z/OS 2.4 IBM Education Assistant (IEA)

Solution (Epic) Name: **Non-Executable Memory Support**

Pricing: IFAUSAGE wrapper

Element(s)/Component(s): Language Environment

Agenda

- Trademarks
- Session Objectives
- Overview
- Usage & Invocation
- Interactions & Dependencies
- Migration & Coexistence Considerations
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Trademarks

- See url http://www.ibm.com/legal/copytrade.shtml for a list of trademarks.

- Additional Trademarks:
  - None

Session Objectives

- Explain the new function being delivered for z/OS V2.4 Language Environment

Overview – Non-Executable Memory Support

- Who (Audience)
  - System administrators and application programmers

- What (Solution)
  - A new non-executable heap is added and used for 31-bit environment variable buffer allocation
  - The entire 64-bit library heap is allocated as non-executable

- Wow (Benefit / Value, Need Addressed)
  - **Issue:** In an application, the control flow could be hijacked to a data area that contains injected malicious code. We need to make risky data areas as non-executable to enhance the security characteristics.
  - **Benefit:** Enhance the security of LE-conforming applications by preventing execution attempt in some risky data areas transparently without any change to applications.

Usage & Invocation – Non-Executable Memory Support

New keyword CEENXSTG is added in CEEPRMxx to control whether non-executable memory is enabled (default is enabled). Syntax:

`CEENXSTG(OFF|ON)`

New keyword CEENXSTG is added to SETCEE command to control whether non-executable memory is enabled (default is enabled). Syntax:

`SETCEE CEENXSTG,ON`

`SETCEE CEENXSTG,OFF`

New keyword CEENXSTG is added to D CEE command to display current value for CEENXSTG keyword

`D CEE,CEENXSTG`

Interactions & Dependencies

- To exploit this item, all systems in the Plex must be at the new z/OS level: No

- Software Dependencies
  - None

- Hardware Dependencies
  - Instruction Execution Protection Facility (IEPF) introduced in z14

- Exploiters
  - N/A

Overview – Tailored Fit Pricing: IFAUSAGE wrapper

- ## Who (Audience)
  - System administrators and application programmers

- ## What (Solution)
  - High level language wrapper for IFAUSAGE in both 31-bit and 64-bit

- ## Wow (Benefit / Value, Need Addressed)
  - **Benefit:** IBM, ISV applications can all report verifiable billing data using metrics that they determined and which is kept separate from traditional workload billing data (CPU time).

Usage & Invocation – Tailored Fit Pricing: IFAUSAGE wrapper

New LE callable services provided

- ## 64-bit

```
#include<__le_api.h>
void __le_ceeusgd(_INT4 *function_code, void **in_buf, void
**out_buf, unsigned char *fbfe, _FEEDBACK *fc);
```

- ## 31-bit

```
#include<leawi.h>
void CEEUSGD(_INT4 *function_code, _POINTER *in_buf,_POINTER
*out_buf, char *fbfe, _FEEDBACK *fc);
```

Interactions & Dependencies

- To exploit this item, all systems in the Plex must be at the new z/OS level: No

- Software Dependencies
  - None

- Hardware Dependencies
  - None

- Exploiters
  - N/A

Session Summary

- The following z/OS V2R4 Language Environment Epics have been explained:
    - **Non-Executable Memory Support**
    - **Pricing: IFAUSAGE wrapper**

Appendix

- Book Updates
  - z/OS XL C/C++ Runtime Library Reference
  - z/OS Language Environment Programming Reference
  - z/OS Language Environment Vendor Interface
  - z/OS Language Environment Customization
  - z/OS Language Environment Programming Guide for 64-bit Virtual Addressing Mode