

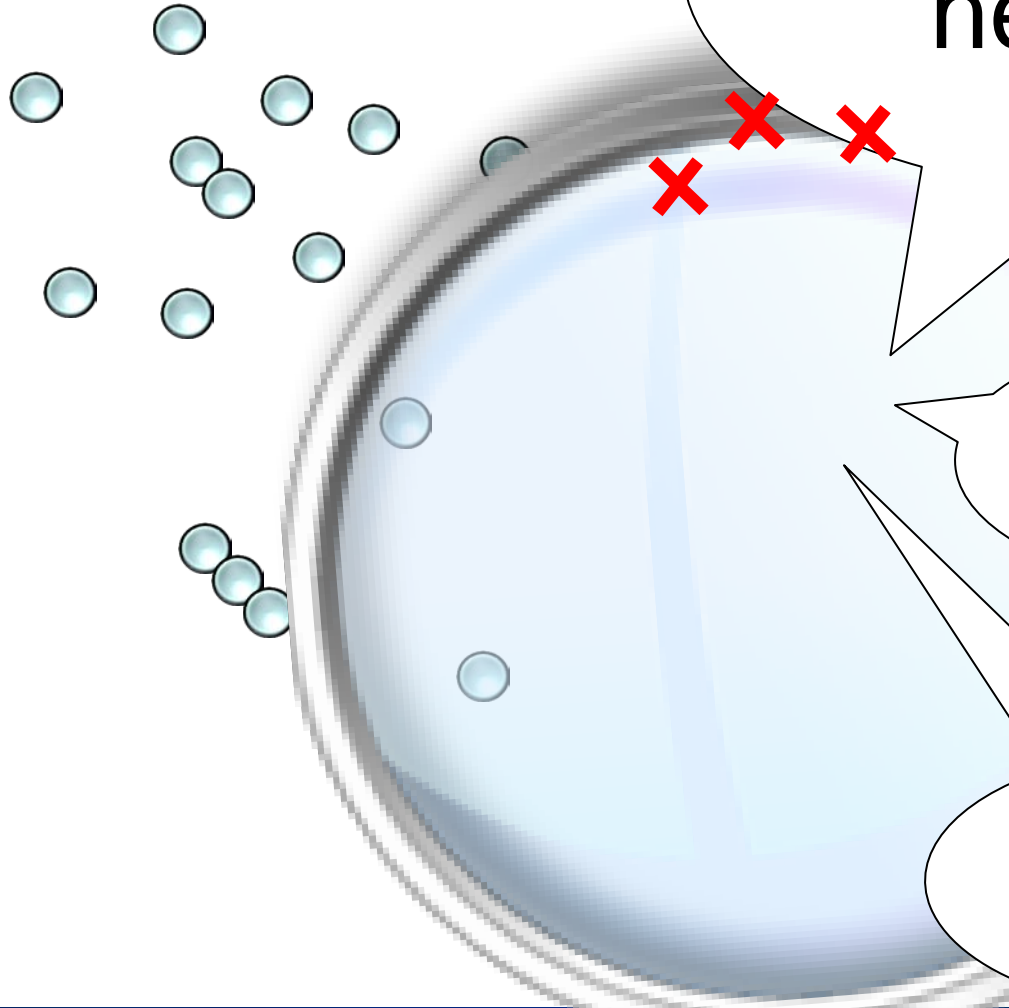
# *Self-Monitoring in Dynamic Wireless Networks*



*Stephan Holzer  
Yvonne Anne Pignolet  
Jasmin Smula  
Roger Wattenhofer*

# Self-Monitoring in Dynamic Wireless Networks

Problem:



Who is in the network?

Update

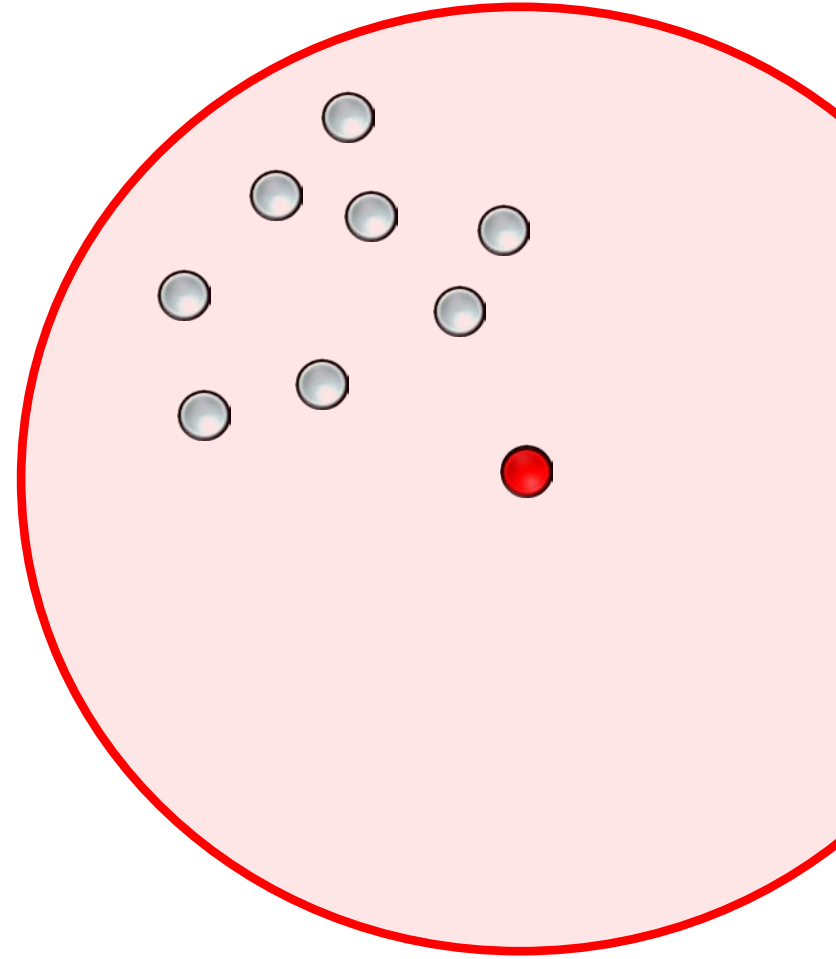
$O(1)$ ?



I can:

send / receive

hear each node



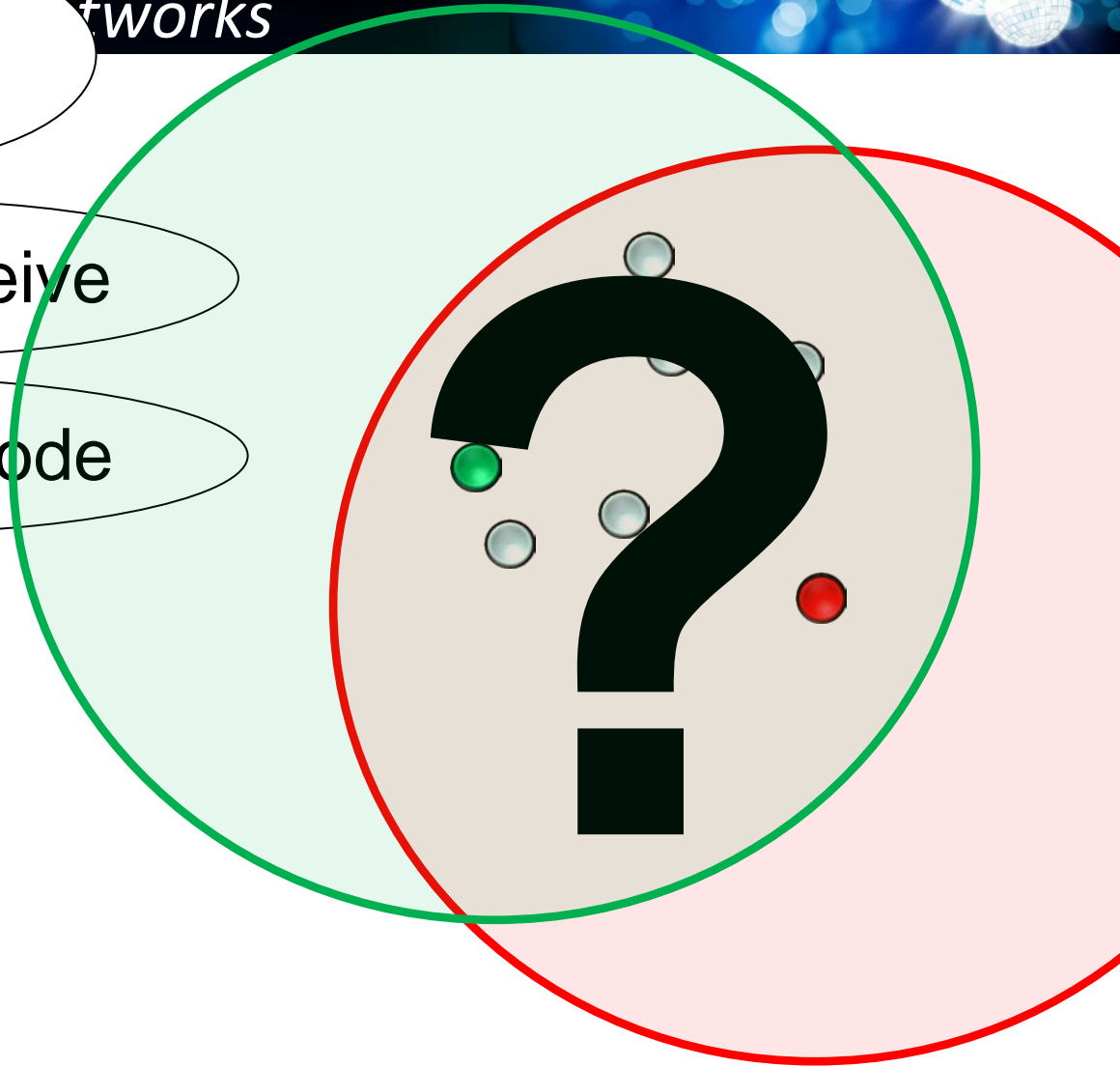
# Self-Monitoring in Dynamic Networks



I can:

send / receive

hear each node



# Self-Monitoring in Dynamic Networks

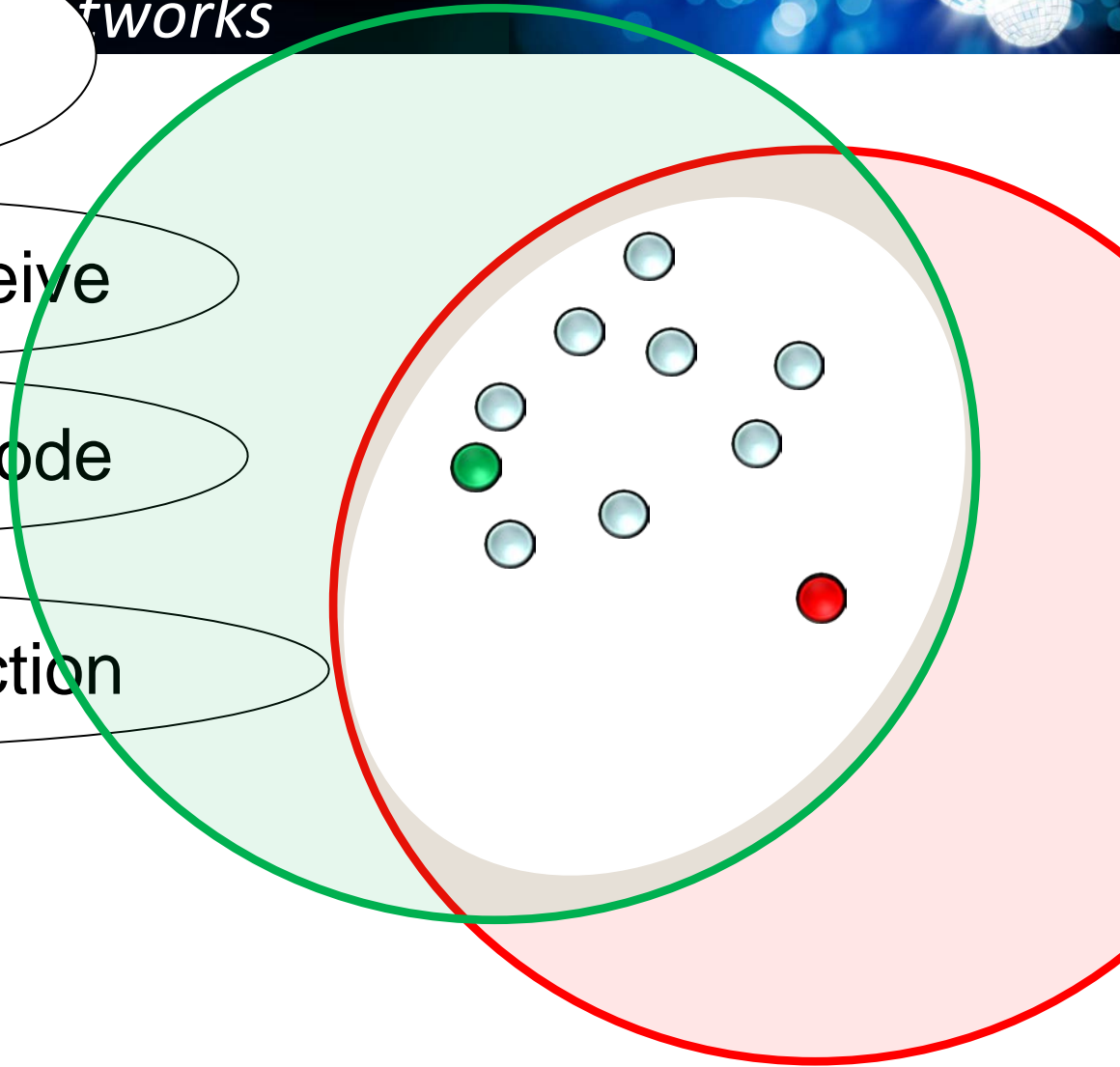


I can:

send / receive

hear each node

no collision detection





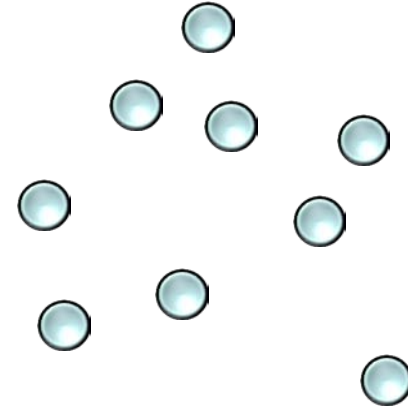
I can:

send / receive

hear each node

no collision detection

switch channels



101 Mhz

117 Mhz

132 Mhz

...



I can:

send / receive

hear each node

no collision detection

switch channels

**complexity**

computation: free

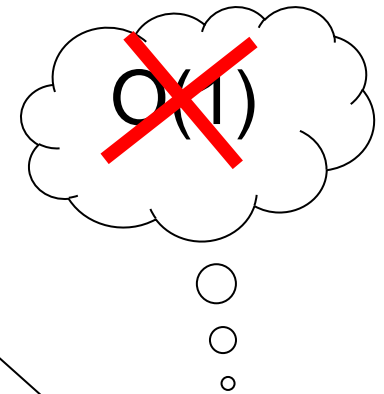
radio: time 1



# Self-Monitoring in Dynamic Wireless Networks



One ID per message



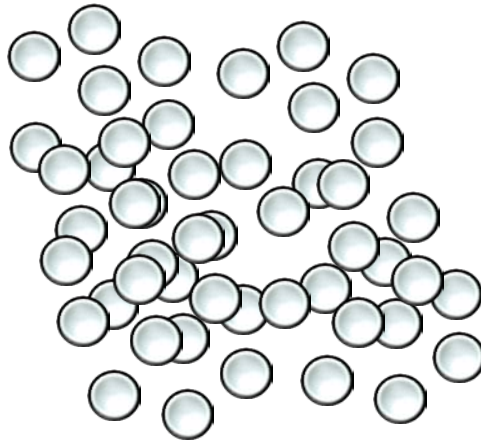
$$\Rightarrow \Omega \left( \begin{array}{c} \# \text{ crashes} \\ + \\ \# \text{ joins} \end{array} \right)$$



# Self-Monitoring in Dynamic Wireless Networks



What can I do?



# Self-Monitoring in Dynamic Wireless Networks



What can I do?

**collision!**

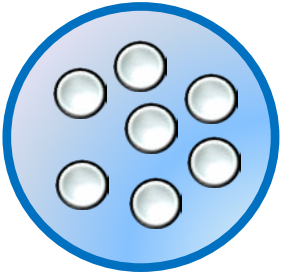
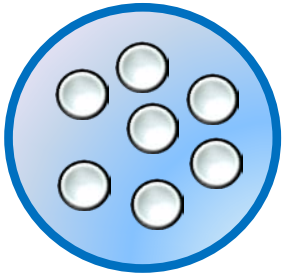
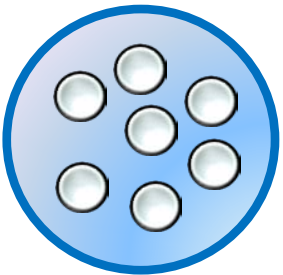
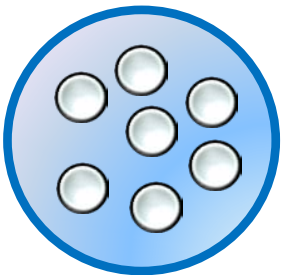
I am here



= ok



redundancy

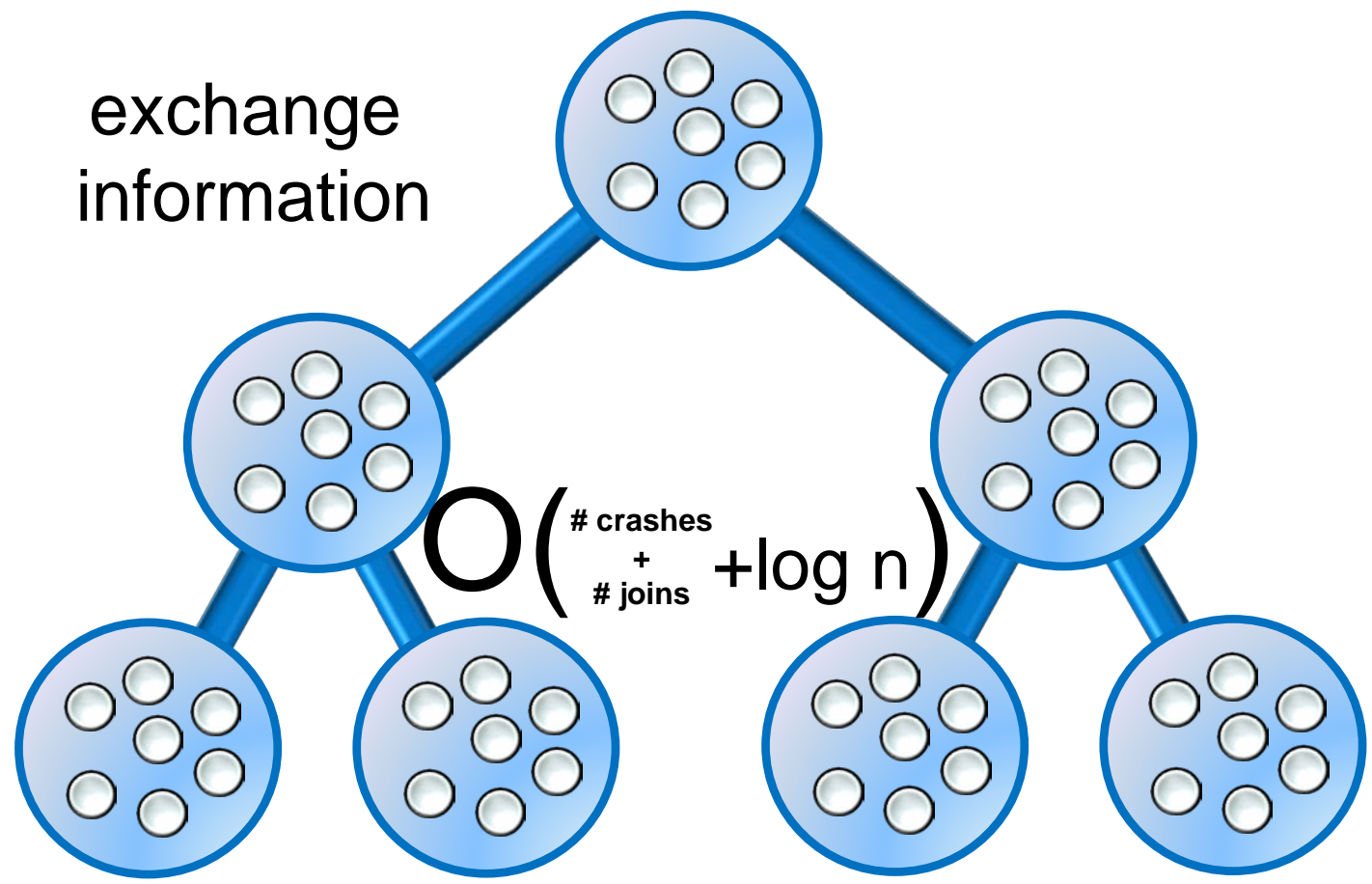


# Self-Monitoring in Dynamic Wireless Networks



What can I do?

exchange  
information

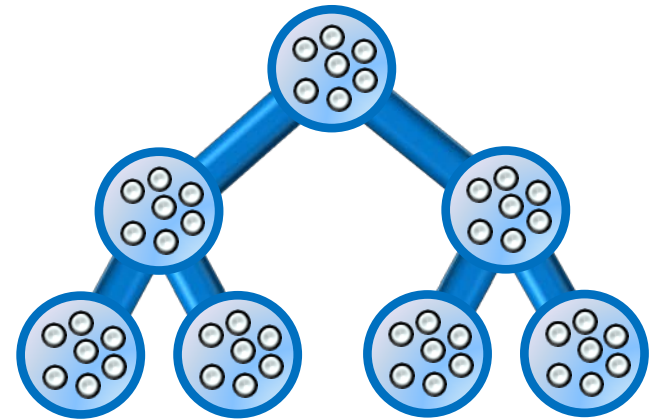
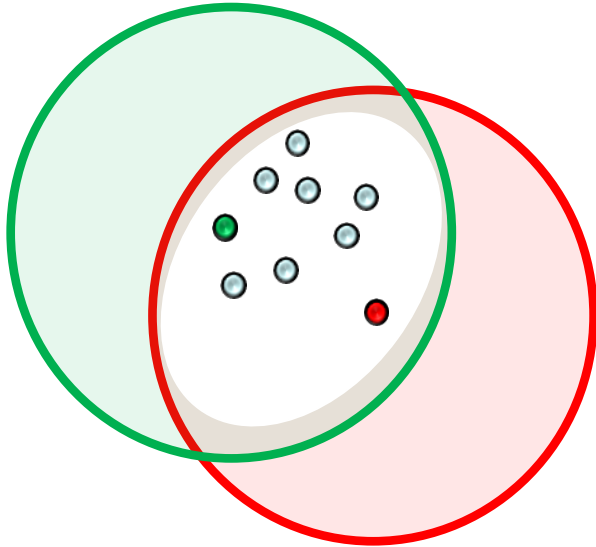


# Self-Monitoring in Dynamic Wireless Networks



in Summary ...

Update: who is in the network?  
dynamics ...



$$\Omega\left(\begin{array}{c} \# \text{ crashes} \\ + \\ \# \text{ joins} \end{array}\right)$$

$$O\left(\begin{array}{c} \# \text{ crashes} \\ + \\ \# \text{ joins} \end{array} + \log n\right)$$

Current work: **Optimal**  $O\left(\begin{array}{c} \# \text{ crashes} \\ + \\ \# \text{ joins} \end{array}\right)$  w.h.p.

# *Thank You!*

*Questions & Comments?*



***Stephan Holzer***

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