



Title:	Deliverable D1.14 Report from the 13th Workshop in San José, Costa Rica	Document Version: 1.0
---------------	---	-------------------------------------

Project Number: 261584	Project Acronym: 6DEPLOY-2	Project Title: IPv6 Deployment Support
----------------------------------	--------------------------------------	--

Contractual Delivery Date: 31/01/2013	Actual Delivery Date: 31/12/2011	Deliverable Type* - Security**: R – PU
---	--	--

* Type: P – Prototype, R – Report, D – Demonstrator, O – Other

** Security Class: PU- Public, PP – Restricted to other programme participants (including the Commission Services), RE – Restricted to a group defined by the consortium (including the Commission Services), CO – Confidential, only for members of the consortium (including the Commission Services)

Responsible and Editor/Author: A. Dans / A. Servin	Organization: LACNIC	Contributing WP: WP1
--	--------------------------------	--------------------------------

Authors (organisations): Alexandra Dans & Arturo Servin (LACNIC)
--

Abstract: This deliverable presents a report from the workshop held in San José, Costa-Rica from September 7 th – 9 th , 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, LAC, Training, Modules, 6DEPLOY
--

Disclaimer

The 6DEPLOY-2 project (number 261584) is co-funded by the European Commission under the Framework Programme 7. This document contains material that is the copyright of certain 6DEPLOY-2 beneficiaries and the EC, and that may not be reproduced or copied without permission. The information herein does not necessarily express the opinion of the EC.

The EC is not responsible for any use that might be made of data appearing herein. The 6DEPLOY-2 beneficiaries do not warrant that the information contained herein is capable of use, or that use of the information is free from risk, and so do not accept liability for loss or damage suffered by any person using this information.

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 report details the IPv6 workshop which took place from September 7th – 9th, 2011 on the premises of the UNA- Universidad Nacional (San José, Costa-Rica).

The workshop was organized by LACNIC. 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) an assessment of the opportunities for further co-operation and follow-up actions planned, and e) an analysis of the feedback questionnaires from the participants.

Table of Contents

- 1. Introduction 6**
 - 1.1 6DEPLOY-2 Objectives 6**
 - 1.2 6DEPLOY-2 Workshop Methodology 7**
- 2. The Workshops (general) 9**
- 3. The 6DEPLOY-2 Workshop in San José, Costa-Rica 11**
 - 3.1 Overview 11**
 - 3.2 Attendees 11**
 - 3.3 Workshop programme 12**
 - 3.4 Presentation material 13**
 - 3.4.1 Modules 13
- 4. Opportunities for Further Co-operation 15**
- 5. Analysis of the Feedback Questionnaires 16**
 - 5.1 General questions related to participants and IPv6 16**
 - 5.2 Questions regarding the workshop 17**
 - 5.3 Results graphics 18**
 - 5.4 Survey participation 20**
- 6. Conclusions 21**
- 7. References 22**

Table of Figures

Figure 1-1: 6DEPLOY-2 methodology (diagrammatically) 7

Figure 5-1: Usefulness of the topic 19

Figure 5-2: Quality of the presentations 19

Figure 5-3: Familiarity with the topics 20

Table of Tables

Table 3-1 Costa-Rica Workshop list of participants 12

Table 3-2: Costa-Rica Workshop programme 12

Table 3-3: Costa-Rica Workshop list of modules used 13

Table 5-1: Questions related to participants and IPv6 16

Table 5-2: General questions regarding the workshop 17

Table 5-3: Usefulness, quality of presentations and familiarity with the topics 18

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:

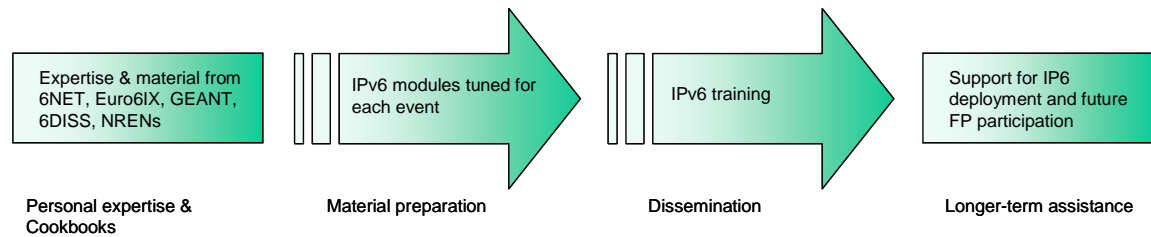


Figure 1-1: 6DEPLOY-2 methodology (diagrammatically)

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 several 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 San José, Costa-Rica from September 7th to 9th, 2011. The workshop comprised both slide presentations and hands-on exercises.

Chapter 2 of this document explains the general motivation for running IPv6 workshops, and Chapter 3 describe 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, University networks and even on much larger scales. They 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, 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 SAN JOSÉ, COSTA-RICA

This workshop was held on September 7th - 9th, 2011. The event was held in the city of San José (Heredia), Costa Rica with the support of the Universidad Nacional.

The meeting was open to the regional community and focused mainly on training and encouraging participants to use and deploy the new IPv6 protocol.

Details of the workshop and the training material used can be found in 6DEPLOY's project web site:

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

and:

<http://eventos.lacnic.net/evra/publico?la=en&id=192836&cod=info>

3.1 Overview

The 6DEPLOY-2 representative at the workshop was Arturo Servin.

The event was attended by 26 participants representing different sectors including governments, regulatory bodies, ISPs, ccTLD, and content providers.

The workshop included theory and practical material.

3.2 Attendees

Below is a list of the 26 persons that attended:

Name	Organization
ADRIÁN MAZÓN VILLEGAS	SUTEL
VIVIAN VALVERDE ARGUELLO	ICE (INSTITUTO COSTARRICENSE DE ELECTRICIDAD Y TELECOM.)
EDGAR VEGA	UNIVERSIDAD NACIONAL DE COSTA RICA
JORGE ARTURO VILLALOBOS MADRIGAL	UNIVERSIDAD NACIONAL SRB
ERWIN BOTAS	CRITICAL COLOCATION, S.A.
SAMUEL OSVALDO SANTOS RAMOS	AMNET CABLE COSTA RICA (AMNET CABLE COSTA RICA)
SUSANA ZÚÑIGA MIRANDA	UNIVERSIDAD NACIONAL/MINISTERIO DE HACIENDA
SEIDY RODRÍGUEZ CALDERÓN	UNIVERSIDAD NACIONAL
ALLAN ARTURO CORRALES ACUÑA	SUPERINTENDENCIA DE TELECOMUNICACIONES

ELVIN ROJAS RAMÍREZ	UNA SRB
DANIEL QUESADA	SUTEL
CARLOS WATSON	ISOC COSTA RICA
LISSET ROSALES ALPÍZAR	VICEMINISTERIO TELECOM
RAFAEL ENRIQUE CHOCOOJ BARRIOS	AMNET CABLE COSTA RICA
HECTOR MENA GUTIERREZ	ICE
EDGARDO RAMOS ROQUE	UNIVERSIDAD NACIONAL
RONALD ESQUIVEL JIMÉNEZ	ICE (INSTITUTO COSTARRICENSE DE ELECTRICIDAD Y TELECOM.)
JOSE PABLO MADRIGAL ACOSTA	HOSTARICA (CORPORACION HOSTARICA S.A.)
ADRIAN MURILLO	HOSTARICA
CÉSAR ANDRÉS CALVO LÓPEZ	NIC CR
HAIRO VILLALOBOS VILLALLOBOS	UNIVERSIDAD NACIONAL COSTA RICA
JUAN PABLO DELGADO	UNIVERSIDAD NACIONAL
ALEJANDRO BERROCAL VALVERDE	VICEMINISTERIO DE TELECOMUNICACIONES
SUGHEY SALAS	ICE
VIRGILIO RODRIGUEZ	CABLE ONDA
JULIO OSES	CABLE ONDA

Table 3-1 Costa-Rica Workshop list of participants

3.3 Workshop programme

The programme of the workshop is presented in the following table:

Date	Time	Topic
7 th September	09:00 - 13:00	Introduction Addressing
	14:00 – 17:00	Autoconfiguration New Protocols
8 th September	09:00 - 13:00	Routing Protocols I
	14:00 – 17:00	Routing Protocols II DNS
9 th September	09:00 - 13:00	Transition Mechanisms
	14:00 – 17:00	Security

Table 3-2: Costa-Rica Workshop programme

3.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
Introduction to 6DEPLOY	Arturo Servin	LACNIC
Introduction to IPv6	Arturo Servin	LACNIC
IPv6 Basics: Protocol and Addressing	Arturo Servin	LACNIC
IPv6 Associated Protocols	Arturo Servin	LACNIC
IPv6 Autoconfiguration	Arturo Servin	LACNIC
IPv6 Deployment and Transition mechanisms	Arturo Servin	LACNIC
IPv6 Security	Arturo Servin	LACNIC
IPv6 Routing	Arturo Servin	LACNIC
IPv6 on clients (Windows and Linux)	Arturo Servin	LACNIC
DNS	Arturo Servin	LACNIC

Table 3-3: Costa-Rica Workshop list of modules used

3.4.1 Modules

Below is a brief description of each module's content:

- **IPv6 Introduction:** This module explains why a new version for IP, IPv6, has been developed. A brief history of IPv6, its motivation and benefits are given.
- **IPv6 Protocol:** This module describes IPv6 protocol: IPv6 packet header, extensions headers and differences with IPv4 headers. Packet size issues and upper layer considerations are also treated.
- **IPv6 Addressing:** This module explains the IPv6 addressing architecture, the different types of addresses (unique local IPv6 addresses, interface IDs, multicast addresses), their textual representation, how these are built and related to a layer 2 address.
- **IPv6 associated protocols:** This module describes new protocols associated to IPv6: e.g. Neighbour Discovery Protocol, ICMPv6, MLD, etc.
- **IPv6 Autoconfiguration:** This module describes stateful (DHCPv6) and stateless (Router Solicitation/Router Advertisement) autoconfiguration mechanisms.

- **IPv6 DNS:** This module describes new Resource Records for IPv6 DNS, availability of IPv6 in the root servers zone and CC-TLDs, etc.
- **Routing:** This module mainly describes the differences between IPv4 and IPv6 routing protocols for OSPFv3, EIGRP, RIPng, BGP4+, ISIS
- **Security:** Several issues are covered like the IPsec model, privacy extensions, ND threats, IPv4 vs. IPv6 Threat Analysis, IPv6 security issues, practical IPv6 security issues and firewalling IPv6. Security issues from transition and coexistence point of view are also provided.
- **Deployment mechanisms:** This module explains different approaches to deploy IPv6 in an IPv4 environment.
- **Transition mechanisms:** Transition concepts are introduced and several transition mechanisms are covered: Dual Stack, tunnels, tunnel broker, 6to4, Teredo, Softwires, NAT64, and 6rd.

4. OPPORTUNITIES FOR FURTHER CO-OPERATION

In all the workshops, the attendees were informed on how to stay in contact with the 6DEPLOY-2 partners and LACNIC in case they have questions regarding IPv6 deployment, addressing plans, etc.

Additionally, anyone can follow the e-learning course and/or check the availability of the 6DEPLOY-2 remote labs and use these.

5. ANALYSIS OF THE FEEDBACK QUESTIONNAIRES

A questionnaire has been specially designed for the purpose of getting feedback from the participants regarding the suitability of the course material, and the presenters' ability to convey information, and the relevance of the information to the expectations of the attendees.

5.1 General questions related to participants and IPv6

Employment sector	Job Function	Do you use IPv6?	Does your organization use IPv6?
Regulation	Telecommunications Engineer	No	No
Government	Networks Engineer, ICT	No	No
Education- Government	IT Manager	No	No
ISP	Director IT	Yes	Yes
ISP, NGO	Board	Yes	Yes
Education	IT	No	No
Education	IT manager	No	No
Education- Government	Networks Engineer	Yes	No
Education	Networks Engineer	No	No
Education	Networks Engineer, Researcher, Professor	No	No
Government	Networks Engineer	No	Yes

Table 5-1: Questions related to participants and IPv6

5.2 Questions regarding the workshop

Quality of the course documentation

Excellent	72,72%
Good	27,27%
Average	0
Poor	0

General workshop organization

Excellent	81,81%
Good	18,18%
Average	0
Poor	0

Would you recommend the workshop to your colleagues

Yes	100%
No	0

Table 5-2: General questions regarding the workshop

Usefulness of the topic	Very useful	Useful	Slightly useful	Not useful
Presentation 1 - IPv6 Introduction	8	3	0	0
Presentation 2 - IPv6 Addressing	7	4	0	0
Presentation 3 – New Protocols	8	3	0	0
Presentation 4 - Autoconfiguration	8	3	0	0
Presentation 5 – DNS	9	1	0	0
Presentation 6 - Transition	8	2	0	0
Presentation 7 - Security	8	3	0	0

Presentation 8 - IPv6 Routing	9	2	0	0
Quality of the presentation	Excellent	Good	Average	Poor
Presentation 1 - IPv6 Introduction	8	2	0	0
Presentation 2 - IPv6 Addressing	9	2	0	0
Presentation 3 – New Protocols	8	2	0	0
Presentation 4 - Autoconfiguration	9	2	0	0
Presentation 5 – DNS	9	2	0	0
Presentation 6 - Transition	8	2	0	0
Presentation 7 - Security	9	1	0	0
Presentation 8 - IPv6 Routing	9	2	0	0
Familiarity with the topic?	None	Some	Most	All
Presentation 1 - IPv6 Introduction	0	1	1	7
Presentation 2 - IPv6 Addressing	0	1	1	7
Presentation 3 – New Protocols	0	1	2	7
Presentation 4 - Autoconfiguration	0	2	1	7
Presentation 5 – DNS	0	1	1	7
Presentation 6 - Transition	0	1	1	7
Presentation 7 - Security	0	1	3	6
Presentation 8 - IPv6 Routing	1	1	1	7

Table 5-3: Usefulness, quality of presentations and familiarity with the topics

5.3 Results graphics

Following are some graphics that represent the above results in a more friendly way, so as to ease their interpretation.

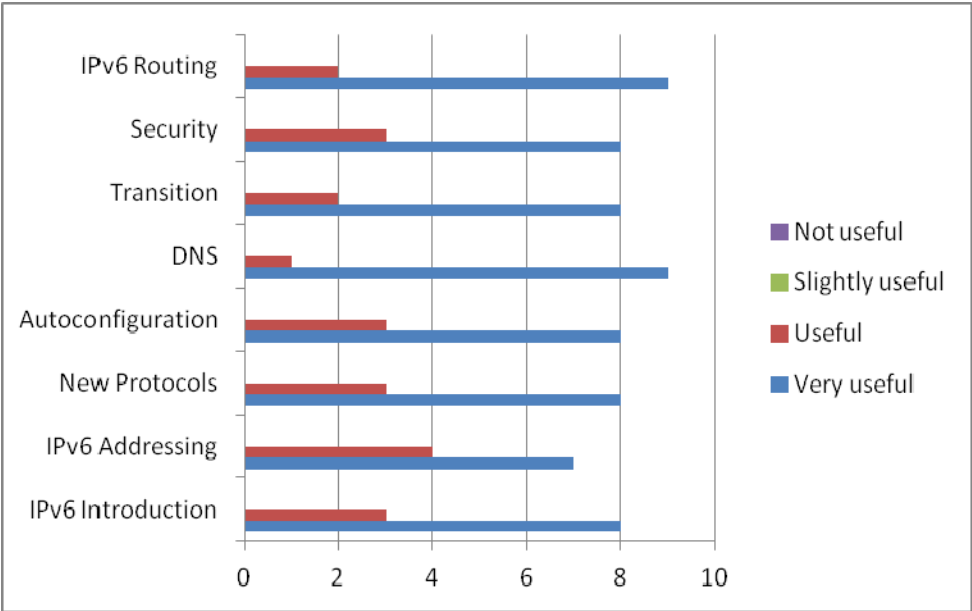


Figure 5-1: Usefulness of the topic

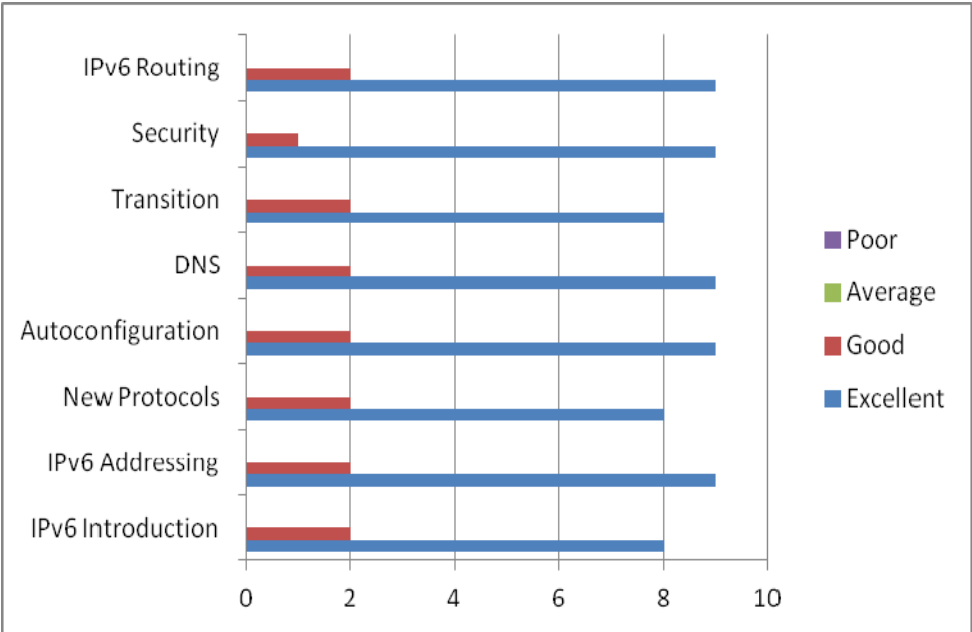


Figure 5-2: Quality of the presentations

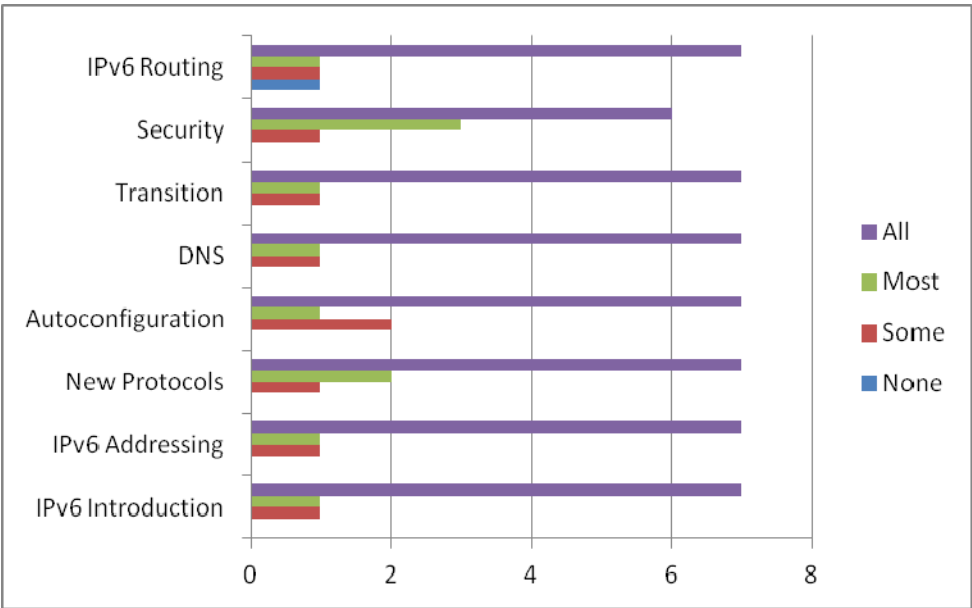


Figure 5-3: Familiarity with the topics

5.4 Survey participation

Answer	11	42,30%
No answer	15	57,69%

6. CONCLUSIONS

From the feedback of participants we concluded that the material and the presentation were outstanding. Attendees left the workshop ready to start deploying IPv6 in test-environments or to try it out in a production environment after testing.

In this workshop (probably accidentally) ISPs and customers came face to face and the customers discovered for the first time that some of the ISPs were providing IPv6 connectivity. Up until this workshop, the customers did not know the technical people to contact regarding deploying IPv6 and were given here the opportunity to talk and discuss deploying IPv6 in practice. This demonstrates the lack of communication between ISP's sales and technical people and how these events can be used to overcome some barriers.

We consider that this workshop was a success with regard to the dissemination of IPv6 in the Central Latin America region, although we identified that IPv6 has not been deployed widely yet, and we know that further work has to be done in the future.

7. REFERENCES

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

6DISS website: <http://www.6diss.org>

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>