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Intro to Git Source Versioning of Classic IBM i Source with iForGit

For IBM i Developers

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Your Presenter

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- 30+ yr developer IBM i, Windows, Linux, Mac
- Started RJS Software Systems in 1990
- Created automated report distribution, doc management and app integration software
- Sold business in 2014 when partner retired
- Started MobiGoGo to build multi platform apps
- Provides training and consulting services
- Contributes open source to Github repositories
- Author of iForGit Native IBM i Git client for RDI, SEU and PDM developers

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iForgit IBM i Git Client: http://www.iforgit.com

Discussion Topics

- Managing IBM i Source Physical Files with Git
- Intro to iForGit Git Client for IBM i
- Demo

What is Git ?

- Git is an open-source distributed **version control** software component written by **Linus Torvalds,** the creator of the **Linux** kernel.
- The program was designed to keep track of every change that occurs in a specified PC or IFS style directory.
- **GitHub** is a web-based Git repository hosting service.
- GitHub Slogan - **“Build better software together”**
  Acquired by Microsoft in 2018
- **Git knows Nothing about IBM i Source Members in Source Files**

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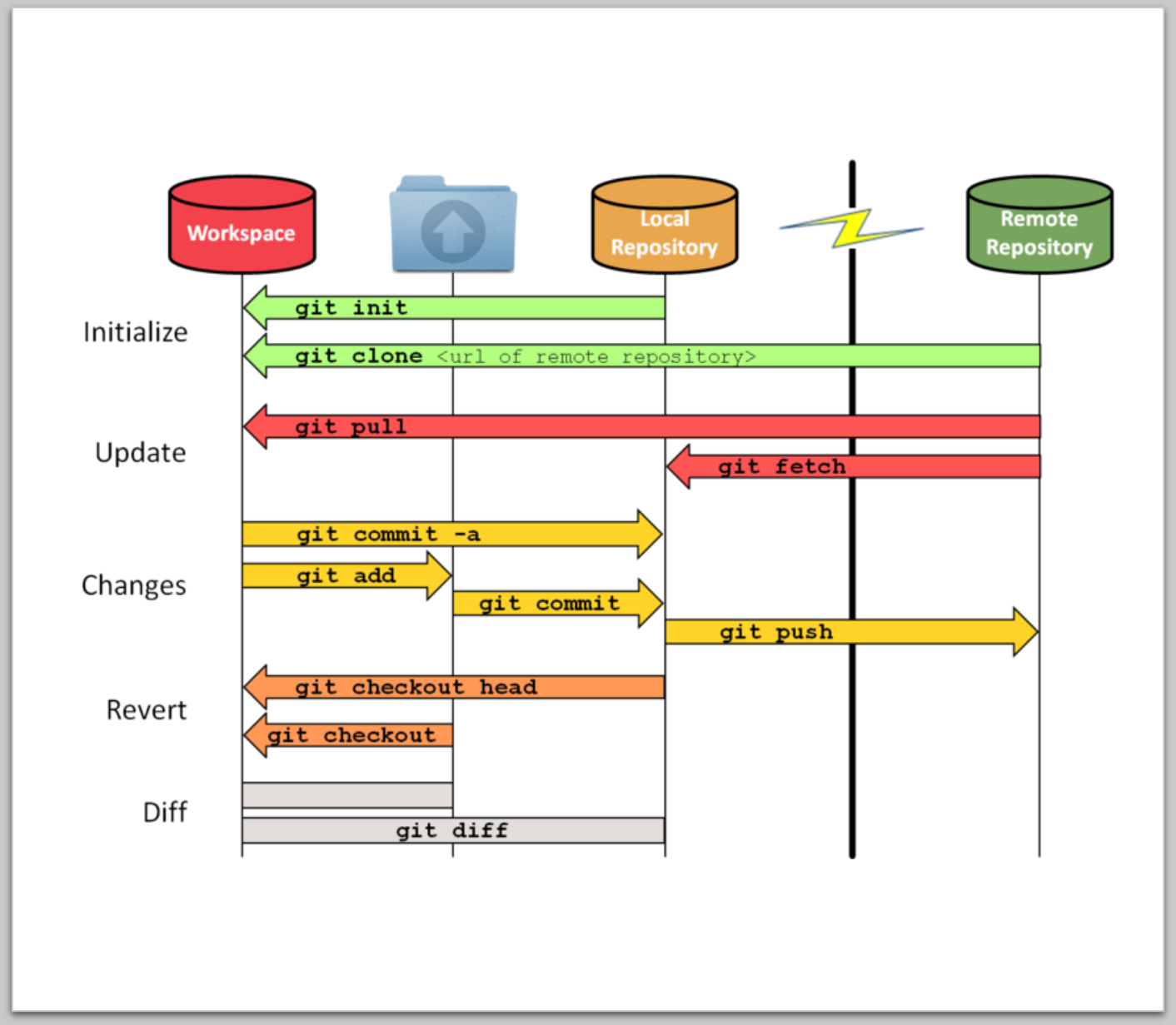
What is a Git Repository (Repo) ?

- Stores and saves project file changes
- Tracks file changes
- Knows who changed a file
- Can be created locally on PC or IBM i (IFS)
- Can be pushed remotely to GiHub, GitLab, Azure, etc.



How is Git different from other IBM i Source Tools

- Git does not manage your objects/builds. It is source version control only.
- Git does not automatically provide build processes
- By itself is not an IBM i source file management tool
- Does not provide issue, wikis, etc. without something like GitHub
- There are other commercial IBM i source tools that manage source/objects

Two types of IBM i Git Projects

- IFS or PC based source
- Source Members in source physical files

IFS or PC Based Projects

- IFS based source
- Node, PHP, Java, Python, etc.
- App contains multiple file assets
- html, css, js, php, python, etc
- Edit many source members simultaneously
- App usually builds at runtime
- Commit many source member changes to git at once

IFS or PC App
/application
HTML
CSS - .css
Javascrupt - .js
PHP - .php
Python - .py
NodeJS - .js

Classic
IBM i Source Physical File Projects

IBM i Library
GITTESTxxx
- QCLSRC
- QCMDSRC
- QDDSSRC
- QRPGLESRC
- QSQLSRC
- QTXTSRC

- All Source Members in source files
- QRPGLESRC, QCLSRC, QDDSSRC, etc.
- Edit one source member at a time
- Still edit from source files as always
- Source member locking for concurrency
- Git adds source member change visibility
- Source physical file members committed to git repository

Summary of Basic Git WorkFlow

For PC or IFS Files

- Create new local git repository – **git clone url://mygitrepo.git** or **git init .**

  git supports many url types: ftp, http, ssh, .
- Clone existing git repository from GitHub, Bitbucket, GitLab, etc.
- Edit files in working directory
- Add changed files to staging area – **git add foo.py bar.js baz.rb**
- Commit staging area to repository – **git commit -m 'Commit message'**
- (Optional) Push history to remote repository – **git push**
- (Optional) Pull history from remote repository – **git pull**

What does GitHub Provide ?

- GitHub Plans
  https://github.com/settings/billing/plans
- Private documentation Pages and Wikis
- Repository insights
- Multiple issue assignees
- Required reviews
- Required status checks
- FREE plan may be good enough to start managing source code

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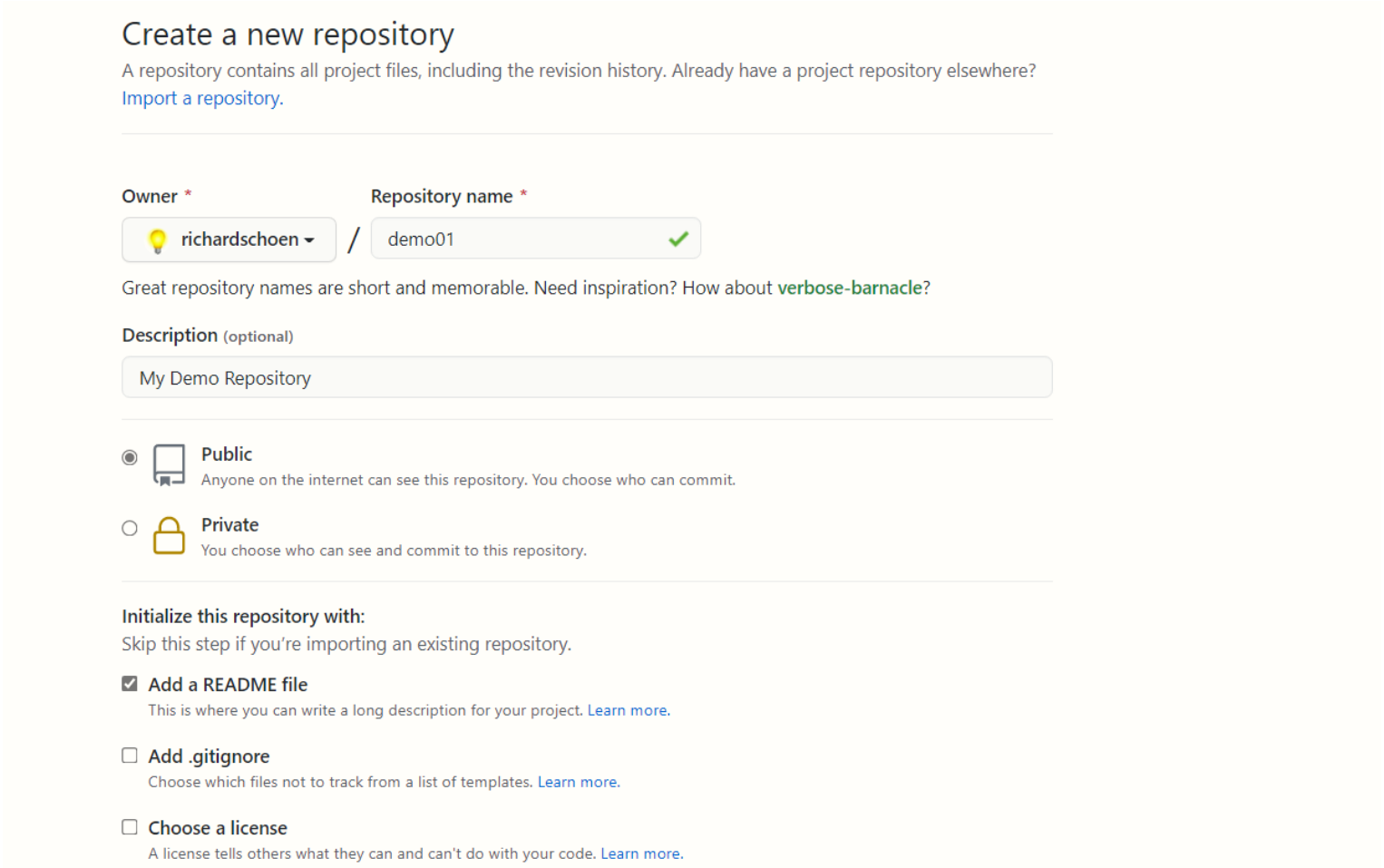
Creating Your GitHub Repository

Or Use GitLab, Bitbucket, Azure DevOps, Gitbucket etc.



$ **git init** (Creates a bare repository in your current directory)

$ **git clone** **https://github.com/jordiwes/demo01.git** (Clones an existing repository in your current directory)

What is a Git Client ?

- Git clients are tools that allow developers to access their git repositories
- May provide a graphical user interface (Tortoise, SourceTree)
- IDE's may have one. Visual Studio, VS Code, Eclipse (Egit)
- Default client is PC, Linux, Mac or IBM i PASE based command line calls
- iForGit is a 5250 based CL driven git client for PDM, RDI and SEU users
- iForGit knows how to manage IBM i source members with git

Lots of PC Git Client Choices

- Git Install
  https://git-scm.com/downloads
  https://git-for-windows.github.io
- Command line (Windows, Linux, Mac, IBM i - bash)
- Windows Shell Interface to Git
  https://tortoisegit.org/
- Git GUI Clients
  https://git-scm.com/downloads/guis
- SourceTree
  https://www.sourcetreeapp.com
- Google: **git clients**

What is iForGit ?

- Git Client for PDM – (Program Development Manager)
- Git Client for SEU – (Source Entry Utility)
- Git Client for RDI (Rational Developer for i)
- Keep source member in source physical files
- Driven by CL commands
- Schedule daily changed member commits
- On demand member commits (PDM or RDI)
- Automatic commits with SEU (If desired)
- Auto-store source versions in the IFS or push Git repository to Github or other online repository
- Changes viewed online at Github or via Tortoise, SourceTree, etc.

What iForGit Is Not - Today

- A full devops lifecycle toolset
- An automated continuous integration build tool (CI)
- A visual git client for viewing source versions
  Use Tortoise, SourceTree, etc.
- Not a good vehicle for using git branching - yet
- 1:1 each library is tied to a single git repository
- Isn't required for IFS PHP, NodeJS or other IFS development
- Although there are general CL commands to drive all git operations

Why Choose iForGit

- Fast and easy classic IBM i source file versioning
- Need to get a handle around source changes and versioning
- Be able to view source changes (via git repo)
- Automatic source versioning
- Compliance issues with auditors
- Installs in minutes
- Don’t need large source/lifecycle management tool
- May not need automated build tooling
- May want to use Github or other best of breed project management and build solutions

No Initial Changes to Development Process

- Edit source file members as always
- Use existing IBM i member locking
- Back up libraries nightly/weekly as usual
- Adds source member change visibility

Reduce Source Member Version Copy Hell

- Example: Need to change SRC001R
- Copy to: SRC001RS1, SRC001RS2, etc.
- Try to use member text to describe differences
- Lose track of previous member version sequences
- No way to visually compare changes between member versions

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iForGit Main Source Versioning Use Case

- Instant IBM i classic source member version control
- Continue to keep source in standard source files
- Use traditional source editing with SEU or RDI
- Low or NO learning curve for existing developers
- Automatically version and back up source changes to a Git repository
- Keep repo in IFS or store remote Git versions on Github, Gitlab, etc.
- Eliminate source member copying
- Ease in to using Git

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iForGit Automated Passive Versioning Use Case

- Instant version control and automatic scheduled change capture
- Continue to keep source in standard source files
- Use traditional source editing with SEU or RDI
- No learning curve for existing developers
- Automatically version and back up source changes to a Git repository
- Keep repo in IFS or store remote Git versions on Github, Gitlab, etc.
- Eliminate source member copying
- Add change visibility
- Ease in to using Git

iForGit Edit, Commit, Push Changes Use Case

- Developer driven change commits
- Can be used with passive change capture in place
- Commit latest version before editing source
- Commit after editing source
- Eliminate source member copying

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iForGit Augment Custom Build System Use Case

- Replace source control for existing custom build system
- Integrate source member commit, push and pull from repo
- Use CL commands from your custom build process

IBM i Source Member Management Assumptions

- You will still be editing, compiling and building as usual
- There will be 1 shared git repository for each library
- Your git repo will mimic your library/file/member structure in the IFS

  Ex: /gitrepos/qgpl/qclsrc/qstrup.clp
- One-way version push from library to git repository
- Can view, copy and paste source back from git repo
- At some point you want to create your own custom IBM i build process
- At some point you want to create your own custom IBM i deploy process

IBM i Source Repository IFS Structure

- Think of each library as an IFS git repository/project directory
- The git repository for each library gets created at the library level
- Can create top level directory for all git repos or just each library (library by default)

  Library name: **QGPL**

  /gitrepos/qgpl – Top level plus library level for git project repository
  /qgpl – Library level directory

- Each source file gets a dir under library directory
  /gitrepos/qgpl/qclsrc
  “ “/qrpglesrc
  “ “/qddssrc
- Under each source file subdirectory, store individual source member files
  /gitrepos/qgpl/qclsrc/pgm001.clp
  “ “/qrpglesrc /pgm002.rpgle
  “ “/qddssrc /customers.pf

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Source File Master in Libraries
Git Local Library Repository in IFS

One Library Per Git Project Rpository

IBM i Library
GITTESTxxx
- QCLSRC
- QCMDSRC
- QDDSRC
- QRPGLESRC
- QSQLSRC
- QTXTSRC

IFS Git Repository
/gitrepos/GITTESTxxx
- QCLSRC
  - MEMBER01.CLP
- QCMDSRC
  - MEMBER01.CMD
- QRPGLESRC
  - MEMBER01.RPGLE

View /Commit Changes with Git Clients: Tortoise Git Source Tree

\\server\gitrepos\GITTESTxxx
IFS Share required to view from IFS Git repository

No change to existing SEU or RDI editing process needed initially

Local IBM i Version of Source in IFS Directories

View git repository vis IFS file shares

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Source File Master in Libraries
Git Repo in IFS and GitHub/Remote Repo

IBM i Library
GITTESTxxx
QCLSRC
QCMDSRC
QRPGLESRC

No change to existing SEU or RDI editing process needed initially

IFS Git Repo
/GITTESTxxx
QCLSRC
MEMBER01.CLP
QCMDSRC
MEMBER01.CMD
QRPGLESRC
MEMBER01.RPGLE

Local IBM i Version of Source in IFS Directories

Push, replicate changes to Remote git repo

Remote Github or other Repo
/github.com/myrepos/GITTESTxxx.git
QCLSRC
MEMBER01.CLP
QCMDSRC
MEMBER01.CMD
QRPGLESRC
MEMBER01.RPGLE

View /Commit Changes with Git Clients:
Tortoise Git
Source Tree

\\server\gitrepos\GITTESTxxx
IFS Share required unless using remote Git repository

Library Git Versioning Strategy

- Send main source library source members to library git repo
- Send developer/work libraries to git repo for work in process
- Stop copying/pasting source members to new member for new versions
- Simply commit current source member version before/after changes
- If copying/pasting source to dev libraries and back, things to consider.

Main Source and Dev Source Copies

- Copy source from main library to your dev/work library
- Edit, compile, test in your library and version to git while work in process
- Run commit on main library source version to make sure commits current
- Copy source back from dev/work library to main source library
- Run commit again main library source version to capture dev/work changes
- Compile and deploy as usual into production

iForGit Basic IBM i
Source Member Git Flow

- Create local git IFS repository – git init
- Run LIBSRCEXP *ALL to do initial git population from a library
- Edit source members as usual
- Run SRCTOGIT command or use daily auto-commits via LIBSRCEXP

  Add changed files to staging area – git add filename.rpg, etc.
- Commit staging area to repository – git commit -m 'Commit message’
- (Optional) Push history to remote repository – git push
- (Optional) Pull history from remote repository – git pull

Classic IBM i Development

- Edit Source with SEU or RDI
- Edit, Save
- Compile
- Test
- Repeat…
- Deploy to Production
- Back Up Source Libraries

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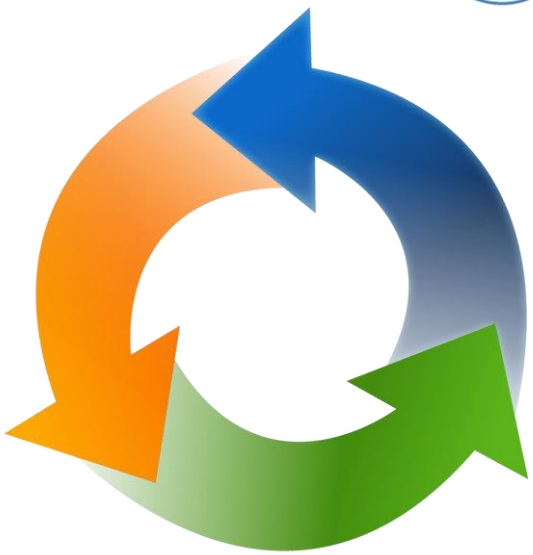
Classic SEU/PDM
IBM i App Development

IBM i Source Editing Process

Edit → Save → Compile → Test → Deploy



```
Columns . . . :    6  76            Edit                    GITTEST123/QRPGLESRC
SEU==>                                                      MONOSTDOUT
FMT *    *. 1 ...+... 2 ...+... 3 ...+... 4 ...+... 5 ...+... 6 ...+... 7 ...+.
     ********** Beginning of data **************************************
0001.00  *-------------------------------------------------------
0002.00  * Source information
0003.00  * @@LIBRARY: GITTEST123
0004.00  * @@FILE: QRPGLESRC
0005.00  * @@MEMBER: MONOSTDOUT
0006.00  * @@TYPE: RPGLE
0007.00  * @@TEXT: Read and parse stdout log....xxxz
0008.00  *-------------------------------------------------------
0009.00 /*************************************************************
0010.00  * Program: MONOSTDOUT
0011.00  * Author : Richard J Schoen
0012.00  * Desc . : This program will read the selected STDOUT log file and
0013.00  *          send back info to the caller for processing the
0014.00  *          selected log messages. MONOSTDOUT is created in QTEMP
0015.00  *          at runtime.
0016.00  *          Uses its own custom CPF message: NET9898 which

 F3=Exit    F4=Prompt    F5=Refresh    F9=Retrieve    F10=Cursor    F11=Toggle
 F16=Repeat find         F17=Repeat change           F24=More keys
                                   (C) COPYRIGHT IBM CORP. 1981, 2013.
MA+  A                    MW                                      05/001
```

```
                    Create Bound RPG Program (CRTBNDRPG)

Type choices, press Enter.

Program . . . . . > MONOSTDOUT    Name, *CTLSPEC
  Library . . . . . >   GITTEST123  Name, *CURLIB
Source file . . . . . > QRPGLESRC     Name, QRPGLESRC
  Library . . . . . >   GITTEST123  Name, *LIBL, *CURLIB
Source member . . . . . > MONOSTDOUT    Name, *PGM
Source stream file . . . . . .

Generation severity level . . .  10           0-20
Text 'description' . . . . . .   *SRCMBRTXT

Default activation group . . . .  *YES         *YES, *NO

                                                                    Bottom
F3=Exit    F4=Prompt    F5=Refresh    F10=Additional parameters    F12=Cancel
F13=How to use this display          F24=More keys

MA+  A                    MW                                      05/037
```

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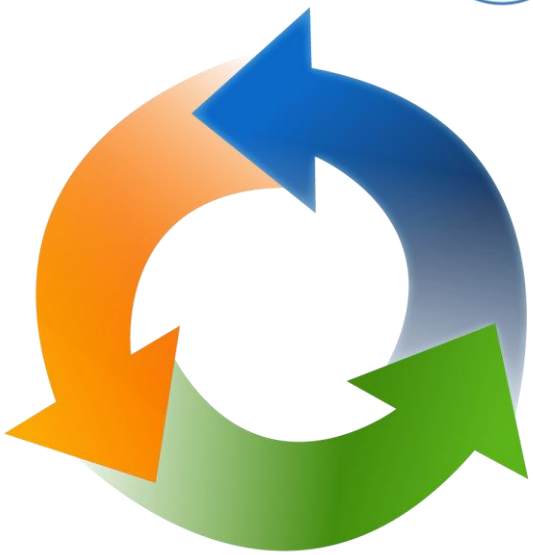
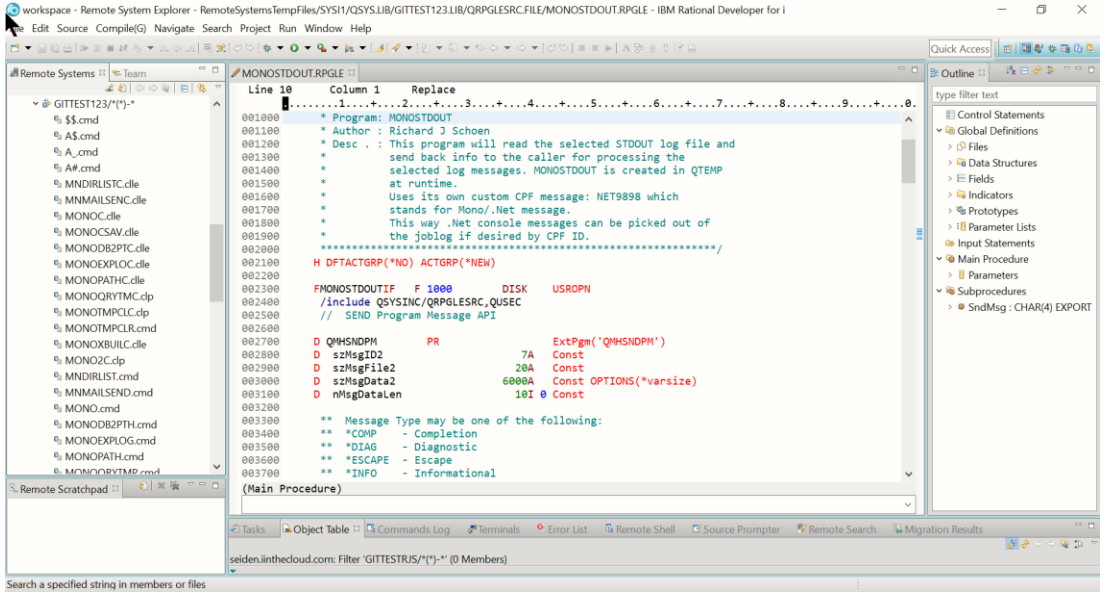
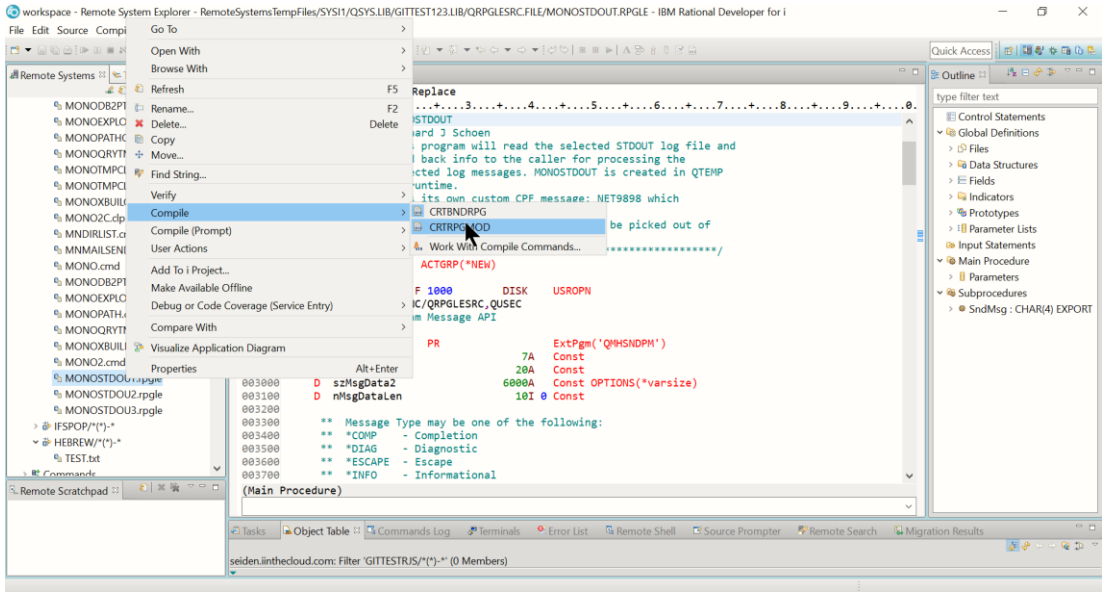
Classic RDI
IBM i App Development

IBM i Source Editing Process

Edit → Save → Compile → Test → Deploy







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Classic IBM i Development with Git

- Edit Source with SEU or RDI
- Edit, Save, Commit
- Compile
- Test
- Repeat…
- Deploy to Production
- Source Library Backups
- Auto-Commit Changes Hourly, Daily, Weekly, Monthly

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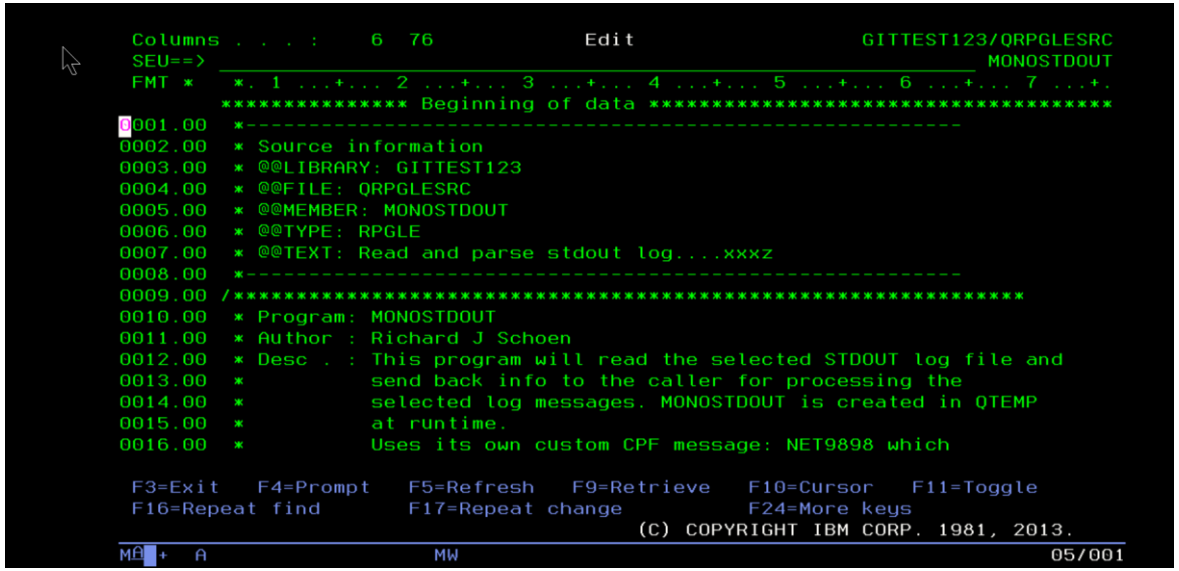
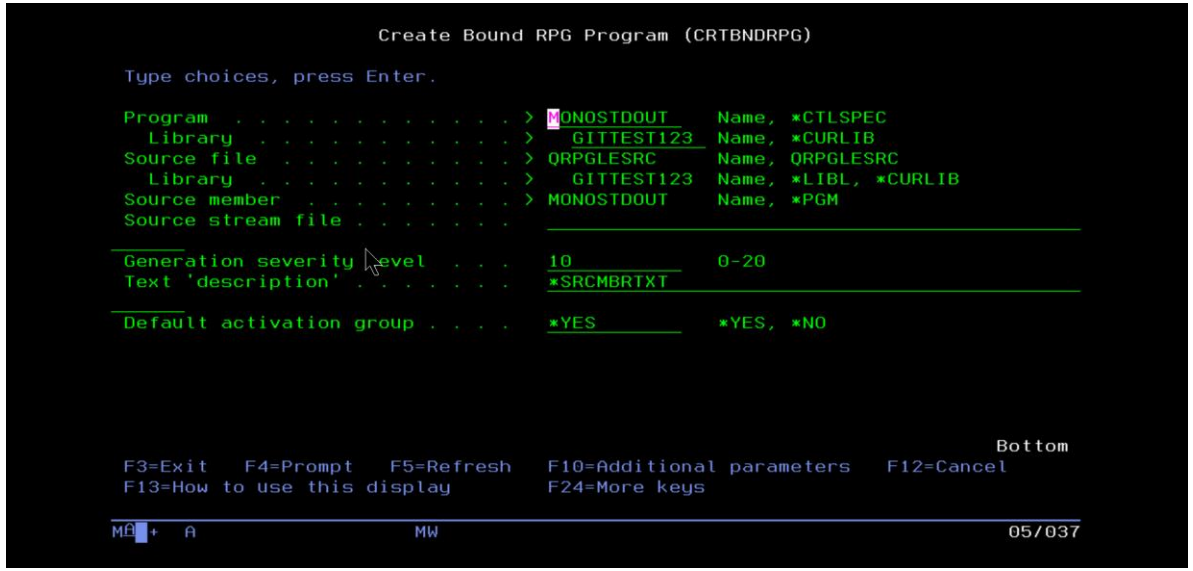
Classic SEU/PDM
IBM i Development with Git

IBM i Source Editing Process

Edit → Save → Commit → Compile → Test → Deploy





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Classic SEU/PDM
IBM i Development with Git

IBM i Source Editing Process

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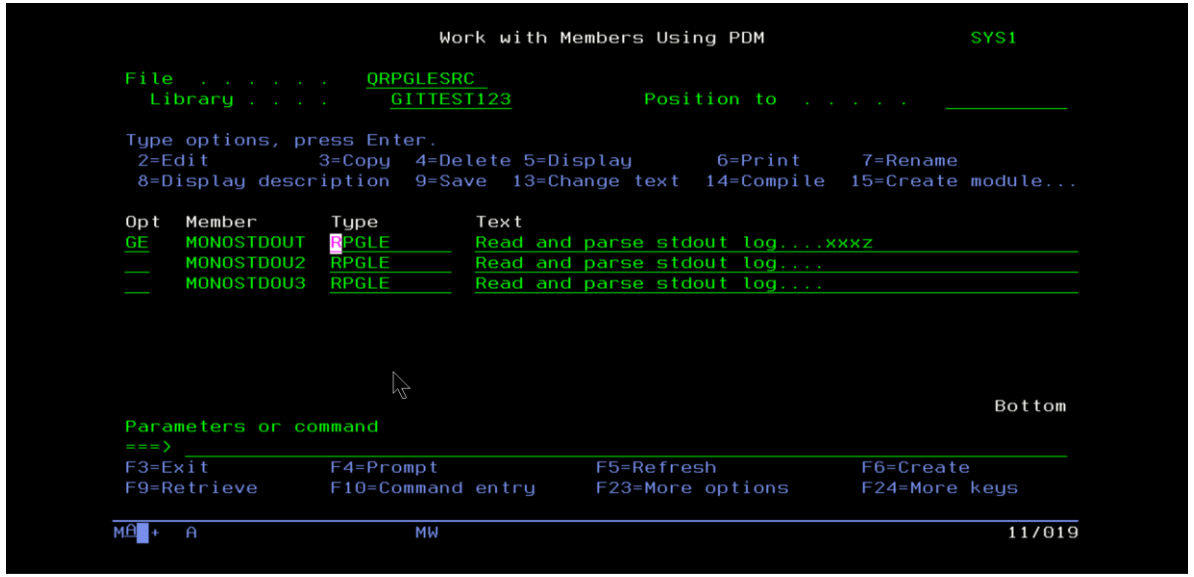

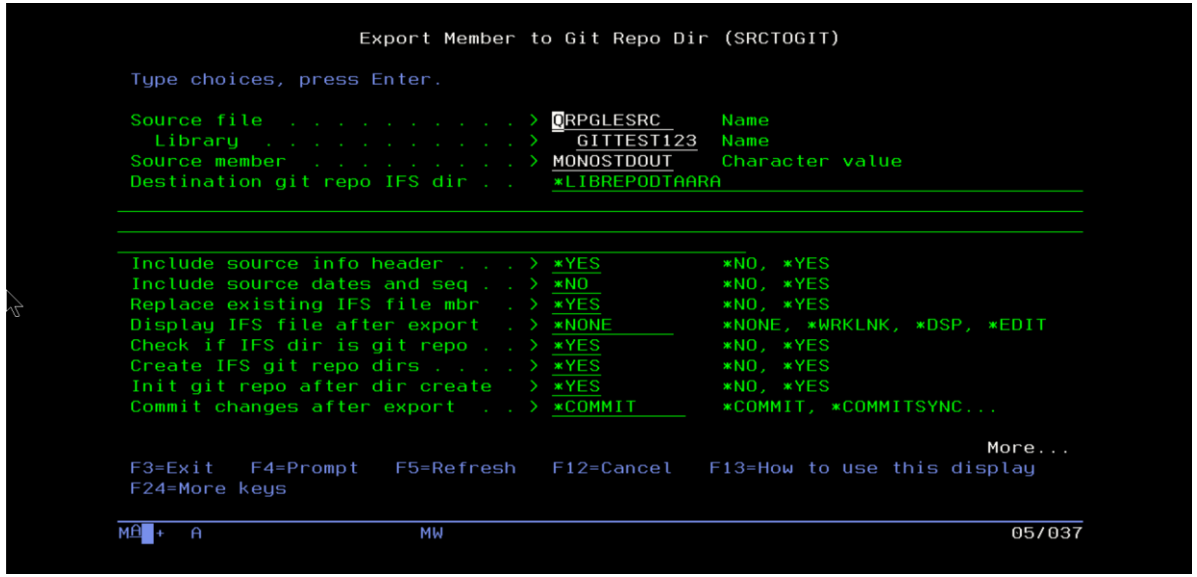

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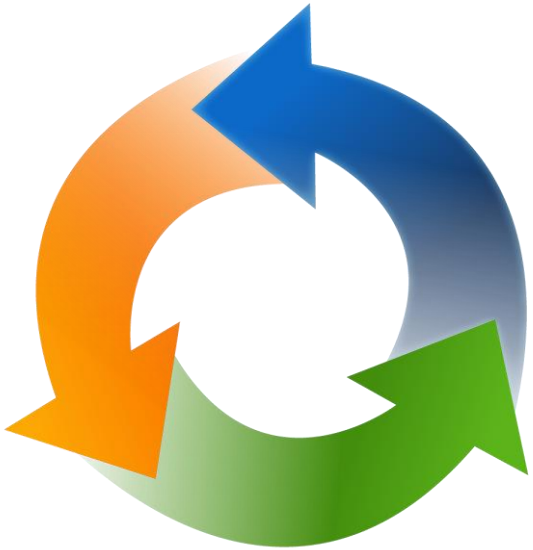
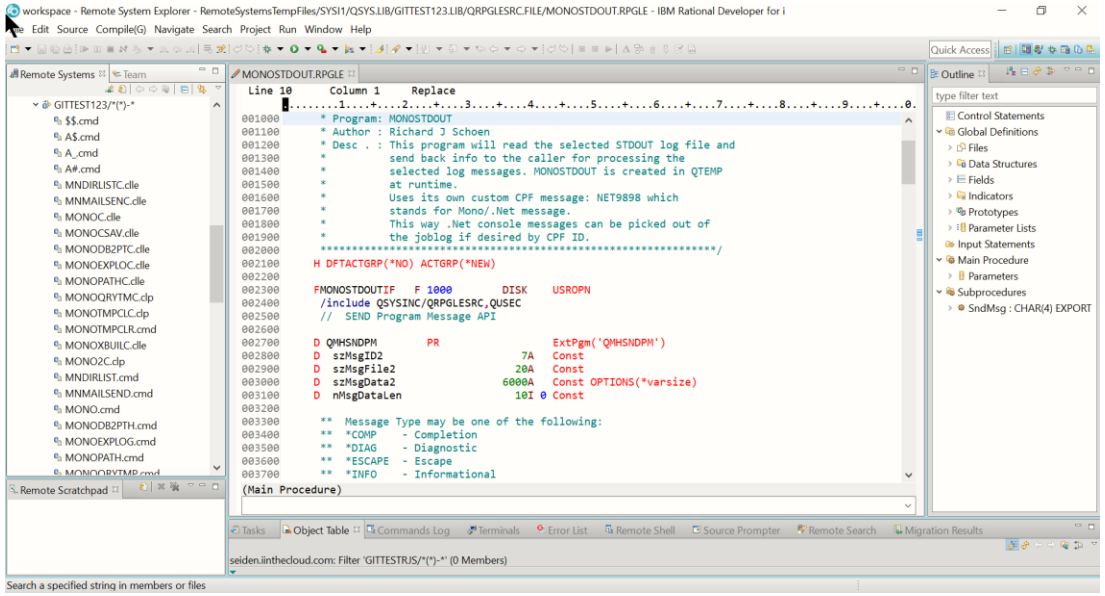
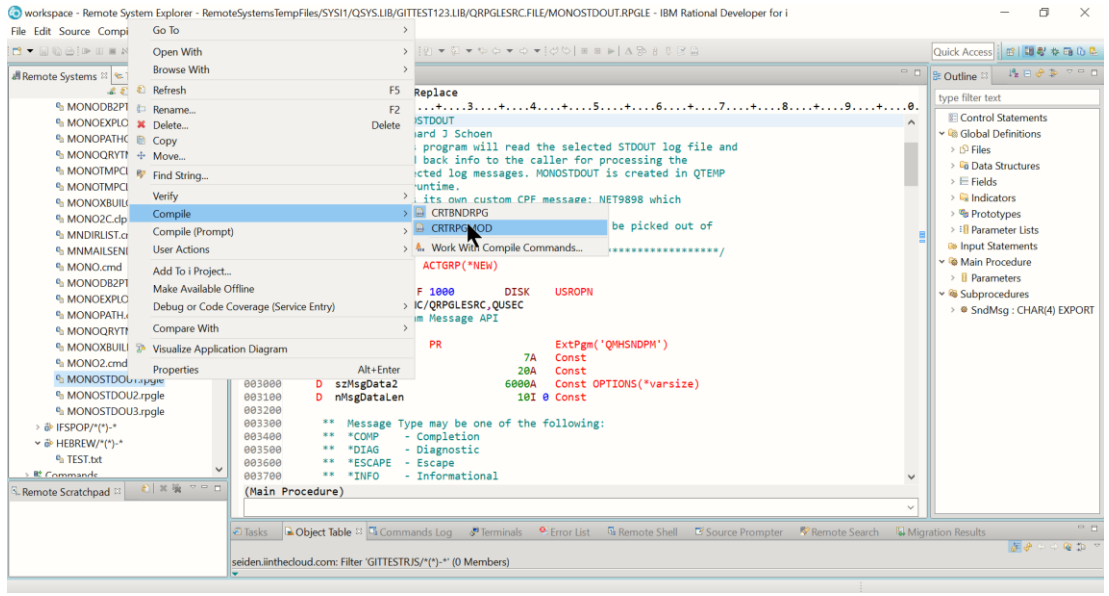
Classic RDI
IBM i Development with Git

IBM i Source Editing Process with Save to Git

Edit → Save → Commit → Compile → Test → Deploy







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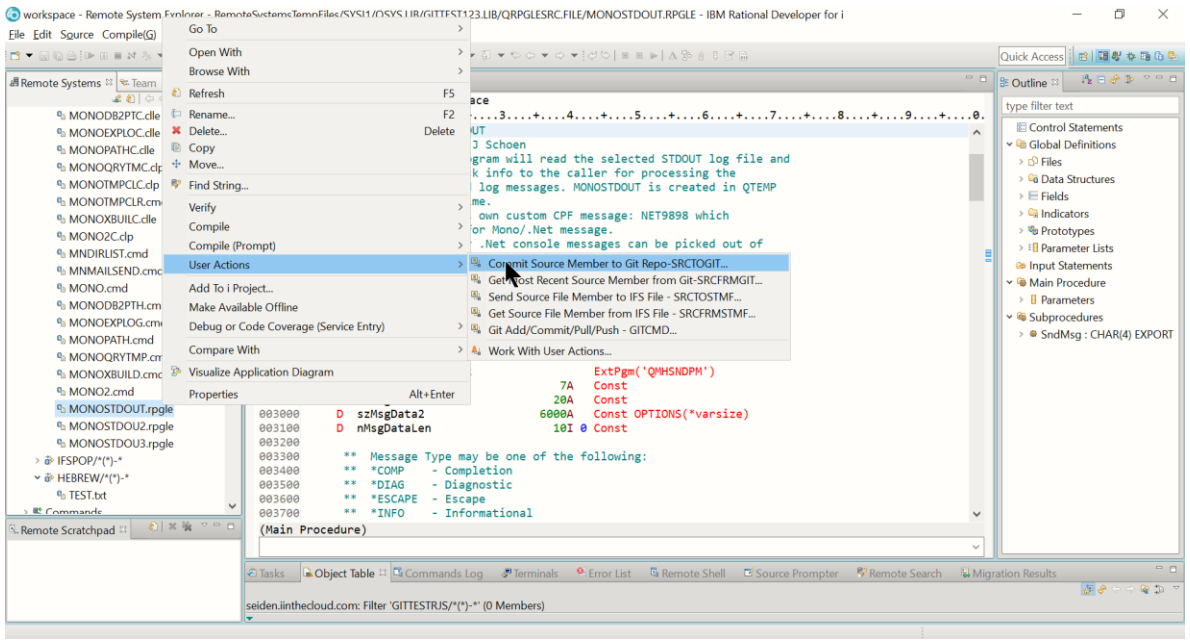
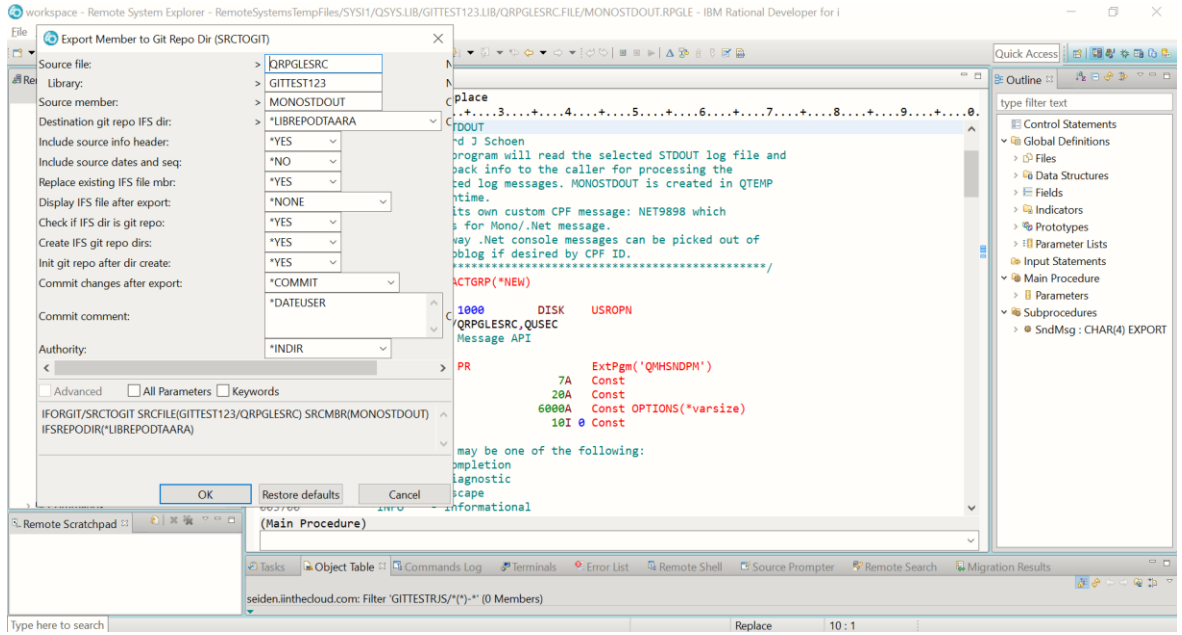
Classic RDI
IBM i Development with Git

IBM i Source Editing Process with Save to Git

Edit → Save → Commit → Compile → Test → Deploy





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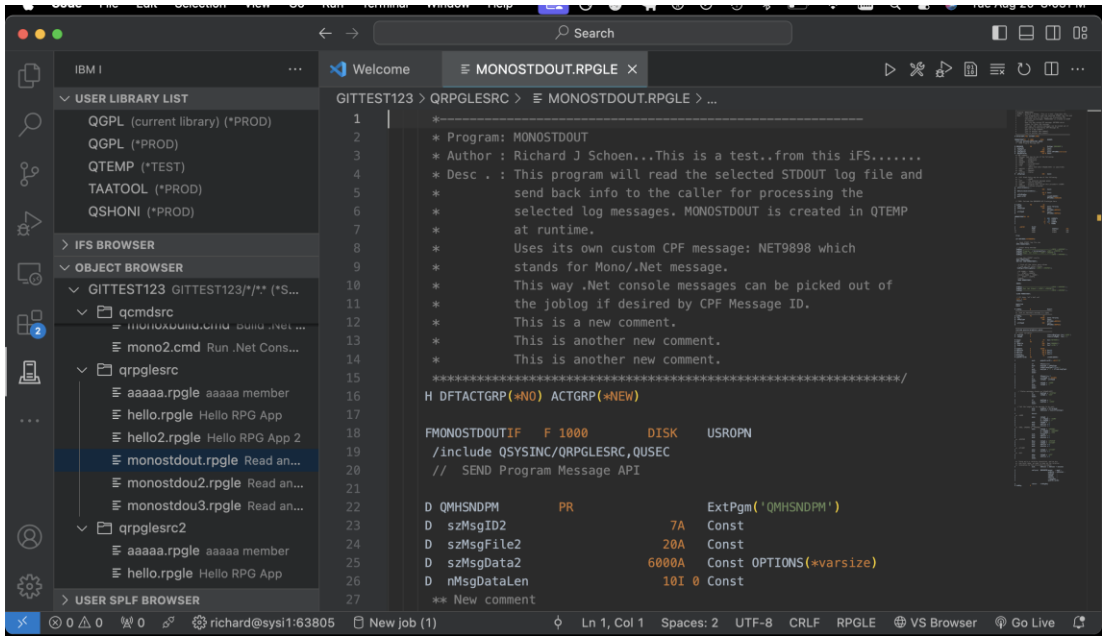
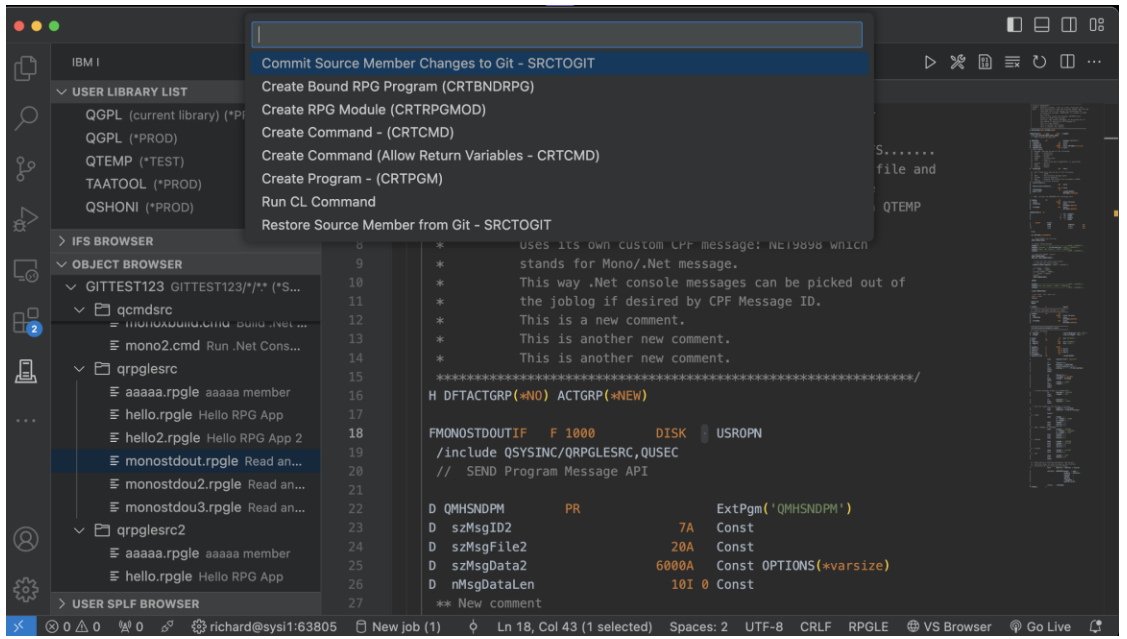
VS Code
IBM i Development with Git

IBM i Source Editing Process with Save to Git

Edit → Save → Commit → Compile → Test → Deploy





Other Links

- iForGit Docs

  http://www.mobigogo.net/files/docs/iforgit

- Git Docs
  https://git-scm.com/docs

What you learned

- How to start managing IBM i classic source with Git and iForGit

  http://www.mobigogo.net/files/docs/iforgit
- Install iForGit and Eliminate Awkward Source File Management
- Get started !!
- Questions: richard@richardschoen.net