Data Exchange and Conversion Utilities and Tools (DExT)

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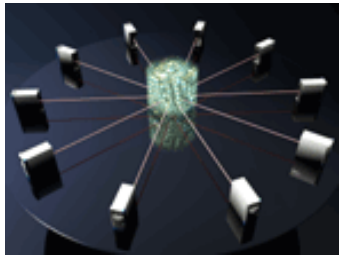
DExT project, UK Data Archive



ODaF Meeting, 13-15 September 2007, USA

ACS Meeting, 12-13 September 2007, UK

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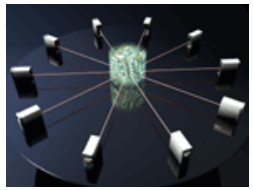
Introduction to DExT

- data exchange models & Data conversion tools for primary research data collected in the course of qualitative research
- a standard format for representing richly encoded qualitative data
- small budget for one year – proof of concept
- developing, refining and testing models for data exchange for qualitative research data based on a combination of existing and internationally recognised schema
- test data selected are from the social sciences (multimedia, linked, annotated data etc.), but these formats are typically found across all domains of primary research



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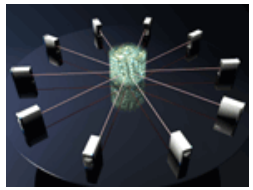
Project Environment

JISC

- funded by JISC (Joint Information Systems Committee) under the Repositories Programme
- “provides world-class leadership in the innovative use of ICT to support education and research”
- funds UK national services, programmes & projects



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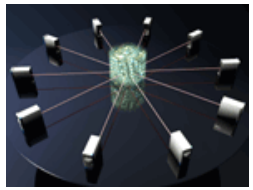
Project Environment

UKDA

- the leading UK social science data archive
- pioneered the archiving and sharing of qualitative data
- preserving and disseminating data for 40 years
- offers a robust data service on a national scale with a dedicated infrastructure – ESDS Qualidata



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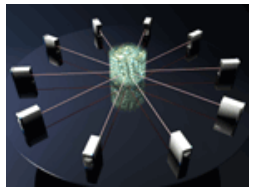
Project Environment

ESDS Qualidata

- provides access and support for a range of social science qualitative datasets
- promotes and facilitates effective use of data in research, learning and teaching
- offers a resource hub via the www.esds.ac.uk delivering support and training in:
  - research project management
  - issues of confidentiality and consent
  - documentation of data for archiving
- committed to creating & disseminating value-added data resources through enriched data context



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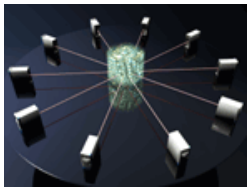
Defining qualitative data

- audio/video tape recordings
- in-depth and semi-structured interview transcripts
- focus groups
- observations and field notes
- unstructured/ semi-structured diaries
- open-ended survey questions
- personal documents and photographs
- records of meetings and case study notes
- collections of press cuttings



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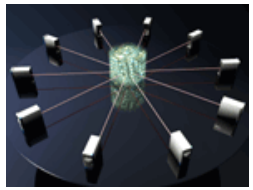
ESDS Qualidata Technical Environment

- authenticated data download via web
- online data search and browse facility for selected textual collections



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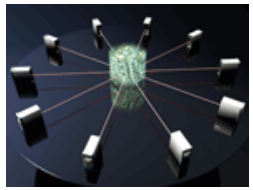
Standard data delivery

- text delivered via web download as rtf or pdf, depending on level of digitisation
- audio as mp3, or streaming of examples
- video as mpeg4
- behind authentication system



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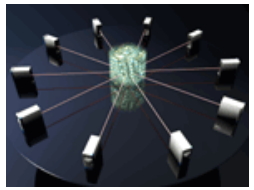
Online data browsing system

- enables more precise searching/browsing of archived qualitative data beyond the standard summary record
- allows querying and display of full interview texts across data collections through a standard web browser
- XSL Style sheets to display XML textual documents
- XML texts are currently interviews based on basic TEI mark up
- extending to display audio visual content



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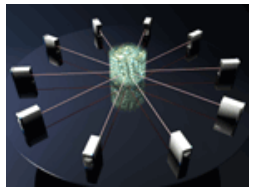
ESDS qualitative collections

already utilise known XML schema

- DC/OAI – basic bibliographic and study description
- DDI2 – study level description
- TEI – content level structural mark-up
  - header
  - interview attributes
  - utterences
  - selected interviewee
  - turn taking
-
- Some fixed vocabulary for qualitative data types, data formats and data collections methods



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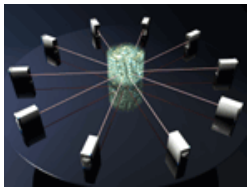
An exchange format for qualitative data

- data exchange models and data conversion tools for primary research data collected in the course of qualitative research.
- a standard format for representing richly encoded qualitative data



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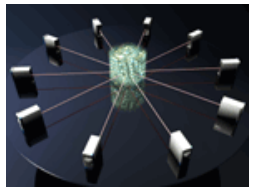
Qualitative Data Mark up

- the process of defining start and end points for segments within a file and assigning values to those segments or to entire files. Assigned values may be further arranged in a hierarchical structure
- initially the mark up (aka coding or annotation) and analysis of qualitative data
- originally textual e.g. interview transcripts
- information technology has been used to facilitate this process
- now expanded to incorporate images, audio and video



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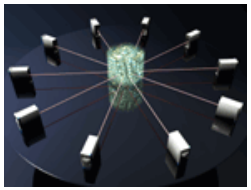
What is CAQDAS?

- CAQDAS, Computer Assisted Qualitative Data AnalysiS is a term, introduced by Fielding and Lee in 1991
- refers to the wide range of software now available that supports a variety of analytic styles in qualitative work
- most have been under development for many years



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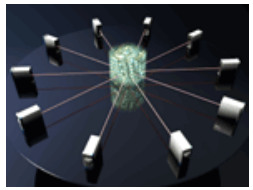
CAQDAS: What does the software do?

- most of the popular programs now support a common range of functions:
  - coding
  - searching
  - memoing
  - variables/attributes
  - grouping codes and documents
  - see: http://onlineqda.hud.ac.uk/ for details



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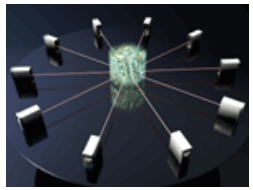
CAQDAS: Key functions

- segment: A subset of a file (text, audio, video, image) EXAMPLE 1
- code: A short alphanumeric string (usually a single word) assigned to a segment or file EXAMPLE 2
- hiCode: The top level in coherent hierarchical structure of codes EXAMPLE 3
- fileClass: A short alphanumeric string assigned to one or more files EXAMPLE 4
- memo: A variable length (from a word to a detailed document) alphanumeric string assigned to a a segment or code EXAMPLE 5

or file



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SEGMENTS: Identify Subsets of the study (e.g. text or line selections)

LP: There's just one or two factual things first of all do you mind my asking how old you are?

G24: 49.

LP: And what schools did you go to?

G24: King Street, Woodside and Hilton.

LP: Uh-huh ... and how old were you when you left the school?

G24: 14.

LP: And you work at the moment? What sort of work do you do?

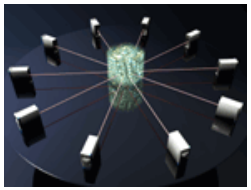
G24: Well I've gone back to get shorter hours, I've went back to domestic, which I dinna really care for. But then I used to be in the pharmacy department at ARI ... just pharmacy assistant. At least it was better than cleanin'! But then they've nae part-time workers there so...

LP: And did you work in the pharmacy long?

G24: I was there for eleven years.

LP: And did you have any other sort of jobs?

G24: Where? Since I left school, like? Well, when I first left school I was just a shop assistant in a number of shops like Reid and Pearsons, which is... we hinna got it ony mair.



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CODES: Assign Values to a Subset of a study (e.g a segment)

LP: There's just one or two factual things first of all do you mind my asking how old you are?

G24: 49.

LP: And what schools did you go to?

G24: King Street, Woodside and Hilton. — School

LP: Uh-huh ... and how old were you when you left the school?

G24: 14.

LP: And you work at the moment? What sort of work do you do?

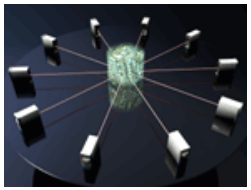
G24: Well I've gone back to get shorter hours, I've went back to domestic, which I dinna really care for. But then I used to be in the pharmacy department at ARI ... just pharmacy assistant. At least it was better than cleanin'! But then they've nae part-time workers there so... — Current Work

LP: And did you work in the pharmacy long?

G24: I was there for eleven years.

LP: And did you have any other sort of jobs?

G24: Where? Since I left school, like? Well, when I first left school I was just a shop assistant in a number of shops like Reid and Pearsons, which is... we hinna got it ony mair. — First Job



HiCODES: Create a Value Hierarchy (e.g codes arranged in a coherent hierarchical structure)

LP: There's just one or two factual things first of all do you mind my asking how old you are?

G24: 49.

LP: And what schools did you go to?

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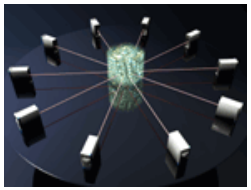
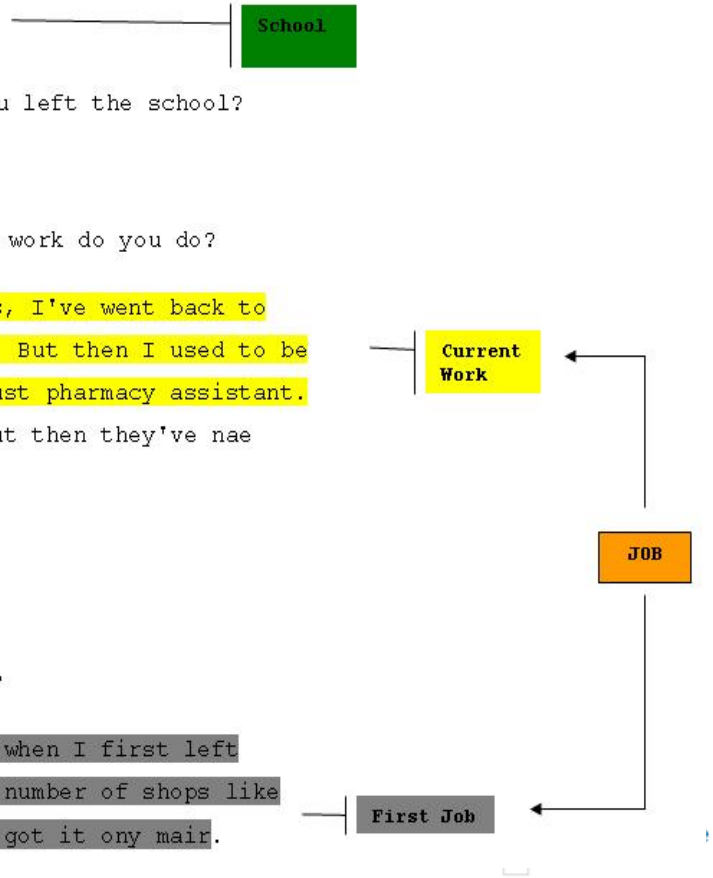
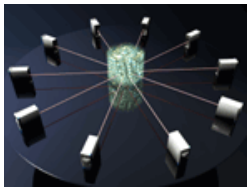




FileCLASS: Create a File Hierarchy/file classification (e.g. files arranged in a coherent hierarchical structure)



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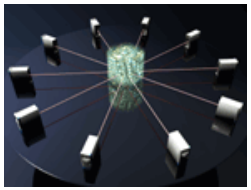
MEMOS: Assign Notes or Comments (e.g. to a segment or a code)

0008 Date of birth : 1902
0009 Gender : M
0010 Marital status : Married
0011 Occupation : Postman
0012 Geographic region : Colchester, Essex
0013
0014 I : I'd like to start, if I may, by asking you your birth date.
0015 K : November 9th, 1902.
0016 I : Could you tell me how many children there were in your family?
0017 K : There were 11 of us. I was the eldest.
0018 I : Could you tell me, if you remember, how they went after that and roughly the
0019 space between them and whether they were boys or girls.
0020 K : Well, the first 3 of us were boys, then I had a sister, another brother, three more
0021 sisters and twin brothers at the end.

ME:ME - 30/07/07 {1-Me} - Super
this date might be significant

ME - 30/07/07



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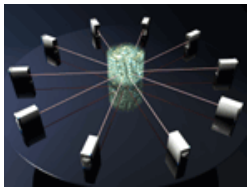
The problem with CAQDAS

- Large number of programs
  - Atlas-ti
  - HyperResearch
  - Max-QDA
  - NU*DIST 6
  - N*VIVO 2
  - QDA Miner
  - QUALRUS
  - Weft QDA



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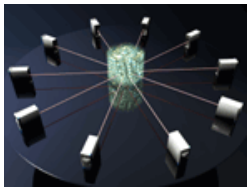
The problem with CAQDAS

- linear structural mark-up (e.g. TEI) not suitable for coding as codes may overlap
- need robust pointing system to relate segments of text/audio-visual to codes/researcher annotations/keywords
- CAQDAS software use different methods to store links between annotated data and annotations



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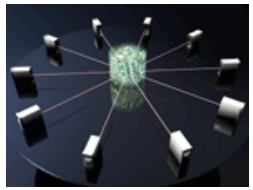
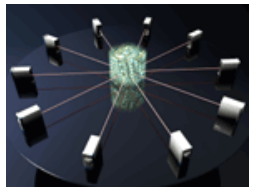
The problem with CAQDAS: For example

- Atlas –ti – links codes to identified segments from the text being analysed
- QDAMiner embeds the XML in the text being analysed
- ‘value-added’ work (mark-up /coding/annotation) that is carried out within the package typically cannot be exported
- neither can previously annotated data from another software be imported
- recent efforts by vendors to export in XML



The solution: our wish list

- long-term preservation requirements (software and platform independent formats)
- in-house toolsets for preparing qualitative data for multiple forms of dissemination
- enable ‘added-value’ data to be retained and exchanged e.g CAQDAS-specific functionality
- offers a standard for data creators to store and publish data in multiple formats e.g. web-based publishing
- more precise searching/browsing of archived qualitative data beyond a summary record
- facilitates annotated data exchange and data sharing across dispersed collections and repositories (comparative analysis and e-science)



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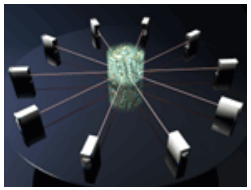
The solution: our basic needs

- ESDS: Vendor-neutral format
- UKDA : System for the management of
  - all study & case files
  - associated documentation
  - metadata enrichment



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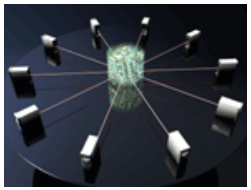
The solution: our basic needs

- ESDS: Vendor-neutral format

QuDEx

- UKDA : System for the management of
  - all study & case files
  - associated documentation
  - metadata enrichment

METS



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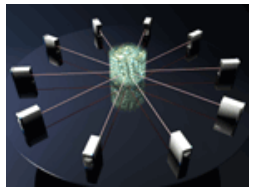
Vendor Neutral Format: the QuDEx Schema

- initially working with XML output from 2 CAQDAS Vendors: Atlas-ti and QDAMiner
- methodology uses embedded segment identifiers pointing to external files



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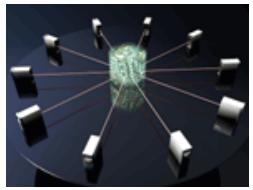
QuDEx: Solutions considered

- SMIL (Synchronized Multimedia Integration Language)
- QDIF (Qualitative Data Interchange Format)
- MPEG – 21 (Moving Picture Experts Group)
- TEI (Text Encoding Initiative)



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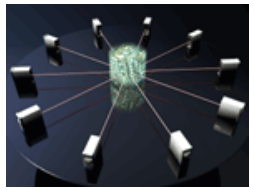
QuDEx: Solutions rejected

- SMIL
  - no descriptive relationship
  - Flexible but can be complex sometime
- QDIF
  - abstract way of identifying and linking fragments
  - not a good interchange and long term preservation method
- MPEG -21
  - continuous media (audio/video) only & no discrete media
  - hard to identify image and text fragments
- TEI
  - no relationship scheme
  - does not provide line “offsetting”



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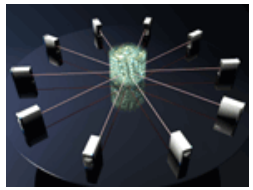
QuDEx: Decisions

- stand alone, independent schema holding all the concepts with descriptive nature
- simplified XML format for vendors
- contains all key constructs
  - Segment(s)
  - Code(s)
  - Hicode(s)
  - Memo(s)
  - File(s)
- easily interchangeable



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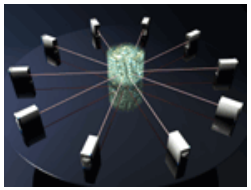
QuDEx structure

- segmentCollection: contains segments that hold the pieces of text and memo information
- codeCollection: contains codes which can have “segmentRef” to related segments plus a “codeRef” to other low-level related codes (nesting concept)
- hiCodeCollection: contains hicodes which can have “childCodeRef” to subordinate codes (which might or might not have low-level codes)
- memoCollection: contains memos which can have a “memoRef” that could be linked to file, segment, code, hiCode and memo.
- fileClassCollection: contains all the files



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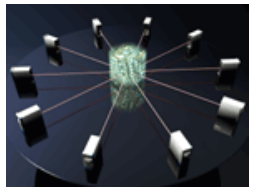
Archival File Management: Metadata for a whole study

- a qualitative study may consist of multiple data files of different types:
  - interview texts
  - audio recordings
  - photographs
  - textual field notes
  - video capture
  - survey data
- only selected parts may have been analysed in a CAQDAS package, and the rest remains in its raw format
- we need a way to represent the whole collection for longer term preservation
- and document how each part is related to other parts e.g. how a single case may have text, audio and image data associated



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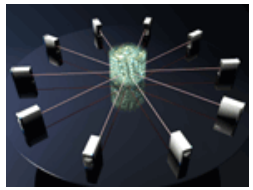
METS

- METS has been chosen to describe the structure and to package all the files relating to a study
- METS is a standard for encoding descriptive, administrative, and structural metadata regarding objects within a digital library, expressed using the XML schema language
- the standard is maintained in the Network Development and MARC Standards Office of the Library of Congress, and is being developed as an initiative of the Digital Library Federation
- METS can point to other XML schema already in use for the study, e.g. DDI, TEI, DC and MODS
- http://www.loc.gov/standards/mets/



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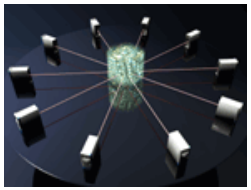
Structural Maps

- these are used to split a study in any way; the usual example is by chapter and page. Each split is identified by a tag
- **CAQDAS:** are constructed for Values, Value Hierarchies and File Hierarchies
- **Logical and Physical:** Logical (by section) and Physical (file by file). Structural maps provide a mechanism by which 3rd party programs can access the whole of the original study as well as the vendor-specific markup



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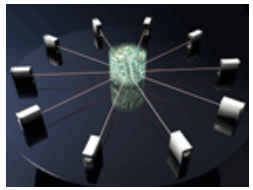
Content Packaging

- in addition to a DExT-METS version of the core data concepts the METS file (*METS File Section*) may also retain
  - original files from the study
  - any rtf format versions created for analysis
  - original vendor-specific xml file describing the resource
  - any report output from the vendors program
  - any supporting documentation, notes or content delivered with the study but not part of the core deliverables



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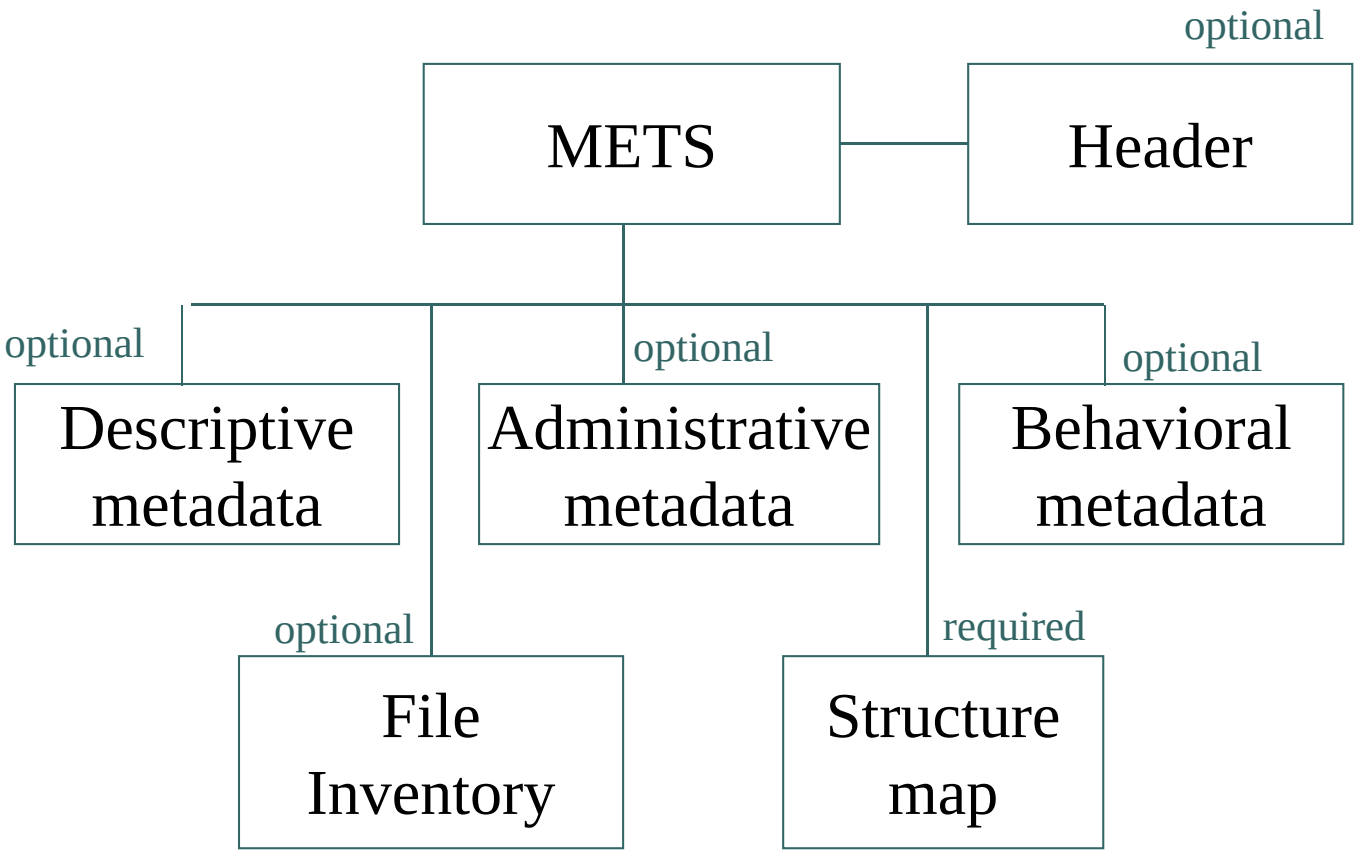
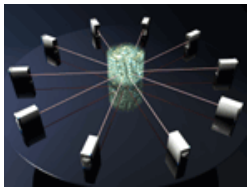
METS





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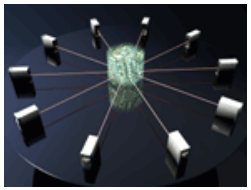
Linking in METS Documents

DescMD
mods
relatedItem
relatedItem

AdminMD
techMD
sourceMD
digiprovMD
rightsMD

fileGrp
file
file

StructMap
div
div
fptr
div
fptr



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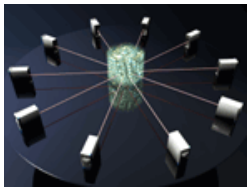

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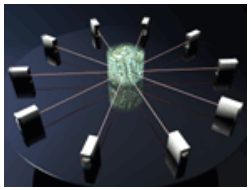

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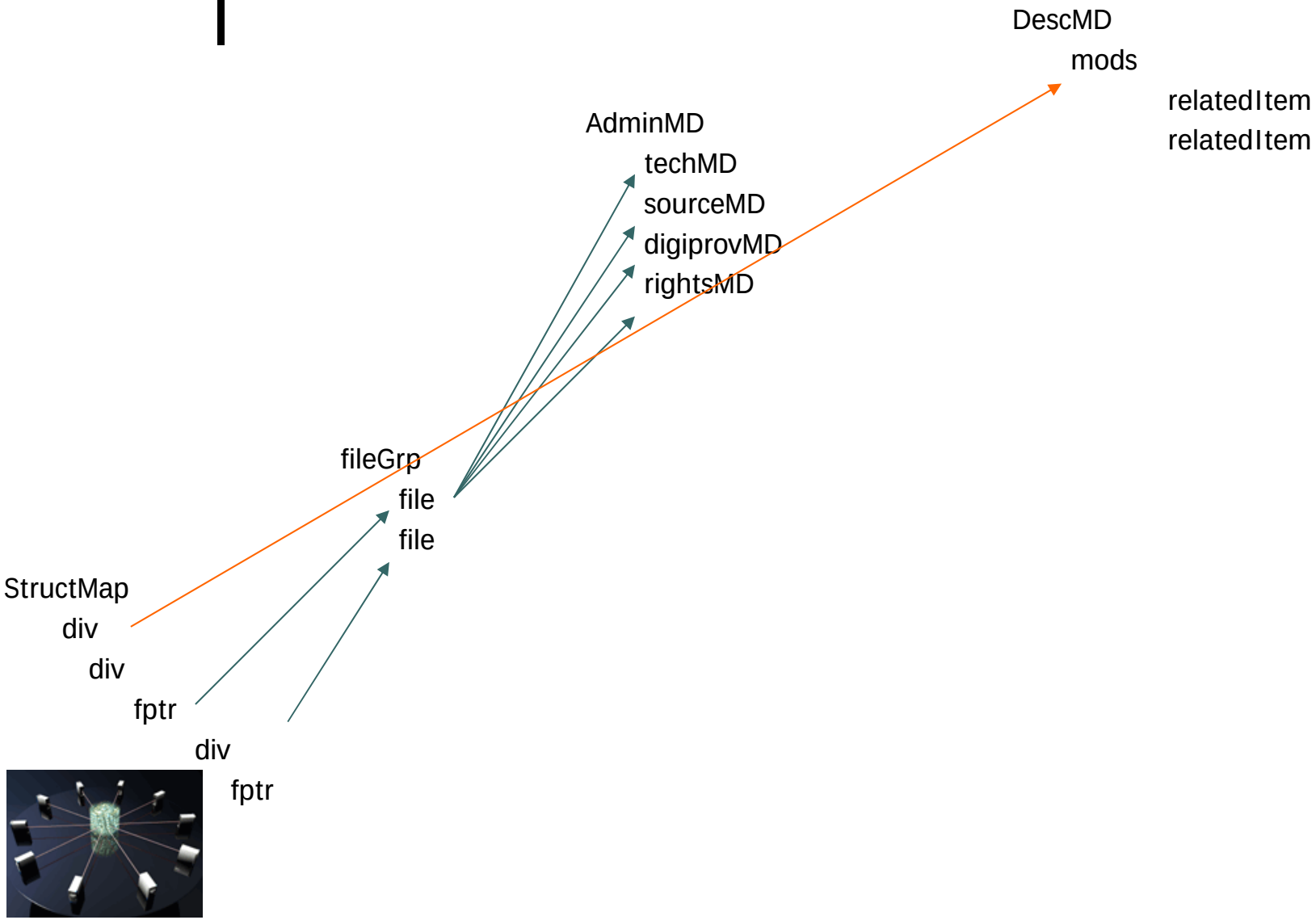

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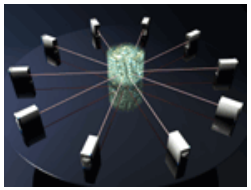
How far have we got?

- representative sample dataset
- schema
- sample METS
- UML model
- import GUI plan
- viewer plan under review
- initial meeting with software vendors



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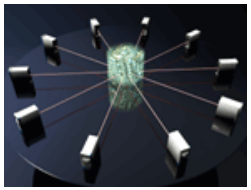
Next steps

- proof of concept
- import GUI
- review existing tools
- stand alone METS reader
- initial METS profile
- review with vendors
- future of the standard



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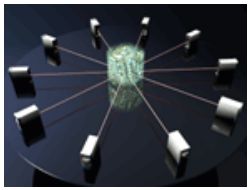
A home for the standard

- want other data producers/archives to take up the standard
- need mechanism for feedback on model and technical possibilities
- need a well respected home for the standard and associated tools
- and the capacity for refining/nurturing of the standard



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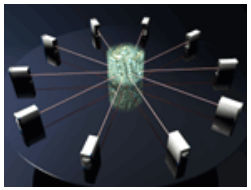
Options

- UKDA DExT project extension
- UKDA
- An existing standards body e.g. DDI, OASIS



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Contact

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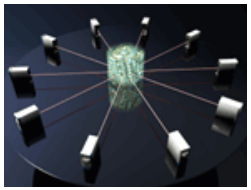
- abhat@essex.ac.uk



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