SOLARWINDS TECH TIPS

Challenges in IP Address Management

Learn about the day-to-day challenges in IP address, DNS and DHCP management

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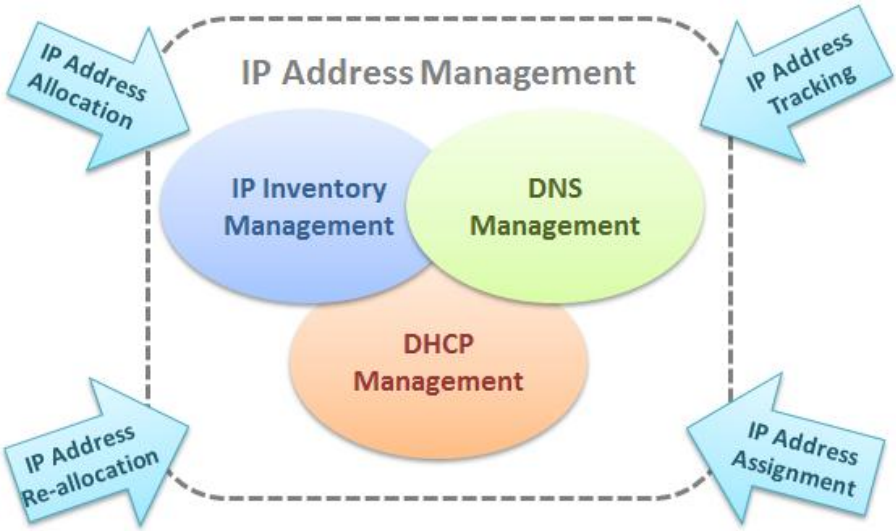
In addition to many other responsibilities, network administrators are in charge of allocation, assignment, tracking and reallocation of IP addresses. In the past, the tasks involved in IP address management could be accomplished through manual methods like keeping an up-to-date spreadsheet or using homegrown tools. However, as networks become more dynamic and as the number of devices in the network increases, manual IP address management starts to break down. This document discusses some of the challenges that administrators face in day-to-day IP address management.

IP Address Management

To achieve effective IP address management, organizations must first formulate a strategy that caters to their needs. While chalking out this strategy, administrators need to focus on three major components of IP management: **IP Address Inventory Management, Domain Name Service (DNS) Management, and Dynamic Host Configuration Protocol (DHCP) Management.**



- **IP Address Inventory Management:** This includes planning, allocation, and management of IP addresses for an organization. It also covers maintaining real-time details on current IP inventory and status that helps facilitate optimal usage of the organization's IP space.

- **DNS Management:** This segment handles the DNS servers and zones. Administrators must ensure the continuous availability of DNS services on the network. The objective here is to keep DNS servers updated in accordance with the IP changes in the network. Most times, administrators are also required to effectively manage multivendor DNS servers in the network.

- **DHCP Management:** DHCP servers enable the assignment of static and dynamic IP addresses and ensure that they are available to authorized hosts when required. In order to make this process run smoothly, DHCP servers must be configured properly and their scope utilizations and provisioning must be monitored in order to maintain security and availability. DHCP management also aims to automate and optimize the usage of IP space in the network.

Challenges in IP Address Management

As more and more devices connect to the network, each one must be allocated with a unique IP address. The advent of Bring Your Own Device (BYOD) and Internet of Things (IoT) are largely responsible for the increase in IP devices on the network. To accommodate this growth, organizations need high performance and high availability DHCP/DNS services that come with simplified administration. Some of the common challenges that administrators face in their daily IP management activities include:

- **Human errors:**

  In a dynamic network where IP requests and changes are occurring all the time, manually tracking and updating records can very easily result in inconsistencies and errors. Although many of these errors may seem like small mistakes at first, they can eventually lead to bigger network issues and costly downtime if not corrected. The biggest problem here is that it's extremely time consuming.

  When there is no centralized repository and management, there is always the possibility of IP conflicts in the network due to the duplicate assignment of IP addresses. Most times, there is no way to detect an IP conflict in the network unless a user reports an issue. And by the time

someone does report such an issue, a problem that began as minor has now become much greater. The time spent to troubleshoot and correct such a scenario is large, contrary to being notified in advance and proactively avoiding IP conflicts all together.

- **Non-availability of real-time data:**

  Maintaining IP data in spreadsheets and other manual methods makes it difficult to search for IP details. That is, there is no at-hand information on how the total IP space is structured. In addition, it becomes difficult to maintain an audit trail of what IP was assigned to which device. In many organizations, there are multiple people accessing the IP address spreadsheet, so there is no track of who updated what. There is absolutely no visibility into IP utilization, DHCP server configurations, and subnet allocations- especially in the case of a multi-vendor environment. The administrator ends up spending large amounts of time tracking and documenting IP details. Most importantly there is no means to quickly find if an IP is available for use or not.

- **Managing multiple DHCP and DNS services:**

  As IP address requirements grow, the number of DHCP and DNS servers in the network also increase. This implies the need for high performance, high availability services, and of course more tasks for the administrator while resources remain constant. As the network expands, it may involve servers operating at branch locations leading to decentralization of IP address management. This gives rise to new problems for the IP management teams, and one of the biggest glitches in DNS and DHCP is their limited integration with IP management software.

- **Multiple admins accessing data:**

  In an environment where there are multiple admins in charge of network administration tasks like IP allocation and assignment, it's almost impossible to keep a track of who made what change when. Standard servers perform only the most basic input and configuration checks. This makes it difficult for the organization to create workflow processes. Hence, the accuracy of data entered at most times is at the care of the user.

- **Limited budgets:**

  Every network admin is required to secure higher availability and scalability for the DHCP and DNS servers in the network. To offer high availability, organizations have to not only invest in infrastructure, but also spend heavily on licensing costs. This makes having a high availability environment expensive. And with standing budget restrictions, it becomes difficult to build out a robust IP infrastructure management system.

- **Vendor related shortfalls:**

  Spreadsheets and other manual documentation for IP address management are known to be error-prone and time-consuming. These methods often fall short in meeting administrative requirements like automation, alerting, reporting, and integration with DHCP and DNS services.

  DHCP and DNS services from Microsoft® Windows® come with a user friendly GUI that makes it easy to manage. However, it is possible that the same server that hosts the DHCP and DNS services also shares hardware resources with Microsoft® Exchange, SharePoint ®, Central IIS, and other MS services causing reduced or slow performance. In addition, the server can become unreliable at times, especially when it needs to restart for Windows updates to be applied. One alternative to avoid these issues is to acquire a service that runs on a dedicated machine. But this approach can be very costly.

Solution

The ideal IP address management solution should allow you to do the following:

- Manage a large pool of IP addresses, improve availability, and detect issues while offering simplified DNS and DHCP administration.
- Manage all of your IP address tasks from one central location.
- Have the ability to report on authoritative documentation and share it with anyone who needs it.
- Set access based on user roles and permissions.

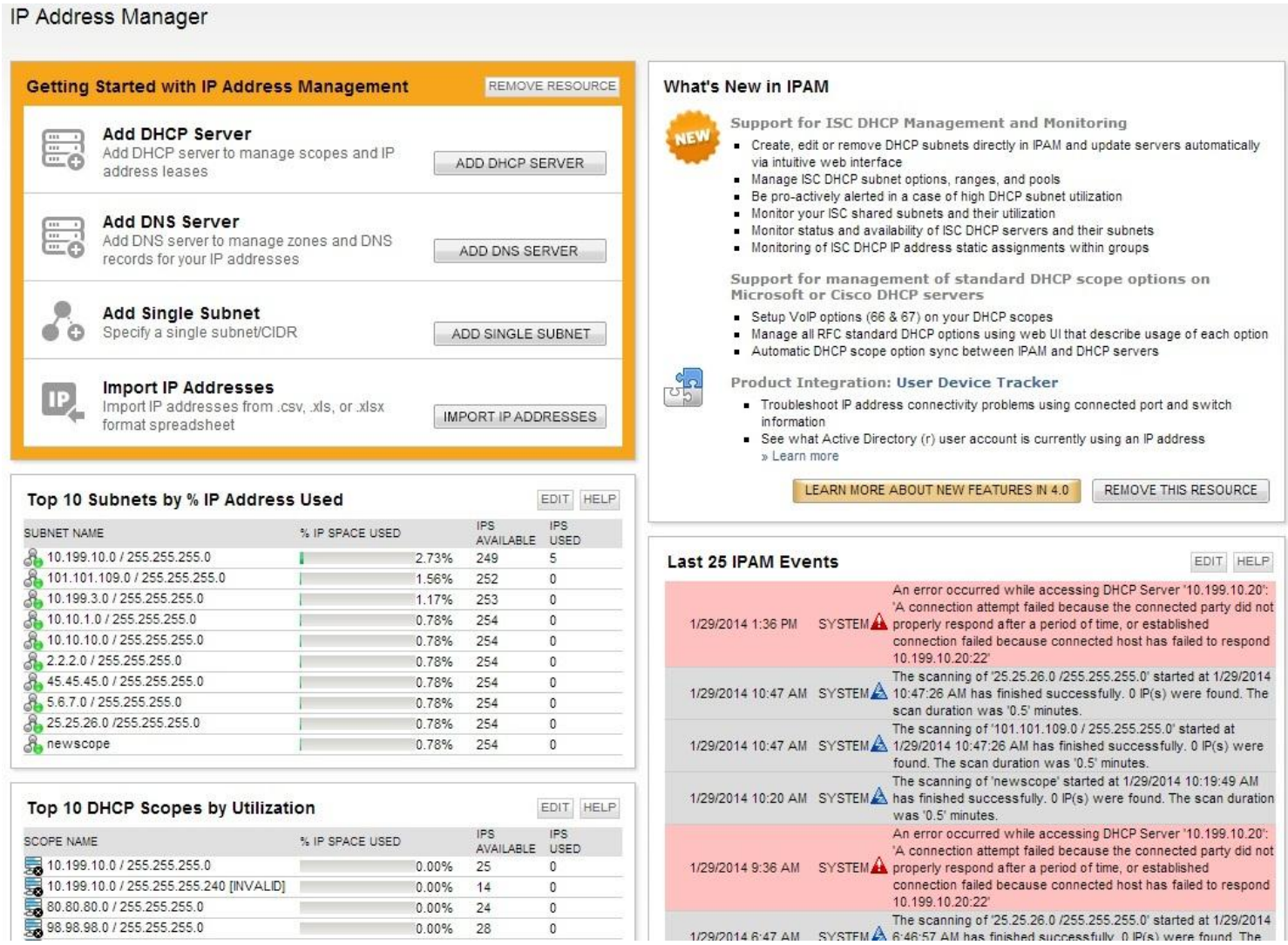
- Perform unified, cross-vendor DHCP and DNS administration for easy provisioning of IP addresses. IP address management and DHCP and DNS administration complement each other and should be used together.
- Provide vital operational and troubleshooting data like IP address history, how an address is presently being used (e.g., MAC address, location, OS, User, etc.), and reports summarizing IP address resources and utilization.

Services from Microsoft® and Cisco® are the commonly used vendors for DHCP and DNS. However, these solutions are expensive because of their licensing and maintenance costs. An alternative would be solutions from open source namely ISC (Internet Systems Consortium). These solutions provide cost-effective, high performing and high availability services for DHCP and DNS. They also have better community support and global audience. In fact, ISC DHCP and BIND DNS are built around standards and are used by most admins and operating distributions. When the same services are available for free as compared to the other paid services available in the market, why not give it some consideration? However, these options can present complicated management through command line interface (CLI). This can be overcome by management tools that provide a user-friendly interface reducing the use of CLI and the dependency on skilled resources to execute complicated commands.

SolarWinds® IP Address Manager (IPAM) is one such tool that allows you to manage and monitor your Microsoft DHCP and DNS, ISC DHCP and BIND DNS as well as Cisco DHCP servers and ASA devices directly from the IPAM console! IPAM seamlessly integrates into your existing DHCP and DNS environment with quick and easy deployment in as little as an hour!

Benefits of using SolarWinds® IPAM

- Provides centralized IP address management and **unified administration for Microsoft®, Cisco® and ISC open source DHCP and DNS.**
- Helps improve DHCP & DNS infrastructure through upgrade or **consolidation to the platform of choice** (like open source) without disruptive "rip-n-replace" upgrades or expensive appliances.
- Offers **cross-vendor DHCP & DNS support**, scanning, scalability, alerting, and reporting which otherwise are additional investments.
- Gets **rid of using complex Command Line Interface (CLI)** and allows you to manage your open source servers from a user friendly GUI.
- **Propagates all DNS changes made via SolarWinds IPAM to the DHCP and DNS servers** with the click of a button.
- **Provides DNS management functions** like the ability to easily search for DNS records, their details and also for the status of DNS service and DNS zone to validate DNS functionality in the network.
- **Provides preventive alerting and escalation for active IP address management**, allowing you to recognize and correct issues before users experience fault or performance problems.
- **Proactive alerts on subnets and scopes reaching full capacity and** avail benefits of automatic monitoring especially for your ISC servers.



Summary View in SolarWinds IPAM

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