• Global Software Company, $1B+ Revenue
• Design, Manufacture, Operate, and Service “Things”
• Leading Industrial Innovation Platform and Solutions
• Global Network of 400K+ Developers and 1K+ Partners
WE ARE A GLOBAL TECHNOLOGY COMPANY

REVENUE BY VERTICAL

- Life Sciences: 5%
- Industrial Products: 32%
- Federal, Aerospace & Defense: 16%
- Electronics & High Tech: 15%
- Automotive: 14%
- Retail & Consumer: 9%
- Other: 9%

REVENUE BY REGION

- Americas: 43%
- Europe: 37%
- Asia Pacific: 20%
- Others: 10%

FAST FACTS

- $1.16B: FY17 total revenue
- 6K: employees
- 1K: partners
- 400K: ecosystem developers
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

- vuforia
- kepware
- creo®
- thingworx®
- windchill®
- thingworx® analytics
- vuforia™ studio
PHYSICAL DIGITAL CONVERGENCE
OPPORTUNITIES FOR INDUSTRIAL INNOVATION

IoT/Smart, Connected Products

Smart Manufacturing/Industrie 4.0

Smart Cities, Fields, & Worksites

Connected Service/Asset Maintenance
NEW STRATEGIC PARTNERSHIPS

ThingWorx Industrial Innovation Platform on Microsoft Azure cloud platform

ThingWorx IoT, Kepware industrial connectivity, Vuforia augmented reality combined with Rockwell Automation smart factory technologies
PTC Developer Tools

A Comprehensive Suite of Developer Tools for the Serious Engineer
Family of Ada compilers, runtime environments, and test tools for the development of complex applications

\[\text{ptc}^\circ \text{ objectada}^\circ\]
\[\text{ptc}^\circ \text{ apexada}^\text{™}\]
\[\text{ptc}^\circ \text{ adaworld}^\circ\]

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

\[\text{ptc} \text{ perc}^\circ\]
\[\text{ptc} \text{ perc}^\circ \text{ 64}\]
PTC Developer Tools
A Comprehensive Suite of Developer Tools for the Serious Engineer

ADA PRODUCTS UPDATE

June 2018
PTC ADA PRODUCT FAMILY OVERVIEW

**ptc® apexada™**
- **ptc® apexada** Developer
- **ptc® apexada** Embedded Developer

**ptc® objectada®**
- **ptc® objectada** for Windows
- **ptc® objectada** for Linux
- **ptc® objectada** Real-Time
- **ptc® objectada** Raven™

**ptc® objectada® 64**
- **ptc® objectada** 64 for Windows

**ptc® adaworld®**
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
• **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

*Released May 2018*
APEXADA V5.2 EMBEDDED EXEC/INTEL64

- 64-bit bare-board Ada runtime kernel for Intel X86_64
- Kernel support for interrupts, time, multiple threads of control
- Two kernel editions
  - Complete Ada tasking kernel
  - Smaller, sequential kernel
- Target Debug Monitor (TDM)
  - Supports download & debug
  - Serial edition / Network edition
- Enet TCP/IP TCP/UDP network stack
PTC OBJECTADA PRODUCTS

**ptc objectada® 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 V10.0 is now available!

ptc® objectada® for Windows V10.0

ptc® objectada® 64 for Windows V10.0

- 32-bit / 64-bit application development & execution
- First increment of Ada 2012 language feature support
- Windows 10 compatibility – also works with Windows 7 or later
- Based on Visual C++ 2017 tools and Windows 10 SDK libraries
- ADT Eclipse interface works with latest Eclipse versions

Released June 2018
- 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
- Predefined program library extensions
  - Ada.Strings extensions/new child packages
  - Ada.Wide_Characters.Handling
  - Ada.Wide_Wide_Characters_handling
  - Ada.Directories extensions
THE REAL-TIME SOLUTION FOR JAVA APPLICATIONS

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

- Patented, 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
- Broad embedded target OS/RTOS Coverage
- Reduces Time and Cost of Development
- Guarantees System Availability
PTC PERC VERSUS JAVA STANDARD EDITION

ptc perc® - 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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Java SE</th>
<th>PTC Perc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Just-in-Time (JIT) Compiler</td>
<td>✔ Yes</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Ahead-of-Time (AOT) Compiler</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Real-Time Garbage Collector</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Priority Inheritance Protocol</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Precise Timing APIs</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>GC monitor and control APIs</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Real-Time Scheduling</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
<tr>
<td>Page Locking</td>
<td>✗ No</td>
<td>✔ Yes</td>
</tr>
</tbody>
</table>
IOT GATEWAY SOFTWARE STACK USING PERC

- Typically runs Linux on x86 or ARM hardware
- PTC Perc provides real-time Java with sub-millisecond response
- OSGi framework provides Java software component model, over-the-air (OTA) updates, 3rd party plugin components for protocols, database, web, configuration, etc.
- Gateway-specific application code runs as an OSGi component
- Application can respond to events in real time
PERC USED IN AEGIS WARSHIP SOFTWARE UPGRADE

Software modernization project

- PTC Perc selected October, 2006 to implement improved user interfaces, new communication protocols, and new functionality in Java
- Uses Concurrent RedHawk Linux on Multi-Core x86 architecture

“PERC Ultra Virtual Machine passes muster on modernized missile cruiser USS Bunker Hill”
- March 2010 - “The combat readiness trials assert rigorous stress on the systems they test,” said Jim Sheridan, Lockheed Martin’s director, Aegis U.S, Navy Programs. “We appreciate Atego’s technical team’s dependability, responsiveness and support during our development and testing cycle.”

“USS John Paul Jones Makes History with Live Fire Missile Tests”
- June, 2014 - USS John Paul Jones successfully conducted five live-fire tests for the Baseline 9C Aegis Combat System during Combat Systems Ship’s Qual. Trials (CSSQT) and Naval Integrated Fire Control Counter Air (NIIFC-CA) capability
PERC CASE STUDY - SIEMENS AG

SPPA-T3000 Distributed Control System

- Improved plant availability, e.g. by predictive data analytics
- Quick reaction of the system or of the guided operator in critical situations
- Deployed in 2395 projects worldwide
- “A pre-emptible garbage collector combined with a transparent prioritization of the involved threads was the convincing base for building a deterministic, robust and maintainable solution. Another decisive factor was the Ahead-Of-Time (AOT) compilation mechanism available with PTC Perc…” – Andreas Drebinger, Siemens AG
- Uses Real-Time Linux on x86
PERC PRODUCT RELEASE UPDATE

PTC PERC® Ultra SMP
PTC PERC® 64

Version 8.2

Released June 2018

- **32-bit & 64-bit Linux/Intel and Linux/ARM support**
- **Key Features / Highlights**
  - Updated OpenJDK Library (Java 8 Update 162)
  - Redesigned, faster, real-time Garbage Collector
    - Improved support for Weak, Soft, and Phantom reference types
  - OpenJFX graphics supports Java 8 UI applications
  - AOT/JIT Compiled Lambda expressions provide faster execution
- New Linux/ARM64 support for Raspberry Pi 3, Samsung ARTIK 710 IoT gateway module
Have Questions?

Need more information?

Stop by the PTC exhibit for additional information on these PTC Developer Tools products!