

# z/OS 2.4 IBM Education Assistant (IEA)

Solution (Epic) Name: Enhancements to zlsf

Element(s)/Component(s): z/OS UNIX System Services



# 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

- Understand the enhancements made to zlsof

# Overview

- Who (Audience)
  - z/OS UNIX administrators
- What (Solution)
  - New -s option to switch back to original uid
  - New -x option that provides extended process information
  - New -json option to produce output as a json object
- Wow (Benefit / Value, Need Addressed)
  - Avoids leaving the TSO process as uid 0 when using zlsof.
  - Allows you to understand what process are using what files.
  - Output can be process by a json parser for customized formatting.

# Usage & Invocation

- Current output: zlsof

```
zlsof version=180323
Searching for all file usage
Command      PID User   File System      Mountpoint      Inode/file
-sh          83952099 SCH0EN OMVS.ZFS.AQ.SYSPLEX.ROOT /                r 1
              OMVS.ZFS.SCHOEN /u/schoen       1309 zlsof
              OMVS.ZFS.AQFT.DEV /AQFT/dev       1827 /dev/ttyp0017
              OMVS.ZFS.SCHOEN /u/schoen       15984 out1
              OMVS.ZFS.AQFT.DEV /AQFT/dev       1827 /dev/ttyp0017
              OMVS.ZFS.AQFT.DEV /AQFT/dev       1827 /dev/ttyp0017
              OMVS.ZFS.SCHOEN /u/schoen       224 /u/schoen/.sh_history
              OMVS.ZFS.AQFT.DEV /AQFT/dev       1827 /dev/ttyp0017
ISREDIT      67175047 SCH0EN OMVS.ZFS.AQ.SYSPLEX.ROOT /                r 1
              OMVS.ZFS.SCHOEN /u/schoen       c 1
              SYS1.ZFS.OVFPKB.ROOT /PRIPKB         20971 /usr/lib/nls/msg/C/fsumucat.cat
              OMVS.ZFS.AQFT.DEV /AQFT/dev       1524 /dev/ptyp0017

zlsof End of output
```

# Usage & Invocation

- New output: zlsof -x

```
zlsof version=180323
Searching for all file usage
Command      PID User      File System      Mountpoint      Inode/file/process info
-sh          83952099 SCH0EN(4)      OMVS.ZFS.AQ.SYSPLEX.ROOT /                r 1
                                                    1309 zlsof
                                                    rw 1827 /dev/ttyp0017
                                                    wr 14845 out2
                                                    rw 1827 /dev/ttyp0017
                                                    rw 1827 /dev/ttyp0017
                                                    224 /u/schoen/.sh_history
                                                    rw 1827 /dev/ttyp0017
                                                    GMT Start: 04/05 13:32 ET: 00:02:03 CPU: 00:04:37
                                                    Parent pid: 67175047 Threads: 1 TTY: /dev/ttyp0017 State: MULPROCES
                                                    Command: -sh
                                                    r 1
                                                    e 1
                                                    rd 20971 /usr/lib/nls/msg/C/fsumucat.cat
                                                    rw 1524 /dev/ptyp0017
OMVS.ZFS.SCH0EN /u/schoen
OMVS.ZFS.AQFT.DEV /AQFT/dev
OMVS.ZFS.SCH0EN /u/schoen
OMVS.ZFS.AQFT.DEV /AQFT/dev
OMVS.ZFS.SCH0EN /u/schoen
OMVS.ZFS.AQFT.DEV /AQFT/dev
ISREDIT 67175047 SCH0EN(4)
OMVS.ZFS.AQ.SYSPLEX.ROOT /
OMVS.ZFS.SCH0EN /u/schoen
SYS1.ZFS.OVFPKB.ROOT /PRIPKB
OMVS.ZFS.AQFT.DEV /AQFT/dev
zlsof End of output
```

# Usage & Invocation

- `zlsf -json`
- Meant to be processed with a parser

```
{
  "utility": "zlsf",
  "version": "180323",
  "request": "Searching for all file usage",
  "result": [
    {
      "command": "-sh",
      "commandLine": "-sh",
      "userId": "SCH0EN",
      "uid": "4",
      "job": "SCH0EN",
      "asid": "59",
      "pid": "83952099",
      "ppid": "67175047",
      "startTime": "1522935121",
      "cpuTime": "281",
      "contty": "\\dev\\tty0017",
      "threads": "1",
      "state": "MULPROCESS",
      "files": [
        {
          "type": "root",
          "openFlags": "0",
          "devno": "1",
          "fileSystem": "OMVS.ZFS.AQ.SYSPLEX.ROOT",
          "mountPath": "\/",
          "inum": "1",
          "diagName": null,
          "pathName": null
        },
        {
          "type": "directory",
          "openFlags": "0",
          "devno": "89953",
          "fileSystem": "OMVS.ZFS.SCH0EN",
          "mountPath": "\\u\\schoen",
          "inum": "1309",
          "diagName": "zlsf",
          "pathName": null
        },
        {
          "type": "charSpec",
          "openFlags": "35",
          "devno": "76190",
          "fileSystem": "OMVS.ZFS.AQFT.DEV",
          "mountPath": "\\AQFT\\dev",
          "inum": "1827",
          "diagName": "\\dev\\tty0017",
          "pathName": null
        },
        {
          "type": "regularFile",
          "openFlags": "145",
          "devno": "89953",
          "fileSystem": "OMVS.ZFS.SCH0EN",
          "mountPath": "\\u\\schoen",
          "inum": "16882",
          "diagName": "out3",
          "pathName": null
        },
        {
          "type": "charSpec",
          "openFlags": "35",
          "devno": "76190",
          "fileSystem": "OMVS.ZFS.AQFT.DEV",
          "mountPath": "\\AQFT\\dev",
          "inum": "1827",
          "diagName": "\\dev\\tty0017",
          "pathName": null
        },
        {
          "type": "charSpec",
          "openFlags": "35",
          "devno": "76190",
          "fileSystem": "OMVS.ZFS.AQFT.DEV",
          "mountPath": "\\AQFT\\dev",
          "inum": "1827",
          "diagName": "\\dev\\tty0017",
          "pathName": null
        },
        {
          "type": "regularFile",
          "openFlags": "139",
          "devno": "89953",
          "fileSystem": "OMVS.ZFS.SCH0EN",
          "mountPath": "\\u\\schoen",
          "inum": "224",
          "diagName": "\\u\\schoen\\.sh_history",
          "pathName": null
        },
        {
          "type": "charSpec",
          "openFlags": "35",
          "devno": "76190",
          "fileSystem": "OMVS.ZFS.AQFT.DEV",
          "mountPath": "\\AQFT\\dev",
          "inum": "1827",
          "diagName": "\\dev\\tty0017",
          "pathName": null
        }
      ]
    },
    {
      "command": "ISREDIT",
      "commandLine": "ISREDIT",
      "userId": "SCH0EN",
      "uid": "4",
      "job": "SCH0EN",
      "asid": "59",
      "pid": "67175047",
      "ppid": "1",
      "startTime": "1522932958",
      "cpuTime": "281",
      "contty": null,
      "threads": "3",
      "state": "MULPROCESS",
      "files": [
        {
          "type": "root",
          "openFlags": "0",
          "devno": "1",
          "fileSystem": "OMVS.ZFS.AQ.SYSPLEX.ROOT",
          "mountPath": "\/",
          "inum": "1",
          "diagName": null,
          "pathName": null
        },
        {
          "type": "cwd",
          "openFlags": "0",
          "devno": "89953",
          "fileSystem": "OMVS.ZFS.SCH0EN",
          "mountPath": "\\u\\schoen",
          "inum": "1",
          "diagName": null,
          "pathName": null
        },
        {
          "type": "charSpec",
          "openFlags": "7",
          "devno": "76190",
          "fileSystem": "OMVS.ZFS.AQFT.DEV",
          "mountPath": "\\AQFT\\dev",
          "inum": "1524",
          "diagName": "\\dev\\pty0017",
          "pathName": null
        }
      ]
    }
  ]
}
```



# 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
  - List any announced hardware dependencies.
- Exploiters
  - List any announced exploiters.

# Migration & Coexistence Considerations

- N/A

# Installation

- N/A

# Session Summary

- Fixed issue with uid 0.
- Enhanced process output.
- Output available in JSON

# Appendix

- See z/OS UNIX System Services Command Reference for more information on the zlsf command.