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 17th 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

SIGGRAPH
www.siggraph.org/chapters/boston

Boston SIGCHI
www.gbsigchi.org

WebTech
www.acm.org/chapters/webtech

SPIN
www.boston-spin.org

IEEE
www.ieeeboston.org

IEEE Consultants Network
www.ieee-boston.org/consultants.htm

Boston-area User Group Calendar
www.bugc.org

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 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)
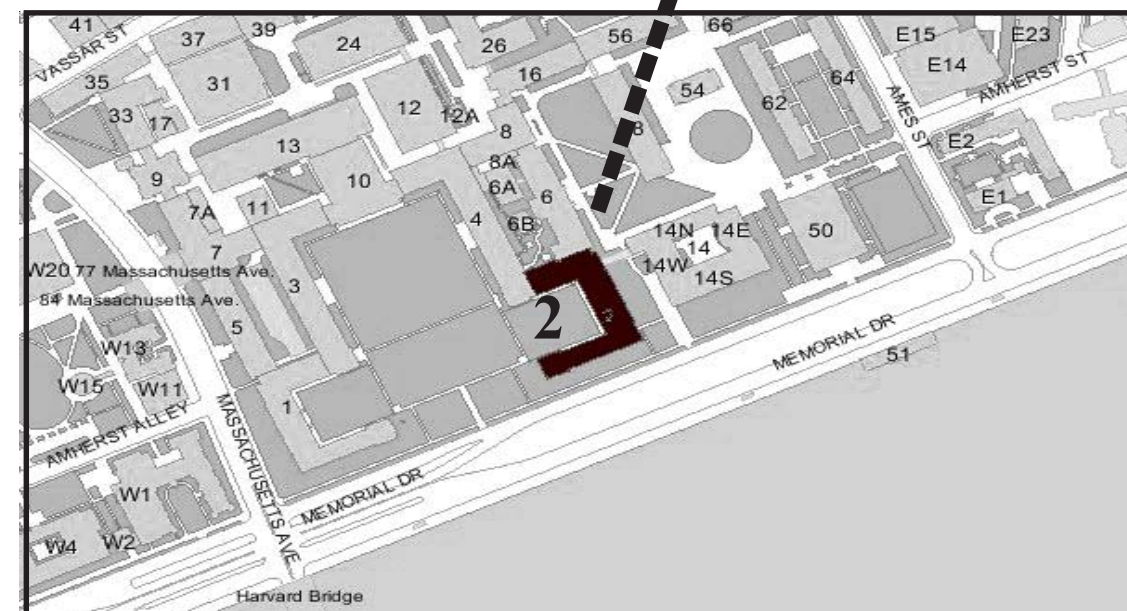
Topic: The Mathematics of Games and Sports: From shuffling a deck to shuffling your feet
Speaker: Dr. Joseph B. Keller, Professor Emeritus of Mathematics and Mechanical Engineering, Stanford University
Date: Wednesday, May 11, 2005 at 4-5 PM
Location: Harvard University, Maxwell Dworkin, Lessin Auditorium 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

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 .

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

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

Are you a current member of GBC/ACM?*

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(*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

The Real Times

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 theLaboratory 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 onpage 3 of this issue.

Visit the GBC ACM website for last minute meeting changes: www.gbcacm.org