

# Zenoss for Cisco ACI: Application-Centric Operations

## Introduction

Zenoss is a systems management software company focused on the challenges of operating and helping ensure the delivery of large-scale IT services. It replaces a patchwork of traditional existing management frameworks and custom-built solutions with an operations model built on six main principals, creating a platform that is:

- **Unified:** Uses one platform for cross-domain monitoring, deep analytics, and automated remediation
- **Simplified:** Uses simple building blocks, enables rapid customization, and removes complexity wherever possible
- **Model based:** Builds on intelligence and automation through real-time, model-based understanding
- **Service focused:** Enables operations from an end-user, service-based perspective
- **Scale out:** Elastically expands to cloud scale with horizontal distribution
- **Open:** Builds on the “power of open,” with an open ecosystem, open source design, open integration, open standards, and open collaboration

These main principles are tightly aligned with the core value proposition of Cisco® Application Centric Infrastructure (ACI). Zenoss brings highly scalable, unified monitoring and operations management to Cisco ACI, an automated solution for deploying and managing secure data center infrastructure using centralized application policies. This powerful combination is well suited for a new class of IT demands, including IT as a service (ITaaS), automated operations, and hybrid cloud infrastructure.

To date, Zenoss has been deployed in more than 35,000 organizations in more than 180 countries. Commercial clients include hundreds of organizations, including brand-name enterprises, leading online businesses, cloud service providers, prominent universities, and national defense organizations. Now, these organizations can enforce dynamic application policies in production environments with sophisticated and familiar operational tools correlated with application visibility.

## Data Center Challenges

Enterprise data center managers increasingly face new business challenges:

- **Reduce the time needed to deliver services:** Chief information officers (CIOs) are being asked to provide rapid delivery and support of new applications to address emerging business needs. Cisco ACI is designed to enable rapid, secure application delivery, and organizations are seeking to extend the ACI constructs automatically to storage, computing, and virtualization domains to unify day-1 and day-2 operations. By extending ACI tenants, applications, and endpoint groups using a continuously updated live model, Zenoss helps meet this need.
- **Provide on-demand scale out and tear down:** Data center managers are increasingly unable to predict changing resource needs, and business application developers are adopting a “succeed rapidly, fail rapidly” methodology. Orchestrated cloud infrastructure enables rapid resource scaling, but requires expensive, slow, manual configuration of multiple management tools to keep up.

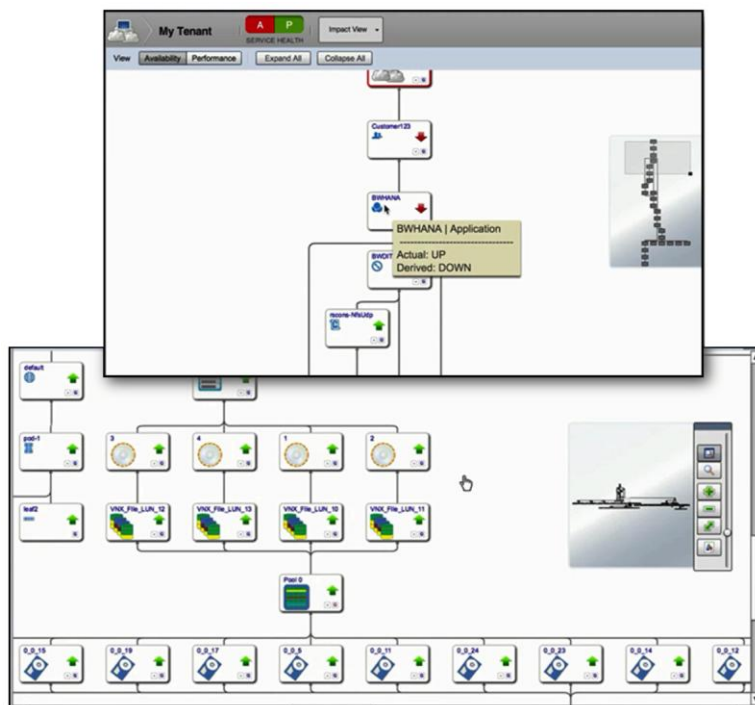
- Deliver proactive responses to performance problems:** Too often, IT operations teams hear about application performance problems first from end users. Business executives are seeking proactive, anticipatory responses from IT.
- Simplify the complexity of modern IT and improve service delivery:** IT departments adopting highly virtualized, dynamically changing overlays find it extremely challenging to identify root causes of problems and identify performance bottlenecks across heterogeneous infrastructure. Siloed IT specialists find it even harder to efficiently work together. The accurate Zenoss live model provides automatic relationship mapping from Cisco ACI tenants across traditionally separately managed technology domains to provide the simplified, unified view that organizations are demanding.

## The Solution

Zenoss for Cisco ACI software delivers application-centric IT operations monitoring for the software-defined data center. Cisco ACI defines tenant and application needs, and Zenoss software delivers service impact and root-cause analysis unified across the network, computing, virtualization, and storage resources in the infrastructure.

Zenoss for Cisco ACI uses the business definitions of tenants, applications, endpoint groups, and contracts to build an end-to-end live model of your data center. The Zenoss live model identifies the specific infrastructure components used by each application and correlates the network health, key performance indicators (KPIs), faults, and events for each ACI tenant and application to identify the root cause of performance and availability problems (Figure 1).

**Figure 1:** The Live Model Identifies the Infrastructure That Supports Each Tenant



The live model starts with continuously updated configuration information gathered from each technology domain - network adapters, MAC addresses, logical unit numbers (LUNs), etc. - and builds relationship models by matching common elements from different technology domains. For example, a Cisco Unified Computing System™ (Cisco UCS®) service profile identifies the MAC address for a virtual network interface card (vNIC), and a Microsoft Hyper-V virtualization host using that service profile will know the same MAC address. The relationship model tracks a huge number of relationships across the entire data center.

Zenoss uses Cisco ACI definitions (tenant, application, endpoint group, etc.) to build a specific dependency map of the relationships that are relevant for that particular tenant or application. Custom policies can alter the behavior of any dependency map to meet individual situations. Performance thresholds, critical events, and other indicators are evaluated against the dependency map and produce a precise analysis of the current state of each tenant or application, with automated actions on a per-tenant or per-application basis supplementing traditional device problem notification. Where problems exist, the live model outputs numerically ranked, cross-technology domain information, with root-cause analysis, enabling the right IT specialist to be assigned to fix the problem. Customers report that the use of Zenoss software has enabled them to reduce problem resolution time by up to 80 percent in complex environments.

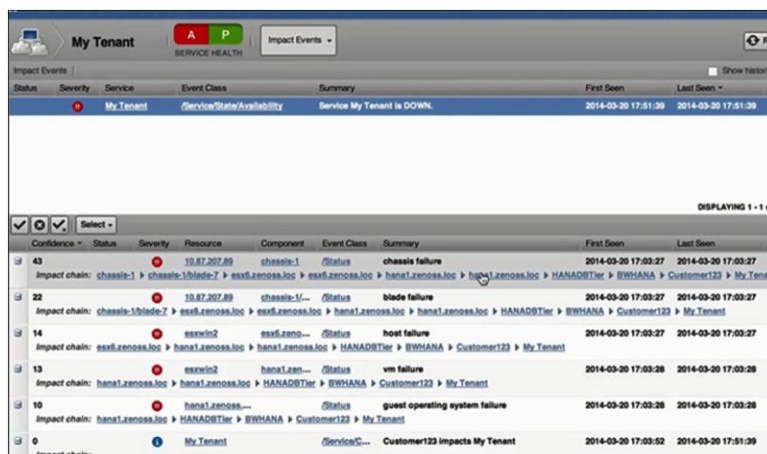
Because the live model automatically adjusts to policy-based configuration changes in network, computing, and virtualization technologies, you're assured that root-cause analysis is precise and accurate without the need to define complex rules. With Cisco ACI for Zenoss, you'll be able to focus on delivering highly available customer service first, and on fixing infrastructure problems second.

## Benefits of Zenoss for Cisco ACI

Zenoss for Cisco ACI offers these primary benefits:

- **Operations agility:** The Cisco Application Policy Infrastructure Controller (APIC) simplifies automation with an application-based policy model, while Zenoss software keeps IT operations synchronized with centralized visibility.
- **Reduced time-to-repair:** Automated network provisioning from Cisco reduces overhead and errors, and quantitative root-cause analytics from Zenoss reduces the mean time to repair problems (Figure 2).
- **Increased efficiency:** Zenoss policy-based monitoring and analysis is simpler to define and maintain when promoted by consistent application policies based on Cisco ACI.
- **Application visibility:** Zenoss extends the application policy model of ACI to include computing, storage, and virtualization to provide an end-to-end view of application infrastructure.

**Figure 2:** Root-Cause Analytics Reduces Time-to-Repair with a Ranked Problem List



Confidence	Status	Severity	Resource	Component	Event Class	Summary	First Seen	Last Seen
43	●	●	10.87.207.89	chassis-1	/Status	chassis failure	2014-03-20 17:03:27	2014-03-20 17:03:27
Impact chain: chassis-1 > chassis-1/blade:7 > esxi.zenoss.loc > esxi.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > HANA08Tier > BWHANA > Customer123 > My Tenant								
22	●	●	10.87.207.89	chassis-1V	/Status	blade failure	2014-03-20 17:03:27	2014-03-20 17:03:27
Impact chain: chassis-1/blade:7 > esxi.zenoss.loc > esxi.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > HANA08Tier > BWHANA > Customer123 > My Tenant								
14	●	●	esxi02	esxi.zeno-	/Status	host failure	2014-03-20 17:03:27	2014-03-20 17:03:27
Impact chain: esxi.zenoss.loc > hana1.zenoss.loc > hana1.zenoss.loc > HANA08Tier > BWHANA > Customer123 > My Tenant								
13	●	●	esxi02	hana1.zeo-	/Status	vm failure	2014-03-20 17:03:28	2014-03-20 17:03:28
Impact chain: hana1.zenoss.loc > hana1.zenoss.loc > HANA08Tier > BWHANA > Customer123 > My Tenant								
10	●	●	hana1.zenoss-	/Status	guest operating system failure	2014-03-20 17:03:28	2014-03-20 17:03:28	
Impact chain: hana1.zenoss.loc > HANA08Tier > BWHANA > Customer123 > My Tenant								
0	●	●	My Tenant	/ServiceC-		Customer123 impacts My Tenant	2014-03-20 17:03:52	2014-03-20 17:03:39
Impact chain:								

## Features of Zenoss for Cisco ACI

Zenoss software is designed to provide a flexible, highly scalable, and extensible architecture for addressing end-to-end service assurance challenges. Table 1 summarizes the main features.

**Table 1:** Main Features

Feature	Description
<b>Monitors tenant applications defined by Cisco ACI</b>	<ul style="list-style-type: none"> <li>• Extends the ACI network and network service model to computing, virtualization, storage, OS, and middleware infrastructure</li> <li>• Proactively evaluates application health</li> <li>• Provides cross-technology stack root-cause identification</li> <li>• Continuously tracks the health and performance of each ACI tenant application and its supporting infrastructure</li> </ul>
<b>Complete support for Cisco ACI</b>	<ul style="list-style-type: none"> <li>• Discovers the APIC cluster with associated Cisco Nexus<sup>®</sup> 9000 Series Switches spine and leaf nodes</li> <li>• Supports multiple ACI pods</li> <li>• Models ACI tenants, applications, endpoint groups, contracts, bridge domains, private networks, fabric nodes, etc.</li> </ul>
<b>Complete data center infrastructure support</b>	<ul style="list-style-type: none"> <li>• Cisco UCS and third-party servers</li> <li>• Microsoft Hyper-V and VMware virtualization</li> <li>• Cisco Nexus and Cisco Catalyst<sup>®</sup> OS networking</li> <li>• Cisco network services: Cisco Adaptive Security Appliance (ASA) for Nexus 1000V Series Switch, Cisco Cloud Services Router (CSR) 1000V, and Citrix NetScaler VPX</li> <li>• EMC and NetApp storage</li> <li>• Operating systems and middleware applications</li> <li>• Public cloud providers</li> </ul>
<b>Use of Cisco ACI relationships to model data center infrastructure support</b>	<ul style="list-style-type: none"> <li>• Application &gt; endpoint group &gt; OS &gt; virtual machine &gt; virtual host</li> <li>• Application &gt; contracts -&gt; network services &gt; virtual machine &gt; virtual host</li> <li>• Virtual machine &gt; virtual host &gt; data store &gt; storage array</li> <li>• Host &gt; Cisco UCS service profile &gt; blade &gt; chassis &gt; domain</li> </ul>
<b>Unified data collection</b>	<ul style="list-style-type: none"> <li>• Collects, analyzes, and stores configuration, health, performance, fault, and event data</li> <li>• Provides robust Layer 2 and 3 topology-based event storm suppression</li> <li>• Processes synthetic transactions to verify availability and performance</li> </ul>
<b>Scalable, agentless design</b>	<ul style="list-style-type: none"> <li>• Uses a suite of secure access methods to configure the full infrastructure without the need for proprietary agents</li> <li>• Provides a horizontally scalable data collection architecture</li> <li>• Consolidates separate instances using a central console</li> </ul>

Feature	Description
<b>Open and extensible platform</b>	<ul style="list-style-type: none"> <li>Provides comprehensive, validated, coverage for Cisco data center architecture</li> <li>Rapidly extends, customizes, and integrates with other management tools</li> </ul>
<b>Service impact</b>	<ul style="list-style-type: none"> <li>Live model automatically maps the network, network service, computing, virtualization, storage, and workload dependencies for each application service and identifies which services rely on any specific infrastructure component.</li> <li>Quantitative root-cause analysis identifies and ranks faults specific to any tenant service.</li> <li>Impact graph enables teams to view the health status of infrastructure resources supporting any application.</li> </ul>
<b>Service analytics</b>	<ul style="list-style-type: none"> <li>Uses the unified data store and live model to report on service levels and provide risk assessment</li> <li>Provides an open business intelligence engine to support both historical reporting and trend analysis</li> </ul>

Zenoss for Cisco ACI provides comprehensive technology coverage for the components of the Cisco data center (Table 2).

**Table 2:** Zenoss for Cisco ACI Technology Coverage for Cisco Data Center

Technology	Coverage List (Partial)	Discovery	Inventory	Fault	Performance and Health	Service Impact	Service Analytics
<b>Network</b>	<ul style="list-style-type: none"> <li>Cisco Nexus 1010 Virtual Services Appliance; 1000V Switch; 2000 Series Fabric Extenders; and 3000, 5000, 6000, 7000, and 9000 Series Switches</li> <li>Cisco APIC</li> <li>Cisco Catalyst 6500 Series Switches and other Cisco IOS® Software devices</li> <li>Cisco ASR 1000 and 9000 Series Aggregation Services Routers</li> </ul>	✓	✓	✓	✓	✓	✓

Technology	Coverage List (Partial)	Discovery	Inventory	Fault	Performance and Health	Service Impact	Service Analytics
<b>Network services</b>	<ul style="list-style-type: none"> <li>• Cisco Virtual Security Gateway (VSG) for Nexus 1000V Series Switch</li> <li>• Cisco ASA for Nexus 1000V Series Switch and ASA 5500 Series</li> <li>• Cisco Catalyst 6500 Series Application Control Engine (ACE) and Firewall Services Module (FWSM) and contexts</li> <li>• Cisco ASA 1000V Cloud Firewall</li> <li>• Citrix NetScaler VPX</li> </ul>	✓	✓	✓	✓	✓	✓
<b>Computing</b>	Cisco UCS domains and standalone servers	✓	✓	✓	✓	✓	✓
<b>Virtualization</b>	VMware, Microsoft Hyper-V, Red Hat, and Citrix Xen	✓	✓	✓	✓	✓	✓
<b>Storage</b>	<ul style="list-style-type: none"> <li>• Cisco MDS 9000 Family</li> <li>• EMC VNX and VMAX</li> <li>• NetApp FAS</li> </ul>	✓	✓	✓	✓	✓	✓
<b>Workload</b>	<ul style="list-style-type: none"> <li>• Microsoft Windows OS, Exchange, Internet Information Services (IIS), Lync, Messaging Queuing (MSMQ), and SQL Server</li> <li>• Linux OS, Apache HTTP, MySQL, and RabbitMQ</li> </ul>	✓	✓	✓	✓	✓	✓

Technology	Coverage List (Partial)	Discovery	Inventory	Fault	Performance and Health	Service Impact	Service Analytics
	<ul style="list-style-type: none"> <li>• Oracle databases</li> <li>• Apache HBase and Hadoop</li> <li>• Apache Tomcat, IBM WebSphere, and Red Hat JBoss</li> </ul>						
<b>Cloud</b>	<ul style="list-style-type: none"> <li>• Amazon EC2</li> <li>• Microsoft Azure</li> <li>• OpenStack</li> <li>• VMware vCloud</li> </ul>	✓	✓	✓	✓	✓	✓

The Zenoss software platform also provides a comprehensive set of integration APIs. Standard professional services-led integration support is available for:

- Cisco UCS Director and Cisco Intelligent Automation for Cloud
- Service desk systems BMC Remedy, CA Help Desk, and ServiceNow

Zenoss for Cisco ACI is available directly from Zenoss or through Cisco and Cisco resellers as Zenoss Cloud Service Assurance. Zenoss Cloud Service Assurance, sold exclusively through Cisco and Cisco partners, has been applied throughout the world in large service provider and enterprise private cloud deployments to enable these organizations to deliver high levels of service assurance.

As organizations globally evolve their IT strategies to deliver availability 24 hours a day, every day, while becoming more efficient and more dependent on virtualization and cloud technologies, they are finding that Zenoss meets their needs with a unique set of capabilities that directly addresses the challenges of modern IT.

### For More Information

- Cisco ACI strategy: <http://www.cisco.com/go/aci>
- Zenoss Cloud Service Assurance: <http://www.cisco.com/go/cloudassurance>
- Zenoss: <http://www.zenoss.com/>



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