

Statement of Direction on LTE Gateways

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Cisco is pleased to announce our intention to develop mobile gateways in support of Long Term Evolution (LTE) RAN deployments. LTE is also known as Enhanced UMTS Terrestrial Radio Access Network (eUTRAN). We will support operators that are migrating from a CDMA environment as well as those migrating from a GSM/UMTS environment. Our LTE gateways will be built on the Service and Application Module for IP (SAMI), the only shipping LTE-ready platform in the industry.

LTE is one of several all-IP radio access technologies that will enable the Mobile Internet. The others include HSPA and EV-DO for paired licensed spectrum, WiMAX for unpaired licensed spectrum, and Wi-Fi in the unlicensed bands. LTE is being developed as part of an industrywide effort to stay ahead of the tremendous growth in mobile data traffic. The first phase of the LTE specifications is set to be frozen by the end of 2008 with the Next Generation Mobile Networks (NGMN) Alliance predicting limited commercial deployments beginning in 2010.

LTE is an Orthogonal Frequency Division Multiple Access (OFDMA)-based radio access technology that has been highly optimized for packet traffic. LTE radios will be supported by a System Architecture Evolution (SAE) mobile core. SAE is also known as the Evolved Packet Core (EPC). The key data plane elements of the EPC are the Serving Gateway (SGW) and the Packet Data Node (PDN) gateway. The Serving Gateway (SGW) will be primarily tasked with issues related to micro-mobility and the PDN gateway is the IP point-of-attachment for mobile users. Cisco will be building both Serving and PDN gateways.

LTE presents some unique challenges for gateway vendors. It should deliver greater spectral efficiency than older radio access technologies such as HSPA and EV-DO, and that along with wider channel allocations and new antenna technologies means a lot more data traffic will find its way back to the gateways. LTE is also not defined for circuit switched voice traffic. That means all voice will eventually have to be carried over IP once the transition to LTE is complete. VoIP is especially challenging for the gateways because it means a large number of small packets and the load on a gateway is the same for a large packet as for a small one. Another challenge is the always-on nature of these connections, which drives up the session count to very high levels. This all adds up to the need for very high-performance and very highly available mobile gateways.

When we add this to the traffic load that is already being generated by HSPA and EV-DO networks, it becomes evident that LTE gateways must be implemented on powerful edge routers. In many of today's mobile networks, operators are starting to deploy the Cisco® SAMI module running on a Cisco 7600 Series Router to handle the current load and to position for future growth. A Cisco 7613 Router with nine SAMI modules can deliver throughput in excess of 50 Gbps. This has been verified in third-party testing by [Current Analysis](#). With leading mobile operators dimensioning their current RANs for 30 kbps per provisioned user, and LTE promising up to four-times improvement in spectral efficiency, it is clear that gateway throughput in excess of 40 Gbps will be required in the coming years (this assumes 350,000 users per gateway and 120 kbps per provisioned LTE user).

Cisco's approach to supporting this avalanche of mobile data traffic is as follows:

- In the future we plan to allow our mobile gateway applications to be more easily ported onto service modules that run on a variety of our high-end edge routers. This gives operators far more flexibility in their choice of a platform to host the gateway function.
- We are announcing our intention to develop LTE gateway functionality. We will support operators that are migrating from a CDMA environment as well as those migrating from a GSM/UMTS environment. Our plan is to develop both Serving and PDN gateways. Our gateways will be built on the SAMI module, the only shipping LTE-ready platform in the industry.

Our unmatched portfolio of high-end router platforms, expertise in service module development, track record of developing mobile gateways, and expertise in all things IP put us in a good position to help operators as they continue to build out the Mobile Internet.

Stay tuned for more on how Cisco will continue to lead in enabling the technology required to enable the Mobile Internet.



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