

# Changing how you interact with z/OS with IBM Z Open Automation Utilities

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# IBM Z Open Automation Utilities overview

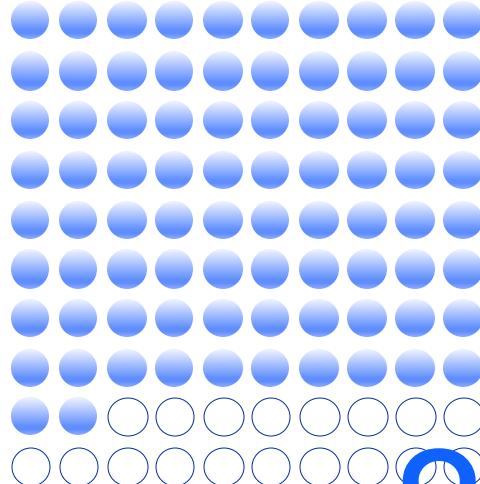
# IBM Z Open Automation Utilities (ZOAU)

**Enabling modern automation integration points for a diverse mainframe userbase**



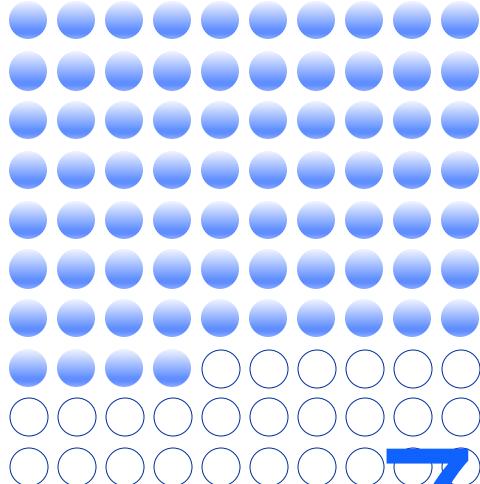
# Mainframe-based applications play central role

*Executives that agree their business case supports mainframe-based applications<sup>1</sup>*



**82%**

*Mainframe-based applications are central to technology strategy<sup>1</sup>*

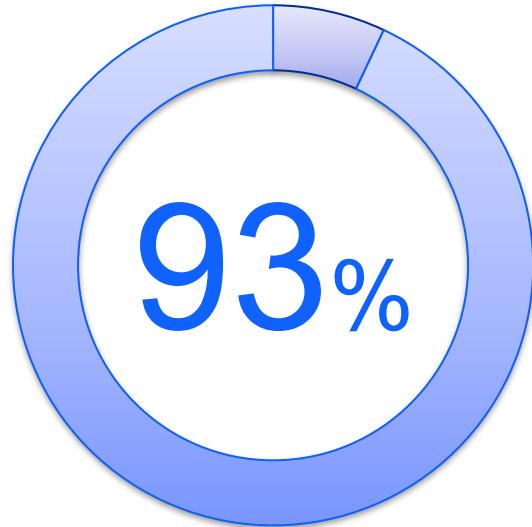


**74%**

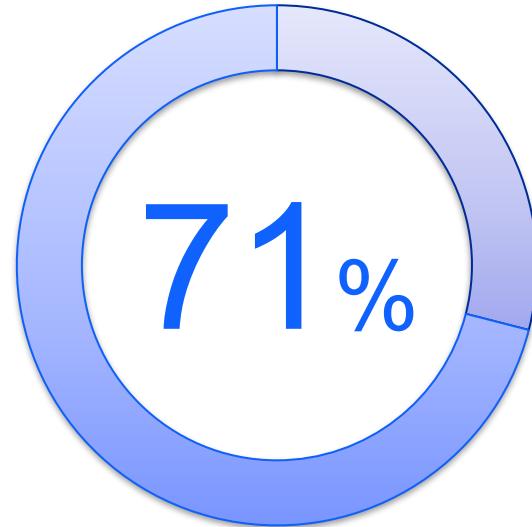
1 – IBM Institute for Business Value (2021) Mainframe application modernization study. IBM. Retrieved from <https://www.ibm.com/downloads/cas/MOV58KNM>

# Ease-of-use for the UNIX community

*Acquiring the right mainframe resources and skills is “moderately” to “extremely” challenging<sup>1</sup>*



*Percentage of IT decision makers reporting that their mainframe teams are understaffed<sup>1</sup>*



<sup>1</sup> – Ian Chappell et al (2020) Mainframe modernization with APIs. Deloitte. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-ibm-zos-pov-digital.pdf>

# IBM Z Open Automation Utilities (ZOAU)

## Easy. Familiar. Native

- Provides a command-line utilities with full capabilities to z/OS resources
- Enables z/OS developers to leverage common tooling to script automation
- Exposes z/OS services in an easy-to-consume manner
- Enhances other IBM offerings such as IBM Open Enterprise SDK for Python or IBM Open Enterprise SDK for Node.js and Red Hat Ansible Certified Content for IBM Z
- Continuously updated and enhanced



# Key use cases



MVS dataset manipulation via USS



Consolidated Software Inventory queries  
PTF level determination



Ansible automation via Red Hat  
Ansible Certified Content for IBM Z  
Prerequisite



Job management



Operator console queries  
ISPF command execution via USS



MVS command execution

# ZOAU is designed for programmers familiar with Linux and UNIX

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## Standardized Interfaces

- Runs in a UNIX environment that non-Z developers are used to

## Native Automation

- Provides on-platform automation using popular open-source scripting languages such as Shell and Python

## Foundational

- ZOAU provides a common abstraction layer that helps other offerings interface directly with z/OS

## Free of charge

- Get started today for free
- Optional, free of charge software subscription & support recommended.

# What is included in ZOAU



## Capabilities

	Shell	Python	C API	3rd party open src Node.js
Dataset manipulation	●	●	●	●
Job management	●	●	●	
MVS program execution	●	●	●	●
Operator command	●	●	●	

# Ways to obtain ZOAU

- Mainframe Downloads Page as PAX

IBM Enterprise DevOps

Product Name Downloads

IBM Application Delivery Foundation for z/OS	<a href="#">Download</a>
IBM Application Delivery Intelligence	<a href="#">Trial</a>
IBM Application Discovery and Delivery Intelligence	<a href="#">Trial</a>
IBM Application Discovery	<a href="#">Trial</a>
IBM Cloud Provisioning & Management for z/OS	<a href="#">Trial</a>
IBM Dependency Based Build	<a href="#">Download</a>
IBM Explorer for z/OS Atlas (Open Toolchain API)	<a href="#">Technical Preview</a>
IBM Rational Team Concert (Enterprise Extensions)	<a href="#">Download</a>
IBM Rational Test Workbench	<a href="#">Contact Us</a>
IBM UrbanCode Deploy	<a href="#">Trial</a>
IBM Z Development & Testing (ZD&T)	<a href="#">Contact Us</a>
<b>IBM Z Open Automation Utilities</b>	<b><a href="#">Download</a></b>
IBM z/OS Connect EE Build Toolkit 1.9	<a href="#">Download</a>
IBM z/OS Provisioning Toolkit	<a href="#">Download</a>

- IBM Shopz

IBM Software Shop

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## Shop

Your web service to order z Systems software, manage software licenses, view software inventory and more

Sign in/Register

ATTENTION: If you become a Kyndryl user and have questions about how to request access again into ShopZ, please follow the guide from the Customer service page, under Help and resources.

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Order tailored product and service packages for z/OS, z/VM and z/VSE.

Use the pre-selected order checklist based on your installed inventory.

Designate multiple user access levels.

View software inventory for all environments and upgrade opportunities.

Download software while you review your current software licenses.

Ready to get started?

Cookie preferences and do not sell my personal information

# ZOAU – Product Information

- ZOAU is available as a stand-alone product via SMP/E and [PAX](#)
  - PID: 5698-PA1
  - S&S PID: 5698-PAS
- ZOAU is also available as a bypassable requisite when ordering z/OS 3.2
- Product Information:
  - <https://www.ibm.com/products/z-open-automation-utilities>
  - <https://www.ibm.com/support/knowledgecenter/SSKFYE>
- It is also bundled with other products:
  - IBM Z Development and Test Environment (PID: 5900-A08)
  - ADCD

# IBM Z Open Automation Utilities Simplification Ecosystem

- ZOAU is part of a larger community of products to simplify z/OS
- IBM Open Enterprise SDK for Python
  - Required to use ZOAU Python language bindings
- IBM Open Enterprise Foundations
  - Provides a set of standard open-source utilities typically available on Linux and other operating systems
    - git, curl, bash, vim, gpg, jq, and more
- All three are available as bypassable requisites with z/OS 3.1 or later
  - Very useful for application development in the z/OS UNIX shell

# JSON output – Overview

- Open standard data exchange format
- Structured data
- Example

```
{  
  "identifier": "opercmd",  
  "rc": "0",  
  "reason": "0"  
  "data":  
    {  
      "command": "R 24,CANCEL",  
      "output": "IEE600I REPLY TO 24 IS;CANCEL\\n"  
    }  
}
```

- Integration with z/OS client web enablement toolkit
- **JSON output directly via supported ZOAU APIs and shell commands**
- 13 utilities: apfadm, dcat, ddls, dhead, dinfo, dls, dtail, jls, opercmd, pjdd, dmod, dsed, and zinfo

# Updates - ZOAU 1.4 – FMID HAL5140



- ZOAU 1.4.0: [Announcement letter AD25-1204](#)
- [Migration guide](#) (<https://www.ibm.com/docs/en/zbau/1.4.x?topic=planning-migrating-zbau-v14-from-v13x>)
- [Release notes](#) (<https://www.ibm.com/docs/en/zbau/1.4.x?topic=whats-new-zbau>)

## Enhanced data set statistics

- Extended attribute support in dls/mls
- Add'l VSAM stats
- mls ISPF statistics

## vf – *NEW* Volume statistics utility

- Access volume information via command line
- JSON output support

## Python processing capabilities

- Read/write strings in other encodings
- Raised 1GB data ceiling
- Improved performance

## IBM Open Enterprise SDK for Python 3.13 support

# ZOAU - Updates

v1.4.0 release



- vf: (NEW) Lists active DASD volume status and space information
- dls/mls: Improved performance. Both have been rewritten in C
- dls: Extended attributes and statistics for VSAM data sets are now available
- mls: Better support for alias data set indication and grouping. Extended attribute support for data set members
- mls: Ability to print ISPF member statistics. JSON output support for mls
- Python datasets.read() and datasets.write() have improved performance due to leveraging zoau\_io
- Python encoding conversion for strings read or written via other encodings. Raised processing limit to 1GB



Bug fixes / Minor enhancements

- dcat, dhead, and dtail: NULL bytes and unprintable characters in the input dataset are converted to spaces before printing.  
Unprintable characters can be left unchanged if the -b argument is used.
- zoau(7): A new man page is added with descriptions of all the ZOAU commands. Use the command man zoau to view it.
- dls/dinfo: The -s option now also includes the number of extents, the size of the first extent, and the secondary space of a dataset.
- dls: Removed the deprecated dlshelper shell script from the bin directory, dls is now completely implemented in C.
- dls: Removed extraneous trailing periods from certain error messages.
- dls: New -tVSAM filter to display VSAM clusters including their components.
- pcon: New option -S allows reading the SYSLOG from different systems.
- pjdd: New option -i allows reading and filtering SYSIN datasets.
- The samples directory is reorganized, and new samples added.
- zoautil.so: Increased shared library version to 0x00020102.

# ZOAU - Updates

v1.4.0 release



## Python bug fixes / minor enhancements

- datasets.Dataset: Added three new fields for the space attributes, which are also fetched by datasets.list\_datasets():
  - allocated\_extents displays the allocated extents for the dataset in the volume.
  - first\_extent\_size estimated size of the first extent of the dataset.
  - secondary\_space estimated size of the secondary space for the dataset.
- datasets.list\_members(): The returned list now separates member names and alias names into individual elements.
- New module members: New class Member to represent a partitioned dataset member metadata:
  - Alias information.
  - SMDE extended attributes.
  - ISPF member statistics.
- New function fetch\_members()
- New module volumes
  - Class Volume
    - New function list\_volumes() to leverage the new vf utility.
- New module vsam
  - New classes VsamCluster and VsamComponent to represent a VSAM cluster including the following metadata:
    - VSAM cluster type
    - VSAM component attributes
    - VSAM component statistics
- New function fetch\_cluster()

# ZOAU Ideas Portal

The screenshot shows a web browser window for the IBM Z Software Ideas Portal. The URL is <https://ibm-z-software-portal.ideas.ibm.com/?project=ZOAU>. The page title is "Z Open Automation Utilities". On the left, there's a sidebar with a "+ ADD A NEW IDEA" button, a "Pinned ideas" section (0), and a "FILTER BY CATEGORY" dropdown menu. The categories listed are: IBM Z IntelliMagic Vision for z/OS (19), AI on IBM Z (0), AI Toolkit for IBM Z and IBM LinuxONE (0), AIX COBOL (0), Application Discovery and Delivery Intelligence (501), Application Delivery Intelligence Extensions (26), Application Discovery (470), and Wazi Analyze (4). At the bottom of the sidebar are links for "Your privacy choices" and "Analyzer for z/OS". The main content area displays a list of user suggestions. The first suggestion is "Parse/Read job step log even if it is in BINARY" (8 votes, last updated 2 months ago, status: Under review). The second is "ISPF statistics retention for dcp operations" (19 votes, last updated 8 months ago, status: Future consideration). The third is "Provide a facility similar to jls but which returns information like SDSF DA instead of ST" (1 vote, last updated 13 days ago, status: Submitted). The fourth is "Provide a z/OS ENQ query command" (6 votes, last updated 4 months ago, status: Future consideration).

+ ADD A NEW IDEA

Pinned ideas 0

▼ FILTER BY CATEGORY

- IBM Z IntelliMagic Vision for z/OS 19
- AI on IBM Z 0
- AI Toolkit for IBM Z and IBM LinuxONE 0
- AIX COBOL 0
- Application Discovery and Delivery Intelligence 501
- Application Delivery Intelligence Extensions 26
- Application Discovery 470
- Wazi Analyze 4

Your privacy choices

Analyzer for z/OS

## Z Open Automation Utilities

Sort by: Trending ▾ Filter by: Status ▾

Showing 45 of 8843

**8 Parse/Read job step log even if it is in BINARY**

When ZOAU read all job log STEPs it skips "CHECK1 SMPLOG 164" due to the fact that sometimes this step is in BINARY mode. The problem is that the Return Code detail message is within that step and it cannot be extracted. Looks like this step is a ...

2 months ago in Z Open Automation Utilities  0 Under review

**19 ISPF statistics retention for dcp operations**

For our Ansible-based deployment solution, we use the zos\_copy module from the ibm\_zos\_core collection (version 1.8.0). We note the absence of ISPF statistics on our PDS and this is particularly penalizing for our PARMLIBs. The objective of this p...

8 months ago in Z Open Automation Utilities  5 Future consideration

**1 Provide a facility similar to jls but which returns information like SDSF DA instead of ST**

On Spark we start jobs (master, worker, executor, driver) and we can control which jobname it assigns. I'm assuming that the IAZXJSAB CREATE interface is used somewhere in Unix-land to register that name. I can see and work with those names and ow...

13 days ago in Z Open Automation Utilities  0 Submitted

**6 Provide a z/OS ENQ query command**

There are many ways to query the system/dataset ENQs on z/OS but there is no way presently via ZOAU. Please provide an easy to use query capability for ZOAU that does not require operator authority to issue the d grs command. See both ISPF ISRDDN ...

4 months ago in Z Open Automation Utilities  0 Future consideration

<https://ibm-z-software-portal.ideas.ibm.com/?project=ZOAU>

# IBM Z Open Automation Utilities

## Demo

# Datasets

```
~/mvsutil> dtouch -t seq angio.hello
~/mvsutil> decho "Hello, world!" angio.hello
~/mvsutil> dls -lshU angio.hello
dsname                                dsorg  recfm lrecl volume      used      alloc
ANGIO.HELLO                           PS     FB       80  9SX906      748      5.4M
~/mvsutil> drm angio.hello
~/mvsutil> dls -lshU angio.hello
BGYSC1103E No datasets match pattern: ANGIO.HELLO.
```

# Jobs

```
~> jsub -f mvsutil/tools/jcl/long_job.jcl
```

```
J0844625
```

```
~> jls J0844625
```

```
ANGIO      HLQ0      J0844625 AC          ?
```

```
~> jcan C HLQ0 J0844625
```

```
~> jls J0844625
```

```
ANGIO      HLQ0      J0844625 CANCELED    ?
```

```
~> jcan P HLQ0 J0844625
```

```
~> jls J0844625
```

```
BGYSC3503E Failed to retrieve job list.
```

# Operator commands

```
~> opercmd "d t"
NP8      2025055 09:57:14.00          ISF031I CONSOLE ANGI0000 ACTIVATED
NP8      2025055 09:57:14.00          -D T
NP8      2025055 09:57:14.00          IEE136I LOCAL: TIME=09.57.13 DATE=2025.055 UTC: TIME=14.57.13 DATE=2025.055
~> opercmd "d m=stor"
NP8      2025055 09:57:18.00          ISF031I CONSOLE ANGI0000 ACTIVATED
NP8      2025055 09:57:18.00          -D M=STOR
NP8      2025055 09:57:18.00          IEE174I 09.57.18 DISPLAY M 561
REAL STORAGE STATUS
ONLINE-NOT RECONFIGURABLE
    0G-400G
    500G-1000G
ONLINE-RECONFIGURABLE
    400G-500G
PENDING OFFLINE
    NONE
    OM IN OFFLINE STORAGE ELEMENT(S)
    OM UNASSIGNED STORAGE
    STORAGE INCREMENT SIZE IS 2G

~> opercmd '$dsp1'
NP8      2025055 09:57:24.00          ISF031I CONSOLE ANGI0000 ACTIVATED
NP8      2025055 09:57:24.00          -$DSPL
NP8      2025055 09:57:24.00          $HASP893 VOLUME (SPLX95) STATUS=ACTIVE, PERCENT=4
```

# Call to action

## Learn

[ZOAU Product page](#)

[ZOAU Documentation site](#)

[ZOAU Migration Guide \(<=1.3.x\)](#)

[IBM Open Enterprise SDK for Python](#)

## Try

[IBM Github Downloads Page - ZOAU](#)

[ZOAU sample repository](#)

## Community

[IBM Z Open Automation Utilities Community](#)

[IBM Z and LinuxOne - Ansible for IBM Z Community](#)

## Engage

[IBM ideas portal](#)

# IBM Z Open Automation Utilities

## Q&A

# Thank you

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