AMD FOR BUSINESS – THE NEW STANDARD

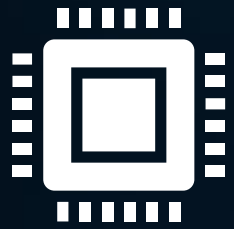
OCTOBER 2020

BENEFITS OF AMD RYZEN™ PROCESSORS ON 7nm

POWER OPTIMIZED

Focused design to deliver improved power efficiency

Up to 20+ hours of battery life with AMD Ryzen 7 PRO 4750U on a premium platform[1]



CORE DENSITY

With up to 8 cores and 16 threads, the AMD Ryzen7 PRO 4750U processor has the most cores and threads in an ultrathin business notebook[2]

COOL & QUIET

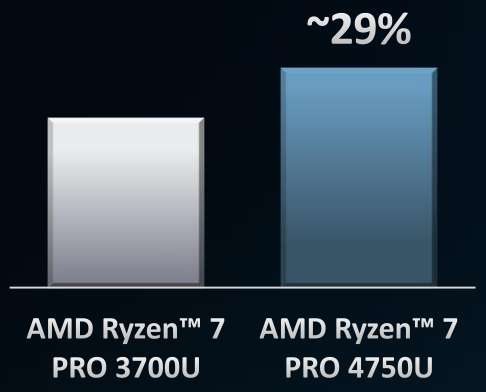
With a typical 15W TDP, AMD Ryzen PRO 4000 processors are designed for premium ultrathin, cool and quiet business notebooks

See endnotes 1. RNP-24, 2. RNP-19

GENERATIONAL LEAP IN PERFORMANCE

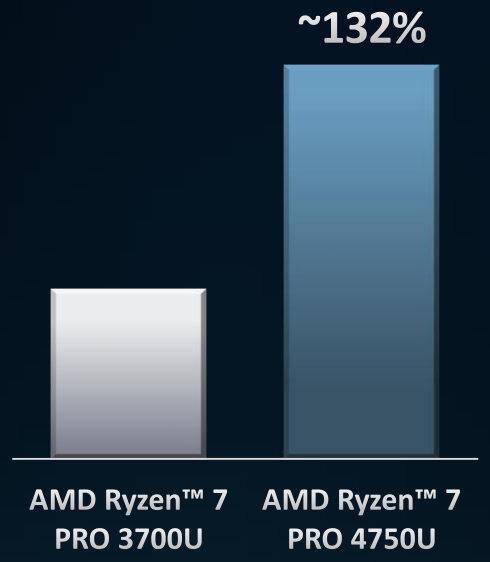
AMD RYZEN™ PRO 3000 VS. 4000 SERIES

SINGLE-THREAD PERFORMANCE



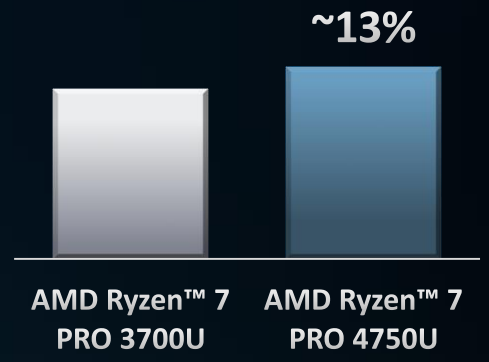
CINEBENCH R20 1T

MULTI-THREAD PERFORMANCE



CINEBENCH R20 NT

GRAPHICS PERFORMANCE

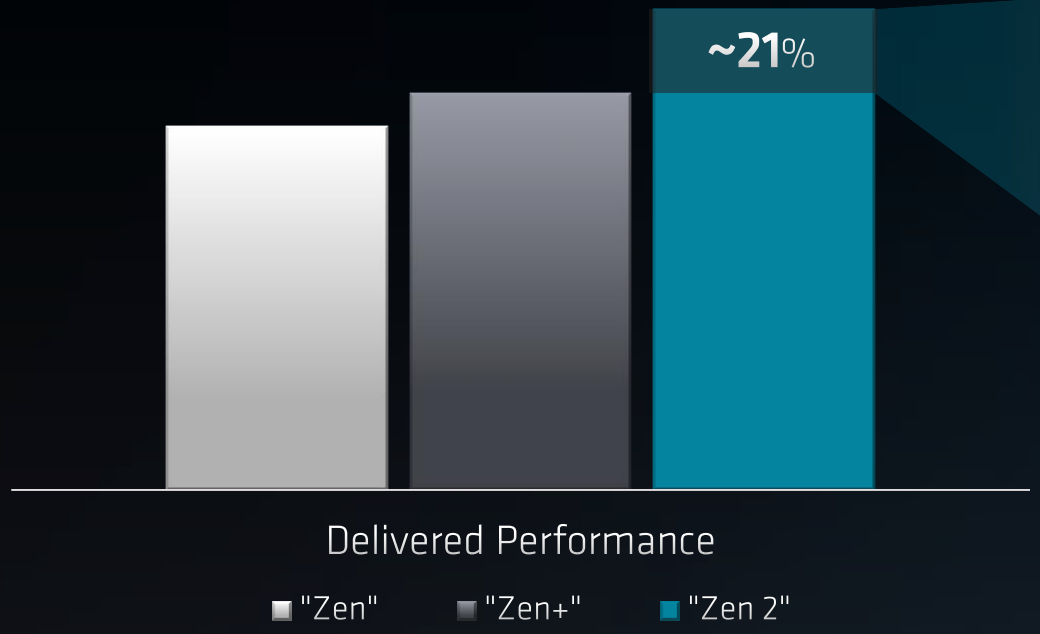


3DMARK® TIME SPY

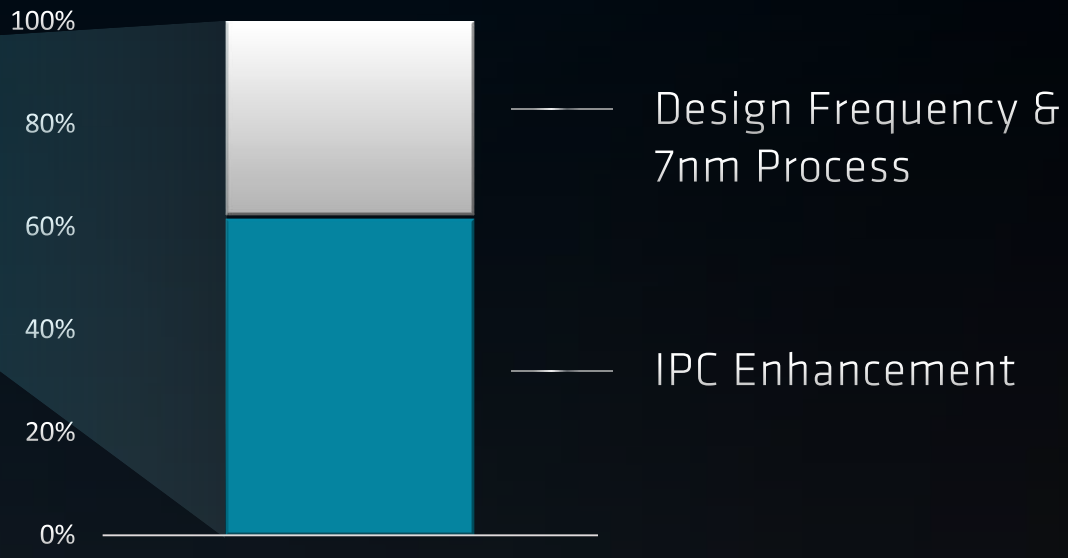
*See Endnotes: RNP-5 Results May Vary

SINGLE THREAD HIGH-PERFORMANCE

CINEBENCH R20 1T PERFORMANCE



"ZEN 2" PERFORMANCE CONTRIBUTORS

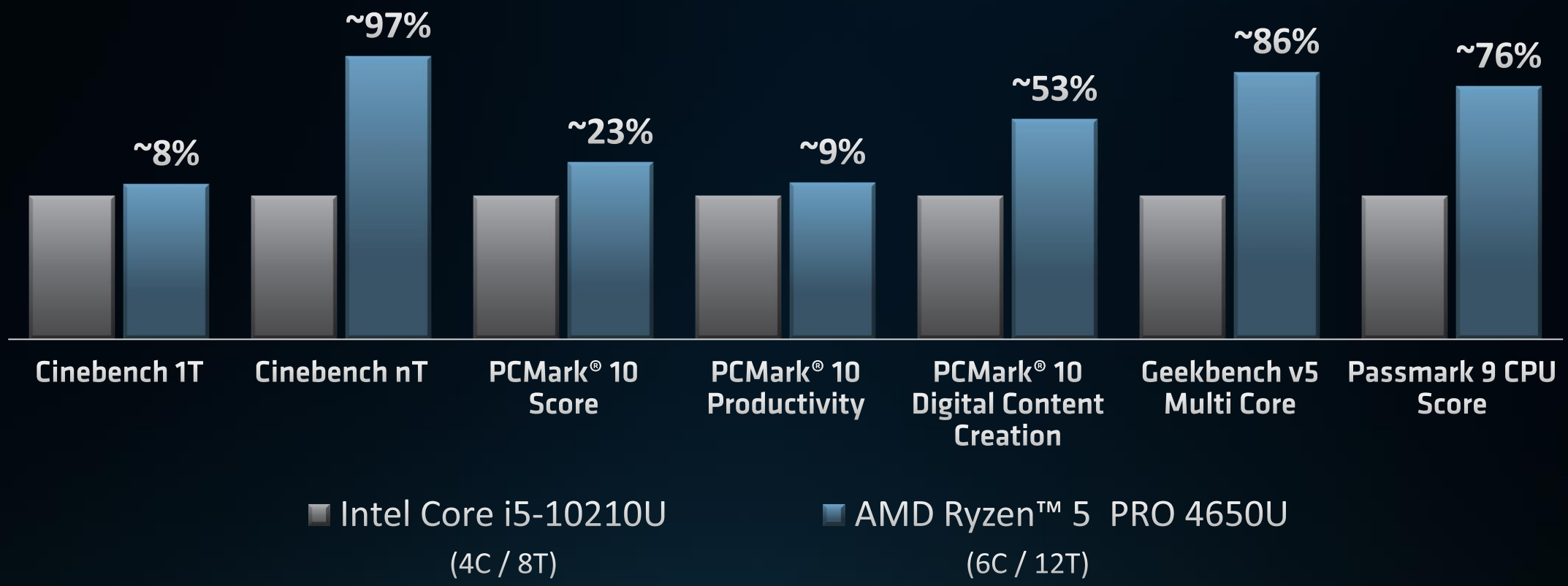


Significant Architecture Changes to Beat Industry Norm	Improved Branch Prediction	Higher Integer Throughput	Doubled Floating Point	Reduced Effective Latency to Memory

See endnotes RZ3-45 and RZ3-25. AMD internal estimate for performance contributors.

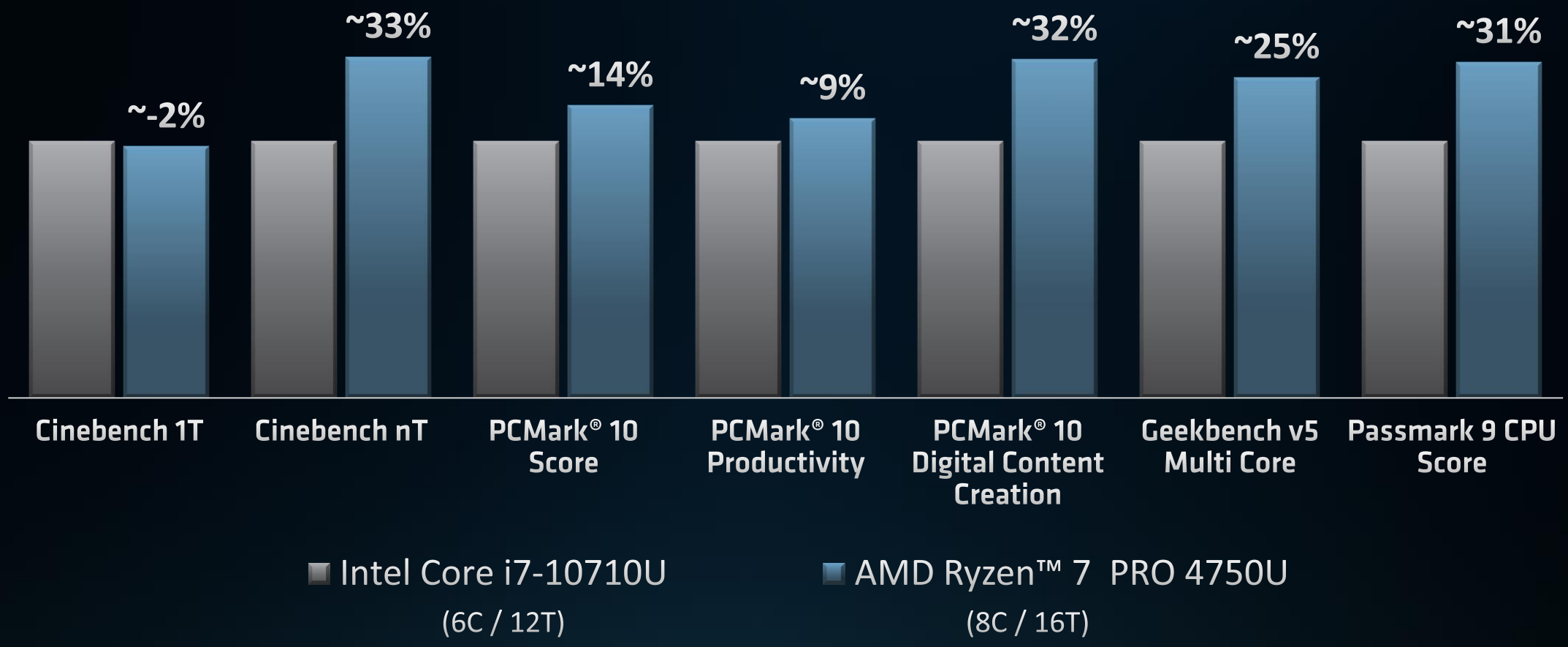
AMD

AMD RYZEN 5 PRO 4650U BENCHMARK LEADERSHIP



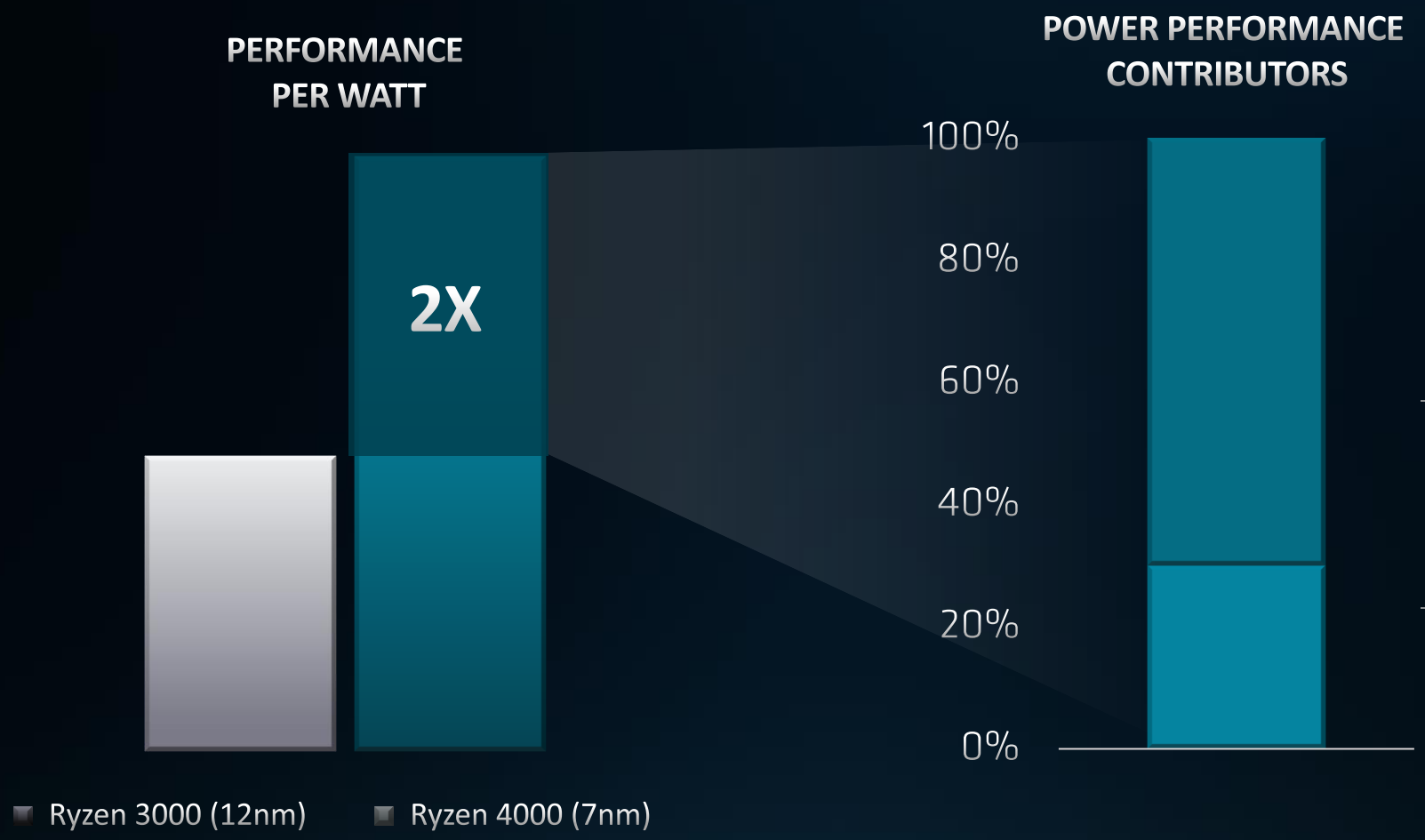
*See Endnotes: RNP-9 | RNP-15 Results May Vary

THE FASTEST PROCESSOR FOR ULTRA-THIN BUSINESS NOTEBOOKS



*See Endnotes: RNP-7 | RNP-17 Results May Vary

BREAKTHROUGH POWER EFFICIENCY

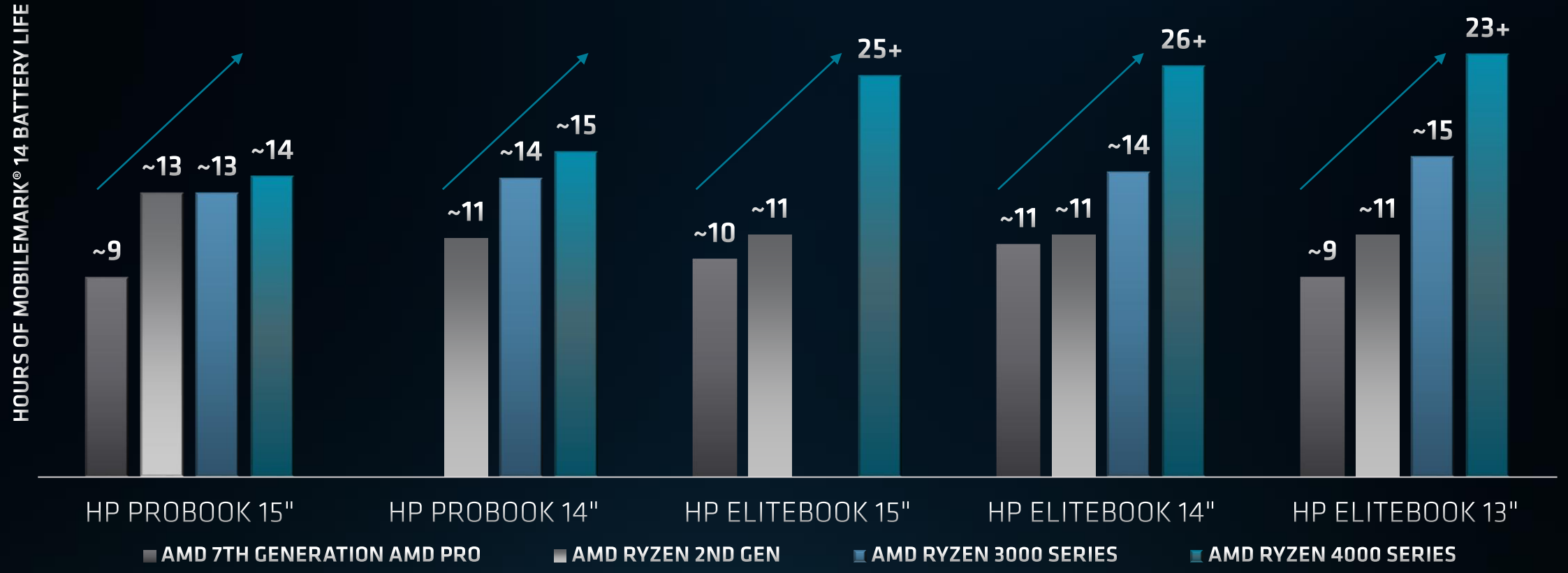


Based on AMD internal analysis and testing by AMD Performance Labs as of 11/22/2019 utilizing the Ryzen™ 7 4800U vs. 2nd Gen Ryzen™ 7 3700U in Cinebench R20 Benchmark. Results may vary. RM3-123

AMD

POWER YOUR WAY

AMD ENABLES LONG BATTERY LIFE

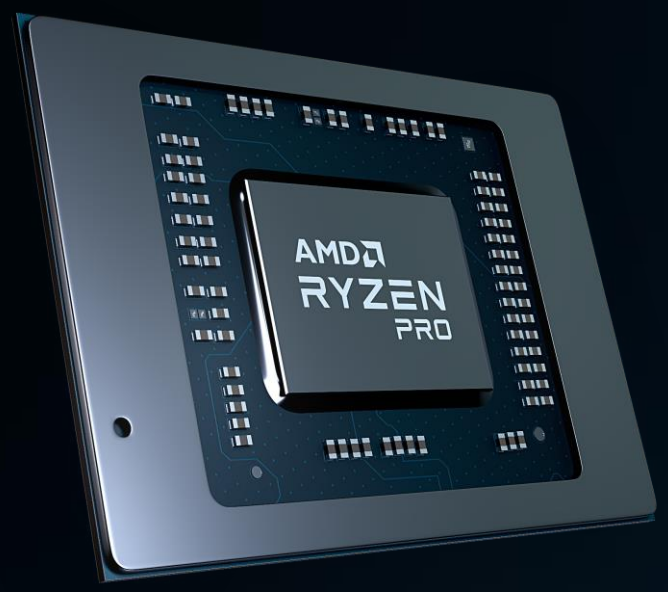


Battery life estimate is provided for informational purposes only and is based on OEM testing not independently verified by AMD. Data from HP Quick Spec documents and HP internal R&D data. HP 15" EliteBook was not refreshed for Picasso but will be for Renoir in 2020. AMD Renoir projections are preliminary and should not be shared outside of AMD and HP. Windows 10 MobileMark 14 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage.

AMD


Multitask like an octopus
Propel your productivity to the next level with AMD Ryzen™ 4000 Series Processors, featuring the most cores for ultrathin business laptops.
AMD
RYZEN

AMD PRO TECHNOLOGIES VS VPRO

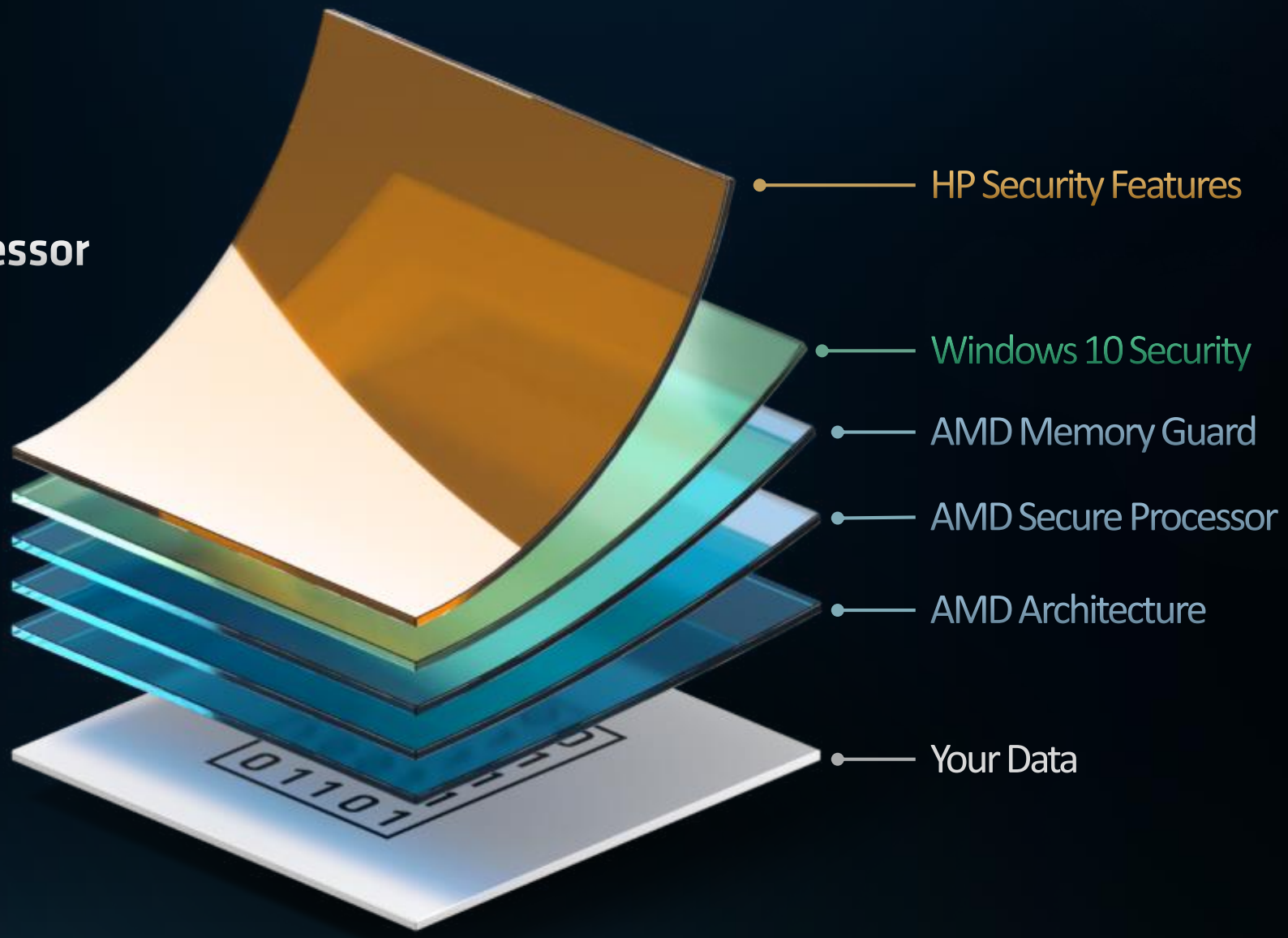


AMD PRO TECHNOLOGIES	Intel vPro
AMD PRO SECURITY Layers of built-in security technology to help protect your sensitive data	vPro Security
AMD PRO MANAGEABILITY For simplified deployment, imaging, and management that is compatible with your current infrastructure	Intel Active Management Technology (AMT)
AMD PRO BUSINESS READY 18 months of planned software stability brings peace of mind; 24 months of planned availability for a stable enterprise	Intel Stable Image Platform Program (SIPP)

AMD

LAYERED DEFENSES

Every AMD Ryzen PRO processor delivers the most modern security solution* through a layered approach



*As of February 2020. Defined by Microsoft secured core PC – Modern security RNP-22

STRONG SECURITY GETS STRONGER

CAN YOU AFFORD?

- Risking your business data
- Lower employee productivity from system downtime

SECURITY MITIGATIONS	"Zen"	ZEN 2
Spectre	Firmware and OS/VMM	Built-In Hardware
Speculative Store Bypass	OS/VMM	Hardware and OS/ VMM
Meltdown*	N/A	N/A
Foreshadow*	N/A	N/A
Lazy FPU*	N/A	N/A
Spoiler*	N/A	N/A
RIDL & Fallout*	N/A	N/A

*AMD believes AMD processors are not susceptible and no mitigation is required.
Visit https://www.amd.com/en/corporate/security-updates for more information and amd.com/en/corporate/product-security#paragraph-313561 for details.

AMD

POWERFUL SECURITY FEATURES BUILT IN

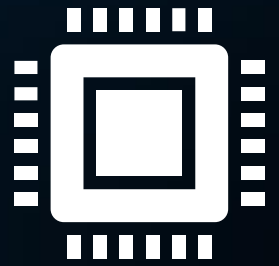
AMD MEMORY GUARD

The world's first and only business processor family with full memory encryption* as a standard security feature to help protect data should your PC be lost or stolen

AMD SECURE BOOT

Enables a secure boot process to help secure the PC.

Helps prevent threats from reaching critical software



AMD SECURE PROCESSOR

Helps protect a system by operating as a hardware root of trust for digital right management and firmware protection

See endnotes PP-3 & PP-12

AMD

LAYERS OF SECURITY FEATURES FROM THE ECOSYSTEM

AMD works closely with Microsoft and HP to enable and complement their enterprise-level security features

HP Sure Start

HP Sure Run

HP Sure Click

Microsoft

Advanced Threat Protection

Enhanced Sign-On

Bitlocker

Device Guard

Secured-core PC

AMD

AMD Memory Guard

AMD Secure Processor

AMD “Zen” Architecture

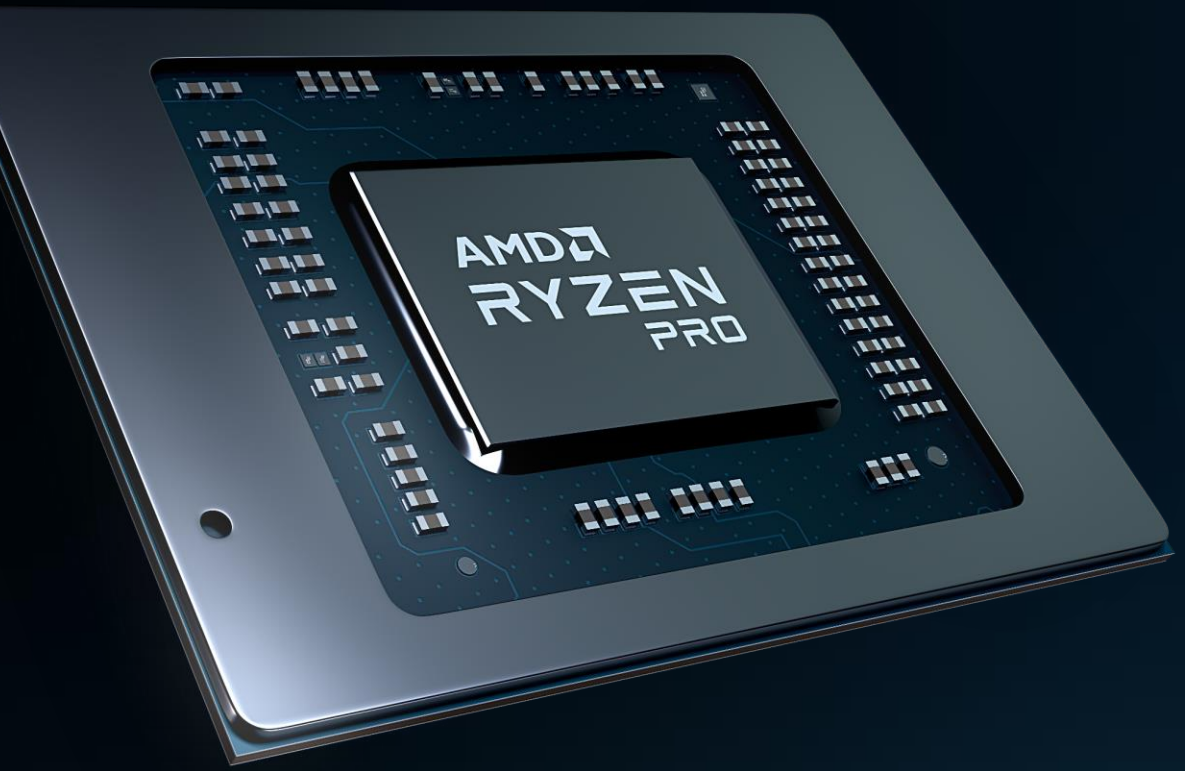
Steady as a rock

AMD PRO multi-layer security technology helps secure your business data and personal information, even on lost or stolen devices.

AMD RYZEN PRO

AMD PRO MANAGEABILITY

YOUR BUSINESS, YOUR CHOICE



MODERN MANAGEMENT

AMD Ryzen processors enable support for Microsoft Endpoint Manager to deliver a flexible and integrated cloud management solution

TRADITIONAL MANAGEMENT

All PRO processors from AMD enable a full manageability feature set for simplified deployment, imaging, and management that is compatible with your current infrastructure

AMD

Don’t get trapped inside

With cross-platform manageability in every product, AMD PRO technologies means no vendor lock-in, so you’re free to deploy your way.

AMD RYZEN PRO

CHOOSE AMD FOR BUSINESS – THE NEW STANDARD FOR MODERN PCs

- PRODUCTIVITY
  - More Performance
  - Over 26 Hours Battery Life
  - Richer Configs
- PROTECTION
  - Supports HP & Microsoft Security
  - Architected for Security
  - Dedicated Security Processor
  - AMD Memory Guard
- PROFESSIONAL
  - Class Leading Designs
  - Most advanced and Capable Manufacturing Process
  - Provides Enterprise Features on ALL PRO Processors with NO Premium

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AMD

NOTES

ROM-557 Estimates based on AMD Server Virtualization TCO (total cost of ownership) Estimator tool v5.5, comparing the AMD EPYC™ and Intel® Xeon® server solutions required to deliver 320 total virtual machines (VM), requiring 1 core and 8GB of memory per VM, with a minimum total solution memory requirement of 2.56 TB of memory. The analysis includes both hardware and virtualization software components. For 320 VMs and 1 core per VM, the Intel _Gold_6250 processor requires 20 - 2P servers. The AMD EPYC_7702P solution requires 5 - 1P servers. Virtualization software pricing as of October 2019. Third party names are for informational purposes only and may be trademarks of their respective owners. This scenario contains many assumptions and estimates and, while based on AMD internal research and best approximations, should be considered an example for information purposes only, and not used as a basis for decision making over actual testing. All pricing is in USD.

RZN-11 Updated Feb 28, 2017: Generational IPC uplift for the "Zen" architecture vs. "Piledriver" architecture is +52% with an estimated SPECint_base2006 score compiled with GCC 4.6 –O2 at a fixed 3.4GHz. Generational IPC uplift for the "Zen" architecture vs. "Excavator" architecture is +64% as measured with Cinebench R15 1T, and also +64% with an estimated SPECint_base2006 score compiled with GCC 4.6 –O2, at a fixed 3.4GHz. System configs: AMD reference motherboard(s), AMD Radeon™ R9 290X GPU, 8GB DDR4-2667 ("Zen")/8GB DDR3-2133 ("Excavator")/8GB DDR3-1866 ("Piledriver"), Ubuntu Linux 16.x (SPECint_base2006 estimate) and Windows® 10 x64 RS1 (Cinebench R15). SPECint_base2006 estimates: "Zen" vs. "Piledriver" (31.5 vs. 20.7 | +52%), "Zen" vs. "Excavator" (31.5 vs. 19.2 | +64%). Cinebench R15 1t scores: "Zen" vs. "Piledriver" (139 vs. 79 both at 3.4G | +76%), "Zen" vs. "Excavator" (160 vs. 97.5 both at 4.0G| +64%). RZN-11

PP-16 - As of July 2019. Battery life estimate is provided for informational purposes only, and is based on HP's published battery life results using the MobileMark 2014 benchmark. Battery life results have not been independently tested or verified by AMD. See bapco.com for additional details. System Configuration: HP EliteBook 745 G6, 2nd Gen Ryzen™ 7 PRO 3700U processor, 14" Display, Up to 14.75 hour of battery life with 50Wh battery. http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA7-5391EEAP.pdf | HP EliteBook 745 G5, 1nd Gen Ryzen™ 7 PRO 2700U processor, 14" Display, Up to 11.75 hour of battery life with 50Wh battery. https://store.hp.com/us/en/pdp/hp-elitebook-745-g5-notebook-pc-p-4jb96ut-aba-1 14.75 / 11.75 = 1.26 or 26% higher. Results may vary based on a variety of factors, including time, usage, configuration, and manufacturing variability. Battery life estimate is provided for informational purposes only, and is based on OEM testing not independently verified by AMD. https://www.lenovo.com/ca/en/laptops/thinkpad/thinkpad-t-series/T495s/p/22TP2TT495S https://www.lenovo.com/ca/en/laptops/thinkpad/thinkpad-t-series/T495/p/22TP2TTT495 https://www.lenovo.com/us/en/laptops/thinkpad/thinkpad-x/X395/p/22TP2TXX395

PP-8 Testing conducted by AMD Performance Labs as of January 10, 2019 | Cinebench nT used to measure CPU Multi Thread Performance. Performance presented in i7-7600U | (HP EliteBook 840 G4) (100%) vs Ryzen 7 PRO 3700U scored a 688.4775, i7-8650U | (HP EliteBook 840r G4) scored a 593.24 while the i7-7600U (HP EliteBook 840 G4) scored a 349.885 for a comparison of 688.4775/349.885=1.97 and 593.24/349.885=1.70 respectively. PCMark 10 used to measure System Performance. Performance presented in i7-7600U | (HP EliteBook 840 G4) (100%) vs Ryzen 7 PRO 3700U scored a 4075.5, i7-8650U | (HP EliteBook 840r G4) scored a 4063.75 while the i7-7600U (HP EliteBook 840 G4) scored a 3688 for a comparison of 4075.5/3688=1.11 and 4063.75/3688=1.10 respectively. 3DMark 11 Performance used to measure Graphics Performance. Performance presented in i7-7600U | (HP EliteBook 840 G4) (100%) vs Ryzen 7 PRO 3700U scored a 4432.25, i7-8650U | (HP EliteBook 840r G4) scored a 2153 while the i7-7600U (HP EliteBook 840 G4) scored a 1919 for a comparison of 4432.25/1919=2.31 and 2153/1919=1.12 respectively. System Configurations: AMD Ryzen™ 7 PRO 3700U, 2x4GB DDR4, Radeon™ Vega 10 Graphics (driver 25.20.14102.16), Samsung 850 Pro SSD, Windows® 10 Pro x64 | Intel i7-8650U, 2x4GB DDR4, Intel UHD 620 Graphics (driver 23.20.16.4973), Samsung 850 Pro SSD, Windows® 10 Pro x64 | Intel i7-7600U, 2x4GB DDR4, Intel HD 620 Graphics (driver 23.20.16.5018), Samsung 850 Pro SSD, Windows® 10 Pro x64 | PCMark and 3DMark are registered trademarks of Futuremark Corporation. PC manufacturers may vary configurations yielding different results. All scores in are an average of 3 runs with the same settings. Performance may vary based on use of latest drivers. PP-8

PP-12 "Processor for commercial ultrathin notebooks" defined as 15W typical TDP. Testing conducted by AMD performance labs as of January 10, 2019 Cinebench R15 nT ("CPU"): Core i7-8650U vs. Ryzen™ 7 PRO 3700U: 593.2 vs. 688.5 (16%/1.16X faster for AMD); 3DMark® 11 Performance ("GPU"): Core i7-8650U vs. Ryzen™ 7 PRO 3700U: 2153 vs. 4432.3 (106%/2.06X faster for AMD). System Configurations: AMD Ryzen™ 7 PRO 3700U, 2x4GB DDR4, Radeon™ Vega 10 Graphics (driver 25.20.14102.16), Samsung 850 Pro SSD, Windows® 10 Pro x64 | Intel i7-8650U, 2x4GB DDR4, Intel UHD 620 Graphics (driver 23.20.16.4973), Samsung 850 Pro SSD, Windows® 10 Pro x64 | 3DMark is a registered trademarks of Futuremark Corporation. PC manufacturers may vary configurations yielding different results. All scores in are an average of 3 runs with the same settings. Performance may vary based on use of latest drivers. PP-12

PP-7 Testing conducted by AMD Performance Labs as of January 10, 2019. Cinebench 1T used to measure CPU Single Thread Performance. Performance presented in A12-9800B (100%) vs Ryzen 7 PRO 3700U scored a 152.0475, Ryzen 7 PRO 2700U scored a 140.1425 while the A12-9800B scored a 84.75 for a comparison of 152.0475/84.75=1.79 and 140.1425/84.75=1.65 respectively. Cinebench nT used to measure CPU Multi Thread Performance. Performance presented in A12-9800B (100%) vs Ryzen 7 PRO 3700U scored a 688.4775, Ryzen 7 PRO 2700U scored a 634.345 while the A12-9800B scored a 240 for a comparison of 688.4775/240=2.87 and 634.345/240=2.64 respectively. PCMark 10 used to measure System Performance. Performance presented in A12-9800B (100%) vs Ryzen 7 PRO 3700U scored a 4075.5, Ryzen 7 PRO 2700U scored a 3494 while the A12-9800B scored a 2547.33 for a comparison of 4075.5/2547.33=1.60 and 3494/2547.33=1.37 respectively. 3DMark 11 Performance used to measure Graphics Performance. Performance presented in A12-9800B (100%) vs Ryzen 7 PRO 3700U scored a 4432.25, Ryzen 7 PRO 2700U scored a 4125 while the A12-9800B scored a 1947 for a comparison of 4432.25/1947=2.28 and 4125/1947=2.12 respectively. System Configurations: AMD Ryzen™ 7 PRO 3700U, 2x4GB DDR4, Radeon™ Vega 10 Graphics (driver 25.20.14102.16), Samsung 850 Pro SSD, Windows® 10 Pro x64 AMD Ryzen™ 7 PRO 2700U, 2x4GB DDR4, Radeon™ Vega 10 Graphics (driver 25.20.14102.16), Samsung 850 Pro SSD, Windows® 10 Pro x64 AMD PRO A12-9800B, 2x4GB DDR4, Radeon™ R7 Graphics (driver 22.19.662.4), Samsung 850 Pro SSD, Windows® 10 Pro x64 PCMark and 3DMark are registered trademarks of Futuremark Corporation. PC manufacturers may vary configurations yielding different results. All scores in are an average of 3 runs with the same settings. Performance may vary based on use of latest drivers. PP-7

RZ3-45 Testing by AMD Performance Labs as of 06/03/2019 utilizing 3rd Gen AMD Ryzen™ Processors: 3900X, 3800X, 3700X, 3600X, 3600 and Ryzen™ 7 2700X in Cinebench R20 1T. Results may vary.
RZ3-25 Testing by AMD Performance Labs as of 06/03/2019 utilizing an AMD Ryzen™ 7 1800X and 2700X in Cinebench R20 1T. Results may vary.

PP-17

CineBench R20 n-thread Score: Core i5-8365U: 1250.7 (100% baseline) Ryzen™ 5 3500U: 1392.1 (111%) 3DMark 11 Performance Score: Core i5-8365U: 2053.5 (100% baseline) Ryzen™ 5 3500U: 4159.3 (203%) PCMark 10 Extended Score: Core i5-8365U: 2809.5 (100% baseline) Ryzen™ 5 3500U: 2925.0 (104%) PCMark10 Digital Content Creation Subtest Score: Core i5-8365U: 3067.0 (100% baseline) Ryzen™ 5 3500U: 3333.5 (109%)	HP ProBook 445R G6 APU • CPU: AMD Ryzen™ 5 3500U • RAM: 2x4GB 2400 MHz • Graphics: Radeon Vega 8 Graphics driver 26.20.12001.7006 • SSD: Samsung 850 PRO 512GB • OS: Microsoft Windows 10 Professional (x64) Build 18362.175 LENOVO ThinkPad T490s • CPU: Intel Core i5-8365U • RAM: 2x4GB • Graphics: Intel UHD Graphics 630 driver 26.20.100.6860 • SSD: Samsung SSD 850 EVO M.2 500GB • OS: Microsoft Windows 10 Professional (x64) Build 18362.239

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"Zen" is a codename for AMD architectures, and is not a product name. GD-122

AMD