## Summary of the research paper, "mpls: the magic behind the myths" essay

Business, Management



Summary of the Research Paper, "MPLS: The Magic Behind the Myths" Content SummaryMultiprotocol Label Switching (MPLS) is a computer networking and telecommunications mechanism that can be used for carrying different types of traffic and routing protocols. As the use of MPLS became more established, MPLS has been able to provide a unified datacarrying service for both circuit-based clients and packet-switching clients. One of the early versions of this technology serves to simplify IP (internet protocol) backbone architecture and allows the deployment of wide-scale networks by making use of the capabilities of asynchronous transfer mode (ATM) switch hardware over IP protocols. This mechanism poses problems in IP/ATM scaling however, because of the difference in speed between IP and ATM switches. The attraction of MPLS lies in its capability for increased routing speed and the solution it provides to the IP/ATM scaling problem. There are many claims that MPLS can be a great solution for highperformance forwarding and IP guality of service (QoS); the issue thus lies in whether MPLS could indeed strike a balance between high aggregate performance and IP QoS and network consumption.

To determine this, IP routers and LSR (label-switching router) processes (which are derivatives of MPLS technology) were compared, and how these mechanisms affect network capability were detailed as well. MPLS is found out to have the capability to provide powerful traffic engineering capabilities, specifically, " the ability to forward packets over arbitrary non-shortest paths and emulate high-speed " tunnels" between non-label-switched domains". However, when compared to IP routers, the only difference of consequence was the explicit non-shortest-path routing. Other MPLS features can already be attained due to advancements in conventional router design. Ultimately, the real benefit of MPLS may lie in its ability for sophisticated load-balancing and QoS, by supporting constraint-routed label-switched paths from edge to edge. However, this solution needs a lot of work to be fully implemented. Because of this limitation, the utility of MPLS remains a " mixture of myth and magic".

Main pointsThe MPLS mechanism was initially developed in order to simplify wide-area, high-performance IP backbone architectures. MPLS has been touted as the new, revolutionary solution for various networking problems. This claim, however, has often not been examined.

The real issue is to whether or not MPLS has the ability to provide high aggregate performance and IP QoS together with optimal network resource consumption. The solution can be broken into three parts: 1) Per-hop QoS, the goal of which is to provide " predictable differentiated loss, latency, and jitter characteristics"; 2) traffic engineering, which attempts to provide the shortest path between a data packet and its destination; and3) signaling/provisioning, wherein users request network configuration. The internal functionality of an IP router and an MPLS LSR can be split into two distinct parts: 1) A management engine, wherein signaling and topology/path discovery protocols run; and2) a packet-forwarding engine, which executes specific packet forwarding rules. NIF (native IP-forwarding) routers, core LSRs, and edge LSRs can all leverage similar queue management and scheduling capabilities. The differences between NIF routers, core LSRs, and edge LSRs lie in the way the devices classify traffic into queues. MPLS features such as high performance and traffic differentiation can already be attained by conventional routers due to advancements router design. Unless one desires to optimize a legacy ATM network currently carrying IP traffic, there is little benefit that can be gained by moving to topology-driven MPLS.

Strengths & Weaknesses The article presents salient views and effectively demonstrates the benefits of traffic engineering using MPLS and other routing technologies. It shows how the underlying technologies and protocols differ between conventional IP routers and MPLS-derived mechanisms. However, the article could have expounded more on the "myth" behind the MPLS mechanism—it is the subject of the title, after all. While the article gives a detailed account of how the mechanisms work, without explicit elucidation, the reader may have trouble establishing a connection between the facts and the article's purpose.