Using the UEFI Shell

October 2010 – UEFI Taipei Plugfest

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Agenda

- Insyde UEFI Support

- UEFI Shell 2.0 – What is it?
- UEFI Shell 2.0 – Unique Features

- Network Browsing Example Application
- ACPI Testing Example Application

- Summary

Insyde UEFI Support

Insyde UEFI Support - TODAY

- Many Insyde customers are shipping their 4th generation of EDK1117 UEFI based BIOS
  - 5th generation preparing for Mass Production NOW
- InsydeH2O® UEFI BIOS
  - The most shipped UEFI based BIOS
  - Over 100 million clients and servers on EDK1117 codebase
- Next two mainstream platform generations will continue to use EDK1117

At the same time – Insyde is developing for the Future

Insyde UEFI Support – The Future – EDK II

- The industry will evolve from EDK1117 to UDK2010 (EDK II)
- Some Insyde customers are shipping InsydeH2O EDK II BIOS now!
- Insyde is fully engaged and aligned with Intel Client, Server, and SSG on UDK2010
  - Active Intel development partner on UDK2010
- Insyde will provide a smooth transition from EDK1117 to UDK2010
  - Adding support for the new specifications
  - Improving the industry

UEFI Shell 2.0 – What is it?

What is the UEFI 2.0 shell

- An interactive BIOS extension
- Provides environment for running programs
- Scripting interpreter to execute script files
- Bootable from external storage devices
- Optionally included as boot device in BIOS
- Similar to MS-DOS or Linux command line
- Has some built-in commands
  - File manipulation, driver management, device access, informational, memory access, BIOS status, scripting control

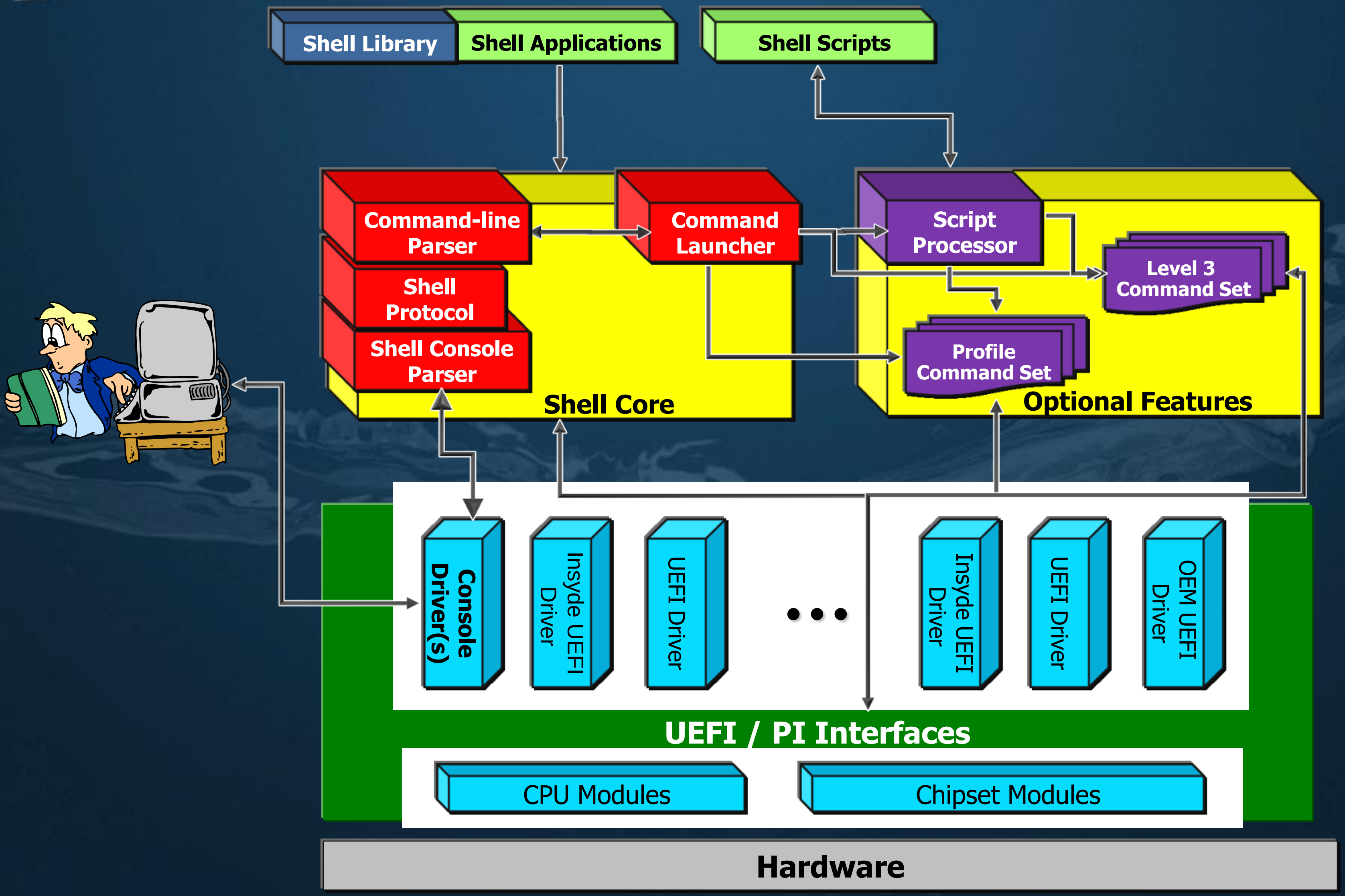
Shell Apps vs. UEFI Drivers

- UEFI core provides services and protocols
- Drivers and Applications use UEFI services

- Drivers
  - Have higher priority
  - Usually stay resident

- Applications
  - Written to perform a task
  - Expected to exit after completing the task

The UEFI Shell 2.0 Architecture



Using the Shell

- Shell applications
  - Compiled C programs use Shell or UEFI protocols

- Shell scripts
  - Automated shell commands, shell apps, UEFI apps, or other shell scripts
  - Complex FOR, IF, and GOTO control logic

- Start Shell apps or scripts from the console
  - The shell can be compiled to start an app automatically

UEFI Shell 2.0 Unique Features

Differences between EFI & UEFI 2.0 Shell

- EFI and UEFI 2.0 Shell scripts are compatible
- Additional features in UEFI 2.0 Scripts
  - Query if commands are available
  - Command features are consistent with EFI Shell

- Old Shell Protocols deprecated
- UEFI Shell Protocols added
  - EFI Shell extensions require porting
  - UEFI applications will work

- Use the UDK2010 Shell Lib to support both Protocols

Manage firmware image size

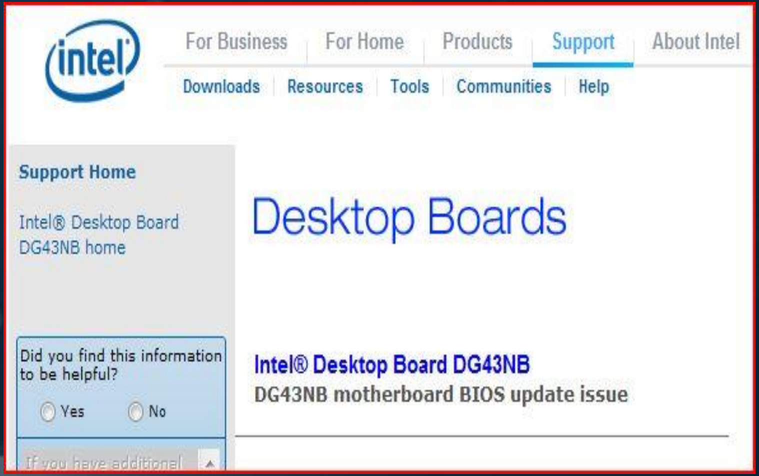
- Shell Levels manage main features
  - Level 0 – Launching a single application
  - Level 1 – Adds scripting
  - Level 2 – Adds file manipulation
  - Level 3 – Adds UI and information retrieval

- Shell Profiles manage additional commands
  - Install – Adds OS loader configuration
  - Debug – Adds debug
  - Driver – Adds driver manipulation
  - Network – Adds network configuration & test

Internet Browsing Example

Internet Browsing

- Extends pre-boot space onto Internet
- Network Browsing Examples:
  - OEM or IT department support page
    - Help pages
    - Http download client
    - Access to OS recovery images
  - Remote assist system
    - System drivers download from OEM service site
    - Remote system diagnostic
    - Hardware support page

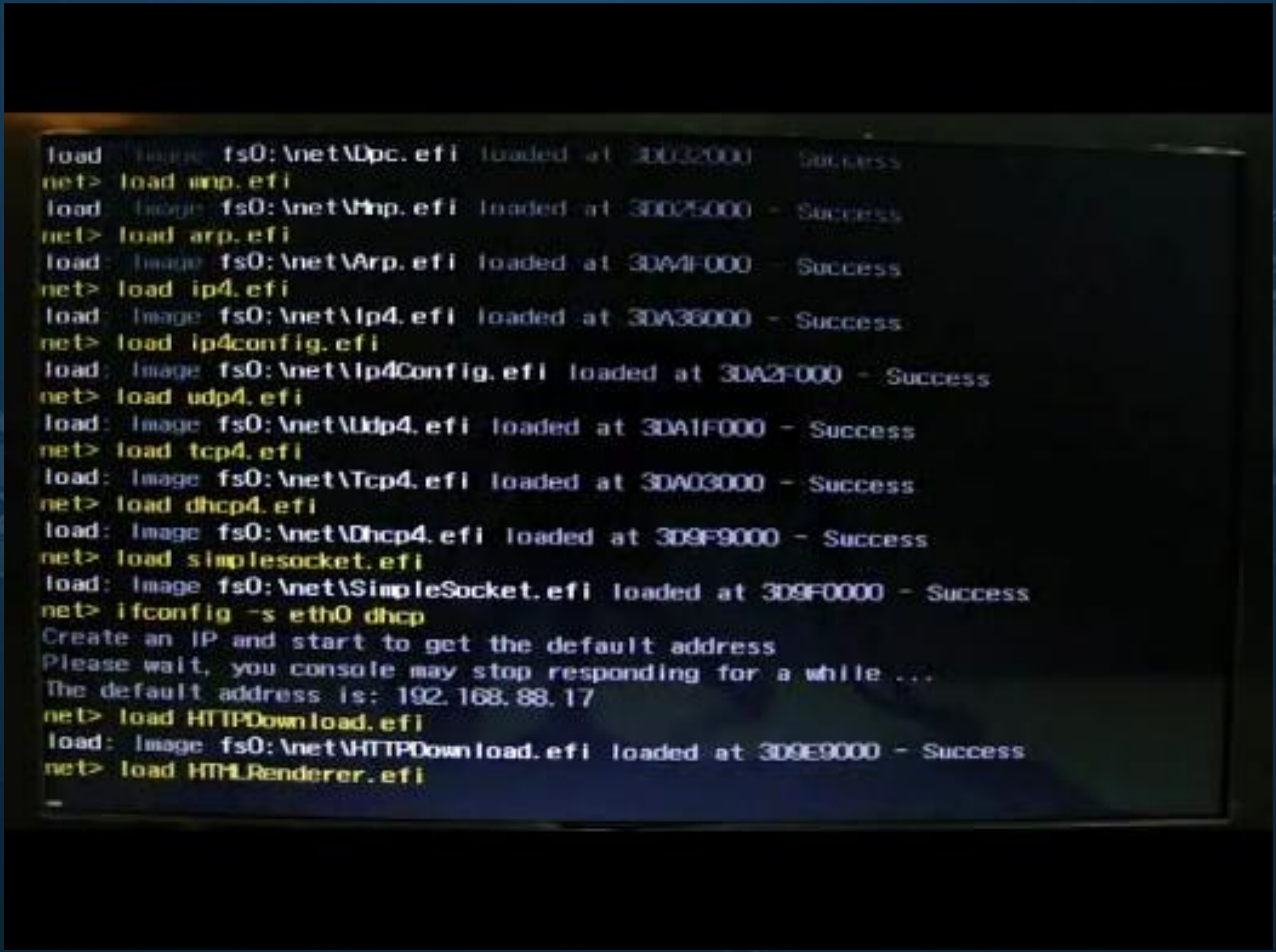


Desktop Boards

Intel® Desktop Board DG43NB

DG43NB motherboard BIOS update issue

Network Browser Example



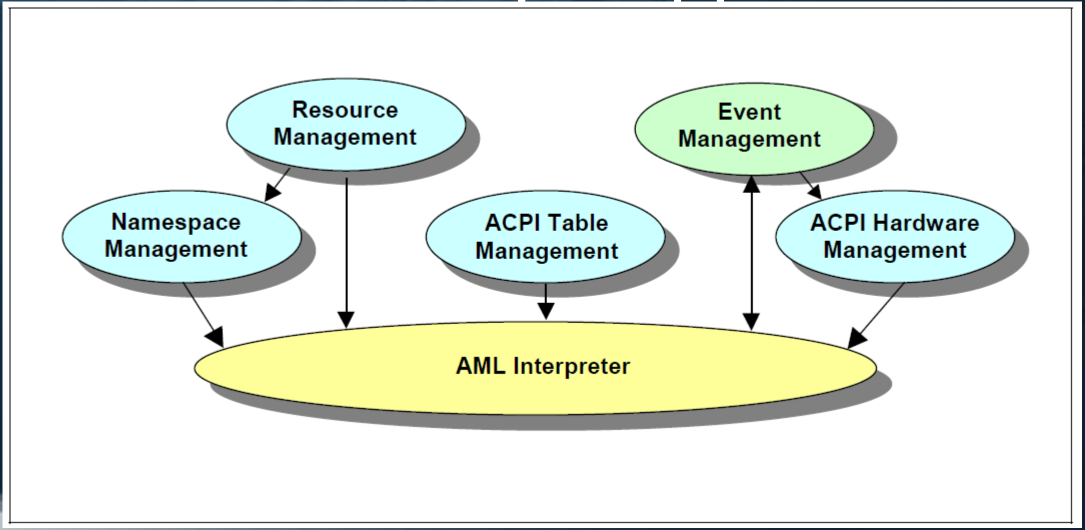
```
load: Image fs0:\net\Dpc.efi loaded at 3DD32000 - Success
net> load mnp.efi
load: Image fs0:\net\Mnp.efi loaded at 3DD75000 - Success
net> load arp.efi
load: Image fs0:\net\Arp.efi loaded at 3DA4F000 - Success
net> load ip4.efi
load: Image fs0:\net\Ip4.efi loaded at 3DA36000 - Success
net> load ip4config.efi
load: Image fs0:\net\Ip4Config.efi loaded at 3DA2F000 - Success
net> load udp4.efi
load: Image fs0:\net\Udp4.efi loaded at 3DA1F000 - Success
net> load tcp4.efi
load: Image fs0:\net\Tcp4.efi loaded at 3DA03000 - Success
net> load dhcp4.efi
load: Image fs0:\net\Dhcp4.efi loaded at 3D9F9000 - Success
net> load simplesocket.efi
load: Image fs0:\net\SimpleSocket.efi loaded at 3D9F0000 - Success
net> ifconfig -s eth0 dhcp
Create an IP and start to get the default address
Please wait, you console may stop responding for a while ...
The default address is: 192.168.88.17
net> load HTTPDownload.efi
load: Image fs0:\net\HTTPDownload.efi loaded at 3D9E9000 - Success
net> load HTMLRenderer.efi
_
```

ACPI Testing Example Application

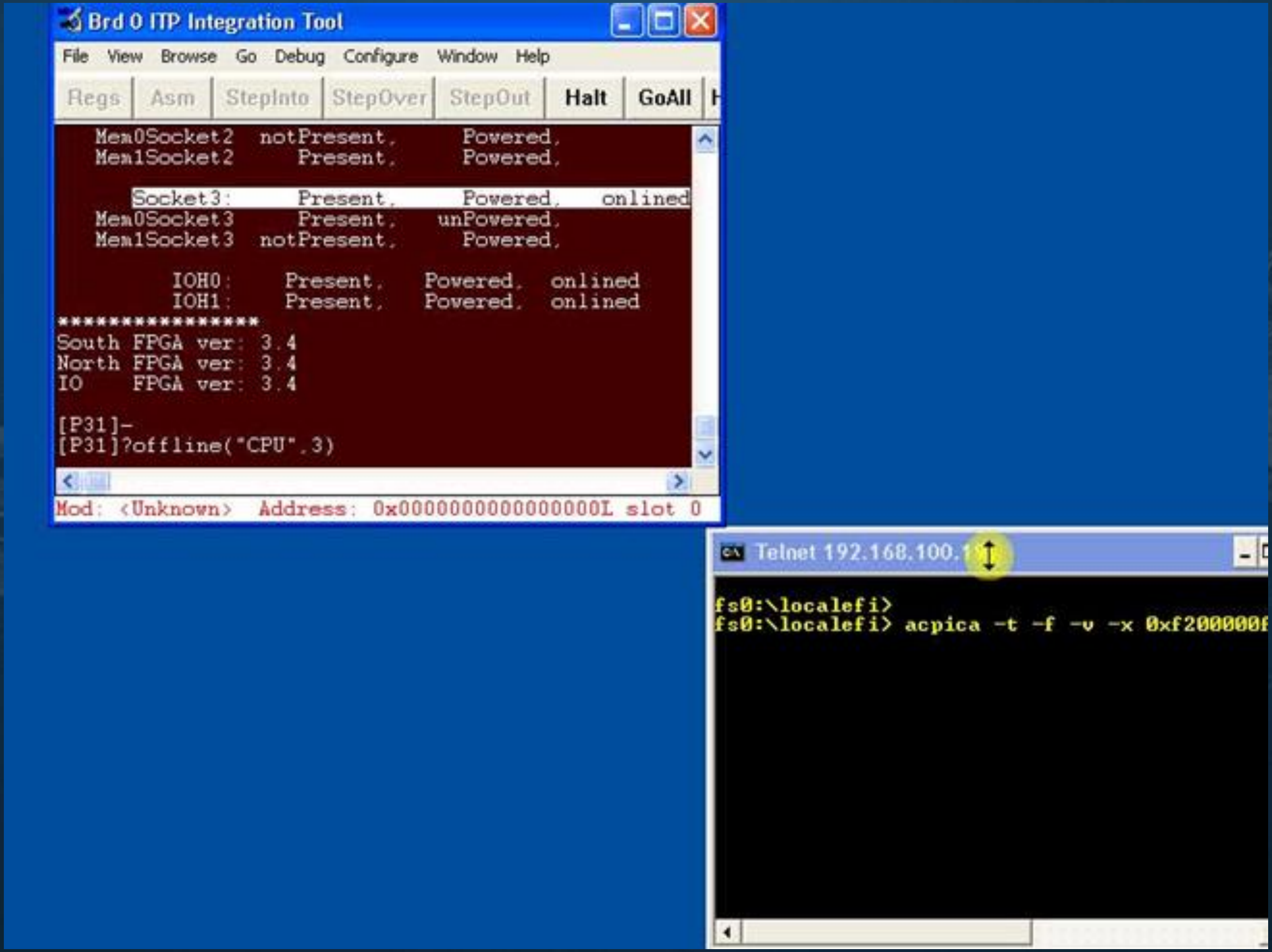
Complex Testing in a shell application

- Test hardware features without complex OS
  - Hardware feature development
  - Simpler debug environment than OS
  - More control for probing error conditions
  - Enable efficient testing of features
- Rapid test cycles booting just to UEFI Shell
- Easy to port Linux or MS-DOS style apps

- ACPICA
  Open Source
  www.acpica.org



ACPICA running on 4 socket platform


Brd 0 ITP Integration Tool
File View Browse Go Debug Configure Window Help
Regs Asm StepInto StepOver StepOut Halt GoAll

```
    Mem0Socket2  notPresent,      Powered,
    Mem1Socket2     Present,      Powered,

        Socket3:    Present,      Powered,    onlined
    Mem0Socket3     Present,    unPowered,
    Mem1Socket3  notPresent,      Powered,

            IOH0:     Present,    Powered,   onlined
            IOH1:     Present,    Powered,   onlined
****************
South FPGA ver: 3.4
North FPGA ver: 3.4
IO    FPGA ver: 3.4

[P31]-
[P31]?offline("CPU",3)
```

```
Mod: <Unknown>  Address: 0x0000000000000000L slot 0
```

```
fs0:\localefi>
fs0:\localefi> acpica -t -f -v -x 0xf200000
```

Summary

- UDK2010 Shell 2.0 implementation
  - Available now
  - Fully compliant to UEFI Shell Specification
- You control Shell size and features
- Network profile can connection to networks
- UEFI Shell is a great test environment

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The most shipped UEFI BIOS