SAGE
ELECTRONIC ENGINEERING, LLC

Is coreboot right for me?

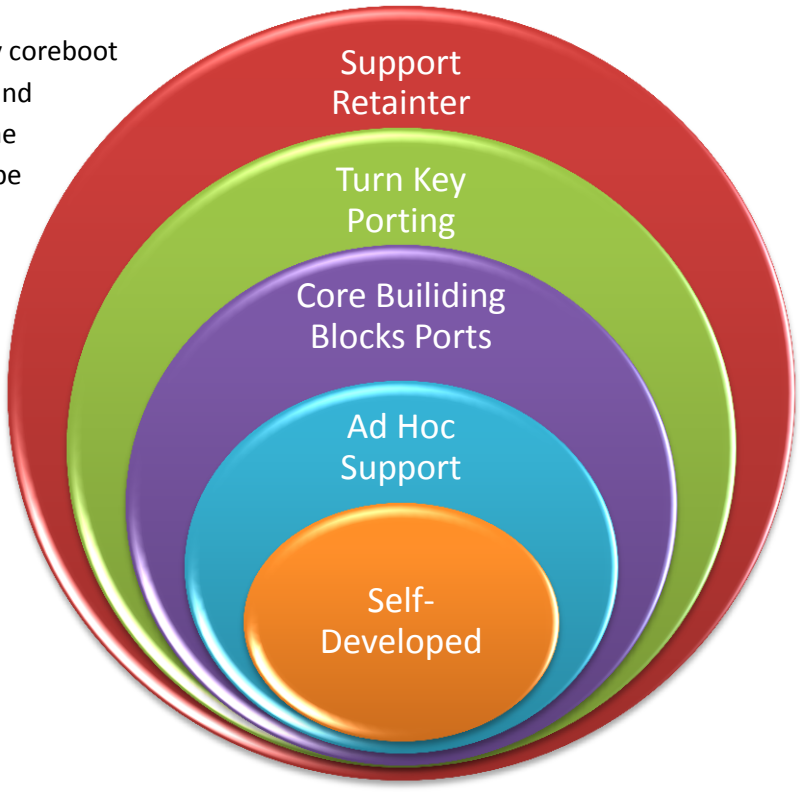
Coreboot is an open source alternative to the traditional x86 BIOS. Licensed under the GNU General Public License (GPL), this code base allows users to build custom boot-loaders for x86 processors. Coreboot provides a flexible and cost effective alternative to traditional BIOS in many applications.

The benefits of Coreboot include:

- Lowers NRE and eliminates royalty costs for "BIOS" in x86 products
- Complete control of source code for development, maintenance and future enhancements
- Extensive support by AMD for use on their processors and chipsets
- Easy configuration for small, fast and yet flexible deployments
- Numerous boot options to any operating system supporting x86
- Features to ease support of non-standard system configurations and peripherals devices

It is important to consider your organization's skills and experience when undertaking any project. Time to market, engineering expense, feature requirements, product quality, and unit cost may all be factors. Coreboot can be an important ingredient in achieving these goals. It is free to use and customize as required, nevertheless there can be significant costs with coreboot. These costs are commonly realized in the form of engineering time or NRE. This occurs because every specific platform has an inherent need to customize the initialization code. And with x86 processors and chipsets, the cost can be high due to the cutting edge nature of these systems.

Sage provides the know-how to deploy coreboot on your platform on-time, on-budget and without compromise. At one end of the spectrum, the Sage EDK and SmartProbe are the ideal tools if you are looking to develop your own coreboot boot-loader. On the other end, Sage can provide a complete port and long term support of you platform. Or, Sage can work with you at any level in between.



The table on the next page illustrates a cost versus benefit analysis of Sage's coreboot support tiers.

Implementation Strategy	Description	Advantages	Disadvantages
Self-Developed	Utilize GPL Coreboot source codes and internal engineering to develop and deploy Coreboot boot-loader and associated payloads.	• Lowest Out-of-Pocket Cost – Requires Engineering Labor Only • Leverages bare-metal tools to permit efficient development and debug	• Requires expert "BIOS" engineers • Must implement a support infrastructure • Riskiest path for time to market • Greatest dependency on community support. • Must Manage GPL *versus* Proprietary issues
Ad Hoc Support	Similar to Self-developed, but hiring outside technical experts to resolve more complex issues or provide skill development for engineers	• Managed cost for 3rd party services • Path to recover from schedule slips • Reduced technical risk • External resources to augment internal expertise	• Requires expert "BIOS" engineers • Help is generally sought after schedule has slipped • Internal support and maintenance infrastructure required
Core Building Block Ports	Use 3rd party engineering resources to develop an initial code base for product. Use internal resources to complete the development and provide support	• Managed cost for 3rd party services • Rapid porting of major functions • External resources to augment internal expertise	• Requires "BIOS" engineers to complete the work • Internal resources are needed for support and maintenance • Project management and systems engineering necessary to assure integration success
Turn-key Porting	Use 3rd party engineering resources to provide a complete port to the product and provide training and documentation to allow you to support and maintain the product	• Low risk for engineering and schedule	• NRE fees for code port and testing • Requires some "BIOS" expertise • Potential support burden at product introduction
Support Retainer	Acquire a complete turn-key port and test of Coreboot and payload on the product, as well as documentation and on-going maintenance and support during the life of the product	• No BIOS expertise required • Lowest engineering and schedule risk • Expert engineers available to perform maintenance and support functions	• NRE fees for code port and testing • Additional fees for support and maintenance

For additional information, please contact Sage Electronic Engineering at: info@se-eng.com or http://www.se-eng.com