

# PTC DEVELOPER TOOLS

## ADA EUROPE 2019

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Ada Europe 2019 – Warsaw Poland – June 2019



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# ABOUT PTC

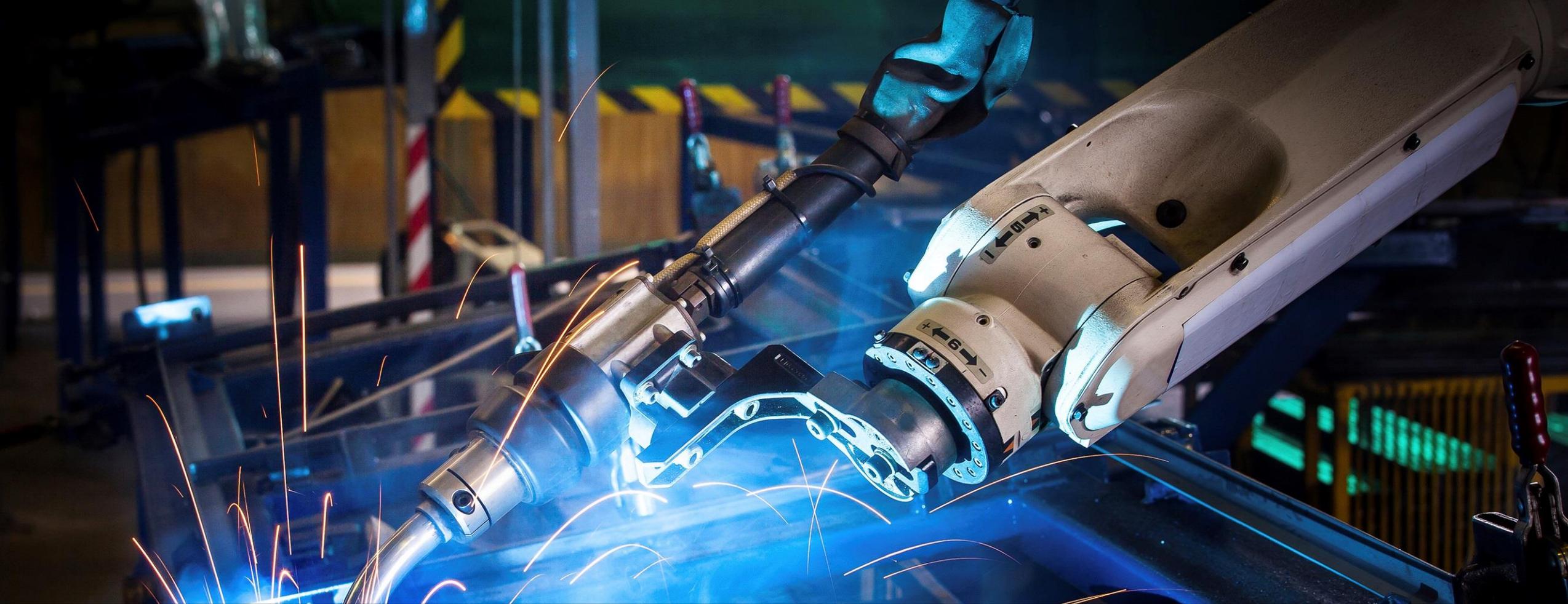


- Global Software Company, \$1B+ Revenue, Headquarters: Boston MA USA
- CAD / IoT / AR products which Design, Manufacture, Operate, and Service “Things”
- Leading Platform and Solutions Enable Industrial Innovation
- Global Network
  - 550,000 Developers
  - 6,500 employees
  - 1,150 Partners,
  - 1,050 Services Professionals



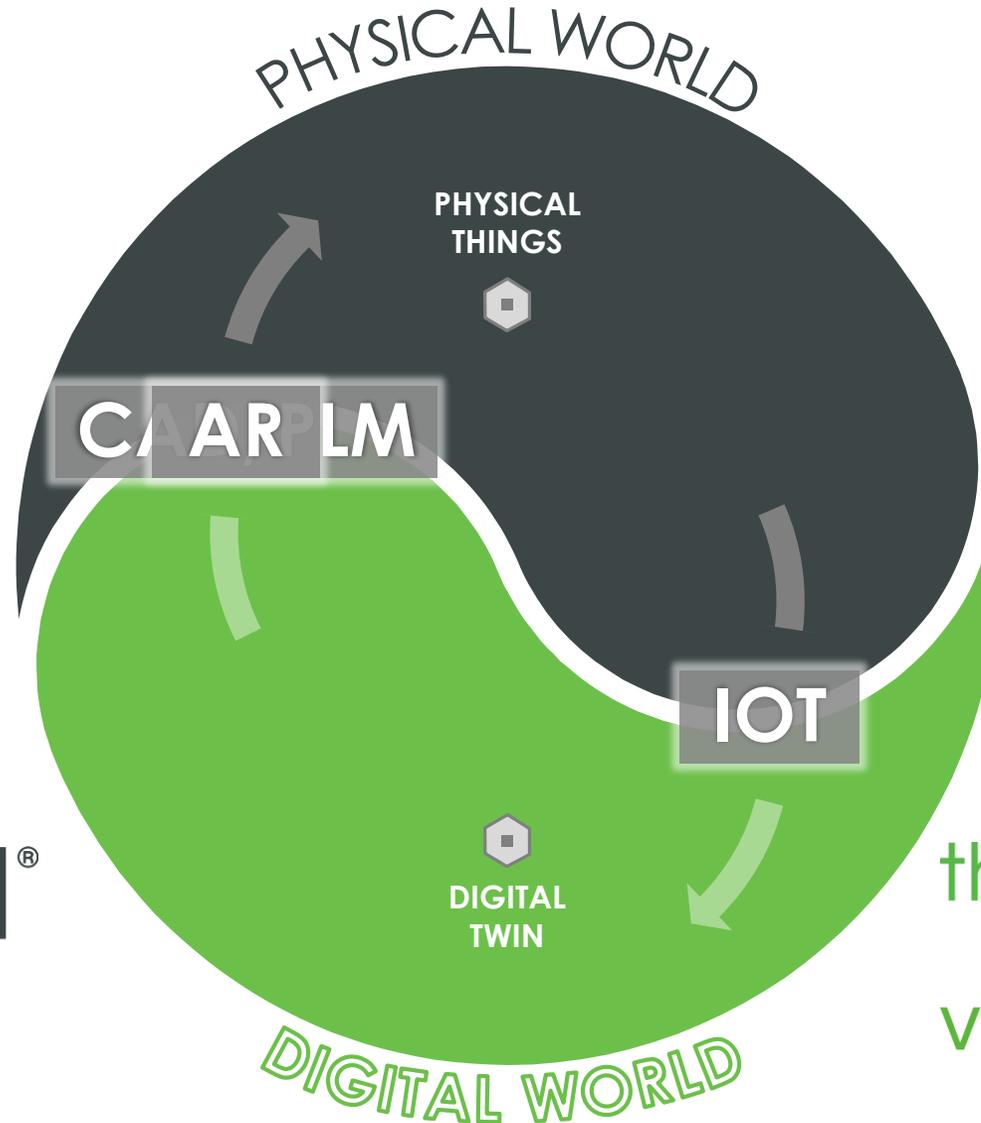
The Boston Globe

TOP PLACES TO WORK 2018



Transforms how companies create, manufacture and service things, and enables an ecosystem to develop the applications and experiences for those things.

# PHYSICAL DIGITAL CONVERGENCE SHAPED OUR STRATEGY



thingworx analytics

vuforia studio



ptc



**"P"** represents physical things in the IoT, and the data they generate.

Our logo embodies our deep conviction in the physical and digital convergence, and the incredible value unlocked when they come together.



Grey the color of stability



Yin-Yang symbolizes balance between complementary forces, like physical and digital.

Hexagon a shape of connection, balance, and integration.

**"D"** represents digital information that define the things in the IoT.



Green the color of growth

The mission statement is presented within a graphic design featuring a large, dark grey, irregular polygon. Inside this polygon is a smaller, solid green, irregular polygon. The text is centered within the green polygon. A thin green line outlines a larger, irregular shape that encompasses the dark grey polygon.

The leader in  
unleashing industrial  
innovation that  
occurs at the  
convergence of the  
physical, digital, and  
human worlds



June 10 – 13, 2019 | Boston, MA

# THE WORLD'S MOST RESPECTED DIGITAL TRANSFORMATION CONFERENCE

6500+ Technologists

240 Breakout Sessions

100 Product Demos

300+ Industry Experts

LIVEWORX.COM

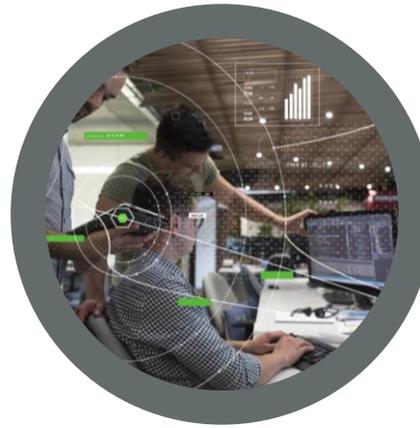
#LIVEWORX

Register to view LiveWorx LIVE  
broadcast (and recordings)  
at [LIVEWORX.COM/LIVE](https://LIVEWORX.COM/LIVE)



# PTC **FOCUSED** SOLUTIONS GROUP

- Internal group of independent Business Units within the larger PTC
- Provide focused attention to established product lines and associated customer base
- Dedicated development, sales, and support resources
- Ongoing commitment to important long-term customers





## PTC Developer Tools

A Comprehensive Suite of Developer Tools for the Serious Engineer

ptc<sup>®</sup> apexada<sup>™</sup>  
ptc<sup>®</sup> objectada<sup>®</sup>

Family of Ada  
compilers, runtime  
environments, and  
test tools

ptc perc<sup>®</sup>

Family of real-time virtual machine  
and compilation technologies for  
Java



ptc® apexada

ptc® objectada®

ptc perc®

Providing a world-class, smart and efficient development environment to speed construction of intensive native, embedded, and real-time mission-critical applications.

**Packet of latest Product Release Announcements and Datasheets located in Conference Attendee Bag / Kit**





## PTC Developer Tools

A Comprehensive Suite of Developer Tools for the Serious Engineer

**Visit our exhibit to learn more!**

**Register & take survey to be entered into drawing for an Amazon.com Gift Card!**

**Winner announced at end of conference!**

**amazon.com**  
Gift Card



# PTC Developer Tools – Product Overviews and Release Update

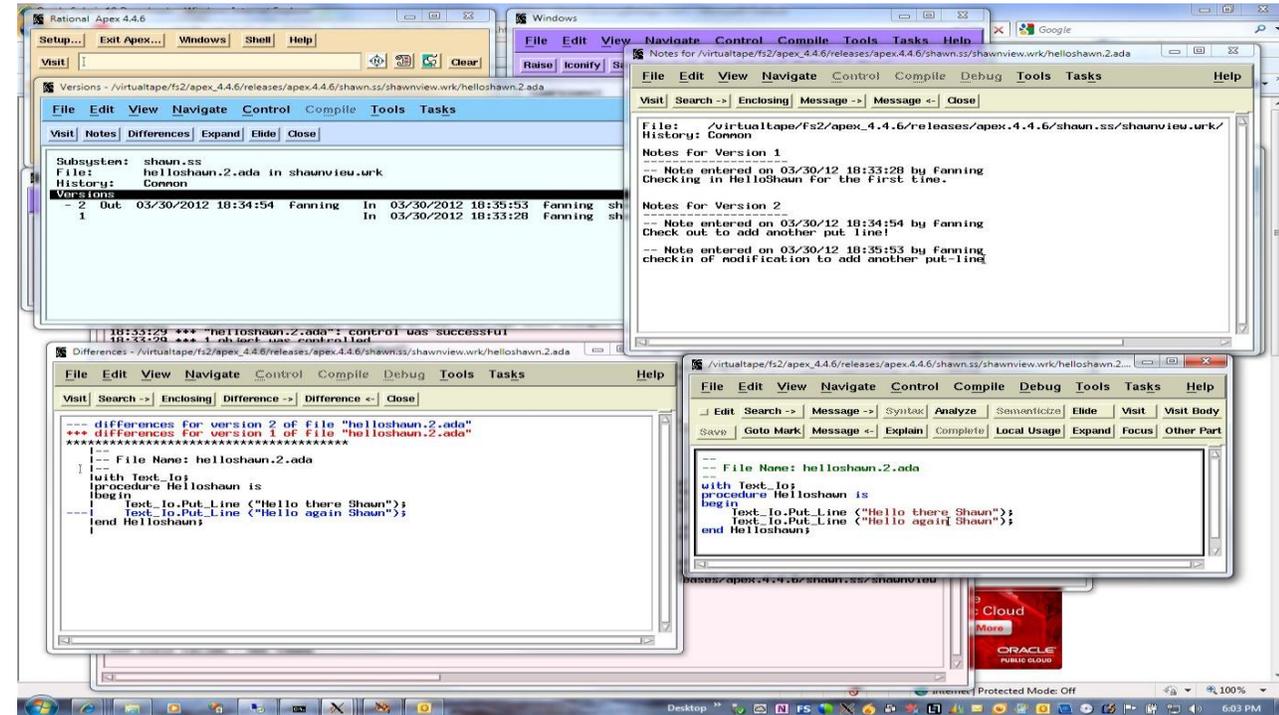


ptc<sup>®</sup> apexada<sup>™</sup>

# PTC APEXADA OVERVIEW



- Ada 95 & Ada 2005 language support
- **ApexAda Developer** (native compilers):
  - Solaris SPARC
  - Solaris Intel
  - Linux Intel
- **ApexAda Embedded Developer** (embedded / cross compilers):
  - **VxWorks** (Intel, PowerPC targets)
  - **LynxOS** (Intel, PowerPC targets)
  - **ApexAda Exec** (Intel, PowerPC, MIPS bare-board targets)
- Summit CM & TestMate test tools



## ptc® apexada™ Native & Embedded v4.x / v5.x

- Updates for new OS versions (Solaris 11.4, SuSE 12 SP3)
  - RHEL/CenOS 8 & SuSE 15 planned/in-progress

## ptc® apexada™ Embedded v5.2 for 64-bit Targets

- Includes 64-bit Linux native compiler
- Available Embedded cross compilers:
  - Wind River VxWorks V7/Intel 64 cross compiler
  - ApexAda Exec/ Intel 64 bare-board cross compiler
- In Development: Linux ARM/aarch64

The main title of the slide is "ptc objectada". The word "ptc" is rendered in a green, lowercase, sans-serif font. The word "objectada" is rendered in a dark blue, lowercase, sans-serif font. Both words include a registered trademark symbol (®) to their upper right. The text is centered horizontally and overlaid on a large, semi-transparent hexagonal graphic that contains background images of an airplane, a ship, and a person at a computer.

# PTC OBJECTADA PRODUCTS



## ptc® objectada® / ptc® objectada® 64 for Windows

- Native compiler for Windows
- Ada 95, Ada 2005, Ada 2012 (subset) language support

## ptc® objectada® for Unix / Linux

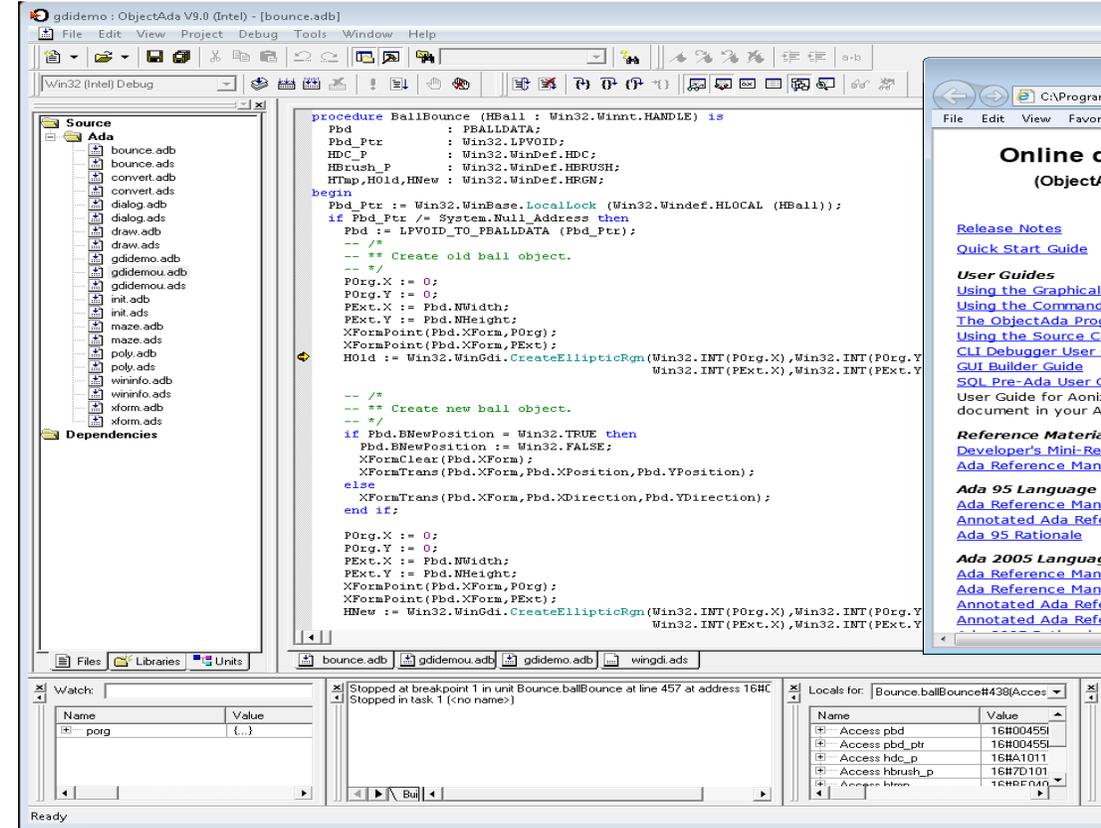
- Native compilers (*Solaris SPARC, Solaris Intel, AIX, HP-UX, Linux Intel*)
- Ada 95 language support

## ptc® objectada® Real-Time™

- Cross development products - Real-time full Ada 95 runtime products
- VxWorks (*Windows host; Intel, PowerPC targets*)
- LynxOS (*Solaris, AIX, Linux host; PowerPC targets*)

## ptc® objectada® Raven™

- Cross development products – safety-critical Ravenscar profile – restricted Ada 95 runtime
- Bare target (*Windows, Solaris host; PowerPC, Intel, ERC32 targets*)
- VxWorks 653 (*Windows host; PowerPC target*)



ptc® objectada®

# PTC OBJECTADA 10.1 RELEASE



ptc® objectada® for Windows V10.1

ptc® objectada® 64 for Windows V10.1

Released  
May 2019

- **32-bit / 64-bit application development & execution**
- **Expanded Ada 2012 language feature support**
  - Runtime assertion checks for conditions on class-wide types
  - Full support for container packages and required features
- **Windows 10 compatibility** – also works with Windows 7 or later
- **Based on Visual C++ 2017 tools** and **Windows 10 SDK** libraries
  - Also works with Visual Studio / C++ 2019
- ADT Eclipse interface **works with latest (32-bit) Eclipse versions**



# OBJECTADA V10.1 ADA 2012 SUPPORT



- Aspect specifications
- Dynamic contracts
  - Preconditions and Postconditions for subprograms
  - Assertions for types that are checked dynamically
- New flexible forms of expressions
  - If expressions
  - Case expressions
  - Quantified expressions
  - Expression functions
  - Generalized forms for membership tests
- Loops and quantified expressions using the iteration specification form
- Functions with **out** and **in out** parameters
- Predefined program library extensions
  - Ada.Strings extensions / new child packages
  - Ada.Wide\_Characters.Handling
  - Ada.Wide\_Wide\_Characters\_handling
  - Ada.Directories extensions
  - New container packages

```
oav100_x64 : ObjectAda X64 V10.0 (Intel) - [stack.ads]
File Edit View Project Build Tools Window Help
Win32 (Intel) Debug
Source
  Ada
  ephemeris.adb
  ephemeris.ads
  stack.adb
  stack.ads
  twentytwelve.ada
Dependencies
procedure Push (S: in out Int_Stack; I:
  Pre => not IsFull (S),
  Post => not IsEmpty (S);

procedure Pop (S: in out Int_Stack; I
  Pre => not IsEmpty (S),
  Post => not IsFull (S) and
  IsBigger (S'old, S); --

function Top (S: Int_Stack) return Int_
```

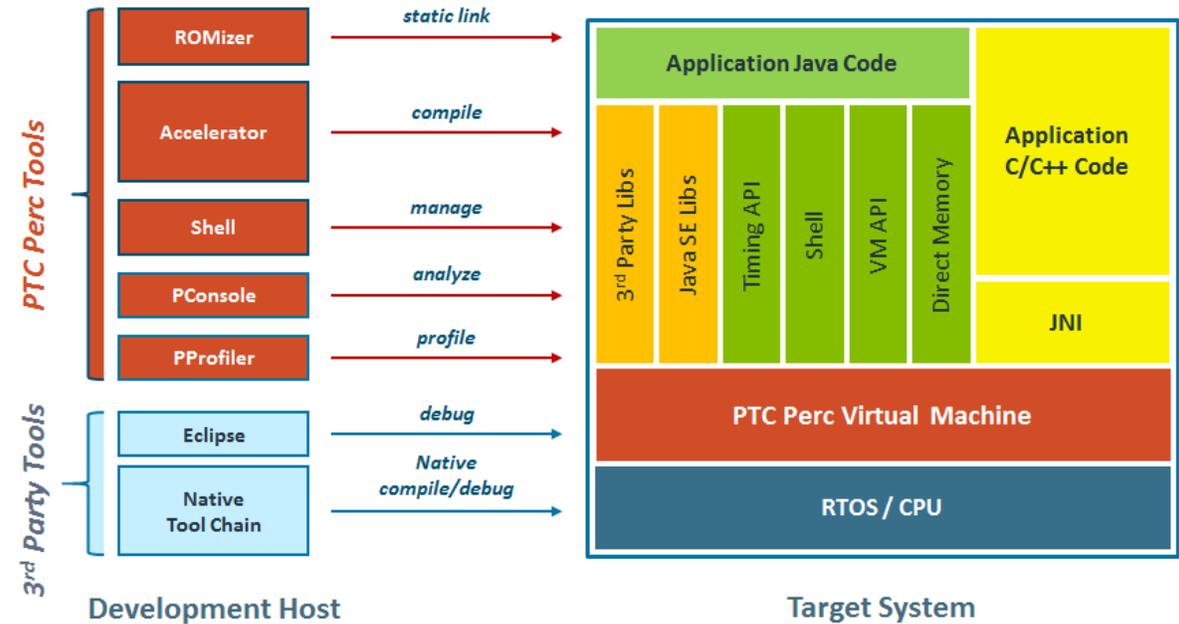
The main logo for PTC Perc, featuring the word "ptc" in a green sans-serif font, followed by "perc" in a black sans-serif font with a registered trademark symbol (®) to its upper right. The text is overlaid on a semi-transparent hexagonal graphic that contains a network of white nodes and lines connecting them, set against a background of a city skyline at night.

# THE REAL-TIME SOLUTION FOR JAVA APPLICATIONS



## PTC Perc - The Embedded/Real-Time, Deterministic Virtual Machine

- ✓ Deterministic Garbage Collection Technology
- ✓ Java Standard Edition Compatible
- ✓ Symmetrical Multi-Processor Support
- ✓ Ahead-Of-Time (AOT), Just-In-Time (JIT), and Interpreted Compilation
- ✓ Eclipse-based Tool Chain
- ✓ Reduces Time and Cost of Development
- ✓ Guarantees System Availability



ptc perc®

# PTC PERC VERSUS JAVA STANDARD EDITION



## ptc perc<sup>®</sup> - the obvious choice

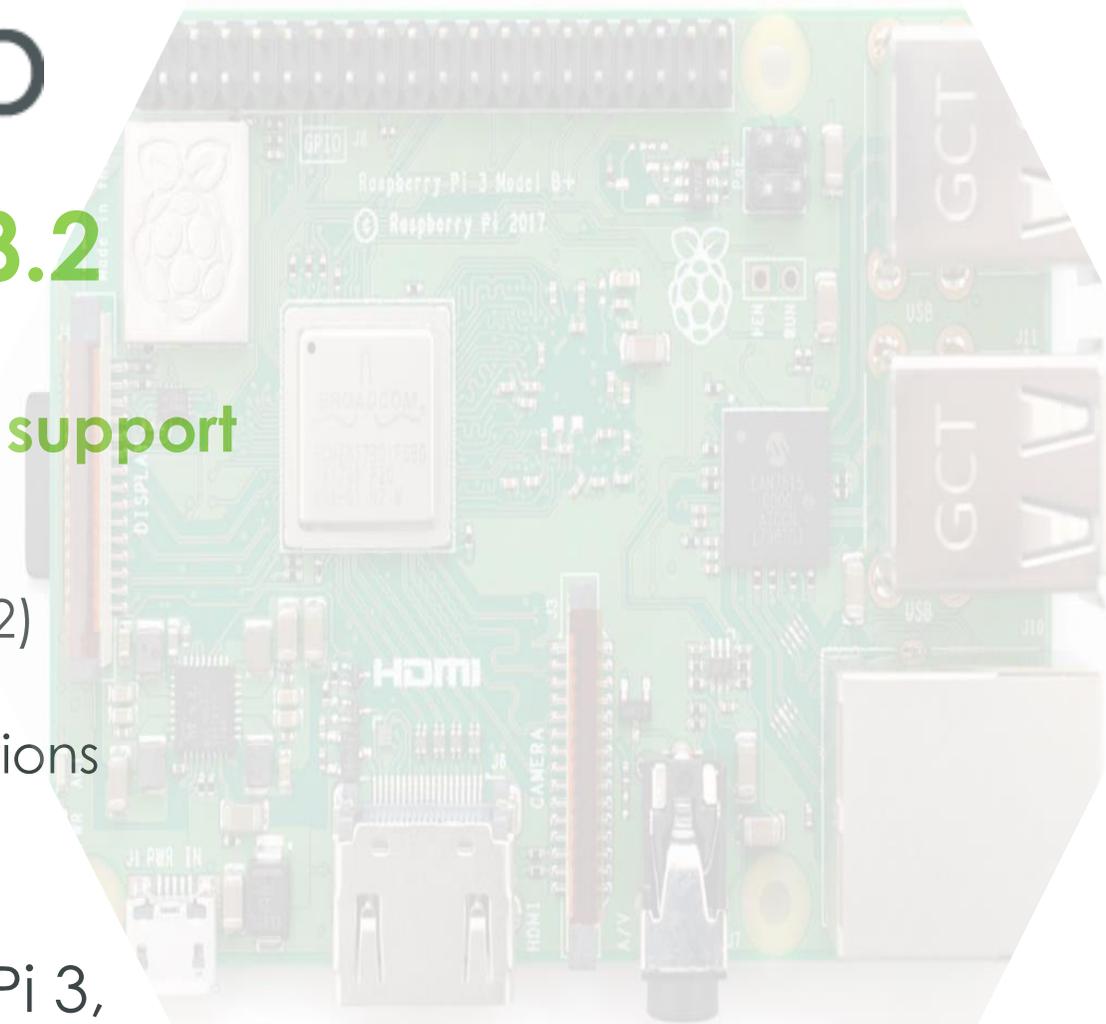
- ✓ For IoT Gateways
- ✓ For Edge Devices
- ✓ When application code security is important
- ✓ When long-lived, trusted execution is required
- ✓ When real-time, deterministic behavior is critical to application success

Feature	Java SE	PTC Perc
Just-in-Time (JIT) Compiler	✓ Yes	✓ Yes
Ahead-of-Time (AOT) Compiler	✗ No	✓ Yes
Real-Time Garbage Collector	✗ No	✓ Yes
Priority Inheritance Protocol	✗ No	✓ Yes
Precise Timing APIs	✗ No	✓ Yes
GC monitor and control APIs	✗ No	✓ Yes
Real-Time Scheduling	✗ No	✓ Yes
Page Locking	✗ No	✓ Yes

## ptc perc<sup>®</sup> ultra smp

## ptc perc<sup>®</sup> 64 **Version 8.2**

- **32-bit & 64-bit Linux/Intel and Linux/ARM support**
- **Key Features / Highlights**
  - Updated OpenJDK Library (Java 8 Update 162)
  - Faster real-time Garbage Collector
  - OpenJFX graphics supports Java 8 UI applications
  - AOT/JIT Compiled Lambda expressions for faster execution
- New Linux/ARM64 support for Raspberry Pi 3, IoT gateways





- Have Questions?
- Need more information?
- **Stop by the PTC exhibit for additional information on these PTC Developer Tools products!**

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