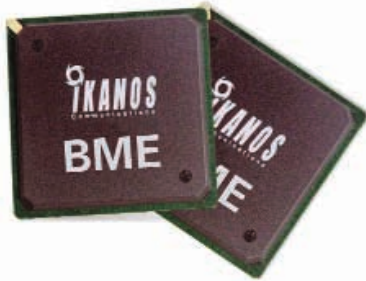




Success Story

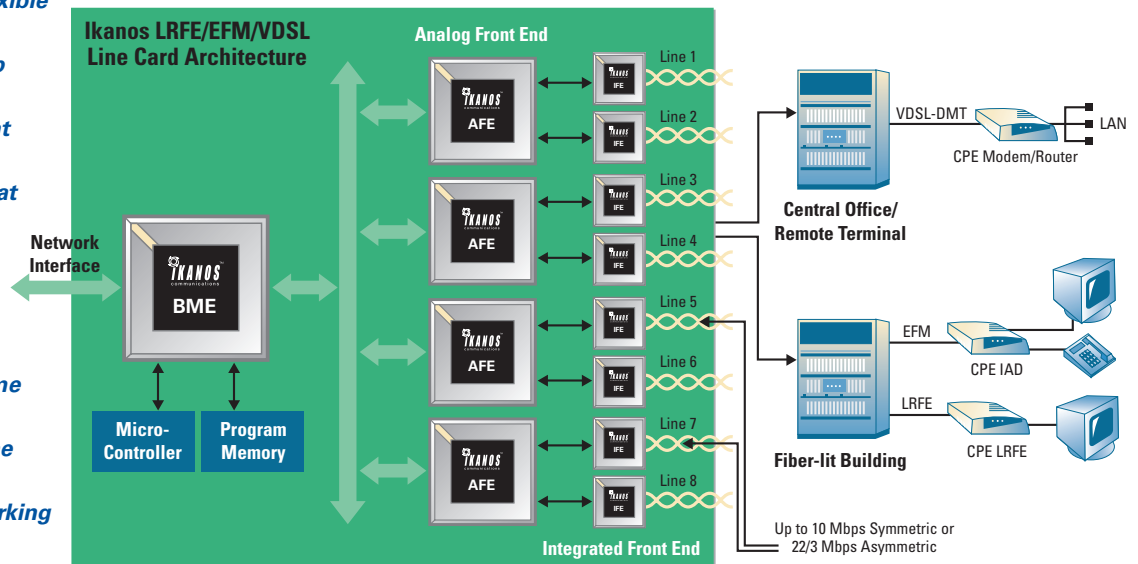


Xtensa® Processor Core Fuels Rapid Time-To-Market for Ikanos

“We were confronted with the challenge of creating a multi-channel single-chip DSP engine (Burst Mode Engine) for very high performance broadband applications. We had to ensure that Ikanos’ solution was very flexible and future proof.” said Anoop Khurana, VP of Engineering at Ikanos. “We were pleased that we met our performance targets and significantly reduced the development time for this chip. From signing the contract with Tensilica to working reference cards with complete software and RTOS support took less than eighteen months.”

IKANOS communications Ikanos Communications, developer of Smart Silicon For Profitable Broadband™, has created a new class of silicon that serves the entire range of worldwide broadband markets and applications with a single programmable chipset. In 2001, Ikanos introduced the SmartLeap™ 8100 and the CleverConnect™ 150 chipsets to target voice/data/video broadband systems, such as concentrators and CPEs in the metro fiber extension, multi-tenant and multi-dwelling unit, and central office and remote terminal markets.

At the heart of the SmartLeap 8100 and CleverConnect 150 chipsets is the Burst Mode Engine™ (BME) chip powered by Tensilica®’s Xtensa processor core. Ikanos Communications’ design objective for the BME chip was to provide a flexible SOC solution that integrated all of the control, DSP, datapath, and management functions needed in broadband access applications.



Ikanos Communications’ Line Card Architecture for Broadband Applications

The Xtensa-based Burst Mode Engine / DSP Engine (BME), Analog Front End (AFE), Integrated Front End (IFE) and Ikanos Programmable Operating System™ (iPOS) are self-contained in this Ethernet in the First Mile (EFM), Long Range Fast Ethernet™ (LRFE) and Very-high-bit-rate DSL (VDSL) line card architecture. The line card is designed to be field-programmable to various international standards and band-plans.

In the current challenging market conditions, Ikanos offers an optimal solution for faster time-to-market. An optimal solution and time-to-market were not variables to tradeoff against each other – they were both requirements. To deliver a full-featured, field-programmable solution in a timely manner, the Ikanos team needed an embedded high-performance processor in the BME chip to perform both control and signal processing operations. The processor also needed to run the Ikanos Programmable Operating System (iPOS) environment. This Operating System environment integrates the VxWorks RTOS kernel and the management Application Programming Interface (API) to allow for operating system configuration and monitoring on the BME. Ikanos also needed a complete software tool suite for applications development. Wasting weeks or months waiting for software tools or for an OS port was not an option – the processor had to be fully supported, immediately, by a world class software environment. Ikanos demanded the best of both worlds – a processor tailored to the exact application needs, yet with production-worthy tools and OS-support ready out-of-the-box.

Ikanos Overcomes the Design Barriers

The Ikanos team was tasked with integrating a system on a chip solution with building blocks that existed only as

discrete components not too long ago. An embedded synthesizable processor core is a critical building block in the BME for managing and controlling a Reed-Solomon Forward Error Correction (FEC) block, Framer/De-Framer blocks, FFT/IFFT engines, and interleaver/de-interleaver RAM. The BME essentially provides the datapath, control, and DSP functionalities for broadband access concentrator and customer premise equipment vendors for products with scalable broadband speeds ranging from 64 Kbits/sec to 100 Mbits/sec over copper pairs.

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Solution: Tensilica's Xtensa Configurable Processor Core!

The Xtensa synthesizable core is at the heart of Ikanos' newest 166MHz BME controller. Using the Xtensa Processor Generator, Ikanos engineers configured the Xtensa core for optimized performance

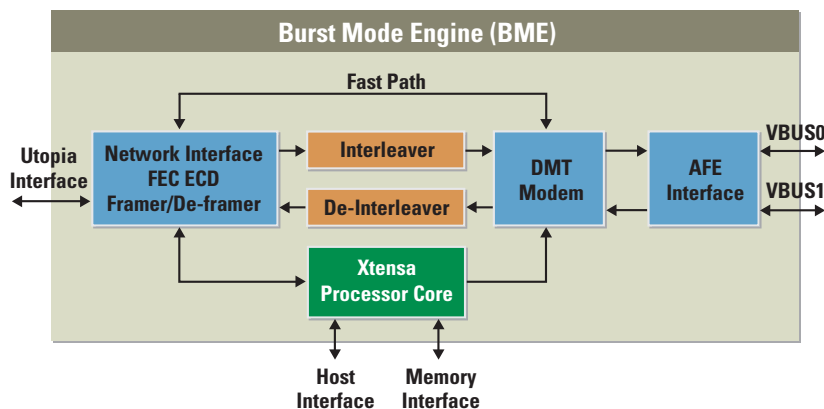
in a system controller application. The Xtensa solution provides a correct-by-construction approach and generates a complete software development tool chain for each configuration. This capability reduces the risk of integration and provides a complete product to market quickly.

Operating System Support Was Key

A significant decision factor in Ikanos' choice of the Xtensa processor was the automatic support for WindRiver System's VxWorks. *"Rapid porting of our iPOS operating environment was key to the rapid deployment of the BME,"* said Khurana. *"We were impressed by the fact that we could leverage VxWorks' support of the Xtensa core, which enabled us to complete our software development before our reference cards were available. Changes in the Xtensa configuration were easy to manage; all we had to do was link in the new libraries, and everything worked as before."*

Summary

The Xtensa core's configurability, accompanying tools, and RTOS support helped Ikanos deliver a high-performance, flexible, future-proof Burst Mode Engine in a timely manner.



The Burst Mode Engine Integrates Key Building Blocks

The Xtensa-based Burst Mode Engine is a flexible SOC device that integrates the control, DSP, datapath, and management functions needed in broadband applications. Advanced building blocks such as the Discrete Multi-Tone (DMT) line-coding block, forward error correction encoder block, interleaver/de-interleaver blocks and various interfaces facilitate the delivery of various traffic classes needed by other ICs in the Ikanos chipsets.

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