

Cisco Prime Network Registrar DHCP for Connected Grid Data Sheet

Product Overview

Cisco Prime™ Network Registrar DHCP for Connected Grid offers scalable, high-performance, and fault tolerant Dynamic Host Configuration Protocol (DHCP) services. Based on industry standards, the solution provides the IP address assignment and management required for IP network access for millions of connected grid endpoints. This helps support the Cisco® Connected Grid vision to transform energy production, distribution, and consumption using an end-to-end IP platform to sustainably meet the world's future energy needs.

Utilities are investing to add digital intelligence to their transmission and distribution networks, and digital intelligence requires connectivity. One of the main challenges with connecting large numbers of devices is providing a unique identifier, or address, for each device. DHCP provides the IP connectivity needed to manage and implement distributed networks, a virtually impossible task to undertake manually.

Given the increasing number of connected homes, businesses, and connected devices (as well as the need to support both IPv4 and IPv6 for smart meters and grid router devices), a high-capacity dual-stack DHCP server is an imperative for today's utility.

Migration to IPv6

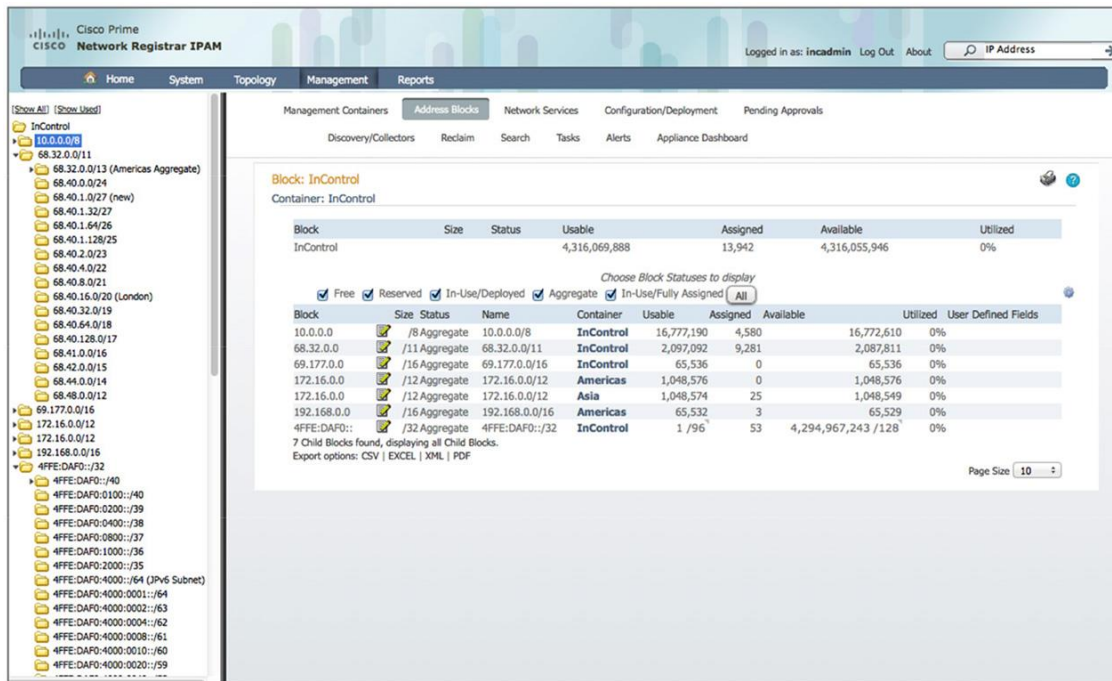
The introduction of IPv6 into network environments presents significant challenges and added complexity. The Internet Assigned Numbers Authority (IANA) address pool was exhausted on February 3, 2011, and the Regional Internet Registry (RIR) address pools have already begun to run out of allocatable IPv4 addresses. And IPv6 offers straightforward addressing and routing for a huge network such as the connected grid. Hence, most utilities are focusing on IPv6 as a component of their implementation. Network operators implementing connected grid solutions require DHCP systems that support IPv4 and IPv6.

Cisco Prime Network Registrar DHCP for Connected Grid supports the IPv4 to IPv6 transition and allows dual-stack deployments on a single server. The solution helps utilities to develop a multiservice network v6 and provides:

- Support for grid security - for example, digital certificates using authentication, authorization, and accounting (AAA)
- New opportunities to run multiple applications over multiple physical topologies. Examples of those applications include:
 - Integration with and monitoring of renewable energy sources
 - Better ability to monitor grid performance with the goal of reducing volt/VAR (voltage levels and reactive power) optimization losses
 - Smart metering
- Ability to implement network quality of service (QoS)
- Scale to millions of endpoints

See Figure 1.

Figure 1. Cisco Prime Network Registrar IPv4 and IPv6 Management



IP Address Management

With the continual deployment of new IP services and technologies, and the explosive growth in connected devices, connected grid networks should also consider a full-featured, automated IP address management (IPAM) solution. Without a next-generation, scalable IPAM system to plan, track, and manage the full lifecycle of IP address space and ease the transition to IPv6, service providers and enterprises risk operating inefficiencies and unnecessary costs and delayed service activation. Cisco Prime Network Registrar IPAM provides centralized, automated management of IP address space and DHCP servers. For information, please visit <http://www.cisco.com/go/networkregistrar>.

Features and Capabilities

Cisco Prime Network Registrar provides the following features:

- **Fast and scalable:** A blazingly fast DHCP server, Cisco Prime Network Registrar DHCP for Connected Grid has the ability to assign more than 47,000 DHCP leases per second. The solution is also the industry's most scalable DHCP server - supporting 50 million plus devices in a single customer deployment.
- **Reliable:** The solution helps address unique challenges in large-scale deployments of DHCP by offering multiple levels of redundancy with DHCPv4 and DHCPv6 safe failover and a patent-pending discriminating rate limiter. The later provides unsurpassed DHCP avalanche prevention to reduce downtime after network outages.

- **Consolidated IPv4/IPv6 address management:** Cisco Prime Network Registrar DHCP for Connected Grid includes integrated, full lifecycle management for IPv4 and IPv6 and allows dual-stack deployments on a single server. The full-featured DHCPv6 server provides support for address assignment, both stateless and stateful configuration, prefix delegation, and prefix stability for full IPv6 address management.

Table 1 lists additional detailed features and benefits of Cisco Prime Network Registrar DHCP for Connected Grid.

Table 1. Features and Benefits

Feature	Benefit
Rapid Time to Value	
DHCP setup wizards	Using the basic configuration mode with setup wizards for the DHCP component, users can easily perform DHCP configuration by entering the parameters that are essential for the configuration. An advanced configuration mode is available for users with more in-depth experience with DHCP configuration. Users can quickly set up and configure Cisco Prime Network Registrar DHCP properly to facilitate IP-based services such as voice over IP (VoIP), LAN, and so on.
Standards and Regulatory Compliance	
Industry standard IPv4 and IPv6 protocol services	Cisco Prime Network Registrar DHCP for Connected Grid provides dual-stack support for IPv4 and IPv6. The Internet Engineering Task Force (IETF) standard compliant services include USGv6 certification.
Simplified Dashboard and Reporting Capabilities	
Real-time server status dashboards	The DHCP dashboard provides at-a-glance, real-time indicators of the server health, system metrics, alarms and alerts, and inventories of the Cisco Prime Network Registrar DHCP server. The dashboard displays graphs for monitoring DHCP general information, throughput, and error data that can affect network operations. To measure address usage over time, the DHCP dashboard can collect DHCP utilization information for a time period and present graphs showing trends that are useful for capacity planning. Benefits include improved network maintenance and increased uptime.
Audit reporting	<ul style="list-style-type: none"> • Users are able to track IP address assignment history for auditing and troubleshooting purposes. • The system allows users to view administrator activity for accountability tracking.
Centralized DHCP Server Configuration	
Automated configuration	Operators can significantly reduce downtime with more accurate DHCP configurations.
Advanced configuration support	Support for multitiered addressing, multihomed hosts (to model multiple IP addresses on a given device), DHCP client classes, MAC address processing, client ID, and more - all help to meet complex network operator needs.
DHCP configuration verification and preview	Verification and preview capabilities help limit network outages and IP conflicts.
Static IP Address Management	
Carrier-class lease reservation performance	For users with needs for static IP address assignment, Cisco Prime Network Registrar DHCP for Connected Grid can handle up to 500,000 lease reservations. Because Cisco Prime Network Registrar supports failover deployment, the enhanced lease reservation synchronizes the lease reservation between the main and the backup server to ensure that any update to the configuration will be populated between these servers. Modification to the reserved lease configuration can be done through the web UI, a CLI, and the Java Software Development Kit (SDK).
Full-Featured DHCP Server	
Dynamic lease notification	With dynamic lease notification, network operators can request external system notification whenever Cisco Prime Network Registrar DHCP for Connected Grid issues a lease.
DHCPv4 and DHCPv6 failover	A simple failover model using TCP provides support for IP address, prefix, and variable-length prefix failover. This allows a backup DHCP server to take over for a main server if the main server is taken off the network for any reason.
Client reservations	Cisco Prime Network Registrar DHCP for Connected Grid provides client reservations for IPv4 and IPv6 addresses as well as IPv6 prefix delegation. This capability allows the DHCP server to reserve a permanent IP address assignment. These reservations can be stored internal to Cisco Prime Network Registrar (through the Cisco Prime Network Registrar client entries). This avoids the need to synchronize data with Cisco Prime Network Registrar's internal databases and provides for a much more dynamic and scalable reservation-based service.
Client class support	<p>Cisco Prime Network Registrar DHCP for Connected Grid can classify incoming client packets in two ways for greater flexibility:</p> <ul style="list-style-type: none"> • Looking up clients in a database (internal or external) • Applying a customer-defined algorithm or algorithms based on incoming packet content <p>The client class can specify the options supplied to the client - which subnet or prefix to use for address allocation, which DNS server to update, and how to generate the host name, and more - as required for the various device types and service classes in the network.</p>

Feature	Benefit
Gracefully handles difficult client situations	The DHCP server will handle an avalanche of DHCP client requests by prioritizing and processing the most important requests using a patent-pending discriminating rate limiter. The DHCP server will not collapse under any load, no matter how extreme - it will rapidly work through any backlog and get the network back up as quickly as possible.
Bulk lease query support for DHCPv6	The DHCP server will respond to lease query requests for a large number of DHCPv6 leases using standards-compliant bulk lease query functionality.
External Systems Integration and Support	
Integration with external systems	Users are able to streamline intersystem workflow using robust API/CLIs for communication between related asset inventory and network management systems.
Deployment Environments: Virtual, Physical, and Cloud	
Virtual appliance deployment option	Cisco Prime Network Registrar DHCP for Connected Grid can be deployed as a preconfigured virtual appliance and will run on any VMware ESXi 4.1-capable server running Linux or Windows. Deployment of a virtual appliance helps simplify installation, lower deployment risks, and reduce startup costs.
Software deployment option	Physical deployment of Cisco Prime Network Registrar offers choice of hardware and three operating systems: Solaris, Linux, and Windows or VMware with Linux/Windows.
Cloud support	Cisco Prime Network Registrar DHCP for Connected Grid is available as a virtual image for deployment in cloud environments that is easy to download and install.

System Requirements

Table 2 gives system requirements for Cisco Prime Network Registrar DHCP for Connected Grid.

Table 2. Server System Requirements for Cisco Prime Network Registrar DHCP for Connected Grid

Component	Recommendation		
Operating system	Solaris 10 (Sparc)	Red Hat Enterprise Linux ES 5.0 Red Hat Enterprise Linux ES 6.0	Windows Server 2008
Memory (RAM)	16 GB	Small networks - 4 GB; Average networks - 8 GB; Large networks - 16 GB	
Disk space	Local Server: Two 73/146 SAS drives Regional Server: 300 GB and higher recommended	With basic DHCP and optimal hardware configuration: <ul style="list-style-type: none"> For expected peak load between 500 and 1000 DHCP leases per second, 7500 RPM SATA6 drives are recommended. For expected peak load above 1000 DHCP leases per second, 15,000 RPM SAS drives are recommended. 	
Hardware	Sun T5220	Intel Core Duo or equivalent	

A regional server is included with the license; however, it must be installed as a separate server.

Ordering Information

To place an order, visit the [Cisco Ordering Homepage](#). To download software, visit the [Cisco Software Center](#).

About Cisco Prime

The Cisco Prime portfolio of IT and service provider management offerings empowers organizations to more effectively manage their networks and the services they deliver. Built on a service-centered foundation, Cisco Prime supports integrated lifecycle management through an intuitive workflow-oriented user experience, providing A-to-Z management for evolved programmable networks, mobility, video, cloud, and managed services.

Cisco Services

Cisco offers a wide range of services programs to accelerate customer success. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

For More Information

For more information about Cisco Prime Network Registrar, visit <http://www.cisco.com/go/networkregistrar/>, contact your local account representative, or send an email to ask-networkregistrar@cisco.com. For more information about Cisco Connected Grid solutions, visit <http://www.cisco.com/go/smartgrid>.




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