Minimum Requirement of IPv6 for Low Cost Network Appliance

draft-okabe-ipv6-lcna-minreq-00.txt

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At First

- In this presentation, we are focusing upon
  - Motivations, objectives, open issues
  - Please read our draft for details.

Motivations (1/4)

- Always-on network is becoming popular.
- Many Low Cost Network Appliances (LCNA) will be connected to the Internet.
- LCNA
  - is specific purposed unlike PC.
  - has limited network functionality under limited resources.
  - is not a router, but a host.
- Ex. Sensor, AV equip., home appliance, etc...
  - Many activity has begun in Japan.
  - http://www.v6pc.jp/

Motivations (2/4)

- Many LCNA has very limited resources.
  For examples, down to:
  - Performance: 8 bits CPU/40MHz
  - Memory size: 512KB ROM, 512KB RAM
  - Physical size: SIMM size system board

Ex. of Embedded OS Footprint

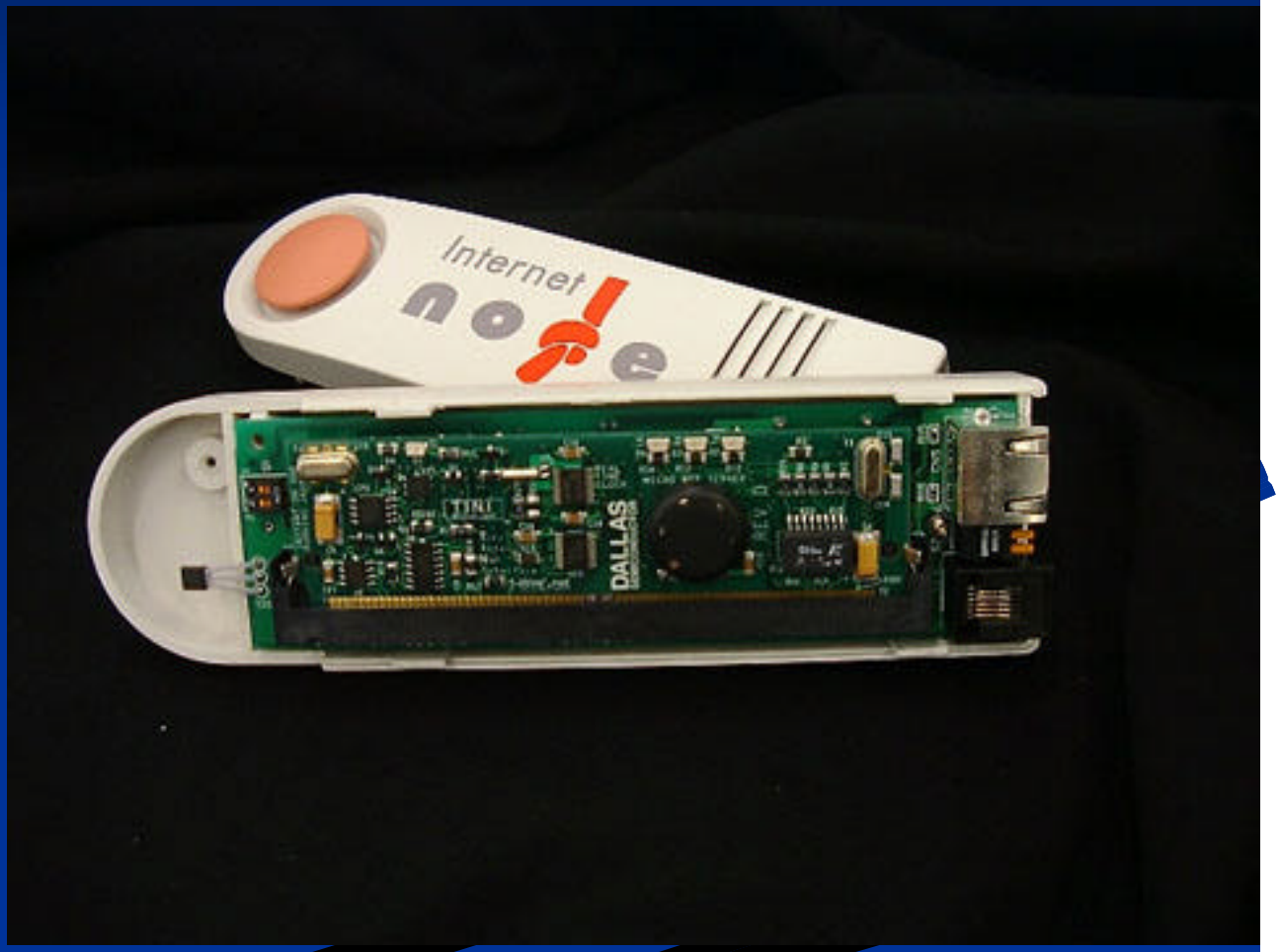
OS	ROM	RAM	Memo
TINI	512K	512K	OS+JVM+IP
uTRON	1M	512K	OS+IP
*BSD	2M	8M	
Linux	3M	12M	50% greater than *BSD
Embedded XP	?	16M	OS:12M
WinCE	?	1M	OS:750M

Motivations (3/4)

- For LCNA, IPv6
  - is necessary,
    - Large address space
    - Plug & play
  - is too heavy
- Our experiences
  - We have developed IPv6 stack for a LCNA that has 8bits/40MHz CPU whose spec. was subset of our draft.
    - IPv6 code (w/o IPsec) is three times larger than IPv4's one. 21KB vs. 7KB
    - SSL session takes 30 seconds.

Example of a LCNA (prototype)

- SIMM size
- 1MROM
- 1MRAM
- 8bits,40MHz
- IPv4: 7KB
- IPv6:21KB
- JVM
- HTTPD, Telnet, Ftp



Motivations (4/4)

- There are no guidelines for shrinking IPv6/IPsec specifications for small network devices except cellular host.

Objectives

- Sharing our experience with other LCNA implementers to encourage them to implement IPv6 code.
  - Making IPv6/IPsec guideline for LCNAs.
    - Getting feedback from IETF IPv6 WG people
  - Developing test suites for the public.
  - Having test events

Outline of the Spec. (1/5)

- H/W
  - Single network interface
  - Ethernet or PPP
  - Host
- Core Specifications
  - RFC 2460
    - Accept all extension headers except Fragmentation and AH.
    - No need to send packet with any extension headers except ESP.
    - Keep packets size less than IPv6 Minimum MTU to avoid fragmentation and reassembling.
  - RFC1981
    - No need to support Path MTU Discovery.

Outline of the Spec. (2/5)

- RFC2461
  - All ND functions are necessary except router related ones (sending RA, receiving RS, sending REDIRECT).
  - Receiving REDIRECT can be ommited.
- RFC2462
  - All functions are necessary.
- RFC2463
  - Support host related ICMPv6 messages

Outline of the Spec. (3/5)

- RFC 2373
  - By default
    - Loopback (::1)
    - Node-local all nodes multicast (ff01::1)
    - Link-local all nodes multicast (ff02::1)
  - For address autoconfiguration
    - Link-local unicast (fe80/64 + host ID), and its Solicited-node multicast.
    - Unicast (prefix/64 + host ID) corresponding to the prefix option of router advertise message, and its Solicited-node multicast
  - For manual configuration
    - Arbitrary unicast, and its Solicited-node multicast

Outline of the Spec. (4/5)

- RFC1886
  - Resovler is necessary if a LCNA initiates a communication.
- draft-ietf-ipngwg-dns-discovery-02.txt
  - Keep watching discussion in IPNG

Outline of the Spec. (5/5)

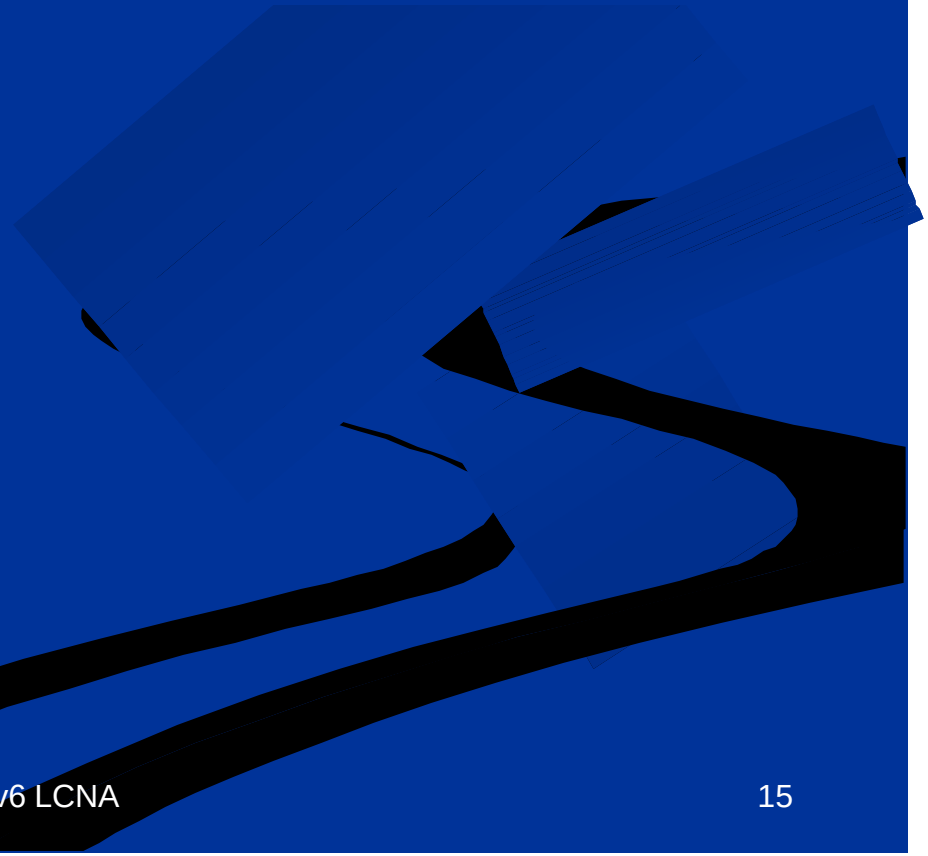
- Security
  - RFC2406
    - ESP w/ authentication
    - Serial padding
  - draft-ietf-ipsec-ciph-aes-cbc-01.txt
    - AES with 128 bit key
    - CBC for IV mode
    - HMAC-SHA2-256 for authentication
  - RFC2401
    - Regulated specifications in this draft may be omitted (IPsec mode, key lifetime)
    - Manual key exchange

Open Issues

- MLD:
  MLD for ND
  - →MLD is NOT mandatory.
- MIP6:
  Home Address Option & Binding Management
  - → Keep watching discussions in IPv6/Mobileip
- Security:
  IPsec has issues in LCNAs deployment.
  - → Take the right security method (IPsec or else) for the right requirement.

What's Our Next Step?

- We need more feedback from IPv6 WG.
  - →Can we keep going?



More Info.

- Contact Points
  - http://www.tahi.org/minspec/
  - tiny@tahi.org
- TAHI IPv6 Test Event
  - 2002/1/23(Wed)-26(Sat)
  - Pacifico Yokohama, Japan
  - Please see http://www.tahi.org/