

METHOD FOR ENABLING SUPER VLAN AND VLANIF TO BE COMPATIBLE IN IPRAN SYSTEM

TECHNICAL FIELD

[0001] The present invention relates to the field of data and IP transmission devices, specifically to a method enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system.

BACKGROUND

[0002] LAN (Local Area Network) may be a network consisting of several household computers, or an enterprise network consisting of hundreds of computers. VLAN (Virtual Local Area Network) refers to a LAN which is a network divided using a router, namely a broadcast domain. Every VLAN has a corresponding broadcast domain. Different VLANs communicate with one another through a third-layer exchange technology.

[0003] SUPER VLAN is also called a VLAN aggregation, and the principle thereof is that one SUPER VLAN includes a plurality of SUB VLANs, each of the SUB VLANs is a broadcast domain, and different SUB VLANs are mutually isolated by two layers. The SUPER VLAN can be configured with a layer-3 interface, while the SUB VLAN cannot be configured with a layer-3 interface. When users in the SUB VLAN need to perform layer-3 communication, the users use the IP address of the SUPER VLAN layer-3 interface as a gateway address. In this way, a plurality of SUB VLANs share an IP network segment, thereby saving IP address resources.

[0004] VLANIF (vlan interface) is a COMMON-type VLAN; each VLANIF needs to occupy a network segment, and each VLANIF also has the function of layer-3 interface.

[0005] IPRAN refers to IP-based Radio Access Network. An IPRAN system

includes devices for mobile network return. At present, devices of this type only support the VLANIF, and do not support the SUPER VLAN. Compared with the VLANIF, the SUPVLAN can save IP addresses and support binding a plurality of SUB VLANs. Along with the network development, application demands for the IPRAN system will be increased. Therefore, it is necessary to adopt a new method to meet the increasing application demands.

SUMMARY

[0006] Aiming at defects in the prior art, the objective of the present invention is to provide a method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system, so that the SUPER VLAN and the VLANIF are compatible in the IPRAN system to meet different application demands of the IPRAN system.

[0007] To achieve the above objective, the present invention adopts the following technical solution: A method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system includes steps of: S1. creating a new VLAN, while setting a port list and a VLAN list; S2. specifying whether the type of the VLAN is a SUB VLAN or a COMMON VLAN, performing S3 if the type is the COMMON VLAN, performing S5 if the type is the SUB VLAN; S3. binding the COMMON VLAN to a layer-2 Ethernet port; S4. creating a VLANIF interface with an ID which is identical with the ID of the COMMON VLAN, configuring layer-3 attributes of a VLANIF, and completing the configuration; S5. binding the SUB VLAN to a layer-2 Ethernet port; S6. creating a new VLAN, specifying the type to be a SUPER VLAN, creating a layer-3 interface of the SUPER VLAN; S7. binding the SUB VLAN which is bound with the layer-2 Ethernet port into the SUPER VLAN as a SUB VLAN; S8. configuring layer-3 attributes of the SUPER VLAN, and completing the configuration.

[0008] On the basis of the above technical solution, the method also includes

creating a new VLAN and determining whether or not the VLAN ID of the new VLAN exists; and if the VLAN ID exists, the creation failed; and the VLAN ID does not exist, the creation succeeded.

[0009] On the basis of the above technical solution, the IPRAN system is configured with a VLAN data sheet which stores all VLAN information, and whether or not the VLAN ID exists is determined through searching the VLAN data sheet of a current data structure.

[0010] On the basis of the above technical solution, the layer-3 attributes of both VLANIF and SUPER VLAN include the IP of the VLANIF and attributes capable of enabling three layers.

[0011] On the basis of the above technical solution, after the configuration of the SUPER VLAN is completed and the SUPER VLAN is modified into the COMMON VLAN, the IPRAN system automatically deletes the binding relation between the SUPER VLAN and the SUB VLAN, and deletes the layer-3 attributes of the SUPER VLAN.

[0012] On the basis of the above technical solution, when the type of the VLAN is the COMMON VLAN or the SUB VLAN, the bound layer-2 Ethernet port is stored in the port list.

[0013] On the basis of the above technical solution, when the type of the VLAN is the SUPER VLAN, the bound SUB VLAN is stored in the VLAN list.

[0014] On the basis of the above technical solution, the COMMON VLAN, the SUB VLAN and the SUPER VLAN are identical in data structure; the types are distinguished through a parameter role set in the data structure; when the parameter role is 0, this represents that the type is the COMMON VLAN; when the parameter role is 1, this represents that the type is the SUB VLAN; and when the parameter role is 2, this represents that the type is the SUPER VLAN.

[0015] On the basis of the above technical solution, the data structure is configured

with a common pointer; in the case of COMMON VLAN type, the layer-3 attributes of the VLANIF are configured; or when the SUPER VLAN is created, the common pointer points at a created layer-3 interface.

[0016] On the basis of the above technical solution, the data structure is configured with a parameter pointer, and when the type is the SUB VLAN, the parameter pointer points at a SUPER VLAN where the parameter pointer is added.

[0017] The present invention has the following beneficial effects:

[0018] 1. The VLANIF and SUPER VLAN have the same attributes at the layer-3 interface, and the same data structure. The VLANIF and SUPER VLAN can both perform layer-3 forwarding, and support configuration at the same router, so that the SUPER VLAN and the VLANIF can be compatible in the same IPRAN system to meet different application demands of the IPRAN system.

[0019] 2. The IPRAN system supports mutual switch among different types of VLANs. Through directly modifying the VLAN type, the VLAN switching can be performed without deleting the original VLAN and then creating a new VLAN.

[0020] 3. It can be selected to create the VLANIF or the SUPER VLAN according to different application demands of the IPRAN system, enhancing the flexibility of configuration; applicable to the mixed networking of the IPRAN, expanding the application scope of the prior art.

[0021] 4. The SUPER VLAN, the SUB VLAN and the COMMON VLAN are identical in data structure, so that various types of VLANs are well compatible merely through distinguishing of the parameter role, simplifying the program design, facilitating data management, and facilitating the maintenance management of the codes of the SUPER VLAN, the SUB VLAN and the COMMON VLAN.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] FIG.1 is a flowchart of a method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system in an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0023] The present invention is described in further detail in conjunction with the attached drawings and embodiments.

[0024] As shown in FIG.1, a method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system specifically includes the following steps:

[0025] S1. Creating a new VLAN, while setting a port list (port_list) and a VLAN list (vlan_list). Creates a new VLAN. A VLAN ID is required to be created for the new VLAN. Therefore, whether or not the VLAN ID exists needs to be determined. If the VLAN ID exists, a prompt of creation failed is sent to the user; and if the VLAN ID does not exist, the creation succeeded. Specifically, the IPRAN system is configured with a VLAN data sheet which stores all VLAN information, and one VLAN occupies one data structure object. Whether or not the VLAN ID exists needs to be determined through searching the VLAN data sheet of a current data structure. If the VLAN ID exists in the VLAN data sheet, this represents that the VLAN ID is not the newly created VLAN ID, and the creation failed.

[0026] S2. Specifying whether the type of the created VLAN is a SUB VLAN or a COMMON VLAN, performing S3 if the type is the COMMON VLAN, performing S5 if the type is the SUB VLAN. If the type is not selected, the type is the COMMON VLAN by default.

[0027] S3. Binding the created COMMON VLAN to a layer-2 Ethernet port.

[0028] S4. Creating a VLANIF interface with an ID which is identical with the ID

of the COMMON VLAN, configuring layer-3 attributes of a VLANIF, and completing the configuration. The layer-3 attributes of the specific VLANIF include the IP and MAC of the VLANIF, and attributes that enable 3 layers, for example, ldp, igmp, arp, etc.

[0029] S5. Binding the created SUB VLAN to a layer-2 Ethernet port.

[0030] S6. Creating a new VLAN, where whether the VLAN ID exists also needs to be determined; specifying the re-created VLAN type to be a SUPER VLAN after the creation succeeded, while automatically creating a layer-3 interface of the SUPER VLAN.

[0031] S7. Binding the SUB VLAN which is bound with the layer-2 Ethernet port into the SUPER VLAN as a sub-VLAN.

[0032] S8. Configuring layer-3 attributes of the SUPER VLAN, and completing the configuration. Specifically, the layer-3 attributes of the specific SUPER VLAN also include IP and MAC of the VLANIF, and attributes that enable 3 layers, for example, ldp, igmp, arp, etc.

[0033] In the above steps, different types of VLANs vary with commands and configurations, for example, the COMMON VLAN cannot be used as the sub VLAN of the SUB VLAN, and cannot be bound with the SUB VLAN. After the configuration of the layer-3 attributes of the SUPER VLAN is completed, the modification of the VLAN type can be completed through modifying the VLAN type. For example, a SUB VLAN10 is created and bound to a layer-2 Ethernet port; a SUPER VLAN100 is created, and the SUB VLAN10 as a sub VLAN is bound into the SUPER VLAN100. When the type of the SUPER VLAN100 is modified into the COMMON VLAN, the IPRAN system automatically deletes the binding relation between the SUPER VLAN100 and the SUB VLAN10, and deletes the layer-3 attributes of the SUPER VLAN.

Table 1

Parameter	Description
char vlan_name[NSM_VLAN_NAME_MAX + 1];	VLAN description
nsm_vid_t vid;	VLAN ID, each VLAN has an independent ID
u_int16_t role;	VLAN type: role is 0: COMMON VLAN, role is 1: SUPER VLAN, role is 2: SUB VLAN
struct interface *ifp;	When the COMMON VLAN creates a layer-3 interface, or when SUPER VLAN is created, the common pointer (ifp) points at the created layer-3 interface;
struct nsm_vlan *parentvlan;	In the case of SUB VLAN, the parameter pointer points at the SUPER VLAN added by SUB VLAN;
struct list *port_list;	In the case of SUB VLAN or COMMON VLAN, the bound port is stored in the port_list
struct list *vlan_list;	In the case of SUPER VLAN, the bound SUB VLAN is stored in the vlan_list

[0034] Table 1 shows basic information of the VLAN data structure, including VLAN description, VLAN ID, VLAN type, layer-3 interface, etc. It can be seen that, the VLAN ID is globally unique, and after a VLAN is created, other VLANs with the identical ID cannot be created.

[0035] The COMMON VLAN, the SUB VLAN and the SUPER VLAN are identical in data structure; the types are distinguished through a parameter role; when the parameter role is 0, this represents that the type is the COMMON VLAN; when the parameter role is 1, this represents that the type is the SUB VLAN; and when the

parameter role is 2, this represents that the type is the SUPER VLAN. Different types of VLANs have different purposes. The SUPER VLAN must be used in combination with the SUB VLAN, and then a SUPER VLAN can be successfully created. The SUB VLAN is added with a layer-2 Ethernet port to realize layer-2 exchange in the VLAN domain, and the SUB VLAN is bound into the SUPER VLAN, so that the users in each SUB VLAN can access a layer-3 network. After creation of the COMMON VLAN, binding the COMMON VLAN to a layer-2 Ethernet port is required to realize layer-2 exchange. When not creating the VLANIF, the VLAN is a common layer-2 VLAN and can only realize the layer-2 exchange service. After creating the VLANIF, the VLAN has a layer-3 function, can be configured with an IP address, and as a layer-3 interface, supports layer-2 services and layer-3 services. The COMMON VLAN can be bound to a port, and creates a layer-3 interface and layer-3 attributes, but cannot be added into SUPER VLAN.

[0036] The data structure is configured with a common pointer (ifp); when the type is the COMMON VLAN, the layer-3 attributes of the VLANIF are configured; or when a SUPER VLAN is created, the common pointer points at the created layer-3 interface; when the type is the SUB VLAN, a parameter pointer (parentvlan) is set, and the parameter pointer points at the SUPER VLAN where the parameter pointer is added.

[0037] When the type of the VLAN is the COMMON VLAN or the SUB VLAN, the bound layer-2 Ethernet port is stored in the port list (port_list). When the type of the VLAN is the SUPER VLAN, the bound SUB VLAN is stored in the VLAN list (vlan_list).

[0038] The COMMON VLAN, SUB VLAN and SUPER VLAN share all VLAN IDs in the system, so that those several types of VLANs can be uniformly managed, and the VLANIF and the SUPER VLAN are compatible in the IPRAN system.

[0039] 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. A method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system, the method comprising the following steps:

- S1. creating a new VLAN, while setting a port list and a VLAN list;
- S2. specifying whether the type of the VLAN is a SUB VLAN or a COMMON VLAN, performing S3 if the type is the COMMON VLAN, performing S5 if the type is the SUB VLAN;
- S3. binding the COMMON VLAN to a layer-2 Ethernet port;
- S4. creating a VLANIF interface with an ID which is identical with the ID of the COMMON VLAN , configuring layer-3 attributes of a VLANIF, and completing the configuration;
- S5. binding the SUB VLAN to a layer-2 Ethernet port;
- S6. creating a new VLAN, specifying the type to be a SUPER VLAN, creating a layer-3 interface of a SUPER VLAN;
- S7. binding the SUB VLAN which is bound with the layer-2 Ethernet port into the SUPER VLAN as a sub-VLAN;
- S8. configuring layer-3 attributes of the SUPER VLAN, and completing the configuration.

2. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 1, characterized by creating a new VLAN, determining whether the VLAN ID of the new VLAN exists or not; if the VLAN ID exists, the creation failed; and if the VLAN ID does not exist, the creation succeeded.

3. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 2, characterized in that the IPRAN system is configured a VLAN data sheet for storing all VLAN information, and whether or not the VLAN ID exists is determined through searching the VLAN data sheet of a current data structure.

4. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 1, characterized in that the layer-3 attributes of the VLANIF and SUPER VLAN all include IP of the VLANIF, and attributes enabling three layers.

5. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 1, characterized in that after the configuration of the SUPER VLAN is completed and the SUPER VLAN is modified into the COMMON VLAN, the IPRAN system automatically deletes the binding relation between the SUPER VLAN and the SUB VLAN, and deletes the layer-3 attributes of the SUPER VLAN.

6. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 1, characterized in that when the type of the VLAN is the COMMON VLAN or the SUB VLAN, the bound layer-2 Ethernet port is stored in the port list.

7. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 1, characterized in that when the type of the VLAN is the SUPER VLAN, the bound SUB VLAN is stored in the VLAN list.

8. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to any one of claims 1-7, characterized in that the COMMON VLAN, the SUB VLAN and the SUPER VLAN are identical in data structure; the types are distinguished through a parameter role set in the data structure; when the parameter role is 0, this represents that the type is the COMMON VLAN; when the parameter role is 1, this represents that the type is the SUB VLAN; and when the parameter role is 2, this represents that the type is the SUPER VLAN.

9. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 8, characterized in that the data structure is configured with a common pointer; when the type is the COMMON VLAN, the layer-3 attributes of

the VLANIF are configured; or when the SUPER VLAN is created, the common pointer points at a created layer-3 interface.

10. The method for enabling a SUPER VLAN and a VLANIF to be compatible in an IPRAN system according to claim 8, characterized in that the data structure is configured with a parameter pointer, and when the type is the SUB VLAN, the parameter pointer points at the SUPER VLAN where the parameter pointer is added.