Università degli Studi di Firenze

Software Defined Mobile Fog Networking

GAUCHO – A GREEN ADAPTIVE FOG COMPUTING AND NETWORKING ARCHITECTURE

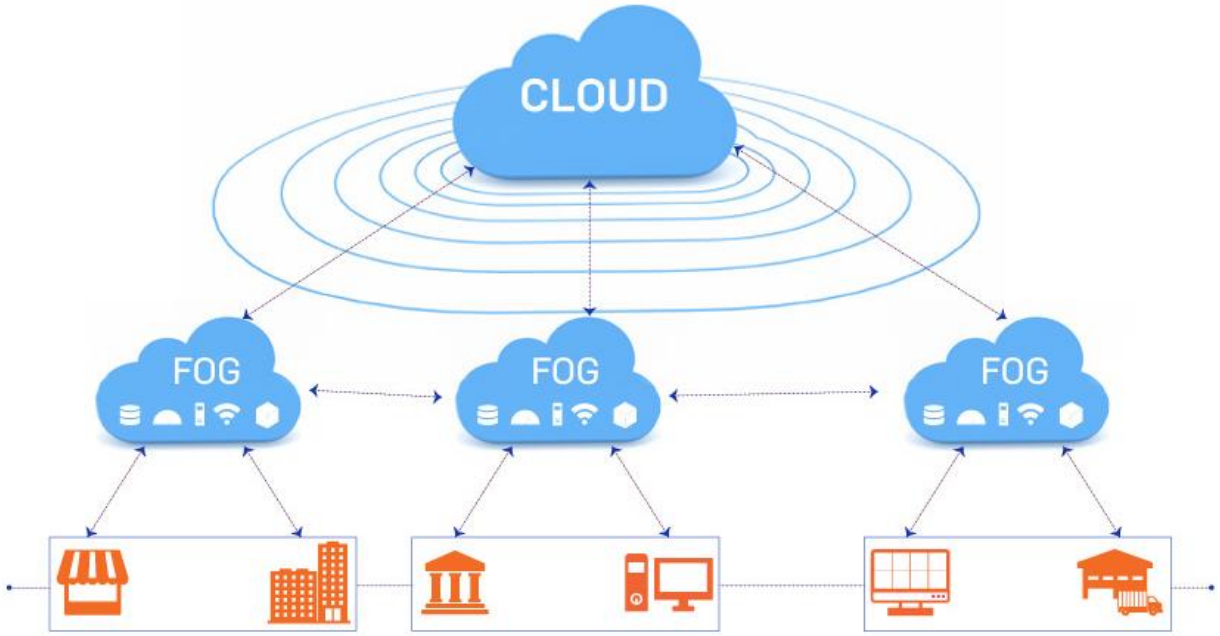
Software Defined Mobile Fog Networking - SDMFN

Combination of:

- **Fog Computing**, able to reduce the latency for real time and location aware services and to avoid the increase of traffic in the core network.

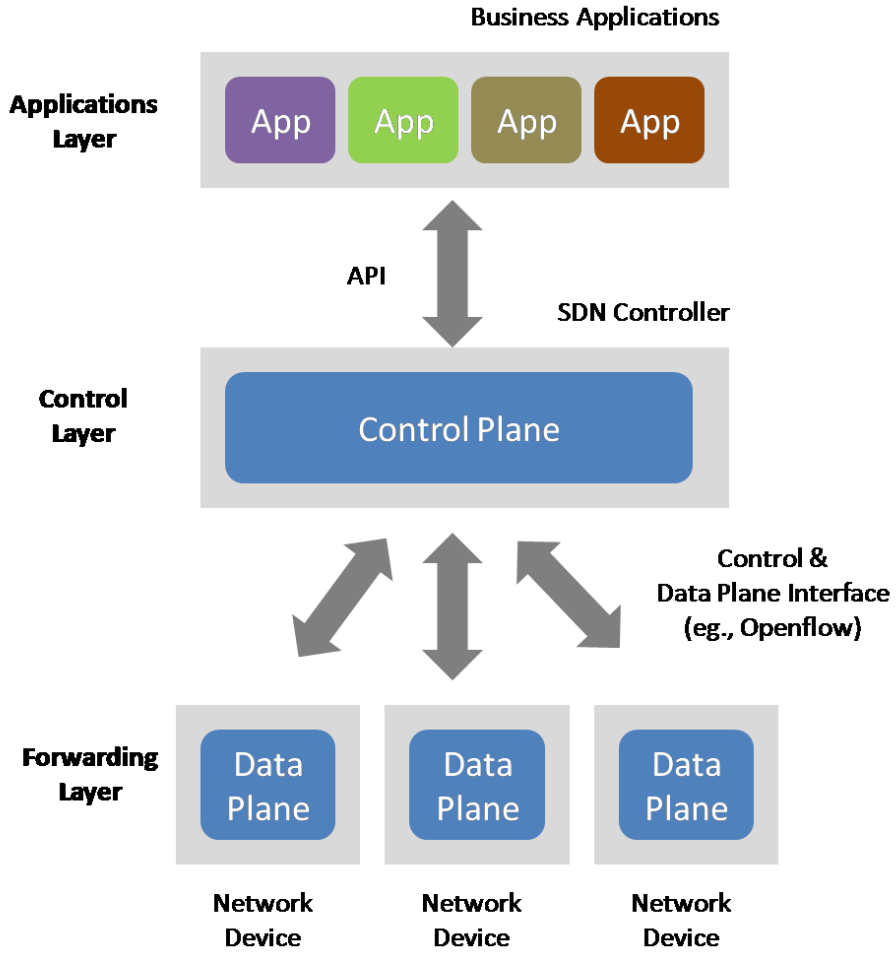
- **Software Defined Networking – SDN**, which alllows both simplified network management and a high degree of stability, flexibility and innovation.

Fog Computing



- Distributed infrastructure;
- Central layer between the cloud and the hardware to enable more efficient data processing, analysis and storage;
- Located more close to end users;
- Process and give response to the Client in less time

Software Defined Networking



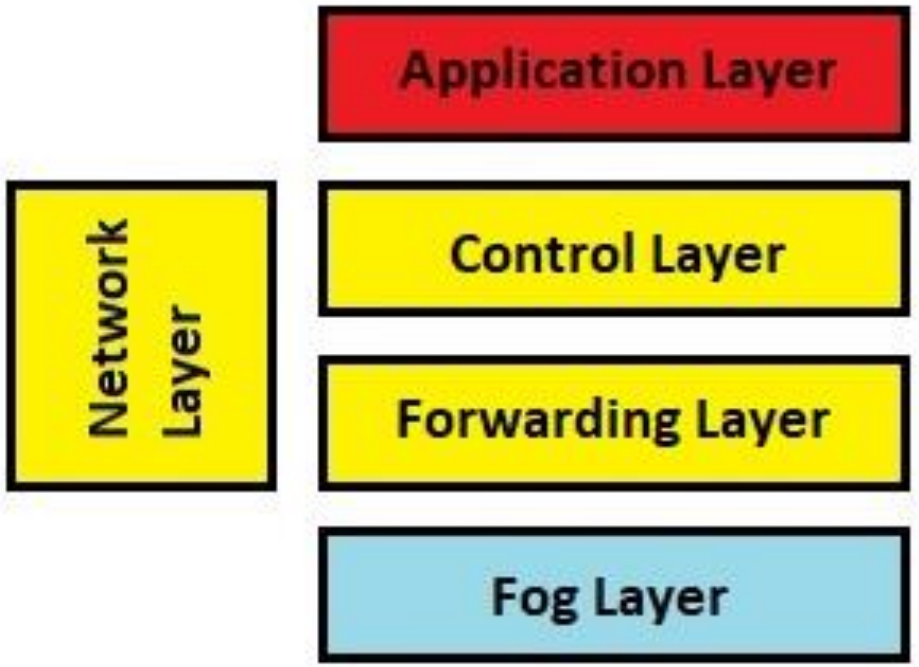
3 Logical Layers:

- Forwarding Layer;
- Control Layer;
- Application Layer.

4 Types of Interfaces:

- Southbound;
- Northbound;
- Eastbound;
- Westbound;

Architecture of Software Defined Fog Network



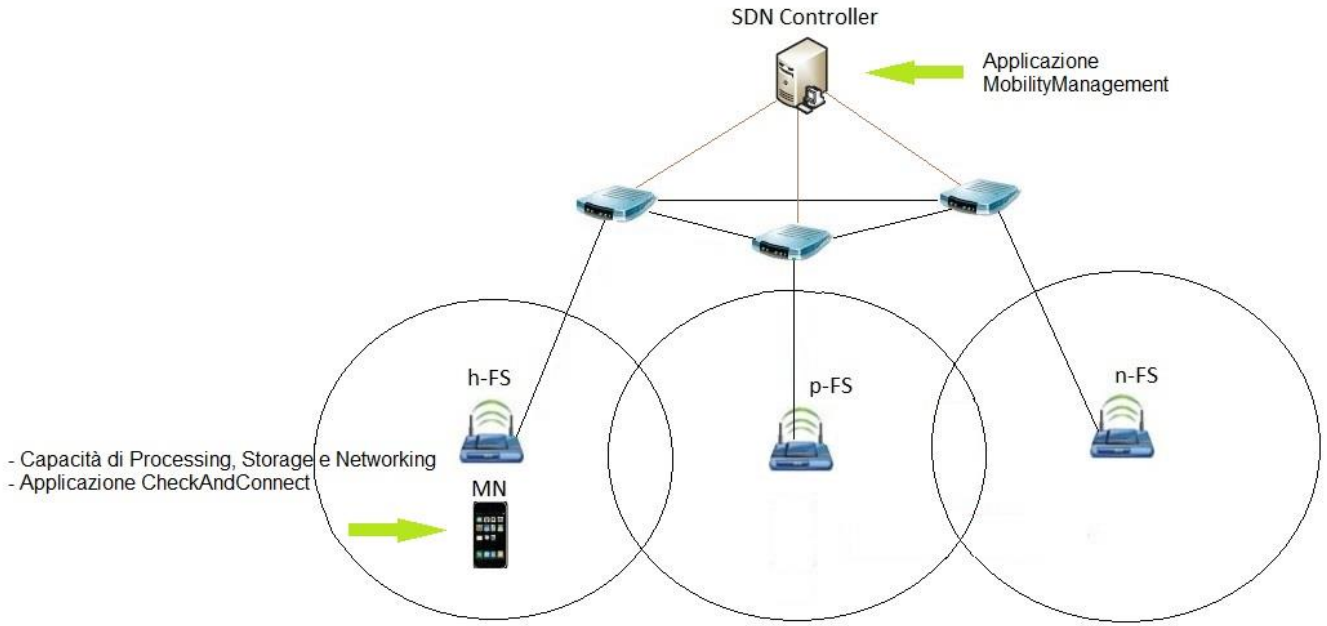
Applications for network management

SDN Controller and DHCP server

OpenFlow switches

Fog Servers

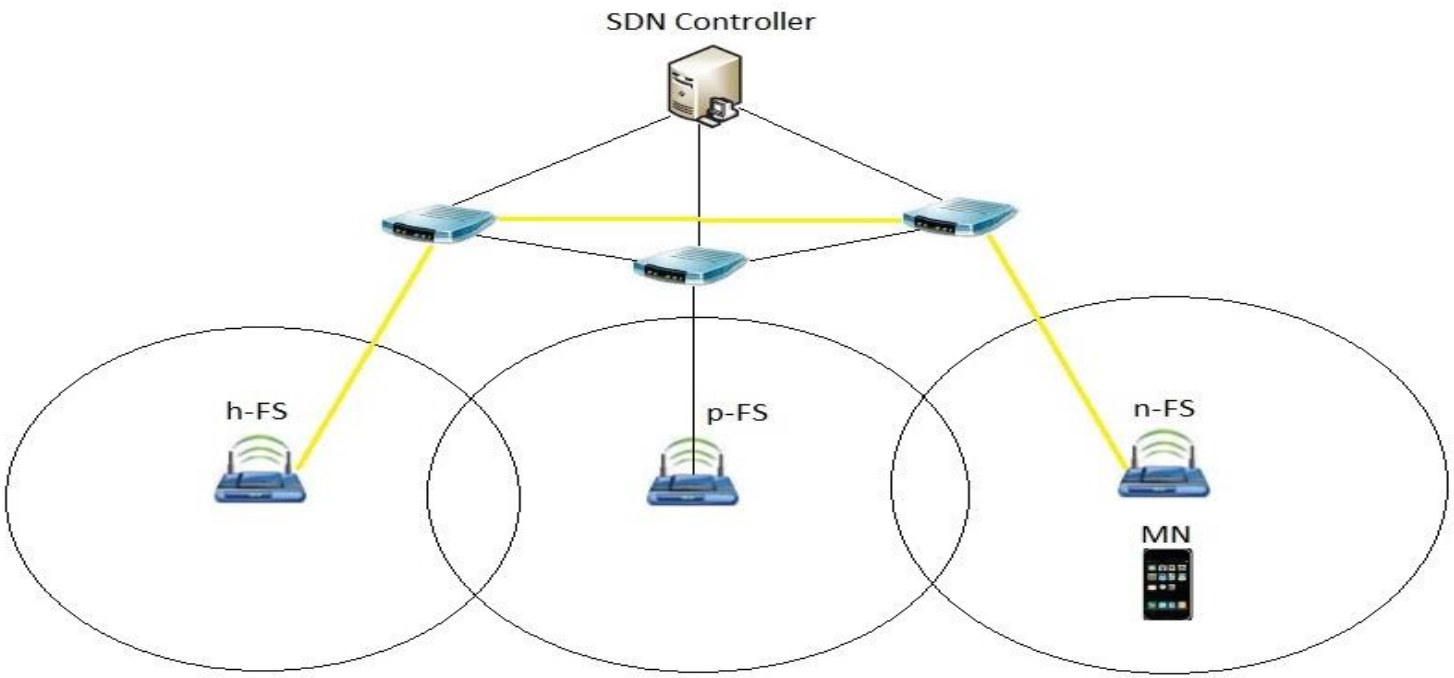
Design



➢**Phase 1:** Connection of the MN to a FS (h-FS) and subsequent receipt of a service;

➢**Phase 2 - Flows redirection**

Flows redirection

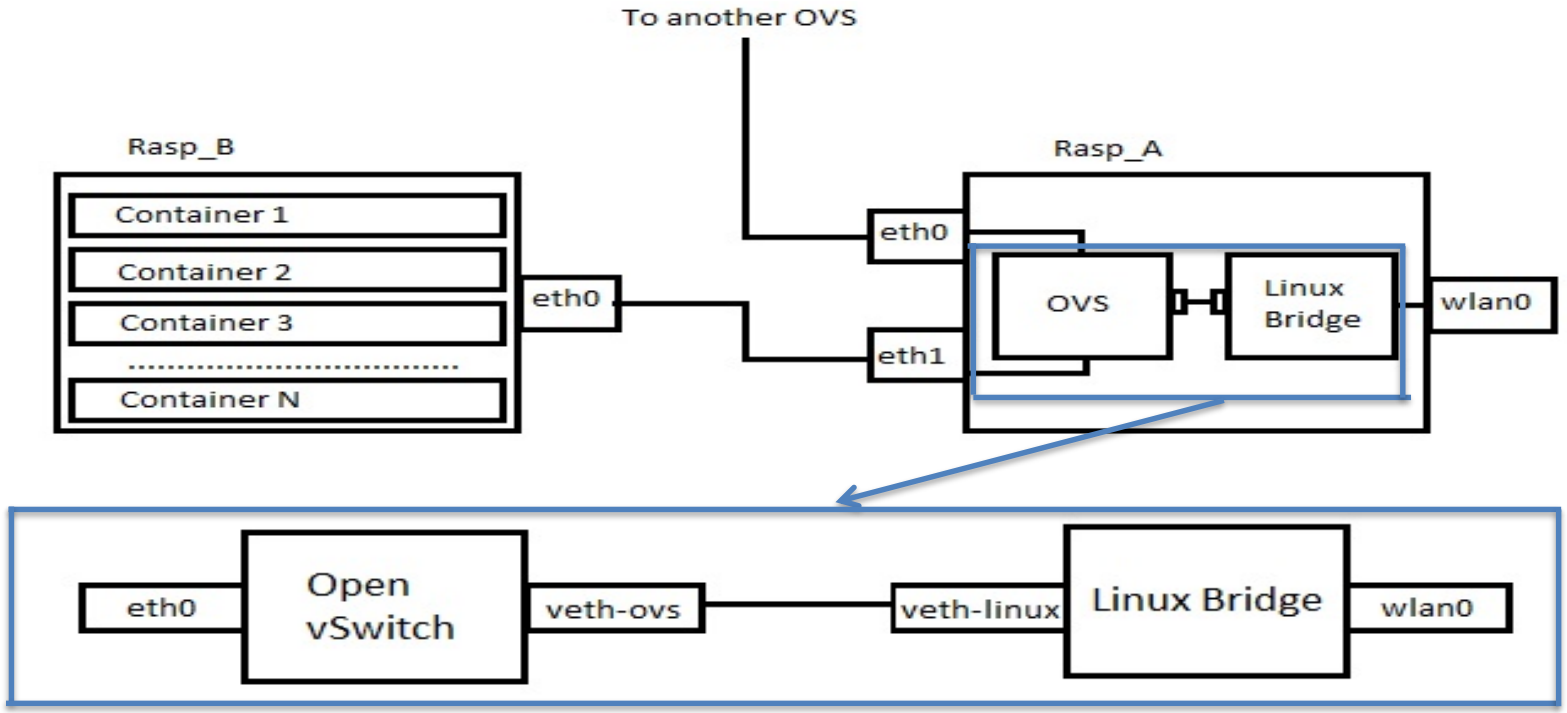


1) MN is connected to the p-FS but is receiving the service from the h-FS;
2) Moving, MN detects a better FS and activates the pre-handover procedure;
3) The SDN Controller calculates the best route and redirect the flows;
4) MN performs the handover and connects to the n-FS;
5) SDN Controller modifies the flow entries of the switches, so as to guarantee the forwarding only on the best route.

Realization

Fog Layer:

• Fog Server, made using two Raspberry 3 b+;



• Mobile Node, laptop with an external IEEE 802.11 antenna and running the CheckAndConnect application.

Forwarding Layer:

• Modem Router with OpenWRT running Open vSwitch.

Control Layer:

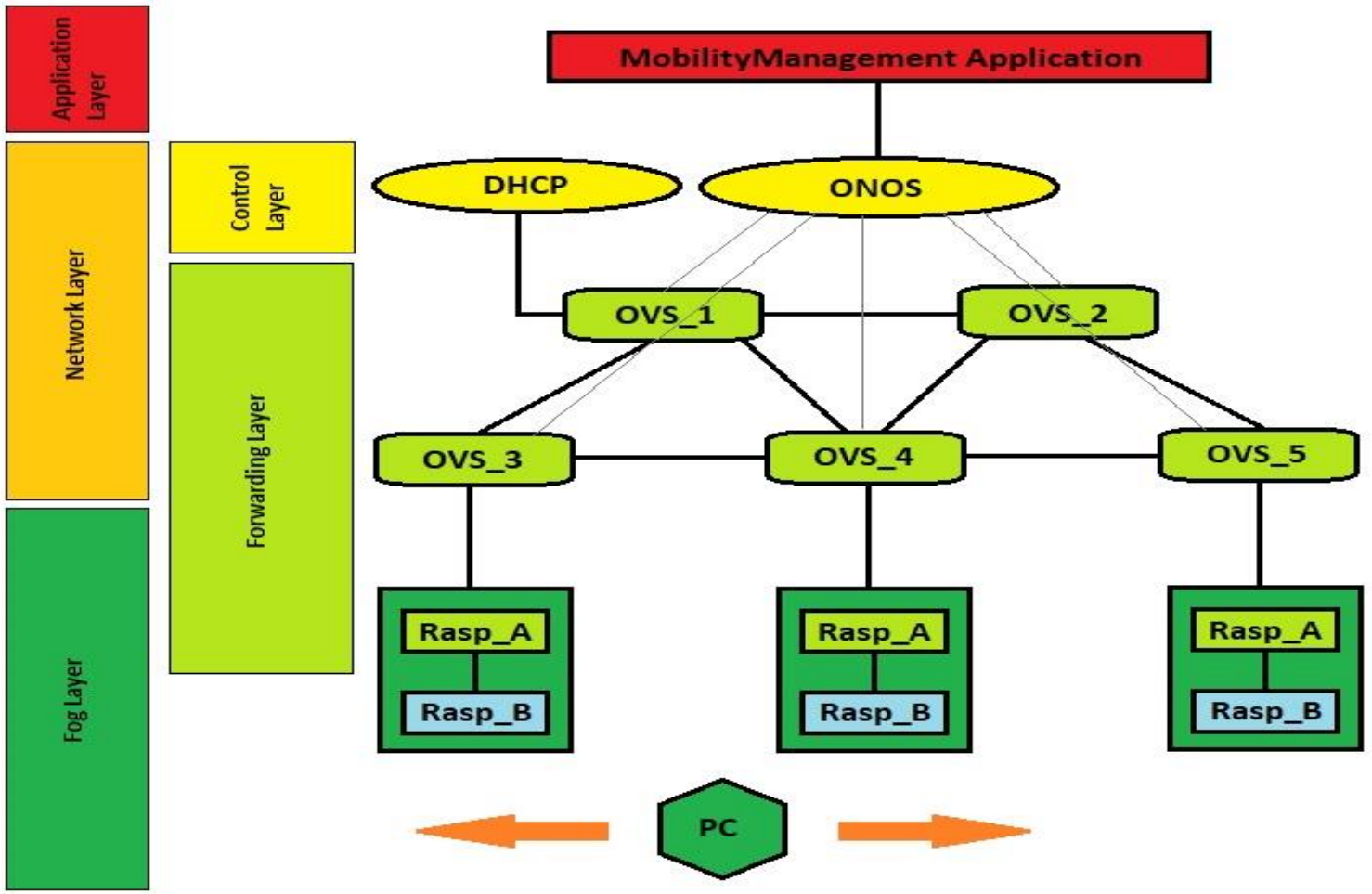
• Server running ONOS Controller;

•DHCP Server.

Application Layer:

• MobileManagement application on the same server of the SDN Controller.

Overall System



Let’s demonstrate an experiment…