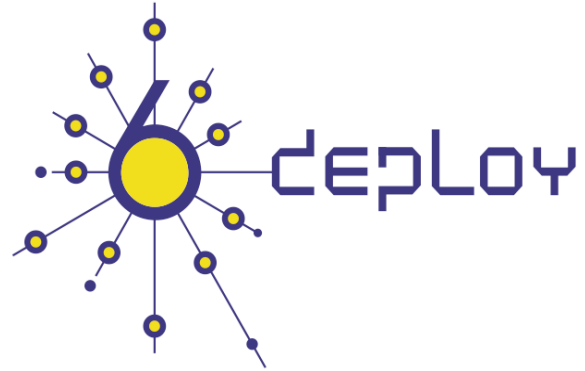




e-infrastructure



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Abstract: This deliverable reports on three workshops that were held in the Latin America and the Caribbean region. Specifically, this deliverable reports on workshops that took place in Managua (Nicaragua), San Salvador (El Salvador), and Belize City (Belize). 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, Training, Testbeds, Modules, 6DISS, 6DEPLOY, Hands-on exercises
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Revision History

The following table describes the main changes to the document since created.

Revision	Date	Description	Author (Organization)
v0.1	11/05/2010	Document creation	Alvaro Vives (Consulintel)
V1.0	23/05/2010	Final review	Alicia Higa and Martin Potts (Martel)

Executive Summary

One of the main activities in the 6DEPLOY 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 reports on three workshops that were held in the Latin America and the Caribbean region. Specifically, this deliverable reports on workshops that took place in Managua (Nicaragua), San Salvador (El Salvador), and Belize City (Belize). The following workshop details are described in this report: a) the workshop attendees and their affiliations, b) the programme outline, c) the material presented, and d) an assessment of the opportunities for further co-operation and follow-up actions planned.

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1. INTRODUCTION

1.1 6DEPLOY Objectives

The following comprise the 6DEPLOY objectives:

- organize workshops for the e-Infrastructure community and give practical advice and hands-on support for deploying IPv6 in their environments;
- work on deployments in Europe and in developing countries, exchanging experiences and best practices;
- improve the competitiveness of European industry by sharing experiences from IPv6 deployments in other regions;
- gain expertise with which to support *more commercial* deployments in European industries (e.g. Emergency Services, Health, Broadcast, Transport, Schools, Environment, Gaming, etc.);
- help to build consensus between European researchers by enabling and exploiting synergy among related projects (e.g. GÉANT-2, SEEREN-2, SEE-GRID, EUMEDCONNECT, CLARA, ALICE);
- encourage and enhance the effectiveness of the coordination between National and pan-European e-Infrastructure initiatives by being a focal point for IPv6 activities, giving IPv6 training, and supporting IPv6 deployments;
- open up the ICT programme to the participation of third country organizations in International Cooperation Partner Countries, including countries in Africa, Asia, and Latin America, by involving organizations that influence e-Infrastructures on those continents;
- improve scientific cooperation between Europe and the declared target regions (Africa, Asia, and Latin America) by exchanging knowledge and experiences through direct practical support for deployment, training events, etc. The project therefore also helps support other Community policies, most notably the development policy. Telecommunications infrastructures and the capability to access information worldwide are key measures of a country's progress. IPv6 has been a cornerstone of European Internet policy for several years; and
- support interoperability and standards by sharing information on the latest IPv6 standards, equipment hardware and software releases, and IPv6 policies (RIRs).

One of the main activities in the 6DEPLOY 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 Workshop Methodology

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

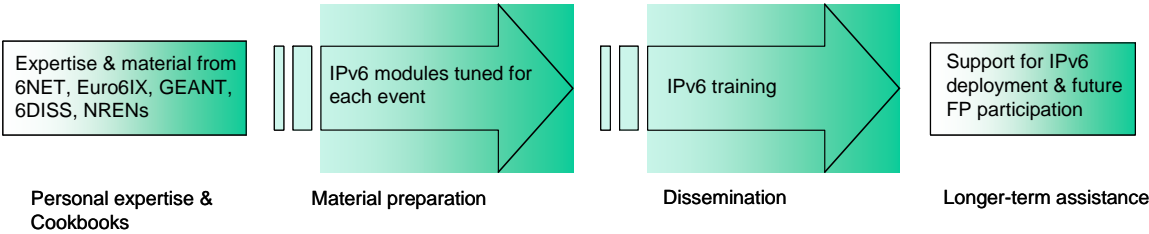


Figure 1-1: 6DEPLOY methodology (diagrammatically)

The approach is to use course material available from 6DISS 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 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 2 managed testbeds) is available from 6DISS 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: "IPv6 training material and related usage procedures".

This deliverable reports on three workshops that were held in the Latin America and the Caribbean region. Specifically, this deliverable reports on workshops that took place in

Managua (Nicaragua), San Salvador (El Salvador), and Belize City (Belize).

Chapter 2 of this document explains the general motivation for running IPv6 workshops, and chapters 3, 4, and 5 describe the specific details of each workshop, in terms of the attendees, the modules that were presented, and the “hands-on” exercises. Chapter 6 identifies opportunities for further collaboration in the region and follow up actions, and Chapter 7 provides some general conclusions.

2. THE WORKSHOPS (GENERAL)

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

6DEPLOY 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 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, facilitate and encourage the participation of their organizations 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 organizers so as to suit the type of participants, the subjects to be addressed, the location, the host organization, the sponsors, etc.

3. THE 6DEPLOY WORKSHOP IN MANAGUA (NICARAGUA)

This day-and-a-half workshop was held in the Spanish language in Managua (Nicaragua) during the 12th and 13th October 2009. This workshop was part of LACNIC's IPv6 Tour 08/09. In the following paragraphs we provide information about the workshop, including the programme outline and the material that was presented.

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

http://www.6deploy.eu/index.php?page=20091012_managua_nicaragua

3.1 Overview

Individuals present at the workshop included Jordi Palet, from Consulintel representing 6DEPLOY, and Adriana Rivero and Juan Carlos Alonso from LACNIC.

The first part of the workshop, which was aimed at a broad spectrum of participants (ISPs, organizations, end users) included some words from local authorities and from LACNIC, related to Internet resources, addresses, etc. This occurred during the morning of the first day.

During the second part of the workshop, specific IPv6 material was presented tailored to the requirements identified by the organizers. This included an introduction to basic IPv6 concepts on the transition and coexistence of IPv4 and IPv6, as well as different transition mechanisms, some of which are automatic and explain the growth of IPv6 traffic that is being observed at the global level despite its low level of deployment on the part of ISPs. Recommendations were made regarding IPv6 deployment in ISP and corporate networks.

The presentations were conducted in Spanish, in order to accommodate the local audience.

3.2 Attendees

Below is a list of people that attended at least one session:

No.	Name	Affiliation
1	Alejandro Vargas	Ministerio de Fomento Industria y Comercio
2	Armando José Sánchez Cerda	Amnet Nicaragua
3	Asdrubal Zahir Suazo Calero	UNI
4	Carlos Pineda Cuadra	Personal
5	Daniel Fajardo Valente	Condor Comunicaciones

6	Daniel Prado	Interconect SA
7	Eddy Perez Guzman	UNICA
8	Edgar Fernando Urrutia Samagua	TELCUR
9	Edgard Picado Vanegas	Del Campo
10	Edgard Ulises Aviles Mejia	NIC NI
11	Ernest Antonio Rodriguez Chavarría	Condor Comunicaciones
12	Giovanny Antonio Padilla Dávila	UPOLI (Universidad Politécnica de Nicaragua)
13	Jairo Medina	Laboratorios Rarpe SA
14	Joao Ismael Maldonado Bermudez	PETRONIC
15	Johanna Hernandez	UNAN-León
16	Jorge Davila	Universidad Nacional Agraria
17	Jorge Prado	UNI
18	Jorge Yader Martinez Miranda	Banco de la Producción
19	José Abraham Castillo	Universidad Técnica de Comercio
20	Juan Miguel Mairana	
21	Kevin Rafael Morales Pérez	
22	Lestter Villaloboz Mora	UPOLI (Universidad Politécnica de Nicaragua)
23	Lissitte Serrano	COMPULAB
24	Luis Enrique Robleto	NIC NI
25	Maribel Fonseca Blandón	Guegue Comunicaciones
26	Mario Francisco Espinoza Hernandez	Sociedad Bíblica de Nicaragua
27	Mario José Mendieta	Plásticos de Nicaragua SA
28	Mario José Rocha Mena	Newcom Nicaragua
29	Marlón Marota Mejía	BANPRO
30	Nelson Juarez	UNI
31	Nubia Kenia Altamirano	UNI
32	Omar Antonio Corrales Callejas	Ejercito de Nicaragua
33	Omar Antonio Tiffer Tiffer	NIC NI
34	Oscar Rayo	UNICA
35	Pablo A. Hurtado	TIC Municipal
36	Rafael Viga	GUIGA Comunicación
37	Roberto Oslando	Universidad Nacional Agraria/ Red Nicaraguense de Internet Avanzada (RENTA)
38	Salvador Arúcz Urbina	NAVINIC

Table 3-1: Managua (Nicaragua) Workshop list of participants

The participants represented a wide range of the ICT community. They were generally technical people whose knowledge about IPv6 ranged from almost no knowledge at all to having significant experience with IPv6 deployment. Some had already performed IPv6 experiments or were planning some level of deployment at their institutions.

3.3 Workshop programme

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

Date	Time	Title of session
12/10/2009	09:00-09:30	Opening: Words from Nicaragua's Government Representative
		Opening: Words from LACNIC's Representative
12/10/2009	09:30-09:50	Gestión de los Recursos de Internet en América Latina & Caribe y el mundo
12/10/2009	09:50-10:10	Cómo obtener recursos de Internet en la región
12/10/2009	10:10-10:30	Proceso de Desarrollo de Políticas de Asignación de recursos numéricos de Internet en LAC
12/10/2009	10:45-11:00	LACNIC en el marco de la cooperación regional y el desarrollo de la Sociedad de la Información
12/10/2009	11:00-11:20	Estado de Situación del Consumo de Direcciones IPv4 y despliegue IPv6
12/10/2009	11:35-13:00	Introducción a IPv6
12/10/2009	14:00-15:15	Prácticas en hosts
12/10/2009	15:15-16:45	Mecanismos de transición IPv4-IPv6
12/10/2009	17:00-18:00	Prácticas de transición
13/10/2009	9:00-10:00	Prácticas de transición (cont.)
13/10/2009	10:00-11:00	Casos de despliegue en redes de banda ancha
13/10/2009	12:10	Event Closing

Table 3-2: Managua Workshop programme

3.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
Gestión de los Recursos de Internet en América Latina & Caribe y el mundo	Adriana Rivero	LACNIC
Cómo obtener recursos de Internet en la región	Juan Carlos Alonso	LACNIC
Proceso de Desarrollo de Políticas de Asignación de recursos numéricos de Internet en LAC	Juan Carlos Alonso	LACNIC
LACNIC en el marco de la cooperación regional y el desarrollo de la Sociedad de la Información	Adriana Rivero	LACNIC
Estado de Situación del Consumo de Direcciones IPv4 y despliegue IPv6	Juan Carlos Alonso	LACNIC

Introducción a IPv6	Jordi Palet	Consulintel
Prácticas en hosts	Jordi Palet	Consulintel
Mecanismos de transición IPv4-IPv6	Jordi Palet	Consulintel
Prácticas de transición	Jordi Palet	Consulintel
Casos de despliegue en redes de banda ancha	Jordi Palet	Consulintel

Table 3-3: Managua Workshop list of modules used

3.4.1 Modules

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

- **Introducción a IPv6:** 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 packet header, extensions headers and differences with IPv4 headers. Packet size issues and upper layer considerations are also treated. In addition, 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, were explained.
- **Mecanismos de transición IPv4-IPv6:** This module explains different approaches to deploy IPv6 in an IPv4 environment. Transition concepts are introduced and several transition mechanisms are covered: Dual Stack, tunnels, tunnel broker, 6to4, Teredo, Softwires and translation (at various layers).
- **Casos de despliegue en redes de banda ancha:** This module focuses on broadband access networks and IPv6 deployment related issues.
- **Prácticas en hosts:** Practice basic IPv6 concepts like addresses, autoconfiguration, neighbor discovery protocol using hosts.
- **Prácticas de transición:** Practice basic transitions mechanisms using hosts.

4. THE 6DEPLOY WORKSHOP IN SAN SALVADOR (EL SALVADOR)

This one-day workshop was held in the Spanish language in San Salvador (El Salvador) on the 14th October 2009. This workshop was part of LACNIC's IPv6 Tour 08/09. In the following paragraphs we provide information about the workshop, including the programme outline, and the material that was presented.

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

http://www.6deploy.eu/index.php?page=20091014_san_salvador_el_salvador

4.1 Overview

Individuals present at the workshop included Jordi Palet, from Consulintel representing 6DEPLOY.

During the workshop, specific IPv6 material was presented. This included an introduction to basic IPv6 concepts on the transition and coexistence of IPv4 and IPv6, as well as different transition mechanisms, some of which are automatic and explain the growth of IPv6 traffic that is being observed at the global level despite its low level of deployment on the part of ISPs. Recommendations were made regarding IPv6 deployment in ISP and corporate networks.

The presentations were conducted in Spanish, in order to accommodate the local audience.

4.2 Attendees

Below is a list of people that attended at least one session:

No.	Surname	Name	Affiliation
1	Acevedo Mendez	Gerson Raul	Transportes Serrano (Sonsonate)
2	Acosta Escobar	Mauro Antonio	TACA
3	Aguilar	Daniel Ricardo	UCA
4	Aguilar	José Mauricio	Tigo
5	Aguilar	Oscar Rolando	IEPROES
6	Aguilar Lemus	Eduardo Luis	UDB
7	Alegría	Damián	Asamblea Legislativa de El Salvador
8	Alfaro	Álvaro	GCA TELECOM
9	Alfaro Bonilla	Jonathan Steven	UDB
10	Alfaro Castro	Carlos Filiberto	UDB
11	Alfaro Ramírez	Edwin	Telefonica
12	Alvarado	Ale	Particular
13	Anaya	Jaime	UDB
14	Angulo	Fredy	UFG
15	Aquino Miranda	José Rubén	Particular
16	Aquino Sosa	Walter Antonio	Asociación Demográfica Salvadoreña
17	Arqueta	Roberto Antonio	Universidad Politécnica
18	Ayala	Luis Alexander	Universidad Andrés Bello (San Miguel)
19	Ayala	Francisco José	Documentos y Digitales de El Salvador
20	Berrios	Claudia Liseth	Universidad Andrés Bello (San Miguel)
21	Bolaños	Wilfredo Antonio	UNICAES
22	Bran	Carlos	UDB
23	Brito	Mario	UDB
24	Caballero de Acosta	Glenda	ITCA-FEPADE
25	Calderón	Neftaly	GCA TELECOM
26	Campos Robles	Santiago José	UDB
27	Campos Rosa	Jorge Alberto	Ministerio de Defensa Nacional
28	Cano	Samuel Alejandro	Universidad Andrés Bello (San Miguel)
29	Castellanos	Leonidas	UFG
30	Castellón	José Eduardo	Movement Engineering of RBS
31	Cerna	Francisco	Universidad Matías Delgado
32	Cerritos	Vidal Enrique	UNICAES
33	Chamagua	Erwing	ITCA-FEPADE
34	Chanchan	Elmer	UFG
35	Chávez	Israel	TACA
36	Chávez	Nelson Josué	UDB
37	Chávez Hernández	Luis Alberto	Particular
38	Chávez Pérez	Jorge Alberto	UDB
39	Chicas Quezada	Adolfo Antonio	Claro
40	Chorro Zepeda	Salvador Antonio	Particular
41	Cornejo	Mauricio	Ministerio de Medio Ambiente y Rec..
42	Cortés	Guillermo	UCA
43	Dávila	Alberto	UDB
44	Díaz	Noemy del Carmen	Universidad Matías Delgado
45	Díaz Martínez	José María	Telefonica
46	Díaz Ramírez	Milton Gabriel	Telefonica
47	Escobar	Manolo	GCA TELECOM
48	Escobar	Baltazar	FEPADE
49	Escobar	Ligia Edith	Universidad Matías Delgado

50	Espinal	Edwin	NAVEGA
51	Espinoza	Melchor	Visión Mundial Internacional
52	Esquivel Martínez	Óscar Ernesto	Digicel
53	Figueroa	Ricardo Emilio	IPSFA
54	Flores	Osmín	DIGESTYC
55	Franco	Salvador Alcides	UTEC
56	Galdámez	Nathaly	Universidad Matías Delgado
57	García	Erick	GCA TELECOM
58	García Renderos	Juán Antonio	NAVEGA
59	Gómez	Erick	NAVEGA
60	Gómez	Nelson José	Universidad Matías Delgado
61	Gómez Morán	Salvador Enrique	Escuela Esp. En Ingeniería, ITCA
62	González	José Carlos	Universidad Matías Delgado
63	Grande	Manuel Mauricio	UCA
64	Grande	Mauricio José	UCA
65	Guandique	David	BMI
66	Guardado Cuéllar	Carlos Roberto	Universidad Andrés Bello (Sonsonate)
67	Guardado de Rodríguez	Liliam	Universidad Andrés Bello (Sonsonate)
68	Guevara	Mayra Melany	Tigo
69	Guillén	Mario	NAVEGA
70	Gutiérrez	Juán Carlos	Amnetcorp
71	Gutiérrez	Luis	Universidad Matías Delgado
72	Henríquez	Alejandro	SALNET
73	Hernández	Jesús	SIGET
74	Hernández	César	Digital Cellular Company
75	Herrera	David	Claro
76	Jovel Zelaya	Marcos Antonio	FEPADE
77	Lagos Canales	José Miguel Angel	La Fabril S.A.
78	Larios	Jelpi Remberto	Banco Hipotecario
79	Lazo Hernández	Roberto Edgardo	UDB
80	Lazo Herrera	Teresa Elizabeth	Claro
81	Linares	Claudia	Documentos y Digitales de El Salvador
82	López	Nelson Oswaldo	UTEC
83	López Cisneros	Jonathan	Tigo
84	López Mendoza	Leonel Amilcar	Amnetcorp
85	Magaña Chávez	Jaime Ernesto	MIGOB
86	Magaña Vizcarra	Julio Alberto	ITCA-FEPADE
87	Marinero Alemán	Nery Cruz	UDB
88	Mata de Bonilla	Ana María	CIT
89	Mayorga	René	Digicel
90	Median Handal	Fernando Steven	UDB
91	Meléndez Cruz	José Eduardo	UDB
92	Mena	David	UEES
93	Méndez	Edgar Renato	Ministerio de Educación
94	Mendoza	Zamuel	UCA
95	Mendoza	René Alfredo	UNICAES
96	Mendoza Machado	William	Ministerio de Defensa Nacional
97	Merino de Villeda	Elsa	Universidad Albert Einstein
98	Minero	Jorge	UFG
99	Minero Dubón	Carlos	UDB
100	Morales Samayoa	Carmen Celia	UDB
101	Morán	Edwin Wilfredo	Ministerio de Educación
102	Navarrete	Katia	FONAVIPO
103	Ortiz Cuéllar	Silvia Carolina	ITCA-FEPADE

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104	Ostorga Cartagena	Victor	CEL
105	Palma	Yessenia Carolina	DIGESTYC
106	Parada Peñate	Javier Alejandro	UDB
107	Peña	Raquel A.	Universidad Matías Delgado
108	Pérez	Ixchel	RAICES
109	Pérez Méndez	Renso	Telefonica
110	Portillo	Germán	Corte de Cuentas
111	Portillo Alvarez	Noel Antonio	Caja de Crédito de Sonsonate
112	Ramírez	Jaime	UDB
113	Rauda	Carlos E.	UDB - Estudiante
114	Rivas	Boris	SALNET
115	Rivas	Rafael	Corte de Cuentas
116	Rivera Mendoza	Aziz Arturo	UDB
117	Rivera Pineda	Julián	Xtesoft S.A. de C.V.
118	Rodríguez	Reina Elizabeth	Universidad Andrés Bello (San Miguel)
119	Rodríguez Torres	Alfredo Omar	UDB
120	Rodríguez Velásquez	Israel Alcides	UFG
121	Rojas López	Adolfo Antonio	UDB
122	Román de Molina	Irene Noemí	Universidad Andrés Bello (Sonsonate)
123	Salazar Alvarenga	Tomás	Universidad Albert Einstein
124	Sánchez	Mauricio	Particular
125	Sánchez Alfaro	Angel	Universidad Matías Delgado
126	Sánchez de Gómez	Marta	Universidad Albert Einstein
127	Santana Umaña	Rabins Alfredo	Super Repuestos
128	Santos	Joel	Amnetsal
129	Segovia	Jalmy Ivory	Superintendencia de Competencia
130	Sermeño Murillo	Carlos	Corte de Cuentas
131	Serrano	José Alfredo	ISNA
132	Serrano	Andy Amilcar	T&T Serrano
133	Serrano Rogel	Joan Antonio	Transportes Serrano (Sonsonate)
134	Sosa	Elmer	GCA TELECOM
135	Torres	Marco	SALNET
136	Turcios Hernández	Julio Ernesto	Particular
137	Ulloa de Aguirre	Janeth Evangelina	Universidad Andrés Bello (San Miguel)
138	Urbina	Alexander	Aeroman
139	Valencia	Javier R.	Universidad Matías Delgado
140	Vásquez	Carlos Arnoldo	Ministerio de Hacienda
141	Vásquez	Carlos Heriberto	Telefonica
142	Vega	Rodrigo E.	SIGET
143	Villalobos	Marvin Fredy	ISNA
144	Zelayandia	Germán	NAVEGA

Table 4-1: San Salvador (El Salvador) Workshop list of participants

The participants represented a wide range of the ICT community. They were generally technical people whose knowledge about IPv6 ranged from almost no knowledge at all to having significant experience with IPv6 deployment. Some had already performed IPv6 experiments or were planning some level of deployment at their institutions.

4.3 Workshop programme

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

Date	Time	Title of session
14/10/2009	9:00-10:30	Introducción a IPv6
14/10/2009	10:45-12:00	Prácticas en hosts
14/10/2009	12:00-13:00	Mecanismos de transición IPv4-IPv6
14/10/2009	14:00-14:30	Mecanismos de transición IPv4-IPv6 (cont.)
14/10/2009	14:30-16:30	Prácticas de transición
14/10/2009	16:45-18:00	Casos de despliegue en redes de banda ancha
14/10/2009	18:00	Event Closing

Table 4-2: San Salvador Workshop programme

4.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
Introducción a IPv6	Jordi Palet	Consulintel
Prácticas en hosts	Jordi Palet	Consulintel
Mecanismos de transición IPv4-IPv6	Jordi Palet	Consulintel
Prácticas de transición	Jordi Palet	Consulintel
Casos de despliegue en redes de banda ancha	Jordi Palet	Consulintel

Table 4-3: San Salvador Workshop list of modules used

4.4.1 Modules

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

- Introducción a IPv6:** 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 packet header, extensions headers and differences with IPv4

headers. Packet size issues and upper layer considerations are also treated. In addition, 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, were explained.

- **Mecanismos de transición IPv4-IPv6:** This module explains different approaches to deploy IPv6 in an IPv4 environment. Transition concepts are introduced and several transition mechanisms are covered: Dual Stack, tunnels, tunnel broker, 6to4, Teredo, Softwires and translation (at various layers).
- **Casos de despliegue en redes de banda ancha:** This module focuses on broadband access networks and IPv6 deployment related issues.
- **Prácticas en hosts:** Practice basic IPv6 concepts like addresses, autoconfiguration, neighbor discovery protocol using hosts.
- **Prácticas de transición:** Practice basic transitions mechanisms using hosts.

5. THE 6DEPLOY WORKSHOP IN BELIZE CITY (BELIZE)

This day-and-a-half workshop was held in the Spanish language in Belize City (Belize) during 15th and 16th October 2009. This workshop was part of LACNIC's IPv6 Tour 08/09. In the following paragraphs we provide information about the workshop, including the programme outline, and the material that was presented.

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

http://www.6deploy.eu/index.php?page=20091015_belize_belize

5.1 Overview

Individuals present at the workshop included Jordi Palet, from Consulintel representing 6DEPLOY, and Adriana Rivero and Juan Carlos Alonso from LACNIC.

The first part of the workshop included some words from local authorities and from LACNIC, just to introduce the workshop.

During the second part of the workshop, specific IPv6 material was presented. This included an introduction to basic IPv6 concepts on the transition and coexistence of IPv4 and IPv6, as well as different transition mechanisms, some of which are automatic and explain the growth of IPv6 traffic that is being observed at global level despite its low level of deployment on the part of ISPs. Recommendations were made regarding IPv6 deployment in ISP and corporate networks.

The presentations were conducted in Spanish, in order to accommodate the local audience.

5.2 Attendees

Below is a list of people that attended at least one session:

No.	Name	Affiliation
1	Alvan Rowland	Central IT office
2	Ashton Zuniga	Belize Telemedia Ltd.
3	Elias Melendez	Public Utilities Commission
4	Feliz Reyes	Belize Telemedia Ltd.
5	Glenn Wallen	Belize Telemedia Ltd.
6	José urbina	Speednet Communications Limited
7	Lulce Guild	Belize Telemedia Ltd.
8	Malcolm Antonio	Belize Telemedia Ltd.
9	Michael Kong	Netking Solutions Ltd.
10	Michael Link	University of Belize
11	Paul Elliot	Social Investment Fund
12	Renell Alamilla	Public Utilities Commission
13	Robert Price	Gob.
14	Shawn Eck	Belize Telemedia Ltd.
15	Victor Torres	Speednet Communications Limited
16	Winston Aspinall	Belize Telemedia Ltd.

Table 5-1: Belize City (Belize) Workshop list of participants

The participants represented a wide range of the ICT community. They were generally technical people whose knowledge about IPv6 ranged from almost no knowledge at all to having significant experience with IPv6 deployment. Some had already performed IPv6 experiments or were planning some level of deployment at their institutions.

5.3 Workshop programme

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

Date	Time	Title of session
15/10/2009	09:00-09:30	Opening: Words from Belize's Government Representative
		Opening: Words from LACNIC's Representative
15/10/2009	9:30-9:50	Management of Internet Resources in Latin America & Caribbean
15/10/2009	9:50-10:10	How to apply for Internet resources?
15/10/2009	10:10-10:30	How does the Policy Development Process work?
15/10/2009	10:45-11:00	LACNIC in the framework of the regional cooperation and the Internet Society development
15/10/2009	11:00-11:20	IPv6 depletion and transition to IPv6
15/10/2009	11:35-13:00	Introduction to IPv6

15/10/2009	14:00-15:15	Practices in hosts
15/10/2009	15:15-16:45	Transitions mechanisms IPv4-IPv6
15/10/2009	17:00-18:00	Transition practices
16/10/2009	9:00-10:00	Transition practices (cont.)
16/10/2009	10:00-11:00	Cases of deployment
16/10/2009	11:00	Event Closing

Table 5-2: Belize Workshop programme

5.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
Management of Internet Resources in Latin America & Caribbean	Adriana Rivero	LACNIC
How to apply for Internet resources?	Adriana Rivero	LACNIC
How does the Policy Development Process work?	Adriana Rivero	LACNIC
LACNIC in the framework of the regional cooperation and the Internet Society development	Adriana Rivero	LACNIC
IPv6 depletion and transition to IPv6	Juan Carlos Alonso	LACNIC
Introduction to IPv6	Jordi Palet	Consulintel
Practices in hosts	Jordi Palet	Consulintel
Transitions mechanisms IPv4-IPv6	Jordi Palet	Consulintel
Transition practices	Jordi Palet	Consulintel
Cases of deployment	Jordi Palet	Consulintel

Table 5-3: Belize Workshop list of modules used

5.4.1 Modules

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

- Introduction to IPv6:** 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 packet header, extensions headers and differences with IPv4 headers. Packet size issues and upper layer considerations are also treated. In

addition, 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, were explained.

- **Transitions mechanisms IPv4-IPv6:** This module explains different approaches to deploy IPv6 in an IPv4 environment. Transition concepts are introduced and several transition mechanisms are covered: Dual Stack, tunnels, tunnel broker, 6to4, Teredo, Softwires and translation (at various layers).
- **Cases of deployment:** This module focuses on broadband access networks and IPv6 deployment related issues.
- **Practices in hosts:** Practice basic IPv6 concepts like addresses, autoconfiguration, neighbor discovery protocol using hosts.
- **Transition practices:** Practice basic transitions mechanisms using hosts.

6. OPPORTUNITIES FOR FURTHER CO-OPERATION

In all the workshops, the attendees were informed on how to stay in contact with the 6DEPLOY partners in case they have questions regarding IPv6 deployment, addressing plans, etc. In this respect, the role of the *helpdesk* was explained as being the way to submit questions. An e-mail to helpdesk@6deploy.org will be distributed to a mailing list composed of volunteers who are available to answer (or forward) any kind of questions, requests, etc. Also a web form can be used to send requests to the project.

Additionally, the attendees (and trainers from the region) can follow the e-learning course and/or check the availability of the 6DEPLOY remote labs and use these.

7. 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.

Three 6DEPLOY workshops took place during the week from 12th to 16th October 2009. All of these workshops were coordinated by LACNIC, as a 6DEPLOY representative, with local authorities and collaboration with Consulintel. Based on previous projects and training activities, most of the IPv6 education material needed to start 6DEPLOY workshop training was available from the very beginning. The material included most of the issues of Internet deployment and evolution, especially IPv6 introduction, IPv4-IPv6 transition/co-existence strategies, and broadband issues.

Approximately 198 network engineers, system administrators, and regulators participated in the workshops. The topics presented were selected according to the participants' requirements.

During the 6DEPLOY lifetime, stakeholders will continue to enhance today's "knowledge database". The reader and interested parties are referred to the 6DEPLOY website to check for new material.

In summary, this workshop should be considered a success with regard to the dissemination of IPv6 in Latin America and the Caribbean region, though this is only one of many steps towards the deployment of real IPv6 networks and services in the region.

8. REFERENCES

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

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

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 Workshops Agenda and detailed information:

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