

The Planets Testbed: a walkthrough

Brian Aitken
HATII

The Planets Testbed: a definition

“A controlled environment for experimentation and evaluation, with metrics and benchmark content that allow comparison of preservation tools and strategies”

Why do we need a Testbed?

- To enable systematic experimentation in digital preservation
- Scientific research requires a controlled research environment for evaluation of preservation approaches
- Testbed provides:
 - Methodology for systematic execution of experiments by distributed actors
 - (Automated) evaluation of experiment results
 - Reproducibility of experiment results
 - Long-term availability of structured experiment documentation
 - Shared access to the experiments themselves

Testbed Origins

- NANETH developed the idea of a digital preservation Testbed in 1996
 - ‘Dutch Testbed’ software rolled out in 2001
 - Four file types covered (Documents, spreadsheets, email and databases)
- DELOS developed a Testbed Framework based on this
- Planets built upon these systems
 - Integration in PLANETS Interoperability Framework
 - Focus on formalisation of experiment design
 - Strong emphasis on comparability and traceability of results

Main Participants

- Austrian National Library
- Humanities Advanced Technology and Information Institute at the University of Glasgow (HATII)
- Austrian Research Centers (ARC)
- British Library
- National Archives of the Netherlands
- Vienna University of Technology
- University of Cologne

Current status of the Planets Testbed

- First Testbed prototype release in September 2007
- Planets-wide first release of Testbed in March 2008
- Release to be used by Planets partners for digital preservation experiments in July 2008
 - Experiments carried out by BL, NANETH, SB, ONB,KB etc
- Planning for corpora established
- Planning for participation of external institutions established

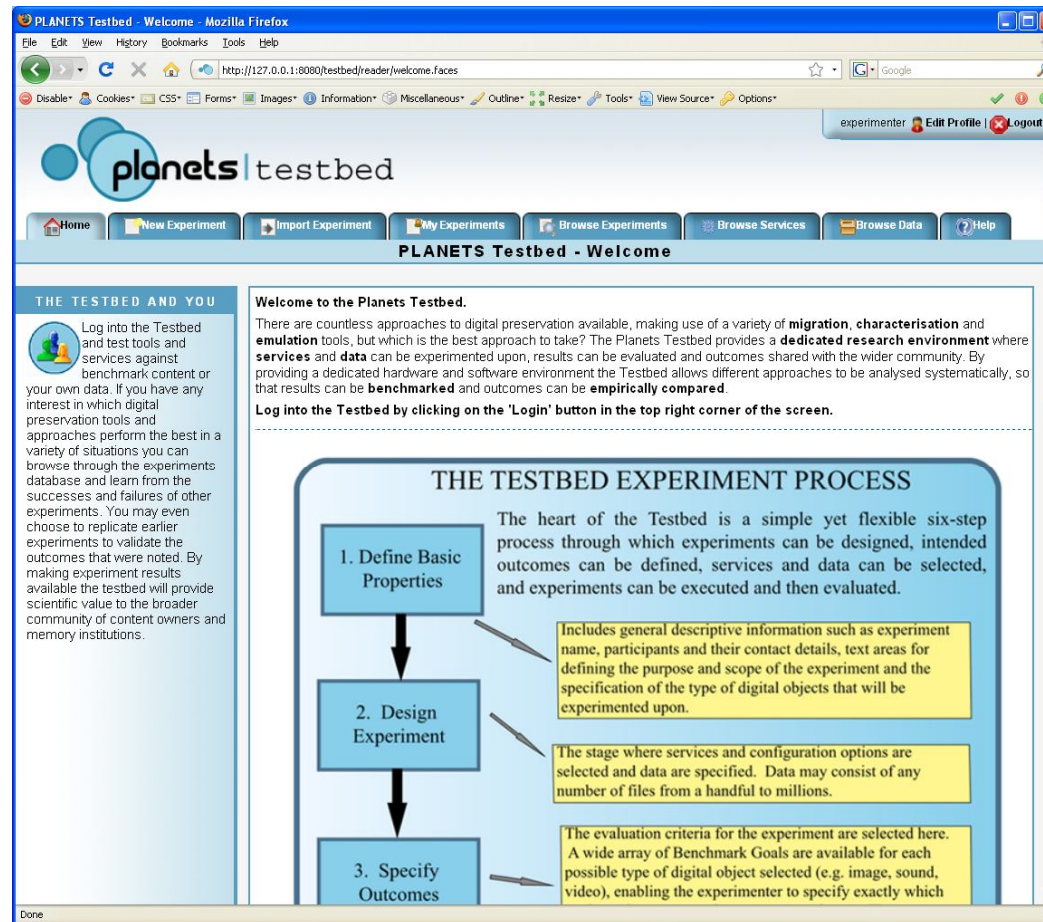
The Testbed within the Planets Architecture

- Fully Integrated with the Interoperability Framework
 - Data registry
 - Single sign-on
 - Account management
- Uses PA, PC and PP services,
 - Comparator and Extractor
 - 3rd party tools that have been wrapped such as DROID and Xena
 - Connections to service registries

Planets Testbed Walkthrough

- The Walkthrough demonstrated the actual Testbed software. Screenshots of the Testbed are presented here in place of the walkthrough itself.

Testbed Welcome Page for Experimenters



The screenshot shows the PLANETS Testbed Welcome page. The browser title is "PLANETS Testbed - Welcome - Mozilla Firefox". The address bar shows the URL "http://127.0.0.1:8080/testbed/reader/welcome.faces". The page features the PLANETS Testbed logo and a navigation menu with buttons for Home, New Experiment, Import Experiment, My Experiments, Browse Experiments, Browse Services, Browse Data, and Help. The main content area is titled "PLANETS Testbed - Welcome" and contains the following sections:

THE TESTBED AND YOU

Log into the Testbed and test tools and services against benchmark content or your own data. If you have any interest in which digital preservation tools and approaches perform the best in a variety of situations you can browse through the experiments database and learn from the successes and failures of other experiments. You may even choose to replicate earlier experiments to validate the outcomes that were noted. By making experiment results available the testbed will provide scientific value to the broader community of content owners and memory institutions.

Welcome to the Planets Testbed.

There are countless approaches to digital preservation available, making use of a variety of **migration, characterisation and emulation** tools, but which is the best approach to take? The Planets Testbed provides a **dedicated research environment** where **services and data** can be experimented upon, results can be evaluated and outcomes shared with the wider community. By providing a dedicated hardware and software environment the Testbed allows different approaches to be analysed systematically, so that results can be **benchmarked** and outcomes can be **empirically compared**.

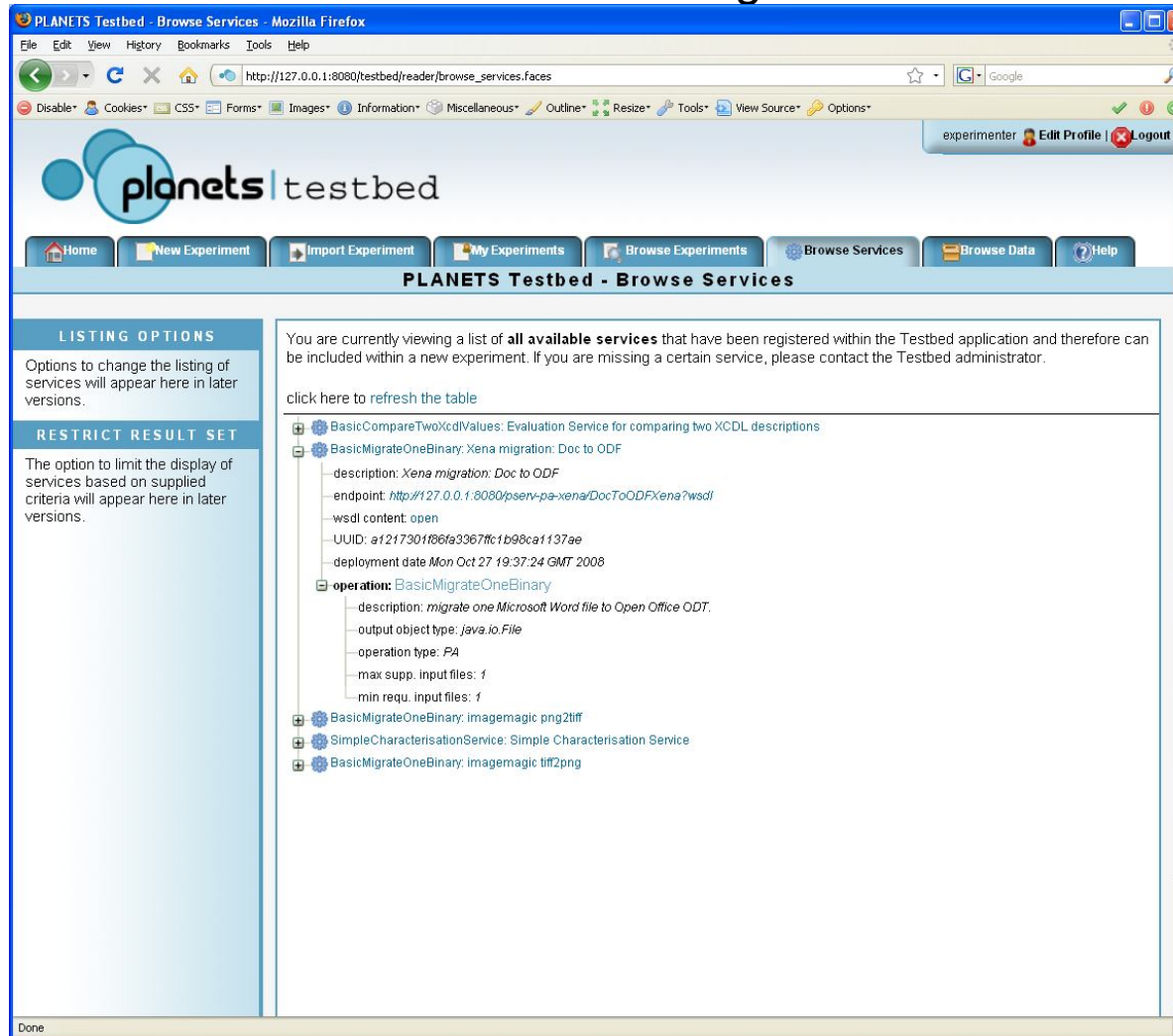
Log into the Testbed by clicking on the 'Login' button in the top right corner of the screen.

THE TESTBED EXPERIMENT PROCESS

The heart of the Testbed is a simple yet flexible six-step process through which experiments can be designed, intended outcomes can be defined, services and data can be selected, and experiments can be executed and then evaluated.

- 1. Define Basic Properties**
 - Includes general descriptive information such as experiment name, participants and their contact details, text areas for defining the purpose and scope of the experiment and the specification of the type of digital objects that will be experimented upon.
- 2. Design Experiment**
 - The stage where services and configuration options are selected and data are specified. Data may consist of any number of files from a handful to millions.
- 3. Specify Outcomes**
 - The evaluation criteria for the experiment are selected here. A wide array of Benchmark Goals are available for each possible type of digital object selected (e.g. image, sound, video), enabling the experimenter to specify exactly which

Browse Services Page



PLANETS Testbed - Browse Services - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://127.0.0.1:8080/testbed/reader/browse_services.faces

Disable Cookies CSS Forms Images Information Miscellaneous Outline Resize Tools View Source Options

planets testbed

experimenter Edit Profile Logout

Home New Experiment Import Experiment My Experiments Browse Experiments Browse Services Browse Data Help

PLANETS Testbed - Browse Services

LISTING OPTIONS

Options to change the listing of services will appear here in later versions.

RESTRICT RESULT SET

The option to limit the display of services based on supplied criteria will appear here in later versions.

You are currently viewing a list of **all available services** that have been registered within the Testbed application and therefore can be included within a new experiment. If you are missing a certain service, please contact the Testbed administrator.

[click here to refresh the table](#)

- BasicCompareTwoXcdlValues: Evaluation Service for comparing two XCDL descriptions
- BasicMigrateOneBinary: Xena migration: Doc to ODF
 - description: Xena migration: Doc to ODF
 - endpoint: http://127.0.0.1:8080/pserv+pa-xena/DocToODFXena?wsdl
 - wsdl content: open
 - UUID: a1217301f86fa3367ffc1b98ca1137ae
 - deployment date Mon Oct 27 19:37:24 GMT 2008
 - operation: BasicMigrateOneBinary
 - description: migrate one Microsoft Word file to Open Office ODT.
 - output object type: java.io.File
 - operation type: PA
 - max supp. input files: 1
 - min requ. input files: 1
- BasicMigrateOneBinary: imagemagic png2tiff
- SimpleCharacterisationService: Simple Characterisation Service
- BasicMigrateOneBinary: imagemagic tiff2png

Done

Browse Experiments Page

PLANETS Testbed - Browse Experiments - Mozilla Firefox

http://127.0.0.1:8080/testbed/reader/browse_exp.faces

experimenter [Edit Profile](#) [Logout](#)

planets testbed

[Home](#)
[New Experiment](#)
[Import Experiment](#)
[My Experiments](#)
[Browse Experiments](#)
[Browse Services](#)
[Browse Data](#)
[Help](#)

PLANETS Testbed - Browse Experiments

YOUR SEARCH:
 You can search the titles and summaries of all the experiments using this form.

LISTING OPTIONS
 Options allowing you to change the number of files displayed per page will appear here in later versions.

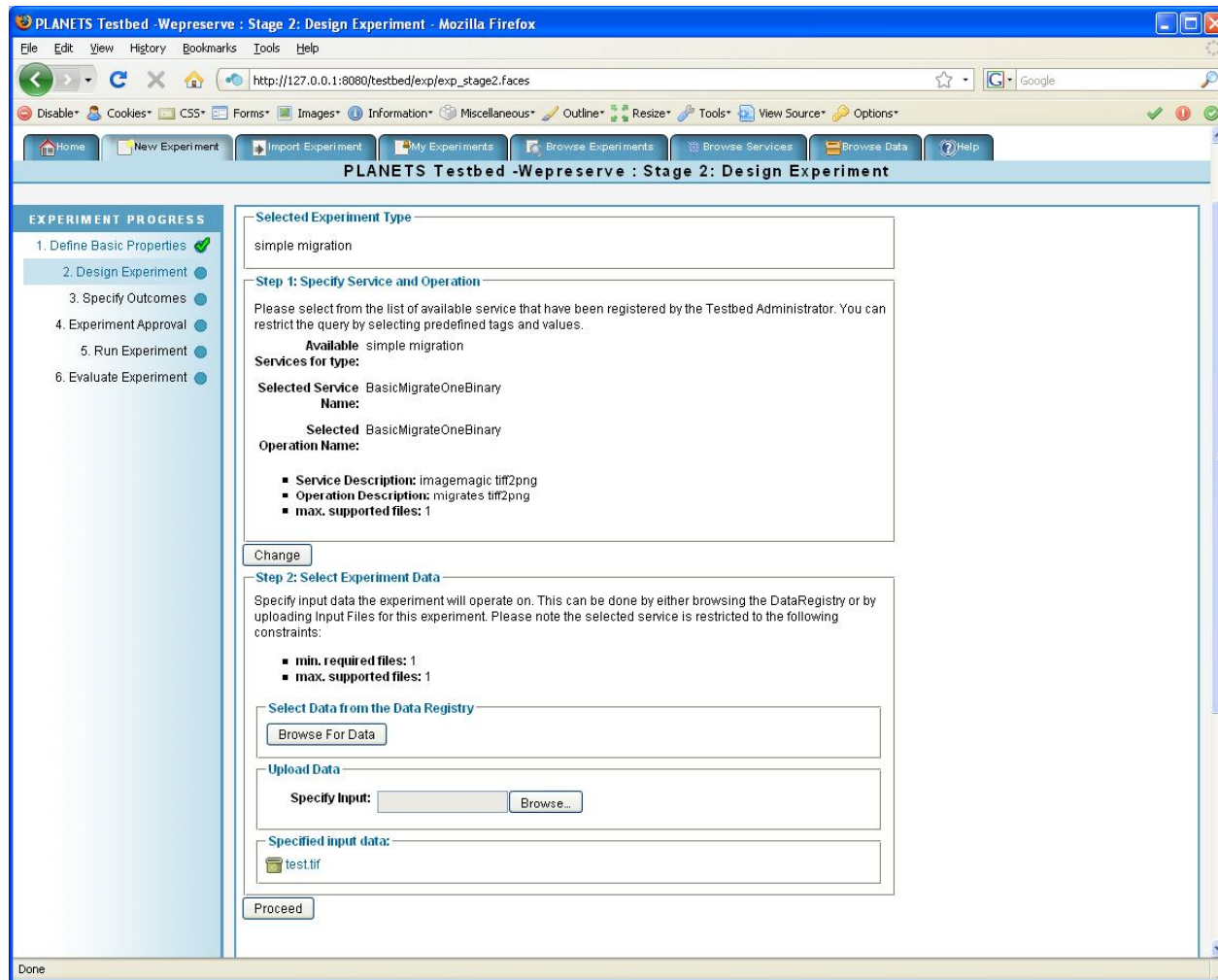
Experiment Name	Type	Start Date	Execution Date	Current Stage	Experimenter Name
TIFF Migration Experiment #4	simple migration	Oct 30, 2008	Oct 30, 2008	Experiment Evaluation	experimenter
Thursday Test	simple migration	Oct 30, 2008	Oct 30, 2008	Experiment Evaluation	experimenter
TIFF Migration Experiment #3	simple migration	Oct 29, 2008	Oct 29, 2008	Experiment Evaluation	experimenter
TIFF Migration Experiment #2	simple migration	Oct 29, 2008	Oct 29, 2008	Experiment Evaluation	experimenter
TIFF Migration Experiment	simple migration	Oct 29, 2008	Oct 29, 2008	Experiment Evaluation	experimenter
Tuesday Test #3	simple migration	Oct 28, 2008	Oct 28, 2008	Experiment Evaluation	experimenter
Tuesday Test #2	simple migration	Oct 28, 2008	Oct 28, 2008	Experiment Evaluation	experimenter
DROID test	simple characterisation	Oct 28, 2008		Experiment Setup	experimenter
Tuesday Test	simple migration	Oct 28, 2008	Oct 28, 2008	Experiment Finalized	experimenter
Automated experiment six	simple migration	Oct 27, 2008		Experiment Setup	experimenter

[1](#) [2](#)

Contact the Testbed Helpdesk [here](#). | The Testbed is part of The Planets Suite. | PTB Version 0.61

Done

Experiment Stage 2



PLANETS Testbed - Wepreserve : Stage 2: Design Experiment - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://127.0.0.1:8080/testbed/exp/exp_stage2.faces

Disable Cookies CSS Forms Images Information Miscellaneous Outline Resize Tools View Source Options

Home New Experiment Import Experiment My Experiments Browse Experiments Browse Services Browse Data Help

PLANETS Testbed -Wepreserve : Stage 2: Design Experiment

EXPERIMENT PROGRESS

1. Define Basic Properties ✓
2. Design Experiment ●
3. Specify Outcomes ●
4. Experiment Approval ●
5. Run Experiment ●
6. Evaluate Experiment ●

Selected Experiment Type

simple migration

Step 1: Specify Service and Operation

Please select from the list of available service that have been registered by the Testbed Administrator. You can restrict the query by selecting predefined tags and values.

Available simple migration

Services for type:

Selected Service: BasicMigrateOneBinary

Name:

Selected: BasicMigrateOneBinary

Operation Name:

- **Service Description:** imagemagic tiff2png
- **Operation Description:** migrates tiff2png
- **max. supported files:** 1

Change

Step 2: Select Experiment Data

Specify input data the experiment will operate on. This can be done by either browsing the DataRegistry or by uploading Input Files for this experiment. Please note the selected service is restricted to the following constraints:

- **min. required files:** 1
- **max. supported files:** 1

Select Data from the Data Registry

Browse For Data

Upload Data

Specify Input: Browse...

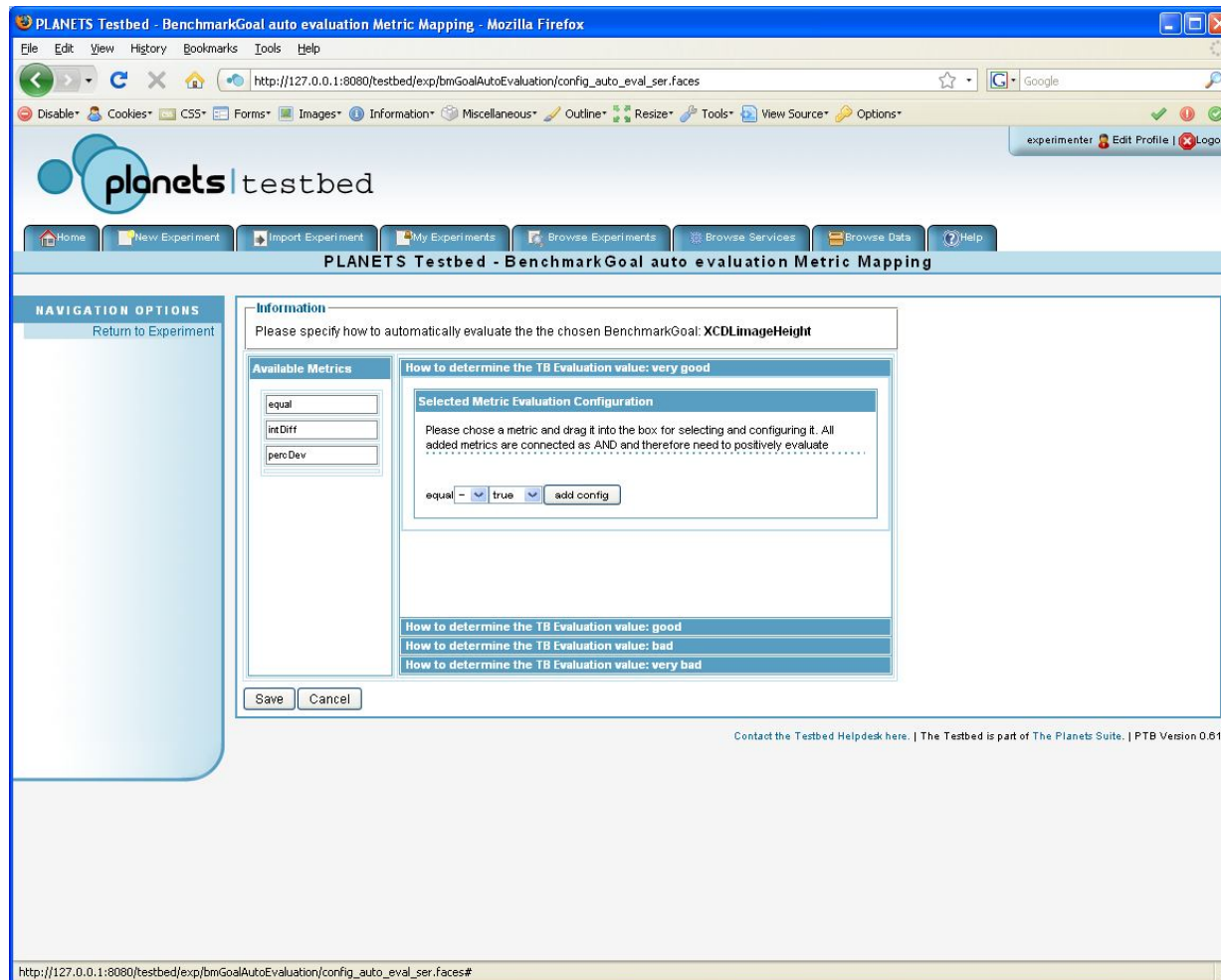
Specified input data:

test.tif

Proceed

Done

Configuration of Auto-Evaluation Criteria



The screenshot shows a web browser window titled "PLANETS Testbed - BenchmarkGoal auto evaluation Metric Mapping - Mozilla Firefox". The address bar shows the URL: `http://127.0.0.1:8080/testbed/exp/bmGoalAutoEvaluation/config_auto_eval_ser.faces`. The browser's status bar at the bottom displays: `http://127.0.0.1:8080/testbed/exp/bmGoalAutoEvaluation/config_auto_eval_ser.faces#`.

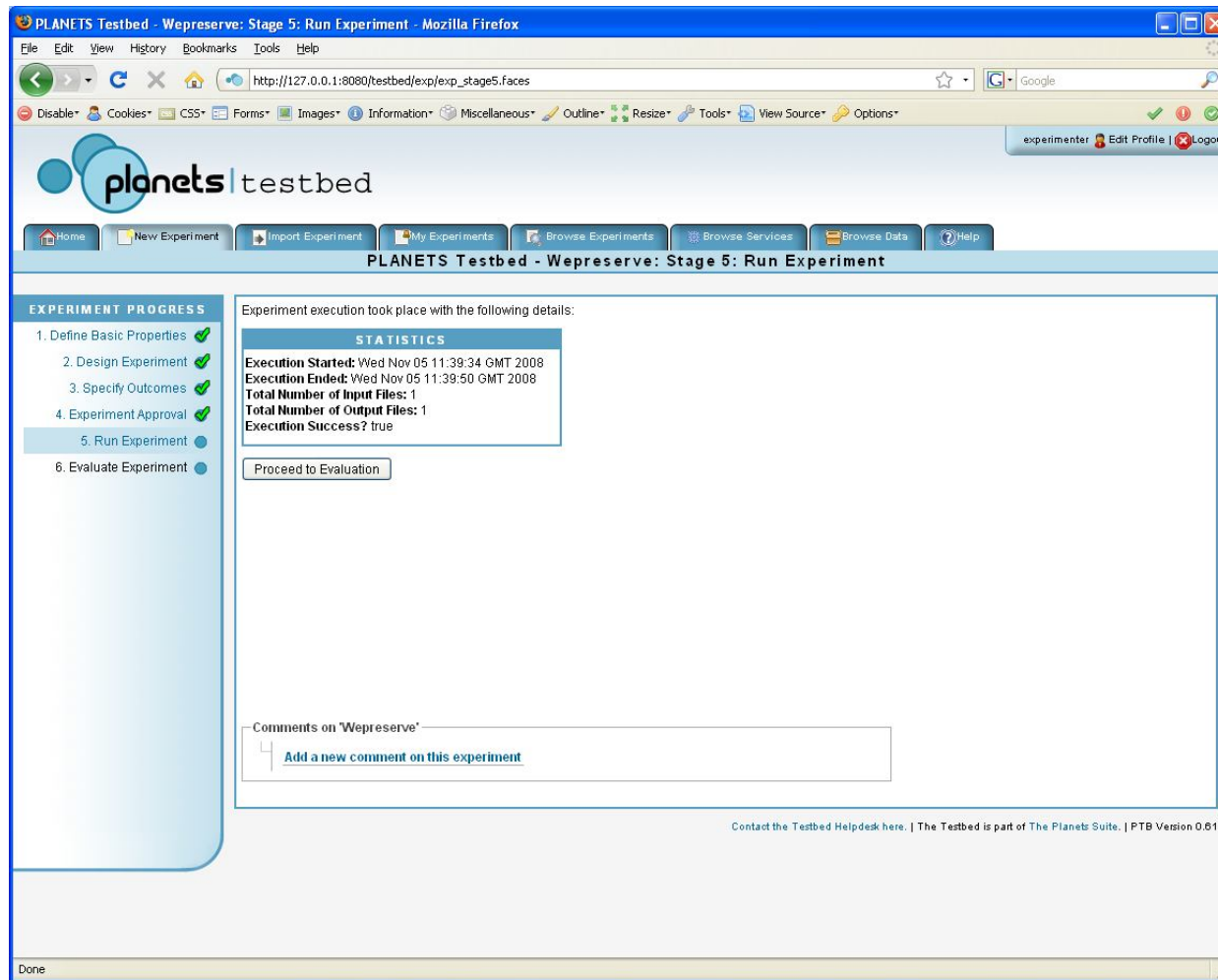
The application interface includes a navigation menu with options: Home, New Experiment, Import Experiment, My Experiments, Browse Experiments, Browse Services, Browse Data, and Help. The main content area is titled "PLANETS Testbed - BenchmarkGoal auto evaluation Metric Mapping".

On the left, there is a "NAVIGATION OPTIONS" sidebar with a "Return to Experiment" link. The main configuration area is titled "Information" and contains the following elements:

- Information:** Please specify how to automatically evaluate the the chosen BenchmarkGoal: **XCDLImageHeight**
- Available Metrics:** A list of metrics: equal, intDiff, and peroDev.
- How to determine the TB Evaluation value: very good:** A section titled "Selected Metric Evaluation Configuration" with instructions: "Please chose a metric and drag into the box for selecting and configuring it. All added metrics are connected as AND and therefore need to positively evaluate". Below this, there is a configuration box showing "equal" selected in a dropdown, followed by "true" in another dropdown, and an "add config" button.
- How to determine the TB Evaluation value: good**
- How to determine the TB Evaluation value: bad**
- How to determine the TB Evaluation value: very bad**

At the bottom of the configuration area, there are "Save" and "Cancel" buttons. A footer note reads: "Contact the Testbed Helpdesk here. | The Testbed is part of The Planets Suite. | PTB Version 0.81".

Experiment Execution Statistics



PLANETS Testbed - Wepreserve: Stage 5: Run Experiment - Mozilla Firefox

http://127.0.0.1:8080/testbed/exp/exp_stage5.faces

experiment | Edit Profile | Logout

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Home | New Experiment | Import Experiment | My Experiments | Browse Experiments | Browse Services | Browse Data | Help

PLANETS Testbed - Wepreserve: Stage 5: Run Experiment

EXPERIMENT PROGRESS

1. Define Basic Properties ✓
2. Design Experiment ✓
3. Specify Outcomes ✓
4. Experiment Approval ✓
5. Run Experiment ●
6. Evaluate Experiment ●

Experiment execution took place with the following details:

STATISTICS

Execution Started: Wed Nov 05 11:39:34 GMT 2008
 Execution Ended: Wed Nov 05 11:39:50 GMT 2008
 Total Number of Input Files: 1
 Total Number of Output Files: 1
 Execution Success? true

Proceed to Evaluation

Comments on 'Wepreserve'

Add a new comment on this experiment

Contact the Testbed Helpdesk here. | The Testbed is part of The Planets Suite. | PTB Version 0.61

Done

Experiment Evaluation

PLANETS Testbed - Wepreserve: Stage 6: Evaluate Experiment - Mozilla Firefox

http://127.0.0.1:8080/testbed/exp/exp_stage5.faces

planets testbed

Home | New Experiment | Import Experiment | My Experiments | Browse Experiments | Browse Services | Browse Data | Help

PLANETS Testbed - Wepreserve: Stage 6: Evaluate Experiment

EXPERIMENT PROGRESS

1. Define Basic Properties ✓
2. Design Experiment ✓
3. Specify Outcomes ✓
4. Experiment Approval ✓
5. Run Experiment ✓
6. Evaluate Experiment ●

View the experiment's input and output data, evaluate the outcomes of your experiment against the benchmark goals you specified during Stage 3 of the experiment and supply a report about your experiment. You may save and re-edit your evaluation as often as required.

Experiment Data Evaluation

Experiment Record #1: <http://localhost:8080/planets-testbed/inputdata/f1cf8e7f-dc60-4c0e-9630-a388dd4af9d7.tif> - <<test.tif>>

Experiment Data

Experiment Input Data	Experiment Output Data
test.tif	http://localhost:8080/planets-testbed/outputdata/f1cf8e7f-dc60-4c0e-9630-a388dd4af9d7.png

Benchmark Goal Evaluation

Criteria: Preservation Of...	Explanation	Source Value	Target Value	Evaluation
Color depth	Describes the number of bits used to represent the color of a single pixel <i>Can not be determined by visual inspection (you cannot simply see it) but only by a tool.</i>	<input type="text" value="Integer"/>	<input type="text" value="Integer"/>	bad ▾
XCDLImageHeight	XCDL property 2 <i>Height of an image. Corresponds to the y-axis of a Cartesian coordinate system. Measured in pixel. XCDL property 2</i>	<input type="text" value="Integer"/>	<input type="text" value="Integer"/>	bad ▾

Experiment Overall Evaluation

Below are the benchmark goals you specified during stage three of the experiment design. Evaluate the success of your experiment by selecting the level of success of each goal.

What next for the Testbed?

- Integration of Automated experiment evaluation
- Integration of Emulation services
- Integration of complex workflows
- Make digital preservation corpora available as test data
 - ensure that a sufficient knowledge base is available for each experiment
 - Provide an annotated collection of digital objects
 - Annotations will contain the criteria against which given algorithms will be evaluated

Opening the Testbed to External Organisations

- Agreement with external institutions in place by November 2008
- Opening of Testbed for external experiments by April 2009
- DCC already involved in the Testbed
 - DCC Testbed Research Model established
 - Close collaboration with DCC experimenters expected shortly