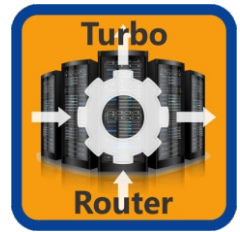




Turbo Router™



COTS Based vRouter Solution With Scalable Performance

Routing Performance¹

- 16 Mpps per core
- Performance scales linearly with number of cores

Scalability

- 1/10/40/100GE support
- 1 million routes

Bare Metal or Virtual Platforms

TCO Savings > 50% over Hardware

NFV Ready: Support for OpenStack

6WIND Turbo Router is a scalable, cost-effective routing solution and is part of the 6WIND vRouter family. It is a ready-to-use software network appliance that can be deployed standalone on bare metal commercial-off-the-shelf (COTS) servers or as a virtual machine. 6WIND Turbo Router's flexibility and rich features make it ideal for medium to very large Enterprises and Network Operator/Carriers and Data Centers.

Leveraging COTS Platforms for Improved TCO

When comparing 6WIND Turbo Router on COTS servers versus purpose-built hardware routers, cost benefits can be realized in multiple ways. Comparing CAPEX, the cost of 6WIND Turbo Router on a COTS server is more than 50% less than any purpose-built hardware with similar performance characteristics. By adding virtualization, customers further reduce CAPEX since they can combine 6WIND Turbo Router with additional services, such as load balancers, firewalls, etc. on the same COTS server, increasing productivity and generating new revenue streams.

OPEX savings are realized by minimizing installation efforts, sparing requirements and service commissioning efforts. In an OpenStack environment, adding additional router applications is a matter of spinning up VMs. Turbo Router eliminates downtime needed to install, connect and cable cumbersome traditional purpose-built hardware products.

Product Description and Architecture

The 6WIND Turbo Router software is divided up into a control

plane and a data plane. The control plane is comprised of the Linux operating system as well as applications for routing, etc. The control plane operates independently of the data plane component and runs on at least one core.

The tremendous boost in performance is accomplished by running the data plane packet processing software on dedicated cores. The data plane software comprises DPDK, a set of poll mode drivers that provide efficient data I/O processing. In addition, 6WIND technology has native multi-queue support to distribute the load across multiple CPU cores. This combination allows performance to scale linearly by 16 Mpps per core. Internal testing confirms 6WIND Turbo Router scales linearly from 16 Mpps to over 300 Mpps with each added core.

6WIND Turbo Router can be loaded directly onto bare metal servers as a pure router deployment option. This standalone appliance is suitable as a direct replacement for traditional, dedicated hardware routers small and large.

NFV Ready

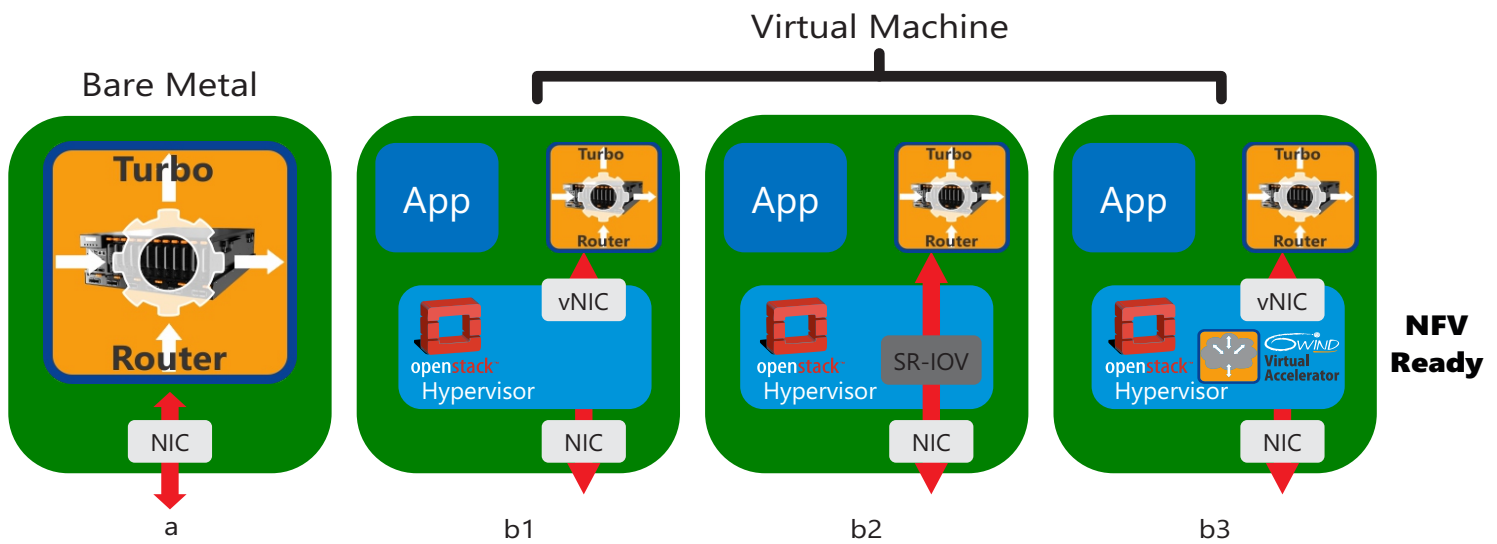
In NFV or virtual environments 6WIND Turbo Router is instantiated as a regular virtual machine and supports standard Virtio vNIC (b1). 6WIND Turbo Router also supports SR-IOV or PCI passthrough, a technology that bypasses the hypervisor in order to increase forwarding performance (b2). The third option (b3) combines the performance of SR-IOV and all the rich features of the hypervisor (live migration, switching, hardware independence, etc.) by installing 6WIND Virtual Accelerator™, which is hypervisor scaling software. The added advantage of using 6WIND Virtual Accelerator is that all virtual machines benefit from the increase in hypervisor performance.

Advanced Management and Monitoring with APIs

Turbo Router provides both traditional, CLI-based management and management based on YANG and NETCONF APIs for integration with higher level orchestrators and management frameworks. For monitoring, the traditional SNMP and syslog mechanisms are supported, plus data plane telemetry through sFlow, and graphical analytics with time series data base.

Use Cases

- Cost-effective multi-homing with BGP - use as a border router providing multiple links to a single service provider or multiple service providers for redundancy, reliability and path diversity
- Routing at the server edge - replace or offload data center edge routers by tapping into unused hypervisor platform resources



Key Features

- High performance, full-featured data plane networking supports an extensive set of L2 to L4 networking protocols, including IP forwarding and more
- Platform/NIC agnostic-does not lock the customer into a single vendor solution to meet small and large scale requirements
- Management options include CLI, and NETCONF/YANG management
- Bare metal or virtual machine

System Requirements

x86 with 1, 2, or 4 sockets (Advantech, Dell, HP, Lanner, Super Micro)

CPU:

- Intel Xeon and Atom

Core count: Minimum one for control, one for data plane; fully customizable

Memory: 2GB min, configurable, depends on capacity

NIC:

- Intel 1G 82575, 82576, 82580, I210, I211, I350, I354
- Intel 10G/40G 82598, 82599, X520, X540, XL710
- Mellanox 10G/25G/40G/50G/100G CX4, CX5
- Broadcom NetExtreme E-Series
- Virtio, SR-IOV, PCI passthrough, VMXNET3, ENA

Deployment / Hypervisor: Bare metal, KVM, VMware ESXi, OpenStack NFV, AWS, containers (Kubernetes/docker)²

Features

Routing

- BGP4, BGP4+
- OSPFv2, OSPFv3
- RIPv1, RIPv2, RIPvng
- Static Routes
- Path Monitoring For Static Routes
- ECMP
- PBR
- MPLS
- BGP L3VPN
- BFD
- NHRP²
- VXLAN EVPN²
- BGP RPKI²

L2 and Encapsulations

- GRE, mGRE²
- VLAN (802.1Q, QinQ)
- VXLAN
- LAG (802.3ad, LACP)

IP Networking

- IPv4 and IPv6
- Segment Routing v6²
- IPv6 autoconfiguration²
- VRF
- IPv4 and IPv6 Tunneling
- NAT
- Multicast²

Management / Monitoring

- SSHv2, Telnet
- CLI

- NETCONF/YANG
- SNMP
- KPIs/Telemetry (YANG-based)
- RBAC with AAA
- Syslog
- 802.1ab LLDP
- sFlow

High Availability

- VRRP

Security

- ACLs (stateless & stateful)
- uRPF
- CP Protection
- BGP FlowSpec

IP Services

- DHCP Server/Client/Relay
- DNS Client/Proxy
- NTP

QoS

- Rate limiting per interface
- Rate limiting per VRF
- Class-based QoS
 - Classification: ToS/IP/DSCP/CoS
 - Shaping and policing
 - Scheduling: PQ, PB-DWRR

Operations

- Installation: PXE, USB, ISO, QCOW2, OVA
- Update/Rollback Support
- Provisioning: cloud-init, Ansible, ZTP²

²Near-term Roadmap

Expected Layer 3 Forwarding Performance

# of vCPUs	1	2	4	8	16	20
Throughput Mpps	16	32	64	128	256	320

6WIND Turbo Router Part Numbers

Turbo Router 1G
6SS-TR-1-Perp-Intel

Turbo Router 2G
6SS-TR-2-Perp-Intel

Turbo Router 5G
6SS-TR-5-Perp-Intel

Turbo Router 10G
6SS-TR-10-Perp-Intel

Turbo Router 25G
6SS-TR-25-Perp-Intel

Turbo Router 40G
6SS-TR-40-Perp-Intel

Turbo Router 100G
6SS-TR-100-Perp-Intel