Software Defined Fabric™ Product Overview

Kaloom™ is delivering an innovative automated data center fabric, Software Defined Fabric™; an industrialized software solution for networking white boxes from Accton, Delta 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 developers to drive innovation and allows customers to add new services and features into the Software Defined Fabric. The flexible fabric architecture presents 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.

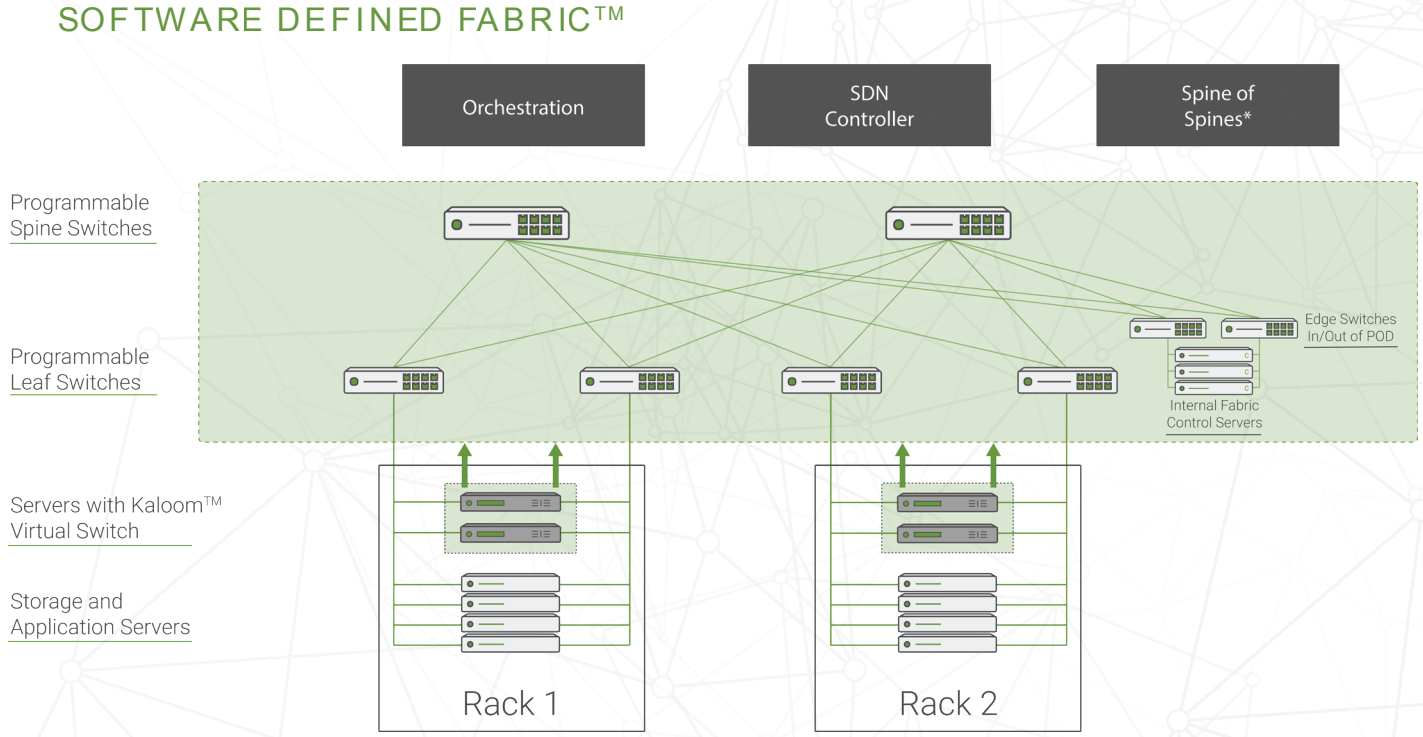

Figure 1. Software Defined Fabric™ Topology

The days of managing complex and error-prone configuration files and scripts are finally over as Kaloom 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 and is automatically updated during runtime.

*Roadmap Product

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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.

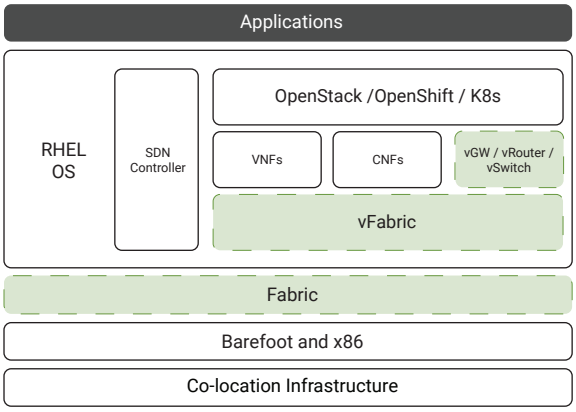

Figure 2. Kaloom Software Defined Fabric™

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.

Software Defined Fabric Key Features and Benefits

Software based datacenter fabric that manage 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 & eliminates the need to wait for silicon upgrades
- Allows for customer programmability
- Industry standard P4 programming language

Fully automated fabric

- Advanced Self-forming & Self-discovery Fabric
  - Automated discovery of incorrect network topology & cabling mistakes
- Zero Touch Provisioning of the virtual networking and virtual components
  - Zero-touch fabric with minimal to no human intervention
- 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

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Integrated virtual network components

- vRouter, vSwitch and VxLAN gateway
- Reduced complexity and reduced TCO

Optimized for virtual environments

- 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

- Provides 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 customers/tenants

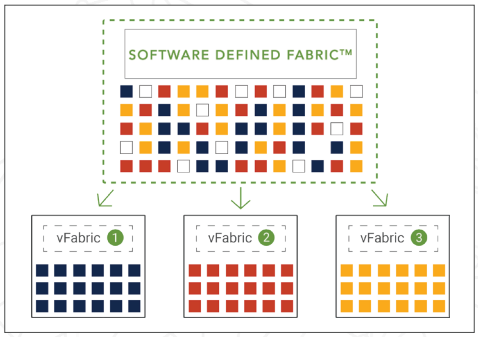

Figure 3. Creation of vFabrics

Open Networking and APIs

- Standard Linux based
  - No kernel patches
- Open APIs
  - Netconf API and Yang modeling
- SDN controller agnostic
  - Plugins for OpenDaylight*
- Orchestration agnostic
  - Plugins for OpenStack, K8s, and OpenShift
- No vendor lock-in
  - Networking white box friendly
- Open-source friendly
  - Contributing improvements upstream to Linux and K8s

Significant x86 resource utilization improvements

- Delivers power efficiencies and savings
- Reduces number of CPU cores used for networking and frees them up for payload tasks
- Delivers lower latency and higher performance by offloading and improving NIC functionality into the fabric with the Kaloom Virtual Switch

Lower latency

- Provides significantly lower server and NIC latency when using the Kaloom Virtual Switch
- Improves virtual end to end latency with advanced service chaining capabilities

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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 & modular capabilities of Linux containers

Best of Breed Ecosystem

Open Application Environment	openstack. · Red Hat OpenShift Container Platform · kubernetes
Open Fabric	kaloom SOFTWARE DEFINED FABRIC™
Mainstream Linux OS	Red Hat Enterprise Linux CoreOS
Merchant Silicon	BAREFOOT · intel

MBUZZ

MBUZZ Europe

Kaloom's Exclusive Partner in Europe

Contact Us

contact@mbuzzeurope.com
www.mbuzzeurope.com
linkedin.com/company/mbuzzeurope
twitter.com/MBUZZEurope

For more information please visit: www.kaloom.com

kaloom™

Headquarters

355 Rue Peel, Suite 403
Montreal, Quebec, Canada
H3C 2G9

www.kaloom.com
info@kaloom.com

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