Cisco CRS-1/IOS-XR Device Management 3.5.2: Based on Cisco Active Network Abstraction Software

Cisco CRS-1/IOS-XR Device Management, based on Cisco Active Network Abstraction (ANA) software, is designed for service providers and large enterprises to efficiently manage their Cisco CRS-1 4-slot, 8-slot, 16-slot and Cisco XR12000 series routers, running Cisco IOS® XR Software.

Overview

Cisco CRS-1/IOS-XR Device Management provides a cost-effective platform for device management based on Cisco ANA. Further, it provides several fixed-price, prepackaged, custom professional services to build network management functions tailored to customers' specific network services offerings and operational needs.

Key Features and Benefits

Cisco CRS-1/IOS-XR Device Management utilizes Cisco ANA software to provide the features and benefits listed in Table 1.

Table 1. Feature and Benefits of Cisco CRS-1/IOS-XR Device Management

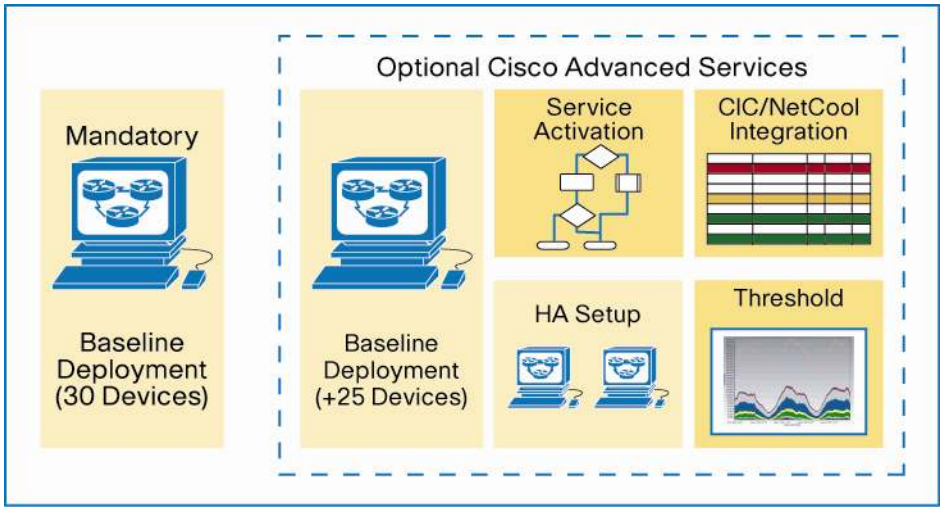
Feature	Benefits
Device inventory	• Complete CRS-1 and XR12K device inventory views covering both physical and logical inventory.
Device connectivity discovery	• Automatic discovery of device relationships (topology) using Cisco Discovery Protocol and Border Gateway Protocol (BGP).
Device fault collection and forwarding	• Captures and forwards device level alarms to OSS/BSS systems for monitoring at network operations center (NOC) or data center. • Integration to Cisco Information Center and IBM Tivoli/NetCool.
High availability	• Cisco ANA Warm Standby system facilitates 24-hour-a-day, 7-day-a-week network operations, services management, and business continuity.
Northbound interface	• Standard northbound interface (XML) provides single device mediation platform for all Cisco devices running Cisco IOS XR Software. • Currently supports CRS-1 and XR12K devices running Cisco IOS XR Software. • Device mediation and northbound Interface will cover additional Cisco device families as they support Cisco IOS XR–based software in future. • Standard northbound interface reduces OSS/BSS integration complexity.
Uniform device view	• Cisco ANA provides a generic view of devices and allows them to perform automated operational tasks using a GUI that reduces network operator training for CRS-1 and XR12K devices and Cisco IOS XR Software.
Customization tools	• Command Builder tool facilitates the automation of frequently used operational tasks, reduces errors, and improves network operations. • Soft Properties tool facilitates customization of device events and alarms to proactively monitor device health. • Work Flow Client tool facilitates customization of service activation flow and network operations management.
Distributed and scalable architecture—Device management	• Cisco ANA architecture and Cisco ANA Unit Servers eliminates single point for computation in managing core network consisting of CRS-1 and XR12K devices. • Cisco ANA architecture allows network operators to expand and effectively manage a core network with low incremental cost as they grow.

Cisco Advanced Services allows Cisco CRS-1/IOS-XR Device Management deployments to meet network operational needs through involvement in all aspects of planning, design, and implementation activities to better manage CRS-1 and XR12K devices using Cisco ANA.

The following fixed-price, prepackaged, custom implementation services to deploy Cisco ANA are available. Please also see Figure 1 below:

- Baseline Deployment Service (Mandatory)
- High Availability Configuration Service (Mandatory with Cisco ANA Warm Standby)
- Network & Service Activation (Optional)
- Network Threshold Management (Optional)
- Cisco ANA to Cisco Information Center or IBM Tivoli/NetCool Integration Service (Optional)

Figure 1. Implementation Services Available for Deploying Cisco CRS-1/IOS-XR Device Management



All custom deployment and implementation services can be delivered by the Cisco Advanced Services led engagement team in a 6- to 12-week timeframe. Table 2 shows the features and benefits of the prepackaged fixed-priced Cisco Advanced Services deployment packages.

Table 2. Features and Benefits of Cisco Advanced Services Deployment Packages

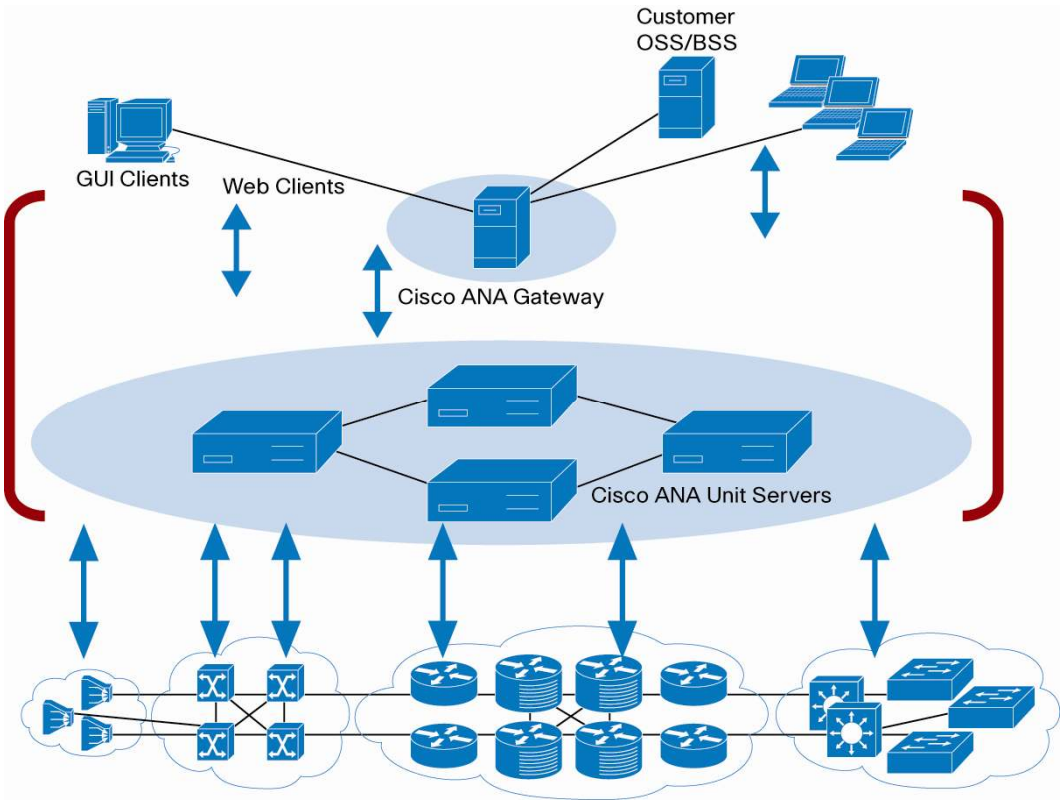
Feature	Benefits
Baseline Deployment Service (Mandatory—Fixed Price)	• Install, configure, and perform custom setup of Cisco ANA as device management for Cisco CRS-1 and Cisco XR12K tailored to your operational needs (for example, management of TRAPs and syslogs, configuration setup based on IT security needs, and so on). • Set up network discovery, topology, and backup and restore configuration of Cisco CSR-1 and Cisco XR12K devices in your network. • Complete documentation and transfer of knowledge. • Covers up to 30 devices and is extendable in 25-device increments for larger core networks based on Cisco CRS-1 and Cisco XR12K devices.
High Availability Configuration Service (Mandatory with ANA Unit Warm Standby —Fixed Price)	• Install, configure, and set up ANA Unit Warm Standby system for high availability of Cisco CRS-1 and Cisco XR12K device management, to suit your operational environment.
Network & Service Activation Service (Optional—Fixed Price)	• Build workflow and service activation through custom-built scripts and custom-built Cisco ANA GUI menus to configure and activate services to suit your network operations needs. Covers only Cisco CRS-1 and Cisco XR12K device service configuration and activations.

Network Threshold Management Service **(Optional—Fixed Price)**	• Assess and identify network and service performance thresholds for your service and operational needs, configure threshold alert levels to proactively monitor network and device performance for service and operational assurance. Covers only Cisco CRS-1 and Cisco XR12K device threshold assessment and management.
Cisco ANA to Cisco Information Center or IBM Tivoli/NetCool Integration Service **(Optional—Fixed Price)**	• Identify, capture, and forward events from Cisco ANA–based Cisco CRS-1 and Cisco XR12K device management to Cisco Info Center and IBM Tivoli/NetCool, acting as a manager of managers or fault console. Covers only Cisco CRS-1 and Cisco XR12K device fault event integration to Cisco Info Center.

Cisco Active Network Abstraction—Core Technology

Cisco CRS-1/IOS-XR Device Management uses Cisco ANA core technology—a unique Virtual Network Element (VNE) abstraction model that dynamically discovers and identifies basic network components, while obtaining an end-to-end view of network resources, connections, and dependencies. The building blocks of this model are autonomous virtual software-based network devices—each one cloning the characteristics and properties of its real-world hardware device counterpart. The aggregation of these virtual devices creates a virtual network model in the same way an aggregation of network elements creates a real world network (Figure 2).

Figure 2. Cisco ANA Core Technology



Cisco Active Network Abstraction—Architecture

Virtual Network Elements

Virtual Network Elements are the building blocks of the Cisco ANA virtual network model. They are software-based network devices—each one cloning the characteristics and properties of its real-world counterpart. These software entities run autonomously within Cisco VNE Server Units. Each VNE is assigned to manage a single network element instance using whatever southbound

management interfaces the network element implements (such as Simple Network Management Protocol [SNMP] or Telnet).

Cisco ANA Unit Servers

The Cisco ANA Unit Server can host up to thousands of individual VNE units that are interconnected to form a fabric that can intercommunicate with other VNEs regardless of which unit they are running on. Cisco ANA VNE Server Units also allow for optimal VNE distribution, helping ensure geographic proximity between VNEs and their managed network elements.

Cisco ANA Gateways

Cisco ANA Gateways are server units through which all clients, including any OSS/BSS applications as well as Cisco ANA applications and clients, access the system. They enforce access control and security for all connections and manage client sessions. In addition, they function as a repository for storing ANA configuration, network and system events, and alarms. They are also used to map network resources to the business context, allowing Cisco ANA to contain information that is not directly contained in the network (such as VPNs and subscribers) and display it to northbound applications.

Cisco Advanced Services Fixed-Price Prepackaged Deployment Service

Cisco Advanced Services supports the implementation and operations of Cisco CRS-1/IOS-XR Device Management. Cisco Advanced Services provide comprehensive, customized planning, design, and implementation services that help to ensure the ability to support Cisco CRS-1/IOS-XR device management requirements.

These services provide assessment reports and recommendations, detailed designs, implementation plans, and as-built documentation—all the necessary details required to deploy and operate a comprehensive Cisco CRS-1/IOS-XR Device Management deployment. All services include the following planning, design, and implementation activities:

- **Project management**: Develop a comprehensive project plan and provide project control and monitoring throughout the Cisco CRS-1/IOS-XR Device Management deployment.
- **Detailed design development**: Create the Cisco CRS-1/IOS-XR Device Management design that addresses the features and functionality needed to meet your business and technical objectives.
- **Site readiness assessment**: Assess the readiness and identify site modifications of your site to support operation of the Cisco CRS-1/IOS-XR Device Management software.
- **Implementation plan**: Define the activities, configurations, and commissioning test plans required to implement your Cisco CRS-1/IOS-XR Device Management implementation.
- **Installation, configuration, and testing**: Perform hardware and software installation, application configuration, and user-acceptance testing for Cisco CRS-1/IOS-XR Device Management.
- **Operations training**: Transfer knowledge relating to the design, implementation, and operations of the Cisco CRS-1/IOS-XR Device Management software.

Cisco CRS-1/IOS-XR Device Management—Specifications

Cisco CRS-1/IOS-XR Device Management uses Cisco ANA product that includes Cisco ANA Unit Servers, the Cisco ANA Gateway Server and Cisco ANA Clients.

Tables 3, 4, and 5 provide system requirements for the Cisco ANA Unit Server, Cisco ANA Gateway Server and Cisco ANA Client respectively.

Table 3. System Requirements for Cisco ANA Unit Server

Description	Specifications
Hardware	• Sun V490 (preferred) • 1 x DVD drive • 2 10/100M Ethernet ports
Operating system	Solaris 10
Memory	16 GB
Processor	4 x 1.35-GHz Ultra SPARC IV Processors
Disk space	Recommended: 2x73-GB HDD

Table 4. Systems Requirements for Cisco ANA Gateway Server

Description	Specifications
Hardware	• Sun V490 (preferred) • 1 x DVD drive • 2 10/100M Ethernet ports
Operating system	Solaris 10
Memory	• 16 GB • 8 GB of Solaris SWAP per CPU
Processor	4 x 1.35-GHZ Ultra SPARC IV Processors
Disk space	Recommended: 2x73-GB HDD
Database software	Oracle 9i (Customer Supplied)

Table 5. System Requirements for Cisco ANA Client

Description	Specifications
Hardware	• Pentium IV, 2.66 MHz Processor or better • 1 x DVD drive • Minimum screen resolution of 1024x768 pixels • True Color (32 bit) setting
Operating systems	• Windows 2000 or • Windows XP
Memory	• 1 GB • 512 MB of free non-virtual memory
Processor	Pentium IV, 2.66 MHz Processor or better
Disk space	2 GB free disk space

Supported Cisco Router Family

Cisco CRS-1/IOS-XR Device Management supports the Cisco CRS-1 router family and the Cisco XR12000 Series router family. Table 6 lists the Cisco CRS-1 and Cisco XR12000 routers supported along with the supported Cisco IOS XR Software version.

Table 6. Cisco Device and Software Support Information*

Device Family	Devices	Cisco IOS-XR® Software Release
Cisco CRS-1 Routers	Cisco CRS-1 16-Slot Single-Shelf System Cisco CRS-1 8-Slot Single-Shelf System Cisco CRS-1 4-Slot Single-Shelf System	Cisco IOS XR Software 3.4.1 and later
Cisco XR12K Series Routers	Cisco XR 12416 Router Cisco XR 12410 Router Cisco XR 12406 Router Cisco XR 12016 Router Cisco XR 12010 Router Cisco XR 12008 Router Cisco XR 12006 Router	Cisco IOS XR Software 3.4.1 and later

*For more information about system requirements and Cisco ANA support for additional Cisco router families (such as the Cisco 7600 Series) please refer to the Cisco Active Network Abstraction 3.5 Quick Start Guides at http://www.cisco.com/go/ana.

Ordering Information

For simplicity and ease of deployment, Cisco CRS-1/IOS-XR Device Management is offered as a packaged solution that includes all necessary Cisco ANA software components and mandatory Cisco Advanced Services deployment for optimal operational setup. The packaged solution includes a perpetual license bundle of Cisco ANA software components to manage the CRS-1 and XR12000 router family. Note that ordering of Cisco CRS-1/IOS-XR Device Management is based on the current Cisco ANA software pricing framework[1] and can be extended to manage other Cisco router devices, in future, for low incremental cost.

Table 7 lists mandatory ordering information for Cisco CRS-1/IOS-XR Device Management. Note that the ordering information is dependent on the size of the core network made of Cisco CRS-1 and Cisco XR12K devices.

Table 7. Cisco CRS-1/IOS-XR Device Management—Mandatory Ordering Information

Part Number	Description
ANA-SOFTWARE	Cisco ANA Software Product Category. Must be ordered before other options.
ANA-3.5-XR-SK-K9 **(Mandatory)**	Cisco ANA Core Network – Starter Kit[2]**.** This includes the following license bundle: • One each CRS-1 4, 8 and 16 Slot and XR12K Device VNE License • One Programmable Northbound API License • One Workflow Engine/Client License • One Command/Threshold builder License • One Cisco ANA Gateway software License • Cisco ANA Unit Server software as needed • Ten(10) Starter Kit RTU License for Group 4, 5, or 6 devices (CRS-1 4/8 Slot, 16 Slot or XR12K devices only)
ANA-3.5-SK-G6 **ANA-3.5-SK-G5** **ANA-3.5-SK-G4** **(Mandatory – based on network size)**	Cisco ANA Starter Kit RTU – Group 6 devices (one per CRS-1 16 Slot device) Cisco ANA Starter Kit RTU – Group 5 devices (one per CRS-1 4 -8 Slot device) Cisco ANA Starter Kit RTU – Group 4 devices (one XR12K device) Orderable for core networks with more than 10 CRS-1 and XR12K devices
AS-OSS-CNSLT **Fixed Price** **Cisco ANA Baseline Deployment –** **Up to 30 devices** **(Mandatory)**	Cisco Advanced Service – Cisco ANA Baseline Deployment Service. Covers Cisco ANA operational deployment for up to 30 CRS-1 and XR12K devices in core network. Orderable as Standard Statement of Works (SOW) contract
AS-OSS-CNSLT **Fixed Price** **Cisco ANA Baseline Deployment – Add in increments of 25 devices** **(Mandatory—based on network size)**	Cisco Advanced Service – Cisco ANA Baseline Deployment Service. Covers Cisco ANA operational deployment for 25 more CRS-1 and XR12K devices in core network. Orderable, in 25-device increments, for core networks with more than 30 CRS-1 and XR12K devices Orderable as Standard Statement of Works (SOW) contract
SP-SAS-ANA3SKG6 **SP-SAS-ANA3SKG5** **SP-SAS-ANA3SKG4** **(Mandatory—based on network size)**	Cisco ANA Starter Kit Maintenance (SAS) – one per CRS-1 16 Slot device Cisco ANA Starter Kit Maintenance (SAS) – one per CRS-1 4–8 Slot device Cisco ANA Starter Kit Maintenance (SAS) – one XR12K device

[1] This allows a single Device Management Platform (for example, Cisco 76xx).

Additionally, Cisco CRS-1/IOS-XR Device Management can be extended to suit the customer's network and service management needs by choosing appropriate optional Cisco ANA software and fixed-priced prepackaged Cisco Advanced Service packages. Following are the list of optional orderable packages:

- Cisco ANA High Availability Software and High Availability Deployment Service
- Additional Cisco ANA Software components (as needed)
- Network & Service Activation Service
- Network Threshold Management Setup Service
- Cisco ANA to Cisco Information Center or IBM Tivoli/NetCool. Integration Service

Table 8 lists optional ordering information for Cisco CRS-1/IOS-XR Device Management that can be ordered to suit individual customer needs.

Table 8. Table 8 Cisco CRS-1/IOS-XR Device Management—-Optional Ordering Information

Part Number	Description
ANA-3.5-UHS **SP-SAS-ANA3UHS** **AS-OSS-CNSLT** **Fixed Price** **Cisco ANA** **High Availability Deployment**	Cisco ANA Unit Hot Standby Option. Must order Cisco Advanced Services Fixed Price Cisco ANA High Availability Configuration Service. Cisco ANA Unit Hot Standby – Maintenance (SAS) Cisco Advanced Service – Cisco ANA High Availability Configuration Service. Orderable as Standard Statement of Works (SOW) contract
ANA-3.5-NBA **ANA-3.5-WFC** **ANA-3.5-UI**	Cisco ANA Northbound API – one concurrent Cisco ANA Workflow Client – Single Cisco ANA Client User Interface – Single Orderable as needed for customers operational needs, depending on desired number of northbound OSS/BSS integration points, network operators, and so on.
AS-OSS-CNSLT **Fixed Price** **Network & Service Activation** **Service**	Cisco Advanced Service – Cisco CRS-1/IOS-XR Device Management extension to Network Service Activation Configuration Covers Cisco ANA operational deployment and customization for network service activation based on CRS-1 and XR12K device family only. Covers unlimited number of CRS-1 and XR2K devices in core network. Orderable as Standard Statement of Works (SOW) contract
AS-OSS-CNSLT **Fixed Price** **Network Threshold Management Service**	Cisco Advanced Service – Cisco CRS-1/IOS-XR Device Management extension to Network Threshold Management Setup Covers Cisco ANA operational deployment and customization for network threshold monitoring based on CRS-1 and XR12K device family only. Covers unlimited number of CRS-1 and XR2K devices in core network. Orderable as Standard Statement of Works (SOW) contract
AS-OSS-CNSLT **Fixed Price** **Cisco ANA to Cisco Information Center or IBM Tivoli/NetCool Integration Service**	Cisco Advanced Service – Cisco CRS-1/IOS-XR Device Management extension to integrate fault management to Cisco Info Center (CIC) or IBM Tivoli/NetCool used as Fault Console or Manager-of-Manager Covers Cisco ANA operational deployment, device fault forwarding, and one-way integration to Cisco Information Center for CRS-1 and XR12K device family only. Covers unlimited number of CRS-1 and XR2K devices in core network. Orderable as Standard Statement of Works (SOW) contract

[2] Cisco ANA Core Network—Starter Kit can be extended to cover edge and aggregation layer devices.

For More Information

For more information about Cisco CRS-1/IOS-XR Device Management, visit http://www.cisco.com/go/ana-crs or contact your local Cisco account representative.

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