IDC TECHNOLOGY SPOTLIGHT

Unified Infrastructure and Cloud Management: The Future of Datacenter Operations

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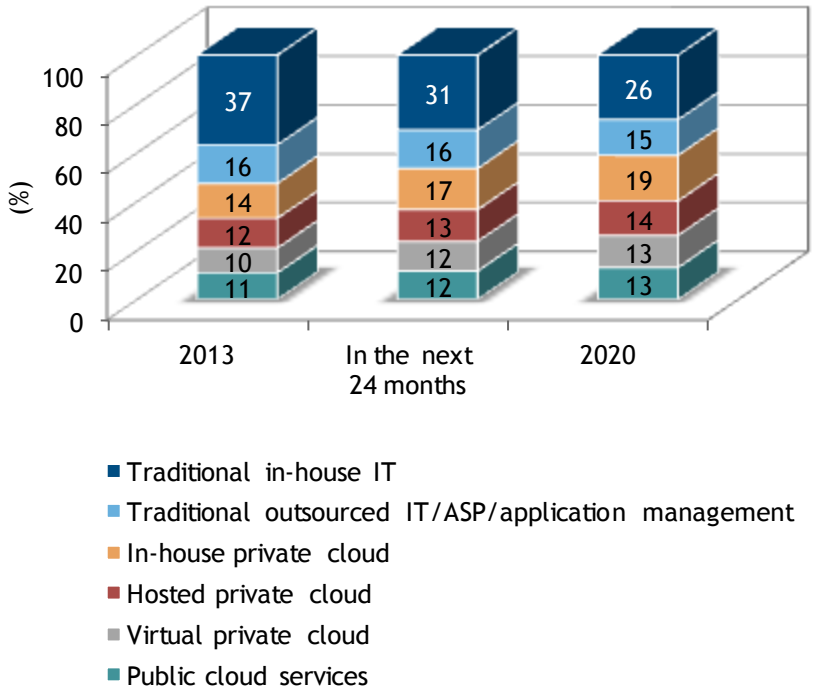
In 2014, IDC expects enterprise IT leaders will embrace converged and integrated infrastructure, private and public cloud, and unified cloud and infrastructure management strategies enabled by policy-based automation, orchestration, and self-service. This Technology Spotlight examines the critical role unified infrastructure and cloud management will play in the transformation of today's datacenter operations environments. The paper also considers the impact that Cisco's Intelligent Automation for Cloud and UCS Director products are having in this market.

Datacenter Architectures and Operations Being Transformed by Cloud and Converged Infrastructure

IDC's research shows that many IT organizations are planning to gradually transition to self-service cloud and IT-as-a-service architectures, even as they continue to support a range of existing applications for a number of years. By 2020, on average, current and planned cloud users expect that 26% of their IT budget will be allocated to traditional in-house IT and 15% will be spent on outsourced or hosted IT solutions using traditional architectures. The remainder of the budget is expected to be divided across a range of private and public cloud solutions (see Figure 1).

Figure 1

IT Budget Allocation Estimates, 2013, in the Next 24 Months, and 2020



n = 1,109

Notes:

Respondents were IT and LOB decision makers in 2013.

Figure shows estimated percentage of organization's total annual IT budget allocated to each of the cloud and traditional IT procurement/management models.

Source: IDC's *CloudTrack Survey,* 2013

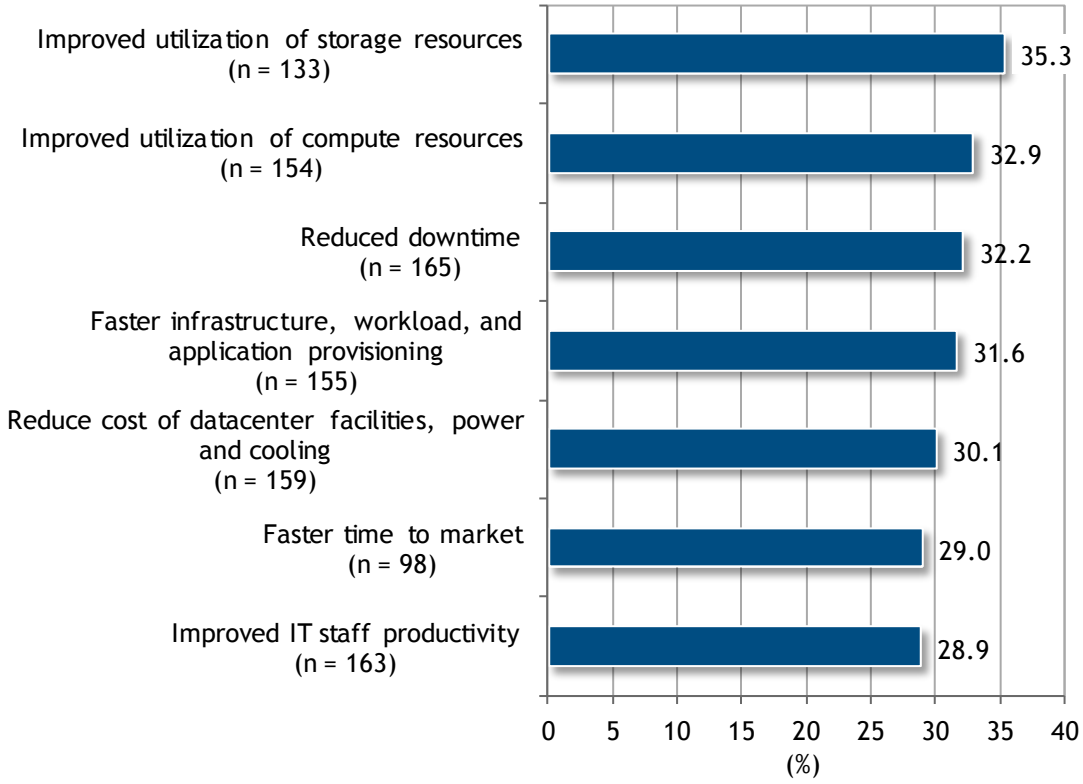
At the same time, converged systems (also known as integrated systems) are rapidly moving from evaluation to mainstream use. These systems are differentiated from traditional hardware platforms and architectures in that they are designed to be deployed quickly using a modular building-block approach to rapidly scale up resources and workloads. Because these systems are pre-integrated and engineered to optimize internal east-west network traffic within the box, they are simpler to deploy and maintain while reducing processing and network overhead and latency. They enable the system to run its basic functions autonomously via programmed algorithms and present rich APIs that can be leveraged by higher-level systems and application management software and directly by end-user self-service portals.

Among early adopters, these systems are becoming the standard infrastructure platform for new deployments as IT organizations move through datacenter technology refresh cycles. Customers are increasingly deploying mission-critical tier 1 applications and using converged systems to reduce downtime, increase cost savings, and improved resource utilization. They are being deployed in support of both existing applications and next-generation private cloud initiatives. Early users report that use of these systems is delivering significant benefits, including more than 30% improvement in infrastructure provisioning times, 32% less downtime, 29% improvement in IT staff productivity, and 29% faster time to market (see Figure 2).

Figure 2

Improvements Experienced from Use of Converged and Integrated Systems

Q. What percentage improvement have you experienced or do you expect to experience in each area?



Base = all respondents indicating they expect a specific type of improvement

Source: IDC's *Converged and Integrated Systems End-User Survey*, July 2013

For organizations that are also deploying private clouds, the starting point is often basic self-service virtual machine (VM) provisioning. As these organizations move to implement more sophisticated cloud environments and deploy more and varied workloads onto cloud platforms, they often look for cloud management tools that integrate with converged infrastructure systems. Specifically, they look for cloud self-service portals and service catalogs to provide unified access points for end users to request and self-provision a wide range of in-house legacy, private cloud, and public cloud applications and infrastructure services. As cloud and converged infrastructure strategies mature, IT organizations need management solutions that tightly unify and automate infrastructure management and cloud management capabilities.

Benefits of Unified, Automated Infrastructure and Cloud Management

For organizations that are implementing a private cloud, a unified approach to automating infrastructure and cloud management can result in additional improvements to IT resource utilization, IT staff productivity, end-user service levels, and end-user satisfaction with IT.

Compared with earlier-generation datacenter managers who relied on single-purpose siloed management tools, each dedicated to the needs of a specific system or application, today's datacenter operations teams need to adapt much more quickly to changing requirements. The fragmented tools and processes that were adequate for more static datacenter architectures do not scale effectively in an era when end users are empowered to request resources on the fly while expecting those requests to be fulfilled in minutes.

In today's cloud environments, workload requirements can fluctuate quickly and end users expect resources to be available in a matter of minutes or hours, not days or weeks or months. For many organizations, cloud deployments are serving as the catalyst for a broad-based review of datacenter management priorities and consolidation and simplification of management, automation, and orchestration tools. IDC's research consistently finds that application and infrastructure provisioning tools are high on the list of management software products that IT decision makers want to consolidate or eliminate as part of their journey to cloud architectures.

IT decision makers rightly recognize that using separate tools to provision applications, middleware, physical servers, virtual servers, networks, and storage is time consuming, error prone, and expensive. Effective cloud strategies require tightly linked integration and orchestration between the end-user service catalog and the infrastructure management systems that assign resources, monitor utilization, migrate workloads, and adjust to changing demand as needed. Cloud orchestration engines in turn must connect seamlessly with the underlying infrastructure managers to ensure rapid and consistent execution of end-user requests.

By implementing more consistent, policy-based provisioning automation solutions that support the full stack of physical and virtual infrastructure, in addition to applications and middleware, IT operations teams can more quickly deliver active services to end users. Simultaneously, they can improve configuration compliance and resource utilization while reducing human error and downtime.

Considering Cisco UCS Director and Intelligent Automation for Cloud

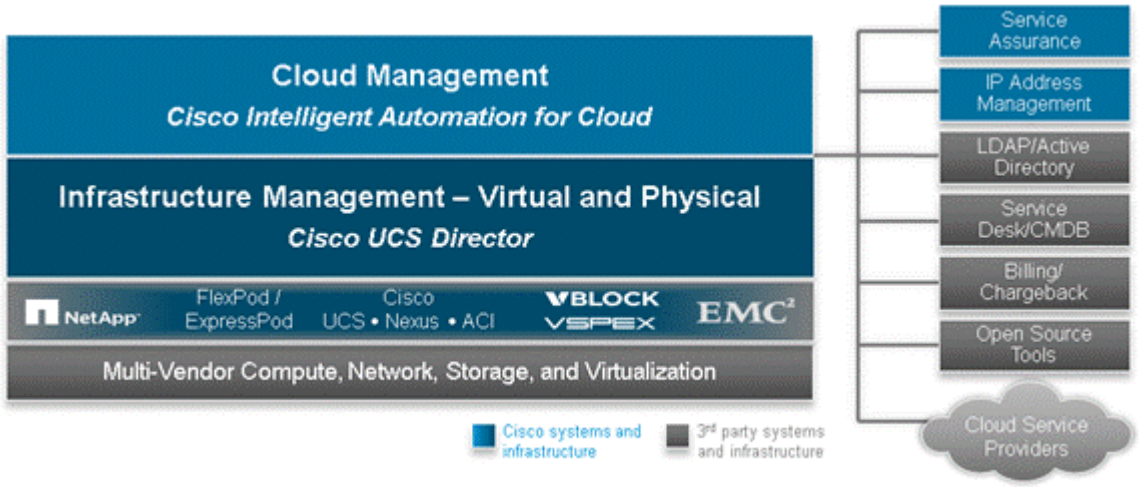
Cisco offers customers two integrated products that together support physical, virtual, and cloud automation. They are:

- Cisco UCS Director, which provides automated physical and virtual infrastructure management, including support for Cisco UCS-based integrated systems (such as Vblock, FlexPod, and VSPEX) as well as third-party infrastructure
- Cisco Intelligent Automation for Cloud (IAC), which delivers full-stack cloud workload and application provisioning, governance, and usage tracking from an end-user self-service portal and service catalog

Each product can be deployed independently and is capable of managing heterogeneous mixes of Cisco and third-party infrastructure. However, recently introduced integrations between the two products now enable end-to-end automation from cloud service management through physical bare metal, virtual, and application infrastructure provisioning (see Figure 3).

Figure 3

Cisco Integrated Cloud and Infrastructure Management Architecture



Source: Cisco, 2014

Cisco UCS Director (formerly known as Cloupia) enables policy-driven provisioning of Cisco and third-party compute, storage, and network infrastructure via a single pane of glass. The product is now integrated with both UCS Manager and UCS Central, as well as the new UCS Invicta (formerly known as Whiptail), with deep infrastructure support for Cisco UCS architectures. It also supports Cisco Nexus datacenter switching fabric, including the new Nexus 9000, and provides multi-hypervisor support, including additional support for VMware vSphere and Microsoft Hyper-V in the latest release.

In the past several releases, UCS Director has also extended its out-of-the-box support for NetApp FlexPod, VCE Vblock, and UCS-based EMC VSPEX systems, each of which includes Cisco UCS and Nexus infrastructure. According to the IDC Worldwide Quarterly Integrated Infrastructure and Platforms Tracker, December 20, 2013, as of 3Q13, these three systems combined represent nearly 50% of worldwide integrated infrastructure and platforms market — with VCE Vblock at 16.8%, NetApp's FlexPod at 15.4%, and EMC VSPEX at 14.6%. The ability to support both UCS and related integrated systems enables customers to implement UCS Director across a broad range of datacenter and private cloud configurations.

Cisco is committed to continually extending UCS Director support for large-scale, multi-vendor datacenter environments. The product currently integrates with systems from vendors such as HP and Dell along with additional storage support for NetApp (including Clustered ONTAP) and EMC (including VMAX and VNX2). In the most recent release, the product has been enhanced to support environments with as many as 5,000 devices and 50,000 virtual machines. An SDK is available for development of additional third-party device support.

In terms of achieving fully unified infrastructure and cloud management, the most recent release of UCS Director includes a northbound API for integration with Cisco IAC as well as third-party cloud management tools.

Cisco IAC provides full-stack cloud workload orchestration, self-service provisioning, governance, and usage tracking across Cisco and third-party private and hybrid cloud environments. The key components of Cisco IAC include Cisco Prime Service Catalog as the service catalog, Cisco Process Orchestrator as the orchestration engine, and now Cisco Prime Network Services Controller for virtual network services. As UCS Director has become Cisco's focal point for physical and virtual infrastructure automation, Cisco has prioritized IAC development to focus on cloud management capabilities that complement UCS Director's deep infrastructure management capabilities.

For example, the most recent release of IAC was designed to simplify the user experience and to provide more intuitive, persona-specific administrator and end-user interfaces. This includes an enhanced end-user service catalog and IT-as-a-service portal that allows for unified, policy-based service request and provisioning — together with improved governance, quota-based provisioning, and service pricing. It also includes multi-tenant functionality that allows customers to manage individual tenants or organizations using different billing rates.

Cisco has also significantly extended out-of-the-box IAC integrations. The latest release of IAC includes out-of-the-box integration with UCS Director for infrastructure management, leveraging the northbound API noted previously. IAC also provides out-of-the-box templates to accelerate network services automation across VPNs, firewalls, and load balancers via the embedded Cisco Prime Network Services Controller. For organizations that are implementing hybrid, multi-cloud strategies, IAC includes out-of-the-box multi-cloud management for on-premise and off-premise cloud environments, including integrations with Amazon Web Services, OpenStack, and VMware vCloud.

The most recent IAC release includes additional prebuilt templates, catalog content, and automation workflows that organizations can extend to configure their own best practice process orchestrations. In addition, Cisco has announced the creation of a DevOps accelerator to rapidly expand the scope of IAC-supported cloud services and on-premise applications and middleware assets (including OSs and databases), moving IAC beyond simple VM and IaaS provisioning to providing an end-user service catalog with full app-stack offerings and an evolved cloud management experience. This includes embedded integrations with Puppet and Chef for configuration management.

With the most recent releases of UCS Director and Intelligent Automation for Cloud, Cisco has made substantial progress on its promise to tightly integrate infrastructure and cloud management and automation. IDC expects that during 2014, Cisco will continue to unify the user interfaces and workflows across these products and continue to strengthen support for an increasing range of infrastructure, application, and middleware products as well as open source solutions including OpenStack and third-party public cloud services.

Challenges

Cisco's growing portfolio of infrastructure and cloud automation solutions are, in many ways, one of the firm's best kept secrets. Cisco is a leader in the datacenter infrastructure market, but its growing portfolio of software and automation offerings is often overlooked outside of Cisco's installed base of customers. In fact, Cisco UCS Director and IAC support heterogeneous hardware, multi-hypervisor, and multi-cloud environments. As more and more enterprise cloud strategies embrace heterogeneous and public/private hybrid architectures, Cisco has an opportunity to expand its market awareness and address the infrastructure and cloud management needs of a broader range of existing and new customers. In the coming year, Cisco needs to continue to raise awareness about its broad and growing physical and virtual infrastructure management, multi-cloud, multi-platform capabilities in order to reach a wider base of customers, including many who are still in the early days of crafting their long-term cloud management strategies.

Conclusion

IDC's research indicates that customer demand for integrated cloud application and infrastructure automation continues to move beyond self-service VM provisioning to include integrated application and infrastructure DevOps life-cycle automation, policy-driven full-stack provisioning, end-to-end service monitoring, governance, and analytics to enable real-time policy-based, end-to-end application, middleware, and infrastructure configuration, remediation, and optimization. IT organizations recognize that traditional management strategies and fragmented tools can no longer efficiently scale and react to the needs of private and hybrid cloud environments.

The most successful datacenter and cloud management software providers will offer customers a full-stack, multi-cloud solution based on open industry standards and out-of-the-box best practices that ensure the ability to integrate with existing systems, applications, and management tools while simplifying all aspects of public, private, and hybrid cloud life-cycle management and operations.

If Cisco continues to unify and integrate its infrastructure and cloud management and automation capabilities while supporting heterogeneous multi-cloud architectures and full-stack applications environments, it has an opportunity to play an increasingly important role across many emerging cloud datacenter strategies spanning existing and new customer accounts.

A B O U T T H I S P U B L I C A T I O N

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