White Paper

Cisco Application Centric Infrastructure: Use ACI as a Technology-Based Catalyst for IT Transformation

What You Will Learn

One of the main challenges of IT transformation is not in getting organizations to acknowledge the benefits of the model, but in transforming the corporate culture of the organization to achieve those benefits. The two primary requirements for IT transformation are:

- Executive sponsorship and pervasive influence (top-down support)
- Capability to use technologies to support new operational models (bottom-up support)

This document discusses how Cisco® Application Centric Infrastructure (ACI) can catalyze the adoption of IT transformation from the bottom up through the operational benefits inherent in the technology. This document is not intended as a technical review of ACI capabilities. It instead is meant to showcase the capability of ACI to influence the desired IT operation and transformation changes.

Introduction

The term “IT transformation” is used to describe the process and benefits of an augmented business model in which corporate IT is operated as a line of business, providing both qualitative and quantitative measurement relative to corporate strategy. At the foundation, IT transformation is technology neutral; it does, however, rely on a functional architecture that dictates the right technology for the given requirements, use cases, and business outcomes.

The factor most critical to success in instantiating this new business model is also the most challenging because it requires a shift from the traditional “IT cost bucket” approach, to a culture in which IT is operated as an asset used for strategic business differentiation. This culture change can be successful, viable, and long term only if it is supported and sustained by executive leadership.

As the top-down corporate culture is shifting, IT must be able to use technology in such a way that both supports and promotes the new operational models that underpin the IT transformation: that is, the transformation must also be supported from the ground up. It is at this foundational level that Cisco ACI can have a positive impact by breaking down silos that span a number of different functional technology domains, such as network operations, application development, and information security.

ACI was designed from the foundation with a focus on the way that the network supports the business, directly mapping application connectivity and security needs to the network infrastructure. The fundamentals of this architectural design, in which requirements are mapped into the network, are what differentiate it from other solutions and provide the operational flexibility to define workflows across technology domains.

Note that although the capabilities inherent in ACI can help catalyze IT transformation, the efficacy of the solution, and the means for applying these capabilities in support of IT transformation, fundamentally depends on the way it is operated.

Traditional IT Operations

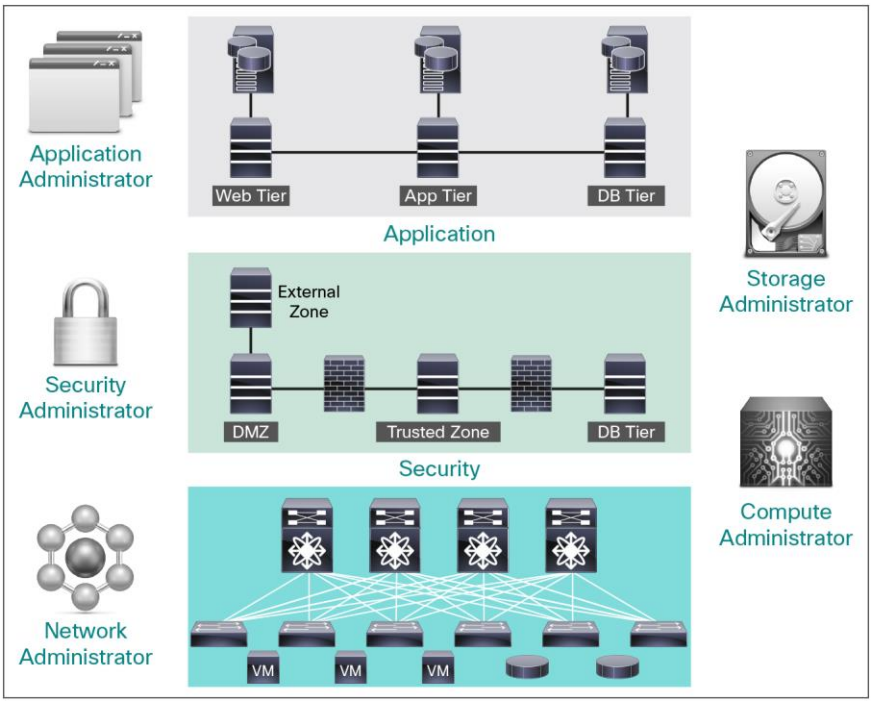
To understand the future of IT operations and the capability to run IT as a service or business, first consider the shortcomings of traditional (siloed) operational models. Then consider the way that technology can have a positive impact on the capability to transform IT.

IT operations traditionally divide the span of administration by technology and function. The result tends to be a highly segmented support structure in which technologies (such as network, storage, and computing technologies) and individual functions (such as applications, information security, and network functions) are controlled by separate teams.

The lack of cohesion between silos is reinforced by reporting structures and budgeting operations, which tend to be separate as well. Another contributing factor is that these silos were created in the first place because the technology for which each silo is responsible serves only the purpose of that silo.

Only recently have platforms begun to operate across technology silos, The Cisco Unified Computing System™ (Cisco UCS®) is one such platform. ACI takes this concept further by introducing a structure that not only brings together historically disparate technology silos, but also functional silos such as application development (Figure 1).

Figure 1. Traditional Functional Operational Silos



All of these teams are primarily accountable for supporting the growth of the business, and the result of this operating model is higher operating expenses (OpEx), which directly affects the profitability of the business. In addition, the lack of continuity associated with a siloed support structure tends to affect the amount of capital expenditures (CapEx) required for internal development.

This limitation also negatively affects IT's capability to meet the technology needs of the different lines of business. In fact, many lines of business are now circumventing corporate IT, instead interacting directly with external technology and cloud providers. This approach not only introduces a number of security concerns, but it also can result in wasteful spending due to the consumption of redundant services across different teams who may require faster time to market than what IT can currently deliver.

Transforming Corporate IT

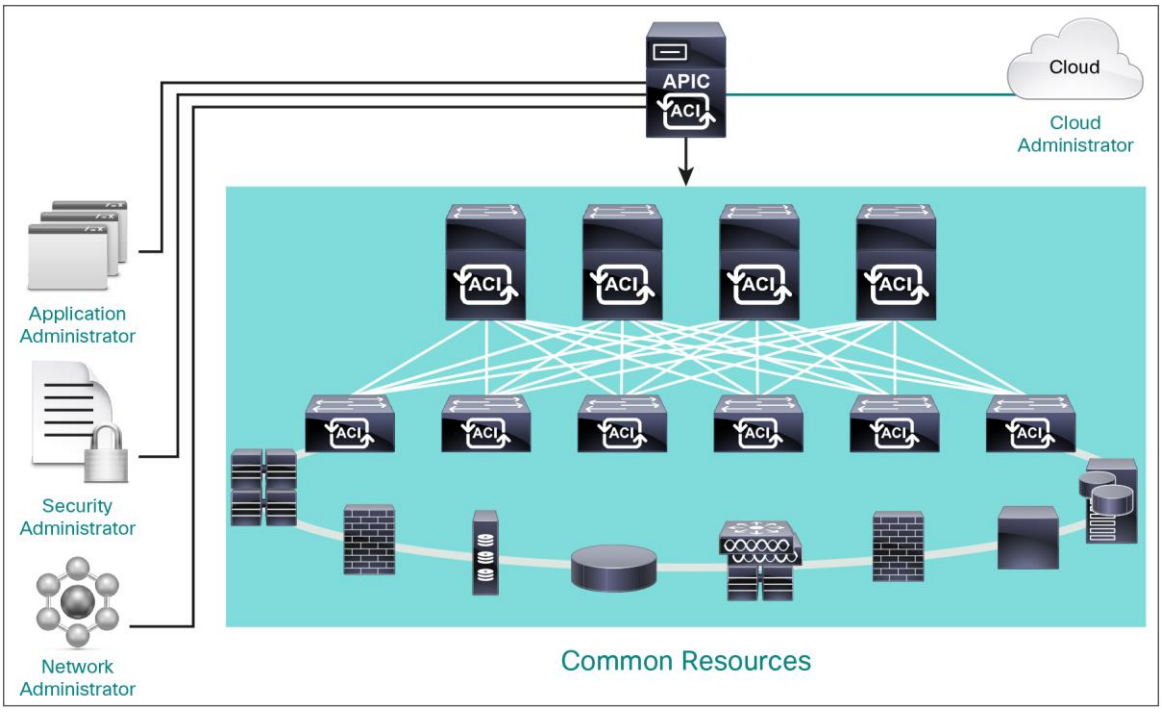
Transforming the IT business model so that IT operates as a line of business not only sustains the relevance of corporate IT, but it also results in centralized technology diligence and provides the company with the means to use IT as a competitive differentiator.

A number of methodologies and operational models are available by which IT can facilitate and enable transformation, including development and operations (DevOps), outcome-based IT, and Cisco Fast IT. The success of these top-down strategies is dependent on the bottom-up capability to use technology to support them. ACI was created specifically to support this transformation, inherently bringing the traditionally isolated technology teams together and allowing more cohesive interaction between operations and development teams.

The following core ACI design principals are the fundamental reasons why ACI provides a catalytic influence on IT transformation (Figure 2):

- System architecture: ACI is a true distributed system, based on innovative engineering and design principals, that mirrors the current trends and dynamics of application development.
- Open source: ACI innovations are published as open source technologies, and system interaction is not restricted.
- Multivendor: In the same way that the value of the network provides ubiquitous connectivity to all connected endpoints, the capabilities of ACI are not restricted to a subset of vendors.
- Physical and virtual interconnectivity: ACI provides a consistent connectivity model regardless of endpoint technology, allowing a multivendor strategy and the capability to scale the system in the way that best supports business requirements.
- Simplicity and abstraction: ACI abstracts the management and operation of the system so that workloads (for example, application traffic, file transfer, and data backup and recovery) are not hardware dependent and can be moved transparently between components (stateless hardware).
- Cost: ACI was built with both CapEx and OpEx in mind. Both custom and merchant silicon are used to provide the lowest cost base, and the operational efficiencies inherent to the systems automation capabilities reduce the cost of operating the environment.

Figure 2. Unified Operational Infrastructure Based on Cisco ACI Design Principals



Operational Changes and Requirements for Gaining the Benefits of Cisco ACI

As with traditional networking and IT, operational effectiveness has a direct impact on the utility of the technology investment. With IT transformation, the role and effectiveness of operations is especially critical because the historically segregated technology domains need to be operationally unified to provide the monetary benefits associated with transformational methodologies (such as outcome-based IT).

ACI serves to operationally simplify the underlying technology components, creating an environment in which traditional silos must work together. Whereas some competitive solutions address complexity by ignoring the foundational infrastructure, ACI provides a means of unifying the infrastructure, instilling abstraction throughout.

This unified methodology helps enable a cohesive operational strategy across multiple technology domains, which up to this point has been difficult to achieve. It is the successful implementation of this new approach to operations that provides the means to most effectively use ACI. Existing operational processes must be augmented, and in some cases created, to help ensure that the benefits of ACI are achieved and that ACI promotes IT transformation.

Process optimization is not a requirement that is specific to ACI, but is a requirement whenever new technology is introduced into the operating environment. ACI, however, provides a single means of interaction not only for operation metrics, but also operation automation. ACI simplifies Event management, Incident management, Configuration management, and other ITIL processes, making standardization of unified infrastructure operations much easier to achieve.

Centralized management principals are a critical attribute of a unified infrastructure built using open standards. ACI thus makes activities such as capacity planning, forecasting, monetary showback and chargeback, application-specific service-level management, and other operation leading practices that are essential to IT transformation much easier to accomplish.

Business Objectives Enabled by Cisco ACI

Table 1 presents a series of use cases to show how ACI can help enable IT transformation and how to operate IT as a service (ITaaS) from a technical perspective.

The left column specifies a business objective that must be enabled by a technology-based operational capability, listed in the middle column. The right column describes how the introduction of ACI helps facilitate the technology-based operational capability, which then enables the organization to meet the business objective.

Table 1. IT Transformation Use Cases

Business Objective Underpinning IT Transformation	Technology-Based Operational Capability Underpinning the Business Objective	Cisco ACI Enablement of the Operational Capability
Create and maintain a trusted relationship with organizational lines of business.	Provide outcome-based, organization-level agreements to individual lines of business within the organization.	The distributed system architecture of ACI provides the capability to create customized service levels and health scoring for individual objects in the system, as well as object aggregates. Examples include: • A critical application endpoint group • A line-of-business tenant composed of numerous individual objects
Provide operational transparency and market the benefit of IT for corporate customers.	Deliver specific metrics and customizable analytics on a per-customer basis.	Access to the object information in the Cisco Application Policy Infrastructure Controller (APIC) is not restricted, providing the capability to gather and trend specific metrics and customized groups of related metrics from the system. Examples include: • Trended capacity metrics that can be used for forecasting and seasonal burst requirements • Application-specific atomic counters that can be used in relation to end-user experience
Offer on-demand resource scalability and consumption.	Use intelligent automation and orchestration to provision, burst, and tear down resources as needed.	System interaction with ACI is not restricted, providing the capability to automate operational changes to the fabric using internally developed, open source, or purchased tool sets. Examples include: • The provisioning of new endpoint groups or a new corporate line of business tenant in response to a business need Operational changes to the fabric can also be set up as an automatic response to a condition or threshold. Examples include: • Traffic pattern manipulation based on an environmental event
Introduce new features and functionality as an integral component of IT-delivered services.	Operate in a bimodal way by maintaining a highly available, stable foundation while enabling fast-paced development capabilities and reducing development, testing, trial, and production time to market.	ACI allows the operation of, and fast transition between, multiple functional domains within a single fabric. Within the same ACI fabric, logically separate endpoint groups can be used for individual stages of the software development lifecycle. Examples include: • Alpha testing • Beta testing • Release-candidate testing • Production consumption

Business Objective Underpinning IT Transformation	Technology-Based Operational Capability Underpinning the Business Objective	Cisco ACI Enablement of the Operational Capability
Relate IT operations and forecasting to business-relevant financial metrics.	Apply and show trends for quantifiable operational costs to specific metrics on a per-customer basis.	ACI resource use is maintained within the objects that comprise the distributed system. Access to this information is not restricted, providing the capability to gather and trend specific metrics and customized groups of related metrics from the system. Examples include: • Resource and capacity metrics that can be used for chargeback and cost forecasting • Bandwidth use that can be referenced for internal corporate showback

Future IT and Business Requirements

As new operational models and methodologies are defined in support of IT transformation, the underlying infrastructure must be able to easily incorporate them, allowing the organization to take full advantage of the expected outcomes without the need for new CapEx. The design principals used to create ACI inherently support this capability by creating a fully distributed, object-based, programmable, hardware-decoupled system.

One example of a new model, being introduced by Gartner, is bimodal IT. In this model, operations capabilities are divided into two unique contexts. One operating context resembles a startup (fast-paced and rapid development), and the other represents the more traditional, and often stable, operating environment that adheres to defined processes and procedures. The flexibility of ACI allows it to accommodate both methods of operation in the same single system. The programmability and logical separation of resources allows independent operation of the same physical infrastructure.

Conclusion

Without the adoption of new technologies, the transition to ITaaS can be difficult to achieve because of the constraints of traditional operations and development silos. These IT resources typically are constrained by the limited operations capabilities of traditional technologies. Even with a top-down executive-supported call for transformation, the use of traditional technologies to facilitate IT transformation can actually inhibit this effort because they limit cross-functional possibilities to those of traditional operating models.

Cisco ACI can assist in IT transformation. The operational capabilities of ACI can serve as a technical catalyst to help eliminate these traditional silos and bring teams together, thus laying the foundation for ITaaS.

Next Steps

To learn more about how a Cisco ACI solution can benefit your organization, visit www.wei.com/ciscoaci.

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