Networks Go ‘Soft’

Open source and SDN is disrupting networking and IoT solutions
OpenSourceSDN.org is an ONF-supported repository to incubate community-based projects. ONF has contributed a growing family of vertically integrated SDN stacks to accelerate adoption and usability of SDN," says Dan Pitt, Executive Director of the Open Networking Foundation. "Project Atrium is an example of a BGP peering router application implemented as a vertically integrated solution using ONOS and ODL SDN controllers.

Dan Pitt
Executive Director of the Open Networking Foundation.

There is a point at which innovation happens every day, everywhere. Software-defined Networking (SDN) is one such example. With the Open Networking Foundation (ONF) promoting its adoption, SDN has got a further boost. While enterprises were provisioning servers, storage and business applications in minutes through virtualization, networking resources such as firewalls, routers, switches and intrusion detection/protection device still took months to provision and deploy. Network Equipments were realized by vendors as purpose-built hardware appliances. SDN is changing that rapidly. With SDN, hardware lock-in is being loosened and open platform based solutions are becoming a reality. Now, with SDN, network providers can use a commodity x86 server and white boxes to manage and control the network. Today, SDN is on rapid adoption path. Different open applications are propelling the adoption of SDN. Internet of Things (IoT) is one application that is enabling innovation of SDN based solution. Along with the rise of open source software, this represents a double shift in paradigm for SDN.

OpenVswitch (OVS), Data Plane Development Kit (DPDK), SDN controllers like Open DayLight (ODL), Open Networking Operating System (ONOS), Quagga Open Source router, OpensourceSDN — all well understood and recognized — are examples of prominent open source software that are changing the way we implement networking. These have become even more significant as sensors in equipment and devices proliferate, seamlessly connecting cars, homes, cities and industrial operations across diverse platforms. A complex and diverse networking layer connects IoT devices to a gateway that in turn connects to a cloud server. Open source and software-centric approach to networking provides the flexibility to address and knit together the diverse use cases that IoT brings with it.
The trend of using open source-based SDN across the IoT is being driven by the need of network service providers to provide platforms for open innovation. Traditionally, all networking innovation was “inside the box”, under the control of individual equipment manufacturers. Network providers were dependent on manufacturers for additional features. Now, with the intelligence required to manage the network decoupled from the hardware, controller software can be scaled quickly, (practically) endlessly and at significantly lower costs to meet growing IoT requirements. Suddenly, open source-SDN can invoke independent innovation for any size of organization.

A good example is that of Branch office connectivity of an enterprise with branch offices across several locations in the city. We could use a white box solution based on Intel x86 hardware for Enterprise Branch Routing. The solution is based on SDN methodology where a standard X86 server is used as the hardware while platform software is based on open source components like Linux OS, KVM Hypervisor, Intel DPDK library for accelerating packet processing and OpenVswitch for L2 switching. Networking applications like routing, network address translation (NAT) and firewall are realized as software applications running on virtual machines, containers or as a native host application. Using this approach we are able to choose any vendor product and yet ensure line rate performance for 1GB interfaces.

Think about this: using SDN, network applications like router, firewall and IoTGW (IoT gateway) become software catalogue items in a service provider or an enterprise portal. These applications are tested and certified to be ‘fit for use’ in the network and are ready for zero-touch provisioning. The implication is profound. Scores of IoT elements with varying network protocol requirements could be networked easily and quickly. New business applications could be hosted on the open networking platform. When you expand the scope to enterprise, cities and governments, with their associated operational equipment, field forces, inventory, security systems, etc., the true muscle of open source-based SDN becomes evident.
Open source + SDN + IoT = accelerated innovation

A global 2015 study called The Open Source Era, published by Oxford Economics and Wipro, found that open source was gaining momentum - 46% respondents said open source supported their IoT infrastructure. The report said that open source was turning into a powerful platform for innovation, creating differentiators for products and services that traditional software did not allow. Open source allows businesses to accelerate IoT adoption, thereby allowing innovation to thrive in places unimaginined before.

Enterprises, ISPs and CSPs are waking up to the possibility of rolling out services faster and cheaper, enabling rapid automation and simplification of operational processes. Organizations now have the leeway to invest in experimentation and innovation, without the risk of massive investments in hardware. While organizations will, doubtless, be keen to test the waters opened up by open source-based SDN and the IoT solutions, they must practice caution. There is a need to take up end-to-end integration and ensure guaranteed support of the production network—something only well qualified technology partners can provide. For their part, enterprises must also be open to adopting new thinking around engineering if they are to harvest the benefits of new technologies.

References

i. There are other networking challenges involved as well such as transporting diverse packet sizes that IoT demands in different use cases.

ii. Enterprise Branch Routing provides users in remote sites to access the same set of rich network services including security and availability that on-site users would enjoy

About the Author

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