draft-ietf-6tisch-msf-02

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Agenda

• Update msf-02
  • Using SHARED and non-SHARED autonomous cells
  • Resolve the pending issues in msf-01 version
  • Revised the specification overall

• Evaluation
  • OpenTestBed
  • Experimentation
Update msf-02

-Usage of Auto(nomous) Cells
  - Install Auto Cell (node addr.)

1

2

3

4

Auto cell (node addr.)

Auto cell (JP/parent addr.)
Update msf-02

- Usage of Auto(nomous) Cells
  - Install Auto Cell (node addr.)
  - Install Auto Cell (JP/parent addr.)
Update msf-02

• Usage of Auto(nomous) Cells
  • Install Auto Cell (node addr.)
  • Install Auto Cell (JP/parent addr.)

1

2

Join Resp/6P Resp

3

4

Auto cell (node addr.)

Auto cell (JP/parent addr.)
Update msf-02

• Usage of Auto(nomous) Cells
  • Install Auto Cell (node addr.)
  • Install Auto Cell (JP/parent addr.)
    • Shared, contention with siblings
Update msf-02

- **Usage of Auto(nomous) Cells**
  - Install Auto Cell (node addr.)
    - Non-Shared
  - Install Auto Cell (JP/parent addr.)
    - Shared, contention with siblings

- **Join Resp/6P Resp**

- Auto cell (node addr.) (non-shared)
- Auto cell (JP/parent addr.) (shared)
Update msf-02

• Pending Issues Resolved
  • Security issue on autonomous cell installation
  • NumCellsElapsed shouldn’t update on shared dedicated cell
  • Parameters for SAX is missing
  • 6P Timeout calculation is wrong
  • Separate Cell Counters for TX and RX
  • non-trusted packet shouldn’t be accounted for for adapting traffic
  • Two slotframes
  • Wrong end state statement
  • Dependency on RFC8180 shouldn’t be a MUST
  • DIO can be unicast packet as indicated in RFC6550
  • Create a list of packets that be able to be sent on minimal cell
  • Wrong statement in Step 4
  • Rephrase NumCellsPassed to NumCellsElapsed
  • Clarify term ‘dedicated cell’
  • text is missing

• To Be Discussed
  • Handling the case when bandwidth allocation exceeds available capacity
  • Adapting 6P Timeout
  • Rules for broadcast frames is out of scope of MSF

For more information about the issues on mailing list:
https://mailarchive.ietf.org/arch/msg/6tisch/w68mMZFumm_b9RRHrEKg2zB-2Cg
Comments on version 02

• Security issue on neighbor cache during joining process
• non-trusted packet shouldn't be accounted for adapting
• EB/DIO transmission rules is implementation-specific optimization
• unclear how to implement "Trickle timer with rate-limiting"
• SAX hash function parameter configuration
• Definition of two type of autonomous cells
• 6P TIMEOUT calculation
• The usage of frame pending bit
Evaluation

- Experimentation
- OpenWSN
  - Latest Release: REL-1.24.0
  - Implementation of MSF-02
  - Increase the robustness of code

https://openwsn.atlassian.net/wiki/spaces/OW/pages/376799234/Implementation+of+MSF-02

https://github.com/openwsn-berkeley/openwsn-fw/releases/tag/REL-1.24.0
Experimental Result

• **End-to-End Reliability**
  • Configuration
    • NUMTRIES: 3
    • 40 nodes
    • Traffic load on each node:
      • 1 packet/minute
  • Average: 96.46%
    • Experiment in Office building during working hours
    • Total 4157 packets sent within 2 hours

average PDR = 96.46%
Experimental Result

• Average Cell Usage
  • Computed every 64 Tx Cells
    • LIM_NUMCELLSUSED_HIGH 75%
    • LIM_NUMCELLSUSED_HIGH 25%
Experimental Result

- **Average Cell Usage**
  - Computed every 64 Tx Cells
    - LIM_NUMCELLSUSED_HIGH 75%
    - LIM_NUMCELLSUSED_HIGH 25%
  - Node b563
    - Low cell Usage
Experimental Result

- Average Cell Usage
  - Computed every 64 Tx Cells
    - LIM_NUMCELLSUSED_HIGH 75%
    - LIM_NUMCELLSUSED_HIGH 25%
  - Node b563
    - Low cell Usage
  - Node b646
    - High cell Usage
Call for adoption

• The framework of MSF draft is stable
• Evaluated in experimentation
• Next?