Author: Harri Sunila

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GSMP

The gsmp module implements the IETF RFC 1987 [1] (Ipsilon's General Switch Management Protocol (GSMP)). GSMP is a general purpose protocol to establish and modify virtual connections across an ATM switch. It also contains capabilities to collect statistical information about existing virtual connections and ports in the switch.

1   Introduction

"The Geneneral Switch Management Protocol (GSMP), is a general purpose protocol to control an ATM switch. GSMP allows a controller to establish and release connection across the switch; add and delete leaves on a point-to-multipoint connection; manage switch ports; request configuration; and request statistics. It also allows the switch to inform the controller of asynchronous events such as a link going down. GSMP runs across an ATM link connecting the controller to the switch, on a control connection (virtual channel) established at initialization. The GSMP protocol is asymmetric, the controller being the master and the switch being the slave. Multiple switches may be controlled by a single controller using multiple instantiations of the protocol over separate control connections." [1]

The specification defines both GSMP and Adjacency protocol, which is responsible to synchronise the link between the controller and the switch. It is not allowed to send GSMP messages to the switch before synchronisation of the control link.

GSMP uses CPCS adapter to access AAL5 service offered by the ATM Network Interface Card, and the service interface of GSMP is represented as objects instantiated from gsmpConnectionManagement and gsmpConfigurationManagement classes. gsmpConnectionManagement objects represent modifiable virtual connections and gsmpConfigurationManagement objects allows user to request configuration of the switch and manage the resources of the switch.

2   Architecture

The gsmp module implements both GSMP and Adjacency protocol conduits that can be used to control the switch as shown in Figure 1 and Table 1. gsmpFactory is an object to create gsmpConnectionManagement and gsmpConfigurationManagement objects and CC represents the existing user.
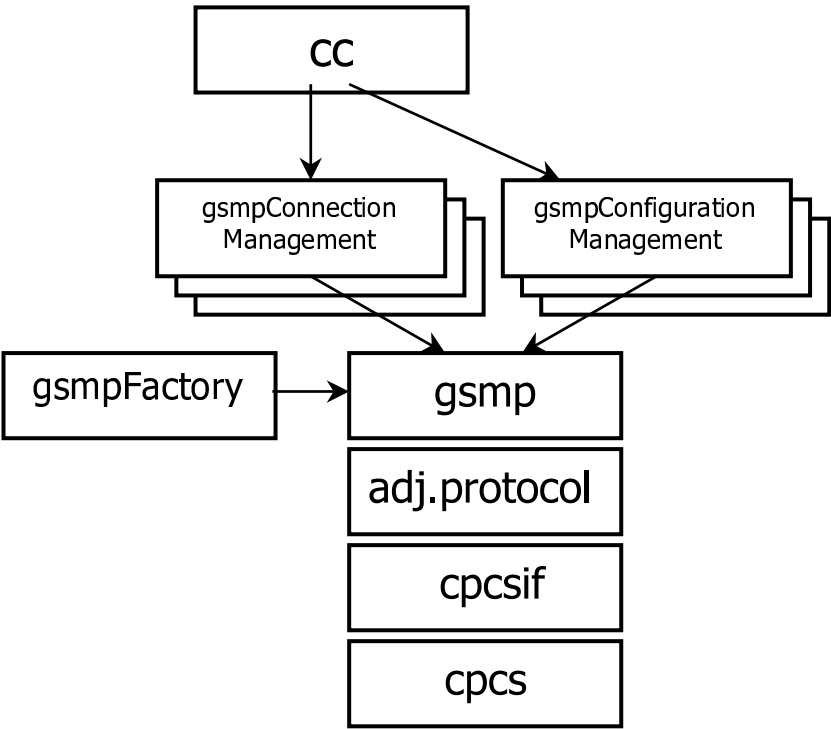

Figure 1. The upper and lower interfaces and modules used with gsmp module.

Upper protocol: call control

Upper module: cc

Module: gsmp

Lower interface: cpcsif

Lower module: cpcs

Lower protocol: cpcsATMAdapter

Uses:

Used by:

Table 1. The upper and lower interfaces and modules used with gsmp module.

3 Implementation details

The implementation of both GSMP and Adjacency protocol is a straightforward conduit implementation without any modifications. The Adjacency protocol is compatible with the one defined in the specification. However this implementation is extended with capabilities of detecting the lost of synchronization. Also resynchronization mechanisms has been defined and implemented.

GSMP is implemented with a two-state finite state machine. GSMP can be either idle or active and it enters the active state after Adjacency protocol has established the control link to the switch. The lost of synchronization between the controller and the switch causes GSMP to enter the idle state. All requests to the switch will be replied with failure response messages if GSMP is not active.

gsmpFactory is needed to create both gsmpConnectionManagement and gsmpConfigurationManagement objects which are associated with the specific gsmpProtocol conduit.

4 Features implemented

Currently GSMP implements only the Connection Management Messages and Configuration Management Messages defined in the specification. GSMP also supports all event messages defined in the specification.

The gsmpConnectionManagement has six different functions:

- addBranch(). Add a new output branch to an existing virtual connection. GSMP does not make difference between point-to-point and point-to-multipoint connections. Add Branch to an existing point-to-point connection transforms it to a point-to-multipoint connection.

- deleteBranch(). Delete an existing output branch from an existing virtual connection. Delete Branch to a point-to-multipoint connection with two output branches transforms it to a point-to-point connection.

- deleteTree(). Delete an entire virtual connection. All output branches will be removed.

- verifyTree(). Verify the number of output branches in a virtual connection.

- deleteAll(). Delete all connections in the specified input port.

- moveBranch(). Move an output branch of an existing virtual connection to another branch.

The gsmpConfigurationManagement has three different functions specified by the specification and four implementation specific functions:

- configureSwitch(). Sends a Switch Configuration request message to the switch to get the configuration information of the switch. The Switch Configuration request message is specified in the specification.

- configurePort(). Sends a Port Configuration request message to the switch to get the configuration information for the specific port. The Port Configuration request message is specified in the specification.

- configureAllPorts(). Sends an All Ports Configuration request message to the switch to get the configuration information of all ports in the switch. The All Ports Configuration request message is specified in the specification.

- bind(). Reserve a VPI/VCI pair in a port for a virtual connection. This function is implementation specific.

- unbind(). Free a reserved VPI/VCI pair in a port. This function is implementation specific.

- unbindAll(). Free all reserved VPI/VCI pairs in a port. This function is implementation specific.

- unbindAll(). Free all reserved VPI/VCI pairs in all ports. This function is implementation specific.

Event messages:

- Port Up event. A port of the switch has been brought into service. GSMP updates its internal state.

- Port Down event. A port of the switch has been taken out of service. GSMP updates its internal state.

- Invalid VPI/VCI event. This event indicates that one or more cells has been arrived at an input port of the switch with VPI/VCI that is not allocated to an assigned connection. The Invalid VPI/VCI event will be forwarded to the user of GSMP.

- New Port event. This event indicates that a new port has been added to switch. The event will be forwarded to the user.

- Dead Port event. This event indicates that a port has been removed from the switch. The event will be forwarded to the user.

5   Known bugs and flaws

There is not known bugs in this software.

6   Future development

The completion of missing features should be discussed. Software testing should be performed according test cases of Ipsilon. The final code inspection should be performed.

7 References

[1]   IETF RFC 1987, *Ipsilon's General Switch Management Protocol Specification, Version 1.1*, August 1996