

## Cisco Active Network Abstraction 3.7.1

Element, network, and service management for Cisco-based service provider IP networks

### Product Overview

Cisco® Active Network Abstraction (ANA) addresses the challenge of managing converged, multitechnology, multilayer and multivendor IP next-generation networks (IP NGN).

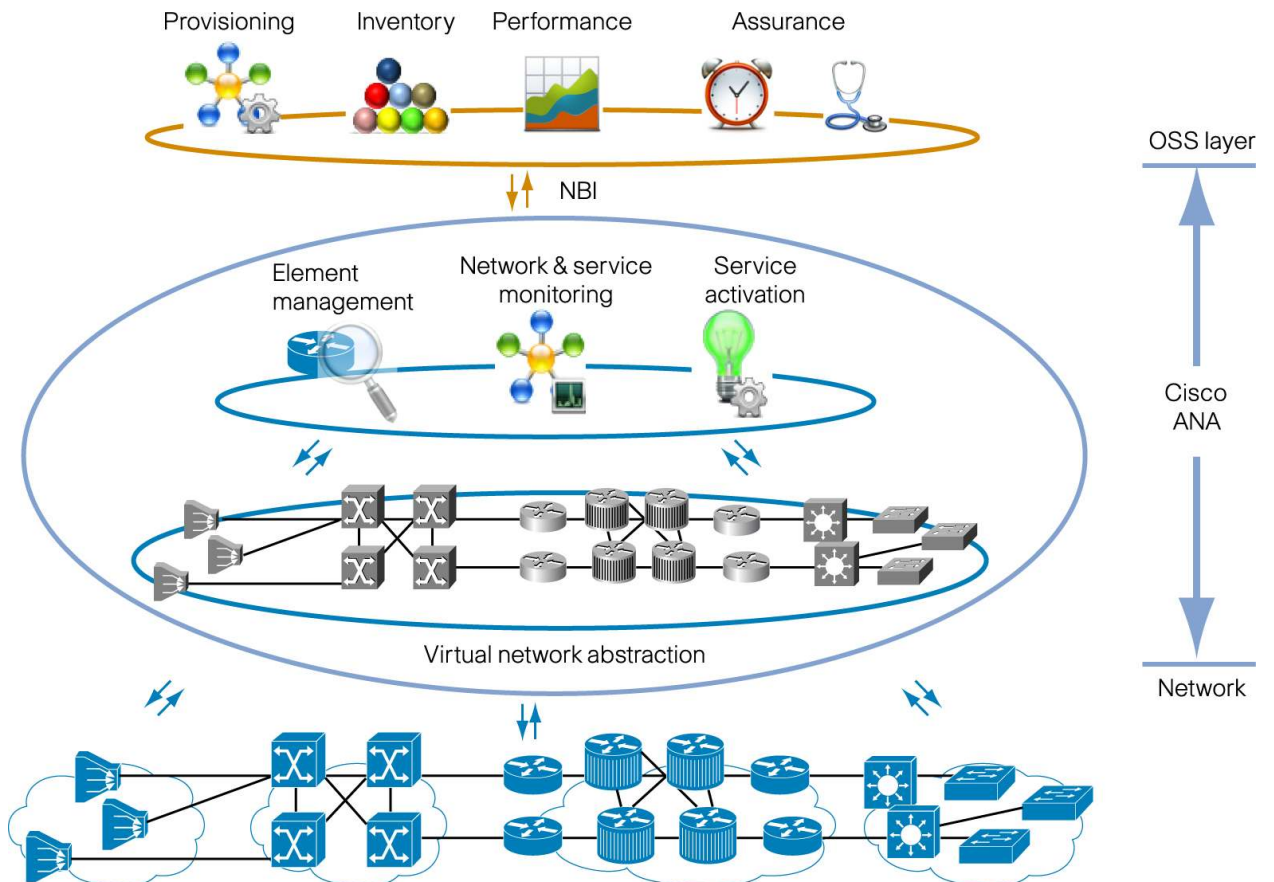
Cisco ANA manages IP NGN through its unique model-based virtual network abstraction. Its service-aware design and abstraction supports converged core, aggregation, and access networks based on converged IP/Multiprotocol Label Switching (MPLS) core and edge, Carrier Ethernet, and IP Radio Access Network (IP RAN)/Mobile Transport over Packet (MToP) technology foundations, and extends to support other emerging services and technologies.

Cisco ANA offers service providers the following functional tiers:

- Element management
- Network and service monitoring
- Service activation

It operates between the network and the operations support systems (Figure 1).

**Figure 1.** Cisco ANA Operates Between the Network and the OSS Layer



Cisco ANA is customizable and extensible and can be readily integrated into customers' NMS/BSS/OSS. Cisco ANA provides a set of customization and extension tools, allowing users to tailor it for their unique network deployment scenarios. Cisco ANA offers partners and integrators a rich set of northbound APIs and flexible query language to its TMF-compliant network information model, as well as comprehensive developer support services. Cisco ANA can be deployed along with service provisioning systems, inventory, and performance management systems, for complete management of next-generation IP networks.

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.

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 operation lifecycle from new service introduction, service activation, and troubleshooting to remediation. The management architecture is simplified to one application - Cisco ANA - reducing the number of disjoint applications.

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.

Cisco ANA accelerates technology and service introduction and reduces day-to-day cost of human error by supporting automated software image upgrade, service activation, configuration, and monitoring of the latest devices and services. Cisco ANA gives users control on the network configuration with its detailed tracking of the configuration evolution.

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.

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 standard-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 Features at a Glance**

Cisco ANA offers service providers three functional tiers. In its simplest form, using only the ANA Foundation and Element Management tier, Cisco ANA can be deployed as an element manager for Cisco network elements such as the Cisco CRS-1, 7600, and ASR 9000 families. By licensing all tiers, operators can use Cisco ANA as a full service-aware, end-to-end, IP NGN manager.

Tables 1 through 3 summarize the features of Cisco ANA by tier.

**Table 1.** Tier 1: ANA Foundation and Element Management

<b>Abstract virtual network element (VNE) model and mediation layer</b>	<ul style="list-style-type: none"> <li>• NE communication protocol abstraction (telnet, Secure Shell [SSH] Protocol, Simple Network Management Protocol [SNMP])</li> <li>• Integrated model used across all applications (fault, inventory, configuration, service assurance, performance, and so on)</li> </ul>
<b>Fault management</b>	<ul style="list-style-type: none"> <li>• Fault detection (active and passive monitoring)</li> <li>• Event archiving</li> <li>• Fault identification, association, local correlation, archiving</li> <li>• Ticket management</li> <li>• Specialized viewer application with drill down capability</li> </ul>
<b>Inventory and topology management</b>	<ul style="list-style-type: none"> <li>• Auto-discovery and physical/logical Inventory sync in real time with the device</li> <li>• Topological views integrated with alarms and severity representations</li> <li>• Common launching point for majority of element management operations</li> <li>• Support threshold crossing alarms for augmented model variables</li> </ul>
<b>Configuration</b>	<ul style="list-style-type: none"> <li>• Pass-through command execution with full access to internal model (also referred to as activation)</li> <li>• Auditing of all activation actions</li> <li>• Orchestration of device configuration activities using workflow engine</li> <li>• More than 200 built-in or downloadable configuration scripts</li> </ul>
<b>Configuration and Image management</b>	<ul style="list-style-type: none"> <li>• NE configuration change management and backup</li> <li>• Restore to known configuration</li> <li>• NE software image distribution and activation</li> <li>• Full Cisco IOS<sup>®</sup> Software image and granular Cisco IOS XR package operations support</li> </ul>
<b>Security</b>	<ul style="list-style-type: none"> <li>• NMS user management</li> <li>• Role-based access control (RBAC) for NMS users (scopes and roles)</li> <li>• Local and external authentication (Lightweight Directory Access Protocol [LDAP])</li> </ul>
<b>System management</b>	<ul style="list-style-type: none"> <li>• High availability support</li> <li>• ANA Manage for majority of system administration tasks</li> <li>• Windows GUI client, NEBS-compliant SPARC servers, Oracle Enterprise 10i/11g support</li> <li>• Fully distributed system for carrier-class scale and robustness</li> </ul>
<b>OSS integration API</b>	<ul style="list-style-type: none"> <li>• XML-based interface (queries, commands, notifications)</li> <li>• SNMP trap notification</li> <li>• Web Services</li> <li>• Application cross-launch</li> </ul>
<b>Customization and extension capabilities</b>	<ul style="list-style-type: none"> <li>• UI customization - script execution, cross launch, maps layout</li> <li>• Model extension - Soft properties to extend internal model</li> <li>• Workflow builder - toolset for workflow orchestration</li> <li>• VNE Customization Builder - customize and extend VNE driver support</li> <li>• Registry Service - customize specific behavior</li> <li>• Business tags (multibyte language support)</li> <li>• Rule engine to customize alarm post processing</li> <li>• SDK and developer support (refer to ANA Technology Center)</li> </ul>
<b>Pluggable VNE support</b>	<ul style="list-style-type: none"> <li>• Specialized drivers based on device type, version</li> <li>• Automatically discovered from the device</li> <li>• Support for 50+ device families, 300+ NE types, multivendor capable</li> </ul>
<b>Solution integration</b>	<ul style="list-style-type: none"> <li>• Performance management with InfoVista VIN - ANA Edition</li> <li>• Fault management with Cisco Info Center and IBM Tivoli Netcool</li> <li>• Video assurance management (VAMS solution)</li> </ul>

**Table 2.** Tier 2: Network and Service Monitoring

<b>Topology management</b>	<ul style="list-style-type: none"> <li>• Auto-discovery and topological views for multilayer logical links</li> <li>• Unmanaged network segment (cloud) support</li> <li>• Network-level fault correlation and root-cause analysis</li> </ul>
<b>Service management</b>	<ul style="list-style-type: none"> <li>• Service discovery</li> <li>• Monitoring of service connectivity events</li> <li>• Service representation - service inventory, service topology views, and overlay representation</li> </ul>
<b>Trouble shooting</b>	<ul style="list-style-type: none"> <li>• Service Impact</li> <li>• Path Trace and E-OAM troubleshooting tools</li> </ul>
<b>OSS integration</b>	<ul style="list-style-type: none"> <li>• Augments foundation northbound interface (NBI) with network service management APIs</li> </ul>

**Table 3.** Tier 3: Service Activation

<b>Activation</b>	<ul style="list-style-type: none"> <li>• GUI "Wizard"-driven activation of services</li> <li>• Set of service activation workflows for Carrier Ethernet and MToP services; pretested with Cisco network elements</li> <li>• Extensible framework for definition of new service types and attributes and customizable wizards</li> </ul>
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### 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 Oracle database, and Windows-based clients. Cisco ANA supports Solaris Logical Domain (LDOM) virtualization, 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 4 through 6 list the minimum Cisco ANA 3.7.1 system requirements. Through an engagement with Cisco Advanced Services 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 4.** Minimum System Requirements, Cisco ANA Unit Logical Server

Item	Requirement
<b>Server</b>	Sun/Fujitsu Ultra SPARC T series processor, with 16 GB
<b>Software</b>	Solaris 10

#### 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. In addition it functions as a repository for configuration, network, and system events and alarms.

**Table 5.** Minimum System Requirements, Cisco ANA Gateway Logical Server

Item	Requirement
Server	Sun/Fujitsu Ultra SPARC T series processor, SPARC 64 VI-based processor, with 16 GB
Software	Solaris 10 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

**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](mailto: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](mailto:ask_ana_pm@cisco.com). Technical integration information can be found at <http://developer.cisco.com/web/ana/home>.



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