Cisco Prime IP Express Technical Data Sheet

Demands on today's business networks are extensive - from the ever increasing numbers of connected users and personal devices in the workplace, requirements for anytime, anywhere network access, and shifts to virtualization and IPv6 to ongoing security concerns and more. And these demands are placing stress on two core enabling IP services, DNS and DHCP, as well as IP address management. Current operational processes, largely manual, simply do not scale. Enterprises require an integrated, standards-compliant and comprehensive solution to simplify management of IP addresses and provide reliable, always on DNS and DHCP services.

Product Overview

Cisco Prime™ IP Express is designed to quickly, easily, and securely manage IP addresses within an enterprise. This reliable, high-performance and cost-effective solution provides integrated Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), and centralized IP address management (IPAM) services. It is specifically designed for today's enterprise networks - with associated emerging Internet technologies, mobile device proliferation, new security threats, bring-your-own-device (BYOD) movement, and high level of virtualization all in mind.

Users expect to be able to bring their personal mobile devices to work. Self-provisioning these devices securely and cost effectively requires a BYOD interface that integrates with a secure external authentication service like Microsoft Active Directory (AD). Providing terms of use, branding, and identity confirmation all lead to an in-house provisioning experience that will lower operating expenses (OpEx) while satisfying administrators and end users.

DNS and DHCP are core enabling IP services that are mission-critical in today's enterprise networks. Without fast, reliable, and secure DNS services, broadband Internet access will be compromised. If DNS fails, Internet connectivity will fail. High-performing, resilient, secure, centrally managed DNS is a requirement.

DHCP is a core network access technology - every device must be assigned a unique address when connected to the network, a virtually impossible task to undertake manually. The number of connected users and connected devices within the organization continues to grow, as employees want to access services from any laptop, smartphone, or virtual desktop over Wi-Fi, cellular, and wired networks. Given this growth, as well as the increase in demand for network services driven by rich-media applications such as voice over IP (VoIP) and video, automating the tracking and controlling of users and devices with a high-capacity DHCP server is imperative.

With the continual deployment of new IP services and technologies and, again, the increasing number of connected users and the explosive growth in connected devices, today's complex networks also require a full-featured, automated IPAM solution. Spreadsheets and homegrown applications are inefficient, labor-intensive, and error-prone. 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, enterprises risk operating inefficiencies and unnecessary costs.

Cisco Prime IP Express includes the following integrated components - all supporting both IPv4 and IPv6:

- DNS services for IP address translation and service delivery
- A single DNS caching server that supports forwarding, DNS recursion, and DNS Security Extensions (DNSSEC) to prevent cache poisoning and other attacks
- DHCP services for device network access
- A powerful, comprehensive IPAM system to automate and manage all IP address requirements

Features and Benefits

Cisco Prime IP Express provides the following features and benefits:

- **Centralized, automated management of IP address space and multivendor DHCP and DNS services:** Automation of IP address discovery, tracking, allocation, assignment, and reclaim drives operational efficiencies to help eliminate IP conflicts and configuration errors. This, in turn, reduces downtime of DHCP and DNS services and lowers network operating costs. Seamless integration with and IPAM support for Microsoft DNS and DHCP services also reduces management complexity, while providing flexibility for heterogeneous environments.
- **Reliable and secure:** Cisco Prime IP Express offers multiple levels of redundancy with DHCPv4 and DHCPv6 failover, support for High-Availability DNS (HA-DNS), and IPAM database replication for backup of IPAM data. A patent-pending discriminating rate-limiter provides unsurpassed DHCP avalanche prevention to reduce downtime after network outages. The DNS caching server provides support for DNSSEC to reduce network attacks and secure role-based access administration, and external authentication using AD or RADIUS provides secure log-on.
- **Lowers operating expenses:** Enterprises can realize significant operating efficiencies and reduce costs with centralized management, reuse of AD authentication with an integrated BYOD server to accelerate provisioning, track devices, and more.
- **Fast and scalable:** The Cisco Prime IP Express DHCP server has the ability to assign more than 47,000 DHCP leases per second. And the recursive, extremely fast DNS caching server offers significant acceleration of DNS query throughput. The solution is also the industry's most scalable DHCP server - supporting millions of devices in a single customer deployment.
- **Support for IPv6 and virtualization:** The solution provides integrated, full lifecycle management for IPv4 and IPv6 (including US Government IPv6 certification) and allows dual-stack deployments on a single server. And extensive support for virtual machines and the related provisioning and administration of IP addresses helps enterprises manage the transition to virtualized environments.

Table 1 lists additional detailed features and benefits of Cisco Prime IP Express.

Table 1. Features and Benefits

Feature	Benefit
Rapid Time to Value	
DNS and DHCP setup wizards	Using the basic configuration mode with setup wizards for the DHCP and DNS components, users can easily perform DHCP and DNS 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 and DNS configuration. Users can quickly set up and configure Cisco Prime IP Express DHCP and DNS properly to facilitate IP-based services such as VoIP, LAN, and so on.
IPAM ease and speed of setup	• IPAM accepts XLS or comma-separated value (CSV) files to import preexisting license data. • The Import Wizard allows users to import address space and resource records. • Automated discovery facilitates creation of a central IPAM repository of network IP addresses.
BYOD portal	The Cisco Prime IP Express BYOD integrated captive portal is easy to use and allows for self-service device registration and management. It enables employees to use their own mobile devices for business communications in a managed way - with the correct IP addresses and network settings. And it allows enterprise network operators to accelerate provisioning of a large number of devices and acquire information about all devices being configured on the network. The BYOD captive portal is customizable and allows an organization to add specific terms and conditions, color schemes, and company logos.
Standards and Regulatory Compliance	
Full visibility into lease history for IPv4 and IPv6	Cisco Prime IP Express DHCP provides the ability to query DHCP lease history for IPv4 and IPv6. Searching of lease history is possible both at the local and regional cluster level and is compliant with European Union privacy regulations. Lease history maintains client identifier to expedite client lookups. This feature is used in lawful intercept solutions and for long-term storage of customer data for regulatory compliance and operational efficiency.
DNSSEC government mandate compliance	For some U.S. government agencies, DNSSEC is an operational mandate. On 22 August 2008, the Office of Management and Budget (OMB) released a memorandum requiring U.S. federal agencies to deploy DNSSEC across .gov sites. In addition, in July 2011, several additional zones were signed using DNSSEC, including .net and .com. The Cisco Prime IP Express caching server offers DNSSEC support that helps to provide authenticated data to the end user, providing validation that DNS data has been signed.
Cloud Support	
Support for virtualized environments	Cisco Prime IP Express provides: • Automated tracking of IP addresses and DNS bindings in public and private clouds • Consistent management of IP addresses for virtual machines and physical devices • Support for role-based administration of DNS, DHCP, and IPAM for multidomain environments • A single view across the entire IP address space that combines physical and virtual networks • Extensive IPAM information about virtual assets, including location, type, MAC address, and more Cisco Prime IP Express offers a virtualized deployment package.
IPAM Rich Graphical User Interface	
Intuitive GUI	• A web-based interface allows administrators to quickly visualize the network and allocate addresses based on current and future requirements. The GUI allows users to associate address blocks easily with geography, topology, or other user-defined hierarchies through the use of a container model. • The GUI provides administrators with a real-time snapshot of the network that reduces the amount of time it takes a user to perform certain tasks, including keystrokes, mouse clicks, pointing, selecting an item from a list, and more. • Two-dimensional mega menus provide for easy navigation and greater visibility of available command options.
Context-aware menus and context-sensitive help	• Context-aware menus display relevant commands only for expedited operations and faster decision making. • Context-sensitive help offers information specific to the task for greater user productivity.
Simplified Dashboard, Tracking, and Reporting Capabilities	
Real-time server status dashboards	The DNS, DNS caching, and DHCP component dashboards provide at-a-glance, real-time indicators of the server health, system metrics, alarms and alerts, and inventories of the respective Cisco Prime IP Express servers. The dashboards display graphs for monitoring DHCP and DNS general information, throughput, and error data that can affect network operations. To measure address usage over time, the DHCP component dashboard can collect DHCP metrics for a time period and present graphs showing trends that are useful for capacity planning. Benefits include improved network maintenance and increased uptime.
IPAM historic reporting, tracking, and trending	• Address utilization data is tracked and trended for reporting purposes. • Multiple graphical reports provide information at any level in the container or address block hierarchy to manage IP address space capacity from both an address pool perspective and a network/subnet perspective.

Feature	Benefit
IPv4 and IPv6 audit, reporting, and alert capabilities	• Audit reporting promotes accountability and provides history tracking for administrators, subnets, devices, IP addresses, and containers. • Utilization tracking, analysis, global search, and reporting (with threshold alerting for notification of pending address depletions) help preempt potential service-affecting outages and prevent: ◦ Lost productivity ◦ Calls to the help desk ◦ Lost revenue ◦ Expensive troubleshooting time These capabilities also assist in compliance initiatives such as: ◦ Proactive and preventative management and maintenance ◦ Inventory reporting ◦ Graphical reports
IP Address Planning	
Planning for hierarchical IPv4 and IPv6 address space with a continual feedback loop	• Planning tools facilitate development of a disciplined IPv4 and IPv6 address plan that can be deployed, monitored, and tracked automatically - for a continuous feedback loop to assure accuracy and provide an overall management view. • Users can plan and stage the following interrelated entities for immediate or future deployment to DHCP and DNS servers: IP block or subnet allocation, IP address assignment, IPv6 prefixes and links, addition of a new DHCP pool and associated parameters, or DNS domain, server configuration, or resource records. • Discovery-to-database reconciliation and exception reporting help enable administrators to view plan discrepancies and potential errors or rogue users
Creation and management of IPv6 prefixes and links	Using IPv6 prefixes or links, administrators can easily perform IPv6 address allocation, assignment, tracking, and search - for significant operational efficiencies compared to manual processes.
Definition of DHCPv6 options and client classes	• Client classes may be used to associate classes of devices with policies and options. For instance, users can easily create a VoIP client class with a policy set to provide an address out of a given scope or prefix with associated options. • Users can create a client class configuration where specific client detail is stored.
Creation and management of IPv4 and IPv6 client reservations	Cisco Prime IP Express IPAM allows users to easily select and assign an IP address or prefix.
User definability/ flexibility and management of IP address space	The easy-to-use container architecture allows the user to define and manage topology, address space (including block allocations and subnets), device and block types, and associated attributes (through user-defined fields). This helps administrators to organize address space in a manner that best matches an organization's structure.
Address allocation: User-defined policies and automation	• Cisco Prime IP Express IPAM allows users to allocate space in a hierarchical, logical manner in accordance with the topology as defined in their IP address plan. • Automated allocation prevents the administrator from having to manually enter IP addresses, improving worker productivity and network uptime, decreasing costs, and allowing service providers and enterprises to scale seamlessly. • Optimal "best fit" address allocation maximizes address utilization efficiency. • Customization through multiple block types provides multiple address subspaces for various applications or IP types such as data, VoIP, higher quality of service (QoS), and more. • Simplified address renumbering allows movement of address space where it is needed.
Automated and manual IP address and subnet reclaim	IPAM provides the ability to reclaim or free up IP addresses or entire subnets - a task that is crucial to assuring the IP inventory database is accurate.
Address utilization trending and forecasting	IPAM allows trending and forecasting of address pools, helping to prevent network access failure through proactive management of available addresses and utilization trends.
Centralized DNS/DHCP Server Configuration	
Automated configuration	Administrators can significantly reduce downtime with more accurate DNS/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, dynamic DNS, and more - all helping to meet complex network operator needs.
DHCP configuration verification and preview	Verification and preview capabilities help limit network outages and IP conflicts.

Feature	Benefit
IP Address Management	
Discovery	• Cisco Prime IP Express IPAM performs host discovery using a variety of methods including ping, TCP port 80 connections, DNS lookups, Address Resolution Protocol (ARP) cache data, and device OS mapping. • The IPAM component performs integrated switch port mapping through Simple Network Management Protocol (SNMP) Bridge-MIB polling, facilitating support of a broad variety of switches, and mapping of a subnet's VLAN. • Router subnet discovery identifies which IPv4 and IPv6 subnets are provisioned on given router interfaces. • IPAM collects rich network data from a broad variety of multivendor Layer 3 routers, Layer 2 switches, and DNS/DHCP servers. • IPAM allows comparison of implemented network address data to the database to highlight discrepancies and reconcile conflicts.
User-defined thresholds and alerts	Users can set up thresholds and alerts - for example, for notification if an address space is over a designated utilization percentile or if an address pool is forecasted to deplete within a designated time frame - for proactive management. These capabilities help to facilitate planning and minimize network outages and IP conflicts.
Granular administrator policies and tiered administration capabilities	Granular administrator policies within Cisco Prime IP Express IPAM dictate access to and visibility and control of given functions, geographies, domains, subnets, and blocks. For enterprises with multiple operations personnel responsible for different portions of the network and/or different DHCP or DNS servers, administrators are empowered to delineate and partition responsibilities.
Static IP Address Management	
Lease reservations	For users with needs for static IP address assignment, Cisco Prime Network IP Express DHCP can handle up to 500,000 lease reservations. Because Cisco Prime IP Express 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 command-line interface (CLI), and the Java Software Development Kit (SDK).
Full-Featured DHCP Server	
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 IP Express DHCP 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 IP Express (through the Cisco Prime IP Express client entries) or external to Cisco Prime IP Express - either in Lightweight Directory Access Protocol (LDAP) or supplied through the DHCP server's extension interface from other external sources. This avoids the need to synchronize data with Cisco Prime IP Express' internal databases and provides for a much more dynamic and scalable reservation-based service.
Client class support	Cisco Prime IP Express DHCP can classify incoming client packets in three ways for greater flexibility: • Look up clients in a database (internal or external) • Apply a customer-defined algorithm or algorithms based on incoming packet content • Call customers or use third-party extensions written in C/C++ or Tool Command Language (Tcl) 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. For example, device types could include phones, printers, and desktop computers.
Extensions	Cisco Prime IP Express DHCP provides powerful extension support to allow for DHCP server processing customization. Extensions can be used to classify client types, add/remove/modify options in packets, query or update an external database, and much more. Extensions are flexible enough to be written in the enterprise development environment - they are written in either Tcl or C/C++ and support all operating platforms and all devices.
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. Also, through the use of an extension, the Chatty Client Filter, the DHCP component handles misbehaving clients. For clients that do not have multiple packets outstanding but still frequently send requests to the DHCP server, the extension will automatically disable such clients and then, if their behavior improves, automatically reenable them. In customer situations this has been shown to decrease packet traffic by more than 50 percent.
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.
Prefix stability for IPv6	Prefix stability allows a client to retain a delegated IPv6 address prefix when the client changes location - for example, during network maintenance, when an administrator performs node splits, or during load-balancing events. Universal prefix stability allows end users to retain a delegated prefix anywhere in the network. Use of this feature requires administrative assignment of the delegated prefixes and use of a client or lease reservation. It can be deployed across multiple DHCP servers.
Prefix allocation groups	Prefix allocation groups allow users to define multiple prefixes that do not result in multiple lease assignments to clients and to control the order in which the prefixes are used.

Feature	Benefit
DNS Features	
Standards-compliant DNS authoritative server	Cisco Prime IP Express DNS is a standards-compliant authoritative DNS server that offers an advanced feature set, with support for incremental zone transfers, dynamic updates, and notifications. To secure DNS services, the DNS component supports transactional signature (TSIG) to authenticate DNS zone transfer and update requests.
High-Availability DNS	If a single DNS primary server fails, dynamic DNS updates will get lost and the actual network will be out of sync with the database. High-Availability DNS enables a pair of DNS primary servers to act as an active standby pair. This feature ensures that a single DNS primary failure does not prevent dynamic DNS updates from DHCP servers from getting recorded.
DNS caching server	The DNS caching server is optimized for its specific role, performing the actual recursion to resolve a given name, resulting in greater simplicity and better performance overall. The server improves speed/performance of high volume recursive queries, and administrators can expect increased performance in end-user applications. The server stores DNS query results locally, which helps to improve efficiency and reduce DNS traffic across the Internet.
DNSSEC support	The Cisco Prime IP Express DNS caching server performs DNSSEC validation and authenticates DNS data as being published by zone administrators. This helps to ensure the authenticity and integrity of DNS records and servers being accessed. Specifically, DNSSEC validation provides assurance to end-user resolvers that DNS query responses are accurate for signed zones. The DNSSEC server validates signatures of each resource record ultimately to the root zone in accordance with standard DNSSEC protocol. DNSSEC also protects resource records against DNS vulnerabilities such as DNS cache poisoning.
DNS64 functionality	The Cisco Prime IP Express DNS caching server supports DNS64, synthesizing AAAA (IPv6) records from A (IPv4) records in order to provide an IPv6-only client access to an IPv4-only resource. This capability helps facilitate the migration of IPv4 to IPv6, as many organizations still don't support IPv6 resource records.
DNS views support	Cisco Prime IP Express provides simplified implementation support for and management of DNS views. DNS views allow presentation of alternate resource record sets (different "views" of the same data) based on the source or destination of the query and whether the query is recursive or not. End users only have to remember a single URL rather than an internal versus external URL. Enterprises can realize operating expense savings through the ability to have a single primary DNS server for both internal and external view servers. An enterprise domain could apply this concept to name spaces outside of the campus environment to create a true set of internal (on-campus) versus external (Internet-based clients) DNS name resolutions - for enhanced security for systems within a campus LAN.
Domain redirect	DNS administrators can optimize the user experience by helping users get to a predefined URL. The DNS server can be configured to modify response to queries to redirect clients away from known "risky" websites. Administrators can block a domain or list of domains, redirecting the user to a notification page.
NXDomain redirect	Large enterprise network operators can assist users when they make errors while trying to find websites. When a user queries an invalid domain name (that is, the server has no entry), the system will return an "NXDomain" response, meaning nonexistent Internet or intranet domain name.
DNS ENUM configuration	E.164 Number Mapping (ENUM) allows telephone numbers to be resolved to URLs using a DNS-based architecture. Cisco Prime IP Express offers an easy way to input and manage ENUM records. By placing telephone numbers into the DNS server, ENUM can facilitate interoperability for a wide range of applications including VoIP, video, presence, and instant messaging.
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. The IPAM API is available for integration with third-party applications such as provisioning systems and change management systems. A callout manager service can trigger downstream flows (for example, to a router provisioning system), helping to automate the workflow process, improving accuracy, speeding up the provisioning process, and lowering OpEx.
IPAM multivendor DHCP/DNS support	The IPAM component cohesively supports the following additional DNS and DHCP servers: Internet Systems Consortium (ISC DHCP and BIND 9 DNS) and Microsoft, allowing support of existing infrastructure.
Import tool for Microsoft DHCP	The DHCP migration tool enables an organization currently running a Microsoft DHCP server to easily move its configuration and current DHCP leases over to a Cisco Prime IP Express server.
Integration with Microsoft AD	Cisco Prime IP Express supports external authentication using Microsoft AD. This integration allows an organization to use AD as the single source for authentication for enforcement of controls and security policies. This reduces potential access or security errors and ensures that operating costs and procedures are not impacted when migrating to Cisco Prime IP Express.
Deployment Environments: Virtual, Physical, and Cloud	
Virtual appliance deployment option	Cisco Prime IP Express DHCP, DNS, and the DNS caching server can be deployed as a preconfigured virtual appliance and will run on any VMware ESXi 5.X-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 IP Express offers choice of hardware and three operating systems: Solaris, Linux, and Windows or VMware with Linux/Windows.
Cloud support	Cisco Prime IP Express is a cloud-ready service, deployable in a virtualized environment for private cloud deployments.

System Requirements

Table 2 lists server system requirements for Cisco Prime IP Express 8.2 DHCP, DNS, and DNS caching servers. Table 3 lists server system requirements for the Cisco Prime Network Registrar IPAM Executive Centralized Manager and the IPAM Agent.

Table 2. Server System Requirements for Cisco Prime IP Express 8.2 DHCP (Regional and Local), DNS, and the DNS Caching Servers

Component	Recommendation	
Operating system	Red Hat Enterprise Linux ES 5.0 Red Hat Enterprise Linux ES 6.0 CentOS Enterprise Linux 6.4 (64 bit)	Windows Server 2008
Memory (RAM)	Small networks up to 100K configured leases - 4 GB; Average networks up to 500K configured leases - 8 GB; Large networks up to 2 million configured leases - 16 GB	
Disk space	With basic DHCP and optimal hardware configuration: 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	Intel Core Duo or equivalent	

Table 3. Server System Requirements for Cisco Prime Network Registrar IPAM Executive Centralized Manager and Cisco Prime Network Registrar IPAM Agent

Component	Recommendation		
Operating system	Red Hat Enterprise Linux 5 (32 bit)	Windows 2008 Server (32-bit or 64-bit English versions) Windows 2008 R2 Server (64 bit)	CentOS Enterprise Linux 6.4 (64 bit)
Memory (RAM)	2 GB RAM or higher		
Disk space	2 GB disk space for base install		
Hardware	Xeon - 1.2 GHz or faster processor		

Ordering Information

To place an order, visit the Cisco® Ordering Homepage. See the Cisco Prime IP Express Ordering Guide for a list of Cisco Prime IP Express product numbers and upgrade product numbers as well as detailed licensing information. To download software, visit the Cisco Platform Suite.

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. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. 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.

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