draft-duquennoy-6tisch-asf

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Overview

- ASF: Autonomous Scheduling Function
- 1) Autonomous slotframes
  - Slots based on a hash of neighbor's MAC address
  - Slots added/removed locally, no extra signaling
- 2) Slotframe per traffic plane
  - E.g. one for TSCH sync, one for RPL control, one for application
  - The length of each slotframe dictates per-plane capacity

Application and Limitations

- High reliability over distributed routing
  - Schedule adapts instantly to what e.g. RPL decides
  - 5 nines demonstrated in 100+ node testbeds
- No stringent energy/latency requirements
  - Cells are not cascaded along the path
  - Only shared slots
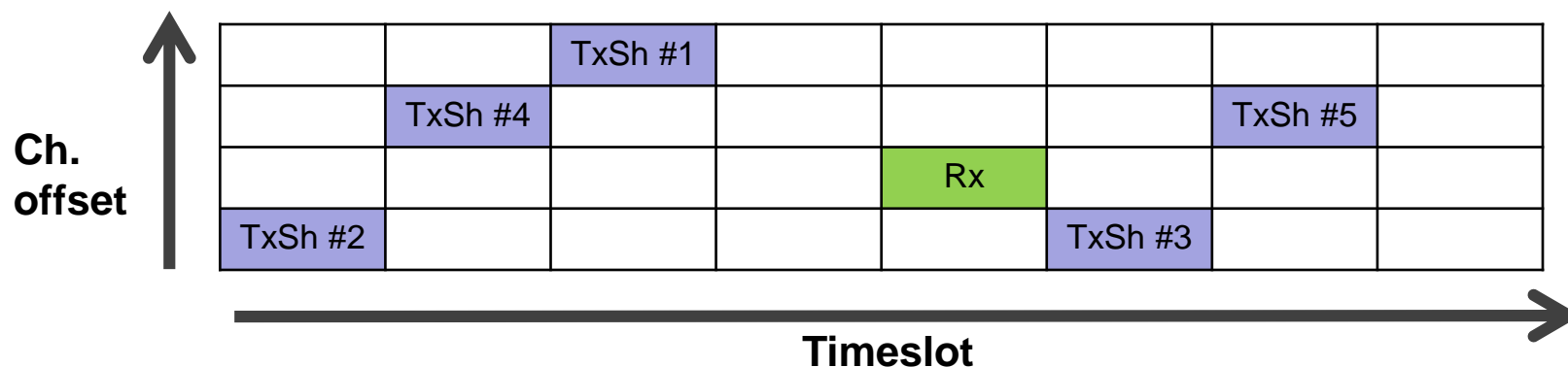 - Schedule is provisioned for worst case

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1/3: Rendez-vous slotframe

- Equivalent to 6tisch-minimal RFC 8180
- Used for rendez-vous
- E.g. RPL control, 6LoWPAN-ND, etc.

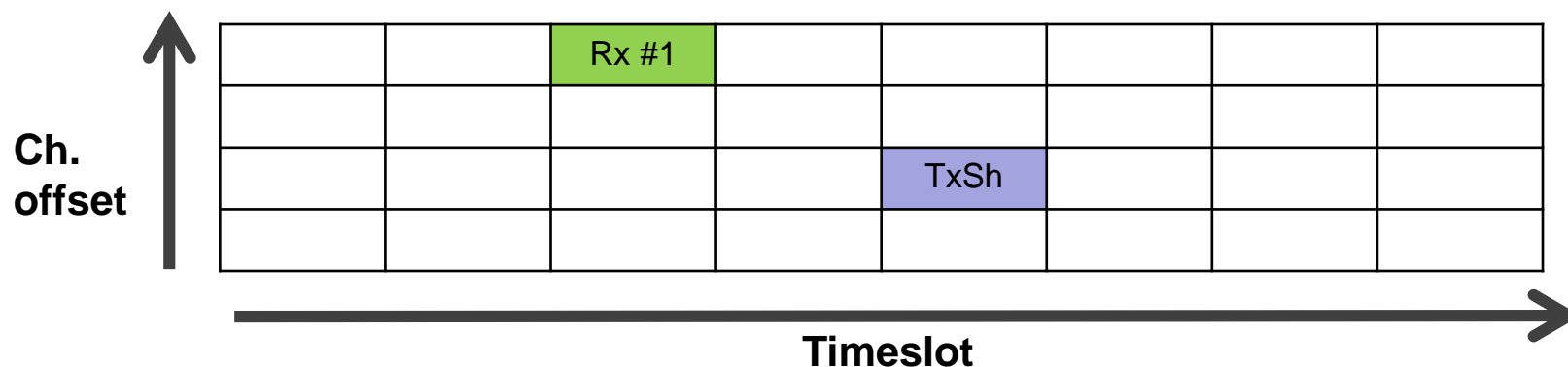
Ch. offset

RxTxSh

Timeslot
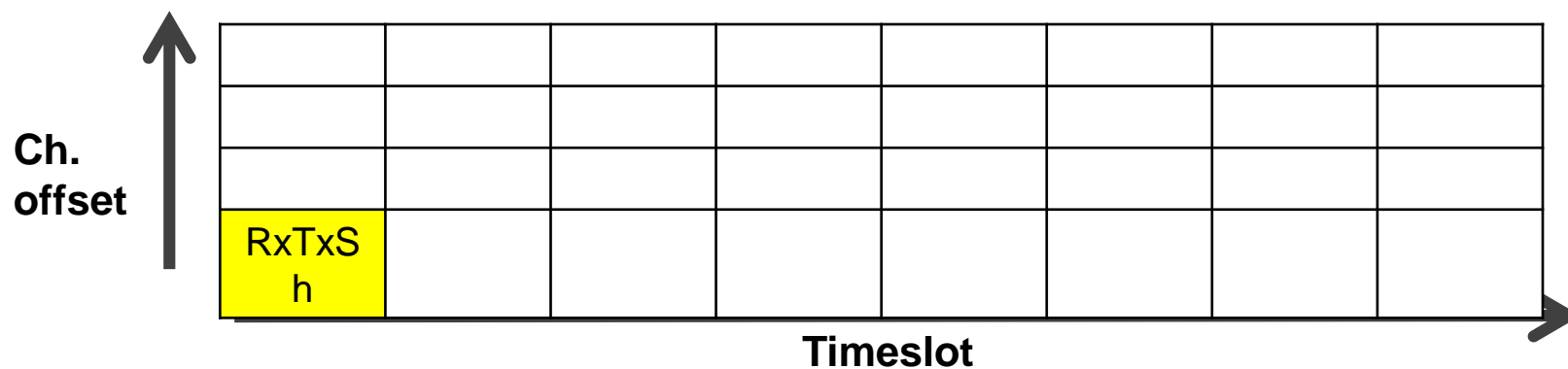
2/3 Receiver-based slotframe

- Nodes have one fixed Rx cell
- Nodes have one Tx (Shared) cell for each neighbor (IPv6 nbr cache)
- E.g. use for unicast to any neighbor

		TxSh #1					
	TxSh #4					TxSh #5	
				Rx			
TxSh #2					TxSh #3		

Ch. offset →

Timeslot

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3/3 Sender-based slotframe

- Nodes have one fixed Tx (Shared) cell
- Nodes have one Rx cell for each neighbor (IPv6 nbr cache)
- E.g. use for received from a privileged neighbor, e.g. TSCH time source

Ch. offset (vertical axis)

Timeslot (horizontal axis)

Putting it all together

- Each slotframe takes care of a traffic plane (traffic filter)

- Each slotframe uses a different subset of ch. offset

- As slotframes repeat, cells will overlap
  - Apply standard IEEE slot precedence
  - Slotframe len that are co-prime are preferred

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Draft Status

- Description of the slotframe types

- Definition of cell coordinates (hash of MAC)

- Example schedule with 4 slotframes

- Definition of configuration parameters

- Open issue: configuration discovery
  - Proposal: new EB IEs
  - Other option: 6P commands (not preferred because adds a transition state between minimal and ASF)

Feedback?

- On the nature of ASF and its slotframes?
- On what the draft should cover and not?
- On configuration parameters?
- On configuration discovery?
- Anything else?

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