

presented by



UEFI Development Resources

UEFI Winter Plugfest – February 20-24, 2012
Presented by Brian Richardson,
Intel Corporation

Agenda



- Resources Available to UEFI Developers
- Open Source Resources
- Documentation Resources
- Development Platforms
- Summary / Q&A

Resources Available to UEFI Developers



Documentation

- UEFI Specifications & Learning Center
- UEFI Driver Writer's Guide
- UEFI Driver Development Guides

Open Source

- EFI Development Kit (EDK II)
- UEFI Development Kit (UDK2010)

Development

- UEFI Self Certification Test (SCT)
- UEFI 2.3.1 Developer Platforms & Debug Tools
- UEFI Driver Wizard

Documentation Resources



UEFI Specifications



UEFI Learning Center



UEFI Driver Writer's Guide



UEFI Driver Development Guides

UEFI Learning Center



- http://www.uefi.org/learning_center/
 - Related journals & whitepapers
 - Presentations from UEFI Plugfests

A screenshot of the UEFI Learning Center website. The top navigation bar includes links for Privacy Policy, Site Map, Contact, Forgot Password?, and Log On. On the left is a sidebar with the UEFI logo and menu items: Home, About UEFI, Join UEFI, and UEFI Specifications. The main content area is titled 'Learning Center' and contains a paragraph of text, a link to 'UEFI Today: Bootstrapping the Continuum', and a detailed paragraph about the Intel Technology Journal, Volume 15, Issue 1.

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Learning Center

The following are resources from past events and technical sessions.

[UEFI Today: Bootstrapping the Continuum](#)

The Intel Technology Journal, Volume 15, Issue 1 issue is completely focused on UEFI and the impact the technology has had on platform engineering. The content architects for this edition are Vincent Zimmer and Michael Rothman. From its roots in 1997 to support Intel® Itanium® based servers and the first published Extensible Firmware Interface (EFI) specification around 2000, Unified Extensible Firmware Interface (UEFI) has now eclipsed legacy BIOS across all computing platforms

UEFI Driver Writer's Guide



- Updated by Intel in Feb 2012
- Expanded to cover UEFI 2.3+ topics
- Designed as a developer reference
 - Organized & indexed by driver function
 - Not a “cover to cover read”
- <http://intel.com/go/uefi-ihv>

A comprehensive resource for UEFI Driver Developers ...

Driver Development Guides



- Published by Intel in Nov 2011
- Supplements for specific driver classes
- <http://intel.com/go/uefi-ihv>

Developer Guides and Documentation

[UEFI Driver Development Guide for All Hardware Device Classes >](#)

[UEFI Driver Development Guide for Graphics Controller Device Classes >](#)

[UEFI Driver Development Guide for Network Boot Devices >](#)

[UEFI Driver Development Guide for USB Devices >](#)

[UEFI Driver Development Guide for USB Host Controllers >](#)

Short resources to help developers get started with UEFI drivers ...

Open Source Resources



- Community for core UEFI components in open-source - <http://tianocore.org>
 - Develop firmware, drivers & applications
- Main TianoCore Projects
 - EDK Development Kit (EDK II)
 - UEFI Development Kit (UDK2010)
 - UEFI Shell

Development Resources



UEFI Self Certification Test (SCT)



UEFI 2.3.1 Developer Platforms



Intel[®] UDK Debugger Tool



Intel[®] UEFI Driver Wizard

UEFI 2.3.1 Developer Platforms



- Intel production hardware with UEFI 2.3.1 for debugging OS and add-in hardware against the latest firmware
 - Firmware updates are released based on code updates from Intel and UDK2010
 - Designed for IHV & OSV development
- <http://intel.com/go/uefi-ihv>

UEFI 2.3.1 Developer Platforms



Intel DQ57TM



Intel DQ67SW

New!

Intel® UDK Debugger Tool



- Software debugger for UEFI & EDK II
 - Connect via COM or USB Debug Port
 - Supports Microsoft Windows (WinDBG) and Linux (gdb) OS environments
 - Target side agent available in the EDK II **SourceLevelDebugPkg** component
- <http://intel.com/go/uefi-ihv>

Intel® UDK Debugger Tool

A screenshot of the WinDBG debugger interface. The main window displays source code from 'v:\sourceleveldebugpkg\library\pecoffextraactionlibdebug\pecoffextraactionlib.c'. The code includes comments and function definitions for handling debug registers and breakpoints. The Command window on the right shows the debugger's startup sequence, including kernel debugger connection, symbol search paths, and a series of commands like '.sympath', '.reload', and 'g' being executed. The status bar at the bottom indicates 'Ln 105, Col 38' and 'Sys 0:eXDI KD Proc 000:0 Thrd 000:0 ASM OVR CAPS NUM'.

```
eXDI 'exdi:clsid={66C102B6-D4F6-4F8E-84CC-B09802D364EA}' - WinDbg:6.11.0001.404 X86
File Edit View Debug Window Help
v:\sourceleveldebugpkg\library\pecoffextraactionlibdebug\pecoffextraactionlib.c Command
AsmWriteDr7 (0x20000480):
AsmWriteCr4 (Cr4 | BIT3):
//
// Do an IN from IO_PORT_BREAKPOINT_ADDRESS to generate a
// returns a read value other than DEBUG_AGENT_WAIT
do {
  DebugAgentStatus = IoRead8 (IO_PORT_BREAKPOINT_ADDRESS)
} while (DebugAgentStatus == DEBUG_AGENT_IMAGE_WAIT);
} else if (LoadImageMethod == DEBUG_LOAD_IMAGE_METHOD_SOFT_
//
// Generate a software break point.
//
CpuBreakpoint ();
}
//
// Restore Debug Register State only when Host didn't change
// E.g.: User halts the target and sets the HW breakpoint w
// in the above exception handler
//
NewDr7 = AsmReadDr7 ();
if (!IsDrxEnabled (0, NewDr7)) {
  AsmWriteDr0 (Dr0);
}
if (!IsDrxEnabled (1, NewDr7)) {
  AsmWriteDr1 (Dr1);
}
if (!IsDrxEnabled (2, NewDr7)) {
  AsmWriteDr2 (Dr2);
}
if (!IsDrxEnabled (3, NewDr7)) {
  AsmWriteDr3 (Dr3);
}
if (AsmReadCr4 () == (Cr4 | BIT3)) {
  AsmWriteCr4 (Cr4);
}
Microsoft (R) Windows Debugger Version 6.1
Copyright (c) Microsoft Corporation. All r

Kernel Debugger connection established
Debugger data list address is NULL
Connected to eXDI Device 0 x86 compatible
Symbol search path is: SRV*c:\symbols*http
Executable search path is:
eXDI Device Kernel Version 0 UP Free x86 c
Machine Name:
Primary image base = 0x00000000 Loaded mod
System Uptime: not available
Break instruction exception - code 8000000
ffffeab6 cc int 3
0: kd> .sympath V:\BUILD\OVMFIA32\DEBUG_MY
Symbol search path is: V:\BUILD\OVMFIA32\D
Expanded Symbol search path is: v:\build\o
0: kd> .reload /f SECMAIN=0x0`FFFEE064
0: kd> g
SECMAIN!PeCoffLoaderRelocateImageExtraActi
ffffeab7 0f21f8 mov eax,dr7
0: kd> .sympath V:\BUILD\OVMFIA32\DEBUG_MY
Symbol search path is: V:\BUILD\OVMFIA32\D
Expanded Symbol search path is: v:\build\o
0: kd> .reload /f SECMAIN=0x0`FFFEE064
0: kd>
Ln 105, Col 38 Sys 0:eXDI KD Proc 000:0 Thrd 000:0 ASM OVR CAPS NUM
```

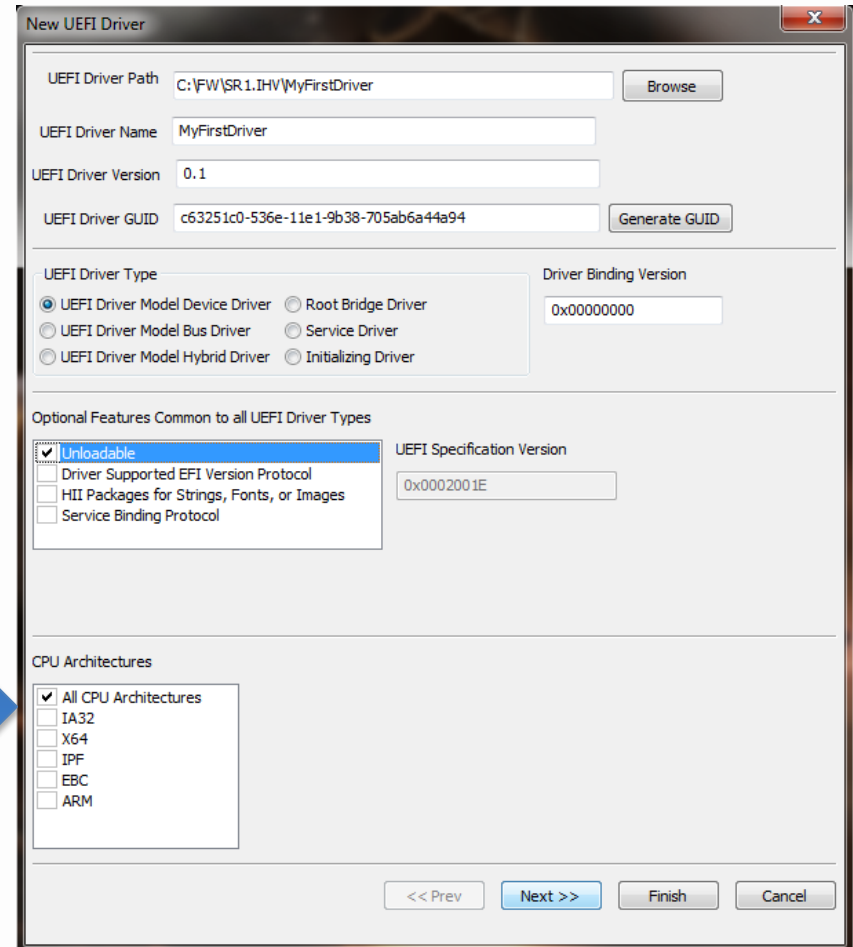
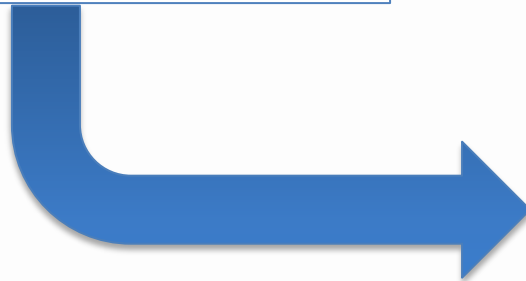
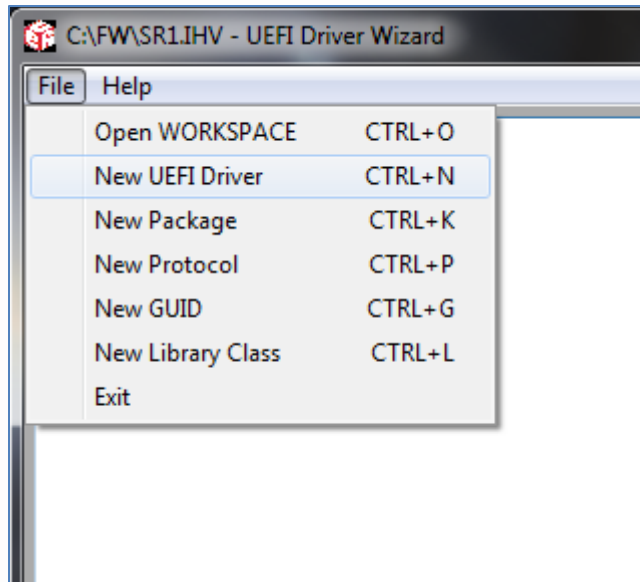
WinDBG

Intel UEFI Driver Wizard



- Newly developed interface to simplify UEFI Driver Development
 - Uses subset of the UDK2010 source tree
 - Wizard-based template generation
- Open source project contributed to TianoCore.org by Intel SSG
 - Python interface, designed for extensibility
 - Intel encourages contribution by developers

Intel UEFI Driver Wizard



Wrap Up / Q&A



Documentation

- UEFI Specifications & Learning Center
- UEFI Driver Writer's Guide
- UEFI Driver Development Guides

Open Source

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Development

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Get More Information



- UEFI Forum Learning Center
 - http://www.uefi.org/learning_center/
- UEFI IHV Resources @ intel.com
 - <http://intel.com/go/uefi-ihv>
- Use the TianoCore [edk2-devel mailing list](#) for support from other UEFI developers

Thanks for attending the
UEFI Winter Plugfest 2012



For more information on
the Unified EFI Forum and
UEFI Specifications, visit
<http://www.uefi.org>



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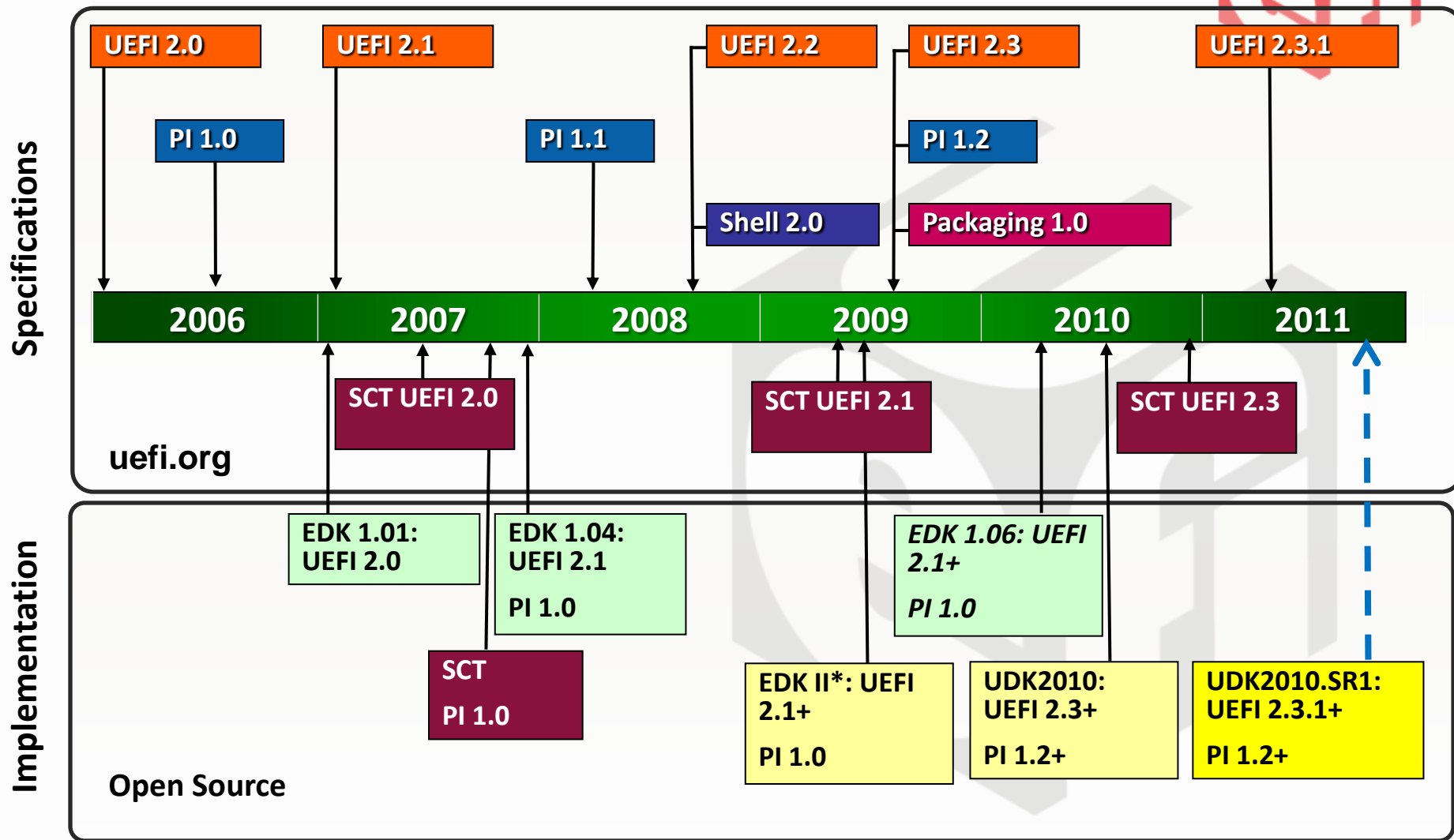


UEFI Development Resources

Backup Slides



UEFI Specification Timeline

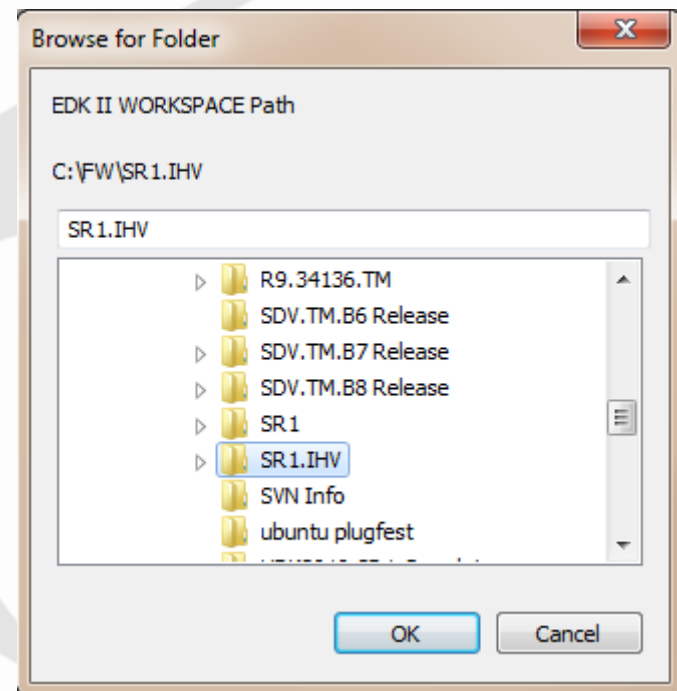
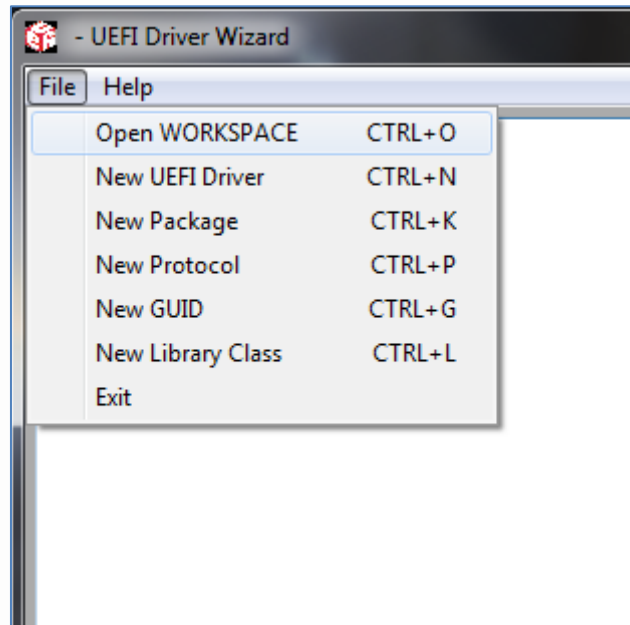


EDK II versus UDK2010

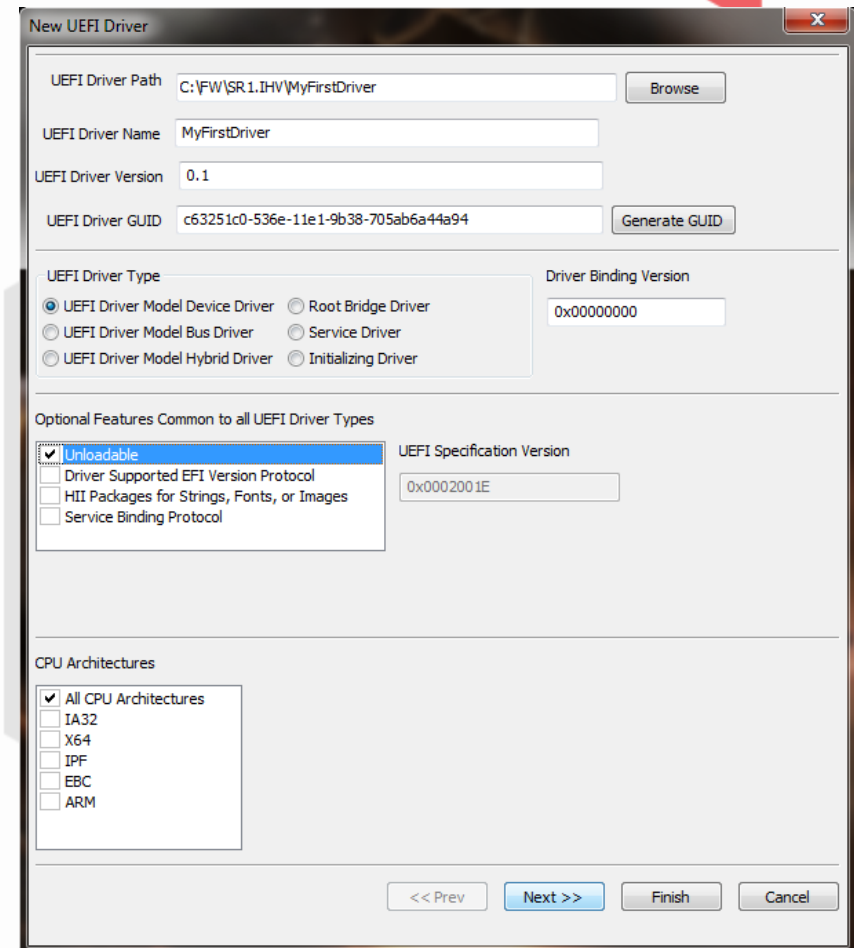
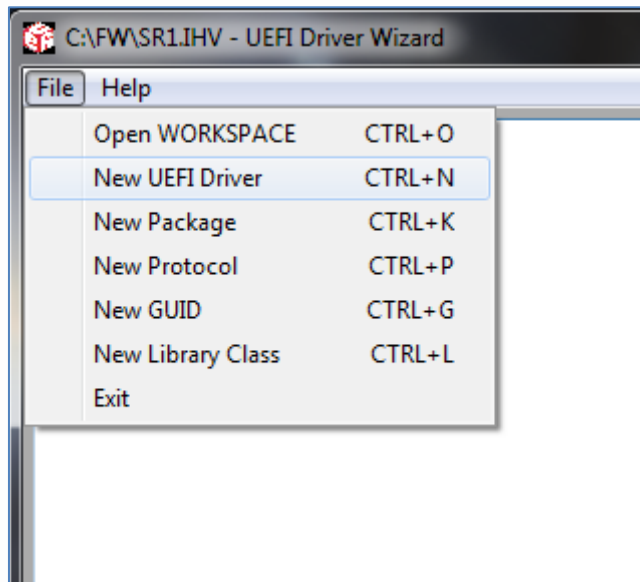


- EDK II is the open source “TianoCore” project
 - Available under BSD license at tianocore.org
- Intel SSG uses this project as the base for a common UEFI implementation within Intel
 - Intel® UEFI Development Kit 2010 (UDK2010)
 - UDK2010 is a stable snapshot of EDK II that has been validated against Intel silicon components
 - Most recent open-source release is UDK2010.SR1
- *EDK II rev 12898* is the base for UDK2010.SR1

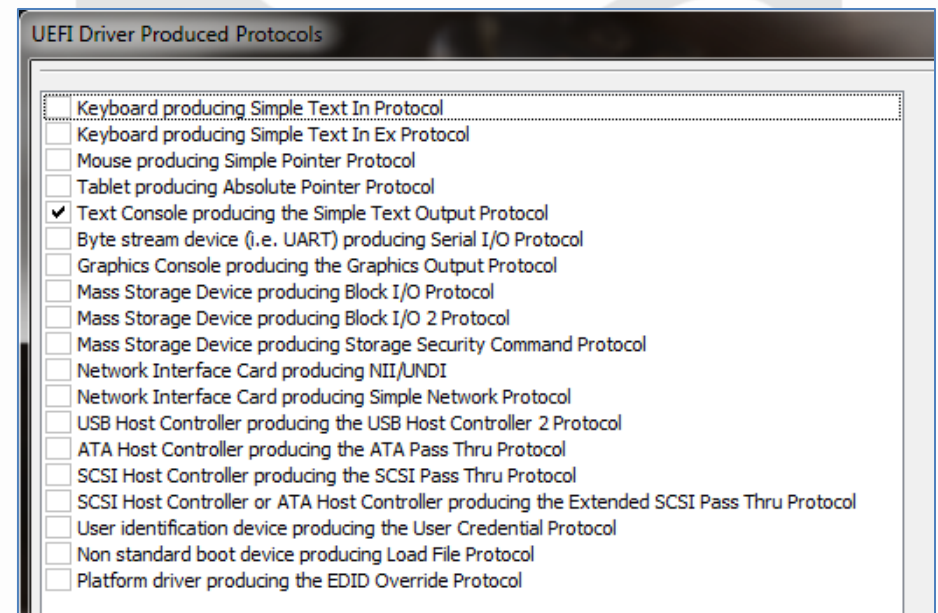
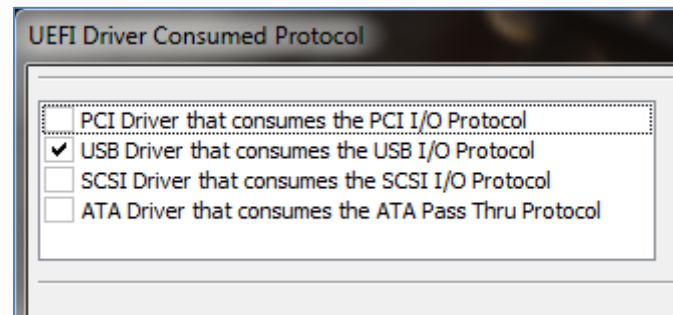
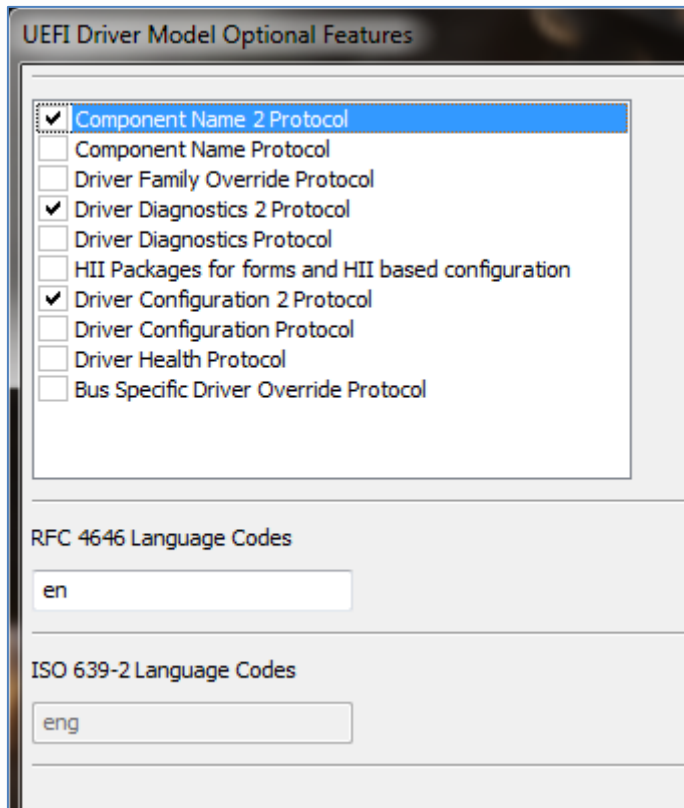
Screenshots from the UEFI Driver Wizard



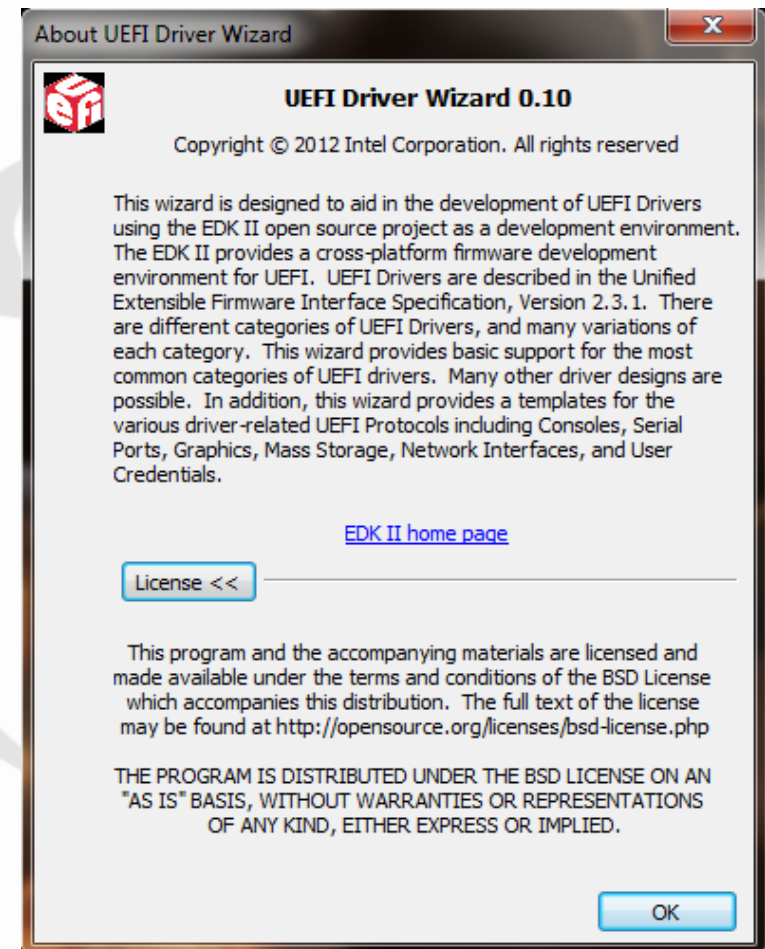
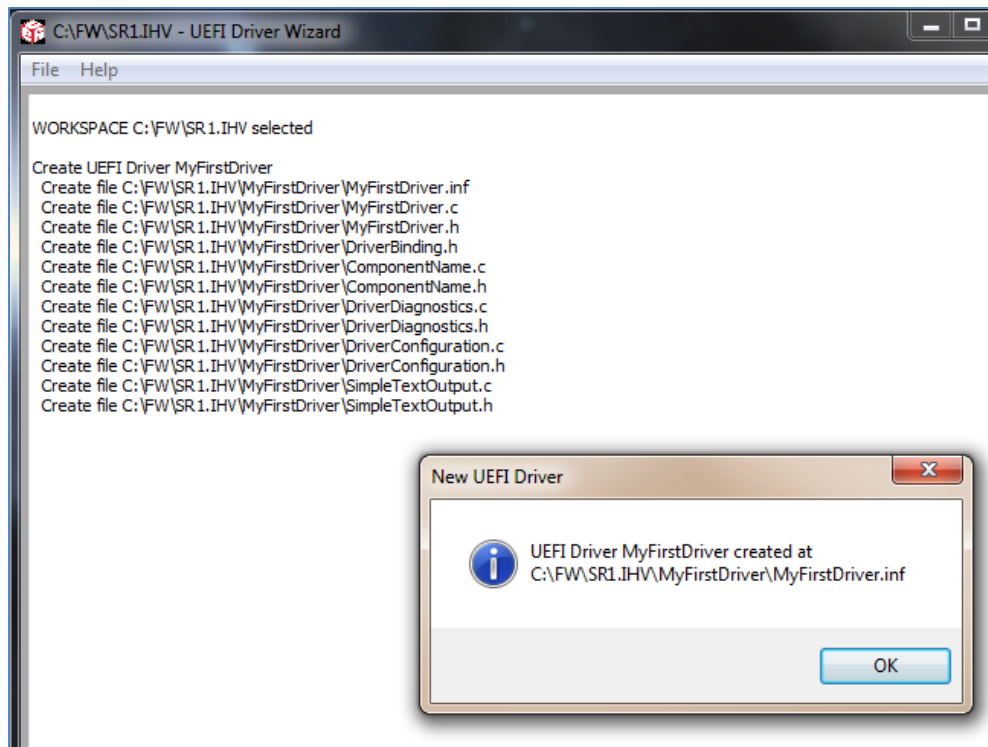
Screenshots from the UEFI Driver Wizard



Screenshots from the UEFI Driver Wizard



Screenshots from the UEFI Driver Wizard





UEFI Development Resources

www.uefi.org

