EfficientIP Smart DDI
Return on Investment (ROI) in a Real-World Network

Understanding Operational & ROI Benefits of Automated DNS, DHCP and IPAM Solution - From the Customer Perspective

Tolly Report #220131
Commissioned by
EfficientIP

An update of research & reporting first issued in 2016.
The ROI information and calculations remain applicable to current scenarios.

EfficientIP

Smart DDI

ROI in A Real-World Network: Customer Analysis

Evaluated 2016 Updated 2020

Key Takeaways: Projected ROI

60,000 IP Address Scenario

- **Three-Year Savings: $412,650**
- **Three-Year ROI: 281%**
- **Payback Period: 8 Months**

8,800 IP Address Scenario

- **Three-Year Savings: $56,335**
- **Three-Year ROI: 72%**
- **Payback Period: 16 Months**

Market Challenges

With the advent of IoT, "Bring Your Own Device" (BYOD), hybrid cloud, a dramatic increase of applications, WLAN network access to customers and visitors, and virtualized systems the demand for IP addresses has exploded. Even small companies might have to manage more than 1,000 IP addresses, with 10,000 or more addresses spread across many locations not being unusual for larger businesses.

For retail, the challenges begin prior to the store opening for business. Setting up the network infrastructure - IP subnet provisioning - is the major challenge for these businesses. With Wi-Fi expected for corporate users, visitors and even retail customers, IP address management needs to be even more sophisticated and dynamic than ever before. Large retail environments need to allocate and release thousands of IP addresses each day as customers enter and leave stores.

Today, every business environment is leveraging the operational benefits of virtualization. While server and desktop virtual machines (VMs) benefit the business, their presence increases the demand for IP addresses thus adding to the management burden. Manual IP address management in today's fast-paced, virtualized environments is not only highly complex and enormously time consuming but also prone to human error. And, as we shall see, the cost of home-grown automated IP address management can be substantial and have its own problems and limitations.

Executive Summary

Automated, Efficient, and Reliable IP Address Management

After converting from existing methods, all three of the customers profiled benefitted from the agility provided by the EfficientIP solution, and were afforded more robust business continuity as a direct result of automation and reduction or elimination of human error in this important infrastructure area.

Implementing EfficientIP's solution delivered benefits that included:

- **Scalability to support large remote sites' infrastructure**
- **Automation of IPAM with DNS & DHCP (thus limiting risk of error)**
- **Dramatic time & cost savings**
- **Increased network service continuity**

Tolly evaluated two ROI studies conducted by EfficientIP customers and detailed the results later in this paper. In one case, a large customer with some 60,000 IP addresses under management calculated its potential savings when moving to EfficientIP. In another, a smaller customer with some 8,800 IP addresses under management projected its savings. See "Key Takeaways" for projected ROI summaries for both scenarios.

Project Background

To assist prospective users in understanding the actual ROI of deploying an automated DDI (DNS, DHCP, IPAM) solution, EfficientIP commissioned Tolly to analyze deployment characteristics of actual customers and, applying Tolly's knowledge and existing research, analyze and outline project ROI scenarios based on customer needs and tasks.

Customer Profiles

Migration From "Home-Grown" Automation Solution

In one instance, a large, global retailer (400 stores) had previously recognized the challenges of manual IP address management and had developed a "home grown" automated solution. Over time, it had been recognized that this solution was no longer capable of delivering required functionality. This company was focused on integrating and automating IPAM along with DNS & DHCP.

Migration From Manual Management

In two other instances, a medium and a large company had used only manual management and had recognized the severe limitations of that approach. Here, too, the companies were focused on the benefits integrating and automating IPAM with DNS & DHCP.

Both companies shared their experiences and, where relevant, empirical data to illustrate the drivers for moving to EfficientIP's DDI solution.

This Tolly white paper will explore some of the issues faced by these customers as well as the benefits they accrued embracing the EfficientIP solution.

ROI vs "Home-Grown" IPAM

Situation

This global retailer was faced with the "good problem" of very rapid expansion and growth. This growth in business simultaneously increased demand for IP addresses and ongoing management of those addresses. In addition to growth in demand by corporate employees, the retailer had decided to provide Wi-Fi access to customers - thousands per day - at its various retail locations around the world.

Initial Response: Build

Realizing years ago the issues and challenges of manual IP address administration, the company had decided to automate the IP address management process to whatever extent it could. Twelve years prior, the company programmed its own, proprietary solution to automate IP address management.

Limitations of Home-Grown IP Address Automation

While that system provided a solution for a while, over time the company began to see limitations of that approach. Continued growth meant increasing demands for features and functionality. The company determined that "it would take a huge [number] of hours to fulfill all future requirements."

And, while the home-grown system could automate many IP address update tasks, it did not document the changes that it made. Thus, the task of documentation remained a manual task. The company admitted its current IP address documentation is most likely incomplete and inaccurate because of the manual method used to maintain it.

Most restrictive perhaps was the limited integration between the home-grown IP address management system and DNS and DHCP. The internal system did not provide automated and unified configuration management to those companion systems.

Also significant was the negative impact on business should the home-grown system fail. In this company of over 150,000 employees, very few people had deep knowledge of the system. In fact, just two people were responsible for writing and maintaining the home-grown IPAM system. If those two people were no longer available, support and development progress would cease.

While it is impossible to project the cost of downtime caused by the failure of a home-grown IP management system, one can note that even a loss of 1% of annual revenue for this company would amount to some $300 million.

Benefits of The EfficientIP Solution

Summarized in Table 1, some key benefits of deploying the EfficientIP solution include the following:

Business Focus

"Build or Buy?" That is a question faced by IT departments in most companies worldwide. While short-term it might appear that a "custom-built," in-house solution would be optimal, that proved not to be the case. By moving to the EfficientIP solution, future development and support could be offloaded from in-house employees. The company benefitted from a system that was designed, coded and maintained by a dedicated, focused team.

Strategic Business Benefits

IPAM, DNS & DHCP Integration - Using EfficientIP DDI, the customer benefitted not only from the automation, but also from the integration of the IP address management function with DNS and DHCP and the improvement to business continuity that this provided.

The combination of the automated DDI with the central "single source of truth" repository provided by the IPAM helped to practically eliminate configuration errors and to enforce management policies across the company's platforms.

Phased Migration Approach - Using EfficientIP DDI, the customer was able to deploy using a phased approach where the old home-grown system could be replaced by EfficientIP DDI in a controlled fashion. There was no "big bang" conversion that could have potentially disrupted operations. They were able to make a smooth migration from the old to the new system at the pace that worked for them.

Benefits of Integrated, Automated DDI Management vs "Home-Grown" IPAM

Area	IP Address Management Solution	
	EfficientIP	Home-Grown
Fully-Staffed Development Team	✔	✘
World-Wide Support Team	✔	✘
Phased Migration/Integration	✔	N/A
Integrated, Automated Documentation Feature	✔	✘
Accurate and Streamlined IP Address Documentation	✔	✘
Management Policy Enforcement	✔	✘
Avoid DHCP Outages	✔	✘

Note: Global management policies such as naming conventions could not be enforced by their home-grown solution.
Source: Tolly, 2016/2020 Table 1

Outage Avoidance & Rapid Recovery

The company discovered that, even in the early phases of implementation, the EfficientIP solution's robust nature provided for automatic recovery of functions like unplanned DHCP server outages. They noted that prior to implementing the EfficientIP solution, a DHCP failure could require 30 minutes to recover where with EfficientIP, DHCP failover was handled automatically, thus avoiding any DHCP server resource unavailability.

ROI vs Manual IPAM

Situation: Large IP Address Population

This company grew to a point where it had some 60,000 total IP addresses to manage.

Initial Response: Manual Management

As this situation had developed over time, the IP address space was managed manually. The environment consisted of roughly 600 IP subnets serviced by 22 DNS and DHCP servers. Around 64% of the addresses were administered dynamically via the DHCP servers. Some 9,600 (roughly 16%) addresses used DHCP address reservations and the final 20% of the addresses, 12,000 in all, required manually-administered IP addresses.

Limitations of Manual IP Address Management

First, the manual approach required provisioning, managing and maintaining the nearly two dozen domain name servers (DNS) that would resolve resource names to numeric IP addresses. In addition, dynamic host configuration protocol (DHCP) servers that provided IP addresses dynamically to a large part of the network population also needed provisioning. In any such environment there is a great risk of a large number of errors caused by manual configuration.

The hardware and software providing DNS/DHCP would need to be monitored for performance and would likely require hardware upgrades within a three-year window.

The key limitation of the manual approach is that it takes employee time - lots of time. While individual tasks may be relatively simple, when repeated endlessly IP address management tasks could easily consume the equivalent of multiple full-time workers.

Additionally, for each task, accurate documentation is required. Unfortunately, if a worker is rushing to complete a task or is interrupted during the process, documentation could easily be left unfinished. Thus, a manually-maintained network is one where the documentation of the network does not match the reality of the network.

Benefits of The EfficientIP Solution

Additional key benefits, not previously discussed, of deploying the EfficientIP solution are detailed below. They include:

- **Significant task time savings**
- **Significant cost savings**
- **Reduction or elimination of errors through automation**
- **Increased DNS & DHCP service availability**
- **Integration of DNS-DHCP-IPAM management**

Benefits of EfficientIP vs Manual IPAM

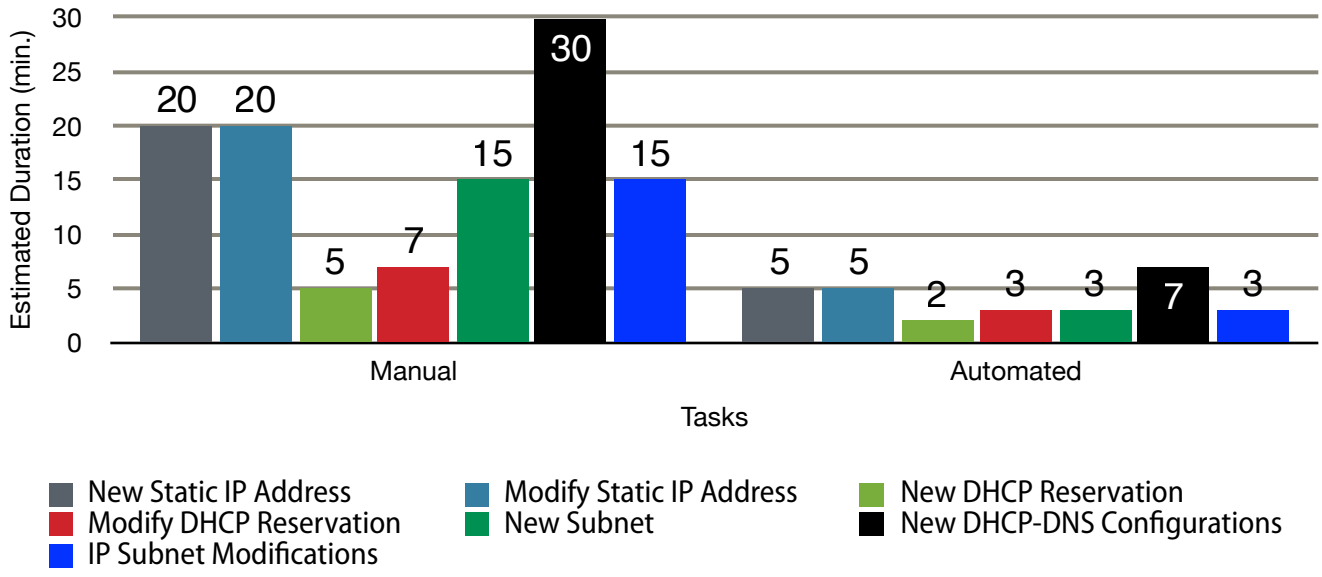
Area	IP Address Management Solution	
	EfficientIP	Manual
Efficient Use of Employee Resource	✔	✘
Significant Task Time Savings	✔	✘
Significant Employee Cost Savings	✔	✘
Errors Reduced/Eliminated Through Automation	✔	✘
Management Policy Enforcement	✔	✘
Fully-Staffed Development Team	✔	✘
World-Wide Support Team	✔	✘
Phased Migration/Integration	✔	N/A
Integrated, Automated Documentation Feature	✔	✘
Accurate and Streamlined IP Address Documentation	✔	✘
Avoid DHCP Outages	✔	✘

Source: Tolly, 2016/2020 Table 2

Task Drill-Down

In evaluating alternative approaches to IPAM, it is instructive to "drill down" to identify specific tasks and the relative amounts of time required to complete each using a manual approach compared with using an automated approach.

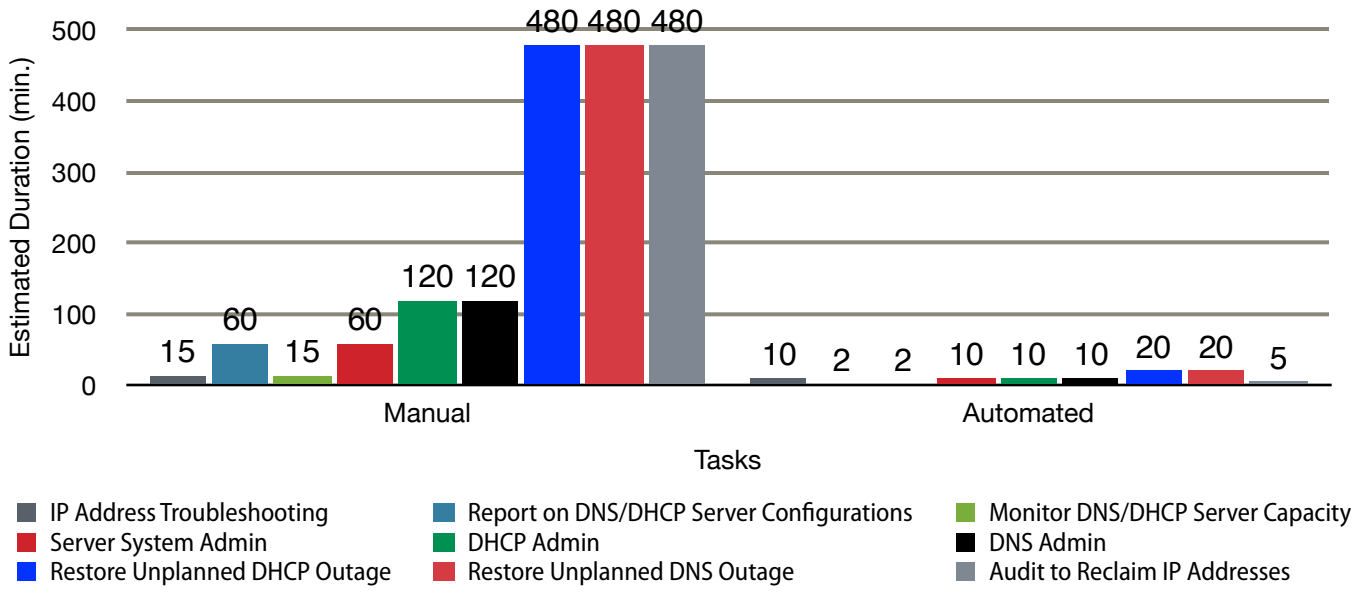
Figures 1 and 2 illustrate estimated task times using first a manual approach and then using EfficientIP automation. Figure 1 shows tasks that are likely performed on a daily basis. Figure 2 shows tasks performed weekly or periodically. As can be seen, some very common tasks take 4 or even 5 times longer to perform manually. As will be shown, when these tasks are repeated frequently the cost delta between manual and automated becomes very significant.



Note: Manual task durations provided by actual user customer. New subnet task includes search, allocation and DHCP-DNS services configuration.

Source: EfficientIP, 2016/2020

Figure 1



Note: Above tasks performed weekly or "as needed." Manual task durations provided by actual user customer. Some tasks, such as "IP Address Troubleshooting" could take much longer manually than estimated above. Admin tasks include patches, upgrade & backup.

Source: EfficientIP, 2016/2020

Figure 2

EfficientIP ROI Bottom Line

Task Summary - 60,000 Address Environment

To evaluate the ROI of the automated solution, the customer provided estimates of the number of times that common tasks would be performed over the course of a year. Calculations assumed that the number of tasks would increase by 10% eachyear. See Table 3.

For cost calculations, an hourly labor rate of $55 was used for the first year with 2% increases assumed for years two and three.

60,000 IP Address Management Operations - Three Year Estimate

Task	Year		
	One	Two	Three
Static IP Address Additions[1]	1,200	1,320	1,452
Dynamic IP Address Reservations (DHCP)[1]	480	504	530
Static IP Address Modifications[1]	600	660	726
Dynamic IP Address Modifications[2]	480	504	530
Number of Troubleshooting Operations[3]	601	617	636
New IP Subnets[4]	31	31	31
IP Subnet Modifications[3]	31	61	61

Note: Year one represents current maintenance requirements. Growth assumed in years two and three: 1) 10%, 2) 5%, 3) Customer indicated fixed number, 4) 0%.

Source: EfficientIP, 2016/2020 Table 3

ROI Summary - 60,000 Address Environment

The three-year return on investment (ROI) and payback period calculations, shown in Table 4, compare the costs of the EfficientIP solution with the savings in both labor and hardware.

In this scenario, the investment in EfficientIP becomes a net benefit for the company in less than one year. The payback period in this instance is only eight months. After the initial investment in EfficientIP, the cost savings continue and, over the course of a three-year period, the ROI is 281%.

While the actual values will vary by company - as task details will certainly vary - the financial benefits alone of the EfficientIP automated solution are so significant that it is worthy of evaluation and review by all but the smallest companies.

EfficientIP - ROI Calculated on Labor Costs Saved (60,000 IP Environment)

Cost Category	Estimated Yearly Cost/Savings ($)			
	One	Two	Three	3 Year - Total
Yearly Investments in EfficientIP Solution	117, 667	14,667	14, 667	147,000
Yearly Labor and Hardware Costs Saved	194,280	179,389	185,981	559,650
Yearly Net Savings	76,614	164,722	171,314	412,650
Accumulated Yearly Net Savings	76,614	241,336	412,650	**$412,650**
ROI and Payback Period				
Estimated ROI in Percentage				281%
Payback Period (months)				8 Months

Note: Values in USD. Estimates only, actual cost/savings/ROI will vary by customer.

Source: EfficientIP, 2016/2020

Table 4

ROI Summary - 8,800 Address Environment

To illustrate that benefits do not just accrue in very large environments, Tolly analysts reviewed task data submitted by another, smaller customer with an IP environment of 8,826 addresses. This customer estimated the need for roughly 220 new static IP addresses per year with an equal number of static IP address modifications - growing at 5% per annum. This customer estimated that requirements for new IP subnets and modifications to existing subnets would be about five per annum and consistent across three years.

Here, too, the costs savings are significant with a payback period of 16 months and an estimated ROI of 72%.

Calculations used in this test are based on analysis Tolly has conducted in this area along with task estimates provided by end-users. Figures are estimates used to illustrate potential savings. IP address management tasks will vary by customer and, thus, ROI and payback period scenarios will be unique to each customer. Tolly makes no representations as to actual savings in any of the scenarios discussed.

EfficientIP - ROI Calculated on Labor Costs Saved (8,800 IP Environment)

Cost Category	Estimated Yearly Cost/Savings ($)			
	One	Two	Three	3 Year - Total
Yearly Investments in EfficientIP Solution	56,544	10,835	10,835	78,215
Yearly Labor and Hardware Costs Saved	46,466	43,503	44,581	134,550
Yearly Net Savings	-10,079	32,667	33,746	56,335
Accumulated Yearly Net Savings	-10,079	22,589	56,335	**$56,335**
ROI and Payback Period				
Estimated ROI in Percentage				72%
Payback Period (months)				16 Months

Note: Values in USD. Estimates only, actual cost/savings/ROI will vary by customer.

Source: EfficientIP, 2016/2020

Table 5

About Tolly…

The Tolly Group companies have been delivering world-class IT services for over 30 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

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