Logical and bit-stream preservation using Plato and EPrints

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- **Vienna University of Technology**
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  - Stephan Strodl
  - Michael Greifeneder
  - Petar Petrov

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DP Activities in Vienna

- Web Archiving (AOLA)
  in cooperation with the Austrian National Library
- DELOS DPC (EU FP6 NoE)
- DPE: Digital Preservation Europe (EU FP6 CA)
- PLANETS (EU FP6 IP)
- eGovernment & Digital Preservation
  series of projects with Federal Chancellery
- National Working Group on Digital Preservation
  of the Austrian Computer Society, in cooperation with ONB
- Digital Memory Engineering: National research studio

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University of Southampton, UK

- **University of Southampton**
  http://www.soton.ac.uk
  - School of Electronics & Computer Science
    http://www.ecs.soton.ac.uk
- **EPrints**
  http://www.epints.org
- People in Preservation
  - Steve Hitchcock
  - **David Tarrant**
  - Chris Gutteridge
  - Tim Brody
  - Patrick McSweeny
- EPrints Services
  - **Adam Field**
  - Tim Miles-Board

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DP Activities in Southampton

- EPrints Preservation
  - KeepIt!
  - Preserv2
  - Preserv
- P2N – Preservation Network
  - Collabotarion with Oxford Univeristy
- P2-Registry
  - Linked Data for Digital Preservation
- Web Archiving
  - ECS project to archive old project websites and Wikis

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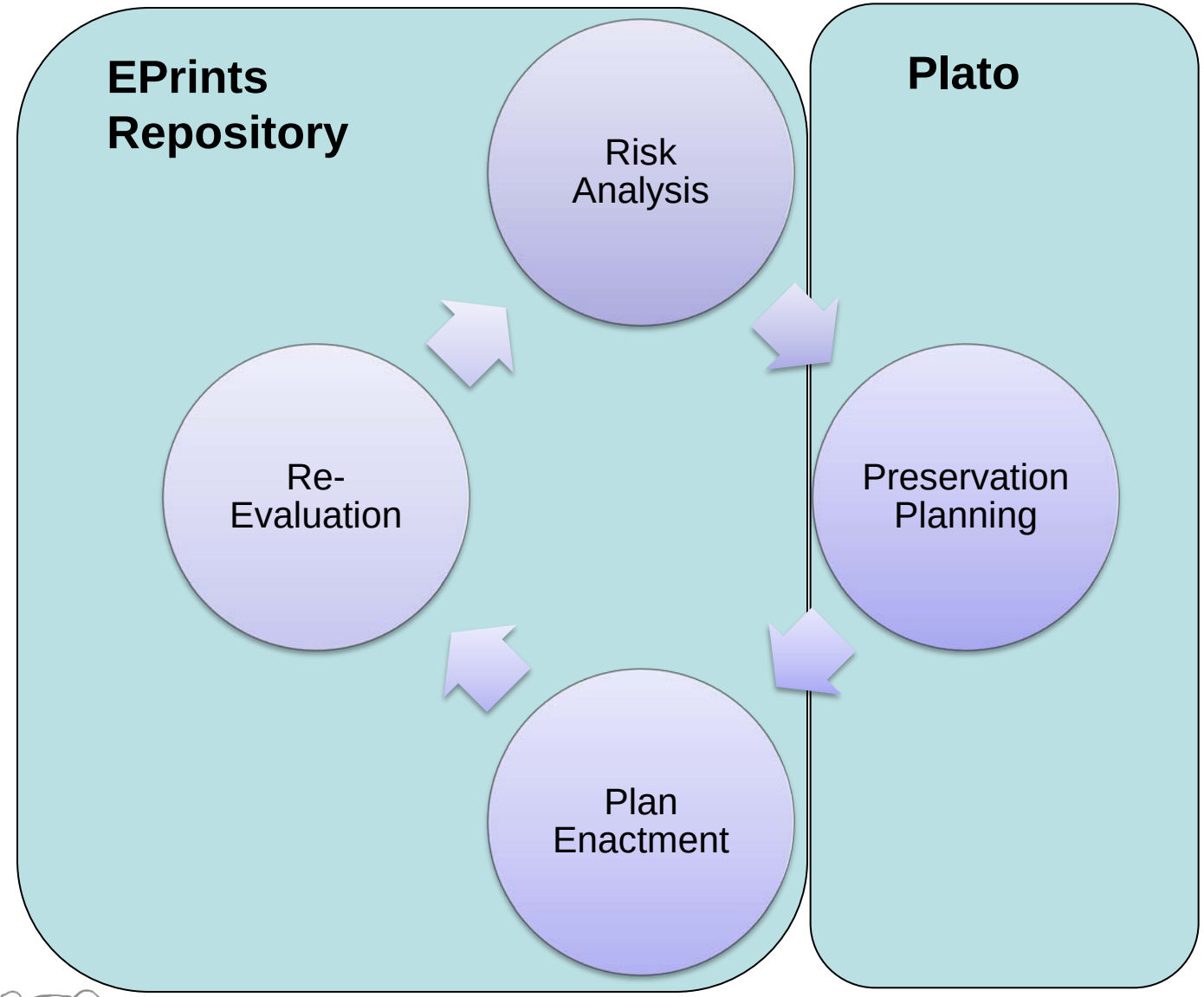
Introductions

What will you know after this tutorial?

You will:

- See the (first?) system integrating **bit stream preservation** and **logical preservation** supported by a **fully documented planning** process
- Perform **risk analysis as trigger** for preservation actions
- Understand why we need to **plan preservation activities**
- Know a **workflow to evaluate preservation strategies**
- Be familiar with Plato and EPrints
- Be able to **develop a specific preservation plan** that is optimized for
  - the objects in your institution
  - the users of your institution
  - the institutional requirements
- Be able to **execute it** in a repository (EPrints)

Integrated Preservation Cycle



Schedule

09:00 – 09:45	Introduction
09:45 – 11:00	Exercise 1 (EPrints)
11:00 – 11:15	Coffee/Tea
11:15 – 13:00	Requirements
13:00 – 14:00	Lunch
14:00 – 15:30	Evaluation/ Transformation
15:30 – 16:00	Coffee/Tea
16:00 – 17:15	EPrints
17:15 – 18:00	Discussion
(18:15 - ???	Ice breaking & Wine tasting)

Schedule

(1) Introduction

(2) Preservation in EPrints

(3) Preservation Planning with Plato

(4) Bringing it all together and Closing

Overview

Part 1: Introduction

- Quick introduction to physical preservation with EPrints
- Quick introduction to logical preservation with Plato
- Bringing it together: bit-stream and logical preservation

What is EPrints For?

- EPrints offers a safe, open and useful place to store, share and manage material in the pursuit of research and educational agendas.

administrative reporting, collaboration, data sharing, digital profile enhancement , e-learning, e-publishing, e-research, marketing, open access, preservation, publicity, research assessment, research management, scholarly collections

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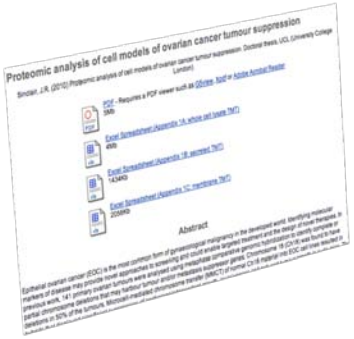
An EPrints repository is

- A valuable part of the researcher's information environment
  - directly integrating with the research desktop
  - offering sustainable storage and open access

- A competent and mature component of the institution's information environment
  - providing management and curation support for core business research data
  - leveraging information about research outputs to inform management strategy

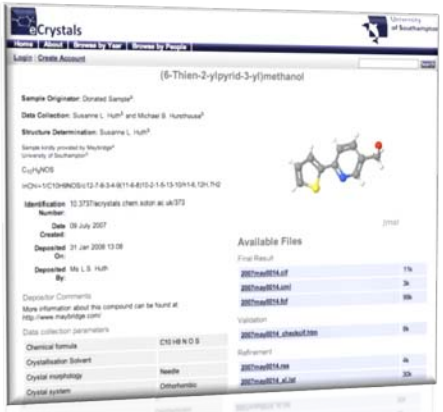
KeepIT Exemplars



Open Access to Research Outputs

Open Arts

Open Educational Resources



Open Scientific Data

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EPrints Repositories

- eprints.lse.ac.uk (institutional)
- eprints.ecs.soton.ac.uk (departmental)
- pubs.or08.ecs.soton.ac.uk (conference)
- archive.serpentproject.com (project)
- nora.nerc.ac.uk (funders)
- ecrystals.chem.soton.ac.uk (data)
- www.linnean-online.org (collection)
- ualresearchonline.arts.ac.uk (art)
- **demoprints.eprints.org** (demo)

Overview

Part 1: Introduction

- Quick introduction to physical preservation with EPrints
- Quick introduction to logical preservation with Plato
- Bringing it together: bit-stream and logical preservation

Preservation Planning

Why Preservation Planning?

- Several preservation strategies developed
  - For each strategy: several tools available
    - For each tool: several parameter settings available
- How do you know which one is most suitable?
- What are the needs of your users? Now? In the future?
- Which aspects of an object do you want to preserve?
- What are the requirements?
- How to prove in 10, 20, 50, 100 years, that the decision was correct / acceptable at the time it was made?

Preservation Planning

- Consistent workflow leading to a preservation plan
- Analyses, which solution to adopt
- Considers
  - preservation policies
  - legal obligations
  - organisational and technical constraints
  - user requirements and preservation goals
- Describes the
  - preservation context
  - evaluated preservation strategies
  - resulting decision including the reasoning
- Repeatable, solid evidence

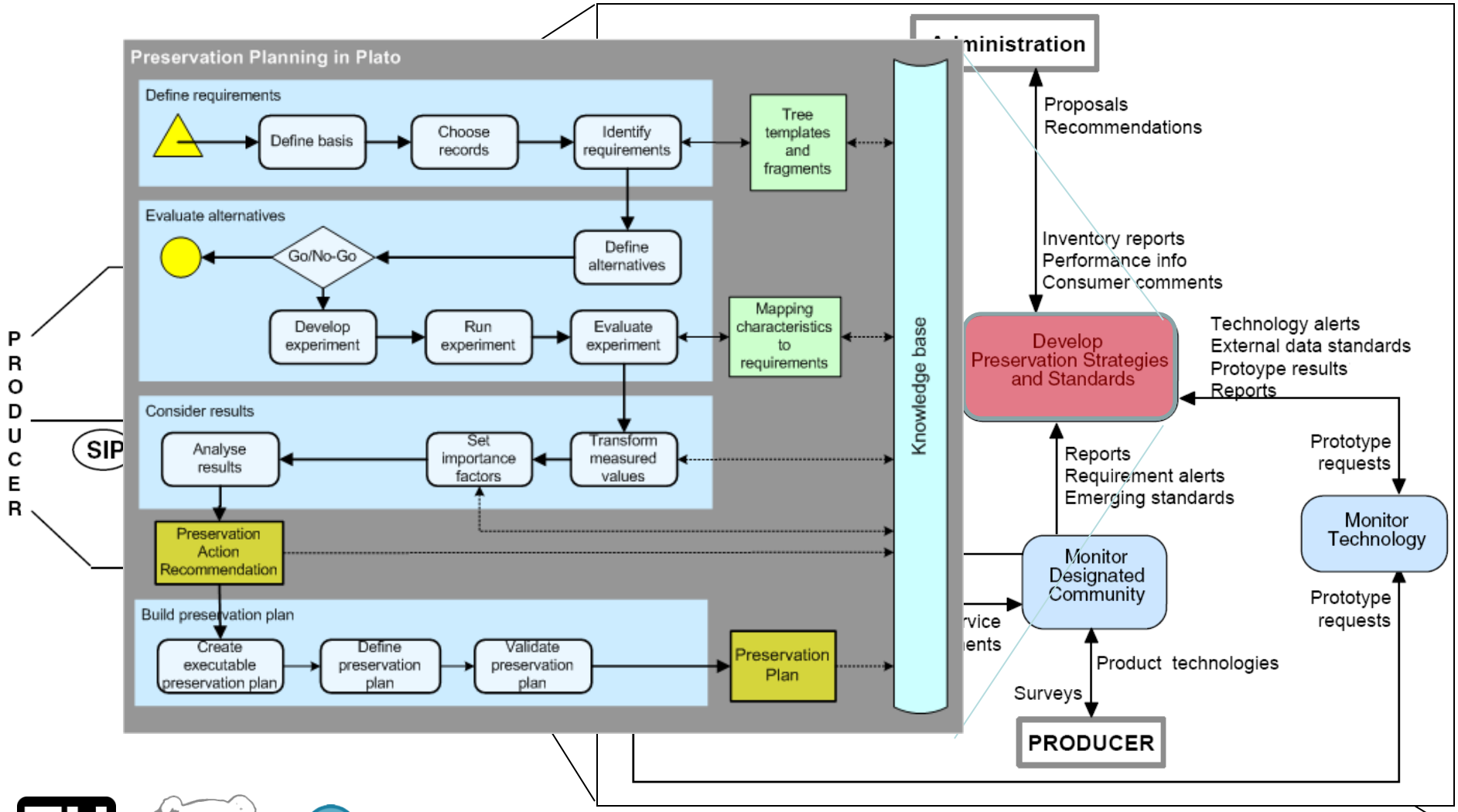
Digital Preservation

What is a preservation plan?

- 10 Sections
  - Identification
  - Status
  - Description of Institutional Setting
  - Description of Collection
  - Requirements for Preservation
  - Evidence for Preservation Strategy
  - Cost
  - Trigger for Re-evaluation
  - Roles and Responsibilities
  - Preservation Action Plan

Preservation Plan Template

Preservation Planning



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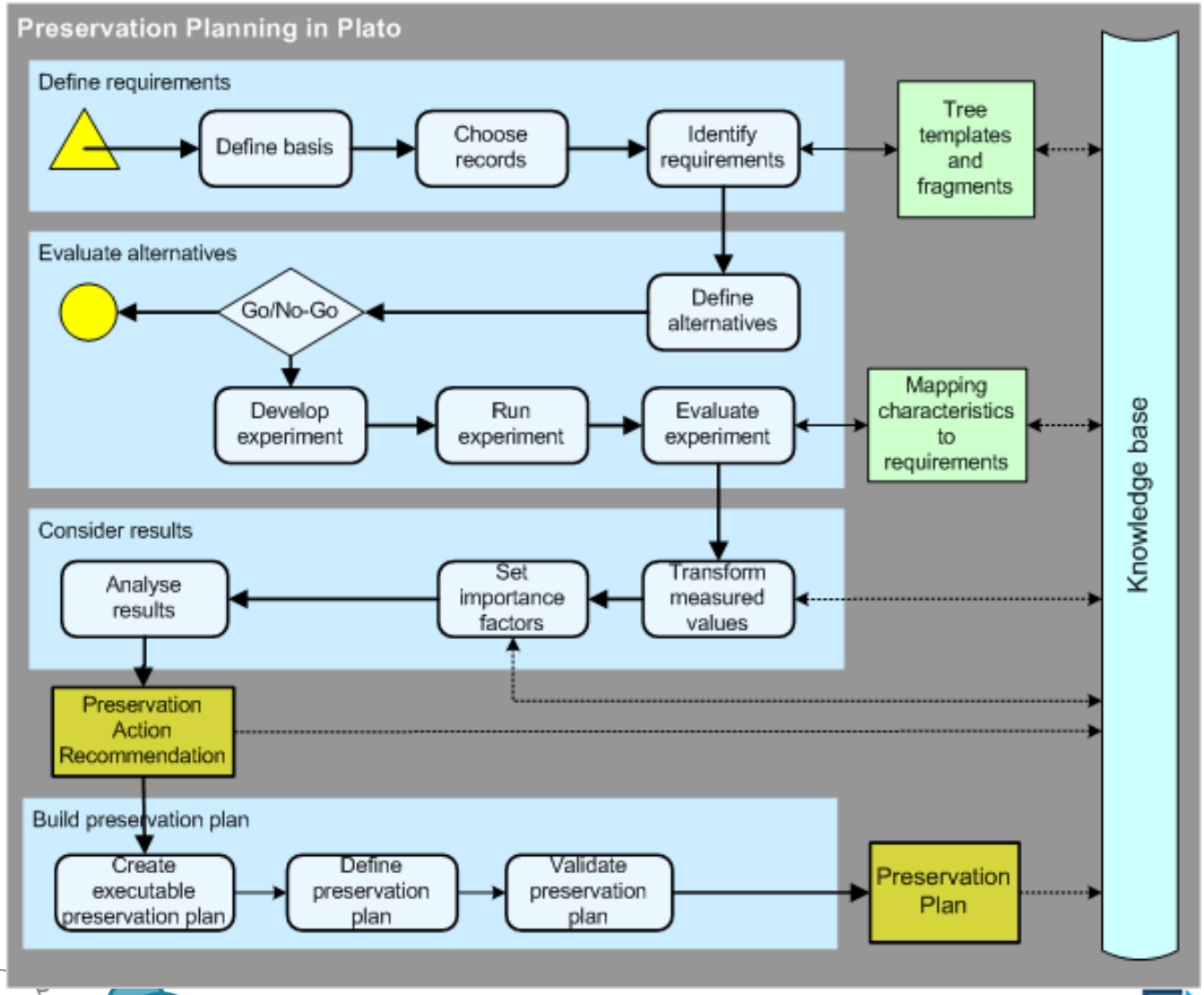
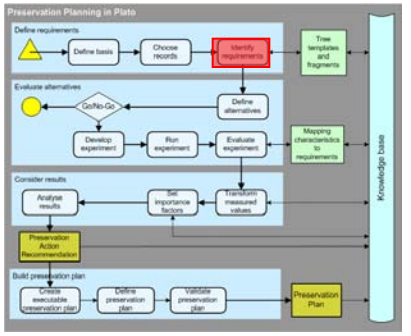
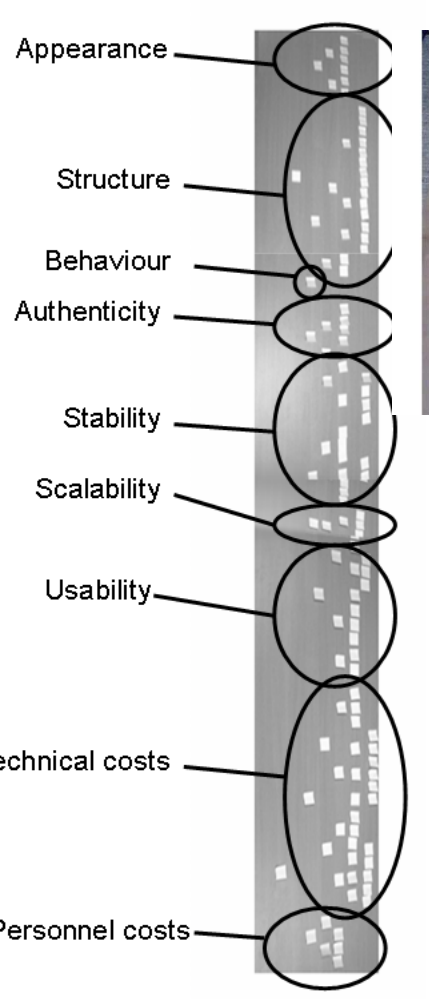
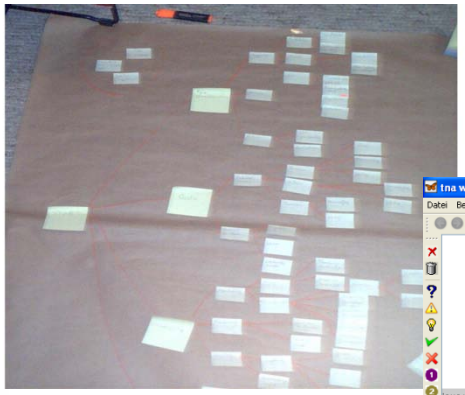
Preservation Planning Workflow



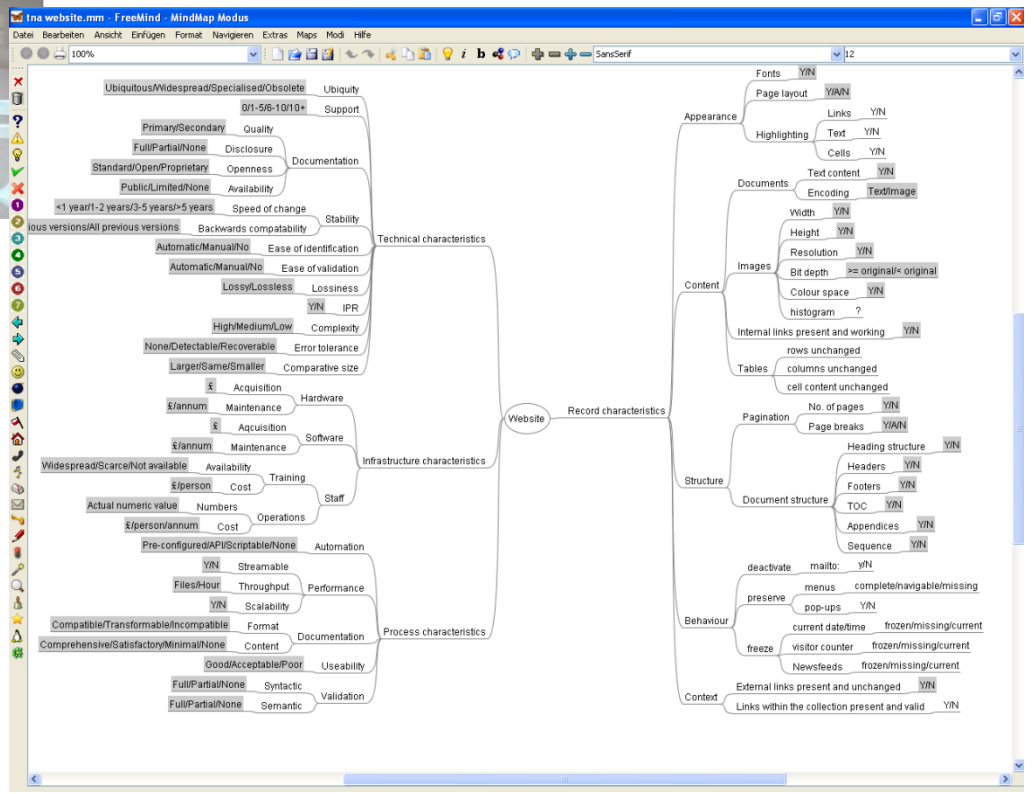
Identify requirements







Analog…



… or born digital

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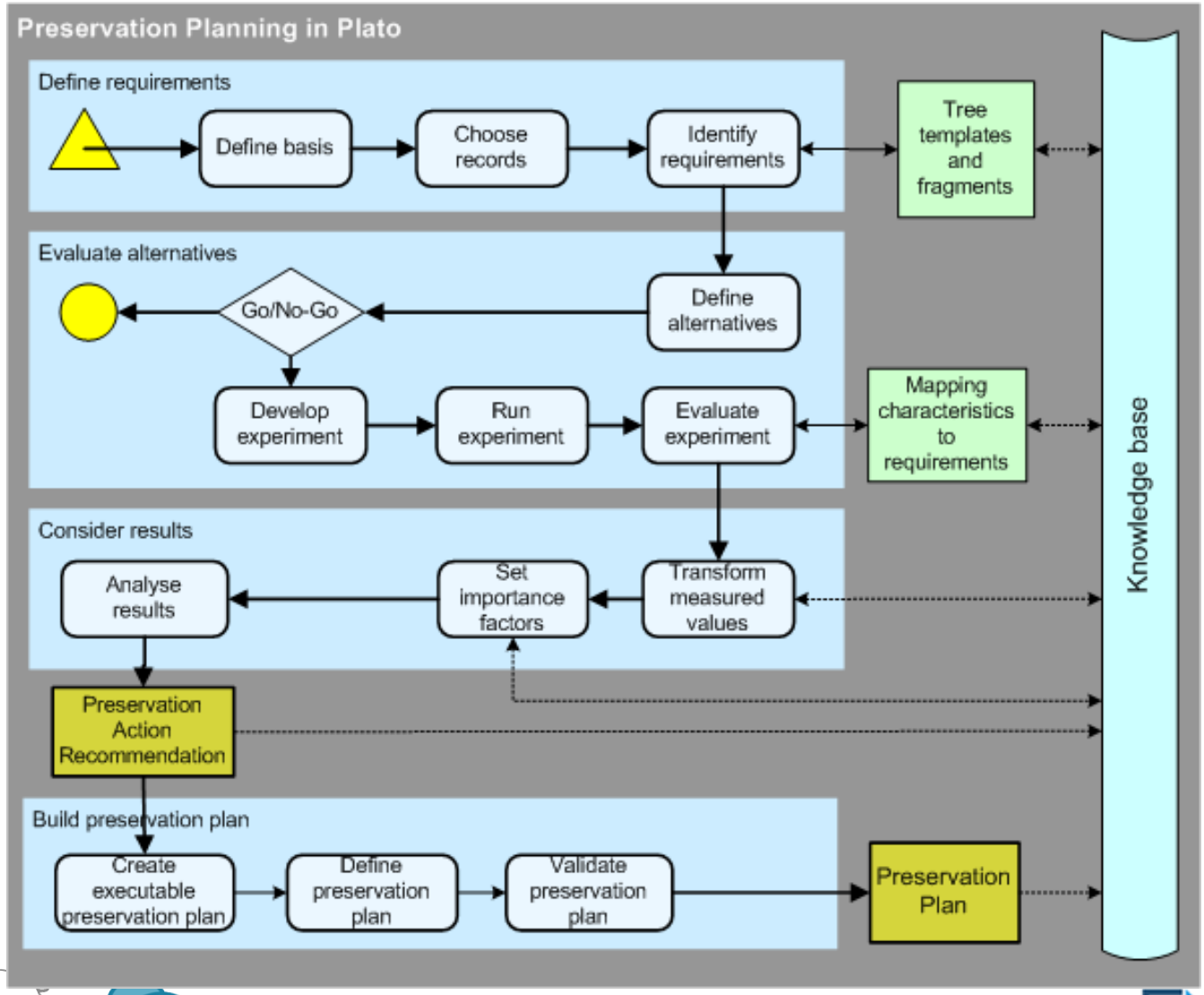
Preservation Planning Workflow

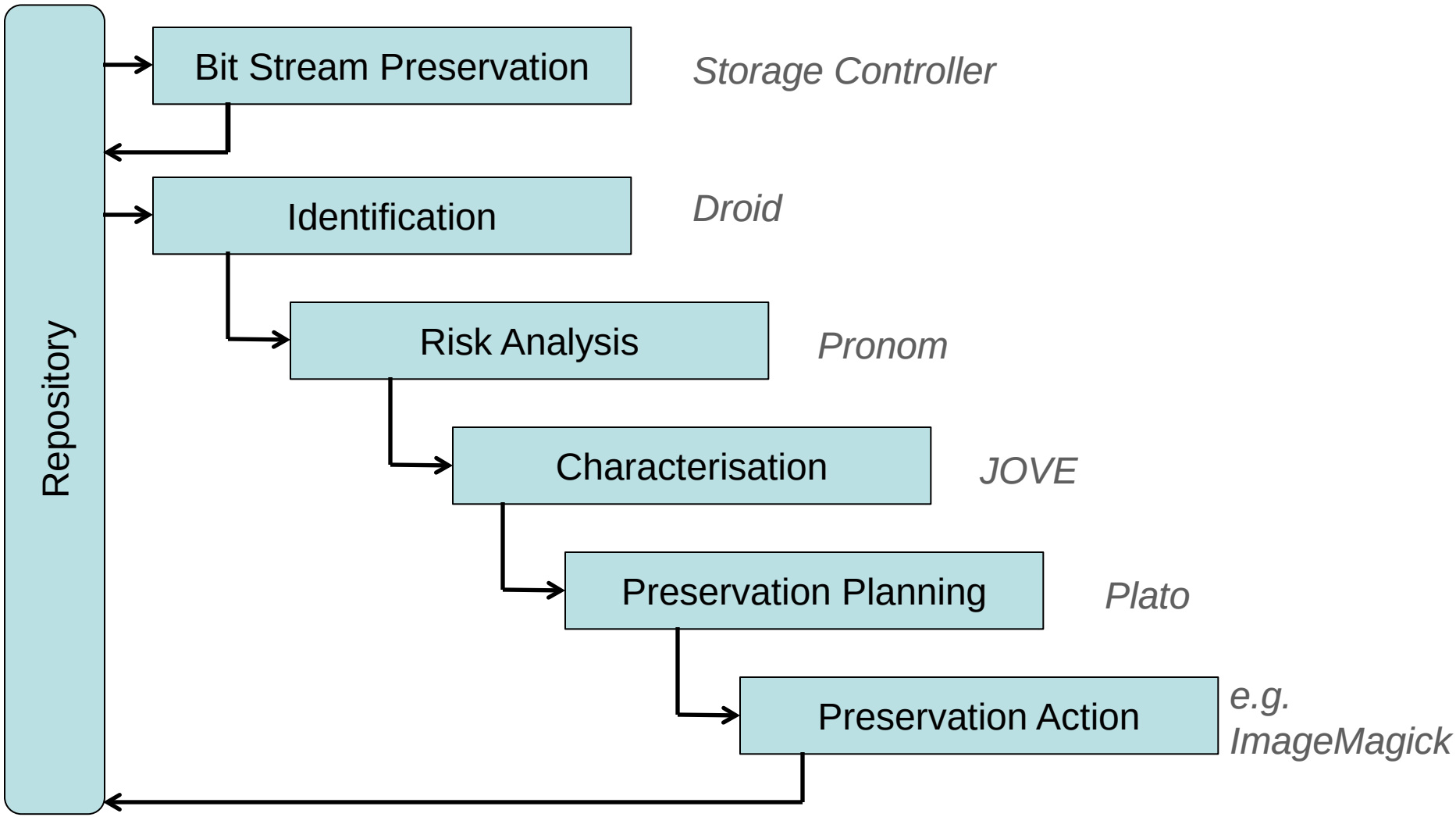


Overview

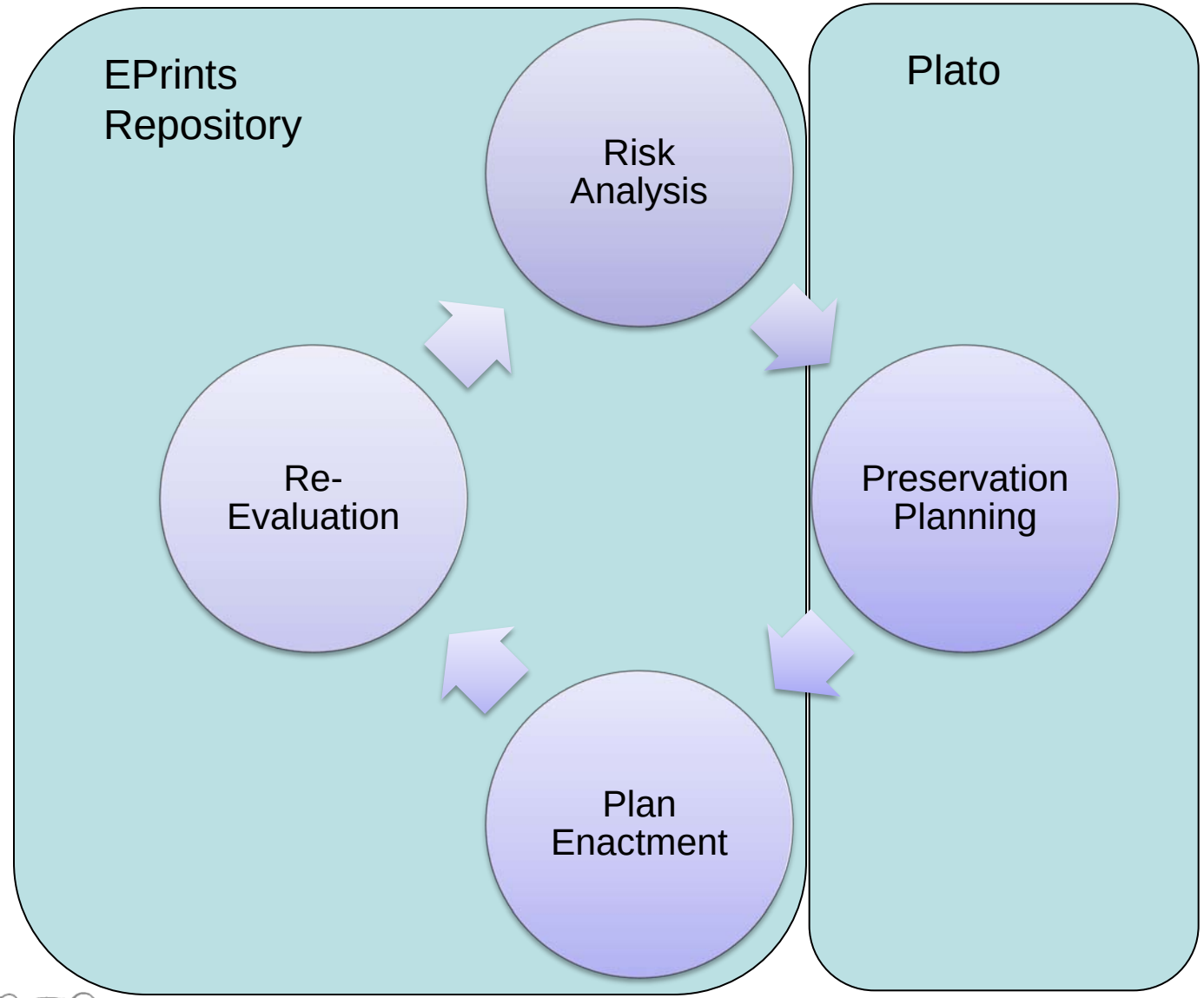
Part 1: Introduction

- Quick introduction to physical preservation with EPrints
- Quick introduction to logical preservation with Plato
- Bringing it together: bit-stream and logical preservation

Bringing it all together



Bringing it all together (3/2)



Conclusions

- Integrating bit-stream and logical preservation
- Thorough planning process
- Actionable preservation plan
- Consistent with OAIS model
- Follows recommendations of TRAC and nestor
- Generic workflow that can easily be integrated in different institutional settings
- **EPrints**:
  - Open-source repository system

    http://www.eprints.org
- **Plato**:
  - Tool support for preservation planning

    http://www.ifs.tuwien.ac.at/dp
    http://www.ifs.tuwien.ac.at/dp/plato

Schedule

(1) Introduction

(2) Preservation in EPrints

(3) Preservation Planning with Plato

(4) Bringing it all together and Closing

The Preservation Process

Preservation - Check

- Resilient Storage
- Bit checking & checksum calculation

Preservation - Analyse

- What is the type of file, is the file valid?
- Is the file at risk of not having an editor/reader?
- Is there a better format available? Lossless or Lossy?

Preservation - Planning

- What is the best preservation action given requirements and constraints
- Preservation Planning (Plato)

Preservation - Action

- File migration to avert risks found by analysis.
- Movement of file to new storage.

The Storage Ecosystem

Local

- No local bandwidth costs
- Hard to expand
- Locally Managed
- High overheads cost
- Requires space and cooling
- Tied closely to the software

Archival

- Specialist
- Expensive to purchase
- Locally Managed
- Space and running costs
- Expandable

Cloud

- Scalable
- Externally controlled
- Known Costings
- Unclear retention policy
- Re-Useable (APIs)
- Global Scale

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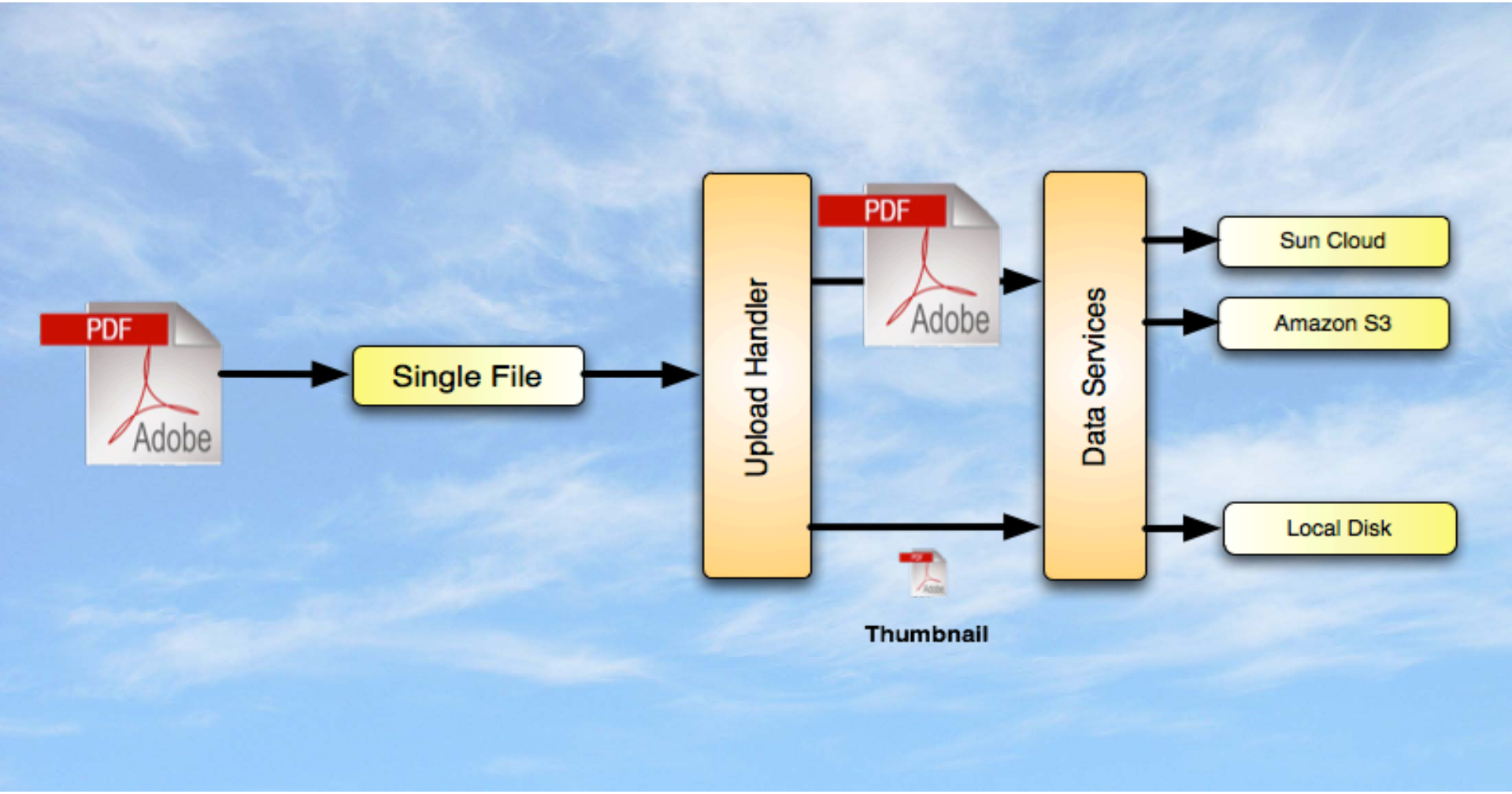
Hybrid Storage

- Use the best features of each storage type
- Performance
  - Scaling-up bandwidth
- Optimisation
  - Large-file handling
  - Multimedia streaming
- Localised Delivery
  - Local delivery from the cloud

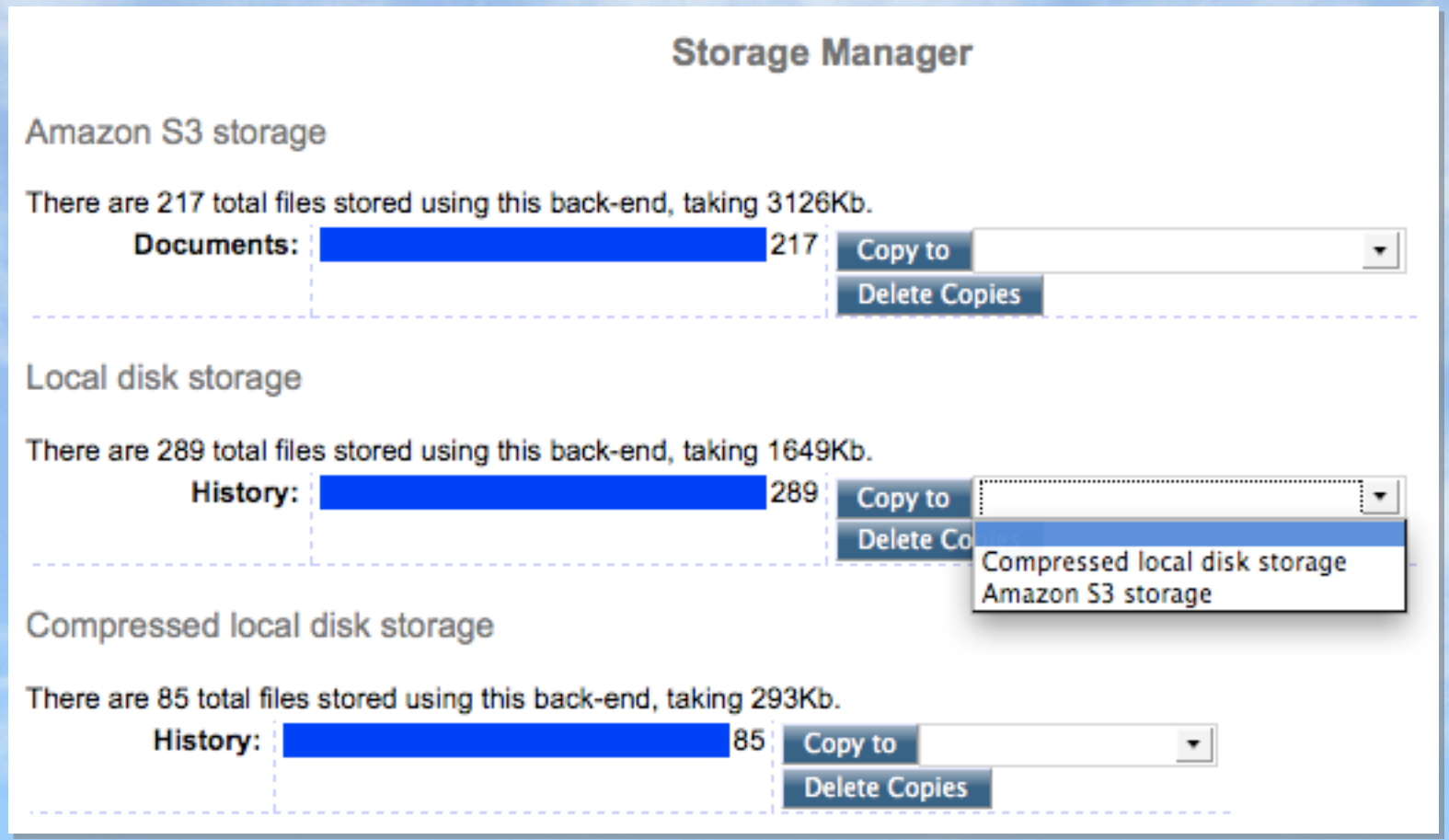
EPrints Storage Controller

- The storage controller manages the location of files.
- Uses rule based policy defined by a simple configuration file (XML)
- Examples:
  - Large binary files of scientific data (raw machine result data) can be stored in a large disk (slower access) system and sent to a tape company for long term storage.
  - Processed results can be stored locally and in the cloud ready for rapid delivery to end points.

Hybrid Storage Policies



EPrints Storage Manager



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Recap

1. Storage Ecosystem
   - There are a great number of products and services available designed to protect your resources. Each is aimed at a market with different needs based on the type of content.
2. Storage Controller
   - Allows you to utilise a diverse range of storage services simultaneously. Take advantage of the current ecosystem.
3. Managing Stored Assets
   - If the ecosystem changes, moving of resources to a new service is a seamless operation.

The Preservation Process

Preservation - Check

- Resilient Storage
- Bit checking & checksum calculation

Preservation - Analyse

- What is the type of file, is the file valid?
- Is the file at risk of not having an editor/reader?
- Is there a better format available? Lossless or Lossy?

Preservation - Action

- File migration to avert risks found by analysis.
- Movement of file to new storage.

Analysis

Preservation - Analyse

- What is the type of file, is the file valid?
  - Droid is a good classification tool for this.

The National Archives

- Is the file at risk of not having an editor/reader?
  - Functionality is being developed in PRONOM technical registry.

The technical registry PRONOM

- Is there a better format available? Lossless or Lossy?

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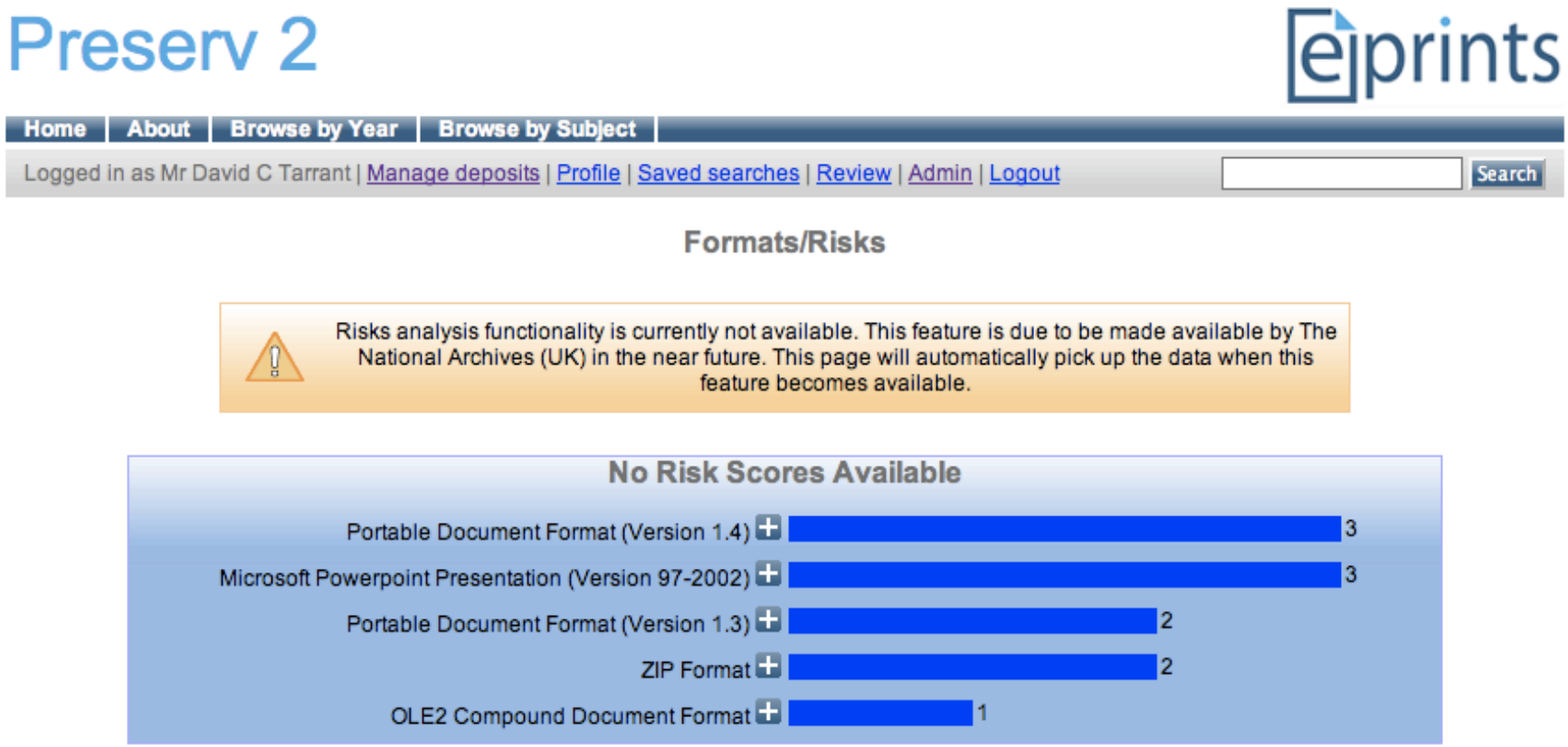
File Format Analysis

Preservation - Analyse

EPrints File Classification



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Risk Analysis

Preservation - Analyse

The technical registry PRONOM

- Is the file at risk of not having an editor/reader?
  - Functionality is being developed in PRONOM technical registry.

- Simple SOAP web service

- Takes file format identification id's, hands back risk score.
- Breakdown of risk score may also be available in future releases.

- A stub you can download and run providing this functionality before the official release with mock up risk scores is available at http://preserv2.googlecode.com

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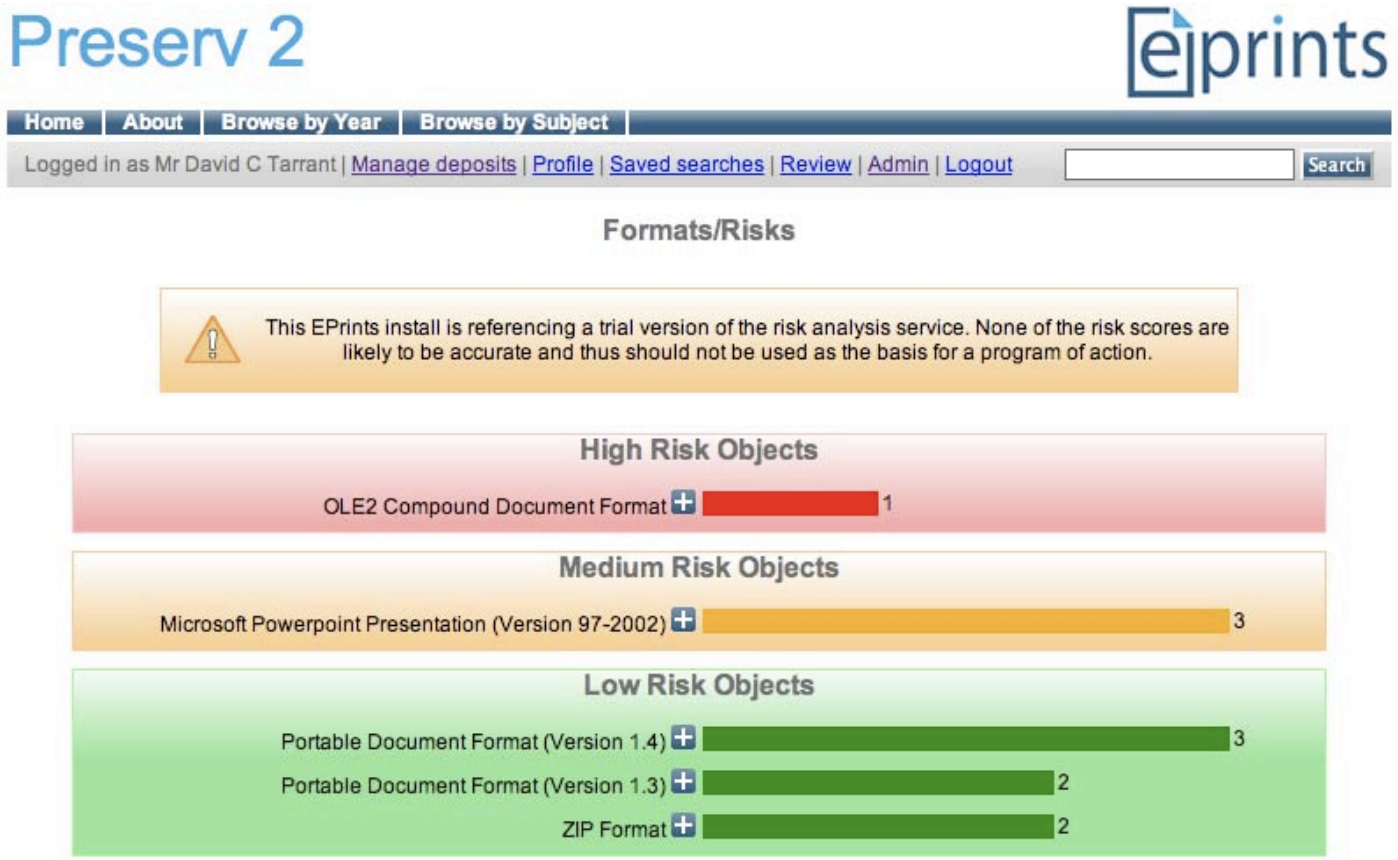
Risk Analysis In EPrints

Preservation - Analyse

EPrints File Classification + Risk Analysis



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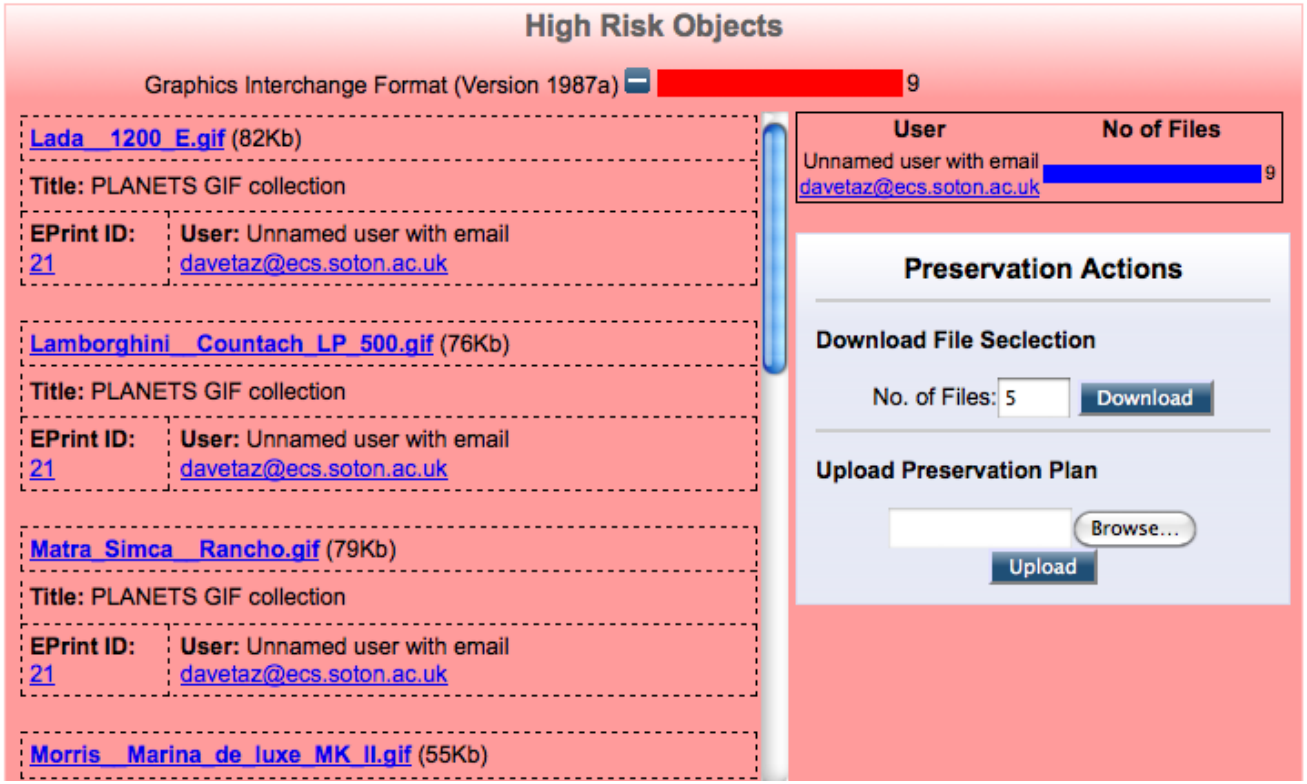
Risk Analysis In EPrints - Detailed View

Preservation - Analyse

EPrints File Classification + Risk Analysis



Exercise Time

Recap

Preservation - Check

- Handled by our storage manager and reported back via the preservation interface.

Preservation - Analyse

- Parallels can be drawn with storage, in that we are integrating with and utilising currently available services to perform our analysis.
- Processing of the results leads to a powerful interface which tells us many things about the repository ecosystem and it's future.

Preservation - Action

- Future plan is to utilise further web based services to ensure information remains comprehensive and up to date set, 0day digital preservation.

Schedule

(1) Introduction
- EPrints
- Preservation Planning and Plato

(2) Preservation in EPrints

(3) Preservation Planning with Plato

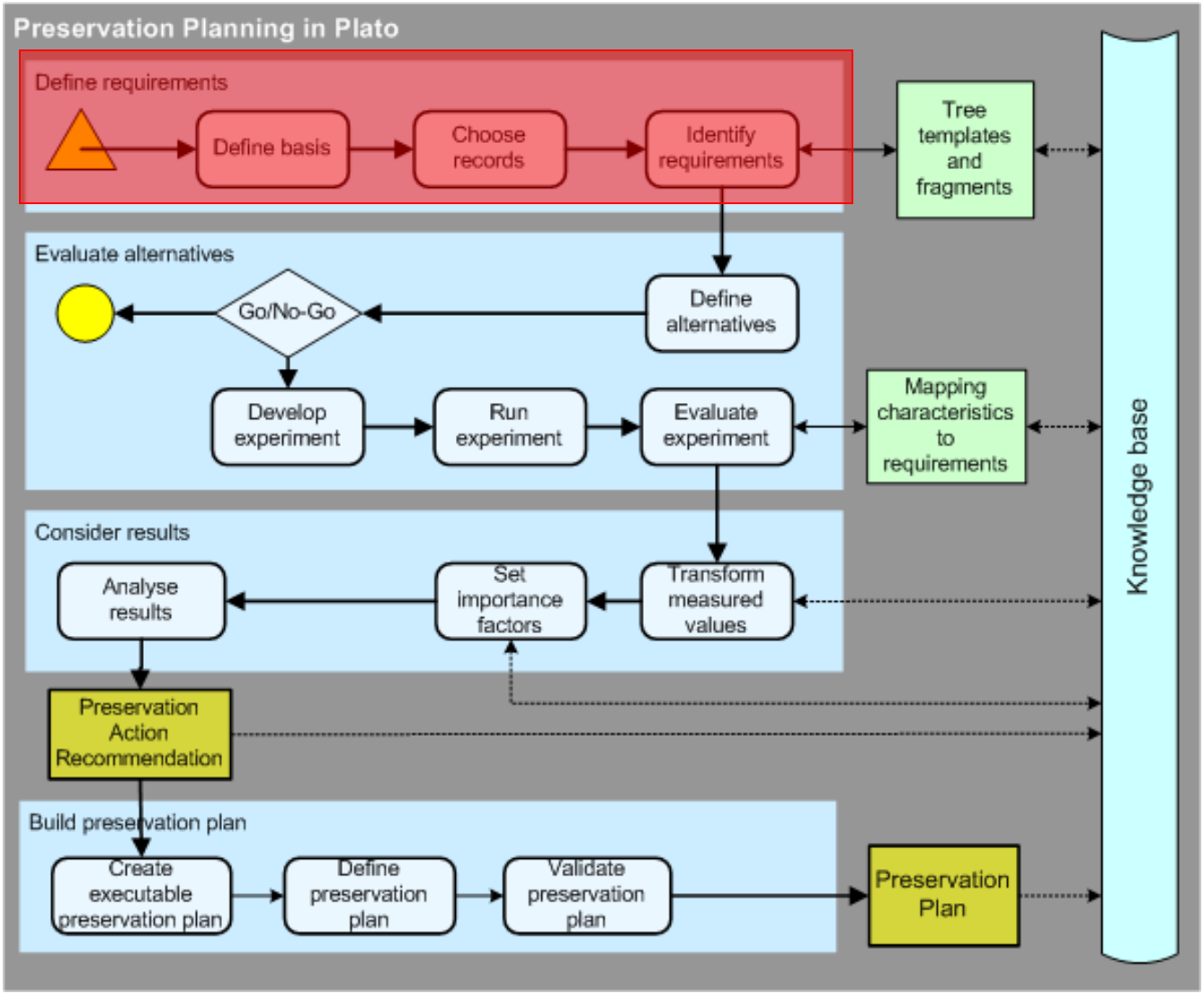
(4) Bringing it all together and Closing

Overview

Part 3: Preservation Planning with Plato

- Preservation planning workflow
- Exercises

PP Workflow



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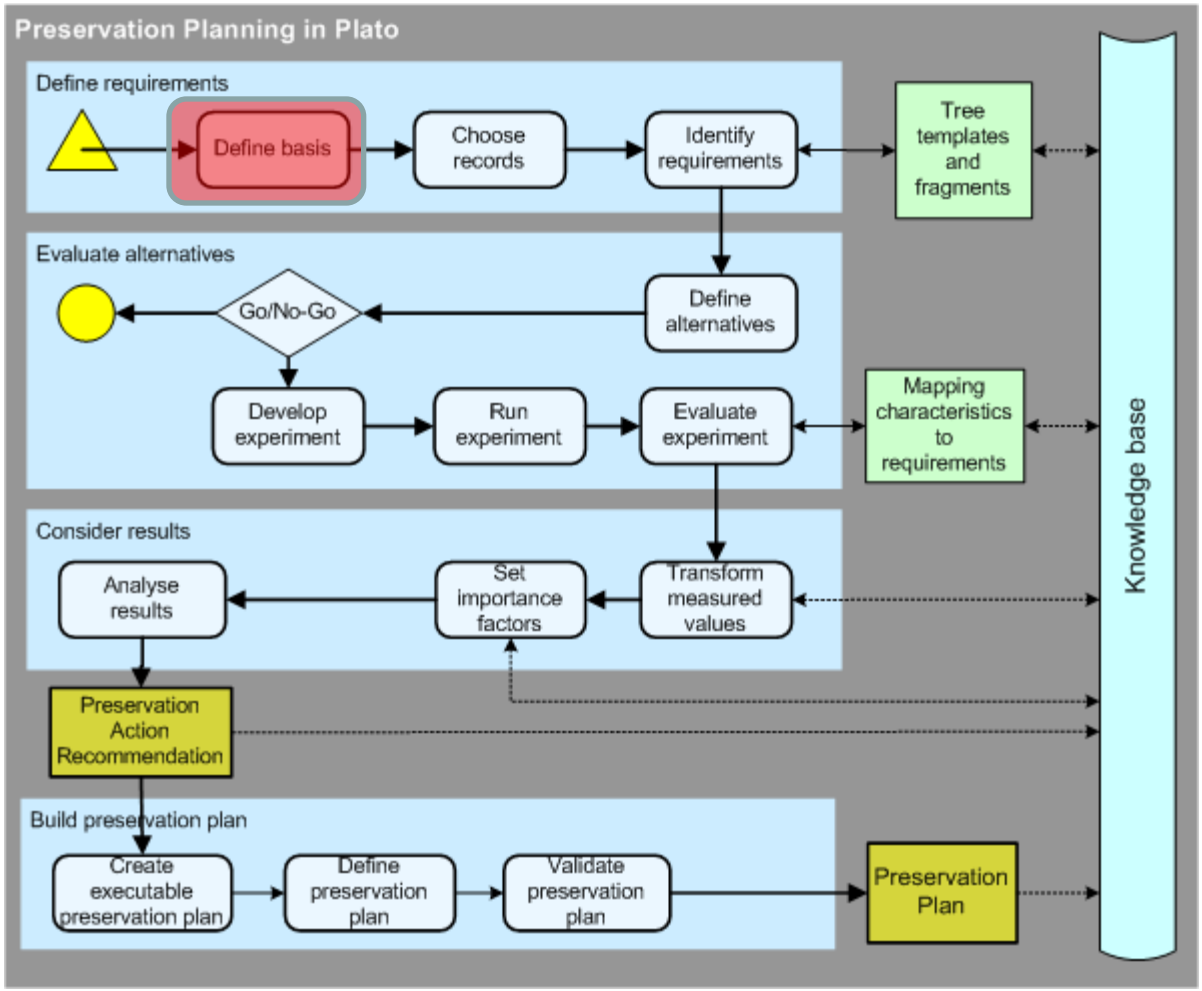
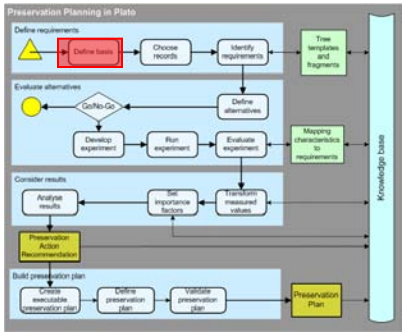
Orientation

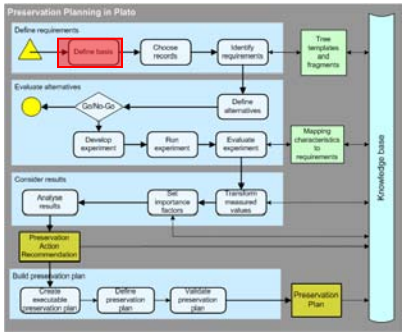


Define Basis



- Basic preservation plan properties
- Describe the context
  - Institutional settings
  - Legal obligations
  - User groups, target community
  - Organisational constraints
- 5 triggers
  - New Collection Alert (NCA)
  - Changed Collection Profile Alert (CPA)
  - Changed Environment Alert (CEA)
  - Changed Objective Alert (COA)
  - Periodic Review Alert (PRA)

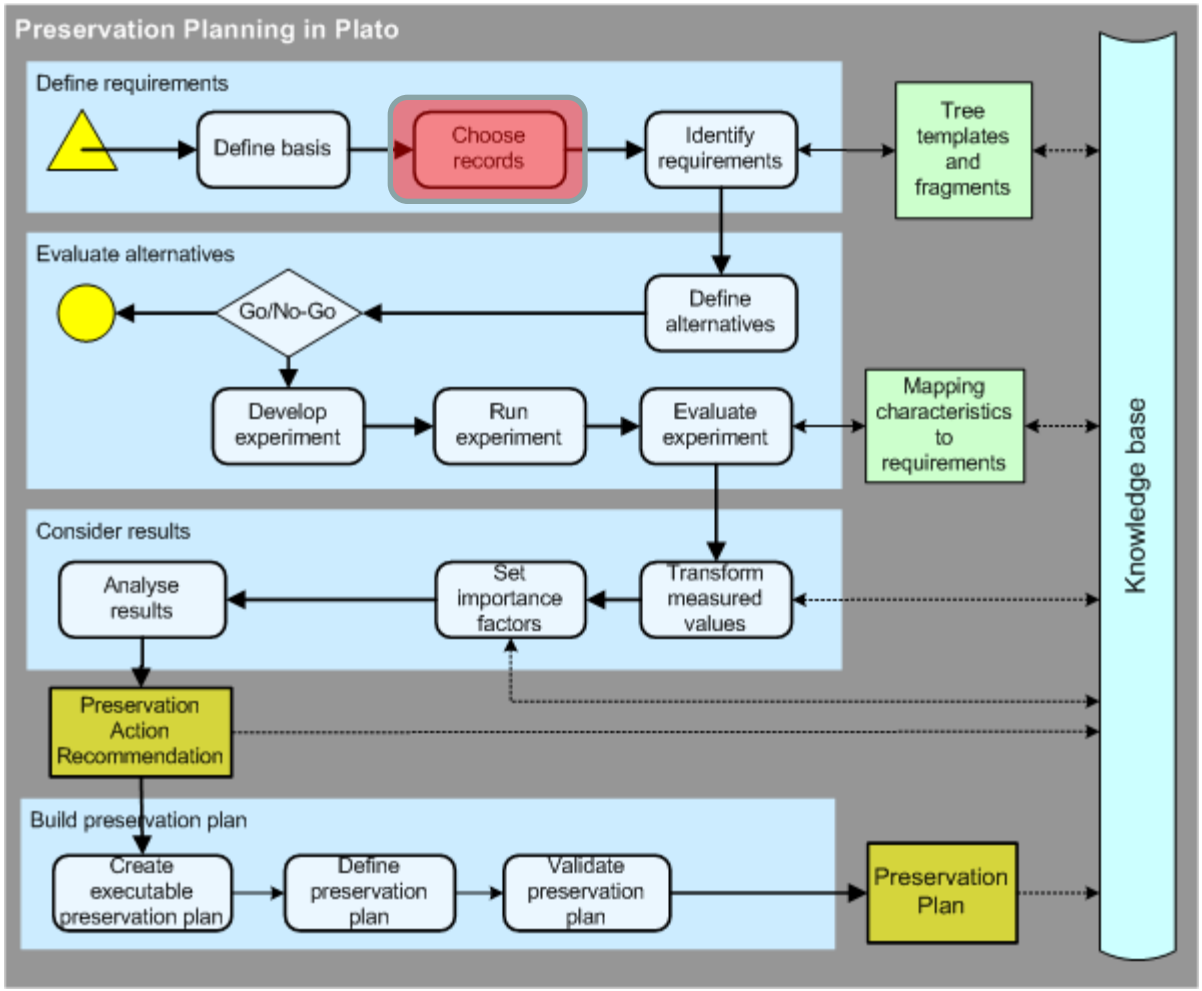
Define Basis



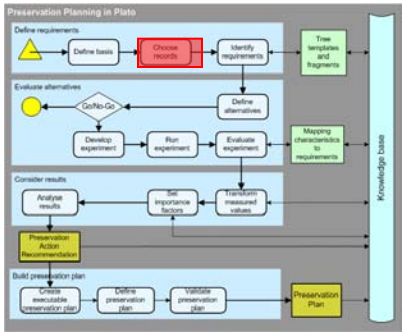
Organizational structure

- Mandate, Mission Statement
  - Provide reliable, long-term access to digital objects
  - Internet Archive: *"The Internet Archive is working to **prevent the Internet** […] and other 'born digital' materials **from disappearing** into the past. Collaborating with institutions including the Library of Congress and the Smithsonian, we are working to preserve a record for generations to come."* http://www.archive.org/about/about.php
  - Oxford Digital Library: *"Like traditional collection development **long-term sustainability** and **permanent availability** are major goals for the Oxford Digital Library."* http://www.odl.ox.ac.uk/principles.htm

Orientation

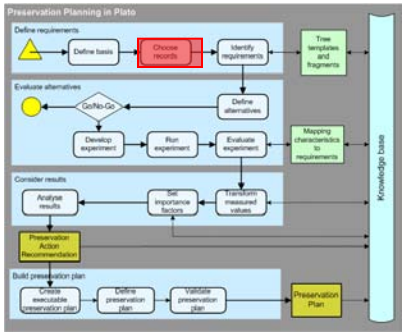


Choose Sample Objects



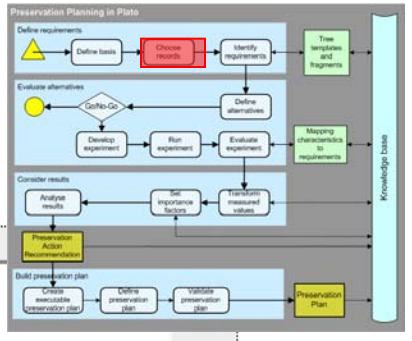
- Identify consistent (sub-)collections
  - Homogeneous type of objects (format, use)
  - To be handled with a specific (set of) tools
- Describe the collection
  - What types of objects?
  - How many?
  - Which format(s)?
- Selection
  - Representative for the objects in the collection
  - Right choice of sample is essential
  - They should cover all essential features and characteristics of the collection in question
  - As few as possible, as many as needed
  - Often between 3 – 10

Choose Sample Objects



- Stratification – all essential groups of digital objects should be chosen according to their relevance
- Possible stratification strategies
  - File type
  - Size
  - Content (e.g. document with lots of images, including macros)
  - Time (objects from different periods of times)
- File Format Identification
  - DROID
  - PRONOM

Define Sample Objects



[↑] Sample Records

Description of sample records: several samples of electronic theses ?

Sample Record		Object Format	
Full name:	sample thesis 1 ?	PUID:	?
Short name:	DA1 ?	Name:	?
Has data:	☑ download	Version:	?
Original technical environment:	?	Mime-type:	?
Description:	?		Identify format

Remove record

Save | Discard changes | Proceed

Add new record without file

Add record

Upload new record

Durchsuchen... | Upload File ?

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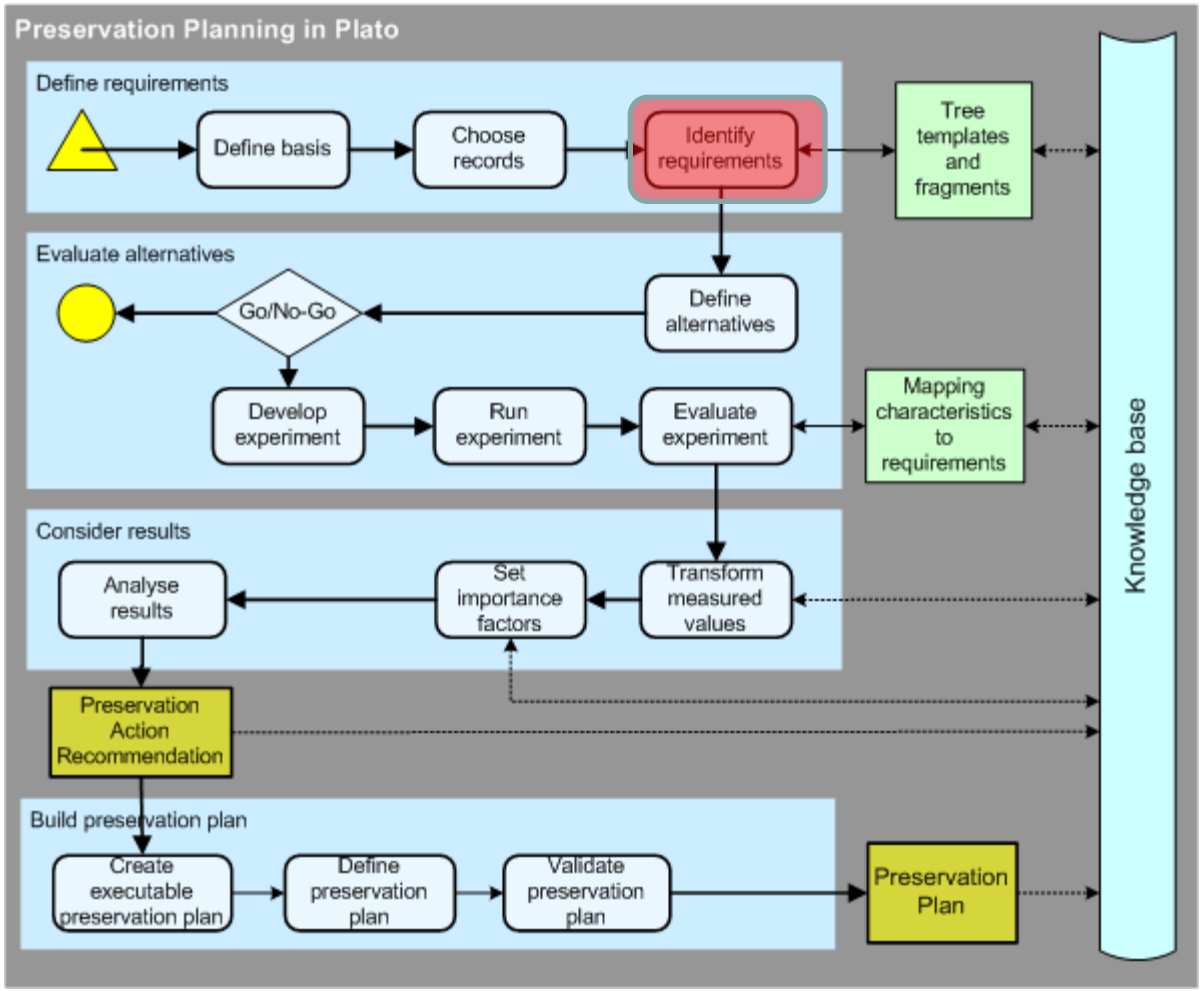
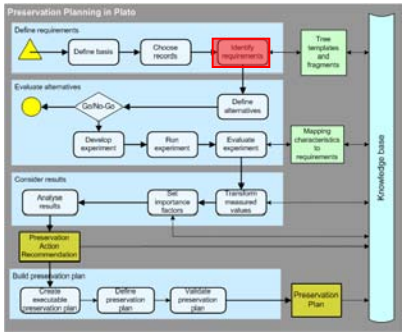
Practise time!

- Public institution – State and University Library
- Mission to preserve the state's cultural heritage in the form of any publication
- Scanned collection of yearbooks, 9000 objects
  - One file per page
  - Scans are black and white
- Copyright held for the physical material, same for digital content
- Objects are provided

Orientation

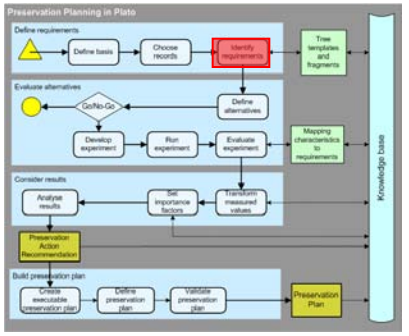


Identify Requirements

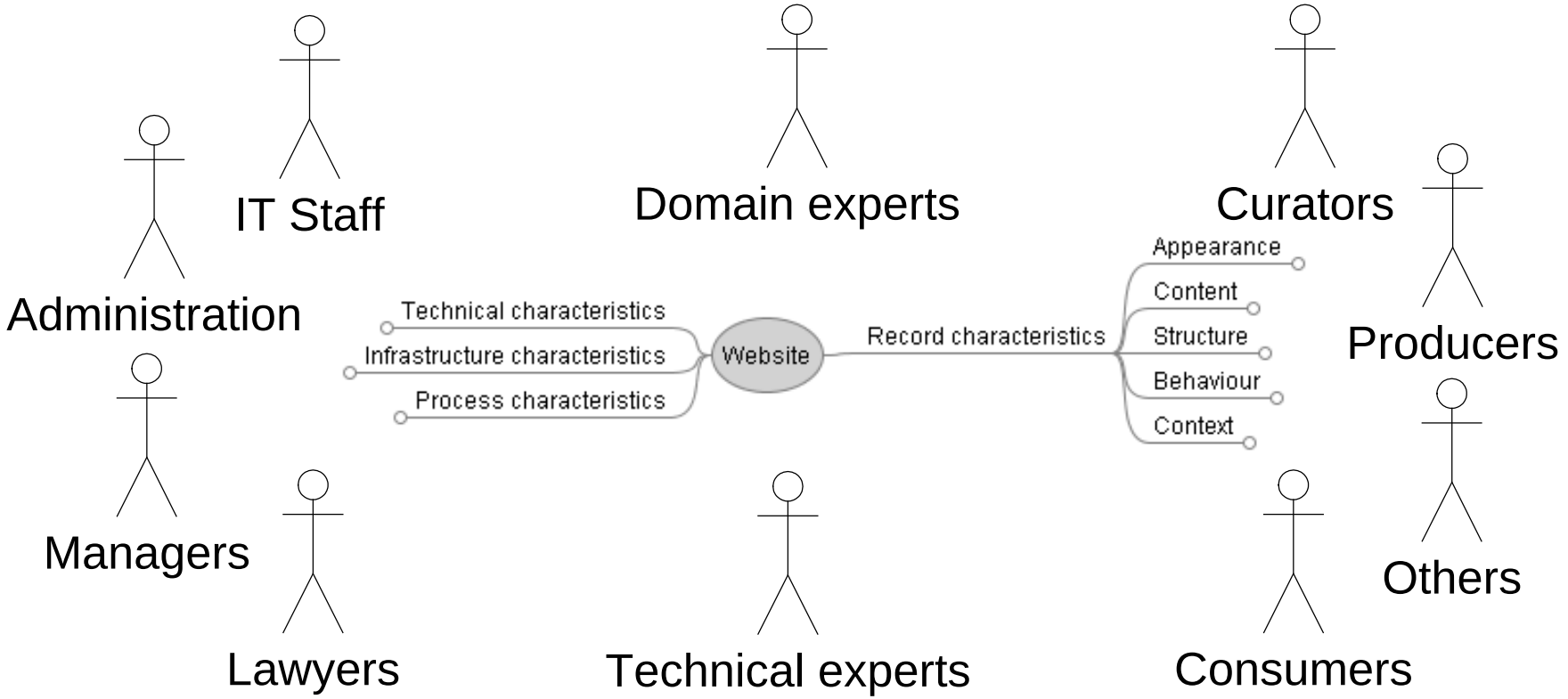


- Define all relevant goals and characteristics (high-level, detail) with respect to a given application domain
- Put the requirements in relation to each other
  → Tree structure
- Top-down or bottom-up
  - Start from high-level goals and break down to specific criteria
  - Collect criteria and organize in tree structure

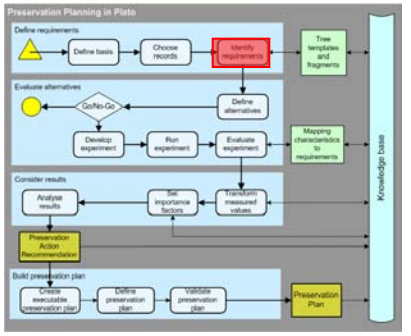
Identify Requirements



- Input needed from a wide range of persons, depending on the institutional context and the collection

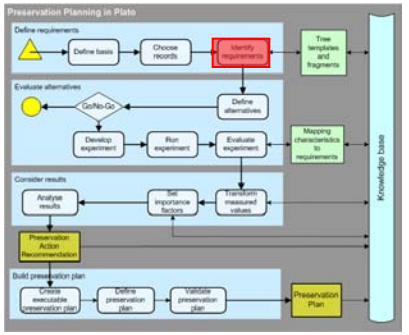


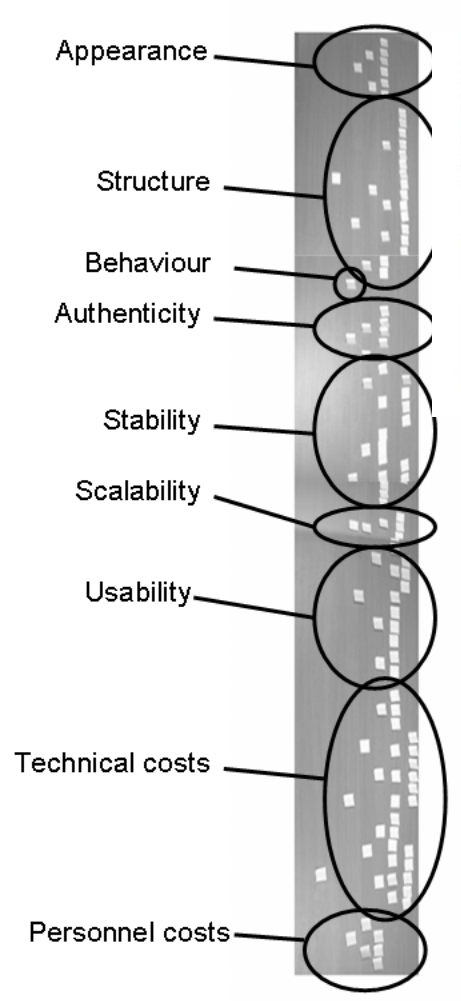
Identify requirements

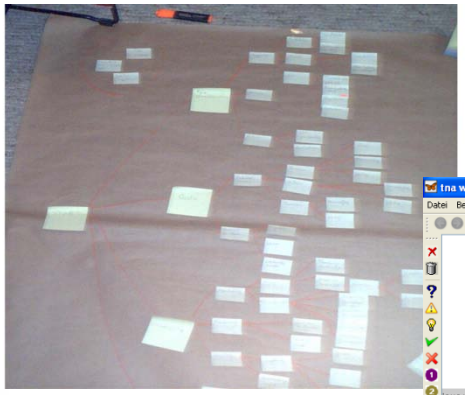


- Core step in the process
- Define all relevant goals and characteristics (high-level, detail) with respect to given application domain
- Usually four major groups
  - Object characteristics (content, metadata,…)
  - Record characteristics (context, relations,…)
  - Process characteristics (scalability, error-detection,…)
  - Costs (set-up, per object, HW/SW; personnel,…)

Identify requirements

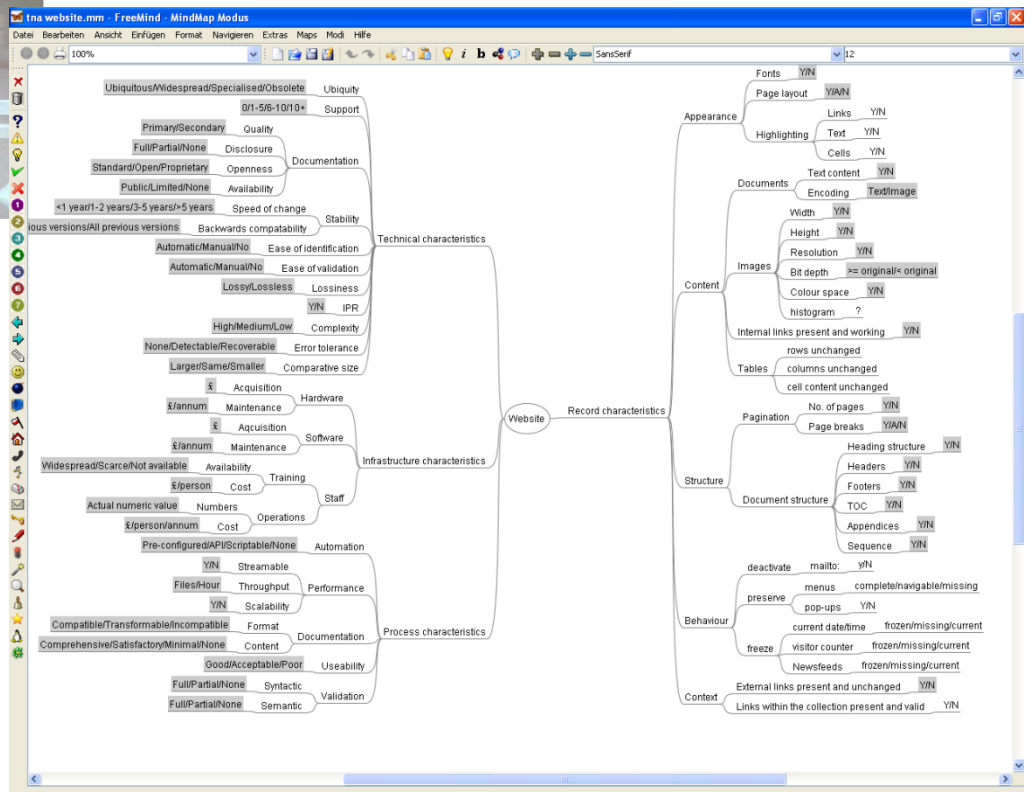






analogue…

… or digital



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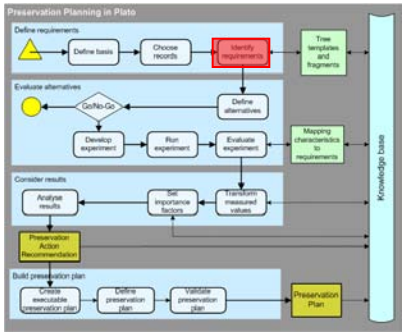
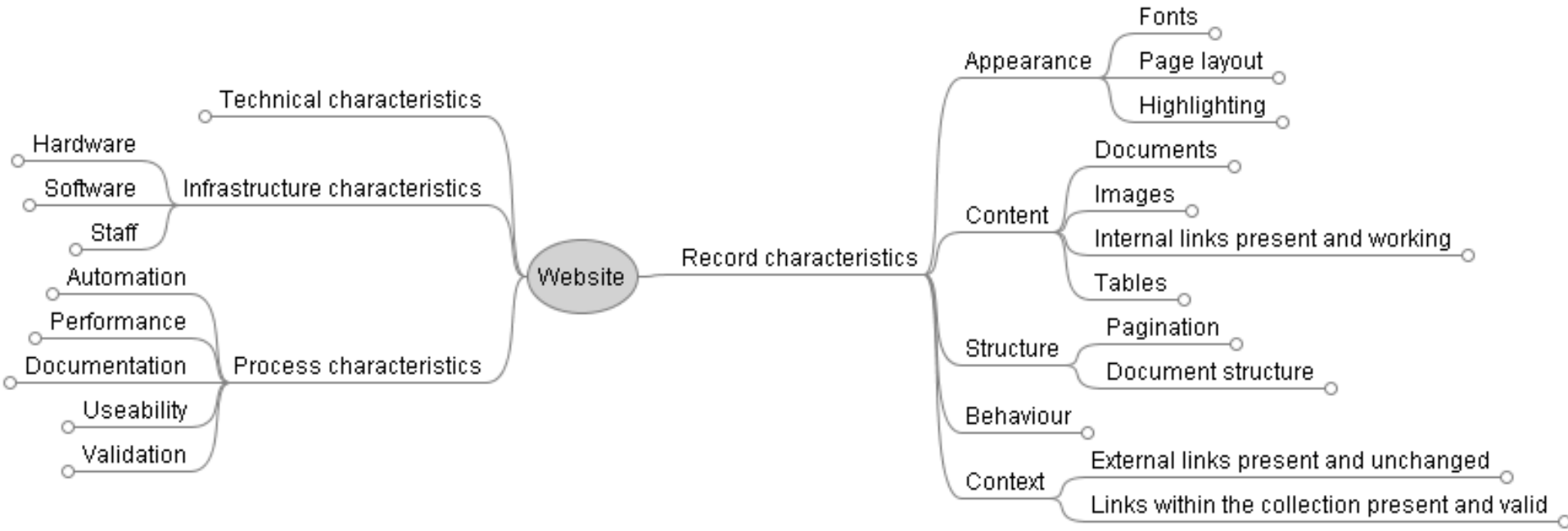
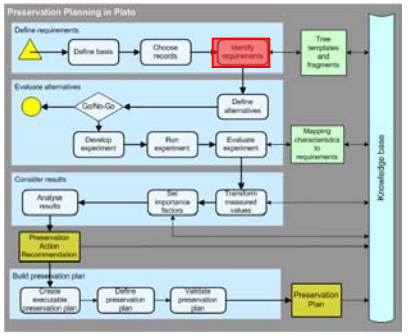
Identify requirements



Example: Webarchive



Identify requirements



- Creation within PLATO with Tree-Editor

PLANETS Preservation Planning Tool *(Plato)*

[logout becker] [help]

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results | PP4 workshop - The National Archive

Identify Requirements

Objective Tree
Descriptive Information

How can I define the objective tree?

[↑] Objective Tree

Expand All | Collapse All

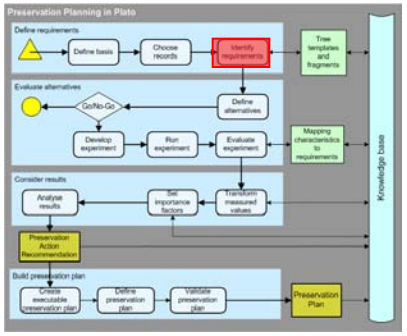
Website

Focus	Node	Single	Scale	Restriction	Unit
	▼ Website				
X	▶ Record characteristics				
X	▼ Technical characteristics				
X	▶ Ubiquity	☐	Ordinal	Ubiquitous/Widespread/Specia	
X	▼ Support	☐	Positive Integer		number of tools
X	▶ Documentation				
X	▶ Stability				
X	▶ Ease of identification	☐	Ordinal	Automatic/Manual/No	
X	▶ Ease of validation	☐	Ordinal	Automatic/Manual/No	
X	▶ Lossiness	☐	Ordinal	Lossy/Lossless	
X	▶ IPR	☐	Boolean	Yes/No	
X	▶ Complexity	☐	Ordinal	High/Medium/Low	
X	▶ Error tolerance	☐	Ordinal	None/Detectable/Recoverable	

Release 1.1 - Institute of Software Technology and Interactive Systems: «off-ice bears»

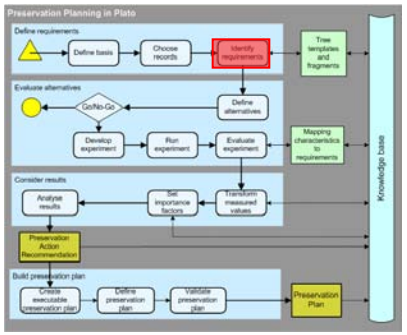
Quick Access:

Identify requirements



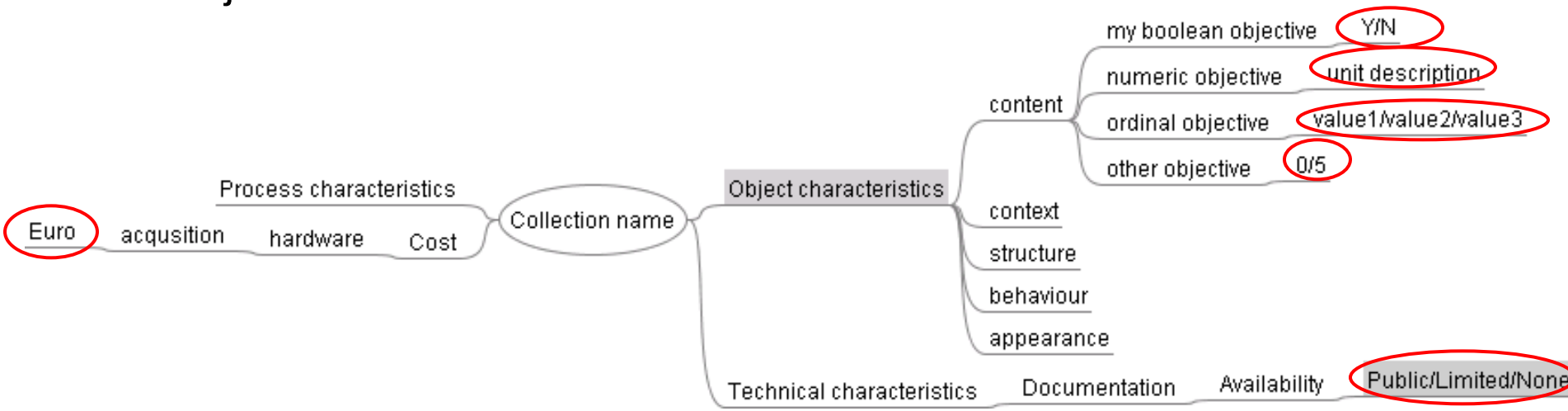
- Assign measurable unit to each leaf criterion
  - As far as possible automatically measurable
    - seconds / Euro per object
    - colour depth in bits
    - ...
  - Subjective measurement units where necessary
    - diffusion of file format
    - amount of expected support
    - ...
- No limitations on the type of scale used

Identify requirements

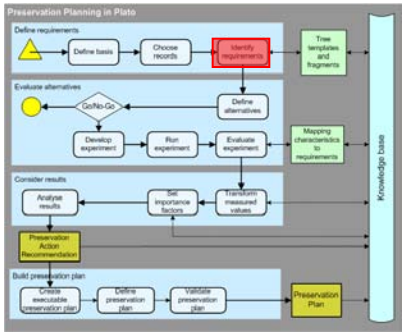


Types of scales

- Numeric
- Yes/No (Y/N)
- Yes/Acceptable/No (Y/A/N)
- Ordinal: define the possible values
- Subjective 0-to-5



Identify requirements



- Creation within PLATO with Tree-Editor

PLANETS Preservation Planning Tool *(Plato)*

[logout becker] [help]

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results | PP4 workshop - The National Archive

Identify Requirements

Objective Tree
Descriptive Information

How can I define the objective tree?

[↑] Objective Tree

Expand All | Collapse All

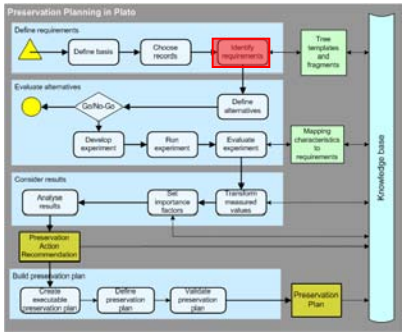
Website

Focus	Node	Single	Scale	Restriction	Unit
	Website				
X	Record characteristics				
X	Technical characteristics				
X	Ubiquity		Ordinal	Ubiquitous/Widespread/Specia	
X	Support		Positive Integer		number of tools
X	Documentation				
X	Stability				
X	Ease of identification		Ordinal	Automatic/Manual/No	
X	Ease of validation		Ordinal	Automatic/Manual/No	
X	Lossiness		Ordinal	Lossy/Lossless	
X	IPR		Boolean	Yes/No	
X	Complexity		Ordinal	High/Medium/Low	
X	[illegible]		Ordinal	None/Detectable/Recoverable	

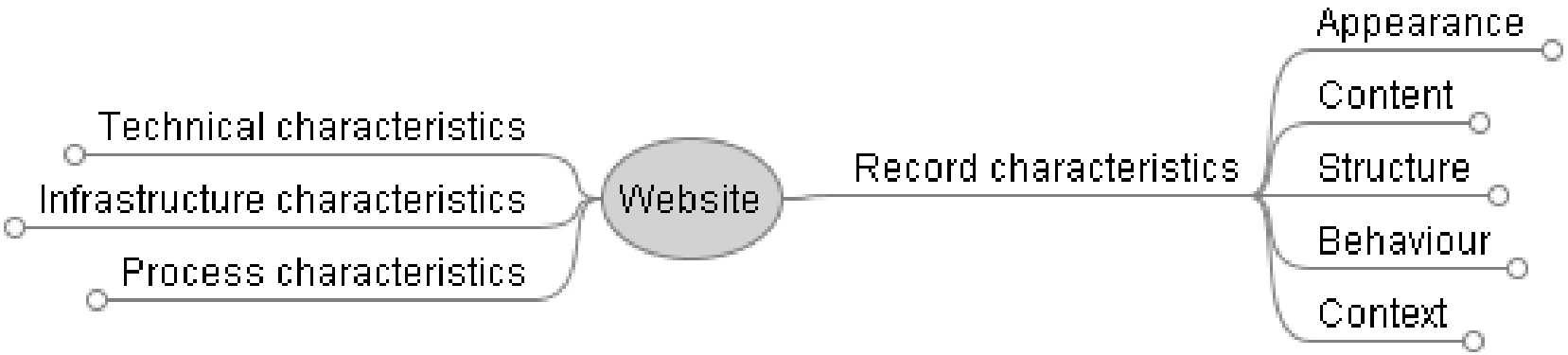
Release 1.1 - Institute of Software Technology and Interactive Systems: «off-ice bears»

Quick Access:

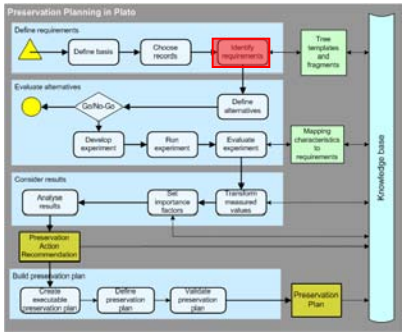
Identify Requirements: Example

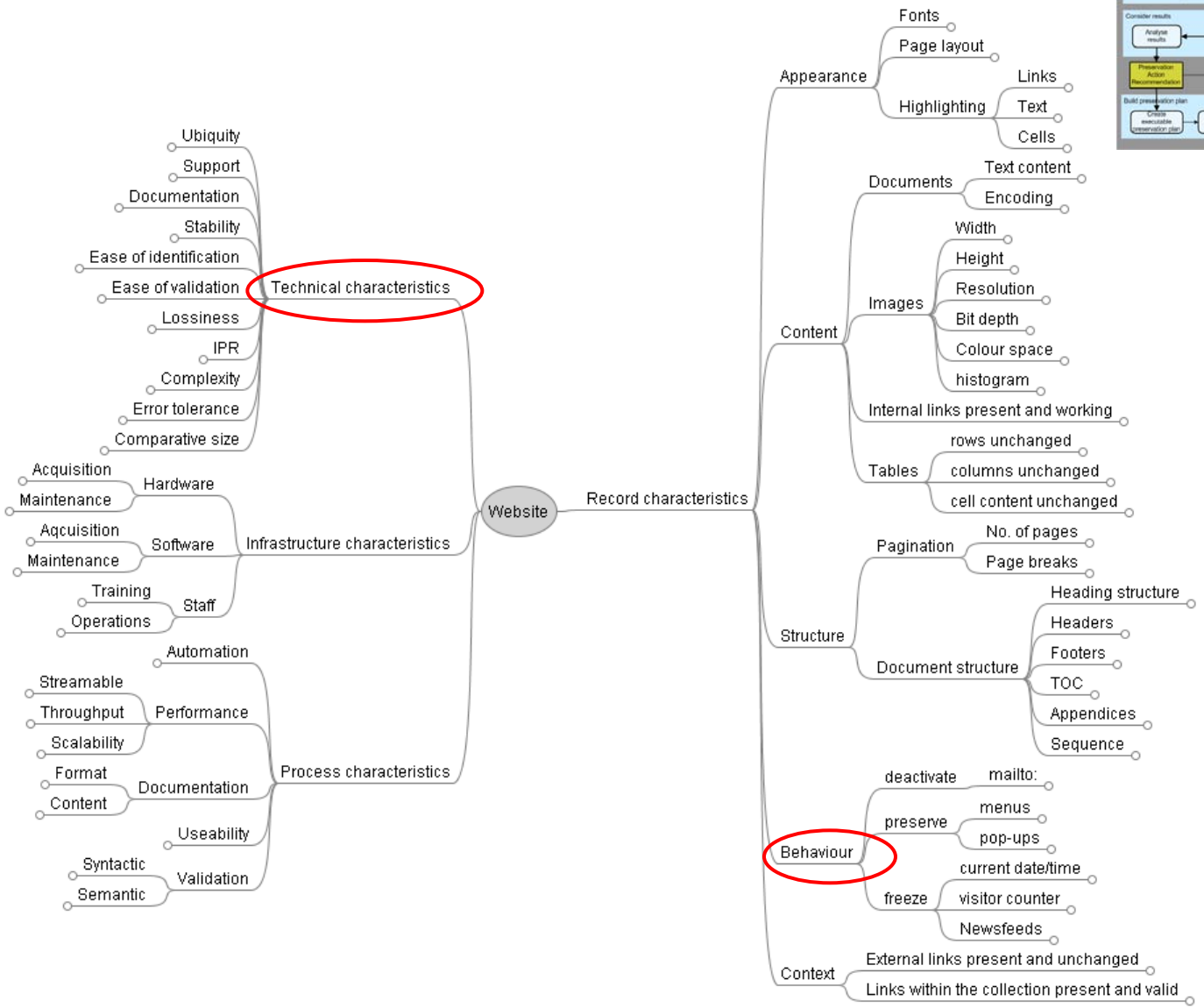


- Example Webarchiving:
  - Static Webpages
  - Including linked documents such as doc, pdf
  - Images
  - Interactive elements need not be preserved

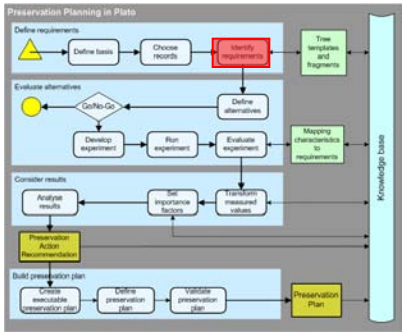


Identify Requirements: Example



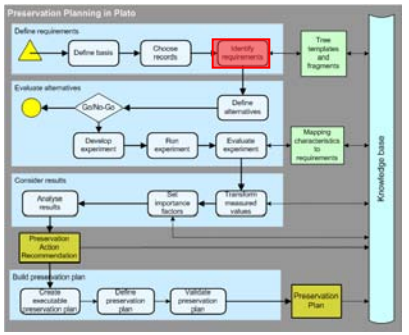


Identify Requirements: Example

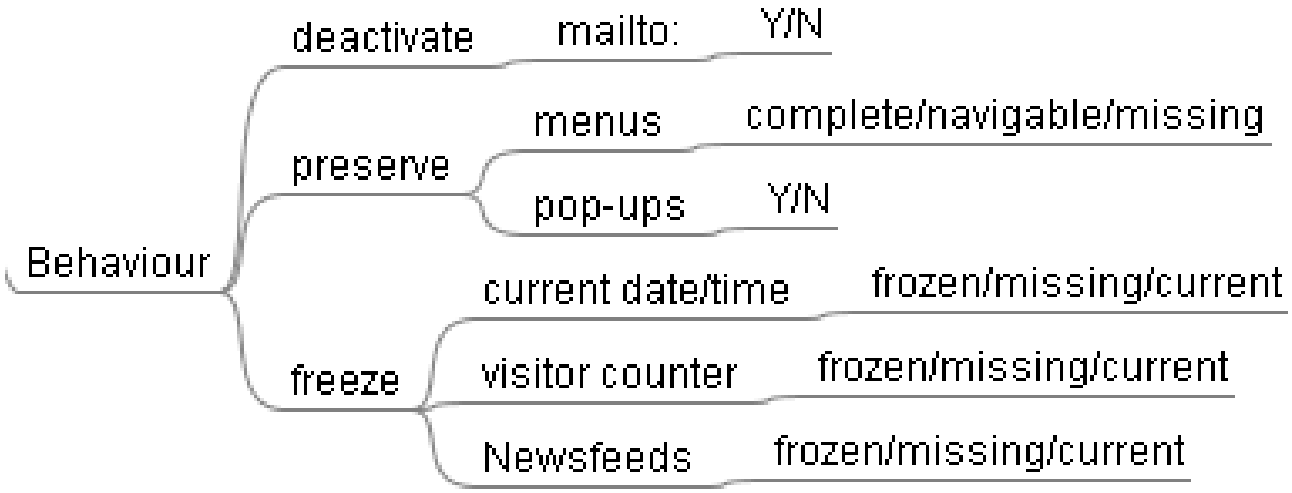


- Technical characteristics
  - Ubiquity: Ubiquitous/Widespread/Specialised/Obsolete
  - Support: number of tools
  - Documentation
    - Quality: Primary/Secondary
    - Disclosure: Full/Partial/None
    - Openness: Standard/Open/Proprietary
    - Availability: Public/Limited/None
  - Stability
    - Speed of change: <1 year/1-2 years/3-5 years/>5 years
    - Backwards compatability: None/Previous version only/Some previous versions/All previous versions
  - Ease of identification: Automatic/Manual/No
  - Ease of validation: Automatic/Manual/No
  - Lossiness: Lossy/Lossless
  - IPR: Y/N
  - Complexity: High/Medium/Low
  - Error tolerance: None/Detectable/Recoverable
  - Comparative size: Larger/Same/Smaller

Identify Requirements: Example



Behaviour



- Visitor counter and similar functionalities can be
  - Frozen at harvesting time
  - Omitted
  - Remain operational, i.e. the counter will be increased upon archival calls
    (is this desired? count? demonstrate functionality?)

Practise time!

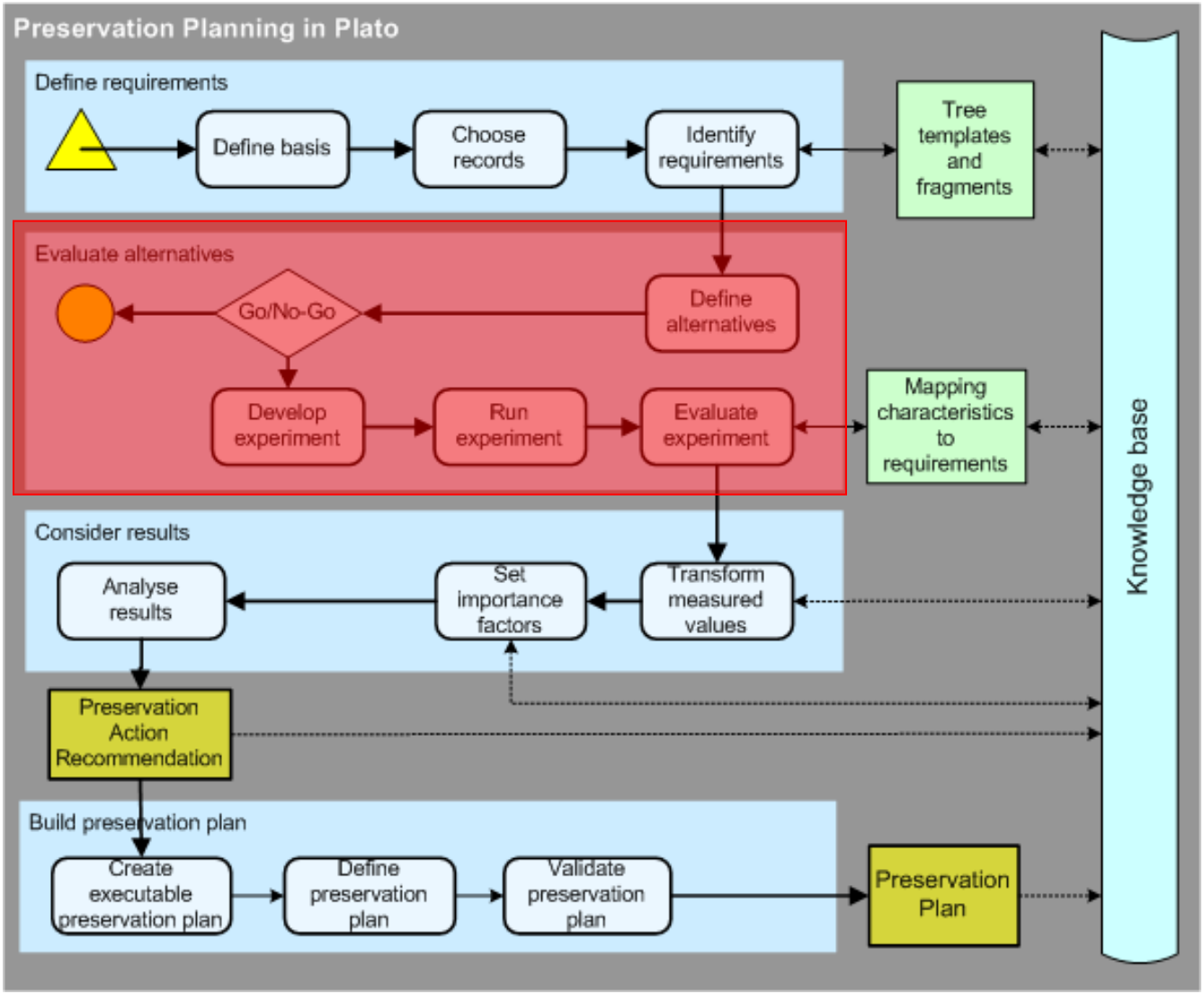
- Go to Plato: http://www.ifs.tuwien.ac.at/dp/plato
- Log into Plato with group account
- Click “List my preservation plans”

- Open preservation plan named

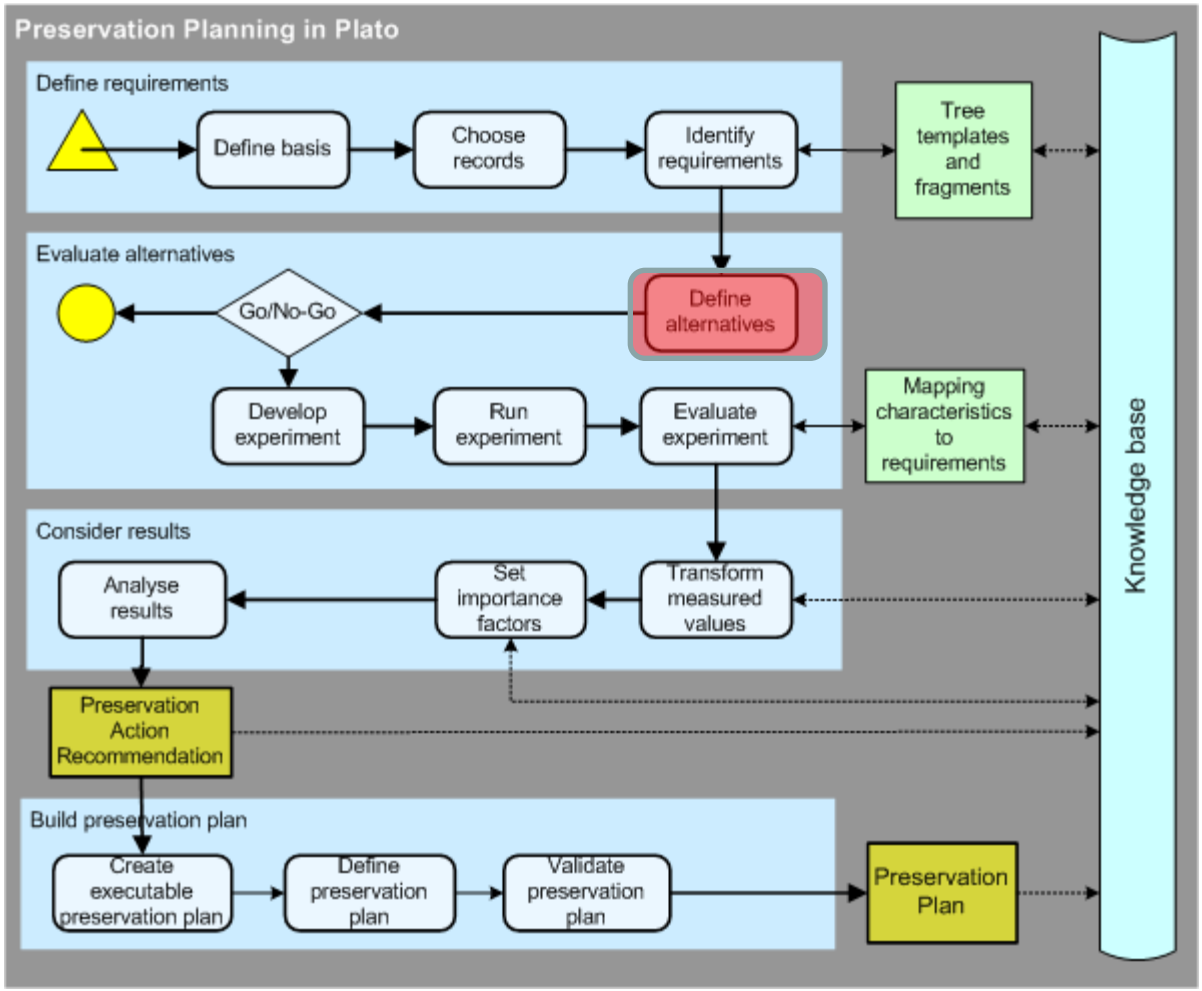
  “**Scanned yearbooks archive (IDENTIFY REQUIREMENTS)”**

- Enter further requirements

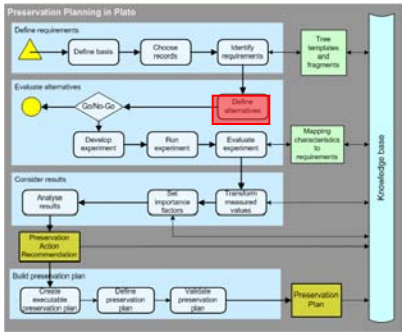
PP Workflow



Orientation

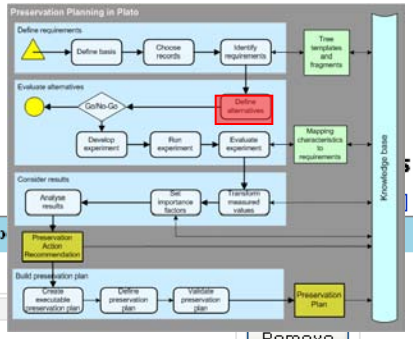


Define Alternatives



- Given the type of object and requirements, what strategies are possible and which is most suitable
  - Migration, emulation, other?
- For each alternative, precise definition of
  - Which tool (OS, version)
  - Which functions of the tool
  - Which parameters
  - Resources that are needed (human, technical, time and cost)
- Define manually or use registries via web services

Define Alternatives



PLANETS Preservation Planning Tool *(Plato)*

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results | Polar b

Define the alternatives of the Project

ID	Name	Description	
196616	TIFF (tool A)	Convert to TIFF using the well-tested and expensive tool 'A'	Remove
196613	TIFF (tool B)	Convert to TIFF/4 using this new tool named 'B'	Remove
196614	GIF (tool C)	Convert to GIF using the well-tested tool 'C'	Remove
196615	PNG (tool D)	Convert to PNG using the well-tested tool 'D'	Remove

Add new Alternative

Save | Discard changes | Proceed

Create alternatives from applicable services

Sample record #1 has format JPEG File Interchange Format, 1.01.
You can look up services that are able to handle this object type in the following registries:

Planets Preservation Action Tool registry

Show Preservation Services

Planets Service Registry

Show Preservation Services

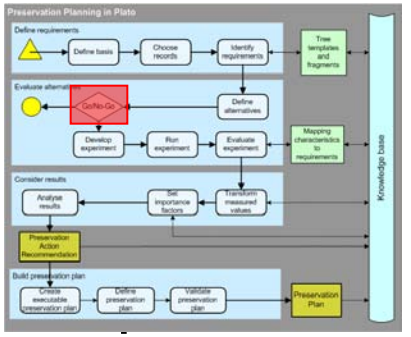
CRiB Service Registry

Show Preservation Services

	Preservation Action	Target Format	Info
☐	JPG > BMP	Windows Bitmap, version 3.0	JPG>BMP
☑	JPG > TIF	Tagged Image File Format, version 3	JPG>BMP>TIF
☐	JPG > TIF #2	Tagged Image File Format, version 3	JPG>TIF
☑	JPG > TIF_2	Tagged Image File Format, version 3	JPG>TIF_2
☐	JPG > PNG	Portable Network Graphics, version 1.0	JPG>PNG
☐	JPG > JP2	JPEG 2000	JPG>JP2

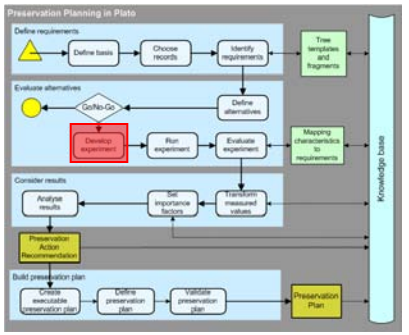
Create alternatives for selected services

Go/No-Go



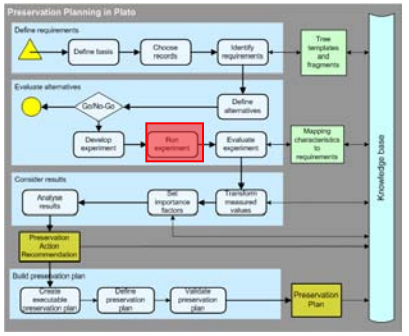
- Deliberate step for taking a decision if it will be useful and cost-effective to continue the procedure, given
  - The resources to be spent (people, money)
  - The availability of tools and solutions,
  - The expected result(s).
- Review of the experiment/ evaluation process design so far
  - Is the design complete, correct and optimal?
- Need to document the decision
- If insufficient: can it be redressed or not?
- Decision per alternative: go / no-go / deferred-go

Develop experiment



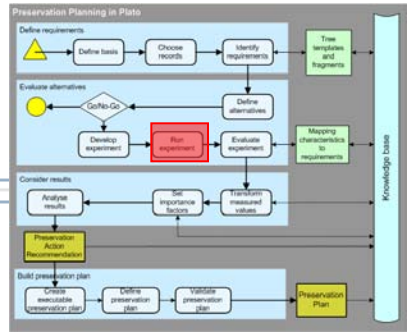
- Plan for each experiment
  - steps to build and test SW components
  - HW set-up
  - Procedures and preparation
  - Parameter settings, capturing measurements (time, logs...)
- Standardized Testbed-environment simplifies this step (PLANETS Testbed)
- Ideally directly accessible Preservation Action Services
- Ensures that results are comparable and repeatable

Run experiment



- Before running experiments: Test
- Call migration / emulation tools
- Local or service-based
- Capture process measurements
  (Start-up time, time per object, throughput, ...)
- Capture resulting objects, system logs, error messages,…

Develop and Run Experiment



JPG > JP2

Save | Discard changes | Proceed

Result Files

Results	Sample Records		
TIFF (tool A) ?	Polar bear 1	Upload File	
	Polar bear 2	Upload File	
TIFF (tool B) ?	Polar bear 1	Upload File	
	Polar bear 2	Upload File	
GIF (tool C) ?	Polar bear 1	Upload File	
	Polar bear 2	Upload File	
PNG (tool D) ?	Polar bear 1	Upload File	
	Polar bear 2	Upload File	
JPG > BMP ?	Polar bear 1	Upload File	Polar bear 1.bmp Download File
	Polar bear 2	Upload File	Polar bear 2.bmp Download File
JPG > TIF ?	Polar bear 1	Upload File	
	Polar bear 2	Upload File	

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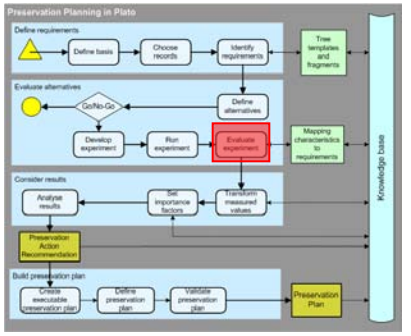
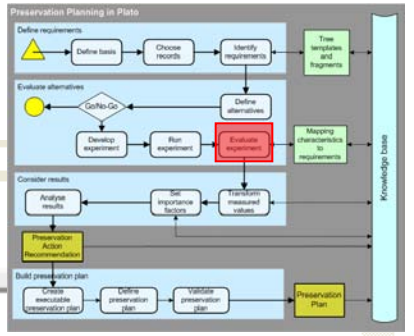
Demo!

Evaluate experiment



- Analyse the results according to the criteria specified in the Objective Tree
- Preservation Characterization: *Characterization Services*
- Evaluation analyses
  - Experiment measurements, results
  - Necessity to repeat an experiment
  - Undesired / unexpected results
- Technical and intellectual aspects

Evaluate Experiment



Designated community:

Durchsuchen...

Applying policies:

Durchsuchen...

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Figure 8 Define

In the first step of the workflow (Figure 8), the number environment are described in the text boxes. The proje

Evaluate Experiment

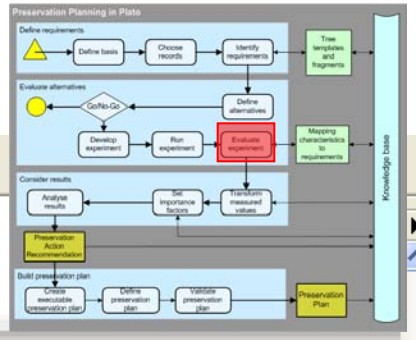
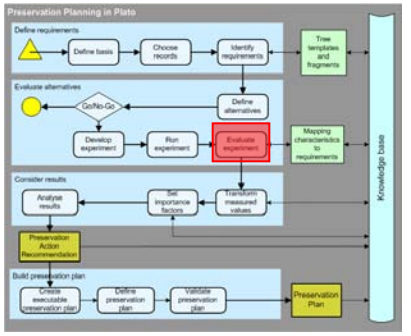


Figure 8 Define

In the first step of the workflow (Figure 8), the number
environment are described in the text boxes. The proje

Evaluate Experiment



PLANETS Preservation Planning Tool *(Plato)*

Project | | Define Requirements ::: Evaluate Requirements ::: Consider Results | |

Evaluate Experiment

Expand All | Collapse All

Polar bear image preservation

Focus	Node
	▼Polar bear image preservation
X	▼Process
X	▼Complexity
X	▼Cost
X	▼Image properties
X	▼Bits of colour depth
X	▼Technical characteristics
X	▼Official standard
X	▼Filesize (in Relation to Original)

Comments:

Process > Complexity

Alternative	Single result	Comments
TIFF (tool A)	Simple *	
TIFF (tool B)	Simple *	
GIF (tool C)	Complex *	
PNG (tool D)	Medium *	

Process > Cost

Alternative		Comments
TIFF (tool A)	173 *	
	152 *	
TIFF (tool B)	100 *	
	88 *	
GIF (tool C)	140 *	
	128 *	
PNG (tool D)	79 *	
	80 *	

Image properties > Bits of colour depth

Alternative	Single result	Comments
TIFF (tool A)	32 bit *	
TIFF (tool B)	32 bit *	
GIF (tool C)	32 bit *	
PNG (tool D)	32 bit *	

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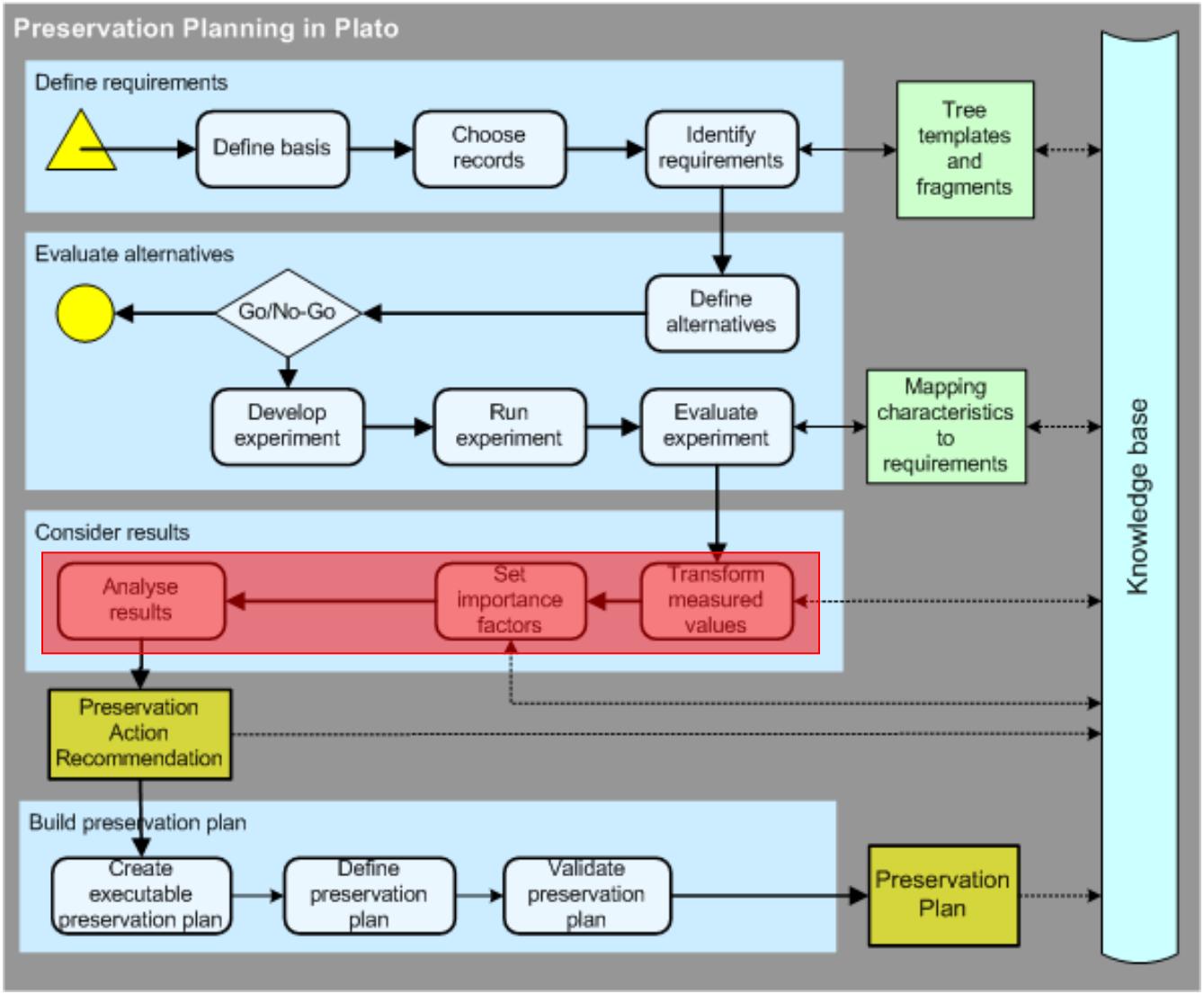
Practise time!

- Log into Plato at: http://www.ifs.tuwien.ac.at/dp/plato
- Download http://www.ifs.tuwien.ac.at/~kulovits/sample-files.zip
- Download http://www.ifs.tuwien.ac.at/~kulovits/experiment-results.zip
- Open preservation plan named

  “Scanned yearbooks archive (EVALUATE EXPERIMENTS)”

- Evaluate requirements

PP Workflow



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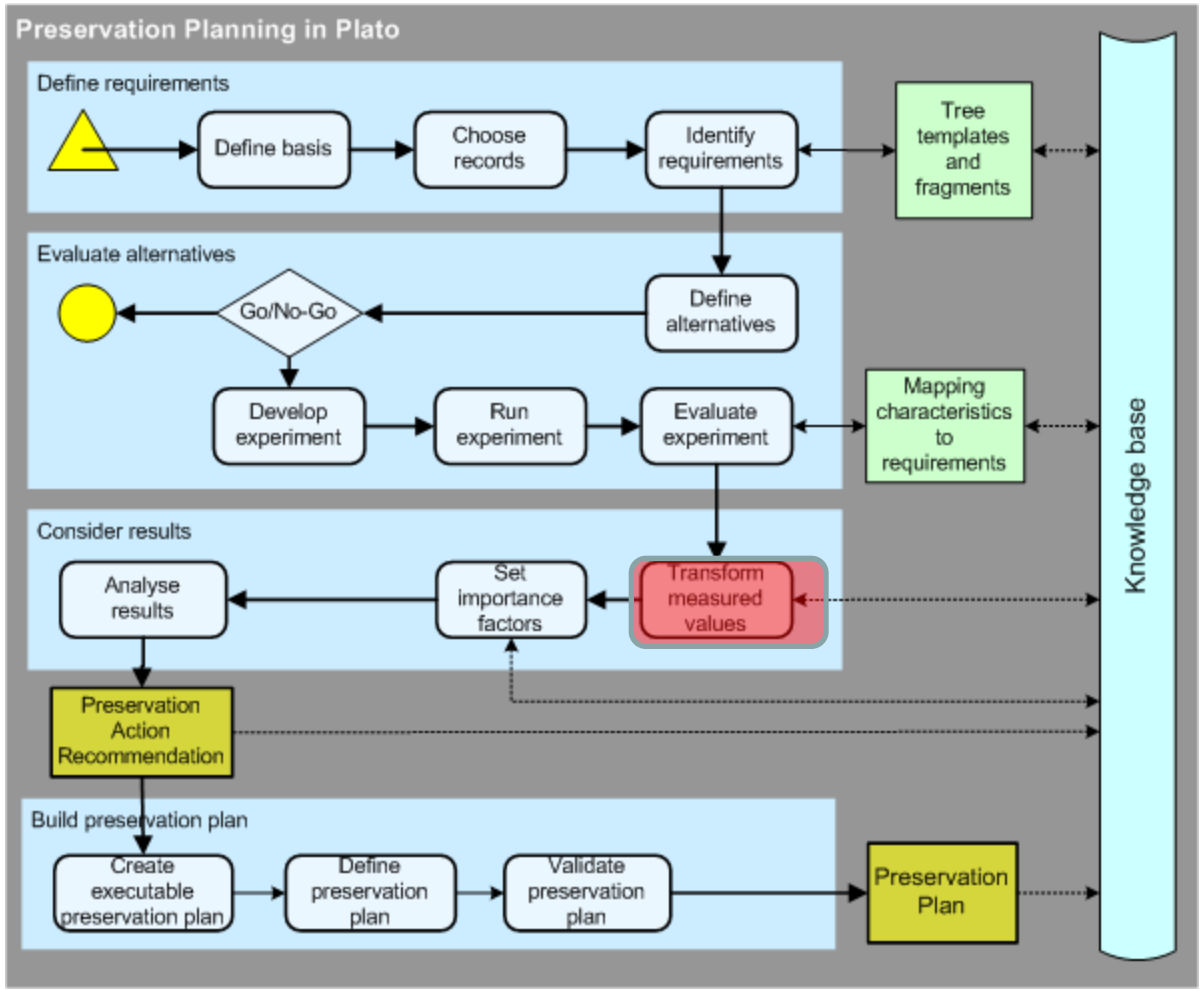
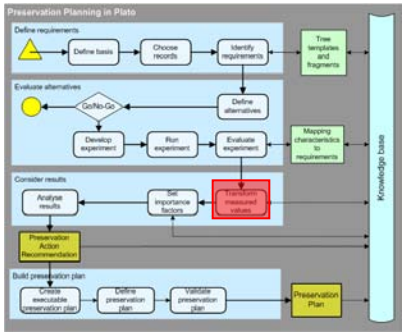
Orientation

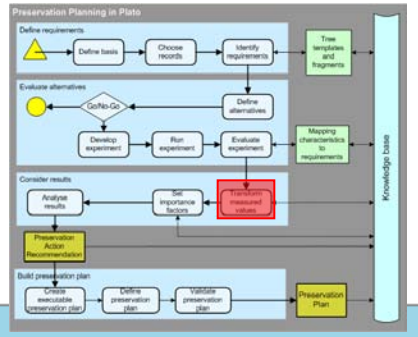


Transform measured values



- 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"

Transform Measured Values



PLANETS Preservation Planning Tool *(Plato)*

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results

Transform Measured Values

Expand All | Collapse All

Polar bear image preservation

Focus	Node
	▼Polar bear image preservation
X	▼Process
X	▼Complexity
X	▼Cost
X	▼Image properties
X	▼Bits of colour depth
X	▼Technical characteristics
X	▼Official standard
X	▼Filesize (in Relation to Original)

Comments: The limit for the process cost was decided to be 150¢ per picture in the last polar-bear-enthusiasts-association-

Technical characteristics > Official standard

Ordinal Value	Target Value
Yes	-> 5.0 *
No	-> 0.0 *

Results	Single
TIFF (tool A)	Yes
TIFF (tool B)	Yes
GIF (tool C)	No
PNG (tool D)	Yes

Aggregation mode:

(•) Worst result ( ) Arithmetic mean

Technical characteristics > Filesize (in Relation to Original)

Threshold	Target value
10.0 *	x -> 1
5.0 *	x -> 2
2.0 *	x -> 3
1.2 *	x -> 4
0.8 *	x -> 5

Results	1	2
TIFF (tool A)	2.73	2.6
TIFF (tool B)	2.3	3.1
GIF (tool C)	1.1	0.9
PNG (tool D)	1.3	1.5

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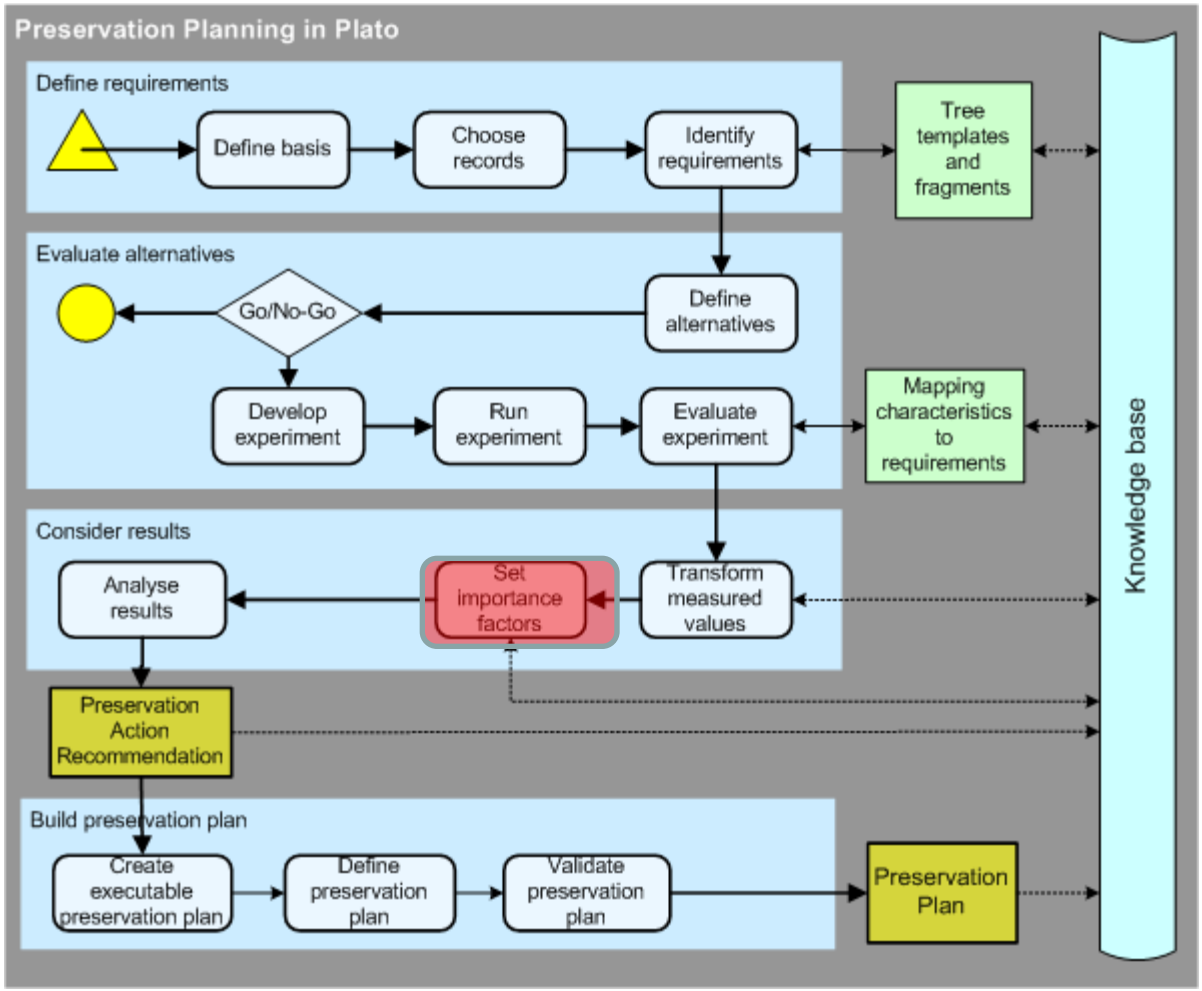
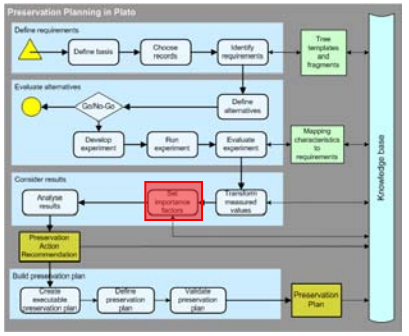
Orientation

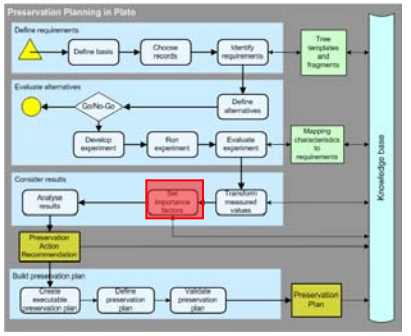


Set Importance Factors



- Not all leaf criteria are equally important
- By default, weights are distributed equally
- Adjust relative importance of all siblings in a branch
- Weights are propagated down the tree to the leaves

Set Importance Factors



- Object characteristics
  - 25% structure
    - 35% menus and navigation path
    - 35% complete
    - 30% overall page layout
  - 10% appearance
    - 25% mouse
      - animated pointer
    - 20% transitions
      - speed
      - effects
        - graphic
        - sound
    - 15% animations
      - speed
    - 5% background
      - colour gradient
    - 25% menu speed
    - 10% fonts
      - type
      - colour
      - style
      - size
  - 15% behaviour
    - 10% navigation
    - 80% reaction to activity
      - mouse
      - keyboard
    - 10% video/sound control
  - 10% context
    - 20% documentation material
    - 80% metadata reference valid
  - 40% content
    - 22% sound
      - Loops
      - Effects
      - content identical
      - quality
    - 22% video
      - sound
      - picture
      - synchronisation
    - 22% image
      - resolution
      - colour
      - position
      - size
      - content identical
      - quality
    - 22% text
      - content identical
      - line breaks
    - 12% user manual

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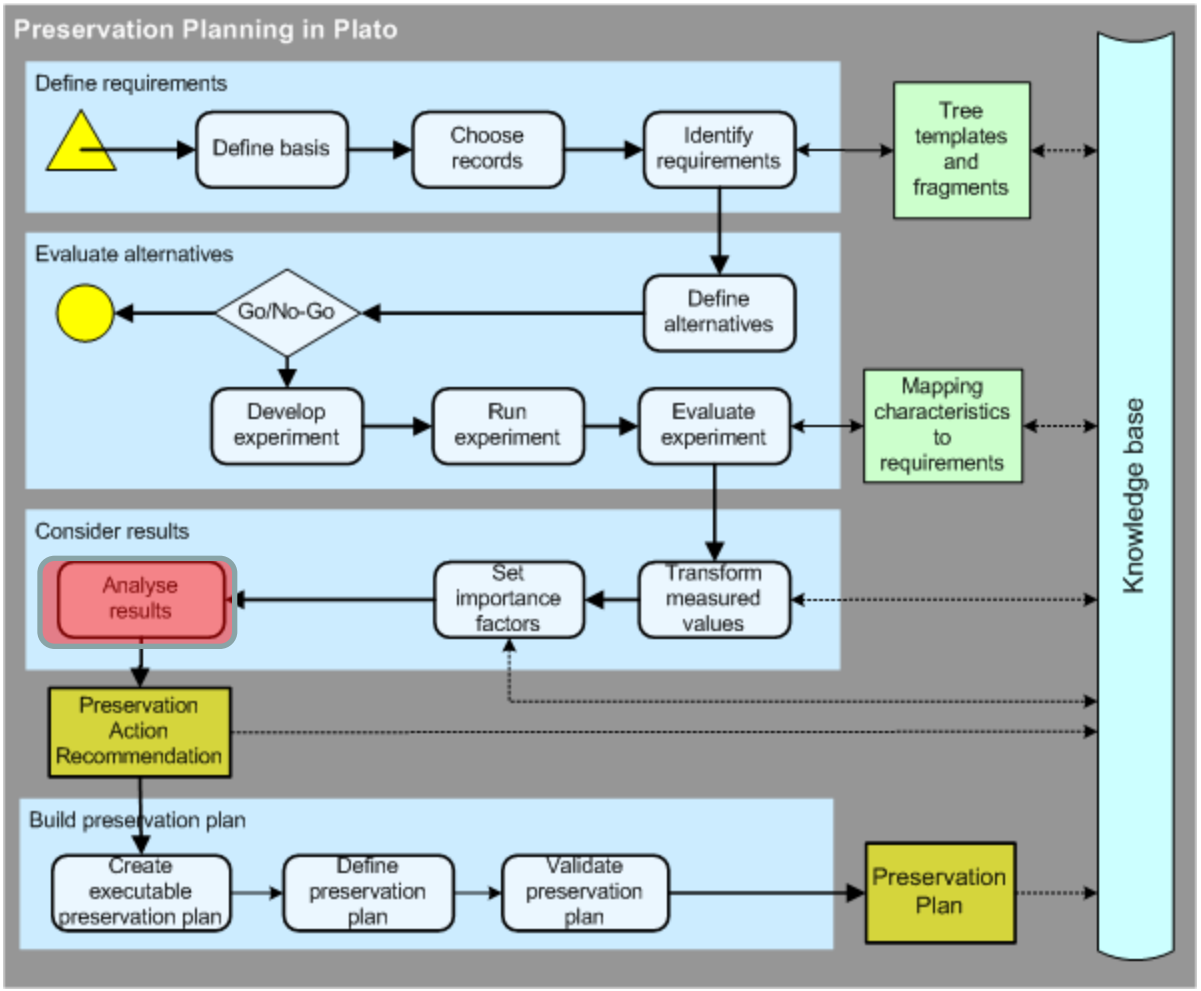
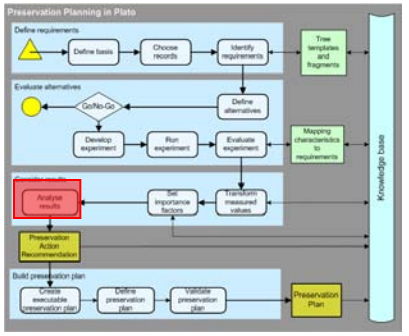
Orientation

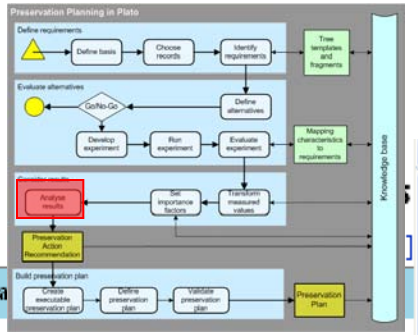


Analyse results



- Aggregate values in Objective Tree
  - Multiply transformed measurements in leaves with weights
  - Sum up across tree
- Results in accumulated performance value per alternative at root level
  → ranking of alternatives
- Also results in performance value for each alternative in each sub-branch of the tree
  → combination of alternatives
- Basis for well-informed and accountable decisions
- Different aggregation methods, e.g. sum and multiplication

Analyse Results



PLANETS Preservation Planning Tool *(Plato)*

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results | Minimalist test project in sta

Analyse Results

Aggregation method: Sum

Select	Alternative
☑	PDF/A ToolA
☑	PDF/A ToolB

Show

Expand All | Collapse All

Minimalist root node

Focus	Name	Result
	▼Minimalist root node	PDF/A ToolA: 2,88 PDF/A ToolB: 3,19
X	▶Image properties	PDF/A ToolA: 0,60 PDF/A ToolB: 0,80
X	▶Karma	PDF/A ToolA: 0,40 PDF/A ToolB: 0,00
X	▶Filesize (in Relation to Original)	PDF/A ToolA: 0,78 PDF/A ToolB: 0,99
X	▶A Single-Leaf	PDF/A ToolA: 0,40 PDF/A ToolB: 0,80
X	▶IntRange 0-10	PDF/A ToolA: 0,70 PDF/A ToolB: 0,60

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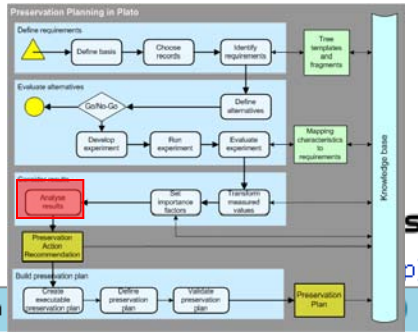
Analyse Results



PLANETS Preservation Planning Tool *(Plato)*

Project | Define Requirements ::: Evaluate Requirements ::: Consider Results | Minimalist test project in

Analyse Results

How do the aggregation mechanisms work?

Aggregation method: Multiplication

Select	Alternative
☑	PDF/A ToolA
☑	PDF/A ToolB

Show

Expand All | Collapse All

Minimalist root node

Focus	Name	Result
	▼Minimalist root node	PDF/A ToolA:2,86 PDF/A ToolB:0,00
X	▼Image properties	PDF/A ToolA:1,28 PDF/A ToolB:1,32
X	▼Amount of Pixel	PDF/A ToolA:3,50 PDF/A ToolB:4,00
X	▼Karma	PDF/A ToolA:1,15 PDF/A ToolB:0,00
X	▼Filesize (in Relation to Original)	PDF/A ToolA:1,31 PDF/A ToolB:1,38
X	▼A Single-Leaf	PDF/A ToolA:1,15 PDF/A ToolB:1,32
X	▼IntRange 0-10	PDF/A ToolA:1,28 PDF/A ToolB:1,25

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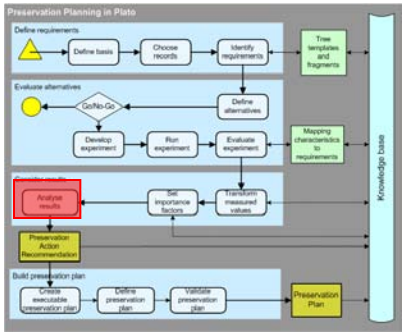
Analyse results



Example: Electronic documents

Alternative	Total Score Weighted Sum	Total Score Weighted Multiplication
PDF/A (Adobe Acrobat 7 prof.)	4.52	**4.31**
PDF (unchanged)	**4.53**	0.00
TIFF (Document Converter 4.1)	4.26	3.93
EPS (Adobe Acrobat 7 prof.)	4.22	3.99
JPEG 2000 (Adobe Acrobat 7 prof.)	4.17	3.77
RTF (Adobe Acrobat 7 prof.)	3.43	0.00
RTF (ConvertDoc 4.1)	3.38	0.00
TXT (Adobe Acrobat 7 prof.)	3.28	0.00

- Deactivation of scripting and security are knock-out criterium (PDF)
- RTF is weak in *Appearance* and *Structure*
- Plain text doesn't satisfy several minimum requirements

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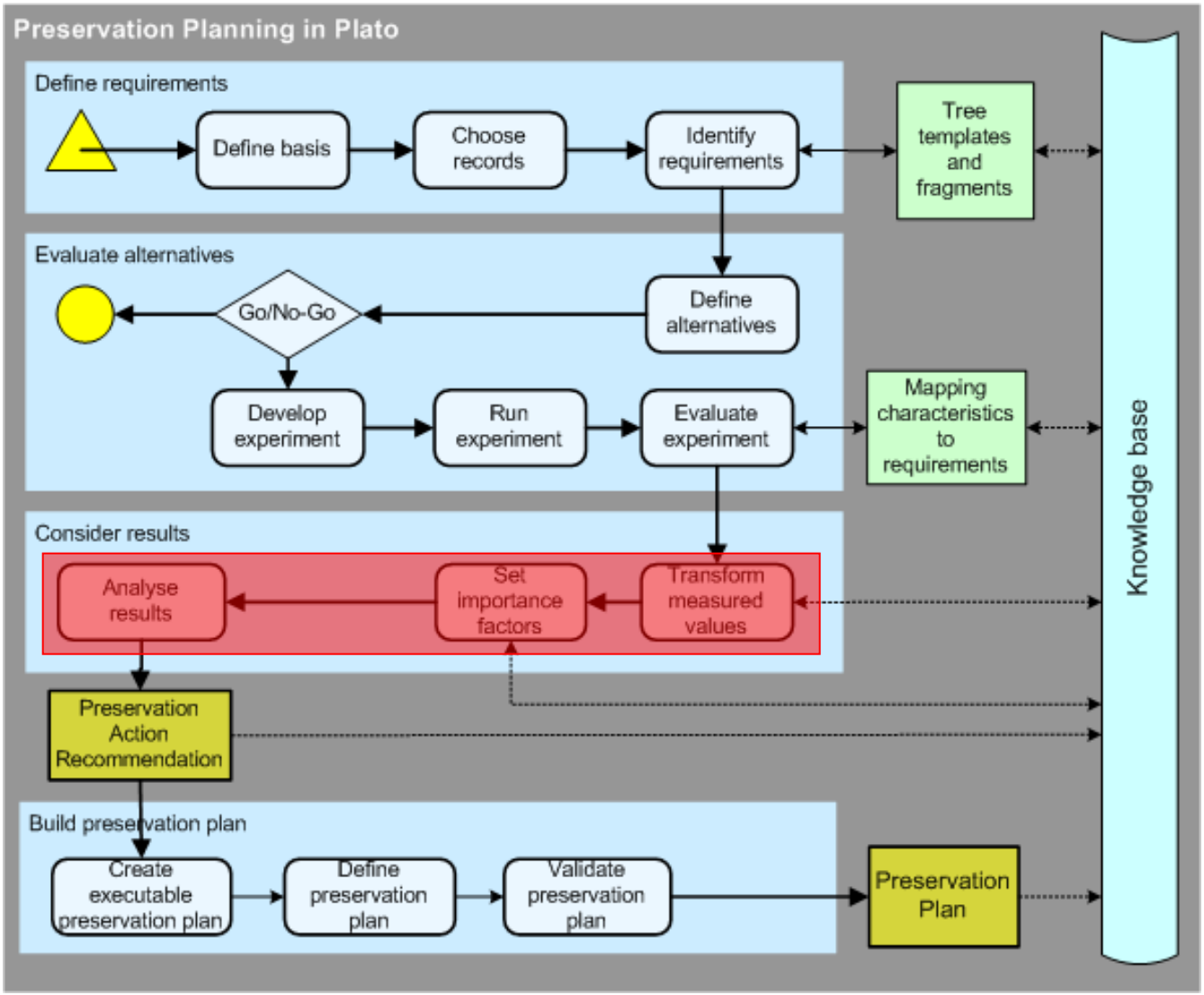
PP Workflow



Practise time!

- Log into Plato at: http://www.ifs.tuwien.ac.at/dp/plato
- Open preservation plan named

  “Scanned yearbooks archive (ANALYSE)”

- Proceed to “Validate Preservation Plan”
- Export the preservation plan

Schedule

(1) Introduction
- What is Digital Preservation?
- EPrints
- Preservation Planning and Plato

(2) Preservation in EPrints

(3) Preservation Planning with Plato

(4) Bringing it all together and Closing

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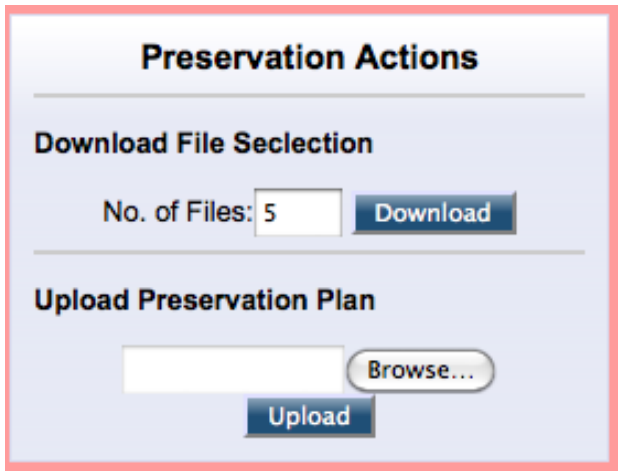
The Preservation Process

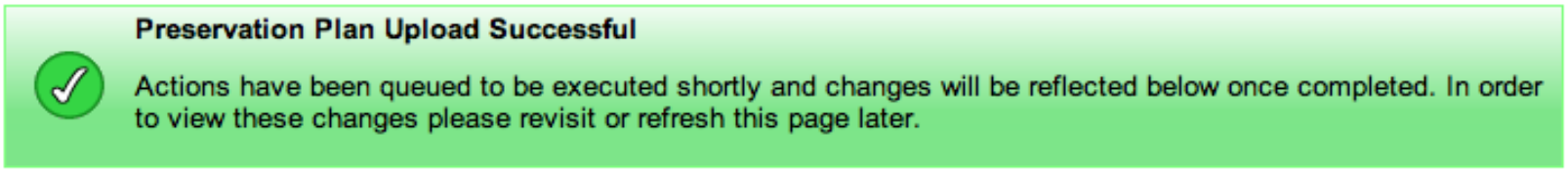
Preservation - Action

- Uploading a Preservation Plan in EPrints
- Viewing resultant actions
- Managing your plans
- Re-enacting the Plan
- Viewing Provenance Information

Uploading a Plan



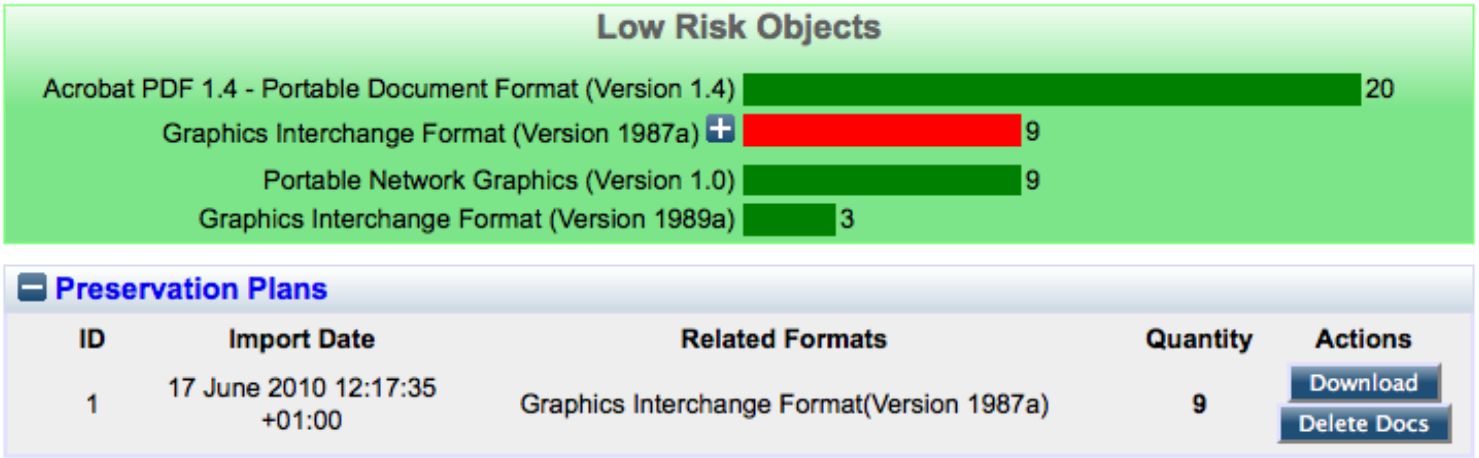
- Each set of “at risk” classified files can have a single related preservation plan.
- Once uploaded, any defined actions will be performed on **all** files of that classification.



Plan Management

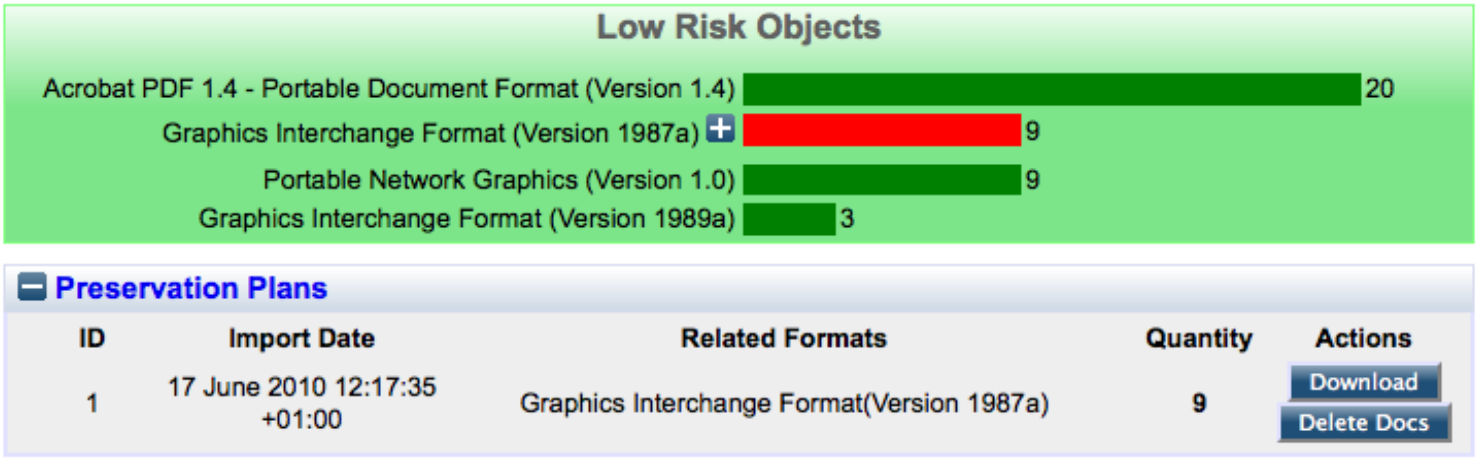
- No plan can cause files to be deleted.

- A plan controls any files it has created.
- While these files exist, the plan cannot be deleted.

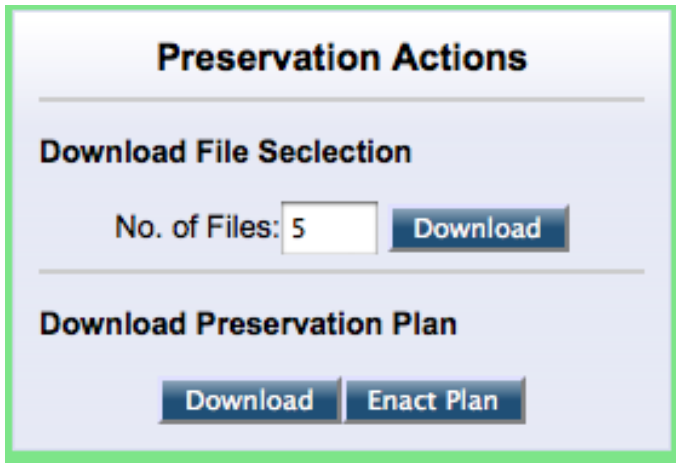


Viewing the Result

- Previously high risk objects are still represented by a red bar, but are now in the low risk category.



Preservation Actions Panel



- Download plan for reviewing in planning software.
- Re-enact plan

Viewing the Result

- Before

Image (GIF)
Download (76Kb) | Preview

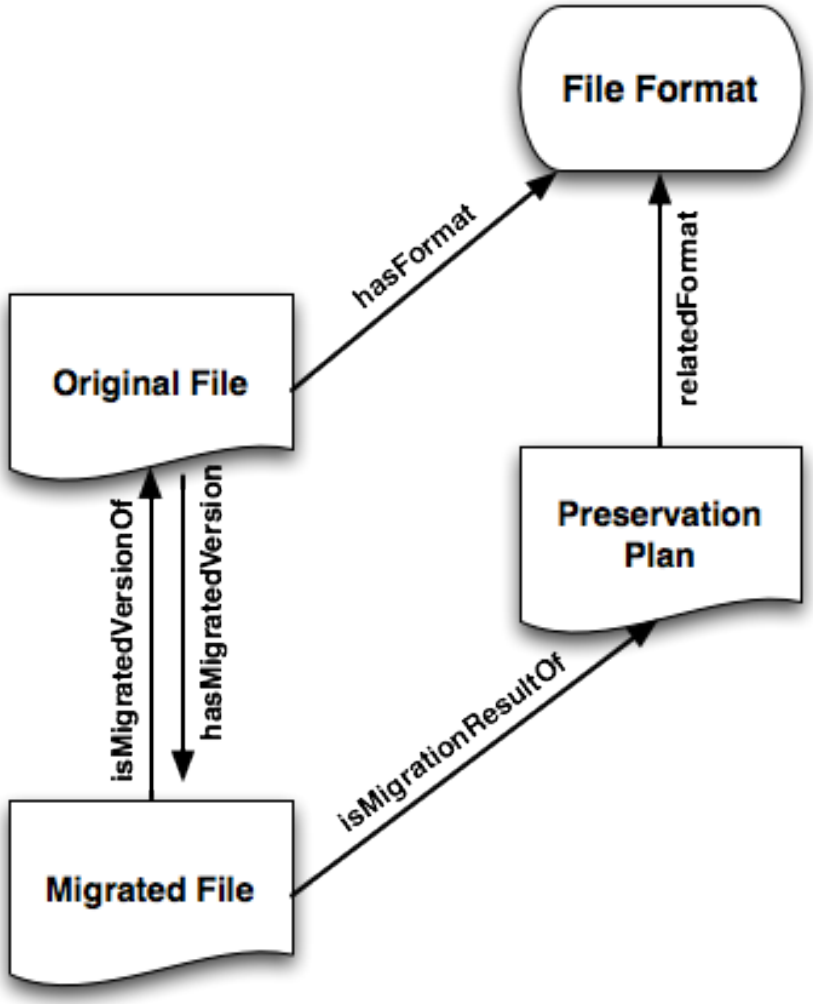
- After

Image (PNG) (Migrated (Preservation) from Document ID: 41 (image/gif))
Download (76Kb) | Preview

- Image (GIF) (Original Version)

Provenance Information

- Open Provenance Model (OPM) compliant
- Stored in RDF triple form using the EPrints relation manager added in 3.2



Exercise Time

Conclusions

Preservation Planning

Why Preservation Planning?

- Several preservation strategies developed
  - For each strategy: several tools available
    - For each tool: several parameter settings available
- How do you know which one is most suitable?
- What are the needs of your users? Now? In the future?
- Which aspects of an object do you want to preserve?
- What are the requirements?
- How to prove in 10, 20, 50, 100 years, that the decision was correct / acceptable at the time it was made?

Preservation Planning

- Consistent workflow leading to a preservation plan
- Analyses, which solution to adopt
- Considers
  - preservation policies
  - legal obligations
  - organisational and technical constraints
  - user requirements and preservation goals
- Describes the
  - preservation context
  - evaluated preservation strategies
  - resulting decision including the reasoning
- Repeatable, solid evidence

Digital Preservation

What is a preservation plan?

- 10 Sections
  - Identification
  - Status
  - Description of Institutional Setting
  - Description of Collection
  - Requirements for Preservation
  - Evidence for Preservation Strategy
  - Cost
  - Trigger for Re-evaluation
  - Roles and Responsibilities
  - Preservation Action Plan

Preservation Plan Template

Preservation lifecycle

Thank you!

http://www.ifs.tuwien.ac.at/dp

http://www.eprints.org/