

Application Brief:

# BGP Route Reflectors

## Maximum Scalability with Minimum Cost

The ZebOS® SRS BGP Route Reflector can be used to deliver maximum scalability to your networks, with minimal cost. Using off-the-shelf hardware with the ZebOS SRS, you can quickly and easily integrate a low-cost BGP route reflector into your network, rather than purchasing expensive equipment or sharing existing resources.

### What are BGP Route Reflectors?

Using standard Internal Border Gateway Protocol (IBGP) configurations, all BGP systems within an Autonomous System (AS) must peer with all other BGP systems, forming a full-mesh configuration. This presents scaling concerns, as all external information must be propagated/distributed to all BGP systems within the AS, resulting in far more information being shared between the IBGP peers than is necessary. BGP Route Reflectors (RR) provide a mechanism for both minimizing the number of update messages transmitted within the AS, and reducing the amount of data that is propagated in each message. The deployment of BGP Route Reflectors lead to much higher levels of network scalability.

### Standard IBGP Configurations

Figure A illustrates a standard, full-mesh IBGP configuration.

1. If R1 receives an external route, and it is selected as the best path, it must advertise the external route to R2 and R3.
2. R2 and R3 (as IBGP speakers) will not re-advertise these routes to other IBGP speakers.

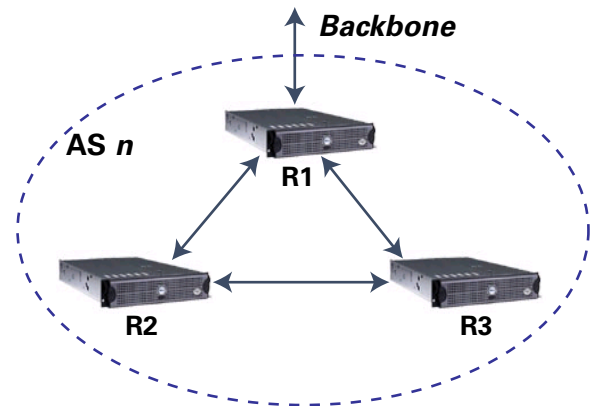


Figure A - Full-mesh IBGP

### BGP Route Reflector Configuration

If instead, R2 is allowed to advertise IBGP learned routes to IBGP peers, then it could advertise (reflect) the learned routes from R1 to other routers in the network. This would eliminate the need for full mesh, as depicted in Figure B.

Besides reducing communication messages passed within the AS, the Route Reflector also minimizes the amount of data per message by reflecting only the best path.

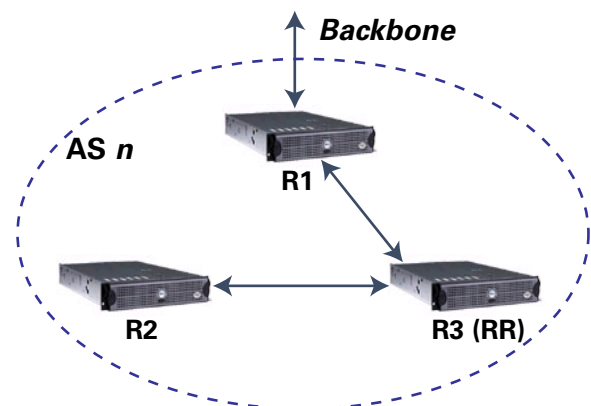


Figure B - AS with BGP Route Reflector

## Deployment Considerations

The ZebOS SRS provides a low-cost alternative for integrating route reflectors into existing networks using off-the-shelf systems. When considering network topology schemes, the ZebOS SRS RR can be deployed as a non-forwarding box within the network, so hardware (forwarding) performance is not an issue.

## Case Study: Peering with Larger Service Providers

A common application for the ZebOS SRS RR is for Internet Service Providers (ISPs) that want to connect to Internet eXchange Points (IXPs) or peer with larger providers. Doing so requires expensive BGP routers with 128MB+ memory, which is not feasible for many smaller ISPs. The ZebOS SRS provides a cost-effective solution.

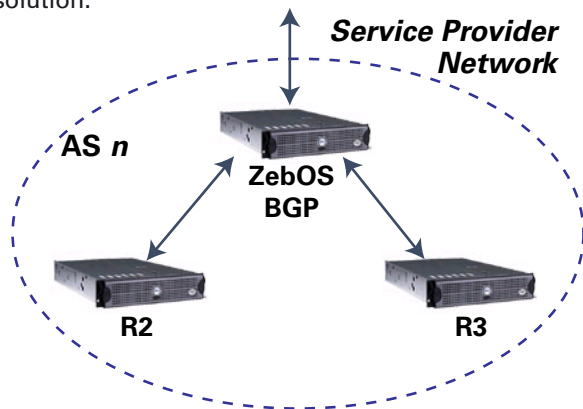


Figure C - ZebOS SRS Route Reflector

Recognizing that:

- (a) The ZebOS SRS can be deployed on inexpensive hardware (where memory is cheap), and
- (b) Route Reflectors do not need to be forwarding devices.

Service Providers are able to deploy the ZebOS SRS RR on off-the-shelf systems that have sufficient memory to peer with the upstream BGP routers and subsequently reflect the routes to the internal low-end BGP routers. This scenario is depicted in Figure C.

## See Also

For additional information on the ZebOS SRS, please visit <http://www.ipinfusion.com/server.php>. For information about the ZebOS BGP implementation, download the ZebOS BGP Technical Spec Sheet at [http://www.ipinfusion.com/pdf/ZOS\\_BGP.pdf](http://www.ipinfusion.com/pdf/ZOS_BGP.pdf).