

Cloud-Based Infrastructure Management for the Digital Era

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Matthew Eastwood Ashish Nadkarni
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IDC OPINION

For businesses to thrive in a digital-first economy, they must embark on aggressive, transformative, and often disruptive initiatives – all intended to deliver superior business outcomes, internally and externally. These initiatives are designed with one principal objective: to maintain revenue-generating operations today while increasing the firm's competitive differentiation via new and innovative products and services. IDC estimates that by 2025, 80% of organizations (responding to the digital-first economy) will require advanced enterprise applications with exceptional innovation, multifunctional capabilities, and self-learning aspects. For businesses to gain consistent, resilient outcomes, they must have an agile IT organization that is made up of two operating paradigms:

- **Modern IT infrastructure.** Digital infrastructure forms the backbone for a business to consistently scale its operations, accelerate innovation, and surpass its profitability goals. The right mix of fit-for-purpose computing, storage, networking, and data management stacks power business applications, analytics, and activities. Digital infrastructure encompasses dedicated on-premises datacenters and edge systems as well as shared public cloud services. A flexible infrastructure enables IT to support current as well as next-gen applications and data.
- **Modern cloud-based infrastructure management.** It liberates IT organizations from maintaining infrastructure to manage infrastructure. Software-as-a-service (SaaS)-assisted management enables new levels of supportability, connectivity, operational resiliency, people productivity, and superior service quality. It enables IT organizations to implement and enforce policies and processes consistently across various core, cloud, and edge deployments while meeting platform- or service-specific requirements like compliance.

Chief information officers (CIOs) that take a holistic people-process-technology approach to implementing a modern IT infrastructure supported by cloud-delivered management can deliver consistently higher levels of operational resiliency, security, revenue growth, and overall productivity to their business. Using AI insights on telemetry data, cloud-based IT infrastructure management products like Cisco Intersight provide IT automation, infrastructure as a code, and tools for proactive troubleshooting. They enable IT organizations to deliver consistent and scalable service quality to the business.

SITUATION OVERVIEW

IDC's Future of Digital Infrastructure research shows that 80% of decision makers worldwide recognize the importance of digital infrastructure in enabling the organization to meet or exceed their stated business objectives.

For most mature enterprises, the manifestation of digital infrastructure strategy involves five key pillars:

- A modern fit-for-purpose computing, storage, and network infrastructure that can deliver performance and scale to current and next-generation workloads
- An infrastructure that enables cloud scale, with the ability to connect or bridge together various deployments into a common control and management plane
- An infrastructure that is highly resilient but also meets the governance and sustainability goals of the enterprise, thus delivering on key long-term objectives set forth by the business
- Infrastructure that is operationally friendly to procure and maintain, with flexible procurement, consumption, and as-a-service management options
- Infrastructure choices that are driven by and are a catalyst for organizational changes that enable agile and elastic IT service delivery with highly automated operations

Organizational Initiatives

Much has been said and written about the challenges a traditional IT organization can face due to its organizational structure. The implementation and operational complexities of diverse, interconnected environments can create significant challenges for any IT organization without organizational realignment and changes to the organizational structure.

For a modern IT organization to deliver consistent service quality at cloud scale, chief information officers and IT decision makers (ITDMs) are exploring or embracing opportunities to streamline people and process interactions:

- **Focusing on IT staff efficiency by shifting to highly automated AI/ML-enabled operations.** This reduces the risk of human errors; leads to more proactive and preemptive actions, minimizing unplanned events; and frees up staff to focus on strategic initiatives.
- **Embracing modern methodologies like DevOps and continuous integration and delivery (CI/CD) in partnership with their business stakeholders.** This elevates the role of IT from being a one-way order fulfillment entity to a business partner.

A modern IT organization with unwavering focus on people and process efficiency, which operates in complete alignment with the objectives of their business stakeholders, can overcome significant operational challenges, become agile and flexible, and thus accelerate business transformation initiatives.

Technology Investments

Businesses continue to invest in technology to support their digital transformation initiatives. A recent IDC study of ITDMs globally found that 60% of organizations expect on average computing capacity, data storage capacity, and network connectivity and capacity increases of 30%+ annually over the next two years. For computing, the majority expect to continue to support a mix of cloud-native, bare metal, virtualized, and software as a service-based applications. For storage, the same study found

growth in unstructured and semistructured data from initiatives such as Internet of Things, edge, and distributed IT.

A modern, fit-for-purpose infrastructure is based on a hybrid cloud and multicloud architecture, with a variety of compute, storage, and connectivity options for current-generation workloads (which tend to run in virtualized or bare metal environments) and next-generation or cloud-native workloads (which tend to be containerized or make use of serverless functions).

IT Infrastructure Management

IDC's research shows that 58% of enterprises see digital infrastructure resiliency as a priority for ensuring long-term business resiliency and success. While investments in people, processes, and technology are critical, the systems used for IT infrastructure management can make or break an IT organization's ability to deliver digital infrastructure resiliency. Traditional platform-specific infrastructure management tools make it difficult to gain holistic and actionable insights on the health of the infrastructure. Such systems often fall short when it comes to correlation and causality analysis of various events that occur within the environment, making it harder to troubleshoot performance issues and take preemptive action to eliminate unplanned downtime. Furthermore, many of these tools lack visibility into workloads.

The shift to a consumption-driven infrastructure-purchasing mindset means that most organizations seek a unified control and management plane for their IT infrastructure that:

- Eliminates or minimizes the need for maintaining an infrastructure stack, which itself can be a bottleneck or single point of failure
- Is cloud based and SaaS assisted, thus ensuring consistent and secure access to globally distributed IT teams
- Delivers a level of automation that not only eliminates most human intervention but also delivers insights for preemptive action when needed
- Connects and bridges the various datacenter and cloud deployments into a single operating framework, accessible via a single UI
- Replaces or complements point products for managing computing, storage, hyperconverged, and networking elements within a datacenter
- Provides API access for integration with workflow, provisioning, and automation frameworks like Ansible, Terraform, and Puppet, enabling organizations to implement infrastructure as code

CISCO INTERSIGHT IT OPERATIONS PLATFORM

The Cisco Intersight IT Operations Platform provides a single dashboard for managing and automating the global IT infrastructure for any organization throughout its life cycle (see Figure 1). It delivers intelligent automation, observability, operations, and optimization to customers for traditional, cloud-native, and hybrid IT infrastructure and resources. Cisco Intersight transforms traditional datacenter-based management into cloud-based, as a service-based management. The platform is made up of:

- **Cisco Intersight Infrastructure Service (IIS)** is an infrastructure life-cycle management solution specifically optimized for Cisco Unified Computing System (Cisco UCS), Cisco HyperFlex, and converged infrastructure customers. It helps IT operations teams see, control, and automate

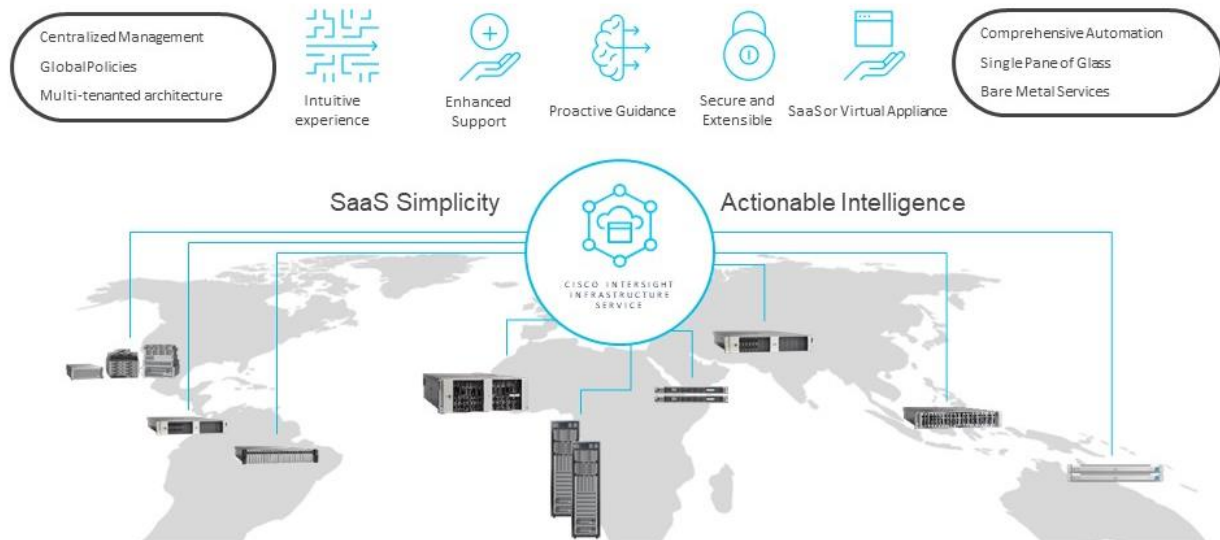
their computing, storage, and networking infrastructure – regardless of its deployment location – from a single console.

- **Cisco Intersight Workload Optimizer (IWO)** is a real-time decision engine that drives continuous health of applications across on-premises and public cloud environments. Intersight Workload Optimizer continuously analyzes workload consumption, costs, and policy constraints across the full stack, from applications to infrastructure, and automatically scales resources in real time to ensure application performance.

With Cisco Intersight, IT organizations can consolidate the management of their entire deployment estate across datacenters, remote sites, branch offices, edge environments, and public clouds. Cisco Intersight empowers ITOps teams to observe, analyze, optimize, update, maintain, and automate their environment through a cloud-based infrastructure management service in ways that are not possible with point products or on-premises tools. As a result, IT organizations can achieve significant acquisition and operational cost savings and deliver a complete solution to their business.

FIGURE 1

Cisco Intersight Service Overview



Source: Cisco, 2023

Cisco Intersight Infrastructure Service

Cisco Intersight Infrastructure Service is a core module of the Cisco Intersight Platform. It provides a single dashboard for organizations to manage and automate their global IT infrastructure throughout its life cycle. Cisco IIS enables industry-leading support for Cisco and non-Cisco products and services:

- Cisco Unified Computing System and Cisco HyperFlex hyperconverged infrastructure, Cisco Nexus, and MDS networking platforms
- Virtualization and container platforms, public cloud services, third-party servers and storage arrays, and other infrastructure endpoints

For Cisco equipment, Cisco IIS works in conjunction with Cisco UCS Manager, Cisco Integrated Management Controller (IMC), and Cisco HyperFlex Connect. For third-party platforms, systems, and services, Cisco IIS uses API integration.

Cisco Device Connector

Cisco Device Connector enables devices to be connected to the IIS portal using software that is embedded in the management controller of each system. Device Connector provides a secure way for the connected devices to send information and receive control instructions over the internet from the Cisco IIS portal.

When an Intersight-enabled device or application starts, the Device Connector service starts at boot by default and attempts to connect to the cloud service. If the Auto Update option is enabled, the Device Connector is automatically updated to the latest version through a refresh by Cisco IIS when the devices connect to Cisco Intersight.

Cisco Intersight Assist enables ITOps teams to claim third-party infrastructure, platforms, and other endpoints that are not directly SaaS connected to Intersight, so they can become Intersight managed. For example, they can use Intersight Assist to manage VMware vSphere environments; storage arrays from vendors such as NetApp, Pure Storage, and Hitachi Vantara; and other on-premises infrastructure and platforms. Cisco Intersight Assist is deployed as a virtual appliance running on premises and installed using an Open Virtual Appliance (OVA) that is available from Cisco.

Flexible and Scalable Deployment Options

Cisco IIS is available via SaaS, as a connected appliance or as private virtual appliance.

The SaaS option is hosted in the public cloud and works best for most organizations. With the SaaS option, features and functions are made available or updated automatically as part of the service. IT organizations that opt for appliances can download and apply updates to the local instance of Cisco IIS seamlessly.

Organizations with data locality or security requirements can opt for the on-premises Cisco Connected Appliance or the Private Virtual Appliance:

- The Cisco Connected Appliance enables directly attached Cisco infrastructure and third-party systems to be connected to Cisco IIS.
- Cisco Intersight Private Virtual Appliance provides an effortless way to deploy an Open Virtual Appliance in VMware vSphere or ESXi environments.

Cisco Connected Appliance can be used to support platforms and systems that do not support the native Device Connector. On the other hand, the Private Virtual Appliance can be configured, deployed, and run off premises and allows organizations to still take advantage of much of the SaaS functionality without connectivity back to the cloud portal. Both the Cisco Connected Appliance and Private Virtual Appliance offer advantages over conventional on-premises management tools.

Continuous Updates

Cisco IIS makes the task of updating infrastructure quite seamless. Operations teams no longer need to go through the archaic process of scheduling time for applying software updates. With IIS, updates can be pushed through transparently.

The Cisco IIS management platform hosts server management software and associated policies in the cloud or in the appliance. It includes platform-level firmware like Network Controller images, CIMC firmware, BIOS firmware, and storage controller software. Operations teams are automatically notified when new versions are available for download and can enable those to be automatically updated or set up policies that can apply those at a designated time.

Seamless IT Automation, Orchestration, and Planning

Cisco IIS also enables advanced analytics capabilities based on telemetry data obtained from infrastructure endpoints under management. This capability works as follows:

- **Data collection.** Every Cisco UCS server, Cisco HyperFlex system, Cisco Nexus or MDS network device, or Cisco UCS Director instance can be configured to automatically connect and transmit to Cisco Intersight certain telemetry information over a secure channel (including serial numbers and IP addresses, the types of software installed on an endpoint, and feature use data).
- **Data analytics.** Cisco IIS ingests telemetry information to proactively review customer metadata to identify potential issues in customers' environments to prevent problems and improve system uptime in the future.

Cisco IIS offers a low-code automation framework to create and execute complex workflows of operational tasks across Intersight-managed Cisco and third-party compute, network, storage, integrated systems, virtualization, container, and public cloud platforms. A central workflow engine sequences the steps in workflows and automates their execution. A workflow executes a set of tasks, each designed to automate specific operations (e.g., create, read, update, or delete) on any infrastructure or platform element. Workflows can consist of one or more tasks arranged to execute sequentially, repeatedly, in parallel, or conditionally, or they can include subworkflows to help organize or reuse automation. Intersight Infrastructure Service orchestration capability includes a library of prebuilt tasks that automate many popular operations across Cisco and third-party compute, network, storage, integrated systems, virtualization, container, and public cloud platforms. These prebuilt library tasks are pre-integrated with access to infrastructure models, inventory, and configuration information managed within Intersight to simplify task configuration and workflow creation.

ITOps teams can simply associate a model-based configuration to provision servers and associated storage and fabric automatically, regardless of form factor. Using profiles, they can consistently align policy, server personality, and workloads. These policies can be created once and used to simplify server deployments, resulting in improved productivity and compliance and lower risk of failures due to inconsistent configuration. In addition, Cisco provides integration with third-party operations tools, such as ServiceNow, to allow ITOps teams to use their existing solutions more efficiently. The model-based deployment works for a single system in a remote location or hundreds of systems in a datacenter to enable rapid, standardized configuration and deployment.

Cisco Intersight Managed Mode

Intersight Managed Mode (IMM) is a new management architecture for the Cisco UCS Fabric Interconnect (FI) systems through a Redfish-based standard model. IMM unifies the capabilities of the UCS Fabric Interconnect systems and the cloud-based flexibility of Cisco IIS. Intersight Managed Mode standardizes policy and operation management – thus unifying the management experience – for standalone and Fabric Interconnect attached systems.

UCS Managed Mode (UMM) is an alternative legacy management mode in Intersight for Cisco UCS Servers. On the other hand, Cisco IMM is a native policy-based complete system management interface for Cisco servers connected behind a Fabric Interconnect. ITOps teams can choose between the UCS Managed Mode or Intersight Managed Mode for the Fabric attached UCS Systems during initial setup.

Cisco IMM provides:

- Full functionality of UCS Managed Mode, so there are no compromises to be made during initial setup and ongoing operations
- Automatic discovery and inventory of hardware, with a scalable consolidated view of hardware across datacenters
- Day 0 to Day N device configuration, bringing network, storage, and server management under a common operating model
- Shared policies with template support for mass deployment across multiple locations and centralized identity pools for pre-provisioning and optimized resource management
- Support for up to 20 chassis with 160 blade servers

ITOps teams can convert to Intersight Managed Mode from UCS Managed Mode by enabling Fabric Interconnects to be "claimed" by Intersight Infrastructure Service. This enables the entire management of the Cisco UCS environment to move into Cisco IIS. With this conversion, ITOps teams can shift service profiles, firmware management, policies, and device monitoring into centralized SaaS-based management. Having the management plane independent of the Fabric Interconnect provides IT administrators with the flexibility and choice to manage their infrastructure from any location, regardless of the deployment type.

Cisco Intersight Workload Optimizer

Cisco Intersight Workload Optimizer enables ITOps teams the visibility, insight, and actions necessary to improve business outcomes. It is designed to provide data visibility across different domains, enabling application and infrastructure teams to tap into contextualized and correlated insights. Such insights facilitate better collaboration and enable strategic actions to ensure superior digital experience across the organization. IWO works with applications on premises, in the cloud, or both. It can bridge the gap between application and IT infrastructure, continuously optimizing the hybrid cloud environment to support better business outcomes. IWO provides:

- Visibility into the entire stack to understand application resource needs based on demand at every layer
- Insight through AI-assisted analytics to keep application performance optimized with real-time decisions
- Action to help ensure application performance (recommended actions can be automated or applied manually)

Cisco Intersight Workload Optimizer makes it easy to view the environment holistically and understand how changes affect. With these insights, IT teams can:

- **Gain visibility into the health, usage, and performance of their infrastructure stack.** Operations and application teams can discover application and infrastructure interdependencies to make more informed decisions on how to apply and use IT resources.

- **Get insight into infrastructure bottlenecks and factors that increase costs.** Intelligent analytics stitch together each layer of the application and infrastructure stack, allowing resourcing decisions to be tied to application demand and relevant policies and constraints while factoring in available capacity.
- **Trust actions that continuously optimize infrastructure to deliver application performance.** Specific real-time actions help ensure that workloads get the resources as needed for placement, scaling, and capacity. IT teams can automate the software-related decisions to match their service levels: recommend (view only), manual (select and apply), or automated (executed in real time by software).

OPPORTUNITIES FOR CISCO

Cisco, and broadly speaking providers of digital infrastructure, must prioritize the availability of automated and intelligent, continuously enhanced, full-stack operations and cloud-based managed frameworks. This will complement the sophisticated infrastructure-as-a-service consumption and support models that Cisco is also rolling out to meet the needs of businesses seeking cloud scale and economics. Cisco Intersight fits well with the introduction of Cisco+, Cisco's flexible consumption model targeted at traditional IT buyers and infrastructure decision makers.

ESSENTIAL GUIDANCE FOR IT DECISION MAKERS

Cisco's vision for Intersight is to address customer pain points with traditional IT infrastructure management. It helps simplify the way customers manage and maintain infrastructure as they transition to more dynamic cloud-centric architectures and autonomous operational models. Cisco's commitment to as-a-service delivery, paired with full-stack infrastructure security, operational visibility, control, and automation, is aligned with the emerging priorities of today's enterprise customers.

For IT organizations that are committed to shifting toward as-a-service and cloud-centric architectures, Cisco Intersight provides a way to accelerate infrastructure modernization while improving operational effectiveness. Further, IT organizations need to consider how consumption-based offerings such as Cisco+ will allow them to better align spending with business needs while continuing to meet strict compliance and performance requirements.

Cisco's commitment to transitioning to a future digital infrastructure environment focused on cloud-centric, consumption-driven architectures and autonomous operational models is well aligned with top customer priorities. IDC recommends that IT organizations closely monitor the rollout of these new offerings and engage in conversations with Cisco about how to best apply them to their specific workloads and business resiliency priorities.

CONCLUSION

Business decision makers are beginning to appreciate the vital role provided by infrastructure in the digital-first economy. CIOs are accordingly incentivized to modernize their IT to deliver robust, agile, cost-efficient, fit-for-purpose scalable digital infrastructure. As businesses transform themselves digitally, IT organizations will increasingly look to cloud-based IT infrastructure management solutions to deliver consistent service quality and better business resiliency, enabling their business stakeholders to drive better business outcomes.

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Global Headquarters

140 Kendrick Street
Building B
Needham, MA 02494
USA
508.872.8200
Twitter: @IDC
blogs.idc.com
www.idc.com

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