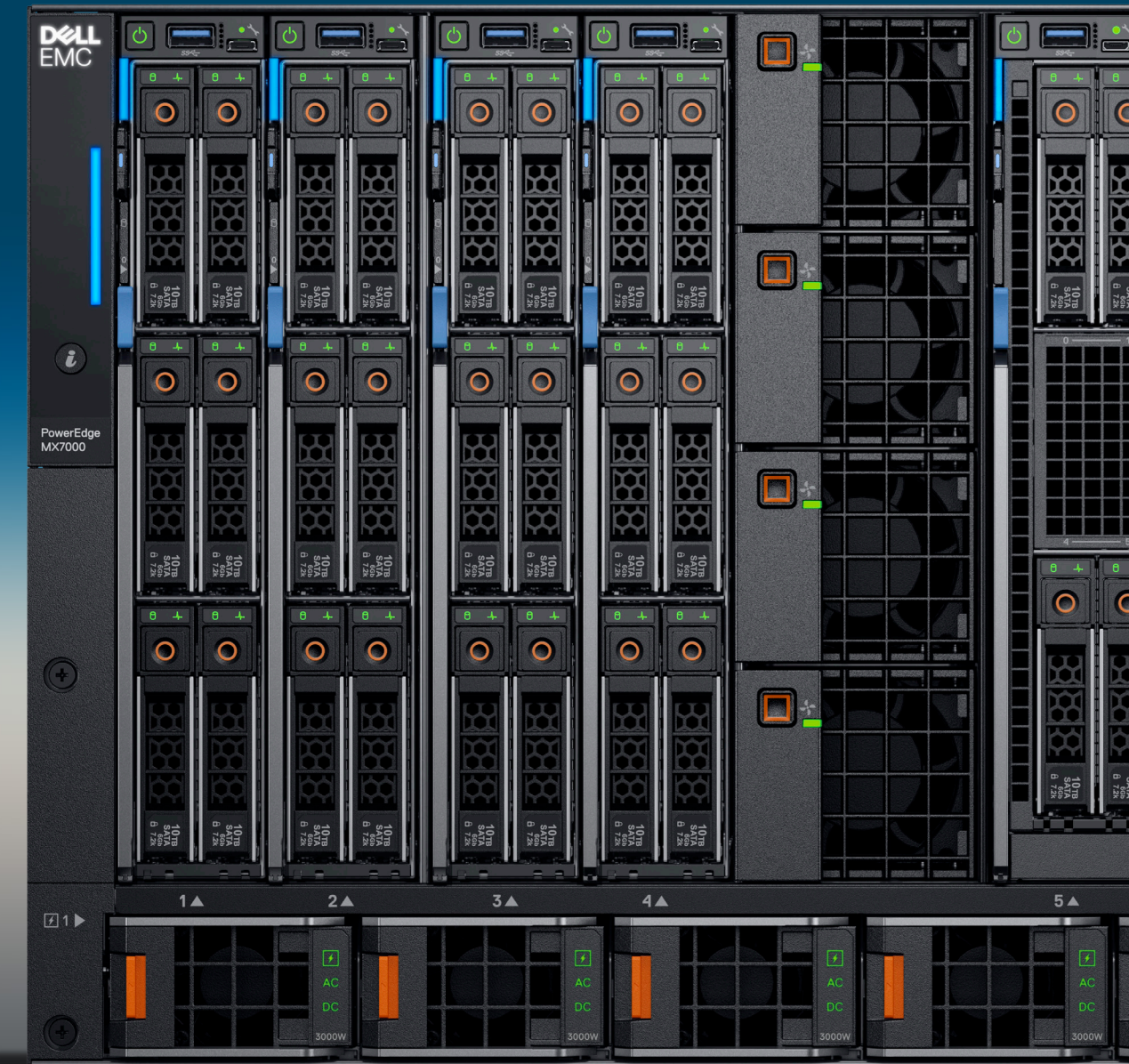# THE ROLE OF MODULAR INFRASTRUCTURE IN
IT TRANSFORMATION

How a flexible and scalable infrastructure can help companies handle traditional and transformational workloads while preparing for future growth

DELL EMC
PowerEdge

(intel) Intel Inside®.
Powerful Solution Outside.

Introduction

Modernized
IT organizations
use 4x more
modular compute
than aging
organizations.

Data is today's digital currency. It continues to widen the gap between modernized and aging IT organizations.

But it's not enough to simply have a lot of data - it's what you do with the data that counts. How is it stored? How fast can you process it? How quickly can you turn that raw data into something useful? Organizations focused on a successful digital transformation must develop a comprehensive IT modernization strategy that addresses these issues.

Data-fueled technologies such as IoT and artificial intelligence are on the rise. Modernized companies that can use these technologies to leverage their data have a significant edge over their competitors – while those with aging IT infrastructure will be left behind.

Although it brings many potential benefits, this industry shift also presents numerous challenges for IT departments. While the need for reliability and predictability will always be important, in today's world it is no longer enough. IT must balance reliability and predictability with the need for speed and agility. Success depends on a company's ability to quickly adapt and scale to a rapidly changing environment.

Given this need for speed and flexibility, it's critical that organizations have the infrastructure in place to handle emerging technology. Modular servers help many companies achieve this, because they make it easier for users to scale and manage different workloads. In fact, we've found that 20% of the overall compute in modernized companies is comprised of modular servers, compared to only 5% in aging companies*.

This eBook provides essential information on modular infrastructure, and the role it can play in a company's IT transformation. First, we define modular infrastructure and highlight its key benefits. Next, we provide an overview of the Dell EMC modular portfolio and introduce kinetic infrastructure, which lays the path for full composability. Finally, we highlight the benefits of our newest modular server, PowerEdge MX, designed with kinetic infrastructure.

For additional information and related resources, visit www.dellemc.com/servers

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First Things First: What is Modular Infrastructure?

Modular infrastructure refers to infrastructure housed in a chassis that shares centralized resources such as power, cooling, storage, networking and management. Designed to support the right balance of density, capacity, and flexibility, modular servers meet the needs of both traditional and transformational workloads.

Customizable modules of compute, storage and networking are easily and rapidly scaled and managed.

Traditional Workloads

Mainstream workloads such as file, print, web serving, virtual desktop, collaborative applications, and content applications

Transformational Workloads

New and emerging workloads such as structured data analytics, unstructured data analytics (cognitive/AI), and cloud-native applications

Modular infrastructure is the foundation for a modern, compute-centric, software-defined data center.
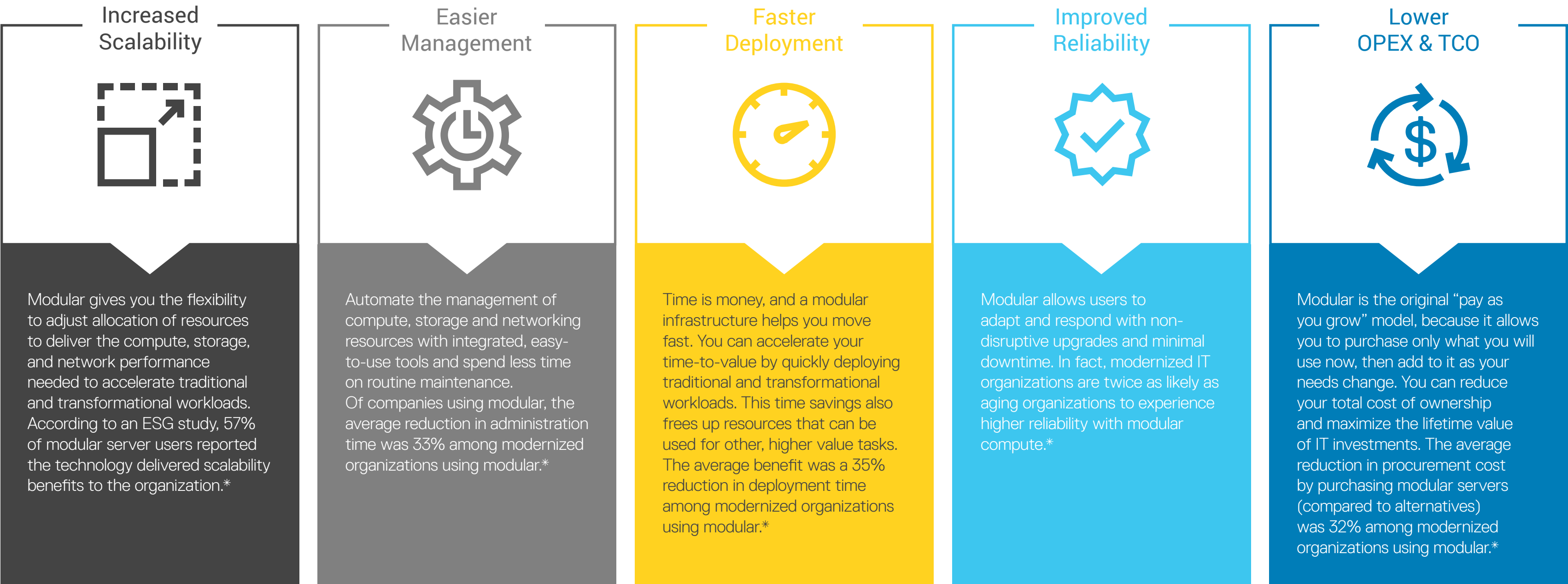
Today's modernized companies are driving leading edge technology and processes to power their business. In fact, 87% of modernized IT organizations allocate more than 20% of their compute resources for transformational workloads, compared to only 25% of aging organizations.*
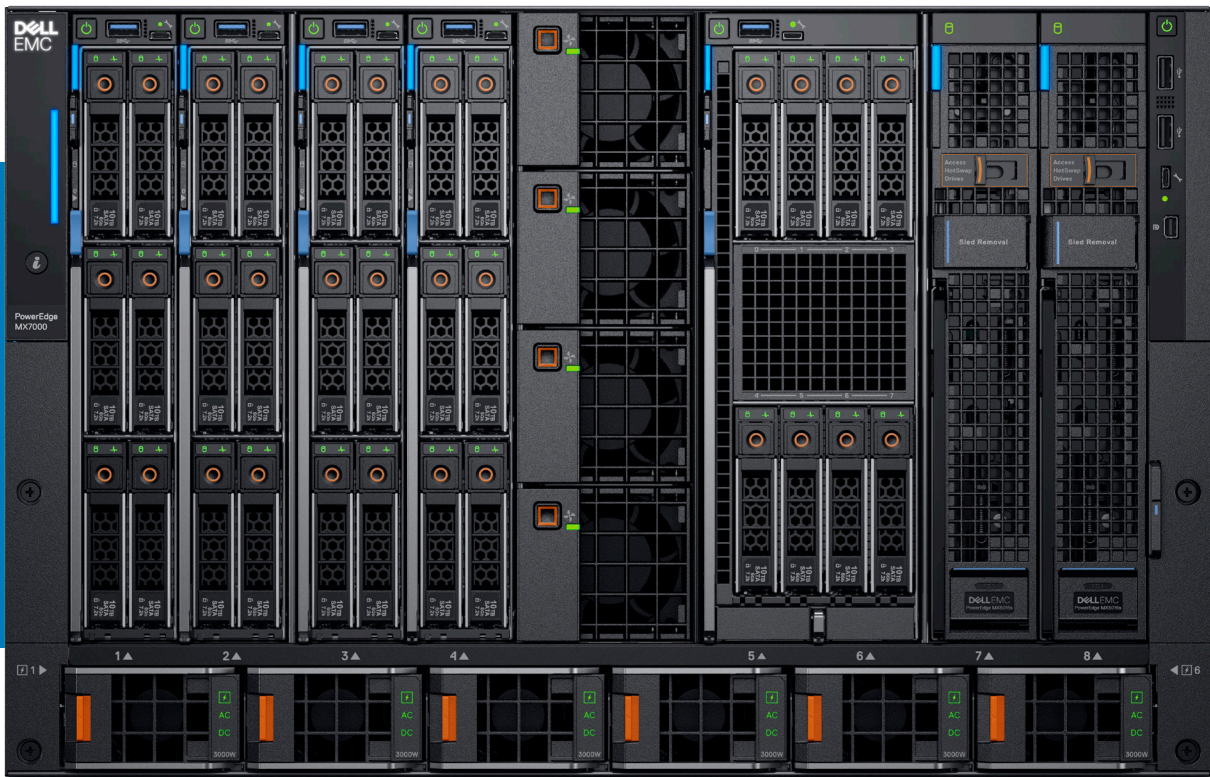
Benefits of Modular Infrastructure

A modular compute platform enables users to bridge the demands of traditional and transformational workloads, such as artificial intelligence and machine learning. Users can precisely tailor, quickly deploy, and easily administer workloads while lowering operating costs.

Increased Scalability

Modular gives you the flexibility to adjust allocation of resources to deliver the compute, storage, and network performance needed to accelerate traditional and transformational workloads. According to an ESG study, 57% of modular server users reported the technology delivered scalability benefits to the organization.*

Easier Management

Automate the management of compute, storage and networking resources with integrated, easy-to-use tools and spend less time on routine maintenance. Of companies using modular, the average reduction in administration time was 33% among modernized organizations using modular.*

Faster Deployment

Time is money, and a modular infrastructure helps you move fast. You can accelerate your time-to-value by quickly deploying traditional and transformational workloads. This time savings also frees up resources that can be used for other, higher value tasks. The average benefit was a 35% reduction in deployment time among modernized organizations using modular.*

Improved Reliability

Modular allows users to adapt and respond with non-disruptive upgrades and minimal downtime. In fact, modernized IT organizations are twice as likely as aging organizations to experience higher reliability with modular compute.*

Lower OPEX & TCO

Modular is the original "pay as you grow" model, because it allows you to purchase only what you will use now, then add to it as your needs change. You can reduce your total cost of ownership and maximize the lifetime value of IT investments. The average reduction in procurement cost by purchasing modular servers (compared to alternatives) was 32% among modernized organizations using modular.*

Delivering the Value of Modular Infrastructure: Past, Present and Future

Why It Matters?

As the IT industry moves from a legacy model to a virtual model - and then on to disaggregation - companies are moving away from the traditional siloed infrastructure in favor of a more scalable, flexible solution. Modular compute helps with this transition, as it leads companies away from the pre-virtualization era to a modernized, fully disaggregated state.

IT's ultimate goal is to combine the benefit of modular design with an extended flexibility of configuration at the individual storage device and all the way to memory centric devices. Dell EMC refers to this end goal of true composability as **kinetic infrastructure.**

Composable

"Composable" has become a commonly used industry term to refer to a service-centric model that seeks to disaggregate compute, storage, and networking fabric resources into shared resource pools that can be available for on-demand allocation. However, given that key memory and accelerator resources are still trapped inside the server, they can only deliver a partial solution. So, while full composability is not yet possible, it lays the foundation for the ultimate goal: **kinetic infrastructure.**
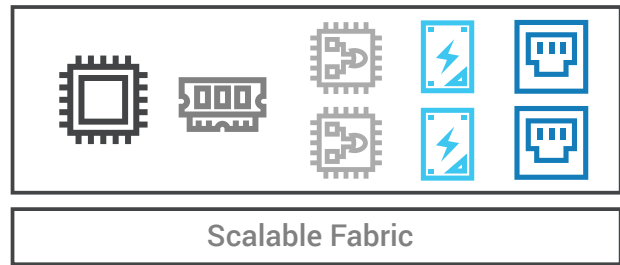

Disaggregation helps companies improve utilization of the data center server resources while increasing efficiency and agility.
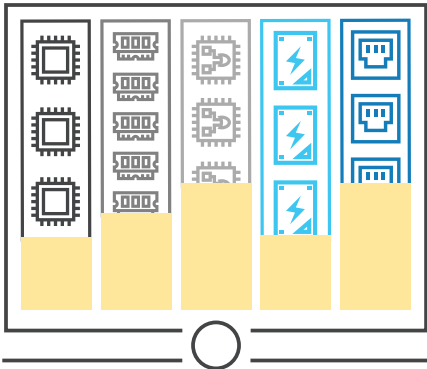
<20% server utilization
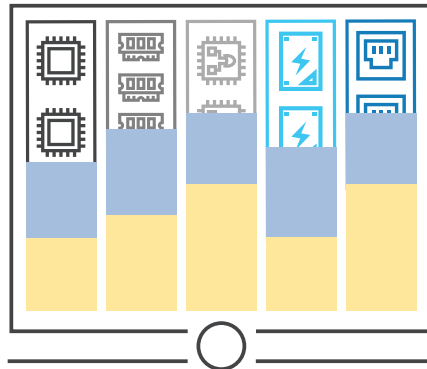
<50% server utilization

Scalable Fabric

Configuration Optimization

Pre-virtualization era

Virtualization era

Disaggregated era

CPU

Memory

Accelerator

Storage

Networking

*Bars represent different workloads*

How Does Disaggregation Work?

Disaggregated compute and storage resources, connected by low-latency and scalable fabric, are pooled to create consumable resources. Workloads can draw the resources needed to run most quickly and efficiently. Then, when they are no longer needed, the resources are returned into the pool. Creating on-the-fly hardware capacity reduces over-provisioning and stranded assets while optimizing efficiency.
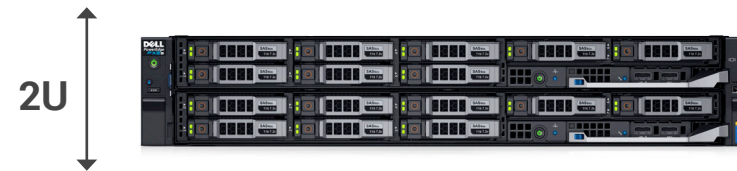
The Dell EMC Modular Infrastructure Portfolio

Dell EMC has modular infrastructure solutions to fulfill the needs of your business, whether you're building an enterprise data center or equipping smaller branch offices. You can tailor your workload demands with PowerEdge modular systems containing integrated server and disk storage sleds, networking modules and unified management software.

7U

2U

5U
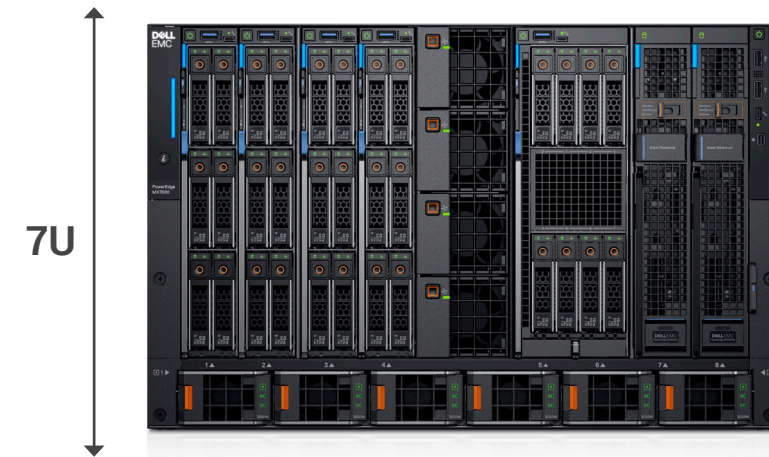
PowerEdge MX

PowerEdge FX2

PowerEdge VRTX

PowerEdge MX, the first modular platform designed for the software-defined era, provides the flexibility, agility and responsiveness needed to bridge demands of traditional and transformational workloads. Combining compute and storage, connected by scalable fabric, this 7U chassis with integrated systems management software creates shared resources pools that can be dynamically allocated and reallocated as needed for optimum workload performance. PowerEdge MX is the first modular server designed with kinetic infrastructure.

PowerEdge FX2 delivers dense computing and storage to help transform legacy infrastructures into flexible, agile foundations for modern workloads. This hybrid 2U rack-based infrastructure for SMB-to-large enterprise provides disaggregated compute, storage, and networking with PCIe flexibility for scale-out and scale-up applications. Dense 2-socket and 4-socket solutions provide ample performance and flexibility, coupled with intelligent chassis management.
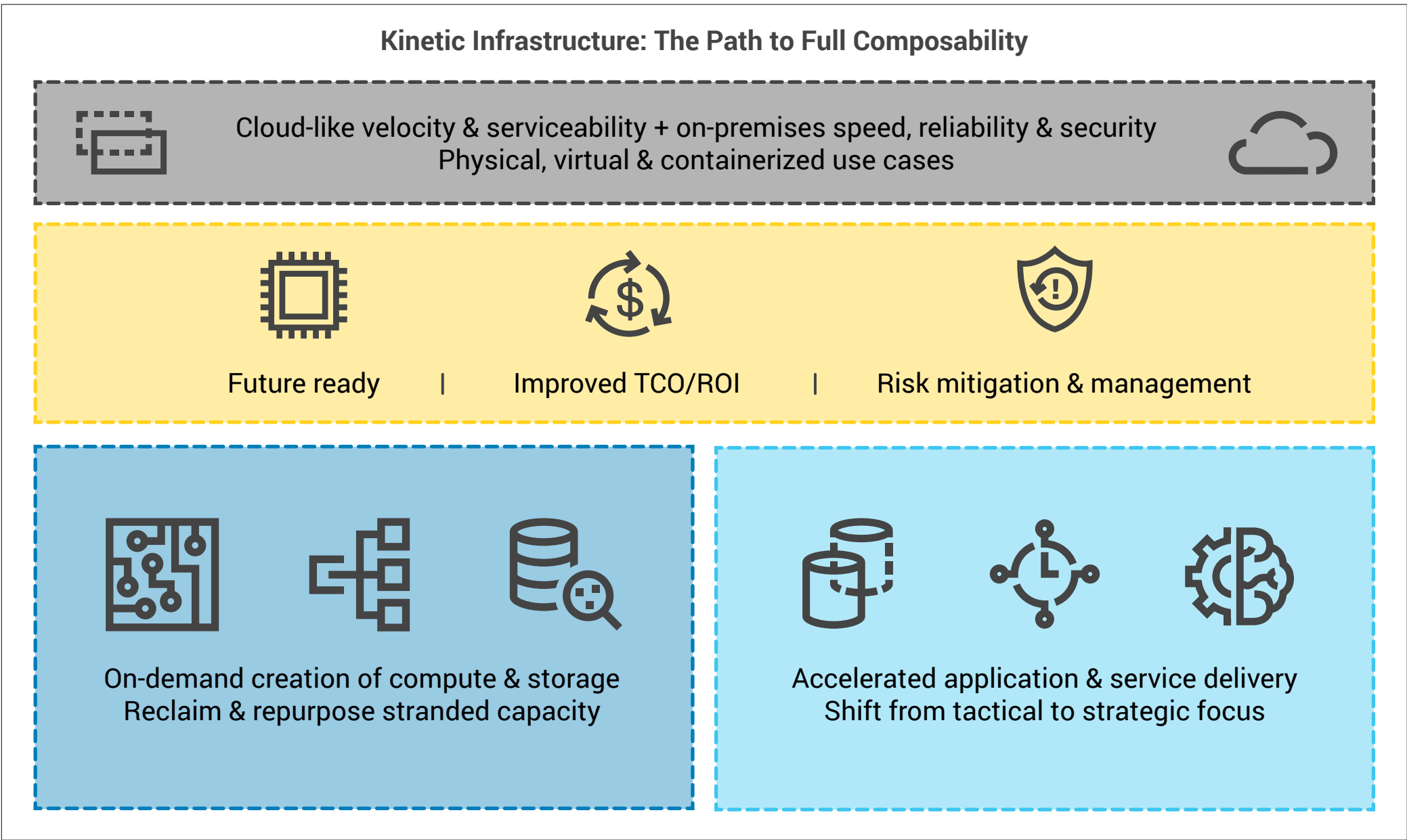
PowerEdge VRTX introduced the industry's first modular infrastructure for small business markets with compute, local shared storage, and PCIe fabric flexibility. It offers data center performance with office-optimized dimensions, acoustics, power requirements and security. This single, compact tower/rack-capable integrated solution optimized for greater simplicity, efficiency and versatility for small and remote/branch offices.

Kinetic Infrastructure

Kinetic infrastructure defines true composability. It brings the benefits of CPU disaggregation and extends the flexibility of configuration down to the individual storage device.
In the future, it will expand to GPUs, FPGAs, and memory centric devices, such as storage class memory.

Kinetic Infrastructure: The Path to Full Composability

Cloud-like velocity & serviceability + on-premises speed, reliability & security
Physical, virtual & containerized use cases

Future ready | Improved TCO/ROI | Risk mitigation & management

On-demand creation of compute & storage
Reclaim & repurpose stranded capacity

Accelerated application & service delivery
Shift from tactical to strategic focus

Kinetic derives from the Greek word ***kinetikos***, to move.

Dell EMC applies the term to a dynamic IT infrastructure that instantly responds, adapts, and evolves with shifting needs. Stranded resources, like storage, equal potential energy – and potential energy does nothing for the business when it's stranded. Kinetic infrastructure puts capital investment back in motion to deliver improved productivity and better use of IT resources.

"A kinetic infrastructure releases the potential of your organization and puts investment back in motion to deliver improved productivity and better ROI."

Robert W. Hormuth,
Vice President/Fellow, CTO, Server & Infrastructure Systems Dell EMC

PowerEdge MX: A Strong Foundation for IT Transformation

PowerEdge MX is designed for today's software-defined data center and provides a strong foundation for IT transformation. It allows users to break free from traditional boundaries to transform their infrastructure to a dynamic pool of instantly responding, adapting and evolving resources.

Flexible Architecture

Disaggregated systems leverage a shared pool of compute, storage and networking assets to dynamically respond to changing needs via:

- **Elastic Resources:** Non-disruptive provisioning, on-demand allocation of compute, storage and networking resource pools
- **Scalable SmartFabric:** Intelligent cost-effective multi-chassis architecture with open networking options and upgrade simplicity for future I/O flexibility
- **Granular Storage:** Dense, highly flexible, swappable, scale-out direct attached storage sled with easy front access

Responsive Design

PowerEdge MX helps companies protect infrastructure and life-cycle investment for superior ROI and greater business impact. This future-forward architecture provides:

- Support for at least 3 microprocessor technology cycles
- An industry leading fabric, system thermal architecture, mechanical design and control algorithms for dense configurations with future compatibility
- A hardened design to protect, detect and recover underlying infrastructure from cyber attacks

Agile Management

PowerEdge MX helps companies increase efficiency by creating policies and workflows, and automating them via software tools. This improves productivity by freeing up staff and allowing them to focus on more strategic tasks.

- End-to-end lifecycle management and single point authentication for all devices from a single interface
- Simplified set-up/updates with no specialized training needed, and with multiple at-the box management options
- An operational template methodology and comprehensive Rest API

Systems Management

Dell EMC OpenManage Enterprise Modular Edition helps you control administrative costs and streamline by replacing multiple enterprise-level systems management tools with a single, complete, modular unified platform. You can simplify and automate administration while still providing bandwidth for the heterogeneous support needed to build and manage entire data centers.

You can't **predict** the future, but you can **plan** for it

Unleash Your Potential

Modular infrastructure brings tremendous value to companies throughout their IT transformation.

Many modernized companies use modular servers to help them with both traditional and transformational workloads because they can precisely tailor, quickly deploy, and easily manage their infrastructure.

Now, with the introduction of kinetic infrastructure, companies will be able to grow and respond quickly, realizing their full potential today and into the future.

To learn more about **kinetic infrastructure** and **PowerEdge MX**, read the **Hurwitz & Associates white paper**:
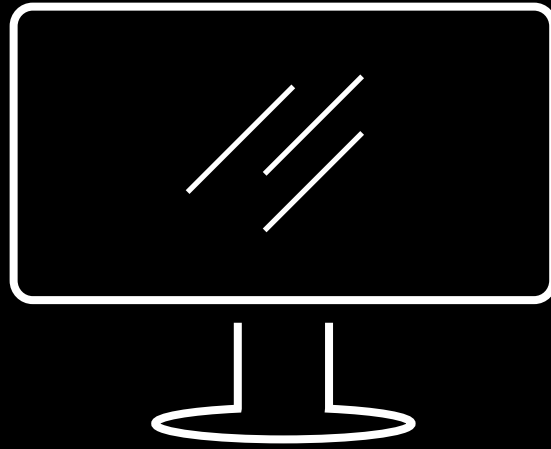
How Dynamic Infrastructure Accelerates Business Innovation: Kinetic Infrastructure and Dell EMC PowerEdge MX
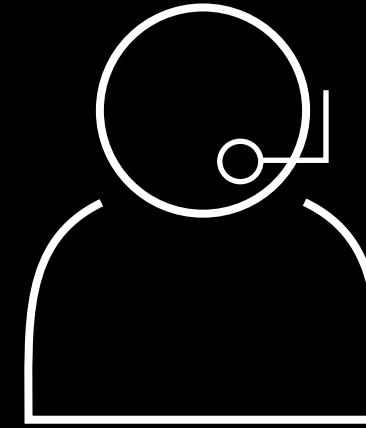
*Source: ESG White Paper commissioned by Dell EMC, Insights from Modernized IT: Modular Compute Can Have a Big Impact, August 2018. G18000161
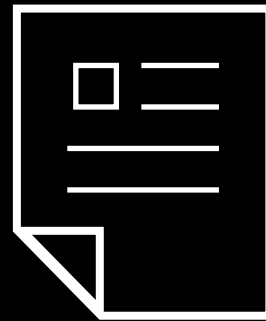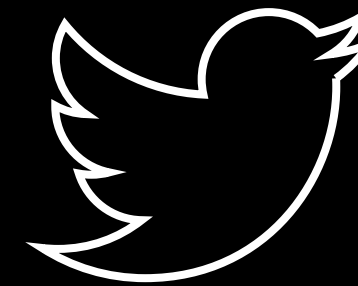
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PowerEdge and solutions

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