



AdaCore

# TECH DAYS

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# GNAT Pro Update

Arnaud Charlet

2018-11-14

# Release Schedule

October: Preview release      Oct 2018: 19.0      *Continuous Release Area*

February: **Major release**      **Feb 2019: 19.1**

July: **Corrective release**      **July 2019: 19.2**

Oct 2019: 20.0

**Feb 2020: 20.1**

**July 2020: 20.2**

**GNAT**

# GNAT Pro 19 overview

62 platforms (57 cross, 5 native)

Support for Ada 83, 95, 2005, 2012, 202x, SPARK

GCC 6.x ➡ GCC 7.x

Binutils: 2.28.51 ➡ 2.30.52

GDB 7.10 ➡ GDB 8.2

MinGW 3.1.0 ➡ 5.0

QEMU 2.8.1 ➡ 2.12

# GNAT Pro Ports

7 new ports, 11 new configurations

riscv64-elf

aarch64-elf-{linux,windows}64

aarch64-linux-linux64

aarch64-qnx-{linux,windows}64

aarch64-vx7-{linux,windows}64

ppc-linux-windows

x86-lynx178elf-{linux,windows}64

# GNAT on VxWorks

Simplify mixing Ada/C++

Better integration of GNAT in Workbench (even for Ada-only projects)

Add support for Wind River's LLVM

# Libadalang integration

Libadalang available to customers and supported

GNATpp now based on libadalang

*faster and doesn't require closure, support for simple preprocessor directives*

More to come



# Other GNAT Highlights

Spectre V2 mitigation (`-mindirect-branch` and `-mfunction-return` switches)

Link time speedup on Windows for large executables with multiple DLLs

Full Ada 2012 syntax for C/C++ binding produced by `-fdump-ada-spec`

Improved suppression of access-before-elaboration checks and warnings

AWS improvements

- Enhanced interoperability with Apache CXF for document/literal WSDL and generated SOAP messages.

- Improved session handling security by using a configurable private hash.

**IDEs**

# GPS

*AdaCore's main IDE*

Stability and speed

# GPS

## Learn view

The screenshot displays the 'Learn' view in the GPS IDE. It is divided into three main sections:

- Scene:** A vertical toolbar on the left with icons for adding (+), removing (-), and editing (pencil).
- Code Editor:** The top right pane shows a code snippet with a function definition:

```
6  
7  function Minus_I (A,  
8  is  
9  begin  
10     return A - B;  
11 end Minus_I;  
12  
13  function Minus_I (A,  
14  is  
15     (A - B);  
16  
17 end Arithmetic;
```
- Actions Panel:** The central pane is titled 'Actions' and lists various editor actions with their keyboard shortcuts:

Editor	
Goto declaration	
Delete word backward	Alt+Backspace
Uncomment lines	Shift+Ctrl+?
Previous subprogram	Ctrl+Up
Comment lines	Ctrl+/
Delete word forward	Ctrl+Delete
Goto line	Ctrl+G
Goto end of line	Ctrl+E
Goto beginning of line	Ctrl+A
Refill	Ctrl+=
- Messages:** The bottom right pane shows the current action being viewed: 'Arithmetic.Minus\_I' and a 'Messages' section with icons for help, search, and refresh.

Below the actions list, a description for the selected 'Goto declaration' action is provided:

- Action:** goto declaration
- Category:** Editor
- Menu:** /Navigate/Goto Declaration

# GPS

Libadalang view

Improved integration with debugger

- new Registers view

- set values in Variables view

- lazy retrieve of callstack information

Improved Scenario view

- untyped variables

- variables in aggregated projects

Revamp and simplification of color preferences + theme support

# GNATbench

*Eclipse Plug-In for Ada*

Support for Eclipse 4.8 Photon, Wind River WorkBench 4.15

*Eclipse SimRel 2018-09 under test*

Improved Ada/C++ exception handling on VxWorks 7

Better integration with WorkBench

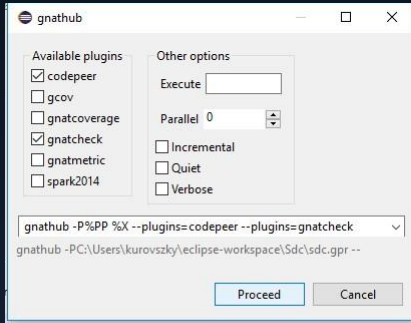
improve support for compiler with GNAT Pro C

full access to environment managed by WorkBench

New UI for runtime selection

# GNATbench

## GNAThub integration



The screenshot shows the Eclipse IDE interface with GNAThub integration. The main editor window displays Ada code with several error messages highlighted in yellow. The Problems window shows the GNAThub Analysis Data, listing various error messages and their locations in the code.

<input checked="" type="checkbox"/>	codepeer	22
<input checked="" type="checkbox"/>	gnatcheck	63

<input checked="" type="checkbox"/>	low	15
<input checked="" type="checkbox"/>	medium	7
<input checked="" type="checkbox"/>	unspecified	63

<input checked="" type="checkbox"/>	array_index_check	3
<input checked="" type="checkbox"/>	conditional_check	3
<input checked="" type="checkbox"/>	numeric_literals	3
<input checked="" type="checkbox"/>	others_in_case_statements	1
<input checked="" type="checkbox"/>	others_in_exception_handlers	1
<input checked="" type="checkbox"/>	overflow_check	1
<input checked="" type="checkbox"/>	positional_parameters	21
<input checked="" type="checkbox"/>	precondition	11
<input checked="" type="checkbox"/>	predefined_numeric_types	31
<input checked="" type="checkbox"/>	raising_external_exceptions	6
<input checked="" type="checkbox"/>	suspicious_precondition	2
<input checked="" type="checkbox"/>	unused_out_parameter	1
<input checked="" type="checkbox"/>	validity_check	1

```
7 -----
8 -- Process --
9 -----
10
11 procedure Process (V : Value) is
12 begin
13   stack.Push (V);
14 end Process;
15
16 -----
17 -- Read --
18 -----
19
20 function Read (Word : String) return Value is
21   Int_Val : Integer;
22   Kind    : Input_Number_Kind;
23 begin
24   Input.Read_Number (Word, Int_Val, Real_Val, Kind);
25
26   if Kind /= Int_Number then
27     raise Except.User_Error;
28   end if;
29
30
31
```

GNAThub Analysis Data

- 16:11 gnatcheck: unspecified - explicit reference to predefined numeric subtype
- 41:4 codepeer: medium - suspicious precondition for Last: not a contiguous range of values
- 93:47 codepeer: medium - array index check might fail: requires I <= 200
- 93:35 codepeer: medium - precondition might fail on call to values.to\_string: requires V /= null
- 93:35 gnatcheck: unspecified - positional parameter association
- 96:26 gnatcheck: unspecified - positional parameter association
- input.adb
  - screen\_output.adb
    - 52:12 gnatcheck: unspecified - explicit reference to predefined numeric subtype
    - 63:52 gnatcheck: unspecified - explicit reference to predefined numeric subtype
    - 64:13 gnatcheck: unspecified - explicit reference to predefined numeric subtype
    - 81:12 gnatcheck: unspecified - explicit reference to predefined numeric subtype
- values.adb
  - 11:4 codepeer: medium - suspicious precondition for Stack.Body.Last: not a contiguous range of values
  - 21:18 gnatcheck: unspecified - explicit reference to predefined numeric subtype
  - 22:18 gnatcheck: unspecified - explicit reference to predefined numeric subtype
  - 26:12 codepeer: medium - unused out parameter Real\_Val
  - 26:26 gnatcheck: unspecified - positional parameter association
  - 26:32 gnatcheck: unspecified - positional parameter association
  - 26:41 gnatcheck: unspecified - positional parameter association
  - 26:51 gnatcheck: unspecified - positional parameter association
  - 29:10 codepeer: low - conditional check might raise exception: requires Kind = Int\_Number
  - 29:10 gnatcheck: unspecified - raised exception is not declared in visible part of enclosing library package
  - 44:14 gnatcheck: unspecified - explicit reference to predefined numeric subtype

# GNATdoc

*Documentation Generator*

Support for generics



# GNATdashboard

*GNAT Tools Aggregation and Visualization*

Support for SonarQube 6.7 LTS

New Web UI

**Tools**

# GPRbuild

*Multipurpose GNAT builder*

Removed compile command line length limitation on Windows

Recompile if GNAT toolchain version changes between compiles

Propagation of static SAL link dependencies upstream

# GNATcheck

*Qualifiable Coding Standard Checker*

Many new GNATcheck rules implemented & qualified

# GNATcoverage

## *Qualifiable Code Coverage*

Improved handling of pragmas wrt statement coverage

Support for programs with compressed debug info section

**In Our Labs**

# New Elaboration Algorithm

Taking complete call graph into account

Will solve porting efforts

# GNAT Pro C++

Cross Linux

VxWorks 6

VxWorks 7



# GNAT LLVM

Working on plugging GNAT front-end with LLVM code generator

# GNATcoverage

Support for source instrumentation to provide coverage everywhere

# GPR

Active work on GPR2 library and tools

# Libadalang and Tools

Libadalang will replace all source navigation, cross reference and refactoring capabilities in GPS and GNATbench

GNATstub, GNATmetric, GNATcheck are also being transitioned

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