

Project no. 015926

6DISS

IPv6 Dissemination and Exploitation

Instrument: SPECIFIC SUPPORT ACTION

Thematic Priority 2

D11: Training the Trainers Manual

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Abstract

This Deliverable describes the supporting material that is available to anyone who will disseminate the 6DISS material via workshops in the targeted regions. It is an essential toolkit for trainers, comprising:

- guidelines regarding the fundamentals of teaching
- guidelines on how to organise a workshop on IPv6
- information on where to find the latest workshop module material
- an instructors' guide to accompany each module, containing:
 - o a list of key messages to impart to the participants
 - o questions, that will determine whether or not the participants have understood the module
- information on how to reserve, access, configure, ... the remote laboratories in Brussels and Paris
- information on the e-learning package
- information about the Tiger Team
- information that should be collected about the region
- information about the feedback questionnaire

(Information on how to use the "hands-on" equipment and the 2 testbeds (in Brussels and Paris) to make practical experiments regarding addressing, routing, dns, httpd, smtp, is documented in the related deliverable D12: IPv6v Technical Training")

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Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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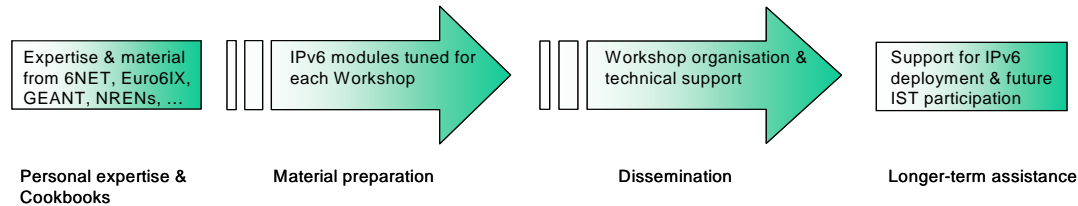
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Introduction

The methodology behind the 6DISS approach to giving support for IPv6 deployment through dissemination and other forms of assistance is shown below:



Dissemination through workshops is one of the major activities in the project, but due to time and budget constraints, 6DISS cannot deliver an unlimited amount of workshops. By providing a “Training the Trainers” facility, 6DISS is able to train other people, who can then support the 6DISS goals by disseminating the information further. Typical situations in which this can be beneficial are when:

- regions wish to take advantage of the 6DISS material, independently from the official workshops.
- people in the targeted regions wish to make some training prior to the workshop
- due to high travel costs or other constraints, it can be more cost-effective for one person to receive the training and then disseminate the information to many others, than for them all to attend the workshop
- due to the success of the workshop, the local¹ organisation itself wishes to run several more in the region

Therefore, whilst also useful for the 6DISS presenters, the information in this document is aimed primarily at non-6DISS persons who are less familiar with the technical content in some (or all) of the IPv6 modules that comprise the set of slides that represent the 6DISS workshop material.

Training can be given in Europe (Brussels or Paris), or at a local location; ideally immediately prior to - or after - a workshop. Such a “Training the Trainers” course is typically suitable for up to 20 people per session.

This Deliverable describes the supporting material that is available to those who will make the dissemination, via the workshops in the targeted regions. It comprises a toolkit for trainers, as organized in the following sections:

Section 1: Guidelines regarding the fundamentals of teaching

Section 2: Guidelines on how to organise a workshop on IPv6

Section 3: Information on where to find the latest workshop module material

Section 4: An instructors’ guide to accompany each module, containing:

- a list of key messages to impart to the participants
- questions, that will determine whether or not the participants have understood the module

In addition, the slide set of modules has been - and will continue to be - enhanced with “speaker notes” giving guidelines for the presenter, in terms of:

- additional speaker notes to accompany the slides
- identification of which slides are mandatory / optional

Section 5: Information on the 6DISS e-learning package

Section 6: Information about the Tiger Team

Section 7: The feedback questionnaire

Section 8: Network connectivity information that should be collected from the region

¹ In this document, “local” or “local host/organization” refers to people/organization in one of the 6DISS targeted countries (outside the EU).

1 Guidelines regarding the fundamentals of teaching

In general, the persons proposed as extra trainers to disseminate further the 6DISS material within a region, will be selected by the organisations in those regions. Since the skills of these persons will therefore be various, this section provides some basic advice regarding the fundamentals of teaching. It can be useful information for people who are new to this role, but also serve as a reminder to those with more experience of training.

1.1 Trainer Guidelines – How to be a successful Instructor

To be effective, a presentation must be carefully thought out and prepared. Your preparation, appearance, and creative ability will all play an important part in how memorable and professional your presentations will be.

1.1.1 Preparation

Thorough preparation is essential if you are to make a positive first impression. There is no excuse for not-done homework. Among the items of preparation, is the **audience analysis**.

You must ask yourself these five questions:

- Who will be in the group?
- Why are these people here?
- Do they want to be here?
- What do the students want to learn?
- What is their level of experience?

If you have done this analysis correctly, you will be able to more accurately address the participants' needs at the depth they want.

1.1.2 Building your own credibility

The participants will judge your credibility on your command of the subject matter. If you are unsure of the lesson and hesitate constantly, your students will begin to distrust your teaching ability.

Be sure that you know your material, and are confident of its accuracy. In preparing for a class, anticipate questions. It has been said that the best way to really learn a subject is to learn it as if you were going to teach it.

An additional benefit of preparation is the establishment of your own confidence. If you really know a subject, you will display that confidence, and this will also help alleviate your initial nervousness.

1.1.3 First Impressions

The first impression that an instructor gives to the class is an extremely important part of this credibility. Failure to establish this initial credibility means that the rest of the session will be an uphill battle.

What do the participants see? Do they see a suitably dressed professional, who is proud of his/her profession?

Or do they see an individual who appears not to care about him/herself or the job he/she is doing?

Some factors that determine this first impression are:

- Clothing, breath, fingernails and hand care.
- Poise, good posture
- Gestures
- Facial expressions

- Body language
- Nervous habits
- Speech and language

1.1.4 Overcoming nervousness

There are several tricks to overcoming the initial stage fright that every instructor feels at the beginning of every class. One of these is to memorize the first few lines of your introduction. By the time you get these out, you will be well into the flow of your presentation, and will have gotten over those “first few uncomfortable moments”.

1.1.5 Other aspects that can reduce the credibility of the trainer

Misspelling of technical terms is of particular importance, as this implies that you don’t know the technology.

1.1.6 Summary

Every instructor brings particular strengths into the classroom. If two instructors were to learn the same material and teach it, the impact that they would make would be different. Capitalize on your own strengths and talents and find out what makes you excited about the material. This is what you will convey to the students and what will set you apart from just “any other” instructor.

Feedback from colleagues and students will help you see how they perceive your strengths. You will receive this feedback through the evaluation forms. Paying attention to this feedback will help you to tune your individual strengths and advance you as a professional instructor.

An instructor must be aware of the following:

- Effective presentations are characterized by poise and the confidence that comes from thorough preparation
- Attention to personal details, verbal and non-verbal communications will determine your credibility and effectiveness as an instructor
- Developing your own style is your strongest asset

1.2 Creating a Successful Learning Environment

It is very important that the successful instructor establishes the correct atmosphere in the room.

The participants must be comfortable, and receptive to learning and retaining the material presented. Several aspects must be respected in order to provide the correct learning environment.

- Security
- Belonging
- Autonomy
- Relevancy

1.2.1 Security

In order for the participants to concentrate, a safe and comfortable learning environment must be provided. The classroom should be well lit, the chairs comfortable, and the graphics and text easy to see and read. The instructor should create an atmosphere of interaction. The participant’s basic needs must be addressed. Housekeeping details should be addressed. Your rules for the class should be defined.

1.2.2 Belonging

The instructor introduces him/herself and has the participants introduce themselves. This activity serves two purposes. It allows the instructor to build his or her professional credibility as a professional. It starts to establish the instructor/learner relationship. It gives the opportunity for the participants to present themselves as professional colleagues, and mention their expertise. The successful instructor will take this time to make notes of what technical expertise he/she has in the classroom and use this later in the class.

1.2.3 Autonomy

Your participants are professional colleagues. Do not treat them like children. Do not condescend or reprimand them; mostly they can and must be allowed to think for themselves. The fastest way to lose your audience is to behave as if you are better than they are.

This aspect can be developed during the introduction when the housekeeping details are discussed.

1.2.4 Relevancy

Adults must have a reason to learn a new subject. The successful instructor must make the learning experience meaningful for the participants and associate it to their prior knowledge. Every section should have a minimum goal, which the instructor (and student) should be able to evaluate based on the objectives set at the beginning of the session.

1.2.5 Summary

In establishing an effective learning environment the participant must:

- Feel comfortable and safe
- Feel accepted as part of the group
- Have input and control
- Have learning objectives that are attainable and measurable.

1.3 Teaching for Retention

We all remember an effective or outstanding presentation that we have seen in the past. In this section we look at some of the things that set the successful presentations apart from the others. An outstanding presentation:

- Is clear
- Is logically organized
- Is well paced
- Includes visual details

1.3.1 Organization of the Presentation

A presentation should be logically organized. The organization of the presentation should perform two functions. It should assist you in developing and delivering your presentations, and help the participants understand and retain the information that you are presenting. The presentation should consist of three sections.

- Introduction
- Body
- Summary

Another way to think of this is:

- (1) Tell them what you will tell them,

- (2) Tell them what you are telling them,
- (3) Tell them what you told them.

1.3.1.1 Introduction

The introduction is the portion of the presentation where general information is presented.

- Instructor and participant introductions
- Basic needs and housekeeping details
- Credibility is established
- Student expectations
- Objectives for the session are defined
- General overview of the session

1.3.1.2 Body

The body of the presentation consists of the specific information that the instructor wants to present. This portion is broken down into two sections:

- Knowledge transfer
- Sequencing

Knowledge transfer is the theoretical aspect of training, whereas *sequencing* is the process of going from the general to the specific, and is the order in which a series of technical steps must be taken to accomplish a specific task. The successful instructor will include the following techniques to improve the presentation:

- Technical accuracy
- Grouping of similar issues
- Association of information (linking)
- Questioning
- Activities

1.3.1.3 Summary

The summary is the concluding portion of the session. This section will accomplish several things.

- Neat close
- Restate the objectives
- General overview
- Questions
- Test of knowledge

1.3.2 Adult learning and information retention

Adult learners retain information in a variety of ways.

While all the human senses are used, the extent and impact of the senses on retention will vary from one participant to another.

1.3.2.1 Senses used in Remembering

The most significant senses used in retention are:

- Sight
- Sound
- Touch

Practical training exploits all the major senses to assist the participant in retaining information. The use of the presenter, the overhead projections, and the “hands-on” activities provides the participant with stimulation of all the major memory senses.

1.4 Eliciting Student Participation

There are two kinds of questions which serve several purposes. These are:

- Open questions
- Closed questions

Questions serve several purposes when addressed in the retention scheme:

- Memory
- Comprehension

A successful instructor will be ‘in tune’ with the class. Being ‘in tune’ means checking for attention, comprehension and retention.

1.4.1 Maintaining concentration

The average length of time at a significant level of concentration has been found to be about 15 - 20 minutes. This means that about every 15 minutes the participants will start to become distracted and lose attention. Successful instructors will time the key points of the lessons to be accommodated within this interval, or will reset the participant’s concentration level at about this frequency.

1.5 Relevant Learning Activities

The successful instructor uses activities to reinforce the learning experience. An activity by definition is “hands-on”, and has to be related to the subject in a direct or indirect way.

Learning must be:

- Relevant
- Entertaining
- Appropriate
- Fit in the allocated time

1.6 Instructor Habits

A good instructor will always learn from the other instructors.

1.6.1 Soliciting Feedback: your Self-Evaluation

A successful instructor will keep his professional skills tuned up. Keeping up to date with the latest technology is an important aspect of remaining in touch. Feedback can come in two forms:

- Student evaluation forms (a proposed feedback questionnaire is provided in Section 7)
- Videotaping teaching sessions

The professional trainer will always welcome the opportunity for self evaluation which ensures that self perception and reality are one and the same.

1.7 Summary

In summary, as a professional instructor you are responsible to your participants. You are a role model, as well as a source of information. Some of the key factors in your success as an instructor are:

- Your personal habits, and preparation
- Creating a Successful Learning Environment
- Using Retention Techniques
- Involving the Students
- Creating relevant learning activities
- Soliciting Feedback for Self Evaluation

2 Guidelines on how to organize a workshop on IPv6

The goal of 6DISS is to generally promote and support the deployment of IPv6, and not to specifically advertise or recommend products from any one particular vendor. All trainers should therefore respect this philosophy. Information about any - or all - of the topics listed in sub-section 2.2.1 is available for presentation in the workshops. Since many members of the consortium have experience of leading such workshops, it is strongly recommended to maintain a close contact with the 6DISS partners, for planning the workshop programme.

2.1 What is expected from the hosts

Organisations that are interested in hosting a 6DISS workshop for ISPs are recommended to organise it in conjunction with another regional event at which the appropriate attendees² will be present. This will optimise travel costs.

The following items should be considered:

- Infrastructure:
- Equipment
- Connectivity
- Attendee pre-requisites
- Trainer pre-requisites

2.1.1 Infrastructure

The following items should be considered:

- The room should be typically a classroom or amphitheatre, adequate for the number of participants, considering that - if the course includes hands-on exercises - each person should ideally have a PC or laptop. Additional space for networking equipment may be necessary (see 2.1.2, below).
- Video projector (beamer)
- Microphone
- Whiteboard

2.1.2 Equipment

The minimum equipment needed for a 6DISS workshop is a small router to allow some demonstrations (eg. autoconfiguration, routing protocols set up, filtering, ...)

If “hands-on” sessions are scheduled, it must be determined whether the exercises will be oriented towards client devices, or rather focused on network services and router configuration. In any case, the number of participants should be limited to a maximum of 25 and 1 PC or workstation (or laptop) per 2 attendees is required. If the practical work is network-oriented, a second small router should be provided. For maximum benefit, the local organisers may also wish to provide equipment that is representative of that found in their networks. This may impact on the exercises that can be performed.

² The workshops are ideally suitable for representatives of ISPs (commercial networks or NRENs), especially for persons planning to deploy and/or manage IPv6 networks

2.1.3 Connectivity

Remote 6DISS testbeds in Paris and Brussels are accessible via the Internet, using IPv6 connectivity. To enable access to these testbeds, IPv6 connectivity will be configured (either native if locally available or encapsulated within IPv4). If needed, RENATER's Migration Broker service is available to provide encapsulated IPv6 connectivity to whoever needs it.

The use of these testbeds is described in more detail in deliverable D12: "IPv6 Technical Training".

Having access to the 6DISS testbeds, without any filtering issues, is a point to pay attention to.

2.1.4 Attendee pre-requisites

The workshops have been found to be especially attractive for ISPs and deployers/operators of National Research and Education Networks. Attendees of the workshops are expected to have experience of operating a network, with a sound knowledge of addressing, routing, security, network monitoring and management under IPv4.

It is recommended that attendees follow the whole of the 6DISS e-learning package (see Section 5). This will take approximately 2 hours. In theory, the scores they achieve can be interpreted as a measure of their suitability for the workshop, though currently, this feature is not implemented.

2.1.5 Trainer pre-requisites

If the trainers are provided by the host, then ideally, they should be familiar with most of IPv6 protocol features, and have some experience of deploying an Internet network. The 6DISS e-learning package can be used to test and improve one's knowledge, and it has also been negotiated to be able to use Cisco's IPv6 e-learning material (see Sub-section 9.2), which explains the subject down to an even more technical level.

2.2 What the hosts can expect from us

- Presentations on any technical topic related to IPv6, given by experienced persons (see Sub-section 2.2.1)
- Experience of deployments (see Sub-section 2.2.2)
- Hands-on sessions (see Sub-section 2.2.3)
- Access to remote laboratories (see Sub-section 2.2.4)
- Workshop registration service (see Sub-section 2.2.5)

2.2.1 Topics

6DISS has material covering a very wide range of IPv6 subjects, from which the local organizers can select, according to their specific requirements. The topics include:

- Introduction to IPv6 (protocol, addressing and associated protocols)
- Multicast
- M6bone and IPv6 multicast applications and services
- Autoconfiguration
- Routing protocols
- DNS
- RPSLNg
- Security
- QoS
- Mobility

- Multihoming
- Co-existence with IPv4
- Network Management
- Deployment experiences
- Regulation

A typical programme (taken from the Southern Africa workshop) is given below:

Day 1:

- [6DISS Overview](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [IPv6 Introduction](#) - *Bernard Tuy, RENATER*
- [IPv6 Protocol \(RFC 2460 DS\)](#) - *Bernard Tuy, RENATER*
- [IPv6 Addressing](#) - *Bernard Tuy, RENATER*
- [IPv6 Addressing Case Study \(RENATER\)](#) - *Bernard Tuy, RENATER*
- [Addressing Architecture at NIIF/HUNGARNET](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [IPv6 Autoconfiguration \(Stateless and Stateful\)](#) - *João Nuno Ferreira, FCCN*
- [IPv6 Associated Protocols](#) - *Bernard Tuy, RENATER*
- [IPv6 Support in the DNS](#) - *João Nuno Ferreira, FCCN*
- [IPv6 Support on the ccTLD .pt](#) - *João Nuno Ferreira, FCCN*
- [Host Configuration Overview](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [Routing Protocols \(Intra- and Inter-domain\)](#) - *João Nuno Ferreira, FCCN*
- [IPv6 Routing Configuration](#) - *Janos Mohacsi, NIIF/HUNGARNET*



Day 2:

- Question and Answer Session
- [Multihoming](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [Campus IPv6 Deployment](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [IPv6 Security](#) - *Janos Mohacsi, NIIF/HUNGARNET*
- [IPv6 Mobility](#) - *João Nuno Ferreira, FCCN*
- [IPv6 Multicast](#) - *Bernard Tuy, RENATER*
- [M6Bone](#) - *Bernard Tuy, RENATER*
- [IPv6 Network Management](#) - *Bernard Tuy, RENATER*



2.2.2 Experience of deployments

Some IPv6 deployment examples of which 6DISS partners have experience are:

- Transitioning 1'000 schools to IPv6 in the Greek Schools Network
- Campus installations (eg. University of Southampton)
- IPv6 Multicast (M6Bone)
- NREN installations (RENATER, Hungarnet, GRNET)

2.2.3 Hands-on sessions

The trainers should also be capable of supervising “hands-on” sessions dedicated to the configuration of devices from different manufacturers, and providing information about applications.

Examples of such hands-on sessions are basic configuration commands for servers (Cisco, Juniper, 6Wind, FreeBSD, Debian, Windows XP, Zebra) and hosts (Windows, Linux (RedHat, Fedora, Debian), Solaris, Macintosh)

6DISS has also developed the following practical experiment scenarios / exercises, which show the configuration of IPv6 equipment for typical situations that will be needed for any deployment:

- dhcpv6
- smtp
- basic static IPv6 connectivity
- httpd
- access control
- dns
- autoconfiguration
- configuring tunnels
- routing (OSPFv3, IS-IS Aggregation, Tunneling and BGP)
- multicast (including an application that uses multicast)

More details can be found in deliverable D12: “IPv6 Technical Training”.

2.2.4 Access to remote laboratories

Where equipment is not available locally, access can be arranged to 2 testbeds (in Brussels and Paris)

2.2.4.1 The Brussels laboratory

Cisco Systems Belgium

Pegasus Park

De Kleetlaan 7

1831 Diegem

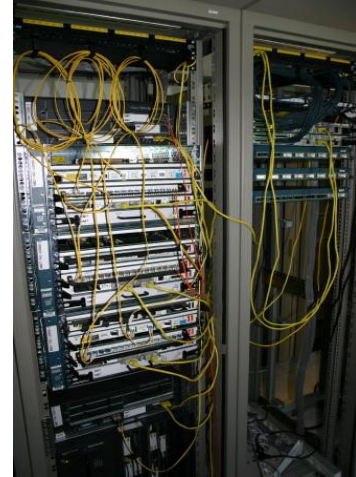
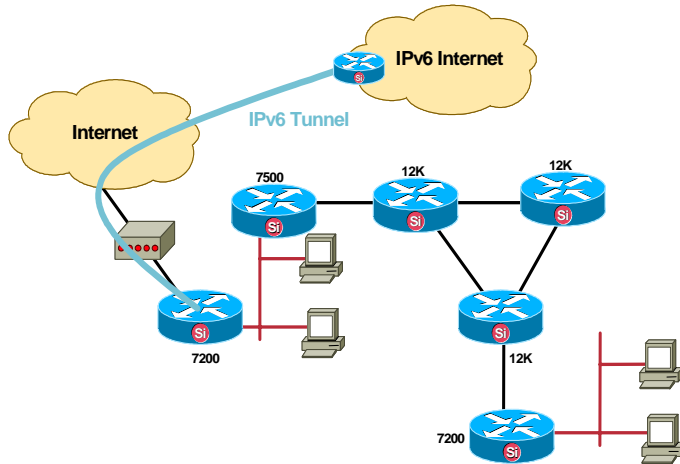
Belgium

The Brussels 6DISS lab can be used for IPv6 tests that may disturb traffic and is therefore especially useful for testing out transitioning mechanisms. It is possible to request the availability of support for certain IPv6 features by contacting the lab manager in advance. The lab can then be configured accordingly. The lab also contains traffic generators. If needed, network convergence and disruptive restoration can also be experimented and tested.

The default configuration does not contain any IPv6 implementation. This is done deliberately to allow the trainee to start from the basic configuration to simulate real-live transitioning for his own managed network. The lab can be configured for either an IPv6 client environment or for a pure router environment. All IPv6 router components (OSPFv3, ISISv6, BGP, Security, ...) in a IPv6 network infrastructure can be tested on this network.

Future plans for the lab are to expand the connectivity with a connection to the Unicast and Multicast IPv6 Internet and provide a full BGP routing table for the students to play with.

The layout of the Brussels testbed and some of the equipment is shown below:



The Brussels Equipment

2.2.4.2 Reservation procedure

The Brussels laboratory is reserved by sending an e-mail request to lab@6diss.org. This e-mail should contain the start date and the anticipated duration of the reservation. For example, the reservation may start 1 week before the workshop, during the workshop and 1 week after the workshop.

The request (e-mail) should be sent at least 2 weeks before the access is required.

The Brussels testbed will be reserved by the responsible lab manager (Gunter Van de Velde) on a “first-come, first-served” basis; priority will be given for the official 6DISS workshops.

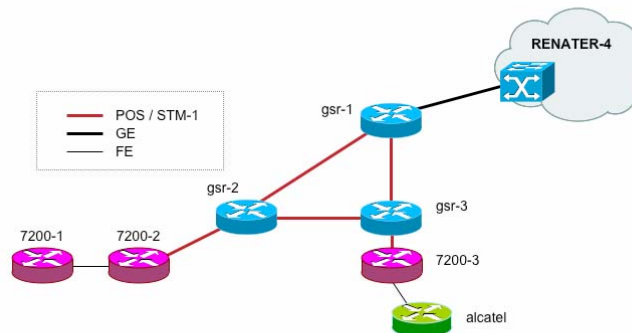
2.2.4.3 Accessing the Brussels laboratory

The external access is via a 1Mbps SDSL link, to a public address. The console IP address and password that will be given to the trainers.

2.2.4.4 The Paris testbed

GIP RENATER
151 Bd de l'Hôpital
75013 Paris
France

The layout of the Paris testbed is shown below:



The Paris Equipment

2.2.4.5 Reservation procedure

The Paris testbed availability is shown on the following URL:
http://www.renater.fr/spip/article.php3?id_article=190

It can be reserved by sending an e-mail request to lab@6diss.org. This e-mail should contain the start date and the anticipated duration of the reservation. For example, the reservation may start a couple of days before the workshop, during the workshop and a couple of days after the workshop.

The request (e-mail) should be sent at least 2 weeks before the access is required.

The Paris testbed will be reserved by the responsible lab manager (Jérôme Durand) on a “first-come, first-served” basis; priority will be given for the official 6DISS workshops.

2.2.4.6 Accessing the Paris testbed

The testbed is connected to the RENATER-4 backbone with a Gigabit Ethernet connection. It will also be accessible via an out-of-band connection, making it possible to access the routers in case a wrong configuration has been made and the connectivity is lost. The login procedures will be given to the trainers via a secure mechanism.

Details about the interfaces and the addressing will be given to the trainers. The access procedures will become increasingly automated in the future.

2.2.4.7 Experiment procedures and expected results

People willing to access the testbed must send a summary of the operations that will be performed. There are no special restrictions on the usage. Nevertheless, according to the requests made, the lab owner reserves the right to decline a request or to ask for some modifications to the initial proposal.

2.2.4.8 Testbeds connectivity

Both the Paris and Brussels testbeds are connected to Internet v4 and v6. Moreover they will be interconnected to each other using IPv6 encapsulation techniques. This arrangement can be viewed on the 6DISS Website.

2.2.5 Workshop registration service

If desired, 6DISS can also manage the workshop participant registration system on behalf of the local organisers, via its Website.

3 Information on where to find the latest workshop module material

The following *structure* and *procedures* have been established in order to organise the production, modification and storage of the presentation material in a manageable way:

3.1 Structure

The Private Area of the Website contains a directory: “Material”, which has the following sub-directories:

- Modules
- E-learning
- Snapshots (past workshops)
- Miscellaneous
- Questionnaires
- Hands-on

3.2 Procedures

3.2.1 The Module slide sets

The module responsables upload their module slide set into the Material/Modules directory (one .ppt file per module). A standard slide mask is used, with no event name written in the footers.

The nomenclature for the filenames is: <number-module_OWNER>. If the last digit of the 3-digit prefix is not zero, then a reason for the revision is given. Examples are:

010-IPv6_introduction_RENATER.ppt
020-IPv6_protocol_RENATER.ppt
030-IPv6_addressing_RENATER.ppt
090-IPv6_DNS_FCCN.ppt
100-IPv6_Routing_Protocols_FCCN.ppt
110-IPv6_Security_UCL.ppt
160-QoS_Module_GRNET.ppt

Only the module responsables may modify presentations in this directory. Trainers can take and modify these slides for their particular needs, but must not change the original version. Suggestions for permanent changes must be notified to the module owner, who will decide whether or not to include them.

3.2.2 Using the Material

When preparing the set of slides for a workshop, use the <000-main-template.ppt> file in the Material/Modules directory, add the dates and location to the footer, and the links to the modules that will be presented.

3.2.3 Archiving the Workshop Material

After the workshop, the complete set of module slide sets used should be uploaded into the Material/Snapshots directory, using a single .zip file per workshop. The trainer for the workshop should coordinate the collection of all the material and storage on the Website. Also add in the .zip file the hands-on material (“Configuration” module) and any photographs. This single .zip file should contain everything related to one event. The .zip file must be named: <yearmonthday-location.zip>. Example: 20050919-South-Africa.zip

3.2.4 Publishing the Workshop Material

TERENA will then take the presentation material from the .zip file and publish it (in .pdf format) on the Public Area of the 6DISS Website under the directory: www.6diss.org/workshops/location. Example: www.6diss.org/workshops/saf

4 The instructors' guide to accompany each module

The set of slides for each module is being enhanced with “speaker notes” to help those trainers who are less familiar than the 6DISS partners with the technical content.

In addition, the key messages to be imparted to the participants have been identified for each module, and questions have been provided that determine whether or not the participants have understood the module (these are generally linked to the questions in the e-learning package).

Module	Key Messages	Questions
General IPv6 introduction	<p>Why a new version of the Internet Protocol has emerged.</p> <p>The current situation of IPv4 address space exhaustion.</p> <p>Whilst techniques such as NAT, CIDR and DHCP have been developed to extend the lifetime of IPv4, these have disadvantages in terms of performance, or restrict the capabilities (especially those seeking to exploit mobility and always-on features) of Internet services.</p> <p>IPv4 and IPv6 can co-exist.</p> <p>Embedded security (IPsec is mandatory).</p> <p>Built-in support for mobility and autoconfiguration.</p>	<p>1. The IPv6 header...</p> <p>a) has a fixed length</p> <p>b) is smaller than the IPv4 header</p> <p>c) is compatible with the IPv4 header</p> <p>d) doesn't contain any error control field (both “a”) and “d”) are correct)</p> <p>2. Regarding fragmentation and IPv6, which one of the following statements is/are true</p> <p>a) There is no fragmentation in IPv6</p> <p>b) There are fields for fragmentation in the IPv6 header</p> <p>c) Fragmentation is always done by the sender</p> <p>d) There is a fragmentation option for IPv6 (“c”) is correct)</p> <p>3. Which one of the following are IPv6 extensions</p> <p>a) routing</p> <p>b) traffic class</p> <p>c) authentication</p> <p>d) fragmentation (“a”), “c”) and “d”) are correct)</p> <p>4. What IPv6 fields were designed for classification of traffic</p> <p>a) Traffic class</p> <p>b) Flow label</p> <p>c) Required bandwidth</p>

Module	Key Messages	Questions
		<p>d) Hop limit ("a)" and "b)" are correct)</p> <p>5. Hop by hop extension...</p> <p>a) is analyzed by every router b) can be used to transmit very large packets c) is required for source routing d) needs to be the first extension ("a)", "b)" and "d)" are correct)</p>
IPv6 and associated protocols		<p>1. Which of the following protocols are used for stateless address autoconfiguration</p> <p>a) DHCPv6 b) Duplicate Address Detection c) NDP (Neighbor Discovery Protocol) d) Router renumbering ("b)" and "c)" are correct)</p> <p>2. Say which of the following messages are NDP messages</p> <p>a) Neighbor solicitation b) Router advertisement c) Router solicitation d) Path MTU discovery ("a)", "b)" and "c)" are correct)</p> <p>3. Which address is the solicited multicast address of 2001:660:3001:4001:4014:208:74ff:fe46:bc1a</p> <p>a) FF02::1:FF46:BC1A b) FF0E::1:FF46:BC1A c) FF02::1:FE46:BC1A d) FF02::FF:FE46:BC1A ("a)" is correct)</p> <p>4. Path MTU discovery...</p> <p>a) Is achieved by routers</p>

Module	Key Messages	Questions
		b) Makes it possible to avoid fragmentation on routers c) Is a protocol based on TCP d) Is obsolete (“b”) is correct
Addressing and Multihoming	IPv6 address format (the IPv6 address size is 128 bits). IPv6 address space. IPv6 address types (the header format is simplified). Hierarchical network architecture (for routing efficiency). IPv6 Interface Identifier (EUI-64). IPv6 multicast address format. Anycast address. Production Addressing scheme. Regional Internet Registries (RIRs) allocations. RIRs IPv6 allocation procedures.	1. Routers usually advertise on links prefixes of length: a) 16 b) 32 c) 48 d) 64 (“d”) is correct 2. FF7E:D40:2001:660:3001:4001:123a:1256 is a) a multicast address b) an anycast address c) a unicast test address d) a unicast official address (“a”) is correct 3. A host has the MAC address 00-08-74-46-BC-1A. It is on a VLAN where the prefix 2001:660:3001:4014::/64 is advertised. What is going to be the host address when autoconfiguration is used: a) 2001:660:3001:4014:0008:74FF:FE46:BC1A b) 2001:660:3001:4014:208:74ff:fe46:bc1a c) 2001:660:3001:4014:0008:7446:BC1A d) fe80::0208:74ff:fe46:BC1A (“b”) and (“d”) are correct 4. Say which one of the following are advantage(s) for IPv6 addressing a) The hexadecimal notation is faster to process on routers

Module	Key Messages	Questions
		<p>b) The address length makes it possible to have better hierarchy and therefore aggregate prefixes in routing tables</p> <p>c) Link-local addresses make it possible for hosts to talk "IP" even before they get an address</p> <p>d) There are more addresses (“b”), “c)” and “d)” are correct)</p> <p>5. IPv6 autoconfigured addresses can be bad because</p> <p>a) It is very likely that 2 hosts get the same address, causing problems on the network</p> <p>b) People can easily get traced as lower bits of the address always stay the same</p> <p>c) They are not easily readable</p> <p>d) Change of hardware has impacts on the addresses, which can be a disaster for servers and routers (“b)” and “d)” are correct)</p>
Security	<p>1. Security is a many faceted activity; there is no immediate fix for all the problems. Security is a system not a protocol or component.</p> <p>2. There is a wide variety of security threats; each must be countered. Most are identical in IPv4 as IPv6.</p> <p>3. Many details of the threats change continually - eg. new viruses.</p> <p>4. Wireless makes things worse.</p> <p>5. Some of the specific protocols designed to meet threats are the following: IPsec, security enhancements to MIPv6, CGA, PANA, SEND.</p>	<p>1. Why do mobile devices increase the security problem?</p> <p>2. Why is address spoofing easier in IPv6?</p> <p>3. What are the mechanisms for detecting and responding to attacks?</p> <p>4. How is scanning different in IPv6?</p> <p>5. What are the security mechanisms put in to protect MIPv6?</p> <p>6. What does PANA do, and how does it work?</p> <p>7. Why is address spoofing easier to deploy in IPv6?</p>

Module	Key Messages	Questions
	<p>6. Universal need is the processes: Detect, localize, identify, assess, respond, identify, keep audit trail</p> <p>7. IPv6 changes: scanning, CGA, MIPv6, firewall policies, address spoofing, neighbour discovery, DDOS amplification, IPv4-IPv6 gateways.</p>	<p>8. How can one protect neighbour discovery?</p> <p>9. How can one mitigate IPv6 amplification?</p> <p>10. How can IPv4-IPv6 gateways increase attach risks?</p> <p>11. What transport modes exist in IPsec, and what do they do?</p>
Multicast		<p>1. The IPv6 equivalent to IPv4 IGMPv2 is</p> <ol style="list-style-type: none"> MLDv2 NDP ICMPv6 MLD <p>("d") is correct</p> <p>2. The solution for IPv6 interdomain ASM multicast is</p> <ol style="list-style-type: none"> MSDP Embedded-RP Source Specific Multicast There is no solution at this stage <p>("b") is correct</p> <p>3. The multicast address FF7E:D30:2001:660:3001:4001:1234:abcd is</p> <ol style="list-style-type: none"> A test multicast address Derived from Rendezvous Point 2001:660:3001:4001::d Derived from Rendezvous Point 2001:660:3001::d A global scope multicast address <p>("c") and ("d") are correct</p> <p>4. Give for any of the scope below the</p>

Module	Key Messages	Questions
		<p>correct hexadecimal value</p> <p>a) Site-local --> 5 b) Link-local --> 2 c) Global --> E d) Organization-local --> 8</p> <p>5. SSM (Source Specific Multicast) requires</p> <p>a) MLDv2 support on hosts b) MLDv2 support on routers c) Embedded-RP support d) Multicast address assignment protocol (“a”) and “b”) are correct)</p>
QoS	<p>1. The IPv6 protocol, in terms of QoS support, is neither superior nor inferior to its IPv4 counterpart. However, the flow label field in the IPv6 header is expected to ease the provision of services in the future.</p> <p>2. Routers under test allowed the definition of a common QoS policy for IPv6 and IPv4 traffic. This simplifies the delivery of QoS in production networks.</p> <p>3. New hardware (or software) does not do impose limitations. On the contrary, old hardware (or software) may either lack some pieces of functionality or provide a lower level of service.</p>	<p>1. Which is the new QoS-related field added in the IPv6 header as compared to its IPv4 counterpart?</p> <p>a) Traffic Class field b) Flow Label field c) Hop Limit field (“b”) is correct)</p> <p>2. Shall we expect different performance guarantees for IPv6 and IPv4 traffic?</p> <p>a) Yes, due of the flow label field b) Identical, because the traffic class field is analogous to the Type of Service field c) No, because the IPv4 header is smaller (“b”) is correct)</p> <p>3. Why is packet classification in IPv4 networks considered problematic</p> <p>a) Due to the fact that flow classification information is stored in the transport header b) Because of packet fragmentation c) Both of them (“c”) is correct)</p> <p>4. Who can set (or change) the value in the</p>

Module	Key Messages	Questions
		<p>flow label field?</p> <p>a) The source sets the value, but routers can change it</p> <p>b) The source sets the value, and routers cannot change it</p> <p>c) The source and the router can set or change the value</p> <p>(“b”) is correct)</p> <p>5. Is the IPv6 header more easily processed than the IPv4 counterpart when QoS services are supported?</p> <p>a) Yes, because the flow label field simplifies the identification of flows</p> <p>b) No, because both headers have similar fields</p> <p>(“a”) is correct)</p>
DNS	<p>1. DNS is key for IPv6 rollout, just as it is key for the current Internet.</p> <p>2. DNS for IPv6 works in a similar way as for IPv4. The main difference is the use of AAAA records and a different root zone for IPv6 reverse resolutions (ip6.arpa. instead of in-addr.arpa.)</p> <p>3. The zone delegation process is not affected by IPv6, because names are used, not addresses. It is only necessary to keep in mind when adding a glue record, that if an NS has a AAAA associated, that record should also be there in the parent zone.</p> <p>4. IPv6 support on DNS software is quite mature. IPv6 addresses have been entering the DNS tree space for some time, without any problems.</p> <p>5. Dual-Stack DNS servers</p>	<p>In IPv4 we have A Resource Records. What is the equivalent record in IPv6?</p> <p>a) A6</p> <p>b) DNAME</p> <p>c) AAAA</p> <p>(“c”) is correct)</p> <p>Which of the following extensions made in DNS are deprecated?</p> <p>a) AAAA Record</p> <p>b) A6 Record</p> <p>c) ip6.int domain</p> <p>d) ip6.arpa domain</p> <p>(“b”) and “c”) are correct)</p> <p>If we have a host (www.organisation.com) with the address 3FFE:B00:C18:1::2, which of the following options should we put in the zone file?</p> <p>a) www.organisation.com DNAME 3FFE:B00:C18:1::2</p> <p>b) www.organisation.com A6</p>

Module	Key Messages	Questions
	(authoritative or resolvers) are the best choice. IPv6-only DNS servers are not recommended.	<p>3FFE:B00:C18:1::2</p> <p>c) www.organisation.com AAAA 3FFE:B00:C18:1::2</p> <p>d) www.organisation.com A 3FFE:B00:C18:1::2</p> <p>(“c”) is correct)</p> <p>Where is rooted the domain that provides a way of mapping an IPv6 address to a host name?</p> <p>a) ip6.int b) ip6.arpa c) in-addr.arpa</p> <p>(“b”) is correct)</p> <p>What is the correct reverse of the IP address 2001:690:10:1::10?</p> <p>a) 10.1.10.690.2001.ip6.arpa b) 0.1.1.0.1.0.9.6.1.0.0.0.2.ip6.arpa c) 0.1.0.0.0.0.0.0.0.0.0.0.0.0.0.1.0.0.0.0.1.0.0 .0.9.6.0.1.0.0.2.ip6.arpa d) 2.0.0.1.6.9.0.1.0.1.1.0.ip6.arpa e) 2.0.0.1.0.6.9.0.0.0.1.0.0.0.0.1.0.0.0.0.0.0.0 .0.0.0.0.0.1.0.ip6.arpa</p> <p>(“c”) is correct)</p> <p>Which software can be used as an IPv6 DNS server?</p> <p>a) Bind -> correct b) Apache c) Microsoft DNS server -> correct d) Squid</p> <p>(“a”) and (“c”) are correct)</p>
Autoconfiguration and DHCP	1. Stateless autoconfiguration increases the plug & play factor, but this should only be used in certain (simple) scenarios.	<p>Q: Which autoconfiguration types exist? A: 2 types: stateless and stateful</p> <p>Q: What are the major advantages of</p>

Module	Key Messages	Questions
	<p>2. Getting an IPv6 address from a router advertisement is not enough in certain environments. In this case, Stateful is the only way to go.</p> <p>3. DHCPv6 is the solution for stateful autoconfiguration by providing several network settings to DHCPv6 clients.</p> <p>4. DHCPv6 implementations are still scarce and need more work. Lack of client integration in operating systems is still a problem at end'2005.</p> <p>5. Relay Agents in DHCPv6 increase the model's flexibility, but also add complexity.</p>	<p>stateless autoconfiguration?</p> <p>A: Minimum configuration of routers is needed, and no manual configuration of hosts is necessary</p> <p>Q: What are the major disadvantages of stateless autoconfiguration?</p> <p>A: It is impossible to send DNS server addresses, and there are no admission control policies</p> <p>A host will only get its global IPv6 address, if a DHCPv6 server (or a Relay agent) is present in the network.</p> <p>a) True b) False ("b)" is correct)</p> <p>What information is found in router advertisements messages?</p> <p>a) A default router b) DNS server address c) The maximum transmission unit or MTU of the local link d) The network prefix defined for the link ("a)", "c)" and "d)" are correct)</p> <p>When a client wants to connect to a DHCP server which destination address will it use?</p> <p>a) All DHCP Relay Agents and Servers b) All DHCP Servers address ("a)" is correct) (The address in "b)" is only used by relay agents to contact DHCPv6 servers)</p> <p>5. Place the following steps of the stateless address autoconfiguration process in the correct order</p> <p>a) DHCPv6 requests for service discovery - -> 8</p>

Module	Key Messages	Questions
		<p>b) DAD for the link local address --> 3</p> <p>c) Router advertisement --> 5</p> <p>d) DAD for global address --> 7</p> <p>e) Calculation of the Interface Identifier from the MAC address --> 1</p> <p>f) Calculation of the global address from the prefix received --> 6</p> <p>g) Router solicitation --> 4</p> <p>h) Calculation of the link-local address --> 2</p> <p>1. Which of the following protocols are used for stateless address autoconfiguration</p> <p>a) DHCPv6</p> <p>b) Duplicate Address Detection</p> <p>c) NDP (Neighbor Discovery Protocol)</p> <p>d) Router renumbering</p> <p>(“b”) and “c”) are correct)</p> <p>Q: Can stateful and stateless autoconfiguration coexist?</p> <p>A: yes</p> <p>What kind of information can a DHCPv6 server provide?</p> <p>a) IPv6 addresses</p> <p>b) NTP server address</p> <p>c) DNS server address</p> <p>d) Default gateway address</p> <p>(“a”), “b”) and “c”) are correct)</p>
Routing (and RPSLNg)	<p>1. Running a routing protocol is the best option when managing a network with some degree of complexity. Support for routing protocols for IPv6 networks were one of the first building blocks.</p> <p>2. Most environments do not need an Exterior Gateway Protocol</p>	<p>Which of the following routing protocols have IPv6 support?</p> <p>a) RIP</p> <p>b) OSPF</p> <p>c) IS-IS</p> <p>d) BGP</p> <p>e) None</p>

Module	Key Messages	Questions
	<p>(EGP). This is still true for IPv6. The New Internet's paradigm is exactly the same as the old one regarding the connection of different networks, managed by different people.</p> <p>3. IS-IS is the more scalable Interior Gateway Protocol (IGP), and it carries both v4 and v6 information, unlike OSPF where you need two different processes if wishing to run two different address families.</p> <p>4. The security issues around IPv6 routing protocols are exactly the same as for IPv4, including the need to use correct filtering and secure communication between nodes.</p> <p>5. The routing policies configured with BGP towards other autonomous systems can be different in IPv4 and IPv6. This should be interpreted as flexibility.</p>	<p>("a", "b", "c") and "d" are correct)</p> <p>Which of the following protocols does OSPFv3 support?</p> <p>a) IPv4 b) IPv6 c) Both ("b") is correct)</p> <p>Which IGP is the most scalable? A: IS-IS</p> <p>What is the main difference between BGP and BGP4+ A: BGP4+ is a multiprotocol routing protocol</p>
Applications	<p>1. IPv6 impacts most high-level protocols, but writing in some languages, e.g. JAVA, takes care of most of the problems.</p> <p>2. Most IPv4 applications can be ported to IPv6 in a straightforward way if certain ways of writing are changed - and particularly if one writes in a language like JAVA</p> <p>3. Be careful requesting utilities that may differ in the two stacks: eg. MIP, neighbour discovery, IPsec</p>	<p>1. What should one look out for particularly in porting applications from IPv4 to IPv6?</p> <p>2. Give examples of utilities that must be ported specifically.</p> <p>3. Give examples of some libraries that must be ported.</p> <p>4. Give some examples of IPv6 applications that have been ported.</p> <p>5. State what has to be done to port VoIP from IPv4 to dual-stack.</p> <p>6. Describe a transition scenario in moving a Globus application to work in IPv6</p>

Module	Key Messages	Questions
Network Management		<p>environments also.</p> <p>1. Netflow v9...</p> <p>a) Can be used to get CPU information from routers</p> <p>b) Uses IPv6 transport</p> <p>c) Is a protocol used to collect IPv6 flows</p> <p>d) Is capable of exporting several types of flows, including IPv6 flows</p> <p>(“d”) is correct)</p> <p>2. SNMP can be used to monitor IPv6...</p> <p>a) Over IPv4 transport</p> <p>b) Over IPv6 transport</p> <p>c) If SNMPv6 is used</p> <p>d) But what can be retrieved depends upon the MIBs implemented on routers</p> <p>(“a”), “b”) and “d”) are correct)</p> <p>3. ASPath-Tree...</p> <p>a) Can be used for operational routing monitoring</p> <p>b) Can be used for elaborating routing policies</p> <p>c) Is based on SNMP/MIBs</p> <p>d) Draws a graphical tree from BGP tables</p> <p>(“b”) and “d”) are correct)</p> <p>4. Which of the following statements are true regarding the unified MIBs?</p> <p>a) Unified MIBs are obsolete</p> <p>b) Unified MIBs are updates of purely IPv4 MIBs</p> <p>c) Unified MIBs are built using textual conventions defined in RFC 4001</p> <p>d) Are replacing dissociated MIBs, that where either IPv4 or IPv6 specific</p> <p>(“b”), “c”) and “d”) are correct)</p>

In addition, the slide set of modules has been - and will continue to be - enhanced with “speaker notes” giving guidelines for the presenter, in terms of:

- additional speaker notes to accompany the slides
- identification of which slides are mandatory / optional

For information about how to make practical demonstrations with some of the above topics, please refer to Deliverable D12: IPv6 Technical Training Manual”.

5 Information on the e-learning package

This professional interactive e-learning package explains to users the main features of IPv6 and guides them to the appropriate reference material (e.g. 6NET Cookbooks, IETF standards) if more information is needed. The material is partly intended as a “teaser” for stimulating interest to learn more about each topic in the workshops. Tests are incorporated to assess whether the participant has understood the lessons. These tests can also be used to gauge the suitability of a person to attend the workshops.

The e-learning experience has the advantage that anyone connected to the Internet and able to find the 6DISS website has the possibility to access the 6DISS IPv6 e-learning package. The material will be actively promoted in the 6DISS target countries, but interested audiences anywhere in the world will be able to benefit from the e-learning course.

The technical level of the e-learning material assumes that participants have a networking background and a good basic understanding of TCP/IP concepts such as: IPv4 addressing, routing protocols, access lists, NAT, etc.

The typical profile of a target e-student is that of a network administrator, experienced in setting up an IP network environment. The approach within most of the e-learning modules is to compare the important aspects of IPv6 with those of IPv4.

After an initial module (Module 0) that describes the set of support and dissemination material that is available from 6DISS (ie. the Website, E-learning package, Workshops, Laboratories, Tiger Team, deliverables), and the role of e-learning within the whole dissemination framework, the e-learning package comprises the following technical modules. These are all based on - or aligned with - the workshop powerpoint slide sets:

Module 0: Introduction to the E-learning package

- The set of dissemination material that is available from 6DISS as a whole (the Website, E-learning package, Workshops, Laboratories, Tiger Team, deliverables)
- The positioning of the E-learning package within the whole framework

Module 1: Introduction to IPv6

- Limitations of IPv4
- Why IPv6 is needed

Module 2: IPv6 Addressing

- IPv6 address syntax
- Types of IPv6 addresses
- Automatic building of a host’s interface identifier from its physical address

Module 3: The IPv6 Header

- Structure of an IPv6 packet header (and the differences between IPv4 and IPv6)
- IPv6 header functions
- IPv6 extension headers

Module 4: IPv6 Basic Services

- Internet Control Message Protocol (ICMP) for IPv6
- Neighbour Discovery Protocol (NDP)
- IPv6 stateless autoconfiguration
- DHCPv6
- DNSv6

- IPv6 Multicasting (incl. Multicast Listener Discovery - MLD)
- QoS

Module 5: Security in IPv6

- IPv6 security elements
- IPsec functions in IPv6 (and differences from IPv4)

Module 6: IPv6 Routing, Mobility and Management

- Interior and Exterior Gateway Protocols
- Mobile IPv6
- Network management

Module 7: Coexistence with IPv4

- Transition and coexistence mechanisms overview
- Dual-Stack techniques
- Tunnelling techniques

Every module contains the following:

1. A voice-over guided explanation of the subject
2. After every relevant piece of content: an interactive overview screen with clickable objects. Users can click keywords, objects, elements within a graph for further, text-based explanations
3. A series of self-test multiple choice questions based on the content which is explained

Ongoing work includes the translation of the key messages that appear as sub-titles throughout the e-learning package into the different languages of the target countries. The contents of the e-learning package will also be updated if any significant technical inaccuracies are discovered.

An overview of each of these modules is given in Deliverable D13: "E-learning Material".

The e-learning course can be found at www.6diss.org/e-learning.

6 Information about the Tiger Team

The 6DISS Tiger Team continues the work started in 6NET. The 6NET project produced over 100 deliverables in its lifetime from 2002 to 2005. Aims of the Tiger Team are to offer pointers to the relevant 6NET and 6DISS reference material and tutorials, and access to IPv6 expertise, via the virtual helpdesk. The main material is made available as an IPv6 Wiki. The Wiki allows our team of IPv6 “Tigers” to modify and update the content on the fly.

A request tracker tool is installed to help us distribute all IPv6 queries to the appropriate people. To get IPv6 help, on any topic, just send an email to helpdesk@6diss.org and the request will be assigned to one of the Tiger Team members.

7 The Feedback Questionnaire

6DISS has developed the following feedback questionnaire, in order that the trainers can obtain the opinions of the participants regarding the quality and relevance of the topics presented. The responses should be used to improve the subsequent workshops.

In order to help us plan similar workshops in the future, the 6DISS project would be grateful if you would take a few minutes to complete this form. Thank you.

Personal Details

Not mandatory

Full Name: _____

Organisation: _____

Country: _____

In which employment sector do you work?

- Government
- University or higher education
- Schools or further education (K19)
- Research
- Health
- Commercial
- Other (please specify): _____

Which of the following best describes your job function?

- Government Advisor
- Senior Manager
- IT Manager
- System administrator

- Network administrator
- Researcher/Postgraduate
- Undergraduate
- Other (please specify): _____

Does your organisation use IPv6?

- Yes
- No, but planned in the next year
- No, but planned in the longer term
- No, and no plans as yet

Do you use IPv6 yourself?

- Yes
- No

About the Workshop

Please complete as many sections as possible

How useful did you find the presentations?

	<i>Very Useful</i>	<i>Useful</i>	<i>Slightly Useful</i>	<i>Not Useful</i>
Presentation 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How well were the sessions presented?

	<i>Excellent</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>
Presentation 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Presentation 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How much of the workshop material was already familiar?

	<i>None</i>	<i>Some</i>	<i>Most</i>	<i>All</i>
Presentation 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Presentation 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Quality of course documentation?

<i>Excellent</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

General organisation of the workshop?

<i>Excellent</i>	<i>Good</i>	<i>Average</i>	<i>Poor</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would you recommend the workshop to your colleagues?

<i>Yes</i>	<i>No</i>
<input type="checkbox"/>	<input type="checkbox"/>

What topics would you have liked to hear more about?



What topics would you have liked to hear less about?

Any other comments:

8 Network Connectivity Information from the Region

Being a part of the Research Infrastructure Unit of DG INFSO, 6DISS is interested to learn about the Internet connectivity, both internal and external to the region. In particular, plans for major upgrades and the deployment of IPv6 are of interest, and will help in identifying opportunities for future collaboration with EU partners in IST projects.

Examples showing how this information has been reported previously can be found in Deliverables D03 and D04 (reports from the Asia and S. Africa workshops, respectively).

9 Other material available from 6DISS

9.1 IPv6 technical training material

6DISS provides an IPv6 technical training course that comprises both slides and hands-on sessions. It is intended for engineers and network managers (especially from ISPs) who will work with equipment on a daily basis, and who want a deeper technical training on IPv6 configuration and management. The main objectives of this “complementary, non-workshop training” are:

- To develop an IPv6 training course for engineers (e.g. deployment engineers, maintenance engineers, NOC personnel)
- To give IPv6 training to engineers (e.g. deployment engineers, maintenance engineers, NOC personnel) in a testbed laboratory

The training course will last 1 week and will cover the same items as in the workshops, but with more focus on hands-on practical examples. Equipment from Cisco, Alcatel and Juniper is available. Typically, the course is suitable for up to 20 people.

The course can be held either at the Brussels or Paris laboratories, or in the targeted regions. More details will be included in Deliverable D12: “IPv6 Training Material” (due M12).

9.2 Cisco IPv6 technical e-learning material

Cisco has developed an e-learning course, which complements the 6DISS e-learning package with a deeper level of training on IPv6, but oriented towards Cisco customers and Cisco devices. An arrangement has been made whereby this course can be accessed free of charge, for non-commercial purposes, using a specific username and password combination.

Conclusion

Dissemination through workshops is one of the major activities in the project, but due to time and budget constraints, 6DISS cannot deliver an unlimited amount of workshops. By providing a “Training the Trainers” facility, 6DISS is able to train other people, who can then support the 6DISS goals by disseminating the information further. Typical situations in which this can be beneficial are when:

- regions wish to take advantage of the 6DISS material, independently from the official workshops.
- people in the targeted regions wish to make some training prior to the workshop
- due to high travel costs or other constraints, persons are not able to attend the workshop
- due to the success of the workshop, the local organisation itself wishes to run several more in the region
- as a result of a workshop on one particular topic, interest is generated in some of the other 6DISS topics (e.g. specialist programmes for Network Operation Centres, ISPs, or regulators)

Therefore, whilst also useful for the 6DISS presenters, the information in this document is aimed primarily at non-6DISS persons who are less familiar with the technical content in some (or all) of the IPv6 modules that comprise the set of slides that represent the 6DISS workshop material.

Training can be given in Europe (Brussels or Paris), or at a local location; ideally immediately prior to - or after - a workshop. Such a “Training the Trainers” course is typically suitable for up to 20 people.

This Deliverable has described the supporting material that is available to those who will make the dissemination, via the workshops in the targeted regions. It therefore comprises a toolkit for trainers containing the following items:

- Guidelines regarding the fundamentals of teaching
- Guidelines on how to organise a workshop on IPv6
- Information on where to find the latest workshop module material
- An instructors’ guide to accompany each module, containing:
 - o a list of key messages to impart to the participants
 - o questions, that will determine whether or not the participants have understood the module
- Information on how to reserve, access, ... the remote laboratories in Brussels and Paris
- Information on the e-learning package
- Information about the Tiger Team
- The feedback questionnaire
- Network connectivity information that should be collected from the region

In addition, the slide set of modules has been - and will continue to be - enhanced with “speaker notes” giving guidelines for the presenter, in terms of:

- additional speaker notes to accompany the slides
- identification of which slides are mandatory / optional

Finally, it was mentioned that 6DISS provides a technical training course for people who will work closely with IPv6 equipment, and who require more “hands-on” training.