

End-to-end development

Modern IBM i development stack

Liam Allan



Agenda

- Git refresher
- What developing locally means
- Developing on local machine
- Building and compiling on IBM i
- Build and test automation
 - Pipelines
 - Impact analysis
 - Build tools

Git refresher

Similar look

Just a different file system!

DEVLIB

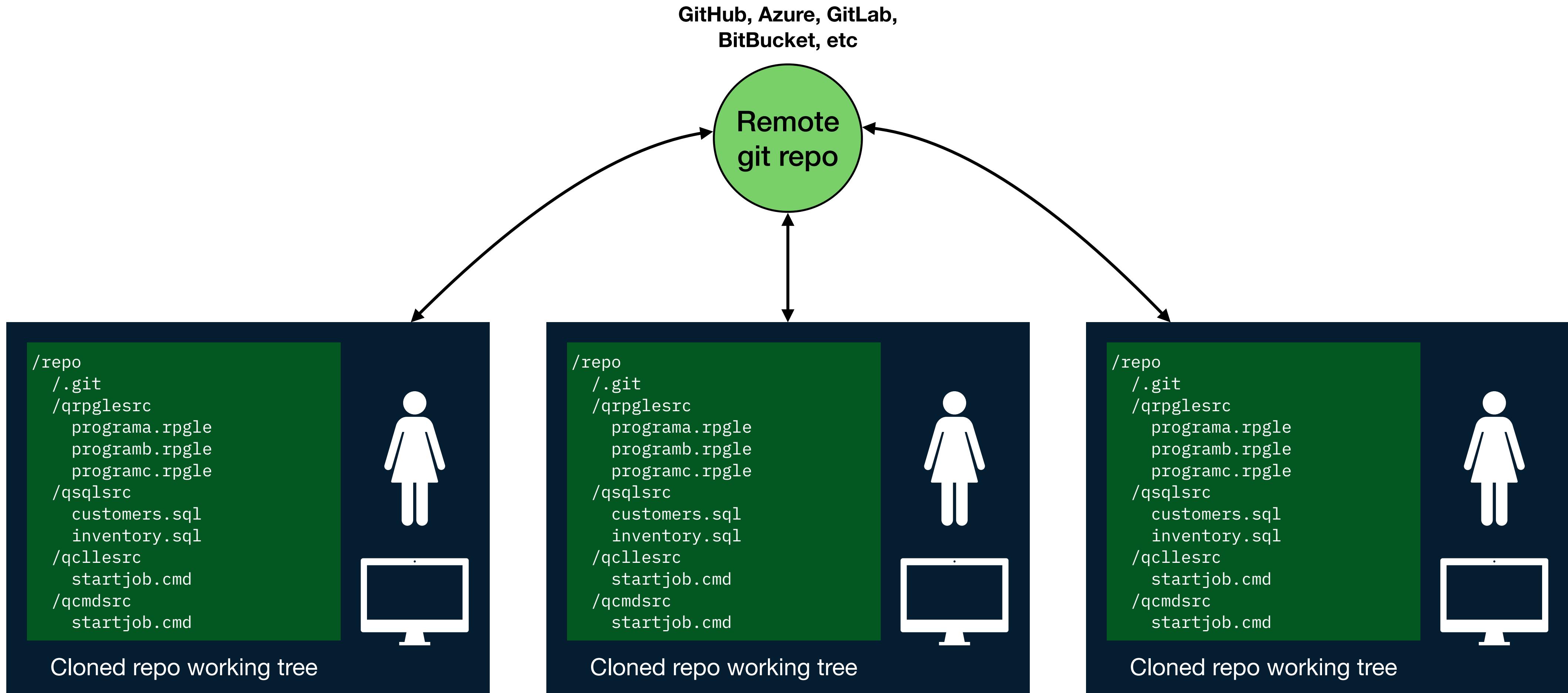
- QRPGLESRC
 - PROGRAMA.RPGL
 - PROGRAMB.RPGL
 - PROGRAMC.RPGL
- QSQLSRC
 - CUSTOMERS.SQL
 - INVENTORY.SQL
- QCLLESRC
 - STARTJOB.CLLE
- QCMDSRC
 - STARTJOB.CMD

QSYS.LIB Library

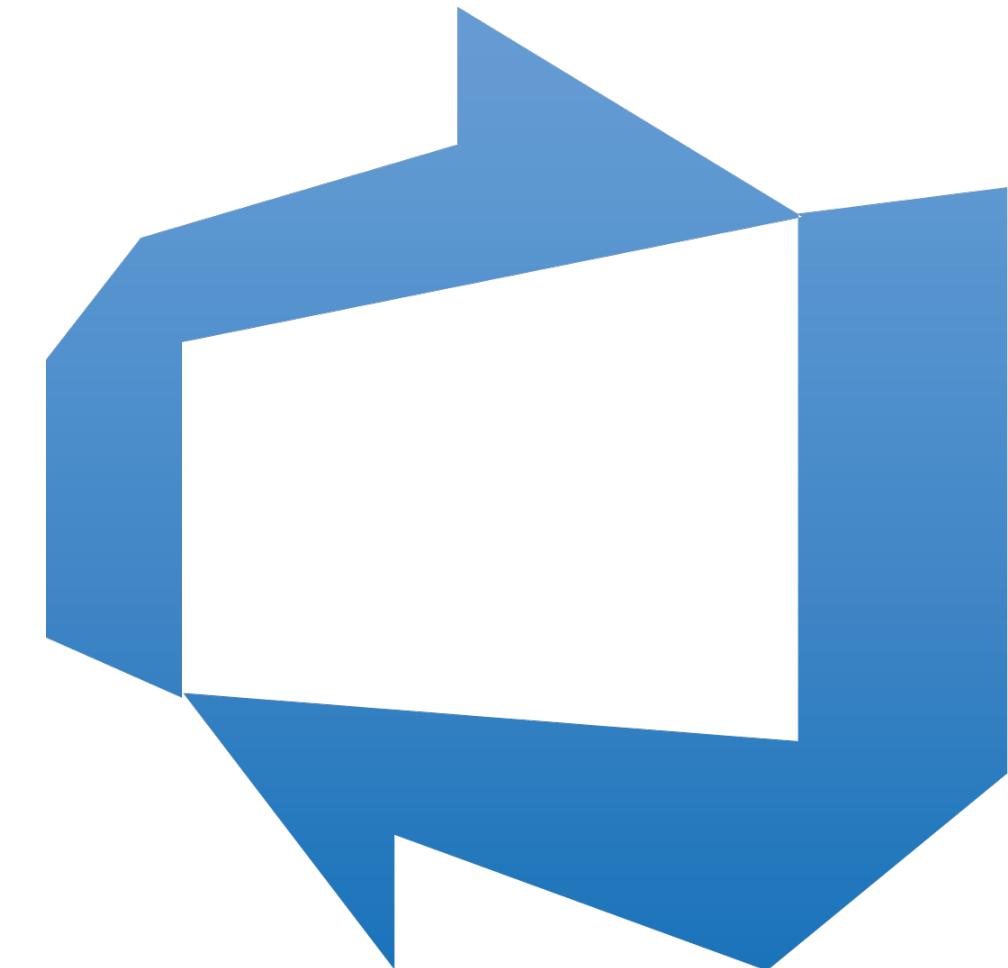
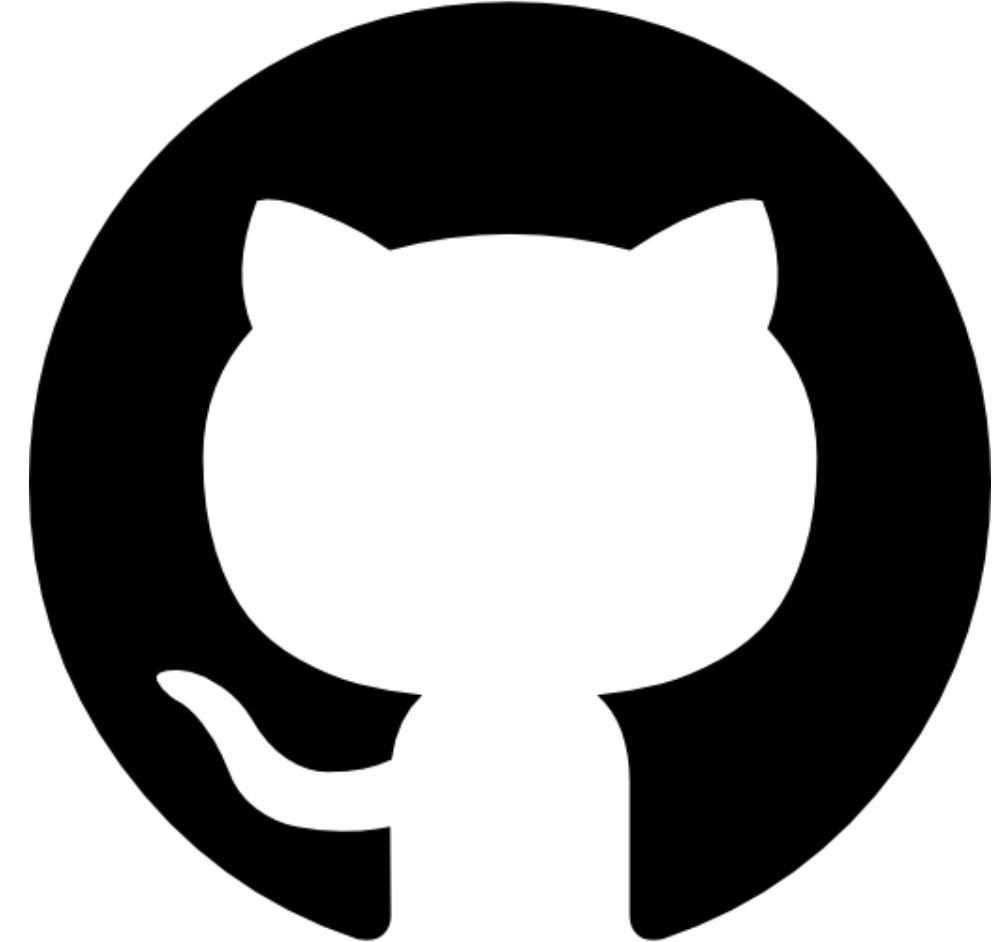
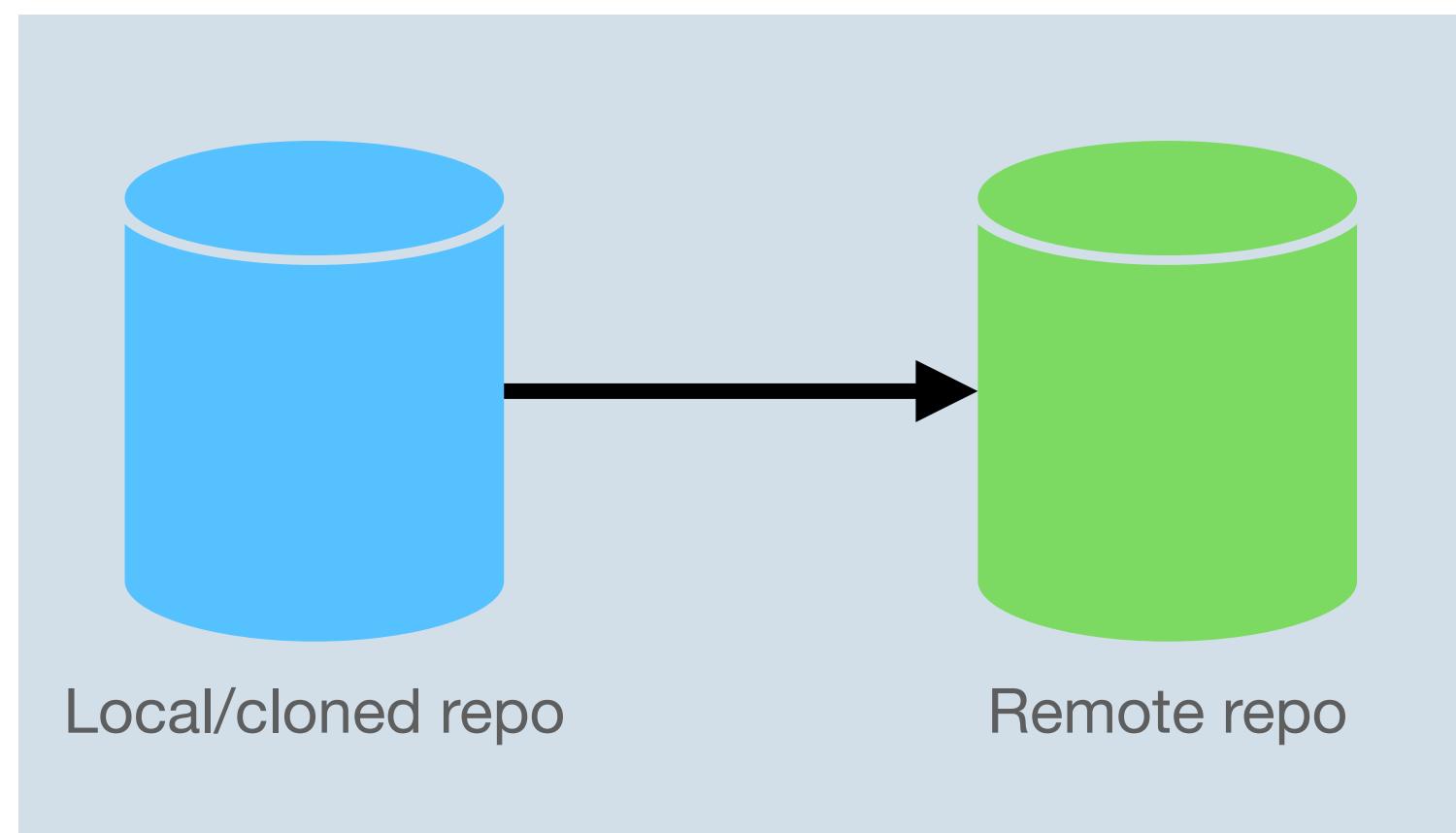
```
/repo
/.git
/qrglesrc
    programa.rpgle
    programb.rpgle
    programc.rpgle
/qsqlsrc
    customers.sql
    inventory.sql
/qcllesrc
    startjob.cmd
/qcmdsrc
    startjob.cmd
```

IFS and git repository

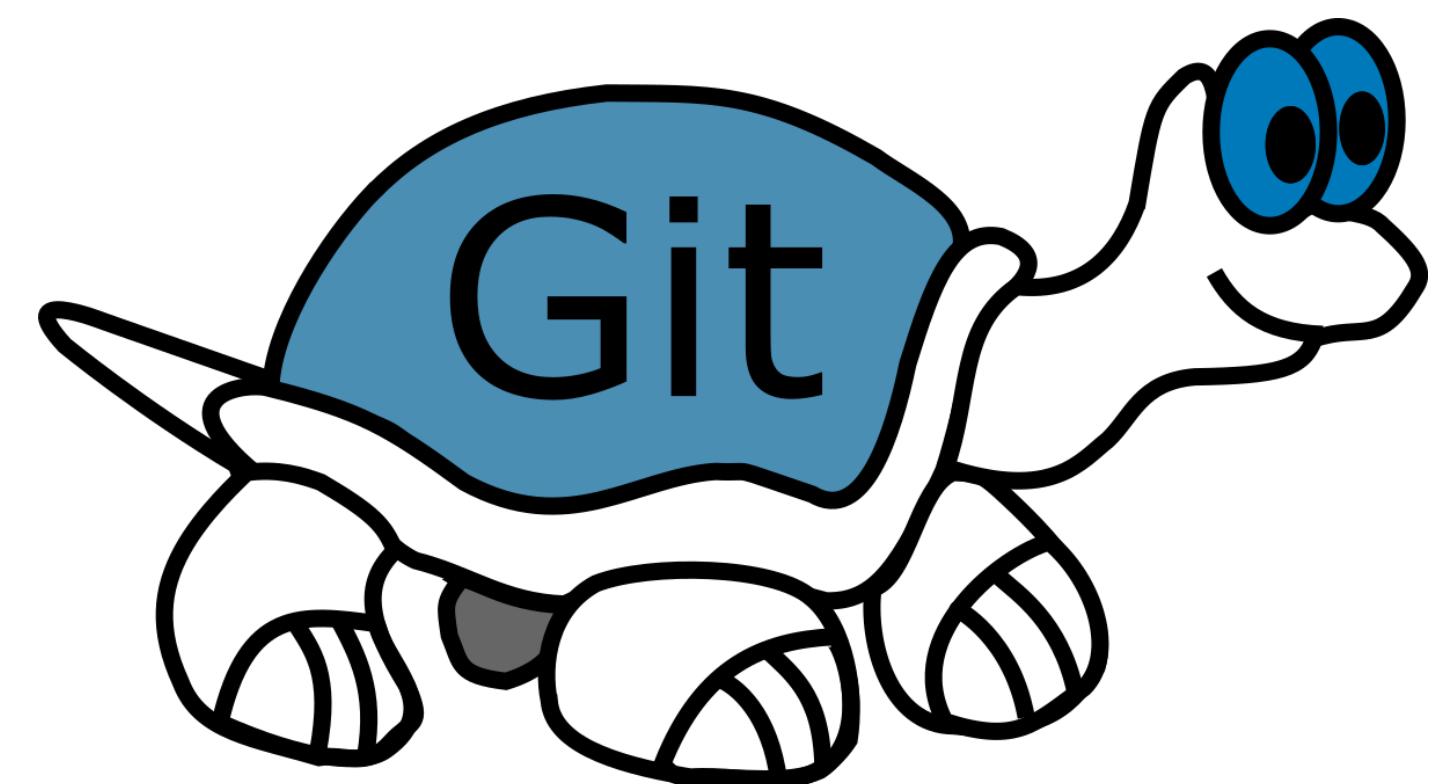
Distributed



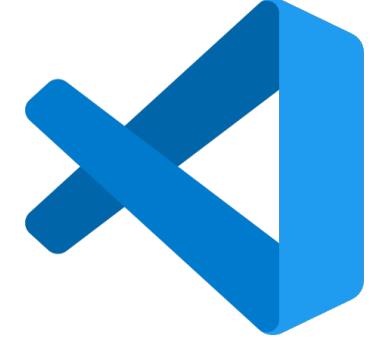
Where to host?



Lots of tools

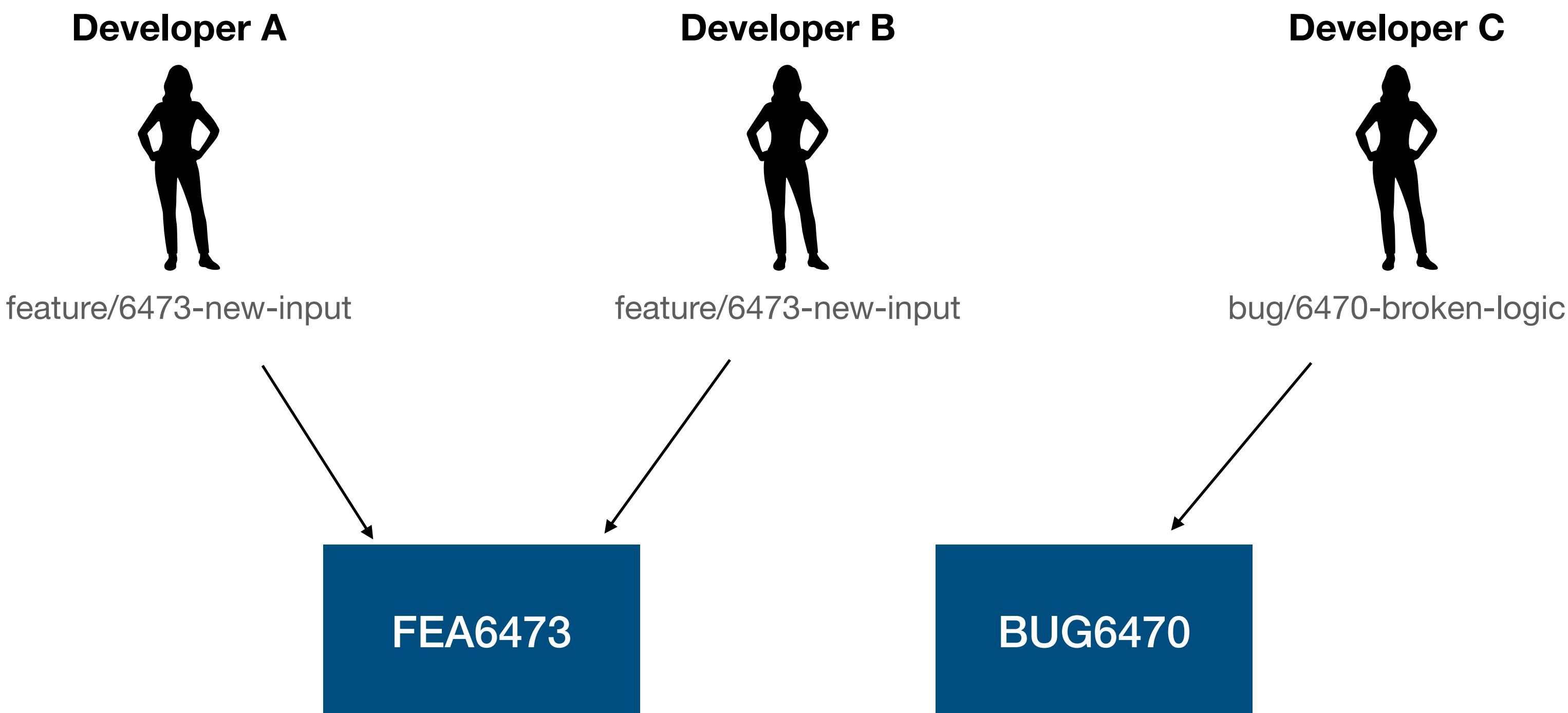


Development with git



Visual Studio Code

Code for IBM i



Local development?

Similar look

Just a different file system!

DEVLIB

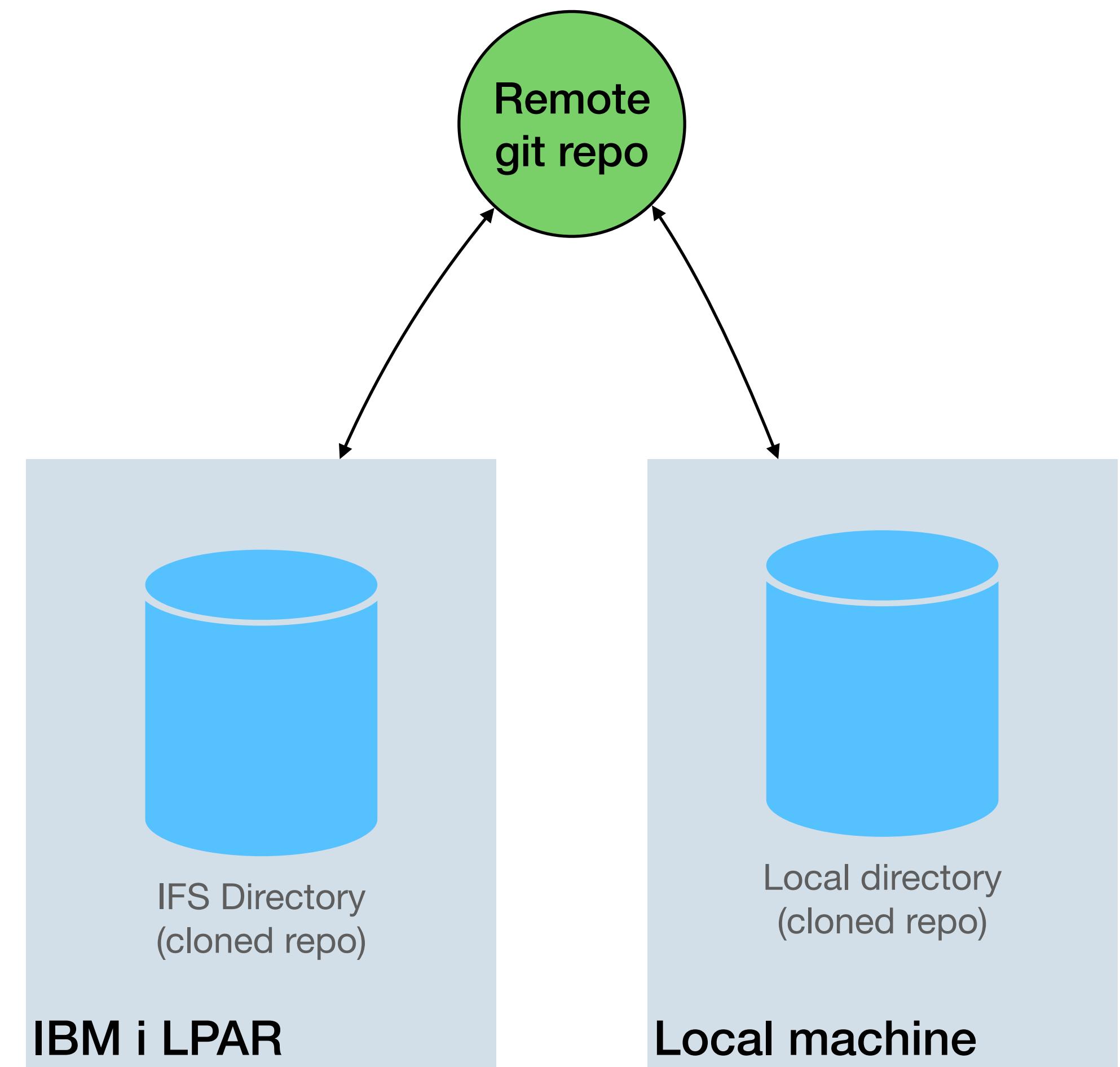
- QRPGLESRC
 - PROGRAMA.RPGL
 - PROGRAMB.RPGL
 - PROGRAMC.RPGL
- QSQLSRC
 - CUSTOMERS.SQL
 - INVENTORY.SQL
- QCLLESRC
 - STARTJOB.CLLE
- QCMDSRC
 - STARTJOB.CMD

QSYS.LIB Library

```
/repo
/.git
/qrglesrc
    programa.rpgle
    programb.rpgle
    programc.rpgle
/qsqlsrc
    customers.sql
    inventory.sql
/qcllesrc
    startjob.cmd
/qcmdsrc
    startjob.cmd
```

IFS and git repository

Where do you write code?



Git in the IFS

ics — zsh — 95x24

```
[barry@Liams-MBP ics % git status
On branch feature/wmcpa2
Your branch is up to date with 'origin/feature/wmcpa2'.

Untracked files:
  (use "git add <file>..." to include in what will be committed)
    qrpglesrc/test.rpgle

nothing added to commit but untracked files present (use "git add" to track)
barry@Liams-MBP ics % ]
```

ics — less - git log — 95x24

```
commit 782a5d66eb137b57e35435e17435ad2d7c0b84cf (HEAD -> feature/wmcpa2, origin/feature/wmcpa2)
Author: worksofliam <mrliamallan@live.co.uk>
Date:   Thu Apr 11 18:25:56 2024 -0400

    Change the text for a broken ID

    Signed-off-by: worksofliam <mrliamallan@live.co.uk>

commit eaee79241c50d13d4372b49e0a99a4015815e947 (origin/main, origin/feature/coolness, origin/H
EAD, main, feature/coolness)
Merge: e4bc22a 08f739f
Author: barry <3708366+worksofliam@users.noreply.github.com>
Date:   Tue Jan 23 15:03:32 2024 -0500

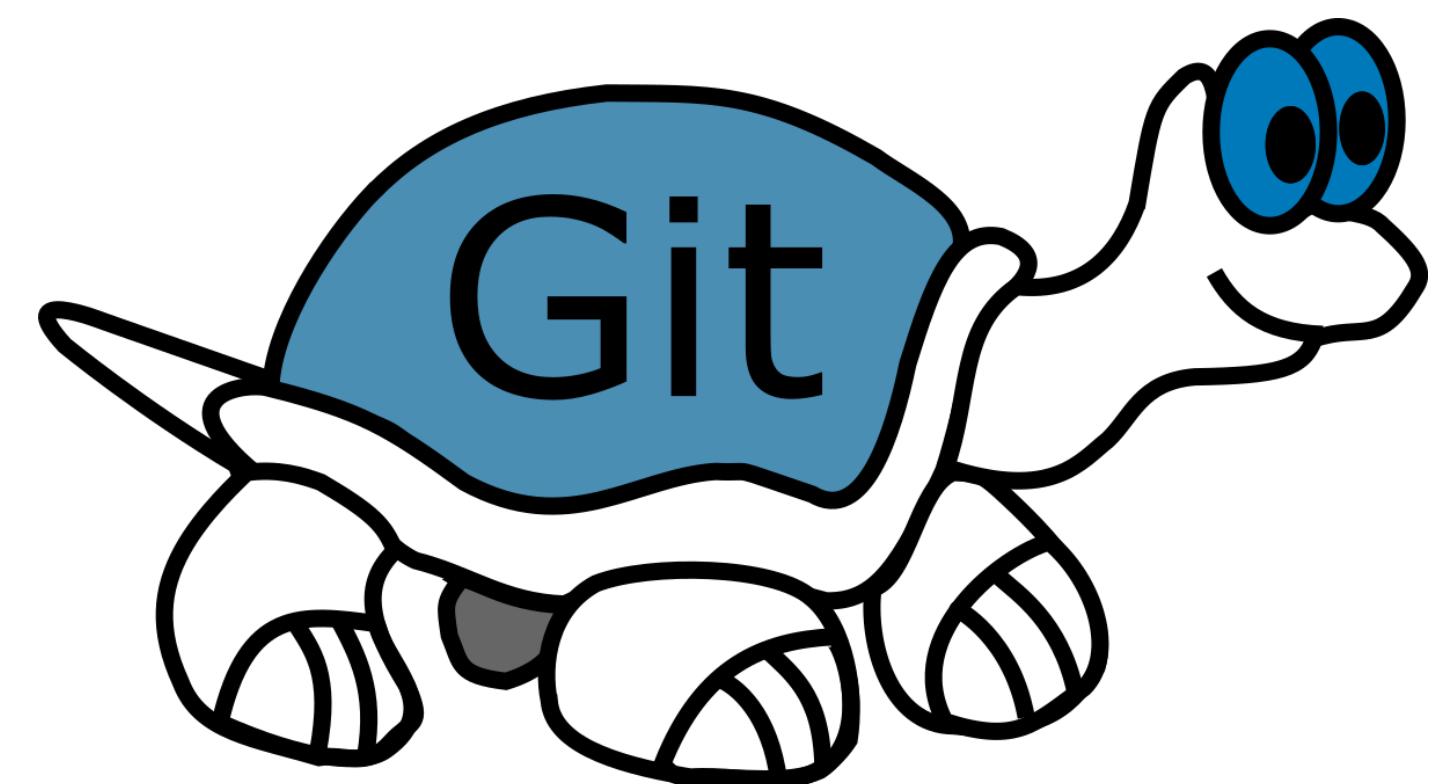
    Merge pull request #35 from IBM/feature/new_dept_employee

    Create employee from department screen

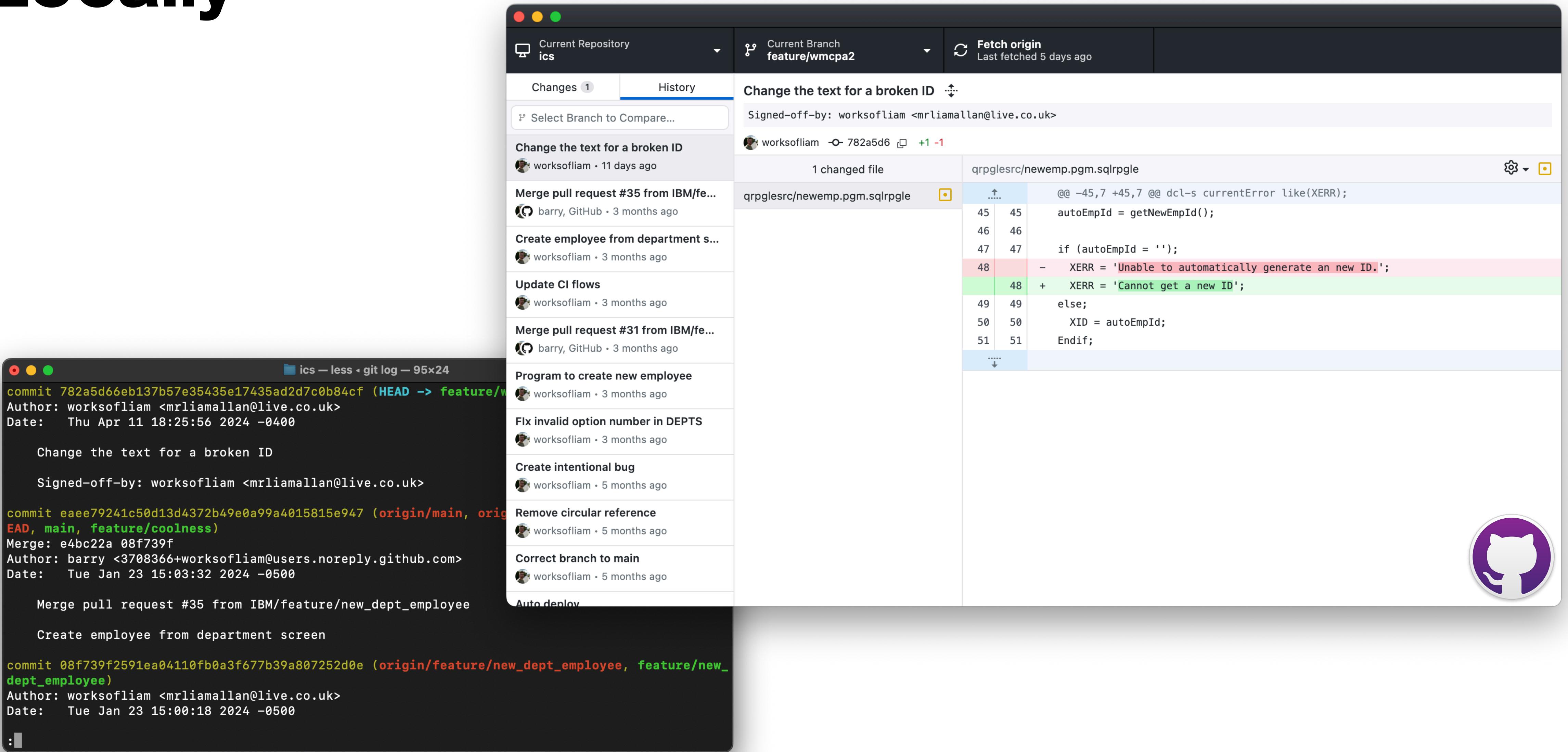
commit 08f739f2591ea04110fb0a3f677b39a807252d0e (origin/feature/new_dept_employee, feature/new_
dept_employee)
Author: worksofliam <mrliamallan@live.co.uk>
Date:   Tue Jan 23 15:00:18 2024 -0500

:]
```

Lots of tools



Locally



The image shows a dual-screen setup. The top screen displays the GitHub desktop application interface. The bottom screen shows a terminal window running the command `git log`.

GitHub Desktop Application (Top Screen):

- Current Repository:** ics
- Current Branch:** feature/wmcpa2
- Last fetched:** 5 days ago
- Changes:** 1 (selected)
- History:** 1 changed file
- Signed-off-by:** worksofliam <mrliamallan@live.co.uk>
- Pull Request:** Change the text for a broken ID (worksofliam · 11 days ago)
- Merge pull request #35 from IBM/fe...** (barry, GitHub · 3 months ago)
- Create employee from department s...** (worksofliam · 3 months ago)
- Update CI flows** (worksofliam · 3 months ago)
- Merge pull request #31 from IBM/fe...** (barry, GitHub · 3 months ago)
- Program to create new employee** (worksofliam · 3 months ago)
- Fix invalid option number in DEPTS** (worksofliam · 3 months ago)
- Create intentional bug** (worksofliam · 5 months ago)
- Remove circular reference** (worksofliam · 5 months ago)
- Correct branch to main** (worksofliam · 5 months ago)
- Auto deploy**

Terminal Window (Bottom Screen):

```

ics - less - git log - 95x24

commit 782a5d66eb137b57e35435e17435ad2d7c0b84cf (HEAD -> feature/wmcpa2)
Author: worksofliam <mrliamallan@live.co.uk>
Date: Thu Apr 11 18:25:56 2024 -0400

    Change the text for a broken ID

    Signed-off-by: worksofliam <mrliamallan@live.co.uk>

commit eaee79241c50d13d4372b49e0a99a4015815e947 (origin/main, origin/feature/coolness)
Merge: e4bc22a 08f739f
Author: barry <3708366+worksofliam@users.noreply.github.com>
Date: Tue Jan 23 15:03:32 2024 -0500

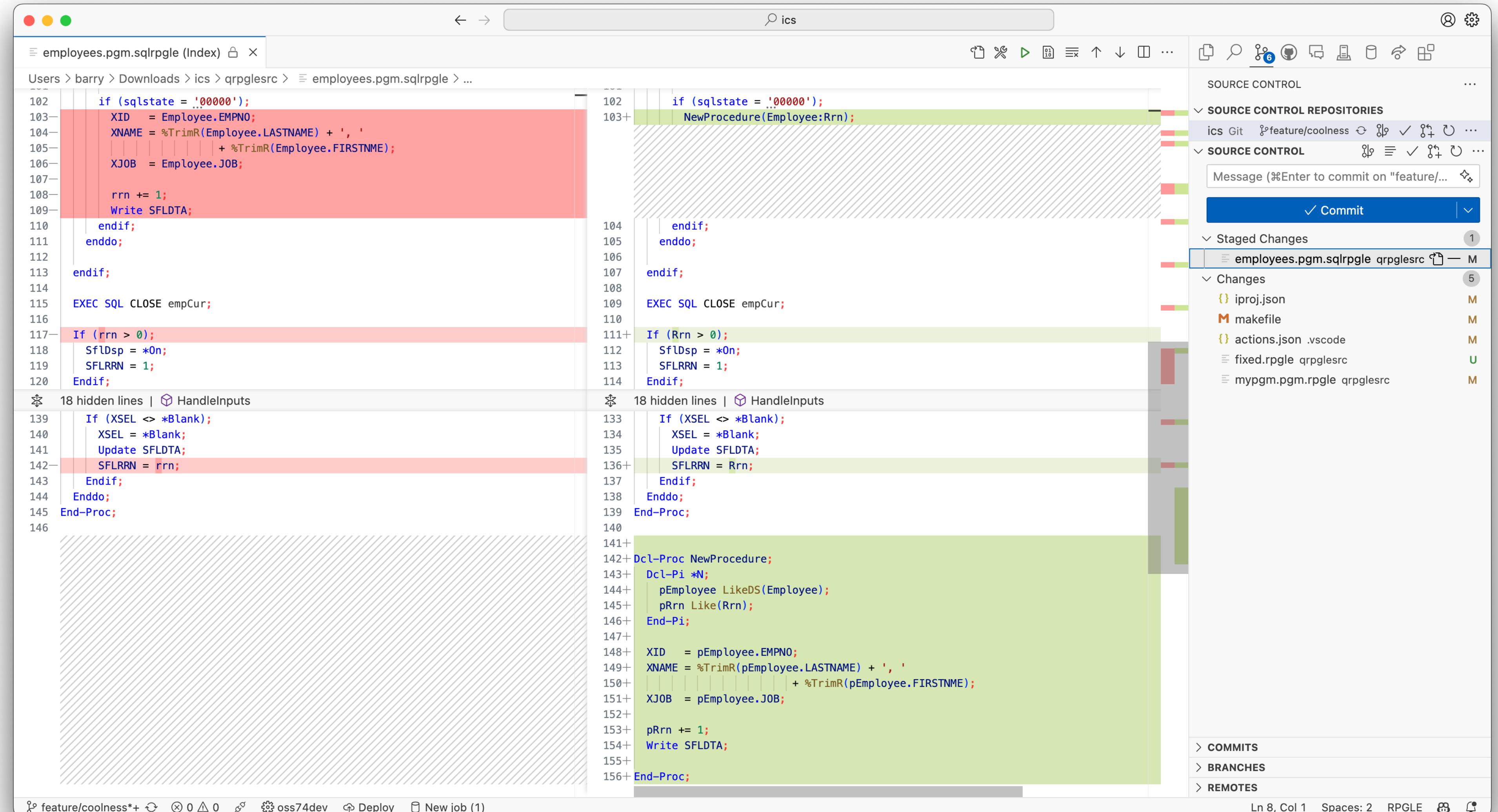
    Merge pull request #35 from IBM/feature/new_dept_employee

Create employee from department screen

commit 08f739f2591ea04110fb0a3f677b39a807252d0e (origin/feature/new_dept_employee, feature/new_dept_employee)
Author: worksofliam <mrliamallan@live.co.uk>
Date: Tue Jan 23 15:00:18 2024 -0500

```

Locally



The screenshot shows the IBM Rational Developer for RPG IDE interface. The main area displays two side-by-side code editors for the file `employees.pgm.sqlrpgle`. The left editor shows the original code, and the right editor shows the modified code with changes highlighted in green and red. The code is an RPGLE program that processes employee data.

```

102 if (sqlstate = '00000');
103   XID = Employee.EMPNO;
104   XNAME = %TrimR(Employee.LASTNAME) + ', '
105   |           + %TrimR(Employee.FIRSTNAME);
106   XJOB = Employee.JOB;
107
108   rrn += 1;
109   Write SFLDTA;
110
111   endif;
112   enddo;
113
114
115 EXEC SQL CLOSE empCur;
116
117 If (rrn > 0);
118   SflDsp = *On;
119   SFLRRN = 1;
120 Endif;
121
122 18 hidden lines | HandleInputs
123
124 If (XSEL <> *Blank);
125   XSEL = *Blank;
126   Update SFLDTA;
127   SFLRRN = rrn;
128
129 Endif;
130 Enddo;
131
132 End-Proc;
133
134
135
136 Dcl-Proc NewProcedure;
137   Dcl-Pi *N;
138     pEmployee LikeDS(Employee);
139     pRrn Like(Rrn);
140   End-Pi;
141
142   XID = pEmployee.EMPNO;
143   XNAME = %TrimR(pEmployee.LASTNAME) + ', '
144   |           + %TrimR(pEmployee.FIRSTNAME);
145   XJOB = pEmployee.JOB;
146
147   pRrn += 1;
148   Write SFLDTA;
149
150
151 End-Proc;

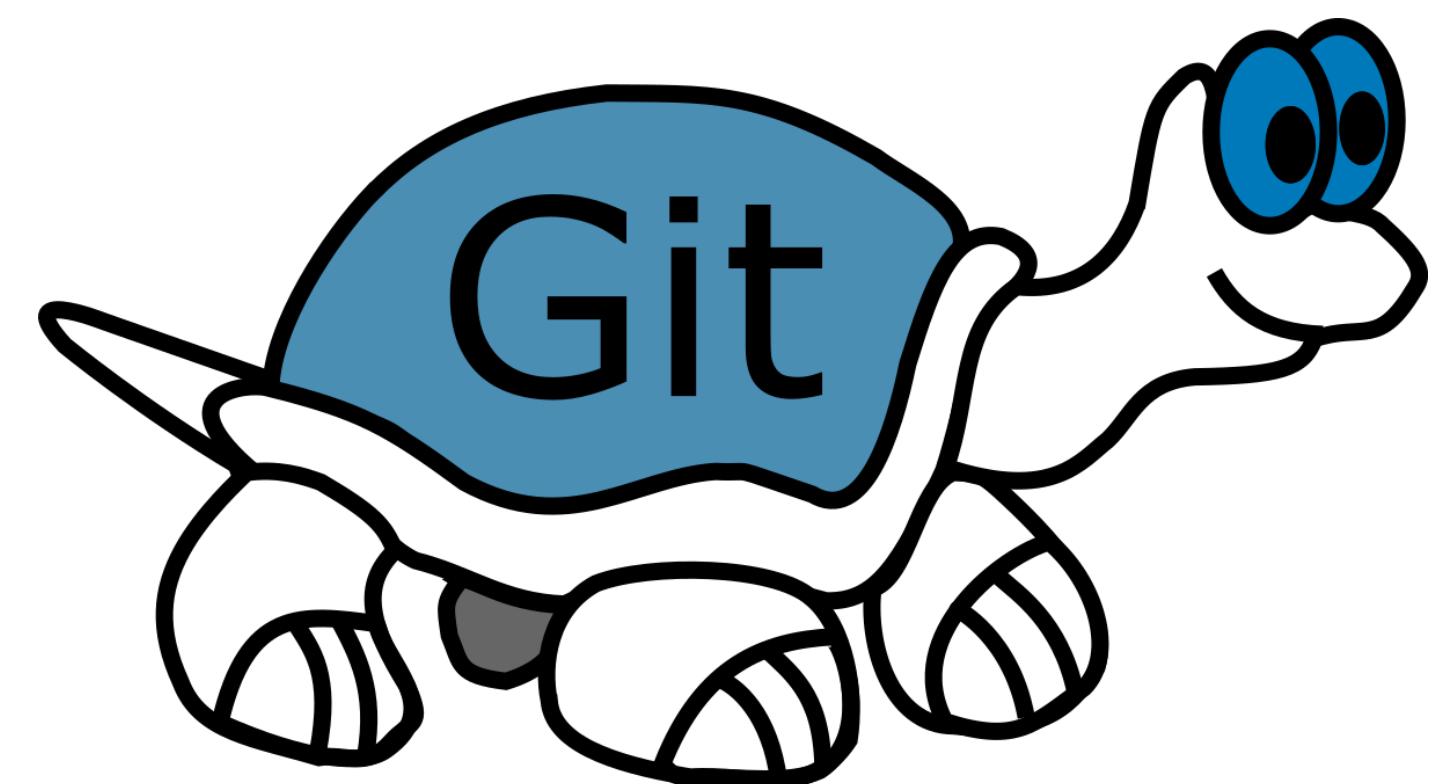
```

The right editor shows the same code with several changes made:

- Line 103: Added `NewProcedure(Employee:Rrn);`
- Line 104: Added `endif;`
- Line 105: Added `enddo;`
- Line 107: Added `endif;`
- Line 109: Commented out `EXEC SQL CLOSE empCur;`
- Line 111: Added `If (Rrn > 0);`
- Line 112: Added `SflDsp = *On;`
- Line 113: Added `SFLRRN = 1;`
- Line 114: Added `Endif;`
- Line 133: Added `If (XSEL <> *Blank);`
- Line 134: Added `XSEL = *Blank;`
- Line 135: Added `Update SFLDTA;`
- Line 136: Added `SFLRRN = Rrn;`
- Line 137: Added `Endif;`
- Line 138: Added `Enddo;`
- Line 139: Added `End-Proc;`
- Line 142: Added `Dcl-Proc NewProcedure;`
- Line 143: Added `Dcl-Pi *N;`
- Line 144: Added `pEmployee LikeDS(Employee);`
- Line 145: Added `pRrn Like(Rrn);`
- Line 146: Added `End-Pi;`
- Line 148: Added `XID = pEmployee.EMPNO;`
- Line 149: Added `XNAME = %TrimR(pEmployee.LASTNAME) + ', '`
- Line 150: Added `| + %TrimR(pEmployee.FIRSTNAME);`
- Line 151: Added `XJOB = pEmployee.JOB;`
- Line 153: Added `pRrn += 1;`
- Line 154: Added `Write SFLDTA;`
- Line 155: Commented out `End-Proc;`

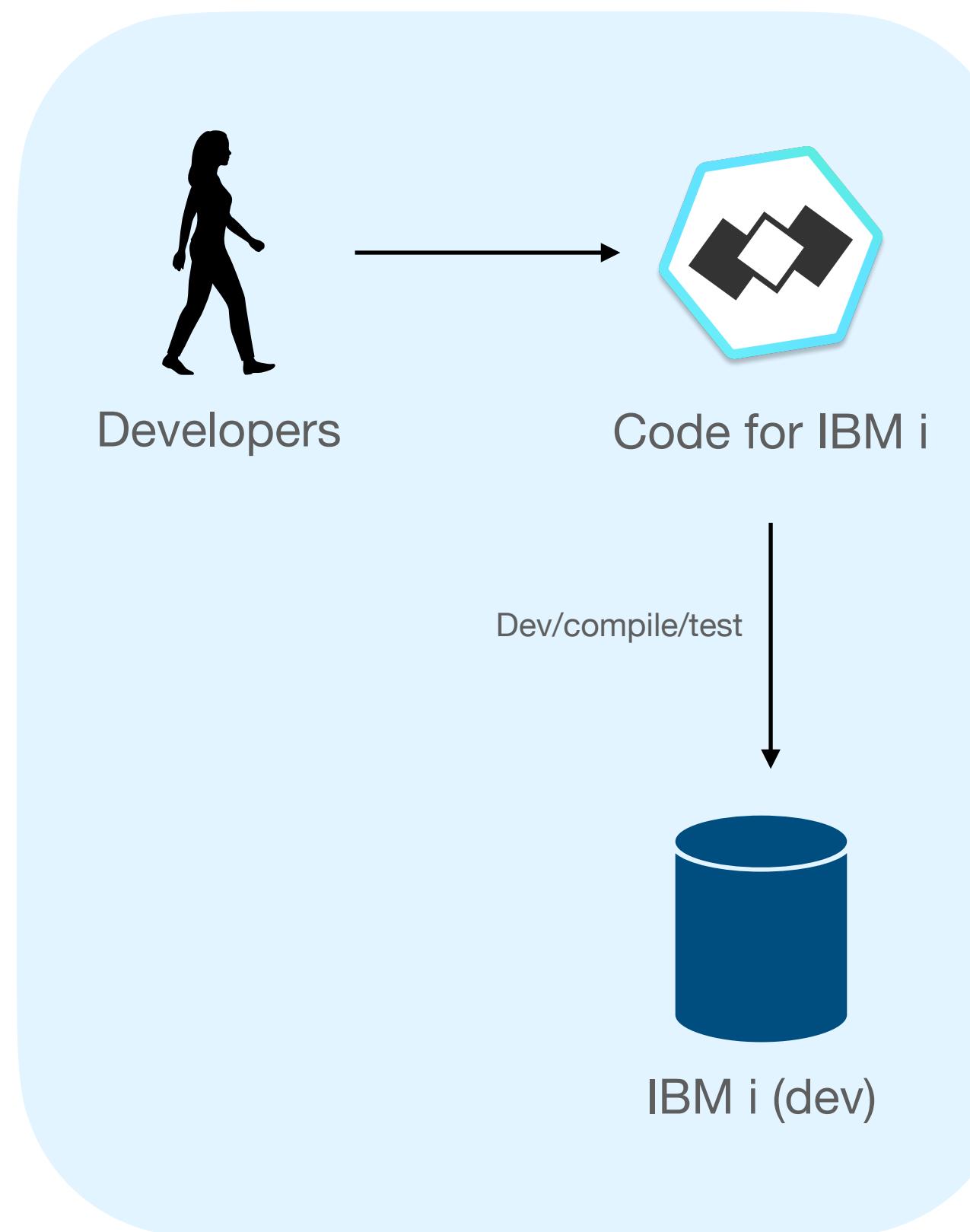
The right pane of the interface includes a "SOURCE CONTROL" panel with a commit message input field containing "Message (#Enter to commit on 'feature/coolness'...)". A "Commit" button is visible, along with a "Staged Changes" section showing the modified file `employees.pgm.sqlrpgle` with a status of "M" (Modified). Other files listed include `iproj.json`, `makefile`, `actions.json .vscode`, `fixed.rpgle qrglesrc`, and `mypgm.pgm.rpgle qrglesrc`.

Lots of tools



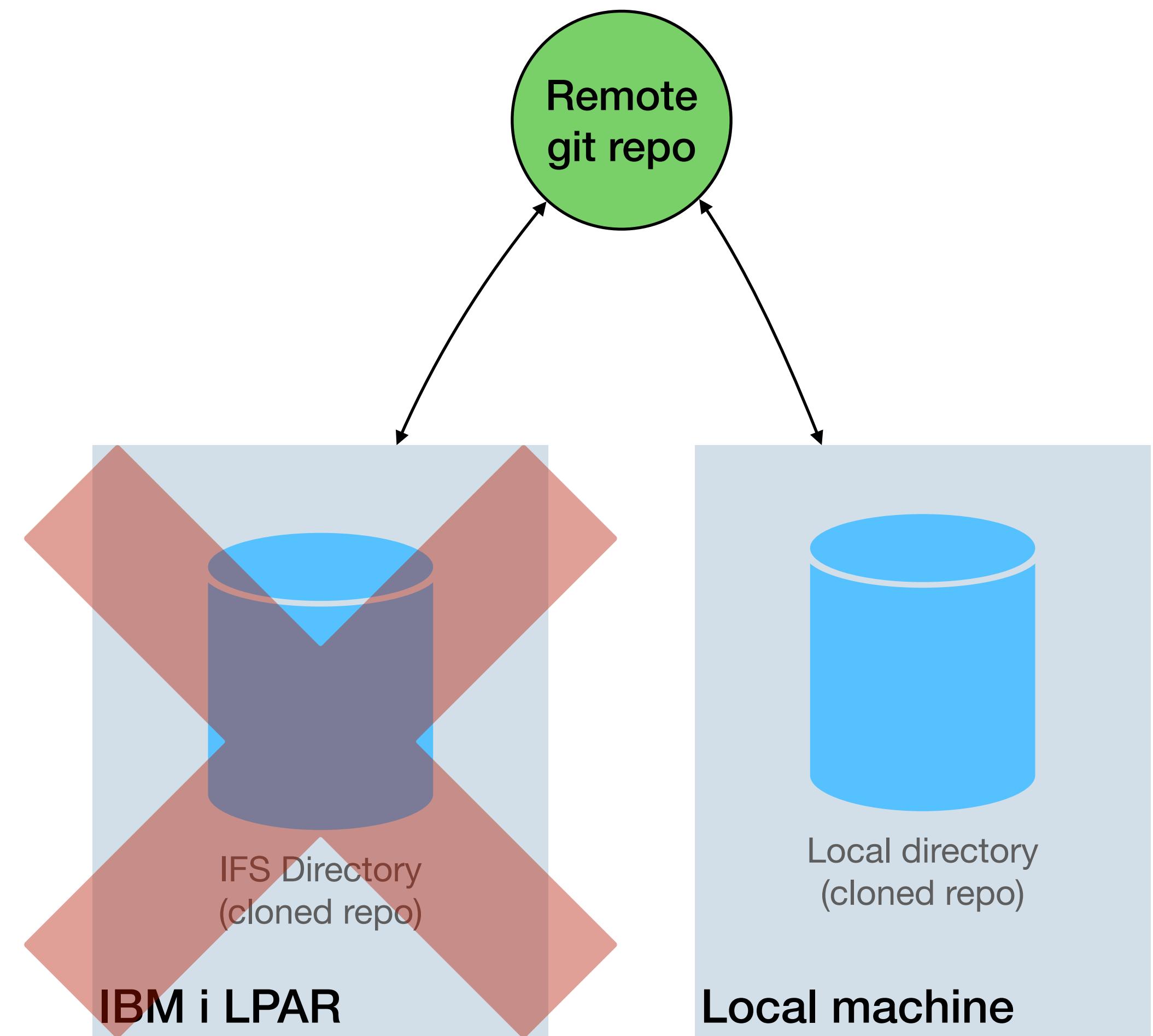
Visual Studio Code

Development



- First class git support
- IBM i integration via extensions
- Access to hundreds of git tools
- Integrates with vendors or self-managed tools
- RPGLE, COBOL, CL, SQL, and more

Where do you write code?



Compilers

Streamfile support

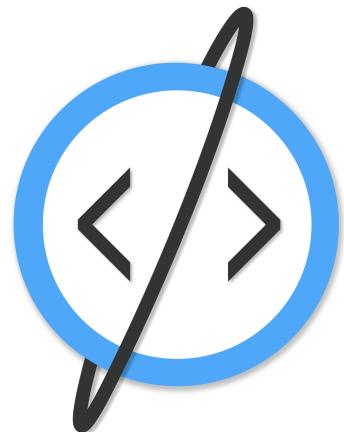
Command	Supports compiling from IFS?
CRTBNDRPG / CRTRPGMOD	SRCSTMF(path)
CRTSQLRPGI	SRCSTMF(path)
CRTSRVPGM	SRCSTMF(path)
CRTBNDCL / CRTCLMOD	SRCSTMF(path)
CRTDSPF	No
CRTPF / CRTLTF	No
RUNSQLSTM	SRCSTMF(path)
CRTBNDC / CRTCMOD	SRCSTMF(path)
CRTBNDCBL / CRTCBLMOD	SRCSTMF(path)

/COPY and /INCLUDE

- Both /COPY and /INCLUDE work for both file systems
 - QSYS
 - IFS
- Can also work across file systems
 - Copy in IFS source from within source member
 - Vice-versa

```
/INCLUDE QRPGLEREF,REF001  
/INCLUDE `qrpgleref/ref001.rpgle'
```

Include syntax



Object Browser

Shows all objects that would exist based on source code in the repository.

Object Dependencies

Nodes below the objects indicate that the parent depends on them.

Affected Objects

Source Orbit hooks right into git can show what objects would be affected (and might need to be rebuilt) based on the working and staged changes.

[Extension Development Host] BBSADGCR.pgm.rpgle — BBS400

```

src > BBSADGCR.pgm.rpgle > ...
1   You, yesterday | 2 authors (Dave Asta and others)
2   H/TITLE Administration - General Configuration
3   H COPYRIGHT('© 2020 David Asta under MIT License')
4   * SYSTEM : V4R5
5   * PROGRAMMER : David Asta
6   * DATE-WRITTEN: 12/NOV/2020
7
8   * This program allows an Administrator user to display/change the
9   * general Configuration values of the BBS stored in PCONFIG
10  ****
11  /copy 'src/CBKOPTIMIZ.rpgleinc'
12  ****
13  * INDICATORS USED:
14  * 80 - *ON turns DSPATR(PR), which protects fields from being changed
15  * 81 - CBKPCFGRE A CHAIN Not Found
16  ****
17  You, yesterday | 2 authors (Dave Asta and others)
18  FBBSADGCD CF E WORKSTN
19  You, yesterday | 2 authors (Dave Asta and others)
20  FPCONFIG UF E K DISK
21  ****
22  * Data structures
23  /copy 'src/CBKDTAARA.rpgleinc'
24  * Constants
25  D cKeysDft C CONST('F10>Edit F12=Go back')
26  D cKeysEdit C CONST('F10=Confirm Changes F12=Cancel')
27  D cSavedOK C CONST('Configuration was changed successfully.')
28  D cSavedKO C CONST('There was an error while writing to PCONFIG.')
29
30  * Variables
31  /copy 'src/CBKPCFGDCL.rpgleinc'
32  D wCfgKey S 6A
33  D wShowWelcome S 1A Dave Asta, 3 years ago • Initial com
34  ****
35  C WRITE HEADER
36  C 80 EVAL KEYSLS = cKeysDft
37  C N80 EVAL KEYSLS = cKeysEdit
38  C WRITE FOOTER
39  C EXFMT BODY
40  C CLEAR MSGLIN
41  C EXSR CheckFkeys
42  ****
43  * Subroutine called automatically at startup
44  ****
45  C *INZSR BEGSR

```

Dave Asta, 3 years ago Ln 32, Col 41 Spaces: 5 UTF-8 LF RPGLE

Project Explorer

Integrated right into the IBM i Project Explorer without any additional setup required.

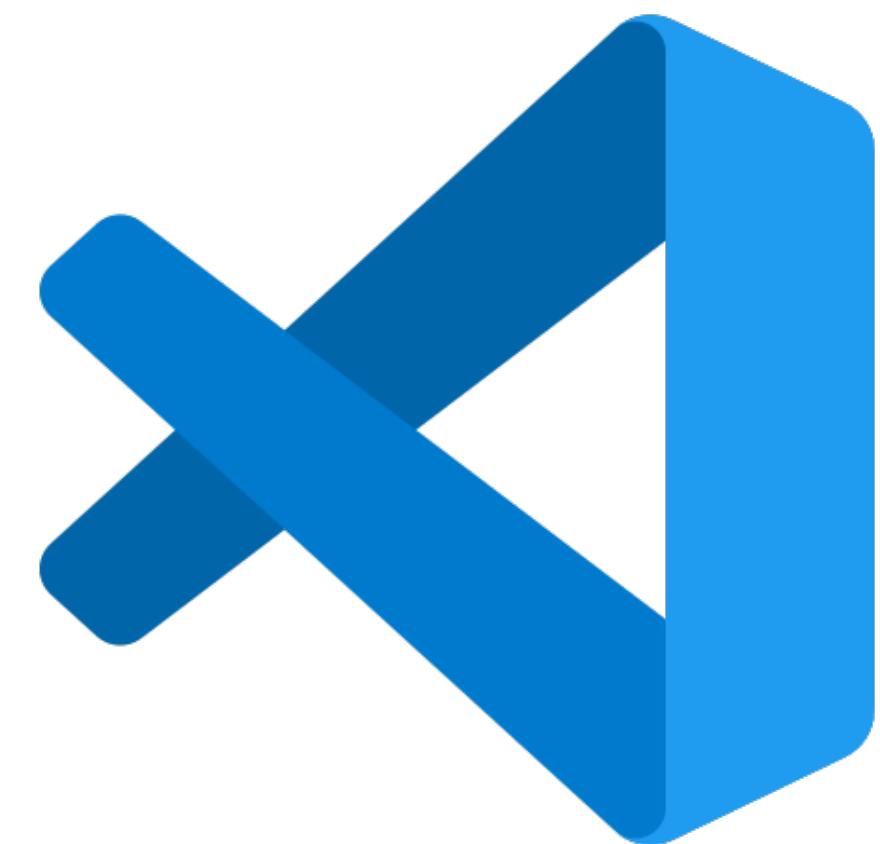
Diagnostic Messages

Source Orbit can make suggestions about source names, missing references, and more.

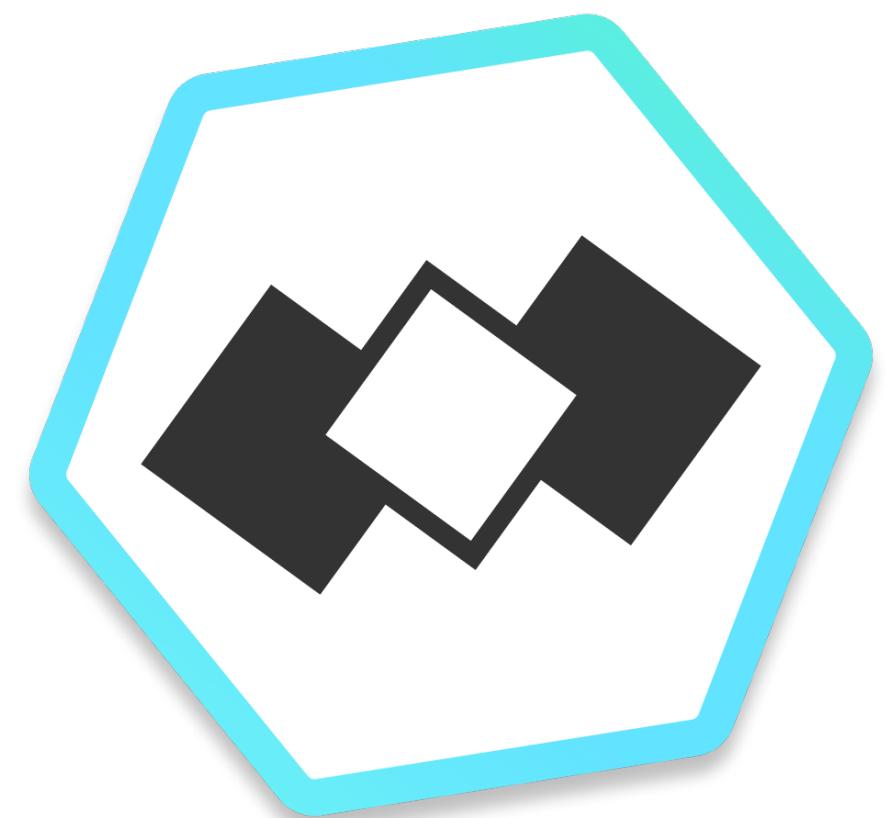
Affected Objects view

This view shows what objects would be affected based on the active editor. As you switch between sources, the view updates automatically.

Tools to take away



Visual Studio Code



Code for IBM i

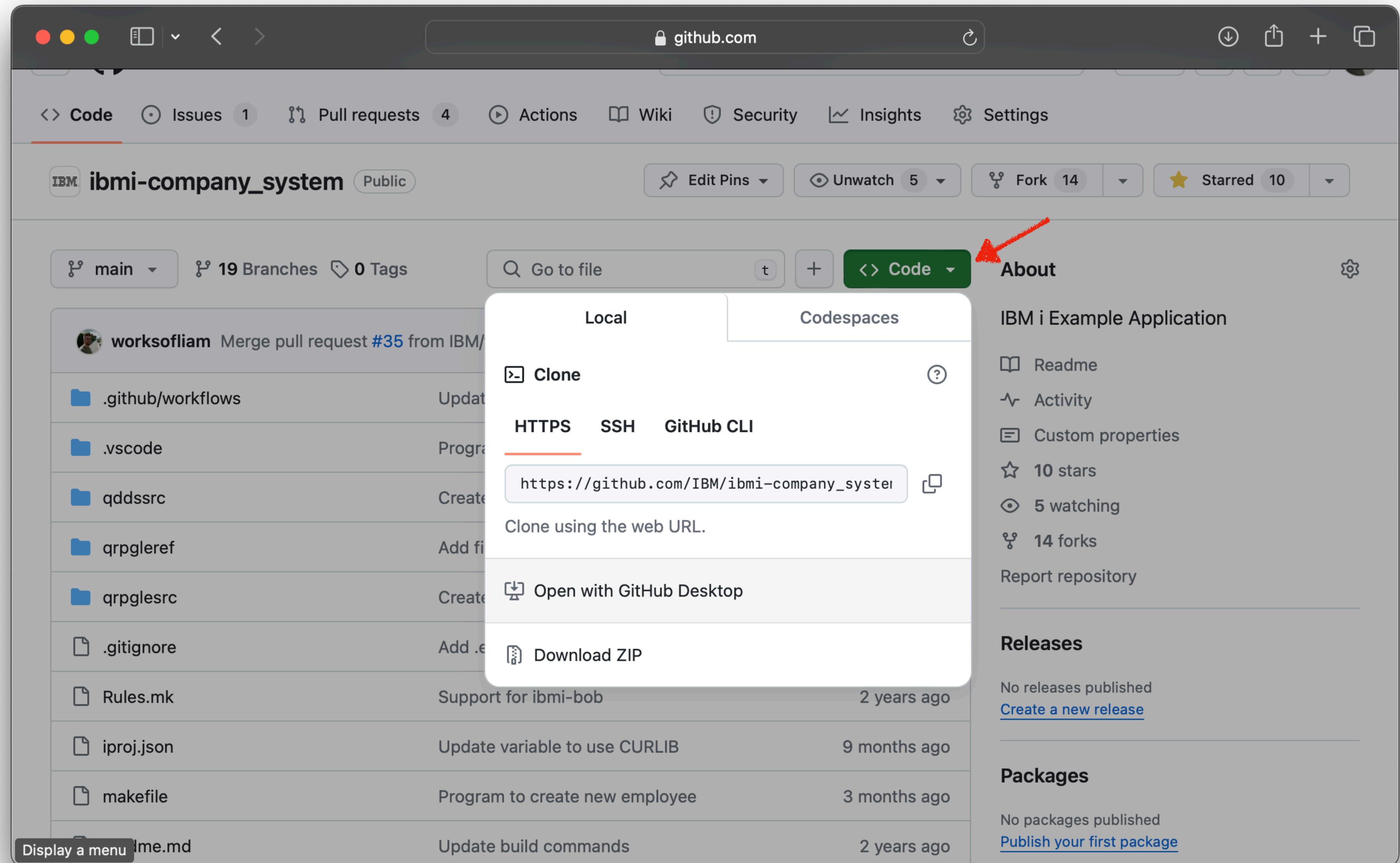


GitHub Desktop

Local development how?

New methodologies

- Cloning the repository
- Compiling from local machine
- Terms:
 - Actions
 - Deploy location
 - Deployment
 - Deploy and build



A screenshot of a GitHub repository page for the repository `ibmi-company_system`. The page shows various repository details like branches, tags, and pull requests. A context menu is open over the `Code` button in the top navigation bar. The menu is titled "Local" and includes options for "Clone" via "HTTPS", "SSH", or "GitHub CLI". It also has links to "Open with GitHub Desktop" and "Download ZIP". A red arrow points from the text "About" in the top right corner of the page to the "About" link in the menu. The "About" section on the right lists repository statistics such as 10 stars, 5 watching, and 14 forks.

ibmi-company_system Public

Code Issues Pull requests Actions Wiki Security Insights Settings

main 19 Branches 0 Tags Go to file + <> Code About

worksofliam Merge pull request #35 from IBM/

.github/workflows .vscode qddssrc qrgleref qrglesrc .gitignore Rules.mk iproj.json makefile

Support for ibmi-bob 2 years ago Update variable to use CURLIB 9 months ago Program to create new employee 3 months ago Update build commands 2 years ago

Display a menu

Local Codespaces

Clone

HTTPS SSH GitHub CLI

https://github.com/IBM/ibmi-company_system

Clone using the web URL.

Open with GitHub Desktop

Download ZIP

About

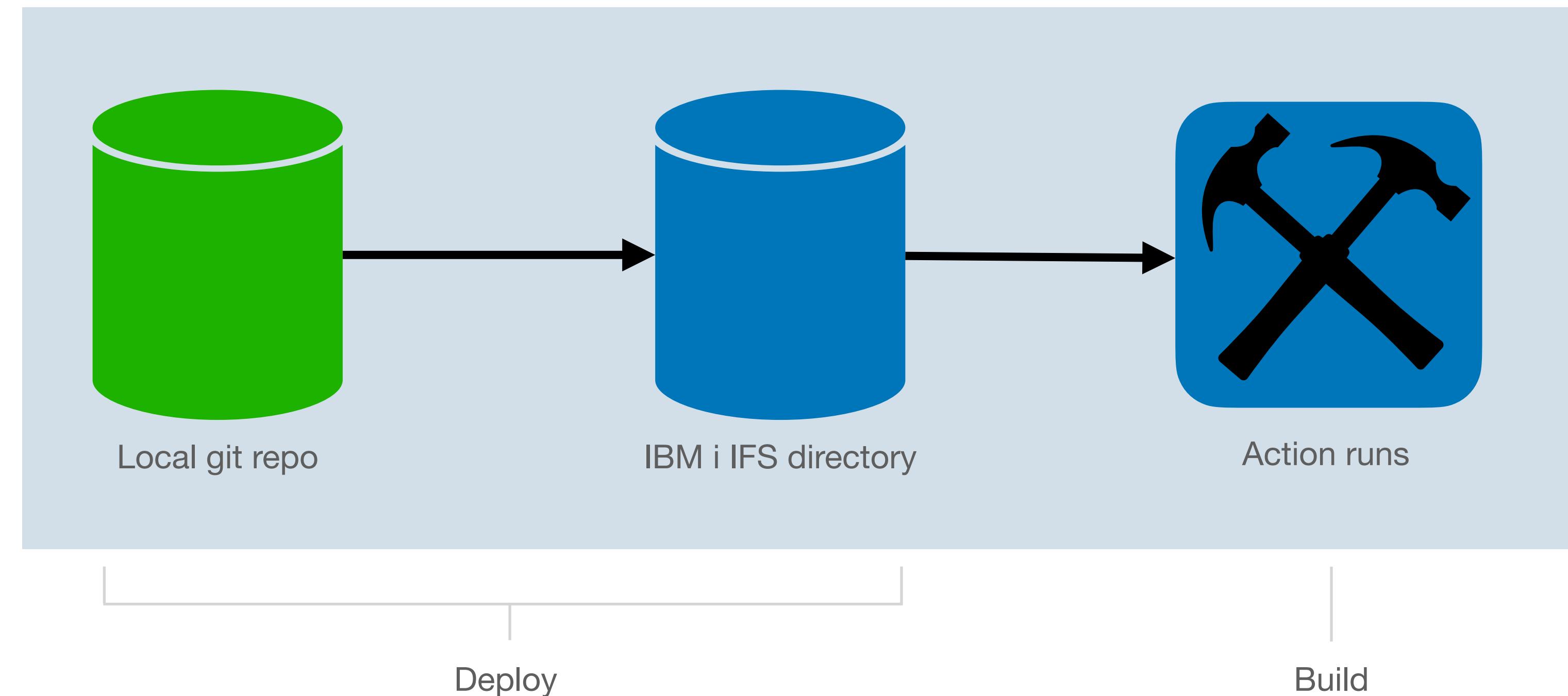
IBM i Example Application

Readme Activity Custom properties 10 stars 5 watching 14 forks Report repository

Releases No releases published Create a new release

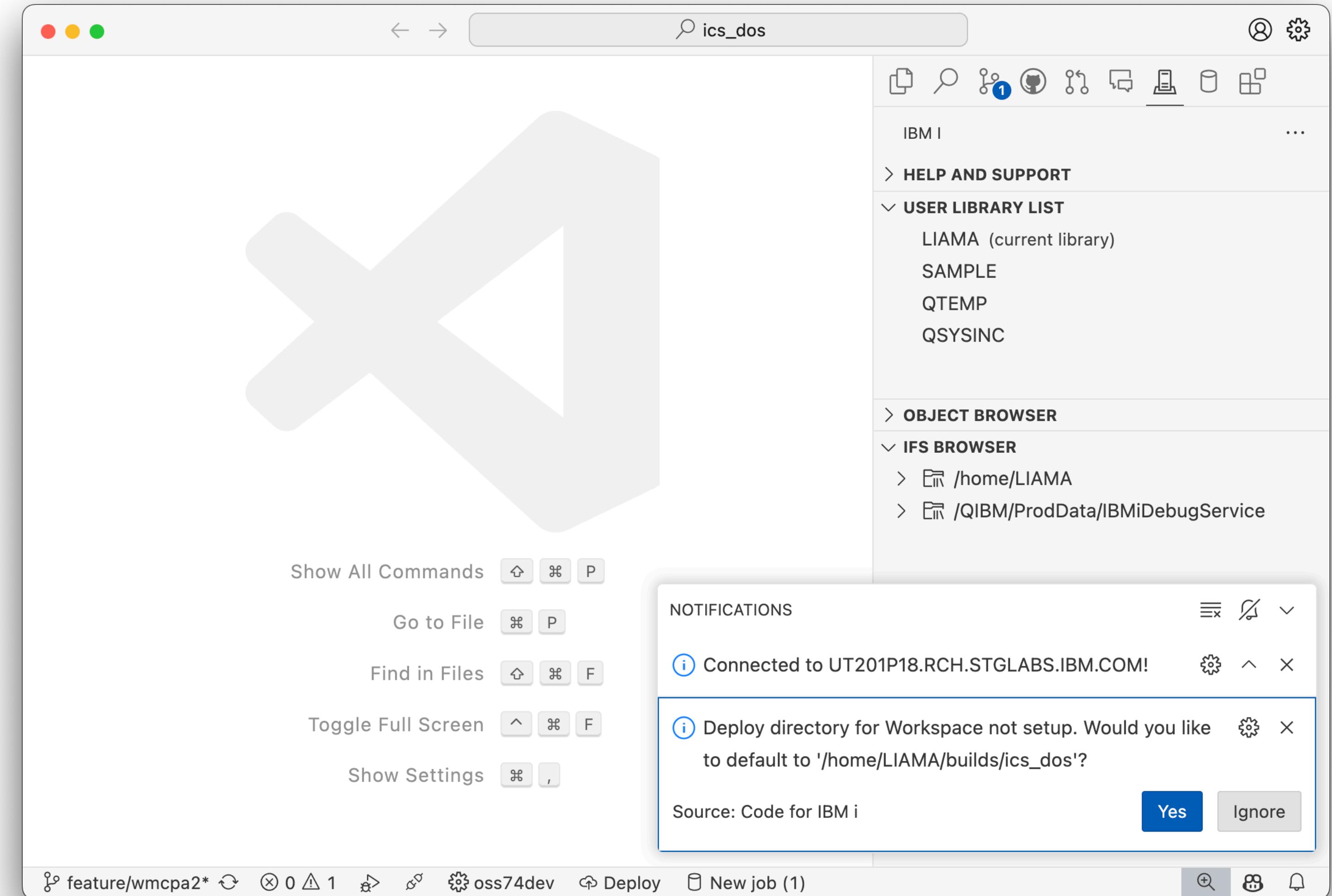
Packages No packages published Publish your first package

Deploy and build



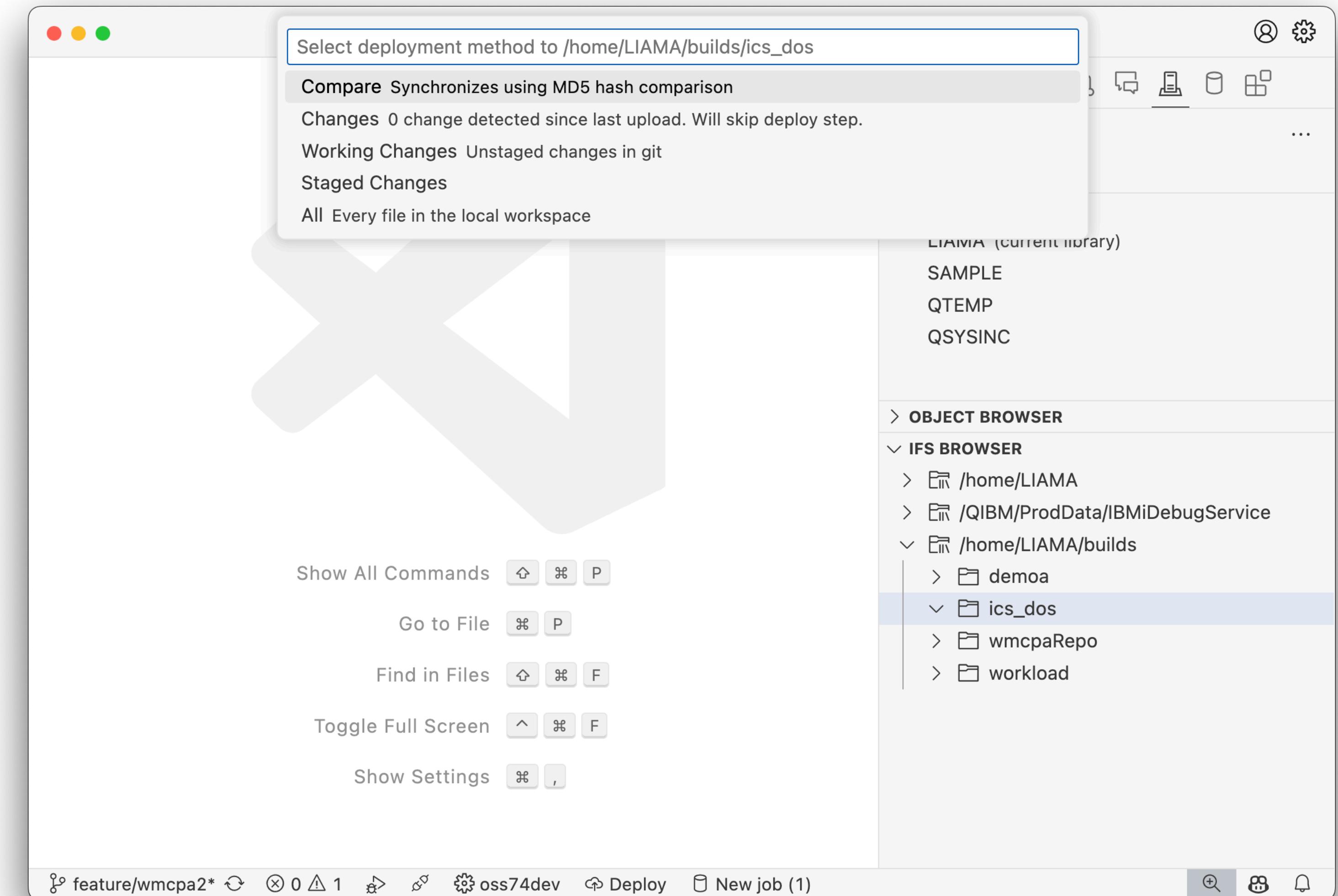
Deploy location

- Typically set only once
- Where sources get uploaded to get compiled
- Each developer gets a unique location
- Each repos get a unique location



Deploy

- The process of moving files to the deploy location
- Different options to determine how files get uploaded
- Typically 'Compare' is the safest



Actions

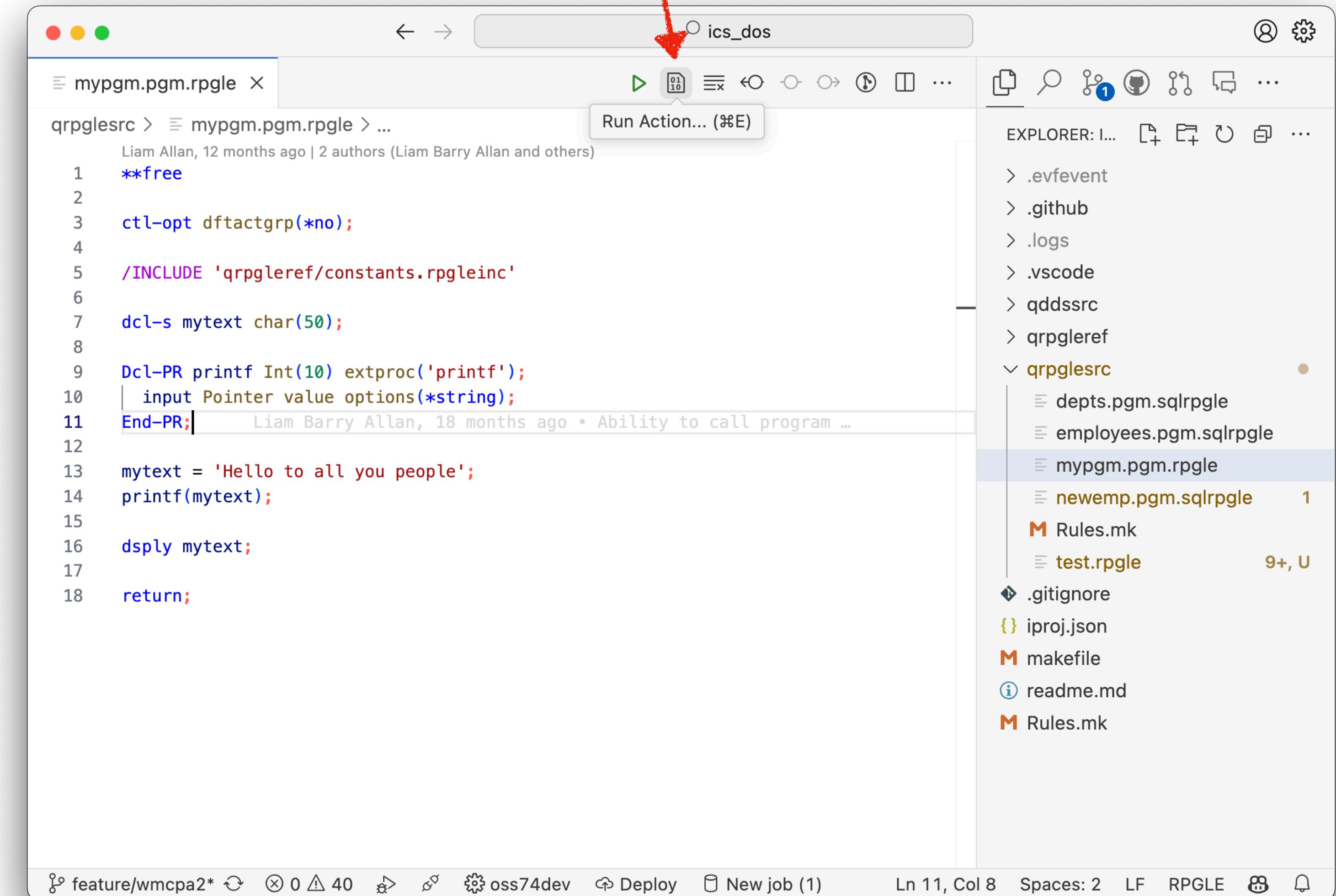
- JSON file inside of repo
 - Lists all compile commands
 - Checked into git
 - Common commands used by all

```
.vscode > { } actions.json > {} 0
You, 3 months ago | 4 authors (Liam Barry Allan and others)
1 [ 
2 {
3     "name": "Compile with CRTBNDRPG 🚧",
4         "command": "CRTBNDRPG PGM(&CURLIB/&NAME) SRCSTMF('&RELATIVEPATH') OPTION(*EVENTF) DBGVIEW(*SOURCE) TGTRLS(*CURRENT)",
5         "environment": "ile",
6         "deployFirst": true,
7         "extensions": [
8             "RPGLE"
9         ]
10    },
11    {
12        "name": "Create SQLRPGLE Program",
13            "command": "CRTSQLRPGI OBJ(&CURLIB/&NAME) SRCSTMF('&RELATIVEPATH') OPTION(*EVENTF) DBGVIEW(*SOURCE) CLOSQLCSR(*ENDM",
14            "deployFirst": true,
15            "environment": "ile",
16            "extensions": [
17                "SQLRPGLE"
18            ]
19        },
20        {
21            "name": "Call program",
22            "command": "CALL &CURLIB/&NAME",
23            "environment": "ile",
24            "deployFirst": true,
25            "extensions": [
26                "RPGLE"
27            ]
28        },
29        {
30            "name": "Build and deploy with make 🚧",
31            "command": "/QOpenSys/pkgs/bin/qmake BIN LIB=&CURLIB OPT=*EVENTF",

```

Run Action

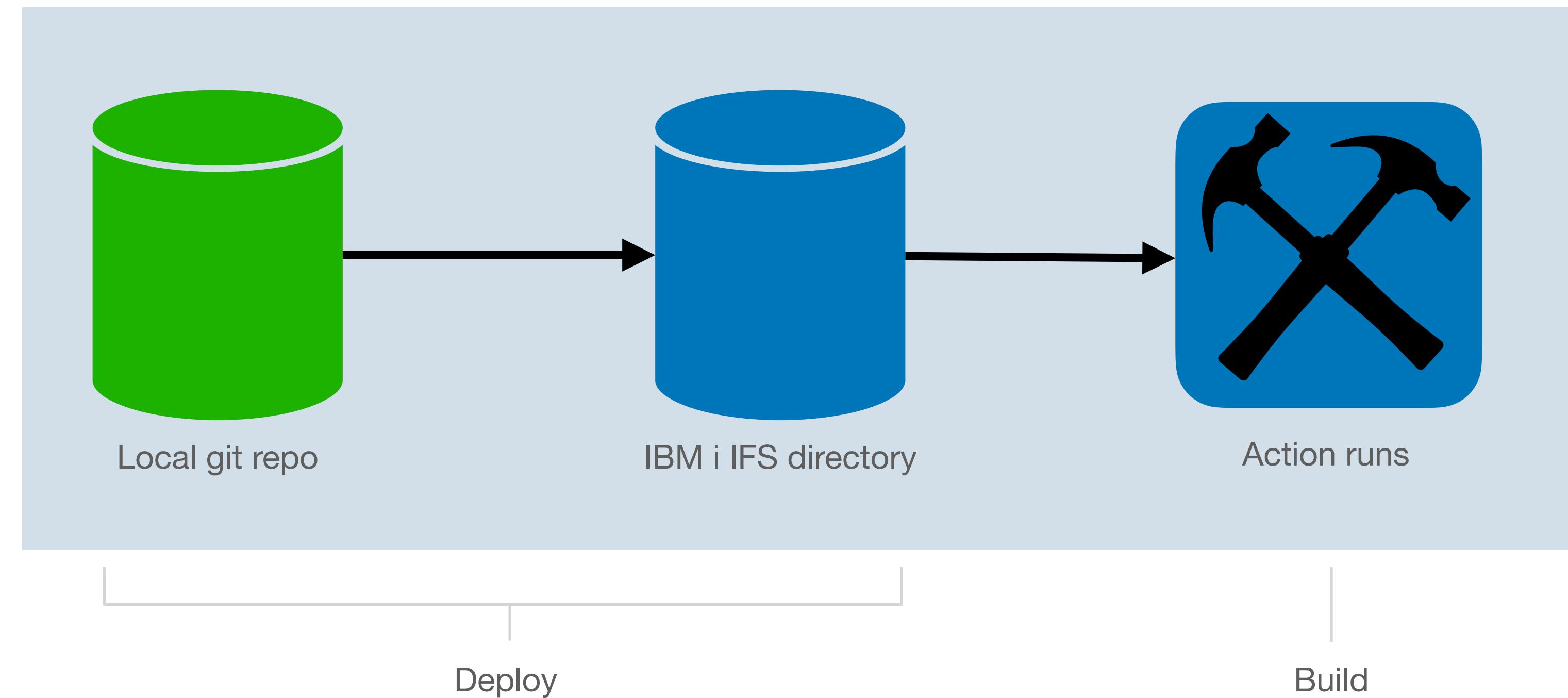
- User can select which Action to run (based on the actions.json)
- Triggers the deploy process
- Runs command(s) on the server
- Also known as the build



The screenshot shows the RDZ interface with the following details:

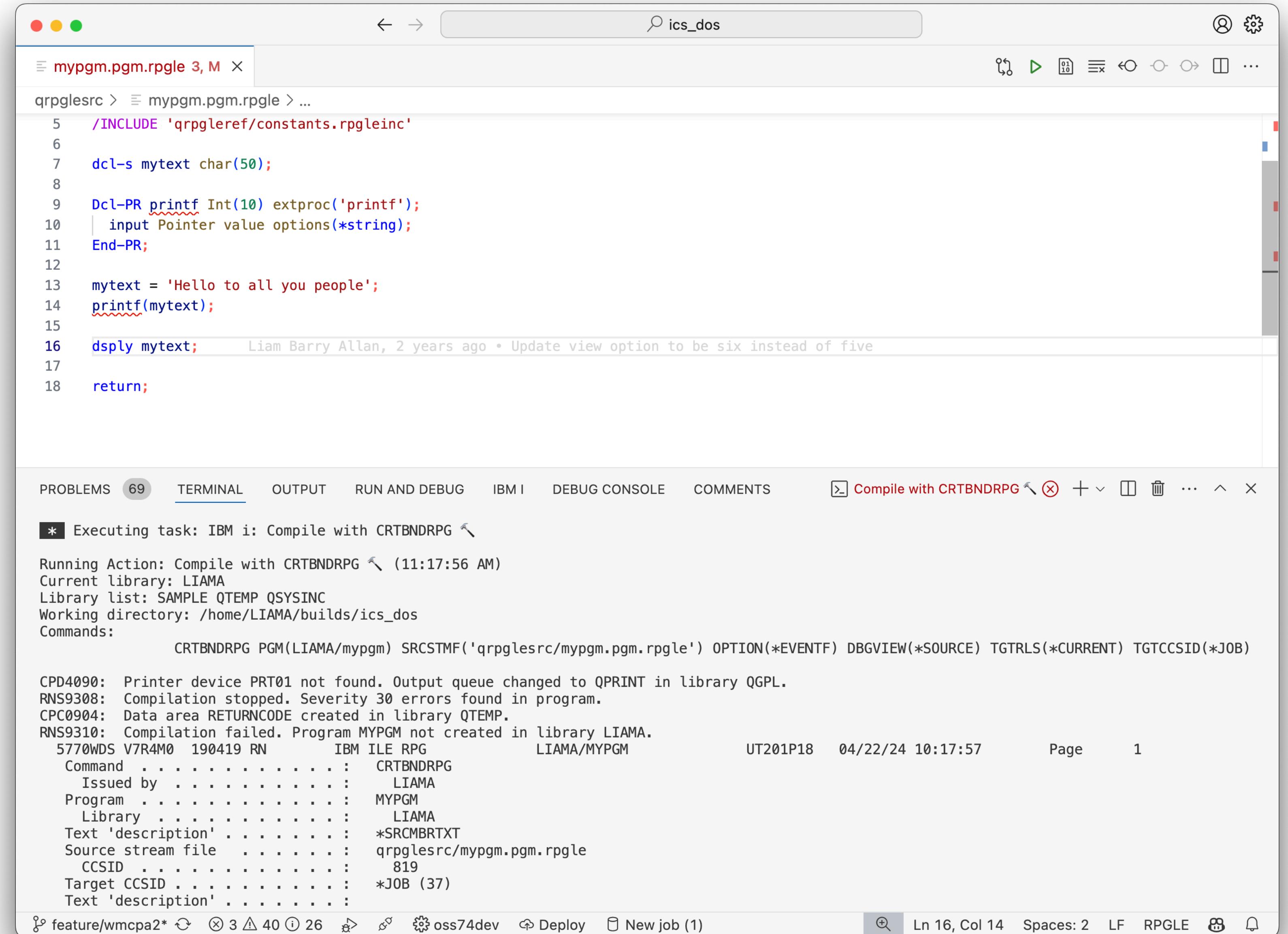
- Title Bar:** Shows the project name "mympgm.pgm.rpgle" and the connection "ics_dos".
- Toolbar:** Includes standard file operations like Open, Save, Print, and a "Run Action..." button.
- Code Editor:** Displays RPGLE code for a program named "mympgm.pgm.rpgle". The code includes declarations for a character variable "mytext" and a procedure block with a parameter "mytext". It also contains a call to the RPGLE printf function.
- Explorer View:** Shows the project structure under "qrpglesrc", including files like "dept.pgm.sqlrpgle", "employees.pgm.sqlrpgle", "mympgm.pgm.rpgle" (which is selected), "newemp.pgm.sqlrpgle", and "Rules.mk".
- Bottom Status Bar:** Provides information about the current file ("feature/wmcpa2*"), the connection ("oss74dev"), deployment status ("Deploy"), and other system details.

Deploy and build



Action result

- List of problems are highlighted
- Spool file result as expected
- Except built from within git



The screenshot shows an IDE interface with two main panes. The top pane is a code editor for a RPGLE program named 'mypgm.pgm.rpgle'. The code includes an INCLUDE statement, a declaration of a character variable 'mytext', a Dcl-PR block with a printf call, and a dsply statement. The bottom pane is a terminal window showing the execution of a 'Compile with CRTBNDRPG' task. The terminal output details the compilation process, including the command used, the library and program names, and various error messages such as CPD4090 and RNS9308.

```

mfp:~/Desktop/IBM i Build$ ibm i -run "Compile with CRTBNDRPG"
* Executing task: IBM i: Compile with CRTBNDRPG ↵
Running Action: Compile with CRTBNDRPG ↵ (11:17:56 AM)
Current library: LIAMA
Library list: SAMPLE QTEMP QSYSINC
Working directory: /home/LIAMA/builds/ics_dos
Commands:
    CRTBNDRPG PGM(LIAMA/mypgm) SRCSTMF('qrpglesrc/mypgm.pgm.rpgle') OPTION(*EVENTF) DBGVIEW(*SOURCE) TGTRL(*CURRENT) TGTCCSID(*JOB)

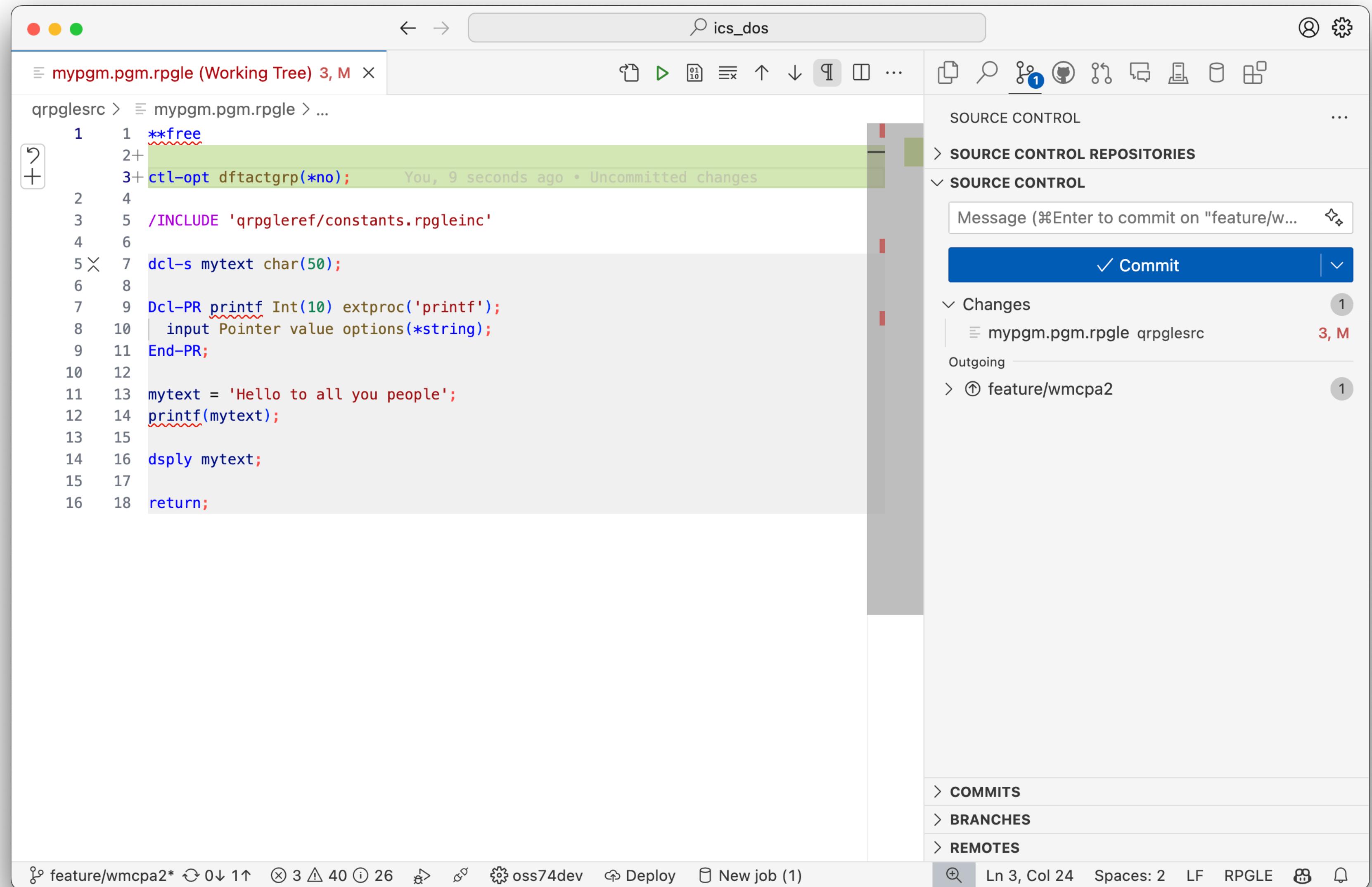
CPD4090: Printer device PRT01 not found. Output queue changed to QPRINT in library QGPL.
RNS9308: Compilation stopped. Severity 30 errors found in program.
CPC0904: Data area RETURNCODE created in library QTEMP.
RNS9310: Compilation failed. Program MYPGM not created in library LIAMA.

      5770WDS V7R4M0 190419 RN      IBM ILE RPG      LIAMA/MYPGM      UT201P18 04/22/24 10:17:57      Page      1
      Command . . . . . : CRTBNDRPG
      Issued by . . . . . : LIAMA
      Program . . . . . : MYPGM
      Library . . . . . : LIAMA
      Text 'description' . . . . . : *SRCMBRTXT
      Source stream file . . . . . : qrpglesrc/mypgm.pgm.rpgle
      CCSID . . . . . : 819
      Target CCSID . . . . . : *JOB (37)
      Text 'description' . . . . . :

```

Git lifecycle

- Compile and test code
- Make commits to a branch
- Make pull requests
- That is developer life



The screenshot shows a Git commit interface with the following details:

- Repository:** mypgm.pgm.rpgle (Working Tree) 3, M
- File:** qrpglesrc > mypgm.pgm.rpgle > ...
- Commit Message:** You, 9 seconds ago • Uncommitted changes
- Code Diff:**

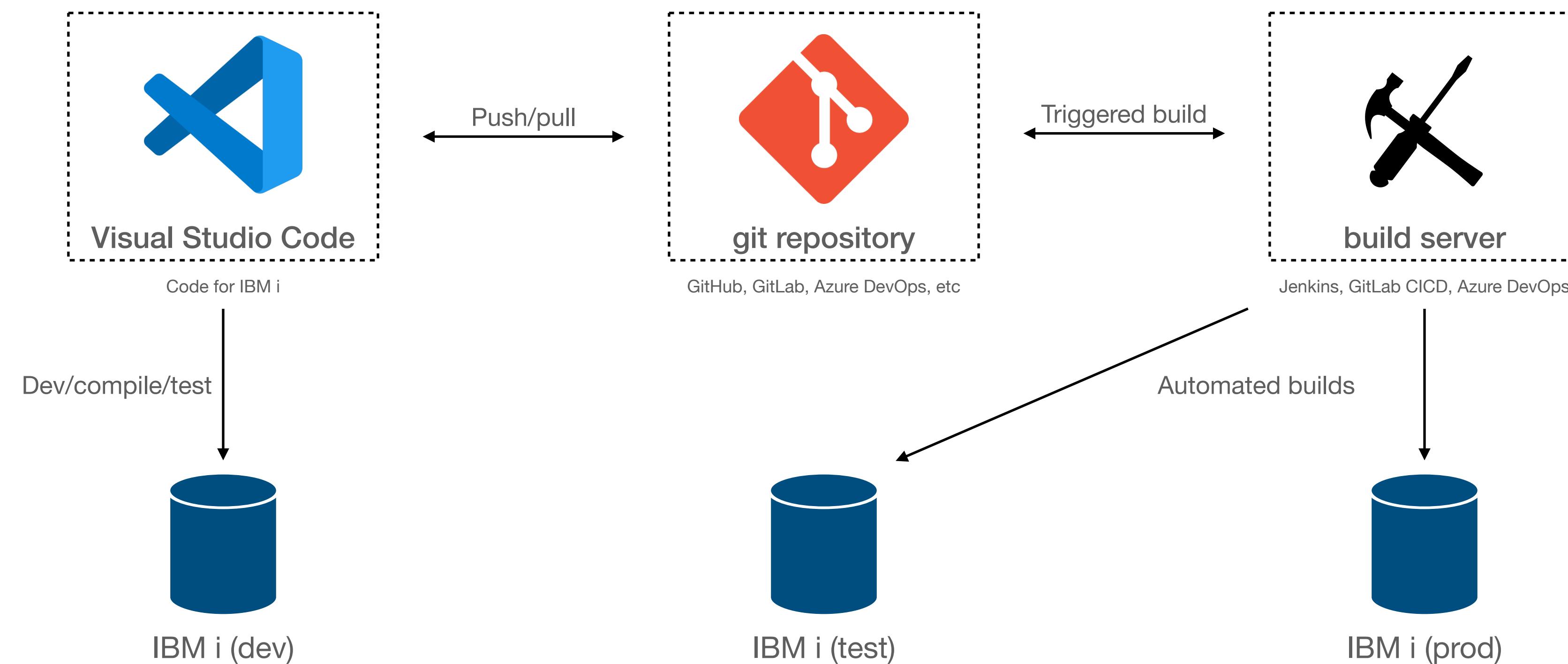
```

1  1 **free
2+
3+ctl-opt dftactgrp(*no);      You, 9 seconds ago • Uncommitted changes
4
5 /INCLUDE 'qrpgleref/constants.rpgleinc'
6
7 dcl-s mytext char(50);
8
9 Dcl-PR printf Int(10) extproc('printf');
10    input Pointer value options(*string);
11 End-PR;
12
13 mytext = 'Hello to all you people';
14 printf(mytext);
15
16 dsply mytext;
17
18 return;

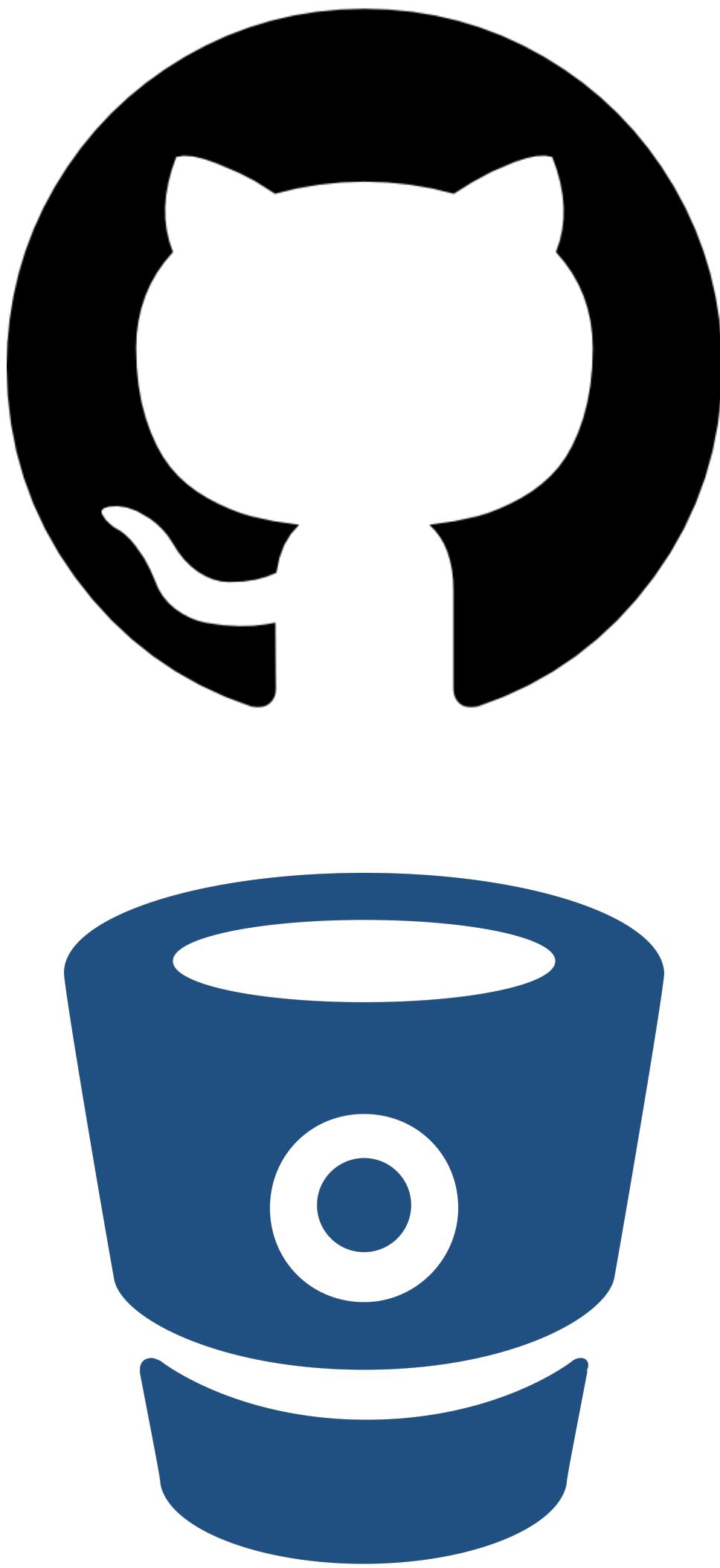
```
- Source Control Panel:**
 - Changes:** mypgm.pgm.rpgle qrpglesrc (3, M)
 - Outgoing:** feature/wmcpa2 (1)
 - Commits:**
 - Branches:**
 - Remotes:**
- Bottom Status Bar:** feature/wmcpa2*, 0↓ 1↑, 3 ▲ 40, 26, oss74dev, Deploy, New job (1), Ln 3, Col 24, Spaces: 2, LF, RPGLE

Automation

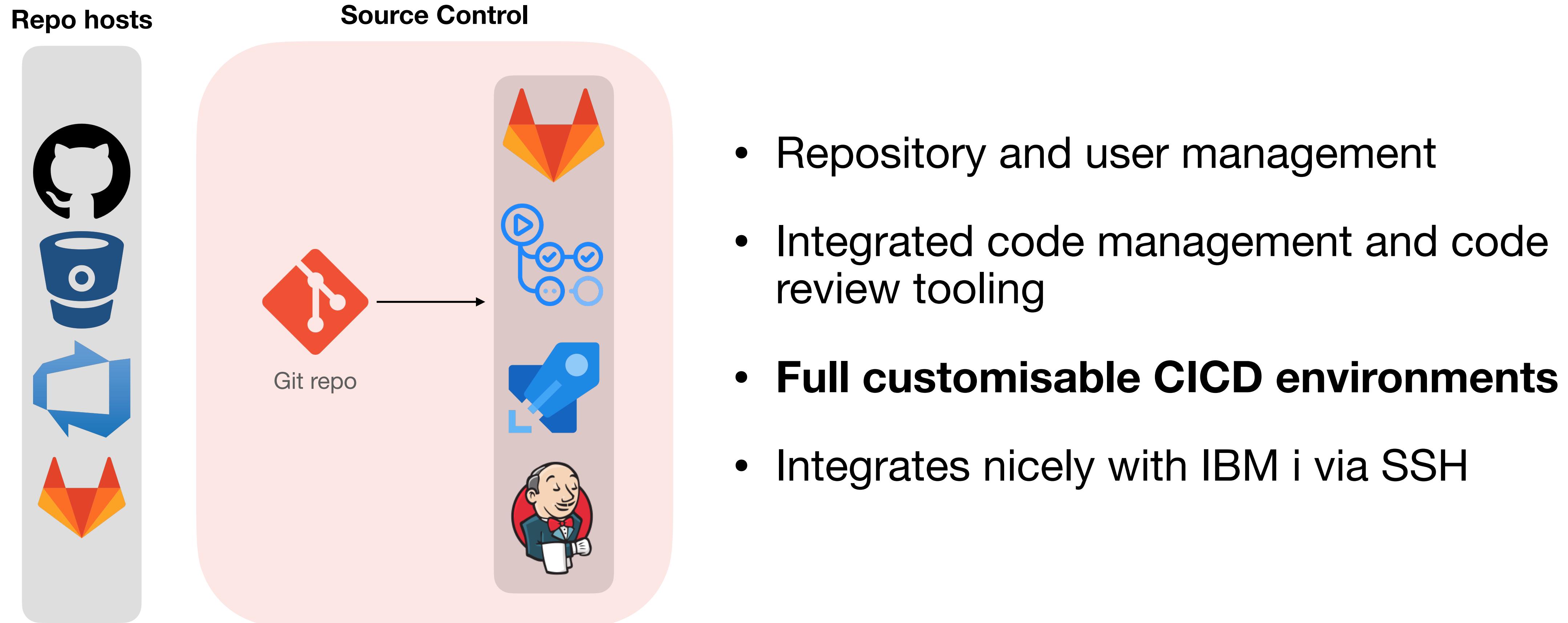
Simple overview



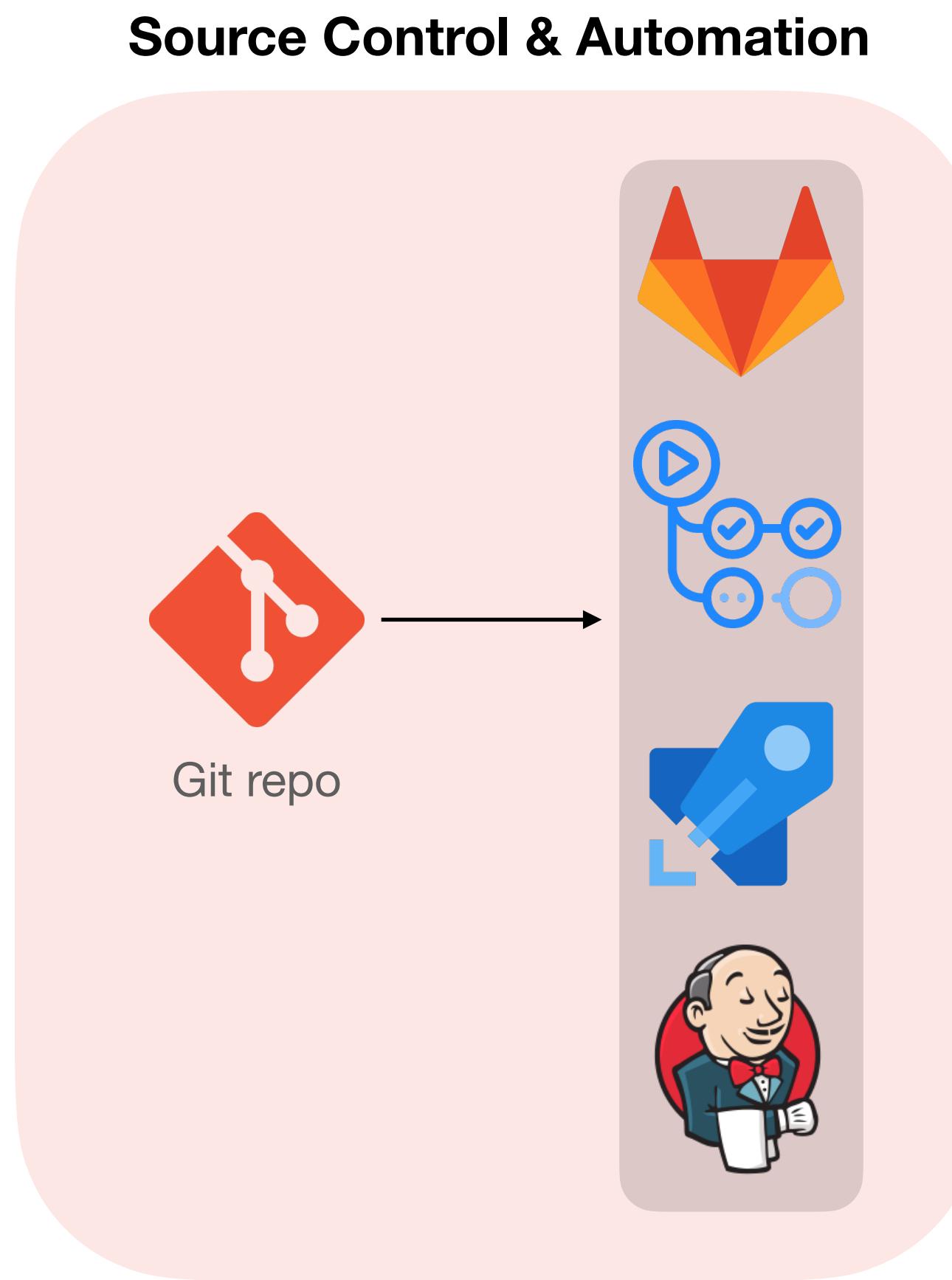
Popular Platforms



Git tooling and automation



Automation steps



GitLab	.gitlab-ci.yml
Azure DevOps	azure-pipeline.yml
GitHub	anything.yml
Jenkins	Jenkinsfile

yml can also be yaml

IBM / ibmi-company_system

Type / to search

Code Issues 1 Pull requests 4 Actions Wiki Security Insights Settings

Files

main Go to file

.github/workflows

- deploy.yaml
- pr.yaml
- .vscode
- qddssrc
- qrpgleref
- qrpglesrc
- .gitignore
- Rules.mk
- iproj.json
- makefile
- readme.md

ibmi-company_system/.github/workflows/pr.yaml

worksofliam Update CI flows ✓

Code Blame 60 lines (50 loc) · 1.84 KB

```
1 name: Source Orbit Impact Report
2
3 on:
4   pull_request:
5     types: [opened]
6
7 jobs:
8   so-impact:
9     environment: COMMON1
10    runs-on: ubuntu-latest
11    permissions:
12      packages: read
13      issues: write
14      pull-requests: write
15      contents: read
16    steps:
17      - uses: actions/checkout@v4
18        with:
```

Automation file properties

Event	New issue, new PR, new commit, etc
Environments	Configure where the pipeline should connect to
Steps	Steps to take when this pipeline is running

pr.yaml

```
steps:
  - uses: actions/checkout@v4
    with:
      fetch-depth: 0

  - uses: actions/setup-node@v3
    with:
      node-version: 20

  - run: npm i -g @ibm/sourceorbit

  - name: Generate impact information
    run: so -bf imd -l `git diff --name-only origin/main origin/${GITHUB_HEAD_REF}`

  - name: Adding markdown
    run: cat impact.md >> $GITHUB_STEP_SUMMARY
```

Open-source tooling

Development	Code for IBM i	Developer writes and compiles code
Dependency management Impact analysis	Source Orbit	Automated tools to generate build scripts and impact analysis reports automatically
Deployment	IBM i CI	Deploys code to IBM i and runs the build scripts automatically

Source Orbit

ILE dependency analysis

Source Orbit



What does it do?

- It's a CLI tool
- Build dependency lists for RPGLE, DDS, SQL, CL, etc
- Generate impact analysis information
- Create scripts to automate builds of your application code
- Cleans up your repository
- It's open-source!

```
[barry@Liams-MBP ics % so -h

-d <dir>
--cwd <dir>      To see the directory of where source code lives.
                  The default is the current working directory.

-f <relative paths>
--files <relative paths>
                  this option will still scan the entire working
                  directory, but will single out these specific files
                  when generating other files. If no build file is
                  specified, dependencies will be printed.

-bf make|bob|imd|json  Create build files of a specific format
                      Example: -bf make

-bl <name>        Set the BRANCHLIB environment variable based on
                  a user provided branch name, and will write it out.
                  Example: -bl feature/123-cool-idea
                  -bl bug/123-bad-move

Options for project cleanup:

-ar               Run the auto-rename process after scanning all code
                  Ensure it is run inside of source control.
                  Rename program sources to have the '.pgm.' attribute in the name
                  Rename RPGLE copybooks found (based on include statements) to be '.rpgleinc'

-fi               Fix includes for RPGLE sources
                  Ensure it is run inside of source control.
```

Repository cleanup

The screenshot shows a code editor interface with two panes comparing two versions of a RPGLE program, BBSADNUDFR.pgm.rpgle, from a repository named BBS400.

Left Pane (Original Code):

```
1 H/TITLE Administration - New User default values
2 H COPYRIGHT('© 2020 David Asta under MIT License')
3 * SYSTEM : V4R5
4 * PROGRAMMER : David Asta
5 * DATE-WRITTEN: 25/NOV/2020
6 *
7 * This program allows an Administrator user to display/change the
8 * New User default values
9 ****
10 H/COPY DVBB5400/CURRENTSRC,CBKOPTIMIZ
11 ****
12 * INDICATORS USED:
13 * 80 - *ON turns DSPATR(PR), which protects fields from being change
14 * 81 - CBKPCFGREA CHAIN Not Found
15 ****
16 FBBSADNUDFDCF E WORKSTN
17 FPCONFIG UF E K DISK
18 ****
19 * Data structures
20 D/COPY DVBB5400/CURRENTSRC,CBKDTAARA
21 * Constants
22 D cKeysDft C CONST('F10>Edit F12=Go back')
23 D cKeysEdit C CONST('F10=Confirm Changes F1
24 D cel')
25 D cSavedOK C CONST('Configuration was change
26 D cessfully.')
27 D cSavedKO C CONST('There was an error while
28 D ting to PCONFIG.')
29 * Variables
30 D/COPY DVBB5400/CURRENTSRC,CBKPCFGDCL
31 D wCfgKey S 6A
32 ****
33 C WRITE HEADER
34 C 80 EVAL KEYSLS = cKeysDft
35 C N80 EVAL KEYSLS = cKeysEdit
36 C WRITE FOOTER
37 C EXFMT BODY
38 C CLEAR MSGLIN
39 C EXSR CheckFkeys
40 ****
41 * Subroutine called automatically at startup
42 ****
43 C *INZSR BEGSR
44 C EVAL SCRSCR = 'BBSADNUDF'
45 * Protect fields from being modified
46 C EVAL *IN80 = *ON
47 * Get values from PCONFIG and show them on screen
```

Right Pane (Corrected Code):

```
1 H/TITLE Administration - New User default values
2 H COPYRIGHT('© 2020 David Asta under MIT License')
3 * SYSTEM : V4R5
4 * PROGRAMMER : David Asta
5 * DATE-WRITTEN: 25/NOV/2020
6 *
7 * This program allows an Administrator user to display/change the
8 * New User default values
9 ****
10 /copy 'src/CBKOPTIMIZ.rpgleinc'
11 ****
12 * INDICATORS USED:
13 * 80 - *ON turns DSPATR(PR), which protects fields from being change
14 * 81 - CBKPCFGREA CHAIN Not Found
15 ****
16 FBBSADNUDFDCF E WORKSTN
17 FPCONFIG UF E K DISK
18 ****
19 * Data structures
20 /copy 'src/CBKDTAARA.rpgleinc'
21 * Constants
22 D cKeysDft C CONST('F10>Edit F12=Go back')
23 D cKeysEdit C CONST('F10=Confirm Changes F1
24 D cel')
25 D cSavedOK C CONST('Configuration was change
26 D cessfully.')
27 D cSavedKO C CONST('There was an error while
28 D ting to PCONFIG.')
29 * Variables
30 /copy 'src/CBKPCFGDCL.rpgleinc'
31 D wCfgKey S 6A
32 ****
33 C WRITE HEADER
34 C 80 EVAL KEYSLS = cKeysDft
35 C N80 EVAL KEYSLS = cKeysEdit
36 C WRITE FOOTER
37 C EXFMT BODY
38 C CLEAR MSGLIN
39 C EXSR CheckFkeys
40 ****
41 * Subroutine called automatically at startup
42 ****
43 C *INZSR BEGSR
44 C EVAL SCRSCR = 'BBSADNUDE'
45 * Protect fields from being modified
46 C EVAL *IN80 = *ON
47 * Get values from PCONFIG and show them on screen
```

The code editor interface includes an Explorer sidebar on the left, a Project Explorer section at the bottom left, and a Job Log section at the bottom right. The status bar at the bottom shows file statistics like 'ggggg*' and 'Project: GitLens Pro (Trial)'.

Show code in a repository where the copy statements have been corrected

Impact Analysis

The screenshot shows a GitHub Actions interface for a pull request. The main header bar includes links for Code, Pull requests (1), Actions, Projects, Wiki, Security, Insights, and Settings. The Actions tab is selected, showing a green checkmark next to "Update utils.sqlrpgle #1". Below this, there's a "Summary" card for a "Code scan (18.x)" job triggered via pull request 2 hours ago by user worksofliam. The job status is Success with a duration of 22s and no artifacts. A "Matrix: Code scan" section shows 1 job completed. The "Code scan (18.x) summary" section contains an "Impact Analysis" section with a "Touched objects" list:

- UTILS MODULE : qrpglesrc/utils.sqlrpgle

Below this, there's a "UTILS MODULE" section with a nested tree:

- UTILS MODULE (qrpglesrc/utils.sqlrpgle)
 - UTILS SRVPGM (qsrvsrc/utils.bnd)
 - DEPTS PGM (qrpglesrc/depts.pgm.sqlrpgle)
 - \$(APP_BNDDIR).BNDDIR (no source)

The screenshot shows a detailed Impact Analysis summary from a "Code scan (18.x)" job. The top navigation bar has a "Summary" tab selected. The main content area starts with a "Jobs" section showing the "Code scan (18.x)" job as successful. Below this are "Run details" sections for "Usage" and "Workflow file". The main content is titled "Impact Analysis" and includes a "Touched objects" section:

- BANKING MODULE : qrpglesrc/banking.sqlrpgle
- DEPTS PGM : qrpglesrc/depts.pgm.sqlrpgle
- UTILS MODULE : qrpglesrc/utils.sqlrpgle
- UTILS SRVPGM : qsrvsrc/utils.bnd

Below this, there are sections for each touched object:

- BANKING MODULE**
 - BANKING MODULE (qrpglesrc/banking.sqlrpgle)
 - BANKING SRVPGM (no source)
 - \$(APP_BNDDIR).BNDDIR (no source)- DEPTS PGM**
 - DEPTS PGM (qrpglesrc/depts.pgm.sqlrpgle)
- UTILS MODULE**
 - UTILS MODULE (qrpglesrc/utils.sqlrpgle)
 - UTILS SRVPGM (qsrvsrc/utils.bnd)
 - DEPTS PGM (qrpglesrc/depts.pgm.sqlrpgle)
 - \$(APP_BNDDIR).BNDDIR (no source)

A note at the bottom states: "Changes to this object have no impact."



sourceorbit 0.4.25

Latest

IBM i dependency management tool

Install from the command line:

```
$ npm install @ibm/sourceorbit@0.4.25
```

[Learn more about npm packages](#)

Install via package.json:

```
"@ibm/sourceorbit": "0.4.25"
```

Recent Versions

0.4.25

Latest

Details

IBM

sourceorbit

Apache License 2.0

12 dependencies

Readme

Last published

17 minutes ago

Issues

1

Total downloads

44

.↓. 4

pr.yaml

```
name: Source Orbit Impact Report

on:
  pull_request:
    types: [opened]

jobs:
  so-impact:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v4
        with:
          fetch-depth: 0

      - uses: actions/setup-node@v3
        with:
          node-version: 20

      - run: npm i -g @ibm/sourceorbit

      - run: npm i -g @ibm/ibmi-ci

      - name: Generate impact information
        run: so -bf imd -l `git diff --name-only origin/main origin/${GITHUB_HEAD_REF}`

      - name: Adding markdown
        run: cat impact.md >> $GITHUB_STEP_SUMMARY
```

IBM / ibmi-company_system

Type / to search

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Actions

New workflow

All workflows

Workflows

Impact analysis

Source Orbit Impact Report

Source Orbit Impact Report

Management

Caches

Deployments

Runners

All workflows

All workflows

Showing runs from all workflows

40 workflow runs

Event ▾

- ✓ Change the text for a broken ID**
Source Orbit Impact Report #32: Pull request #45 opened by worksofliam
`feature/wmpca2`
- ✓ Change string literals**
Source Orbit Impact Report #31: Pull request #44 opened by worksofliam
`feature/lug`
- ✓ Update newemp.pgm.sqlrpgle**
Source Orbit Impact Report #28: Pull request #41 opened by worksofliam
`wmpca/demo`
- ✓ Update EDLEVEL column in employee table**
Source Orbit Impact Report #27: Pull request #40 opened by worksofliam
`fix/change_to_emp`
- ✓ Update employee.table**
Source Orbit Impact Report #26: Pull request #39 opened by worksofliam
`fix/no_null_emp`

IBM / ibmi-company_system

Type / to search

Code Issues 1 Pull requests 4 Actions Wiki Security Insights Settings

← Source Orbit Impact Report

Change the text for a broken ID #32

Re-run all jobs ...

Summary

Jobs

so-impact

Run details

Usage

Workflow file

so-impact succeeded 2 weeks ago in 18s

Search logs

Set up job 1s

Run actions/checkout@v4 1s

Run actions/setup-node@v3 1s

Run npm i -g @ibm/sourceorbit 1s

Run npm i -g @ibm(ibmi-ci) 7s

Generate impact information 0s

Run so -bf imd -l `git diff --name-only origin/main origin/\${GITHUB_HEAD_REF}`

Adding markdown 0s

ibmi-ci

Simple SSH tool



ibmi-ci 0.1.1

Latest

IBM i CLI tool

Install from the command line:

```
$ npm install @ibm/ibmi-ci@0.1.1
```

[Learn more about npm packages](#)

Install via package.json:

```
"@ibm/ibmi-ci": "0.1.1"
```

Details

IBM

ibmi-ci

5 dependencies

Readme

Last published

12 hours ago

CLI usage

```
ici \
  --rcwd "./builds/myproject" \
  --push "." \
  --cmd "/QOpenSys/pkgs/bin/gmake BIN_LIB=MYLIB"
```

IBM / ibmi-company_system

Type / to search | > | +

Code Issues 1 Pull requests 4 Actions Wiki Security Insights Settings

General

Access

Collaborators and teams

Moderation options

Code and automation

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Rules

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Environments

Pages

Custom properties

Environments

You can configure environments with protection rules, variables and secrets. [Learn more about configuring environments.](#)

COMMON1 4 secrets Delete

Environments / Configure COMMON1

Environment secrets

Secrets are encrypted environment variables. They are accessible only by GitHub Actions in the context of this environment.

 IBMI_HOST	Updated 20 minutes ago	 
 IBMI_PASSWORD	Updated 10 minutes ago	 
 IBMI_SSH_PORT	Updated 19 minutes ago	 
 IBMI_USER	Updated 11 minutes ago	 

 Add secret

Multiple environments can be configured in your org/repo

[← Source Orbit Impact Report](#)

✓ Change the text for a broken ID #32

[Re-run all jobs](#)



[Summary](#)

Jobs

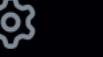
[✓ so-impact](#)

Run details

Usage

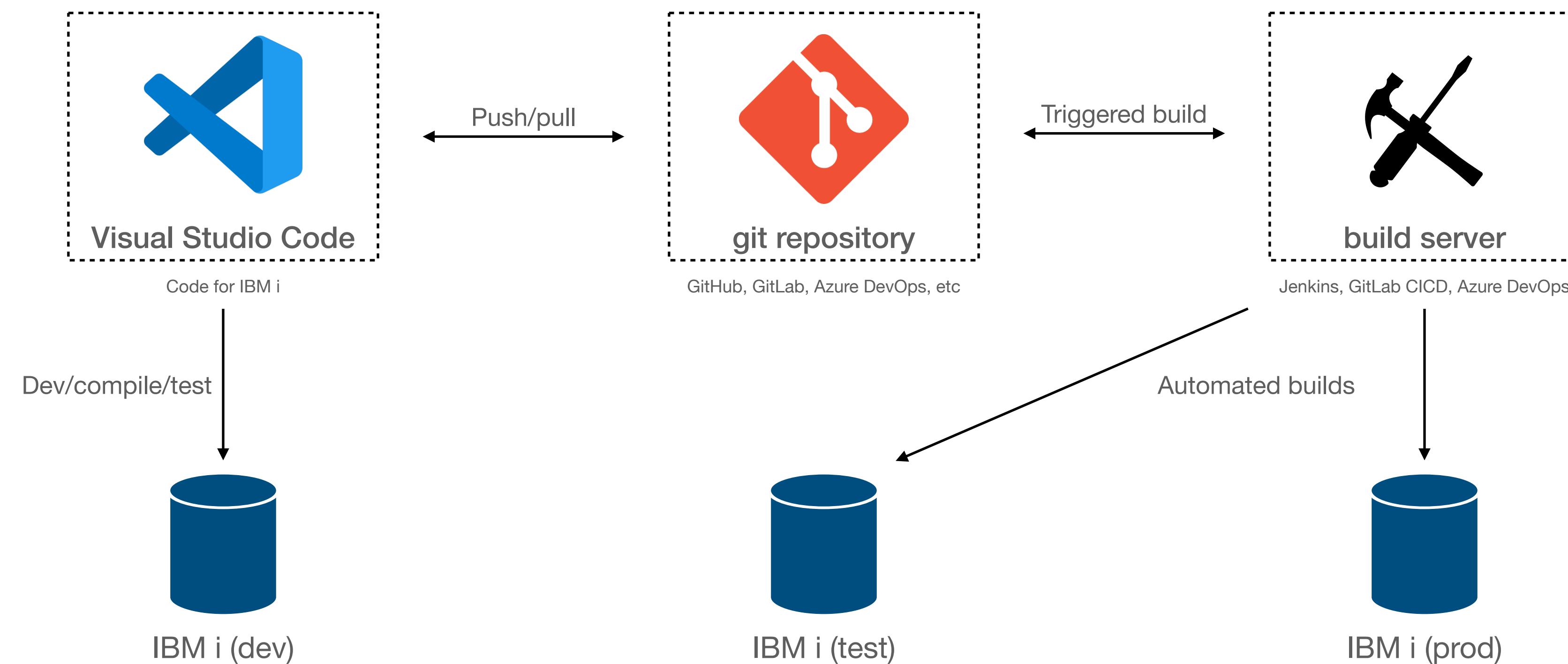
Workflow file

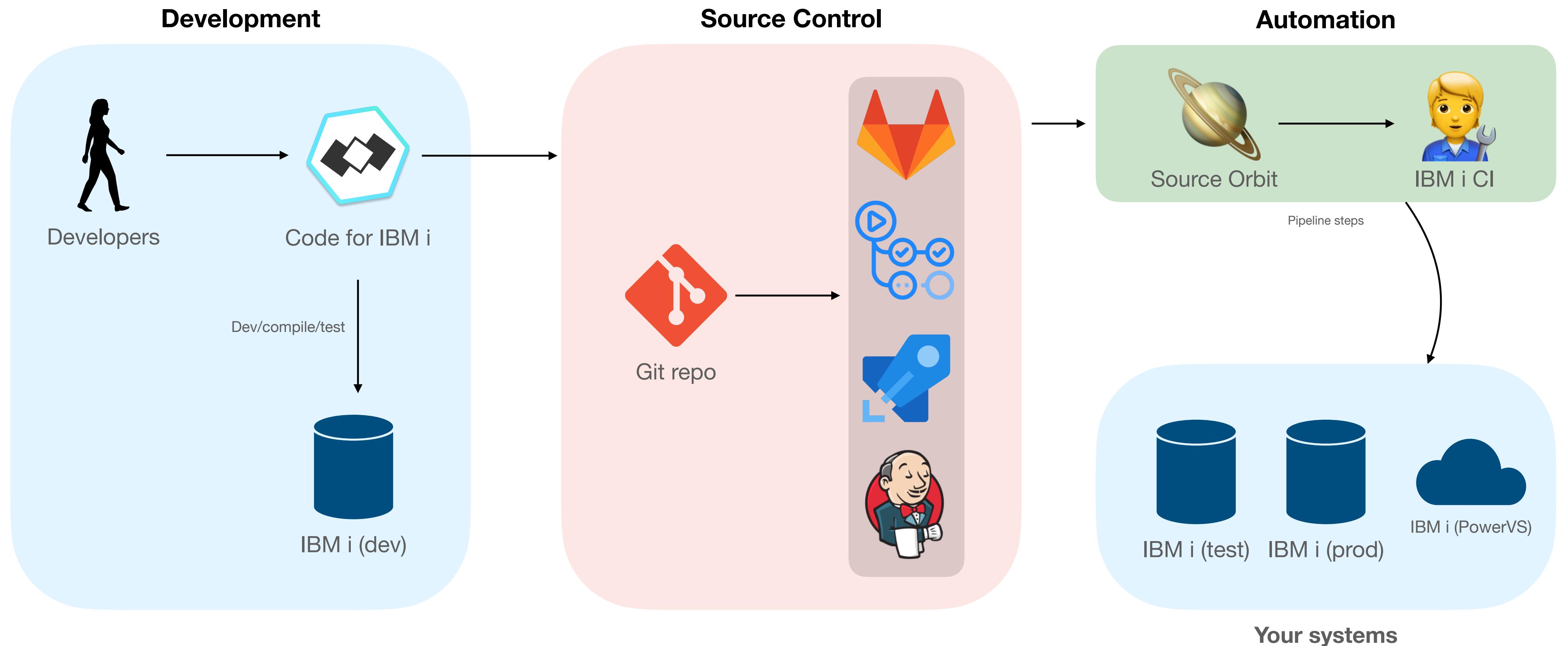
so-impact
succeeded 2 weeks ago in 18s

Search logs  

- > Run actions/checkout@v4 1s
- > Run actions/setup-node@v3 1s
- > Run npm i -g @ibm/sourceorbit 1s
- > Run npm i -g @ibm/ibmi-ci 7s
- ✓ Generate makefile 0s
 - 1 ► Run so -bf make -l `git diff --name-only origin/main origin/\${GITHUB_HEAD_REF}`
 - 4 make: Loaded project settings.
- ✓ Deploy to IBM i 4s
 - 1 ► Run ici \
 - 13 All steps are valid.
 - 14
 - 15 =====
 - 16 Executing step 1: connect
 - 17 =====
 - 18
 - 19 Connected to system.
 - 20 Remote working directory is '/home/DRIVEWAY'

Simple overview





github.com/works of liam/blog