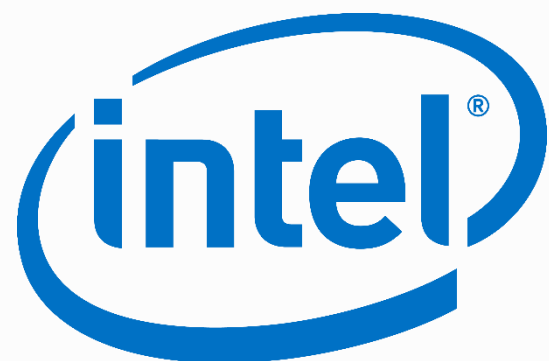


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The State of ACPI Source Language (ASL) Programming

Spring 2018 UEFI Seminar and Plugfest

March 26-30, 2018

Presented by Erik Schmauss (Intel)

Agenda



- **Intro to ACPI/ASL**
- Challenges of ASL
- Addressing Challenges
- Questions

What is Advanced Configuration and Power Interface (ACPI)?



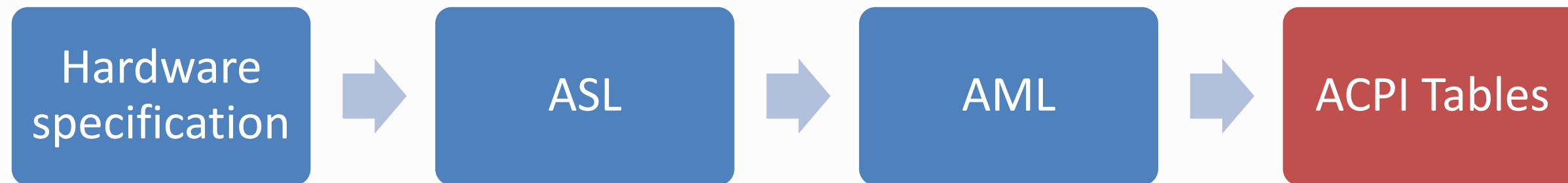
- Firmware interface used by OS
 - Enables device discovery and configuration
 - Enables OS power management
- Specifies firmware data tables as well as executable bytecode called AML
- This talk will focus on the executable bytecode written in a language called ASL

What is ACPI Source Language (ASL)?

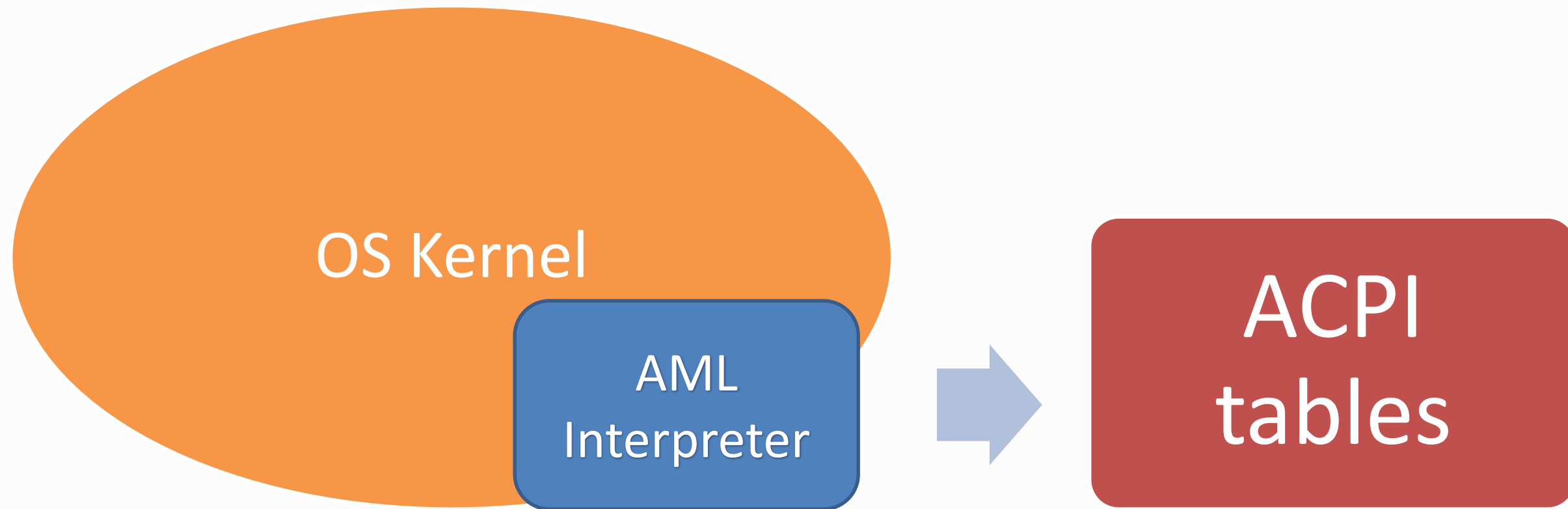


- A language written by firmware developers to define executable ACPI tables
- Stands for ACPI source language
- ASL gets compiled to AML
- AML gets interpreted in the kernel space of the OS

ACPI Firmware Development



ACPI Firmware Interaction with OS



Agenda



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Challenges of ASL Programming



- We have identified a shortage of skilled ASL programmers
- Firmware code is increasing in complexity
- Firmware code for a new platform is often copy/pasted from older platforms
- This frequently results in poor code quality



Examples of Bad ASL Code

```
Name (OBJ1, 0) //create object OBJ1  
OBJ1 = 1
```

The store is unnecessary

We can avoid the store operation by
initializing OBJ1 to 1



Examples of Bad ASL Code

```
Method (_PCD, 1, NotSerialized)
{
    \_PR.CPU0.M001 = INT1
}
```

M001 is a method that returns a reference, **INT1** is an integer. This results in a runtime error.



Examples of Bad ASL Code

```
External (DEV1)
```

```
Name (PKG1,
```

```
Package () { DEV1 } )
```

The named object, DEV1, is not defined
but is referenced by PKG1



Impact of Challenges

- Some operating systems emit errors from the AML interpreter that users can see
 - This can frighten end-users (FUD)
- Run time errors during AML evaluation abort the execution
 - This means that the OS could be missing functionality that firmware developers think they enabled

Agenda



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- Challenges of ASL
- **Addressing Challenges**
- Questions



What Can We Do About this?

- Use the latest ASL compiler
 - intel ASL compiler (iASL) catch many errors that could happen during runtime.
- Use a user-space interpreter to execute AML before packaging with firmware
 - Verify that ACPI tables load correctly
- Create an ACPI firmware developer tutorial
 - Introduces ASL to firmware developers
 - Outlines how ASL should be used



What Can We Do About this?

- Communicate with ACPICA developers and give us feedback!
 - If you write **ANY** amount of ASL, we would love to interact with you!



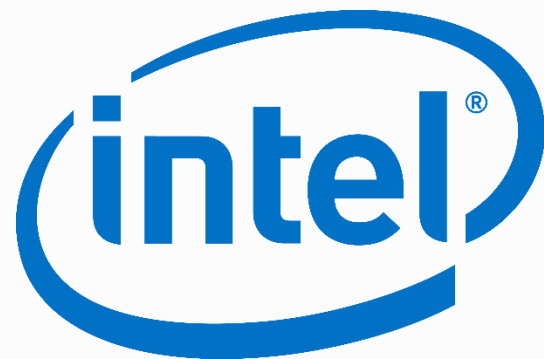
Questions?

Thanks for attending the Spring 2018 UEFI Plugfest



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

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References

- ACPICA project website
<https://acpica.org/>
- ACPICA mailing list
<https://lists.acpica.org/mailman/listinfo>