Introduction to IBM i Merlin

Steve Will – <u>stwill@us.ibm.com</u> DE, IBM i CTO

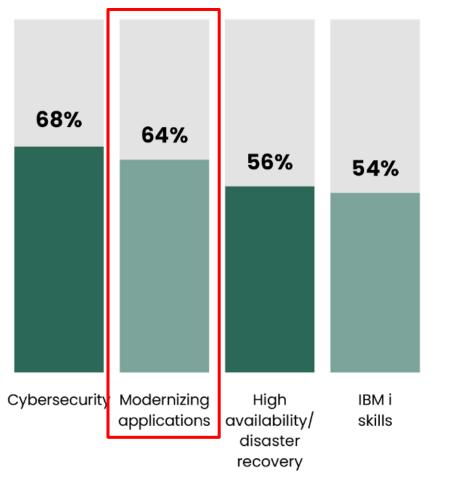
Tim Rowe – <u>timmr@us.ibm.com</u> IBM i Business Architect



IBM i Customers need to modernize their business applications



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



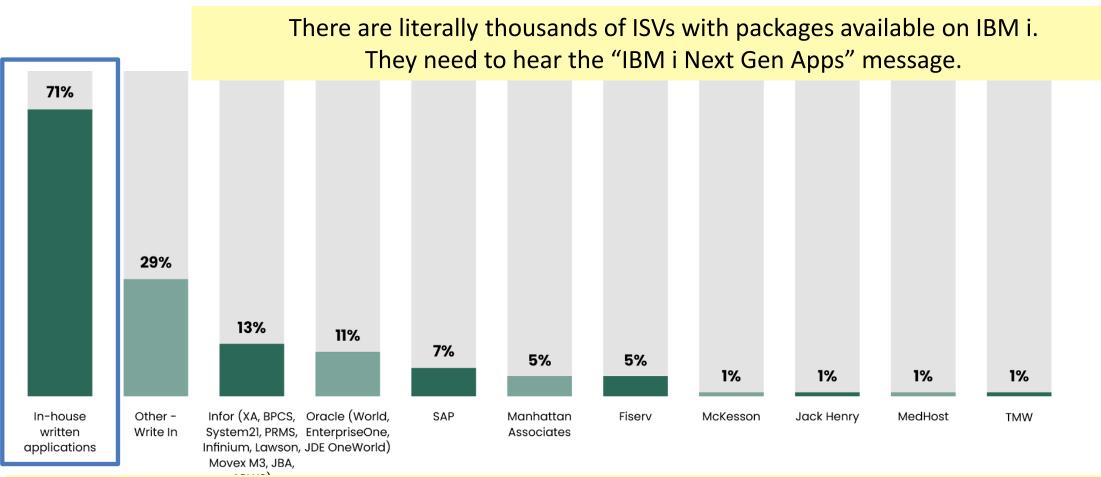
- Some use "modern" tools and methods
 - Must "cobble together" various pieces
 - Must "force-fit" IBM i native file systems
- Some (many) are stuck/still using inefficient old tech
 - No automated change control, project builds
 - Often in monolithic (not modular) designs
 - Source Editors from the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



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

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

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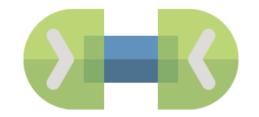
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Attributes of "IBM i Next Gen Apps"





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"

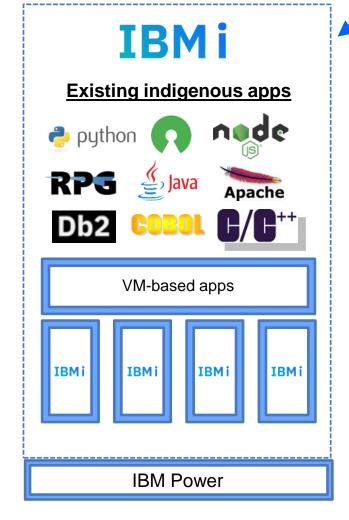


Easily incorporate new tech Even if the tech is not "in-house"

https://techchannel.com/Trends/04/2022/ibm-i-next-gen-apps

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



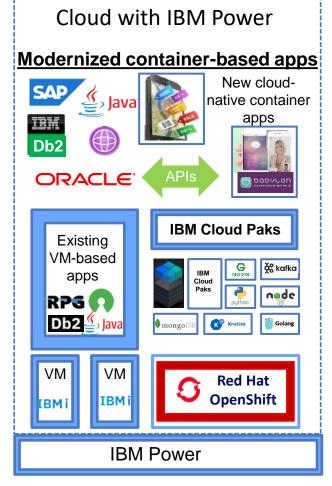


Existing applications can get value from cloud-based applications through services

- 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

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What Issues does Merlin Help Solve





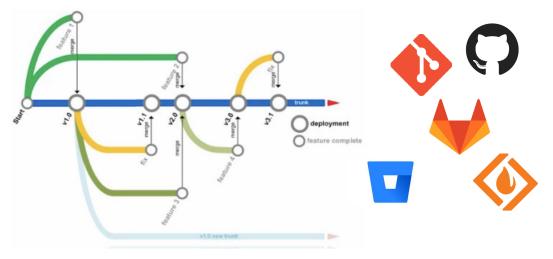






What Issues does Merlin Help Solve





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

EXPLORER	PR0300.RPGLE ART200-Work_with_article.PGM.SQLRPGLE	ORD200.PGM.SQLRPGLE × OUTLINE	
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- Outline View
- Tokenization
- Content Assist
- Code formatting
- Understand Languages
 - RPG
 - SQL
 - Embedded SQL
 - CL
 - Cobol
 - DDS

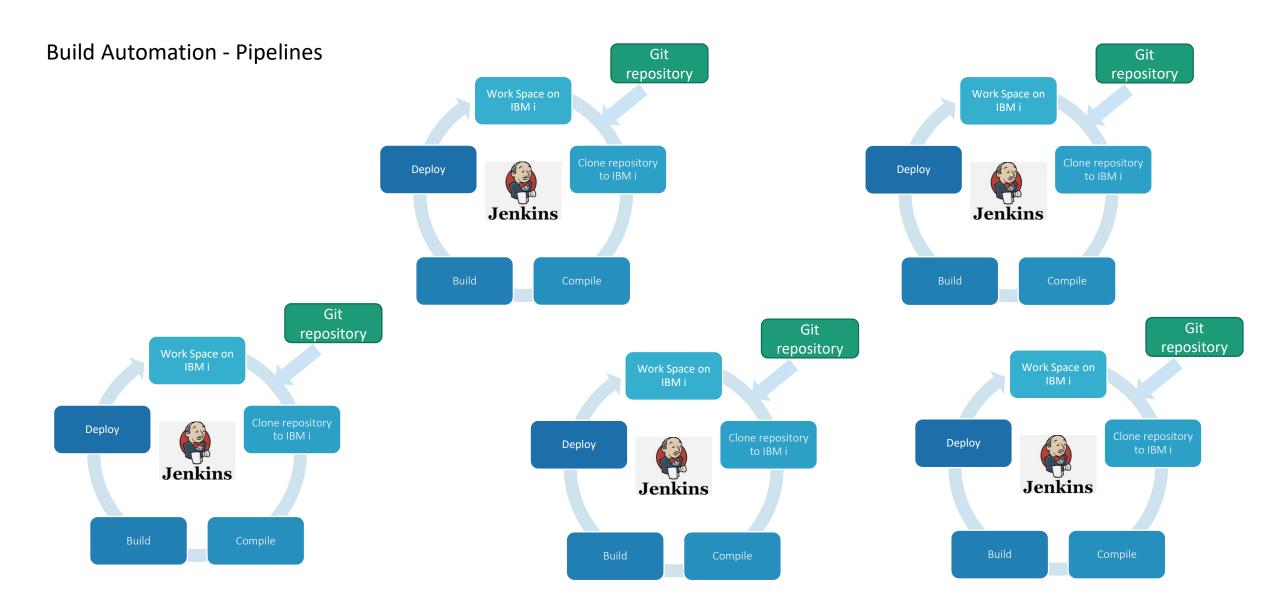
Application Blueprint





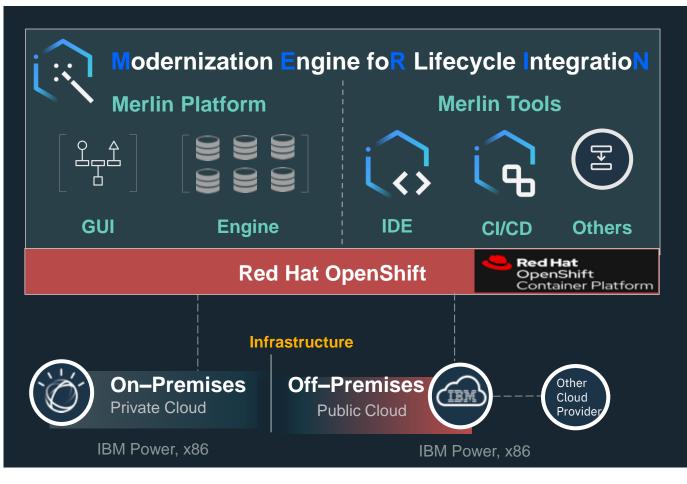
- Impact Analysis
- Program
 Understanding
- Data Usage
- Pgm Flow

What Issues does Merlin Help Solve





Merlin



What is it? Today

IBM Developer - IDE

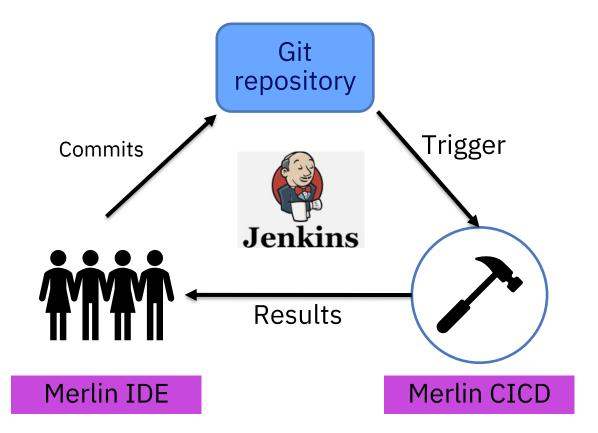
Pipelines for All – CI/CD

Merlin the engine / framework





Automated reliable application build and deployment - Pipelines



IBM i Merlin



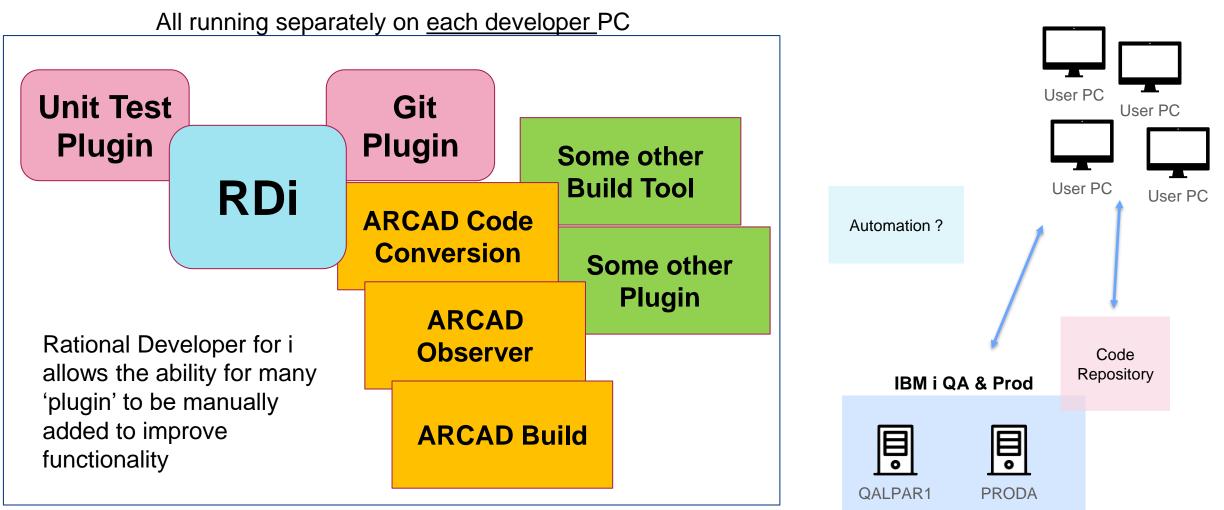
Modern Browser based developer environment

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- Outline View
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 - Embedded SQL
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 - DDS
- Impact Analysis
- Intelligent Build
- Full Git Integration
- Debugger



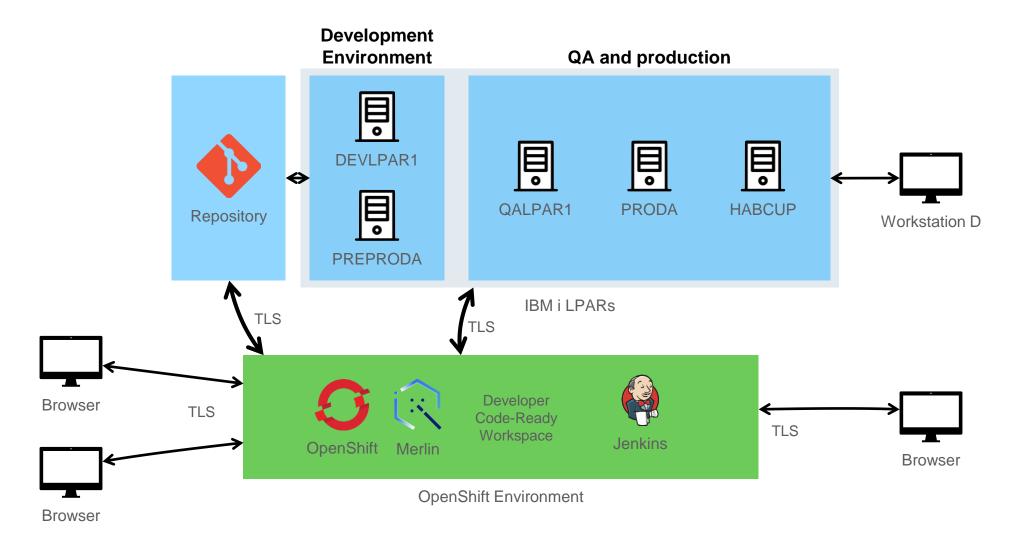




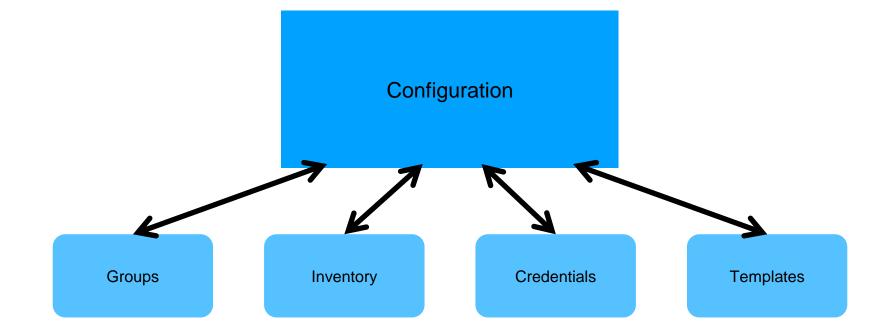
In all cases, additional function / features are all manually added, and no unified support



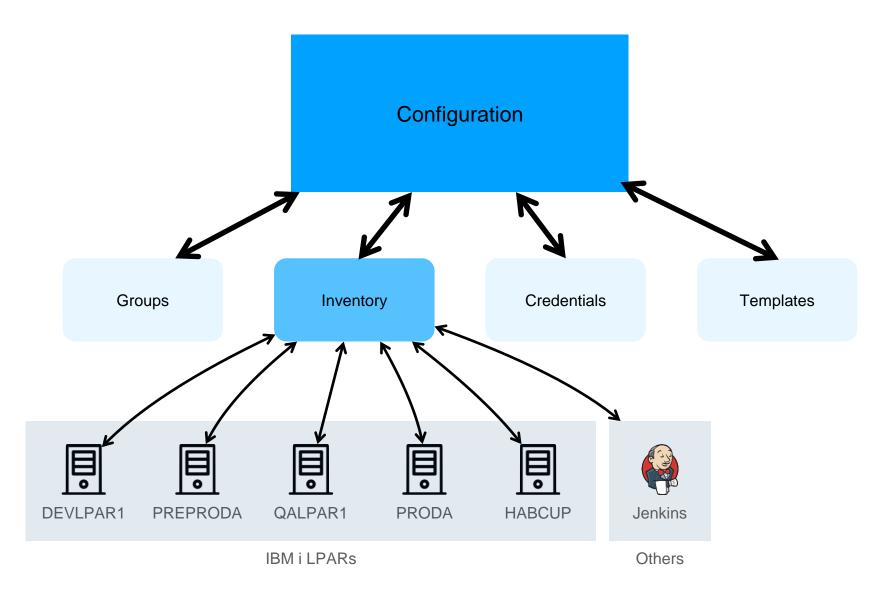
Network Topology for dev (Merlin style)



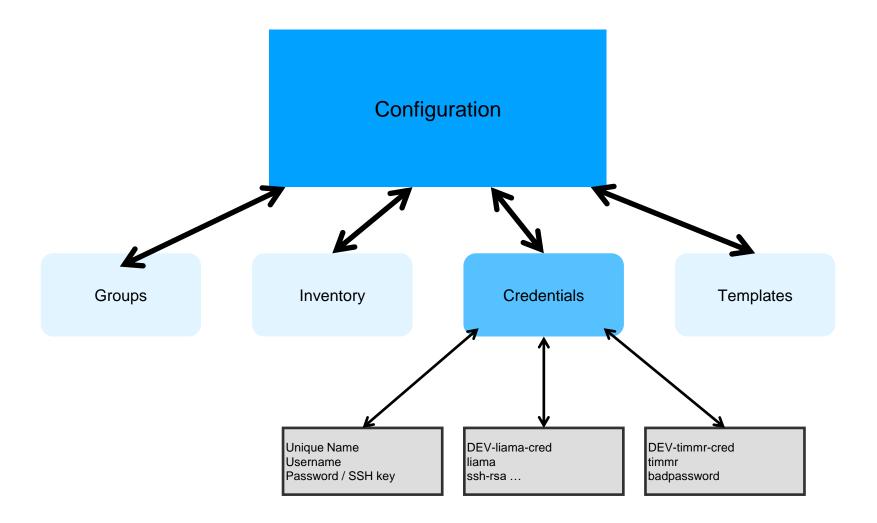




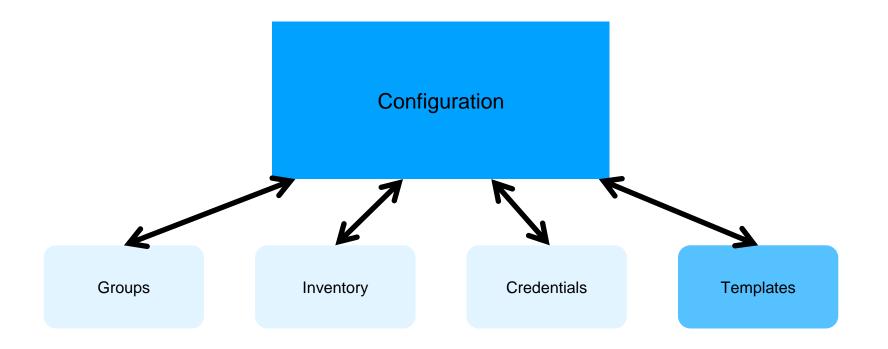




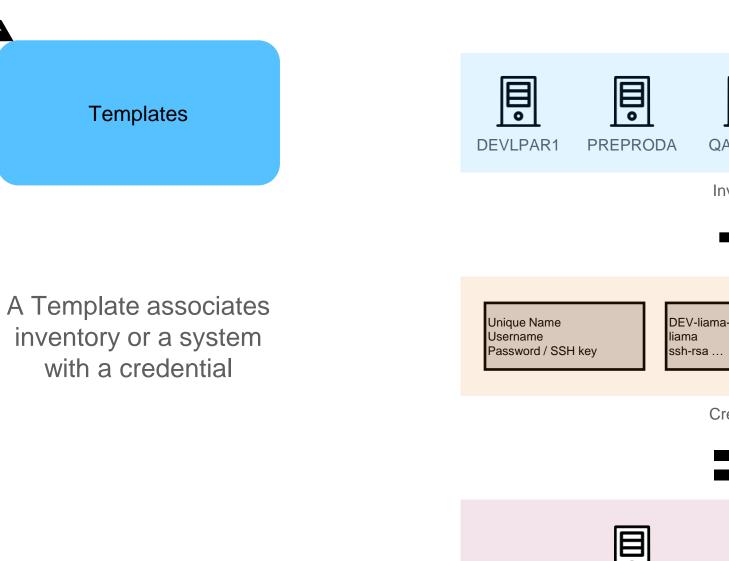


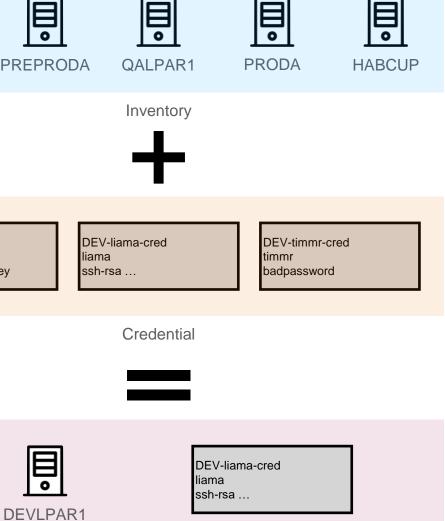












liam-dev-template

What are Developers Already Doing ?

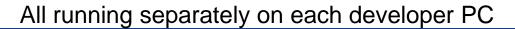


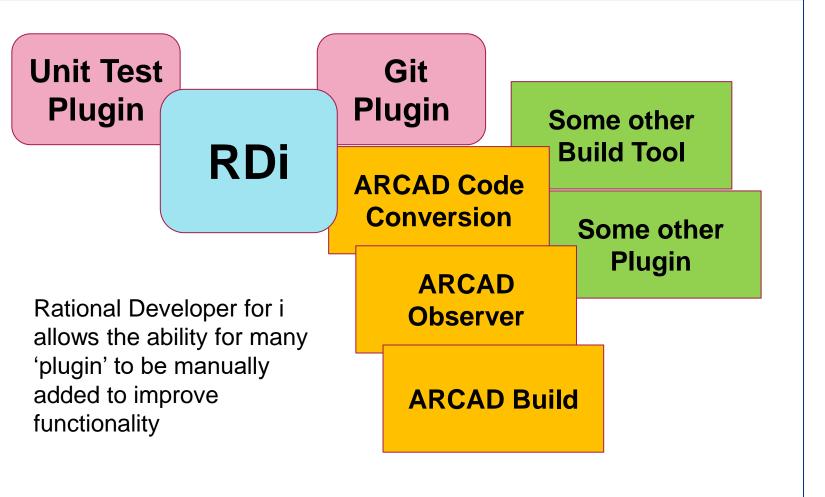
- Modern RPG
 - Helping to solve the talent gap
- RPG integration with modern development tools and strategies
 - Git
 - Jenkins
 - DevOps
- Connectivity with Cloud/Container apps Rest APIs
 - Call RPG Business logic with a Rest connection
 - Call a Rest based service from RPG

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



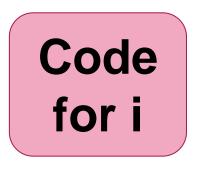








SEU – No plugins can be added

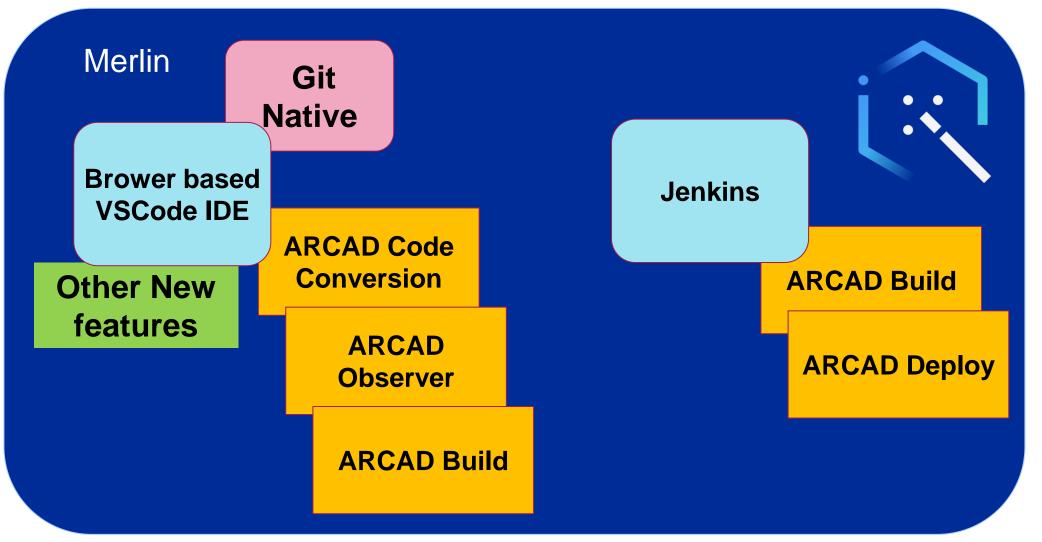


Plugin can be added....TBD

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

Future





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



RPG a Modern Language



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Transformation of RPG

Transformation



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

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;

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

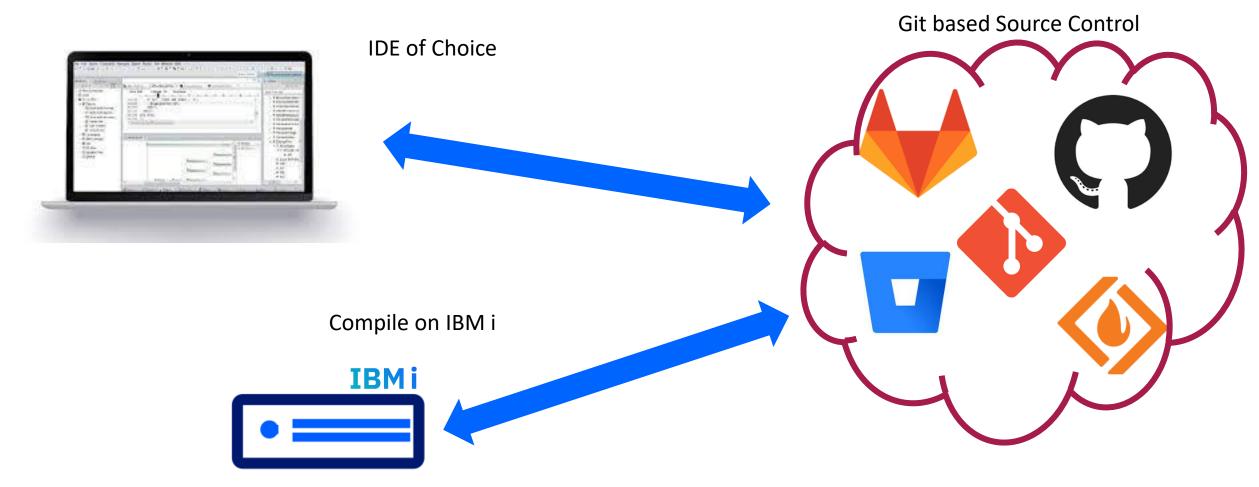
Refactor

- 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





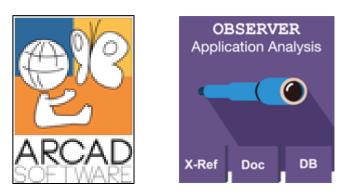
ALL ILE compiles support stream files

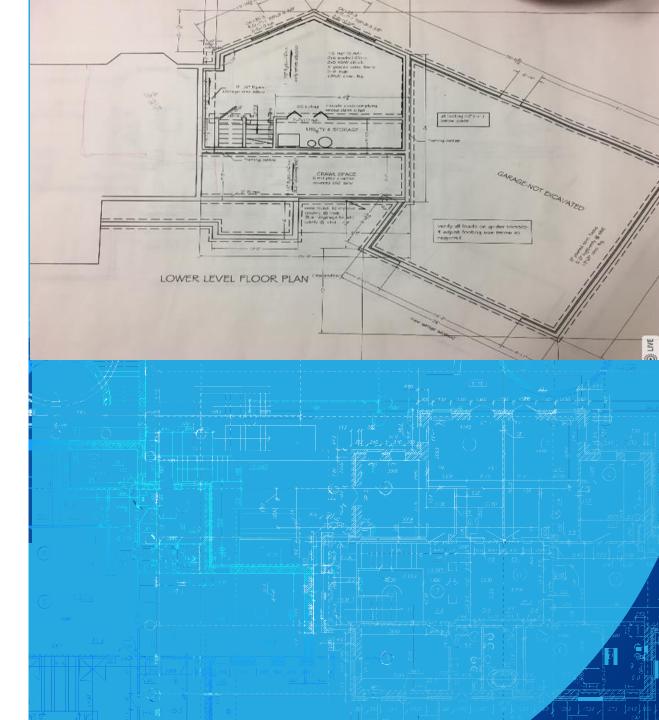
https://www.ibm.com/support/pages/how-use-source-control-rdi

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

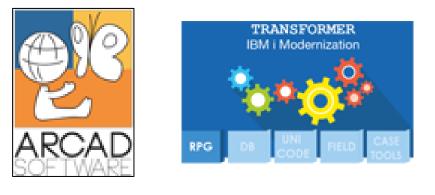




How to Convert into Modern RPG?

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



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002400 DC1-C @OFF CONST('0'); 005700 I '0' C @OFF 002500 DC1-C @OFK CONST('0'); 005800 I '1' C @OFF 002200 DC1-C @FRUE CONST('1'); 005800 I '1' C @FRUE 002300 DC1-C @FRUE CONST('ACDEFGHIJKLMNOPORST- 005800 I '1' C @FRUE 003000 DC1-C @FRUE CONST('ACDEFGHIJKLMNOPORST- 006500 I 'ABCDEFGHIJKLMNOPORST-C CHARS 003000 DC1-DS *n PSDS; @FGM Char(10) Pos(1); // 006500 I 'opgrsturwoyz ' 003300 @FART Zoned(3:0) Pos(37); // 006500 I 11 10 @FGM E 003300 @GATA Char(10) Pos(1); // 007700 I 11 10 @FGM E E 003300 @GATA Char(10) Pos(244); // 007700 I 11 10 @FGM E E E E E E E E E			CONST(X P	·),				A 10		GUITIN	
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002200 DC1-C @FALSE CONST('9'); 002200 DC1-C @FALSE CONST('ADCDEFGHIJKLMNOPORST- 002300 DC1-C (ARS CONST('ABCDEFGHIJKLMNOPORST- 003300 DC1-C (ARS CONST('ABCDEFGHIJKLMNOPORST- 003300 DC1-C (ARS CONST('ABCDEFGHIJKLMNOPORST- 003300 DC1-C (ARS CONST('ABCDEFGHIJKLMNOPORST- 003300 Opgrstuwwyz '); 006500 I 'UWXYZabcdefghijKIm- 003300 @PCM Char(10) Pos(1); // 003300 @PCM Char(10) Pos(1); // 003300 @PARKS Zoned(3:0) Pos(1); // 003300 @PARKS Char(10) Pos(2); // 003300 @PARKS Char(10) Pos(2); // 004100 @USNA Char(10) Pos(244); // 007300 I 244 253 dUSNA _E 004100 @USNA Char(10) Pos(244); // 007300 I 244 253 dUSNA _E 004300 @GSRCL Char(10) Pos(324); // 007300 I 334 423 dSRC	002500	Dcl-C @ON				005800	I	'1'			
002200 DC1-C @TRUE CONST('1'); 006100 I '1' C @TRUE 002200 DC1-C (ARAS CONST('ABCDEFGHIJKLMN0PQRST- 006200 I 'ABCDEFGHIJKLMN0PCRST-C CHARS 003100 UVMXYZabcdEFGHIJKLMN0PQRST- 006200 I 'ABCDEFGHIJKLMN0PXC' C @TRUE 003100 UVMXYZabcdEFGHIJKLMN0PQRST- 006200 I 'ABCDEFGHIJKLMN0PXC' C @TRUE 003100 UVMXYZabcdEFGHIJKLMN0PQRST- 006200 I 'BACDEFGHIJKLMN0PXC' C @GTRUE C @TRUE C <		11									
002900 // 00200 // 003000 0/// 00000 1 *ABCDEFGHIJKLMN0PORST- 003000 0/// 00000 1 *UVWX72abcdefghijKlm- 003000 0/// 00000 1 *UVWX72abcdefghijKlm- 003000 0/// 00000 1 *UVWX72abcdefghijKlm- 003000 0/// 00000 1 100000 003000 00000 1 100000 1 100000 003000 00000 1 1100000 1 100000 1 1000000 1 100000 1 100000 1 100000 1 1000000 1 1000000 1 1000000 1 1000000 1 1000000 1 1000000 1 1000000 1 1000000 1 1000000 1 10000000 1 10000000 1 10000000 1 100000000 1 1000000000 1 10000000000000 1 1000000000000000000000000000000000000											
003000 DC1-C CHARS CONST('ABCDEFGHIJKLHNOPQRST- 005300 I 'ABCDEFGHIJKLMNOPQRST-C CHARS 003100 UVMX72abcdEfghijkLm- 'opgrstuwsyz'); 'opgrstuwsyz'); 'opgrstuwsyz' 003300 // 'opgrstuwsyz'); 'opgrstuwsyz'; 'opgrstuwsyz' 003300 // 'opgrstuwsyz'; 'opgrstuwsyz'; 'epgrstuwsyz'; 003300 (// Char(10) Pos(1); // 'opgrstuwsyz'; 'epgrstuwsyz'; 003300 (// Char(10) Pos(1); // 'opgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz'; 'epgrstuwsyz;			CONST('1');				'1'	С	@TRUE	
003100 UWWX72bcdefghijklm- 003200 op/rstuwsyz'); 003300 // 003300 // 003300 // 003300 @667 Th 720red(5:0) Pos(1); 003300 @676 Th 720red(5:0) Pos(1); 003300 @676 Char(10) Pos(37); 003300 @677 Char(10) Pos(37); 003300 @677 Char(10) Pos(37); 003300 @677 Char(10) Pos(37); 003300 @677 Char(10) Pos(24); 003300 @677 Char(10) Pos(24); 004400 @057 Char(10) Pos(24); 004400 @687 Char(10) Pos(24); 004400 @687 Char(10) Pos(314); 004400 @687 Char(10) Pos(314); 004400 @687 Char(10) Pos(314); 004400 @687 Char(10) Pos(324); 004400 Char(10) Pos(1) NX/(255); 004400 Char(1) Pos(1) NX/(255);			CONCT (1 AD	CDE ECUIT 3KI MNODODCET					MNODODCT C	CUADC	
003200 0/0grstuwwyz''; 003300 // 003300 // 003300 (// 004300 (// 004300 (// 004300 (// 004300 (// 004300 (// 004300 (//				LUEFORIJKLMNUPQKSI-						CHARS	
003300 //* 006600 1* 10 006700 003300 0°0700 10 505 10 0°0700											
003400 PCL'Ds *n PSDS; 0007400 I 5DS 003500 @PGM Char(10) Pos(1); // 000600 I 11 10 0PGM E 003500 @PGAMS Zoned(5:0) Pos(1); // 000600 I 31 150 000700 E 3700 PARMS E<								opq: scavwxyz	-		
003600 @6TAT Zoned(5:0) Pos(1L); // 006900 I 11 150857AT E 003700 @PARMS Zoned(3:0) Pos(37); // 007700 I 3700 PARMS E 003900 @POSID Char(7) Pos(40); // 007700 I 91169 Pos(40); E 004000 @UDBNA Char(10) Pos(244); // 007700 I 244 253 UDBNA E 004100 @UDBNA Char(10) Pos(254); // 007700 I 244 253 UDBNA E 004200 @UDBNA Char(10) Pos(324); // 007700 I 264 269 UDBNA E 004300 @SRCL Char(10) Pos(324); // 007700 I 314 323 @SRCL E E 004400 @SRCL Char(10) Pos(324); // 007700 I 314 323 @SRCL E E 004700 D Char(10) Pos(324);<	003400	Dcl-Ds *n PSDS;				006700	I	SDS			
004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<										1 10 @PGM	_E
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004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<			Char(7)								
004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<											
004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<											
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004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<			Char(10)	Pos(304);	11		I		30	4 313 @SRCF	_E
004501 End-Ds; 004600 // 004400 Dc1-Ds APIERR; 004400 BinDec(9:0) Pos(1) IX2(256); 004400 ERRSIZ 004500 I 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005000 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 ERRVIC 005200 End-Ds; 005200 End-Ds; 005200 End-Ds; 005200 CL Ds *n; 005500 McGLEN BinDec(9:0) 005500 McGLEN BinDec(9:0) Pos(1) IXZ(0); 005500 McGLEN BinDec(9:0)<				Pos(314);	11				31	4 323 @SRCL	E
004600 /// 00 FULDS APTERR: 006800 IAPTERR DS 004900 ERRSLE BinDec(9:0) Pos(1) IX/256); 004900 ERRSLE BinDec(9:0) Pos(1) IX/20); 005000 ERRNER Char(7) Pos(9) IX?; 005000 ERRNER Char(7) Pos(9) IX?; 005000 ERRNER Char(7) Pos(9) IX?; 005000 ERRNER Char(7) Pos(9) IX?; 005000 ERRNER Char(240) Pos(1) IX?; 005000 II 1 0 B 1 40FERR DS 008300 II 0 B 5 80FRNER 008300 II 1 0 B 1 40FERR DS 008300 II 1 0 B 5 80FRNER 008300 II 1 12 1726 ERRNER 008500 II 1 12 1726 ERRNER 008500 II 1 12 5 ERRNER 008500 II 0 DS 008500 IS 008500 IS 008			Char(<mark>10</mark>)	Pos(324);	11				32	4 333 @SRCM	_E
004700 Dcl-bs.AptCRR; 008400 ERRS1Z BinDec(9:0) Pos(1) IXZ(256); 008300 I 256 B 1 40RRS1Z 0044000 ERRS1Z BinDec(9:0) Pos(1) IXZ(256); 008300 I 0 B 5 8087RMLC 005100 ERRNTA Char(7) Pos(1) IXZ(35); 008300 I 0 B 5 8087RMLC 005100 ERNOTA Char(240) Pos(1) IXZ(1) 0 B 5 8087RMLC 005201 End-0s; 008300 I 0 D5 008300 I 008300 <				-				DC			
004900 ERRIZ BinDec(9:0) Pos(1) INZ(256); 005500 ERRNUR Char(7) Pos(9) INZ; 005500 ERRNUR Char(7) Pos(9) INZ; 005500 ERRNUR Char(7) Pos(9) INZ; 005500 ERRNUR Char(240) Pos(17) INZ; 005500 ERRDTA Char(240) Pos(17) INZ; 005500 CL-Ds*n; 005500 MSGCTR BinDec(9:0) Pos(1) INZ(0); 005500 MSGCTR BinDec(9:0) Pos(1) INZ(0);		Dol-De ADTERR							P	1 40588517	
004900 ERRLEN BinDec(9:0) Pos(5) INZ(0); 008300 II 9 15 ERRNTC 005500 ERRNTR Char(1) Pos(1) INZ; 008300 II 16 16 ERRNTR 005201 End-Us; 008300 I 17 256 ERRNTA 008400 I 005201 End-Us; 008300 I 17 256 ERRNTA 008400 I 005201 End-Us; 008300 I 008400 I 008400 I 005201 End-Us; 008300 I 008400 I 008400 <t< td=""><td></td><td></td><td>BinDec(9.0)</td><td>Pos(1) IN7(256):</td><td></td><td></td><td></td><td>250</td><td></td><td></td><td></td></t<>			BinDec(9.0)	Pos(1) IN7(256):				250			
005000 ERRNIC Char(7) Pos(9) IX2; 008400 I 16 16 ERRNER 005100 ERRNIC Char(7) Pos(9) IX2; 008400 I 1726 1726 005201 ERROTA Char(240) Pos(17) IN2; 008500 I 1725 008500 I 005201 ERROTA Char(240) Pos(17) IN2; 008500 I 008500 I 008600 I* 005201 ERROTA Char(240) Pos(1) IN2; 008600 I* 0086700 I* 008670 0086700 I* 008670 008670 I* 008670 008670 008670 008670 I* 008670 008670 I* 008670 008670 008670 008670 008670 008670 008670 008670 I* 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 008670 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>~</td> <td></td> <td></td> <td></td>								~			
005100 ERRNBR Char(1) Pos(16) INZ; 008500 I I 1 17 256 ERRDTA 005200 ERRDTA Char(240) Pos(17) INZ; 088600 I * 005300 // 005400 DC1-0s*n; 009500 I 0 0 B 1 40MSGCTR 005500 MSGCTR BinDer(9:0) Pos(1) INZ(0); 09900 I I 0 B 5 80MSGLEN 005500 MSGCTR BinDer(9:0) Pos(1) INZ(0); 09900 I I * 005500 MSGCTR BinDer(9:0) Pos(1) INZ(0); 09900 I I * 009000 I I 0 B 2 80KSGF FLGHT400 ' 9 28 MSGF			Char(7)								
005201 End-Ds; 005300 // 005300 DC1-Ds *n; 005500 MSGCTR BinDec(9:0) Pos(1) INZ(0); 005500 MSGCTR BinDec(9:0) Pos(2) INZ(0); 005500 MSGCTR BinDec(9:0) Pos(5) INZ(0); 009000 I I *RSNSGF FLGHT400 '9 28 MSGF 009000 I I *RSNSGF FLGHT400 '9 28 MSGF 009000 I I *RSNSGF FLGHT400 '9 28 MSGF 009000 I V *RSNSGF FLGHT400 '9 28 MSGF 009000 I V *RSNSGF FLGHT400 '9 28 MSGF	005100	ERRNBR	Char(1)	Pos(16) INZ;		008500	II				
005300 // 008800			Char(240)	Pos(17) INZ;							
005400 Dcl-Ds *n; 008500 II 80 B 5 80M5GLEN 005500 M5GCTR BinDec(9:0) Pos(1) INZ(0); 009000 II "FRSM5GF FLGHT400' 9 28 M5GF 009000 II "FRSM5GF FLGHT400' 9 28 M5GF 0000 V V V V V V V V V V V V V V V V V											
005500 MSGTER BinDer(5:0) Pos(1) IN2(0): 09000 I I *RSMSGF FLAT400 *9 28 MSGF 009000 I I *RSMSGF FLAT400 *9 28 MSGF 000100 I I * **RSMSGF FLAT400 *** *** *** *** *** *** *** *** ***											
005600 MCGLEN BinDec(0.0) Doc/5) TN7/90).			DisDec(0,0)								
		MSGLEN		POS(1) INZ(0); Pos(5) INZ(80);	*						*
	<	CONTRACTOR OF THE OWNER)	<					

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
 - Cobol
 - DDS

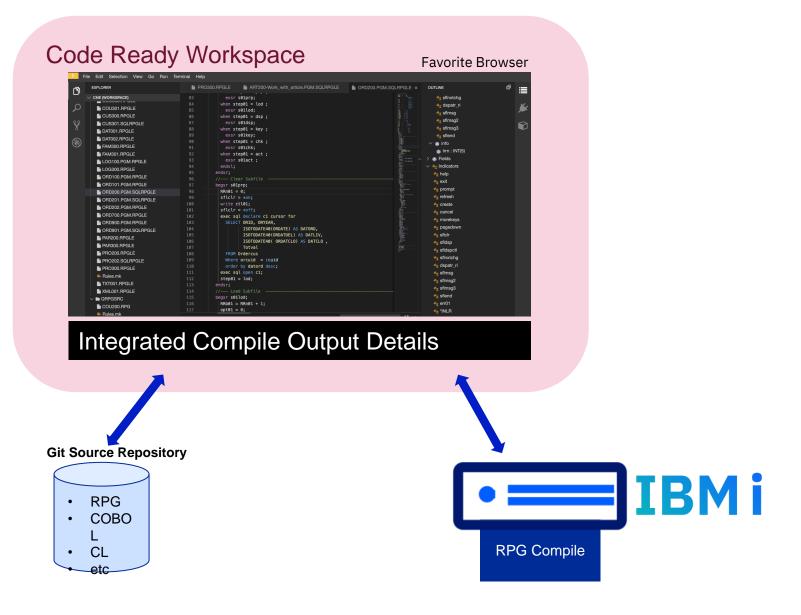
V OHE (MORECARDE) 83 exsr s01prp; COUSOL RPGLE 84 when step01 = lod; % sfmsg2 COUSOL RPGLE 86 when step01 = dsp; % sfmsg2 D CUSSOL RPGLE 88 when step01 = dsp; % sfmsg3 D DATOOL RPGLE 88 when step01 = key; % sfmsg3 D DATOOL RPGLE 90 when step01 = act; % sfmsg3 D DATOOL PRGLE 91 exsr s012ch; % sfmsg3 D DATOOL PRGLE 92 when step01 = act; % sfmsg3 D COSOOL PRGLE 93 exsr s012ch; % sfmsg3 D COSOOL PGM.RPGLE 93 exsr s012ch; % sfmsg3 D ORDOOL PGM.RPGLE 93 exsr s012ch; % sfmsg3 D ORDOOL PGM.RPGLE 93 exsr s012ch; % sfmsg3 D ORDOOL PGM.RPGLE 94 ends1; % sfmsg3 D ORDOOL PGM.RPGLE 94 ends1; % sfmsg3 D ORDOOL PGM.RPGLE 94 sftlc1 = son; % sfmsg3 D ORDOOL PGM.RPGLE 94 sftlc1 = son; % sfmsg3 D ORDOOL PGM.RPGLE 94 sftlc1 = son;	EXPLORER	PRO:	300.RPGLE ART200-Work_with_article.PGM.SQLRPGLE	ORD200.PGM.SQLRPGLE ×	OUTLINE	đ
■ COU301.RPGLE 84 when step01 = 00; ***		83	exsr s01prp;		nt sflnxtchg	
■ COUSD: APGLE 85 exsr solid; 4; sfimsg ■ CUSSO: SQLAPGLE 86 when step01 = dsp; 4; sfimsg ■ DATOO: APGLE 87 when step01 = dsp; 4; sfimsg ■ DATOO: APGLE 87 when step01 = dsp; 4; sfimsg ■ DATOO: APGLE 97 when step01 = dsp; 4; sfimsg ■ DATOO: APGLE 98 when step01 = dsp; 4; sfimsg ■ FAM30: APGLE 91 exsr solich; 1 4; sfimsg ■ LOG 100, PGM.RPGLE 93 exsr solich; 1 1 1 1 ■ LOG 300, APGLE 94 endsl; 1		84			🛧 dspatr_ri	
□ CUSS0URPALE 86 when step01 = d5p ;					n sflmsg	
□ COSSDI-SQL.HPGLE 07 cs.3 studay, when step01 = key; exsr s01key; 4 stimag3 □ DAT002.RPGLE 98 when step01 = key; exsr s01key; 4 stiend □ FAM300.RPGLE 91 exsr s01key; 6 info □ FAM300.RPGLE 92 when step01 = act; 6 6 info □ LOG100.PRM.RPGLE 93 exsr s01act; 6 info 6 info □ LOG100.PRM.RPGLE 94 ends1; 6 info 6						
DAILON INFALLE FAM300.RPGLE 99 when step91 = chk; ************************************	CUS301.SQLRPGLE					
■ DATO02.RPGLE 90 when step01 = chk ; ■ FAM300.RPGLE 91 exsr s01cht; ■ FAM300.RPGLE 91 exsr s01ct ; ■ LOG100.PGM.RPGLE 93 exsr s01act ; ■ LOG300.RPGLE 93 exsr s01act ; ■ LOG100.PGM.RPGLE 93 exsr s01act ; ■ LOG300.RPGLE 94 ends1; ■ ORD200.PGM.SQLRPGLE 96 //	DAT001.RPGLE			E L.		
FAM300.RPGLE 91 exsr s01chk; • exsr s01chk; FAM301.RPGLE 92 when step01 = act; • • • • • • • • • • • • • • • • • • •	DAT002.RPGLE					
Image: Status and Statu	FAM300.RPGLE			12	∨ ⊚ info	
■ LOG100.PGM.RPGLE 93 exsr s0lact ; ends1; ends1; ends1; >> (*) Fields ■ ORD100.PGM.RPGLE 94 ends1; ends1; > > (*) Indicators ■ ORD100.PGM.RPGLE 96 ///				an a	🛞 Irrn : INT(5)	
LCG300.RFGLE 94 ends1; • Ag Indicators B LCG300.RFGLE 95 endsr; • Ag Indicators B ORD100.PGM.RPGLE 95 ends1; • Ag Indicators B ORD200.PGM.SQLRPGLE 97 begsr s0lprp; • Ag Indicators B ORD200.PGM.SQLRPGLE 98 Rkn01 = 0; • Ag Pormpt B ORD200.PGM.SQLRPGLE 98 sftCtr = *on; • Ag Pormpt B ORD200.PGM.RPGLE 100 write ctl01; • Ag refresh B ORD200.PGM.RPGLE 101 sftCtr = *off; • Ag romekays B ORD900.PGM.RPGLE 102 eexe sql declare cl cursor for • Ag sfloresh B ORD900.PGM.RPGLE 103 SELECT ORID, ORYEAR, • Ag sflore B ORD901.PGM.SQLRPGLE 106 ISOTODATE40(ORDATE) AS DATCND, • Ag sfldsp B PAR300.RPGLE 106 ISOTODATE40(ORDATEL) AS DATCLO , • Ag sfldsp B PRO202.SQLRPGLE 106 FROM Ordercus • Ag sfldsp • Ag sfldsp B PRO202.SQLRPGLE 109 Where orcuid = :cuid • Ag sfldsp • Ag sfldsp B PRO202.SQLRPGLE 110 order by datord desc; • Ag sflmsg2 <t< td=""><td></td><td></td><td></td><td>BUCH BARRARS</td><td>> 🛞 Fields</td><td></td></t<>				BUCH BARRARS	> 🛞 Fields	
Port of Didologending and the set of the set o		94		Bra" "Milin. San	V 🔩 Indicators	
OKD100_PGM.RPGLE 96 // Clear Subfile 4% exit B ORD200_PGM.SQLRPGLE 97 begsr s0lprp; 4% exit B ORD200_PGM.SQLRPGLE 98 RRn01 = 0; 4% exit B ORD200_PGM.SQLRPGLE 99 sflc1r = xon; 4% erfresh B ORD200_PGM.SQLRPGLE 101 sflc1r = xon; 4% erfresh B ORD200_PGM.SQLRPGLE 101 sflc1r = xon; 4% erfresh B ORD200_PGM.RPGLE 101 sflc1r = xon; 4% erfresh B ORD200_PGM.SQLRPGLE 101 sflc1r = xon; 4% erfresh B ORD200_PGM.SQLRPGLE 102 exec sql declare c1 cursor for 4% erfresh B ORD201_PGM.SQLRPGLE 103 SELECT ORID, ORVERA; 5% pagedown B PAR300_RPGLE 104 ISOT0DATE40(ORDATEL) AS DATLIV, 4% erfresh B PAR300_RPGLE 106 ISOT0DATE40(ORDATEL) AS DATLIV, 4% effects B PR0200_RPGLE 106 FROW Ordercus 4% effects Where orcuid = icuid ordercus 4% effects 4% effects B PR0300_RPGLE 110 order by datord desc; 4% effmsg1 4% effmsg2 B PR0300_RPGLE<		95	endsr;		🛧 help	
ORDUTUT.PGM.RPGLE97Degsr s01prp;*********************************				2		
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IBM Developer – The Merlin IDE





Compile a single program or Build an Application

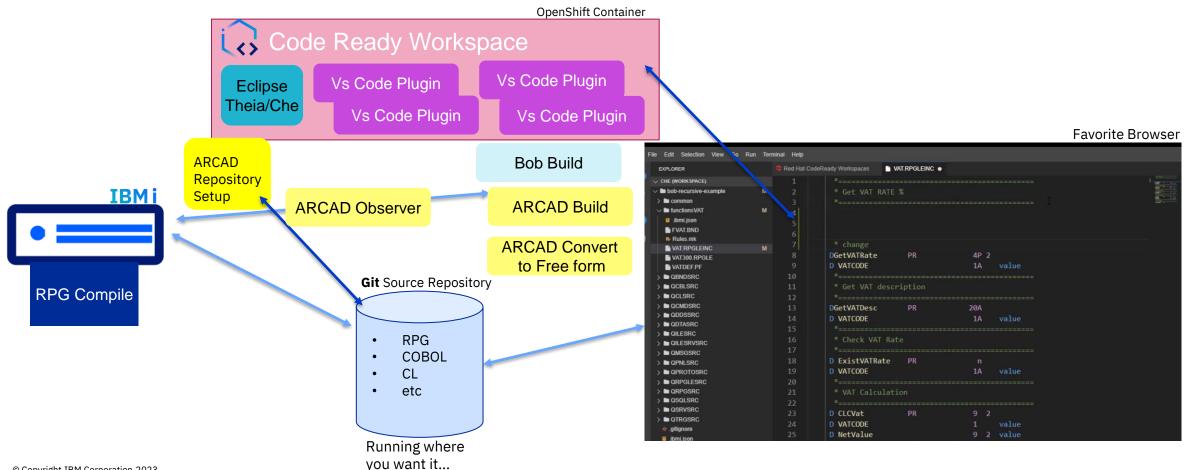




IDE - Today

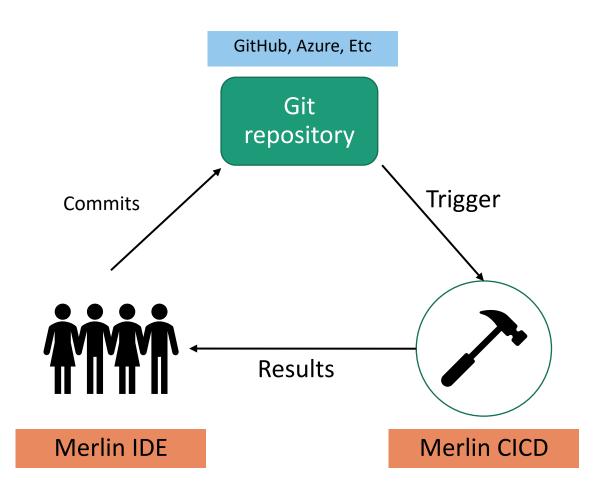


- Rich editing capability
- Build / Compile your project _



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'

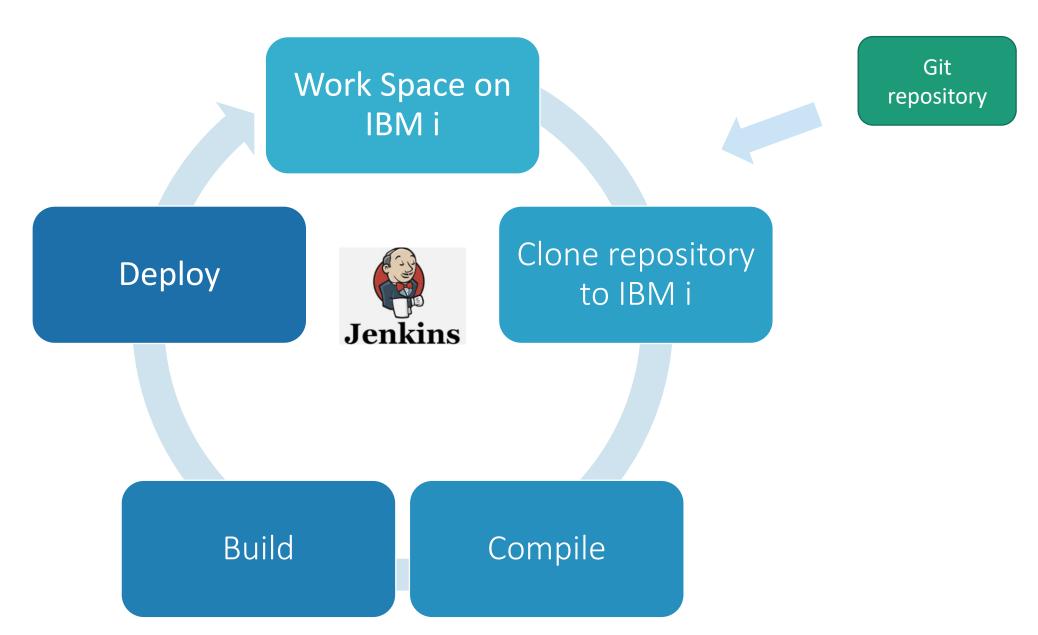
Build

Compile

- Build of entire application, or
- Build of specific portion of application (e.g. a display file and any dependent programs)
- Compilation of a specific sources without the need of launching larger build

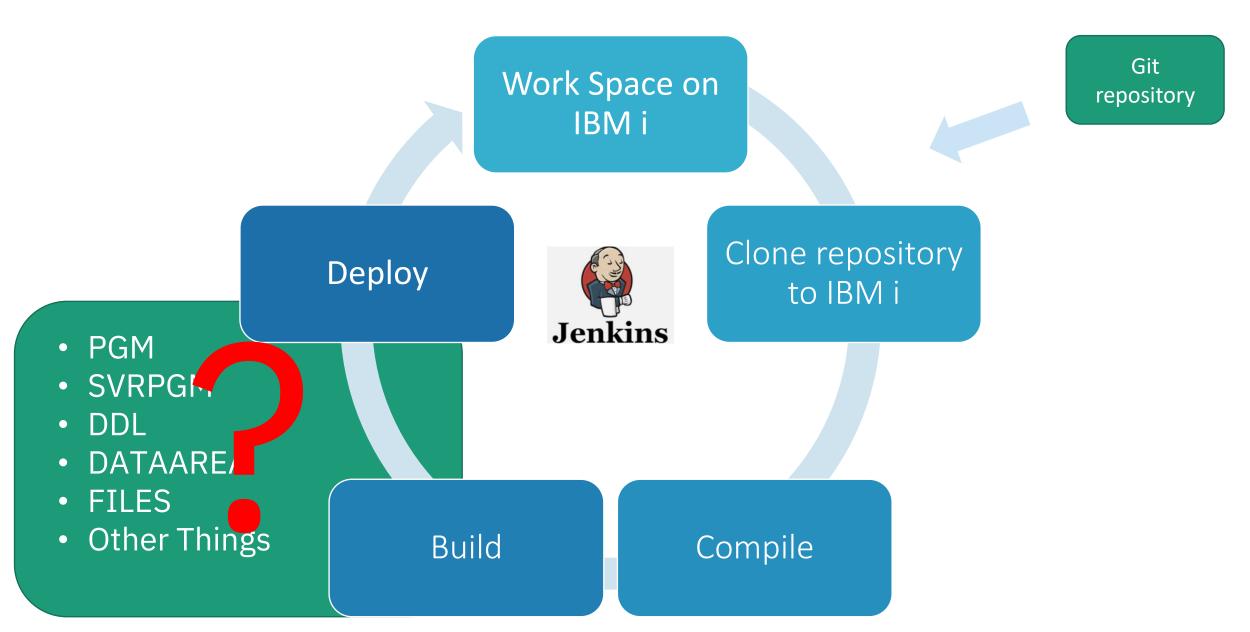
CI/CD Flow Today



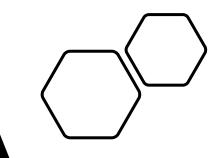


CI/CD Flow Today





Any build tool



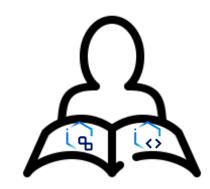
- ARCAD Builder
- Custom build tools
- GNU Make
- ibmi-bob
- Other options ??

ARCAD Builder

- Automatically detects projects dependency tree
- Highly optimized smart builds and minimal clones
- Integrated into Jenkins, Merlin IDE and Merlin CICD



Where can I Learn More about Merlin ?





Merlin Product Page

TRM



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Image: Second and DevOps Image: Second a

Search

IBM i Modernization Engine for Lifecycle Integration

A development and modernization environment for IBM i applications



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IBM i Merlin

The coolest IBM product since ADDPFM

Get Started

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

Modern Documentation Hosted on IBM GitHub Targeted for Hands on Usage

- Overview
 - > Merlin
 - > Platform
 - > FAQs
- Source control
- > Moving into git
- OpenShift
- Requirements (todo)

 \equiv

- > IBM Entitlement
- > Installing Merlin

Merlin

- > App Installation
- > Configuration
- > Basic Flows

Merlin IDE

- > Usage
- > ARCAD

Merlin CICD

- > Usage & Jenkins
- > ARCAD Builder
- > ibmi-bob

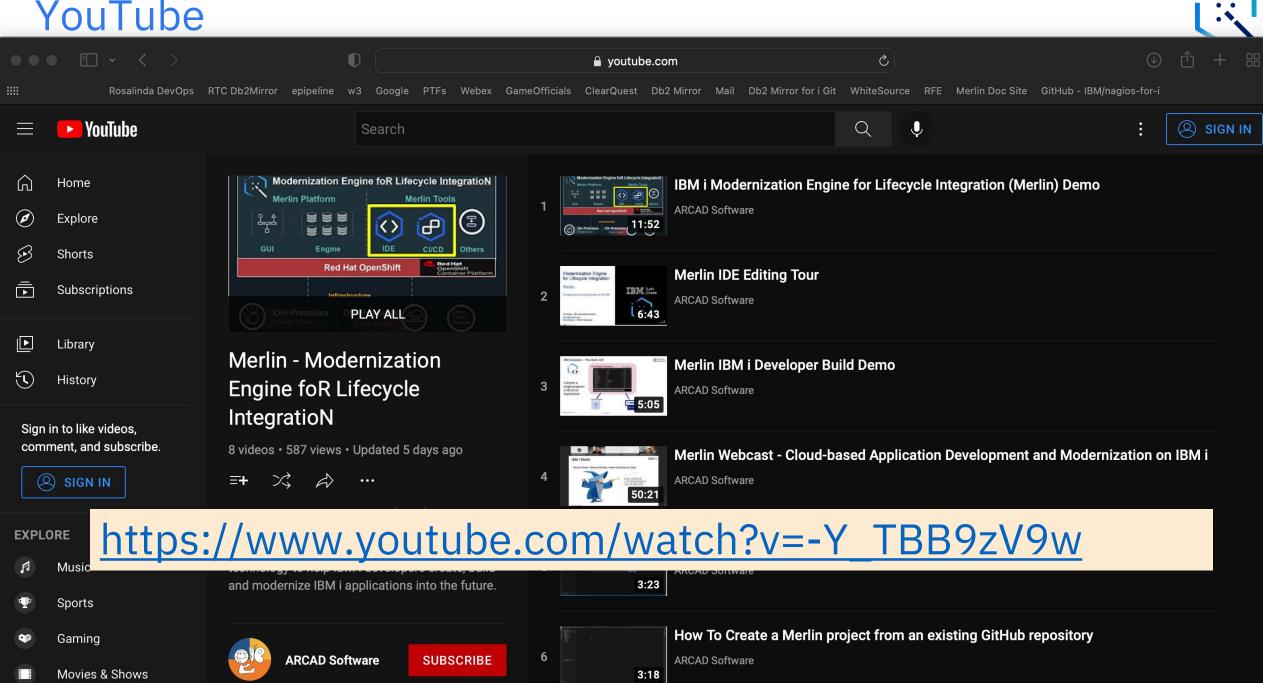
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Overview Dashboard	IBM i Modernization Engine for Lifecycle Integration (Merlin IBM i Modernization Engine for Lifecycle Integration (Merlin in the hybrid cloud world. Providing cloud native tools to hel application using standard cloud methods.	ifecycle Integration a) environment has been created to help IBM i users interact b) with modern development and deployment of IBM i native
Projects	Quick Launch	- S
Tools		
Connections	<u>ן רק' רא' רא</u>	>
Provision	IBM i CI/CD IBM i Developer IBM i Developer In merlin-tools In merlin-tools In zlj-0	
Authorization	>	
User Management	> Vault Status	- S
Rest APIs	Vault server status: Output Token status: Valid	
Serviceability	>	

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.

Getting started videos

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

YouTube



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



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

Quick Reference Guide

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

- Overview
- This offering provides shortterm access to a pre-configured IBM i Merlin environment.

IBMi



IBM Client Engineering for Systems



- 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, multiplatform 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 <u>ce4s@ibm.com</u>

(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





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 form 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
- Defne phases and scope of initial devops CICD initiatives
- Design details for repositorites, automation servers, CICD pipelines, and tool integrations including Open source options

IBM i Modernization with Merlin

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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