IBM Network Configuration Command

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Chapter 1 DLSw Configuration Command

1.1 DLSw Command

1.1.1 dlsw local-peer

Syntas

dlsw local-peer [**peer-id** ip-address] [**cost** *cost*] [**lf** *size*] [**keepalive** *seconds*] [**init-pacing-window** *size*] [**max-pacing-window** *size*] [**promiscuous**]

no dlsw local-peer [**peer-id** ip-address] [**cost** *cost*] [**lf** *size*] [**keepalive** *seconds*] [**init-pacing-window** *size*] [**max-pacing-window** *size*] [**promiscuous**]

The command is used for designating the parameter of local－peer of DLSw. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
peer-id *ip-address*	IP address of local peer created by the command “Local peer”
cost *cost*	(optional) The parameter means the value of cost attribute of local DLSw configuration. It will be transmitted to DLSw of the opposite terminal in the process of exchange of abilities. The opposite DLSw chooses the optimum route among the multiple routes according to the value. The numeric area of the parameter is 1～5, the default value is 3.
lf *size*	(optional) The parameter means the maximum length of frame local DLSw can process, numeric area is 516 `1470 `1500 `2052 `4472 `8144 ` 11407 ` 11454 and 17800 bytes, the default value is 1500 bytes.
keepalive *seconds*	(optional) The parameter means the time interval of sending Keepalive type DLSw message when the circuit does not communicate.
init-pacing-window *size*	(Optional) Initializing the size of local response window so as to agree with RFC 1795. Numeric area of parameter is 1-2000 bytes.
max-pacing-window *size*	(optional) Maximizing the size of local response window so as to agree with RFC 1795. Numeric area of parameter is 1-2000 bytes.
promiscuous	(optional) Setting promiscuous mode and allowing the opposite terminal to set up connections with local DLSw under the circumstance of no configuring remote peer on the local terminal.

Default

keepalive *seconds* ：The default value is 30 seconds.

cost *cost*: The default value *is* 3.

lf *size*: The default value is 1500 bytes.

Command mode

global configuration mode

Explanation

Setting up TCP communication is the first step for establishing DLSw connection. In order to set up TCP communication, the local peer of DLSw shall be configured first for designating the IP address of the local terminal connected with TCP, then the request made by the remote router for setting up TCP connection can be accepted. One router can only have one local peer.

The setup of DLSw communication link:

Under the circumstance of setup failure or de-linkage (excluding the cancellation of the command “dlsw local－peer” or the related command “dlsw remote－peer”), DLSw will make the connection request every 15 seconds incessantly till the connection succeeds. The time interval of 15 seconds cannot be configured.

Under the circumstance of a successful connection, DLSw will send one keepalive request message every 30 seconds incessantly. After the opposite terminal receives keepalive request message, it should send keepalive response message as a response. If no keepalive response message is received in a set period, it will be interpreted as a disconnection. The connection request will be restarted. The time interval of 30 seconds can be configured.

Under the normal operation, DLSw does not release this link unless the following two conditions are met:

(1) The command “dlsw local－peer” or the relevant command “dlsw remote－peer” is canceled.

(2) Abnormal circumstance occurs to the system, featuring the network inaccessible or insufficient system resources and so on.

When the first condition is met, DLSw communication link will be released and no trial will be made for setting up link before an effective command “dlsw remote－peer” is available.

When the second condition is met, DLSw communication link will be released. But DLSw will retry the setup of DLSw link incessantly.

Example

Setting local peer.

dlsw local-peer peer-id 192.168.20.202

Setting local peer under promiscuous mode

dlsw local-peer peer-id 192.168.20.202 promiscuous

Relevant command

dlsw remote-peer

dlsw bridge-group

1.1.2 dlsw remote-peer

Syntas

dlsw remote-peer *list-number ip-address* [**circuit-weight** *weight*] [**cost** *cost*] [**lf** *size*] [**backup-peer** *ip-address* [**backup-static**] [**linger** *minutes*] [**circuit-inactivity** *minutes*]] [**dynamic** [**no-llc** *minutes*] [**inactivity** *minutes*]] [**keepalive** *seconds*] [**passive**][**priority** [**priority-vendor-id** *id-number*]] [**tcp-queue-max** *size*]

no dlsw remote-peer *list-number ip-address* [**circuit-weight** *weight*] [**cost** *cost*] [**lf** *size*][**backup-peer** *ip-address* [**backup-static**] [**linger** *minutes*] [**circuit-inactivity**

minutes]][**dynamic** [**no-llc** *minutes*] [**inactivity** *minutes*]] [**keepalive** *seconds*] [**passive**][**priority** [**priority-vendor-id** *id-number*]] [**tcp-queue-max** *size*]

The command is used for designating IP address of remote DLSw under TCP encapsulation protocol and other information. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
list-number	List number of port （ bgroup ） configured by local router and corresponding to remote DLSw
ip-address	IP address of remote DLSw used by router for communication.
circuit-weight *weight*	(Optional) circuit weight value
cost *cost*	(Optional) the weight value of remote peer
lf *size*	(Optional) setting the maximum length of frame
backup-peer *ip-address*	(Optional) Setting route backup and setting the backup for the route of remote peer whose IP address is ip-address.
backup-static	(Optional) Setting the application of static mode for backup route
linger *minutes*	(Optional) Setting the idle time of backup route.
circuit-inactivity *minutes*	(Optional) Setting the rest time of circuit on the backup route
Dynamic	(Optional) Setting the application of dynamic mode for setting up the connection with the remote peer.
no-llc *minutes*	(Optional) Setting the timeout minute without circuit under dynamic mode.
inactivity *minutes*	(Optional) Setting the inactivity timeout minute of circuit under dynamic mode.
keepalive *seconds*	(Optional) Setting the time interval at the time of sending keepalive message to the remote peer.
Passive	(Optional) Setting the application of passive mode for setting up the connection with remote peer.
Priority	(Optional) Setting the application of priority level mode for setting up the connection with remote peer.
priority-vendor-id *id-number*	(Optional) Setting verdor-id attribute under priority level mode
Tcp-queue-max *size*	(Optional) Setting the maximum bytes of TCP connection transmit queue set up with remote peer.

Default

IP address of remote DLSw is not configured.

If the command “dlsw load-balance circuit-count *circuit weight”* is not configured, the default value of circuit-weight *weight* is 10. Otherwise the value of *circuit weight* will be the one set in the command “dlsw load-balance circuit-count”.

The default value of cost *cost* is 3.

The default value of lf *size* is 1500 bytes.

The default value of keepalive *seconds* is 30 seconds.

If dynamic is configured and the parameters of backup-static, no-llc and inactivity, etc are not designated, the default state is the keyword without backup-static.

The default value of tcp-queue-max *size* is 20000 bytes.

Command mode

global configuration mode

Explanation

After the local peer is configured, the remote peer shall be configured for establishing TCP channel. Router will incessantly try setting up TCP connection with the remote router. One router can configure multiple remote peers. TCP channel with for multiple remote routers can be created by configuring multiple remote peers.

The remote DLSw corresponding to the command “dlsw remote-peer” can be linked to the local port of local DLSw through *list-number* parameter configured after the command “dlsw remote-peer”. Here is an example. When some command “dlsw remote-peer” have configured some *list-number,* it means that the remote DLSw corresponding to this command is configured the following local port, namely SDLC port corresponding to the *list-number* and contained in port-list, and all the Ethernet ports corresponding to bridge-group and *list-number* and contained in bgroup-list. Only from the local with the list feature of the remote DLSw, can the circuit be created for the remote DLSw. The circuit cannot be set up successful for transmuting the data bet

ween the local port and the remote DLSw. The configuration of port-list and bgroup-list can be referred to the command “dlsw port-list and dlsw bgroup-list”.

The setup of circuit through balance method can be achieved by adjusting circuit-weight and cost attribute. The specific process of setting up flow-balanced circuit can be referred to with the command “dlsw load-balance”.

For cost cost parameter, its attribute can be configured after the command “dlsw local-peer” and the command “dlsw remote-peer”. The numerical value of cost attribute will be used for choosing the best route among the routes accessible to the same destination MAC. The value of cost attribute configured after these two commands will be used in the process of the exchange of abilities. The priority level of the value of cost that is configured after the command “dlsw remote-peer” of local DLSw is higher than that of the value of cost that is configured after the command “dlsw local-peer” of remote DLSw.

For example, the value of cost attribute configured for remote DLSw after the command “remote-peer” of local DLSw is 2, but the value of cost attribute configured after the command “dlsw local-peer” of remote DLSw is 4. Through exchange of abilities, local DLSw thinks the cost of the route from local DLSw to remote DLSw is 2. The command “show dlsw capability” can be used for examining the cost attribute of remote DLSw configuration obtained through exchange of abilities.

If *size* can be set after the command “dlsw local-peer” and the command “dlsw remote-peer”. The “lf” value in the command “local-peer”represents the maximum length of frame that local DLSw can process. The “lf” value in the command “remote-peer” represents the maximum length of frame that the corresponding remote DLSw can process. When “lf” value is configured in the above two commands, these two values will participate in the negotiation of “lf” in the process of setting up the circuit.

In a word, the purpose of negotiation of “if” is to ensure that llc frame will not be the fragment when it is received by the destination llc host. Here is an example. If the size of frame sent from source llc host to source DLSw is 1500 and maximum length of frame that can be processed between destination host and destination DLSw is 516, the data frame sent from source llc host will not be transmitted to the destination correctly. The main purpose of negotiation of “if” is to determine whether the maximum length of frame that source DLSw can process is less than or equal to the one that can be processed by destination DLSw. If the result is less or equal, it means the negotiation passes and the circuit can be set up. Otherwise, it means the negotiation fails, and the circuit cannot be set up.

The maximum length of frame that can be processed by source DLSw is the maximum length of frame of physical circuit between the source DLSw and source llc host and the minimum value compared with the above value, the value of “if” configured in the command “local-peer” of source DLSw and the value of “if” configured in the command “remote-peer” corresponding to the destination DLSw and configured on source DLSw. Correspondingly, The maximum length of frame that can be processed by destination DLSw is the maximum length of frame of physical circuit between the destination DLSw and destination llc host and the minimum value compared with the above value, the value of “if” configured in the command “local-peer” of destination DLSw and the value of “if” configured in the command “remote-peer” corresponding to the source DLSw and configured on destination DLSw. So-called negotiation process of “if” is to judge whether the maximum length of frame that can be processed by source DLSw is les than or equal to the maximum length of frame that can be processed by destination DLSw.

Because the value of “if” reflects the ability of DLSw to process local llc frame, the bigger the value is, the more efficient the transmission will be under the condition that the transmit capability of llc host meets the requirement. For the implementation of the router of Our Company, the maximum capacity of the physical circuit supported by the router of Our Company between DLSw and llc host is to transmit 1500-byte frame. In the implementation of our commands, the default value of either the command “dlsw local-peer” or “dlsw remote-peer” is 1500**.**

The backup can be made to the configured remote peer through the command “backup-peer”. The command “backup-static, linger, and circuit-inactivity” can be used for setting the time for releasing the route. The backup route cannot bear the attribute of dynamic and passive.

If the link communication interrupts due to the network trouble after TCP channel is set up, the backup link should be used for communication. The backup link can be divided into static backup link and dynamic backup link on the different setup modes. The default is dynamic backup link. When the configuration is over, the connection will be established after the old main communication link is disconnected instead of the immediate setup of the communication link. Under general conditions, the circuit is not set up on the link. It is used only when the old link is disconnected. The addition of keyword “backup-static” indicates the backup link is the static backup link.

For the backup communication link, after the old communication is restored, the backup link and the circuit on the backup link shall be decided whether they should be reserved or not in accordance with the user’s preset “linger” parameter configuration. If they are reserved, the time for reservation will be subject to the following three cases:

When the keyword “linger” is not added**,** the new circuit will not be set up on the backup communication after the old communication is restored. If the backup link is the static one, the circuit on the backup link will remain in active status all the time till the circuit is removed automatically. But the communication link will be maintained all the time. If the backup link is a dynamic one, the circuit on the backup link will keep connective status all the time. When all the circuits on the dynamic backup link are removed, the dynamic backup link will be removed automatically.

when the value of “linger” is set as 0**,** the backup link shall be removed immediately in case of dynamic backup link after the old communication link is restored. The circuit on

the backup link shall also be removed and shall be re-established on the old communication link. In case of static backup link, all the circuits on the backup link immediately. The backup link will not be removed.

When the value of “linger” is a nonzero integer, it means the effective time of the circuit on the backup link. When the time set by linger is hit, the circuit on the backup link will be removed automatically. During this effective period, new circuits will not be established on the backup link. The new circuit shall be set up on the restored original data link. For the dynamic backup link, when the time set by “linger” is hit, the circuit and the backup link will be removed at the same time. For the static backup link, when the time set by “linger” is hit, the circuit will be removed, but backup link will be reserved.

The role of the key word “circuit-inactivity minutes” is similar to the keyword “inactivity” after the dynamic communication link. When the keyword “circuit-inactivity” is configured, all the circuits on the backup communication link will be removed automatically under the condition that no data on the whole circuits exceed the value during the transmit period even if the circuit still exists on the backup link. If the backup communication link is the dynamic one, the communication link will be removed. If the backup communication link is a static one, the communication link will not be removed.

The default state of backup communication link has no keyword or parameter, meaning the backup route is dynamic backup communication link and is not configured with linger and circuit-inactivity parameter.

“dynamic**”** can be used for setting up a dynamic type link. When explorer type message is sent, the dynamic link will actively link to the opposite terminal. The command “no-llc**”** and “inactivity” is used for setting the time for releasing the route. The dynamic route cannot bear the attribute of “backup-peer” and “passive”.

Different from the original static setup of TCP communication link of dlsw, the dynamic data link does not start the process of setting up link after DLSw gateways of two terminals are configured with the command “local peer” and the corresponding command “remote peer”. For DLSw gateway of one terminal, it will start to set up communication link to DLSw of opposite terminal when it needs to send CANUREACH_EX message after receiving the test frame or xid frame sent by local sna host. Similarly, when the opposite terminal sends the request for establishing TCP communication link to local DLSw, local DLSw will respond to the request and set up communication link finally.

Only after two DLSws in communication are configured with dynamic link-setup mode (specifically, the keyword “dynamic” is added to the back of the command “dlsw remote-peer” on the gateway of two terminals, namely configuring DLSw of the opposite terminal as dynamic), the communication link will employ the dynamic link-setup mode. Otherwise, the static link-setup will be applied (for instance, if local DLSw is configured with the keyword “dynamic” in the command “dlsw remote-peer” and the opposite DLSw is not configured with the keyword “dynamic” in the command “dlsw remote-peer”, the opposite DLSw will send the request for setting up TCP link to the local terminal and the local terminal will respond to the request and set up TCP communication link.).

Inactivity parameter and no-llc parameter is closely related to the process of removing dynamic communication link. The numerical value configured after the command “no-llc” means: When the time without circuit on the dynamic communication link exceeds the value, the dynamic communication link will be removed automatically. The numerical value configured after the command “inactivity” means: dynamic communication link will be removed automatically under the condition that no data on the circuits exceeds the value during the transmit period even if the circuit still exists on the dynamic communication link. The unit of these two values is a minute, the scope is 1 ~ 300 minutes. When the keyword “dynamic is configured and these two parameters are not configured, the default condition is that when the time of without circuit on the communication link exceeds 10 minutes, the dynamic communication link will be removed, the configuration similar to the default is no-llc 10.

It should be noted that inactivity parameter and no-llc parameter cannot co-exist, namely, When inactivity configuration is configured, no-llc parameter will not be configured, and vice versa. In addition, after the keyword “dynamic” is configured, keepalive time will be limited to 0 seconds, namely, after the dynamic communication link is configured, local DLSw will not send keepalive message any longer.

When a link is set as a passive mode, it means that local peer will not actively link to the remote peer.

The command “priority” can be used for establishing a link of priority level type. The command “priority-vendor-id” can be used for setting the attribute of vendor-id of remote peer. For example, when some kind of link to CISCO equipment is set up, the attribute shall be set as 0x00000C.

After the single channel without priority level is set up, other channels with different priority level can be established. The correspondence relationship between priority level and TCP port number is: top priority level high（2065）, medium priority level medium（1981）, normal priority level normal（1982）and lowest priority level low（1983）

The keyword “priority” shall be added to the back of the command “dlsw remote-peer” of DLSw of two terminals of communication. Only by doing so will the multi-channel DLSw communication link with priority level be set up between the DLSws of two terminals. If the key word “priority” is only added to the back of the command “dlsw remote-peer” of DLSw of one terminal, the exchange of ability will not be accomplished rightly and any type of DLSw communication link will be established between DLSws of two terminals.

Example

1. Backup

For DLSw_A of network point, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
dlsw remote-peer 0 192.168.20.205 backup-peer 192.168.20.204
```

…

For DLSw_B of center, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.204
dlsw remote-peer 0 192.168.20.202
```

…

For DLSw_C of center, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.205 promiscuous
```

…

On DLSw_A, the configuration indicates (A-B) connection is the main route. When the route has trouble, the relevant backup route (A-C) will start, A will actively link to C to ensure DLSw connection between network point and the center. When the main route（A-B）is restored, all the new circuits will shape on the route. When all the circuits shaped on the main route（A-C）are closed down, the backup route (A-C) will close.

If the configuration on DLSw_A is:

```
dlsw remote-peer 0 192.168.20.205 backup-peer 192.168.20.204 linger 10
```

It indicates that 10 minutes later when the main route (A-B) is restored, the backup route (A-C) closes off and shuts down all the circuits on it.

If the configuration on DLSw_A is:

dlsw remote-peer 0 192.168.20.205 backup-peer 192.168.20.204 circuit-inactivity 5

It indicates when the main route (A-B) is restored, all the circuits on the backup route (A-C) close off if no message is sent within 5 minutes.

2. Dynamics

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.202

dlsw remote-peer 0 192.168.20.204 dynamic

…

For DLSw_B of the other terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.204 promiscuous

…

When explore message needs to be sent on DLSw gateway A, Gateway A will actively link to Gateway B. If the link fails, Gate A will cease the link process after several retrials.

If the configuration on DLSw_A is:

dlsw remote-peer 0 192.168.20.204 dynamic no-llc 5

It indicates when the route (A-B) has no circuit in 5 minutes, the route will close. If no-llc option is not configured, the default definition is 10 minutes.

If the configuration on DLSw_A is:

dlsw remote-peer 0 192.168.20.204 dynamic inactivity 10

It indicates that when the circuit on the route (A-B) sends no message within 10 minutes, all the circuits on the route and the route itself will close down.

3. Priority Level

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.202

dlsw remote-peer 0 192.168.20.204 priority

…

For DLSw_B of the other terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.204

dlsw remote-peer 0 192.168.20.202 priority

…

When DLSw connection is created successfully, there will be 4 TCP links between A and B that are used for transmitting DLSw message. TCP port numbers are 2065（High），1981（Medium），1982（Normal），1983（Low）. The directions on how to designate the different priority level for the data streams can be referred to the command “sap-priority-list”.

4. The list feature of Remote peer

For DLSw_A of one terminal, the commands related to the list feature are as follows:

dlsw port-list 1 s1/0 s1/1 e2/0
dlsw bgroup-list 1 bgroups 10 20
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
dlsw remote-peer 1 192.168.20.203

Under local Ethernet port e1/0, the command below is configured:

bridge-group 10

Under local Ethernet port e1/1, the command below is configured:

bridge-group 20

Under local Ethernet port e2/0, the command below is configured:

bridge-group 30

The above commands indicate: For DLSw_B whose IP address is 192.168.20.204, it corresponds to all the local ports of local DLSw_A, source llc host can create circuit on the path between these ports and DLSw_B. For DLSw_C whose IP address is 192.168.20.203, it corresponds a part of local ports of local DLSw_A, including s1/0 and s1/1 in port-list 1 (notes: port-list is only effective to Ethernet port. Actually it does not work in spite of the fact that e2/0 is included in port-list 1). Bridge－group 10 and bridge-group 20 included in bgroup-list 1 corresponds to Ethernet port e1/0 and e1/1, only source llc host and destination llc host can create circuit on the path between these ports and DLSw_B. No circuit can be created on the path between e2/0 of bridge-group 30 and DLSw_B.

Relevant command

dlsw local-peer

dlsw bridge-group

sap-priority-list

1.1.3 dlsw port-list

Syntas

dlsw port-list *list-number* **type** *number*

no dlsw port-list *list-number* **type** *number*

The command is used for configuring the port list of local DLSw. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
list-number	List number of the port-list
Type	Port type, including serial port, Ethernet port and high-speed Ethernet port.
Number	Serial number of port, such as 1/0 in s1/0.

Default

none

Command mode

global configuration mode

Explanation

Through the command, some ports can be configured into a port list. By adding *list-number* to the back of the command “dlsw remote-peer”, port-list feature function of DLSw can be realized. The numeric area of *list-numbe* is 1 ~ 255. It shall be pointed out that port-list is not able to identify Ethernet and high-speed Ethernet port. That is to say, although the different Ethernet ports (or high speed Ethernet) can be configured into some port-list and the list number of this port-list can be configured in the command “dlsw remote-peer”, it will not enable the remote DLSw to correspond to Ethernet port included in the list. In order to enable different remote DLSw to correspond to different Ethernet ports, the commands described below shall be configured.

Example

For DLSw_A of one terminal, the configured commands related to port-list are as follows:

dlsw port-list 1 s1/0 s1/1 e2/1 e2/0 f3/0
dlsw port-list 2 s1/0 s1/1

Because port-list is not able to identify Ethernet port, the ports included in the port list indicated in port-list 1 and port-list 2 that are configured according to the above commands.

Relevant command

dlsw remote-peer

dlsw bgroup-list

1.1.4 dlsw bgroup-list

Syntas

dlsw bgroup-list *list-number* **bgroups** *number*

no dlsw bgroup-list *list-number* **bgroups** *number*

The command is used for configuring the bridge-group list of local DLSw. The “no” format” of the command can be used for canceling the configuration.

Parameter

Parameter	Description
list-number	List number of the bgroup-list
bgroups *number*	Group number of the bridge-group(s) belonged to this bgroup-list

Default

None

Command mode

global configuration mode

Explanation

Through the command, the different bridge-groups can be configured into a bgroup-list, making the bgroup-list include all the Ethernet ports (or high-speed Ethernet ports) of different bridge-groups in the list. By adding *list-number* to the back of the command "dlsw remote-peer", bgroup-list feature function of DLSw can be realized. The numeric area of *list-numbe* is 1 ~ 255.

Example

For DLSw_A of one terminal, the configured commands related to bgroup-list are as follows:

dlsw bgroup-list 1 bgroups 10 20 30
dlsw bgroup-list 2 bgroups 10 20

The bgroup-list 1 configured on the above commands include bridge-group 10, bridge-group 20 and bridge-group 30, namely, all the Ethernet ports and high-speed Ethernet ports are included these three bridge-groups. Bgroup-list 2 includes bridge-group 10 and bridge-group 10, namely, all the Ethernet ports and high-speed Ethernet ports are included these two bridge-groups. The Ethernet ports and high-speed Ethernet ports belonging to bridge-group 30 are not included in bgroup-list 2.

Relevant command

dlsw remote-peer

dlsw port-list

1.1.5 dlsw timer

Syntas

dlsw timer {**sna-cache-timeout** | **explorer-wait-time**} *time*

no dlsw timer {**sna-cache-timeout** | **explorer-wait-time**} *time*

The command is used for configuring two time clocks of local DLSw. One is the clock used for buffering the effective time of data, the other is the clock used for waiting for the echo time of remote DLSw's response to explorer message. The "no" format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
sna-cache-timeout	The effective time buffering the data stored at IP address or local port of remote DLSw of some Mac address, namely the time from effective data to the ineffective data. The effective range is 1 ~ 86400 seconds.
explorer-wait-time	The wait time of remote DLSw's response to explorer message, namely the time of waiting ICR_EX after CUR_EX message is sent. The effective range is 1 ~ 86400 seconds.
time	MAC address accessible to local DLSw.

Default

The default value of **sna-cache-timeout** is 1800 seconds (30 minutes)

The default value of **explorer-wait-time is** 0 seconds.

Command mode

global configuration mode

Explanation

For the clock of sna-cache-timeout, its numerical value represents the effective time of data in the buffer. If the numerical value is set too big, it will probably not be able to reflect the current path information. For example, when the effective time of the buffer is set too long, the data in the buffer during this period is likely to be ineffective and remote-peer in the remote buffer is not able to reach destination mac address. When numerical value is set too short, the effective period of data in the buffer will be too short, making the local DLSw frequently be started for sending explorer message to locate the target. In practice, this clock does not need to be amended, as the application of default value will be right. When there is a definite requirement, the command can be used for amending the value of the clock.

For the clock of explorer-wait-time**,** its numerical value represents the waiting time of the remote DLSw's response to explorer message. If the default value is 0, the local DLSw will immediately set up circuit after it has received the first ICR_EX message. If a waiting time is set, the waiting time will continue till the timeout of the clock and the responses of the remote DLSw are thought to have received even after ICR_EX message is received. Afterward the circuit will be created. In order to have better realization of load-balanced circuit setup mode of DLSw, the value should be set relatively bigger. If the value is set too bigr, the waiting time will be too long, which affects the efficiency of setting up the circuit. The recommended value of the clock is 20 ~ 60 seconds.

Example

For DLSw_A of one terminal, the commands for configuring the clock are as follows:

dlsw timer sna-cache-timeout 1200

After the command is configured, the effect time of data in the local and remote buffer will turn into 1200 seconds (20 minutes), that is to say, When local DLSw sends test frame or explorer message and receives the response, the buffer catering to some mac address begins to take effect and the data in the buffer will be ineffective 20 minutes later. If the circuit needs to be set up for the destination mac address, test frame or explorer message shall be retransmitted to locate the target.

dlsw timer explorer-wait-time 20

After the command is configured, the waiting time of local DLSw's waiting for remote DLSw's response to explorer message will become 20 seconds. <![endif]>

Relevant command

dlsw load-balance

1.1.6 dlsw load-balance

Syntas

dlsw load-balance [**round-robin** | **circuit-count** *circuit weight*]

no dlsw load-balance [**round-robin** | **circuit-count** *circuit weight*]

The command is used for configuring the load-balance function of local or remote terminal on local DLSw. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
round-robin	Load balance applies to round-robin mode (i.e. rotation mode)
circuit-count *circuit weight*	Load balance applies circuit-count mode, i.e., the balance setup of circuit shall be made on the weight value of the path.

Default

The default value of the command “circuit-count *circuit weight”* is 10.

Command mode

global configuration mode

Explanation

When local DLSw is configured with the command “dlsw load-balance”, the balanced setup of circuit between multiple paths accessible to the same destination MAC address can be achieved and it also can be viewed as the equal distribution of a given circuit load to multiple paths. The multiple paths here mean that under the condition that “cost” is the same and if the values of “cost” of multiple paths are different, the circuit will be created equally on the multiple paths with the minimum value of “cost”. If the path with the minimum value of “cost” has only one, all the circuits will be set up on the path.

Based on the setup direction of the circuit, load-balance can be classified into two: 1. When the circuit is set up from the local port of local DLSw to the remote terminal, the load balance of the circuit is made between multiple remote DLSws. 2. When the circuit is created from remote DLSw to the destination address of local port of local DLSw, the load-balance of the circuit is made between the multiple local ports of local DLSw.

Load-balance has two modes. One is the traditional round-robin mode, the other is circuit-count mode. The former features the round use of different paths between multiple paths for establishing the circuit, the later features the selection of a path for establishing a circuit in accordance with the value of circuit-weight configured for different paths and the ratio of numbers of the circuits existing on the various current paths. The circuit-weight value configured after the command “dlsw load-balance circuit-count” is the default circuit-weight value of local-configured remote peer, the numeric area is 1 ~ 100, the default value is 10. In addition, the circuit-weight value corresponding to the remote peer can be configured after the command “dlsw remote-peer”, the numeric area of the value is 1 ~ 100, the default value is the one configured after the command “dlsw load-balance circuit-count”.

It shall be noted that circuit-count mode of dlsw load-balance is catering for load-balance of circuit between multiple remote DLSws (remote-peer). For the local load-

balance, it applies round-robin mode no matter which mode is selected in the command “dlsw load-balance”. In addition, in order to achieve better effect of load-balance, the command “dlsw timer explorer-wait-time” had better be configured for extending the time of waiting for the response of remote terminal to explorer message after the command “dlsw load-balance circuit-count” is configured.

Example

For DLSw_A of one terminal, the configuration commands related to load-balance function are as follows:

dlsw load-balance circuit-count 20
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.203 circuit-weight 10
dlsw remote-peer 0 192.168.20.204

It indicates that load-balance function is configured on DLSw_A (load balance function). If two DLSw hosts whose IP addresses are 192.168.20.203 and 192.168.20.204 can access to the host of some destination mac address, the circuit created from llc host of local terminal of DLSw_A to the host of destination mac address will be set up between two remote DLSws in turn at the ratio of 1:2. Meanwhile, if DLSw_A has multiple local ports accessible to some llc host on some side of the local terminal, the circuit created from remote llc host to local llc host will be set up on the multiple local ports of DLSw_A in turn.

Relevant command

dlsw remote-peer

dlsw bgroup-list

1.1.7 dlsw icanreach

Syntas

dlsw icanreach {*mac-exclusive* | **mac-address** *mac-addr* | **saps**}

no dlsw icanreach {*mac-exclusive* | **mac-address** *mac-addr* | **saps**}

The command is used for configuring the target that can be achieved by local DLSw. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
mac-exclusive	The user-configured MAC address exclusively accessible to local DLSw
mac-address *mac-addr*	Configuring MAC address accessible to local DLSw
saps	(optional) Configuring a group of SAPs accessible to router local.

Default

none

Command mode

global configuration mode

Explanation

The configuration in the command is embodied in the exchange of abilities,

Exchange of abilities of DLSw applies “Mac Address Exclusivity Control Vector” to judge whether it has refused DLsw of all the other Mac address except for the Mac address occurring in Mac address demand. “Supported SAP List Control Vector” is used for choosing SAP address that needs DLSw exchange. “Mac Address List Control Vector” is used for enabling local DLSw to acquire Mac address for communication with remote DLSw through exchange of abilities.

Example

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
    dlsw icanreach mac-address 00:01:02:03:04:05
    dlsw icanreach mac-address 00:01:02:03:04:05 mask ff:ff:ff:ff:ff:f0
    …
```

It indicates that A can access the hosts whose mac address are 00:01:02:03:04:05 and 00:01:02:03:04:05/ff:ff:ff:ff:ff:f0. After DLSw connection is set up, DLSw_B of the other terminal will get the information, which can be observed on B through “show dlsw capabilities”.

```
        …
icanreach mac-exclusive  : no
reachable mac addresses  : 0001.0203.0405 <mask ffff.ffff.ffff>
0001.0203.0405 <mask ffff.ffff.fff0>
        …
```

If the configuration on DLSw_A is:

```
dlsw icanreach mac-exclusive
```

It indicates A informs the remote peer mac address configured in the command “dlsw icanreach mac-address” exclusively accessible to local terminal, which can be observed on B through the command “show dlsw capabilities” at the same time.

```
    …
    icanreach mac-exclusive  : yes
    …
```

If the configuration on DLSw_A is:

```
    dlsw icanreach saps 0a
```

It indicates A can access the host whose sap is 0x0A, which can be observed on B through the command “show dlsw capabilities”.

```
    …
 unsupported saps        : 0 2 4 6 8 C E 10 12 14 16 18 1A 1C 1E 20 22 24 26 2
8 2A 2C 2E 30 32 34 36 38 3A 3C 3E 40 42 44 46 48 4A 4C 4E 50 52 54 56 58 5A 5C
5E 60 62 64 66 68 6A 6C 6E 70 72 74 76 78 7A 7C 7E 80 82 84 86 88 8A 8C 8E 90 92
94 96 98 9A 9C 9E A0 A2 A4 A6 A8 AA AC AE B0 B2 B4 B6 B8 BA BC BE C0 C2 C4 C6 C
8 CA CC CE D0 D2 D4 D6 D8 DA DC DE E0 E2 E4 E6 E8 EA EC EE F0 F2 F4 F6 F8 FA FC
FE
…
```

Relevant command

dlsw remote-peer

show dlsw capabilities

1.1.8 dlsw icannotreach

Syntas

dlsw icannotreach saps *sap* [*sap...*]

no dlsw icannotreach saps *sap* [*sap...*]

The command is used for designating SAP inaccessible to the local. The “no” format of the command can be used for canceling the configuration.

Parameter

Parameter	Description
sap [**sap...**]	Configuring a group of SAPs inaccessible to local router.

Default

none

Command mode

global configuration mode

Explanation

The configuration in this command is embodied in the exchange of abilities.

Example

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
        dlsw icannotreach saps saps a
        …
```

It indicates A is not able to access to the host whose sap is 0x0A, which can be observed on B through the command “show dlsw capabilities”.

```
        …
unsupported saps        : 2 4 6
…
```

Relevant command

dlsw remote-peer

show dlsw capabilities

1.1.9 dlsw mac-addr

Syntas

dlsw mac-addr *mac-addr*

no dlsw mac-addr *mac-addr*

The command is used for configuring the static MAC address. The “no” format of the command can be used for canceling the setting of the item.

Parameter

Parameter	Description
mac-addr	Designating 48-byte MAC address

Default

none

Command mode

global configuration mode

Explanation

This command has a relation with the local buffer and remote buffer. The feature of the remote buffer of DLSw is: The storage of remote buffer of DLSw is based on the remote DLSw identifier with Mac as index and is used for the response from the Explorer of the local port. If there is no buffer, Explorer shall be sent from all the known communication links of DLSw or through UDP Multicast mode, which is very likely to cause the congestion of the network.

Example

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
        dlsw mac-addr 11:22:33:44:55:66 remote-peer ip-address 192.168.20.204
        …
```

It indicates that A is able to know that DLSw_B（192.168.20.204）can access the host whose mac address is 11:22:33:44:55:66 without sending explore message, which can be observed on A through the command “show dlsw reachability”.

```
…
DLSw MAC address reachability cache list
Mac Addr       status    Loc.      peer/port       type       rif
1122.3344.5566  FOUND    REMOTE   192.168.20.204  From Conf
…
```

Relevant command

dlsw remote-peer

show dlsw reachability

1.1.10 dlsw bridge-group

Syntas

dlsw bridge-group *group-number* [**sap-priority** *list-number*]

no dlsw bridge-group *group-number* [**sap-priority** *list-number*]

The command is used for configuring bridge group communicable to DLSw. The “no” format can be used for canceling the setting of the item.

Parameter

Parameter	Description
group-number	Identification number of bridge group communicable to DLSw, the numeric area of the parameter is 1-63.
sap-priority *list-number*	The list number of sap-priority-list applied by bridge-group. The numeric area of the parameter is 1 ~ 10.

Default

none

Command mode

global configuration mode

Explanation

In order to retransmit the designated message to remote terminal through TCP connection, this command needs to be used for connecting local bridge group to DLSw, namely, the bridge group message can be sent to the remote terminal through TCP channel. The command can be used repeatedly for connecting the multiple bridge groups with DLSw, bringing them into the participation in the retransmit of through TCP channel. After the command is configured, the port of the configured bridge group can communicate with DLSw.

Example

Router A and Router B can be connected through Ethernet port, of which the address of Ethernet port is 128.207.152.5, the address of Ethernet port is 128.207.150.8. The configuration of DLSw is as follows:

Configuration for Router A

```
hostname RouterA
!
dlsw local-peer peer-id 128.207.152.5
dlsw remote peer 128.207.150.8
!
```

```
interface Ethernet1/1
ip address 128.207.152.5 255.255.255.0
bridge-group 1
```

Configuration for Router B

```
hostname RouterB
!
dlsw local-peer peer-id 128.207.150.8
dlsw remote-peer 128.207.152.5
!
interface Ethernet1/1
ip address 128.207.150.8 255.255.255.0
bridge-group 1
!
```

The configuration regarding sap-priority can be referred to the command sap-priority-list.

Relevant command

dlsw local-peer

dlsw remote-peer

sap-priority-list

1.1.11 dlsw udp-disable

Syntas

dlsw udp-disable

no dlsw udp-disable

The command is used for setting whether DLSw should prohibt UOD from sending message. The “no” format of the command can be used for canceling the setting of the item.

Parameter

none

Default

none

Command mode

global configuration mode

Explanation

After this command is configured, the udp unicast mode cannot be used for sending DLSw message. Under default state, udp unicast mode can be used for sending DLSw message. Currently in our realization, only UDP Unicast mode is used for sending four kinds of messages, namely CANURACH_ex，CANUREACH_cs，ICANRACH_ex and ICANREACH_cs. Other control messages shall be sent through TCP mode.

This command does not affect the receipt of DLSw message through UDP mode, that is to say, after this command is configured, router is still able to receive DLSw

message sent by the remote peer through UDP.

Example

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

```
dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.204
dlsw udp-disable
…
```

It indicates that local peer A sends DLSw message to the remote peer （ 192.168.20.204 ）exclusively through TCP and can receive DLSw message sent from the remote peer（ 192.168.20.204 ）through UDP.

Relevant command

dlsw local-peer

dlsw remote-peer

1.1.12 sap-priority-list

Syntas

[no] sap-priority-list *list-number* [**high**|**medium**|**normal**|**low**] [**dmac** *mac-address*]

[**smac** *mac-address*] [**dsap** *sap-value*] [**ssap** *sap-value*]

The command is used for configuring bridge group communicable to DLSw. The “no” format of the command can be used for canceling the setting of the item.

Parameter

Parameter	Description
list-number	List number of sap-priority-list. The numeric area is 1~10.
high	Setting the priority level corresponding to the list as High
medium	Setting the priority level corresponding to the list as Medium
normal	Setting the priority level corresponding to the list as Normal
low	Setting the priority level corresponding to the list as Low
dmac *mac-address*	Setting DMAC address due to the message conforming to the list
smac *mac-address*	Setting SMAC address due to the message conforming to the list
dsap *sap-value*	Setting DSAP address due to the message conforming to the list
ssap *sap-value*	Setting SSAPaddress due to the message conforming to the list

Default

none

Command mode

global configuration mode

Explanation

After the multi-channel DLSw communication link with priority leveo is established between DLSws of two terminals, the differernt addresses or different bridge-groups on the local area network (LAN) need to be assigned with different priority levels, which ensures that the messages coming from different SNA terminals is able to use the corresponding priority channel on the configured different priority levels.

Example

For DLSw_A of one terminal, the commands related to multi-channel DLSw communication link with priority level are as follows:

```
sap-priority-list 1 high
sap-priority-list 1 low dmac 0007.f010.a01d  ssap 6   dsap 4
sap-priority-list 1 normal smac 0007.f010.2003
sap-priority-list 2 medium
dlsw local-peer peer-id 192.168.20.168
dlsw remote-peer 0 192.168.20.169 priority
dlsw bridge-group 10 sap-priority 2
dlsw bridge-group 20 sap-priority 1
dlsw bridge-group 30 sap-priority 7
…
```

The configuration command related to DLSw_B of opposite terminal is supposed as follows:

```
dlsw local-peer peer-id 192.168.20.168
dlsw remote-peer 0 192.168.20.169 priority
dlsw bridge-group 10
…
```

The configuration command of DLSw of the above two terminals indicates that the multi-channel DLSw communication with priority level can be set up between DLSws pf the two terminals. For DLSw_A, it is configured with two sap-priority-lists, of which sap-priority-list 1 contains three items. The first item indicates that the default priority of sap-priority-list 1 is high; the second item indicates that the priority level of the message sent from the opposite mac whose address is 0007.f010.a01d and sap address is 4 to local terminal of DLSw_A whose sap address is 6 is low; the third item indicates that the priority level of the message sent from local terminal of DLSw_A whose address is 0007.f010.2003 is normal. Sap-priority-list 2 contains only one item, the items means that means the default priority level of Sap-priority-list 2 is medium.

Relevant command

dlsw local-peer

dlsw remote-peer

dlsw bridge-group

1.1.13 show dlsw capabilities

Syntas

show dlsw capabilities [**ip-address** *ip-address* | **local**]

Through displaying the information of exchange of capabilities, the user can have a more clear picture of various conditions generated in the process of the exchange of capabilities.

Parameter

Parameter	Description
ip-address *ip-address*	(Optional) Showing the information of performance exchange of the specific IP address.
Local	(Optional) showing the local information of performance exchange.

Default

none

Explanation

The output information of the command helps the user make statistics of IPX flow or diagnose the trouble.

Example

```
Router#sh dl ca local
DLSw: Capabilities for local peer 192.168.21.171
vendor id              : 'fff'
version number         : 2
release number         : 0
init pacing window     : 20
unsupported saps       : none
num of tcp sessions    : 1
icanreach mac-exclusive  : no
reachable mac addresses  : none
version string         :
DLSw Subsystem - ( SSP ) V0.8(T) build 20020109, written by Alex Wang
```

Relevant command

dlsw local-peer

dlsw remote-peer

dlsw icanreach

show dlsw peers

1.1.14 show dlsw circuit

Syntas

show dlsw circuits [**detail**] [**mac-address** *address* | **sap-value** *value* | **circuit** *id*]

Through displaying the virtual circuit of DLSw, the user can understand the status information of all the current circuits.

Parameter

Parameter	Description
detail	(Optional) Showing the detailed information of virtual circuit.

mac-address *address*	(Optional) Showing the information of designated destination MAC circuit.
sap-value *value*	(Optional) Showing the information of designated destination SAP circuit
circuit *id*	(Optional) The parameter is the ID of virtual circuit of DLSw

Default

none

Explanation

The output information of the command helps the user make statistic of IPX flow or diagnose the trouble.

Example

```
Router#sho dlsw cir det
Index    local addr(lsap)          remote addr(dsap)    state                    uptime
8982368  0010.1010.99a0(04)   0007.f010.10d9(04)   CONNECTED     00:00:09
      PCEP: 8982368                    UCEP: 536870918
      Port: Serial2/0                        peer 192.168.20.22(2065)
      Flow-Control-Tx CW:20, Permitted:16; Rx CW:20, Granted:40 Op:None
      Local busy flag:  00,                        Remote busy flag: 00
      Congestion: IDLE, HWO: 0/0 ZWO: 0/0 RWO: 2/3 IWO: 0/0 DWO: 0/0
      2wan_in: 44, 2wan_out: 44    2lan_in: 0, 2lan_out: 0
tx/rx: 44/0 drops:  0
      ifcm packet tx/rx:  0/2
      xid packet tx/rx :  0/0
      ui packet tx/rx  :  0/0
```

Relevant command

dlsw local-peer

dlsw remote-peer

show dlsw peers

1.1.15 show dlsw peers

Syntas

show dlsw peers [**ip-address** *ip-address*]

The various information of remote DLSw can be shown through the command.

Parameter

Parameter	Description
ip-address *ip-address*	(Optional) Designating some specific remote DLSw by using IP address.

Default

none

Explanation

The output information of the command helps the user make statistics of IPX flow or diagnose the trouble.

In order to have real monitoring of operation condition of DLSw, the statistic shall be made to SSP processing. Flow control, as an important function of DLSw, is applied to the transmission of DLSw data message.

Example

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.156
dlsw remote-peer 0 1.1.1.1 dynamic no-llc 1 keepalive 0
dlsw remote-peer 0 192.168.20.204 priority
…
router#show dlsw peer

Peers:	state	pkts_rx	pkts_tx	type	drops	ckts	uptime
TCP 192.168.20.156	DISCONNECT	0	0	conf	0	0	-
TCP 192.168.20.204							
High priority	ACTIVE	521	521	conf	0	0	04:10:15
Medium priority	ACTIVE	0	0	conf	0	-	04:10:15
Normal priority	ACTIVE	0	0	conf	0	-	04:10:15
Low priority	ACTIVE	0	0	conf	0	-	04:10:15
TCP 1.1.1.1	DISCONNECT	0	0	dyna	0	0	-

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

dlsw local-peer peer-id 192.168.20.202
dlsw remote-peer 0 192.168.20.156
dlsw remote-peer 0 192.168.20.204 backup-peer 192.168.20.156 backup-static
…
router#show dlsw peer

Peers	state	pkts_rx	pkts_tx	type	drops	ckts	uptime
TCP 192.168.20.156	ACTIVE	19	19	conf	0	0	00:08:35
TCP 192.168.20.204	ACTIVE (SInvalid)	21	21	conf	0	0	00:09:25

“(SInvalid)” on the second line indicates the static backup route is ineffective for circuit

although it is under “ACTIVE” status. That is to say, new circuits will produce on the route.

For DLSw_A of one terminal, the commands related to DLSw communication link are as follows:

dlsw remote-peer 0 192.168.20.156
dlsw remote-peer 0 192.168.20.204 backup-peer 192.168.20.156 linger 10
…
router#show dlsw peer

Peers	state	pkts_rx	pkts_tx	type	drops	ckts	uptime
TCP 192.168.20.156	ACTIVE	4	4	conf	0	0	00:01:11
TCP 192.168.20.204	ACTIVE (SInvalid)	7	7	conf	0	0	00:01:12

“(Invalid)” on the second line indicates the backup route is ineffective for circuits although it is under “ACTIVE” status. That is to say, new circuits will produce on the route.

Relevant command

dlsw local-peer

dlsw remote-peer

show dlsw capabilities

show dlsw circuit

1.1.16 show dlsw reachability

Syntas

show dlsw reachability [[**local** | **remote**] | [**mac-address** *address*]

The buffer information can be shown through the command, including local buffer and remote buffer.

Parameter

Parameter	Description
Local	(Optional) Exclusively showing local buffer information of DLSw
Remote	(Optional) Exclusively showing remote buffer information of DLSw.
mac-address	(Optional) Exclusively showing the information related to MAC address.

Default

none

Explanation

The output information of the command helps the user make statistics of IPX flow or diagnose the trouble.

In order to improve response performance of Explorer of LLC2 and lower network spending, buffer is realized as a feature of DLSw.

Two kinds of buffers are:

Remote DLSw buffer---storing remote DLSw identifier based on Mac as index.

Local DLSw buffer---storing local port identifier based on Mac as index

Example

Router#sho dlsw reach
DLSw MAC address reachability cache list

Mac Addr	status	Loc.	peer/port	type	rif
0007.f010.10d9	FOUND	REMOTE	192.168.20.22	Dynamic	
0007.f070.a01d	FOUND	REMOTE	192.168.20.204	Dynamic	max-lf(1500)

Relevant command

dlsw local-peer

dlsw remote-peer

dlsw bridge-group

show dlsw peers

1.1.17 debug dlsw error

Syntas

debug dlsw error

The command is used for exporting the wrong debug information

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

This operation is used for exporting all the wrong information occurring in DLSw operation.

Example

router#debug dlsw error
DLSw: so_bind() Err! rc = -49

2001-12-18 11:57:18
DLSw(RC):
RetCode = DLSW_ERR_SYS_SOCK_INIT_FAILURE line = 64, name
= ../../sys/dlsw/dlswx_tcp_sm.c

Relevant command

dlsw local-peer

debug dlsw state

debug dlsw event

debug dlsw packet

1.1.18 debug dlsw state

Syntas

debug dlsw state [**tcp** *ip-address* | **circu**it *circuit-id* | **explorer** *mac-address*]

The command is used for exporting the debug information of internal state machine of DLSw.

Parameter

Parameter	Description
TCP	It is used for tracing the setup process of TCP connection and can locate some specific remote DLSw (it can be realized by state machine)
circuit	It is used for tracing state machine of circuit and can locate some specific circuit or remote DLSw belonging to the circuit.
Explorer	It is used for tracing state machine of Explorer and can locate some specific destination MAC address.

Default

none

Command mode

supervisor mode

Explanation

The trace of state machine shall include some debugging information of status, event, action and state machine, such as the receipt of an unuseful event, etc.

State machine of Information interactive of circuit: The state machine is responsible for the whole process of the setup, connection, cancellation, etc of a circuit. The specific status, event and action of the state machine is compatible with DLSw1.00 and DLSw+.

State machine of Explorer: the state machine is responsible for processing the Explorer frame.

The transmit of CANUREACH_ex by state machine of Explorer: When state machine of Explorer receives the message corresponding to a LLC2 and that can trigger the transmit of explorer, it will send CANUREACH_ex message under the condition that

remote buffer is not able to find the message. The state machine is under the status of waiting for ICANREACH_ex of opposite party.

The local buffer shall be found for CANUREACH_ex message fisrt. If the local buffer is found, it shall send ICHANREACH_ex message back to the opposite DLSw. If the local buffer is not found, test request message of LLC2 shall be sent to local LAN or DLC port. At this moment, the state machine is under the status of waiting for test response message of LLC2 of local SNA host.

The receipt of test response message of LLC2 of Explorer state machine: When the state machine is under the status of waiting for test response message of LLC2 of local SNA host, the state machine shall update the local buffer and shall immedialtely send ICANREACH_ex message to opposite DLSw, then the state machine turns into jterminate condition.

The receipt of ICANREACH_ex message of Explorer state machine: When the state machine is under the status of waiting for ICANREACH_ex message of opposite DLSw of local SNA host, the state machine shall update the remote buffer and shall immedialtely send test response message of LLC2 to local SNA host, then the state machine turns into jterminate condition. DLSw can set backup remote DLSw. When all the host DLSws lose their function, the backup DLSws will be responsible for communication.

Example

Router#debug dlsw state tcp
Router#2002-1-16 22:13:40 DLSw(SM-TCP):
EV_NAME : [DLSW_E_TCP_TM_004]
2002-1-16 22:13:40 DLSw(SM-TCP): TCP_ACT_8_1_1
2002-1-16 22:13:40 DLSw(SM-TCP): <192.168.20.22> @op: Tx kpalive req
2002-1-16 22:13:40 DLSw(SM-TCP): <192.168.20.22> @op: Set timer 005
2002-1-16 22:13:40 DLSw(SM-TCP): <192.168.20.22> DLSW_S_TCP_ACTIVE -> DLSW_S_TCP_ACTIVE

Relevant command

dlsw local-peer

debug dlsw error

debug dlsw event

debug dlsw packet

1.1.19 debug dlsw event

Syntas

debug dlsw event [**detail**]

This command is used for exporting the debug information of internal state machine of DLSw.

Parameter

Parameter	Description
detail	Output of debug inforamtion of processing link exchange

Default

none

Explanation

none

Command mode

supervisor mode

Example

Router#debug dlsw event

Router#2002-1-16 22:14:09 DLSw: Recv LLC DATA_INDICATION message, port s2/0,dmac 0007.f010.10d9, smac 0010.1010.99a0, dsap 04, ssap 04 dlen: 251

2002-1-16 22:14:09 DLSw(DCCI): Send SSP INFOFRAME packet, peer 192.168.20.22, rem_corr 20000006 dlen: 251

2002-1-16 22:14:09 DLSw(Main-StdE): Recv IFCM SSP pkt 2002-1-16 22:14:09 rem_corr 0x00890f60, len: 0

2002-1-16 22:14:10 DLSw(SM-TCP): Send CISCO-comatiblae KEEPALIVE request packet for <192.168.20.22>

2002-1-16 22:14:10 DLSw(SM-TCP): <192.168.20.22> DLSW_S_TCP_ACTIVE -> DLSW_S_TCP_ACTIVE

2002-1-16 22:14:10 DLSw(Main-StdE): Recv Cisco-compatible KeepAlive response pkt from 192.168.20.22

Relevant command

dlsw local-peer

debug dlsw error

debug dlsw state

debug dlsw packet

1.1.20 debug dlsw flow-control

Syntas

debug dlsw flow-control

This command is used for exporting the debug information of processing flow control.

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

Flow control, as an important function of DLSw, is used for the transmission of DLSw data message.

Example

```
Router#deb dlsw fl
Router #2002-1-16 22:14:22 DLSw(FC): <8982368> decr s - sw:20 s:34 so:1 rw:20 r:40 ro:0
2002-1-16 22:14:22 DLSw(FC): <8982368> sent FCO on INFOFRAME - sw:20 s:34 so:0 rw:20
r:40 ro:0
2002-1-16 22:14:25 DLSw(FC): <8982368> decr s - sw:20 s:33 so:0 rw:20 r:40 ro:0
Router #2002-1-16 22:14:29 DLSw(FC): <8982368> decr s - sw:20 s:32 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:29 DLSw(FC): <8982368> decr s - sw:20 s:31 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:29 DLSw(FC): <8982368> decr s - sw:20 s:30 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:29 DLSw(FC): <8982368> decr s - sw:20 s:29 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:29 DLSw(FC): <8982368> decr s - sw:20 s:28 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:34 DLSw(FC): <8982368> decr s - sw:20 s:27 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:34 DLSw(FC): <8982368> decr s - sw:20 s:26 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:35 DLSw(FC): <8982368> decr s - sw:20 s:25 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:35 DLSw(FC): <8982368> decr s - sw:20 s:24 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:35 DLSw(FC): <8982368> decr s - sw:20 s:23 so:0 rw:20 r:40 ro:0
2002-1-16 22:14:38 DLSw(FC): <8982368> decr s - sw:20 s:22 so:0 rw:20 r:40 ro:0
```

Relevant command

dlsw local-peer

debug dlsw error

debug dlsw state

debug dlsw event

debug dlsw packet

1.1.21 debug dlsw packet

Syntas

debug dlsw packet

The command is used for exporting the debug information of internal state machine of DLSw.

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The debug information can be classified to be detailed and brief. The detail debug information includes the interpretation of the content of the message.

Example

Router#deb dlsw pa
Router#2002-1-16 22:14:45 ver_num:31 2002-1-16 22:14:45 hdr_len:10
2002-1-16 22:14:45 msg_len:0062
2002-1-16 22:14:45 rem_dl_corrltor:20000006
2002-1-16 22:14:45 rem_dlc_port_id:813c4298
2002-1-16 22:14:45 res0:0000
2002-1-16 22:14:45 msg_type: a 2002-1-16 22:14:45 fc_byte: 0
2002-1-16 22:14:45 00 2002-1-16 22:14:45 4e 2002-1-16 22:14:45 4f 2002-1-16 22:14:45 2e 2002-1-16 22:14:45 35 2002-1-16 22:14:45 39 2002-1-16 22:14:45 37 2002-1-16 22:14:45 32 2002-1-16 22:14:45…

Relevant command

dlsw local-peer

debug dlsw error

debug dlsw state

debug dlsw event

1.1.22 clear dlsw circuit

Syntas

clear dlsw circuit [*circuit-id*]

The command is used for clearing the circuit of DLSw .

Parameter

Parameter	Description
circuit-id	The identifier of some specific circuit. The numeric area of the parameter is 0-4294967295.

Default

none

Command mode

supervisor mode

Explanation

The command can be used for clearing virtual circuit information of DLSw of all or designated IP addresses. This operation will disconnect the relevant LLC2 dialogue.

Information interactive state machine of circuit: The state machine is responsible for

the whole process of the setup, connection, cancellation, etc of a circuit. The specific status, event and action of state machine is compatible with DLSw1.00 and DLSw+.

Example

A circuit exists on gateway router of DLSw.
RS_config#show dlsw cir

Index	local addr(lsap)	remote addr(dsap)	state	uptime
12454144	0007.f010.1019(04)	0007.f070.a01d(04)	CONNECTED	00:00:07

Router#clear dlsw circuit
RS_config#show dlsw cir
Index local addr(lsap) remote addr(dsap) state uptime
…

Relevant command

dlsw local-peer

dlsw remote-peer

show dlsw circuit

1.1.23 clear dlsw reachability

Syntas

clear dlsw reachability

This command is used for clearing the statistic information of DLSw.

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

This operation will clear all the statistic information of DLSw. In order to have the real-time monitoring of the operation condition of DLSw, the statistic shall be made to SSP processing. This operation will clear all the buffers, including local buffer and remote buffer.

Example

A reachability list item exists on gateway router of DLSw.
RS#show dlsw rea
DLSw MAC address reachability cache list
Mac Addr status Loc. peer/port type rif

0007.f070.a01d FOUND REMOTE 192.168.20.204 Dynamic max-lf(1500)
Router#clear dlsw circuit
RS#show dlsw rea
DLSw MAC address reachability cache list
Mac Addr status Loc. peer/port type rif
…

Relevant command

dlsw local-peer

dlsw remote-peer

show dlsw peers

Chapter 2 LLC2 Command

2.1 LLC2 configuration command

2.1.1 llc2 idle-time

The command is used for controling the query frequency at idle time (no data is exchanged) The “no” format of the command can be used for restoring the default value.

Syntas

llc2 idle-time *seconds*

no llc2 idle-time

Parameter

Parameter	Description
Seconds	the interval (seconds) for sending RR frame at idle time. The maximum interval is 60 seconds; the minimum one is 1 second.

Default

10 seconds

Command mode

Interface configuration Mode

Explanation

At idle time, No I (nformation) frame is exchanged and RR ready receipt) frame is sent to remote terminal periodically to inform the remote terminal to get ready for receiving data. The relative small value shall be set to ensure the prompt advice to the remote terminal. The too small value is likely to lead to too many RR frames to be transmitted on the network.

Example

Set it to transmit RR frame every 12 seconds.

```
int ethernet1/1
llc2 idle-time 12
```

2.1.2 llc2 t1-time

The command is used for controlling the time of waiting for the conformation of the remote terminal. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 t1-time *seconds*

no llc2 t1-time

Parameter

Parameter	Description
Seconds	the time of waiting for the confirmation of remote terminal. The maximum time is 60 seconds while the minimum is 1 second.

Default

1 second

Command mode

Interface configuration Mode.

Explanation

The confirmation of remote terminal is expected after I frame is sent each time. If no confirmation is received in a specific time, I frame will be re-sent. The relative bigger value shall be set for the network on which the data transmit is quite slow.

Example

Setting the time of 12 seconds of waiting for confirmation

Router_config#int ethernet1/1
Router_config _e1/1#llc2 t1-time 12

2.1.3 llc2 tbusy-time

The command is used for controling the waiting time when the remote terminal is busy. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 tbusy-time *seconds*

no llc2 tbusy-time

Parameter

Parameter	Description
seconds	The time of waiting is in seconds when the remote terminal is busy. The maximum time is 60 seconds, the minimum is 1 second.

Default

10 seconds

Command mode

Interface configuration Mode

Explanation

A LLC2 connective terminal is able to inform the opposite terminal that local terminal is busy and prevent the opposite terminal from transmitting data to local terminal and send “RNR” (receipt not ready) to the opposite terminal. The relative bigger value can be set for averting the timeout.

Example

Setting the time of 12 seconds of busy remote terminal

Router_config#int ethernet1/1
Router_config _e1/1#llc2 tbusy-time 12

2.1.4 llc2 tpf-time

The command is used for controlling the time of waiting for the response of the remote terminal. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 tpf-time *seconds*

no llc2 tpf-time

Parameter

Parameter	Description
Seconds	the time of waiting for the response of the remote terminal. The maximum time is 60 seconds while the minimum is 1 second.

Default

1 second

Command mode

Interface configuration Mode

Explanation

When an LLC2 connection terminal sometimes needs to know the status of the opposite terminal, it shall send a command frame for the response of the opposite terminal and wait for the response of the opposite terminal simultaneously. When the opposite terminal receives the command frame, it will make a response frame. If the error occurs, the transmit terminal will keep waiting. In order to avoid this situation, a clock needs to be started for prompting the transmit terminal to send another command frame when the arrival time is hit. The command is used for setting the time of waiting for the response frame of the opposite terminal.

Example

Setting the time of 12 seconds of waiting for response of the opposite terminal.

Router_config#int ethernet1/1
Router_config _e1/1#llc2 tpf-time 12

2.1.5 llc2 trej-time

The command is used for controlling the time of waiting for the response of the remote terminal to the rejection frame.

Syntas

llc2 trej-time *seconds*

no llc2 trej-time

Parameter

Parameter	Description
seconds	the waiting time is in seconds when the remote terminal is busy. The maximum time is 60 seconds, the minimum is 1 second.

Default

3 seconds

Command mode

Interface configuration Mode

Explanation

The data receipt and transmit of the two terminal of LLC2 links is based on the specific sequence. When the sequence number of opposite I frame received by a LLC2 connection terminal is not the expected value, the LLC2 connection terminal will send a REJ(rejection) frame to the opposite terminal and start a clock. If no response is made at the arrival time, LLC2 link will be disconnected. The command is used for setting the time of waiting for the response to REJ (rejection) frame.

Example

Setting the waiting time of 12 seconds.

Router_config#int ethernet1/1
Router_config _e1/1#llc2 trej-time 12

2.1.6 llc2 n2

The command is used for controlling the times of retransmit of the frame. The “no” format of the command can be used for restoring the default value.

Syntas

llc2 n2 retry-count

no llc2 n2

Parameter

Parameter	Description
retry-count	the time of retransmit of frame, the maximum is 255 times and the minimum is 1 time.

Default

8

Command mode

Interface configuration Mode

Explanation

When one terminal of LLC2 link sends data to the opposite terminal, it will wait for the confirmation of the opposite terminal. If the opposite terminal does not send the confirmation information in the specified time, the local will re-send the data, but the times of retry shall be limited. When the retry times exceed retry-count, LLC2 link will be disconnected. The command is used for setting the retry times (retry-count).

Example

Setting the retry times as 12

Router_config#int ethernet1/1
Router_config _e1/1#llc2 n2 12

2.1.7 llc2 local-window

The command is used for controlling the maximum number (namely the size of window for transmit) when I frame is not confirmed. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 local-window *packet-count*

no llc2 local-window

Parameter

Parameter	Description
packet-count	the maximum number of I frame transmit at the time of not being confirmed, the maximum number is 127, the minimum one is 1

Default

7

Command mode

Interface configuration Mode

Explanation

When one terminal of LLC2 link sends data to the opposite terminal, only some specific amount of data can be sent before the confirmation of the opposite terminal/ The command is used for setting the maximum value. However, when the value is set too big, it will result in the loss of data as the opposite terminal is not able to receive all the data.

Example

Setting the size of the window for transmit as 12

Router_config#int ethernet1/1
Router_config _e1/1#llc2 local-window 12

2.1.8 llc2 holdqueue

The command is used for controlling the maximum number the local can accumulate when I frame cannot be sent (the remote terminal is busy). The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 holdqueue packet-count

no llc2 holdqueue

Parameter

Parameter	Description
packet-count	the maximum number reserved by I frame at the time of not being confirmed. The maximum number is 200, the minimum one is 20.

Default

40

Command mode

Interface configuration Mode

Explanation

One terminal of LLC2 link is not able to send data (I frame) when the opposite terminal is busy. All the data shall be reserved before the opposite terminal clears busy. But the number to be reserved has specific limitations. The command is used for setting the number of the data to be reserved.

Example

Setting the maximum number of the data to be reserved as 120

Router_config#int ethernet1/1
Router_config _e1/1#llc2 holdqueue 120

2.1.9 llc2 ack-delay-time

The command is used for controlling the time delay for I frame confirmation. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 ack-delay-time *time*

no llc2 holdqueue

Parameter

Parameter	Description
time	The maximum milliseconds the command “*time”* allows the unconfirmed I frame to reserve.

Default

400

Command mode

Interface configuration Mode

Explanation

When one terminal of LLC2 link receives I frame sent from the opposite terminal, the confirmation frame (RR frame, receive ready frame) does not need to be sent immediately for waiting some time. If no data is sent for confirmation during the said time, the confirmation frame (RR frame, receive ready frame) shall be sent, or when I frame is sent from the opposite terminal reaches the value of **llc2 ack-max** during the said time, the confirmation frame (RR frame) shall be sent immediately. The command can be used for reducing the unnecessary data interactive at the time of big data flow.

Example

Setting the time delay as 1 second at the time of confirmation

Router_config#int ethernet1/1
Router_config _e1/1#llc2 ack-delay-time 1000

2.1.10 llc2 ack-max

The command is used for controlling the allowed maximum I frame before confirming I frame. The “no” format of the command can be used for restoring to the default value.

Syntas

llc2 ack-max *number*

no llc2 holdqueue

Parameter

Parameter	Description
number	The maximum number allowed by the command "*number*" before confirming I frame. The maximum number is 127, the minimum one is 1.

Default

3

Command mode

Interface configuration Mode ˚

Explanation

When one terminal of LLC2 link is waiting for the confirmation of the opposite terminal, a given number of I frame can be sent. When the receipt terminal receives the confirmation or the maximum number of I frames, the confirmation frame (RR frame) will be sent. The command can be used for reducing the unnecessary data interactive at the time of big data flow.

Example

Setting the confirmed maximum number as 7.

Router_config#int ethernet1/1
Router_config _e1/1#llc2 ack-max 7

2.1.11 show llc

The command is used for displaying the relevant information of LLC2 link connection.

Syntas

show llc interface [**type** *number*]

Parameter

Parameter	Description
type	Interface Type
number	Interface number

Default

none

Command mode

supervisor mode ` global configuration Mode ` Interface configuration Mode

Explanation

Showing the relevant information of LLC2 kink connection. The command “show llc” is used for displaying the information of LLC2 link of the interface under interface mode.

Example

Under Interface configuration Mode, the command “show llc” is used for displaying llc2 information on the interface ethernet1/1.

Router#sho llc ethernet1/1
Router_config# sho llc ethernet1/1
Router_config#int ethernet1/1
Router_config _e1/1#sho llc ethernet1/1

2.1.12 debug llc2

Syntas

debug llc2 [**packet**|**error**|**state**]

Parameter

Parameter	Description
packet	opens the debug switch of LLC2 link data information;
error	opens the debug switch of wrong information of LLC2 link;
state	opens the debug information of status information of LLC2 link.

Default

none

Command mode

supervisor mode

Explanation

The command is used for opening debug switch of LLC2.

Example

Opening the debug switch of LLC2 link

Router#debug llc2 packet
Router#debug llc2 state
Router#debug llc2 error

Chapter 3 SDLC Configuration Command

3.1 SDLC Command

3.1.1 sdlc address

Syntas

sdlc address *sdlc-address*

Configuring SDLC address of SDLC secondary station.

Parameter

Parameter	Description
Sdlc-address	Address of SDLC secondary station. Range:1-0xfe.

Default

none

Explanation

SDLC protocol allows multiple virtual circuits to run on physical link of SDLC. One terminal connects with the primary station, the other terminal connects with the secondary station. In order to distinguish each virtual circuit, SDLC address shall be designated to each virtual circuit. As the mode of SDLC is the unbalanced one, main equipment can connect with multiple sole secondary equipment through shared ware or SDLC exchanger. But the connection cannot be set up between the equipment. So when the address of the secondary equipment is identified, the normal communication between SDLC equipment of the same group can be ensured. The command designated SDLC address, which is exclusive on a physical port, for the virtual circuit. SDLC address configured on Synchronous port is actually the address of SDLC secondary station connected with the interface.

SDLC address on a router is effective exclusively on a physical interface, which means that SDLC address configured on the different interfaces are the same.

Example

Configuring a SDLC station C1

```
int s1/1
sdlc address c1
```

3.1.2 sdlc k

Syntas

sdlc k *length*

Configuring the size of the window for transmitting SDLC, namely the maximum frames sent one time and unconfirmed by the opposite terminal

Parameter

Parameter	Description
length	The size of window for transmission.Range:1-7.

Default

7

Explanation

none

Example

Configuring the window for transmission of sdlc as 3

```
int s1/1
sdlc K 3
```

3.1.3 sdlc n1

Syntas

sdlc n1 *length*

Configuring the maximum length of fame receivable of SDLC, namely N1 value defined by protocol.

Parameter

Parameter	Description
Length	The maximum length of frame receivable.Range: 1-1500 bytes

Default

1500 bytes

Explanation

none

Example

Configuring the maximum length of frame receivable of a SDLC

```
int s1/1
sdlc n1 1200
```

3.1.4 sdlc n2

Syntas

sdlc n2 *times*

Configuring the maximum times of retransmit of SDLC, namely N2 value defined by protocol.

Parameter

Parameter	Description
Times	Maximum times of retransmit.Range:1-255.

Default

20 times

Explanation

none

Example

Configuring the maximum times of retransmit of a SDLC as 12

int s1/1
sdlc n2 12

3.1.5 sdlc t1

Syntas

sdlc t1 *seconds*

Configuring the time of SDLC's waiting for response, namely T1 value defined by protocol.

Parameter

Parameter	Description
Seconds	The time of waiting for response.Range:1-64s

Default

3s

Explanation

none

Example

Configuring the time of a SDLC's waiting for response as 30s.

int s1/1
sdlc t1 30

3.1.6 sdlc sdlc-largest-frame

Syntas

sdlc sdlc-largest-frame *sdlc-address length*

Configuring the maximum length of frame receivable of each secondary station.

Parameter

Parameter	Description
Length	Maximum length of frame receivable. 1-1500 bytes

Default

265 bytes

Explanation

none

Example

Configuring the maximum length of frame receivable of a SDLC as 1200

int s1/1
sdlc sdlc-largest-frame 1200

3.1.7 sdlc partner

Syntas

sdlc partner *mac-address sdlc-address*

Configuring the mapping of SDLC secondary station and remote MAC address, thus the connection is set up between the secondary station and remote equipment.

Parameter

Parameter	Description
Mac-address	MAC address of remote equipment.Range:48bytes
Sdlc-address	Address of secondary station. Range:1-0xfe

Default

none

Explanation

none

Example

Configuring 0011.1122.3344 for C1 station of a SDLC

```
int s1/1
sdlc partner 0011.1122.3344 C1
```

3.1.8 sdlc poll-limit-value

Syntas

sdlc poll-limit-value *times*

Configuring the maximum times of SDLC query to secondary station. °

Parameter

Parameter	Description
times	The maximum times of query to secondary station.Range:1-10.

Default

1

Explanation

When the mast station inquires the secondary station and the secondary station sends the data frame equal to the size of a full window for transmission, the primary station can re-inquire the secondary station rather than the next secondary station. The command is used for configuring the times of consecutive inquiry to a secondary station.

Example

Configuring the maximum times of a SDLC's inquiry to the secondary station

```
int s1/1
sdlc poll-limit-value 10
```

3.1.9 sdlc poll-pause-timer

Syntas

sdlc poll-pause-timer *seconds*

Configuring the interval of SDLC inquiry to the secondary station

Parameter

Parameter	Description
seconds	Time Interval.range: 100-10000 ms

Default

100 ms

Explanation

none

Example

Configuring the time interval of a SDLC as 1200ms

int s1/1
sdlc poll-pause-timer 1200

3.1.10 sdlc saps

Syntas

sdlc saps *sdlc-address local-sap remote-sap*

Configuring SAP value used for the connection between SDLC and remote equipment

Parameter

Parameter	Description
Sdlc-address	SDLC address of secondary station.range:1-0xfe
Local-sap	SAP value used by the secondary station. range: 1-254
Remote-sap	SAP value used by remote terminal. range: 1-254

Default

The secondary station and remote terminal both use 0x04.

Explanation

none

Example

Configuring SAP value used by the secondary station C1 of a SDLC as 8, and SAP value used by the remote terminal as 24.

int s1/1
sdlc saps C1 8 24

3.1.11 sdlc role

Syntas

sdlc role *{primary|secondary}*

Configuring the type of SDLC station

Parameter

Parameter	Description
Primary	Configuring the port into SDLC primary station
secondary	Configuring the port into SDLC secondary station

Default

primary

Explanation

SDLC is an unbalanced mode link layer, the status of the connected equipment on the two terminals are not equal, of which one terminal plays a leading role and controls the whole process of connection, it is called the primary station, the other terminal is passive and controls the primary station, it is called secondary station. In order to encapsulate the role of interface configuration of SDLC protocol, the user shall make the decision according to the role of SDLC equipment connected with the router when configuring SDLC role. If SDLC equipment connected with the interface is primary, the interface shall be set as secondary. If the connected equipment is secondary, the interface shall be set as primary**.** Under general conditions, the mainframes at the center are primary. The terminal equipment such as Unix host and ATM are secondary.

Example

Configuring SDLC as secondary station

```
int s1/1
sdlc role secondary
```

3.1.12 sdlc simultaneous

Syntas

sdlc simultaneous *[full-datamode* | *half-datamode]*

Configuring half-duplex and full duplex working mode of SDLC .

Parameter

Parameter	Description
Full-datamode	full duplex working mode.
Half-datamode	Half-duplex working mode.

Default

full duplex working mode

Explanation

None

Example

Configuring a SDLC primary station into harf-duplex working mode

```
int s1/1
sdlc simultaneous half-datamode
```

3.1.13 sdlc vmac

Syntas

sdlc vmac *mac-address*

Configuring virtual MAC address of SDLC secondary station. The address is used for communication with remote Ethernet or token ring networks.

Parameter

Parameter	Description
Mac-address	Virtual MAC address of secondary station.range: 48 bytes

Default

none

Explanation

Among 48-byte digits of virtual MAC address, the last 8 digits shall be 0. For instance, when vmac is set as ab12.3456.78c1, the configuration should be ab12.3456.7800.

Example

Configuring the virtual MAC address 4000.0099.9900 for a SDLC

```
int s1/1
sdlc vmac 4000.0099.9900
```

3.1.14 sdlc xid

Syntas

sdlc xid *sdlc-address xid-number*

Configuring XID of SDLC secondary station.

Parameter

Parameter	Description
Sdlc-address	SDLC address of secondary station.range: 1-0xfe
Xid-number	XID value of secondary station .range:Four-digit hexadecimal system number

Default

none

Explanation

XID is the identifier of an equipment identity in SNA family, the front 12 bytes represents network number and last 20 bytes represents node point number. There are two kinds of equipment, namely PU2.0 and PU2.1. The equipment of PU2.1 has been configured with XID and can present its identity through exchange of XID, while the equipment of PU2.0 does not exchange XID and does not have XID. Therefore PU2.1 type of equipment does not need to be configured with the command. For the equipment of PU2.0, a XID should be designated for it.

If the command is not configured, router will view it as PU 2.1. If the command is configured, router will view it as PU 2.0. These are the just differences with the commands of Cisco. When the command of Cisco is used for configuring PU 2.1, xid-poll parameter needs to be added to the back of the command “sdlc address”. When all types of PU are 2.1 type, they can be defined as the uniform command “sdlc role prim-xid-poll”.

Notes:

The command shall be configured when the interface is disconnected.

Example

Configuring xid of station C1 of a SDLC as 01020007

int s1/1
sdlc xid C1 01020007

3.1.15 sdlc holdqueue

Syntas

sdlc holdqueue *address length*

Configuring the length of transmit queue of SDLC

Parameter

Parameter	Description
Address	Address of secondary station.range: 1-0xfe
Length	Length of queue.range: 1-65535

Default

none

Explanation

If the number of data packet requested by the upper lever to send is bigger than the value, the date packet will be abandoned.

Example

Configuring the length of queue of station C1 of a SDLC as 100

int s1/1
sdlc holdqueue C1 100

3.1.16 debug sdlc error

Syntas

debug sdlc error

This command is used for exporting the wrong debug information of SDLC.

Parameter

none

default

none

explanation

The command is used for exporting all the erroneous information occurring in SDLC operation and erroneous location.

3.1.17 debug sdlc state

Syntas

debug sdlc state

This command is used for exporting the information of the state machine of SDLC.

Parameter

none

Default

none

Explanation

The output format is as follows:

SDLC Serial0/0: CONNECT.Req on station C1, state DISC -> WAIT_CONNECT

SDLC Serial0/0: Rx I on station C1, state CONNECT

3.1.18 debug sdlc packet

Syntas

debug sdlc packet

The command is used for exporting the information of receipt and transmit of packet.

Parameter

none

Default

none

Explanation

The content of the packet that should be interpreted. The output format shall refer to LAPB and X.25.

SDLC Serial0/0: TX -> Info(3, 4) on station C1, Poll set, Len 25 Notes: 3 means N(S), 4 means N（R）.

Ff ff ff ff ff ff ff ff ff ff This is the specific content of packet.

SDLC Serial0/0: RX <- RR(4) on station C1, Final