



Indonesia Internet eXchange IIX

IIX and IIXv6 Development Update 2007

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Overview

- Indonesian Internet History
- Birth of IIX
- The Role of IIX during the Monetary Crisis
- IIX Operation
- IIXv6 Development
- NOC IIX-APJII

APJII – Asosiasi Penyelenggara Jasa Internet Indonesia

- Association of Indonesian Internet Service Providers
- Non-profit Organization
- Founded March 1996 at the first national conference held in Jakarta
- Membership included all 27 ISP's plus UI, Indosat and Telkom



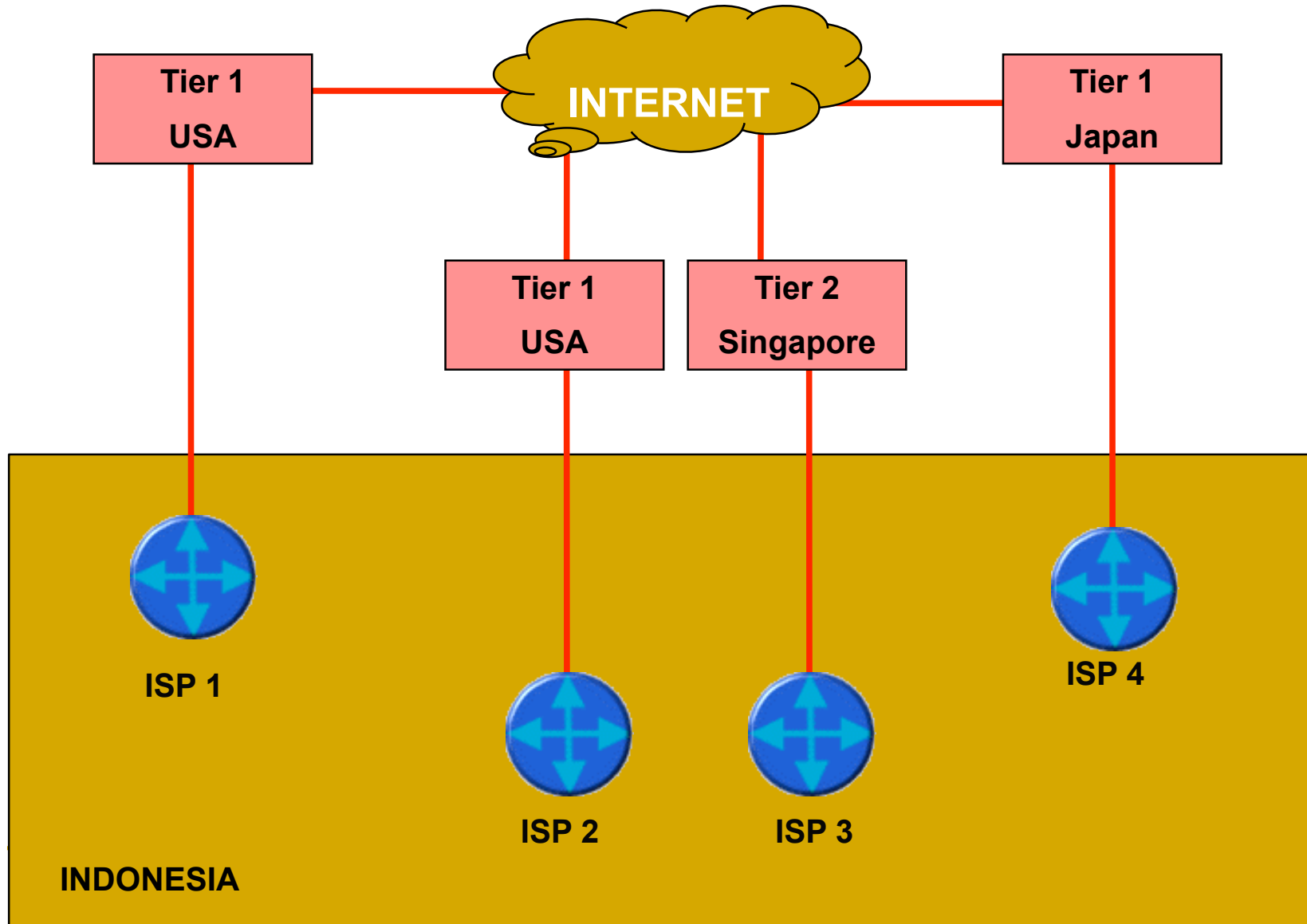
ISPs in Indonesia 1994

- Indonet and IPTEKnet was the first operational ISPs in Indonesia
 - ❑ Started operating in 1994
 - ❑ Launched before ISP licenses were required from the government
 - ❑ Used 9600bps IDD dial-up to Singapore
 - ❑ Services offered were TELNET, IRC, and UUCP

ISPs in Indonesia 1995

- RadNet was the first licensed ISP
 - Started operating in 1995
 - Introduced the World Wide Web (WWW)
 - Used dedicated connection to the Internet
 - Charges users for connection.
- Indonet and other ISPs followed the model
- Regulators issued a total of 27 ISP licenses

Indonesian Internet before IIX



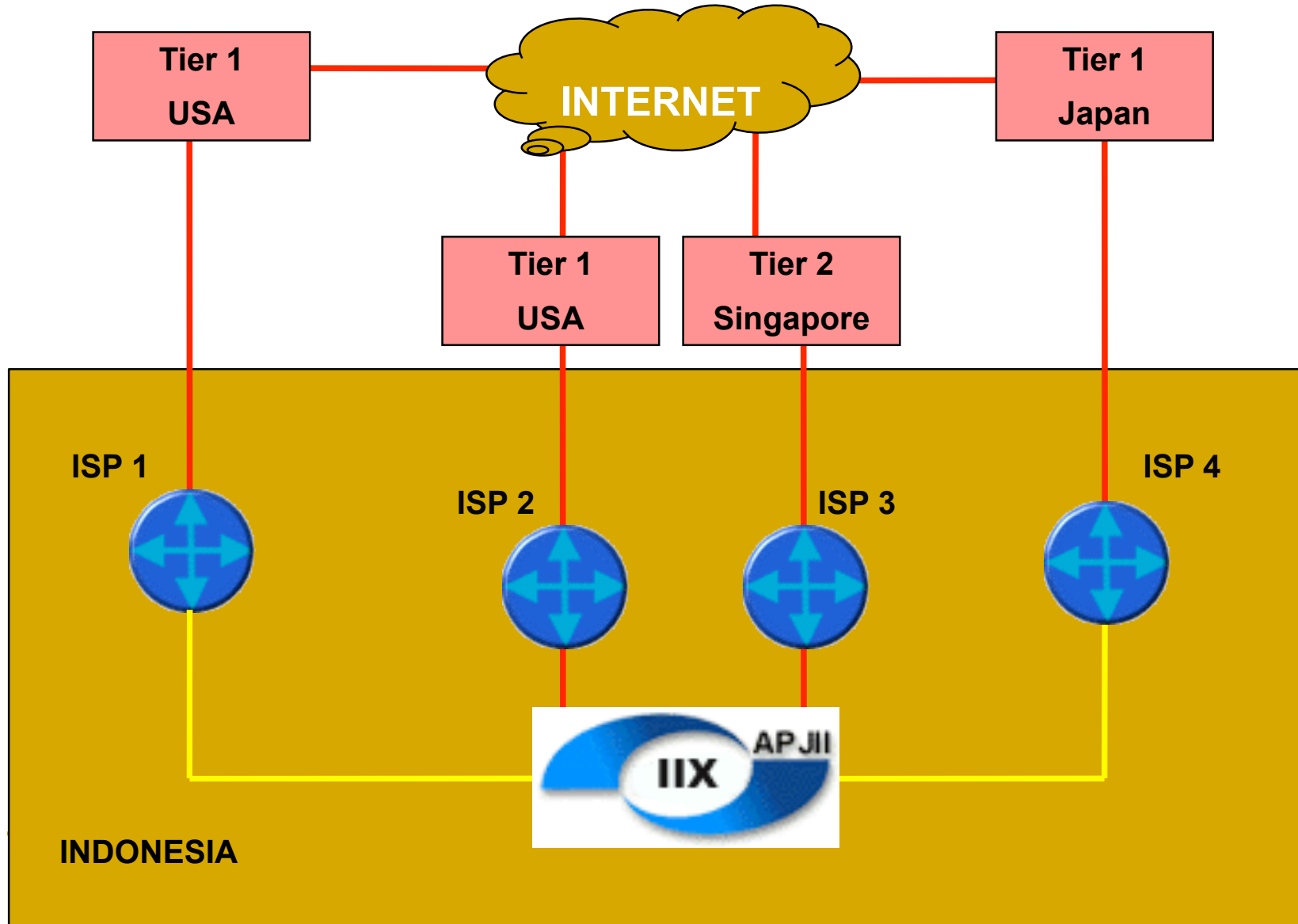
The Birth Indonesia Internet eXchange (IIX)

- Initiated by APJII on June 1997
- No funding was provided by the Government
- Design by CISCO (US) and APJII
- All active ISP's (15) contributed
- Routers were granted by CISCO
- Baseband Modems was granted by RAD
- Servers by HP and Intel
- Operational on August 1997

7 Fundamentals of IIX

- Sense of Belongings
- Relationship
- Giving good effect for APJII members
- Non Profit
- Do not make competition with members (ISPs)
- Neutral
- Independent

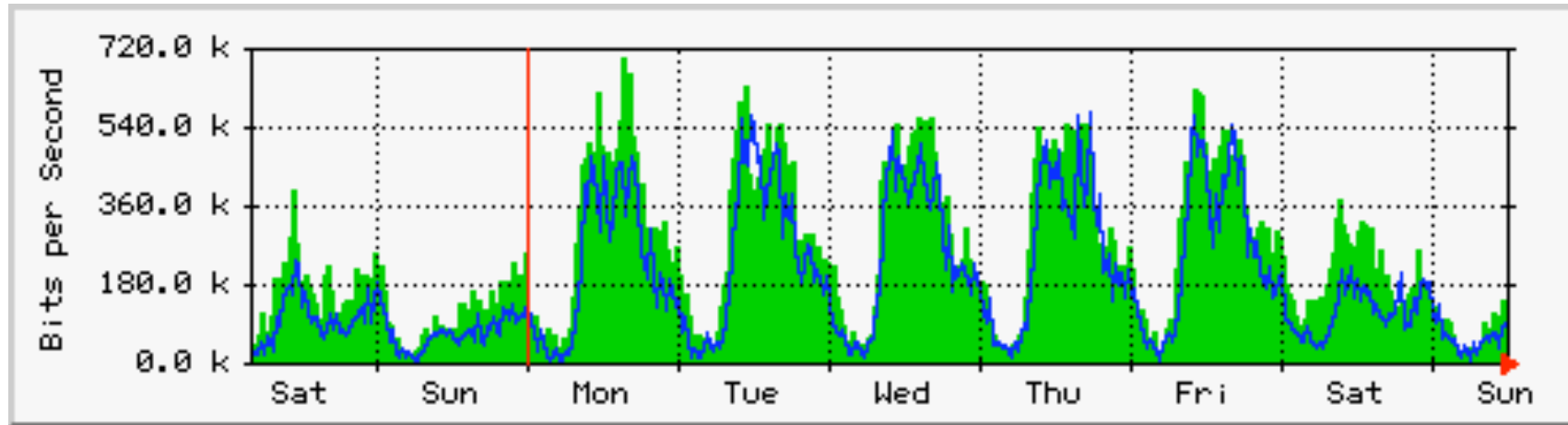
Indonesian Internet After IIX



The Role of IIX during the Monetary Crisis 1997

- The monetary Crisis started few months before the operation of IIX in 1997
- US\$ rose up to 800% toward ID-Rupiah
- The international bandwidth fee in US\$, ISP is predicted to be closed down

The Role of IIX during the Monetary Crisis 1997



- Local bandwidth from one ISP to IIX is 512Kbps
- Not using the international route, ISP has saved the monthly costs

The Role of IIX during the Monetary Crisis 1997

- ISP whose international connection has been disconnected, informed its customers to get an access to local sites in Indonesia
- IIX is used to connect one ISP member to another ISP's proxy server
- Give more time to ISPs to restore their international bandwidth
- Not one ISP was closed during the crisis

How the IIX affects the Indonesian Internet 1997

- Drop in delay time of local sites access from an average ping of 700ms to 7ms
- New opportunities of deploying internet based applications due to the small delay time
- Stimulating the growth of local Indonesian content
- Security for e-commerce since local packets will not go through the global internet
- Implementation of e-gov with local internet traffic

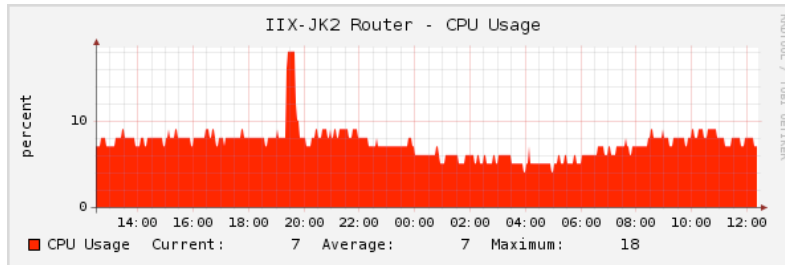
IIX Routing

- Members use their IP Address (Both IPv4 and IPv6 Address) and ASN assigned by APNIC.
- Interface addresses are given to each member.
- The benefits of this configuration:
 - Each ISP's need only 1 BGP Peer.
 - Minimizes the CPU load of ISP's router.
 - Minimizes the investment of all ISP's.

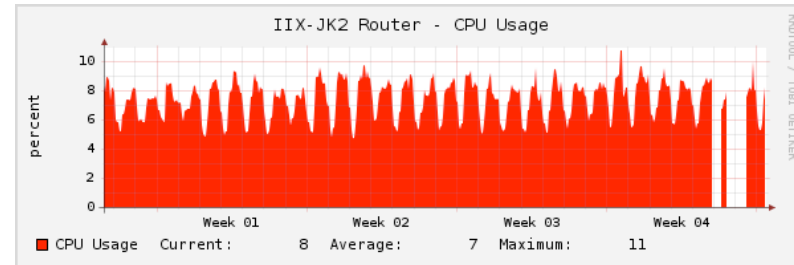
IIX Routing (sample from IIX-JK)

- Members peer only to the IIX router.
- IIX is a layer 2 and 3 infrastructure.
- Routes more than 1500 announcements (prefixes IPv4) received from it's members.
 - Peering Party : 49 ISPs
 - Router utilization : 8%.
 - Average traffic at 150 Mbps

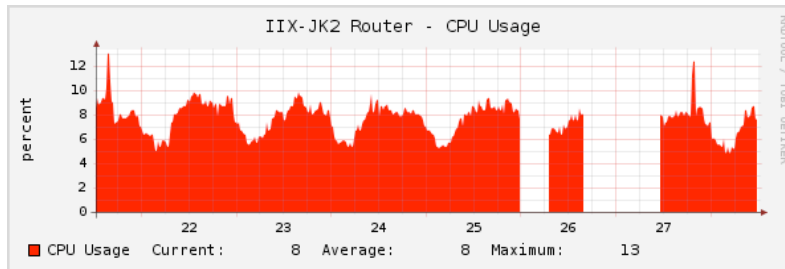
CPU Usage Sample



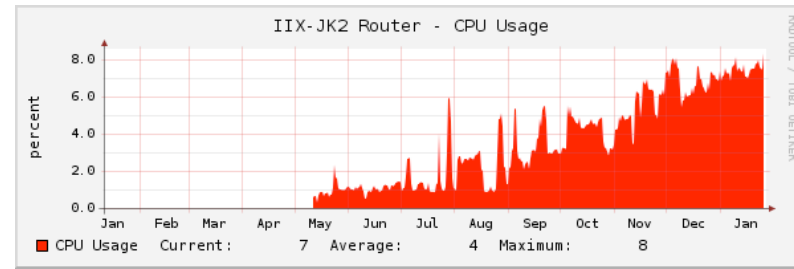
■ Daily Graph



■ Monthly Graph



■ Weekly Graph



■ Yearly Graph

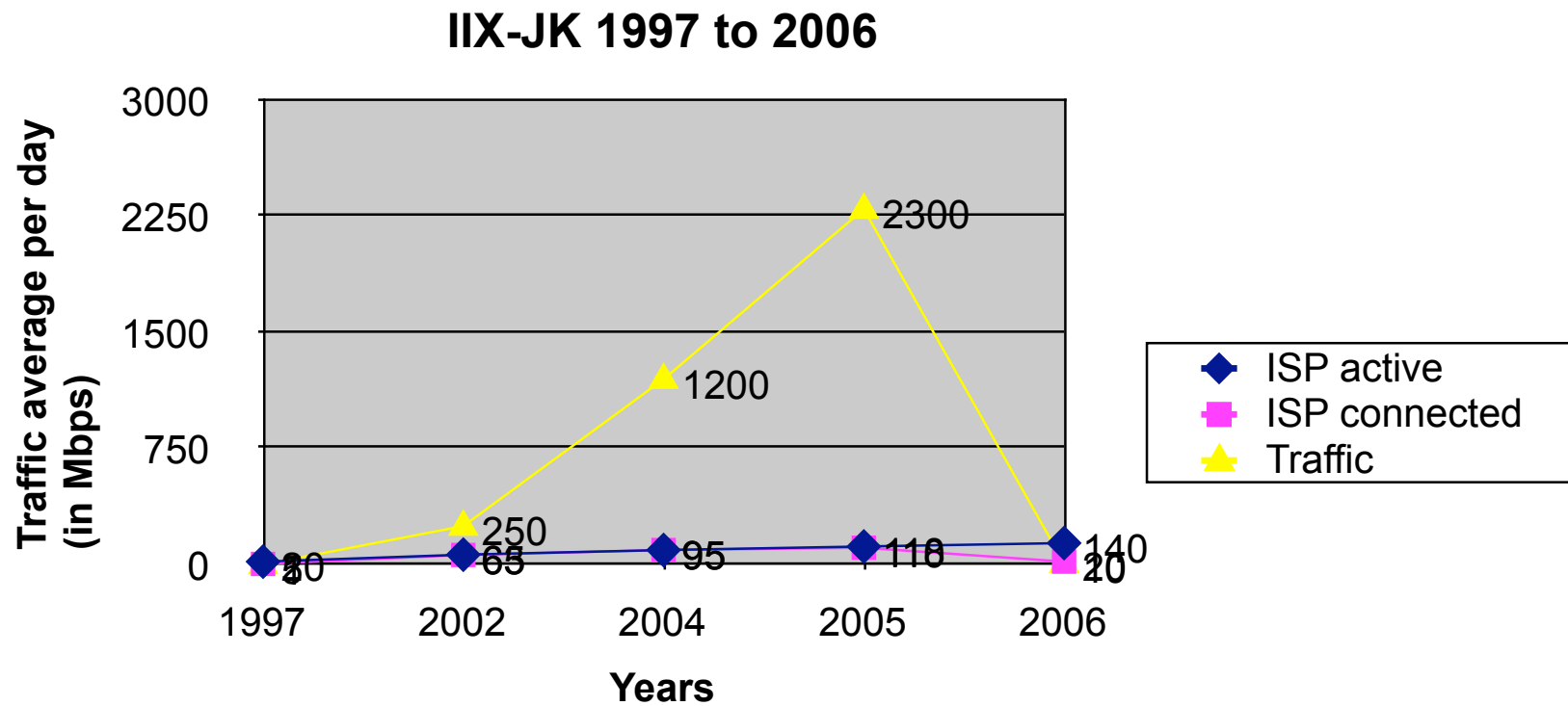
IIX Operational Implementation

- Have 1 IIX day to day Administrator with 3 backup Administrator from three different ISPs
- The three Administrator are not informed for public
- Use IPv4 and IPv6 address which can not be accessed from outside of Indonesia
- Use own AS Number
- Use BGP4 routing and static to facilitate the connected ISP
- A 24-7 monitoring by the IIX and ISP Administrator

IIX from 1997 – 2006 (IIX-JK only)

- August 1997
 - IIX connected 5 ISPs from 20 active ones
 - Resulted in less than 0.5 Mbps peak traffic every day
- July 2002
 - IIX connected 63 ISPs of 65 active ones
 - Resulted average traffic 250 Mbps every day
- 2004
 - IIX connected 92 ISPs of 95 active ones
 - Resulted average traffic 1.2 Gbps every day
- 2005
 - IIX connected 110 ISPs of 118 active ones
 - Resulted average traffic 2,3 Gbps every day, peak traffic are 3,4 Gbps
- 2006
 - IIX connected 20 ISPs of 140 active ones
 - Resulted average traffic 10 Mbps every day, peak traffic are 30 Mbps

IIX from 1997 – 2006 (IIX-JK only)



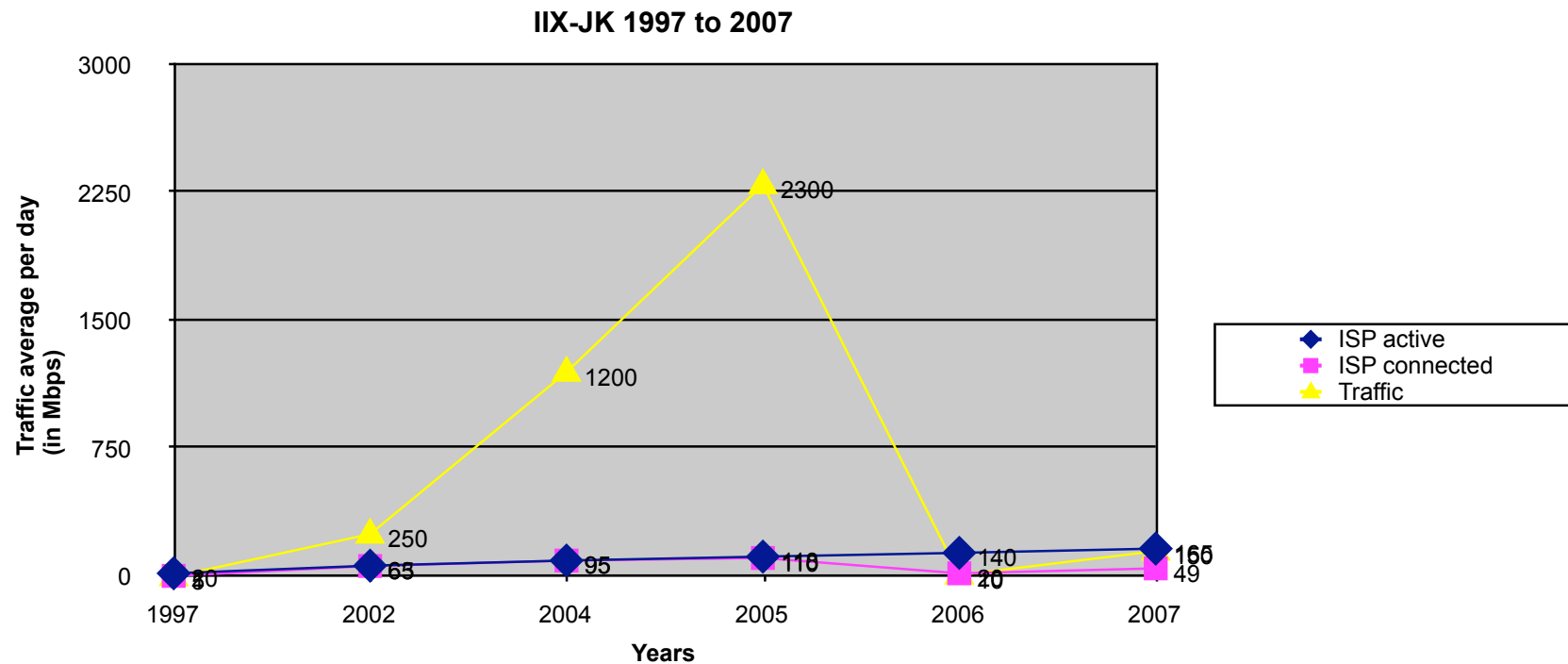
Reasons Decreasing IIX Prefixes and Traffics 2005

- APJII had political and business conflict with IIX-JK2 Co-Location Operator
 - 11 September 2005 The Operator shutdown IIX power panel without any confirmation and reasons
 - The Operator moving out all ISPs peers to their new router that placed beside of IIX-JK2 router
- 80% daily IIX traffic is from IIX-JK2 peers

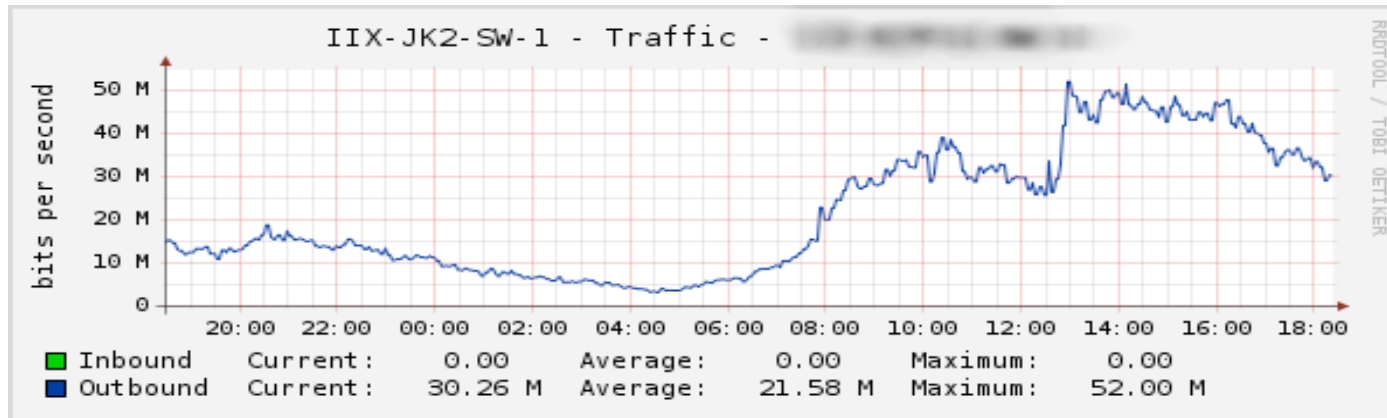
IIX Now 2007 – 2008

- IIX Node
 - IIX-JK (Jakarta) : 3 Nodes (49 ISPs)
 - IIX-JI (Surabaya) : 1 Node (4 ISPs)
 - IIX-YO (Yogyakarta) : 1 Node
 - IIX-SU (Medan) : 1 Node
- Total ISPs Connected to IIX-JK are 49 ISPs
- Total prefixes announced to IIX-JK are 1569
- Total average traffic in IIX-JK are 150 Mbps

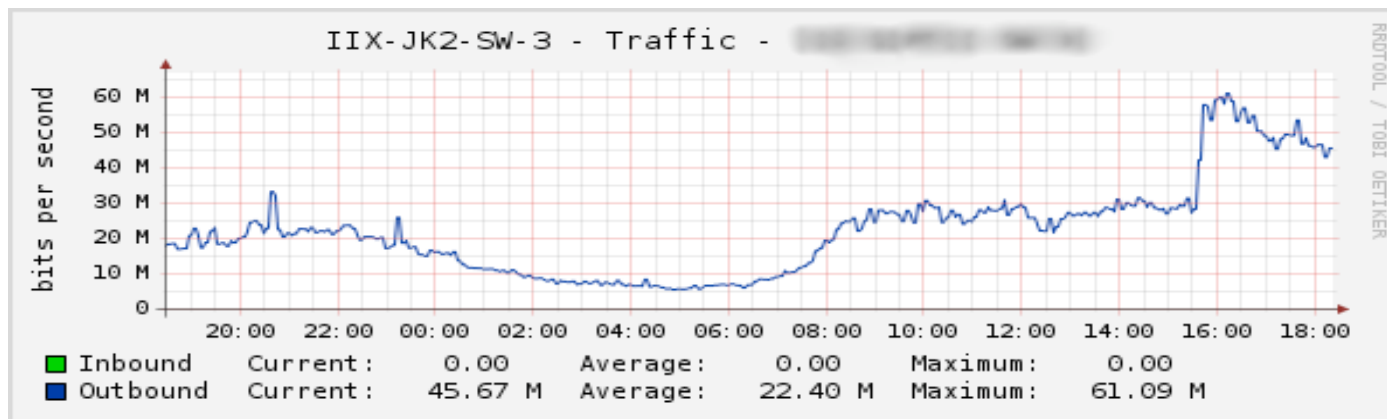
IIX Now 2007 – 2008 (IIX-JK only)



Daily Traffic Sample of IIX



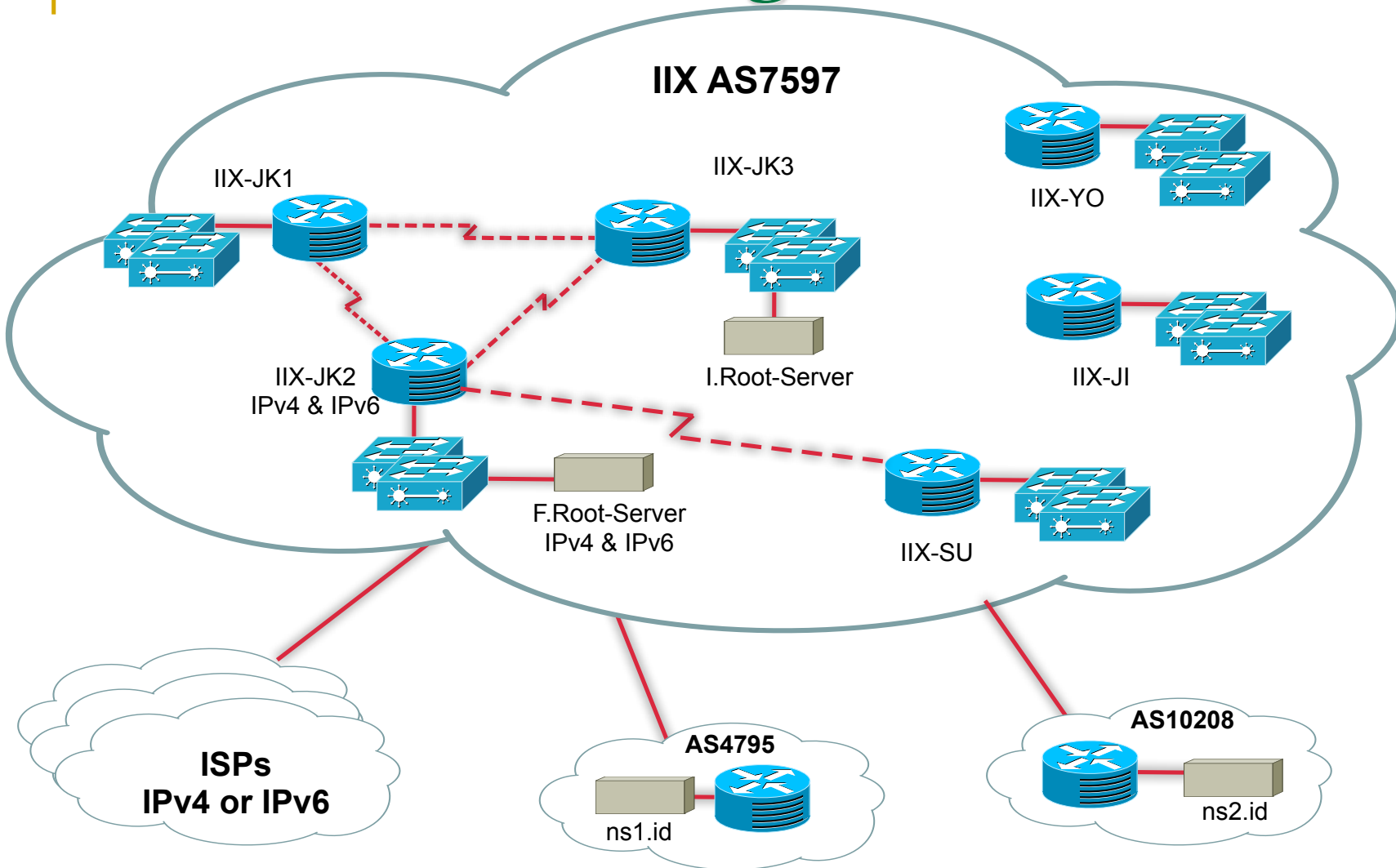
IIX-JK2 Port Mirror 1



IIX-JK2 Port Mirror 2

Port mirror capture both Traffic (Inbound & Outbound) of IIX-JK2 switches

IIX Current Configuration



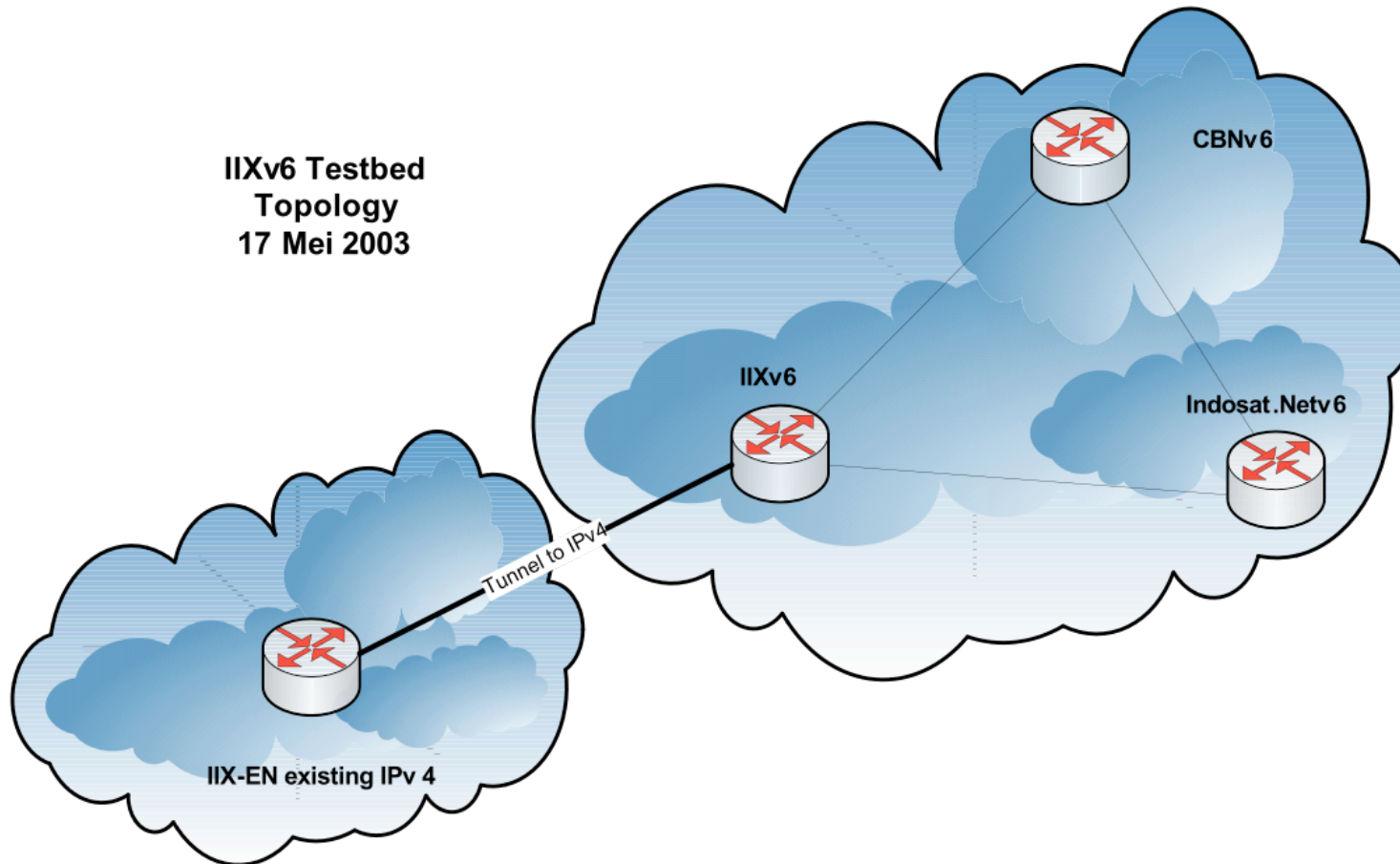
Indonesia Internet Exchange: Logical Layer

IIXv6 Development (1st phase)

- 04 March 2003 IIX received /48 IPv6 IXP allocation from APNIC
- Since April 2003 IIXv6 Team (collaborated APJII, CBN, Kabelvision, Indosat) launch IPv6 Testbed using OSPF, RIP, and BGP routing.
- Testbed not published until 17 May 2003
- All configuration and equipment are temporary established due to the Testbed

IIXv6 Development (1st phase)

IIXv6 Testbed
Topology
17 Mei 2003



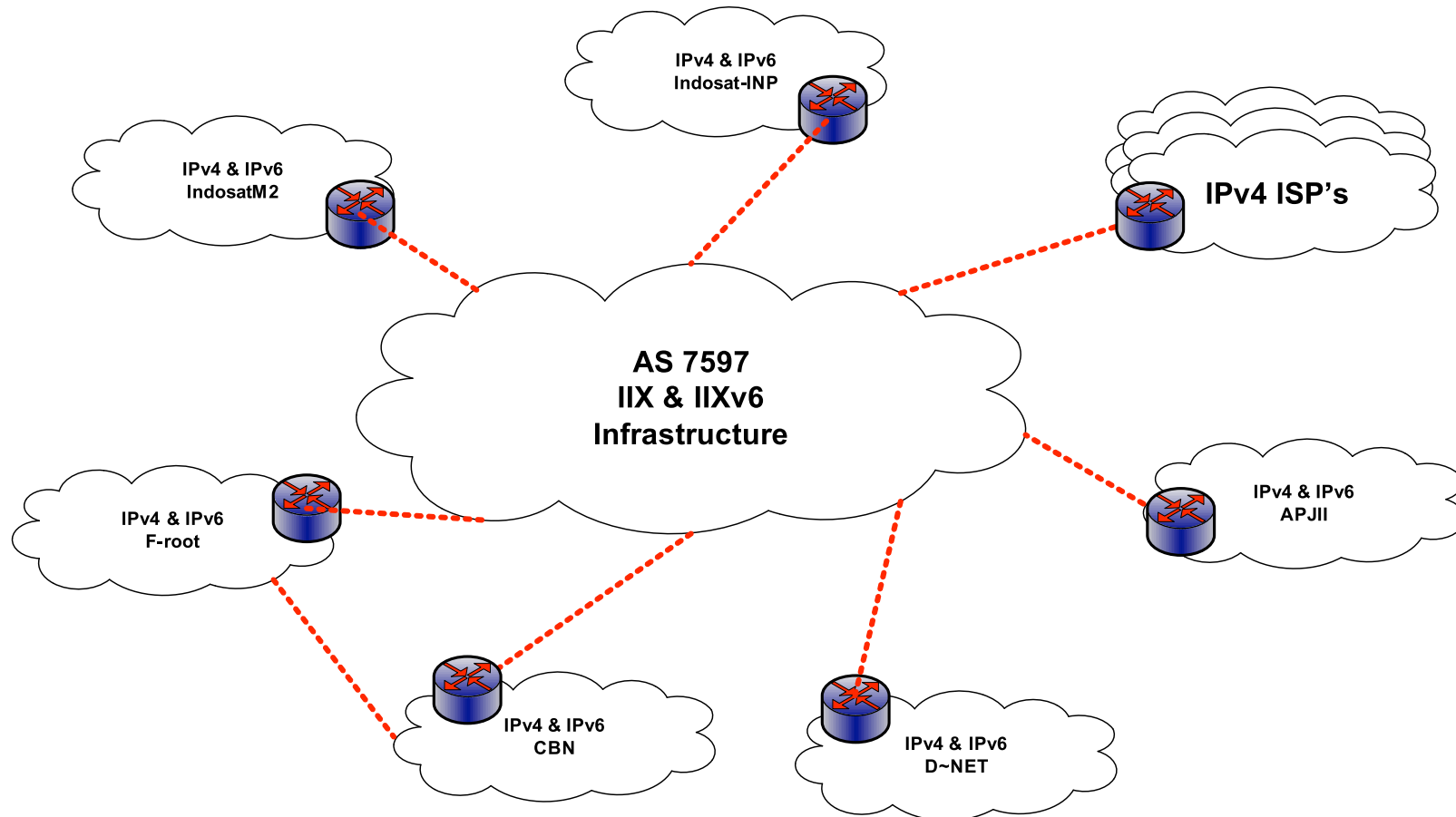
IIXv6 Development (production phase)

- December 2006 APJII change IIX-JK2 core router to Cisco 7500 series RSP-8 (Router provide by TELKOMSEL)
- January 2007 IIX try to implementing IPv6 BGP routing between IIXv6 and APJII gateway router (IPv4 peer and IPv6 peer provide on same ethernet cable)
 - All IPv6 peers filtered base on AS-path, prefix-list, and access-list
 - Dual stack peers is best model due to production phase (IPv6 traffics not affected the total daily IIX traffic flow)

IIXv6 Development (production phase)

- February 2007 internal R&D Finished, and the first IIXv6 peers are; APJII, IndosatM2, APRICOT 2007, and BIZ.Net
- During APRICOT 2007, BIZ.Net test IP-TV streaming via IIXv6 infrastructure
- 21 December 2007 IIXv6 established F-root IPv6 peers
- IIXv6 peers in January 2008 are :
 - APJII, IndosatM2, Indosat-INP, F-root, CBN, D~NET

IIXv6 Current Configuration



NOC IIX-APJII

- 15th December 2006 APJII launched main Network Operation Center for IIX, it is named NOC IIX-APJII
- NOC IIX-APJII operate independently by APJII under control IIX-APJII division
- NOC IIX-APJII take place at Cyber Bld 1st fl, Jakarta with total area are 416,82 m²
- NOC IIX-APJII is new home of IIX-JK2 and act as IIX interconnection central
- Only APJII members that available to co-location at NOC IIX-APJII with minimum monthly fee (this fee needed to cover operational cost)

NOC IIX-APJII Services

- ENUM-ID Testbed
- ID-IPv6 TF infrastructure connection
- IPv6 R&D for ISPs
- Connecting to IIX or IIXv6 without any extra fee

NOC IIX-APJII Overview



IIX Infrastructure 2007

IIX Infrastructure



IIX-JK = IIX-JAKARTA
IIX-YO = IIX-YOGYAKARTA
IIX-JI = IIX-JAWA TIMUR
IIX-SU = IIX-SUMATERA UTARA

Any Questions ?



Thank You!

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