HIGHLY INTEGRATED, SCALABLE MACROCELLS AND CLOUD-RAN DESIGNS FOR HETEROGENEOUS NETWORKS

FASTER TIME TO MARKET FOR HIGHLY INTEGRATED, HIGH-PERFORMANCE MACROCELL BASEBAND AND CLOUD-RAN DESIGNS

Industry Challenges

- An explosion of different air interfaces
- Evolving heterogeneous network architectures; Single sector baseband units to high density Cloud RAN
- Insatiable demand for data bandwidth
- CapEx and OpEx reduction
- Shortening time to market
- Reducing latencies and increasing transmission bandwidths

Xilinx Baseband Solutions

- All Programmable FPGAs and SoCs for scalable, highly integrated macrocells (future-proof designs)
- Highly integrated devices driving up reliability while lowering power and BOM costs
- Processing bandwidth for advanced algorithms
- Heterogeneous network scalability, with co-processing support for macrocell and C-RAN applications
- Class-leading tools and IP: Vivado HLS for rapid development (C to RTL) and shortened time to market

Xilinx® All Programmable FPGAs and system-on-a-chip (SoC) devices offer designers the ideal platforms for addressing the rapidly changing requirements for evolving heterogeneous networks. Besides the inherent scalability and reconfigurability, the broad Xilinx portfolio delivers high performance and the ability to balance hardware and software for maximum design efficiency. However, it is the unprecedented levels of integration that are allowing designers to achieve higher reliability—for fewer truck rolls—along with reduced power and BOM costs.

A Generation Ahead for Flexible, Scalable Network Performance

From the cost-efficient Artix™-7 family to the high-throughput and price-performance of Kintex™-7 family and the market-leading signal processing power of the Virtex®-7 family, Xilinx puts designers a generation ahead with breakthrough 28nm devices. The breadth and performance leadership of the portfolio makes it possible to address the diverse and stringent requirements of the fastest-evolving points in the network. Xilinx devices and associated IP can streamline designs for power-efficient and lower-cost macrocells and deliver processor power and throughput for the largest-scale, centralized C-RAN architectures.

At every point in today’s heterogeneous networks, solutions must build in more for less. With unprecedented high-capacity FPGAs, 3D ICs, and SoCs, Xilinx drives up integration to lower BOM costs. This lowers CapEx in the network, and, for OpEx savings, Xilinx devices boost transmission efficiencies and power-efficient designs.

System Integration for Baseband

Traditional baseband macrocell cards were designed using multiple NPU, DSP, and FPGA devices. With the 7 series family, a single multi-core CPU/NPU and three Xilinx FPGAs support not only the I/O-intensive switching, but also replace previously discreet DSPs for uplink/downlink functions.
Motivations for C-RAN

C-RANs can reduce system costs by exploiting the increased pooling efficiency that results from centralizing core basestation processing. They can also increase deployment flexibility by using remote radio heads for macrocell-level coverage and to extend coverage to areas that are under-served. The C-RAN architecture can also exploit the use of commodity technologies. This reduces reliance on custom wireless technologies such as ASSPs and SoCs, and enables a more open and cost-effective platform for basestations.

Conventional platforms targeted at macro basestation applications provide pre-determined functionality and do not offer a solution for C-RAN. Wireless designers also need to drive up levels of integration to reduce BOM costs. Xilinx devices overcome these challenges associated with C-RAN, and additionally offer the connectivity options that enable support of numerous interconnect standards. High I/O performance also provides the capacity for a large numbers of connections for remote radio heads, and addresses the synchronization and delay compensation issues that must be considered within C-RANs.

Xilinx Solution for C-RAN

Increased levels of integration are particularly important for the emerging C-RAN architectures where rapidly increasing LTE data rates are driving the need for reduced latencies. In particular, the use of higher-order antenna systems and centralized baseband processing in C-RAN systems are pushing algorithmic demands forward at an exponential rate. Equipment vendors need a platform that scales easily to keep up with unpredictable markets with integrated high-speed connectivity and switching functions co-located with baseband processing for maximum throughput and low latency.

Xilinx All Programmable devices make it possible to deliver next-generation C-RAN solutions. A highly scalable FPGA fabric architecture enables baseband pools with high throughput, and lets equipment designers improve connectivity switching for high-performance and power-efficient C-RAN BTS. Xilinx devices also offer dynamic reconfiguration for evolving feature sets to keep up with standards (LTE-Advanced and beyond).

Take the NEXT STEP

Visit www.xilinx.com to learn more about the Xilinx wireless communications product portfolio and All Programmable FPGAs, 3D ICs, and SoCs. For information on Xilinx baseband solutions, visit xilinx.com/applications/wireless-communications/baseband/index.htm.