



▶ Enhancing the Speed of Communication

IPv6 Stack for Satellite Modems



A US-based advanced satellite communication equipment manufacturing company providing advanced communications solutions to its clients needed to improve the performance of its satellite modem products. They needed an embedded software solution that would allow their modems running IPv6 protocol to communicate across the internet and to devices that were still using the IPv4 standard. A translation algorithm and tunneling protocol was needed to bridge these two protocols.

The Challenge

Emtec's client needed to improve the network packet processing in data plane and control plane. The client also wanted to integrate the code in smaller footprint so that they could gain a cost advantage in building the hardware as well. The client required IPv6 and other functionality like tunneling, protocol translation and proxy ARP be compliant with the relevant Request for Change (RFC).

Emtec's Solution

Emtec developed and enhanced the IPv6 control plane and data plane software stack that used Network Processor Unit (NPU) such as the Intel IXP 2350 and integrated it with the existing IPv4 stack. The Proxy ARP functionality was also added in the IPv4 control plane stack. Emtec also developed IPv6 over IPv4 Tunneling and NAT-PT (network address translation and protocol translation) functionality to bridge the IPv6 and IPv4 network.

Emtec also provided optimization of data plane code for enhanced performance and developed a CLI module to provide the table configuration support for the IPv6 and tunnel table. The design of the IPv6 architecture provides additional network security for the embedded satellite systems.

To ensure the IPv6 software stack's compliance with the relevant RFC's, Emtec used the open source test suite TAHI (www.tahi.org). The TAHI consortium's objective is to develop and provide the verification technology for IPv6. TAHI is an open source test suite of IPv6 control plane stack to test RFC compliance.

Emtec developed the embedded software on the Intel IXP 2350 NPU. The control plane utilized Wind River's Linux product and code for the control plane stack was developed in C language. Emtec used Intel microcode and Teja-C to enhance the data plane software stack.

Features

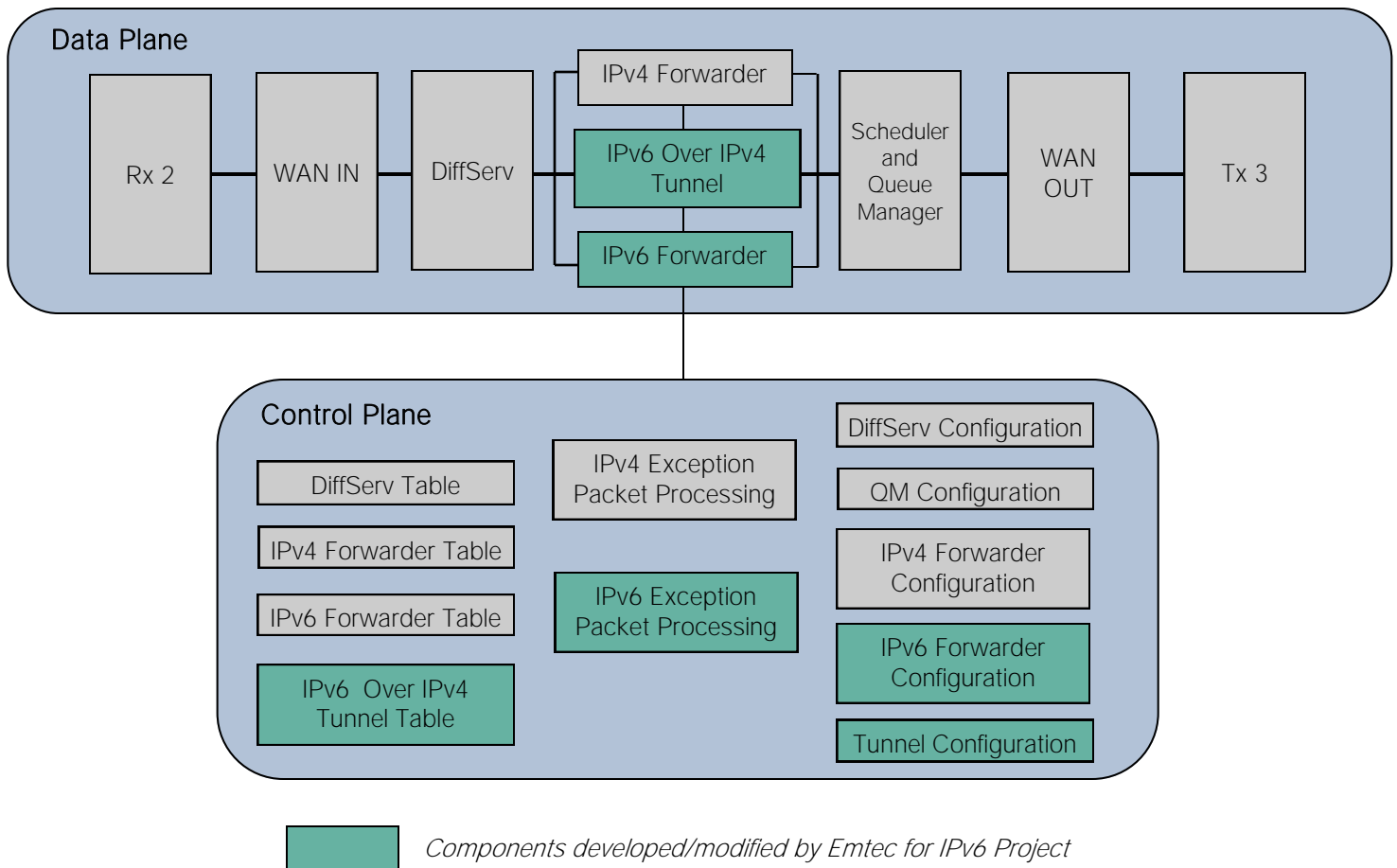
The control plane IPv6 stack includes features such as:

- ◆ IPv6 Spec
- ◆ ICMPv6
- ◆ Neighbor Discovery
- ◆ Router Discovery
- ◆ Address Architecture
- ◆ IPv6 Stateless Address Autoconfiguration
- ◆ Duplicate Address Detection
- ◆ IPv6 Over IPv4 Tunneling
- ◆ NAT-PT

Outcome

Emtec's extensive knowledge in NPUs allowed our programmers to successfully develop the embedded software solution in half the time expected by the client. Programming the code tightly also decreased the real-estate on the hardware thereby lowering the manufacturing costs and using less of the system's memory. Emtec's software solution also optimized data plane performance by processing packets faster and lowering the risk that packets would be dropped.

IPv6 Software Stack



About Emtec

Established in 1964, Emtec, Inc. is a systems integrator that provides IT services and products to the federal, state, local, education and commercial markets. Our market leading value-based management methods, coupled with best-in-class IT technology, application development services and strategic IT consulting, address a wide range of specific client needs, as well as support broader IT transformation initiatives. Emtec's service capabilities span the United States, Canada and countries around the globe.