Software Defined Networking (SDN)
Network Function Virtualization (NFV)
Edge Computing

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History and terminology

SDN: decouple control/data plane

Virtualization, from DCs to NFV and programmable data planes

From network core to edge platforms

Virtual Machines

Containers

Unikernel

Programmable data planes

Control Plane

Data Plane

Network and function abstractions

Network Operating System (SDN controllers)
Use cases

NFV: vOPG, vCPE, vCDN, …

MEC: gaming, AR/VR, ML/DL, massive IoT, vehicle services,…

NFV/computing: core routers, management platforms, etc.

Source images: Telefónica Open Access and Edge Computing White Paper 2019
Research work past and present

- Abstraction and programming languages
- Programmability of data and control plane
- Orchestration and resource allocation
- Use cases
- Architecture design and standardization
- Data/Control plane performance
- Data/Control plane verification
- Security and privacy
Hot trends: edge computing and data plane programmability

- Architecture design for heterogeneous HW
- Abstraction for reconfigurability and management
- State management and representation
- Performance, security and HW offload
- Monitoring, verification, anomaly detection
- Orchestration, resource allocation, slicing
- Multi-operators environment, cloud vs edge
- Use case driven work: e.g., real time and ML/DL functions
- Measurements with first deployments
- Granularity and technology: microservices, serverless, unikernels, processes, …
Thank you!