

Overview

Models

HP VAN SDN Controller Base Software with 50-node License E-LTU

J9863AAE

Key features

- Enterprise-class platform for the delivery of a broad range of network innovations
- Compliant with OpenFlow 1.0 and 1.3 protocols
- Support for over 50 OpenFlow-enabled HP switch models
- Open APIs to enable third-party SDN application development
- Extensible, scalable, resilient controller architecture

Product overview

HP Virtual Application Networks (VAN) SDN Controller Software provides a unified control point in an OpenFlow-enabled network, simplifying management, provisioning, and orchestration. This enables delivery of a new generation of application-based network services and provides open application program interfaces (APIs) that allow third-party developers to deliver innovative solutions to dynamically link business requirements to network infrastructure via either custom Java programs or general-purpose RESTful control interfaces. HP VAN SDN Controller Software is designed to operate in campus, data center, or service provider environments.

In the Software Defined Networking (SDN) architecture, the control and data planes of the network are decoupled from each other, centralizing network intelligence and abstracting the underlying network infrastructure from applications. VAN SDN Controller software directly provisions physical and virtual switches under its control via the industry-standard OpenFlow protocol. Network ports, links, and topologies are all directly visible, enabling centralized policy administration and more effective path selection based on a dynamic, global view of the network. This dramatically simplifies the orchestration of multi-tenant environments and the enforcement of network policy for both mobile clients and servers.

With SDN, customers in all industries can develop applications specific to their business requirements. SDN concepts are already in use in cloud data center networks, leveraging technologies such as OpenStack. SDN has demonstrated the ability to provide campus administrators with the dynamic network security and QoS provisioning required in a BYOD environment. Service providers are evaluating SDN for service chaining to support network functions virtualization. HP Virtual Application Networks (VAN) SDN Controller Software provides a production-quality platform for the delivery of a broad range of network innovations.

Features and Benefits

Software-defined networking

- **Proactive flow processing**
enables highly scalable, centrally orchestrated SDN networks; with this approach, a central application manages the provisioning of endpoints, such as servers or virtual machines in a data center, or fixed endpoints in a campus network
- **Reactive flow processing**
enables dynamic monitoring of new flows or endpoints, such as individual user or server sessions; these environments require careful characterization to ensure that all levels of the network infrastructure have the capacity to respond to large numbers of subsecond events
- **Graphical user interface (GUI)**
facilitates controller administration and API documentation
- **Northbound APIs**
leverage the controller's extensible RESTful HTTPS interface; provide an abstract representation of the underlying OpenFlow

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network and allow external applications running above the controller to exert deliberative, business-level control over the network; provide the services necessary to support a full management platform such as HP Intelligent Management Center (IMC)

- **Native APIs**

allow Java applications to run within the controller as a collection of OSGi bundles that enable high performance event and packet processing; these network-level applications are extremely powerful, allowing the personality of the controller to be extended and customized for specific environments; they leverage a three-tier architecture with strict API guidelines for interfacing with external entities, other Java modules, and the controller database

- **Scale-out architecture**

uses scalable, resilient database frameworks, allowing expansion beyond a single standalone controller to a high-availability cluster; based on open-source in-memory database systems, including Zookeeper (for strict consistency), Cassandra (for eventual consistency), and a PostgreSQL relational database, persistent data can be shared among multiple controllers to deliver a scale-out approach to the control of large or demanding networks

- **High availability**

provides a "2n+1" active consistency model, which allows three controllers to manage individual subsets of the network while sharing a common network view; the failure of one control component generates a rapid response by the cluster to provide continued network operations

- **Controller security**

delivers security at multiple levels; HTTPS is used for the REST API, and the authentication of users and applications is performed by way of the Keystone identity service; controller-to-switch communications are secured through the Transport Layer Security (TLS) encryption protocol, as specified in the OpenFlow standard

- **Link service module**

utilizes LLDP messages to discover physical links between switches in the control domain and monitors port state changes and notifies applications of link event changes; it is also able to identify multi-hop links where non-OpenFlow devices separate controlled network segments

- **Topology service module**

creates a network graph based on information from the link service; identifies ports, computes the shortest path between nodes, and creates a broadcast tree, avoiding network loops; in future releases, this module will enable multi-path services

- **Node manager service module**

monitors ARP, DHCP, and IP packets from edge ports; allows the module to provide a cache of MAC and IP addresses for each end point, which provides identification of devices or users attached to the network

- **Flow service module**

maintains a cache of flows for every data path and enables service modules and applications to add, modify, and delete flows based on the capabilities of the controlled network switches; for OpenFlow 1.3 devices, the optimal flow table is automatically identified based on match and action fields

- **Path service module**

utilizes information from the node and topology services to program an end-to-end unidirectional L2 path through the control domain for new network flows; drops unknown source addresses and supports flooding for unknown destinations; can be disabled for normal packet processing, or can be replaced with a more sophisticated program as desired by the application programmer

- **Path diagnostic service**

validates network paths and generates protocol-specific test packets (ICMP, DHCP, UDP, TCP, etc.) that can be inserted into the network and observed at various switches along the path; this provides network administrators with trace-route functionality

- **OpenFlow control interface**

uses a generalized approach in the controller's southbound interface to processing OpenFlow 1.0 and 1.3 messages; this provides an efficient and intuitive mechanism for monitoring and programming various network components and for processing new flow messages; packets are translated into a set of rich data types by the controller, which allows Java applications to consume or create messages or packets in a consistent, extensible, and version-independent fashion

- **Flexible packet processing**

enables both OpenFlow and normal packet processing with the HP SDN architecture; access control lists can be provisioned

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centrally, for example, while L2 or L3 forwarding decisions can be made using standard network protocols; this allows SDN concepts to be applied incrementally to the network, starting with the application of network policy and extending to exception-based forwarding, adding value without replacing traditional switching or routing

Technical Specifications

**HP VAN SDN Controller
Base Software with 50-
node License E-LTU
(J9863AAE)**

Platform required

Server:
PostgreSQL 9.1
OpenJDK 7 JVM
Keystone Identity

**System requirements,
recommended**

Server:
3.0 GHz Intel® Xeon® or Intel® Core™2 Quad processor or equivalent

Recommended software

Server:
Ubuntu 12.04 LTS 64-bit

Notes

Performance (single controller)

- Maximum new flows per second (cbench): 1.8 million
- Maximum OpenFlow ports: 80,000
- Maximum OpenFlow devices: 2,000
- Typical OpenFlow ports: 1,000-2,000
- Typical OpenFlow devices: 100-200

Services

Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessories

HP VAN SDN Controller Software accessories

HP VAN SDN Controller Base Software with 50-node License E-LTU (J9863AAE)

HP VAN SDN Controller Additional 50-node License E-LTU

J9864AAE

HP VAN SDN Controller High Availability License E-LTU

J9865AAE

To learn more, visit www.hp.com/networking

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