

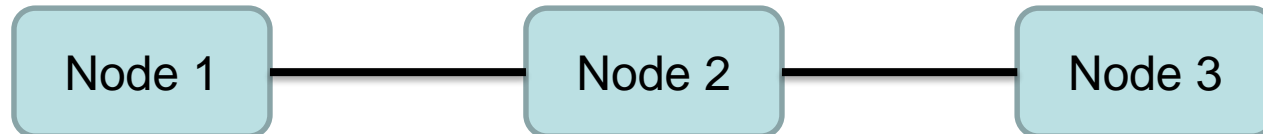
# draft-munoz-6tisch-examples-02

Jonathan Munoz  
Emmanuel Riou  
Dominique Barthel

# What? Why?



- Goal
  - informational
  - examples of different 6TiSCH frames
- Tools and setup
  - 3 nodes running OpenWSN in simulation mode
  - captured using latest official Wireshark build



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# [ping 3] ICMPv6 echo request 1->2



```
IEEE 802.15.4 Data, Dst: 14:15:92:cc:00:00:00:02,  
Src: 14:15:92:cc:00:00:00:01  
Frame Control Field: 0xec21, Frame Type: Data  
.... .... .001 = Frame Type: Data (0x0001)  
.... .... 0... = Security Enabled: False  
.... .... .0... = Frame Pending: False  
.... .... .1. .... = Acknowledge Request: True  
.... .... .0.. .... = Intra-PAN: False  
.... .0... .... = Sequence Number Suppression: False  
.... .0. .... = Information Elements present: False  
.... 11.. .... = Destination Addressing Mode:  
Long/64-bit (0x03)  
..10 .... .... = Frame Version: 2  
11.. .... .... = Source Addressing Mode:  
Long/64-bit (0x03)
```

```
Sequence Number: 34  
Destination PAN: 0xcafe  
Destination: 14:15:92:cc:00:00:00:02 (14:15:92:cc:00:00:00:02)  
Extended Source: 14:15:92:cc:00:00:00:01  
(14:15:92:cc:00:00:00:01)  
FCS: 0x0366 (Correct)  
6LoWPAN  
.... 0001 = Page Number: 1  
6LoRH: Routing Header 3, 8 byte compression  
100. .... = Routing Header 6lo: Critical Routing Header  
(0x04)  
.... 0000 .... = 6LoRH Hop Number - 1: 0x0000  
.... 0000 0011 = 6LoRH Type: Routing Header 3,  
8 byte compression (0x0003)  
Source/8, Delta: ::1415:92cc:0:2
```

```
IPHC Header  
011. .... = Pattern: IP header compression (0x03)  
...1 1... .... = Traffic class and flow label:  
Version, traffic class, and flow label compressed (0x0003)  
.... .0.. .... = Next header: Inline  
.... .00 .... = Hop limit: Inline (0x0000)  
.... 0... .... = Context identifier extension: False  
.... .0.. .... = Source address compression:  
Stateless  
.... .00 .... = Source address mode: Inline (0x0000)  
.... 0... = Multicast address compression: False  
.... .0.. = Dest address compression: Stateless  
.... .00 = Dest address mode: Inline (0x00)  
Next header: ICMPv6 (0x3a)  
Hop limit: 64  
Source: bbbb::1  
Destination: bbbb::1415:92cc:0:3  
Internet Protocol Version 6, Src: bbbb::1, Dst:  
bbbb::1415:92cc:0:3  
0110 .... = Version: 6  
.... 0000 0000 .... = Traffic class:  
0x00 (DSCP: CS0, ECN: Not-ECT)  
.... 0000 00.. .... = Differentiated  
Services Codepoint: Default (0)  
.... .00 .... = Explicit  
Congestion Notification: Not ECN-Capable Transport (0)  
.... 0000 0000 0000 0000 0000 = Flowlabel:  
0x00000000  
Payload length: 18  
Next header: ICMPv6 (58)  
Hop limit: 64  
Source: bbbb::1  
Destination: bbbb::1415:92cc:0:3  
Internet Control Message Protocol v6  
Type: Echo (ping) request (128)  
Code: 0  
Checksum: 0x13f9 [correct]  
Identifier: 0x3943  
Sequence: 1
```

# [ping 3] ICMPv6 echo request 2->3



```
IEEE 802.15.4 Data, Dst: 14:15:92:cc:00:00:00:03,
                      Src: 14:15:92:cc:00:00:00:02
Frame Control Field: 0xec21, Frame Type: Data
  .... .001 = Frame Type: Data (0x0001)
  .... .0... = Security Enabled: False
  .... .0.... = Frame Pending: False
  .... .1. .... = Acknowledge Request: True
  .... .0.. .... = Intra-PAN: False
  .... .0.... = Sequence Number Suppression: False
  .... .0. .... = Information Elements present: False
  .... 11.. .... = Destination Addressing Mode:
                      Long/64-bit (0x03)
  ..10 .... .... = Frame Version: 2
  11.. .... .... = Source Addressing Mode:
                      Long/64-bit (0x03)
Sequence Number: 35
Destination PAN: 0xcafe
Destination: 14:15:92:cc:00:00:00:03 (14:15:92:cc:00:00:00:03)
Extended Source: 14:15:92:cc:00:00:00:02
(14:15:92:cc:00:00:00:02)
FCS: 0x793f (Correct)
6LoWPAN
IPHC Header
  011. .... = Pattern: IP header compression (0x03)
  ...1 1... .... = Traffic class and flow label:
Version, traffic class, and flow label compressed (0x0003)
  .... .0.. .... = Next header: Inline
  .... .00 .... = Hop limit: Inline (0x0000)
  .... .0... .... = Context identifier extension: False
  .... .0.. .... = Source address compression:
Stateless
```

```
.... .00 .... = Source address mode: Inline (0x0000)
.... .0... = Multicast address compression: False
.... .0.. = Dest address compression: Stateless
.... .00 = Dest address mode: Inline (0x0000)
Next header: ICMPv6 (0x3a)
Hop limit: 64
Source: bbbb::1
Destination: bbbb::1415:92cc:0:3
Internet Protocol Version 6, Src: bbbb::1, Dst:
bbbb::1415:92cc:0:3
0110 .... = Version: 6
.... 0000 0000 .... = Traffic class:
                      0x00 (DSCP: CS0, ECN: Not-ECT)
.... 0000 00.. .... = Differentiated
                      Services Codepoint: Default (0)
.... .00 .... = Explicit
Congestion Notification: Not ECN-Capable Transport (0)
.... 0000 0000 0000 0000 0000 = Flowlabel:
0x00000000
Payload length: 18
Next header: ICMPv6 (58)
Hop limit: 64
Source: bbbb::1
Destination: bbbb::1415:92cc:0:3
Internet Control Message Protocol v6
Type: Echo (ping) request (128)
Code: 0
Checksum: 0x13f9 [correct]
Identifier: 0x3943
Sequence: 1
```

# [ping 3] ICMPv6 echo reply 3->2



```
IEEE 802.15.4 Data, Dst: 14:15:92:cc:00:00:00:02,
                    Src: 14:15:92:cc:00:00:00:03
Frame Control Field: 0xec21, Frame Type: Data
  .... .001 = Frame Type: Data (0x0001)
  .... .0... = Security Enabled: False
  .... .0.... = Frame Pending: False
  .... .1. .... = Acknowledge Request: True
  .... .0.. .... = Intra-PAN: False
  .... .0.... = Sequence Number Suppression: False
  .... .0. .... = Information Elements present: False
  .... 11.. .... = Destination Addressing Mode:
                    Long/64-bit (0x03)
  ..10 .... .... = Frame Version: 2
  11.. .... .... = Source Addressing Mode:
                    Long/64-bit (0x03)

Sequence Number: 23
Destination PAN: 0xcafe
Destination: 14:15:92:cc:00:00:00:02 (14:15:92:cc:00:00:00:02)
Extended Source: 14:15:92:cc:00:00:00:03
(14:15:92:cc:00:00:00:03)
FCS: 0x84f7 (Correct)
6LoWPAN
  .... 0001 = Page Number: 1
6LoRH: Routing Protocol Information
  100. .... = Routing Header 6lo: Critical Routing Header
(0x04)
  .... 0.... = Packet direction:
                    UP false, DOWN true: False
  .... 0... .... = Error detected: False
  .... .0.. .... = No link to destination: False
  .... .1. .... = Context identifier extension: True
  .... .1.... = Context identifier extension: True
  .... .0000 0101 = 6loRH Type: Routing Protocol
Information
```

```
RPL Instance: 0x00
Sender Rank: 0x07
IPHC Header
  011. .... = Pattern: IP header compression (0x03)
  ...1 1... .... = Traffic class and flow label:
Version, traffic class, and flow label compressed (0x03)
  .... .0.. .... = Next header: Inline
  .... .10 .... .... = Hop limit: 64 (0x0002)
  .... .0... .... = Context identifier extension: False
  .... .0.. .... = Source address compression:
Stateless
  .... .01 .... = Source address mode: 64-bits inline
(0x01)
  .... .0... = Multicast address compression: False
  .... .0.. = Dest address compression: Stateless
  .... .01 = Dest address mode: 64-bits inline
(0x01)
  [Source context: fe80::]
  [Destination context: fe80::]
Next header: ICMPv6 (0x3a)
Source: fe80::1415:92cc:0:3
Destination: fe80::1
Internet Protocol Version 6, Src: fe80::1415:92cc:0:3, Dst:
fe80::1
0110 .... = Version: 6
  .... 0000 0000 .... = Traffic class:
                    0x00 (DSCP: CS0, ECN: Not-ECT)
  .... 0000 00.. .... = Differentiated
                    Services Codepoint: Default (0)
  .... .00 .... = Explicit
Congestion Notification: Not ECN-Capable Transport (0)
  .... 0000 0000 0000 0000 0000 0000 = Flowlabel:
0x00000000
```

# [ping 3] ICMPv6 echo reply 3->2



```
Payload length: 18
Next header: ICMPv6 (58)
Hop limit: 64
Source: fe80::1415:92cc:0:3
Destination: fe80::1
Internet Control Message Protocol v6
Type: Echo (ping) reply (129)
Code: 0
Checksum: 0x12f9 [incorrect, should be 0x8d6e]
  [Expert Info (Warn/Checksum): ICMPv6 Checksum Incorrect]
Identifier: 0x3943
Sequence: 1
Data (10 bytes)
0000  00 01 02 03 04 05 06 07 08 09
      Data: 00010203040506070809
      [Length: 10]
```

# [ping 3] ICMPv6 echo reply 2->1



```
IEEE 802.15.4 Data, Dst: 14:15:92:cc:00:00:00:01,
                        Src: 14:15:92:cc:00:00:00:02
Frame Control Field: 0xec21, Frame Type: Data
  .... .001 = Frame Type: Data (0x0001)
  .... .0... = Security Enabled: False
  .... .0.... = Frame Pending: False
  .... .1. .... = Acknowledge Request: True
  .... .0.. .... = Intra-PAN: False
  .... .0.... = Sequence Number Suppression: False
  .... .0.... = Information Elements present: False
  .... 11.. .... = Destination Addressing Mode:
                        Long/64-bit (0x03)
..10 .... .... = Frame Version: 2
11.. .... .... = Source Addressing Mode:
                        Long/64-bit (0x03)

Sequence Number: 36
Destination PAN: 0xcafe
Destination: 14:15:92:cc:00:00:00:01 (14:15:92:cc:00:00:00:01)
Extended Source: 14:15:92:cc:00:00:00:02
(14:15:92:cc:00:00:00:02)
FCS: 0x7dbc (Correct)
6LoWPAN
... 0001 = Page Number: 1
6LoRH: Routing Protocol Information
  100. .... = Routing Header 6lo: Critical Routing Header
(0x04)
  ...0 .... .... = Packet direction:
                        UP false, DOWN true: False
  .... 0... .... = Error detected: False
  .... .0.. .... = No link to destination: False
  .... .1. .... = Context identifier extension: True
  .... .1.... = Context identifier extension: True
  .... .0000 0101 = 6loRH Type: Routing Protocol
Information
```

```
RPL Instance: 0x00
Sender Rank: 0x03
IPHC Header
  011. .... = Pattern: IP header compression (0x03)
  ...1 1... .... = Traffic class and flow label:
Version, traffic class, and flow label compressed (0x0003)
  .... .0.. .... = Next header: Inline
  .... .10 .... = Hop limit: 64 (0x0002)
  .... .0... .... = Context identifier extension: False
  .... .0.. .... = Source address compression:
Stateless
  .... .01 .... = Source address mode: 64-bits inline
(0x01)
  .... .0... = Multicast address compression: False
  .... .0.. = Dest address compression: Stateless
  .... .01 = Dest address mode: 64-bits inline
(0x01)
[Source context: fe80::]
[Destination context: fe80::]
Next header: ICMPv6 (0x3a)
Source: fe80::1415:92cc:0:3
Destination: fe80::1
Internet Protocol Version 6, Src: fe80::1415:92cc:0:3, Dst:
fe80::1
0110 .... = Version: 6
  .... 0000 0000 .... = Traffic class:
                        0x00 (DSCP: CS0, ECN: Not-ECT)
  .... 0000 00.. .... = Differentiated
                        Services Codepoint: Default (0)
  .... .00 .... = Explicit
Congestion Notification: Not ECN-Capable Transport (0)
```



# [ping 3] ICMPv6 echo reply 2->1



```
.... .... .... 0000 0000 0000 0000 0000 = Flowlabel:
0x00000000
Payload length: 18
Next header: ICMPv6 (58)
Hop limit: 64
Source: fe80::1415:92cc:0:3
Destination: fe80::1
Internet Control Message Protocol v6
Type: Echo (ping) reply (129)
Code: 0
Checksum: 0x12f9 [incorrect, should be 0x8d6e]
  [Expert Info (Warn/Checksum): ICMPv6 Checksum Incorrect]
Identifier: 0x3943
Sequence: 1
Data (10 bytes)

0000 00 01 02 03 04 05 06 07 08 09
  Data: 00010203040506070809
  [Length: 10]
```

# Next steps



- publish -03 this week:
  - Including 6P LIST commands
  - Editorial changes
- discussion points
  - Is this useful?
  - should this be adopted by the WG?