Integrated DHCP, DNS & IP Address Management

Cisco Prime Network Registrar

Charlie Mascari, Product Manager
Network Management Technology Group

September 2011

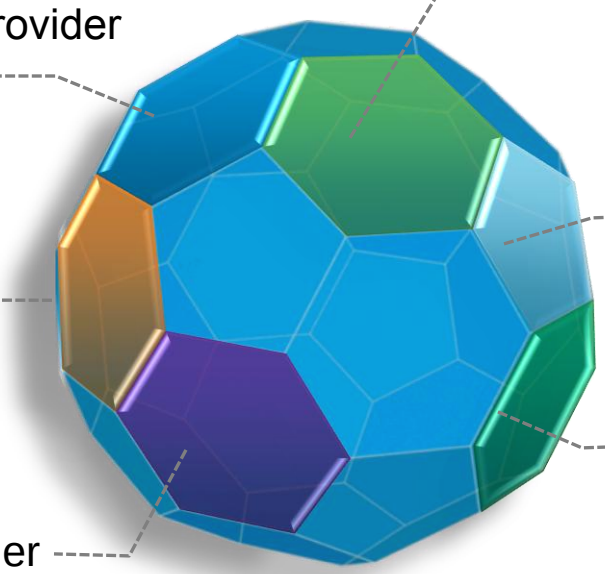
Agenda

- The challenge
- Introducing Cisco Network Registrar
- What's new: Cisco Prime Network Registrar
- Customer story
- Summary and next steps

The IP Address Management Challenge

The number of IP addresses and IP devices continues to increase dramatically, as does network size and complexity

- Domain Name System (DNS) and Dynamic Host Configuration Protocol (DHCP) are mission-critical in today's service provider and enterprise networks
- Network operators have begun to transition from IPv4 to IPv6
- Network operators are under pressure to reduce operating expenses (OpEx)

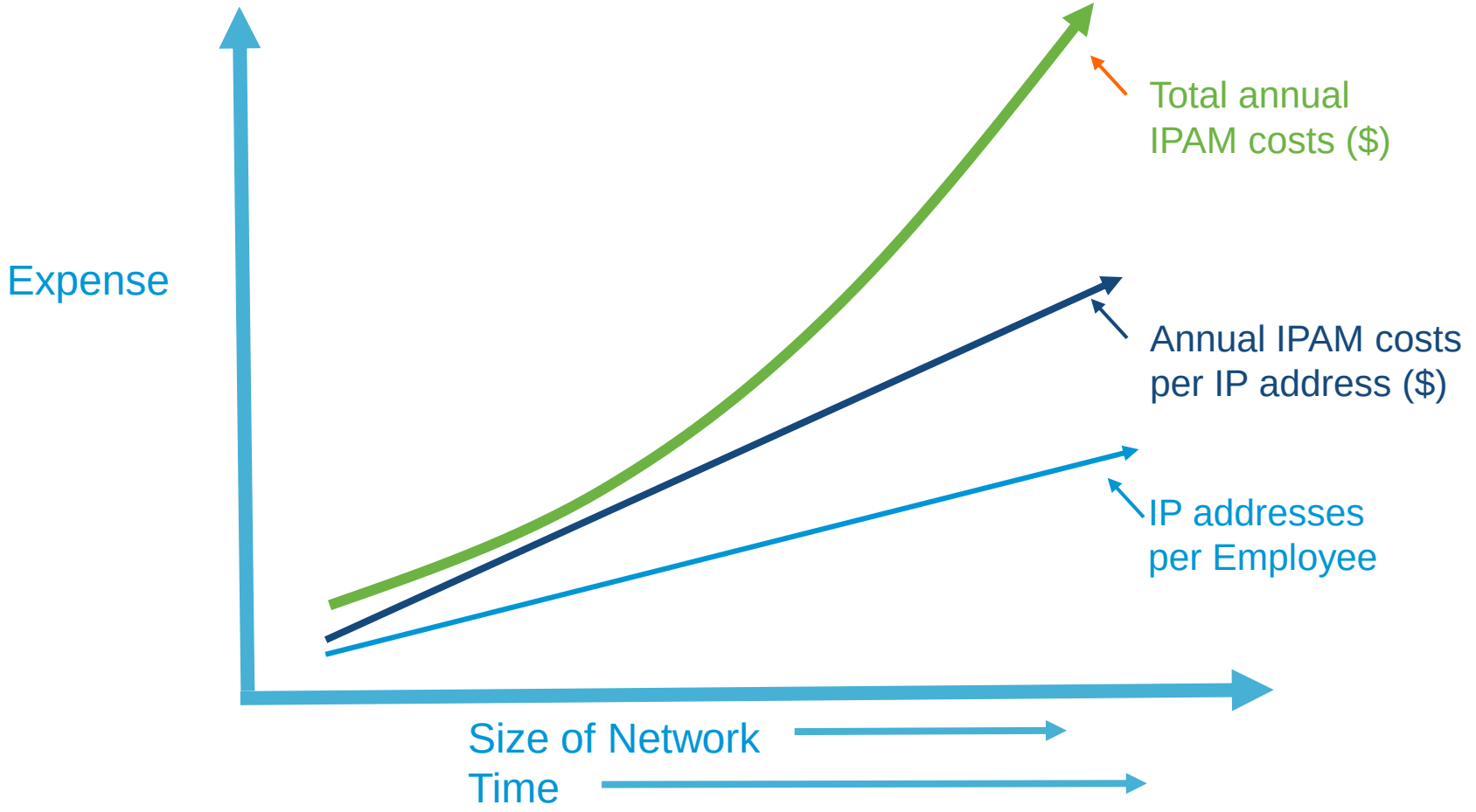


- New technologies are being introduced into the network: voice over IP (VoIP), video, cloud computing, virtualization, etc.
- Network operators need to accelerate provisioning and simplify service activation
- IP address management (IPAM) costs are rapidly accelerating, and manual processes and tools cannot scale

IP Address Management Costs Rapidly Escalating

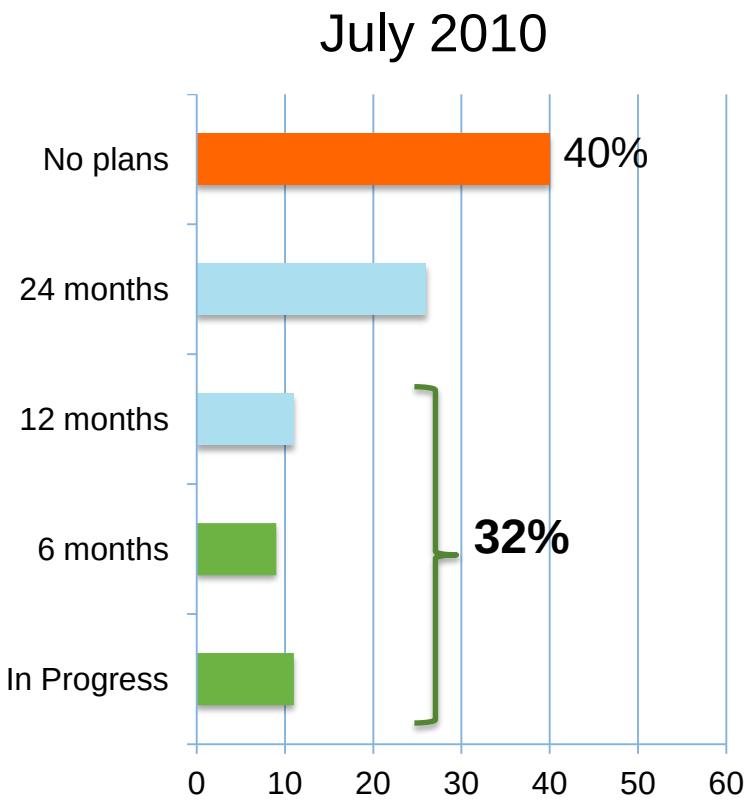
Manual tools/processes cannot scale with network growth

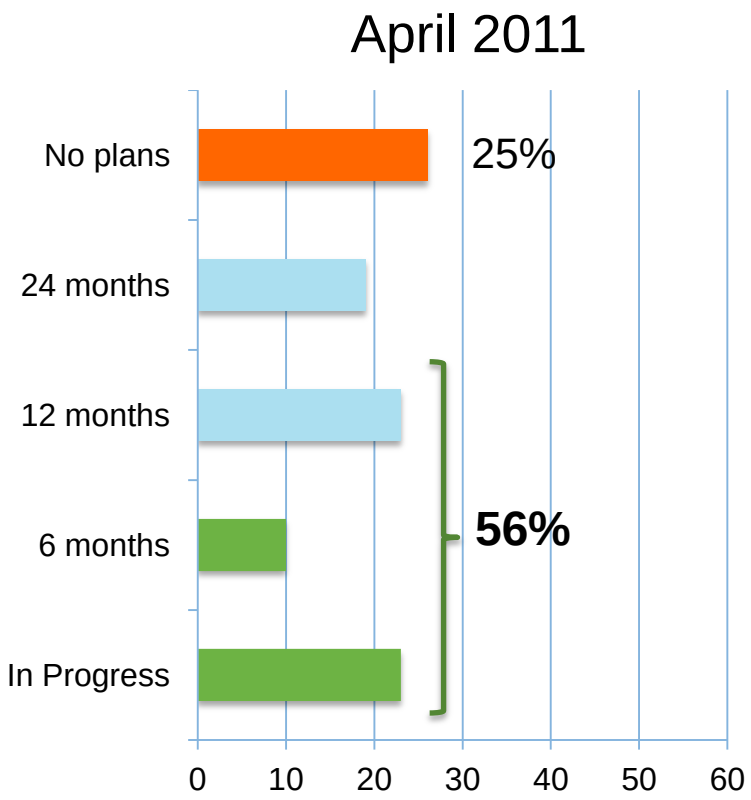
- Requirement for automated IPAM solution: provisioning, service activation, reduced OPEX



Enterprise Action Plan: ETAB Survey

"when are you planning to deploy IPv6 in production?"





Main driver = Internet evolution: 65%

Developing Your IPv6 Transition Plan

Preserve

Preserve investments in infrastructure, assets, and delivery models

- Audit and leverage existing IPv6 capabilities
- Maximize value and utilization of IPv4 resources

Prepare

Prepare for smooth, incremental transition with interoperable IPv4 and IPv6 services

- Develop a migration and deployment plan
- Identify and enable critical IPv6 functional areas

Prosper

Prosper with the uninterrupted reach to globally connected customers

- Enable all systems for v4/v6 coexistence
- Grow seamlessly as services transition to IPv6

IPv6

DDI Solution Operational Requirements
DNS, DHCP, and IP Address Management (DDI)

Network operators need an integrated DDI solution that provides:

- Reduced OpEx
- Improved Workflow
- Automation
- Simplified Manageability
- Security and Compliance

Introducing Cisco Network Registrar

Cisco Network Registrar

Integrated DNS, DHCP and IP Address Management

DNS

- Single DNS server support both IPv4 and IPv6 for device network access
- High Availability
- Auto synchronization of dynamic and static updates
- Standards compliant

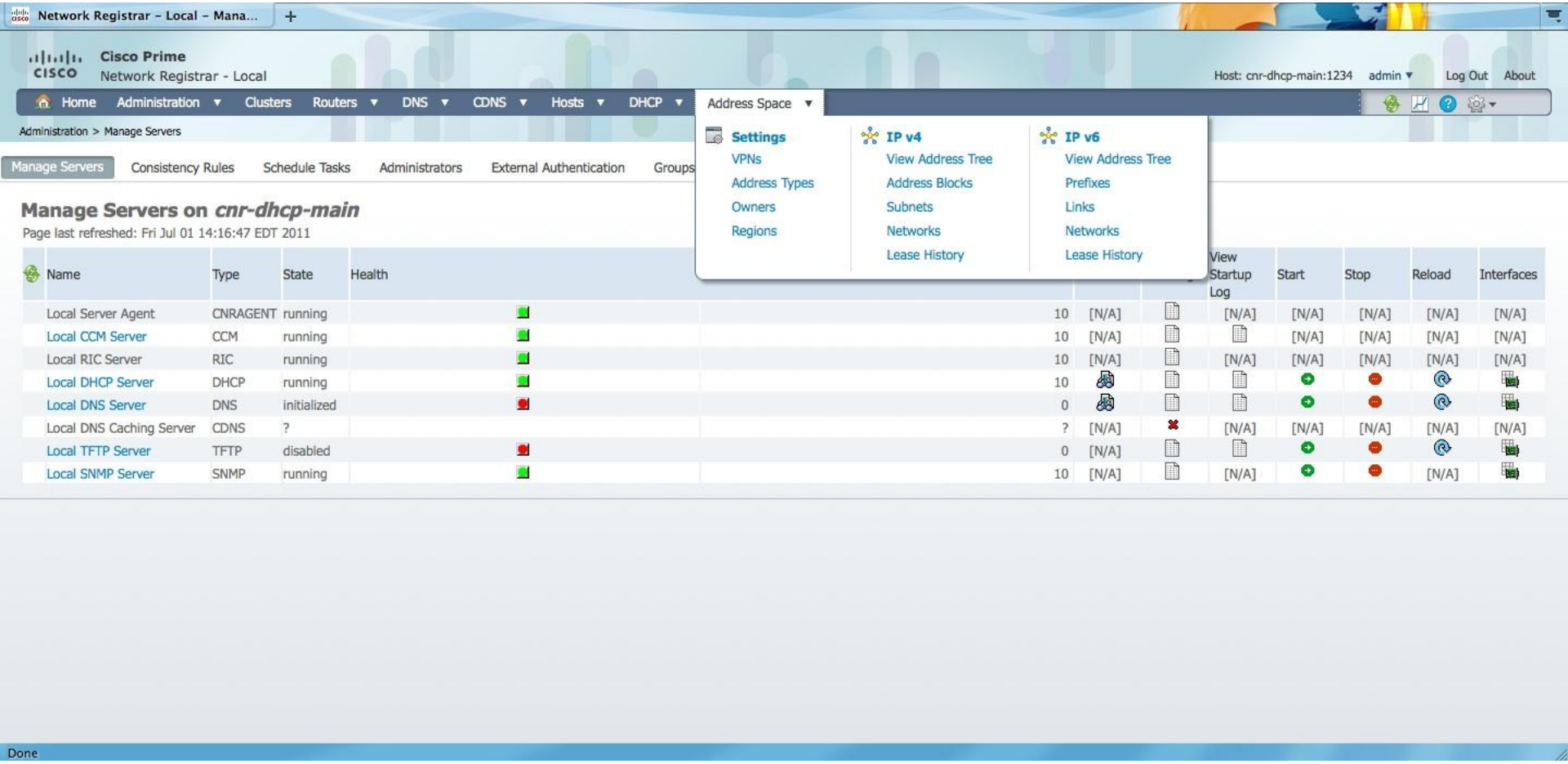
DHCP

- Single DHCP server support both IPv4 and IPv6 for IP address translation and service delivery
- Simplified administration and cost reduction via centralized management
- Internal and external client reservations
- Standards compliant

IPAM

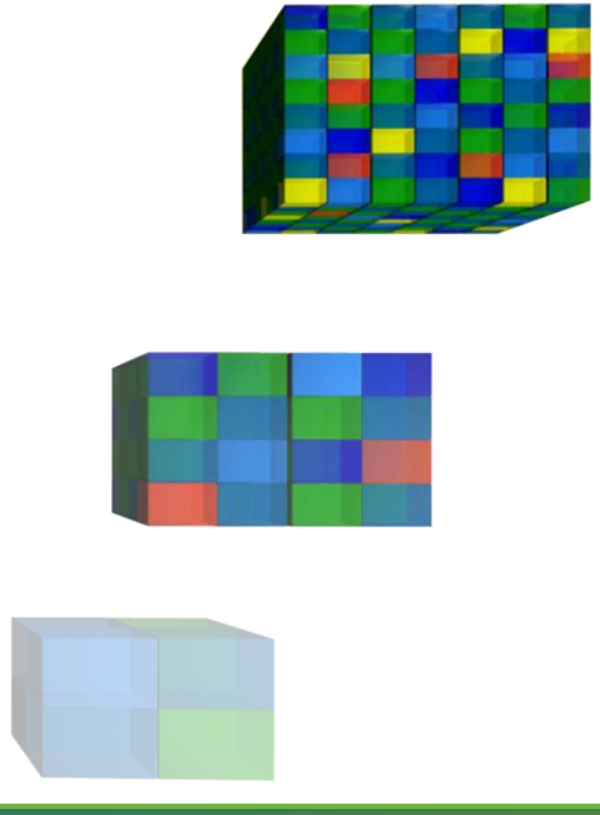
- IPAM integrated with DNS and DHCP
- Configuration management and reporting
- OPEX reduction via automation and single seat management

Cisco Network Registrar
An application for DNS, DHCP and IPAM services



Fast And Scalable

- Distributed architecture that supports millions of subscribers in some of the largest deployments in the world
- A blazingly fast DHCP server with outstanding performance—can assign more than 47,000 DHCP leases per second on Cisco® hardware and over 14,000 DHCP leases per second on non Cisco hardware
- The industry's most scalable DHCP server, supporting more than 50 million devices in a single customer deployment



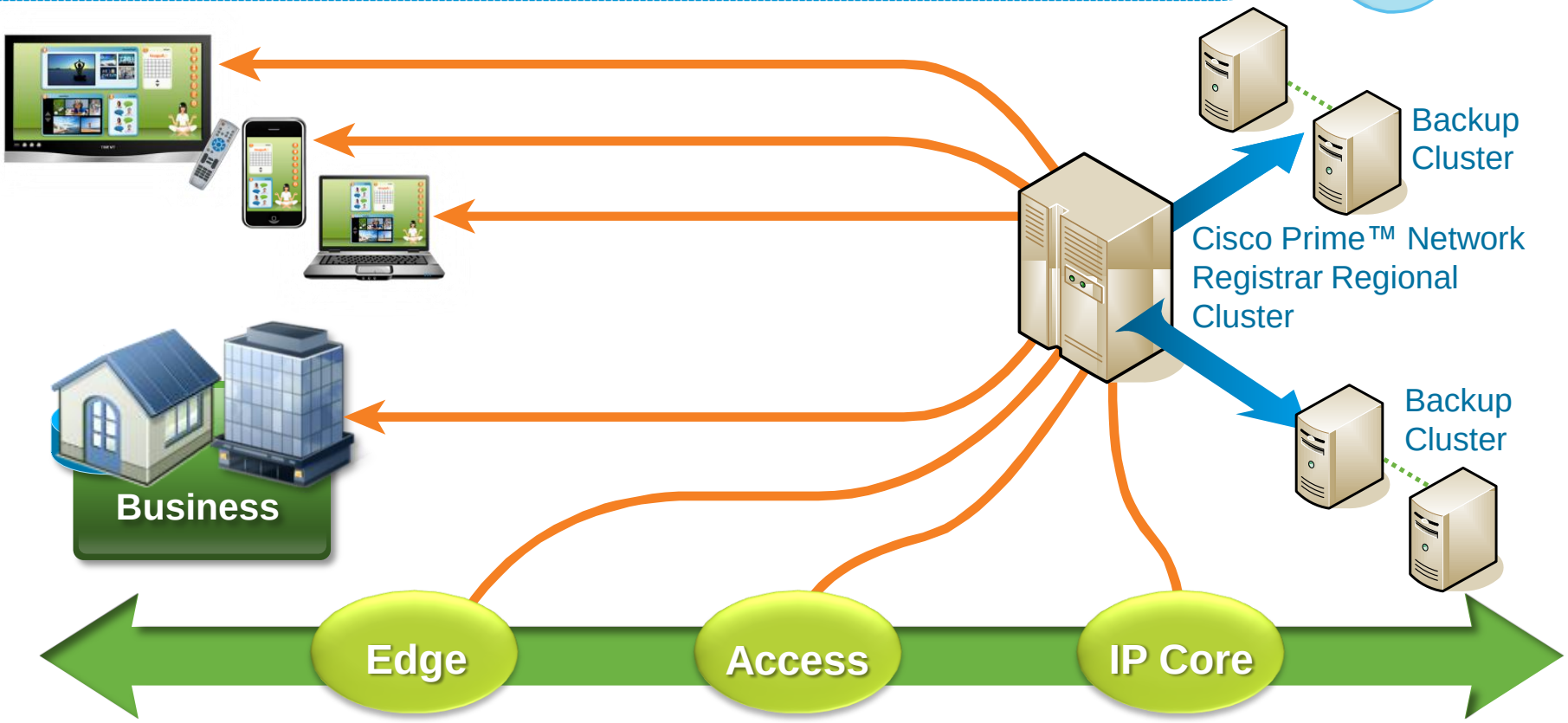
Consolidated IP Address Management

Management Across the Full IP Next-Generation Network

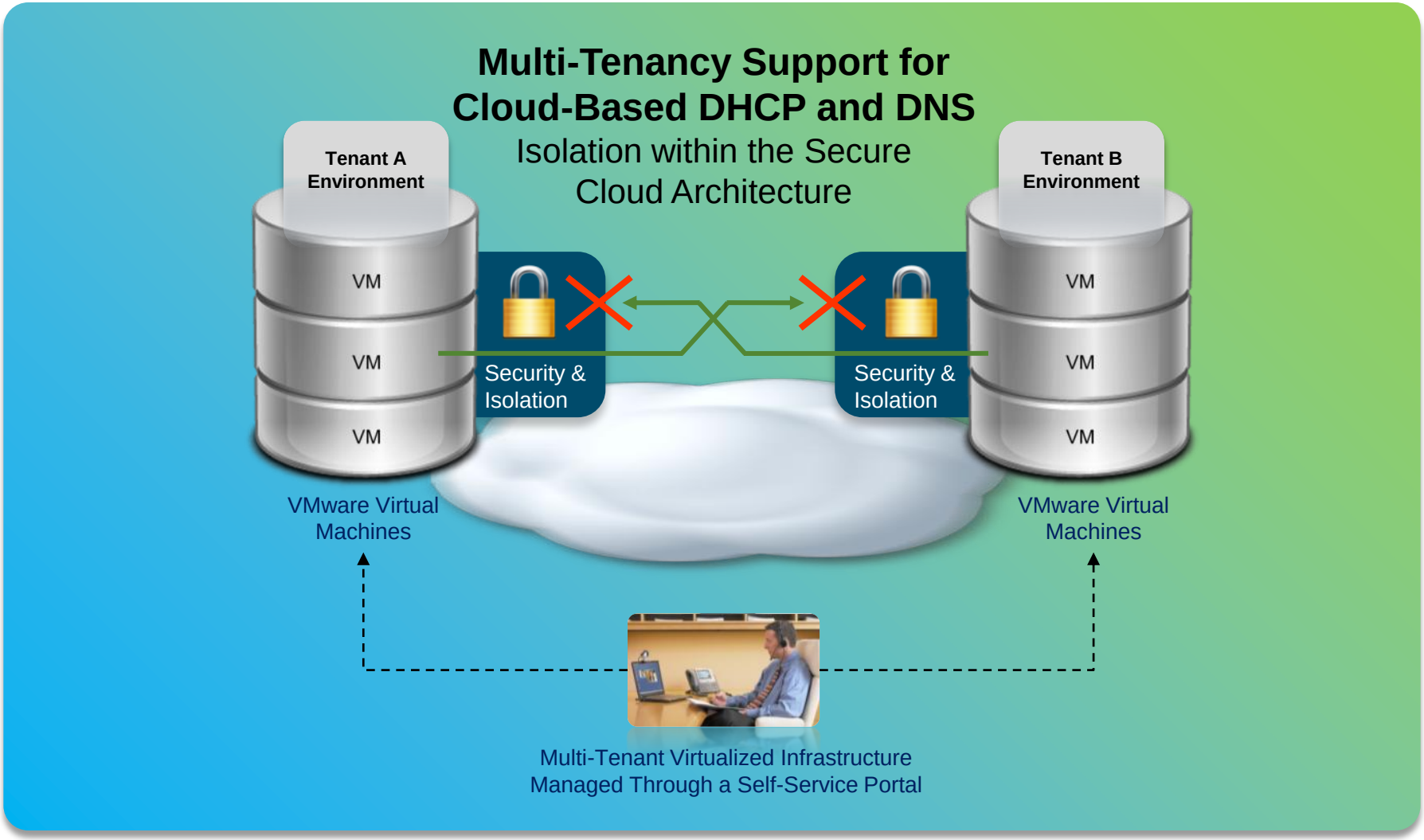
IPv6: Stateful and Stateless Configuration and Prefix Delegation

IPv4

Multi-Tenancy Support for Cloud-Based DHCP and DNS



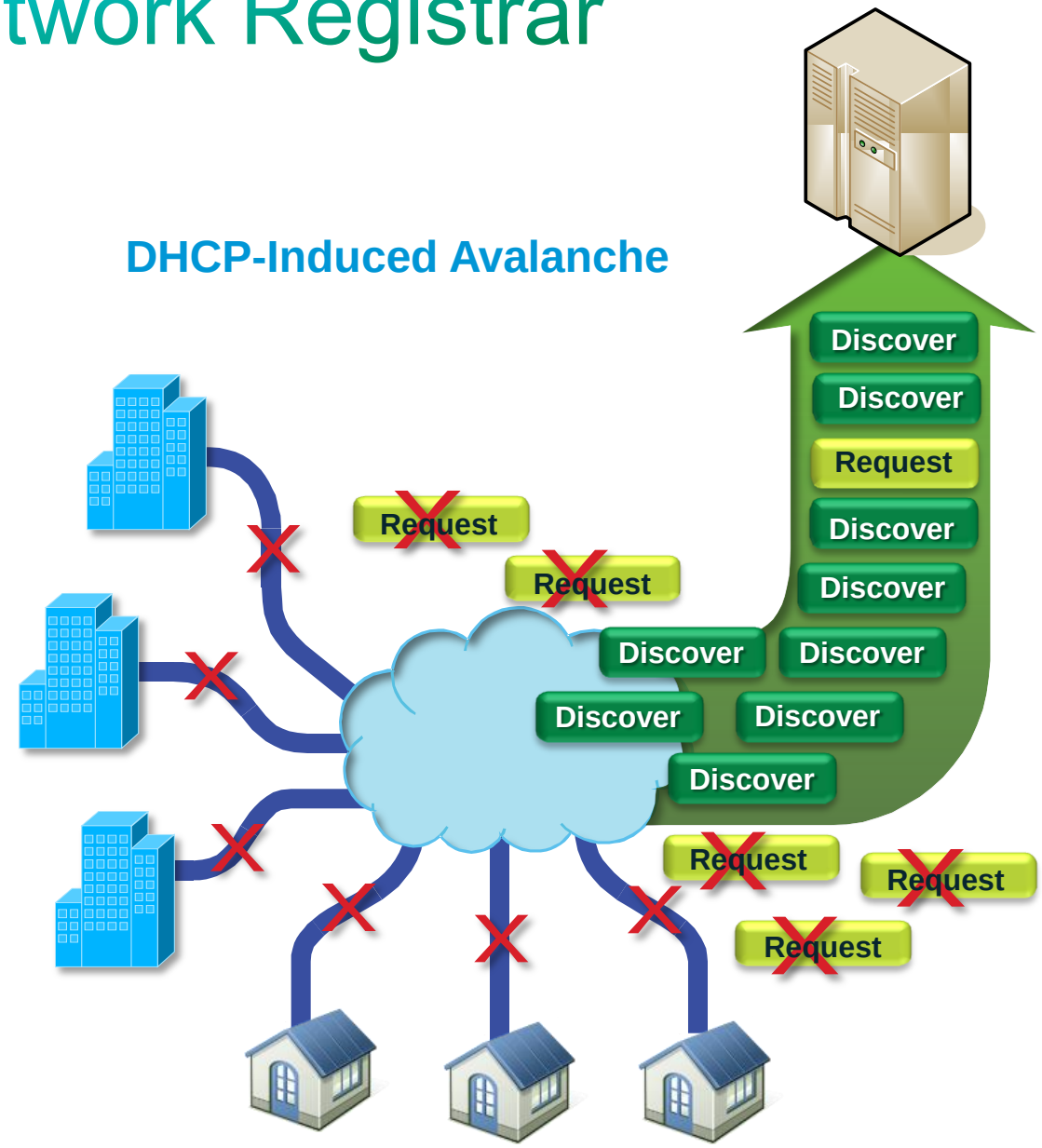
Cloud Ready



Cisco Prime Network Registrar for Reliability

Multiple levels of redundancy with:

- Support for DHCP safe failover
- Patent-pending discriminating rate limiter based on Packet Prioritization
- Reduce downtime after network outages
- Optional Chatty-Client Filter



IPv4 and IPv6 Standards Compliance

- IPv4 and IPv6 management capabilities
- Full featured Stateful, Prefix Delegation, and Stateless DHCP
- IP lease history
- Privacy protection
- Detailed auditing capability
- Extensive administrator controls for detailed IPAM delegation
- System monitoring dashboard

Cisco Network Registrar IPv6 Support

DHCPv6 Feature	Version 7.2
Basic DHCPv6 (**address and prefix delegation**)	√
Client Classing (expressions)	√
Reservations (static only)	√
DNS Updates (over IPv4)	√
LDAP (lookup only, no writes)	√
Extensions (DEX & TCL)	√
Prefix Utilization Counters (current only)	√
Lease History	√
DHCPv6 Client Reconfiguration (and RKAP)	√
Prefix/link-templates (management)	√
DHCPv6 LeaseQuery (RFC 5007)	√
DHCPv6 Bulk Leasequery (RFC 5460)	√

Lower Risks And Reduced Startup Costs
Virtual Appliance Option

- Deploy Cisco® Network Registrar as a preconfigured virtual appliance and simplify installation, lower deployment risks, and reduce startup costs
- Ideal for organizations that have implemented a virtual infrastructure
- Enables organizations to benefit from all the key capabilities of Cisco Network Registrar without investing in new hardware
- Allows rapid DNS/DHCP provisioning for capacity handling and relocation of DNS, DHCP, and IPAM (DDI) services from one server to another for disaster recovery support

Cisco Network Registrar Jumpstart

Cisco® Network Registrar preinstalled and configured on a Cisco Unified Computing System™ server

Benefits

- Fast
- Easy startup
- Rapid time to value
- Single-vendor solution

What's New:
Cisco Prime Network Registrar

Cisco Prime Network Registrar

Enhanced IPAM

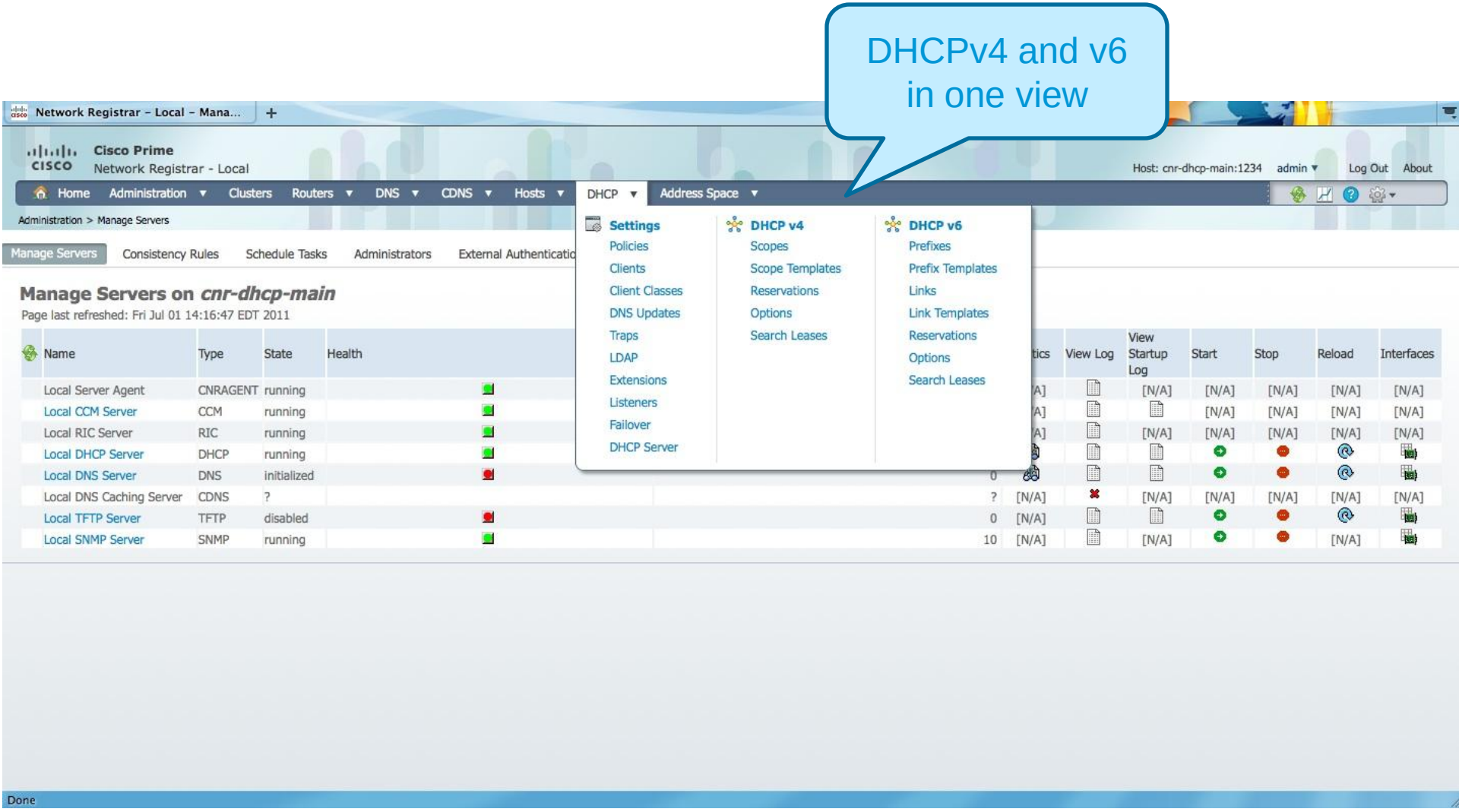
- Integrated solution will deliver DNS, DHCP and IPAM for service providers and enterprises
- New capabilities include:
  - Simple, centralized, integrated management IPv4 and IPv6
  - Intuitive GUI and detailed IP audit reporting and diagnostics
  - Flexibility and user control through role-based IPAM delegation of DNS and DHCP
  - Enables easy transition to IPv6 with options to integrate IPv4 and IPv6 networks

Enhanced DNS

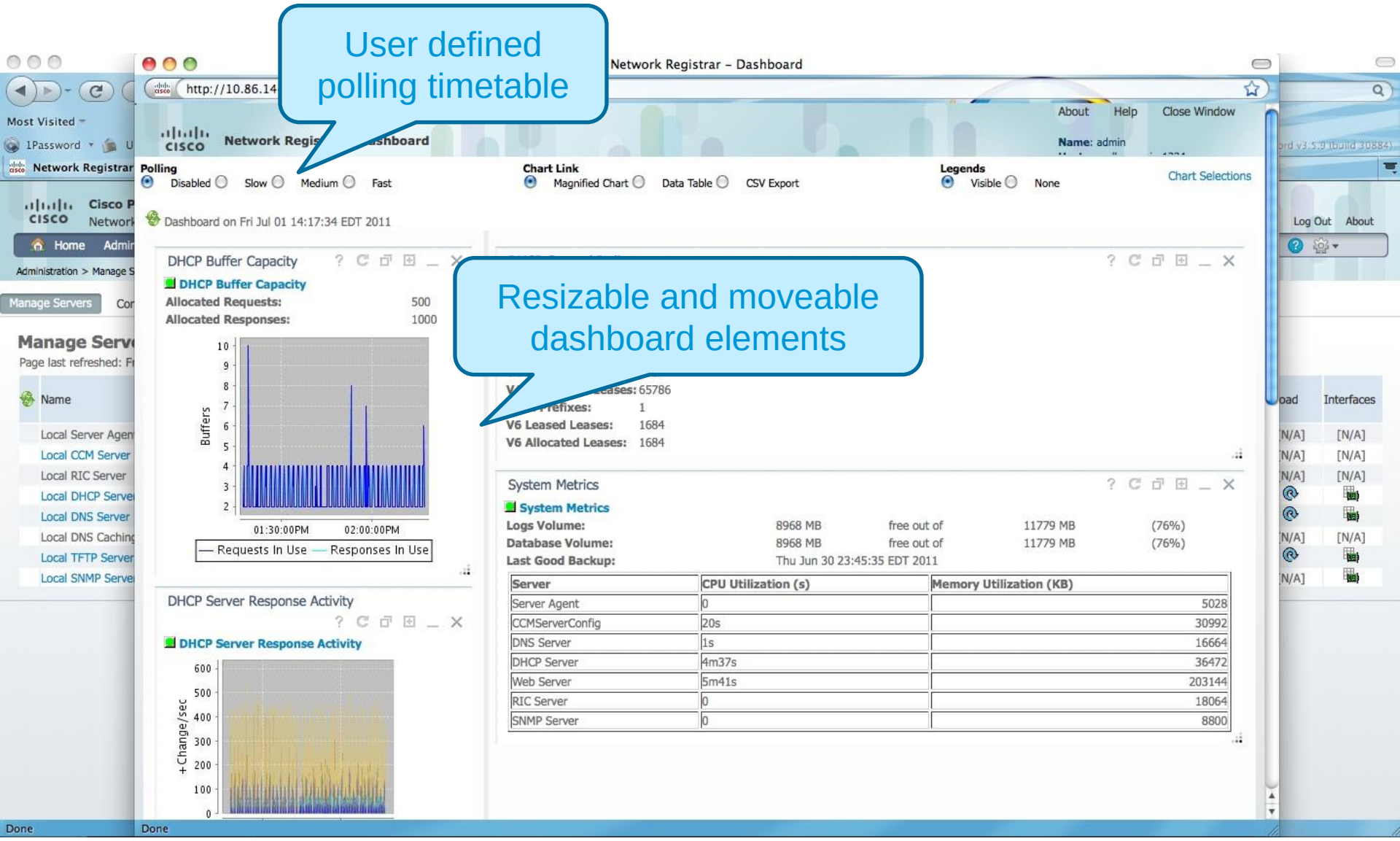
- DNSSEC caching-only server for improved performance
- DNS64 support
- DNSSEC support for secure, authenticated data

Cisco Prime Network Registrar
Customer Benefits

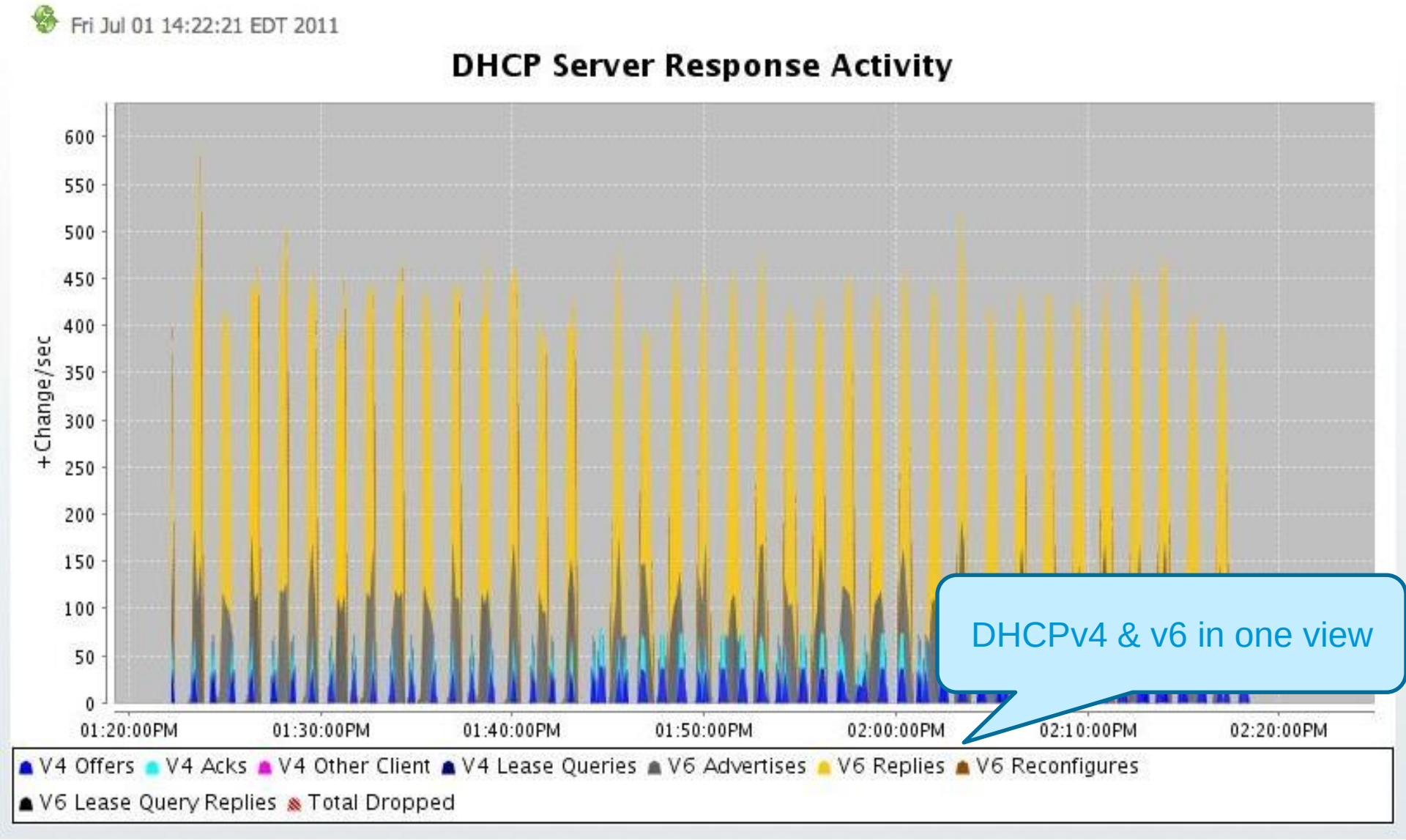
- Superior manageability
- Real-time visibility into IPv4 and IPv6
- Accountability promoted through detailed IP audit reporting and diagnostics and granular administrative policies for access
- Helps ease the IPv4 to IPv6 transition
  - **Discover and take inventory of your IPv4 and IPv6 resources**
  - **Plan and model the way that your IPv6 network should be deployed**
  - **Map your current IPv4 network and devices to your IPv6 space**
- Scalable and able to grow with the business
- Secure with DNSSEC
- Easy to deploy with low-risk options



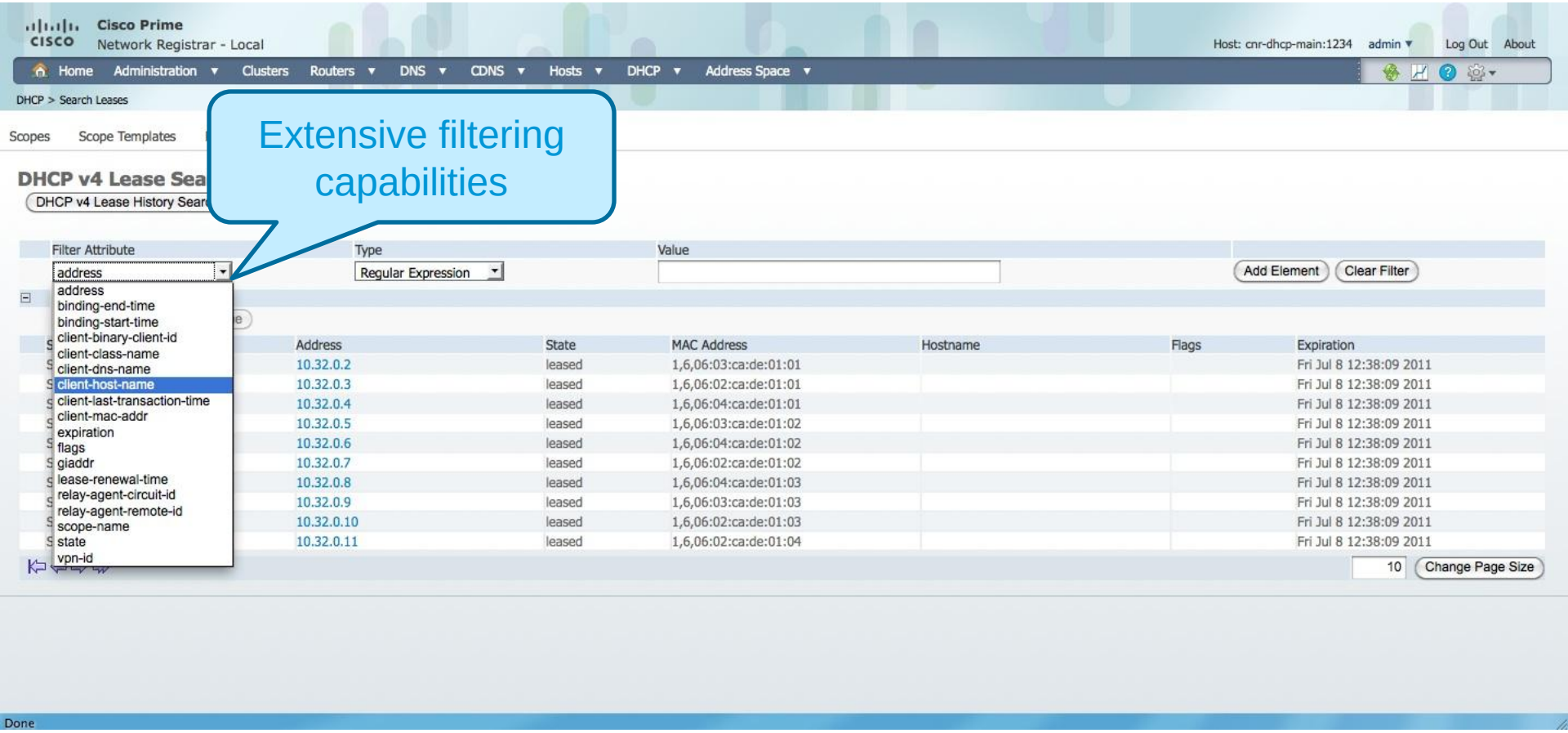
IPv4 and IPv6 in one consolidated view



Dashboard capabilities



Real-time diagnostics



Extensive query and search capabilities

Cisco Prime Network Registrar Product Overview

Four Integrated Components Focused on Scalability, Reliability, and Future-Readiness with Enhanced, Integrated Management

DHCP

- Single DHCP server that supports both IPv4 and IPv6 for IP address translation and service delivery
- Internal and external client reservations
- Standards compliant

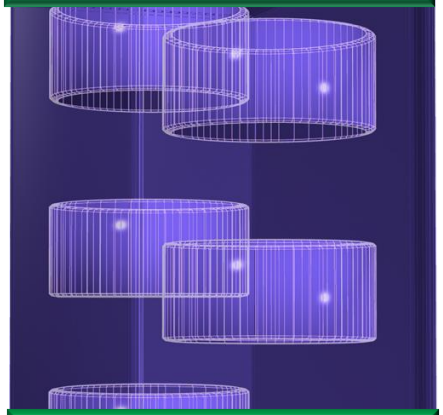
DNS

- Single DNS server that supports both IPv4 and IPv6 for device network access
- DNS64 support (IPv4 access for hosts with only an IPv6 address)
- Standards compliant

IPAM

- Enhanced, comprehensive IPAM integrated with DNS and DHCP for configuration as well as reporting and management of IPv4 and IPv6

DNS Caching



- Recursive, extremely fast DNS Security Extensions (DNSSEC) caching server to gain better performance

Cisco Network Registrar
Case Study: IBBS

Background

- IBBS is a managed service provider supporting small and medium-sized cable operators.
- IBBS has 250 customers managing more than 1 million cable modems across North and South America. IBBS automates the provisioning and diagnostics of these devices via a managed service.
- Cisco® Network Registrar has been an important part of this managed service since the business was established in 2001. The solution supports DNS and DHCP services as the basis of a DOCSIS® cable modem provisioning system. Cisco Network Registrar is deployed as a single, multi-tenant cluster in the IBBS data center in Atlanta.

Impact on Customer and Results

- The flexibility and scalability of Cisco Network Registrar have enabled IBBS to provide cable modem access services using a cloud model for the last 10 years with very little cost—long before it was called "the cloud." Economies of scale and cost savings far exceed those of the competition.
- Extension points give IBBS precise control over the DHCP requests coming in and the responses going out, based on very complex and detailed criteria.

"All day, every day, Cisco Network Registrar reliably identifies each device and class of service, and then provides IP addresses and the right configuration files and profiles to keep each modem up and running." —Kyle Johnson, IBBS Director of Product Strategy

Cisco Network Registrar
Case Study: Comcast

Background

- Comcast is a leading media and entertainment company, providing high-speed video, telephony and internet services to business and residential customers.
- Comcast delivers over 150,000 TV shows, movies and other video content to over 49 million customers across North America.
- Comcast began planning the transition of its network to IPv6 in 2005. The ability to operate in “dual stack” mode, to accommodate IPv4 and IPv6 traffic, has been a critical component of their strategy.

Impact on Customer and Results

- The flexibility and scalability of Cisco Network Registrar have enabled Comcast to transition to IPv6 seamlessly with no disruption to subscribers.
- Cisco Network Registrar enabled Comcast to go well beyond feature parity between its management of IPv4 and IPv6 traffic, to actually advance its business by being able to implement advanced features, from device management to subscriber services while running in dual stack mode.

“With Cisco Network Registrar our IPv6 program was able to go well beyond feature parity and device management. We were able to design and implement features that enabled us to advance our business with new subscriber services.”
— John Brzozowski, Distinguished Engineer, Chief Architect IPv6 Transition, Comcast

Summary

- The number of IP addresses you are managing is increasing the complexity and OPEX of your network
- The IPv6 transition is under way and accelerating
- Implementing an integrated DHCP/DNS/IPAM solution will save you time and money
- Preserve your infrastructure investments by implementing products that support dual-stack
- Cisco Network Registrar offers full lifecycle management for IPv4 and IPv6 and allows dual-stack deployments on a single server
- Cisco Services and partners can help you quickly and cost-effectively assess your entire network infrastructure

Additional Resources

- Cisco® Network Registrar on Cisco.com: www.cisco.com/go/cnr/
- Cisco Network Registrar Tech Center developer support: http://developer.cisco.com/web/cnr/home
- www.cisco.com/go/cgv6 for Cisco Carrier-Grade IPv6 Solution information
- www.cisco.com/go/ipv6 for general information on IPv6, Cisco IPv6 Services, and IPv6 Transition Best Practices
- www.cisco.com/go/prime-sp for Cisco Prime for Service Providers
- For additional information, please contact: ask-cnr@external.cisco.com