

Dynamic Routing

“A router with dynamically configured routing tables is known as a dynamic router. Dynamic routing consists of routing tables that are built and maintained automatically through an ongoing communication between routers. This communication is facilitated by a routing protocol, a series of periodic or on-demand messages containing routing information that is exchanged between routers. Except for their initial configuration, dynamic routers require little ongoing maintenance, and therefore can scale to larger internetworks.

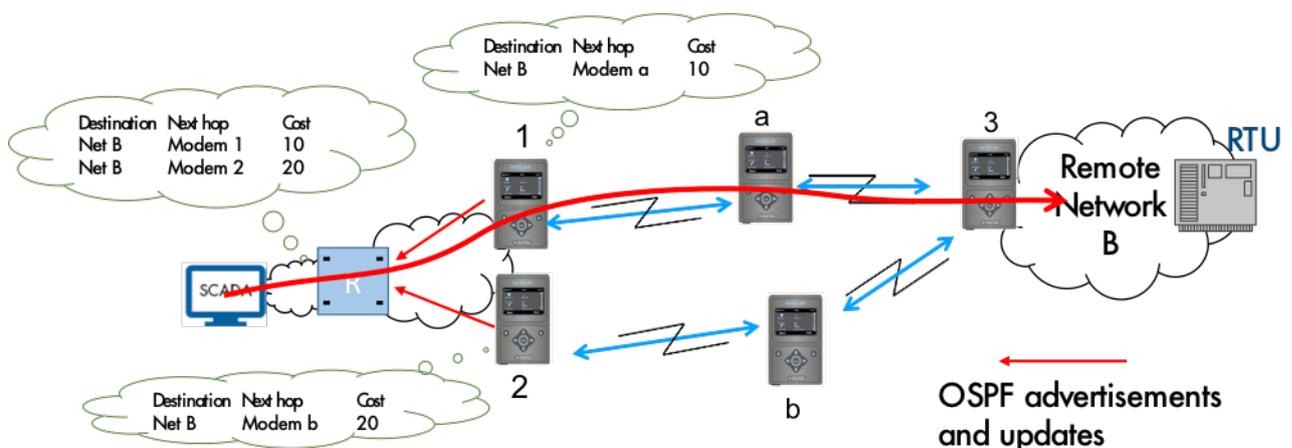
Dynamic routing is fault tolerant. Dynamic routes learned from other routers have a finite lifetime. If a router or link goes down, the routers sense the change in the internetwork topology through the expiration of the lifetime of the learned route in the routing table. This change can then be propagated to other routers so that all the routers on the internetwork become aware of the new internetwork topology. [<https://technet.microsoft.com/en-us/library/cc957844.aspx>]

Dynamic routing benefits:

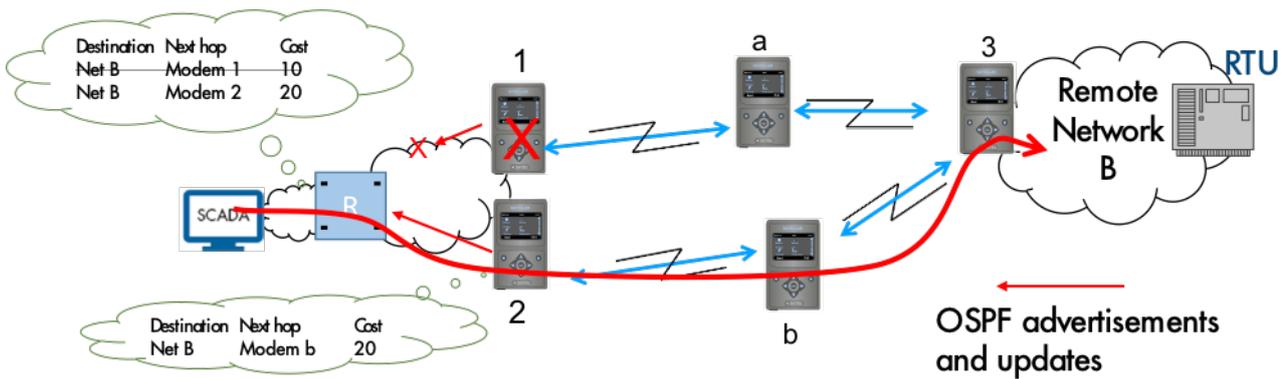
- Easy setup of routing
- Fast setup of routing
- Load sharing by routing
- Redundancy by routing

SATELLAR support dynamic routing protocol by providing OSPF (Open Shortest Path First) functionality. SATELLAR uses the OSPFv2 daemon from the Quagga Routing Suite to implement OSPF. More information, such as full documentation, can be found on the following web page: <http://www.nongnu.org/quagga/>

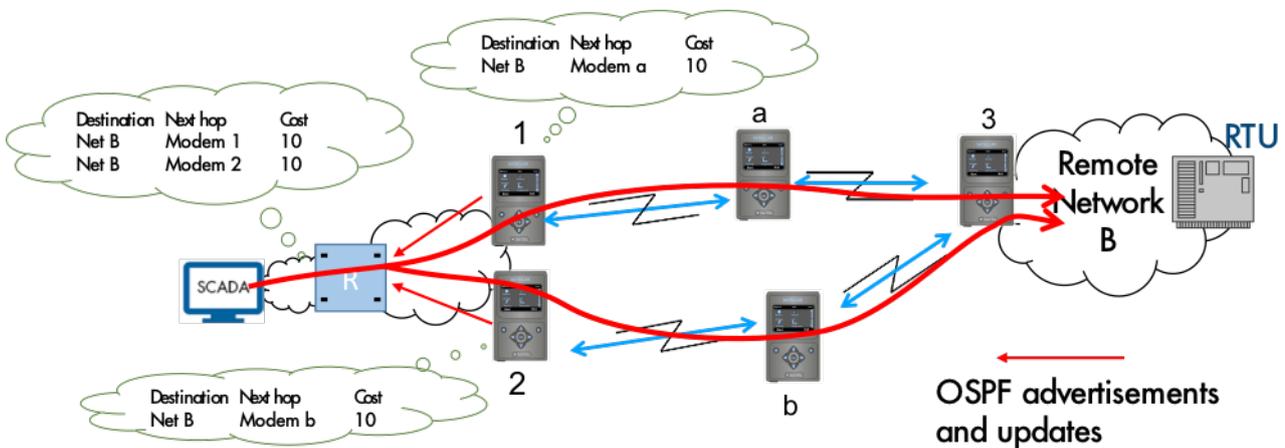
In the following image, there are two redundant paths from SCADA system to remote network. The router connected to SATELLARs is an OSPF enabled router, and thus the OSPF enabled SATELLARs and the gateway router will be able to communicate with the dynamic routing protocol. The two SATELLARs advertise the route towards the remote network. In other words the gateway router will learn from the protocol that the remote network can be reach via both of the SATELLARs. As a result, it will use the one with the lower cost as a route towards the remote network.



If the gateway router stops hearing advertisements from the lower cost SATELLAR, it will regard that route gone and will remove it from its routing tables. Hence, the traffic will switch to surviving SATELLAR.



SATELLARs may have equal costs to their routing paths. In this case the router R may also carry out load sharing scheme, if the router R has Equal Cost Multi Path (ECMP) feature enabled. This would make some of the traffic to be forwarded to other path and some proportion of the traffic via another path.



Furthermore, the dynamic routing protocol will be able to utilize information from the redundant routing functionality: if a route monitoring is resulting one or more routes unavailable, the SATELLAR will remove those routes from its routing table. This will result SATELLAR updating the changed routing information to the OSPF protocol, and thus the gateway router will know to recalculate its own routing tables. Consequently, the traffic will dynamically be move to a path via the SATELLAR that still has the corresponding route accessible and in its routing table.

The OSPF protocol is widely used and common, so it will be easy to combine SATELLAR with any other OSPF enabled device. Thus, the OSPF could be used to provide redundant or shared networking solution by combining the SATELLAR network together with wired networking or public cellular network.

