Milestone M5.1

HOPE
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Repository workflow and Requirements specification

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Table of contents

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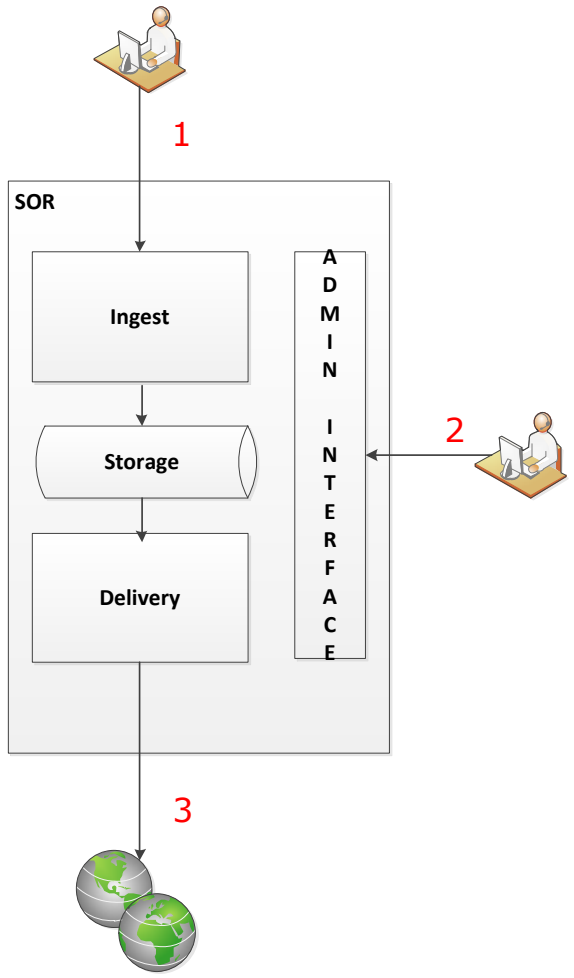
Introduction

This is the milestone document for Task 5.1. This document describes the requirements specification for the SOR. This document consists of 3 parts:
1: Requirements for ingest
2: Requirements for admin interface
3: Requirements for delivery

Part 1 and 2 are mainly describing communication between the content provider and the SOR. Therefore is decided to give an overview of the requirements and based on these requirements workflows are made.

Part 3 is mainly about delivery to 3rd parties through API's. Therefore is decided to only list the functionalities provided by these API's



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1. Ingest workflow

Based on the following staging area and submission requirements an ingest workflow is made:

1.1 Staging area requirements

1 A Staging Area shall be provided to allow each CP to remotely store and manage their digital master files
2 The Staging Area shall provide a root directory, which allows subfolders, for each user account
3 There will be no metadata requirements for storage of files in the Staging Area
4 The system shall support SFTP upload
5 The system shall support ASCII 33-126 (with possible exceptions)
6 The system shall support all linux supported file systems (NTFS, Fat32)
7 The system shall be able to support simultaneous upload by all CPs at any given time
8 The system shall scan content for viruses at least at upload. If a virus is found, the staging area will delete the file and the system informs the
9 The system shall provide tools to ensure a smooth and error free upload of files in the case of broken connections
10 CPs shall be able to send digital master files on a storage device (usb 2.0) for inclusion into the Staging Area
  10.1 The SOR administrator should SFTP the files to the selected folder on the SA that was provided by the CP. Mirroring the provided structure
11 The system must generate reports or logs on the activity in the Staging Area; these shall be available through the web interface
12 The Staging Area shall be accessible 24/7 over the duration of the HOPE project
13 The staging area will serve as a pre-ingest module

1.2 Submission requirements

1 The system can create an SOR processing instruction based on data input by CPs into the administrative interface
  1.1 The system shall support a SOR processing instruction for every folder tagged by the CP as a collection
  1.2 The SOR processing instruction shall be able to represent attributes that apply to all files in collections at a higher level
  1.3 The SOR processing instruction shall include at a minimum the following metadata tags: PID, checksum, file location, mimetype, access type, local identifier
  1.4 The system shall be able to generate a PID for inclusion in the SOR processing instruction

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1.5 CPs shall be able to download and alter SOR processing instruction generated by the system
1.6 The system shall accept and support SOR processing instruction generated by CPs.
1.7 The system shall store the SOR processing instruction in the Staging Area

2 The system shall accept the submission of file(s) and related technical metadata, single object or batch, single time or serially
3 The system shall accept the resubmission of file(s) and related technical metadata, single object or batch, single time or serially
4 The system shall accept the deletion of file(s) and related technical metadata, single object or batch, single time or serially
5 The system shall authenticate and authorize access to the repository.
6 The system shall check for incomplete or invalid technical metadata.
6.1 The system shall assign „restricted access" as a default to objects uploaded without access metadata
7 The system shall check the integrity of files. (suggestion: check sum produced prior to and after transmission to system)
8 The system shall check on duplicates. (suggestion: checksums will be used to detect duplicate files, file PIDs can be used to confirm resubmissions)
9 The system shall provide output on successful/failed actions (submissions, resubmissions, deletions) by the user.
9.1 The default assignment of restricted access to an object shall be reflected in the output
10 The system shall be able to send update requests to the PID resolving system
11 The system shall provide output on unresolved PIDS.
12 The system shall be able to ingest, store, and provide access to submitted files and metadata 24/7 over the duration of the project
13 The system shall be able to create derivatives
13.1 The system shall create normalized versions of uploaded content for upload to social sites (e.g. YouTube)
14 The system shall be able to store and manage master files and SOR generated derivatives upon submission and resubmission
15 The system shall purge master files and derivatives upon deletion
16 The system shall be able ensure referential integrity upon submission, resubmission, and deletion
17 The system shall keep detailed information on submission, resubmission, and deletion requests
18 The system shall accept submission, resubmission, and deletion of digital object(s) and related technical metadata independently of whether there is metadata on the object harvested by the Aggregator.

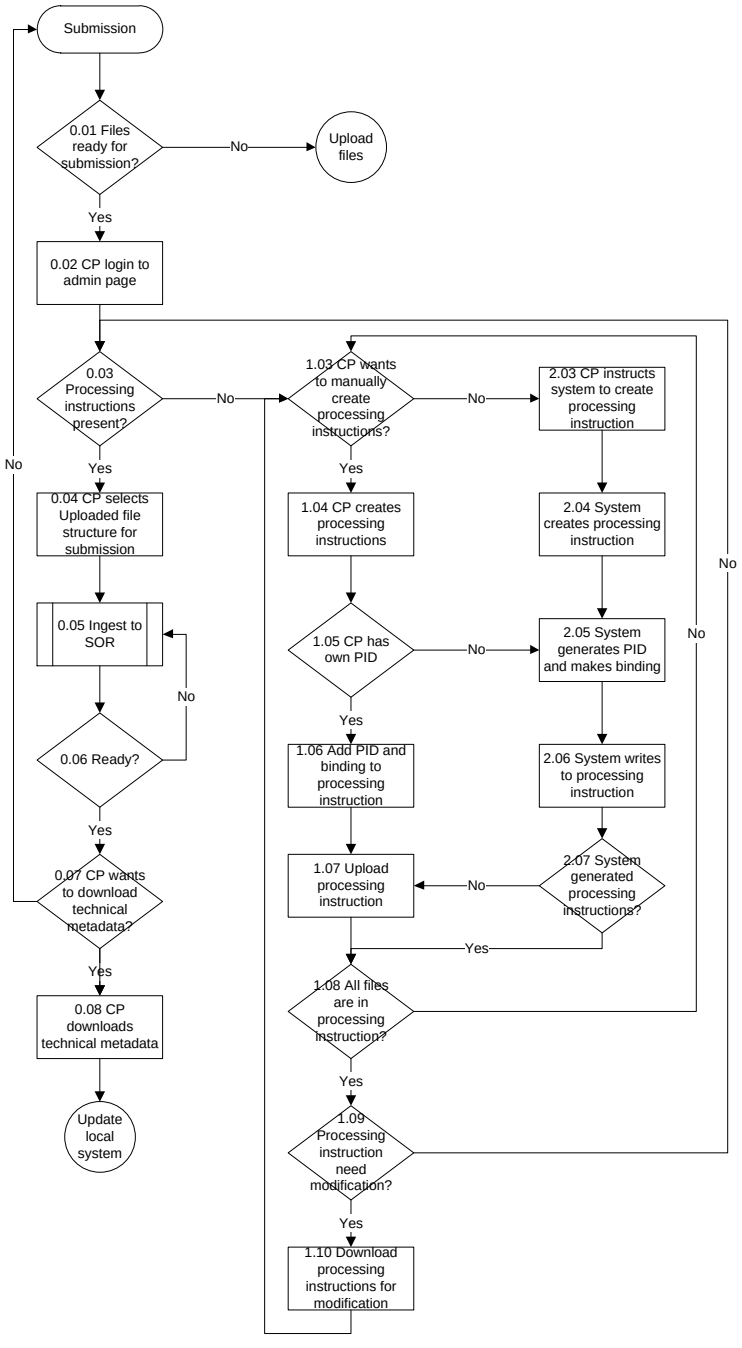
1.3 PID service

1 The system should provide PIDS on request
2 The system must enable the user to manage the resolving table
3 The system should enable the transfer to local/other PID services

1.4 Submission workflow

The submission workflow consists of two parts: The submission workflow and the ingest workflow.

1.4.1 Submission workflow schema



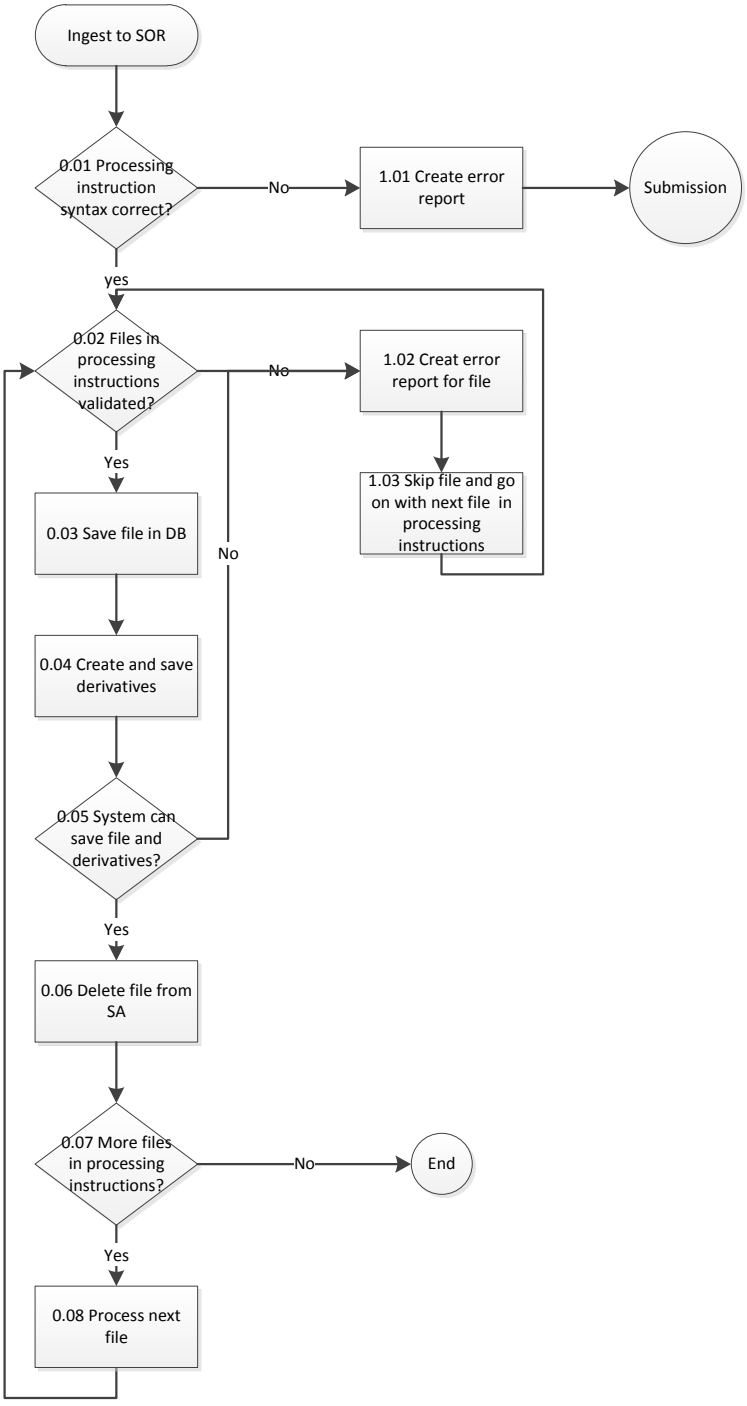
1.4.2 Submission workflow addition

0.01 CP checks if files are ready for submission, if not CP must upload files to before starting submission. If yes, CP can start submission
0.02 CP logs in to his administration page
0.03 The CP checks if any SOR processing instruction are present. If so workflows goes on. If no the CP can decide to create SOR processing instruction on its own or let the system generate the SOR processing instruction
0.04 The CP admin selects the preferred collection (s)he wants to submit
0.05 Ingest to SOR will start, move to workflow "Ingest SOR"
0.06 Check if the ingest is finished. If yes, start deletion of the Masters from the SA. If no stay in ingest workflow
0.07 The CP can decide to download the technical metadata. If yes, start download technical metadata. If no, go back to start and new submission can occur
0.08 CP downloads the technical metadata from the system
1.03 The CP can decide to create the SOR processing instruction. This can be done manually or by the system. If yes, CP starts SOR processing instruction. If no, CP gives instructions to the system to generate the SOR processing instruction
1.04 The CP creates the SOR processing instruction manually
1.05 If the CP is able to create his own PID, CP can use this to add to the SOR processing instruction. If CP decides not to use his own PID or the CP is not able to create own PID, the system will generate PID for the CP
When the CP requests an account the preferred PID service is selected.
1.06 The CP adds the own PID to the SOR processing instruction
1.07 When CP is ready, CP uploads the SOR processing instruction to the system. If there is any SOR processing instruction present, the system shows the CP a warning message. The CP has to select the option that CP wants to overwrite the old SOR processing instruction by the new one
1.08 CP decides if all files are present. If not, CP can change the SOR processing instruction by adding the missing files to the SOR processing instruction. If yes the CP checks if the SOR processing instruction need any other modifications
1.09 If any modification to the SOR processing instruction is needed, CP can edit the SOR processing instruction. If no modification is needed the workflow goes back to step 0.03
1.10 CP downloads the SOR processing instruction again, before changing them and upload them again to the system.
2.03 CP doesn't want to create the SOR processing instruction manually and gives the system instructions to create SOR processing instruction.
2.04 The system generates the SOR processing instruction
2.05 The system generates PIDs for the files
2.06 System writes PID to SOR processing instruction

1.5 Ingest workflow

When all the files are uploaded to the SA and the SOR processing instruction are ready, the ingest to the SOR can start

1.5.1 Ingest workflow schema



1.5.2 Ingest workflow addition

0.01 Validation of the syntax of the SOR processing instruction xml. Checking completeness of the SOR processing instruction xml, presence of the technical metadata
0.02 Files in the SOR processing instruction will be checked one by one. If one file has been checked it will be processed or it will be skipped if an error occurred
0.03 The file will be stored in the database
0.04 Derivative of the file will be created and saved into the database
0.05 If the file or derivative cannot be stored into the database an error have occurred.
0.06 When the file and derivative have been saved to the database, the file from the staging area will be removed. In case an error occurred the file will be kept in the staging area
0.07 Check if there are more files in the SOR processing instruction present
0.08 If any file is present, the process goes back to step 0.02
1.01 Create an error report stating a syntactical error in the process instructions. The content provider will receive this error message on his administration panel
1.02 Create an error report stating which error has occurred. The content provider will receive this error message on his administration panel
1.03 The SOR processing instruction of the file will be stopped. The file will be kept on the staging area. The next file will be processed.

1.6 SOR processing instructions

Before an ingest to the SOR can appear the SOR processing instruction should be present. See workflow "Submission".

Staging area

1.6.1 Structure

A SOR instruction consists of two levels:

- document main element (SOR)
- file elements (file)

Certain elements can be set at both levels: action, access, mime type. When set in the SOR main element the value will apply to all file elements. However, a file element setting will always replace the main element value.

1.6.2 Dynamically added elements

Some elements have values that are created only once during the CP's SOR account setup. Those are automatically added to a SOR instruction:

API key
The private web service key that gives a CP access to all of their resources (set at CP account level, system generated).

resolverBaseUrl
The base hyperlink of the resolver. At the SOR jump off page this value is used to prefix the PID

NA
In case of Hope PID Webservice usage: a Handle System Naming Authority (see www.handle.net).

1.6.3 Elements added per fileSet

A CP uploads files to the staging area.

FileSet
The root folder containing all the sub folders and files that are declared in an instruction

Label
A convenience alias for a fileSet. It is used as a display tag.

Access (default=restricted)
Indicates how the resources are available to the public. Valid values are:
OPEN: master and level 1 derivatives can be accessed after authentication. Level 2 and 3 derivatives do not need authentication for access.
RESTRICTED: the master and all derivatives can be accessed after authentication.

LID
The local identifier of the file.

PID
The persistent identifier without the resolver base Url. This field is supplied by the CP, yet it can be automatically generated for HOPE PID webservice users. In this case the PID string will be opaque or it may be derived from a LID:

a. Opaque: a random looking string. An immutable universally unique identifier (UUID).
b. If the supplied LID has the following convention, it will be used for the PID: [(non)country code i]:[institution code ii]:[CP collection codings]:[identifier]
    i. country code: ISO 3166-1 alpha-2 (two letter) country code for the country where the CP is located. For trans-national institution also a plain letter code is allowed.
    ii. institution code: letter code identifying the institution. Remark: if your institution has registered with a national ISIL authority, please use the ISIL codes for the [country code] and [institution code].
    iii. [TENTATIVE]: The LID may only contain alphanumerics [0-9a-zA-Z] and the special characters "$-_.+:!*'(),
    iv. The length of the PID is not larger than 248 characters

Action (default=add)
ADD: a new file is offered to the SOR

Location
The absolute path of the digital file that is present in the fileSet. This value can be auto-generated by the SOR.

Checksum
The unique string calculated with the use of a MD5 algoritm to verify the file's integrity. This value can be auto-generated by the SOR.

Mimetype
The Content type that indicated what the digital file is (image\tiff, etc)

1.6.4 Example

Example of a complete SOR instruction with one master file. The CP is using the HOPE PID webservice:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<sor xmlns="http://org.hope/schema/sor-instruction"
     label="Apple collection"
     mimetype="image/tiff"
     access="restricted"
     resolverBaseUrl="http://hdl.handle.net/"
     na="28432"
     action="add"
     fileSet="/home/claudette/apple/posters/003">
    <file>
        <location>/home/claudette/apple/posters/003/23/hego.tiff</location>
        <pid>28432/NL:IISH:APPLECOLLECTION:12345</pid>
        <lid>NL:IISH:APPLECOLLECTION:12345</lid>
        <checksum>d41d8cd98f00b204e9800998ecf8427e</checksum>
        <access>open</access>
    </file>
</sor>
```

This instruction would lead to the following PID and resolveable URLs for the resources:

1. Sor jump off page (no authentication required)
    a. Resolvable url: http://sor-domain?pid=28432/NL:IISH:APPLECOLLECTION:12345
    b. PID: http://hdl.handle.net/28432/NL:IISH:APPLECOLLECTION:12345
2. Master (authentication required):
    a. http://sor-domain?pid=28432/NL:IISH:APPLECOLLECTION:12345&view=master
    b. http://hdl.handle.net/28432/NL:IISH:APPLECOLLECTION:12345?locatt=master
3. Level 1 derivative (authentication required):
    a. http://sor-domain?pid=28432/NL:IISH:APPLECOLLECTION:12345&view=level1
    b. http://hdl.handle.net/28432/NL:IISH:APPLECOLLECTION:12345?locatt=level1
4. Level 2 derivative (no authentication required):
    a. http://sor-domain?pid=28432/NL:IISH:APPLECOLLECTION:12345&view=level2
    b. http://hdl.handle.net/28432/NL:IISH:APPLECOLLECTION:12345?locatt=level2
5. Level 3 derivative (no authentication required):
    a. http://sor-domain?pid=28432/NL:IISH:APPLECOLLECTION:12345&view=level3
    b. http://hdl.handle.net/28432/NL:IISH:APPLECOLLECTION:12345?locatt=level3

1.6.5 Constraints in the first release

1. No compound object \ structural metadata is supported. This can be used to group and order related files. As a consequence:
    a. the SOR jump off page cannot be used to identify and bring order to a set of files that encompass an object (like scanned pages of a book).
    b. The CP cannot apply a single access policy, action or mimetype to grouped files

2. To extend the previous point: no PID of a descriptive identifier unit is present in the instruction. Hence:
    a. No isShownAt link can be presented at a SOR jump off page.
    b. The nexus between digital files and descriptive\structural metadata is absent

3. No DELETE or UPDATE actions are supported

2. Admin interface workflow

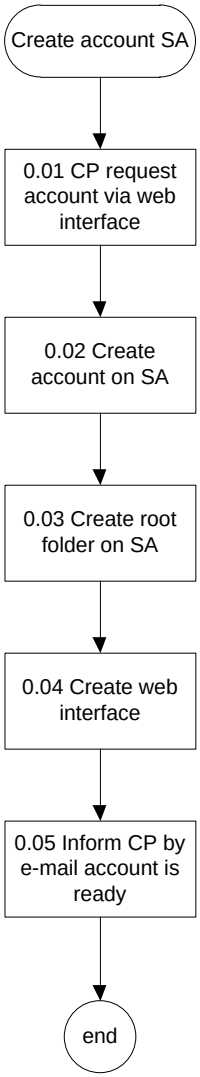
2.1 Requirements for admin interface

1 The system should provide authenticated and authorized access to the user for data managing purposes
2 The system should enable the user to manage their stored files, objects and metadata
  2.1 Monitor ingest, conversion, push to social sites
  2.2 Monitor authentication to site (e.g. YouTube) and return error in case of failure
  2.3 Monitor ingest to site (e.g. YouTube) and return error in case of upload failure (delete normalized version?)
  2.4 The user is able to generate statistics/reports on submissions, masters and derivatives, views, deliveries
  2.5 The user is able to check for file integrity and corruption
  2.6 The user is able to generate an audit trail of access to and changes to records
3 The user can make exceptions to derivative and social site settings
4 The system should provide an interface where CP can create new users for the system
5 Each CP will be able to set up one (or more) accounts via a web interface
6 The system should provide an interface where CP can manage the users
7 The system shall allow the user to search and browse objects for administrative purposes
8 The system should provide unrestricted access to authorized users

2.2 Create account SA workflow

The first part for the Admin interface is an account creation for the CP on the SA.

2.2.1 Create account SA schema



2.2.2 Create account SA addition

0.01 The CP requests an account by filling in a web form. The CP provide institutional name, e-mail address, request for PID service, if yes they have to also provide the naming authority name from handle service.

0.02 The system creates an account on the SA for the CP. The role of the account is set to Guest. A SOR admin should change the role from Guest to CP admin

0.03 The system creates a root folder for the CP on the SA

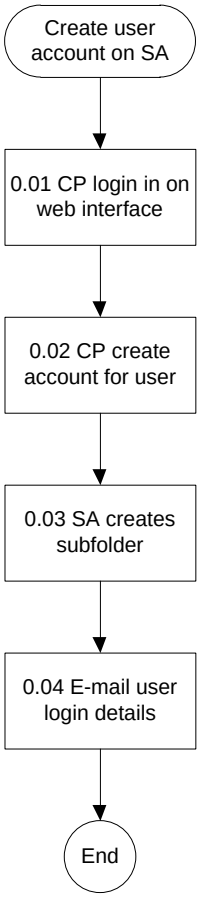
0.04 The user will gain access to the user user-friendly web interface web interface is created for the CP.

0.05 The system sends an e-mail to the CP, informing his account is ready. The e-mail contains all the login details for the account

2.3 Workflow Create user account

When a CP has an account the CP is able to create user accounts for his users.

2.3.1 Workflow create user account schema



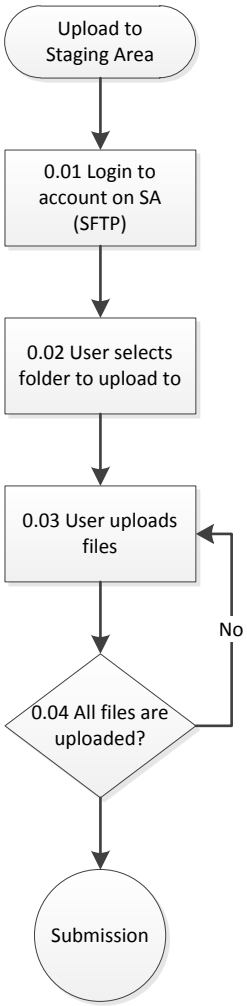
2.3.2 Workflow create user account addition

0.01 The CP logs in on his web interface and selects the function to create an user account
0.02 The CP fills in the form and creates the user account
0.03 SA creates a subfolder under the root folder for the new user
0.04 When the account is created, the new user receives an e-mail from the system, containing his login details

2.4 Upload to staging area

Whenever an account is created and users have been made by the CP, users are able to upload content to the staging area. The following workflow describes the process of uploading files to the staging area.

2.4.1 Workflow uploading to staging area



2.4.2 Workflow uploading to staging area addition

0.01 A user has to login to the staging area. A user can decide on which ftp program (for instance filezilla) or tool (s)he prefers to use. The used protocol is SFTP

0.02 When a user has logged in (s)he will gain access to the default folder. In case a user has access to more than one folder, the user has to select the preferred folder for uploading the files

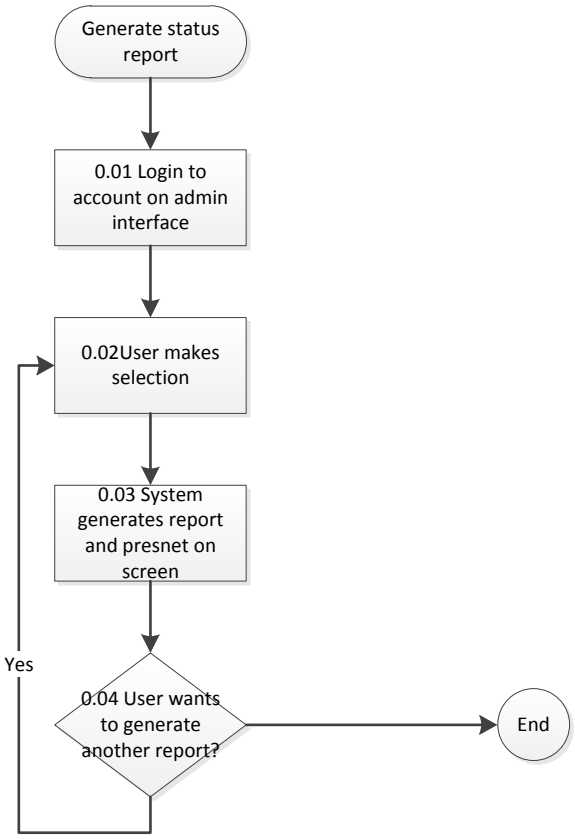
0.03 The user selects the files on his local machine which will be uploaded through the ftp program. File transfer will be using SFTP

0.04 The user is able to select more files to upload. In case the user and ftp program are ready, the submission workflow will start

2.5 Generate status reports

A user that is logged in to the admin interface is able to generate several status reports of the system

2.5.1 Workflow generating status reports



2.5.2 Workflow generating status reports addition

0.01 A user has to login to the admin interface of the system
0.02 The user has to select the sort/type of status report
0.03 The system generates the reports and shows a representation of the report to the user. This could be done by plain text or diagrams showing statistics of the system
0.04 The user can decide on generating more reports

3. Delivery requirements

1 The system should provide access to external users using an API
2 The system must provide a jump-off page that provides information on the digital object
3 The system should provide a jump-off page that provides information on ways to obtain a copy of the object
4 The system should provide unrestricted access to authorized users (e.g. The CP that owns the digital object)
5 The system should use XML based APIs to facilitate local implementations
6 The system should be able to function as a standalone compliant HOPE system
7 The system shall give external users and systems access to objects based on rights provided by the CP
8 The system shall provide thumbnails to the Aggregator

3.1 File formats Matrix

From the specific master files uploaded to the SOR a certain amount of derivatives will be generated. The following file formats matrix gives an overview of master files that can be accepted and which derivatives will be made out of them. The matrix is filled in with the knowledge for release 1 and stated is which parts will be done during release 2 and 3. Therefore the matrix should be evolving during the project and will be updated for every new release.

In chapter 3.2 all the file type specifications are stated.

Legenda for the file formats matrix:

P1 : Proof release 1
P2 : Proof release 2

R1 : Release 1
R2 : Release 2
R3 : Release 3

Master

Derivatives		Still Image							Audio			Video			
		Tiff lossless	JPEG2000	PNG	PDF/A	TIFF Compressed	JPEG Compressed	PDF	FLAC	WAVE-LPCM	MBWF	Motion JPEG 2000	MPEG-2	MPEG-4	H.264
Level 1															
Image	TIFF (RGB)	p1/r2				p1/r2									
	TIFF(CNYK)	p1/r2				p1/r2									
	EPS														
	PDF														
	JPEG2000		p2/r2												
	JPEG						p1/r2								
	PNG			p2/r2											
Audio	FLAC								p2/r2						
	WAVE-LPCM									p2/r2					
	MBWF										p2/r2				
Video	H.264														p2/r2
	Motion JPEG2000											p2/r2			
	MPEG-2												p2/r2		
	MPEG-4													p2/r2	
Level 2															
Image	JPEG	p1/r2	p2/r2			p1/r2	p1/r2								
	PDF														
Audio	Vorbis														
	AAC														
	MP3								p2/r2	p2/r2	p2/r2				
Video	VP8											p2/r2	p2/r2	p2/r2	p2/r2
	Dirac											p2/r2	p2/r2	p2/r2	p2/r2
Level 3															
Image	JPEG JFIF	p1/r2	p2/r2			p1/r2	p1/r2								
	GIF/PNG														
Audio	MP3								p2/r2	p2/r2	p2/r2				
Video	VP8											r3	r3	r3	r3

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3.2 File formats Specification

The SOR will be implemented in different releases. In the above file formats matrix is provided which files will be supported and converted during these releases.
The following tables describe the file formats. These tables are not complete. During the following releases these tables will be updated according to the latest specifications and requirements.

3.2.1 Master files

Digital master files are the high resolution files the CP submits to the SOR. The file formats are described in the following tables.

Still Image

Format	DPI	Compression	Color	Size
Tiff (6.0)	300 (at least 150)	Lossless compression	CMYK preferred (RGB and gray scale possible)	
TIFF	300 (at least 150)	Lossless compression	CMYK preferred (RGB and gray scale possible)	
JPEG 2000				
PNG				
PDF/A				
PDF				
Tiff Compressed				
JPEG Compressed	72	Lossless compression	CMYK preferred (RGB and gray scale possible)	
PDF				

Audio

Format	Resolution	Frequency	Bitrate	Size
Flac				
WAVE-LPCM				
MBWF				

Video

Format	Resolution	Size	Bitrate	length
Motion JPEG2000				
MPEG-2				
MPEG-4				
H.264/MPEG-4				

3.2.2 Derivatives level 1

Derivative level 1 is a copy of the original digital master that has been submitted to the SOR by the CP. This specification should be identical to the digital master file.

Image

Format	DPI	Compression	Color	Resolution
Tiff (RGB)	300 - 600	Lossless compression	CMYK preferred (RGB and gray scale possible)	Identical to master
TIFF (CMYK)	300 - 600	Lossless compression	CMYK preferred (RGB and gray scale possible)	Identical to master
PDF				
PNG				
JPEG	72	Lossless compression	CMYK preferred (RGB and gray scale possible)	Identical to master
JPEG2000				

Audio

Format	Resolution	Frequency	Bitrate	Size
Flac				
WAVE-LPCM				
MBWF,compatible with with WAV and BWFembed rights metadata				

Video

Format	Resolution	Size	Bitrate	length
Motion JPEG2000				
Theora (OGG)				
H.264/MPEG-4				

3.2.3 Derivatives level 2

Derivative level 2 is a smaller derivative of derivative level 1. This derivative is usefull for desktop showing/printing.

Image

Format	DPI	Compression	Color	Resolution
PDF				
JPEG				

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Audio

Format	Resolution	Frequency	Bitrate	Size
Vorbis				
AAC				
MP3				

Video

Format	Resolution	Size	Bitrate	length
Dirac				
VP8				
VP8: Streaming				

3.2.4 Derivatives level 3

Derivative level 3 is the smallest derivative the SOR can provide. This level can be compared with thumbnail level.

Still Image

Format	DPI	Compression	Color	Resolution
JPEG		Identical to derivative level 1	Identical to derivative level 1	200px
GIF/PNG				

Audio

Format	Resolution	Frequency	Bitrate	Size
MP3	8 Bit		1411 bps	

Video

Format	Resolution	Size	Bitrate	length
Vp8				

4. Wireframes

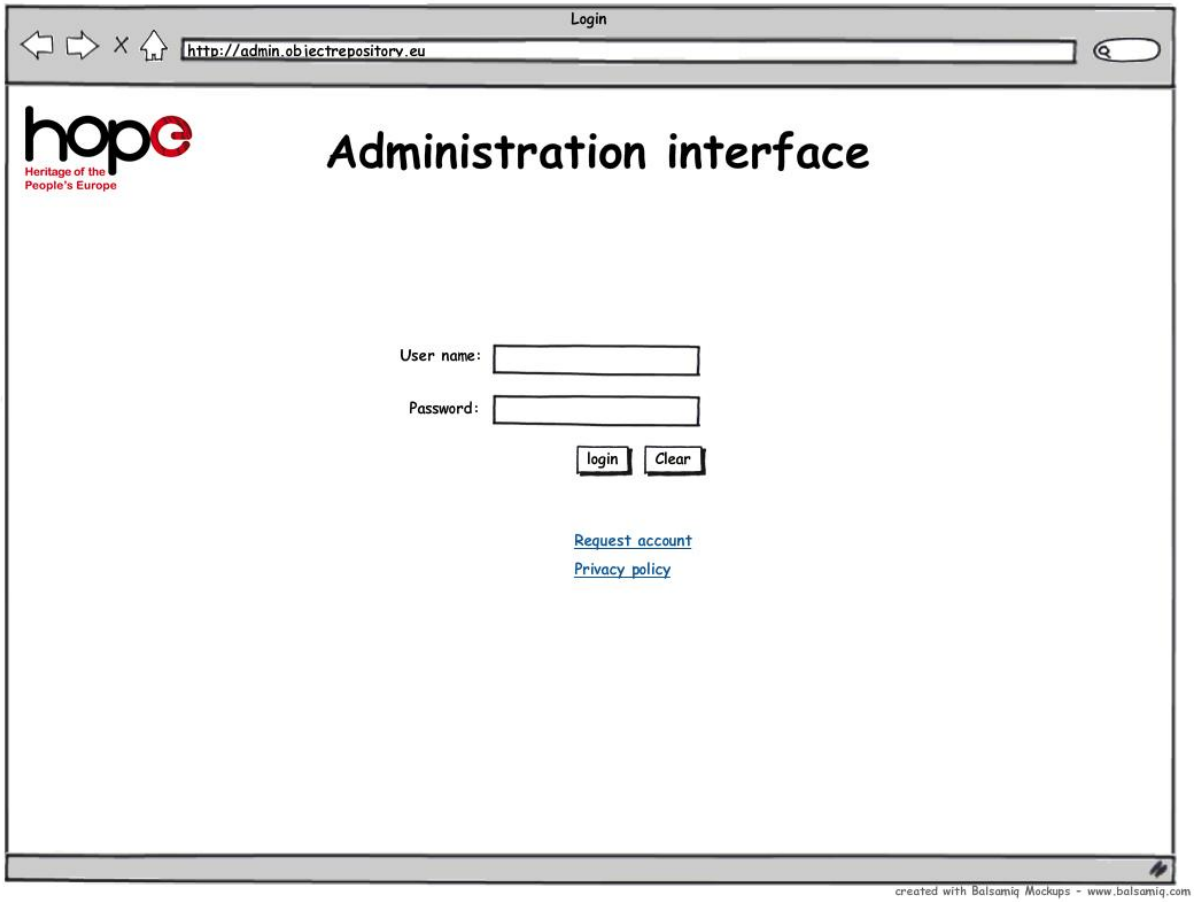
Based on the requirements and workflows the following wireframes for the administration interface have been made:

4.1 Request form for account on the staging area

To request an account on the Staging Area, the CP has to fill in the form. When the CP wants to use an own PID service, the CP can select the option "No". Then the CP has to select the local PID service used.

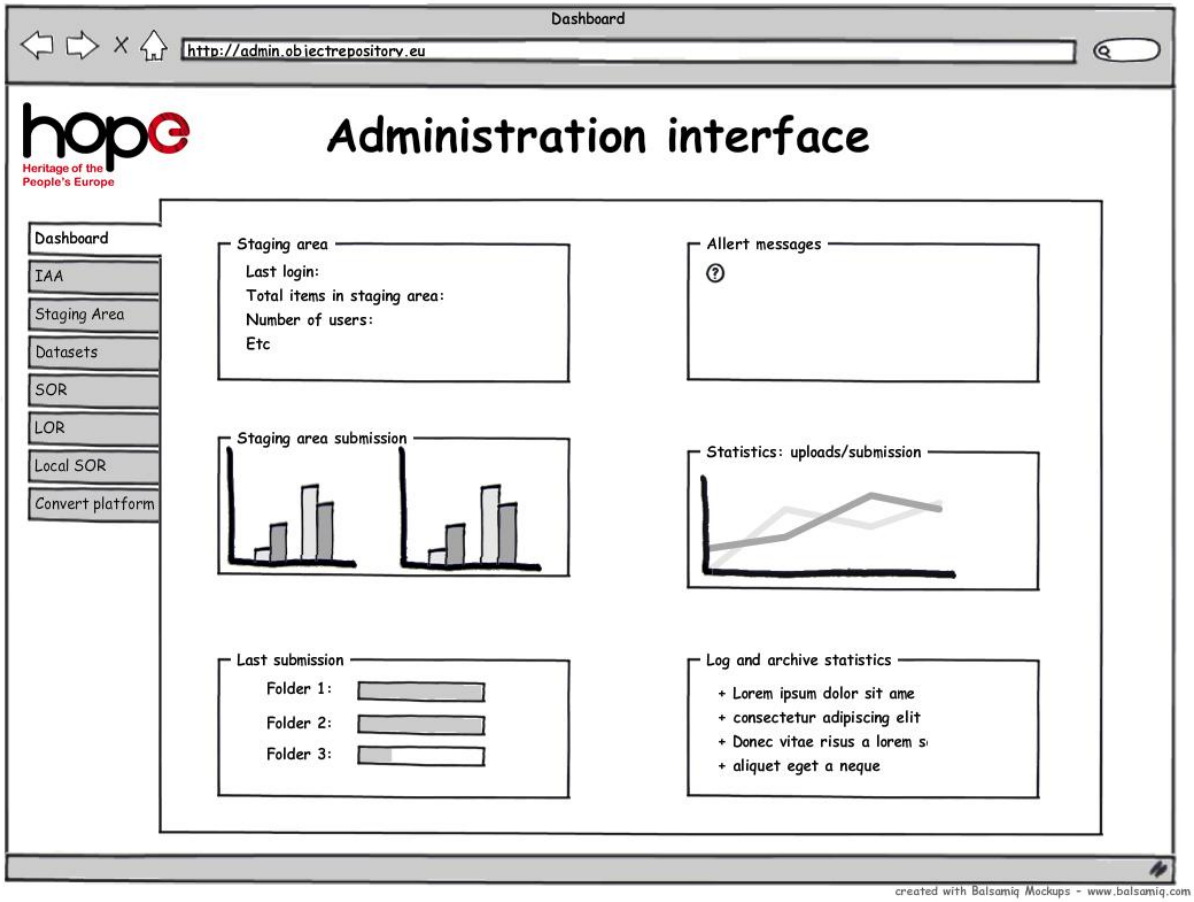
When the form is filled in correctly and the request button is pushed, a guest account will be created for the CP and an e-mail to the SOR administrator will be sent. The SOR administrator will set the role for the new account from guest to "CP admin". The account can be used by the CP administrator.

4.2 Login screen



Users can login here or can request an account for the staging area. This request is only for CP administrators to request an account. CP administrators can create user accounts (see 4.5 create users by CP screen)
A forgot password option should be present as well.

4.3 Dashboard screen

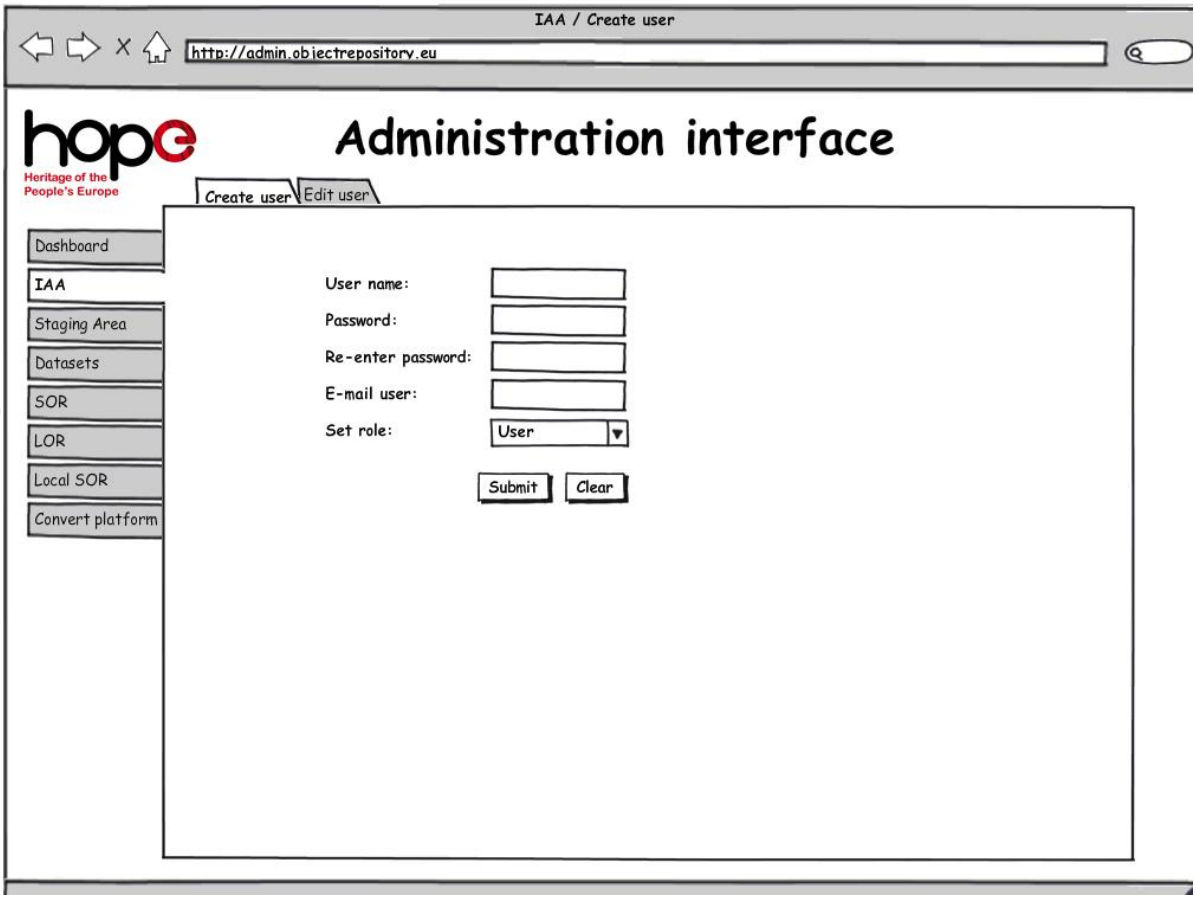


Administrators can get an overview of the system here. These features will be worked out in detail from release 2

4.4 Create administer for CP screen

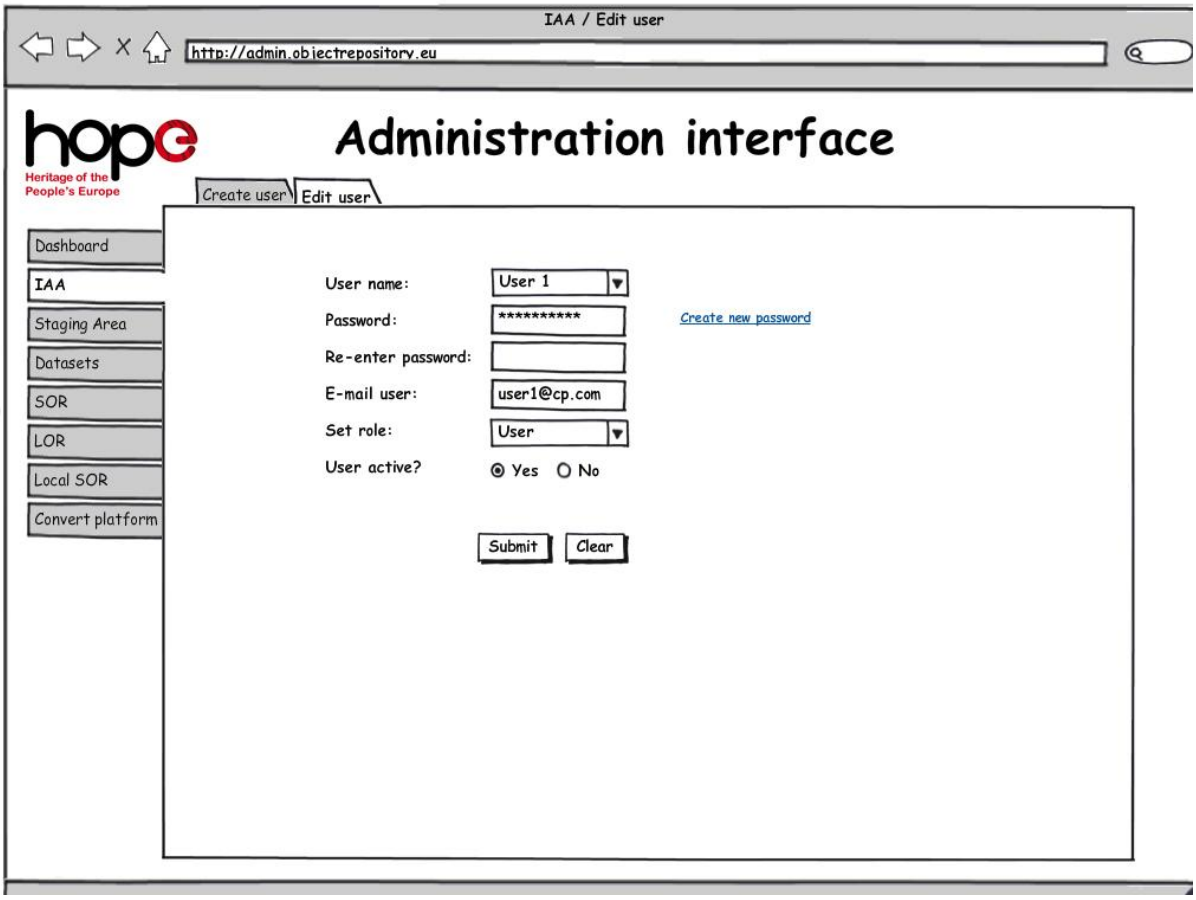
When a CP admin has requested an account a SOR admin can create the account in this screen. When the CP admin has requested the account, the above form is filled in automatically based on the input from the account request form. A SOR admin only has to set the role for the CP admin, before the CP admin can use his/her account.

4.5 Create user by CP screen



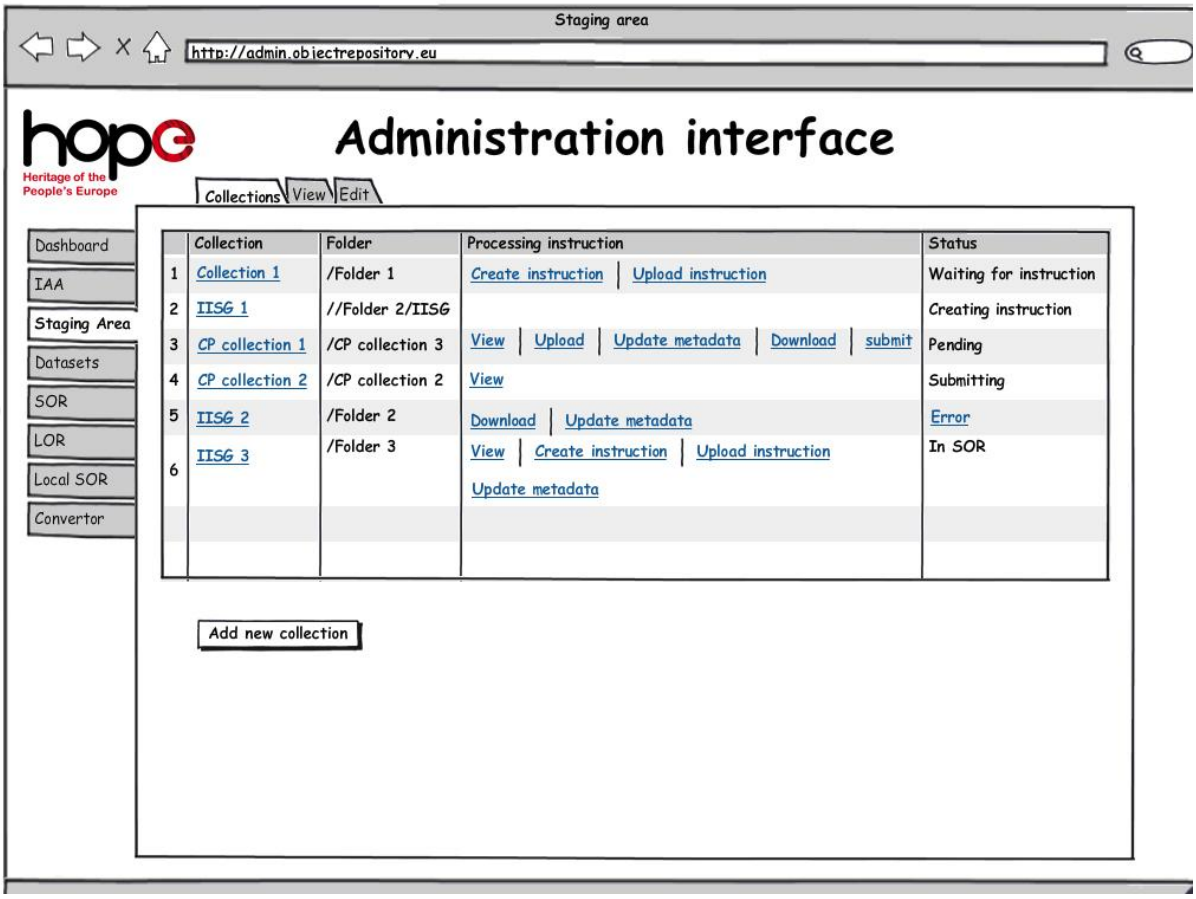
A CP admin can create users by filling in the above details. An e-mail will be sent automatically to the users e-mail, providing the login details.

4.6 Edit user screen



Editing a user account can be done in the above screen. All fields can be changed except the user name. A CP admin can set an account on in active in case he wants to delete an account. After the account has been set inactive the CP admin can contact the SOR admin to delete the user account.

4.7 SA Collections screen

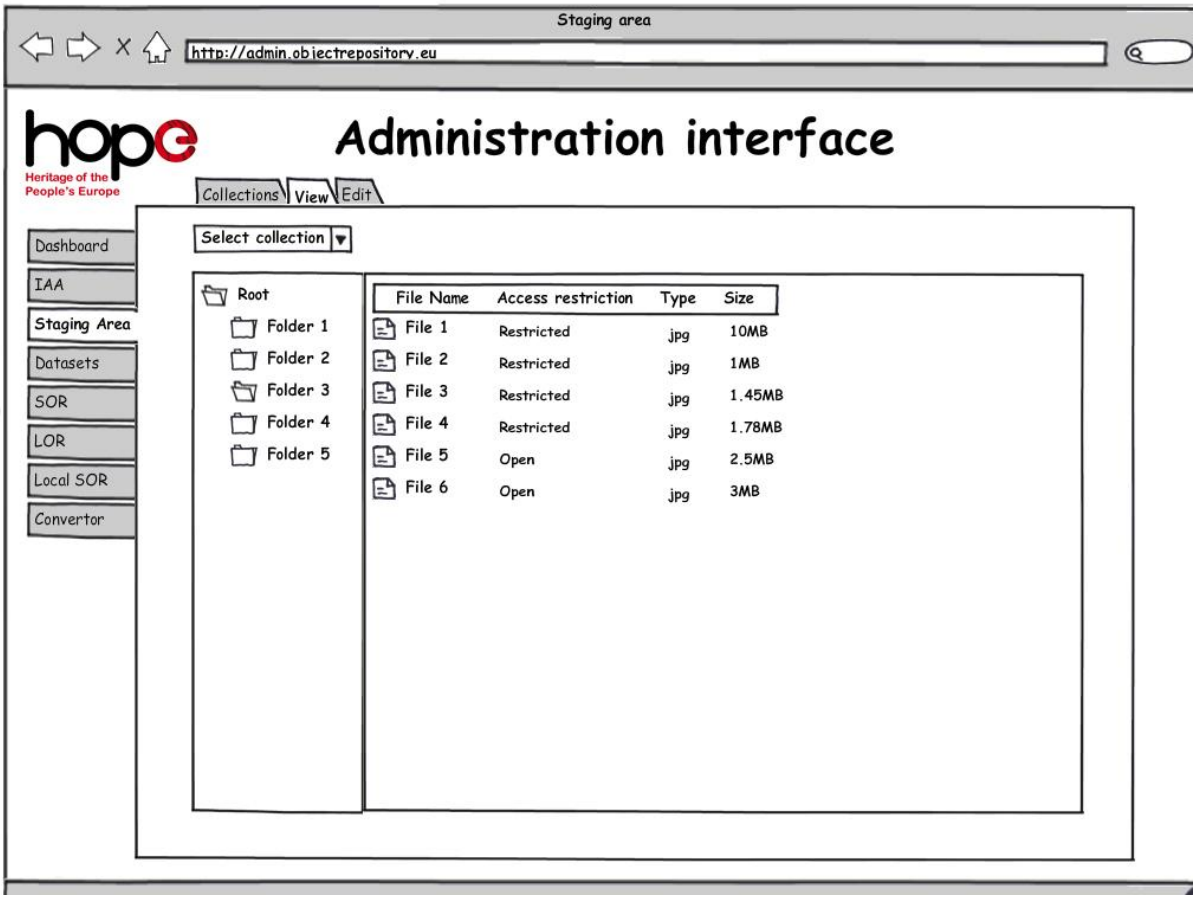


CP admins have the availability to create collections. In the above screen they can see an overview of their collections.
They can click on the Add new collection button for adding a new collection. The CP admin can fill in the collection name and select the containing folder or folder structure.

1. When a collection has been created, the CP admin can create or upload SOR processing instruction. The status of the system will be "Waiting for instruction"
2. When SOR processing instruction are being created the CP admin has no options
3. After the SOR processing instruction has been made the CP admin has the ability to either view or download them, or upload new one or update the metadata. When the SOR processing instruction are present and ready the CP admin can do a submit
4. When files will be submitted to the SOR the CP admin is able to view the SOR processing instruction

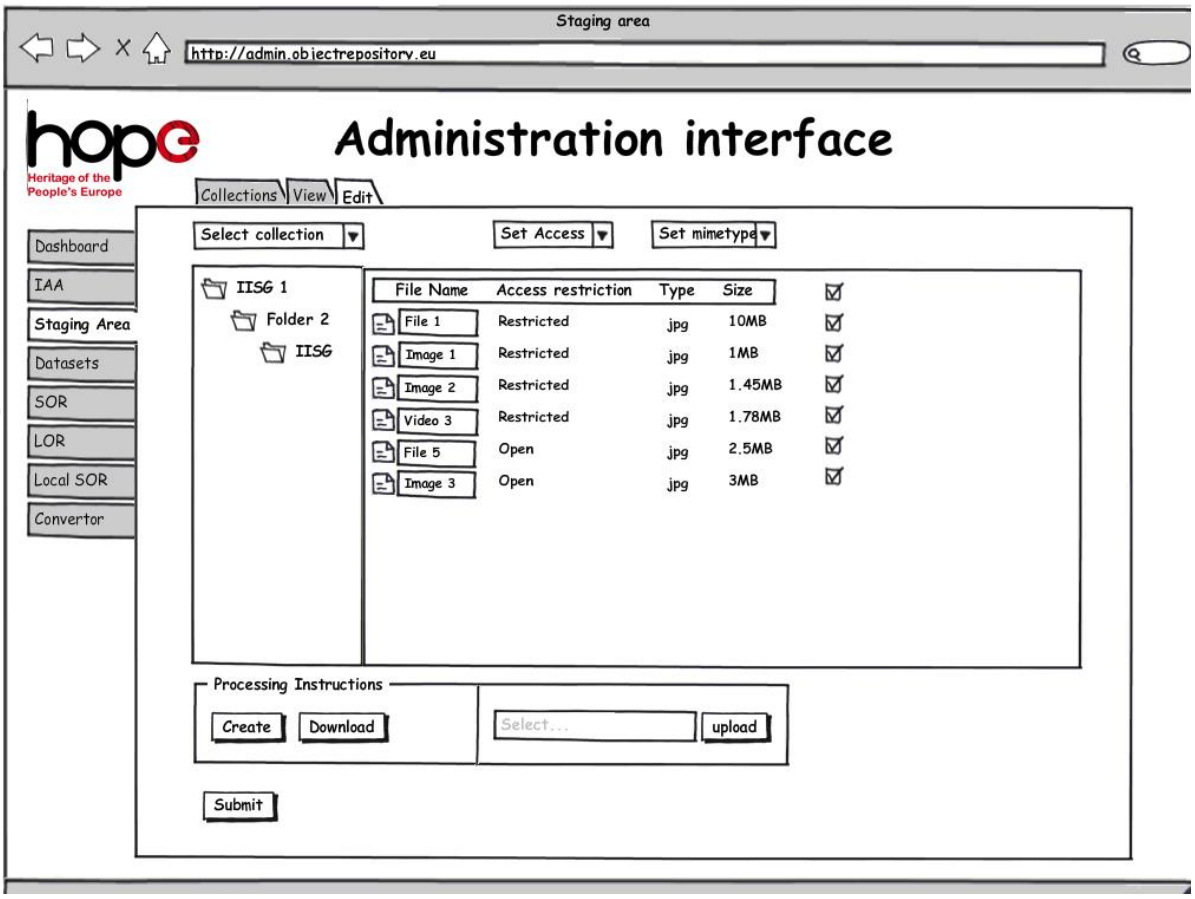
5. When an error occurred during a submit the CP admin can read the error messages. The CP admin is able to download the SOR processing instruction or update the metadata, before the CP admin can start a new submission for the files that caused the errors
6. When the complete collection is ingested to the SOR without errors the CP admin is able to: View the collection in the SOR, create new SOR processing instruction, upload new SOR processing instruction or update the metadata

4.8 View Staging Area screen



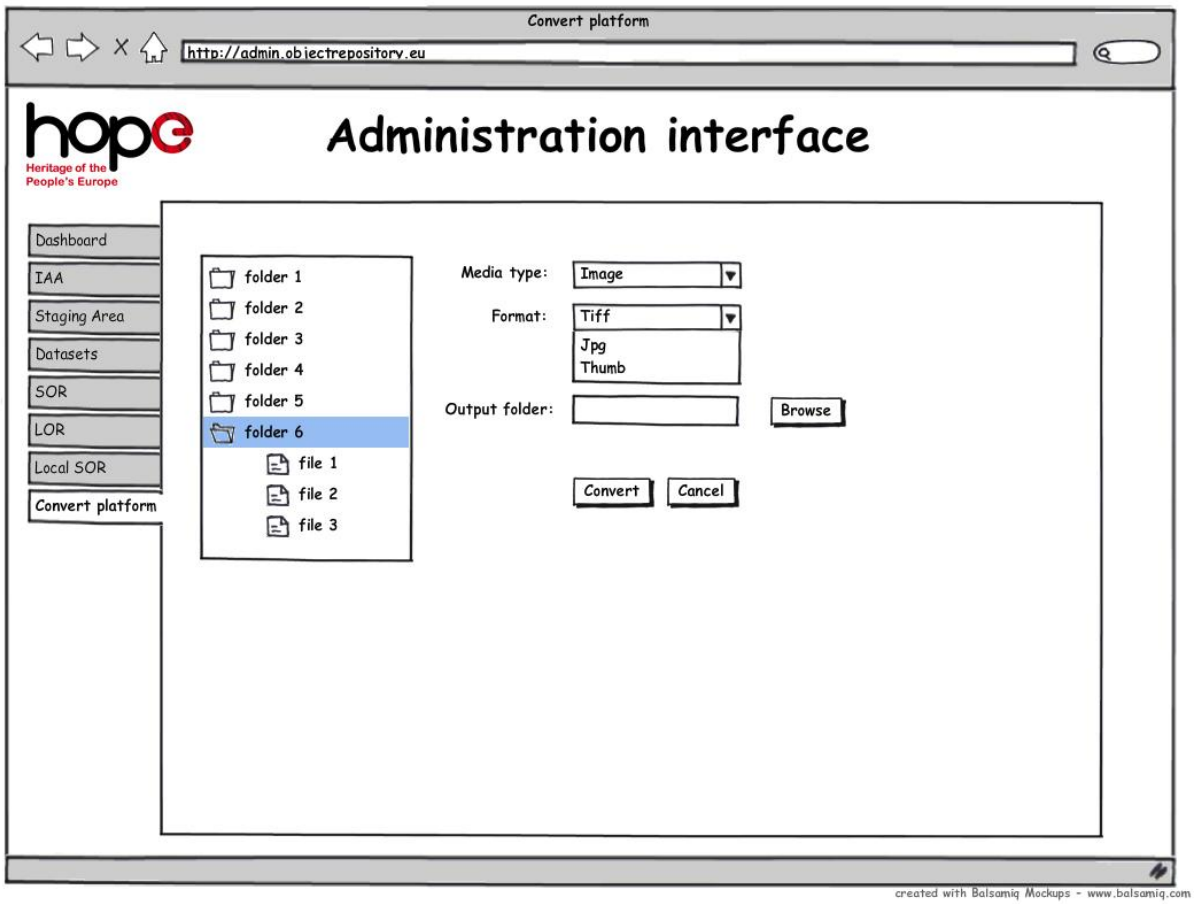
By clicking on the tab "view" an overview of all the folders and files on the staging area will be shown.
A CP admin is able to select a specific collection (s)he has made. Only the corresponding folder or folder structure will be presented.

4.9 Edit SOR processing instruction screen



By clicking on the edit tab, the CP admin is able to create or edit SOR processing instruction.

4.10 Convert platform screen



Conversion of files will be worked out in detail from release 2

Conclusion

In this document we have described the requirements and workflows for the HOPE SOR. We have focused on three aspects:

1. Ingest to the SOR
2. Delivery from the SOR
3. Administration panel of the SOR

Different workflows are created and the requirements are set up in a MoSCoW-like approach. Based on these workflows and requirements different wireframes are created. These visualize in a simple way the basis for the administration panel of the SOR.