

# EUROPEAN MIDDLEWARE INITIATIVE

## DNA2.2.3 - TRAINING PLAN

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#### **Abstract:**

This document presents the EMI training plan including the types of training, the training targets, the organization of training events, and the expected collaboration with other projects.

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## IV. DOCUMENT AMENDMENT PROCEDURE

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When the document is modified for any reason, its version number shall be incremented accordingly. The document version number shall follow the standard EMI conventions for document versioning. The document shall be maintained in the CERN CDS repository and be made accessible through the OpenAIRE portal.

## V. GLOSSARY

Acronym	Long Name
CDS	CERN Document Server
CERN	European Organisation for Nuclear Research
EGI	European Grid Infrastructure
EGI-CF	EGI Community Forum
EGI-TF	EGI Technical Forum
EMI	European Middleware Initiative
EMI-1	EMI Middleware release version 1
EMI-2	EMI Middleware release version 2
EMI-3	EMI Middleware release version 3
NA2	Networking Activity 2: Outreach and Collaborations
NGI	National Grid Initiative
OGF	Open Grid Forum
PEB	Project Executive Board
QA	Quality Assurance
SA2	Service Activity 2: Quality Assurance
VRC	Virtual Research Community (within EGI)
DCISS	Distributed Computing Infrastructures Summer School

The complete EMI glossary is available at <https://twiki.cern.ch/twiki/bin/view/EMI/EmiGlossary> .

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## 1. INTRODUCTION

### 1.1. EXECUTIVE SUMMARY

The Technical Knowledge Management task within NA2 is responsible for training activities within the project. During this period NA2 has conducted a range of training-related activities in line with the previous training plan DNA2.2.2. Two online in-reach training sessions were held in December 2011 and February 2012. These focussed on skills and knowledge required for the then up-coming EMI-2 release.

User-focussed training was conducted at the EMI Technical Conference in March 2012, as well as at the GridKa School (August 2012) and the EGI Technical Forum (September 2012). These training events focussed mainly on the new products and features introduced by EMI-2, as well as the upgrade paths from older non-EMI versions of the software products.

The reach of training activities was broadened by introducing a “Train the Trainer” session and training aimed specifically at application developers. Where possible, the training included a hands-on component, but in some cases demonstrations and presentations have been deemed more appropriate.

Participants in training events were surveyed to determine the effectiveness of the training activities. Feedback for the in-reach sessions was very positive with an average rating score of 3.3 out of 4. Feedback for the user training sessions, although still positive, was not as high at 3.68 out of 6. The comments suggest that the lower rating was due to the lack of a hands-on component to the training. This was due to time constraints on the session and the fact that the features being introduced were part of the then up-coming EMI-2 Matterhorn release.

The EMI documentation was updated with the release of EMI-2 and a documentation review was conducted to ensure that the new documentation complied with the minimum documentation requirements as specified in the EMI documentation Policy. These documents were then uploaded into the EMI online documentation library with over 200 new entries being added. In addition the documentation library web portlet was significantly enhanced and a management portlet was added to facilitate inserts and updates.

The existing online tutorials have also been updated and a number of new tutorials are almost completed. The collaboration with the FutureGrid project has allowed EMI to provide a user tutorial specifically aimed at remote self-paced learners along with a training infrastructure which they can use to perform the hands-on components of the tutorial. One tutorial is now available via the FutureGrid portal, and a number of others are in development.

Several video tutorials are now also available on the EMI website based on webcasts of either face-to-face or online training events.

Training collaborations have continued with the European Grid Infrastructure, facilitating knowledge transfer via the EGI Training Marketplace, and receiving specific training inputs from EGI. In the meanwhile EMI has continued to support the GridKa school and begun a new collaboration with FutureGrid.

An entirely new training infrastructure based on FutureGrid resources is now available for use by remote learners, and possibly also in face-to-face courses.

The activities to date have been very successful with all of the Year 2 metrics being met or exceeded. Year 3 metrics are only partial to-date, but considering past years' trend, it is reasonable to think that most of these metrics will also be met.

In DNA2.2.2 it was suggested that it might be possible to conduct a small-scale follow-up survey of trained users to determine the longer-term impact and effectiveness of EMI training activities. This was proposed to occur in advance of a full-scale survey. This proved infeasible, although the large-scale follow-up survey is planned to go ahead before the end of the project.

The coverage of the training has been increased during this period, with more products being addressed, and the addition of application developer training.

In terms of future plans, work to produce a number of new online tutorials is well under way with these expected to go live in November 2012. Additional in-reach training events are expected to be held before the release of EMI-3. Face-to-face training events will be held at several upcoming events, and where possible, these will also be streamed as webcasts and recorded to create video tutorials. Some of the possible events where EMI would like to hold training fall beyond the end of the project, but these will also be considered if the logistical issues can be addressed.

The collaborations with EGI will and FutureGrid will continue, and the EMI Training Infrastructure on FutureGrid will be expanded with a dCache tutorial and virtual appliance in development, and another planned for ARC.

A list of specific planned activities is given in Table 5.

## 1.2. PURPOSE AND SCOPE

This document presents the second year update on the training activities for the European Middleware Initiative with respect to the previous Training Plans DNA2.2.1 (M6) [R1] and DNA2.2.2 (M18) [R2] and includes an updated plan for the remainder of the project.

## 1.3. DOCUMENT ORGANIZATION

This document is organized as follows:

**Chapter 1 Introduction:** this chapter includes the executive summary, purpose, scope and organization of the document.

**Chapter 2 Training Strategy:** this chapter describes the overall strategy of the EMI training activities.

**Chapter 3 Status Report on Training Plan:** this chapter outlines the progress over the last year in line with the plans set out in the previous training plan DNA2.2.2.

**Chapter 4 Measuring Success and Metrics:** this chapter discusses the outcome of the training activities and measures progress against the stated metrics. It also looks at the breadth of coverage of the training activities in terms of the EMI products covered.

**Chapter 5 Future Plans:** this chapter outlines plans for further training activities up to and beyond the life-time of the project.

**Chapter 6 Conclusions:** a brief description of the outcome, consequences or further work to be done beyond the work described in the document.

**Chapter 7 References:** articles, books, papers and other materials cited in this document.





## 2. TRAINING STRATEGY

The Technical Knowledge Management task within NA2 is responsible for coordinating a comprehensive training program organized in three main levels:

- training and knowledge transfer activities within the EMI project itself or “in-reach”
- user training on EMI technologies for a wider audience
- on-line training courses and self-paced training activities

The training strategy was laid out in the previous deliverables DNA2.2.1 [R1] and DNA2.2.2 [R2]. It has taken a three-pronged approach in line with the three levels identified above.

The EMI project aims to coordinate and integrate several different middleware products to produce a unified European middleware distribution. Thus in-reach training aims to ensure that all members of the project have at least a basic understanding of the software of the other product teams, and also that they are fully familiar with project-wide policies and procedures.

User training focuses on training the end-users of the software, including the various user groups identified in the previous deliverables DNA2.2.1 and DNA2.2.3. The EMI project does not have a large effort available for training activities, however, and the training strategy, as identified in the previous deliverables, has focused on using the expertise of members of all work packages. NA2 has played a coordinating role, by identifying suitable training topics and arranging logistics for training sessions. Members of the product teams have been asked to deliver the actual training. While this has been quite successful in most cases, it has on occasion been difficult to engage the product teams in training activities. Members of NA2 have thus, where necessary, delivered the training itself rather than simply facilitate it.

Another essential component of the training strategy was the production of training materials. This task involves both ensuring ease of access to the technical documentation produced by the product teams, and also producing online tutorials and courses based on this documentation and the materials from training events, which can be used by self-paced learners.

NA2 also pursues collaborations with other projects and leverages the training resources of projects such as EGI (and through them the National Grid Infrastructure (NGI) of each partner country), Schools of Computing, User Communities and others to run training on the EMI middleware. To facilitate this, NA2 publishes its training materials to public repositories and collaborating partner sites, and the project encourages other projects to make use of these.

### 2.1. USERS

User training for EMI needs to consider two main categories of users

- End users – researchers and members of the scientific communities who will use resources running the EMI middleware to do their jobs
- Technical users – technical experts within the user communities, site managers and system administrators who manage infrastructures running EMI software, and application developers writing software which relies on EMI middleware components

The main focus is on this second category of users. This decision has been taken due to practical constraints (it is simply impossible for EMI to undertake to train all user communities due to the limited training resources available) and because it is the application developers, system administrators and site managers who are seen as the main customers of EMI, due to its nature as a middleware provider for distributed computing infrastructure.

The wider user community is reached through the project's collaborations with other partners. For example EGI has a role in coordinating training across the NGIs, collecting training needs. EGI has developed a programme of accredited Virtual Research Communities (VRCs) who are the scientific communities using the EGI infrastructure, and EMI works with EGI, for example, in developing an EMI training schedule for EGI events, to ensure that the training which is provided meets the needs of EMI, EGI and their user communities.

## 2.2. GOALS

The main goal of EMI training activities is to enlarge the base of expert developers and engineers knowledgeable in EMI technologies through comprehensive training programs and materials. It is translated to the following tangible objectives:

1. Produce training materials and resources for the EMI product suite based on the documentation produced by the product teams, at the same time changing the granularity of training from “middleware training” to “product training”
2. Facilitate knowledge transfer within the EMI project by coordinating in-reach events and producing in-reach training materials
3. Run a limited number of user-training events, focused mainly on communicating changes in the middleware to the application developer, system administrator and site manager communities
4. Disseminate EMI training materials to trainers within the user communities such as EGI and the VRCs, and collaborate with external projects to have the EMI products included in their training activities

These objectives have been pursued during this period, with advances in relation to the first objective in particular as the EMI product suite has matured.

### 3. STATUS REPORT ON TRAINING PLAN

#### 3.1. IN-REACH TRAINING

One of the objectives of the Technical Knowledge Management task of NA2 is to facilitate knowledge transfer within the EMI project by coordinating what are called “in-reach” events. These are training events aimed at members of the project which aim to introduce developers to the products of other product teams and also to ensure that all members are familiar with the project-wide policies, procedures, tools and technologies that they need in order to perform their work.

During this period two further in-reach training sessions were held, building on the successful sessions held during the previous period.

##### 3.1.1 Third In-reach Training Session

The third in-reach training session was held on Friday 2<sup>nd</sup> December 2011. It introduced the Debian packaging policies and tools as Debian was to become a supported platform with the release of EMI-2.

The session was held online via Adobe Connect and the recording of the training is available at [R3]. It was well attended and received positive feedback from the participants.

##### 3.1.2 Fourth In-reach Training Session

The fourth in-reach training session was held on Friday 17<sup>th</sup> February 2012. This course covered changes and updates to the EMI release policies in preparation for the release of EMI-2.

Also this session was held online via Adobe Connect, and its recording of the training is available at [R4]. It was well attended and received positive feedback from the participants.

#### 3.2. RESOURCE ADMINISTRATOR, APPLICATION DEVELOPER AND END-USER TRAINING

User training is another objective of the Technical Knowledge Management task. As indicated in Section 2, the EMI training strategy recognises that the project does not have the resources to run a large volume of user training. Rather, NA2 has aimed to run a small number of courses at key community events which focus on introducing new technologies and features in the EMI product suite. To this end, training during this reporting period has included newly introduced EMI products as well as upgrade paths from older non-EMI versions of the software products.

##### 3.2.1 EGI Community Forum / EMI Technical Conference 2012

Two training sessions were organised during the EGI Community Forum / EMI Technical Conference in March 2012.

The first session introduced some of the important new features of the then upcoming EMI 2 release. The session began with WNoDeS, a product being released for the first time within an EMI release. This contribution provided an overview of the product and a demonstration of its basic functionalities. The session continued with the presentation of DPM's new NFS and HTTP interfaces, followed by the demonstration of new data staging features in the ARC CE, and a taste of EMI-ES, featuring submission, with the very same set of commands, to UNICORE and CREAM CE. In conclusion, the L&B product team leader introduced the audience to the most interesting innovations in the next LB

release, notably the new mechanism to control L&B's broadcasting of information over the messaging infrastructure.

The second session was aimed at application developers creating e-Science or Grid-enabled applications. It introduced some of the APIs supported by EMI products. The ARGUS team demonstrated techniques for the interaction, via API, with the ARGUS authorization service. In the second part of the session, the NGI-CH gave an overview of how High Throughput solutions can be developed using ARC.

These sessions were in the form of presentations and demonstrations of new features with no hands-on component. The reason for this was due partially to time constraints on the session as 180 minutes were initially requested, but the session was scheduled as a 90 minute session. A more important reason, however, was that the sessions largely introduced new features of EMI-2 Matterhorn which at this time had not been formally released.

### 3.2.2 GridKa School 2012

The GridKa School [R5], hosted by the Steinbuch Centre for Computing (SCC) of Karlsruhe Institute of Technology (KIT), was held this year from 27<sup>th</sup> to 31<sup>st</sup> August. As in 2010 and 2011, EMI was asked to contribute to the school.

EMI topics covered in the 2012 school included gLite, ARC and dCache. EMI provided a speaker for the gLite tutorial. This session was attended by 11 participants. As the course was not run directly by EMI it was not possible to collect participant feedback using the normal feedback form, however the GridKa School organisers collected their own feedback, and the EMI session received a score of 7.54 out of 10 for Quality, and 7.9 out of 10 for Relevance. This score is slightly lower than that received in the 2011 school, with one outlier who gave a low evaluation bringing the overall scores down. All other participants rated both aspects of the tutorial at 6 or higher.

### 3.2.3 EGI Technical Forum 2012

At the EGI Technical Forum which took place from 17<sup>th</sup> to 21<sup>st</sup> September 2012, EMI arranged a whole day of tutorial sessions, agreeing the schedule with EGI, who had surveyed NGIs asking which topic could have been of interest.

The tutorials were aimed at system administrators and mainly covered the installation and configuration of various EMI services. The sessions involved theory and a demonstration, which could also be followed as a hands-on exercise by the participants, although participants outnumbered the virtual machine available, and thus not everyone was able to join the hands on part

The topics covered were as follows:

- Configuring EMI services through YAIM
- Site BDII installation and configuration
- CREAM installation, configuration and troubleshooting
- WMS installation and configuration
- DPM migration from gLite 3.2 to EMI
- An introduction to EMIR

The configuration practical demonstrations/hands-on highlighted best practices and most common mistakes in installing and configuring various EMI services.

The session was also delivered as a webcast with remote learners who were unable to attend the conference still able to participate in the training sessions. The webcasts were recorded and are also available for later online viewing.

The sessions were attended by approximately 30 to 40 participants, including those following the tutorials online.

#### **3.2.4 Online User Training with EGI**

As indicated in Section 3.2.3, EMI has been active in collaborating with EGI to provide training at their events and to collect training requirements. One stand-alone online training session was also delivered jointly by EMI and EGI. This was a training course on “VOMS Recent Developments” [R16] which was delivered via Adobe Connect on 13<sup>th</sup> July 2012.

The session gave an overview of the VOMS service configuration and operation and then introduced new features. At the end of the training there was a very active Q&A session using the chat feature of Adobe Connect.

In total there were 48 participants in the session which lasted two hours. The session was also recorded and the webcast is available [R17].

### **3.3. SUMMARY OF FEEDBACK RESULTS**

This section presents summarised feedback scores for each of the training events held within this reporting period. The full feedback results are presented in the Annex to this document (Section 8).

### 3.3.1 In-reach training

Training Session	Event	Location	Date	Feedback rating
Debian packaging and tools	Third in-reach training event	On-line	2 <sup>nd</sup> December 2011	3.44
Updated policies	Fourth in-reach training event	On-line	17 <sup>th</sup> February 2012	3.17
<b>Overall Average Feedback Score</b>				3.3

Table 1: In-reach Training Average Feedback Scores

The above ratings were computed by taking the average of user responses on a four-point scale as follows:

1. Poor
2. Fair
3. Good
4. Excellent

### 3.3.2 User Training

Training Session	Event	Location	Date	Feedback rating
Site Administrator & Train the Trainer Workshop	EGI Community Forum / EMI Technical Forum	Munich, Germany	29 <sup>th</sup> March 2012	2.84
Application Development with EMI	EGI Community Forum / EMI Technical Forum	Munich, Germany	29 <sup>th</sup> March 2012	4.27
EMI 2 Matterhorn - tutorial for system administrators	EMI Technical Forum	Prague, Czech Republic	19 <sup>th</sup> September 2012	3.94
<b>Overall Average Feedback Score</b>				3.68

Table 2: User Training Average Feedback Scores

The above scores were computed by taking the average of user responses on a six-point scale as follows:

1. Poor
2. Fair
3. Average
4. Good
5. Very good
6. Excellent

### 3.3.3 Discussion

As the ratings for the in-reach and user training use different scales, to compare it is necessary to convert the final feedback score for the in-reach sessions. When this is done we find that it is the equivalent of a score of 4.95 on a six point scale.

The figure for in-reach training for this period is higher than that for user training. The comments left on the feedback form suggest that users felt that there was not enough hands-on in many of the user courses and this explains the slightly lower than expected ratings. The training held at the EMI Technical Conference was mainly to give an overview of new features in EMI-2 and thus it was a presentation/demo-style training without practical hands-on. At the EGI Technical Conference there were only a limited number of virtual machines available to users with credentials distributed at the start of the session, and there was no provision for remote participants to get access to one of these virtual machines. Thus not all participants were able to join the hands-on exercises.

## 3.4. ONLINE DOCUMENTATION AND TRAINING MATERIALS

The first goal of the Technical Knowledge Management function within NA2 is to produce training materials and resources for the EMI product suite. This section will describe the efforts in this area during this reporting period.

### 3.4.1 Documentation

For the release of EMI-2 a thorough review of the documentation throughout the project was undertaken. The documentation review is carried out jointly by NA2 and SA2. It reviews documentation produced by the product teams to ensure that it complies with the minimum documentation requirements as specified in the EMI documentation Policy [R6].

Once reviewed and accepted, the documentation is entered into the online documentation library, which consists of a LifeRay portlet with a database back-end which allows searching the documentation library by component name, version, intended audience, document type, etc.

Over 200 new entries were made in the documentation library to point to the updated documentation for the products of the EMI-2 release. These typically included a functional description, software specification documents, guides for system administrators, users and application developers, troubleshooting guides, etc.

A new version of the documentation library LifeRay portlet was developed by NA2 which introduced the ability to insert and edit documents, as well as enhanced search functionality.

### 3.4.2 Online Tutorials

EMI aims to produce online tutorials suitable self-paced learners covering a range of topics, from introductory end-user tutorials to more complicated installation and configuration.

#### EMI website

The existing EMI user tutorial has been updated with an expanded “Installation and Preparation” section which covers installation of a UI machine and makes it easier for learners to follow the tutorials on their own.

A tutorial on installation of EMI components aimed at resource administrators has been in development and the first two parts have been made available on the EMI website. The first covers the basic process and prerequisites for installing EMI components, such as preparing the node, configuring software repositories, etc. The second covers the process of installing the Certification Authority (CA) certificates, host and user certificates, and the VOMS service which is required by many other EMI components.

Further parts of this series of tutorials will focus on installing and configuring individual EMI services and components. A number of these are in development and they are due to go live in November 2012. The next tutorial expected to be made available will cover the installation and configuration of CREAM.

#### FutureGrid

EMI has pursued a collaboration with the US FutureGrid project for an EMI testbed running on the FutureGrid infrastructure. More details of this collaboration are given in Section 3.5.3.

The FutureGrid Portal is a website which gathers information about how to use the FutureGrid infrastructure and services such as the EMI software which are hosted on it. EMI has contributed one tutorial so far to the FutureGrid Portal, on the use of UNICORE on FutureGrid. Additional tutorials will be uploaded as new EMI services are deployed on the infrastructure.

These tutorials are also hosted on the EMI website in order to ensure maximum impact.

### 3.4.3 Remote Tutorials

Various webcasts of EMI training have been created using Adobe Connect. These have allowed online training sessions to be run, such as those arranged for the in-reach training sessions. Recording and streaming face-to-face training events also allows remote learners to participate in these trainings even if they cannot attend the event in person. This was done for the trainings at the EGI Technical Forum 2012.

To date, six webcasts of end-user training sessions have been made and these are available on the EMI website [R7].

## 3.5. TRAINING COLLABORATIONS

Collaborating on training activities with a view to disseminating the training events and materials of the EMI project and increasing the reach and impact of NA2's activities is the final goal of the Technical Knowledge Management task.



### 3.5.1 European Grid Infrastructure

EGI is a partnership between National Grid Initiatives (NGIs) and the coordinating body in Europe, they are thus a major customer of EMI and the contact point for the NGIs. Furthermore, through the EGI accredited Virtual Research Community (VRC) programme, EGI is a contact point for a wide range of end-users in various scientific domains, ESFRI projects, national research projects and other potential end users. As such EGI must be considered as one of the major customers of EMI, and from the outset the projects have tried to coordinate activities to ensure the quality and effectiveness of both projects' training efforts.

In December 2010 EGI set up the Training Working Group [R9] the purpose of which was to develop and monitor a training coordination strategy for the community of actual and potential users of Distributed Computing Infrastructure (DCI) across Europe. EMI was a member of this group from the beginning, along with representatives of several NGIs and other DCI projects.

Despite a promising start, the group became inactive during the lifetime of the EMI project. Instead, the EGI Training Marketplace [R8] is used as a hub for sharing training materials and information. EMI has been very active in providing feedback to the EGI User Community Support Team (UCST) on issues such as the ease of use and functionality of the marketplace. Feedback from EMI has resulted in several changes being made to the interface and search functionality within the Marketplace.

In addition EMI has made considerable use of the EGI Training Marketplace to disseminate information about upcoming training events, and to advertise the training materials and online tutorials created by the project.

Many training sessions have been organised at EGI events, and input from EGI on suitable training topics has been periodically sought. The programme for the EMI training delivered at the EGI Technical Forum 2012 was agreed in advance with EGI based on the training requirements which they had collected from their user communities. Furthermore, a joint online training session on VOMS was held.

The EMI training feedback form was based on those used by EGI (and the previous EGEE projects) with a view to ensuring that information about user requirements and training effectiveness could be compared between the two projects. With the demise of the Training Working Group this sharing has not materialised to the extent that it was previously intended, but the Training Manager is in regular contact with the EGI UCST.

### 3.5.2 GridKa School

EMI has now participated in the GridKa school for three consecutive years. In previous years the project provided speakers on various topics and also helped to review materials. This year a speaker was provided for the gLite installation and configuration training. The EMI branding was also more prominent this year, with both the gLite and ARC tutorials clearly identified in the school agenda as EMI products. This was identified as a necessary step after the 2011 school (see DNA2.2.2) where the various EMI products were presented separately, and it helps to present a more holistic view of a consolidated EMI middleware.

In 2011 EMI participated in the Joint European DCI Summer School (DCISS). It had been hoped that this would be held again in 2012 and that EMI could again participate, however, the organisers chose rather to run a summer school event focused on e-science workflows, which was not a suitable target for EMI training.

### 3.5.3 FutureGrid

EMI has an agreement with the FutureGrid project to use their infrastructure to set up a permanent Testbed of EMI releases for exploration by US partners in order to disseminate the activities happening in Europe. This testbed can also be used more generally by those outside of the US for self-paced training purposes. The collaboration has thus far resulted in one virtual appliance being made available along with a corresponding tutorial suitable for self-paced learners and those new to the EMI middleware. Additional virtual appliances are expected to be made available soon. This is a very important collaboration which can extend the reach of the EMI training activities both to self-paced learners who might otherwise not have an available infrastructure on which to complete the practical parts of the online tutorials, but also to an entirely new geographic region with many more potential users.

## 3.6. TRAINING INFRASTRUCTURES

### 3.6.1 EMI Infrastructures

NA2 hasn't its own testbed, and relied mainly on SA2 large scale integration testbed. However, the SA2 resources this year have been used less than year 1, due to the type of tutorials organized. In the 2nd EMI Technical Conference, the Train the Trainers workshop, as well as the Application Developer tutorial, anticipated services to be released yet. thus not deployed on large scale. For this purposes. one-off installations were performed. The EGI community forum trainings were focused on EMI 2 services installation and configuration. 12 virtual machines were made available from the GILDA training infrastructure [ADD reference], where participants could practice the service installation or configuration performed by the tutors. Unfortunately, the number of participant exceeded the virtual machines available. Normally, this is handled making participants work in pairs (or groups), but with remote participants this was obviously not possible. For the future, a pre-registration of interested participants will allow to handle better these situations.

This flexible infrastructure model, capable to support different training needs with a lightweight effort will be probably followed also in the third year, where the training requirements are not expected to change much.

### 3.6.2 FutureGrid Infrastructure

In July and August 2012 the first EMI products were tested on the FutureGrid infrastructure and a new user tutorial aimed specifically at remote self-paced learners was created and uploaded to the FutureGrid portal. Initially UNICORE is the only product available.

In order to use FutureGrid for EMI training users must obtain a FutureGrid account, and submit their ssh public key to the FutureGrid Portal. This may make using FutureGrid for face-to-face courses difficult, as the FutureGrid accounts and ssh keys take time to be created, approved and uploaded and this would have to be done in advance of the tutorial. While it may be an option for summer schools and other such events where the learners are required to pre-register, it is not likely to be a satisfactory solution for the majority of the EMI training activities.

The FutureGrid infrastructure is ideally suited, however, to remote self-paced learners. The EMI tutorial instructions on the FutureGrid Portal take the learner through all of the steps involved in getting access to FutureGrid, setting up their cloud client, bringing up a UNICORE server in the EMI virtual appliance, installing and configuring their UI machine to use this server, and finally

performing a range of tasks on a UNICORE grid including submitting jobs, monitoring their status, retrieving the results, uploading data files, etc.

Some concerns remain. During initial testing, periodic instability of the FutureGrid NimbusCloud infrastructure caused substantial delays and problems. These issues appear to be with the FutureGrid infrastructure itself, and beyond the control of EMI. Such problems have the potential, however, to impact learner experience and satisfaction or give an unfavourable impression of the EMI products.

## 4. MEASURING SUCCESS AND METRICS

### 4.1. SPECIFIC METRICS

Based on the metrics defined in DNA2.2.1, the project has met most of its targets in the area of training. Some figures are lower than hoped, in particular, the learner feedback score for Year 3 is currently quite low. This figure is, however, partial and it can be expected to change as more training events are run. The project is on target to meet the other metrics for Year 3.

Description of metric	Year 1		Year 2		Year 3	
	Achieved	Target	Achieved <sup>1</sup>	Target	Achieved (so far)	Target
Number of training events organised directly by EMI	5	2	3	2	0	2
Number of training events organised jointly or collaborations in the training events of other projects	1	3	3	3	2	3
Number of in-reach events	2	2	2	1	0	1
Number of people trained on EMI middleware	100 <sup>2</sup>	50	~60-70	50	>50	50
Learner feedback (from 1 to 6)	4.48	>4	4.27	> year 1 score	3.94	> year 2 score

**Table 3: Metrics**

### 4.2. FOLLOW-UP SURVEYS

DNA2.2.2 outlined plans to run a follow-up survey to assess the longer-term impact of EMI training activities. Until that time NA2 had not been collecting contact information for participants. This was done for subsequent training events occurring after the publication of DNA2.2.2. It was hoped that a small subset of attendees from previous events could also be contacted in order to run a small-scale follow-up survey, but the small number of contact details available made such a study unfeasible. The training at the EMI Technical Conference / EGI Community Forum which took place in Munich, Germany in March 2012 were the first training events where contact information was systematically collected. As six months have now passed since this training, NA2 intends to contact these participants in the near future with an invitation to participate in a follow-up survey. A survey form for this purpose is currently in development.

<sup>1</sup> These figures differ from the partial figures reported for Year 2 in DNA2.2.2 as they include all events for the period May 2011 to April 2012, while the DNA2.2.2 only covered up to October 2011

<sup>2</sup> This figure is based on the number of participants in the training sessions, although some did not complete the hands-on exercises

#### 4.3. COVERAGE OF EMI COMPONENTS IN TRAINING

Table 4 below shows the coverage of EMI products by the training delivered thus far in the project. Items which were not covered in previous years but which were covered during the current reporting period are indicated in bold face. Note the addition of training for application developers who had not previously been specifically targeted by any of the training events.

Product	User Training	Resource Administrator Training	Application Developer Training
AMGA	No	No	No
APEL Parsers	No	No	No
APEL Publisher	No	No	No
ARC CE	N/A	Yes	<b>Yes</b>
ARC Clients	Yes	No	<b>Yes</b>
ARC Core	N/A	No	<b>Yes</b>
ARC gridftp server	N/A	No	No
ARC InfoSys	Yes	No	No
ARGUS	N/A	<b>Yes</b>	<b>Yes</b>
ARGUS-EES	No	No	No
BDII core	N/A	No	No
BDII site	N/A	Yes	No
BDII top	N/A	No	No
BLAH	N/A	No	No
CEMon	N/A	Yes	No
CREAM	Yes	Yes	No
CREAM LSF module	N/A	No	No
CREAM TORQUE module	N/A	Yes	No
dCache	Yes	Yes	No

Delegation Java	N/A	No	No
DGAS-sensors	N/A	No	No
DPM	Yes	Yes	No
EMI-ES	<b>Yes</b>	No	No
EMIR	<b>Yes</b>	<b>Yes</b>	No
EMI UI	Yes	No	No
EMI WN	N/A	<b>Yes</b>	No
FTS	N/A	No	No
GFAL/lcg_util	Yes (lcg_util)	No	No
gLExec	N/A	No	No
gLite CLUSTER	N/A	Yes	No
gLite MPI	No	No	No
gLite-gSoap/gss	N/A	No	No
glite-proxyrenewal	N/A	No	No
glite-yaim-core	N/A	Yes	No
GridSite	N/A	No	No
L&B	Yes	<b>Yes</b>	No
LCAS	N/A	No	No
lcg-info-clients	Yes	No	No
LCMAPS	N/A	No	No
LCMAPS-plugins-c-pep	N/A	No	No
LFC	Yes	No	No
RAL-SAGA-SD	No	No	No
StoRM-SE	Yes	Yes	No

TORQUE server config	N/A	Yes	No
TORQUE WN config	N/A	Yes	No
Trustmanager	N/A	No	No
UNICORE Client	Yes	Yes	No
UNICORE Gateway	N/A	Yes	No
UNICORE HILA	N/A	No	No
UNICORE Registry	N/A	No	No
UNICORE Services Environment	N/A	Yes	No
UNICORE TSI	N/A	No	No
UNICORE WS	N/A	No	No
UNICORE XUADB	N/A	No	No
UVOS	N/A	No	No
VOMS	Yes	No	No
VOMS Admin	N/A	No	No
WMS	Yes	<b>Yes</b>	No
WNoDeS	<b>Yes</b>	<b>Yes</b>	No

**Table 4: Training coverage by product**

## 5. FUTURE PLANS

### 5.1. ONLINE DOCUMENTATION AND TRAINING MATERIALS

Additional online training materials are currently being developed and are expected to be available shortly. Specific topics include:

- Configuring EMI services through YAIM
- CREAM installation, configuration and troubleshooting [R12]
- Site BDII installation and configuration [R13]
- WMS installation and configuration [R14]
- DPM migration [R15]

Other topics may be added later.

The documentation library will also be updated with the release of EMI-3 to include the updated documentation provided by the product teams.

### 5.2. IN-REACH TRAINING

At least one further in-reach training will be held in order to prepare project members for the release of EMI-3 and introduce any changes in the release procedures. Other training topics may also be covered, subject to demand.

### 5.3. USER TRAINING

While EMI does not have resources to run a large volume of user training events, NA2 is committed to organising targeted training activities at venues and events which will attract a large number of users.

To date training has been delivered which targets all of the user groups identified by EMI, from end-users interested in learning how to use the EMI products, to resource administrators, application developers and individuals responsible for user training within NGIs or other organisations.

It is planned to continue to offer training along these lines, while also further increasing the impact of this type of training by producing webcasts of face-to-face training events, and creating online courses based on the content delivered during such events.

Planning for the final stages of the project must take into account the fact that many key events will occur after the end of the EMI project. Nonetheless EMI plan to continue to support third-party training events such as the GridKa school.

Training will also be organised at events such as the EMI Technical Conference / EGI Community Forum which will take place in the UK in April 2013. While technically falling outside of the lifetime of the EMI project, it may still be possible to target other conferences such as ISC 2013 or e-science 2013 as at least part of the initial work in submitting tutorial proposals could be completed during the lifetime of the project. Some logistical issues relating to such training events remain to be addressed.



#### 5.4. TRAINING COLLABORATIONS AND DISSEMINATION OF MATERIALS

EMI continues to use the EGI training marketplace in order to announce and publicise training events, disseminate training materials and online courses. A problem was encountered recently, however, with spam comments being added to events listed in the marketplace. This has meant that some items had to be temporarily removed from the marketplace while EGI implements a better mechanism to avoid spam.

In addition to the EGI training marketplace, EMI tutorials are now being published on the FutureGrid portal. This significantly extends the reach of these materials as FutureGrid has an established US user-base. The tutorials will enhance the usability of the EMI training infrastructure being deployed on FutureGrid and will introduce new user communities to the EMI middleware.

#### 5.5. TRAINING INFRASTRUCTURE

EMI is keen to continue to roll out additional services on the FutureGrid infrastructure. NA2 has already created and deployed a dCache 2.2 virtual appliance, and this is currently in testing. Some problems remain before this can be made public, but it is expected that these can be resolved soon.

The next EMI product slated for installation on FutureGrid is ARC. It is hoped that an ARC virtual appliance can be added in the coming months.

#### 5.6. LIST OF SPECIFIC PLANNED ACTIVITIES

Table 3 gives a list of some specific training-related items planned for the near future. As the project is nearing its end, the list is shorter than in previous incarnations of this document, but the potential impact and scope of some of the activities is quite high.

Event/Title	Details	Audience	Location	Date	Status
Online tutorials	Additional online tutorials on installing EMI services available	Resource Administrators	Online	Oct – Nov 2012	In progress
dCache on FutureGrid	A dCache virtual appliance available on the FutureGrid infrastructure	Resource Administrators, End Users and Application Developers	Online	Q4 2012	In progress
ARC on FutureGrid	An ARC virtual appliance available on the FutureGrid infrastructure	Resource Administrators, End Users and Application Developers	Online	Q4 2012	In planning
Tutorials on FutureGrid	Additional EMI tutorials on the FutureGrid portal to cover dCache and FutureGrid	End Users	Online	Q4 2012	In progress
Follow-up survey	A follow-up survey will be conducted by contacting participants in some of the previous training events	Resource Administrators, End Users and Application Developers	Online	Q4 2012	In planning
In-reach training	Probable in-reach training session on updated procedures for EMI-3 release	EMI developers	Online	Jan 2013	In planning
EMI Technical Conference / EGI Community Forum	EMI-3 training at this event	Resource Administrators, End Users and Application Developers	Manchester, UK	April 2013	In planning

**Table 5: Specific Training Activities for the Coming Period**

## 6. CONCLUSIONS

A range of training activities have been organised in this period, in line with the plans laid out in Deliverable DNA2.2.2. Some items identified in DNA2.2.2 have not been addressed, such as the follow-up survey to assess the longer-term impact of the training activities, but this will be investigated before the end of the project.

The coverage of the EMI training events has been broadened during this period, both in terms of the types of user targeted with training for application developers being added, and in terms of the EMI products and components that have been addressed by training.

The documentation and training materials have been extensively updated during this period and work on producing a number of new online courses is well under way.

Although the project is entering its final stages, a number of training events are in planning for the final period and even beyond the lifetime of the project.

## 7. REFERENCES

R1	<a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA221">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA221</a>
R2	<a href="https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA222">https://twiki.cern.ch/twiki/bin/view/EMI/DeliverableDNA222</a>
R3	<a href="http://www.eu-emi.eu/3rd-inreach-deb-packaging-webcast">http://www.eu-emi.eu/3rd-inreach-deb-packaging-webcast</a>
R4	<a href="http://www.eu-emi.eu/emi-2-updated-policy-changes-webcast">http://www.eu-emi.eu/emi-2-updated-policy-changes-webcast</a>
R5	<a href="http://gridka-school.scc.kit.edu/">http://gridka-school.scc.kit.edu/</a>
R6	<a href="https://twiki.cern.ch/twiki/bin/view/EMI/EMISa2DocumentationPolicy">https://twiki.cern.ch/twiki/bin/view/EMI/EMISa2DocumentationPolicy</a>
R7	<a href="http://www.eu-emi.eu/training/webcasts">http://www.eu-emi.eu/training/webcasts</a>
R8	<a href="http://www.egi.eu/services/support/training_marketplace/">http://www.egi.eu/services/support/training_marketplace/</a>
R9	<a href="http://www.egi.eu/services/support/training_marketplace/">http://www.egi.eu/services/support/training_marketplace/</a>
R10	<a href="http://www.eu-emi.eu/training/emi-2-installation">http://www.eu-emi.eu/training/emi-2-installation</a>
R11	<a href="http://www.eu-emi.eu/training/cert-tutorial">http://www.eu-emi.eu/training/cert-tutorial</a>
R12	<a href="http://www.eu-emi.eu/training/cream-tutorial">http://www.eu-emi.eu/training/cream-tutorial</a>
R13	<a href="http://www.eu-emi.eu/training/bdii-tutorial">http://www.eu-emi.eu/training/bdii-tutorial</a>
R14	<a href="http://www.eu-emi.eu/training/wms-tutorial">http://www.eu-emi.eu/training/wms-tutorial</a>
R15	<a href="http://www.eu-emi.eu/training/dpm-tutorial">http://www.eu-emi.eu/training/dpm-tutorial</a>
R16	<a href="https://indico.egi.eu/indico/conferenceDisplay.py?confId=1103">https://indico.egi.eu/indico/conferenceDisplay.py?confId=1103</a>
R17	<a href="http://connect.ct.infn.it/p7dupaewm0g/?launcher=false&amp;fcsContent=true&amp;pbMode=normal">http://connect.ct.infn.it/p7dupaewm0g/?launcher=false&amp;fcsContent=true&amp;pbMode=normal</a>

## 8. ANNEX

### 8.1. EMI TECHNICAL CONFERENCE / EGI COMMUNITY FORUM 2012 FEEDBACK RESULTS

#### EMI Site Administrator & Train the Trainer Workshop

1. Please rate the following aspects of the course

	Poor	Fair	Average	Good	Very Good	Excellent	Response Count
<b>WNoDeS</b>	16.7% (1)	16.7% (1)	0.0% (0)	<b>66.7% (4)</b>	0.0% (0)	0.0% (0)	6
<b>DPM interfaces</b>	0.0% (0)	<b>33.3% (2)</b>	0.0% (0)	<b>33.3% (2)</b>	<b>33.3% (2)</b>	0.0% (0)	6
<b>ARC CE data staging</b>	0.0% (0)	20.0% (1)	20.0% (1)	<b>40.0% (2)</b>	20.0% (1)	0.0% (0)	5
<b>EMI Execution Service</b>	16.7% (1)	<b>33.3% (2)</b>	16.7% (1)	<b>33.3% (2)</b>	0.0% (0)	0.0% (0)	6
<b>Logging &amp; Bookkeeping</b>	0.0% (0)	16.7% (1)	33.3% (2)	<b>50.0% (3)</b>	0.0% (0)	0.0% (0)	6
<b>Overall Evaluation</b>	16.7% (1)	16.7% (1)	16.7% (1)	<b>50.0% (3)</b>	0.0% (0)	0.0% (0)	6
<b>Advertising &amp; Registration</b>	25.0% (1)	25.0% (1)	0.0% (0)	<b>50.0% (2)</b>	0.0% (0)	0.0% (0)	4
<b>Facilities</b>	16.7% (1)	0.0% (0)	<b>50.0% (3)</b>	16.7% (1)	16.7% (1)	0.0% (0)	6

#### Comments

WnoDeS

“technical presentation, not really a training”

DPM Interfaces

“technical presentation, not really a training”

ARC CE Data Staging

“technical presentation, not really a training”

EMI Execution Service

“technical presentation, not really a training”

#### Logging & Bookkeeping

“technical presentation, not really a training”

#### Overall Evaluation

“a real training should be interactive and include hands-on”

“Too little time for every tutorial. No time left for questions. At least twice more time is needed.”

#### Facilities

“Network need to be more stable. Or tested replacement computer must be always available.”

#### What did you most like about this training?

“Getting info on new developments ”

“Introduction to new features ”

“To get information about the latest developments. ”

#### What did you least like about this training?

“nothing ”

“Some topics were less relevant to me. ”

“It was not training at all. It looked more like technical presentations. ”

#### Which of the training subjects were the most useful to you?

“about ARC ”

“DPM ”

“WNODES, DPM, ES ”

#### Which of the training subjects did you find the least useful?

“L&B ”

“ARC ”

#### Is there anything else you would like the training to have covered?

“General planning of actually rolling out EMI-2. I know that this depends on the user community.”

#### Further Comments

“the base knowledge of the participants needs to be taken into account to make the trainings more effective. It would be good if the advertisements state the level of knowledge a participant is expected to have.”

### Application Development with EMI

1. Please rate the following aspects of the course

	Poor	Fair	Average	Good	Very Good	Excellent	Response Count
<b>ARGUS authorization service</b>	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	<b>100.0% (3)</b>	0.0% (0)	3
<b>High Throughput solutions with ARC</b>	0.0% (0)	0.0% (0)	<b>50.0% (1)</b>	0.0% (0)	<b>50.0% (1)</b>	0.0% (0)	2
<b>Overall Evaluation</b>	0.0% (0)	0.0% (0)	0.0% (0)	33.3% (1)	<b>66.7% (2)</b>	0.0% (0)	3
<b>Advertising &amp; Registration</b>	0.0% (0)	<b>33.3% (1)</b>	0.0% (0)	<b>33.3% (1)</b>	<b>33.3% (1)</b>	0.0% (0)	3
<b>Facilities</b>	0.0% (0)	0.0% (0)	<b>33.3% (1)</b>	<b>33.3% (1)</b>	<b>33.3% (1)</b>	0.0% (0)	3

#### Comments

ARGUS Authorisation Service

“Practical, easy to follow”

High-throughput Solutions with ARC

“Useful, but badly organised”

Overall Evaluation

“Average”

Advertising & Registration

“What advertising”

Facilities

“practical, hands on demonstration would be better”

What did you most like about this training?

“it was practical and at a good level ”

“Argus API tutorial ”

What did you least like about this training?

“The ARC presentation was very disjointed ”

“I only followed the Argus API tutorial ”

Which of the training subjects were the most useful to you?

“The ARC presentation should have been. ”

“Argus API tutorial ”

Which of the training subjects did you find the least useful?

“The first one ”

“I only followed the Argus API tutorial ”

Is there anything else you would like the training to have covered?

“Portals and workflow engines ”

## 8.2. EGI TECHNICAL FORUM 2012 LEARNER FEEDBACK RESULTS

### Evaluation of EGI-TF 2012 EMI-2 training

#### Introduction

EMI held a series of training events at the EGI Technical Forum 2012. The schedule, materials and recorded webcasts for the training sessions are available on the Indico page at [https://indico.egi.eu/indico/sessionDisplay.py?sessionId=64&tab=time\\_table&confId=1019#20120919](https://indico.egi.eu/indico/sessionDisplay.py?sessionId=64&tab=time_table&confId=1019#20120919).

The training consisted of face-to-face sessions which were also streamed live using Adobe Connect to enable remote learners to join. The face-to-face sessions were attended by between 20 and 30 people each, while a number of additional participants joined remotely.

Most topics included a hands-on component which was demonstrated by the tutors. A small number of virtual machines were made available for participants to also complete the hands-on part, however there were not enough resources available to allow all participants to complete the exercises.

The following topics were included in the training:



- Configuring EMI services through YAIM
- Site BDII installation and configuration
- CREAM installation, configuration and troubleshooting
- WMS installation and configuration
- DPM migration, from gLite 3.2 to EMI
- An introduction to EMIR

Users were asked to rate the following aspects of the course on a six-point scale from Poor to Excellent.

- Theory
- Hands-on
- Clarity of tutors
- Overall evaluation
- Advertising and Registration
- Facilities

They could also provide an option free text comment on each of the above aspects.

Users were then asked the following questions with answers in the form of free-text comments:

1. What did you most like about this training?
2. What did you least like about this training?
3. Which of the training subjects were the most useful to you?
4. Which of the training subjects did you find the least useful?
5. Is there anything else you would like the training to have covered?
6. Further Comments

### Results

Converting the rating the rating to a numeric scale from 1 to 6, the average satisfaction score is 3.94 out of 6, and the average satisfaction scores for each topic are as shown in Table 4.

Topic	Avg. Satisfaction score
Configuring EMI services through YAIM	3.92
Site BDII installation and configuration	4
CREAM installation, configuration and troubleshooting	4.61
WMS installation and configuration	4.61
DPM migration, from gLite 3.2 to EMI	4.65
An introduction to EMIR	4.70

Table 3: Average Satisfaction Scores per topic

The full rating is given in Table 5 while a graph of the rating responses is in Figure 1. A full list of comments received is included below.

	Poor	Fair	Average	Good	Very Good	Excellent	Response Count
Theory	4.2% (1)	4.2% (1)	20.8% (5)	29.2% (7)	29.2% (7)	12.5% (3)	24
Hands-on	16.7% (4)	12.5% (3)	16.7% (4)	16.7% (4)	20.8% (5)	16.7% (4)	24
Clarity of Tutors	8.3% (2)	4.2% (1)	20.8% (5)	29.2% (7)	25.0% (6)	12.5% (3)	24
Overall Evaluation	0.0% (0)	16.7% (4)	20.8% (5)	25.0% (6)	25.0% (6)	12.5% (3)	24
Advertising & Registration	12.5% (3)	12.5% (3)	20.8% (5)	20.8% (5)	16.7% (4)	16.7% (4)	24
Facilities	0.0% (0)	4.2% (1)	16.7% (4)	29.2% (7)	29.2% (7)	20.8% (5)	24

Table 4: Rating

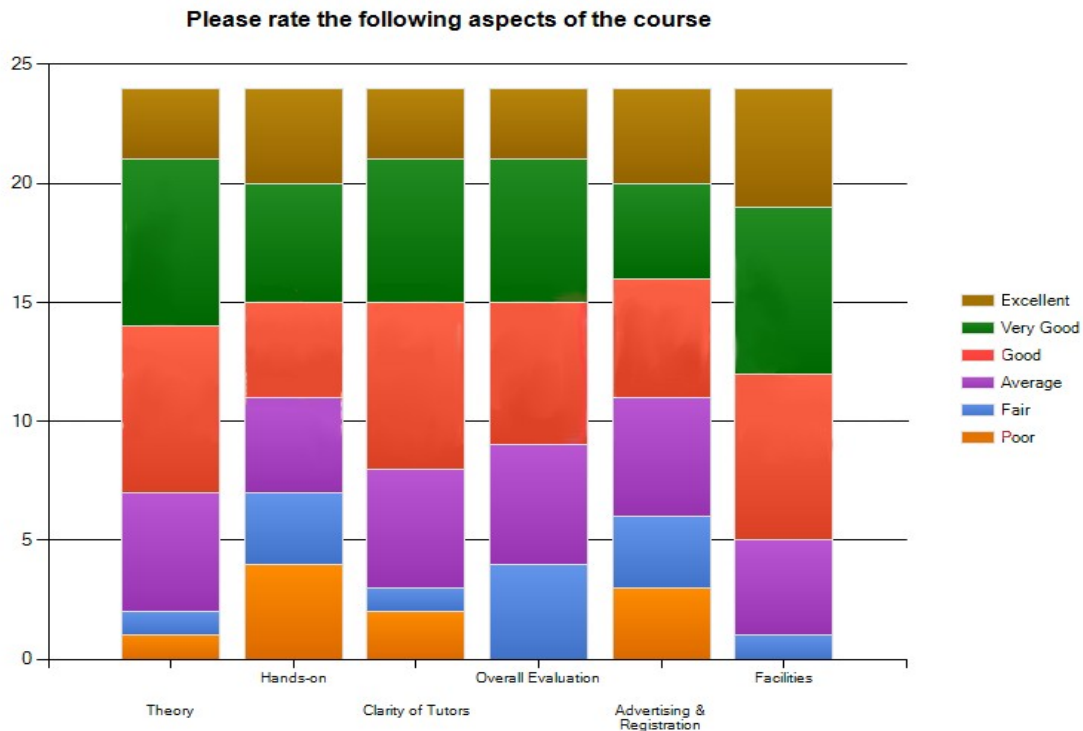


Figure 1: Graph of learner ratings

### Comments from the participants attending the first training session only

#### Theory

- *"It would be nice to have more technical info since I'm not a total beginner"*
- *"Clear."*

#### Hands-on

- *"There was no hands-on..."*
- *"No clear instructions"*
- *"MORE HANDS ON!"*

#### Clarity of Tutors

- *"Adequate"*
- *"not be seated, stand up and do it step by step with feedback from the listeners"*

#### Overall Evaluation

- *"Good"*

#### Advertising & Registration

- *"Was there any?"*

#### Facilities

- *“Regular conference room..”*

What did you most like about this training?

- *“subject”*

What did you least like about this training?

- *“lack of energy from the speaker”*
- *“It was impossible to follow on command line, since the commands were to long.”*
- *“Dont access to slides and training and examples config files”*
- *“Too little time for everything”*

Which of the training subjects were the most useful to you?

- *“yaim variables and structure”*
- *“\_”*

Which of the training subjects did you find the least useful?

- *“installing the packages”*

#### Further Comments

- *“It is very helpful if the slide was updated into the indico before start the tutorials.”*

#### Comments from the participants attending the first and second training sessions

What did you most like about this training?

- *“Combination of slides and command-line demonstrations ”*

What did you least like about this training?

- *“Interruptions to sound in the remote broadcast ”*
- *“Rather slow and monotonous”*

#### Further Comments

- *“Would be better to have VMs pre-configured to save time ”*

#### Comments from the participants attending the second training session only

Hands-on

- *“too quick ”*

What did you most like about this training?

- *“clarity of instructions (slides) ”*

What did you least like about this training?

- *“instructions (slides) should have been accessible via web during the sessions ”*

Which of the training subjects were the most useful to you?

- *“DPM, CREAM ”*

Which of the training subjects did you find the least useful?

- *“WMS, EMIR (simply as I don't run these, or plan to)”*

Further Comments

- *“pace of sessions a bit too fast ”*

### **Comments from the participants attending the third training session only**

What did you most like about this training?

- *“It showed the easy steps to update the DPM.”*

### **Comments from the participants attending all three training sessions**

Hands-on

- *“We should put our hands on, not just tutors ”*

Facilities

- *“The best, smoothest remote tutorial I have attended thus far. ”*

What did you most like about this training?

- *“the “yaim” files available to download ”*
- *“The smoothness and clarity of the presentation. ”*

What did you least like about this training?

- *“Not having the option to see the speaker detracted slightly from the proceedings. ”*

Which of the training subjects were the most useful to you?

- *“whole EMI presentations ”*
- *“CREAM CE ”*
- *“The DPM and CREAM installation subjects. Despite having done these before it had some useful tips. ”*

Which of the training subjects did you find the least useful?

- *“EMIR services ”*
- *“WMS, as hopefully I'll never have to install one! ”*

Is there anything else you would like the training to have covered?

- *“maybe provide the "script" with all commands to downloads? Or slides could cover it too.. ”*

Further Comments

- *“Very useful training, that wasn't detracted from too much by taking it remotely. ”*