REACHING 5G CORE POTENTIAL

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Bringing 5G core to Life

verizon

Verizon and Ericsson deploy ground breaking cloud-native packet core controller (vMME) in a live wireless core network

May 27, 2019

SK telecom

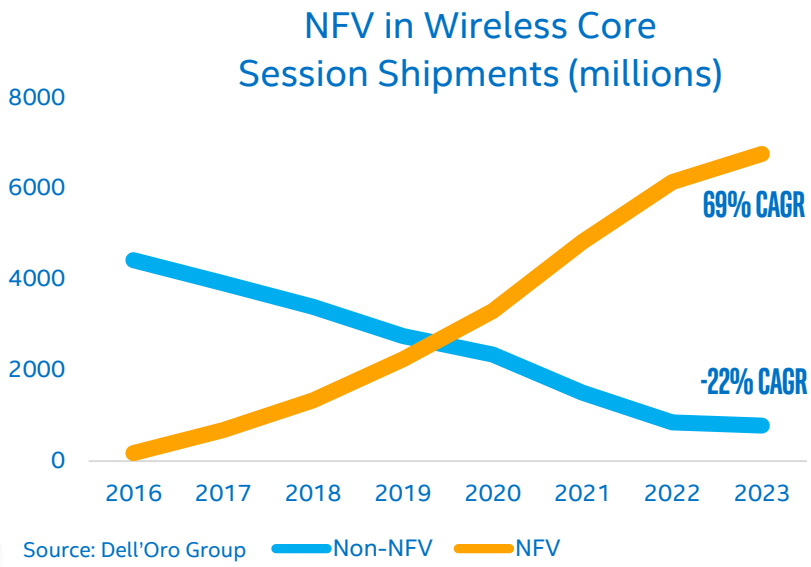
Joint SKT and Intel white Paper defining a MEC services reference architecture enabled by distributed UPF to the Next Generation Central Office

Feb 13, 2019

ERICSSON

Ericsson's dual stack mobile core User Plane function delivers up to 193 Gbps User Plane throughput, offering high performance at low cost per gigabit

July 16, 2019



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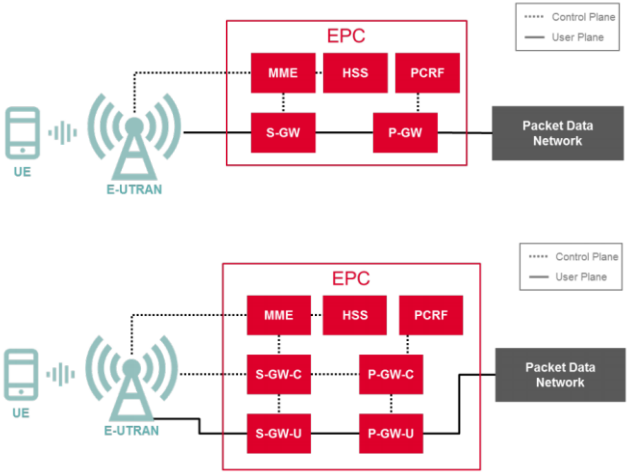
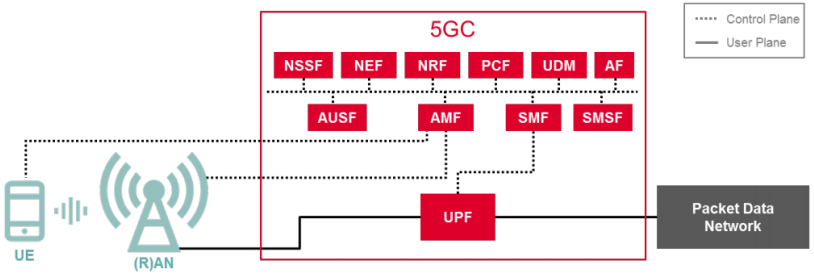
4G LTE & 5gCN



3GPP Release 14 Introduced CUPS



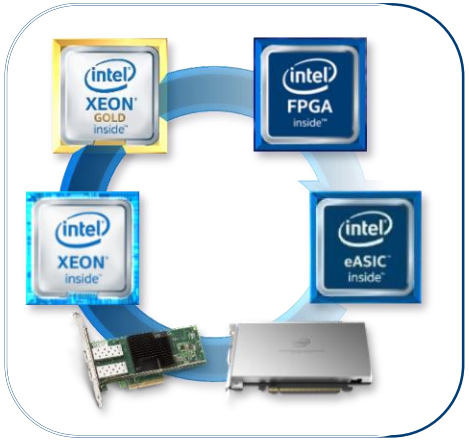
- For 1st wave 4G LTE, IA was leader in CP.
- With NR deployed with LTE core (option 3) Intel is leading in both Control and User plane deployments.
- Intel is defining new platforms optimised for the new Disaggregated Mobile Core.

- 5GC was CUPS defined from Instantiation
- With the flexibility of IA compute we can support any deployment option defined in 3GPP on common NFVI
- Using our reference stack Intel has documented a plethora of optimisations and configurations for User Plane Function (UPF).

Source GSMA: Road to 5G: Introduction and Migration

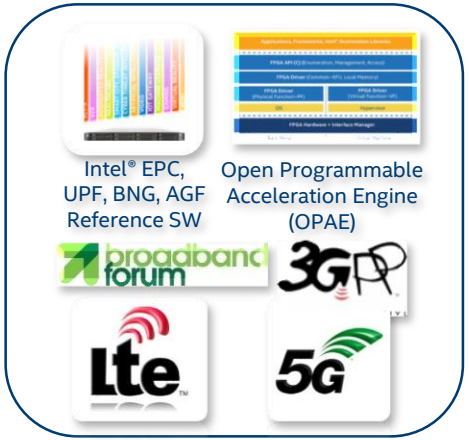
Intel NFV Strategy

Hardware



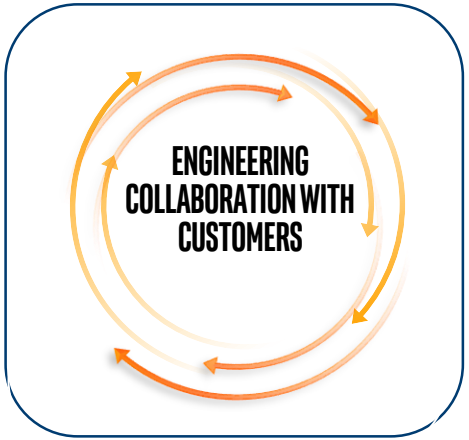
Broad portfolio of technologies

Software



Standards and industry forums

Broad ecosystem enabling



IP, OEM, OSV, ISV, SI & Orchestration

- Enabling a common Infrastructure for workload consolidation
- Standard Interfaces to address both Infrastructure (NFVi) and Application (VNF/CNF)
- Enabling standard SW programming models & Orchestration

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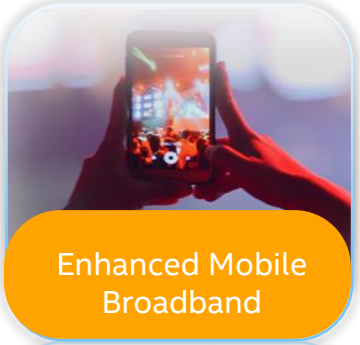
5G User Plane Function (UPF) many use cases

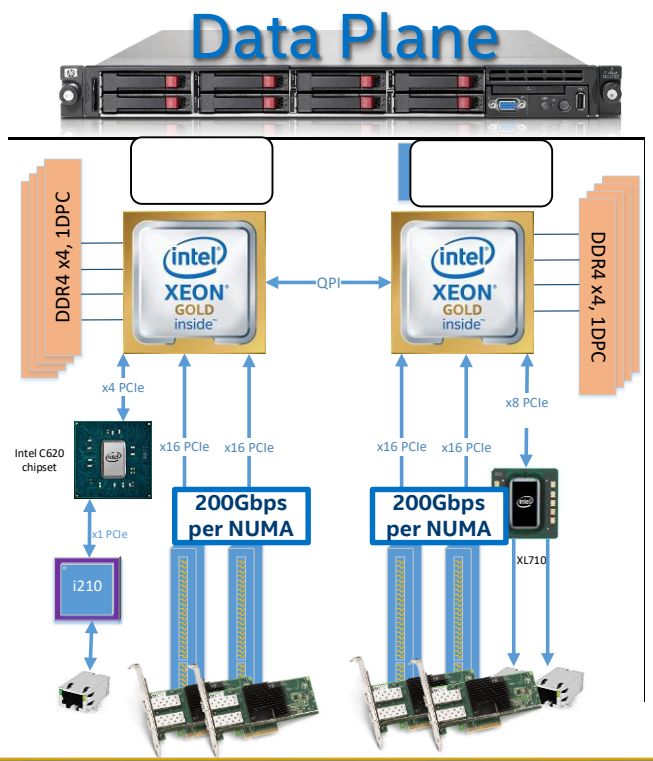


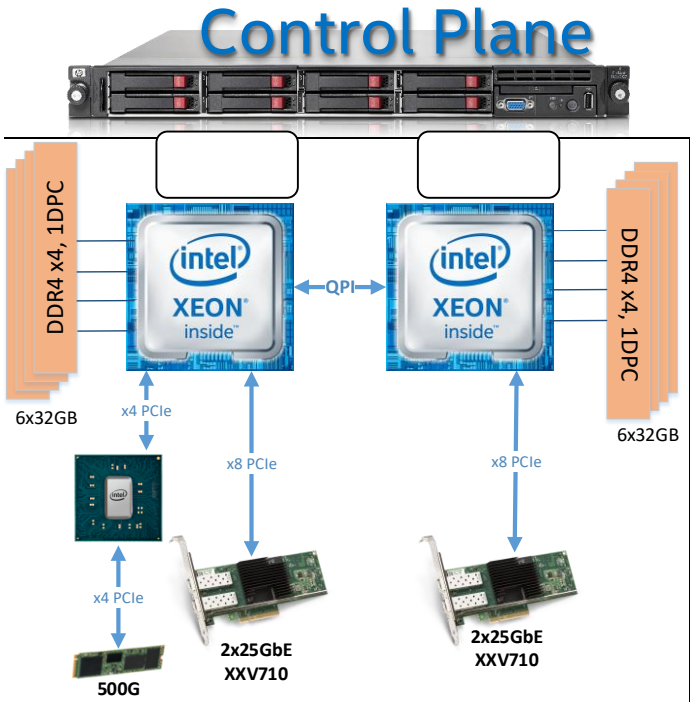
Option 3,4 & 7

Optimised for Flexibility, Performance and Scalability

Single Platform Supporting 5G use case from Core to Edge

Optimised wireless core configurations

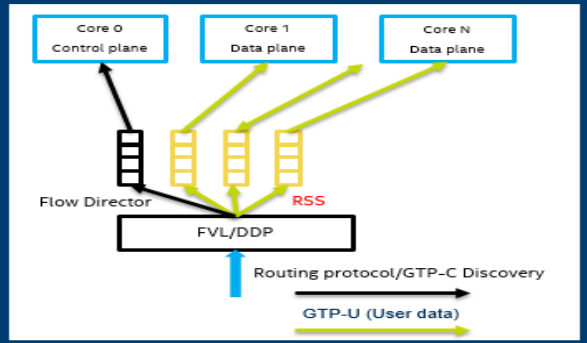


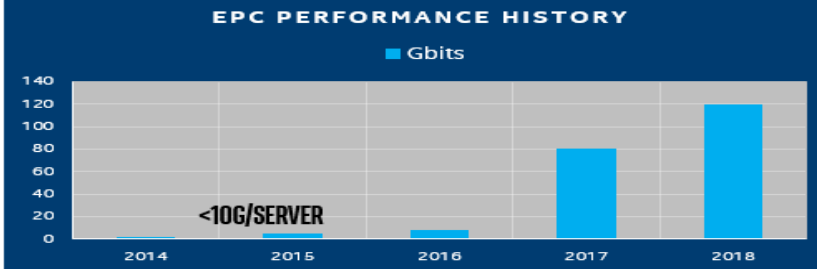


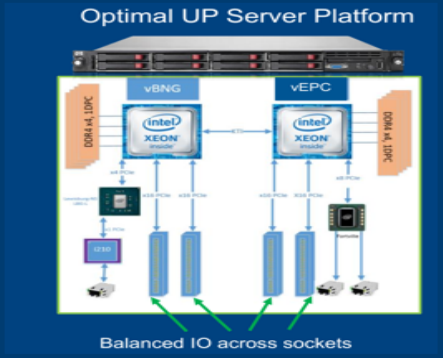
Balanced IO across sockets enabling dual DP server maximize Data plane processing for vEPC or UPF

User plane Best Known Methods

- NFV missed the initial roll out of 4G LTE
- vEPC performance has improved exponentially in the last 5 years
  - **Code Optimisation:** working directly with ISVs to optimise to Intel x86
  - **Balanced IO:** enables both CPUs be used for User plane
  - **Load balancing techniques (incl. DDP):** TCP, Checksum, protocol Steering from standard NIC
  - **Run to completion (RTC):** uses LB techniques to allow application Scale performance with Cores
- Once the architecture rises high above the demand curve, TCO becomes positive and we see serious greenfield builds, Rakuten, RJio etc.







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Core – 4G/5G

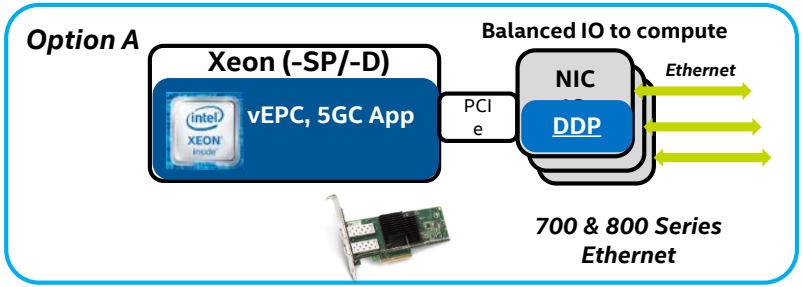
Example Platforms

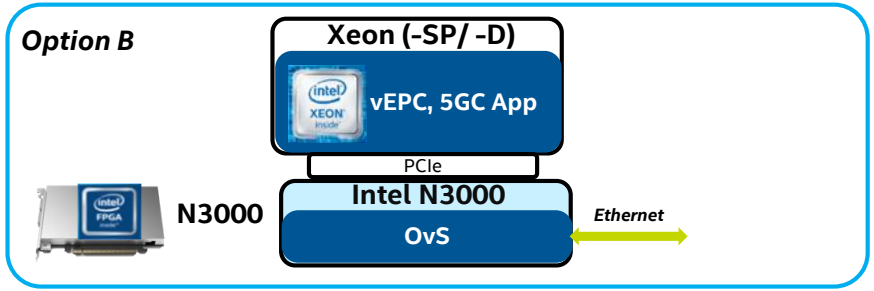
Enterprise IT

19" Telco Rack (dUPF)

Example Configurations (Customer Configs can be reviewed)

VNFs (EPC, UPF, IMS)	VNFs (EPC, UPF,IMS)	VNFs (EPC, UPF, IMS)
UPF	UPF	UPF
Intel Comms Package Protocol (GTP), Load balancing	*HW Accelerated Infrastructure Fabric: OvS*	*Optional: HW Accelerated: OvS Application: TEP, Load balancing*
Software only	Infrastructure Accelerated	Infrastructure & Application offload





Xeon | NIC | FPGA

Call to action

5G is here and now. And its Running on Intel x86

Intel and the industry are investing in 5G end-to-end and driving network transformation

Let's collaborate to realize the full potential of UPF in both Core & Edge

Visit networkbuilders.intel.com for more information

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