

Meta-Modelling of Interconnection Networks with Meta-Modelling Tool

ATOM^β

Sina Meraji

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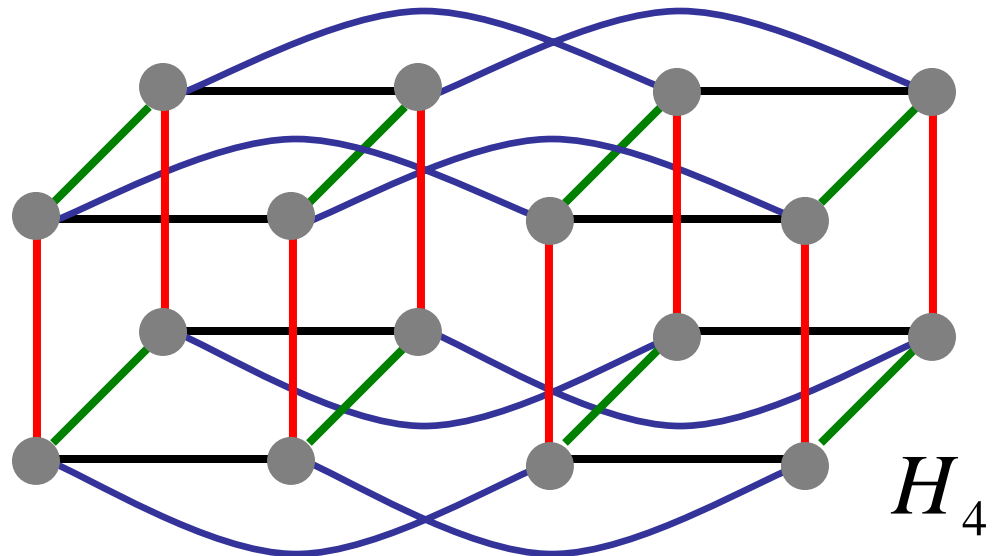
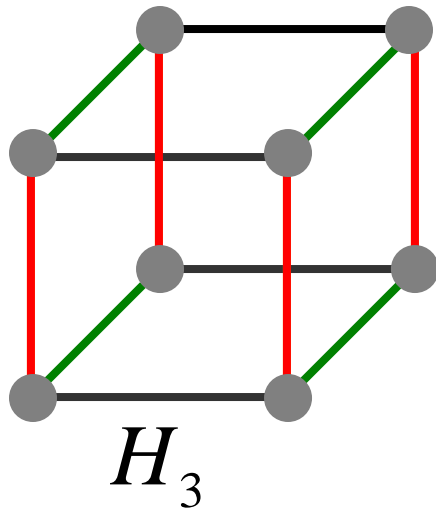
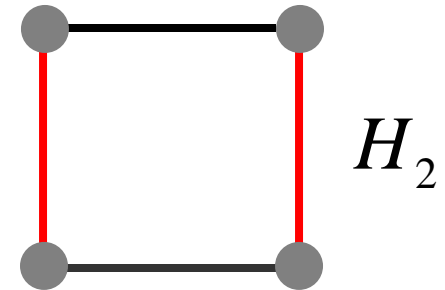
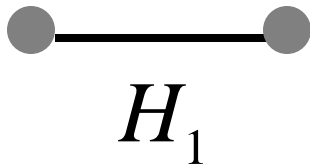


Outline

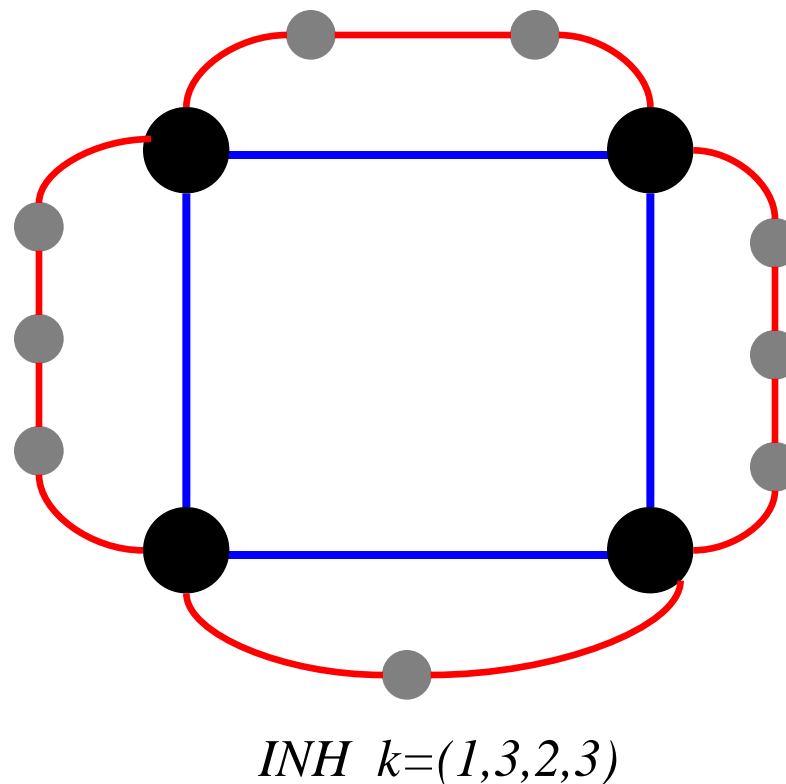
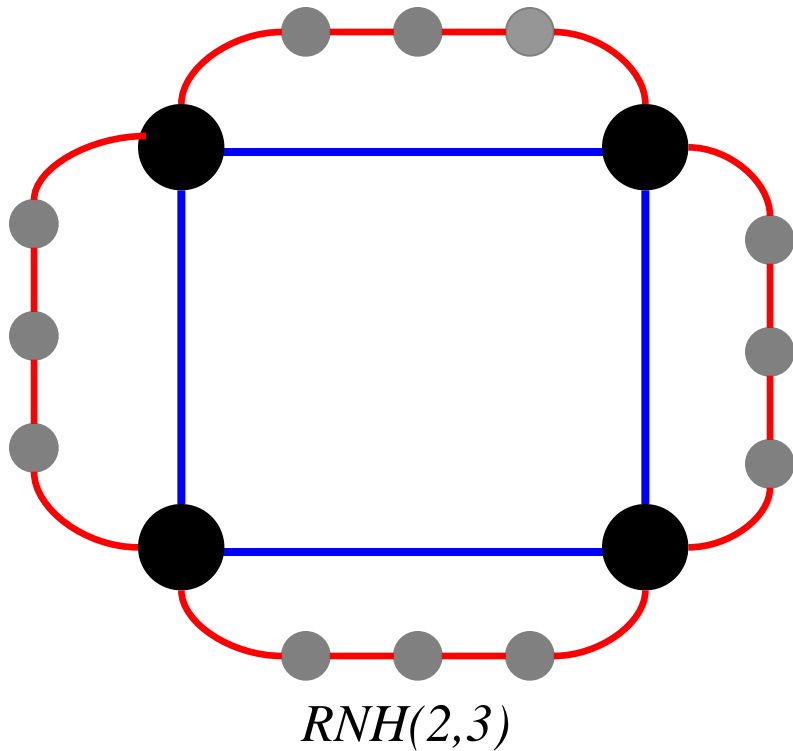
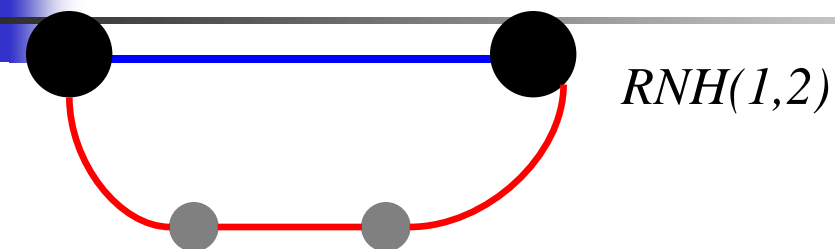
- Introduction (hypercube family)
- Stretched hypercube
- Meta Modelling of hypercube family
- Model Transformation
- Results
- Conclusion & future work



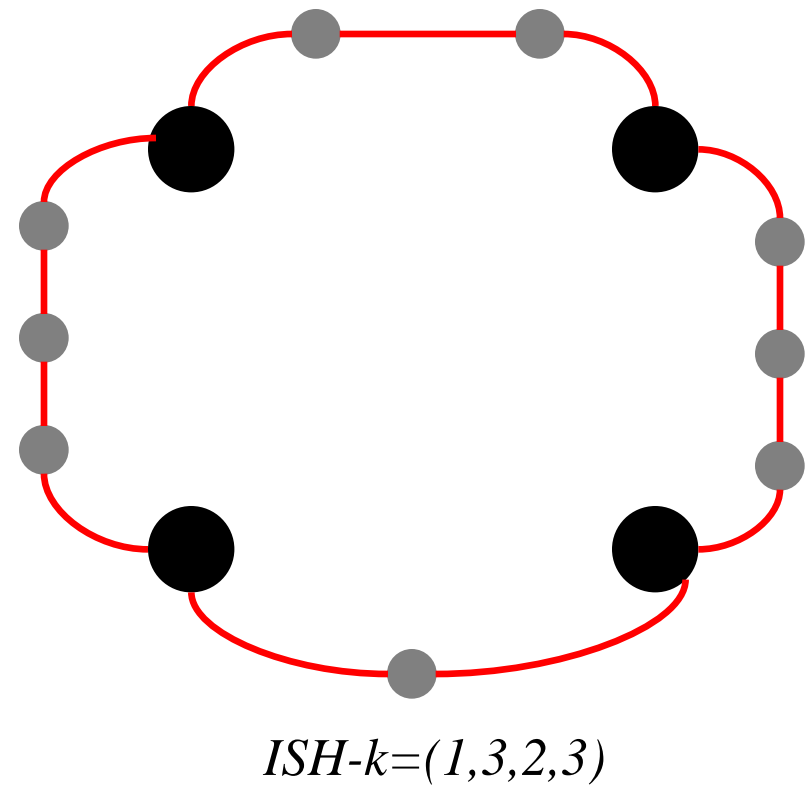
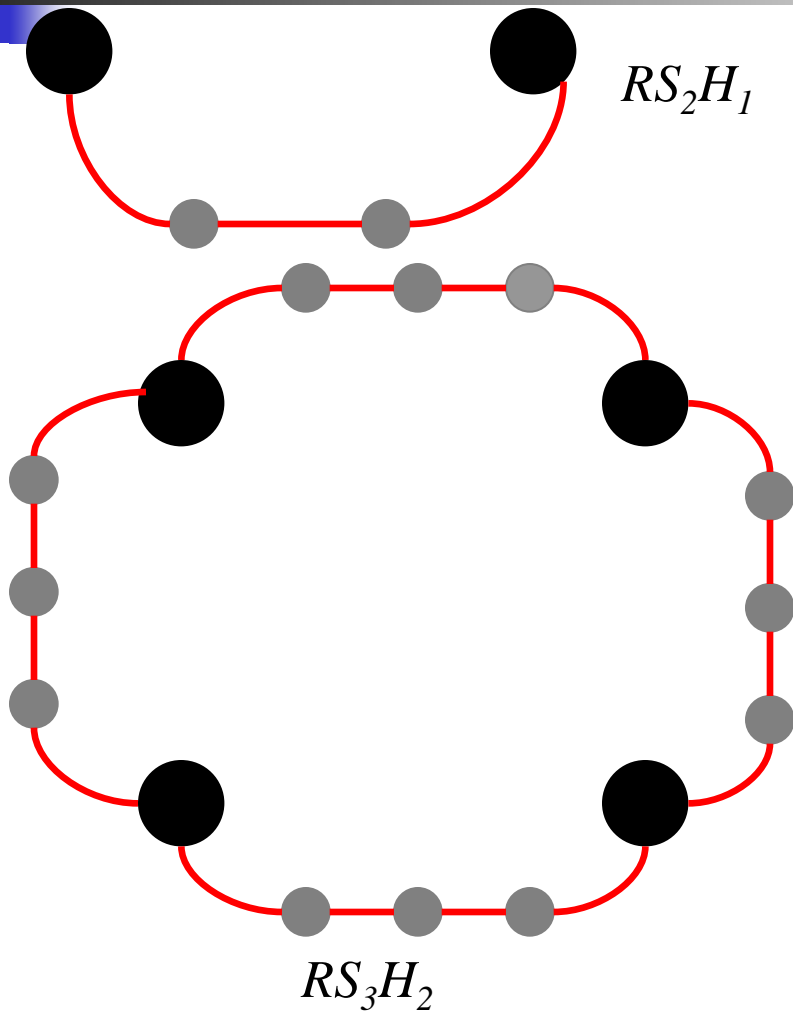
Introduction – Hypercube Family



Introduction-Necklace Hypercube



Stretched Hypercube Topology





Two phases

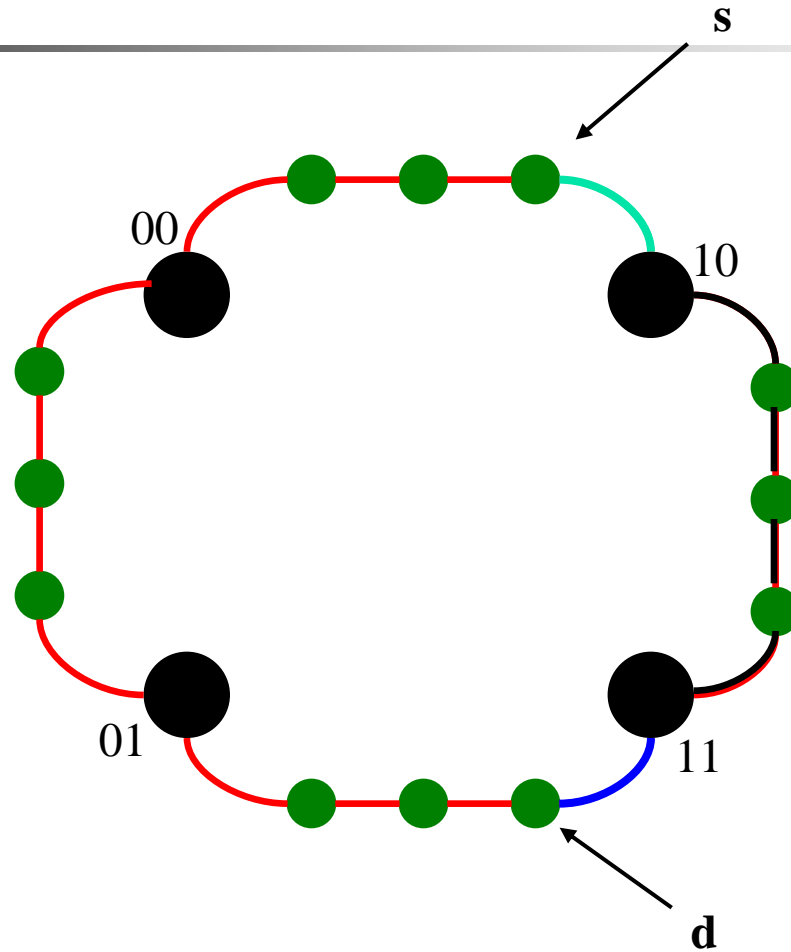
- Bottom-Up
 - Developing 2 algorithms for each topology
 - Deterministic
 - Adaptive
- Top-Down
 - Meta-Modelling
 - Model Transformation



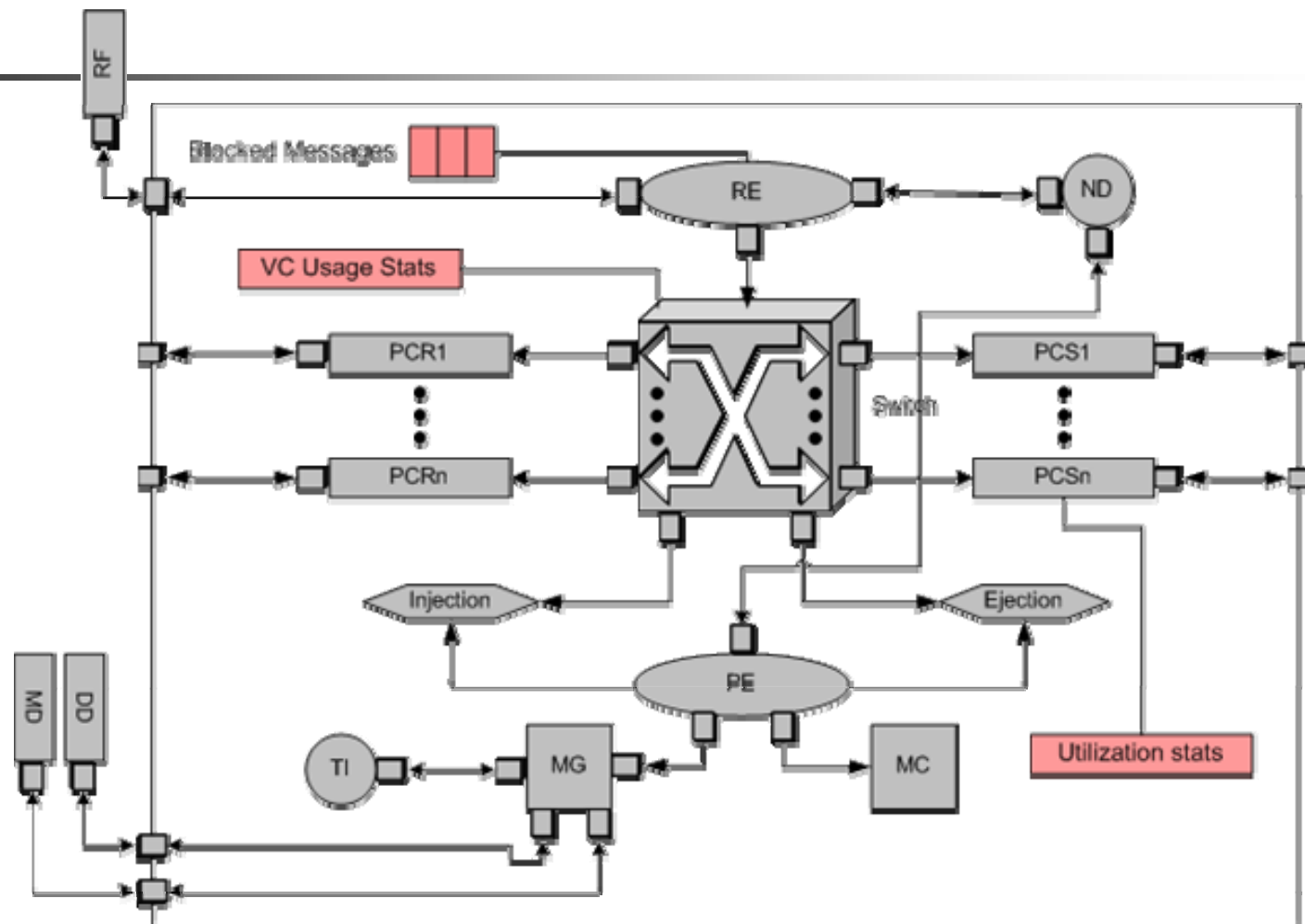
Routing on Stretched Hypercube

- If s is the source node and d is the destination node, we use these rules for routing.
 - Move towards the nearest base neighbor of source
 - Move towards the nearest base neighbor of the destination
 - Move towards the destination

Routing on Stretched Hypercube



Node Structure





Meta-Modelling of Hypercube Family

- Design two Meta-Models using Entity-Relationships formalism in AToM³
 - Meta-Hypercube
 - Meta-SwitchInfo



Meta-Hypercube

- Use to define the topology
- Elements:
 - Physical Channel Sender (PCS)
 - Physical Channel Receiver (PCR)
 - Switch
 - Necklace Switch



Meta-SwitchInfo

- Use to define the structure of each switch
- Some important elements:
 - Switchinfo
 - Topology
 - Destination Distribution
 - Routing Element
 - Node



Switchinfo

- Shows the parameters of each simulation iteration
 - disableLoges
 - maxSimulationEvents
 - nRuns
 - initialGenRate



Node

- shows some physical properties of each switch
 - pcDelay
 - swDelay
 - vcN
 - Injection & Ejection channel properties



Model Transformation

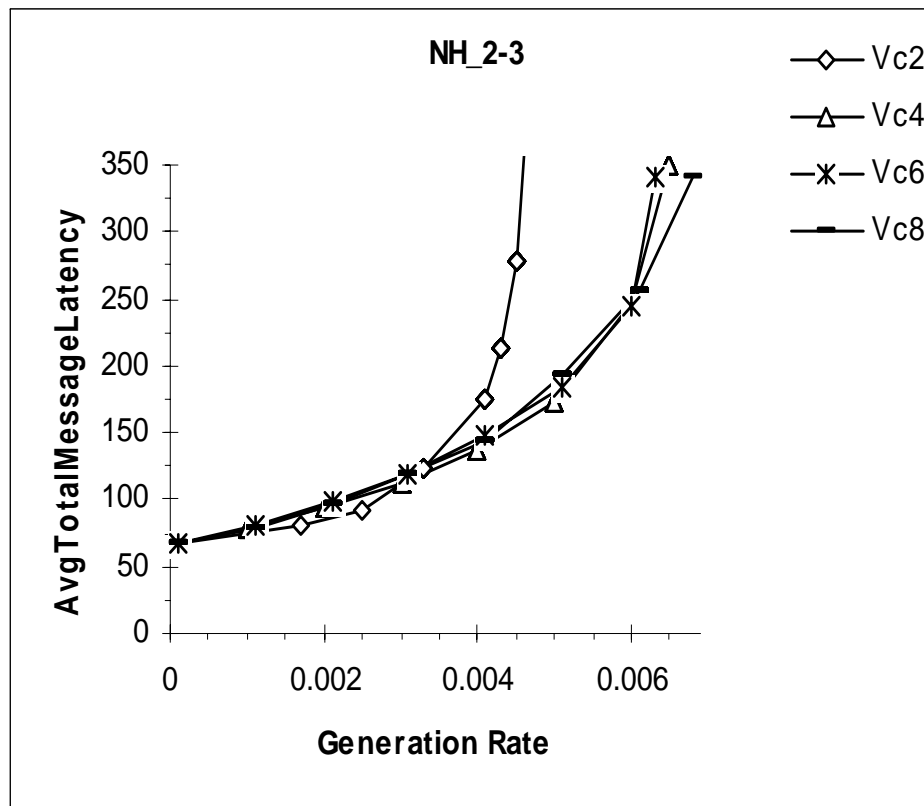
- Using Atom³
- Inserting another bottom to generate the XML file
- The XML file must be compatible with the Ximulator's input



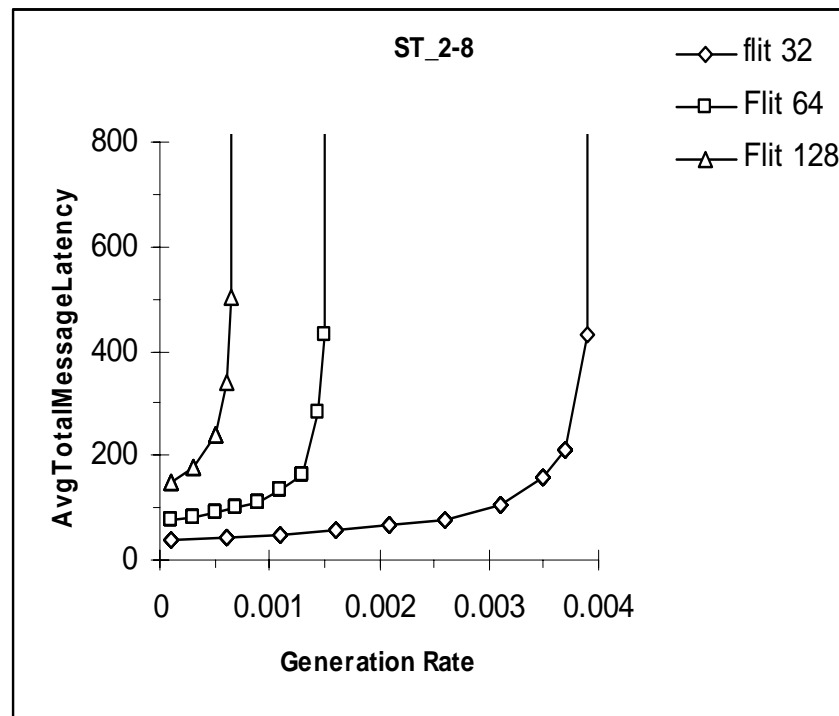
XML Generator

- Check the correctness of topology
 - number of main nodes
 - Number of necklace nodes
 - Number of PCSs and PCRs
- Generate the XML file
 - Reading the properties of different constructs

Results-Virtual channel



Results-message length





Conclusion & future work

- Hypercube family
- Meta-Hypercube
- Meta-switchInfo
- Model Transformation
- Results
- Model other topologies

Questions

