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Abstract:

This deliverable presents a report from the workshop held in Luanda, Angola from the 11th - 13th October 2011. The presentation material is listed, the attendees and their affiliations are given, and the opportunities for further co-operation and follow-up actions are described.

Keywords:

IPv6, Support, Training, Testbeds, Modules, 6DEPLOY, 6DEPLOY-2, Hands-on exercises

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Executive Summary

One of the main activities in the 6DEPLOY-2 project is to organise workshops to train the different Internet communities in the areas of IPv6 deployment, configuration, and usage. This project is a follow up of previous project activities within and outside the Framework Programmes of the European Commission.

This deliverable presents a report from the workshop held in Luanda (Angola) from 11th - 13th October 2011. The following workshop details are described in this report: a) the workshop attendees and their affiliations, b) the programme outline, c) the material presented, d) hands-on exercises, e) an assessment of the opportunities for further co-operation and f) an analysis of the feedback questionnaires from the participants.

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1. INTRODUCTION

1.1 6DEPLOY-2 Objectives

The following comprise the 6DEPLOY-2 objectives:

- to support the deployment of IPv6, in Europe and developing regions

- to sustain the wealth of 6DEPLOY training material (e-learning package with subtitles in national languages, presentation material, exercises, etc.)

- to create a catalyst of global IPv6 expertise through the installation of strategically-placed sustainable IPv6 training labs

- to synchronise with the training schedules of AfriNIC and LACNIC (and also APNIC) to exploit training opportunities cost effectively in Africa, Latin America and Asia

- to revive the IPv6 Cluster

- to describe deployment examples on the project Website

- to exploit the expertise and high quality training material from 6DEPLOY, including presentations, the e-learning course and the available IPv6 Labs, and - whilst continuing to offer professional training to organisations in Europe and developing countries - focus on supporting real deployments

- to maintain and update the 6DEPLOY material and include new training media, and multiply its training effectiveness through courses which educate other trainers about the basics of IPv6, so that they can teach others ("training trainers")

- to extend to global scale the IPv6 Labs. Sustainability is achieved initially through the careful selection of locations for the installations (e.g. within NRENs) where the connectivity, funding and qualified staff support are all secured

- to support the (human) networking between the Lab managers with regular workshops.

One of the main activities in the 6DEPLOY-2 project is therefore to organise workshops to train the different Internet communities in the areas of IPv6 deployment, configuration, operation, and management. This activity is a follow up of previous project's activities within and outside the Framework Programmes of the European Commission.

1.2 6DEPLOY-2 Workshop Methodology

The 6DEPLOY-2 methodology relating to the workshops is shown in the diagram below:

Expertise & material from 6NET, Euro6IX, GEANT, 6DISS, NRENs → IPv6 modules tuned for each event → IPv6 training → Support for IP6 deployment and future FP participation

Personal expertise & Cookbooks   Material preparation   Dissemination   Longer-term assistance
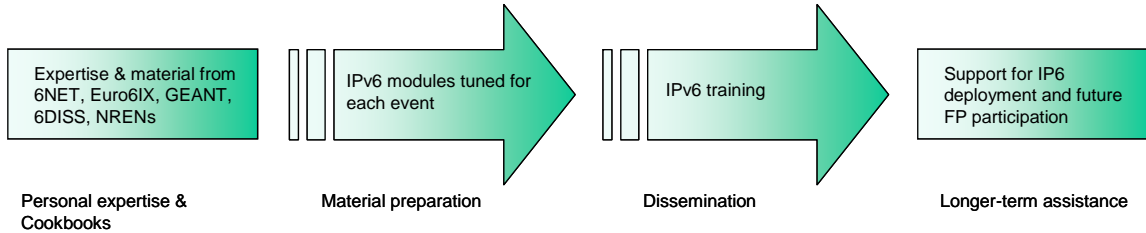
Figure 1-1: 6DEPLOY-2 methodology (diagrammatically)

The approach is to use course material available from 6DEPLOY and elsewhere that relates to IPv6, the e-learning course, and the 6NET IPv6 Deployment Guide book, together which will form the basis of the training material. This training material is supplemented with knowledge from partners' participation in events such as IPv6 Forum meetings, IPv6 Task Force meetings, Internet2 meetings, and the IETF, and from the experience of similar activities brought to the project by the representatives of the Internet Registries in North and South America, the Asia-Pacific region, Africa, and Europe. The knowledge is disseminated through training sessions that, for practical reasons, are often held in conjunction with AfriNIC, LACNIC, APNIC, AfNOG, APRICOT, and ISOC meetings.

After each workshop, feedback reports are collected from the participants, enabling 6DEPLOY-2 to assess the impact of the presentations and to identify any areas that need improvement.

The full set of dissemination materials (including the e-learning course and an increasing number of managed testbeds) is available from 6DEPLOY and partners´ own sources. This includes presentation slides on all issues of Internet deployment and evolution; especially IPv4-IPv6 transition strategies, DNS, DHCP, routing, QoS, MobileIP, multicast, renumbering, auto-configuration, security, monitoring and management tools, and applications. This material was described in the deliverable D1.1.1: "Report of the available training material and the assignment of partners responsible for maintaining each item".

This deliverable presents a report from the workshop held in Luanda (Angola) from the 11th - 13th October 2011. The workshop comprised both slide presentations and "hands-on" exercises using remote testbeds for routing exercises.

Chapter 2 of this document explains the general motivation for running IPv6 workshops, and

Chapter 3 describes the specific details of this workshop, in terms of the attendees, the modules that were presented, and the "hands-on" exercises that were performed. Chapter 4 identifies opportunities for further collaboration in the region and follow up actions, Chapter 5 summarises the analysis of the feedback questionnaires that were filled in by the participants, and Chapter 6 provides some general conclusions.

2. THE WORKSHOPS (GENERAL)

Workshops are one of the main mechanisms used by 6DEPLOY-2 to transfer information and to build collaboration.

6DEPLOY-2 is structured to provide an ideal platform for the discussion of deployment scenarios and the exchange of best practices, thereby avoiding duplication of effort, by preventing the waste of time on techniques that are known not to have been deprecated, and generally making the most efficient use of the available resources in a region. Partners in 6DEPLOY-2 have deployed IPv6 on a production basis in their own NRENs and University networks, and have documented their experiences in Cookbooks and in IETF informational/best common practice RFCs. The manufacturer in the consortium is building IPv6 products.

The workshops are not only intended to lead to an improved quality of the Internet infrastructure in developing countries, but will also raise the competence of the attendees and, in exploiting the personal contacts made through 6DEPLOY-2, facilitate and encourage the participation of their organisations in future FP7 calls and beyond.

Impacts from the workshops will include:

- A positive effect towards preventing the "brain drain" from developing countries by bringing interesting and state-of-the-art activities into these regions, thus making information and knowledge resources accessible to scholars both locally and globally;

- An expansion of the conditions for growth by enabling the exchange of ideas, launching joint experiments and projects, disseminating RTD results, and activating market forces; all of which are substantial elements in the process of regional development;

- Making European research and industrial concerns aware of the highly skilled personnel who can contribute to the urgently needed improvement of ICT infrastructures, resulting in an increase of the demand for specialized services provided by the highly skilled academics and researchers of the region; and

- The identification of IPv6 deployment activities in the region and an exchange of information about deployment experiences.

While IPv6 standards and services are quite stable, regional variations in practices and operations will require slightly different approaches for collaboration and dissemination. Therefore, the material for these workshops was collected, and the workshop schedules,

formats, and contents were tailored in conjunction with the local organisers so as to suit the type of participants, the subjects to be addressed, the location, the host organisation, the sponsors, etc.

3. THE 6DEPLOY-2 WORKSHOP IN LUANDA (ANGOLA)

This IPv6 Workshop was held in Luanda (Angola) from October 11th - 13th, 2011. In the following paragraphs we provide information about the workshop, including the programme outline, and the material that was presented.

3.1 Overview

Carlos Friaças from FCCN and Nishal Goburdhan from AfriNIC led the workshop.

The course started with the description of the 6DEPLOY-2 project, followed by an introduction, mostly focused on the problem statement i.e. IPv4 address exhaustion. The fundamentals of IPv6 were then taught, starting with basic addressing, drawing parallels of equivalent IPv6 protocols to the basic functionality protocols that engineers use today with IPv4, IPv6 sub-netting and address planning. Autoconfiguration was the next topic, followed by the DNS and Management modules. Then, some basic applications were described, before the routing module was presented. The theory part of the workshop ended with the transition module. The last day was fully dedicated to "hands-on" exercises, where the participants practiced taking a IPv6 prefix, breaking it up and allocating it to the remote labs and then proceeding to configure a full dual-stacked network (addressing, routing).

3.2 Attendees

	Full Name	Organisation
1	Aderito Martins	UNIBELAS
2	Aimée Rosa	BPC
3	Amélia Gomes	INACOM
4	Anderson Leite	BNI
5	Artur Moreira	Cinfotec
6	Claudio Patricio F. Pereira	Mstelcom
7	Daniele Gobbo	UCAN
8	David Neto	ACS
9	Edgar Ferreira	Netone
10	Felix Cunha	Infrasat
11	Filomeno Martins	ITA
12	Flavio Vunda	ACS
13	Gaspar Mateus	Tvcabo
14	Geraldo Sachipengo Pambasange	Cinfotec

15	Hadjani Silva	Mstelcom
16	Hildebrando Costa	Movicel
17	Honorio Adolfo	Atelecom
18	Jeremias Durão	Estado Maior General
19	João Vicente Rocha	Atelecom
20	José Diogo	Multitel
21	Kizeidioko Antonio	UNINET
22	Leonel Augusto	AAPSI
23	Luis Waleka	Movicel
24	Mario Pinho	Netone
25	Mauro Silva	Netone
26	Mungo Saraiva	CNTI
27	Nelson Lopes	Tvcabo
28	Oscar Zovo	Mstelcom
29	Paulo figueredo	Tvcabo
30	Paulo Gomes Cristovão	Mstelcom
31	Paulo Sagueve	CMC
32	Pepino prazeres	Movicel
33	Rosario Correia	BCI
34	Sadrach Costa	Startel
35	Silvio Almada	AAPSI
36	Simão Queta	ATelecom
37	Sozinho Pedro Neves	Itelnet
38	Suzete Sebastião	ACS
39	Tiago Mota	NCR/SNET
40	Victor Gomes	Velonet
41	Wagner Bruno Pereira Sousa	BNI
42	Walter Ernesto	Startel

Table 3-1: Luanda (Angola) Workshop participants

The participants represented a broad sector of the country's ICT community. The local telecommunications regulator and the Army were represented on the government side. We also had attendees from local Universities (private and public) and the banking sector. The majority of participants were from local IT integration companies as well as ISPs and mobile providers.

3.3 Workshop programme

The agenda was agreed on after close collaboration with the local organisers. The meeting agenda and the related material were submitted in advance so that the local organisers could decide which topics should be prioritised and so manage the logistics accordingly. The programme of the workshop is presented in the following table:

Date	Modules and Topics Covered
11/10/2011	[a] AfriNIC's INRM course
12/10/2011	[a] 6DEPLOY-2 Project [b] IPv6 Introduction [c] Addressing [d] DNS [e] Management [f] Applications [g] Security [h] Routing [i] Transition
13/10/2011	[a] Hands-On exercises

Table 3-2: Luanda (Angola) Workshop programme

3.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
INRM course (english)	Nishal Goburdhan	AfriNIC
Introduction; Addressing; DNS; Management; Applications; Security; Routing; Transition (all in portuguese)	Carlos Friaças	FCCN
Hands –On exercises (english)	Nishal Goburdhan & Carlos Friaças	AfriNIC & FCCN

Table 3-3: Luanda (Angola) Workshop list of modules used

The class was divided into 12 groups and each group was assigned to one of the routers in the AfriNIC and RENATER remote labs. The step-by-step instructions and all required supporting information were projected onto the wall. The two trainers supervised the exercises, making clarifications and explanations when required.

4. OPPORTUNITIES FOR FURTHER CO-OPERATION

The links to 6DEPLOY-2's material were given to the participants. They were also told and shown how to book any of the labs in the 6DEPLOY-2 project and to practice on their own, either using the provided lab manual or their own scenarios.

One of the attendees told the trainers he had some spare routers with which he could build up an identical local lab.

The local organiser (AAPDSI) held a small half-day event for managers in the morning of October 10th. Nishal Goburdhan (AfriNIC) and Carlos Friaças (FCCN) presented on behalf of 6DEPLOY-2, describing the status of IPv6 in Africa and in Europe, respectively.

5. ANALYSIS OF THE FEEDBACK QUESTIONNAIRES

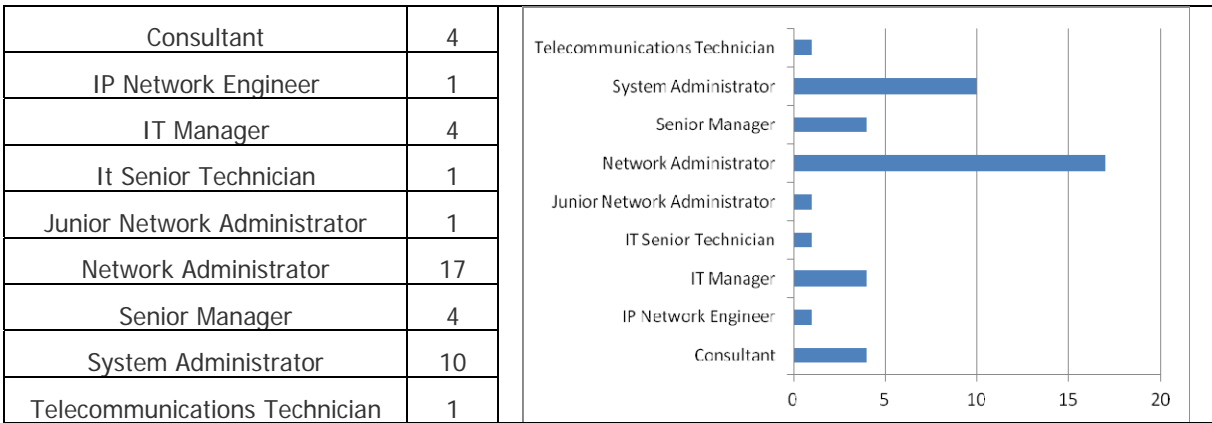35 of the total 42 participants completed the feedback questionnaires.

5.1 Pre-workshop knowledge and skills

«Some» and «None» answers combined represent over 69% of input, clearly showing the selected topics for this training was adequate.

|	
Some	41,71%
None	27,42%
Majority	24,57%
N/A	0,05%
All	0,01%
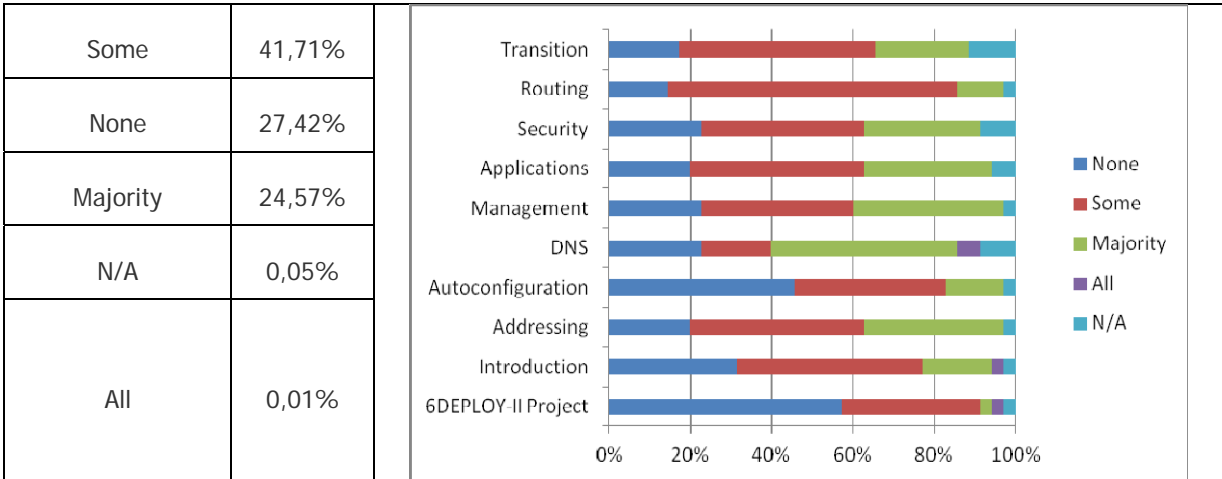
5.2 Primary role in the organization

Some of the participants indicated more than one role. Network and Systems Administrator were the clear majority in this training.

|	
Consultant	4
IP Network Engineer	1
IT Manager	4
It Senior Technician	1
Junior Network Administrator	1
Network Administrator	17
Senior Manager	4
System Administrator	10
Telecommunications Technician	1

5.3 Presentation

Over 90% of answers indicate the presentation of the 6DEPLOY material was good or excellent.

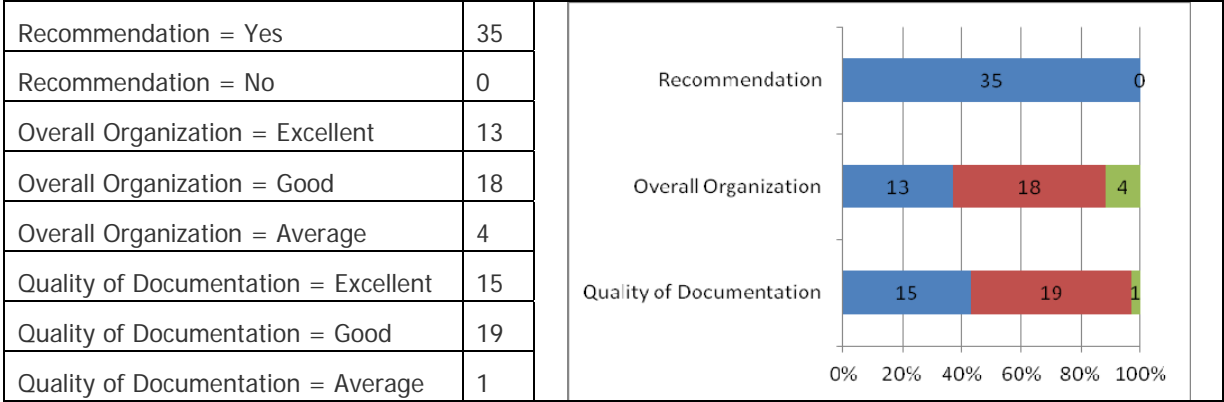| Good	60,85%
Excellent	31,71%
N/A	4,2%
Average	2,5%
Poor	0,5%
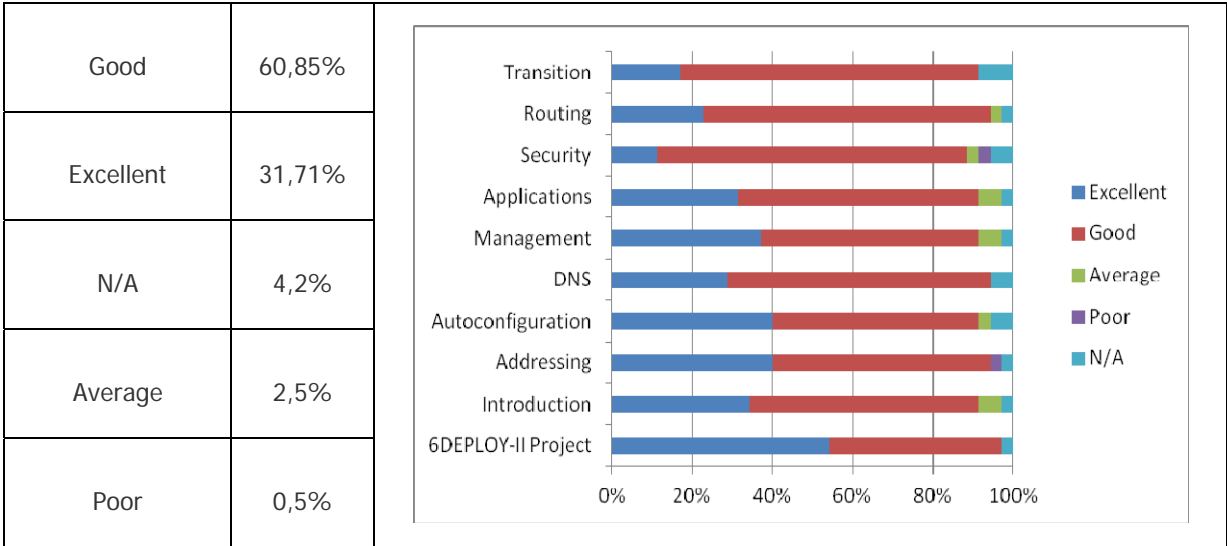
5.4 Usefulness

Almost 95% of answers indicate the presentations were considered either useful or very useful.

Very Useful	51,14%
Useful	43,71%
Slightly Useful	3,42%
N/A	1,71%
Useless	0%
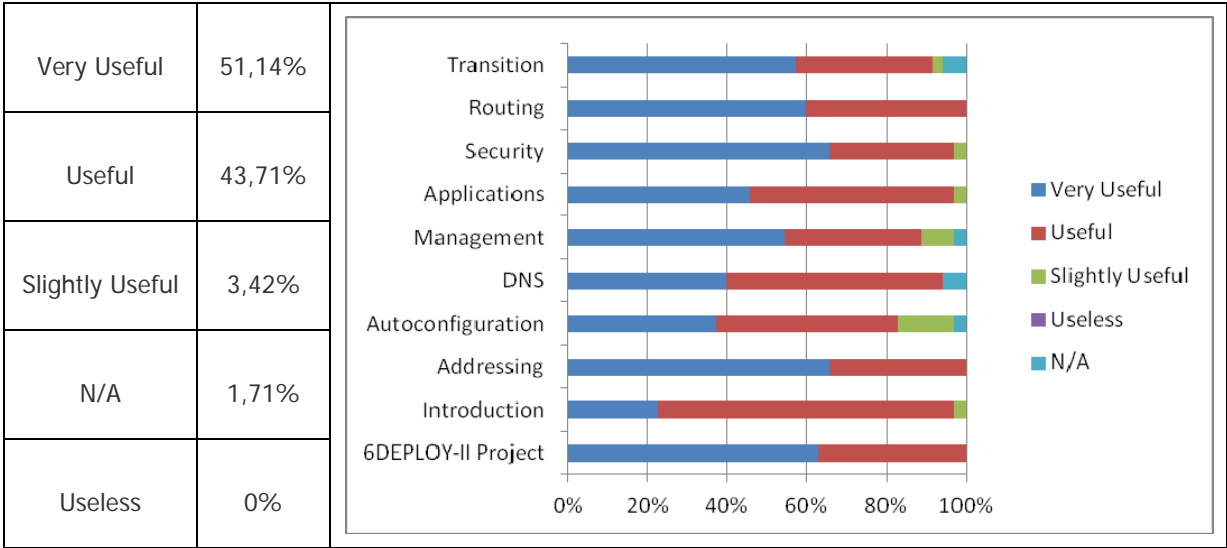
5.5 General event organization

The collected data shows that people were generically happy with the event organization and the provided documentation quality. All participants who delivered their feedback forms said they would recommend this workshop to their colleagues.

Recommendation = Yes	35
Recommendation = No	0
Overall Organization = Excellent	13
Overall Organization = Good	18
Overall Organization = Average	4
Quality of Documentation = Excellent	15
Quality of Documentation = Good	19
Quality of Documentation = Average	1

6. CONCLUSIONS

Workshops are a key mechanism through which information, knowledge, and know-how are transferred to less experienced countries and participants. The workshops enable us to build constituencies and raise awareness; disseminate, benchmark, and validate the research results from the EU's Framework Programmes; promote European technologies; exchange best practices; and offer information related to standards and interoperability issues.

This 6DEPLOY-2 workshop took place in Luanda - Angola from October 11th - 13th 2011. The Workshop was held in collaboration with AAPSI (the Angolan Internet Providers Association) who organized all the logistics for the event and also a half-day event aimed at managers. AAPSI published an article on its website, about the event, at http://www.aapsi.og.ao/index.php?option=com_content&view=article&id=51:workshop-ipv6-lir&catid=22:formacao&Itemid=60. FCCN and AfriNIC led this workshop using 6DEPLOY labs deployed in Mauritius (AfriNIC) and Paris (RENATER).

In summary, this workshop should be considered a success with regard to the dissemination of IPv6 in Portuguese speaking Western Africa.

7. REFERENCES

6DEPLOY-2 website: http://www.6deploy.eu

Hands-on modules: http://www.6deploy.eu/index.php?page=hands-on

How-to organise an IPv6 workshop:

http://6diss.6deploy.eu/workshops/workshop-guidelines.pdf

Training the trainers workshop: http://6diss.6deploy.eu/workshops/ttt/

e-learning package: http://www.6deploy.eu/index.php?page=e-learning

6DEPLOY-2 Workshops Agenda and detailed information:

http://www.6deploy.eu/index.php?page=workshops2

AAPSI: http://www.aapsi.og.ao