IPv6DISSemination and Exploitation

Information Society Technologies

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6DISS

IPv6 Dissemination and Exploitation

Instrument: SPECIFIC SUPPORT ACTION

Thematic Priority 2

D03: Report on the workshop and status of Internet connectivity in Southern Asia

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Abstract

This Deliverable presents a report from the 6DISS workshop for the Asia-Pacific region that was held in August 2005 in Taipei, Taiwan. The report includes information about the workshop, the presentation material, the event, and an assessment of the opportunities for further co-operation and follow-up actions planned. This was the first 6DISS workshop, and was arranged at short notice, due to a late request from the organisers. The invitation was accepted since it was an opportunity to disseminate information on IPv6 to precisely the target audience that 6DISS is aiming to reach.

This report also includes an overview description of the status of the major Internet connectivity links deployed by the National Research and Education Networks (NRENs) and some of the ISPs in the Southern Asia countries at the time of the 6DISS workshop.

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	✓
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1. Introduction

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1.1. 6DISS objectives

6DISS is a 6th Framework IST project that commenced on the 1st of April 2005 and will run for 30 months. The declared objectives of 6DISS are as follows:

1. To establish and operate a Specific Support Action of information exchange for the optimal transfer of knowledge on Internet deployment and evolution to emerging research network operators, Universities, commercial organisations, ISPs, governments and regulators in the following countries[1]:
   - The Asia-Pacific region,
   - Africa[2],
   - South and Central America,
   - Mediterranean partner countries[3],
   - Balkan countries[4],
   - Newly-Independent States (NIS)[5],
   - The Caribbean.
2. To enhance the knowledge base of the partners by exchanging deployment experiences with target regions, especially India and China.

[1] The specific countries targeted in each region have been selected on the basis that:
- the developing countries are precisely those identified by the Call,
- the countries are generally lagging behind in the deployment of broadband and preparedness for IPv6, and can therefore benefit most from the support of projects which already have the experience,
- the countries are precisely those with which 6DISS partners have very close working relationships,
- the developing countries in Europe are those that - in the longer term - might become candidates for membership of the EU, or are amongst those with which the EU has special international collaborative agreements for participation in the RTD Programmes.

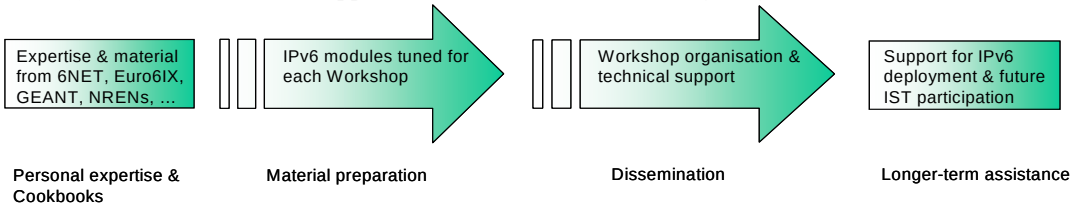
[2] Including sub-Saharan Africa, South Africa, Angola and Mozambique.

[3] Including Turkey

[4] Including the Associated Countries of Bulgaria and Romania. Turkey and the Republic of Moldova will be invited too

[5] Including the neighbouring country of Afghanistan

The key thread of the 6DISS approach is shown in the following diagram:



The focus of the knowledge transfer is IPv6, leveraging the 6DISS partners' significant practical and theoretical expertise in the subject matter, gained in part through deployment experience in the 6NET project.

The target countries for 6DISS are also often ones most likely to benefit from IPv6 adoption, due to their current shortage of global IPv4 addresses.

1.2. 6DISS methodology

The main mechanism for raising awareness and effecting the information and knowledge transfer on IPv6 is through practical workshops to those people who are directly responsible for the installation, operation and maintenance of the National Research and Education Networks in these developing regions, and also to inform strategists/decision makers in these countries of the benefits of deploying IPv6.

Specific material will include topics such as how to install IPv6 versions of: DNS, DHCP, routing, multicast, QoS, renumbering, monitoring and management, and applications. The presentation material will be improved throughout the project lifetime, taking into account feedback from the participants. Reports will also be made available on the status of standardisation, IPv6 Forum activities, etc.

2. The Workshops (general)

Workshops are the main mechanism of 6DISS information and knowledge transfer, and of collaboration building between Europe and the target regions.

6DISS has been structured to provide the ideal platform for the discussion of deployment scenarios and the exchange of best practices, passing the experience gained in Europe to the target regions. In doing so, those regions can avoid duplication of effort, or wasting effort on solutions that are known not to work, and generally make the most efficient usage of the available resources that they have.

Partners in 6DISS are active in deploying IPv6 on a production basis in their own National Research and Education Networks (NRENs) and University networks, and documenting the experience in Cookbooks and in IETF informational/best common practice RFCs. The manufacturers in the consortium are also building IPv6 products.

The workshops are not only intended to lead to an improved quality of the Internet infrastructure in these countries, but will also raise the competence of the organisations and - exploiting the personal contacts made through 6DISS - facilitate and encourage their participation in future FP6 Calls and beyond.

Impacts from the workshops will include:

- a positive effect in preventing the "brain drain" from developing countries, by bringing interesting and state-of-the-art activities into these regions, making information and knowledge resources accessible to the scholars both locally and globally.
- the establishment of a communication channel between the scientific communities in the targeted regions and European industry, thus resulting in an increase in the demand for the specialised services provided by the highly skilled academics and researchers of the region.
- an expansion of the conditions for growth, by enabling the exchange of ideas, launching of joint experiments and projects, disseminating RTD results, and activating market forces; all 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 to an increase of the demand for specialized services provided by the highly skilled academics and researchers of the region.

While IPv6 standards and services remain constant, regional variations in practices and operations will require slightly different approaches for collaboration and dissemination. Therefore, the material for this workshop was collected, and the workshop schedule, format and contents were tailored in conjunction with the local organisers, to suit the type of participants, the subjects to be addressed, the location, the host organisation, sponsors, etc.

3. 1st Workshop: Southern Asia

3.1. Background

The workshop held in Taipei was organised by 6DISS partners, in particular Soton-ECS, Cisco and Hungarnet (providing the main speakers), together with the Taiwan Network Information Center and Cisco System Ltd, Taiwan.

The Taiwan Network Information Center (TWNIC) was established in March 1994 and began its operation with a 2-year Experimental Program. From June 1996 to April 1998, the Taiwan Network Information Center operated under the control of the Computer Society of the Republic of China (CSROC). In April 1998, the Directorate-General of Telecommunication was appointed as the authority of the TWNIC and helped the center to transform into a corporation. The TWNIC officially completed its corporation registration on the 29th of December 1999.

The TWNIC is the unique neutral and non-profit organization that has the responsibility for the domain name registration and IP address allocation in Taiwan. Besides offering a full range of network services, the TWNIC participates in various related international conferences, and aims to provide the best services for network service providers in Taiwan through public participation and constant improvements. Its mission is to bring the best to society, and expects that society to give the TWNIC support and encouragement, ultimately assuring the healthy and rapid growth of the Internet industry in Taiwan.

3.2. The workshop format

The 6DISS workshop was held in conjunction with a larger IPv6 Summit and APAN meetings. The workshop included presentations made in English by 6DISS speakers, complementing the three-day workshop sessions presented by Cisco Systems Ltd, Taiwan (those presentations were delivered in Chinese). By working within the framework of these larger events, the basics and principles of IPv6 technology reached a much broader audience than would have been the case at a dedicated event.

After the workshop, the annual “IPv6 Summit in Taiwan 2005: The Way to Modern eLife” event marking the milestones in the development and deployment of IPv6 in Taiwan was held. This year, the IPv6 Summit in Taiwan was held in conjunction with the 20th APAN Meeting. The IPv6 Summit in Taiwan 2005 took place from August 22nd - 25th and the APAN Meeting was held on August 23rd - 27th. All events were held in the Howard Plaza Hotel Taipei.

In addition to the 6DISS full-day workshop, Stig Venaas (University of Southampton) presented European and International experiences on “IPv6 Multicast” for 6DISS in the IPv6 Summit programme.

3.3. Attendees

The specific people attending this workshop were the early adopters of the technology and strategists/decision makers; namely, specialists responsible for the research infrastructure, University network managers and ISPs. There were also Government ministers present at the full event. These people are the ones who will collectively determine the rate of deployment of the latest Internet technologies, and therefore the impact of the event could be that they will promote the upgrading of the networks to a state-of-the art that is comparable with European countries. These specific people are also from precisely those organisations that we wish to encourage to be active participants in future IST projects.

There were about 60 attendees during the three first days for the Chinese language sessions. For the 6DISS day there were 45 attendees. The attendees were from several countries in the region, but mainly from Taiwan, China and Vietnam.

3.4. Presentation material

The material presented by 6DISS was determined in close collaboration with the local organisers and is available at the 6DISS web site (http://www.6diss.org/workshops/asiapac/). Since this was the first workshop run by 6DISS, the full and final range of material was not complete, but we were able to offer a tailored set of material for the event on demand.

The 6DISS presentations given at the workshop included the following topics:

- Mobile IPv6 in Cisco IOS
- IPv6 Security
- IPv6 Multicast
- IPv6 Network Management

3.5. Programme outline

As described above, the full programme comprised a 4-day workshop: 2 days of theory and 2 days of practice, with the first three days presented in Chinese by Cisco Systems Ltd, Taiwan, working with Cisco representatives from 6DISS, and the last day presented in English by other 6DISS partners (Soton-ECS and Hungarnet).

The presentations on the first days included:

1. Introduction of IPv6
   - (History, Feature)
   - IPv6 addressing (Unicast address, Multicast address, Anycast, Interface ID)
   - IPv6 Header (Basic header, Extension header)
   - ICMPv6
   - Neighbor Discovery
   - ACL(Access Control List)
   - Address Autoconfiguration
   - IPv6 Name Resolution
2. IPv6 Routing
   - IPv6 Routing
   - RIPng
   - OSPFv3
   - IS-ISv6
   - MPBGP
3. IPv6 Transition
4. IPv6 Deployment

The following IPv6 topics were covered by other presenters:

- Introduction to Mobile IPv6
- Mobile IPv6 in Linux (MIPL)
- IPv6 NEMO (NEPL)

In addition, a practical “hands-on”session was led by experts from Cisco Systems.

On the final day, more advanced IPv6 topics were covered by 6DISS:

- Mobile IPv6 in Cisco IOS, Patrick Grossetete, Cisco Systems
- IPv6 Security, Janos Mohacsi, Hungarnet
- IPv6 Network Management, Stig Venaas, University of Southampton
- Q&A Session

3.6. Sponsors

There were some local sponsors for the overall arrangements, but nothing related to 6DISS; the 6DISS workshop was a self-supporting event.

3.7. Summary of Costs

The only costs for 6DISS were the travel and subsistence costs for the 6DISS participants, and the time spent to prepare the presentations. There were no extra 6DISS costs (or income), for example relating to the hire of the location or travel costs for participants.

4. Opportunities for further Co-operation and follow-up Actions

4.1. Common areas of interest

There is a clear and deliberate movement towards IPv6 deployment in the region.

The target of the Taiwanese IPv6 Forum is to develop/educate human resources, and for 2006 - 2007 to support the delivery of a nationwide native IPv6 network and bring to the market IPv6 embedded products, such as IA, 3G and WLAN, NAT-PT single chip translator, 6IDS - IPv6 intrusion detection system, IPv6 multihoming SOHO router, IPv6 SIP based videophone.

The Taiwanese network infrastructure is moving steadily towards IPv6; evidence of this includes:

- Allocation of 16 production IPv6 address blocks.
- Commercial networks:
  - Most major ISPs (HiNet, SeedNet, TTN, Taiwan NTT, TFN, Gigamedia) already have IPv6 address blocks,
  - 2 ISPs provide commercial trial services,
  - 2 IPv6 exchange point s are available.
- Academic and Research Networks:
  - TWAREN/TANet2 has had support for IPv6 since March 2004,
  - TANET is now enabling IPv6 in the backbone.
- Government networks will deploy IPv6 in 2005.
- Various IPv6 trials are underway with the involvement of research and commercial entities:
  - Commercial VoD service,
  - Eco-Grid,
  - Public Multimedia Payphone.
- Promotion activities:
  - IPv6 portal: http://www.ipv6.org.tw,
  - IPv6 demonstration sites: http://www.v6corner.org.tw.
- A number of cooperation MoUs have been agreed with:
  - IPv6 promotion council, Japan,
  - IPv6 Forum Korea.
  - Eurov6.
  - Taiwanese IPv6 Promotion Council.
  - TAHI.
  - University of Southampton, UK,
  - University College London, UK.

It is also worth noting that in China the core IPv6 network will be operational by the end of 2005 – **this may be the largest commercial IPv6 network in the world**.

In terms of specific technology areas of collaboration, the following topics of common interest were identified through discussions at the workshop:

- IPv6 multicast,
- Development of IPv6 Security practices
- Experimenting with p2p protocols in IPv6.

It was also interesting to note that, based on the IPv6 Forum presentation and discussion after the sessions, presenters from different vendors and those present had a discussion about IPv6 applications. The conclusion was that the "killer application" for IPv6 might consist of IPv6 services that reduce costs and improve services at the same time, for example:

- factory automation,
- building/home automation – facility networking,
- mobile IP devices.

Network mobility is useful both for "fixed" and "mobile" networks via portable addresses. The requirement for a potentially huge number of IP phones also generates an incentive for IPv6. These topics should also be considered by potential European partners.

4.2. Appropriate partners

In terms of the three topics cited above, local initial partners could be:

IPv6 multicast:

- Academia Sinica Taiwan, NTU Taiwan, Vietnamese NREN

IPv6 Security practices:

- National Doung Hwa University

IPv6 and p2p protocols

- National Doung Hwa University

4.3. Follow-up actions

Several sites in Taiwan are already using IPv6 multicast and are connected to the M6bone IPv6 multicast network. We should aim to perform some tests together with them. Connectivity between Europe and Academia Sinica has been tested using the ssmping tool developed by Stig Venaas of Soton-ECS. We should also try to get more sites and networks (eg. the Vietnamese NREN) connected to the M6bone.

There has been an exchange of e-mail contacts for the initial follow-up discussions.

4.4. Problems

One issue raised by attendees as a concern was that they believed that the Republic of Taiwan (ROC) was not recognised as an independent state by the EU, and thus they believed they could not participate to IST supported projects. The EU should clarify that position[6].

[6] On the 22nd of April 2005, is was confirmed by the European Union that the Republic of Taiwan will have the status of **"Associate Member State"** for the purpose of collaboration with the European Union on implementation of the 6th Framework Programme for Research (FP6) and the 7th Framework Programme for Research (FP7). Please see http://stn.nsc.gov.tw/en/view_detail.asp?doc_uid=0940402003 for the full report.

Another problem seemed to be the relative incapability of the attendees to speak technical English. Most of the participants could speak English, and were probably able to understand spoken English from the 6DISS speakers well, but they got into trouble finding the correct English terms for technical aspects of the IPv6 projects when describing them.

However, this was also the case on the other days with the Chinese language content. This may partly be a language or a cultural problem. We did, however, make some contacts and received some questions, which were then discussed after the presentations.

It is also worth noting that this was the first IPv6 workshop held by 6DISS, and therefore it was the first time that the presentation material had been used. The experience led to an improvement of some of the slides, for the benefit of the subsequent workshop in South Africa. This will be a continuous process.

5. Background information about Internet connectivity in the region

5.1. Status of Internet Connectivity

The Trans-Eurasia Information Network (TEIN) is one of the initiatives endorsed by ASEM III to connect research networks between Asia and Europe by linking the EU's GÉANT pan-European gigabit research network with Asia's research networks such as the Asia Pacific Information Infrastructure (APII) testbeds, in order to promote information exchanges in research, development and education. The ASEM leaders have emphasized the need to establish and expand information and research networks between the two regions and among ASEM partners, in order to facilitate the flow of knowledge and information as well as research endeavors. The successor project, TEIN2, began in late 2004 - see http://www.tein2.net/.

APAN (Asia-Pacific Advanced Network) is a non-profit international consortium established in 1997. APAN is designed to be a high-performance network for research and development on advanced next generation applications and services. APAN provides an advanced networking environment for the research and education community in the Asia-Pacific region, and promotes global collaboration.

Its objectives are:

- to coordinate and promote network technology developments and advances in network-based applications and services;
- to coordinate the development of an advanced networking environment for research and education communities in the Asia-Pacific region; and
- to encourage and promote global cooperation to help achieve the above.

With respect to the above objectives, the organization may carry out the following activities, though not necessarily limited to these:

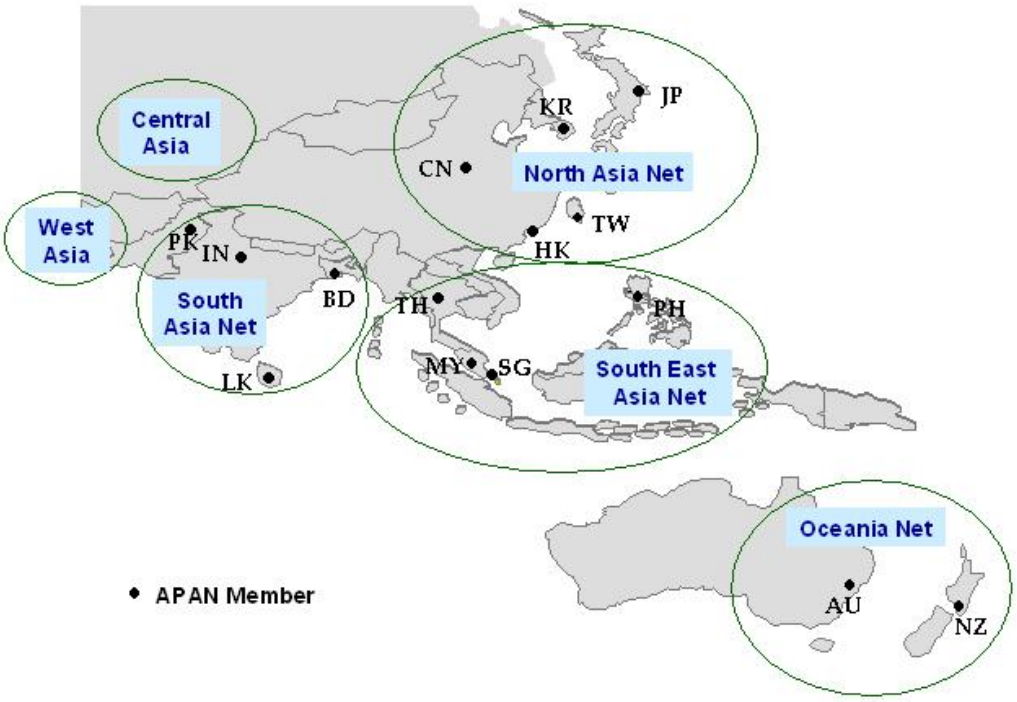
- holding meetings, workshops and conferences;
- exchanging technical information among its community and beyond;
- arranging and organizing education and training workshops; and
- promoting and encouraging regional connectivity

With regard to the above objectives, the organization may work closely with interested individuals and organizations to further the cause of adoption and research into advance network applications and technologies.

APAN Link Information		2005.5.30 sec@apan.net	
Countries	**Network**	**Bandwidth(Mbps)**	**AUP/Remark**
AU-US (thru Suva-HNL-Seattle)	AARNet	155	R&E and commodity
AU-US (Seattle)	AARNet	155	R&E and commodity
AU-US (Palo-Alto)	AARNet	622	R&E and commodity
AU-US (LA)	AARNet	622	R&E and commodity
AU-US (HNL-Seattle)	AARNet	10 Gbps	R&E
AU-US (LA)	AARNet	10 Gbps	R&E
CN-HK	CSTNET-HKIX	1 Gbps	R&D
CN-US	GLORIAD / CSTNET-STARLIGHT	155	R&D
CN-RU	GLORIAD / CSTNET-RRC Kurchatov	155	R&D
CN-UK	CERNET-JANET	45	R&D
CN-US	CERNET-STARLIGHT	155	R&D
CN-HK	CERNET-HARNET	155	R&D
CN-TW	CERNET-ASNET/TANET	100	R&D
CN-JP	CERNET-TOKYO-XP	1000	R&D
CN-KR	CERNET-KOREN	155	R&D
HK-US	HARNET	45	R&E
HK-TW	HARNET/TANET/ASNET	100	R&E
ID-ID	AI3 (ITB-UNIBRAW)	0.128/0.128	R&E and commodity
IN-US/UK	ERNET	80	R&E
JP-CN	NICT-CERNET	1 Gbps	R&E
JP-CN	NICT-CSTNET	1 Gbps	R&E
JP-ID	AI3 (ITB)	0.5/1.5 (From JP / To JP)	R&E and commodity
JP-KR	APII	2 Gbps	R&E
JP-LA	AI3 (NUOL)	0.128/0.128 (From JP / To JP)	R&E and commodity
JP-VN	AI3 (IOIT)	0.5/0.5 (From JP / To JP)	R&E and commodity
JP-MY	AI3 (USM)	0.5/0.5 (From JP / To JP)	R&E and commodity
JP-PH	AI3 (ASTI)	0.5/0.5 (From JP / To JP)	R&E and commodity
JP-PH	MAFFIN (ASTI)	6	R&E
JP-SG	AI3 (TP)	0.5/0.5 (From JP / To JP)	R&E and commodity
JP-TH	AI3 (AIT)	0.5/1.5 (From JP / To JP)	R&E and commodity
JP-TH	SINET (ThaiSarn)	45	R&E
JP-US	IEEAF	10 Gbps+622	R&E
JP-US	JGN2	10 Gbps	R&E
JP-US	SINET	10 Gbps+2.4Gbps	R&E
JP-Any	AI3 UDL links (* listed below)	9	R&E and commodity
KR-CN	APII-CERNET	155	R&E
KR-CN	KREONet2-CSTNET	155	R&E
KR-US	KREONet2/APII	2*622	R&E
KR-FR	TEIN	155	R&E
MY-SG	NRG/SICU	2	Experimental
SG-US	SingAREN	155	R&E and commodity
TH-NP	AI3 (AIT-TU)	0.128/0.128	R&E and commodity
TH-US	UniNet	155	R&E
TW-JP	ASNET/TANET	622	R&E
TW-HK	ASNET/TANET/TWAREN	622	R&E
TW-SG	ASNET/SingAREN	155	R&E
TW-US	ASNET/TANET/TWAREN	6.6 Gbps	R&E
(TW)-US-NL	ASNET/TANET/TWAREN	2.5 Gbps	R&E
US-JP	TransPAC	10 Gbps	R&E
US-JP	U-Hawaii (NCC)	155	R&E

*** AI3 UDL Links**

ITB(ID),UNSRAT(ID),UNHAS(ID),UNIBRAW(ID),AIT(TH),CU(TH),CRMA(TH),PSU(TH),ASTI(PH),IOIT(VN),UCSY(MM),NUOL(LA),
AYF(MY),BUET(BD),ITC(KH),MUST(MN),TU(NP)



APII CC is an affiliated organization of the APEC Telecommunications and Information Working Group, which aims to coordinate the joint endeavours of the APEC members to build the Asia Pacific Information Infrastructure (APII) for linking countries in the region via an advanced telecommunications network. The center supports various cooperative activities and pilot projects for the early realization of the APII. It also provides member economies with the assistance necessary to develop their information infrastructures.

5.2. IPv6 Experience

Several large academic networks in the region are now supporting IPv6 and also some ISPs. It was identified at the workshop that more knowledge is needed at the edges (by site administrators, users and developers). IPv6 activity is evident in countries like Taiwan, China, Japan and South Korea, but there appears to be limited or no activity in other countries in the region.

In Taiwan, IPv6 addresses have been allocated to many organisations, including Chungwa Telecom, TANet (Taiwan Academic Network), ASNet (Academia Sinica Network), 6REN (Research and Education Network), TWIX (Taiwan Internet Exchange) and SeedNet.

5.3. Ongoing IPv6 projects

Several academic and commercial institutions in Taiwan are experimenting with IPv6 multicast, including Academia Sinica, Taiwan Fixed Network, SeedNet, National Cheng Kung University, Taiwan Telecom Network, ChungHwa Telcom, GigaMedia, National Central University and Ming Chuan University. In

the region there are also IPv6 multicast activities in the Philippines (ASTO). In Asia in general there is also multicast activity in Japan and Korea.

There is IPv6 deployment in networks like TWAREN/TANet2 (Taiwan) and CERNET2 (China). Also, TEIN (Trans Eurasia Information Network) is providing IPv6 connectivity between Asia and Europe as described above.

APAN is also promoting and assisting with the deployment of IPv6.

Some very interesting IPv6 related projects are running in Taiwan, including:

- Development of IPv6 application level firewall – with content filtering technology,
- Wireless IPv6-enabled Security gateways with real-time intrusion prevention system,
- Development at Leadtek Technology Inc of a business SIP-based VoIPv6 Videophone implementation,
- Mobilty layer-2 handoff optimisation on WinCE,
- Development of Mobile IPv6 to WinCE,
- Design and implementation of IPv6 based SIP user agents on WinCE,
- Design and implementation of intelligent transportation system with IPv6.

A national IPv6 standard and interoperability laboratory has been established. Many vendors in Taiwan now have IPv6 products. There is currently an IPv6 SIP Voice over IP trial and also a trial of a commercial VoD service.

5.4. Planned IPv6 activities

In Taiwan, the National Initiatives for Communication and Information (NICI) established an IPv6 Steering Committee in 2001. It has a number of working groups and involves research, education and commercial interests.

ABIEN (Advanced Broadband Integrated e-service Network) has plans to offer broadband to 6 million subscribers that are IPv6 enabled by 2007.

GSNv6 (Government Service Network) is to be launched this year and will be dual-stack by 2007.

6. Conclusion

6DISS workshops are an important mechanism through which information can be transferred from Europe to the targeted regions. These workshops enable us to build constituencies and raise awareness; disseminate, benchmark and validate the research results from IST; to promote European technologies; to exchange best practices; and explain about activities related to standards and interoperability issues.

Soton-ECS is responsible for the Southern Asia collaboration and workshops in 6DISS, and was supported strongly for this event by Cisco and Hungarnet. The 6DISS workshop in Taipei was attended by 45 participants. The material was selected based on what the local organisers of the full workshop asked for.

The project is aware that the workshops do not represent the end of the co-operation, but that this could be continued through the participation of representatives from the targeted regions in the IST Programme. This goal can only be achieved by maintaining contact with the local organisers in each region, and particularly the organisations that attend the workshops. This extended contact will be stimulated by 6DISS through:

- The Tiger Team comprising an expert for each IPv6 topic, who will give practical expert operational support for configuration, bug fixes, technical queries, (most likely via e-mail) to implementers and deployers,
- A facility whereby trainers in the developing countries can be trained in Brussels on the full set of material and equipment available within 6DISS.

For specific technology areas, including IPv6 multicast in particular, there should be further possibilities for collaboration, and contacts have been established for multicast, security and p2p applications - both in helping people deploy it, but also to perform tests with applications and services.