

Task 6.6: Digital Preservation Testbed and Evaluation Framework

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Motivation

- ensuring long-term access requires preservation actions
- several different strategies:
 - migration (within-format, on-demand, ...)
 - emulation (HW, OS, SW)
 - standardization (at ingest)
- several tools for a given strategy
- all tools loose something, 100% preservation not possible

Motivation

- which tool(s) to use?
 - which version, on which OS, with which parameters,...
- what do I loose?
 - look-and-feel, content, functionality,...
- does the solution fulfill my preservation requirements?
 - institutional strategy, repurposing

Goals

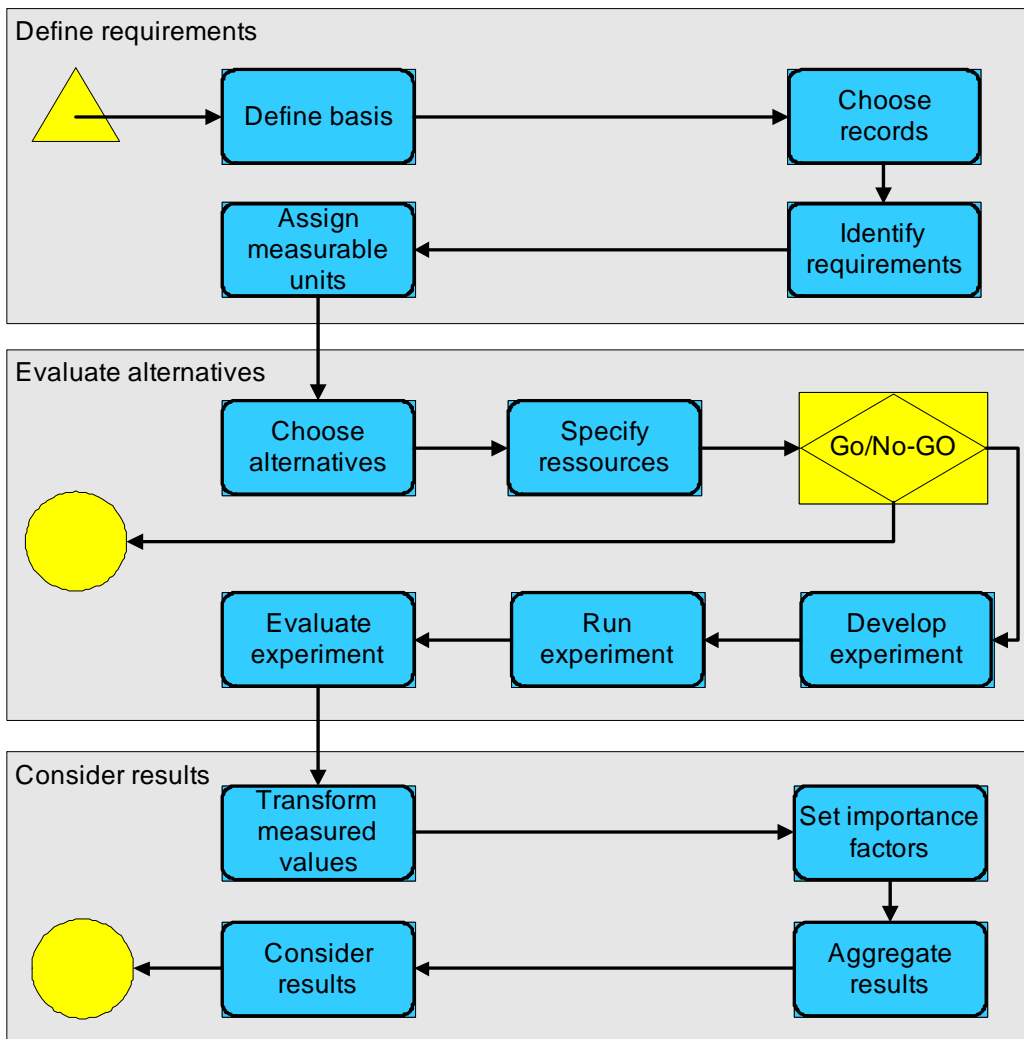
- motivate and allow curators to precisely specify their preservation requirements
- provide structured model to describe and document these
- create defined setting to evaluate preservation strategies
- document outcome of evaluations to allow informed, accountable decisions

(based on tasks 6.1 and 6.4 of JPA1)

Utility Analysis + Testbed

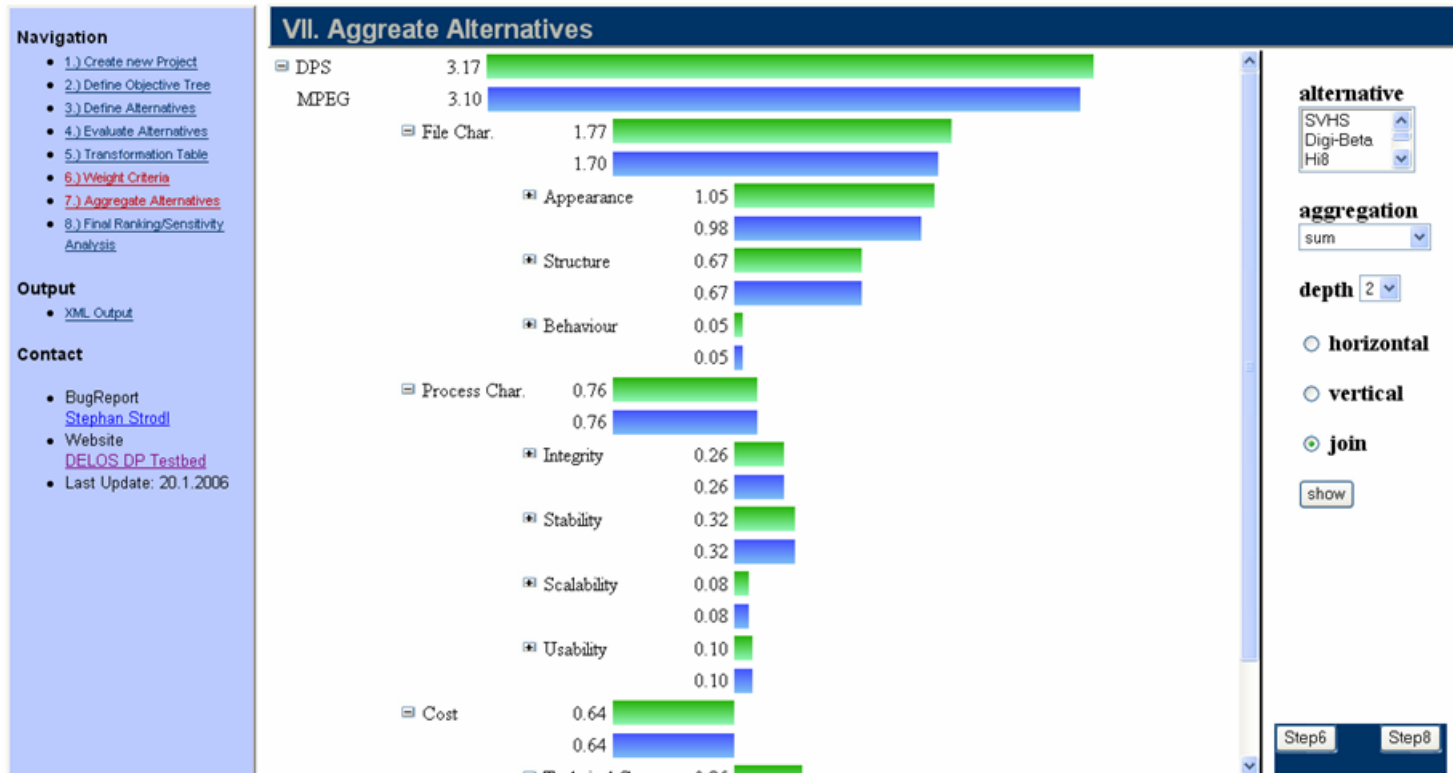
- framework in cooperation of Vienna University of Technology and National Archives Netherlands
 - cost-benefit analysis model
 - well-defined evaluation framework
- 14 steps grouped into 3 phases
- series of case studies with content holders
 - video holdings of Austrian Phonogram Archives
 - XML database migration in cooperation with CNR
 - dissertations of the Austrian National Library
 - special collection of SUB Göttingen

Process Overview



DP Testbed Tool

DELOS DP TESTBED



Benefits

- a simple, methodologically sound model to specify and document requirements
- repeatable and documented evaluation for informed and accountable decisions
- generic workflow that can easily be integrated in different institutional settings
- basis for **informed** and **accountable** decisions on which tailored DP solution to adopt

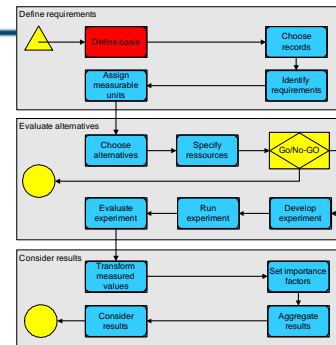
Achievements

- Software Prototype
- 3 case studies finished,
2 further to come in spring
- training session at DELOS DP Summerschool
- publications
- both base-line models shortlisted for the
2005 DP Award

Next Steps

- enhance model based on case studies
- collect cases to form baseline for automated decision support
- integrate file format repositories (PRONOM)
- integrate support for automatic evaluation of experiments (task 6.7 in JPA2)

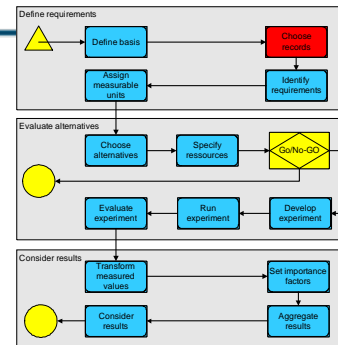
Define basis



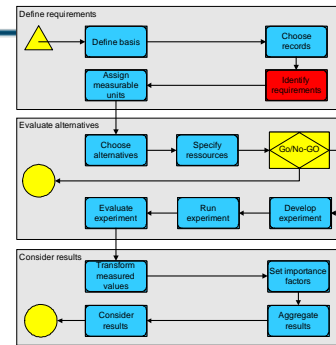
- types of records (e.g. Java applets, audio streams, Flash, ..)
- what are the essential characteristics?
 - content, context(!), structure, form and behaviour
- specific task of web archives (e.g. e-gov vs. historic websites)
- requirements
 - metadata
 - authenticity, reliability, integrity, usability

Choose objects/records

- choose sample records
 - a test-bed repository
 - from own collection
- choice of records affects the evaluation

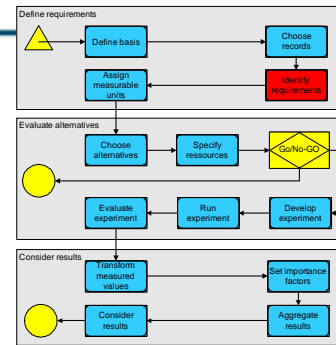


Identify objectives (1)



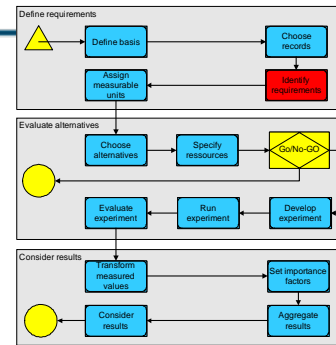
- list all requirements and goals in tree structure
- start from high-level goals
- break down to fine-granular, specific criteria

Identify objectives (2)



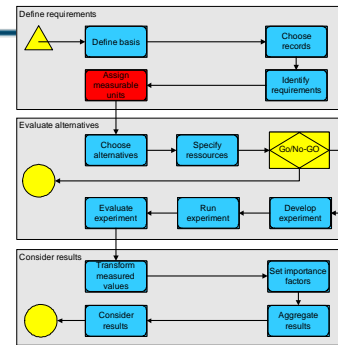
- usually 4 top-level branches:
 - object characteristics (*content, metadata ...*)
 - record characteristics (*context, relations, ...*)
 - process characteristics (*scalability, error detection, ...*)
 - costs (*set-up, per object, HW/SW, personnel, ...*)
- define requirements for web archives
 - preserve picture, video clip, text content, interactivity
 - search, links, metadata

Identify objectives (3)



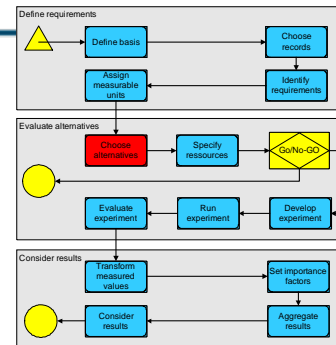
- objective tree with several hundred leaves
- usually created in workshops, brainstorming sessions
- re-using branches from similar institutions, collection holdings, ...

Assign measurable units



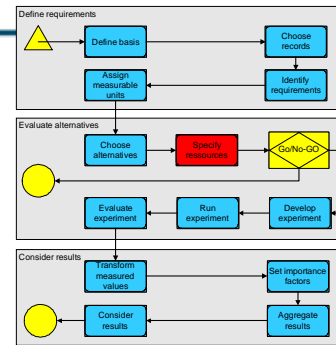
- ensure that leaf criteria are objectively (and automatically) measurable
 - seconds/Euro per object
 - bits color depth
 - ...
- subjective scales where necessary
 - diffusion of file format
 - amount of (expected) support
 - ...

Choose alternatives



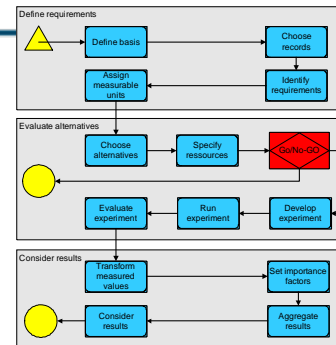
- list and formally describe the preservation action possibilities to be evaluated
 - tool, version
 - operating system
 - parameters
- alternatives for web archives
 - original
 - migration (ASCII, picture, video clip)
 - standardization (minimal HTML)

Specify resources



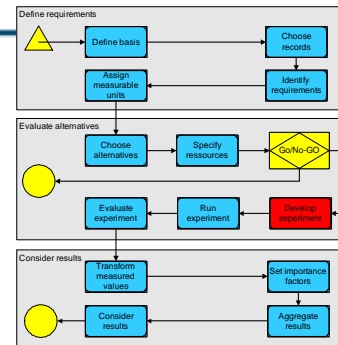
- detailed design and overview of the resources
 - human resources (qualification, roles, responsibility, ...)
 - technical requirements (hardware and software components)
 - time (time to run experiment,...)
 - cost (costs of the experiments,...)

Go/No-Go



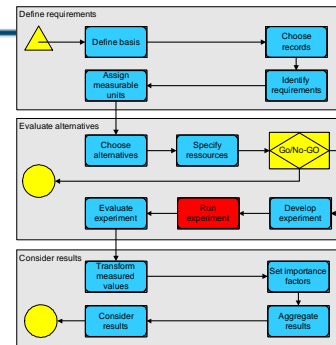
- deliberate step for taking a decision whether it will be useful and cost-effective to continue the procedure, given
 - the resources to be spent (people, money)
 - the expected result(s).
- review of the experiment/ evaluation process design so far
 - e.g. is the design correct and optimal?
 - is the design complete (given the objectives).

Develop experiment



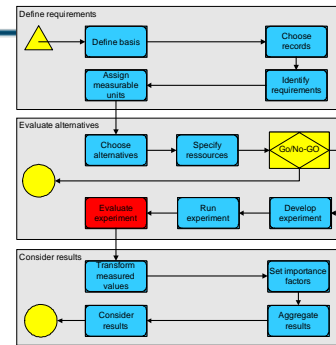
- formulate for each experiment a detailed plan
 - includes builds build and test software components
 - mechanism to capture the result
 - workflow/sequence of activities

Run experiment



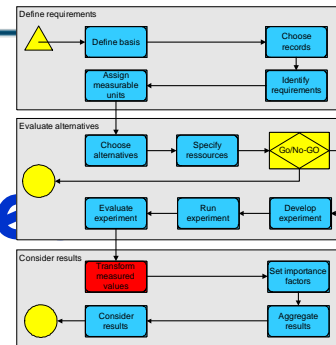
- run experiment with the previously defined sample records
- the whole process need to be documented
- e.g. convert html file to pdf

Evaluate experiment



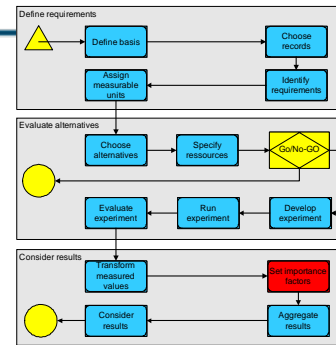
- evaluate how successfully the requirements are met
- measure performance with respect to leaf criteria in the objective tree
- document the results

Transform measured values



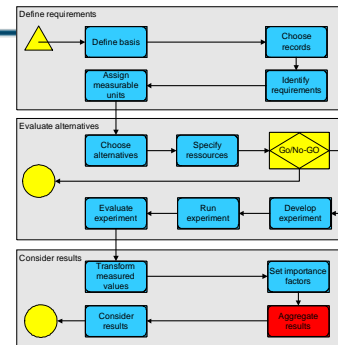
- measures come in seconds, euro, bits, goodness values,...
- need to make them comparable
- transform measured values to uniform scale
- transformation tables for each leaf criterion
- linear transformation, logarithmic, special scale
- scale 1-5 plus "not-acceptable"

Set importance factors



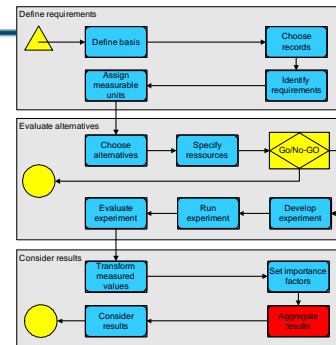
- set importance factors
- not all leaf criteria are equally important
- set relative importance of all siblings in a branch
- weights are propagated down the tree to the leaves

Aggregate values



- multiply the transformed measured values in the leaf nodes with the leaf weights
- sum up the transformed weighted values over all branches of the tree
- creates performance values for each alternative on each of the sub-criteria identified

Consider results



- rank alternatives according to overall utility value at root
- performance of each alternative
 - overall
 - for each sub-criterion (branch)
- allows performance measurement of combinations of strategies
- final sensitivity analysis against minor fluctuations in
 - measured values
 - importance factors

Achievements

- Software Prototype
- 3 case studies finished,
2 further to come in spring
- training session at DELOS DP Summerschool
- publications
 - Rauch C., Pavuza F., Strodl S. and Rauber A.: Evaluating preservation strategies for audio and video files. Proceedings of the DELOS Workshop on Digital Repositories: Interoperability and Common Services, May 11-13 2005, Heraklion, Greece.
 - Carl Rauch, and Andreas Rauber. Anwendung der Nutzwertanalyse zur Bewertung von Strategien zur langfristigen Erhaltung digitaler Objekte. Zeitschrift für Bibliothekswesen und Bibliographie. 52(3-4):172-180, May-August 2005, Klostermann. Frankfurt, Germany.
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Conclusion

