Cisco UCS: True System Innovation

Cisco expands beyond servers with a true system architecture

Executive Summary

Businesses are finding that their IT organizations are struggling to address the new demands of digital transformation. Many of these organizations continue to use environments built from silos and discrete components rather than a well-thought-out systems architecture. If IT leaders are going to modernize their infrastructure, they need a solution that delivers flexibility and agility while enabling IT teams to maintain visibility and control over the infrastructure. The Cisco Unified Computing System (Cisco UCS) platform offers a cohesive system-level approach, providing pools of policy-based programmable infrastructure to support a wide range of workloads and IT operating models.

Today's Customer Needs

Changing needs are forcing businesses to consider alternatives to traditional IT approaches. Today's competitive markets demand more agility and more flexibility, essentially requiring cloud economics in the datacenter. But organizations continue to buy traditional servers and point-product solutions targeted at specific applications and use cases. Although annual server market revenue continues to decrease, generic rack servers still form the majority of those shipments. And average prices are rising, indicating that businesses are paying more and probably getting less.

Fast-changing workload requirements are making the situation even more challenging. But while these dynamics play out, IT's primary focus on cost constraints is limiting innovation. However, simply reducing costs is an ineffective way to achieve better business outcomes.

The traditional approach to IT is not suited for the more flexible, fluid environments needed today. Instead, businesses need a true system that rids IT of the constraints of existing technology.

In today's world of hybrid IT, businesses need a holistic architecture that combines the speed and simplicity of an off-premises public cloud with the visibility and control of an on-premises deployment. Agility is critical, but not if it entails losing control or giving up current capabilities. But maintaining that control with traditional IT products that do not deliver better business outcomes is an untenable position for IT. The infrastructure will fail to adapt quickly enough or to the degree necessary to address the changing business needs.

Workloads are expanding, and the use of virtualization and the cloud with traditional applications is no longer sufficient. Big data analytics, containers, and microservices are requiring new approaches to infrastructure, and the Internet of Things (IoT) is vastly

expanding the environments in which data is generated and processed. IT teams are trying to choose the optimal infrastructure solution to accommodate workload diversity, but today's servers and point-product solutions can create silos, use complex management models, and lack visibility and control. What is needed is a system that can help IT teams respond to the requirements of the business faster while being flexible enough to handle future technologies.

A True Systems Approach

There is a significant difference between a server and a system. Servers arose in the age of the PC, taking on many of the PC's attributes, including independent subsystems and a monolithic hardware view. Systems, in contrast, have a much more flexible approach. They are defined by five main differences:

- **Fabric-centric**: Systems blend the various I/O channels together into a single high-performance fabric that can be tuned to the needs of workloads, easily provisioned, and balanced for each individual workload.
- **100% programmable**: For the best scaling and configuration, systems abstract the underlying hardware from the operational plane, enabling an environment with much more precise control that can adapt to multiple workloads that are running simultaneously.
- **Intent-based**: Easily aligning with the needs of the business, systems enable administrators to automate configurations and tasks based on specific requirements that are tied to business objectives and application experiences.
- **Endpoint-aware**: Developed in an environment in which the norm is multiple hosted workloads on each platform, systems have visibility into physical, virtual, and container host endpoints and can optimize the environment to address the actual needs of the workloads.
- **Analytics-powered**: A systems approach enables increased use of analytics and machine learning to deliver assisted and autonomic capabilities. Knowledge is power, and systems can learn, track, and anticipate events and usage models, comparing actual incidents to the business intent and deriving the best outcome.

Traditional Infrastructure Approaches Are Not Systems

Most IT infrastructure today is still being built from the same siloed design principles of 20 years ago, requiring complex connections and multiple heterogeneous management systems and providing limited visibility into and control over the infrastructure and application needs. With this lack of visibility and control, a common outcome is inconsistent configurations and potential security holes. With the traditional limitations on automation, time-consuming and error-prone manual processes are the norm, exposing businesses to costly mistakes and potentially leading to unwanted external exposure.

With no application-focused view, the primary subsystems each act like individual islands of resources, not sharing easily and making it harder to align resources with

workloads and business needs. Organizations implementing significant changes such as digital transformation and infrastructure modernization typically find the rigid constraints of servers to be incompatible with the flexibility they require. Servers limit their programmability to the computing realm. They rely heavily on rigid hardware-based constructs with ancient management concepts that require IT teams to adapt their activities to accommodate traditional device operations. Traditional IT architectures have an implied separation between the hardware and the OS and applications. This abstraction prevents the real-time feedback and insight that could be used to optimize resources. Servers do not learn. They simply alert, over and over and over.

Cisco Unified Computing System

Today's computing environments must use a different model than in the past. They must take a system-level approach. Systems begin with the assumption that workloads are fungible and that resources will need to shift, meaning that the system must proactively support the intelligent movement of applications and data.

Cisco UCS is a true system, designed for IT innovation and business acceleration, that is delivered as a single platform to better match a business' agility needs. By giving IT the freedom to deploy applications and services as needed by eliminating complexity, Cisco UCS enables IT to quickly shift resources as needs change, allowing greater responsiveness to revenue opportunities and changes in the business environment. The simplification of management combined with automated configuration and provisioning can increase operation efficiency, improving business revenue. Cisco UCS workload optimization capabilities give IT teams greater control over the end user experience, helping them improve productivity for end users and optimize the IT environment.

With its fabric-centric design, built on a single common control plane, Cisco UCS enables flexible system management that can change as application needs shift. As resource needs rapidly increase, the modular architecture can scale while still maintaining a single management control point, regardless of the location, form factor, and architectural solution: converged, hyperconverged, or scale out.

With an open API for leading third-party management and automation software, Cisco UCS offers 100% programmability of the hardware state. On-demand assignment and reassignment of physical resources to workloads is achieved through object-model abstraction of all identity and configuration elements. The composable nature means specific resources can be assembled and presented to operating systems, hypervisors, and containers while Cisco UCS still maintains full control at the system level.

Cisco UCS is business-intent-based. Configuration and control can be based on business intentions, not on system limitations. Automated, policy-based configuration of devices for application optimization allows automatic system configuration and updates, freeing IT staff so administrators can spend more time working with the business. Models, metrics, and objectives are derived from business terms instead of being based on arcane IT jargon.

As an endpoint-aware system, Cisco UCS uses an intelligent, high-performance network fabric to see and control configuration at host endpoints. Through this policy-based visibility and control, administrators have insight into the physical, virtual, and container host points, so they can align configuration requirements with application needs.

This analytics-powered system brings intelligent insight into application traffic and performance, enabling the control that IT demands and allowing resource assignment to optimize the application experience for end users. Based on its understanding of the underlying system performance, Cisco UCS can optimize workload placement and utilization of resources. With the system foundation present in Cisco UCS, we anticipate machine learning, pattern recognition, and anomaly detection are within reach, as Cisco innovates to deliver assisted administration with autonomic systems management.

Call to Action

With change as a constant and speed and agility as priorities, IT leadership should place strategic emphasis on developing environments that can adapt to future technologies. IT should seek more flexible, agile systems, not server-level or point-product solutions. Specifically, IT should ask these questions:

- Does the platform offer operational consistency and nondisruptively adapt to new technologies and capabilities, unlike a component approach?
- Does the platform enable automation of manual tasks and easily integrate with higher-level management tools?
- Does the platform automatically recognize the addition of resources and easily scale resources without creating infrastructure silos?
- Does the platform understand and control physical, virtual, and container host endpoints, so it can align and optimize policies to deliver a performance-optimized, secure user experience?
- Is the platform capable of artificial intelligence, leading to more autonomic operation-based targeted business outcomes?

With the impending platform changes from CPU vendors such as Intel and AMD in 2017, there will be a significant inflection point in IT buying cycles. Now is an excellent time to address whether servers are meeting needs or whether a system can deliver better outcomes.

As businesses look toward digital transformation, infrastructure modernization, and changing workloads, Moor Insights & Strategy recommends they consider the Cisco Unified Computing System as a potential solution for their changing business needs.

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