IKN
Institut für
Kommunikationsnetze

Distributed Resource Reservation for RPR

Harmen R. van As and Roman Morawek
Vienna University of Technology, Austria

Content

- **Background and Purpose**
- **The Token Signalling Protocol**
  - Token-circulation
  - Connection setup
  - Possible collisions
  - Collisions
- **Simulation results**
  - A simple model
  - Equidistant tokens
  - Variation of the ring size
  - High traffic dynamics

Background and purpose

Background

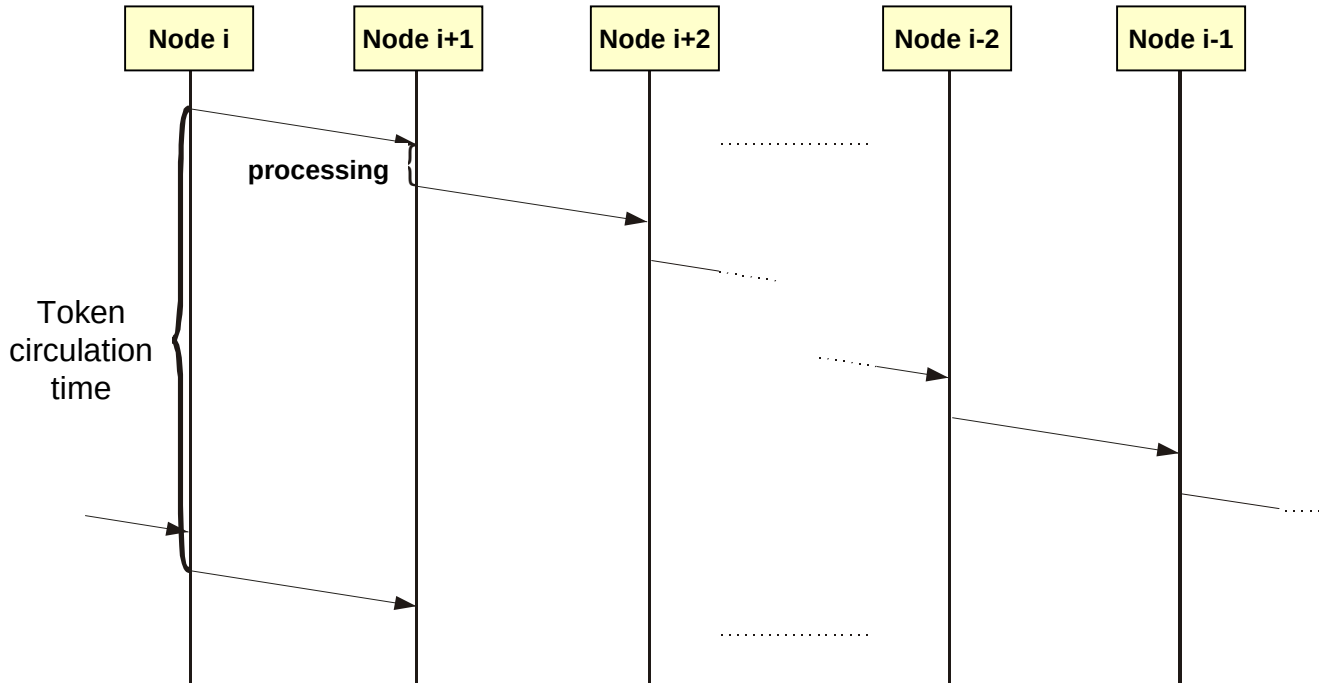
- Rings have limited hardware and interfaces
- This enables the fact that all nodes know all hardware and their states
- This can be exploited to develop an efficient and decentralized signalling protocol

Purpose

- Distribution of information on
  - SLAs (Service Level Agreements)
  - Bandwidth required for real-time connections with constant bit rates
  - Bit rates of each transmission link on the ring

Token access

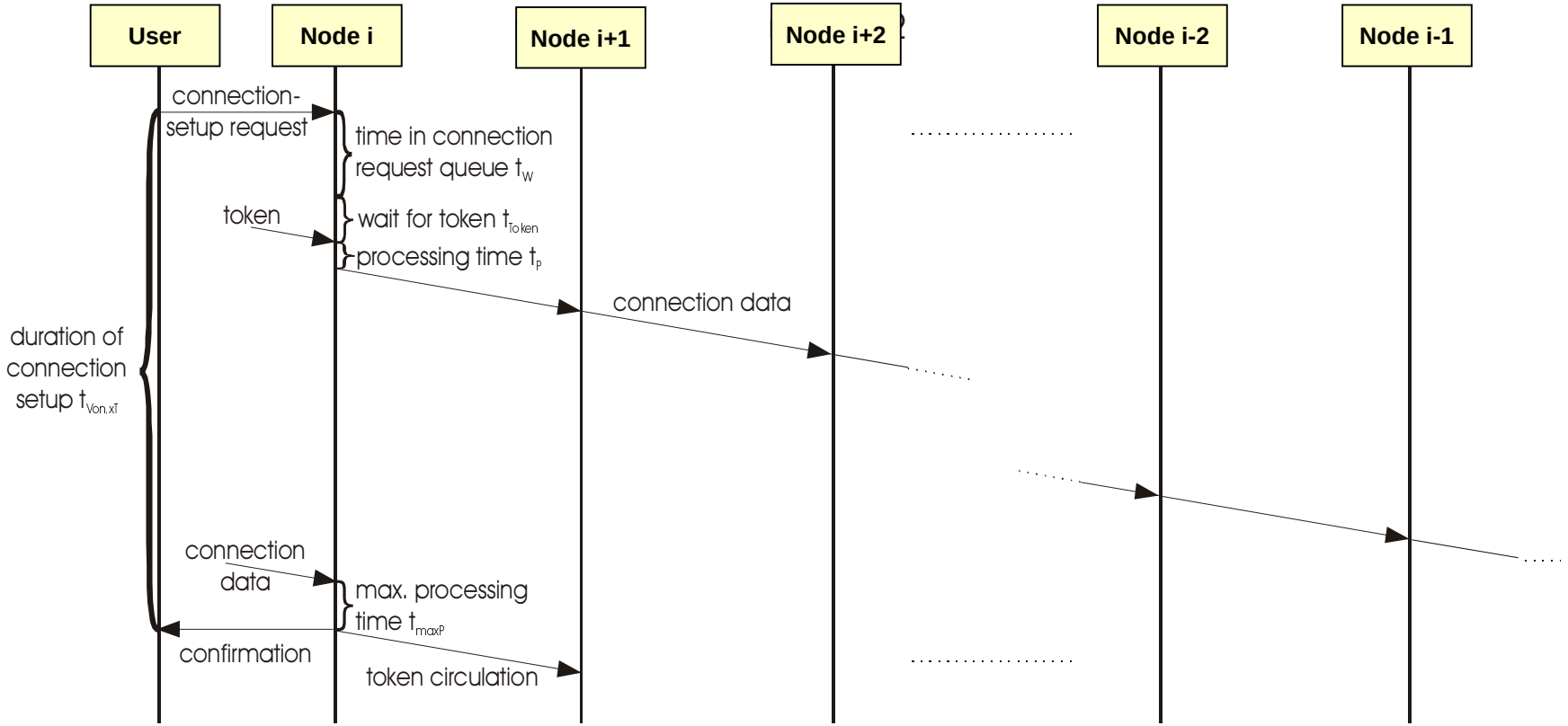
- **Use of a token protocol because of limited ring resources**



1 token circulating on the ring

Connection setup

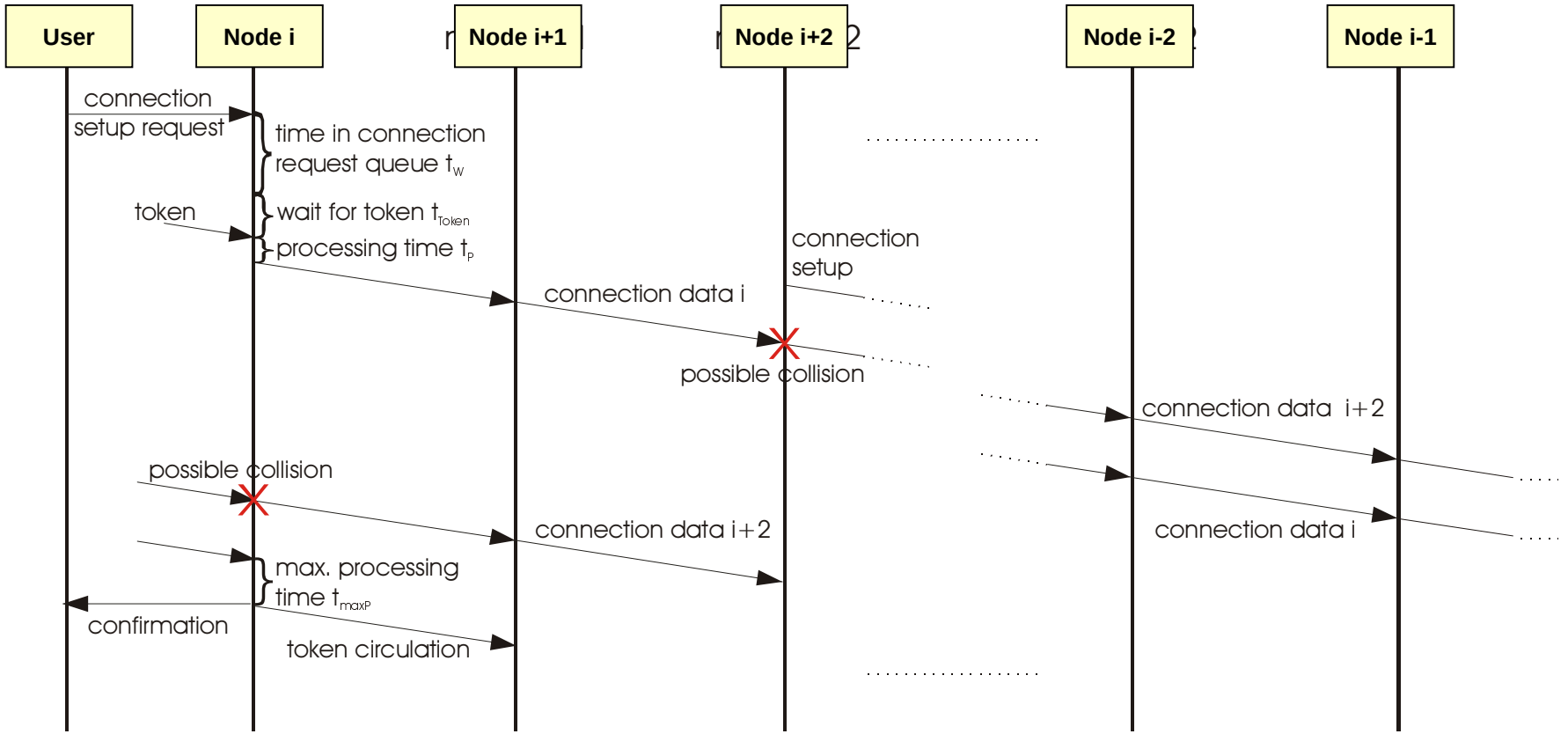
- **If more than one token, one must wait for a critical time interval to detect possible collisions**



Connection setup with more than one token

Connection setup

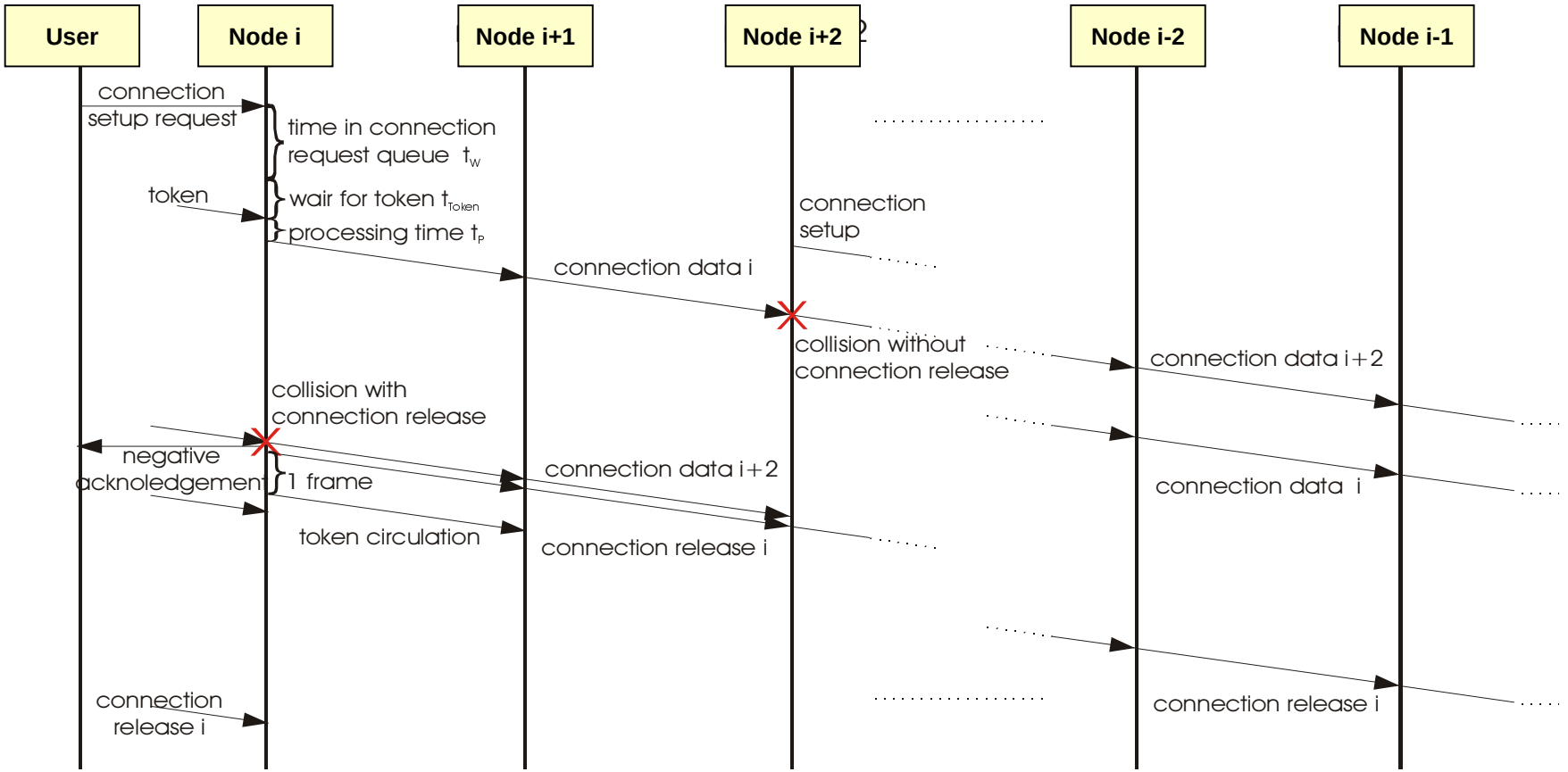
- If some other node sets up a connection in parallel, a possible collision occurs



Connection setup with a possible collision

Connection setup

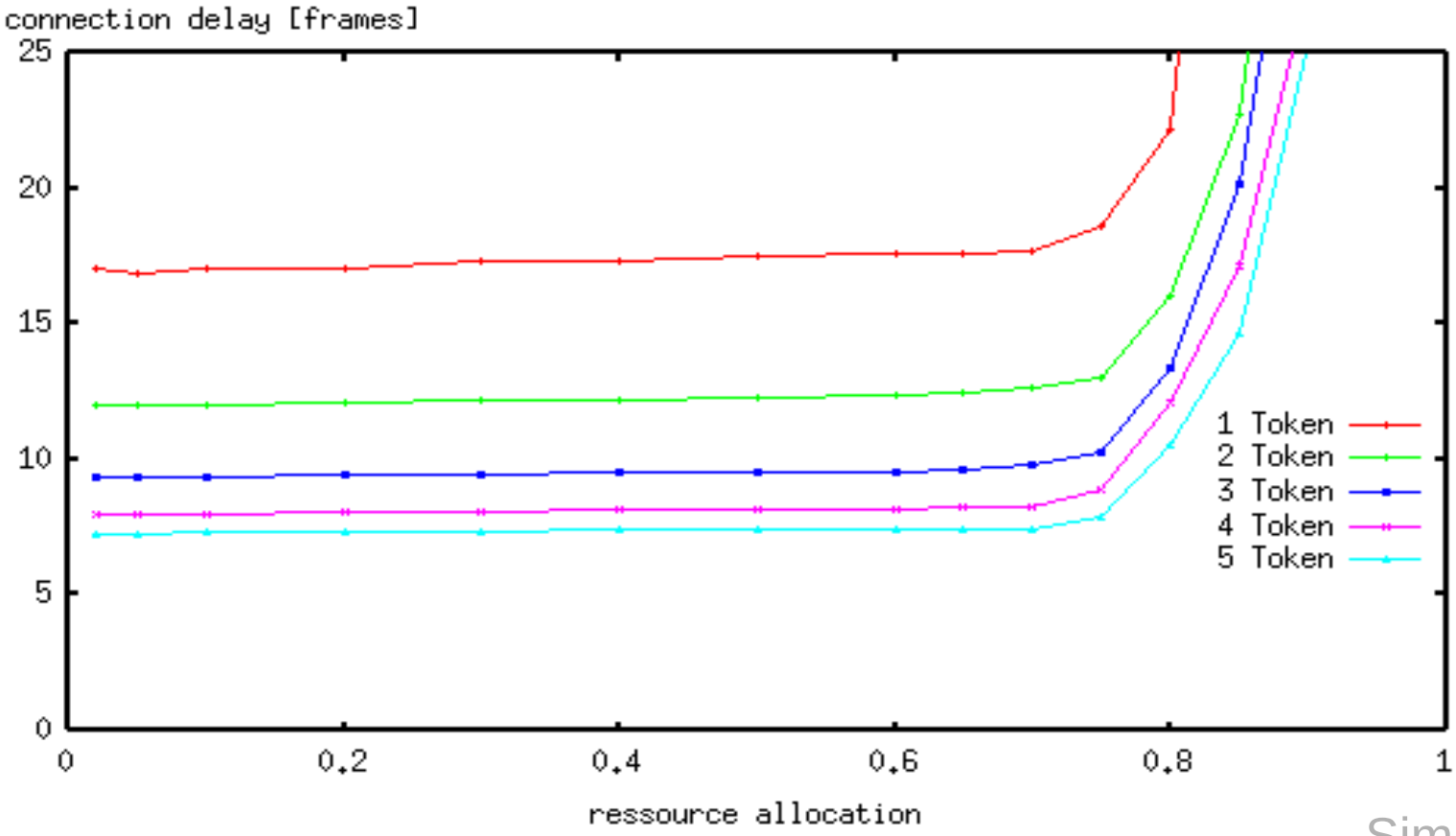
- **In case of a collision, set up connection again**



Connection setup with collision

Delay of connection setup

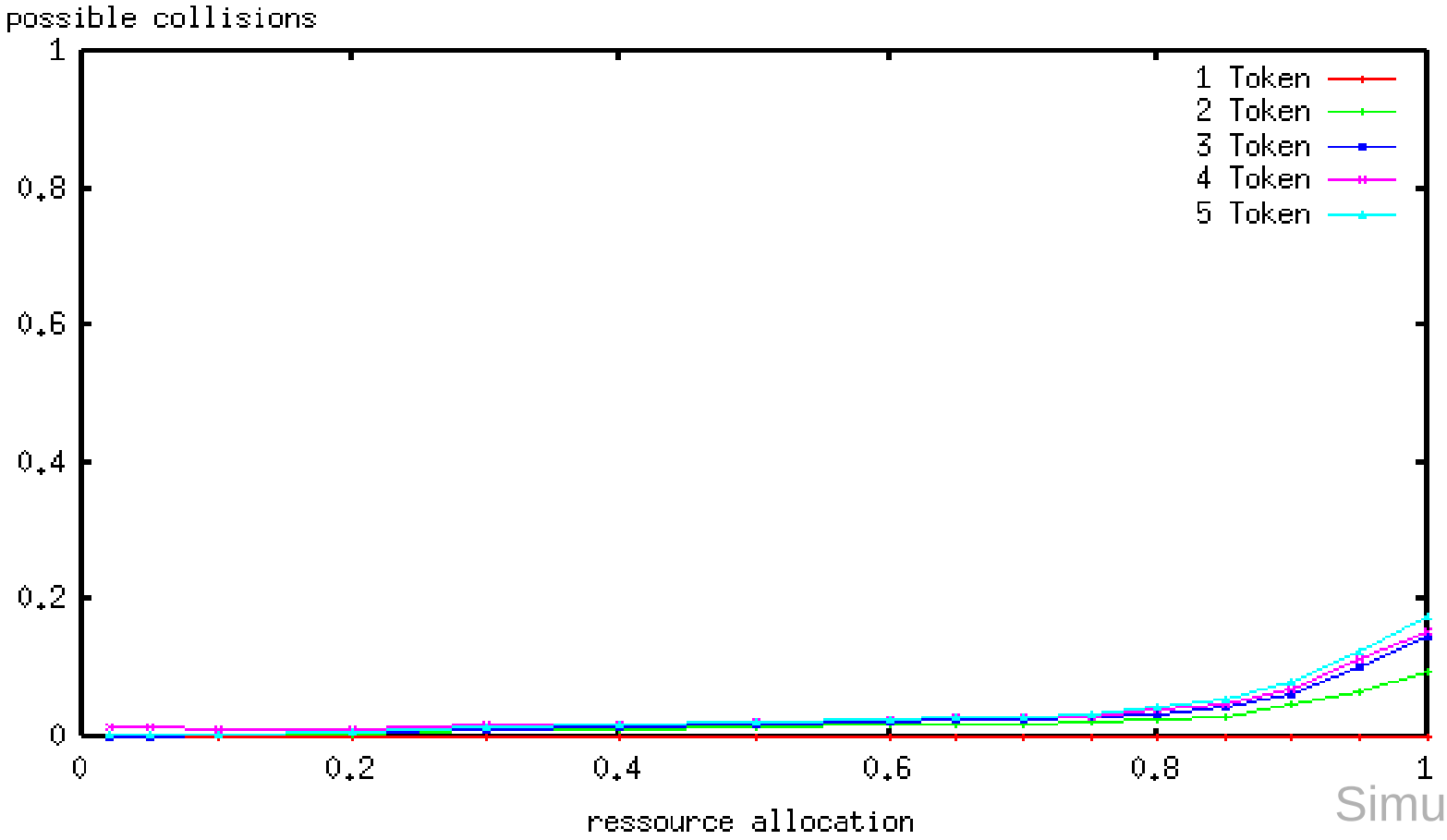
- **With a higher number of tokens the connection setup delay reduces because a token gets available earlier**



Simulation

Portion of potential collisions

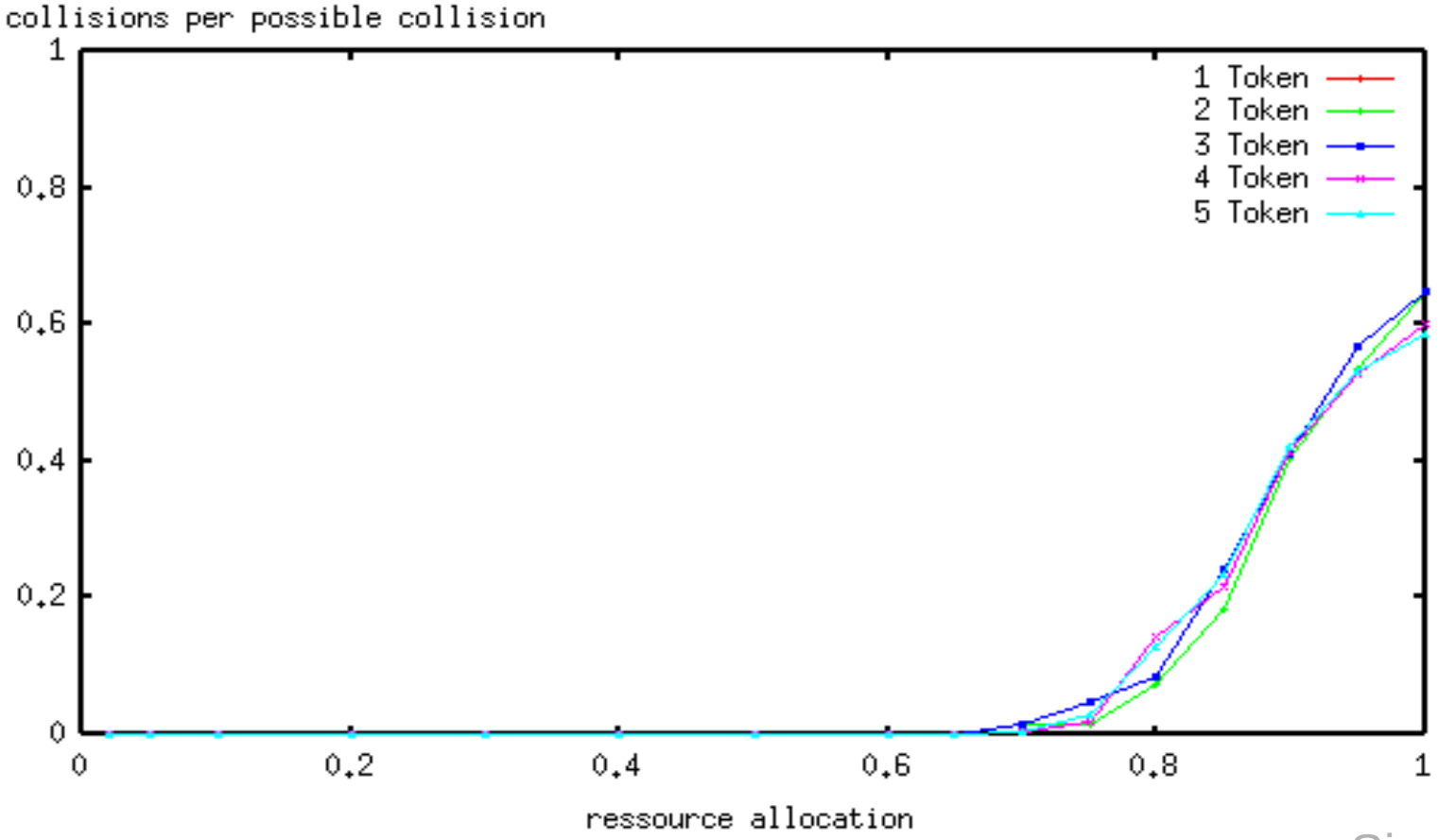
- **The portion of possible collisions increases with higher resource allocation on the ring**



Simulation

Portion of real collisions

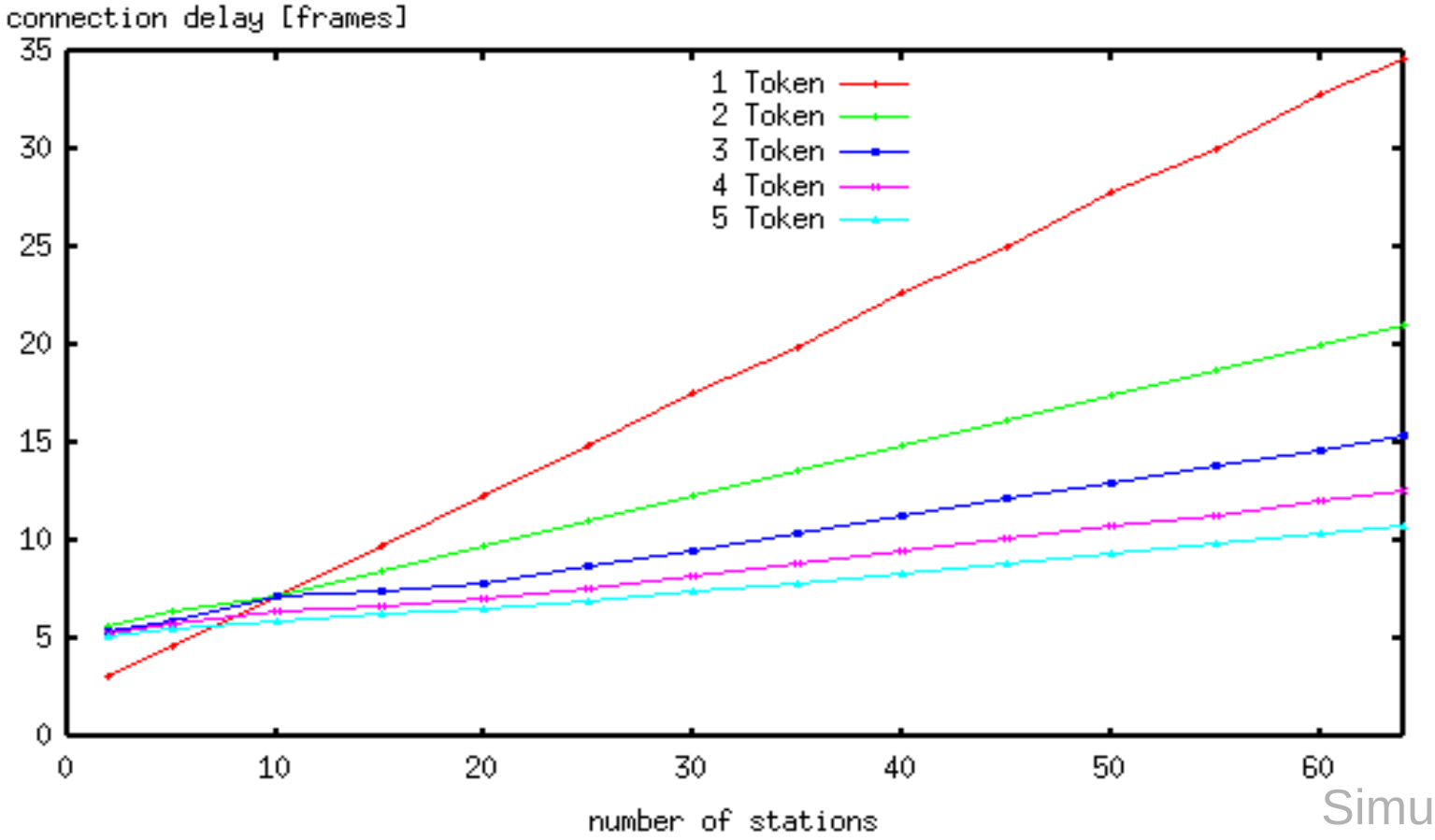
- **Collisions only occur at high resource allocation on the ring**



Simulation

Varying the number of nodes

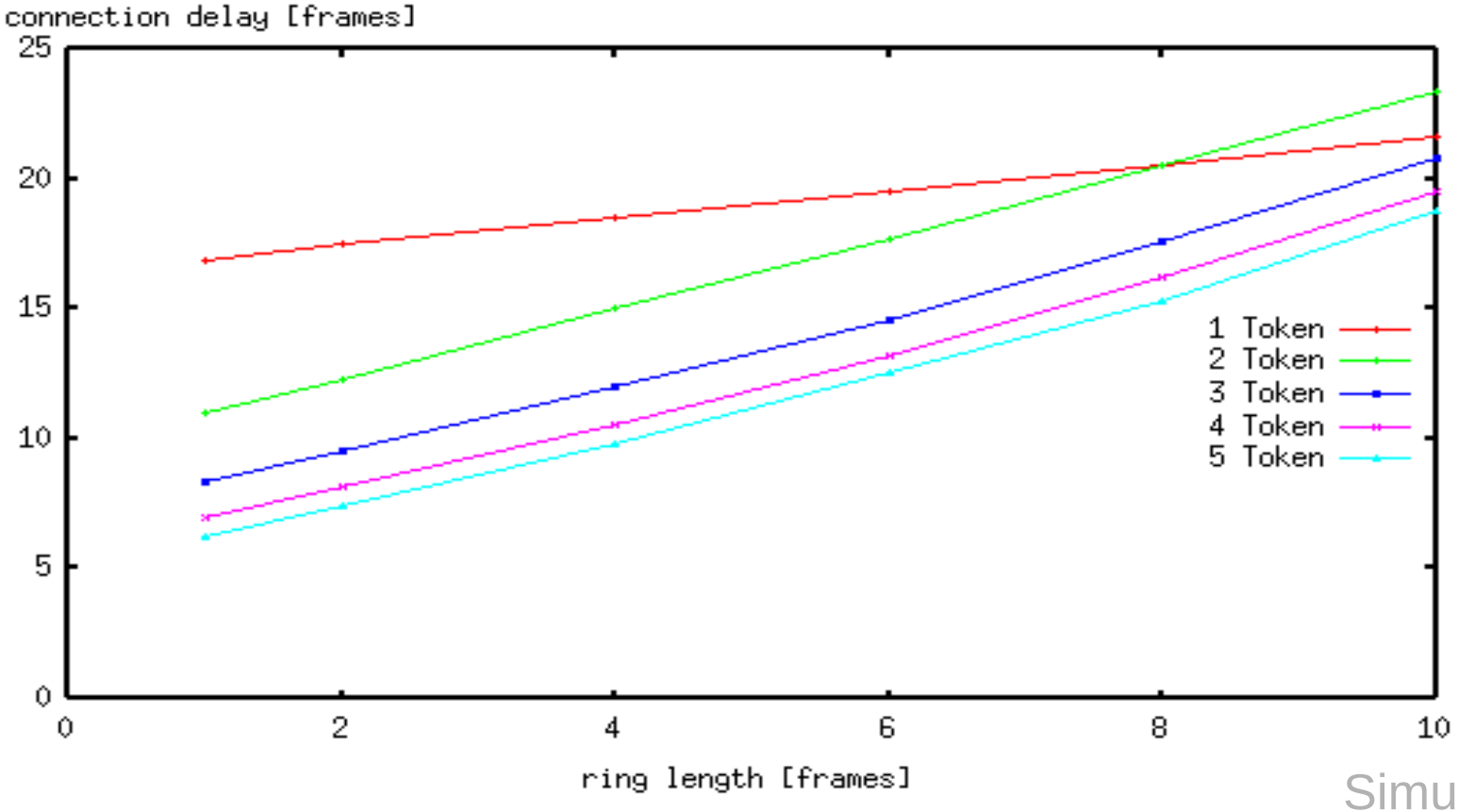
- **With a higher number of nodes, the reduction in waiting time for a token has a higher effect**



Simulation

Varying the ring length

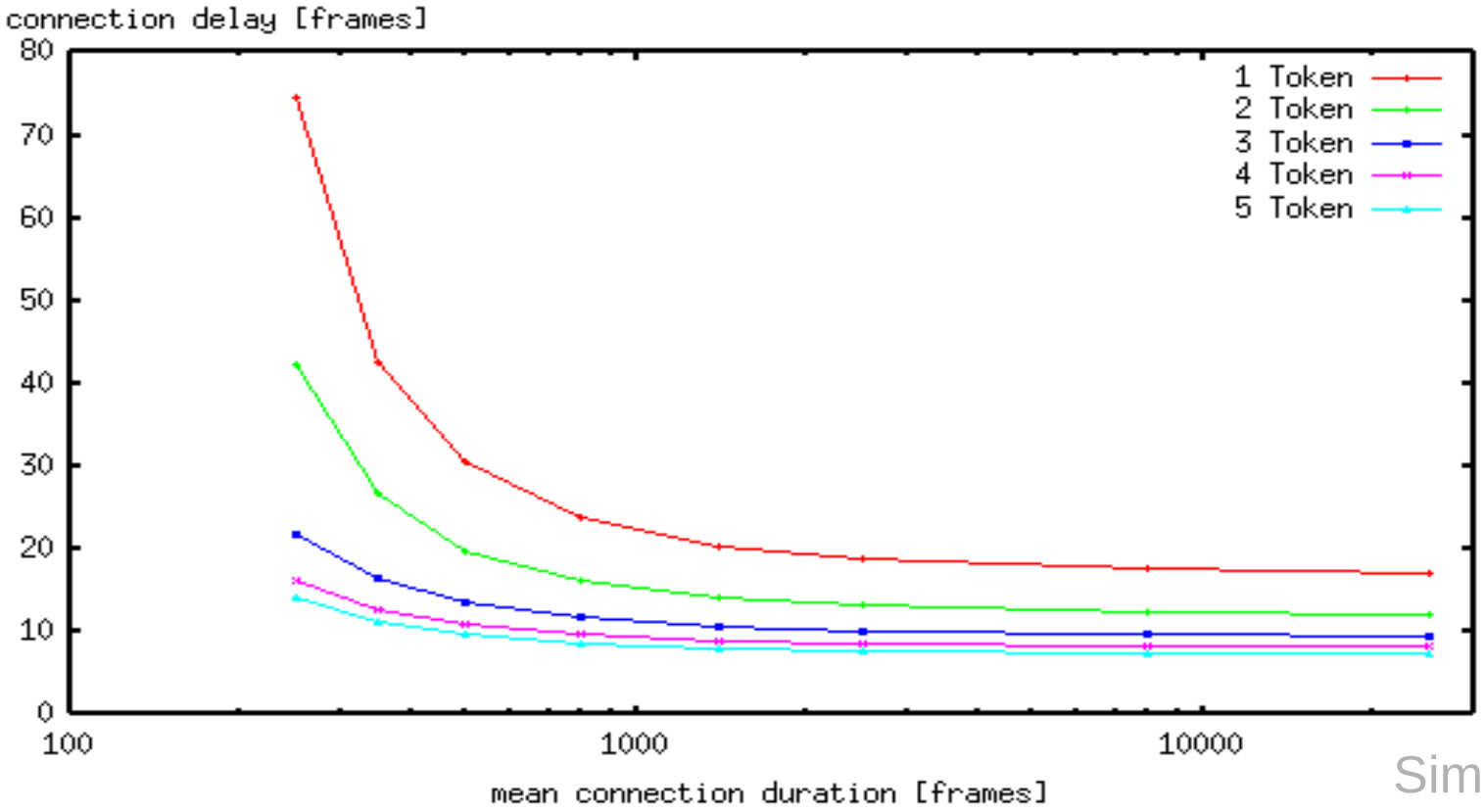
- **The ring length has a double effect on the connection setup delay when using more than one token because of the critical time one has to wait in this case**



Simulation

High traffic dynamics

- **At high traffic dynamics (many connection setups and releases) the advantages of the token signalling protocol becomes apparent**
- **Main advantage of the multiple tokens: parallel handling of connection requests**



Simulation