Virtualized LTE Packet-Core Network Suite

Virtualized EPC (vEPC)

vEPC is a Mobile-Core network system accommodates LTE access systems. vEPC is empowered by NEC Carrier-Grade Virtualization and Software-Defined Networking (SDN) Technology, it optimizes Mobile-Operators’ TCO and Service Quality.

vEPC is a 3GPP compliant LTE Packet Core-Network system consists of following mandatory functions to provide LTE mobile broadband services:

- **Mobility Management Entity (MME)**
  A heart of EPC system provides Control-Plane functionality such as location, mobility, paging, authentication, security and session managements.

- **Serving / PDN Gateway (S-GW / P-GW)**
  Data-plane functionality that delivers end-user’s packets between the Internet (PDN) and LTE cell where the target user staying.

- **Home Subscriber Server (HSS)**
  Stores subscriber profile and authentication information and provides them to MME.

- **Policy and Charging Rules Function (PCRF)**
  Manages each subscribers’ network usage and policy in order to improve network QoE and fairness and provides flexible service-plan for network-operators.

NEC’s Carrier-Grade Virtualization Technology enables ALL functions above to work on same hardware platform.

**Accelerates Reliable, Flexible and Efficient LTE services deployment.**
## Specifications

### MME (Mobility Management Entity) Software

<table>
<thead>
<tr>
<th>Protocols</th>
<th>Functions</th>
</tr>
</thead>
</table>
| GTPv2 (S3, S10, S11) | Mobility Management  
  - UE Location Management, Multiple-TA, ISR  
  - Handover control between eNodeBs  
  - Handover control between 2G/3G ↔ LTE  
| S1-AP (S1-MME) | eUTRAN Connectivity  
  - Accommodates LTE base-stations  
| Diameter (S6a) | Authentication and Security Functions  
  - Subscriber Authentication  
  - NAS Security (Integrity Check and Ciphering)  
| SGsAP (SGs) | Connection Management  
  - Data Connection / Transmission Control  
  - Multiple PDN Access  
|  | Voice Call Support (CS Fallback)  
|  | 3GPP QoS Management  
|  | Operation, Maintenance and Charging  
|  | Roaming Support  

### S/P-GW (Serving / PDN Gateway) Software

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Functions</th>
</tr>
</thead>
</table>
| GTPv2 (S1-U, S4, S5, S8, S11) | eUTRAN Connectivity  
  - Accommodates LTE base-stations  
| PMIPv6 (S2, S5, S8) | Connection Management  
  - Data Connection / Transmission Control  
  - Multiple PDN Access  
| Policy and Charging (Gx, Ga/Gz, Gy) | Idle-mode Support (Paging invocation)  
| Packet Data Network (SGi) | Packet Routing and Forwarding  
|  | Mobility Management  
  - Handover control between eNodeBs  
  - Handover control between 2G/3G ↔ LTE  
|  | 3GPP PCC-based QoS Management  
|  | Operation, Maintenance and Charging  
|  | Roaming Support  
|  | Static IP Address Assignment  
|  | Dynamic IP Address Assignment  
  - Based on internal IP Addresses Pool  
  - With external AAA/DHCP Server  

### HSS (Home Subscriber Server) Software

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Functions</th>
</tr>
</thead>
</table>
| Diameter (S6a) | Subscriber Profile Management  
|  | Subscriber Location Management  
|  | Subscriber Authentication Data Generation  
|  | Operation and Maintenance  

### PCRF (Policy and Charging Rules Function) Software

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Functions</th>
</tr>
</thead>
</table>
| Diameter (Gx) | Policy Management  
  - Manages Bandwidth restriction rules  
  - Manages Redirection rules  
  - Decision based on Total Data Volume  
  - Decision based on predefined Date/Time  
  - Heavy User Management  
|  | Data Volume Management  
|  | Operation and Maintenance  

### Abbreviation

- 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
- GTPv2: GPRS Tunnelling Protocol version 2
- LTE: Long Term Evolution
- PDN: Public Data Network
- PMIPv6: Proxy Mobile IPv6
- QoS: Quality of Service
- RAN: Radio Access Network
- VLAN: Virtual Local Area Network
- VPN: Virtual Private Network

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For Inquiry or more information:

1st Carrier Services Division  
NEC Corporation  
TEL: +81 3 3798 8394  
FAX: +81 3 3798 2485

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NEC Corporation  
7-1, Shiba 5-chome, Minato-ku, Tokyo 108-8001 JAPAN