

# HPE AND AMD DELIVER A COMPELLING PORTFOLIO FOR THE MODERN BUSINESS

## INTRODUCTION

The modern business is undergoing digital transformation to be faster and more responsive to the market's needs. And the outbreak of COVID-19 has expanded the scope of many transformation projects to support an increasingly remote workforce. Indeed, digital transformation is more than a trend – it is a fundamental shift both operationally and organizationally – and it's rooted in technology.

The workloads that drive the digitally transformed business require infrastructure designed to deliver optimal performance and lock-down security. That translates into infrastructure rich in platform features and capabilities and able to support both a target workload and the unknown “what's next” in this software-defined world.

This brief will look at the evolution of Hewlett Packard Enterprise's (HPE) ProLiant Gen10 Plus portfolio based on the 3rd Generation AMD EPYC™ Processor, and how HPE has leveraged the capabilities of this processor to its fullest extent in workload - optimized solutions. Further, we will explore the industry-leading security features resulting from the HPE and AMD partnership. Finally, this paper will discuss the ability for organizations to consume these solutions “as-a-service” through GreenLake.

## SETTING THE STAGE – MODERNIZED WORKLOADS START WITH MODERNIZED INFRASTRUCTURE

Database, big data and data analytics, hybrid multi-cloud, virtual desktop infrastructure (VDI), and virtualized workloads are many of the components that, when deployed properly, enable the modern enterprise to evolve. The ability to capture, transform, and act on data faster than the competition is critical to a business's success.

Further, IT organizations are increasingly relying on newer deployment models to deliver applications and data. Hyperconverged infrastructure (HCI) is an excellent example of how IT organizations look to drive operational efficiency through a centrally deployed and managed virtualized environment.

In both cases, the workloads and applications that drive the business are only as fast, secure, and reliable as the underlying infrastructure. That infrastructure must start with a CPU architected for the modern workload and a system that unlocks all that CPU's capabilities. Further, infrastructure providers must deliver solutions that support today's workloads while having a richness of features to power tomorrow's workloads. Yes, ironically, in a software-defined era, infrastructure has never mattered more.

Lastly, business craves “everything-as-a-service,” giving IT departments a competitor – it’s called the public cloud – and IT customers a choice. Therefore, IT must deliver everything faster, cheaper, and more securely.

Moor Insights & Strategy (MI&S) believes HPE is well-positioned to deliver on this vision of the future with its ProLiant portfolio built on the 3<sup>rd</sup> Generation AMD EPYC Processor. The companies have partnered to deliver rich features with a zero-trust approach to security as a service.

### 3<sup>RD</sup> GENERATION AMD EPYC PROCESSOR – QUICK OVERVIEW

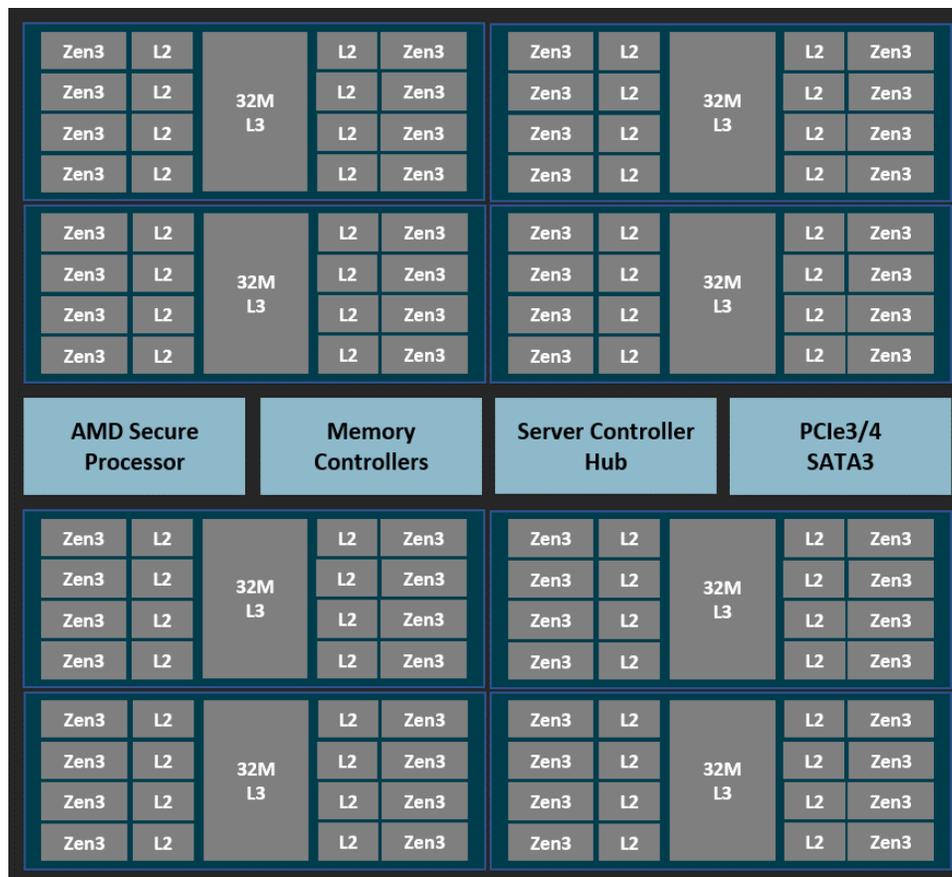
As previously mentioned, the performance and security of a server start with the CPU. With the 3<sup>rd</sup> Generation EPYC Processor, AMD has a CPU architecture that leads the industry in many performance measures and security features.

EPYC is the only x86 CPU built on a cutting-edge 7nm manufacturing process. This means better performance with lower power consumption, leading to a lower total cost of ownership.

Paired with that industry-leading manufacturing process is a set of technical specifications unrivaled in the x86 server CPU market, including:

- Up to 64 (128 threads) high-performance processing cores
- Up to 4TB of DDR4 RAM per CPU, with flexible configuration capabilities
- 8 memory channels per CPU, enabling better performance for memory-hungry applications
- 128 lanes of PCIe Gen4 I/O, enabling rich options for local storage and application accelerators
- Advances in security capabilities that protect systems from boot to OS load to virtualized environments

FIGURE 1: EPYC ARCHITECTURE



Source: Moor Insights & Strategy

One of the approaches AMD takes is fidelity of features across the stack. From the lowest-performing CPU to the highest, EPYC has a consistent set of features – I/O lanes, memory channels, security capabilities, etc. This unique approach demonstrates an understanding that customer needs don't change depending on the selection of a CPU core count or the number of sockets in a server.

Those familiar with EPYC may think this generation is quite similar to the 2<sup>nd</sup> Generation EPYC Processor, but this is not the case. While the topline specifications look familiar, core architectural changes along with memory and caching configuration improvements translate into greater performance in the workloads that are powering today's enterprise.

AMD claims strong generational performance gains in the 3<sup>rd</sup> Generation EPYC Processor, including:

- 19% increase in Instructions Per Clock (IPC), an indicator of real-world core performance<sup>1</sup>
- 21% increase in performance of Java-based applications<sup>2</sup>
- 17% increase in 2P floating point performance, an indicator of improved support for HPC applications<sup>3</sup>

These numbers demonstrate more than incremental updates. Rather, they demonstrate architectural improvements that can substantially improve the performance of enterprise business applications with diverse performance characteristics and computational needs.

It is a similar situation with security. Although the security changes in this new generation may seem minor, AMD has deepened the system-level protection it provides. For example, Secure Encrypted Virtualization (SEV) has always been built into EPYC. The 2nd Generation EPYC built on these capabilities, and with the 3rd Generation, AMD focuses on protection of the entire virtualized environment with support for Nest Page Tables through SEV-SNP. For administrators of virtualized environments, this should be a welcome feature.

## HPE'S EXPANDED PORTFOLIO MAPS TO THE WORKLOADS THAT POWER THE MODERN DATACENTER

Just as workloads are only as performant as the infrastructure that hosts them, CPUs are only as powerful as the systems that embrace and light up their features. And in the case of HPE and AMD, ProLiant appears to be well-positioned to lead in the market.

The HPE ProLiant DL325 Gen10 Plus and DL385 Gen10 Plus were introduced late in 2019 to accommodate full system-level support for EPYC's capabilities, such as PCIe

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All performance claims are based on internal AMD testing.

<sup>1</sup> IPC performance based on testing as of 2/1/2021, average performance improvement at ISO-frequency on an EPYC 72F3 compared to an EPYC 7F32, per core, single thread, using a select set of workloads including estimated SPECrate2017\_int\_base, SPECrate2017\_fp\_base and representative workloads

<sup>2</sup> Java results based on internal AMD testing using two AMD EPYC 7763 CPUs with 512 GB (RAM) 16x32GB DIMMs of DDR4, running SPECJBB2015

<sup>3</sup> HPC results based on internal AMD testing using the above configuration (7763 w/ 512G) running SPECrate2017\_FP\_BASE)

Gen4 support. These models will be relaunched as HPE ProLiant DL325 Gen10 Plus v2 and DL385 Gen10 Plus v2, with the DL325 sporting a new, shorter chassis design and both platforms supporting a tri-mode storage controller.

The additions of the HPE ProLiant DL345 Gen10 Plus and ProLiant DL365 Gen10 round out a portfolio that supports all performance profiles. Combined, these four platforms should enable HPE to address any digital transformation project with its EPYC-based portfolio.

**FIGURE 2: HPE EPYC-BASED GEN10 PLUS PORTFOLIO**

	ProLiant DL325	ProLiant DL345	ProLiant DL365	ProLiant DL385
<b>HPE Value Statement</b>	Low-Cost Performance	Storage Optimized	Rack Optimized Density	Accelerator Optimized
<b>Form Factor/Sockets</b>	1 Rack Unit (RU)   1P	2 Rack Unit (RU)   1P	1 Rack Unit (RU)   2P	2 Rack Unit (RU)   2P
<b>HPE Workload Focus</b>	Entry level VDI	Database	Enterprise VDI	ML, Big Data Analytics
<b>Total Cores</b>	64 (128 threads)	64 (128 threads)	128 (256 threads)	128 (256 threads)
<b>Total Memory</b>	4TB (8 mem channels)	4TB (8 mem channels)	8TB (16 mem channels)	8TB (16 mem channels)
<b>Management</b>	iLO5	iLO5	iLO5	iLO5
<b>Security</b>	HPE Secure Supply Chain HPE Silicon Root of Trust AMD Secure Memory Encryption AMD Secure Encrypted Virtualization - ES - SNP	HPE Secure Supply Chain HPE Silicon Root of Trust AMD Secure Memory Encryption AMD Secure Encrypted Virtualization - ES - SNP	HPE Secure Supply Chain HPE Silicon Root of Trust AMD Secure Memory Encryption AMD Secure Encrypted Virtualization - ES - SNP	HPE Secure Supply Chain HPE Silicon Root of Trust AMD Secure Memory Encryption AMD Secure Encrypted Virtualization - ES - SNP

*Source: Moor Insights & Strategy*

The previous-generation HPE ProLiant DL385 Gen10 Plus is the best-selling EPYC-based ProLiant. As seen in the above table, HPE targets the HPE ProLiant DL385 Gen10 Plus v2 at many of the traditional datacenter workloads such as virtualized infrastructure and data analytics. However, given the ability to support a large number of GPUs and application accelerators, the new HPE ProLiant DL385 Gen10 Plus v2 should be an ideal platform for Artificial Intelligence/Machine Learning (AI/ML) – an essential workload in driving digital transformation.

Organizations should also find success using the DL385 to power many back-end, performance-hungry applications that drive product development and manufacturing. Marrying the 3<sup>rd</sup> Generation AMD EPYC CPU with outstanding floating-point performance to a host of application accelerators should enable workloads like electronic design automation (EDA) to perform optimally.

As mentioned, the HPE ProLiant DL365 Gen10 Plus is new to the HPE portfolio with the expansion of Gen10 Plus. This 1U, dual-socket server is all about compute density. HPE sees the DL365 as an ideal platform for enterprise virtual desktop infrastructure (VDI) with its rich core count and ability to support up to 3 x16 PCIe Gen4 slots. Given the compute density in the DL365, MI&S also sees the DL365 as a candidate for virtualized infrastructure. It can deliver the highest number of cores per rack unit (RU) of any HPE platform. Finally, the specifications of the DL365 indicate a robust enterprise-grade HCI platform. From Nutanix to VMware to HPE's own SimpliVity and Nimble dHCI – the DL365 has the compute, memory, and storage capacity to support the initial deployment and growth of HCI environments.

The ProLiant DL345 Gen10 Plus Server is HPE's other new entry to the EPYC-based portfolio. This 2RU, single-socket server platform is rich in storage, making it a good database management system platform. The single-socket powered by AMD's "F" Series EPYC processors (performance core optimized) should be able to deliver optimal performance for database environments such as Microsoft's SQL Server 2019.

At the entry-level of the ProLiant family of servers is the redesigned DL325 Gen10 Plus v2. This single socket, standard depth, 1RU cost-optimized server platform is designed to support entry-level VDI deployments and the like. Given the cost-performance of the DL325, MI&S sees this as a strong candidate for HCI deployments in "clean edge" environments such as remote office/branch office (RoBo), retail, health care, and the like.

The EPYC-based ProLiant portfolio is certainly richer with the addition of the DL345 and DL365. However, what is most impressive warrants repeating: The way HPE designed this portfolio around EPYC makes it capable of supporting virtually all the workloads that drive the datacenter. Some workloads are very memory intensive. Others require a lot of high-performance localized storage or compute and compute acceleration functionality. The HPE portfolio supports all these workload requirements and delivers outstanding performance.

One could argue that the adoption of virtualization made every server a "Swiss Army Knife," and to an extent this may be true. However, as utilitarian as a Swiss Army Knife is, it is not known for performing any single function especially well. Conversely, the rich feature set of EPYC combined with its large shared L3 cache and memory improvements make this a CPU well-suited for all workloads. As a result, IT organizations can get best-of-breed performance, functionality, and uncompromised security with the current ProLiant lineup.

## *UNCOMPROMISED SECURITY*

While this paper reveals the new security capabilities delivered in the 3<sup>rd</sup> Generation AMD EPYC processor, it is HPE's security capabilities that complete the holistic protections required by IT organizations.

What makes HPE's approach to securing its servers compelling is its focus on the complete system, from sourcing components to end of life – zero trust across the product lifecycle. The elements of that approach include:

- A secure supply chain is more than working with trusted partners for materials and components. It's an organizational commitment and approach to ensuring integrity in the sourcing process.
- This commitment continues through the manufacturing and shipping process. HPE has established a secure manufacturing facility with higher requirements around security and integrity and employees who have passed extensive background checks and clearances.
- Regardless of where systems are manufactured and the route to the customer, HPE ProLiant servers go through a validation process, confirming no tampering or modification has taken place.
- One of the better-known features of HPE servers is Silicon Root of Trust. This is a technology that, as the name implies, is rooted in silicon and validates BIOS and an immutable digital fingerprint before allowing the boot process to complete. This level of security is what guards HPE servers so well from low-level ransomware attacks.
- Once the server boots into a validated, pristine state, AMD security technologies add further protection by encrypting the physical memory and virtual machines through Secure Memory Encryption (SME) and Secure Encrypted Virtualization (SEV).
- If a cyber-event is detected, HPE's Integrated Lights-Out (iLO) tool can immediately isolate and remove the threat and restore the server to its last known good state.
- Finally, as the server life ends, HPE employs a program that enables customers to safely and securely recycle server platforms.

MI&S sees HPE's approach to security as one which should instill confidence in IT organizations.

## GREENLAKE - THE BENEFITS OF THE CLOUD, WITHOUT THE COST

One of the outcomes of any digital transformation project is business agility. If your business can't respond faster than the competition, you lose. Business units therefore require the availability of IT services on demand. The result? IT faces stiff competition from the public cloud. In fact, many of the IT organizations MI&S speaks with articulate the challenges faced with "managing" shadow IT operations. Some industry estimates put the cost at up to 40% of an IT group's operating budget.

So, IT organizations must respond to the needs of their internal customers faster than the public cloud – at a lower cost.

HPE has been an industry leader in bringing the cloud agility concept to businesses of all sizes without the exponential growth in cost through GreenLake. GreenLake is a consumption-based model by which HPE enables IT organizations to quickly stand up products and services in response to the business's needs. Further, GreenLake's pricing model allows IT organizations to pay only for those resources used. MI&S sees GreenLake's three most significant benefits to an IT organization as:

- **Reducing time-to-value:** Being able to deploy solutions at the flip of the "proverbial switch" enables businesses to more quickly utilize technology to anticipate and act on market trends instead of responding after the fact.
- **Shifting cost burden:** GreenLake services from HPE are designed to be consumed in the same manner as cloud services. Why is this important? It should reduce the CapEx burden associated with traditional IT services and significantly add to the all-important "time-to-value" metric.
- **Simplifies the adoption of new technology:** IT is continuously bombarded with requests from business units to deploy new technologies believed to add a competitive advantage in the market. New, unfamiliar technologies may indeed be a difference-maker but are difficult to successfully to deploy, optimize, and manage. This challenge – which has limited IT for as long as IT has been in existence – disappears with GreenLake. This ability to adopt new technologies enables smaller organizations to take on bigger competitors and shifts IT's role from a "break/fix" organization to a trusted adviser.

## CALL TO ACTION – IN CLOSING

IT organizations of all sizes are in the throes of digital transformation projects. While Covid-19 was initially expected to slow these projects, we have witnessed instead industries doubling down on technology to shape (and reshape) business operations,

product development and manufacturing, and customer relations – from sales to support.

As a result, IT organizations are being relied on more than ever to deliver the solutions and services to support the data-driven business in this new era – to teams spread across the globe, in real time, with the security of infrastructure and data as a given. In short, IT organizations must become more like the public cloud by delivering solutions as-a-service with infrastructure that can meet the business's service-level expectations.

Digital transformation projects tend to skew heavily toward software. The modernization of applications and data management platforms is crucial to making informed strategic and tactical decisions faster. MI&S recommends IT organizations look at infrastructure as an essential project stream, and ensure that the infrastructure deployed has the richness of features, performance, and security to support the business today and tomorrow.

MI&S sees HPE's ProLiant Gen10 Plus portfolio based on the 3<sup>rd</sup> Generation AMD EPYC Processor as well-positioned to meet IT organizations' needs. The portfolio is poised to meet the performance profiles of virtually any workload in the datacenter, be it compute-intensive, performance accelerated, memory-intensive, highly threaded, or merely virtual compute cycles for the day-to-day operations of the business.

The richness of features in the EPYC CPU - as enabled by HPE - makes these ProLiant servers as prepared as they can be for the expected, the unexpected, and the "to be determined" trendy workload that will invariably hit the market.

To learn more about the HPE Gen10 Plus portfolio designed around the 3<sup>rd</sup> Generation AMD EPYC Processor, visit [www.hpe.com/partners/AMD](http://www.hpe.com/partners/AMD)

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