A Few Musings on Elastic Network Edges and In-Network Computing

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The Network Edge

- The limit of the management domain of a network provider
  - Usually, with respect to the user access
  - But other providers could be considered as well
- *Edge computing* has become a popular target in these days
  - Fostered by SDN and NFV
  - Access edges no longer based on dedicated devices
  - Use cases related to latency, pervasiveness, resiliency...
  - Open standards and implementations

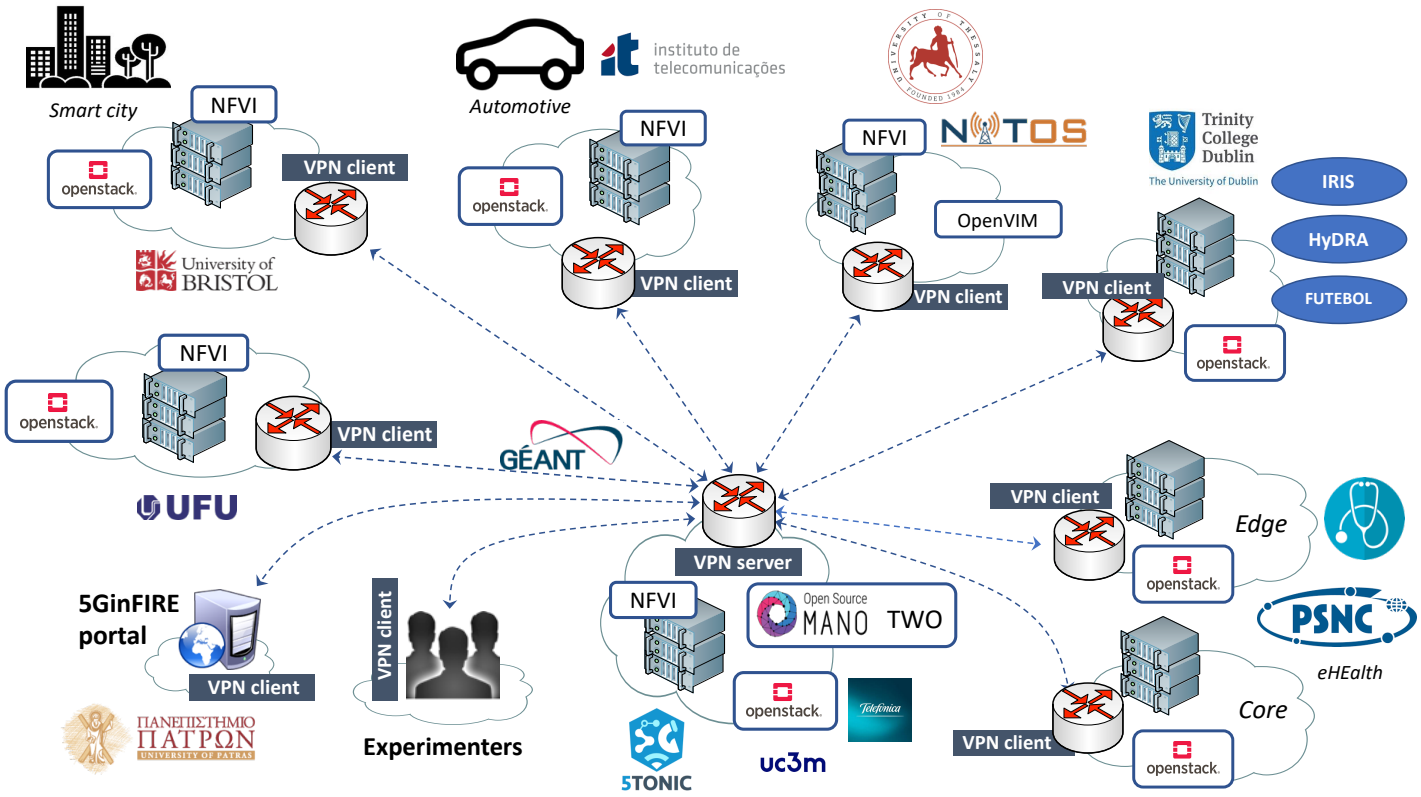
Blurring the Edges

- In-network computing allows us to blur internal edges
  - Positioning functions of all nature
  - From the access edge to core datacenters
  - And forwarding data as needed to the appropriate place
- But external edges as well
  - Go beyond the access edge to build ad-hoc networking
  - Go beyond the inter-provider edge to build cross-domain services
  - Go beyond the NSP/ASP edge to build integral service stacks
    - *NSP* (network service provider), *ASP* (application service provider)
- Welcome to the continuum

A Few Obvious Challenges

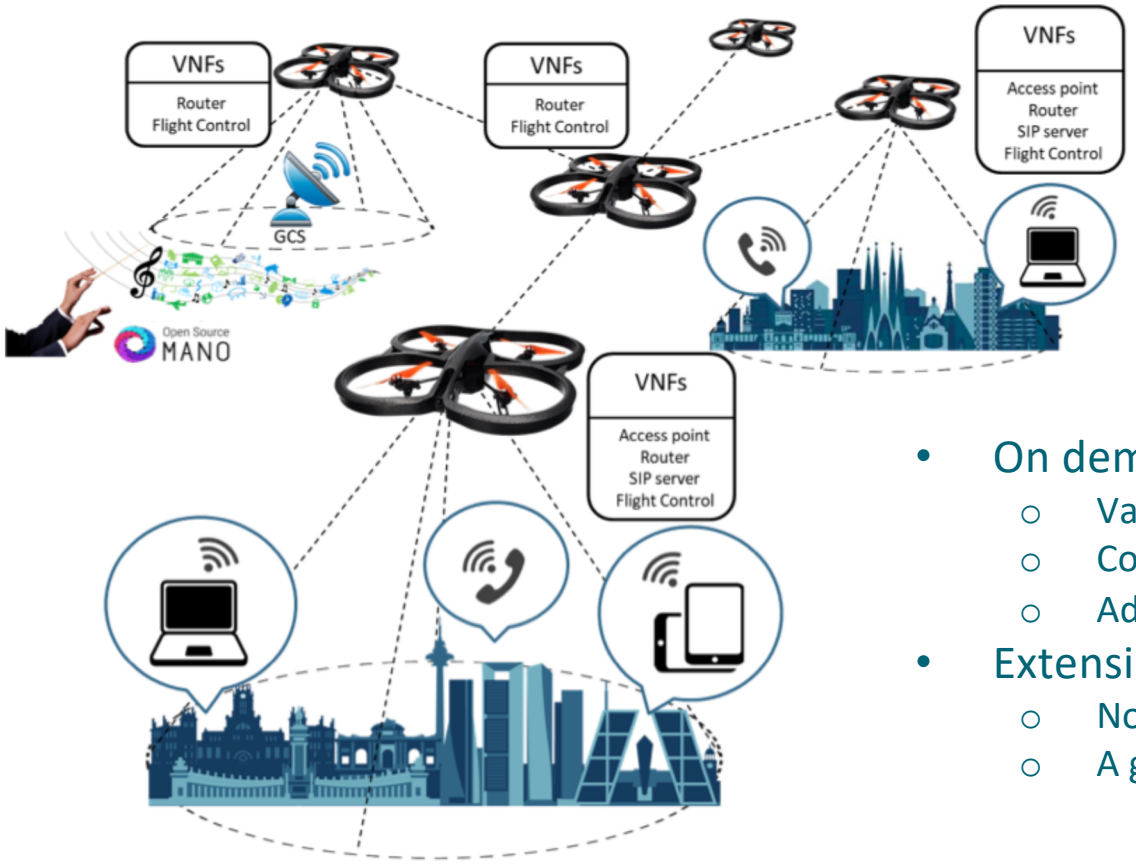
- The natural forwarding considerations
  - Rule updating
  - Mobility
  - Domain crossing
- The unavoidable security matters
  - Mutual attestation
    - Guest functions and host environments
  - Decentralized traceability
    - The quest for a scape goat if needed
  - Privacy
    - The required term
    - While preserving the above goals as well

A First Example: Cross-Domain NFV



- Common function repository
  - Including metadata
- Common orchestration and control
  - Monitoring and telemetry
- Common service model
  - Consistent definitions
- Specialized environments
  - Tailored to concrete use cases when needed

A Second Example: Orchestrating by Drones



- On demand infrastructure
  - Variable topology
  - Component reuse
  - Adaptive functionality
- Extensible as edge computing
  - Not limited to network internal functions
  - A general in-network computing concept