



Software Defined Fabric™

A fully automated, programmable software-based data center networking fabric

Overview

Kaloôm™ is delivering an innovative automated data center fabric, Software Defined Fabric™; for networking white boxes from Accton and other vendors. Our Software Defined Fabric is designed for hyperscale, as well as distributed datacenters, and targeted to clients in the Data Center Operator (DCO), Telco, Enterprise, Cloud and Gaming industries. The programmable fabric enables the rapid development of new services and features into the Software Defined Fabric. The flexible fabric architecture offers an adaptable, high-performance, low latency multi-datacenter fabric, specifically designed to satisfy the current and future challenges of increasing network workload demands at scale.

Software Defined Fabric is a programmable data center fabric capable of running several virtual data-centers with different network services at scale, thus fulfilling the vision of a true customizable Software Defined Networking (SDN) environment. The solution offers integrated routing and switching, while providing customers with the opportunity to program new features and services in-house. Its programmability enables developers to develop new code and drive innovation. The programmable fabric avoids vendor lock-in and eliminates the need to wait for silicon upgrades.

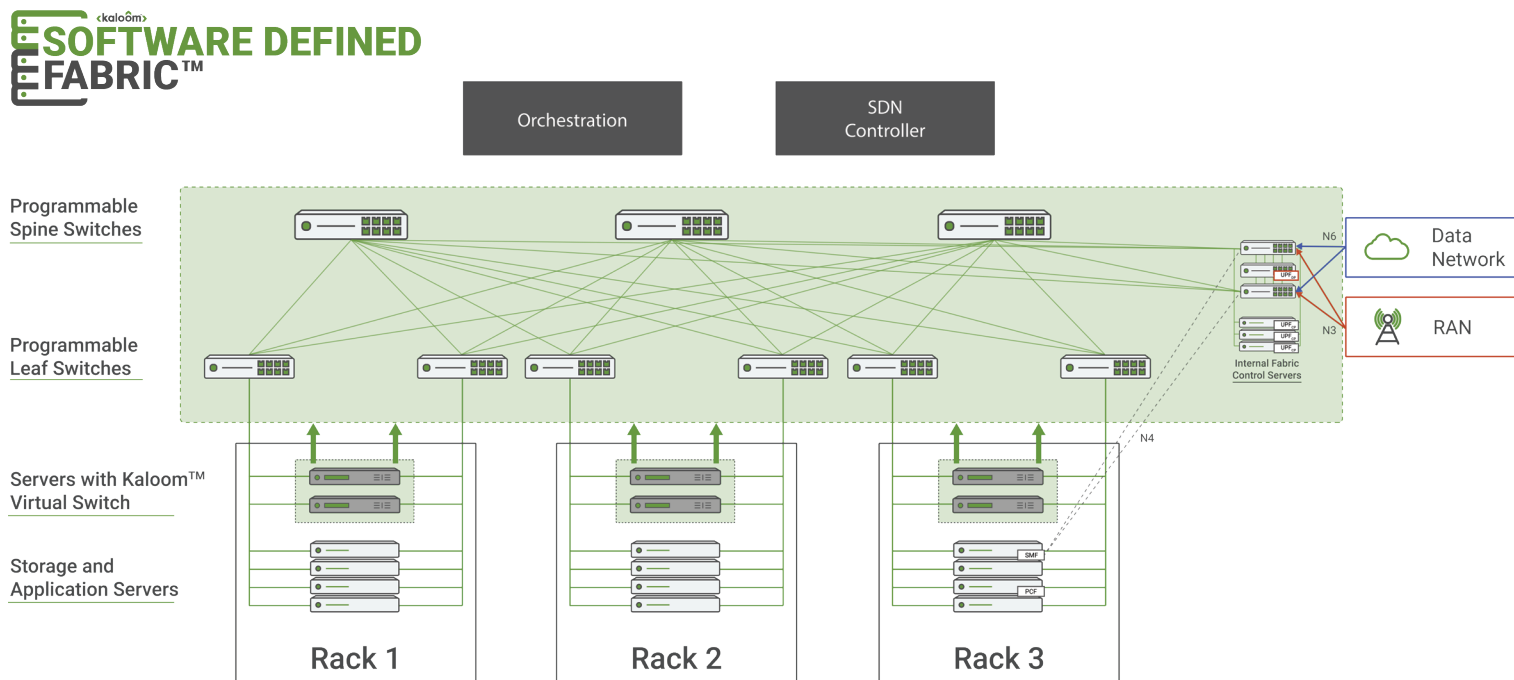


Figure 1 - Software Defined Fabric™ Topology

The days of managing complex and error-prone configuration files and scripts are finally over as Kaloôm brings true all layer automation to the data center networking space. The Software Defined Fabric has advanced self-forming and self-discovery capabilities, zero-touch provisioning of the virtual networking and virtual components with automated software upgrades. As a result, human intervention is minimized thus saving on time and effort, as well as, minimizing errors. Network provisioning time is reduced from several days to minutes.

The adoption of SDN has led to a proliferation of virtual machines (VMs) handling network functions, introducing latency to both compute and network systems with the data plane path “tromboning” back and forth through numerous VMs. Virtual network functions within VMs comprise components in both the control plane and data plane. Kaloom’s software solution moves the data plane functions from the VMs into Software Defined Fabric. In doing so, it frees up both compute and networking resources, increasing system throughput while reducing energy consumption.

Software Defined Fabric has been designed to virtualize the data center. A physical data center can be partitioned into multiple independent and fully isolated virtual data centers (vDC). Each vDC operates with its own Virtual Fabric (vFabric) which can host millions of IPv4 or IPv6 tenant networks. Additional compute and storage resources can be dynamically assigned or removed from a vDC through the associated vFabric thus creating a flexible and elastic pool of network resources.

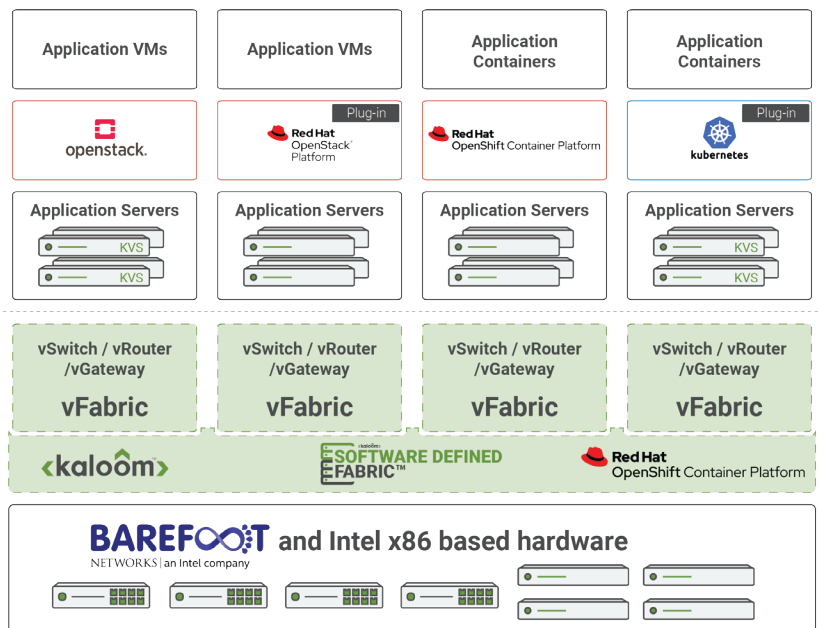


Figure 2 - Software Defined Fabric™ - High Level Block Diagram

Software Defined Fabric Key Features and Benefits

Software based datacenter fabric that manages spine switches, leaf switches and controllers

- ▶ Autonomous Leaf/Spine switch management using a combination of centralized and distributed control functions
- ▶ Fabric controller for
 - Switch topology management of Spine, Leaf and controllers
 - Virtual fabric creation, resource allocation and modification
 - External Management Interfaces

Programmable software-based data center networking fabric

- ▶ Enables the addition of new features and services in runtime without impacting traffic
- ▶ Allows developers to develop new code and drive innovation
- ▶ Avoids vendor lock-in and eliminates the need to wait for silicone upgrades
- ▶ Industry standard P4 programming language



Fully automated fabric

- ▶ Advanced self-healing and self-discovery fabric
 - Automated discovery of incorrect network topology and cabling mistakes
- ▶ Zero Touch Provisioning of the virtual networking and virtual components
- ▶ Provisions in minutes vs. hours/days with traditional solutions
- ▶ Automated software upgrades
- ▶ True network automation with autonomous spine and leaf switches
- ▶ Self-healing (automated remediation)

Scalable from small to large data centers (e.g. small edge DCs to large hyper-scale DCs)

- ▶ Native IPv6, Multi POD, cloud and multi data center solutions

Integrated virtual network components

- ▶ vRouter, vSwitch and VxLAN Gateway
- ▶ Support for many routing protocols including BGP, OSPF, BFD, MPLS, EVPN, etc.
- ▶ Support for VRF
- ▶ Reduced complexity and reduced TCO by managing each vfabric as an entity rather than managing the nodes of the fabric

Optimized for virtual components

- ▶ Provides support for both VM and container-based workloads

Advanced monitoring and segment analytics capabilities built-in

- ▶ Enables programmable in/out-of-band telemetry per flow/packet

Multivendor solution by design and no vendor lock-in

- ▶ Support for networking white boxes from multiple vendors such as Accton and Delta
- ▶ Support for Point of Delivery (POD) modules from different vendors
- ▶ Easy integration into existing solutions

Fabric Virtualization

- ▶ Provide full support for network virtualization (e.g. slicing)
- ▶ Enables allocation of physical resources into multiple autonomous isolated network slices, called vFabrics
- ▶ Enables the assignment of vFabrics to different virtual DC operators
- ▶ Enables DC operators to faster provision new customers in software
- ▶ Provides full isolation between customer/tenants

Open Networking and APIs

- ▶ Standard Linux based
 - No kernel patches
- ▶ Open APIs
 - Netconf API and YANG modeling
- ▶ Orchestration agnostic
 - Plugins for OpenStack, K8s, and OpenShift*
- ▶ No vendor lock-in
 - Leverages Open Compute Platform networking switches
- ▶ Open-source friendly
 - Contributing improvements upstream to Linux and K8s



Figure 3 - Creation of vFabrics

Significant x86 resource utilization

- ▶ Delivers lower latency and higher performance by offloading and improving NIC functionality into the fabric with the Kaloom Virtual Switch

Lower Latency

- ▶ Provides less than 5 microseconds of latency for end to end traffic latency when using the Kaloom Virtual Switch
- ▶ Improves virtual end-to-end latency with advanced service chaining capabilities

Standard Linux (RHEL Atomic)

- ▶ No hacked and/or out-of-date Linux kernels which guarantees faster updates and security fixes
- ▶ Allows standardizing on the same OS for compute, storage and networking
- ▶ Leverages security-enhanced Linux (SELinux), control groups (cgroups), and kernel namespaces to provide military-grade security
- ▶ Lightweight OS that provides the flexible and modular capabilities of Linux containers

Best of Breed Ecosystem

Open Application Environment



Open Fabric



Mainstream Linux OS



Merchant Silicon



For more information please visit: www.kaloom.com

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