

Security Management in the Internet Era

5th : IPv6 Security
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Schedule

01st (09/22) Course Description

02nd (09/29) Cloud Security (1)

03rd (10/06) Cloud Security (2)

04th (10/13) Military use of the cyber security technology and its issues

05th (10/20) IPv6 Security

06th (10/27) Guest Lecture(Joichi Ito)

07th (10/27) Personal Information and Security(1)

08th (11/10) Personal Information and Security(2)

09th (11/17) Disaster Recovery Internet(1)

10th (12/01) Disaster Recovery Internet(2)

11th (12/08) Midterm Presentation(1)

12th (12/15) Midterm Presentation(2)

13th (12/22) Evaluation of Security Risk

14th (1/12) Final Presentation(1)

15th (1/19) Final Presentation(2)

1st Assignment Review

- 3 reports will be presented
 - Presentation: 3 min.
 - Discussion: 7 min.
- Amerio Airlines, the company that has many branches around the world, want to share customer information by using cloud computing service. Please suggest the appropriate method to do this process. Your idea should consist of 4 points of view:
 - a contract between Amerio Airlines and customer,
 - a contract between Amerio Airlines and cloud computing service,
 - a legal system for distributing customer information, and
 - a data leakage prevention technique.

星北斗さんのレポート(SFC)

Clients

A Contract

- Act on the Protection of Personal Information

Amerio Airlines

A Contract

- Locus of responsibility

Cloud Company

A Legal System

- International cooperation

A data leak prevention technique

- Audit trail
- Encryption

樋口尚文さんのレポート(SFC)

Clients

Big Problem

- Asymmetry of information
- Locus of responsibility
- Vendor lock-in

Amerio Airlines

A Contract

- Act on the Protection of Personal Information

Cloud Company

A Contract

Management at home

A data leak prevention technique

Employee training, Internal rules

尾花 悦正さんのレポート(NAIST)

Clients

- An explanation about treat of a individual information.
- Vender rock-in

Amerio Airlines

- An selection of Cloud system vender.

Cloud Company

- A protection of communication
- A protection of information leakage
- A treatment of user information

Doudou Fallさんのレポート(NAIST)

Clients

Amerio Airlines

A Contract

- Composite risk

A Contract

- Data sovereignty

Cloud Company

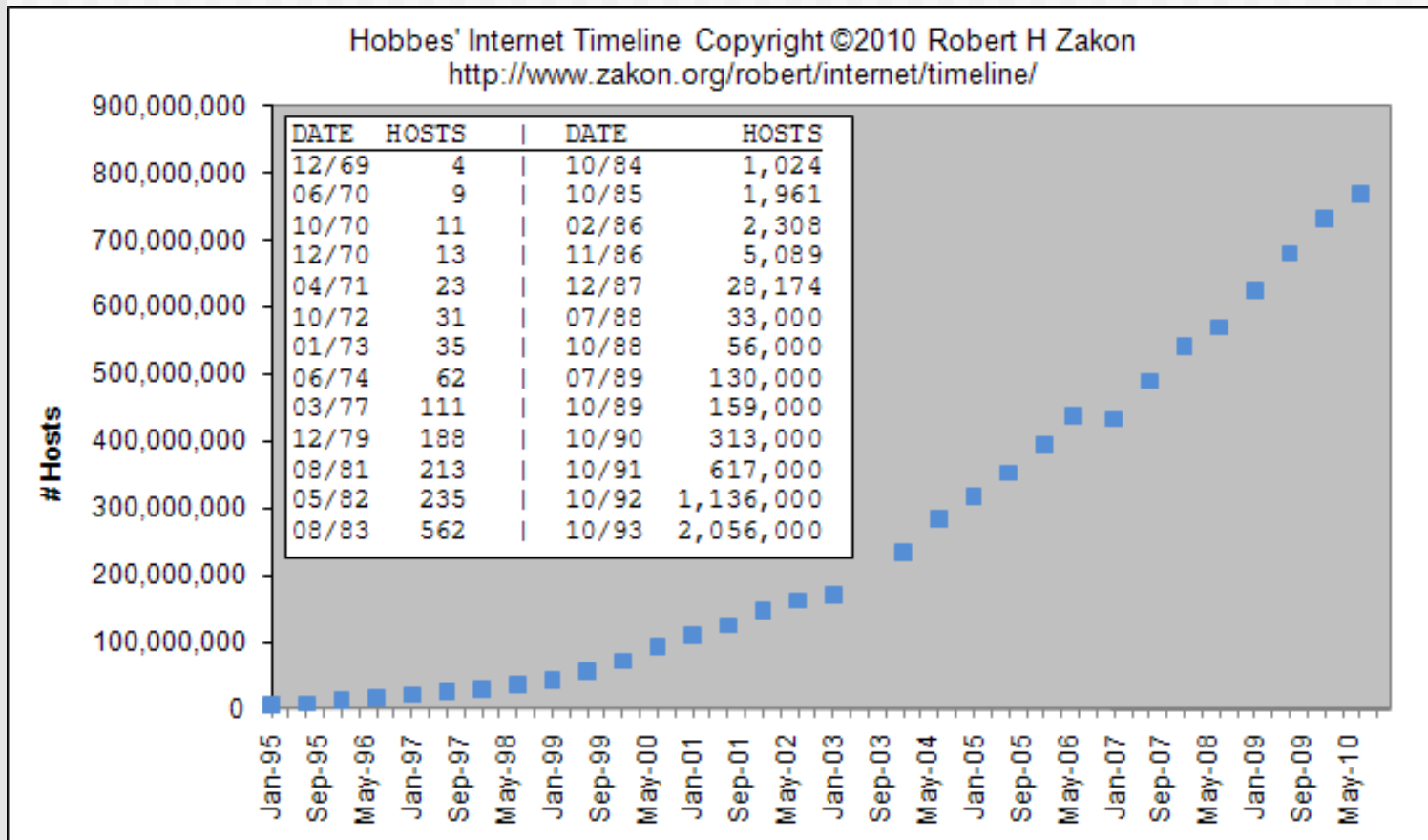
Legal system

- Federated Identity Management

Data leakage prevention

- Homomorphic encryption

The growth of the Internet



Problems

- Rapid growth of the IP-based communication
 - IPv4 address exhaustion
 - New adaptation fields and new requirements
 - Security, Mobility, etc.
- Urgent issue: address & route
 - Address aggregation
- Solution
 - New Internet Protocol = IPv6

Different between IPv6 & IPv4

- Expansion of address space
 - IPv4: 32-bit address = 4,294,967,296 addresses
 - E.g. 192.168.0.1
 - IPv6: 128-bit address = 3.4×10^{38} addresses
 - E.g. 2000:aaaa:bbbb:cccc:dddd:eeee:ffff:1
- Address architecture
 - Hierarchical structure
- Security
 - IPsec as a standard

IPv6 Support Status

- January 2011 – IANA’s IPv4 exhaustion
- April 2011 – APNIC’s IPv4 exhaustion
- Current status of IPv6 in each country
 - USA
 - 2007/2 NIST
 - “A Profile for IPv6 in the U.S. Government – Version 1.0”
 - EU
 - 2009/3 European Commission
 - “Action Plan for the deployment of IPv6 in Europe”
 - Australia
 - 2007/6
 - “A Strategy for the Implementation of IPv6 in Australian Government Agencies”
 - South Korea
 - 2008/12
 - “Basic plan about management of Internet Address Resources”

IPv6 in Japan

- ISPs start the IPv6 service
 - December 2005 – NTT Communications
 - April 2010 – Yahoo!BB
 - April 2011 – KDDI
 - Other ISPs are work in progress
- World IPv6 day
 - June 8, 2011 – several large content providers tested the public IPv6 deployment

IPv6 Mitigation

- IPv4/IPv6 dual-stack
 - Using both IPv4 and IPv6 in a device
 - If IPv6 can't be used, it will use IPv4 instead
- Dual-stack issues
 - Hardware compatibility
 - E.g. network interface card, etc.
 - Operating system compatibility
 - Windows XP is not support
 - Network equipment compatibility
 - Router, firewall, etc.

IPv6 Security Risk

- Device will be exposed to the Internet
 - Removing NAT will migrate devices from private IP address to global IP address
 - For embedded device which has vulnerability will be affected
 - Need for filtering
- Auto IP tunneling
 - IPv6 transition technology which automatically gives IPv6 connectivity on IPv4 network
 - Teredo on Windows

IPv6 Security Risk

- Privacy Consideration
 - Generation of IPv6 address is from MAC address
 - Devices can be tracked

DISCUSSION

- Imagine a security risk in the future which IPv6 network is default !

Summary

- IPv4 address is exhaustion, so we need to use IPv6 address
 - IPv6 address space is so big.
 - IPv6 Support Status is not perfect, in spite of IPv4 address is exhaustion.
- IPv6 Security Risk
 - IPv6 have some security problems.