KEEP

KEEPING EMULATION ENVIRONMENTS PORTABLE

Media Carriers and Transfer Tools

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FUTURE-proof COMPUTING

Programme

- Introduction – *Marcus Dindorf*
- Transfer Tool Framework Overview – *Janet Delve*
- Transfer Tools – *Antonio Ciuffreda*
- Media Carrier and Transfer Tool Knowledge Bases and Demonstration – *Janet Delve*
- *Future Developments – Marcus Dindorf*
- Questions?
- *Workshop*

Introduction – *Marcus Dindorf*

Motivation

Media carrier at collections

-> Risk of data loss!!!

- Material deterioration
- Hardware / Software obsolescence
- Knowledge loss

Preservation starts with safeguarding

Urgent: Safeguarding the Original Bits!

Requirements

- Hardware reader
- Software environment
- Knowledge (in media transfer)
  - technically & legally!

Media Transfer Knowledge

Knowledge required about

- Digital media carrier types
- Image file formats
- Transfer solutions (Hard- / Software)
- Copy protection mechanisms
- Legal framework
- User Requirements

How to handle variation & complexity

Media carrier types, image file formats, copy-protections

vs.

Transfer solutions (Hard- / Software) within the legal framework

->

Investigations into a

'Transfer Tools Framework‘

Goal: Provide Knowledge & Assistance

At archive time…

1 Suppose your collection holds old media carriers, such as 5.25" floppy disks. It is important to capture the data stored on these media, before it is too late.

3 The result of this extraction is a container file holding all files of the storage medium (a "disk image"), enriched with metadata. This can now be stored in your digital archive, just like other files.

Transfer Tools Framework → Digital archive

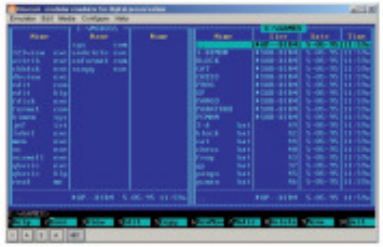
2 The Transfer Tools Framework assists you with extracting the data from your old media. It does this by using existing transfer tools

At access time…

4 When a user requests an item from your digital collection and this item requires an old computer environment to render, the Emulation Framework is used.

5 The Emulation Framework automatically selects and runs the best available emulator and configures the software dependencies required to render the object (operating system, applications, etc.).

Digital archive → Emulation Framework → Emulator



6 Even emulators will become obsolete after a while. That is why KEEP develops a KEEP Virtual Machine that enables execution of any software on any platform any time.

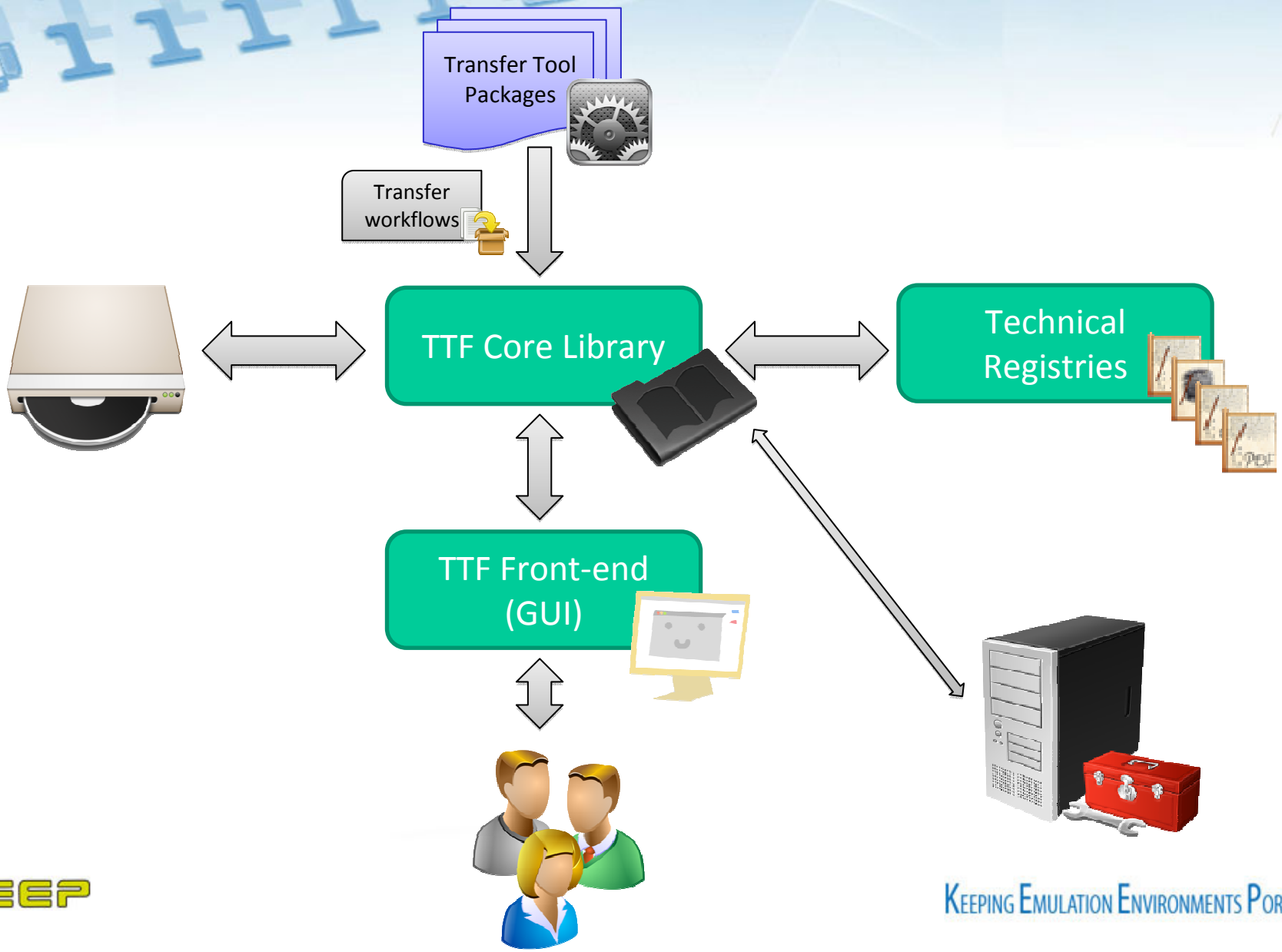
KEEP Virtual Machine (VM)

Transfer Tool Framework Overview

KEEP Transfer Tool Framework in the Planets Interoperability Framework and the Open Planets Foundation

Janet Delve

The KEEP Transfer Tool Framework (TTF)



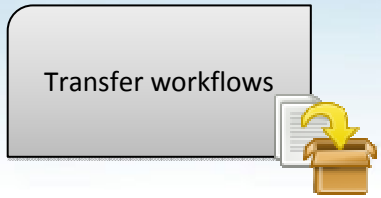
TTF Core Library

Layer responsible for logical functions

Functionality to:

- Add, remove and run **workflows**
- Store and manage **transfer tool packages**
- Record and store procedural and analytical **data**
- Add, remove and access **technical registries**
- Support **user management**

Transfer Workflows

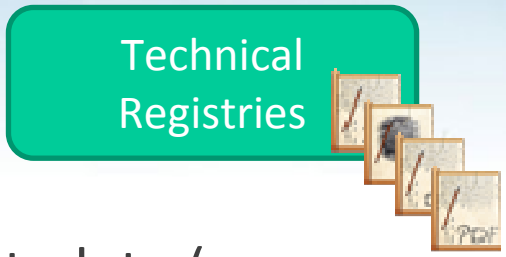


- Pre-configured sequences of activities
- Image files from a digital media carrier
- Depending on functionality provided by media transfer tools

Transfer Tool Packages

- Chosen two media transfer tools NibTools and ImgBurn wrapped as web services
- Called by Transfer Workflows
- Generate a disk image file from a media carrier

Technical Registries



- Connect to internal resources for technical metadata (see TOTEM, more about this later on)
- Connect to Media carrier and transfer tool knowledge base (more about this coming up)
- Future - connect to external registries (e.g. MediaPedia)

Procedural and analytical data

Capture and store information about the activity and contents of the framework:

- knowledge about the integrated transfer and characterisation tools
- media carrier types
- image file formats
- transfer pathways between carriers and formats
- user evaluation and feedback on executed transfer workflows

Reinventing the wheel?

TTF is an original idea

- But implementation could be accommodated through tools developed by other EU projects

- KEEP Agents previously involved in the Planets EU project have investigated this further and suggested we can integrate the KEEP TTF with the **Planets Interoperability Framework** via the **Open Planets Framework (OPF)**.

In brief: what is the OPF?

- independent not-for-profit foundation
- brings together organisations that share a commitment to enduring long-term access to digital material
- advances digital preservation research and provide practical solutions
- provides stable hosted access to Planets services
- sharing of expertise and know-how in a community of experts
- coordinates further development of the Planets services, tools, and technology by supporting and engaging the Planets Open Source community
- external funding for development projects

Open Planets Foundation

KEEP

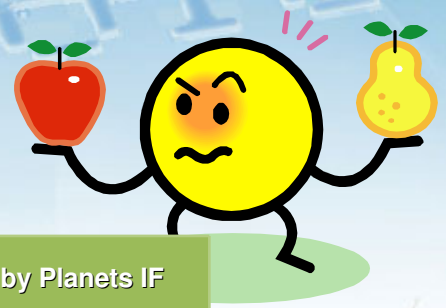
Keeping Emulation Environments Portable

What is the Planets Interoperability Framework?

Allows for services to interact within a distributed environment:

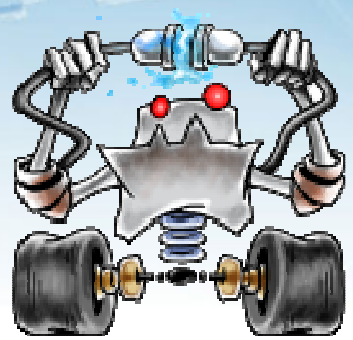
- preservation action and characterisation services
- user management
- management and execution of workflows
- monitoring and logging of community feedback
- data repository to store the information generated through monitoring and logging services

Let's Compare!



Item	Required by KEEP TTF	Covered by Planets IF
Support for workflow creation and management	✓	✓
Support for wrapping preservation tools as web services	✓	✓
Characterisation for web services (preservation tools)	✓	✓ (through WSDL)
Support for knowledge base	✓	✓ (through Testbed)
Service registry	✓	✓
File format registry	✓	✓
Integration with metadata schemas	✓	✓
Interaction with external technical registries	✓	✓
User management	✓	✓
User interface	✓	✓
Testbed	✓ (through Core Emulation Framework)	✓
Open, scalable, distributed architecture	✓	✓
API specification for emulation services	✓	✗
Transfer tool services	✓	✗
Transfer tool workflows	✓	✗

How does it work?

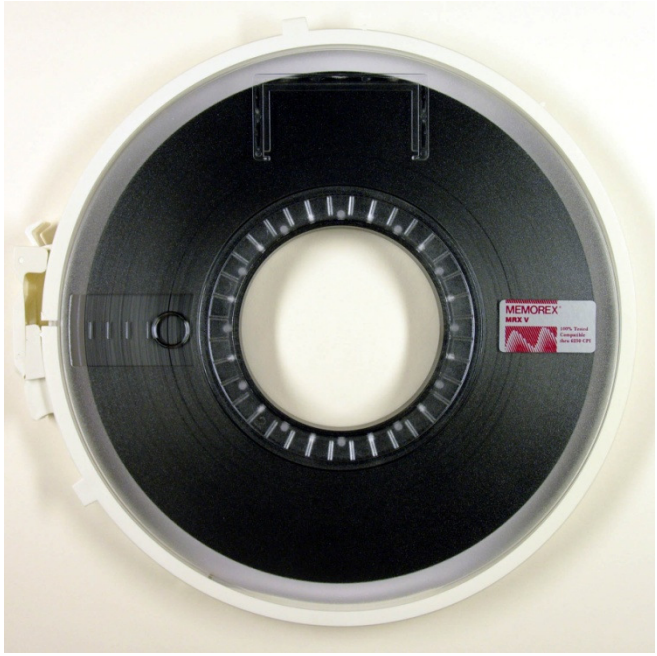


Planets IF + Media Transfer Use Case = TTF

TWO TRANSFER TOOLS

Antonio Ciuffreda

MAGNETIC MEDIA



C64 Preservation Project

NIBTOOLS

- Two Commodore 64-related image files supported:
- G64 (*.g64) and D64 (*.d64)
- Free and open-source

NIBTOOLS HARDWARE REQUIREMENTS

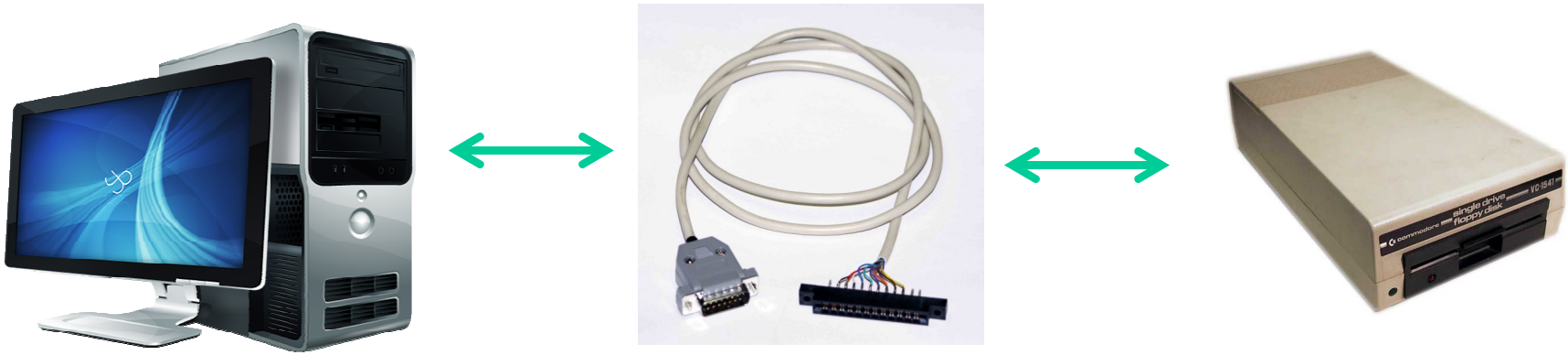
Commodore 64 floppy disk drive of the following categories:

1541

1541 II

1571

NIBTOOLS HARDWARE REQUIREMENTS



NIBTOOLS SOFTWARE REQUIREMENTS

- Wide range of operating systems supported:


Windows (NT/2000/XP/Vista/7)


Linux (Any)


DOS (MS/DR/Caldera)

- OpenCBM software (0.4.2 or higher) in order to enable the user computer to access the Commodore 64 disk drive

NIBTOOLS READING PROCESS

Command line interface only

```
>nibread -t test.nib


nibread - Commodore 1541/1571 disk image nibbler
(C) C64 Preservation Project
http://c64preservation.com
Revision 511 - (Built Jun  1 2011 21:29:51)

* Extended parallel port test loops = 100

Drive Version: 73,CBM DOS V2.6 1541,00,00
Drive type: 1541
Bumping...
Initializing
Uploading floppy-side code...
Starting custom drive code...

Failed parallel port transfer test. Check cabling.
Floppy drive initialization failed

Resetting drive...
Cleaning up...
```

NIBTOOLS READING PROCESS

Instructions

1. `nibread [options] filename.nib`

2. `nibconv filename.nib filename.g64`

   or

   `nibconv filename.nib filename.d64`

NIBTOOLS READING PROCESS

- Large range of `[options]` included
- 20 seconds average to read a floppy disk

OPTICAL MEDIA

IMGBURN

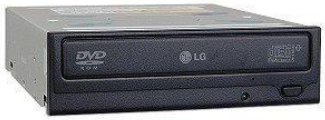
- Generate image files from CDs, DVDs and Blu-Ray discs
- Free
- User-friendly GUI provided
- Inability to read sub-channel data from a CD

IMGBURN SOFTWARE REQUIREMENTS

- All Windows operating systems supported
- Wine software supported: ability to run on Unix- like operating systems

IMGBURN HARDWARE REQUIREMENTS

Any disk drive supported



IMGBURN READING PROCESS

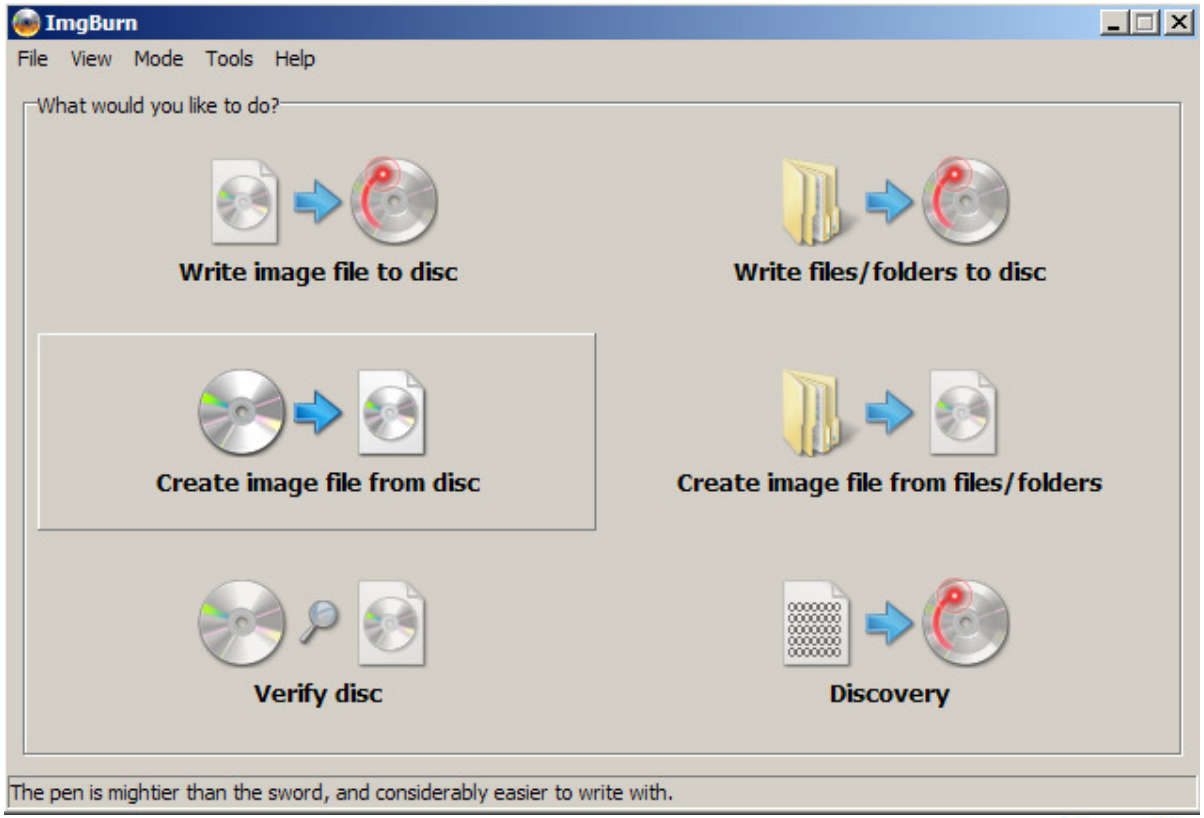
Large range of configuration settings provided

e.g.

- Disk Capacity
- Create Image Layout File
- Number of Software Retries
- Number of Hardware Retries
- Ignore Read Errors

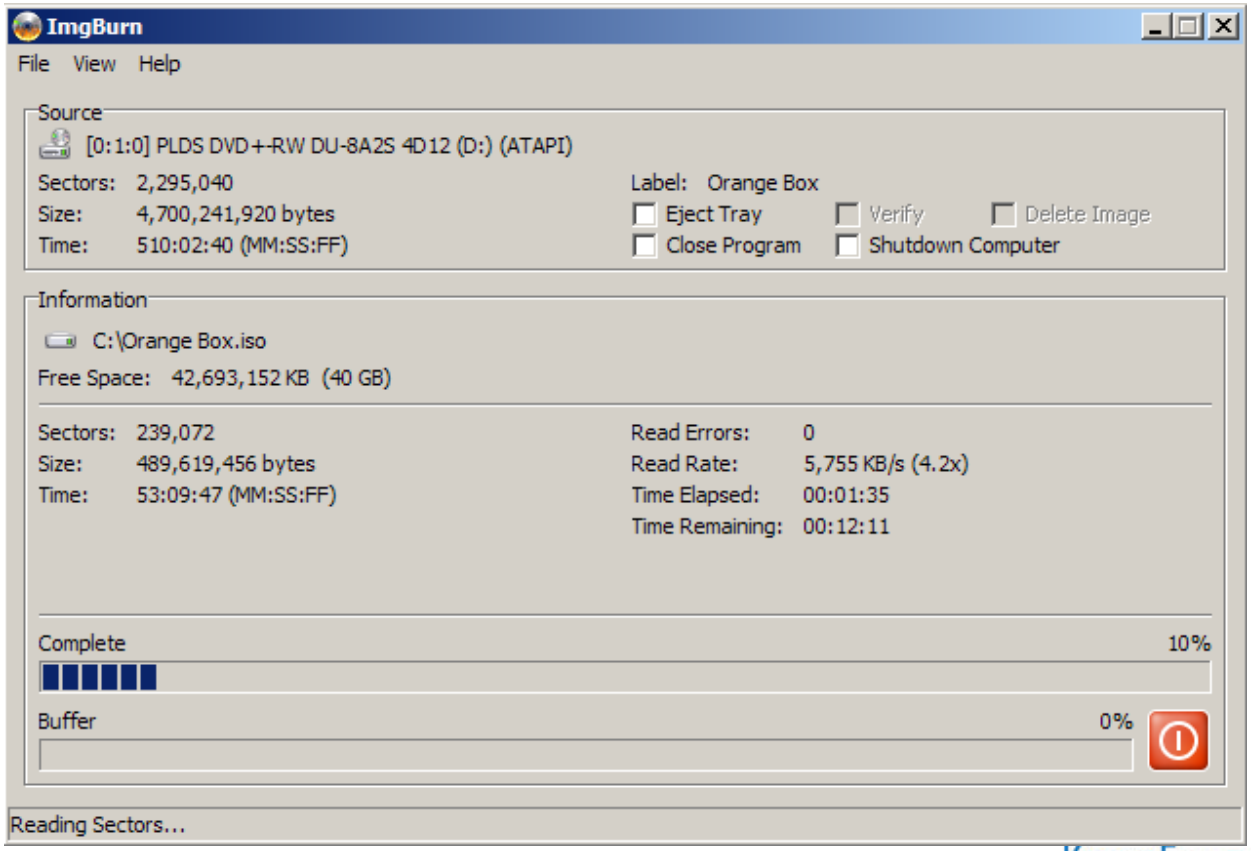
IMGBURN READING PROCESS

Graphical User Interface provided



IMGBURN READING PROCESS

Graphical User Interface provided



IMGBURN READING PROCESS

Image file generated:

IMG file (*.img) + CDRWin file (*.cue)

BIN file (*.bin) + CDRWin file (*.cue) + DVD file (*.dvd)

Maximum reading speed provided:

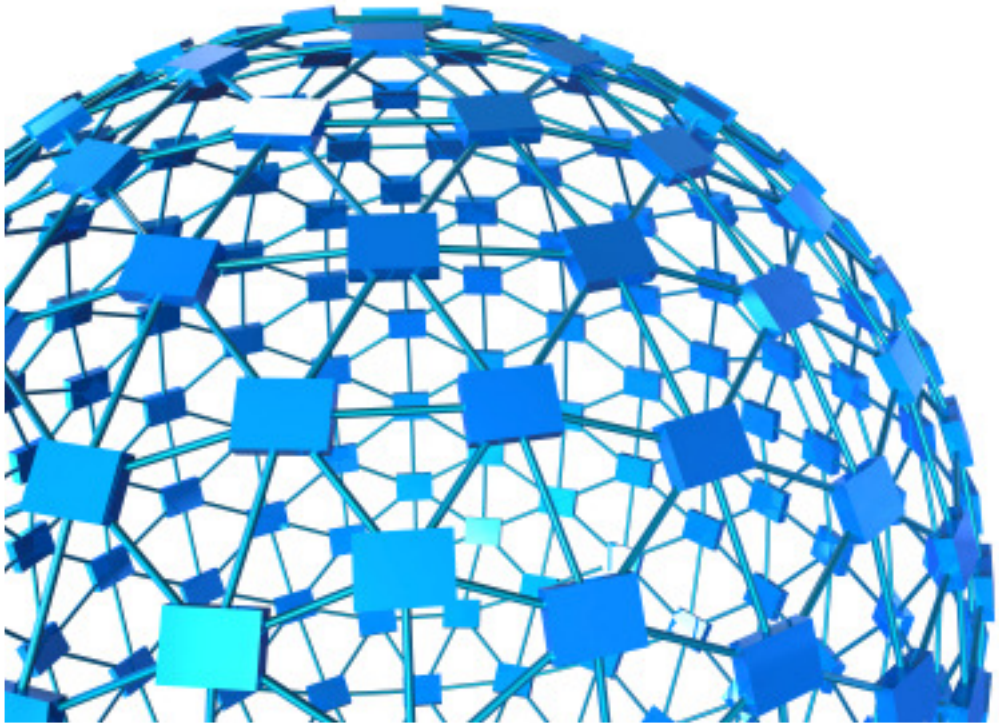
~ 8 MB per second for CDs

~ 77 MB per second for DVDs

252 MB per second for Blu-Ray disks

Media Carrier and Transfer Tool Knowledge Bases

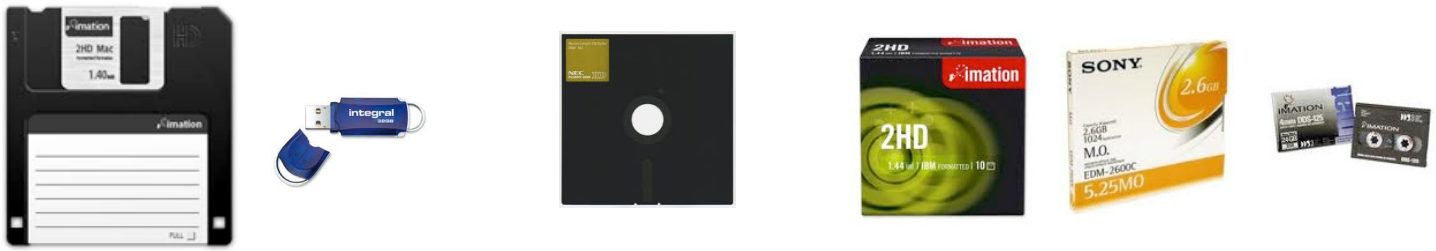
– *Janet Delve*



KEEPING EMULATION ENVIRONMENTS PORTABLE

THE BIG QUESTIONS!!!

- What is this disk / cartridge etc.?
- How do I get data off it?
- What tools and other computer equipment do I need?
- What outputs do I get?



THE MEDIA TRANSFER PROCESS

Which disk?
- Type?
- Format?

Which Tool?
- Open Source?
- How does it work?

What image file do I get?

.FDI? Etc.

HOW IS KEEP TACKLING THIS ISSUE?

- Tests: Computerspiele Museum
- Test criteria
- iPRES paper 2011

TRANSFER TOOL CRITERIA

1 Compatibility

- How well does it work with external components & configurations?

2 Usability

- How easy is it for a user / developer to use the transfer tool?

TRANSFER TOOL CRITERIA

3 Capability

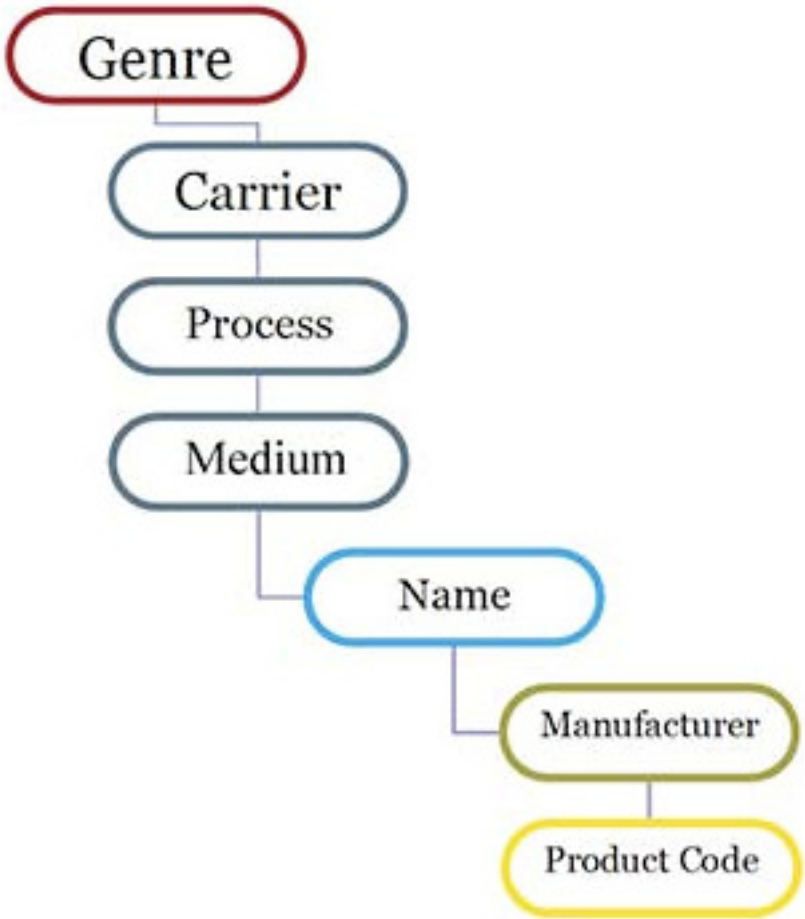
- Required functions supported?
- Secure and accurate transfer achieved?
- Performance?

4 Error handling

- Does the transfer tool resist failure?
- Graceful when error occurs?
- Recovers readily?

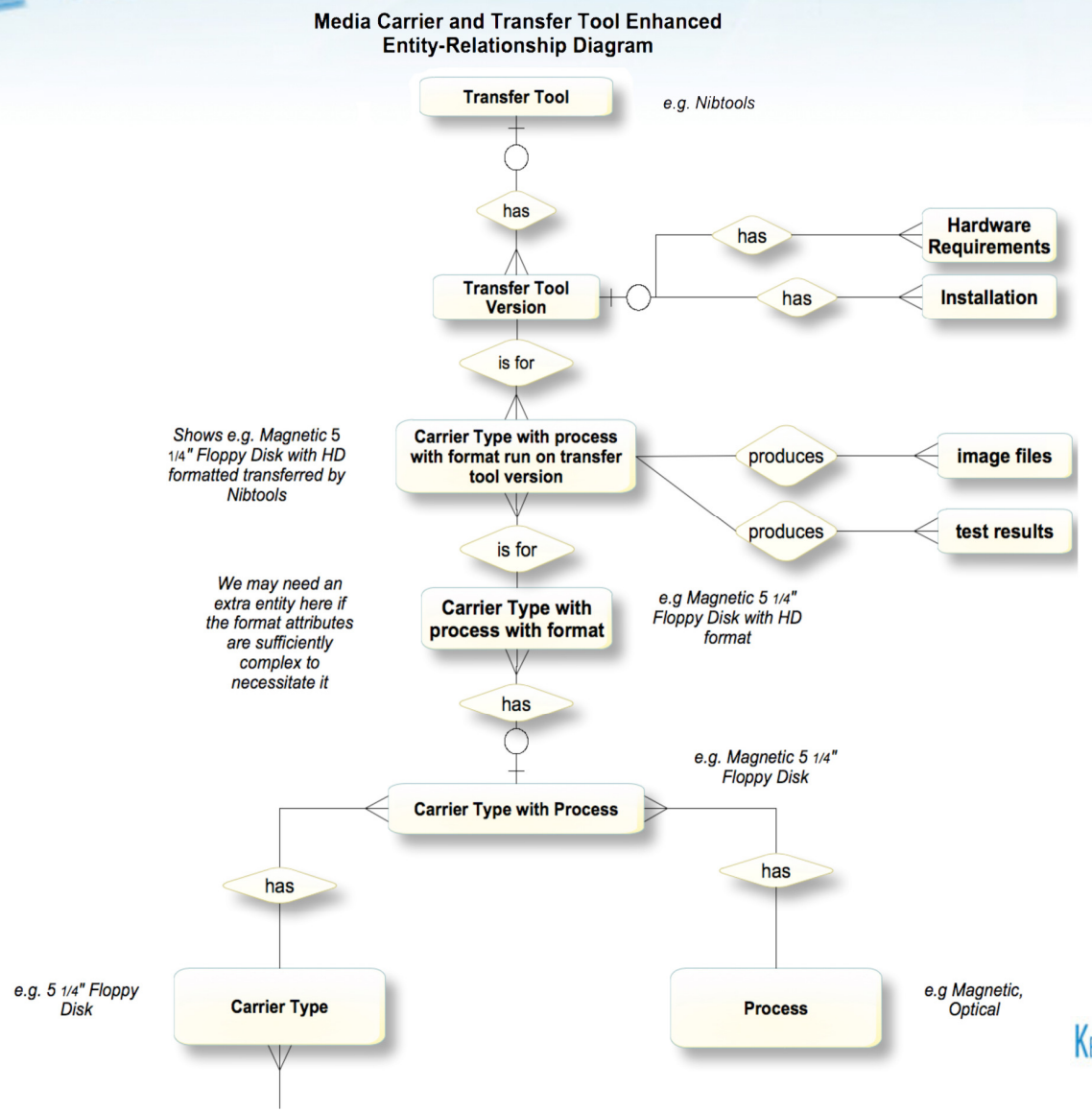
NATIONAL LIBRARY OF AUSTRALIA

Mediapedia



Media Carrier and Transfer Tool Database

Media Carrier and Transfer Tool Enhanced Entity-Relationship Diagram



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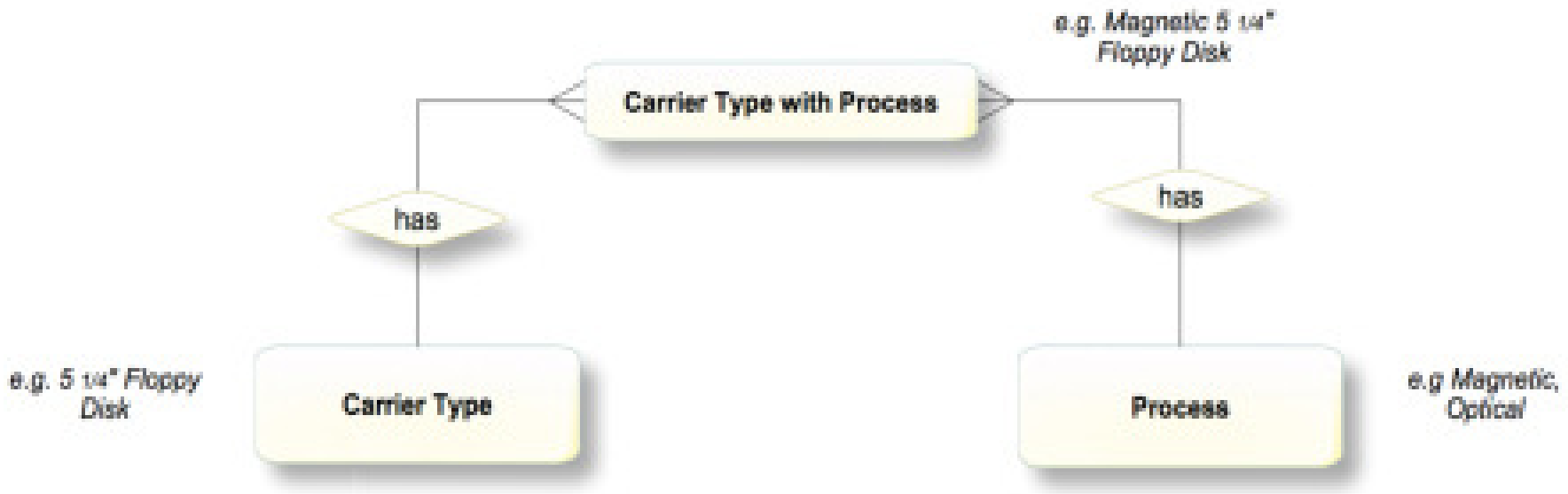
Media Carrier and Transfer Tool Database



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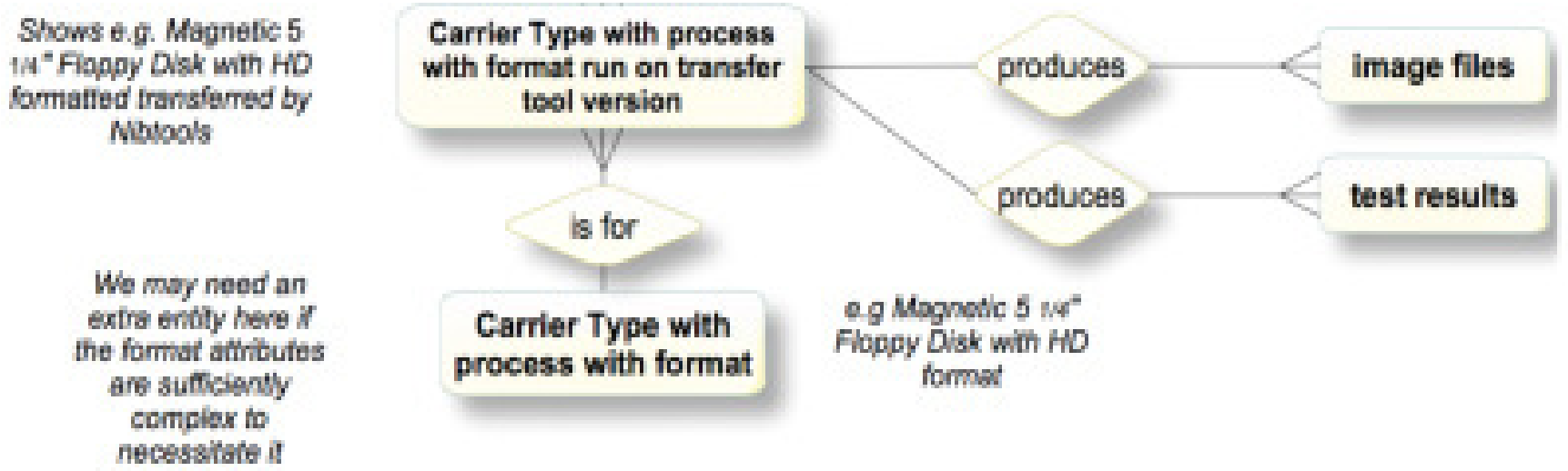
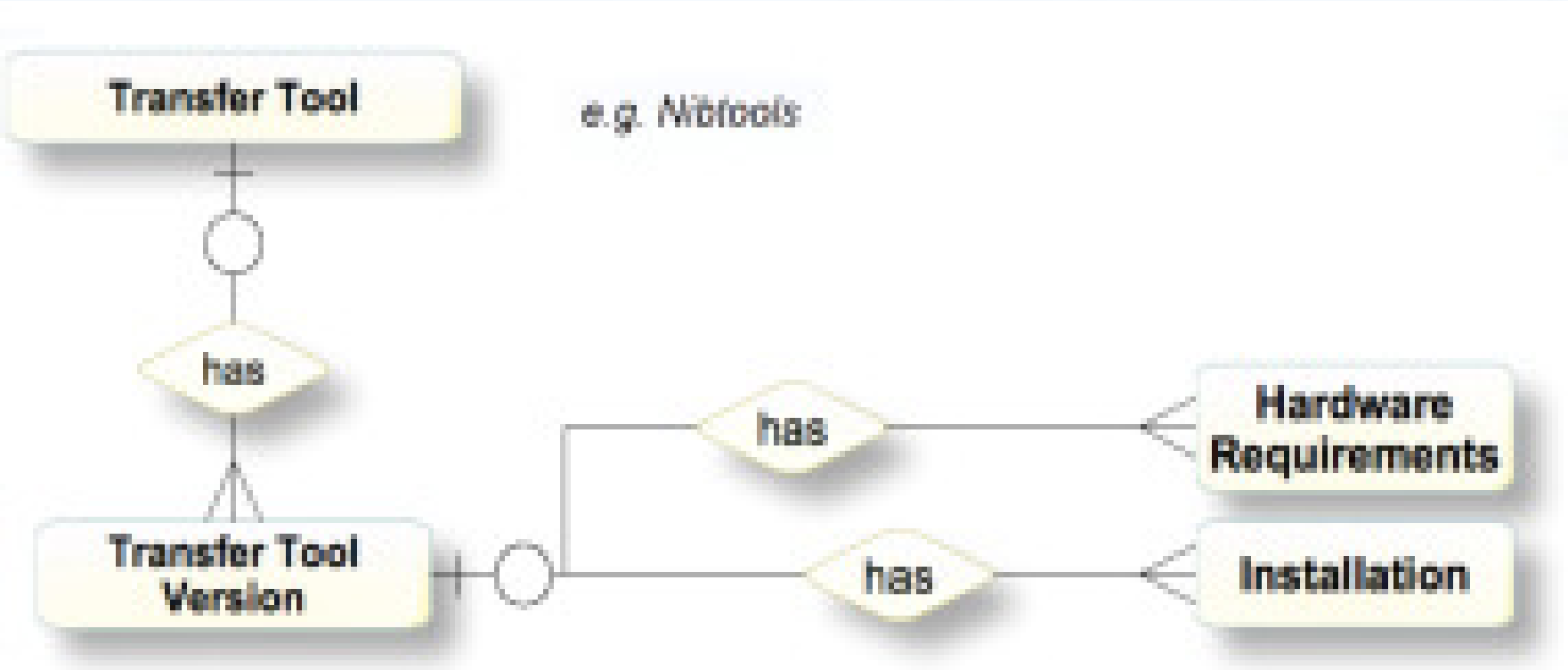


Media Carrier and Transfer Tool Database



KEEP MEDIABASE

Transfer Tool Knowledge Base **Media Carrier Knowledge Base**

Transfer Tool Knowledge Base > Transfer Tools

Click on a Tranfer Tool for more information:

1. Alcohol 120%

...

2. Blindwrite

Thank you for listening!
Questions?