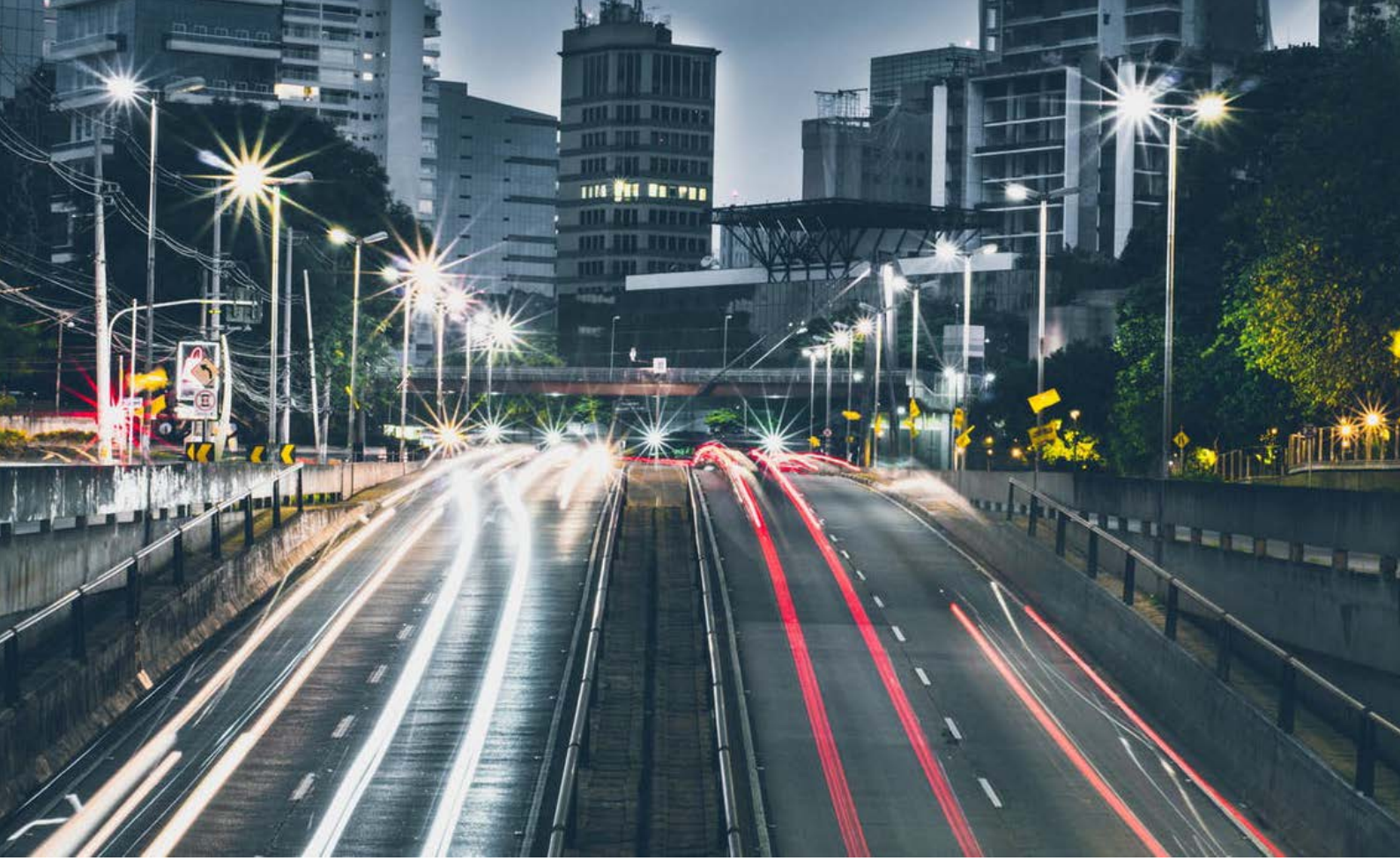
Orchestrating a brighter world

NEC

The Simple Solution for Complex Networks

ProgrammableFlow Networking



Networking Challenges in the Cloud

In today's data center and cloud environment, new business demands and new innovations in compute infrastructure have increased the strains on data center networks.

Economies of scale and improvements in governance are driving demand for IT infrastructure that can handle a variety of workloads. Building networks that enable these benefits is a challenge. Current network equipment lacks flexibility and responsiveness to dynamic business demands, making it difficult to provision and even harder to manage the multitenant networks that cloud services require.

"Network complexity has grown to a point beyond reasonable. ProgrammableFlow provides an automated means of network self-repair, and gives us the single pane of management and control we have long sought."

Eric Miller, CEO of Genesis Hostings Solutions

At a Glance

> Campus LAN and data center network
> Reduces operation costs by reduced network complexity
> Improves IT efficiency through ease of use
> Speeds-up deployment of new services
> Assures network policy adherence and eases monitoring
> Provides investment protection

ProgrammableFlow: Creating a Cloud-Ready Network

Easy to manage

Complex, inflexible network configurations are a feature belonging to past decades with ProgrammableFlow. ProgrammableFlow centralizes control of the network, eliminates the need for distributed protocols such as Spanning Tree. ProgrammableFlow streamlines data center management

through greater levels of automation while driving down operational costs and time to deliver business services.

Enterprise ready & scalable

In an environment where business requirements are constantly changing, planning for capacity has never been harder. ProgrammableFlow makes scaling out of network resources as easy as scaling out virtualized servers. ProgrammableFlow scales from a single rack integrated into an existing network to an entire data center, all managed from a central console.

Dynamic

ProgrammableFlow automatically monitors and intelligently distributes network traffic across multiple paths. Paths are managed according to custom defined policies and continuously updated based on network resources and traffic conditions. Any path between any two devices can be used, enabling more efficient use of network resources and multiplying the available bandwidth within the network.

Open standards

ProgrammableFlow leverages the OpenFlow protocol to create Software-Defined Network (SDN) virtualization, giving NEC customers freedom of choice. By separating network control from switch hardware, organizations can make infrastructure investment decisions independently from the network features they want to support.

Programmability

With the standard REST API interface network behavior can be programmed or/and information gathered from the controller, making any integration with the open source world simpler. Both XML and JSON formats are supported.

Core technology

Virtual Tenant Network (VTN) allows network slicing and traffic isolation, abstract physical network as vBridge (L2) and vRouter (L3) and hide physical complexity, through which intent interfaces (VTN policies) are supported.

ProgrammableFlow Controller: Unique, Network-Level Virtualization

ProgrammableFlow Controller Software brings the benefits of virtualization to high performance switching. Data center can now deploy, control, monitor, and manage multi-tenant network infrastructure all from a central point.

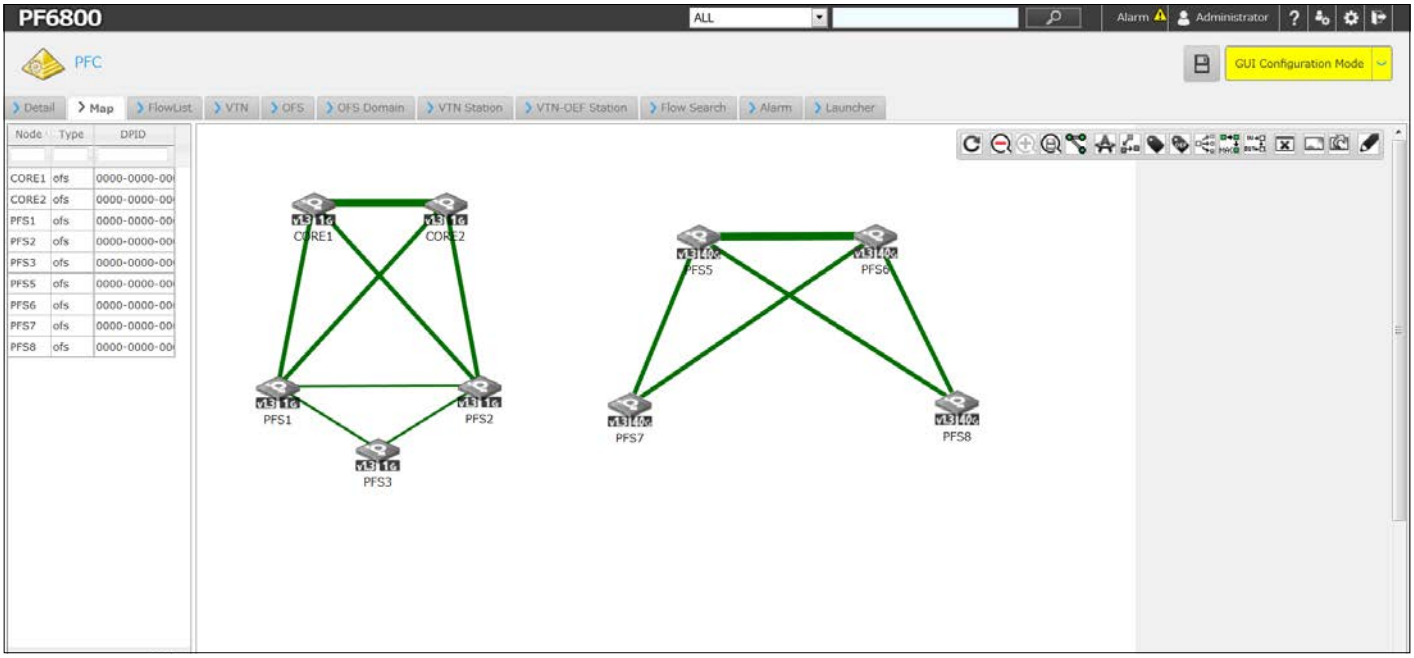
- **Multi-tenant network virtualization:** NEC's Virtual Tenant Network technology enables administrators to build multi-tenant networks in which virtual machine migration is unfettered, enabling rapid scale-out of new applications, balanced workloads, and higher levels of availability.
- **Reduced network complexity:** ProgrammableFlow's centralized control of the network eliminates the need for distributed protocols such as Spanning Tree, reducing network complexity and unlocking the network capacity unavailable in networks running Spanning Tree.
- **Enhanced Investment Protection:** New network services can be added and extended without changing hardware.

ProgrammableFlow PF524x, PF54xx, PF5340 Switches: Award-Winning High Performance

ProgrammableFlow switches are powerful, hybrid, multi-layer switches that can integrate into a legacy environment, or fully function with OpenFlow-enabled benefits behind NEC's ProgrammableFlow Controller.

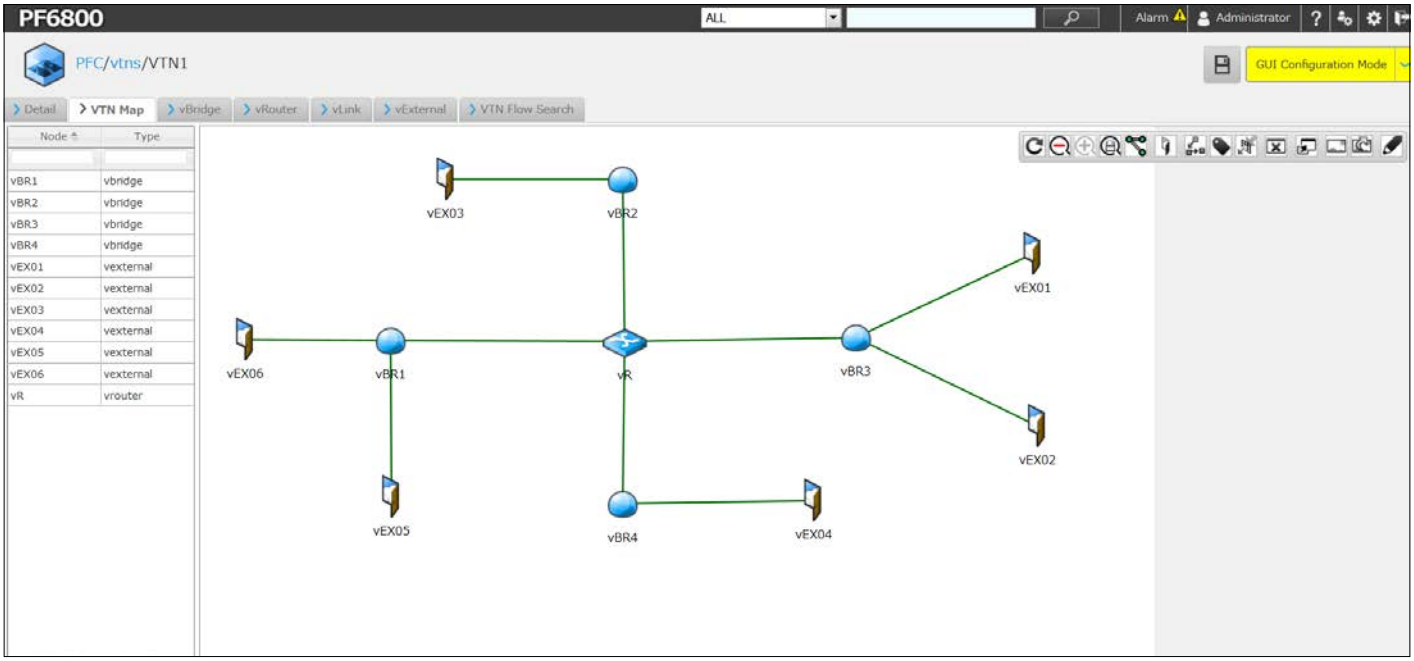
- **High Performance** – 1/10/40 Gigabit ports configurations to fit networking needs with fully non-blocking switching capacity.
- **Data Center Class OpenFlow Support** – provides line-rate control over network flows.
- **Any Topology** – ProgrammableFlow networks can be deployed in any network topology, increasing network resiliency and capacity.
- **Greener, Easier Operation** – Flow based networking enables organizations to migrate data traffic dynamically for maintenance and power savings.

ProgrammableFlow Management Console: Centralized Monitoring for Greater Control



Physical network view

Increase uptime with topology discovery and flow visualization for performance monitoring and management



Virtual Network view

Reduce cost of ownership and Increase IT staff productivity by managing multiple tenants from one console.

Corporate Headquarters (Japan)
NEC Corporation
nec.com

North America (USA & Canada)
NEC Corporation of America
necam.com

NEC Enterprise Solutions
NEC Europe Ltd
nec-enterprise.com

APAC
NEC Asia Pacific Pte Ltd
sg.nec.com

Latin America
NEC Latin America
lasc.necam.com