

Summary of “MIRO: Multi-path Interdomain ROuting”

This paper proposes a bilateral negotiation based multi path inter-domain routing, which enables ASes to choose multiple routes to one destination without changing the whole internet protocol or routers. The problem that the authors describe is that the existing inter domain routing is completely relying on BGP. The characteristic of the BGP is path vector and policy based which provides strict single route for each destination. Unfortunately, not all of the routes are optimized from a perspective of performance. MIRO proposes an extension to the current BGP so that ASes could require the AS on the path to provide an alternative route for the destination by using tunneling technique which sounds similar to NAT or VLAN. This will enable users to avoid un-trusted ASes on the path, load balancing by using multiple paths, and increasing reliability by using as a backup.

The authors describes that one of the strengths of MIRO is that because it is based on current BGP and backwards compatible, it is easy to deploy. But as it gets in details, it seems like each ASes that has a tunnel will need to keep a soft state of it and therefore, the routers in the AS will also need to carry some state. This violates the “Smart End Host & Dumb Network” philosophy and I believe that it would be better to choose overlay network even if it will cost a lot. Also, as authors mentions in the paper, MIRO has not solved the security problem yet. Since the tunnel seems to be created on IP based mechanism, there are many possibilities of intrusions and attacks by spoofing as a customer. Another problem is the asymmetric traffic. When the customer wants to ignore going through an un-trusted AS on the path, they will be able to choose an outgoing path, but incoming traffic does not have any guarantee. This is not only the problem of MIRO but also BGP.

Because this is a recent paper (published in last September), and also still kind of a concept. It is difficult to infer the future of this system. As I mentioned in the problem, I will support overlay network rather than MIRO since I feel it is more clean & slate. But on the other hand it is true that if few of the tier-1 providers start using MIRO, it might dramatically change the routes over the internet. If authors could implement MIRO more securely and easy to implement, that might be a great extension for the current BGP. Looking the network in the granularity of ASes is very interesting, but also intra domain routing especially in tier-1 ASes must be interesting too.