Integrating ALTQ QoS into FreeBSD

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Abstract

Most of the modern operating systems of our times, either commercial or open source, have developed support for network quality of service (QoS). The BSD camp makes no exception thanks to the ALTQ framework developed by Mr. Kenjiro Cho from Sony Computer Science Labs, Japan. The OpenBSD and NetBSD folks have already integrated this framework into their core distributions, while for the FreeBSD project the integration is just about to start.

ALTQ, standing for "ALTernate Queueing", is a framework of (network) queueing disciplines and related components required to offer resource sharing and Quality of Service capabilities. It is thought to be a development framework, although it has been successfully used in production environments. ALTQ development is now taking place in the KAME repository where it has been recently imported.

Some of the biggest challenges that ALTQ poses are the modifications to the network drivers needed to enable the shaping of the packet flows and figuring out the locking changes needed for the new fine-grained architecture of the -CURRENT branch. The standard BSD network architecture, inherited from the original BSD distribution, makes it hard to integrate alternative queueing disciplines. Instead, hooking points had to be devised in order to place the packets in controlled network queues. The task becomes even more difficult if you have to take into account the newly introduced locking semantics.

Recently work has been started and evolved quite rapidly towards the integration of the "pf" packet filter from OpenBSD; the nice point is that the queueing functionality has been achieved using the ALTQ package proposed for integration. This offers an alternative hooking point for the packet flows and queueing disciplines management.

In the long term, I believe that a new approach is needed in the design of the networking stack which would permit using alternative queueing mechanisms and a unified method for packet tagging for various networking services (traffic shaping, firewalling, etc). Although the *BSD family is renown for its networking performance, the modern IT community demands more network versatility from the nowadays' operating systems.

Note: the full content of this article will be available on the conference's website.

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