch](http://www.e-rara.ch) (rare books)
    - [http://retro.seals.ch](http://retro.seals.ch) (Swiss journals)
ETH-Bibliothek – the physical library

- Physical holdings (by end of 2010): 7’617’000, including
  - 2’858’000 print volumes
  - 2’213’000 reports (print and microfiche)
  - 1’853’000 physical images
  - 216’000 manuscripts (ETH Archives)
  - 22’000 archival boxes (ETH Archives)
  - 5’330 subscribed print journals

- Usage in 2010:
  - 282’000 print documents on loan
  - 112’000 articles in document delivery
ETH-Bibliothek – the digital library

- Digital holdings (by end of 2010): 292’000, including
  - 158’000 electronic images
  - 63’000 e-books
  - 13’000 licensed e-journals
  - 24’000 full texts in inst. repository (ETH E-Collection)

- Usage in 2010:
  - 3’365’000 downloads of e-journal article full texts
  - 912’000 visits of e-book full texts
  - 2’025’000 downloads of full texts from ETH E-Collection
  - 527’000 visits to databases
ETH-Bibliothek – the hybrid library

- ETH-Bibliothek’s services are hybrid
- They will remain hybrid for a long time
- Weights shift continuously
- Usage numbers underline growing dependence on digital resources
- Reliability, citability and persistence of digital resources do not yet match their importance

➔ We need to do something...
... and we could do something for others, as well:

- ETH Zurich guideline on integrity of research
  - Project managers must ensure that (“primary“) data is kept for as long as is appropriate for the discipline
  - No common tool is available to support this
- Irreplaceable data
  - Unique observational data in long continuous timelines
  - Other data which is to be used for comparative research
- Published and / or referenced data
  - Administrative records from ETH Archives
  - Library materials (born digital theses, digitization masters)
Overall aim: local services managed centrally

**ETH-Bibliothek**
- Information, library and collection management for ETH Zurich
- Library IT-Services dedicated to library’s applications
- Mandate for Digital Curation from the university board
- Focus on research data, but responsibility for all data

**ETH Zurich IT Services**
- IT infrastructure management
- IT service provision including virtual environment for Rosetta
- Storage management
  → New storage infrastructure from 2011 onward aiming at: Robustness, scalability, transparent costing, efficient hierarchical storage management, rule-based storage according to pre-defined classes of data
• **Re-use of data**
  • Accountability, re-assessment
  • Citability of data referred to in publications
    → DOI-registration already operational
  • Re-use could range from granting access to known colleagues to fully *Open Data*

• **Open Data?**
  • Very sensitive issue to many scientists
  • Not necessarily related to long-term preservation
What do our potential customers need and want?

- Online survey with all professors
- Questions on produced and used data, current data handling and possible offers from the library.
- Personal reminders and talks
- Several departments with answers from about 80% of addressees
- Extremely heterogeneous degrees of awareness, understanding and willingness
- Depending on disciplines and persons
Results from the survey and from interviews on current solutions:

• „None“: Data on a file system and/or on offline media – only group leader can retrieve anything manually

• **Managed on- and offline storage** including conversion to open formats (e.g. doc to rtf or txt) and periodic migration to new media

• **Supported applications** on group level
  Capture data when produced, support handling, analysis and visualisation, but not long term preservation in a narrower sense

→ **There is awareness that data needs to be taken care of**

→ **Preservation must not be mixed up with initiatives for Open Data**
Researchers...

• want to keep **full control** at least of who accesses their data - even though they might theoretically be in favour of Open Data

• need to **re-arrange and select** data prior to ingest, add **documentation** and **legal documents**

• need to **edit metadata and add data** to ongoing series, e.g. annually

• are **interested in support for preservation and quality control** (checklists, feedback on metadata...)

• need to keep certain data for **limited periods** (e.g. 10 to 12 years)

• see **archiving needs** often **related to** data and materials used for **publications** and want to **persistently reference** them

• make mixed statements concerning a **data policy** for ETH

• want **no additional workload**
• **Previous assumption:**
  
  "Researchers won‘t want us to interfere with their research and data management: Let‘s support them with advice and checklists during data production and otherwise only take over data at the end of the pipe."

• **Statements from pilot partners:**
  
  "We need to be able to do some degree of data management before/while submitting material to the long-term archive and don‘t want to use an additional tool for that."

→ **In some cases we might be closely in touch with the research process and its data management.**

→ **A good thing for the library, but demanding with respect to staffing and software.**
• Pilot phase with four to five pilot partners
• Different requirements
• Proposed workflows
  • Manual data management around a publication ready manuscript
  • (Group) datasets as raw material for following publications
  • Automatic import from an existing data management application

→ Next step: definition of use cases with pilot partners and discussion with Ex Libris
EXAMPLE WORKFLOW

Preprint + Illustrations, tables + Data used → Ingest → Rosetta

Add to ingested data → Postprint

Publication process

Publisher

Submission

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Pilot with ETH Archives

- ETH Archives operated by ETH-Bibliothek
- Legal obligation to archive digital administrative records
- Heterogeneous data producers

Pilot with ETH E-Collection

- Institutional repository
- Materials belonging to ETH‘s scientific heritage

→ Get to know the system with known data
Materials from mass digitization

• Image master files
• Metadata files which can be recreated only with massive expenditure of time and money

→ Digital preservation to be integrated in existing workflows on running applications
→ Further analysis to evaluate the potential of Rosetta to take over functions of existing platforms
FUNCTIONAL LEVELS

What?
- Data Curation
- Content Preservation
- Bitstream Preservation

Why?
- Ensure intellectual re-usability
- Ensure technical re-usability
- Ensure technical stability

Who?
- Data Producers
- ETH-Bibliothek
- IT-Services ETH Zurich

Adapted after Jens Ludwig, Wissgrid
## CHARACTERISTICS OF MATERIALS

<table>
<thead>
<tr>
<th>Research data</th>
<th>Library objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Only partly known context</td>
<td>• Usually known context</td>
</tr>
<tr>
<td>• Numerous formats</td>
<td>• Few formats</td>
</tr>
<tr>
<td>• Often no standard formats</td>
<td>• Mostly standard formats</td>
</tr>
<tr>
<td>• Third party production, can only be influenced over time</td>
<td>• Production can be influenced rapidly</td>
</tr>
<tr>
<td>• Few formalized metadata</td>
<td>• Formalized metadata</td>
</tr>
<tr>
<td>• Rights often not clear (ownership, use, publication)</td>
<td>• Copyright situation usually clear</td>
</tr>
<tr>
<td>• Public access not necessarily wanted</td>
<td>• Usually public access is desired</td>
</tr>
<tr>
<td>• Reservations with some producers</td>
<td>• In-house: a certain degree of trust can be expected – or decreed</td>
</tr>
</tbody>
</table>

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RISKS PRIOR TO OBSOLESCENCE

Serious risks need to be addressed during data production

• Unclear or frequently changing responsibilities
  ➔ *Loss of meta-information*

• Missing or incomplete documentation
  ➔ *Loss of contextual information*

• Haphazard directory and file structures
  ➔ *Versioning issues, uncontrolled redundancies*

→ *Occurrence of these and further risks can make long-term preservation of any data questionable*

→ *Research is particularly prone to these risks due to its dynamic development and the high mobility of staff*
• Meaningful re-use of research data will rely heavily on contextual information and structural relations

• Exhaustive documentation is required

• There is a need to appraise, select and re-arrange objects prior to ingest and later in time

→ Treatment and ingest of research data might have more in common with challenges in administrative archives than with those in typical library collections

→ Trying to keep this in mind for synergies in future development
## DIFFERENCES BETWEEN DATA TYPES?

<table>
<thead>
<tr>
<th>What?</th>
<th>Research data</th>
<th>Library objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Curation</td>
<td>Comprehensive documentation by producers required</td>
<td>Full control of metadata and context</td>
</tr>
<tr>
<td>Content Preservation</td>
<td>More and less common formats</td>
<td>Mainly standard formats</td>
</tr>
<tr>
<td>Bitstream Preservation</td>
<td>Same preservation procedures apply</td>
<td>„Any object is just bits“</td>
</tr>
</tbody>
</table>
CONSEQUENCES FOR THE USE OF ROSETTA

• Bitstream preservation relies on ETH Zurich‘s IT services‘ infrastructure

• Rosetta is the backbone of content preservation

• Rosetta is well prepared to support data curation
  • „Classical“ metadata management
  • Support of supplementary documentation
  • Configuration of flexible workflows
  • Potential for data management prior to archiving?
  • How and where to deal with limited retention periods?
• Rosetta supports important functions with a clear focus on long-term preservation according to OAIS
• Rosetta can only support preservation when adequate staffing and an active preservation management are in place
• An active international community is needed to collect, manage and share information and knowledge, e.g. on formats
• Flexibility in data management partly contradicts the requirements of a stable preservation environment:

→ Where should be the interface between data management and preservation?
→ What are the technical limitations?
POSSIBLE WORKFLOWS AND ROSETTA

Data production and handling for current analysis

Pre-ingest, e.g. structuring, re-arranging, selecting

Long-term preservation according to OAIS

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POSSIBLE EXTENSION OF ROSETTA’S SCOPE?

Data production and handling for current analysis

(Semi-)automatically

Manually

Pre-ingest, e.g. structuring, re-arranging, selecting

Long-term preservation according to OAIS

ExLibris Rosetta

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VISION: ROSETTA AS A COMMON BASIS

Data production and archiving

- Researchers
  - Measurement Calculation Interpretation
  - Fileserver, application etc.

- Administration
  - Documents Records
  - Fileserver, SAP etc.

- Library
  - Digitization Licensing Deposit
  - Fileserver, Online-platform

(Re-)Use

- Knowledge portal et al.
- Stable reference (eg. DOI)

Access according to producers’ choice

Digital long-term archive and management of permanently relevant data (Rosetta)
Hierarchical storage environment of ETH Zurich
STRATEGIC QUESTIONS FOR ETH-BIBLIOTHEK

• What kind of service can / should we offer?
  • Limit ourselves to content preservation in a narrow sense?
  Or – in the longer run and with appropriate partners:
  • Open up to support data management or…
  • … even support other functions within the research process? …
  • … e.g. virtual research environments?

→ Tempting, but even more challenging
→ Heterogeneous environment prevents common solutions
→ Possible only with (very) strong commitment of ETH‘s board
→ To be discussed based on experiences from the current project
WORK SO FAR

- DOI-registration by ETH Zurich as member of DataCite
- Full survey of research groups (Profs.) at ETH Zurich and accompanying informal interviews
- Identification of pilot partners
- Workshops with 4 research partners on their requirements
- Work on a manual workflow for administrative records for ETH archives
- Check and update inventory of data hosted by the library
- Work on specification of submission application for library materials (institutional repository)
NEXT STEPS

• Implement **manual workflows** for research data and ETH archives
• **Identify further requirements** to be addressed in development phase until the end of 2012
• Specify and develop **submission application** for library materials
• Develop and implement **submission application** for import of research data **out of existing data management solution**?

If successful:

• **Extend coverage** to more groups
• **Convince the university‘s board** to grant **ongoing funding** as part of their risk management
THANK YOU VERY MUCH!

Questions?

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