

## Abstract

The evolution of the router architecture has gradually changed from a conventional architecture which processes all functions on one operating system/processor to a remote architecture which can be split into a control plane and a data plane with their respective functions. The control plane is mainly responsible for the operations of the routing/signaling protocols and the data plane is responsible for forwarding the large amount of data packets. Furthermore, the remote architecture facilitates the realization of virtual routers. Virtual routers are created basically by logically splitting a routing processor in the control plane into many virtual routing units which have independent routing tables, use independent protocols, and connect to the external network through different interfaces. A virtual router with a remote architecture is more flexible and efficient than conventional routers; however it requires an additional communication mechanism between the control plane and the data plane. We propose using existing tunneling techniques to provide a communication mechanism between the control plane and the data plane. Many design and implementation issues on the software architecture and protocol ramification are identified. We discuss solutions to these issues and successfully demonstrate a working virtual router with our proposed solutions.

Keywords: Virtual routers, control plane, data plane, tunnel, virtual interface