



Post-IP Network

Knowledge, Piloting, Virtualization,
Security, Cloud

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Where we are?

Stone age

Bronze age

Iron age

2.5 M années

8000 années

3000 années

Printing

Stone age

Bronze age

Iron age

1440

1850

1930

Internet

Stone age

Bronze age

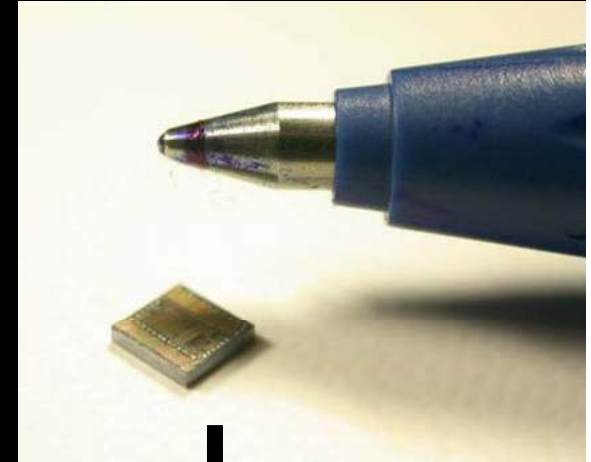
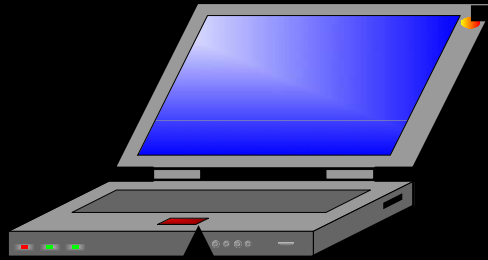
Iron age

1970

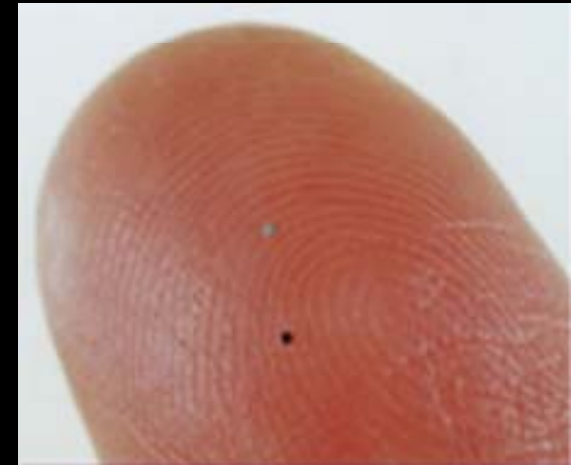
2010

2030

Network evolution



Internet
Protocol



Why a new generation ?

- Cloud
- Security
- Control
- Management
- Energy
- Mobility

We could have two networks:

- The current Internet (with some improvements)
- An Internet adapted to the cloud

What to do?

- Starting from scratch or improving current IP technology
- Build a secure basis
- Virtualize all physical and software resources
- Implement a network collective intelligence
- Use massively wireless environments

Security

- Build a highly secure network
- Use secure microcontrollers (smartcard)
 - SSL/TLS in the secure microcontroller
 - Secure identity management to access the web
 - Privacy using secure modules in authentication servers

Virtualization

- Virtualize all resources
 - Virtual node
 - Virtual antenna
 - Virtual server
 - Virtual machine
 - Virtual storage
 - ...

Collective network intelligence

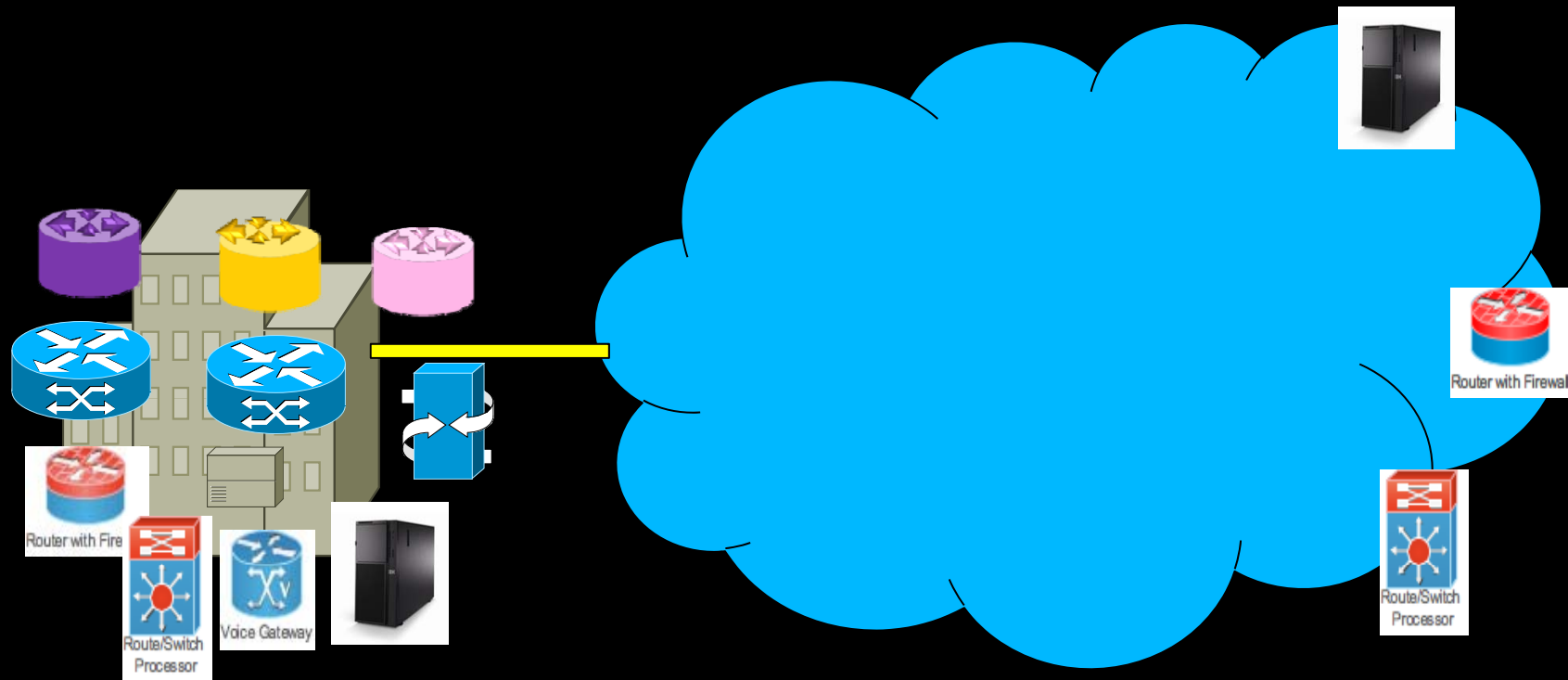
- Build an intelligent network to optimize management and control schemes
- Use a distributed intelligent agent platform
 - Knowledge plane
 - Piloting plane

Mobility

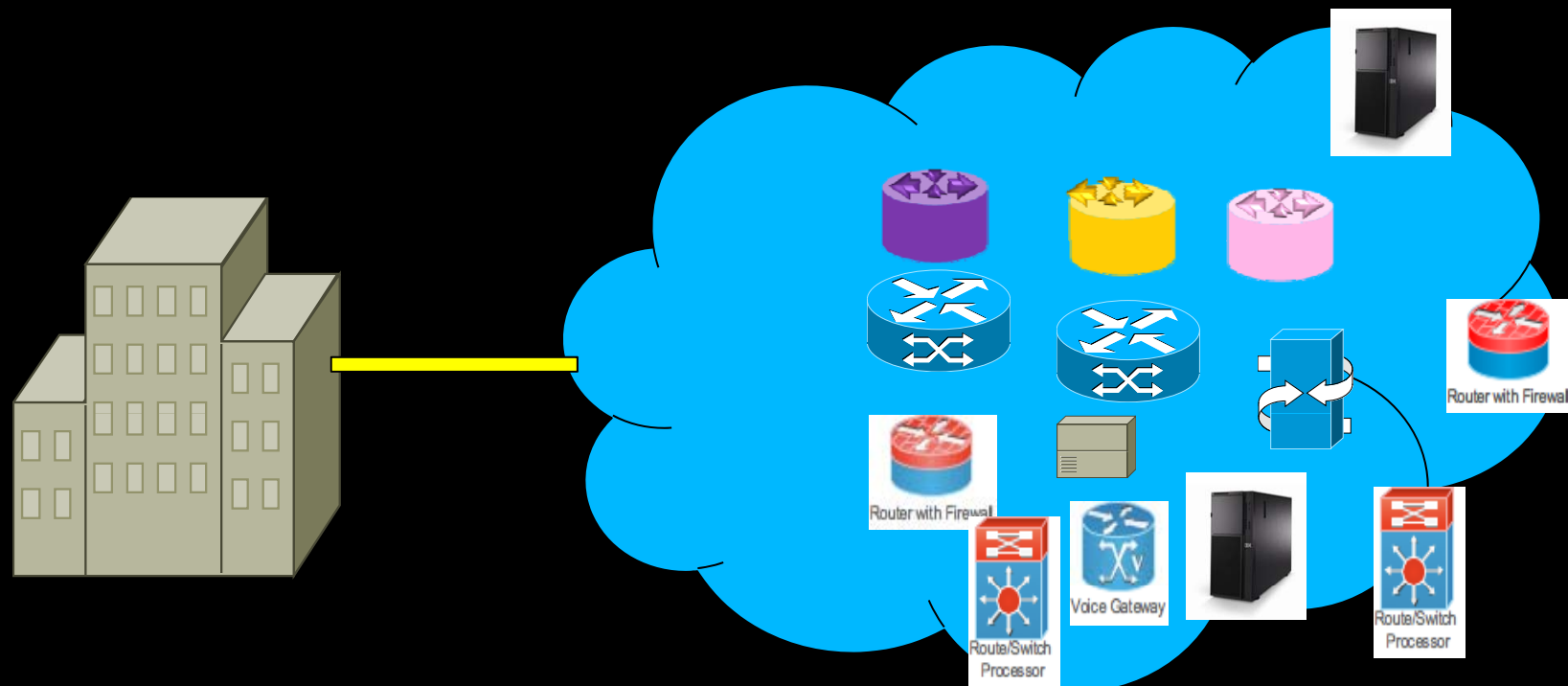
- Wireless access
 - Throughput is increasing by a factor of 1000 between 2010 and 2020
 - Multihoming
 - 4G and/or Wi-Fi NG (IEEE 802.11ac and af)
 - Virtual Antenna + Virtual systems
 - Cognitive radio

Architecture

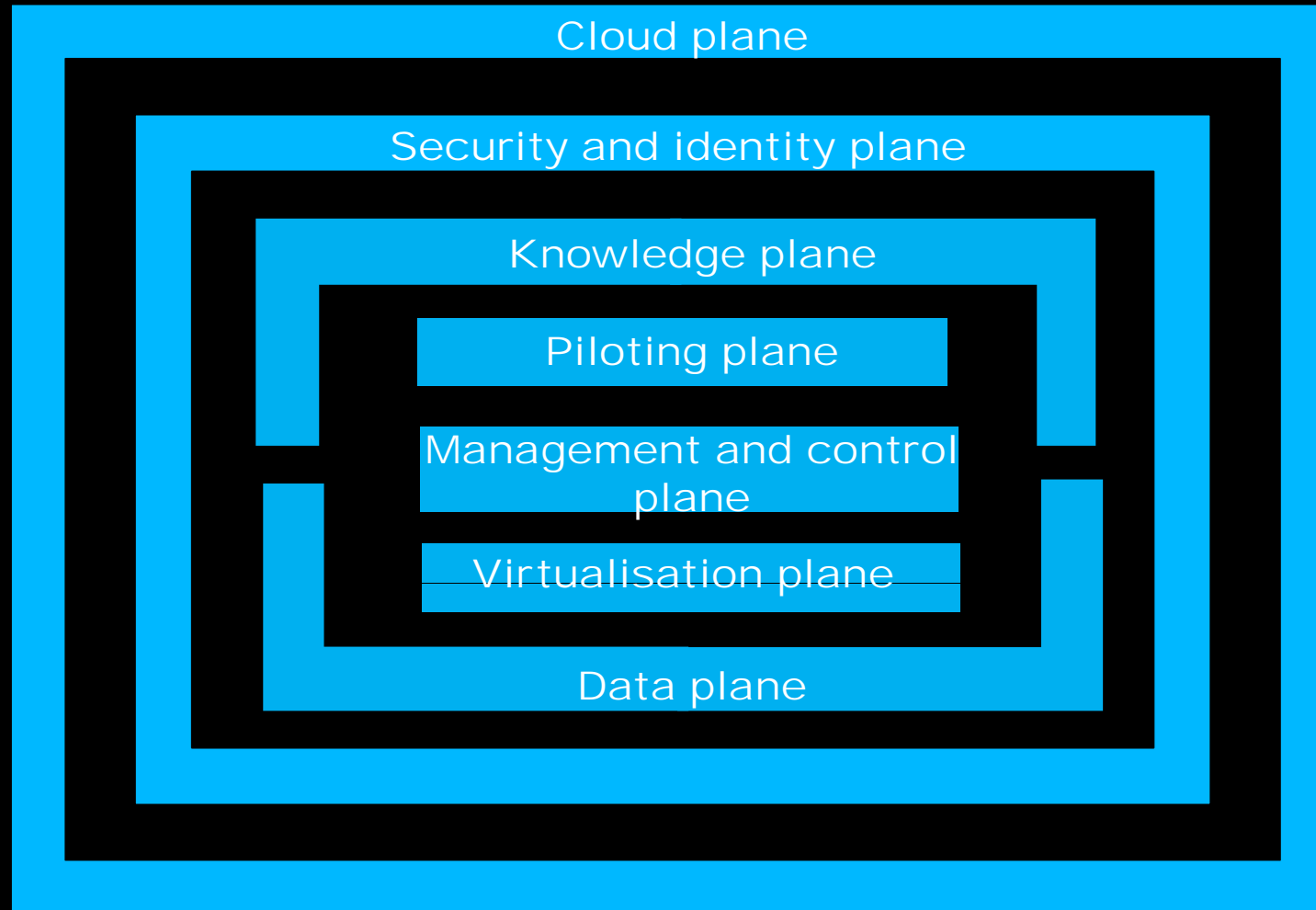
Cloud



Cloud



A Seven-plane Architecture



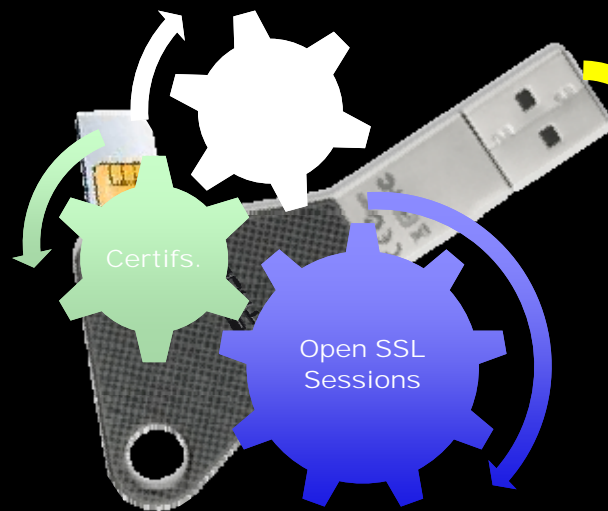
Security

The KEY for accessing the network



Solution

Information
exchanged by the
secure module is
encrypted

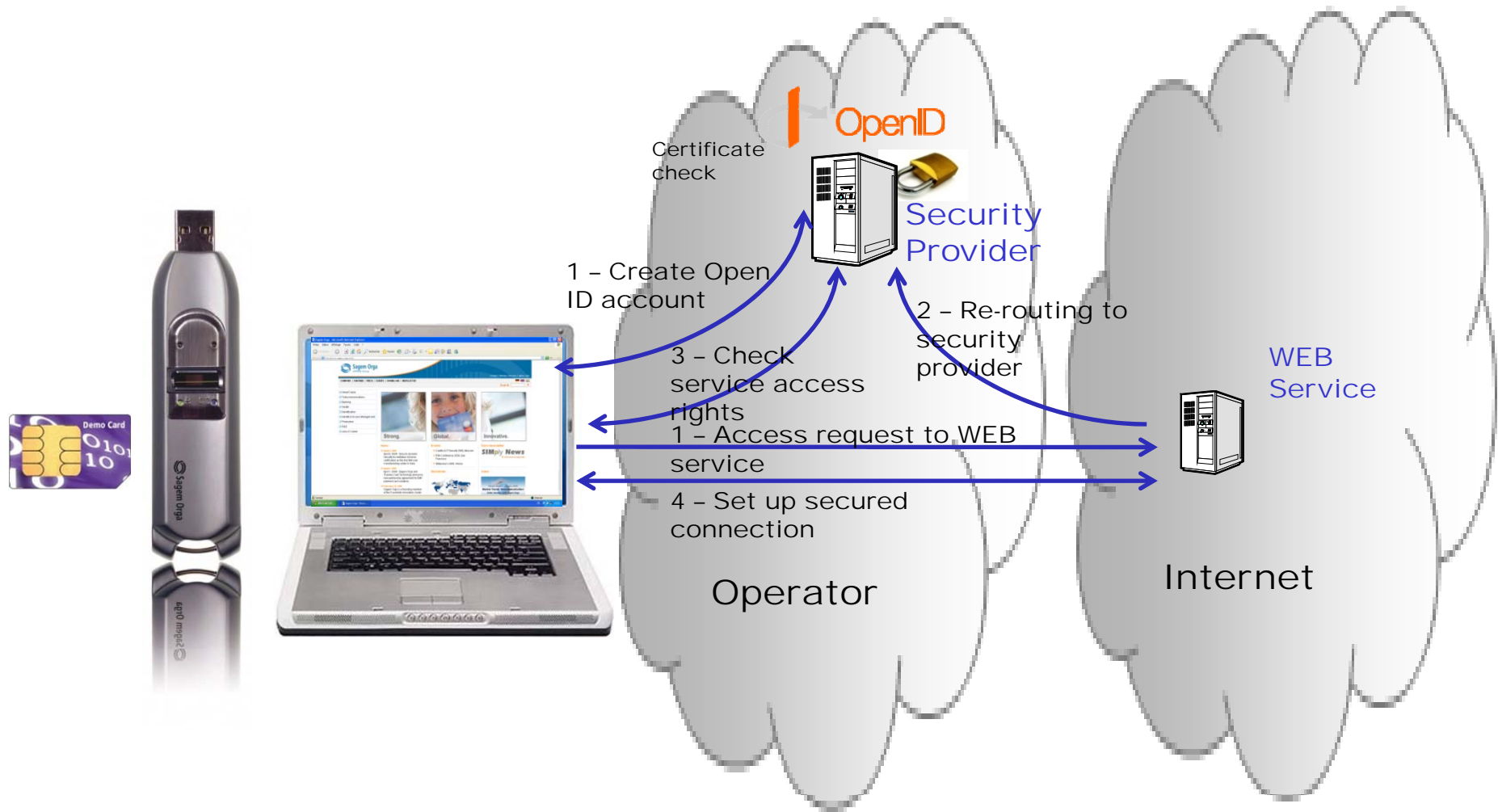


Loading

SSL encryption and Authentication



SSO solution for web access



SSO Single Sign-on

Advantages



End of phishing schemes

No login, no password



Spywares and Trojans inefficient

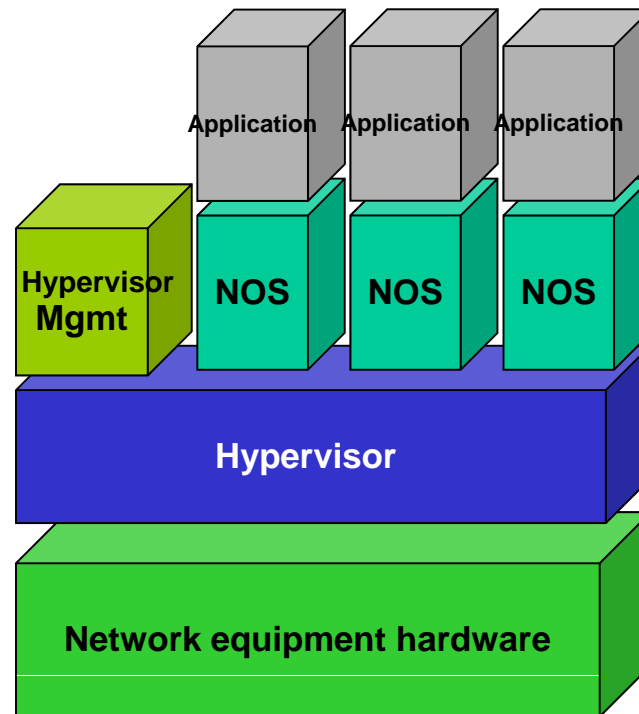
Secure protocol are in the smartcard or secure element



Working for all OS and all
terminals

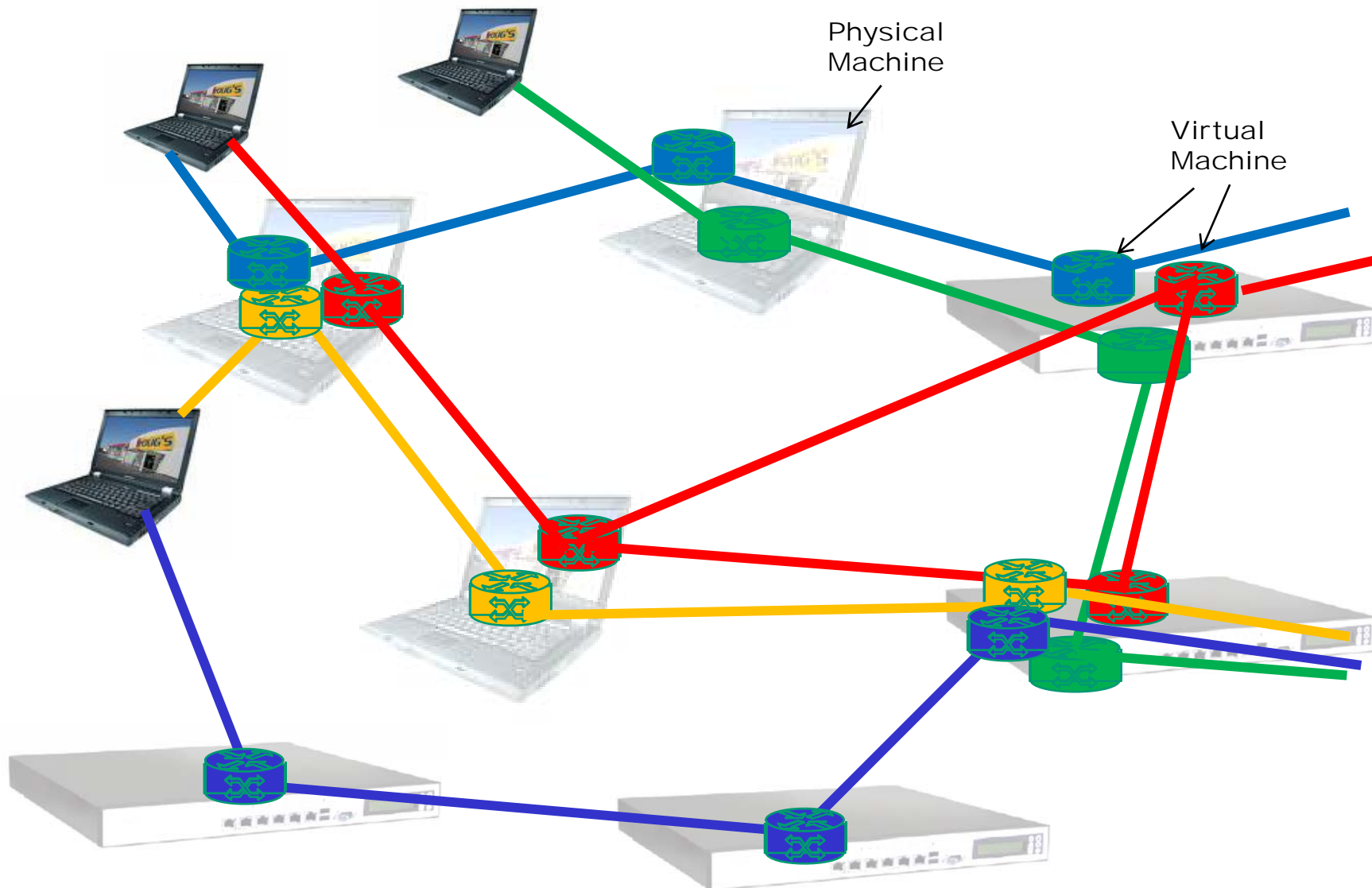
Virtualization

Network virtualization

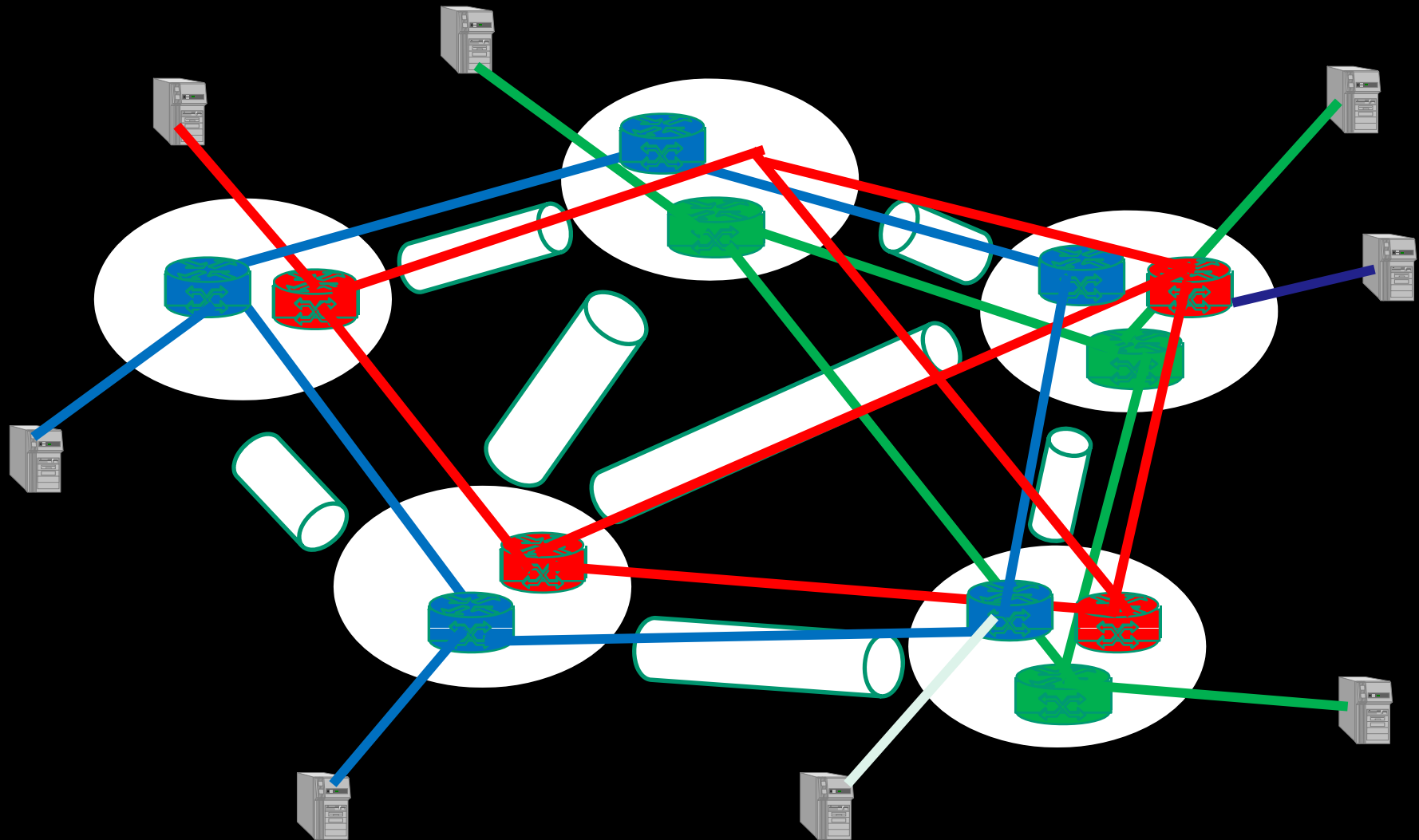


Virtual networks

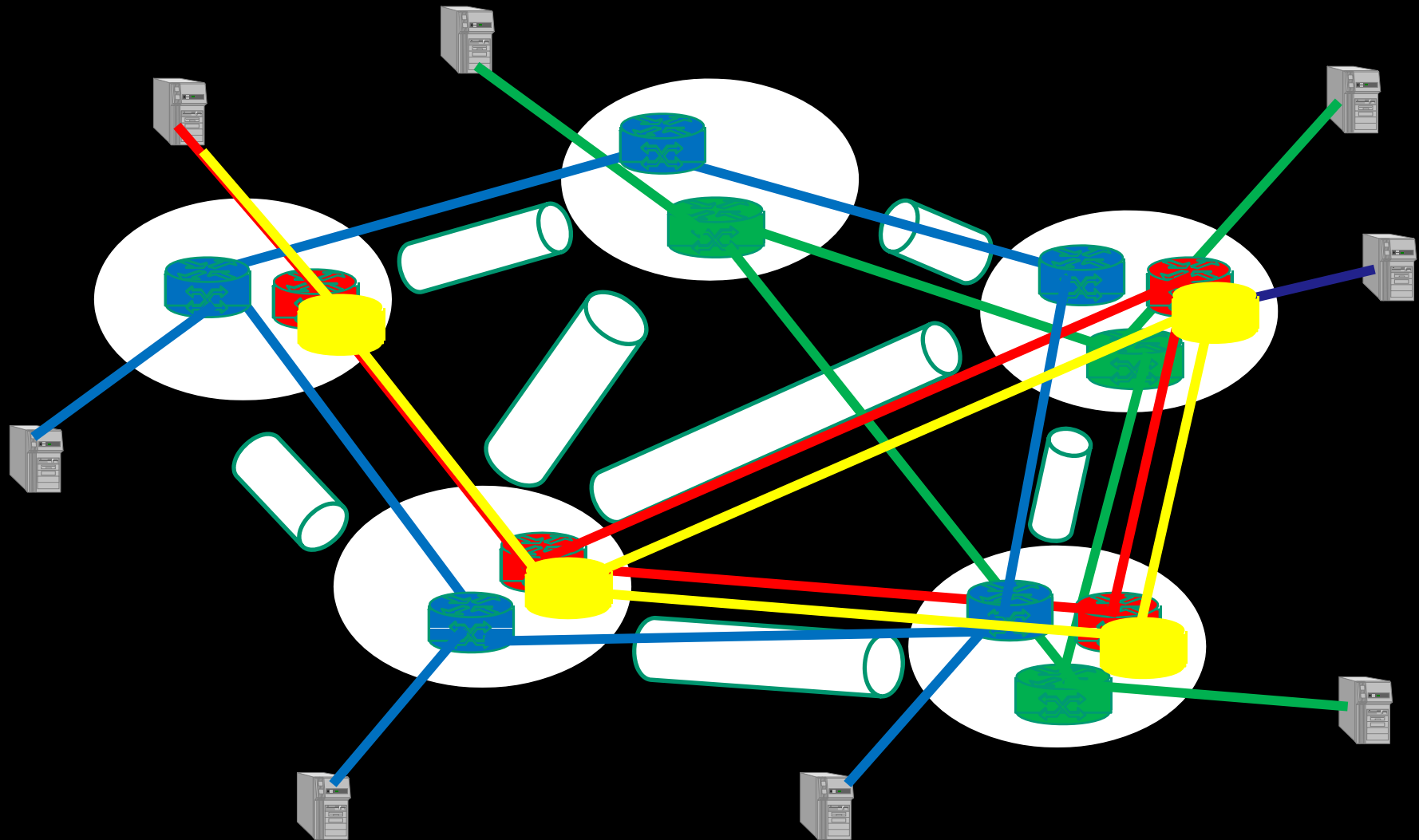
A protocol adapted
to each flow



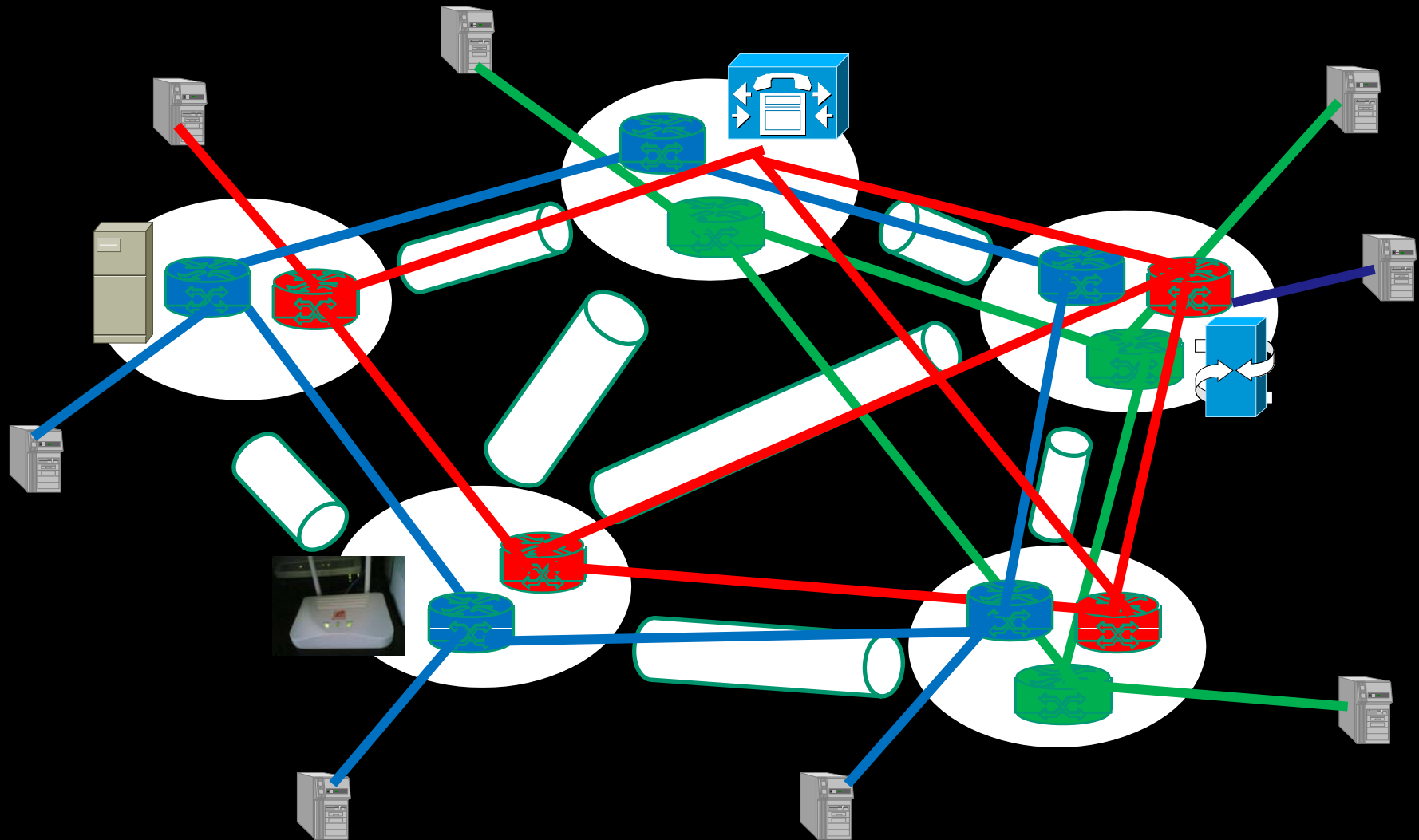
Live migration

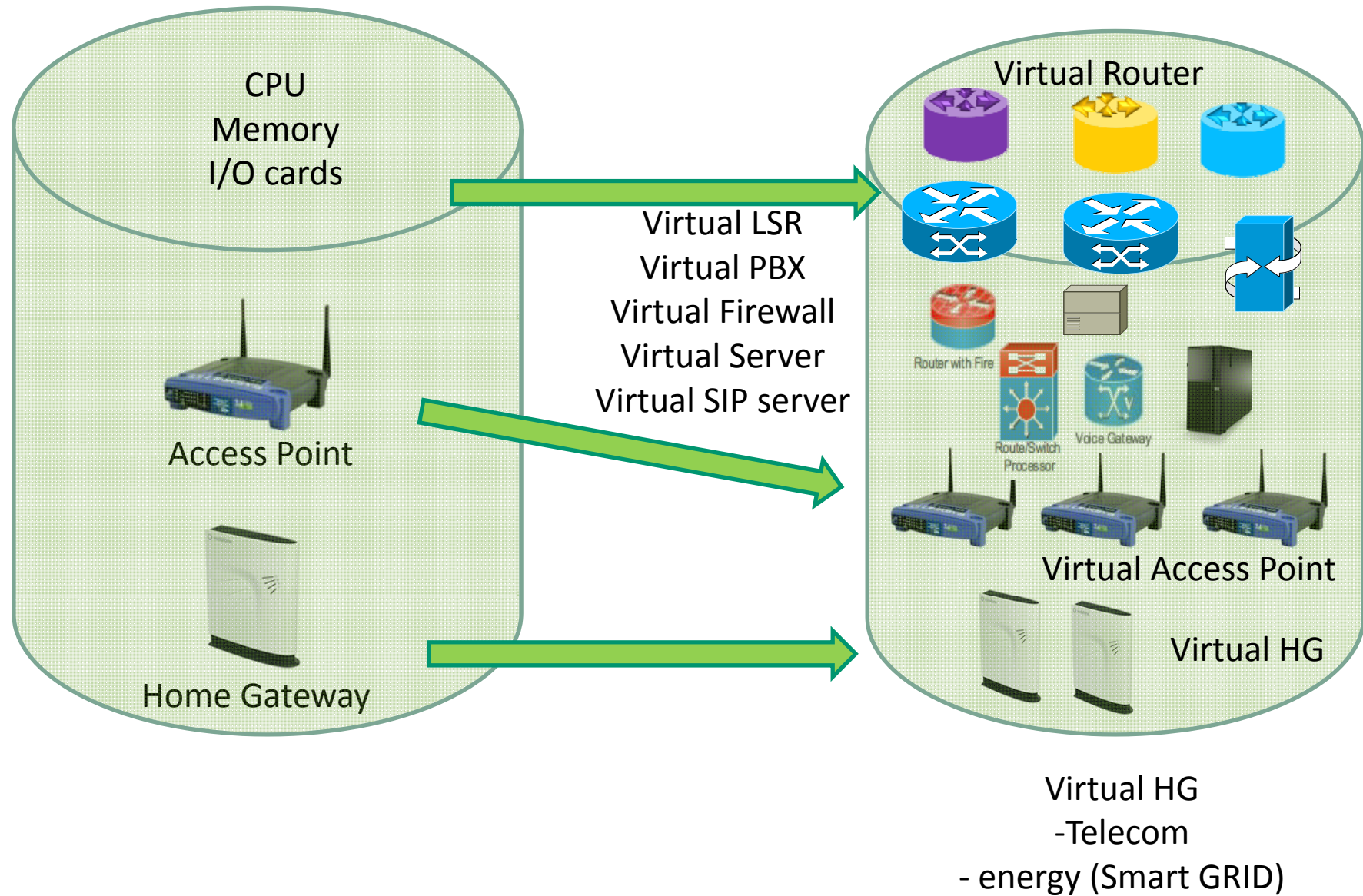


Network on the fly



Urbanization

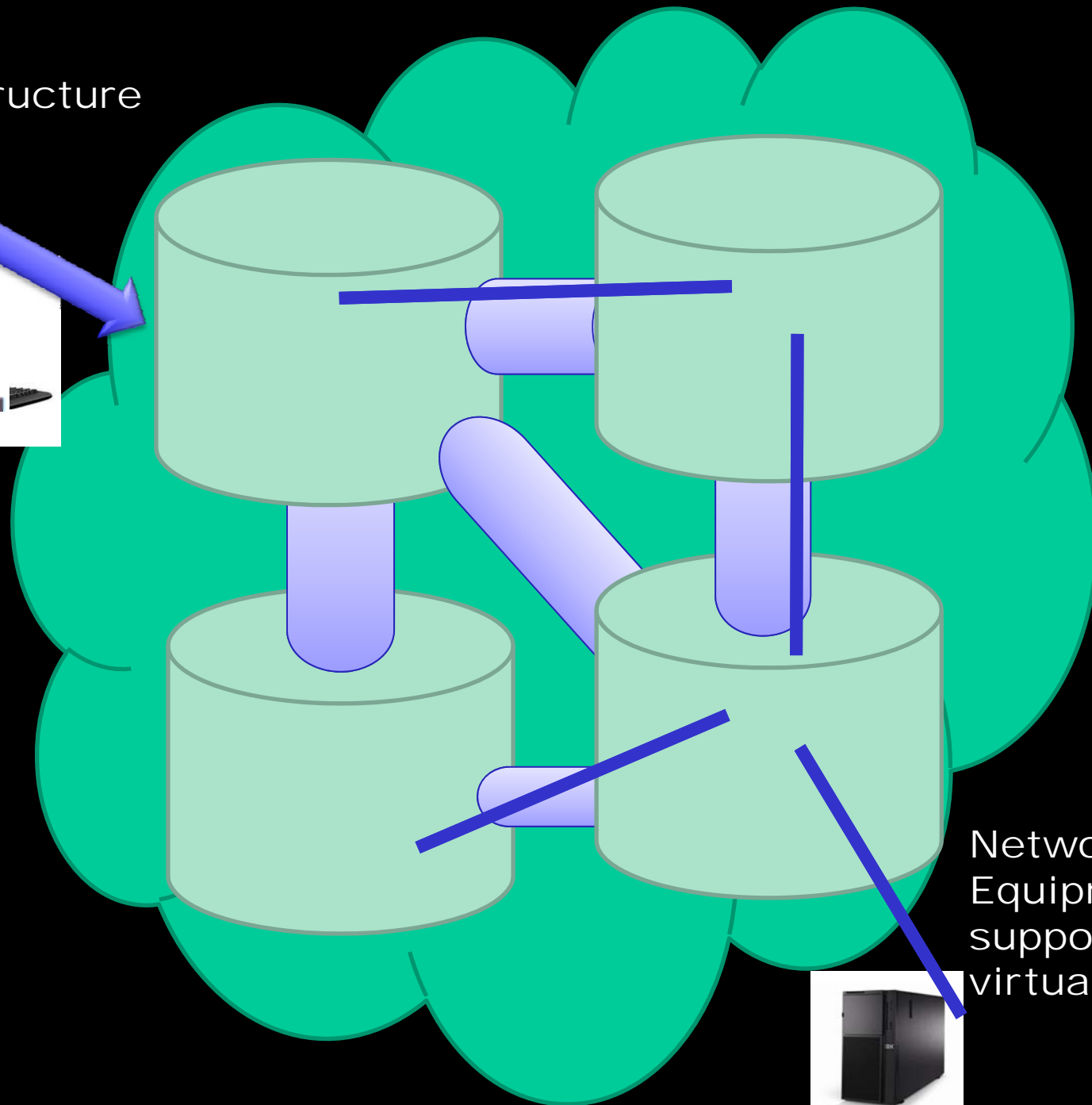






Infrastructure control server

Infrastructure
Control
Server



Network
Equipment
supporting
virtualization



Knowledge plane
Piloting plane

Autonomic plane

IP architecture

Management
plane

Control plane

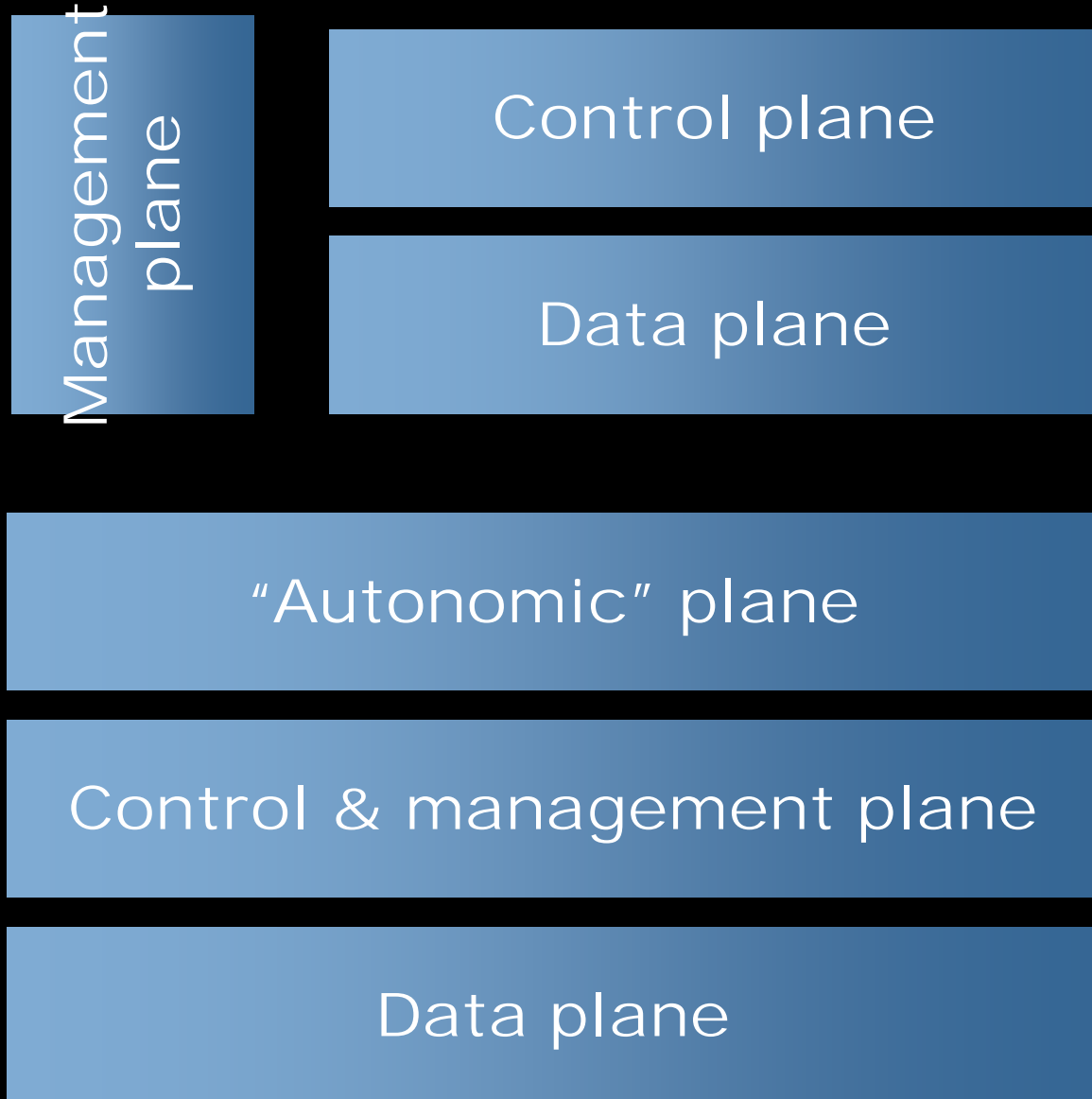
Data plane

“Autonomic” plane

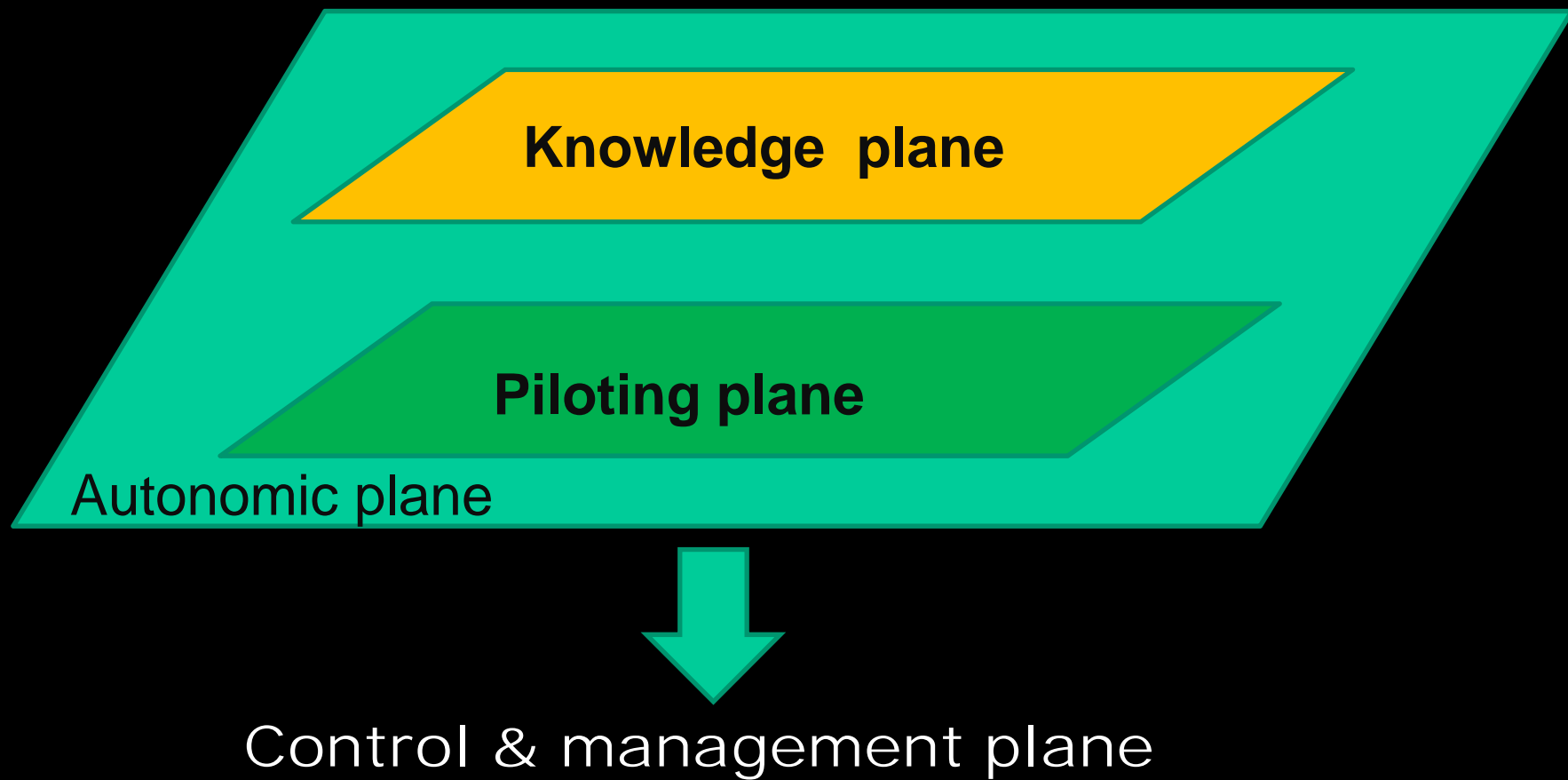
Post-IP
architecture

Control & management plane

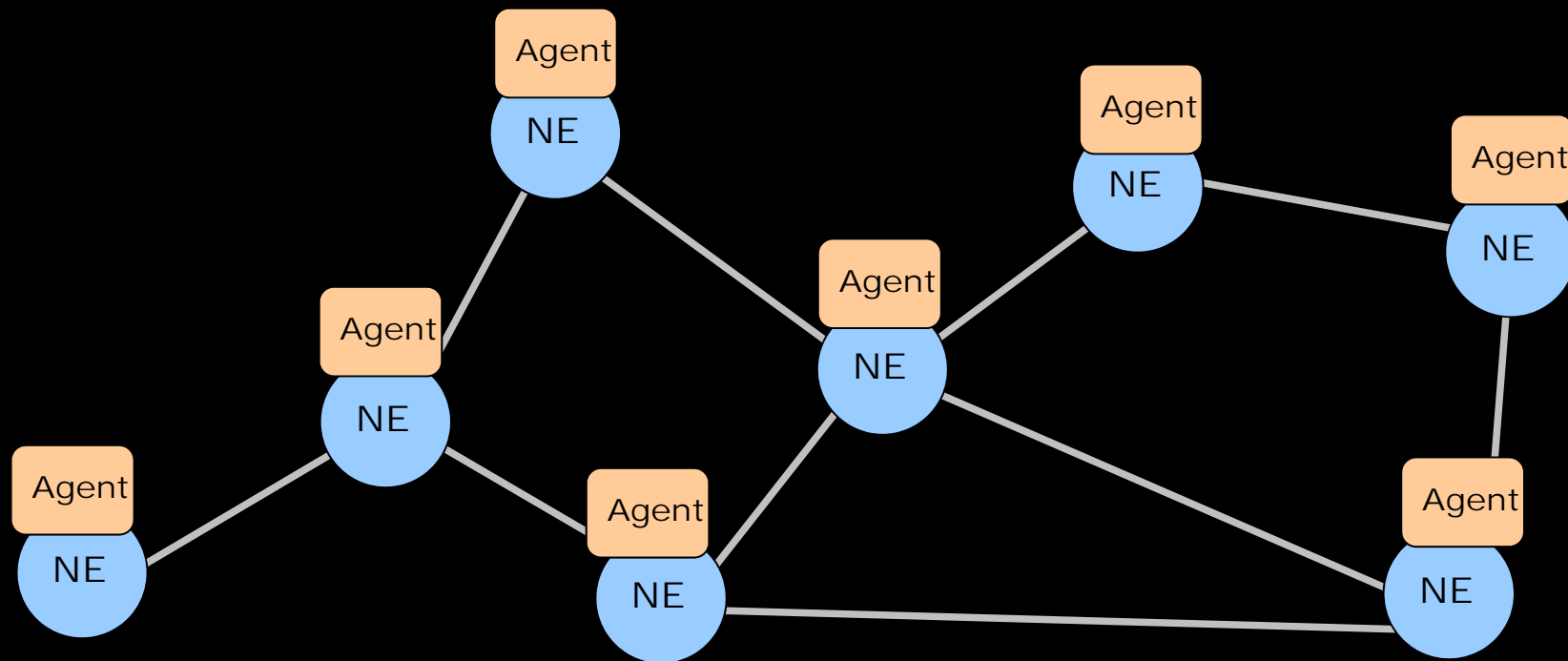
Data plane



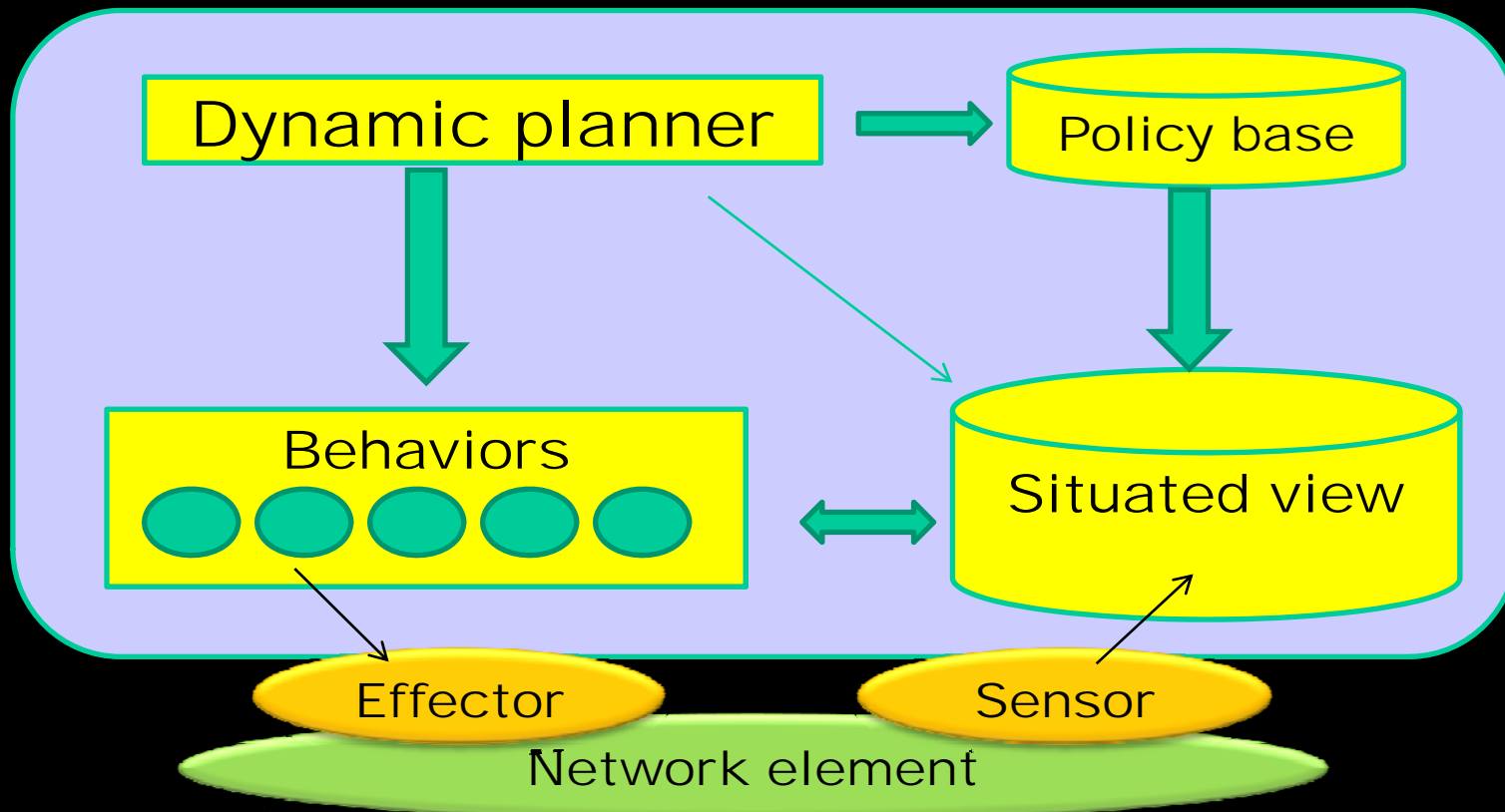
Autonomic plane



Knowledge and piloting plane



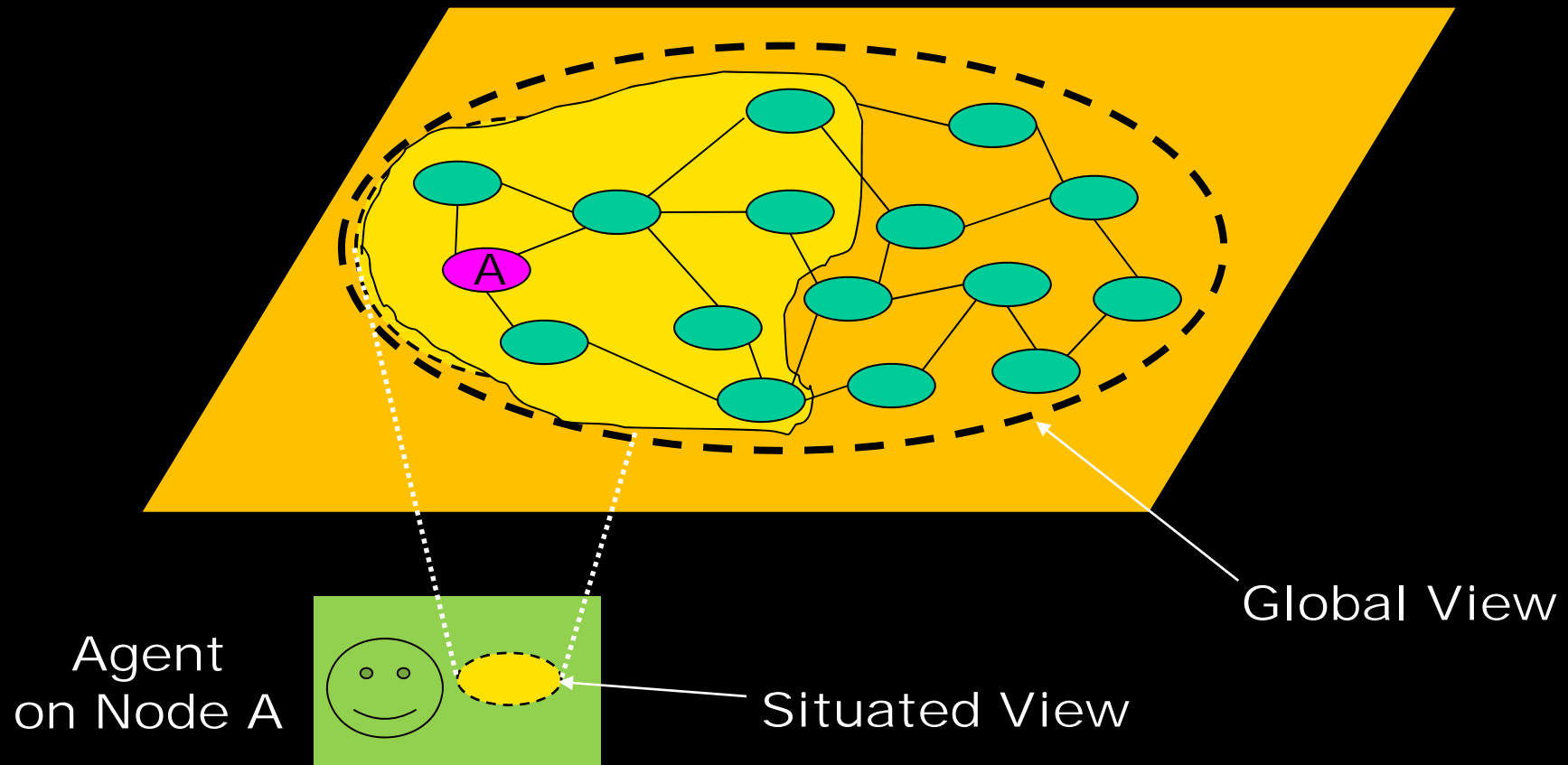
Knowledge and piloting plane



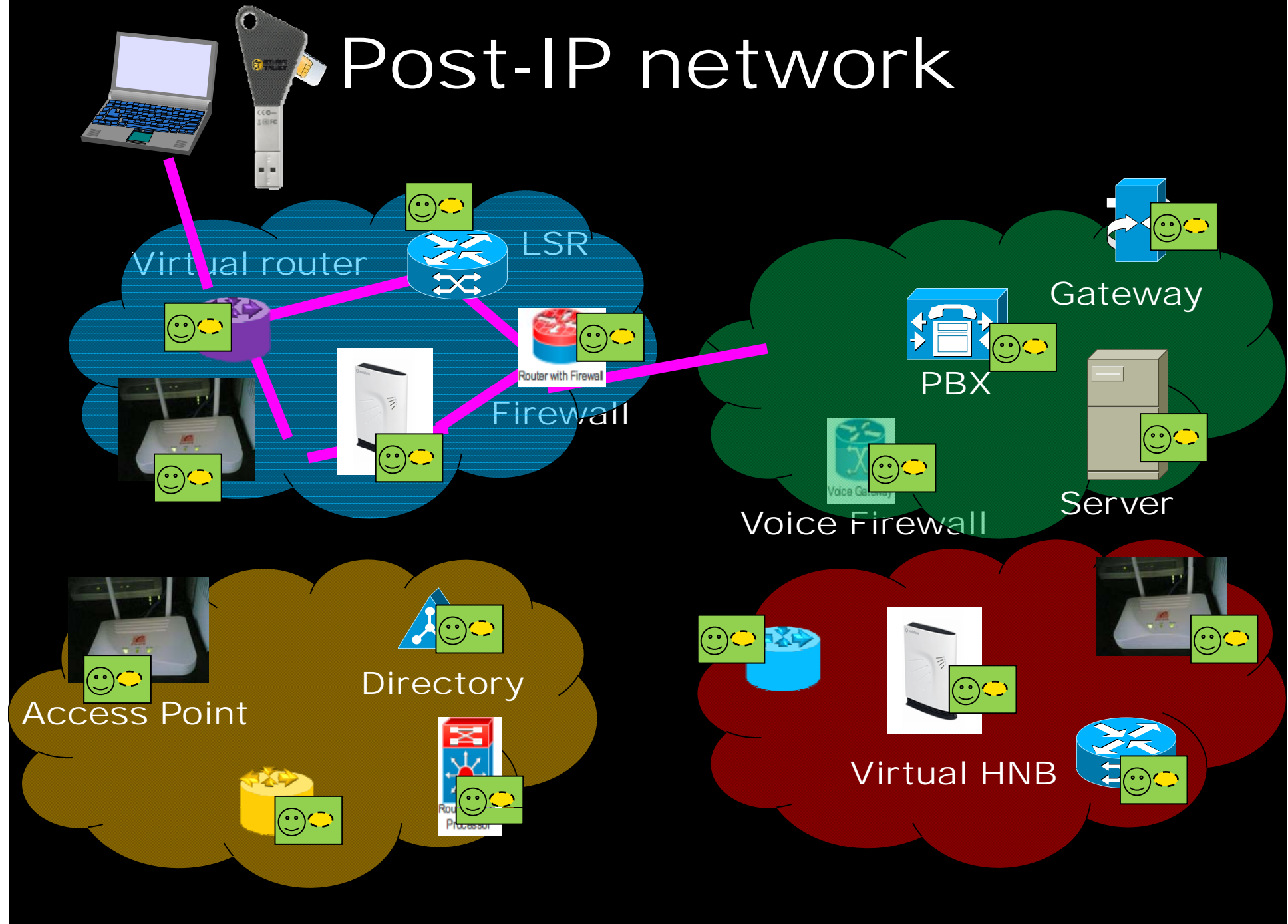
Behavior are expert autonomic components in charge of monitoring, decision and control.

Dynamic Planner orchestrates all the activities of the Agent.

Knowledge and piloting plane



Post-IP network



Questions

