



UEFI & EDK II Training

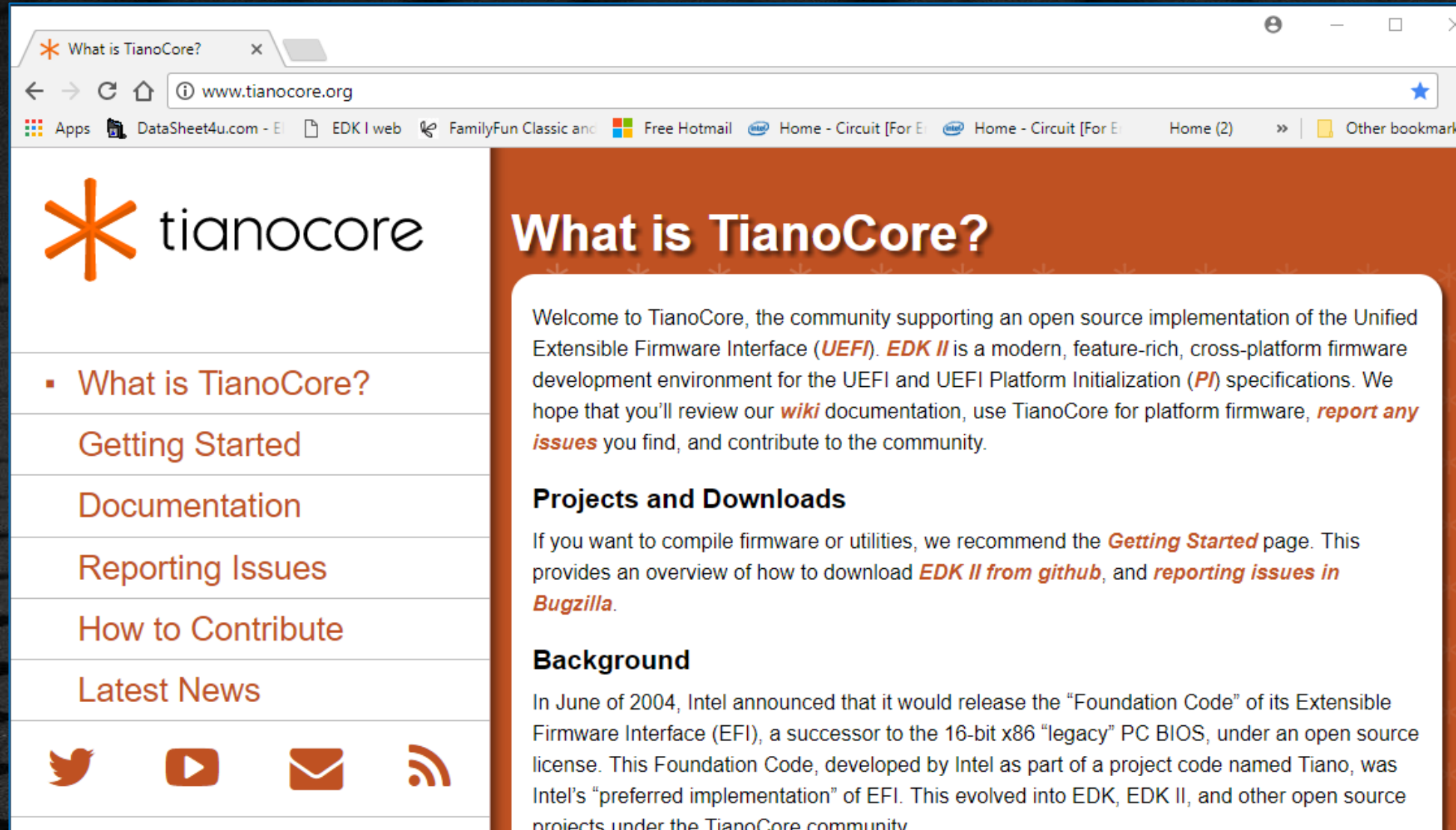
Open Source UEFI Platforms

tianocore.org

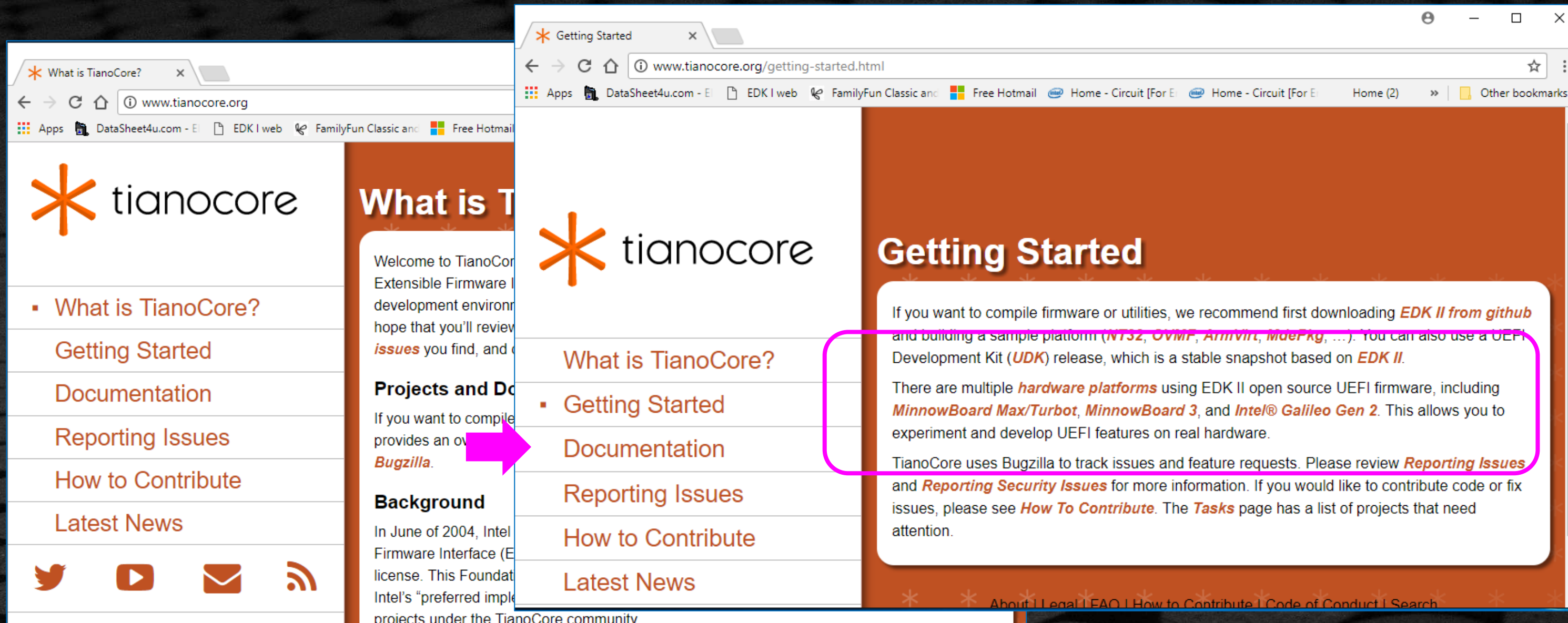


LESSON OBJECTIVE

-  Chart the organization of the Tianocore.org repositories
-  Recognize the various Open Source UEFI Platforms



Platforms [Emulator](#), [OVMF](#), [ArmVirt](#), [MdePkg](#) **Hardware platforms:** [MinnowBoard Max/Turbot](#), [Up Squared](#), and [Intel® Galileo Gen 2](#).



What is TianoCore?

Welcome to TianoCore Extensible Firmware Interface (EFI) development environment. We hope that you'll review [issues](#) you find, and contribute.

Projects and Development

If you want to compile firmware or utilities, we recommend first downloading [EDK II from github](#) and building a sample platform ([NT32](#), [OVMF](#), [ArmVirt](#), [MdePkg](#), ...). You can also use a UEFI Development Kit ([UDK](#)) release, which is a stable snapshot based on [EDK II](#).

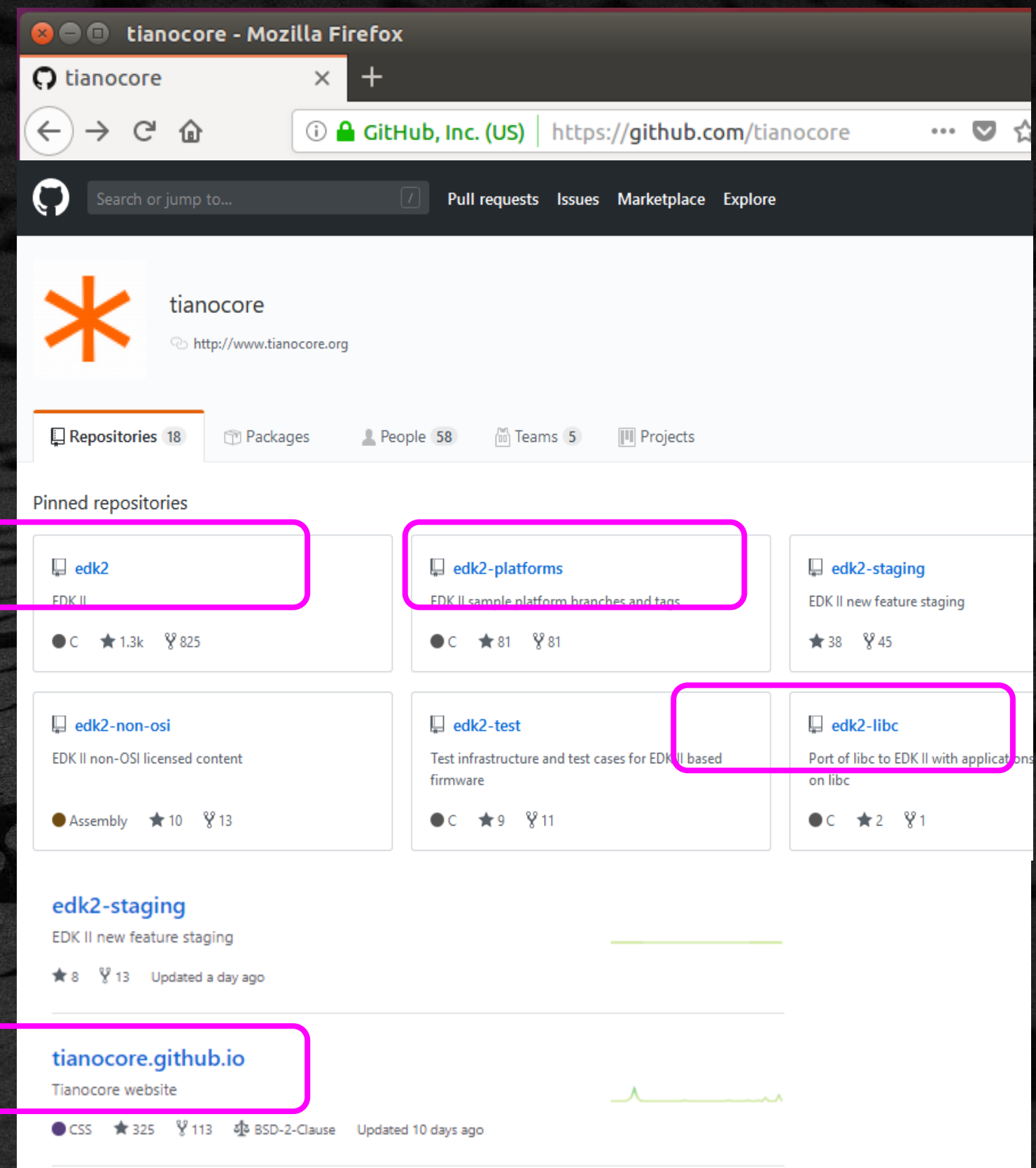
There are multiple [hardware platforms](#) using EDK II open source UEFI firmware, including [MinnowBoard Max/Turbot](#), [MinnowBoard 3](#), and [Intel® Galileo Gen 2](#). This allows you to experiment and develop UEFI features on real hardware.

TianoCore uses Bugzilla to track issues and feature requests. Please review [Reporting Issues](#) and [Reporting Security Issues](#) for more information. If you would like to contribute code or fix issues, please see [How To Contribute](#). The [Tasks](#) page has a list of projects that need attention.

Platforms [Emulator](#), [OVMF](#), [ArmVirt](#), [MdePkg](#) **Hardware platforms:** [MinnowBoard Max/Turbot](#), [Up Squared](#), and [Intel® Galileo Gen 2](#).

Concept of Repositories

- Main development - **edk2**
- Online Info & Help (Wiki pages) **tianocore.github.io**
- Other platforms **edk2-platforms**
- “C” library for Apps - **edk2-libc**
- To download use “**git clone**” then “**git checkout**”



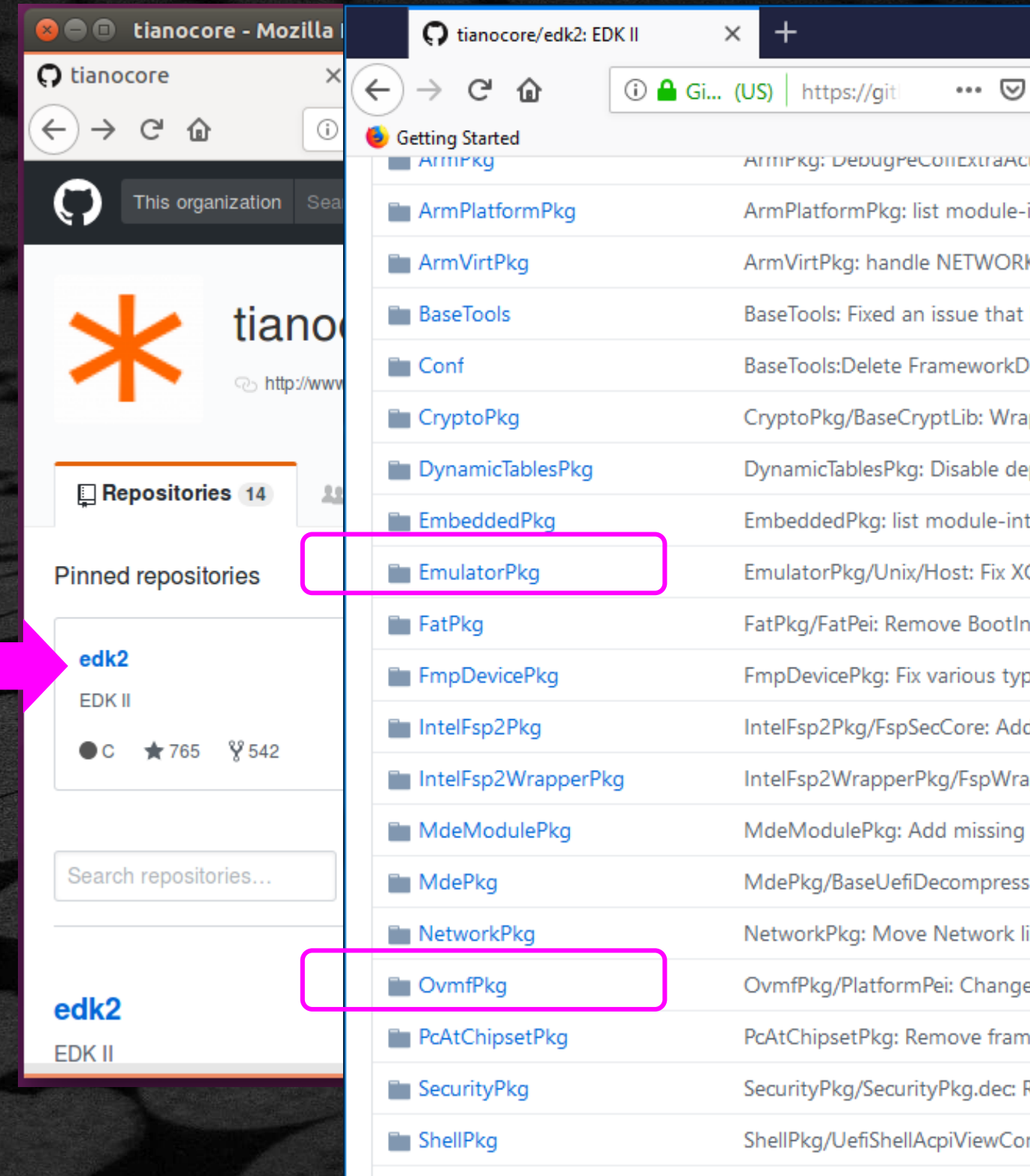
[GitHub Tianocore.org](https://github.com/Tianocore.org)

edk2 – Platforms on edk2- “CORE”

EmulatorPkg

OvmfPkg

See *Readme.md* files



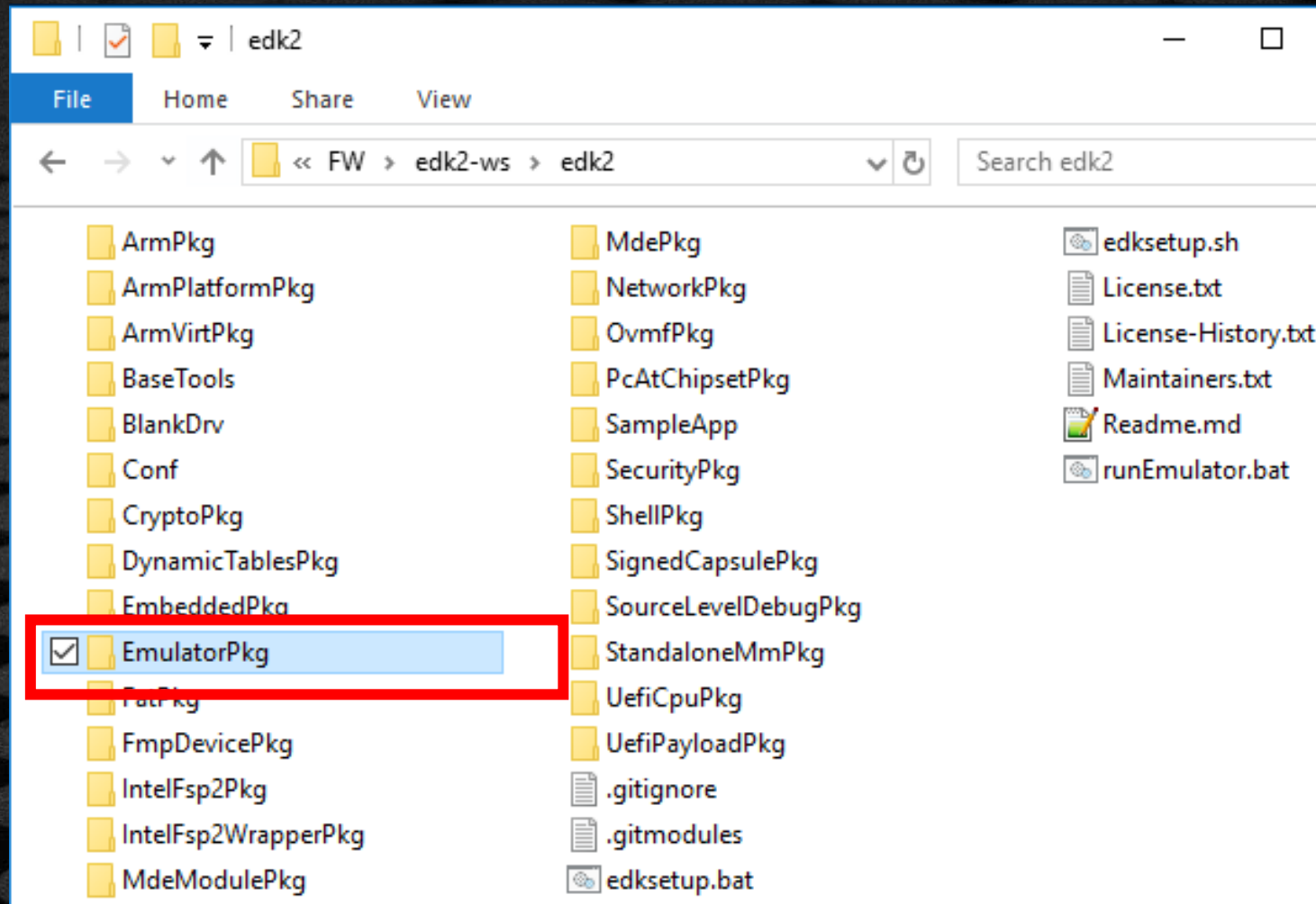
The image shows two browser windows. The left window displays the GitHub organization page for 'tianocore', featuring the Tianocore logo and a list of pinned repositories. The 'edk2' repository is highlighted with a pink arrow. The right window shows the 'edk2' repository page, listing various packages. Two packages, 'EmulatorPkg' and 'OvmfPkg', are highlighted with pink rectangles.

Package Name	Description
ArmPkg	ArmPkg: DebugPeContextExtraAC
ArmPlatformPkg	ArmPlatformPkg: list module-i
ArmVirtPkg	ArmVirtPkg: handle NETWORK
BaseTools	BaseTools: Fixed an issue that
Conf	BaseTools:Delete FrameworkD
CryptoPkg	CryptoPkg/BaseCryptLib: Wra
DynamicTablesPkg	DynamicTablesPkg: Disable de
EmbeddedPkg	EmbeddedPkg: list module-int
EmulatorPkg	EmulatorPkg/Unix/Host: Fix XC
FatPkg	FatPkg/FatPei: Remove BootIn
FmpDevicePkg	FmpDevicePkg: Fix various typ
IntelFsp2Pkg	IntelFsp2Pkg/FspSecCore: Add
IntelFsp2WrapperPkg	IntelFsp2WrapperPkg/FspWra
MdeModulePkg	MdeModulePkg: Add missing
MdePkg	MdePkg/BaseUefiDecompress
NetworkPkg	NetworkPkg: Move Network li
OvmfPkg	OvmfPkg/PlatformPei: Change
PcAtChipsetPkg	PcAtChipsetPkg: Remove fram
SecurityPkg	SecurityPkg/SecurityPkg.dec: R
ShellPkg	ShellPkg/UefiShellAcpiViewCor

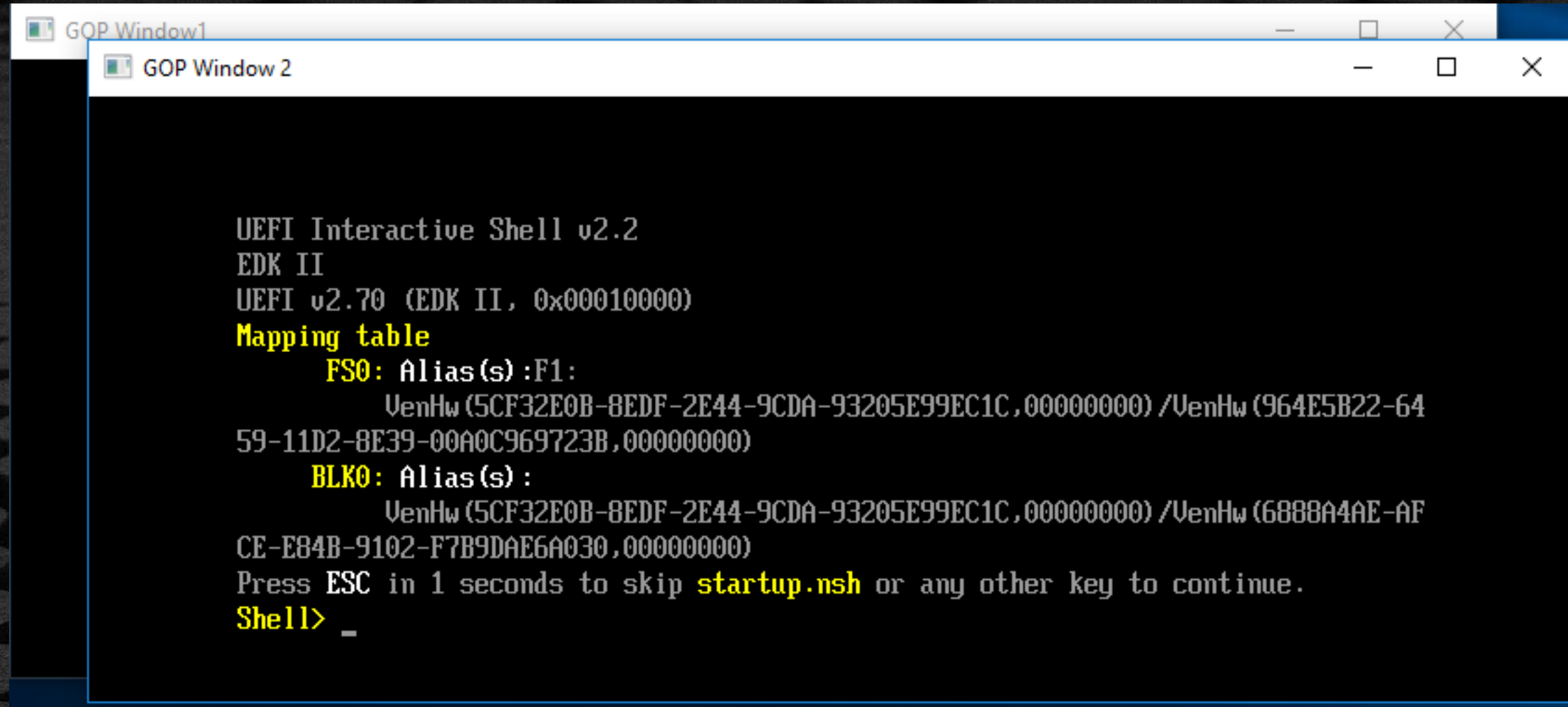
Emulation Directory Structure

EmulatorPkg files

- ✓ EmulatorPkg.dsc
- ✓ EmulatorPkg.dec
- ✓ EmulatorPkg.fdf



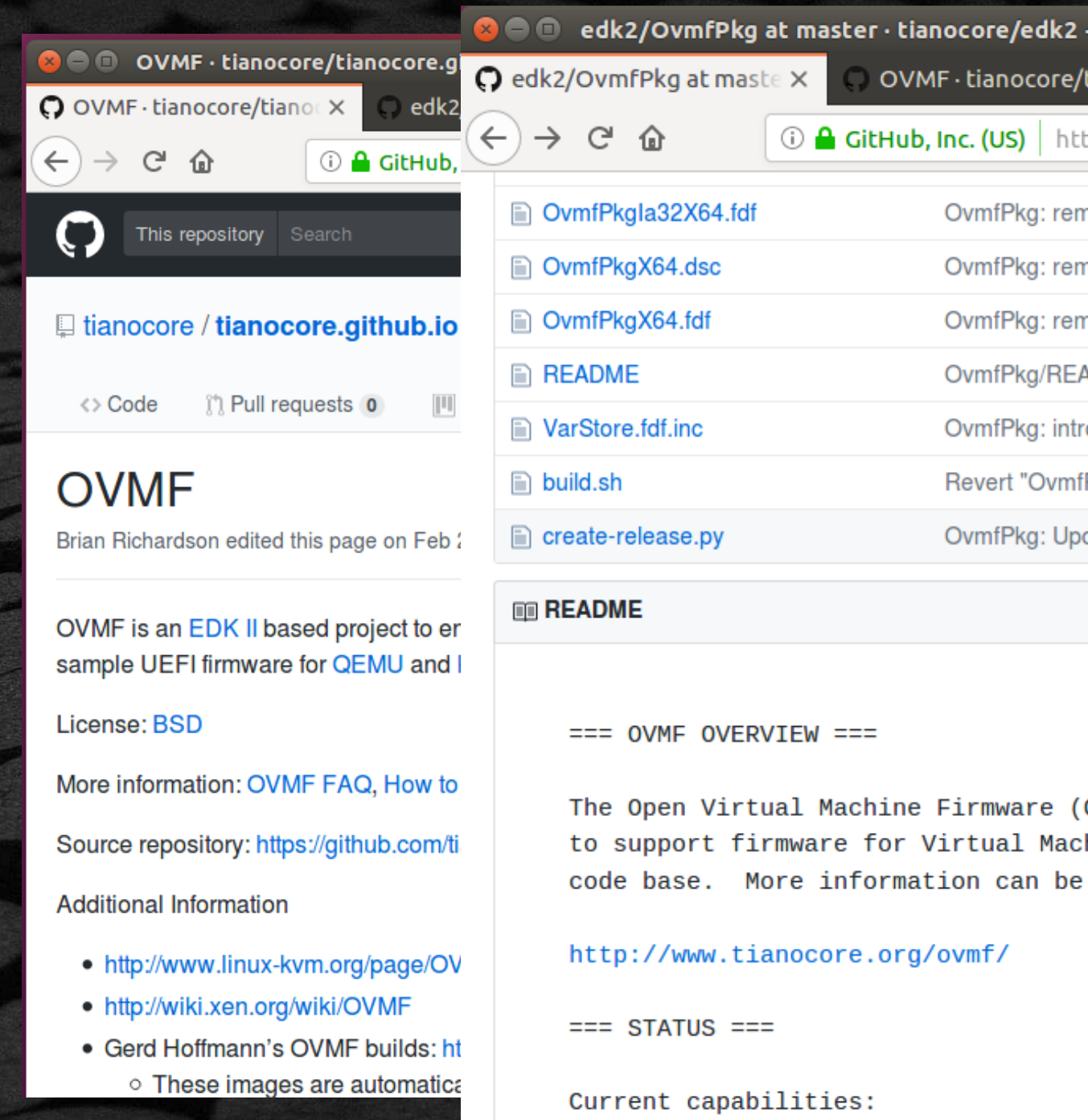
Running Emulator with Windows



```
UEFI Interactive Shell v2.2
EDK II
UEFI v2.70 (EDK II, 0x00010000)
Mapping table
  FS0: Alias(s):F1:
        VenHw (5CF32E0B-8EDF-2E44-9CDA-93205E99EC1C,000000000) /VenHw (964E5B22-64
59-11D2-8E39-00A0C969723B,000000000)
  BLK0: Alias(s):
        VenHw (5CF32E0B-8EDF-2E44-9CDA-93205E99EC1C,000000000) /VenHw (6888A4AE-AF
CE-E84B-9102-F7B9DAE6A030,000000000)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell> _
```

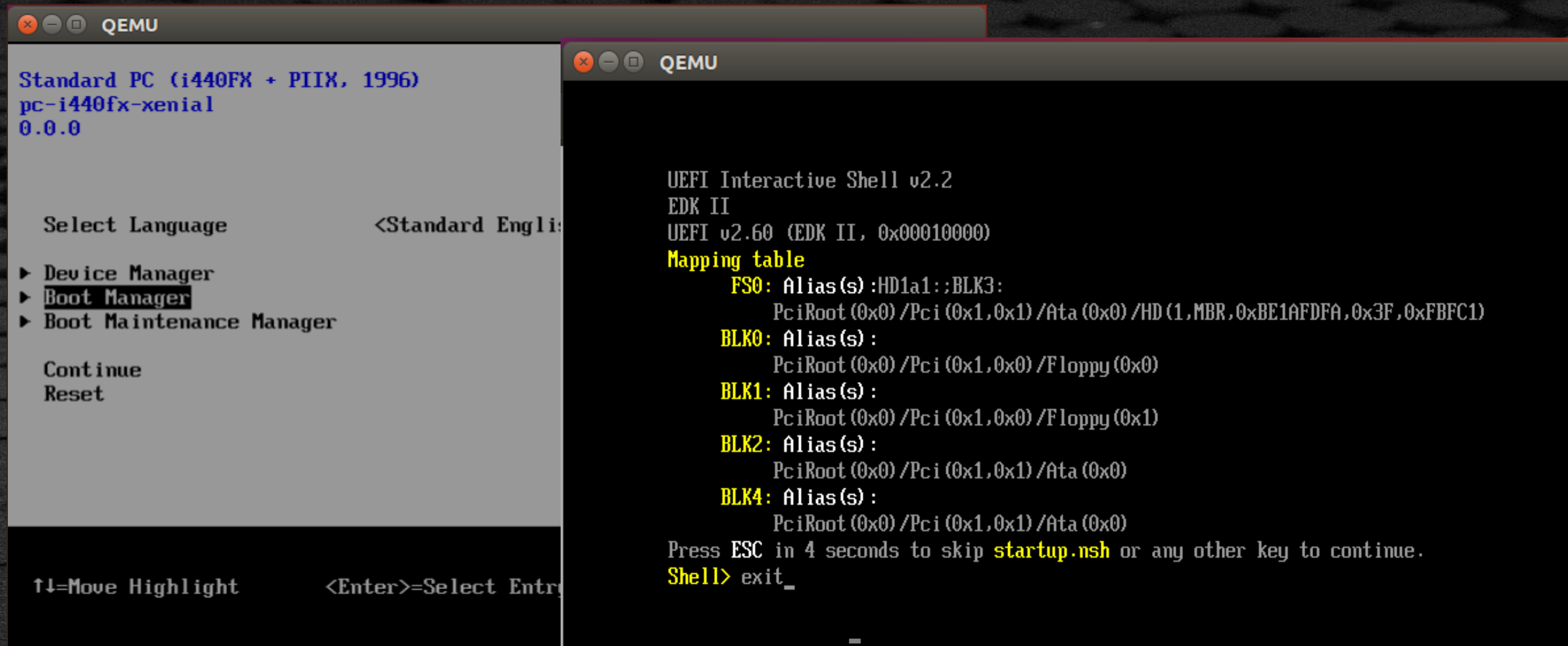

Open Virtual Machine Firmware (OVMF)

- Uses EDK II to support firmware in the OvmfPkg platform package
- Supports UEFI: Helps develop/debug drivers & applications
- QEMU VM; emulates IA32 (x86)/X64 (x86-64) based system
- Exit condition → UEFI Shell
- Tool Chain/OS Support
- Information [Ovmf wiki](https://www.tianocore.org/ovmf/wiki/), Tianocore.org



OVMF BIOS w/ QEMU

Boots to UEFI Shell



```
Standard PC (i440FX + PIIX, 1996)
pc-i440fx-xenial
0.0.0

Select Language          <Standard English>

▶ Device Manager
▶ Boot Manager
▶ Boot Maintenance Manager

Continue
Reset

↑↓=Move Highlight      <Enter>=Select Entry

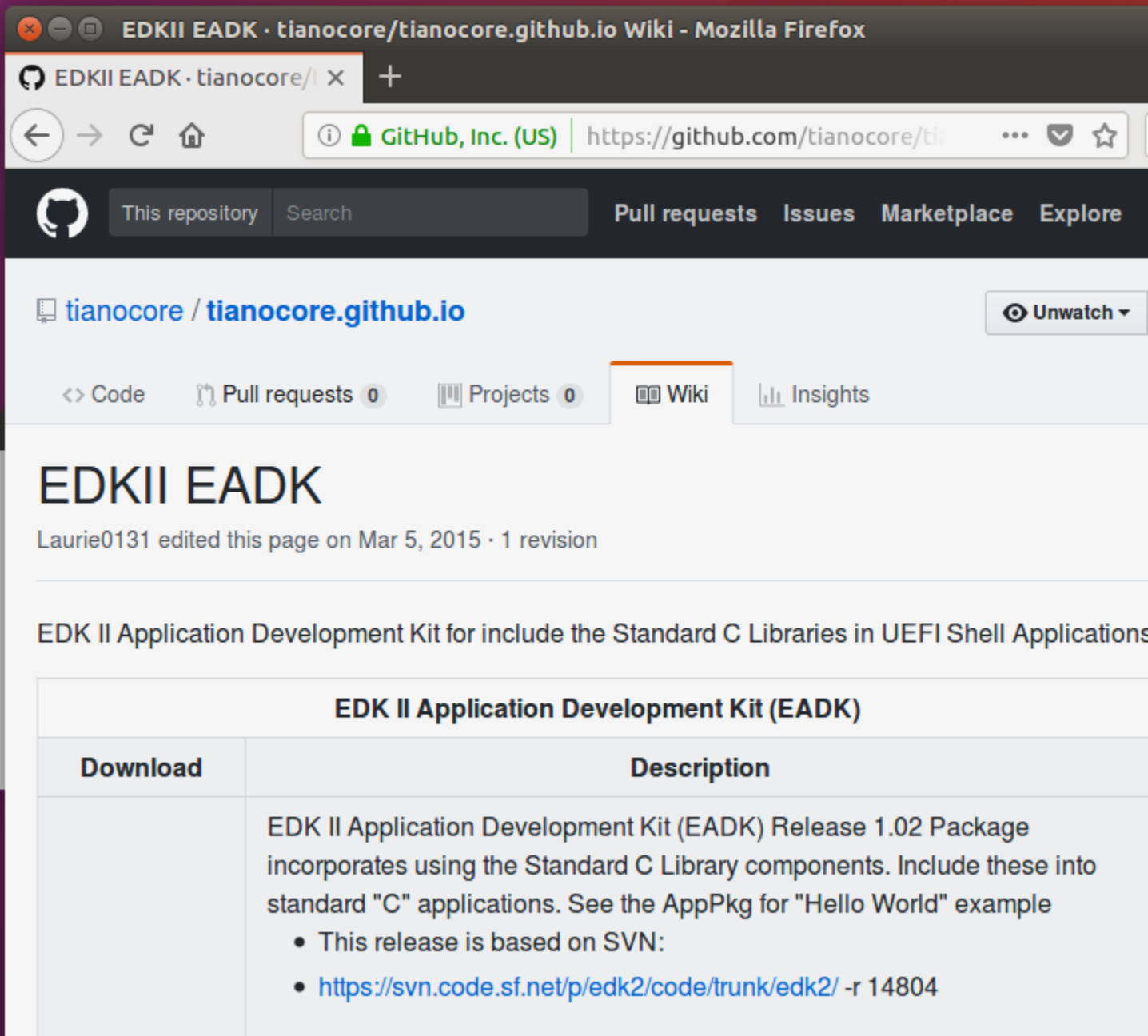
UEFI Interactive Shell v2.2
EDK II
UEFI v2.60 (EDK II, 0x00010000)
Mapping table
  FS0: Alias(s) :HD1a1::BLK3:
          PciRoot (0x0) /Pci (0x1,0x1) /Ata (0x0) /HD (1,MBR,0xBE1AFDFA,0x3F,0xFBFC1)
  BLK0: Alias(s) :
          PciRoot (0x0) /Pci (0x1,0x0) /Floppy (0x0)
  BLK1: Alias(s) :
          PciRoot (0x0) /Pci (0x1,0x0) /Floppy (0x1)
  BLK2: Alias(s) :
          PciRoot (0x0) /Pci (0x1,0x1) /Ata (0x0)
  BLK4: Alias(s) :
          PciRoot (0x0) /Pci (0x1,0x1) /Ata (0x0)
Press ESC in 4 seconds to skip startup.nsh or any other key to continue.
Shell> exit_
```


EDK II EADK

EDK II Application Development Kit includes the Standard “C” Libraries in UEFI Shell Applications

Link: [wiki EADK](#)

Github: [edk2-libc](#)



The screenshot shows a Mozilla Firefox browser window displaying the GitHub Wiki page for 'EDKII EADK' by 'tianocore'. The page title is 'EDKII EADK' and it was edited by Laurie0131 on Mar 5, 2015. The content describes the EDK II Application Development Kit (EADK) for including Standard C Libraries in UEFI Shell Applications. A table provides details about the EADK Release 1.02 Package, including its description and the SVN link for the release.

EDK II Application Development Kit (EADK)	
Download	Description
	<p>EDK II Application Development Kit (EADK) Release 1.02 Package incorporates using the Standard C Library components. Include these into standard "C" applications. See the AppPkg for "Hello World" example</p> <ul style="list-style-type: none">• This release is based on SVN:• https://svn.code.sf.net/p/edk2/code/trunk/edk2/ -r 14804

EDK II EADK COMPONENTS

EDK II Application Development Kit includes the Standard C Libraries in UEFI Shell Applications

● Components

- Utilities (Python 2.7.2, & 2.7.10 etc.)
- C Library
- BSD Socket Library
- Network Socket Library – Ipv4 / Ipv6

● Packages /AppPkg /StdLib

FreeBSD Port

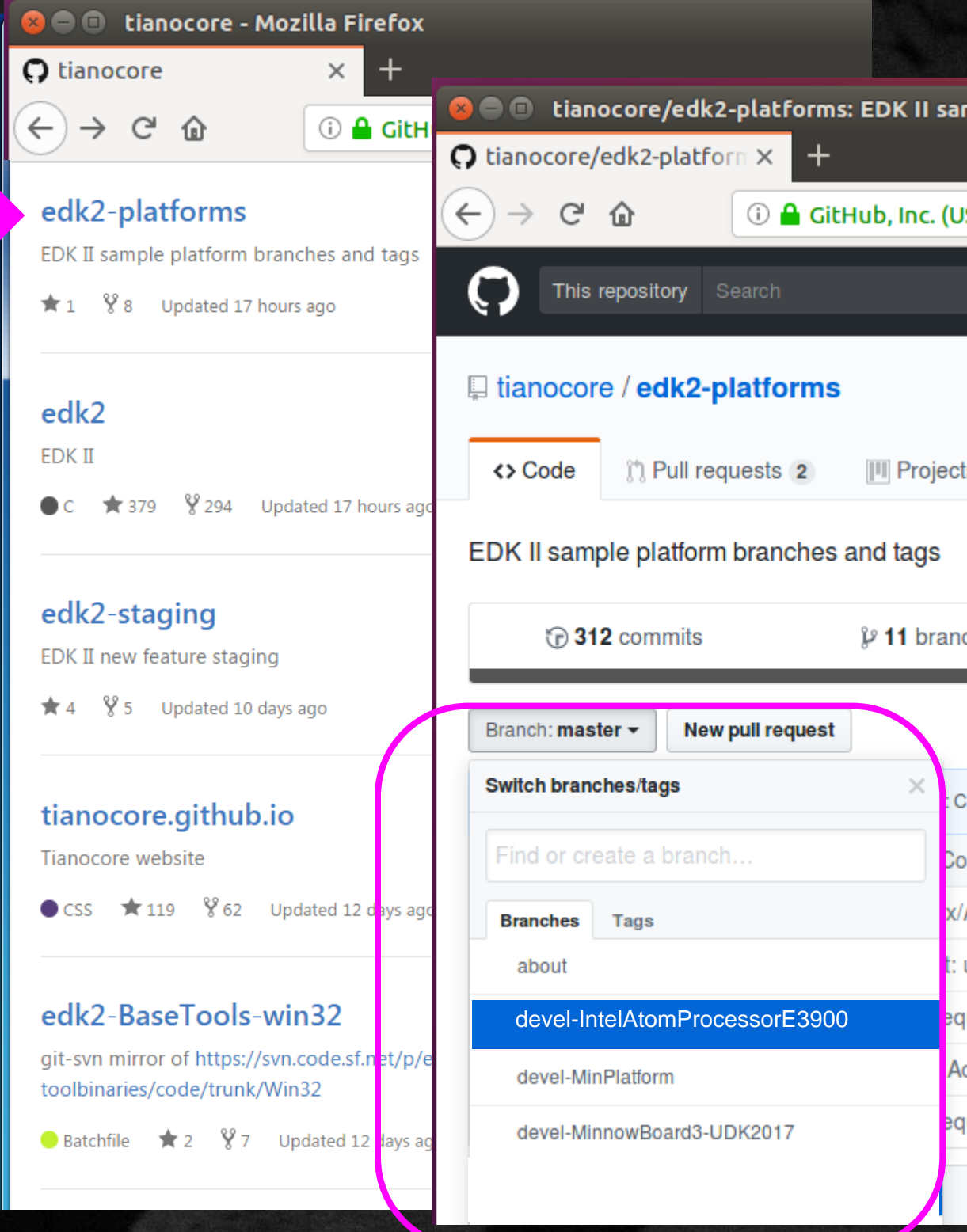
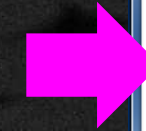
ANSI/POSIX compliant

System I/O	- open(), read(), write(), close(), stat()
Standard I/O	- fopen(), printf(), gets(), getchar(), . . .
String/Char	- strcmp(), isascii(), atoi(), . . .
Memory	- malloc(), free(), realloc(), . . .
Time/Date	- time(), asctime(), ctime(), . . .
Math	- sqrt(), pow(), sin(), log(), . . .

Platforms Tianocore.org

edk2-platforms – Platforms

- devel-IntelAtomProcessorE3900
– Leaf Hill, Up Squared (Apollo Lake)
- Vlv2TbItDevicePkg
– BayTrail-I
- MinPlatformPkg – (w/ FSP)
 - KabylakeOpenBoardPkg
 - ClevoOpenBoardPkg
 - PuleyOpenBoardPkg
 - WhiskeyLakeOpenBoardPkg
- How to build
See *Readme.md* files



The screenshot shows the GitHub repository page for `edk2-platforms` under the `tianocore` organization. The page displays the repository name, description, and a list of branches. A pink circle highlights the 'Switch branches/tags' dropdown menu, which is open, showing a list of branches including `devel-IntelAtomProcessorE3900`.

Slim BootLoader (SBL) Project



Fast & Secure Open source boot solution for IoT
Use Cases

Github: <https://github.com/slimbootloader>

Supported Hardware:

QEMU

UP2 Board

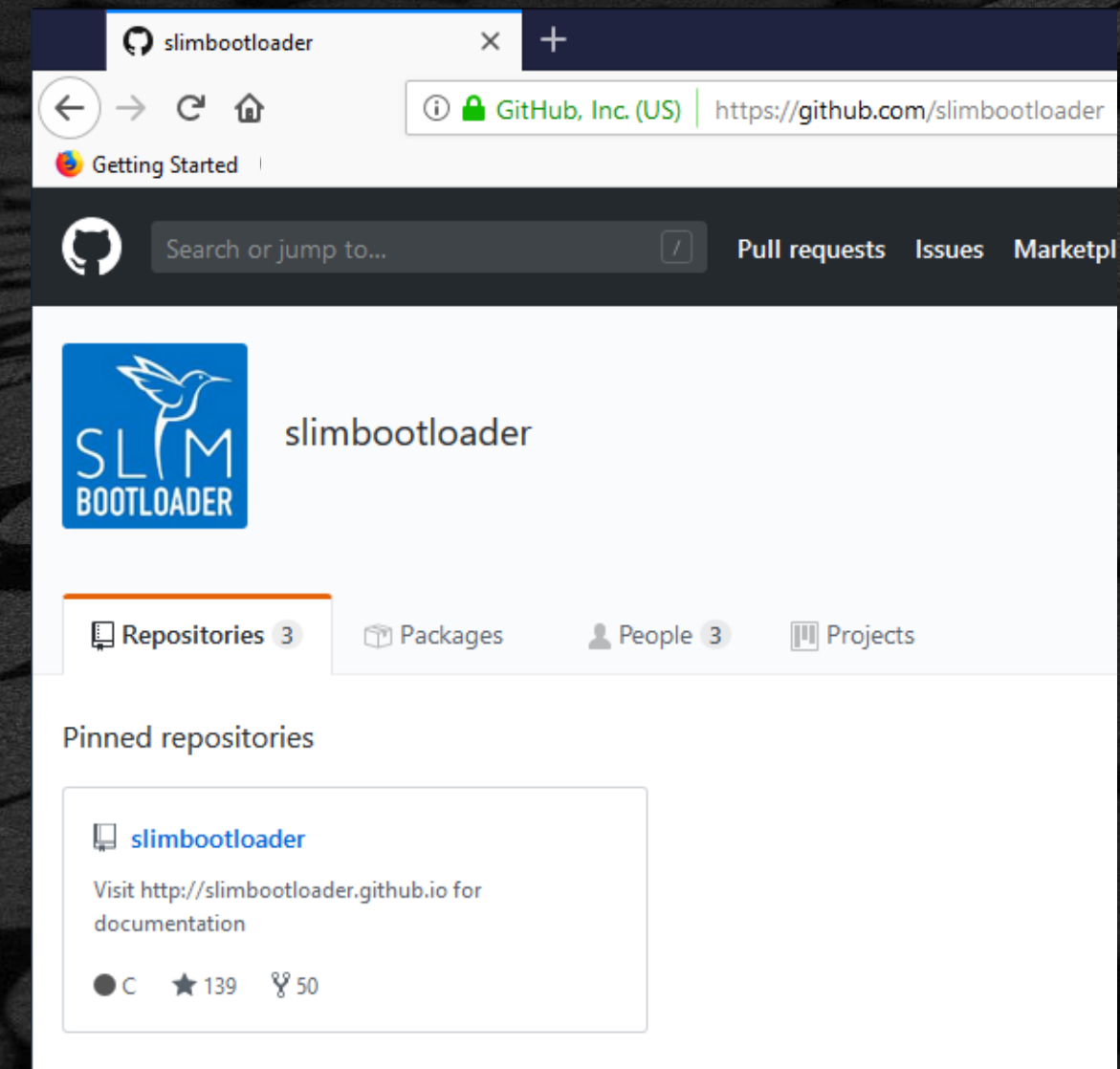
Apollo Lake CRB

Whisky Lake CRB

Coffee Lake Refresh CRB

UP Xtreme Board

Documentation: [Slim Bootloader Project](http://slimbootloader.github.io)



Intel® FSP Repository

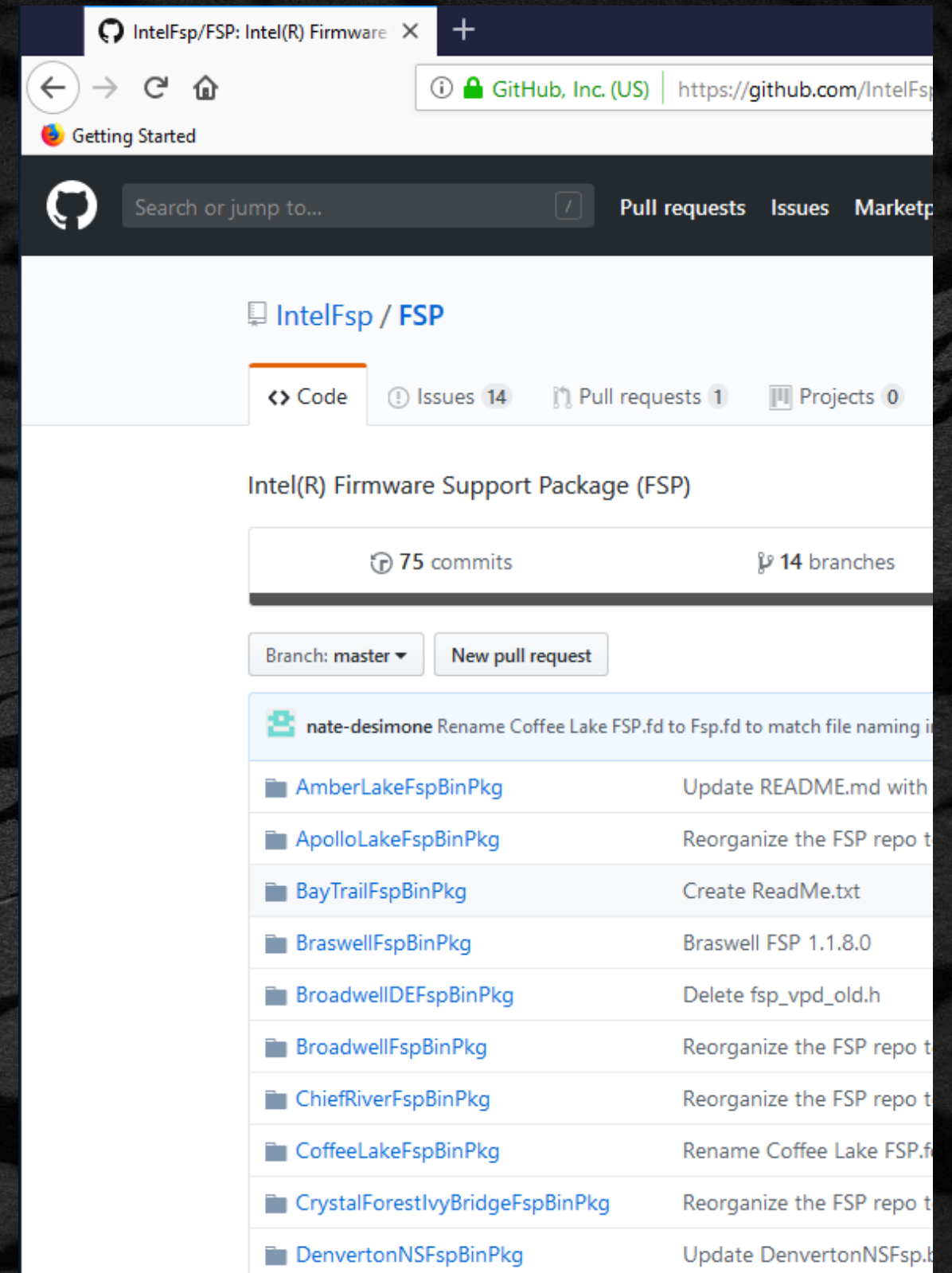
Repository of Intel FSP binaries posted by Intel

Includes documentation on how to integrate with various platforms

<https://github.com/IntelFsp/FSP>

Wiki: <https://github.com/IntelFsp/FSP/wiki>

- current specs

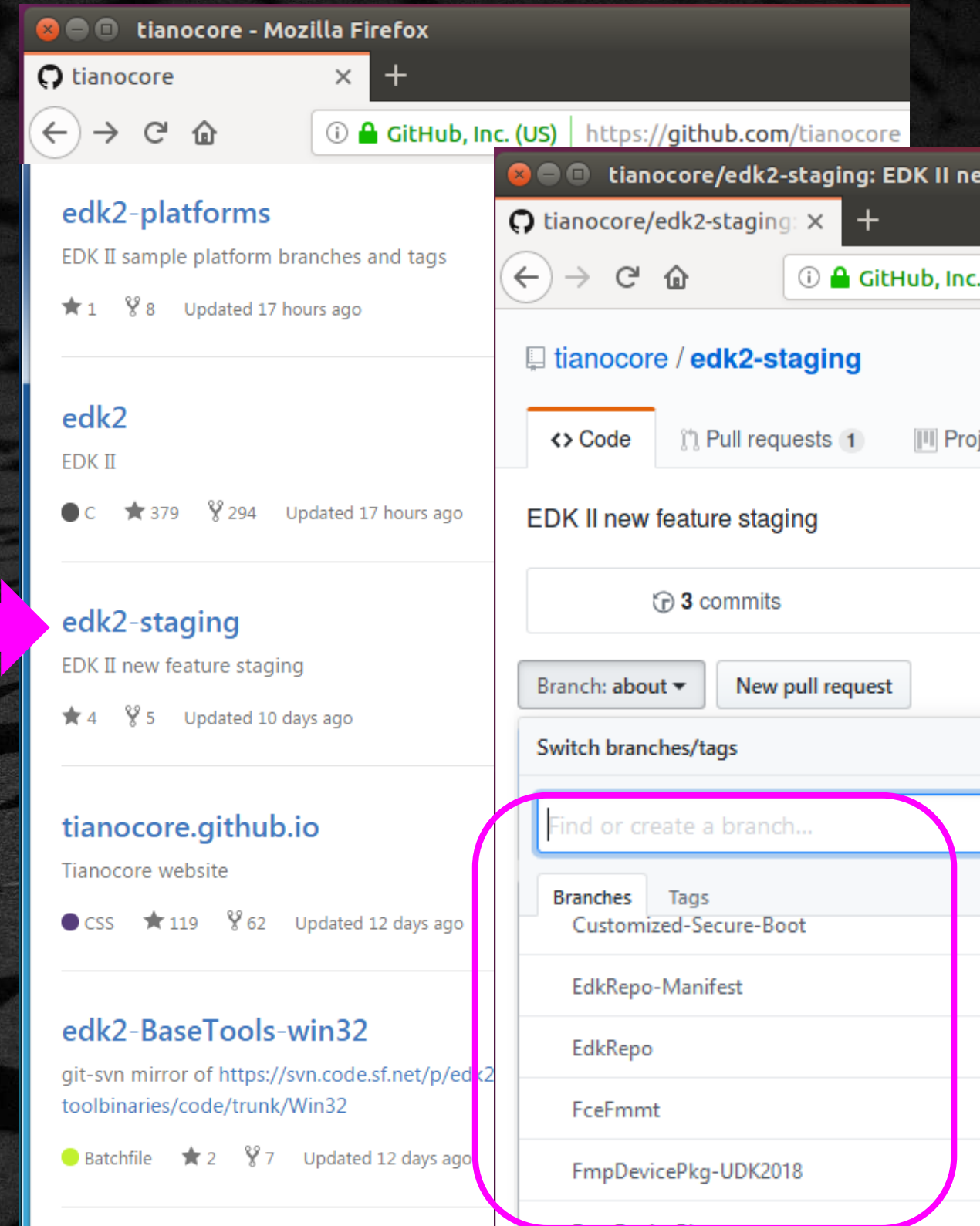


STAGING TIANOCORE.ORG

Implementations not yet Ready for
EDK II Main edk2-staging

Projects on branches

- Host-based FW analysis (HBFA)
- edk2-host-test
- FceFmmt (FW Utils)
- UEFI_PCI_ENHANCE-2
- EdkRepo
- Cpu/6-level
- HTTPS-TLS
- RICS-V
- ...
- See *Readme.md* files



The image shows two browser windows. The left window displays the GitHub repository list for 'tianocore', with 'edk2-staging' highlighted. The right window shows the 'edk2-staging' repository details, including a list of branches. A pink arrow points from the 'edk2-staging' repository in the left window to the 'edk2-staging' repository in the right window. The right window also shows a list of branches, with 'Customized-Secure-Boot' and 'EdkRepo-Manifest' highlighted.

Left Window: tianocore - Mozilla Firefox

- edk2-platforms
- edk2
- edk2-staging
- tianocore.github.io
- edk2-BaseTools-win32

Right Window: tianocore/edk2-staging: EDK II new feature staging

EDK II new feature staging

3 commits

Branch: about New pull request



Switch branches/tags

Find or create a branch...

Branches Tags

- Customized-Secure-Boot
- EdkRepo-Manifest
- EdkRepo
- FceFmmt
- FmpDevicePkg-UDK2018

SUMMARY

-  Chart the organization of the Tianocore.org repositories
-  Recognize the various Open Source UEFI Platforms

Questions?



Return to Main Training Page



Return to Training Table of contents for next presentation [link](#)

A large, stylized orange asterisk-like symbol is positioned to the left of the word "tianocore" in a large, white, lowercase, sans-serif font. The background is dark with a repeating pattern of small, light-colored circles and vertical lines.

Intel® Quark SoC X1000 Platform Project EDK II

- Uses EDK II to support firmware
- QuarkPlatformPkg
-Intel® Galileo Gen2
- How to Build: [Quark Readme.md](#)

