



Proximus Reference Offer for Wholesale Multicast Services

Main Body

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1. Glossary

- **Available Dedicated Capacity:** Network bandwidth reserved for the Beneficiary at initial set-up for the injection of dedicated streams.
- **Bitstream:** Any reference to the term Bitstream in the present Wholesale Multicast Offer (Main Body and any of its Annexes) must be interpreted as either Bitstream VDSL2 or Bitstream Fiber GPON, unless it is explicitly stated otherwise.
- **Bitstream Fiber GPON:** The Bitstream FTTH offer (shared VLAN only).
- **Bitstream VDSL2:** The Bitstream VDSL2 offer (shared VLAN only).
- **Broadcaster:** The entity providing the TV signal distributed by Proximus.
- **Customer Equipment:** Any equipment that belongs to the Beneficiary.
- **Encryption Key Interface:** Interface used between the Proximus encryption system and the Beneficiary's encryption system for the exchange of encryption keys.
- **End-User:** The party to whom the Beneficiary is delivering IPTV products.
- **FTTH:** Fiber to the Home. Please refer to the definition provided in the Bitstream Fiber GPON Offer – Main Body.
- **HD Shared Channel:** High Definition Shared TV Channels.
- **IP-DSLAM:** Digital Subscriber Line Access Multiplexer. IP-DSLAMs are located in Proximus Local Exchanges or Proximus Local Distribution Centers and they are owned and managed by Proximus. Remote IP-DSLAM modules are installed in ROPs.
- **IPTV Platform:** Technical platform of Proximus able to receive the broadcaster signals and formatting them before their distribution via the Proximus network.
- **IPTV Product:** Any IPTV solution developed by the Beneficiary and relying on the Wholesale Multicast Services provided by Proximus.
- **LEX:** Proximus Local Exchange.
- **Multicast Dedicated stream:** Multicast stream of which the signal is provided by the Beneficiary.
- **Multicast functionality:** The functionality to be activated at IP-DSLAM/GPON platform level on a specific End-User line for enabling the decoder of the End-User to call any Multicast stream and receive the corresponding TV stream.
- **Multicast Stream:** Stream of data injected into the Proximus network and accessible for End-Users benefitting from the Multicast functionality on their line. A Multicast stream can be either a Shared TV Channel or a Multicast Dedicated stream.
- **NNI:** Network to Network Interface.
- **nPVR:** Network Personal Video Recording.
- **OAL:** OLO (Ethernet) Access Line. An OLO Access Line is an interface between the Customer Equipment and a Proximus Service Router located in one of the two Service PoPs of the Service Area.
- **OLO:** Other Licensed Operator.
- **OLT:** Optical Line Terminal. Is the end point of a passive optical FTTH network, performing conversion between electrical signals used on the Proximus Ethernet backbone and fibre optic signals used by the passive optical network, and coordinating the multiplexing between the ONTs of the PON.
- **Ordered Dedicated Capacity:** Network bandwidth ordered by the Beneficiary and effectively provisioned by Proximus for the delivery by the Beneficiary of Multicast Dedicated streams.
- **p-bit:** priority bit
- **Radio Shared Channel:** The technical features of a Radio Shared TV Channel are described in Annex 2 – Technical Specifications.
- **Right holders:** Content providers and if applicable the assigned collecting companies.
- **SD Shared Channel:** Standard Definition Shared TV Channel.
- **Service PoP:** a Service PoP provides access to the Proximus Ethernet network through NNI connection with a Proximus Service Router.

- **Shared TV Channel Pool:** Updated List of Shared TV Channels offered by Proximus under the Wholesale Multicast Offer.
- **Shared TV Channel:** Multicast TV stream formatted in the Proximus IPTV platform and offered to Beneficiaries under the Wholesale Multicast Offer.
- **STB:** stands for Set-Top Box and is the generic term used for the decoder to be installed that converts the signal provided by the network to a signal that is compatible with the television set.
- **UNI:** User to Network Interface.
- **VCAS:** Video Content Authority System.
- **VDSL2:** Very high speed Digital Subscriber Line 2. Please refer to the VDSL2 definition provided in the Bitstream VDSL2 offer – Main Body.
- **VLAN:** Virtual Local Area Network. Unless specified otherwise, the word “VLAN” refers specifically to a shared VLAN.
- **VoD:** Video on Demand.
- **Wholesale Multicast Services:** The services described in the Wholesale Multicast Offer, also referred to as the Services.

2. Scope of the document

1. This document provides a description of the Wholesale Multicast Services including the method of connection.
2. This document contains the conditions related to the provision by Proximus to the Beneficiary, of the Wholesale Multicast Services, which will enable the Beneficiary to define its own IPTV Product and to market, distribute and sell under its name and on its behalf its own IPTV products towards End-Users, using Proximus installed and existing network infrastructure and Shared TV Channels, pursuant to the technical limitations of these existing infrastructures for offering the service.
3. This document contains the technical conditions related to such services.
4. The provision of the hereunder-described IPTV-product supposes the following prerequisite that will need to be met at all times and in all circumstances:
 - The Beneficiary subscribed to at least the Proximus Bitstream offer (the Bitstream VDSL2 or the Bitstream Fiber GPON offer).
5. For the sake of clarity and unless specified otherwise, "Bitstream" will be used as a generic naming convention covering both the Bitstream VDSL2 service and the Bitstream Fiber GPON (FTTH) service.

3. Description of the Wholesale Multicast Services

3.1 General

6. The Wholesale Multicast Services are a set of services enabling the Beneficiary to benefit from the Multicast functionality with Shared TV Channels and Multicast Dedicated streams via Dedicated Capacity.
7. The Wholesale Multicast Services are available as an extension of the Proximus Bitstream VDSL2 service and the Bitstream Fiber GPON service which are prerequisites to the Multicast Offer.
8. Two Multicast services are defined: the Wholesale Multicast Central Access service and the Wholesale Multicast Local Access service.

3.2 The Wholesale Multicast Central Access service

9. The Wholesale Multicast Central Access service covers:
 - The provision by Proximus on a specific Bitstream line of the Multicast functionality enabling the End-User to call Multicast streams and to receive them accordingly.
 - The provision by Proximus of an Encryption Key Interface enabling the Beneficiary to fetch encryption keys of Shared TV channels the End-User subscribed to.
 - A pool of Shared TV Channels which are made available to the End-Users via the Multicast functionality. Proximus is responsible for the Shared TV Channel signal capture from the broadcasters, the Multicast streams encoding and encryption according to Proximus encryption method.
 - The Shared TV Channel Pool contains SD and HD Video Channels and Radio Shared Channels.
 - The provision of a Dedicated Capacity Injection interface enabling the Beneficiary to inject in the PIM Core Network its own Multicast Dedicated streams.
 - The provision of a Multicast IP address group dedicated to the Beneficiary.
 - The provision of Dedicated Capacity for the transport of the Beneficiary's Multicast Dedicated streams over the Proximus network and injected through the Dedicated Capacity Injection Interface. These Multicast Dedicated streams are available for the End-User through the Multicast functionality.
 - The provision of a Shared TV Channels Interface enabling the Beneficiary to receive through its central OAL(s) connected to its infrastructure all encrypted Shared TV channels it subscribed to. The Shared TV Channels transported so are in the same format (encoding and encryption) as the channels available for its End-Users via the Multicast

functionality. The Beneficiary can use these Shared TV Channels to develop its own services (e.g. TV over internet, fast zapping...).

10. The Prerequisites for using the Multicast functionality on a Bitstream End-User line are:

- The Beneficiary, prior to the activation of the Multicast functionality on a given End-User line, must have activated a shared VLAN with service quality p3 in the LEX by which the End-User is served.
- Subsequently the End-User line must be configured with the VLAN with service quality p3.

11. The prerequisites for using Shared TV Channels are:

- The End-User to whom the Beneficiary wants to offer a Shared TV channel must have a Bitstream line fulfilling the specifications as stated in a previous paragraph.
- The Beneficiary must at least have one central OAL ending in one of the following Service PoPs in order to enable the set-up of the Encryption Key Interface:
 - i. O2STR (VLAN 104)
 - ii. O2MAR (VLAN 104)
 - iii. O3CEN (VLAN 105)
 - iv. O3BKC (VLAN 105)

For redundancy purposes the Encryption Key Interface can be set up over two VLANs: 104 and 105. If the Beneficiary opts for a redundant Encryption Key Interface it must have one central OAL terminated either on O2STR or O2MAR and a second central OAL terminated on either O3CEN or O3BKC.

- The Beneficiary is responsible for dimensioning sufficient bandwidth in these central OAL(s) so that the Encryption Key Interface mechanism works properly.
- The Beneficiary must provide proof that it has been granted the content rights corresponding to the Shared TV channels it wants to use.

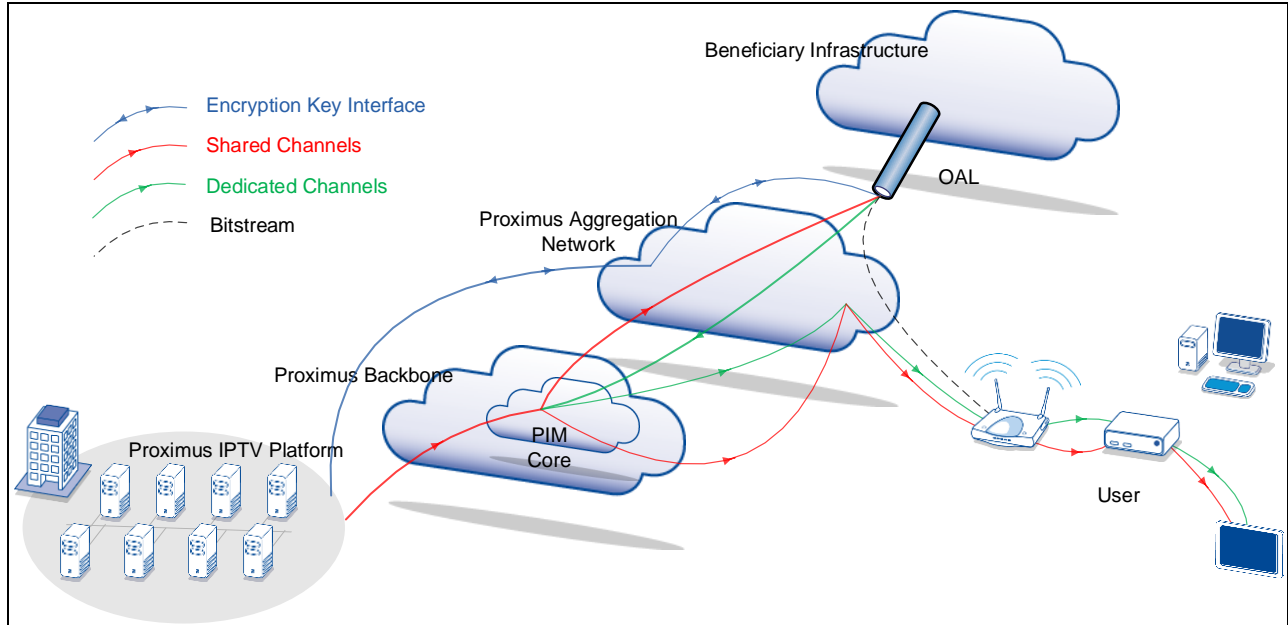
12. The prerequisites for using Dedicated Capacity are:

- The End-User to whom the Beneficiary wants to offer Multicast Dedicated streams must have a Bitstream line fulfilling the specifications as stated in a previous paragraph.
- The Beneficiary must have at least one OAL ending in O2MAR and one OAL ending in O2STR.
- The Beneficiary is responsible for dimensioning sufficient bandwidth in these OALs so that the Dedicated Capacity Interface is properly working.

13. The prerequisites for using the Shared TV Channel Interface are:

- The Beneficiary must have at least one OAL ending up in one of following Service PoPs:
 - i. O2STR

Figure 1: End-to-End Overview



14. The figure 1 gives an end-to-end overview of the Wholesale Multicast Services. The Encryption Key Interface allows the Beneficiary upon request to fetch keys of Shared TV channels it subscribed to. The Shared TV Channels are made available at PIM Core level and merged with the Customer Multicast Dedicated streams that the Beneficiary delivered via its Dedicated Capacity. The Shared TV Channels can be transported up to the Beneficiary infrastructure over the Shared TV Channel Interface via the OAL. If the End-User line has been previously configured with the Multicast functionality, the End-User can call subscribed channels and receive them. The Beneficiary is responsible for providing its End-User with Shared TV channel encryption keys (fetched via the Encryption Key Interface) through its Bitstream access.

15. Any TV service not described in the Wholesale Multicast Offer is developed and delivered under the Beneficiary's responsibility.

16. Specifically e.g. the services and products below are out of the scope of the present offer:

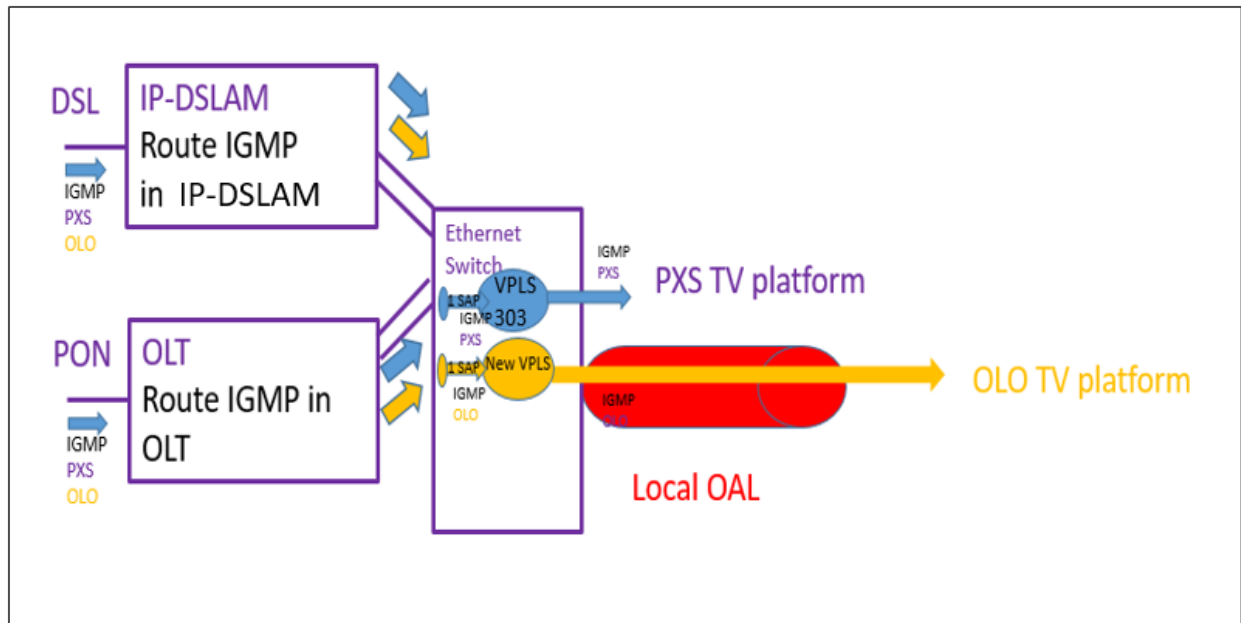
- Content Rights of Shared TV Channels
- Set-Top Boxes
- Any unicast TV Services (nPVR, VoD, graphical user interface...)

3.3 The Wholesale Multicast Local Access service

17. The Wholesale Multicast Local Access is offered via the Ethernet switch in the LEX by means of a local OAL as described in the Bitstream reference offer. This local OAL can also transport Shared

VLAN and Dedicated VLAN services, under the conditions mentioned in the Bitstream reference offer.

Figure 2: Wholesale Multicast Local Access



18. Proximus will assign a dedicated Multicast address range to each Beneficiary who subscribes to the Wholesale Multicast Local Access service. Its End-Users join selected Multicast Channels via IGMP.

3.4 Multicast functionality & Cross-Connect

19. The Multicast functionality is an IP-DSLAM and GPON Platform feature enabling the End-User's STB to call a given Multicast stream and to receive it accordingly in order to display it on the screen.
20. The Multicast functionality alone does not enable the End-User's STB to decrypt the received TV signal. The Beneficiary is responsible for providing the End-User's STB with the encryption keys of its Multicast Dedicated streams (assuming they are encrypted) and encryption keys of Shared TV Channels it subscribed to.
21. The Multicast functionality enables the End-User's STB to call at any moment another Multicast stream by leaving the previous one and calling the new one (Multicast stream zapping).
22. The Beneficiary can activate the Multicast functionality on the Bitstream line of a given End-User through the Multicast functionality activation on a Bitstream line ordering process that will be detailed in the future Annex 3 - Planning and Operations.
23. Proximus will enable IGMP for Multicast on VLAN 40 on the End-User's Bitstream line ordered by the Beneficiary as per the Bitstream offer. The TV unicast VLAN is the Bitstream shared VLAN of service quality P3 (not P3bis) intended to transport TV unicast services under the Beneficiary's responsibility.

24. The Beneficiary is responsible for dimensioning its Bitstream shared VLAN(s) in order to take into account new traffic generated by its TV unicast services.
25. The Beneficiary shall at least order and maintain fifteen Shared TV Channels before Proximus will accept a Multicast functionality activation on Bitstream End-User lines. This requirement is here after referred as “the Start-up Pack”.
26. The Start-up Pack must be made up of SD and HD Shared TV Channels only. Radio Shared Channels are not considered as qualified for being part of the fifteen channels of the Start-up Pack.

3.5 Shared TV Channels

27. Shared TV Channels are Multicast TV streams offered by Proximus to the Beneficiaries for the Wholesale Multicast Central Access service. Proximus ensures the complete processing chain of Shared TV Channels from the TV signal capture from the Broadcaster up to the injection of the Multicast stream into the Proximus Network so that the Multicast stream is available to End-Users. This TV processing chain includes the Broadcaster TV signal capture, the TV signal decoding and decryption (decoding and decryption of the signal provided by the broadcaster), the TV Multicast stream encoding, the TV Multicast stream encryption with Proximus encryption key and encryption algorithm deployed at Proximus and the TV Multicast stream injection into the Proximus network.
28. A Shared TV Channel is by definition a channel which is offered by Proximus to Beneficiaries having subscribed to the channel.
29. The pool of Shared TV Channels offered by Proximus will not include any channel for which Proximus owns content rights exclusivity.
30. The Shared TV Channel ordering process will be detailed in the future Annex 3 - Planning and Operations.
31. The acquisition of content rights for the selected Shared TV Channels is the Beneficiary's responsibility. Proximus will approve the ordering of a given Shared TV Channel only after a proof has been provided to Proximus that the Beneficiary has acquired the appropriate content rights.
32. Proximus offers in its Shared TV Channels pool three types of Shared TV Channels:
 - Radio Channels: Audio Content
 - SD Channels: Standard Definition Channel
 - HD Channels: High Definition Channel
33. The technical features are available in Annex 2 – Technical Specifications.
34. The Beneficiary shall notify Proximus upfront when an End-User intends to resell to or otherwise put the Wholesale Multicast Services at the disposal of a third party.

3.5.1 Encryption

35. A Shared TV Channel is by default available via the Multicast functionality to any End-User having a Proximus Bitstream line and having the Multicast functionality activated on it. But the Shared TV Channel is encrypted by Proximus and is only available in clear if the End-User's STB receives the required encryption keys.
36. All Shared Channels provided by Proximus in the shared channel pool are without exception encrypted.
37. Once the ordering process of a Shared TV Channel is completed Proximus shall ensure that the encryption key of the Shared TV channel can be fetched by the Beneficiary. The Beneficiary is then responsible for sending the encryption key to the STB of its End-Users.
38. The Proximus encryption keys are managed by the Proximus Video Content Authority System (VCAS). In order to make use of the encryption keys made available by Proximus the Beneficiary's VCAS shall be compatible with the Proximus VCAS.
39. The Beneficiary is responsible for deploying any equipment compatible with the Proximus VCAS required for making usage of the encryption keys provided by Proximus.
40. A prerequisite for the ordering of Shared TV Channels and the subsequent exchange of encryption keys is the set-up of the Encryption Key Interface. The Beneficiary shall ensure that this prerequisite is fulfilled before any Shared TV Channel is ordered.
41. Encryption keys for a given Shared TV Channel are renewed on a regular basis. The Beneficiary shall fetch the encryption keys at a frequency imposed by Proximus in order to ensure that the Beneficiary has always a valid encryption key. Proximus shall not be held responsible for any service degradation in case of non-compliance with that requirement.
42. By fetching encryption keys the Beneficiary fetches all the encryption keys it is entitled to and corresponding to Shared TV Channels the Beneficiary subscribed to.
43. The encryption key renewal date might be different for each Shared TV Channel.
44. Two encryption keys are always provided for a given channel while the Beneficiary fetches the encryption key for a given Shared TV Channel: the currently valid encryption key and the next valid Key.

3.5.2 Encryption Key Interface

45. The Encryption Key Interface is a prerequisite to the provisioning of a Shared TV Channel.
46. The Encryption Key Interface is intended to interconnect the Proximus VCAS and the Beneficiary's VCAS.
47. The Encryption Key Interface is made up of following network pieces:
 - A specific VLAN configured on an OAL. The OAL on which the VLAN is configured is chosen by the Beneficiary but must end on one of the following Service PoPs: O2MAR, O2STR, O3CEN or O3BKC. Further information regarding those Service PoPs is available in the Bitstream offer – Main Body.

- Network configuration required for connecting the VLAN to the Proximus VCAS.

3.5.3 Shared TV Channel Management

48. Regarding Shared TV Channels the Beneficiary has subscribed to, Proximus has the right to remove any Shared TV Channel from the Shared TV Channels pool, provided the Beneficiary has been notified two (2) months before its removal. The considered Shared TV Channel stream will accordingly no longer be provided by Proximus to the Beneficiary.
49. Regarding Shared TV Channels the Beneficiary has not subscribed to, Proximus has the right in any case to remove the Shared TV Channels from the Shared TV Channel pool without any obligation to notify the Beneficiary. The considered Shared TV Channel stream will accordingly no longer be provided by Proximus.
50. A Shared TV Channel to be removed from the Shared TV Channels pool will be removed from the list of Shared TV Channels available on the Proximus secured website two (2) months before its actual stop.
51. Proximus has the right to reject the ordering of a given Shared TV Channel if it is known that it will be removed within two (2) months following the ordering notification by the Beneficiary.
52. Proximus has the right to add a Shared TV Channel to the Shared TV Channel pool. This Shared TV Channel will be available for ordering by the Beneficiary.

3.6 Shared TV Channel Interface

53. The Shared TV Channel Interface provides the Beneficiary with an interface enabling the transport of all Shared TV Channels the Beneficiary subscribed to through an OAL up to the Beneficiary's infrastructure.
54. The Shared TV Channel interface consists in a specific VLAN configured on a chosen OAL as specified by the Beneficiary.
55. It is up to the Beneficiary to decide if the Shared TV Channel Interface must be redundant.
56. The Beneficiary is responsible for the dimensioning of the VLAN(s) the Shared TV Channels streams will flow over. Proximus shall not be held responsible for stream quality issues (e.g. packet drops) due to a bandwidth shortage on the concerned OAL(s) or VLAN(s).
57. All Shared TV Channels transported over the Shared TV Channel Interface are encrypted and in the same format as the Shared TV Channels as made available to the End-Users.

3.7 Dedicated Capacity

58. The Dedicated Capacity is an optional feature for the Wholesale Multicast Central Access service which provides the Beneficiary with the capability to inject its own Multicast Dedicated streams into the Proximus Network.

59. The Dedicated Capacity is made up of:

- Bandwidth in the Proximus network. The bandwidth ordering can be done either at the initial set-up of the Multicast Service or later depending on the Beneficiary's needs and the available bandwidth.
 - i. Initial set-up: The Beneficiary can order up to 50 Mbps and up to 32 channels (Available Dedicated Capacity at initial launch) or less. If the Beneficiary orders less than 50 Mbps or less than 32 channels, Proximus will free up remaining capacity so that it can be ordered by anyone else according to a fair split between requestors.
 - ii. Later: There is no guarantee about the feasibility of a dedicated capacity request of over 50 Mbps or over 32 channels. Proximus will assess the request depending on the capacity still available in the network and independently of the Available Dedicated Capacity.
- A Dedicated Capacity Injection Interface aimed at interfacing the Beneficiary's infrastructure and the Proximus network.

3.7.1 Dedicated Capacity Injection Interface

60. The Dedicated Capacity Injection Interface must be redundant.

61. Before Proximus can provision the Dedicated Capacity Injection Interface the Beneficiary must ensure that it has two OALs, one connected to Service PoP O2MAR and one to Service PoP O2STR. This is a prerequisite for the setup of the Dedicated Capacity Injection Interface.

62. Proximus shall configure on both OALs a specific VLAN dedicated to the transport of Multicast Dedicated streams of the Beneficiary.

63. The VLAN bandwidth for the Multicast Dedicated streams is capped at the Ordered Dedicated Capacity. Proximus shall not be held responsible for stream quality issues (e.g. packet drops) due to injecting Multicast Dedicated streams beyond the Ordered Dedicated Capacity.

64. The Beneficiary is responsible for ensuring the total bandwidth used for the Multicast Dedicated streams flowing over the Dedicated Capacity Injection Interface does not exceed the Ordered Dedicated Capacity.

65. The Beneficiary is responsible for ensuring appropriate bandwidth in the used OALs so that the Customer's Multicast streams can flow over the OALs without any risk of packet drop impacting the Multicast stream quality.

66. Proximus shall not be held responsible for any Multicast stream quality issue due to capacity saturation on the OALs of the Beneficiary.

3.7.2 Dedicated Capacity Bandwidth

67. Included in the Dedicated Capacity is a reserved bandwidth as ordered by the Beneficiary in the Proximus network from the Proximus backbone/PIM core, where all Multicast streams including the Shared TV channels and the Customer's streams are present, up to the IP-DSLAM and the GPON Platform.

68. This bandwidth is capped downstream at Dedicated Capacity Injection Interface level as further explained in a paragraph above.

3.7.3 Multicast IP Addresses

69. Proximus will provide the Beneficiary with a set of 32 Multicast IP addresses corresponding to 32 Multicast streams.

70. The Beneficiary shall specify the bandwidth allocated to each of the 32 Multicast streams.

71. The Sum of bandwidths allocated to each Multicast IP address can be greater than the Ordered Dedicated Capacity without changing that limitation. The Beneficiary is responsible for injecting streams so that the total bandwidth injected into the Proximus network does not exceed the Ordered Dedicated Capacity as specified in a paragraph above.

72. The Beneficiary's allocated Multicast IP addresses and corresponding bandwidths are configured in all IP-DSLAMs and GPON Platforms in the Proximus network.

73. Proximus offers the Beneficiary the possibility to perform two changes a year at fixed dates. Such a change includes a modification of the bandwidth allocated to each Multicast IP address.

3.7.4 Dedicated Capacity Management

74. The overall Multicast capacity will be reviewed one year after the operational launch of the Wholesale Multicast Services described in this offer.

75. Based upon Proximus forecasts and the IPTV market status, an extension of the Beneficiary's Dedicated Capacity bandwidth will be assessed and capacity reserved but not allocated yet could be redistributed amongst Proximus and Beneficiaries having subscribed to the Wholesale Multicast Offer.

4. Operational Processes

76. The provisioning and repair processes for the Wholesale Multicast Services will be detailed in the future Annex 3 - Planning and Operations.

5. Pricing and Billing

- 77. Principle: all Standard Fees will be described in the future Annex 5, Pricing and Billing, and will be invoiced to the Beneficiary whenever relevant.
- 78. The Beneficiary will receive a monthly invoice containing the fees (recurring and non-recurring) for that period. Invoices related to any relevant fees are to be paid within the foreseen deadlines as they will be set out in the Annex 5, Pricing & Billing document.

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