



AdaCore

# TECH DAYS

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# GNAT Pro Update

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# 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. The interface is divided into several sections:

- Scene:** Located at the top left, it contains a vertical toolbar with a plus sign (+), a minus sign (-), and an edit icon (pencil).
- Code Editor:** On the right side, it shows a snippet of code with line numbers 6 through 17. The code defines a function `Minus_I` within a larger function `Arithmetic`. The line `function Minus_I (A,` is highlighted in blue.
- Actions Panel:** In the center, a table lists various editor actions. The 'Goto declaration' action is highlighted in blue. The table is as follows:

Actions	
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+=
- Jump to the declaration of the current entity:** A text instruction located below the actions panel.
- Action Details:** Below the instruction, it lists:
  - Action:** goto declaration
  - Category:** Editor
  - Menu:** /Navigate/Goto Declaration
- Messages:** A panel at the bottom right with the title `Arithmetic.Minus_I` and a 'Messages' header, containing icons for a person, a folder, and a trash can.

# 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

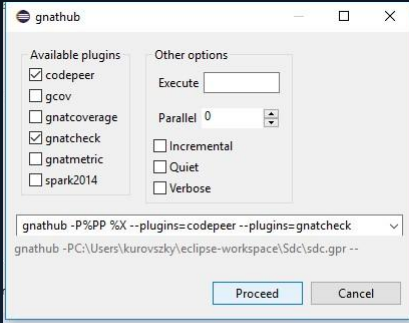
improve support for compiler with GNAT Pro C

full access to environment managed by WorkBench

New UI for runtime selection

# GNATbench

## GNAThub integration



eclipse-workspace - Sdc/struct/values.adb - Eclipse IDE

Tools:

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

Severities:

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

Rules:

<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;
```

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
- sd.c.adb

# 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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