



INT NETLINK's Past Projects

eXchange Afghanistan Government Ministry

Afghanistan



Exchange Points (IXPs) are the most critical part of the Internet's Infrastructure. An Internet Exchange Point is a facility that allows Internet Service Providers to "meet" and exchange traffic, also called peering. This saves money on International bandwidth for the ISPs and improves connectivity for their customers by reducing latency.

Government Ministry of Islamic Republic of Afghanistan, procured the necessary equipment and systems for the setting up and establishment of the country's First Internet Exchange Point, Exchange of Afghanistan in Kabul

Main components of the project are as follows

BGP route servers

Internet Exchange Point (IXP) LAN switches

MRTG server

IXP Manager server

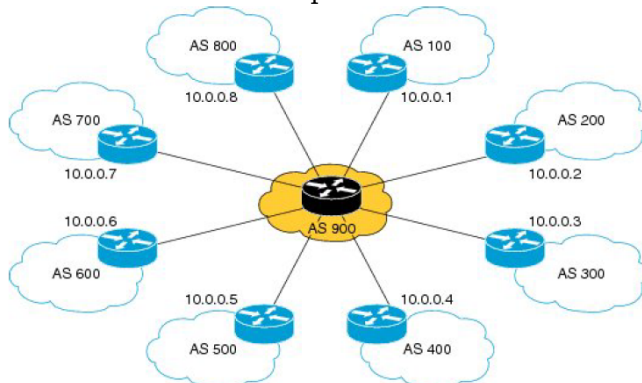
Looking Glass server

ISPs of the country establish BGP connectivity with NIXA BGP route servers. Data Plane traffic is switched by IXP LAN switches. MRTG, IXP Manager and Looking Glass provide network monitoring and visibility.

Main aim of the project is to let the ISPs of Afghanistan to directly communicate with each other. Key component of the project is BGP route server. Following section describe that in detail.

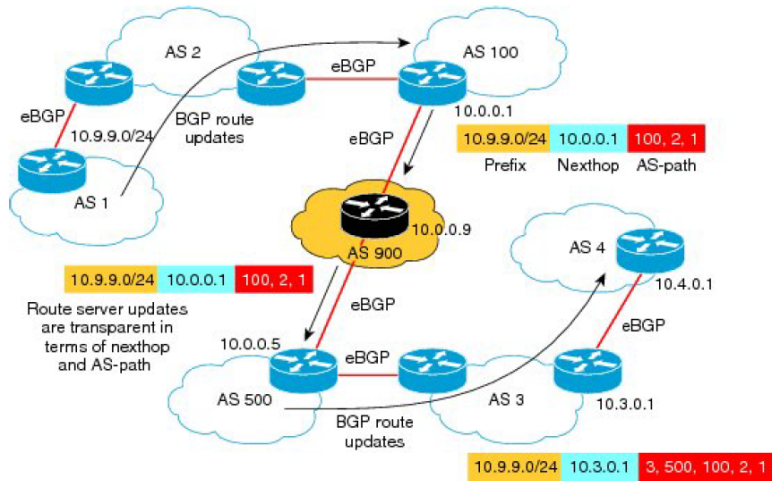
BGP Route Server Simplifies SP Interconnections

A BGP route server simplifies interconnection of SPs at an IX, as shown in the figure below



Instead of maintaining individual, direct eBGP peerings with every other provider, an SP maintains only a single connection to the route server operated by the IX. Peering with only the route server reduces the

configuration complexity on each border router, reduces CPU and memory requirements on the border routers, and avoids most of the operational overhead incurred by individualized peering agreements. The route server provides AS-path, MED, and nexthop transparency so that peering SPs at the IX still appear to be directly connected. In reality, the IX route server mediates this peering, but that relationship is invisible outside of the IX. The figure below illustrates an example of transparent route propagation with a route server at an IX.



In the figure above, a routing update goes from AS 1 to AS 2 to AS 100. The update leaves the router in AS100 advertising that the router can reach the prefix 10.9.9.0/24, use 10.0.0.1 as the next hop, and use the AS path of AS100, AS2, AS1. The router in AS 900 is a route server and the router in AS 500 is a route server client. A route server client receives updates from a route server. As shown in the figure above, the router in AS 900 does not change the update; route server updates are transparent in terms of MED, next hop and AS-path. The update goes to the client with the same prefix, next hop and AS-path that came from the router at 10.0.0.1.

Benefits of a BGP Route Server

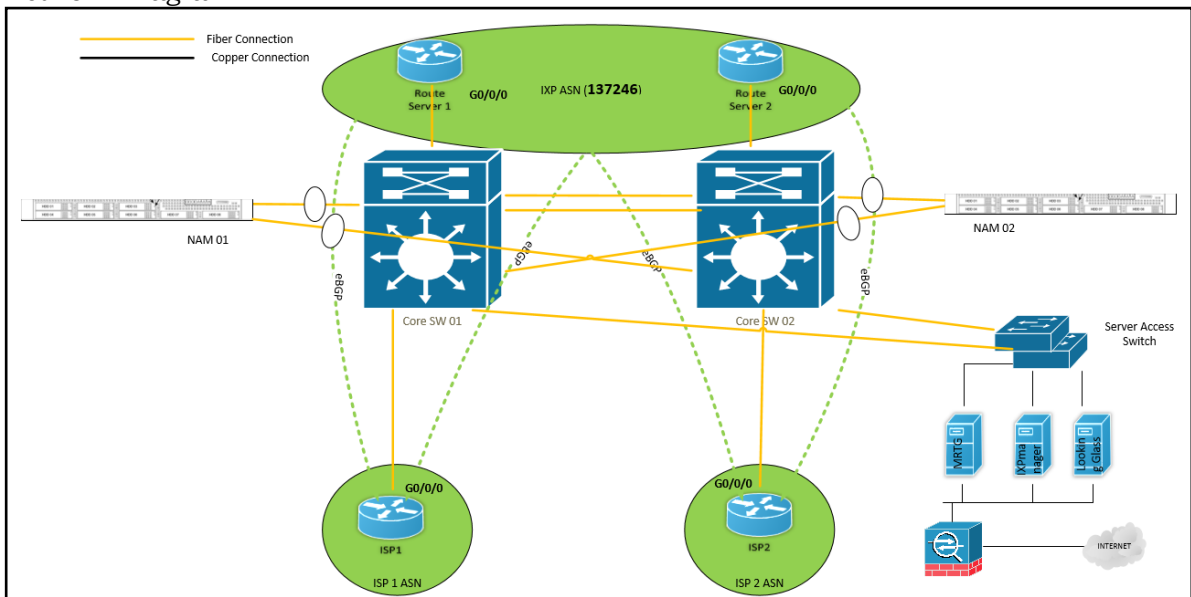
A BGP route server provides the following benefits:

- Reduced configuration complexity on each border router.
- Reduced CPU and memory requirements on each border router.
- Reduced operational overhead incurred by individualized peering agreements.

Hardware Component summary

- 2 x WS-C3650-24TS-E switches
- 4 x N7K-C7004 Nexus switches
- 4 x ASR1001-X
- 4 x PowerEdge T430 Server

Network Diagram



Above diagram shows how various components are connected in this project.