Taiwan Government's Initiative to Deploy IPv6

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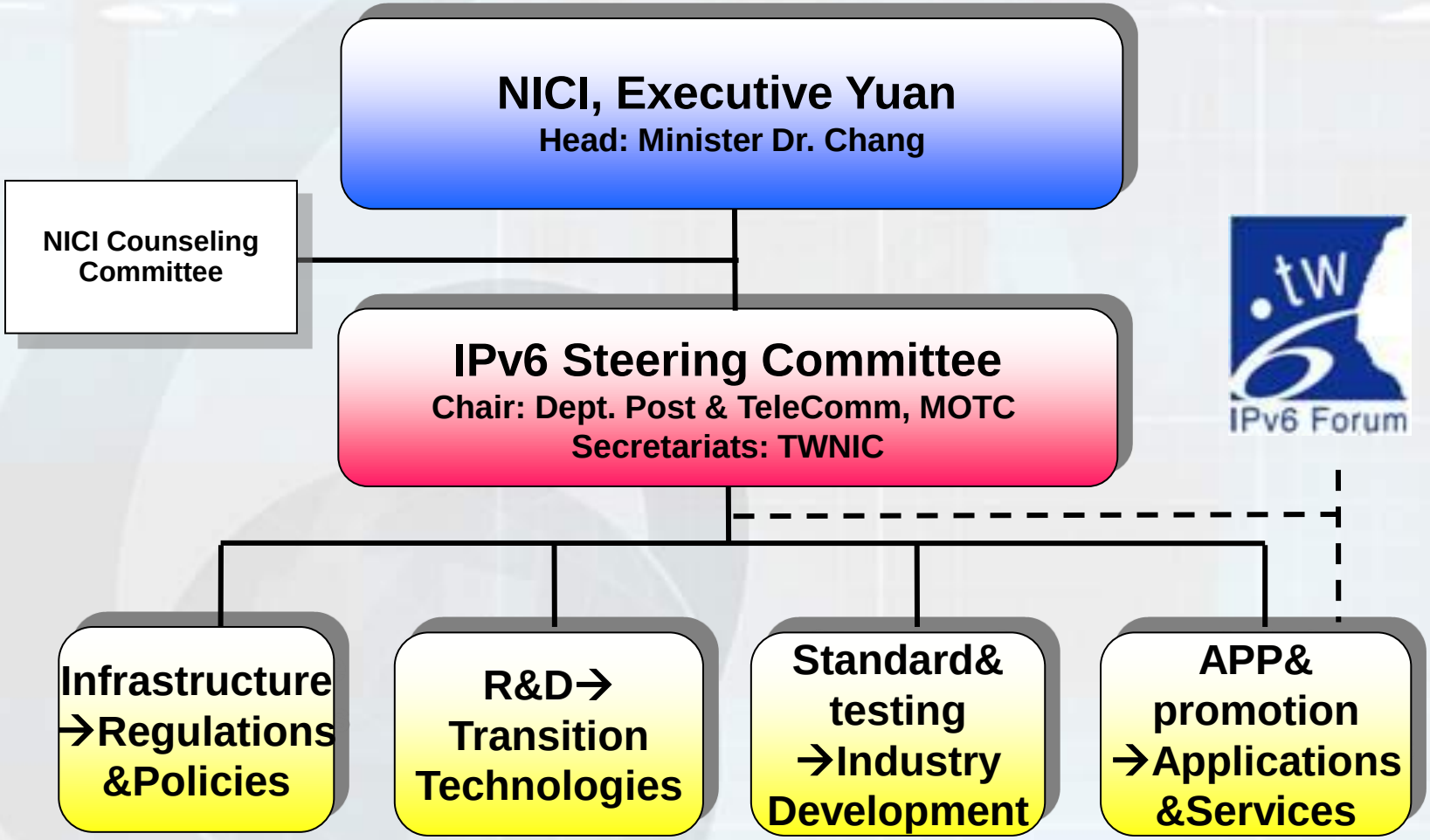
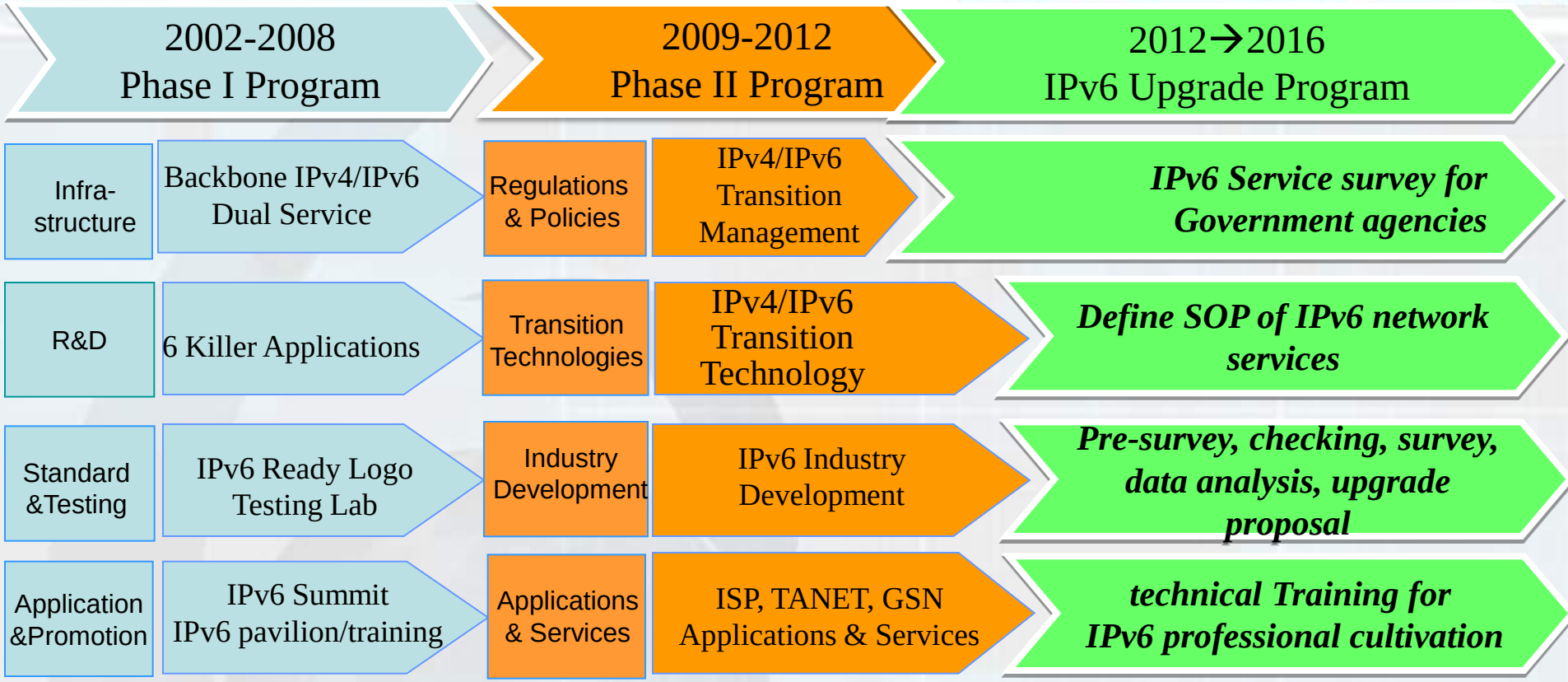
National IPv6 Program



The Roadmap of IPv6 Program in Taiwan



- Analyze Global IPv4/IPv6 policy
- Analyze IPv4/IPv6 interoperability among ISPs
- Access network on TANet and GSN
- Collaboration with national research program
- IPv6 upgrade promotion for government agencies

Motivation of Taiwan IPv6 Initiative

- **Why did we take the IPv6 initiative this Jan.?**
  - Face the fact of IPv4 address exhaustion.
  - Face the rapid growth of IPv6 services.
  - Let government be the driving wheel of IPv6 upgrade.

- We made a proposal of IP Network Development Strategies to government last Dec. And then the government launched the initiative subsequently.

- Challenge : Based upon our past experience, how to find cost-effective *Strategies to have a* seamless transition

The Goal of IPv6 UP Program

- Smoothly upgrade Government Service Network (GSN) to IPv6
  - *Upgrade the first half of public network services (Web, DNS, Email) to be dual stack enabled* **2012-2013**
  - *Upgrade the second half of public network services to be dual stack* **2014-2015**
- Encourage the research and development of IPv6 enabled appliances and services
- Encourage and stimulate the creation of intelligent IPv6 applications

Strategies of IPv6 Initiative

- ***Strategy 1:*** Make a survey to find the problems and difficulties.
  - From small scale to large scale.
- ***Strategy 2***: Define ***the standard operating procedure (SOP)*** of the IPv6 upgrade for major Internet services.
- ***Strategy 3***: Encourage ISPs to provide ***dual-stack or tunneling for the IPv6 network connection***.
- ***Strategy 4:*** technical training courses for IPv6 professional cultivation.

The public network services survey

- ***Principle*** :Make a survey of public network service systems and their related hardware/software.
- ***Stage 1***(Preparation) : Establish 5 standard operating procedures (SOP) of IPv6 upgrade for DNS, WEB, Email, FTP, Network services and survey data management system including the data acquisition authoring and on-line help tools.
  - technical trial to verify these SOPs.
- ***Stage 2***(Launch) : Make a proposal of IPv6 deployment survey plan for government agencies.

- ***Stage 3*** : Pre-survey trial (a small scale survey) for 6 voluntary government agencies
- ***Stage 4***(Checking) :
  - Revise the plan according to the feedback
  - technical training
- ***Stage 5*** : Full scale survey
  - Data analysis.
- ***Stage 6***: Make a summarized upgrade proposal.
- Till now, there are about 5,556 network services in the government agencies survey.

Milestones

Date	Action Items
Jan.	Design data acquisition table for IPv6 service systems survey and develop the DB system.
Feb.	Take IPv6 inventory trial run within 6 Gov. organs.
Feb.	Orientation seminars. (1,000 attendee)
Mar.	IPv6 technical Training including IPv6 basic and hand-on lab.
Mar.	Full scale service survey for Government agencies.
Apr.	Help 6 Gov. organs propose upgrade plan.
June	Make a summarized IPv6 upgrade proposal

Current status – participated org.

	# of Main organs	# of Subsidiary organs	# of Total organs	# of Complete the inventory	% of completion
Office of the President	1	1	1	1	100%
The Legislative Yuan	1	1	1	1	100%
The Examination Yuan	5	2	7	7	100%
The Control Yuan	2	0	2	2	100%
The Executive Yuan	1	0	1	1	100%
Ministries of the Executive Yuan	8	167	175	148	85%
Commissions of the Executive Yuan	29	103	132	113	86%
Local Governments	22	446	468	370	79%
Subtotal	**69**	**720**	**787**	**643**	**82%**

Date：2012/5/7

Expected IPv6 ready for Service Systems

# of Services	Web	Email	DNS	FTP	Others	Total	Web %	Email %	DNS %	FTP %	Others %
already Ready	12	0	5	0	0	17	0%	0%	1%	0%	0%
2012	319	54	71	1	45	490	9%	9%	14%	2%	7%
2013	1,752	412	350	19	259	2,792	56%	77%	81%	44%	48%
2014	321	57	49	5	63	495	64%	86%	90%	56%	57%
2015	1,049	50	38	17	177	1,331	92%	95%	97%	93%	85%
2016 or later	286	33	15	3	94	431	100%	100%	100%	100%	100%
Subtotal	3,739	606	528	45	638	5,556					
Percentage	67%	11%	10%	1%	11%	100%					

Date：2012/5/7

Expected IPv6 ready for Services

# of Service	Primary Service	Second-ary Service	Internal Service	Subtotal	Interna-tional Service	Represe n-tative Service	Mobile Servic e	Freq. Used Service	Annual Revisio n System
IPv6 Ready	17	0	0	17	2	10	0	9	2
Year 2012	421	58	11	490	221	400	128	444	161
Year 2013	2,361	370	61	2,792	904	2179	398	2440	694
Year 2014	162	321	12	495	86	282	51	354	74
Year 2015	124	1,067	140	1,331	91	394	72	679	121
Year 2016 or later	168	135	128	431	73	179	38	260	51
Subtotal	**3,253**	**1,951**	**352**	**5,556**	**1377**	**3,444**	**687**	**4,186**	**1,103**

Date：2012/5/7

Expected IPv6 ready for Servers

# of Servers	Total Servers	IPv6-enable	% of IPv6-enable	IPv6 Ready	# of Upgrade on 2012	# of Upgrade on 2013	# of Upgrade on 2014	# of Upgrade on 2015	# of Upgrade on 2016 or later
WWW Server	4126	3205	78%	12	530	2042	384	779	345
DNS Server	620	424	68%	5	120	391	47	33	17
Email Server	723	470	65%		132	453	49	48	35
FTP Server	69	54	78%		3	32	6	21	7
Proxy Server	66	38	58%		5	48		8	3
Cache Server	34	34	100%			14	7	3	10

Date：2012/5/7

Expected IPv6 ready for Network Devices

# of Devices	Total Devices	IPv6-enable	% of IPv6-enable	IPv6 Ready	# of Upgrade on 2012	# of Upgrade on 2013	# of Upgrade on 2014	# of Upgrade on 2015	# of Upgrade on 2016 or later
Firewall	1704	1060	62%	4	289	1067	105	148	74
Load Balance	463	216	47%	2	41	330	25	47	5
Router	1113	449	40%	18	206	648	59	107	40
Layer 4 Switch	175	43	25%		45	116	7	3	4
Layer 3 Switch	935	579	62%	12	153	599	57	61	43
Layer 2 Switch	783	360	46%		144	371	97	107	55
Others	2534	1317	52%		214	1413	217	456	215

Date：2012/5/7

WWW Server systems distribution

	Server System	Quantity	Percentage
1	IIS6	1821	41%
2	Apache	974	22%
3	IIS7	755	17%
4	IIS5	320	7%
5	Tomcat	140	3%
6	Oracle Web Server	127	3%
7	WebSphere	94	2%
8	JBoss	29	1%
9	Sunweb	29	1%
10	TrendMicro	17	0.4%

Date：2012/5/7

Email Server systems distribution

	Server System	Quantity	Percentage
1	Exchange	142	26%
2	Mail2000	69	13%
3	Sendmail	65	12%
4	Postfix	52	10%
5	RaidenMAILD	31	6%
6	Omail	29	5%
7	Open WebMail	19	4%
8	Share Tech	15	3%
9	SPAM SQR	13	2%
10	HGIGA CCmai	13	2%

Date：2012/5/7

DNS Server systems distribution

	Server System	Quantity	Percentage
1	Windows	358	63%
2	BIND	208	36%
3	NIOS	2	0.3%
4	CITRIX Netscale	1	0.2%
5	RaidenDNSD	1	0.2%
6	Smart DNS	1	0.2%
7	Infoblox	1	0.2%

Date：2012/5/7

Hardware Solutions ratio

- Hardware

	2012	2013	2014	2015	2016 or later	Total	%
Device Replaced	445	1,773	248	404	213	3,083	79%
Module Replaced	32	106	29	20	30	217	6%
Reverse Proxy Solution	2	2	2			6	0%
Device to be Off-line	10	83	12	12	20	137	4%
Others	80	215	53	40	51	439	11%
Total	569	2,179	344	476	314	3,882	100%

Software Solutions ratio

■ Server System and Software

Date：2012/5/7

	2012	2013	2014	2015	2016 or later	Total	%
Software Upgrade	475	2,104	235	370	249	3,433	53%
Program or Webpage Revised	127	380	111	190	115	923	14%
Software Upgrade plus Webpage Revised	30	198	76	72	50	426	7%
Replacement of software	68	233	66	48	21	436	7%
Reverse Proxy Solution		5	11	7		23	0%
Others	95	669	116	271	83	1,234	19%
Total	795	3,589	615	958	567	6,524	100%

Taiwan IPv6 Readiness Survey

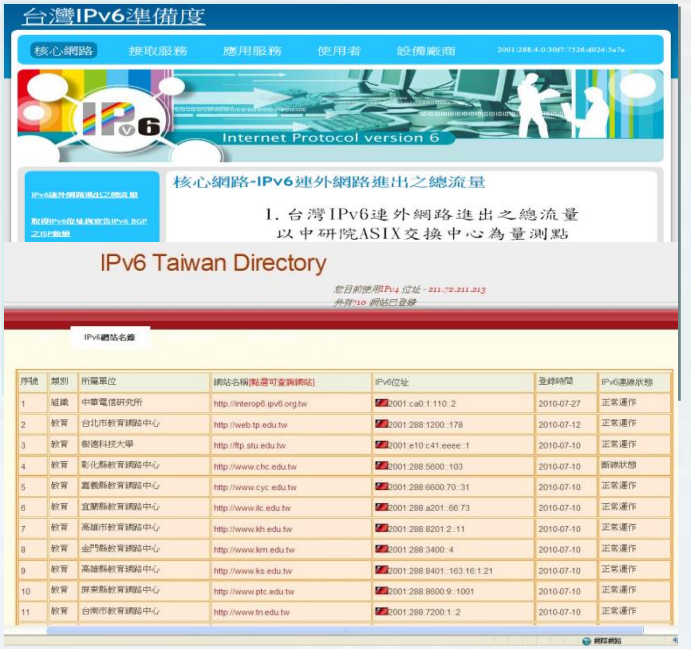
- Measure the status of IPv6 deployment in Taiwan since 2009
  - http://v6readiness.ipv6.org.tw/
  - http://v6directory.twnic.net.tw

IPv6 Readiness	Mar-11	Mar-12	Growth
International IPv6 Traffic (Mbps)	109	167	153%
IPv6 Websites	1,107	7,793	699%
IPv6 DNS	247	2,455	994%
IPv6 Ready logo	87	145	167%

Users	• Web query from IPv6 • DNS query from IPv6
Applications	• IPv6 servers in Web, and DNS
Access Network	• Traffic in IPv6 Tunnel Broker
Core Network	• Number of ISPs within IPv6 allocations that are advertised in BGP • IPv6 traffic that in/out of Taiwan

Vendors

IPv6 Ready Logo Phase I & Phase II



Source: Taiwan Network Information Center (TWNIC)

Conclusion

- **Cost-effective strategies are successful.**
- We will continuously encourage the research and development of IPv6 enabled appliances and services.
- We will continuously encourage and stimulate the creation of intelligent IPv6 applications.

Thank you!