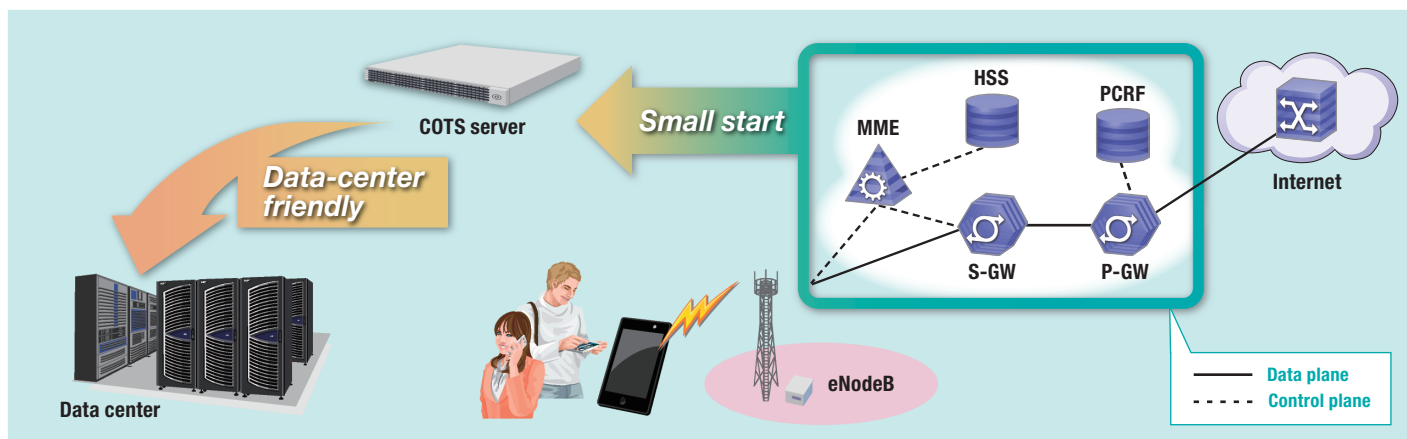# Virtualized LTE Packet-Core Network Suite

Virtualized EPC (vEPC)

vEPC is a mobile-core network system that supports the LTE standard. Empowered by NEC's carrier-grade virtualization platform and software-defined networking (SDN) technology, vEPC optimizes mobile operators' total cost of ownership (TCO) and service quality.

Proven EPC system provides reliable network operation

NEC's vEPC solution is based on proven and trusted mobile-core network products used commercial systems deployed in the global network infrastructure market.

Service flexibility: start small, scale as required

● **Start from a 1U rack**

NEC's vEPC solution allows you to dynamically select the components that suit the size of your system, whether that be a 1U sized all-in-one configuration or a nationwide core network.

Also, by managing resources in a virtualized environment, you can enhance your capacity and functionality any time.

● **A COTS server is the hardware platform**

By using a COTS server as the hardware platform in our data centers, NEC can offer state of the art technology that provides the best performance vEPC at low cost.

Optimized TCO and service quality

NEC's vEPC solution offers highly reliable virtualization technology with a real time performance ideal for telecom applications that will enable you to eliminate system design limits and optimize TCO and service quality.

NEC's value proposition for virtualization technology

● **High performance with low jitter**

NEC's virtualization platform minimizes the overhead of the virtualization layer and the dispersion of delay.
High data plane processing is performed on a COTS server.

● **Reliable support for the virtualization layer**

NEC's Linux and virtualization technology engineers will help you implement your virtualized environment.
NEC's virtualization platform offers quick and precise fault analysis and restoration by using virtual machine monitoring.

● **Optimized resource allocation**

NEC's virtualization platform optimizes the allocation of network and server resource for each situation.
Hardware resources can be freed up and the entire hardware resource pool can be managed so that more resources are allocated to VMs that require a high performance.

Specifications

MME (Mobility Management Entity)

Interface (Protocol)	Gn (GTPv1)
	S3, S10, S11 (GTPv2)
	S1-MME (S1-AP)
	S6a (Diameter)
	SGs (SGsAP)
Functions	Mobility management ・UE location management, multiple-TA, ISR ・Handover control between eNodeBs, 2G/3G<->LTE ・Roaming support
	eUTRAN connectivity ・Supports LTE base-stations (eNodeB)
	Authentication and security functions ・Subscriber authentication ・NAS security (integrity check and ciphering)
	Connection management ・Data connection/transmission control ・Multiple PDN access
	Voice call support (CS fallback)
	3GPP QoS management

S/P-GW (Serving / PDN Gateway)

Interface (Protocol)	Gn (GTPv1)
	S1-U, S4, S5, S8, S11 (GTPv2)
	S2, S5, S8 (PMIPv6)
	Gx, Gxc, Gy (Diameter)
	SGi
IP address allocation	Static
	Dynamic ・Based on internal IP addresses pool
VPN	VLAN (802.1q)
Functions	eUTRAN connectivity ・Supports LTE base-stations (eNodeB)
	Connection management ・Data connection/transmission control ・Multiple PDN access ・Idle-mode support (paging invocation) ・Packet routing and forwarding
	Mobility management ・Handover control between eNodeBs, 2G/3G<->LTE ・Roaming support
	3GPP PCC-based QoS management
	Deep packet inspection

HSS (Home Subscriber Server)

Interface (Protocol)	S6a (Diameter)
Functions	Subscriber profile management
	Subscriber location management
	Subscriber authentication data generation
	Geo-redundancy

PCRF (Policy and Charging Rules Function)

Interface (Protocol)	Gx, Sy (Diameter)
Functions	Policy management ・Flow-based control ・Bandwidth limitation ・Date/time schedule control ・Connection/application gating ・Redirection ・Priority control
	Data volume management

Abbreviations

AAA : Authentication Authorization and Accounting

CS : Circuit Switched

DHCP : Dynamic Host Configuration Protocol

eNodeB : evolved NodeB

EPC : Evolved Packet Core

eUTRAN : evolved UMTS Terrestrial Radio Access Network

GTPv1/v2 : GPRS Tunneling Protocol version 1 / version 2

ISR : Idle-mode Signaling Reduction

LTE : Long Term Evolution

NAS : Non-Access Stratum

PDN : Public Data Network

PMIPv6 : Proxy Mobile IPv6

QoS : Quality of Service

SGsAP : SGs Application Part

S1-AP : S1 Application Protocol

VLAN : Virtual Local Area Network

VPN : Virtual Private Network

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