IDATE Consulting

Business Impact

VNPaaS

Virtual Mobile Core Network

vCDN and MEC

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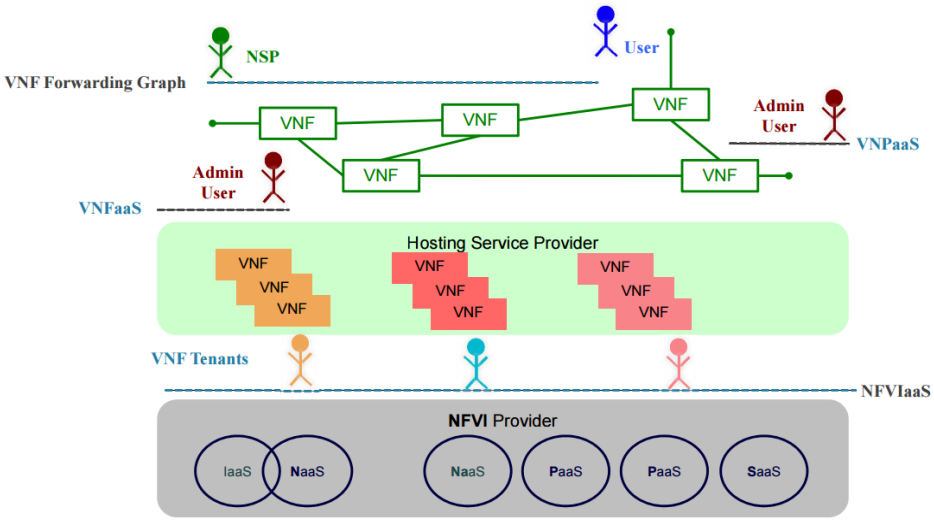
Brussels - 30 June 2016

Introduction to Virtual Network PaaS

> VNPaaS concept blurred

- Similar to conventional telco PaaS
  - VNPaaS provides companies with a platform allowing to run services without managing the underlying infrastructure at lower costs
  - Multi-tenant characteristics : possibility to share the same platform between multiple third parties
- Specifically to VNPaaS
  - Exposure of existing and new network services usually tied to hardware appliances under the form of VNFs
  - Unlimited applications to be deployed



> Specific benefits identified from VNPaaS

- Reduction of upfront CapEx leveraging on virtualization
  - Resources added through software avoiding purchase and install of dedicated hardware appliances
  - Resources dynamically allocated when needed (in case of disaster or congested zones)
  - Resources shared and concurrently used between multiple users
- Reduction of OpEx directly linked with the reduction of hardware
- High level of flexibility

Improved network assets utilization

Implication Virtual Network PaaS

> New revenue opportunities

- Ability to offer a better proposition with VNPaaS compared to non virtualized PaaS
  - Broad variety of network services exposed, potentially more end users
  - High level of customization with possibilities to deploy new VNFs
  - Ability for end users to orchestrate and control VNFs
- Telcos already active in the cloud and capture less than 10% of the market in 2013
  - PaaS, the smallest cloud market weighting for 5%, estimated at 2.5 billion EUR in 2013
  - PaaS market expected to flourish driven by the innovation through apps (6.3 billion EUR in 2018)

> Value chain impacts

- Improve telco position in IT area also by hosting cloud infrastructure and by doing more integration
- Competitive advantage face to traditional PaaS providers
- Traditional equipment providers with the reduction of hardware required
- Virtualization specialists issued from SDN/NFV (not specifically to VNPaaS)
- Opportunity for new players to enter the market
  - Hosting companies
  - Integrators

Opportunity to monetize on network assets

Introduction to Virtual Mobile Core Network

> Focus on EPC

- In line with 3GPP LTE mobile core network
- Clearly seen as a major application of SDN and NFV paradigms to provide new capabilities to support a variety of use cases
  - Comparable performance in terms of scaling
  - One or the whole EPC to be virtualized
  - Though critical elements subject to very fluctuating traffic and flows

> Specific benefits from deploying vEPC

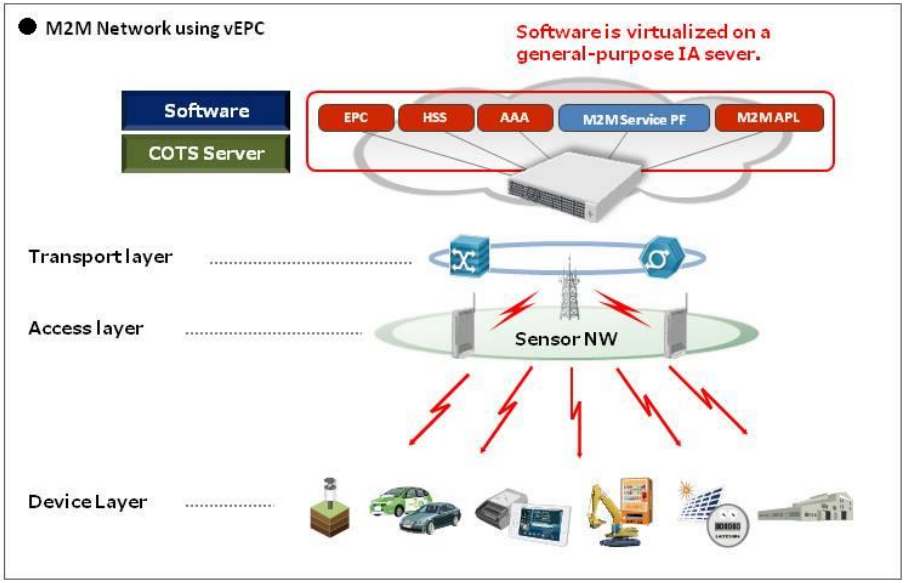
- Cost reduction
  - CapEx savings from the consolidation of the platforms to support the different mobile core network functions, reduction of dedicated physical hardware and related maintenance
  - Environmental savings
- Cost efficiency
  - Modular scalability, agility, elasticity as network demand evolves
  - Especially under peak usage and congested areas (e.g. natural disaster)
- Time to market acceleration (reduction of on-site deployment)
- Innovation through new classes of applications
  - Slicing, mobile core instances dedicated to specific services rather than unique

Leveraging vEPC to deliver innovative services at lower costs

Virtual Mobile Core Network

> New revenues opportunities

- Mobile broadband
- VoLTE and Wi-Fi Calling
- Support for verticals
  - IoT/M2M
  - New model of MVNO
  - Entreprise



> EPC value chain impacts

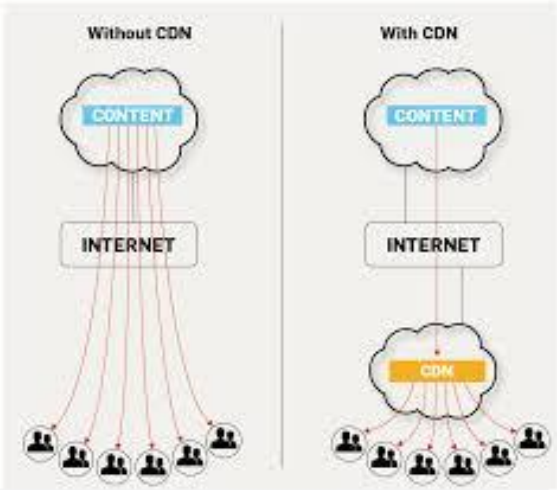
- Strengthening telcos activities
- Improve telcos role in the IoT/M2M
- Strong competition in Mobile Core Network supply with aggressive players
  - Specialists of vEPC
  - Consolidation : Connectem acquired by Brocade, Starent by Cisco
- New players include integrators
- More end users with telecom and non-telecom companies

Introduction : CDN and MEC

> Concepts existing before/without SDN/NFV

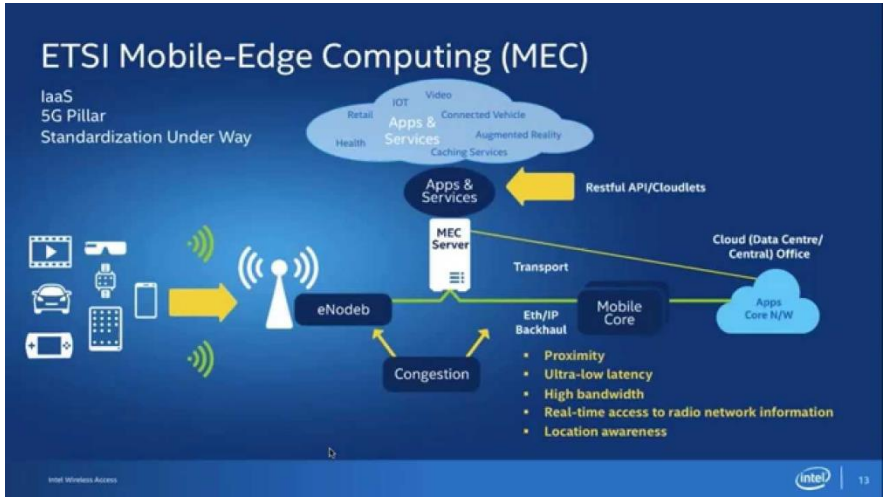
CDN (Content Delivery Networks)

- Delivery of large files (video)
- Delivery of small files (web)
- Acceleration



MEC (Mobile Edge Computing)

- Edge computing resources
- A computing version of video CDN (often essentially for fixed networks)
- New : mobile focus, even potentially at the eNB (but unlikely for cost reasons, at least for full scale deployments)
- Strong expectations through 5G

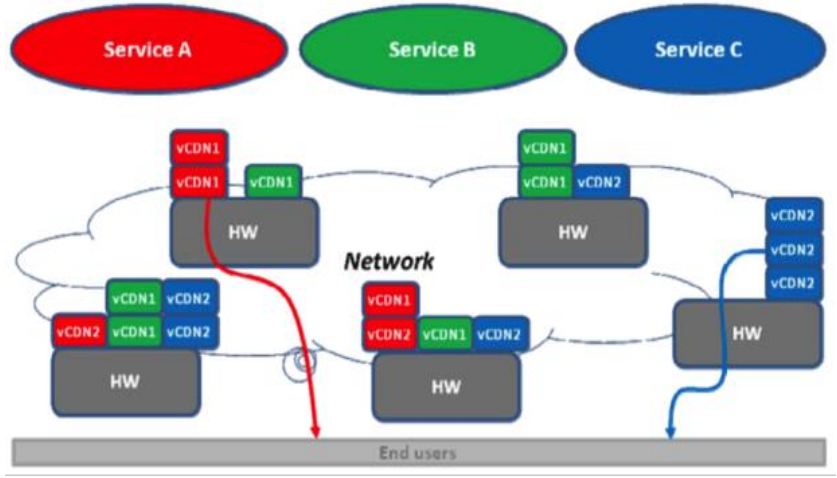


vCDN

> Usual benefits of CDN

Edge caching and load balancing

- Reduce latency
- Reduce bandwidth costs (esp backhaul)



> Specific cost benefits with vCDN

Deeper integration of all types of CDN (traditional and telcos). A better model than CDN-I (interconnection of telco CDNs)

Shared hardware for vCDN

CAPEX impacts through generic hardware

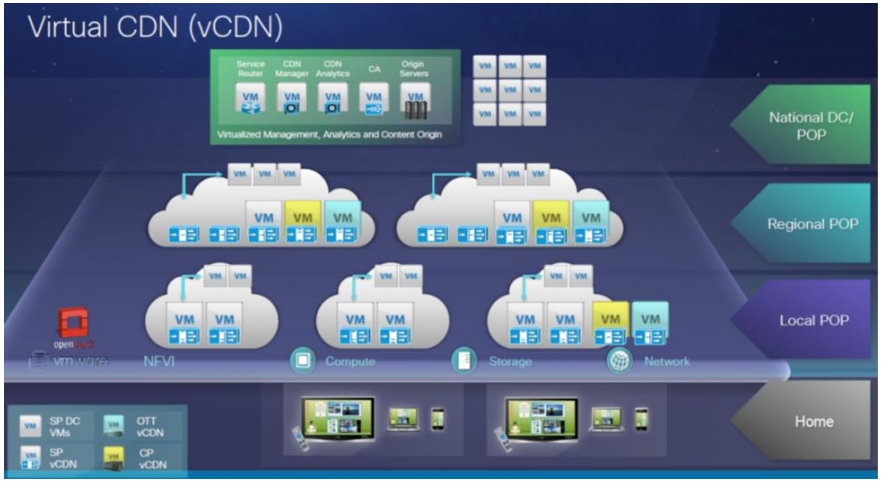
- no need for video specific servers (and hardware independence)
- Unclear overall impacts due to server localization

OPEX benefits

- Lower power consumption
- Less specialized staff
- Transit savings

Integration of software-based services

Indirect benefits on operations



> New Revenues opportunities

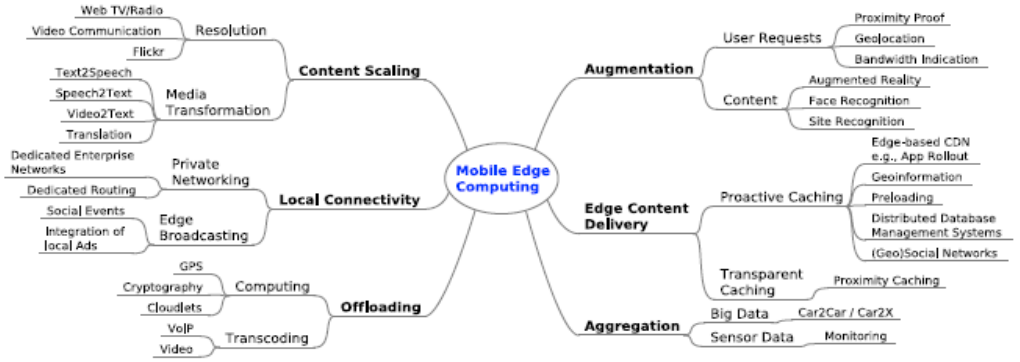
- 2 sided approach for video delivery, similar to CDN in general
  - Wholesale (bandwidth, storage, computing, data)
  - Retail (QoS as a service, latency for gamers). Potential quite small here on the consumer markets.

MEC

> Usual benefits of MEC

Bring economic benefits of cloud and IT at the edge of networks

- MEC is an enabler, in combination with SDN/NFV, rather than cost saving solution
- Partly similar to small cells in terms of potential markets



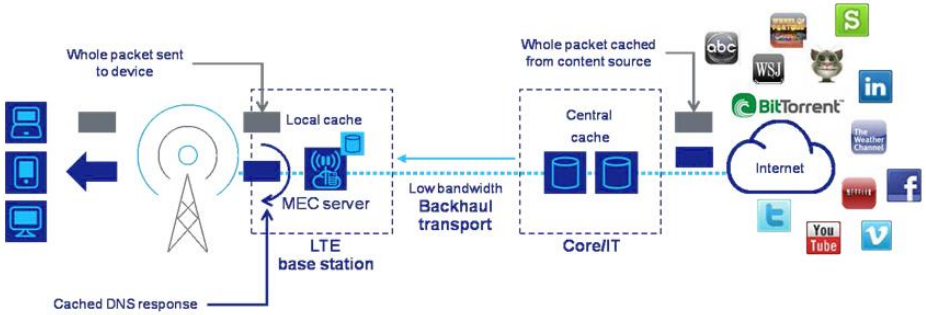
> MEC cost benefits are more indirect

More limited than with vCDN in general

Higher efficiency of network (processing, radio resources, backhaul)

> New Revenues are the focus

- Benefits in markets leveraging
  - Low latency
  - Proximity and location awareness
  - Edge isolation
  - High bandwidth locally
  - Real-time insight of (local) network
- Numerous potential use cases, but with some high degree of competition
  - Augmented reality, video delivery in stadiums, IoT/M2M (especially connected cars), enterprise services (voice, data), analytics, local-based services



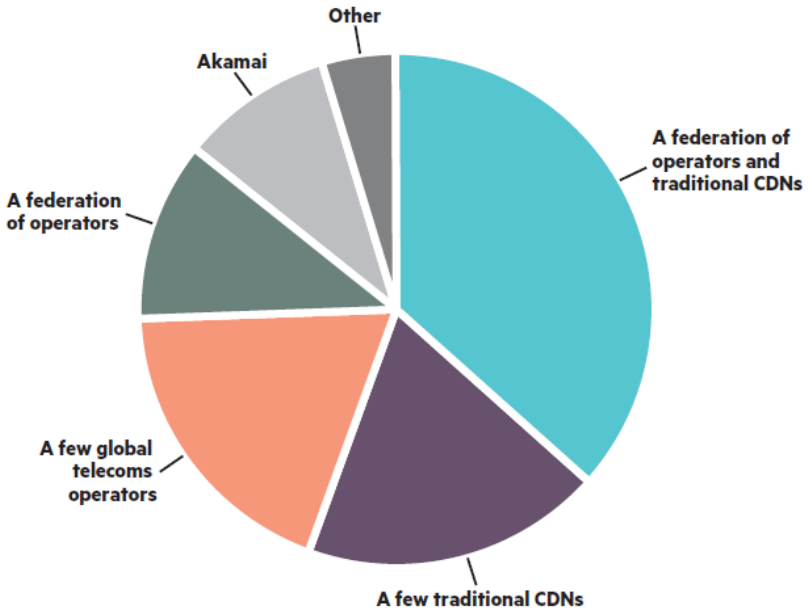
- A distributed caching technology can provide backhaul and transport savings and improved QoE
- Potential to reduce backhaul capacity requirements by up to 35%. Local Domain Name System (DNS) caching can reduce web page download time by 20%

vCDN and MEC

> Value chain impacts

- Competition from IT vendors for NEP
  - More limited than other use cases as still need for physical edge resources
- New VNOs/brokers to address specialized markets/small clients
- Squeeze of traditional CDNs? At least more competition in the CDN market
- More wholesale approaches for telcos with large accounts

By 2017, which company or companies will dominate the delivery of high-quality video over the Internet?



Source: Informa Telecoms & Media