

Introduction to IBM i Merlin

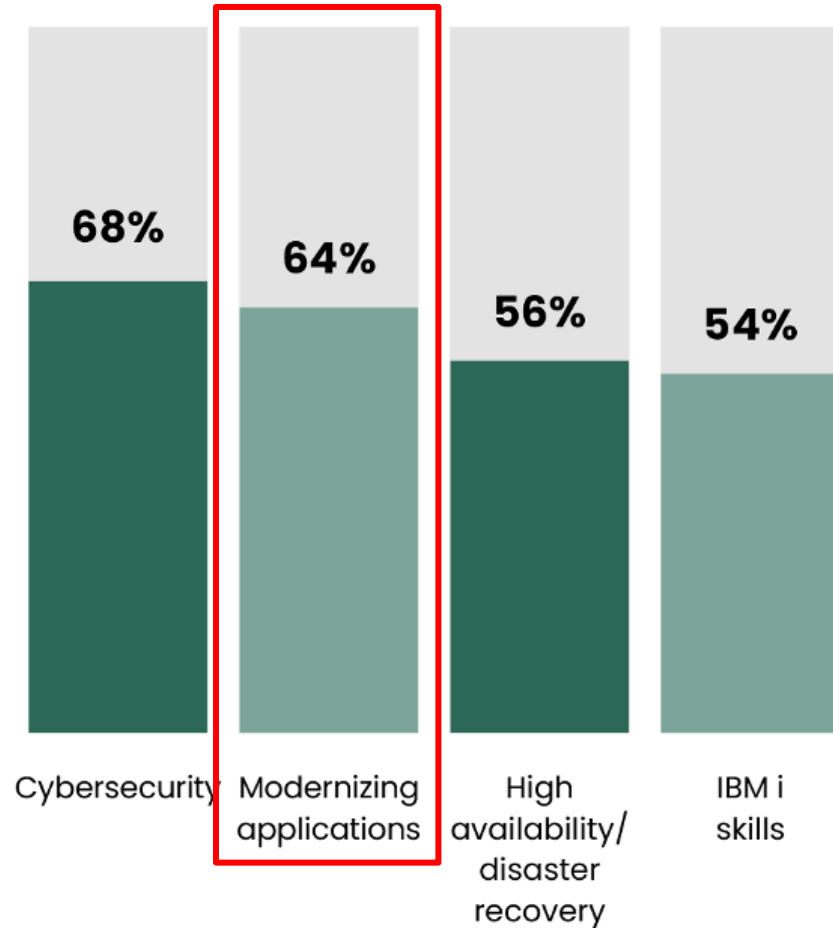
Steve Will – stwill@us.ibm.com
DE, IBM i CTO

Tim Rowe – timmr@us.ibm.com
IBM i Business Architect



IBM i Customers need to modernize their business applications

What are your top concerns as you plan your IT environment?



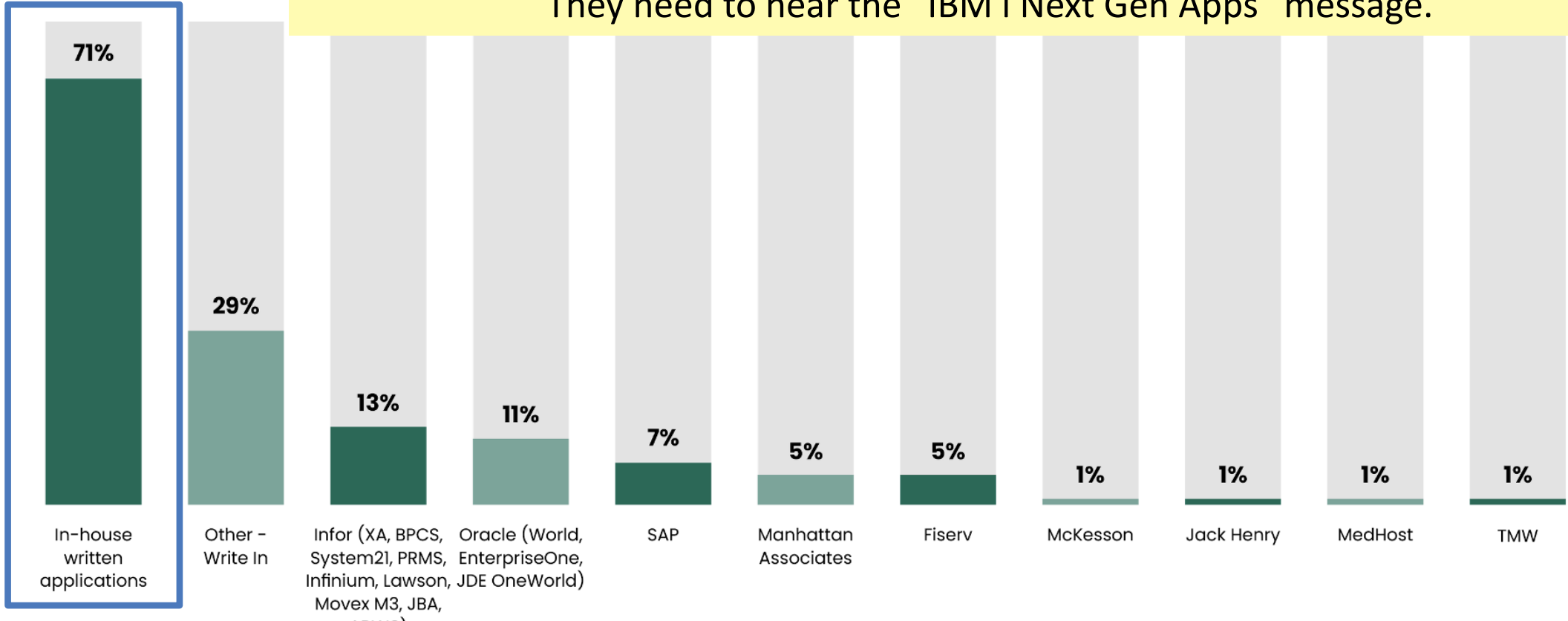
- Some use “modern” tools and methods
 - Must “cobble together” various pieces
 - Must “force-fit” IBM i native file systems
- Some (many) are stuck/still using inefficient old tech
 - No automated change control, project builds
 - Often in monolithic (not modular) designs
 - Source Editors from the 1980’s

<https://www.fortra.com/resources/guides/ibm-i-marketplace-survey-results>

Survey Results – Applications Running on IBM i

Which business applications are you running on IBM i?

There are literally thousands of ISVs with packages available on IBM i. They need to hear the “IBM i Next Gen Apps” message.



Many IBM i users have application code unique to their enterprise..

The Question: Modernize, or Re-platform?
 The Answer: IBM i Next Gen Apps

Attributes of “IBM i Next Gen Apps”



Quickly Respond to Business Needs
DevOps, CI/CD, Agile



Encapsulate processes & data
Creating assets for the business

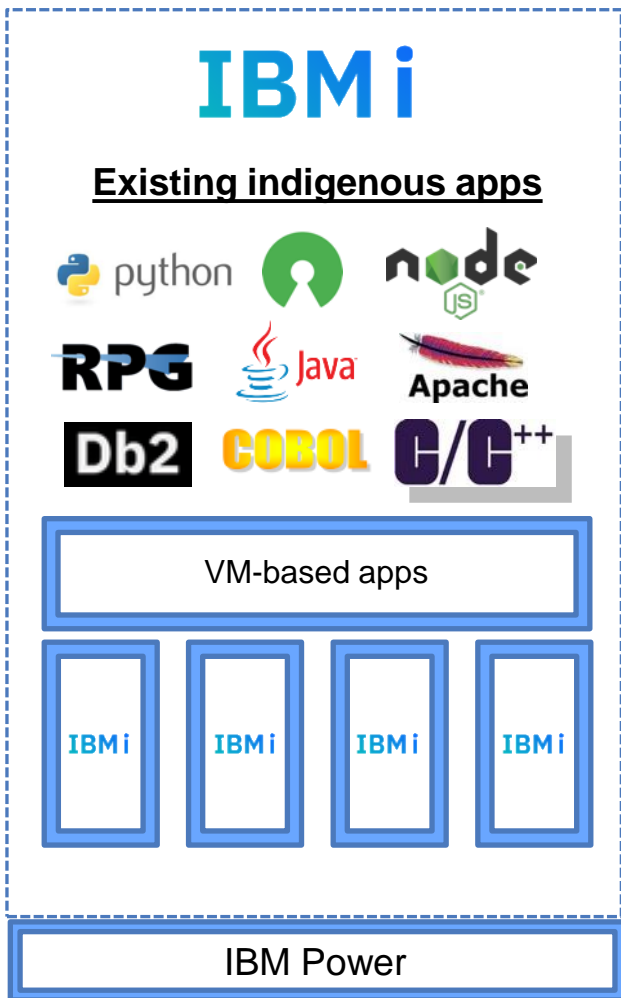
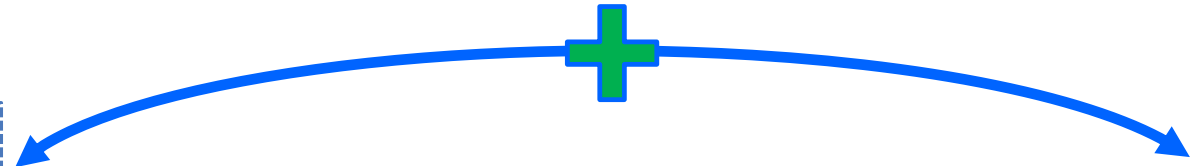


Blend technology
Using the “best fit for purpose”



Easily incorporate new tech
Even if the tech is not “in-house”

IBM i and Cloud – IBM i Next Gen Applications – Prepared for Cloud

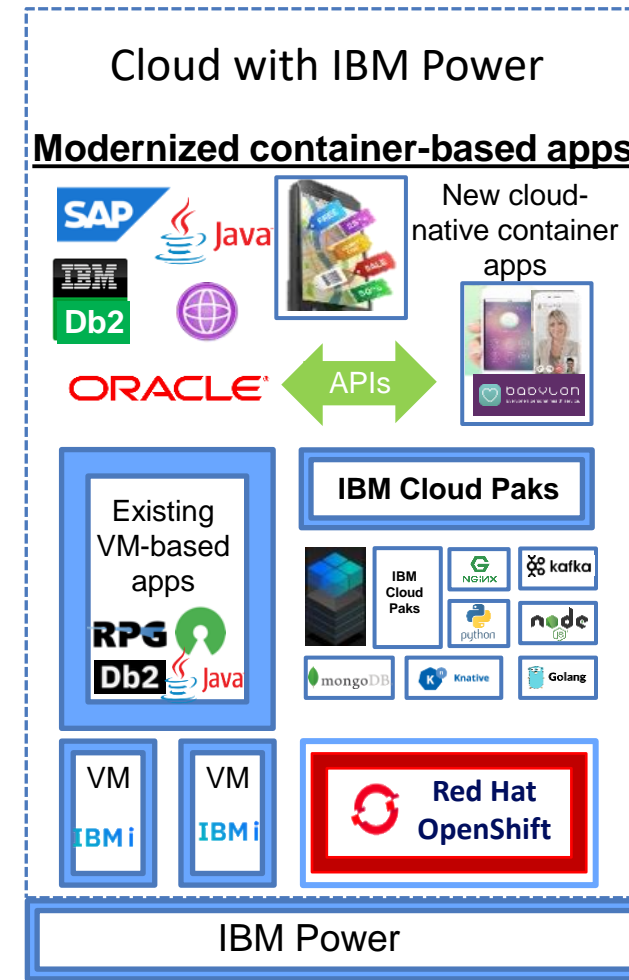


Existing applications can get value from cloud-based applications through services

- Existing IBM i applications **call services**
- IBM i applications can **provide services** to others – easily, in a standard Restful way

IBM i Next Gen Applications

- Agile/DevOps capable
- Modular
- Mixed programming languages
- Producing & Consuming Services



Modernization Engine for Lifecycle Integration



A safe, secure IBM i focused modern development ecosystem

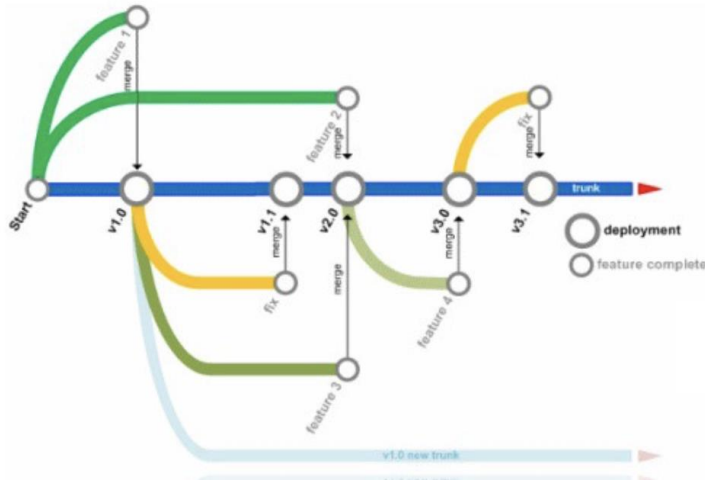
What Issues does Merlin Help Solve



What Issues does Merlin Help Solve



Modern / Centralized Source Control and Branching



Modern RPG

```
ctl-opt bnddir('ACCRCV');
dcl-f custfile usage(*update);
dcl-ds custDs likerec(custRec);
dcl-f report printer;

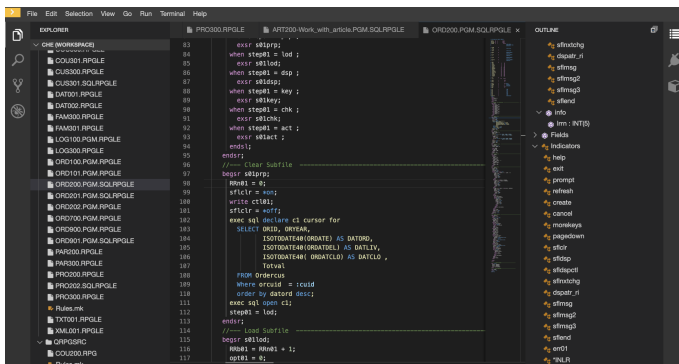
read custfile custDs;
dow not %eof;
  if dueDate > %date(); // overdue?
    sendOverdueNotice();
  write reportFmt;
  exec sql insert :name, :duedate into
    mylib/myfile;
```



- Fixed to Free
- Refactoring

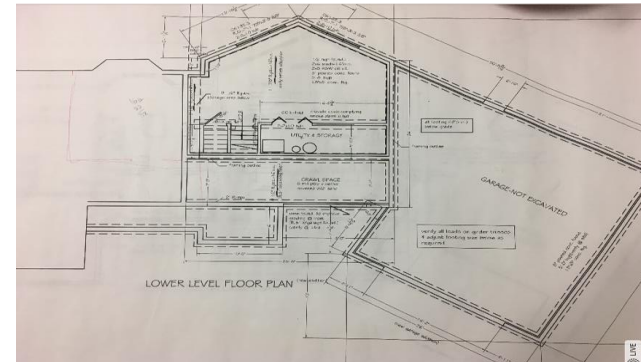


Browser Centric VsCode Based IDE



- Outline View
- Tokenization
- Content Assist
- Code formatting
- Understand Languages
 - RPG
 - SQL
 - Embedded SQL
 - CL
 - Cobol
 - DDS

Application Blueprint



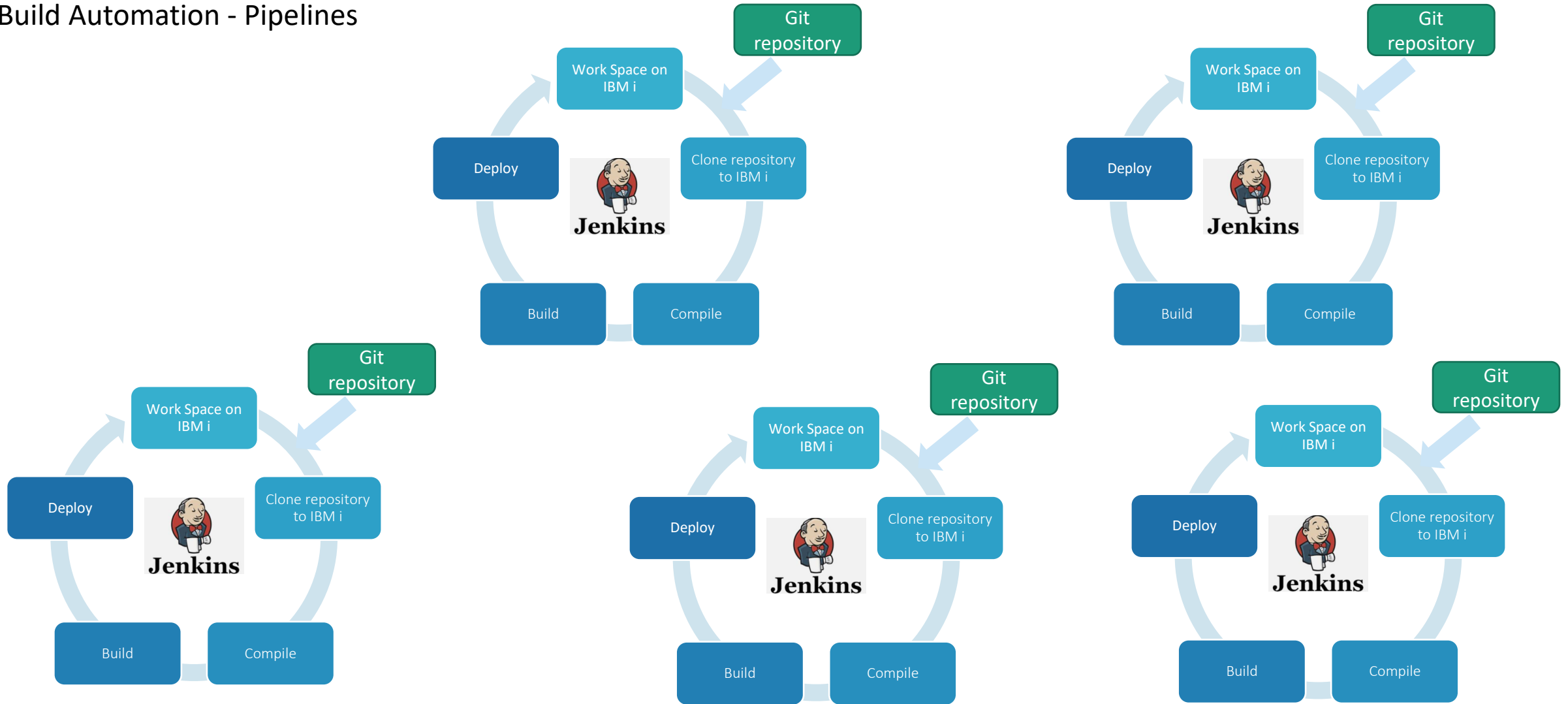
- Impact Analysis
- Program Understanding
- Data Usage
- Pgm Flow



What Issues does Merlin Help Solve

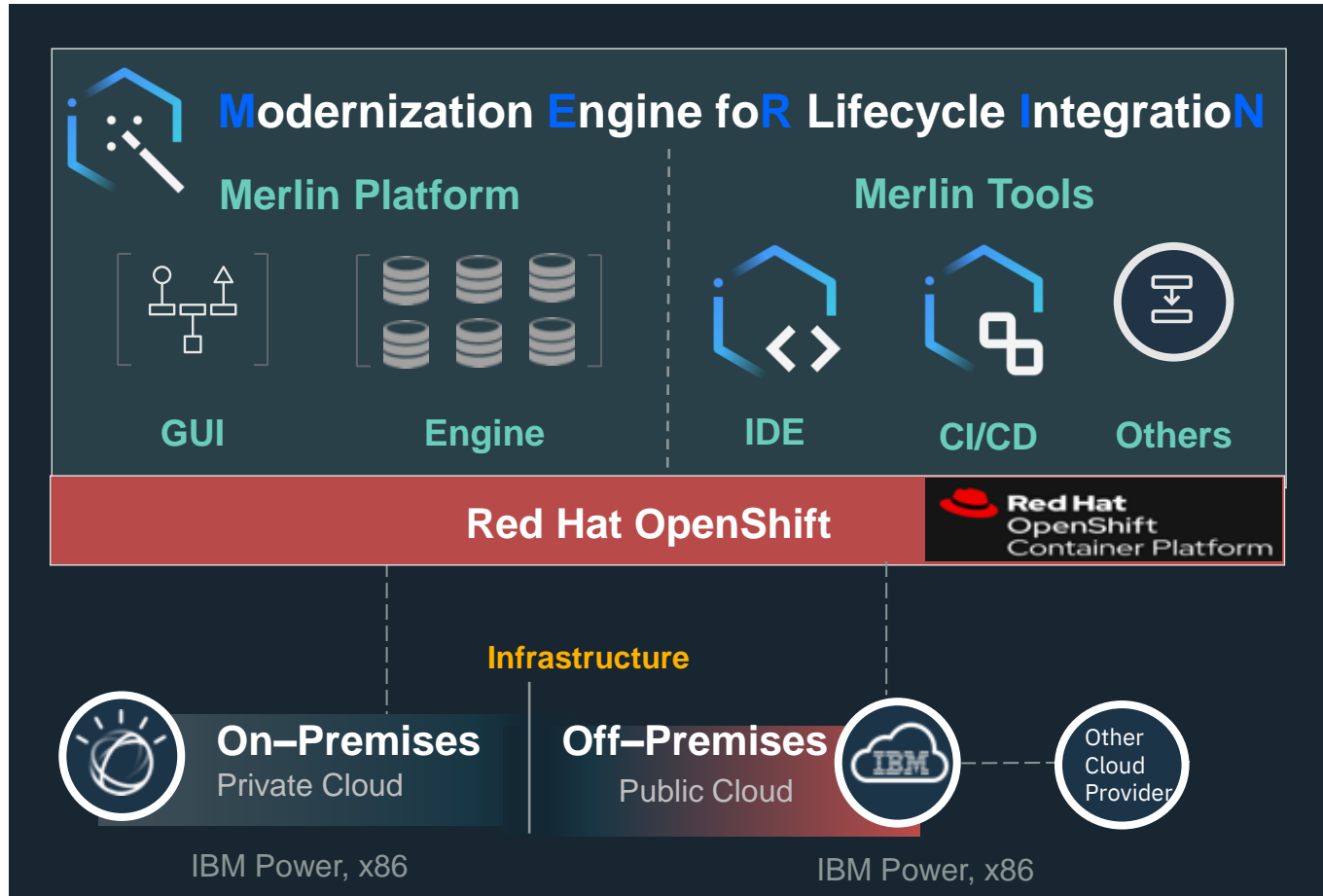


Build Automation - Pipelines





Merlin



What is it ? Today

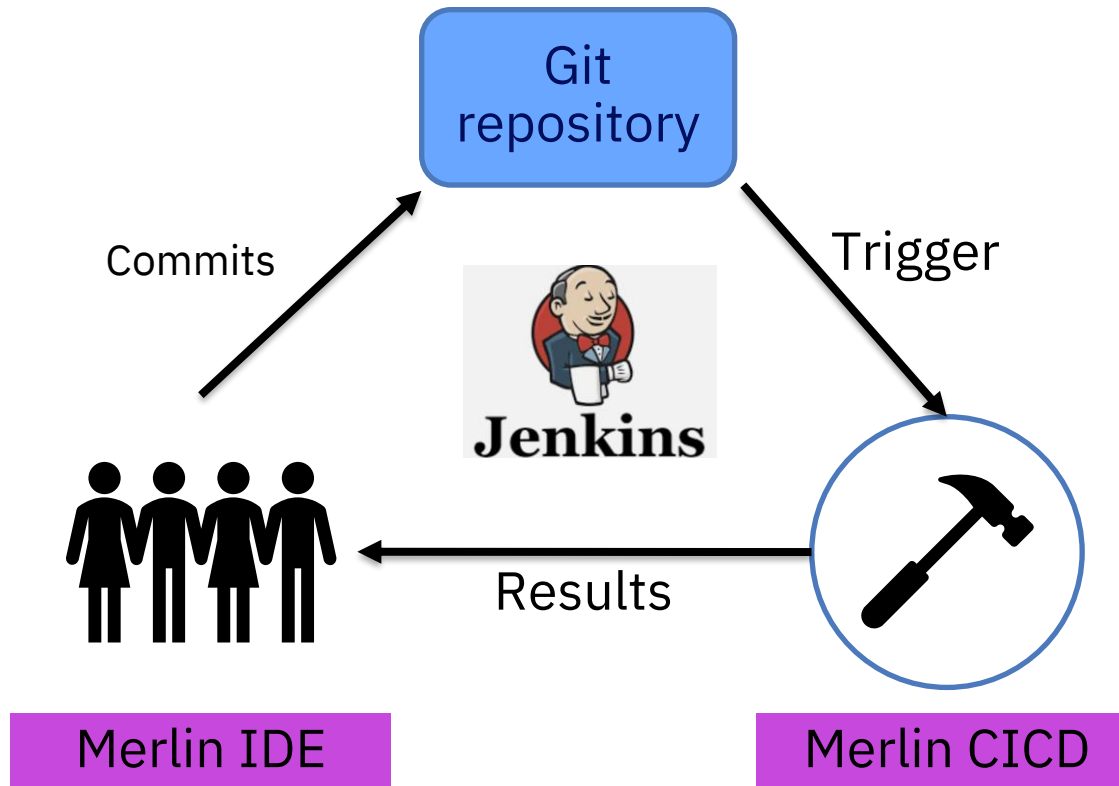
IBM Developer - IDE

Pipelines for All – CI/CD

Merlin the engine / framework

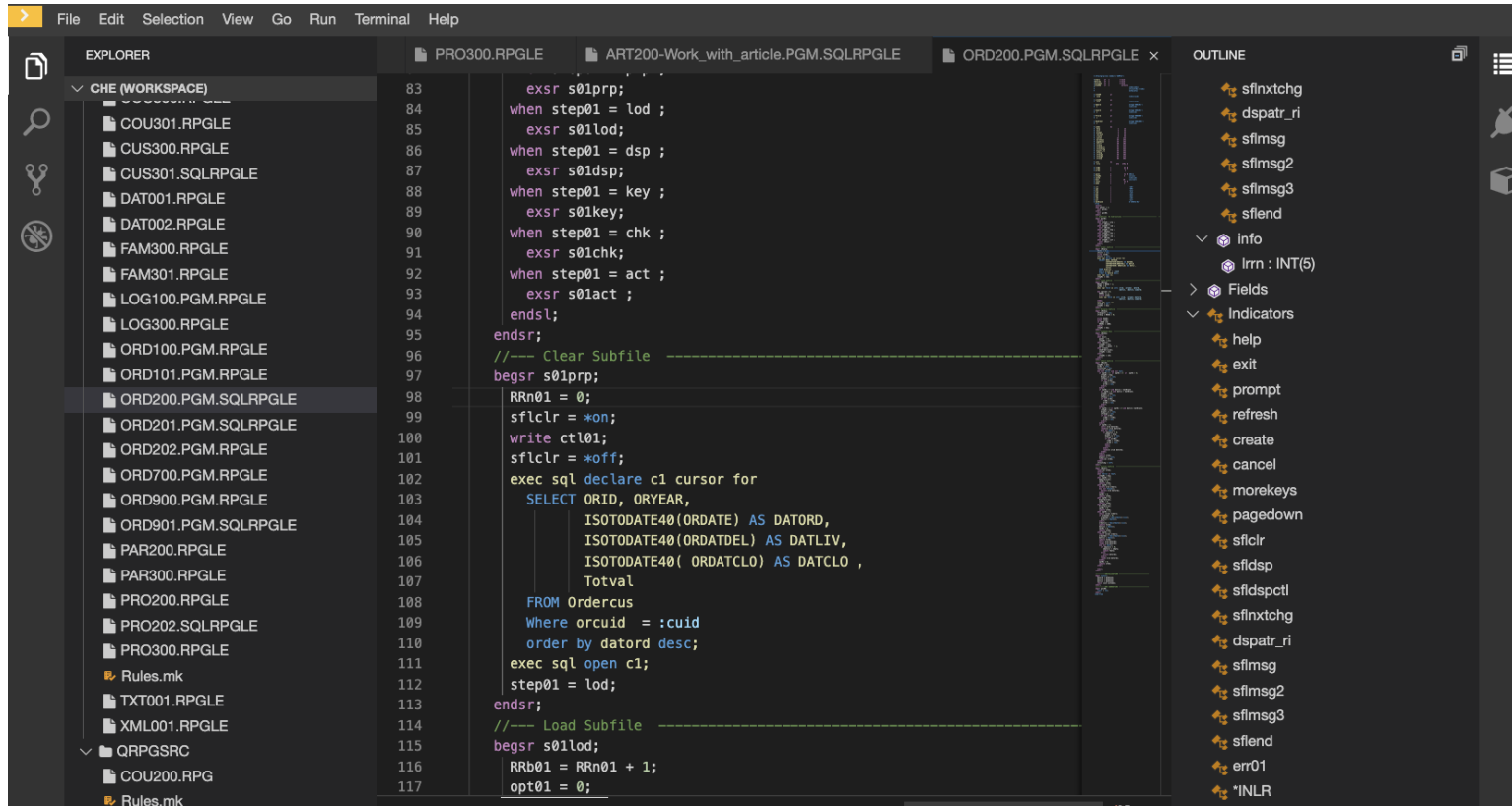


Automated reliable application build and deployment - Pipelines





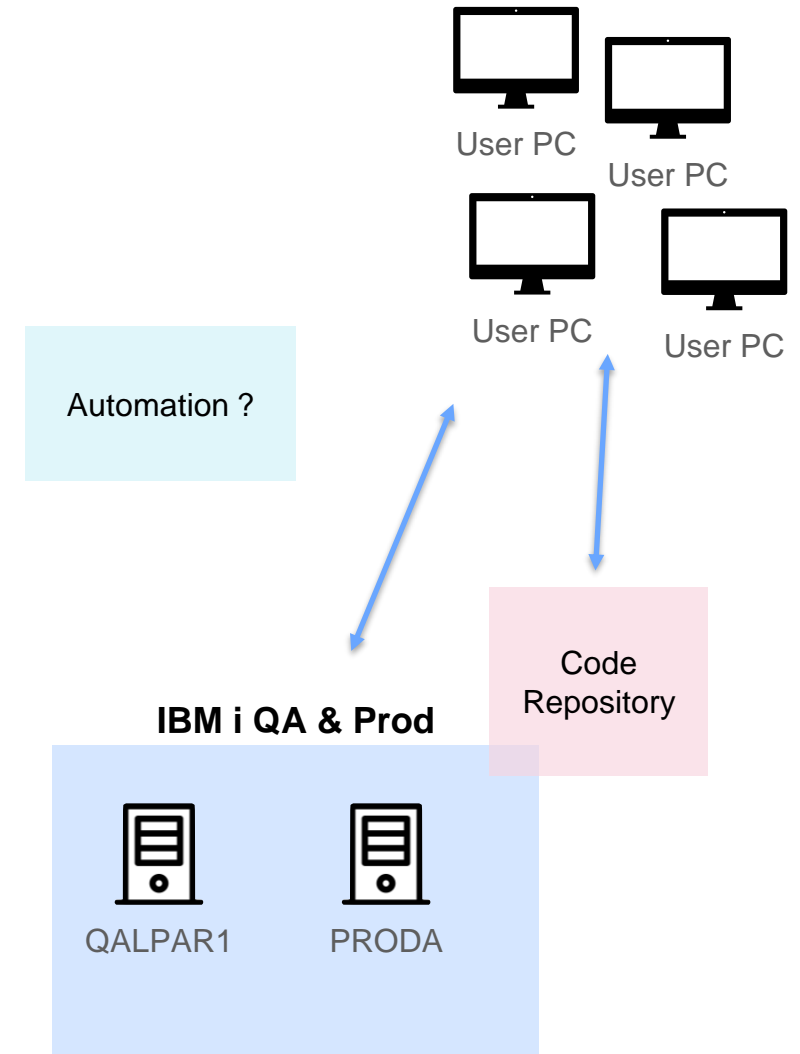
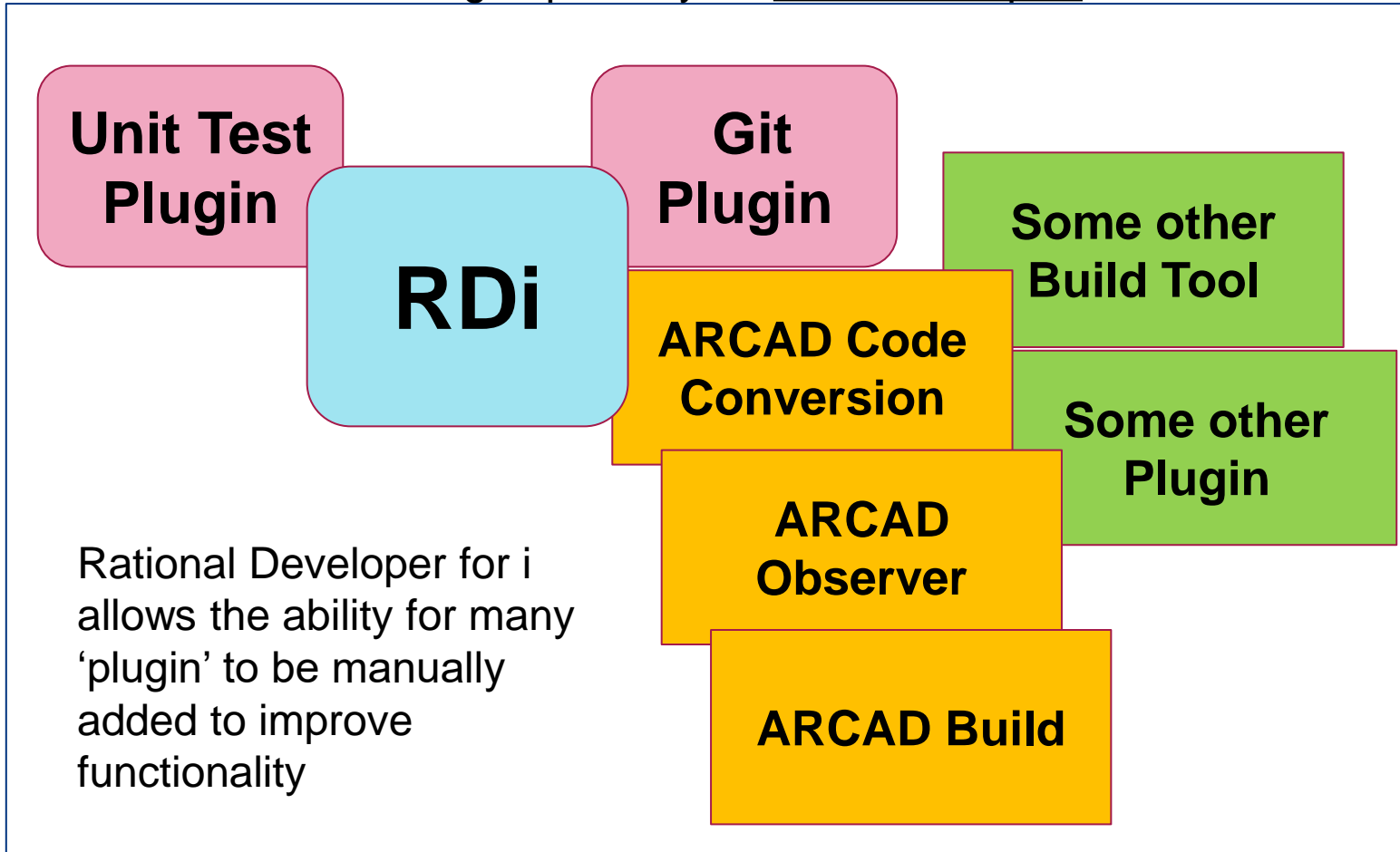
Modern Browser based developer environment



- Outline View
- Tokenization
- Content Assist
- Code formatting
- Understand Languages
 - RPG
 - SQL
 - Embedded SQL
 - CL
 - Cobol
 - DDS
- Impact Analysis
- Intelligent Build
- Full Git Integration
- Debugger

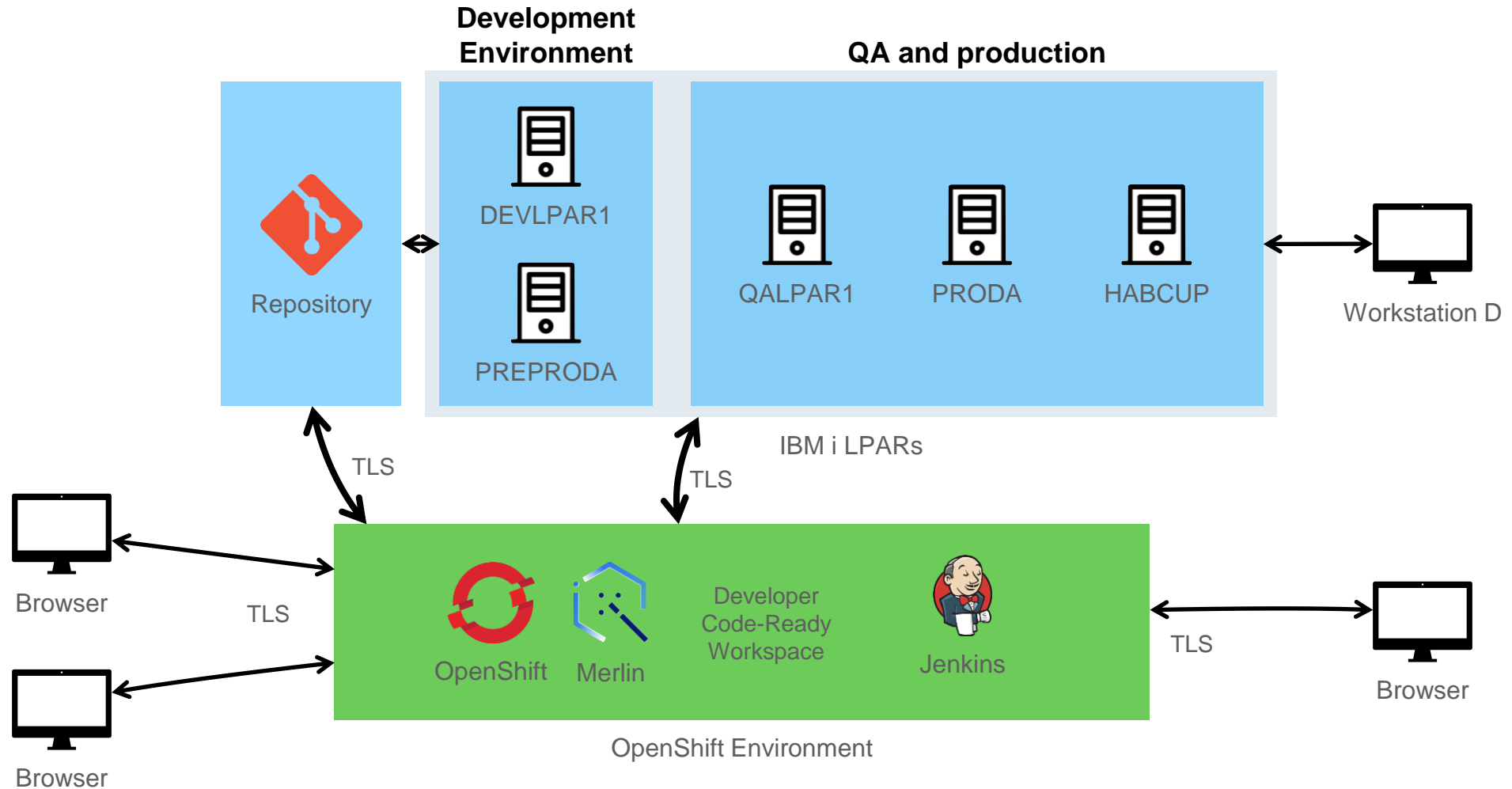
Today

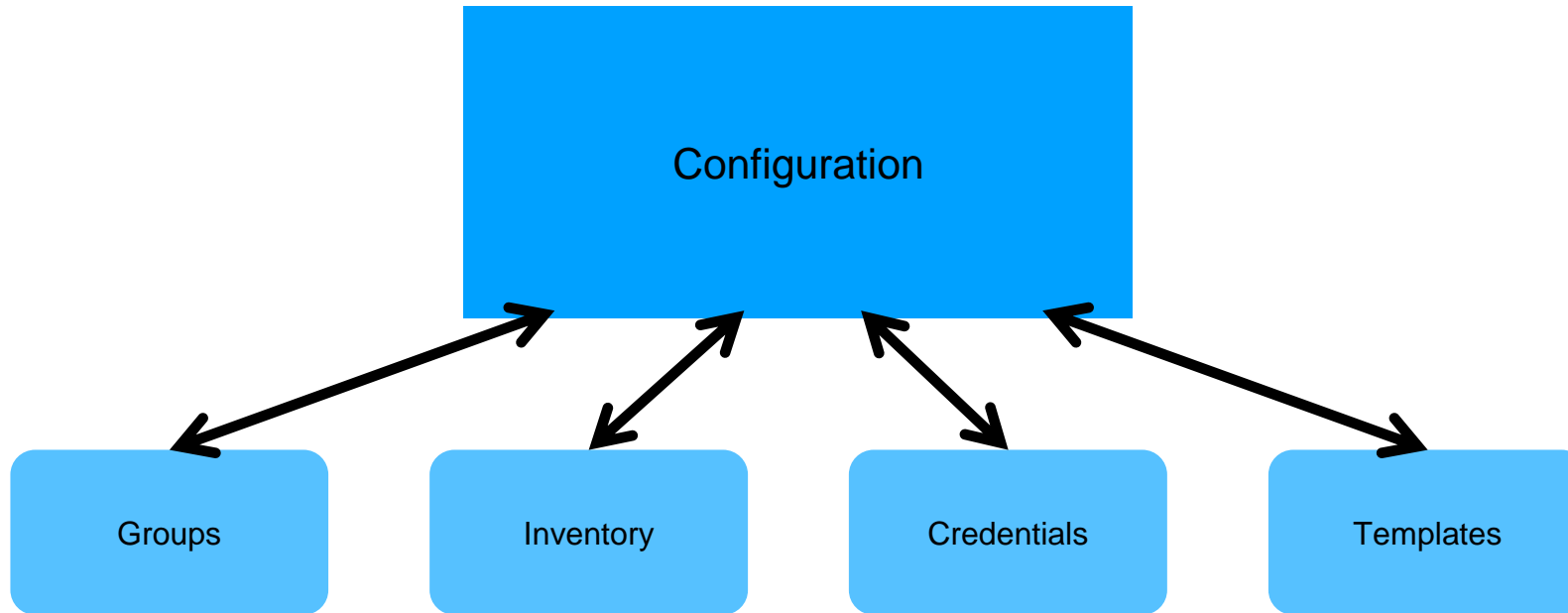
All running separately on each developer PC

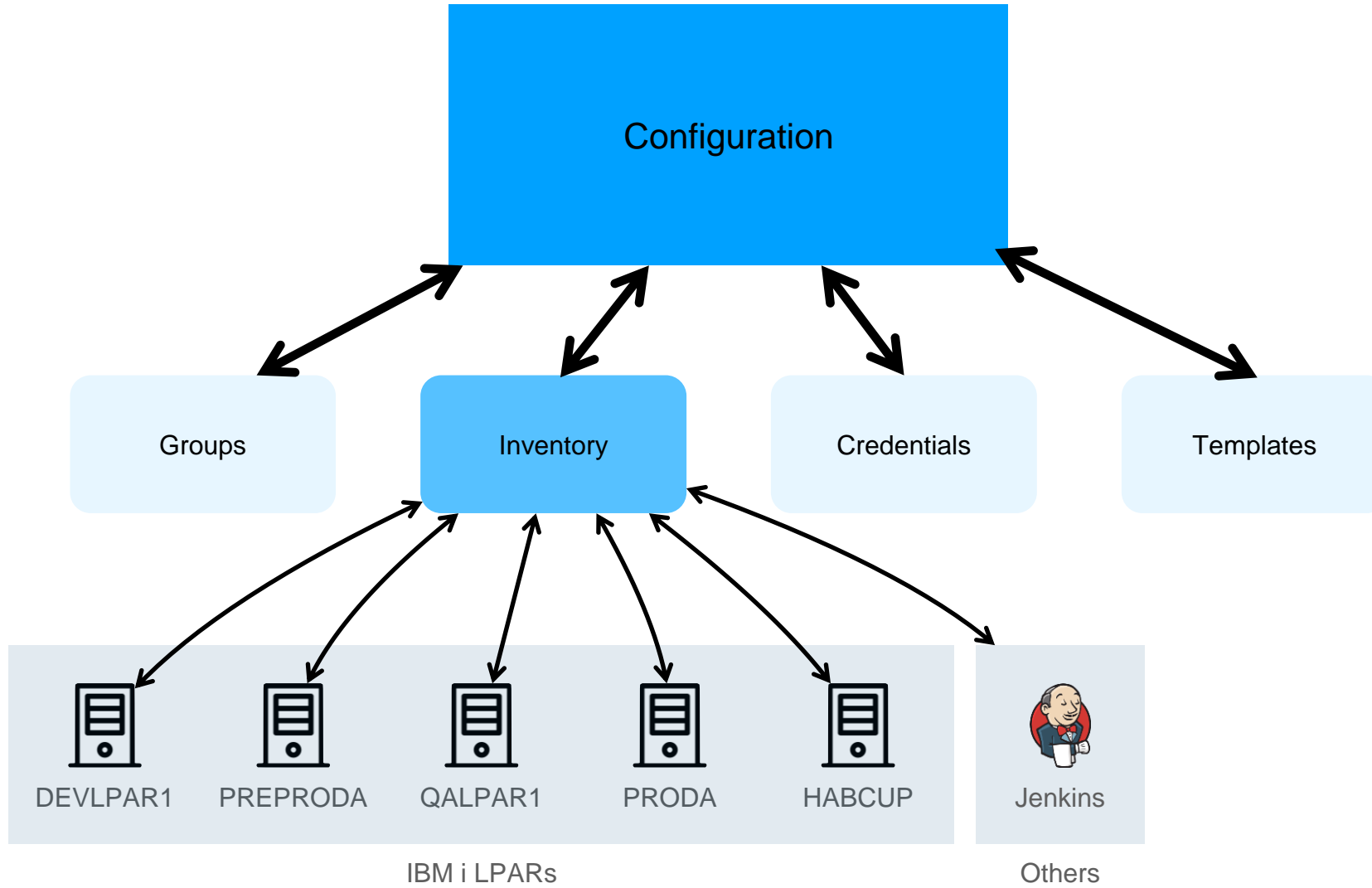


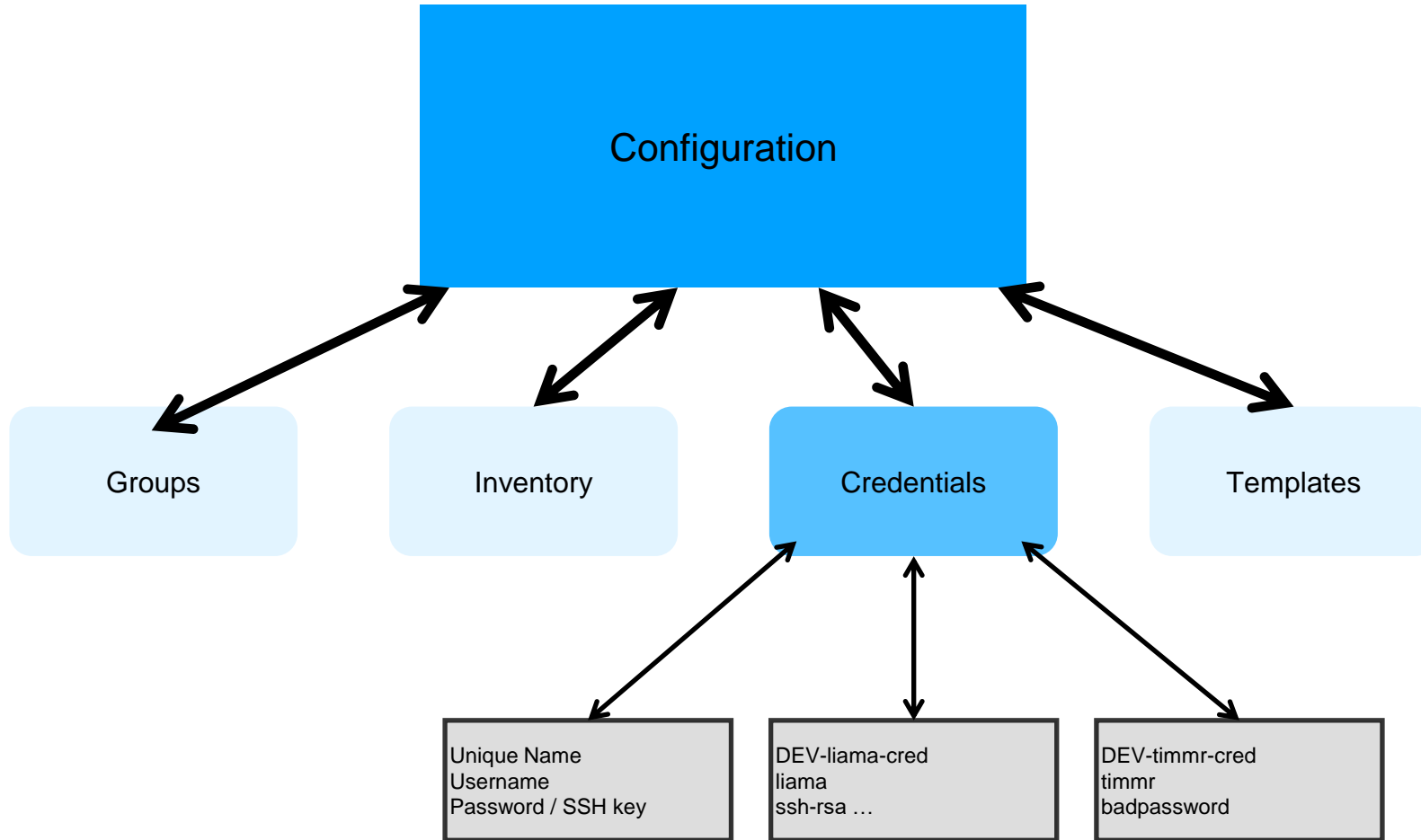
In all cases, additional function / features are all manually added, and no unified support

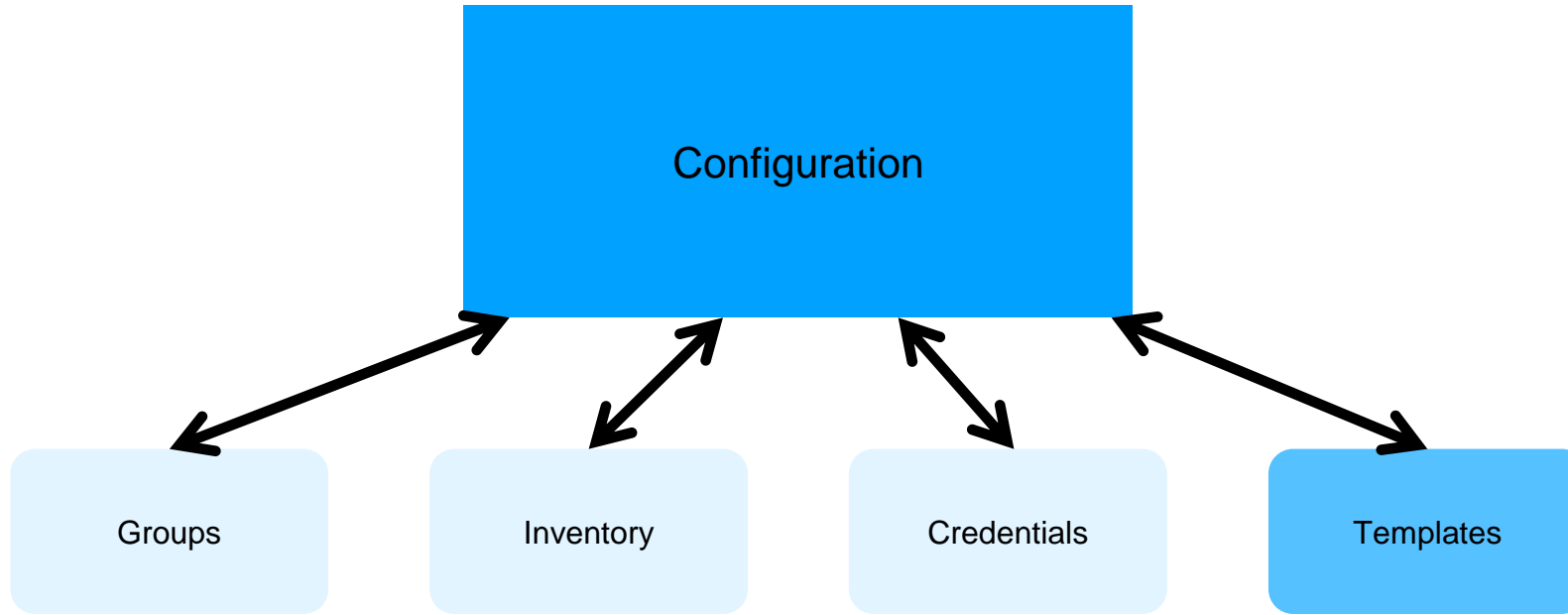
Network Topology for dev (Merlin style)

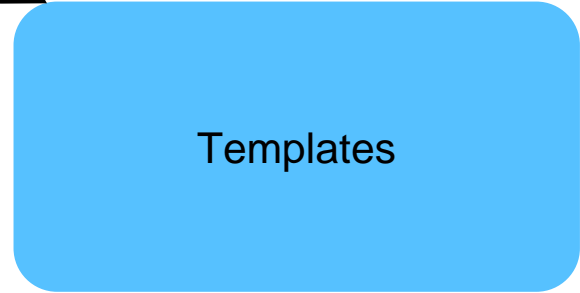




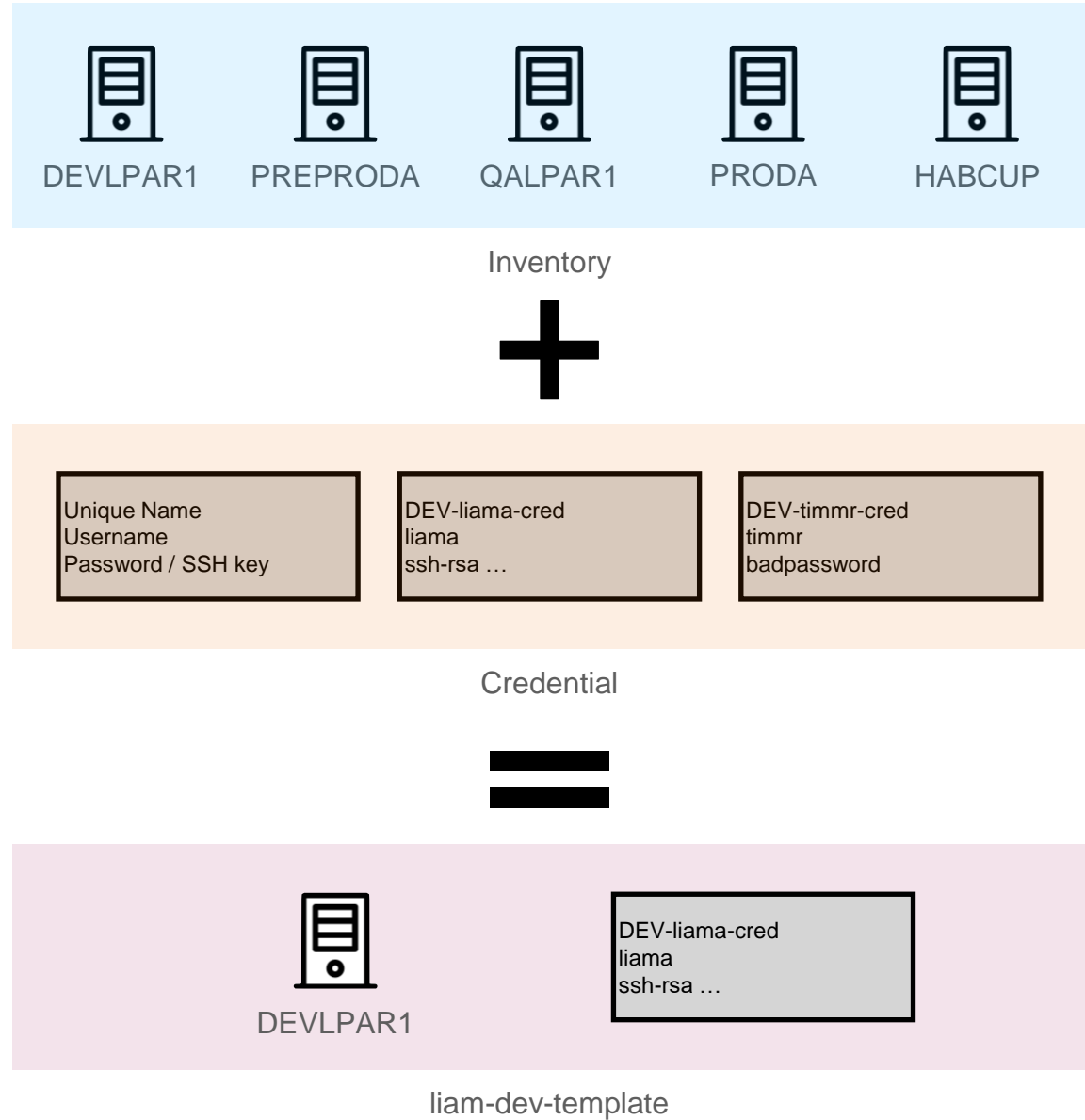








A Template associates inventory or a system with a credential



What are Developers Already Doing ?

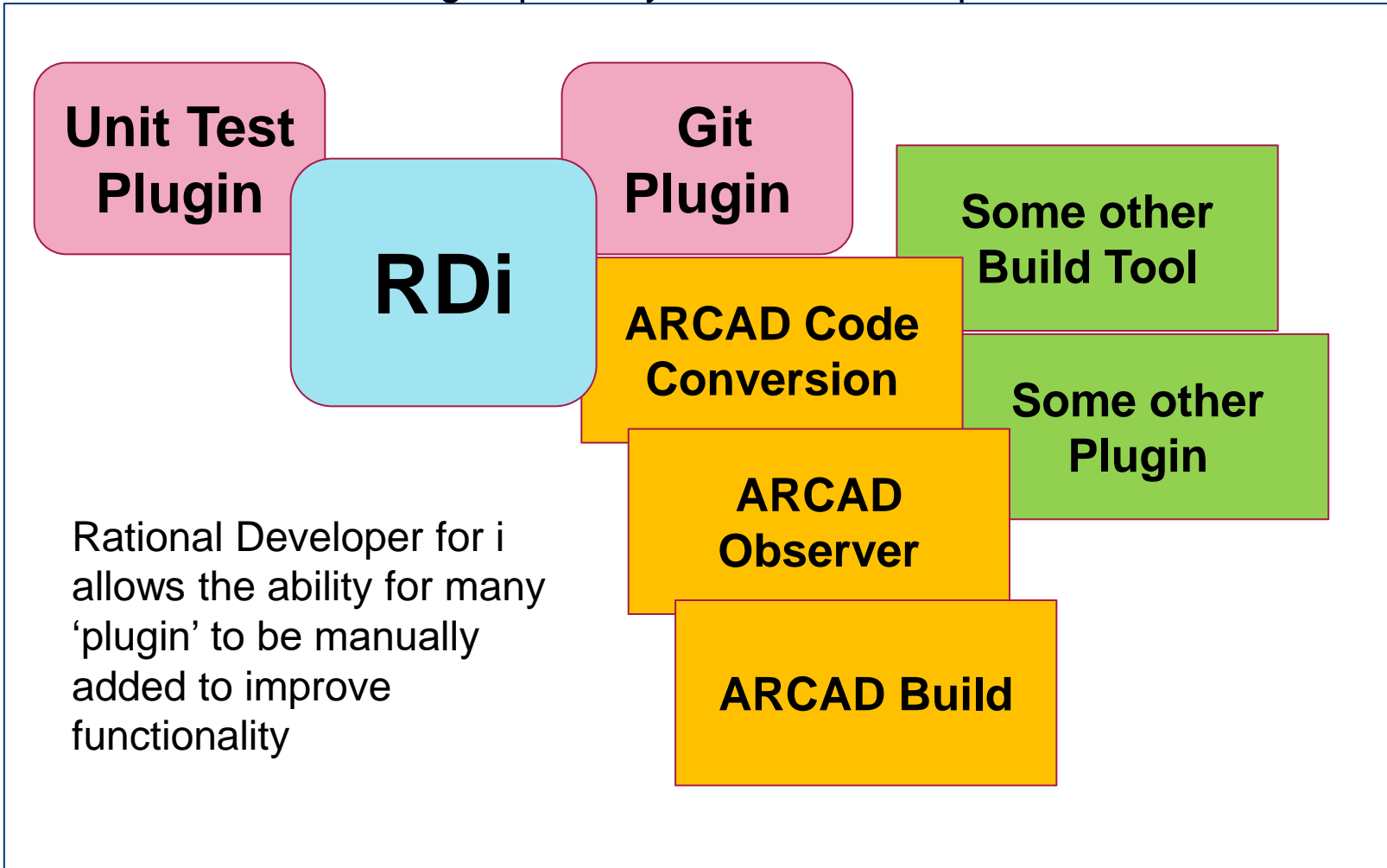


- Modern RPG
 - Helping to solve the talent gap
- RPG integration with modern development tools and strategies
 - Git
 - Jenkins
 - DevOps
- Connectivity with Cloud/Container apps - Rest APIs
 - Call RPG Business logic with a Rest connection
 - Call a Rest based service from RPG

Merlin was created to help simplify our IBM i customers journey to leveraging these already existing options

Today

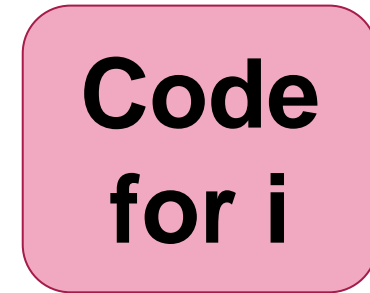
All running separately on each developer PC



Rational Developer for i allows the ability for many 'plugin' to be manually added to improve functionality

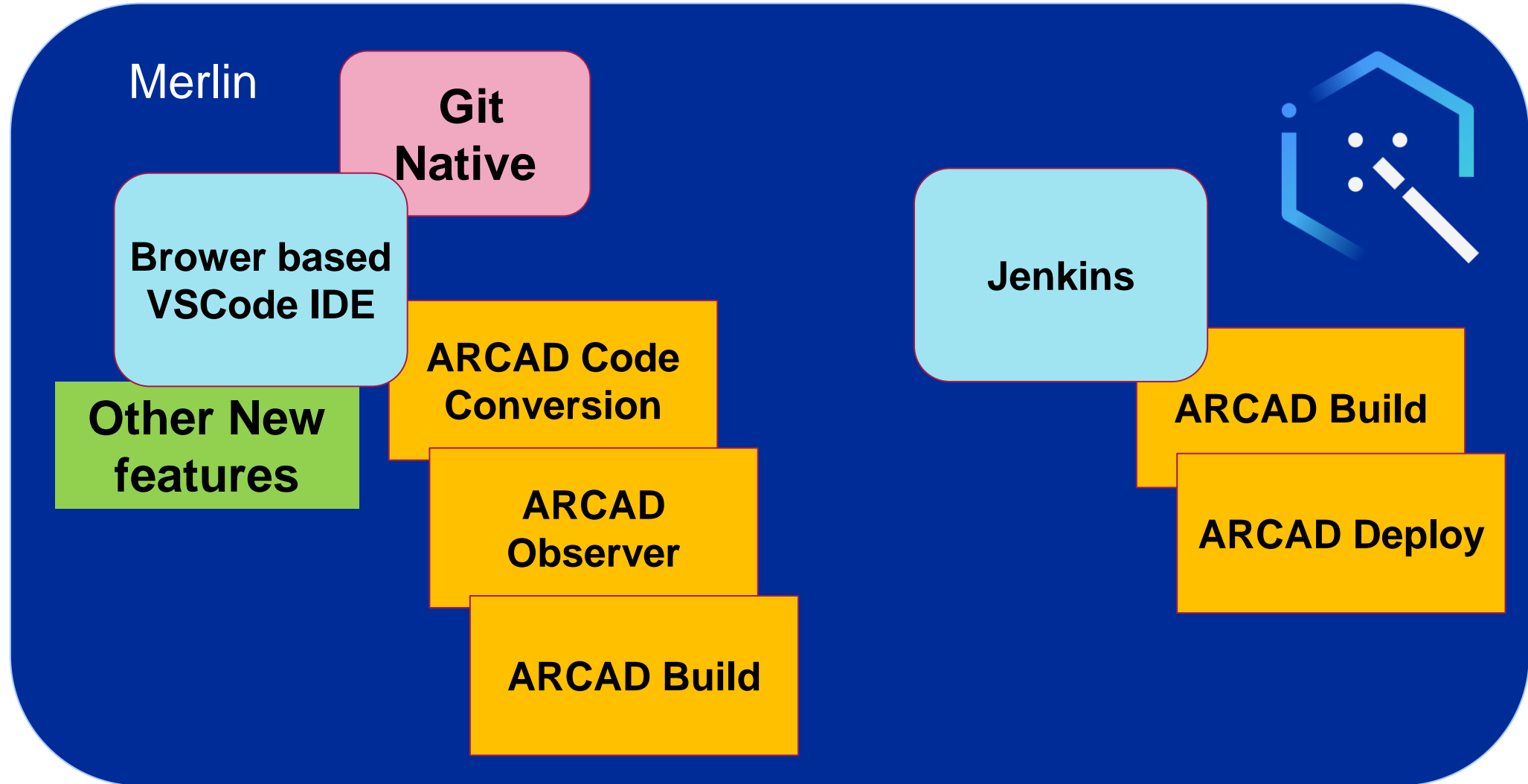


SEU – No plugins can be added



Plugin can be added....TBD

In all cases, additional function / features are all manually added, and no unified support



A single interface from IBM and fully supported by IBM, combining the key features required for modern IBM i Development

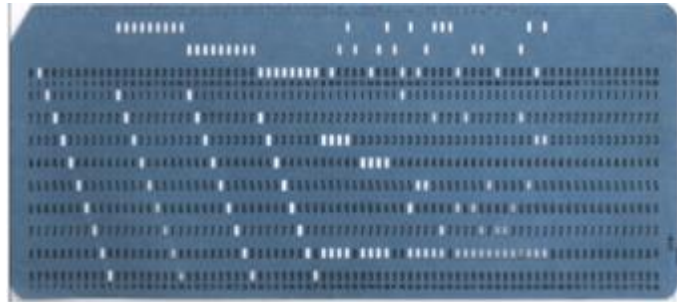
RPG a Modern Language



Transformation of RPG

RPG

AS/400®



Transformation

Modern RPG



```

ctl-opt bnddir('ACCRCV');
dcl-f custfile usage(*update);
dcl-ds custDs likerec(custRec);
dcl-f report printer;

read custfile custDs;
do not %eof;
  if dueDate > %date(); // overdue?
    sendOverdueNotice();
  write reportFmt;
  exec sql insert :name, :duedate into
    mylib/myfile;

```

007900	I*				
008000	I	APIERR	DS		
008100	I	I	256	B	1 40ERRSIZ
008200	I	I	0	B	5 80ERRLEN
008300	I	I			9 15 ERRMIC
008400	I	I			16 16 ERRNBR
008500	I	I			17 256 ERRDTA

What Are the Risks of Staying with old RPG

Staying with **OLD** RPG

- Record level access
- Column based code style
- Monolithic
- Remains largely single threaded
- Difficult to maintain

Transforming to **Modern** RPG

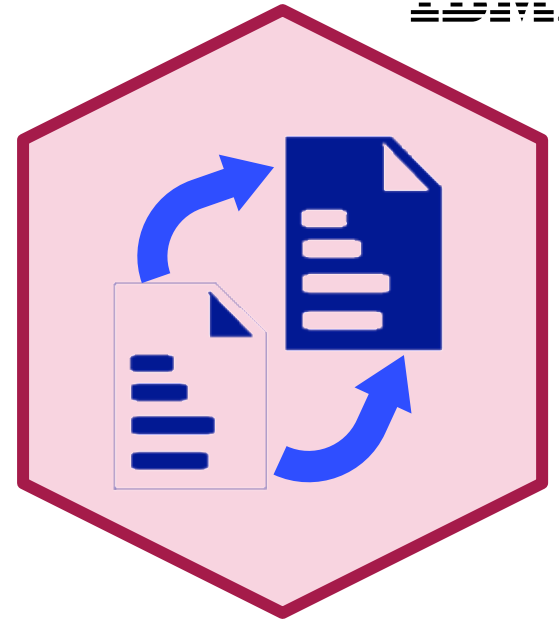
- Embedded SQL
- Set based data access
- Modular
- Easy to leverage as a Rest API
- Maintainable
- Self Describing



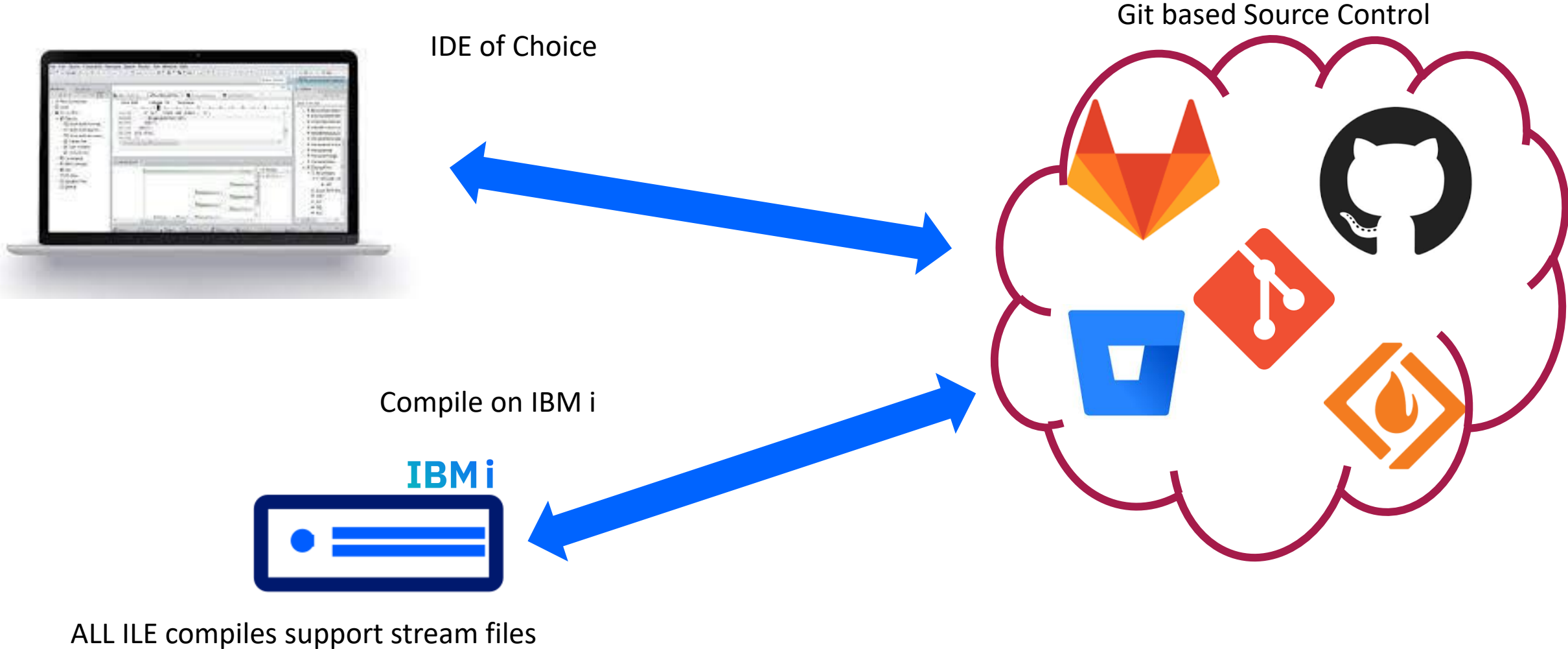
Modernization Best Practices

Refactor

- Rename Refactor
 - Change variables to self describing
- Modular
 - Extract Procedures
 - Leverage Service programs
 - ILE at its core is designed for maintainability
- Record -> Set based data access
 - Convert from DDS to DDL
 - Use surrogates to leave some programs unchanged (record access) and key programs leverage the power of SQL
- Be targeted
 - Not all programs need to be refactored



Git with ILE

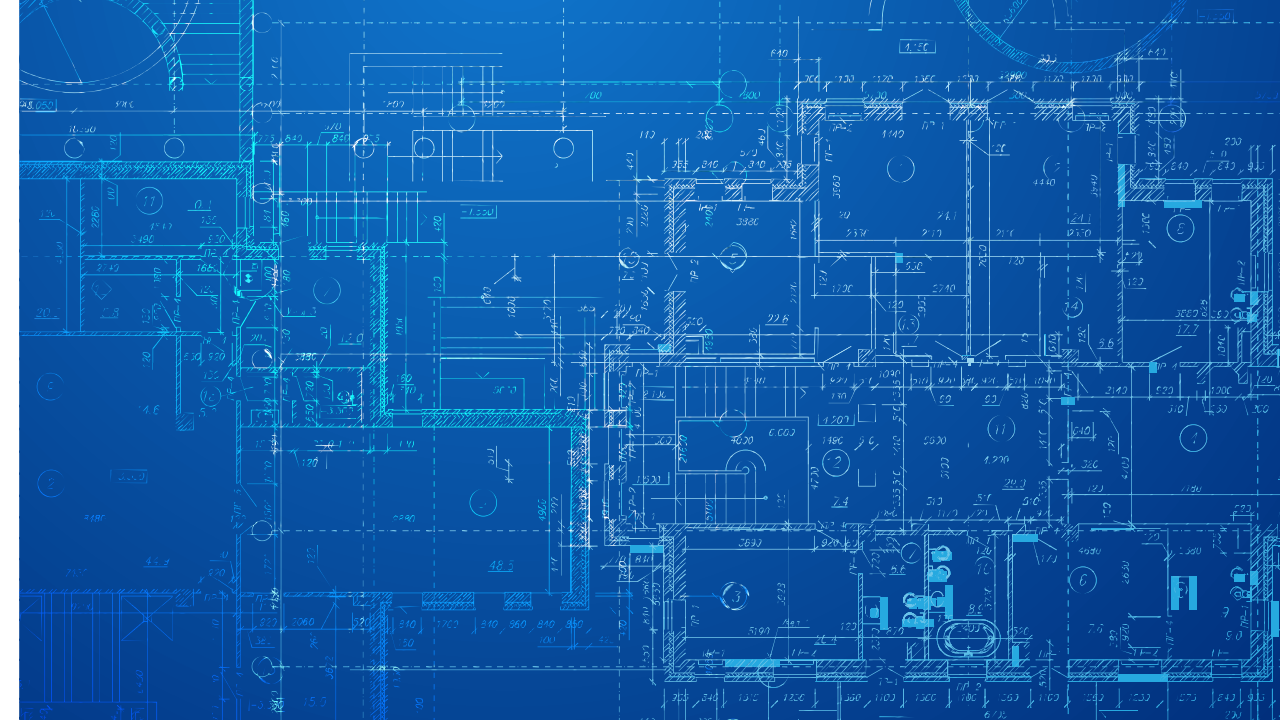
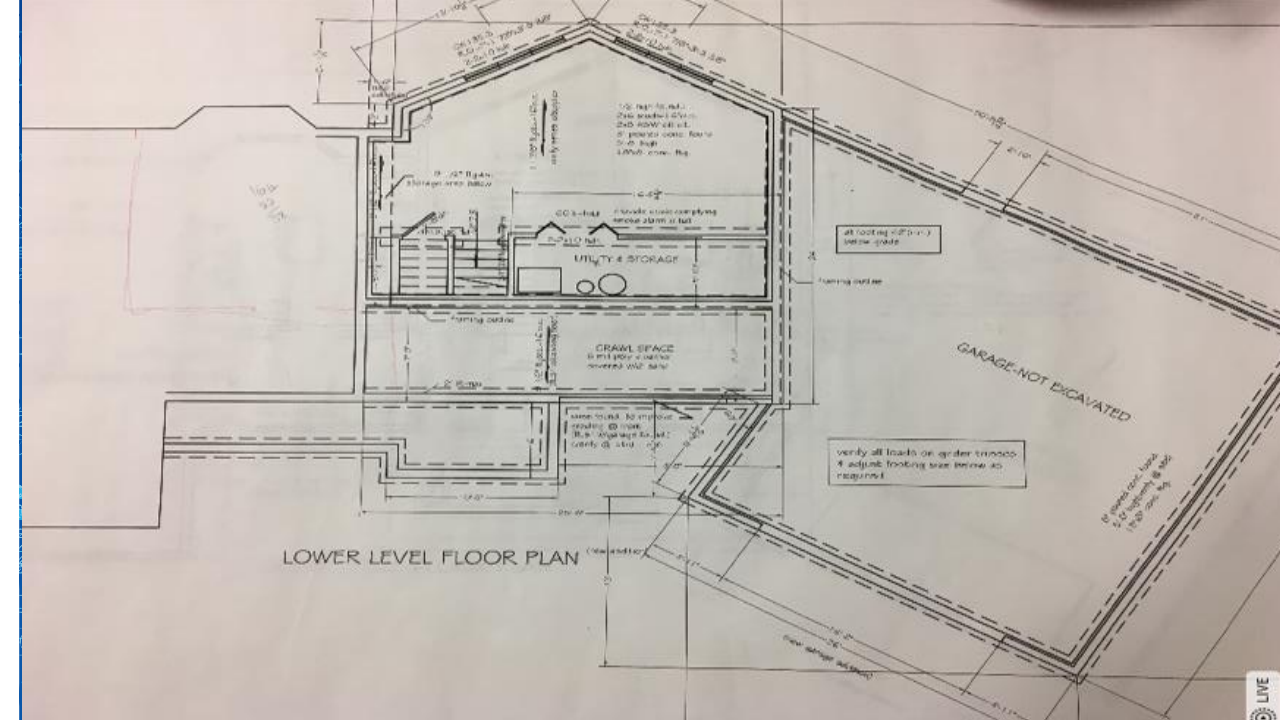


<https://www.ibm.com/support/pages/how-use-source-control-rdi>

Why a Tool for Analysis?

Provides the BluePrint for the application

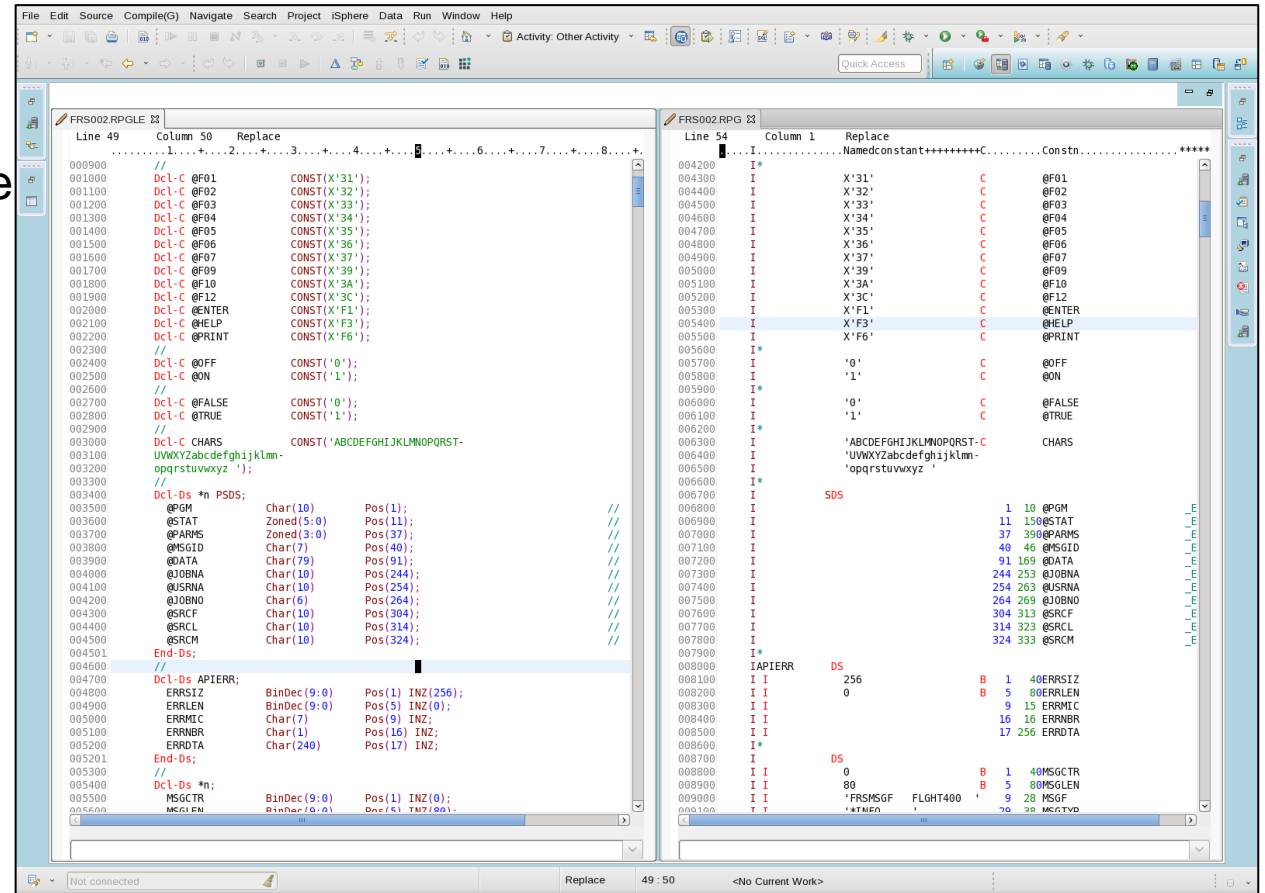
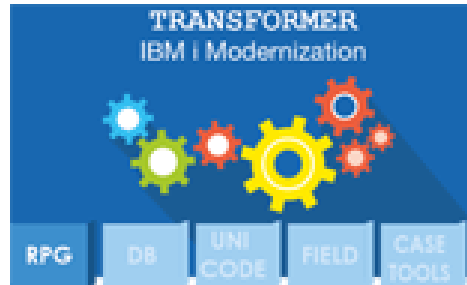
- Rapid analysis for hot fixes
- Application Change Studies (cost estimation)
- Redesign/re-architecting/SOA
- Extraction of business rules
- Application modernization
- Skill transfer
 - Help new people learn the application
- Generation of documentation required by regulatory constraints



How to Convert into Modern RPG ?

IBM i Anywhere
IBM i Everywhere

- ARCAD Converter (Transformer)
 - Plugs into RDi
 - Green Screen interface for MASS conversion
 - Convert multiple source members at once
 - can be ordered from IBM
 - ARCAD Converted for i - 5733-AC1
 - Or acquire from ARCAD – Free Trial



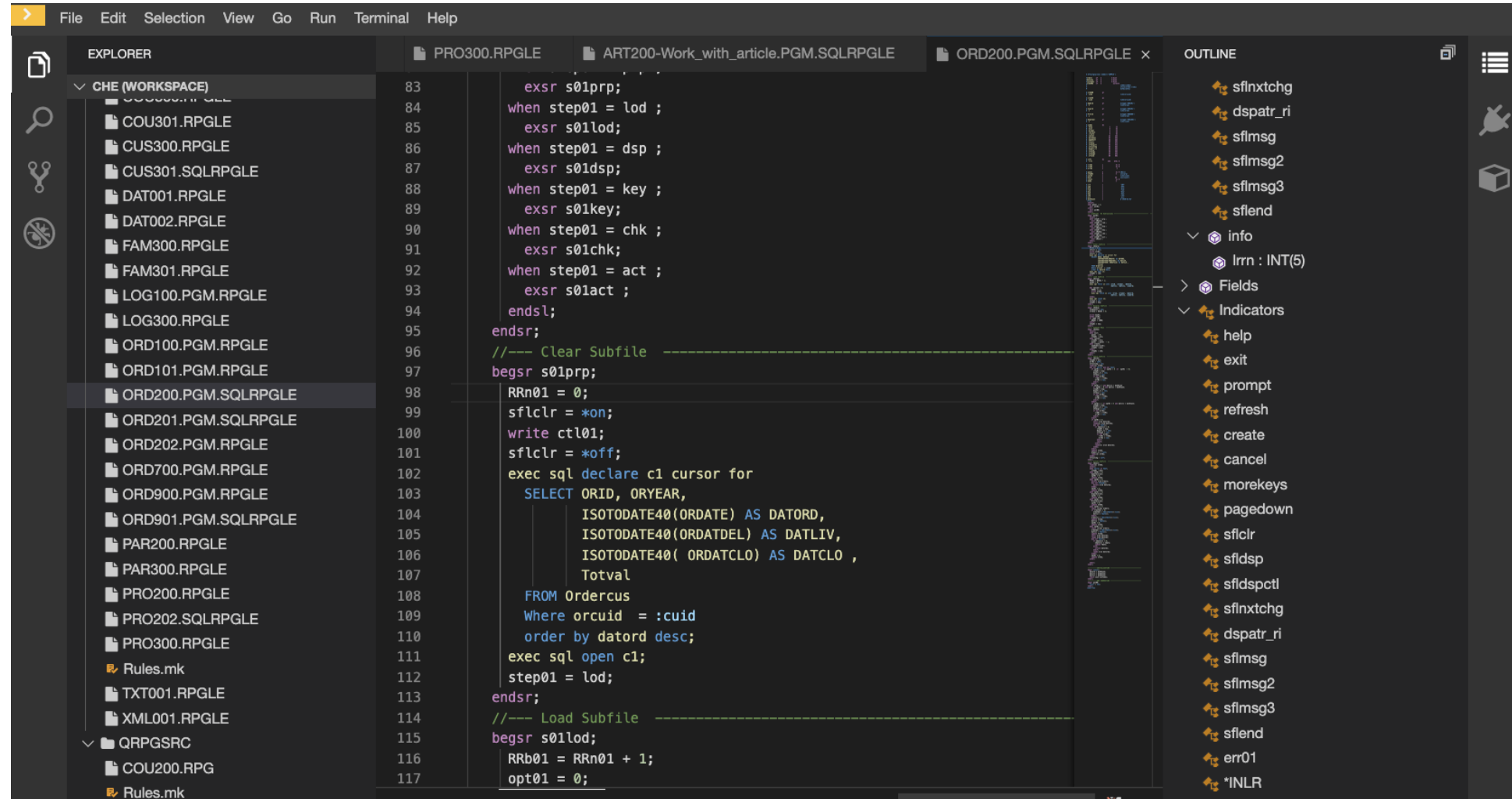
```
Line 49 Column 50 Replace
000900 //
001000 Dcl-C @F01 CONST('X'31');
001100 Dcl-C @F02 CONST('X'32');
001200 Dcl-C @F03 CONST('X'33');
001300 Dcl-C @F04 CONST('X'34');
001400 Dcl-C @F05 CONST('X'35');
001500 Dcl-C @F06 CONST('X'36');
001600 Dcl-C @F07 CONST('X'37');
001700 Dcl-C @F09 CONST('X'39');
001800 Dcl-C @F10 CONST('X'3A');
001900 Dcl-C @F12 CONST('X'3C');
002000 Dcl-C @ENTER CONST('X'F1');
002100 Dcl-C @HELP CONST('X'F3');
002200 Dcl-C @PRINT CONST('X'F6');
002300 //
002400 Dcl-C @OFF CONST('0');
002500 Dcl-C @ON CONST('1');
002600 //
002700 Dcl-C @FALSE CONST('0');
002800 Dcl-C @TRUE CONST('1');
002900 //
003000 Dcl-C CHARS CONST('ABCDEFGHIJKLMNQRST-
003100 UVWXYZabcdefghijklmnop-
003200 opqrstuvwxyz ');
003300 //
003400 Dcl-DS *n PSDS;
003500 @PGM Char(10) Pos(1); //
003600 @STAT Zoned(5:0) Pos(11); //
003700 @PARMS Zoned(3:0) Pos(37); //
003800 @MSGID Char(7) Pos(40); //
003900 @DATA Char(79) Pos(91); //
004000 @JOBNA Char(10) Pos(244); //
004100 @USRNA Char(10) Pos(254); //
004200 @JOBNO Char(6) Pos(264); //
004300 @SRCF Char(10) Pos(304); //
004400 @SRCL Char(10) Pos(314); //
004500 @SRCM Char(10) Pos(324); //
004600 //
004700 Dcl-DS APIERR;
004800 ERRSIZ BinDec(9:0) Pos(1) INZ(256);
004900 ERRLEN BinDec(9:0) Pos(5) INZ(0);
005000 ERMIC Char(7) Pos(9) INZ;
005100 ERNBR Char(1) Pos(16) INZ;
005200 ERDTA Char(240) Pos(17) INZ;
005300 //
005400 Dcl-DS *n;
005500 MSGCTR BinDec(9:0) Pos(1) INZ(0);
005600 MSGLEN BinDec(9:0) Pos(5) INZ(0);

Line 54 Column 1 Replace
004200 I*
004300 I X'31' C @F01
004400 I X'32' C @F02
004500 I X'33' C @F03
004600 I X'34' C @F04
004700 I X'35' C @F05
004800 I X'36' C @F06
004900 I X'37' C @F07
005000 I X'39' C @F09
005100 I X'3A' C @F10
005200 I X'3C' C @F12
005300 I X'F1' C @ENTER
005400 I X'F3' C @HELP
005500 I X'F6' C @PRINT
005600 I*
005700 I '0' C @OFF
005800 I '1' C @ON
005900 I*
006000 I '0' C @FALSE
006100 I '1' C @TRUE
006200 I*
006300 I 'ABCDEFGHIJKLMNQRST-C CHARS
006400 I 'UVWXYZabcdefghijklmnop-
006500 I 'opqrstuvwxyz '
006600 I*
006700 I SDS
006800 I 1 10 @PGM
006900 I 11 150 @STAT
007000 I 37 390 @PARMS
007100 I 40 46 @MSGID
007200 I 91 169 @DATA
007300 I 244 253 @JOBNA
007400 I 254 263 @USRNA
007500 I 264 269 @JOBNO
007600 I 304 313 @SRCF
007700 I 314 323 @SRCL
007800 I 324 333 @SRCM
007900 I*
008000 I APIERR DS
008100 I I 256 B 1 40ERRSIZ
008200 I I 0 B 5 80ERRLEN
008300 I I 9 15 ERMIC
008400 I I 16 16 ERNBR
008500 I I 17 256 ERDTA
008600 I*
008700 I DS
008800 I I 0 B 1 40MSGCTR
008900 I I 80 B 5 80MSGLEN
009000 I I 'FRMSGF FLGHT400 ' 9 28 MSGF
009100 I I '*TLEN ' 70 28 MCTVD
```

<https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=AN&subtype=CA&htmlfid=897/ENUS217-151&appname=lenovous&language=en>

<https://www.arcadsoftware.com/resource-items/arcad-transformer-rpg-free-format-rpg-conversion/>

IBM Developer – The Merlin IDE



- Outline View
- Tokenization
- Content Assist
- Code formatting
- Understand Languages
 - RPG
 - SQL
 - Embedded SQL
 - CL
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 - DDS

IBM Developer – The Merlin IDE



Compile a single program or Build an Application

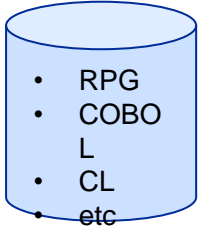
Code Ready Workspace

Favorite Browser

```
File Edit Selection View Go Run Terminal Help
EXPLORER
C:\HE (WORKSPACE)
  COL3001.RPGLE
  CUI3000.RPGLE
  CUI3301.SQLE.RPGLE
  DAT001.RPGLE
  DAT002.RPGLE
  FAM300.RPGLE
  FAM301.RPGLE
  LOG300.PGM.RPGLE
  LOG300.RPGLE
  ORD100.PGM.RPGLE
  ORD101.PGM.RPGLE
  ORD200.PGM.SQLE.RPGLE
  ORD201.PGM.SQLE.RPGLE
  ORD202.PGM.RPGLE
  ORD700.PGM.RPGLE
  ORD900.PGM.RPGLE
  ORD901.PGM.SQLE.RPGLE
  PAR200.RPGLE
  PAR300.RPGLE
  PHO200.RPGLE
  PHO202.SQLE.RPGLE
  PHO300.RPGLE
  Rules.mk
  TX1001.RPGLE
  XML001.RPGLE
  QRPGRSRC
  COL3000.RPG
  Rules.mk
PRD300.RPGLE
ART200-Work_with_article.PGM.SQLE.RPGLE
ORD200.PGM.SQLE.RPGLE
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114
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  exsr s@lprp;
  when step@1 = lod ;
  exsr s@llod;
  when step@1 = dsp ;
  exsr s@ldsp;
  when step@1 = key ;
  exsr s@lkey;
  when step@1 = chk ;
  exsr s@lchk;
  when step@1 = act ;
  exsr s@lact ;
  ends;
  //--- Clear Subfile
  beqsr s@lprp;
  RR@1 = 0;
  sfclr = won;
  write ct@1;
  sfclr = woff;
  exec sql declare c1 cursor for
  SELECT ORID, ORYEAR,
         ISOTODATE@1(ORDATE) AS DATORD,
         ISOTODATE@1(ORDATE) AS DATLEV,
         ISOTODATE@1(ORDATCLO) AS DATCLO ,
         Totval
  FROM Ordercus
  where orcid = :scud
  order by datord desc;
  exec sql open c1;
  step@1 = lod;
  ends;
  //--- Load Subfile
  beqsr s@llod;
  RR@1 = RR@1 + 1;
  opt@1 = 0;
```

Integrated Compile Output Details

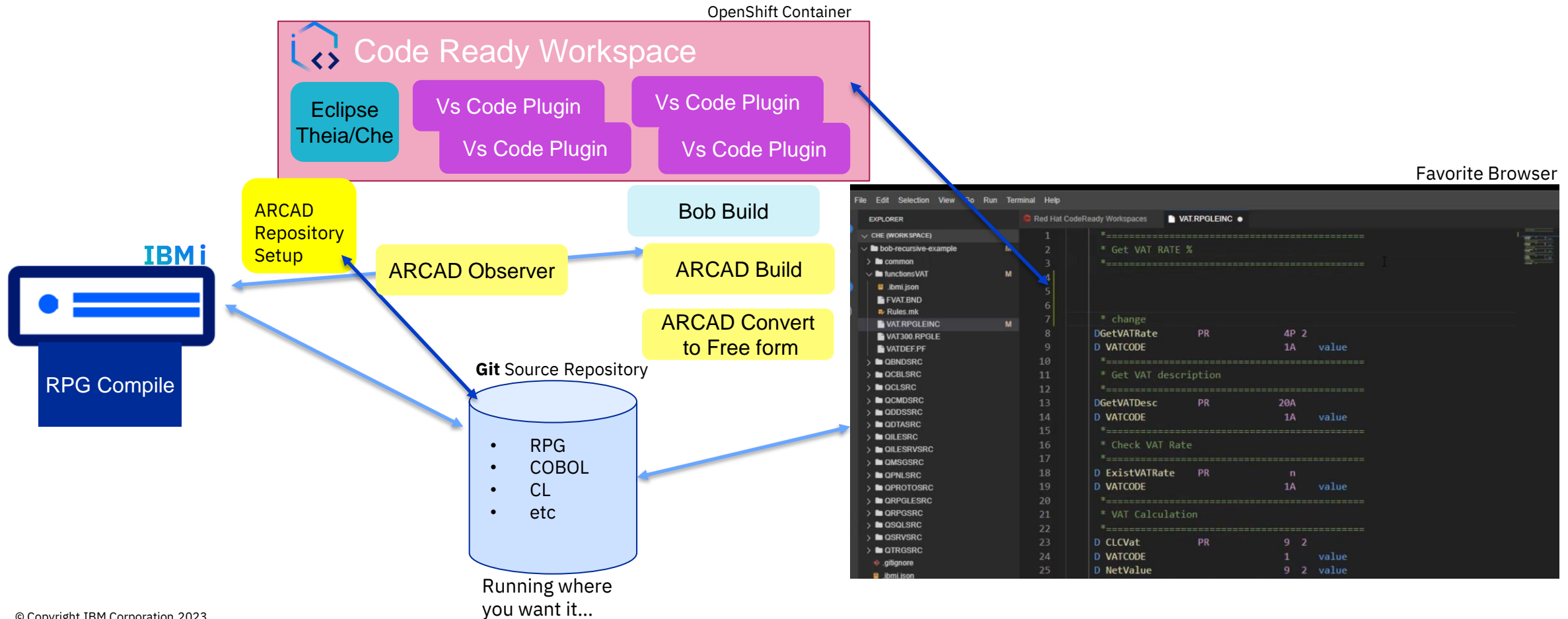
Git Source Repository



IDE - Today

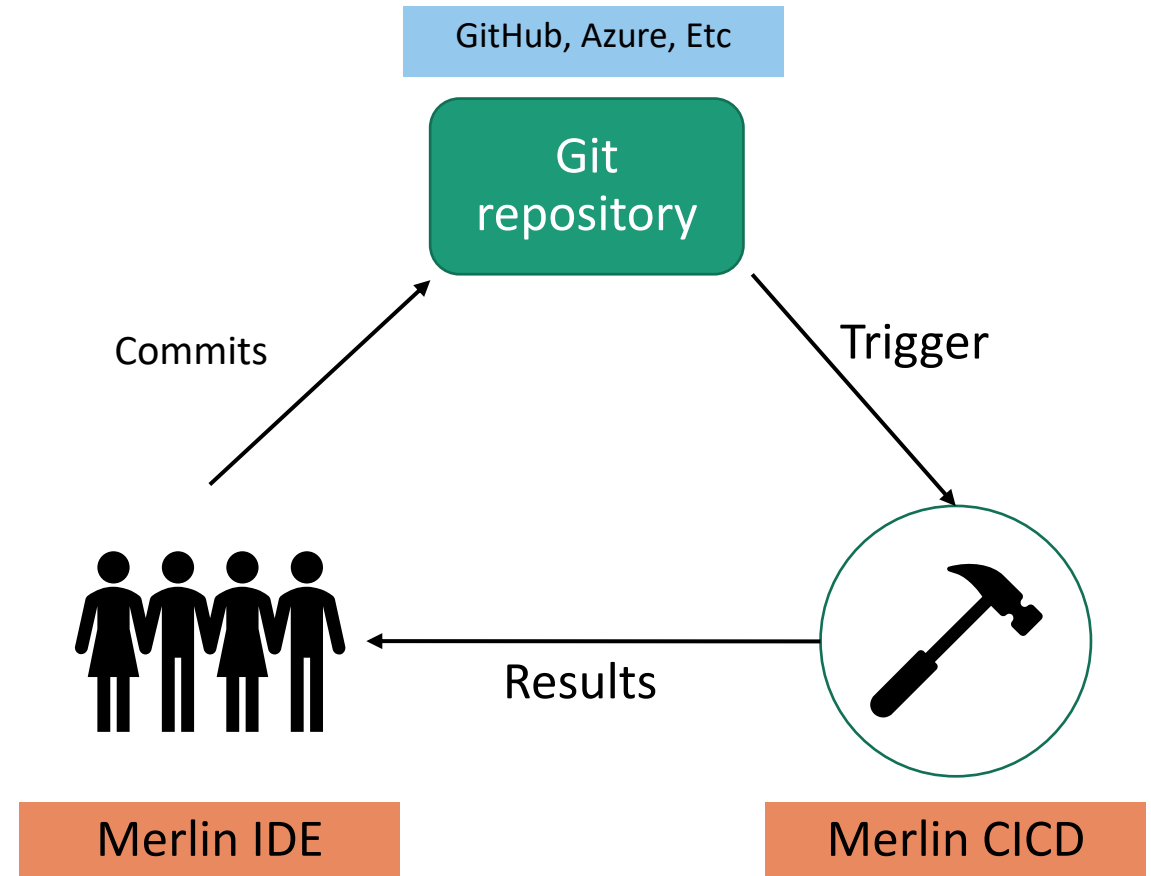


- Setup your development environment
- Rich editing capability
- Build / Compile your project



What is continuous integration?

- Developers commit code to a shared repository regularly
- Repository pushes cause a build to trigger automatically
- Immediate feedback based on build result





Why CI?

Detect problems or bugs,
as early as possible,
in the development life cycle

Potential bugs and errors are
caught earlier in the life cycle
which results in better quality
software

Fixing broken builds should be
treated as a high priority issue for
all team members

The deployment process should
be automated, with no manual
steps involved



Types of 'builds'

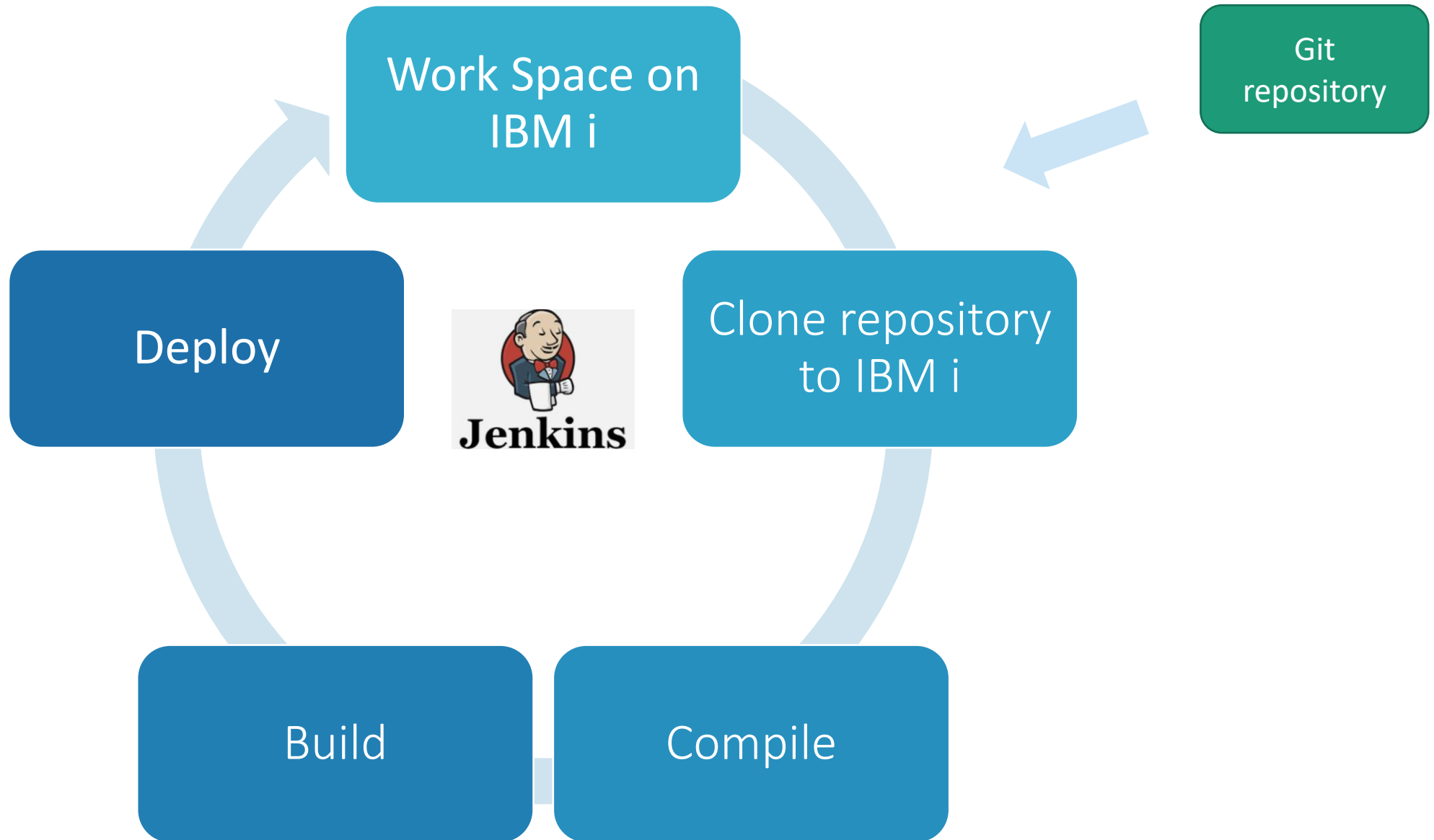
Build

- Build of entire application, or
- Build of specific portion of application (e.g. a display file and any dependent programs)

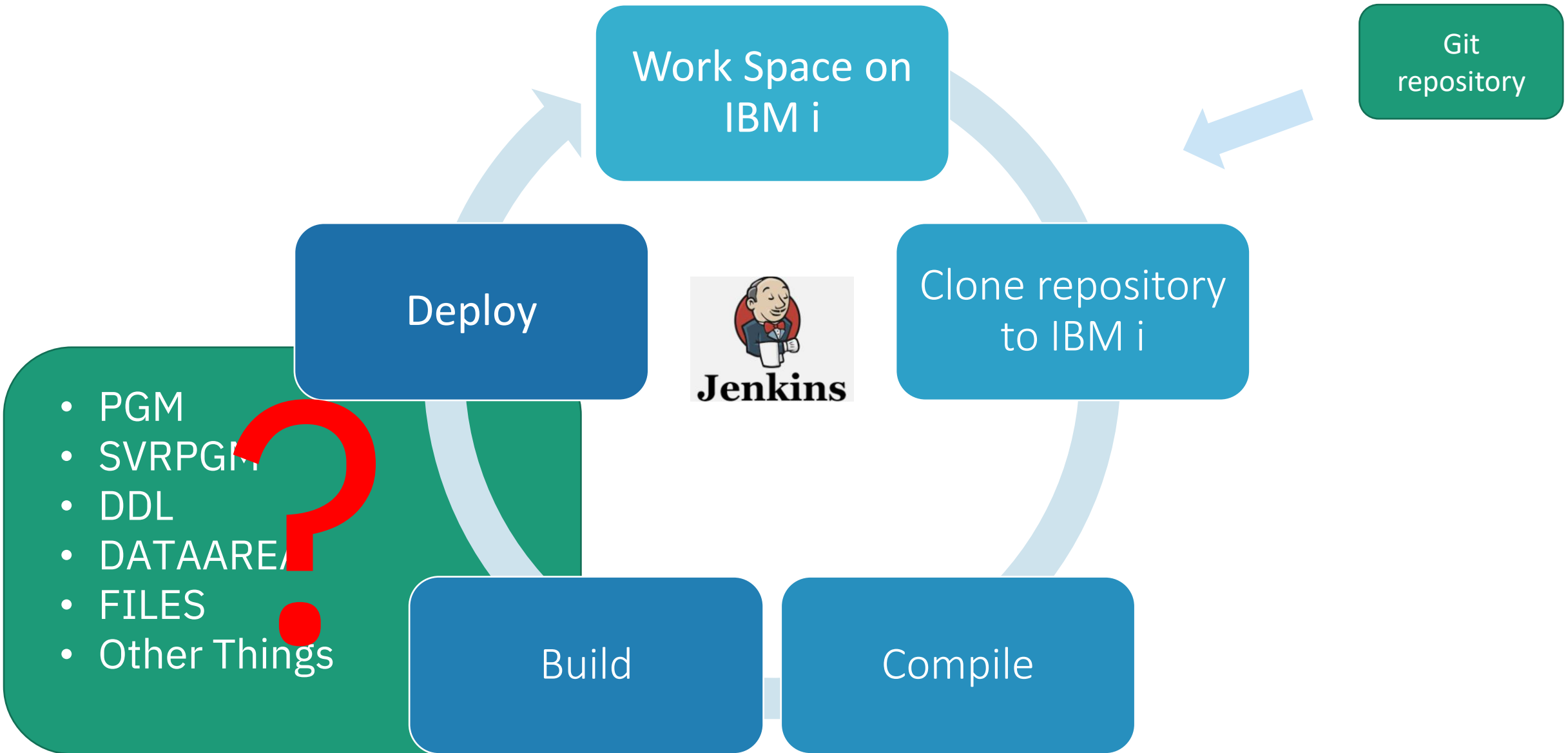
Compile

- Compilation of a specific sources without the need of launching larger build

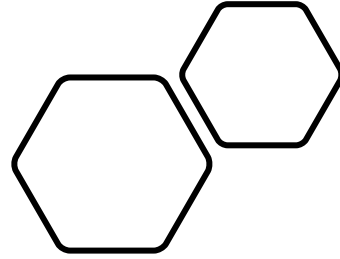
CI/CD Flow Today



CI/CD Flow Today



Any build tool



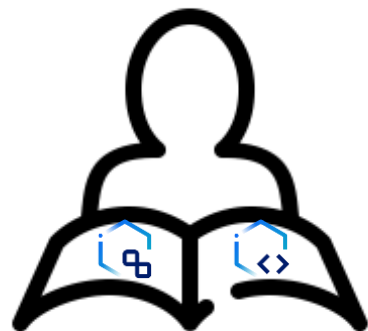
- **ARCAD Builder**
- Custom build tools
- GNU Make
- ibmi-bob
- **Other options ??**

ARCAD Builder

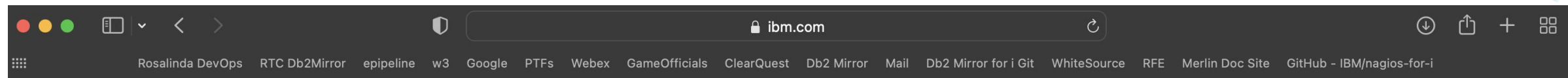
- Automatically detects projects dependency tree
 - Highly optimized smart builds and minimal clones
 - Integrated into Jenkins, Merlin IDE and Merlin CICD
- 
- A solid blue triangle is positioned in the bottom right corner of the slide, pointing towards the top right.



Where can I Learn More about Merlin ?



Merlin Product Page



Search



<https://www.ibm.com/products/ibm-i-merlin>

IBM i Modernization Engine for Lifecycle Integration

A development and modernization environment for IBM i applications

Let's talk 



IBM i Merlin

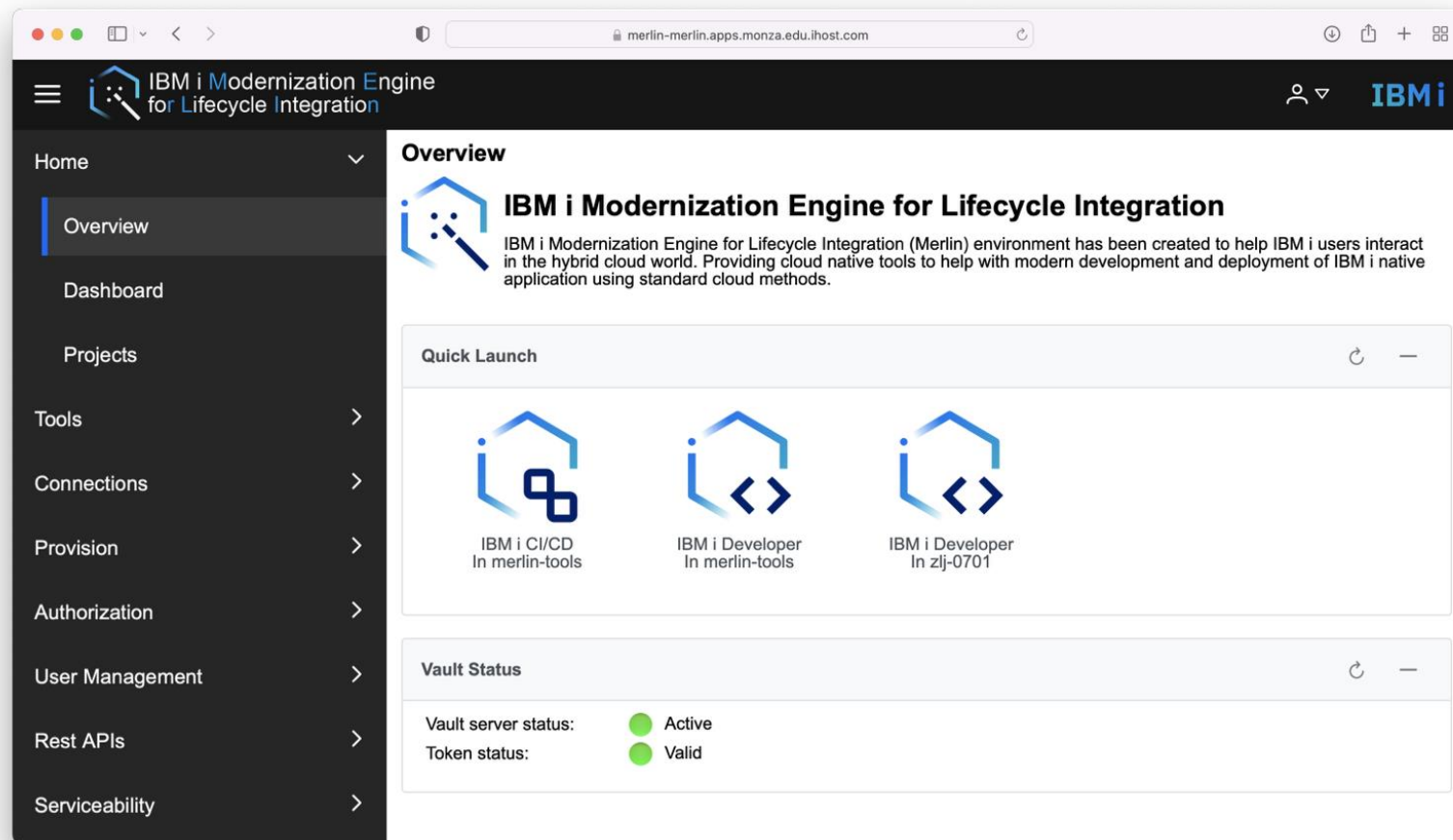
The coolest IBM product since ADDPFM

Get Started

Modern Documentation
Hosted on IBM GitHub
Targeted for Hands on Usage

<https://ibm.github.io/merlin-docs/#/>

- Overview
 - Merlin
 - Platform
 - FAQs
- Source control
 - Moving into git
- OpenShift
 - Requirements (todo)
 - IBM Entitlement
 - Installing Merlin
- Merlin
 - App Installation
 - Configuration
 - Basic Flows
- Merlin IDE
 - Usage
 - ARCAD
- Merlin CICD
 - Usage & Jenkins
 - ARCAD Builder
 - ibmi-bob



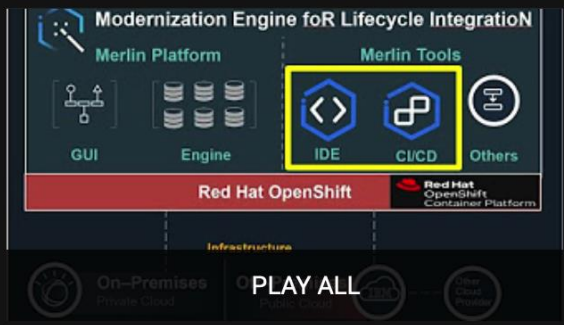
IBM i Modernization Engine for Lifecycle Integration (Merlin) is a set of tools run in OpenShift containers which guide and assist software developers in the modernization of IBM i applications, allowing them to realize the value of a hybrid cloud, multi-platform DevOps implementation.

<https://ibm.github.io/merlin-docs/#/>

Getting started videos



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Merlin - Modernization Engine for Lifecycle Integration

8 videos • 587 views • Updated 5 days ago



- 1 **IBM i Modernization Engine for Lifecycle Integration (Merlin) Demo**
ARCAD Software
11:52
- 2 **Merlin IDE Editing Tour**
ARCAD Software
6:43
- 3 **Merlin IBM i Developer Build Demo**
ARCAD Software
5:05
- 4 **Merlin Webcast - Cloud-based Application Development and Modernization on IBM i**
ARCAD Software
50:21

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- 6 **How To Create a Merlin project from an existing GitHub repository**
ARCAD Software
3:18

IBM i Guided Tours

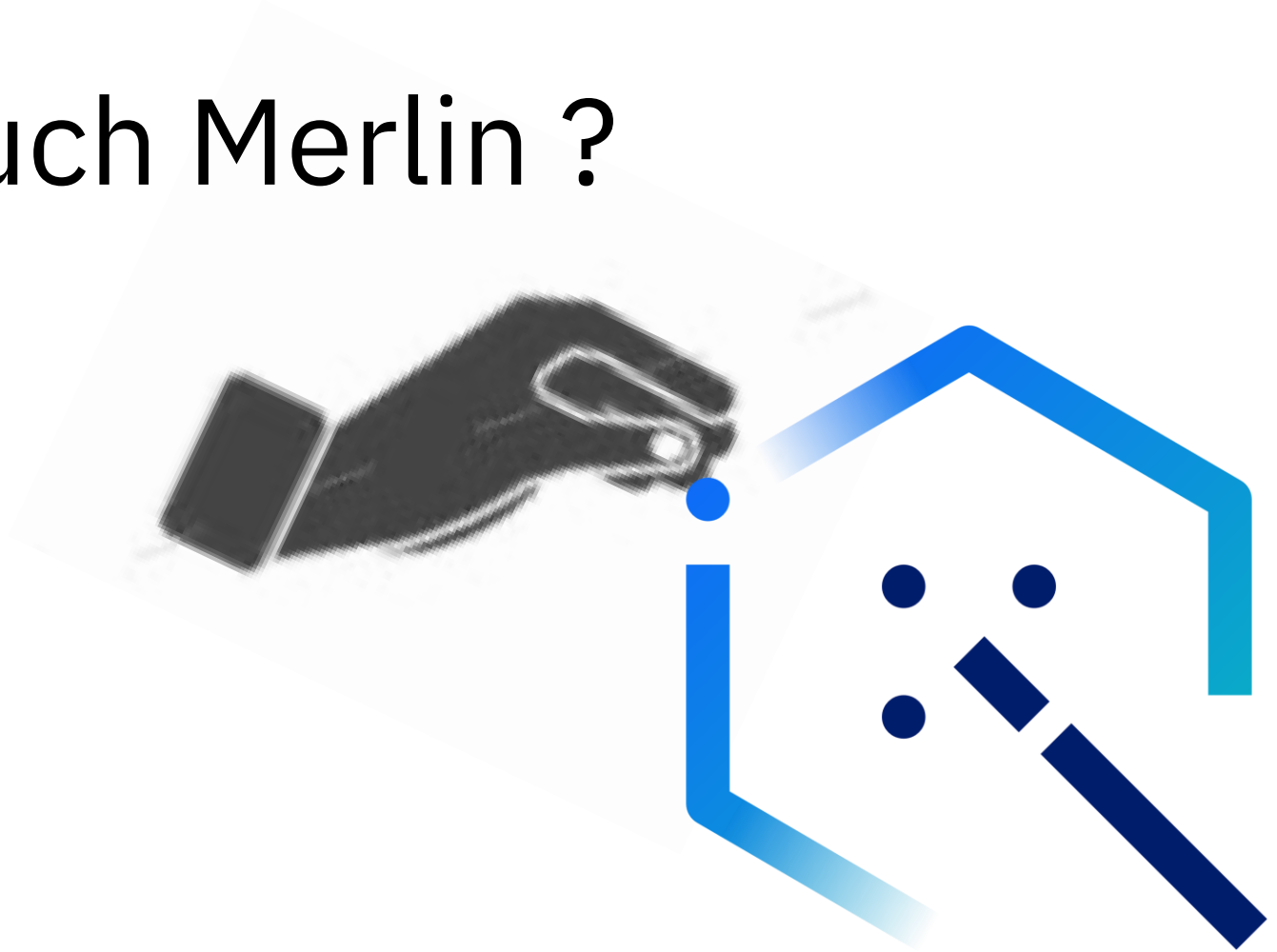
- Every Wednesday, 9:00 am Central US Time
 - Everyone is welcome: IBMers, Partners and Customers
 - To register [click here](#)
- Series 1 – Merlin Guided Tours - currently on Series 2
 - Introduction to Merlin and Office Hours (Open for questions)
 - Introduction to the IDE
 - Introduction to the CI/CD capabilities
 - Installation and Configuration
-]



<https://ibm.webex.com/ibm/onstage/g.php?PRID=bcdcfadf19e9baf2f05ddb4408b445ea>



Best way to touch Merlin ?



Merlin Testdrive



- Public Access
- Pre-Set up
- Place to touch Merlin and get a feel for it
- Pre-Defined RPG App for Edit and Build Purpose
- Not intended for POC
- Requires an Opportunity number



Merlin

<https://ibm.github.io/merlin-docs/#/./guides/overview/sandbox>

IBM i Modernization Engine for Lifecycle Integration (Merlin) Test Drive

- **Overview**
- This offering provides short-term access to a pre-configured IBM i Merlin environment.

IBM i



- **Target Audience**
- Tech-Sellers and Business Partners who wish to provide a hands-on experience to their clients with the IBM i Merlin product, to help advance an IBM Power opportunity.
- **IBM i Experience is recommended.**
- Clients can participate with their Tech-Seller requesting the offering.
- IBM i development provides support to your client.
- Client Engineering for Systems supports the systems and infrastructure.
- Do you need access to an environment to showcase IBM i Merlin, and to provide a client hands-on access?
- If so, this offering may be what you're looking for!

Value Proposition

- Realize the value of a hybrid cloud, multi-platform DevOps implementation.
- Gain hands-on experience with the technology.
- A self-guided tour and sample code are provided.
- Leverage, test, and / or demonstrate IBM i Merlin.
- The user is provided an OpenShift Merlin Workspace and a dedicated IBM i partition.
- IBM Client Engineering for Systems provides the infrastructure, IBM i Development provides the Merlin expertise, while you bring your client.
- VPN Access is provided to remotely access the environment; for the IBM Tech-Seller, BP, and for the client.



- **Duration**
 - Up to one week.
- **Environment Limitations**
 - This is not instructor led training or education.
 - This is not a custom PoC environment.
 - You are not to load HIPAA or PHI data on the IBM systems.

Contacts

- Contact us at ce4s@ibm.com

(Please include an associated ISC Opp#, and a comment in the form that you're requesting "IBM i Merlin" access.)

IBM i Modernization with Merlin

IBM Technology Services – US Capabilities

Randy Ruhlow
ruhlowr@us.ibm.com



US IBM Technology Services - IBM i MERLIN Service Capabilities

MERLIN platform installation and initial configuration:

- Configure Red Hat OpenShift Container Platform (OCP) Operator Hub for MERLIN operators
- Create OCP project for the install of MERLIN Operator, create MERLIN instance and launch MERLIN platform
- Configure MERLIN platform global artifacts: inventory, credentials, templates, and vaults
- Provide skills and knowledge transfer on MERLIN platform setup, administration, and operation

MERLIN platform tools: IBM i Developer and IBM i CICD

- Provide installation and configuration of the MERLIN platform tools
- Assist clients with the use of the tools including integration into Git repositories and IBM i development systems
 - IDE VSCode features and functions
 - CICD pipeline features and functions
 - Jenkins and Git integration
- Advise on the use of tools for application development, and CICD pipeline creation

IBM i DevOps Discovery Sessions:

- Explore capabilities of newly announced IBM i Modernization Engine for Lifecycle Integration (MERLIN)
- Explore solutions and tools from IBM i ISVs
- Align your devops CICD requirements and objectives with current IBM i devops solutions from IBM and IBM i ISVs
- Assist with developing roadmaps for initial IBM i devops and CICD initiatives

IBM i DevOps Architecture and Sessions:

- Craft devops architectures for hardware and software infrastructures supporting IBM i CICD devops initiatives
- Define phases and scope of initial devops CICD initiatives
- Design details for repositories, automation servers, CICD pipelines, and tool integrations including Open source options

US IBM Technology Services - IBM i MERLIN Service Capabilities

Red Hat OpenShift Container Platform (OCP):

- Provide installation of OCP to client's on-premise IBM Power hardware or in the cloud (PowerVS)
- Implement Kubernetes management of pods and services, and container image management
- Advise on use of intuitive UI for deployment, management, and monitoring of containers
- Demonstrate existing Red Hat operator deployment

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