Capabilities Updates

draft-ietf-roll-capabilities
ROLL Interim 30th Sep 2020

Changes
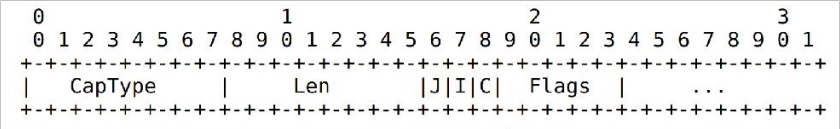
- Updates based Dominique's feedback. Thank You Dominique
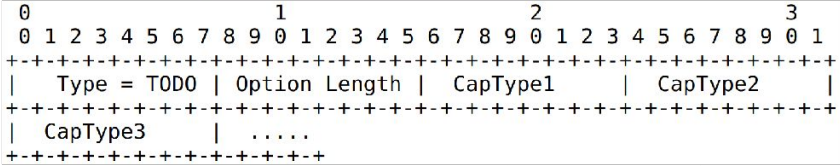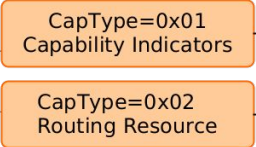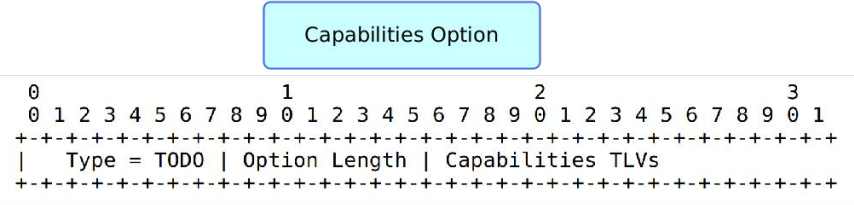
What does the document contain?

- Capability Options that can be carried in any RPL messages
- Two specific capabilities
    - Capability Indicator flags
    - Routing Resource Capability
- Capability Query/Response signalling
- Guidelines for defining new capabilities

MUSTs:

- Handling of Capabilities MUST be supported if the network uses MOPex [I-D.ietf-roll-mopex].

Capability Options

Capability Type List Option

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Type = TODO | Option Length | CapType1       | CapType2      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  CapType3     |  .....
+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Capabilities Option

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Type = TODO | Option Length | Capabilities TLVs
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Capabilities TLVs

CapType=0x01
Capability Indicators

CapType=0x02
Routing Resource

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   CapType      |     Len       |J|I|C| Flags  |      ...
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Join as Leaf
if cap not understood

Copy cap
if not understood

Ignore msg if cap
not understood

Capability Query/Response

```
Root                            6LR/6LN
|                                  |
|   CAPQ(seq=1, opts=nil)          |
|--------------------------------->|
|                                  |
|                                  |
|   CAPS(seq=1, opts={CapTypeList})|
|<---------------------------------|
|                                  |

   Figure 8: Query supported Cap Types
```
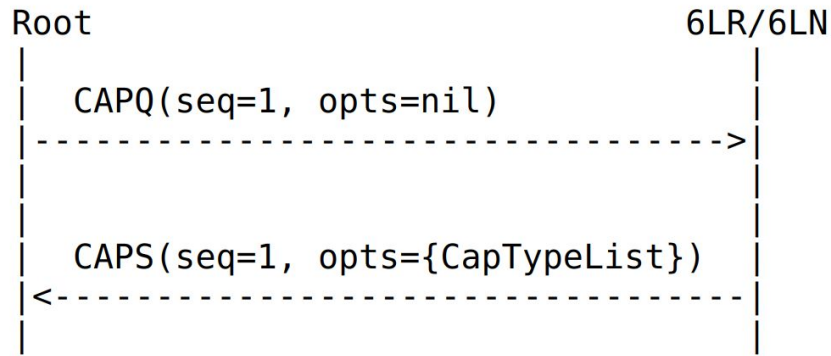
```
Root                            6LR/6LN
|                                  |
|   CAPQ(seq=2,                    |
|    opts={CapTypeList=[Cap1, Cap2]})|
|--------------------------------->|
|                                  |
|                                  |
|   CAPS(seq=2,                    |
|        opts={Cap1=Cap1Value,     |
|             Cap2=Cap2Value})     |
|<---------------------------------|
|                                  |

   Figure 9: Query specific Cap Set
```
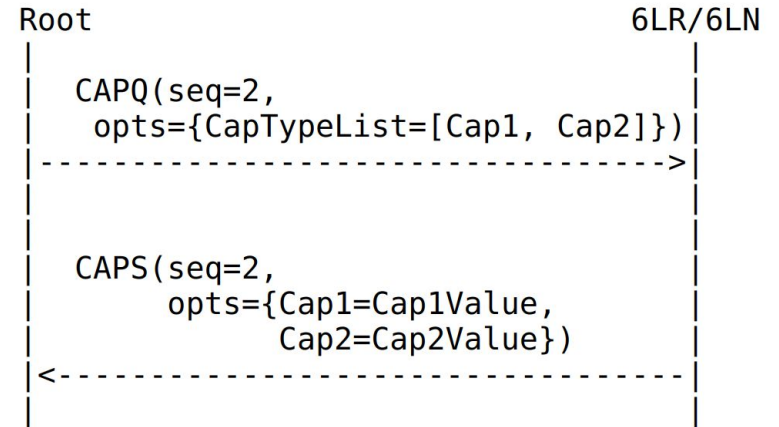
And the corresponding secure messages.

MOPex Updates

draft-ietf-roll-mopex

Extending RPL Control Options

```
 0                   1                   2
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+----------
|X|   OptionType| Option Length |Opt Flags|J|I|C| Option Data
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+----------
```
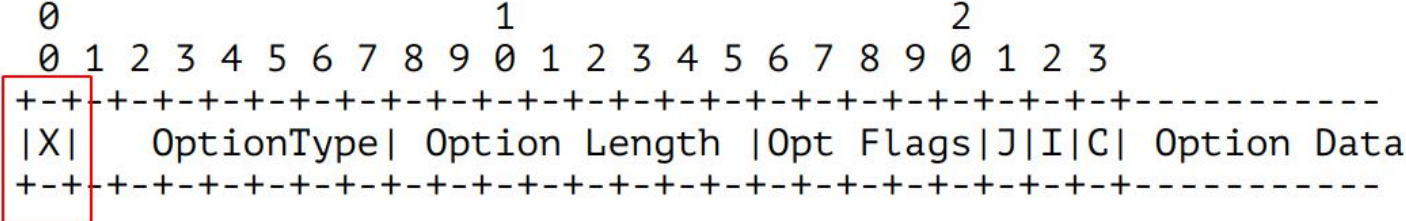
Figure 2: Extended RPL Option Format

- Earlier the location of 'X' bit was second most MSB.
- IANA section is updated to reflect this