IPv6

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Testing IPv6 Implementations

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Outline

- IPv6
- What to test?
- Tests performed
- Results
- Future

What Is IPv6?

- New protocol for the next generation Internet

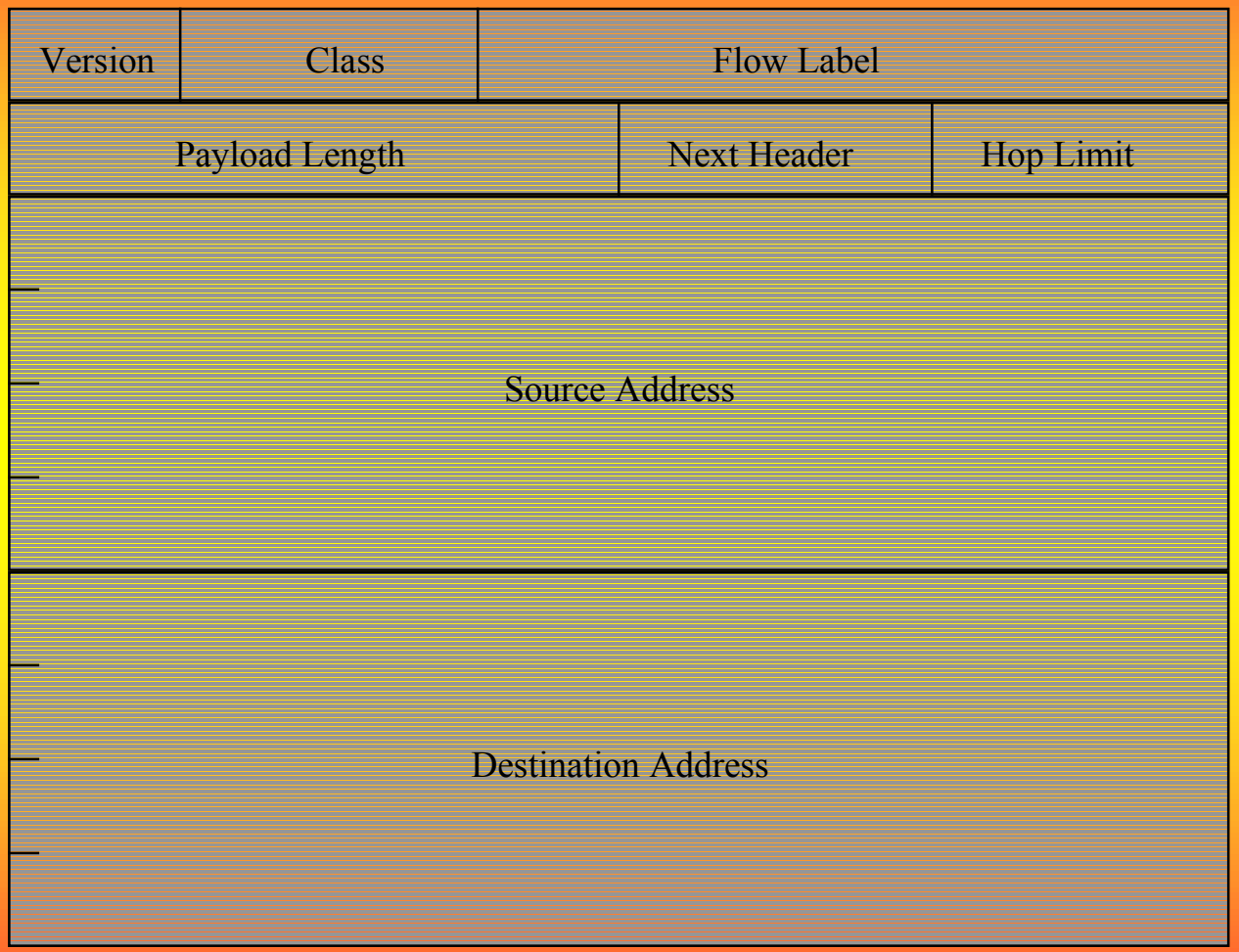
Key Features of IPv6

- New addressing architecture
- Autoconfiguration
- Security (Authentication & Confidentiality)
- Simplified processing
- Real-time supports and flows
- Compatibility to IPv4 (Transitions)

New elements briefly

- New addressing architecture
  - 128 bit for addressing
  - Structured address for better routing
  - Anycast addresses
- Autoconfiguration
  - ARP
  - Router discovery
  - ICMP
  - and more!

IPv6 Header


Version
Class
Flow Label
Payload Length
Next Header
Hop Limit
Source Address
Destination Address

What to Test?

- IPv6 implementations are working according to RFCs
- Interoperability
- Ease of Usage
- Applications
- Documents

Not Tested (Yet)?

- Performance. Since different hardwares and the softwares are usually test softwares
- Applications that is not part of the systems
- IPSec - separate testing in progress

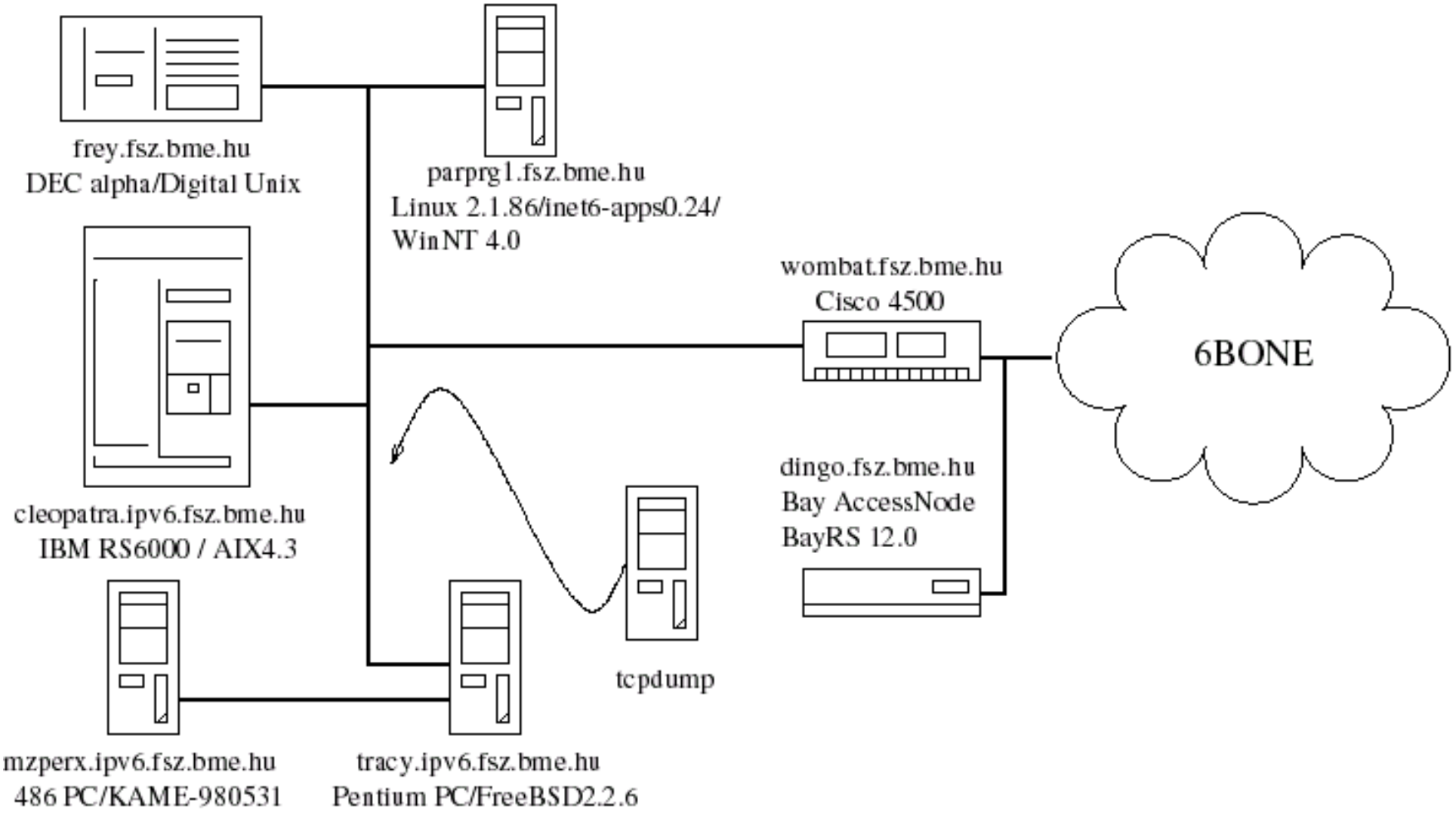
Why?

- Recently appeared softwares are experimental (except AIX)
- RFC standards are under revision
- The implementations are under development

How We Have Tested?

- Tests are performed on our departmental ipv6 test network (part of the 6bone)
- Each system has been tested as a “host” system
- Captured the network traffic to analyse the packets in certain times

Test network setup



System We Have Examined

- Pentium PC /486 PC, Freebsd 2.2.6 + INRIA 199806xx
- Pentium PC /486 PC, Freebsd 2.2.6 + KAME 199805xx
- 486 PC, Linux 2.1.85 + Inet6-apps0.26 +Net-tools-980126.
- Alphaserver 2000, Digital UNIX 4.0B + IPv6 v.6.112.
- RS6000/580, aix 4.3.
- 486 PC, Windows 95, + FTP Software Secure Client 3.0
- Pentium PC, Windows NT + Microsoft IPv6

The Experiments

- Addressing and handling of different addresses
- Autoconfiguration
- IPv4 compatibility (tunnels)
- Installability
- Quality of documents
- Applications

Experiences

- All implementations more or less conform to the IPv6 standards
- Some minor nonconformity
- Quantity of the applications are very different.
- Usability is ranging from pre-alpha to perfect
- Same applies for documents

Evaluation

- Useable:
  - AIX, INRIA, KAME, Digital UNIX
- Experimental:
  - Wide, Linux, Microsoft
- Rudimentary:
  - FTP software

Latest Results

- NT : stable, one application
- WIDE $\longrightarrow$ KAME
- Some changes in the FreeBSD INRIA
- New Digital UNIX implementation
- AIX 4.3.1

Future Plans

- New implementations (SUN, HP-UX, Unixware 7, BSDI)
- IPSec
- More advanced testing environment
- Router implementations

The End
To Be Continued

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