

Supercomputing Solutions

OVERVIEW

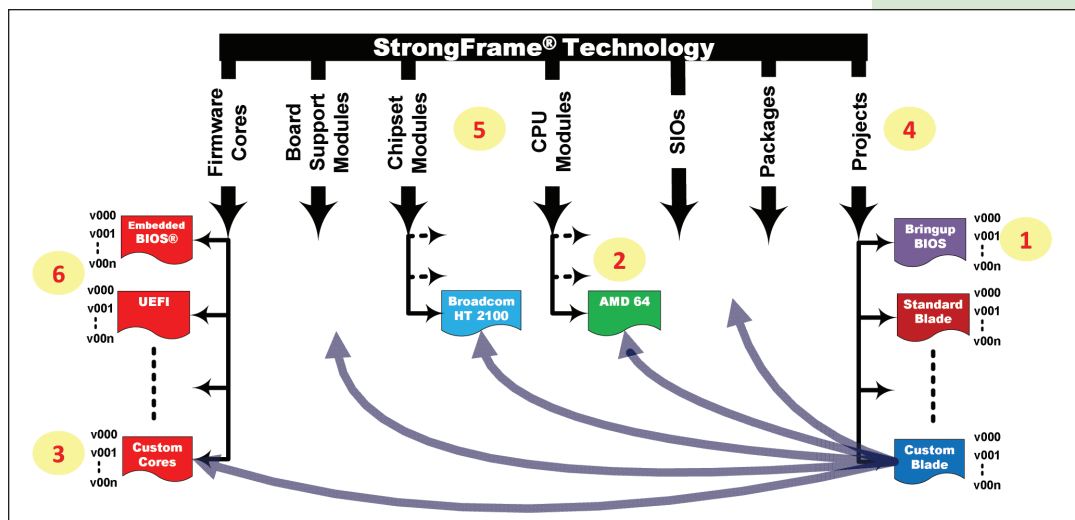
In the early 1960s, the visionary Seymour Cray introduced the design philosophy that would guide the industry into the 21st century: Big, Fast, and Simple were the basic guiding principles. In the 20th century, Cray’s implementations used arrays of nodes consisting of simple components such as adders, all working in concert to achieve big results. Today, each node is implemented with X86 architecture CPUs, achieving further parallelism with localized scalable multiprocessing and memory. Nodal complexity is therefore accelerating at the same rate as the rest of the X86 industry.

X86-based nodes require firmware for initialization, as well as a control program for accepting workflow from the rest of the system. Initialization firmware, depending on the underlying architecture, can be simple or complex, but can involve running tens of thousands of lines of code to initialize the memory controller, communication paths between CPUs and memory, etc. Commonly, the silicon vendor supplies sample initialization code, which must be customized for specific board-level designs, since the parts are so flexible. This translates to an adaptation of this code for each new node design.

Workflow control firmware is highly design-specific, since it must directly address the physical and logical topology of the nodal network. This firmware also implements the policies associated with scheduling and dispatching actual work items on each node. This policy-oriented role requires the supercomputing company to develop and maintain its own firmware stack across a growing family of node SKUs and CPU/chipset architectures.

Phoenix Technologies specializes in firmware for targeted applications, providing support for over 80 silicon architectures and 100 reference designs with a multi-core firmware strategy, including BIOS, UEFI, EC, and other targeted firmware for specific applications, from portable MP3 players to carrier grade servers, with a big focus on X86. With a single firmware build architecture called StrongFrame® Technology, Phoenix firmware cores, as well as customers’ proprietary cores, can leverage the company’s productized silicon support, following embedded roadmaps of AMD, Intel, VIA, and others.

- 1 **Node Bring Up Tools (BIOS, Bootloader, Debugger, etc.)**
- 2 **Silicon Support Subscription Service Stays Current With SVs’ Embedded Roadmaps**
- 3 **Integrated Customer Cores Leverage Phoenix Modules**
- 4 **Project-Driven Framework Supports Multiple Node Designs and their Revisions**
- 5 **Versioned Plug-In Modules Separate Firmware Cores from Silicon Support**
- 6 **BIOS and UEFI Cores Support Standard OSES for Prototyping and Validation**



Introducing the Phoenix Framework—StrongFrame® Technology

Phoenix StrongFrame® Technology is the build environment that makes it possible to support multiple firmware cores across a broad range of chipsets, CPUs, and board-level designs. StrongFrame® Technology provides project definitions that describe which modules at the board, chipset, CPU, and core levels should be incorporated into a firmware build. Then, StrongFrame® Technology provides versioning of projects and modules in a uniform way, so that project definitions can elect to choose the current or back-level versions of any module in the system. Finally, StrongFrame® Technology modularizes the core itself, so that a project can point to a BIOS core, a UEFI core, a bootloader, or customer-defined proprietary cores.



Node Bring-Up Tools

Node bringup can be greatly facilitated with StrongFrame® Technology bringup tools from Phoenix. Embedded BIOS®, with its 1,000-option parametric build, can be configured to provide a bootloader with instrumentation that exposes hardware diagnostics, chipset initialization, and its integrated debugger and integrated signal analyzer, via serial port or proprietary links.

OEM-added custom diagnostics suites, monitored signal sources, and debugger commands can plug into the system and be reused across projects.

Silicon Support Subscription Service

Stay current with silicon vendor support firmware (i.e., memory controller, clocking, bus configuration, and other moving targets) with regular updates to your StrongFrame® Technology support modules. The strong embedded relationships shared by Phoenix with the industry's leading silicon vendors, including AMD, Intel, and VIA, promote incorporation of new releases of SV-supplied firmware and microcode into StrongFrame® Technology modules. With a Silicon Support Subscription Service from Phoenix Technologies, the burden of integrating and validating new firmware from silicon vendors shifts from your staff to Phoenix, saving time and debugging, while gaining surety.

Proprietary Customer Cores Integrate into the Framework

Customer-supplied firmware stacks, regardless of implementation language, can fit into the StrongFrame® Technology build environment, making them selectable by projects referring to them by name just as other project descriptions refer to BIOS, UEFI, or bootloader cores.

Once integrated into the StrongFrame® Technology build environment, customer-supplied firmware cores can replace the silicon-specific initialization code with calls to Phoenix StrongFrame® Technology silicon support modules.

Project-Driven Framework Supports Multiple Node Designs and Their Revisions

With StrongFrame® Technology's versioning on project descriptions and support modules, each new node design can have its own set of historical build descriptions—allowing full lifecycle support for each node, all within the same framework. Each revision might refer to common or unique versions of the silicon and core modules, allowing a mix-and-match approach that keeps mature node designs supported with older cores, while newer node designs enjoy the benefits of later releases of silicon and core firmware.

Versioned Plug-In Modules Separate Firmware Cores from Silicon Support

The StrongFrame® Technology environment supports plug-in modules for cores, boards, chipsets, CPUs, SIOs, and generic packages, keeping silicon-specific functionality moving forward separately from core innovations. With interface boundaries well-defined, cores are freed from maintaining legacy silicon programming.

BIOS and UEFI Cores for Prototyping and Validation

While Linux or Windows are unlikely node firmware candidates, having the ability to quickly build a firmware stack that boots industry standard BIOS or UEFI OSEs on a node is invaluable for future innovation. These two standard cores are available from Phoenix Technologies.

To learn more about how Phoenix and StrongFrame® Technology can help you with your next supercomputing solution, call (425) 576-8300, email embedded_sales@phoenix.com, or visit us at www.phoenix.com.



Phoenix Technologies Ltd.

Headquarters:
915 Murphy Ranch Road
Milpitas, CA 95035 USA
408.570.1000 main
408.570.1001 fax

www.phoenix.com

Embedded Products:

915 118th Avenue SE, Suite 320
Bellevue, WA 98005 USA
425.576.8300 main
425.576.8334 fax
800.850.5755 toll free
embedded_sales@phoenix.com

Copyright© 2008 Phoenix Technologies Ltd. All rights reserved. Phoenix Technologies®, the Phoenix logo, Embedded BIOS®, Firmbase®, StrongFrame® and Firmware for Every Application™ are Trademarks or Registered Trademarks of Phoenix Technologies Ltd. The names of actual companies and products mentioned herein may be the trademarks of their respective owners. Information subject to change without notice.
DS254.00 11.08