



► Preferential Treatment for Higher Priority Data

DiffServ Functionality for Satellite Modems



Differentiated Services (DiffServ) is an industry-standard method of adding Quality of Service (QoS) to IP networks. It offers the capability to prioritize certain types of traffic and various methods of traffic handling based on the class of a particular stream. DiffServ can be configured to provide interactive traffic, such as voice and video, with higher priority than non-real-time traffic, such as e-mail.

The Challenge

A satellite communications equipment manufacturing company based in the US wanted their modems to offer DiffServ to their clients. They required an embedded software solution that would classify and prioritize the data offering QoS to their IP network.

DiffServ operates on the principle of traffic classification, where each data packet is placed into a limited number of traffic classes rather than differentiating network traffic based on the requirements of an individual flow. Each traffic class is managed differently, ensuring preferential treatment for higher-priority traffic on the network.

Emtec's Solution

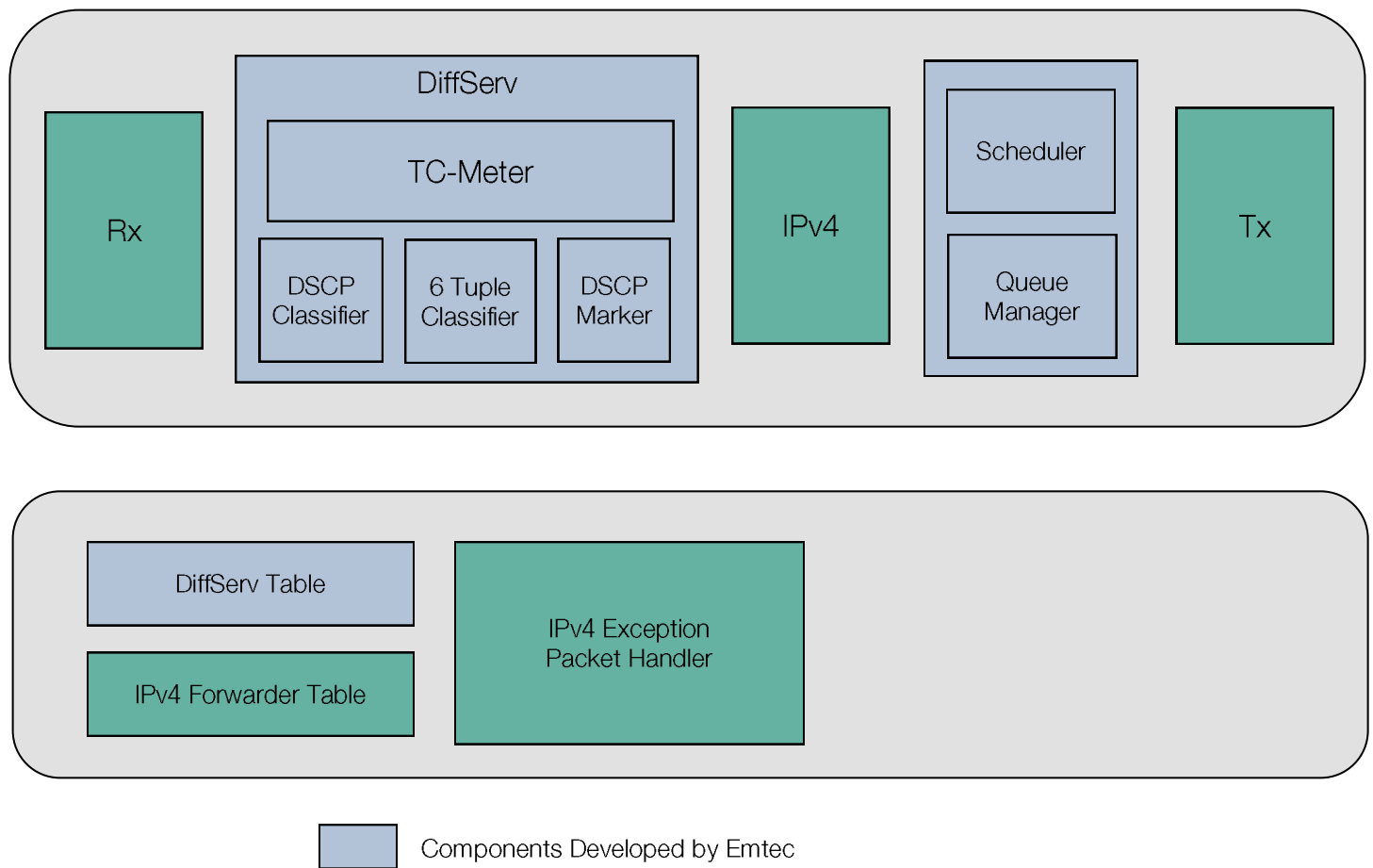
Emtec developed DiffServ classifier, metering, marking, shaping and policing modules. These software modules resided on the data plane and their table configuration module resided in the control plane. Emtec implemented two types of classifiers: the DSCP (differentiated services code point) Classifier and 6-tuple classifier. Data in each class may be further conditioned by subjecting the traffic to rate limiters, traffic policers or shapers. The traffic metering required the implementation of two algorithms: single rate three-color meter (SRTCM) and two rate three color Meter (TRTCM).

Emtec also implemented the DRR (deficit round robin) scheduler to handle packets of variable size. Configuration of the queue manager was developed to manage the assured forwarding (AF) – which gives the assurance of delivery under certain conditions; Expected Forwarding (EF) – dedicated to low-loss, low-latency traffic; and Best Effort (BE) Queue. Emtec also configured a Command Line Infrastructure (CLI) module to provide the table configuration support for the DiffServ Code.

Emtec developed software on the Intel IXP 2350 network processing unit (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. The embedded software modules were developed and enhanced on multiple Intel IXP series NPUs.

Outcome

Emtec's embedded software solutions allowed the client to stream priority data at a higher rate giving importance to critical communications. The data plane was optimized to process packets faster and with greater efficiency. 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. Most importantly, Emtec's extensive knowledge in NPUs allowed our programmers to successfully develop the embedded software solution in half the time expected by the client.



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.