Versatile Network Redundancy Topologies for Flexible Networking

In industrial networks a single link failure results in serious loss of information. Hence, network redundancy is a must in network planning. In addition to the RSTP and MSTP legacy redundancy technologies, Korenix JetNet series managed switches support Korenix Patented MSR redundancy technology with various redundant ring topologies.

Multiple Super Ring (MSR™) Aggregation Capability

Korenix designs MSR (Multiple Super Ring) redundant ring technology for building reliable, high quality and scalable networks. The Multiple Super Ring is the new generation of Rapid Super Ring (RSR™) protocol, and is supported in JetNet managed Switches. It includes various new technologies for redundancy applications and different network structures.

**Rapid Super Ring (RSR™)**
The most common way of providing industrial network redundancy, is to form a ring or loop. Typically, the managed switches are connected in series and the last switch is connected back to the first one. In such connection, you can implement Korenix Rapid Super Ring (RSR™) technology. Rapid Super Ring is Korenix 2nd generation Ring redundancy technology. It is Korenix patented and protected worldwide ensuring the most reliable and high quality network.

The maximum number of switches in a single Korenix RSR is 250. Several rings can be connected together for larger network.

**The RSR provides reliable, high quality and scalable network through its superior functionalities.**

- **Easy Setup:** The Rapid Super Ring provides a simple and time-saving setup mechanism with auto selection of the RM and of the best redundant route.
- **Efficient Control:** RSR monitors the ring status with minimum bandwidth consumption, less than 1kbps.
- **Rapid Failure Recovery and RM Redundancy:** It also guarantees the recovery of a network failure, either link or device failure, in less than 5ms. The exclusive RM redundancy mechanism ensures the ring’s reliability even when the RM fails.
- **Failure Notification and Positioning:** In addition to the event warnings, such as alarm, email, or SNMP trap, the RSR points out the failure location by the LED indicator helping to detect and react to the failure promptly.
- **Seamless Restoration:** The RSR provides a 0 ms restoration time and eliminates the packet loss, loop, and topology change problems of other protocols when restoring a failed network to its original state. It guarantees the highest quality video transmission for an IP surveillance system.

**Rapid Dual Homing (RDH™)**

Rapid Dual Homing (RDH™) replaces DualHoming II and can be used for ring coupling. While keeping easy configuration and multiple redundancies, the failover time is much faster (up to 50 ms) and the restoration time is ZERO (seamless restoration). Uplinks can be auto detected and gathered into groups. In each group, uplinks are sorted into Primary, Secondary and Standby links based on their link speed. The uplink with the highest speed is more likely to be the active path for data transmission. Link aggregation is also integrated into RDH™. An uplink can be a link or several links aggregated as a trunk, which provides better redundancy and link capacity. Korenix ring is fully compatible with Cisco switches, allowing easy and flexible connections.
between Korenix and Cisco switches. Multiple redundancies are achieved by connecting more than one single link.

MultiRing™ within one Switch

Korenix JetNet series managed switches support MultiRing which allows aggregating multiple Rapid Super Rings within a single switch. With the MultiRing™ technology all the Fast Ethernet and Gigabit Ethernet ports can be part of the ring ports. Besides, up to 12 100M Rings and 2 Gigabit Rings can be aggregated to single access switch. Traditional ring switches, which only allow one ring setting or one ring traffic pass-through, need additional links or settings to connect multiple rings. When there are several ring requests in your network, the setting and environment becomes complex. Unlike these traditional ring switches, with MultiRing feature the lower rings can connect to the JetNet series directly.

TrunkRing™

TrunkRing™ is a new feature in MSR™ which merges the two technologies of RSR and link aggregation. It takes advantage of aggregation to enhance the link redundancy, while increasing the link speed. The ring will drop only if all the aggregated links are broken. Link aggregation can be achieved by either static trunk or LACP protocol. Not all the link sections in a TrunkRing™ need to be the same. Ring links can be either symmetric or asymmetric. Some are a single link, and the others are aggregated by links where the number of links in a trunk group can be different. Users can enhance the link redundancy at different locations in accordance to the need. And the link with less speed is more likely to be used as the backup path for restoring the network to full play capacity.
Independent Ring Operation

Unlike traditional redundancy technologies, such as RSTP, which takes all LAN devices as a single system, each of Korenix redundant rings operates independently. The influence of any network failure is limited within the ring itself and will not spread to the other parts, as a result ensuring network scalability and high quality data transmission.

IEEE 802.1s Multiple Spanning Tree Protocol

The JetNet series support IEEE 802.1s Multiple Spanning Tree Protocol (MSTP). The switch with enabled MSTP can select the root switch for each instance, and block and form the forwarding path for each instance. Each instance represents one VLAN. It is the limitation in STP/RSTP as the 2 traditional protocols can only block one path for all the existing VLANs in the same environment.

Example: Instance 1 represents VLAN 20. Instance 2 represents VLAN 10. In instance 1, there is one root and one blocking path. The VLAN 20 data can be transmitted from switch 3 to 1, and then to 2 or vise versa. In instance 2, there is another root and another blocking path. The VLAN 10 data can be transmitted from switch 3 to 2, then to 1 or vise versa.
Exclusive Jumbo Frame Ring

Typical Ethernet frame ranges from 64 to 1518 bytes. This is sufficient for general use. However, when users need to transmit large files, the files may be divided into many small size packets, hence resulting slow transmission speed. To solve this issue, 9Kbytes Jumbo Frame is required. Korenix provides complete Jumbo Frame supported switches for allowing users to easily form a Jumbo Frame Ring where larger files can be transmitted with fewer segments.

Jumbo Frame is supported by: Rackmount: JetNet 6524G, 5628G, 5428G Din Rail Models: JetNet 3018G, 5012G, 5018G Once there is one Jumbo Frame unaware switch in the network, the frame will be dropped.