Developing CICS applications your way, using Visual Studio Code

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Agenda

CICS and APIs
Why do you need them?
What APIs do we have?

The IDE options for CICS

Visual Studio Code
Deeper dive!
What extensions are useful?
How does it all work together?

Give it a try
Tips for your setup
Get in touch and shape the way this works.

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CICS – the mixed language application server

You write your business logic

CICS looks after the boring stuff…

- Security, scaling, access to resources
- CICS TS – Transaction Server (commit, rollback)

For CICS to do this, it needs to understand what resources you're accessing and what you're doing.

Enter … the APIs!

What is CICS TS for z/OS? - https://www.ibm.com/docs/en/cics-ts/6.x?topic=what-is-cics-transaction-server-zos
CICS TS video series - https://www.redbooks.ibm.com/abstracts/crse0303.html

The orchestra of APIs

A wide choice of languages

- COBOL, PL/I, Assembler, REXX
- C/C++, Java, Node.js

Components written in different languages can call each other and access the same resources

e.g. You can write your business logic in COBOL and write a front end in Java / Node.js

The orchestra of APIs

```
210
211           UPDATE-CUSTOMER-VSAM SECTION.
212           UCV010.
213
214         *
215         *    Position at the matching CUSTOMER record and
216         *    lock it.
217         *
218               MOVE COMM-CUSTNO TO DESIRED-CUSTNO.
219
220               EXEC CICS READ FILE('CUSTOMER')
221                    RIDFLD(DESIRED-CUST-KEY)
222                    INTO(WS-CUST-DATA)
223                    UPDATE
224                    RESP(WS-CICS-RESP)
225                    RESP2(WS-CICS-RESP2)
226               END-EXEC.
227
```

COBOL, PL/I, Assembler, REXX

EXEC CICS commands
CICS translator -> a preprocessor

COMMAREA vs CHANNEL/CONTAINER

Async API
EXEC CICS RUN -> starts an async request
EXEC CICS FETCH -> retrieves async result

Developing applications - https://www.ibm.com/docs/en/cics-ts/6.x?topic=developing-applications
EXEC CICS command summary - https://www.ibm.com/docs/en/cics-ts/6.x?topic=reference-cics-command-summary
ASYNC API - https://www.ibm.com/docs/en/cics-ts/6.x?topic=applications-developing-asynchronous-requests

The orchestra of APIs

```
62          @GET
63          @Produces("application/json")
64          public Response getCompanyName()
65          {
66                  logger.entering(this.getClass().getName(), GET_COMPANY_NAME);
67                  // We cache the company name as a static variable. If not set, we jCICS
68                  // LINK to a COBOL program to go get it
69                  if (companyNameString == null)
70                  {
71                          Program getCompy = new Program();
72                          getCompy.setName("GETCOMPY");
73
74                          byte[] companyNameBytes = new byte[40];
75
```

```
// Gets the current CICS Context for the environment we're running in
CICSContext task = CICSContext.getCICSContext();

try {
        // Create a new channel called "charchan", with a CHAR container called
        // "charcont"
        // Add the text to the CHAR container
        CHARContainer charContainer = task.getChannel(CHANNEL_NAME).getCHARContainer(CONTAINER_NAME)
                        .put("I'm running under task ");

        // Get the current task number that this unit of work is running under
        Integer taskNumber = task.getTaskNumber();

        // Add the task number to the end of the CHAR container
        charContainer = charContainer.append(taskNumber.toString());

        // Get the full contents of the container, and print this
```

Java

- JCICS API - similar to EXEC CICS
- JCICSX API – remoteable and more “Java native” (provides LINK -> Channel/Container)

- CICS Liberty
  Jakarta, Eclipse MicroProfile, Spring Boot

- Other Java libraries you need!

Maven and Gradle plugins available

Java JCICS - https://www.ibm.com/docs/en/cics-ts/6.1.0?topic=applications-java-development-using-jcics
Java JCICSX - https://www.ibm.com/docs/en/cics-ts/6.1.0?topic=applications-java-development-using-jcicsx
cics-bundle-maven - https://github.com/IBM/cics-bundle-maven
cics-bundle-gradle - https://github.com/IBM/cics-bundle-gradle

The orchestra of APIs

```
74      let url = catalogServer + '/exampleApp/inquireCatalogWrapper';
75
76      console.log('Get first set of items API request: ' + url);
77      console.dir(inquireRequest1);
78
79      var promise1 = cics.invoke(url, inquireRequest1)
80        .then(function (json) {
81          console.log('Get first set of items API response: ');
82          console.dir(json.inquireCatalogResponse.catalogItem);
83
84          allItemsArray = allItemsArray.concat(json.inquireCatalogRespor
85        });
```

Node.js

- Promises and similar Node.js async API
- Link to other CICS programs
- Other JavaScript libraries you need!

Node CICS API - https://www.npmjs.com/package/ibm-cics-api

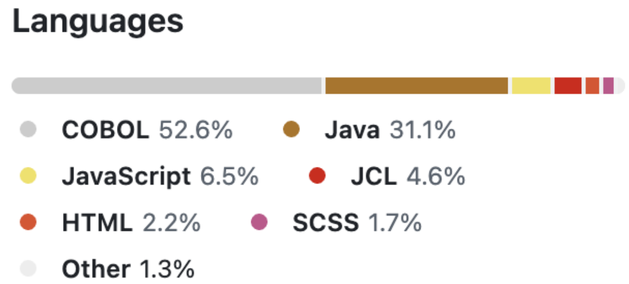
API samples

CICSDev

- A large collection of samples on GitHub
- https://github.com/cicsdev

CICS Banking Sample Application

- Our biggest sample
- Mix of COBOL, Java, JavaScript
- 3270 interface
- Liberty-hosted Web interface



EXEC CICS command summary - https://www.ibm.com/docs/en/cics-ts/6.x?topic=reference-cics-command-summary
Java JCICS - https://www.ibm.com/docs/en/cics-ts/6.1.0?topic=applications-java-development-using-jcics
Java JCICSX - https://www.ibm.com/docs/en/cics-ts/6.1.0?topic=applications-java-development-using-jcicsx
CBSA - https://github.com/cicsdev/cics-banking-sample-application-cbsa

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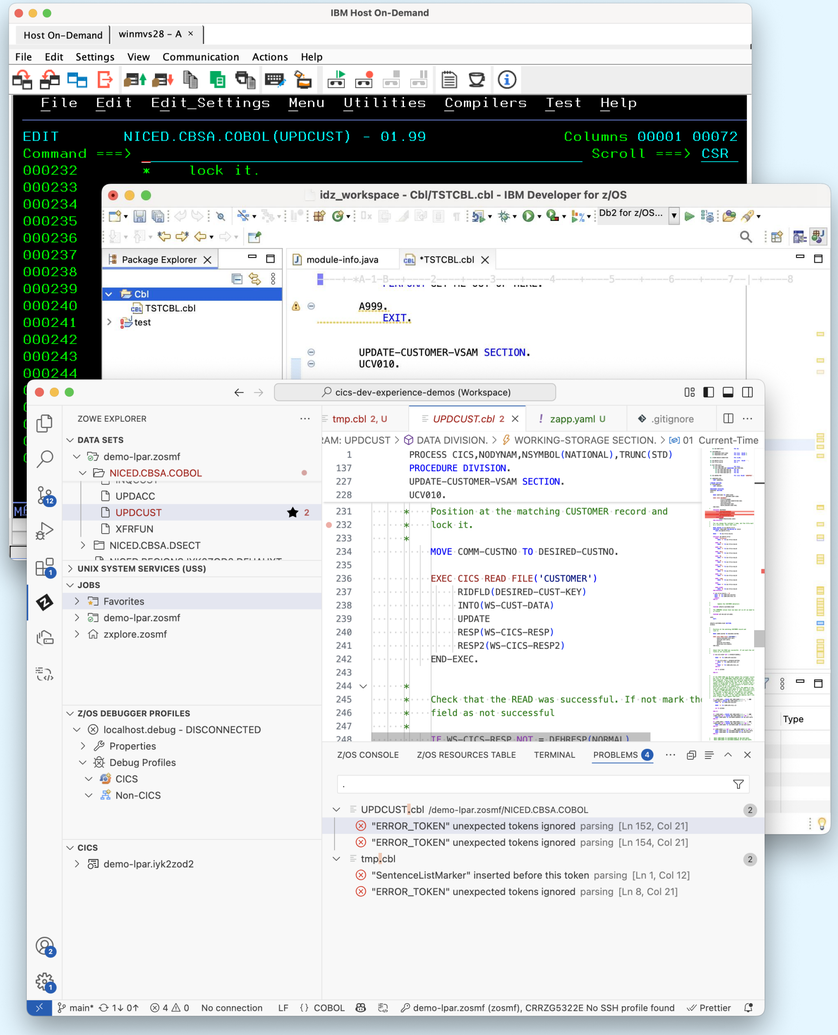
Our 3 contestants



3270 (ISPF, CEMT)

- Traditional choice
- Keyboard, keyboard, keyboard!

Eclipse

- Mature, stable, feature-rich

Visual Studio Code (VS Code)

- The new(ish) kid on the block
- Lightweight
- Modular / extension-oriented

Our 3 contestants

- Many tasks can be completed in any environment, so it’s a preference call.
- What your colleagues do doesn’t have to be what you do!
- Some options will fit better with your company’s SCM and any mandated workflows
- Today we’ll focus on VS Code!

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VS Code

Local file manipulation
Git tools

VS Code

Data sets, z/OS Unix, Jobs, z/OS Console
Profiles (connection details)

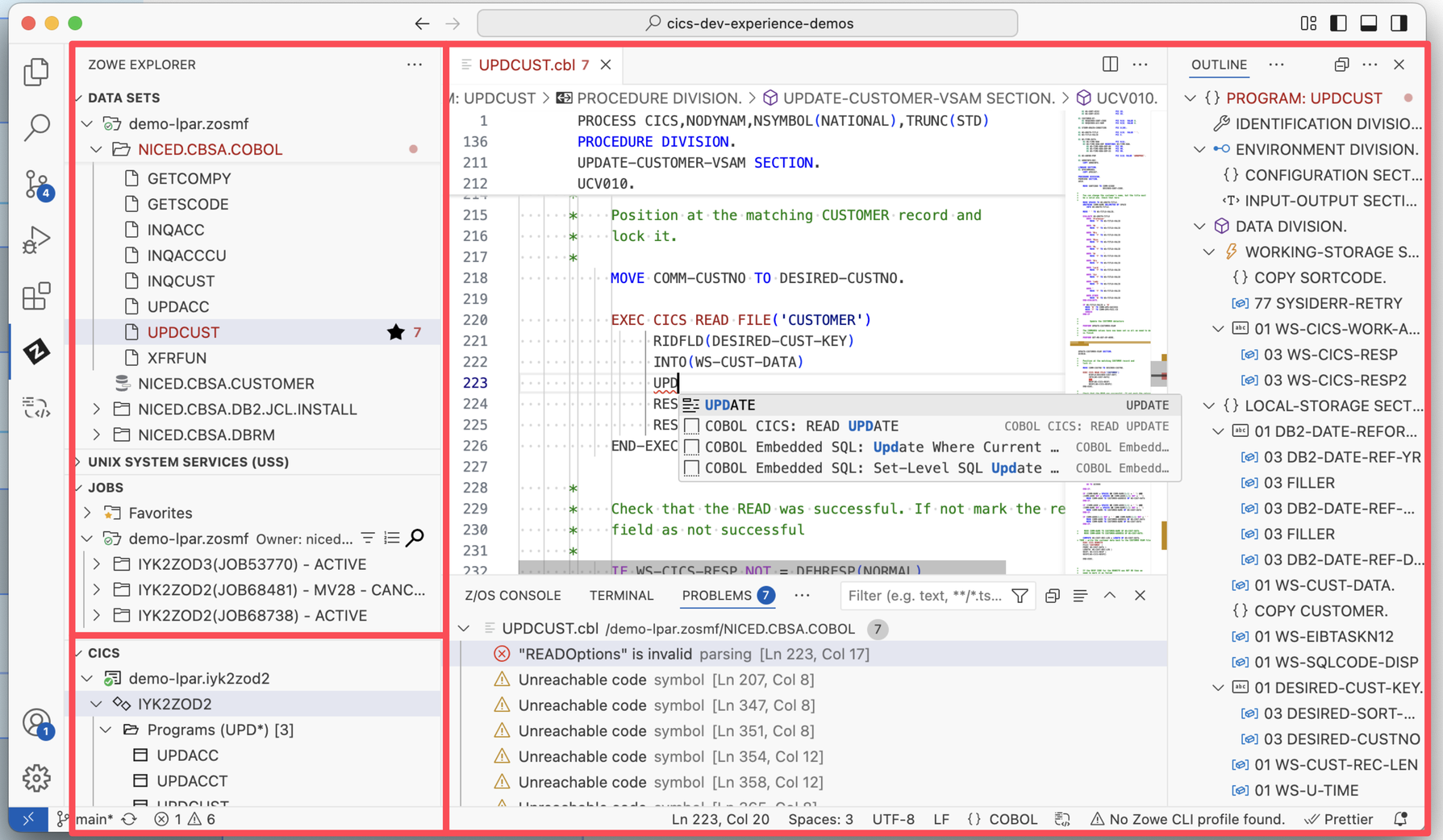
Zowe Explorer

Managing CICS resources in a CICS region

IBM CICS for Zowe Explorer

COBOL, PL/I, Assembler
syntax highlighting, code complete

IBM Z Open Editor



Demo

Demo uses **CBSA** installed in a CICS region
z/OSMF available on the host
CMCI connection through an SMSS region with the CMCI JVM server

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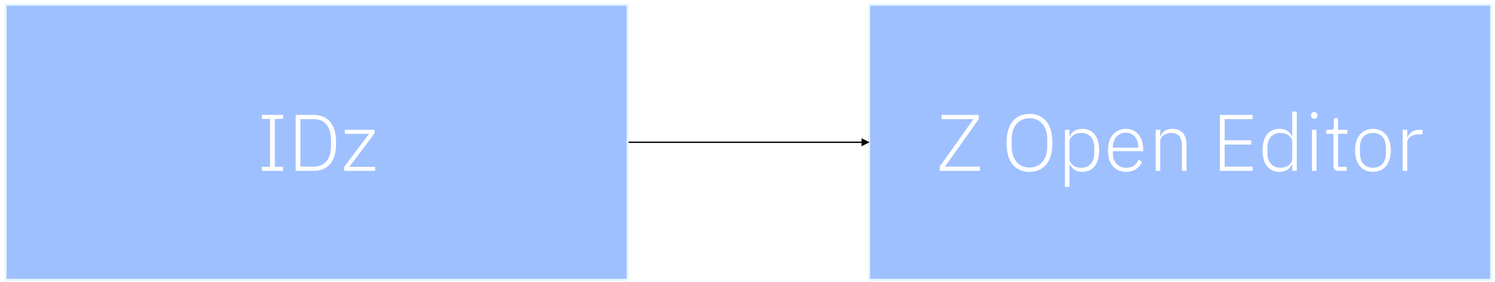
What are you currently using?

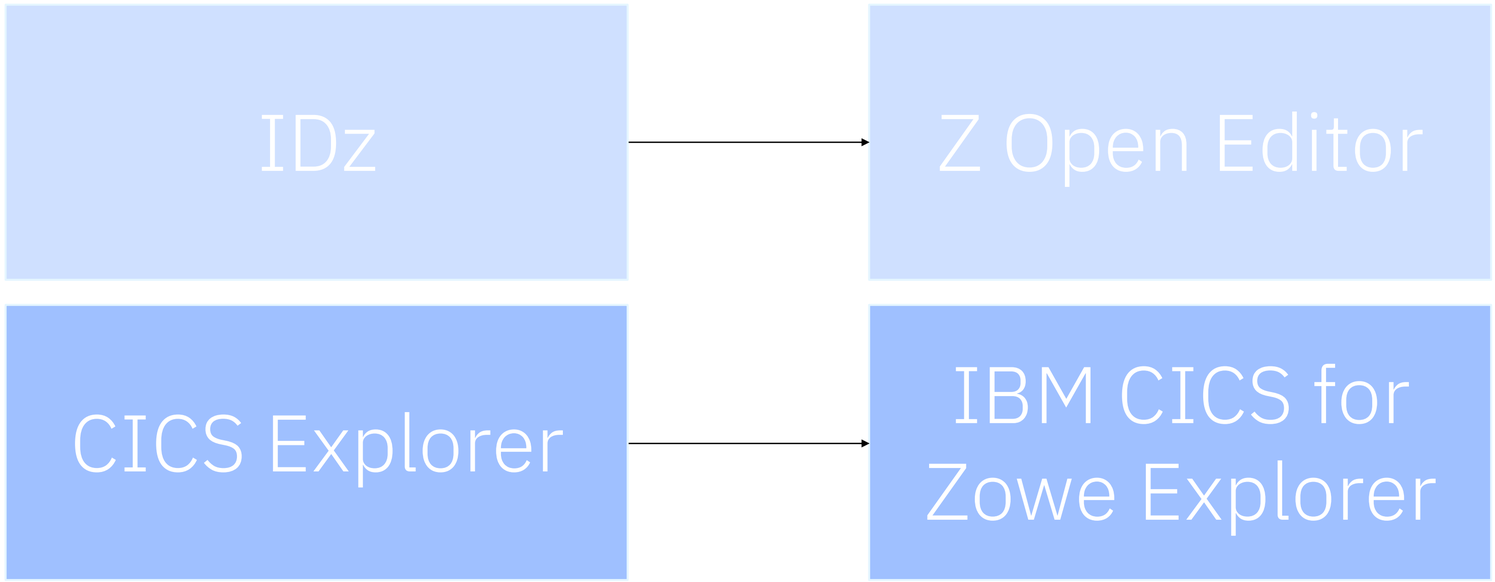
- 🤔 If you have an IDz license you are supported to use all Z Open Editor features

- ✅ Without an IDz license you can still use most Z Open Editor features



What are you currently using?

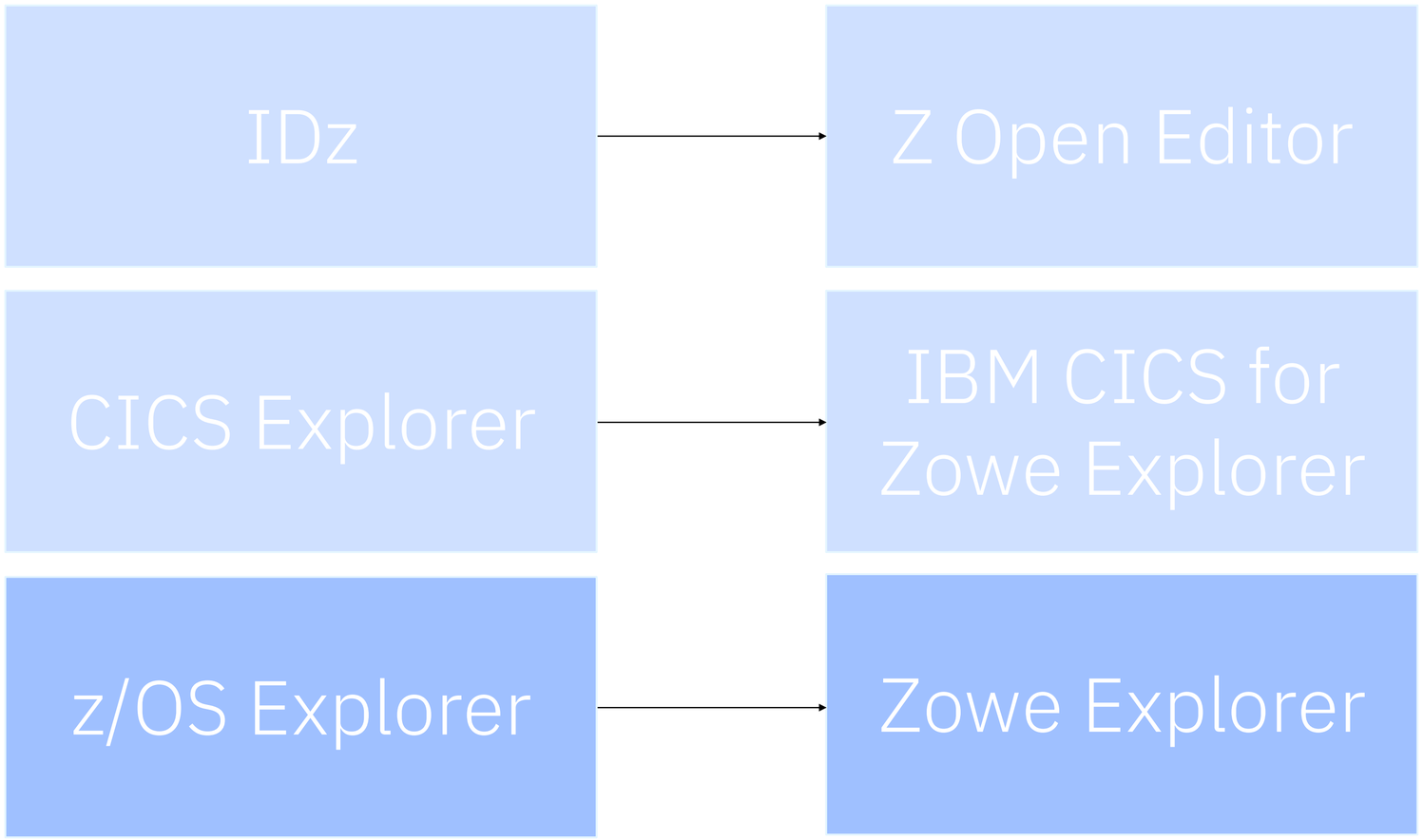
- CICS Explorer uses the same **CMCI connection** as IBM CICS for Zowe Explorer



What are you currently using?

- z/OS Explorer with z/OSMF or FTP – you can use this with Zowe Explorer (and IBM z/OS FTP for Zowe Explorer)

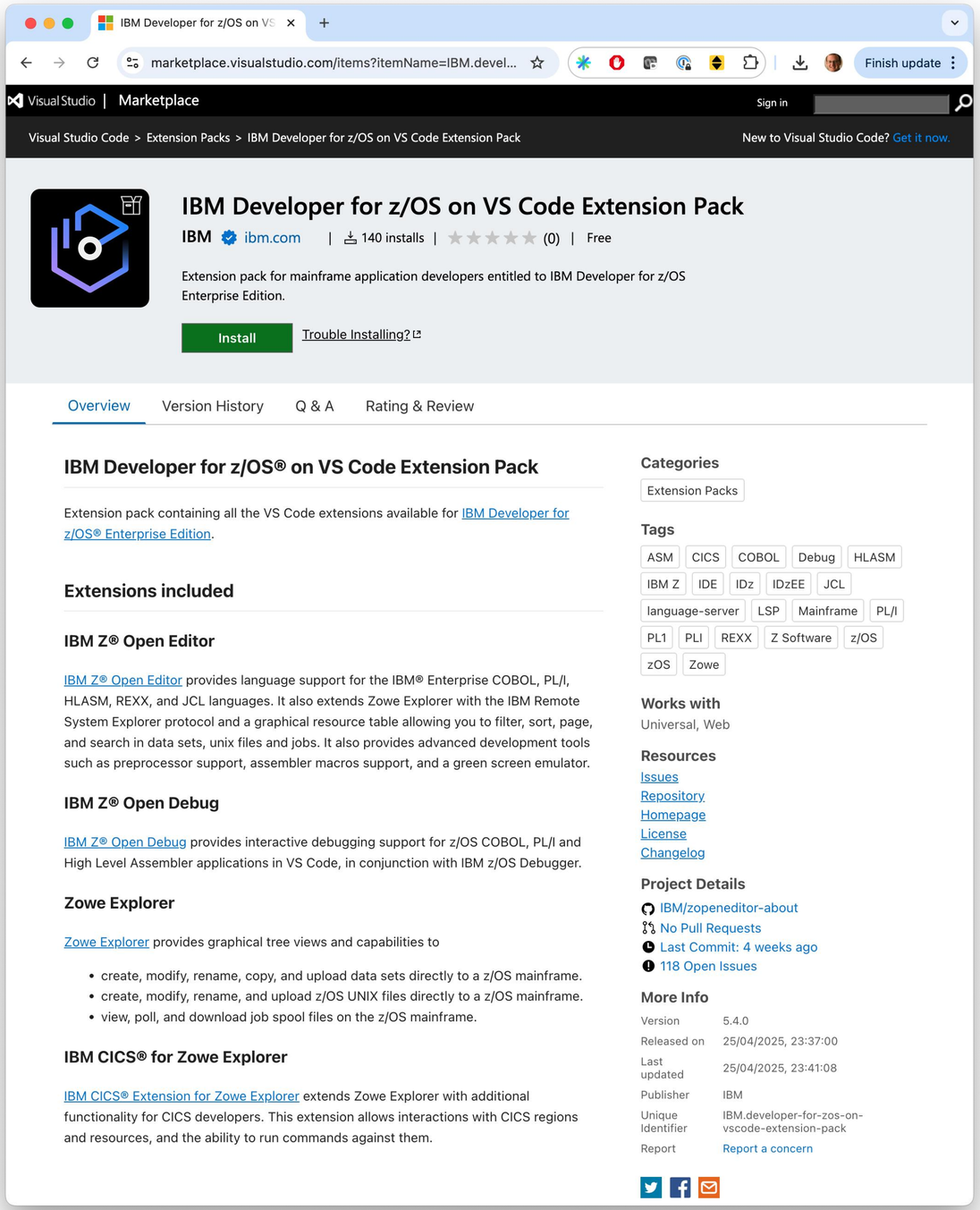
- z/OS Explorer with RSE – install the additional RSE API to use Zowe Explorer



ID/z EE extension pack

One click to install:

- Z Open Editor
- Z Open Debug
- Zowe Explorer
- IBM CICS for Zowe Explorer



Zowe profiles

- JSON based files that contain your connection details
- Updated significantly with Zowe v3 in Oct 2024

- 😄 Shared with zowe-cli
- 😄 Can be stored in workspaces to share with colleagues
- 😕 Can be a bit painful to get set up with

- New in v3 are nested profiles … you can associate profiles for a host together and share properties. Nested is the way to go! 🎉

Zowe profiles doc: https://docs.zowe.org/stable/user-guide/ze-profiles

Zowe profiles

- Profiles are nested by host
- Common properties for a host
- Connection profiles inheriting common properties
- Save passwords to secure storage

```
{
  "$schema": "./zowe.schema.json",
  "profiles": {
    "host1": {
      "properties": {
        "host": "host1.com",
        "rejectUnauthorized": false
      },
      "secure": ["user", "password"],
      "profiles": {
        "zosmf": {
          "type": "zosmf",
          "properties": {
            "port": 32070,
            "protocol": "https"
          }
        },
        "cicsplex1": {
          "type": "cics",
          "properties": {
            "protocol": "http",
            "port": 12345,
            "cicsPlex": "MYPLEX",
            "regionName": "MYREGION"
          }
        }
      }
    },
    "host2": {
      "properties": {
        "host": "host2.com",
        "rejectUnauthorized": false
      },
      "secure": ["user", "password"],
      "profiles": {
        "zosmf": {
          "type": "zosmf",
          "properties": {
            "port": 32070,
            "protocol": "https"
          }
        },
        "cicsplex3": {
          "type": "cics",
          "properties": {
            "protocol": "https",
            "port": 12347
          }
        }
      }
    },
    "defaults": {
      "zosmf": "host1.zosmf",
      "tso": "host1.tso",
      "ssh": "host1.ssh",
      "rse": "host1.rse",
      "cics": "host1.cicsplex1"
    }
  },
  "autoStore": true
}
```

An example: https://gist.github.com/davenice/0cd4623ea3386ab522eac0999b8f7aaa

ZAPP files

- YAML files that help set out rules for your Z application
- Referenced by Z Open Editor, IDz, and build tools

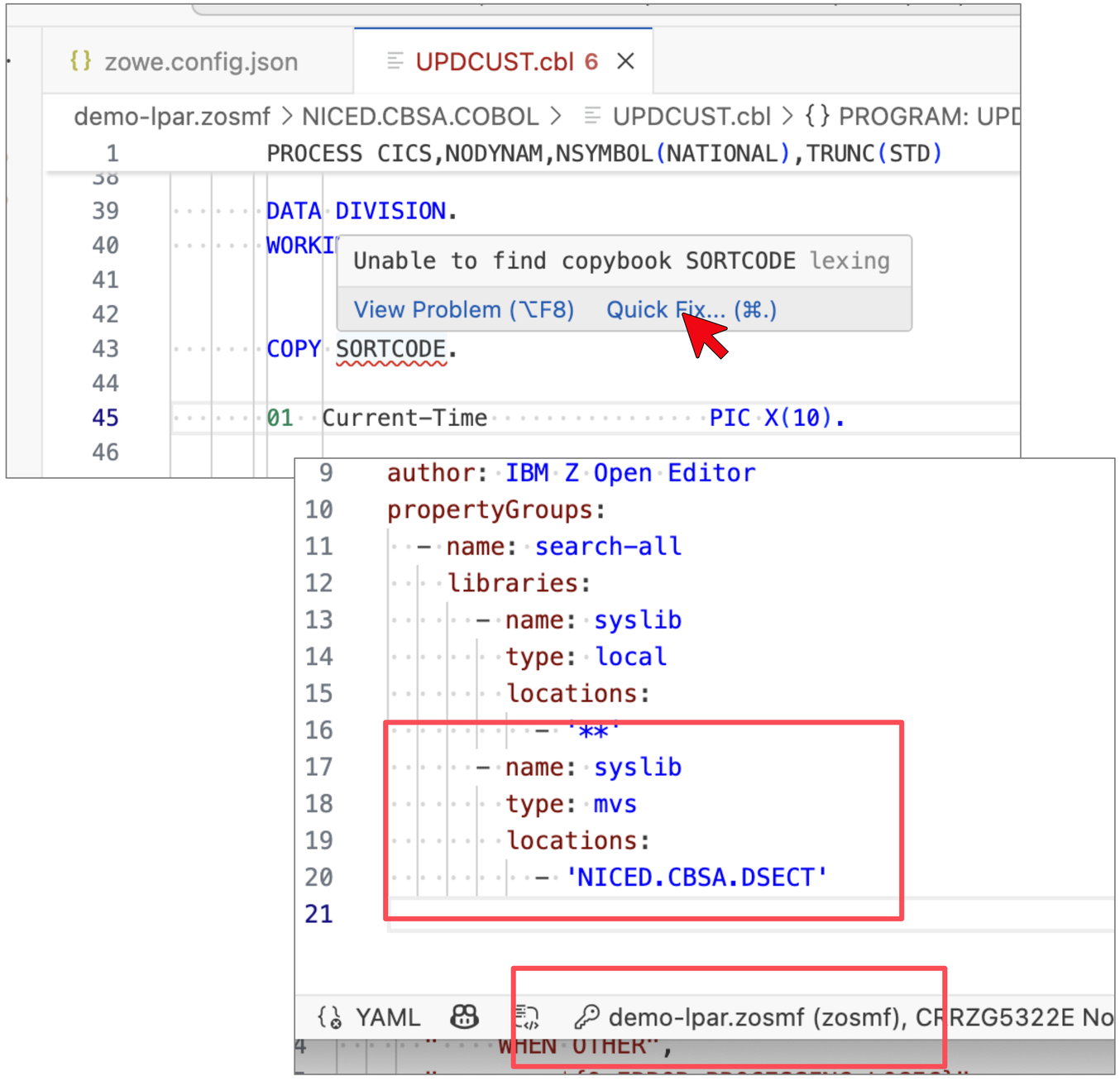
- The most basic reason is to help resolve copybooks if you're editing code remotely

Steps:
(1) Set up the ZAPP file
(2) Tell Z Open Editor which connection to use

ZAPP files doc: https://ibm.github.io/zopeneditor-about/Docs/zapp.html
Property groups doc (for include resolution): https://ibm.github.io/zopeneditor-about/Docs/setting_propertygroup.html

ZAPP files

- Copybooks unresolved!
- Use quick fix to jump into the ZAPP file
- Add entry to resolve from MVS (can use variables so these can be shared with your app code)
- Use status bar widget to choose connection



Get involved!

Contribute

- Zowe Explorer, IBM CICS for Zowe Explorer are both open source projects!
- Raise your 🦗, feature requests, PRs :-D

- We'd ❤️ to talk to more CICS developers whatever their current development workflow

Connect with CICS!

- LinkedIn - https://www.linkedin.com/groups/4304249/
- Stack overflow - https://stackoverflow.com/questions/tagged/cics
- Github - https://github.com/zowe/cics-for-zowe-client/discussions

Thank you