GNAT Pro insider

newsflash

▶ **Joel Brobecker named as GDB Release Manager**

Joel Brobecker, a senior software engineer in AdaCore's Vancouver (Canada) office and a specialist in debugger technology, has been selected by the GDB Steering Committee to be the new Release Manager. Joel is a regular contributor to the GDB debugger and other FSF technologies.

▶ **Bob Duff and Matt Heaney join AdaCore**

AdaCore's technical team has expanded with the addition of Bob Duff as a full-time member and Matt Heaney as a consultant. Bob is an Ada expert and a major contributor to the language design for both Ada 95 and Ada 2005. Matt is the principal designer of the Containers library for Ada 2005.

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GNATbench: The Bridge Between GNAT Pro and Eclipse

GNATbench is a new AdaCore plug-in that integrates Ada into Eclipse and, more specifically, into Wind River's Workbench environment. GNATbench offers the familiar Eclipse "look and feel" in accessing the GNAT Pro tools and capabilities. It supports both all-Ada and mixed-language development. GNATbench includes sophisticated Ada-aware editing and browsing, and project-based program building. The underlying technology for implementing this integration is AdaCore's GNAT Programming Studio (GPS) Integrated Development Environment.

GNATbench is available on Windows, GNU/Linux and Solaris. GNATbench for Workbench on VxWorks 6 and VxWorks 653 will be part of the GNAT Pro 5.04 release, and GNATbench for native (standard) Eclipse is scheduled for Q2 2006.

Full Steam Ahead with Ada 2005!

With the Ada 2005 design effort nearing completion, AdaCore is continuing to make the new language a reality. The features implemented in GNAT Pro 5.04a are in the following areas:

Programming in the large
You can now use the "limited with" and "private with" features, important mechanisms that generalize Ada's modularization facility.

Object-Oriented Programming
AdaCore has implemented the new interface feature (including task, protected, synchronized, and limited interfaces), the "Object.Operation" notation, and the syntax that indicates whether an operation is overriding.

Containers
GNAT Pro has a complete implementation of Ada 2005's Containers library: generic packages for containers with elements selectable by position (vectors, lists) and by key (maps, sets), and generic procedures for array sorting.

Access type enhancements
Extending Ada 95's functionality, Ada 2005 allows nested subprograms to be passed as parameters, provides control over whether *null* is allowed for an access type, and includes a new "access constant" parameter mechanism. These facilities are all implemented in GNAT Pro. Beyond these, a number of additional Ada 2005 features are available in GNAT Pro, with others on our agenda for future releases.

To learn more about Ada 2005, please visit www.adacore.com/ada_2005.php where you can download chapters of the Ada 2005 Rationale, written by Ada expert John Barnes. Several chapters are now available, with a new chapter (9 in total) being posted each month. You will also find information on the implementation of Ada 2005 features in GNAT Pro.

< releases & updates >

What's New with GNAT Pro

New 64-bit platforms

GNAT Pro is now supported on HP Alpha (OpenVMS, Tru64), HP Integrity Servers (Linux, HP-UX), SGI Altix (Linux), x86-64 (AMD64, EM64T) GNU/Linux, and SPARC64 (Solaris). GNAT Pro on OpenVMS for HP Integrity Servers will be available as part of our 5.04 product release.

New operating systems

GNAT Pro is now available for the following operating systems on existing platforms: PowerPC AIX 5.2 and 5.3, Alpha Tru64 5.1b, SPARC Solaris 10, Intel Solaris 10, x86 Linux - Red Hat Enterprise Linux 4, SuSE Linux Enterprise Server 9, and VxWorks 6.

New features

GNAT Pro 5.04, available in Q1 2006, includes a wide range of enhancements:

▶ **Support for all major Ada 2005 features** (see companion article in this issue)

▶ **AltiVec support**

• Efficient access to AltiVec vector operations on PowerPC targets

• Compatible simulated AltiVec vector operation on other targets

▶ **Improved installation and usage**

• Easier installation of GNAT, GPS, ASIS, AUnit, AWS, GtkAda, XML / Ada, Win32Ada

• Simplified use of add-on libraries with project files

• Direct access to components' documentation from GPS

• Direct access to GNAT examples from GPS

▶ **Stack size control and analysis**

• New compiler options to output subprogram stack usage information

• New binder options enabling task stack usage instrumentation

• Enhanced implementation of -fstack-check

▶ **Efficient linker-level removal of unused subprograms and data**

• Available on x86 GNU / Linux, with implementation in progress on other platforms

▶ **GNATCHECK (ASIS-based tool)**

• Provides evidence of the enforcement of project-specific rules

Over 100 members and growing!

Ada Academic Initiative > > > > > > >

Interest in Ada in academia is on the upswing

AdaCore's initiative in promoting Ada usage in academia, an effort unique in the industry, continues to bear fruit, and 2005 has seen steady growth in both membership and benefits. Begun in Summer 2004, the GNAT Academic Program (GAP) currently has over 100 members, from 23 countries on 6 continents. GAP members receive, at no cost, the GNAT Academic Edition (a full Ada compiler and toolsuite), including on-line technical support for instructors and access to a repository of teaching resources provided primarily by GAP members themselves. Here are some of the GAP-related developments in 2005:

New compiler releases with Ada 2005 support

The Ada 2005 features described in a companion article are available in the GNAT Academic Edition (where they are enabled by default) as well as in GNAT Pro.

New teaching resources

The GAP repository includes textbooks, course slides, example-based instructional material, a real-time embedded systems lab, libraries, and tools. Contributors include well-known Ada educators such as Ted Baker, Martin Carlisle, Michael González Harbour, John McCormick, Javier Miranda, Richard Riehle, Mario Rivas, and Ed Schonberg.

MaRTE OS

The GAP program and GNAT's Open Source technology have helped spur real-time research and development based around Ada 2005. Prof. Michael González Harbour visited AdaCore Paris in September to report on his work on MaRTE OS, which will implement all the real-time enhancements of Ada 2005.

Ada Internship Program

This new initiative helps to match Ada-knowledgeable students with internship positions at AdaCore customers. Through the GNAT Tracker interface a company can locate eligible students, and a student can find companies offering internships.

GPS 3.1 Available: Brings Many Improvements

The latest version of the GNAT Programming Studio IDE provides many new features:

▶ **New cross-reference queries, such as finding all entities imported from a given unit**

▶ **Improved plug-in and python capabilities**

▶ **Refactoring support**

▶ **Efficient and user-friendly locations view**

▶ **Improved assembly view**

▶ **Persistent bookmarks**

▶ **New Version Control System functions**

▶ **Enhanced tooltips and code completion**

▶ **Improved graphs**

▶ **Project Editor enhancements**

▶ **Graphical support for code coverage and profiling**

AdaCore at Wind River Regional Developer's Conferences
www.windriver-rdc.tpgnc.com
November 3, 2005 / Santa Clara, CA (US)
November 8, 2005 / Munich (Germany)
November 10, 2005 / Paris (France)
November 14, 2005 / Tel Aviv (Israel)
November 17, 2005 / Cambridge (UK)
December 14, 2005 / Westford, MA (US)
January 11, 2006 / Manhattan Beach, CA (US)
AdaCore is presenting live demos of GNAT Pro integration with WorkBench and the VxWorks 6.0 and VxWorks 653 operating systems. AdaCore is also highlighting Ada 2005 features already available for VxWorks users.

< focus >

Interview with Ed Schonberg
Vice President, AdaCore US

GNAT Pro Insider: Tell us a bit about your background, how you came to be involved with Ada and AdaCore, and what your current role is.

Ed Schonberg: I've been involved in Ada since the early days of Ada 83. Our group at New York University (with Robert Dewar and several current members of AdaCore) produced the first fully-validated translator for the language. Several years later I was on the NYU team that produced GNAT, the first compiler for Ada 95. These were prototype implementations, but we foresaw a business model for Ada development tools, with GNAT as an Open Source high-quality industrial product based on the Free Software Foundation's GCC code generation technology. The result, in 1994, was the formation of Ada Core Technologies (now AdaCore), and we've been at it ever since. My work focuses on the front-end of the compiler: issues of semantics and intermediate code generation. Recently I've been working on the implementation of the new Ada 2005 features, which is now reasonably complete.

GNAT Pro Insider: You have a longstanding reputation as an accomplished pianist. Any highlights that you'd like to mention?

Ed Schonberg: I'm an enthusiastic Chamber Music player, and like other such addicts I find that I never have enough time to practice! In recent years, AdaCore (the well-tempered software company) has presented musical events at various Ada-related venues, and these have been a great delight. With Robert Dewar we perpetrated several spoofs of Gilbert and Sullivan operettas, rewriting the lyrics to make their humor irresistible to Ada techies, and these were very well received. We have also advertised GNAT and AdaCore with more serious musical events, in particular song recitals by Karen Mason, who not only runs our New York sales office but is also an accomplished soprano. As a result I've gotten to spend some quality time at AdaCore on other keyboards than just my laptop's.

GNAT Pro Insider: Unlike companies with proprietary compiler technologies, AdaCore has chosen to implement Ada by integrating into the Free Software Foundation's GCC ("GNU Compiler Collection") technology. How has that worked out?

Ed Schonberg: The decision to use FSF technology and consequently to adopt FSF policies for all of our software has been successful beyond our expectations. The use of GCC as the GNAT back-end has allowed us to make GNAT available on an amazing number and variety of platforms, and to take advantage of GCC's sophisticated optimization technology. We participate actively in the GCC development work; Richard Kenner, one of the founders of AdaCore, was for a long time one of the principal maintainers of GCC. Our current involvement in the GCC technology is mutually beneficial: the GNAT compiler is now used by the FSF to test new versions of GCC, and the semantics of Ada have proved to be a serious test of the correctness of new optimizations in the GCC back end. And of course the visibility of GNAT in the Free Software community translates into a greater awareness of Ada, and a growing recognition of its merits *vis-à-vis* more widespread languages. Finally, the various licensing policies of the FSF allow us to provide our products to different user communities (commercial and government customers, academia, individual software developers), each with the relevant licensing terms. This would be impossible to achieve with proprietary software.

GNAT Pro Insider: AdaCore is the first vendor to implement Ada 2005. Any reaction from customers as to how they view the new features?

Ed Schonberg: We started prototyping various aspects of Ada 2005 early on, and we focused on those proposed enhancements that seemed most important to serious users. We implemented the "limited with" clause to allow mutually recursive type declarations in different packages, and our customers found this extremely useful. We have recently implemented interfaces, another feature that users want to adopt as soon as possible. Safety features, like the overriding indicators on subprograms, were requested by users even before the final design of the feature was agreed on. We also have an implementation of the new Containers library, and this is clearly a hit with users. We have implemented the enhancements to anonymous access types, and expect to see very heavy use of them, in particular by programmers coming to Ada from other languages. In short, it's clear that the new Ada 2005 features will be very useful to the Ada community, and we're pleased to be able to provide them to our customers in a timely fashion.

AdaCore in the News

AdaCore has been receiving excellent coverage in the trade press, reflecting both the general interest in the new Ada language revision and the increasing attention being paid to Open Source software licensing. Among others, *Byte.com* and *Software Development Times* have featured articles on Ada 2005, while *Military & Aerospace Electronics* has published articles on the EADS CASA Boom project (which used Ada and GNAT Pro) and on the role of open systems for reliability and security. Please visit **www.adacore.com** for links to these articles and to press releases on AdaCore product announcements.

Photo: Gary Matoso

< partnership corner >

GNAT Pro Port to ERC32 Smoothed by IPL's AdaTEST 95

As part of the implementation of the GNAT Pro High-Integrity Edition on the ERC32 platform for the European Space Agency, AdaCore needed to demonstrate complete coverage analysis of the Ravenscar run-time library code. The work required automated support, and tool partner IPL's AdaTEST 95 was an obvious choice.

AdaTEST 95, integrated into GPS by IPL, provided the desired functionality but

presented a technical challenge. The tool needs dynamic memory to store raw coverage data, but dynamic allocation is not supported by the Ravenscar profile. IPL responded by implementing a Ravenscar-customized version of AdaTEST 95. Using this tool, AdaCore was able to provide the needed coverage analysis and deliver the resulting product to ESA.

For further information please see
www.ipl.com/pdf/pc021b.pdf

AdaCore at Conferences, November 2005 – April 2006

▶ **Military Avionics 2005, October 31–November 1, 2005 / London (UK)**
www.defenceiq.com
AdaCore has an exhibit at this conference.

▶ **SIGAda 2005, November 14–17, 2005 / Atlanta, GA (US)**
www.sigada.org/conf/sigada2005
AdaCore is a platinum sponsor for this conference with an exhibit and several presentations:
Ben Brosgol, *Real-Time Java for Ada Programmers* **(Tutorial)**
Thomas Quinot, *PolyORB* **(Tutorial)**
Javier Miranda, Edmond Schonberg, and Hristian Kirtchev,
The Implementation of Ada 2005: Synchronized Interfaces in the GNAT Compiler

▶ **CALIBRE (Eurocontrol Round Table, Open-Source Software in Air Traffic Management)**
December 7, 2005 / Bretigny-Sur-Orge (France)
www.oss-in-atm.info
Franco Gasperoni is making a presentation.

▶ **ERTS2006 (Embedded Real Time Software), January 25–27, 2006 / Toulouse (France)**
www.erts2006.org
AdaCore is presenting the following papers:
Franco Gasperoni, *FLOSS, COTS, and Safety: A Business Perspective*
Cyrille Comar, *Certification & Object Orientation: The New Ada Answer*

▶ **Safety-Critical Systems Symposium 2006, February 7–9, 2006 / Bristol (UK)**
www.safety-club.org.uk
AdaCore is presenting the following paper:
José F. Ruiz, *Ada 2005 for High-Integrity Systems*

▶ **Ada Conference 2006 UK, March 28, 2006 / Manchester (UK)**
www.ada-uk-conference.co.uk
The conference includes a keynote presentation from Robert Dewar.

▶ **Embedded Systems Conference, April 3–7, 2006 / San Jose, CA (US)**
www.embedded.com/esc/sv
Robert Dewar is presenting a 90 minute class on Safety-Critical Design Techniques for Secure and Reliable Systems.

newsflash

▶ **Matt Heaney receives SIGAda award**
In recognition of his work on the Containers library, Matt is receiving an Outstanding Ada Community Contribution Award at the November 2005 SIGAda conference in Atlanta. He joins previous AdaCore recipients Robert Dewar, Ed Schonberg, and Bob Duff (all in the Outstanding Ada Community Contribution catgory) and Ben Brosgol (ACM SIGAda Distinguished Service Award).

▶ **AdaCore Australian distributor wins Service Excellence Award**
Dedicated Systems Australia was awarded the 2005 Electronics Industry Association's Service Excellence Award, based on measurements of set criteria and customer feedback. Dedicated Systems Australia distributes AdaCore's products in the Australia and New Zealand region.

▶ **Public Ada language and GPS training to be offered at New York office**
Introductory and advanced Ada courses and GNAT Pro / GPS training are being offered at AdaCore US's New York City headquarters. For information on schedule, pricing, and content, please contact sales@adacore.com

▶ **GtkAda and PolyORB training courses now available**
AdaCore is pleased to announce the addition of two new 2-day on-site courses: *Introduction to GtkAda* and *Advanced Application Development and Tuning with PolyORB*. For more information on our courses, please visit **www.adacore.com/services_training.php**