Motivation for developing SA46T
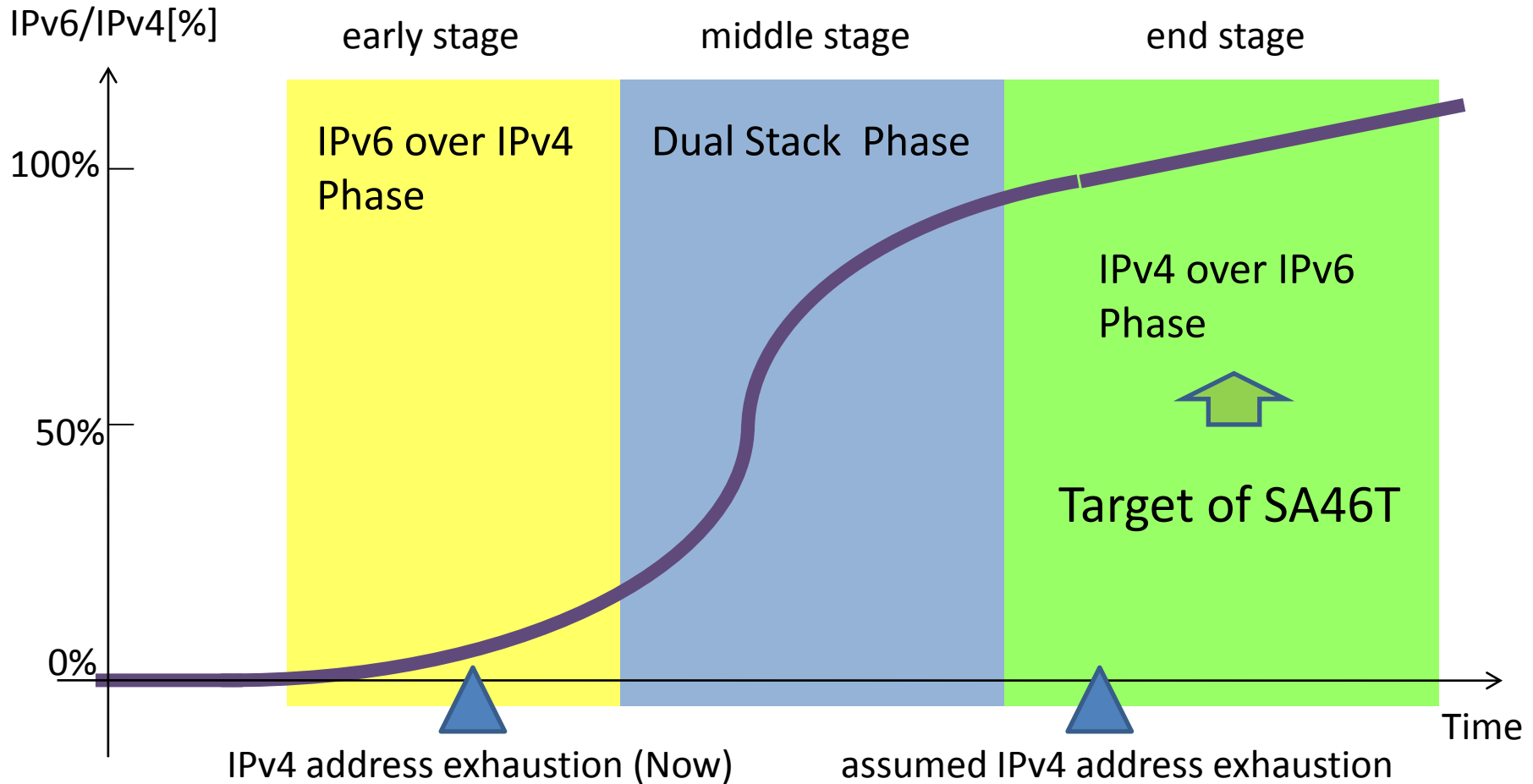
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Fujitsu Limited

81st IETF Quebec, July 2011

Image of IPv4 to IPv6 transition

IPv6/IPv4[%]

early stage   middle stage   end stage

100%

IPv6 over IPv4 Phase

Dual Stack Phase

IPv4 over IPv6 Phase

Target of SA46T

50%

0%

Time

IPv4 address exhaustion (Now)   assumed IPv4 address exhaustion

Time when SA46T contributes has advanced.

Motivation for SA46T

- Can install into existing network
  - any IPv4 address, non dependency
- Less tunnel configuration
  - N, not N^2
- Simple install strategy
  - edge based solution
- Can treat both IPv4 Global and IPv4 Privates
  - plane ID
- Can install into various networks
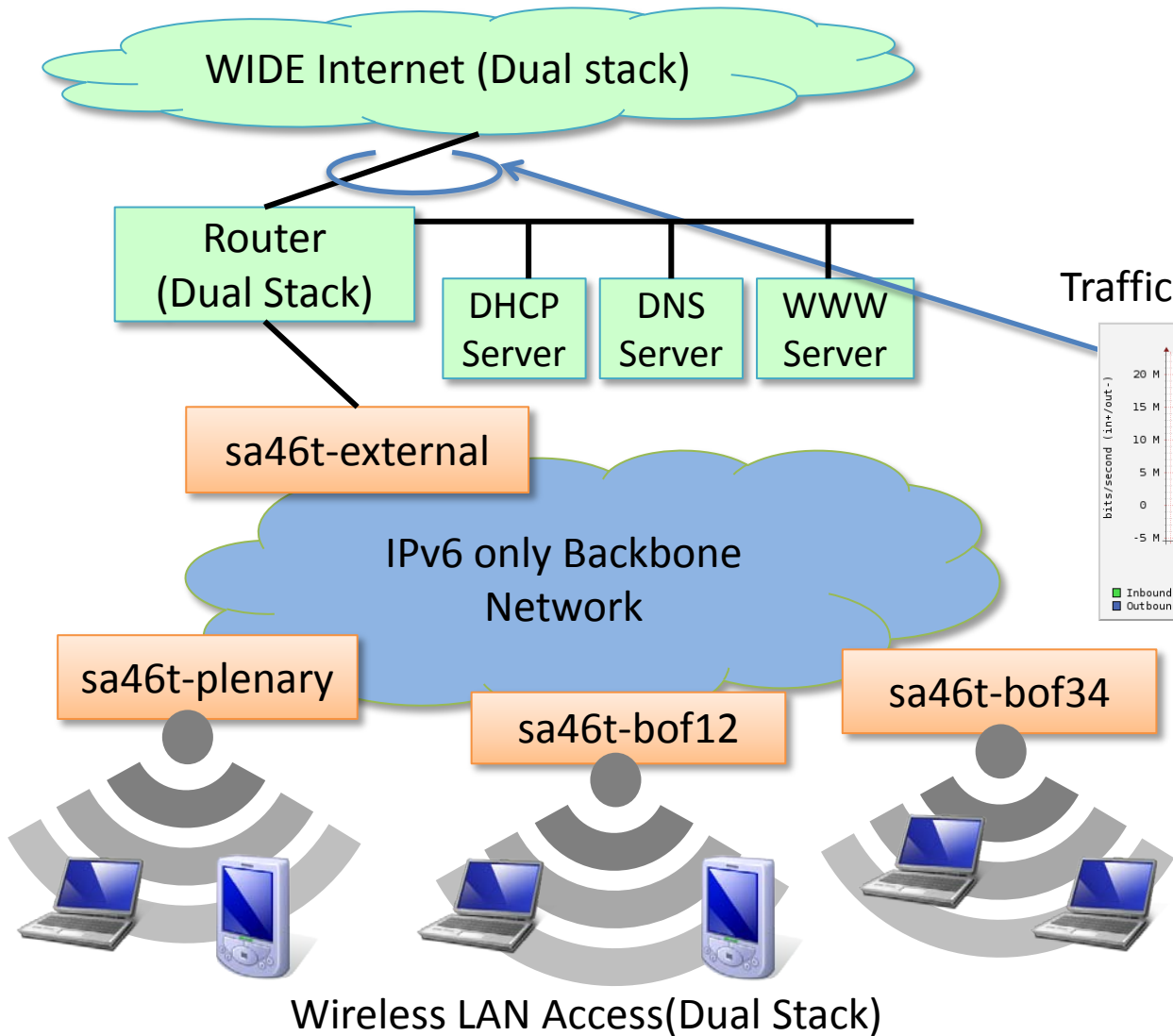 - access, backbone, enterprise, datacenter

position of SA46T

- One of tunneling technology
  - GRE, IP in IP, etc
  - but focus only on IPv4 over IPv6
- Can combine with NAT
  - CGN with SA46T, may tunnel option of DS-Lite
  - CPE NAT with SA46T-AS, A+P capability
  - off course, non NAT solution may possible
- General purpose of IPv4 over IPv6 Tunneling
  - can apply access network, backbone network, enterprise network, data center network
  - plane ID is unique function for VPN like service

Consideration

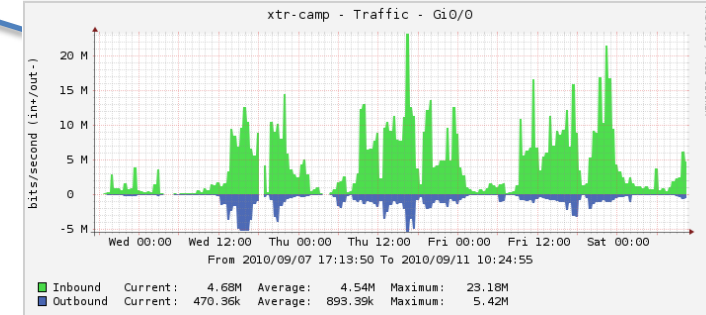- SA46T is fundamental tunneling function
  - simple protocol / function specification
  - Can combine other technologies
- Many application may possible
- I believe that SA46T is useful for a smooth transition to IPv6 and the continuance of IPv4 in the near future.
  - The dependency between network transition and host transition can be separated.
- I believe that SA46T has the qualification of the IETF standard.

sa46t experiments at WIDE camp

WIDE Internet (Dual stack)

Router
(Dual Stack)

DHCP
Server

DNS
Server

WWW
Server

sa46t-external

IPv6 only Backbone
Network

sa46t-plenary

sa46t-bof12

sa46t-bof34

Wireless LAN Access(Dual Stack)

Overview
- 4.5days in September 2010
- provide both IPv4 & IPv6
- Using single IPv4 plane
- Clients Join via Wireless LAN

Traffic

xtr-camp - Traffic - Gi0/0

From 2010/09/07 17:13:50 To 2010/09/11 10:24:55

		Current:		Average:		Maximum:	
Inbound		4.68M		4.54M		23.18M	
Outbound		470.36k		893.39k		5.42M	

Results
- 191 people attended
- 275 clients joined
- sa46t Work fine, very stable
- >230 million IPv4 packets encaped by sa46t

sa46t experiments at NICT JGN2Plus Testbed

HDTV Live Stream (150Mbps)
(One Month)

HDTV Live Stream (30Mbps)
(3 weeks)

3D HDTV Live Stream (>140Mbps)
(3 days)

HDTV data
(3 days)

sa46t-sapporo

sa46t-okinawa

sa46t-osaka

sa46t-okayama

sa46t-thai

OSPFv3

BGP4+
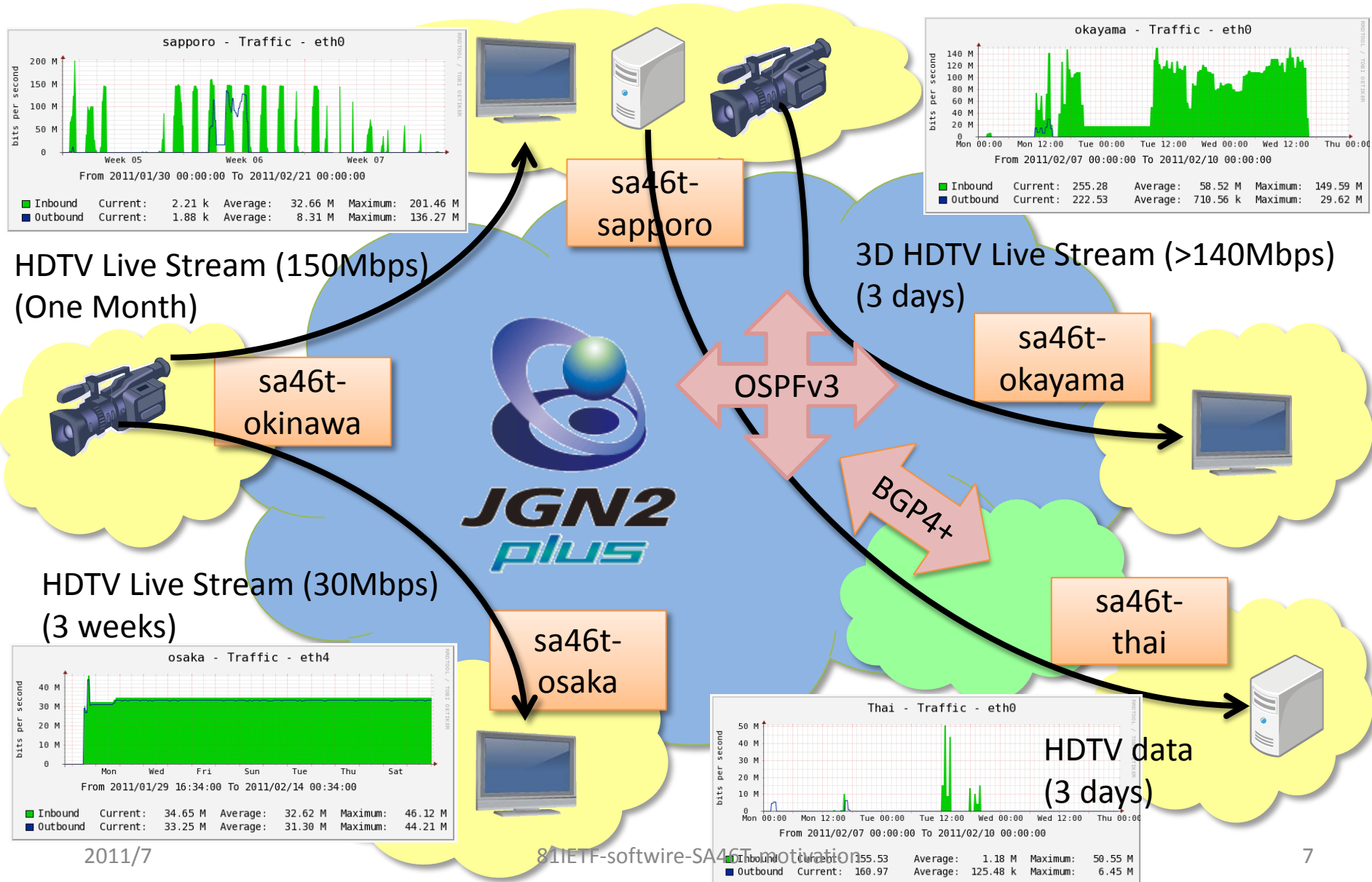
SA46T Demo at Interop 2011 Tokyo (in this June)

Makuhari Messe

The Internet

Grand Prix

BEST OF SHOW AWARD INTEROP
TOKYO | 7 – 10 JUNE, 2011

(2) Used 3 SA46T Plane

グランプリ

SA46T Plane#0 (Global address)

ThaiSarn 3
Thailand's Next Generation Internet

SA46T (F-SA46T)

ThaiSarn Bangkok

SA46T (F-SA46T)

SA46T (F-SA46T)

PC

SA46T (N-SA46T)

Access Corner

(3) Experience SA46T

#sh△net
> The Reality

Interop ShowNet

(1) IPv4 over IPv6 only drop

Fujitsu booth

JGN-X

DC NOC

(4) Case of Enterprise Network

Server

SA46T (F-SA46T)

SA46T Plane #1 (Private address)

SA46T (F-SA46T)

PC

(6) Used same IPv4 address

FUJITSU

NICT otemachi

NICT booth

SA46T (N-SA46T)

SA46T Plane #2 (Private address)

SA46T (F-SA46T)

3D-PC

Server

NICT

SA46T (N-SA46T)

(5) ShowNet Peering with JGN-X

2011/7

8 (7) Interoperability SA46T initiative

(7) Interoperability between different box

SA46T
Stateless Automatic IPv over IPv6 Tunneling