Planetarium

FOREWORD

Dr. Adam Farquhar, Planets Project Coordinator

The European Commission conducted their third annual review of the project during the summer, with their report delivered this fall. The independent panel of experts unanimously approved work carried out in year three and recommended the project to continue into year four. They also concluded that "The consortium has achieved a great deal, in a complex subject area, and involving multiple skills and specialties. All members of the consortium gave the impression of total commitment, and the results of the project show that they have all worked extremely well together." This reflects my own observations – the team has been extremely effective and remains excited about both the progress that it has made as well as the potential for the future. The Commission also recognised that "The use potential for project outcomes is unusually large. Exceptionally, there is strong interest not only from within Europe but from all over the World."

Looking back, I see the substantial progress that Planets has made since the last issue of Planetarium was released. This includes new versions of Planets planning tool, Plato, the release of the Comparator tool which compares files before and after preservation; release of the Recommender tool and completion of research into common file formats and tools available to preserve them. Much of this progress has been reported in the conference papers. Planets was the most strongly represented digital preservation project in this year's ECDL and iPRES conferences. These do an excellent job of capturing the breadth of activities in the project and included papers on evaluating organisational readiness, foundational work on significant characteristics, architectural work to enable scalability, novel ways of using emulation technology, advances in preservation planning and testbed applications, and more. The project has also completed three-day training events in Copenhagen, Sofia, and Bern leaving over a hundred people with detailed knowledge about the Planets approach to digital preservation. The Planets user community has also achieved the landmark of having 500 members.

Looking forward, I see three important strands of activity that will establish a lasting foundation for preserving access to our digital content. First, the project continues to do essential work on integrating, testing, hardening, and extending software components and methods as it conducts case studies in partner institutions. Second, the IPAL (Implementing Planets in Archives and Libraries) user group continues to provide a forum for organisations that hold content – and are directly confronted with the problems of digital preservation – to exchange ideas, plans, and methods and learn from each other. Third, we are working to establish a not-for-profit membership organisation that will carry forward the Planets approach in a sustained fashion. Details about these are set out in new literature about the project which can be downloaded at: www.planets-project.eu/about/.

The Planets not-for-profit will strive to provide practical solutions to its members' digital preservation needs. The British Library has offered to provide an incubator environment that will help the new organisation to flourish. The organisation's members will set its direction and determine the mix of services that it offers. I expect it to encourage take-up of Planets technology, provide stable hosted access to Planets services, coordinate further open-source development, and nourish the growing Planets community.

Members of the organisation will be able to take advantage of millions of euro investment in digital preservation technology and research by 16 institutions across Europe, influence future development, and take steps towards improving their own digital preservation practices.

If you or your organisation are interested in being among the founding members of this exciting new organisation alongside some of the world's leading memory institutions, technology companies, and universities, then please contact us at info@planets-project.eu I consider this to be a major step towards ensuring that digital material is meaningful and accessible for many years to come.
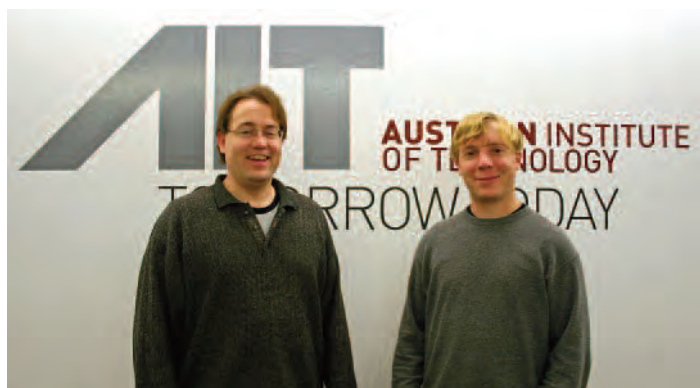
INSIDE THIS ISSUE

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INTEROPERABILITY FRAMEWORK
The glue that holds Planets together

Planetarium interviews Rainer Schmidt and Ross King of the Austrian Institute of Technology about the Planets Interoperability Framework.

Ross King and Rainer Schmidt

In previous issues we have focused on some of the Planets applications. In this issue, we discuss the Planets architecture itself with references to sources of more detailed and technical information.

What does the Interoperability Framework do for me?
The Interoperability Framework works behind the scenes. Without it the Planets software just could not work. It manages the user accounts, preservation services and digital objects. It helps you to log into a Planets application, discover a preservation tool, execute it on a particular dataset and view the results.

What is the Planets Interoperability Framework?
The Interoperability Framework (IF) provides the glue to hold the Planets tools and services together. It provides a unified access mechanism for typical preservation actions such as migration or characterisation. This allows users to make use of a large variety of pre-installed preservation tools without having to deal with the individual programs.

Where do I go to see the Planets Interoperability Framework?
The IF is not visible to most users. The IF is employed when a user logs into an application such as the Planets Testbed or Plato, or the Service Registry. There are, however, interfaces to perform user management, service registration, or workflow management, but these are meant for developers and administrators.

What do I see when I log on?
This depends on your role and the application, e.g. Plato or Testbed, you log on to. In order to log in a Planets application, a user must provide credentials in the form of username and password. The username can be associated with one or more roles. The role determines the permissions a user has, for example to modify the service registry. Typical roles include an Administrator who can create user accounts, deploy and browse services, browse registries; a Preservation Expert who defines service workflows, implements preservation plans, and can define and run experiments; or a Librarian/Archivist who configures and tests preservation plans, and executes preservation processes on a repository.

Tell me about the Planets architecture
The Interoperability Framework includes a container for web applications and web services. It also provides a number of components that multi-tier applications commonly require. Also, by defining standard Web Service interfaces for preservation actions, as well as a common digital object model, the IF supports access to remote and distributed third-party preservation action services and ensures interoperability within preservation workflows.

How can I install the IF or incorporate it into my current digital library system or repository?
The IF automatically comes with the Planets installation package and can be used as it is, for example to evaluate different preservation tools. The Planets software comes with support for read/write access to its internal repository called the 'data registry' as well as the local file system. It can also be customised to access data from existing repositories using the Planets Java Application Programming Interface (API)[1]. As an example, the Austrian Institute of Technology and the Austrian National Library have developed such a data manager for accessing an image collection using the OAI-PMH protocol in just a few days.

How will Planets deal with growing volumes of content?
The Planets framework supports automatic workflow execution and batch processing. We have published a paper[2] describing recent results on dealing with large volumes of data by deploying and executing Planets preservation services using the Amazon utility cloud infrastructure.

What does the IF give me if I am a tool or service developer?
The IF defines web service interfaces for typical preservation actions that that can be incorporated into automated preservation workflows. Tool wrapping is supported by a Java Application Programming Interface (API) as well as by a number of existing Planets services for a large variety of tools. Moreover, the IF provides an infrastructure for automatic unit testing, nightly build and a formal process for implementing, deploying and registering new Planets Preservation Services.

That seems like a lot of capabilities; how will you get it done?
We have actually implemented all of the major features – we will be concentrating on improving robustness, testing, documentation, packaging and distribution. The final project release will by in May 2010. The software will be made available as an open source project on Sourceforge (http://sourceforge.net).

Where do I go for more information about the IF?
A more detailed introduction to the IF is given in the paper accompanying this newsletter at: http://www.planets-project.eu/docs/papers/if_spotlight.pdf You will be using the IF any time you use a Planets application or service.

See also *A Framework for Distributed Preservation Workflows* on the Planets website at http://www.planets-project.eu/publications/

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[1] http://planetarium.hki.uni-koeln.de/public/XCL/Deliverables/planets_pc2-d7_finalxcdispec_ext.pdf
[2] http://planetarium.hki.uni-koeln.de/public/XCL/Deliverables/planets_pc2-d8_finalxcelspecification_ext.pdf
[1] Plug-in components provide access to different data sources e.g. based on the OAI-PMH protocol, existing Repository APIs, or REST Web Services. These 'adapters' can be customised for directly accessing an individual repository system. Planets is currently working on implementing support for fully integrating Fedora as well as Jackrabbit based repositories. http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?isnumber=4976405&arnumber=4976418

SPOTLIGHT ON PRESERVATION PLANNING:
Developing a digital preservation policy

Hans Hofman, Senior Advisor Digital Longevity, National Archives of The Netherlands

A policy is a vital first step to any new business activity. It is also a catalyst to implementing practical solutions. This is equally true when it comes to work to preserve digital content so that it continues to be accessible in the future. The recent Planets Market Survey found that organisations with a policy are three times more likely than organisations without to have a budget in place and three times more likely to have a digital preservation solution in place or planned. They are also fifty per cent more likely to include digital preservation in their operational, business continuity and financial planning and eighty-five per cent more likely to make an investment in the next two years.

Having a coherent policy is then a pre-condition to successful digital preservation. It makes it possible for an organisation to define what it will preserve, how it will preserve and who will be responsible. When developing a preservation policy a number of factors must be taken into account [see pull-out box]. The collective and coherent set of

choices should be documented in the policy. This sets the scene for defining organisational requirements, assessing the risks involved and supporting the approach that will guide preservation of digital content.

The basis for a policy is established first by understanding the mandate or strategy of an organisation. Memory institutions such as libraries and archives will have different mandates from commercial companies or government agencies. There are even differences within each of these groups.

An organisation must define the infrastructure and resources available to accomplish preservation of digital content. No organisation has unlimited resources, so any policy will be governed by what is or what can be made available.
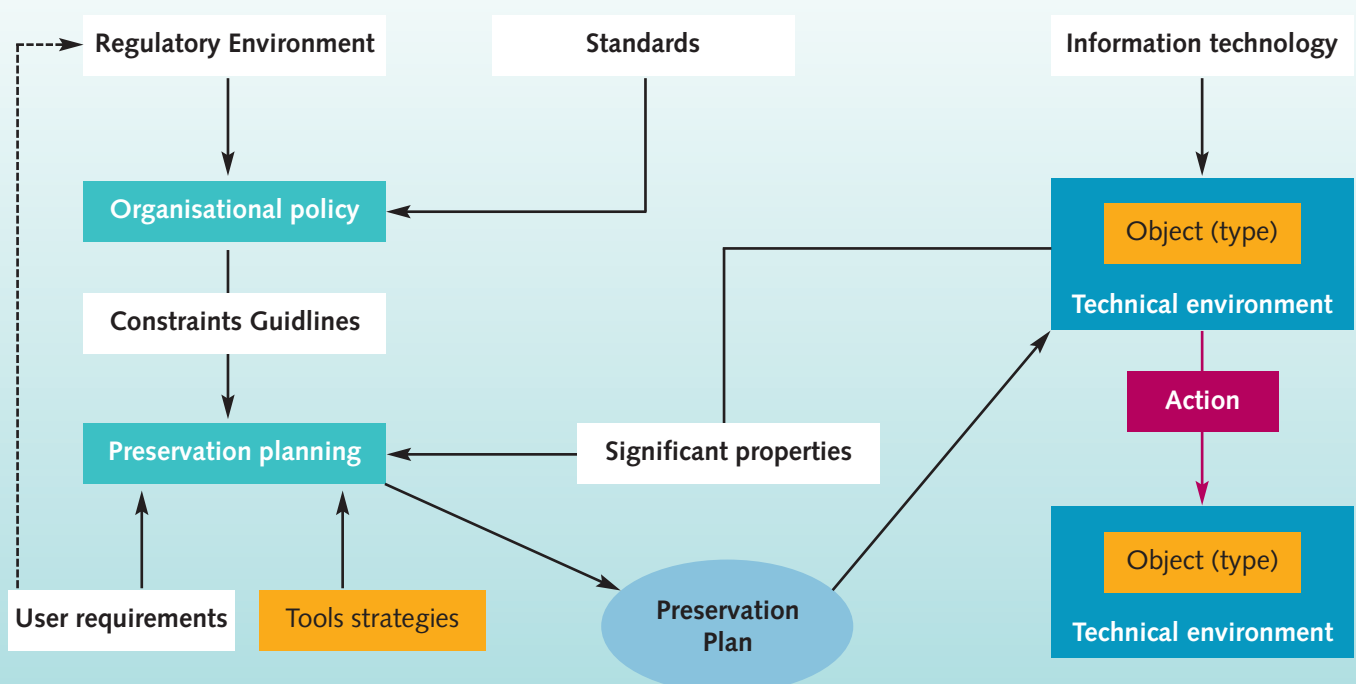
Similarly, staff need to have the appropriate skills and adequate knowledge to be able to manage digital collections. Gaps and deficiencies should be identified and resolved. Courses are beginning to be established although digital preservation is not yet embedded in regular curricula. The University of North Carolina (Chapel Hill) has taken a lead in defining a digital curation curriculum. Given the complexity and sometimes technical nature of digital preservation issues, it may be necessary to collaborate between institutions and to share knowledge, for instance by temporary exchange of staff or by hiring specialists.

The key tasks for the preservation of cultural heritage, including digital objects, are to decide upon the processes for ingest, (meta)data management, storage management, access and preservation planning.

Developing a Digital Preservation Policy:
Factors to Consider

- User requirements
- Organisational requirements
- Business needs and budget constraints
- Legal constraints
- Policies
- Characteristics of digital objects (e.g. content, appearance, structure, behaviour, context)
- Technology (e.g. technical characteristics, infrastructure characteristics, process characteristics)
- Standards

FACTORS INFLUENCING A DIGITAL PRESERVATION POLICY

The policy framework should then contain a coherent set of standards that have been identified as being useful and best suited to the purposes of the organisation. In digital preservation, most organisations refer to the Open Archival Information System (OAIS) reference model and related metadata standards such as PREMIS.

Preservation activities must meet the expectations of users. Some users are primarily interested in presentation copies (derived from preservation copies) that are easy to use. The policy should then set out the expectations of users so that decisions and actions ensure they are met.

It is important to have a thorough understanding of the characteristics of the collection and types of digital objects in it, as it will have an impact on the decisions and choices an organisation has to make in developing a policy. This may relate both to technical (e.g. which formats) and intellectual (e.g. genre) characteristics.

Lastly, an organisation must monitor what is happening in practice and evaluate it to see whether the policy needs to be adapted. Things will change over time and, as a consequence, the policy will have to change, too.

A policy is then a first step to preserving digital content. It makes it possible for an organisation to set out clearly to all concerned what should be preserved, how and who will undertake the work. Defining a policy requires a number of factors to be taken into account. It is not a 'one-off' activity and the policy must be reviewed and updated in the light of societal, organisational and technological changes.

IMPLEMENTING PLANETS:
Technology partners put Planets into practice

In July, Planetarium considered how libraries and archives in the Consortium have started to implement Planets into their operations. Here we review the role that technology partners have played in the project and how their involvement and Planets technology will enhance the tools and services and be of benefit to their customers.

Tessella Technology and Consulting: a Planets-enabled business stream

Tessella Technology and Consulting was established in the UK in 1980 and now employs around 200 staff in offices in Europe and North America. It specialises in providing IT and consultancy services to companies in research and development, scientific and engineering industries which include: life sciences, oil and gas, chemicals, transport and environmental engineering sectors. Tessella has a thriving and growing archive business that generated over €3 million last year. The majority of that archival revenue was generated by Tessella's archiving tool, the Safety Deposit Box (SDB).

The Safety Deposit Box is fully compliant with the OAIS model and allows users to store and preserve digital information in a safe and accessible environment. It can be integrated with third-party document management systems and repositories including open-source repositories such as Fedora. The SDB provides automated ingest functions that identify the characteristics of digital content, perform preservation planning, conduct preservation activities and reload material back into the repository. There are also comprehensive administration and reporting capabilities.

Tessella's technology incorporates components developed by Planets. This includes the characterisation framework and Planets Core Registry. Several of the characterisation tools wrapped in Planets such as DROID and JHove have already been integrated into the SDB and there are plans to wrap further tools developed in Planets. These include the Extensible Characterisation Description Language (XCDL) which automates the process of describing the characteristics of digital objects.

www.tessella.com/

Tessella's Headquarters at Abingdon, UK

The SDB has been deployed at several Planets partner institutions including The National Archives of the UK, the Swiss Federal Archives, the National Archives of The Netherlands and the British Library as well as non-Planets institutions such as the National Archives of Malaysia, Rotterdam City Archives and the Wellcome Trust Library in the UK.

There are also plans to add emulation technology to the SDB. This will use work in the Planets project that is being further developed by the Seventh European Framework project KEEP (Keeping Emulation Environments Portable http://www.keep-project.eu/) in which Tessella and the National Library of The Netherlands are involved. An upgrade version of SDB (4.0) will be partially released this autumn.

IBM's investment in Planets

IBM

International Business Machines Corporation (IBM) is an international computer technology company and consulting corporation. It is one of the oldest information technology companies in the world – its roots date back to the later years of the nineteenth century.

IBM is also the owner of the largest number of patents in the world. It manufactures and sells computer hard- and software and offers several services like infrastructure, hosting and consulting services in all sorts of different areas of computing.

Technology is continuously changing, requiring preservation systems to be adapted and extended to support these changing requirements. IBM recognises that long-term digital preservation can only be successfully applied in systems that are open to facilitate the integration of other third party technology. Planets is leading the development of these new tools and technologies for preservation.

IBM's contribution to Planets focuses on preservation action through emulation using the Universal Virtual Computer (UVC). The UVC makes it possible to render legacy file formats accessible in future via a logical data view (comparable to XML) which enables the original data to be interpreted. IBM has been actively developing the UVC for the last seven years and has produced numerous concepts to preserve static data formats, e.g. images and text documents. Within Planets, IBM is applying the UVC to preserve complex digital objects and actual applications.

As a leading technology vendor, IBM is represented in all major standardisation bodies. It has also contributed to the development of standardisation activities including PDF/A, J2EE and ODF. Where appropriate, IBM will work with these bodies to disseminate Planets research, tools and services, particularly in the area of service-orientation to provide a standardised and open platform for preservation services

IBM is currently planning the next version of DIAS (Digital Information Archiving System) which will provide a flexible and extendable Service Oriented Architecture (SOA) long-term deposit system. The tools and services that are currently being developed can be integrated within DIAS as web services. This way the research results from Planets will help to prevent the digital information age becoming the digital dark age)!

www.ibm.com/nl/nl/

Digital Preservation through Partnership

Microsoft Research

Microsoft Research Laboratory in Cambridge, UK, was established in 1997, and conducts basic and applied research in computer science and software engineering. It has over 100 researchers who work very closely with academics across Europe to tackle challenging problems and conduct ground-breaking research.

Natasa Milic-Frayling PhD, Director, Research Partnership Programme, Microsoft Research Cambridge, UK

A core belief of Microsoft Research is scientific excellence and innovation through partnership. As part of the Preservation Action component of Planets, the role of Microsoft Research has been focussed on identifying strategies for using XML based standards to preserve content of office documents. Together with other industry leaders, Microsoft provides office productivity tools that capture significant intellectual properties of the information workers in the digital format. Considering the rapid advances in computing technology, it is of paramount importance to ensure the continuity of use and long term preservation of digital documents. The Microsoft Open Office XML (OOXML) standard formats represent a significant advance in representing information contained in textual documents, spreadsheets, and multimedia presentations.

By migrating files to the Office Open XML format, documents are expected to have greater longevity thus helping to retain their value for the future to organisations concerned with preservation.

Microsoft Research participation in Planets has involved developing tools and services for preserving the original features of document formats and providing true representations of legacy documents. It leveraged conversion tools from proprietary document formats to open standards that were created through open source initiatives. These are incorporated within Planets technology and used with other Planets services to preserve office documents.

Participation in Planets means that the project partners can consult with Microsoft researchers on technology issues. Planets also gains by indirect contact with Microsoft product groups which can contribute to defining a strategy for Planets preservation research. Similarly, Microsoft technology partners can use Planets insights and approaches to ensure secure storage, integrated access, and optimised architecture for supporting long-term preservation strategies.

Microsoft Research, Roger Needham Building, University of Cambridge

COMMERCIAL COMPANIES HAVE THEIR SAY

Amir Bernstein, Project Manager, Swiss Federal Archives

Representatives from 18 of the world's leading providers of digital library systems, tools and services attended a Planets Briefing in Brussels on 5–6 June 2009.

The goals of the briefing were to understand the current status of provision of digital preservation services; learn about the needs of organisations with an active interest in digital preservation; increase tool and service providers' understanding about Planets and to initially explore opportunities for Planets to work with these companies.

Senior managers representing companies with headquarters based in Europe, the Middle East and Australasia took part in the face-to-face and telephone briefings. They included CEOs (six participants), IT managers (eight participants), and consultants.

The central issues

The overall outcomes indicate that there is a high degree of awareness about digital preservation among vendors and their customers. In line with the Planets Market Survey, many said they are seeing end-users engage in activity to preserve their digital content and around half said end-users have digital preservation policies of some kind or other in place.

The findings show that there is a clear differentiation in attitudes towards digital preservation:

- **Differentiation by geographical region:** In North America the practice of digital preservation appears to emphasise long-term storage. Elsewhere (Europe, Middle East, Australasia) digital preservation emphasises long-term accessibility, readability and understanding.
- **Differentiation by industry sector:** Interest in long-term preservation of digital content is perceived to be highest among memory institutions that have a traditional mandate to preserve and provide long-term access to information. Interest is also perceived to be high among financial, banking and administrative industries under pressure to comply with legislation or regulation. Interest by government and the private sector was perceived to be lower where investment of time and effort to safeguard long-term access to digital data may be seen as a peripheral activity. The participants believed that national libraries and IT companies in particular recognise the business value of digital preservation to support data portability.
- **Differentiation by the size of organisation:** Several participants stated that large companies are more likely to be aware of and invest in digital preservation than small ones. Smaller organisations, while aware of digital preservation, are more subject to budgetary constraints.

The findings reinforced many of those in the Market Survey in relation to the types of formats that need to be preserved for the long-term now and in the future; the important capabilities of a digital library system, including the importance of technical and metadata standards and scalability to growing volumes of content and a preference for migration over emulation as a preservation strategy.

One of the key outcomes is the requirement for a strong business case to outline the need for digital preservation. High awareness about the issues does not necessarily translate into investment and implementation. Suppliers and vendors suggested short budget cycles and difficulty with accessing funding are a barrier to addressing the challenges associated with preserving digital content. A solid business case may bridge the gap between awareness and implementation, incite long-term budgetary planning for digital archiving and contribute to stimulating the digital preservation market. Planets may be in a position to create a business case for investment into digital preservation; one participant also expressed an interest in co-authoring such work.

The final major finding of the briefings was the need for guidance and practical support to carry out digital preservation in practice. Notwithstanding the growing awareness and market potential, there is still a general requirement for practical methodology, tools, services and guidance when engaging in digital preservation.

The way forward

Planets will publish findings from these briefings in Spring 2010 as a white paper. To be the first to hear about the release of the white paper, sign up to the planets user community: http://www.planets-project.eu/community/

Grand Place, Brussels

PRESERVATION ACTION TOOLSET UPDATE

Asger Askov Blekinge, Developer, State and University Library, Denmark

In the last issue of Planetarium, we reported on work that had been done to identify the Preservation Action tools that should be provided as services in the Planets suite.[3]

The project team has been testing migration tools and wrapping them for addition to the Preservation Action Toolset that will be available through the Planets server. So far the Preservation Action Toolset has a range of document, archive, image and video migration services, including:

Tool	Object Type						Services					
	Text	Image	Database	Video/Audio	Disk	Archive	Migrate	Identify	Validate	Modify	CreateView	Characterise
Abiword	✓						✓					
AviDemux				✓			✓					
Extractor (XCDLMigrate)		✓					✓					
FloppyImageHelper					✓		✓					
Gimp		✓					✓					
GraphicsMagickMigrate		✓					✓					
Im4JavaImageMagickMigrate		✓					✓					
ImageMagick		✓					✓	✓		✓		
InkScape		✓					✓					
Jasper19		✓					✓					
Java-SE		✓					✓					
JJ2000		✓					✓				✓	
OpenJpeg		✓					✓					
Pdf2Ps	✓						✓					
PdfBox	✓	✓					✓					
Pdf2PdfAMayComputer	✓	✓					✓					
SanselanMigrate		✓					✓	✓				
SIARD Suite (Mdb2SIARD)			✓				✓					
Xena	✓		✓				✓					
DioscuriArjMigration						✓	✓					
DioscuriPnmToPngMigration		✓					✓					
UvsMigrate	✓	✓					✓				✓	

The last three services in the table above combine migration tools running in an environment emulated using Dioscuri or UVC.
The following will be added over the next few months:

Tool	Text	Image	Database	Video/Audio	Disk	Archive	Migrate	Identify	Validate	Modify	CreateView	Characterise
JTidy	✓					✓	✓					
Ghostscript	✓	✓					✓					
MsgText	✓						✓					
SoX				✓			✓					

[3] Planetarium 7, "Help! My Users Can't Access Their Objects", pp6–7

DEMYSTIFYING EMULATION

Dirk von Suchodoletz, Assistant Professor of the Chair of Communication Systems and Senior Researcher, University of Freiburg and Jeffrey van der Hoeven, Project Manager, Digital Preservation, National Library of The Netherlands
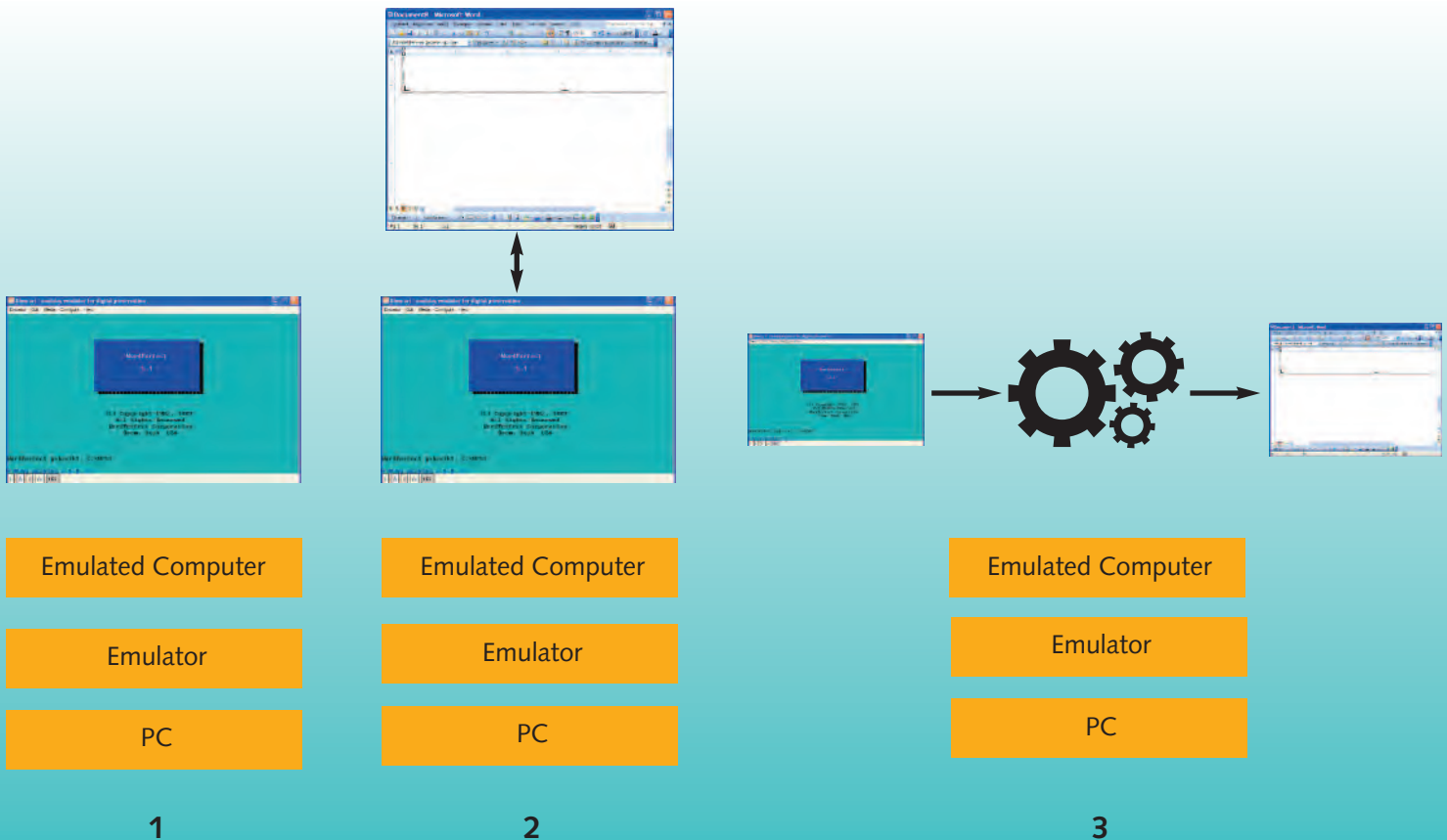
Emulation has often been seen as the poor relation when it comes to choosing an approach for preserving digital content. However, emulation has a distinct and complementary role. This article explains the role of emulation as an alternative strategy or even how it may be used alongside migration. It also addresses Planets' research and development into emulation tools and services and what is required to support emulation as part of an operational archiving environment.

Over the past ten years, emulation has been part of a debate about which strategy to choose for long-term access to digital records. Emulation has been seen to be expensive, complex and sophisticated compared to the popular migration approach. However, research undertaken by the Planets project shows emulation can be a good counterpart to migration in various ways. Firstly, it can handle dynamic interactive digital objects such as scientific applications, computer games or whole computer environments. Secondly, it can help to prove the authenticity of migrated objects by rendering the original, unaltered object in an emulated environment identical to the way it was at the time the object was created originally. A third way of using emulation is to support the migration process. When using applications like WordPerfect 5.1 or DBaseIII, computers will eventually become incompatible with the migration tool. This happens due to deterioration of hardware and new advancements in software. To counter this problem, emulation can be used to recreate a compatible computer environment that allows the migration tool to do its work again.

Planets offers access to a range of emulation services and provides access to digital objects by replicating their original environment. Over the last three years, Planets research has identified a range of conditions that have to be in place before emulation can be successfully deployed in a preservation framework. This starts with the formalisation of a so-called View-Path to identify which metadata and additional software components are needed to render the object, using its native computer environment.

Aside from the necessary metadata, an emulator is needed that can mimic the original hardware. Outside the archiving community, a lot of emulation software is already available, both commercially and open source. Popular commercial tools include VMware, Parallels, VirtualBox and Microsoft's Virtual PC. In the open source community, even more emulators or virtualisation software can be found, although many of them are not very robust or well maintained. There are some, however, that are very successful, such as Multiple Emulator Super System (MESS)[4] for the home computer era, DOSBox[5] for MSDOS or QEMU[6] for X86, PPC and Sparc computer architecture.
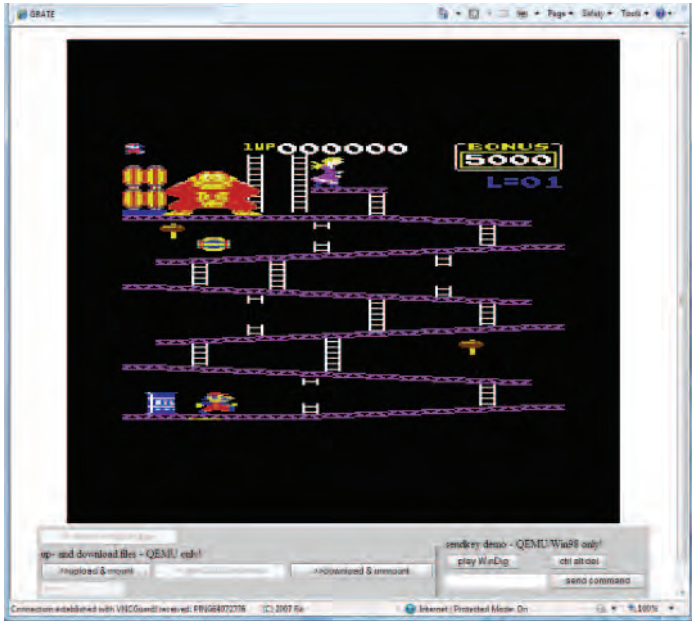
While up until now none of these emulators have been programmed primarily for the purpose of long-term archiving of digital objects, this is changing along with current research. Dioscuri (http://dioscuri.sourceforge.net) is an emulator which supports both the recreation of an X86- computer environment and a durable architecture. With this design Dioscuri is capable of operating on many computer systems without the need to change

Emulated Computer	Emulated Computer	Emulated Computer
Emulator	Emulator	Emulator
PC	PC	PC
1	**2**	**3**

[4] MESS, available at: http://www.mess.org/ | [5] DOSBox, available at: http://dosbox.comt | [6] QEMU, available at: http://www.quemu.org

the software itself. This increases the chance that the emulator will survive over time. Currently, Dioscuri is less advanced than emulators such as QEMU, but improvements are on their way as part of the Planets project and the newly established KEEP project (Keeping Emulation Environments Portable), http://www.keep-project.eu.

After finding a suitable emulator, the original computer environment has to be recreated. To do so, the original software is needed that was initially used to open a file or load an application. This includes the operating system and often additional applications, plug-ins, codex, fonts and other utilities as well. As of today, no arrangements are in place to preserve the software, but Planets is drawing up requirements to ensure that we at least know what to keep.

GRATE emulation tool: Donkey Kong running on a Commodore 64 circa 1983

When all the components such as digital objects, emulators and additional software are available, they should be linked together as you normally need to plug all cables, devices and software together to be able to open your digital object and see it on your computer screen. This could be done all by hand, but to make it more user-friendly, the process should be automated as much as possible. Planets supports automation by offering remote access to an emulated environment. It does so using the demonstrator GRATE: Global Remote Access To Emulation-services. With GRATE, the user only has to select the object and the environment it prefers and all configuration is done automatically at server-side. After that, the user can easily experience the emulated environment via a web browser.

Nevertheless, you still need to understand how to operate an old computer environment. Today, many of us still remember older environments such as MS DOS and early Windows, but soon even that experience will be lost. Therefore, manuals, tutorials and other supporting documents need to be preserved and kept available as well.

Elsewhere in Planets, IBM is engaged in the development of the Universal Virtual Computer (UVC)[7]. The UVC takes a different approach and combines emulation and migration to maintain interpretability of files where the original computer programme has been lost. The UVC is a general purpose computer. Once an emulator has been developed a programme it can be archived with data file. The programme decodes the specific file format and allows the file format to be made accessible via migration in a logical data view such as XML so that it can be viewed in future. A UVC emulator can be developed for any computer platform. By using an emulator of the UVC it is possible to run the programme and return data in an easy to understand logical view.

Emulation is a versatile and durable solution for retaining access to any kind of digital content. For some digital objects, such as games, educational software or research applications, it is actually the only way to go as these objects cannot be migrated. Within Planets, a number of solutions are underway to maximise the benefits of emulation and to combine emulation with a user-friendly demonstrator.

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[7] Research report on UVC http://jeffrey.famvdhoeven.nl/dd/Researchtask%20IBM%20TU%20Delft%20-%20J.R.%20van%20der%20Hoeven.pdf. See also Hoeven, J.R. van der, Diessen, R.J. van, Meer, K. van der, Development of a Universal Virtual Computer (UVC) for long-term preservation of digital objects, Journal of Information Science, vol. 31(3), p. 196–208, 2005.

NEWS ROUND UP

Training and Outreach Programme Crosses the Half-way Mark

Digital Preservation – The Planets Way at the Swiss Federal Archives, in Bern, on 17–19 November marked the half-way point in the programme to roll out five Planets events in Europe between May 2009 and May 2010.

Each event is designed to provide a practical introduction to digital preservation and Planets. The first day explains the business case for digital preservation, its role in risk management and introduces Planets tools and services.

Days two and three allow preservation, curation and IT staff to take a sample collection and, through a series of lectures, demonstrations and hands-on exercises, to create and test a preservation plan. Each event is tailored to the European region with local case studies.

There is also the opportunity to meet and learn from creators and developers of Planets, ask questions and network with peers.

"The Planets training course has been hugely useful. There's only so much you can learn about a project from looking through papers and websites, so to actually be able to try some of the tools in a hands-on way is extremely valuable."
Grant Young, Digitisation and Digital Preservation Specialist,
Cambridge University Library

Work Starts on Recommender Support in Plato

Work has started on a new tool that will help Planets users to pin-point preservation actions to treat particular content and meet defined requirements.

Planets Recommender tool will be incorporated into Planets preservation planning tool, Plato, and will help users with less experience in digital preservation to evaluate potential tools to meet defined needs.

Preservation planning is the process of building a plan to preserve a set of objects, meet particular objectives and assess potential solutions. The Planets preservation planning methodology and Plato are being developed to address these issues.

Plato automates the planning process to a certain degree, but it is still a complex task which requires specific knowledge from the planner.

For example: the object tree at the heart of the preservation plan requires the user to understand what the institution needs to preserve and what it's willing to lose, the properties of digital objects in a collection and which preservation actions are available.

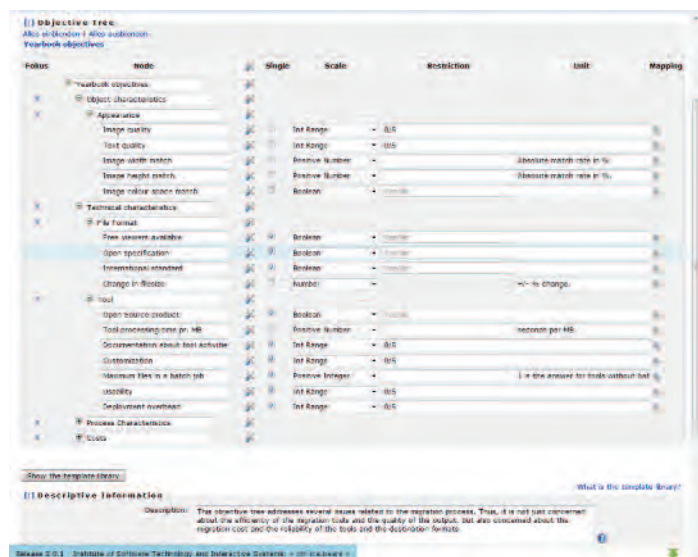Integration of a recommender system into Plato will help to:

- reduce complexity of certain workflow steps. The Recommender will consider the numerous potential preservation actions available and provide a ranked list of best-suited preservation actions. They may include: tools wrapped as web services, but also migration paths, emulation view-paths and unwrapped tools as web services.
- improve preservation action recommendation. The quality of a recommendation is dependent on the requirements specified by the user against which potential solutions will be evaluated. The recommender will help the user by advocating requirements that should be specified to focus on the collection in question.
- reduce time and effort for planning activity. Time and effort needed to identify preservation actions can be reduced by filtering out those that are unsuitable and suggesting actions that performed best in previous experiments taking into account the institution's policies and requirements.

The Recommender tool will be released as part of Plato version 3 in Spring 2010. For more information about Plato visit:
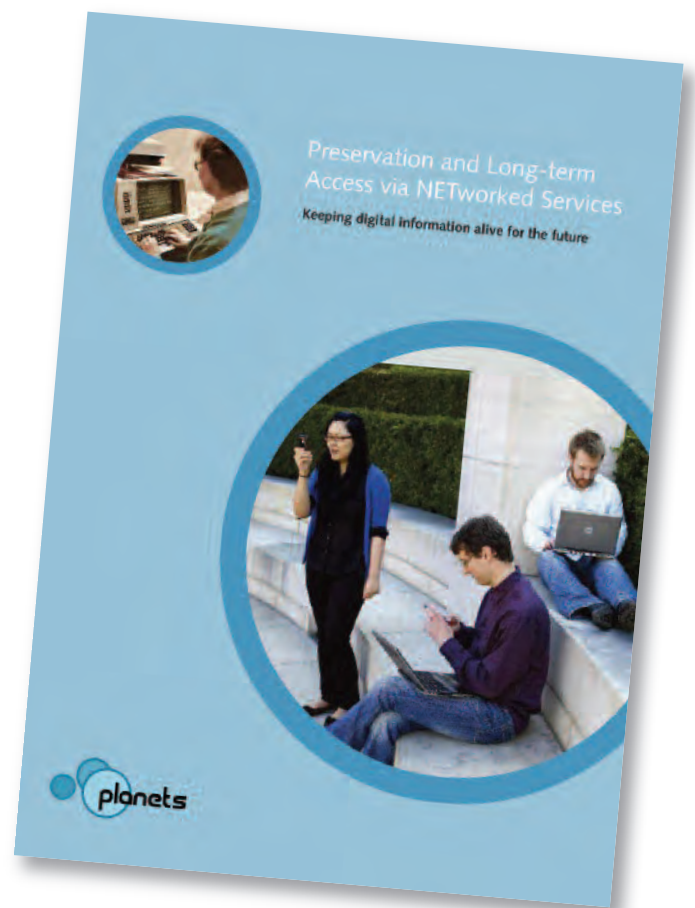http://www.ifs.tuwien.ac.at/dp/plato

You can register to join the Planets User Community and receive notices about technology releases at:
http://www.planets-project.eu/community/

Planets Preservation Planning Tool, Plato

New Planets Publications

Planets is delighted to introduce its new brochure and product specification which are now available to download from the Planets website.

The Planets brochure explores the need to preserve digital information and the challenges faced by libraries, archives and commercial companies. It introduces Planets approach, tools and services and how they help you to build, evaluate and execute preservation plans, convert objects from formats that do not meet your requirements to ones that do, and run software on legacy operating systems.

It also features case studies from national libraries and archives across Europe which shows how they are each planning to preserve their growing digital collections.

Planets product specification details the main tools and services contained in the Planets suite. It explains briefly their role in supporting each stage in the preservation workflow.

To download the brochure and product specification, please visit:
http://www.planets-project.eu/about.

To receive hard copies to share with colleagues in your institution, please send an e-mail to info@planets-project.eu with contact details and the number of copies you need.

Digital Preservation – The Planets Way, Copenhagen, 22 – 24 June 2009

The Royal Library at 'The Black Diamond' overlooking Copenhagen's harbour provided the stunning backdrop to Planets' first 'Digital Preservation – The Planets Way' event on 22 – 24 June 2009.

Copenhagen was the first opportunity for people outside the project to try out Planets tools and services. It also featured a case study by the National Library of The Netherlands presenting its work of building an e-depot and its involvement in Planets developing technology to support long-term preservation.

Participants said that the event met their expectations and provided an introduction to Planets and the issues and challenges associated with preserving digital content. There was also considerable interest in Planets technology.

"The long-term presentation of our research is vital. I think the Planets process is what will be best for us."
Lance Deveson, Library and Information Manager, Australian Council for Educational Research (ACER)

The Royal Library, Copenhagen

Coming soon…

There is still chance to participate in 'Digital Preservation: The Planets Way'; the final two events will take place in:
London, UK, 9 – 11 February 2010;
Rome, Italy, April 2010.

For more details, visit: www.planets-project.eu/events. To receive advance notification of registration opening sign up to the User Community www.planets-project.eu/community

Planets goes East

By hosting Planets' second Outreach and Training event in Bulgaria, Planets crossed new borders and made friends in Eastern Europe.

In mid-September, Planets crossed new borders by holding its second outreach and training event outside a consortium member's country. The three-day outreach and training event took place in Sofia, Bulgaria, and brought together digital preservation practitioners from Eastern and South-Eastern European (SEE) countries. The Central European Initiative (CEI) kindly provided a bursary for 15 participants from regional non-EU countries to attend.

Participants and speakers from the region, and Planets representatives, assembled in Sofia's Hotel Arena di Serdica. The building is constructed around the ruins of an ancient Roman amphitheatre, preserving its remains and combining them with the contemporary structure. This provided a tangible point of reference for the conference – how to preserve digital objects in a way to guarantee future accessibility?

Participants from SEE countries appreciated the well-structured sessions

Case studies from the region

Professor Nikola Ikonomov, Co-chair Digitisation Centre, Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, analysed the experience of SEE countries in the field of digital preservation and their access to their cultural and scientific heritage. They have a rich cultural heritage but it is still underrepresented in the digital space. Most countries in the region are still far from moving into line with European standards. Having neither national strategies nor large scale digitisation facilities to promote digitisation activities, SEE countries are in danger of missing the connection to new developments. The presentation emphasised the need for stronger regional cooperation and joint initiatives to help bridge the gap.

Gabriella Ivacs, Chief Archivist and Records Manager at the Open Society Archives in Budapest, Hungary, introduced the research community 'Parallel Archives'. Parallel Archives is a personal scholarly workspace; a collaborative research environment, and a digital repository. It includes essential tools for building and managing personal collections of primary sources. Researchers can share documents or ask fellow researchers working in distant archives to digitise and upload documents useful for their own ongoing research

Interesting links:
- Abstracts and outlines: www.planets-project.eu/sofia-2009
- SEEDI (South-Eastern European Digitisation Initiative): www.ncd.matf.bg.ac.yu/seedi/
- CEI (Central European Initiative) www.ceinet.org
- Parallel Archives by Open Society Archives (OSA): www.parallelarchive.org

PLANETS AT EVENTS AND PUBLICATIONS

IJDC

The International Journal of Digital Curation, Issue 2, Volume 4 | 2009, pp. 119–134

'Modelling Organizational Preservation Goals to Guide Digital Preservation'
Angela Dappert and Adam Farquhar (British Library, UK)
http://www.ijdc.net/index.php/ijdc/article/view/123

Planets at ECDL 2009

27 September to 2 October 2009

http://www.ecdl2009.eu/

ECDL 2009 was the 13th European Conference on Digital Libraries, and took as its general theme 'Digital Societies'. The programme included two special plenary tracks, each corresponding to a main topic: Infrastructures and Services, with around 230 people attending the main conference tracks. In addition there were tutorials and workshops. Planets and Planets-related papers, demonstrations, posters and tutorial sessions are listed below. Proceedings of the conference are published in ECDL 2009, LNCS 5714, pp. 297-308, 2009, © Springer-Verlag Berlin Heidelberg 2009 at:
http://www.springerlink.com/content/978-3-642-04345-1/

'Adding Quality-Awareness to Evaluate Migration Web-Services and Remote Emulation for Digital Preservation'

Christoph Becker, Hannes Kulovits, Michael Kraxner, Riccardo Gottardi, Andreas Rauber and Randolph Welte (Vienna University of Technology, Austria)

Paper: http://www.planets-project.eu/docs/papers/Becker_AddingQuality_ECDL2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Becker_AddingQuality_ECDL2009.pdf

'Significance is in the Eye of the Stakeholder'

Angela Dappert and Adam Farquhar (British Library, UK)

Paper: http://www.planets-project.eu/docs/papers/Dappert_SignificantCharacteristics_ECDL2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Dappert_SignificantCharacteristics_ECDL2009.pdf

'Just One Bit in a Million: On the Effects of Data Corruption in Files'

Volker Heydegger (University at Cologne, Germany)

Paper: http://www.planets-project.eu/docs/papers/Heydegger_JustOneBit_ECDL2009.pdf

For more info, see http://www.hki.uni-koeln.de/volker-heydegger-m (see under 'Lectures')

'Data recovery from distributed personal repositories'

Rudolf Mayer, Robert Neumayer and Andreas Rauber (Vienna University of Technology, Austria)

Poster: See conference proceedings.

The Planets interoperability framework: an infrastructure for digital preservation actions'

Ross King and Rainer Schmidt (Austrian Institute of Technology, Austria), Andrew N. Jackson and Carl Wilson (British Library, UK), and Fabian Steeg (University at Cologne, Germany)

Poster: See conference proceedings.

'Hoppla – digital preservation support for small institutions'

Stephan Strodl, Florian Motlik, Andreas Rauber (Vienna Institute of Technology, Austria)

Demonstration: See conference proceedings.

'Active preservation'

Robert Sharpe (Tessella, UK), and Adrian Brown (The Parliamentary Archives, UK)

Demonstration: See conference proceedings.

'Digital Preservation: Logical and Bit-stream Preservation Using Plato, EPrints and the Cloud'

Andreas Rauber and Hannes Kulovits (Vienna Institute of Technology, Austria)

The workshop outlined some of the features of the EPrints 3.2 software.

It allows usage of a hybrid storage architecture to ensure the longevity of objects managed by the repository. Plug-ins were demonstrated that allowed storage of files both on secure archival platforms as well as in the cloud. EPrints interfaces with file classification tools and registries such as DROID and PRONOM to perform identification and risk analysis on files contained within an Institutional repository.

It also highlighted the implementation of a plug-in to EPrints which allows interpretation of PLATO preservation plans. This way the repository can automatically perform any action required on any affected objects in the repository, storing provenance information along with the original and newly generated objects. Presentations can be viewed at
http://eprints.ecs.soton.ac.uk/17962
David Tarrant, University of Southampton

Workshop: Abstract at http://www.ionio.gr/conferences/ecdl2009/tut_dp.php

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Planets at iPres 2009, http://www.cdlib.org/iPres/

5 to 6 October 2009

iPres 2009 was the sixth in the series of annual international conferences bringing together researchers and practitioners from around the world to explore the latest trends, innovations, and practices in preserving our scientific and cultural digital heritage. Over 300 people registered for the conference from around the world. There were five papers given by the Planets project, as follows:

'A Programming Model and Framework for Distributed Preservation Workflows'
Rainer Schmidt, Ross King (AIT Austrian Institute of Technology, Austria), Andrew Jackson, Carl Wilson (British Library, UK), Fabian Steeg and Peter Melms (University at Cologne, Germany)

Paper: http://www.planets-project.eu/docs/papers/Schmidt_AFrameworkfor_iPres2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Schmidt_AFrameworkFor_iPres2009.pdf

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'Are You Ready? Assessing Whether Organisations are Prepared for Digital Preservation'
Pauline Sinclair, Robert Sharpe, James Duckworth, Lewis Jardine, Ann Keen (Tessella, UK), Clive Billenness, Adam Farquhar, Jane Humphreys (British Library, UK)

Paper: http://www.planets-project.eu/docs/papers/Sharpe_AreYouReady_iPres2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Sharpe_Areyouready_iPres2009.pdf

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'Implementing Metadata that Guides Digital Preservation Services'
Angela Dappert, Adam Farquhar (British Library, UK)

Paper: http://www.planets-project.eu/docs/papers/Dappert_MetadataAndPreservationServices_iPres2009.pdf
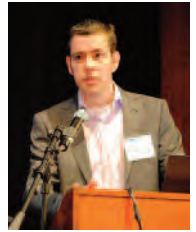
Presentation: http://www.planets-project.eu/docs/presentations/Dappert_ImplementingMetadata_iPres2009.pdf

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'Digital Archaeology: Recovering Digital Objects from Audio Waveforms'
Mark Guttenbrunner, Mihai Ghete, Annu John, Christanth Lederer, Andreas Rauber (Vienna Institute of Technology, Austria)

Paper: http://www.planets-project.eu/docs/papers/Guttenbrunner_DigitalArcheology_iPres2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Guttenbrunner_DigitalArchaeology_iPres2009.pdf

L–R Andreas Rauber, Jeffrey van der Hoeven and Klaus Rechert presenting at iPres

'Novel Workflows for Abstract Handling of Complex Interaction Processes in Digital Preservation'
Klaus Rechert, Dirk von Suchodoletz, Randolph Welte (University of Freiburg, Germany), Maurice van den Dobbelsteen, Bill Roberts (National Archives of The Netherlands), Jeffrey van der Hoeven (Royal Library, The Netherlands), Jasper Schroder (IBM Netherlands)

Paper: http://www.planets-project.eu/docs/papers/Rechert_NovelWorkflows_iPres2009.pdf

Presentation: http://www.planets-project.eu/docs/presentations/Rechert_NovelWorkflows_iPres2009.pdf

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Planets at eChallenges 2009, www.echallenges.org/e2009

21 – 23 October 2009

'The Planets Testbed – A Collaborative Research Environment for Digital Preservation'
Max Kaiser, Austrian National Library

Presentation: http://www.planets-project.eu/docs/presentations/eChallenges_2009_Kaiser_Testbed.pdf

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Society of Archives conference 2009

1 – 4 September 2009

'Planets Leaving Orbit – Beyond the Project'
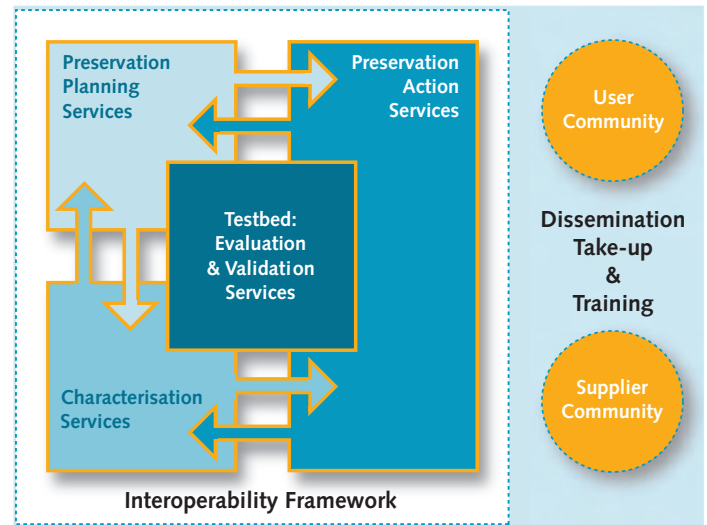Clive Billenness, British Library

http://www.archives.org.uk/thesociety/conference2009blogtwitter/abstractsofpresentations.html

BACKGROUND TO THE PLANETS PROJECT

Preservation and Long-term Access through Networked Services (Planets) is a European joint-venture for research and development in the field of digital preservation. The project is being delivered by sixteen institutions in Europe and coordinated by the British Library. It is co-funded by the European Commission under Framework Programme 6. (IST-033789).

Planets' is delivering a framework and set of practical tools and services that will enable institutions in Europe to manage and access digital collections for the long-term:

- **Models** to enable you to identify the digital preservation needs of your organisation, decide what information you want to keep and in what format you want to store it. They also help you to understand the ways in which end-users work with these collections.

- **Tools** to allow you to build, shape, compare and execute preservation plans in accordance with your preservation needs. Planets and third-party tools enable you to identify the significant properties of you collection; recommend and execute migration to convert old file formats into new ones or emulation to replicate the original environment; and to compare objects before and after preservation actions have taken place to quality assure and document the outcome.

- **Registry** containing descriptions of file formats, descriptions of available preservation actions preservation and their suitability when applied to particular object types.

- **Architecture** providing access to Planets and third-party preservation tools through a single web-based application.

- **Testbed** and laboratory environment in which you can test these tools and services using real data in a secure environment, so you can make decisions based on scientific evidence.

Interoperability Framework

Planets Partners are:
> The British Library
> The National Library of the Netherlands
> Austrian National Library
> The Royal Library of Denmark
> State and University Library, Denmark
> The National Archives of the Netherlands
> The National Archives of England, Wales
>   and the United Kingdom
> Swiss Federal Archives
> University of Cologne
> University of Freiburg
> HATII at the University of Glasgow
> Vienna University of Technology
> Austrian Research Centers GmbH
> IBM Netherlands
> Microsoft Research Limited
> Tessella Support Services Plc

For more information, visit www.planets-project.eu or email info@planets-projects.eu