NUST INSTITUTE OF INFORMATION TECHNOLOGY

FINAL YEAR PROJECTS

If you are interested in getting a head-start and plan to work on your final year projects, following are a few ideas. Also, if you have an idea and would like to work with me, feel free to contact me for and discuss the details.

BGP Black Holes — Dealing with DoS attacks in service provider networks
Sponsored by Micronet and Nayatel, Pakistan

Traditionally speaking black holes in network are a result of routing errors or incorrect configuration. When a black hole is created in network, any traffic that goes into an interface, does not come out. One can mitigate the effect of DoS attack particularly distributed DoS by creating a black hole to sink all the attack traffic. With a denial-of-service (DoS) attack, in addition to service degradation of the target, there is possible collateral damage such as bandwidth consumption, processor utilization, and potential service loss elsewhere in the network. One method to mitigate the damaging effects of such an attack is to filter the infected traffic and redirect it towards a dynamically created black-hole.

The challenge is to find a way to drop the offending traffic at the network edge, document and track the destination addresses of the redirected traffic, and promptly return these addresses to the service once the threat is averted. Destination-based IP black hole filtering with remote triggering allows a network-wide destination-based black hole to be propagated by adding a simple static route to the triggering device (trigger). Contact for further details.

Maintaining BGP route consistency and Enhanced Topology Discovery
Sponsored by Micronet and Nayatel, Pakistan

To identify and visualize inconsistency in routes. Traditional topology discovery tools tend to discover active topology, featuring interconnection between devices. However network administrators also require a bird eye view of the whole network featuring which networks are behind which router. Traditional Topology Discovery Tools return a topology map that is a representation of interconnection of directly connected peers in a network. In a physical topology peers are ports on devices connected to a physical transmission link. At the IP Level peers are hosts or routers, one IP hop away from each other. However, network administrators often want a concise view of the topology that not only shows interconnection between devices, but also a track of which routes/ networks are behind which devices

The challenge is to develop a software that dynamically discovers the network topology and determines if the advertised BGP routes are consistent with the connected Autonomous Systems.

Automated Network Configuration Implementation
Sponsored by Micronet and Nayatel, Pakistan

In order to document network configurations and network design, network administrators resort to use tools like Visio and Cisco Configuration Maker etc. The Aim of these tools is not only to document design scenarios and configurations of individual customers, but in addition to it, these tools also aid in understanding of customer specific requirements. In the legacy method; once network is commissioned by one network engineer over his ISP network, he draws a network diagram according to customer requirements. However a mistake in network diagram might lead to incorrect configuration. Since the diagram is being drawn in one tool and configuration is made on other device i.e. no dependency exists between any of these tasks (technically speaking) Also it is worthwhile to note that if a network administrator is provided with the configuration made on devices pertaining to a customer, he conceives, visualizes and draws a network diagram out of it with a some effort.

Thus, the challenge is to develop a tool that can yield network diagram if configuration made on device is provided to it. And if diagram is made using the tool it should yield network configuration to be made on the devices.

More ideas to follow …

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Determining and making arrangements for the required equipment shall be my responsibility

The people who get on in this world are the people who get up and look for the circumstances they want and if they can't find them, [they] make them — George Bernard Shaw