Market Central, Inc.

www.secureswitch.com

How To Series:

Article #1 - Automatic Failover and Recovery Switching Between Primary and Backup Communications Links

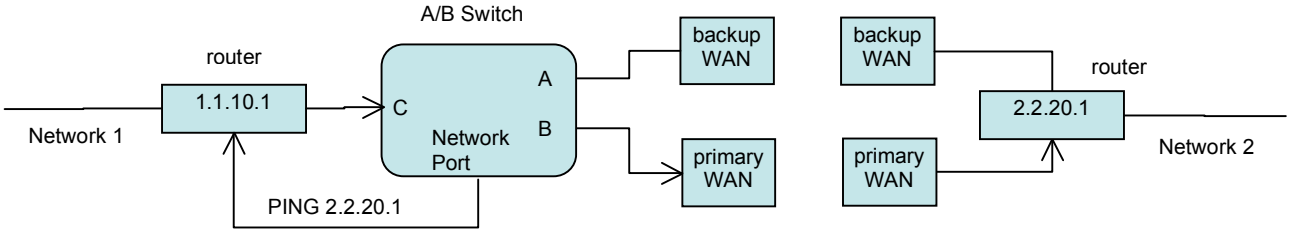
Most organizations rely on the availability of their communications circuits (is there anyone today who doesn't?) and cannot afford to be isolated from their customers and suppliers when a network connection goes down. For these companies, a secondary or backup communications circuit is often provisioned so that it is readily available and can be put into service ASAP when problems occur. To help support this requirement, Market Central has developed an automatic switching feature available in Data DeadBolt®, SwitchMaster®, and other switch products, that constantly monitors the primary/backup network connections and switches between the two when needed – automatically.

Regardless of the switch product that is used, all of the Market Central A/B Switches that support automatic switching use a similar approach to monitoring the health of the connection path and in deciding when to switch between connections. In order to perform the auto bypass and auto recovery switching functions, these A/B Switches send ICMP echo request (PING) packets from their Ethernet network interface to a user configurable IP address. If the "normal" network path connections between the A/B Switch and the device being monitored go down for any reason, the A/B Switch will no longer be able to PING the specified IP address, and will then automatically switch from the "normal" connection state (port C connected to port B) to the "bypass" or "failover" connection state (port C connected to port A).

Once the problems on the primary path have been identified and corrected, the user can issue a command to cause the A/B Switch to switch from the failover connection state back to the normal connection state. Or, if auto recovery is enabled, the A/B Switch will automatically re-connect the normal path connections when it is again able to PING the user specified IP address. When using the auto recovery feature, it is important that the Ethernet network interface on the A/B Switch be connected to the user's network such that the normal path is continuously being monitored even when the backup path has been selected, otherwise the A/B Switch could repeatedly switch (flap) back and forth between the failed primary path and the functioning backup path. See the diagrams below for examples of auto switching configurations.

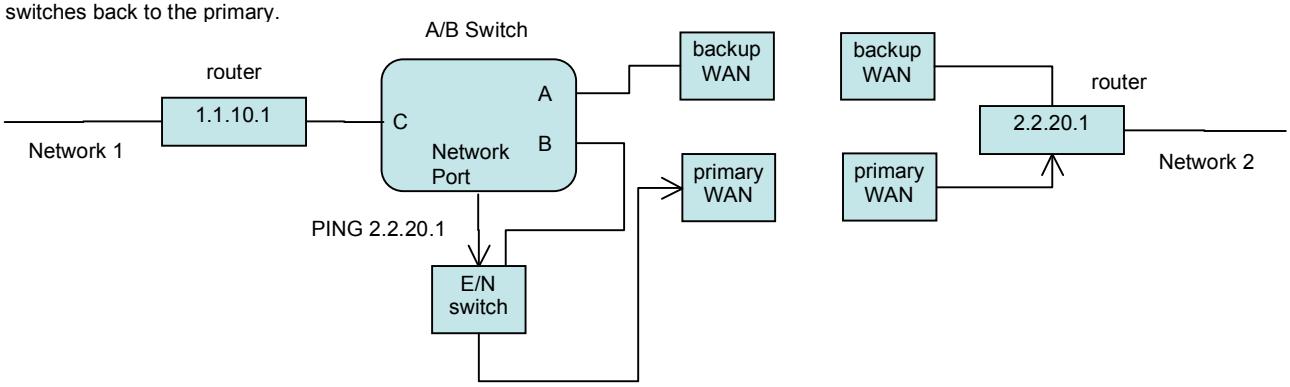
Auto Failover & Manual Recovery

Note: The A/B Switch monitors the WAN connections by PINGing the far side router thru the primary WAN link. If the primary WAN link fails, the A/B Switch auto switches to the backup WAN link. Auto recovery is disabled in this configuration to prevent flapping.



Auto Failover & Auto Recovery

Note: The A/B Switch monitors the WAN connections by PINGing the far side router thru the primary WAN link. If the primary WAN link fails, the A/B Switch auto switches to the backup WAN link. When the primary WAN link is available again, the A/B Switch auto switches back to the primary.



To allow these automatic A/B Switches to be used in a variety of applications, the user has access to a number of configurable parameters. These parameters can be set to help optimize the automatic switching decisions for each environment. The PING rate used to monitor the connection paths can be varied from once every half-minute, to many times a second. A "Failover Count" parameter allows the user to select how many failed PING attempts have to occur in a row before the decision to switch is made. Similarly, a "Recovery Count" parameter can be set when using the auto recovery switching feature to specify when to start using the primary connection path again.

There are some tips to keep in mind when configuring these parameters that will help insure the best overall failover and recovery performance is achieved. For example, if you want the A/B Switch to bring the backup path into service quickly when problems develop on the primary connection path, the interaction between the PING interval and Failover Count parameters needs to be considered. The failover response time of the A/B Switch is the Failover Count multiplied by the PING interval. Thus you could achieve a two second failover response time by using a PING interval of one second and a Failover Count of two. Alternatively, you could also achieve the same failover response time by selecting a PING interval of 100 msec and a Failover Count of 20. But by using a 100 msec PING interval and a Failover Count of 20, short duration "outages" that occur due to temporary network congestion will be tolerated much better than if a longer PING interval and a lower Failover Count is used, since the network would have to drop many more of the PING packets in a row before the network path is declared "failed".

Likewise, when using the auto recovery feature, it may be appropriate to set the Recovery Count value higher than the Failover Count value. Doing so will help to insure that the primary path connection problems are corrected and the path is stable again before switching from the backup path back to the primary path.

SUMMARY:
Network outages are bad (does anyone disagree?), but with a properly configured Market Central A/B Switch with automatic switching capabilities connected to the primary communications link and to a backup communications link these outages can be all but eliminated. And with auto recovery switching enabled, the primary communications link (which is often many times faster than the backup link) will automatically be put back into service by the Market Central A/B Switch as soon as it is stable and ready for use again.