

# Delving Further Into Object Process Networks (OPNs) Review of an OPN Usage Tutorial and Prototype OPN-IDE

By James J. Byleckie, Ph.D.

Those of you who attended the GBC/ACM meeting on the 17<sup>th</sup> of March of this year, learned about a powerful approach to architecting, modeling, simulating and evaluating systems. The approach is called Object Process Network or OPN. The talk, "A meta-language for system architecting: A case study on NASA's Apollo Program," <http://www.gbcacm.org/website/semInfo.php?id=1095>, was given by Dr. Benjamin Koo and Jay Conne. Ben Koo is a software architect and MIT Post-Doctoral Associate. Jay Conne is current GBC/ACM VP, engineer, trainer and business developer.

OPN is an executable, graphical meta-language that uses concepts from Petri Nets and Bayesian Belief Networks (BBN), which can be used to model systems and their behavior. OPN can be used to perform computations based on the progress of execution-tokens through the object-process network. Additionally, OPN can be used to evaluate the likelihood of various outcomes based on accumulated evidence or evaluate the utility of alternative design approaches. The latter application of OPN was illustrated at the talk by examining the tradeoffs NASA faced in sending astronauts to the Moon in 1969. An OPN model was used to demonstrate that NASA made the best choice with regard to time and money when they decided on a lunar orbit rendezvous when landing astronauts on the moon.

Now, Jay Conne has produced a tutorial for those interested in taking the next steps in learning about OPN. The tutorial and Ben Koo's Ph.D. thesis are available at <http://www.jconne.com/opn1benkoo1edcrawley/>. The tutorial contains clear instructions for installing a prototype OPN-IDE and, if necessary, Java. Once set up, there is a brief introduction to the IDE components. Then Jay takes you through a series of five exercises:

1. An annual, simple interest calculation model, which introduces sequential computation with OPN;
2. An introduction to dynamic symbolic expression construction, which shows how symbolic formulas can be dynamically generated by OPNs;
3. An introduction to the global script, pre-conditions and parallel processing, which illustrates the use of shared computational formulas and multiple simultaneous execution tokens;
4. An illustration of combined sequential and parallel process execution for a more complicated financial calculation; and finally
5. A simple Bayesian Belief Network (BBN), first proposed by Judea Pearl, for describing the probabilistic relationships between the clouds, rain, lawn sprinklers and wet grass.

The BBN example is tantalizing because it illustrates the power of the OPN approach for analyzing situations. Input conditions can be adjusted for this model, but unfortunately, the model itself is hard coded and cannot be modified in the IDE. This exercise and the others in the tutorial provide a clear illustration of the OPN approach and its power. Because the tutorial uses a prototype IDE, some of the UI features, in particular mouse gestures, are unconventional. Still, Jay has made it easier to remember the conventions by providing a tear-out reference. Also I found the Java-based interface a bit sluggish on my modest laptop, so you may need to be patient when waiting for a display update. Overall, this tutorial represents an excellent way to familiarize yourself with the OPN approach, which has potential to supplant a range of graphical-language approaches including UML and MDA. This reviewer is eagerly awaiting a more robust OPN-IDE and additional examples from Jay that are suggested in Section V of the tutorial.

## Websites of some Local Groups

**GBC/ACM**  
[www.gbcacm.org](http://www.gbcacm.org)

**SIGGRAPH**  
[www.siggraph.org/chapters/boston](http://www.siggraph.org/chapters/boston)

**Boston SIGCHI**  
[www.gbsigchi.org](http://www.gbsigchi.org)

**WebTech**  
[www.acm.org/chapters/webtech](http://www.acm.org/chapters/webtech)

**SPIN**  
[www.boston-spin.org](http://www.boston-spin.org)

**IEEE**  
[www.ieeeboston.org](http://www.ieeeboston.org)

**IEEE Consultants Network**  
[www.ieee-boston.org/consultants.htm](http://www.ieee-boston.org/consultants.htm)

**Boston-area User Group Calendar**  
[www.bugc.org](http://www.bugc.org)



The Institute of Electrical and Electronic Engineers, Inc.

## Spring 2005 Continuing Education Program

For Detail Course and Registration Information, Visit our Website at

<http://ieeeboston.org> Phone: 781-245-5405

Register Early to get a Discount!

Advanced Umts Communications  
Date and Time: Mondays, April 4, 11, 18,  
6:30PM - 8:30PM  
Location: Westin Hotel, Waltham

Implementing Voice over IP  
Date and Time: Saturday, April 30,  
8AM - 5PM  
Location: EMPIRIX, Bedford

Open Process Frameworks  
Date and Time: Tuesday, April 12,  
8AM - 5PM  
Location: Radisson Hotel, Woburn, MA

Fundamentals of C++  
Date and Time: Tuesdays, May 3-June 7,  
6:15PM - 9:45PM  
Location: Sheraton Hotel, Lexington

Fundamentals of Java Script Programing  
Date and Time: Thursdays, March 24 - April 21  
6:15PM - 9:45PM  
Location: Sheraton Hotel, Lexington

Agile Object-Oriented Analysis and Design  
Date and Time: Thursdays, May 5 - 26,  
7PM - 9PM  
Location: Sheraton Hotel, Lexington

Entrepreneurship-How to Start Your  
Own Company  
Date and Time: Saturday, March 12,  
9AM - 5PM  
Location: Westin Hotel, Waltham

Power Quality in Electrical Systems  
Date and Time: Tuesday, April 5, 12 & 26,  
6PM - 8PM  
Location: Westin Hotel, Waltham

Practical Phased-Array Antenna Systems  
and Adaptive Arrays for Radar and  
Communication Systems  
Date and Time: Mondays, Feb 21 - May 2  
6:00PM - 9:00PM  
Location: MITRE Corp., Bedford, MA

How to Build & Maintain a  
Profitable Consulting Practice  
Date and Time: Saturday, April 2,  
8:30AM - 4:00PM  
Location: Westin Hotel, Waltham, MA

Configure and Secure Your Home or Small  
Business Network Mini-Course Lab  
Date and Time: Wednesdays, April 13, 20  
6:15PM-9:45PM  
Location: Sheraton Hotel, Lexington

A Practicle Hands-On Introduction to XML  
Schemas and its Applications  
Date and Time: Monday, Tuesday, April 4 - 5  
8:30AM-4:30PM  
Location: Westin Hotel, Waltham

Predictable Software Development Part I, II & III  
Date and Time Part I: Tuesday, April 12,  
8:30AM - 12:00Noon  
Date and Time Part II: Wednesday, April 13  
Date and Time Part III: Thursday, April 14  
8:30AM-4:30PM  
Location: Westin Hotel, Waltham

## May Meetings

### Software Quality Group of New England

**Topic:** Applying Six Sigma to Software Development

**Speaker:** Dr. Bill Eventoff, ESTM Associates

**Date/Time:** Wednesday, May 11, 2005 6:00PM - Networking 6:30 PM - 8:00 PM Meeting & Presentation

**Location:** Sun Microsystems, Burlington, MA

**Details:** <http://www.swquality.com/users/pustaver/bcs.htm>

### Greater Boston SIGCHI

**Topic:** Are You Really Ready to Launch Your Product?

**Speaker:** Steve Henry and Dan McLaughlin

**Date/Time:** Tuesday, May 10, 2005 6:30PM - Refreshments 7:00 PM Meeting

**Location:** Sun Microsystems, Burlington, MA

**Details:** <http://www.gbsigchi.org/mtg.html>

*RSVP to [sigchi-rsvp@east.sun.com](mailto:sigchi-rsvp@east.sun.com) at least one day in advance*

### Boston SPIN

**Topic:** Building Accurate Schedules from Software Requirements

**Speaker:** Steve Rakitin

**Date:** Tuesday, May 17, 2005 6 PM Networking, 7:10 PM Presentation

**Location:** The Mitre Corporation, S Building, Bedford, MA

**Details:** <http://www.boston-spin.org/meeting.html>

### IEEE Consultants Network

**Topic:** Using Copyrights and Trade Secrets to Gain and Protect your Edge in Business

**Speaker:** Robert A. Adelson, Esq.; Engel & Schultz LLP

**Date/Time:** Wednesday, May 25, 2005 7:00 PM

**Location:** Sheraton Lexington Inn, Lexington, MA

**Details:** <http://www.ieee-boston.org/consultants.htm>

\$7.00 charge at door for non-members

### Harvard University Events

**Details:** <http://deas.harvard.edu/newsandevents/calendars/index.html> (Select "Month", Month "5", and "Go")

**Topic:** Advanced Reasoning in Graphical Models

**Speaker:** Rina Dechter, Donald Bren School of Information and Computer Science, UC-Irvine

**Date:** Thursday, May 5, 2005 at 4-5 PM (Ice Cream - 3:30PM second floor lounge area)

**Location:** Harvard University, Maxwell Dworkin G125 (33 Oxford St., Cambridge, MA 02138)

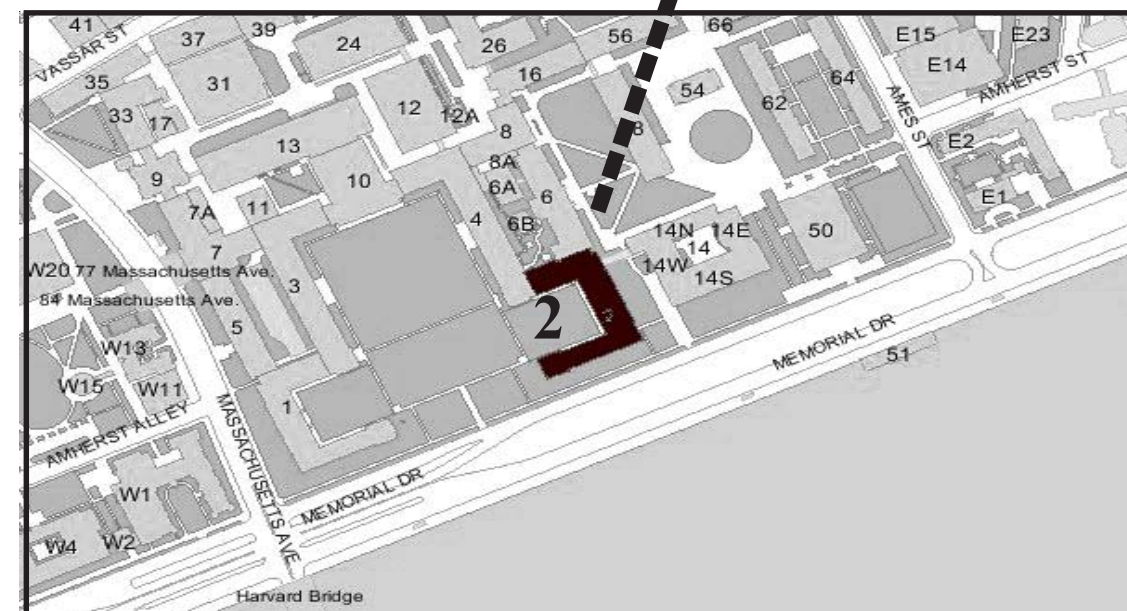
**Topic:** The Mathematics of Games and Sports: From shuffling a deck to shuffling your feet

**Speaker:** Dr. Joseph B. Keller, Professor Emeritus of Mathematics and Mechanical Engineering, Stanford University

**Date:** Wednesday, May 11, 2005 at 4-5 PM

**Location:** Harvard University, Maxwell Dworkin, Lessin Auditorium G115 (33 Oxford St., Cambridge, MA 02138)

## GBC ACM May General Meeting Building 2-105



## Slate of Candidates for GBC/ACM Fiscal Year 2005-2006 Officers

The GBC/ACM fiscal year will be over at the end of June 2005. At the beginning of the June general meeting, the election of officers for the 2005-2006 fiscal year will be held. The slate of candidates selected by the Nominating Committee is:

**President:** *Peter Carmichael* - incumbent President, PDS Lecture Notes Editor, and PDS Committee member.

**Vice President:** *Jay Conne* - incumbent Vice President, a member of the PDS and Volunteer committees, and a former President, Membership Chair and PDS Registrar

**Treasurer:** *Yona Carmichael* - incumbent Treasurer, PDS Food Coordinator, and PDS Assistant Registrar.

**Secretary:** *Ed Bristol* - incumbent Secretary and former chairman of the Boston chapter of the IEEE Control Society

— *Sam Cardman, David L. Presberg, Edward Freedman,*  
GBC/ACM Nominating Committee



**Real Times Editor**

Rochelle Goren, rochelle\_goren@comcast.net

**GBC/ACM Officers (2004 - 2005)**

**President**

Peter Carmichael, pcarmichael@alum.mit.edu

**Vice President**

Jay Conne, conne@acm.org

**Secretary**

Ed Bristol, e.bristol@comcast.net

**Treasurer**

Yona Carmichael, treasurer@gbcacm.org

**Past President**

Stephanie Collins, jsoco@attglobal.net

**Local Special Interest Group Chairs**

**GB/SIGCHI**

Gabriel Spitz, spitz@aptima.com

**SIGGRAPH/Boston**

Samuel Murphy, samuelmurphy@gmail.com

**GBWEB TECH**

Dan Jacobs, (781) 273-5825, daniel.jacobs@acm.org

**Standing Committee Chairs**

**PDS Committee**

Peter Barzdines, (617) 924-4072 (home), peterbar@world.std.com

**Program Committee**

Peter Mager, p.mager@computer.org

**Interest Group Committee**

Sam Cardman, sc@mbunix.mit.edu

**Acting Membership Chairman**

Kenneth Baclawski, kenb@ccs.neu.edu

**Volunteer Coordinator**

Glenn Hoffman, GlennHoffman@mac.com

**Webmaster**

Michael Ciaraldi, ciaraldi@ciaraldi.com, <http://www.gbcacm.org>

The Real Times is published ten times per year (September through June) and is the official newsletter of the Greater Boston Chapter of the Association for Computing Machinery, First-class postage paid at Boston, MA, 02101.

All rights reserved: ©2004 by the Greater Boston Chapter of the ACM, Copying without fee is permitted, provided that copies are not made or distributed for direct commercial advantage and credit to the source is given, except articles that are noted otherwise. Abstracting with credit is permitted. For copying of articles that are specially noted, contact the Editor at the address below.

Timely notices of events, meetings, and other activities of interest to the Chapter's Membership should be submitted by the 10th of the month Before the intended issue and sent, with attention to the Managing Editor to:

**GBC/ACM, P.O. Box 465, Lexington, MA 02420  
(781) 862-1181**

The Chapter's mailing list is available to related professional organizations or for commercial use. Please contact the Membership Chair at the address above when requesting mailing lists.

Annual subscription cost is included in the Chapter Membership dues of \$10.00. See top line on mailing label for membership expiration date. Library subscriptions are free. Please send orders for copies to the Chapter mailing address above.

## A Message From the President....

The Greater Boston Chapter of the ACM is a volunteer run, non-profit computer educational organization. We continue to give free monthly meetings, and high quality, low cost, Professional Development Seminars (PDS) throughout the year. These are tough times for the computer industry, and attendance for our seminars has been going down. I am trying to do what I can to help, and we are now offering scholarships to steeply discount our PDS seminars to students and unemployed.

It takes about the same effort and fixed cost to put on a seminar for 40 people, as it does 100 people. The difference is that we lose money with 40, and don't with 100. We have been losing money for the past several years, and rather than raising the prices, which might even lower attendance, we are trying to reduce costs, and increase attendance with better publicity, speakers and topics. We saved a considerable amount of money recently by having volunteers buy and put out breakfast foods, snacks, drinks and coffee instead of paying a caterer to do this. The quality is even better, and the coffee is even hot! This comes with a different type of cost, the effort of volunteers. I would like to thank the considerable effort of the volunteers that keep this organization running. Volunteering is a way to share your skills, and even learn new ones, and is a great networking opportunity. You can feel good about doing something to help keep this great organization going.

We can only reduce costs so far, so we need to find more and better ways to increase our attendance. This is where we need your help. Please give suggestions for improvements, speakers, and/or seminar topics you are interested in, to any of the board members, or send them to me at:

[president@gbcacm.org](mailto:president@gbcacm.org).

Better still, if you see something that needs doing, you can do it, or offer to help; we would really appreciate it.

— Peter Carmichael  
President GBC/ACM

## IEEE Future Events

**Group:** Providence Section - Advance registration required  
**Details:** [http://ieeeboston.org/providence\\_section.htm#jun4](http://ieeeboston.org/providence_section.htm#jun4)

**Topic:** Robotics Park Family Fun Day      **Location:** UMass Dartmouth campus  
**Date:** Saturday, June 4, 2005 - 9:00 AM-1:00 PM

**Topic:** Block Island Summer Escape      **Location:** Block Island  
**Date:** Saturday, July 9, 2005 - 9:00 AM-5:00 PM

*We would like to thank our PDS Sponsors for their support:*

**Softpro**

75 Third Ave., Waltham; 197G Post Rd West, Marlboro  
<http://www.softpro.com>

**Quantumbooks**

Corner of Ames & Broadway, Cambridge  
<http://www.quantumbooks.com>

**PCs for Everyone**

24 Charles Street, Cambridge, MA 02141  
<http://www.pcsforeveryone.com>



**Are you a current member of GBC/ACM?\***

If not, join! The \$10 annual membership fee offers many opportunities for development, through regular and engaging interaction with local contemporaries in addition to access to our popular PDS seminars. Mail in your membership form today!

**Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**City/State/Zip:** \_\_\_\_\_

**Phone Number:** \_\_\_\_\_

Please make checks payable to GBC/ACM and mail to:  
P.O. Box 465  
Lexington, MA 02420

(\*Check your address label for expiration date.)

\*\*\* Calendar of May 2005 Events \*\*\*

Date	Page	Sponsor	Location
May 5	6	Harvard Computer Science Series	Harvard University, Cambridge, MA
May 10	6	Greater Boston SIGCHI	Sun Microsystems, Burlington, MA
May 11	6	Harvard Academic Event	Harvard University, Cambridge, MA
May 11	6	Software Quality Group of NE	Sun Microsystems, Burlington, MA
May 17	6	Boston-SPIN	Mitre Corporation, Bedford, MA
May 19	1	GBC ACM General Meeting	MIT, Cambridge, MA
May 25	6	IEEE Consultants Network	Sheraton, Lexington, MA

If the top line of your mailing label below reads **\*\*EXPIRED\*\***, please renew your membership (for just \$10/yr). For that \$10 you get a copy of this newsletter/local event calendar mailed to any address you choose plus the right to attend PDS seminars at the member rate. Please consider renewing for more than one year at time. Your support helps make possible the wide array of GBC/ACM activities.

Address Service Requested

**First Class:  
Dated Materials**

GBC/ACM is a non-profit educational and scientific society. (781) 862-1181 - [www.gbcaacm.org](http://www.gbcaacm.org)

The Greater Boston Chapter of the  
P.O. Box 465  
Lexington, MA 02420



First Class  
Presorted  
U.S. Postage  
PAID  
Boston, MA  
Permit Number  
56536

# The Real Times

Vol. 44 No. 9 [www.gbcaacm.org](http://www.gbcaacm.org) May 2005

## GBC/ACM May 2005 Meeting

### *Haystack: Putting Users Back in Control of their Information Organization*

**Speaker:** David Karger, MIT Laboratory for Computer Science  
**Date/Time:** Thursday, May 19, 2005, 7-9 PM  
**Location:** MIT Room 2-105

Haystack is a system that aims to maximize every individual user's control over the way he or she records, views, organizes, and searches for information. In this talk David Karger discusses the elements of the system: a flexible semantic-net data model that can stretch to accommodate whatever information, relationships, properties, and categories a user considers important, and a user interface framework that can effectively display the personalized information space in ways that make sense to and can be customized by the end user.

David Karger is a Professor of Computer Science and a member of the Laboratory for Computer Science at the Massachusetts Institute of Technology. He received a Ph.D. from Stanford in 1994 under the supervision of Rajeev Motwani. His research interests include algorithms and information retrieval. Some of his recent projects include Grid, a scalable ad-hoc mobile networking system; Chord, a scalable peer to peer system; and Haystack, a personalizable information retrieval system. His theoretical research currently targets problems in graph algorithms, optical networks, machine learning, and network coding. He serves on the board of Vanu Inc. He was awarded the 2002 National Academy of Sciences award for Initiatives in Research.

**Directions:** For a map of the meeting location, visit: <http://whereis.mit.edu/map-jpg?mapterms=2&mapsearch=go>. Also see a map on page 3 of this issue.

Visit the GBC ACM website for last minute meeting changes: [www.gbcaacm.org](http://www.gbcaacm.org)