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UEFI & EDK II Training

Changing PCDs w/ Windows Lab

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See also LabGuide.md for Copy & Paste examples in labs

Lesson Objective

- UEFI Application with PCDs

EDK II PCD's Purpose and Goals

Review

Documentaton : MdeModulePkg/Universal/PCD/Dxe/Pcd.inf

Purpose

- Establishes platform common definitions
- Build-time/Run-time aspects
- Binary Editing Capabilities

Goals

- Simplify porting
- Easy to associate with a module or platform

PCD Syntax

Review

PCDs can be located anywhere within the Workspace even though a different package will use those PCDs for a given project

.DEC	.INF	.DSC
Define PCD	Reference PCD	Modify PCD
Package	Module	Platform

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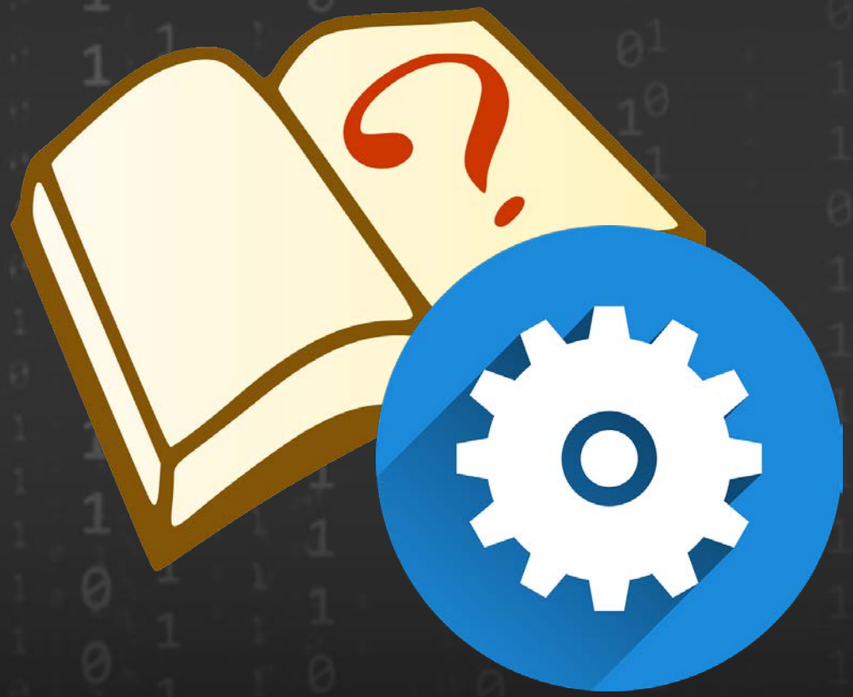
Lab 1.1: Writing UEFI Applications with PCDs

In this lab, you'll learn how to write UEFI applications with PCDs.



Solution: Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1

EDK II HelloWorld App Lab

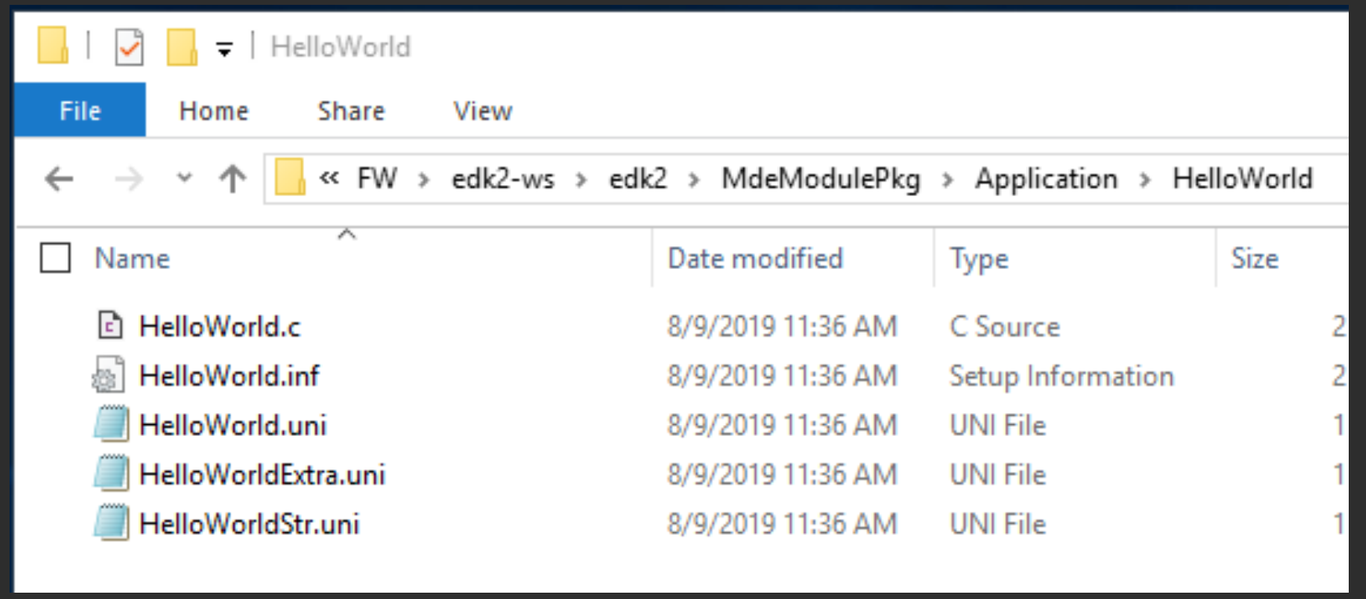
First Setup for Building EDK II for EmulatorPkg, See Lab Setup

Locate and Open edk2\MdeModulePkg\Application\HelloWorld\HelloWorld.c

Notice the PCD values

Build Emulation Package

Then Run HelloWorld



-D WIN_SEC_BUILD -a X64

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EDK II HelloWorld App Lab

Open a VS Command Prompt and type: `cd C:/FW/edk2-ws` then

```
$> Setenv.bat
$> cd edk2
$> edksetup
```

Build EmulatorPkg for Windows X64 (run WinHost.exe from `Build/EmulatorX64/ . . ./X64`)

```
$> Build
$> RunEmulator.bat
```

At the UEFI Shell prompt

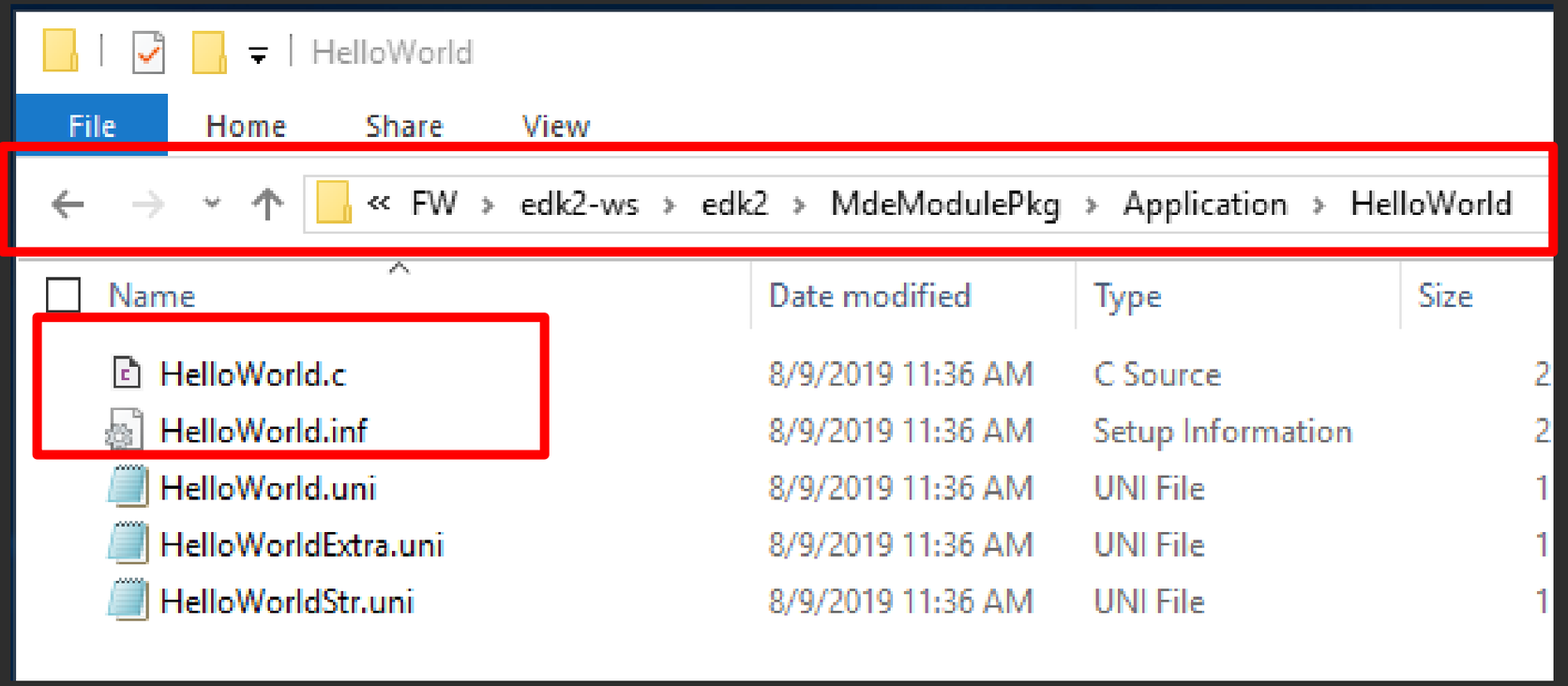
```
Shell> Helloworld
UEFI Hello World!
Shell>
```

How can we force the HelloWorld application to print out 3 times ?

Note: RunEmulator.bat will run WinHost.exe from `Build/EmulatorX64/DEBUG_TAG/X64`

EDK II HelloWorld App Lab

MdeModulePkg/Application/HelloWorld



EDK II HelloWorld App

Source HelloWorld.c

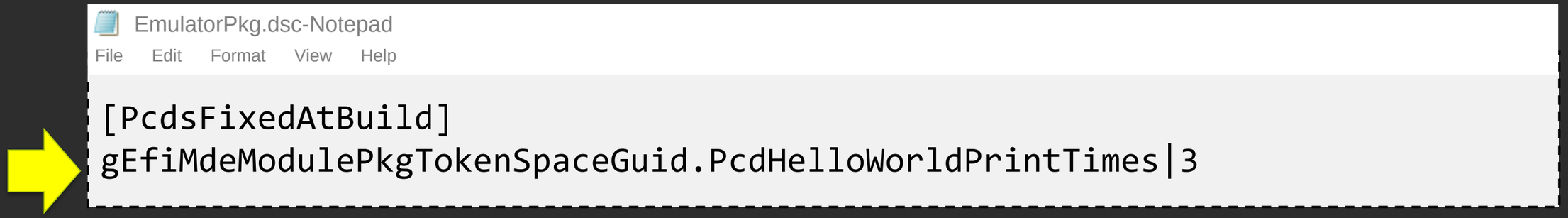
```
EFI_STATUS
EFIAPI
UefiMain (
  IN EFI_HANDLE        ImageHandle,
  IN EFI_SYSTEM_TABLE  *SystemTable
  )
{
  UINT32 Index;
  Index = 0;
  // Three PCD type (FeatureFlag, UINT32
  // and String) are used as the sample.
  if (FeaturePcdGet (PcdHelloWorldPrintEnable)) {
  for (Index = 0; Index < PcdGet32   (PcdHelloWorldPrintTimes); Index ++) {

    // Use UefiLib Print API to print
      // string to UEFI console

      Print ((CHAR16*)PcdGetPtr (PcdHelloWorldPrintString));
    }
  }

  return EFI_SUCCESS;
}
```

Notice the 3 PCDs

EDK II HelloWorld App Solution

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dsc

After the section `[PcdsFixedAtBuild]` (search for **"PcdsFixedAtBuild"** or **"Hello")**



2. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

EDK II HelloWorld App Solution

3. Run Emulation (run WinHost.exe from `Build/EmulatorX64/ . . ./X64`)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

4. At the Shell prompt

```
Shell> Helloworld
UEFI Hello World!
UEFI Hello World!
UEFI Hello World!
Shell>
```

5: Exit Emulation

```
Shell> Reset
```

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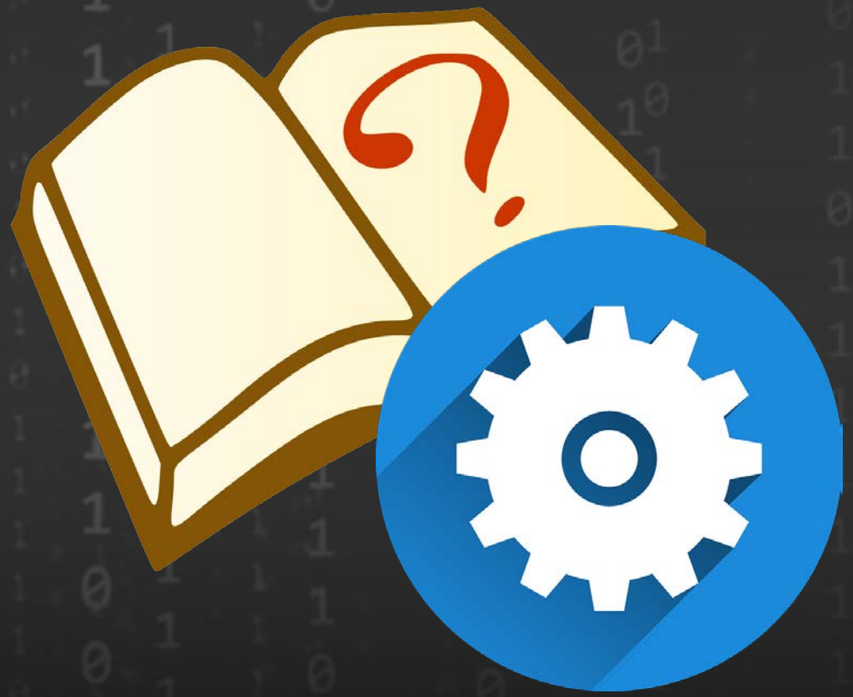
Lab 1.2: Writing UEFI Applications with PCDs

In this lab, you'll learn how to change a PCD String in the HelloWorld UEFI applications.



Solution: Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1_2

EDK II HelloWorld App Change String

How can we change the string of the HelloWorld application?

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dsc

After the section `[PcdsFixedAtBuild]` add the PCD for the HelloWorld String

2. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

Hint: see ../edk2/MdeModulePkg/MdeModulePkg.Dec

EDK II HelloWorld App Solution

3. Run Emulation (run WinHost.exe from `Build/EmulatorX64/ . . ./X64`)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

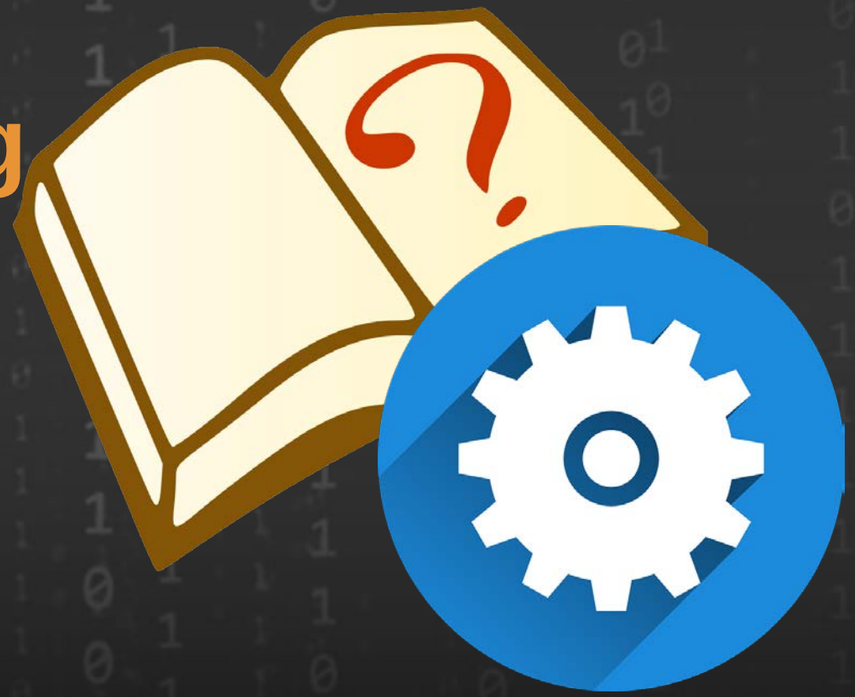
4. At the Shell prompt

```
Shell> Helloworld
My New String!
My New String!
My New String!
Shell>
```

5: Exit Emulation

```
Shell> Reset
```

Lab 1.3 – Adding PCD String



In this lab, you'll add a PCD String to the previous lab's SampleApp UEFI Shell application

Solution: Lab_Material_FW/FW/LabSampleCode/LabSolutions/LessonB.1_3

Lab 1.3: Catch up from previous lab

Skip to next slide if Lab Writing UEFI App Lab completed (Lab Guide)

- Perform Lab Setup from previous Labs (Lab Guide)
- Create a Directory under the workspace `C:/FW/edk2-ws/edk2` "`SampleApp`"
- Copy contents of `C:../FW/LabSampleCode/SampleAppPCD to C:/FW/edk2-ws/edk2/SampleApp`
- Open `C:/FW/edk2/EmulatorPkg/EmulatorPkg.dsc`
- Add the following to the [Components] section:

```
# Add new modules here
 SampleApp/SampleApp.inf
```

- Save and close the file `EmulatorPkg.dsc`

Sample App Add PCD String

How can we add a string to the SampleApp application?

1. Edit the file C:/FW/edk2-ws/edk2/EmulatorPkg/EmulatorPkg.dec. After the section `[PcdsFixedAtBuild]` add the PCD for the SampleApp called: `PcdSampleAppString`
2. Edit the file C:/FW/edk2-ws/edk2/SampleApp.inf and add the new PCD in the PCD section. Also add the package EmulatorPkg.dec in the Package section
3. Edit the file C:/FW/edk2-ws/edk2/SampleApp.c and add the correct Library include and also add:

```
Print((CHAR16 *)PcdGetPtr(PcdSampleAppString));
```

4. Re-Build – Cd to C:/FW/edk2-ws/edk2

```
$> Build
```

EDK II SampleApp Test

5. Run Emulation (run WinHost.exe from `Build/EmulatorX64/ . . ./X64`)

```
C:/FW/edk2-ws/edk2> RunEmulator.bat
```

6. At the Shell prompt

```
Shell> SampleApp
SampleApp String

. . .
Shell>
```

7: Exit Emulation

```
Shell> Reset
```

Summary

- UEFI Application with PCDs

Questions?

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ACKNOWLEDGEMENTS