

# TORONTO USERS GROUP *for Power Systems*™

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# Cloud Computing

with Sandra Weir, IBM Software Group

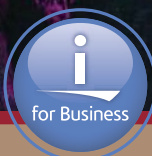
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## TUG™ magazine

is a regular publication of the TORONTO USERS GROUP for Power Systems™ (a.k.a. TUG), and is distributed to members and industry associates six times per year. It contains updates on activities of the users group, as well as articles from members and non-members, which are of general interest to the "IBM® Power Systems™ 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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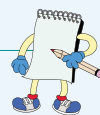


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## TUG TURNS GREEN

By Vaughn Dragland

In January 2009, TUG began publishing its on-line magazine (TUG eZine). This is the sixth issue where we produced both the online version and the printed version. Now we are ready for the next step... Commencing with the January 2010 edition, the TUG magazine will be **completely paperless**, and available for reading on-line only. Not only will this save money, but it is also more environmentally responsible.

### Don't miss it!

The TUG eZine is free to anyone, but in order to receive notification of each issue, you need to make sure that [vaughn@tug.ca](mailto:vaughn@tug.ca) and [admin@tug.ca](mailto:admin@tug.ca) are not blocked by your spam filter. You also need to make sure that we have your current preferred email address. If you are not already receiving the **TUG Buzz**, go to [www.tug.ca/mag](http://www.tug.ca/mag) and click on "Subscribe to the magazine."

Happy on-line reading!



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Our 25<sup>th</sup> season (2009/10) is now well under way and regular projects are under control as usual. We already had one Meeting of Members (September 23<sup>rd</sup>) plus an excellent, day-long class on RD<sup>i</sup> (October 1<sup>st</sup>) with none other than IBM's Claus Weiss.

We have already started making preparations for our upcoming 17<sup>th</sup> annual conference, TEC, and we're also looking at many other ways to educate our members and the IBM Power Systems community at large.

### New Direction

TUG is also expanding its horizons. As the world is always coming up with new technologies, new ways to co-operate with each other regardless of the tools used—it is to our advantage to have a good understanding of what can affect us in our life, personally and collectively, at home and at work.

While the IBM System i is the world's best platform to work on and, for businesses to rely on, there are still many people who have different needs or are trying other avenues. Therefore, today there are many types of systems with which to connect, and if we want to stay in the race, we have to learn as much as we can about them. TUG is trying its best to give our members that opportunity.

TUG has already established an alliance with the Southern Ontario Websphere Users Group and its president, **Sally Li**, is now a TUG Director, bringing all her knowledge to our group. A full track of

Websphere topics is being prepared for TEC 2010.

Other approaches are being worked on with the Power AIX Users Group, and soon we'll see the fruit of our work. A full track of AIX topics is also being set for TEC 2010.

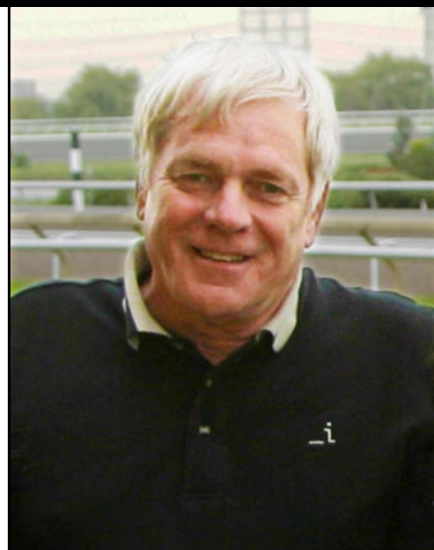
There will be Websphere and AIX oriented sessions at TEC 2010, but that does not mean that the i side is left behind. Absolutely not! More i-centric sessions will be offered. As you can see, TEC, and obviously TUG, are offering all sorts of topics to benefit all of our members.

### New Policy

Attending the TUG Meetings of Members is a major benefit for our members, and more and more topics presented at those meetings are generating interest for many non-members as well. These meetings are a wonderful aspect of TUG and for us to keep it going, we need ALL attendees to be members to help support the group. However, it has been noticed that not all attendees are current paid-up TUG members. We want to be fair to everyone, but we also need to retain the value of a TUG membership.

As you know, TUG is run by volunteers who also have to pay their own membership dues. When a non-member shows up at a MoM, TUG has to pay for that person—so that money is not available to support meetings and topics. The Meetings of Members bring value to everyone. They are a great way to network with colleagues, and these days—who does not need to network? You lost your job? It is not a shame to meet when you are out of work, for any reason: everybody understands.

We are (unpaid) volunteers but the facilities we use are not free, and their fees are increasing on a regular basis. I will not reveal our costs publicly here but if you ask me privately, I will



TUG President Léo Lefebvre

share TUG's financial information with any member-in-good-standing. It should not surprise you to know that meetings are getting more expensive and we have to be very selective on the venue and the menu. Some of our prior locations (where we had lots of great meetings) have now raised their prices so much that TUG can no longer afford to go there.

So, starting with this coming Meeting of Members on November 18<sup>th</sup>, admission will still be free for TUG members and invited guests, but a payment of \$40 will be required from non-members. When you register in advance on-line, we will verify the status of your membership and we'll contact you if there is a concern about your membership (or your company's membership).

### Next Meeting

Don't forget to join us on November 18, 2009 at the Living Arts Centre Mississauga, for another great Meeting of Members when **Sandra Weir**, IT specialist at IBM will entertain us with Cloud Computing... not necessarily new technology but with IBM's twist, it makes it much better. Come and learn how! Check the agenda, and register at [www.tug.ca/reg\\_meet.html](http://www.tug.ca/reg_meet.html).



Reduce costs.  
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## A NEW ERA IS HERE

Information technology is changing rapidly, and now forms an invisible layer that increasingly touches every aspect of our lives. Power grids, traffic control, health care, water supplies, food and energy, along with most of the world's financial transactions, all now depend on information technology. An emerging compute model—**cloud computing**—addresses the explosive growth of Internet-connected devices, and complements the increasing presence of technology in today's world. Cloud computing is massively scalable, provides a superior user experience, and is characterized by new, Internet-driven economics.

### IBM Smart Business

Cloud computing represents a paradigm shift in the consumption and delivery of IT services. Built on the foundation of a dynamic infrastructure, IBM Smart Business cloud solutions are workload optimized and provide a choice of delivery options. With cloud computing, IT professionals can devote more energy to enhancing the value of using IT for their enterprises and less on the day-to-day challenges of IT.

Here are some of the ways that cloud computing addresses the pain points of today's IT environment:

- Cloud computing liberates organizations to deliver IT services as never before. Cloud enables the dynamic availability of IT applications and infrastructure, regardless of location. More rapid service delivery results from the ability to orchestrate the tasks to create configure provision and add computing power in support of IT and business services much more quickly than would be possible with today's computing infrastructure.
- Cloud computing also promotes IT optimization so that IT resources are configured for maximum cost-benefit. This is possible because cloud computing supports massive scalability to meet periods of demand while avoiding extended periods of under-utilized IT capacity.
- Cloud computing fosters business innovation by enabling business enhancements that can grow with unprecedented scale. It delivers a greater return on IT equipment spending and promotes more effective use of staff. (IT labor costs alone represent as much as 70 % of an IT operating budget.) With its highly autonomic character, cloud computing reduces the time required to requisition and provision IT resources and yields significant cost savings in the real estate required for the data center as well as power and cooling costs. 

## IBM TRAINING CORNER

By Kathleen Chiovitti



Kathleen Chiovitti

To help bootstrap and kick-start your latest IT projects, IBM Canada Training is offering TUG members a 10% discount for any IBM training class. Go to <http://www-304.ibm.com/jct03001c/services/learning/ites.wss/ca/en?pageType=page&c=a0001419&priorityCode=tugmems>. All current TUG members are eligible to use the priority code "tugmems"!


We've seen a resurgence of interest in System i operations classes. We have a brand new class, course code ASFW24CE: System i Operations for Windows Administrators. Check it out at [http://www-304.ibm.com/jct03001c/services/learning/ites.wss/ca/en?pageType=course\\_description&courseCode=ASFW24CE](http://www-304.ibm.com/jct03001c/services/learning/ites.wss/ca/en?pageType=course_description&courseCode=ASFW24CE). The purpose of this class is to make System i operations much easier and straightforward to someone who is already familiar with Windows. It concentrates on IBM Director interfaces. Having said that through, some customers are asking for the class to be tuned slightly and also feature Operations Navigator and 5250, CL programs. The good news is that the available content is easily customized to provide just the right type of operational flavour you want. Just call or email, and we'll ensure the

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class is tuned to meet your specific requirements. It has a great price, live or ILO delivery and you can use the discount on top of that!

Our next project is the brand-spanking new RIM Development for IBM Systems class. IBM Systems customers may be interested in reaping the many business benefits of mobile computing by extending their existing applications to BlackBerry users. Particularly, customers may be interested in extending information about customer orders, service contracts, CRM, warehouse information, and stock levels to those who need wherever they are.

To help develop the necessary skills to assist those already crafty with DB2, and RPG/COBOL to extend their systems to BlackBerry users, IBM is developed this three-day course offering with RIM and local partners. RIM has two approaches to mobile application development: the first deals with the BlackBerry Browser and HTML; and the second, BlackBerry Java or Java/ME. The class will use a sample distribution or CRM application and extend it to Blackberry using both approaches in a hands-on class. If you want to be involved in a pilot class, let me know via email! See you at the November MoM! 

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Garry Kipfer

By Garry Kipfer

The room, audience, and speakers were real but the topic was virtual... Actually, virtualization to be more exact. Virtualization is a hot topic in the IT industry today, which was confirmed by the large number of attendees at the Sept. 23 MoM. This topic can be complex and multi-faceted but we had two excellent speakers: Roger Singh, CTO at Scalar Decisions Inc. and Dale Perkins, Certified IT Specialist at IBM Canada Ltd., to explain virtualization and how it can be of value to businesses.

## Virtualization – The Next Frontier

Roger Singh and Scalar have extensive experience with virtualization projects and as a result he was able to address the technical aspects of virtualization of the servers and storage as well as the very important issues and opportunities that arise as a result of virtualization. The complete picture that Roger painted for us was very informative and enlightening.

Roger began his presentation with an overview of the current state of virtualization— noting that in the UNIX/Midrange systems and X86 systems, the technology is mature. There are many virtualization offerings, especially for OLTP, DW, and Web servers.

Roger reviewed the X86 approach to virtualization from simple tools through Virtual server management, consolidation, VDI (Virtual Desktop Integration), and SaaS (Software as a Service) as well as the promises of this virtualization. One of the more obvious promises is reduced cost for hardware acquisition. This is the easiest to confirm since many servers are combined to a fewer number of servers and this cost can easily be determined. The other reduced cost that is promised is power savings and Roger spent some considerable time explaining how this promise can be fulfilled introducing elements of the infrastructure.

Power savings, Roger pointed out, can be accomplished due to several factors. One factor is that the power costs are often 4–5 times the cost of a server over the 5–10 year lifetime of that server. This ratio of cost is called the PUE or Power Usage Effectiveness. This cost is driven by the power used by switchgears, UPS, and battery backup equipment as well as the cooling equipment such as chillers and air conditioners in the computer room. The common guideline is a PUE of 2.5, and most facilities fall far short of this due to inefficient equipment or outdated/incorrect requirements definitions.

Roger presented a number of tips that can be used to save energy for the data centre

including the fact that the temperatures are often much colder than required, using water cooling as opposed to high density air—and making sure the building piping designs allow companies to take advantage of winter “free cooling” opportunities. Other opportunities included cleaning under tiles and placing cooling tiles in the correct locations as well as removing old equipment that impedes airflow. All of these and more can reduce energy costs and reduce the carbon footprint of the installation. As Roger pointed out, data centres now consume almost .5% of the world production of energy (the equivalent consumption of 25,000 households) and this usage is increasing at a rapid rate.

Having addressed some of the infrastructure opportunities, Roger delivered an overview of how various server virtualization offerings, such as VMWare, Hyper-V and Xen allow for the creation of virtual machines by using a Virtualizing Layer to interface to the operating system and the physical hardware. This technique allows many virtual servers to run on a single server. He cited instances where companies were able to reduce 60 or more physical servers to one or two larger servers. He also introduced us to new concepts in



Dr. Peter Carr demos the Waterloo PMP certification program during MoM intermission — Sept. 23, 2009

virtualization such as Containers which allow further consolidation by allowing workloads to share a virtual machine.

Roger highlighted the fact that virtualization often just addresses the servers—but other aspects must be addressed, such as storage and networking—since a by-product of server virtualization is that these resources are now used in a much different fashion. Since virtual servers share network resources this is often a bottleneck inhibiting VM growth. He pointed out some interesting emerging trends such as extending network functions to the hypervisor, and the development of common tools for network and VM management, as well as smart load balancers that help address these concerns. Other issues that have to be addressed are storage usage and the role that can be gained by using SAN capabilities such as Snapshots and Golden Masters. These allow gains in performance, better management, and increased utilization in the world of storage virtualization.

An overview of management offerings from various suppliers for Disaster Recovery, Assessments and Audits and Security were also reviewed and it was explained how they can enhance the overall management of the servers. Roger's final topics addressed the Virtual Desktop and how companies are moving the desktop to the data centre to reduce costs and provide better management. This is accomplished by allowing many virtual desktops to run on a single server.

Roger's common sense, holistic approach to virtualization was very informative. This combined with his explanations of the technologies and his inclusions of the latest trends made it an excellent presentation, and we thank Roger for a job very well done.

### Door Prize Winners

During the break TUG gave out some excellent prizes! (You had to register online in advance to win.) Congratulations to: **Hina Rashid**, **Matt Sabanathan** (Rona), and **Gaspare Latona** (TIBCO Software).

### Power VM

After the break we were treated to a presentation by **Dale Perkins**, Certified

Vaughn Dragland



MoM speakers Dale Perkins (IBM) and Roger Singh (Scalar)

IT Specialist with IBM Canada Ltd. Dale explained the details of the Virtualization for IBM Power Systems and reduced a complex subject to one that we could understand.

Dale spoke about the driving forces behind server consolidation, the need to do more with less, and how it has resulted in virtualization becoming the fastest growing software component in the industry. This, he explained, was due to the ability to share processors, memory, and adapters by virtualization which in turn reduces software and infrastructure costs. The average UNIX or x86 server is typically only 20% utilized—but by using virtualization to consolidate a number of physical servers onto one physical server—considerable savings can be achieved. Dale referenced a customer who went from *300 UNIX servers to 6 IBM system p5 servers* with an 80% reduction in energy and facilities cost by using virtualization to increase CPU utilization, etc. A truly remarkable result!

Having established the case for virtualization and its effectiveness for IBM Power Systems, Dale detailed the various server virtualization approaches. He explained how hardware partitioning (used by the S/370, Sun Domains, and the original POWER4 LPAR) subdivided the server into fractions which could each run an OS. This was compared to the Bare Metal

Hypervisor approach used by System z/VM, Power VM, VMware ESX, XEN and Microsoft Hyper-V, which use the hypervisor to provide timesharing of resources. The final model that he discussed was the Hosted Hypervisor model in which the hypervisor uses OS services to do the timesharing of the resources. This approach is used by VMware GSX and Microsoft Virtual Server. This explanation was a great help in clarifying the technical differences between the various virtualization offerings.

Dale discussed how the advanced features of the Power6 architecture with increased cache, fabric bus controllers, increased CPU speeds, along with other features—combined with IBM's long history of virtualization, using LPAR—led to IBM PowerVM. IBM PowerVM is IBM's virtualization offering currently used on IBM POWER based processors for UNIX, Linux and IBM i.

IBM PowerVM features Micro-Partitioning, Virtual I/O Servers, Integrated Virtualization Manager, Partitioning Pooling, NPIV, and Lx86 as well as memory sharing. Fortunately for us Dale went on to clarify each of these in some detail.

As he explained, DLP (Dynamic Logical Partitioning) allows for the partitioning of resources, including Micro-Partitioning

which supports 10 partitions per processor. The resources for each partition can be capped or uncapped and processor resource can be automatically moved between partitions. Processors can also be put in a pool of processors which can be shared between partitions according to capping rules. Any mix of the UNIX (AIX), Linux, or IBM i operating systems can run in any of the partitions.

New in PowerVM, for IBM i users, is the concept of the Virtual I/O Server partition (VIOS). Any partitions can use Virtual I/O paths to the VIOS and the VIOS controls the actual resource. This is used for sharing Ethernet, SCSI, and Fiber Channel resources. Since the partitions do not own the resources, partitions can be created on-the-fly and hardware costs are reduced. Once again it applies to IBM i, AIX, and Linux partitions. Dale explained the various options for Virtual Tape support also using the VIOS partition.

PowerVM also enables active memory sharing between partitions by adjusting the memory for the LPARs (virtual images) based on workload activity levels. This

memory sharing maximizes the usage of total memory and reduces the cost.

Two very interesting features that are now available on Power Systems are Live Partition Mobility which allows a Linux or AIX partition to be moved from one system to another while it is running, and Live Application Mobility which moves a Workload partition from one AIX system to another while it is running.


Another feature that is new to IBM i users is the Integrated Virtualization Manager. It is designed to support virtualization without an HMC and provides simplified management and reduces costs. It supports i 6.1 on Power 520 and 550 systems and in this case the i is a purely virtual partition.

By this stage of Dale's presentation it was obvious that PowerVM contained a lot of very useful capabilities, and I was beginning to actually understand some of them! However, we were not finished yet. Dale concluded by presenting PowerVM Lx86 which is the ability to run x86 Linux on Power Systems along with AIX, Linux, and i applications. He concluded by presenting the more famil-

iar Capacity on Demand and a great chart explaining the capabilities on the different PowerVM Editions that IBM offers.

We owe Dale our thanks for taking a complex topic and presenting us with a clear and concise explanation—not only of the technical details but the more practical business consideration also.

Once again thank you Roger & Dale for two excellent and enlightening presentations. We all found them very valuable and it made for an excellent meeting.

After the presentations many people stayed and visited and talked about what they had just heard. Me—I applied what I had learned and got into my car, put the pedal to the floor and was in home and in bed in virtually no time at all. Now that was a very useful meeting. 

*Garry Kipfer is an independent software developer specializing on the IBM Power Systems platform. He is also a member of the TUG membership committee. Garry can be reached at [garry.kipfer@rogers.com](mailto:garry.kipfer@rogers.com).*

## ONE DAY HANDS-ON WORKSHOP FOR RDI WITH CLAUSS WEISS A HUGE SUCCESS!

By Linda Cole



Over twenty people attended the one-day hands-on workshop on Rational Developer for i, October 1st at the IBM Toronto Lab, in Markham presented by TUG and IBM Rational. With Rational Developer for i, developers have a tightly integrated edit, verify, compile, and debug toolset for native development that leverages their existing PDM / SEU skills while also providing more advanced application development features common in today's Integrated Development Environments (IDEs).

The workshop included lectures and hands-on labs delivered by **Clauss Weiss** from the IBM Toronto Lab, and covered the Remote Systems Explorer, the integrated debugger, and new Visual Development tools like the Application Diagram and Screen Design tools.


The skills learned while using the Rational Developer for i can easily be transferred to other IBM Rational tools for Java, Web,

## IBM Rational software

Léo Lefebvre



WebFacing, HATS, Web Services, XML, and EGL development as well as software change and configuration management.

Did you miss it? Don't worry... TUG and IBM are planning more one-day workshops at the Lab, so stay tuned! 



*Linda Cole is the Rational Software Sales Enablement Manager at IBM Canada Ltd. You can reach her at 905-315-1215 or [lcoble@ca.ibm.com](mailto:lcoble@ca.ibm.com).*



By Mark Buchner

When our TEC committee got together to decide on the theme for next year's conference, we could not help but think of the allegory of the movie "2010: the Odyssey Continues". I love **Stanley Kubrick's** director genius and when coupled with **Arthur C. Clarke's** Sci-fi "2001 a Space Odyssey" it was a one-of-a-kind cinematic magic. Similarly we love IBM®, and all they do, but when they finally let the full genius of the Rochester plant go on June 21, 1988, the IT equivalent magic was born. Today, we all find ourselves moving in divergent paths embarking on an odyssey that is still adventurous, but the script is not from the same "authors" like **Frank Soltis** and "directors" **Steve Schwarz**.

As I talk to TUG members today, I see distinct paths your companies have chosen. Some of you stay current with Power Systems and i, continue your app development, and pack in all the new goodies as if nothing changed. Others have had their corporate HQ dictate ERP standards such as SAP or Oracle and have outsourced or concentrated their IT in out-of-country data centres. Some move aggressively to Windows and have considerable new workload on Intel systems. For many, deployment is no longer simply RPG/CL/DDS but now a hash of PHP, Java, C++, C#, VisualBasic, and .net, coupled with app servers and a multitude of distributed and heterogeneous systems, networks, and vendors.

So, our TEC 2010 will reflect on this odyssey and mirror the dynamics and multitude of options you face. While we will still feature good ole' fashioned RPG/CL/DDS and hardware announcements we will equally bill AIX, WebSphere, Rational, and IBM Systems Management. We want this TEC be to jut as attractive for core "iSeries" devel-

opers as it is for AIX operators, WAS administrators, Rational Developers, and more. Reaching out and expanding our scope is the goal this year! And, we will continue the practice of hands-on labs in conjunction with the IBM Canada Lab.

We also want to have a great featured script. I'm pleased to provide early confirmation that a true Silicon valley legend will be our keynote speaker. It's **Larry Augustin**, the **CEO of Sugar CRM**. Larry is a path-breaking entrepreneur in open source: In 1993, as a Stanford graduate student, he founded VA Linux (now SourceForge, NASDAQ: LNUX), the first company to pre-install the Linux operating system on computers. While CEO, he launched SourceForge.net, a popular collaborative software development management system. He led the company through an IPO in December 1999, and served as CEO until 2002. From 2002 to 2004, he was a Venture Partner at Azure Capital Partners. He's on the board of Fonality, the Free Standards Group, JBoss, Linux International, MedSphere, the OSDL, Pentaho, SugarCRM, Hyperic, Compiere, Zend Technologies, and Appcelerator.

So this year, we won't be looking at the past, but rather feature a fascinating and dynamic speaker, a highly successful entrepreneur, a technical guru, and a CEO who knows where the market is heading, who will explain it to us and tell us what to do.

June 1988 redux? No, its not a monster IBM announcement, but you won't want to miss TEC 2010 if you plan to continue your journey... Hold April 27-29 on your calendars.



Mark Buchner



TEC 2010 keynote  
Larry Augustin

By Stuart Milligan

Developing tools and services for analyzing and reengineering applications for more than twenty years, has given us at Databorough a unique and informed perspective on the large and complex world of legacy applications running on System i, iSeries, and AS/400.

In this new column and related articles, I aim to provide some useful insights into this complex and critical subject of Application Modernization. I am not going to jump in and tell you about all the new technologies that are available, and why you should be using them. I am going to start at a more obvious place: the application itself.

Although I do hope to provide plenty of detail about modern tools, methodologies, and technologies over the next few months, my primary objective is to help you assess their relevance to your modernization objectives. In doing so, I hope to provide a generic enough framework for you to be able to do better qualitative and quantitative analysis of the problem, and in doing so create a better modernization strategy for your business.

I was educated and worked initially as a Textile Engineer in the 80's, before becoming an RPG and SYNON developer in 1995. This combination of engineering, business, and pure computing technologies has helped me maintain a balanced approach to my work. The first modernization project I undertook in 1998 was to build and implement a modernization strategy for SYNON and RPG financial applications. I have been working in the field of AS/400 application modernization since then. It has been an interesting journey.

My first article "Application Modernization: Starting at the Right Place" can be viewed in the on-line version of the TUG Magazine.

**Mark Buchner** is the TUG membership committee chairman. He can be reached at Astech Solutions Inc. (905) 727-2384 or via email at mark@tug.ca.

**Stuart Milligan**  
stuartm@databorough.com

# TUG AGENDA



TUG MoM — WEDNESDAY, NOVEMBER 18, 2009

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| AGENDA AT A GLANCE |  | REGISTER ONLINE |
|--------------------|--|-----------------|
| Time               | Event  |                 |
| 4:30               | Registration   |                 |
| 5:00               | Cloud Computing — What is it all about?                |                 |
| 6:00               | Intermission / MoM & Networking (complimentary buffet) |                 |
| 7:00               | Cloud Computing for Power VM                           |                 |

additional computing capacity, all on demand, all whenever and wherever you needed it—and all for a fraction of the traditional cost and effort? This is what Cloud Computing brings. Cloud Computing is all about dynamic provisioning of resources—applications, testing environments, and computing capacity. Users need not have knowledge of, expertise in, or even control over the technology in the “cloud”. They just use it and pay for it as they need it.

Cloud Computing is not necessarily new, but new technologies that IBM is bringing to market are making it better. Come to the next TUG meeting on November 18th and learn about IBM’s vision of Cloud Computing, Dynamic Infrastructure, and Smarter IT Delivery. The vision contains a lot: Software as a service. Custom on-demand application provisioning. On-demand capacity. Public and private cloud management.

You too can be smarter in the way you deliver IT.



Vaughn Dragland



environment. Sandra is currently the Canadian subject matter expert for Cloud Computing with WebSphere. She earned her Bachelor of Science Degree from McMaster University and is an IBM Certified Expert.

**Session Abstract:**  
*Cloud Computing: Smarter IT Delivery*

The Economist magazine states: “Clouds will transform the information technology (IT) industry... and profoundly change the way people work and how companies operate.”

How does your company deliver applications today? Do you build, install, and manage all of them yourself? How much is it costing you? How much effort is it to build and manage your environment? What if you could get access to new applications, custom testing environments, or

**Speaker:**  
*Sandra Weir*

Sandra Weir is a Senior IT Specialist at IBM. She has been with IBM since 1993. For the past four years Sandra has been immersed in eXtreme transaction processing and virtualization techniques to complement her knowledge of the WebSphere Application Server portfolio. She has worked with many customers to articulate and educate them on the value of developing a scalable, elastic, and on-demand computing

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Send your suggestions for future topics to: [leo@tug.ca](mailto:leo@tug.ca)

# Seneca Update

By Russell Pangborn

"Platform Passion"



Today I will cover three unrelated themes. The first is how the power systems community has energized our students here at Seneca College, the second involves the Computer Studies Department commitment to good communication skills for all our grads and includes a person who provided a good student example of this and finally the third is a quick revisit back to the "bathroom humour" from my last column.

A lot of us have demonstrated our enthusiasm for the power system and related topics by attending the Meeting of Members, coming out to TEC in the spring and taking the time to read TUG magazine. You might not be aware of the fact that many of you have helped to spark a "platform passion" in some of the Seneca students who have come out to these meetings when they see such a vibrant community and what is possible after graduation. During the last few years a few industry individuals have gone the extra mile by involving students in projects. **Jim Cooper, Kumar Rajendra, David Muir, Jon Paris and Susan Gantner** are some of the most recent. Most of them have been very happy with the students' work.

On a recent collaboration our systems instructor, **Barb Czegal** commented to me: "Often the biggest challenge for Computer Studies students is understanding the details of business processes, and how these relate to a system design. In this project the students put out significant effort analyzing such processes, most importantly ordering, and were able to translate them into system specifications and a database design. This experience will certainly help them understand the systems they encounter in their future careers."

In the summer, **Garth Tucker** donated some of his valuable time to come out

and speak with **Lydia Li's** OPS400 students about disaster recovery. OPS400 or Introduction to AS/400 Operations is a subject in our Computer Networking and Technical Support curriculum. It is also a professional option selection in our Computer Systems Technology curriculum. Both of these diploma programs have been attracting a lot of new students and it is nice to see our system represented in these programs. Garth told me in an email: "The Seneca students showed a level of professionalism and sophistication about IT that surprised me. They are far better prepared to face the challenges of the IT industry than I would have expected at the student level and personally would have no problem throwing them into a production environment."

Some of you attended the September MOM in Mississauga. I had invited a student currently in the program and also invited a grad, **Kinturajsi Vaghela**, to officially receive his Seneca/Tug award as the top winter 2009 student. There were about 70 professionals at the meeting

and I gave a short speech about Kintu's accomplishments. I expected him to pose for the photo and then sit down. Instead, he asked if he could say a few words. That is a tough thing for a new grad to do in this environment. He proceeded to give an excellent five minute speech on his time at Seneca and the passion he developed for the iSeries. He had the crowd laughing and appreciative. Here is a comment from **Mark Buchner** (Vice President of TUG): "I was thinking that for someone who started out by saying he was not a great public speaker, he sure was polished and he tugged (pardon the pun) all the right heartstrings."

I sent an email about this to the Computer Studies faculty and closed it off with the comment: "As we all know, it's not just the programming—communication skills are also important."

The chair of our department, **Evan Weaver** responded: "Russ – it was great to hear that Mark Buchner appreciated Kinturajsi

*(Pangborn) Continued on page 12 ...*



Russell Pangborn with Kinturajsi Vaghela and Léo Lefebvre

Vaughn Dragland



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## Web Query and the "Magic Bullet"



Jackie Jansen

**R**arely, if ever, have you ever heard me say "Yes, I have the magic bullet". Normally my comment is "There is no magic bullet" or "No there is no silver bullet". Well, based on the testing that I have done recently, I am going to give you, not only THE magic bullet, but two silver bullets as well.

The first thing that you should know about DB2 Web Query performance is that you want as much work as possible passed to DB2. You want DB2 to do your joins, your grouping, your sorting, your filtering and your aggregation. When summing a million record file by province you will retrieve ten records when DB2 does the aggregation and one million when Web Query does the aggregation. Web Query does an excellent job of creating your reports and generating the DB2 requests but DB2 is king when it comes to actually doing database work.

A simple example: Recently I was doing a lot of testing on a 1.6 million record file and found out that my results seemed to fall into two very separate categories. My response time was either under 10 seconds, or over 150 seconds. The difference turned out to be where the aggregation was being performed.

Don't believe everything you read. There is a checkbox on the Reporting Options panel titled "Use SQL Engine Joins". If I had my way this box would be labeled "Magic Bullet" particularly when working with DDS created files. If I couldn't get that through then I would label it "Have DB2 do the Work." From now on, you should get in the habit of ALWAYS checking this box. Yes, I agree. It should probably be the default, but if it was I wouldn't have had the opportunity of introducing you to a magic bullet for the first time ever.

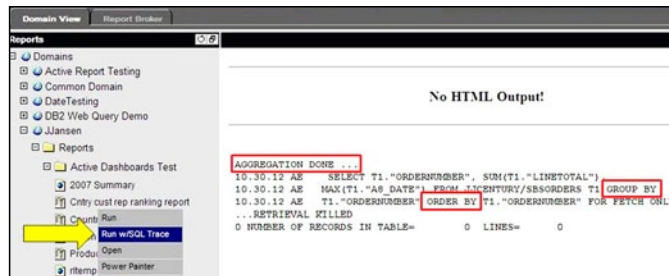
**Magic Bullet**

Use SQL Engine Joins. Multiplicative effect may result. Web Query protection is suppressed.

**Silver Bullets**

- EDIT
- MAX. Prefix Operator

Now in some cases you may still need to use the "Silver Bullets" as well. The first and most important Silver Bullet is the use of the Web Query function EDIT. This comes into play heavily when you are working with fields that contain dates and are described to DB2 as numeric or alphanumeric fields. If you are only using your dates for filtering, sorting, summing by or printing then you are actually better off not telling Web Query that these fields contain dates. This



is somewhat different than what I have said in the past. My recommendation for those with "legacy dates" (i.e. not SQL dates) is to go into Developers Workbench and define the field as an alphanumeric or character field regardless of what the data type actually is on the AS/400. DB2 will do the conversion for you. If you store your date as a six digit field then you would open the file in Developers Workbench and change both the ACTUAL and USAGE properties to A6. You need Developers Workbench to do this but, as I have said before, all of you should have at least one copy of this product.

If you want your dates to be formatted with "/"s create a new field of length A10 with the expression EDIT(datefield, '9999/99/99'). If you want to extract the month

from the middle of an eight character date you would create a month field with a length of A2 using the expression EDIT(datefield, '\$\$\$\$99\$\$'). This will extract the fifth and sixth characters. Web Query will pass to DB2 any filtering, summing or ordering on fields created using EDIT as described. Use CONCAT to combine date components.

In these examples remember to have the USAGE property of your date set to An (A8, A6 etc.) not to AnYYMD.

If you want to find out where the work is being done, simply right click the report name in your browser and select "Run w/SQL trace". The output will show the SQL statement that is being sent to DB2. You don't need to understand SQL for this to help tremendously. You are looking for a few specific items.

|           |          |
|-----------|----------|
| SUM       | GROUP BY |
| PRINT     | ORDER BY |
| > 1 FILES | JOIN     |

DB2 cannot sum alpha fields. Use the prefix operator MAX. with alpha fields referenced in the sum panel or inserted in report headings. Also use MAX. to avoid the multiplicative effect. I am afraid that more details on MAX. will have to wait for a later date.



Remember to always select the "Use SQL Engine Joins", define your dates with an ACTUAL and USAGE of alpha if appropriate, don't specify date formatting in the USAGE property, use EDIT to format your dates or decompose them, and try to use MAX. Good luck!

*Jackie Jansen is the IBM i Solutions Manager for Information Builders specializing in DB2 Web Query. Jackie is a frequent speaker at Technical Conferences and User Group meetings. Contact her at jackie\_jansen@ibi.com.*



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## Upcoming Events

- ⊗ **November 18, 2009: TUG MoM**  
(Living Arts Centre Mississauga)  
↳ **Topic:** Cloud Computing  
↳ **Speaker:** Sandra Weir
- ⊗ **January 27, 2010: TUG MoM**  
(IBM Toronto Lab, in Markham)
- ⊗ **March 24, 2010: TUG MoM**
- ⊗ **April 27–29, 2010: TEC 2010**  
↳ **Keynote:** Larry Augustin  
CEO, Sugar CRM
- ⊗ **May 19, 2010: TUG MoM**
- ⊗ **June 24, 2010: TUG Golf Classic**

## Reminder

Please remember to register on-line for each Meeting of Members. It helps us to plan for seating and food, and you could win a fabulous door prize!

## Find TUG on Facebook

We like to keep as many channels open as possible with our members, so we have created a TUG group within Facebook. Check it out at [www.facebook.com](http://www.facebook.com). You'll probably find that many of your friends are already there!

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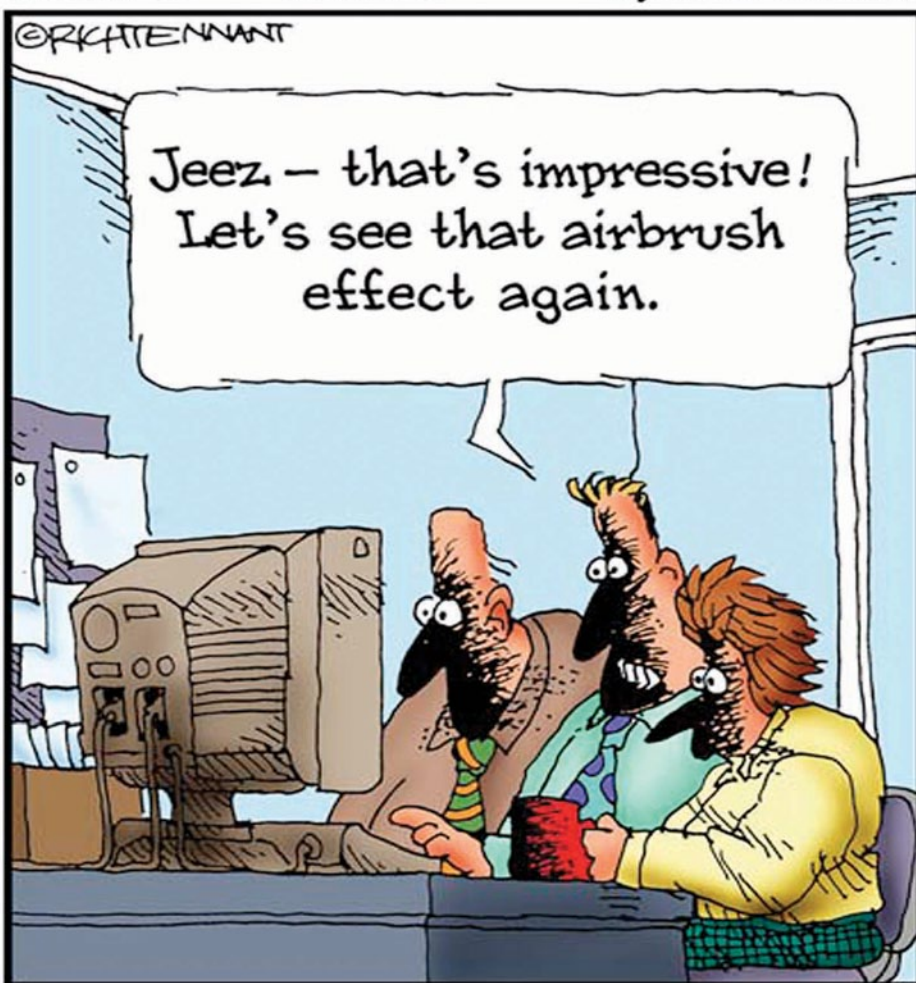
(Pangborn) ... from page 9

Vaghela's polish when receiving his Seneca/TUG award. We know from our advisory committee that employers value communication skills as much as technical ability, and examples like Kintu prove that our students can have both."

One of our professors was so pleased that he forwarded the email to the English faculty. They always encourage us to set aside part of the mark for communication skills. A student might correctly give us all the facts on a test—but they may horribly mangle the English language in the answer. If we deduct a mark for incomprehensible sentences, they get the message that this isn't just about knowing the facts. You have to be able to effectively communicate the facts as well.

## The 5th Wave

By Rich Tennant



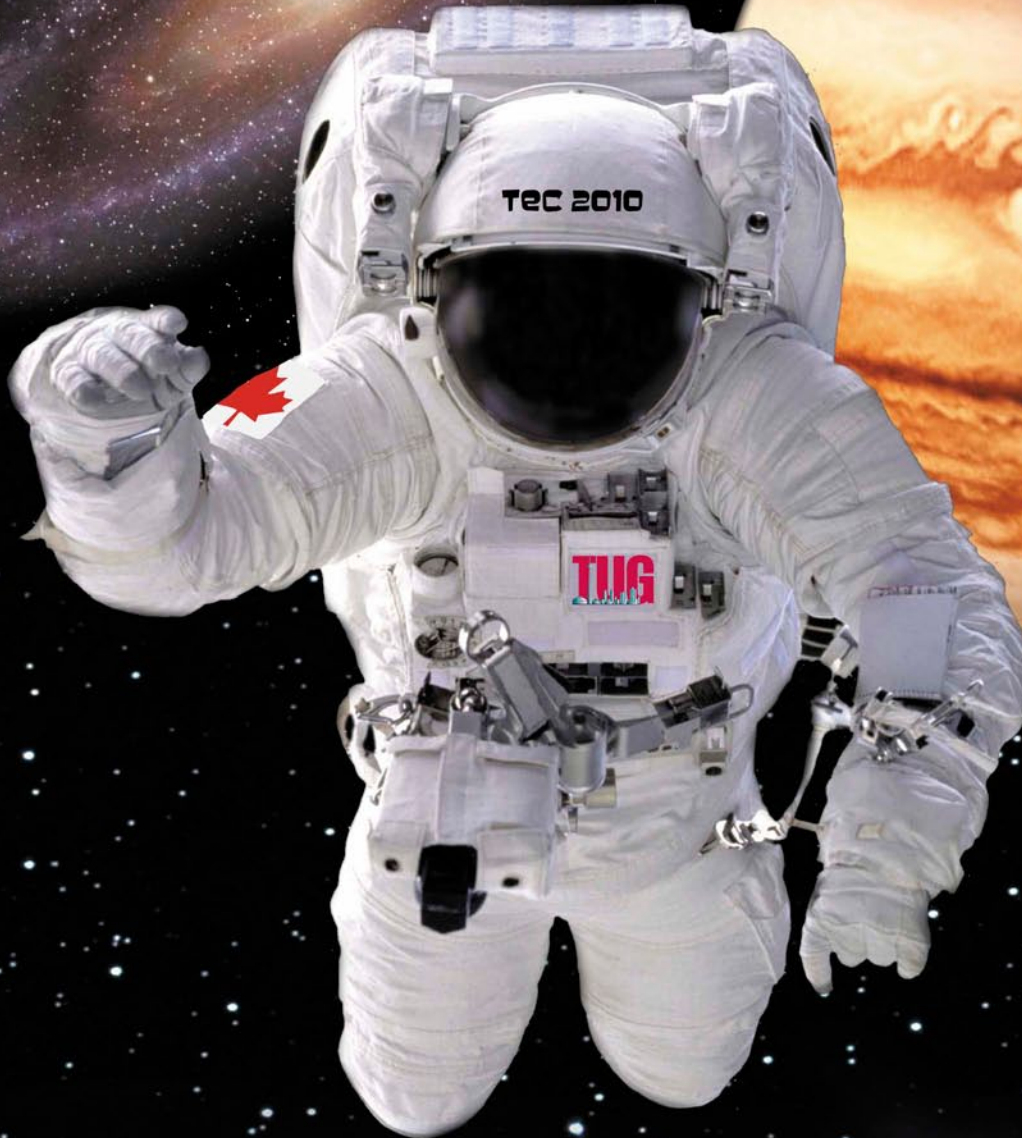
Finally, this talk of marking reminds me about the part of my job that I dislike the most. Sometimes a root canal seems preferable to the marking of a lot of tests, exams and assignments over a weekend. After so many years of this—it is second nature for some of the professors here at Seneca to automatically evaluate veracity and quality of any work they encounter. In my last article, I had some fun with bathroom graffiti. It looks like this was recently graded by one of our C/C++ instructors. He told me that he just happened to be in the same stall the article referred to with a copy of the magazine. He was amazed at the accuracy of my quotes off the wall. Yes, if you will pardon my last bit of bathroom humour—I am anal attentive for accuracy and did not quote from memory. After seeing this stuff, it seemed prudent for me to come back with a paper and pen to get it down right. Although Mark probably disagrees with my ultimate position and what I would have written on the wall, it is nice to know this effort earned an A+ for exactitude. ☺

TUG

*Russell Pangborn is a professor at Seneca College, and a Director of TUG. He can be reached at [russell.pangborn@senecac.on.ca](mailto:russell.pangborn@senecac.on.ca).*

# TEC 2010

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# YOUR IT PROJECT AUDIT - THE RISK AND CONTROLS MATRIX

By Debbie Gallagher

**B**ack in September and November 2007, I described why your IT project might be audited, and an overview of the major steps in the audit for an application development or implementation project.

In this article, I'll describe the IT project risk and controls matrix, which you can use to prepare for the audit.

## Risk and Controls Matrix

A risk and controls matrix is one of the most common methods that companies and auditors use to document risks and controls. Usually Excel spreadsheets or Word tables are used for this documentation. The function of the matrix is simply to provide structure for the documentation. You could certainly write narratives instead, but the matrix is easy to read and is a familiar format for those who document or audit controls.

## Columns in the Matrix

The columns in the matrix (from left to right) generally include:

- Risk description
- Likelihood
- Impact
- Control objective
- Control activity.

## Documenting Risks

First, the risks documented are *inherent* risks, which are the risks that exist assuming there are no controls in your environment. Keep in mind that although you may have risks that are specific to the project, there are some risks you can identify without even knowing what the specific IT project is. Remember, we are talking about inherent risk, so this is easier than it sounds.

Here's an example, "The system may not meet the needs of the business, or deliver what management expects." It's not necessary to write this more formally, but a lot of companies do. This example may be more formally written as, "Systems do not function in accordance with business needs or management's intentions." For each risk, indicate how likely it is and what the impact would be if the risk occurred. You can get numerically fancy if you like, but it is very common to use high, medium, and low for these indicators.



Where the likelihood and impact are high, the controls should be particularly stringent, and their operation should be well documented for reference and audit.

If you had no controls at all on your project, the likelihood of not meeting business needs or management objectives would be a high-probability and high-impact risk.

## Control Objectives

Generally, the control objectives are opposite to the risks, as they represent the outcome you want. For example, the control objective for the above risk would be, "The system meets the needs of the business and is what management expects it to be." ➔



➔ No joke, it's often as obvious as that. As a result, some companies don't bother to document the risk and just start with the control objective. However, it is much more common to include the risk because the entire purpose of the controls is to address risk.

The control objective noted above might be more formally written as, "Systems function in accordance with business needs and management's intentions."

### Control Activities

The control activities are what your company or project team is doing to mitigate the inherent risk and satisfy the control objective.

For the example above, there would usually be several control activities. For example, one of the key ways to ensure that the application functions according to expectations is to test it in several different ways. More formally, you might write this control activity as, "Systems are tested in an appropriate manner, in accordance with test plans that may include system and unit testing, network testing, communications testing, interface testing, parallel testing, capacity testing, and user acceptance testing."

Another control you likely have is formal sign off from the business user on the requirements, on the application design, or on the completed application test results.

In trying to ensure that the application will meet the needs of the business and management when it is implemented, there are generally environmental controls that are enforced not just company wide, but also at the project level.

For example development, testing, and production environments are restricted based on the role of the individual. In addition, you do all of the application testing in an environment that as closely as possible reflects the expected production environment.

In ensuring that the application will deliver its expected results, the project usually also trains end users to make sure they will use the application correctly and follow the associated new processes.

So, now you have a set of control activities that together can satisfy the control objective and mitigate the specified inherent risk.

### Other Typical Risks

Now that you've seen a detailed example of one of the risks, here are some other risks that you may wish to include in your matrix:

Project does not meet the expectations of management. For this risk, the control activities are usually the project approval and project oversight processes you have. For example, project approvals by management, project advisory and steering committees, etc.

Systems implemented interfere with normal business operations. The control activities you might document for this risk are the system outage permission processes, as well as the updates to documentation for the application and the production operations teams. You may also obtain source code or arrange an escrow agreement for purchased applications.

Data converted to the new system may not be complete, accurate, or valid. This is a risk you would normally include if you are converting data from an older system to the new one.

### Project-Specific Risks

The risks outlined above apply to nearly all IT application development or implementation projects. You may also have additional risks to consider based on the specific project you are delivering.

### Conclusion

Documenting your project risks, control objectives, and control activities can help you prepare your project for an audit. The controls matrix is a typical approach used in other areas of the business and by auditors, as it provides structure for the assessment of controls.



*Debbie Gallagher is Principal, DL Gallagher System Services, specializing in project management and business analysis. Debbie previously worked as a systems implementation consultant, and as an IT project auditor. She can be reached by email at [debbie@gallaghers.ca](mailto:debbie@gallaghers.ca).*

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# APPLICATION MODERNIZATION: STARTING AT THE RIGHT PLACE

By Stuart Milligan

With the introduction of the AS/400 in 1988 a quiet revolution began in the world of IT and business. It was designed to consolidate the already successful System/38 and System/36 lines from IBM. The combined forces of the integrated database, RPG/400, and a very reliable and easy to use platform, captured the imagination of the business and development community worldwide. It was now possible to build large, scalable, functionally rich applications using a very productive and simplified development ecosystem. That is exactly what thousands of companies worldwide did. For many years the platform attracted bright new skills, and companies were able to reliably and comfortably evolve their business applications, to help maintain a competitive edge in the market and run their operations more effectively. These applications became a critical asset often outliving staff and company mergers or acquisitions.



Stuart Milligan

## Twenty one years later

—most of these applications are still in use, but many other things have changed since 1988. The Internet explosion radically changed the way applications could be developed and deployed. Applications could be distributed across multiple servers and geographical regions, while still be used from anywhere that a user had access to a web browser. Client/server never really took hold in the business application world. The simplest explanation of this is that it didn't make sense to distribute large, complicated functionality common to these types of applications, to every desktop of every user.



What's interesting is that before the advent of asynchronous HTTP requests (the core of AJAX) Web application design, mapped conceptually very well to AS/400 applications. Thin client served to multiple users from a single application server. One significant practical difference of course was that RPG could not (and astonishingly still cannot) render Web interfaces natively. The

other problem was that essentially RPG was a procedural language, and modern development philosophies and methods had moved on from this approach into the Object Oriented model. This means that all applications already written by this time on the AS/400 were driven by a server based program (sometimes monolithic but not necessarily so) that rendered 5250 text based screens. IBM didn't respond to this quickly enough (it took a decade to get to RPG Free) and the inevitable outcome was that this incredibly successful development platform lost its appeal to the next generation of technology professionals. J Walk from



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Seagull, introduced in 1996, was the first and probably most successful 5250 emulator that ran on the Web, and allowed developers to pretend they were using a Web application. There have subsequently been numerous other tool vendors who have followed this emulation route and even IBM themselves, with their Web-facing product. Even back in 1998 when I was modernizing a SYNON generated RPG financial application, this re-facing approach always struck me as rather odd and short sighted. It seemed a bit like opting for a facelift when you have acute appendicitis.

Meanwhile, existing applications have steadily become more functionally rich, complex, and increasingly difficult to maintain as a result. The number of professional AS/400 resources has become at best static, and for a few lucky companies—application design knowledge resides with a few aging individuals. For many companies the original designers are nowhere to be found.

Application development and maintenance for most companies needs to be agile, productive, and reliable. Different companies in different industries have emphasis on any one of these three requirements. For example, in the financial sector new markets require new business processes and so agility is important to them. In manufacturing, reliability often has more emphasis, where the integrated nature of a vertical operation depends heavily on absolute reliability of the computed information that drives the business. An inaccurate MRP can lose a company millions of dollars in a single month. In the logistics industry, productivity is often critical


where delays in the delivery of additional functionality will mean companies lose business very quickly to competitors.

### The reality is that

very few of the IBM i applications that run a significant portion of the world's economy, are neither agile nor very productive to develop or maintain, even if they are reliable. More alarmingly than this is the fact that even the most fundamental business requirement change, fix, or enhancement, is fast becoming (and in many, many cases is already) beyond the capacity, skill level, or budget of a company's IT department. As basic a requirement as expanding the invoice number field, changing the key field from a sensitive piece of data such as a social security number, changing the interest calculation because of a regulatory change in law, could cost a company more money in development, testing, and reliability issues than it is worth. I am deliberately presenting some extreme cases here, but it is inevitable that almost all companies will ultimately be in this position if nothing drastic is done.

From any CIO's perspective this must be an incredibly stressful and risky position to be in. The most obvious solution that springs to mind is "replace it with something else". That something else might be a modernized version of the custom application running on IBM i, or it might be a completely new application on any platform, perhaps even running in the Cloud.

Before one can ask the question of what to replace a custom application with, the question of what is being replaced needs to be answered. Without a quantifiable assessment of design, function, and relevance of the entire system—any subsequent project plan is based largely on guess work. How could one decide to convert line-for-line an entire system into a new language such as C#.Net without measuring the suitability or relevance of the entire system first? What if half the code is actually redundant? Why choose a 4GL type strategy for my entire system rewrite because a few influential stakeholders are complaining about a particular piece of interactive code that needs modernizing? What if buried in the same application is a million lines of batch code that would be ridiculously unsuited to such an approach? Proofs of concept are a good way to prove a technological concept. They are NOT a good way to extrapolate or statistically predict the outcome of a complete system modernization or migration. It can never replace or equal the reliability and accuracy of a system wide analysis or the application.

Analysing, quantifying, and assessing the current application design assets for their complexity, proliferation, and relevance, up-front is paramount for any company that has a customized IBM i application portfolio. In my next article, I will be discussing how to analyse, quantify, and assess an entire IBM i application system; in a detailed, cost effective, and repeatable fashion. 

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