Hitachi Communication Technologies America Delivers Service Provider Solutions for Machine-Type Communications and Virtualized Evolved Packet Core

Operators globally face significant cost challenges to manage the increasing mobile broadband data demands while competition is keeping revenue growth constrained. Hitachi Communication Technologies America is focused on delivering innovative solutions to operators that will strategically enable the delivery of new service revenues while containing costs. The company offers Hitachi SuperJ Applications Ecosystem and Hitachi ER5000 Virtualized Evolved Packet Core to meet these challenges.

Manage Applications With Hitachi SuperJ Application Ecosystem

Service providers who are now strategically expanding new service offerings in addition to supporting triple play of video, data and voice services are embracing the growth market of Machine Type Communications (MTC). MTC allows the concept of applications for subscriber premises. Leveraging the experience of the exploding “apps” market for wireless smart phones, service providers can also embrace applications as a source of revenue as well as a means to cultivate customer loyalty. As we can see from the wireless experience, the number and variety of applications is practically unlimited. But how do we develop and manage such a large number of applications?

In addition to these general applications, the fields of telemedicine and telehealth promise to further increase demand for applications delivered over communications networks. Such applications are subject to the same need for a unifying platform for deployment. And underlying all of these applications are MTC and embedded systems that communicate for specialized functions or in support of consumer applications.
The Hitachi SuperJ Applications Ecosystem is a fully featured, open OSGi framework that enables development, deployment and management of software on embedded devices (machines). The proven framework enables MTC device and gateway developers to quickly introduce new capabilities, and adapt deployment of these solutions to meet the most challenging requirements. The Hitachi SuperJ Applications Ecosystem consists of 4 modules:

- OSGi-compliant framework optimized for MTC-embedded devices to deliver faster application startup.
- Device and interface abstraction bundles.
- Software development kit.
- OSGi application management system.

The Hitachi SuperJ Applications Ecosystem enables this service opportunity for applications deployment from home applications to vehicle telematics. A universal client-server delivery platform, SuperJ supports applications running on a wide variety of customer premises equipment (CPE) devices, such as cable modems, DSL modems, home routers and plug computers. Unlike standalone applications deployments, in which each application requires its own "environment," the Hitachi SuperJ Ecosystem unifies the environment. It supports the development, deployment and management process for all applications in a "write once, run anywhere" scenario, greatly simplifying operations for the service provider.

**Address Signaling and Data Growth Needs With Hitachi ER5000 Virtualized Evolved Packet Core**

Managing the tremendous increase in mobile data and signaling that is anticipated, is a major challenge for mobile service providers. Hitachi ER5000 Virtualized Evolved Packet Core provides a highly scalable, carrier-grade solution that is both efficient for current operations and futureproof for anticipated explosive growth.

Hitachi ER5000 Virtualized Evolved Packet Core (ER5000 vEPC) is a platform- and hardware-agnostic solution. Hitachi radio area network (RAN) vendor-neutral solution provides a mature, feature-rich set of virtual network functions. Hitachi has implemented a virtualized, elastic EPC architecture that is easily scalable from very small to very large capacity. It is designed to meet anticipated signaling and data growth cost-effectively. Operators gain the flexibility to employ the most appropriate radio access network for the deployment scenario. At the same time, they can trust that essential features and services will work uniformly across the entire network, orchestrated by the mature, feature-rich, Hitachi ER5000 vEPC. Based on commercial "off the shelf" Intel x86-based hardware, this system can be deployed to meet current and future capacity needs. Capacity can be added as needed for future growth in the most

Figure 1. Hitachi SuperJ Applications Ecosystem manages the application environment, while Hitachi ER5000 Virtualized Evolved Packet Core supports growth.
cost-effective manner by using the latest server technology. Hitachi architecture enables operators to make full use of advances in the x86 family of processors to realize performance and cost benefits.

Hitachi ER5000 vEPC is a fully featured product portfolio. The Serving GPRS Support Node (SGSN) was first introduced in 2000. The 4G LTE Mobility Management Element (MME) has been in commercial service since 2012. With more than a decade of incremental development, ER5000 vEPC has a mature, carrier-grade software foundation and a robust set of features to meet the most demanding customer requirements.

Hitachi recognizes that operators face many challenges when deploying heterogeneous network of small cells and macro cells, and that a number of features must be implemented to address the challenges:

- **Data traffic management.** As data demand grows, and more of the traffic is carried on the small cells, optimal routing of the traffic is needed to divert nonmobility traffic away from the EPC. The logical separation of the data and signaling planes enables operators to deploy EPC nodes optimally in their networks.

- **Signaling management.** The ER5000 vEPC portfolio includes a Small Cell Gateway that acts as a signaling concentrator to manage the signaling between the small cells and the macro EPC, minimizing the signaling impact on the macro EPC.

- **Interference mitigation.** Deployment may include low-power residential and enterprise small cells, outdoor micro cells operating at somewhat higher power and high-power macro cells. Careful orchestration among the radio nodes operating within a single frequency band is required to maximize network performance. Implementation of self-optimizing network functionality in the Small Cell Gateway provides the ability to manage interference in heterogeneous networks efficiently.

- **Feature parity.** When deploying heterogeneous networks, it may necessary to deploy cells sites from multiple suppliers. The implementation of interference mitigation, advanced self-organizing networks (SON), selected IP traffic offload (SIPTO) and local IP access (LI-P) features in the Small Cell Gateway enable consistent operation of these essential functions across a multivendor radio access network.

**Next Steps**

For more information regarding innovative solutions for service providers, contact your Hitachi Communication Technologies America representative, LS Ravi (lravi@hitachi-cta.com).