

Moving into git

For RPGLE, COBOL, CL, and more

Liam Allan - liama@ibm.com



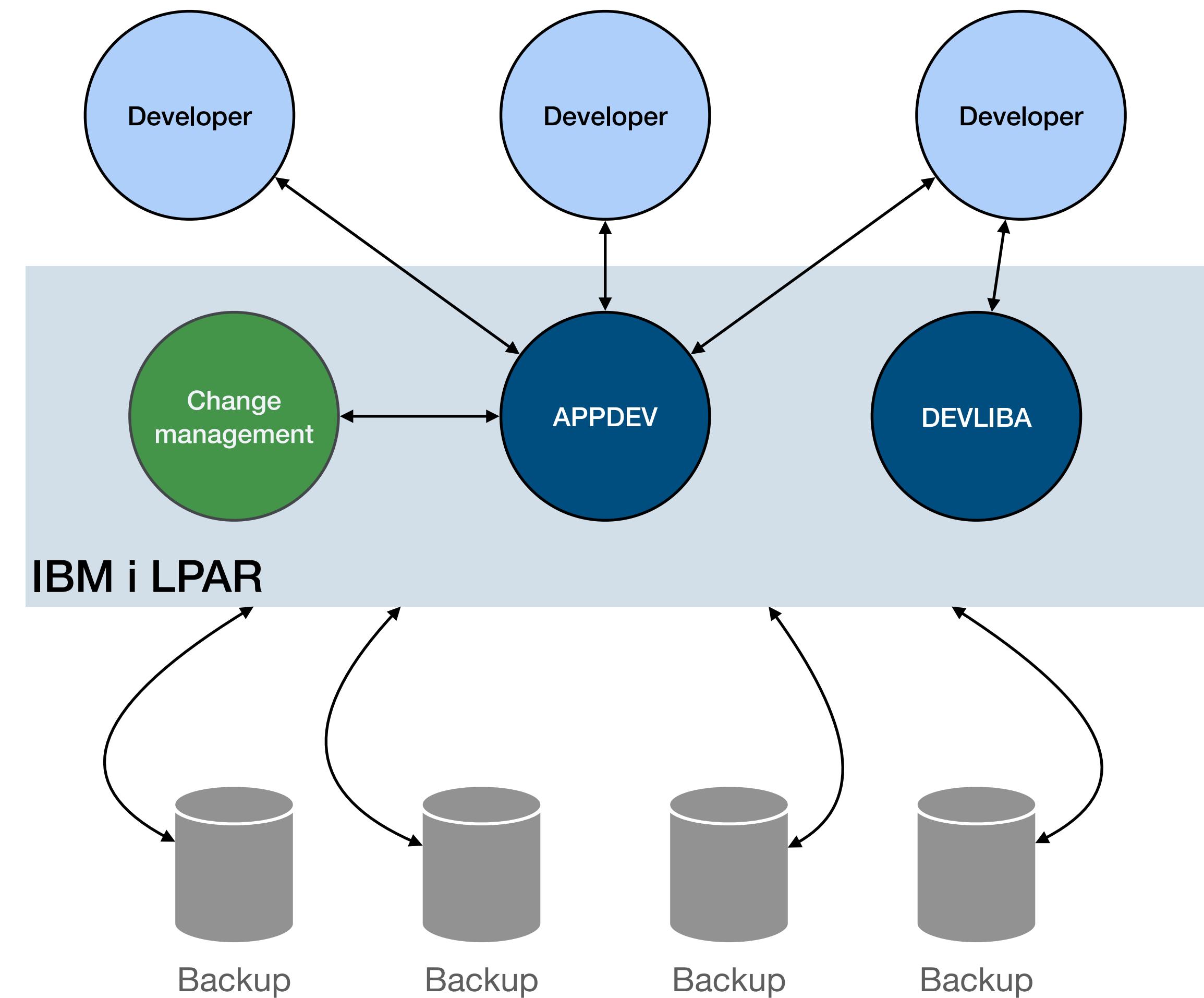
Abstract

- Moving source code
 - why?
 - out of source members
 - into git
 - metadata
- Git workflow
- Tools
 - Rational Developer for i
 - Visual Studio Code
- Compilers
 - source changes

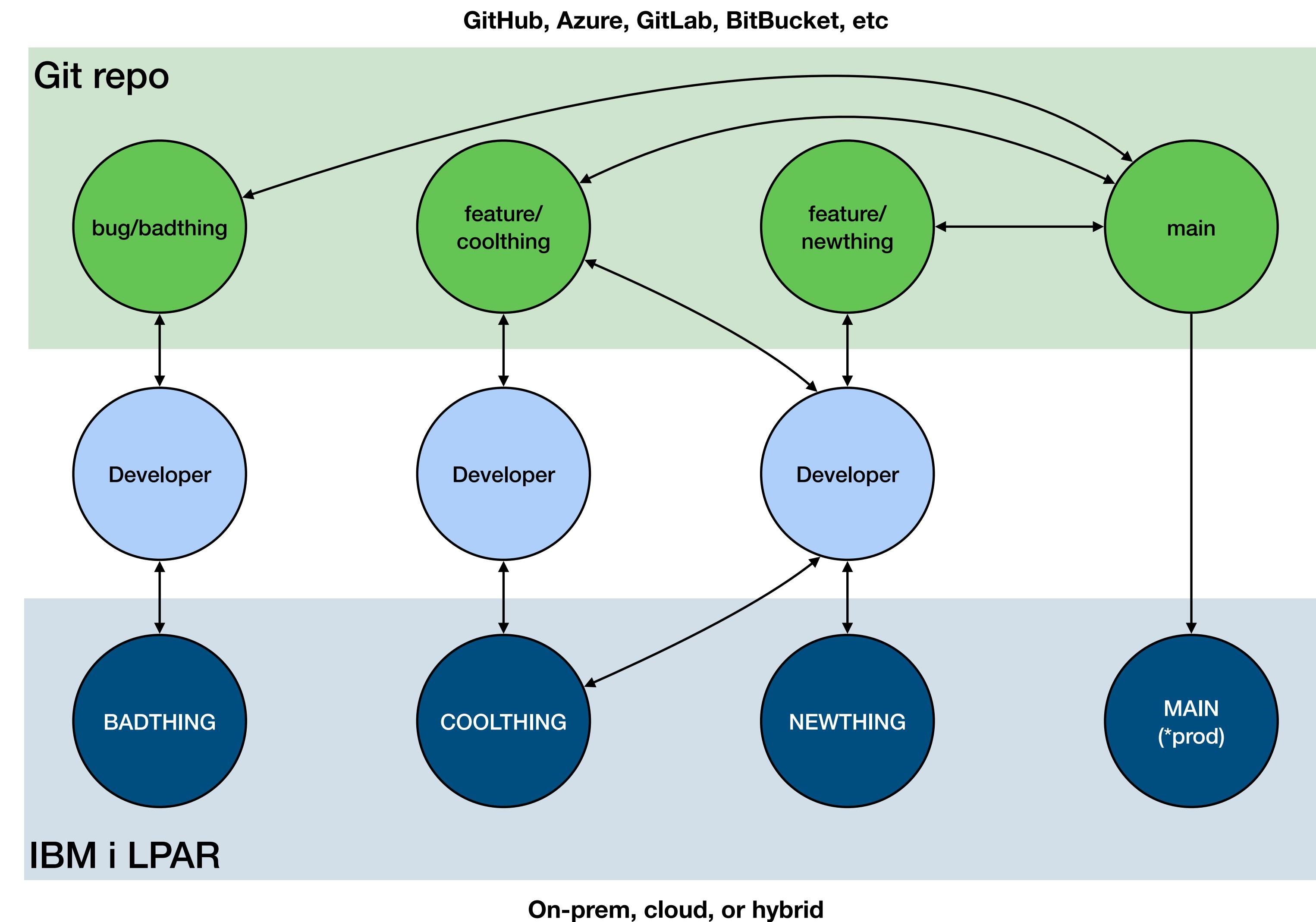
Why?

Moving source code

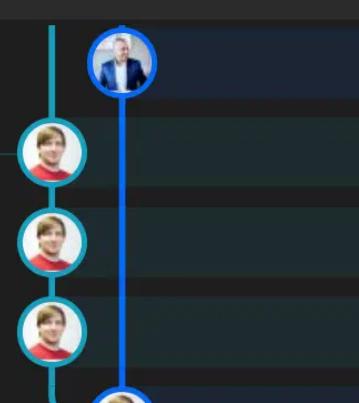
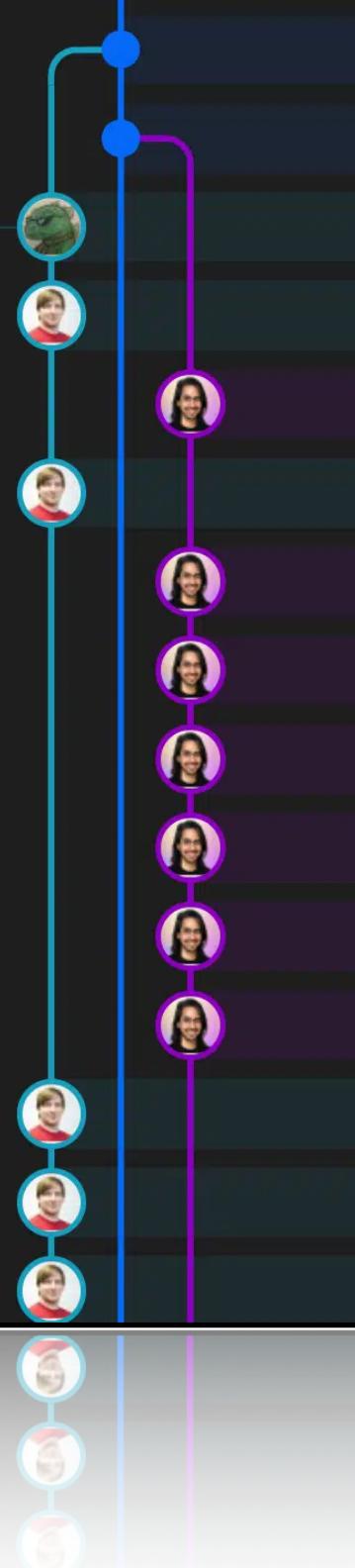
Lack of control



Concurrent development

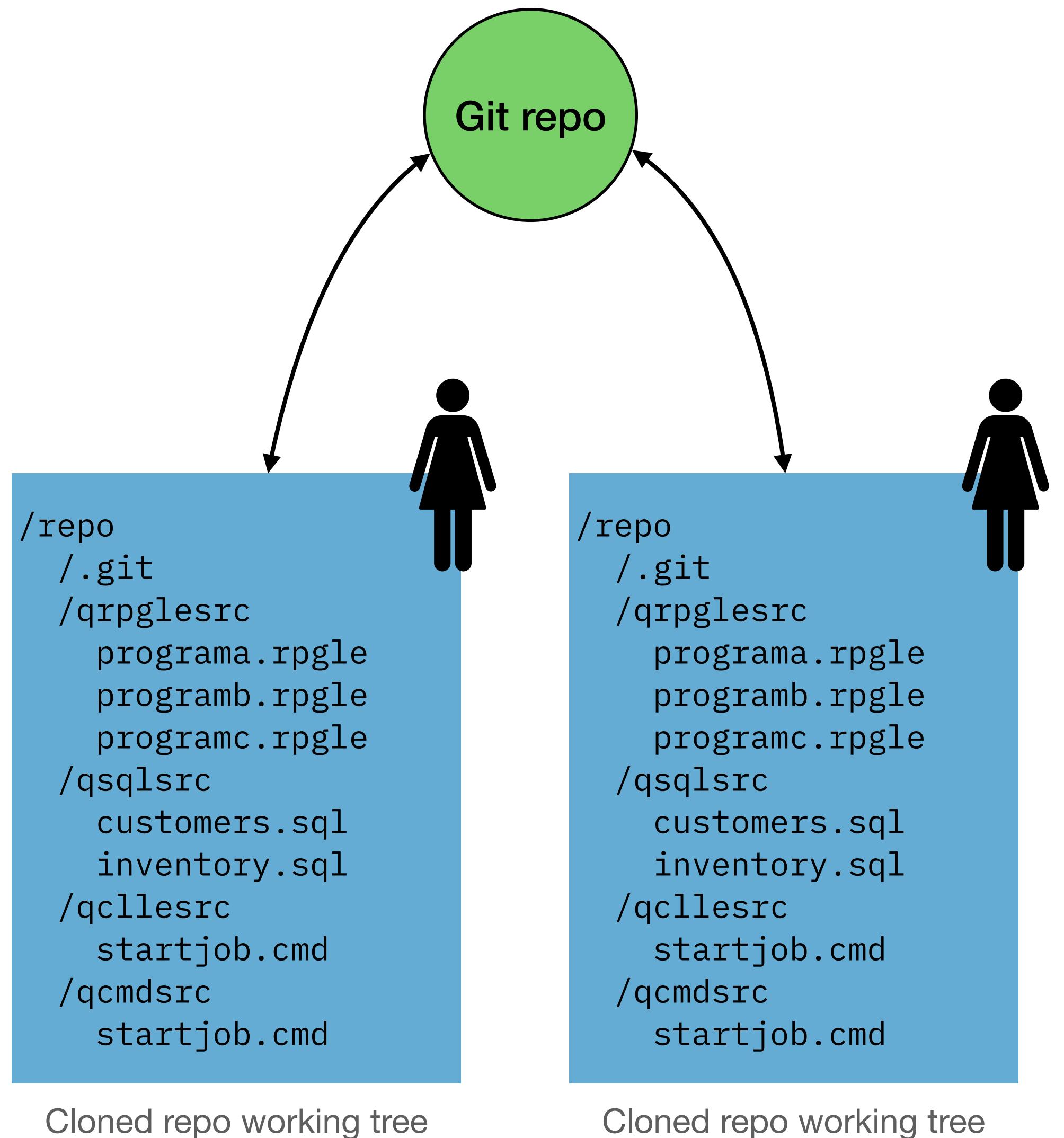


All change history

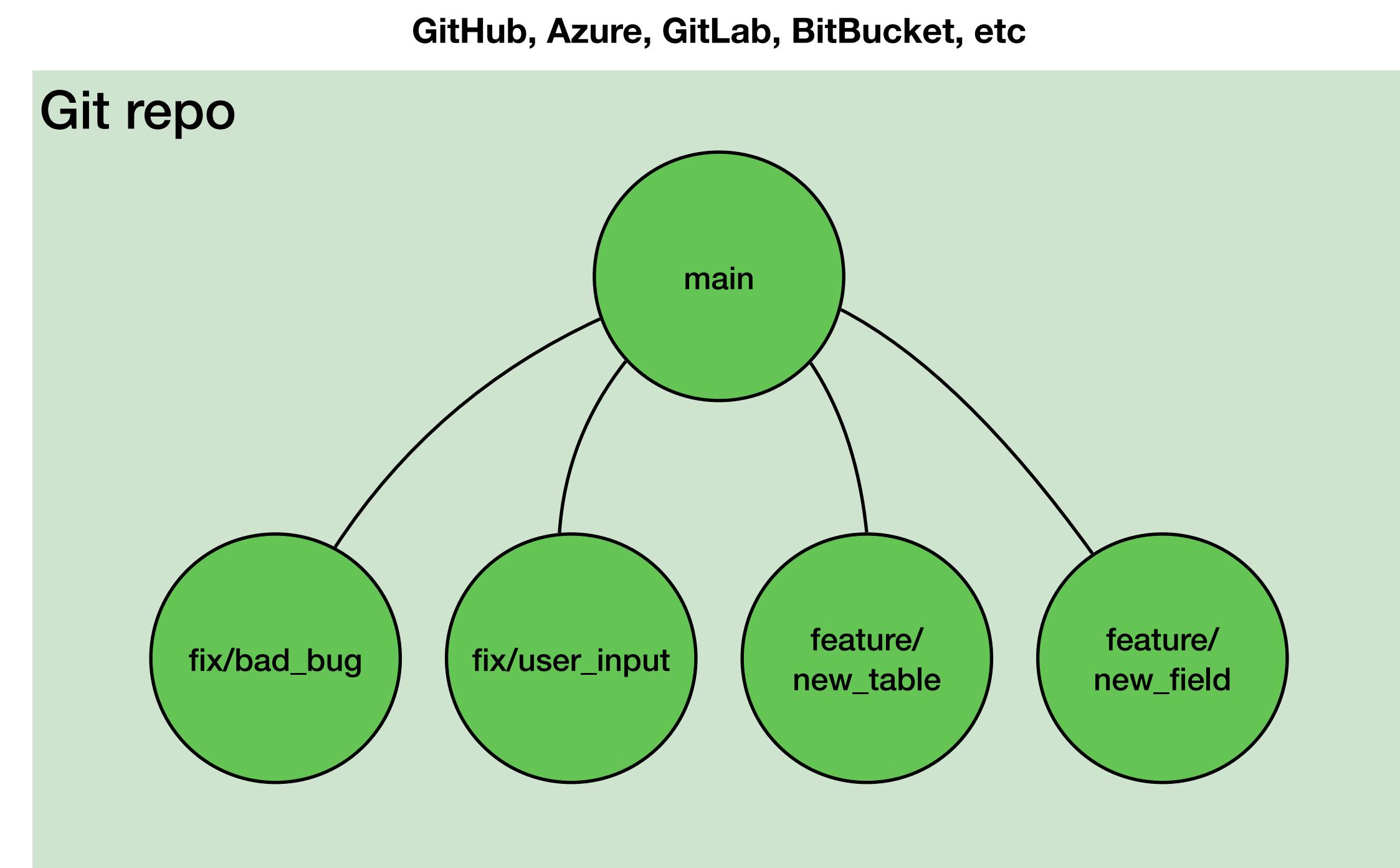
BRANCH / TAG	GRAPH	COMMIT MESSAGE	AUTHOR	COMMIT DATE / TIME	SHA
main		Fixed broken link additional changes Updating image URL for login page Spelling & grammar fixes from Tristan Updates directly to prod Merge pull request #52 from Axxzilla/Add-SO-docs@... into main Merge pull request #51 from jjsilva4/v8-8-1 into main	Melese Alex Alex Alex Alex Alex Latham Alex Latham	8/12/22, 1:32 PM 8/11/22, 9:27 AM 8/11/22, 9:17 AM 8/11/22, 8:39 AM 8/10/22, 4:27 PM 8/10/22, 3:12 PM 8/10/22, 3:12 PM	def... bf3... bff... a28... d74... bbc... a8c...
Add-SO-docs		Further edits/grammar/spelling fixes Updates Updated video link to remove Ping adding more SSO instructions Update the date Tweak a feature Simplify SSO definition Formatting General fixes First draft of v8.8 release notes for the Help Center Updating LFS homebrew and teams section more SSO, adding updates for other pages sso work for the day work for the day changes for other features in libpurple OSS from me ...other members from wednesday SFL purplebug	Alex Alex Jonathan Silva Alex Jonathan Silva Jonathan Silva Jonathan Silva Jonathan Silva Jonathan Silva Jonathan Silva Jonathan Silva Alex Alex Alex alexIA alexIA alexIA	8/10/22, 1:46 PM 8/9/22, 4:49 PM 8/9/22, 2:53 PM 8/9/22, 2:16 PM 8/8/22, 4:30 PM 8/5/22, 2:31 PM 8/5/22, 2:28 PM 8/5/22, 2:15 PM 8/5/22, 2:03 PM 8/5/22, 12:43 PM 8/3/22, 3:49 PM 8/3/22, 3:21 PM 8/2/22, 4:40 PM 8/1/22, 4:40 PM 8/1/22, 3:21 PM 8/1/22, 3:18 PM	266... d2f... 1b5... f23... 53c... a16... 106... 300... 377... c4b... 07b... 9e1... c52... c25... ...16... ...10...

Git concepts

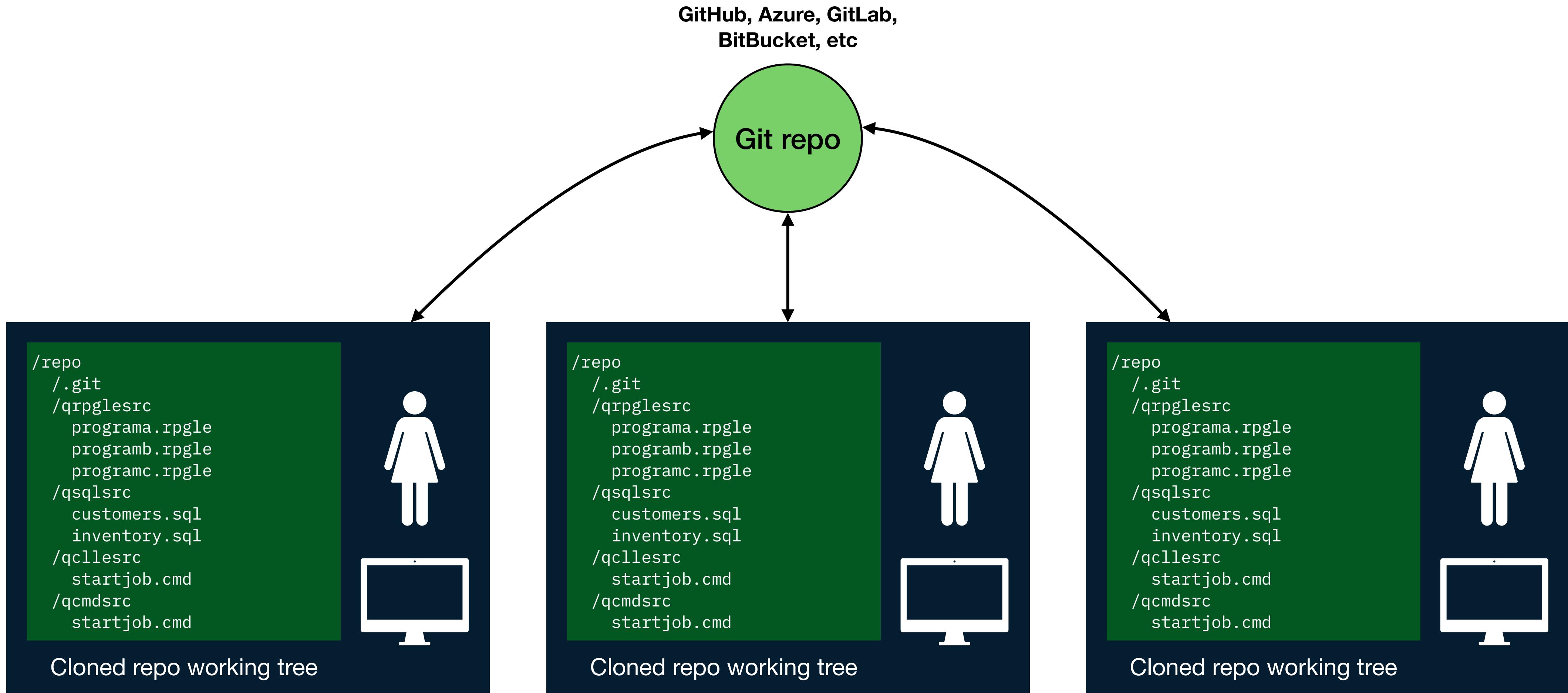
Distributed



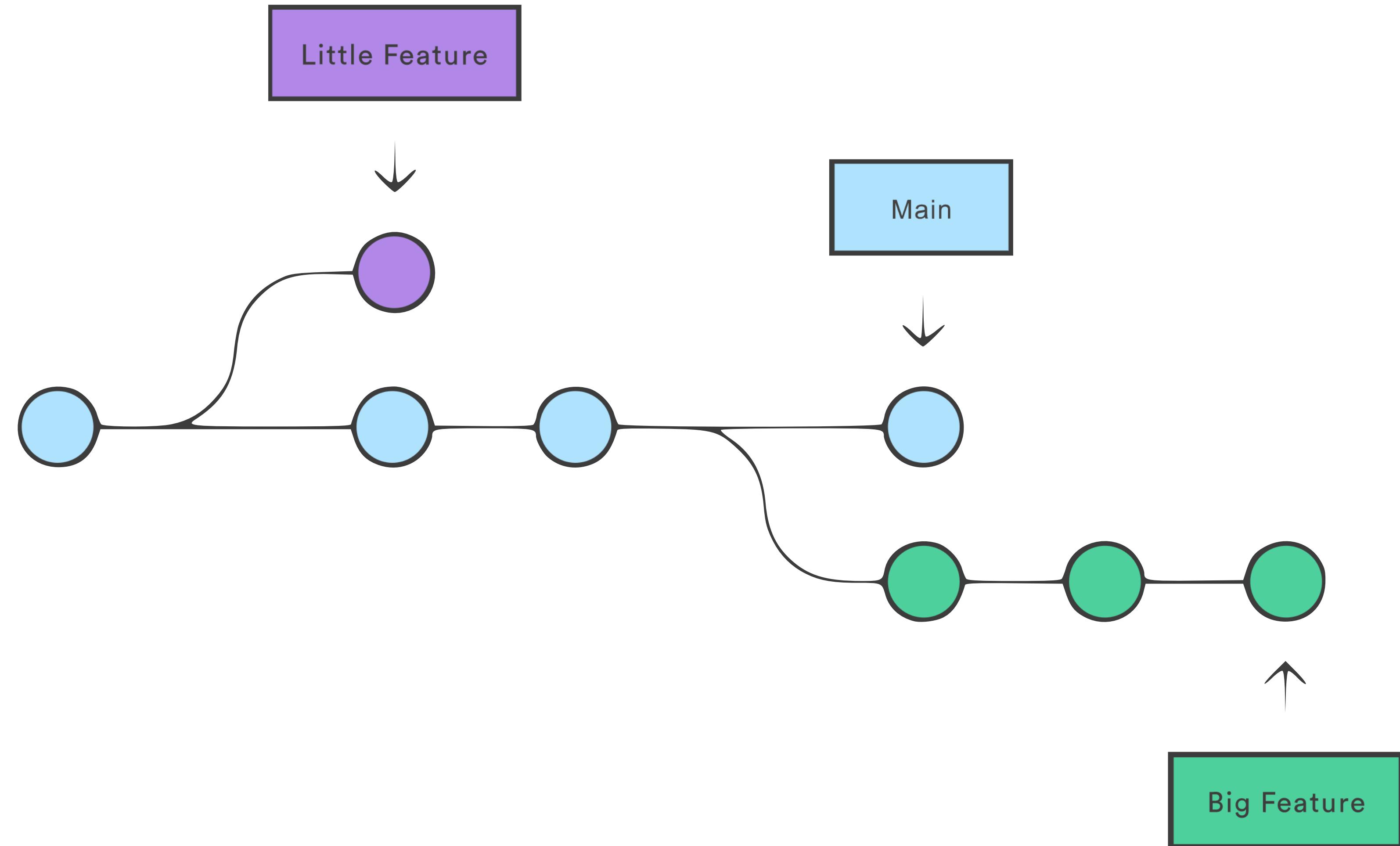
Branching



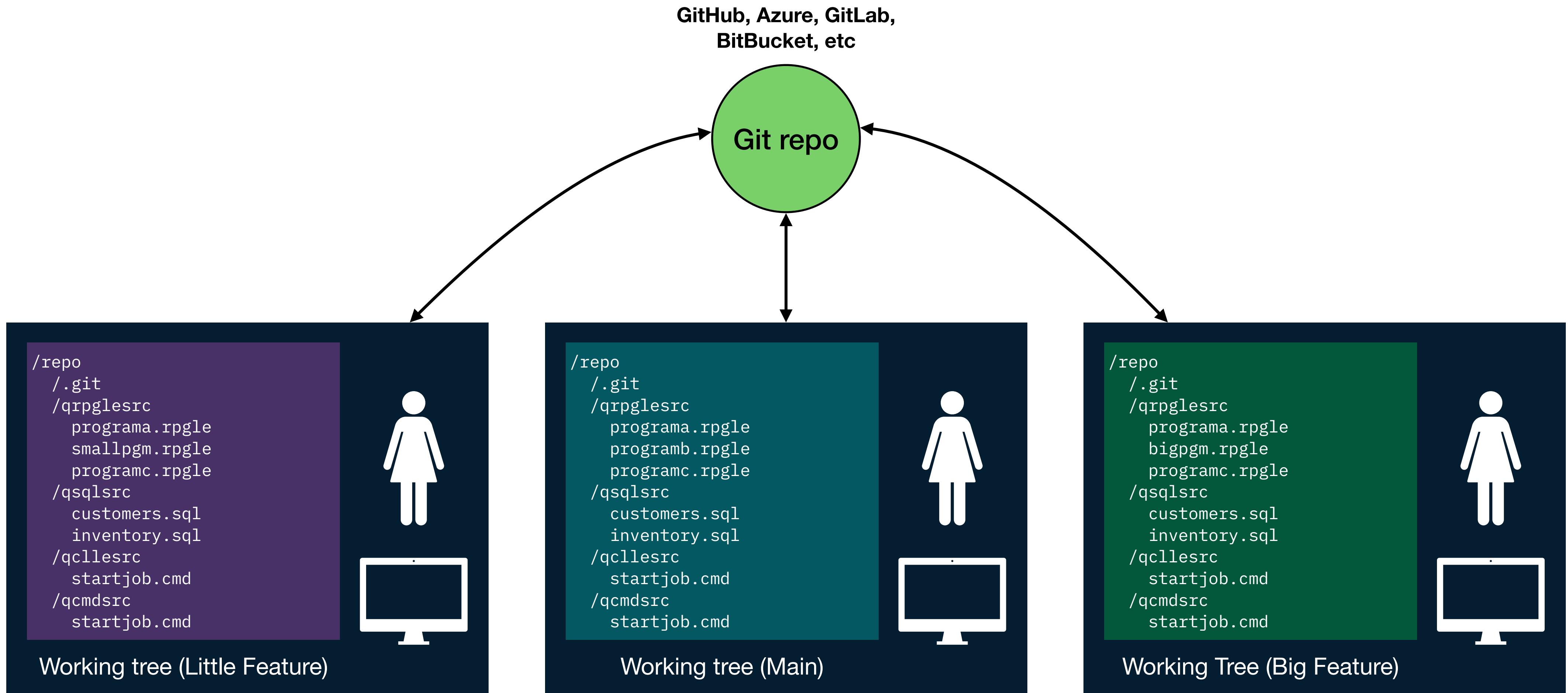
Distributed



Branching

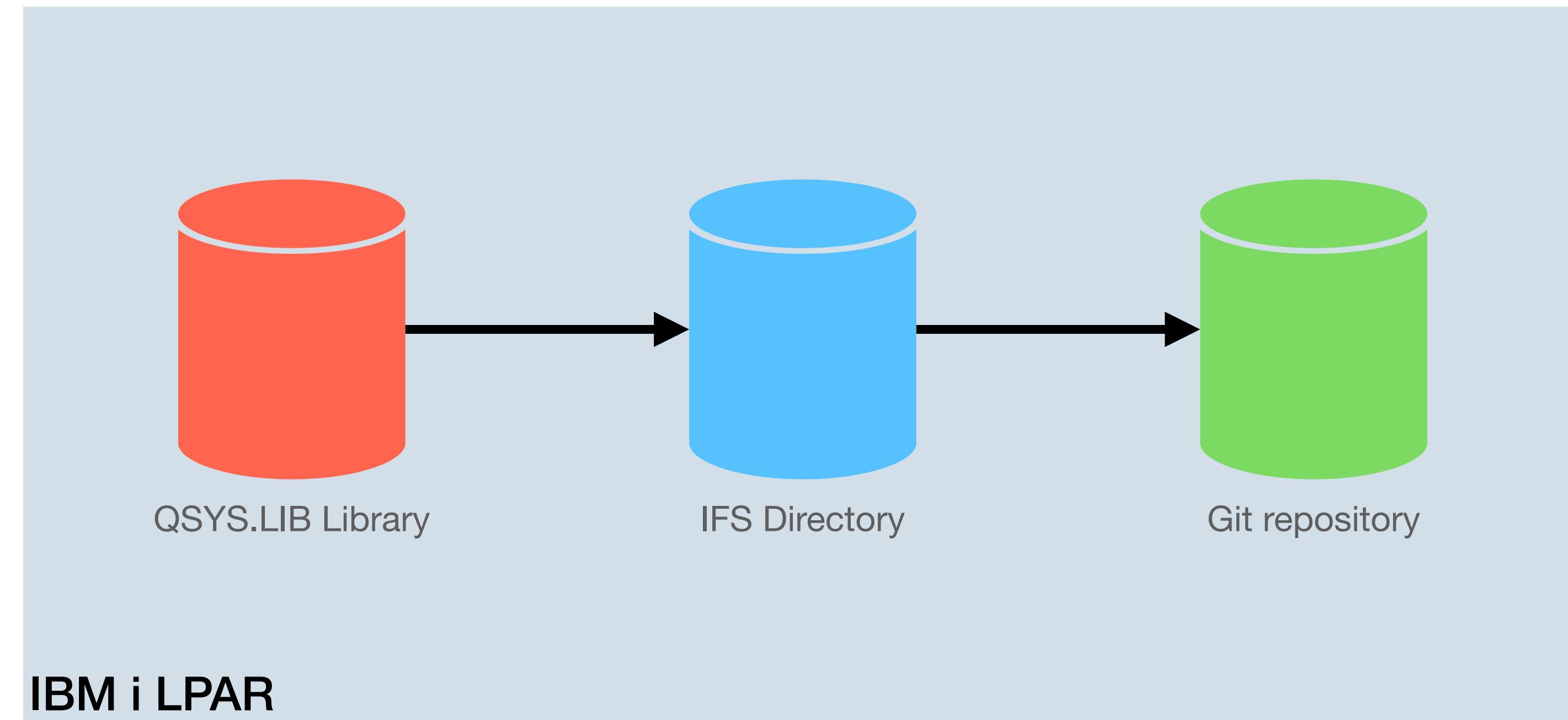


Branching



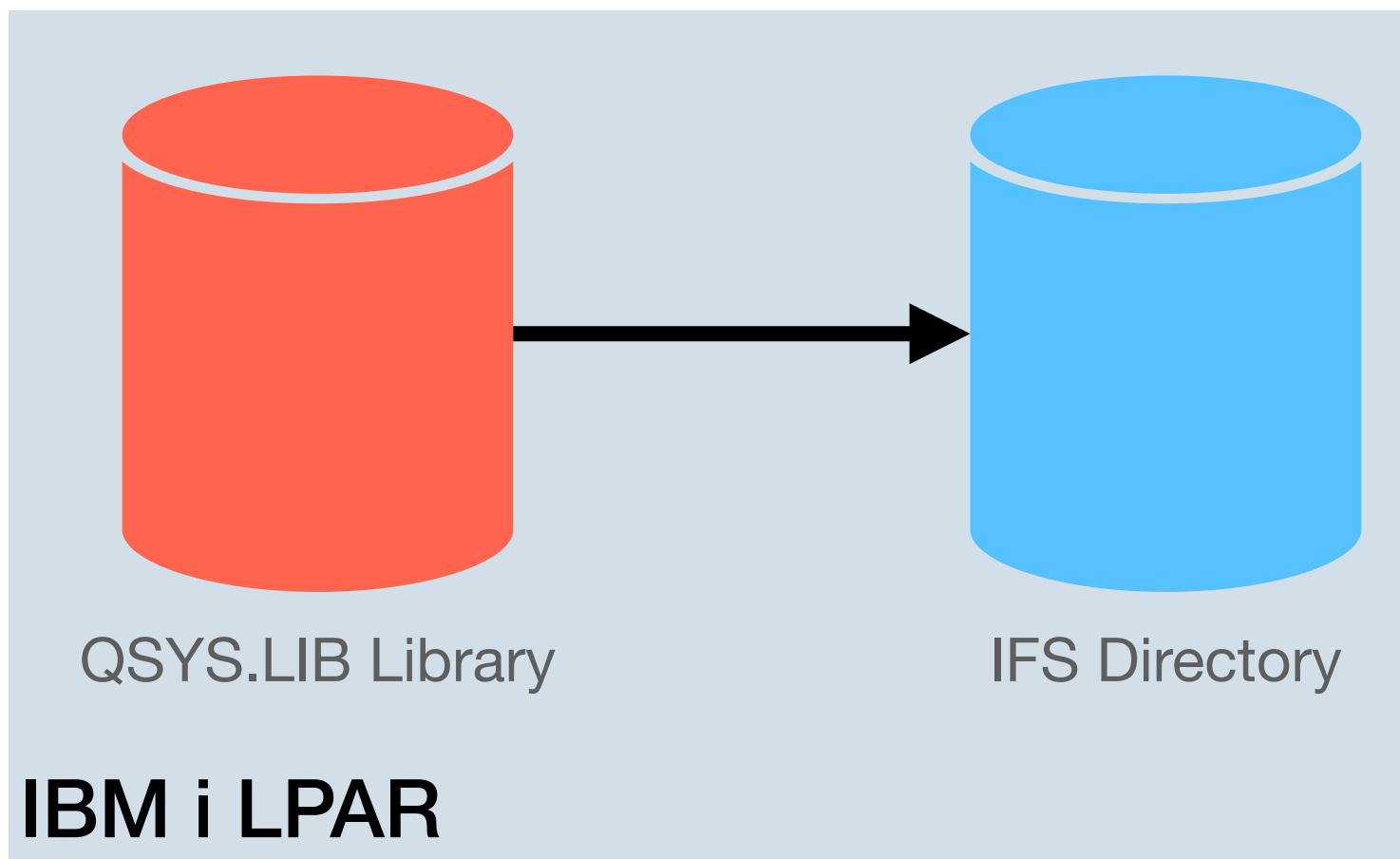
How?

How to move source into git?



CPYTOSTMF

```
CPYTOSTMF  
FROMMBR('/QSYS.lib/DEVLIB.lib/QRPGLESRC.file/PROGRAMA.mbr')  
TOSTMF('/home/barry/myproject/qrglesrc/programa.rpgle')  
STMFOPT(*REPLACE) STMFCCSID(1208)
```



ibmi-bob cvtsrcpf (FOSS)

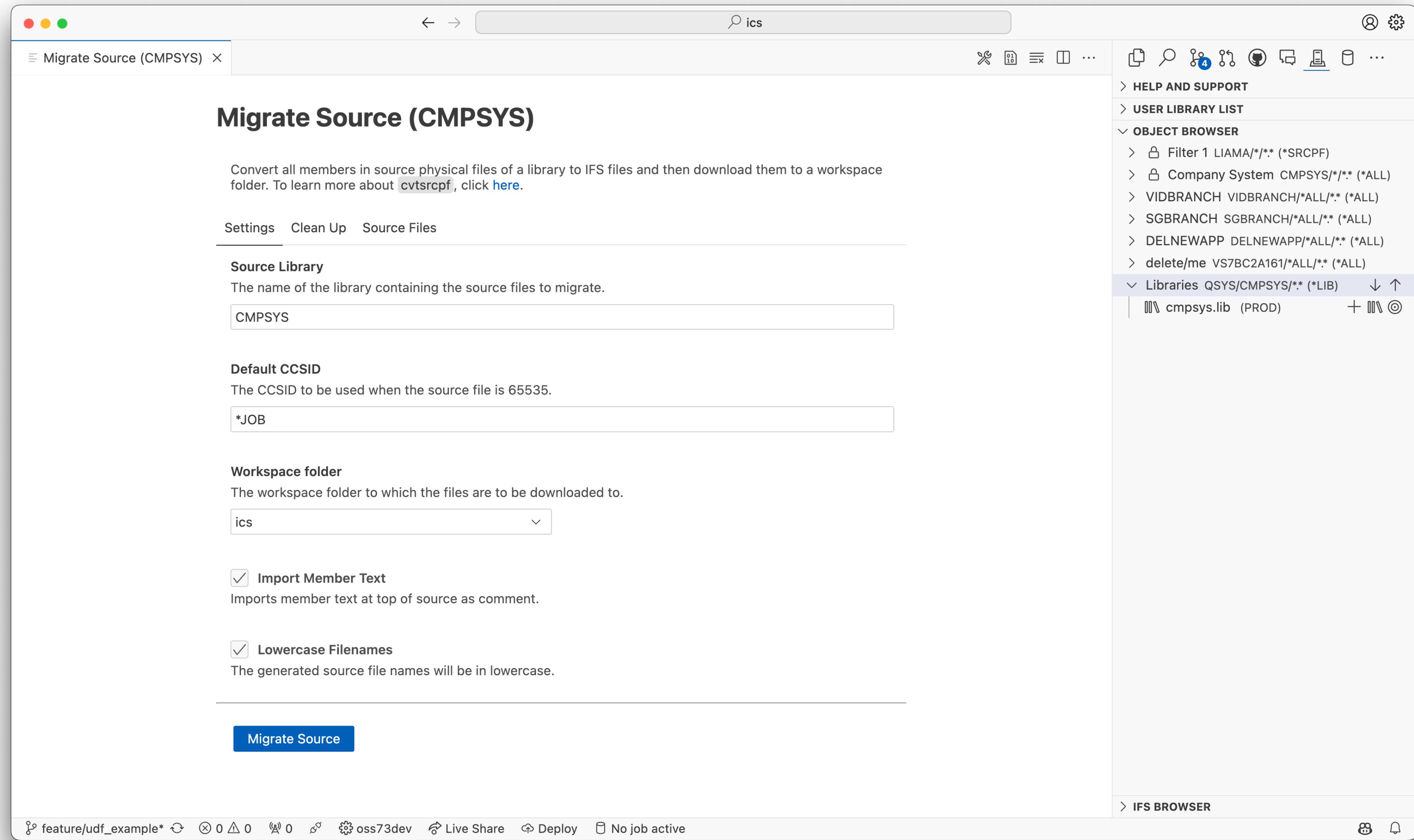
```
cd myproject/qrglesrc  
makei cvtsrcpf qrglesrc testproj
```

Migrate Tool (FOSS)

```
MIGSRCPF LIBRARY(TESTPROJ) SOURCEPF(QRPGLESRC)  
OUTDIR('/home/BARRY/myproject')
```

Vendor tools

Thru VS Code



<https://ibm.github.io/vscode-ibmi-projectexplorer/#/pages/projectExplorer/migrate-source>

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

```
cd ./repo  
git init --bare
```

Changes for the compilers

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

BBSADNUDFR.pgm.rpgle — BBS400

```

EXPLORER
  BBS400
    > IFS
    > screenshots
    > src
      #BUILD.pgm.cle
      #LICENSE.txt
      #MAKE.pgm.cle
      BBS400PROD.pgm.cle
      BBSAACCLVD.dspf
      BBSAACCLVR.pgm.rpgle M
      BBSABLD.dspf
      BBSADGCD.dspf
      BBSADGCR.pgm.rpgle M
      BBSADMMNUD.dspf
      BBSADMMUR.pgm.rpgle M
      BBSADNUDFD.dspf
      BBSADNUDFR.pgm.rpgle M
      BBSAEPGMMD.dspf
      BBSAEPGMMR.pgm.rpgle M
      BBSBRDLDD.dspf
      BBSBRDLR.pgm.rpgle M
      BBSDSPIFSC.pgm.cle
      BBSETPGMSD.dspf
      BBSETPGMSR.pgm.rpgle M
      BBSHELPERC.pgm.cle
      BBSHELPPNL.pnlgrp
      BBSIFSFILD.dspf
      BBSIFSFILR.pgm.rpgle M
      BBSINFC.pgm.cle
      BBSINFID.dspf
      BBSLGIND.dspf
      BBSLGINR.pgm.rpgle M
      BBSLSTUSRD.dspf
      BBSLSTUSRRT.pgm.rpgle M
      BBSMENUD.dspf
      BBSMENUR.pgm.rpgle M
      BBSMSGSD.dspf
      BBSMSGSLL.DSPF
  PROJECT EXPLORER
  JOB LOG

BBSADNUDFR.pgm.rpgle (Working Tree) M X
src > BBSADNUDFR.pgm.rpgle > ...
1 H/TITLE Administration - New User default values
2 H COPYRIGHT('(C) 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 → 10+
11 ****
12 * INDICATORS USED:
13 * 80 - *ON turns DSPATR(PR), which protects fields from being change
14 * 81 - CBKPCFGREA CHAIN Not Found
15 ****
16 FBBSADNUDFDC F E WORKSTN
17 FPCONFIG UF E K DISK
18 ****
19 * Data structures
20- D/COPY DVBB5400/CURRENTSRC,CBKDTAARA → 20+
21 * Constants
22 D cKeysDft C CONST('F10>Edit F12=Go back')
23 D cKeysEdit C CONST('F10=Confirm Changes F1
cel')
24 D cSavedOK C CONST('Configuration was change
cessfully.')
25 D cSavedKO C CONST('There was an error while
ting to PCONFIG.')
26 D
27 D
28 D
29 * Variables
30- D/COPY DVBB5400/CURRENTSRC,CBKPCFGDCL → 30+
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 C *Protect fields from being modified
46 C EVAL *IN80 = *ON
47 C *Get values from PCONFIG and show them on screen

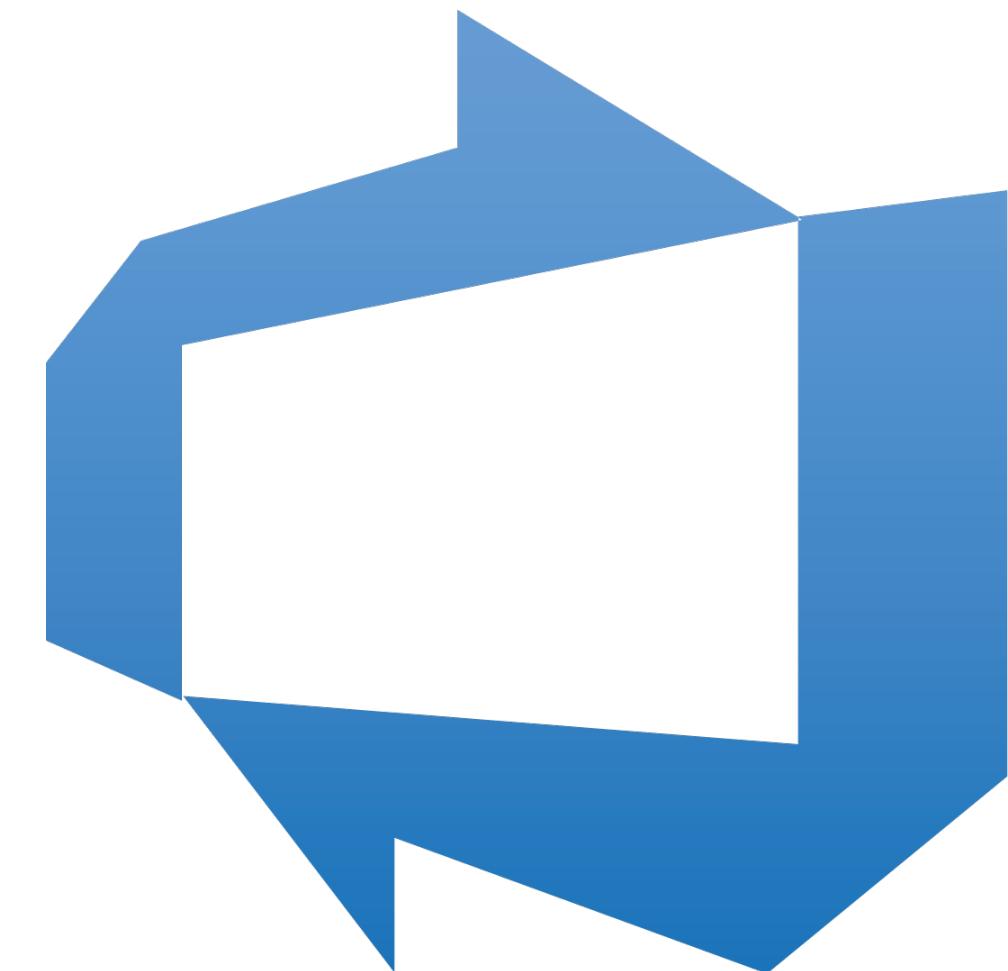
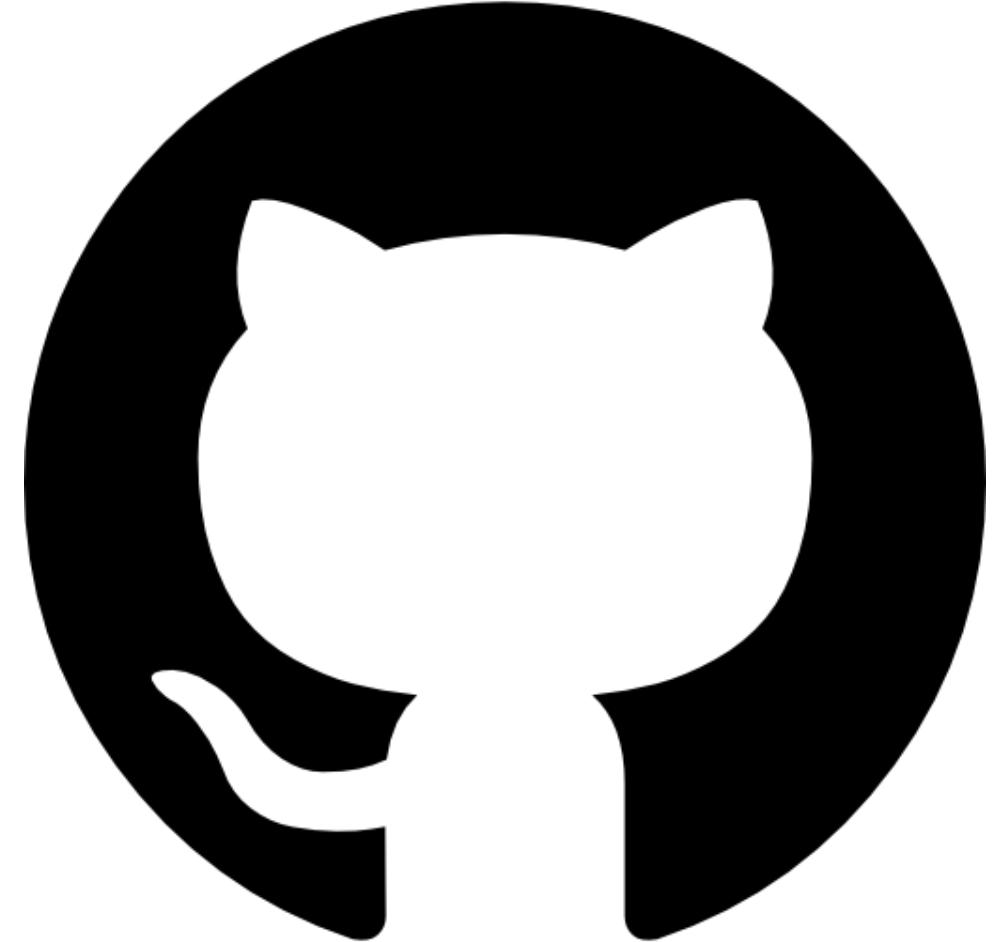
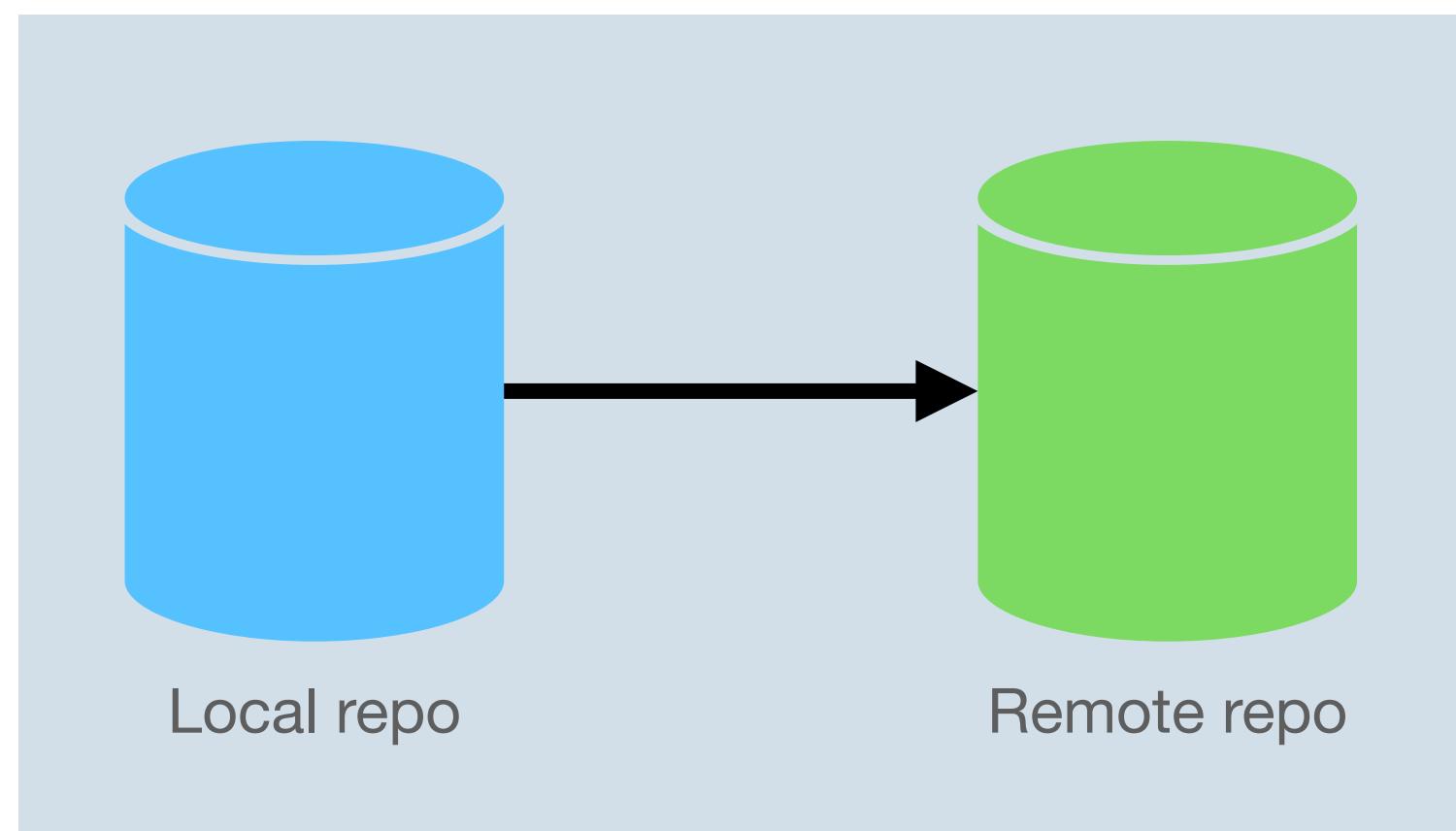
1 H/TITLE Administration - New User default values
2 H COPYRIGHT('(C) 2020 David Asta under MIT License')
3 * SYSTEM : V4R5
4 * PROGRAMMER : David Asta
5 * DATE-WRITTEN: 25/NOV/2020
6 *
7 * This program allows an Administrator user to display/change the
8 * New User default values
9 ****
10+ /copy 'src/CBKOPTIMIZ.rpgleinc' You, 1 second ago • Uncommitted
11 ****
12 * INDICATORS USED:
13 * 80 - *ON turns DSPATR(PR), which protects fields from being change
14 * 81 - CBKPCFGREA CHAIN Not Found
15 ****
16 FBBSADNUDFDC F 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
cel')
24 D cSavedOK C CONST('Configuration was change
cessfully.')
25 D cSavedKO C CONST('There was an error while
ting to PCONFIG.')
26 D
27 D
28 D
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 = 'BBSADNUDF'
45 C *Protect fields from being modified
46 C EVAL *IN80 = *ON
47 C *Get values from PCONFIG and show them on screen

```

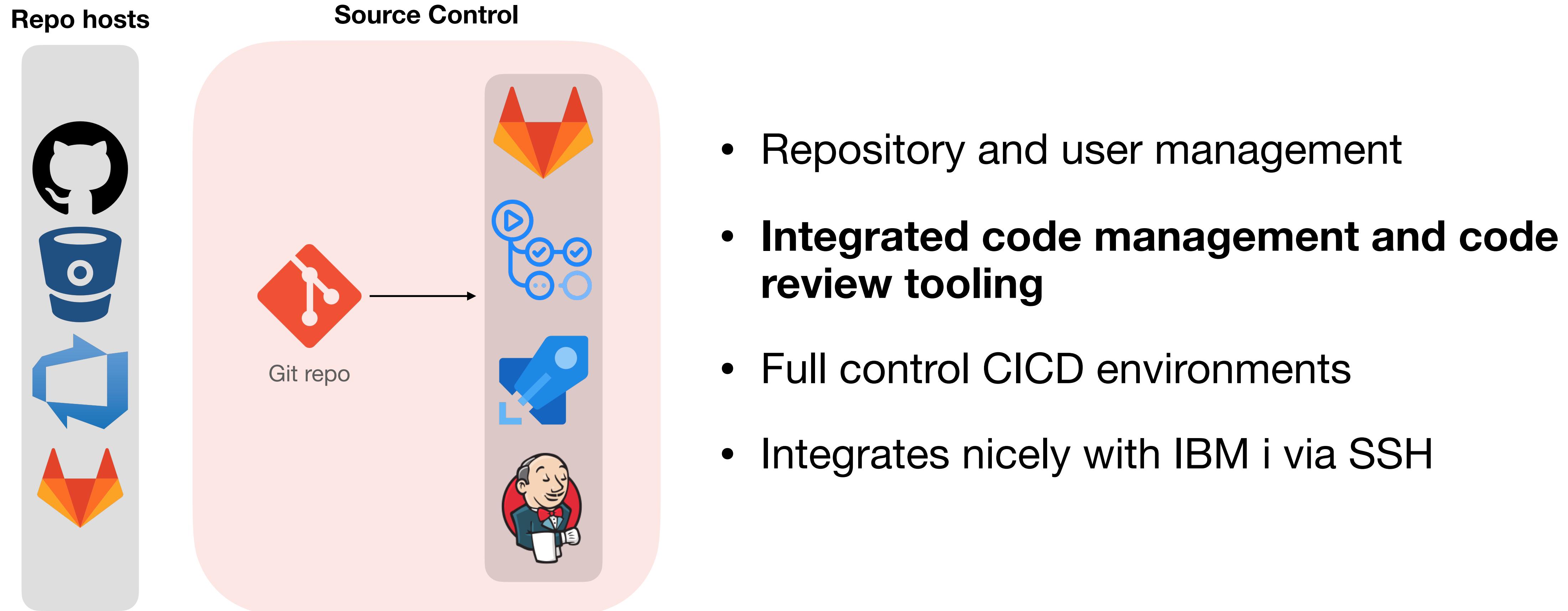
x gggg* ⌂ ⌂ 0 △ 0 Project: GitLens Pro (Trial)

You, 1 second ago Ln 10, Col 1 Spaces: 5 UTF-8 LF RPGLE ⌂ ⌂

Where to host?

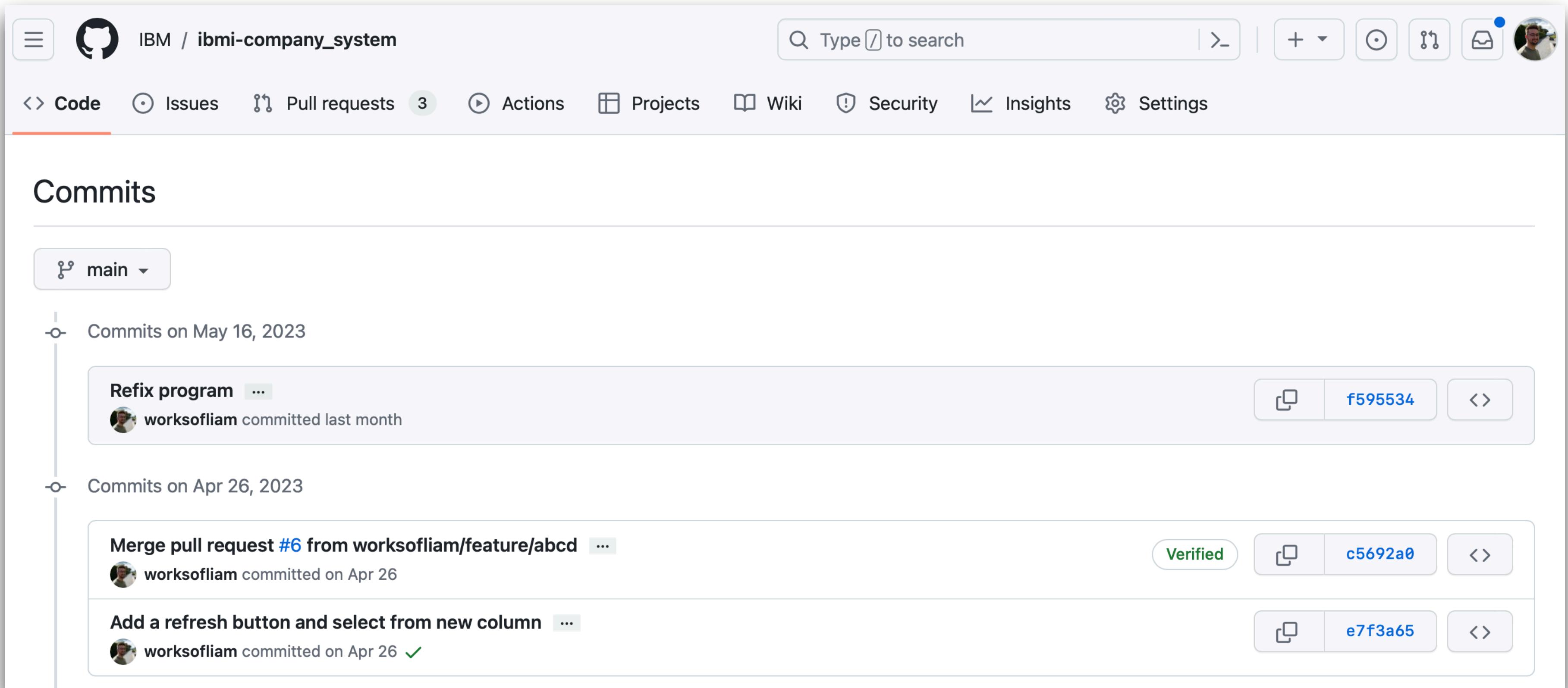


Git tooling and automation



Commit History

GitHub
Azure DevOps
GitLab
Bamboo

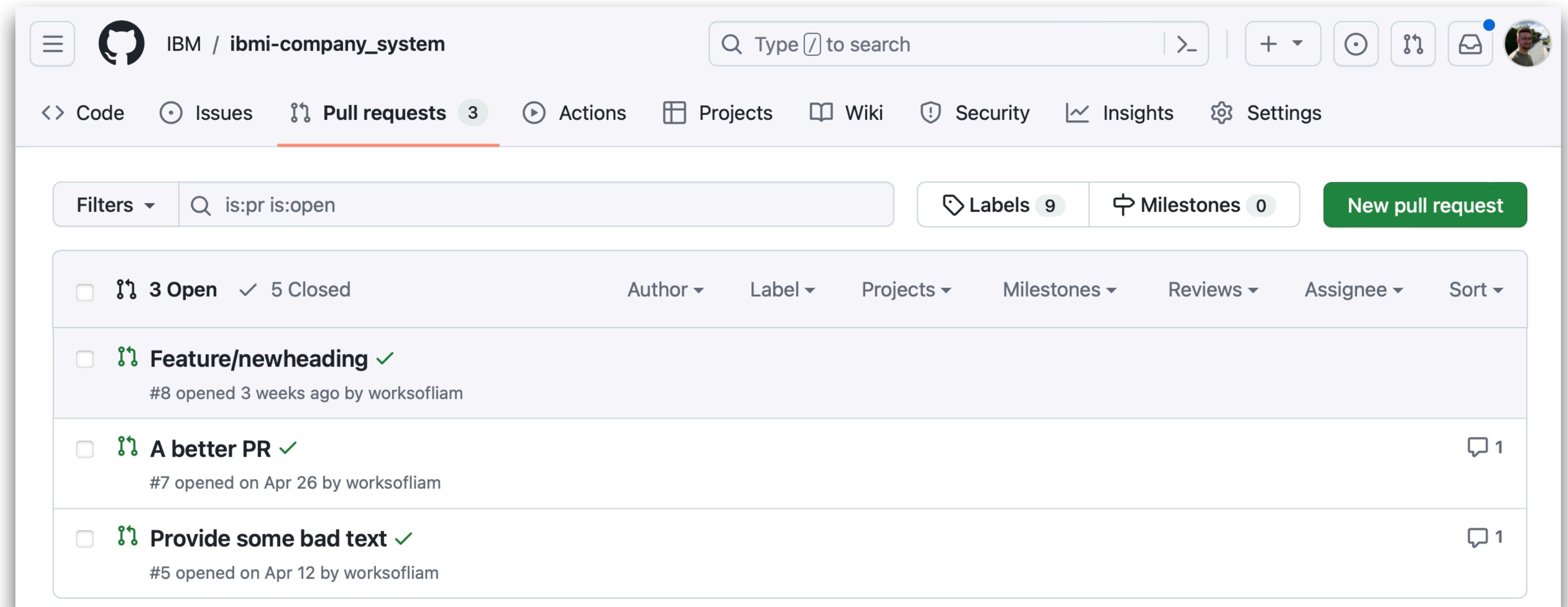


The screenshot shows the GitHub interface for the repository `ibmi-company_system`. The main navigation bar includes links for Code, Issues, Pull requests (3), Actions, Projects, Wiki, Security, Insights, and Settings. A search bar at the top right allows users to search for specific commits or code snippets. The main content area is titled "Commits" and displays the commit history for the `main` branch. Two distinct commit groups are shown:

- Commits on May 16, 2023:**
 - A single commit by `worksofliam` titled "Refix program". The commit message indicates it was committed "last month". The commit hash is `f595534`.
- Commits on Apr 26, 2023:**
 - A merge commit titled "Merge pull request #6 from worksofliam/feature/abcd" by `worksofliam`, which was committed on Apr 26. This commit is marked as "Verified". The commit hash is `c5692a0`.
 - A second commit by `worksofliam` on Apr 26, titled "Add a refresh button and select from new column". This commit is also marked as "Verified". The commit hash is `e7f3a65`.

Pull Requests

GitHub
Azure DevOps
GitLab
Bamboo

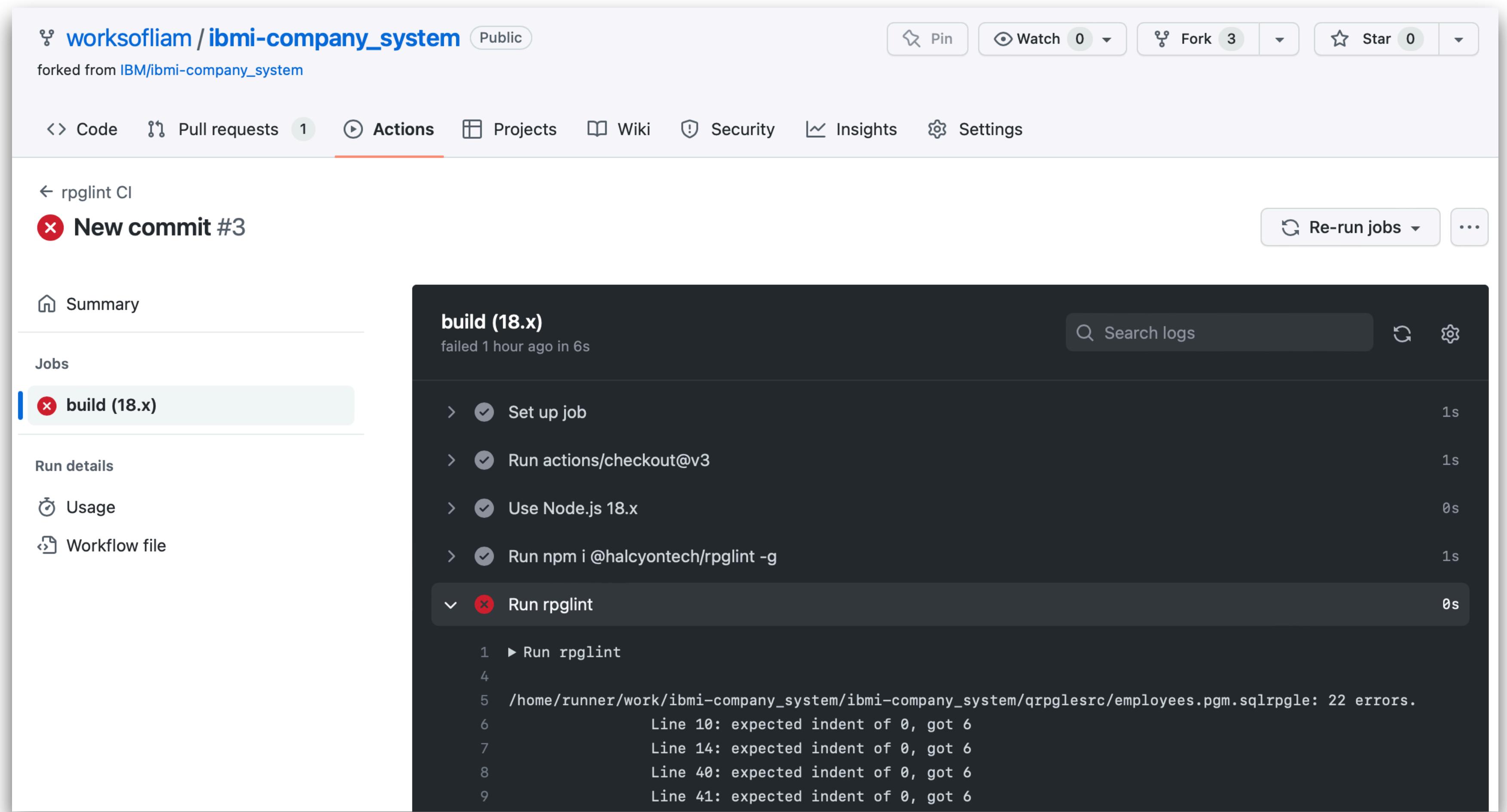


The screenshot shows the GitHub interface for the repository `ibmi-company_system`. The `Pull requests` tab is selected, showing 3 open pull requests and 5 closed ones. The search bar contains the query `is:pr is:open`. The filters section shows 3 open PRs and 5 closed PRs. The pull requests listed are:

- #8: **Feature/newheading** ✓, opened 3 weeks ago by `worksofliam`
- #7: **A better PR** ✓, opened on Apr 26 by `worksofliam`, with 1 comment
- #5: **Provide some bad text** ✓, opened on Apr 12 by `worksofliam`, with 1 comment

CI/CD

GitHub Actions
Azure DevOps Pipelines
GitLab CICD
Bamboo



The screenshot shows a GitHub Actions build log for a commit. The repository is `worksofliam / ibmi-company_system`. The commit is labeled `New commit #3`. The build step `build (18.x)` failed 1 hour ago in 6s. The log details the steps: Set up job, Run actions/checkout@v3, Use Node.js 18.x, Run npm i @halcyontech/rpglint -g, and Run rpglint. The Run rpglint step failed with the following output:

```
1 ► Run rpglint
4
5 /home/runner/work/ibmi-company_system/ibmi-company_system/qrpglesrc/employees.pgm.sqlrpgle: 22 errors.
6 Line 10: expected indent of 0, got 6
7 Line 14: expected indent of 0, got 6
8 Line 40: expected indent of 0, got 6
9 Line 41: expected indent of 0, got 6
```

Insights

halcyon-tech / vscode-ibmi

Type to search | [>](#) | [+ ▾](#) | [\(\)](#) | [\(\)](#) | [\(\)](#) | [\(\)](#) | 

[Code](#) [Issues 39](#) [Pull requests 9](#) [Discussions](#) [Actions](#) [Security](#) [Insights](#) [Settings](#)

[Period: 1 week ▾](#)

Pulse

- Contributors
- Community
- Community Standards
- Traffic
- Commits
- Code frequency
- Dependency graph
- Network
- Forks
- People

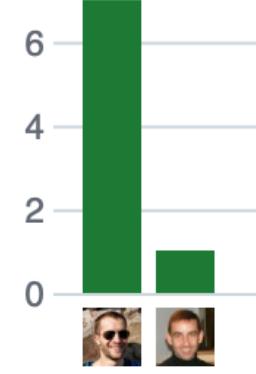
June 6, 2023 – June 13, 2023

Overview

8 Active pull requests 10 Active issues

 5 Merged pull requests	 3 Open pull requests	 6 Closed issues	 4 New issues
---	---	--	---

Excluding merges, 2 authors have pushed 7 commits to master and 8 commits to all branches. On master, 5 files have changed and there have been 97 additions and 56 deletions.



1 Release published by 1 person

 1.9.4 Code for IBM i 1.9.4
published 4 days ago

Project Management

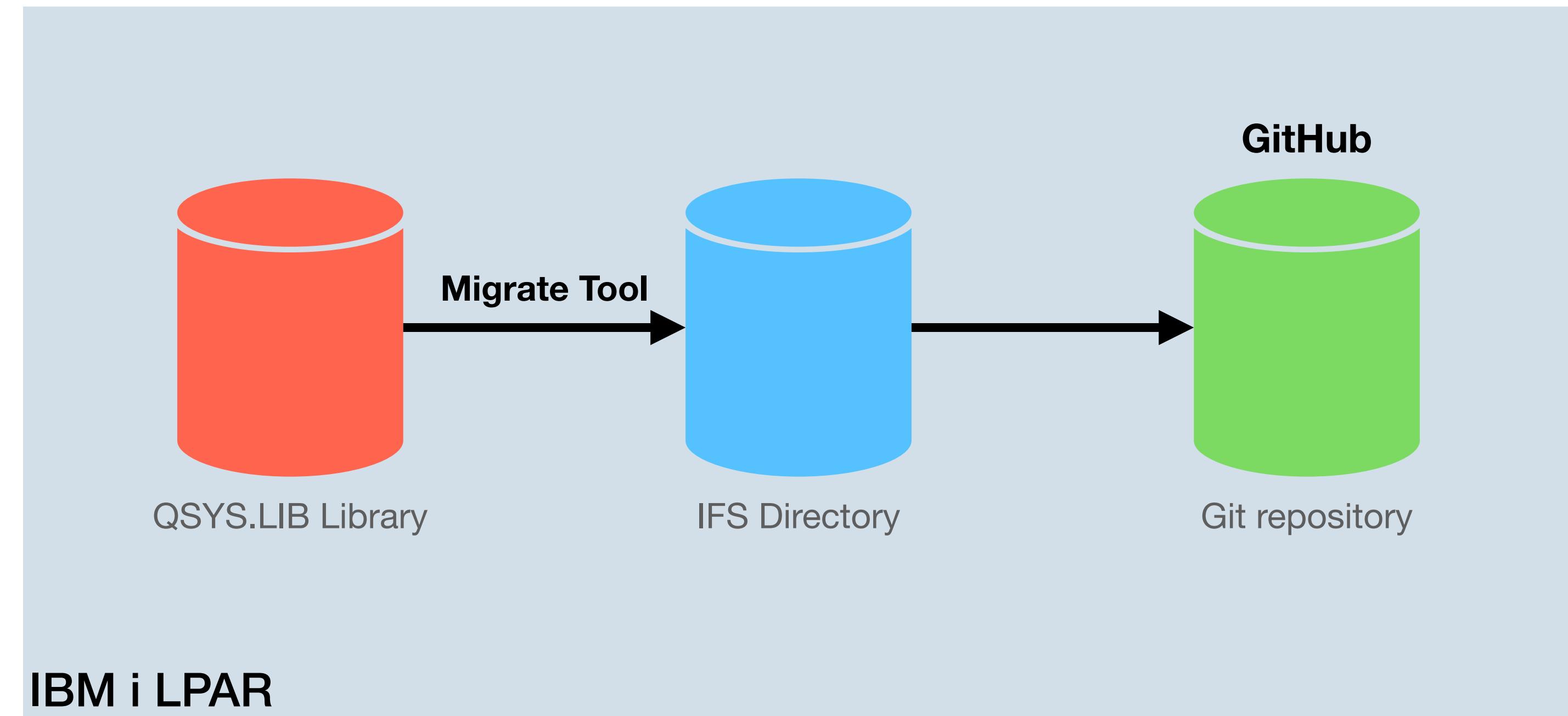
GitHub
Azure DevOps
GitLab
Bamboo (Jira)

The screenshot shows a project management interface for the 'Ecosystem Ideas' board in a GitHub Project. The board has columns for Title, Status, Assignees, Task repo, and Notes. There are 9 items listed:

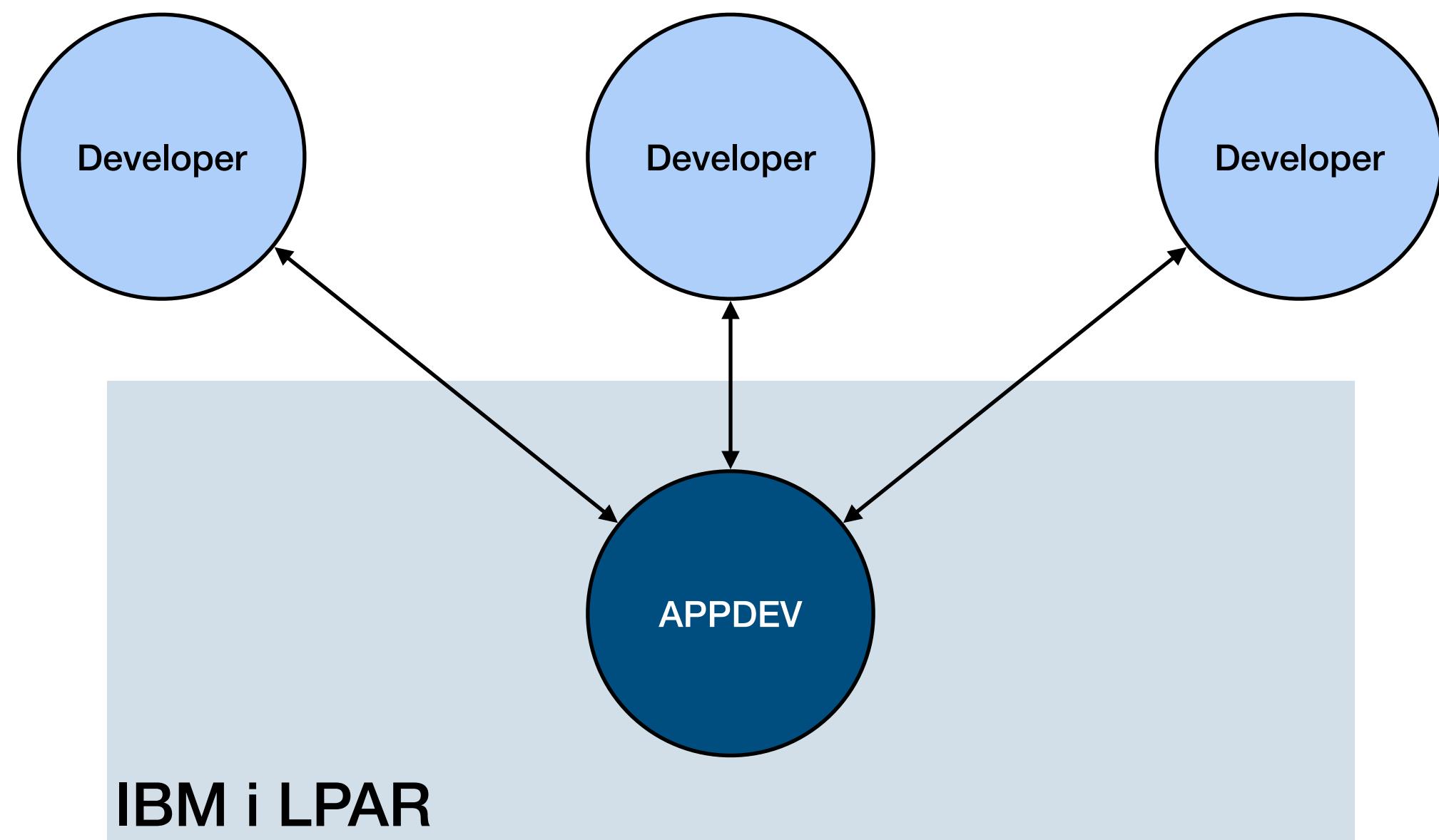
Title	Status	Assignees	Task repo	Notes
1 vscode-ibmi-fs #712	Done	worksofliam	vscode-ibmi-fs	WIP, but bas...
2 Code for IBM i (base) conversion to TypeScript	Done	worksofliam	vscode-ibmi	
3 Cleanup of path resolving for all file systems #136	Done		vscode-ibmi	
4 Code Coverage converted to TS	Todo		code-coverage-ibmi	
5 Code Coverage UX improvements	Todo		code-coverage-ibmi	Depends on...
6 Code Coverage to support local workspace configuration	Todo		code-coverage-ibmi	Depends on...
7 vscode-db2i converted to TS	Done	worksofliam	vscode-db2i	https://github...
8 Debugger for ILE programs	Done	worksofliam	vscode-ibmi	Due release...
9 User experience testing	Todo	worksofliam		Ensuring cre...

A message at the bottom says: '+ You can use Control + Space to add an item'.

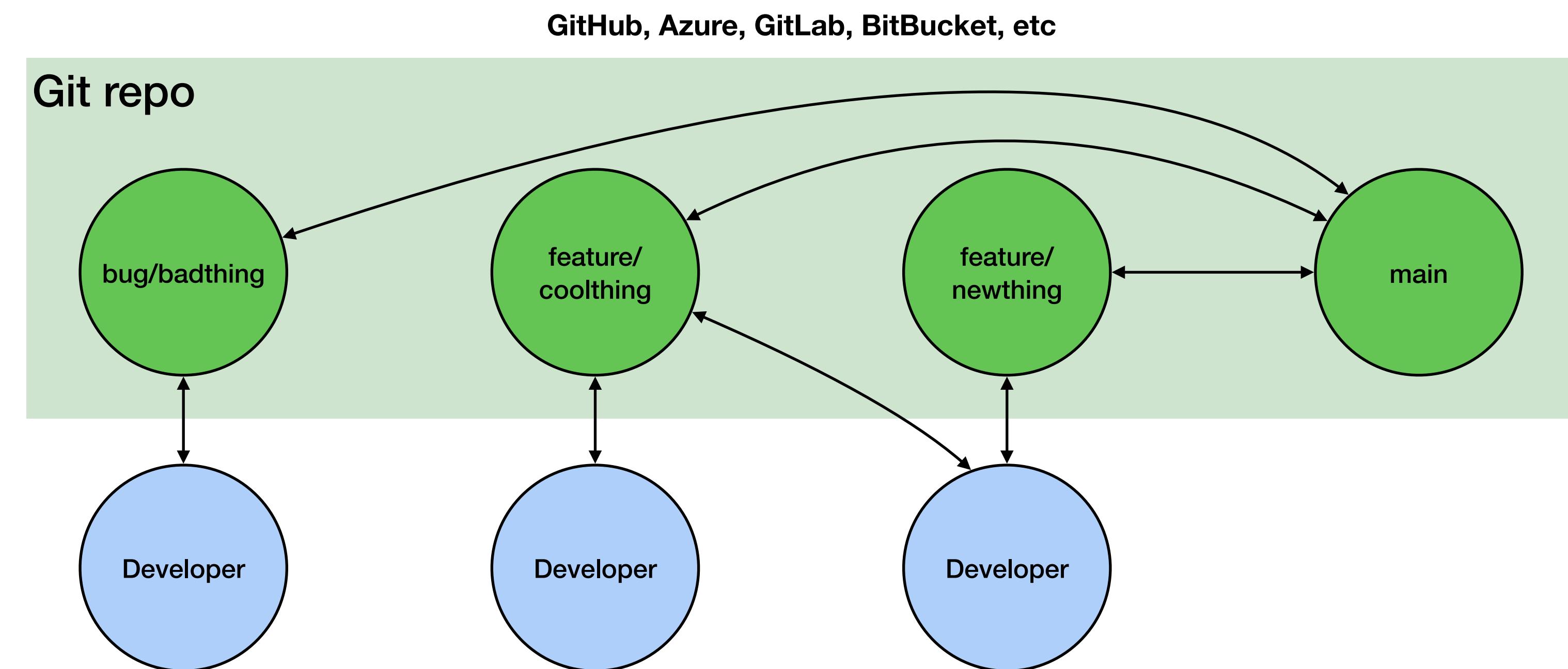
Know your choices



Old way (source members)

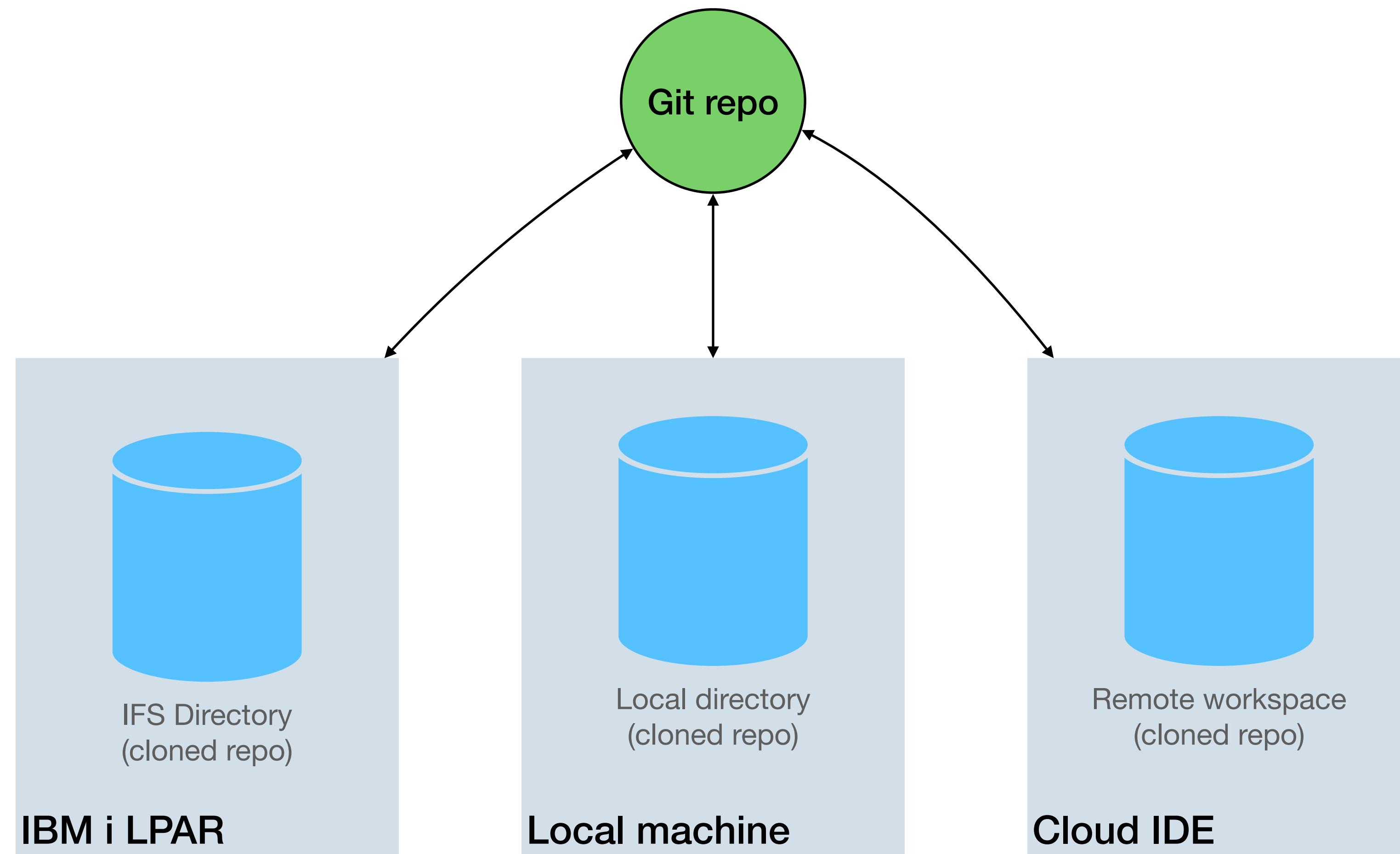


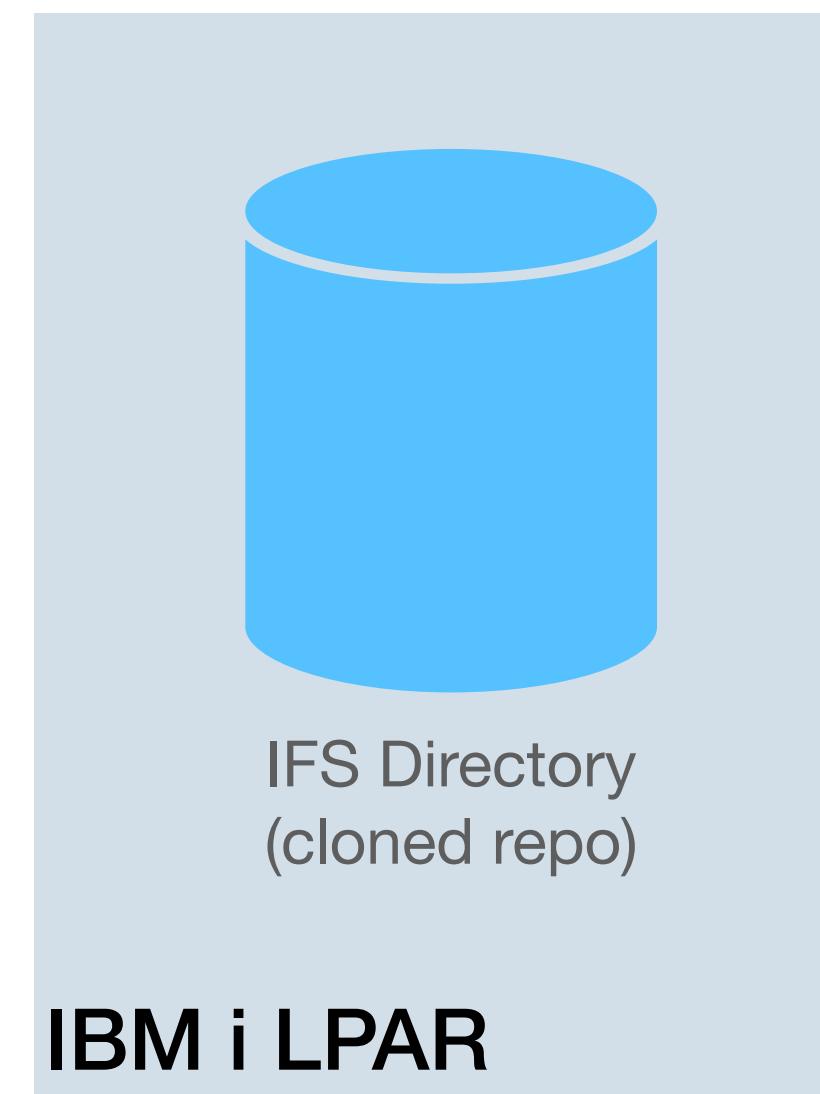
New way



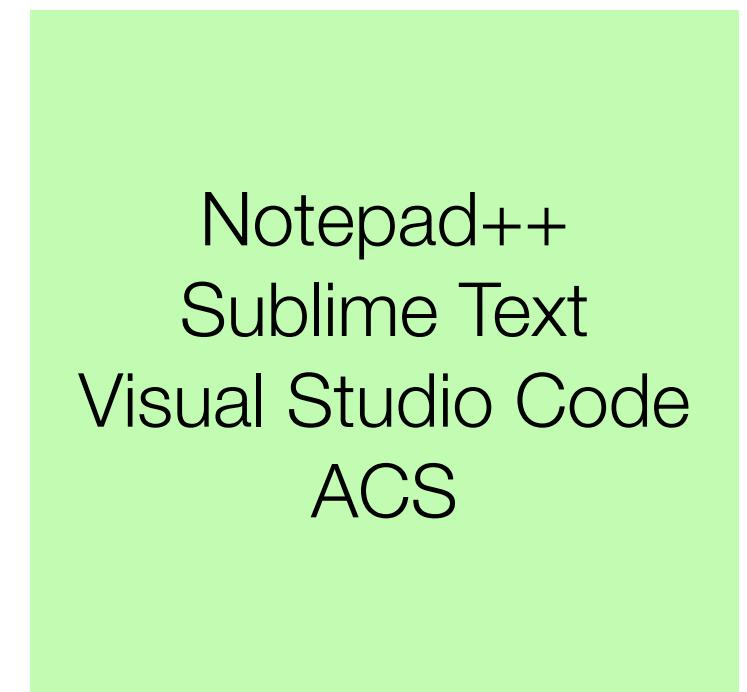
**Where
can you develop?**

Where do you write code?

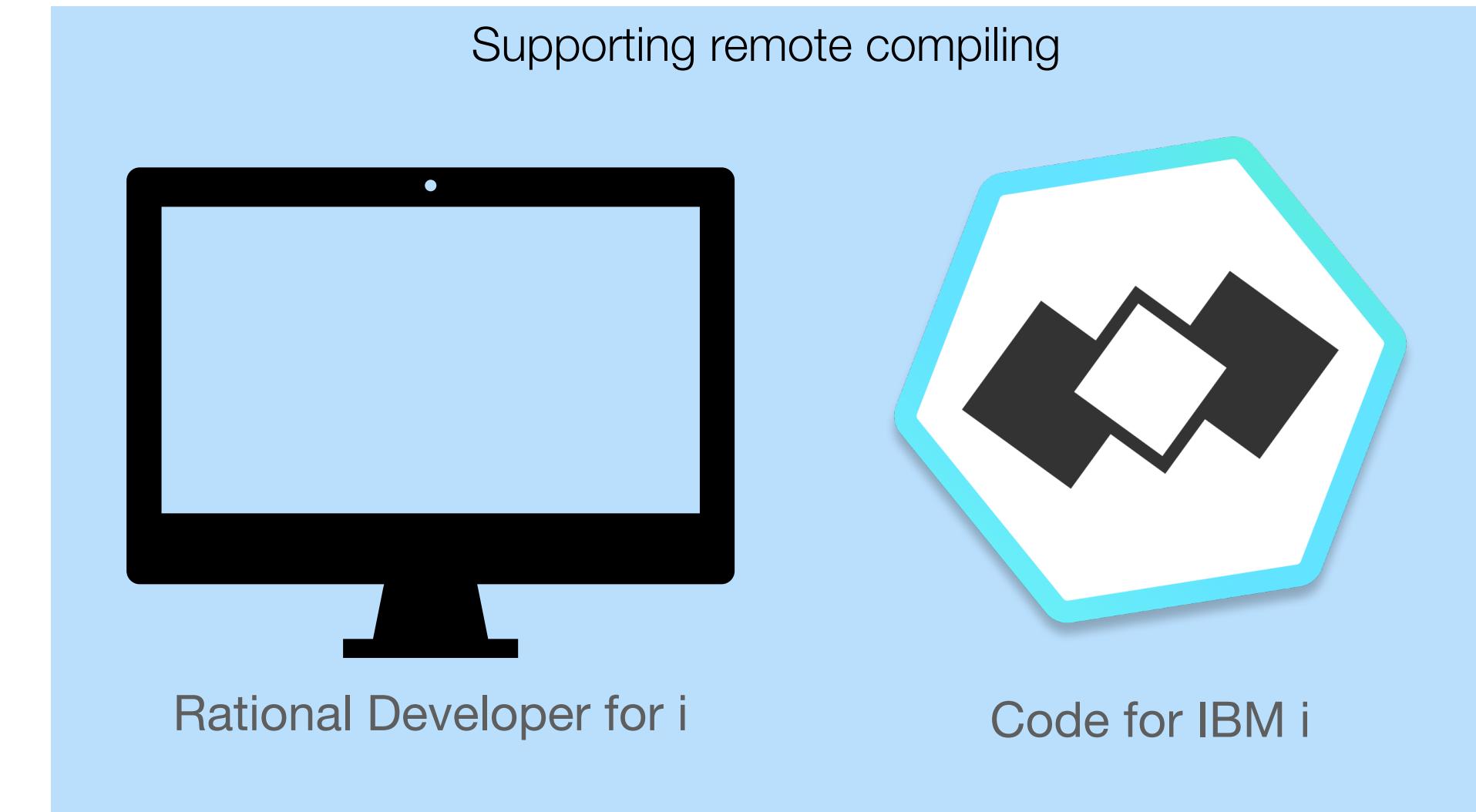


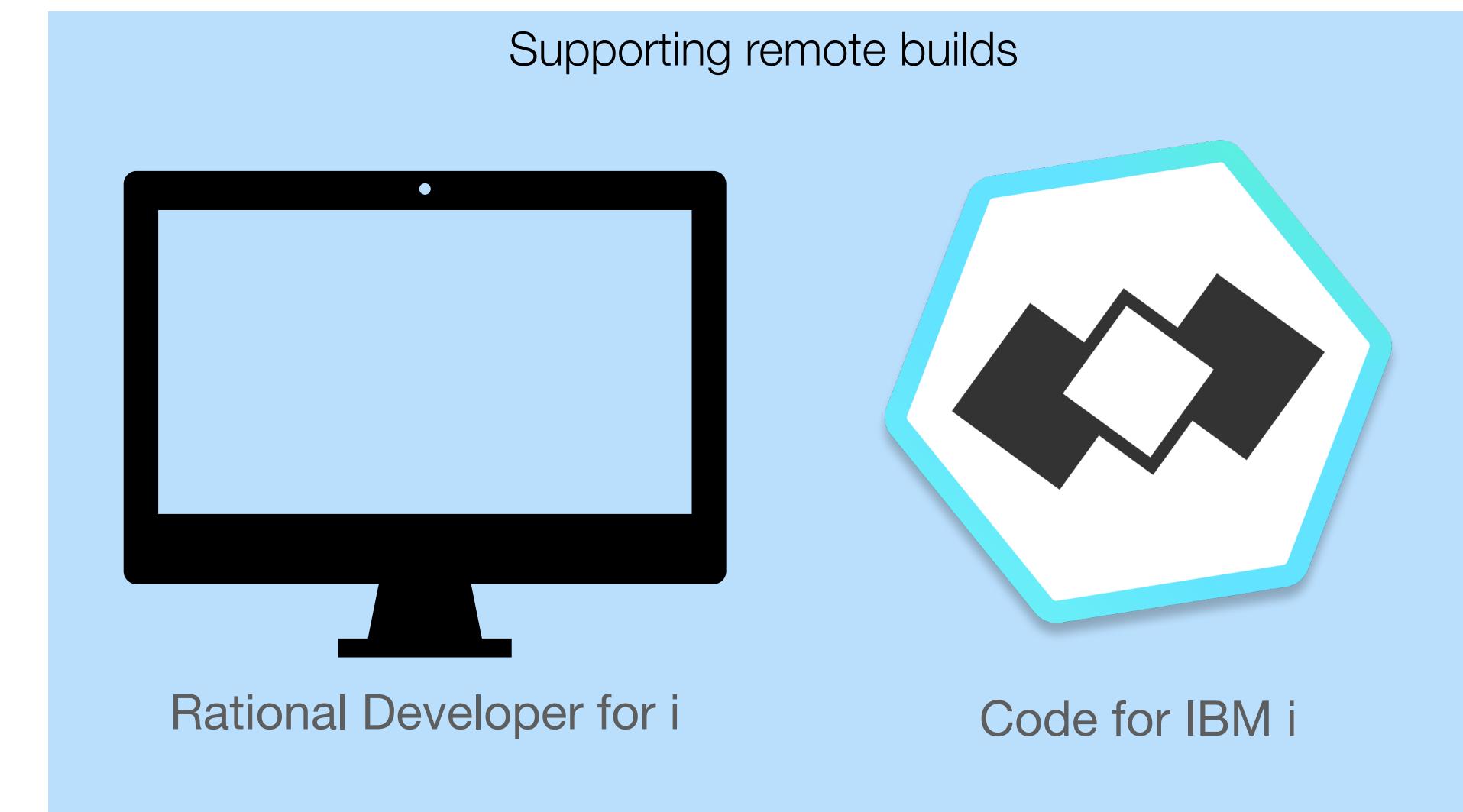
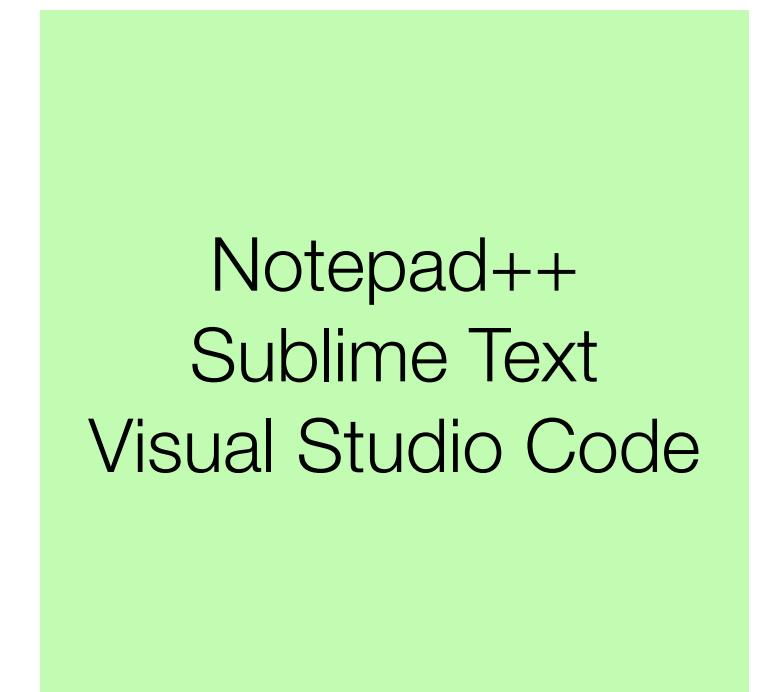
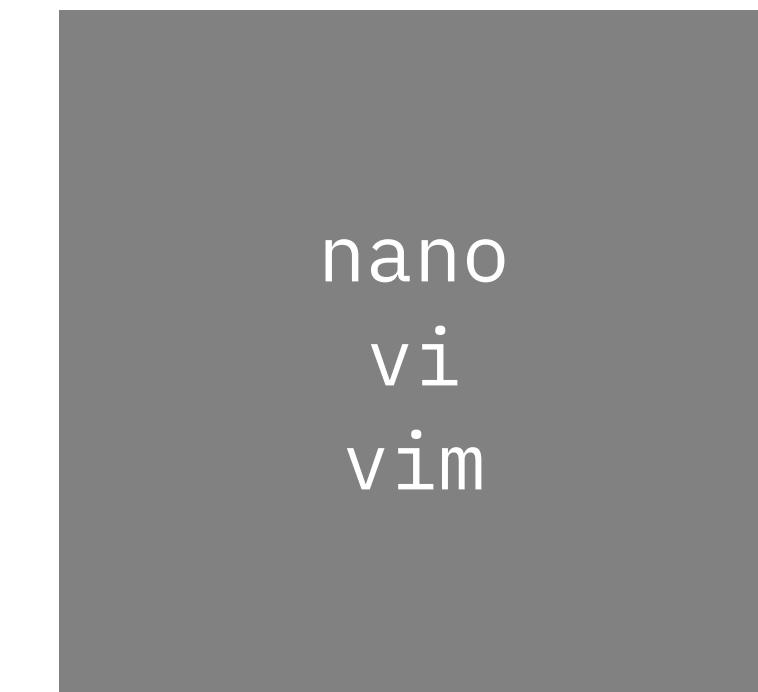
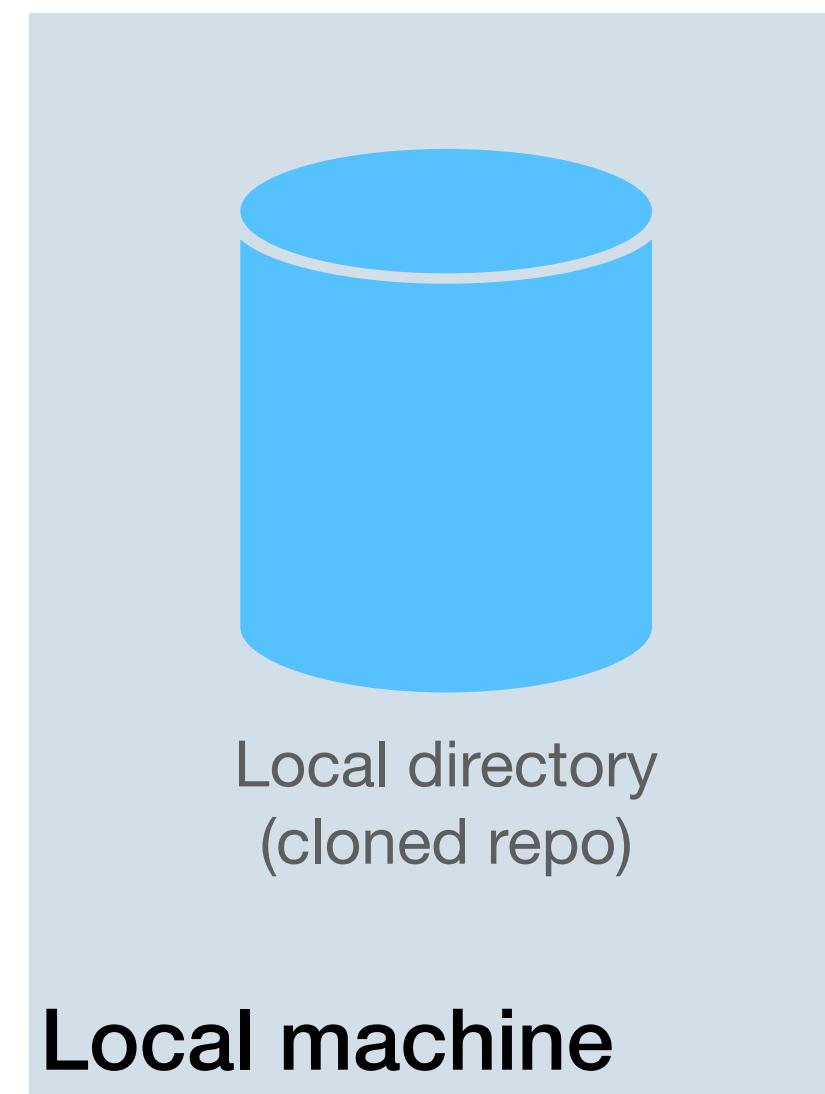


Terminal Editors



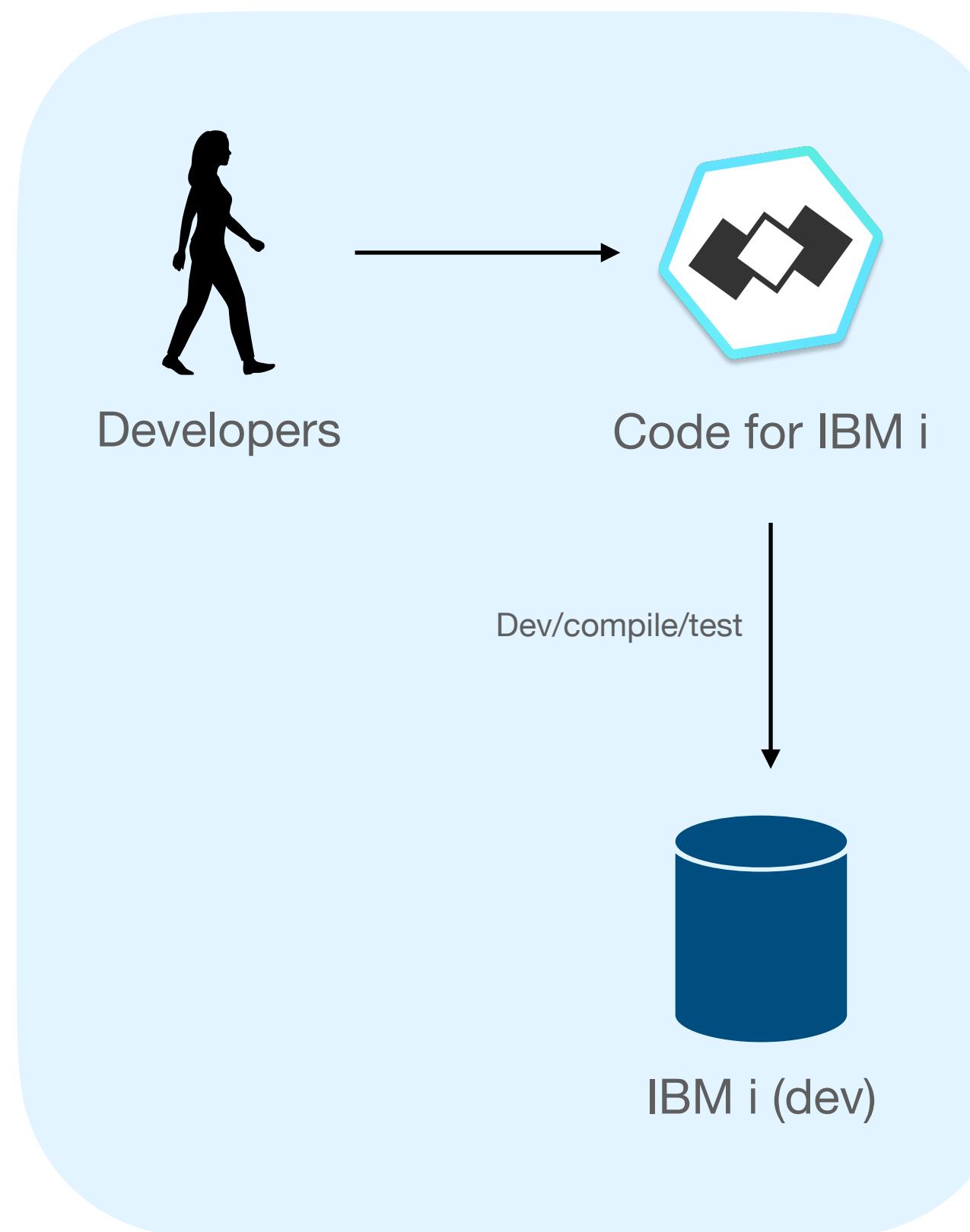
SSH editors





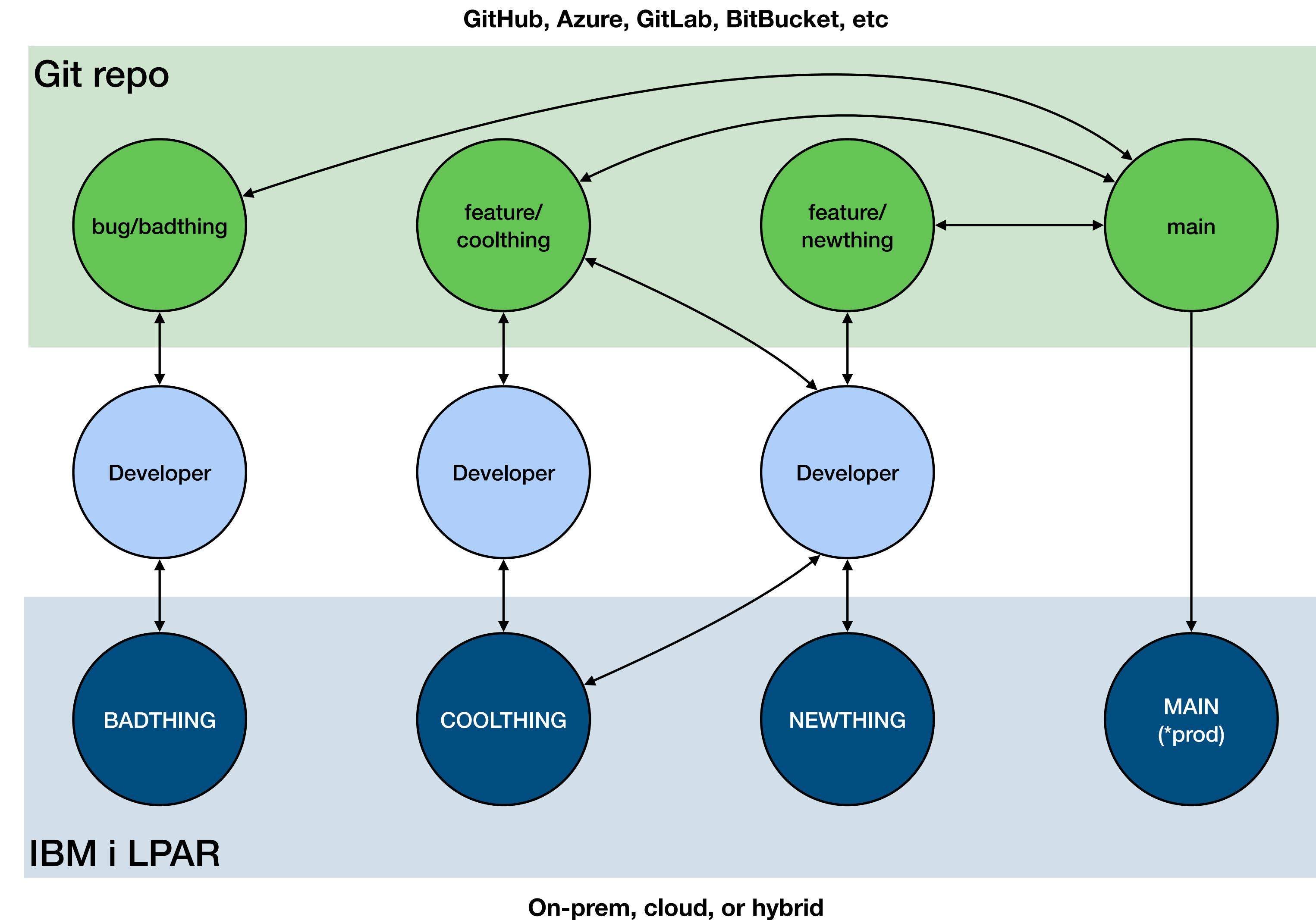
Visual Studio Code

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

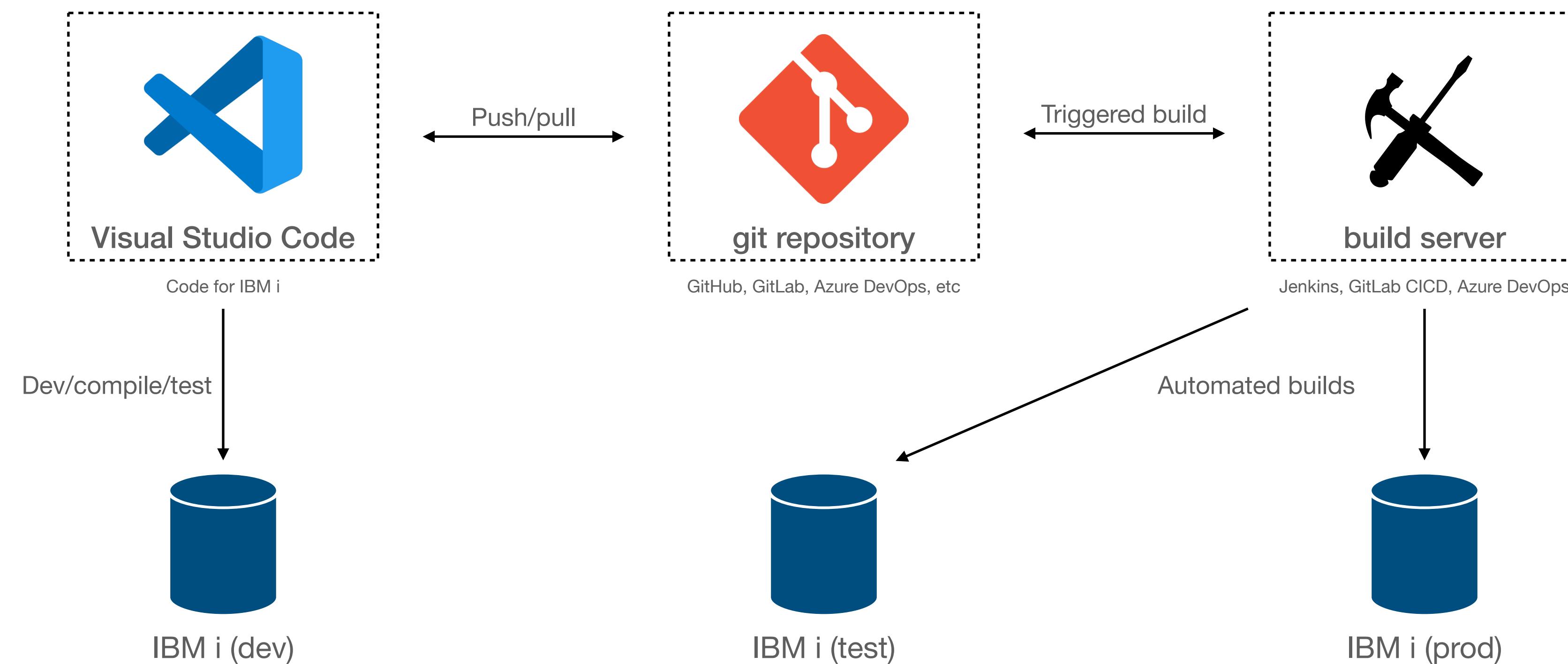
Concurrent development

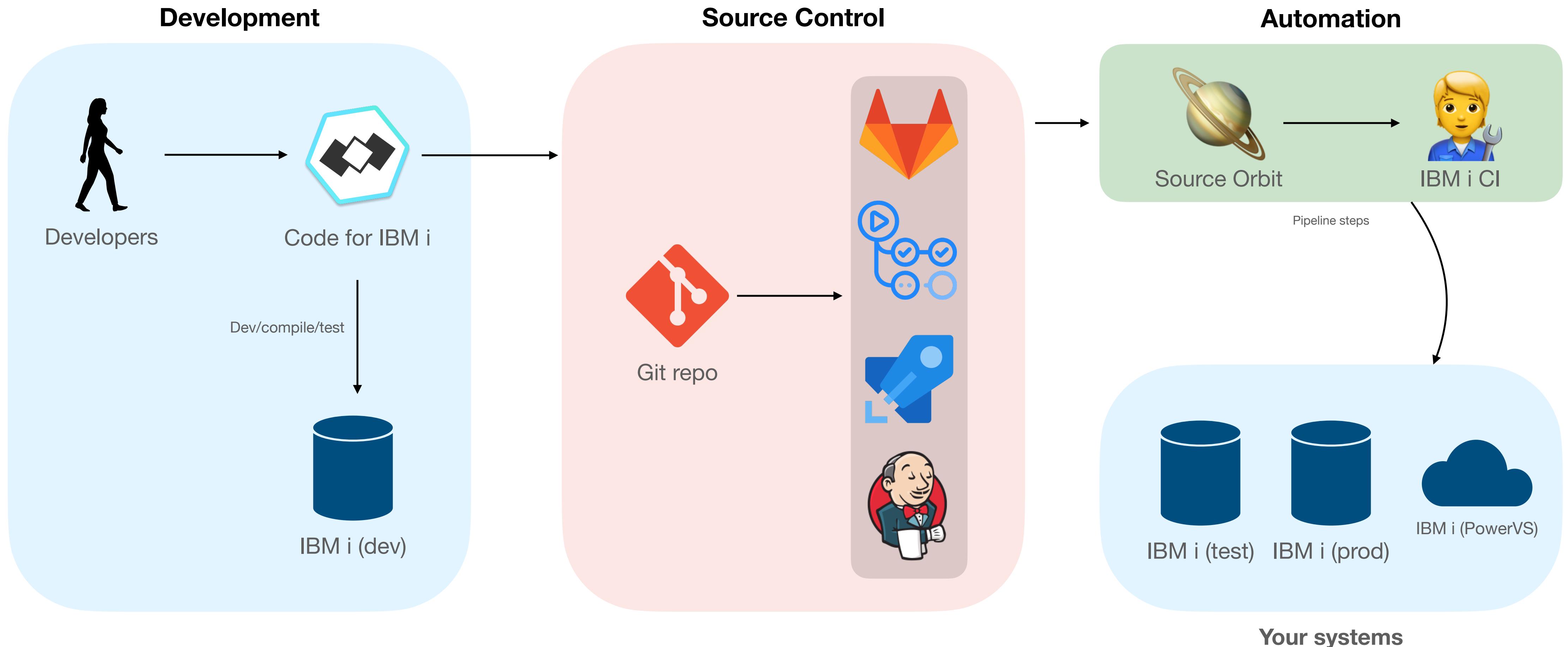


Why?

Automation

Simple overview





Dashboard

worksofliam

Top Repositories

New

Find a repository...

codefori/vscode-ibmi

codefori/vscode-db2i

codefori/vscode-rpgle

IBM/sourceorbit

codefori/rmake

codefori/docs

IBM/ibmi-company_system

Show more

Recent activity

codefori/vscode-rpgle Refactor subroutine under new Code Action

codefori/vscode-rpgle Content assist issues (punctuation characters)

codefori/vscode-ibmi Move CL runner logic to new extension

barrettotte/vscode-ibmi-languag... RPGLE language needs wordPattern to include punctuation

github.com

Type / to search

Send feedback

Filter 8

Home

remotion-dev/remotion published 2 releases · See more

12 minutes ago

v4.0.95

Fixes a regression which was still not fixed in 4.0.94 (@remotion/zod-types became unexpectedly mandatory)

What's Changed

- Docs: New "terminology" section + mention Serve URL in command line by [@Jo...](#)

[Read more](#)

Contributors

v4.0.94

What's Changed

Fixes a regression in 4.0.89 where `zod` and `@remotion/zod-types` became mandatory.

- `@remotion/bundler` : Allow missing `zod` and `@zod-types` imports when bundling Studio by [@JonnyBurger](#) in #...

[Read more](#)

Latest changes

3 hours ago

CodeQL 2.16: Python

Dependency Installation...

Yesterday

Migrating GitHub Classroom

Assignment Repository Creatio...

5 days ago

GitHub Issues & Projects –

Project status updates & issues...

5 days ago

Copilot – January 18th update

[View changelog →](#)

Explore repositories

recharts / recharts

Redefined chart library built with React and D3

21.8k TypeScript

HTTPArchive / almanac.httparchive.org

HTTP Archive's annual "State of the Web" report made by the web community

584 HTML

Demo time

[GitHub.com/worksoufliam](https://github.com/worksoufliam)