

Application Development Strategy and update



Power is performance redefined

Deliver IT services faster,
with higher quality,
and with superior economics

www.ibm.com/power



Gottfried Schimunek
Senior Architect
Application Design
IBM STG Software
Development
Lab Services
IBM ISV Enablement

3605 Highway 52 North
Rochester, MN 55901
Tel 720-342-5261
Fax 845-491-2347
Gottfried@us.ibm.com

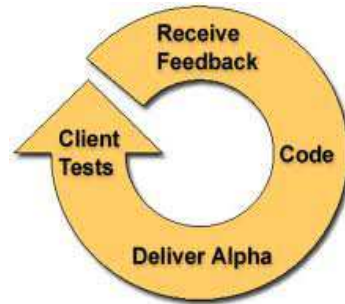
© 2012 IBM Corporation

Acknowledgements

- Thanks to Tim Rowe - Application Business Architect, Development Environments, IBM i Development for providing this comprehensive and detailed presentation

New Development Paradigms

- Graphical User Experiences
 - Grown from GUIs to Experiences
- Agile Development
 - Work in highly collaborative groups
 - Time line is strict
 - Small adaptive modules
- Framework Development
 - Consistency in code creation
 - Component based
 - Model – View – Controller
 - Agile
- Services Orientation
 - Componentized code
 - Business based
 - Distributed function

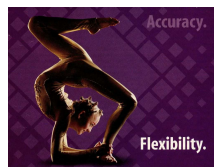


What is Modernization?

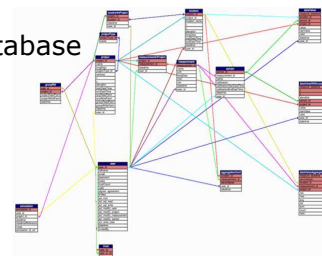
User Experience?



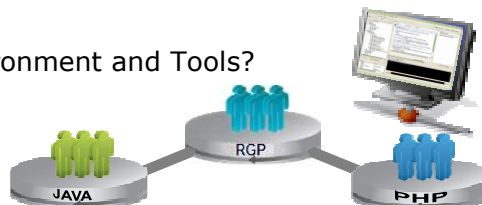
Flexible Code?



Robust Database Design ?



Environment and Tools?



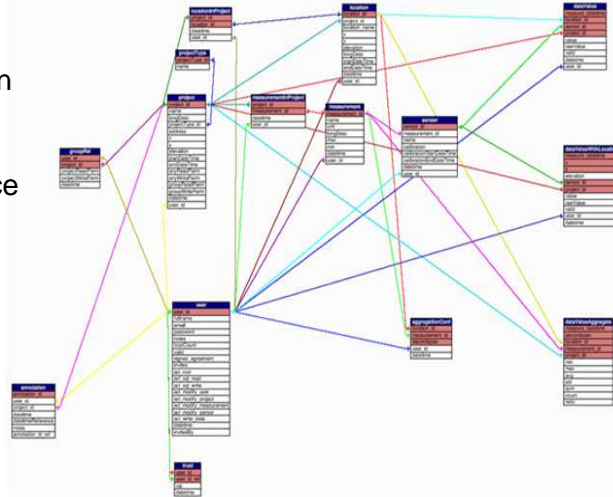
Good Database Design is Fundamental

Referential Database Design

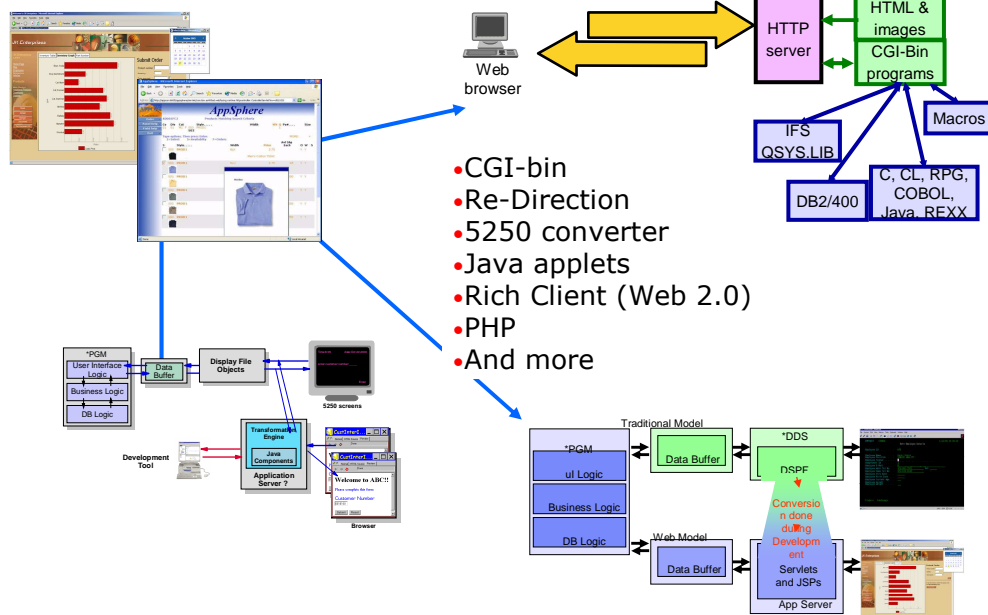
- 3rd or 4th normal form
- Appropriate indexes/views
- Data located in correct place
- SQL interfaces

Clean data

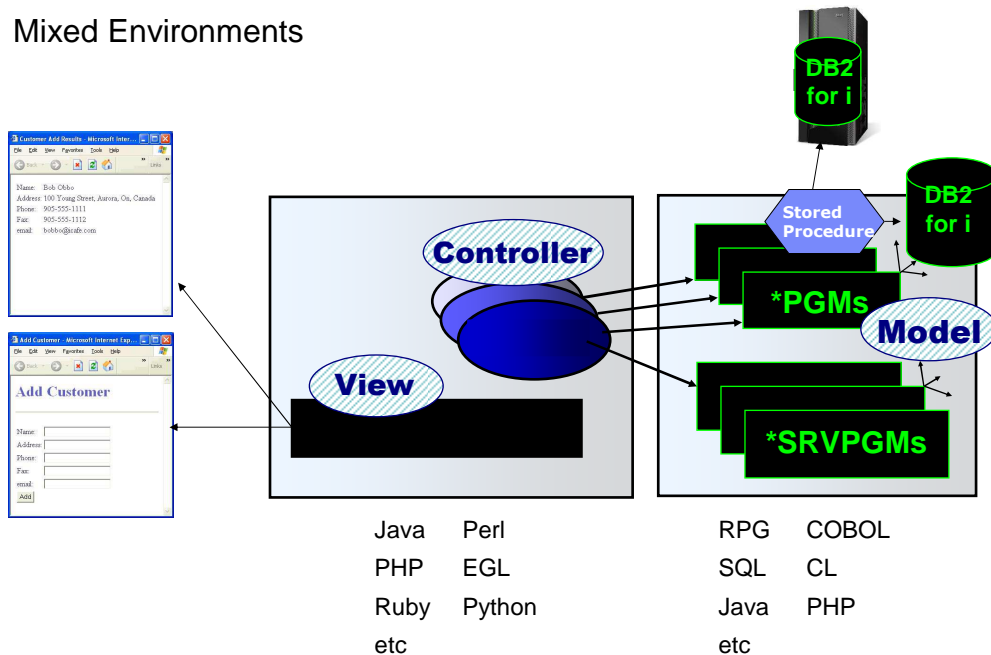
- Lack of anomalies
- Correct rules in place to maintain clean data
- No duplication



Modernizing by ReFacing



Mixed Environments



Application Development in the Power Market



Application Development Strategy for IBM i

High performance compilers
reaching to new technologies



Embrace Open Source Solutions and
Partners to Complete Application
Development Portfolio

Common developer desktop across
operating systems
and languages



Application components & Web
technologies integrated into the
IBM i operating system

Compilers for Optimized Performance

- Compilers tightly integrated with operating systems and POWER7 hardware
- Binary compatibility
 - Applications will move to POWER7 with no recompile required
 - S/36 and S/38 environment applications also
- Rational Open Access: RPG Edition - new offering for RPG
 - Long requested feature from customers and partners



i Architecture

Language Runtimes (RPG, COBOL, C, C++)

Optimizes underlying IBM i and hardware



Single Level Store



Automates & optimizes storage management

Object Based Architecture



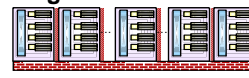
Enables integrity, security, virus-resistance

Integration



Integrates business components, e.g. database

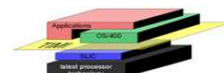
Work Management



Provides built-in application virtualization

Technology Independent Machine Interface

Ensures application compatibility across multiple technology generations

Multi-core
Multi-threads

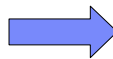
Compilers on IBM i



■ Rational Development Studio

- RPG, COBOL, C, and C++ compilers for IBM i
- Previously called WDS: "WebSphere Development Studio for System i"
- Designed for creating modern business applications

WebSphere software

WebSphere Development
Studio for IBM i

Rational software

Rational Development Studio for i
5770-WDS

New Enhancements

Feature: ILE Compilers

- ILE RPG
- ILE RPG *PRV Compiler
- ILE COBOL
- ILE COBOL *PRV Compiler
- ILE C
- ILE C++
- IXLC for C/C++

Stabilized

Feature: Heritage Compilers

- S/36 Compatible RPG II
- S/38 Compatible RPG II
- RPG/400 (RPG III)
- S/36 Compatible COBOL
- S/38 Compatible COBOL
- OPM COBOL

Stabilized

Feature: ADTS

- PDM
- SEU
- SDA
- RLU

Commitment to RPG and COBOL

To IBM i community

Created on: Apr 26, 2010 1:57 PM by cafe - Last Modified: Apr 26, 2010 2:04 PM by cafe

Power your Innovation
April 13, 2010
Dear IBM i client,

IBM® has a strong history of providing compilers and development tools for applications on IBM i. In his "Power of i" letter, Ross Mauri, IBM Power Systems™ General Manager, outlined IBM's solid and unchanged commitment to our IBM i clients. We at IBM Rational® would like to echo this by confirming our commitment to support and enhance our ILE RPG and ILE COBOL compilers on IBM i and our application development tools.

Back in February, IBM announced POWER7™ and exciting new advancements for the IBM Power Systems platform. As part of those announcements, IBM Rational announced two new products: IBM Rational Developer for Power Systems Software™ and IBM Rational Team Concert™ for Power Systems Software. From an IBM i perspective these



Power your Innovation
April 13, 2010
Dear IBM i client,

IBM® has a strong history of providing compilers and development tools for applications on IBM i. In his "Power of i" letter, Ross Mauri, IBM Power Systems™ General Manager, outlined IBM's solid and unchanged commitment to our IBM i clients. We at IBM Rational® would like to echo this by confirming our commitment to support and enhance our ILE RPG and ILE COBOL compilers on IBM i and our application development tools.

We are also excited about the release of Rational Open Access: RPG Edition, a new product that has the potential to transform the landscape of RPG development. Rational Open Access enables partners, ISVs, and clients to write handlers that extend ILE RPG's native I/O to access new devices and resources such as Web browsers, services, external databases, or spreadsheets.

IBM Rational is committed to the success of our IBM i clients, helping you continue to realize business value from your applications and leverage these applications in new business opportunities.

Echoing Ross's closing comments, thank you for your business and your confidence in the future of one of the world's most durable and productive platforms for business.

Hayden Lindsey
Vice President and Distinguished Engineer
Enterprise Modernization, Modeling, Construction, & Compilers – IBM Rational

Hayden Lindsey
Vice President and Distinguished Engineer
Enterprise Modernization, Modeling,
Construction and Compilers
IBM Rational

COBOL

- Support for COMPUTATIONAL-5 or COMP-5 (native binary data type)

COBOL Data Type	SQL Data Type	SQL Description
01 name PIC S9(4) COMP-5.	SMALLINT	16-bit signed integer
01 name PIC S9(9) COMP-5.	INTEGER	32-bit signed integer
01 name PIC S9(18) COMP-5.	BIGINT	64-bit signed integer

- Specify a non-numeric literal on the VALUE clause for a national data item
- XML GENERATE performance improvements
- Larger program support is enabled by the CRTBNDCBL / CRTCBMOD OPTIMIZE parameter, which now supports a new *NEVER option value
- Constant review of ANSI COBOL and IBM COBOL language standards

RPG IV - A Modern Business Language

Primary goals for RPG IV

- Interoperability
 - Java
 - XML
 - SQL
- Readability
 - Free form
 - Blank lines
 - Comments
- Functionality
 - Procedures
 - Data areas/data structures
 - More data types
 - Extended file support

Performance

Maintainability

Productivity

Mixed environment

System
IntegrationOpen and
Modern

Modern RPG

```

/FREE
  read file;                // Get next record
  dow not %eof(file);       // Keep looping while we have a record
  if %error;
    dsply 'The read failed';
    leave;
  else;
    chain(n) name database data;
    time = hours * num_employees
           + overtime_saved;
    pos = %scan ('\,' : name);
    name = %xlate(upper : lower : name);
    exsr handle_record;
    read file;
  endif;
enddo;
begsr handle_record;
  eval(h) time = time + total_hours_array (empno);
  temp_hours = total_hours - excess_hours;
  record_transaction();
endsr;
/end-free

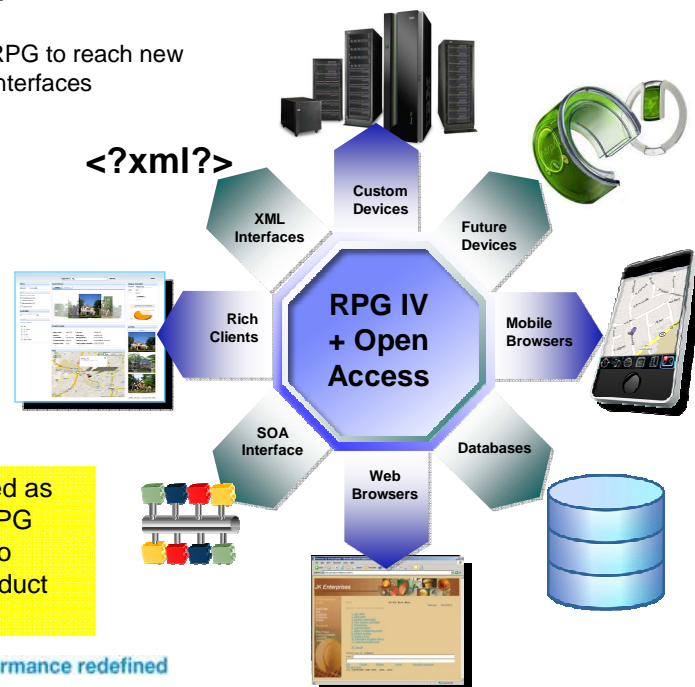
```


ILE RPG enhancements – IBM i 7.1

- New and updated built-in functions %LEN, %SCANRPL, %PARMNUM
- Implicit unicode conversion for parameters
- Sort and search data structures
- Sort Ascend or descend
- Performance when returning large values
- Optional prototypes
- Support for ALIAS names in externally-described data structures
- New options for XML-INTO (also available with a PTF for 6.1)
- Support for Open Access RPG Edition (also available with a PTF for 6.1)

Rational Open Access: RPG Edition

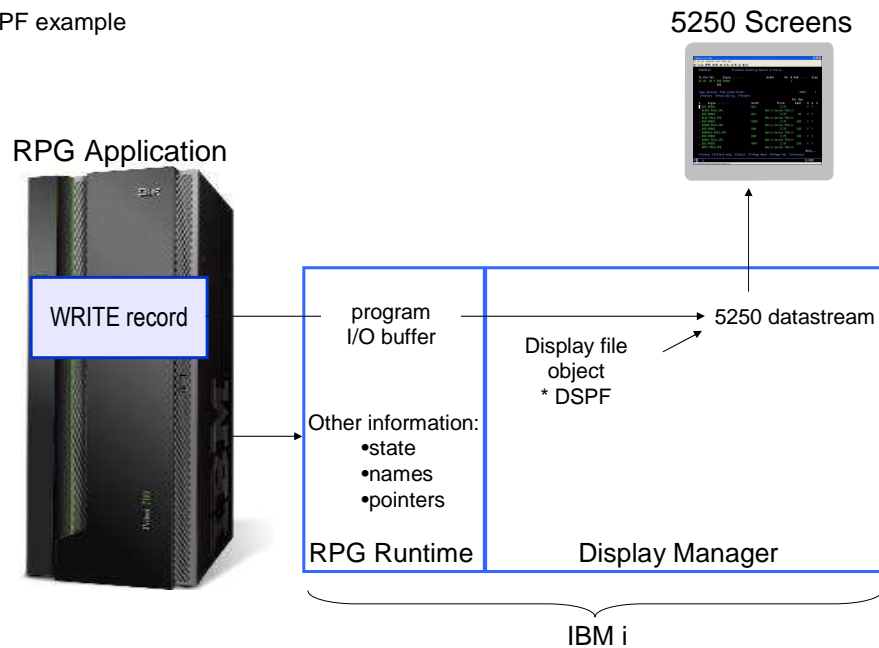
Extending RPG to reach new interfaces



Now delivered as part of the RPG Compiler!! No separate product required!

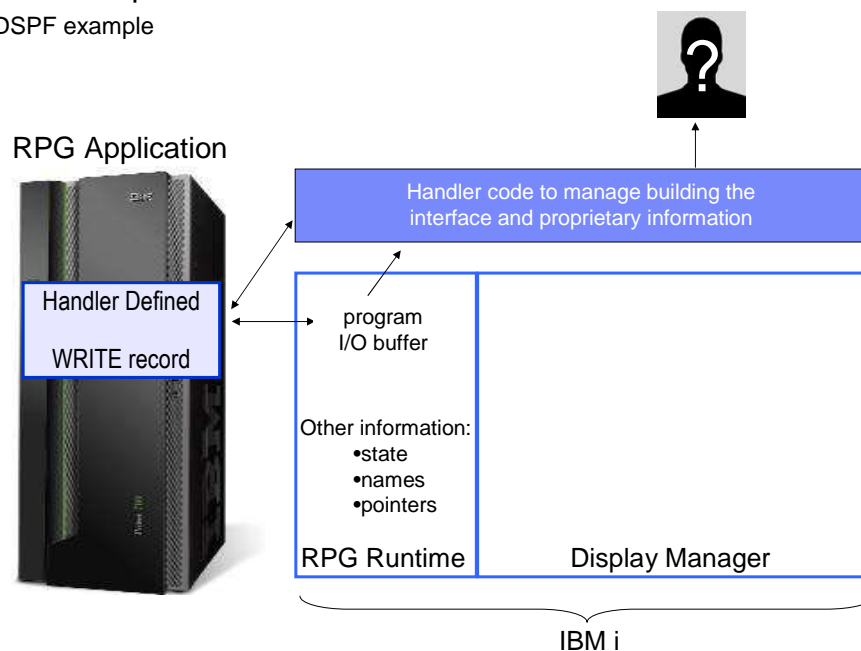
Rational Open Access: RPG Edition

*DSPF example



Rational Open Access: RPG Edition

*DSPF example



Rational Open Access: RPG Edition - Handlers



IBM STG Lab Services

- FM Handler – manages protocol between client applications and OAR
- Web Services Handler - converts OAR to XML and transport
- Socket Handler – converts OAR to a socket message over TCP/IP



looksoftware

- Delivery of multi-channel user interfaces from a single RPG program
- Includes support for smartclient, riacient, thincient and mobile client
- Integrates Web Services Generation



PKS Software

- Fully integrated in RDP as plugin – therefore IBM-based end-to-end-solution
- Highly automated, easy to use, zero deployment solution for RPG OA
- No special knowledge necessary for services



Profound Logic Software

- Native graphical user interface platform for IBM i
- Rapidly create rich browser based applications visually
- Uses native RPG operations and programming techniques



Rocket Seagull Software – LegaSuite

- Converts traditional RPG applications into high performance SOA services
- Expedites building compiles IBM i application orchestrations
- Leverages RPG expertise to SaaS/Cloud development paradigms



RJS Software

- Accesses remote databases using familiar RPG I/O operations
- Conceals the complexity of using our RPG2SQL Integrator functions
- Works with SQL Server, Oracle, Access, MySQL, and more



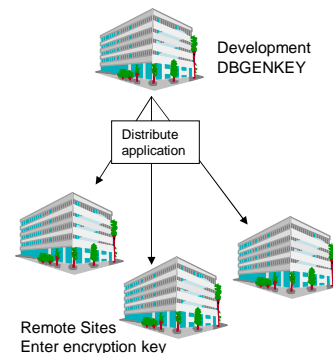
Computer Guidance

- Open Access enables 5250 RPG applications to have a rich web interface
- Open Access handler uses TCP/IP sockets to communicate with web interface

21 **Power is performance redefined** – Graphic web interface built around JavaServer Faces framework © 2012 IBM Corporation

CL Language and Commands

- There have been new and changed IBM CL commands in EVERY release
 - V5R3: 57 new, 247 changed commands
 - V5R4: 43 new, 151 changed commands
 - 6.1: 141 new, 319 changed commands
 - 7.1: 38 new, 179 changed commands
- Programming operation codes added and enhanced
 - extending file support
 - removing GOTOs and LABELs
- Adding fewer "work with" commands to encourage use of graphic commands and desktop commands
- Have continued to add/enhance interfaces with APIs available both as part of IBM i and elsewhere



IBM i Open Source Strategy

- Encourage Open Source vendors to port to IBM i (PASE)
- Encourage Open Source vendors to provide support
- PHP and MySQL run on IBM i
- IBM i PASE Development Team is testing other Open Source products



Over one-third of the Web runs on PHP



Open Source Solutions for i

- **Zend Server Community Edition for i**

- Preloaded with IBM i 7.1, 6.1, 5.4

- **Zend Server for i**

- Provides advanced functions
- Available from IBM with advanced support offerings

- **Zend Studio for i**

- Eclipse-based development environment
- Available with one year of Silver support from Zend for no additional charge

- **Other Open Source Products:**

DB2
Community
Edition



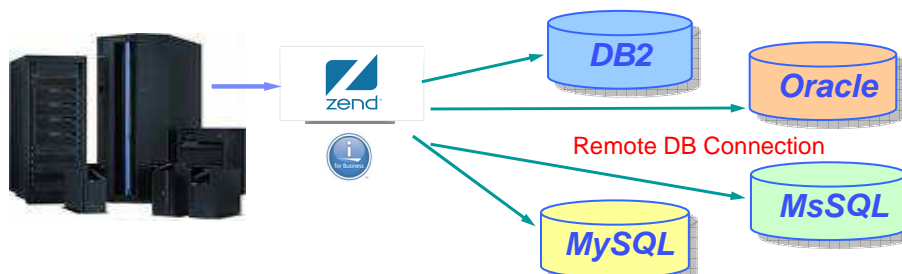
PostgreSQL



New Application Development Support

- **Zend PHP**

- New IBM i PHP Toolkit – **Now available!**
Call *PGM, *SVRPGM, *CMD, PASE utilities
- Enhanced Database support
Local DB support for MySQL, DB2
Remote DB support for MsSQL, Oracle

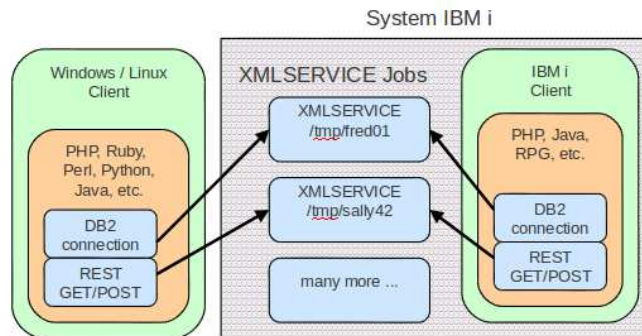


PHP Integration with i – XML Service



Easy access to IBM i data and resources from PHP
(similar to IBM ToolBox for Java)

- DB2 for i – SQL and Native
- Program call
- Procedure call
- Data Area
- Data Queue
- Message Queue
- Commands
- System values
- Spool files



<http://174.79.32.155/wiki/XMLService/XMLService>

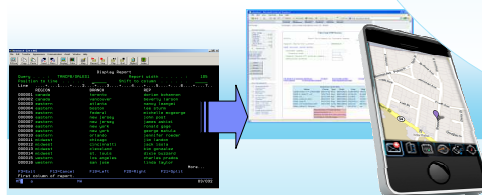
Application Development Strategy for IBM i

Rational Developer for Power
Rational Team Concert
HATS



Driving Business Differentiation

Rational. software



Performance means rapid development of new services with optimized tools and development environments

20% or more improvement
in developer productivity Rational
Developer for Power Systems ¹

- Exploit the latest POWER7 architecture with optimization in new Rational compilers
- Upgrade to modern eclipse-based tools with Rational Developer for Power
- Deploy new collaborative infrastructure and automating the development process with Rational Team Concert for Power

Rational. software



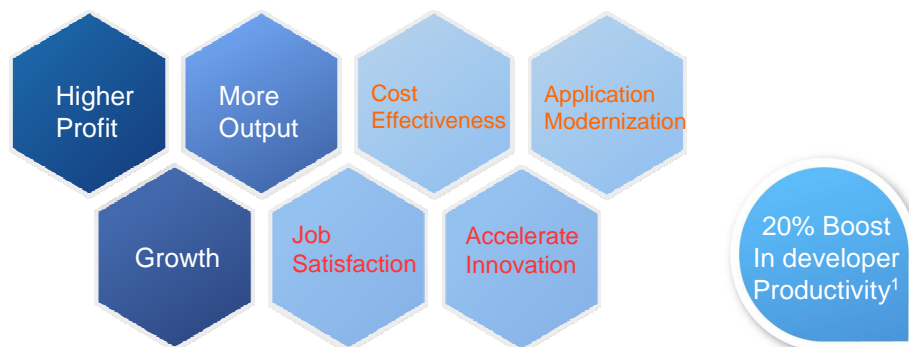
29 **Power is performance redefined**

Based on IBM customer study, "Making a Business Case for IBM Rational Developer for i" <http://www-949.ibm.com/software/rational/caf/docs/DOC-3369>

© 2012 IBM Corporation

Productivity & Innovation – why its important

Productivity: The measure of output from a process, such as output per labor-hour.

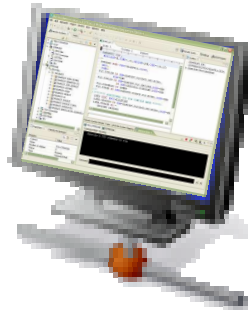


¹ Based on IBM customer study, "Making a Business Case for IBM Rational Developer for i"

30 **Power is performance redefined**

© 2012 IBM Corporation

Rational Developer for Power Systems Software



Rational Developer for Power V8.0

- **RPG and COBOL for IBM i**
- COBOL for AIX
- C/C++ for AIX
- C/C++ for Linux on Power
- C/C++ Development Studio for AIX
- COBOL Development Studio for AIX
- Power Tools for AIX
- **Power Tools for IBM i**
- Power Tools for Linux on Power
- Linux Desktop Support



- IBM XL C/C++ for AIX and Linux V11.1
- IBM XL Fortran for AIX and Linux V13.1
- IBM COBOL for AIX V4.1
- IBM PL/I for AIX V2
- **IBM Rational Development Studio V7.1**
 - IBM i compilers
- **Rational Open Access: RPG Edition V1.1**

Rational Team Concert for Power Systems Software



- Improve communication across disparate programming teams
- Significantly improve quality of application code
- Make software development automated, transparent and predictable

Why RD Power? Developer View (the fun stuff!)

Modern, Eclipse-based, development tools for IBM i

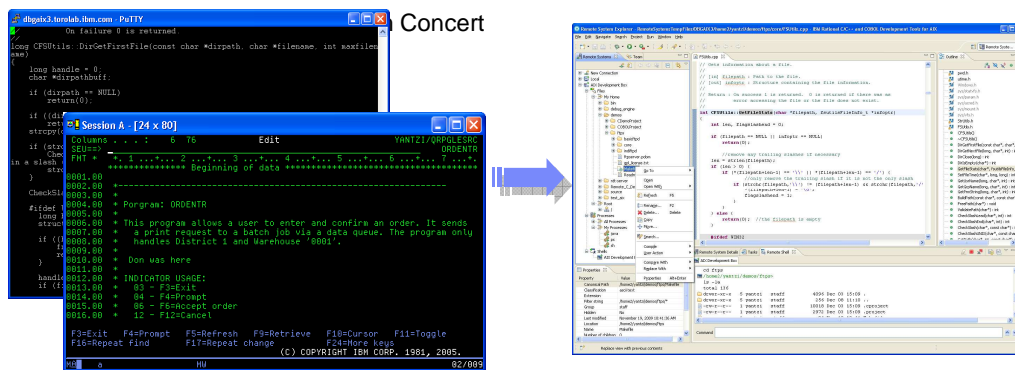
Visual editors, outline views, content assist, integrated language help

Integrated file management, search, edit, compile/build, debug capabilities

Analysis tools (application diagram, call hierarchies, type hierarchies)

Easily debug batch, interactive, and Web applications and Web services with a common visual debugger

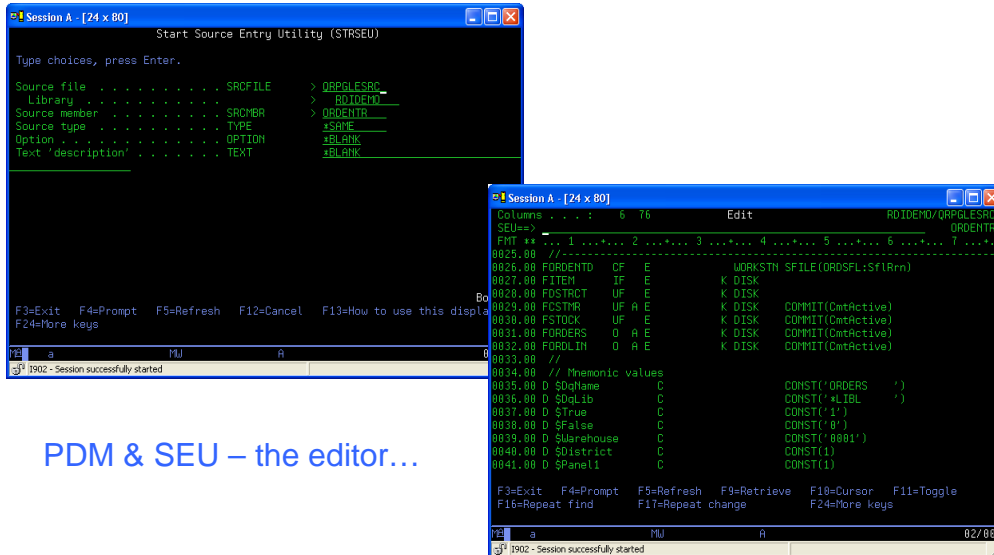
Visual DDS design tools: Screen and Report Designer



- Show me the features

Remote Systems LPEX Editor

From this...

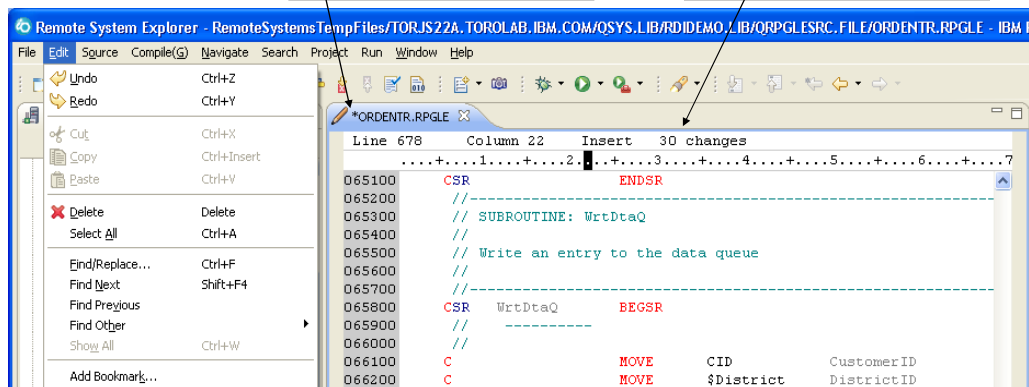


PDM & SEU – the editor...

Undo / Redo

* means editor has unsaved changes

Number of changes made since last save.



- Unlimited undo / redo inside of LPEX editor
 - Undo changes right back to when member was originally opened
 - Even if editor was saved during the editing period
 - Edit > Undo | Redo or use more common keyboard shortcuts Ctrl + Z | Ctrl + Y

Copy and Paste

Block copy / paste

Prefix commands for copy / paste

Stream based copy / paste
(typical of Workstation software)
Uses Windows Clipboard, paste into another editor, email, or document editor.

Outline View and Content Assist

Cross reference information

Content assist helps jog your memory (opcodes, BIFs, fields)

Templates provide a quick way to insert common code patterns (free form and SQL). Predefined or define your own!

From this...

Session A - [24 x 80]

Work with Members Using PDM

File QRPGLSRC
Library RDIDEMO Position to

Type options, press Enter.
2=Edit 3=Copy 4=Delete 5=Display 6=Print 7=Rename
8=Display description 9=Save 13=Change text 14=Compile 15=Create module...

Opt	Member	Type	Text
—	ITEMPROC	SQL RPGLE	Item file access routines
14	ORDCOMIT	RPGLE	Parts Order Entry - data entry
—	ORDENTR	RPGLE	Prototypes for item procedure
—	PRTORDEAR	RPGLE	Print Orders - server job
—	SLTCUSTR	RPGLE	
—	SLTCUSTR2	RPGLE	
—	SLTPARTR	RPGLE	Select Part - SQL stored proc

Parameters or command
F3=Exit F4=Prompt F5=Refresh
F9=Retrieve F10=Command entry F23=More options

1902 - Session successfully started

Session A - [24 x 80]

Display Spooled File

File ORDENTR Page/Line 32/9
Control Columns 1 - 78
Find

.....2.....3.....4.....5.....6.....7.....

Imported fields: Field Attributes Defined
No references in the source.

Exported fields: Field Attributes Defined
No references in the source.

***** END OF EXTERNAL REFERENCES *****

5761WOS V6R1M0 000215 AM IBM ILE RPG ORDEV/ORDENTR

Message Summary

Msg id Sv Number Message text

*RNF7031 00 5 The name or indicator is not referenced.

*RNF7086 00 2 RPG handles blocking for the file. INFDS is updated only wh
blocks of data are transferred.

*RNF7150 00 1 The record format contains null-capable fields.

***** END OF MESSAGE SUMMARY *****

F3=Exit F12=Cancel F19=Left F28=Right F24=More keys

1902 - Session successfully started

Compile Errors

39 Power is performance redefined

© 2012 IBM Corporation

...To This

Remote Systems Team

Go To
Open With
Browse With
Rename...
Copy
Move...
Delete...
Web Services
End String...
Verify
Verify (Prompt)...
Compile
Compile (Prompt)
User Actions
Add To iSeries Project...
Make Available Offline
Debug (Service Entry)
Compare With
Properties(t)

Launch compiles directly from editor or pop-up menu.

Compile errors automatically downloaded and shown in Error List

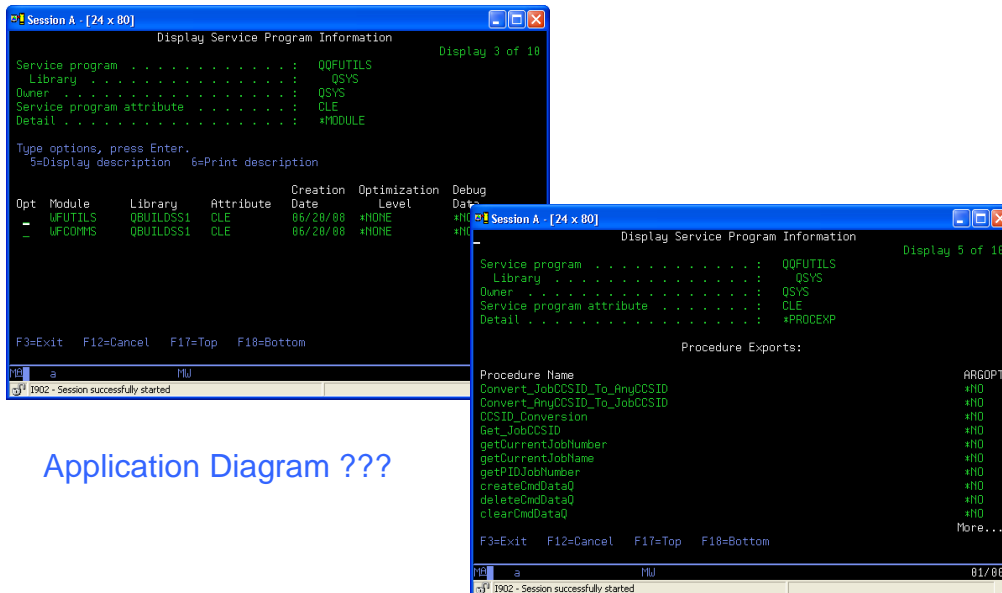
Double clicking on an error opens editor and positions to the line

ID	Message	Severity	Line	Location
RN59308	Compilation stopped. Severity 30 errors found in program.	50	0	RDIDEMO/QRPGLESRC(ORDENTR)
RNF7030	The name or indicator ORDERID is not defined.	30	64	RDIDEMO/QRPGLESRC(ORDENTR)
RNF7030	The name or indicator ENDPG is not defined.	30	128	RDIDEMO/QRPGLESRC(ORDENTR)
RNF7030	The name or indicator RQCLUS is not defined.	30	104	RDIDEMO/QRPGLESRC(ORDENTR)
RNF7030	The name or indicator RQSPAR is not defined.	30	107	RDIDEMO/QRPGLESRC(ORDENTR)
RNF7018				

40 Power is performance redefined

© 2012 IBM Corporation

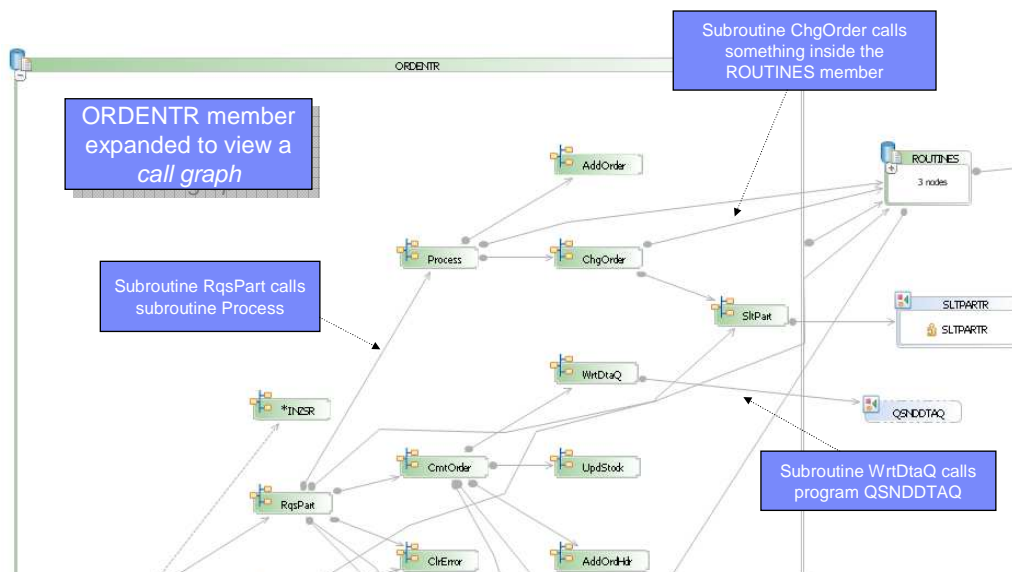
From this...



41 Power is performance redefined

© 2012 IBM Corporation

Application Diagram



42 Power is performance redefined

© 2012 IBM Corporation

From this...

Session A - [24 x 80]

Work with Display Records

File QDDSSAC Member ORDENTO
Library ROIDEMO Source type DSPF

Type options, press Enter. 3=Copy 4=Delete
1=Add 2=Edit comments 12=Design image
7=Rename 8=Select keywords

Opt	Order	Record	Type	Related Subfile	Date	DOS Error
10		PROMPT	RECORD		04/22/08	
20		ORDSFL	SFL		04/22/08	
30		ORDCTL	SFLCTL	ORDSFL	04/22/08	
40		ALTORDER	RECORD		04/22/08	
50		FKEY	RECORD		04/22/08	

F3=Exit F12=Cancel F14=File-level keywords
F15=File-level comments F17=Subset F24=More keys

10 a MU

1902 - Session successfully started

Session A - [24 x 80]

Customer name 00000000000000000000000000000000
Address 00000000000000000000000000000000
City 00000000000000000000000000000000 00 0000000000

Opt	Part	Description	Qty
3	BBBBBB	00000000000000000000000000000000	99999
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666
3	000000	00000000000000000000000000000000	66,666

Work screen for ORDSFL. ORDCTL displayed as additional record.

10 a MU

14/866

1902 - Session successfully started

Build DDM Screens

43 Power is performance redefined

© 2012 IBM Corporation

Report Designer & Screen Designer

Design page screen controls

Screens: All records, Design Screen, Prompt Screens

Excluded: Add, Remove, Add all, Remove all

Included: Add, Remove, Add all, Remove all

Design environment: 24 x 80, 127 x 132

Palette: Select, Marquee, Standard Record, Outline Record, Fields, Continued Field, Date Field, Named Field, Time Field, Time Stamp Field, Constants, Date Constant, Message Constant, System Name Constant, Text Constant, Time Constant, User Constant, Help, Specification

Design area

Customer name 00000000000000000000000000000000
Address 00000000000000000000000000000000
City 00000000000000000000000000000000 00 0000000000

Opt	Part	Description	Qty
3	BBBBBB	00000000000000000000000000000000	99999
3	000000	00000000000000000000000000000000	66,666

Outline view for navigating in the editor and selecting the file, records and fields.

Palette: drag and drop parts from the palette to the design area.

Design, source and preview modes

Use properties view to modify attributes and keywords for the file, records and fields.

Object Table | Error List | Remote Search | Commands Log | Properties

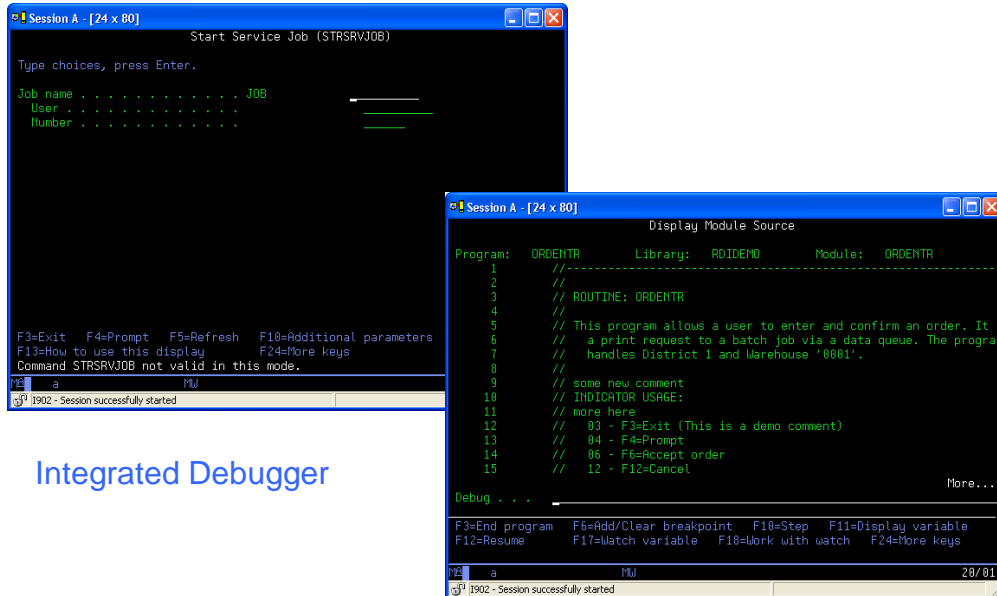
Object Table: <TORASBC Development>WVSIDEMO\QDDSSAC\ORDENTO - ORDCTL - CACORI

Basic: Field, New name: CACORI, Usage: Output, Position: 24 x 80, Row: 8, Column: 33, Type: Character, Length: 20, Decimal: 0

44 Power is performance redefined

© 2012 IBM Corporation

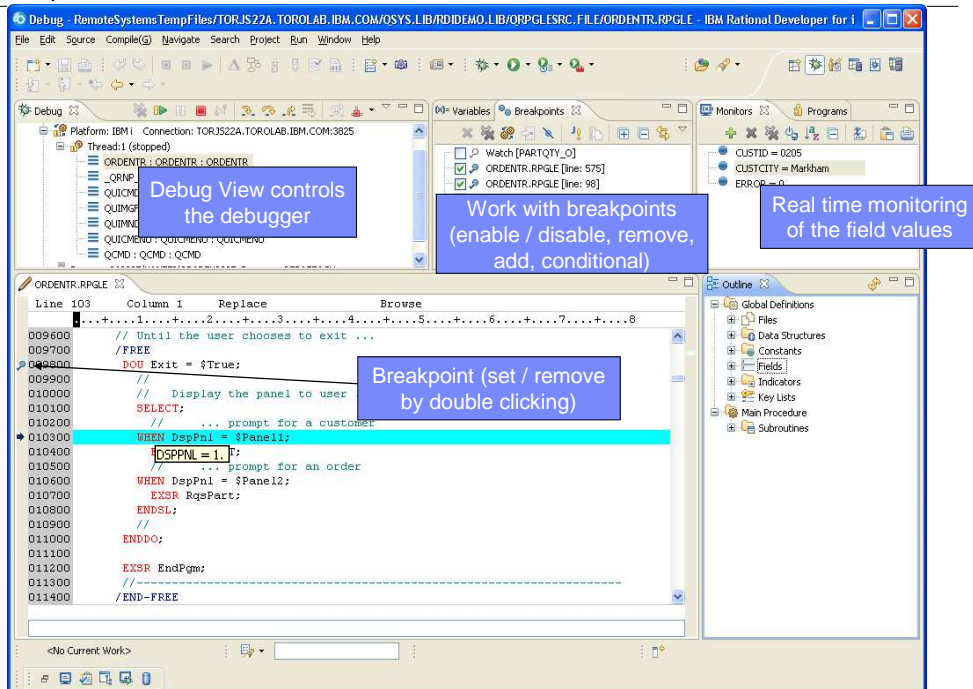
From this...



Integrated Debugger

45 Power is performance redefined

© 2012 IBM Corporation



46 Power is performance redefined

© 2012 IBM Corporation

Rational Application Developer Standard Edition

- Java Web Development tool
- Use RAD SE to build rich Java internet applications
 - improve online user experience
 - increase customer satisfaction
- Visual development for Web 2.0
 - significant productivity benefits
- Award winning! – 2009 Evans Data Users Choice: Software Development

Web 2.0

Usability Widgets Browser AJAX Design CSS Pay Per Click Affiliation Economy

Web Standards



Host Access Transformation Services 7.5.1



iPod Touch and iPhone Support

Application Development Strategy for IBM i



Application components & Web technologies integrated into the IBM i operating system

- HTTP
- Web Services
- Java
- DB2
- Security
- WebSphere
- PHP

DB2 for i – XML Support

- **XML is an industry standard for exchanging information between customers, suppliers, and partners**
- **Rich XML Support now available with DB2 for i**
 1. XML data type stores XML documents supporting database operations
 2. Decompose (shred) XML documents into relational columns
 3. Generate XML documents from existing relational data
- **OmniFind Text Search Server provides support for searching XML documents**
 - Search elements of an XML document (e.g., customer name = Smith)
 - SQL statements use OmniFind to search the XML documents
 - Available with IBM i for no additional charge
- **Strategic replacement for XML Extenders Program Product**



PO #	Customer #	Date	Purchase Order
123	2468	5/27/09	~ XML ~
456	1357	6/10/09	~ XML ~

DB2 for i - Additional Enhancements

Column Level Encryption

- Allows for transparent (no application changes) encryption of a specific column in a database table accessed through SQL or native
- Solutions from tool providers including Patrick Townsend, Linoma Software & nuBridges supply encryption algorithms

First Name	Last Name	City	State	Credit Card#
Megan	Jones	Minneapolis	Minnesota	*&^%\$*
Casey	Smith	Ames	Iowa	\$%#@^

Application Developers

- MERGE, Array support, Global Variables, and consuming Result Sets in RPG and COBOL allows for more powerful and efficient programming

Performance

- Adaptive Query Processing can modify query plan while the query is running to significantly improve performance
- Advanced SQE query optimizer now supports native logical files

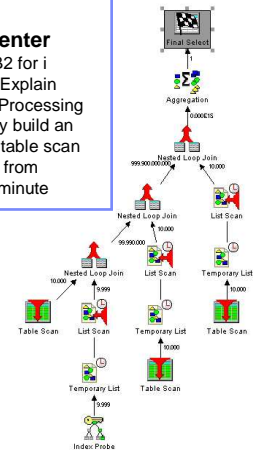
Management

- New tooling to monitor long running operations
- SQL_CANCEL procedure to cancel long running queries.
- Random or Sequential I/O statistics to identify tables that can benefit from SSDs

DB2 is an integrated database supporting transaction processing and business intelligence applications

On-Demand Performance Center

- Rich tools for DB2 for i
- Including Visual Explain
- Adaptive Query Processing can automatically build an index to replace table scan ...taking queries from 30 minutes to 1 minute



51 Power is performance redefined

© 2012 IBM Corporation

IBM i is Trusted Security

15x fewer security alerts

- Object Based Architecture enables integrity, security, and virus-resistance

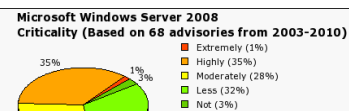
- Integration of the operating system and middleware results in a system that is easier to secure

- IBM i has a track record of significantly fewer security advisories than Microsoft Windows Server

- Secunia has issued 68 security advisories for Windows Server 2008 with only 4 for IBM i

- Trusted security with auditing and compliance tools

Windows® Server 2008



This graph was generated by Secunia. Based on vulnerability information available at <http://secunia.com/>

Between 2003 and 2010, Microsoft Windows Server 2008 was affected by 68 Secunia issued advisories, 3% of which remain unfixed

IBM i



This graph was generated by Secunia. Based on vulnerability information available at <http://secunia.com/>

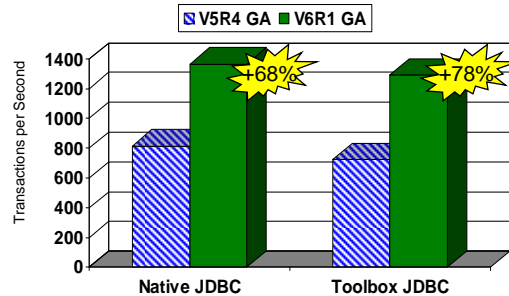
Between 2003 and 2010, IBM i 6.1 was affected by 4 Secunia issued advisories which have been fixed

52 Power is performance redefined

Source June 2010 <http://secunia.com/advisories/vendor/>

© 2012 IBM Corporation

JVM Improves Java Performance



- IBM 32-bit & 64-bit Java™ Virtual Machine Java 5, Java 6, Java 7
 - Shared technology with AIX & Linux improves performance & portability
- **Exceptional Java environment and performance. Built by IBM for Power**
 - Fully compatible with other industry standard Java applications
 - Can be called by APIs or directly from RPG
- IBM Java ToolBox
 - Pre-coded Java classes to access native IBM i artifacts – files, data queues, etc

IBM i Integrated Application Server

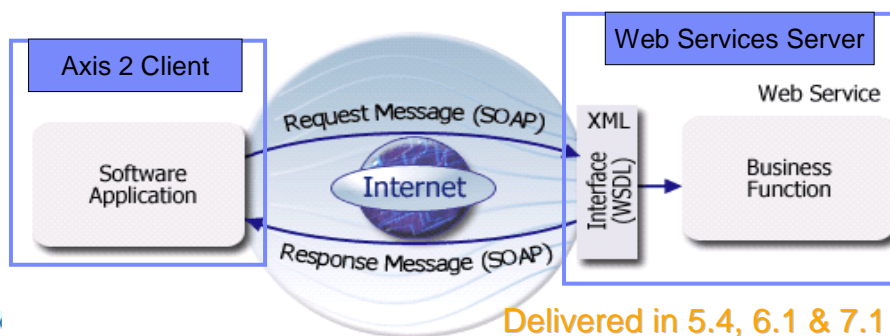
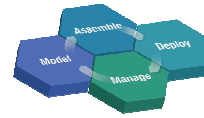


- Web container
- Lightweight application server
- Based on the OSGI framework
- Supports application packaged in a WAR
- Runs IBM Technology for Java (32-bit)
- Supports Java Toolbox and Native DB drivers
- Web container for 'simple' applications
- Web Services Wizard for RPG and COBOL
- Integrated into 6.1; PTFs for 5.4

Web Services for i - Made Easy

Recent Additions to the environment:

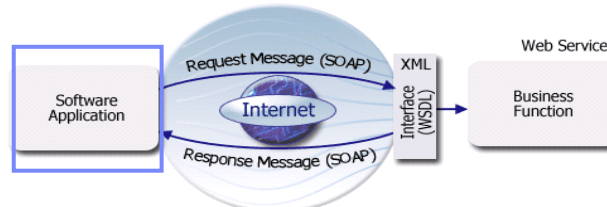
- Service Requestor:
 - Integrated Web Services Environment
 - Externalizes various RPG/COBOL business tasks as services.
 - Abstracts the hidden complexities of Web services for i
 - Provides RPG/COBOL Developer with an easy to use interface, not requiring additional tools or skills
- **Create a Web Service from your RPG or COBOL programs!**



Integrated Web Services Client for i

- Natural for ILE RPG/COBOL Developer
- 4-Step Static Development Process
 1. Use WSDL to generate Web service proxy code in C or **RPG**
 2. Build RPG stub code from C or **RPG** proxy code
 3. Compile/Bind RPG & Web service stub code
 4. Invoke RPG/COBOL Web service client

<http://www.ibm.com/svsystems/i/software/iws/>



Call a Web Service using ONLY native RPG from your existing RPG programs!

Delivered in 5.4, 6.1 & 7.1

WebSphere Support for IBM i



WebSphere software

▪ WebSphere Application Server

- WebSphere Application Server Express V6.1, V7.0 and V8.0
- WebSphere Application Server V6.1, V7.0 and V8.0
- WebSphere Application Server Network Deployment V6.1, V7.0 and V8.0

Access information



▪ WebSphere Portal

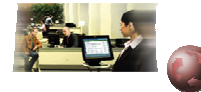
- WebSphere Portal 6.1.5
- WebSphere Portal 7

Customer retention



▪ WebSphere Commerce V7

Operational efficiency



▪ WebSphere Message and Queuing

- WebSphere MQ V7.0.1.5
- WebSphere MQ File Transfer Edition V7.0.2.1

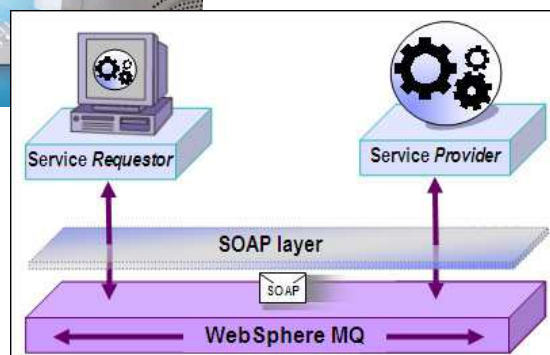
Cost reduction



WebSphere MQ

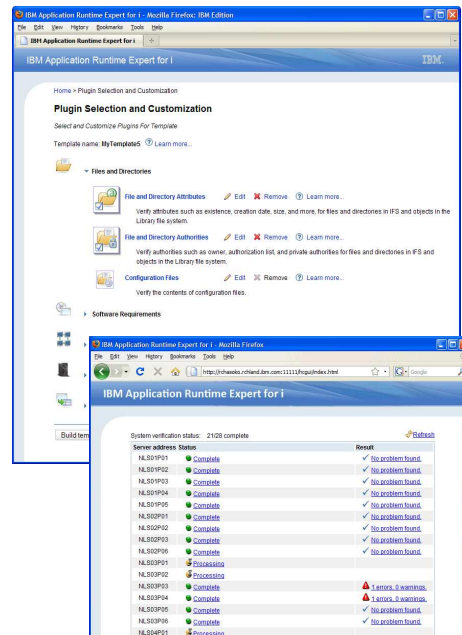


- Messaging between programs
 - Store and forward
- Multiple destinations
- single destinations
- Format changes



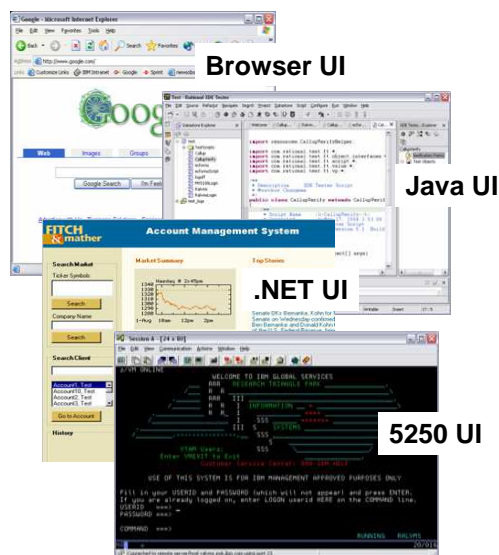
Application Runtime Expert for i

- Verify and validate runtime attributes of an application for problem determination
 - Creates a template for well running application
 - Performs health check against current environment
 - Identifies differences between template and actual runtime attributes
 - Provides some fix capabilities
- Application Runtime Attributes
 - File/Directory Authorities and Attributes
 - Attributes in property/http/xml configuration files
 - User profiles
 - PTFs
 - System Values
 - Products installed
 - TCP/IP Network verification and configuration
 - Environment variables
 - Ports in use



Rational Functional Tester Rational Functional Tester Extensions for Terminal-based Applications

- Automated regression testing for 5250, Web, J2EE and .Net applications
- Key benefits
 - Minimize test maintenance with resilient scripts
 - Wizard for test creation for new user
 - Powerful scripting language
 - Supports team oriented parallel development
 - Integrate traditional and mixed workload function testing



Rational Performance Tester

- Provides testers with automated performance testing capabilities to validate the scalability of web and server based applications
- Identify the presence and cause of system performance bottlenecks
- Supports load testing against a broad range of applications such as HTTP, SAP, Siebel, TCP Socket and Citrix
- Minimizes the memory and processor footprint, enabling large multiuser tests with limited hardware resources



Application Development Strategy for IBM i

High performance compilers
reaching to new technologies



Embrace Open Source Solutions and
Partners to Complete Application
Development Portfolio

Common developer desktop across
operating systems
and languages



Application components & Web
technologies integrated into the
IBM i operating system

QUESTIONS ?



THANK YOU