Understanding Root Protection for STP, RSTP, VSTP, and MSTP on EX-series Switches

EX-series switches provide Layer 2 loop prevention through Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), VLAN Spanning Tree Protocol (VSTP), and Multiple Spanning Tree Protocol (MSTP). A loop-free network is supported through the exchange of a special type of frame called bridge protocol data unit (BPDU). Peer STP applications running on the switch interfaces use BPDUs to communicate. Ultimately, the exchange of BPDUs determines which interfaces block traffic and which interfaces become root ports and forward traffic.

However, a root port elected through this process has the possibility of being wrongly elected. A user bridge application running on a PC can generate BPDUs, too, and interfere with root port election. Root protection allows network administrators to manually enforce the root bridge placement in the network.

Enable root protection on interfaces that should not receive superior BPDUs from the root bridge and should not be elected as the root port. These interfaces become designated ports and are typically located on an administrative boundary. If the bridge receives superior STP BPDUs on a port that has root protection enabled, that port transitions to a root-prevented STP state (inconsistency state) and the interface is blocked. This blocking prevents a bridge that should not be the root bridge from being elected the root bridge. After the bridge stops receiving superior STP BPDUs on the interface with root protection, the interface returns to a listening state, followed by a learning state, and ultimately back to a forwarding state. Recovery back to the forwarding state is automatic.

When root protection is enabled on an interface, it is enabled for all the STP instances on that interface. The interface is blocked only for instances for which it receives superior BPDUs. Otherwise, it participates in the spanning-tree topology.

An interface can be configured for either root protection or loop protection, but not for both.

Related Topics

- Example: Configuring Root Protection to Enforce Root Bridge Placement in Spanning Trees on EX-series Switches
- Example: Configuring Loop Protection to Prevent Interfaces from Transitioning from Blocking to Forwarding in a Spanning Tree on EX-series Switches
- Example: Configuring BPDU Protection on STP Interfaces to Prevent STP Miscalculations on EX-series Switches
- Example: Configuring BPDU Protection on non-STP Interfaces to Prevent STP Miscalculations on EX-series Switches
- Understanding MSTP for EX-series Switches
- Understanding RSTP for EX-series Switches
- Understanding STP for EX-series Switches
- Understanding VSTP for EX-series Switches