Reshaping the Intel® Architecture Firmware Landscape using Intel® Boot Loader Development Kit (Intel® BLDK) for Embedded Designs

Drew Jensen

Firmware Product Marketing Manager

Agenda

- **Introduction to the Intel® Boot Loader Development Kit (Intel® BLDK)**
- **Features and Capabilities of Intel BLDK**
- **Firmware Customization and Optimization**
- **Debugging with Intel BLDK**
- **Q & A**

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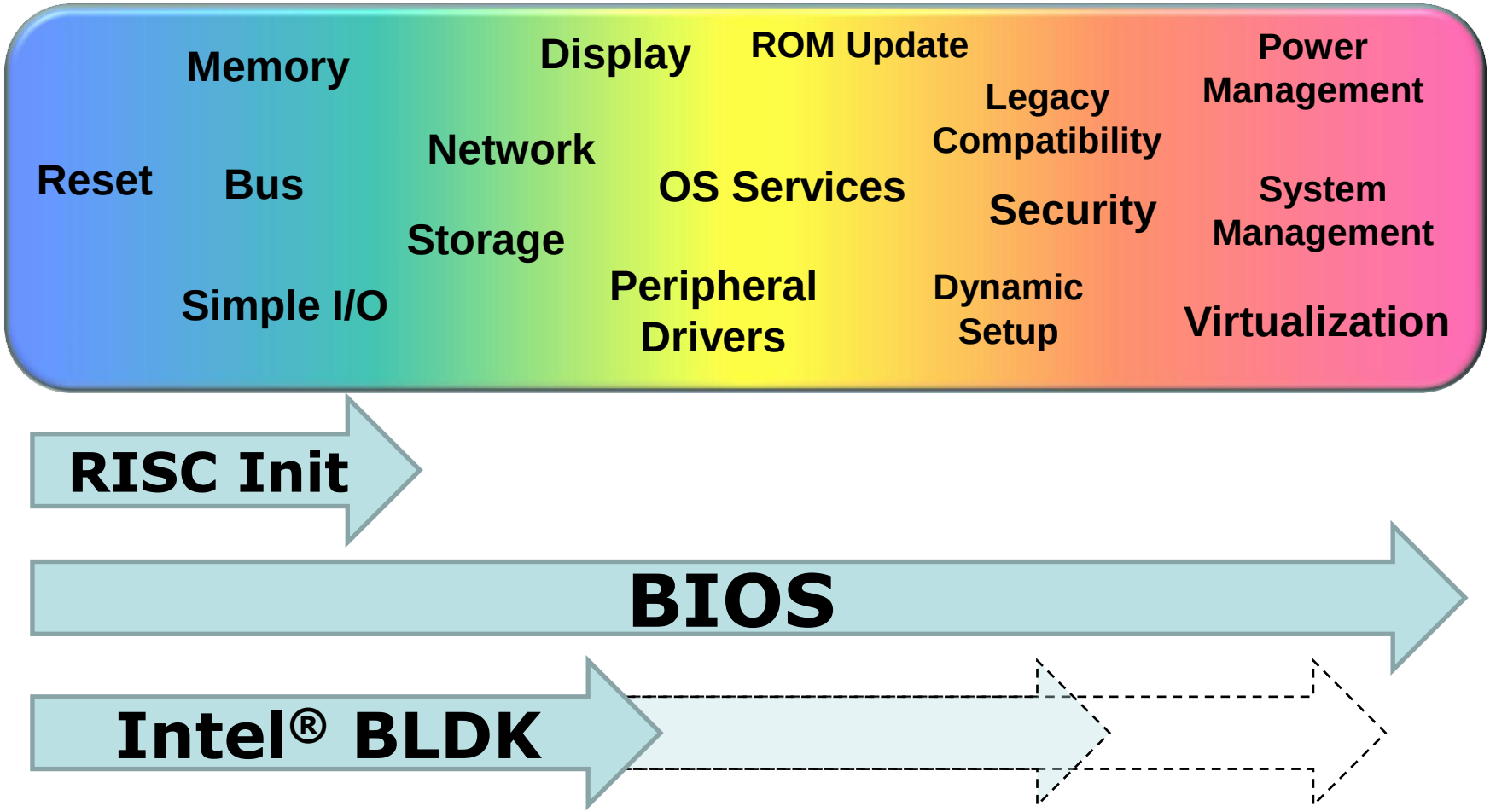
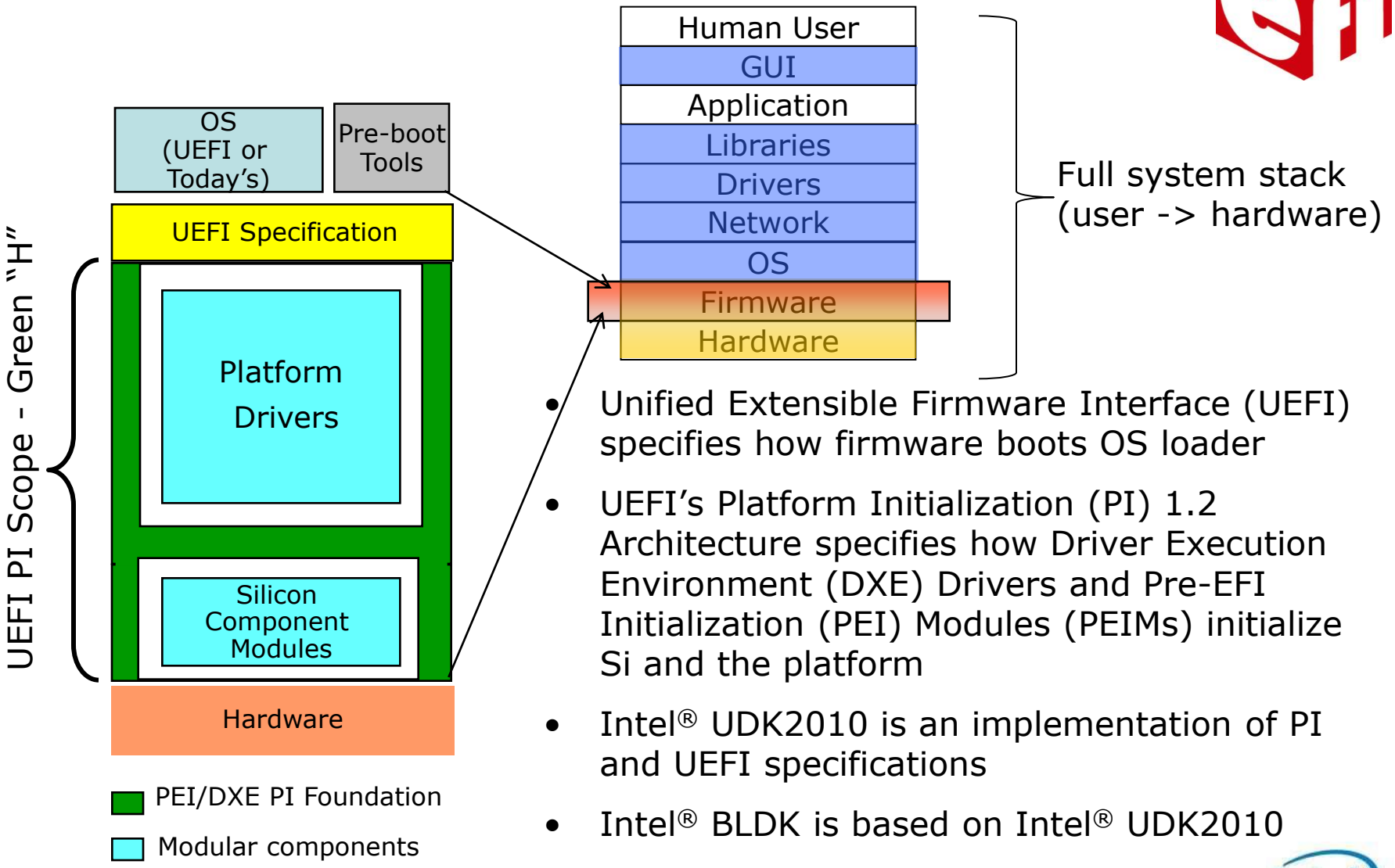
Spectrum of System Initialization Firmware



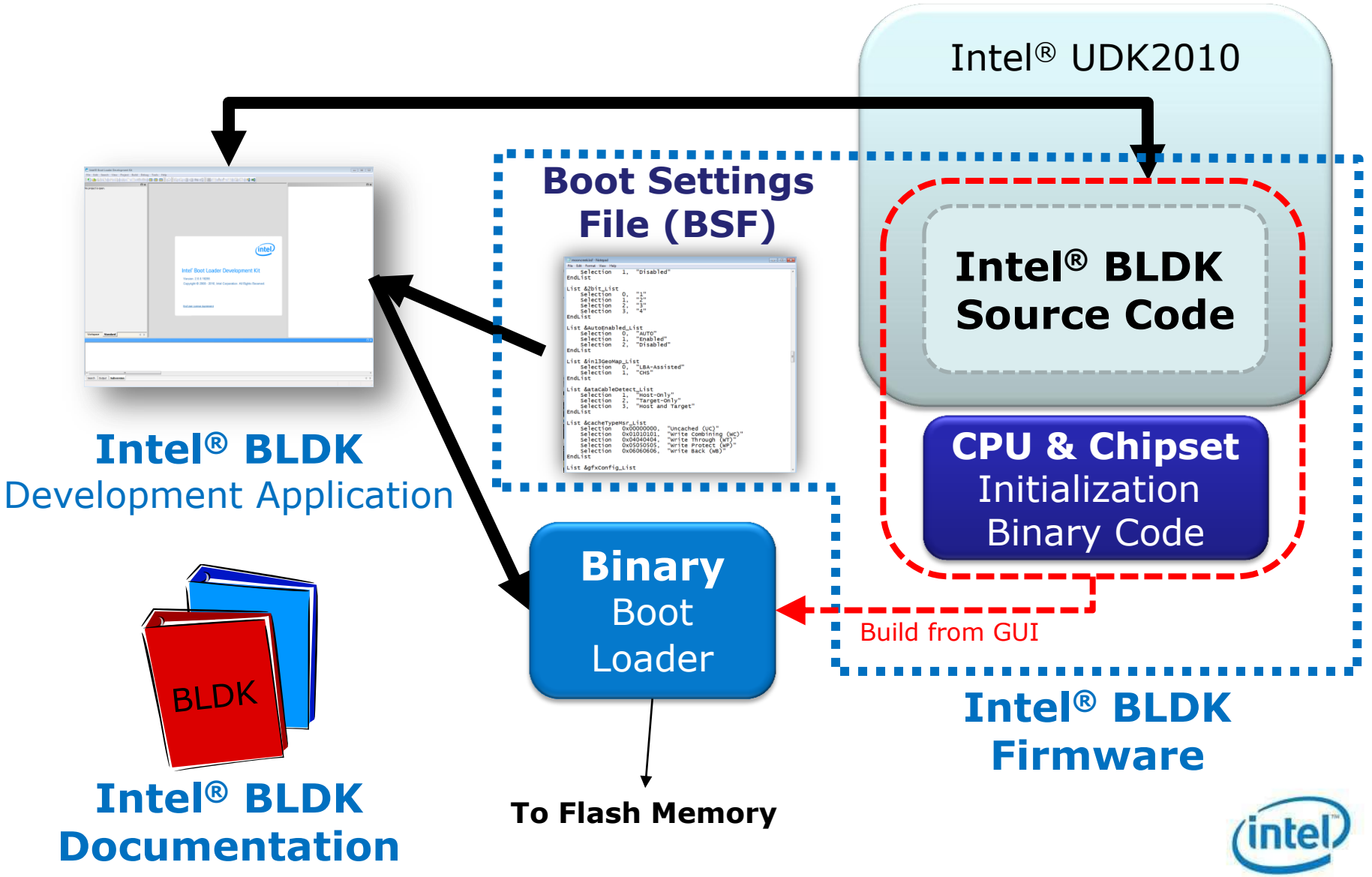
Intel® BLDK Provides Flexibility to Scale System Initialization for Embedded Systems

UEFI Platform Initialization Overview



- Unified Extensible Firmware Interface (UEFI) specifies how firmware boots OS loader
- UEFI's Platform Initialization (PI) 1.2 Architecture specifies how Driver Execution Environment (DXE) Drivers and Pre-EFI Initialization (PEI) Modules (PEIMs) initialize Si and the platform
- Intel® UDK2010 is an implementation of PI and UEFI specifications
- Intel® BLDK is based on Intel® UDK2010

Intel® BLDK Components



Embedded

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Features of Intel® BLDK

Supported

- CPU, Memory, Basic IO Initialization
- Native UEFI Boot from SATA, SD, USB
- Feature configuration via Development Application
- Target OS: Windows* CE, Linux*, UEFI Shell
- Windows* and Linux* Tool Chains for development
- UEFI Specification 2.3 & PI Specification 1.2
- Fast Boot < 3s
- TCP/IP File Transfer
- ACPI 3.0
- Intel® UDK Debugger Tool
- Virtualization
- HD Audio

Not Supported

- Legacy Operating Systems
- Operating System Boot via Int19h
- Legacy USB
- Compatibility Support Module
- Intel® Active Management Technology
- Intel® Trusted Execution Technology
- Intel® vPro™ Technology
- Custom Remote Access Services

Intel® BLDK is targeted at fixed-function devices. It does not replace need for full-featured BIOS.

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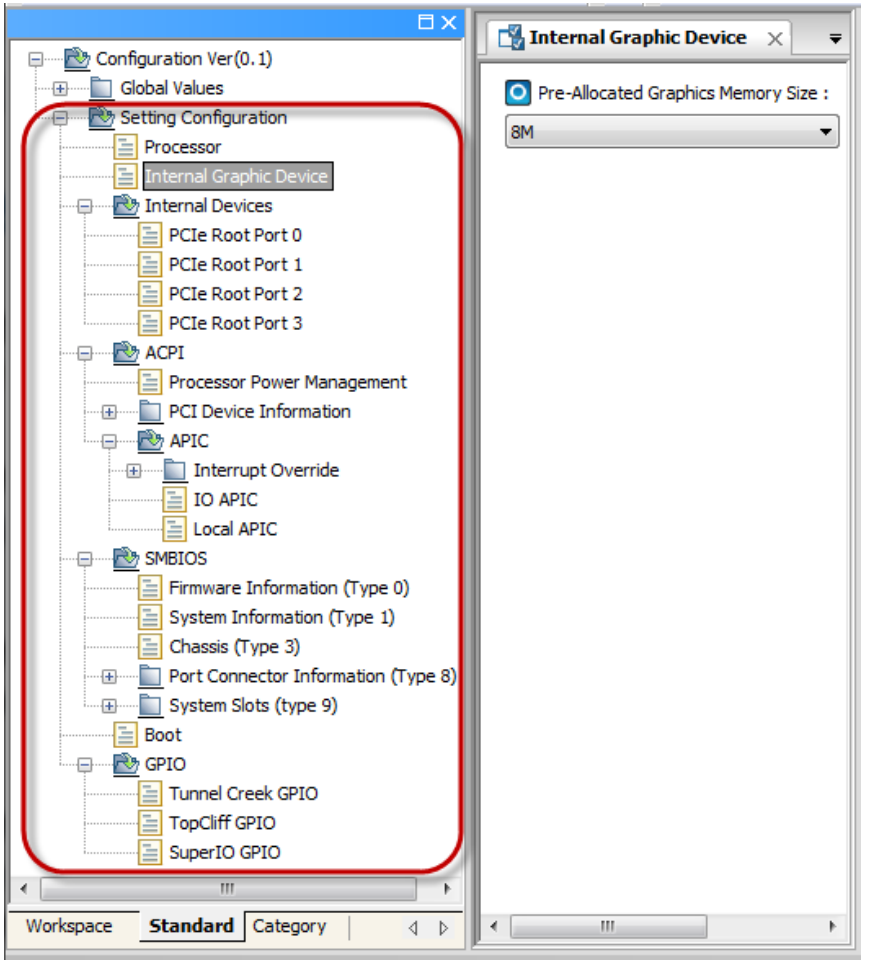
Firmware Customization

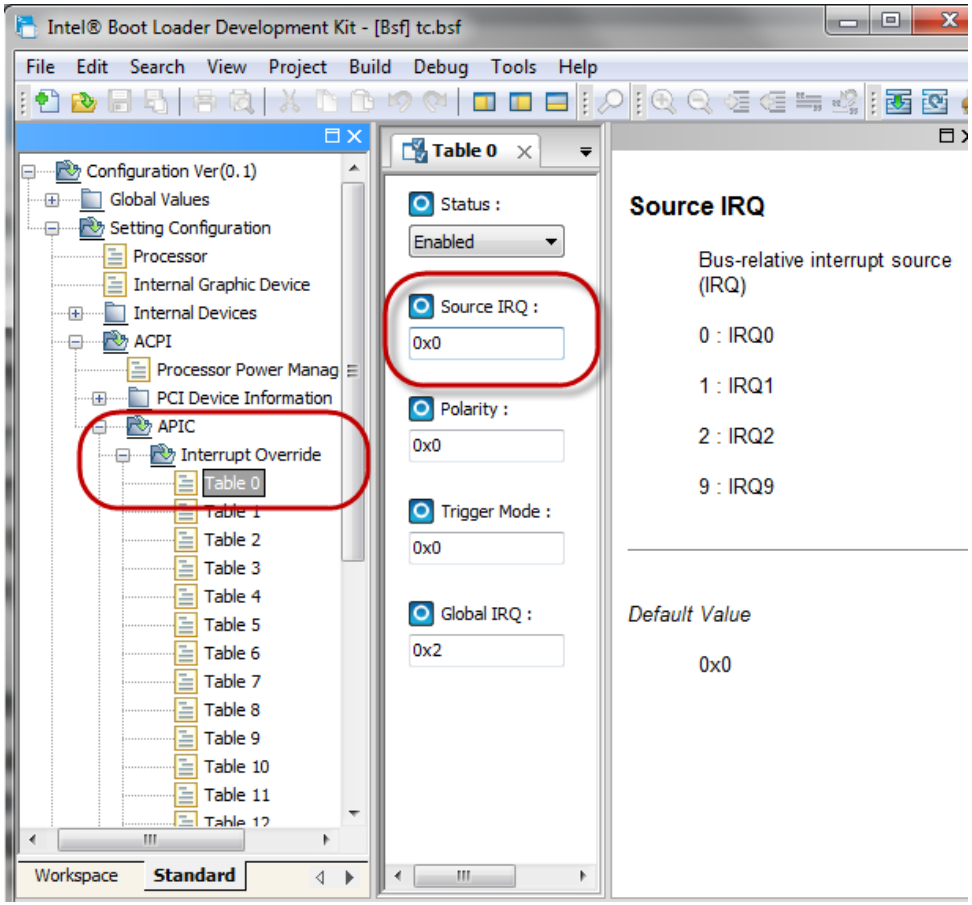
- Development Application provides the ability to customize firmware
- Hundreds of firmware options are configurable through the Development Application
- No source modification is required



Intel® BLDK provides an easy-to-use firmware configuration solution

Binary Modification

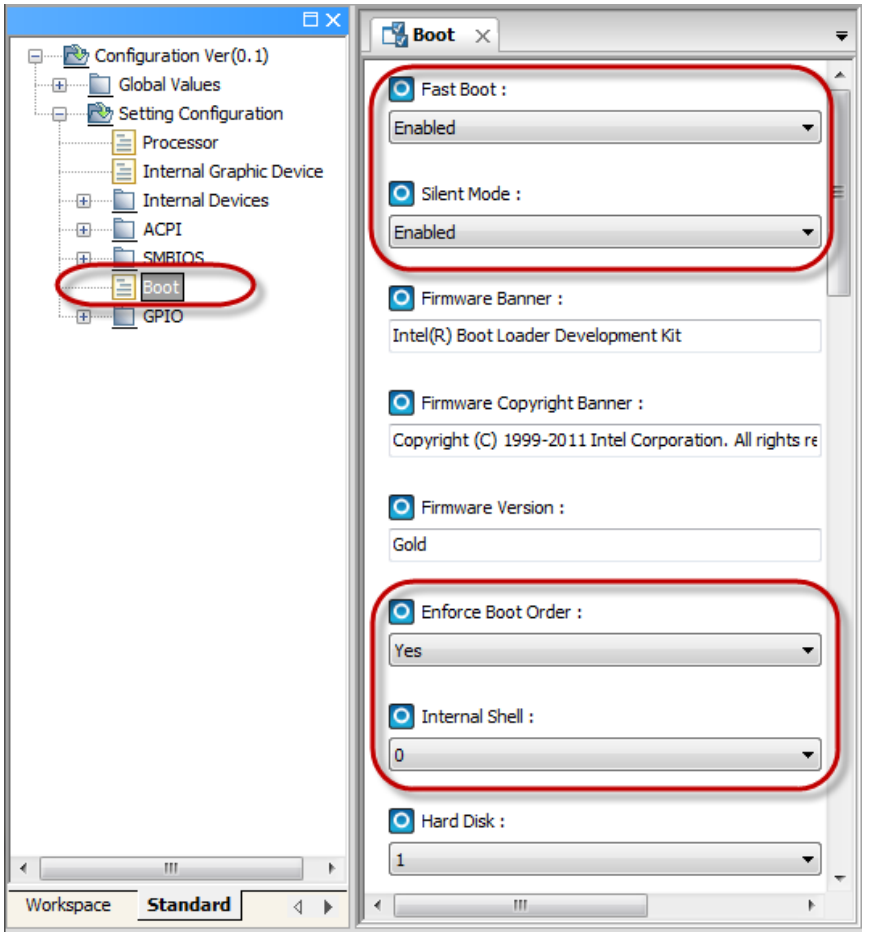
- Provides board customization and porting without rebuilding image or source code updates
- Post-build firmware configurations are accessed through Intel® BLDK Development Application
- 3-Step Process:
  1. Create a project
  2. Modify parameters based on the Target Configuration using Development Application
  3. Generate binary image



Intel® BLDK provides support for simple binary configuration

Performance Optimization in Intel® BLDK

- Intel® BLDK boot sequence can be configured for fast boot via the Development Application
- Only drivers required for system boot are dispatched
- Faster boot times can be achieved by optimizing Intel BLDK for a specific target configuration
  - Download "Reducing Platform Boot Time in UDK2010" for further details



Intel® BLDK is optimized for fast boot

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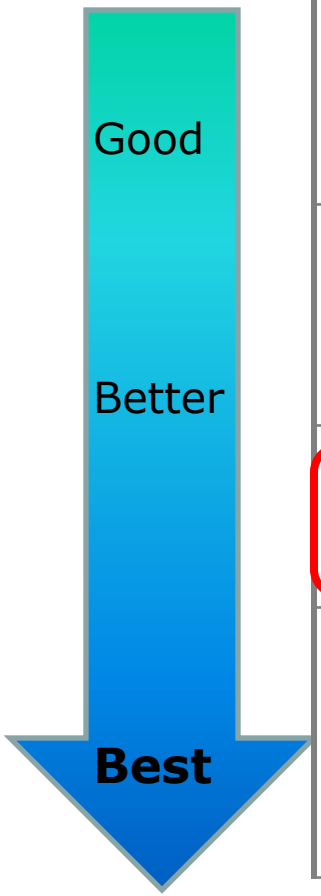
Platform Debug Methodologies



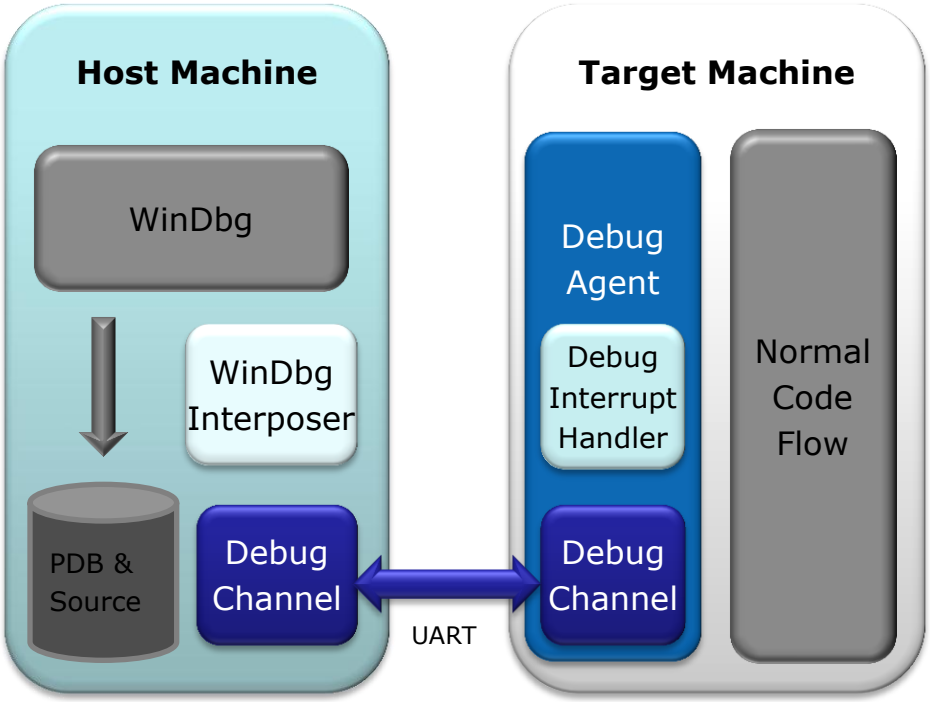
Method	Pros	Cons
Port 80h	• Simple • Low overhead	• Limited information • No execution tracing / flow control • May require several build iterations to isolate failure
Serial Out	• Simple • Low overhead • More information than Port 80h	• Additional hardware and initialization • No execution tracing / flow control
Software Debugger	• Freely available • Source level debug • Execution tracing / flow control	• Debug agent on target • Cannot debug all flows
Hardware Debugger	• Source level debug • Ability to step through code • Greater visibility to HW • Ability to debug complex execution paths (CPU init, SMM)	• Requires purchase of JTAG debugger

Software Debugger is integrated with Intel® BLDK

Intel® BLDK - Debugging

Intel BLDK includes a software debug solution

- WinDbg Interposer interprets the commands from WinDbg
- Debug channels are in charge of communication between Host Machine and Target Machine
- Debug interrupt handler handles the commands from Debug channel



For more details about the Intel UDK Debugger Tool, please refer to:
http://sourceforge.net/apps/mediawiki/tianocore/index.php?title=EDK2

Hardware debug solutions is available from:

Macraigor Systems Complete JTAG Debug Support

Arium

WIND RIVER

intel Embedded

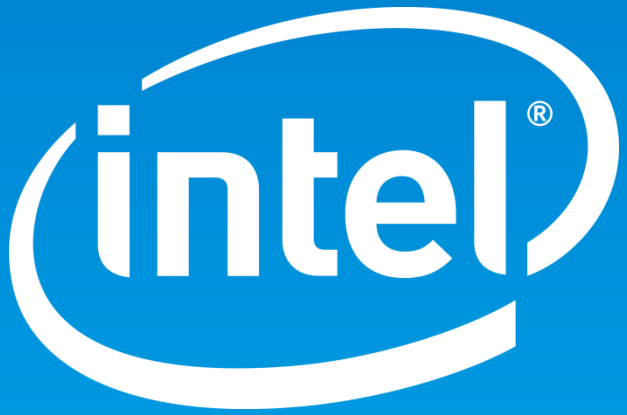
Summary

- **Intel® BLDK is a royalty-free solution for fixed-function embedded devices**
- **Intel BLDK is a complete solution that includes source, binaries, debug tools and documentation**
- **Intel BLDK reference implementations available now for:**
  - **Intel® Atom™ Processor E6xx Series**
  - **Intel® Atom™ Processor E6x5C Series**
  - **Coming Soon:**
    Intel® Atom™ Processor N2000 and D2000 Series

Call to Action

- ***Attend our hands-on Lab at 10:30 or 2:00!***
- **Download Intel® BLDK and related whitepapers and documentation (http://www.intel.com/go/bldk)**
- **Experiment with Intel® BLDK on your Intel reference platform**
- **Identify 3rd parties that can assist with development efforts (http://www.intel.com/go/eca)**
- **Visit the online community support forum (http://edc.intel.com/community)**

Q & A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