Modeling Handover Latency in PMIPv6-based Protocols with Timed Petri Nets

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DMM Special Track

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Handover Latency Modeling

- Time when the communication between nodes is interrupted because of the data path switch
- Mathematical equations
  - McNair, Akyildiz, and Bender

$$T = M + (T_w + M) \times \frac{q}{1-q},$$

  - Hussain, Bakar, and Salleh

$$T_{RS} = \frac{1+P_f}{1-P_f}\left(\frac{M_S^{RS}}{B_{wl}} + T_{wl}\right)$$

$$T_{LU}^{PMIPv6} = n_h\left(\frac{M_S^{PBU}}{B_{wd}} + T_{wd}\right)$$

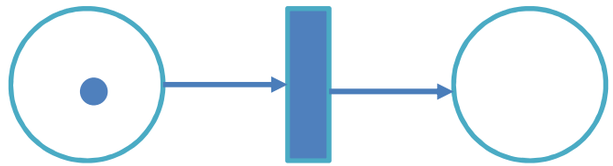
  - Makaya and Pierre

$$T_{x-y} = \frac{1+q}{1-q}\left(\frac{M_{size}}{B_{wl}} + L_{wl}\right) + H_{x-y}\left(\frac{M_{size}}{B_w} + L_w + T_q\right)$$

Sequential Operations

Timed Petri Nets

Places

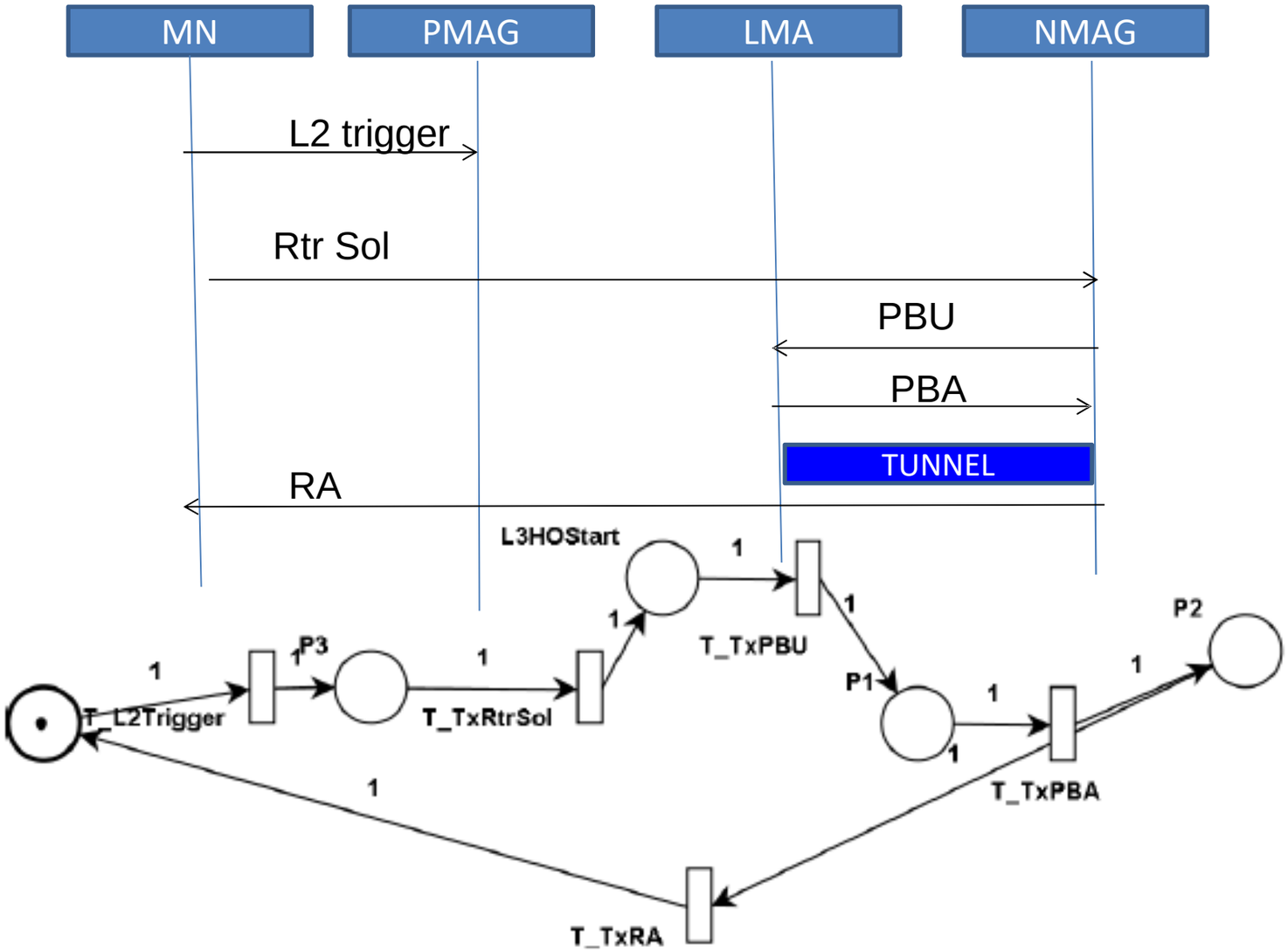


Timed Transitions

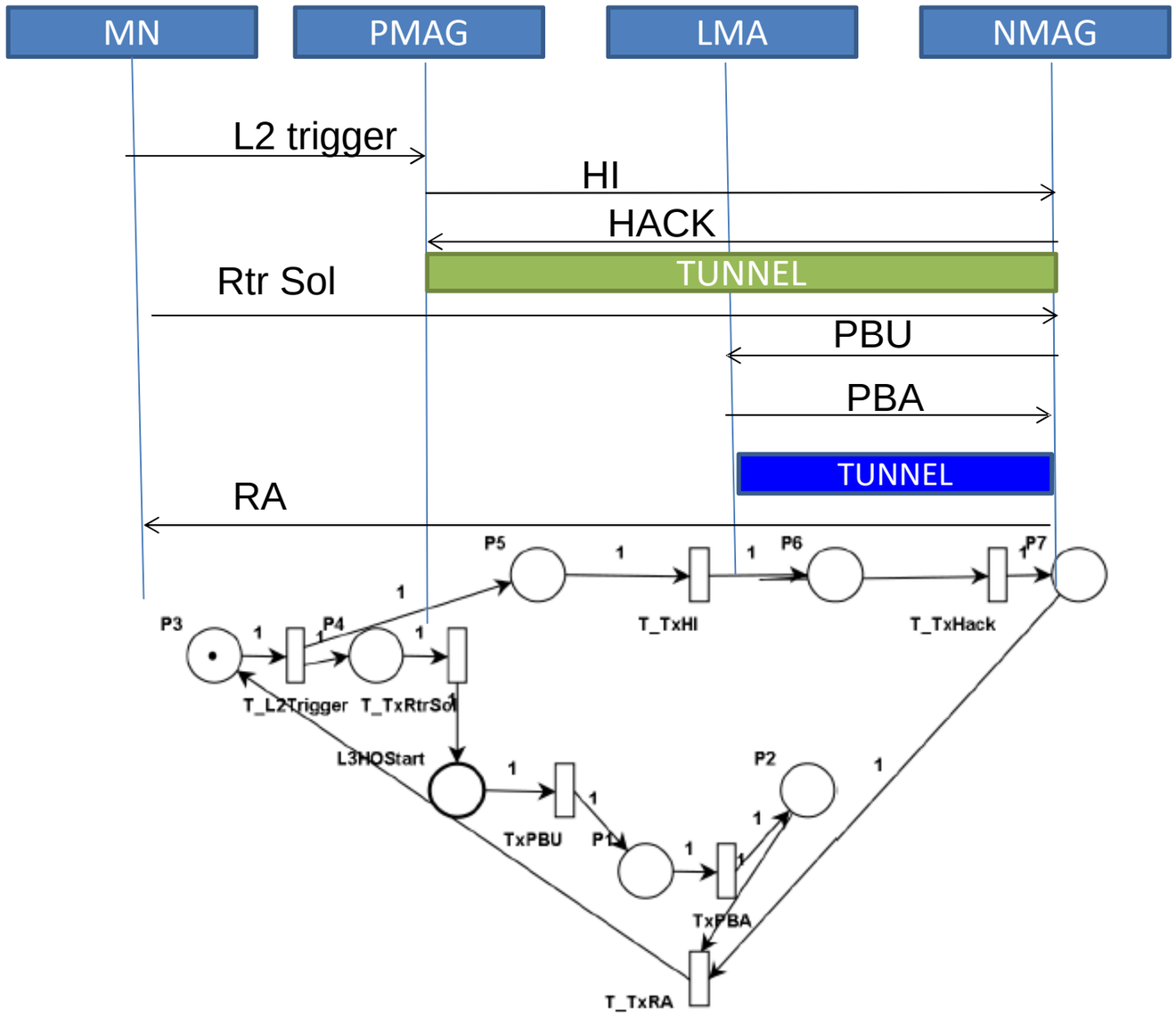
Tokens

Arcs

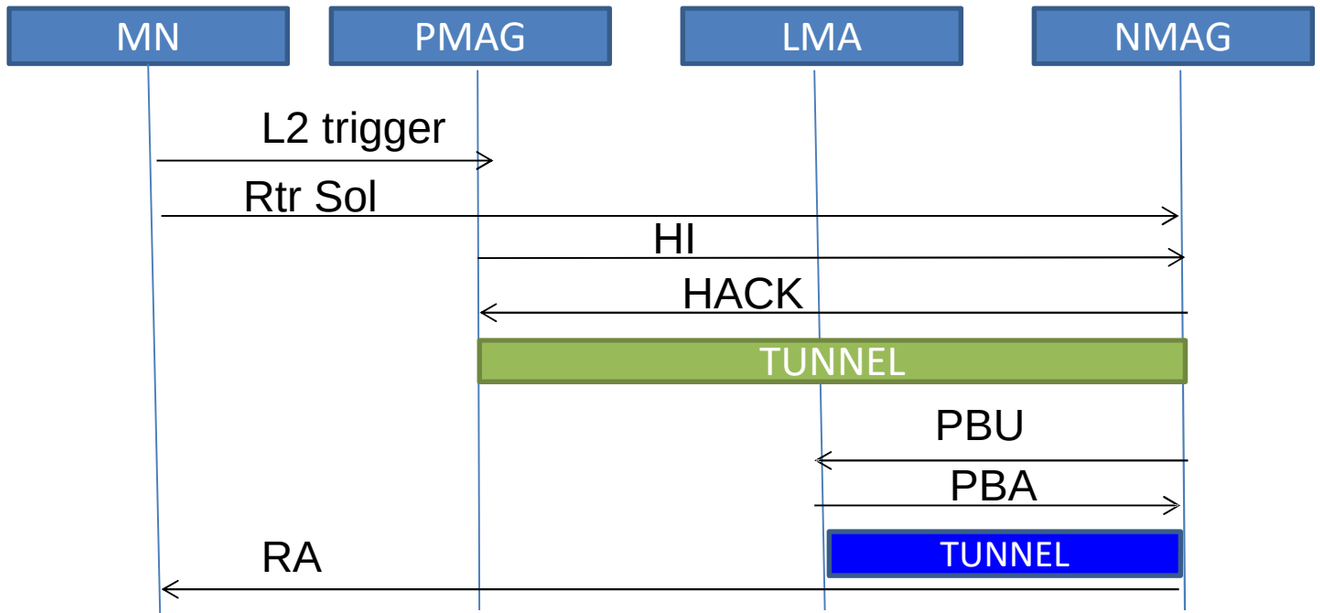
PMIPv6 Handover

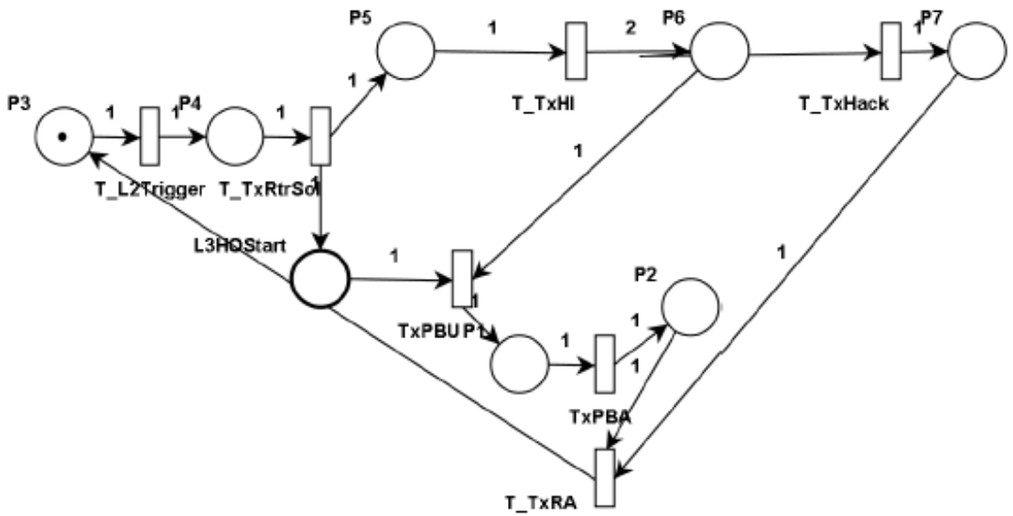


FPMIPv6 Handover (pred.)



FPMIPv6 Handover (react.)





Conclusions and Future Work

- Timed Petri Nets as a tool for modeling PMIPv6-based protocols
  - Resource consumption
  - Parallelism
  - Synchronization
  - Time elapsing
- Future work
  - Characterization of signaling delays
  - Stochastic Petri Nets
  - Express buffering and data flow
  - CI-PMIPv6 scalability

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