
# Autonomous network equipments

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Ginkgo-Networks

# Complexity

- **Networks keep moving towards ever increasing complexity New services added every week!**
  - New technologies added every month!
  - New architectures introduced every year!
  - Combining the old with the new (no replacement!)

# Complexity

- Where are "ever increasingly complex" networks heading?
  - Something needs to be done ...
  - Open systems people need to do something ...

- Solution: introduce an autonomic behavior to provide an automatic configuration.

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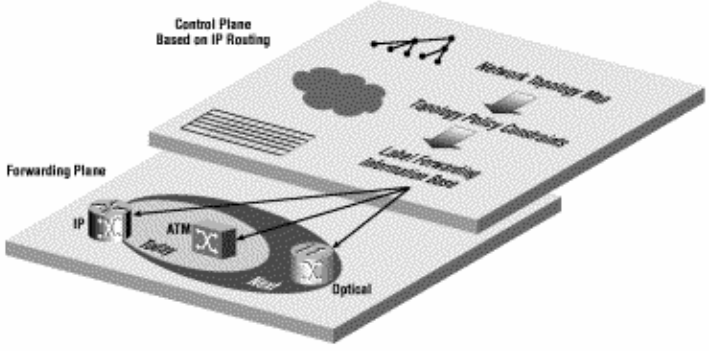
# Ginkgo Value Proposition

- Pick and deploy in real time the most efficient networking control techniques, based on different features (traffic, alarm, etc.), as they are observed by collaborative, intelligent, distributed multi-agent technology.




- Area of applicability: Network Control Plane
  - QoS control
  - Alarm
  - Wireless Internet network
  - Device power management
  - STP/SP architecture

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# The knowledge plane

- We need a knowledge plane
  - A global view of the network
- An intelligence is needed to pilot the network
  - Attempt to understand the behaviour of the network
  - Access to various data and knowledge components

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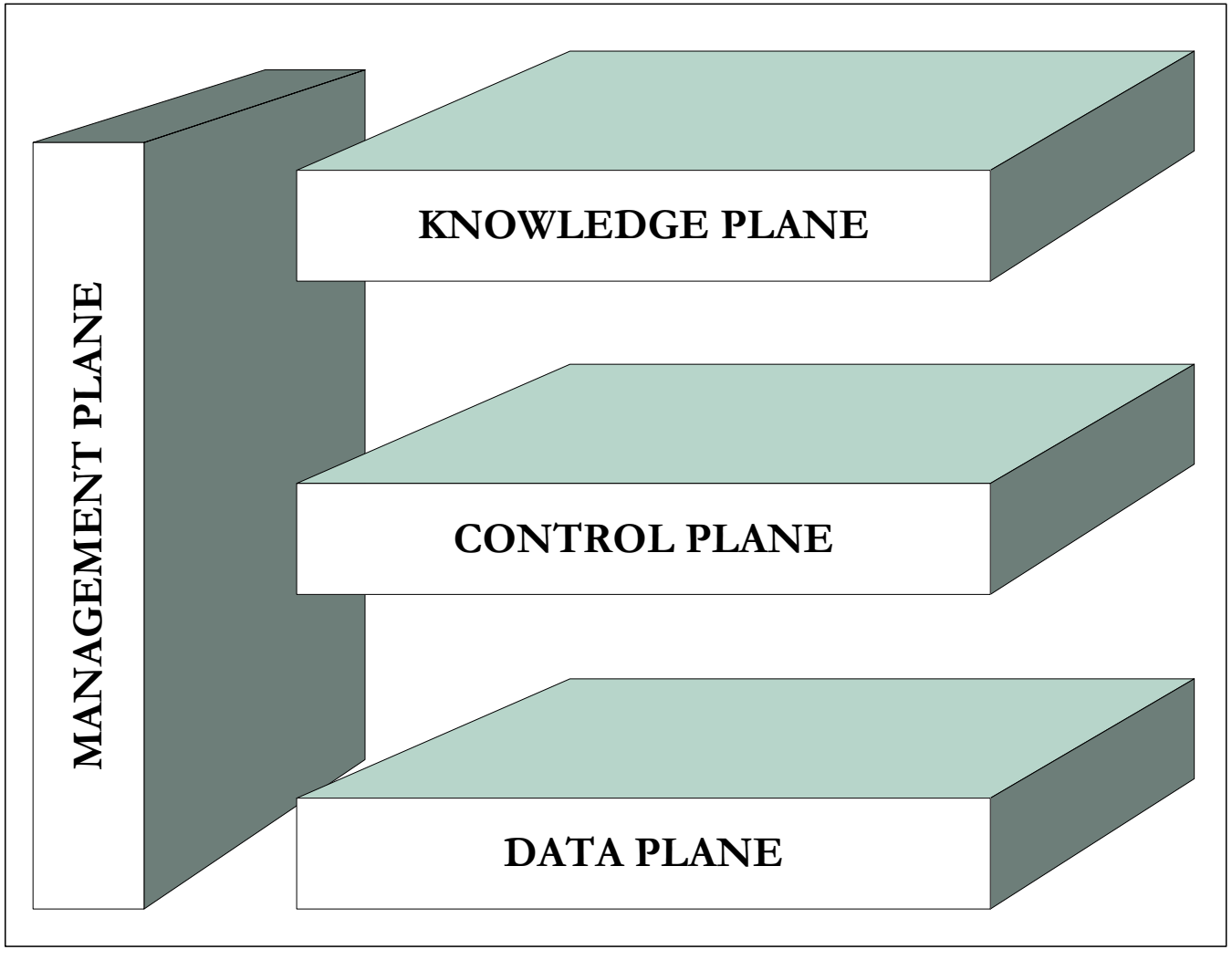
# Four planes



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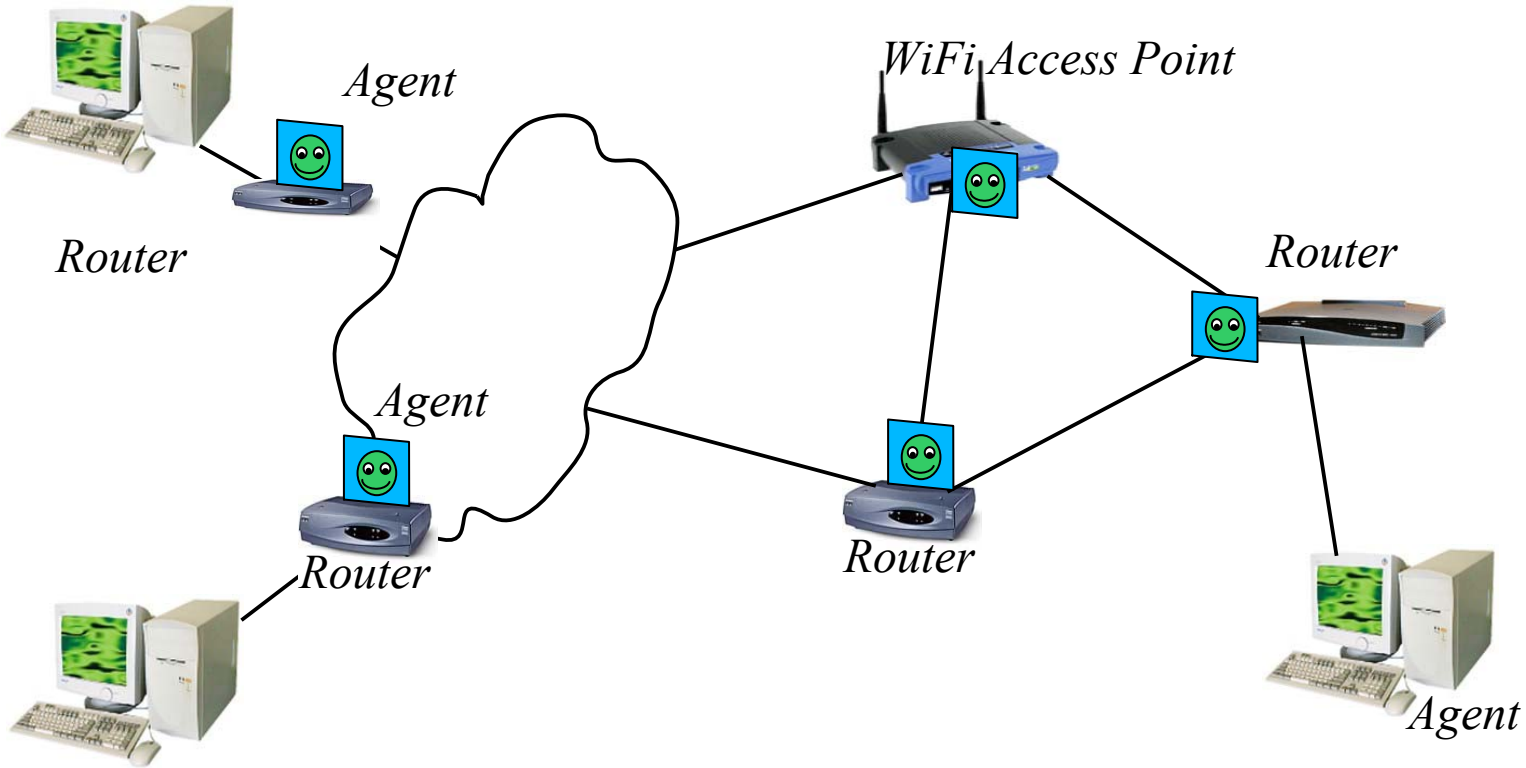
# The agents



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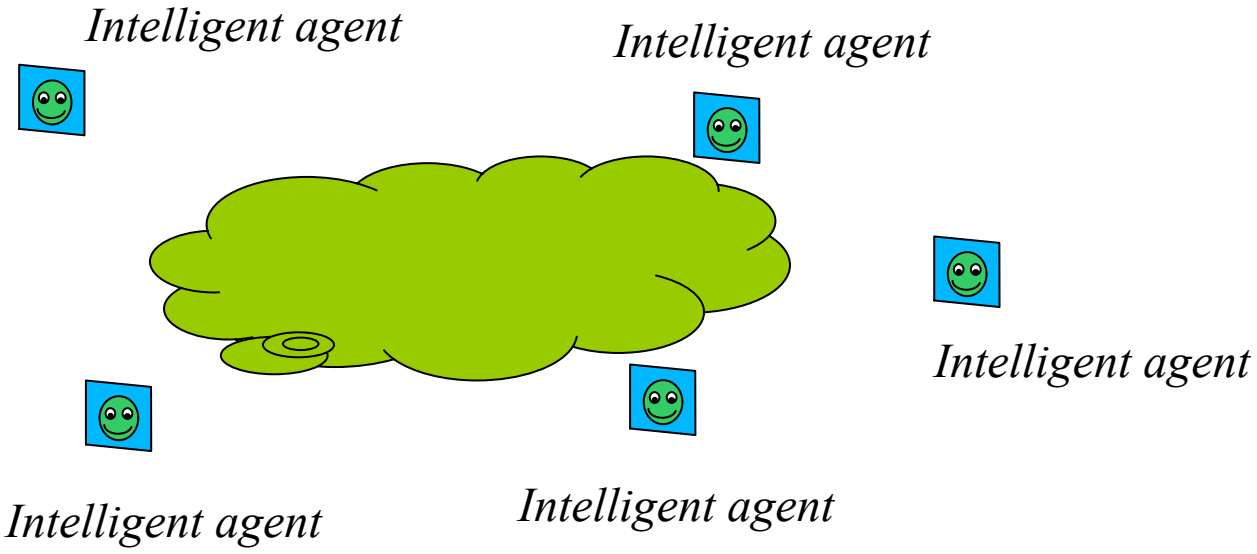
# The multi-agent system



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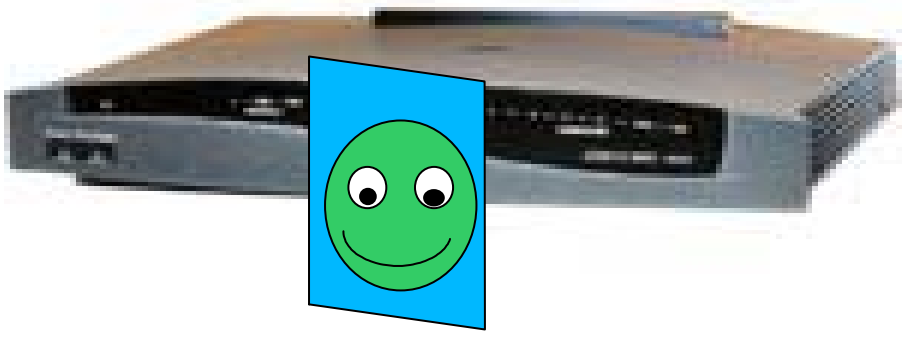
# The agent

*Network equipment*



*Agent*

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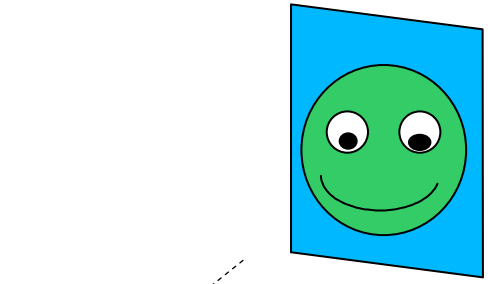
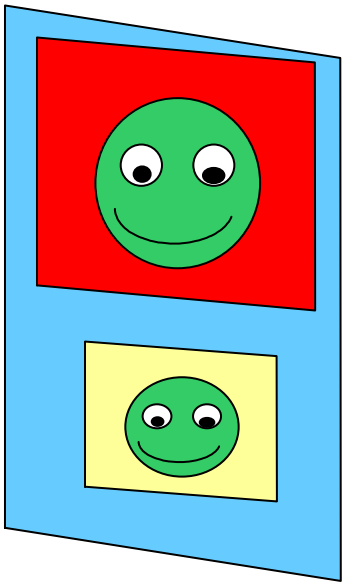
# The Ginkgo agent



Agent



Agent

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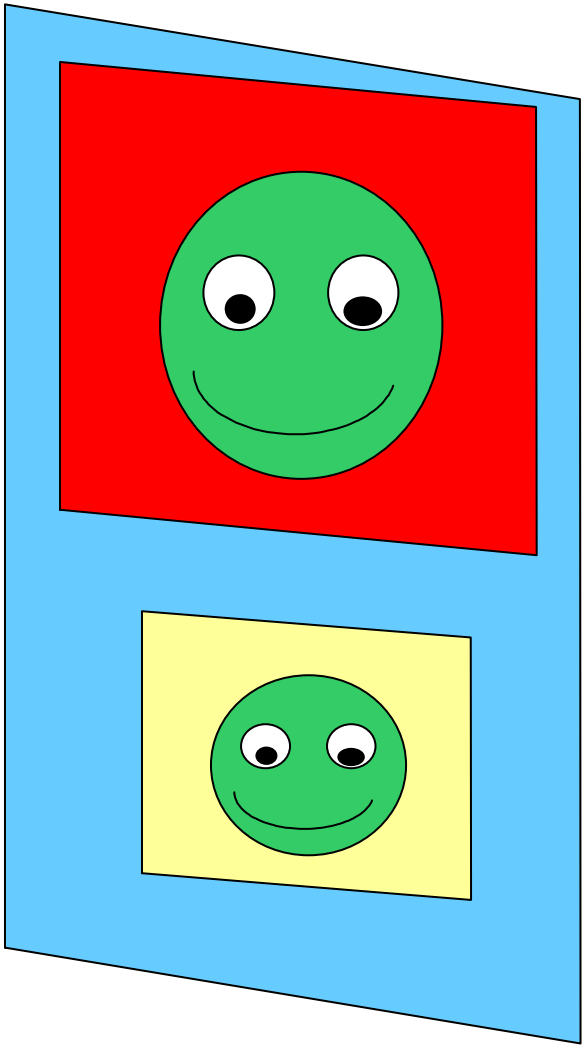
# L'agent Ginkgo

Deliberative part

Reactive part



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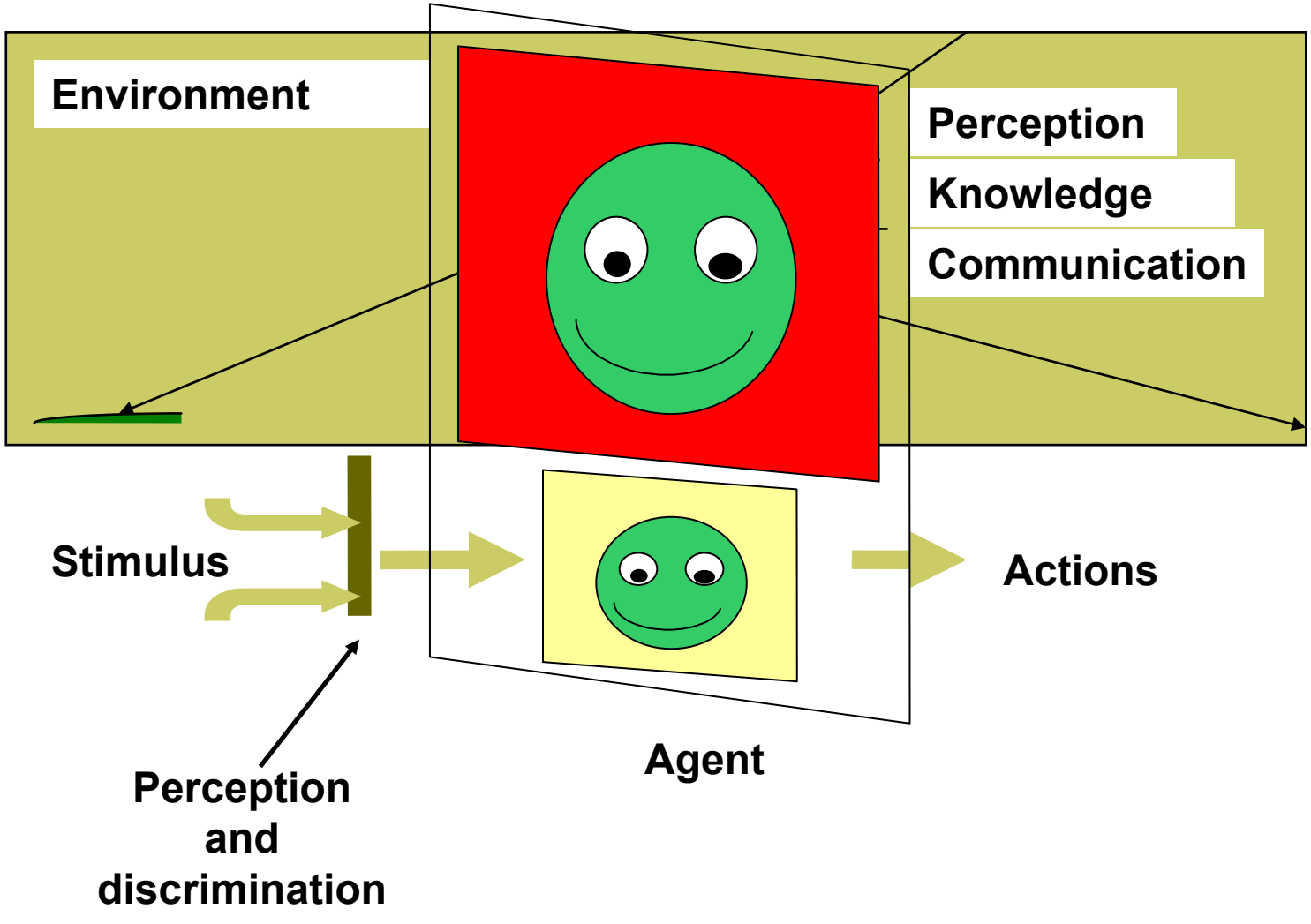
# Agent: cognitive approach and reactive approach



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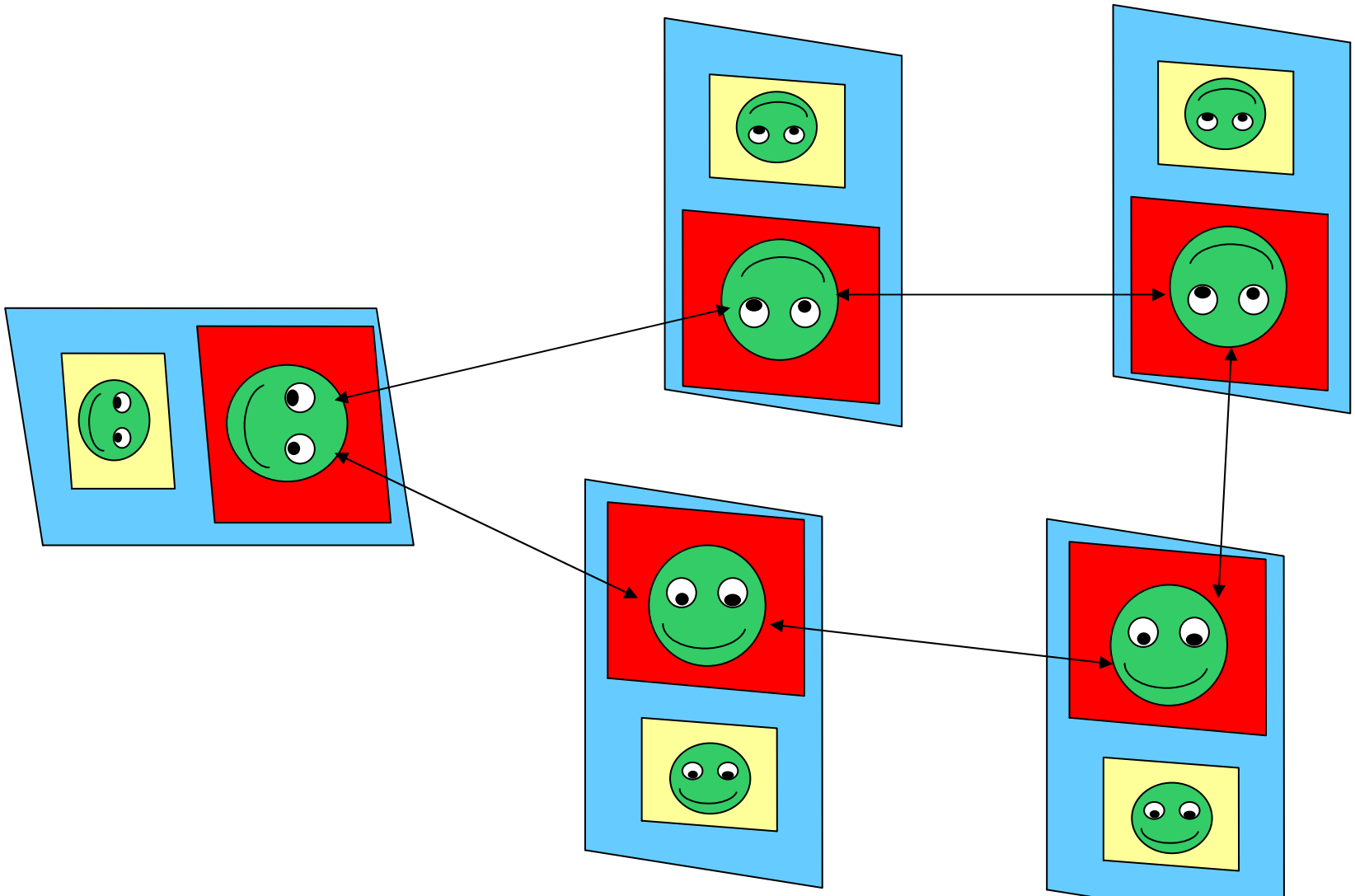
# Multi-agent system



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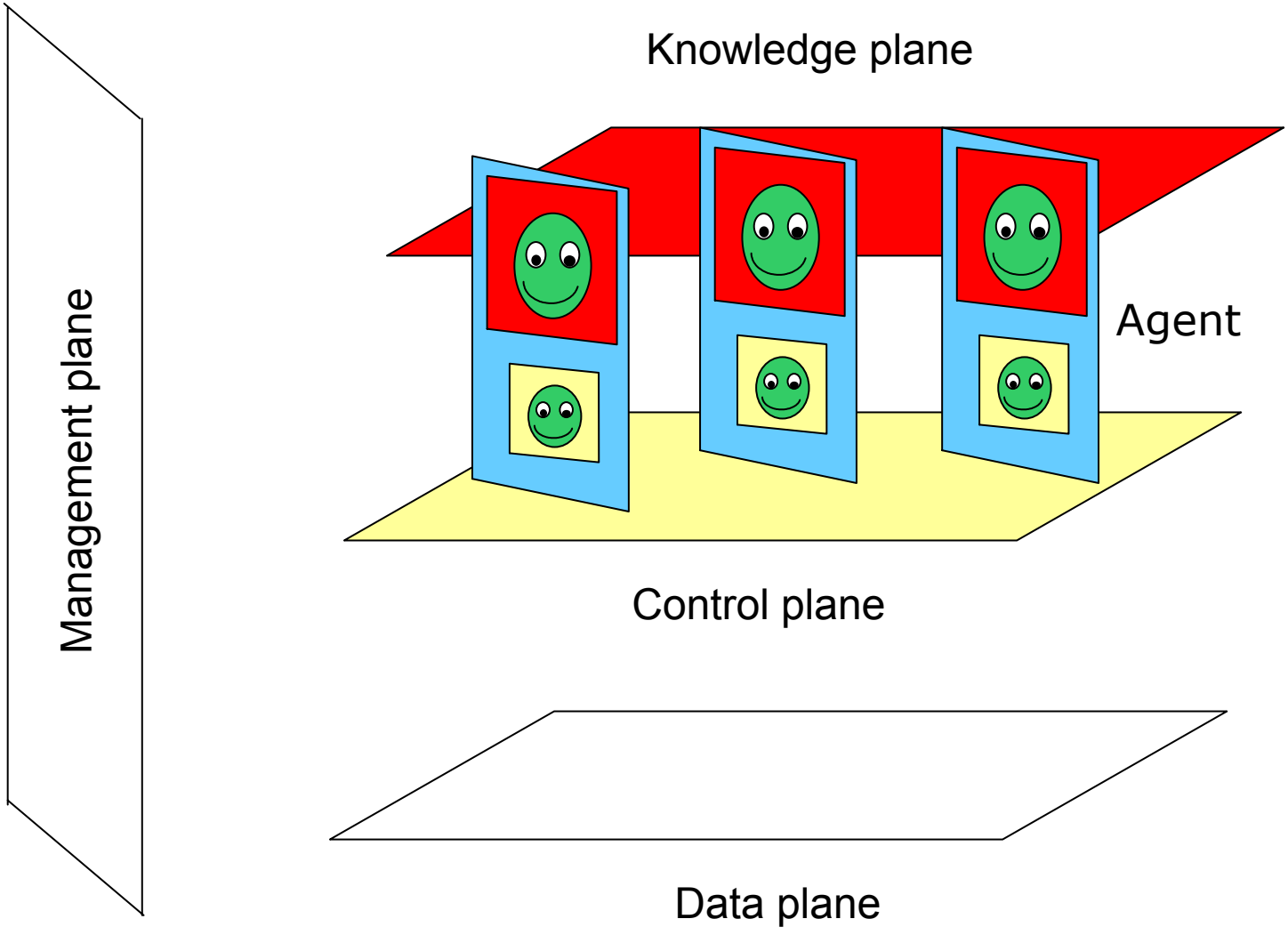
# Knowledge plane



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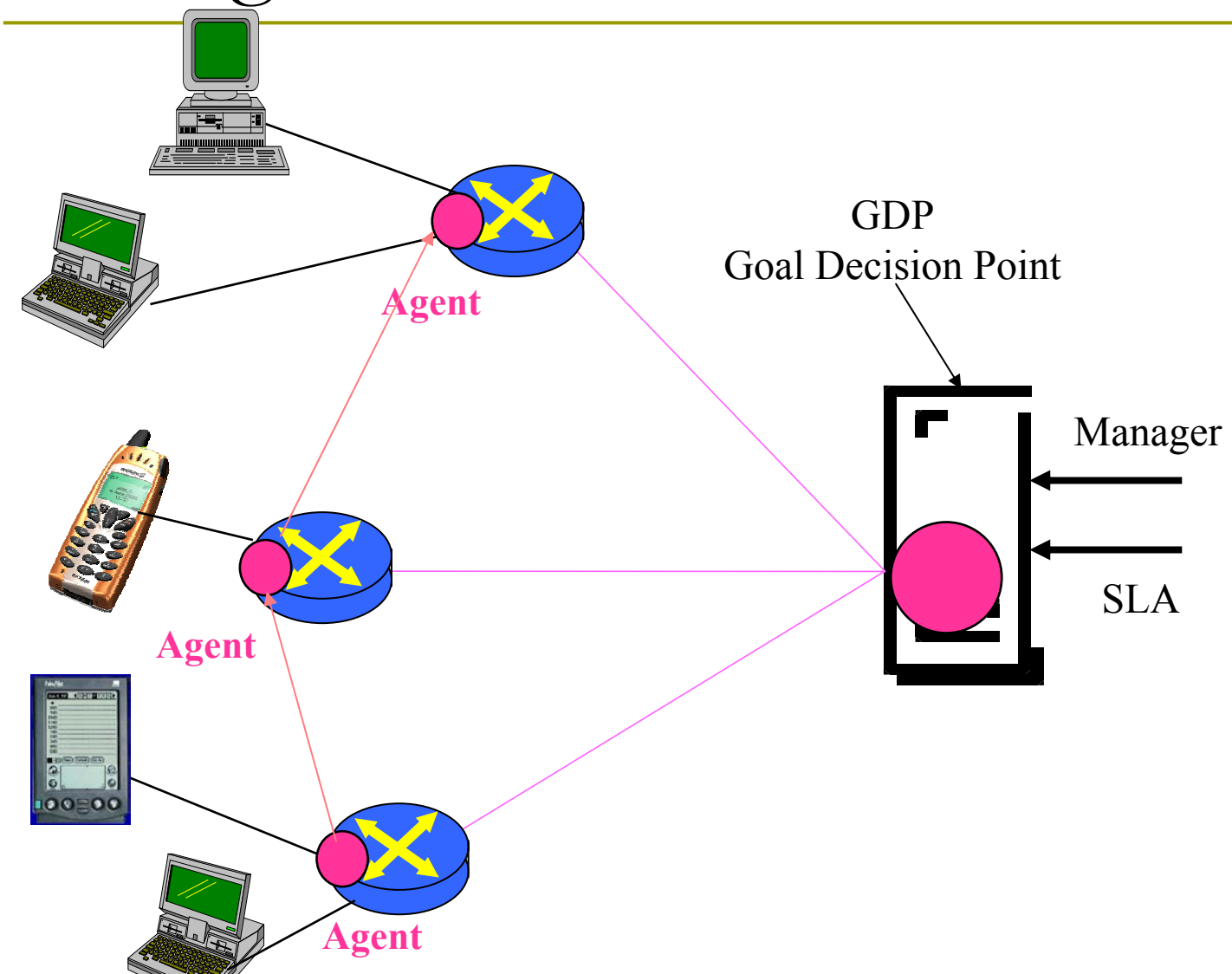
# The global architecture



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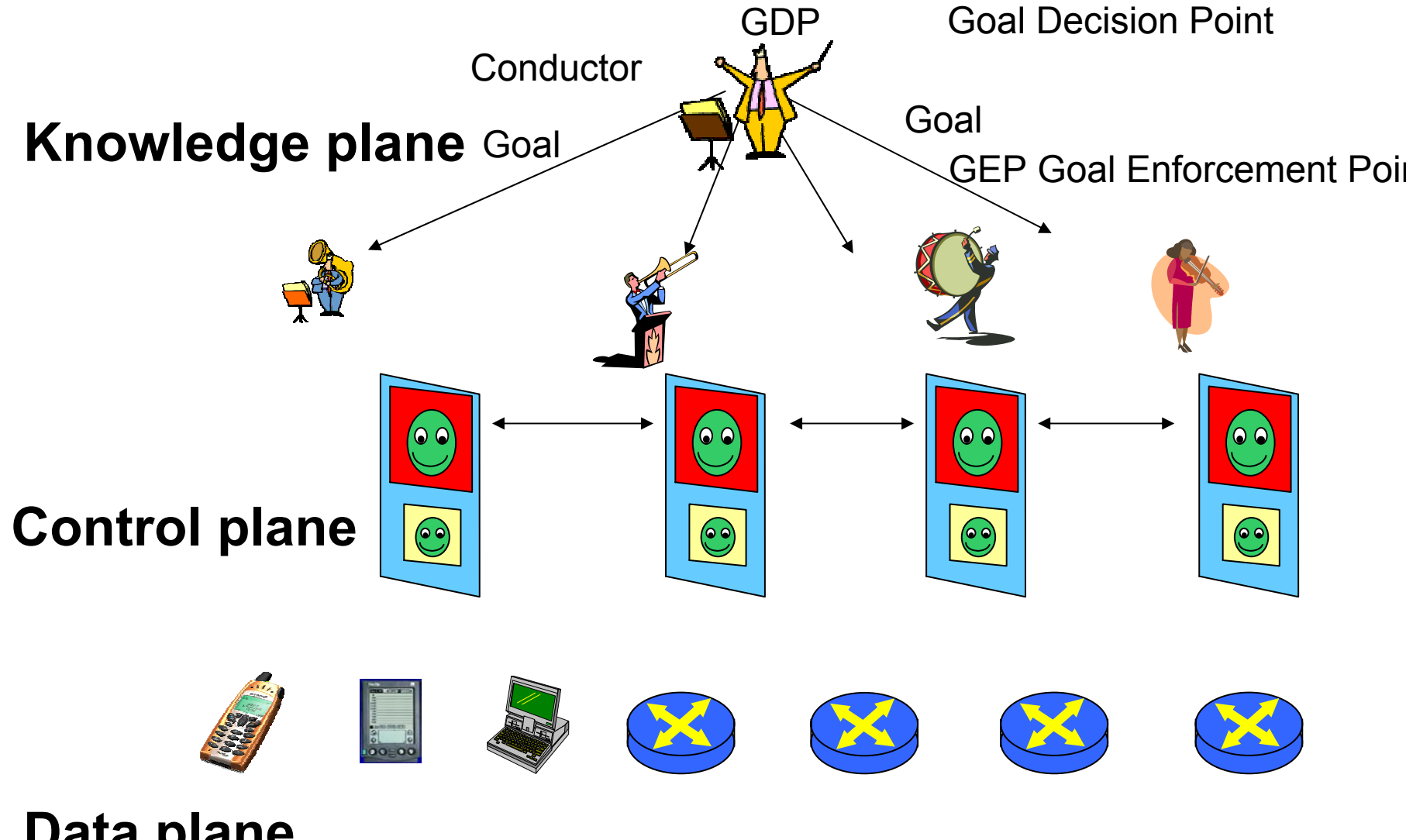
# A goal-based architecture



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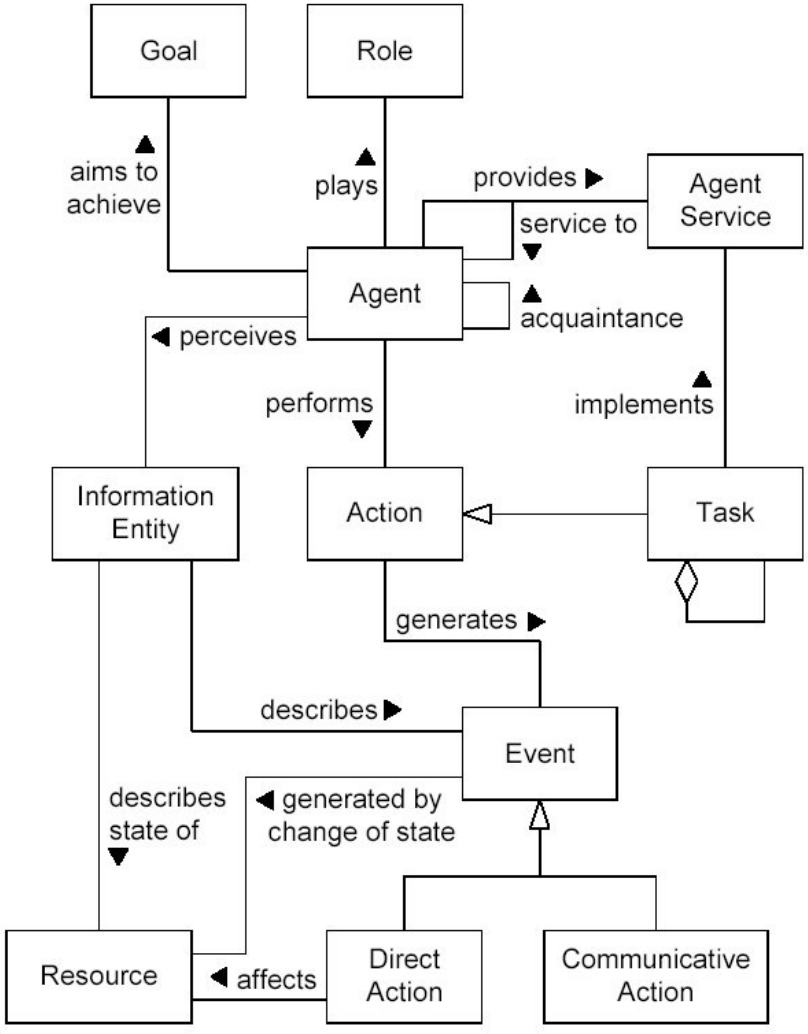
# Intelligent Agents *Message concepts*



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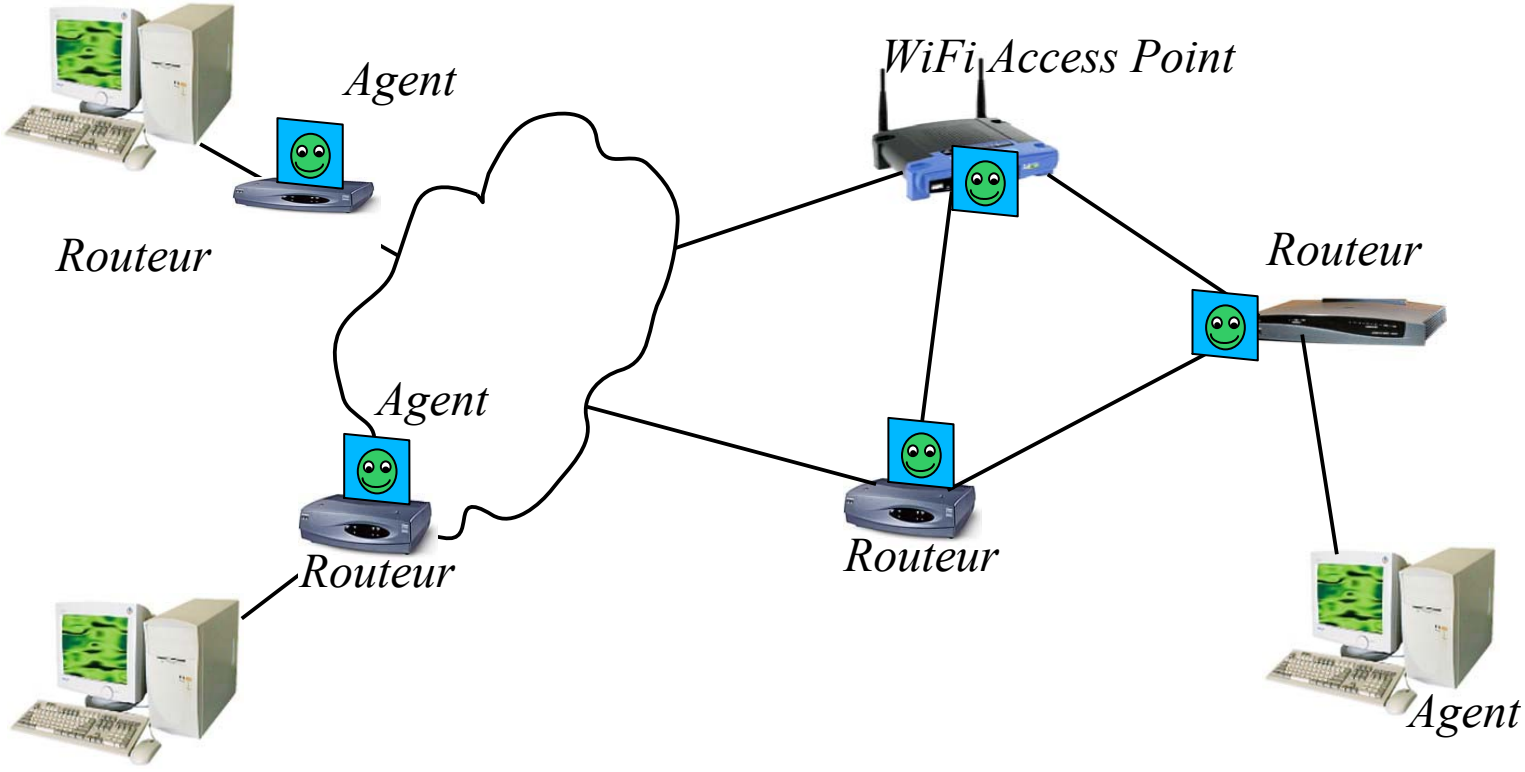
# Example of deployment



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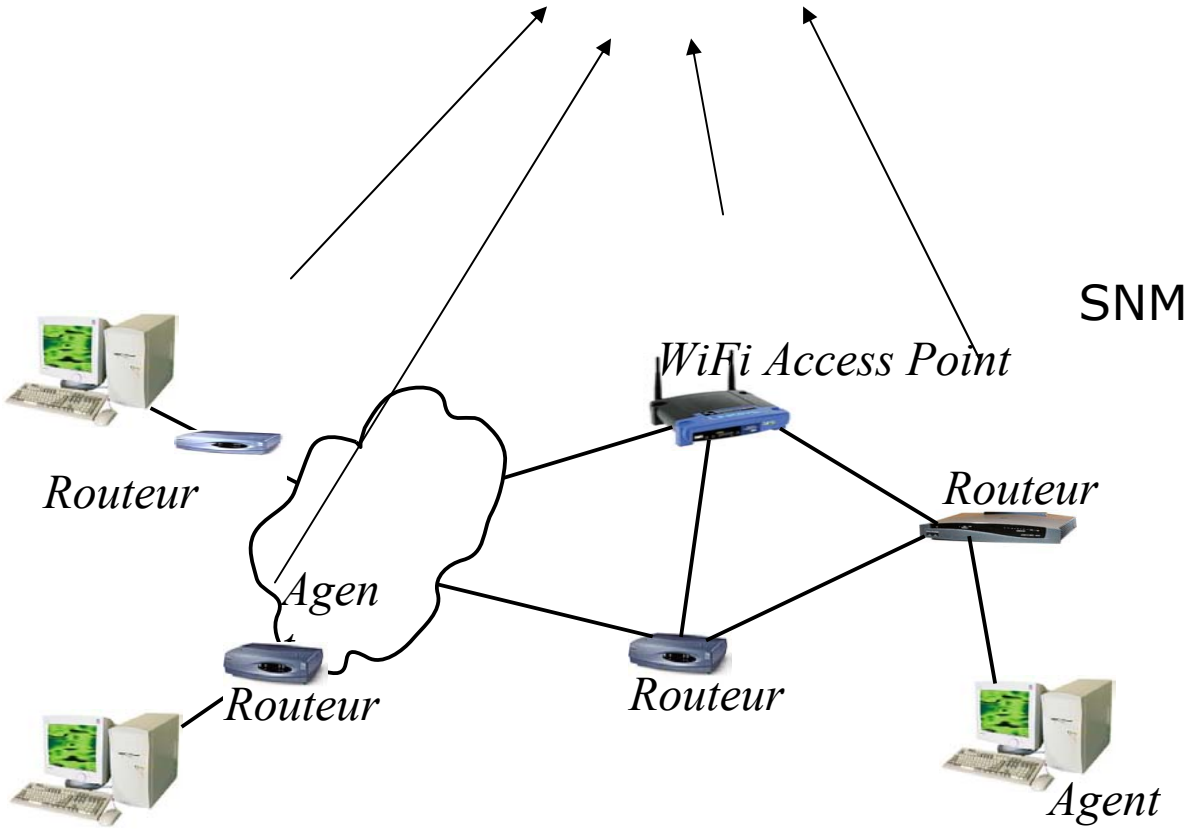
# Alarm management

Transpac/Equant
Nortel

Management software

SNMP traps



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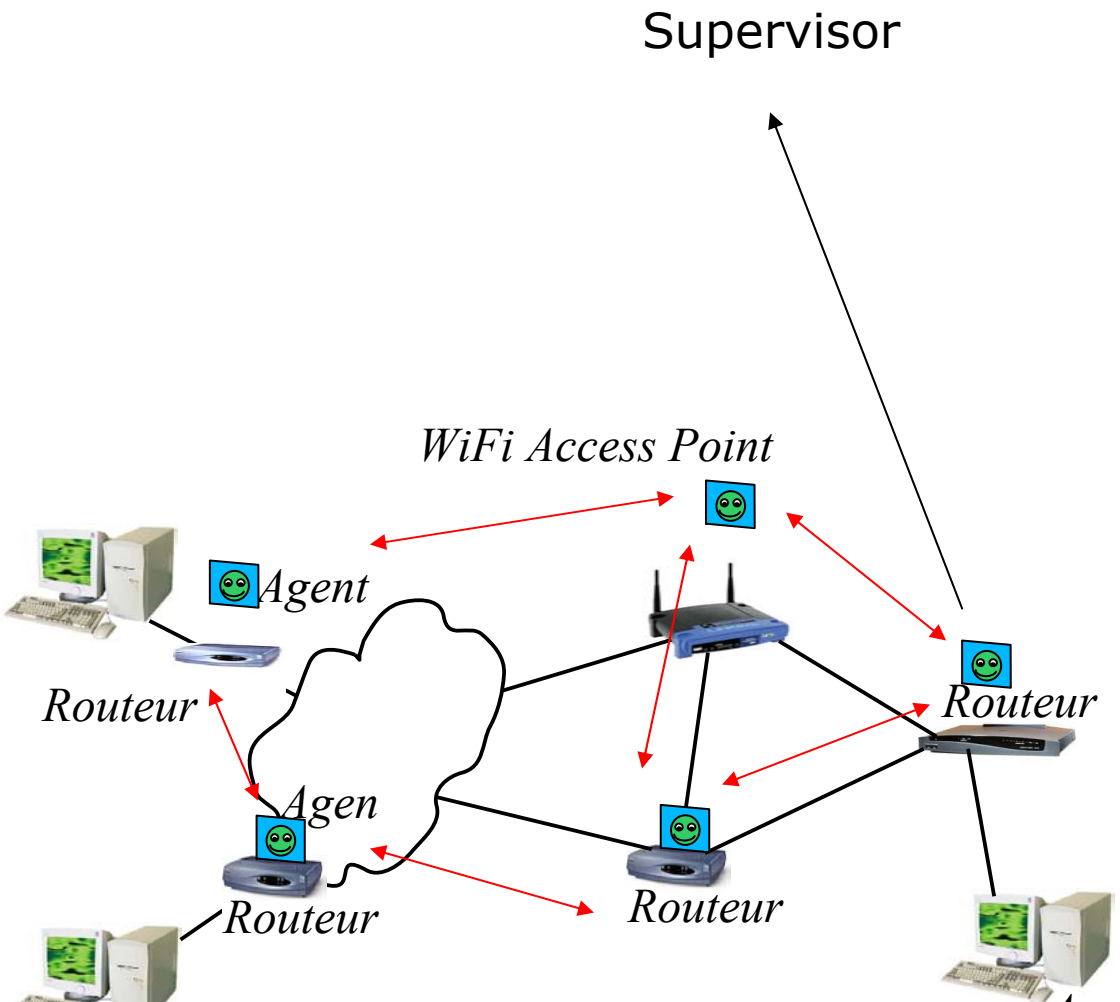
# Alarm management




15% resolved locall

Number of alarms to the supervisor divided by 5

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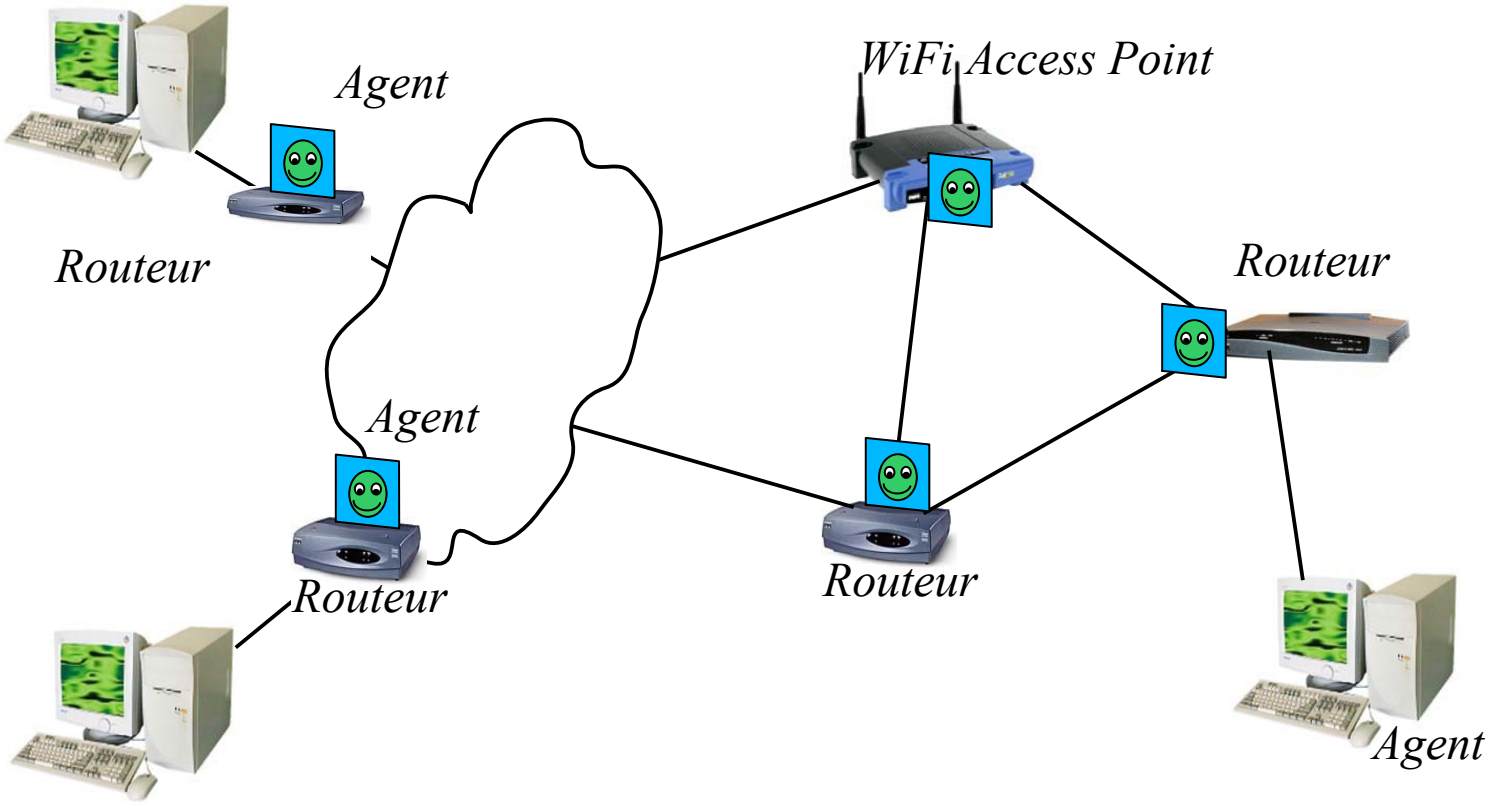
# DiffServ configuration

Thales



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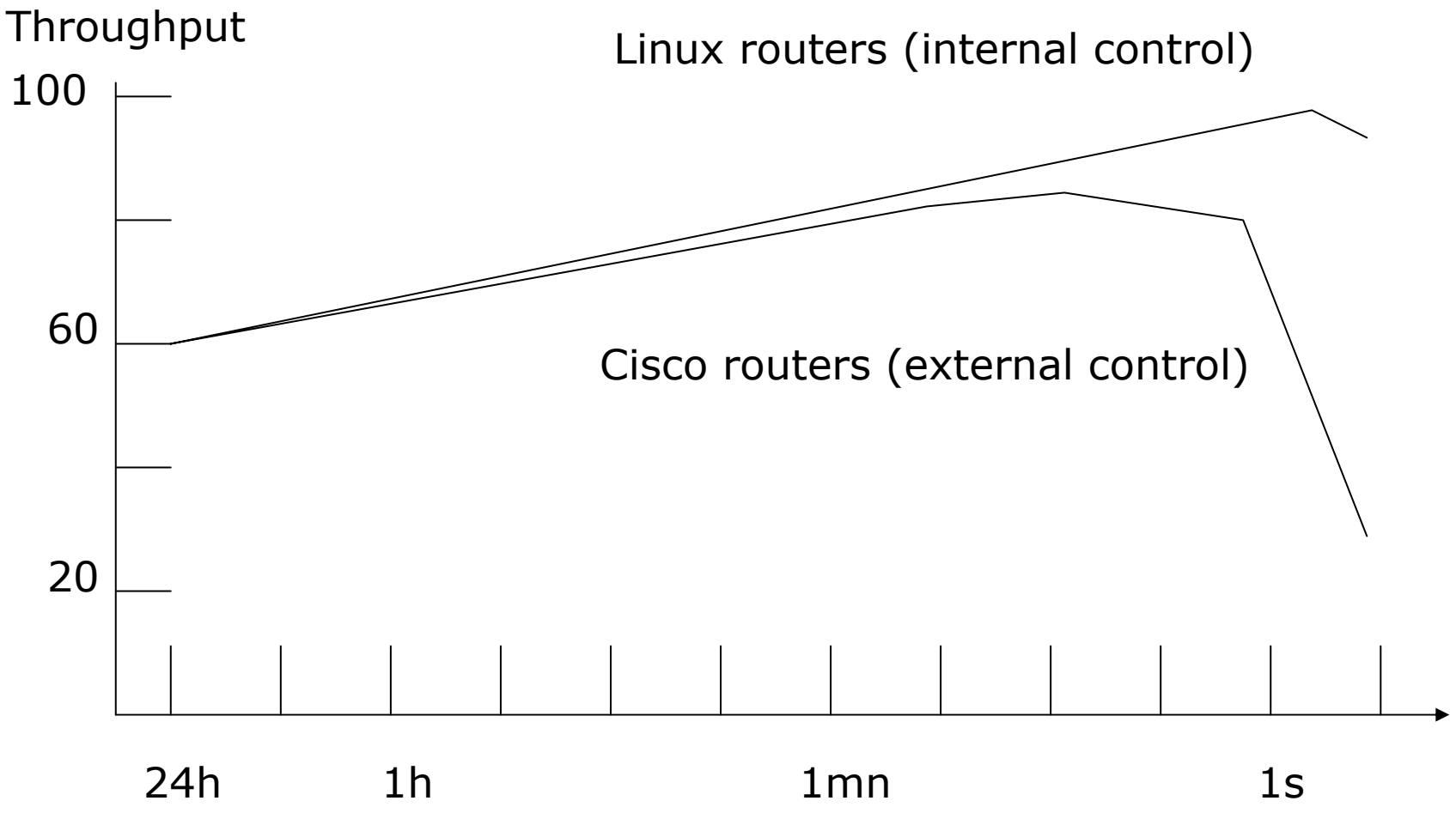
# Performance



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# Wireless Internet network

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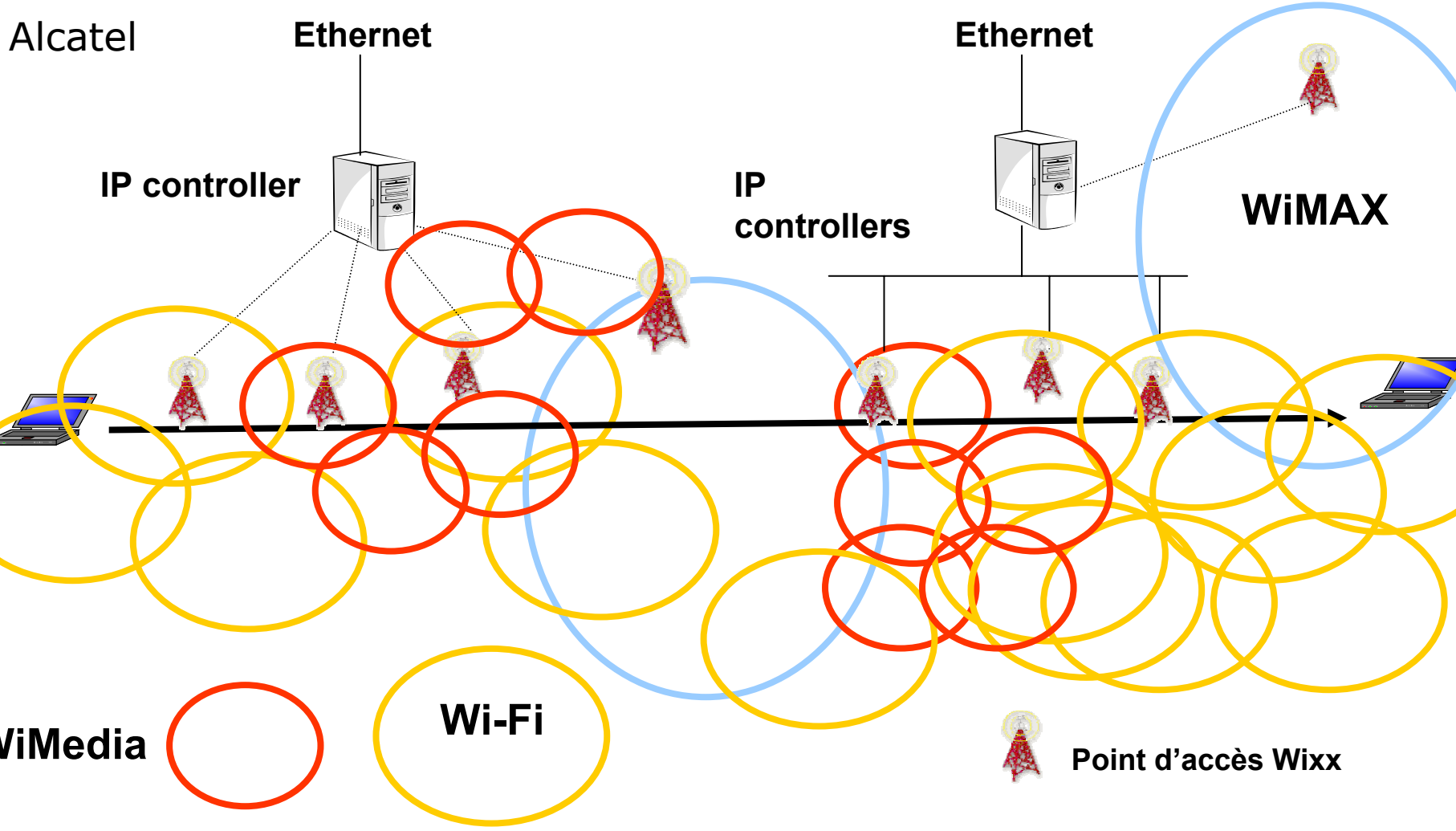
Alcatel



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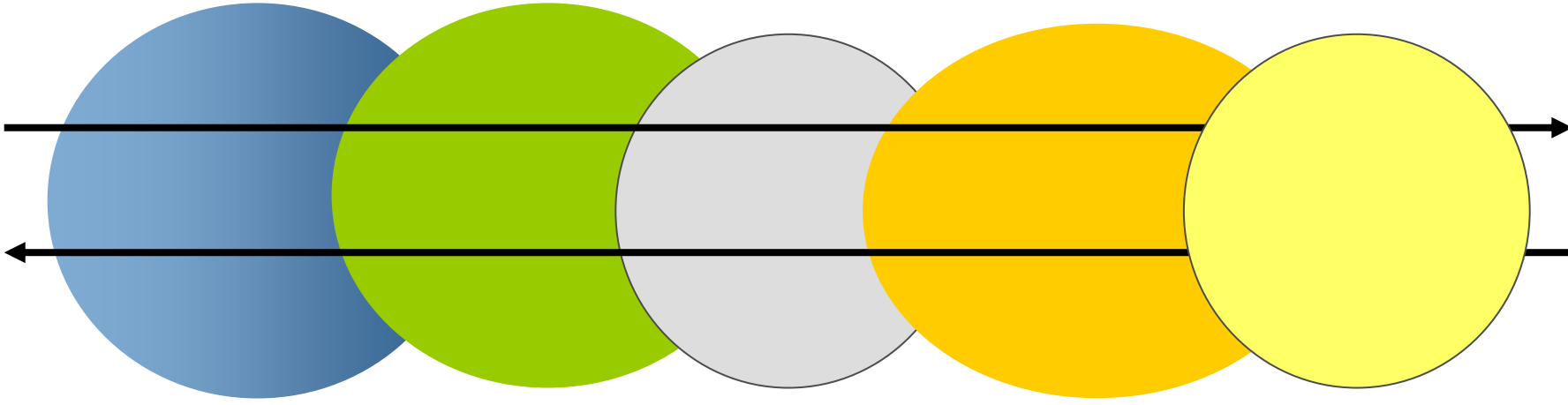
# IEEE 802.21 Media Independent Handoover Scheme

- **Handover between the different 802 standards (802.15, 802.11, 802.16, 802.20, 802.22)**



**WiMedia, Wi-Fi, WiMAX, Wi-Mobile, WiRAN**

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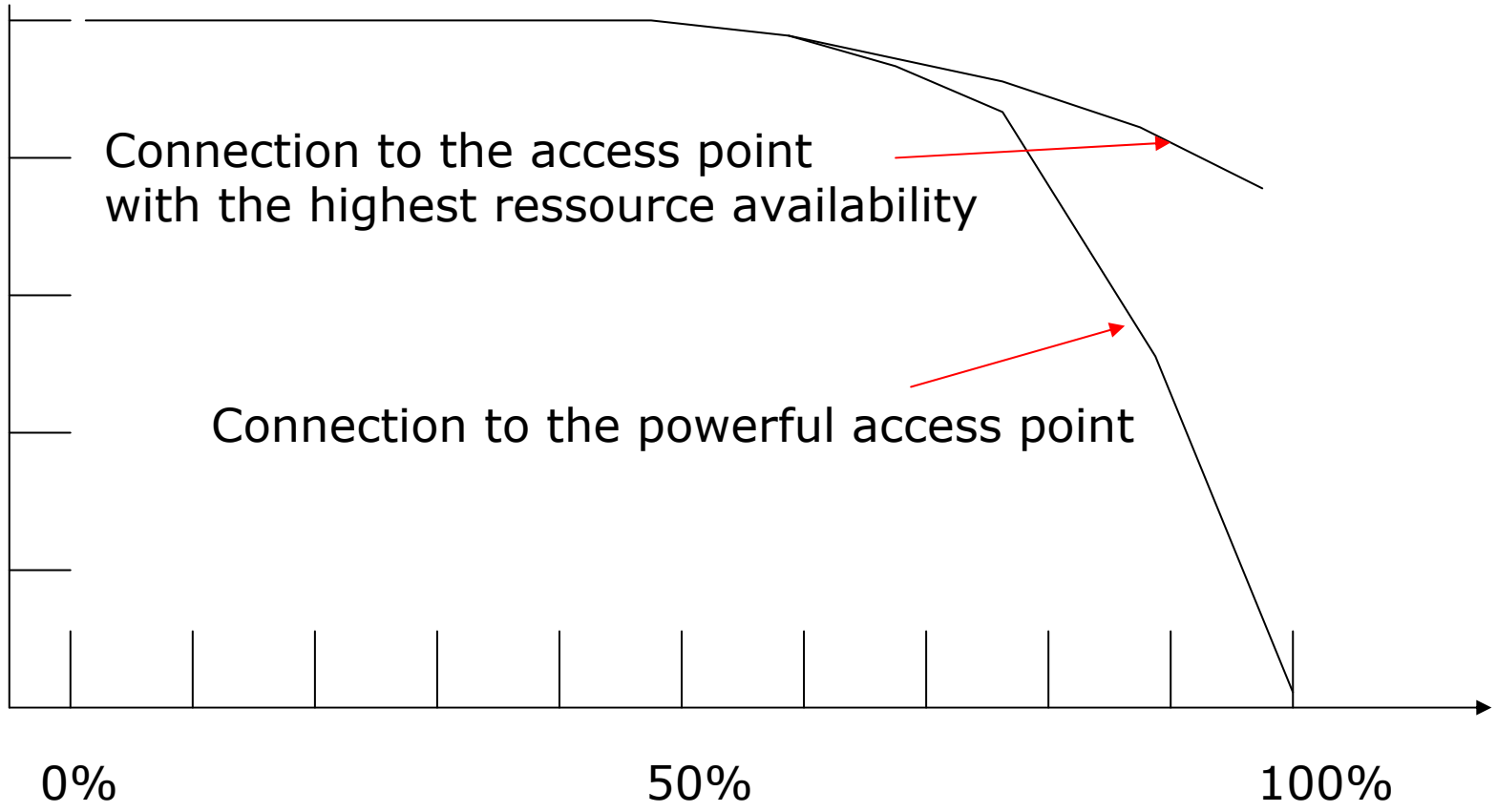
# Performance

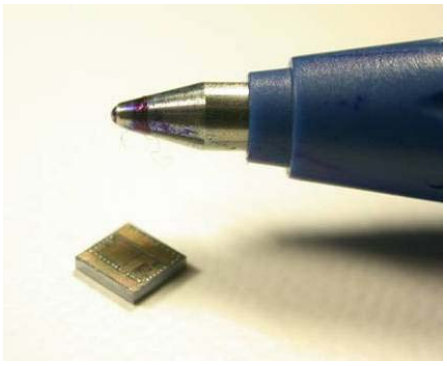
**Proportion of the number of communications reaching the end**



# Energy

- The TCP/IP protocol over wireless is consuming a lot of energy.
- TCP/IP is not a good protocol for wireless networks.

- TCP/IP is a protocol for “rich” networks and not for “poor” networks.



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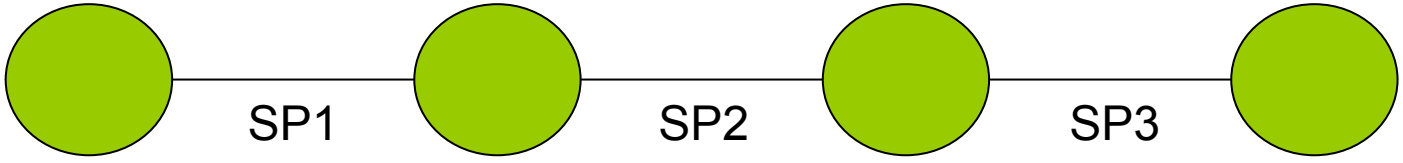
# Proposal for a smart protocol

- STP/SP (Smart Transport Protocol/ Smart Protocol)
  - Optimization of the protocol on every link
    - Energy consumption
    - QOS
    - Reliability
    - Security



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# SP Proposal

- The Smart Protocol (SP)
  - The smart protocol is a protocol that is self-adapting depending on the environment
    - For optimizing battery
    - For optimizing reliability
    - For optimizing QoS
- STP/SP Smart Transport Protocol/Smart Protocol
- Compatibility with IP?

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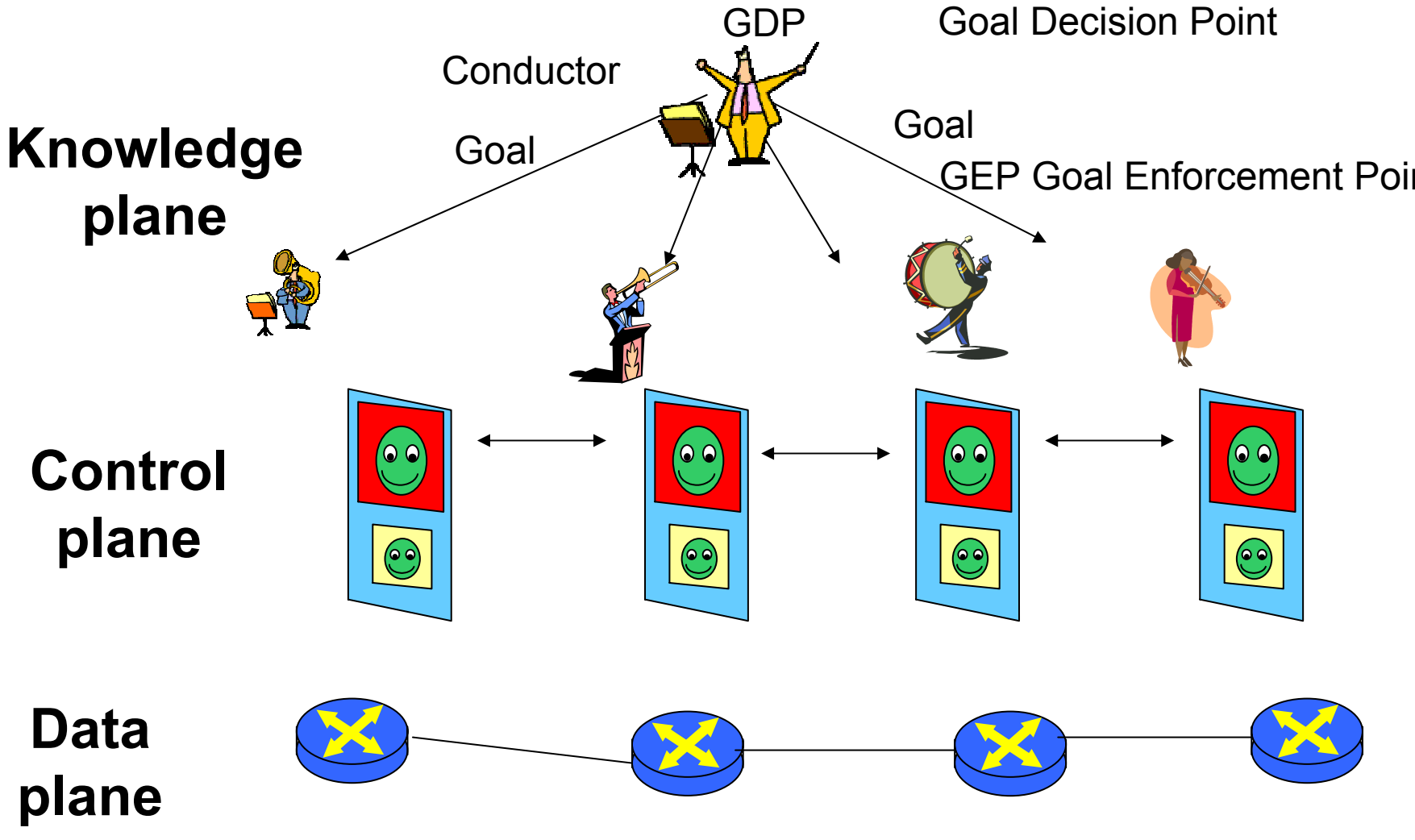
# STP/SP



# Questions?