



Your Name Here

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- Zowe is not an IBM product
- Zowe information presented in this session is public information but subject to change
- Future plans depends on the open community decisions. Time frames for delivery are not guaranteed since it depends on the staffing and time commitment of the open community
- You are encouraged to get involved in the community for the latest information and to influence the project direction and priorities

What is Zowe?



- An extensible software framework on z/OS for connecting primarily – but not limited to – system administrative and development tools to the mainframe.
- Aims to make the mainframe an integrated and agile platform within the changing IT architectural landscape.
- First open source project on z/OS. All code is licensed under the Eclipse Public License version 2.0



Zowe



Zowe Vision Statement

- Reduce the learning curve
 - ✓ Improve productivity
 - ✓ Modern, platform-neutral interfaces
 - ✓ Cloud-like experience
- Attract new people
 - ✓ Demystify the Z platform
 - ✓ Enhance integration and consumability
 - ✓ Promote Open community of practice
- Simplify architecture
 - ✓ Reduce operational overhead
 - ✓ Improve co-existence
 - ✓ Enable rich ecosystem of free and commercial solutions

Zowe accelerates digital transformation through API-enabled services



- z/OSMF
- TSO
- ISPF
- USS
- Rexx
- JCL
- Product Interfaces

- Dataset API
- Job API
- USS API
- System API



Swagger-defined REST APIs

API Discovery - APIs available from the API Discovery feature

API Name	Operations
Dataset APIs	ShowFile List Operations Expand Operations
DELETE /api/dataset/{id}	Delete a data set or member
POST /api/dataset/{id}	Create (and populate) a data set
GET /api/dataset/{id}/attributes	Retrieve attributes of a data set
GET /api/dataset/{id}/content	Read content from a data set or member

APIs

API Mediation Layer

API Mediation Layer API

The API Mediation Layer for z/OS Internal API services. The API Mediation Layer provides a single point of access to maintain REST APIs and other enterprise cloud features such as high-availability, scalability, dynamic API discovery, and documentation.

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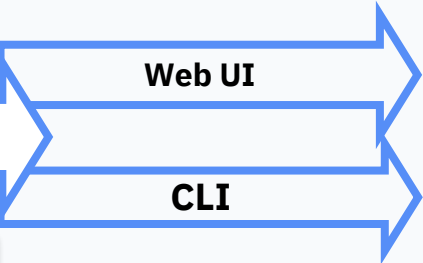
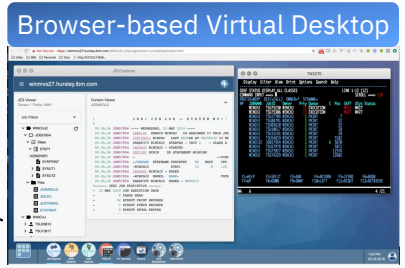
apicatalog
API Catalog
API Homepage
API Catalog service to display service details and API documentation for discovered API services.

API Catalog
API Version: 1.0.0
[ www.ibm.com/zos/2.14/0210154/0210154.nsf/content ]
REST API for the API Catalog service which is a component of the API Mediation Layer. Use this API to retrieve information regarding catalog dashboard files, file contents and its status, API documentation and status for the registered services.
Swagger/OpenAPI JSON Document

API Catalog: Current state information
GET /containers Lists catalog dashboard files
GET /containers/{id} Retrieves a specific dashboard file information

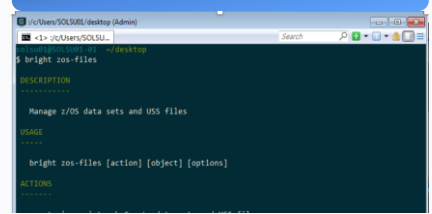
API Documentation: Service documentation
    
```

- MVS Explorer
- USS Explorer
- JES Explorer
- TN3270
- Workflow editor



Development and Operations Teams
(Internal/IT Facing)

Node.js-based Cmd Line Interface



- zos-files
- zos-console
- zos-jobs
- zos-tso
- zos-workflow



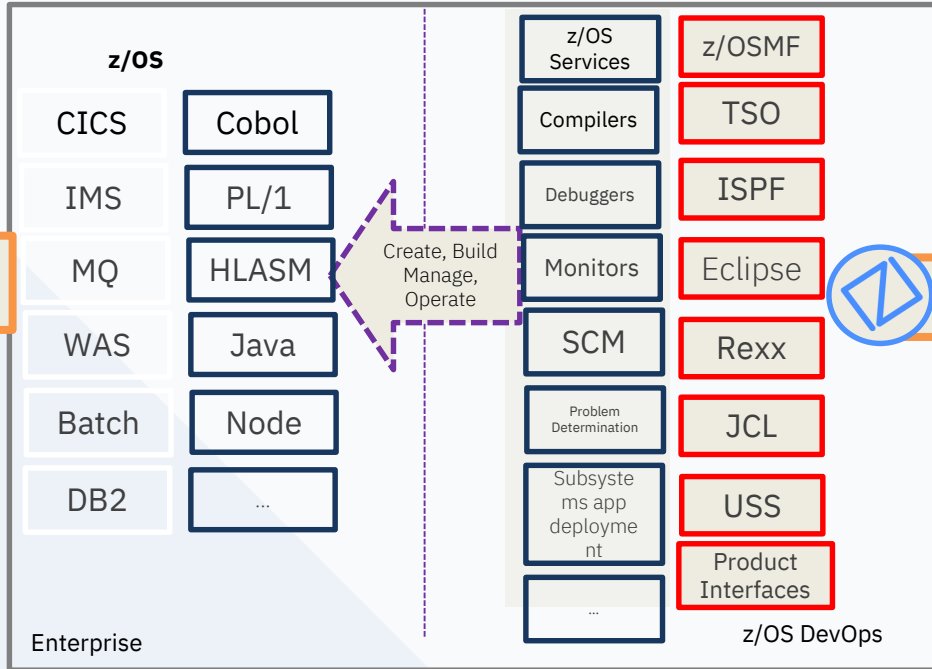
**REST API
Enablement
of Line of
Business
Applications is
not Zowe's
Focus**



Customers
(External/Consumer Facing)

Business Apps

Enterprise Applications and Data



APIs, Web UI, CLI for Development and Operations

Web UI

APIs

CLI



Development and Operations Teams
(Internal/IT Facing)



Zowe

What's in Zowe?



Browser-based Web Desktop

The screenshot shows the JES Explorer web interface. On the left, there's a navigation pane with 'JES Viewer' and 'Content Viewer'. The main area displays job details for 'JES2 JOB LOG -- SYSTEM MV37'. A terminal window on the right shows the output of a command, including job status and execution details.

API Mediation Layer (Gateway, Discovery Service, Catalog)

API Mediation Layer API

The API Mediation Layer for z/OS internal API services. The API Mediation Layer provides a single point of access to mainframe REST APIs and offers enterprise cloud-like features such as high-availability, scalability, dynamic API discovery, and documentation.

apicatalog

API Catalog

API Homepage

API Catalog service to display service details and API documentation for discovered API services.

API Catalog

API Version: 1.0.0

[Base URL: c83x.ca.com:10010/ap1/v1/apicatalog]

REST API for the API Catalog service which is a component of the API Mediation Layer. Use this API to retrieve information regarding catalog dashboard tiles, tile contents and its status, API documentation and status for the registered services.

Swagger/OpenAPI JSON Document

```
-----
USAGE

zowe <group>

Where <group> is one of the following:

GROUPS

config          Manage configuration and overrides
plugins         Install and manage plug-ins
profiles        Create and manage configuration profiles
provisioning | pv  Perform z/OSMF provisioning tasks
zos-console | console Issue z/OS console commands and collect responses
zos-files | files  Manage z/OS data sets
zos-jobs | jobs   Manage z/OS jobs
zos-tso | tso     Interact with TSO
zos-uss | uss    Issue z/OS USS commands and receive responses
zos-workflows | wf Create and manage z/OSMF workflows
zosmf          Interact with z/OSMF

OPTIONS
-----
```

swagger

Api Document

[Base URL: winvms27.hursley.ibm.com]
<https://winvms27.hursley.ibm.com/29493>

Api Documentation

[Terms of service](#)

[Apache 2.0](#)

JES job APIs

- GET /api/v1/jobs {jobName} GET a job
- GET /api/v1/jobs/{jobName}/files Get a list of output file names for a job
- DELETE /api/v1/jobs/{jobName}/{jobId} Cancel a job and purge its associated files
- GET /api/v1/jobs/{jobName}/{jobId}/files Get a list of output file names for a job
- GET /api/v1/jobs/{jobName}/{jobId}/files/{fileId}/content Get content from a specific job output file
- GET /api/v1/jobs/{jobName}/{jobId}/steps Get job steps for a given job
- POST /api/v1/jobs/dataset Submit a job given a data set

Swagger-defined z/OS REST APIs

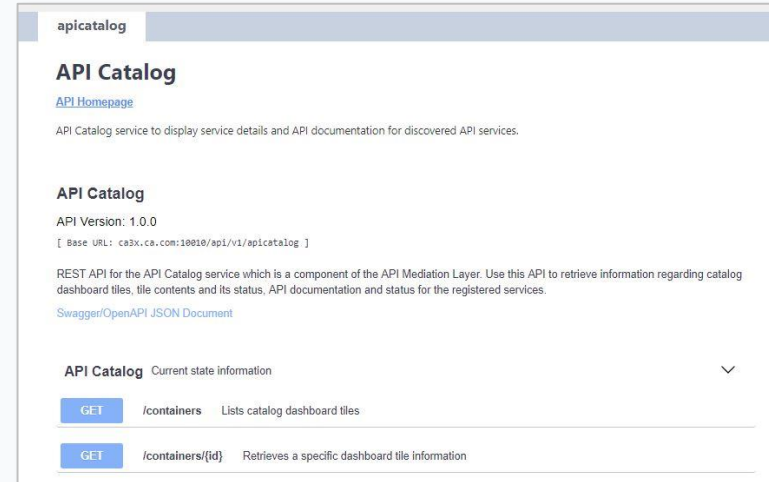
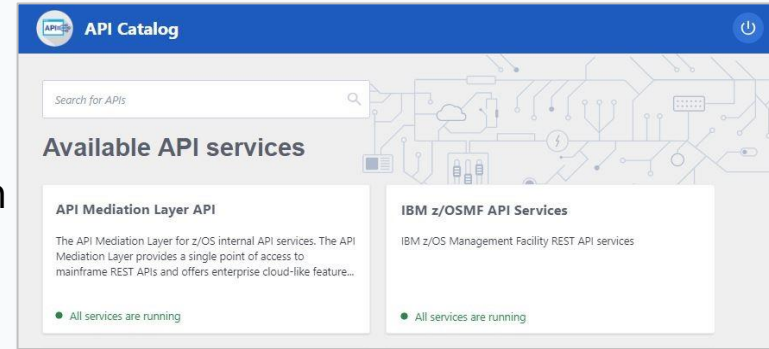
Node.js- based CLI



Zowe API Mediation Layer – Gateway to mainframe APIs

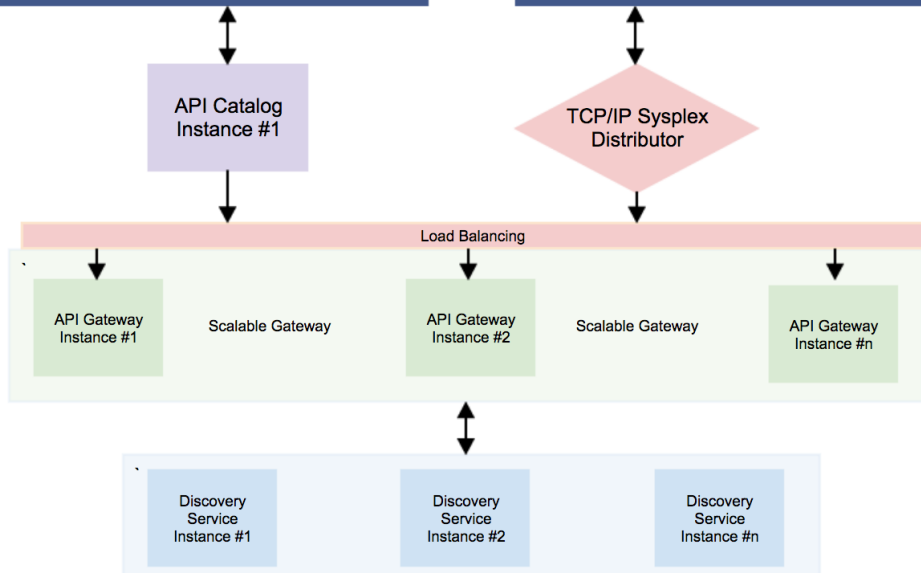


- Enables a single point of access to mainframe APIs with high-availability, scalability, dynamic API discovery, consistent security, “one-time” sign-on experience and unified standard API documentation (OpenAPI / Swagger)
- **API Catalog**
UI Catalog of available APIs with their Swagger doc and service status
- **Gateway**
Single secure point of entry to an ecosystem of API services. Hides complexity. Highly available. Based on Netflix Zuul.
- **Discovery Service**
Discover APIs across many applications. Repository of active API services. Based on Netflix Eureka.



People Find APIs

Apps Call APIs



z/OS Connect

z/OSMF

Jax-RS App

API Layer Components*

- **API Catalog**
UI Catalog of available APIs with their Swagger doc and service status
- **API Gateway**
Single point of entry to an ecosystem of microservices. Hides complexity. Highly available. Based on Netflix Zuul.
- **Discovery Service**
Discover APIs across many applications. Repository of active services. Based on Netflix Eureka.
- **z/OSMF API**
Authenticate Zowe users with mainframe credentials

* Separate microservices, might be running as separate address spaces



Browser address bar: <https://winmvs3b.hursley.i...>

Browser tabs: Atlas, IBM, Personal, Giza, http://127.0.0.1:80...

API Catalog header with search icon and power button

Search for APIs

Available API services

API Mediation Layer API

The API Mediation Layer for z/OS internal API services. The API Mediation Layer provides a single point of access to mainframe REST APIs and offers enterprise cloud-like feature...

● All services are running

z/OS Datasets services

IBM z/OS Datasets REST services

● All services are running

My Server APIs

z/OS Jobs services

IBM z/OS Jobs REST services

● All services are running

z/OSMF services

IBM z/OS Management Facility REST services

● All services are running

API Catalog lists API servers on its “Southbound edge”

API servers can be **statically** defined through .yaml files or else REST API calls to the gateway

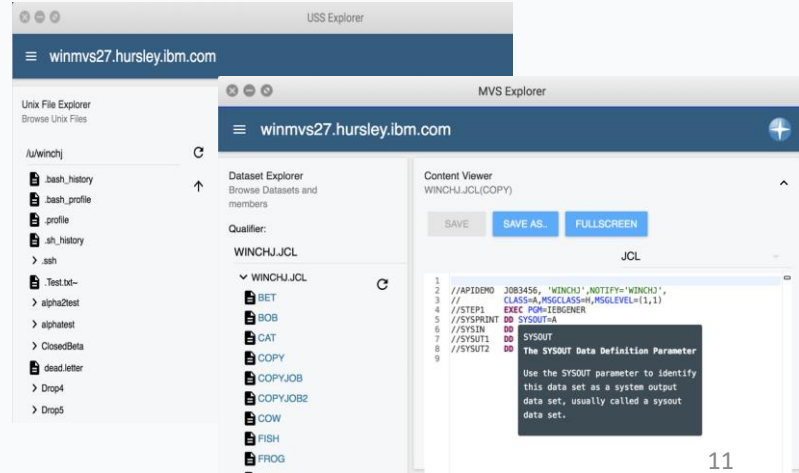
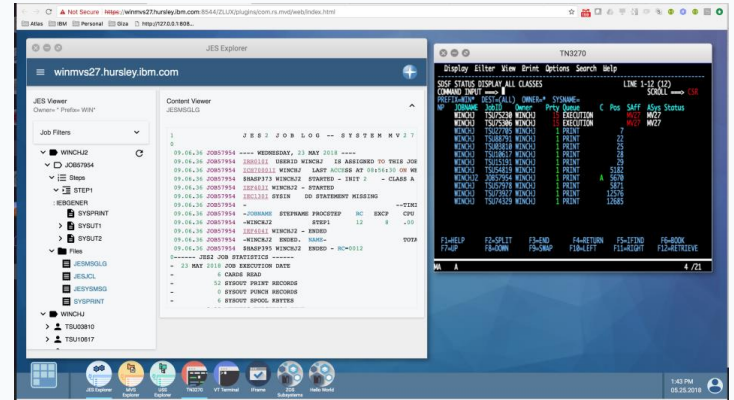
Dynamic discovery service based on Netflix Eureka framework



Zowe Web Desktop – An app container in a browser



- Known as **zLUX**, the Zowe Web UI is a virtual desktop system that offers a rich and open platform for a web-based mainframe user experience.
- **Mainframe Virtual Desktop**
 - A web-based window manager that provides full screen interactive experience
- **Zowe Node Server**
 - Runs zLUX; uses Express.js as web service framework for communication between applications and z/OS services and components, pre-reqs Node.js for z/OS
- **ZSS Server**
 - Provides secured REST API services
- **Application plug-in**
 - Dataservices, Configuration dataservice, URI broker, app-to-app communication, Error reporting UI, Logging utility
- **Explorers**
 - JES, MVS, USS explorers
 - Basic editing support for REXX and JCL





Zowe CLI – Enables cloud-like access to mainframe



- Enables app developer and DevOps engineers to interact with the mainframe easily through a CLI from any terminal on Windows, MacOS, Linux
- Easily integrates with IDEs, shell commands, bash scripts, and build tools; installs using NPM
- **Interact with mainframe files**
Create, edit, download, and upload mainframe files (data sets) directly
- **Submit jobs**
Submit JCL from data sets or local storage, monitor status, view and download output automatically
- **Issue TSO and z/OS console commands**
Issue TSO and console commands to the mainframe directly
- **Integrate z/OS actions into scripts**
Build local scripts that accomplish both mainframe and local tasks
- **Produce responses as JSON documents**
Return data in JSON format on request for consumption in other programming languages
- **CLI Plug-Ins**
Access to CICS and DB2, IMS, z/OS Connect, MQ,.....and Visual Studio

```
USAGE
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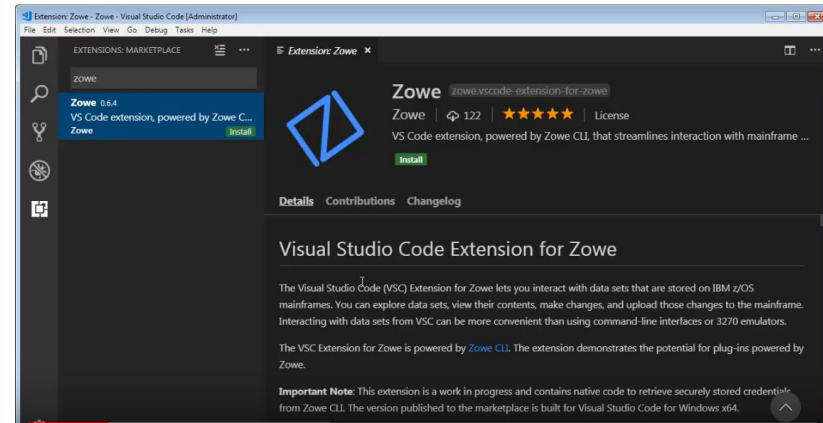
zowe <group>

Where <group> is one of the following:

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zos-console | console Issue z/OS console commands and collect responses
zos-files | files  Manage z/OS data sets
zos-jobs | jobs    Manage z/OS jobs
zos-tso | tso      Interact with TSO
zos-uss | uss      Issue z/OS USS commands and receive responses
zos-workflows | wf Create and manage z/OSMF workflows
zosmf           Interact with z/OSMF

OPTIONS
-----
```





DEMO

Zowe Open Source Directions

Subject to Zowe Community agreement

- **Complete Single Sign On (SSO)** – using JWT technology
- **Complete Multi-Factor Authentication (MFA)**
- **Support for mobile access**
- **z/OS resource discovery** – various technologies being considered
- **z/OSMF Workflows for install or other package manager (Conda)**
- **Consolidation of runtime server address spaces**
- **Containerized Zowe (zCX or other)**
- **CLI on Unix System Services (vs workstation install)**
- **Improve High Availability (HA) capabilities** need to be tested and documented
- **Additional sample desktop apps**
- **Expand REST API Management**
 - Consolidation of swagger docs
 - Integrate with enterprise API Managers or Security Gateways
 - Load balancing simple round robin (tie to WLM)
- **Use of SAF keyrings (vs USS keystore)**

Zowe Core vs. Zowe Exploiters

• Zowe Exploiters

Exploiters are CLI plug-ins, web-UI extensions/apps, and new API's

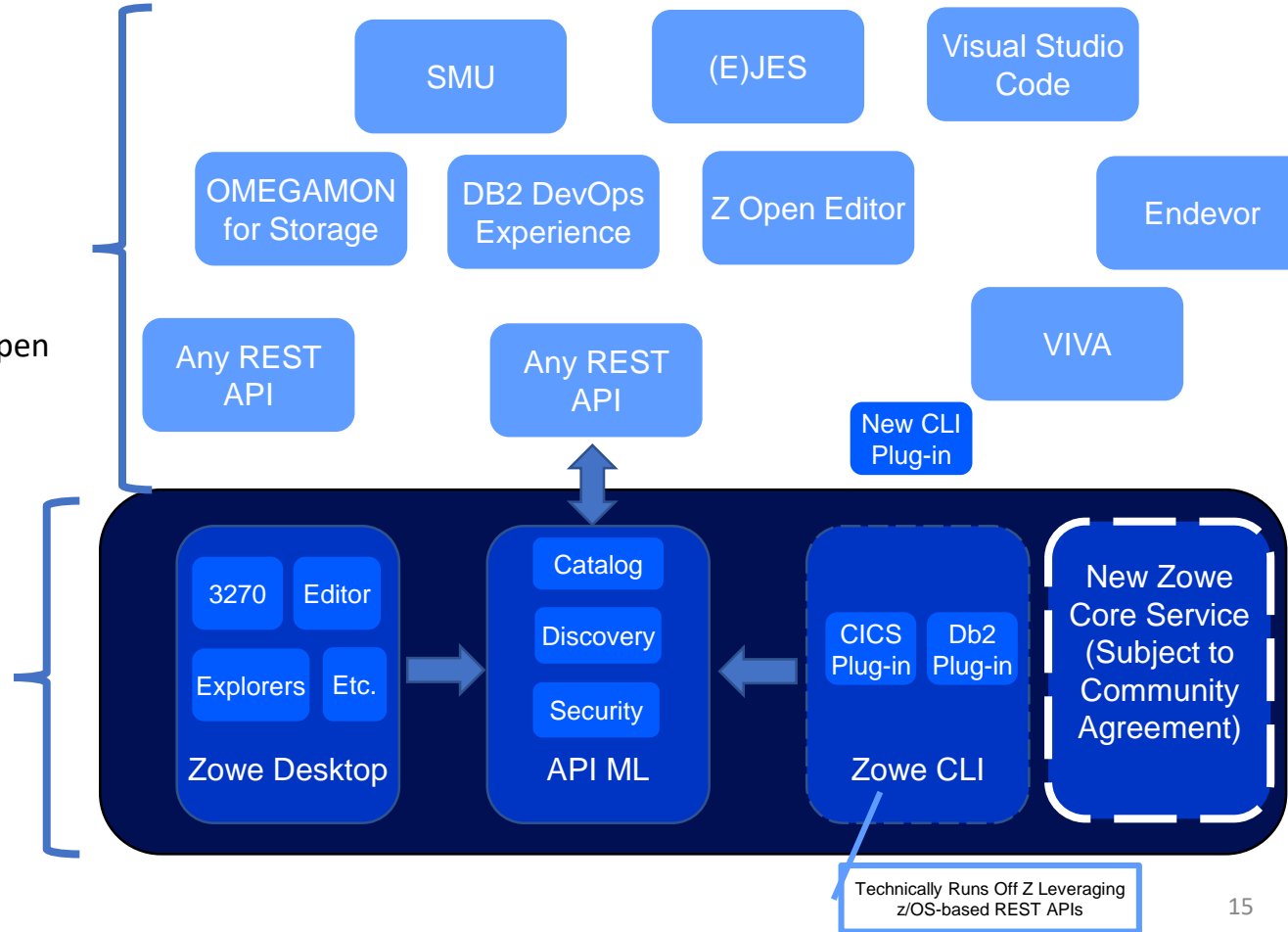
The exploiters use Zowe as infrastructure pre-req "runtime".

The extension may or may not be open sourced themselves.

• Zowe Core

Zowe Core includes the Zowe Desktop, Command Line Interface and the API mediation layer.

Core must be EPL2.0 license



Zowe framework and ecosystem at a glance

Core Zowe includes API Mediation Layer, Command Line Interface (CLI), and Web User Interface

Vendors can build 'Zowe Compliant' plugins that will leverage this framework

Bold - Commercial Extensions

CLI Plug-in and Extensions

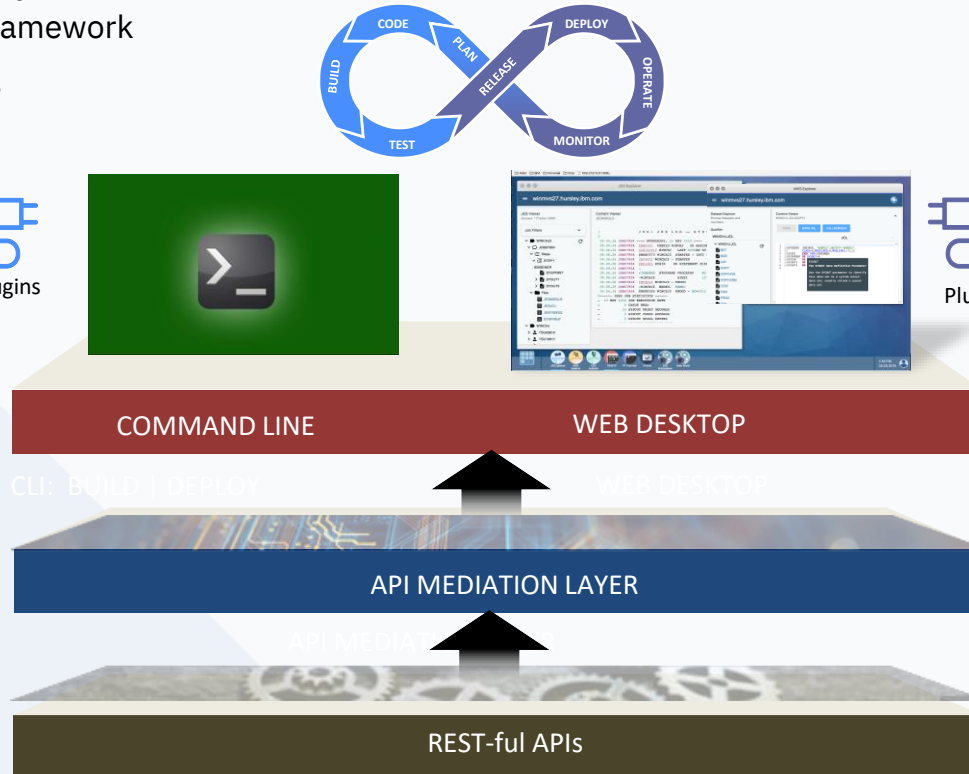
- **CLI Plug-in for CICS**
- **CLI Plug-in for Db2**
- **CLI Plug-in for MQ**
- **CLI Plug-in for z/OS Connect**
- Visual Studio Code Extension
- **Phoenix Software International (E)JES**
- **(Tech Preview) Wazi**
- **CA OPS MVS**
- **CA Workload Automation**
- **CA Sysview**
- **CA Endeavor**
- **CA File Master**
- **CA Brightside**



Plugins



Plugins



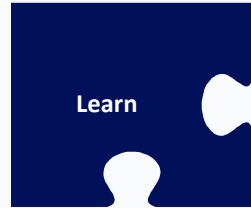
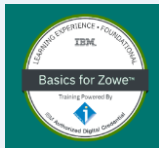
Web Desktop Apps and Plug-ins

- JES Explorer
- Data Set Explorer
- UNIX System Services File Explorer
- Iframe, Angular and React Samples
- TN3270
- VT Terminal
- API Catalog
- Zowe Editor
- z/OSMF Workflow Editor
- Jupyter (separate download)
- **IBM OMEGAMON**
- **IBM Service Management Unite**
- **SMU**
- **IBM NetView**
- **(Demo) Vicom Infinity Voice Assistant**
- **Db2 DevOps Experience**
- **Rocket Bluezone Web**



How to get involved in Zowe

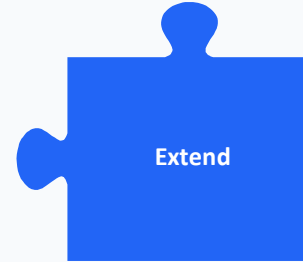
We are building more than just technology, we are building a **community**



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- Visit [Zowe.org](#)
- Connect with us on [Slack](#) or via [email list](#)
- Zowe on [zTrial](#) (under IT Operations)
- Interskill Basics for Zowe badge [Zowe Basics](#)



- [Zowe Github](#)
- [Download Zowe](#)
- Review [documentation](#)
- [Troubleshooting](#)
- Reach out to us on [Slack](#) or via [email list](#)



- Review the [extenders guide](#)
- Zowe [Tutorials](#) and [Samples](#)



- Provide feedback, problems or recommendations to us on [Slack](#) or via [email list](#)
- Submit [Git](#) Issues
- Review the community [backlog](#) and contribute code
- Earn your committer status through meritocracy

Why you and your organization should be a part of Zowe

Individual Contributors and Committer

- Exploit and learn new technology
- Build a global network
- Develop marketable skills through involvement in open source

Company Exploitation of Zowe Technology

- Quick adoption and new app development
- Improved integration and co-existence with other solutions
- Access to market place (future)

Company Investment in Developer Community

- Influence Zowe direction with contributions
- Expand reputation as industry leader
- Anticipate technology direction
- Reduced dependency on outside troubleshooting



Thanks

Intro Demo:

<https://www.youtube.com/watch?v=NX20ZMRoTtk&feature=share>

Visual Studio Code (using command line):

https://www.youtube.com/watch?v=la1_Ss27fn8

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