

# Future Internet with IPv6

Rahmat Budiarto  
National Advanced IPv6 Center  
Penang, Malaysia



Seminar Nasional Teknologi Informasi,  
Program Studi S1 Ilmu Komputer, USU  
12 -03-2009

## AGENDA

- Intro: future Internet
- IPv6
- IPv6 Deployment in Malaysia
- Challenges
- About myself

## *APAN 28<sup>th</sup> Meeting @ Kuala Lumpur, Malaysia*



Kuala Lumpur City Centre. CITY WITHIN A CITY.

- **Proposed Date** : July 20-24, 2009
- **Proposed Venue** : Berjaya Times Square Hotel &  
Convention Centre, Kuala Lumpur
- **Hosts / Organizers** : NAV6-USM, UPM, MYREN
- **Expected Participants** : 200 Local and 200 International

## Major trends shaping the future of the Internet

- Globalism
- Communities
- Virtual reality
- Bandwidth
- Wireless
- Grid
- Mobility
- Convergence of IP-based Networks

## Future Media Internet

- Internet, without a doubt, will become the next mass-media technology
- Broadcast TV will not disappear (like TV did not kill radio), but TV will have to reinvent itself
- Internet is more flexible and versatile, and most important, is fully interactive, the user controls the contents to view, and individual users may produce and distribute content

## Future Internet: some key words

- AI Engine, e-society, Wikipedia 3.0, Inference Engine, Web 3.0, Intelligent Findability, Semantic Blog, Info Agent, P2P, Culture Wars, Google, innovation, Semantic Web, Prediction markets, National Security Agency, ontology, internet governance, IPv6...



## IPv6 Address Fractal Jan-2001

000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100
000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100

## IPv6 Address Fractal Jan-2008

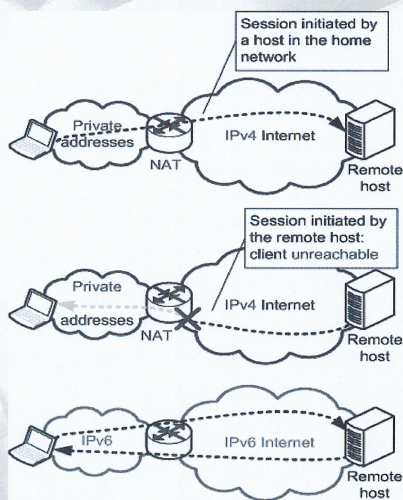
000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100
000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095	096	097	098	099	100



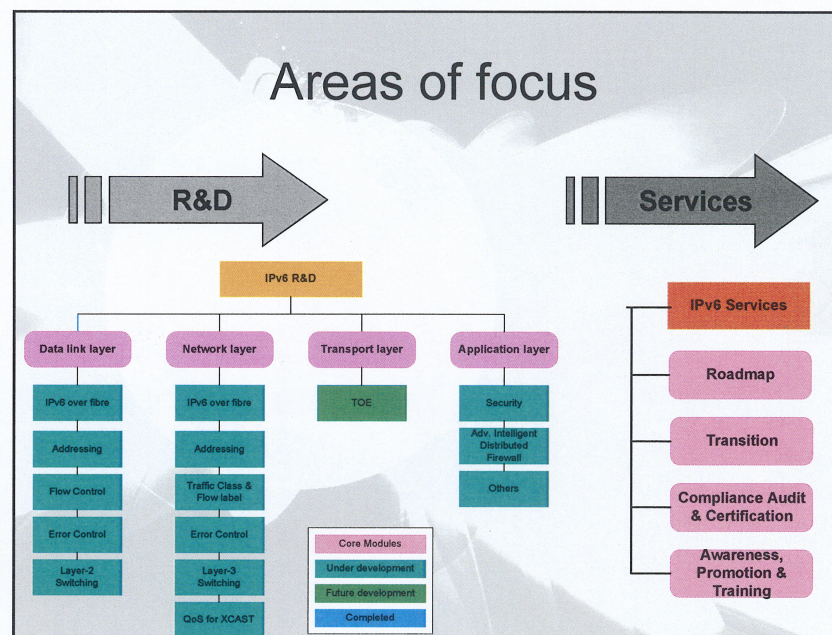


## Why not NAT?

- ⦿ Exhaustion of address space
- ⦿ NAT breaks the end-to-end model
- ⦿ Growth of NAT has slowed down growth of transparent applications
- ⦿ No easy way to maintain states of NAT in case of node failures
- ⦿ NAT break security
- ⦿ NAT complicates mergers, double NATing is needed for devices to communicate with each other



## Areas of focus



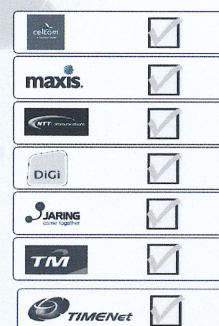




## Transition from IPv4 to IPv6

- Mega Project – IPv6 deployment for Putrajaya Campus Network (PCN)
- Government
  - **Federal**
    - Ministry of International Trade and Industry (MITI)
    - Jabatan Kehakiman Syariah Malaysia (JKSM)
    - Ministry of Finance (MoF)
    - Ministry of Education (MoE)
    - Ministry of Foreign Affairs
    - Ministry of Agriculture
  - **State**
    - Penang State Government
    - Selangor State Government
- Financial Institutions
  - Bank Negara Malaysia (BNM)
- Private sector
  - Government Integrated Telecommunication Network (GiTN)

## IPv6 Compliance Audit & Certification



Tier1 ISPs are IPv6 enabled  
(Appointment by MCMC)



MYNIC is IPv6 enabled



IPv6 Ready

## Awareness & Promotion

No.	Date	Event	Venue
1	28 – 30 Oct 2008	MyBroadband Exhibition and Conference 2008	KLCC
2	28 August 2008	Towards Implementation of Wireless Sensor Technology and Applications over IPv6 Network	PICC, Putrajaya.
3	17 – 20 June	CommunicAsia 2008, The 19 <sup>th</sup> International Communications and Information Technology Exhibition & Conference.	Singapore Expo Centre
4	30 - 31 July 2007	ASEAN IPv6 Workshop	Park Royal Hotel, Batu Ferringgi, Penang
5	15-17 March 2007	Next-Generation Networks Symposium: Malaysia IPv6 Forum Kickoff & IPv6 Certification Training.	IOI Marriott, Putrajaya.
6	17 Nov 2006	National IPv6 Technology Forum, Moving To IPv6 Enabled Nation	Park Royal Hotel, Penang
7	26 Aug 2006	Penang IPv6 Awareness Forum: Latest Technology & Deployment Strategy	USM, Penang
8	27-30 July 2006	27th BKS-PTN-BARAT Rector Meeting.	Bengkulu, Indonesia
9	17-21 July 2006	22nd APAN IPv6 Task force Meeting	Singapore
10	15 – 17 May 2006	DFMA' 06, International Conference	Penang.
11	27 Feb-1 March 2006	APT-NAv6 Joint IPv6 Workshop	Berjaya Langkawi Beach and Spa Resort, Langkawi.
12	22-47 Jan 2006	21st APAN IPv6 Task force Meeting.	Tokyo, Japan.
13	22 to 23 Sept 2003	MCMC Next Generation Networks Workshop 2003.	PWTC, Kuala Lumpur.
12	19 – 20 June 2003	IPv6 WORKSHOP 2003	NAv6, USM, Penang.
13	15 – 16 Oct 2000	A13-IPv6 WORKSHOP 2000	NAv6, USM, Penang.

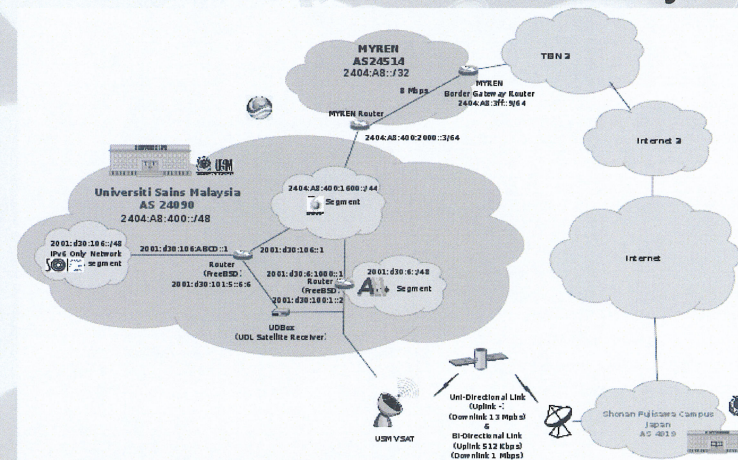
## Training

- Certified Network Engineer in IPv6 (CNE6) – Level 1, 2 & 3
- Certified Network Programmer in IPv6 (CNP6) - Level 1, 2 & 3
- Certified Security Engineer in IPv6 (CSE6)
- Curriculum with systematic approach and lots of hands-on
- Completely developed by NAv6 at USM
- First of a program to be offered in the world on IPv6
- Endorsed by WIDE project Japan and the Global IPv6 forum

## Training

No.	Date	Event	Venue
1	15 – 18 Mar 2007	CNE6 & CNP6 – Level 1	IOI Marriot , Putrajaya
2	12 – 15 Jun 2007	CNE6 – Level 1	NAv6 Centre
3	3 – 7 Dec 2007	CNE6 – Level 1 Course for KTAK	NAv6 Centre
4	4 - 7 Mar 2008	CNE6 – Level 1	NAv6 Centre
5	10 – 13 Mar 2008	CNE6 – Level 2	NAv6 Centre
6	30 Apr 2008	IPv6 Security Engg. Training Course	MCMC, Cyberjaya
7	8 May 2008	IPv6 Security Engg. Training Course	MCMC, Cyberjaya
8	16 May 2008	IPv6 Security Engg. Training Course	USM
9	11 – 13 Aug 2008	CNE6 – Level 1	NAv6 Centre
10	14 – 23 Aug 2008	CNE6 – Level 1 & 2	NAv6 Centre
11	14 – 15 Aug 2008	Linux Programming & Security Training	DPU, USM
12	15 – 18 Sep 2008	CNE6 – Level 1	NAv6 Centre
13	22 – 25 Sep 2008	CNE6 – Level 2	NAv6 Centre
14	17 – 19 Nov 2008	CNE6 – Level 1	NAv6 Centre
15	23 – 25 Feb 2009	ASEAN ICT workshop	NAv6 Centre
16	16-19 Mar 2009	Next CNE6 Training	MEWC, Putrajaya

## IPv6 Network Connectivity



## Challenges

- Innovative Internet base applications
- New Services
- end-to-end communications
- M-applications
- Deployment Area:
  - General Purpose
  - Home Appliance
  - Automobile
  - Cellular Phone
  - Entertainment

Thank you