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Back to the future

Dioscuri, the modular emulator for digital preservation

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Overview

- Preservation
- Emulation
- Migration AND/OR emulation
- Dioscuri
  - Architecture
  - Key features
  - Results so far
- Dioscuri & Planets
- Conclusions

Preservation

- More than simply preserving the binary digits (bits) that represent digital objects;
- Enable reliable, authentic, meaningful and accessible digital objects to be carried forward through time within and beyond organisational boundaries for as long as they are needed for the multiple purposes they serve;
- Authenticity is difficult to define precisely and may be different for different kinds of objects in different business process contexts, leading to different preservation criteria;
- Different preservation approaches and preservation action tools are available.

Emulation; definition

a program that runs on one computer (= host system)
and makes that computer behave like a different computer
(= target system).

≠ simulation

≠ virtualisation

www.chucksconnection.com/back.html

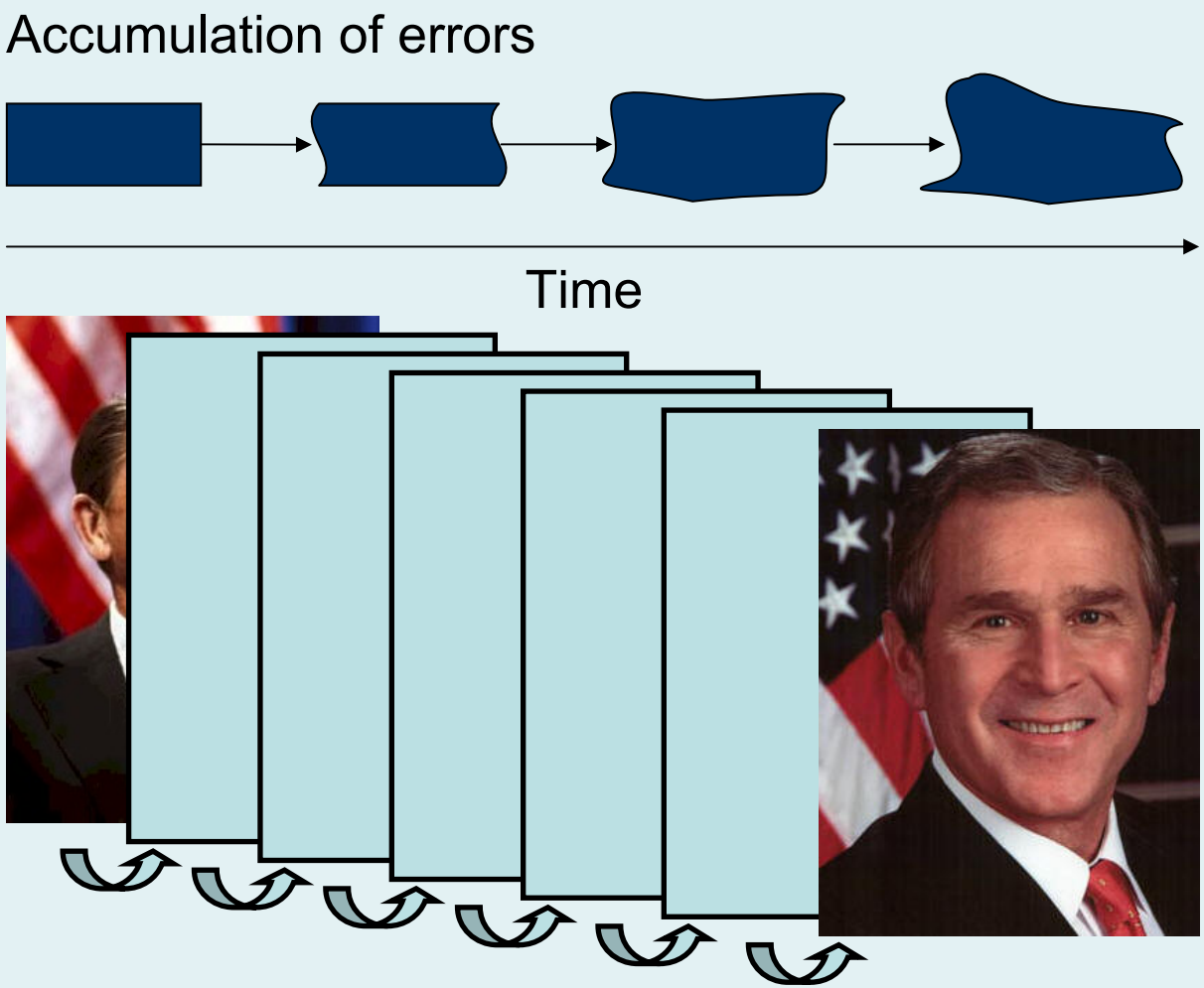
Emulation; pros and cons

- Pros
  - recreating original environment
  - digital object intact
  - proven technology

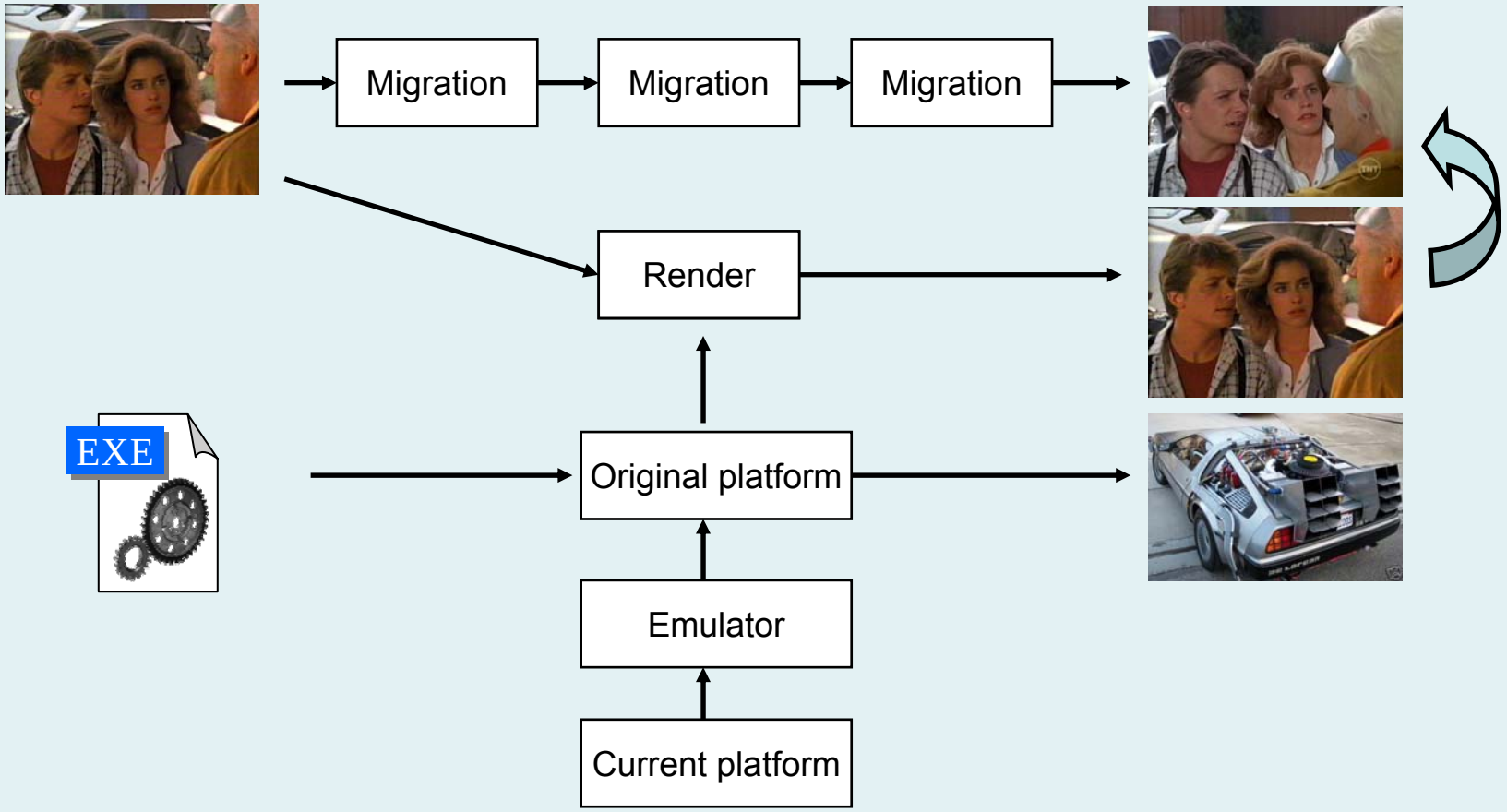
- Cons
  - technically complex
  - initial costs are high
  - knowledge of obsolete environment required

www.hhcc.com/.../2006/04/Back_to_the_Future.jpg

Migration OR emulation



Migration AND emulation



Back to ….Dioscuri

- 2003 Testbed project Nationaal Archief: emulation to preserve behaviour of databases
- 2004 KB preliminary study: feasibility of emulation as preservation approach
- 2005 Nationaal Archief and KB started joint project
  - Goal: develop and test modular emulator
  - Scope: PDF, databases, multimedia applications
- 2006 start development
  - Tessella recruited for development
  - Jeff Rothenberg as emulation expert
- 2007 First release of modular emulator
  July 1st: Dioscuri adopted by Planets

Dioscuri, architect(ure)

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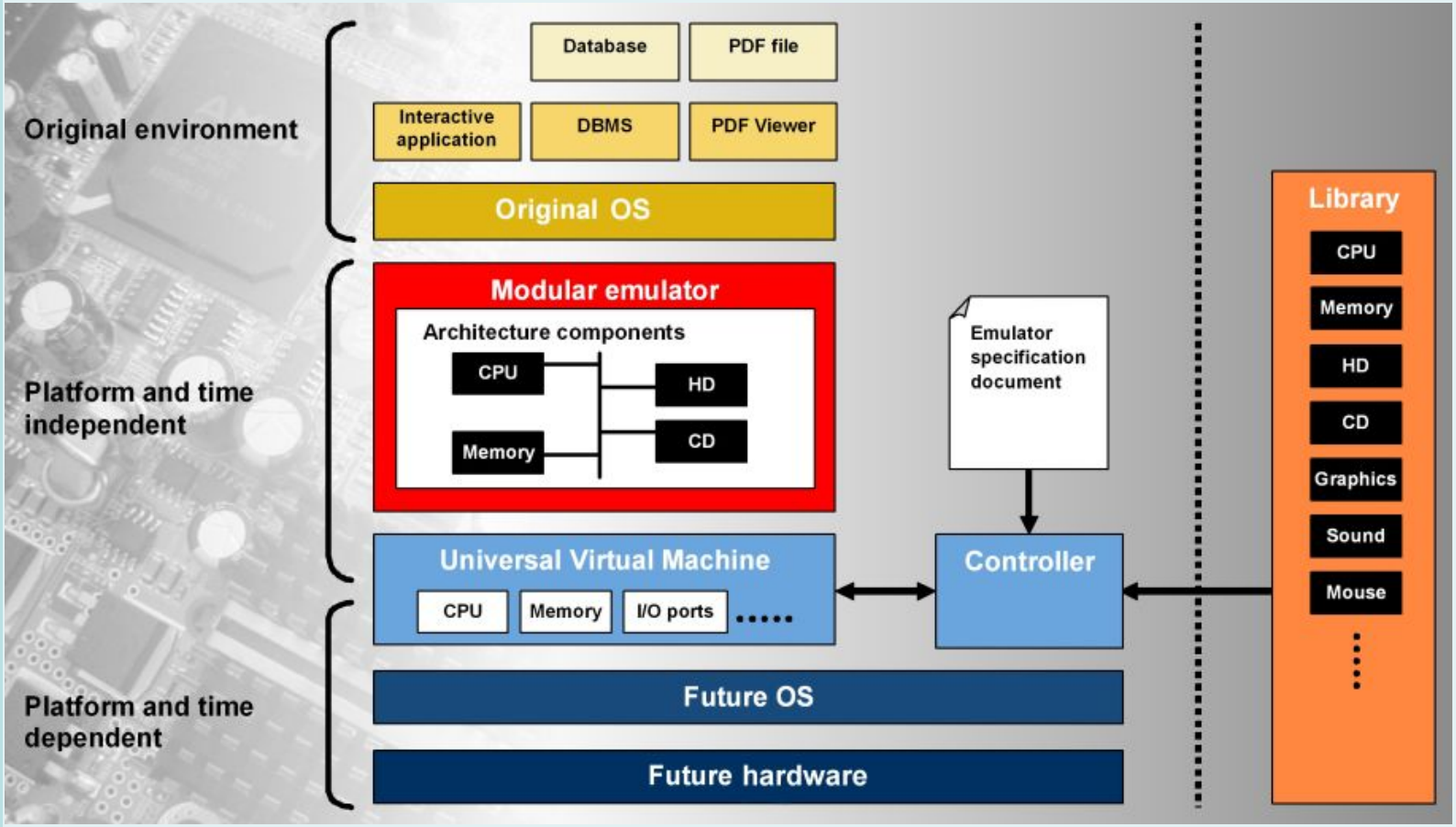

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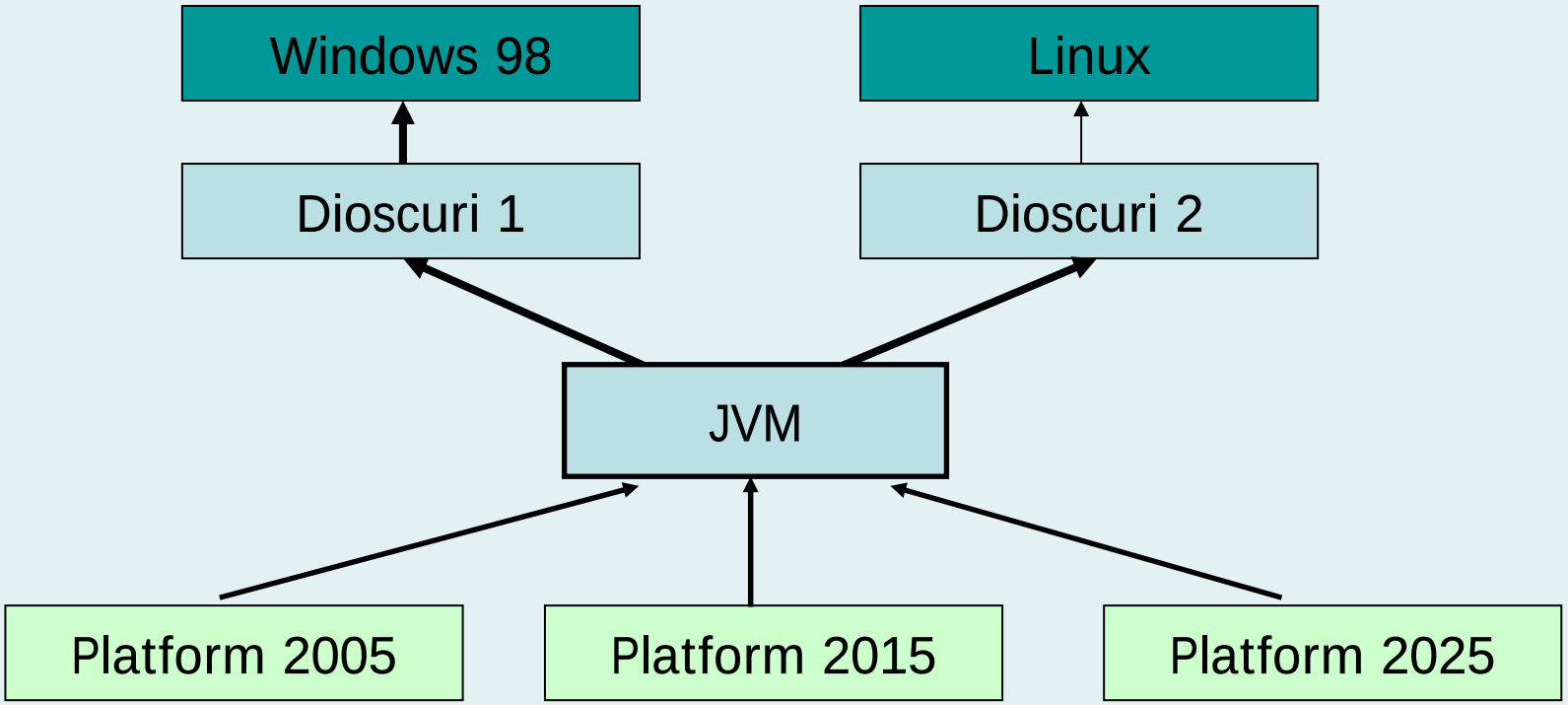
Dioscuri, key features (1)

- Modularity
  - Each module emulates the functionality of a specific hardware component (CPU, memory, graphics card, BIOS, etc.);
  - Enables the emulator to be configured like a real computer;
  - Module library makes it possible to recreate different target machines.

Dioscuri, key features (2)

- Durability
  - Emulator is software as well …. and vulnerable to obsolescence;
  - Using a Virtual Machine makes Dioscuri more durable;
  - For now: Java Virtual Machine (JVM);
  - In future: Emulation Virtual Machine (EVM).

Dioscuri, key features (3)



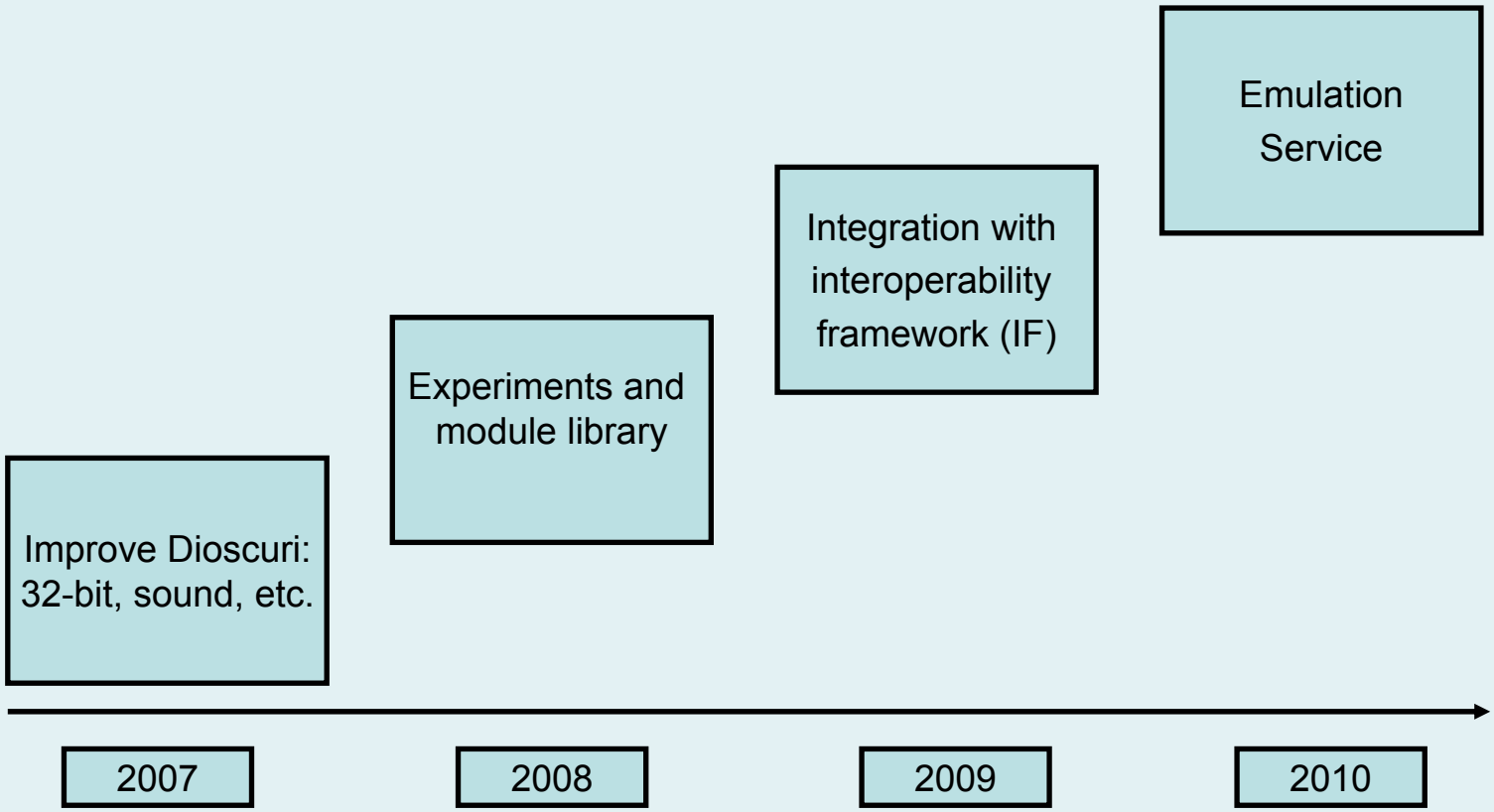
Dioscuri: results so far…

- Current version: 0.2.0
- Programmed in Java using JVM
- Capable of:
  - Running MS-DOS, FreeDOS, Linux 16-bit (ELKS)
  - Norton Commander 3.0, WordPerfect 5.1, DrawPerfect 1.1, games like PC-versions of Pac Man, Tetris, Chess, Ironman; DOS-based web browser Arachne
  - XML-based module configuration
  - Text extraction from emulated environment into the clipboard of host computer.
  - Running on many platforms like Intel Windows, PowerPC Mac, Sun Sparc Solaris.

Dioscuri… the future

- Performance must be increased
- Data extraction and insertion
- More modules:
  - 32 bit CPU
  - Mouse
  - Sound
  - Network
  - …
- Module library
- Replacing JVM by Emulation Virtual Machine (EVM)

Next steps within Planets



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Challenges we face…

- Software repository
- License issues
- Disk image preparation
- Old documentation (manuals, tutorials, tips & tricks)
- Service invocation and execution

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“Back to the future?”

Dioscuri:

- able to recreate obsolete environments;
- render digital objects in their original environment;
- proven technology to preserve the past,
- unlike the movie, we cannot go back in time

(…thank god!)

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References:

Dioscuri website:

http://dioscuri.sourceforge.net

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