Emulation as a Service
Docker & Boot2Emulator

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Emulation as a Service / bwFLA

- Our goal:
  - making emulation accessible
  - →Emulation as a Service

→But: there were issue (due to the chosen design)
  - →requires setup and machinery
  - → not suitable for small scale setups (e.g. reading rooms) or simple local experiments
    - →we still want to make emulation accessible

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Emulator Experiments (local)

- Self-contained Docker instance
  - pull the eaas docker from DockerHub
  - setup a local image-archive (or connect to a networked one)
  - (optional) setup a local object-archive (or connect to a networked one)
  - start docker instance
  - open browser and work with your local files and/or disk-images

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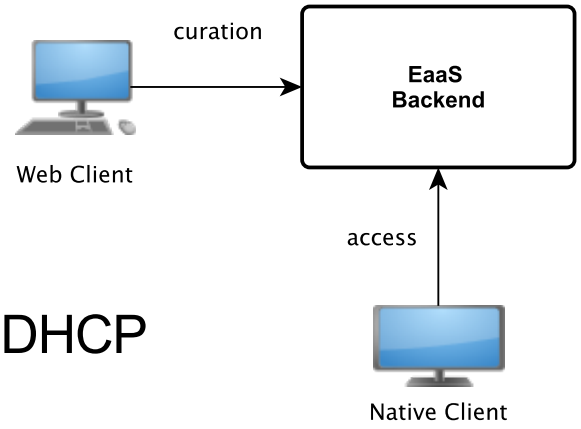
Museums / Public Displays

- Boot2Emulator
  - run emulators locally (USB live system)
  - make use of local hardware (CPUs)
  - allows to connect external hardware components (e.g. gamepad, joystick, etc.)
  - native fullscreen
  - no (low) latency
  - use with (mock-)hardware

Apple Macintosh Performa 630 computer
Vilem Flusser Archive, Berlin
Flusser Exhibition "Bodenlos" @ ZKM Karlsruhe

Museums / Public Displays

- Boot to emulator
  - web-based UI
  - seamless switch (crtl-alt-f) between native fullscreen and traditional web-view
    - create citation link
    - change medium etc.
  - 2 Options:
    - self-contained
    - connected
      - requires wired network and DHCP



TOC of Demo Session

- Docker
  - setup & preparation
  - usage examples
    - using EnCase images with emulators
      - booting a EWF image (DOS / MacOS 7.6)
      - attaching a EWF image as second disk drive
      - creating a redacted overlay
    - working with local objects (ISOs)
- Boot2Emulator
  - self-contained live system
  - customization

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Docker: Preparation

- Download or prepare an "image-archive"
  - http://bw-fla.uni-freiburg.de/image-archive.tgz
- Add your images to:
  - image-archive/incoming

Docker: Preparation

- Find out the IP of your Docker host.
  - E.g. for Mac users it looks like this:

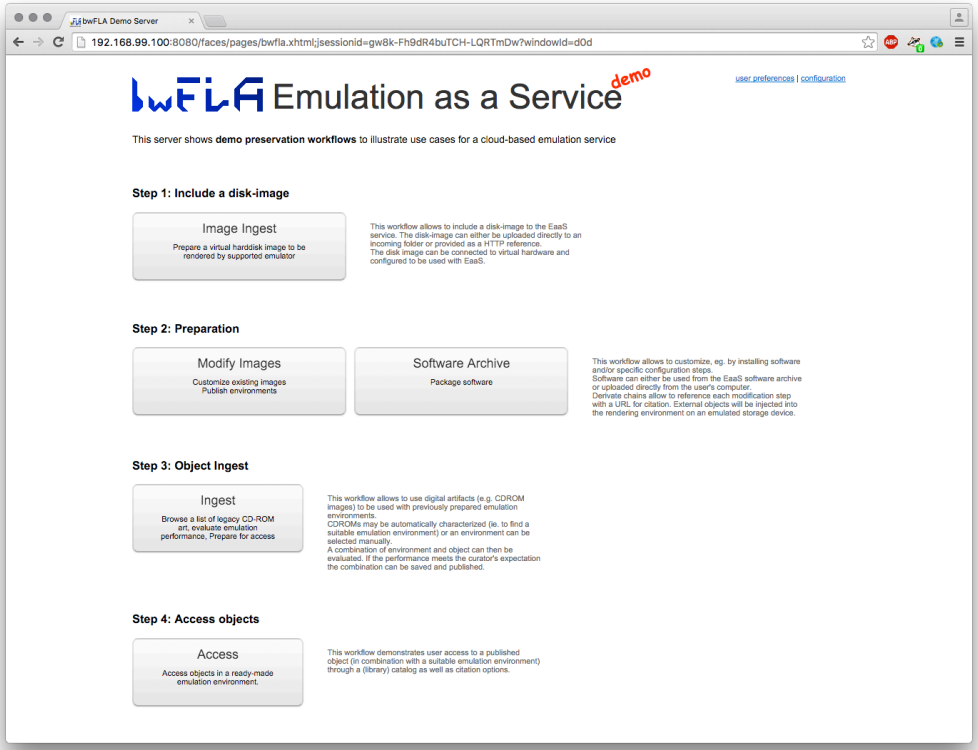
```
                        ##         .
                  ## ## ##        ==
               ## ## ## ## ##    ===
           /"""""""""""""""""\___/ ===
      ~~~ {~~ ~~~~ ~~~ ~~~~ ~~~ ~ /  ===- ~~~
           \_____ o           __/
             \    \         __/
              \____\_______/

docker is configured to use the default machine with IP 192.168.99.100
For help getting started, check out the docs at https://docs.docker.com

krs-MacBook-Pro:~ klaus$
```

Docker: Start

Run:

docker pull eaas/bwfla:curategear16

curate-gear-demo.sh --archive-dir image-archive/ --public-ip-port 192.168.99.100:8080



Docker: Ingest EWF Image

bwFLA Basic System Enviro

192.168.99.100:8080/faces/pages/workflow-images/WF_IM_0.xhtml;jsessionid=gw8k-Fh9dR4buTCH-LQRTmDw?windowId=d0d

bwFLA Basic System Environments

Home

Image Registration

freedos.qcow2
msdos-encase-demo.E01
From URL

Select a machine: pc:x86:qemu:default

Name *: MS-DOS Encase Test

CRT Simulation

Relative Mouse

Native Config

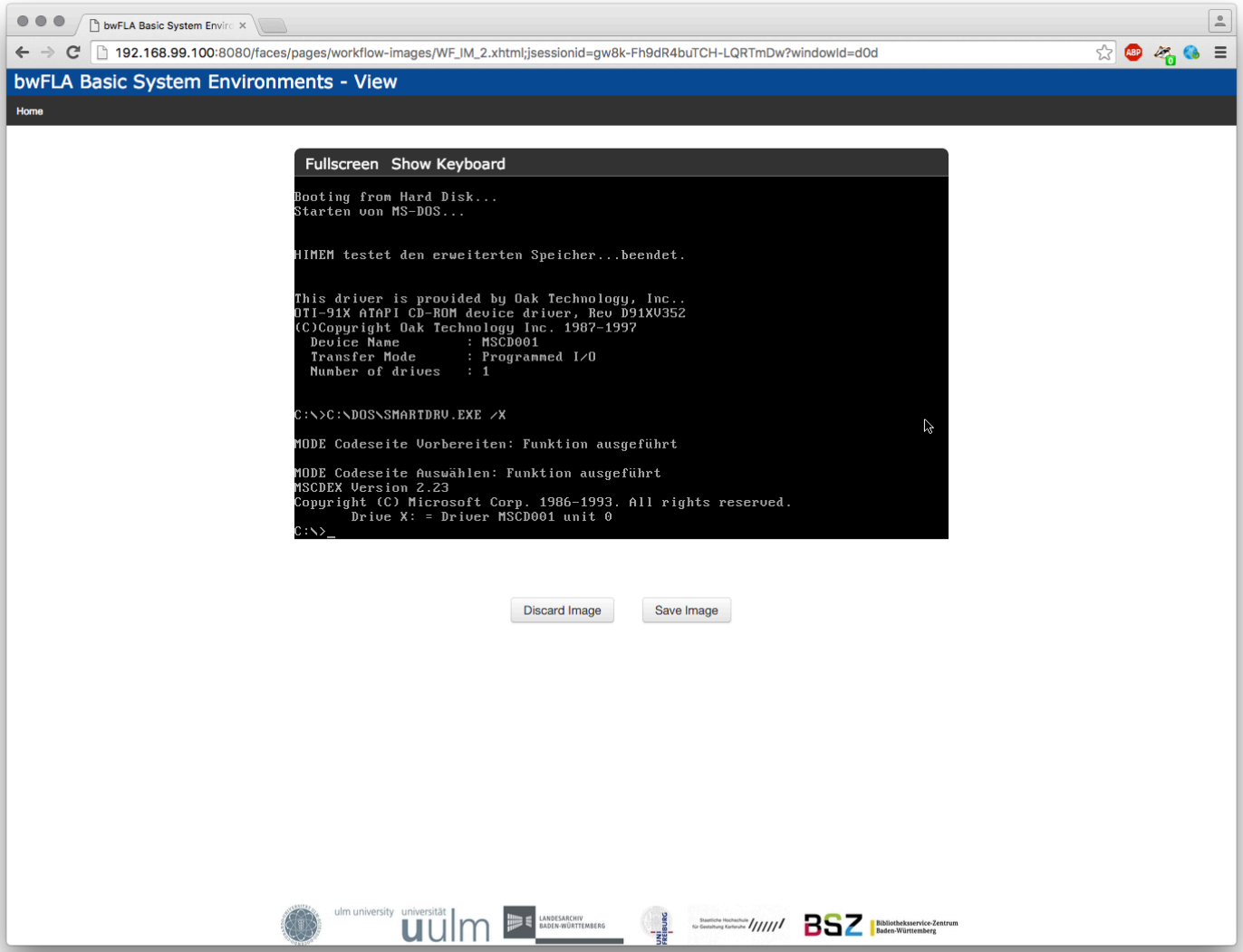
URL

Copy on Write

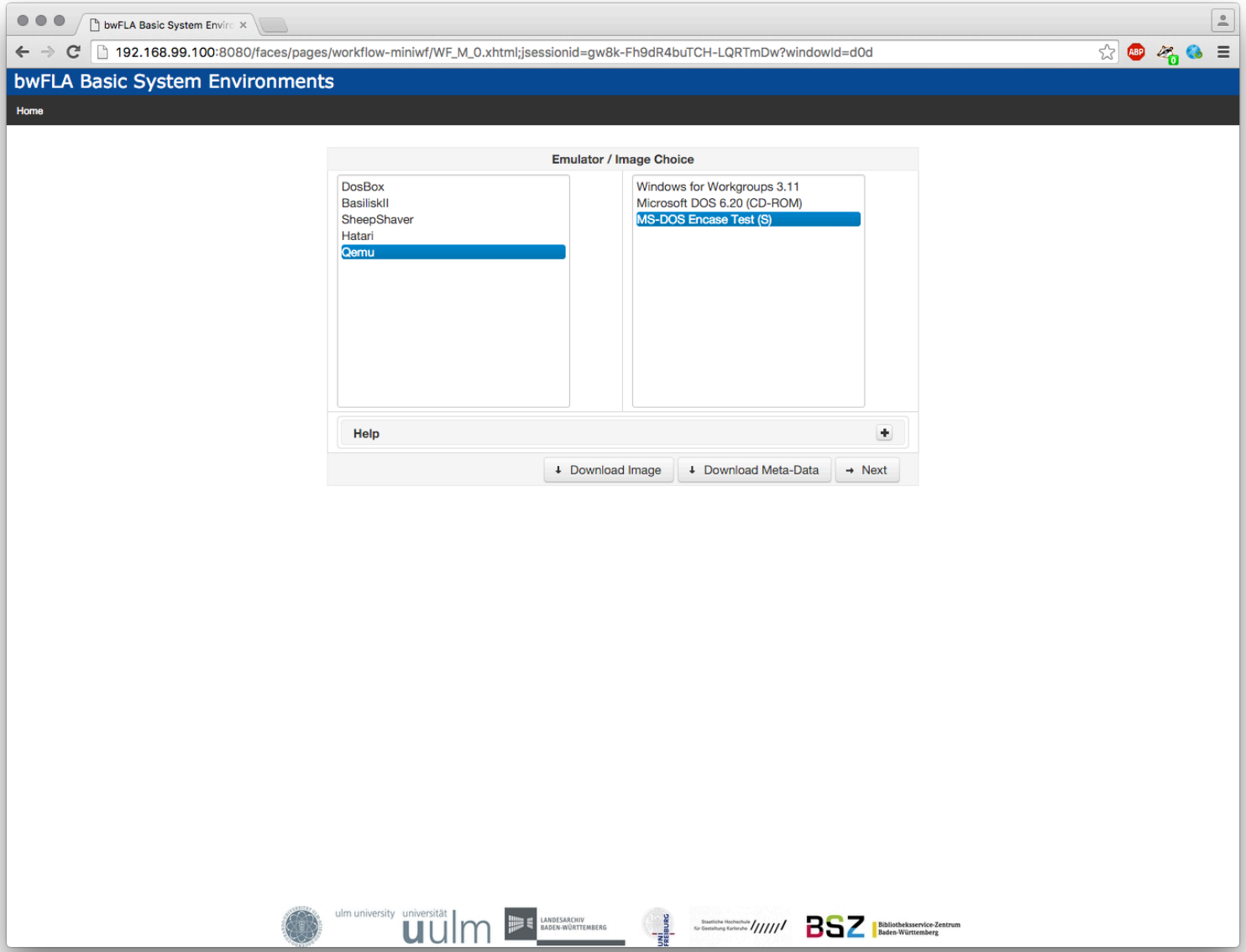
Help

Next

Docker: Ingest EWF Image



Docker: Work with ingested EWF



Docker: Simple Redaction

bwFLA Basic System Envir

192.168.99.100:8080/faces/pages/workflow-miniwf/WF_M_2.xhtml;jsessionid=gw8k-Fh9dR4buTCH-LQRTmDw?windowId=d0d

bwFLA Basic System Environments - View

Home | Stop and Proceed

```
Booting from Hard Disk...
Starten von MS-DOS...


HIMEM testet den erweiterten Speicher...beendet.


This driver is provided by Oak Technology, Inc..
OTI-91X ATAPI CD-ROM device driver, Rev D91XV352
(C)Copyright Oak Technology Inc. 1987-1997
  Device Name        : MSCD001
  Transfer Mode      : Programmed I/O
  Number of drives   : 1


C:\>C:\DOS\SMARTDRV.EXE /X

MODE Codeseite Vorbereiten: Funktion ausgeführt

MODE Codeseite Auswählen: Funktion ausgeführt
MSCDEX Version 2.23
Copyright (C) Microsoft Corp. 1986-1993. All rights reserved.
        Drive X: = Driver MSCD001 unit 0
C:\>mkdir test
```

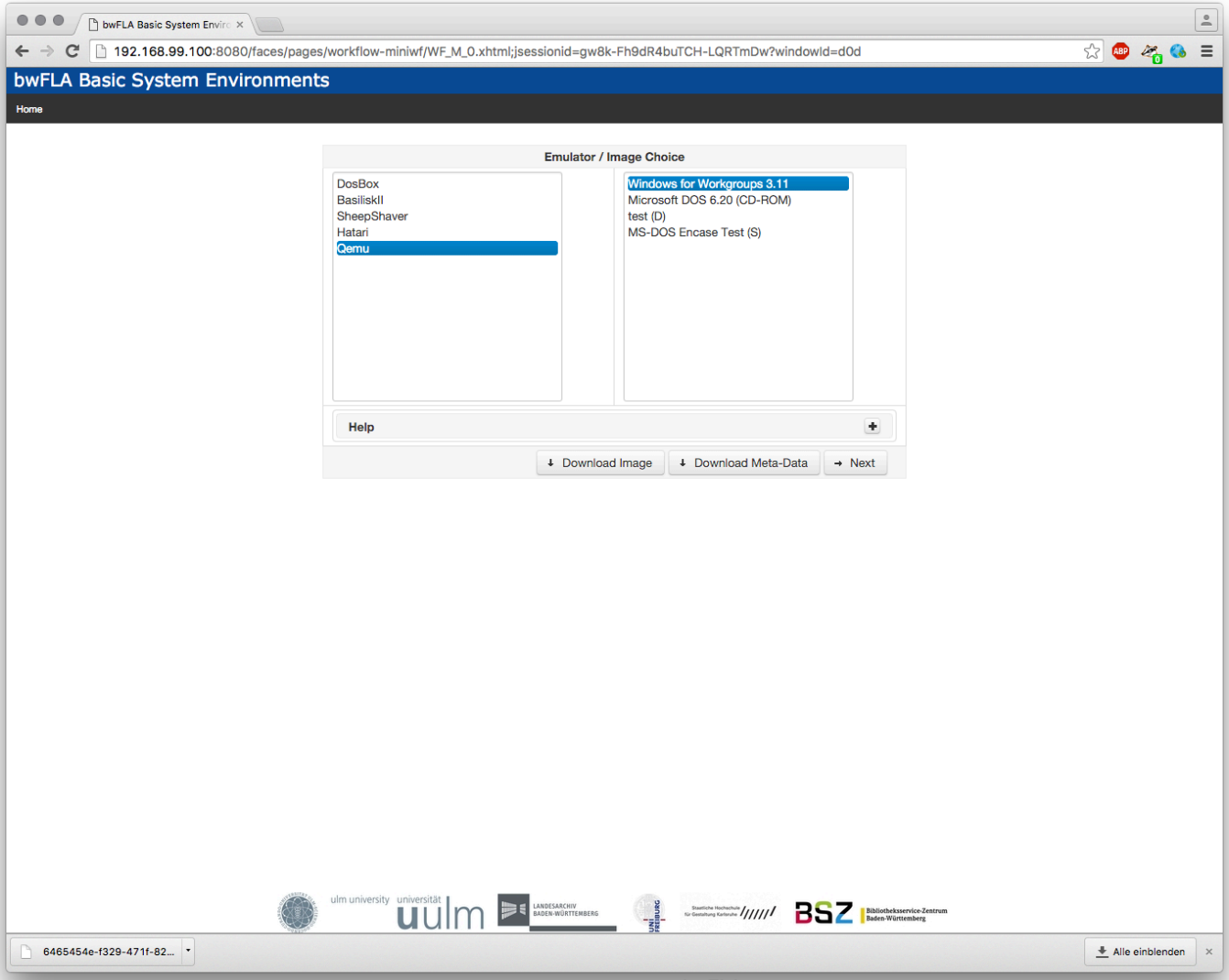
Save as derivate image

Name: redacted overlay | Save Derivate

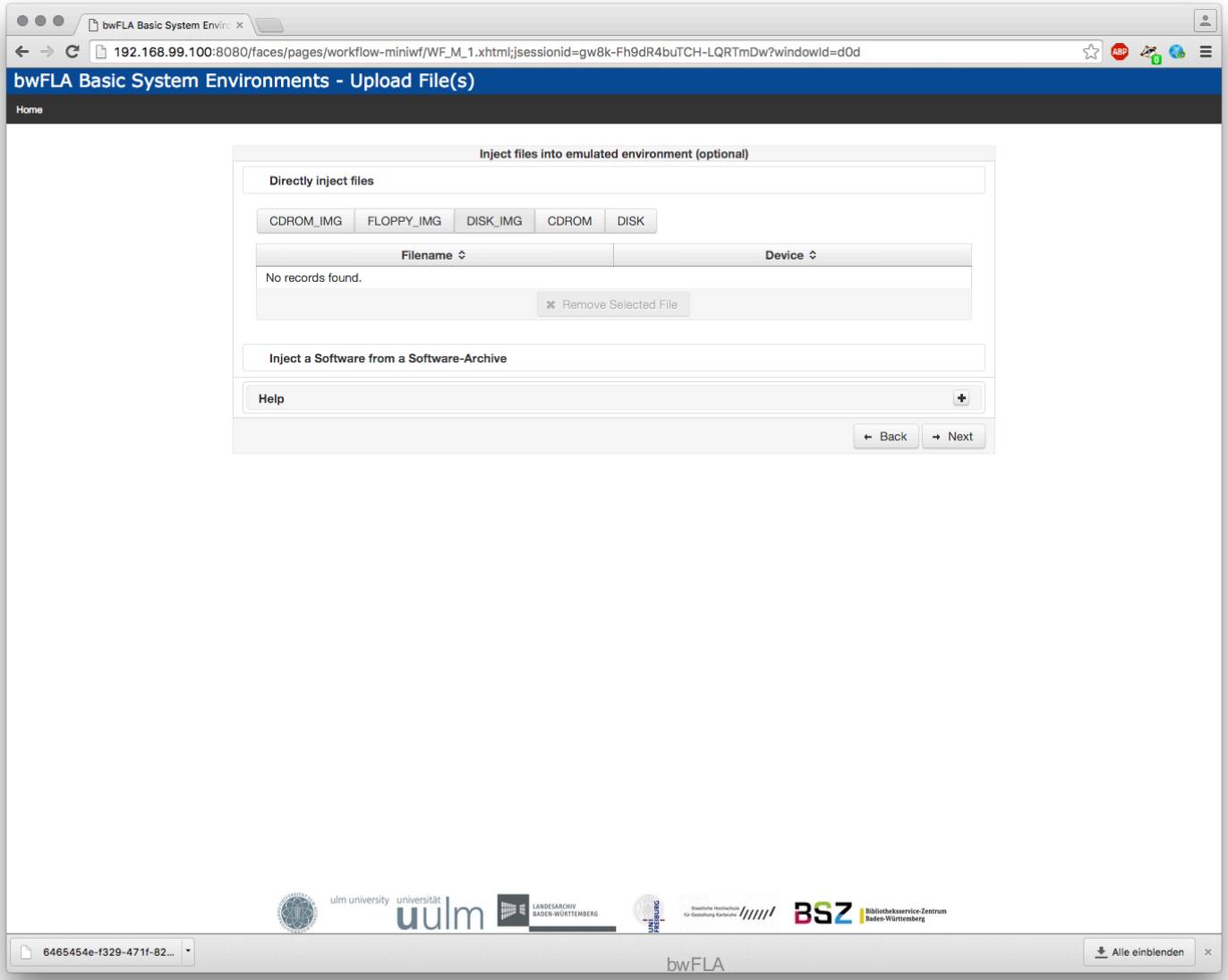
Share | Next | Cite | Cite Modification

6465454e-f329-471f-82... | Alle einblenden

Docker: Upload EWF as Secondary Disk

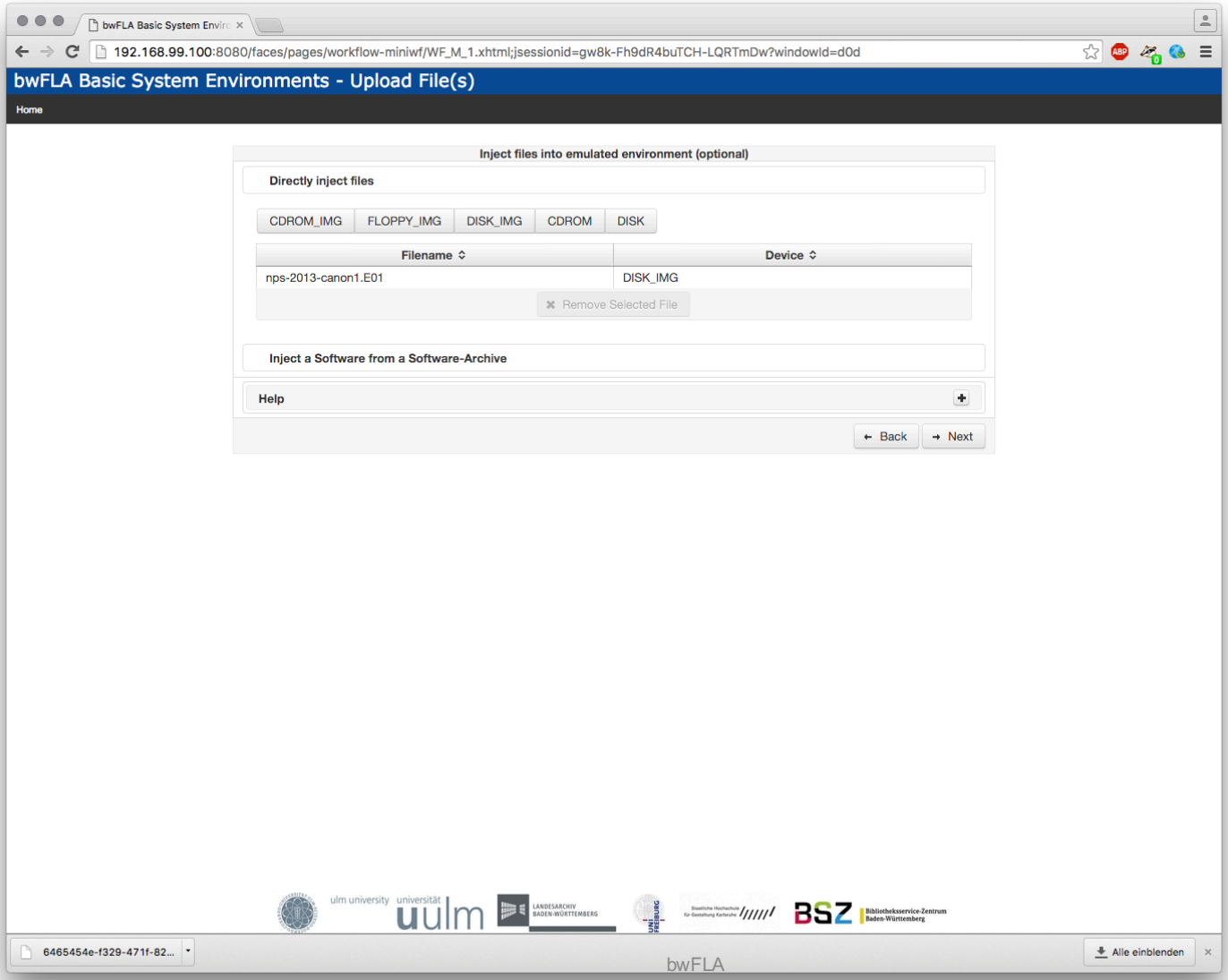


Docker: Upload EWF as Secondary Disk

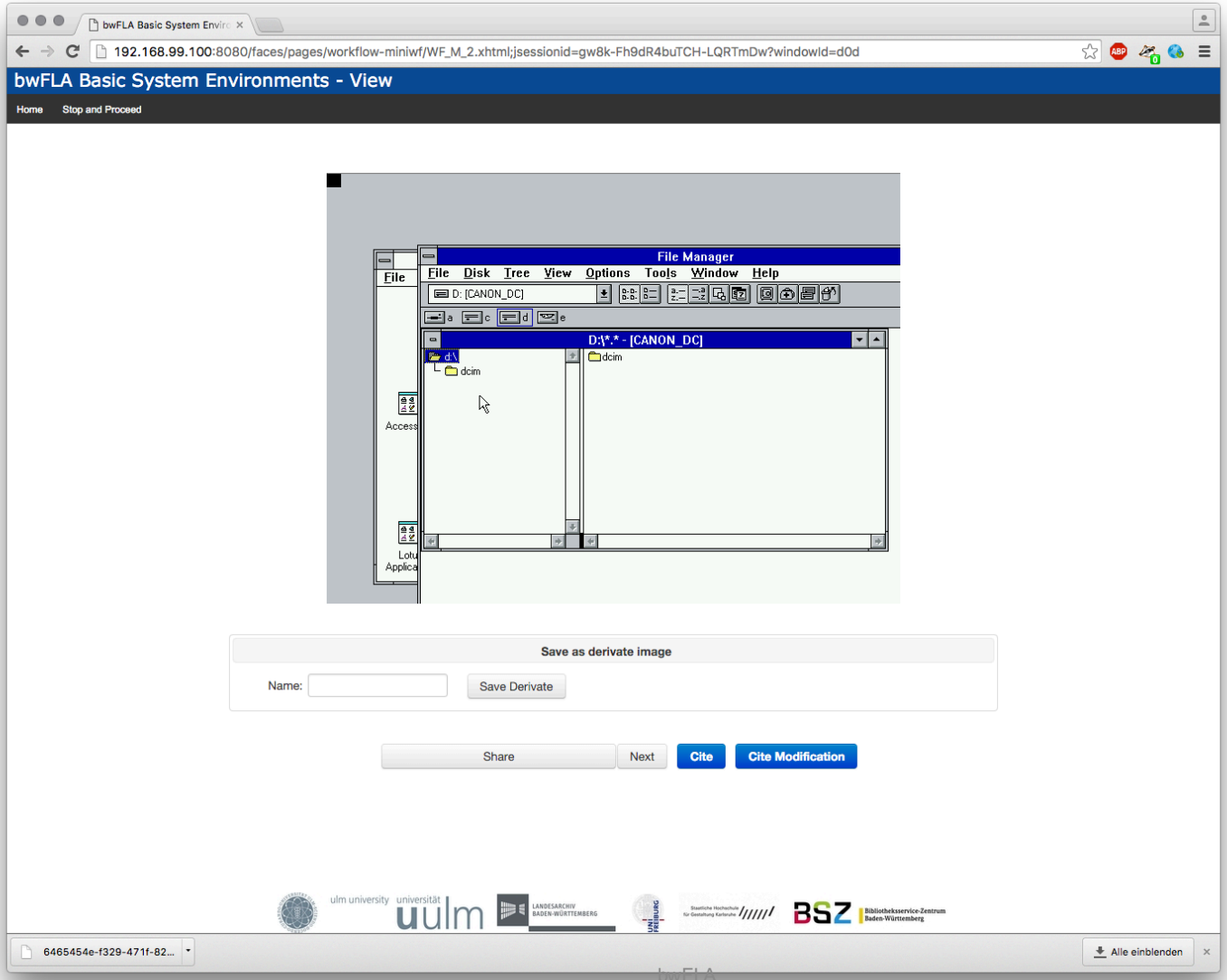


bwFLA

Docker: Upload EWF as Secondary Disk



Docker: Upload EWF as Secondary Disk



Docker: Working with Objects

- Create a local object-archive:

```
my-objects/
    my-object-1/
        iso/
            cdrom1.iso
            cdrom2.iso
    my-object-2/
        floppy/
            fd1.img
            fd2.img
```

Docker: Working with Objects

bwFLA Basic System Environments - View

Home

1. Basic Artifact Properties 2. Test and Evaluation 3. Complete Ingest

Choose Object and Runtime Environment

Archive:

---

user-objects

Digital Object:

smarty

zero

URL

Copy on Write

Advanced Options

Test and Evaluation

Docker: Working with Objects

bwFLA Basic System Environments - View

Home

1. Basic Artifact Properties 2. Test and Evaluation 3. Complete Ingest

Choose Object and Runtime Environment

Archive:
---
user-objects

Digital Object:
smarty
zero

URL

Copy on Write

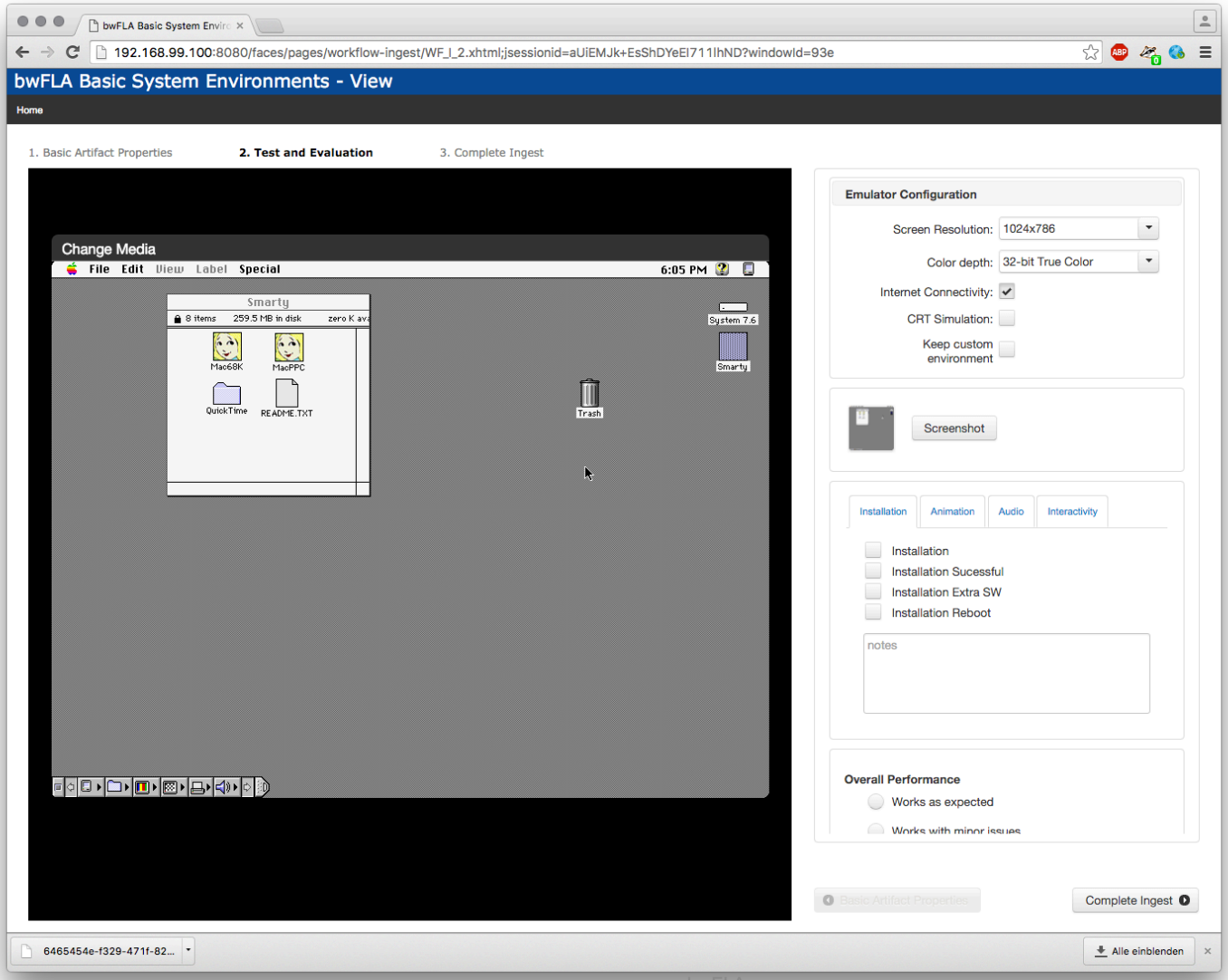
Advanced Options

Emulator and Environment:
DosBox
BasiliskII
SheepShaver
Hatari
Qemu

Apple Mac OS 9
Apple Mac OS 7.6

Test and Evaluation

Docker: Working with Objects



Live System (USB)

- Download latest example:
  - http://bw-fla.uni-freiburg.de/usb-demo.img
- Write to USB Stick, e.g.

  sudo dd if=/home/klaus/usb-demo.img of=/dev/<your usb device>
- Contains 2 partitions
  - live system (~1 Gb)
  - "emil-data" – user-data and configuration

Live System Configuration

- Boot2Emulator
  - add "environment-id.txt"
  - add single image-id entry to txt file
- Connect with external ImageArchive
  - delete image-archive folder
  - open configs/remote/WorkflowsConf.xml
  - set archiveGW to IP:PORT of your image archive
- A tamper/vandalism proof version is available

Demo & Downloads

- http://demo.bw-fla.uni-freiburg.de

Twitter: @bw_FLA

Docker Hub: eaas/bwfla

GitHub: eaas-framework

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