

# B4N CONTROLLER

Carrier Grade SDN Controller

## WHAT IS B4N CONTROLLER?

B4N Controller is a high-performance OpenFlow-based SDN controller that addresses the challenges of slow SDN adoption in Service Providers networks.

## HIGHLIGHTS

- B4N Controller supports OpenFlow v1.3 and higher
- Carrier grade performance and availability, which is the major factors for Service Providers;
- Solution provides logically centralized, but physically distributed approach to manage SP networks.
- B4N Controller provides a set of tools and applications for smooth integration of SDN technologies within existent IP/MPLS Networks

## SMOOTH TRANSITION TO SDN

Software Defined Networking is a rapidly evolving network architecture approach that provides network automation, programmability and virtualization.

One of the major road blocks for SDN adoption is the requirement to rip-and-replace legacy network infrastructure. In case of Service Provider network architecture there is no way to immediately replace existent IP/MPLS network with newer technologies.

B4N Controller is a main part of B4N Service Platform portfolio that provides a unified control point of SDN-enabled network and simplifies network management and provisioning. The solution helps Service Provider to accelerate adoption of SDN technologies by smooth integration SDN-enabled segments within existent IP/MPLS network. It tightly integrates with existing multi-vendor hardware and software network infrastructure, preserving customer investments and avoiding vendor lock-in.

Routing application of B4N Controller acts as distributed IP/MPLS PE Router and provides support static routing capabilities (it's possible to extend capabilities to full stack of routing protocols (eg. MP-BGP, OSPF, IS-IS) with 3<sup>rd</sup> party routing application).

To conform with requirements for evolving NFV era and tight integration with new virtualized functions SDN controller must support both virtual and physical network elements. B4N Controller can be embedded to SPs' NFV farm and enables unified traffic management in dynamic service chains.

## SDN IN SP NETWORKS - PERFORMANCE MATTERS

It is getting evident that a different approach to the architecture of Software defined networks (SDN) is required for Service Providers networks and distributed large enterprise networks as compared to the SDN controller architecture for data centers. The specifics of these networks, remote regions and branches connection types, the traffic volume, QoS requirements – are among a few factors that grant this unique approach and need to be considered in creating the relevant SDN architecture for SPs' and large enterprise' networks.

B4N Controller addresses this challenges. Product architecture is relied on higher requirements from Service Providers for performance and availability of the controller, fast provisioning, and working in in-band and out-of-band modes.

High performance delivered by innovative Brain4Net algorithms implemented in B4N Service Platform architecture, Docker paravirtualization and reduction of MAC learning.

## CONTROLLER APPLICATIONS

B4N Controller provides comprehensive and frequently supplemented list of integrated applications:

- **P2P App**

Point-to-Point pseudo-wires that provides addition of static or dynamic rules for ingress or egress switches

- **P2M App**

Point-to-Multipoint pseudowires

- **M2M App**

Multipoint-to-Multipoint pseudowires (L2VPN functionality)

- **IGMP App**

IGMPv2 / IGMPv3 requests handling, IGMP tree formation

- **QoS App**

Implementation of QoS services

- **Routing App**

Static routing capabilities

- **NAT App**

Carrier Grade NAT Solution

## PRODUCT OVERVIEW

B4N Controller it's a black box which responsible for manage OpenFlow-enabled switches to provide a control-plane for operations. It provides a meta-router functionality via NETCONF and YANG model and can be used in standalone or cluster modes.

Product designed to provide physically distributed approach with centralized management via B4N Orchestrator. This approach enables Service Provider to automate network management in geographically distributed infrastructures.

B4N Controller consists from the following components:

- **Packet Processing Plane**

High performance OpenFlow packet processing

- **Topology & Inventory Service**

Network topology control and management, network segmentation, unique labels assignment, shortest path calculation, flow rules provisioning with Failover support

- **Cluster Service**

Reliable cluster management

- **NETCONF Server**

NETCONF implementation for service provisioning

- **Controller Applications**

P2P, P2M, M2M, IGMP, QoS, NAT, Static Routing, etc.

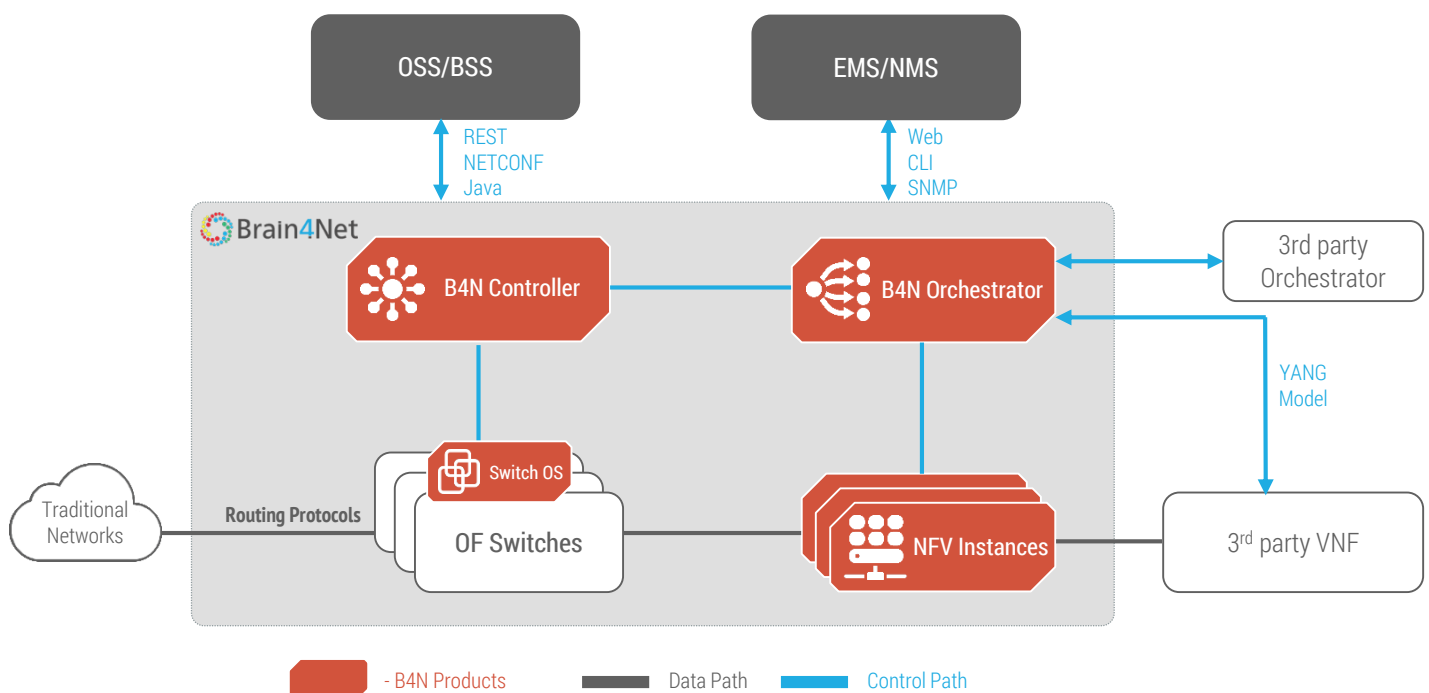


Figure 1: B4N Service Platform Architecture

## FEATURES AND BENEFITS

### Traffic Engineering and Fast Failover

Segment Routing satisfies essential requirements for application-enabled routing in SDN, including the ability to provide strict network performance guarantees, efficient use of network resources and very high scalability for application-based transactions. B4N Controller uses Segment Routing source routing principles to encode calculated path. Customer can choose from two options – typically calculated paths based bandwidth or traffic-engineered paths.

### Non-Stop Forwarding

Nonstop traffic forwarding in case of unreachability of Controller due to preprovisioned flow rules.

### Switching options

VLAN Swapping / MPLS Segment Routing transport strategies are implemented that provides flexible switching options depends on Customer requirements

### Unified Switching Fabric and NFV Ready

B4N Controller as a part of B4N Service Platform provides converged switching fabric, single pane of view and management of physical and virtual SDN-enabled network. It enables Service Provider to deliver customer traffic from Access network to NFV farm in data center and smoothly integrate Metro aggregation network with virtual network. For example, this solution can be used for traffic delivery from SP Access Network to customer vE-CPE services located in the data center NFV farm.

### High Availability

2n+1 active consistency model which allows three controllers to manage individual subsets of the network while sharing a common network view

### Full Virtualization

Fully virtualized components. Program code of all components is executed inside the VM.

### Docker containers

Service isolation with all standard virtualization features with near-to-native performance. That reduces times for restart virtual machines in case of failure. Full system restart takes about 10 seconds.

### Northbound API's

B4N Controller supports REST API that provides an abstract representation of the underlying OpenFlow network and allow external applications running above the controller to exert control over the network

### Modular architecture and customized builds

Simple create new modules by export dependencies (core, topology, etc.). New software build can be created by building new delivery file. The result – new SDN Controller with all the necessary features

### Graphical UI features

UI features include Topology map, Traffic map, Statistics, intelligible configuration blocks and more.

## B4N CONTROLLER SPECIFICATIONS

### HARDWARE REQUIREMENTS

<b>Controller:</b>	<b>Database:</b>
CPU: 4 Core	CPU: 1 Core
RAM: 8 GB	RAM: 2 GB
HDD: 64 GB	HDD: 16 GB

### SOFTWARE REQUIREMENTS

Debian x64 > 8  
 Ubuntu x64 > 14.04  
 Red Hat x64 > 7.1  
 SUSE x64 > 12.4  
 Docker > 1.6  
 Oracle JVM > 1.8

### DATABASE REQUIREMENTS

MongoDB > 3.0  
 (or Dockerized mongo: latest)

### API

NETCONF / YANG  
 REST

### FAULT TOLERANCE

Single  
 Cold-Standby  
 Cluster (minimum 3 nodes)

### QOS

DiffServ  
 Bandwidth Admission

### PERFORMANCE AND METRICS

**64 / 4000 OpenFlow Devices** (VLAN Swapping / MPLS Segment Routing transport strategy)

**4 billions** new flow per second  
 (1 billion per core per single node)

**< 50 ms** packet in processing latency

## ORDERING INFORMATION

Part Number	Description
<b>CTL16</b>	16 nodes license, includes L2 Learning Switch and QoS
<b>CTL32</b>	32 nodes license, includes L2 Learning Switch and QoS
<b>CTL48</b>	48 nodes license, includes L2 Learning Switch and QoS
<b>CTLFHA</b>	HA license (first node)
<b>CTLAHA</b>	HA license (additional node)
<b>CTLPORT1</b>	1 OF Port License
<b>CTLEP</b>	Enterprise Package: 16 nodes, max 256 ports, basic HA
<b>CTLSSP</b>	Small SP Package: 32 nodes, max 816 ports, full HA
<b>CTLBSP</b>	Big SP Package: 48 nodes, max 1248 ports, full HA

## ABOUT BRAIN4NET

Brain4Net SDN/NFV software solution helps Service Providers and large Enterprises to adapt modern network technologies such SDN and NFV with existent network infrastructure. We develop a platform that turns benefits of SDN/NFV synergy and addresses performance and availability challenges that are the major stop factors of slow SDN adoption.

### Communities:



For more information, please visit <http://brain4net.com/>

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