Management Commands for Protection Switching

Zehavit Alon

IEEE Interim Meeting January 2008

Nokia Siemens Networks

Introduction

- Protection switching for point-to-point trunks is defined in section 26.10 of the 802.1Qay.
- The protection switching mechanism is controlled by:
  - Configuration
  - Connectivity condition
  - Administrative requests

Protection switching configuration

The configuration of the protection switching capability includes the definition of :

- working and protection trunks as protection trunk group
- Revertive/non-revertive modes – Determines whether traffic should revert to the configured working trunk after recovery from failure
- time to restore – the time required before reverting back to the working trunk
- hold off time – the time between failure detection and execution of protection switching

Connectivity condition

- Connectivity status is determined by CCMs, as defined in the 802.1ag
- Both working and protection trunks are constantly monitored by CCM
- The protection switching mechanism makes use of the CCM state machine and evaluates CCM variables, in order to define the condition of the trunks which comprise the protection trunk group.
- A signal fail condition (SF) is declared if the CCM variables indicated that there is connectivity problem
- Automatic Protection Switching is triggered when an SF condition is declared on the trunk over which the traffic is flowing.
  - If traffic is mapped to the working trunk and SF is detected on it, traffic will be mapped to the protection trunk
  - If traffic is mapped to the protection trunk and SF is detected on it traffic will be mapped to the working trunk

Administrator actions

- Whenever necessary, the administrator may force a manual switchover to support a specific maintenance operation
  - lock protection - administrative command to prohibits the use of the protection entity
  - switch to working - administrative command to manual switch the data traffic to the working PBB-TE trunk
  - switch to protection -administrative command to manual switch the data traffic to the protection PBB-TE trunk
- Administrative requests should be signaled to both edges of the trunk so that traffic will be mapped to the same trunk on both edges.

CCM enhancement to signal switch over

The CCM message should be extended by the following:

- A new optional TLV that contains the administrative request
  - "Admin" TLV indicates a specific administrative management request.
  - This TLV is added to the CCM only when an administrative management request was received and executed
- An explicit indication that this TLV appears in the CCM message.
  - Use one of the four reserved bits in the Flags field in the Common CFM Header to indicate that an administrative management request is included in the CCM.
  - This bit is referred to as the "Admin" bit.

Proposed “Admin” TLV

The format of the "Admin" TLV structure is defined as follows:

Type = 5
Length
Value

The possible values for the "Value" field are listed below:

Mnemonic of Value	Administrative Management Request	Value
ClearLockOutProtection	Clear lockout protection	0
LockOutProtection	Lockout Protection	1
ClearMS	Clear Manual Switch	2
MSWorking	Manual Switch to working	3
MSProtection	Manual Switch to protection	4

MEP functionality

MEP in the near edge

- Execute the appropriate admin operation. If the command is executed successfully, perform the following:
  - Set the protocol version in the CCM to version 2. (In version 1, the reserved bits in the Flags field are ignored.)
  - Set the "Admin" flag in the CCM to "true".
  - Add the "Admin" TLV with the appropriate value (as defined in the table above) to the CCM.

MEP in the far edge

- Inspect the CCM flags. If the "Admin" flag is set to "true", inspect the "Admin" TLV.
- Execute the appropriate administrative operation, as indicated by the “Admin” TLV.

Advantages

- Uses the existing CCM with minor enhancements
- Does not introduce a new PDU type
- Does not add additional traffic
- Manual switching is flexible and can be performed on the protection entity *and* on the working entity
  - In ITU-T G.8031 APS manual switch can only be performed on the protection entity.
- All PDU data have meaning; no bits are ignored.
- A single state machine performs both automatic and manual protection switching.

Recommendation

Add the support for signaling the administration request in the CCM by defining:

- the proposed “Admin” TLV, and
- the usage of one of the bits in the reserved field

Thank You

zehavit.alon@nsn.com

Nokia Siemens Networks