YANG based Config for MAC Privacy 802.1AEdk

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Outline

• Proto Config for MAC Privacy
Forward

• This presentation is for a discussion on detailed config.
• It may contain errors/omission and should be considered a work in progress.
• An updated version of the presentation will be posted after discussion to correct it but it will remain a work in progress.
Instance Diagram for MACSec and MAC Privacy
enum mode;
int maxPerSecondBitrate;
int minPerSecondBitrate;
int MppduSize;
uint queueDelayThreshold;
int minimumFragmentSize;
int explicitPadSize;
int MppduPriority;

PrivacyType Channels
enum mode;
int maxPerSecondBitrate;
int minPerSecondBitrate;
int MppduSize;
uint queueDelayThreshold;
int minimumFragmentSize;
int explicitPadSize;
int MppduPriority;

PrivacyType Frames
int pfMaxFrameSize;
int pfMinFrameSize;
int pfExtendFrame;
int MppduPriority;

bool macPrivacy;
address prySourceAddress;
address pryDestinationAddress;
counter64 outMppdus; //read only
counter64 outUserFrames; //read only
counter64 outUserOctets; //read only
counter64 outPadOctets; //read only
counter64 outUserFrames; //read only
counter64 outUserOctets; //read only
counter64 inMppdus; //read only
counter64 inErroredMppdus; //read only
counter64 inUserFrames; //read only
counter64 inUserOctets; //read only
counter64 inPadOctets; //read only
counter64 inUserCompleteFrames; //read only
counter64 inUserDroppedFrames; //read only
counter64 inUserErroredFrames; //read only

userPriorityToPry [0..7]
int userPriority
identity privacyType;
Privacy Channel Config

- Two Identity types
  - Channel
  - Channel-express
- Two Modes either:
  - fixed-size-minimum-rate or,
  - fixed-size-maximum-rate
- MPPDU frame size
- Map Priorities to Channels
- MaxPerSecondBitrate
- MinPerSecondBitrate
- queueDelayThreshold
- Explicit Pad size
- MPPDU priority (DE set to 0)
Privacy Channel Timing

Interval = Frame Size –bits / rate bits/secs
Rate <= link rate
Use case Fixed size Minimum Rate

If the queue builds up to a threshold change to the maximum rate.
Queue size translates to a time by buffered bits/minimum rate.
So specify this as queueDelayThreshold(other names?)

An operator can use buffer size/minimum rate to compute the queueDelayThreshold time value.
Implementation can use a buffer threshold or time computation.
Minimum Fragment Size

- Size of a minimum fragment.
- Enables control of preemption of fragments
- Size of 0 means only fragment when fragment will not fit in frame.
- (Mapping to express control whether or not preemption is used).
Explicit Pad size

• Allows addition of user frames while a MPPDU has started transmitting but has padding.
• Value of zero means not explicit pads.
• Need recommendations for nominal sizes.
Privacy Frame Config

• MaxFrameSize;
  • Cannot accept frames larger than this (is overhead included)

• MinFrameSize;
  • Pad frames to at least this size

• ExtendFrame;
  • Pad Frames by some byte boundary eg nearest 16 byte boundary, 32 byte boundary etc. Frames will appear in only fixed sizes.

• MppduPriority
  • DE can be transparently passed through unless multiple user frames are included in the MPPDU
Priority Mapping

<table>
<thead>
<tr>
<th>Priority (low-high)</th>
<th>Identity Map Union of channel and frame identities</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>channel</td>
</tr>
<tr>
<td>1</td>
<td>channel</td>
</tr>
<tr>
<td>2</td>
<td>channel</td>
</tr>
<tr>
<td>3</td>
<td>channel-express</td>
</tr>
<tr>
<td>4</td>
<td>channel-express</td>
</tr>
<tr>
<td>5</td>
<td>frame-b</td>
</tr>
<tr>
<td>6</td>
<td>frame-b</td>
</tr>
<tr>
<td>7</td>
<td>frame-a</td>
</tr>
</tbody>
</table>

identity channel-ident
identity channel-express
identity channel
identity frame-ident
identity frame-a
identity frame-b
identity frame-c
identity frame-d
identity frame-e
identity frame-f
identity frame-g
identity frame-h

Minor issue that Frames or channels can be defined that are not used. Creates

Priority of channels and frames are mapped to channels and frames Orthogonal to names.
Statistics

---ro out-mppdus?                         yang:counter64
---ro out-user-frames?                   yang:counter64
---ro out-user-octets?                   yang:counter64
---ro out-pad-octets?                    yang:counter64
---ro out-user-fragments?                yang:counter64
---ro in-mppdus?                         yang:counter64
---ro in-errored-mppdus?                 yang:counter64
---ro in-user-frames?                    yang:counter64
---ro in-errored-user-frames?            yang:counter64
---ro in-user-octets?                    yang:counter64
---ro in-pad-octets?                     yang:counter64
---ro in-user-fragments?                 yang:counter64
---ro in-user-dropped-fragments?         yang:counter64
---ro in-user-errored-fragments?         yang:counter64
Other?

• Is there any other config?
Output from the Prototype

```
pry {
  mac-privacy enabled
  pry-source-address 00-00-00-11-11-11
  pry-destination-address 00-00-00-11-11-22
  user-priority-to-pry 0 {
    user-priority 0
      privacy-type channel
  }
  user-priority-to-pry 1 {
    user-priority 1
      privacy-type channel
  }
  user-priority-to-pry 2 {
    user-priority 2
      privacy-type channel
  }
  user-priority-to-pry 3 {
    user-priority 3
      privacy-type channel
  }
  user-priority-to-pry 4 {
    user-priority 4
      privacy-type channel-express
  }
  user-priority-to-pry 5 {
    user-priority 5
      privacy-type channel-express
  }
  user-priority-to-pry 6 {
    user-priority 6
      privacy-type frame-a
  }
  user-priority-to-pry 7 {
    user-priority 7
      privacy-type frame-a
  }

  privacy-channel dot1ae-pry:channel-express {
    pc dot1ae-pry:channel-express
    mode fixed-size-minimum-rate
    max-per-second-bitrate 10000
    max-per-second-bitrate 1000000
    mppdu-size 4096
    queue-delay-threshold 1000
    minimum-fragment-size 1000
    explicit_pad_size 1000
    mppdu-priority 4
  }

  privacy-frame dot1ae-pry:frame-a {
    pf dot1ae-pry:frame-a
    pf-max-frame-size 4096
    pf-min-frame-size 300
    pf-extend-frame 64
    mppdu-priority 6
  }
}
```