

MSTP-BASED ANTI-LOOP METHOD IN CE DUAL-HOMING ACCESS PE NETWORK

TECHNICAL FIELD

[0001] The present invention relates to the field of data and IP transmission devices, specifically to an MSTP-based anti-loop method in a CE dual-homing access PE network.

BACKGROUND

[0002] In a layer-2 switching network, the appearance of a loop can result in a broadcast storm of messages, thereby occupying the effective bandwidth of a whole network to cause network paralysis. In such case, an STP (Spanning Tree Protocol) was generated to resolve the layer-2 loop, and then an RSTP (Rapid Spanning Tree Protocol) was generated on the basis of the STP. The RSTP cannot distinguish VLANs, so messages are all transmitted in one link, resulting in a low efficiency. Therefore, an MSTP (Multiple Spanning Tree Protocol) gradually appeared. The MSTP imports the concepts of domains and instances on the basis of the RSTP, not only enhancing the network learning speed, but also making full use of the network bandwidth.

[0003] The existing MSTP is mainly applied to the VLAN (Virtual Local Area Network) model of a layer-2 switching network. In an IPRAN system, a common layer-2 service is a VPLS (virtual Private Lan Service) model. The VPLS model may also have a layer-2 loop. FIG.1 is a schematic view of a scene of a CE (Customer Edge) dual-homing access PE (Provider Edge) network. The CE dual-homing access PE network includes a first PE (namely PE1) and a second PE (namely PE2) that are both connected to a first CE (namely CE1). The CE1 is connected to a personal computer (namely PC). The

PE1 and the PE2 are also connected to a third PE (namely PE3) by means of service PWs (pseudo wires), and the PE3 is connected to a second CE (namely CE2). However, the existing VPLS anti-loop method cannot solve the problem of the appearance of a layer-2 loop in the CE dual-homing access PE network. Therefore, it is necessary to design a method to solve the above method.

SUMMARY OF THE INVENTION

[0004] Aiming at defects in the prior art, the objective of the present invention is to provide an MSTP-based anti-loop method in a CE dual-homing access PE network, which can avoid the appearance of a layer-2 loop in a CE dual-homing access PE network, thereby preventing network paralysis.

[0005] In order to achieve the above objective, the technical solution adopted by the present invention is: an MSTP-based anti-loop method in a CE dual-homing access PE network. The CE dual-homing access PE network includes a first PE and a second PE that are separately connected to a third PE by means of pseudo wires, and are both connected to a first CE. The anti-loop method includes: creating a management pseudo wire between a first PE and a second PE; creating a virtual interface at either end of the management pseudo wire, respectively; adding the virtual interfaces to an MSTP bridge, setting the MSTP bridge to have the highest priority and modifying the ID and overhead of the MSTP bridge into minimum values in all physical ports; and the virtual interfaces enable an MSTP function.

[0006] On the basis of the above technical solution, when the management pseudo wire is in the activated state, a VPLS sends a message to an MSTP, and the MSTP creates two corresponding virtual interfaces according to a VPLS ID.

[0007] On the basis of the above technical solution, when the management

pseudo wire is deactivated, a DOWN message is sent to the MSTP and the MSTP ticks the two virtual interfaces out of the MSTP bridge and deletes the two virtual interfaces.

[0008] On the basis of the above technical solution, the virtual interfaces send or receive a signaling message from a bridge protocol data unit and participate in topology calculation.

[0009] On the basis of the above technical solution, during the calculation of a spanning tree, the MSTP calculates the two virtual interfaces and other physical ports uniformly.

[0010] On the basis of the above technical solution, the virtual interfaces and other physical ports are all within one common and internal spanning tree.

[0011] The present invention has the following beneficial effects:

[0012] 1. A management PW is created between a PE1 and a PE2; a virtual interface is created at either end of the management PW respectively; the virtual interfaces are added to a MSTP bridge; the MSTP bridge is set to have the highest priority, and the ID and overhead of the MSTP bridge are modified into minimum values in all physical ports; and the virtual interfaces enable the MSTP function. The present invention can avoid the appearance of a layer-2 loop among the PE1, PE2 and CE1 in a CE dual-homing access PE network, thereby preventing network paralysis.

[0013] 2. In the present invention, the MSTP mode can also be set as a RSTP and a STP. The present invention supports various protocol modes, and expands the application range of the prior art.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG.1 is a schematic view of a scene of a CE dual-homing access PE network in the background art;

[0015] FIG.2 is a schematic view of a creation scene of a management pseudo wire in a CE dual-homing access PE network in the prior art;

[0016] FIG.3 is a flowchart of the creation of a virtual interface in the present invention.

[0017] Marks in the attached drawings:

[0018] PE1-first PE; PE2-second PE; PE3-third PE; CE1-first CE; CE2-second CE.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0019] The present invention is described in further detail in conjunction with the attached drawings and embodiments.

[0020] As shown in FIG.2, an MSTP-based anti-loop method in a CE dual-homing access PE network applies to the CE dual-homing access PE network. The CE dual-homing access PE network includes a first PE (namely PE1) and a second PE (namely PE2) that are separately connected to a third PE (namely PE3) by means of service PWs (pseudo wires); the PE3 is connected to a second CE (namely CE2); the PE1 and PE2 are both connected to a first CE (namely CE1); and the CE1 is connected to a personal computer (namely (CP)). The anti-loop method of the present invention includes: creating a management PW between a PE1 and a PE2; creating a virtual interface at either end of the management PW, respectively; adding the two virtual interfaces to an MSTP bridge, setting the MSTP bridge to have the highest priority, and modifying the ID and overhead of the MSTP bridge into minimum values in all physical ports; and the virtual interfaces enable an MSTP function.

[0021] As shown in FIG.3, the specific creation flow of the virtual interfaces is as follows:

[0022] S101. A management PW is activated.

[0023] S102. A VPLS sends a message for creating the management PW to an MSTP, which means that the VPLS sends an UP message to the MSTP.

[0024] S103. The MSTP creates two corresponding virtual interfaces stpif according to a VPLS ID, for example, VPLS ID 100, and then the two virtual interfaces are both stpif100, but the two virtual interfaces are located at two different stations. The virtual interfaces send or receive signaling messages of a BPDU (Bridge Protocol Data Unit), and participate in topology calculation.

[0025] S104. The two virtual interfaces are added into an MSTP bridge, and the virtual interfaces enable an MSTP function. A management PW is created between the PE1 and the PE2 that correspond to the VPLS; the VPLS has a specific physical port corresponding to the network-side port thereof; and the physical port corresponding to the network-side port may vary with the topology. Therefore, the two virtual interfaces of PE1 and PE2 cannot be blocked. Only the CE1-side port needs to be blocked, namely preventing the appearance of a loop among the CE1, PE1 and PE2. Therefore, the MSTP bridge is set to have the highest priority, which means that the priority is modified into 0, while the bridge ID and overhead of the two virtual interfaces are modified into minimum values in all physical ports, for example, cist_path_cost (overhead of the common and internal spanning tree) is 1, cist_priority (priority of the common and internal spanning tree) is 16, and the initial value of cist_port_id (port ID of the common and internal spanning tree) is less than the physical port. In this way, during the calculation of a spanning tree, the MSTP calculates the two virtual interfaces and other physical ports uniformly.

[0026] When the management pseudo wire is required to be deactivated, a DOWN message is sent to the MSTP, and the MSTP ticks the two virtual interfaces out of the

MSTP bridge and deletes the two virtual interfaces.

[0027] The present invention does not support multi-instances. All ports are within the instance 0, namely the CIST (Common and Internal Spanning Tree) instance. All VLANs are also bound in the instance 0. All virtual interface and other physical ports are in one CIST, and avoid a layer-2 loop in the CIST instance.

[0028] The present invention is not limited to the above embodiments. For those ordinarily skilled in the art, various improvements and changes can be made on the basis of the principle of the present invention. The improvements and changes shall also fall within the protective scope of the present invention. Contents not described in detail in the Description are prior art known by those skilled in the art.

What is claimed is:

1. An MSTP-based anti-loop method in a CE dual-homing access PE network, the CE dual-homing access PE network comprising a first PE and a second PE that are separately connected to a third PE by means of pseudo wires, and are both connected to a first CE, characterized in that the anti-loop method comprises: creating a management pseudo wire between a first PE and a second PE; creating a virtual interface at either end of the management pseudo wire, respectively; adding the virtual interfaces to an MSTP bridge, setting the MSTP bridge to have the highest priority, and modifying the ID and overhead of the MSTP bridge into minimum values in all physical ports; and the virtual interfaces enable an MSTP function.
2. The MSTP-based anti-loop method in a CE dual-homing access PE network according to claim 1, characterized in that when the management pseudo wire is in the activated state, a VPLS sends a message to an MSTP and the MSTP creates two corresponding virtual interfaces according to a VPLS ID.
3. The MSTP-based anti-loop method in a CE dual-homing access PE network according to claim 1, characterized in that when the management pseudo wire is deactivated, a DOWN message is sent to the MSTP and the MSTP ticks the two virtual interfaces out of the MSTP bridge and deletes the two virtual interfaces.
4. The MSTP-based anti-loop method in a CE dual-homing access PE network according to claim 1, characterized in that the virtual interfaces send or receive signaling messages from a bridge protocol data unit, and participate in topology calculation.
5. The MSTP-based anti-loop method in a CE dual-homing access PE network according to claim 1, characterized in that during the calculation of a spanning tree, the MSTP calculates the two virtual interfaces and other physical ports uniformly.

6. The MSTP-based anti-loop method in a CE dual-homing access PE network according to claim 1, characterized in that the virtual interfaces and other physical ports are all within one common and internal spanning tree.