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Abstract: This deliverable presents a report from the workshop held in Paramaribo, Suriname from July 13 th - 15 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.
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Keywords: IPv6, Support, LAC, Training, Modules, 6DEPLOY
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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 report details the IPv6 workshop which took place from July 13th – 15th, 2011 on the premises of the Torarica Hotel (Paramaribo, Suriname).

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.

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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:

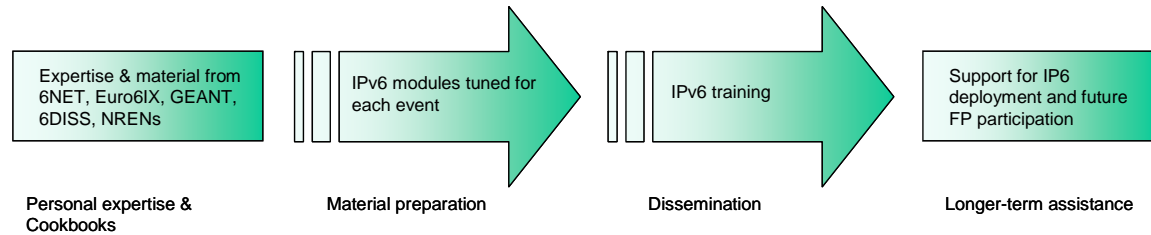


Figure 1-1: 6DEPLOY-2 methodology (diagrammatically)

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 Paramaribo, Suriname from 13th to 15th July 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 PARAMARIBO, SURINAME

This workshop was held on July 13th - 15th, 2011. The event was held in the city of Paramaribo, Suriname, with the support of the Caribbean Association of National Telecommunication Organizations (CANTO) which held their 27th Annual Conference and Trade Exhibition back-to-back with the LACNIC meeting.

The meeting was open to the regional community and focused mainly on training and encouraging participants to use and deploy the new IPv6 protocol and analyzing topics relating to Internet resource administration policies in the region, security issues, and resource certification.

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://lacnic.net/en/eventos/caribbean3/>

<http://eventos.lacnic.net/evra/publico?la=en&id=187600&cod=info>

3.1 Overview

6DEPLOY-2 representatives at the workshop were Arturo Servin and Carlos Martinez.

The event was attended by 64 participants representing different sectors including governments, regulatory bodies, ISPs, IXPs, content providers, and international carriers.

The workshop included theory and practical material, but because of the amount of participants the workshop did not include a practice session on Routing Protocols.

3.2 Attendees

Below is a list of the persons who registered:

Name	Organization
MALISA RICHARDS	KURU KURU CO-OPERATIVE COLLEGE
RICARDO ALAN KARDEC LOIOLA	INSTITUTO MUNICIPAL DE PESQUISAS ADMINISTRACAO E RECURSOS HUMANOS - IMPARH
THEA SMITH	MINISTRY OF TRANSPORT, COMMUNICATION AND TOURISM
GIOVANNI MADARI	SPANG MAKANDRA N.V.
ALVIN BLOEMENVELD	NV. ENERGIEBEDRIJVEN SURINAME
HENK YORKS	DESIGN IT
MARDIE KARTOSOEWITO	DIGICEL SURINAME
TJITROTAROENO STEVEN	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
SEBASTIAN BELLAGAMBA	INTERNET SOCIETY (ISOC)
BLUFPA ND GEORGE	MISABI TESTMANAGEMENT NV
AUGUST IMANG	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
CHANDRA RAMPADARATH	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
JOANNE SABAJO	KROSBÉY SOLUTIONS
CARLOS LINGER	KROSBÉY SOLUTIONS NV
CLAUDIA TOEKIMIN	KROSBÉY SOLUTIONS
HARESH WADHWANI	ITEE NV
MAX LARSON HENRY	CONSORTIUM FDS/RDDH; AHTIC (CONSORTIUM FDS/RDDH; AHTIC; CONSORTIUM FDS/RDDH)
GEMERTS MARLON W.	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
SPENCER THOMAS	NTRC
BRENT MC INTOSH	COLUMBUS COMMUNICATIONS TRINIDAD LIMITED. (COLUMBUS COMMUNICATIONS TRINIDAD LIMITED.)
YORDAN ALMENARES	RPBG
RAYNEL SASTROPAWIRO	PARBONET
PERSHAD SUSIL	RPBG
SOEMODIKROMO DENNY	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
JEAN MARIE ALTEMA	CAPITAL BANK
VENLO ROBBY	MINISTERIE VAN TRANSPORT, COMMUNICATIE AND TOERISME
JAI CHAND UDIT	TELECOMMUNICATIONS AUTHORITY SURINAME (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
MEREDITH LETER	TELECOMMUNICATIONS AUTHORITY SURINAME
MELANIE GROENEFELT	TELECOMMUNICATION AUTHORITY SURINAME (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
MARJORIE RIESKIN	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
HENRY NOBIBUX	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
LIEUW-SJONG RONALD	NEXT STEP CONSULTING NV
MARCEL IMANG	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
NICO SCHEPER	CARIX (CARIBBEAN INTERNET EXCHANGE (CAR-IX))
HAIDY AKOEB A	TAS
TARIQ SABOERALI	TELECOMMUNICATIONS AUTHORITY SURINAME
CHIRIC SOVAN	TELECOM AUTHORITY SURINAME
SHAIENDRA KOENJBIHARIE	TELECOMMUNICATION AUTHORITY SURINAME
GREGORY LEVANT	TAS
DIEGO MAAYEN	TELECOMMUNICATIONS AUTHORITY SURINAME (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
DAUDRY ADIPI	TELECOM AUTHORITY SURINAME
GUILLAUME BOUGUENON	ALL NETWORK TECHNOLOGIES SURINAME (ANTS)
RAOUL OESMANADI	COMPUTER HARDWARE SERVICES N.V.
CHIN SEE HOO ELTON	DSTN

GUY LESTER MALONE	TELECOMMUNICATIONS REGULATORY COMMISSION
FENDY SAHEBALI	DIGICEL SURINAME
ROBERTO PANSA	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
FILIP VAN DEN BOSSCHE	GUYACOM
JERREL DE FREYTA	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
MELESIA SUTHERLAND CAMPBELL	CABLE & WIRELESS
AFRA ACCORD	PRIVATE
JOSEPH MORRIS	MSJ-COMP (ISAC N.V.)
GARDELITO HEW A KEE	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
RAVI RAMCHARAN	INTRADESIGN
ANIEL DEBIDIN	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
ARNOLD MAJOKKO	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
AMEEKA GANESH	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)
RADJKUMAR RADJA	TELESUR (TELECOMMUNICATIONCOMPANY SURINAME - TELESUR)

Table 3-1 Suriname Workshop list of registered participants

3.3 Workshop programme

The programme of the workshop is presented in the following table. All the presentations can be downloaded here:

<http://lacnic.net/en/eventos/caribbean3/agenda.html>

Date	Time	Title of session
13/7/2011	14:00-17:00	Basic IPv6: Introduction, Addressing, Autoconfiguration, New Protocols.
14/7/2011	14:00-17:00	Routing Protocols I and II, DNS, Transition Mechanisms.
15/7/2011	14:00-15:00	IPv6 Security

Table 3-2: Suriname 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	Carlos Martinez	LACNIC

IPv6 Associated Protocols	Carlos Martinez	LACNIC
IPv6 Autoconfiguration	Arturo Servin	LACNIC
IPv6 Deployment and Transition mechanisms	Carlos Martinez	LACNIC
IPv6 Security	Carlos Martinez	LACNIC
IPv6 Routing	Arturo Servin	LACNIC
IPv6 on clients (Windows and Linux)	Arturo Servin	LACNIC
DNS	Carlos Martinez	LACNIC

Table 3-3: Suriname 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.

- Do you consider that technical level of the IPv6 workshop was adequate?
- Do you consider that the material (slides) used in the workshop were clear regarding its content?
- Do you consider that the speaker clearly presented the workshop content?
- Do think that the length of the sessions and the workshop were adequate?
- Did the workshop fulfil your expectations?

5.1 Statistics about the participants

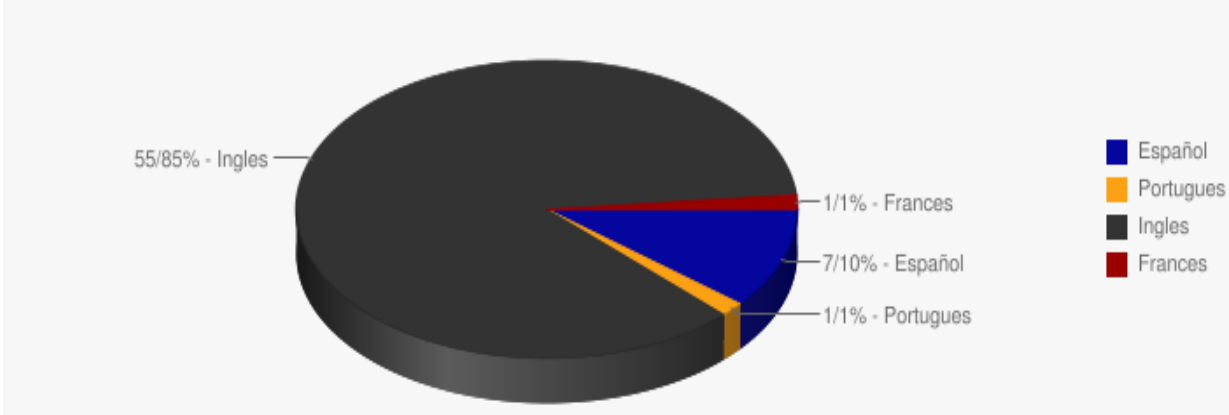


Figure 5-1: Languages

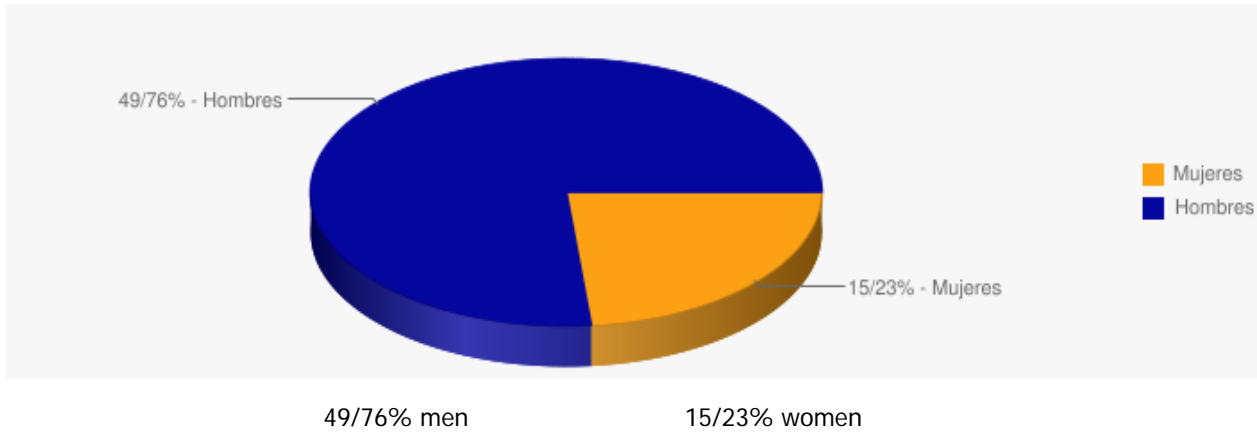
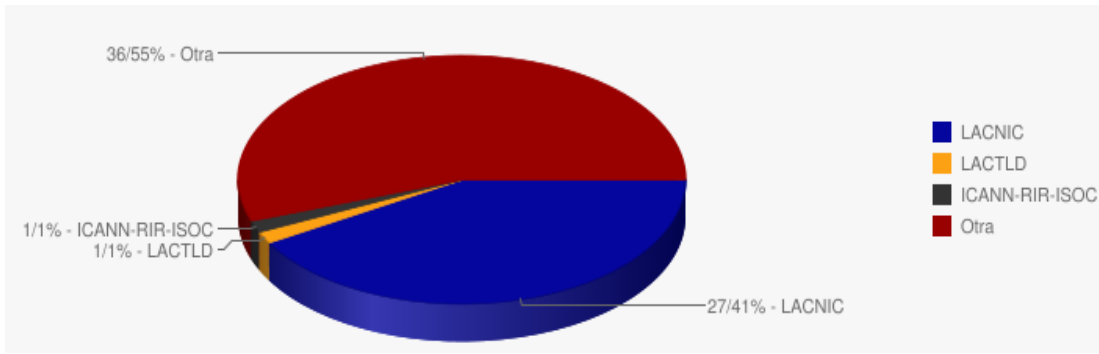
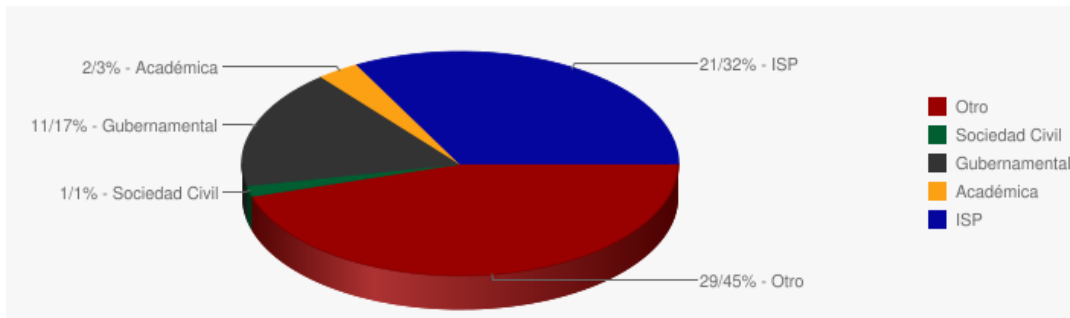


Figure 5-2: Gender



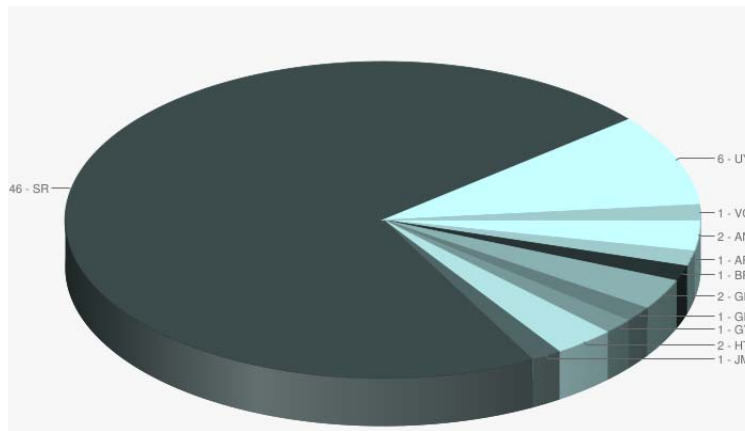
LACNIC: 27/41% 1/1% ICANN, RIR, ISOC 1/1% LACTLD 36/55% Other

Figure 5-3: Organization



2/3% Academia 21/32% ISP 11/17% Government
 1/1% Civil society 29/45% Other

Figure 5-4: Category



46/Suriname; 6/Uruguay; 1/St Vincent and Grenadines; 2/Curacao; 1/Argentina; 1/Brazil; 2/Grenada;
 1/French Guyana; 1/Guyana; 2/Haiti; 1/Jamaica

Figure 5-5: Countries

5.2 Questions regarding the workshop

Do you consider that technical level of the IPv6 workshop was adequate?	
Totally agree	27,78%
Agree	69,44%
Indifferent	2,78%
Disagree	0
Totally disagree	0
No answer	0
Not completed or non displayed	0
Do you consider that the material (slides) used in the workshop were clear regarding its content?	
Totally agree	19,44%
Agree	75%
Indifferent	2,78%
Disagree	0
Totally disagree	0
No answer	2,78%
Not completed or non displayed	0
Do you consider that the speaker clearly presented the workshop content?	
Totally agree	16,67%
Agree	69,44%
Indifferent	13,89%
Disagree	0

Totally disagree	0
No answer	0
Not completed or non displayed	0
Do think that the length of the sessions and the workshop were adequate?	
Totally agree	2,78%
Agree	83,33%
Indifferent	8,33%
Disagree	2,78%
Totally disagree	0
No answer	2,78%
Not completed or non displayed	0
Did the workshop fulfil your expectations?	
Totally agree	25%
Agree	66,67%
Indifferent	8,33%
Disagree	0
Totally disagree	0
No answer	0
Not completed or non displayed	0

Table 5-1: Questions regarding the workshop

5.3 Results graphics

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

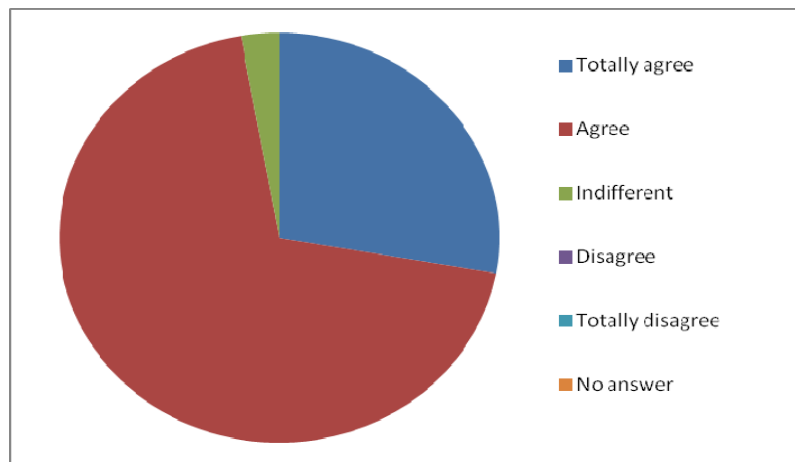


Figure 5-6: Do you consider that the technical level of the IPv6 workshop was adequate?

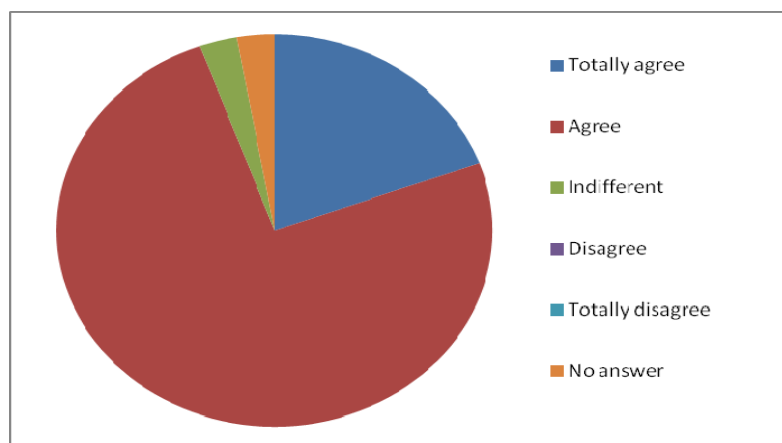


Figure 5-7: Do you consider that the material (slides) used in the workshop were clear regarding its content?

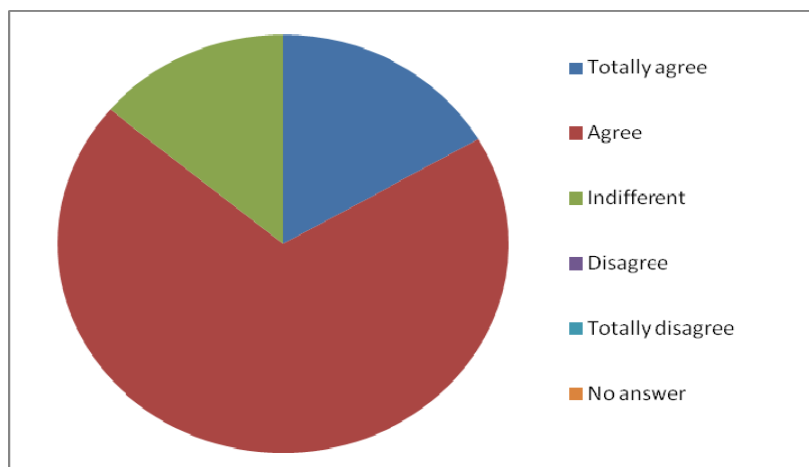


Figure 5-8: Do you consider that the speaker clearly presented the workshop content?

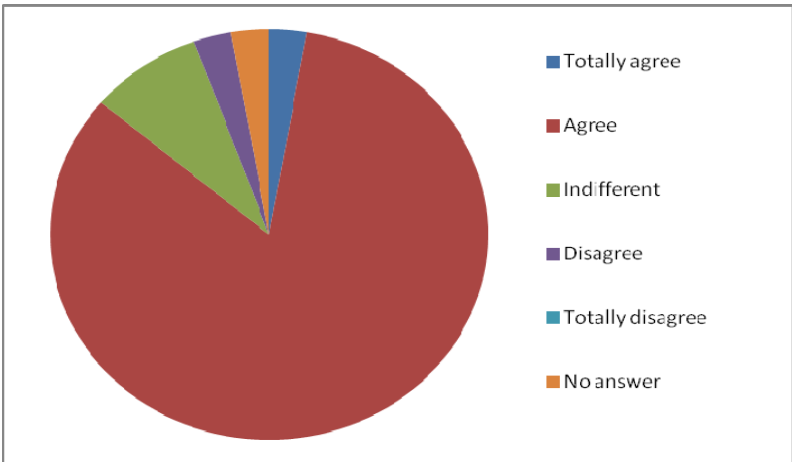


Figure 5-9: Do you think that the length of the sessions and the workshop were adequate?

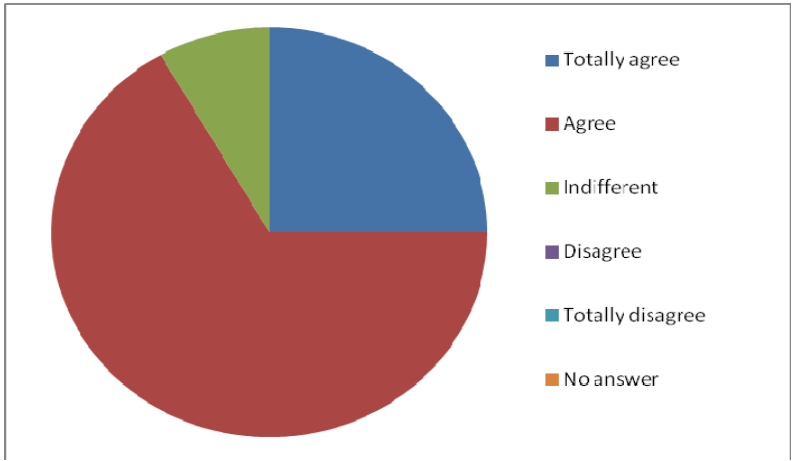


Figure 5-10: Did the workshop fulfil your expectations??

5.4 Participants comments

Answer	14	38.89%
No answer	22	61.11%

- *The workshop lived up to my expectations.*
- *I would suggest the seminar to be split: one for technical people (the one we just had), one for more managerial people. Possible one for specifically for software developers would also be a suggestion.*
- *I would have liked a more hands on experience.*
- *More focus on hands-on labs on transition mechanisms and best practices.*

I would have liked to hear more about:

- *IPv6 and its impact on cloud computing and e-learning*
- *Transmission mechanisms*
- *Business opportunities.*
- *How to implement IPv6 between the customer (end user) and the ISP*
- *Native vs. tunnelling in practice*
- *IPv6 in LTE technology, cloud computing, wireless networking (Ip link)*
- *Radio IP networks (IPlinks)*

6. CONCLUSIONS

This was a very interesting workshop because it included people from diverse cultural backgrounds, different languages (Spanish, French, English, Dutch) and from many countries. Also the level of knowledge related to IPv6 or even IPv4/TCP was very different for each participant. This diversity was a challenge for the instructors but it allowed the trainers to acquire a richer experience.

From the participants' feedback, 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.

We consider that this workshop was a success with regard to the dissemination of IPv6 in the Caribbean 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>