

# TORONTO USERS GROUP *for Midrange Systems*

March 2005: Vol. 20 No. 4



## eServer Evolution Unfolding the beauty of IT



### March 23 TUG MoM (A Taste of **TEC 2005**)

**Speakers: George Farr and Kushall Munir**



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# CONTENTS

Volume 20 Number 4  
March 2005

TORONTO USERS GROUP  
for Midrange Systems



## 04 PRESIDENT'S CORNER

Δ *Léo Lefebvre*

## 06 DIRECTORY OF DIRECTORS

## 07 TUG MoM REVIEW – THE JANUARY MEETING OF MEMBERS

Δ *Stephen Bingham*

The meeting at the travel lodge was well attended as many ventured into the snow to listen to our speakers talk about upgrading the operating system and the Hardware Management Console or HMC.

## 10 THE AGENDA

Our March 23 Meeting of Members (featuring Kushal Munir and George Farr) will provide “a taste of TEC”, since both speakers will also be TEC 2005 speakers. Note that we will be moving to a new venue: The Meridian. (See page 10 for details.)

## 11 eSERVER EVOLUTION – UNFOLDING THE BEAUTY OF IT

Δ *Glenn Gundermann*

TUG is holding its 12<sup>th</sup> annual i5 / iSeries / AS/400 Technical Education Conference (TEC) April 19 – April 20 at the Sheraton Parkway Toronto North, and it just keeps getting better!

## 13 WHY ARE YOU NOT CERTIFIED? THAT IS THE QUESTION

Δ *Stephen Bingham*

Are you interested in writing an exam at TEC? For the low cost of admission to the two day conference you will be able to write 1 free exam!

## 16 REMOTE SYSTEM EXPLORER – IN WDS<sub>c</sub> 5.0

Δ *George Farr and Phil Coulthard*

The next step in the J2EE roadmap calls for *better tools* – not to change what you develop initially, but to change what you develop it with.

## 21 COMMUNICATING WITH SAM – RFID: IS THE TIME RIGHT?

Δ *Sam Johnston*

Radio Frequency Identification (RFID) is a technology that intrigues and scares CEOs, often at the same time...

## 23 SING i5/iSERIES CHOIR SING!

Δ *Dan Duffy*

Guess what? IBM iSeries' Stealth Marketing Plan has been broken...

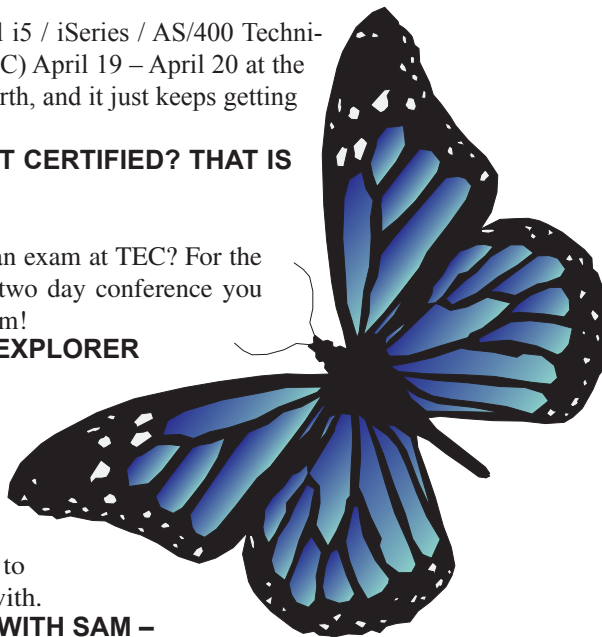
## 24 JACKIE'S FORUM *High Availability + Data Warehousing*

Δ *Jackie Jansen*

If you have a mission critical application that drives the requirement for a high availability system, then justifying a data warehouse just became a whole lot simpler.

## 25 THE GOLD PAGE

## 26 TUG NOTES & INDEX OF ADVERTISERS



\* All articles are the views of the authors and do not necessarily reflect those of the TUG eServer magazine or of the Toronto Users Group for Midrange Systems.



## TUG eServer magazine

is a regular publication of the Toronto Users Group for Midrange Systems (TUG), and is distributed to members and industry associates six times per year. It contains updates on activities of the group, as well as articles from members and non-members, which are of general interest to the “eServer community.” All rights reserved. Articles may be reprinted only with permission. Manuscripts should be submitted to the Editor via email. (See address below.)

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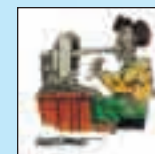
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Friday, April 15, 2005

# President's Corner

By *Léo Lefebvre*,  
President, Toronto Users Group for Midrange Systems

**D**riving to work every morning, I listen to a radio show called (translated) "There are No Two Mornings Alike." These days, it looks like that title would be well suited for TUG. So many things are happening and every day we have to deal with something different.

## Special Meeting Location

For a start, and the most important at the moment, is "special" location for our upcoming March Meeting of Members (aka MoM). Due to a final decision on the fate of the building occupied by the Travelodge Hotel (our previous regular

meeting location) TUG can no longer hold its MoMs at the Travelodge. The building is being converted in a Condo/ Apartment building.

We had less than two weeks to find an alternate location. Luckily, we found a place available on our date, and fortunately, it is only few blocks south of the Travelodge. So, our meeting place on March 23<sup>rd</sup>, 2005 will be the **Meridian Banquet & Convention Centre**, 2301 Keele Street (at Milford, two blocks South of Lawrence Avenue.)

For the May 18 meeting, we will be "Going to the Races". Woodbine Racetrack, here we come again!

With all those changes of venue, I hope you are not too confused. Just make sure you check our Web site for the latest news and register EARLY as seating is limited.

## New Directors and elections

In 2004, three members of the TUG board decided to step aside and leave the space for new people. Last year, **Jay Burford**, **Kimberly McNally**, and **Kumar Rajendra** joined the TUG board. Jay was acclaimed during the 2004 TUG election. Kimberly and Kumar were nominated by the board at its December 2004 meeting to fill two vacant positions. Their presence has already made tremendously good impact on the direction of TUG.

The TUG 2005 election campaign is now on. Five TUG Directors are completing the second year of their term. Before starting their next two-year term they must be re-elected by the members. Are you up for a challenge? Do you want to come "on board"? Contact Wende at the TUG office (before March 31) and she will get you a registration form. Sign it and have two other TUG members to co-



*Léo Lefebvre*

sign the form and you'll be in the race. The election ballot will be sent to the TUG members' primary contacts during the month of April. The ballots received will be counted on Monday May 16 and the results announced at the MoM on May 18. Good luck to the runners!

## 17th Annual TUG Golf Classic

You want something else different? This year, the 17<sup>th</sup> Annual TUG Golf Classic is moving from Friday to Wednesday (i.e., June 22.) Now that family and personal time are getting more and more precious, a Wednesday afternoon golf game would not disturb any week-end plans. Or, conversely, after solving last week-end's problems at work and before you get the systems ready for another week-end of hard work (or maybe another upgrade) a Wednesday afternoon golf game could be quite relaxing! If you want to be in the game, if you want to enjoy a good golf game, register early. Places are limited.

## TEC 2005

TEC 2005 will be the 12<sup>th</sup> edition of a fantastic conference! And here too, there will be a few things different from previous years. To learn more about it, read the article by **Glenn Gundermann** in this magazine.

As you can see, even though TUG is almost 20 years old, it is still a very dynamic group. As they say, "Changes are the spice of life." One thing I can say for sure, there are no two users groups alike, and TUG is the best of them all!



April 19-20, 2005



TEC 2005 – Two days of  
focused iSeries Education.  
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# IBM Canada i5 & iSeries Calendar of Technical Events

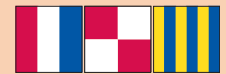


## IBM Canada i5/iSeries Feb-June 2005 Calendar of Events

Topic	Event Location	Date	Time	Event Code
HMC Seminar in French	Seminar at the IBM Montreal Office	02/17/05	9:00AM Local Time	ISHMCMTL-521
The Power of "i" Webinar	Webinar available to all in English	02/17/05	11:00AM EST	ISPIWEN-522
MPG's Performance Navigator Webinar -- English	Webinar available to all in English	03/10/05	11:00AM EST	ISMPEGWPM-523
MPG's Performance Navigator Webinar -- French	Webinar available to all in French	03/10/05	2:00PM EST	ISMPEGWPM-524
HMC Webinar in English	Webinar available to all in English	03/10/05	11:00AM EST	ISHMCW-525
LPAR Seminar in French	Seminar at the IBM Montreal Office	03/17/05	1:00PM Local time	ISLPARMTL-526
Portal Webinar - English	Webinar available to all in English	03/23/05	1:30PM EST	ISPORWPM-528
Performance Directives Seminar - French	Seminar at the IBM Montreal Office	03/30/05	9:00AM Local Time	ISPDMTL-529
Performance Directives Seminar	Seminar in Toronto	03/30/05	9:00AM Local Time	ISPDTOR-530
LPAR Seminar	Seminar at Toronto eServer Technology Centre	04/07/05	9:00AM Local Time	ISLPARTOR-533
Performance Directives Seminar	Seminar at the IBM Winnipeg Office	04/07/05	9:00AM Local Time	ISPDWIN-531
Performance Directives Seminar	Seminar at the IBM Burnaby Office	04/07/05	9:00AM Local Time	ISPDVAN-532
iSeries Navigator Seminar	Seminar at the IBM Burnaby Office	04/14/05	9:00AM Local Time	ISNAVVAN-534
iSeries Navigator Webinar - French	Webinar available to all in French	04/14/05	11:00AM EST	ISNAVWAM-535
iSeries Navigator Webinar - English	Webinar available to all in English	04/14/05	1:30PM EST	ISNAVWPM-536
AIX on i5 and i5/OS on p5 Webinar - French	Webinar available to all in French	04/20/05	11:00AM EST	ISAIXWFR-537
iSeries Access for Web	Seminar at the Toronto eServer Technology Centre	04/21/05	9:00AM Local Time	ISWSAM-634
iSeries Access for Web	Webinar available to all in English	04/21/05	1:30PM EST	ISWSPM-635
DB2 on i5 - what has changed	Session at the evening NAUG Meeting - Edmonton	04/27/05	5:00PM Local Time	ISDB2ED-606
AIX on i5 and i5/OS on p5	Webinar available to all in English	04/28/05	1:30PM EST	ISAIXWEN-540
DB2 on i5 - what has changed	Session at the IBM Calgary Office	05/04/05	9:00AM Local Time	ISDB2CAL-607
The Power of "i" Webinar	Webinar available to all in English	05/10/05	1:30PM EST	ISPIW-636
Linux Seminar	Seminar at the IBM Burnaby Office	05/17/05	9:00AM Local Time	ISLINVAN-637
Linux Seminar	Seminar at the IBM Winnipeg Office	05/17/05	9:00AM Local Time	ISLINWIN-638
Websphere Appl. Server Seminar	Seminar at the Toronto eServer Technology Centre	05/19/05	9:00AM Local Time	ISWSATOR-639
Websphere Appl. Server Webinar	Webinar available to all in English	05/19/05	1:30PM EST	ISWSAW-640
High Availability Webinar - English	Webinar available to all in English	05/26/05	1:30PM EST	ISHAW-641
Linux Seminar	Seminar at IBM Markham office	06/02/05	9:00AM Local Time	ISLINTOR-642
Linux Webinar - French	Webinar available to all in French	06/09/05	11:00AM EST	ISLINW1-643
Linux Webinar - English	Webinar available to all in English	06/09/05	1:30PM EST	ISLINW2-644
AIX on i5 and i5/OS on p5 Seminar	Seminar at the IBM Burnaby Office	06/14/05	9:00AM Local Time	ISAIXVAN-645
AIX on i5 and i5/OS on p5 Seminar	Seminar at the IBM Winnipeg Office	06/14/05	9:00AM Local Time	ISAIXWIN-646
Windows Integration Webinar - French	Webinar available to all in French	06/16/05	11:00AM EST	ISWNW1FR-647
Windows Integration Webinar - English	Webinar available to all in English	06/16/05	1:30PM EST	ISWNW2EN-648

**To register call Toll-free 1-877-463-5440 or Toll 1-450-655-5705 and give Event Code  
Contact IBMi5@ca.ibm.com for more information**

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# – TUG MoM Review –

## The January 2005 Meeting of Members

By Stephen Bingham

### Read me first!

**Y**ou don't need a farmer's almanac to know it will snow on the 3<sup>rd</sup> Wednesday of January, since this is the scheduled date for the Toronto User Group's Meeting of Members. The meeting at the travel lodge was well attended as many ventured into the snow to listen to our speakers talk about upgrading the operating system and the Hardware Management Console or HMC.

Our president **Léo Lefebvre** opened the meeting by welcoming everyone and introducing our first speaker of the evening, one of our own board members, **Richard Dolewski** of Midrange Systems.

Richard has had the opportunity to be part of many operating system upgrades over the years and the phrase: "Read me first!!" has been the starting point of everyone.

Richard walked us through some key elements in installing a new release of the operating system. The first step is: "Planning." Before you start, you want to read the "Memo to Users" for the target release. If you are skipping a version, then be sure to read the "Memo to Users" for any skipped releases as well. Contact any vendors for third party software to ensure that your applications will continue to function as expected after the upgrade. Verify your hardware will continue to be supported as well.

To obtain a copy of the "Memo to Users", visit the following website: <http://publib.boulder.ibm.com/pubs/html/as400/infocenter.html>

The second step is, "Preparing your System". Verify that your currently installed license programs are not showing a status of ERROR and check to see if you currently have any secondary languages installed. If installing to V5R3, ensure that your load source are at least 4GB in size.

Before your upgrade, you will want to run the "Prepare for install" process off the Work with Licensed programs menu to verify that you have all the required CD's for a successful upgrade. This is now a mandatory process when going to V5R3. Ensure that you run this process well in advance, so that you can order that missing CD in time for the upgrade weekend. This is also a good time to verify that you have received all of

your IBM Licensed program product keys.

New to V5R3 is the Software Agreement PTF. These are required to be applied to the system prior to the upgrade. Don't forget to order your CUME and group PTF's. Ideally you would like your CUME to the current version minus one.

The third step is "Cleaning your System". There are many ways to clean your system. Some of these include:

- Cleanup your DASD of any unnecessary clutter.
- Permanently apply any PTF's.



*Stephen Bingham*



*Richard Dolewski*

Photos by Léo Lefebvre



John Still

Léo Lefebvre

- Delete any PTF Save Files and cover letters.
- Delete any software used from the sampler CD.
- Delete any licensed programs that are no longer required.

Other optional cleanup tasks include (but not limited to):

- Reclaim storage
- Reclaim DLO
- Reclaim Spool Storage

How should you perform the install of

the new release: Manual vs Automatic?

The automatic install is the preferred option, but it is not for everyone. If any of the following apply to you, then you should consider the Manual process:

- Adding additional disk units.
- Changing your primary language
- Changing environment AS400 or 36.
- Using tapes created with SAVSYS commands.

### Install Day:

Before you do anything, ensure that you have a full system backup. Ideally you should have 2 full system backups.

Once you have verified that you have successfully completed your backups, verify that all your CD's are in the correct order. Sign on as QSECOFR and start your install. When the install is complete, enter GO LICPGM on the command line. Take option 50 view the install log. Review the log for any errors and correct as necessary.

Verify that all your licensed programs are installed and that none are in ERROR status. Install additional licensed programs and Secondary languages as required. Continue with the following steps: Note: Refer to documentation for as an IPL may be required after a specific task.

- Install CUME PTF's
- Install Group PTF's
- Install Hiper PTF's
- Install Client Access Service Packs.

### Final Steps:

- Review the installation log again.
- Verify your system values.
- Apply your licensed product keys.
- Perform any third party software updates that were not completed prior to the upgrade.

One last thing: Perform one more full system save.

Spend your time planning for the upgrade, and not recovering from it!

### Intermission

During the break, our president Leo Lefebvre introduced our 2 new board members: **Kimberly McNally** and **Kumar Rajendra**. A former TUG Board member and current president of the COMMON User Group, **Beverly Russell** spoke briefly on the upcoming COMMON on March 13-17<sup>th</sup> in Chicago. In addition to the upcoming conference, Bev also mentioned that the election nominations for common are open. For more information on the conference or the elections please visit [www.common.org](http://www.common.org).

With the topic of user conferences in mind, our own **Glenn Gundermann** took the stage to talk about the upcoming 12<sup>th</sup> annual Technical Education Conference. This must attend

## The 5th Wave By Rich Tennant



"You want to know why I'm mad? I suggest you download my latest novel called, 'Why an Obsessive Control-Freak Husband Should Never Pick Out Bathroom Tile Without Asking His Wife First.'"

© The 5th Wave, www.the5thwave.com



### **TUG Meeting of Members, January 19, 2005, Travelodge**

event will be on April 19<sup>th</sup> and 20<sup>th</sup>. Glenn introduced the members of the TEC committee and spoke briefly on what is new and exciting this year at TEC. Not only do we have many of the same speakers that attend COMMON, but we have sessions at the IBM Toronto Software LAB and new this year, IBM Certification.

#### **The HMC:**

With the announcements out of the way and dinner behind us, Leo introduced our 2<sup>nd</sup> speaker of the evening: **John Stills** of Midrange Systems, to talk about the Hardware Management Console or HMC.

John walked us down memory lane with a history of the console. From the System/38, with the built in console through the twinax 5250 display that could only be 20 feet away from the system unit and on to the PC console that we know today.

The HMC was first introduced on the pSeries. It is a Linux based PC appliance for the eServer power 5 that is shipped with a pre-loaded embedded operating system. The functions of the HMC include:

- Configuration and management of the LPAR environment.
- Capacity on demand.
- Some maintenance functions
- Display a virtual console session

for each partition on the i5.

- Save the configuration of your LPAR.
- The HMC can be powered off without affecting the i5.

If you have an LPAR environment on your iSeries, then you are familiar with the Hypervisor partition. With the introduction of the i5, this partition is no longer required as all of its functions have been moved to the HMC, thus removing a single point of failure for the LPAR environment.

Once again the phrase "Read me first" comes into play. Before attempting to configure or for that matter even plugging in your new i5, there is much planning to be done. The most current source for documentation is the eServer Hardware Information Center. You can find this info at: [http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en\\_US/index.htm](http://publib.boulder.ibm.com/infocenter/eserver/v1r2s/en_US/index.htm).

John walked us through a virtual "Guided Setup" of the HMC. From Networking to the Firewall, DNS and Service functions. With the HMC configured, it is time to configure our LPARS. John walked us briefly through the creation of an LPAR.

Once your LPAR has been configured and your OS installed. You can use the HMC to sign on to each configured

partition on the managed system as if you were on the master console itself.


Some of the other functions that John touched on include:

- Backup and restores of the HMC.
- The HMC application GUI and its main functions:
  - Service Agent
  - Remote Support
  - Service Focal Point

Maintaining your HMC:

- Don't shut down your HMC unless required.
- Backup your HMC.
- Create backup of main profiles hscroot and root. Ensure they are documented.
- Document your Network settings and IP Addresses.
- Check for HMC PTF's regularly at Fix Central.

For education on the HMC, refer to the following link: <http://app-06.www.ibm.com/servers/resourcelink> (A password is required for this site.) You can also refer to IBM's education website: Course # AS530. This is a 5 day course.

If you would like a copy of either Richard's or John's presentation They are available at [www.tug.ca](http://www.tug.ca). See you in March. 



# THE AGENDA

 for our next Meeting of Members  
**Wednesday, March 23, 2005 (A Taste of TEC)**

**LOCATION: Meridian Banquet Hall, 2301 Keele Street**

## 5:00pm: Session 1 – Developing Web Applications With JavaServer Faces (JSF) and Enterprise Generation Language (EGL), Speaker: Kushal Munir



**Abstract:** This session will discuss two key new technologies from IBM that simplify the process of Web development: JavaServer Faces and Enterprise Generation Language. The first offers dramatically simplified development of Web applications, using drag and drop technology and data based Web UI controls. The latter builds on these new tools and runtime technologies, but offers an alternative to Java for the business logic and 2nd tier scripting language: EGL, a business language that RPG and COBOL programmers will be comfortable with. EGL offers a fourth generation language that can generate to Java or COBOL, keeping up with the latest standards and best practices on your behalf. If you are doing Web development now, or are looking to do Web development in the future, and want to leverage your existing skills, come to this session to learn about JSF and EGL.

**Biography:** **Kushal Munir** has been a software developer at the IBM Toronto Laboratory since 2001. He is responsible for the design, development, testing and maintenance of Websphere Development Studio Client for iSeries. Kushal has a Bachelor of Applied Science in Computer Engineering from the University of Toronto.

## 6:00 pm Intermission TUG Meeting of Members (MoM)



• Mingle and network with professional colleagues. • **Enjoy our complimentary buffet dinner.** • Limited seating • Register with the TUG office of your intention to participate, to be guaranteed a seat. • You can call, fax, or use the TUG web-site to register, (stating: name, company, phone number, and number attending).

[www.tug.ca](http://www.tug.ca) • Do we have your current e-mail address?

## 7:00pm: Session 2 – IBM's Investment in RPG: Past, Present, and Future, Speaker: George Farr

**Abstract:** Do you want to know if IBM is investing in RPG? In the first part of this session George will start by taking you thru some of the history of RPG IV and IBM's investment in it as well as covers the new functions recently introduced in the RPG IV compiler in V5R3 as well as future RPG features that will be coming soon to an iSeries near you! In the second part we will demo and highlight the latest enhancements in the Remote System Explorer. Time will be allocated at the end to allow customers to voice their requirements and any other Q&A on RPG as well as the tooling. So come with all your questions and new ideas that you would like to see not just for RPG IV but WDS as well.



**Biography:** **George Farr** joined the IBM Toronto Laboratory in May 1985 and worked with the RPG development team for seven years where he developed many functions in the compiler. After spending a year with the AS/400 languages architecture and planning team he joined the visual development organization as the compiler development team leader for the first release of VARPG and later became the Visual RPG Development Manager. Currently he is the Technical Manager for all of the RPG compilers on the iSeries and Windows platforms. In addition, he is the technical development manager for a new generation of tooling based on the eclipse technology. A frequent award-winning speaker at COMMON and user groups worldwide, George has published numerous articles on the subject of AS/400 languages and environments. He authored many books including *ILE- A First Look*, *RPG IV By Example*, and most recently he co-authored, with **Phil Coulthard** the books: *Java for RPG Programmers*, and *Java for COBOL Programmers On OS/390 and OS/400*.

**What topics would you like to see in future? Drop us a line with your suggestions at: [leo@tug.ca](mailto:leo@tug.ca)**



# eServer Evolution

## Unfolding the beauty of IT

By Glenn Gundermann

It's already March and if you haven't yet thought about your education for this year, there is no better time than the present. If you are like a lot of people, you do not take an active enough approach in planning your future growth. There are some that are taking courses for a degree, whether in IT or another area like project management or accounting, etc. There are lots of others who either wait for something to fall into their laps or do nothing.

### This is where TUG can help you

TUG is holding its 12<sup>th</sup> annual i5 / iSeries / AS/400 Technical Education Conference (TEC) April 19 – April 20 at the Sheraton Parkway Toronto North, and it just keeps getting better!



Glenn Gundermann

**So many choices to make – Two days filled with 64 sessions by 26 speakers!**

What hasn't changed is the top quality in the lineup of sessions we have planned for you. We have sixty-four sessions presented by twenty-six renowned speakers with the likes of **Jon Paris, Susan Gantner, Charlie Massoglia, Trevor Perry, Jackie Jansen, Carole Miner, Carol Woodbury, Linda Cole, Alison Butterill, and George Farr** (just to name a few.) We have the latest topics you need to be knowledgeable about. We have various aspects of WebSphere Development including WebSphere Development Studio Client (WDS<sub>C</sub>), WebSphere Application Server (WAS), and more. We have RPV IV, ILE, Java, Security, Disaster Recovery, DB2/400, Hardware Management Con-



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sole (HMC), Remote System Explorer (RSE), plus too many others to mention.

### Hands-On Labs at the IBM Lab

Again this year we have two 2-hour lab sessions at the IBM Toronto Laboratory in Markham. What is new this year is that they are open labs and you have the choice of four labs to choose from: Remote System Explorer (RSE), WebFacing, Web Tools, or VA RPG Tools. And of course we have a charter bus that will shuttle you back and forth between the lab and the Sheraton.



Attendees at one of the many sessions during last year's TEC



### IBM Certification

The biggest addition to TEC this year is IBM Certification. For both days of the conference, each attendee will be able to write one free IBM Certification exam. (Subsequent exams can also be written at a very reasonable rate.) We have a large room filled with laptop computers and a laser printer, courtesy of IBM, plus a high-speed Internet connection. **Stephen Bingham** has written two articles on this, which I hope you read in this issue as well as the January issue, so if you haven't yet, take the time now.

### Executive Breakfast with Trevor Perry

"Architecting Modernization" is a must-attend for any executive that doesn't have the time (or desire) to attend the two full days of technical sessions. Sit down for breakfast with a two-hour presentation by Trevor Perry, followed by the opening of the Vendor Showcase.



*TEC 2004: Executive Breakfast*

### Vendor Showcase

Again this year is a great selection of Vendors presenting their hardware, software and solutions. Come and talk with the experts.

### Keynote Speaker: Trevor Perry

We have a great keynote speaker for you again this year. If you've attended any of

his sessions at COMMON, you will agree that Trevor Perry is a superb speaker and a definite crowd pleaser and must see. An excellent sit-down lunch is provided that you are sure to enjoy.



*TEC 2004: Hands-on Lab*


### The TEC 2005 Team

Many thanks to this year's terrific group of volunteers who make it all possible: **Stephen Bingham, Wende Boddy, Jay Burford, Vaughn Dragland, Richard Dolewski, Eveline Gaede, Glenn Gundermann, Ed Jowett, Léo**

**Lefebvre, Bob Lesiw, Stephen Quan, Alkarim Sachedina, and Ken Sadler.**

### In closing

I think you will agree that education is good. Then doesn't it make sense that everyone should attend TUG TEC 2005? I know, this sounds like one of those cell phone marketers who use the tactic of stating something obvious like "this plan will save you money – don't you want to save money?" If you don't keep up then you most certainly will fall behind and then it's very hard to get back in the game. I encourage you to register now.

For the latest information on TEC 2005, including session grid updates, etc., check out our Web site at [www.tug.ca/tec.html](http://www.tug.ca/tec.html). 



*TEC 2004: Vendor Showcase*



# Why Are You Not Certified? (That is the question...)



## Attention IT Executives

By *Stephen Bingham*


**B**e the first in your office to obtain IBM certification. Impress your friends and colleagues. (Hopefully some of them fall into both groups.) No, you cannot buy one on E-Bay or at an online pharmacy. You will not find them for download at Napster, either.

The good news is that you will find them at TEC 2005. For the low cost of admission to the two day conference you will be able to write 1 free exam. That's right, while attending the best AS/400 / iSeries / i5 Technical Education Conference this side of the 49th parallel, you will get absolutely free: The opportunity to write 1 exam towards an IBM certification!

The reasons to get certified are numerous and are only out numbered by the reasons to attend TEC 2005 on April 20 and 21. As I mentioned in the January issue, text books and study guides geared towards specific IBM exams are nearly impossible to find. There are many books available on iSeries security, performance management, WebSphere, and DB2. But none of those books are directly linked to any exam. I have only come across two such books. These were for the Associate and Professional Operator exams, both of which have been retired by IBM. The lack of these study guides makes the IBM Certifications all the more challenging and accepted as proof of one's knowledge.

Are you interested in writing an exam at TEC? Be pre-pared. Check out the IBM Professional Certification program website at: <http://www-03.ibm.com/certify/index.shtml>. Here you will find a list of all the exams offered by IBM. Select the exam of your choice and you will be provided with the information covered under the exam and be given the opportunity to write a practise exam for a nominal fee.

The list of exams to be offered at TEC has not been finalized at this time. We are currently planning to offer exams on the following subjects: System Administration, DB2 and Websphere.

Managers are looking to hire the best staff that they can find, and the applicant who has a certification in their area of expertise will get the attention. Something to keep in mind: If you were to book a sitting at your local testing center, the average cost of an exam would be approx US \$200. See you at TEC 2005! 

*Stephen Bingham is the TUG Secretary and works for CGI as an iSeries Technical Analyst. He can be reached at 905-821-2252 ext. 7866, or [stephen.bingham@cgi.com](mailto:stephen.bingham@cgi.com).*

TUG will host our second IT Executive Breakfast on the first day of TEC 2005 (Tuesday April 19.) Designed for high-level IT decision-

makers, the executive breakfast will feature renown speaker **Trevor Perry.**

Mark your calendars.



**Trevor  
Perry**

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# Remote System Explorer in WDS Sc 5.0

By Phil Coulthard and George Farr

Hello and welcome back. This is the second article in our series. In the first installment (“An RPG-to-J2EE Roadmap,” *TUG eServer magazine V20N2*), we introduced a simple roadmap for moving from RPG or Cobol to Java 2 Enterprise Edition (J2EE), making it clear we expect that most people won’t go all the way to full, pure J2EE but will probably find themselves happily staying at one of the steps along the way.

The next step in that roadmap calls for *better tools* – not to change what you develop initially, but to change what you develop it with. These new tools for RPG and Cobol give you transferable skills to the other steps in the roadmap and set the culture in your shop to one that embraces change. To embark on any path to modernization, you must overcome a certain inertia – a resistance to change.

To that end, this month we introduce you to the Remote System Explorer (RSE) within WebSphere Development Studio Client (WDS Sc) 5.0. This is the new generation of PDM and SEU, developed by the same team in Toronto who brought you PDM and SEU. We hope you will find it compelling enough to overcome the natural resistance to change.

Have you heard of WDS Sc? Hopefully you have, and maybe you’re already using it. If not, you should know that if you have RPG or Cobol, and you’re at V5R1 or higher (or maybe even V4R5), then you’ve already paid for it and are entitled to unlimited licenses of it. Your job now is to find or order the CDs for it.

## RSE Lpex Editor – The New SEU

The editor in the RSE can edit any member, IFS file, local file, or even remote Unix, Linux, or Windows file. However, it is for RPG, Cobol, C, C++, CL, and DDS that it has special language-sensitive support, including colorization of the tokens (even when printed!). The 4.0 release was the first release of this brand new editor, which is a Java port of the CODE editor.

In release 5.0, IBM has added considerable new functionality to this editor, both in terms of ported CODE function and totally new function. It now offers a superset of SEU’s functionality, although there are a few things still to be ported from CODE’s editor, which can easily be launched from the RSE, too. The biggest enhancements in the editor are the introduction of Syntax Checking, Program Verification (PV), and F1 language-sensitive help. The syntax checkers are ported from SEU, but the PV and F1 help are unique and come from CODE.

The PV lets you do full compiles without the generation of target code to find any and all errors before compile submission. For the F1 help, if you’re editing a source member, just position the cursor at a specification and press F1. The browser will open and you’ll be presented with specific help for the token under the cursor, from the appropriate RPG, Cobol, DDS, or CL reference manual. The programmer’s guides for RPG and Cobol are also shipped in the product.



IBM has also added two new and interesting enhancements that are not even in CODE/400:

- Code assist (for RPG only, until next release)
- Outline view (for both RPG and Cobol)

Code assist (or *content assist* in Java) lets you get help anywhere in the editor as you type in your source code. **Figure 1** shows an example of getting a list of the allowable keywords on the D specification.

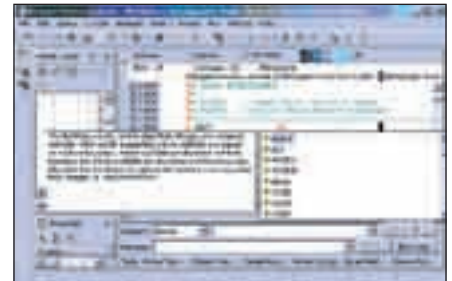


Figure 1.

To get this list, you need only press Ctrl-Space. As you start typing the keyword, you’ll see the list narrowing down to the specific characters that you type. The list is specific to the position where your cursor is. For example, if you’re on an F specification in the keyword area, then the list of keywords of the F specification will be displayed.

As you scroll down the list, another pop-up window appears with detail information about the selected item in the list. In addition, this enhancement has what is called auto-activation characters. In RPG, the two auto-activation characters are

“.” and “%”. If you type in a name of a qualified data structure (say, in free form factor two), the minute you press the “.” character, you’ll be presented with the list of subfields for that data structure. If you type in the “%” character, you’ll be presented with the list of all built-in functions in RPG. Nice? Better than SEU?

The second interesting enhancement is the outline view. If you press the Refresh button in this view, you’ll be presented with a tree listing of all fields, structures, subfields, subroutines, and procedures that are defined and used in your source member. By clicking on a node in the tree, you are positioned in the source to that entry. This offers a great bird’s-eye view of your source for easier understanding and navigation.

Another great enhancement that was added in the editing area is the ability to browse or edit a copy member in RPG or Cobol. This can be accomplished by placing the cursor on a /COPY statement (in RPG, for example) and selecting

Source, /COPY member from the drop-down menu.

As **Figure 2** shows, IBM has added to RPG the ability to show indentation in your source member. If you select Show Indentation, a new view of your source member appears showing all RPG structures indented, similar to the functionality you have today in CODE.

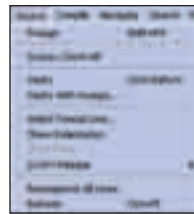


Figure 2.

Along the lines of cool stuff, there is also a menu item in the pop-up menu to show fields when the cursor is on a file declaration in RPG, Cobol, or CL. This will open a table view showing all the fields in the declared file, with the fields attributes shown in sortable columns.

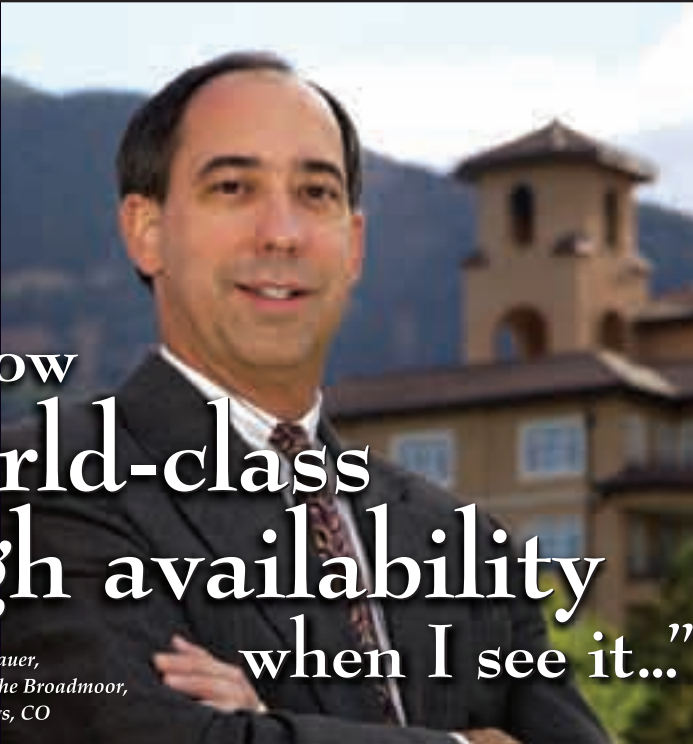
This editor includes many other neat features; many of them are configurable from the Preferences window (see Lpx Editor under Remote Systems). These

features include auto-uppercasing, CL formatting, RPG and DDS column-sensitive editing (so insert/delete are restricted to the current section of the spec), and auto-generation of signature stamps in the first five columns for RPG and DDS. Of course, all usual SEU line commands (e.g., I and DD/CC) are supported, as are prompting and rich find/replace support. Of course, if you want to add new capability to the editor, you can easily extend it by writing Java macros. This is a great way for you to learn a bit of Java (or to put that student to good use).

We’ve only scratched the surface of the existing functionality in the new editor. In future releases of WDS, IBM will continue to dramatically improve the editor functionality to make writing RPG, Cobol, CL and DDS not only easier, but indeed fun again! Stay tuned.

### RSE Tree View – The New PDM

So how do you get to that great editor? You start in the RSE perspective (collection of views and editors), which is



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the first screen you see when you start WDS. You create a connection to your iSeries machine, specifying its host name. You expand the connection to see a number of functional areas to work with (what we call *subsystems*). These include iSeries Objects, iSeries Commands, iSeries Jobs, and IFS Files.

To edit source members, expand iSeries Objects and then one of the predefined filters for library list or user libraries. You then simply drill down by expanding libraries and files. To subset what you see, you can use the new Expand To menu item on a library, or create a persistent filter. There are three prompts for filters within iSeries Objects to allow you to easily create a library filter, object filter, or member filter. When a filter is

created, it appears from then on in the list. When expanded, only the libraries, objects, or members meeting the filter criteria are shown. This is identical to WRKxxxPDM, except the filter criteria are named so as to allow easy re-use.

When you're working with libraries, objects, and members in the RSE, there are many right-click actions for renaming, copying/pasting, deleting, moving, changing, and working with the properties, among other things. You can also use drag and drop to copy members between files on the same or different servers, or even to or from your local PC.

When working with a library list filter, you can now use actions to manipulate the library list, just as in PDM. There

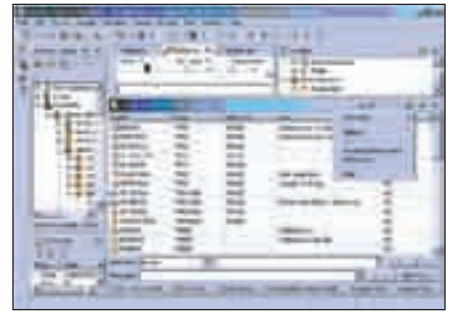


Figure 3.

are also GUI wizards for easily creating new things such as libraries, files, and members. If you don't see an action you like, create your own user action using the same substitution variables that PDM supports. Unlike PDM, however, RSE actions are scorable by object type or by attribute. Business partners can also contribute actions to the menus via plug-ins, as SoftLanding, MKS, Aldon, and ASC already do.

Beyond iSeries objects, you can also create command sets for easy execution, and work with your jobs or IFS folders and files, again with very rich filtering capability.

### The Table View

The RSE tree view is very powerful, letting you see common properties of a selected object in the property view or dialog. But many people prefer to work in a table view where the properties appear as sortable columns. The RSE supplies such a view; named the iSeries Table View (Figure 3), it is available in the lower right corner by default. In fact, just as in PDM, this view also has a command line at the bottom where you can enter OS/400 commands.

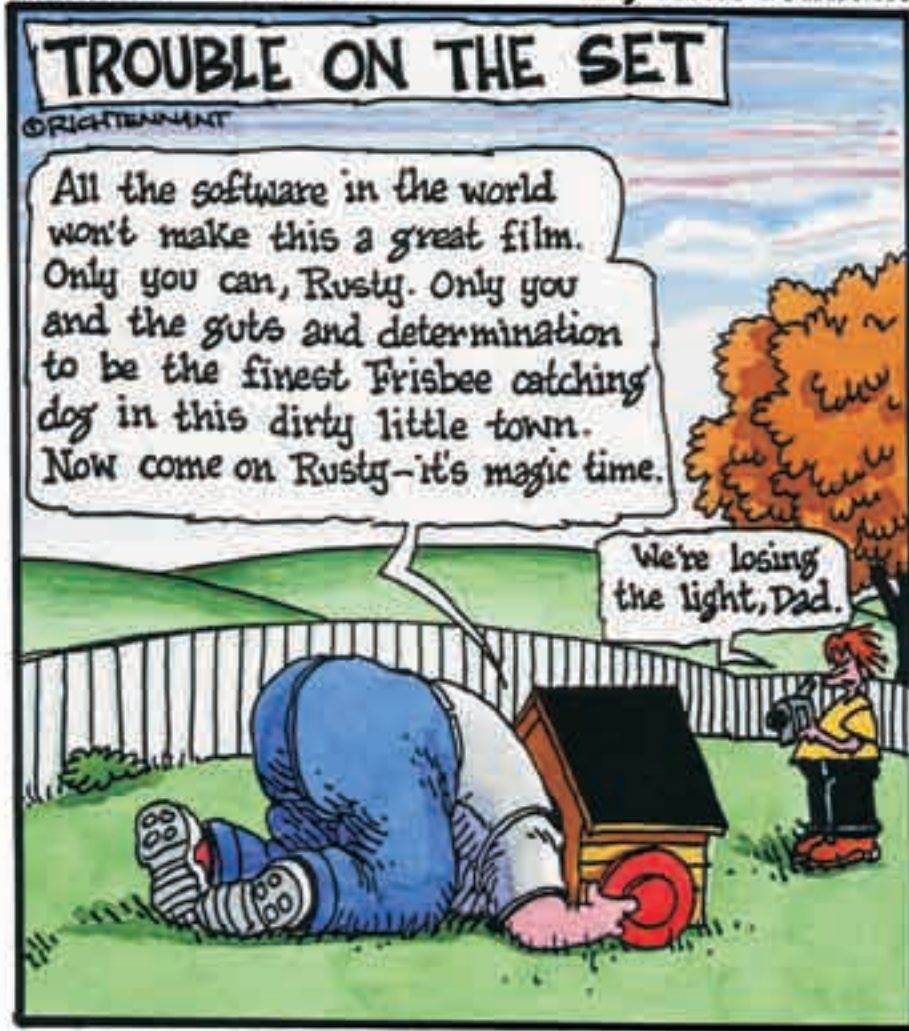
To populate the iSeries Table View, you can use the "Show in Table right-click" action on filters, libraries, objects, and members, from the RSE tree view. This will populate the table with the children of the selected node. You can also "unlock" the view so it automatically populates from the selected node. There is also a Work With pull-down menu item from within the table itself.

Once you've populated the table, you can change the content by double-clicking a library or file to show its children,

## The 5th Wave

By Rich Tennant

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and then arrowing back to the previous contents (just as in a Web browser). Further, the table is sortable by clicking on a column heading, and it has all the same actions in the pop-up menus that the tree view has, including user actions and business partner actions. It also has a cascading PDM Actions menu that offers all the PDM-like options, as menu items, to reduce your learning curve. Also, as with PDM, you can use the drop-down menu to subset the list, position you in the list, and print the list.

### Working Offline

One of the design goals of WDS*c* is to allow for an effective editing environment while disconnected from your iSeries. To enable this, much of the remote information extracted by the RSE is cached locally each time it is accessed. This enables you to enter "work offline" mode and perform a number of actions, such as expanding lists and doing program verification, without requiring a live connection.

Of course though, the offline support is really not that interesting until you make local copies of your source members so you can access them for editing. One way to do this is to use drag and drop in the iSeries to copy to a local folder. Another way is to use the iSeries project support. An iSeries project is a local Eclipse project, into which you can copy iSeries members.


In fact, this is as easy as right-clicking the member in the RSE and selecting Make Available Offline, which creates a project with the same name as the member's library, if necessary, and copies the member(s) to the project.

You can subsequently work with the local member copy, doing editing and program verification. And when you're done, you can use the iSeries project support to push the changed members back to the iSeries.

iSeries projects contain considerable functionality in themselves and are of value beyond just use in a disconnected mode. We will go into more details about this in our next article.

### The New Tools

With its single Eclipse-based development environment for all programming tasks, RSE is the PDM and SEU of the 21<sup>st</sup> century. It is where you will spend your day, and what software vendors will target their tools for.

In our next installment, we'll cover the iSeries project support and the enhancements we did in this area for version 5.0, rounding out our introduction to *better tools* – the first step in our modernization roadmap. 

**George Farr** works at the IBM Toronto lab, where he is the technical development manager for the RPG

and VisualAge for RPG languages, as well as the new RPG and Cobol tools in WDS*c*.

**Phil Coulthard** works at the IBM Toronto lab, where he is the lead architect for application development tools and languages on iSeries.

*Phil and George are frequent speakers at many conferences and user groups worldwide, and their books Java for RPG Programmers, 2nd Edition and Java for S/390 and AS/400 COBOL Programmers, are available from Penton and MC Press.*

*This article was first published in iSeries News magazine.*

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# COMMUNICATING WITH SAM

## RFID – Is the Time Right?

### Question:

**W**ith the recent announcements from major retailers regarding suppliers being RFID (Radio Frequency Identification) compliant in the very near future, our sales and logistics executives have been very focused on the issue. The majority of our sales revenue is achieved through major retailers that will demand compliance, so avoiding the technology is not an option. However, we were quite relieved when the implementation window was moved from 2006 to 2008. Due to the extension, we have been wrestling with whether we should start adopting this technology now, or wait until we must be compliant. What are the compelling reasons to begin implementing RFID technology while there are still standards being reviewed in the industry?



**Sam Johnston**

### Answer:

**R**adio Frequency Identification (RFID) is a technology that intrigues and scares CEOs, often at the same time. Your question is not uncommon when it comes to technologies that are being forced upon us by some higher force, like a customer demand, as opposed to our own business needs. First, let's ease some of the stress that the CEOs are facing. Meeting customer demands of shipping RFID compliant products does not necessarily mean that you need to implement RFID. Simply affixing RFID tags to your products will meet this challenge, albeit not at a minor cost depending on the value of the goods attached to the somewhat expensive tag. So while this looks like a decision solely being driven by the customer, it really is an opportunity to assess your business to determine if the technology is the right fit and can be leveraged internally.

When it comes to committing to new technology, many companies are reluctant to take the plunge and wait to see how others succeed or fail. That may be wise for some however the first thing you have to realize about RFID is that this technology is not new. In fact, it's been in use as far back as the Second World War when allied aircraft carried transponders that identified them as friend, instead of foe, via radar interrogations. The most common places

you can find this technology today are highway toll systems like the 407 ETR or at the gas pump with Esso's Speedpass.

In a similar manner, RFID today uses radio waves to identify objects in business through the use of transponders, or tags as they are better known. The tags contain a microchip and an antenna. The tag then transmits the information to a reader (a portable or fixed device), which in turn converts the radio waves into data. This data can then be sent to your application via a LAN or WLAN connection. Tags can contain a great deal of data that can be accessed quickly.

Companies that have been benefiting from this technology for many years now are today piloting contemporary RFID products to execute key applications in the supply chain. These industry leaders are looking to enhance the production, inventory taking and security of their goods. You can begin leveraging this technology today and expect a return on investment (ROI) within a short period of time, but only if you truly understand your business processes and the bottlenecks that can be reduced or eliminated. RFID tags or Electronic Product Code (EPC) - the term used to identify the tags that have imprinted data stored on them - is not unlike the launch of Universal Product Code (UPC) was for barcode data collection thirty years

ago. The fact that corporations face the same challenges they did years ago when barcodes became pervasive is the same reason to implement RFID today. Companies continue to want real-time tracking of assets and finished goods, availability, product quality and safety. RFID allows them to enhance and speed up the delivery of this information.

RFID industry standards are still being weighed and homogenized by EPC Global. EPC Global is a non-profit organization currently made up of 60 to 70 vendors entrusted by the technology industry to establish global standards regarding EPC & RFID, and although there are still some standards to be refined, industry leaders are not playing the waiting game. EPC Global has instituted Gen2 tag technology standards (second generation), which will ensure scalability for corporations wishing to take advantage of RFID benefits today. For these companies, a short and long-term roadmap can be drawn detailing the logistics and feasibility of such an undertaking. The Gen2 tags have an open standard, cross-vendor compatibility, high reliability, better security encryption and frequency hopping, which will minimize interference and improve the read rate of data. The goal of EPC Global is to improve the standards and technology so that companies are able to use RFID beyond track and trace.

Many questions need to be asked as well when you consider RFID.

- What are the challenges to people, assets and the processes themselves?
- Who will manage the application?
- How do you eliminate wasteful practices within the process flow?
- What software is required and how does it ensure the data is routed to the correct app?
- What are your “need to have” compared to your “nice to have” elements?
- What part of the data extrapolated will be most useful to your company?
- How do you make the most of

incorporating this technology with other network components to make your current infrastructure more effective?

- What modifications to the network are required if any?

The key to a successful deployment of RFID includes taking the following steps:

- Establish you areas of improvement within your processes
- Review your process goals with a reputable vendor
- Choose area and process to apply RFID and review its steps to accommodate your pilot project goals
- Make sure the infrastructure can

support the large volume of data that can be gathered using RFID

– make network adjustment to accommodate the bandwidth

- Determine what will be the necessary hardware and software components
- Ascertain short and long term goals to monitor the projects success

Your choice of vendor is essential to a successful deployment. Typically to deploy EPC tag technology you will need someone to be able to customize the software code to your specifications as well be able to integrate and support the new system. Focus on getting an experienced integrator recommended by RFID hardware manufacturers who have a channel program like Intermec and Texas Instruments. This way you will be assured that all aspects from implementation to the components themselves, will be delivered and executed in a timely manner. As for cost for tags, there are about a dozen or so other makers of tags who are helping to bring the cost of tags down through Gen2 silicon tag development.

Now that Gen2 standards are upon us, the industry has a foundation upon which to begin rolling out their RFID applications that improves the efficiency, productivity and security of the supply chain.

Many changes are expected in this year alone, however, they fall in the category of ‘new and improved’ rather than revolutionary so you can take solace in knowing that the RFID capabilities that we have today will remain very similar in look and feel in the years ahead, with only enhancements. Look for RFID components that include the Gen2 interoperability. It’s best to plan now so that you are ready when the market becomes flooded with the use of RFID and you are not left behind. You have to embrace new technologies and especially those who can help grow your business. When barcode technology was first deployed many years ago, corporations garnered great rewards for having implemented early. The same rule applies to RFID. It will in turn enhance the way of doing business, however,

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with faster and more detailed access to information. RFID in itself does not provide the answers to your business challenges and like other technologies before it serves only as a tool. Visionary companies will look to use this tool to help improve access to the data from their enterprise that makes them more effective in the marketplace.

The compelling reasons to begin working on an RFID solution today is that the technology and its benefits are available now. EPC Global and its highly visible member-corporations pioneered the active use of this technology and for the most part RFID standards are in place and generally commercially available. RFID has now matured enough that it can be used to optimize the effectiveness of your supply chain applications through cost reductions in material handling, while improving the accuracy and responsiveness of the information.

While the impetus may be a customer demand, the real opportunity is to make your own business needs the agent of change in order to gain competitive advantage. While waiting on RFID may delay the investment decision, and reduce the uneasy feeling that is associated with being an early adopter, it may also shift the outcome from unique proposition to simply a cost of doing business. 

**Sam Johnston** is a partner and Chief Technology Officer of Intesys Network Communications Ltd., providing value-added networking and e-commerce solutions to the iSeries community. He can be reached at (416) 438-0002 or via e-mail at [sjohnston@intesys-ncl.com](mailto:sjohnston@intesys-ncl.com). Any TUG member wishing to submit a question to Sam can forward their typewritten material to the TUG office, or to Intesys. The deadline for our next issue is Friday April 15, 2005.

# Sing i5/iSeries Choir Sing!


(And if you can't sing at least download and distribute.)

By Dan Duffy

For years we i5 / iSeries people (also known as "The Chosen Ones" or "The Choir") have been complaining that IBM has been holding the greatest computing platform in the world (our beloved i5 / iSeries) hostage within a Stealth Marketing Plan.

Guess what? The Stealth Marketing Plan has been broken! IBM has actually produced four, count 'em **four** commercials that humourously highlight the messages that we've been trying to get out for years namely that the i5 and iSeries are:

1. Simple to use
2. Don't require a large staff
3. Do under one roof what it would take many servers to execute on any other platform.
4. Are ideal for workload consolidation
5. Have a very low cost of ownership

So? So let's tell some people. More importantly let's tell some people who don't know anything about the i5/iSeries, especially the ones who think Intel is the cure all for every IT problem. You can download the commercials from [www.tug.ca](http://www.tug.ca) Send at least one of them (the "People" one is my favourite) to at least 10 "non-believers" that you know. If everyone on the TUG mailing list does this approximately 50,000 people will get the i5/iSeries message and have a laugh at the same time. That has to be good for us and for them. 

**Dan Duffy** is President of Mid-Range Computer Group Inc. He can be reached at [dduffy@midrange.ca](mailto:dduffy@midrange.ca).



## eServer i5 Family

The IBM eServer i5 is the premier business server for clients who value integration, simplified use and support for the widest choice of business applications available on a single server. It is designed to integrate the latest operating systems and technologies, tested to work together, while simultaneously masking complexity.

Photo courtesy of International Business Machines Corporation. Unauthorized use not permitted.

# JACKIE'S Forum

## High Availability + Data Warehousing



**Jackie Jansen**

“High Availability and Data Warehousing, a match made in heaven”. If that is a bit of a stretch, how about: “two technologies that were meant for each other”. On a more serious note, from a business point of view these two solution areas complement each other extremely well.

I previously addressed this subject in a column a few years ago. Based on the reprints that I am continually asked for, this topic is still very pertinent today and deserves some attention again.

If you have a mission critical application that drives the requirement for a high availability system, then justifying a data warehouse just became a whole lot simpler. If you would like the security of a high availability server, then data warehousing may give you the extra ROI you require to cost justify an additional system.

Let's start by looking at this from a high availability point of view. An obvious requirement for high availability is that you replicate your mission critical data from your production iSeries onto a backup server. This backup server has to be available at a moment's notice to take over should your primary production server experience a failure. What you don't want, is to have your backup server sitting idle. A data warehouse or even a simple query and reporting system is usually not considered to be a mission critical application. It can be shut down in an emergency and is an excellent choice to utilize the additional CPU cycles normally available.

Does having your data replicated on a second server mean that you have a data warehouse? The answer to that is a resounding NO. You will have a system that contains the source data that you


need for your data warehouse and presumably quite a few available CPU cycles. You will also have a system where you can run your operational queries and reports without impacting your production system.

Now from a hardware perspective is this a “free” data warehouse? The answer is: typically not. Although you will usually have enough CPU cycles to run your data warehouse you will still need to add additional disk space. As mentioned earlier, what you now have on the second server is the source data still formatted for your ERP system. One of the characteristics that differentiates a data warehouse or an end-user query/reporting system from your operational

nightly batch window. You can use your high availability server to perform your end of day reporting and potentially your nightly backups depending on physical location and tape access.

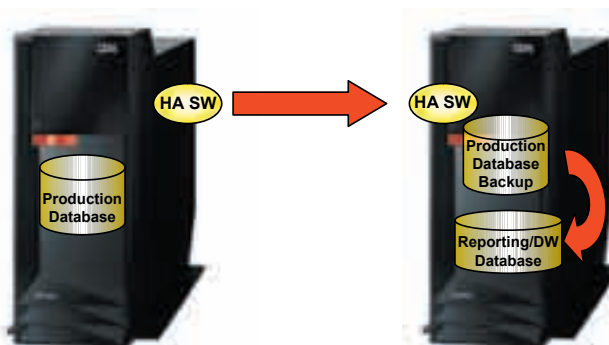
Many of the iSeries excellent high availability software vendors have promoted using the backup copy of your production data to offload batch reporting from the production system. Whether you just want a simple reporting system or a data mart or a more complete data warehouse, you can use your second server to accomplish all this while it is receiving transactions for high availability data recovery.

On Tuesday March 29 at noon Eastern Time, I will be delving into this topic in much more detail during a Webcast sponsored by two IBM Business Partners. In addition to myself there will be various customers discussing their experiences

with utilizing one server for both High Availability and Business Intelligence. You can enroll at [www.mimix.com/webcasts](http://www.mimix.com/webcasts). I look forward to seeing you there. **Two technologies meant for each other – High Availability and Data Warehousing!** 

**Jackie Jansen is a Senior Consulting IT Specialist. She currently works in the IBM Americas Advanced Technical Support Solutions Centre. Jackie is a frequent speaker at iSeries Technical Conferences and User Group meetings. Contact her at [jjansen@ca.ibm.com](mailto:jjansen@ca.ibm.com).**

### High Availability / Business Intelligence



system is the database design. The design methodology used for a transaction processing system is very different from the design required for a large, potentially unstructured query workload to occur efficiently. You will still need to transform and load your data but you will no longer need to impact your production system. This can all be done within the one server, directly from the replicated version of the data.

Another advantage to using the high availability server as both the source and target system for your data warehouse is the additional time it buys you in your

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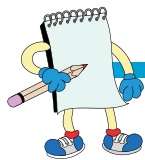
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# TUG NOTES

## ☑ TUG's Calendar of Upcoming Events

- ☒ **March 23, 2005 – MoM (At The Meridian)**
  - ▶ 5:00 Session: "Developing Web Applications with JavaServer Faces (JSF) and Enterprise Generation Language (EGL)"  
Speaker: Kushal Munir
  - ▶ 7:00 Session: "IBM's Investment in RPG"  
Speaker: George Farr
- ☒ **April 19-20 – TEC 2005 (At The Sheraton Hotel)**
  - ▶ Executive Breakfast
  - ▶ Vendor Showcase
  - ▶ Hands-on Labs
  - ▶ Keynote: **Trevor Perry**
- ☒ **May 18 – MoM (At Woodbine Racetrack)**
  - ▶ 5:00 Session: "HATS"  
Speaker: Adeline Chun
  - ▶ 7:00 Session: "TBA"
- ☒ **June 22, 2005 – 17th Annual TUG Golf Tournament (At Nobleton Lakes)**
  - ▶ 1:00 Shotgun start at
  - ▶ 6:00 Awards Banquet (Steaks!)
- ☒ **August 17 – TUG's 20th Anniversary Cruise (Onboard The Kajama)**
  - ▶ 6:30 Sailing



☑ **New Venue for MoM**  
**Don't get left behind!** Our meeting place on March 23rd, 2005 will be the **Meridian Banquet & Convention Centre**, 2301 Keele Street (at Milford, two blocks South of Lawrence Avenue.)



☑ **Lucky Winners**  
of the door prizes at the January MOM (held at the Travelodge) were: **David Lau** (ENCON Group), **Myra Lush** (GE Canada), and **Peter Mione** (Emerson Electric). Special thanks to **IBM Canada** for the memory sticks, **MC Press** for the RPG book, and **sofCast** for use of the projector – **Wende Boddy**

☑ **TUG Election 2005**  
Nominations for the TUG board election are now open. This year, there are five incumbents: **Stephen Bingham**, **Dan Duffy**, **Eveline Gaede**, **Bob Lesiw**, and **Alkarim Sachedina**. If you are interested in putting your name in too, call the TUG office for a nomination form. You must be an employee of a member company or an individual member to serve on the TUG Board of Directors. Nominations will be open until March 31. Ballots will be mailed in April and counted on May 16. The results will be announced at the May 18 MoM.

☑ **Macchapuchhare**  
Special thanks to **FoleyArt**, a.k.a. NF, Melbourne, Victoria, Australia for the use of the photograph on page 6 (meerkats on a mountain.) The central mountain is Macchapuchhare (or Fish Tail Mountain), near the Annapurnas in the Himalayas, Nepal. It is a sacred mountain and it is forbidden to climb. Day is nearing an end, and clouds are descending...

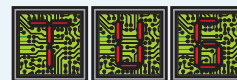
☑ **"Diplomacy:**  
The art of speaking the truth without making people mad."  
– Dr. Condoleezza Rice

☑ **Virus Alert**  
Even the most advanced antivirus programs can't handle the new virus that's affecting those born prior to 1950. This virus causes you to:

- send the same e-mail twice.
- send a blank e-mail.
- send e-mail to the wrong person.
- return it to the person who sent it to you.
- forget to attach the attachment.
- hit "SEND" before you've finished.
- hit "DELETE" instead of "SEND".
- hit "SEND" when you should "DELETE".

It's called the "C-Nile virus".  
(submitted by Glenn Gundermann)

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### Applications



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- › Inventory and Warehouse Management
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- › Business Intelligence
- › Collaboration

### Consulting



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