

Research and Development of Linux IPv6 Stack

Keio University (慶應義塾大学)
USAGI/WIDE Project

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Self Introduction

- Assistant Professor at Keio University
 - Graduate School of Media and Governance
- Core member of USAGI/WIDE Project
- Co-maintainer of Networking [IPv4/IPv6] area in Linux kernel

Background(1)

- 30+ years since the birth of “IP”
 - Scalability issues
 - Lack of IP address space
 - Explosion of routing table
 - New demands
 - Security
 - Mobility
- New generation IP: IPv6
 - Transition to IPv6 is inevitable.

Background(2)

- Linux kernel IPv6 stack
 - Implementation by Pedro Roque (since Linux 2.1.x (1996))
 - One of the earliest IPv6 implementation
 - Not well-matured
 - “EXPERIMENTAL”

Background(3)

- Linux IPv6 Users Group JP
 - Operation of experimental network
 - Porting applications
 - Found and addressed various issues
 - Instability
 - Incompatibility
 - API, Neighbor Discovery, Address Auto-configuration
 - Lack of features
 - IPsec, Mobile IPv6, stateful packet filter etc.
 - Offered several fixes
 - “Discussion” in Netdev ML
 - Barriers...

Background(4)

- Linux is not only for regular PC
 - Enterprise, Embedded systems etc.
 - Never good to leave it...
- USAGI Project (2000-)
 - Founded by WIDE Project
 - Linux IPv6 Users Group JP
 - Call for members

USAGI Project Overview(1)

- Name
 - USAGI/WIDE Project
 - Universal Playground for IPv6
 - <http://www.linux-ipv6.org>
 - cf) KAME Project
- Objectives
 - Research and development of IPv6 and related technologies on Linux.
 - Deployment: open results to public

USAGI Project Overview(2)

- Members
 - 10 from 8 private companies and 2 universities
- Office
 - The University of Tokyo, ITC
 - The University of Tokyo, Hongo campus
 - Keio University, Shin-kawasaki Town Campus

USAGI Project Activities(1)

- Quality Improvement

e.g.) IPv6 core

- Neighbor Discovery
- Address auto-configuration

cf.) TAHI Project

- Development of new features

- IPsec, stateful packet filter, Mobile IPv6 etc.
- Practical use and deployment of new technologies
- Basement of further research and development

USAGI Project Activities(2)

- Maintaining community by ML
 - Development of Linux IPv6 stack
 - Feedback helps improvement of quality
- Frequent participation to interoperability test events
 - TAMI Interoperability Test Event
 - IPv6 Ready Logo Program
 - e.g.) Phase-2 (2.6.15, host, ipsec end-node)
- Development and operation of automatic test running system

USAGI Project Products

- Software Products
 - Motivation of the Project
 - Categories
 - “Stable” (Irregularly)
 - “Snapshot” (every two weeks)
 - “Daily Snapshot”(everyday, unofficial)
 - Source-code management system (CVS, GIT)
- Papers / Conferences

Barriers When Merging USAGI Efforts

- Our efforts could not be merged immediately
 - Contributors' side
 - Lack of skills / knowledge
 - Maintainers' side
 - Uneasy to trust aliens at one sight
 - Quality of code
 - Maintenance costs
 - Gaps in design policies / principles

Breaking Barriers

- Establishment of trust
 - Communication
 - Ottawa Linux Symposium
 - Objective evaluation
 - Support from community
 - Logical, strategical and step-by-step changes
 - Generality and universality
 - Continuous activity

Keys for OSS Activities

- “Participation” in the community
 - Fellowship
 - Public discussion
 - “Manners”
 - Readability
 - Coding style
 - Splitting of patches
 - Responsibility
 - Timeliness

Keys for OSS Activities(2)

- You may have collisions...
 - Interests!
 - Do not lose your real objectives.
 - Development of “better” code
 - Deployment
 - Do not be too nervous / serious.

Conclusion

- What is OSS?
 - Attempt to build a good software by sharing codes and having public discussion (evolution)
 - Should not be considered to be a “competition”
 - win-win
- Points for “success”
 - By building a community and/or participating a community
 - By sharing issues and future directions
 - By subliming collisions

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- Keio University

(in any order)

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