Cisco Active Network Abstraction

Service providers face many challenges introducing new services and evolving existing ones. The volume of services and the pace of innovation are accelerating, and IP next-generation network (NGN) service architectures are increasingly complex to operate. Disjoint management solutions increase integration and operations costs, while internally developed manual processes and reactive troubleshooting lead to expensive service delivery outages. Operators require integrated, comprehensive, and interlocked network management solutions.

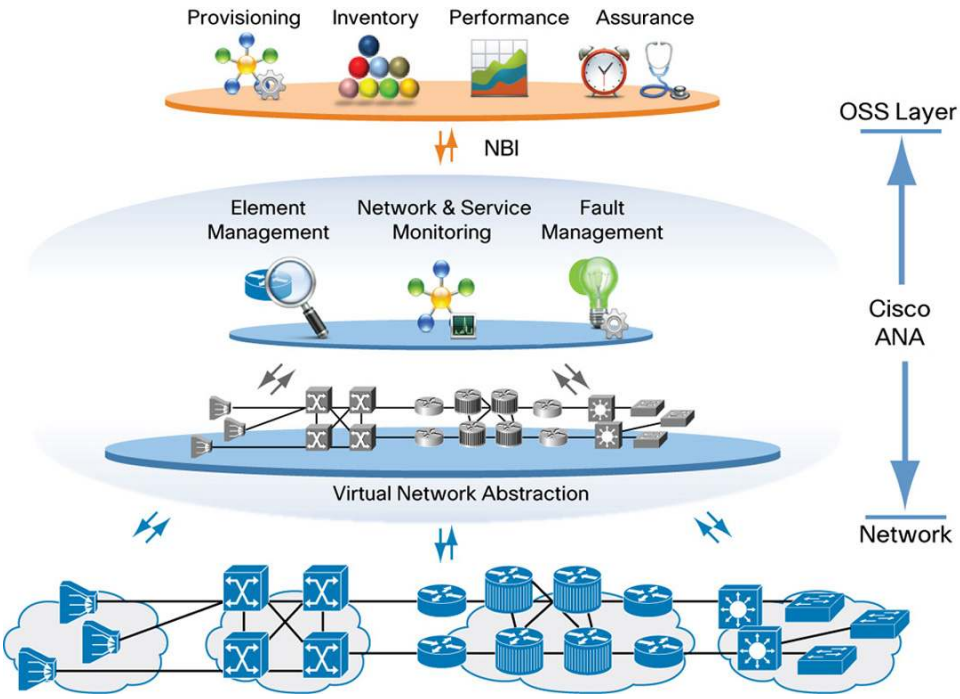
> "ANA is a unique model-based virtual network abstraction that supports CSPs' three critical management challenges… it is years ahead of competitors."
>
> — **Patrick Kelly, Research Director, Analysys Mason**

Cisco® Active Network Abstraction (ANA) provides service providers and other carrier-grade network operators with a comprehensive, network management solution for IP next-generation networks. ANA creates and maintains an accurate, "virtual" abstract model of the network in near real time to:

- Manage network elements: Supports all major Cisco service provider network elements, Multiprotocol Label Switching (MPLS), Carrier Ethernet, and Cisco Unified Radio Access Network (RAN) Backhaul reference architectures.
- Manage networks and services: Integrated networkwide and servicewide monitoring and fault analysis
- Integrate with network management systems (NMSs)/OSSs: Uses a standards-compliant information model for integration with third-party products, and ANA is easily field customized with built-in tools or through the Cisco partner program and Cisco Advanced Services support.

ANA's service-aware design and abstraction support converged core, aggregation, and access networks (see Figure 1).

Figure 1. Cisco ANA's Service-Aware Design



Installed on carrier-class servers, Cisco ANA is highly distributed, providing resiliency, high availability, and scalable deployments with the ability to support thousands of network elements (NEs).

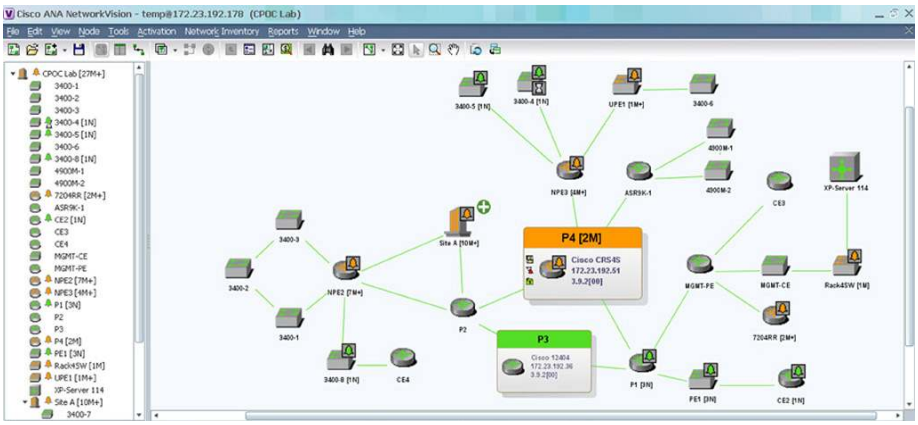
Cisco ANA Benefits

Cisco ANA brings both functional excellence and operational efficiency to network operations. Specific benefits include:

- Single management application for the converged network: Cisco ANA is the management application for the converged network, supporting all service provider IP NGN deployments, such as IP/MPLS core and service edge networks, IP RAN backhaul, and Carrier Ethernet networks. Cisco ANA provides management at the element, network, and service level. It supports the service assurance lifecycle from fault detection, event association, and root-cause analysis to remediation. The management architecture is simplified to one application - Cisco ANA - reducing the number of disjoint applications.
- Network visibility: Using Cisco ANA, users have the needed network information at their fingertips. Cisco ANA's unique model-based virtual network abstraction represents a live information foundation, providing a consistent and complete end-to-end topological view of the network resources, technologies, and services.
- Reduce operating expenses: Cisco ANA helps ensure operational efficiency and speeds up troubleshooting with its fault analysis, alarm correlation capabilities, and diagnostic tools. It reduces the Mean Time to Repair (MTTR) for service problems and thus decreases the cost of trouble tickets.

- Easily customizable: Cisco ANA is flexible and easily adaptable in different deployment scenarios. Cisco ANA is customizable to facilitate deployment in a variety of network scenarios. Its standards-based information model is easily extensible, and with its XML-based API, it provides an effective mediation and integration point for the OSS/BSS layer. Cisco ANA can be deployed along with service provisioning systems, inventory, and performance management systems, for complete management of next-generation IP networks.

Figure 2. ANA Network Topology Map



Cisco ANA Features at a Glance

Cisco ANA offers service providers a basic Element Management module, with which Cisco network elements such as the Cisco CRS-1, 7600, and ASR 9000 families can be managed. Additionally network and service management are available with the Network and Service Monitoring module.

Tables 1 and 2 summarize the features of Cisco ANA available in each module.

Table 1. ANA Foundation and Element Management

Abstract virtual network element (VNE) model and mediation layer	• NE communication protocol abstraction (Telnet, Secure Shell [SSH] Protocol, Simple Network Management Protocol [SNMP]) • Integrated model used across all applications (fault, inventory, configuration, service assurance, performance, and so on)
Fault management	• Fault detection (active and passive monitoring) • Event archiving • Fault identification, association, local correlation, archiving • Ticket management • Specialized viewer application with navigation capability
Inventory and topology management	• Autodiscovery and physical/logical Inventory sync in real time with the device • Topological views integrated with alarms and severity representations • Common launching point for majority of element management operations • Support threshold crossing alarms for augmented model variables
Configuration	• Model-aware command definition and execution with extensible scripting engine • Customizable GUI wizard-driven configuration; orchestration of device configuration activities using workflow engine • More than 200 built-in or downloadable configuration scripts
Configuration and image management	• NE configuration change management and backup • Restore to known configuration • NE software image distribution and image activation • Full Cisco IOS® Software image and granular Cisco IOS XR package operations support

Security	• NMS user management • Role-based access control (RBAC) for NMS users (scopes and roles) • Local and external authentication (Lightweight Directory Access Protocol [LDAP])
System management	• Supported redundancy solutions for Cisco ANA gateway include integrated local redundancy with Red Hat Cluster, embedded geographical redundancy for Linux platforms, and integrated solutions for local and geographic redundancy with Veritas • ANA Manage for the majority of system administration tasks • Fully distributed system for carrier-class scale and robustness
OSS integration API	• XML-based interface (queries, commands, notifications) • SNMP trap notification • Web services • Application cross launch
Customization and extension capabilities	• UI customization: Script execution, cross launch, maps layout • Model extension: Soft properties to extend internal model • Workflow builder: Toolset for workflow orchestration • VNE Customization Builder: Customize and extend VNE driver support • Registry Service: Customize specific behavior • Business tags (multibyte language support) • Rule engine to customize alarm postprocessing • Software Development Kit (SDK) and developer support (refer to ANA Technology Center)
VNE support	• Specialized drivers based on device type, version • Automatically discovered from the device • Independent VNE packages to keep up with device hardware and software updates • Support for 50+ device families, 300+ NE types • Support for non-Cisco devices
Solution integration	• Performance management with Cisco Prime™ Performance Manager or InfoVista VIN - ANA Edition • Fault management with Cisco Info Center and IBM Tivoli Netcool • Video assurance management (VAMS solution)

Table 2. Network and Service Monitoring

Topology management	• Autodiscovery and topological views for multilayer logical links • Unmanaged network segment (cloud) support • Network-level fault correlation and root-cause analysis
Service management	• Service discovery • Monitoring of service connectivity events • Service representation: Service inventory, service topology views, and overlay representation
Trouble shooting	• Service Impact • Path Trace and Ethernet Operations, Administration, and Maintenance (E-OAM) troubleshooting tools
OSS integration	• Augments foundation northbound interface (NBI) with network service management APIs

ANA Technology Center

Resources for OSS customization and integration engineers using Cisco ANA's APIs are available at the ANA Technology Center, http://developer.cisco.com/web/ana/home, hosted by the Cisco Developer Network.

System Requirements

Scalable and Distributed Architecture

Cisco ANA has a scalable and distributed architecture. Each Cisco ANA installation consists of unit servers, which host the VNEs, the gateway server, an embedded database or an external Oracle database, and Windows-based clients. Cisco ANA supports virtualization using either Solaris Logical Domain (LDOM) or VMware for Linux, thus allowing gateway and unit servers to be deployed as virtual servers. Cisco ANA can support a wide variety of deployment configurations tailored to each customer environment; the system requirements for Cisco ANA differ,

depending on the actual type and size of deployment. Tables 3 through 6 list the minimum Cisco ANA 3.7.3 system requirements. The system can be set up in various standby (high availability) modes to help ensure business continuity.

Unit Servers

The interconnected unit servers (units) can host up to thousands of individual VNEs, each representing a managed network element. As the managed network grows, VNEs can easily be moved from one unit to another, and additional units can be added to host additional VNEs.

Table 3. Minimum System Requirements, Cisco ANA Unit Logical Server

Item	Requirement
Solaris	
Server	Sun T series/Fujitsu SPARC 64 series processor, with 16 GB
Software	Solaris 10
Linux	
Server	Intel Xeon x5500 series, with 16 GB
Software	Red Hat 5.3 through 5.x 64-bit Server Edition

Gateway Server

The Cisco ANA gateway is a server through which all clients and external applications access the system. The gateway enforces role-based user access control and security for all connections and client sessions.

Table 4. Minimum System Requirements, Cisco ANA Gateway Logical Server

Item	Requirement
Solaris	
Server	Sun T series/Fujitsu SPARC 64 series processor, with 16 GB
Software	Solaris 10
Linux	
Server	Intel Xeon x5500 series, with 16 GB
Software	Red Hat 5.3 through 5.x, 64-bit Server Edition **Note:** The Cisco ANA gateway local redundancy solution requires as a minimum Red Hat Enterprise Linux 5.5 (RHEL 5.5) with the Red Hat Cluster Suite (RHCS)

Database

The database functions as a repository for configuration, network, and system events and alarms.

Cisco ANA provides the option to use the embedded database or to connect to an external database. See Table 5.

Table 5. External Database Specifications

Item	Requirement
Software	Oracle 10g 10.2.0.3.0 and later, Oracle 11g 11.2.0.1.0 and later database Optionally collocated with the gateway server or distributed on a separate server

Client (User Interface)

Table 6. Minimum System Requirements, Cisco ANA Client

Item	Requirement
Client	Intel processor-based server, with 1 GB
Software	Windows XP, Windows Vista, Windows 7, Citrix XenApp 5

Data Sheet Scope

The information in this datasheet describes the features and specifications for the latest version of Cisco ANA (3.7.3). For information about previous Cisco ANA versions, please contact your local Cisco account representative.

Ordering Information and Service and Support

Ordering Information

To place an order contact your local Cisco account representative or visit the Cisco Ordering Homepage.

Advanced Services

To get the highest value from Cisco ANA, it must be installed and configured with the final operations processes in mind. The Cisco Advanced Services group offers a broad array of services to help ensure that each Cisco ANA deployment is as fast and smooth as possible, optimizing the benefits of Cisco ANA. From initial process evaluations to specifying the most effective system configuration and implementation, Cisco Advanced Services is ready to provide customized assistance. For more information about Cisco Advanced Services for Cisco ANA, contact your local Cisco account team or send an email to wwsp-onm-bus-dev@cisco.com.

Technical Support

Cisco offers a wide range of support services programs to accelerate customer success, delivered through a unique combination of people, processes, tools, and partners. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications. For more information about Cisco support services, see Cisco Technical Support Services.

For More Information

For more information about Cisco ANA, visit http://www.cisco.com/go/ana, contact your local Cisco account representative, or send an email to ask_ana_pm@cisco.com. Technical integration information can be found at http://developer.cisco.com/web/ana/home.

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