PLEXXI HCN™ FOR VMWARE ENVIRONMENTS

SOLUTION BRIEF

FEATURING

» Plexxi's pre-built, VMware Integration Pack makes Plexxi integration with VMware simple and straightforward.

» Fully-automated network configuration, reduces complexity, operating costs, and time-to-value for VMware deployments.

» Dynamically segments the network to provide mission-critical reliability and performance for specific workloads

» Creates user-driven workload SLA policies to ensure workload path priority and security

» Single-network fabric supports multiple workload classes, including isolated IP storage, to reduce network capital and operational costs.

» Single-tier network topology allows users to add more network capacity by simply connecting in more switches.

» Non-disruptively scale from single-rack deployments to cloud scale deployments with equal ease.

Hyperconverged Networking for the Software Defined Data Center (SDDC)

Plexxi HCN™ integration with VMware fully enables the software-defined data center (SDDC) through tight integration of the software-based tools from VMware with the hardware, software, and automation provided by a Plexxi HCN network. This integration creates a first-class user experience for Cloud and Data Center infrastructure administrators, where all of their high-level workflows for configuration, provisioning, and automation are provided through native VMware tools.

Out of the box, Plexxi offers many key capabilities to enable a highly-agile data center network. Plexxi offers customers pre-built, fully-tested integration packs for both vSphere and NSX manager that enable administrators to automate everyday network operations, dramatically improve visibility into network and host configuration details. Plexxi HCN networks can be managed directly from the vSphere HTML5 management interface, simplifying administration and trouble- shooting. Plexxi HCN integrates the network physical data path and control paths with the NSX network virtualization layer to create a truly synchronous physical and virtual network experience.

Plexxi Integration with VMware

Plexxi's seamless integration with VMware is achieved through Plexxi's Connect software and associated VMware Integration Pack, which contains specific logic and interfaces to VMware.

This pre-packaged, pre-tested, fully-supported VMware integration enables Plexxi to automatically discover managed elements (i.e. physical nodes, VMs, VLANs, LAGs, vmKernel adapters) in the VMware environment, and provide workflows to automate operations, such as dynamic network provisioning for VM Lifecycle events, and storage path optimization, all managed through vSphere.

The VMware Integration Pack enables Plexxi's control software to automatically discover VMware nodes and dynamically re-provision the Plexxi network fabric in response to VMware compute and storage events, ensuring highest network performance and service quality for diverse applications and workloads, while making optimal use of network capacity.

Plexxi's integration with VMware provides VMware customers with the fundamental key benefits of automation and network path control across the following three main functional areas:

» Configuration

» Operations and Management

» Network Virtualization via NSX

Plexxi's VMware integration and automation capabilities translate directly into significantly reduced complexity, lower operational costs, and fast time-to-value for VMware customers.

Network Configuration—Dynamic, Auto-configured VMware Fabric

Plexxi's VMware integration provides out-of-the-box automation to reduce configuration time and improve solution time-to-value. This integration eliminates the guesswork of overprovisioning network capacity at initial network configuration and enables customers to ensure network performance and security for a given workload via workload path isolation.

Auto Configuration

Plexxi automatically collects important network, port and grouping information from VMware, synchronizing the host and physical network infrastructures. Empowering VMware administrators through network automation to avoiding manual infrastructure build-outs. Plexxi enables auto-configuration capabilities for the following components:

» VLANs

» Link Aggregation Groups (LAGs)

» Dynamic vMotion network migration

» Isolated vSAN network topology

Logical Workload Policies

The creation of new workloads is one of the most basic aspects of running a data center. These workloads need physical resources on which to execute—namely, compute and storage. They also need network connectivity between those components, as well as other workloads.

Data center administrators leverage VMware tools to deploy these workloads and define the various virtual machines, storage LUNs, vSANs, VVols, and other virtualized abstractions of the physical resources. They also need to define how these components are interconnected. The integration of Plexxi HCN with VMware's vCenter enables this interconnection and related policies to easily synchronize, automatically, without user intervention.

Dynamic Affinity Groups for VMware Data Services

The Plexxi integration with VMware makes Plexxi's centralized control software "aware" of the specific VMware environment, including VMware data services, storage arrays, and end-user applications. This "awareness," enables Plexxi's centralized control software to understand the nature of various application workloads, their endpoint participants ("affinities"), and their relative importance and priority. With this knowledge, VMware administrators can configure (dynamically or explicitly) unique paths through the network fabric that are aligned to the needs of each workload. As workloads are added, changed, or deleted, the fabric continuously adjusts to match their new demands.

Plexxi Provides the Following Capabilities in Support of VMware Data Services:

» vMotion: Plexxi HCN detects and visualizes vMotion events and provides optimized path resources via pre-allocated bandwidth preventing the vMotion event from impacting other user traffic and ensuring a high-quality, speedy migration.

» Fault Tolerance: VMFT is used to create highly resilient VMs and includes VM-to-VM state information that is synchronized. The Plexxi network can be configured to optimize this configuration, creating an isolated network for these critical VMs to ensure their state synchronization is congestion free.

» vSAN: Plexxi's VMware integration automatically discovers vmKernel Adapters that participate in vSAN environments and creates an isolated topology that is dedicated to carrying vSAN storage workloads. Storage typically creates a "noisy neighbor" problem when integrated onto a common network, which is why many people create separate dedicated networks for storage traffic, which creates unneeded cost and complexity. In contrast, Plexxi provides a single network fabric that is logically separated and controlled through Plexxi Control software.

» Integrated In-band Management: Management in a VMware environment typically requires a separate out-of-band network. While this is generally a good practice, it can also create a separate operational domain. Plexxi can integrate the VMware management into a logically separate part of the network fabric to ensure containment.

Dynamic Affinity Groups for VMware Lifecycle Events

Plexxi HCN enables administrators to manage VMware lifecycle events on a per-workload basis. For example, in many environments, especially those leveraging virtual desktops, many VMs will boot at the same time causing "boot storms". Plexxi offers the programmatic ability to define a threshold that indicates that a boot storm is in progress and automatically set up an affinity grouping to ensure the VM boots don't create congestion that could slow the booting process. The administrator can also create a scheduled event (e.g. every day at 9 am) for anticipated boot traffic versus relying on a reactive detection mechanism.

Network Configuration Summary

Plexxi HCN's VMware integration allows a customer to easily create a network for VMware ESX environments. From a configuration perspective, the integration is aimed at solving basic auto-configuration capabilities, as well as more advanced capabilities that help improve policy automation for workload performance, and automatic network services that apply to the VMware infrastructure. Overall, the network configuration phase creates an easy-to-use network that has out-of-the-box.

Management and Operations

Network administration has traditionally been a labor-intensive and time-consuming effort. In modern cloud-centric data centers that leverage virtualization, there are many advanced software tools that provide visibility and correlation of the physical infrastructure to workload-related issues and problems.

Plexxi's integration with VMware vSphere allows customers to further benefit from native VMware tools because the Plexxi network can provide highly-relevant details never before available to the VMware dashboard. This integration simplifies the day-to-day operations of the data center and makes troubleshooting across the physical and virtual environments easier, allowing the VMware administrator to view every-day operational tasks from a single dashboard.

Per-Workload Path Control

Traditional "leaf and spine" network approaches distribute workload traffic using the Equal-Cost Multipath (ECMP) algorithm, which attempts to distribute workload traffic evenly across all available links by randomly choosing paths, and thus limiting the network's flexibility to optimize performance across workloads. Because this traditional approach is unaware of specific workloads, its random selection of network paths typically leads to network hotspots and congestion that is difficult to diagnose and remediate.

With Plexxi, administrators can provision network paths according to the specific needs of any given workload. Plexxi's Control software is made aware of application and infrastructure workloads through its integration with higher-level orchestration and infrastructure management tools, such as VMware vCenter, providing a multitude of granular paths across the Plexxi fabric. Plexxi Control leverages this awareness to provide each workload with the right set of paths to satisfy the workload's individual needs for network capacity.

Plexxi's ability to granularly manage paths on a per-workload basis enables the Plexxi network fabric to meet workload performance needs and avoid workload congestion even as the environment scales to meet increasing CPU and storage workloads. As the network needs grow, new switches can be added completely incrementally without disruption to the running environment.

Fully-Integrated Visualization

Plexxi workload visualization tools display where and how traffic is being distributed across the network fabric, on a per-workload basis, helping IT administrators monitor system performance and resource utilization in real-time. Via Plexxi HCN integration with VMware vSphere, administrators can view Plexxi HCN and other environment statistics directly from vSphere, enabling the administrator to manage their entire VMware environment, including the Plexxi network, from a single pane-of-glass.
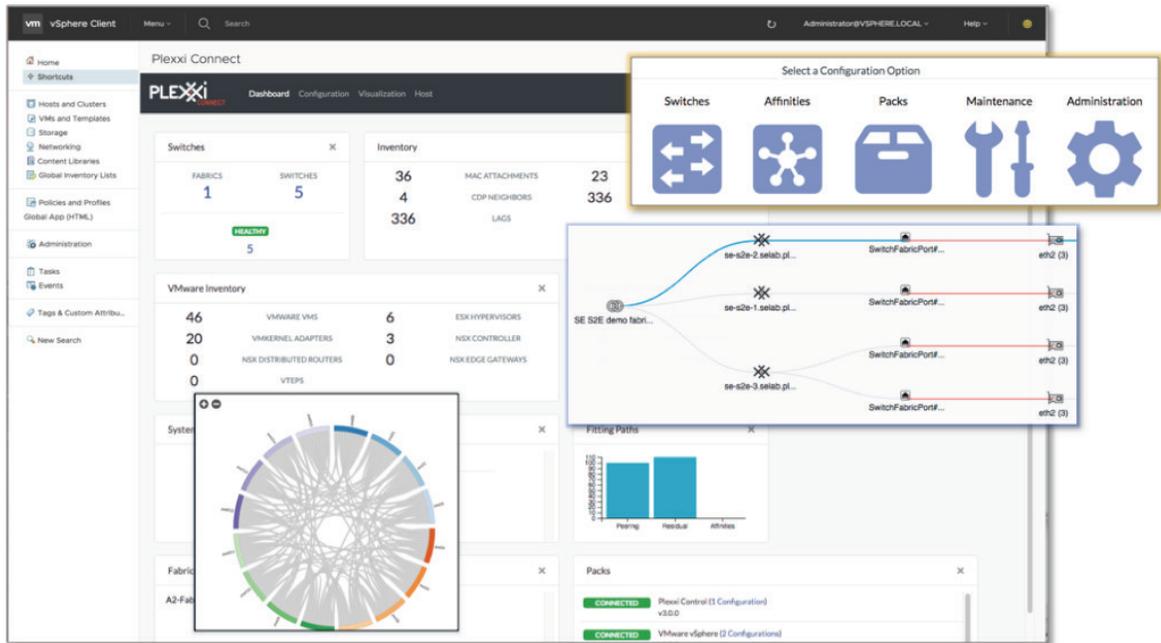
Management and Operations Summary

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"Native" Network Virtualization with VMware NSX and Plexxi

VMware NSX is this industry's first and market-leading network virtualization solution. Network virtualization allows customers to define their networking constructs in software—i.e. in virtual switches that operate on the host devices themselves (within the hypervisor). The NSX software creates virtual networks that define specific connectivity between groupings of devices.

When NSX runs on a non-Plexxi physical network, it runs as an "overlay" meaning there is little to no coordination between the virtual network and the physical network—the physical network is treated as a pure transport layer. This separation of the physical and virtual network requires significant manual engineering effort and forethought to ensure the physical network will meet the needs of the virtual layer. When the physical network is reduced to transport only, it loses the visibility and awareness of the traffic, rendering it unable to react to congestion issues or other problems. When NSX runs on a Plexxi infrastructure, the physical network and the virtual network can be natively and dynamically aligned providing unified visibility, traffic awareness, and traffic path optimization.

Tight Virtual-to-Physical Integration

In Plexxi's parlance, tight virtual-to-physical integration is called "Overlay Awareness," which includes the following key capabilities:

» Interface with the VMware NSX Manager to discover NSX components, including VXLAN Network Identifiers (VNIs), VXLAN Tunnel Endpoints (VTEPs), NSX Edge Services, vmKernel adapters, and VM IPs/MACs

» Visualize the components in the UI and make them available for debug, search, etc.

» Automatically create affinity groups based on detected NSX traffic for these components to automate workload path provisioning and isolation.

» Create Domain affinities that allow all endpoint members of a specified domain to receive the same treatment without specifying each endpoint individually. For example, this capability is useful for designating all VTEPS, a specified set of VNIs or traffic to/from the NSX edge.

» Track the movement and expansion of ports, VLANs, and LAGs.

These capabilities allow the physical and the virtual network to appear as a single network to the user, but also allow for debugging and troubleshooting to occur at each layer with the relevant information correlated between layers. In contrast to separate and disjointed over/underlay solutions, this type of "native virtualization" creates a much more cohesive network infrastructure and drastically reduces provisioning times and mean-time-to-repair.

Organizations building clouds based on VMware's market-leading technology need a flexible and agile infrastructure, which they can achieve with a fully-integrated network, like Plexxi HCN, that leverages and enhances the agility of VMware. Plexxi HCN without NSX integration delivers an easy-to-scale-out network fabric that organizations can fully operationalize from the VMware cloud management tool. When adding NSX integration, the native network virtualization preserves the agility expected by the user, down to the physical network and creates a simplified engineering and architecture experience that saves time, money and reduces errors to create a fully optimized network.

Summary

Plexxi HCN's seamless integration with VMware enables VMware administrators to manage their VMware-centric infrastructure using native vCenter. Plexxi HCN also supports VMware's NSX virtual network overlay providing synchronization with Plexxi's awareness and automation of the VMware infrastructure.

Plexxi HCN for VMware enables customers running VMware infrastructure to significantly reduce management complexity and operational costs, and provides an easily scalable platform for non-disruptive, incremental network growth. With Plexxi HCN, organizations become more flexible and agile to react more quickly to changes in the business and IT infrastructure. And with Plexxi's awareness of the VMware environment, many management tasks become automated, freeing staff resources to focus on other facets of IT. Plexxi is simple, cost-effective, and synergistic with VMware infrastructure and tools.

Related Documents

For additional information on Plexxi's integration and capabilities with VMware, refer to the following documents:

End-to-End Workflows in VMware Environments with Plexxi (Video)

Integrating Plexxi Fabric with VMware vCenter (Video)