

parameters might not be available; or by selecting a service in one set of parameters one might exclude another desired service not available in said one set. Freedom in the choice of services is limited. Also, the categories of users, *e.g.* satellite hub operator and its direct customers, being able to access to the management and control on said services may be restricted. Therefore, there is a need for a satellite telecommunication system and a virtual hub module thereof which can provide an extended control within the types of services offered.

SUMMARY

Embodiments of the present invention seek to provide a satellite telecommunication system and virtual hub module thereof which can offer more freedom in the choice of services available to a user and which is less constrained by the communication frequency, satellite hub manufacturer, or satellite teleport operator. More in particular, embodiments of the claimed invention aim to provide a satellite telecommunication system and virtual hub module thereof which allow bypassing some of the constraints of the satellite hub included in the gateway for satellite communication.

According to a first aspect of the present invention, there is provided a satellite telecommunication system for effecting communication between a network and remote systems via a forward satellite link and a return satellite link. The satellite telecommunication system comprises a gateway and a virtual hub module.

The gateway, or teleport, is configured for establishing the forward satellite link and the return satellite link to the remote systems. The gateway comprises a satellite hub including a first traffic controlling module. The satellite hub is configured for receiving outgoing data and for transmitting said outgoing data to at least one of the remote systems via the forward satellite link.

The first traffic controlling module of the satellite hub is configured for obtaining a first flow of the outgoing data being transmitted from the satellite hub, such that said first flow follows a predetermined traffic profile.

The virtual hub module includes a second traffic controlling module. The virtual hub module is configured for forwarding, from the network, the outgoing data to the satellite hub. The second traffic controlling module of the virtual hub module is configured for obtaining a second flow of the outgoing data being forwarded from the virtual hub module, such that said second flow is unchanged by the first traffic controlling module. In other words, the second flow is shaped by the second traffic controlling module to correspond to the predetermined traffic profile as required

According to an exemplary embodiment, the virtual hub module further includes a management and monitoring module. The management and monitoring module is configured for managing and monitoring the communication between the network and the remote systems.

5 In this way, the remote systems connected to the network via the forward satellite link and the return satellite link may be more easily managed and monitored by the virtual hub module. The management and monitoring of the communication may thus be delegated to the virtual hub module instead of being restricted by the satellite hub. Depending on the access rights provided to the virtual hub module, various users may be allowed to manage their own Internet Protocol (IP) traffic and/or manage the remote systems, as well as monitoring them. Additionally, the categories of users being able to access management and monitoring over the communication between the network and the at least one of the remote systems may be expanded to, for example, satellite operators, satellite teleport operators, satellite hub operators, internet service providers (ISP), local internet service providers (L-ISP), corporate-level end-users, individual-level end-users.

15 According to an embodiment, the management and monitoring module is further configured for generating and managing a data volume voucher upon request by the user, *e.g.* the L-ISP, the ISP. The generating of the volume voucher includes the generation of a unique URL based on a unique identifier associated to the user. The data volume voucher may allow granting connection to the network for a predefined amount of traffic data and/or period of time upon validation of the voucher code by, for example, a subscriber. In an embodiment, the user may further define via the management and monitoring module services linked to the unique URL, and using this URL, provide subscribers with voucher codes associated to the services defined.

25 In this manner, since the virtual hub module allows bypassing the first traffic controlling module, the user, *e.g.* the L-ISP, the ISP, may provide data volume vouchers to the end-users with similar conditions as operators upstream in the value chain between the network and the end-users.

30 There is disclosed a voucher generation sub-module. The voucher generation sub-module is configured for generating and managing a data volume voucher upon request by the user. The generating of the data volume voucher includes the generation of a unique URL based on a unique identifier associated to the user, *e.g.* the ISP, the L-ISP. The skilled person will understand that the implementation of the voucher generation sub-module is not limited to the virtual hub module.

According to a preferred embodiment, the performance metering module is further configured for sending a warning message to the user upon metering a level of the connectivity performance below a predetermined level.

- 5 In this way, mishaps of the satellite telecommunication system may be detected consistently, and thus solved more quickly in order to provide a reliable service.

According to an exemplary embodiment, the satellite hub is configured for transmitting the outgoing data via the Ku-band, the C-band, or the Ka-band.

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The skilled person will understand that the hereinabove described technical considerations and advantages for satellite telecommunication system embodiments also apply to the below described corresponding virtual hub module embodiments, *mutatis mutandis*.

- 15 According to a second aspect of the present invention, there is provided the use of the virtual hub module of the satellite communication system as defined in the first aspect for forwarding, from the network, outgoing data to a satellite hub.

According to a preferred embodiment, the virtual hub module is further configured for forwarding,
20 from the network, the outgoing data to another satellite hub including another hub traffic controlling module different from the hub traffic controlling module.

BRIEF DESCRIPTION OF THE FIGURES

- This and other aspects of the present invention will now be described in more detail, with reference
25 to the appended drawings showing a currently preferred embodiment. Like numbers refer to like features throughout the drawings.

Figure 1 shows a schematic view of an exemplary embodiment of a satellite telecommunication system;

- 30 Figure 2 shows a schematic view of an exemplary embodiment of a second traffic controlling module;

Figure 3 shows a schematic view of an exemplary embodiment of a management and monitoring module;

CLAIMS

1. A satellite telecommunication system for effecting communication between a network and remote systems via a forward satellite link (FWD) and a return satellite link (RTN), the satellite telecommunication system comprising:

- a gateway configured for establishing the forward satellite link (FWD) and the return satellite link (RTN) to the remote systems, said gateway comprising:

- a satellite hub configured for receiving outgoing data and for transmitting said outgoing data to at least one of the remote systems via the forward satellite link (FWD), said satellite hub including a first traffic controlling module;

- wherein the first traffic controlling module is configured for obtaining a first flow of the outgoing data being transmitted from the satellite hub such that said first flow follows a predetermined traffic profile;

- a virtual hub module configured for forwarding, from the network, the outgoing data to the satellite hub, said virtual hub module including a second traffic controlling module;

- wherein the second traffic controlling module is configured for obtaining a second flow of the outgoing data being forwarded from the virtual hub module such that said second flow is unchanged by the first traffic controlling module.

2. The satellite telecommunication system according to claim 1, wherein the virtual hub module is further configured for forwarding, from the network, the outgoing data to another satellite hub including another traffic controlling module different from the first traffic controlling module.

3. The satellite telecommunication system according to claim 2, wherein the another satellite hub is comprised by another gateway.

4. The satellite telecommunication system according to any one of the previous claims, wherein the second traffic controlling module comprises a traffic database for storing a plurality of traffic policies; and wherein the second traffic controlling module is configured for obtaining the second flow based on the plurality of traffic policies.

5. The satellite telecommunication system according to claim 4, wherein the plurality of traffic policies comprises bandwidth limiting policies, traffic priority policies, traffic rerouting policies, and/or outgoing data volume policies.

6. The satellite telecommunication system according to any one of the previous claims, wherein the virtual hub module further includes a management and monitoring module, said management and monitoring module being configured for managing and monitoring the communication between the network and the remote systems.

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7. The satellite telecommunication system according to claim 6, wherein the management and monitoring module is further configured for generating and managing a data volume voucher upon request by a user; wherein the generating of the data volume voucher includes the generation of a unique URL based on a unique identifier associated to the user.

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8. The satellite telecommunication system according to claim 6 or 7, wherein the second traffic module comprises a tracking unit connected to the management and monitoring module and configured for tracking, for each of the remote systems, the outgoing data volume being transmitted.

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9. The satellite telecommunication system according to any one of claims 6-8, wherein the satellite hub further comprises a supervision database for storing supervision data; wherein the satellite hub is further configured for collecting, from the remote systems, the supervision data in parallel with the outgoing data; and wherein the management and monitoring module is further configured for reading the supervision data of the supervision database.

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10. The satellite telecommunication system according to claim 9, wherein the management and monitoring module comprises a logging database, said logging database being configured for logging the user input data.

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11. The satellite telecommunication system according to claim 10, wherein the virtual hub module further includes an activity processing module configured for processing the user input data, logged in the logging database of the management and monitoring module, according to a predetermined template.

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12. The satellite telecommunication system according to claim 4 or 5 and to any one of claims 6-11, wherein the management and monitoring module is further configured for modifying at least one traffic policy of the traffic policies stored in the traffic database or for storing another traffic policy in the traffic database, based on the user input data.

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13. The satellite telecommunication system according to any one of the previous claims, wherein at least one remote system of the remote systems is a polling system; and wherein the virtual hub module further includes a performance metering module configured for metering a connectivity performance of the polling system via the forward satellite link (FWD) and the return satellite link (RTN).

14. The satellite telecommunication system according to claim 13, wherein the performance metering module is further configured for sending a warning message to the user upon metering a level of the connectivity performance below a predetermined level.

15. The satellite communication system according to any one of the previous claims, wherein the satellite hub is configured for transmitting the outgoing data via the Ku-band, the C-band, or the Ka-band.

16. Using the virtual hub module of the satellite communication system according to claim 1 for forwarding, from the network, outgoing data to the satellite hub.

17. Using the virtual hub module according to claim 16, wherein the virtual hub module is further configured for forwarding, from the network, the outgoing data to another satellite hub including another hub traffic controlling module different from the hub traffic controlling module.