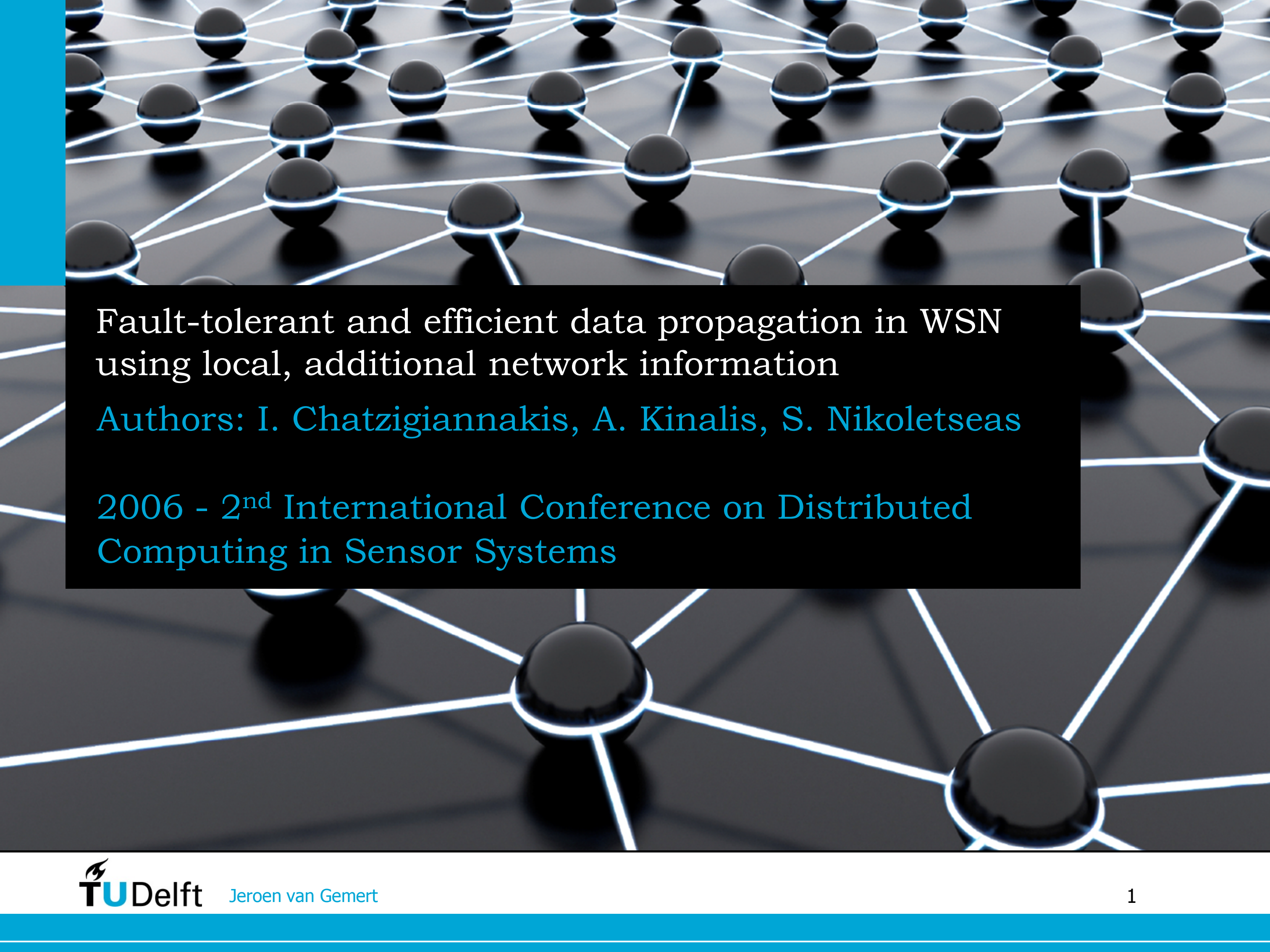




Fault-tolerant and efficient data propagation in WSN
using local, additional network information

Authors: I. Chatzigiannakis, A. Kinalis, S. Nikoletseas

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Computing in Sensor Systems

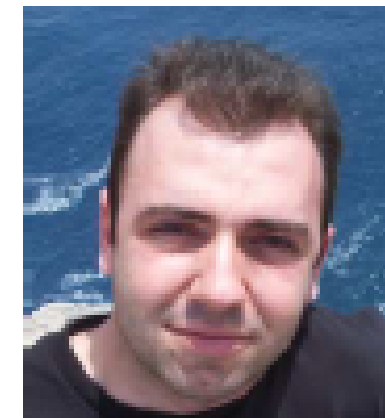


Contents

- CKN
 - Variable transmission range
- Evaluation
 - Comparison with DD
- Pros and cons
 - Fault-tolerant, but...
- Conclusion
 - Final verdict



I. Chatzigiannakis



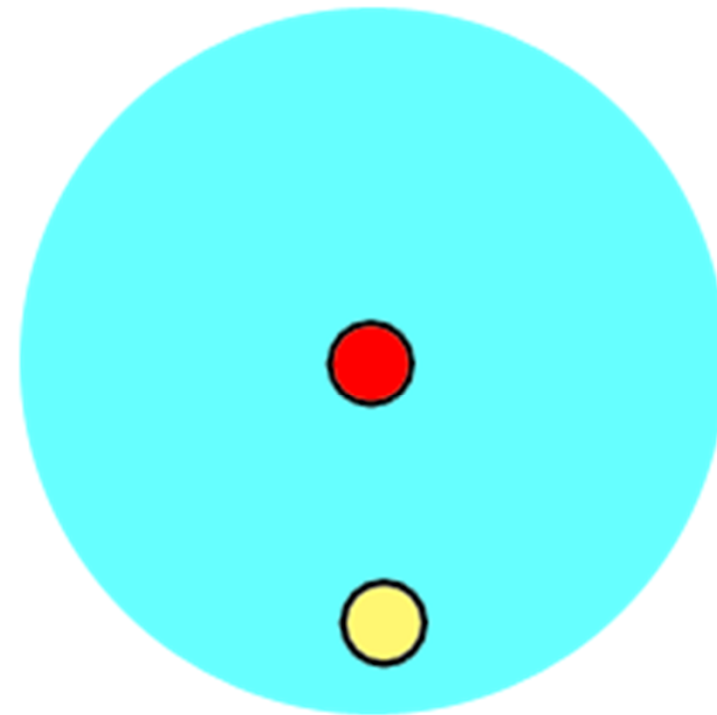
A. Kinalis



S. Nikoletseas

CKN – basic idea

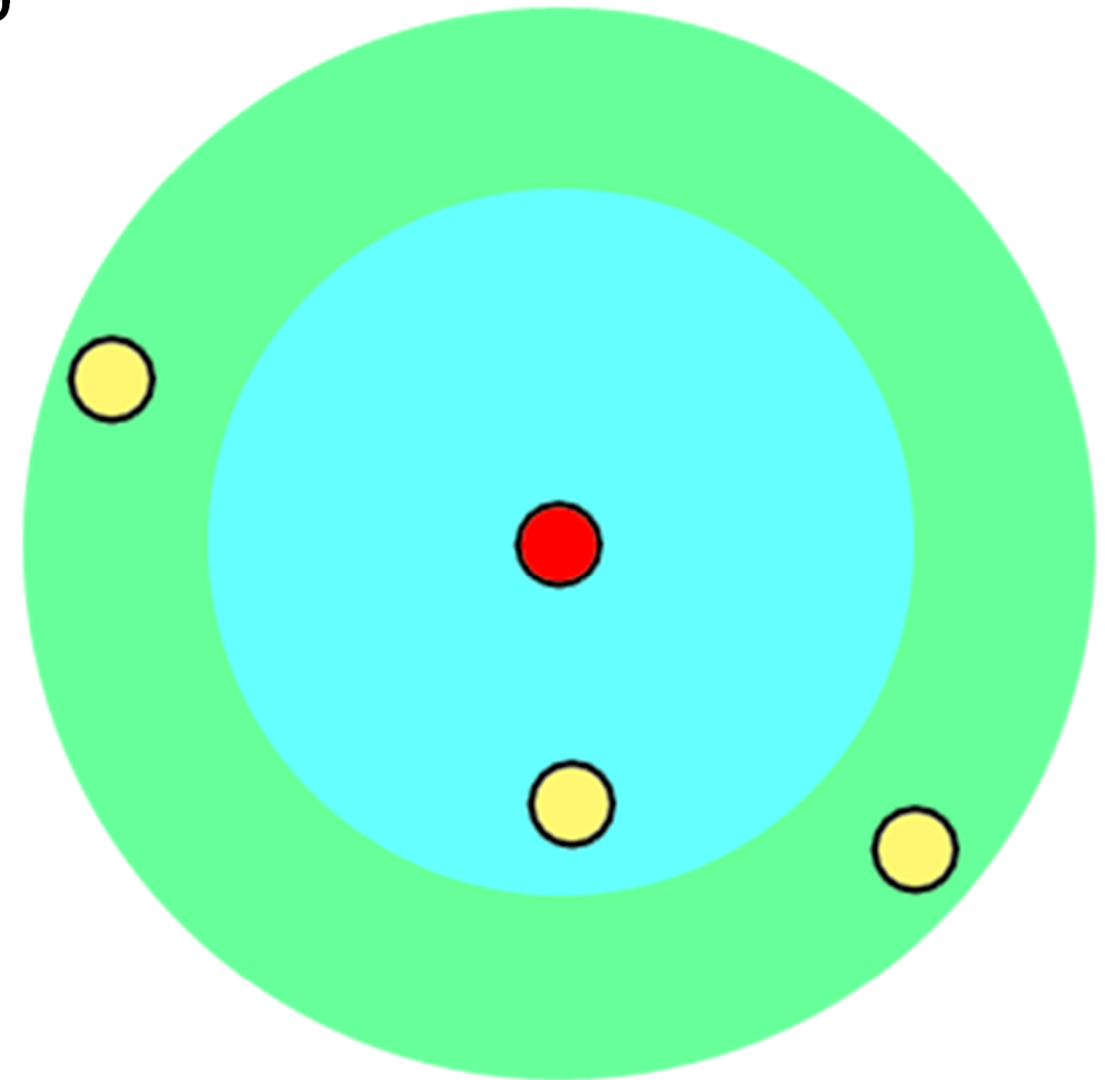
- Event driven, no end-end paths maintained
- Local information used by varying transmission range
- Nodes decide individually whether to participate



S

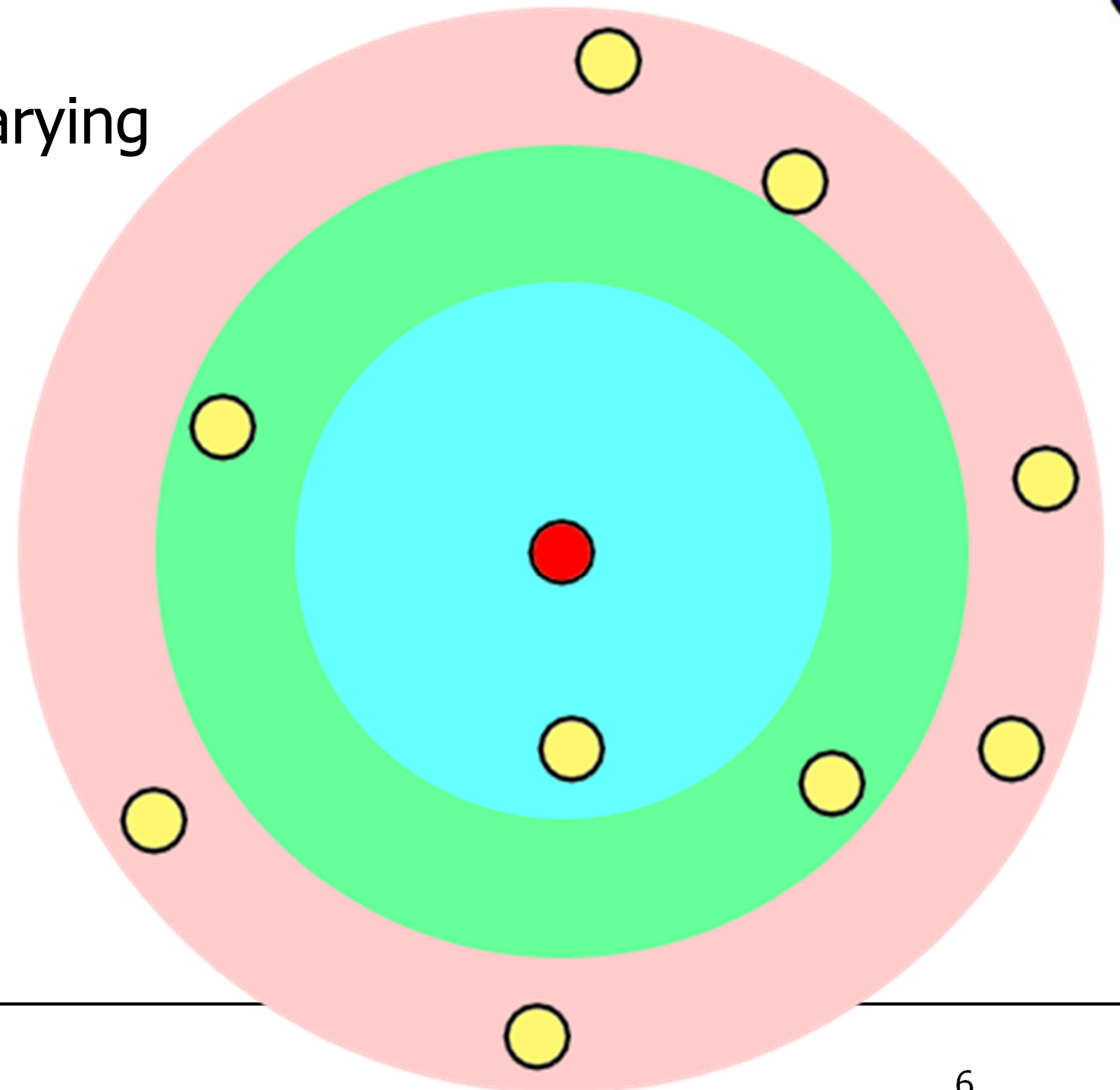
CKN – basic idea

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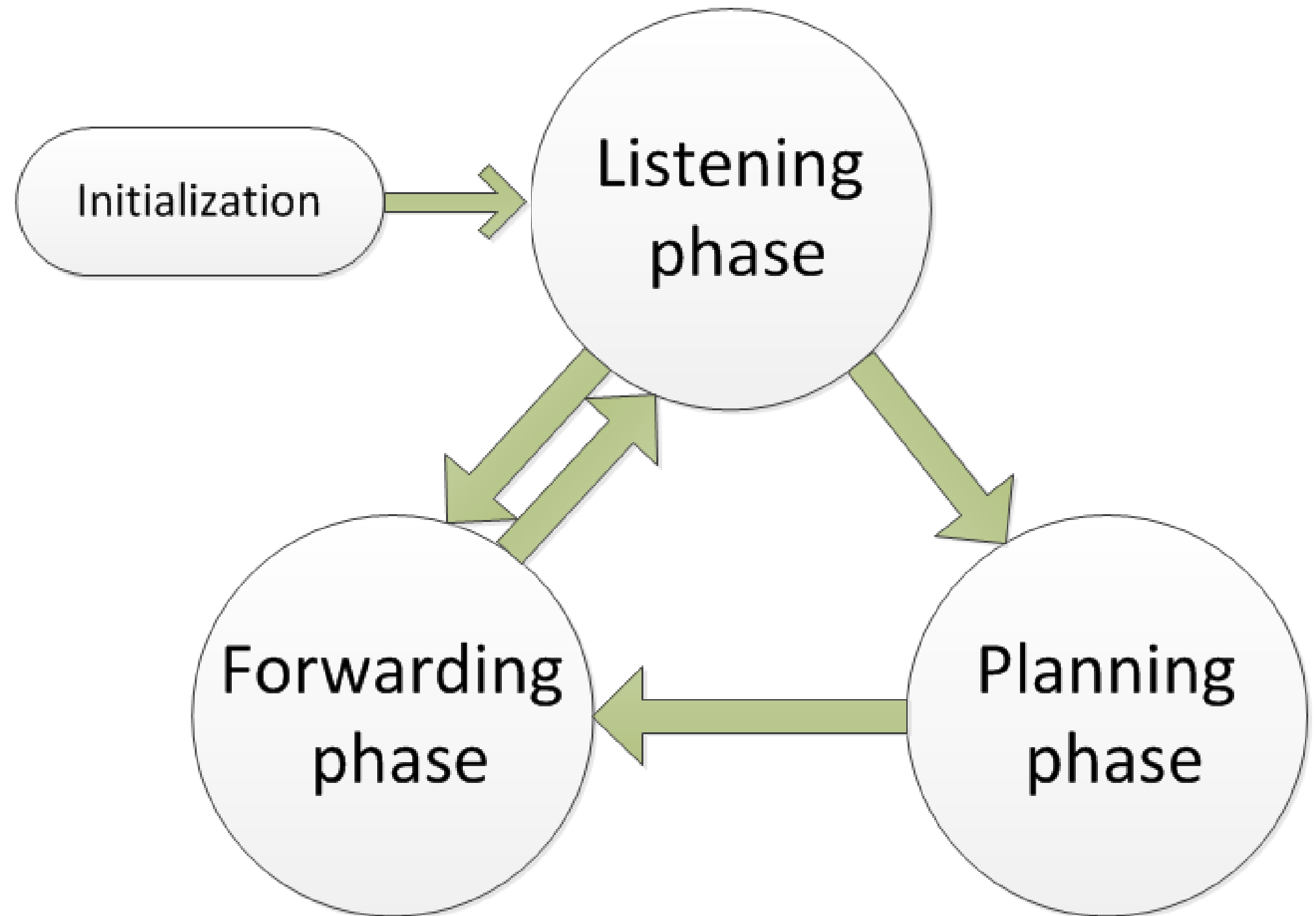
CKN – basic idea

- Event driven, no end-end paths maintained
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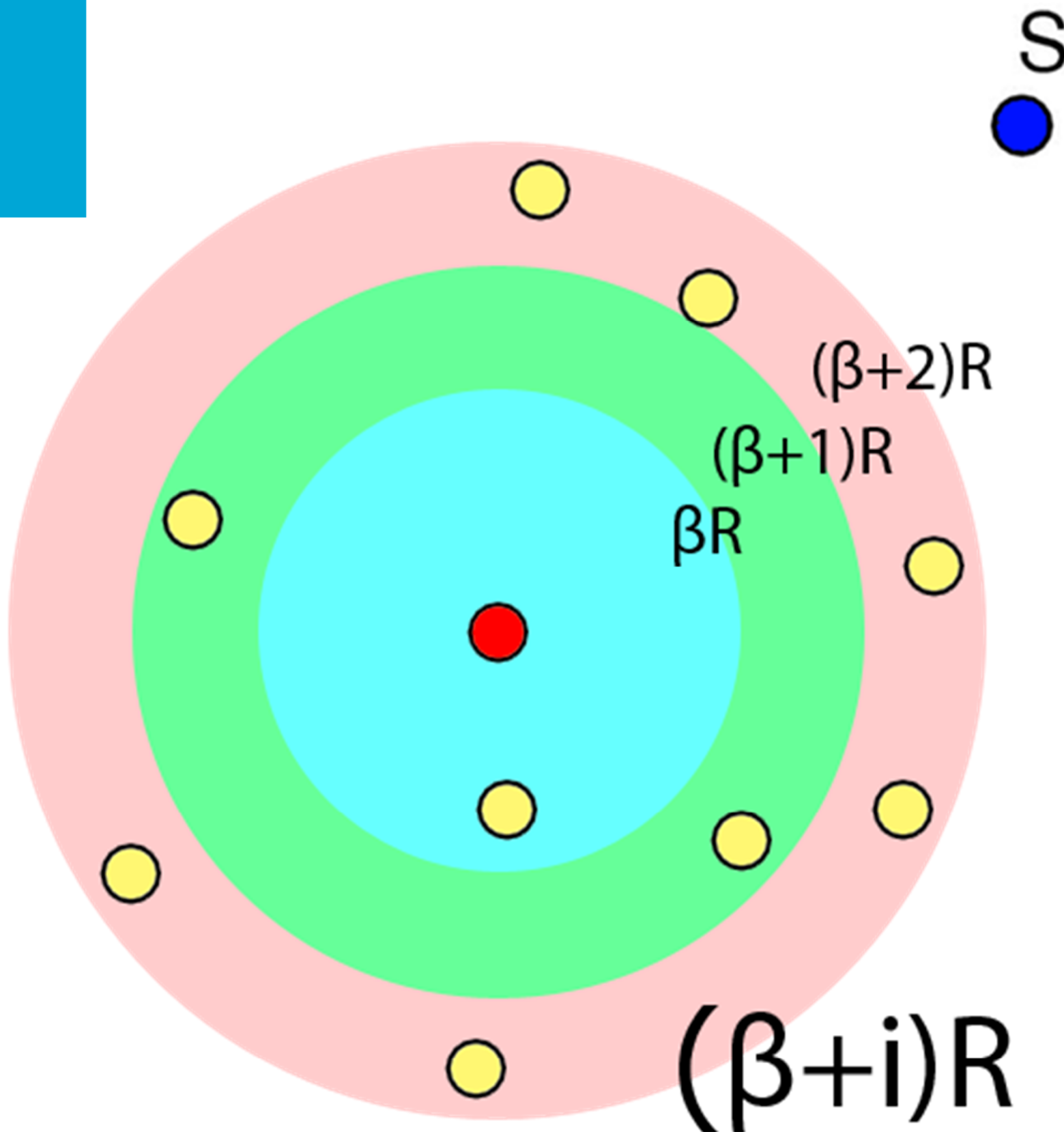


CKN – protocol

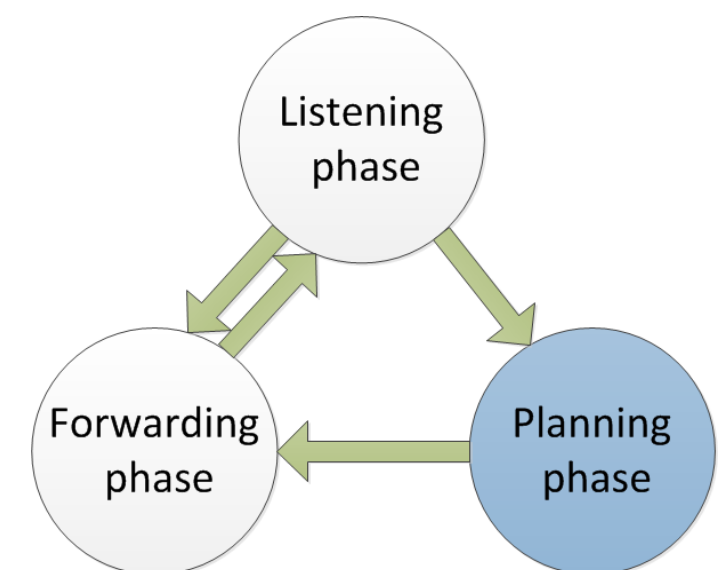
- Initialization
- Phases



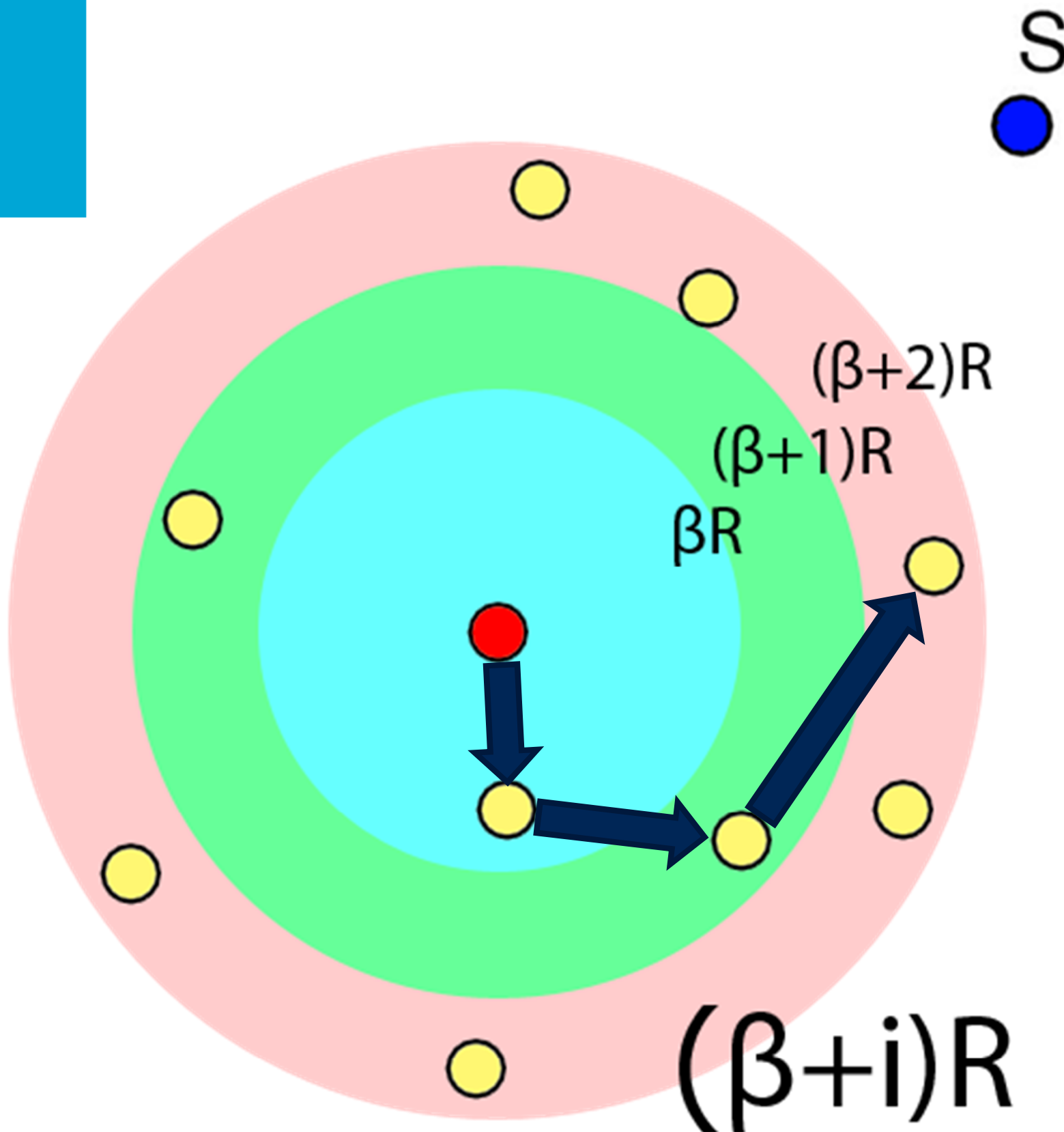
CKN – protocol



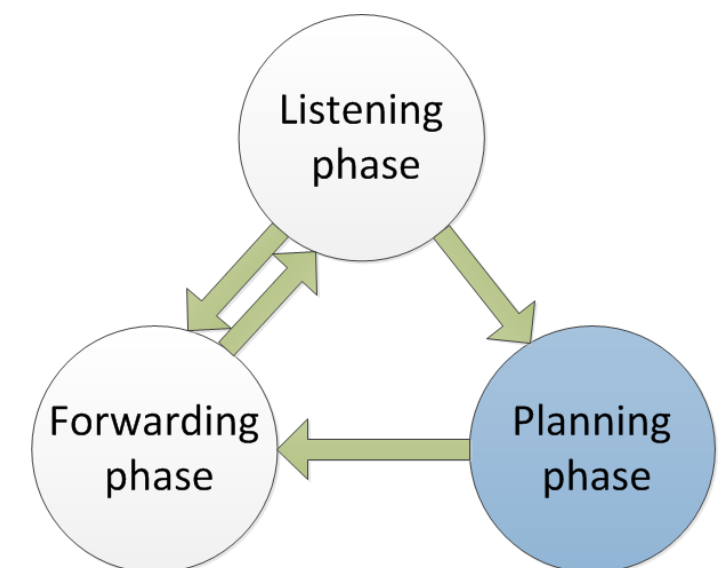
- Announcements for information
- Increase range if not sufficient
- Plan route based on information



CKN – protocol



- Announcements for information
- Increase range if not sufficient
- Plan route based on information

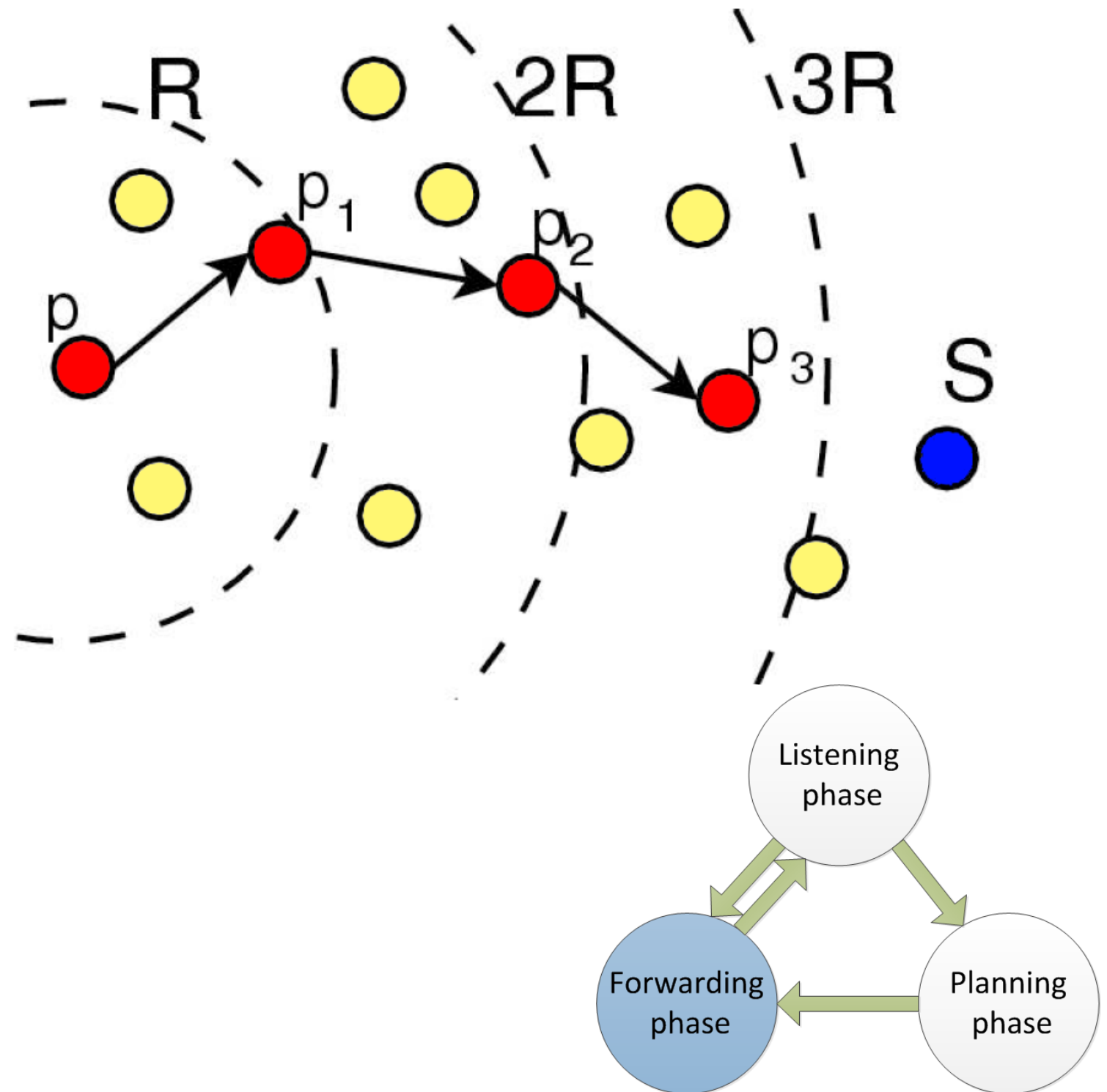


CKN – protocol

M = message

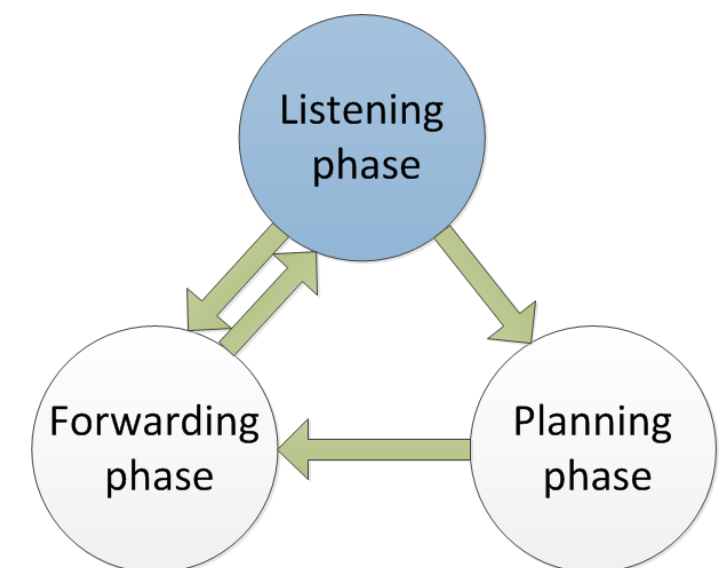
P = path

- Transmit $\{M, P\}$
 $P = \{p_1, p_2, p_3\}$
- Receive $\{M, P\}$
 - send ACK
 - forward $\{M, P'\}$
 $P' = \{p_2, p_3\}$



CKN – protocol

- Announcements/responds other nodes
 - store useful paths if closer to *Sink*
 - decision participation
- Decide whether to participate, based on
 - Energy level
 - Density surrounding nodes
 - High/low priority task



Evaluation

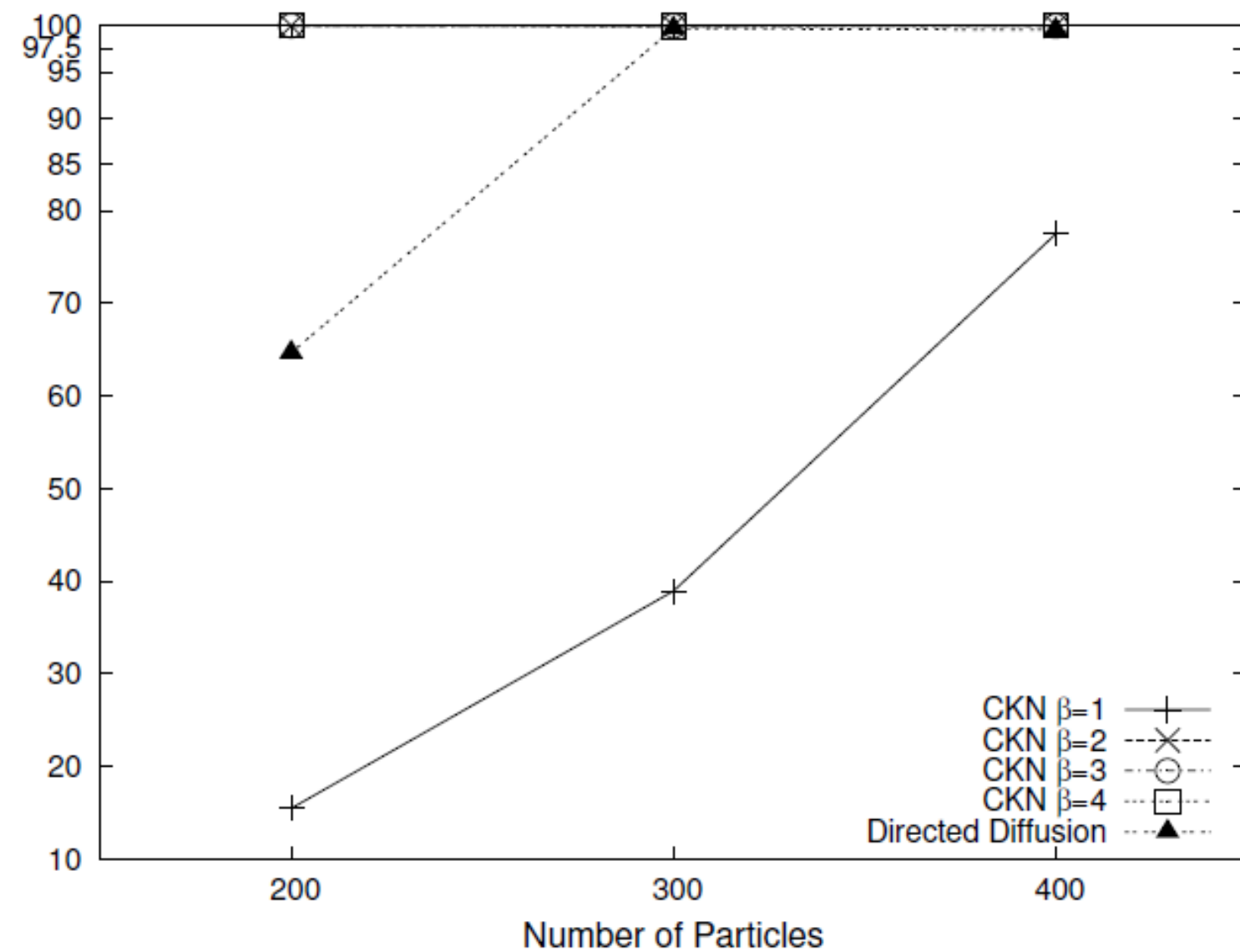
- Tested as function of density & failure for:
 - success rate
 - energy consumption
 - delay
- Comparison CKN and DD

Parameter	
Network area	500m x 500m
Sink position	Lower left corner
Events/sec	2
Range node	50m

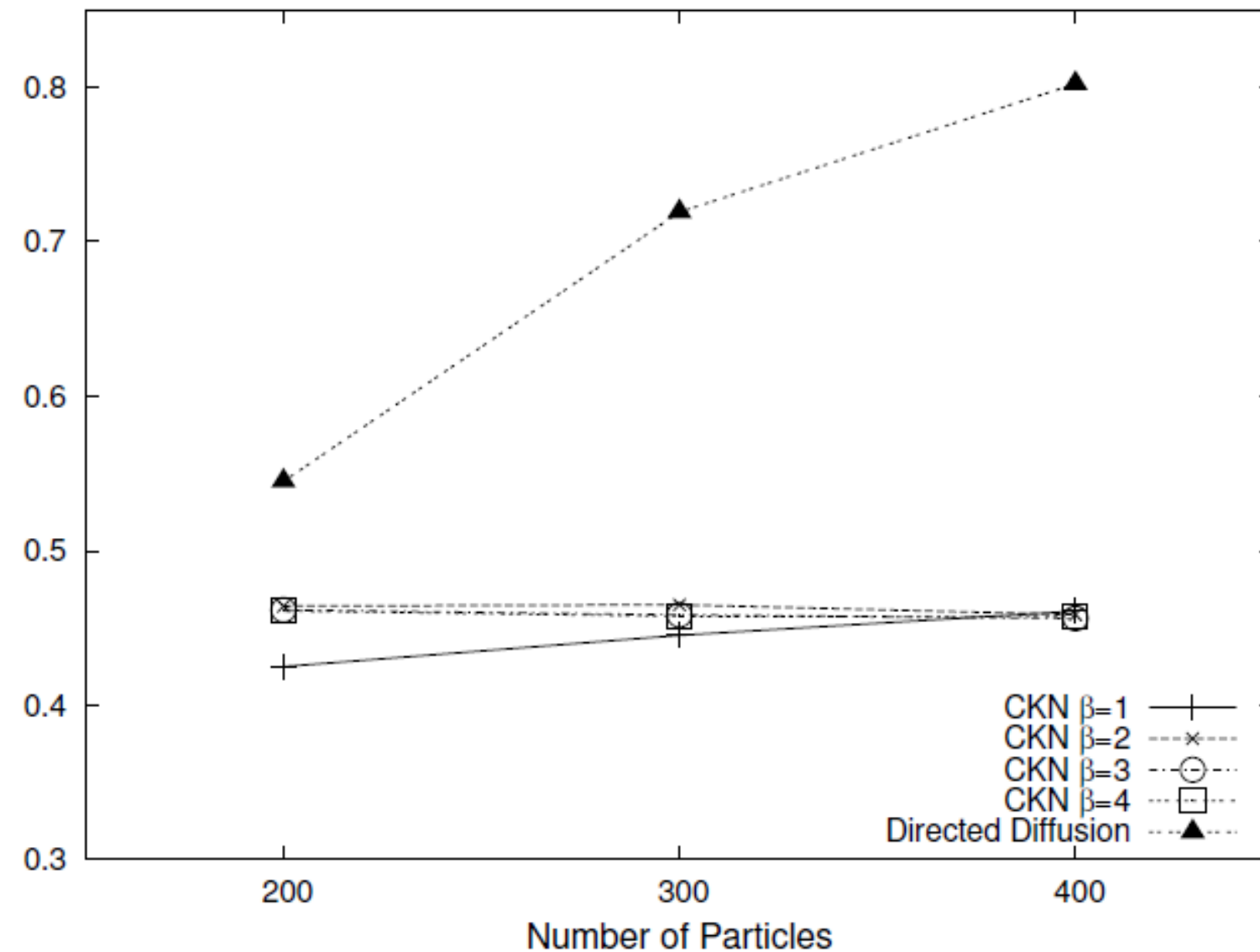
Evaluation – success rate & energy

function of: density failure

Success rate (%)



Energy consumption(J)

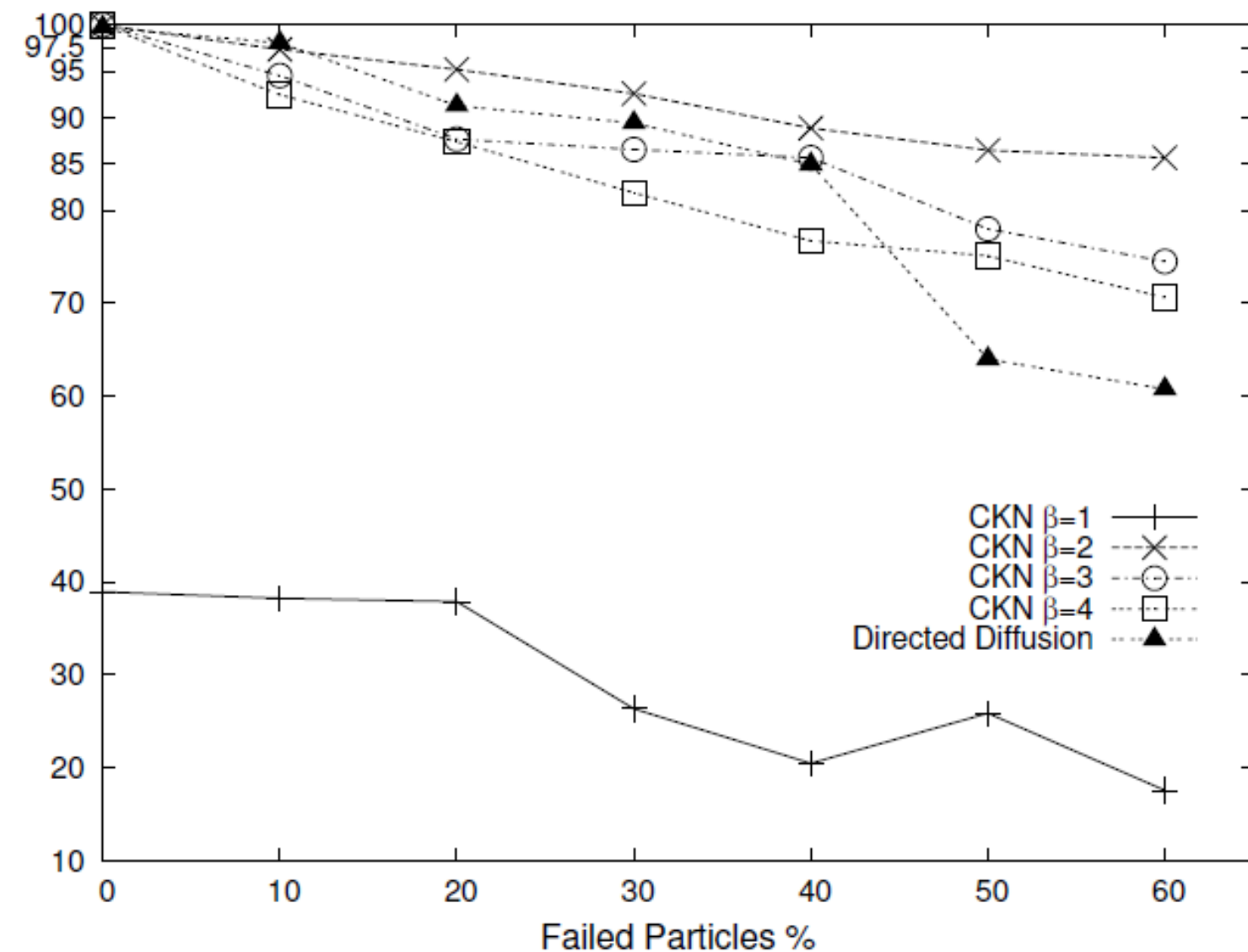


High β == higher success rate

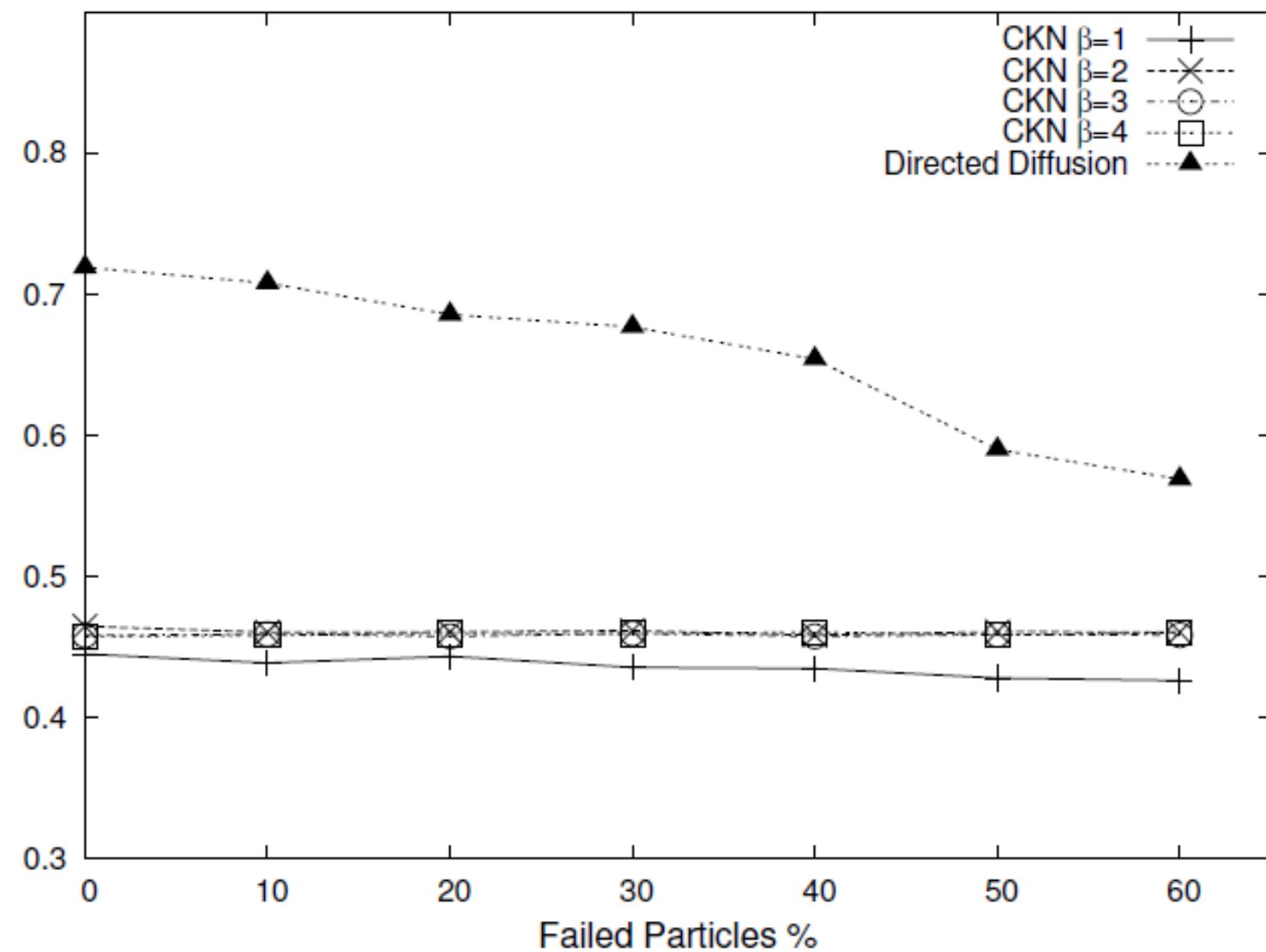
Evaluation – success rate & energy

function of: density failure

Success rate (%)



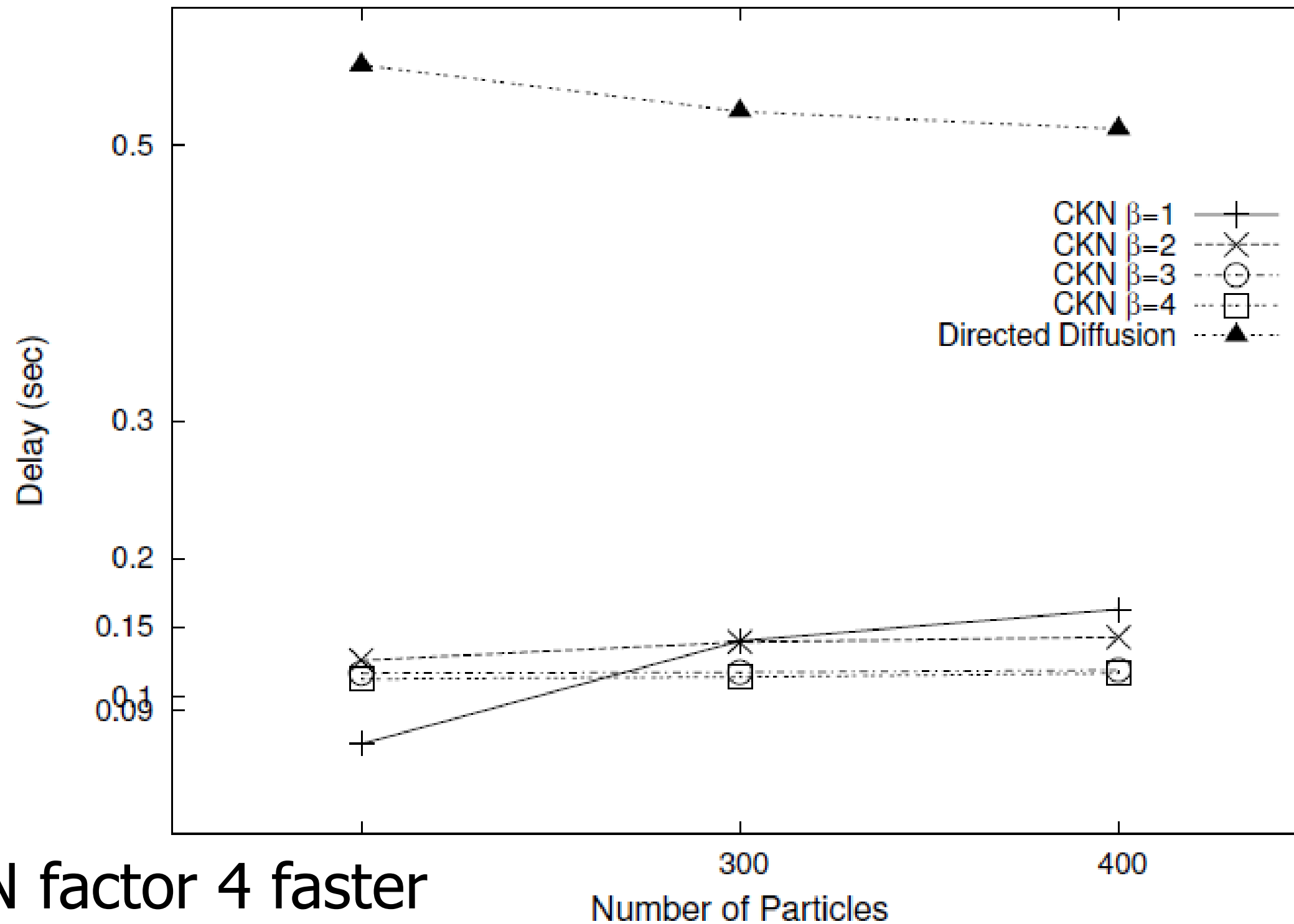
Energy consumption(J)



Too high β != higher success rate

Evaluation – delay

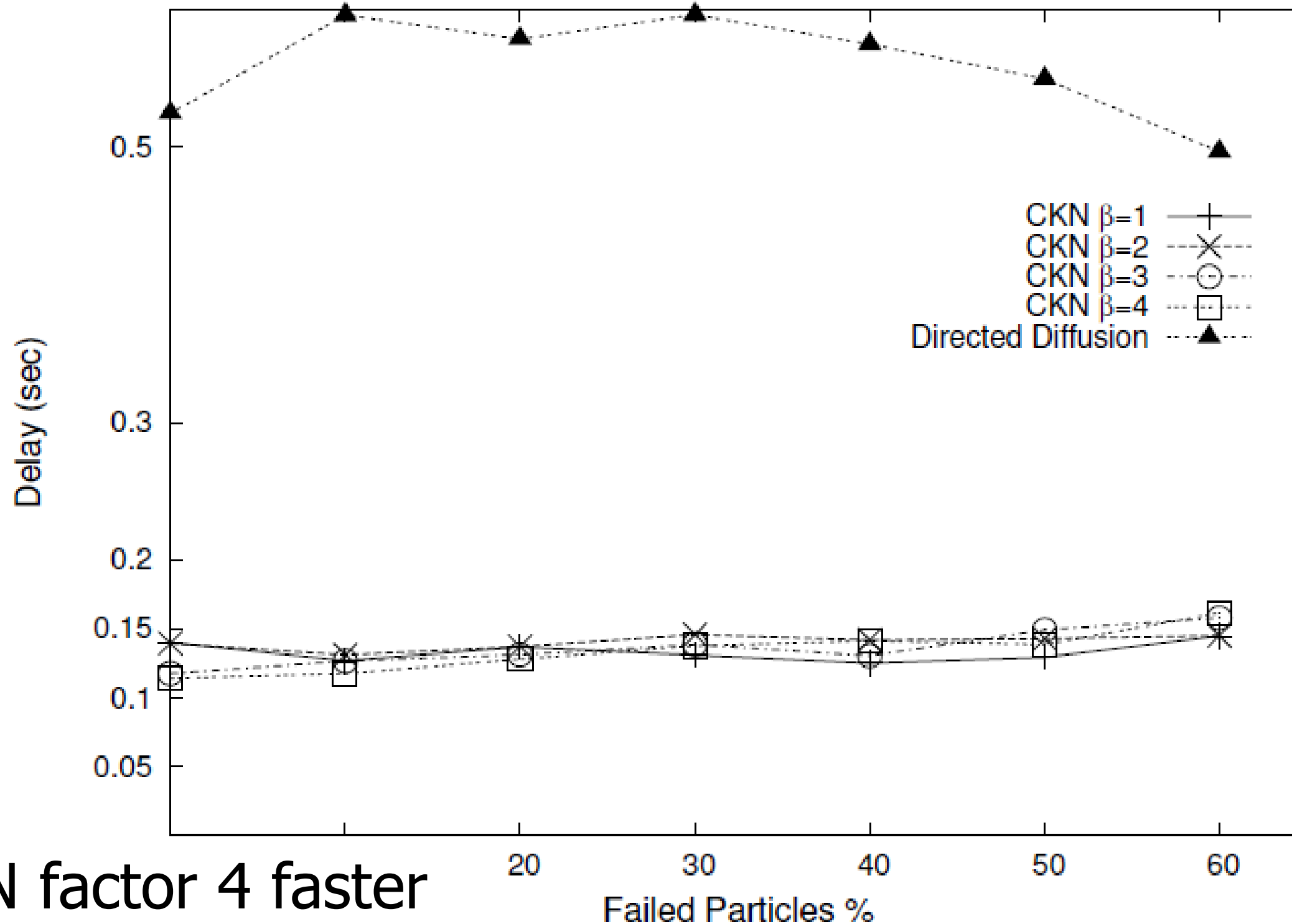
function of: density failure



CKN factor 4 faster

Evaluation – delay

function of: density failure



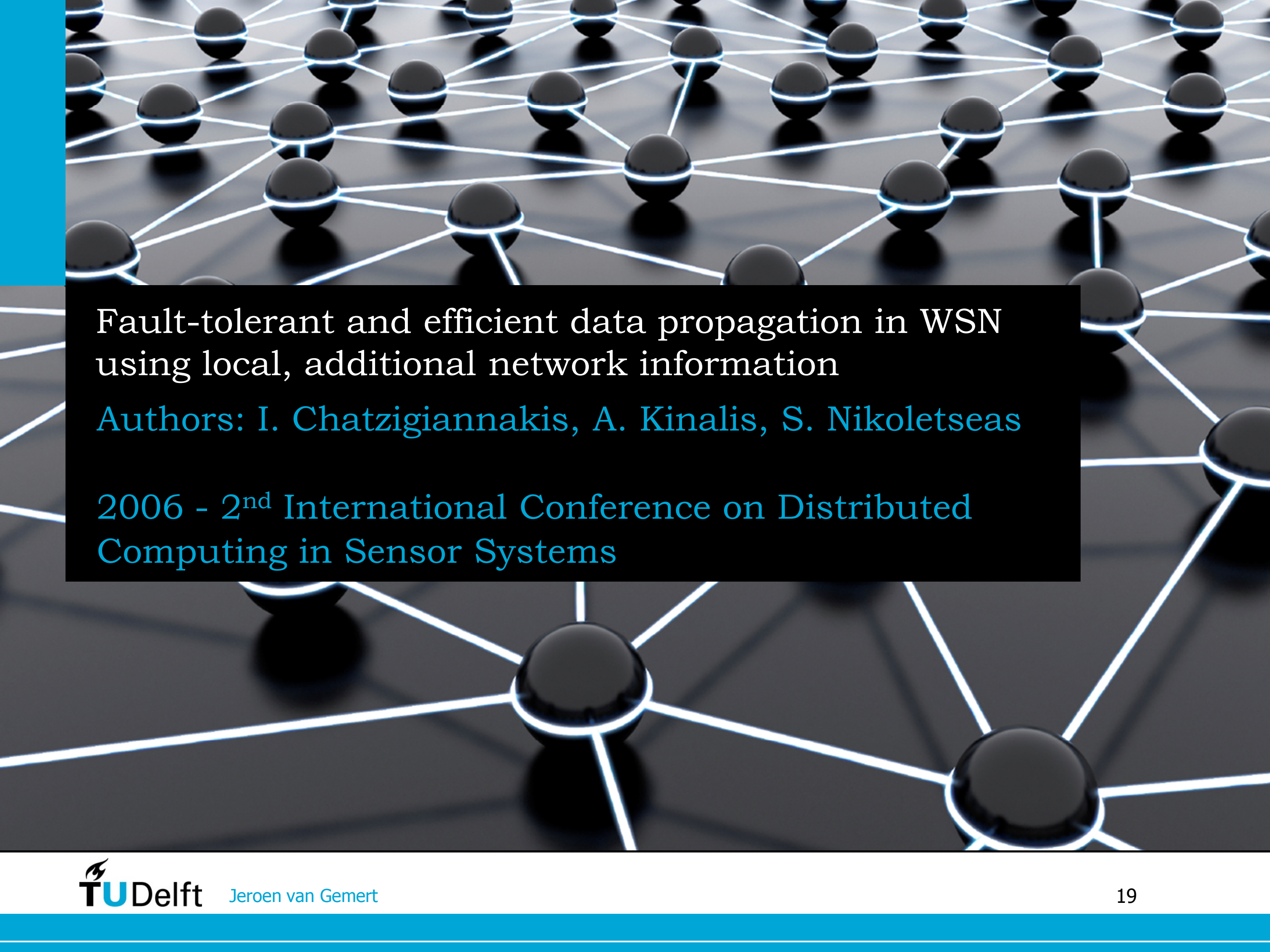
CKN factor 4 faster

Pros and cons

Advantages	Disadvantages
Local information usage	Overhead path in messages
Fault tolerant, increase transmission range to optimize path	Information obtained when events occur, optimization takes some time
Event driven, no paths have to be maintained	No energy fairness
	Lot of announcements/responds

Conclusion

- Varying transmission range optimizes propagation
- No energy fairness, some nodes die sooner
- Nodes decide individually whether to participate
- Event driven, depends on application



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