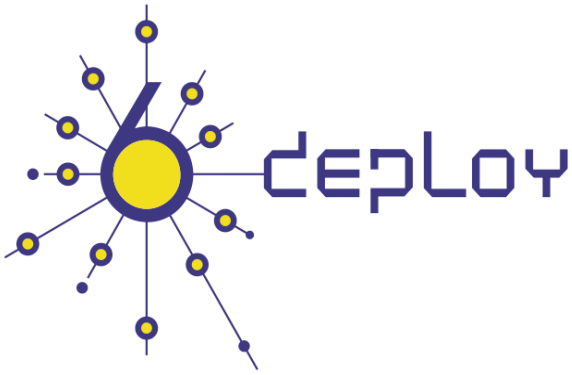

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Authors (organisations):

Abstract:

This deliverable presents a report from the workshop held in Port of Spain (Trinidad and Tobago) on July 16th 2009. The presentation material is listed, complementary IPv6 activities are described, 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, 6DISS, 6DEPLOY, Hands-on exercises

Disclaimer

Revision History

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

Revision	Date	Description	Author (Organization)
v0.1	26/03/2010	Document creation	Alvaro Vives (Consulintel)
v1.0	24/04/2010	Final review	Alicia Higa, 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 presents a report from the workshop held in Port of Spain (Trinidad and Tobago) on July 16th 2009. The following workshop details are described in this report: a) the programme outline, b) additional IPv6 Activities, c) attendees and their affiliations, d) the material presented, and e) 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 organisations in International Cooperation Partner Countries, including countries in Africa, Asia, and Latin America, by involving organisations 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:

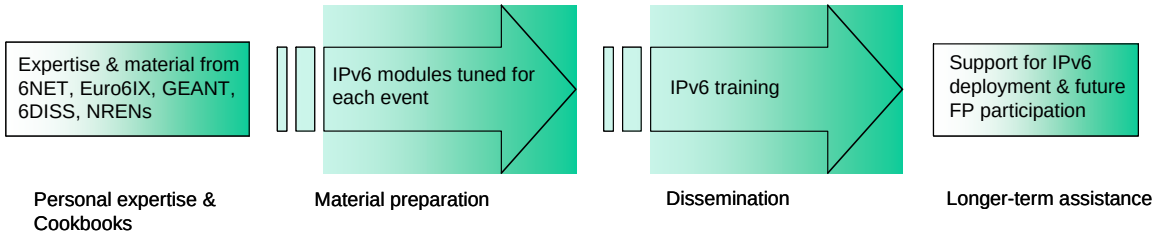

Figure 1-1: 6DEPLOY methodology (diagrammatically)

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 presents a report from the workshop held in Port of Spain (Trinidad and Tobago) in July 16th 2009.

Chapter 2 of this document explains the general motivation for running IPv6 workshops, and Chapter 3 describes the specific details of the workshop, in terms of the attendees, the modules that were presented, and the "hands-on" exercises (if appropriate). Chapter 4 identifies opportunities for further collaboration in the region and the recommended follow up actions, and Chapter 5 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 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 WORKSHOP IN PORT OF SPAIN

This half day workshop was held in Port of Spain (Trinidad and Tobago) on 16th July, 2009, within the LACNIC Caribbean II Meeting, which was held on the 16th to 17th July 2009. In the following paragraphs, we provide information about the workshop, including the programme outline, and the material that was presented.

3.1 Overview

The IPv6 workshop was conducted by Jordi Palet (Consulintel). All the presentations were conducted in English in order to accommodate the local audience.

The first part of the tutorial, which was aimed at a broad spectrum of participants (ISPs, organizations, end users) presented a basic introduction to IPv6, the motivations that are driving its development, its differences from the IPv4 protocol, possibilities for future development, and also business opportunities. The session also allowed practicing some basic configurations.

During the second part of the tutorial, concepts on the transition and coexistence of IPv4 and IPv6 were presented, as well as different transition mechanisms, some of which are automatic, that 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 at ISP and corporate network levels.

Following the IPv6 Workshop, other presentations related to IPv6 were held on the same day:

Presentation Title	Presented by	Affiliation
IPv6 in the last mile	Adriana Gomes	Cisco Systems
IPv4 depletion and transition to IPv6	Ricardo Patara	LACNIC
Implementation experiences of IPv6 in the Caribbean	Max Larson Henry Calvin George	AHTIC (HT) 360communications (TT)

Table 3-1: Additional IPv6-related Presentations

3.2 Attendees

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

No.	Surname	First name	Affiliation
1	Louisa	Eldert	OCIX /SMITCOMS/TelEm Group

2	Loe	Gregory	Open Telecom
3	Lopez Gomez	Jhon Fredy	Fundacion MANA
4	Selal	Roopa	Ministry of Public Administration
5	Mohammid	Sheba	PRIVATE
6	John	Justin	National ICT Centre, Ministry of Public Administration
7	Lamanauskas	Tomas	Telecommunications Regulatory Commission of the British Virgin Islands
8	Hamel-smith	Richard	Trinidad & Tobago Computer Society
9	Joseph	Anika	TSTT
10	Maharaj	Robindranath	Columbus Communications Trinidad Limited
11	Bellagamba	Sebastian	Internet Society (ISOC)
12	Rampersad	Naomi	Opentelecom Limited
13	Guerrier	Reynold	AHTIC
14	Palet Martinez	Jordi	Consulintel
15	Maharaj	Nicole	TSTT
16	Dhoray	Leisha	TRINIDAD AND TOBAGO ELECTRICITY COMMISSION
17	Ramharry	Reeve	University of the West Indies
18	Alleyne	Ian	PRIVATE
19	Osepa	Shernon	ICANN
20	Thompson	Andre	The University of the West Indies
21	Carozo Blumsztein	Eduardo James	Lacnic
22	Lau	Jonathan	UTT
23	Suffia	Irene	LACNIC
24	Smith	Michael	University of Trinidad and Tobago
25	Rose Daphne	Saint-fort	Groupe de Recherches et de Services en Appui au Developpement Durable
26	Smenkh-ka-ra	Dingiswayo	Swayo
27	Richards	Bertnell Auclene Malisa	Kuru Kuru Co-operative College
28	Henry	Max Larson	Facultes des Sciences - AHTIC
29	Supersad	Brian	Telecommunication Services of Trinidad and Tobago
30	Smith	Kingsley	PUBLIC UTILITIES COMMISSION
31	Teelucksingh	Dev Anand	Trinidad and Tobago Computer Society
32	Morris	Jacqueline	Private
33	Nedd	Denzil	National ICT Centre, Ministry of Public Administration
34	Ward	Barry	TSTT
35	Gaspard Taylor	Gia Virginia	International Education and Resource Network, Trinidad and Tobago
36	Rivero	Adriana	LACNIC
37	Sookhai	Brian	TELECOMMUNICATIONS SERVICES OF TRINIDAD AND TOBAGO
38	Mc Intosh	Brent	Columbus Comunications Grenada ltd
39	Alcantara	Melvin	Tricom
40	Majó	Ernesto	LACNIC
41	Mahadeo	Nalani	Telecommunicatons Authority of trinidad and Tobago
42	Jugmohan	Marissa	NATIONAL ICT CENTRE, MINISTRY OF PUBLIC ADMINISTRATION
43	Dans	Alexandra	LACNIC
44	Lalgee	Diyanand	TSTT
45	Hackshaw	Tracy	National ICT Centre, Ministry of Public Administration

46	Fergusson	Abraham "abe"	International Education and Resource Network, Trinidad and Tobago
47	Rama	Shane	Telecommunications Services of Trinidad and Tobago Limited
48	Aqui	Allan	Telecommunication Services of Trinidad and Tobago
49	Gittens	Justin	National Flour Mills Ltd
50	Chin-on	Roy	Bureau Telecommunicatie en Post
51	Cassimire	Nigel	Caribbean Telecommunications Union
52	Lakhan	Denish	TSTT
53	Patara	Ricardo	LACNIC
54	Gomes	Adriana	Cisco Systems
55	Sooknanan	Cintra	Trinidad and Tobago Computer Society
56	Fraser	Simon	The University of the West Indies
57	Ramsingh	Hema	Unitversity of Herdfordshire
58	Raghunanan	Marlon	The University of the West Indies
59	Edwards	Andre	Caribbean Telecommunications Union
60	Berment	Donald	Men Against Violence Against Women (MAVAW)
61	Woodcock	Bill	Packet Clearing House
62	Sha	Christopher	TSTT
63	Luk Pat	Mark	TSTT
64	Harnanan	Lindsay	TSTT
65	Adams	Richelle	The University of the West Indies
66	Abhiraj	Stephen	National ICT Centre, Ministry of public Administration
67	Paque	Virginia (ginger)	DiploFoundation
68	Edwards	Sean	Power 102 FM
69	O'neal	Sonia	Telecommunications Regulatory Commission
70	Lewis	Bernadette	CTU
71	Wooding	Bevil	PCH
72	Ali	Jerome	360 Communications
73	Lwdwig	Kerstin	ITU
74	Malone	Guy Lester	Telecommunications Regulatory Commission
75	Goodridge	Xavier	TSTT
76	Mohamed	Ronald	TSTT
77	Ng Chow	Jeffrey	360 Communications
78	Thomas	Shem	TSTT
79	Duke	Kerwin	T&T Police Service IT Department
80	King	Giovanni	Bureau Telecommunication & Post
81	Ali	Jerome	360 Communications
82	Charles	Darron	TSTT
83	Glasgow	Charles	National ICT Centre
84	Spence	Steve	Spence & Blair Ass
85	De Canha	Joao Duart	Bureau Telecommunication & Post
86	Blair	Fitz Anthony	Spence & Blair Ass
87	Williams	Allan	Antigua Public Utilities Authority

Table 3-2: Port of Spain Workshop list of participants

The participants represented a wide range of the ICT community. They were 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 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 program of the workshop is presented in the following table:

Date	Time	Title of session
16/07/2009	09:30-11:30	IPv6 - Introduction and Transition Mechanisms
16/07/2009	11:30-12:15	IPv6 hands-on

Table 3-3: Port of Spain Workshop program

3.4 Presentation material

The following material was presented:

Modules	Presented by	Affiliation
6Deploy Introduction	Jordi Palet	Consulintel
IPv6 Introduction	Jordi Palet	Consulintel
IPv6 Transition and Coexistence with IPv4	Jordi Palet	Consulintel
IPv6 hands-on	Jordi Palet	Consulintel

Table 3-4: Port of Spain 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 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.

- **IPv6 Transition and Coexistence with IPv4:** 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).
- **IPv6 hands-on:** Practice with hosts.

4. 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.

5. 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 deliverable presents a report from the workshop held in Port of Spain (Trinidad and Tobago) on July 16th 2009. Consulintel, as a 6DEPLOY representative, collaborated with local authorities. 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 addressed most of the issues of Internet deployment and evolution, especially IPv4-IPv6 transition/co-existence strategies, DNS, Autoconfiguration, Routing and Applications.

Due to the LACNIC Caribbean II Meeting and the visibility, diversity of attendees and the number of countries represented, the participation and interest in the IPv6 workshop increased.

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, though this is only the first of many steps towards the deployment of real IPv6 networks and services in the region.

6. 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