Traffic prediction in WMN using process mining algorithms

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Problem Statement

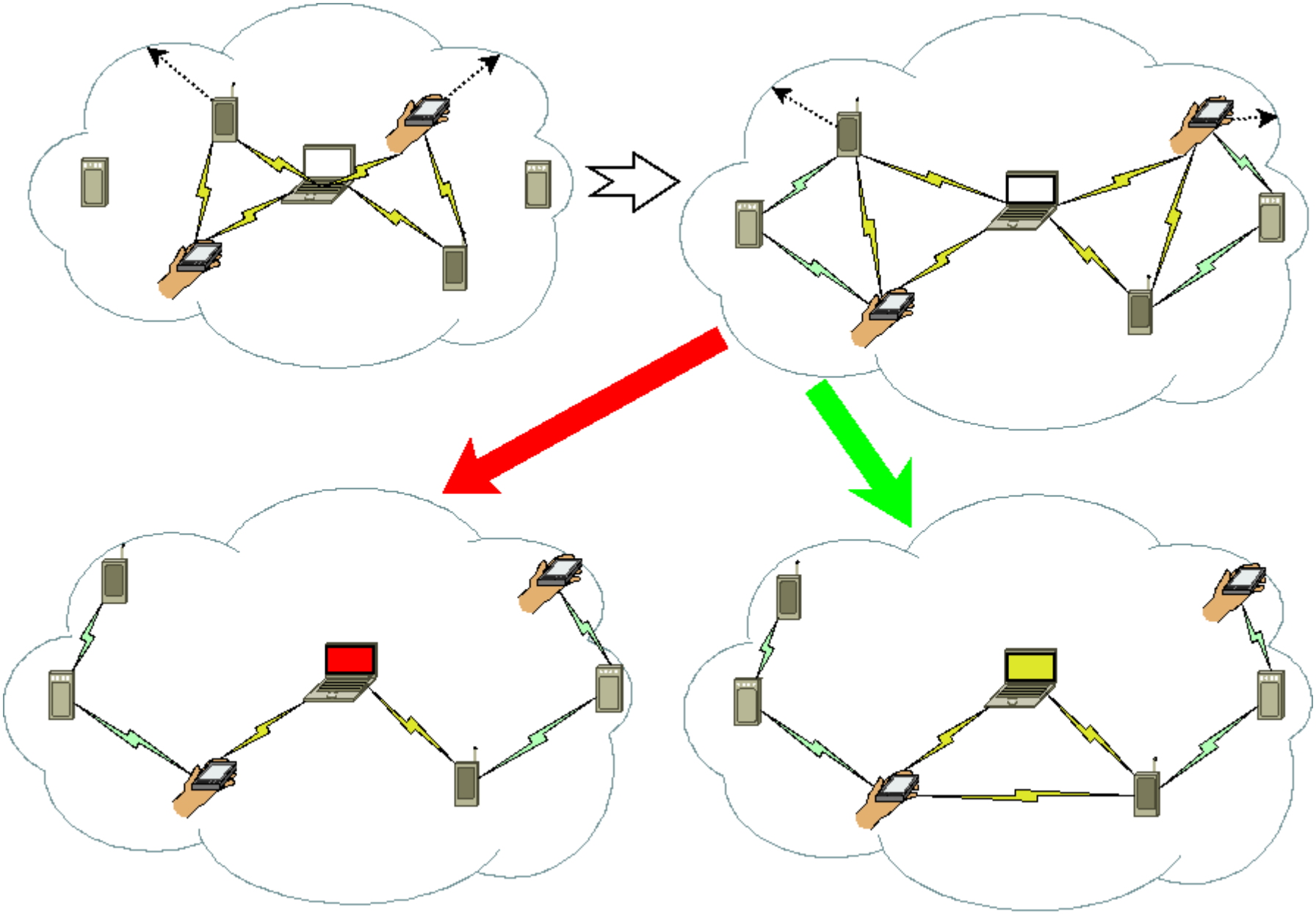
Goal

- Develop and implement and algorithm to determine template network topologies in dynamic mesh networks

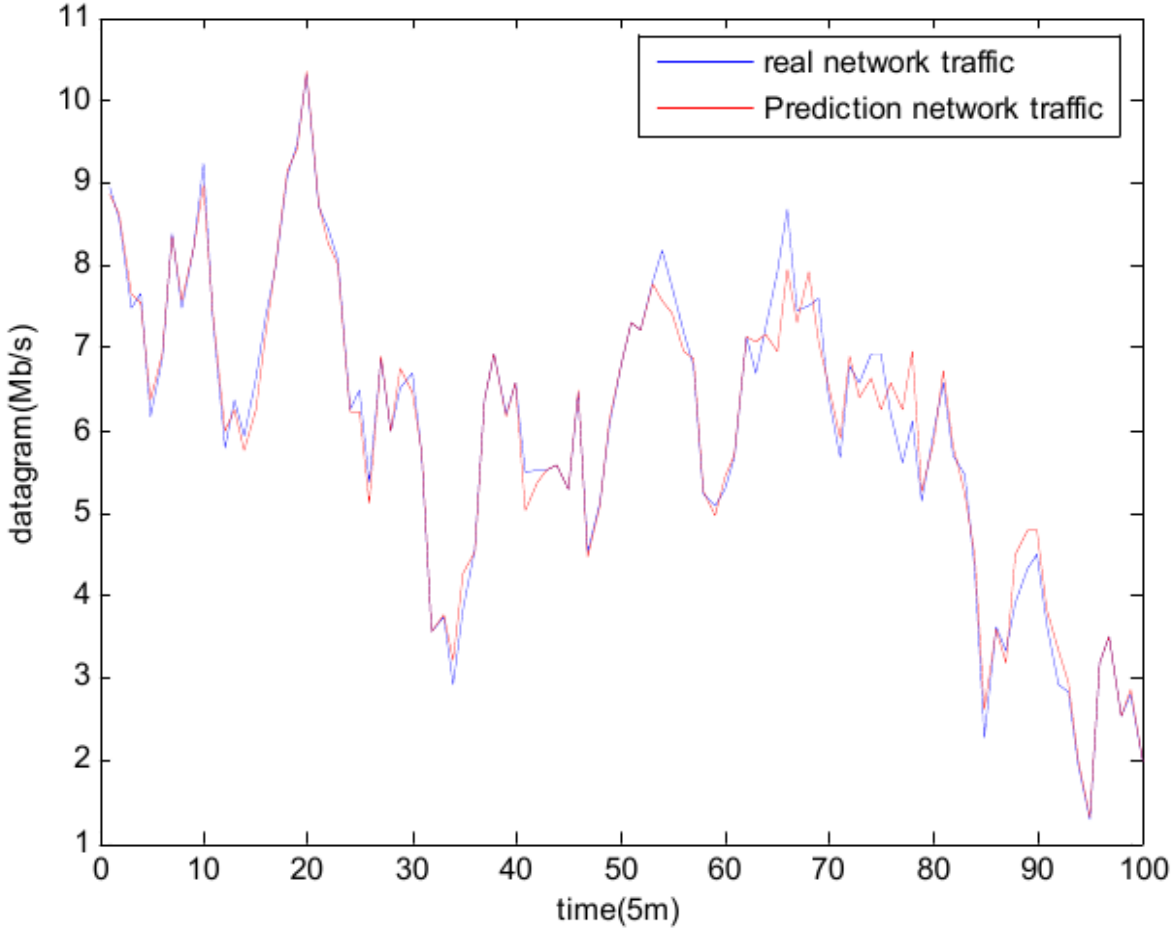
Tasks

- Model a set of dynamic mesh networks topologies
- Analyze traces with process mining techniques
- Define a set of process mining algorithms which are most appropriate for mesh networks
- Develop a metric based on the proposed algorithm

Problem on the picture

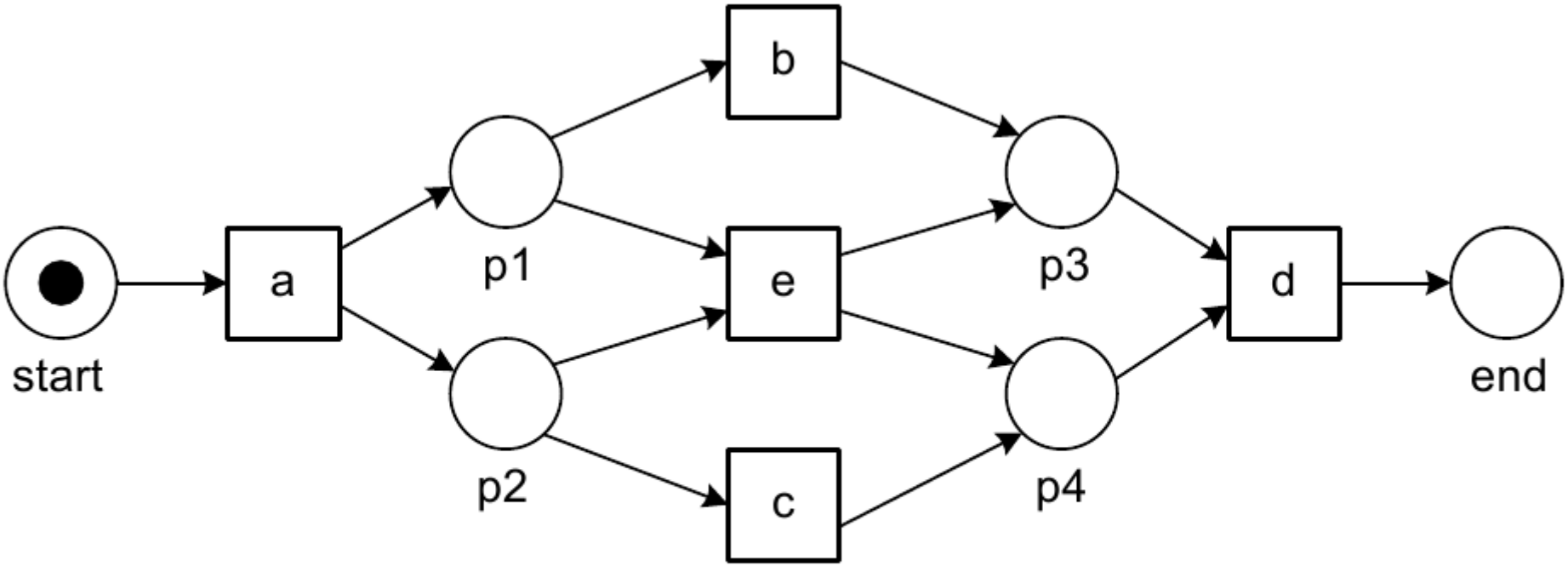


Related works



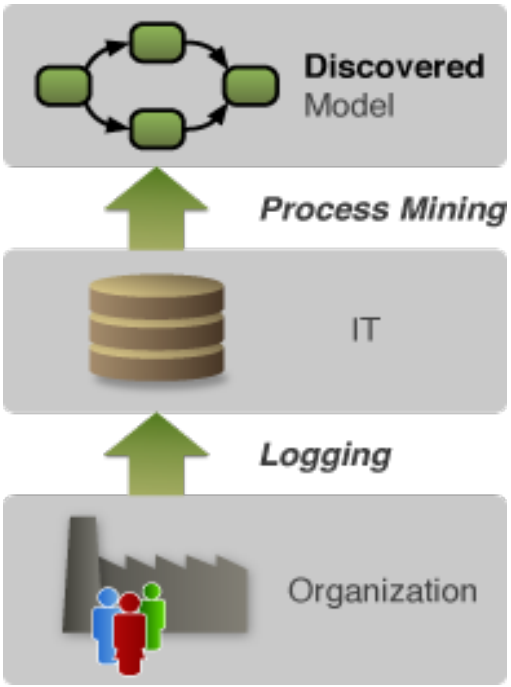
- *Wavelet neural networks*
- *Clastering Approach*
- *Graph Mining*
- *Time series analysis*

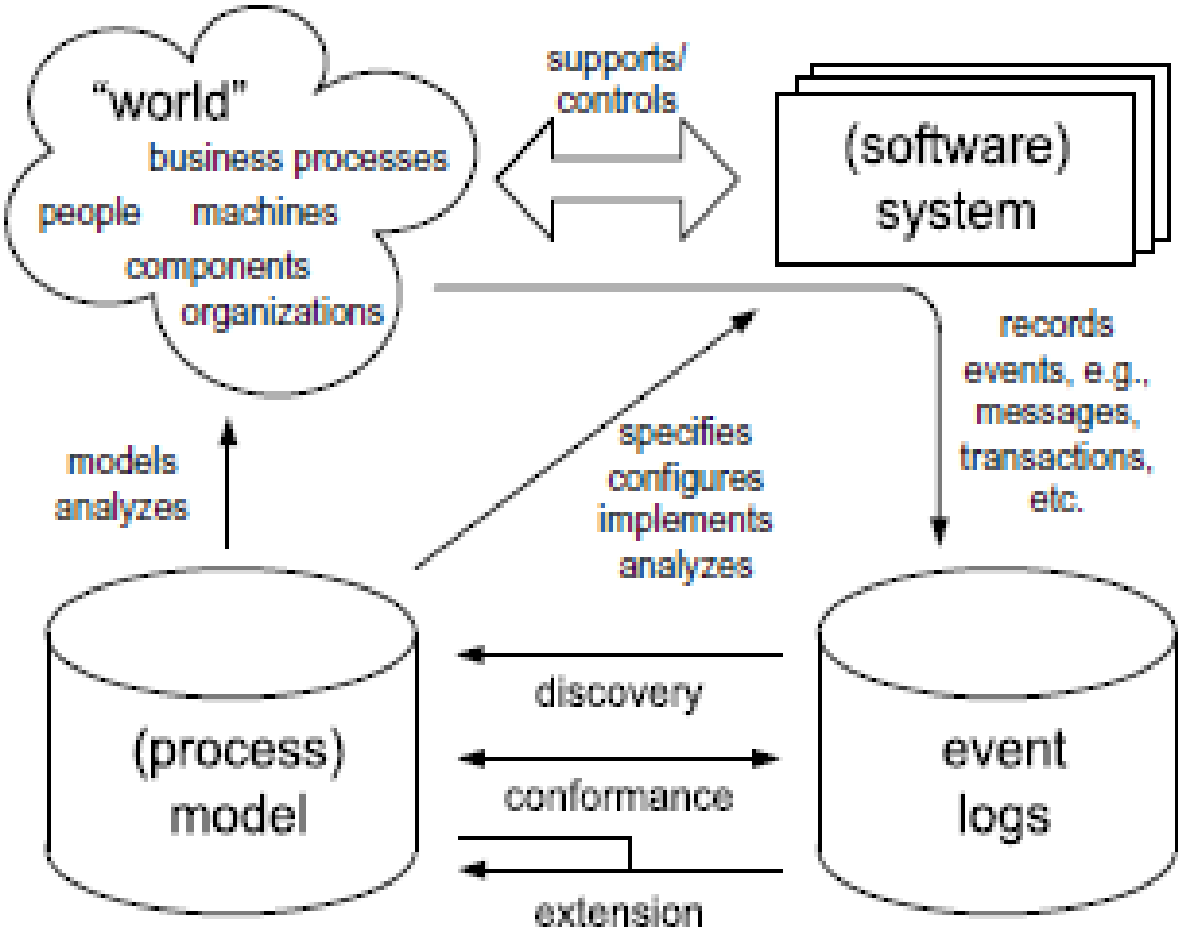
Process mining



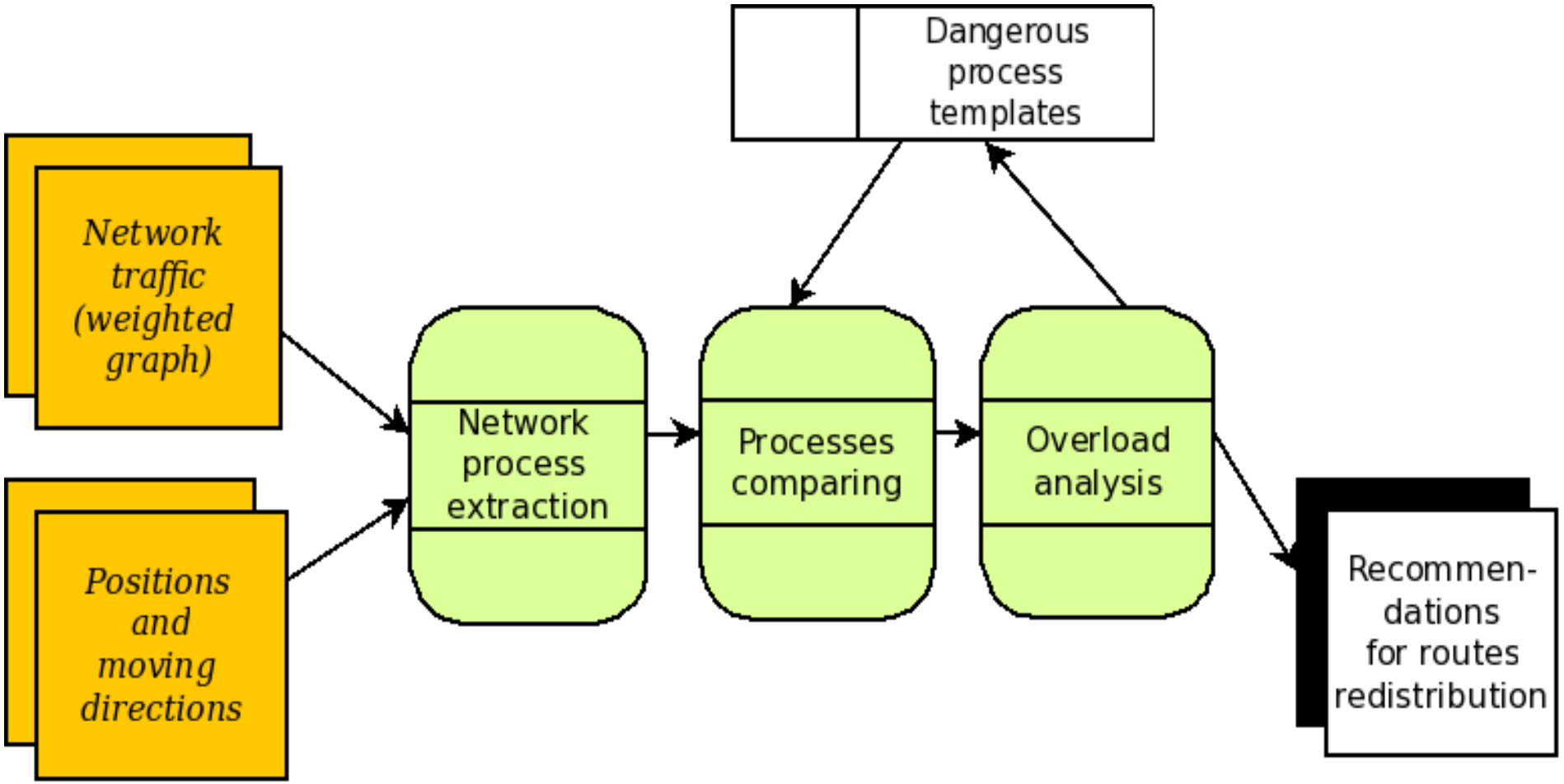
$$L_1 = [\langle a,b,c,d\rangle^3, \langle a,c,b,d\rangle^2, \langle a,e,d\rangle]$$

General approach

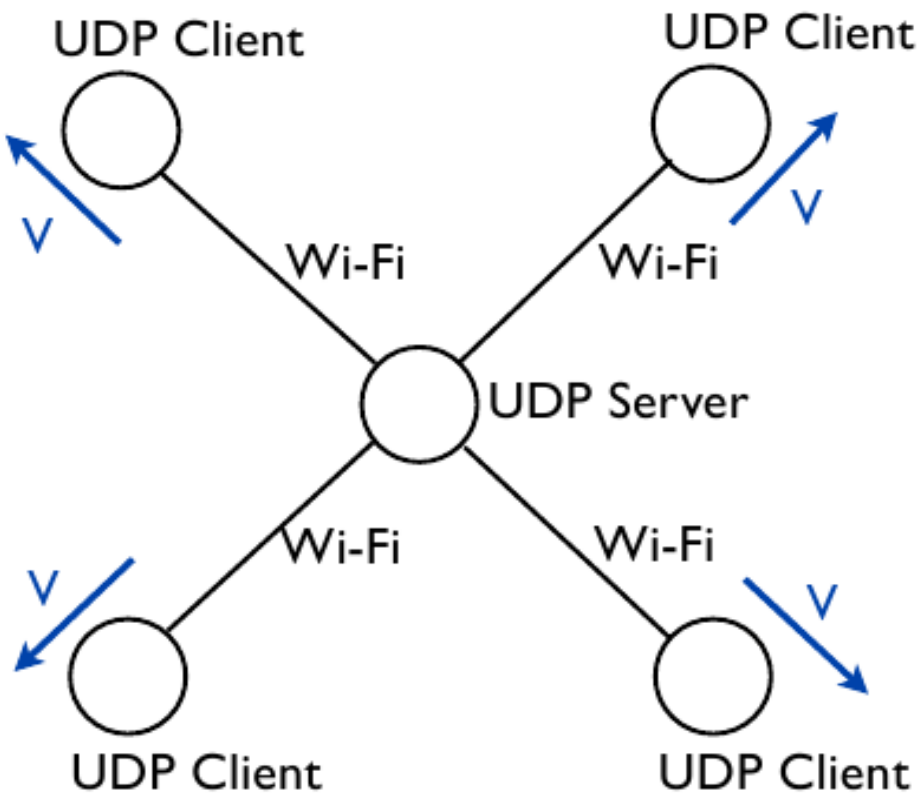




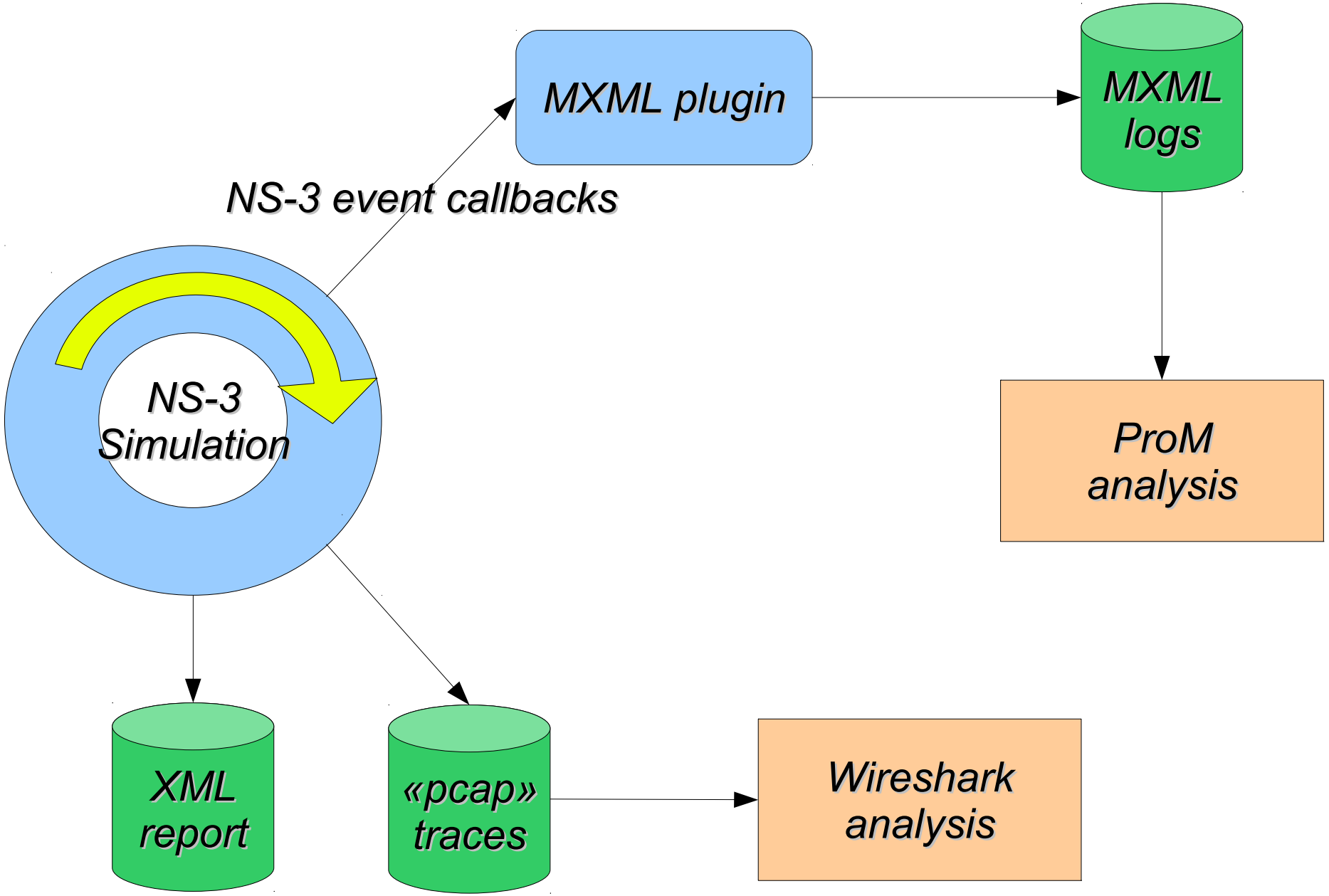
Process mining for WMN



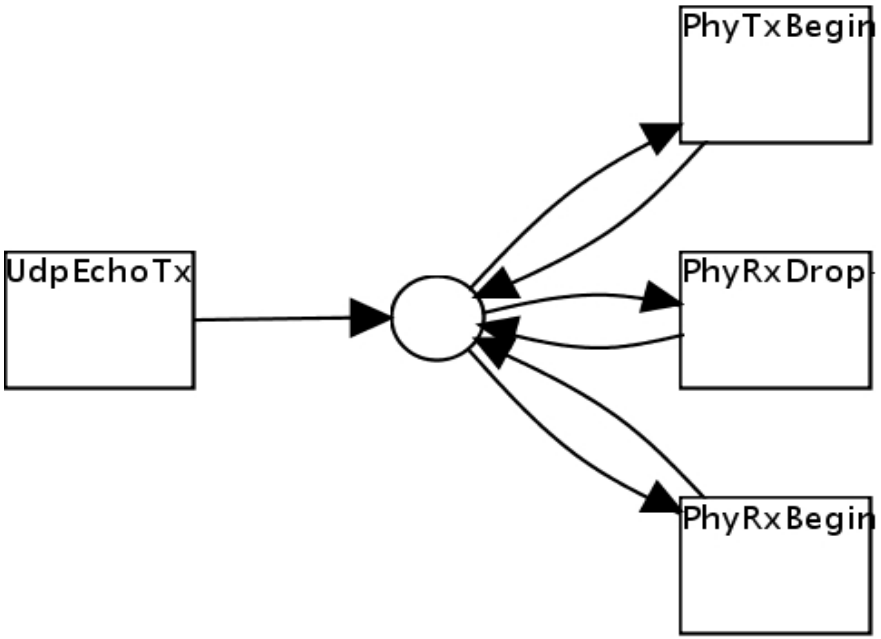
Simple test network



Process mining process

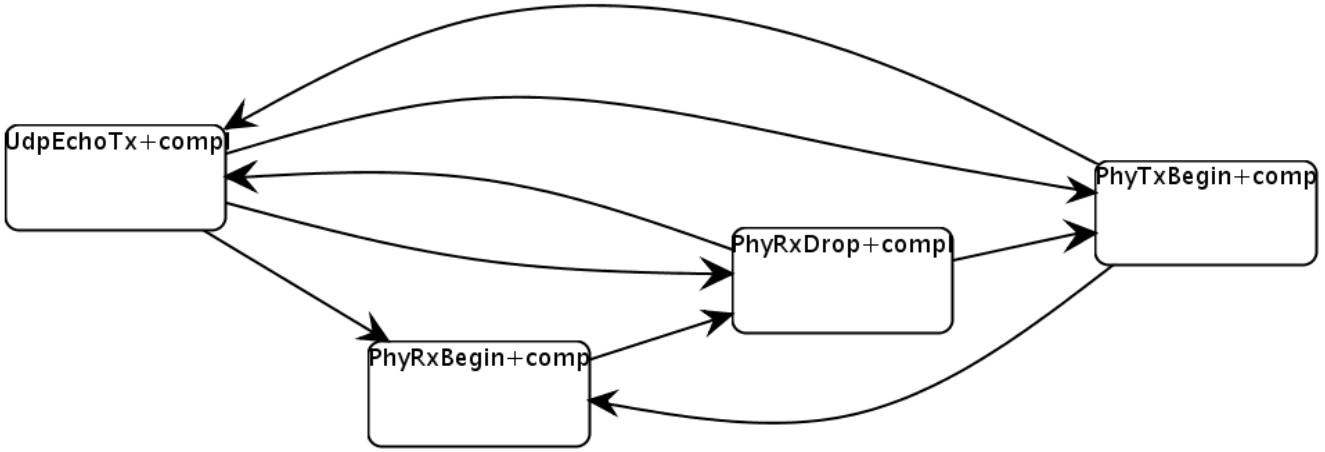


Petri Network and Events



Network

- Start send packet
- Packet dropped
- Packet transmitted...



Moving

- Distance changed...

Possibilities

Analysis and Optimization

- Conformance checking
- Repairing models
- Extending the model with frequencies and temporal information
- Constructing predictive models
- Operational support (prediction, recommendation, etc.)

Results & Further Work

Current Results

- Set of NS-3 simple dynamic mesh networks
- MXML plug-in for NS-3 as a library
- Network process is extracted by some algorithms in ProM framework
- Some algorithms are marked as improper

Further Work

- Elaborate an algorithm for routes optimization
- Implement routing metric in the mesh-network routing protocol in NS-3
- Integrate metric with QoS service

Questions & Answers

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