AMI Aptio V Document

Aptio 5.x Build Tools Release Notes

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AMI Tools

AMISDL Version 7.04.0230

- Bug fix: VeB provided the same package name for two different packages

ParseVeB Version 7.04.0104

- Updated ParseVeB to match changes made in VeB

OverrideProcessor Version 7.04.0037

- File time stamp changed after VeB override processor

VfrId

- Bug fix: VfrId was hanging on Linux systems while processing a file without end of line at the end of the file
- Parameter validation is improved

PackOpRom: Linux binary is provided

- Parameter validation is improved
- Linux binary is provided

MicroPack:

- New AMI tool to construct microcode binaries (EIP 257041)

Make Scripts

- Run override processor at the end of the build process (EIP 245930)
- Support for Microsoft Visual Studio 2015 Tool Chain is added (EIP 252294)

EDKII Tools

Performance of the build tools is improved by enabling compiler optimization.

Build

- Bug fix(EIP 251592)
    - Symptoms: While processing libraries distributed in binary format, the build tool in certain cases used debug library instance in release mode (or vise versa).
    - Root cause: While processing [Binaries] section of the INF file, the tool was not filtering binaries by target (Debug or Release). As a result all binaries were

copied to a module's build directory. This caused .lib file overrides when [Binaries] section included files with the same name located in different subdirectories of the module's source directory. In the following example, a debug version of X.lib was used in debug and release modes because last file with name X.lib (debug instance) was always overriding previous X.lib binaries.
[Binaries]
LIB|Release/X.lib|RELEASE
LIB|Debug/X.lib|DEBUG
    - The bug was introduced in BuildTools_25
- New Feature. Protocol/PPI table.
The tool is updated to generate Protocol and PPI name tables. The tables are used by Foundation_09 and newer to display Protocol/PPI names in debug messages.

GenFv

- Bug fix(EIP 252609)
    - Symptoms: GenFv was hanging during rebase of the corrupted PE/TE image
    - Root cause: poor validation of the PE image relocation table
- Bug fix
    - Symptoms: the tool was in certain cases returning 0 result even though FV generation has failed.
    - Root cause: omissions in the internal error checking logic
- Bug fix
    - Symptoms: the tool was reporting a build error when used without INF file.
    For example:
    GenFv -o <out-fv-name> -b <flash-block-size> -f <ffs-file1> … -f <ffs-filen>
- Bug fix(EIP 260136)
    - Symptoms: While reporting an error about overlapped fixed files, GenFv was reporting invalid file name and location
    - Root cause: Error reporting function was used with the wrong arguments

GenFw

- Bug fix(EIP 252609)
    - Symptoms: While converting ELF image to PE image, the tool was producing a corrupted PE image when --nodebuginfo command line switch was specified
    - Root cause: The debug information removal logic was incompatible with the latest GenFw improvements introduced in BuildTools_28
    - The bug was introduced in BuildTools_28
- Improvement(EIP 252294). GenFw is updated to strip off debug information while producing binary image (-b option). The feature is required to support linkers such as Visual Studio 2015 linker that always embed debug directory into resulting PE image(even when debug information is disabled by the linker flags).
- The generation of binary and ACPI images (-b and -c options) is improved.
    - The utility is updated to remove padding after the last section.

- The ELF to PE conversion code is updated to exclude non-PROGBITS(non program-defined information) sections from the resulting ACPI image

GenSec

- Bug fix(EIP 243141):
  - Symptoms: while creating aggregated section from more than 10 input files, GenSec was adding random size padding sections between the data sections.
  - Root cause: Bug in the reallocation of InputFileAlign array (wrong index variable was used).

GCC Linker Script

- GCC Linker Script is added to Windows destributions

Third Party Tools

IASL

- New IASL ACPI compiler version 20160318 supporting ACPI 6.1 is added (iasl6)
  NOTE: Projects that require ACPI 6.1 compiler should clone ASL_COMPILER SDL token and change its value to iasl6.

NASM

- Nasm x86/64 assembler is added

BuildTools_28

AMI Tools

AMISDL Version 7.04.0226

Fixes

- EIP 236039 – Styx project build fails with tools27 due to incorrect path separator slash

ParseVeB Version 7.04.0100

Fixes

- EIP 239781 – Change the Error message as Warning message, if file is not found

OverrideProcessor Version 7.04.0033

EDKII Tools

The EDKII build tools are upgraded to TianoCore.org SVN revision 18783.

Build

- Bug fix (EIP 226739): Build process was failing on INF files with the .obj file(s) in the [Sources] section.
- Build.exe didn't properly order library constructors in some cases(EIP 223798, 224670, and 201162).
- Improved PCD handling
  - Support for controlling attributes of the variables associated with PCD is added. The variable attributes (runtime or not, read-only or not) can be defined in DSC file.
  - Support runtime validation of PCD values.
    Build tool collects valid PCD values defined in the DEC file and generates data base that can be used for PCD value validation
  - Update AutoGen.c to check for a NULL token space GUID during DynamicEx PCD handling
  - Generate macro for the size of PCD value
- Support new BUILDRULEORDER command in tool chain definition file.
  The command defines priority of source file extensions.
- Added extern declaration for protocols/PPI/GUID in AutoGhen.h
- Support build options for specific module types in DSC file
- Bug fix: Comments after include statement in the UNI file were not supported
- Support UTF-8 string data in .uni files

This allows .uni input files to be encoded with UTF-8. Previous versions of build tools only supported UTF-16 encoding.

- Support of multiple workspaces.
  New PACKAGES_PATH environment variable is introduced to specify the additional WORKSPACEs (additional source code directories outside of the main WORKSPACE directory).

VfrCompile

- UEFI 2.5 Support. Refresh form opcode support.
- UEFI 2.5 Support. Enable buffer type value for default and oneofoption opcode.
- UEFI 2.5 Support. Match2 opcode support.
- UEFI 2.5 Support. Reconnect request flag support.

GenFds

- Bug fix (EIP 210617): GenFds was crashing during processing of the VERSION section in the FILE statement.
- Supported creation of FMP capsule image.
- Add a keyword FvNameString in FDF.
  The keyword with value TRUE OR FALSE is used to indicate whether the FV UI name is included in FV EXT header.

GenFw

- Elf to PE conversion code improvements
  - Take alignment of the first data section into account
  - 4K section alignment support
  - .debug contents is moved to .data section to save space
  - Allow AArch64 tiny and small code model relocations

GCC linker script

- gcc4.4-ld-script and gcc4.9-ld-script scripts are replaced with a unified linker script GccBase.lds
- Support for 4K section alignment is added
- AARCH64 support

Third Party Tools

make

Windows version of the GNU make tool is upgraded to version 4.1.

NOTE: Some projects may be incompatible with the updated version of GNU make.

Technical details:

Starting from version 3.81 GNU make does not convert backslash-newline into space in the command blocks (a.k.a. rule recipes).
The conversion is still performed in macro definitions and other sections of the make file.

New behavior leads to a wrong interpretation of make file commands that have no explicit space between $(ECHO)/$(ECHO_NO_ESC) and the first argument of the echo command, and that rely on implicit space injected by make after backslash-newline processing.
For example:

Command without a space (not compatible with new make):	Command with the space(before \):
Target: $(ECHO)\ "abc"	Target: $(ECHO) \ "abc"

In AmiPkg_18, definitions of $(ECHO) and $(ECHO_NO_ESC) macros are modified to include a “built-in” space at the end of the macro in order to ensure that there is always a space before the first argument.

For additional details refer to section "5.1.1 Splitting Recipe Lines" of the GNU make manual.
GNU manual is available at http://www.gnu.org/software/make/manual/make.pdf

Module Compatibility

This label of build tools requires at least the following Component labels.

- AmiPkg – AmiPkg_18
- NVRAM – NVRAM_05
- ACPI – ACPI_07
- SoftKbd – SoftKbd_06

AMI Tools

AMISDL Version 7.04.0222

New Features

1. Added support for new Multi-Platform SDL objects

Fixes

1. Fixed issue Token is not expanding if it's concatenate with any string in PCD Value
2. Fixed issue Token is not expanding when the value string contains operator(-) symbol
3. Fixed issue where Master token redefine is output only once
4. Fixed issue INFComponent Preprocessing failed for cloned INFComponent entries
5. Fixed issue - NULL LibraryMapping Override does not apply when respective INFComponent is cloned
6. Fixed issue evaluating dependency expression for Build Option type ELINKs used to override in DSC files

ParseVeB Version 7.04.0096

New Features

1. Added support for Multi-Platform

Fixes

1. Fixed evaluates dependencies issue with ParseVeB

OverrideProcessor Version 7.04.0032

AMI Tools

AMISDL Version 7.04.0196

Enhancements

- [AptioV Visual eBIOS]support manually enter _UID
- Support PCI changes related to ARM architecture support

Fixes

- [REF-35105] [AptioV][VeB] AMISDL.jar throws exception under Linux while building a project which building pass under Windows
- [REF-30583] AMISDL Output Wrong INF File to Build Folder when "Preprocess = YES"
- [REF-35113] AMISDL reports an error without checking the token dependency
- AMISDL fix – Token entires are missing in token.h while using Build tools 25 to build project.

ParseVeB Version 7.04.0081

New Features

- EIP 180870 - Add support for Component Dependency to VeB

Build tools 25.1

AMI Tools

AMISDL Version 7.04.0189

Fixes

- EIP 198557 – By using the same code base, VeB 24.6 will build successful but VeB 25 will build fail

AMI Tools

AMISDL Version 7.04.0188

New Feature

- EIP 162082 - AMISDL changes for Packaging Dual Boot FV in A Firmware Image
- EIP 168707 - Support Auto Size and Auto Offset for FD areas

Enhancements

- EIP 123969 - Add support to AMISDL to treat FFS_FILE SDL object attribute FD_AREA as optional
- EIP 160877 - Add support to AMISDL to process nested grammar as part of elink grammar
- EIP 140967 - Add same controll as for _WAK and _PTS object in ACPI tab for "Wake PME Settings" object.

Fixes

- EIP 174227 - AMISDL should display more debug info once it is crashed.
- EIP 163758 - [AptioV][BuildTools][AmiSdl] Platform.fdf has duplicate FV section

OverrideProcessor Version 7.04.0024

Enhancements

- EIP 176892 - restore option in OverrideProcessor command line to restore overridden files

Miscellaneous Improvements

- Font file font_unic.txt is updated to improve consistency of glyph definitions.
- New RunAmiSdl.mak script is added. The script runs AMI preprocessing tools such as AMI SDL. Projects that use AmiPkg version AmiPkg_14 or newer, use this script instead of RunAmiSdl.mak included with the project.

EDKII Tools

All EDKII Tools

- The build tools are upgraded to EDKII SVN revision 16408 from TianoCore.org.
- The build tools are supported to support paths longer than 260 characters on Windows

Build

- Windows GCC friendly list file format.
  The build system supports generation of list files. A list file is produced when a special macro like OBJECT_FILES_LIST is used in a build rule.
  A list file is a list of names of the files of a particular type.
  Prior versions generated a list of file names in OS-native format
  (i.e. OS-native file path separator is used. '\' - on Windows and '/' on Linux/Unix).
  However, some tools can't use list file in this format.
  For example, ld included with Windows Linaro AARCH64 GCC tool chain interprets '\' as an escape character.
  It can't use file\name\like\this. The name has to be converted to file/name/like/this.
  The build utility is updated to always use forward slash '/' as a path separator.
- Bug fix. Build error in PCD driver when dynamic string PCD with even length is used (EIP 174694). Only projects with PCD module version 5.004_PCD_02 or older (Core 5.009 or older) were affected.
- Bug fix in the .UNI file processing (EIP 163424).
  #langdef command that follows a #string command was treated as continuation of the preceding #string definition. The string definition was corrupted by appending language name at the end of the string definition.
- Skip the content defined in USER EXTENSION section without raising an error.
- New "--ignore-source" command line option to force binary build mode
- New "--conf" command line option to specify location of the Conf directory (default is $(WORKSPACE)/Conf).
- New "--check-usage" command line option to check INF file usage comment blocks.
- "as-built" INF generated in the module's output directory now contains a full list of library instances linked with the module as well as full module dependency expression.
- Support for INF GUID override in the DSC file using the following syntax:

```
[components.arch]
Pkg/module/module.inf
Pkg/module/module.inf {
  <Defines>
    FILE_GUID = 0D1B936F-68F3-4589-AFCC-FB8B7AEBC836
}
```

  Pkg/module/module.inf will be copied by the build tools to Conf/.cache/0D1B936F-68F3-4589-AFCC-FB8B7AEBC836module.inf

GenFds

- Auto ROM Area Sizing and Arranging Support.
  It is now possible to specify region Offset and/or Size as Auto. Region Offset can also be set to Top_Fv. The build tools will automatically calculate proper Offset and Size values for each region.
- Bug fix: GenFd was adding a 4 bytes raw section to FFS file of every module that uses HII resource section.

GenFd ejects additional raw section into FFS file of a module that has .VFR or .UNI files. The section defines offsets of the string and IFR arrays in the PE image. However, when module resources are stored in the HII resource section, string and IFR arrays are not generated and there is no need to produce the section. Original code was still producing an empty 4 bytes raw section. To tools is updated to do not generate Offset section for modules that use HII resource section.

- Add Protocol, PPI, and GUID definitions used by the project modules to the Guid.xref file. In the prior versions the file only contained the FFS filename GUID definitions.
- Add support for ${s_*} and ${d_*} macros in the FDF file rule sections. The following keywords are supported: "src", "s_path", "s_dir", "s_name", "s_base", "s_ext", "dst", "d_path", "d_name", "d_base", "d_ext"
- Support DSC and FDF files outside of WORKSPACE
- Support for INF GUID override in the FDF file using the following syntax:

```
INF Pkg/module/module.inf
INF FILE_GUID = 0D1B936F-68F3-4589-AFCC-FB8B7AEBC836 Pkg/module/module.inf
```

  Pkg/module/module.inf will be copied by the build tools to Conf/.cache/0D1B936F-68F3-4589-AFCC-FB8B7AEBC836module.inf
- Support $(SPACE) macro in the file names to represent file name with spaces (the space character can't be used directly in because it may be treated by FDF parser as a filed separator)

GenFv

- The tool is updated to properly handle large files (FFS files with FFS_ATTRIB_LARGE_FILE attribute set).
- Bug fix. The FV generation was failing when Top-Down allocation was enabled for FV_BB.
  - The tools is updated to reserve 4k for AP startup code when Top Down allocation is enabled for boot FV
- Support for Auto-sizing of Top-FV.
  It is now possible to define FV location by specifying its top address using TOP_ADDRESS tag (as oppose to specifying the base address using EFI_BASE_ADDRESS tag).
  See also "Auto ROM Area Sizing and Arranging Support" in GenFd section.
- Bug fix in in a function that defines location of the AP reset vector.
  The function was using additional 4K of FV space when address of pad file prior to VFT was 4k aligned.
- Tools is updated to handle the file path with spaces.

GenFw

- Support for AArch64 ADR_PREL_LO21 and R_AARCH64_CONDBR19 ELF image relocations
  - ADR_PREL_LO21: support for loading a PC relative label offset.
  - R_AARCH64_CONDBR19: support for conditional branch instruction (ELF64 code: 280).

- Fixed handling of R_AARCH64_CALL26/R_AARCH64_JUMP26 ELF image relocations that are referring to start of a section
- Skip generation of debug section during ELF to PE conversion when --nodebuginfo is specified.

VfrCompile

- Compiler is updated to report warning when control default, minimum, or maximum value is defined using and out of range constant (for example, when default of a question associated with a one-byte storage is set to 0x100)
- Improved handling of the numeric questions
    - Support for display flags DISPLAY_INT_DEC, DISPLAY_UINT_DEC, and DISPLAY_UINT_HEX (they were ignored by prior versions)
    - Default, minimum, and maximum values can now defined using a negative constant when DISPLAY_INT_DEC flag is specified
- Report warning when legacy flags not supported by UEFI specification are used
- Format of the orderedlist question is updated to allow comma after flag definitions to make orderedlist syntax consistent with the syntax of other question types (which require command flags)
- Support --version command line parameter

AMI Tools

- AMISDL Version 7.03.0174
  - EIP 162455 AptioV VEB r24 build failure with token value = “-1”
  - EIP 163758 Platform.fdf has duplicate FV section
  - EIP 160450 FDF generation does not honor AARCH64_PLATFORM_DSC support
  - EIP 165888 INF Preprocessing Support issue fixes
  - Revoke Changes done for EIP 154941 - Ordering of INF, Option Rom and File Statement with in FDF

AMI Tools

- AMISDL Version 7.03.0168
  - Support for 64 bit token type
  - Output Build options type elinks to token.mak
  - Enhanced AMISDL error reporting
  - Enable Macro Expansions Support for attributes in LDevice
  - GNU make compatible MODULE_MAK
  - EIP 140831 – AMISDL not supposed to generate ASl device objects for PCIDevice objects and LDEvices whose don't have AslName or ASL File properties set
  - EIP 141803 – VeB/AMISDL processing produces invalid FDF file when SDL token has empty value
  - EIP 144332 – SDL output doesn't contain USB_DEBUG_TRANSPORT with conditional AMIDEBUG_RX_SUPPORT
  - EIP 146035 – [AptioV] build error with override Tokens
  - EIP 149807 – AmiSdl removed space symbol in output for token whose value is a Macro
  - EIP 151060 – ROM Layout is not properly generated by AMISDL
  - EIP 151940 - SIO content is not properly restoring after S3 resume because of AMISDL output
- ParseVeB Version 7.03.0066
  - Support to group orphan components
- OverrideProcessor Version 7.03.0011
- FwBuild Verions 1.23.0044
  - EIP156583 – Bug Fix
    Library function returns wrong value for firmware file offset when a pad file is present immediately after the pad file containing extended volume header. This can cause addresses in the mapping table produced by /m option to be incorrect.

EDKII Tools

EDKII tools are upgraded to BaseTools SVN revision 2654 from TianoCore.org.

All Python tools are rebuilt with Python 2.7.6 and cx_Freeze 4.3.2

(prevision version with built with 2.7.6RC and cx_Freeze 4.3.1)

Visual Studio DLL consumed by Python runtime are included in the build tools distribution (EIP 146283).

- GenFv

    - Bug fix(EIP 143790). GenFv was returning the following error when FV base address was above 4GB.
      "ERROR 4001: FV larger than 4GB is not supported"
      The error was caused by a AlignAddress and AlignAddressDown macros truncating upper 32-bit of the argument.
      The bug was introduced in BuildTools_23.
    - Improvements
        - PatchVtf function is updated to patch VTF with a 64-bit boot firmware volume address when 64-bit dummy VTF signature is found(EIP 147018). This is used to make AARCH64 ROM images compatible with BCP and MMTool.
        - Add fixed attribute if file with the stripped relocations has been rebased.
- GenFds
    - Bug fix(EIP 144567). GenFds was crashing or hanging when one of the ROM regions had a very large offset far beyond the boundaries of the ROM image.
      The tool is updated to report a proper error message
    - Allow RAW, ASL, and ACPI file types in the SUBTYPE_GUID section.
- GenSec
    - Bug fix (EIP 147630). GenSec was crashing when launched with more than 10 input files.
- Build
    - Bug fix. Exception during generation of the execution order report is fixed.
    - Improvements
        - Support for "!include" statements in the tool definition files.
        - Minor output message formatting improvements
        - Support for a pseudo encapsulation section NONE{...}.
          It is used by Aptio to globally disable compression in configurations with nested FV_MAIN.
        - Generate HII String packages for different languages in the order specified in the .dsc file with the RFC_LANGUAGES token.
        - Allow RAW, ASL, and ACPI file types in the SUBTYPE_GUID section.
- GenFds.bat Improvement(EIP 150663). GenFds.bat is updated to support project paths with spaces and special characters.
- GenFw Improvements
    - Improved ELF to PE conversion:
        - support ELF images without code section
        - do not add debug directory if output type is binary
    - Improvement in binary generation:
        - strip unnecessary padding at the end of the last PE section.
    - Improvement in resource section generation for GNU tool chain(EIP 147018):
        - produce resource section compatible with Windows resource API used by BCP.

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- EDKII Tool Improvements:
  - Upgraded to BaseTools SVN revision 2602 from TianoCore.org
  - Built with python 2.7 and VS 2012 (older versions were built with python 2.5 and VS 2010)
- Improvements to Firmware Volume Generation tools (GenFv and GenFds):
  - Support for a Top-Down allocation of FFS files
  - FV Layout optimization support
  - FFS file Location and Size support
- VfrCompile Improvements
  OEM varstore data type override support
- Minor FwBuild improvement (no changes in functionality)
- Minor bug fixes in FontTool
- FontTool for 64 bit Linux
- AMISDL Version 7.03.0161
  - Added Support for File Override
  - Add Support for ROM Layout Output Generation
  - Ability to generate optimized Firmware Volume layout and support for Top Down Allocation
  - Added Expansion of Path macro in Elinks for SDL templates
- ParseVeB Version 7.03.0059
  - Added Support for File Override
- OverrideProcessor Version 7.03.04
  - Added Support for File Override

Build Tools 22

Bug fixes in AmiSdl and ParseVeB

Build Tools 21

New version of Build.exe and GenFds.exe

Improvements in UNI file processing:

1. Improved mapping of ISO 639-2 language codes to RFC 4646 language codes for all languages supported by Aptio 4:
   - Country codes are added to mappings of the languages supported by Aptio 4.
   - Mappings for Bibliographic ISO 639-2 codes used in Aptio 4 are added.
2. Allow RFC 4646 language codes in the compatibility mode to support gradual conversion of UNI files.

New feature(EIP123178): add support for running custom command after the auto-gen stage and before the GenFv stage.

Fontcfg.ini

Replace ISO 639-2 language codes with RFC 4646 language codes

Fontcfg.ini (EIP 128541): no-NO and nn-NO flavors of Norwegian are added.

SVN BuildTools directory is reorganized to better support tools for different platforms.

New version of AmiSdl (7.03.0151) and ParseVeB (7.03.0052):

New Features:

1. Support for new PCI and SIO output meta-data generating varstore information(EIP 117691)
2. Support for IO Devices in BIOS parameter wizard to manage existing IODevices in project
3. Option to include validation and stop build process when bridge bus number is not specified in PCI Devices of type HostBridge and its children
4. Support to generate new PCI_TREE Output for APTIO V that mimics Aptio 4 PCI TREE ASL
5. Support in AMISDL for generating custom output based on a predefined template grammar

Refer to AMI_Visual_eBios_Release_Notes_NDA.pdf for a list of resolved issues and new features.

Build Tools 20

The EDKII Build Tools are upgraded to TianoCore BuildTools revision 2575.

String override support (EIPs 111752 and 114971).

If UNI string is defined more than once, the last definition overrides the previous ones.

BuildToolsVersion.mak is added

The file defines BUILD_TOOLS_VERSION variable, which specifies

a build tools version.

