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Author(s)	NANETH

Contributors

Person	Role	Partner	Contribution
Dirk von Suchodoletz	PA/5	ALUF	Author
Klaus Rechert	PA/5	ALUF	Author
Jasper Schroder	PA/5	IBM	Author
Jeffrey van der Hoeven	PA/5	KB-NL	Author
Bill Roberts	PA/5	NANETH	Author, Coordinator
Maurice van den Dobbelsesteen	PA/5	NANETH	Editor

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1 About this deliverable

The goal of deliverable PA/5-D12 was to provide a manual on the use of emulation services as part of a preservation strategy and the issues involved. The PA/5 team has taken a slightly different approach to fulfilling this requirement.

Firstly a full paper was written and accepted for iPRES 2010: "Seven steps for reliable emulation strategies - solved problems and open issues." The abstract of the paper is as follows:

After four years of research within the PLANETS project and two years of KEEP the jigsaw puzzle of emulation becomes a more complete picture. Emulation strategies are seen as viable complement to migration now. An conceptual and theoretical groundwork has already been laid out, e.g. proper definition and selection of suitable emulators. However, integration into preservation frameworks and additional software archiving were open research questions. This paper discusses several aspects on reliable integration and proposes development steps for more complete emulation based strategies in long-term preservation.

The paper can be found on the PLANETS wiki at:

<http://www.planets-project.eu/private/pages/wiki/images/b/ba/7steps.pdf>

Secondly the PA/5 team has set up a web portal at the SourceForge pages of the PLANETS suite. This portal gives direct access to the emulation services developed in PLANETS, whilst also providing a knowledge base with publications, general info and a FAQ section.

The portal can be found at:

<https://sourceforge.net/apps/trac/planets-suite/wiki/EmulationService>

Thirdly we have listed below an overview of the work done on emulation in Y4 of PLANETS

2 Overview of the work in Y4

Within the first 3 years of PLANETS the PA/5 workpackage (further) developed the individual components GRATE, Dioscuri and UVC. Following the Y3 EC review PA/5 started work on emulation integration.

1.1 Emulation integration

As part of emulation integration Dioscuri and UVC were developed into a version with a PLANETS wrapper, so they could be deployed in the IF in a local deployment as migration by emulation services. An important step was the development of the "CreateView" command used to fire-up the emulators from within the PLANETS Testbed and PLATO. In the second half of Y4 the wrapped Dioscuri and UVC were further developed (by KB-NL and IBM respectively) into webversions so they could be deployed on the Central Instance also.

The main part of the work in PA/5 involved GRATE by ALUF. There is a distinction between GRATE 1.0 (the original stand-alone), GRATE 1.5 (the webservice) and GRATE-R (the PLANETS remote emulator service).

The GRATE 1.0 wrapper fired off the QEMU and DIOSCURI emulators. For the emulation integration project UzK wrote the GRATE 1.5 wrapper for packaging files, transport file to emulator (floppy- or ISO image, container file), a "GrateView" component with certain set of information that can be run from within the Testbed. This is in fact GRATE 1.5, used for Dioscuri at the Y3 review.

The NextGen or 2.0 idea was that GRATE will by itself, load production container files from a registry to the emulator. This project took the form of a component based approach in the spirit of Dioscuri.

This, however, made it totally different from GRATE, so rather than using a 2.0 denominator we called it GRATE-R (where -R stands for Revised). GRATE-R has an emulation workflow engine, and three services developed as components:

- create view service
- formalised view-paths
- automated emulation workflows

Although referred to by the 3rd component as that is the really new service, the whole next gen remote emulator is actually the extra chunk of work accepted in the Y4 workplan.

The end result is a pre-configured almost plug & play remote emulation service that could also be deployed as a LAN webservice in the reading rooms of the content holding institutions. It is pre-configured for a limited number of view-paths expected to be the most common the e-depots of these institutions. The complex technology is hidden in the background, the user basically clicks on, for example, a Wordperfect file they want to open and GRATE-R gives the emulated file back on the screen.

1.2 Addressing technical complexity

We identified two major issues handicapping the proliferation of Emulation: Technical Complexity and legal issues.

Technical complexity goes beyond the efforts required to build, test and maintain emulators. Also to deploy an emulator deep technical skills are required in downloading, installing and configuring the emulator involved. Even then every single file that needs to be emulated requires a complex procedure of creating an image etc.

The GRATE-Remote emulator webservice in our view is a major step in "Making emulation easy". Also the inclusion of Dioscuri and UVC as wrapped services in the PLANETS Testbed will help to demonstrate the practical use of the emulation components in preservation actions.

We also strived for a process of standardisation to reduce the effort needed to develop and deploy emulation environments. As a result of various developer meetings the CreateView command and code is now not only used in PLANETS Interoperability Framework, Testbed, PLATO) but also as a basis for further developments in the KEEP project and even in the SDB e-depot solution for archives by Tessella.

1.3 Addressing legal issues

Legal issues regarding software licenses are a key problem with emulation. An institution may have the original software required for an emulation action, but the original license does not cover the use in an emulated environment especially in a remote, distributed emulation environment as the PLANETS Central Instance can cater for. A preferred option is to come to an emulation Software Archive, a registry where emulators can load their view-paths from. This is completely impossible under general software licenses, however, not even on a local instance of the software archive.

In Y4 the PA/5 workpackage has undertaken two courses of action to address this problem. First and foremost we have started discussions with PLANETS partners Microsoft and IBM to get this problem on the agenda and to find solutions that would be acceptable for their legal departments. Although this has not led to a direct result, it certainly helped raise awareness within these companies that they can contribute to a solution. They provided very valuable feedback and support for further steps. Also we have been in close contact with the KEEP project and with the Open Planets Foundation to take this subject further with the European Commission.