

HEPiX Spring 2012 Workshop



Report of Contributions

Contribution ID: 0

Type: **not specified**

EGI Federated Cloud Infrastructure

Friday, 27 April 2012 09:30 (30 minutes)

This presentation introduces the EGI Task Force on Federated Clouds to the world wide Grid and Cloud communities. Building on the technology and expertise aggregated in over 10 years of successful provisioning and operation of a pan-European Grid Infrastructure, the Task Force further pushes the frontiers of Cloud interoperability enabling user communities to scale their computing needs across multiple Cloud providers, both academic/publicly funded and commercial providers.

Summary

EGI provides a pan-European computing and storage infrastructure for world-wide academic research projects. Stemming from a rich history of high-throughput computing served for heavy user communities such as High Energy Physicists, Earth Sciences academics and molecular biologists, EGI seeks to significantly increase its support for more diverse user communities through the adoption of virtualisation within its data centres to provide a federated IaaS.

To help EGI reaching this goal, a Task Force was set up to examine, document and implement the work needed to federate local, autonomous Cloud Providers within the EGI federation. To begin with, usage scenarios for a federated Cloud infrastructure were elicited through a series of meetings and conferences (e.g. the EGI User Virtualisation workshop, <http://go.egi.eu/uvw1>), and then refined into six fundamental yet high-level scenarios that form the basis for advanced federated Cloud usage.

The six usage scenarios look at a federated Cloud infrastructure from a user application integrator's point of view and describe key aspects of using a virtualised infrastructure: Dividable into two types of scenarios, the first three scenarios describe the needs that may already be satisfied engaging with only one Cloud Provider in a Private Cloud deployment setting, such as VM management, Data integration and configuration, and an Information Discovery system. The second set of scenarios describe the user's needs when scaling out across multiple Cloud providers within the EGI federation; Accounting, Monitoring and Notification are necessary to accommodate the needs of scaling users into communities, and the model user in the earlier scenarios into customers representing virtual research communities.

Most of the necessary key infrastructure capabilities, including corresponding technical solutions, are already in place within EGI; the operational value and scalability of Storage services, distributed information systems, a European monitoring and accounting infrastructure were already proven in over 10 years of operation of a pan-European Grid Infrastructure supported through the EGEE projects and, since recently, the EGI-InSPIRE and EMI projects. Together with the new capabilities, they will be examined to determine what changes are necessary to accommodate a federated virtualised infrastructure.

In summary, the EGI Federated Clouds Task Force brings together representatives of three key stakeholder communities that are necessary for a successful and technology agnostic federation of virtualised infrastructures: User communities not only formulate and develop use cases and requirements for the infrastructure, they also test the deployed services against the six usage scenarios by integrating the provided test bed into their real-life computing workflows. The Resource providers operate the federated Clouds in a test bed, choosing whichever Cloud infrastructure man-

agement software may best suit their specific needs while at the same time satisfying the defined core capabilities. Finally, Technology Providers represent the choice of software components that satisfy not only the key capabilities for Cloud infrastructure management, but also more specific needs of the Resource Providers federated in EGI.

Primary authors: Dr TURILLI, Matteo (OerC); DRESCHER, Michel (EGI.eu)

Presenter: COLLIER, Ian Peter (STFC - Science & Technology Facilities Council (GB))

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 1

Type: **not specified**

CC-IN2P3 Site Report

Monday, 23 April 2012 11:00 (10 minutes)

Some news from CC-IN2P3 since one year.

Summary

Primary author: OLIVERO, philippe (CC-IN2P3)

Presenter: OLIVERO, philippe (CC-IN2P3)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 2

Type: **not specified**

Fermilab Site Report - Spring 2012 HEPiX

Monday, 23 April 2012 09:45 (15 minutes)

The Fermilab Site Report

Summary

Primary author: Dr CHADWICK, Keith (Fermilab)

Presenter: Dr CHADWICK, Keith (Fermilab)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 3

Type: **not specified**

FermiCloud Update

Friday, 27 April 2012 09:00 (30 minutes)

Update on the status of the FermiCloud project.

Summary

Primary author: Dr CHADWICK, Keith (Fermilab)

Presenter: Dr CHADWICK, Keith (Fermilab)

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 4

Type: **not specified**

Business Continuity Efforts at Fermilab

Wednesday, 25 April 2012 14:30 (30 minutes)

Business Continuity Efforts at Fermilab

Summary

Primary author: Dr CHADWICK, Keith (Fermilab)

Presenter: Dr CHADWICK, Keith (Fermilab)

Session Classification: Business Continuity

Track Classification: Business Continuity

Contribution ID: 5

Type: **not specified**

IPv6 at Fermilab

Thursday, 26 April 2012 14:00 (30 minutes)

Status of the IPv6 Deployment at Fermilab

Summary

Primary author: Dr CHADWICK, Keith (Fermilab)

Presenter: Dr CHADWICK, Keith (Fermilab)

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 6

Type: **not specified**

CERN Infrastructure Projects Update

Thursday, 26 April 2012 11:10 (30 minutes)

This talk will provide an update on the two main infrastructure projects; namely the upgrade and consolidation of the CERN computer centre and the remote hosting project. As the tender for the remote hosting will have been recently adjudicated at the CERN Finance Committee in March, the talk will concentrate on the tender and the results. Nonetheless it will give an brief update on the progress with the computer centre upgrade which has progressed significantly since the last HEPiX meeting.

Summary

Primary author: SALTER, Wayne (CERN)

Co-author: DORE, Vincent (CERN)

Presenter: SALTER, Wayne (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 7

Type: **not specified**

Status of CERN Business Continuity

Wednesday, 25 April 2012 14:00 (30 minutes)

This talk will give an overview the status of business continuity at CERN currently and explain the steps that are planned to improve on this.

Summary

Primary author: SALTER, Wayne (CERN)

Presenter: SALTER, Wayne (CERN)

Session Classification: Business Continuity

Track Classification: Business Continuity

Contribution ID: 8

Type: **not specified**

Evolving the AFS Service at CERN

Tuesday, 24 April 2012 16:35 (30 minutes)

In order to provide a scalable service, the AFS infrastructure at CERN currently undergoes an architectural change from Fibre Channel based fabrics towards external SAS based storage. This talk will present the design choices taken, cover the technologies involved, highlight the features and discuss limitations along with their potential solutions.

Summary

Primary author: WIEBALCK, Arne (CERN)

Presenter: Mr MOSCICKI, Jakub (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 9

Type: **not specified**

DB On Demand at CERN

Monday, 23 April 2012 14:30 (20 minutes)

This presentation gives an introduction to the Database On Demand service at CERN. The need to offer support based on different database systems is on the rise within our user community. For example, one use case includes certain applications certified for running with non-Oracle databases (e.g. MySQL). Additional use cases are based on the desire expressed by user groups in being able to easily deploy and maintain different DBMS systems for their internal applications development. DB On Demand will cover this need offering users an easy way to create and manage their databases through a system that is fully integrated with different CERN technologies.

Summary

DB On Demand is a service which empowers users to create and manage database instances using a simple and intuitive web interface. Although MySQL is the only database system supported at present, the architecture has been designed to be flexible and we should be able to support other relational database systems in the future.

DB On Demand has been developed to provide, in a scalable way, database platform support for people who cannot use the Oracle relational database service. The DB On Demand service offers: full DBA privileges on a database running in a preconfigured virtual machine, configurable backups (with a possibility to send consistent full backups to tape), point-in-time recovery using binary logs, configuration management via Web interface, monitoring for instances, database upgrades to be installed by the user when it best suits them and support in case of hardware failure on the underlying virtualization platform.

Primary authors: GOMEZ BLANCO, Daniel (CERN); WOJCIK, Dawid (CERN); COTERILLO COZ, Ignacio (Consejo Superior de Investigaciones Cientificas (CSIC) (ES)); GASPAR APARICIO, Ruben Domingo (CERN)

Presenter: GOMEZ BLANCO, Daniel (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 11

Type: **not specified**

Cyber Security - The Road We've Traveled and Modest Predictions

Thursday, 26 April 2012 16:30 (30 minutes)

One of the first cyber incidents was caused by an insect (a moth, in fact). Ever since then, the lower life forms have been trying to disrupt the virtual landscapes we construct for our users. As our virtual environments have evolved to be more complex, these other life forms have always evolved sufficiently to find new cracks in our defenses. As we continue down the current path we are reminded of a quote attributed to Einstein, "Insanity: doing the same thing over and over again and expecting different results." Of course, he also said, "Only two things are infinite, the universe and human stupidity, and I'm not sure about the former."

So, let's look at how we got here and see if we can use that to guide what we should do in the future.

Summary

Primary author: COWLES, Bob (SLAC)

Presenter: COWLES, Bob (SLAC)

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 12

Type: **not specified**

Site Report Nikhef

Monday, 23 April 2012 10:00 (10 minutes)

Overview of the changes since last site report.

Summary

Primary author: KUIPERS, Paul (Nikhef)

Presenter: KUIPERS, Paul (Nikhef)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 13

Type: **not specified**

Computer Security Update

Thursday, 26 April 2012 16:00 (30 minutes)

The talk tackles current trends in the computer security field. Recent security events, threats, risk management, ... Those are the points which are covered here, including the academic world.

Summary

Primary author: MOLLON, Remi (CERN)

Presenter: MOLLON, Remi (CERN)

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 14

Type: **not specified**

How we carried out a migration to Oracle Grid Engine at CC-IN2P3

Wednesday, 25 April 2012 09:45 (20 minutes)

In 2011, CC-IN2P3 changed its old custom batch System BQS by Oracle Grid Engine (OGE). After recalling briefly the reasons why we did it, this talk will present how we carried out this migration: the method, the different steps, the problems we have had to solve and I'll finish by the current situation, and how we are having a try to encourage a collaboration between sites running xGE clusters.

Summary

Primary author: OLIVERO, Philippe (Unknown)

Presenter: OLIVERO, Philippe (Unknown)

Session Classification: Computing

Track Classification: Computing & Batch Services

Contribution ID: 15

Type: **not specified**

NDGF Site Report

Monday, 23 April 2012 10:10 (10 minutes)

Update on recent developments in NDGF

Summary

Primary author: WADENSTEIN, Erik Mattias (Unknown)

Presenter: WADENSTEIN, Erik Mattias (Unknown)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 16

Type: **not specified**

PIC Site Report Spring 2012

Monday, 23 April 2012 11:10 (10 minutes)

PIC is a scientific-technological center providing High Throughput and Data Processing Services to various scientific disciplines: High Energy Physics, Astrophysics, Cosmology and Life Sciences among others.

To fulfill these communities requirements it needs to maintain a steep capacity growth while keeping high levels of reliability. Thanks to technology improvements, in the last years it has been possible to support this growth keeping the overall energy budget about constant. However, power limit is getting close and, as user communities and requirements just keep growing, energy efficiency has become a key metric to ensure the sustainability of the activity. Therefore, power efficiency has become the metric for most purchasing decisions. The current input power limitations are a 200KVA UPS line to our main computer room and 100KVA UPS line to an independent, more energy efficient, module (PUE 2.3 vs 1.55). While a significant improvement of the situation is on sight, as of today we have to hold out with the available power. That means that our resources are mostly channeled on “going green”: how to save as much energy as possible to keep our equipment running while still delivering the required service.

With that in mind, different techniques are being experimented: improvements on racks to enhance cooling, by controlling air fluxes; newer, more efficient equipment that has a better performance unit per watt ratio; and virtualization technologies that allow us to consolidate servers.

In this presentation a brief description of the experiments running at PIC will be given. Furthermore, the status of the PIC site will be presented: computing resources, storage resources, data-center considerations and software considerations regarding the most resource-consuming project, LHC, as well as other projects, and will try to give some insight on the trade offs found.

Summary

Primary author: BERNABEU, Gerard (U)

Presenter: BERNABEU, Gerard (U)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 17

Type: **not specified**

Image publishing and subscribing.

Wednesday, 25 April 2012 11:20 (20 minutes)

Publishing images involves creating consistent uptodate images, and managing image metadata. At DESY (HH), VM images are created using virt-install, kickstart, vmimagemanager, and puppet.

The HEPiX VWG has recently changed the image format due to multi core job requirements and the image list subscriber has provided an event interface to allow easier integration with clouds and projects such as the Stratus lab market place.

Summary

Will cover image format changes, generating images, publishing images, and changes to the subscribing to images.

Primary author: SYNGE, Owen Millington

Presenter: SYNGE, Owen Millington

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: **18**

Type: **not specified**

HEP-SPEC06 on the Bulldozer and SandyBridge processor

Wednesday, 25 April 2012 09:05 (25 minutes)

We received a dual socket machine with 2x Xeon E5 and 2x Opteron 62xx multicore processor. The HEP-SPEC06 measurements will be presented and compared with previous generation processors.

Summary

Primary author: Dr MICHELOTTO, Michele (INFN Padua & CMS)

Presenter: Dr MICHELOTTO, Michele (INFN Padua & CMS)

Session Classification: Computing

Track Classification: Computing & Batch Services

Contribution ID: 19

Type: **not specified**

The HEPiX IPv6 Working Group

Thursday, 26 April 2012 14:30 (20 minutes)

Since the Vancouver HEPiX meeting in Oct 2011, the IPv6 working group has been busy expanding its IPv6 testbed and testing data management over IPv6. Work has also started on the full survey of the IPv6 readiness of all WLCG applications, software and tools. This talk will present our experiences to date and plans for the future. A second talk by Francesco Prelz will give more details about the experiences on the distributed testbed.

Summary

Primary author: Dr KELSEY, David (STFC - Science & Technology Facilities Council (GB))

Presenter: Dr KELSEY, David (STFC - Science & Technology Facilities Council (GB))

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 20

Type: **not specified**

Federated Identity Management for HEP

Thursday, 26 April 2012 15:10 (20 minutes)

A single Grid (X.509) identity certificate together with an attribute certificate from a Virtual Organisation can be used by an appropriately authorised HEP user anywhere in the world to access WLCG resources wherever they may be. There are however many other non-Grid distributed computing services that HEP users also need to access; webs, wikis, mail lists, document databases, agenda systems, and other collaboration tools to name just a few. Traditionally access to these services has to be fully managed by the hosting site and this results in the requirement to create and manage many many user accounts. This is very painful for both sites and users. This talk will present an overview of work being done both in the general research and education community and by WLCG, in collaboration with other scientific communities, to improve this situation.

Summary

Primary author: Dr KELSEY, David (STFC - Science & Technology Facilities Council (GB))

Presenter: Dr KELSEY, David (STFC - Science & Technology Facilities Council (GB))

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 21

Type: **not specified**

Monitoring at GRIF

Friday, 27 April 2012 11:00 (30 minutes)

The GRIF monitoring infrastructure will be presented, along with the requirements, issues, and foreseen evolutions

Summary

Primary author: Mr SCHAER, Frederic (CEA)

Presenter: Mr SCHAER, Frederic (CEA)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 22

Type: **not specified**

Agile Infrastructure Monitoring

Tuesday, 24 April 2012 11:40 (25 minutes)

The Agile Infrastructure (AI) project will establish a flexible and dynamic management of CERN computer centre resources. From the infrastructure monitoring perspective the AI project is working towards a common monitoring architecture to allow accessing and correlating information about all computer centre resources. This new monitoring solution will simplify the sharing of monitoring data and promote complex monitoring analysis tasks. This talk will motivate the need for such architecture, explain the architecture building blocks, and present the selected technologies.

Summary

Primary author: Mr RODRIGUES DE SOUSA ANDRADE, Pedro Manuel (CERN)

Presenter: Mr RODRIGUES DE SOUSA ANDRADE, Pedro Manuel (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 23

Type: **not specified**

CERN site report

Monday, 23 April 2012 11:40 (20 minutes)

News from CERN since the previous meeting in Vancouver

Summary

Primary author: Dr MEINHARD, Helge (CERN)

Presenter: Dr MEINHARD, Helge (CERN)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 24

Type: **not specified**

Agile Infrastructure at CERN: Introduction

Tuesday, 24 April 2012 11:00 (15 minutes)

Over the past decade, CERN-IT has successfully managed thousands of machines for specific services in the CERN computer centre, using dedicated home-grown tools for configuration, installation and monitoring. However, a more dynamic and flexible approach is needed in order to provide new services, reduce inefficiencies, address business continuity, and cope with a remote extension to the Tier-0 compute facility. The presentation will explain the motivation, and introduce the Agile Infrastructure project detailed in the subsequent presentations.

Summary

Primary author: Dr MEINHARD, Helge (CERN)

Presenter: Dr MEINHARD, Helge (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 25

Type: **not specified**

Agile Infrastructure: Configuration and Operation Tools

Tuesday, 24 April 2012 11:15 (25 minutes)

Configuration Management is not new to CERN. For more than a decade, CERN has build its own Quattor based Configuration Management infrastructure which is currently used to manage the configuration of several thousands machines. Experience shows that our infrastructure has several limitations. Moreover, it will not scale to manage configuration of systems on a heavily virtualised computer centre which will be scattered within two distant sites. This talk unveils those limitations and describes the technical choices that have been made when designing a new Configuration Management infrastructure. An update on current status of its implementation is also provided

Summary

Primary author: GUIJARRO, Juan Manuel (CERN)

Presenter: Dr MEINHARD, Helge (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 26

Type: **not specified**

Virtualisation working group progress report

Wednesday, 25 April 2012 11:00 (20 minutes)

This presentation will summarise the progress of the Virtualisation working group since the Vancouver meeting.

Summary

Primary author: CASS, Tony (CERN)

Presenter: CASS, Tony (CERN)

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 27

Type: **not specified**

Experience with new Service Management at CERN

Monday, 23 April 2012 16:00 (20 minutes)

The CERN Service Management project was born to fulfil the need of a global, homogeneous, and efficient service organization for all services provided to the users. On February 2011 the project entered in operation including in a first step services of the IT and GS departments. The CERN Service Management infrastructure is based on ITIL best practises and it includes a single Service Desk, a Service Portal providing access to the service catalogue and a set of standard processes as the most significant elements of the project. The tool that has been chosen to support the project and to give a single entry point to both supporters and users is a commercial product: Service-Now. The infrastructure provided by this tool has been adapted to accommodate the structures and needs of the laboratory.

This talk presents the status of the project after one year of operation including the user's and supporter's perspectives, volume of work after the first year of operation, and the status and plans for the tool. Future developments as the incoming Service Level Management procedures, new processes and facilities will also be discussed.

Summary

Primary authors: MOLLER, Mats (CERN); Dr MENDEZ LORENZO, Patricia (CERN)

Presenter: Dr MENDEZ LORENZO, Patricia (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 28

Type: **not specified**

INFN-T1 Site report

Monday, 23 April 2012 11:30 (10 minutes)

We will show recent improvements in our T1 infrastructure

Summary

We will show recent improvements in our T1 infrastructure

Primary authors: CHIERICI, Andrea (INFN-CNAF); Dr SAPUNENKO, Vladimir (INFN)

Presenter: CHIERICI, Andrea (INFN-CNAF)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 29

Type: **not specified**

Agile Infrastructure: IaaS

Tuesday, 24 April 2012 12:05 (25 minutes)

The Agile Infrastructure project leverages emerging OpenStack Cloud Computing framework and Puppet configuration tools to provide Infrastructure as a Service in a sustainable and scalable way, but also ensuring sufficient resource flexibility and availability. In this solution, different services will be connected and scheduled over the IaaS layer using the same entry point. Moreover, a common approach to organizing the resources used by each different service will be deployed to be able to correlate usage tracking, auditing, authorization, etc... for various reasons such as security, accounting and isolation. This presentation will give an overview, the current status of the Openstack IaaS implementation and future plans along with how this fits into the CERN computing model

Summary

Primary author: CASTRO LEON, Jose (Universidad de Oviedo (ES))

Presenter: CASTRO LEON, Jose (Universidad de Oviedo (ES))

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 30

Type: **not specified**

ITIL and Business Continuity (Service Perspective)

Wednesday, 25 April 2012 15:00 (30 minutes)

Based on ITIL best practices, the support of the overall business continuity is ensured by managing and controlling the risks that could seriously affect the corresponding services. The identification of the risks and the provision of measures to mitigate or eliminate the threats in the system will play an important role in achieving the level of service required to ensure the business continuity. The CERN Service Management project is starting to put the basis towards a future risk management activity covering the services of the IT and GS departments. A formal approach will be defined to analyze the service assets, the threats and the vulnerabilities and to establish counter-measures towards the increase of the services reliability.

This talk presents the ITIL principles of business continuity and risk management and it describes several practical cases applied to some of the most important IT and GS services.

Summary

Primary authors: MOLLER, Mats (CERN); Dr MENDEZ LORENZO, Patricia (CERN)

Presenter: Dr MENDEZ LORENZO, Patricia (CERN)

Session Classification: Business Continuity

Track Classification: Business Continuity

Contribution ID: 31

Type: **not specified**

Update on CERN infrastructure services

Monday, 23 April 2012 15:10 (20 minutes)

The talk will address the evolution of CERN computing infrastructure services such as CVS, SVN and TWiki as well as the Engineering Linux server infrastructure. Furthermore, the project to setup a central Issue Tracking Service based on Atlassian JIRA will be presented, along with a description of the IT BOINC application service for Volunter Computing.

Summary

Primary author: HØIMYR, Nils (CERN)

Presenter: HØIMYR, Nils (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: **32**

Type: **not specified**

Quattor Update

Friday, 27 April 2012 11:30 (30 minutes)

Report from the recent Quattor Workshop in Budapest and update on developments in the Quattor toolset.

Summary

Primary author: COLLIER, Ian (UK Tier1 Centre)

Presenter: COLLIER, Ian (UK Tier1 Centre)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 33

Type: **not specified**

Virtualisation & Cloud Projects at RAL Tier 1

Wednesday, 25 April 2012 11:40 (30 minutes)

Update on various virtualisation and cloud computing projects at the RAL Tier 1

Summary

Primary author: COLLIER, Ian (UK Tier1 Centre)

Presenter: COLLIER, Ian (UK Tier1 Centre)

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 34

Type: **not specified**

The CERN Storage Services Strategy

Tuesday, 24 April 2012 14:00 (25 minutes)

CERN IT is faced with a rich set of requirements when it comes to the provisioning of storage services. This talk will give an overview of the challenges and constraints, describe which part of the phase space the current services (AFS, CASTOR, EOS) cover and present the short- and mid-term storage strategy. In addition, the current status of ongoing investigations of alternative storage solutions will be summarised.

Summary

Primary author: Mr MOSCICKI, Jakub (CERN)

Presenter: Mr MOSCICKI, Jakub (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 35

Type: **not specified**

HTTP Storage Federation - a dCache/DPM demonstration.

Thursday, 26 April 2012 09:40 (30 minutes)

CERN-DM and dCache.org will demonstrate a storage federation purely based on the http(s) protocol.

Summary

Primary authors: DEVRESSE, Adrien (University of Nancy I (FR)); Mr BECKER, Daniel (HTW Berlin); FURANO, Fabrizio (CERN); KEEBLE, Oliver (CERN); Dr FUHRMANN, Patrick (DESY); MILLAR, Paul (Deutsches Elektronen-Synchrotron (DE)); BRITO DA ROCHA, Ricardo (CERN)

Presenter: FURANO, Fabrizio (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: **36**

Type: **not specified**

GSI site report

Monday, 23 April 2012 11:20 (10 minutes)

GSI site report

Summary

new projects at GSI

Primary author: SCHOEN, Walter (GSI)

Presenter: SCHOEN, Walter (GSI)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 37

Type: **not specified**

The Infiniband based lustre at GSI

Tuesday, 24 April 2012 14:50 (25 minutes)

A new Infiniband based part of the lustre system is build at the “Mini-Cube” at GSI. The connection to the IP based lustre part is realised with LNET routers.

Summary

Primary author: Dr SCHOEN, Walter (GSI)

Co-author: Dr ROTH, Thomas (GSI)

Presenter: Dr SCHOEN, Walter (GSI)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 38

Type: **not specified**

Data Protection Technologies: What comes after RAID?

Tuesday, 24 April 2012 16:05 (30 minutes)

Increasing data volumes and demand for access impose serious challenges for data storage infrastructures. Risk of data corruption increases over time, increase of disc size leads to an unacceptably long recovery time in usual RAID configurations. Recently a new solution, erasure coding, has appeared in the Cloud. It is based on a mathematical construction and involves dividing the data into a large number of small segments which are then duplicated and spread over multiple locations and in some cases multiple IaaS providers. Erasure coding in combination with RAIN (Redundant Array of Inexpensive Nodes) allows significantly reduce overhead ensuring data redundancy similar to RAID and possibility of recovery from storage nodes failures. Several solutions implementing erasure coding are already available on the market.

Summary

Primary author: Dr SAPUNENKO, Vladimir (INFN)

Presenter: Dr SAPUNENKO, Vladimir (INFN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 39

Type: **not specified**

EasyBuild: building software with ease.

Monday, 23 April 2012 14:00 (30 minutes)

EasyBuild is an open source build framework written in Python that enables you to install software in a repeatable and consistent way.

EasyBuild was motivated by the need for a system that would allow us to build and install multiple versions of a software package, built with different tool-kits in an automated manner. This whilst a huge number of software packages require us to divert from the standard configure - make - make install.

Summary

EasyBuild is a software installation framework in Python that allows you to install software in a structured and robust way.

The EasyBuild framework takes an EasyBlock (a custom Python class) combined with a specification file to build the software and produce an environment module.

The framework will resolve and install dependencies, apply patches, run the installation steps specified in the EasyBlock and save the log file and specification file next to the package installation.

Configuration files encoded with the EasyBuild version number are automatically kept under version control after each successful build. This ensures each installation can later be reproduced and shared with others.

Primary author: TIMMERMAN, Jens (U)

Co-author: DE WEIRDT, Stijn (G)

Presenter: TIMMERMAN, Jens (U)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 40

Type: **not specified**

CPU Benchmarking at GridKa (Update 04/2012)

Wednesday, 25 April 2012 08:45 (20 minutes)

Comparative benchmarking of cluster hardware with the latest generations of processors and investigation on the influence of BIOS settings like symmetric multiprocessing and turbo mode.

Summary

Primary author: ALEF, Manfred (Karlsruhe Institute of Technology (KIT))

Presenter: ALEF, Manfred (Karlsruhe Institute of Technology (KIT))

Session Classification: Computing

Track Classification: Computing & Batch Services

Contribution ID: 41

Type: **not specified**

Change Control at RAL

Wednesday, 25 April 2012 16:00 (30 minutes)

In 2009 the RAL Tier-1 introduced a formal change control process as a means of driving cultural changes in the way we tested and deployed new services. Although designed from the bottom up, a mid term review found remarkable similarity with the ITIL model for change management. This talk describes how the process evolved, its impact on team culture, considers outcome metrics and discusses the challenges of risk mitigation and accurate risk assessment.

Summary

Primary author: SANSUM, Andrew (Particle Physics)

Co-author: Dr GORDON, John (Particle Physics)

Presenter: Dr GORDON, John (Particle Physics)

Session Classification: Business Continuity

Track Classification: Business Continuity

Contribution ID: 42

Type: **not specified**

ARTEMIS

Monday, 23 April 2012 16:40 (30 minutes)

ARTEMIS is a lightweight system developed at the STFC e-Science centre for collecting, viewing and analysing environmental data from distributed sensors in a data-centre environments.

Summary

Primary author: ADAMS, James (STFC RAL)

Presenter: ADAMS, James (STFC RAL)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 43

Type: **not specified**

Database access management system

Monday, 23 April 2012 14:50 (20 minutes)

This talk will present the access management system used at CERN Database Services group for allowing intercommunication within the nodes of the various database clusters, used also for granting and maintaining access to database and application servers to administrators and users. Started as a simple SSH keys management tool, the system has evolved together with CERN IT infrastructure, providing now integration with Kerberos, authorization via LDAP groups and so on.

Summary

Primary author: TENAGLIA, Giacomo (CERN)

Presenter: TENAGLIA, Giacomo (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 44

Type: **not specified**

Use of NetApp at CERN IT Database Services group

Thursday, 26 April 2012 10:10 (30 minutes)

This talk will present the experience of CERN Database Services group in running NetApp filers to provide a highly available NFS-based NAS infrastructure.

Summary

Primary authors: GRANCHER, Eric (CERN); GASPAR APARICIO, Ruben Domingo (CERN)

Co-author: TENAGLIA, Giacomo (CERN)

Presenter: TENAGLIA, Giacomo (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 45

Type: **not specified**

RAL Site Report

Tuesday, 24 April 2012 08:55 (10 minutes)

An update on events at RAL

Summary

Primary author: Mr BLY, Martin (STFC/RAL)

Presenter: Mr BLY, Martin (STFC/RAL)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 46

Type: **not specified**

Procurement trends

Thursday, 26 April 2012 12:10 (20 minutes)

This talk will describe the new computing hardware procurement trends at CERN. It will focus on major architectural changes being put in place as well as describe how these are better fitting the power, cooling and space envelopes available in the CERN hosting facilities. The talk will underline how the simplification of these architecture tends to streamline the process of delivering computing capacity quicker to the physics community.

Summary

Primary author: BONFILLOU, Eric (CERN)

Co-authors: MARQUES COELHO DOS SANTOS, Miguel (CERN); BARRING, Olof (CERN)

Presenter: BONFILLOU, Eric (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 47

Type: **not specified**

New burn-in test

Monday, 23 April 2012 16:20 (20 minutes)

This talk will provide an overview of the CERN's new burn-in test system. It will mainly focus on the reasons why a new system is needed (operational factors, remote hosting adaptation) and how it is being implemented and evaluated. The first results will be presented as the acceptance of about 1500 servers relied on it.

Summary

Primary author: BONFILLOU, Eric (CERN)

Presenter: BONFILLOU, Eric (CERN)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 48

Type: **not specified**

Backup Infrastructure at CERN

Tuesday, 24 April 2012 14:35 (15 minutes)

CERN's current backup and archive service hosts 5.5 PB of data in more than 1.6 billion files. We have over 1200 clients which back up or restore an average of 50 TB of data each day. At the current growth rate, we expect to have about 7 PB by the end of 2012.

In this contribution we present CERN's backup and archive service based on the IBM Tivoli Storage Manager. We show the architecture and design of the system, the user requirements and the operational issues, the current limitations of TSM and what we hope will be improved in the future.

Summary

Primary author: IRIBARREN, Alex (CERN)

Presenter: IRIBARREN, Alex (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 49

Type: **not specified**

PDSF at NERSC – Site Report

Tuesday, 24 April 2012 10:10 (10 minutes)

PDSF is a commodity Linux cluster at NERSC which has been in continuous operation since 1996. This talk will provide a status update on the PDSF system and summarize recent changes at the NERSC Center. Highlighted PDSF changes include the conversion to xCAT-managed netboot node images, the ongoing deployment of Scientific Linux 6, and the introduction of XRootD for STAR.

Summary

Primary author: PEZZAGLIA, Larry (LBNL)

Presenter: PEZZAGLIA, Larry (LBNL)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 50

Type: **not specified**

CHOS in Production – Supporting Multiple Linux Environments on PDSF at NERSC

Wednesday, 25 April 2012 12:10 (20 minutes)

The CHOS[1] software package combines a Linux kernel module, a PAM module, and batch system integration to provide a mechanism for concurrently supporting multiple Linux environments on a single Linux system. This presentation gives an introduction to CHOS and details how NERSC has deployed this utility on the PDSF HPC system to meet the complex, and often conflicting, software environment requirements of multiple applications. The CHOS utility has been in continuous use on PDSF for over 8 years, and has proven to be a robust and simple approach to ensure optimal software environments for HENP workloads.

[1] CHOS was written by Shane Canon of NERSC, and the code is available on GitHub[2]. The CHOS technology is explained in detail in the paper at [3].

[2] <http://github.com/scanon/chos/>

[3] <http://indico.cern.ch/getFile.py/access?contribId=476&sessionId=10&resId=1&materialId=paper&confId=0>

Summary

Primary author: PEZZAGLIA, Larry (LBNL)

Presenter: PEZZAGLIA, Larry (LBNL)

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 51

Type: **not specified**

Helix Nebula

Friday, 27 April 2012 10:00 (30 minutes)

In Europe the EIROForum are the 8 international organizations pursuing fundamental research in science and space exploration. In this context, CERN and several of the other organizations, including ESA and EMBL are forming a collaboration to engage with European industry in public-private partnerships to build a European Cloud infrastructure capable of supporting the missions of these organizations. As well as addressing the purely technical aspects, the collaboration will focus on issues of policy and privacy, particularly in the area of data. The goals of the work are to understand cost and service models, and to understand how the needs of the science organizations can be fulfilled by commercial compute and storage providers. This talk will discuss the complementary large scale flagship projects proposed by CERN, ESA, and EMBL, and how they will address the open questions that may eventually enable science to make large scale use of such commercial facilities.

Summary

Primary author: JONES, Bob (CERN)

Presenter: CASS, Tony (CERN)

Session Classification: Grid & Cloud

Track Classification: Grid, cloud and virtualization

Contribution ID: 52

Type: **not specified**

The IPv6 reality check: what we learned so far on the IPv6 distributed testbed.

Thursday, 26 April 2012 14:50 (20 minutes)

The outcome of the first, extremely basic application tests that were performed on the dual-stack testbed that was set up by the HEPix IPv6 group is reported. Running sustained file transfers and deploying the File Transfer Service (FTS) over a mesh of 'gridftp' servers provided enough real-life issues for a first reality check.

Summary

Primary author: PRELZ, Francesco (Sezione di Milano)

Co-authors: Dr PFEIFFER, Andreas (CERN); HOEFT, Bruno (Unknown); Dr KELSEY, David (Particle Physics); MARTELLI, Edoardo (CERN); WADENSTEIN, Erik Mattias (Unknown); OHRENBORG, Kars (DESY); ULJEE, Luuk (SARA); Dr REALE, Mario (GARR); MITCHELL, Mark (University of Glasgow); Mr DEMAR, Philip (FERMILAB); VOICU, Ramiro (California Institute of Technology (US)); SALIH, Sabah (University of Manchester (GB)); ROZSA, Sandor (California Institute of Technology (US)); LANOUAR, Soumaya; FINNERN, Thomas (DESY); Dr WILDISH, Tony (Princeton University (US))

Presenter: PRELZ, Francesco (Sezione di Milano)

Session Classification: Security & Networking

Track Classification: Security & Networking

Contribution ID: 53

Type: **not specified**

PSI Site Report

Tuesday, 24 April 2012 10:00 (10 minutes)

Developments at PSI over the last year, among them: introduction of 10GbE for fast detectors, introduction of AFS Object storage, GPFS + CTDB update

Summary

Primary author: Dr FEICHTINGER, Derek (PSI)

Presenter: Dr FEICHTINGER, Derek (PSI)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 54

Type: **not specified**

Computer rooms and air conditioning experiences at a Tier-2

Thursday, 26 April 2012 11:40 (30 minutes)

To be filled by Peter

Summary

Primary author: GRONBECH, Peter (Particle Physics)

Presenter: GRONBECH, Peter (Particle Physics)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 55

Type: **not specified**

Oxford and SouthGrid site report

Monday, 23 April 2012 12:00 (10 minutes)

To be filled by Peter

Summary

Primary author: GRONBECH, Peter (Particle Physics)

Presenter: GRONBECH, Peter (Particle Physics)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 56

Type: **not specified**

BEIJING-LCG2 Site Report

Tuesday, 24 April 2012 09:05 (10 minutes)

The current status of BEIJING-LCG2 Site Report

Summary

Primary author: SHI, Jingyan (IHEP)

Co-author: FAZHI, Qi (I)

Presenter: SHI, Jingyan (IHEP)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 57

Type: **not specified**

ASGC site report

Monday, 23 April 2012 12:10 (10 minutes)

ASGC site report

Summary

Primary author: Ms CHIEN, Jinny (ASGC)

Presenter: Ms CHIEN, Jinny (ASGC)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 58

Type: **not specified**

BOF Grid Engine

Tuesday, 24 April 2012 17:05 (1h 30m)

This is a first face to face meeting after the initiative from CC-IN2P3 to start a collaboration around Grid Engine, with Scientific Sites using it.

In order to prepare the meeting and to discuss some concrete matter, a list of wanted functions of GridEngine requested to Oracle by CC-IN2P3 is given in a provisory wiki: <https://forge.in2p3.fr/projects/gess/wiki#Lack-of-functionalities> with also a list of interested sites and their configuration.

Then, we would like to suggest the following agenda:

- Self introduction of participants, with an emphasis on expectations
- Collection of proposals for activities of the group, assessment
- Discussion of the requirements list just mentioned;
- Organisational topics:
- AOB (hopefully a lot...)

This is only a suggestion open for discussion on the list or even at HEPiX before the beginning of the meeting itself.

Summary

First face to face meeting after the initiative from CC-IN2P3 to start a collaboration around Grid Engine

Primary author: OLIVERO, philippe (CC-IN2P3)

Presenter: OLIVERO, philippe (CC-IN2P3)

Session Classification: BOF

Track Classification: Miscellaneous

Contribution ID: **60**

Type: **not specified**

Prague site report

Monday, 23 April 2012 09:30 (15 minutes)

A typical site report about the HEP computing activities at Institute of Physics in Prague will be extended by information about local users experience and participating institutions.

Summary

Primary author: CHUDOBA, Jiri (Institute of Physics)

Presenter: CHUDOBA, Jiri (Institute of Physics)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: **61**

Type: **not specified**

DESY site report

Tuesday, 24 April 2012 09:45 (15 minutes)

DESY site report

Summary

Primary author: KEMP, Yves (Deutsches Elektronen-Synchrotron)

Presenter: KEMP, Yves (Deutsches Elektronen-Synchrotron)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 62

Type: **not specified**

BNL RACF Site Report

Tuesday, 24 April 2012 09:25 (10 minutes)

A summary of developments at BNL's RACF since the last HEPiX meeting.

Summary

Primary author: Dr RIND, Ofer (BROOKHAVEN NATIONAL LABORATORY)

Presenter: Dr RIND, Ofer (BROOKHAVEN NATIONAL LABORATORY)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: **64**

Type: **not specified**

SLAC Site Report - Spring 2012 HEPiX

Monday, 23 April 2012 12:20 (10 minutes)

Spring 2012 HEPiX Site Report for the SLAC National Accelerator Laboratory

Summary

Primary author: MELEN, Randy

Presenter: MELEN, Randy

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 65

Type: **not specified**

Why SAS NL?

Thursday, 26 April 2012 08:55 (30 minutes)

Presentation WD.

Summary

Primary author: SANFORD, David (Western Digital)

Presenter: SANFORD, David (Western Digital)

Session Classification: Vendor Presentations

Track Classification: Vendor Presentations

Contribution ID: 66

Type: **not specified**

Scientific Linux Status April 2012

Wednesday, 25 April 2012 16:30 (30 minutes)

Current status of Scientific Linux.

Summary

Current status of Scientific Linux.

Primary author: SIEH, connie (Fermilab)

Co-author: Mr RIEHECKY, Patrick (Fermilab)

Presenter: SIEH, connie (Fermilab)

Session Classification: IT Infrastructure

Track Classification: IT Infrastructure and Services

Contribution ID: 67

Type: **not specified**

AGLT2 Site Report

Monday, 23 April 2012 10:20 (10 minutes)

We will report on the ATLAS Great Lakes Tier-2 which is co-located at Michigan State University and the University of Michigan. We will describe some of our recent efforts at providing service resiliency and “business continuity” even if one of our two sites were offline for an extended period.

Summary

AGLT2 site report focusing on business continuity and service resiliency

Primary author: MC KEE, Shawn (High Energy Physics)

Co-authors: Mr MEEKHOF, Ben (University of Michigan); LAURENS, Philippe Alain Luc (Michigan State University (US)); BROCK, Raymond (Michigan State University (US)); BALL, Robert (University of Michigan (US)); ROCKWELL, Thomas (Michigan State University-Unknown-Unknown)

Presenter: MC KEE, Shawn (High Energy Physics)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: **68**

Type: **not specified**

Diamond Light Source site report

Tuesday, 24 April 2012 09:35 (10 minutes)

update on last years projects & developments

Summary

Primary author: FRIEDRICH, Tina (Diamond Light Source Ltd)

Presenter: FRIEDRICH, Tina (Diamond Light Source Ltd)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: **69**

Type: **not specified**

GridKa Site Report

Tuesday, 24 April 2012 09:15 (10 minutes)

Current status and latest news at GridKa, e.g.: - Hardware status - Storage systems - Middleware deployment

Summary

Primary author: NILSEN, Dmitry

Presenter: NILSEN, Dmitry

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: 70

Type: **not specified**

Gridengine Upgrade at DESY

Wednesday, 25 April 2012 10:05 (25 minutes)

DESY IT supports a number of Batch systems for various scientific groups. As these gain more and more importance we investigated the open source versions of Gridengine to profit from freely available updates and features to be prepared for the challenges to come. We report about our experience during testing, migration and early production phase and will give an outlook on future plans with the Son of Grid Engine for different DESY resources.

Summary

Primary author: FIX, Pirmin (DESY)

Co-author: FINNERN, Thomas (DESY)

Presenter: FIX, Pirmin (DESY)

Session Classification: Computing

Track Classification: Computing & Batch Services

Contribution ID: 71

Type: **not specified**

Discussion

Thursday, 26 April 2012 09:25 (15 minutes)

Summary

Session Classification: Vendor Presentations

Contribution ID: 73

Type: **not specified**

Building the Czech national storage facility

Tuesday, 24 April 2012 15:15 (20 minutes)

CESNET, the Czech national research and education network provider, does not only provide plain network connectivity. CESNET coordinates and builds e-infrastructure services nowadays. Among them, national storage facility is being put into operation. The aim of the project is to provide more than 15PB of storage in three geographically distributed data centers for research and science community. Storage center in Pilsen with a starting set of access protocols now begins to operate. We present challenges, design choices, future plans as well as consequences for HEP community in the Czech Republic.

Summary

Primary author: HORKEY, Jiri (Institute of Physics)

Presenter: HORKEY, Jiri (Institute of Physics)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: 74

Type: **not specified**

Hardware evaluation 2012

Wednesday, 25 April 2012 09:30 (15 minutes)

We have performed several evaluation of new hardware during the last year ranging from the new generation of worker nodes to testing of a deduplication solution. In the talk, we present results from testing of deduplication technology from Fujitsu using synthetic data as well as real life backup and HEP experiment data. It is a common worry that the disk performance can hardly scale with increasing number of cores in the worker nodes. We show the disk performance scaling evaluation using a C6145 Dell server equipped with 64 cores with up to 10 disk drives. We also show HEP-SPEC and performance/watt numbers for new Intel Sandy Bridge processors.

Summary

Primary author: HORKY, Jiri (Institute of Physics)

Co-authors: SVEC, Jan (Acad. of Sciences of the Czech Rep. (CZ)); ELIAS, Marek (FZU ASCR); KOUBA, Tomas (Acad. of Sciences of the Czech Rep. (CZ))

Presenter: HORKY, Jiri (Institute of Physics)

Session Classification: Computing

Track Classification: Computing & Batch Services

Contribution ID: 75

Type: **not specified**

Welcome by prof. Jan Ridky, director of the Institute of Physics AS CR

Monday, 23 April 2012 09:00 (7 minutes)

Summary

Presenter: Prof. RIDKY, Jan (Institute of Physics AS CR)

Session Classification: Welcome

Contribution ID: 76

Type: **not specified**

Logistics

Monday, 23 April 2012 09:15 (15 minutes)

Workshop logistics

Summary

Presenter: HORKY, Jiri (Acad. of Sciences of the Czech Rep. (CZ))

Session Classification: Welcome

Contribution ID: 78

Type: **not specified**

Welcome by prof. Rupert Leitner, chairman of the Committee for Collaboration of the Czech Republic with CERN

Monday, 23 April 2012 09:07 (7 minutes)

Summary

Presenter: LEITNER, Rupert (Inst. of Particle and Nuclear Phys.)

Session Classification: Welcome

Contribution ID: 79

Type: **not specified**

JLAB Site Report

Tuesday, 24 April 2012 10:20 (10 minutes)

JLAB site update

Summary

Primary author: PHILPOTT, Sandy (JLAB)

Presenter: PHILPOTT, Sandy (JLAB)

Session Classification: Site Reports

Track Classification: Site Reports

Contribution ID: **80**

Type: **not specified**

Update on CASTOR tape services

Tuesday, 24 April 2012 14:25 (10 minutes)

News from tape services for CASTOR at CERN

Summary

Primary author: IRIBARREN, Alex (CERN)

Presenter: IRIBARREN, Alex (CERN)

Session Classification: Storage

Track Classification: Storage & Filesystems

Contribution ID: **81**

Type: **not specified**

Wrap-Up

Friday, 27 April 2012 12:00 (20 minutes)

Summary

Presenter: JOUVIN, Michel (Universite de Paris-Sud 11 (FR))

Session Classification: Wrap-Up