Integrating FusionLayer Infinity With Microsoft AD

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Any comments relating to the material contained in this document may be submitted to:

> FusionLayer Inc.
> Keilaranta 1, FI-
> 02151 Espoo,
> Finland.

or by email to:

> info@fusionlayer.com

Integrating FusionLayer Infinity SD IPAM with Microsoft AD

1. DDI in Microsoft AD Environments

Organizations running Microsoft DNS and DHCP services have traditionally relied on Excel spreadsheets in their IP Address Management (IPAM). This results in inefficiencies that increase the Operating Expense (OPEX) associated with managing subnets, IP addresses and other mission-critical network resources. By automating the manual IPAM process, organizations can streamline their day-to-day network management routines, reducing the associated costs by more than 50%.

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A high percentage of organizations continue to run Microsoft Windows Server 2008 and/or 2012 to provide DNS and DHCP services in their enterprise network. In environments such as this, allocation and management of subnets, tracking of individual IP addresses and other network resources, and management of different administrative attributes and properties pertaining to IP address space are oftentimes carried out manually using Excel spreadsheets.

The larger the network, the more inefficient this approach becomes, because Microsoft–based solutions offer no process automation that would help network administrators in keeping their spreadsheets in synch with the live production data. The problem is especially dire in mid-sized and large geographically distributed network environments where the management of DNS and DHCP services is delegated to several network and/or systems administrators.

This White Paper describes how organizations can implement FusionLayer Infinity as an Software-Defined IPAM layer on top of their existing Microsoft DNS and DHCP architecture, without having to install any agents and/or other software on the existing Microsoft AD servers.

2. Business Case for FusionLayer Infinity Software-Defined IPAM in Microsoft AD Environments

When organizations started deploying Microsoft AD in their enterprise networks in the early 2000s, clients relying on IP consisted mostly of traditional workstations, laptops and servers. In these environments, Microsoft AD was often the most pragmatic choice for DNS and DHCP, as these services were included in Windows Server by default. Further, because most clients in Microsoft AD networks remained in the same subnet for most of the time and obtained their IP address dynamically from the MS DHCP server, managing IP address space manually using Excel spreadsheets was seen as a feasible solution in an environment that was relatively static.

Since the early 2000s, enterprise networks have evolved significantly. Over the last few years, both the variety and the number of network clients utilizing IP addresses have increased substantially. Technologies such as virtualization and VoIP place increasing importance on efficient and transparent management of the network and the IP resources. Not only are there more IPs to manage than ever before, but the clients have also become more mobile, making it more difficult and time-consuming for the administrators to keep up with the network environment in constant change.

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The major shortcoming of many network environments relying on Microsoft DNS and DHCP services is that there are no interactive tools that could be used for efficient real-time management of IP address space and related resources.

Benefits of Fus ionLayer Infinity SD IPAM in Microsoft AD Environments

1. Infinity has been designed for efficient management of organizations name and address space, replacing Excel spreadsheets and allowing delegated management with configurable access rights and audit trail via web-based GUI.

2. Automated synchronization of all static and dynamic hosts in AD Zone(s) to the appropriate subnets managed in FusionLayer Infinity, without any manual intervention, complemented with IP Sweep tools for network discovery.

3. Bindings between MS DHCP servers and subnets as well as configuration of DHCP scopes can be carried out centrally from Infinity IPAM for each subnet.

4. Support for making static DNS entries to AD Zone(s) from FusionLayer.

5. Support for centralized user authentication via LDAP / Microsoft AD.

6. Can be run as virtual machine in existing Citrix or VMware environment, eliminating the need for operating platform investment.

The major shortcoming of many network environments relying on Microsoft DNS and DHCP services is that there are no interactive tools that could be used for efficient real-time management of IP address space and related resources. Organizations utilizing spreadsheets in their IP Address Management typically lack the following features that automate and centralize IPAM processes, and introduce the transparency required by various compliance settings:

- Delegated management process via web-based GUI with granular user management, user authentication via LDAP, and audit trail of changes (who, what, when)

- Automated synchronization of dynamic & static clients in Microsoft AD networks to subnets defined and managed in centralized IPAM

- Centralized management of bindings between subnets and scopes configured to MS DHCP servers.

- Purpose-built tools used to distribute and allocate subnets

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By implementing FusionLayer Infinity SD IPAM on top of their existing Microsoft AD architecture, organizations can automate and centralize the management of their IP address space and introduce the transparency required by various compliance settings.

- Tracking the use of dynamic IP addresses issued by Microsoft DHCP server

- Tracking the use of static IP entries made to Microsoft DNS

By implementing FusionLayer Infinity SD IPAM on top of the existing Microsoft AD architecture, organizations can introduce the above listed features to their network environment in a matter of days, without having to install any software on the Windows Server 2008/2012 or make any changes to the existing architecture.

To quantify the annual OPEX of the existing IP address management process utilizing Excel spreadsheets, organizations should estimate the number of hours each network and/or systems administrator spends on the tasks listed below, and multiply the result by the number of administrators and their average hourly salary. The OPEX calculation can be carried out by estimating the time spent on the following tasks:

- How long does it take to add a static host to DNS?

- How long does it take to add dynamic hosts to DHCP service:
    - With fixed IP address?
    - Using MAC authentication?

- How long does it take to find out which IPs the DHCP servers have assigned from dynamic range at any one time?

- After making changes to DNS and DHCP, how long does it take to make related changes to the Excel spreadsheet?

- Before adding hosts or configuring scopes:
    - How long does it take to find a free IP?
    - How long does it take to locate correct subnets and calculate bitmasks?
    - How long does it take to verify that the calculations were correct?
    - How long does it take to make sure there are no double IP entries and to make sure that the source is up to date?

- If something goes wrong when network changes are made and the network experiences problems as result, how long is the average outage and what would be the direct and the opportunity cost of downtime?

- How long does it take to find the location or other information pertaining to a specific client in the network and how often are searches performed?

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Virtualization-Ready Solution for DNS, DHCP and IPAM

FusionLayer Infinity is a secure management system designed for efficient, distributed management of organizations' DNS data and IP address space.

FusionLayer DNS is a secure stand-alone server that can be operated as authoritative and/or as caching/recursive DNS server.

FusionLayer DHCP Server is a secure, stand-alone DHCP server with configuration validations and built-in support for DHCP failover pairs.

FusionLayer Network Equipment Extractor (NEE) has been designed to extract VLAN, MAC, Port ID and other information produced by routers and switches, in real time, and push that data to FusionLayer Infinity SD IPAM.

The more IPAM administrators there are in an organization and the more business critica l the network is, the higher the cost of a manual IP address management process utilizing Excel spreadsheets. By automating and streamlining the process with FusionLayer Infinity, organizations can earn a Return on Investment (ROI) that significantly exceeds 100% per annum, especially in cases where the manual process has already led to costly downtime.

3. Integrating FusionLayer Infinity with Microsoft AD Environment

To integrate FusionLayer Infinity SD IPAM with Microsoft AD Environment as described in this document, the following steps should be taken:

1. Download FusionLayer Infinity for trial and install it as virtual machine or on native x86-based server. Further installation instructions can be found from FusionLayer Infinity Reference Manual.

2. Once FusionLayer Infinity has been installed, configure FusionLayer Infinity as secondary to AD master zone(s) in Microsoft AD. After taking this step, all changes taking place in the AD zone(s) are automatically pushed to FusionLayer Infinity. Once AD zone(s) has been configured as secondary in FusionLayer Infinity, it will also be possible to add static hosts to AD zone(s) from FusionLayer Infinity. Further instructions can be found in the FusionLayer Infinity Reference Manual.

3. Once the AD zone(s) has been added as secondary in FusionLayer Infinity, configure the subnets / blocks in your network as address blocks in FusionLayer Infinity. After an address block has been configured in Infinity, it will automatically retrieve all contents of the AD zone file & populate those IPs automatically to the corresponding address block / subnet configured in Infinity SD IPAM. Setting up blocks / subnets in Infinity has been described in further detail in the FusionLayer Infinity Reference Manual.

4. Once the subnets / address blocks have been configured in FusionLayer Infinity SD IPAM, integrate Microsoft DHCP servers using the Remote Servers module included in FusionLayer Infinity. This process has been described under "Setting up Microsoft DHCP Integration" in the FusionLayer Infinity Reference Manual. Once you have integrated Microsoft DHCP Server with FusionLayer Infinity, you can manage the relationship between subnets / address blocks and subnets managed in Infinity using the DHCP integrated service page.

5. As the last step, configure the groups authorized to access the centralized FusionLayer Infinity SD IPAM and defined their user privileges. Once the groups have been configured, they can be attributed to new user accounts generated in FusionLayer Infinity. When accessing the system, users can either be configured locally or centrally via LDAP. The User Groups functionality and centralized authentication via LDAP have been described in further detail in the FusionLayer Infinity Reference Manual.
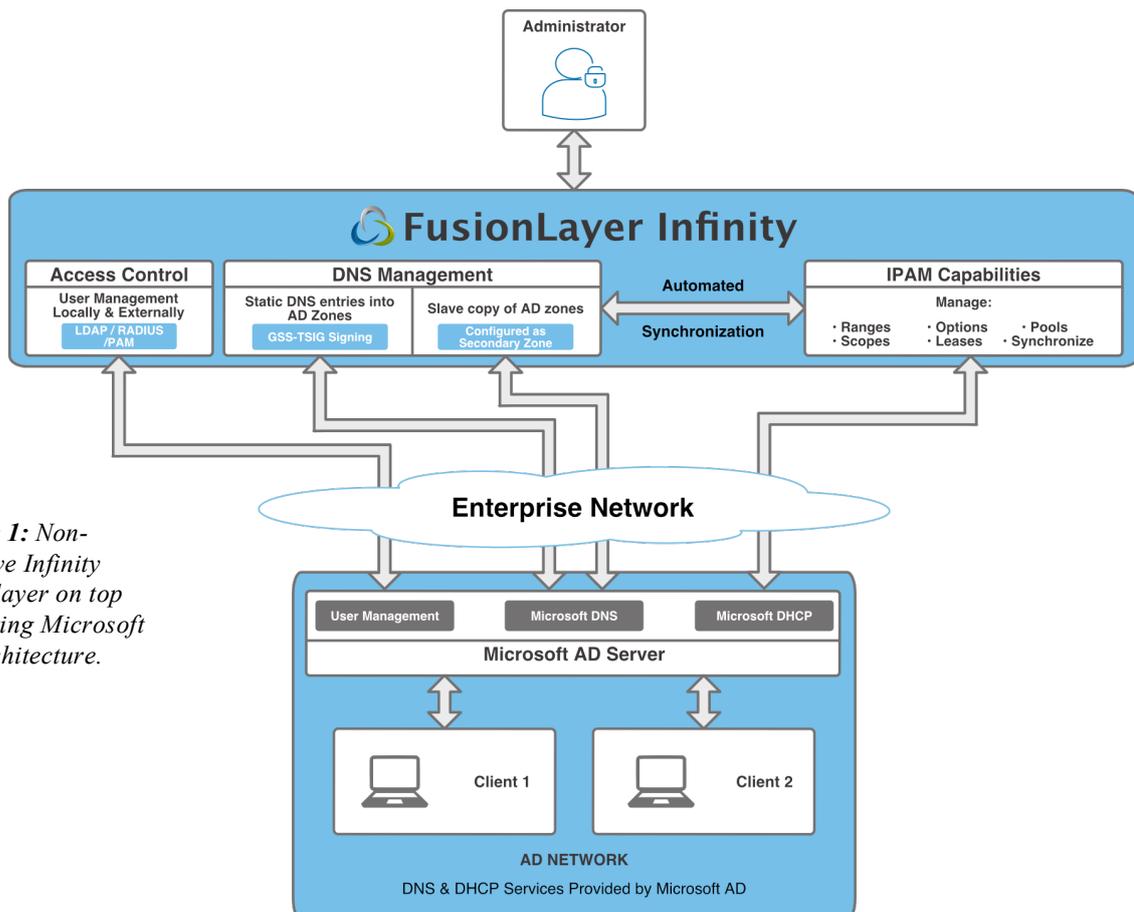
Figure 1: Non-intrusive Infinity IPAM layer on top of existing Microsoft AD architecture.

4. Solution Architecture

Figure 1 is the simplified network diagram of the solution architecture outlined in this white paper. Please note that while the diagram only depicts a single Microsoft AD server and an AD network for the sake   of simplicity, FusionLayer Infinity supports integration with any number of remote Microsoft AD instances and AD networks according to the principles described herein.

About FusionLayer Products

FusionLayer Inc. is a privately held company Headquartered in Helsinki, Finland, and with regional offices in Europe, Americas and Asia Pacific, our mission is to offer the best value for money within the DNS and IP addressing industry. The execution of our mission is based on our virtualization-ready DNS, DHCP and SD IPAM solutions and software appliances that set the benchmark for combined security, ease of use and low cost of ownership.

FusionLayer's products have an installed base of roughly 3,000 installations worldwide. Our technology is used by nearly one third of   all 4G and 5G mobile operators as well as by dozens of Fortune 500 companies that deem available, reliable and efficiently managed network as a strategic asset.